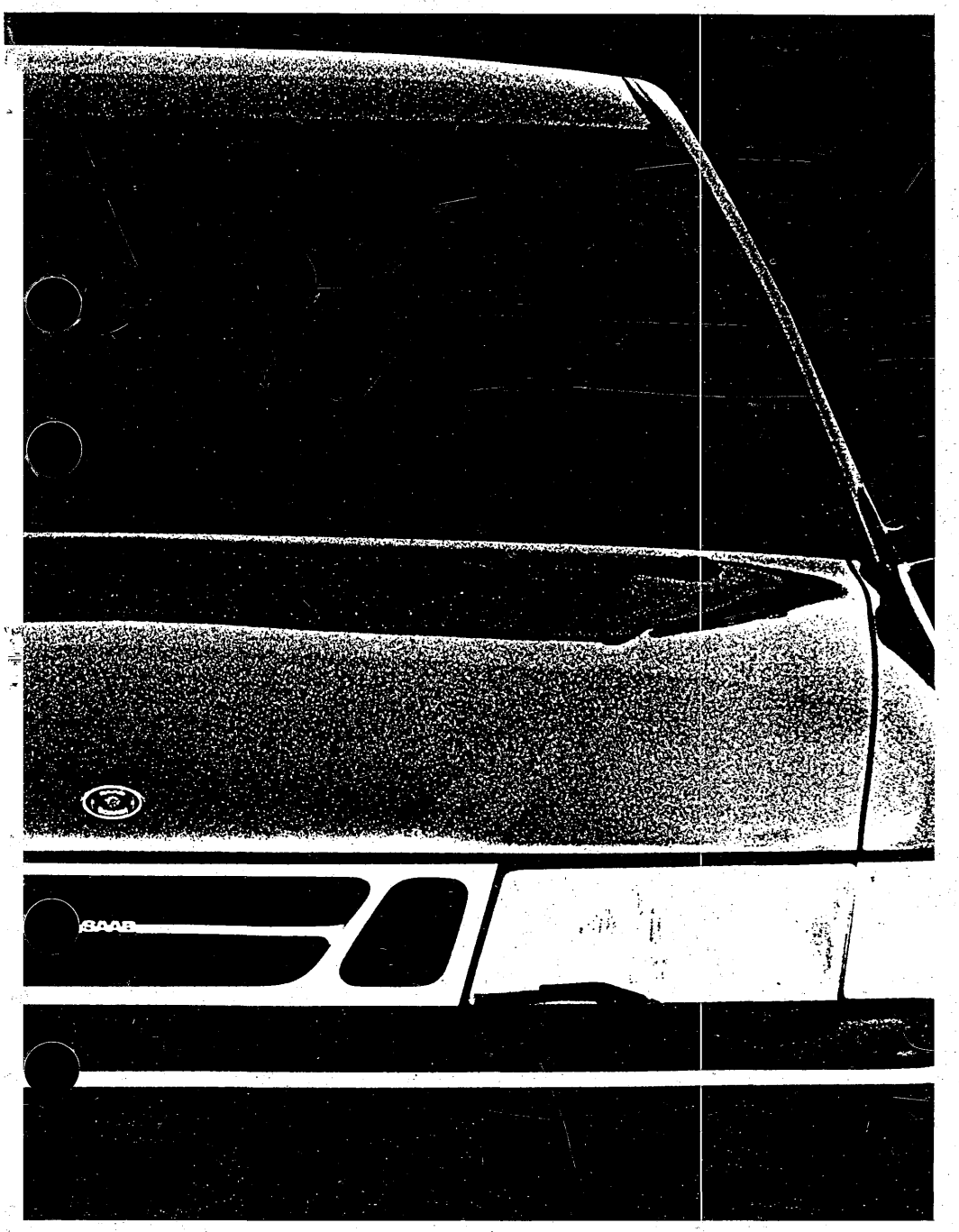
Saab 9000

Service Manual



M 1995–

ENG

3:5 Electrical system, cruise control system

Saab 9000

SERVICE MANUAL

3:5 Electrical system, cruise control system

M 1995

Foreword

All particulars and illustrations in this Service Manual are based on the version of the cars prevailing at the time of going to press. Model variants, technical data and equipment vary from market to market and may be subject to alteration without prior notice.

Saab Automobile AB

Warning, Important and Note

The headings "Warning", "Important" and "Note" occur from time to time in the Service Manual. They are used to draw the attention of the reader to information of special interest and seriousness. The importance of the information is indicated by the three different headings and the difference between them is explained below.

⚠ WARNING

Warns of the risk of material damage and grave injury to mechanics and the driver, as well as serious damage to the car.

Important

Points out the risk of minor damage to the car and also warns the mechanic of difficulties and time-wasting mistakes.

Note

Hints and tips on how the work can be done in a way that saves time and labour. This information is not supplied for reasons of safety.

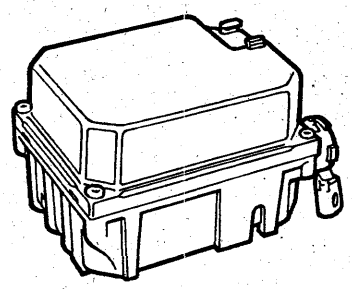
Market codes

The codes refer to market specifications

AT	Austria	GB	Great Britain
AU	Australia	GR	Greece
BE	Belgium	IS	Iceland
CA	Canada	IT	Italy
CH	Switzerland	JP	Japan
DE	Germany	ME	Middle East
DK	Denmark	NL	Netherlands
ES	Spain	NO	Norway
EU	Europe	SE	Sweden
FE	Far East	US	USA
FI	Finland	UC	US California
FR	France		

Production: Service Support, Saab Automobile AB, Trollhättan, Sweden

Technical data



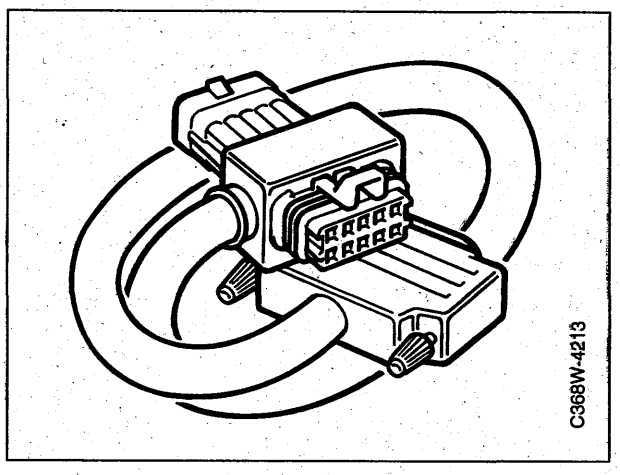
C368W-4212

Control module

Number of pins	qty	10
+54 power supply	Pin No.	F (6)
Power ground	Pin No.	E (5)

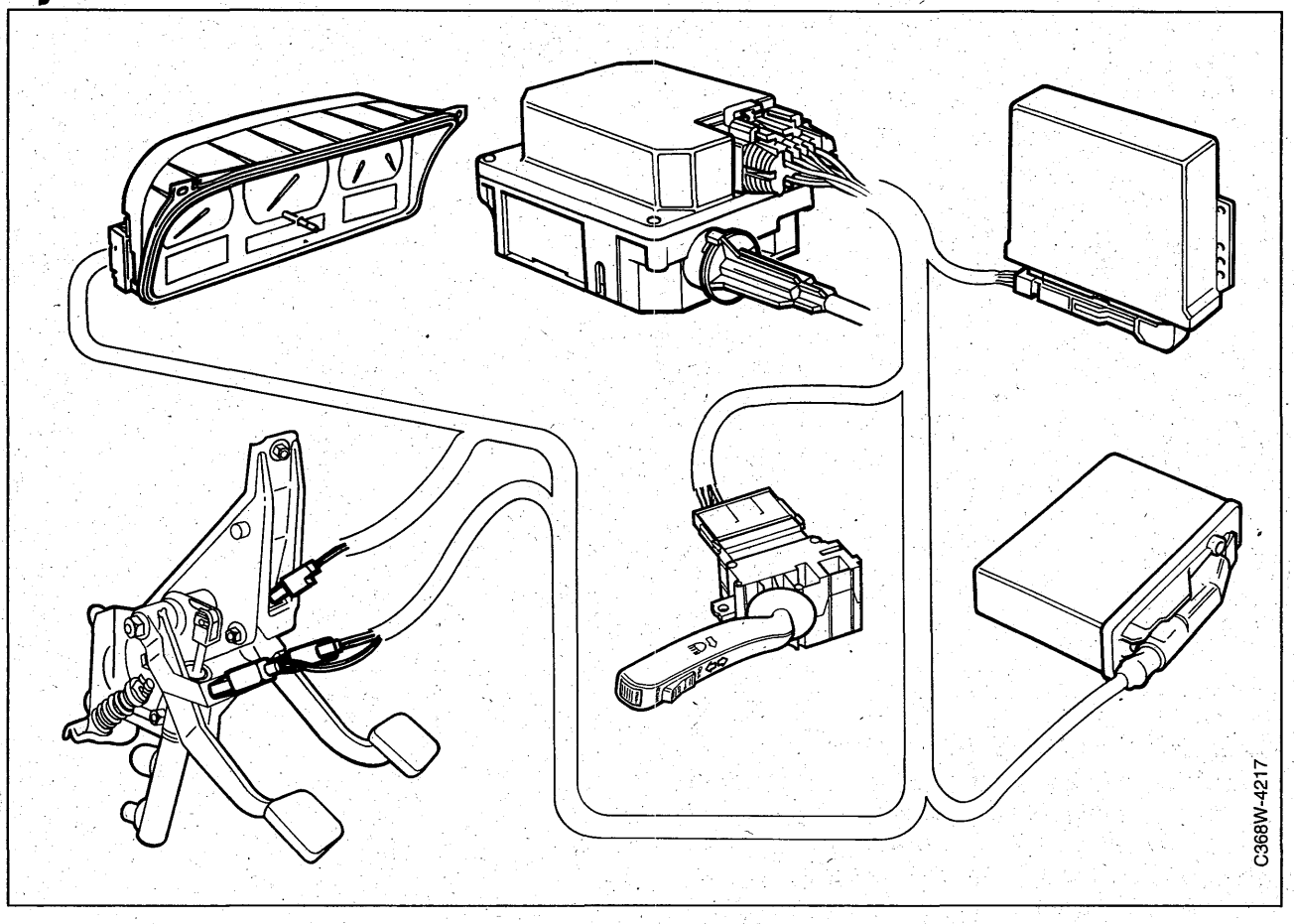
Special tool

86 11 402 Test cable for Cruise Control.



