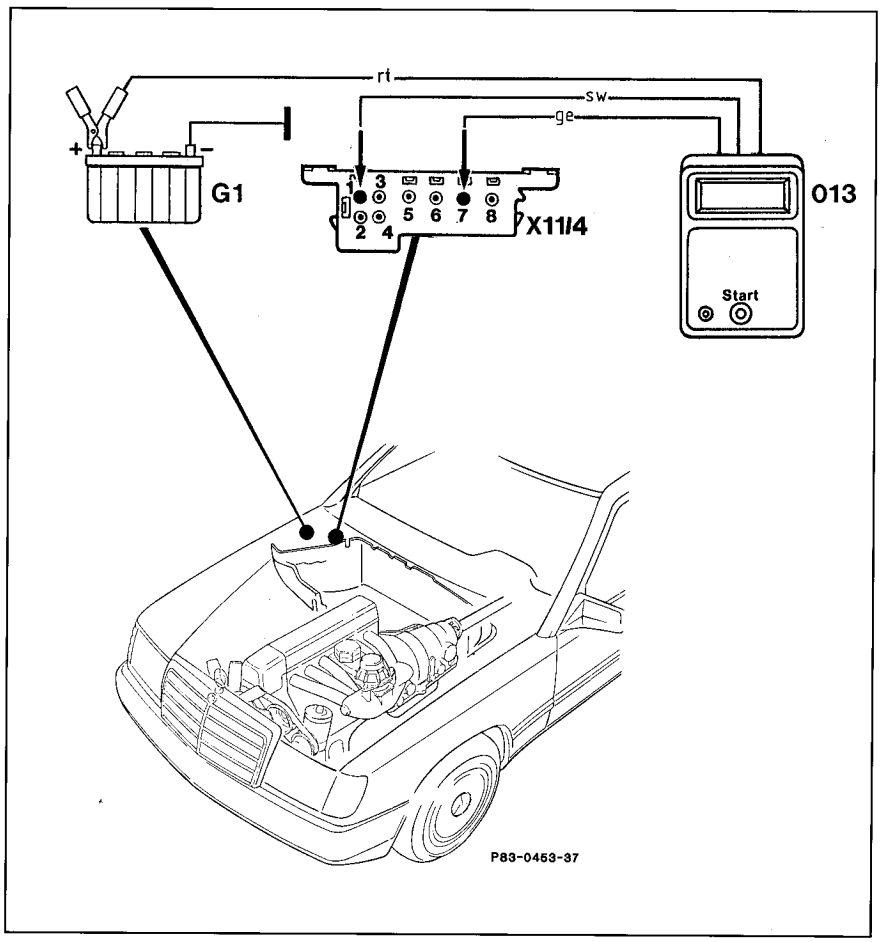
83-603 Testing the automatic climate control with the impulse counter (as of 09/87)

Operation no. of operation texts and work units or standard texts and flat rates
RA 83-1220

A. All models except models 124.034/036

Connection diagram

013 Impulse counter
G1 Battery
X11/4 Test coupling for diagnosis, 8-pin (pulse readout)

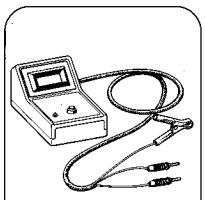


The number of impulses indicates which component or which supply cables are faulty

Impulse display	Component
1	All functions "o.k."
2	Temperature sensor interior air, short-circuit
3	Temperature sensor interior air, interruption
4	Temperature sensor outside air, short-circuit
5	Temperature sensor outside air, interruption
6	Temperature sensor evaporator, short-circuit

7	Temperature sensor evaporator, interruption
8	Temperature sensor heat exchanger, short-circuit
9	Temperature sensor heat exchanger, interruption
12	Temperature sensor coolant, short-circuit
13	Temperature sensor coolant, interruption
30	Circulating pump, short-circuit/interruption
31	Mono valve, short-circuit/interruption
33	Control unit compressor cutoff, short-circuit
34	Auxiliary fan 2nd stage (control), short-circuit
50	Switchover valve defroster nozzle flaps (large lift), short-circuit
51	Switchover valve defroster nozzle flaps (small lift), short-circuit
52	Switchover valve footwell flaps, short-circuit
54	Switchover valve center nozzle flap, short-circuit
55	Switchover valve diverter air flap, short-circuit
56	Switchover valve fresh air/recirculated air flap (large lift), short-circuit
57	Switchover valve fresh air/recirculated air flap (small lift), short-circuit

