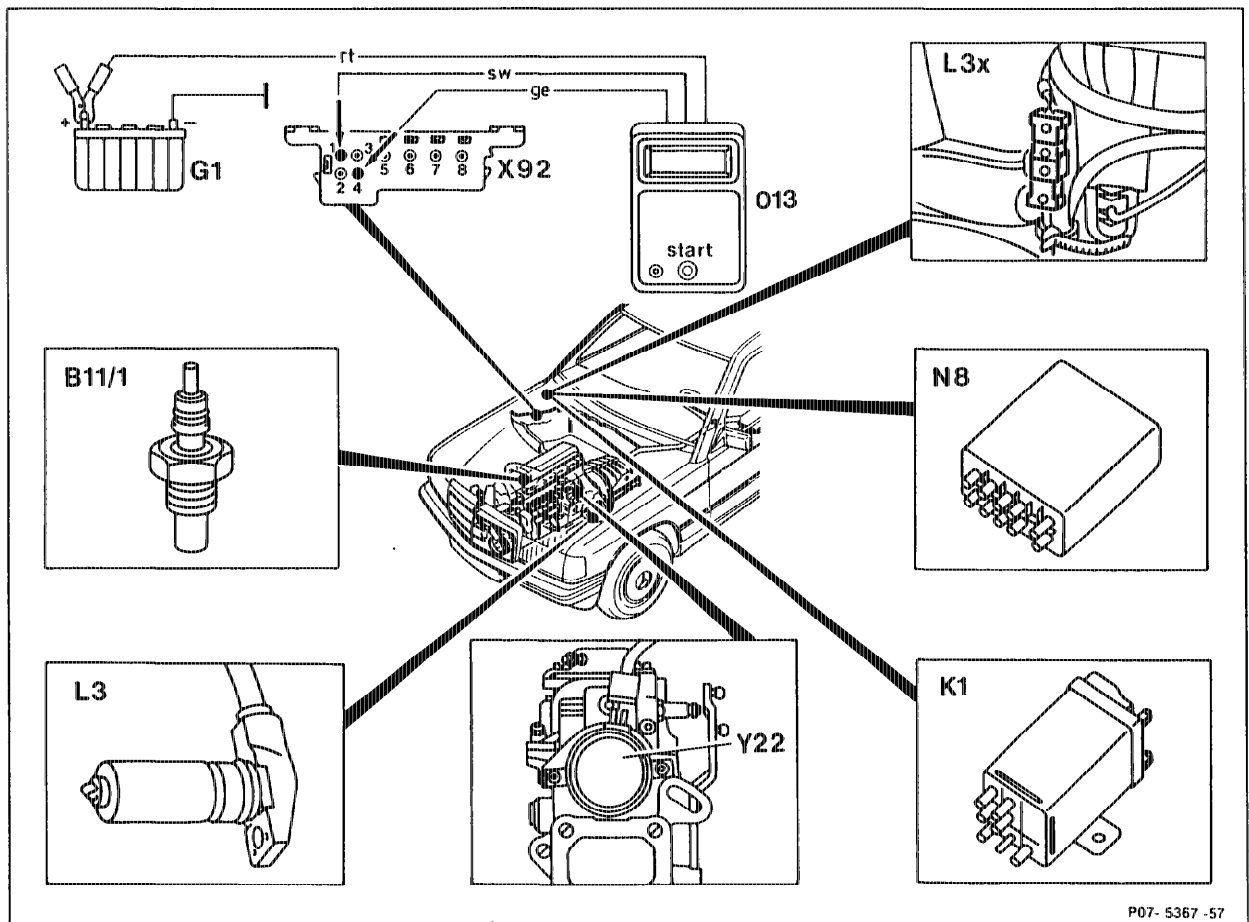


## 07.1-1841 Testing electronic Idle speed control with/without anti-jerk control

Preceding work:  
Testing, adjusting idle speed (07-2053)

Operation no. of operation texts and work units or standard texts  
and flat rates: 07-1841

Engine 602.96, 603.96 with test coupling (X92 or X11/4)



Pulse counter (013) .....	connect to battery (G1) and to test coupling (X92).
Overvoltage protection relay fuse .....	check.
Engine .....	run at idling speed.
Start button of pulse counter (013) .....	operate for 2-4 seconds.
Display .....	read and note.
Start button .....	press again. If no new display appears, no further fault in system.