Technical description

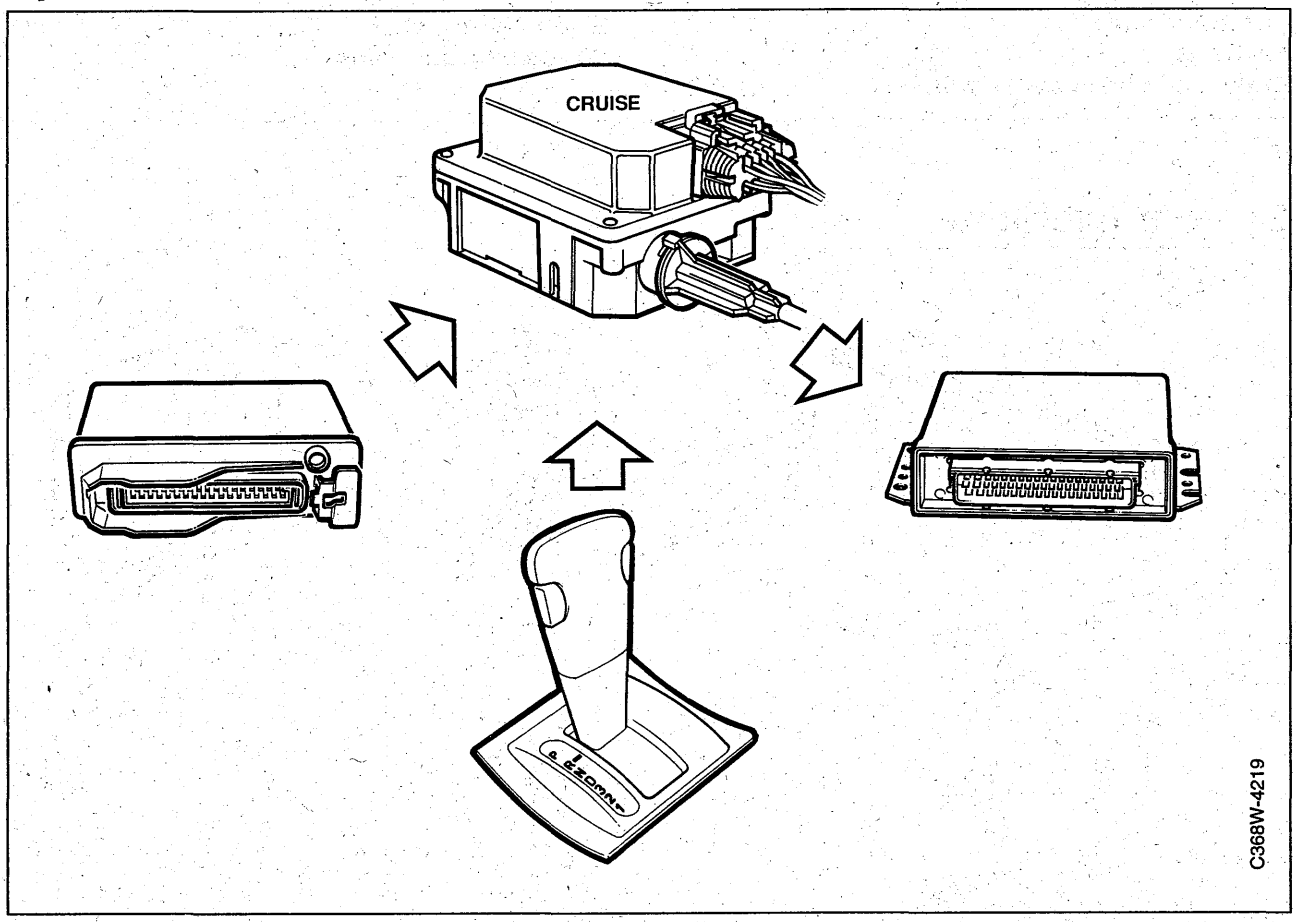
System overview



The Cruise Control system enables the driver to preselect the speed of the car and then take his foot off the accelerator, leaving the system to keep the car travelling at the selected speed. The driver sets the system by means of a switch on the combined dipswitch and direction indicator stalk. The system will be disengaged automatically when either the clutch pedal or brake pedal is depressed, when the switch is moved to the OFF or TIP position, when the selector lever is in the N position or when the Traction Control System is activated on cars equipped with the B308 engine.
The Cruise Control system consists of the following components and signals:

- Control module
- Switches
- Brake and clutch pedal switches
- Brake lights switch
- Speed signal from the speedometer
- Cruise Control active signal, to the engine management system

System overview (contd.)



Cars with the B308 engine

On cars equipped with the B308 engine and TCS, +30 current is supplied from the brake lights switch to pin G (7) of the Cruise Control system control module via the TCS control module. This is to enable the TCS control module to disengage the Cruise Control system if wheelspin occurs for more than one second.

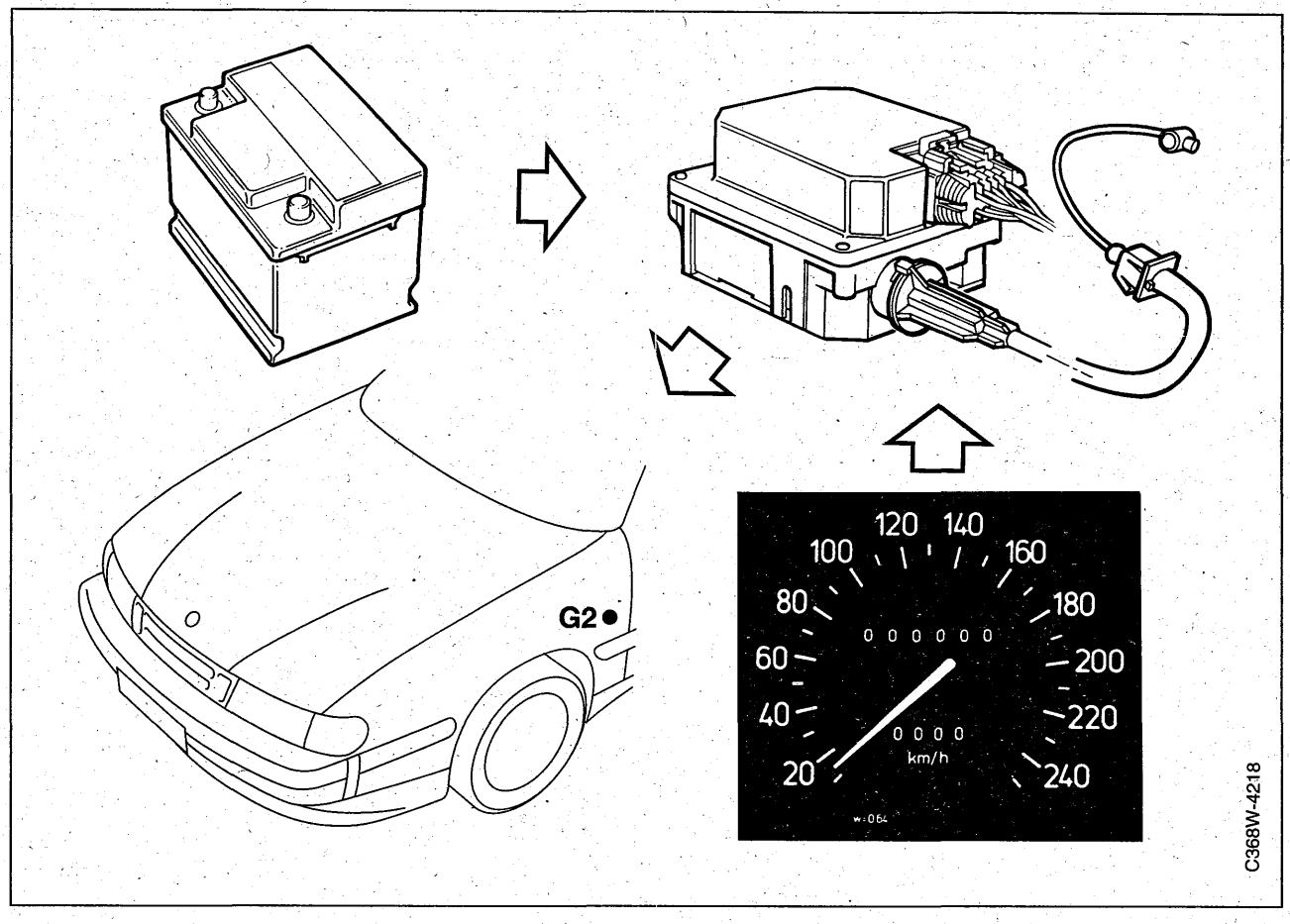
Cars with Turbo

On turbo cars with the Cruise Control system, the TRIONIC control module receives a signal from pin J (9) of the Cruise Control system control module telling it that the Cruise Control system is engaged. This ensures smoother control of the car's speed.

Automatic transmission

The Cruise Control system is supplied with current from fuse 9 via the selector lever position sensor and also from fuse 2. This ensures that the system will be operative when the selector lever is any of the drive positions (D, 3, 2, 1).

Control module

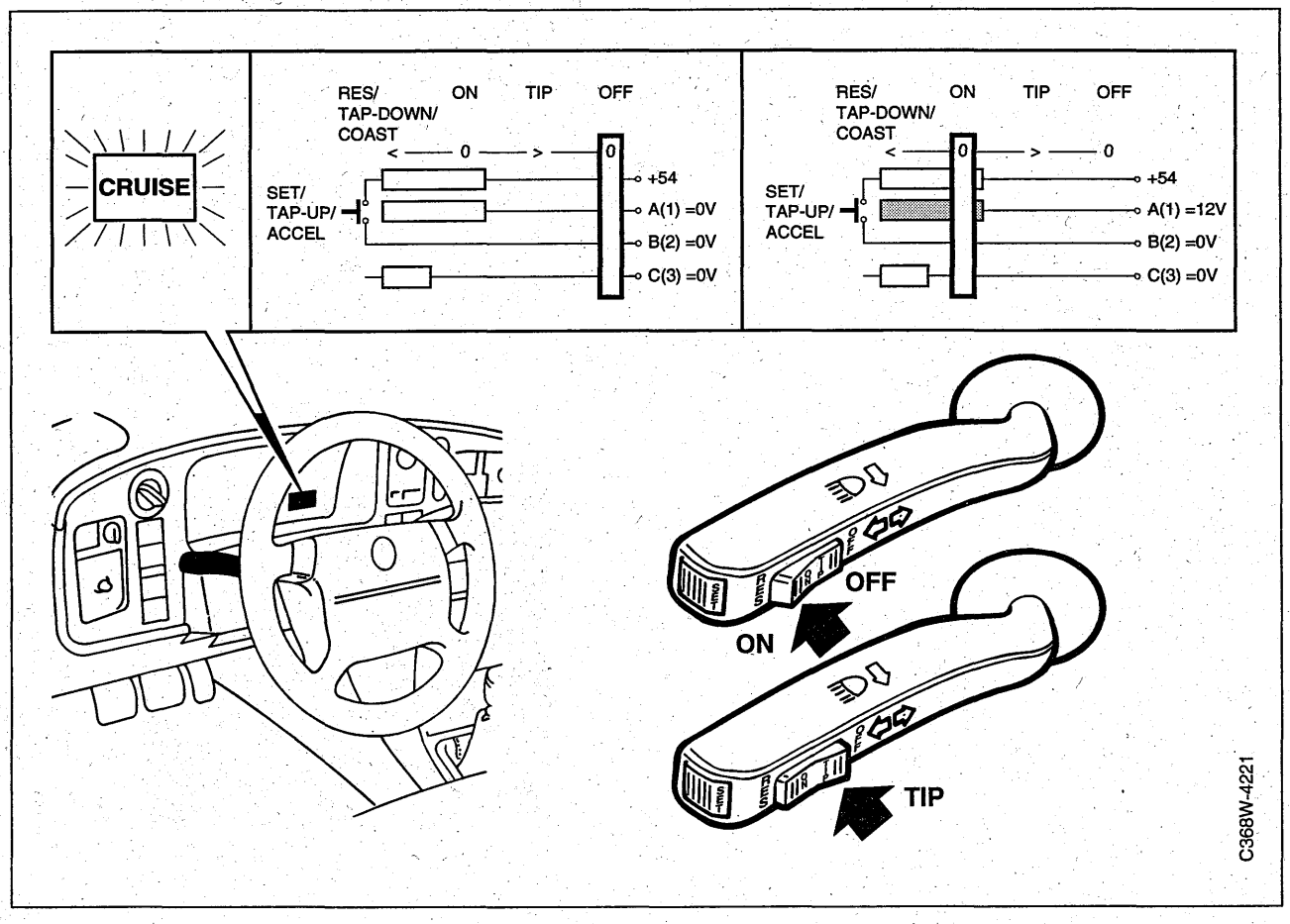


The control module incorporates an electric stepping motor which mechanically regulates the Cruise Control cable connected to the throttle body, either retracting it or extending it according to the speed of the car.

Via fuse 2, +54 current is supplied to terminal F of the control module and switch 141.
The control module is grounded via pin E (5) at grounding point G2.

