Index

index continues on next page

Troubleshooting

Note

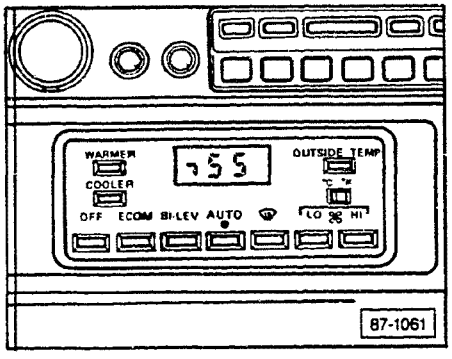
When troubleshooting, go to the digital climate control quick-check first, section D8-70.

Index

Troubleshooting

Note

When troubleshooting, go to the digital climate control quick-check first, section D8-70 .



A/C control head memory display, checking

Note

Up to August 1988, twenty-one diagnostic channels were available for information output on the A/C control head display. From August 1988, 22 channels are used.

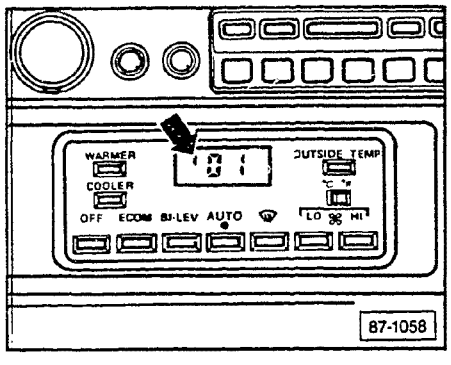
For diagnostic values greater than 199, the first digit 2 is represented as a horizontal and vertical line.

For example, 255 is shown on illustration.

While information is being displayed on A/C control head, the A/C system will run in the last selected mode.

Starting display

- switch ignition **ON**
- push and hold down **OUTSIDE TEMP** button
- push and hold down **OFF** button
- release **OUTSIDE TEMP** button then release **OFF** button



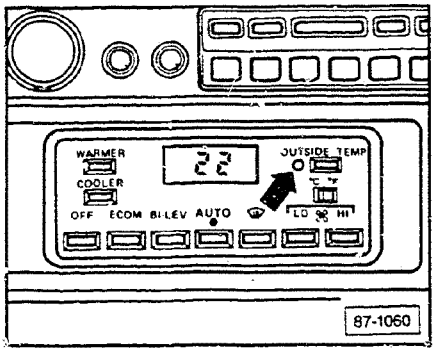
Note

A vertical line in the first field (**arrow**) lights up to indicate the channel number.

To select a different channel
- press **WARMER** button to advance channel by one
- press **COOLER** button to decrease channel by one

To call up information about a particular channel
- select desired channel
- press **OUTSIDE TEMP** button

To leave the memory display
- select any A/C operating mode, or switch ignition to **OFF**



Note

Some faults are displayed without having to start the memory fault sequence.

If a problem develops that affects temperature regulation, the ambient temperature light (**arrow**) will flash for about one minute each time the ignition is switched **ON** or when the fault first happens.

The following faults will cause the ambient temperature light to flash:

- one or both inside temperature sensors is transmitting incorrect values.
- both outside temperature sensors are transmitting incorrect values.
- the feedback potentiometer on the temperature regulating flap is supplying incorrect values or the adjustment motor is not properly adjusted.
- the A/C refrigerant high pressure switch **F118** (red housing) has switched the A/C compressor **OFF** eight times in the last driving period. (This fault can be erased by depressing the **OFF** button or by cycling ignition switch.)

Memory display, channels 1-22

Diagnostic channel no.	Display	Specified display
1	System error	00 = no system error 09 = coolant temperature sensor — interruption Displayed system errors — see section D8-30 **Note** Coolant temperature sensor will be phased in during production.
2	Measurement value of inside temperature sensor **G86** on roof	Depends on temperature — see table, section D8-300
3	Measurement value of inside temperature sensor **G56** on instrument panel	
4	Measurement value of outside temperature sensor **G57** (plenum)	Depends on temperature — see table, section D8-240
5	Measurement value of outside temperature sensor **G17** — cowl	
6	Measurement value of coolant temperature sensor **G62** **Note** Will be phased in during production.	Depends on temperature — see table, section D8-310 **Note** Display value for vehicles without coolant temperature sensor 255 = open circuit
7	Graphic display of output control information for A/C programmer	Depends on program — see section D8-40

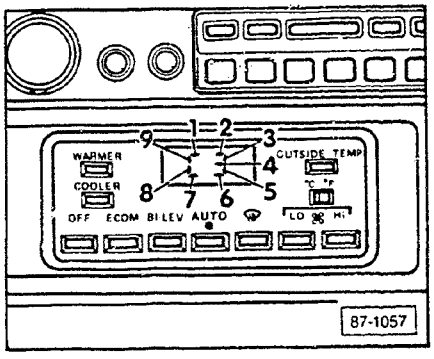
Diagnostic channel no.	Display	Specified display
8	Actual value of feedback potentiometer on temperature regulating flap servo motor, **V68**	Depends on program — A numerical value for the position of the servo motor is shown
9	Specified value of feedback potentiometer on temperature regulating flap servo motor, **V68**	Depends on program Only check when the value in channel 8 is between 30 and 200. Actual servo motor position (channel 8) and specified servo motor position (channel 9) must not differ by more than 3 If difference is greater than 3, ■ adjust feedback potentiometer, see Repair Group 87 • specified value 9-14 (up to **VIN: 44 LN 009586**) • specified value 9-25 (from **VIN: 44 LN 009586**)
10	Specified voltage on fresh air blower **V2** (coded)	Depends on program **Note** Specified voltage in volts. ■ see diagnostic channel no. 15
11	Vehicle electrical system voltage	Depends on instantaneous operating condition greater than 9.5 volts
12	Total of electrical system voltage interruptions — values between 5 and 9.5V **Note** Values less than 5 volts are recognized as an open low-pressure switch.	Depends on running performance since display was last erased **Note** Erase (for example, by disconnecting the battery).
13	Program number	No determination, is of no significance for troubleshooting
14	Switch position of high-pressure switch **F118** (red housing)	0-5 (high-pressure switch closed)
15	Specified voltage on fresh air blower **V2** in volts	Depends on program

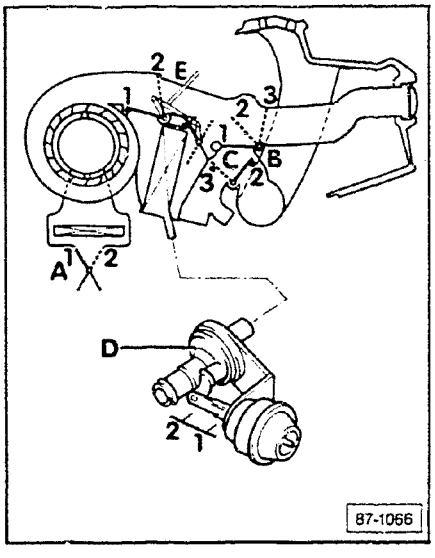
Diagnostic channel no.	Display	Specified display
16	Pulse counter	Of no significance for troubleshooting. (counts from 0-256)
17	Graphic display of compressor shut-off conditions	Depends on program — see section D8-50
18	Graphic display of electrical outputs	Depends on program — see section D8-60
19	Number of times compressor shut off via high-pressure switch **F118** (red housing)	Depends on running performance since display was last reset **Note** Reset (for example, by disconnecting the battery).
20	Number of times compressor shut off via high-pressure switch **F118** (red housing) since last ignition switch cycle or reset from **OFF** button	0 **Note** After 8th shut-off during a driving period, the compressor does not switch on again.
21	Program number	Of no significance for troubleshooting
22	Speed signal, new display from August, 1988 model year **Note** At high vehicle speeds fresh air blower speed is limited in "Fresh Air" mode.	00 when vehicle stopped 01 or greater dependent on vehicle speed

Errors displayed on memory channel 1

Error code	Error code	Correction of error
00	No error recognized	
01	Inside temperature sensor **G56** (instrument panel), open circuit	■ check affected component and related wiring according to wiring diagram
02	Inside temperature sensor **G56** (instrument panel), short-circuit	
03	Outside temperature sensor **G57** (plenum), open circuit	
04	Outside temperature sensor **G57** (plenum), short circuit	
05	Outside temperature sensor **G17** (cowl), open circuit	
06	Outside temperature sensor **G17** (cowl), short circuit	
07	Feedback potentiometer on adjustment motor for temperature regulating flap, **V68** interruption/open	■ check adjustment motor for temperature regulating flap **V68** (with feedback potentiometer), section D8-190
08	Feedback potentiometer on adjustment motor for temperature regulating flap, **V68** short circuit	
09	Coolant temperature sensor **G62**, open circuit	■ check coolant temperature sensor **G62** and its wiring according to diagram **Note** Coolant temperature sensor will be phased in during production.
10	Coolant temperature sensor **G62**, short circuit	

Error code number	Error code	Correction of error
11	Inside temperature sensor **G68** (roof), open circuit	■ check inside temperature sensor (roof) and its wiring according to wiring diagram
12	Inside temperature sensor **G68** (roof), short circuit	
13	Electrical system voltage is or was once less than 9.5 V but greater than 5 V during the current driving period **Note** Values less than 5 V are recognized as an open low-pressure switch.	■ check electrical system voltage display, section D8-250
14	Compressor off; high-pressure switch **F118** (red housing) cycled 8 times	■ check high-pressure switch **F118** (red housing), section D8-230
15	Adjustment motor for temperature regulating flap **V68** (with feedback potentiometer) is set improperly	■ check adjustment motor for temperature regulating flap **V68** (with feedback potentiometer), section D8-190
16	High-pressure switch **F118** has open circuit or cycled at least 1 time during current driving period	■ check high-pressure switch **F118** (red housing) and its wiring according to wiring diagram





Memory display channel 7, checking

This channel displays the control information to the A/C programmer.

Segment 1 lights or flashes
Temperature regulating flap **E** moves in direction **2** "heating," see section D8-60

Segment 2 lights
Recirculation/fresh air flap **A** is in position **2** "recirculation mode."

Segments 3 and 5 light up
Regulating flap **B** (footwell/defrost outlet) is in position **1** "air from instrument panel outlets."

Segment 4 lights up
Heater valve **D** is in position **1** (closed).

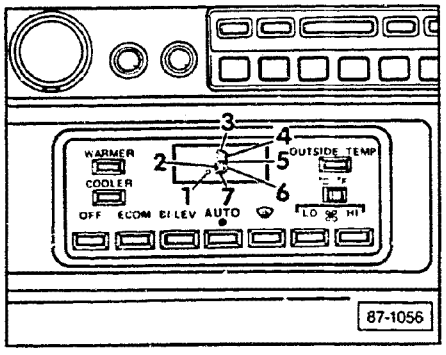
Segment 5 lights up
(segment 3 does not light up)
Regulating flap **B** (outlets for footwell/defrost) is in position **2** "air from instrument panel outlets and to regulating flap (footwell/defrost)."

Segment 6 lights up
Regulating flap **C** (footwell/defrost) is in position **2** "air from footwell outlets."

Segment 7 lights up or flashes
Temperature regulating flap **E** moves in direction **1** "cooling," see section D8-60

Segment 8 lights up
Compressor on.

Segment 9 lights up
Radiator cooling fan runs on 1st speed.



Memory display channel 17, checking

Segment 1 lights up
Compressor on.

Segment 2 lights up
Compressor off. A/C refrigerant high-pressure switch **F118** (red housing) open.

Segment 3 lights up
Compressor off. Outside temperature too low or operating mode set to **ECON** or **OFF**. Check outside temperature sensors, see section D8-240.

Segment 4 lights up
Compressor off. Electrical system voltage less than 9.5V. See section D8-250.

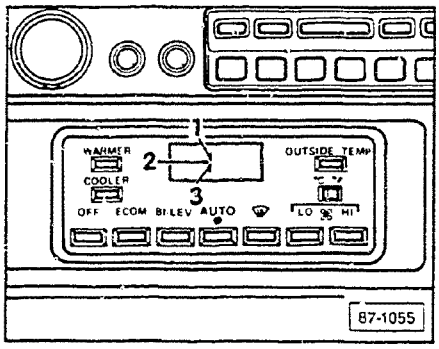
Segment 5 lights up
Compressor off. A/C refrigerant low-pressure switch **F73** open. See section D8-260.

Segment 6 lights up
Compressor off. Kick-down function activated. See section D8-270 (through 1990 m.y.) or section D8-280 (from 1991 m.y.).

Note

A/C compressor switches back on after 12 seconds.

Segment 7 lights up
Compressor off. Coolant temperature warning switch, **F14** or electronic thermoswitch (multi-function temperature sensor), **F76** closed. See section D8-290.



Memory display channel 18, checking

Segment 1 lights
Compressor on.

Segment 2 lights
Radiator cooling fan runs on 1st speed.

Segment 3 lights
Idle speed increases (A/C on).

Note

Idle speed increase does not apply to all vehicles. See section D8-320.

Temperature regulating flap, positions

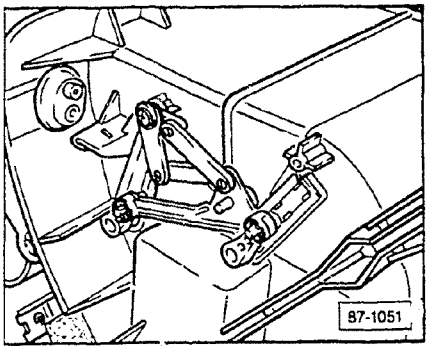


Fig. 1 Cooling position

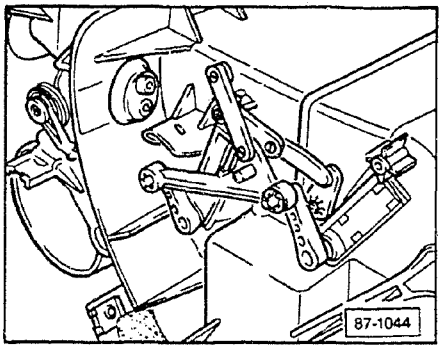
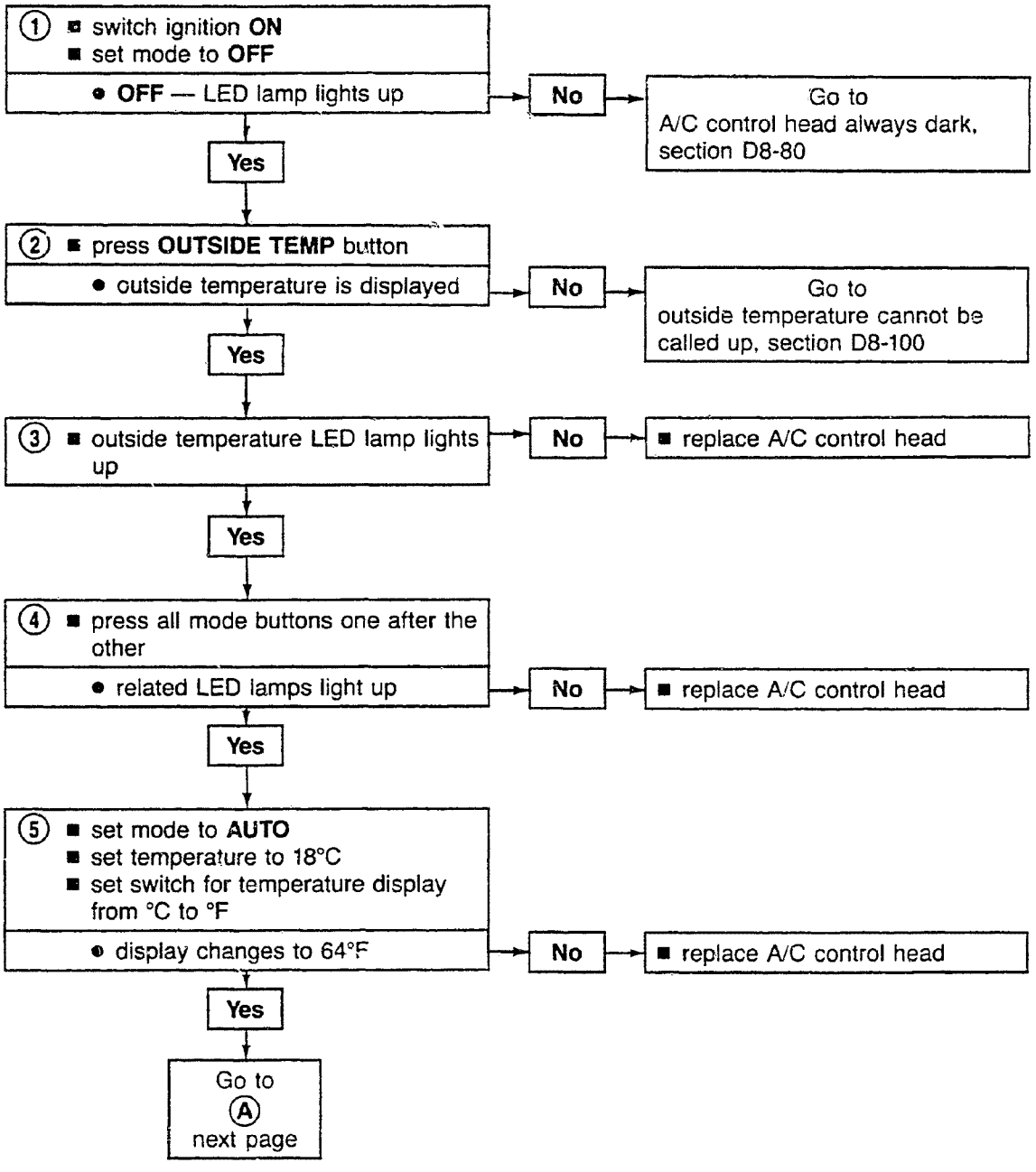


