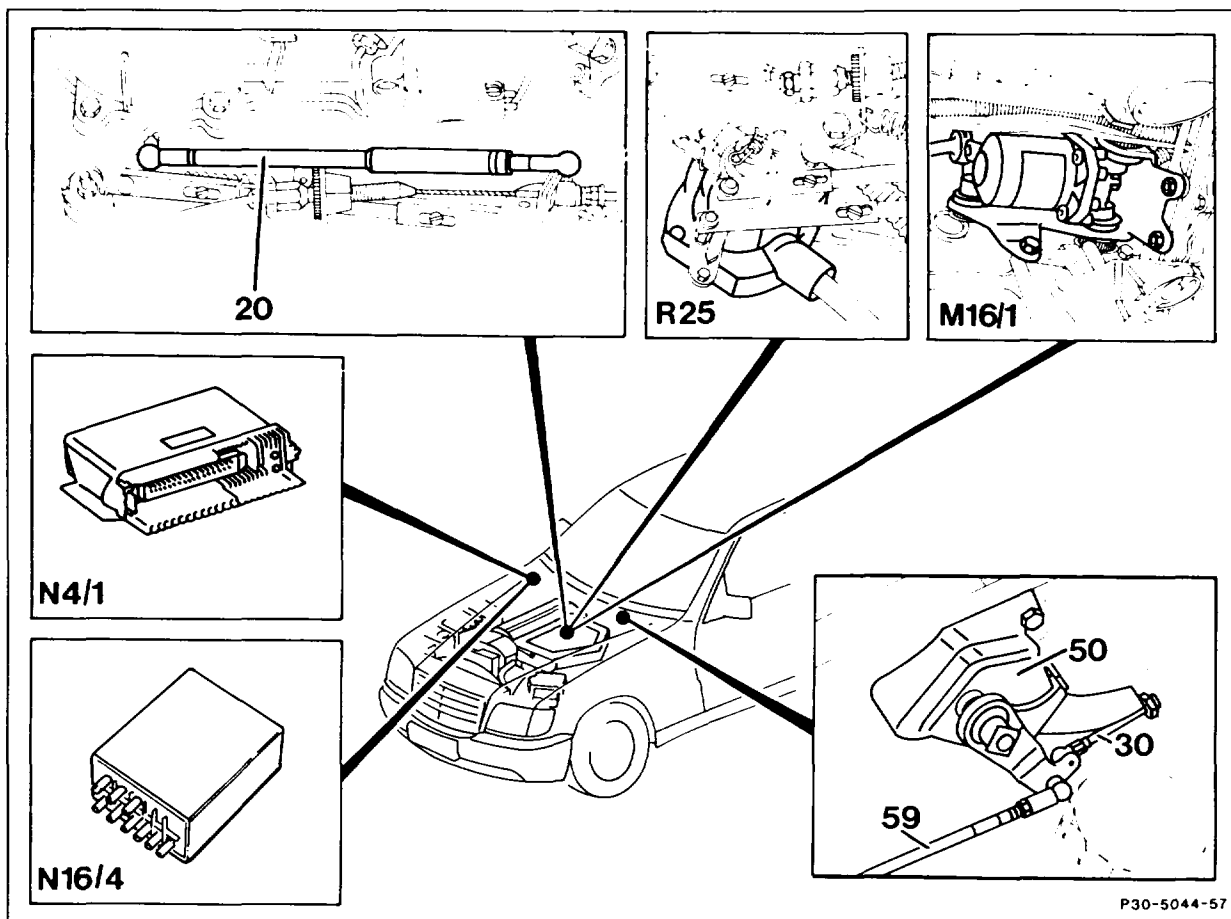


30-1050 Testing electronic engine control

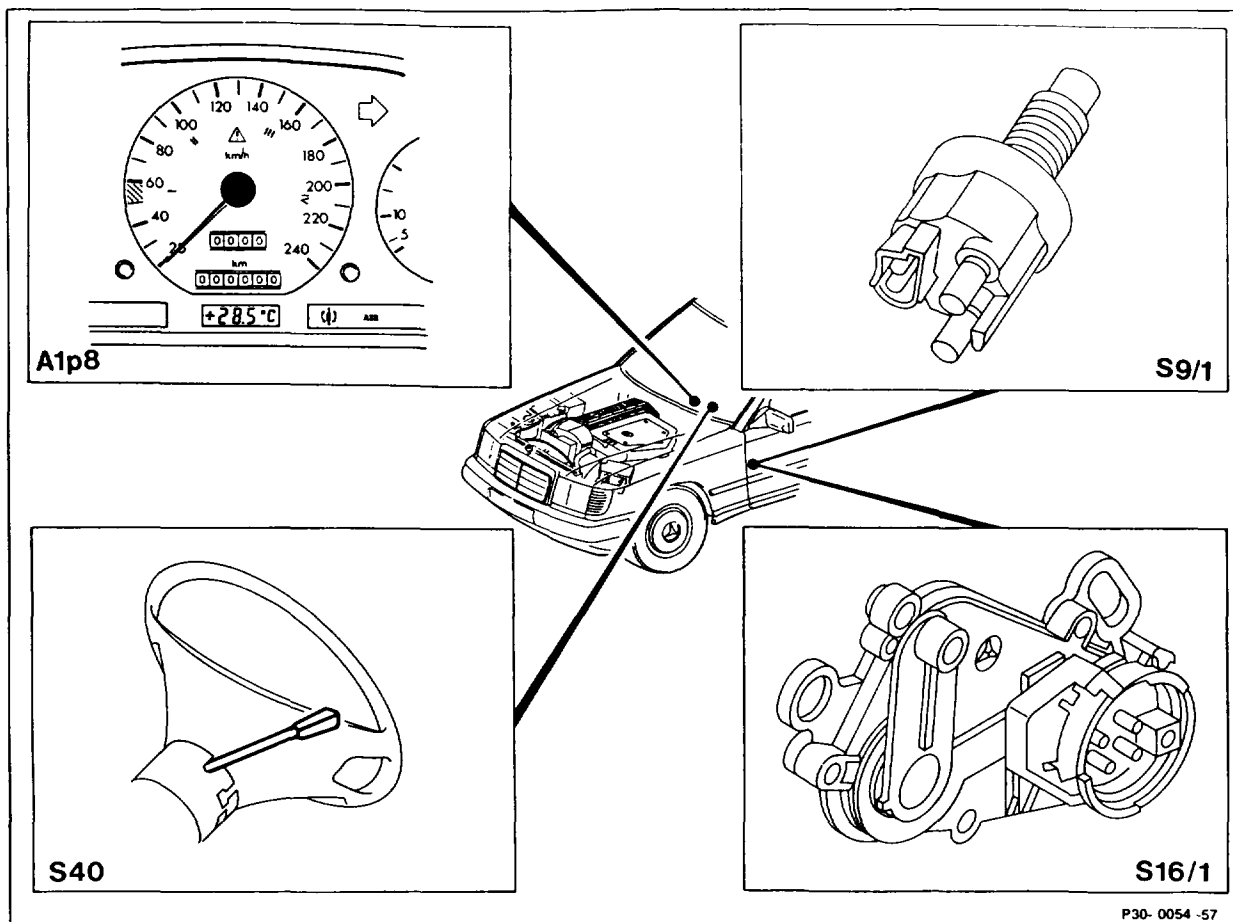
Preceding work:
ABS/ASR and electronic accelerator pedal initial test
(30-0360).