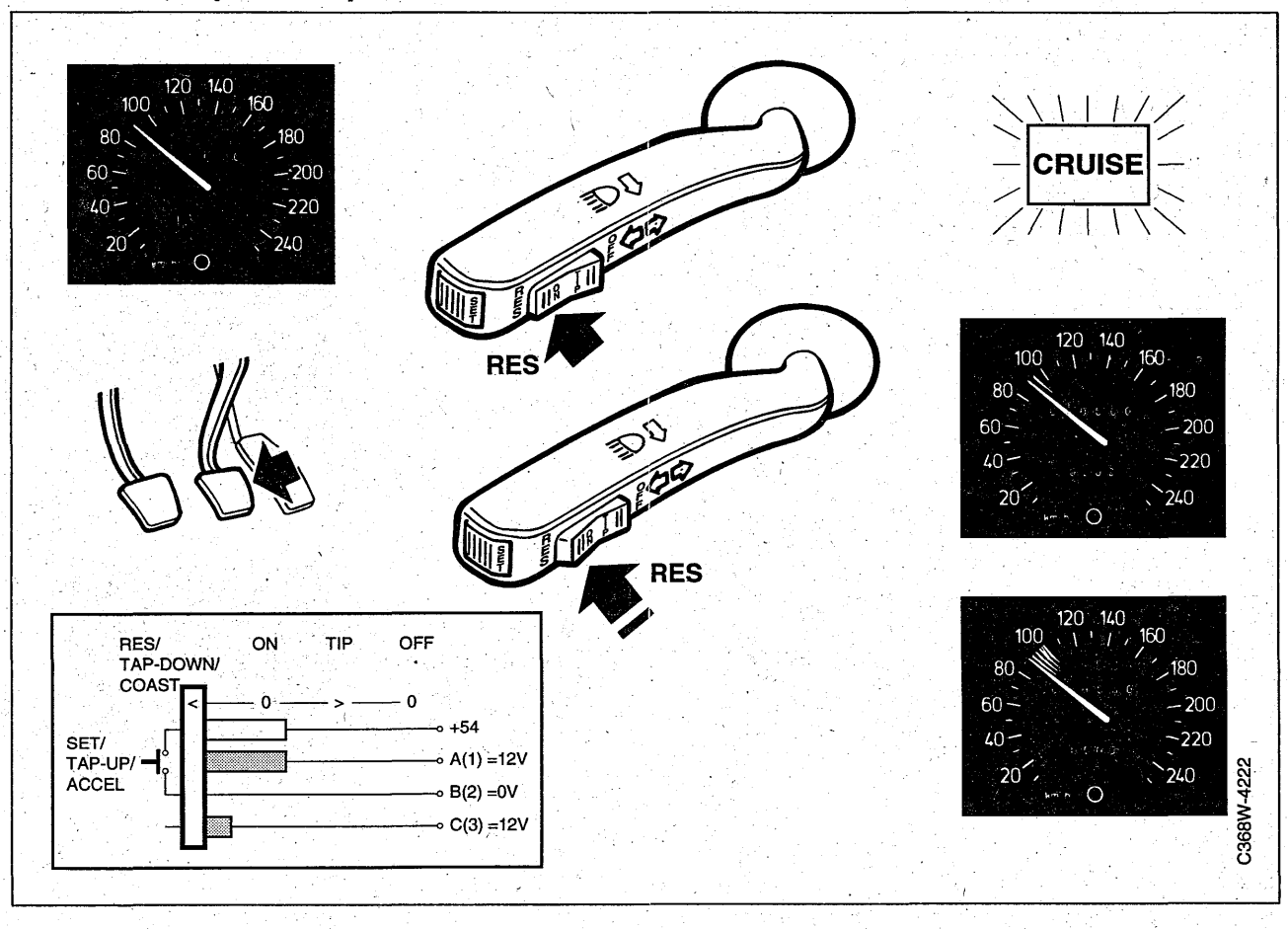
The speed signal is obtained from the speedometer in the main instrument display panel.
The Cruise Control system is not operative at speeds below 32 km/h (20 mph) or above 220 km/h (137 mph).

Switches



The Cruise Control system is controlled by means of switch 141.
The different positions of the switch are as follows:
ON: The ON position is to the left of the OFF position.
In the ON position, current is supplied to terminal A of the control module and the CRUISE lamp lights up.
TIP: Between the ON and OFF positions is a position called TIP.
When the Cruise Control system is activated (ON) and in operation, the CRUISE lamp goes out to indicate that the switch has been moved to the TIP position.
In the TIP position, no current is supplied to terminals A, B or C of the control module and the Cruise Control system is disengaged but the preselected speed is retained in the control module's memory. When the switch is released and springs back to its normal position, current will again be supplied to terminal A (same as in the ON position).
OFF: Further to the right is the OFF position.
In the OFF position, no current is supplied to terminals A, B or C of the control module. As long as the ignition is not switched off, the predetermined speed will be retained in the memory (same as in the TIP position).
The OFF position is the same as a locked TIP position.

Switches (contd.)



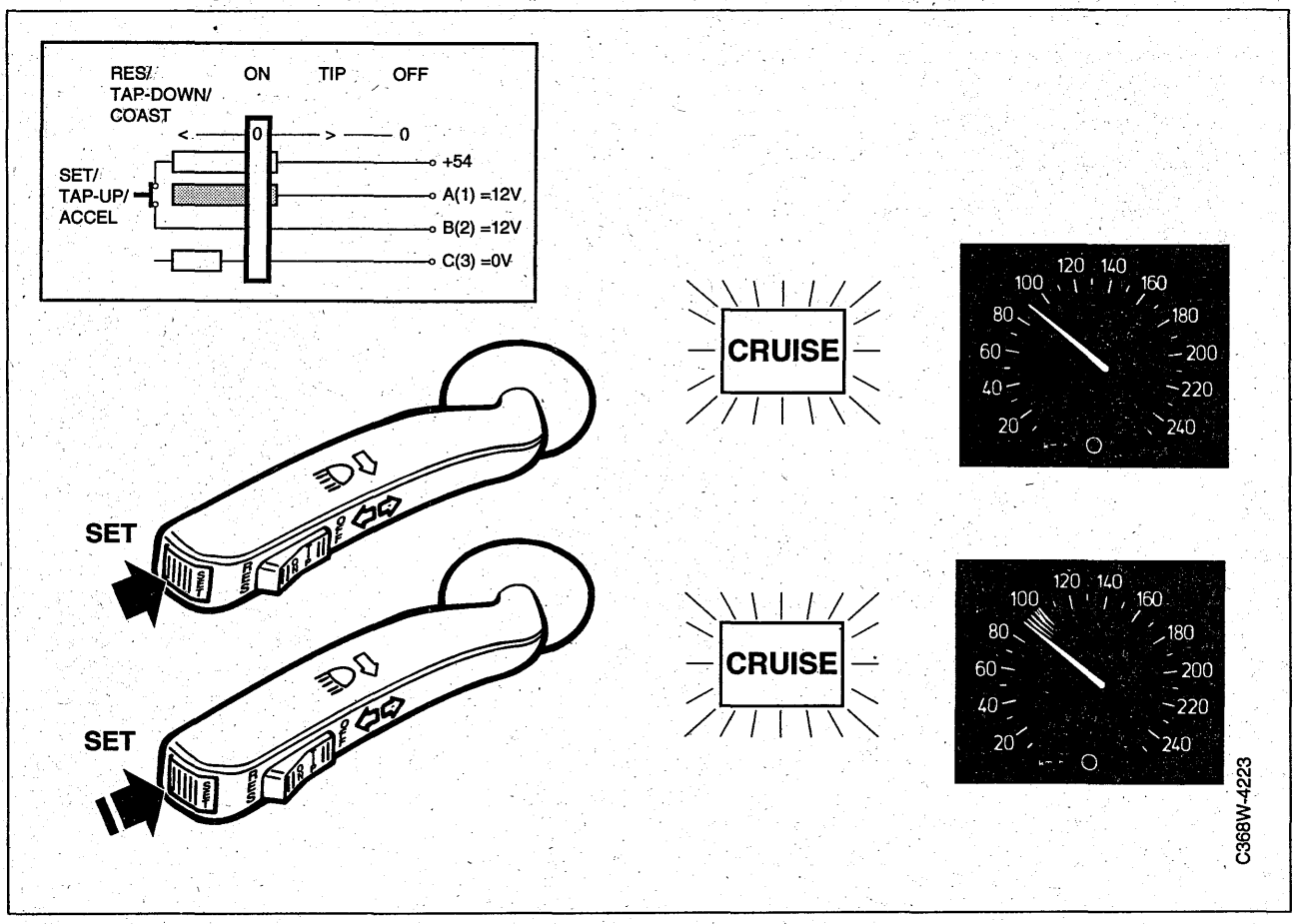
RES/— :

Current is supplied to terminals A and C of the control module. Two functions are available in this position:

1 After activation of the brake or clutch pedal, the Cruise Control can be reset to the original speed by pressing RES/—.

2 If the button is held in the RES position, the car will gradually slow down. The new speed will be stored in the memory when the button is released. If the button is pressed briefly, the speed of the car will be reduced in steps of 1.6 km/h (1 mph).

Switches (contd.)



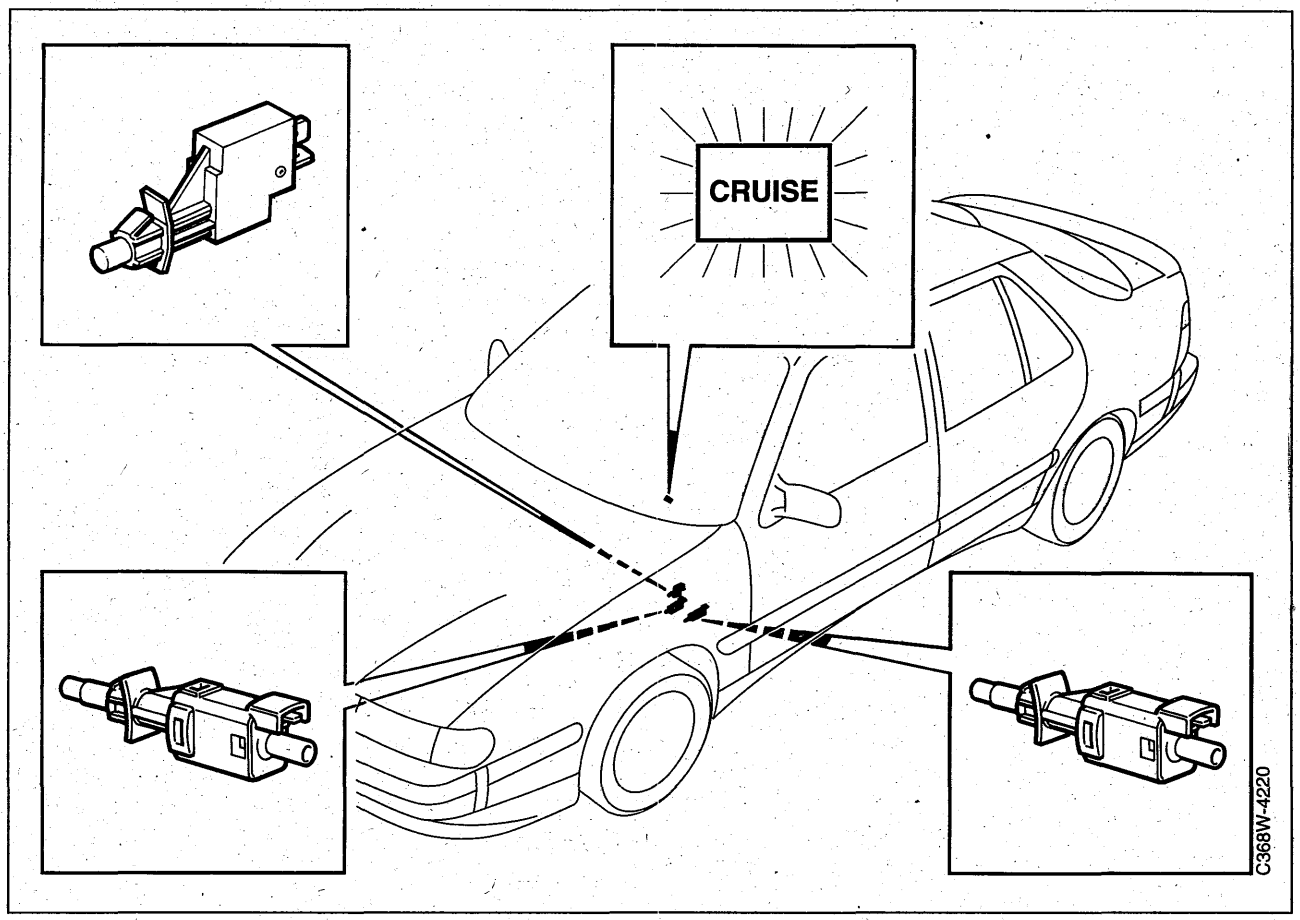
SET/+ :

At the end of the direction indicators stalk is a spring-loaded SET/+ button. When this button is pressed, current is supplied to terminal B of the control module. This button controls two functions:

1 If the SET button is pressed while the Cruise Control system is activated, the current speed will be stored in the Cruise Control memory.

2 If the SET/+ button is kept depressed, the car will gradually pick up speed. The new speed will be stored in the memory when the button is released. If the button is pressed briefly, the speed of the car will increase in steps of 1.6 km/h (1 mph).

Pedal switches, indicator lamp



Brake and clutch pedal switches

When the brake or clutch pedal is depressed, the pedal switches cut off the supply of current to pin D (4) of the control module, causing disengagement of the Cruise Control system.