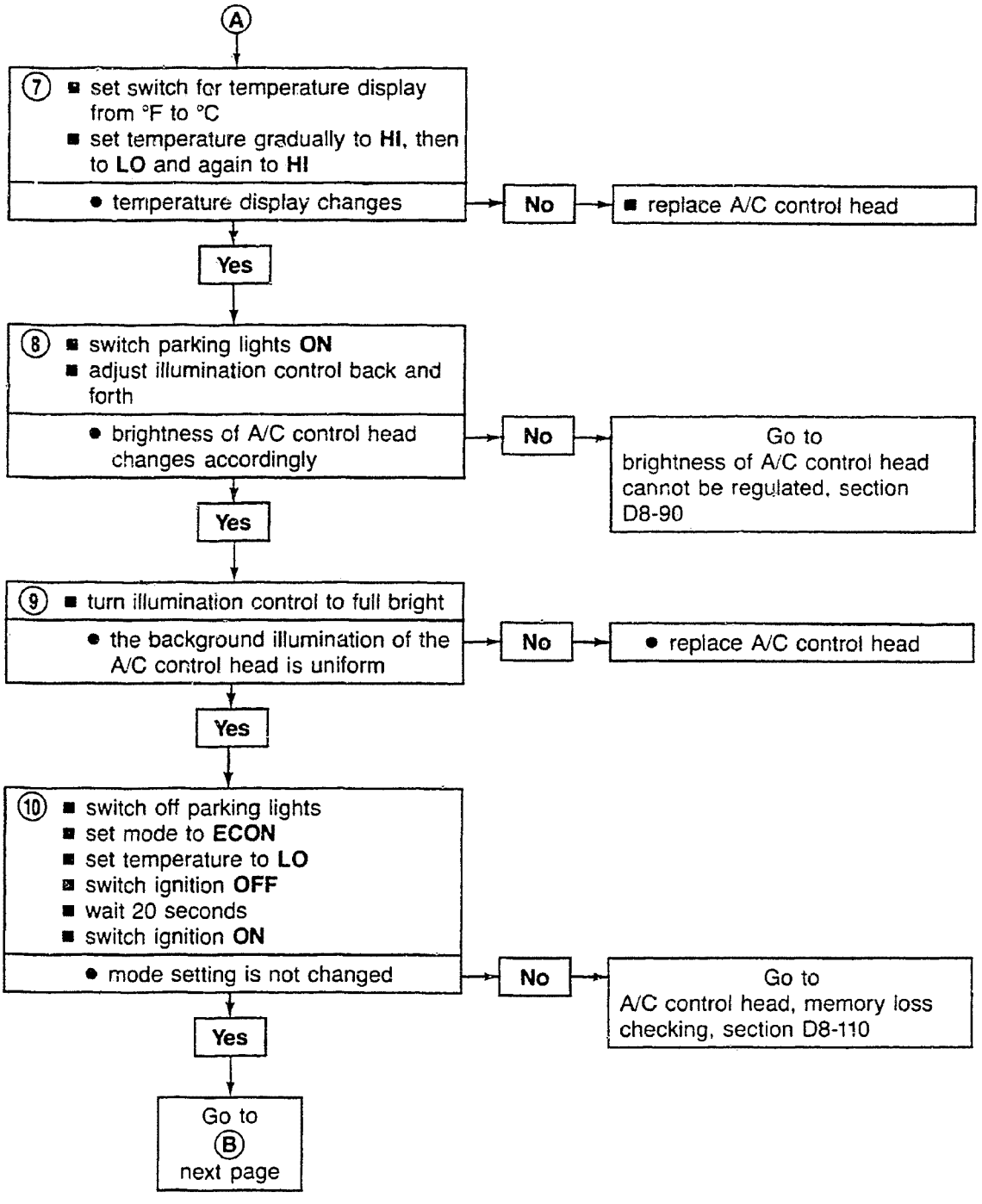
Fig. 2 Heating position

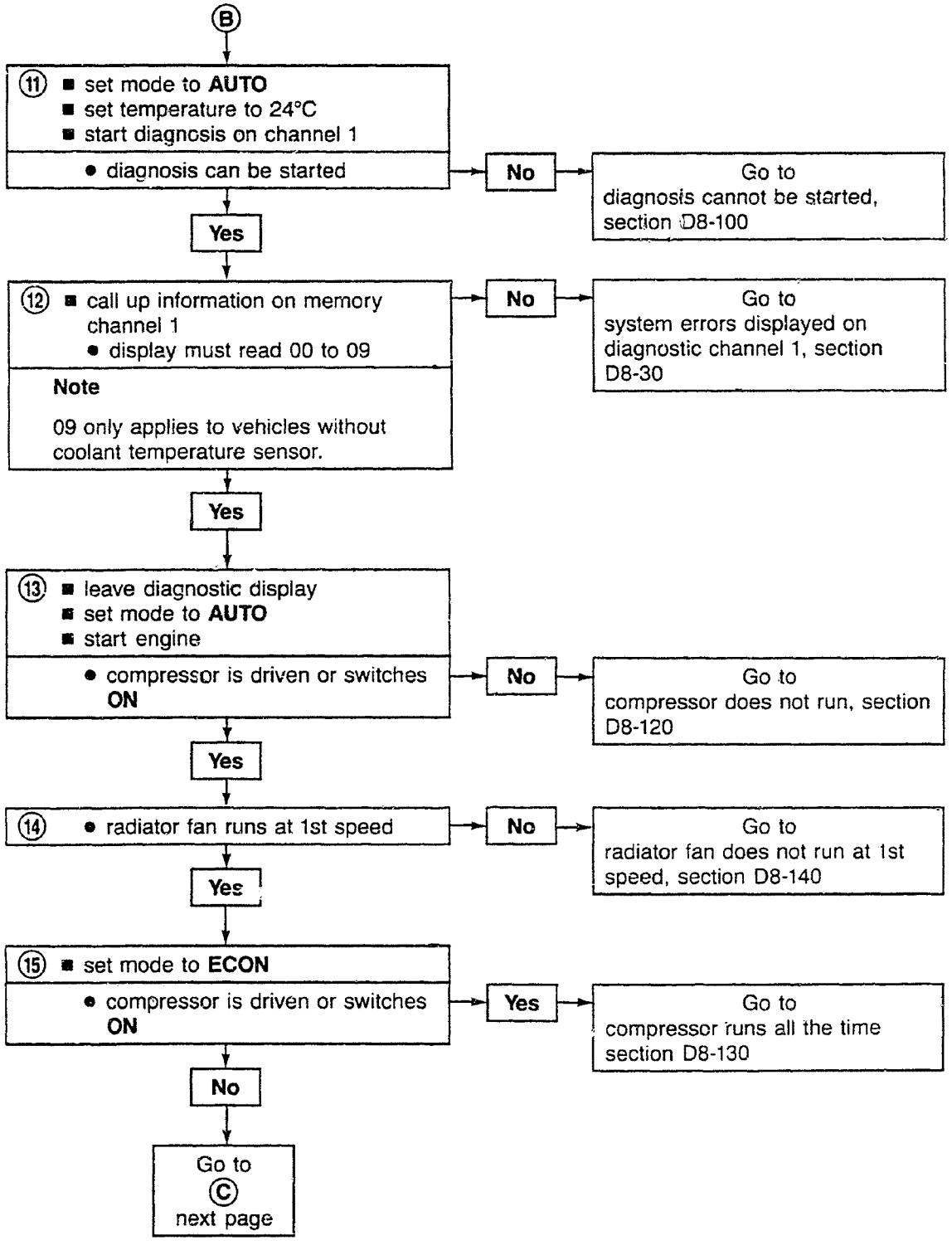
Digital climate control, quick check

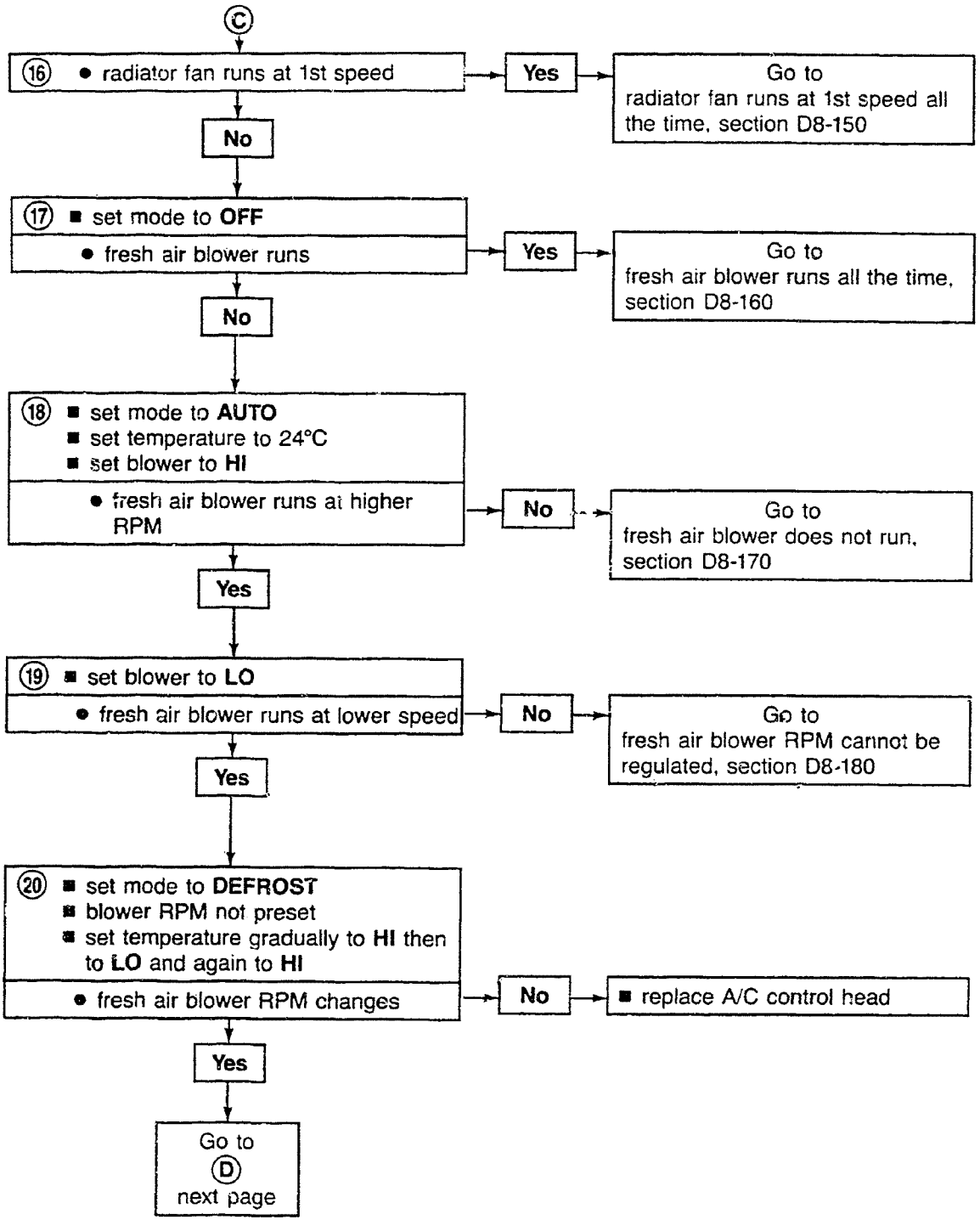
Note

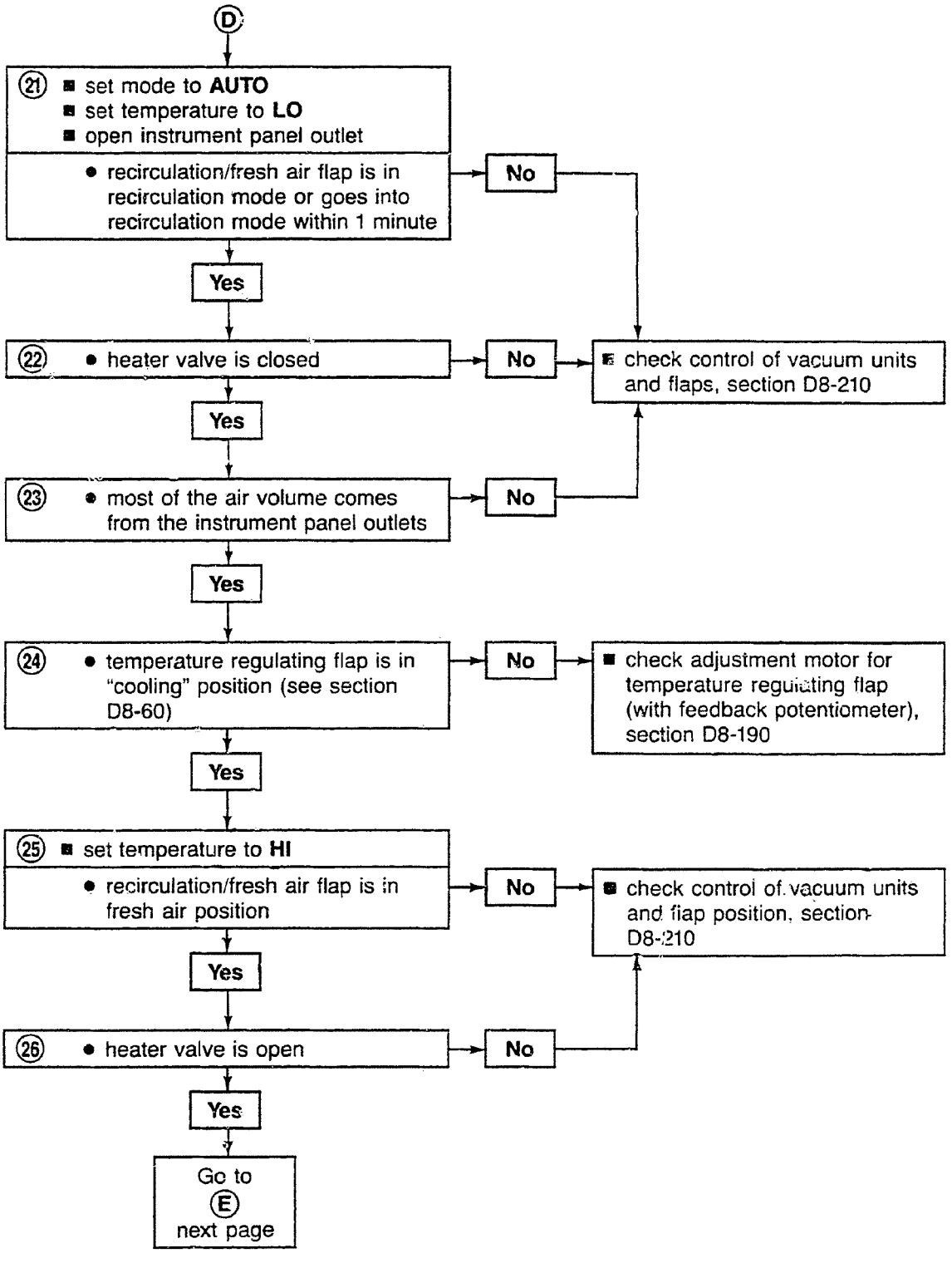
The test steps listed must be followed in their entirety and in sequence.

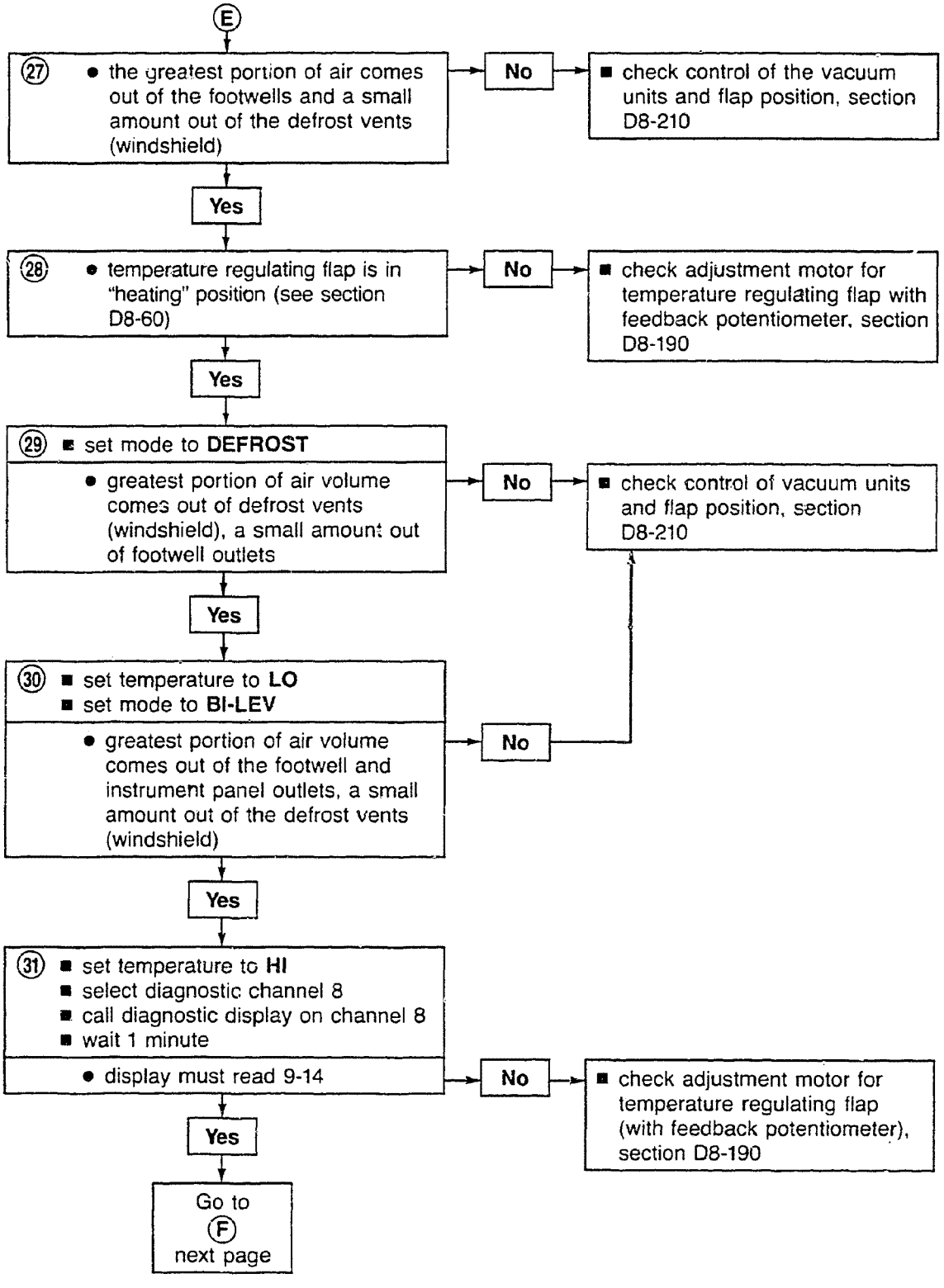


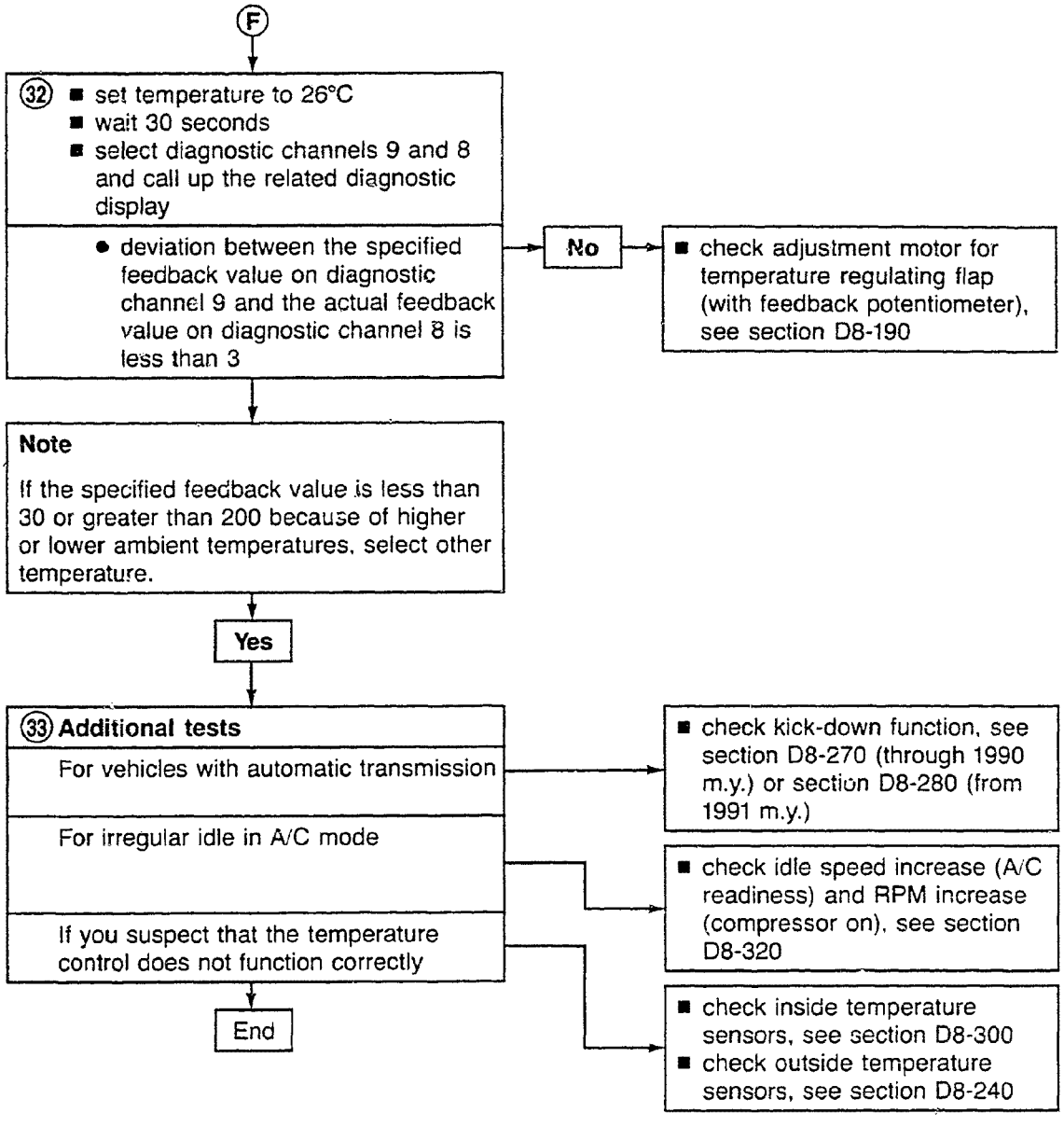

A
7
■ set switch for temperature display from °F to °C
■ set temperature gradually to HI, then to LO and again to HI
● temperature display changes
No
■ replace A/C control head
Yes
8
■ switch parking lights ON
■ adjust illumination control back and forth
● brightness of A/C control head changes accordingly
No
Go to brightness of A/C control head cannot be regulated, section D8-90
Yes
9
■ turn illumination control to full bright
● the background illumination of the A/C control head is uniform
No
● replace A/C control head
Yes
10
■ switch off parking lights
■ set mode to ECON
■ set temperature to LO
■ switch ignition OFF
■ wait 20 seconds
■ switch ignition ON
● mode setting is not changed
No
Go to A/C control head, memory loss checking, section D8-110
Yes
Go to B next page