Operation no. of operation texts and work units or standard texts
and flat rates:



Model 124

M16/1	Electronic accelerator pedal (EFP) actuator	20	Idle travel rod (redundancy rod)
N4/1	Electronic accelerator pedal (EFP) control unit	30	Bowden cable (RHD, only models 126.024/025)
N16/4	Fuel pump relay kickdown shutoff	50	Fire wall bearing (RHD, only models 126.024/025)
R25	Electronic accelerator pedal (EFP) position sensor	59	Connecting rod (RHD, only models 126.024/025)

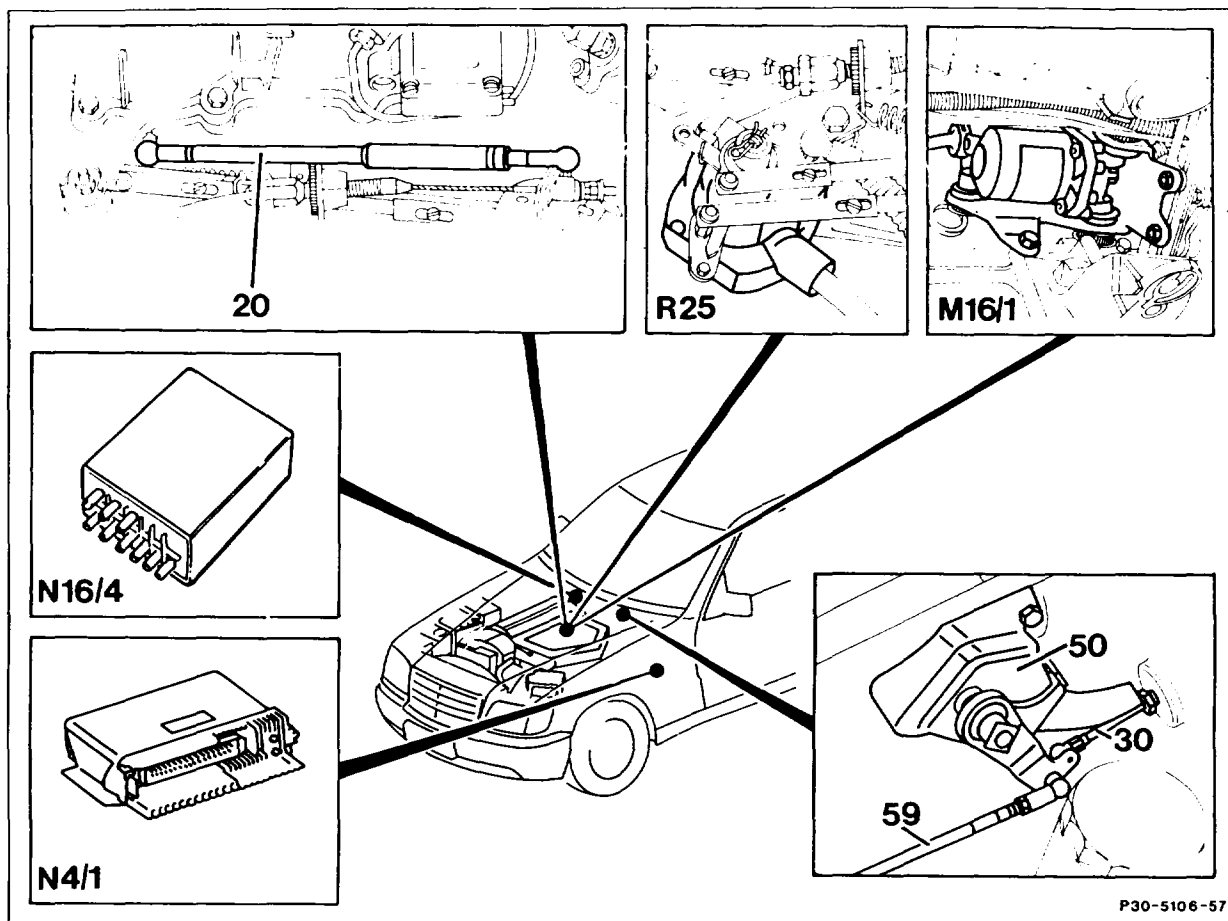


P30-0054-57

Model 124

- A1p8 Electronic speedometer
- S9/1 4MATIC/ASD stop light switch
- S16/1 Starter lockout and reversing light switch

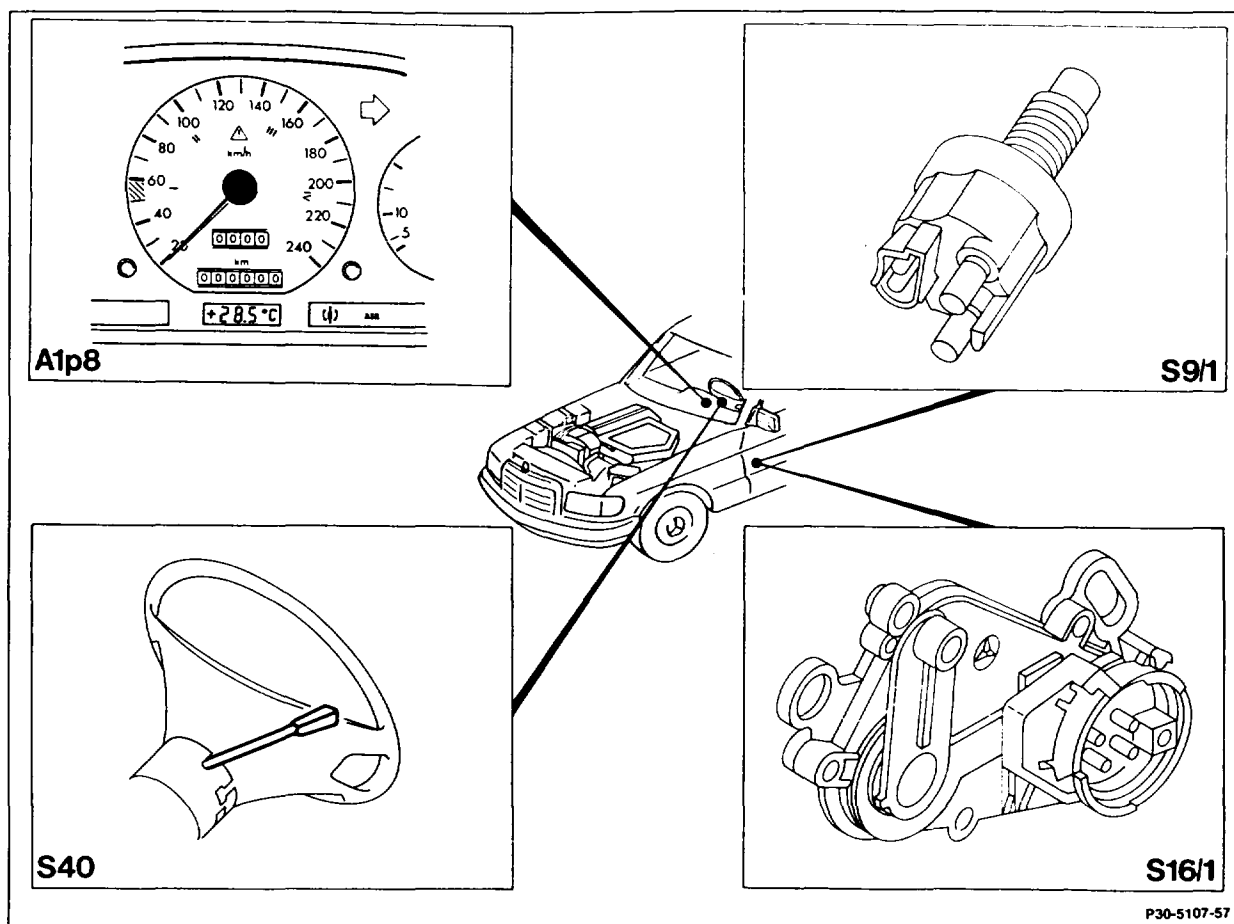
- S40 Tempomat cruise control switch
 - V Decelerate/set
 - B Accelerate/set
 - SP Memory
 - A Off