Brake lights switch

When the brake pedal is depressed, the brake lights switch contacts close and pin G (7) of the Cruise Control system control module is supplied with positive current via fuse 12.
Pin G (7) must be grounded via the brake light bulbs. If it is not, the Cruise Control system will not be operative.

CRUISE indicator lamp

The main instrument display panel contains a CRUISE indicator lamp which lights up when the Cruise Control system is engaged.
This lamp is supplied with current from terminal H of the control module.
In the TIP position, however, the lamp goes out to indicate that the TIP position has been selected.
The CRUISE lamp is also used in connection with fault diagnosis to provide information about the system, see the "Fault diagnosis" section.

Fault diagnosis

Diagnosis

When carrying out fault diagnosis, use is made of the Cruise Control system's switches as well as the clutch and brake pedals. On cars with automatic transmission, use is made of the Cruise Control system's switches, the brake pedal and selector lever.

Start fault diagnosis by checking:

1 The fuses, see page 16.

2 The ignition, see page 17.

3 Grounding, see page 18.

4 The pins of the male control module connector for possible slide-out.

Fault diagnosis is carried out in the diagnostics mode. To enter the diagnostics mode, see the table below.

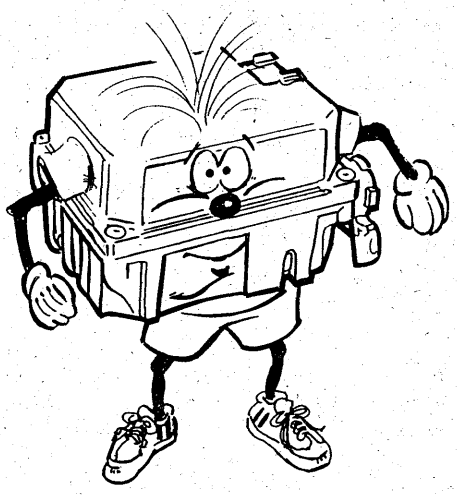
To leave the diagnostics mode, increase the speed of the car to more than 32 km/h (20 mph) or switch off the ignition.

If you happen to make a mistake while in the diagnostics mode, you will be returned automatically to point 5 and will have to start afresh from there.

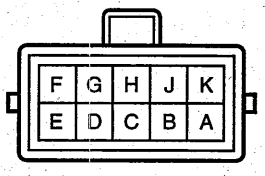
	Action	CRUISE lamp	Item checked	Fault diagnosis page No.
1	Engine switched off and handbrake applied.			
2	Automatic transmission: selector lever in position N (P, R). Manual gearbox: clutch pedal depressed.			
3	Press the SET and RES buttons simultaneously and keep them depressed while the engine starts.			
	The CRUISE lamp should light up to confirm that you are in diagnostics mode.	Lights up Remains out	On function SET function RESUME function Cruise lamp	27 21 24 44
4	First release the SET button and then the RES button.	Goes out Remains on	SET function RESUME function	21 24
5	Press the SET button.	Lights up Remains out	SET function	21
	Release the SET button.	Goes out Remains on	SET function	21
7	Move the switch to the RES/- position.	Lights up Remains out	RESUME function	24
8	Release RES/-.	Goes out Remains on	RESUME function	24
9	Move the switch to the TIP/OFF position.	Lights up Remains out	TIP/OFF function	19
10	Release TIP/OFF.	Goes out Remains on	TIP/OFF function	19
11	Automatic transmission: shift to D (3, 2, 1). Manual gearbox: release the clutch pedal.	Lights up Remains out	Automatic transmission: Selector lever position sensor Manual gearbox: Clutch pedal switch	30 33

Diagnosis (contd.)

	Action	CRUISE lamp	Item checked	Fault diagnosis page No.
12	Depress the brake pedal.	Goes out Remains on	Brake pedal switch Automatic transmission Manual gearbox	 32 35
13	Release the brake pedal.	Lights up Remains out	Brake pedal switch Automatic transmission Manual gearbox	 32 35
14	Automatic transmission: shift to N (P, R). Manual gearbox: depress the clutch pedal.	Goes out Remains on	Automatic transmission: Selector lever position sensor Manual gearbox: Clutch pedal switch	 30 33
15	Depress the brake pedal and keep it depressed for about five seconds. After about five seconds:	Lights up Remains out Goes out Remains on	Brake lights switch Control module	36 48
16	Release the brake pedal.	Slight increase in engine idling speed No increase in engine idling speed	Stepping motor/ cable	41
17	Drive off slowly.	Lamp flashes in time with the speed. Lamp does not flash.	Speed signal	42



Quick test

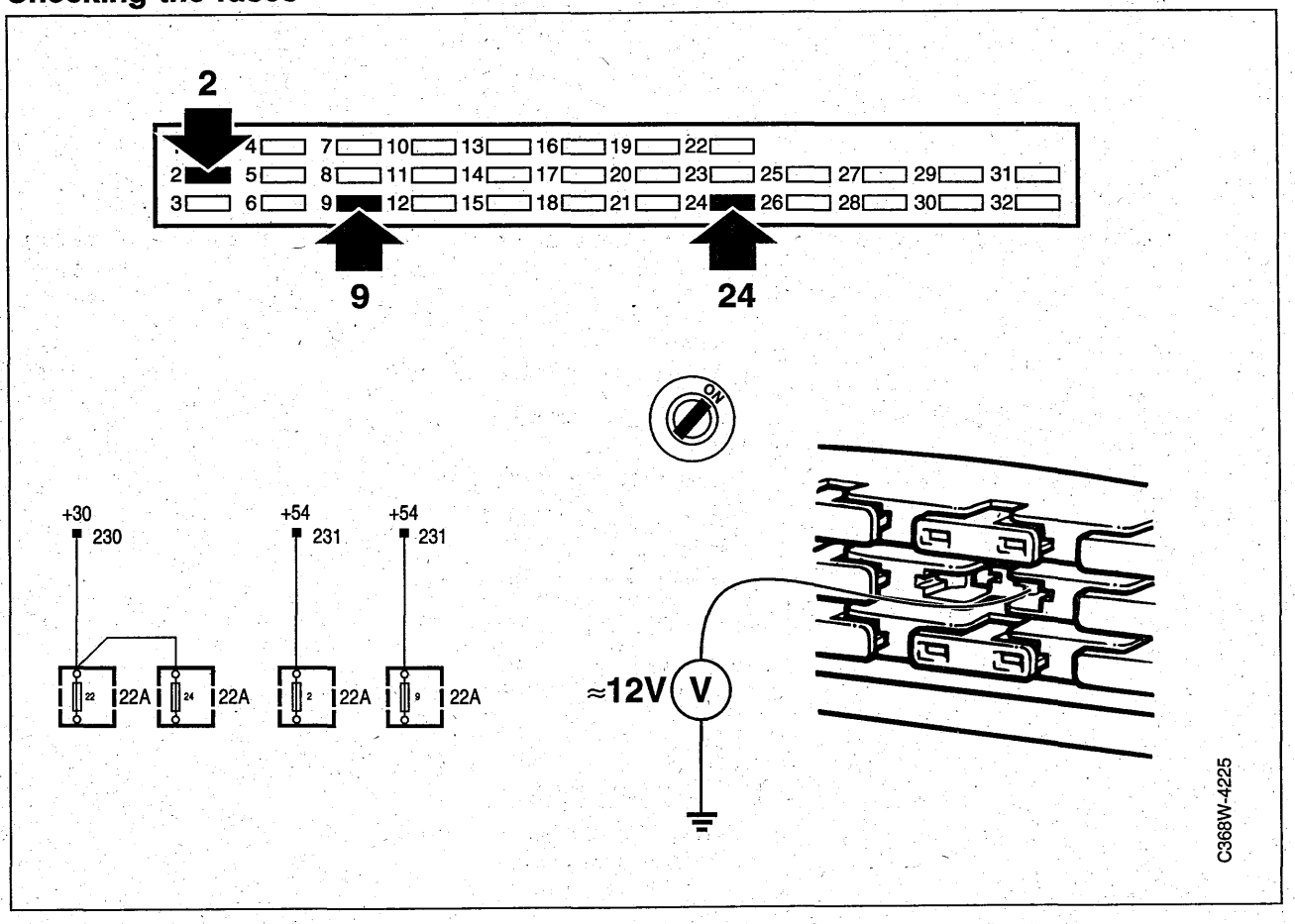


C368W-4224

Pin	Colour	Component/function	Test conditions	Input/ Output	Test reading	Across X—Y
1 (A)	Green	Switches	Switch set to ON position Ignition switched on	Input	Batt+	1-5
2 (B)	Grey/ green	Switches	Switch held in SET position Ignition switched on	Input	Batt+	2-5
3 (C)	Grey	Switches	Switch held in RES position Ignition switched on	Input	Batt+	3-5
4 (D)	Yellow/ green	Pedal switches				
		Brake pedal switch	Automatic transmission D, 1, 2, 3 Pedal not depressed Pedal depressed	Input	 Batt+ 0 V	4-5
			Manual gearbox Pedal not depressed Pedal depressed	Input	 Batt+ 0 V	4-5
		Clutch pedal switch	Manual gearbox Pedal not depressed Pedal depressed	Input	 Batt+ 0 V	4-5
5 (E)	Black	Power ground		Input	Batt+	5-batt+
6 (F)	Brown/ white	Ignition +54	Ignition switched on	Input	Batt+	6-5
7 (G)	Violet or Blue/ green	Brake lights switch	Brake pedal depressed Brake pedal not depressed	Input	 Batt+ 0 V	7-5
8 (H)	Brown/ yellow or Yellow/ white	CRUISE indicator lamp	Lamp out Lamp on	Output	0 V Batt+	8-5
9 (J)	Blue/ green	Communication with Trionic	In diagnostics mode ON/OFF SET RESUME	Output	 Batt+	6-9
10 (K)	Black/ green	Speed signal	Car driven slowly forward	Input	approx. 6 V	10-5

Fault diagnosis schedule

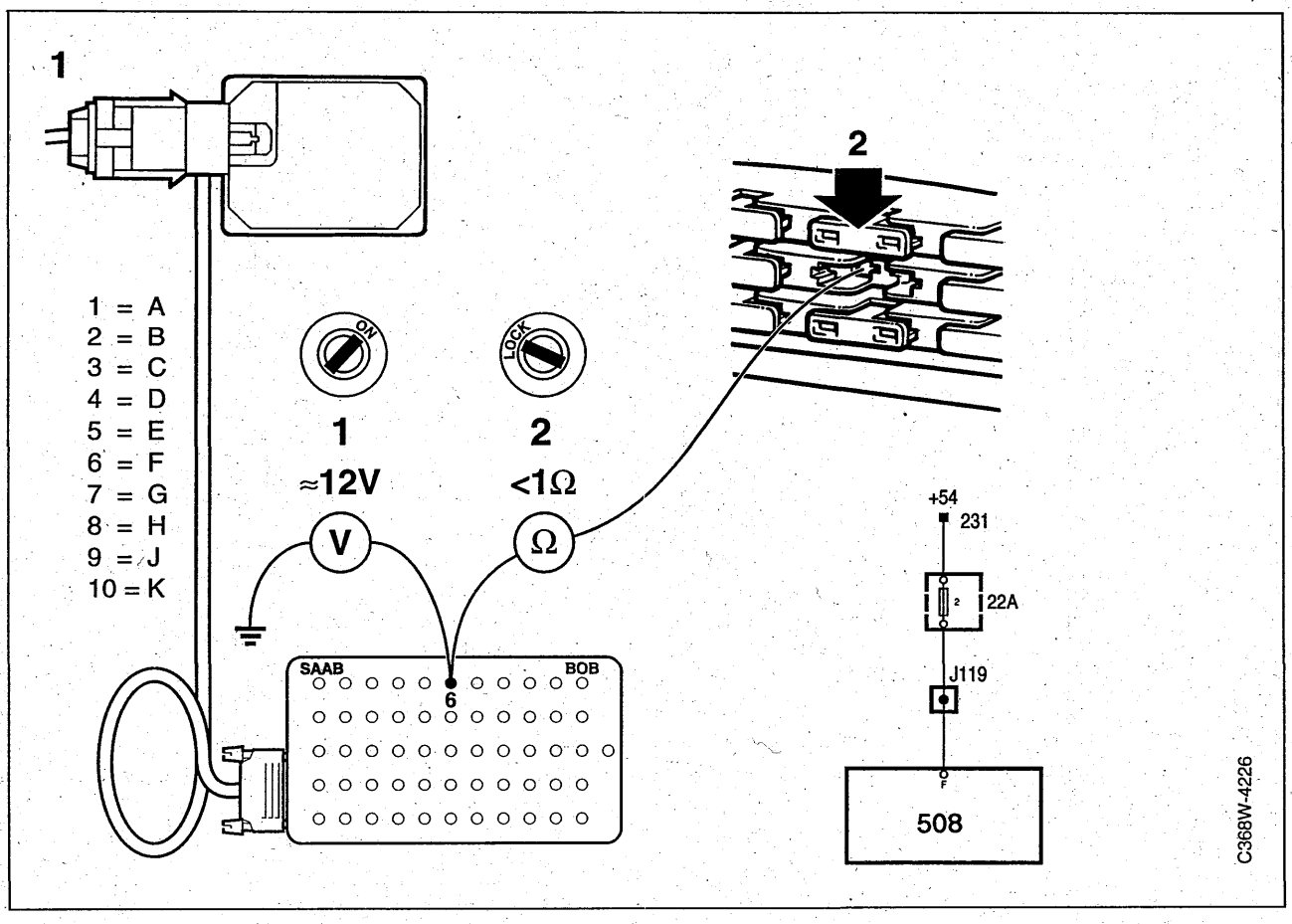
Checking the fuses



1 Check that the fuse is intact and that a voltage of about 12 V is present on it, as indicated in the table below.

Function	Fuse number	Rating	Condition
Cruise Control Power supply	2	15 A	Battery voltage Ignition switched on (+54)
Brake lights switch	24	15 A	Battery voltage (+30)
Selector lever position sensor	9	15 A	Battery voltage Ignition switched on (+X)