The number of pulses indicates whether and which component is faulty, or whether components in the control circuit are defective.

**Assignment (X92)**

- Jack 1 ground
- Jack 2 TD signal
- Jack 3 pulse output, ARA control unit (N8/2)
- Jack 4 pulse output, EDS control unit (N39) only **(A)**

Only short-circuit faults are detected with control units designation "R01". Control units with designation "R02" also detect interrupts. Production breakpoint: control unit with "R02", May 1988.

Pulse readout	Component/faulty circuit
1	all functions "in order"
2	engine speed signal "fault"
3	coolant temperature "fault"
5	ARA control loop "fault"
6	ELR control loop "fault"



**Pulse readout "2"**

Engine speed sensor (L3) to connector (L3x) . . . test, resistance 0.4–2.5 kΩ  
engine idling voltage >4 V ~.

**Pulse readout "3"**

Coolant temperature sensor (B11/1) . . . . . test, specified value +20 °C 2.2–2.8 kΩ

**Pulse readout "5" function test**

Raise engine speed to 1000 rpm.

Operate accelerator lever briefly several times .....

ARA actuator clicks audibly.

ARA operating.

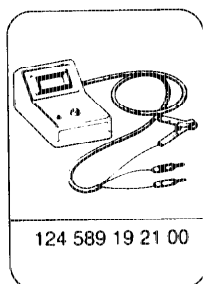
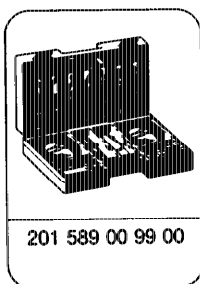
**Pulse readout "6"**

2-pin connector of ELR actuator (Y22) detach

(for at least 3 s) and fit on again .....

Engine speed increases briefly.