P30-5106-57

Model 126

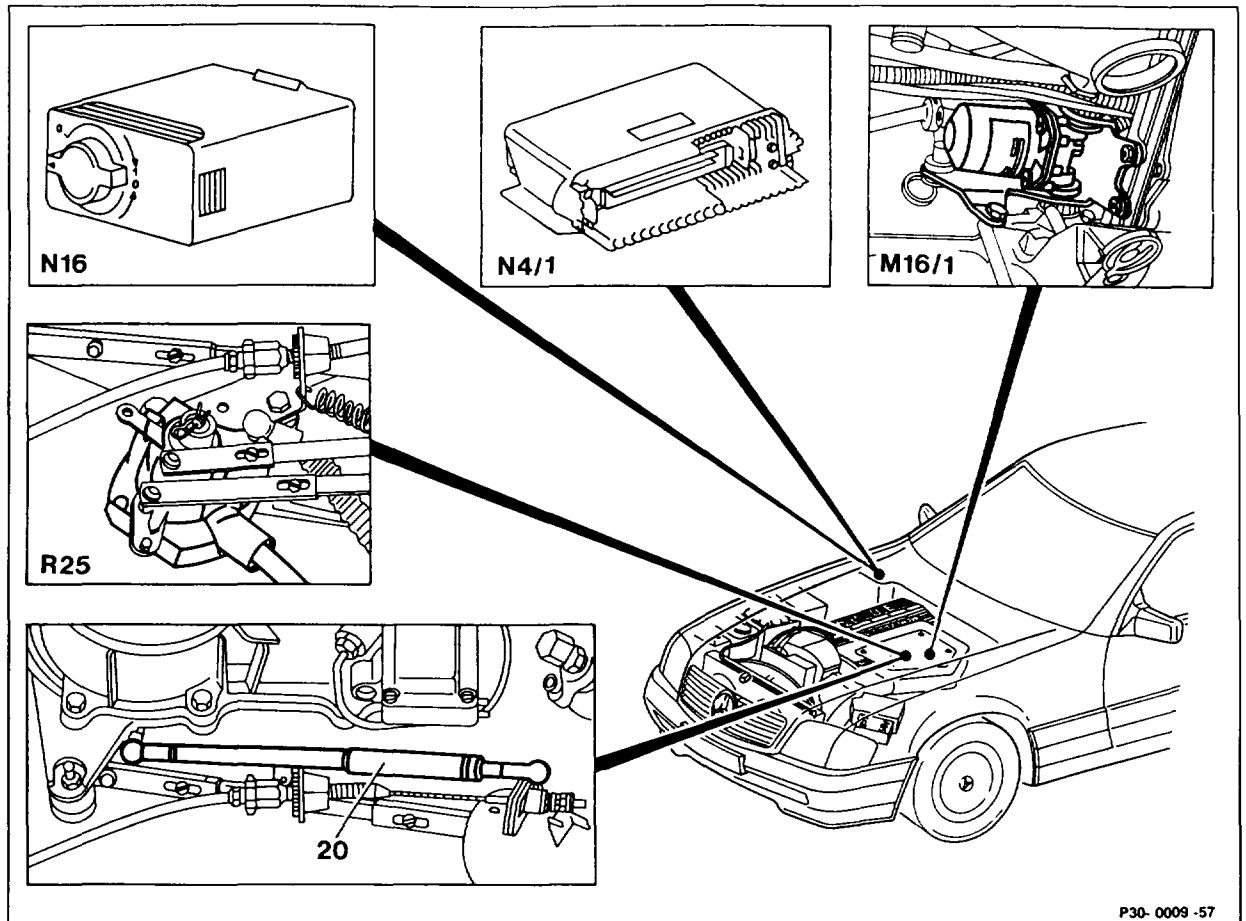
M16/1	Electronic accelerator pedal (EFP) actuator	20	Idle travel rod (redundancy rod)
N4/1	Electronic accelerator pedal (EFP) in left footwell	30	Bowden cable (RHD, only models 126.024/025)
N16/4	Fuel pump relay kickdown shutoff	50	Fire wall bearing (RHD, only models 126.024/025)
R25	Electronic accelerator pedal (EFP) position sensor	59	Connecting rod (RHD, only models 126.024/025)



Model 126

A1p8 Electronic speedometer
 S9/1 4MATIC/ASD stop light switch
 S16/1 Starter lockout and reversing light switch

S40 Tempomat cruise control switch
 V Decelerate/set
 B Accelerate/set
 SP Memory
 A Off