Checking the power supply



1 Ignition switch in the LOCK position.
Connect a BOB and check the power supply for the Cruise Control system's control module by taking a voltage reading across pin F (6) of the control module connector and a good ground (e.g. a door hinge screw).

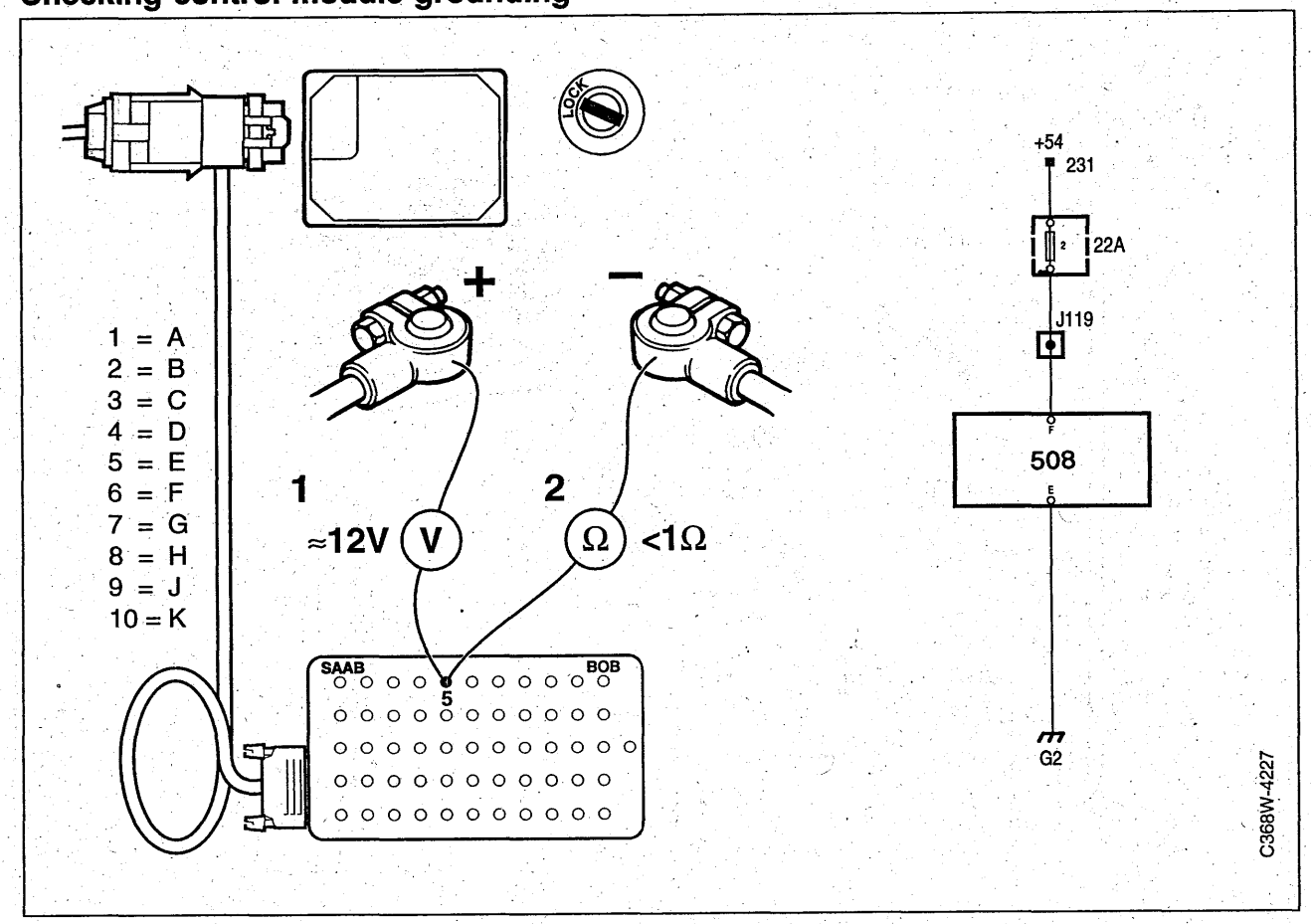
The reading should be about 12 V.

2 If the reading is not 12 V, check the wiring for continuity or a short circuit by measuring the resistance across pin F (6) of the control module connector and the load side of the fuse.

The resistance should be ⩽ 1 ohm.

3 If no fault has been found after carrying out the above checks, continue as described on the next page.

Checking control module grounding



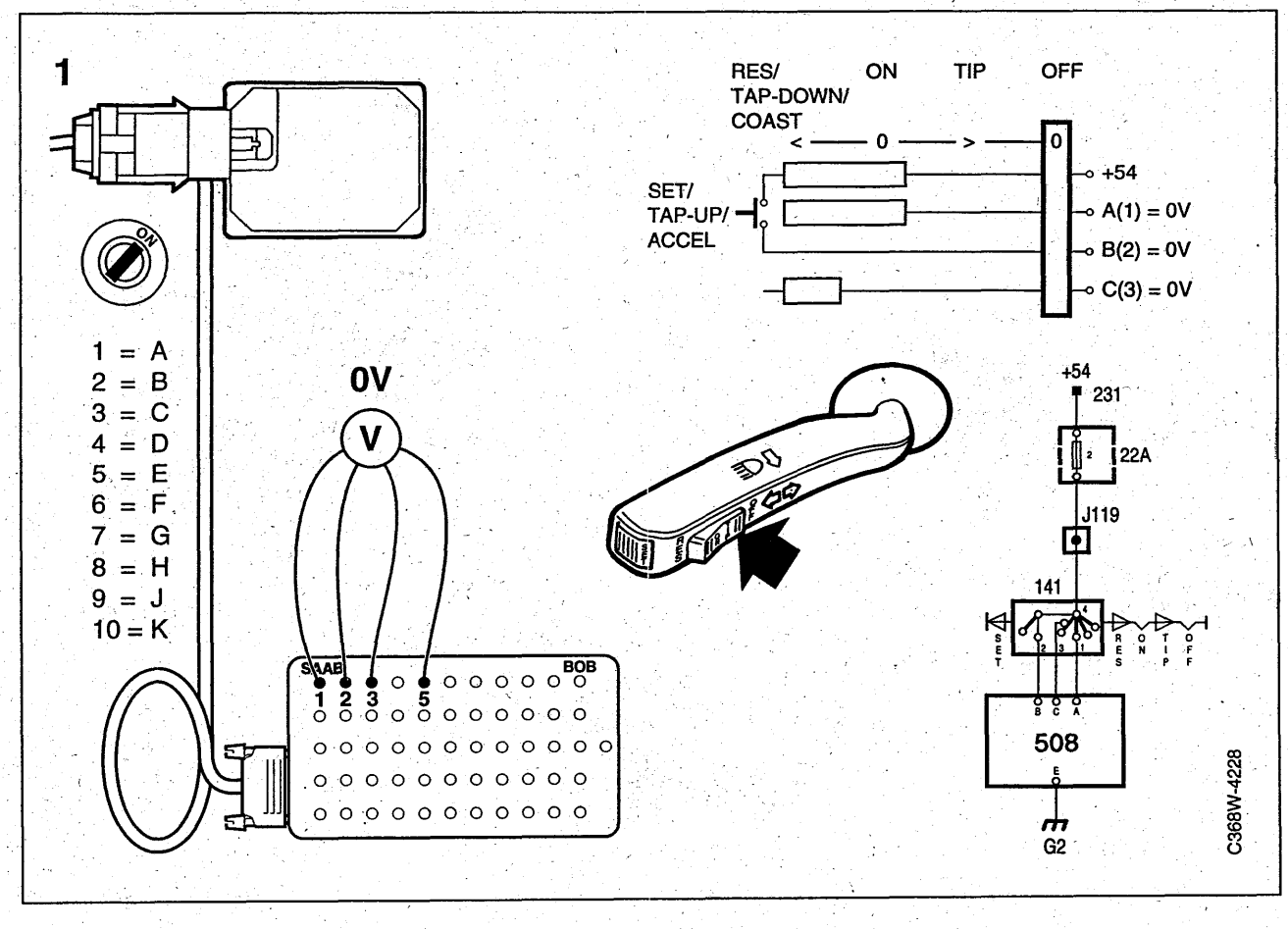
1 Check the grounding of the control module by taking a voltage reading across battery positive and pin E (5) of the control module connector.

The reading should be about 12 V.

2 If the reading is not in the region of 12 V, check the wiring for continuity or a short circuit by measuring the resistance across pin E (5) of the control module connector and the grounding point.

The resistance should be ⩽ 1 ohm.
If the wiring is OK, continue diagnosis as described on page 17.

Checking the TIP/OFF function



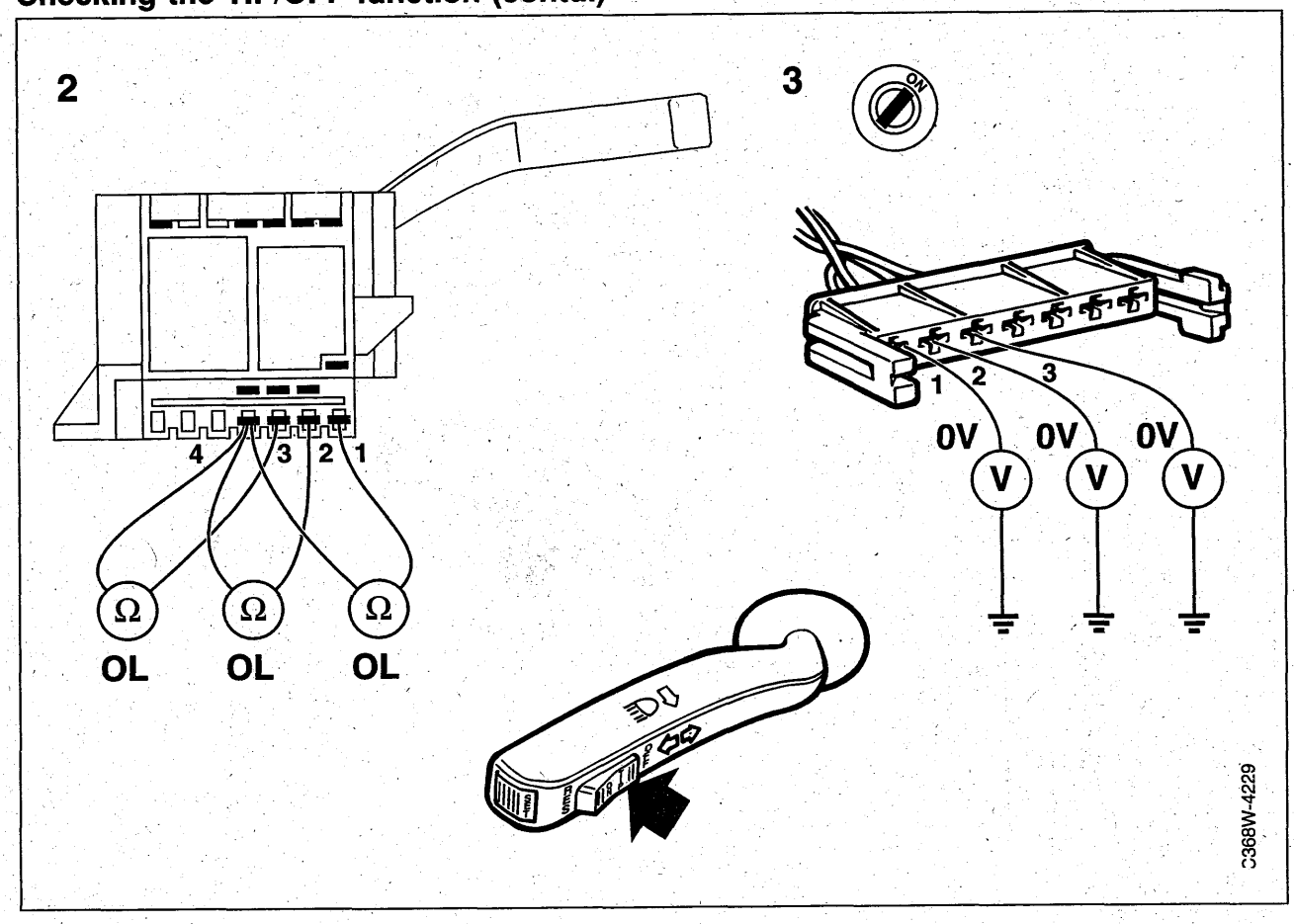
Conditions for TIP/OFF

The following conditions must be fulfilled before activation of the TIP function in the Cruise Control system's control module will be possible:
Pin **A** (1): 0 V
Pin **B** (2): 0 V
Pin **C** (3): 0 V