**Special tools**



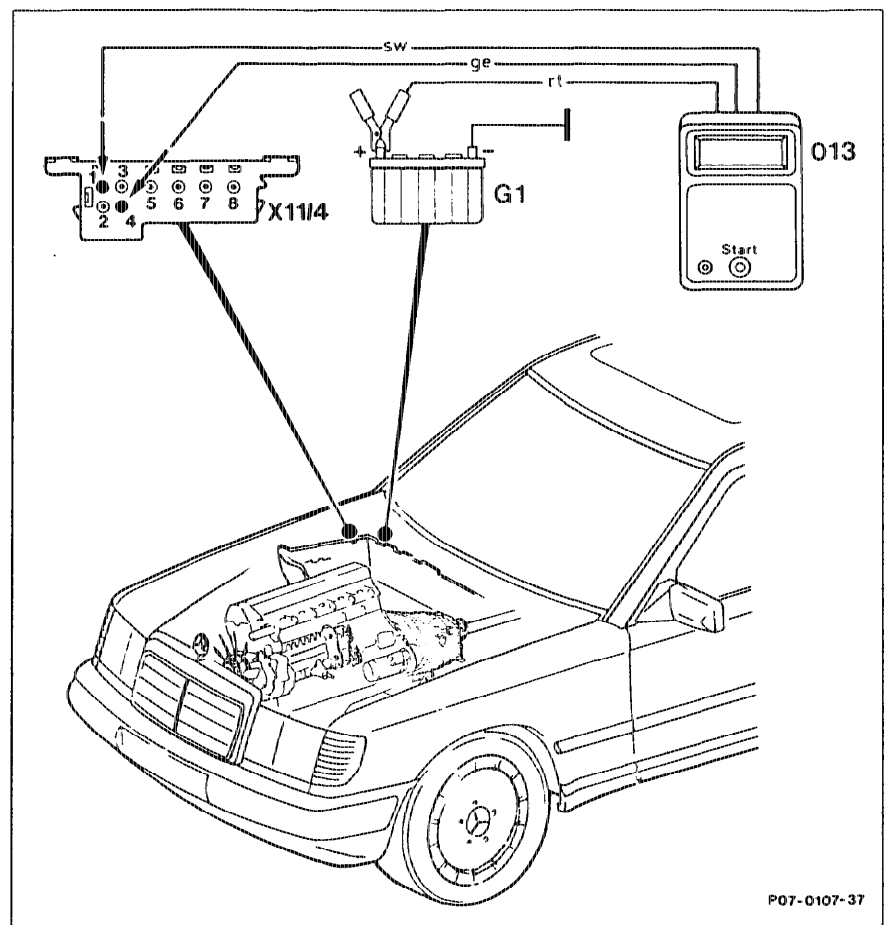
**Commercially available tools**

Designation	e. g. make, order no.
Multimeter	Sun, DMM-5
Digital tester	Bosch, MOT 002.02 Sun, DIT 9000

### Connection diagram

Connect digital tester  
and pulse generator.

Connect pulse counter  
(013) to battery (G1) and  
test connector (X11/4).



### Note

The U-batt LED in display panel must light up;  
if not:

- Test fuse of pulse counter
- Test jack 1 of test connector (X11/4) to battery positive (approx. 12 V)
- Test jack 4 of test connector (X11/4) to battery positive (approx. 12 V)

Test fuse in overvoltage protection relay.

Run engine at idling speed.

Operate start button of pulse counter (013) for between 2 and 4 seconds.

Check readout on the display of the pulse counter (013) and note.

Again press start button for between 2 and 4 seconds. If there is no other fault in the system, no new readout appears.

Rectify noted faults according to test routine or perform test of components.

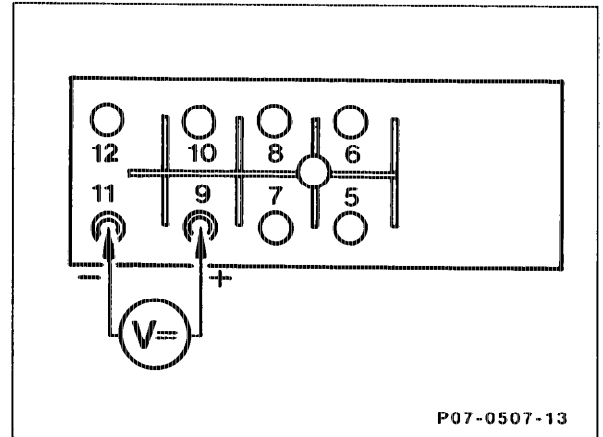
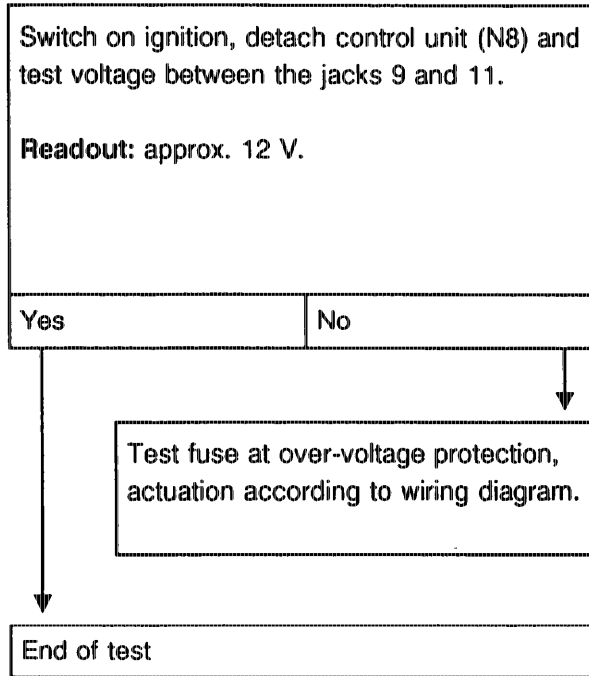
**Note regarding pulse readout**

Numbers from 1 to 6 appear on the display panel of the pulse counter.

The number 1 means that no fault has been detected in the electronic system. All the other numbers are assigned to a certain fault circuit.

## Testing components

Testing overvoltage protection relay (K1/1).