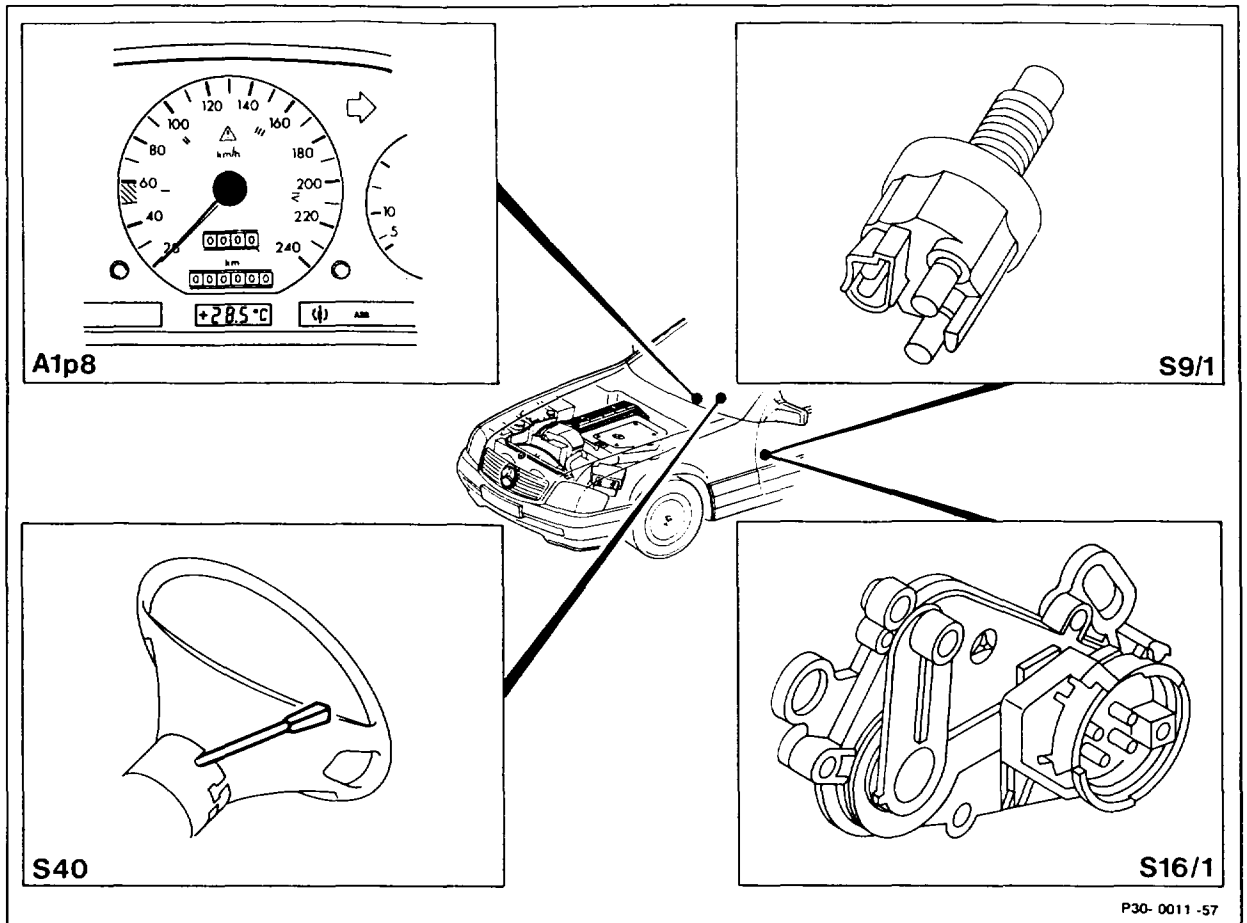


P30-0009-57

Model 129

- M16/1 Electronic accelerator pedal (EFP) actuator
- N4/1 Electronic accelerator pedal (EFP) control unit
- N16 Engine systems control unit MAS

- R25 Electronic accelerator pedal (EFP) position sensor
- 20 Idle travel rod (redundancy rod)



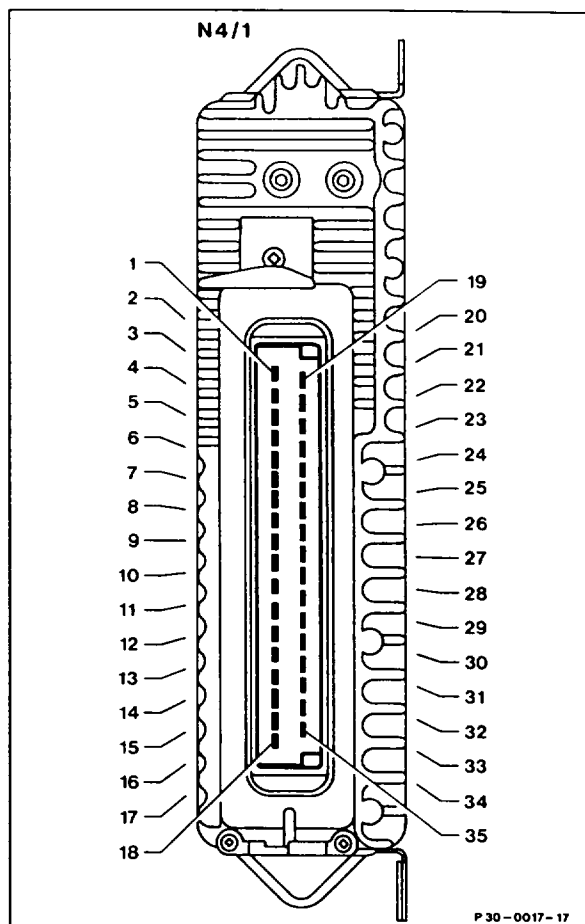
Model 129

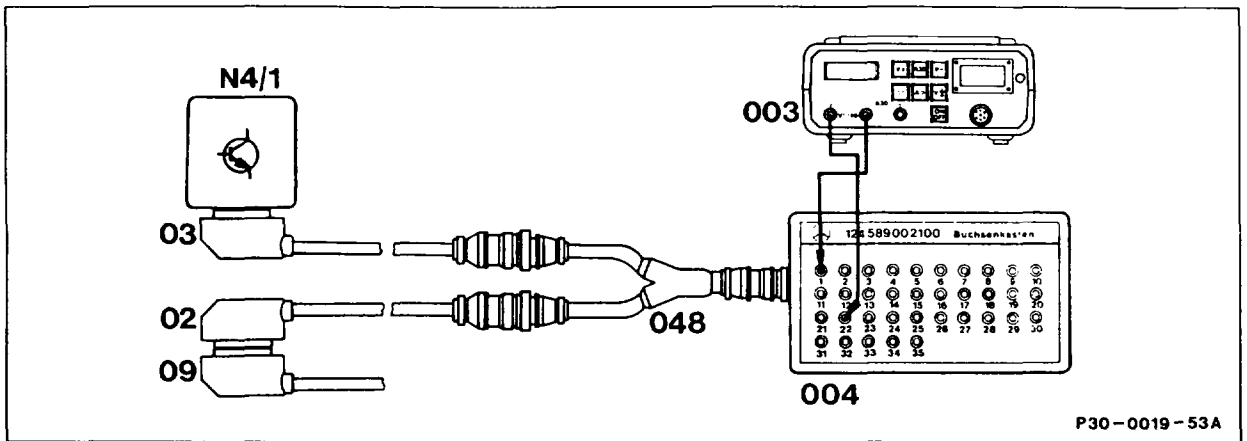
A1p8 Electronic speedometer
 S9/1 ASD/ASR stop light switch
 S16/1 Starter lockout and reversing light switch

S40 Tempomat cruise control switch
 V Decelerate/set
 B Accelerate/set
 SP Memory
 A Off