B
⑪ ■ set mode to AUTO
■ set temperature to 24°C
■ start diagnosis on channel 1
● diagnosis can be started
No
Go to diagnosis cannot be started, section D8-100
Yes
⑫ ■ call up information on memory channel 1
● display must read 00 to 09
Note
09 only applies to vehicles without coolant temperature sensor.
No
Go to system errors displayed on diagnostic channel 1, section D8-30
Yes
⑬ ■ leave diagnostic display
■ set mode to AUTO
■ start engine
● compressor is driven or switches ON
No
Go to compressor does not run, section D8-120
Yes
⑭ ● radiator fan runs at 1st speed
No
Go to radiator fan does not run at 1st speed, section D8-140
Yes
⑮ ■ set mode to ECON
● compressor is driven or switches ON
Yes
Go to compressor runs all the time section D8-130
No
Go to Ⓒ next page

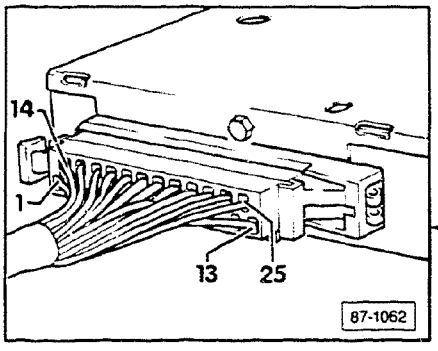

Ⓒ
⑯ • radiator fan runs at 1st speed
Yes
Go to radiator fan runs at 1st speed all the time, section D8-150
No
⑰ ■ set mode to OFF
• fresh air blower runs
Yes
Go to fresh air blower runs all the time, section D8-160
No
⑱ ■ set mode to AUTO
■ set temperature to 24°C
■ set blower to HI
• fresh air blower runs at higher RPM
No
Go to fresh air blower does not run, section D8-170
Yes
⑲ ■ set blower to LO
• fresh air blower runs at lower speed
No
Go to fresh air blower RPM cannot be regulated, section D8-180
Yes
⑳ ■ set mode to DEFROST
■ blower RPM not preset
■ set temperature gradually to HI then to LO and again to HI
• fresh air blower RPM changes
No
■ replace A/C control head
Yes
Go to Ⓓ next page


D
21
set mode to AUTO
set temperature to LO
open instrument panel outlet
recirculation/fresh air flap is in recirculation mode or goes into recirculation mode within 1 minute
No
Yes
22
heater valve is closed
No
check control of vacuum units and flaps, section D8-210
Yes
23
most of the air volume comes from the instrument panel outlets
No
Yes
24
temperature regulating flap is in "cooling" position (see section D8-60)
No
check adjustment motor for temperature regulating flap (with feedback potentiometer), section D8-190
Yes
25
set temperature to HI
recirculation/fresh air flap is in fresh air position
No
check control of vacuum units and flap position, section D8-210
Yes
26
heater valve is open
No
Yes
Go to E next page


E
27
• the greatest portion of air comes out of the footwells and a small amount out of the defrost vents (windshield)
No
■ check control of the vacuum units and flap position, section D8-210
Yes
28
• temperature regulating flap is in "heating" position (see section D8-60)
No
■ check adjustment motor for temperature regulating flap with feedback potentiometer, section D8-190
Yes
29
■ set mode to DEFROST
• greatest portion of air volume comes out of defrost vents (windshield), a small amount out of footwell outlets
No
■ check control of vacuum units and flap position, section D8-210
Yes
30
■ set temperature to LO
■ set mode to BI-LEV
• greatest portion of air volume comes out of the footwell and instrument panel outlets, a small amount out of the defrost vents (windshield)
No
Yes
31
■ set temperature to HI
■ select diagnostic channel 8
■ call diagnostic display on channel 8
■ wait 1 minute
• display must read 9-14
No
■ check adjustment motor for temperature regulating flap (with feedback potentiometer), section D8-190
Yes
Go to
F
next page


F
32
set temperature to 26°C
wait 30 seconds
select diagnostic channels 9 and 8 and call up the related diagnostic display
deviation between the specified feedback value on diagnostic channel 9 and the actual feedback value on diagnostic channel 8 is less than 3
No
check adjustment motor for temperature regulating flap (with feedback potentiometer), see section D8-190
Note
If the specified feedback value is less than 30 or greater than 200 because of higher or lower ambient temperatures, select other temperature.
Yes
33 Additional tests
For vehicles with automatic transmission
check kick-down function, see section D8-270 (through 1990 m.y.) or section D8-280 (from 1991 m.y.)
For irregular idle in A/C mode
check idle speed increase (A/C readiness) and RPM increase (compressor on), see section D8-320
If you suspect that the temperature control does not function correctly
check inside temperature sensors, see section D8-300
check outside temperature sensors, see section D8-240
End

A/C control head, is always dark



- switch ignition **ON**
- switch parking lights **OFF**
- measure voltage between cavities **25** and **7** on A/C control head connector

• less than 8V	• greater than 8V

- repair voltage supply for cavity **25** or ground connection of cavity **7** to A/C control head according to wiring diagram

End

- measure voltage between cavities **13** and **7** on A/C control head connector

• greater than 8V	• less than 8V

- remove A/C control head connector
- measure voltage between cavities **13** and **7** on connector

• greater than 8V	• less than 8V

- replace A/C control head

End

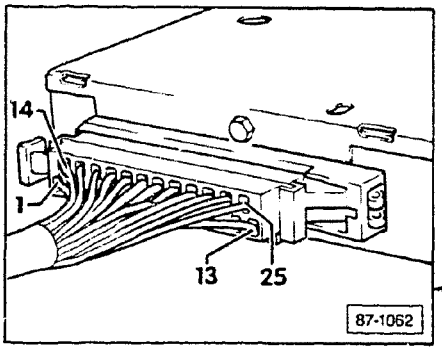
- replace A/C control head

End

- repair short circuit in wiring to cavity **13** according to wiring diagram

End

A/C control head illumination, cannot be regulated



- switch ignition **ON**
- set mode to **AUTO**
- set temperature to 24°C
- switch parking lights **ON**
- turn illumination control to full bright
- measure voltage between cavities **25** and **7** on A/C control head connector

• less than 8V	• greater than 8V

- repair voltage supply from cavities **25** or ground connection from cavity **7** according to wiring diagram

End

- measure voltage between cavities **24** and **7** on A/C control head connector

• less than 8V	• greater than 8V

- repair voltage supply to cavity **24** according to wiring diagram

End

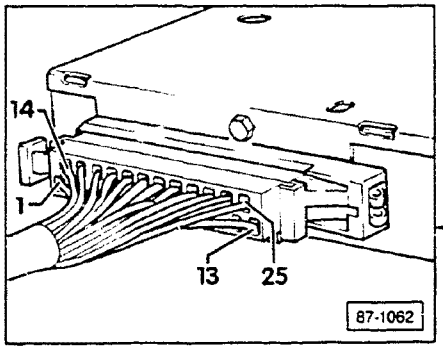
- measure voltage between cavities **13** and **7** on A/C control head connector

• less than 8V	• greater than 8V

Go to Ⓐ next page

- repair voltage supply to cavity **13** according to wiring diagram

End



Ⓐ

- turn illumination control to full bright
- measure voltage between cavities **24** and **7** on A/C control head connector

• less than 6V	• greater than 6V

- replace A/C control head

End

- remove A/C control head connector
- measure voltage between cavities **24** and **7** on connector

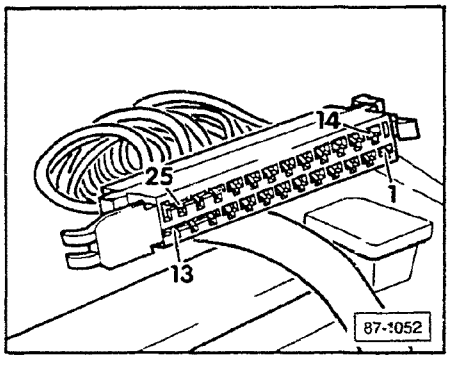
• less than 6V	• greater than 6V

- replace A/C control head

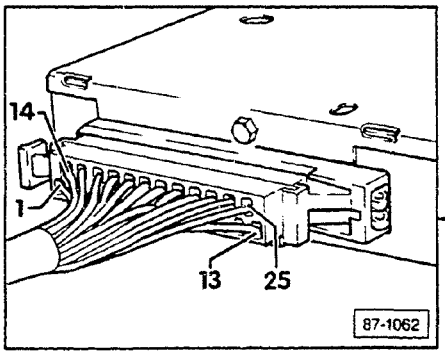
End

- eliminate short circuit in wiring to cavity **24** according to wiring diagram

End



Fault memory cannot be initiated/ outside temperature cannot be displayed



- switch ignition **ON**
- measure voltage between cavities **25** and **7** on A/C control head connector

• less than 8V	• greater than 8V

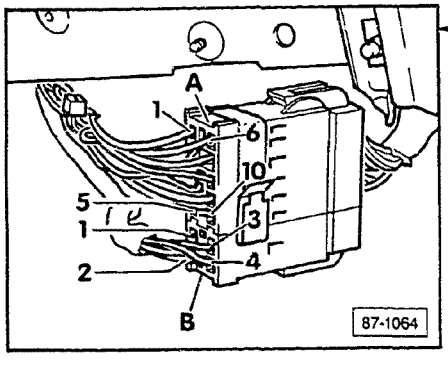
- repair voltage supply from cavities **25** or ground connection from cavity **7** according to wiring diagram

End

- measure voltage between cavities **11** and **7**

• greater than 6V less than 4.7V	• greater than 4.7V less than 6V

Go to section D8-220

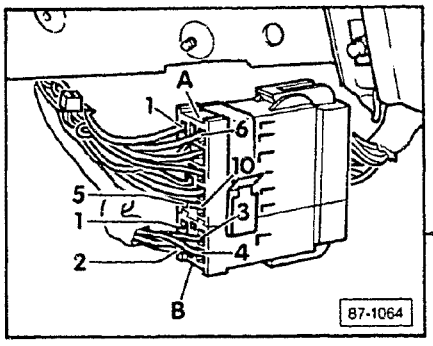


- remove connector to A/C programmer
  - troubleshooting can be initiated
  - outside temperature can be called up

Yes	No

Go to (A) next page

Go to (B) two pages following



(A)

- reconnect connector
- measure voltage on connector between cavities **4** and **7**

• less than 8V	• greater than 8V

- repair voltage supply to cavity **4** or ground connection from cavity **7** connector **A** according to wiring diagram

End

- check wiring between connector **A** cavities **8, 9, 10** and cavities **10, 21, 22** of A/C control head connector for open or shorted circuits using wiring diagram

- wiring **OK**

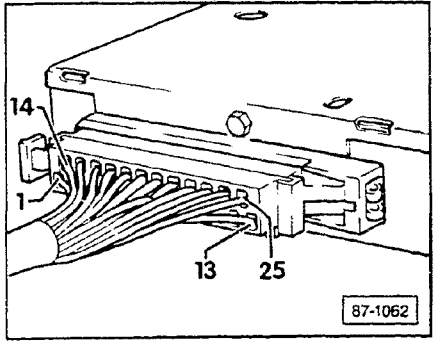
Yes	No

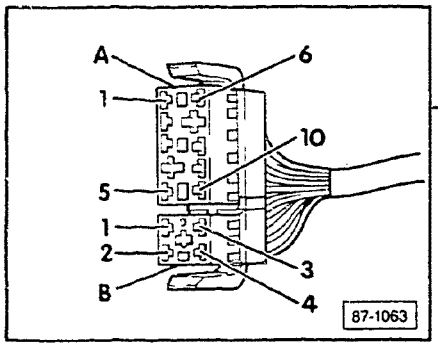
- replace A/C programmer

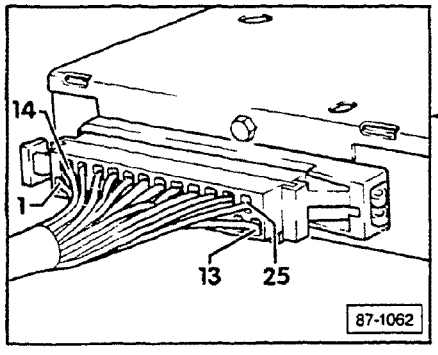
End

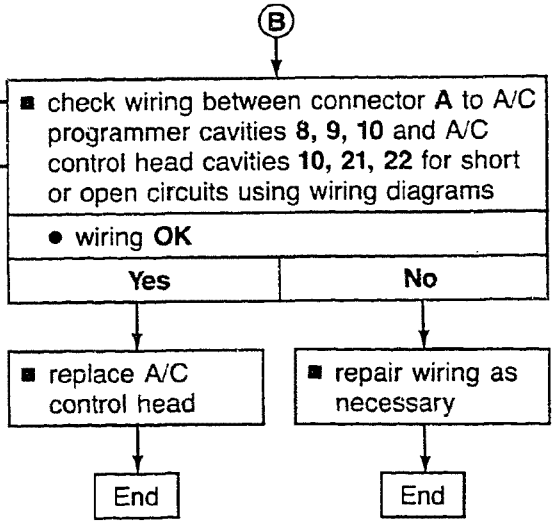
- repair as necessary

End

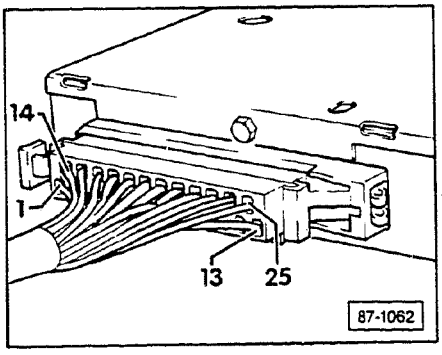



A
1
5
1
2
B
6
10
3
4
87-1063


14
1
13
25
87-1062


B
■ check wiring between connector A to A/C programmer cavities 8, 9, 10 and A/C control head cavities 10, 21, 22 for short or open circuits using wiring diagrams
• wiring OK
Yes
No
■ replace A/C control head
■ repair wiring as necessary
End
End

A/C control head memory loss, checking



- switch ignition **OFF**
- measure voltage between cavities **12** and **7** on A/C control head connector

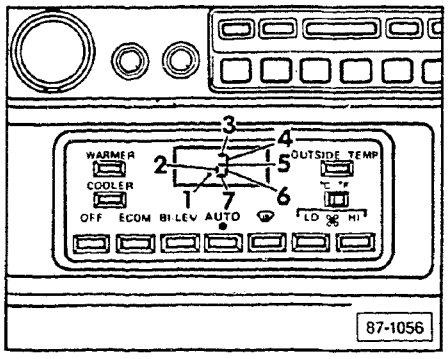
• less than 8V	• greater than 8V

- repair voltage supply to cavity **12** or ground connection of cavity **7** according to wiring diagram

End

- replace A/C control head

End



Compressor does not run in AUTO, BI-LEV and DEF modes

- switch ignition **ON**
- set mode to **AUTO**
- set temperature to 24°C
- start diagnosis on channel 17

- segment **1** (compressor on) lights up

No	Yes

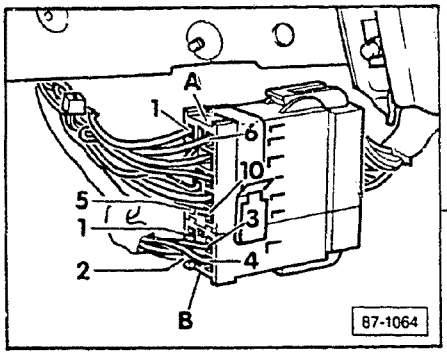
Yes → Go to Ⓐ next page

No →

- segment **2** (high-pressure switch) lights up → Go to section D8-230
- segment **3** (low outside temperature or mode set to **ECON** or **OFF**) → Go to section D8-240
- segment **4** (electrical system voltage too low 5-9.5V) lights up → Go to section D8-250
- segment **5** (low-pressure switch) lights up → Go to section D8-260
- segment **6** (kick-down function) lights up → Go to section D8-270 (through 1990 m.y.) or section D8-280 (from 1991 m.y.)
- segment **7** (hot light switch) lights up
- none of the segments **1-7** lights up → Go to section D8-290

- replace A/C control head

End



(A)

■ measure voltage between cavities **5** and **7** at A/C programmer connector **A**

• less than 1.5V	• greater than 1.5V

■ check the following components and their wiring according to wiring diagram:

- A/C relay, **J32**
- A/C compressor clutch, **N25**

End

■ check wiring from A/C programmer connector cavity **5** to A/C relay for short circuit according to wiring diagram

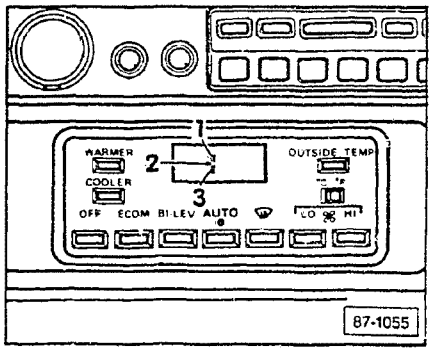
• wiring **OK**

Yes	No

■ repair as necessary

End

Go to section D8-220



Compressor runs in ECON and OFF modes

- switch ignition **ON**
- set mode to **ECON**
- set temperature to 24°C
- start diagnosis on channel 18

- segment **1** (compressor on) lights up

Yes | **No**

Yes:

- replace A/C control head

End

No:

- separate connector to A/C programmer
- start engine

- compressor runs

Yes | **No**

Yes:

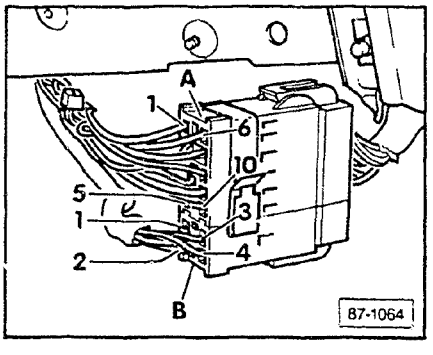
- check the following components and their wiring according to wiring diagram:
  - A/C relay, **J32**
  - A/C compressor clutch, **N25**