**Pulse readout "2"**

**Testing engine speed signal**  
 Connect multimeter to the terminal 1 and 2 of the test connector (X92 and X11/4). Press button V~. Run engine at idling speed.

Specification: >2.8 V~

Yes	No
-----	----

End of test

Engine switched off. Detach plug connection (L3x). Connect multimeter to engine speed sensor plug connection (L3x) and press button "Ω". Test resistance.

Specification: 0.4–2.5 kΩ

Yes	No
-----	----

Renew engine speed sensor on starter ring gear (L3).

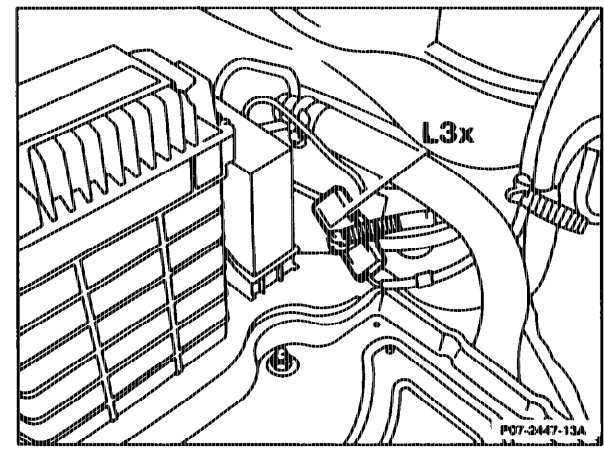
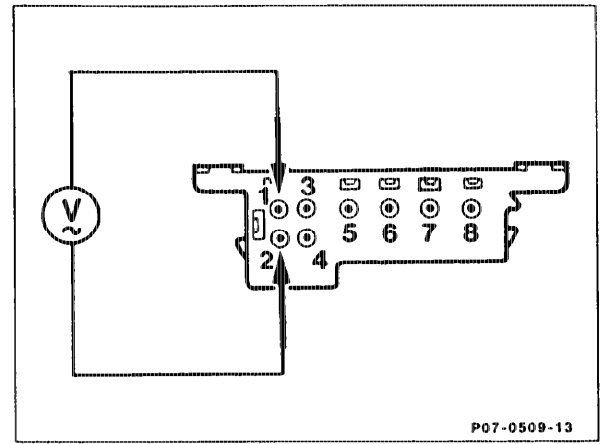
End of test

Multimeter connected as above, press button "V~". Run engine at idling speed.

Readout: >4 V~  
 Voltage increases as engine speed rises.

Yes	No
-----	----

Examine engine speed sensor on starter ring gear (L3) for dirt deposits and metal chips, clean if necessary.



Test electric leads from plug connector (L3x) to control unit and on to test connector (X92 or X11/4), renew control unit (N8 or N8/1) if necessary.



End of test



### Pulse readout "3"

#### Testing coolant temperature sensor (B11/1)

Engine switched off. Detach plug on temperature sensor and test resistance to ground. Refer to diagram for specified values. Measure resistance at two temperature measuring points.

Example:

+ 20 °C = 2.2–2.8 kΩ

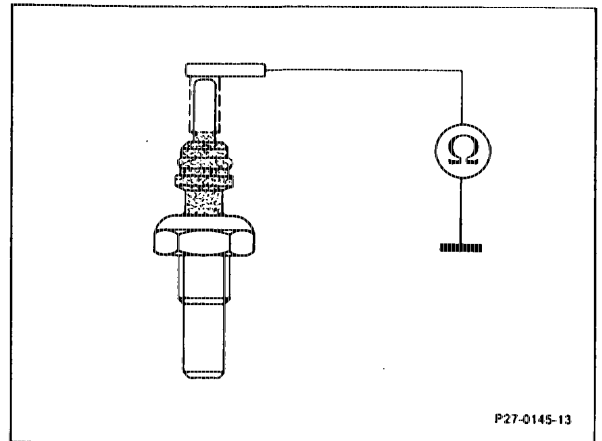
+ 80 °C = 290–370 Ω

Yes

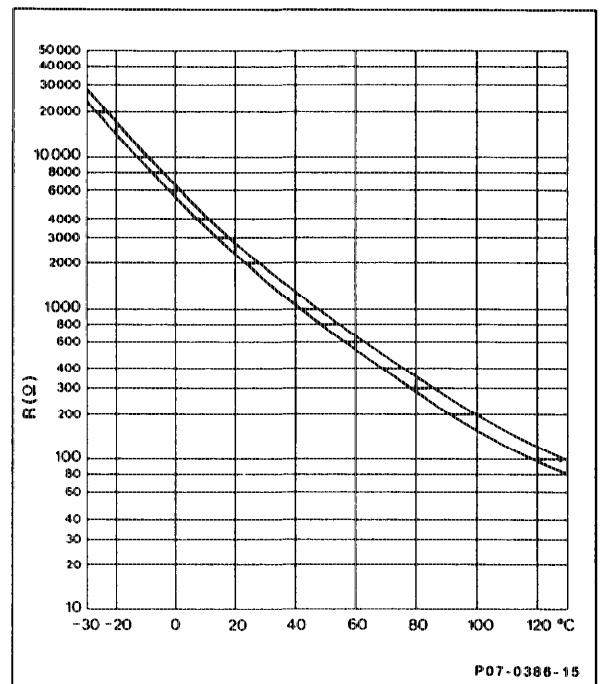
No

Renew coolant temperature sensor (B11/1).

End of test



P27-0145-13



P07-0386-15

Test voltage at 1-pin connector (arrow). "Ignition" on.

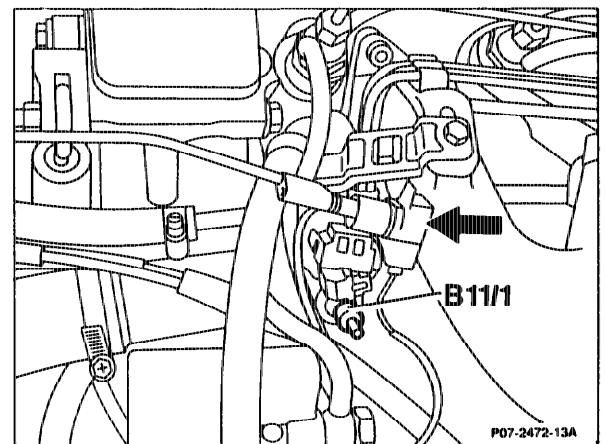
Readout: approx. 5 volts

Yes

No

Rectify cable interrupt.  
Renew control unit (N8).

End of test

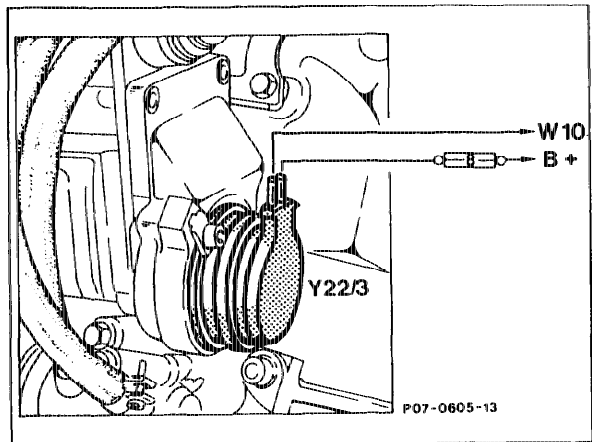


P07-2472-13A

**Pulse readout "5" (function test)**

Raise engine speed to 1000 rpm.  
 Operate the accelerator lever briefly several times, whereby the actuator clicks audibly, possibly use test lamp.  
 "ARA" operative.

Yes	No
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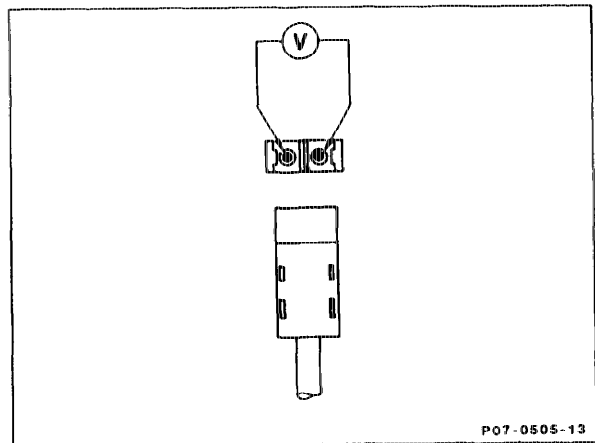


Detach 2-pin connector from ARA actuator.  
 Apply battery voltage (approx. 12 V) to ARA actuator (Y22/3).