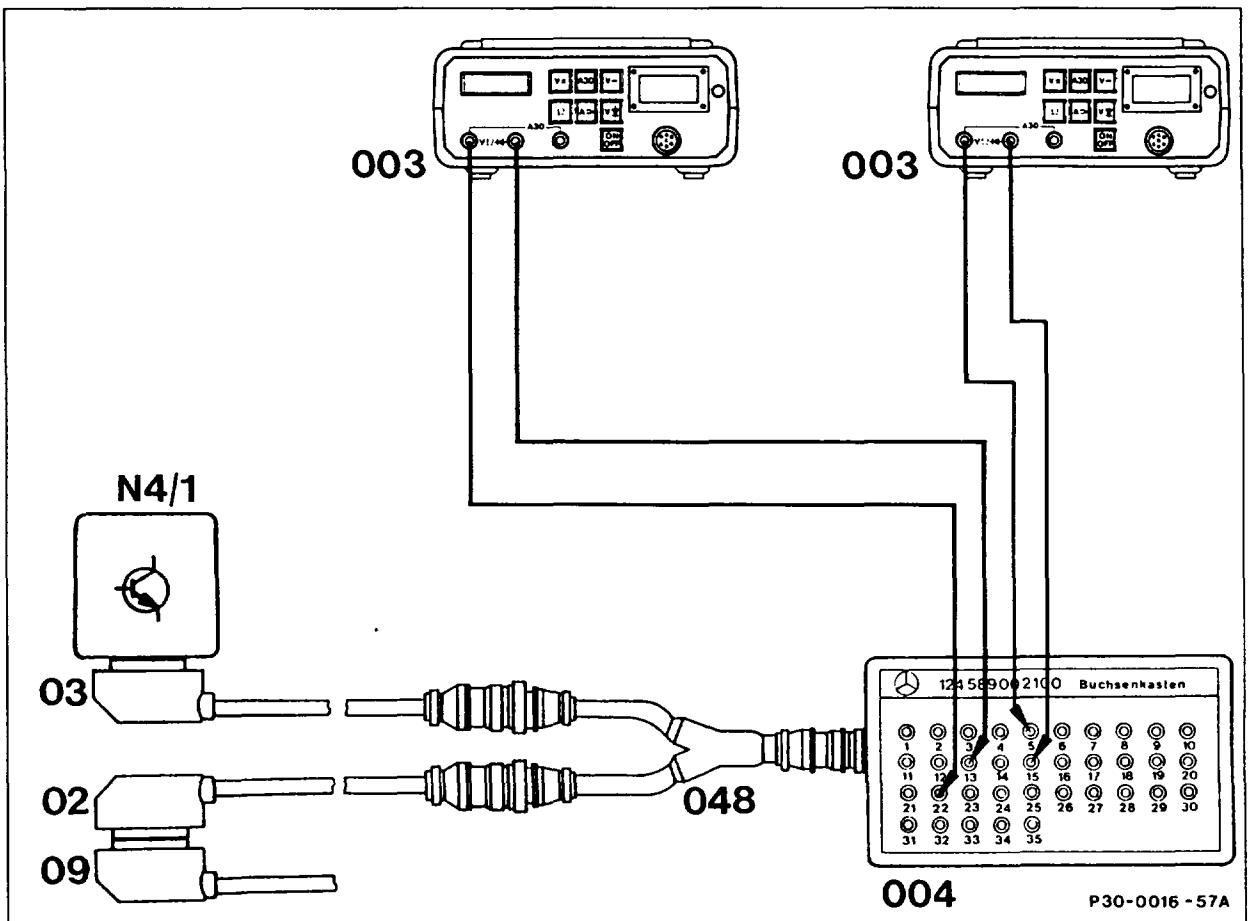
Contact assignment at electronic accelerator pedal control unit

- 1 Voltage supply terminal 15 unfused
- 2 Voltage supply terminal 15 unfused
- 3 Electronic accelerator pedal actuator (engine)
- 4 Electronic accelerator pedal actuator (engine)
- 5 Position sensor potentiometer (ground)
- 6 Actuator, electronic accelerator pedal potentiometer (ground)
- 7 Do not create contact!
- 8 Idle switching signal to KE control unit (N3)
- 9 Position sensor potentiometer voltage supply (+)
- 10 Not assigned
- 11 Battery ground (W10)
- 12 Electronic speedometer, road speed signal
- 13 Safety switch position sensor
- 14 Stop light switch
- 15 Position sensor potentiometer (wiper signal)
- 16 Tempomat cruise control switch (decelerate/set)
- 17 Not assigned
- 18 Tempomat cruise control switch (memory)
- 19 Do not create contact!
- 20 Electronic accelerator pedal actuator (engine)
- 21 Electronic accelerator pedal actuator (engine)
- 22 Battery ground (W10)
- 23 Battery ground (W10)
- 24 Not assigned
- 25 Not assigned
- 26 Actuator, electronic accelerator pedal potentiometer (voltage supply)
- 27 Not assigned
- 28 Actuator, electronic accelerator pedal potentiometer (wiper signal)
- 29 Electronic accelerator pedal actuator (safety switch)
- 30 Fuel pump relay terminal 15, contact 9 or engine systems control unit terminal 15u, contact 10
- 31 To ABS/ASR control unit (throttle valve actual value)
- 32 Tempomat cruise control switch (accelerate/set)
- 33 Starter lockout and reversing light switch, Drive mode "R"
- 34 From ABS/ASR control unit (throttle valve set value)
- 35 Tempomat cruise control switch (OFF)





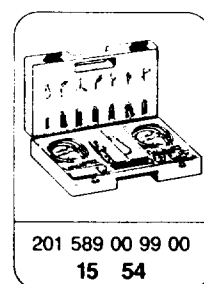
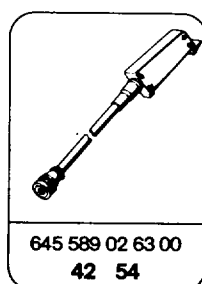
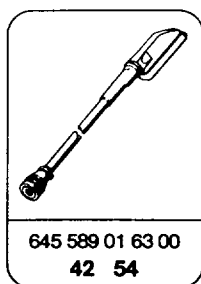
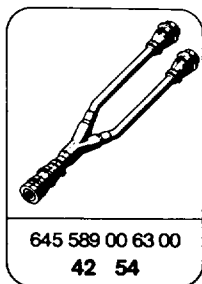
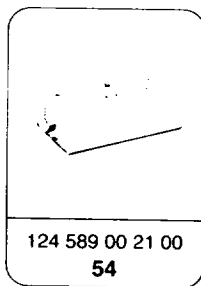
Connection diagram with multimeter for electronic accelerator pedal test program



Connection diagram with 2 multimeters for electronic accelerator pedal test program

02	Test cable	645 589 02 63 00	003	Multimeter	
03	Test cable	645 589 01 63 00	004	Contact box	35-pin
09	Vehicle cable harness (electronic accelerator pedal control unit)		048	Test cable	645 589 00 63 00
			N4/1	Electronic accelerator pedal (EFP) control unit	

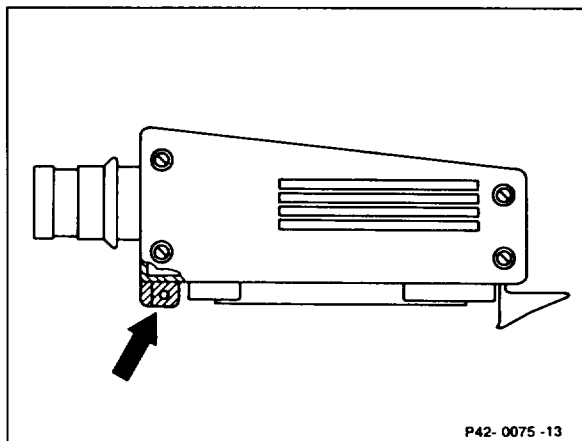
Special tools



Commercially available tools and testers (see Workshop Equipment Manual)

Designation	e.g. Make, order no.
Multimeter	Sun, DMM-5
Frequency generator	Sun, DTR 8416

The stud (arrow) on the test cable
645 589 02 63 00 must be sawn off.