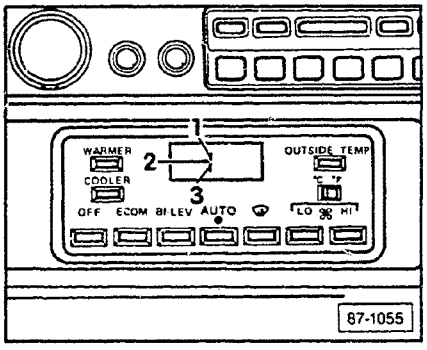
End

No:

- reconnect connector

Go to section D8-220





Radiator cooling fan, V7 does not run at 1st speed (in AUTO, BI-LEV, AND DEF modes)

- switch ignition **ON**
- set mode to **AUTO**
- set temperature to 24°C
- start diagnosis on channel 18

- segment **2** (radiator fan, 1st speed on) lights up

No | **Yes**

- replace A/C control head

End

- measure voltage between cavities **3** and **7** on connector to A/C programmer

- less than 1.5V
- greater than 1.5V

- check the following components and their wiring according to wiring diagram:

- series resistor for radiator cooling fan, **N39**
- radiator cooling fan, **V7**
- radiator cooling fan after-run control unit, **J138** or **J26**

End

- check wiring from A/C programmer connector **A** cavity **3** to radiator cooling fan after-run control unit **J138** or **J26** using wiring diagram

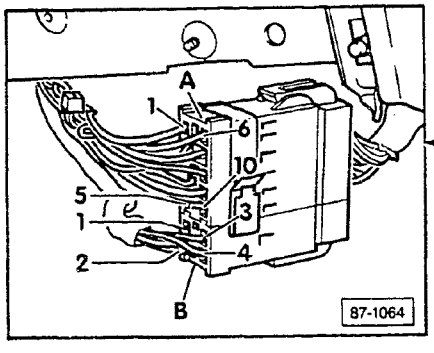
- wiring **OK**

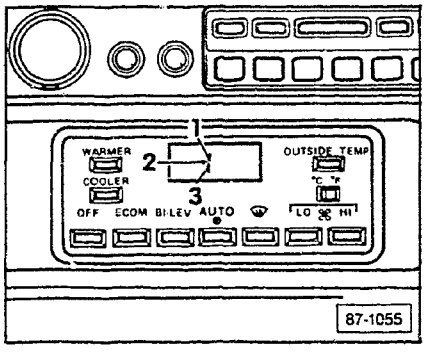
Yes | **No**

Go to section D8-220

- repair as necessary

End





Radiator cooling fan, V7 always runs at 1st speed (in ECON and OFF modes)

- switch ignition **ON**
- set mode to **ECON**
- set temperature to 24°C
- start diagnosis on channel 18

- segment 2 (fan on 1st speed) lights up

Yes | **No**

Yes

- replace A/C control head

End

No

- separate connector to A/C control head

- fan continues to run at 1st speed

No | **Yes**

No

- reconnect connector

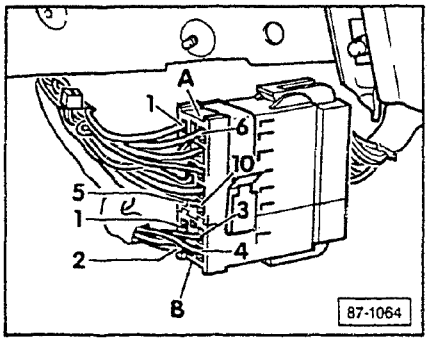
Go to section D8-220

Yes

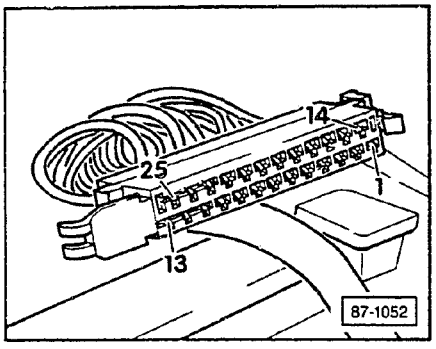
- check the following components and their wiring according to wiring diagram

- radiator cooling fan series resistor, **N39**
- radiator cooling fan, **V7**
- radiator cooling fan after-run control unit **J138** or **J26** and thermoswitch **F95**

End



A/C fresh air blower always runs (in OFF mode)



- switch ignition **ON**
- remove connector from A/C control head
- fresh air blower continues to run

No | **Yes**

- measure voltage between cavities **25** and **7** on A/C control head connector

- greater than 8 V
- less than 8 V

- replace A/C control head

End

- repair voltage supply from cavity **25** or ground connection from cavity **7** according to wiring diagram

End

- remove both connectors from A/C blower control unit, **J126**
- fresh air blower runs

Yes | **No**

- repair short circuit in wiring from A/C blower control unit to fresh air blower according to wiring diagram

End

- check wiring from A/C control head connector cavity **15** to blower control unit for short circuit according to wiring diagram

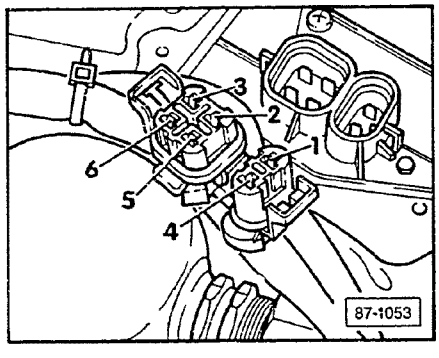
No | **Yes**

- replace control unit for blower

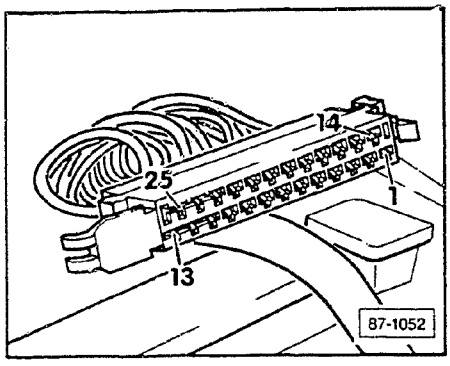
End

- repair as necessary

End



Fresh air blower does not run (in AUTO, BI-LEV, DEF or ECON modes)



- switch ignition **ON**
- remove connector from A/C control head
- bridge cavities **15** and **25** with LED test lamp

- fresh air blower runs

Yes | **No**

- check wiring from A/C control head connector cavity **14** to A/C blower control unit for short circuit according to wiring diagram

Yes | **No**

- repair as necessary
- replace A/C control head

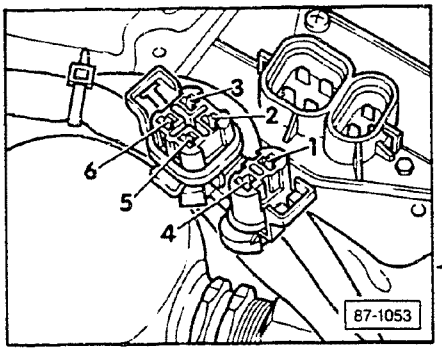
End

- reconnect A/C control head connector
- set mode to **AUTO**
- set temperature to **LO**
- set blower to **HI**
- remove both connectors from blower control unit, J 126
- bridge cavities **6** and **5** with LED test lamp

- LED test lamp lights up

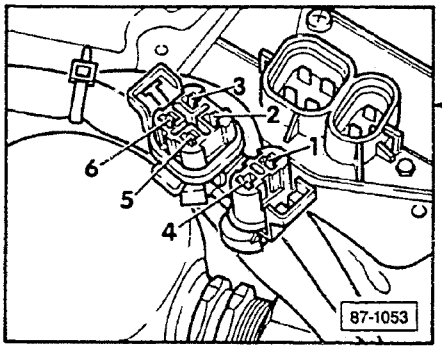
Yes | **No**

Go to Ⓐ next page



- repair break in wiring to A/C blower control unit cavity **5** or **6** according to wiring diagram

End



(A)

- bridge cavities **1** and **3** of A/C blower control unit
  - fresh air blower runs

Yes	No

Yes

- replace A/C blower control unit

End

No

- measure voltage between cavities **1** and **5** on A/C blower control unit connector

• greater than 8V	• less than 8V

greater than 8V

- check wiring from A/C blower control unit connector to fresh air blower and ground connection from fresh air blower according to wiring diagram
  - wiring **OK**

Yes	No

Yes

- replace fresh air blower

End

No

- repair as necessary

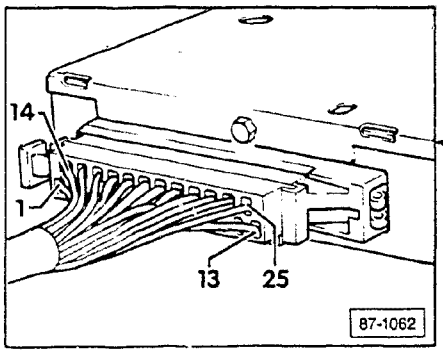
End

less than 8V

- repair voltage supply to cavity **1** see wiring diagram

End

Fresh air blower speed cannot be regulated



- switch ignition **ON**
- measure voltage between cavities **25** and **7** on A/C control head connector

• less than 8V	• greater than 8V

- repair voltage supply from cavities **25** or ground connection from cavity **7** according to wiring diagram

End

- check wiring from A/C control head connector cavities **14** and **15** to A/C blower control unit **J126** for open or shorted circuits according to wiring diagram

• wiring **OK**

Yes	No

- repair as necessary

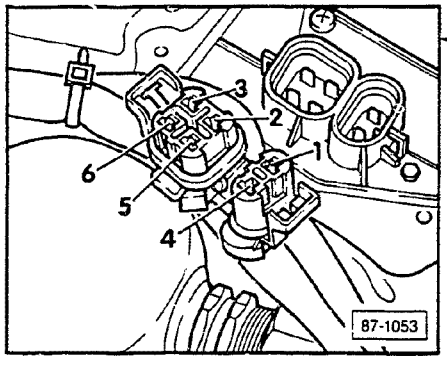
- check A/C blower control unit ground connection from cavity **5** for open circuit

• ground connection **OK**

Yes	No

- repair as necessary

End



- replace A/C blower control unit
- check function

• fresh air blower RPM can be regulated

Yes	No

End

- reinstall old A/C blower control unit
- replace A/C control head

End

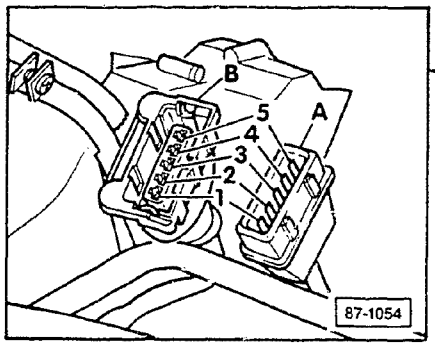
Temperature regulating flap servo motor, V68 (with feedback potentiometer), checking

- switch ignition **ON**
- set mode to **AUTO**
- set temperature to 24°C
- start diagnosis on channel 1

• display neither 07, 08 nor 15	• display 15 (without 07 or 08)	• display 07 or 08 (possibly with 15)

Go to Ⓑ next page

Go to Ⓓ three pages following



- separate 5-point connector on adjustment motor for temperature regulating flap
- measure voltage between cavities **3** and **4** on connector **B**

• greater than 6V or less than 4.7V	• greater than 4.7V and less than 6V

- check wiring from 5-point connector on adjustment motor cavity **5** to A/C control head connector cavity **3** for open or shorted circuits according to wiring diagram

- wiring **OK**

Yes	**No**

Go to Ⓐ next page

- repair as necessary

End

- check wiring from 5-point connector on adjustment motor cavities **3** and **4** to A/C control head connector for open or shorted circuits

- wiring **OK**

No	**Yes**

- repair as necessary

End

Go to section D8-220

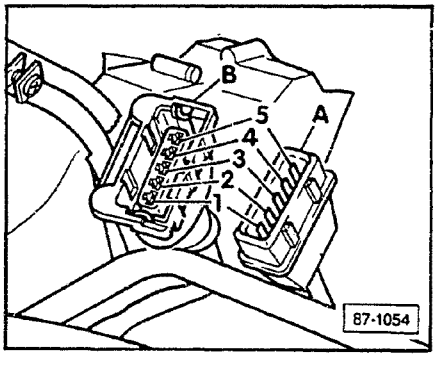
(A)

- switch ignition **OFF**
- wait 10 seconds
- switch ignition **ON**
- start diagnosis on channel 1

• display 08	• display 07

- replace A/C control head

End



- bridge cavity **4** and **5** of 5-point connector **B** with jumper wire

• an additional 08 appears on the display

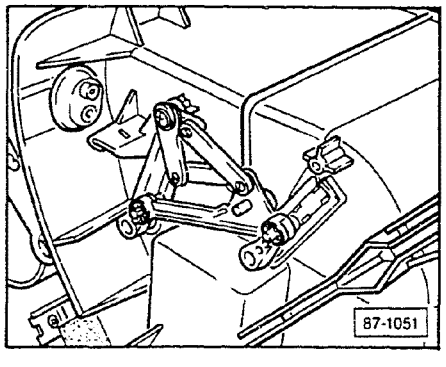
Yes	No

- replace A/C control head

- replace adjustment motor for temperature regulating flap with feedback potentiometer

End

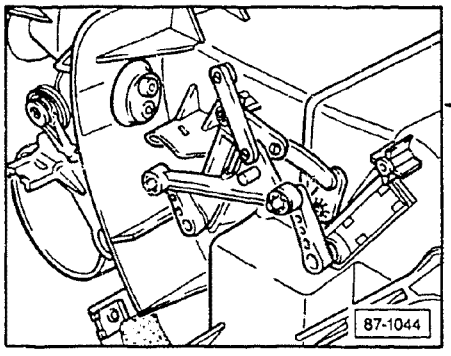
(B)



• gradually set temperature to **LO** and observe the movement of the temperature regulating flap linkage

• linkage moves in "cooling" direction

Yes	No
Go to (C) next page	Go to (D) two pages following



Ⓒ

■ gradually set temperature to **HI** and observe movement of temperature regulating flap linkage

• linkage moves in "heating" direction

Yes	No

Go to Ⓓ next page

■ start diagnosis on channel 8

• display 9-14 (up to **VIN: 44 LN 009586**) • display 9-25 (from **VIN: 44 LN 009586**)	• display greater than 14 / less than 9 (up to **VIN: 44 LN 009586**) • display greater than 25 / less than 9 (from **VIN: 44 LN 009586**)

■ adjust feedback potentiometer on adjustment motor to 12 (up to **VIN: 44 LN 009586**) or 20 (from **VIN: 44 LN 009586**)

Note

See Repair Group 87.

End

■ set temperature to 26°C
■ wait 30 seconds
■ start diagnosis on channel 8 and 9

• deviation between the specified feedback value on channel 9 and the actual feedback value on diagnostic channel 8, less than 3

Note

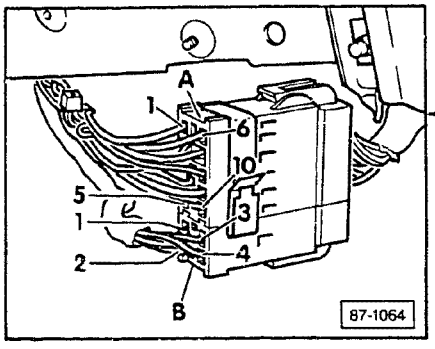
If the specified feedback value on diagnostic channel 9 is less than 30 or greater than 200 because of higher or lower ambient temperatures, select different temperature

Yes	No

End

■ replace A/C control head

End



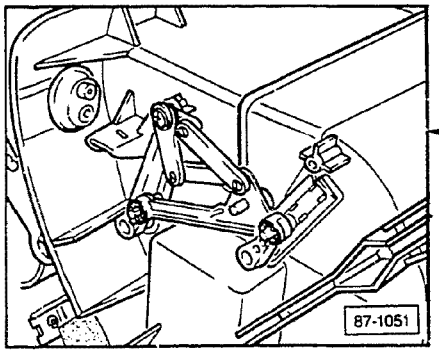
Ⓓ

- bridge cavities **1** and **2** of connector **A** to A/C programmer with LED test light
- set temperature to **LO**

- LED test lamp lights up or flashes

Yes	No

No → Go to Ⓕ two pages following



- linkage of temperature regulating flap moves in "cooling" direction

No	Yes

Yes → Go to Ⓔ next page

- check wiring from cavities **1** and **2** of connector **A** for A/C programmer to adjustment motor for temperature regulating flap for open or short circuit according to wiring diagram

- wiring **OK**

Yes	No

No → repair as necessary → End

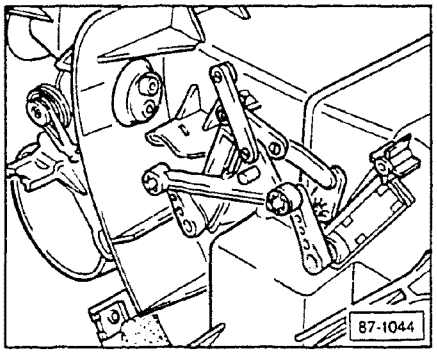
Yes →

- remove motor for temperature regulating flap
- check temperature regulating flap for ease of operation

Yes	No

No → replace temperature regulating flap → End

Yes → replace adjustment motor for temperature regulating flap → End



(E)

- set temperature to **HI**
  - LED test lamp lights up or flashes

Yes	No
	Go to (F) next page

- temperature regulating flap linkage moves in "heating" direction

No	Yes

- remove adjustment motor for temperature regulating flap
- check temperature regulating flap for ease of operation
  - easy to operate

Yes	No
replace adjustment motor for temperature regulating flap	repair temperature regulating flap

End

- check wiring from A/C control head cavities **3**, **6** and **11** to adjustment motor for temperature regulating flap for open or short circuits according to wiring diagram
  - wiring **OK**

No	Yes
repair as necessary	

End

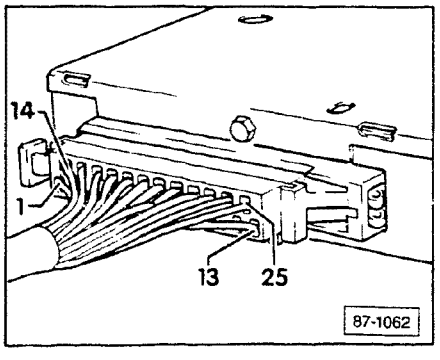
- replace adjustment motor for temperature regulating flap
- set temperature to 24°C
- call up diagnosis on channel 1
  - display 15

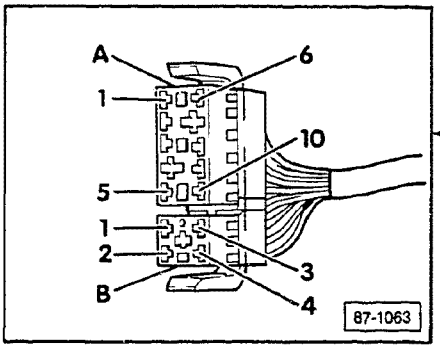
No	Yes

End

- exchange adjustment motor for temperature regulating flap
- replace A/C control head

End





(F)

- separate connector to A/C programmer
- measure resistance between cavity 1 and 2 on connector **A**

• greater than 29 ohms and less than 100 ohms	• less than 30 ohms or greater than 99 ohms

- check wiring from connector **A** to A/C programmer cavities **1** and **2** according to wiring diagram