The ARA actuator will be damaged if the battery voltage is applied for more than 3 s.

Idle speed reduces.

Yes	No
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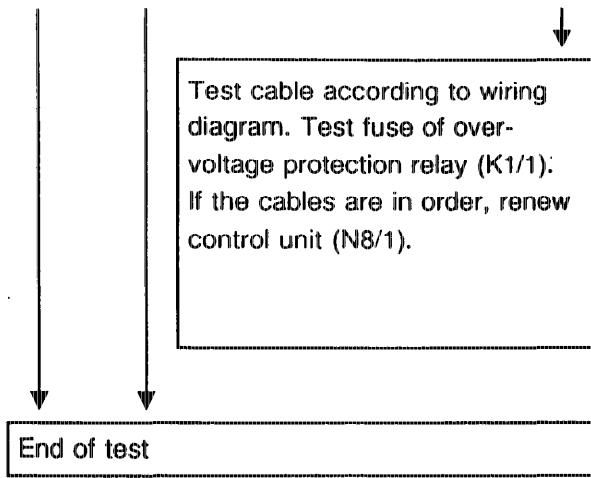
Renew ARA actuator (Y22/3).

End of test

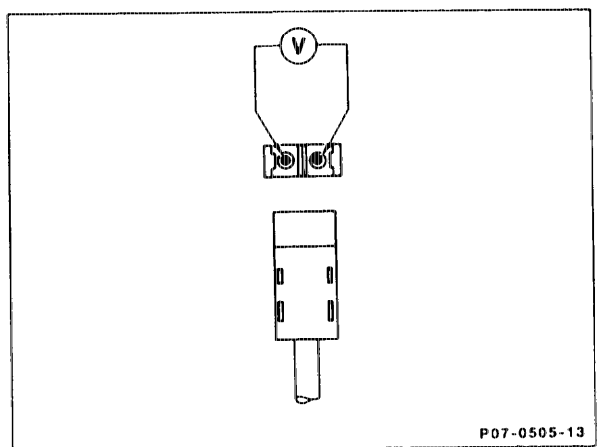
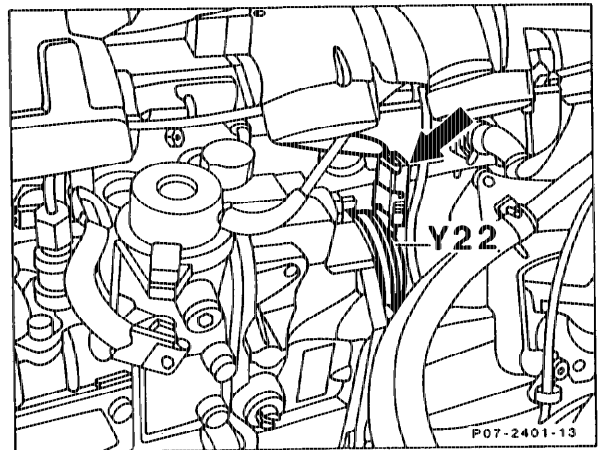
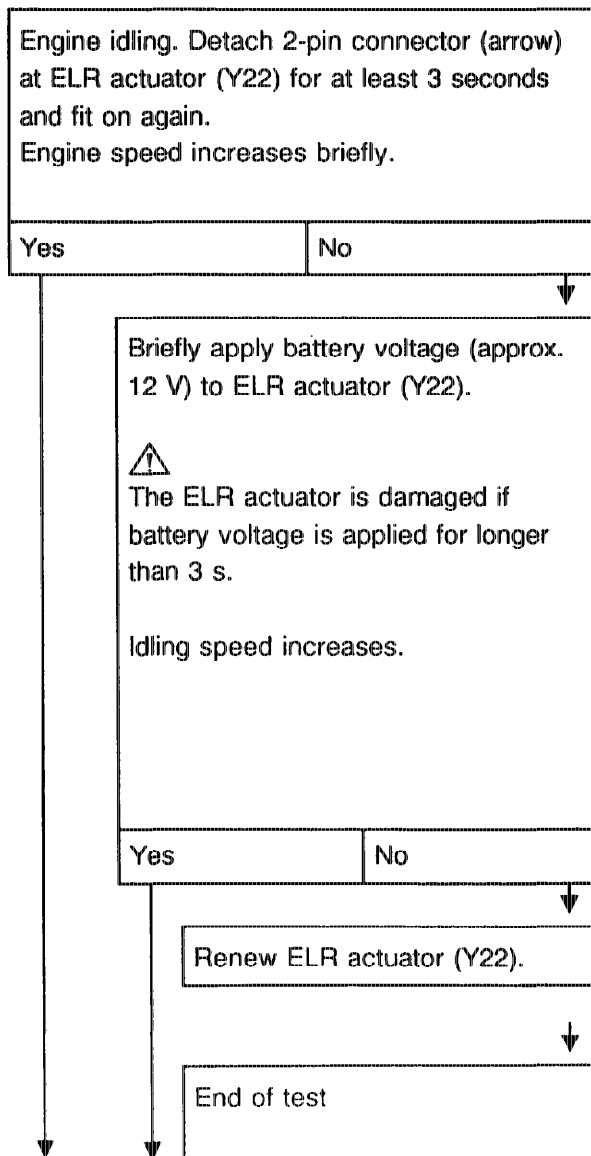
Test voltage at 2-pin connector from ARA actuator (Y22/3):  
 Press multimeter BUTTON "V =".  
 Engine at idle – apply full throttle briefly.