Symbols for testers



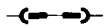
35-pin contact box



Connector



Contact

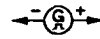


Bridge

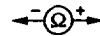
Preconditions for test

- Accelerator control linkage correctly set and check for ease of movement (30–1010).
- Battery voltage 11–14 V.

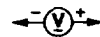
Symbols for test mode with multimeter



Function generator, square-wave signal shape



Multimeter resistance mode



Multimeter DC voltage mode

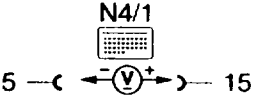


Note

If the specification of a main test step, e.g. test step 3.0, is in order, continue with the next main test step, e.g. test step 4.0.

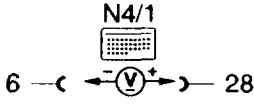
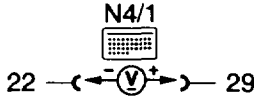

If the specification in the main test step, e.g. test step 3.0, is not achieved, continue test with sub-test step, e.g. test step 3.1.

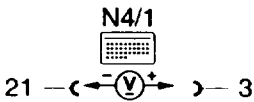
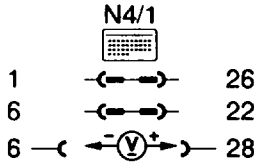
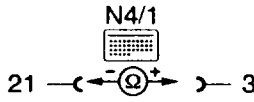
See appropriate wiring diagram volume for wiring diagrams.

Test step	Test scope	Test connection	Operation/ Requirement	Specifi- cation	Possible cause/Remedy
1.0	Ground point at electronic accelerator pedal control unit (N4/1)		Ignition: OFF	11-14 V 11-14 V	Battery ground connection (G1) loose, Open circuit in wiring Battery ground connection (G1) loose, Open circuit in wiring
2.0	Voltage supply, electronic accelerator pedal control unit (N4/1)		Ignition: ON	11-14 V 11-14 V	Cable connection (N4/1) → (F1) fuse 6 Cable connection (N4/1) → (F1) fuse 6
3.0	Electronic accelerator pedal position sensor (R25) voltage supply potentiometer		Ignition: ON Note voltage level	6,8-7,6 V Starting value "A" for table "Voltage values position sensor (R25)"	Open circuit in wiring ⇒ 7,0, Electronic accelerator pedal position sensor (R25), Electronic accelerator pedal control unit (N4/1)





Test step	Test scope	Test connection	Operation/ Requirement	Specifi- cation	Possible cause/Remedy
3.1	Electronic accelerator pedal position sensor (R25) potentiometer signal		Ignition: ON Idle position "a," depress accelerator, full throttle position "b," kickdown "c."	6.8–7.6 V Starting value "A" for table "voltage values position sensor (R25)"	Open circuit in wiring, see test step 7.0
3.2	Electronic accelerator pedal position sensor (R25) switching point safety switch	  Second multimeter to contact box	Ignition: ON Idle position. Slowly deflect accelerator pedal until switching point occurs. Note voltage level at switching point.	< 1 V 11–14 V Voltage values see table "voltage values position sensor (R25)" column "d"	Open circuit in wiring, 7.0 Electronic accelerator pedal position sensor (R25)

Test step	Test scope	Test connection	Operation/ Requirement	Specifi- cation	Possible cause/Remedy
3.3	Position sensor (R25)	<p>N4/1</p> <p>1 ————— 9 5 ————— 22 5 —(V)— 15</p>	<p>Ignition: OFF Disconnect coupling of electronic accelerator pedal control unit.</p> <p>Ignition: ON Deflect lever on actuator to full throttle stop.</p>	Voltage must rise to > 9 V.	Electronic accelerator pedal position sensor
3.4	Idle speed signal	<p>N4/1</p> <p>8 —(V)— 22</p>	<p>Ignition: ON Idle position</p> <p>Depress accelerator.</p>	<p>< 1 V</p> <p>11–14 V</p>	Open circuit in wiring, Electronic accelerator pedal position sensor, Electronic accelerator pedal control unit (N4/1)
4.0	Electronic accelerator pedal actuator (M16/1) voltage supply potentiometer	<p>N4/1</p> <p>6 —(V)— 26</p>	<p>Ignition: ON Note voltage value</p>	6.8–7.6 V	Open circuit in wiring, see test step 8.0, Electronic accelerator pedal control unit (N4/1)

Test step	Test scope	Test connection	Operation/ Requirement	Specifi- cation	Possible cause/Remedy
4.1	Actuator (M16/1) electronic accelerator pedal potentiometer		Ignition: ON Idle position "e," Depress accelerator Full throttle position "f"	Voltage values, see table "Voltage values actuator (M16/1)" columns "e, f"	Open circuit in wiring, see test step 8.0
4.2	Actuator, electronic accelerator pedal (M16/1) switching point of safety switch	  <p>Second multimeter to contact box</p>	Ignition: ON Idle position. Slowly deflect accelerator pedal until switching point occurs. Note voltage value at switching point.	11–14 V < 1 V Voltage values, see table "voltage values elec- tronic accel- erator pedal actuator (M16/1)" column "g"	Open circuit in wiring, see test step 8.0 Electronic accelerator pedal actuator (M16/1)

Test step	Test scope	Test connection	Operation/ Requirement	Specifi- cation	Possible cause/Remedy
4.3	Actuator (M16/1) electronic accelerator pedal DC		<p>Ignition: ON Accelerator control linkage, move connect- ing rod (21) toward idle position.</p> <p>Accelerator control linkage, move connect- ing rod (21) toward idle position.</p>	<p>Voltage must rise (+ value).</p> <p>Sign must change (- value).</p>	<p>Open circuit in wiring</p> <p>Open circuit in wiring</p>
4.4	Actuator, (M16/1) electronic accelerator pedal		<p>Ignition: OFF Disconnect coupling of electronic accelerator pedal control unit.</p> <p>Ignition: ON Deflect lever on actuator to full throttle stop.</p>	<p>Voltage must drop to < 7 V.</p>	<p>Electronic accelerator pedal actuator (M16/1)</p>
4.5	Actuator, (M16/1) electronic accelerator pedal		<p>Ignition: OFF Disconnect coupling of electronic accelerator pedal control unit.</p>	<p>< 10 Ω</p>	<p>Electronic accelerator pedal actuator (M16/1)</p>