The switch should be in the OFF position.

1 Connect the BOB and check that no current (0 V) is present across terminals A, B and C of the Cruise Control connector and a good ground when the TIP/OFF switch is held in the depressed position.

Checking the TIP/OFF function (contd.)



2 Set the switch in the OFF position and measure the resistance across pins 4 and 1, pins 4 and 2, and pins 4 and 3.

If the resistance reading obtained in any measurement is < 1 ohm, fit a new switch.

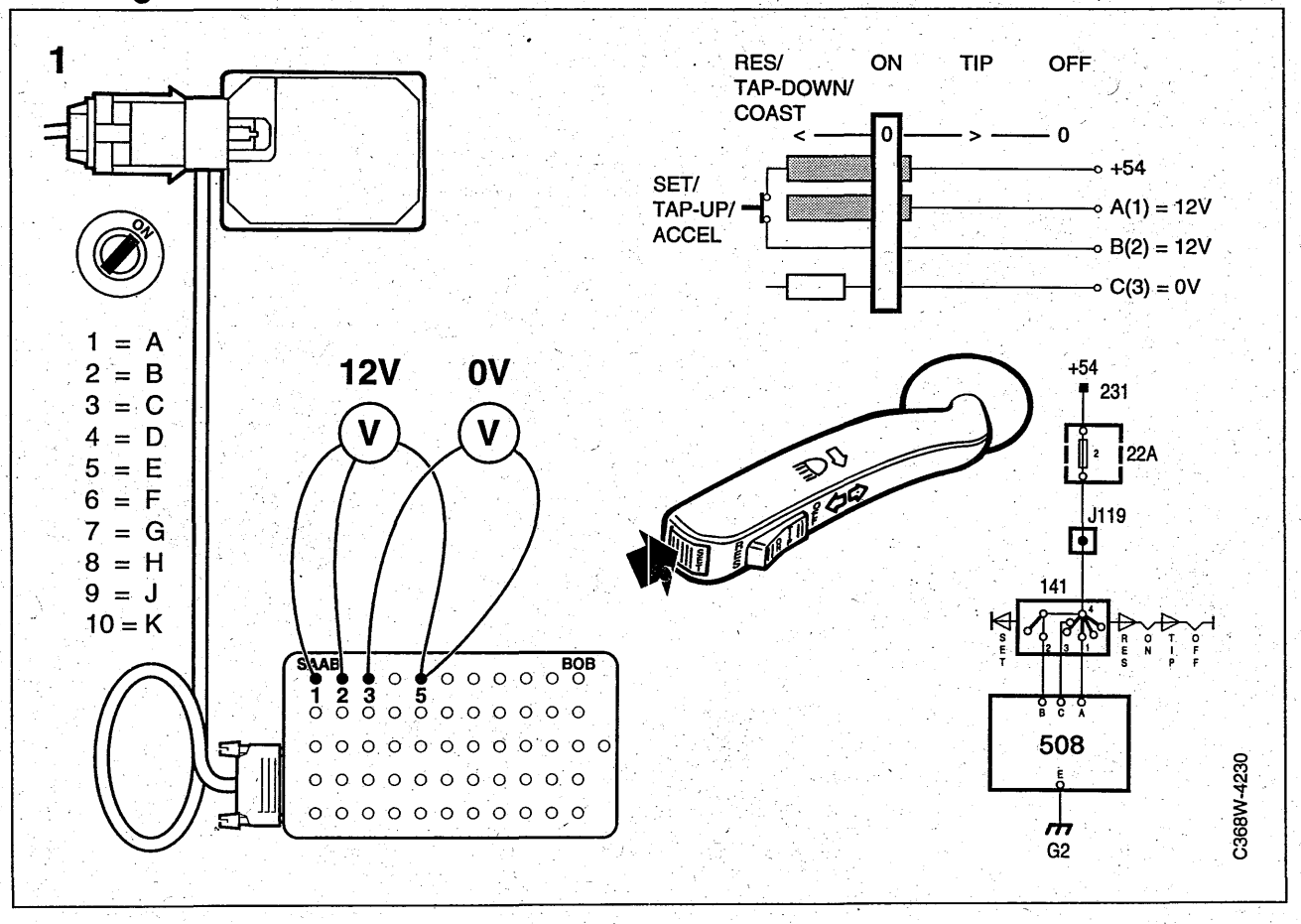
3 If the reading obtained indicates an open circuit, check the wiring for a short circuit to battery positive by taking a voltage reading across:

- Pin A (1) of the Cruise Control connector and a good ground.
- Pin B (2) of the Cruise Control connector and a good ground.
- Pin C (3) of the Cruise Control connector and a good ground.

If any of the readings obtained is about 12 V, check the wiring and rectify the fault.

4 If no fault has been found after carrying out the above checks, continue fault diagnosis as described on page 48.

Checking the SET function



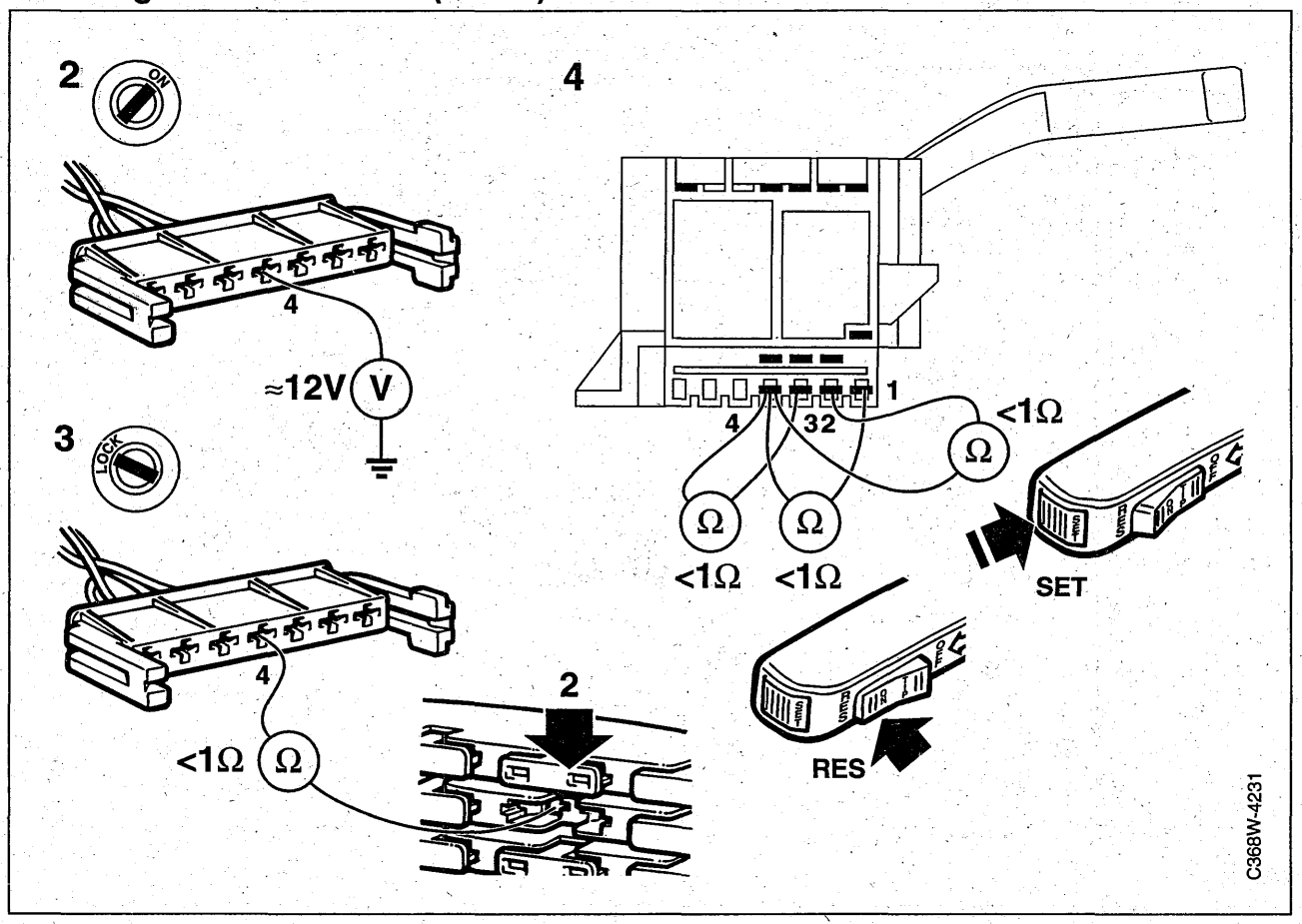
Conditions for SET

The following conditions must be fulfilled before activation of the SET function in the Cruise Control system's control module will be possible:
Pin **A** (1): approx. 12 V
Pin **B** (2): approx. 12 V
Pin **C** (3): 0 V

The switch should be in the ON position.

1 Connect the BOB and check that about 12 V is present across terminals B (2) and A (1) of the Cruise Control connector and a good ground. Also check that no voltage (0 V) is present across terminal C (3) and a good ground when the SET button is held in the depressed position.

Checking the SET function (contd.)



2 If the voltage readings are not OK, check that about 12 V is present across pin 4 of the switch connector and a good ground.

If the voltage is OK, continue with point 4.

3 If the voltage is not OK, check the wiring for continuity or a short circuit by measuring the resistance across the load side of the fuse and pin 4 of the switch connector.