Voltage increases

Yes	No
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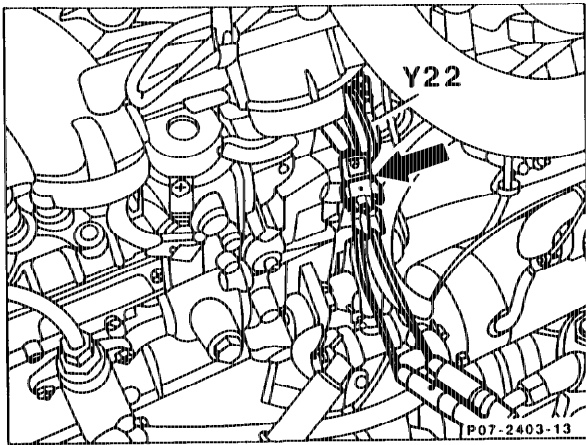


**Pulse readout "6"**



Engine idling. Detach 2-pin connector (arrow) from ELR actuator (Y22).  
Connect multimeter and press button "V =".

Readout: approx. 12 V



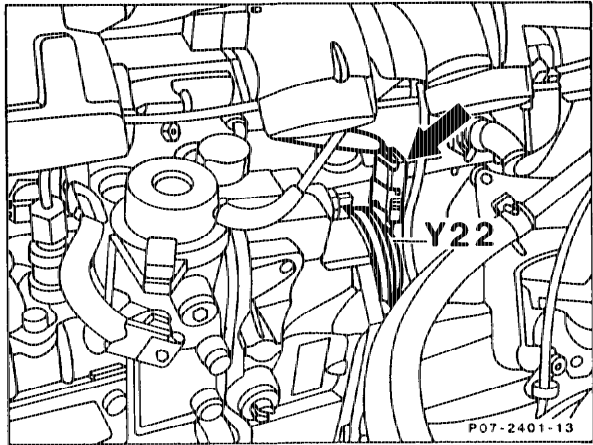
Yes	No
-----	----

Check cables according to wiring diagram. Test fuse of overvoltage protection relay (K1/1).

If the cables are in order, renew control unit (N8 or N8/1).

End of test

Engine idling. Detach 2-pin connector (arrow) at the ELR actuators (Y22).