Test step	Test scope	Test connection	Operation/ Requirement	Specifi- cation	Possible cause/Remedy
5.0	Starter lockout and reversing light switch	 <p>N4/1 22 —(←V→)— 33</p>	<p>Ignition: ON Selector lever position "P."</p> <p>Selector lever position "R."</p> <p>Part throttle and shift selector lever from "P" to "R" and "R" to "P."</p>	<p>< 1 V</p> <p>11–14 V</p> <p>Position of lever at elec- tronic accelera- tor pedal actuator must change.</p>	<p>Electronic accelerator pedal actuator (M16/1)</p> <p>Open circuit in wiring</p> <p>Electronic accelerator pedal control unit (N4/1)</p>
6.0	Fuel pump relay (N16/4) or engine systems control unit (N16) in model 129 and  as of 1990	 <p>N4/1 22 —(←V→)— 30</p>	<p>Engine: start Idling</p> <p>Separate test cable 645 589 02 63 00 before Y piece.</p> <p>Ignition: OFF Connect test cable 645 589 02 63 00 before Y piece.</p>	<p>11–14 V</p> <p>Engine must cut out</p>	<p>Open circuit in wiring</p> <p> Contact 30 is not short circuit proof to ground, Electronic accelerator pedal control unit (N4/1), Check whether wiring is correctly connected</p>



Test step	Test scope	Test connection	Operation/ Requirement	Specifi- cation	Possible cause/Remedy
7.0	Test insulation resistance of cables between plug connection of electronic accelerator pedal position sensor (R25x1) and coupling of electronic accelerator pedal control unit (N4/1)	<p style="text-align: center;">R25x1</p> <p>1 —(— Ω +) — 2 1 —(— Ω +) — 3 1 —(— Ω +) — 6 1 —(— Ω +) — 7 2 —(— Ω +) — 3 2 —(— Ω +) — 6 2 —(— Ω +) — 7 3 —(— Ω +) — 6 3 —(— Ω +) — 7 6 —(— Ω +) — 7</p>	Ignition: OFF Disconnect coupling at electronic accelerator pedal control unit, separate plug connections at electronic accelerator pedal position sensor and electronic accelerator pedal actuator.	> 500 k Ω	if < 500 k Ω replace wiring harness
8.0	Test insulation resistance of cables between plug connection electronic accelerator pedal actuator (M16/1) and coupling of electronic accelerator pedal control unit (N4/1)	<p style="text-align: center;">M16/1x1</p> <p>1 —(— Ω +) — 2 1 —(— Ω +) — 3 1 —(— Ω +) — 4 1 —(— Ω +) — 5 1 —(— Ω +) — 6 1 —(— Ω +) — 7 2 —(— Ω +) — 3 2 —(— Ω +) — 4 2 —(— Ω +) — 5 2 —(— Ω +) — 6 2 —(— Ω +) — 7 3 —(— Ω +) — 4 3 —(— Ω +) — 5 3 —(— Ω +) — 6 3 —(— Ω +) — 7 4 —(— Ω +) — 5 4 —(— Ω +) — 6 4 —(— Ω +) — 7 5 —(— Ω +) — 6 5 —(— Ω +) — 7 6 —(— Ω +) — 7</p>	Ignition: OFF Disconnect coupling at electronic accelerator pedal control unit, separate plug connections at electronic accelerator pedal position sensor and electronic accelerator pedal actuator.	> 500 k Ω	if < 500 k Ω replace wiring harness

Voltage values electronic accelerator pedal position sensor (R25)

"A" Voltage supply potentiometer V	"a" Voltage at idle position V	"b" Voltage at full throttle position V	"c" Voltage at kickdown V	"d" Voltage at switching point of safety switch V
6.8	0.50–0.56	5.92–5.98	5.92–6.37	0.86–1.13
6.9	0.51–0.57	6.00–6.07	6.00–6.46	0.87–1.14
7.0	0.52–0.58	6.09–6.16	6.09–6.55	0.89–1.16
7.1	0.53–0.58	6.18–6.25	6.18–6.64	0.90–1.17
7.2	0.53–0.59	6.26–6.34	6.26–6.74	0.91–1.19
7.3	0.54–0.60	6.35–6.42	6.36–6.83	0.92–1.21
7.4	0.55–0.61	6.44–6.51	6.44–6.92	0.94–1.22
7.5	0.56–0.62	6.53–6.60	6.53–7.01	0.95–1.24
7.6	0.56–0.63	6.61–6.69	6.61–7.11	0.96–1.26

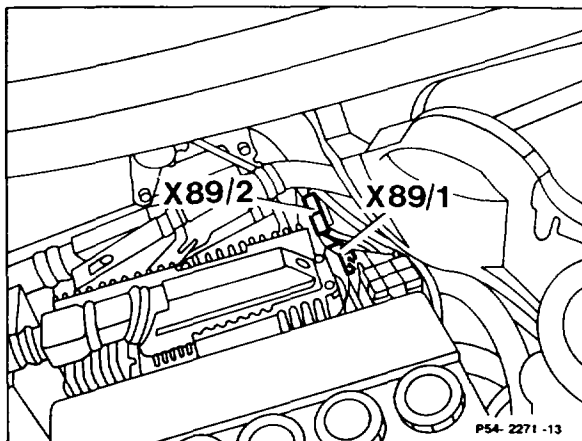
Voltage values electronic accelerator pedal actuator (M16/1)

"B" Voltage supply potentiometer V	"e" Voltage at idle position V	"f" Voltage at full throttle position V	"g" Voltage at switching point of safety switch V
6.8	6.05–6.19	0.61–0.75	5.35–5.68
6.9	6.14–6.28	0.62–0.76	5.43–5.76
7.0	6.23–6.37	0.63–0.77	5.51–5.89
7.1	6.32–0.46	0.64–0.78	5.59–5.93
7.2	6.41–6.55	0.65–0.79	5.67–6.01
7.3	6.50–6.64	0.66–0.80	5.75–6.10
7.4	6.59–6.73	0.67–0.81	5.82–6.18
7.5	6.68–6.83	0.68–0.83	5.90–6.26
7.6	6.76–6.92	0.69–0.84	5.98–6.35

Location of plug connection

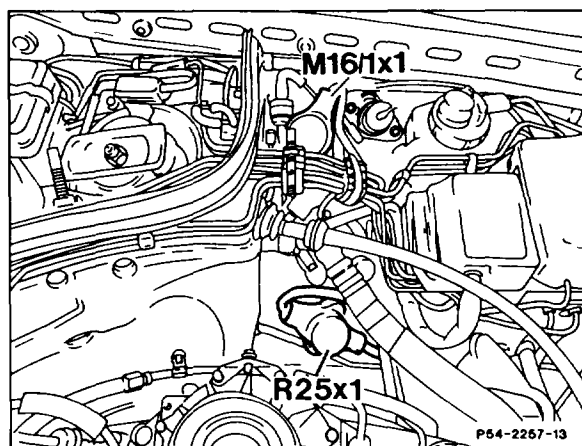
Model 124

- X89/1 Plug connection, electronic accelerator pedal (EFP) control unit/ASR 2-pin
- X89/2 Plug connection, electronic accelerator pedal (EFP) control unit/engine wiring harness, 3-pin