Special tool



124 589 19 21 00

Instructions on impulse output

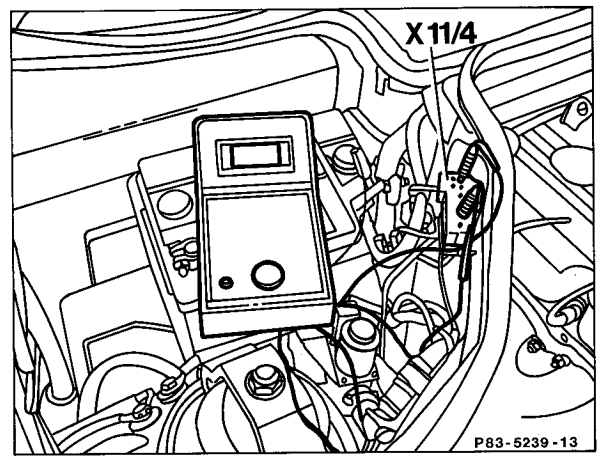
The impulse output shows existing faults, however faults occurring only for brief periods are not stored.

The test with the impulse counter is to be carried out for rapid troubleshooting on the automatic climate control.

If one or several faults are displayed by the impulse output, these are to be eliminated and the impulse output repeated. This ensures that all faults recorded by the impulse output are eliminated.

If no fault is displayed by the impulse output, but there is nevertheless a complaint, there may be a tolerance deviation in the components, e.g. too low resistance value in the case of sensors. Since the impulse output does not record such a deviation, the complete system must be checked with the socket box and the volt/ohmmeter.

Testing



Connect impulse counter in accordance with the connection diagram.

The light-emitting diode "UBatt" must light up, if not:
a) Check fuse
b) Check jack 1 on test coupling (X92) to battery positive. Nominal value 11 - 14 V.
c) Check jack 1 to jack 7 on test coupling (X92). Nominal value 6 - 12 V.
Switch on ignition.

Operate start button (1) for between 2 and 4 seconds.

Read out and note impulse code display.

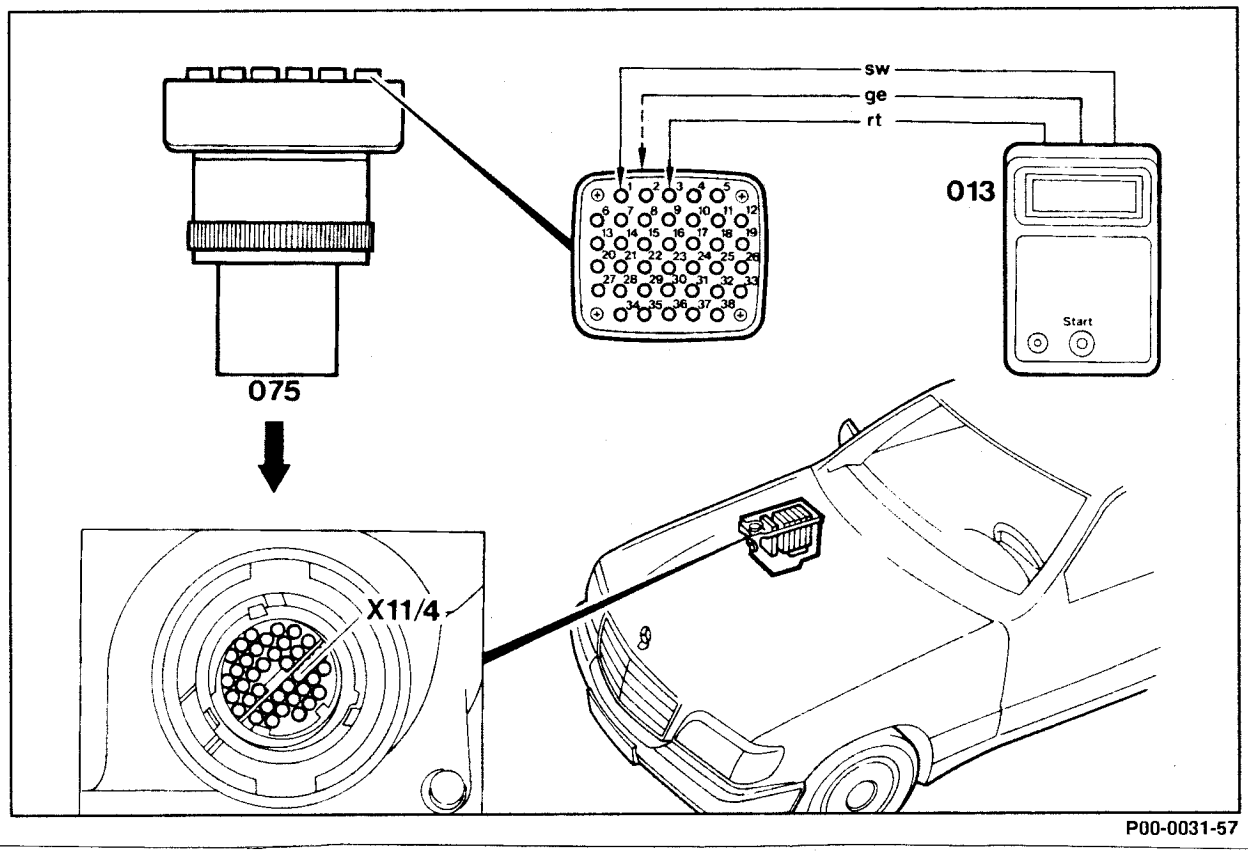
Number 1 means that no error has been recorded by the impulse output. All other numbers are allocated to a particular group of faults. If there are several faults in the system, the next fault is displayed automatically when the start button is operated subsequently.