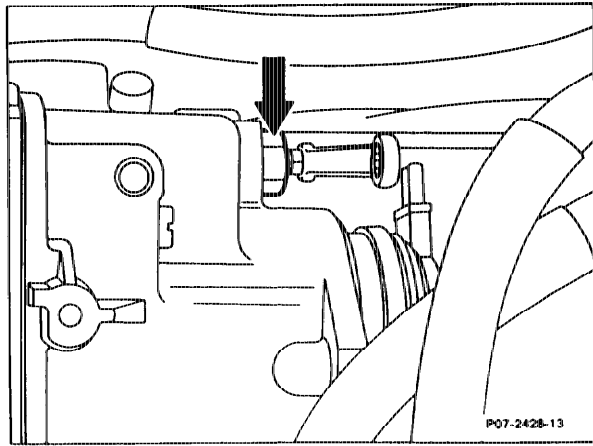
Test idle speed:  
Specification:

M602	690 ± 40 rpm	manual transmission
	620 ± 40 rpm	automatic transmission
M603	570 ± 40 rpm	

Yes	No
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Slacken locking nut and adjust idling speed (arrow).

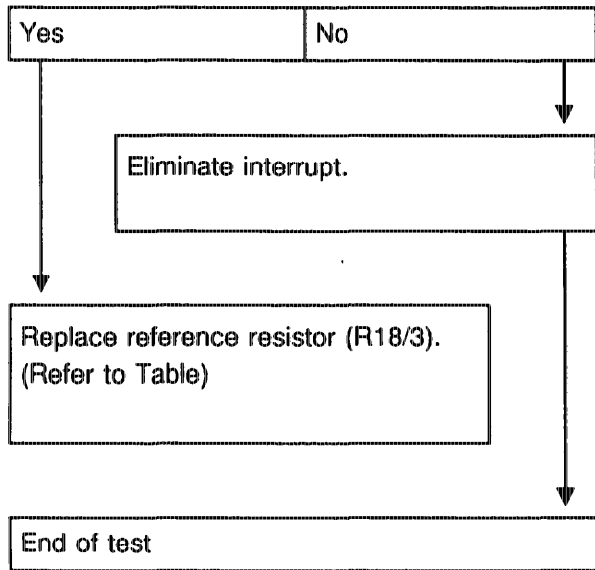
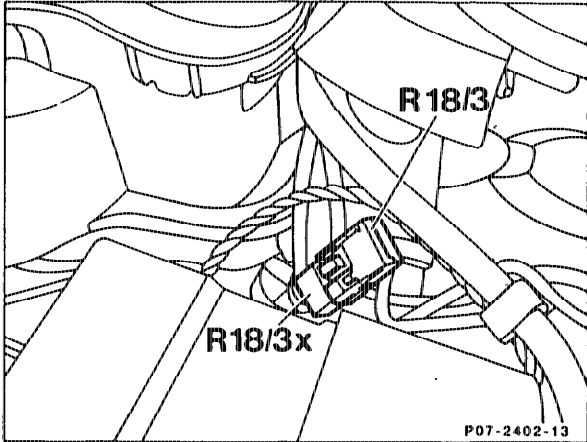
To the left = higher  
To the right = lower



End of test

**Test ARA reference resistor (R18/3)**  
(if fitted)

**ARA reference resistor (R18/3)**  
Engine switched off. Detach reference resistor from 2-pin connector. Glow start switch in position "2", set multimeter to "V =" and measure voltage at 2-pin connector.  
  
Readout: approx. 5 volts



**Reference resistor table**

Part No.	Resistance in $\Omega$	No.	Complaints
000 540 29 81 000 540 22 81 000 540 23 81	100 220 470	I II III	Three different resistors can be installed to prevent "part load bucking". Start with number 1 and progress from there. After change, test drive vehicle.
000 540 25 81 000 540 26 81 000 540 27 81	1300 2400 4700	I II III	Alternatively three different resistors can be installed to prevent "poor acceleration". If an excessive resistance is selected, the bucking deteriorates. After change, test drive vehicle.

**Note**

The ignition must be switched off in order to replace the reference resistor, otherwise the new resistance trimming will not be recognised.

The reference resistors listed in the table can also be simulated with the resistance decade in order to determine the resistance.