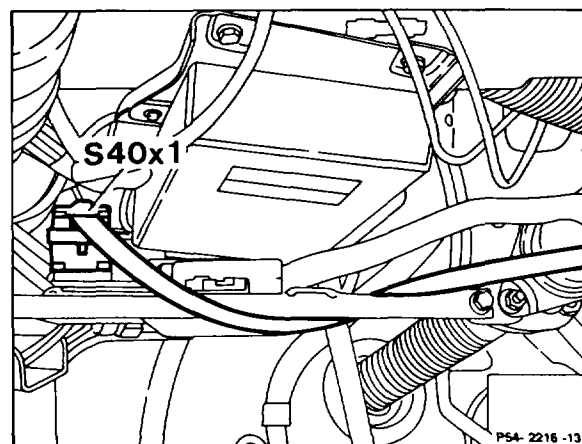
Model 124

- M16/1x1 Plug connection, electronic accelerator pedal (EFP) actuator
- R25x1 Plug connection, electronic accelerator pedal (EFP) position sensor



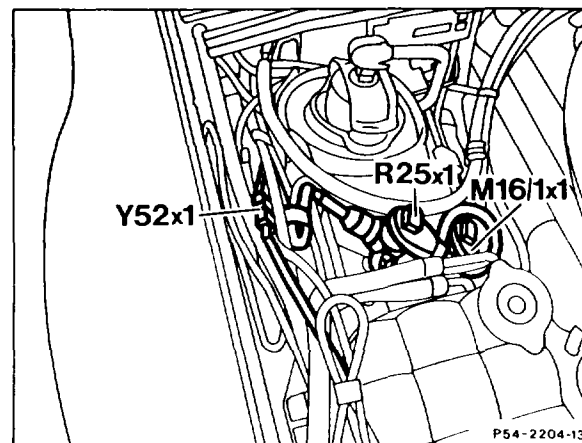
Model 124

- S40x1 Plug connection, Tempomat cruise control (TPM) pushbutton



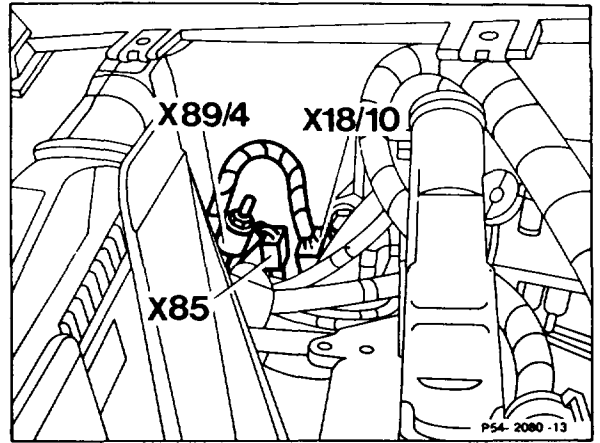
Model 129

- M16/1x1 Plug connection, electronic accelerator pedal (EFP) actuator
- R25x1 Plug connection, electronic accelerator pedal (EFP) position sensor
- Y52x1 Plug connection, right front axle damper valve



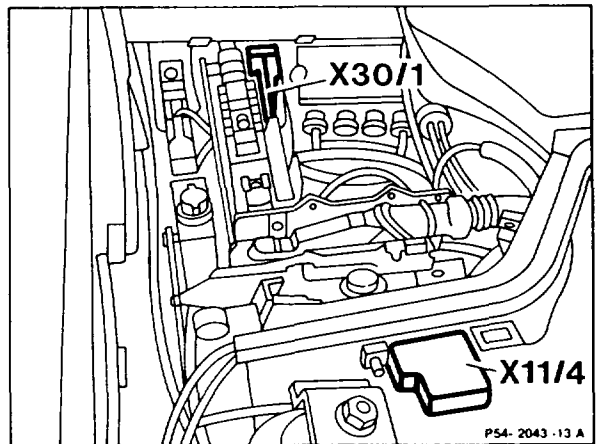
Model 129

- X18/10 Interior/ASR plug connection, 8-pin
- X85 Plug connection, heater and automatic temperature control (HAU, TAU)/engine wiring harness, 4-pin
- X89/4 Plug connection, electronic accelerator pedal (EFP) control unit/KE, 1-pin



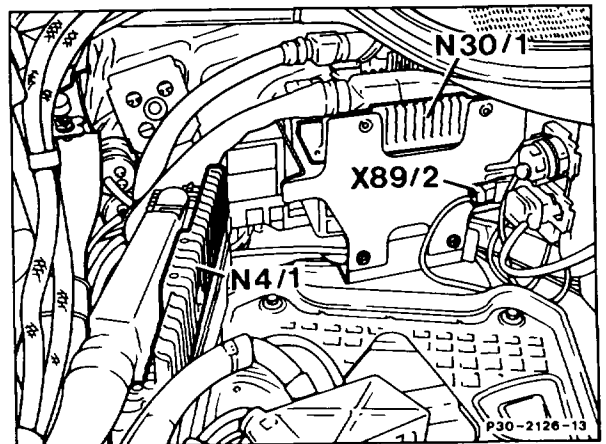
Model 129

- X11/4 Test coupling for diagnosis, 16-pin (pulse signal)
- X30/1 Plug connection, multi-function block



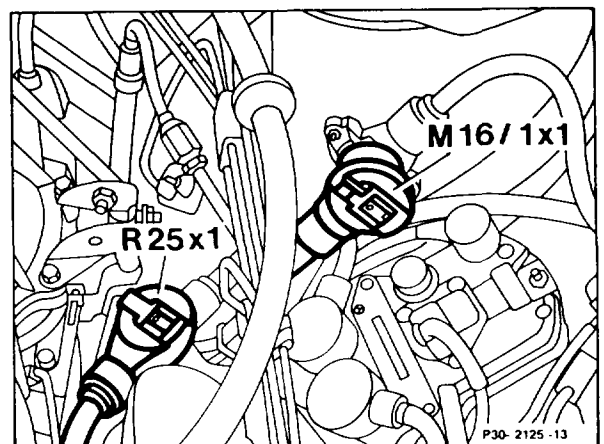
Model 201

- X89/2 Plug connection, electronic accelerator pedal (EFP) control unit/engine wiring harness, 2-pin



Model 201

- M16/1x1 Plug connection, electronic accelerator pedal (EFP) actuator
- R25x1 Plug connection, electronic accelerator pedal (EFP) position sensor



Model 201

S40x1 Plug connection, Tempomat
cruise control (TPM) pushbutton