Operate the start button again for between 2 and 4 seconds. If there is no other fault in the system, the first number appears again.

Eliminate the faults noted (impulse output) and repeat impulse output by switching the ignition off and on again.

Note
The light-emitting diode in the fresh/recirculated air switch flashes at a frequency of one Hertz during the impulse output.

B. Models 124.034/036



Jack 1	Terminal 31 (ground)
Jack 3	Terminal 30 (positive)
075	Impulse counter adapter
013	Impulse counter
X11/4	Test coupling for diagnosis (pulse readout)

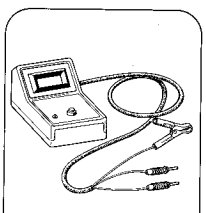
Note
Connect yellow cable to jack 16

The number of impulses indicates which component or cables are faulty.

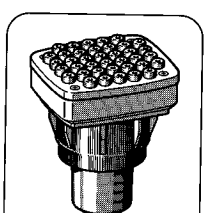
Impulse indicator	Component
1	All functions "o.k"
2	Temperature sensor interior air, short-circuit
3	Temperature sensor interior air, interruption
4	Temperature sensor outside air, short-circuit

Impulse indicator	Component
5	Temperature sensor outside air, interruption
6	Temperature sensor evaporator, short-circuit
7	Temperature sensor evaporator, interruption
8	Temperature sensor heat exchanger, short-circuit
9	Temperature sensor heat exchanger, interruption
12	Temperature sensor coolant, short-circuit
13	Temperature sensor coolant, interruption
30	Circulating pump coolant, short-circuit/interruption
31	Mono valve, short-circuit/interruption
33	Control unit refrigerant compressor shut-off, short-circuit/interruption
34	Auxiliary fan 2nd stage (control), short-circuit
50	Switchover valve defroster nozzle flaps (large lift), short-circuit
51	Switchover valve defroster nozzle flaps (small lift), short-circuit
52	Switchover valve footwell flaps, short-circuit
54	Switchover valve center nozzle flap, short-circuit
55	Switchover valve diverter air flap, short-circuit
56	Switchover valve fresh air/recirculated air flap (large lift), short-circuit
57	Switchover valve fresh air/recirculated air flap (small lift), short-circuit

Special tools



124 589 19 21 00
07 83



140 589 14 63 00
54

Notes on impulse output

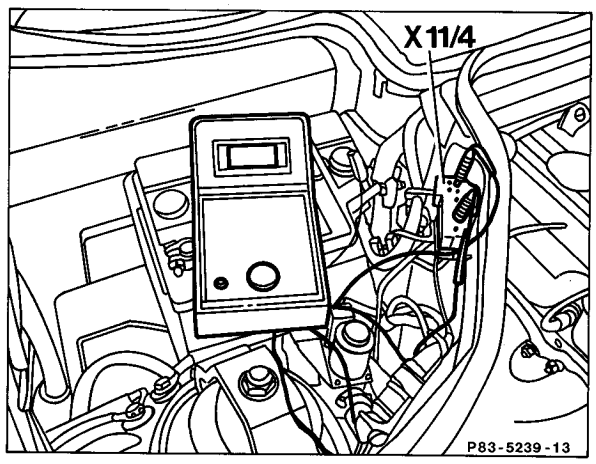
The impulse output indicates existing faults, however faults which only occur briefly are not stored.

The test with the impulse counter should be carried out for rapid troubleshooting on the automatic climate control.