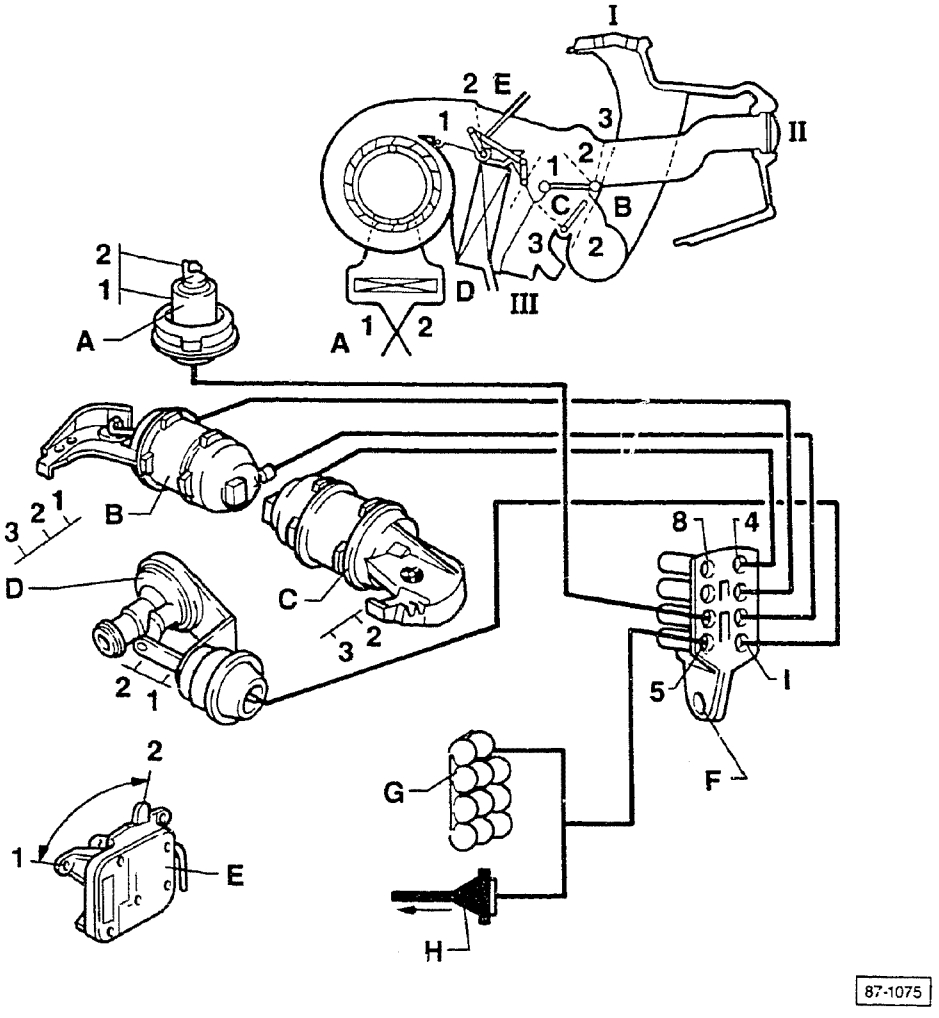
• wiring **OK**

Yes	No
Go to section D8-220	■ repair as necessary → End

- check wiring from connector **A** for A/C programmer cavities **1** and **2** to adjustment motor for open or short circuits

• wiring **OK**

Yes	No
■ replace adjustment motor → End	■ repair as necessary → End



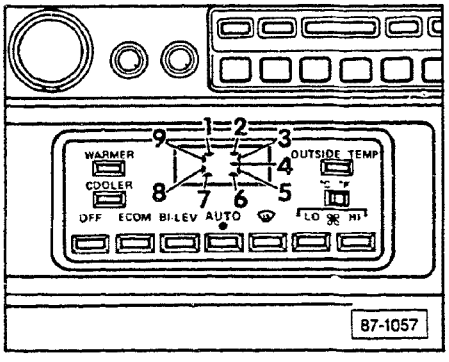
I — Defrost vent (windshield)
II — Instrument panel outlet
III — Footwell outlet
A — Vacuum unit for recirculation/fresh air flap
B — Vacuum unit for regulating flap (outlets, footwell/defrost)
C — Vacuum unit for regulating flap (footwell/defrost)
D — Vacuum unit for coolant check valve for heater
E — Adjustment motor for temperature regulating flap
F — Connector coupling for vacuum lines to A/C programmer
G — Vacuum reservoir
H Check valve

Vacuum units and flap positions, checking

(air distribution is not correct or water valve is in wrong position)

Note

Do this section only if referred here by the Quick Check test.



- start engine
- open all instrument panel air outlets
- set mode to **AUTO**
- set temperature to **LO**
- wait 1 minute
- start diagnosis on channel 7

- segments **2**, **3**, **4**, **5** and **6** light up

Yes	No (one or more of the segments do not light up)

- replace A/C control head

- disconnect vacuum line connector from A/C programmer **F**
- check all vacuum servos and vacuum lines for leaks
- check all vacuum servos, flaps and the water valve for ease of operation

Note

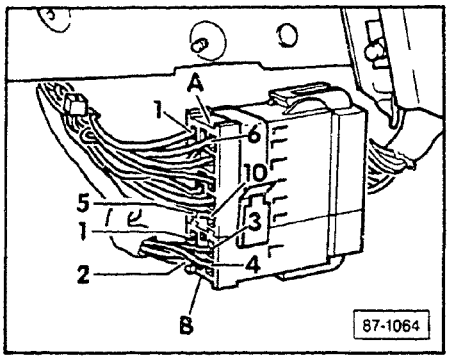
The vacuum unit for regulating flap **B** goes only in position **1**, if there is vacuum at both connections. Apply vacuum to cavity **3** only if there is vacuum at cavity **2** at the same time.

- check vacuum supply at cavity 5

- all vacuum units, vacuum lines, and vacuum supply are **OK**
- all flaps and the heater valve are operable

Yes	No
Go to section D8-220	repair as necessary

End



Errors in the area of climate control regulation

Note

Do this section only if referred here from other test sections.

- switch ignition **ON**
- measure voltage between cavities **4** and **7** on connector **A** to A/C programmer

• less than 8V	• greater than 8V

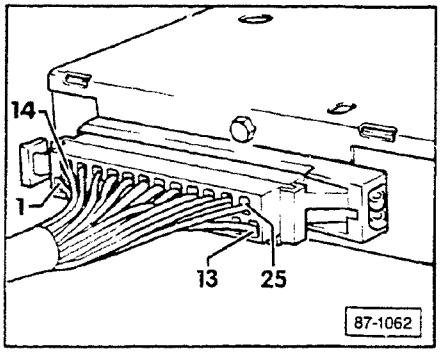
- repair voltage supply from cavity **4** or ground connection from cavity **7** of connector **A** according to wiring diagram

End

- measure voltage between cavities **6** and **7** at connector **A** to A/C programmer

• greater than 4.7V and less than 6V	• less than 4.7V or greater than 6V

Go to (A) next page



- check wiring from A/C programmer connector **A** cavity **8**, **9**, and **10** to connector on A/C control head cavities **10**, **21**, and **22** according to wiring diagram

• wiring **OK**

Yes	No

Go to (D) three pages following

- repair as necessary

End

(A)

- disconnect connector to A/C programmer
- measure voltage between cavities **6** and **7** on connector **A**

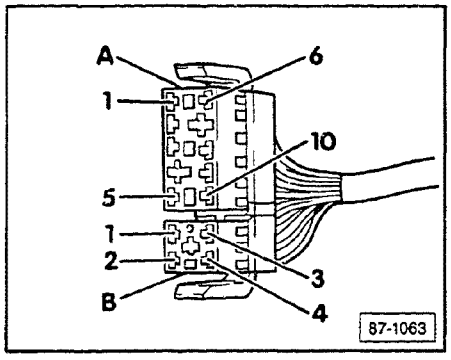
• greater than 4.7V and less than 6V	• less than 4.7V or greater than 6V

- replace A/C programmer

End

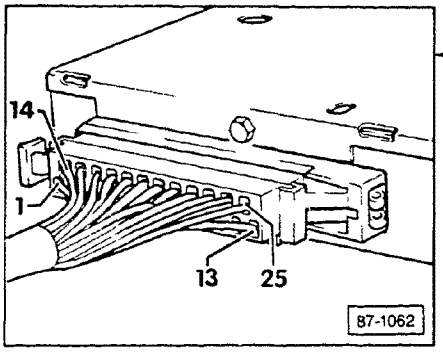
- measure voltage between cavities **25** and **7** on A/C control head connector

• less than 8V	• greater than 8V



- repair voltage supply from cavity **25** or ground connection from cavity **7** according to wiring diagram

End



- measure voltage between cavities **11** and **7** on A/C control head connector

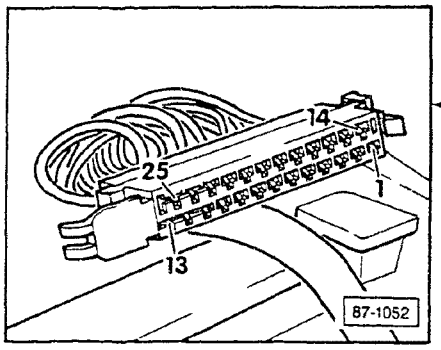
• greater than 6V	• less than 6V and greater than 4.7V	• less than 4.7V

Go to (B) next page

Go to (C) next page

- check wiring from A/C control head connector, cavity **11** to A/C programmer according to wiring diagram, repair as necessary

End



(B)

■ remove connector from A/C control head and measure voltage on connector between cavity **11** and **7**

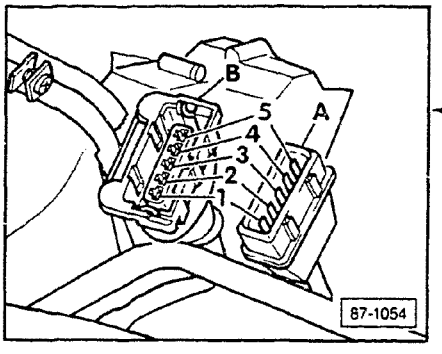
• greater than 6V	• less than 6V

■ replace A/C control head

End

■ eliminate short circuit in wiring to cavity **11** according to wiring diagram

End



(C)

■ disconnect 5-point connector to adjustment motor for temperature regulating flap
■ measure voltage to cavities **3** and **4** on connector **B**

• greater than 4.7V	• less than 4.7V

■ replace adjustment motor for temperature regulating flap (with feedback potentiometer)

End

■ check wiring from connector for A/C control head cavity **11** to A/C programmer and to temperature regulating flap servo motor according to wiring diagram

• wiring **OK**

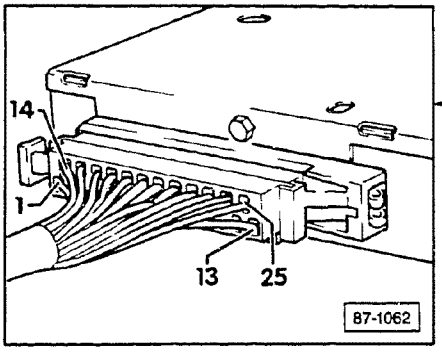
Yes	**No**

■ replace A/C control head

End

■ repair as necessary

End



Ⓓ

- measure voltage between cavities **25** and **7** on the A/C control head
  - greater than 8V
  - less than 8V

- replace A/C programmer
- check affected function
  - function **OK**
    - **Yes** → End
    - **No** → reinstall old A/C programmer, replace A/C control head → End

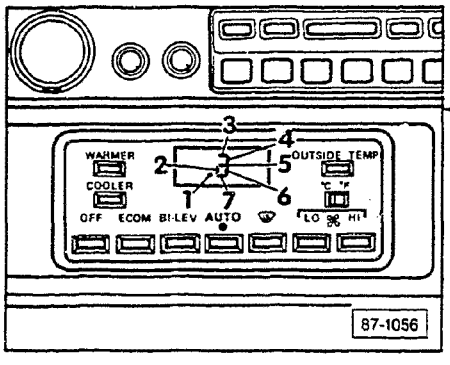
- repair voltage supply from cavity **25** or ground connection from cavity **7** → End

A/C high pressure switches (F118, F23), checking

- switch ignition **ON**
- set mode to **AUTO**
- set temperature to 24°C
- start diagnosis on channel 17

• segment **2** (high-pressure cutout switch F118, red housing) lights up	• segment **2** (high-pressure cutout switch F118, red housing) does not light up

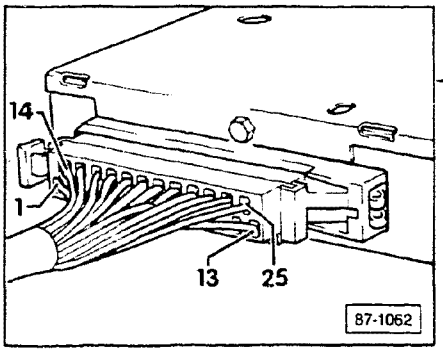
Go to Ⓐ next page



- remove connector from high-pressure switch F118

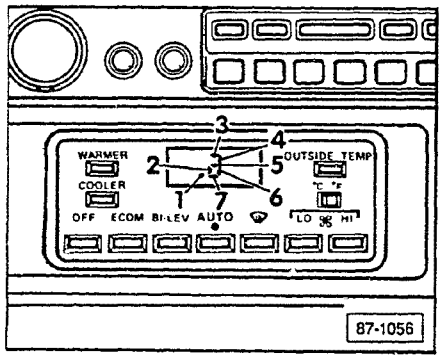
• segment **2** lights up	
Yes	**No**

Go to Ⓑ two pages following



- check wiring from A/C control head connector cavity **5** to high-pressure switch F118 for short circuit

• short circuit	
No	**Yes**
■ replace A/C control head	■ repair as necessary
End	End



Ⓐ

- remove A/C high-pressure switch F118 connector and bridge with jumper wire
- wait 10 seconds

- segment 1 (compressor on) lights up

Yes	No

- replace A/C high-pressure switch F118

End

- check wiring from A/C control head connector cavities **5** and **6** to A/C high pressure switch F118 for short or open circuits according to wiring diagram

- wiring **OK**

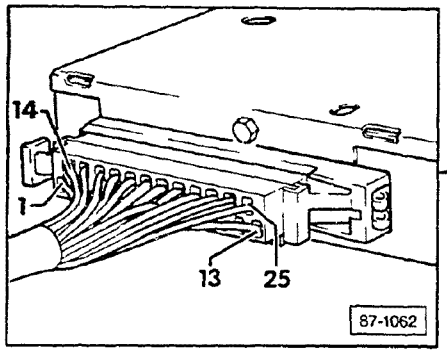
Yes	No

- replace A/C control head

End

- repair as necessary

End



Ⓑ

Is the compressor switched off during driving or during the cooling performance test by the high-pressure switch F118?

No	Yes

No → End

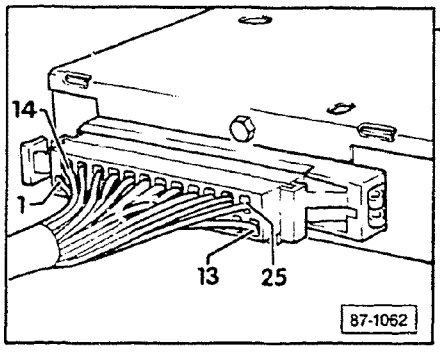
Yes →

- check wiring from A/C control head connector cavity **5** to A/C high-pressure switch F118 for a loose terminal
  - wiring **OK**

Yes	No

No →
- repair as necessary

→ End



Yes →
- reconnect A/C high-pressure switch F118 (red housing) connector
- remove connector from A/C high-pressure switch (F23, green or yellow housing) and bridge with jumper wire
  - the fan runs at 2nd speed

Yes	No

No → Go to Ⓒ next page

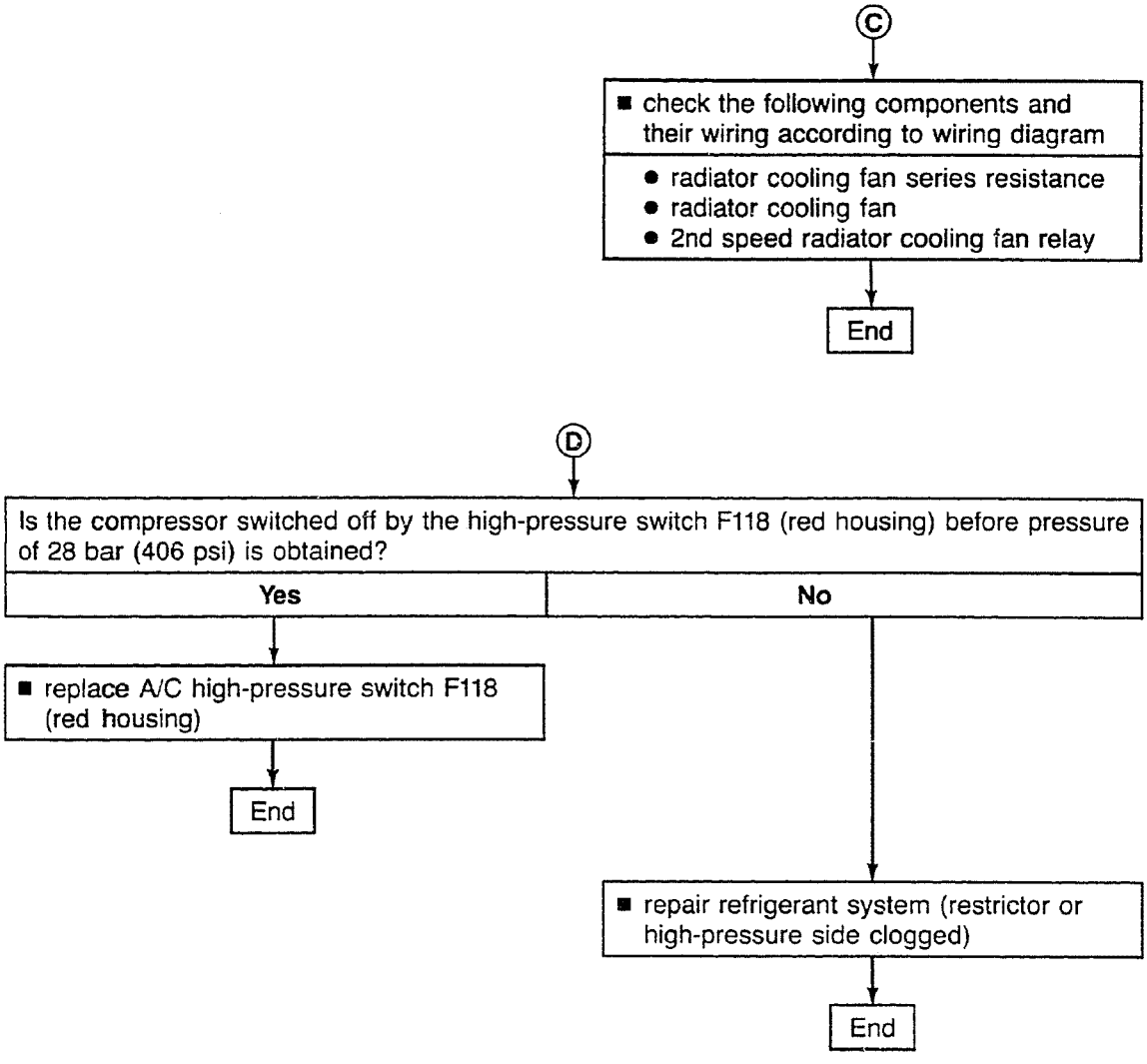
Yes →
- reconnect connector to A/C high-pressure switch (green housing)
- connect A/C pressure gauges
- do cooling performance test (section D8-330)
  - the radiator cooling fan is switched to 2nd speed by high-pressure switch F23 (green or yellow housing) at a maximum 17.5 bar on high-pressure side (activation time depends on ambient temperature and engine RPM)

No	Yes

Yes → Go to Ⓓ next page

No →
- replace high-pressure switch (green housing)

→ End


C
■ check the following components and their wiring according to wiring diagram
● radiator cooling fan series resistance
● radiator cooling fan
● 2nd speed radiator cooling fan relay
End
D
Is the compressor switched off by the high-pressure switch F118 (red housing) before pressure of 28 bar (406 psi) is obtained?
Yes
No
■ replace A/C high-pressure switch F118 (red housing)
End
■ repair refrigerant system (restrictor or high-pressure side clogged)
End