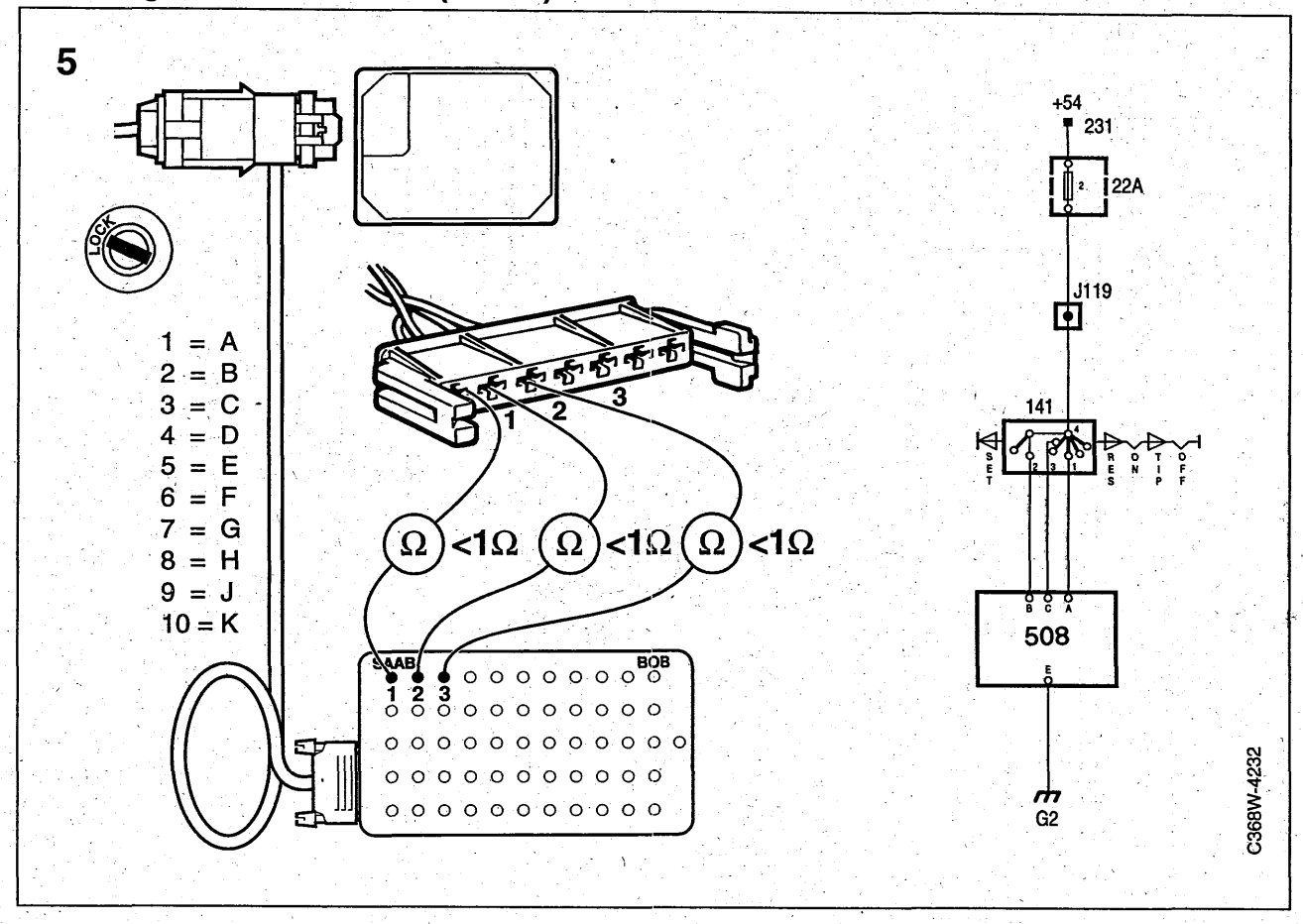
If the resistance is > 1 ohm, rectify the fault.

4 Check the switch by holding it in the SET position and measuring the resistance across pins 4 and 2.

Set the switch in the ON position and measure the resistance across pins 4 and 1. Hold the switch in the RESUME position and take a reading across pins 4 and 3.

If the resistance reading obtained in any measurement is > 1 ohm, fit a new switch.

Checking the SET function (contd.)



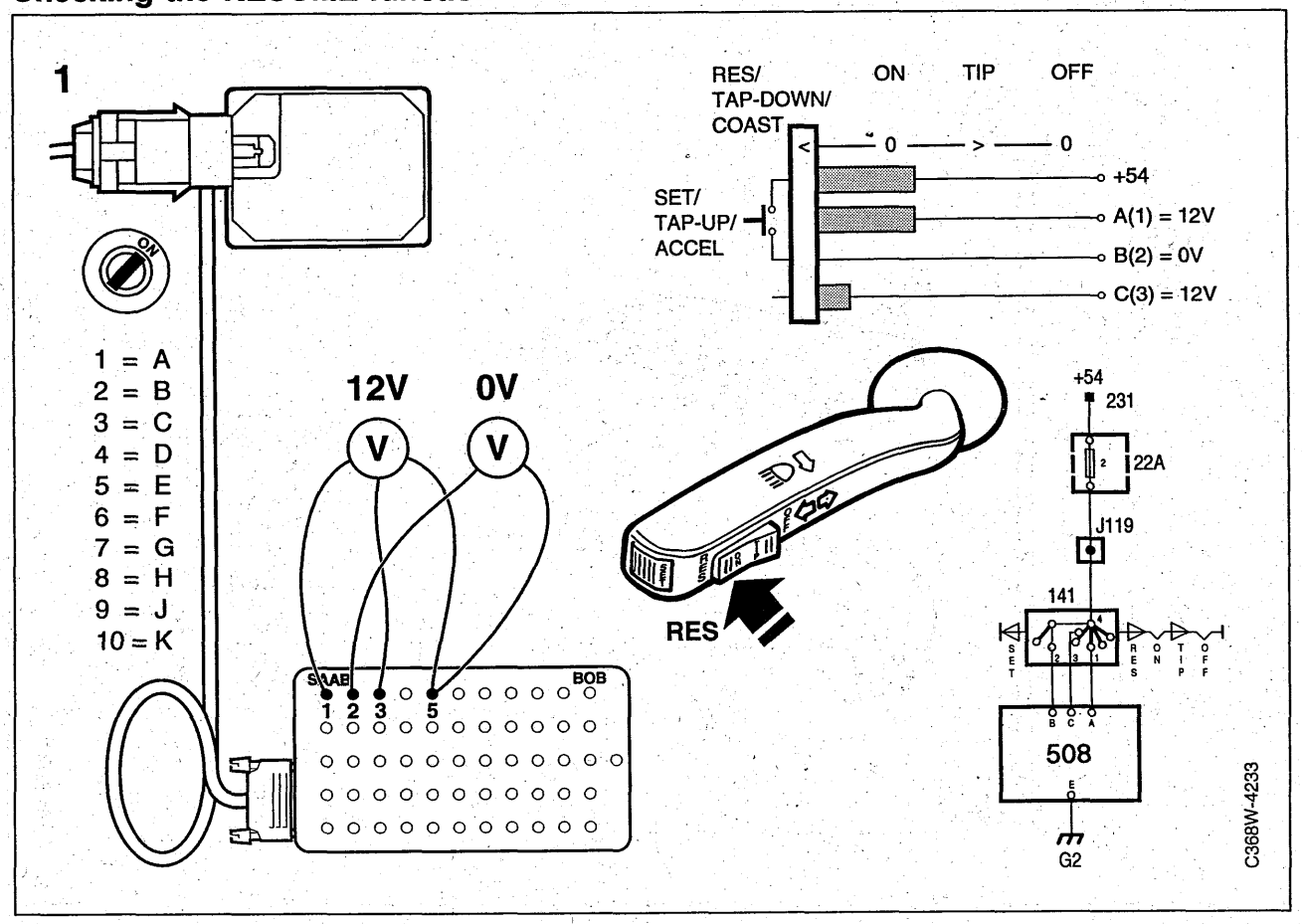
5 If the resistance is ⩽ 1 ohm, disconnect the negative battery cable and check the wiring for continuity or a short circuit by measuring the resistance across:

- pin 2 of the switch connector and pin B (2) of the Cruise Control connector.
- pin 3 of the switch connector and pin C (3) of the Cruise Control connector.
- pin 1 of the switch connector and pin A (1) of the Cruise Control connector.

If the resistance is > 1 ohm, rectify the fault.

6 If no fault has been found after carrying out the above checks, continue fault diagnosis as described on page 48.

Checking the RESUME function



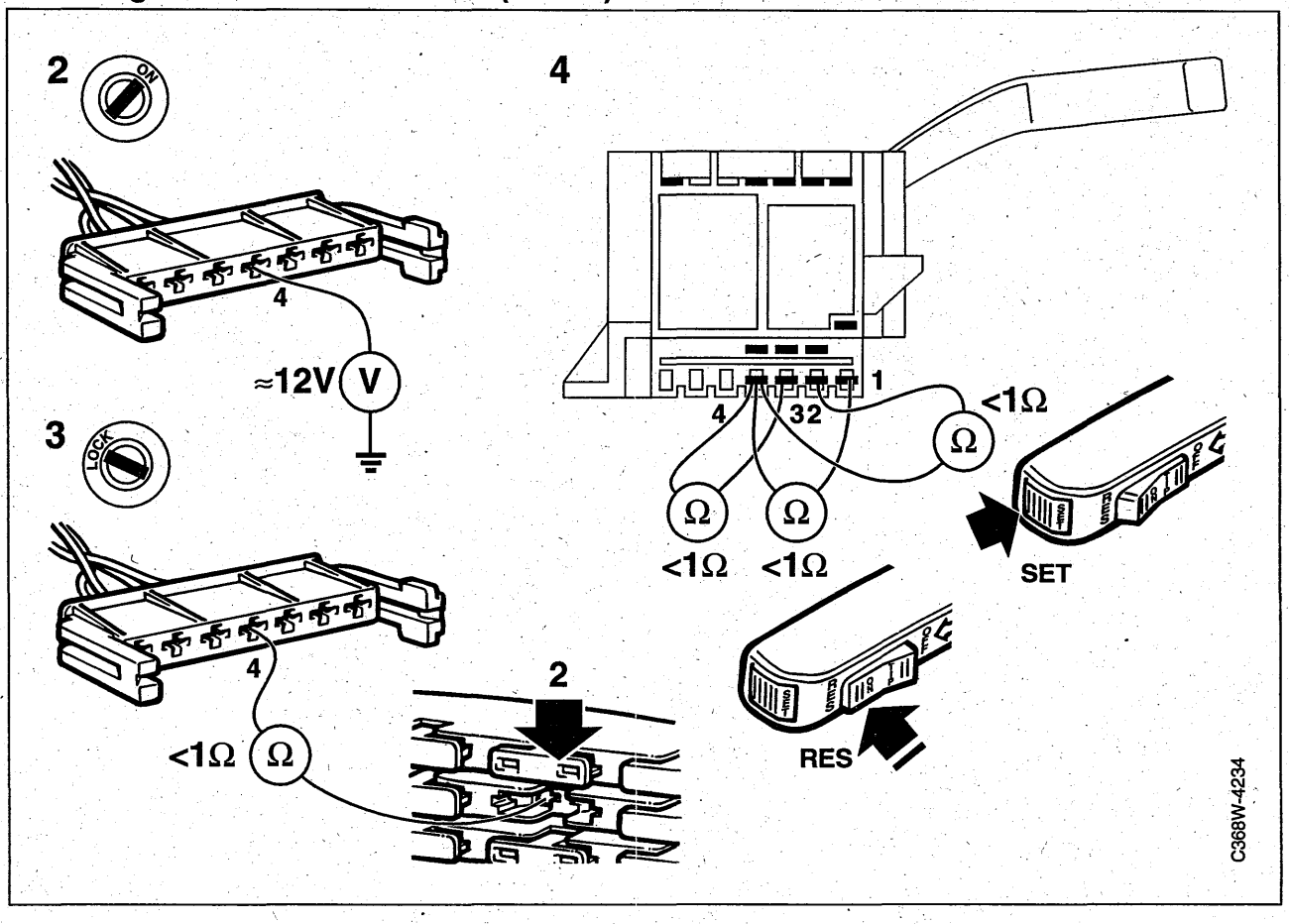
Conditions for RESUME

The following conditions must be fulfilled before activation of the RESUME function in the Cruise Control system's control module will be possible:
Pin **A** (1): approx. 12 V
Pin **B** (2): 0 V
Pin **C** (3): approx. 12 V

The switch should be in the ON position.

1 Connect the BOB and check that about 12 V is present across terminals C (3) and A (1) of the Cruise Control connector and a good ground. Also check that no voltage (0 V) is present across terminal B (2) and a good ground when RESUME is held in the depressed position.

Checking the RESUME function (contd.)



2 If the voltage readings are not OK, check that about 12 V is present across pin 4 of the switch connector and a good ground.

If the voltage is OK, continue with point 4.

3 If the voltage is not OK, check the wiring for continuity or a short circuit by measuring the resistance across the load side of the fuse and pin 4 of the switch connector.