If the impulse output indicates one or several faults, these must be eliminated and the impulse output repeated. This ensures that all faults recorded by the impulse output are eliminated.

If the impulse output does not indicate any fault, but there is nevertheless a complaint, there may be a tolerance deviation in the components, e.g. too low resistance value in the case of sensors. Since the impulse output does not record such a deviation, the complete system must be checked with the socket box and the volt/ohmmeter.

Testing



Connect impulse counter in accordance with the connection diagram.

The light-emitting diode "UBatt" must light up, if not:
a) Check fuse.
b) Check jack 1 on test coupling (X92) to battery positive. Nominal value 11 - 14 V.
c) Check jack 1 to jack 7 on test coupling (X92). Nominal value 6 - 12 V.
Switch on ignition.

Operate start button (1) for between 2 and 4 seconds.

Read out and note impulse code display.

Number 1 means that no error has been recorded by the impulse output. All other numbers are allocated to a particular group of faults. If there are several faults in the system, the next fault is displayed automatically when the start button is operated subsequently.

Operate the start button again for between 2 and 4 seconds. If there is no other fault in the system, the first number appears again.

Eliminate the faults noted (impulse output) and repeat impulse output by switching the ignition off and on again.

Note
The light-emitting diode in the fresh/recirculated air switch flashes at a frequency of one Hertz during the impulse output.

Impulse output

Test conditions:
Fuse 7 in order, battery voltage 11 - 14 volt and selector wheel set on 22°C.

Fault diagnosis chart

Impulse display	Scope of test	Measuring instrument / Test connection	Nominal value	Possible cause/ Remedy
1	–	–	–	No fault in the system was registered by the impulse output.
2/3	Temperature sensor interior air (B10/4) short-circuit/ interruption	on temperature sensor (B10/4)	Ambient temperature + °C / Resistance value temperature sensor interior air kΩ 10 — 18.3 – 21.5 15 — 15.2 – 17.2 20 — 11.5 – 13.5 25 — 9.5 – 10.5 30 — 7.5 – 8.5 35 — 6.0 – 7.0 40 — 4.5 – 5.5 45 — 3.5 – 4.5	Temperature sensor interior air defective
	Cable to the temperature sensor interior air	Remove control unit to coupling R jacks 2 and 12	∞ Ω	Cable to the temperature sensor interior air is shorted to ground
		to coupling R jack 2 and to coupling temperature sensor (B10/4) jack grey/yellow	< 1Ω	Cable to the temperature sensor interior air is interrupted

Im-pulse display	Scope of test	Measuring instrument / Test connection	Nominal value		Possible cause/ Remedy
4/5	Temperature sensor outside air (B10/5) short-circuit/ interruption	on temperature sensor (B10/5)	Ambient temper-ature + °C 10 15 20 25 30 35 40 45	Resistance value temperature sensor exterior air kΩ 5.0 – 6.0 4.0 – 4.6 3.1 – 3.9 2.4 – 3.0 1.9 – 2.3 1.6 – 2.0 1.4 – 1.6 1.1 – 1.3	Temperature sensor outside air defective
	Cable to the temperature sensor outside air	Remove control unit to coupling R jacks 9 and 12	∞ Ω		Cable to the temperature sensor outside air is shorted to ground
		to coupling R jack 9 and to coupling temperature sensor (B10/5) jack grey/black	< 1 Ω		Cable to the temperature sensor outside air is interrupted

Im-pulse display	Scope of test	Measuring instrument / Test connection	Nominal value		Possible cause/ Remedy
6/7	Temperature sensor evaporator (B10/6) short-circuit/ interruption	to temperature sensor (B10/6)	Ambient temper-ature + °C 0 5 10 15 20 25 30 35 40 45	Resistance value temperature sensor evaporator kΩ 30.0 – 35.0 23.4 – 27.4 18.3 – 21.5 15.2 – 17.2 11.5 – 13.5 9.5 – 10.5 7.5 – 8.5 6.0 – 7.0 4.5 – 5.5 3.5 – 4.5	Temperature sensor evaporator defective
	Cable to the temperature sensor evaporator	Remove control unit to coupling R jacks 4 and 12	∞ Ω		Cable to the temperature sensor evaporator is shorted to ground
		to coupling R jack 4 and to coupling temperature sensor (B10/6) jack grey/red	< 1 Ω		Cable to the temperature sensor evaporator is interrupted