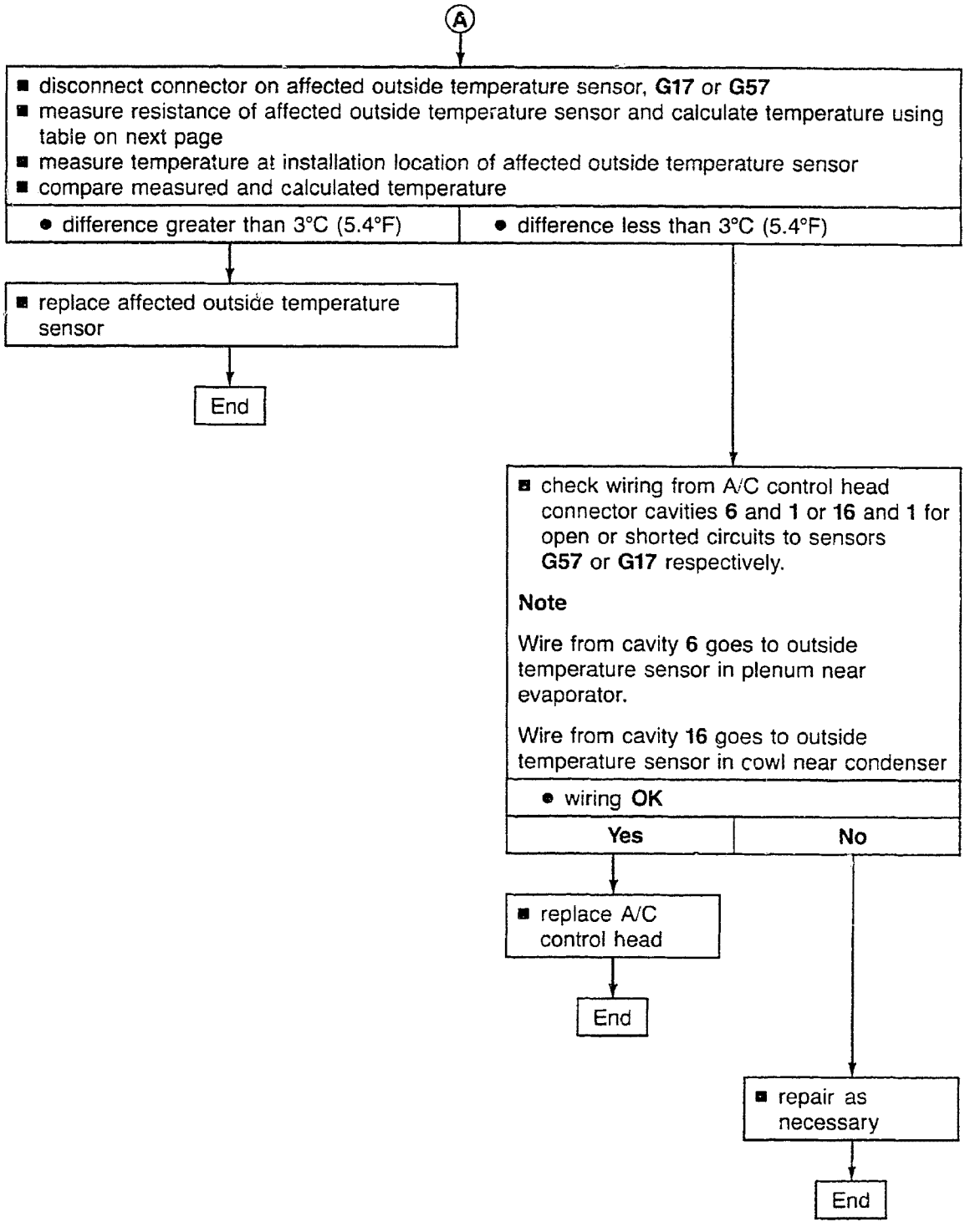
Outside temperature sensors (G57, G17), checking

- switch ignition **ON**
- set mode to **AUTO**
- set temperature to 24°C
- start diagnosis on channel 4
- measure temperature at installation location of outside temperature sensor **G57** in plenum on evaporator
- read diagnostic display on channel 4 and determine temperature using table two pages following
- compare measured and calculated temperature

• difference less than 3°C (5.4°F)	• difference greater than 3°C (5.4°F)
	Go to Ⓐ next page

- start diagnosis on channel 5
- measure temperature at installation location of outside temperature sensor **G17** in front of condenser on cowl
- read diagnostic display on channel 5 and determine temperature using table two pages following
- compare measured and calculated temperature

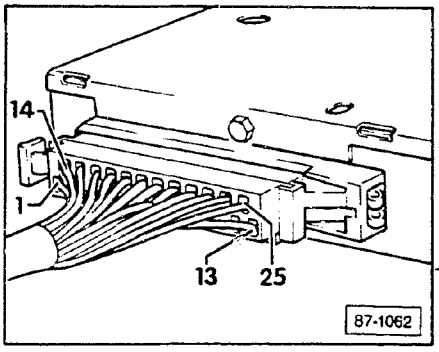
• difference less than 3°C (5.4°F)	• difference greater than 3°C (5.4°F)
End	Go to Ⓐ next page


A
■ disconnect connector on affected outside temperature sensor, G17 or G57
■ measure resistance of affected outside temperature sensor and calculate temperature using table on next page
■ measure temperature at installation location of affected outside temperature sensor
■ compare measured and calculated temperature
● difference greater than 3°C (5.4°F)
● difference less than 3°C (5.4°F)
■ replace affected outside temperature sensor
End
■ check wiring from A/C control head connector cavities 6 and 1 or 16 and 1 for open or shorted circuits to sensors G57 or G17 respectively.
Note
Wire from cavity 6 goes to outside temperature sensor in plenum near evaporator.
Wire from cavity 16 goes to outside temperature sensor in cowl near condenser
● wiring OK
Yes
No
■ replace A/C control head
End
■ repair as necessary
End

Resistance value of outside temperature sensors

Outside temperature in °C (°F) at installation location	Diagnostic display Diagnostic channel 4 and 5	Resistance value of outside temperature sensor (ohms)
−10 (14)	188	5636
− 8 (18)	183	5097
− 6 (21)	177	4558
− 4 (25)	171	4088
− 2 (28)	165	3688
0 (32)	159	3288
2 (36)	153	2992
4 (39)	146	2697
6 (43)	140	2439
8 (46)	134	2216
10 (50)	127	1995
12 (54)	122	1826
14 (57)	116	1657
16 (61)	110	1508
18 (64)	104	1379
20 (68)	98	1250
22 (72)	93	1150
24 (75)	88	1050
26 (79)	83	961
28 (82)	78	883
30 (86)	73	805
32 (90)	69	744
34 (93)	65	683
36 (97)	61	628
38 (100)	57	580
40 (104)	54	532
42 (108)	50	493
44 (111)	47	455
46 (115)	44	421
48 (118)	42	390
50 (122)	39	360
52 (126)	37	335
54 (129)	34	311
56 (133)	32	289
58 (136)	30	269
60 (140)	28	249

Electrical system voltage display, checking



- switch ignition **ON**
- set mode to **AUTO**
- start diagnosis on channel 11
- measure voltage between cavities **19** and **7** on A/C control head connector

• greater than 5V	• less than 5V

Go to section D8-260 (check low-pressure switch)

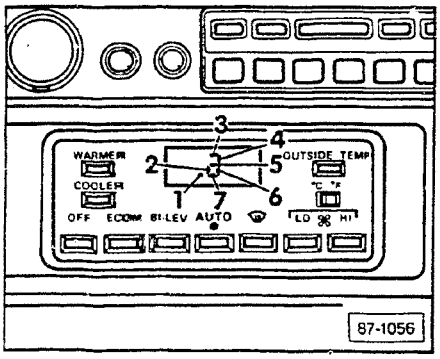
- difference between displayed and measured voltage

• less than 1.5V	• greater than 1.5V

End

- replace A/C control head

End



A/C refrigerant low-pressure switch (F73), checking

Note

The A/C refrigerant low-pressure switch shuts off the A/C compressor when refrigerant pressure is low.

- switch ignition **ON**
- set mode to **AUTO**
- set temperature to 24°C
- start diagnosis to channel 17

- segment **5** (low-pressure switch) lights up

Yes | **No**

Yes → Go to (A) next page

No →

- remove connector from low-pressure switch

- segment **5** (low-pressure switch) lights up

Yes | **No**

Yes →

Is the compressor switched off by the low-pressure switch during the cooling performance test?

Yes | **No**

Yes → Go to (B) next page

No → End

No →

- check wiring between low-pressure switch and A/C control head connector cavity **19** for short circuit according to wiring diagram

- wiring **OK**

Yes | **No**

Yes →

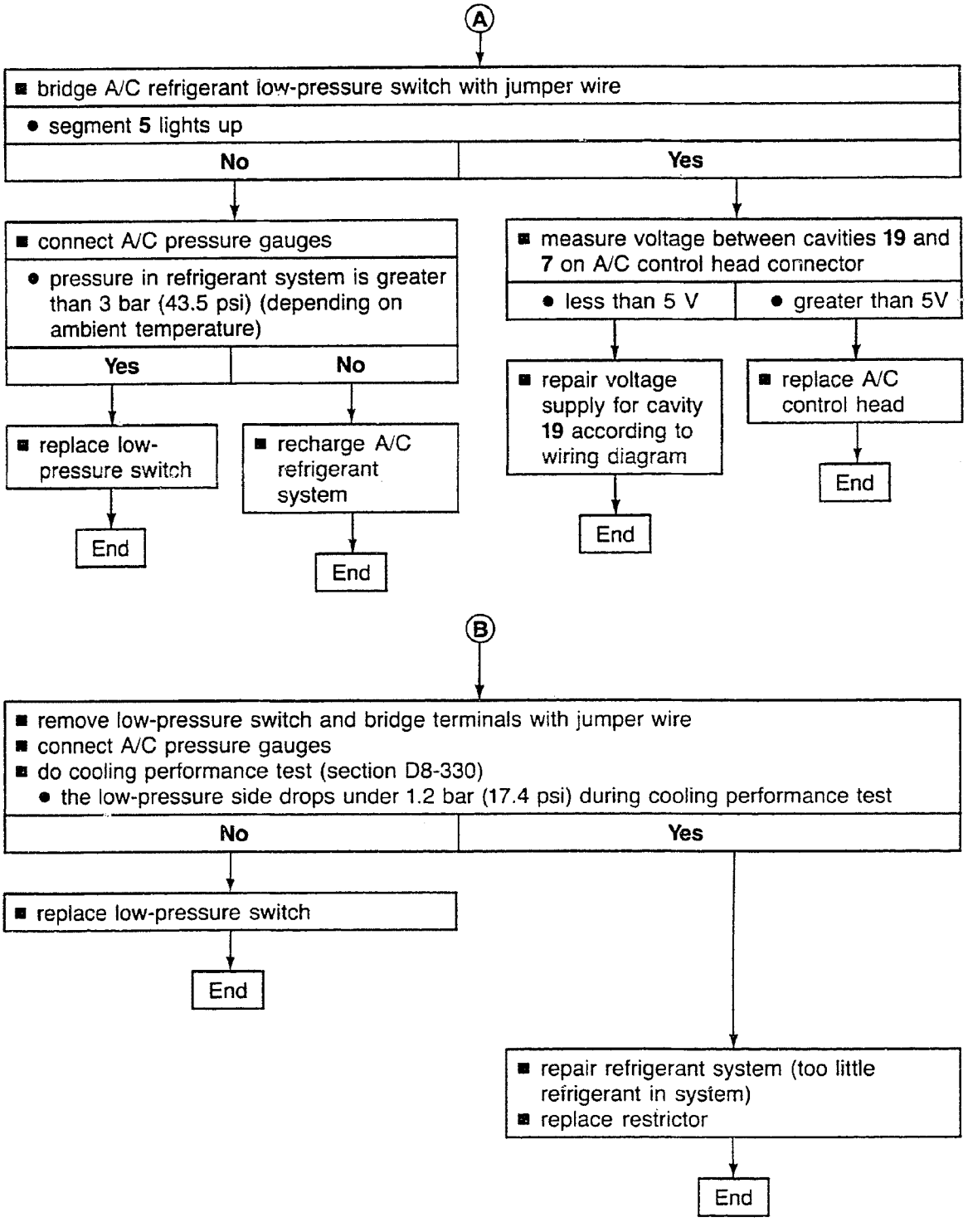
- replace A/C control head

→ End

No →

- repair wiring as necessary

→ End

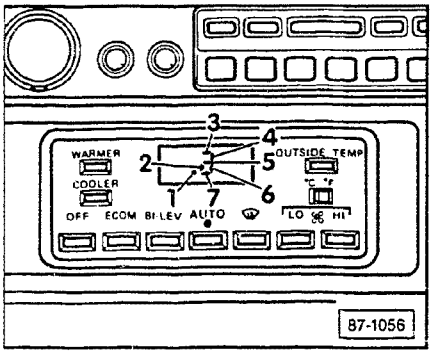

A
■ bridge A/C refrigerant low-pressure switch with jumper wire
• segment 5 lights up
No
Yes
■ connect A/C pressure gauges
• pressure in refrigerant system is greater than 3 bar (43.5 psi) (depending on ambient temperature)
Yes
No
■ replace low-pressure switch
End
■ recharge A/C refrigerant system
End
■ measure voltage between cavities 19 and 7 on A/C control head connector
• less than 5 V
• greater than 5V
■ repair voltage supply for cavity 19 according to wiring diagram
End
■ replace A/C control head
End
B
■ remove low-pressure switch and bridge terminals with jumper wire
■ connect A/C pressure gauges
■ do cooling performance test (section D8-330)
• the low-pressure side drops under 1.2 bar (17.4 psi) during cooling performance test
No
Yes
■ replace low-pressure switch
End
■ repair refrigerant system (too little refrigerant in system)
■ replace restrictor
End

Kick-down switch F46, checking

Note

Kick-down switch **F46** is not installed in all vehicles with automatic transmission.

The A/C compressor is switched off for 12 seconds when kick-down switch **F46** is closed.



- switch ignition **ON**
- set mode to **AUTO**
- set temperature to 24°C
- start diagnosis to channel 17

- segment **6** (kick-down switch) lights up

No | **Yes**

Yes → Go to Ⓐ next page

No →

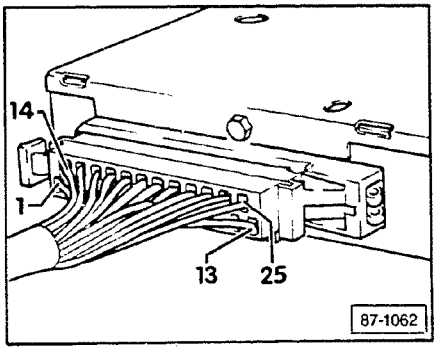
- depress accelerator pedal fully

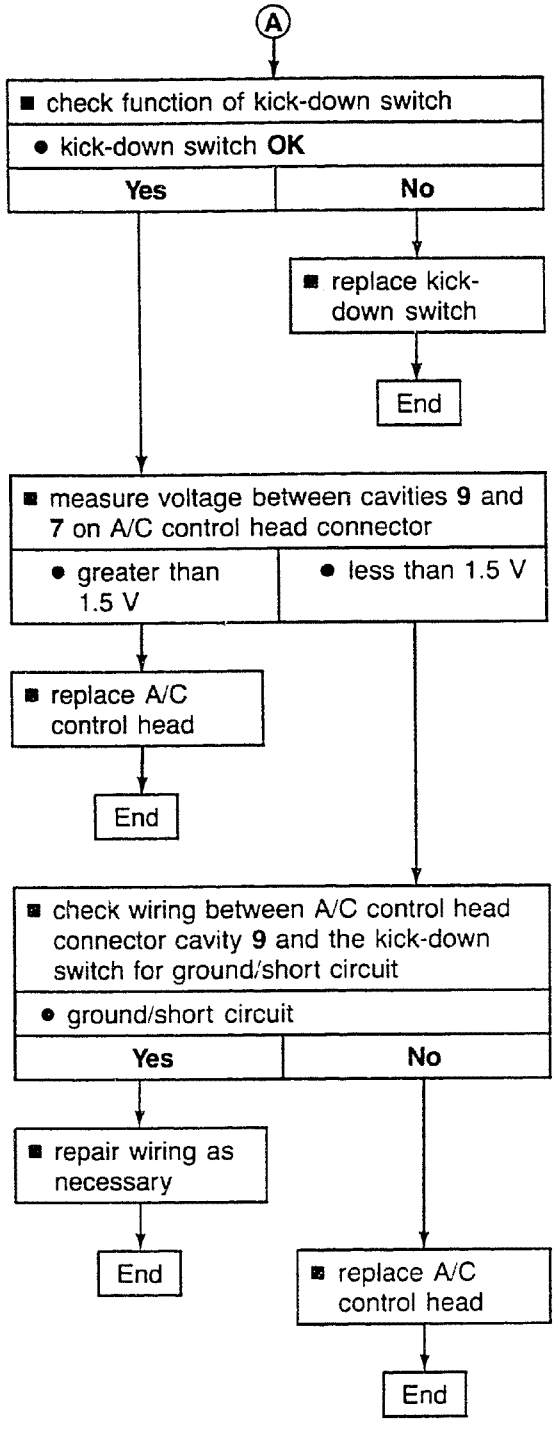
- segment **6** (kick-down switch) lights up

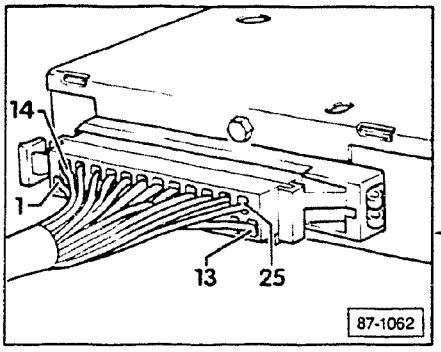
Yes | **No**

Yes → End

No → Go to Ⓑ two pages following


14
1
13
25
87-1062


A
■ check function of kick-down switch
● kick-down switch OK
Yes
No
■ replace kick-down switch
End
■ measure voltage between cavities 9 and 7 on A/C control head connector
● greater than 1.5 V
● less than 1.5 V
■ replace A/C control head
End
■ check wiring between A/C control head connector cavity 9 and the kick-down switch for ground/short circuit
● ground/short circuit
Yes
No
■ repair wiring as necessary
End
■ replace A/C control head
End



(B)

- release accelerator pedal (kick-down switch opens)
- measure voltage between cavities 9 and 7 on A/C control head connector

• less than 1.5 V	• greater than 1.5 V

- check function of kick-down switch
- kick-down switch **OK**

Yes	No

- replace kick-down switch

End

- depress accelerator pedal (kick-down switch closes)
- measure voltage between cavities 9 and 7 on A/C control head connector

• less than 1.5V	• greater than 1.5V

- replace A/C control head

End

- check wiring from A/C control head connector to kick-down switch for short circuit
- short circuit

Yes	No

- repair as necessary

End

- replace A/C control head

End

- check kick-down switch function
- kick-down switch **OK**

Yes	No

- check wiring to kick-down switch for short circuit according to wiring diagram, repair as necessary

End

- replace kick-down switch

End

Kick-down function, checking

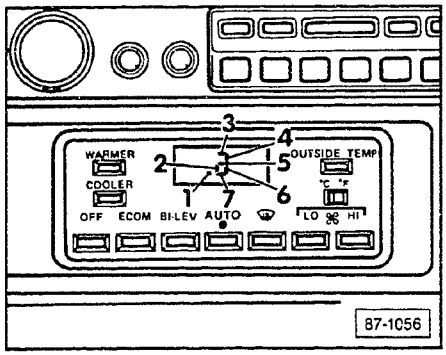
The A/C compressor is switched off for 12 seconds when kick-down function is activated.

A/C kick-down is controlled by:

- A/C kick-down switch, **F46** on vehicles with 3-speed automatic transmission
- automatic transmission control unit, **J217** on vehicles with 4-speed automatic transmission

Note

Some vehicles with 3-speed automatic transmissions may not have the A/C kick-down switch installed, see wiring diagram.



- switch ignition **ON**
- shift gear selector to "D" position
- set mode to **AUTO**
- set temperature to 24°C (75°F)
- start diagnosis on channel 17
  - segment **6** (kick-down) lights up

YES | **NO**

YES → Go to Ⓐ next page

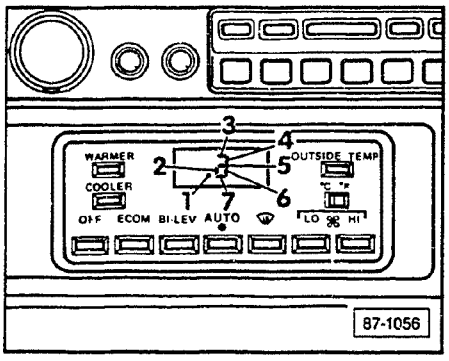
NO →

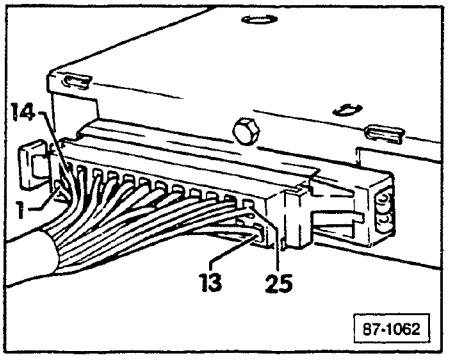
- fully depress accelerator pedal
  - segment **6** (kick-down) lights up

YES | **NO**

YES → End

NO → Go to Ⓑ next page





Ⓐ

- segment **6** (kick-down) goes out 12 seconds after ignition switched **ON**

YES	NO
	■ replace A/C control head → End

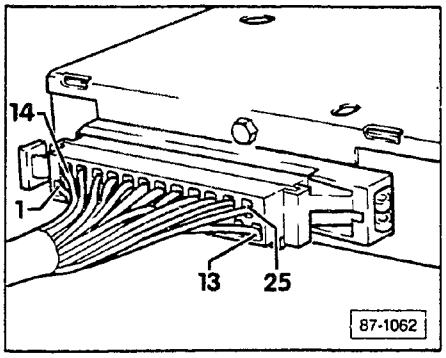
Ⓑ

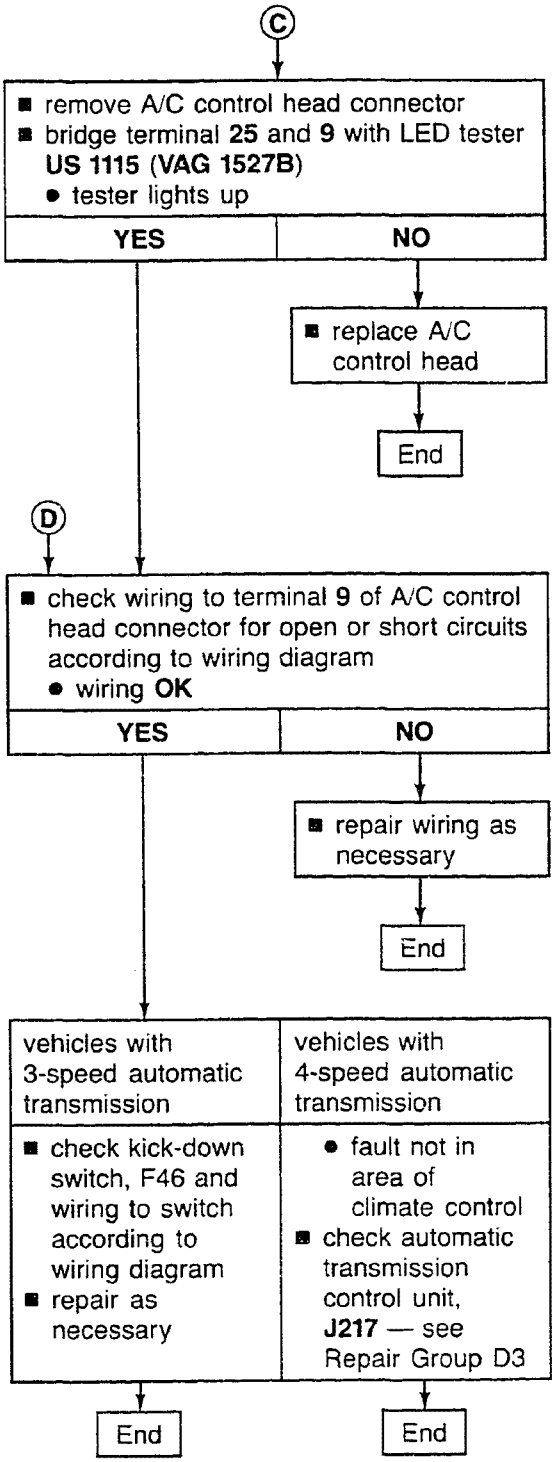
- connect multimeter **US 1119** (set to 20V range) between terminals **9** and **7** on A/C control head connector

• greater than 8V	• less than 8V
	Go to Ⓒ next page

- remove A/C control head connector
- bridge terminal **25** and **9** with LED tester **US 1115 (VAG 1527B)**
- fully depress accelerator
  - tester lights up briefly

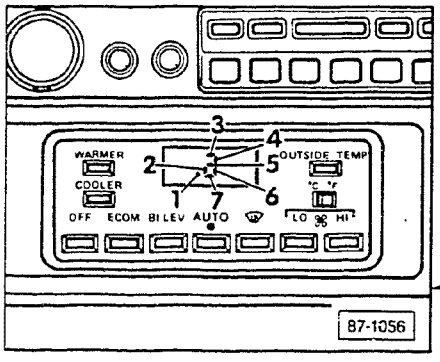
YES	NO
■ replace A/C control head → End	Go to Ⓓ next page


14
1
13
25
87-1062


C
■ remove A/C control head connector
■ bridge terminal 25 and 9 with LED tester US 1115 (VAG 1527B)
• tester lights up
YES
NO
■ replace A/C control head
End
D
■ check wiring to terminal 9 of A/C control head connector for open or short circuits according to wiring diagram
• wiring OK
YES
NO
■ repair wiring as necessary
End
vehicles with 3-speed automatic transmission
vehicles with 4-speed automatic transmission
■ check kick-down switch, F46 and wiring to switch according to wiring diagram
■ repair as necessary
• fault not in area of climate control
■ check automatic transmission control unit, J217 — see Repair Group D3
End
End

Electronic thermoswitch (multi-function temperature sensor) F76, checking

Do Not attempt to test switch by alternative method.

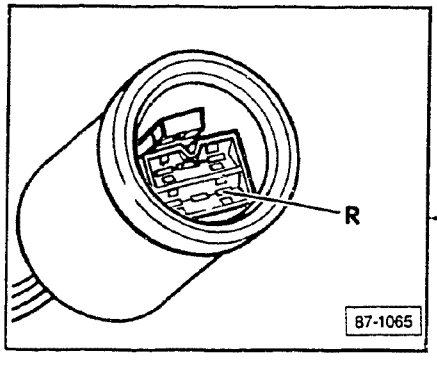


- switch ignition **ON**
- set mode to **AUTO**
- set temperature to 24°C
- start diagnosis on channel 17

- segment **7** (hot light switch) lights up

Yes | **No**

Yes → Go to Ⓐ next page



- remove connector from thermoswitch
- connect terminal **R** to ground with jumper cable

- segment **7** lights up

Yes | **No**

No → Go to Ⓑ next page

Is the A/C compressor switched off by electronic thermoswitch (multi-function temperature sensor) during driving or during the cooling performance test?

Yes | **No**

No → End

Yes →

- check engine cooling system and radiator cooling fan control
- replace electronic thermoswitch (multi-function temperature sensor) if necessary

→ End

Ⓐ

■ remove connector from electronic thermoswitch (multi-function temperature sensor)

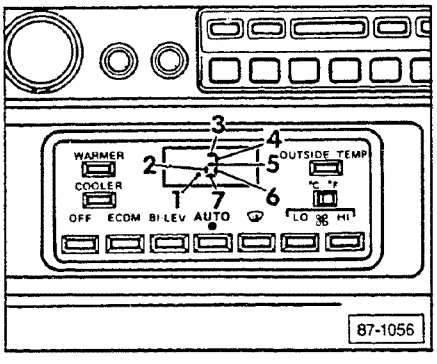
• segment 7 lights up

No	Yes

No:

■ replace electronic thermoswitch (multi-function temperature sensor)

End



Yes:

■ check wiring from A/C control head connector cavity **20**, to electronic thermoswitch connector for ground/short circuit

• ground/short circuit

Yes	No

Yes:

■ repair wiring as necessary

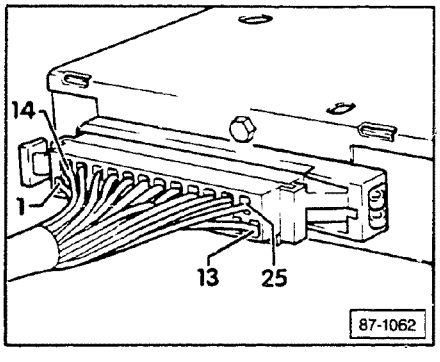
End

No:

■ replace A/C control head

End

Ⓑ



■ check wiring from A/C control head connector cavity **20** to electronic thermoswitch connector for open circuits

• open circuit

Yes	No

Yes:

■ repair as necessary

End

No:

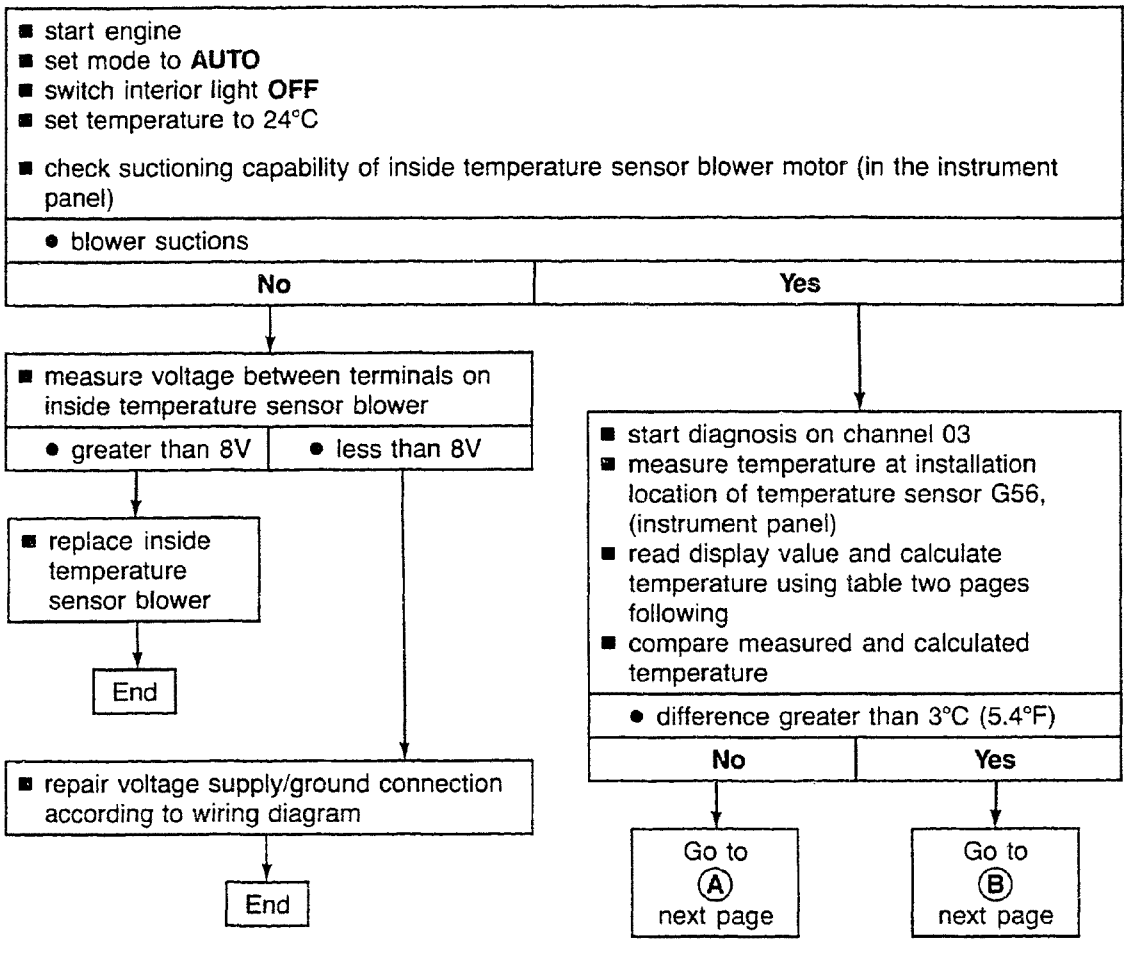
■ replace A/C control head

End

Inside temperature sensors (G56, G86), checking

Note

The measurement value of the temperature sensor can deviate significantly from the ambient temperature because of the temperature increase at the installation location. The comparable inside temperature is always to be measured at the installation location of the sensor.



Ⓐ

- start diagnosis on channel **02**
- measure temperature at installation location of temperature sensor **G86** (roof)
- read display value and calculate temperature using table on next page
- compare measured and calculated temperature

- difference greater than 3°C (5.4°F)

No	Yes

No → End

Ⓑ

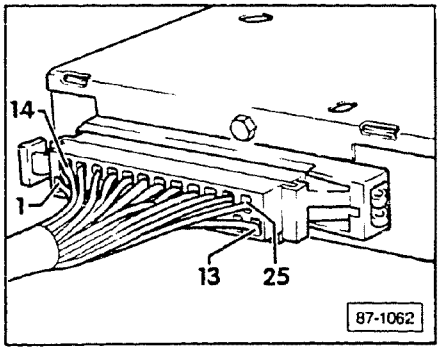
- disconnect connector on affected temperature sensor
- measure sensor resistance and calculate temperature using table on next page
  - difference compared to measured temperature is greater than 3°C (5.4°F)

Yes	No

Yes →

- replace defective temperature sensor

→ End



No →

- check wiring from affected temperature sensor to A/C control head cavities **4** and **6** or **18** and **6** for short or open circuits according to wiring diagram

- wiring **OK**

Yes	No

Yes →

- replace A/C control head

→ End

No →

- repair as necessary

→ End

Resistance value of interior temperature sensors, G56 and G86

Inside temperature in °C (°F) at installation location	Diagnostic display Diagnostic channel 2 and 3	Resistance value of inside temperature sensor (ohms)
4 (39)	187	7699
6 (43)	182	6951
8 (46)	177	6308
10 (50)	171	5666
12 (54)	166	5178
14 (57)	160	4690
16 (61)	154	4259
18 (64)	148	3886
20 (68)	142	3513
22 (72)	137	3225
24 (75)	131	2938
26 (79)	125	2683
28 (82)	119	2460
30 (86)	113	2237
32 (90)	108	2062
34 (93)	103	1888
36 (97)	97	1732
38 (100)	92	1595
40 (104)	87	1459
42 (108)	83	1350
44 (111)	78	1242
46 (115)	74	1144
48 (118)	70	1058
50 (122)	65	972

Engine coolant temperature sensor G62, checking

Note

The engine coolant temperature sensor is not installed in all vehicles (to be phased in). For vehicles without coolant temperature sensor, diagnostic display on channel 6 255 = open circuit.

- start engine
- set mode to **AUTO**
- set temperature to **HI**
- start diagnosis on channel 6
- read diagnostic display on channel 6 and calculate coolant temperature using table two pages following

- difference between calculated coolant temperature and displayed coolant temperature on coolant temperature display

• less than 10°C (18°F)	• greater than 10°C (18°F)
↓	↓
End	Go to Ⓐ next page

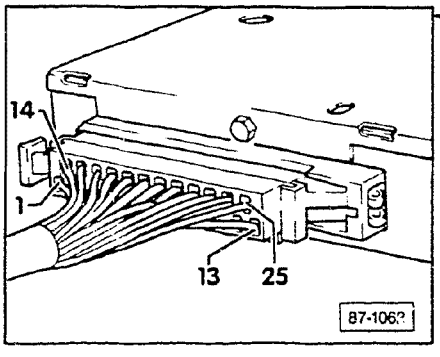
Ⓐ

- remove connector on engine coolant temperature sensor G62
- measure resistance of coolant temperature sensor and calculate coolant temperature using table on next page
- compare calculated coolant temperature with coolant temperature display (diagnosis channel 6)

• difference greater than 10°C (18°F)	• difference less than 10°C (18°F)

- replace engine coolant temperature sensor

End



- check wiring from A/C control head connector cavities **6** and **17** to coolant temperature sensor for excessive resistance and open or short circuits

• wiring **OK**

Yes	No
■ replace A/C control head	■ repair as necessary
End	End

Resistance value of coolant temperature sensor, G62

Coolant temperature in °C (°F) at installation location	Diagnostic display (Diagnostic channel 6)	Resistance value of coolant temperature sensor (ohms)
−20 (−4)	243	14700
−10 (14)	236	9200
0 (32)	225	5600
5 (41)	219	4635
10 (50)	212	3670
15 (59)	205	3060
20 (68)	195	2450
25 (77)	187	2060
30 (86)	176	1670
35 (95)	167	1415
40 (104)	155	1160
45 (113)	145	995
50 (122)	134	830
55 (131)	124	715
60 (140)	113	600
65 (149)	104	520
70 (158)	94	440
75 (167)	86	380
80 (176)	76	320
85 (185)	71	281
90 (194)	62	242
95 (203)	57	216
100 (212)	52	190
110 (230)	41	143
120 (248)	33	110
130 (266)	27	90

Idle speed increase (A/C ON), checking
RPM increase (compressor ON), checking

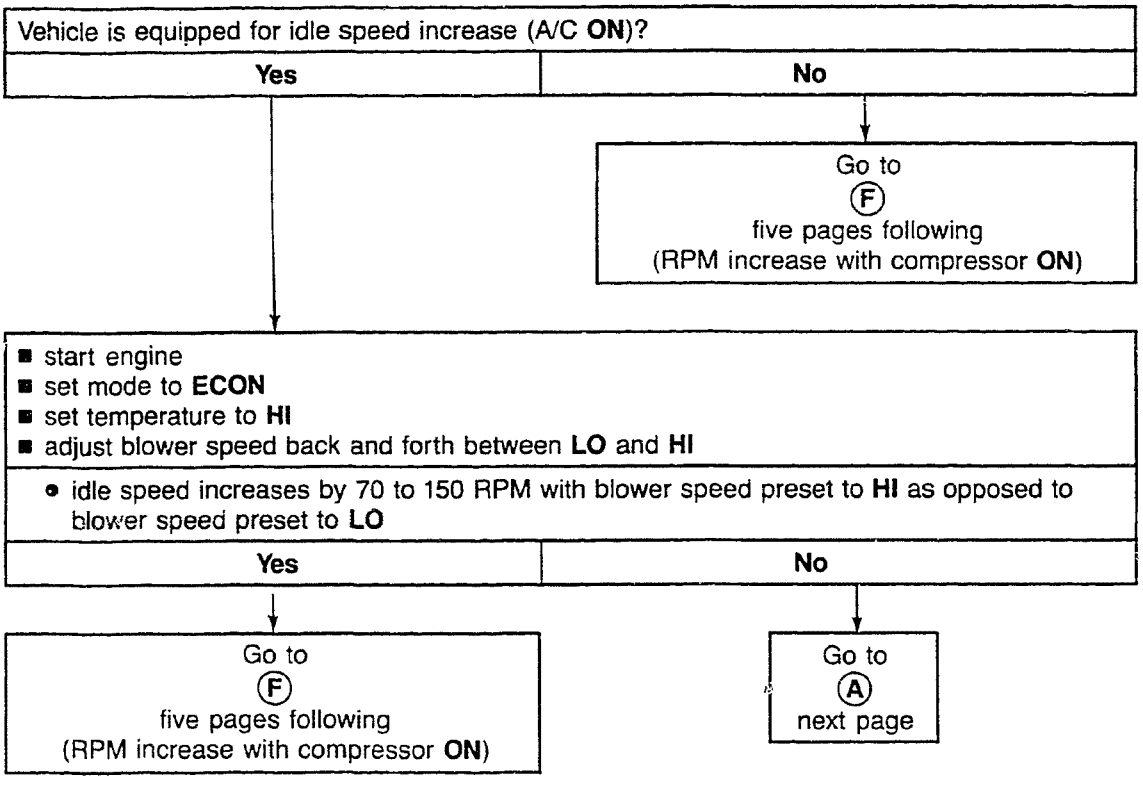
Note

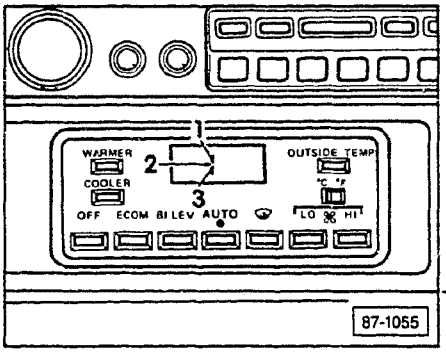
Idle speed increase (A/C **ON**)
(idle speed increases when A/C is switched **ON**)

- not for vehicles with CIS-E III fuel injection
- for vehicles with CIS fuel injection (check according to wiring diagram whether vehicle is equipped for idle speed increase)
- idle speed increase occurs in all modes (except **OFF**), as soon as high heating performance is required and in the **AUTO**, **DEF**, and **BI-LEV** modes, as soon as high cooling performance is required
- idle speed increase does not occur with blower speed set to **LO**

RPM increase (compressor ON)

- for all vehicles





Ⓐ

- switch engine **OFF**
- switch ignition **ON**
- set mode to **ECON**
- set temperature to **HI**
- set blower RPM to **HI**
- start diagnosis on channel 18

- does segment **3** (idle speed increase) light up?