Im-pulse display	Scope of test	Measuring instrument / Test connection	Nominal value	Possible cause/ Remedy
8/9	Temperature sensor heat exchanger (B10/1) short-circuit/ interruption	to temperature sensor (B10/1)	Ambient temper-ature + °C: 10, 15, 20, 25, 30, 35, 40, 45 — Resistance value temperature sensor heat exchanger kΩ: 18.3 – 21.5, 15.2 – 17.2, 11.5 – 13.5, 9.5 – 10.5, 7.5 – 8.5, 6.0 – 7.0, 4.5 – 5.5, 3.5 – 4.5	Temperature sensor heat exchanger defective
	Cable to the temperature sensor heat exchanger	Remove control unit to coupling R jacks 7 and 12	∞ Ω	Cable to the temperature sensor heat exchanger is shorted to ground
		to coupling R jack 7 and to coupling temperature sensor (B10/1) jack grey/green	< 1 Ω	Cable to the temperature sensor heat exchanger is interrupted

Im-pulse display	Scope of test	Measuring instrument / Test connection	Nominal value	Possible cause/ Remedy
12/13	Temperature sensor coolant (B11/7) short-circuit/ interruption	to temperature sensor (B11/7)	Ambient temperature + °C: 20 / 60 / 85 / 100 / 110 / 120 / 130 Resistance value temperature sensor coolant Ω: 5 – 8 kΩ / 900 – 1800 / 460 – 650 / 300 – 400 / 230 – 290 / 180 – 230 / 135 – 175	Temperature sensor heat exchanger defective
	Cable to the temperature sensor coolant	Remove control unit to coupling R jacks 8 and 12	∞ Ω	Cable to the temperature sensor coolant is interrupted
		to coupling R jack 8 and to coupling temperature sensor (B11/7) jack 2 blue/grey	< 1 Ω	Cable to the temperature sensor coolant is shorted to ground
30[1])	Circulating pump (M13) short-circuit	connect to circulating pump (M13). Ignition: ON and function selection DEF	Power consumption circulating pump max. 0.8 A	Circulating pump defective

[1]) In individual cases it is possible that the impulse code 30 is displayed although the circulating pump and the control unit (N6) are in order. In this case the function of the circulating pump must be tested by feeling. To do so, switch the ignition off and on again and press DEF button.
If the circulating pump is running, there is no fault.

Im-pulse display	Scope of test	Measuring instrument / Test connection	Nominal value	Possible cause/ Remedy
31	Mono valve (Y19) short-circuit	⊖Ω⊕ to mono valve (Y19)	11 – 19 Ω	Mono valve defective
33[1])	Control unit compressor cutoff (N6) short-circuit	–	–	Control unit compressor cutoff defective
34	Auxiliary fan 2nd stage (activation) short-circuit	⊖Ω⊕ to the relay auxiliary fan (K9) terminals 85 and 86	50 – 80 Ω	Relay auxiliary fan defective
50	Switchover valve defroster nozzle flaps (Y7) (large lift) short-circuit	⊖Ω⊕ to switchover valve block (Y7) pins 5 and 8	50 – 80 Ω	Switchover valve block 7-fold defective
51	Switchover valve defroster nozzle flaps (Y7) (small lift) short-circuit	⊖Ω⊕ to switchover valve block (Y7) pins 7 and 8	50 – 80 Ω	Switchover valve block 7-fold defective
52	Switchover valve footwell flaps (Y7) short-circuit	⊖Ω⊕ to switchover valve block (Y7) pins 3 and 8	50 – 80 Ω	Switchover valve block 7-fold defective

[1]) In individual cases it is possible that the impulse code 33 is displayed although the circulating pump and the control unit (N6) are in order. In this case the function of the circulating pump must be tested by feeling. To do so, switch the ignition off and on again and press DEF button.
If the circulating pump is running, there is no fault.

Im-pulse display	Scope of test	Measuring instrument / Test connection	Nominal value	Possible cause/ Remedy
54	Switchover valve center nozzle flap (Y7) short-circuit	to switchover valve block (Y7) pins 4 and 8	50 – 80 Ω	Switchover valve block 7-fold defective
55	Switchover valve diverter air flap (Y7) short-circuit	to switchover valve block (Y7) pins 6 and 8	50 – 80 Ω	Switchover valve block 7-fold defective
56	Switchover valve fresh/ recirculated air flap (large lift) (Y7) short-circuit	to switchover valve block (Y7) pins 2 and 8	50 – 80 Ω	Switchover valve block 7-fold defective
57	Switchover valve fresh/ recirculated air flap (small lift) (Y7) short-circuit	to switchover valve block (Y7) pins 1 and 8	50 – 80 Ω	Switchover valve block 7-fold defective