Yes	No

No

- replace A/C control head

End

Yes

- set mode to **ECON**
- set temperature to **HI**
- set blower RPM to **LO**
- start diagnosis on channel 18

- does segment **3** (idle speed increase) light up?

Yes	No

No

- measure voltage between cavities **23** and **25** on A/C control head connector

• less than 8V	• greater than 8V

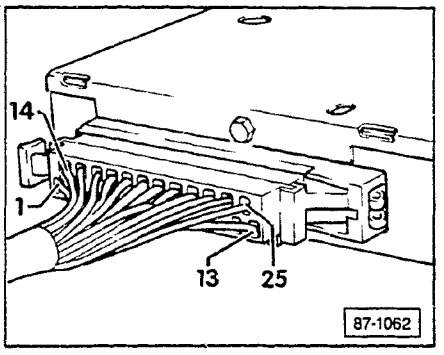
• less than 8V → Go to Ⓑ next page

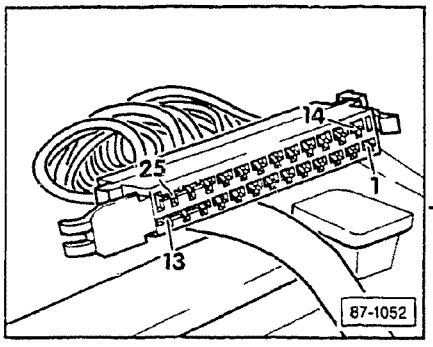
• greater than 8V → Go to Ⓒ two pages following

Yes

- replace A/C control head

End





(B)

- remove A/C control head connector
- measure current between cavities **23** and **7** on connector

• greater than 10 mA	• less than 10 mA

- check wiring from cavity **23** on A/C control head connector to cavity **6** of idle stabilizer control unit (for CIS Turbo) for open or shorted circuits according to wiring diagram

• wiring **OK**

No	**Yes**

- repair as necessary

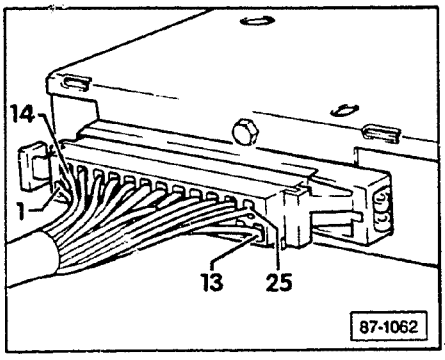
End

Errors not in the area of climate control (check engine electronics)

End

- replace A/C control head

End



Ⓒ

- set mode to **ECON**
- set temperature to **HI**
- set blower speed to **HI**
- measure voltage between cavities **23** and **25** on A/C control head connector

• less than 3V	• greater than 3V

- separate 2-point connector between A/C control head cavity **23** and idle stabilizer control unit
- measure current between cavity **23** of A/C control head and the idle stabilizer control unit at the disconnected connector according to wiring diagram

• greater than 3 mA	• less than 3 mA

Go to Ⓓ next page

Go to Ⓔ next page

- check wiring from cavity **23** on A/C control head connector to idle stabilizer control unit cavity **6** for open circuit according to wiring diagram

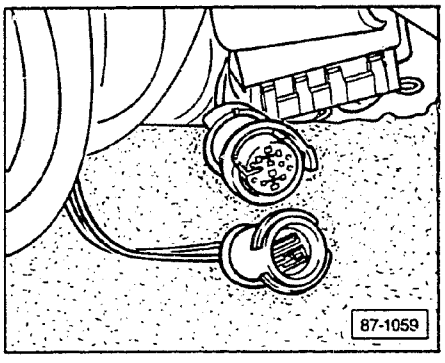
• open circuit

Yes	No

- repair as necessary

End

Errors not in the area of climate control (check engine electronics)



Ⓓ

■ check wiring from 2-point connector to idle stabilizer control unit cavity **6** for short circuit according to wiring diagram

● short circuit

Yes	**No**
■ repair wiring as necessary	Errors not in the area of climate control (check engine electronics)

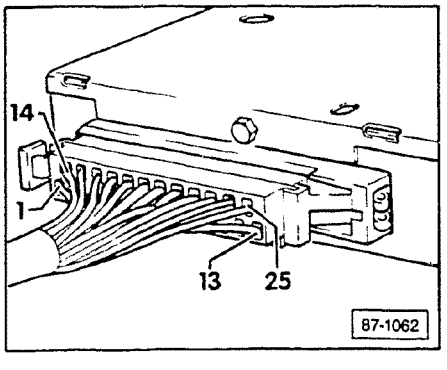
End

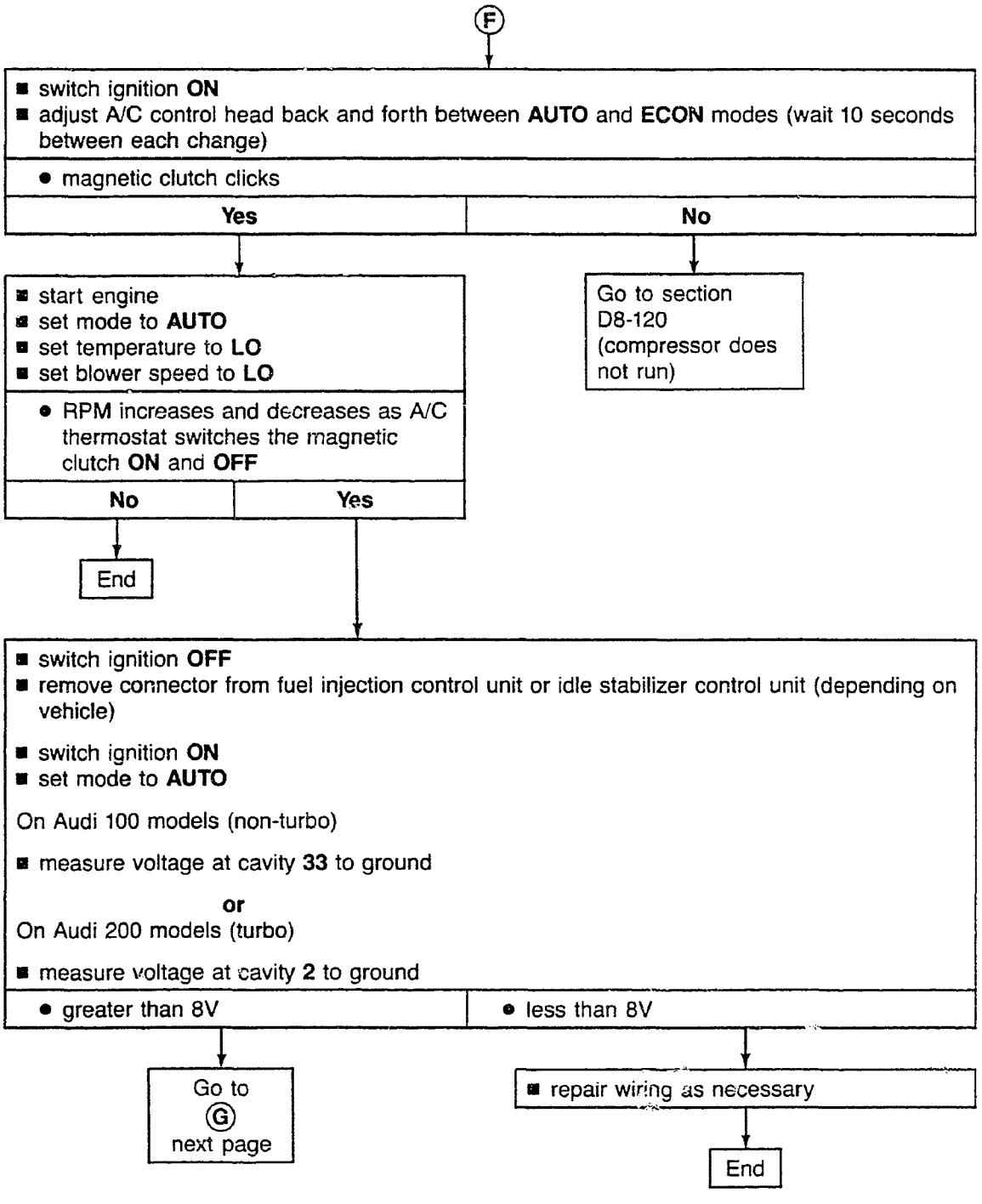
Ⓔ

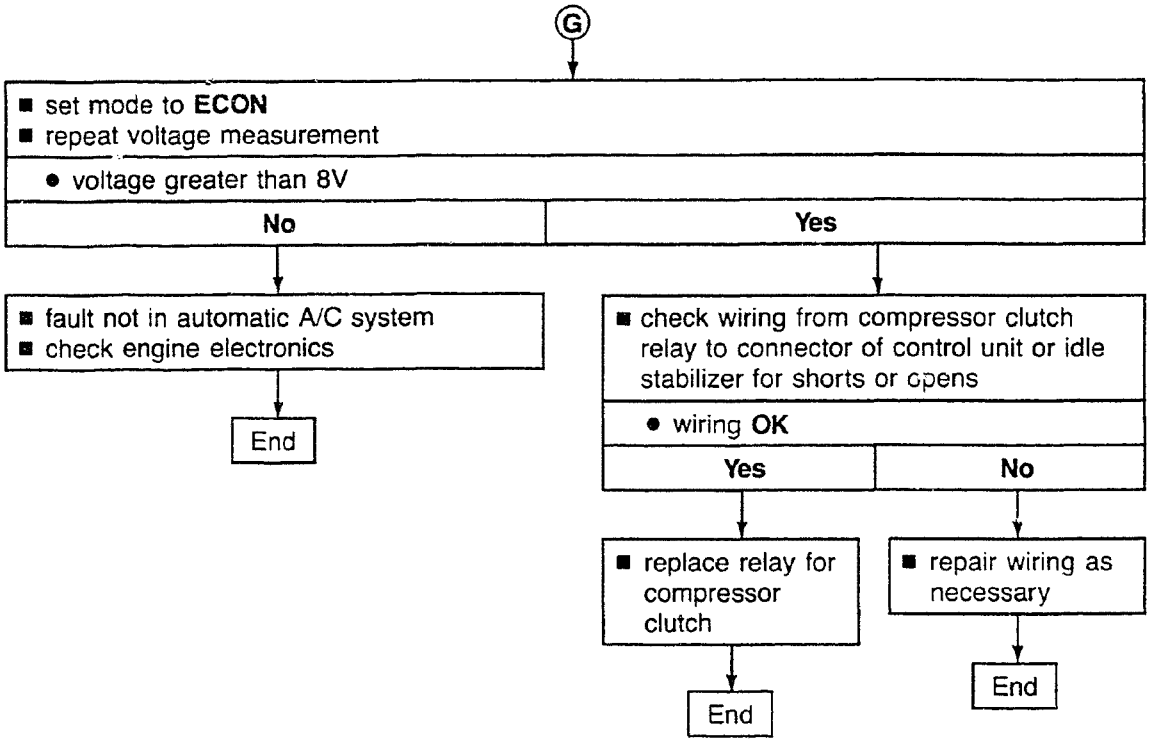
■ check wiring between 2-point connector and A/C control head connector cavity **23** for ground short circuit

● short circuit

Yes	**No**
■ repair wiring as necessary	■ replace A/C control head
End	End




F
■ switch ignition ON
■ adjust A/C control head back and forth between AUTO and ECON modes (wait 10 seconds between each change)
• magnetic clutch clicks
Yes
No
■ start engine
■ set mode to AUTO
■ set temperature to LO
■ set blower speed to LO
• RPM increases and decreases as A/C thermostat switches the magnetic clutch ON and OFF
No
Yes
Go to section D8-120 (compressor does not run)
End
■ switch ignition OFF
■ remove connector from fuel injection control unit or idle stabilizer control unit (depending on vehicle)
■ switch ignition ON
■ set mode to AUTO
On Audi 100 models (non-turbo)
■ measure voltage at cavity 33 to ground
or
On Audi 200 models (turbo)
■ measure voltage at cavity 2 to ground
• greater than 8V
• less than 8V
Go to G next page
■ repair wiring as necessary
End


G
■ set mode to ECON
■ repeat voltage measurement
• voltage greater than 8V
No
Yes
■ fault not in automatic A/C system
■ check engine electronics
End
■ check wiring from compressor clutch relay to connector of control unit or idle stabilizer for shorts or opens
• wiring OK
Yes
No
■ replace relay for compressor clutch
End
■ repair wiring as necessary
End

A/C cooling performance, checking

Note

Before each new test sequence

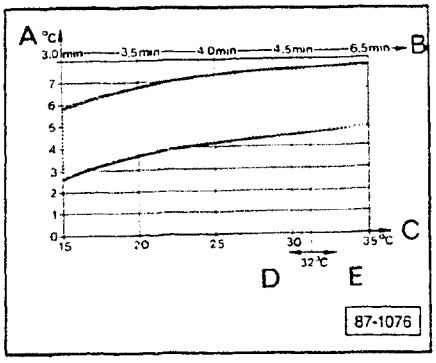
- switch ignition **OFF**
- start engine
- set mode to **ECON**
- set temperature to **LO**
- set blower to **HI**
- run in this condition approximately 5 minutes

Test conditions

- all fuses **OK**
- ambient temperature greater than 15°C (59°F)
- condenser and radiator are clean
- V-belts for compressor and alternator are tightened correctly
- all air ducts, covers and seals are **OK** and correctly installed
- vehicle is not exposed to direct sun
- engine warm

With engine running

- set mode to **AUTO**
- set temperature to **LO**
- set blower speed to **HI**
- open instrument panel outlets:
  - compressor is driven or switches **ON**
  - fresh air blower runs
  - radiator cooling fan runs
  - recirculation/fresh air flap goes into "recirculation" position after 1 minute
  - water valve for heating is closed
  - evaporator, heater, and connecting piece between heater and evaporator do not draw any secondary air
  - air comes out of instrument panel outlets
  - temperature flap is in "cooling" position (see section D8-60)

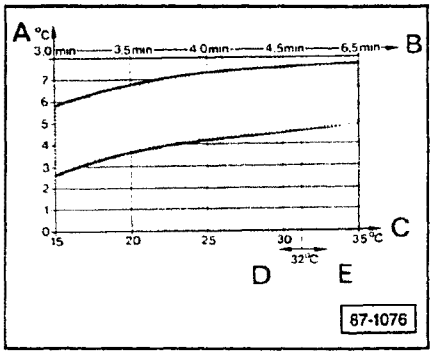


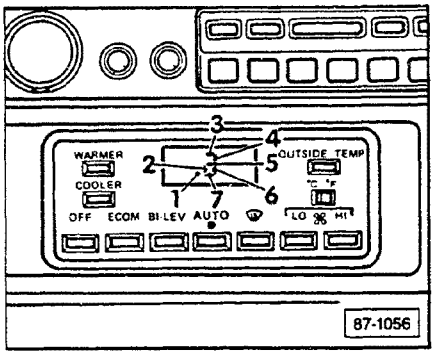
Testing

The temperature of the air coming out of the center instrument panel outlets must be within the tolerance and depends on the ambient temperature and cool-down period.

A — Temperature of air from center instrument panel outlets
B — Time
C — Ambient temperature
D — Doors opened
E — Doors, windows, and sunroof closed

more





- close hood
- open all instrument panel outlets
- measure outside temperature

• greater than 32°C (89°F)	• less than 32°C (89°F)
■ close windows, doors, and sunroof	■ open doors

- start engine
- set mode to **ECON**
- set temperature to **LO**
- wait 1 minute
- set mode to **AUTO** (start of time measurement)
- set blower speed to **HI**
- start diagnosis on channel 17
- bring engine speed up to 2000 RPM
- measure temperature of air coming out of center instrument panel outlets

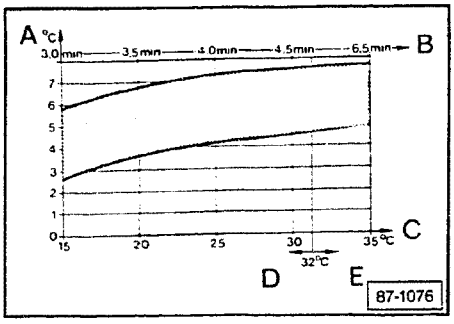
- during cooling performance test, the A/C control head switches the A/C compressor **OFF**
- segment **1** erased on display and one of segments **2-7** lights up

Yes	No

- segment **2** lights up
  Go to section D8-230
- segment **3** lights up
  Go to section D8-240
- segment **4** lights up
  Check electrical system voltage
- segment **5** lights up
  Go to section D8-260
- segment **6** lights up
  Go to section D8-270 (through 1990 m.y.) or D8-280 (from 1991 m.y.)
- segment **7** lights up
  Go to section D8-290

- required cooling obtained

Yes	No
End	Go to Ⓐ next page



(A)

- switch engine **OFF**
- switch ignition **ON**
- bridge A/C high-pressure switch (green housing)

- radiator cooling fan runs at 2nd speed

Yes | **No**

- remove A/C refrigerant high pressure switch (green housing) connector
- bridge A/C thermostat terminals
- connect A/C pressure gauges
- repeat cooling performance test

- the radiator cooling fan is switched to 2nd speed by the high-pressure switch when pressure is maximum 17.5 bar (253.7 psi) (time of activation is a function of ambient temperature and engine speed)

No | **Yes**

- check the following components and their wiring according to wiring diagram:
  - radiator cooling fan series resistance
  - radiator cooling fan
  - radiator cooling fan 2nd speed relay

- repair/replace as necessary

End

- required cooling performance is achieved

No | **Yes**

- replace A/C high-pressure switch (green housing)

End

- replace A/C thermostat

End

- repair refrigerant system (too little refrigerant in system)
- replace restrictor