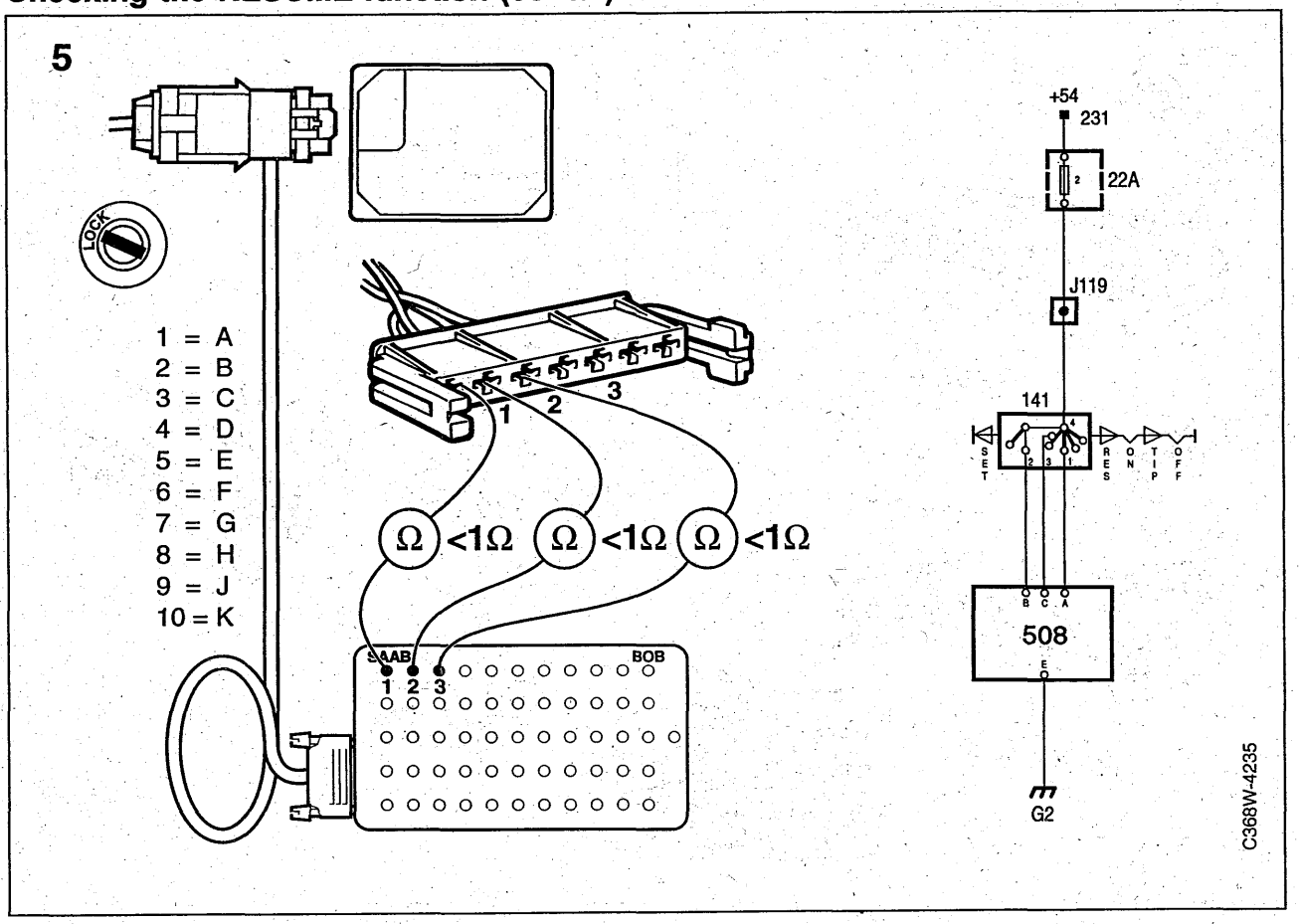
If the resistance is > 1 ohm, rectify the fault.

4 Check the switch by holding it in the RESUME position and measuring the resistance across pins 4 and 3 and pins 4 and 1.

Hold the switch in the SET position and measure the resistance across pins 4 and 2.

If the resistance reading obtained in any measurement is > 1 ohm, fit a new switch.

Checking the RESUME function (contd.)



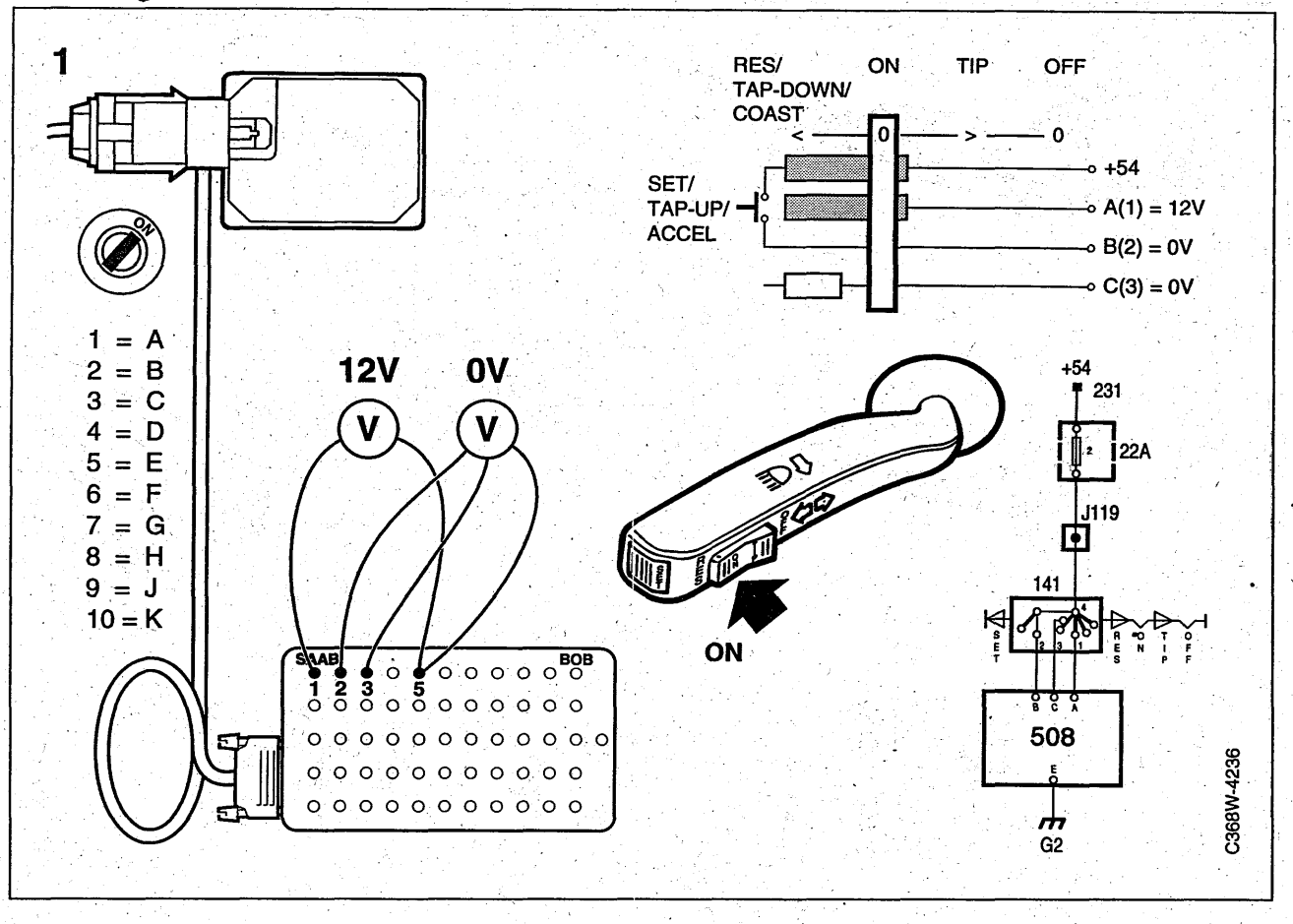
5 If the resistance is ≤ 1 ohm, disconnect the negative battery cable and check the wiring for continuity or a short circuit by measuring the resistance across:

- pin 2 of the switch connector and pin B (2) of the Cruise Control connector.
- pin 3 of the switch connector and pin C (3) of the Cruise Control connector.
- pin 1 of the switch connector and pin A (1) of the Cruise Control connector.

If the resistance is > 1 ohm, rectify the fault.

6 If no fault has been found after carrying out the above checks, continue fault diagnosis as described on page 48.

Checking the ON function



Conditions for ON

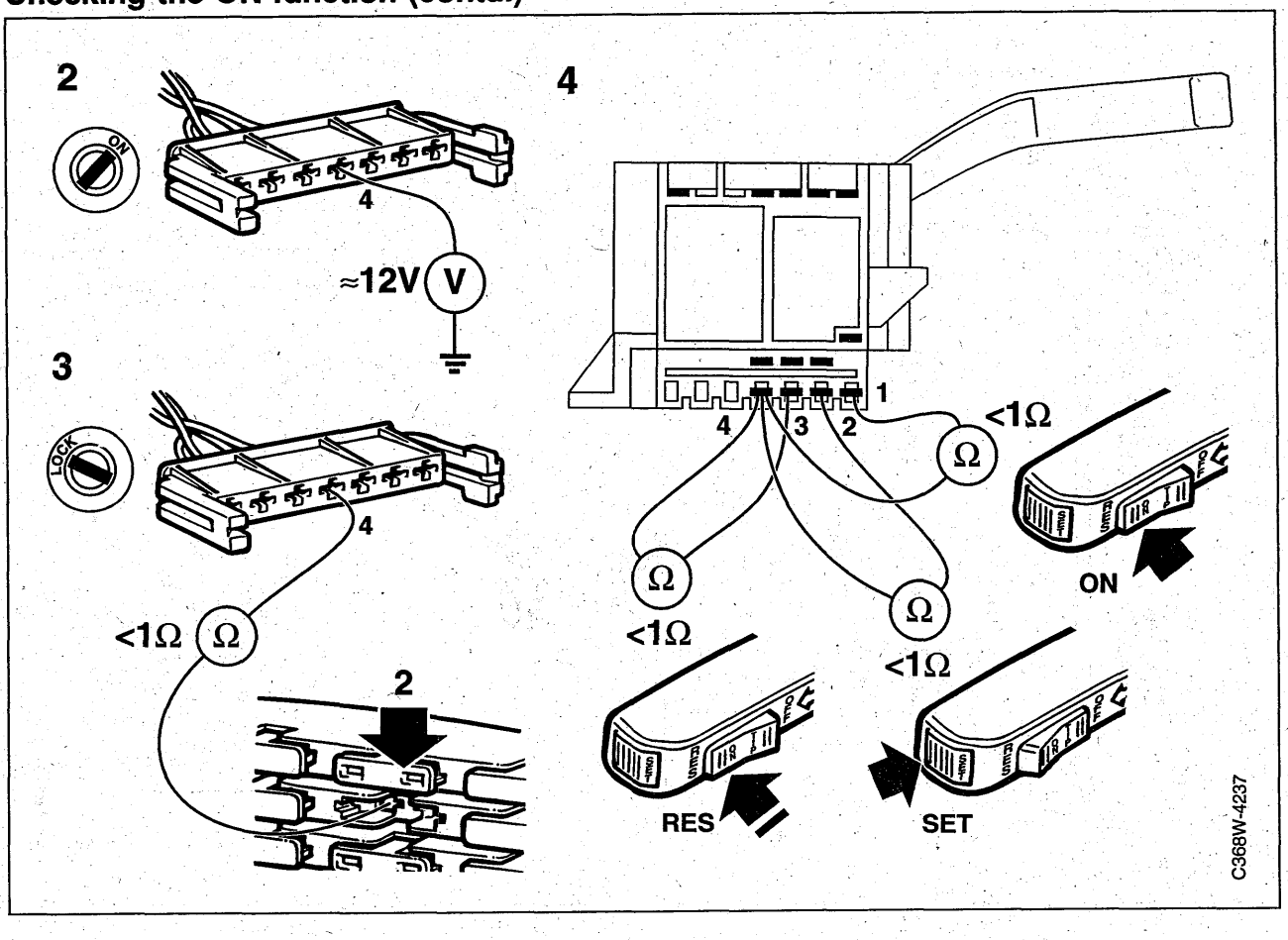
The following conditions must be fulfilled before activation of the ON function in the Cruise Control system's control module will be possible:
ON:
Pin **A** (1): approx. 12 V
Pin **B** (2): 0 V
Pin **C** (3): 0 V

The switch should be in the ON position.

1 Connect the BOB and check that about 12 V is present on terminal A (1) of the Cruise Control connector and that no voltage (0 V) is present on terminals B (2) and C (3) when the Switch is in the ON position.

Measure the voltage across the pins and a good ground.

Checking the ON function (contd.)



2 If the voltage readings are not OK, check that about 12 V is present across pin 4 of the switch connector and a good ground.

If the voltage is OK, continue with point 4.

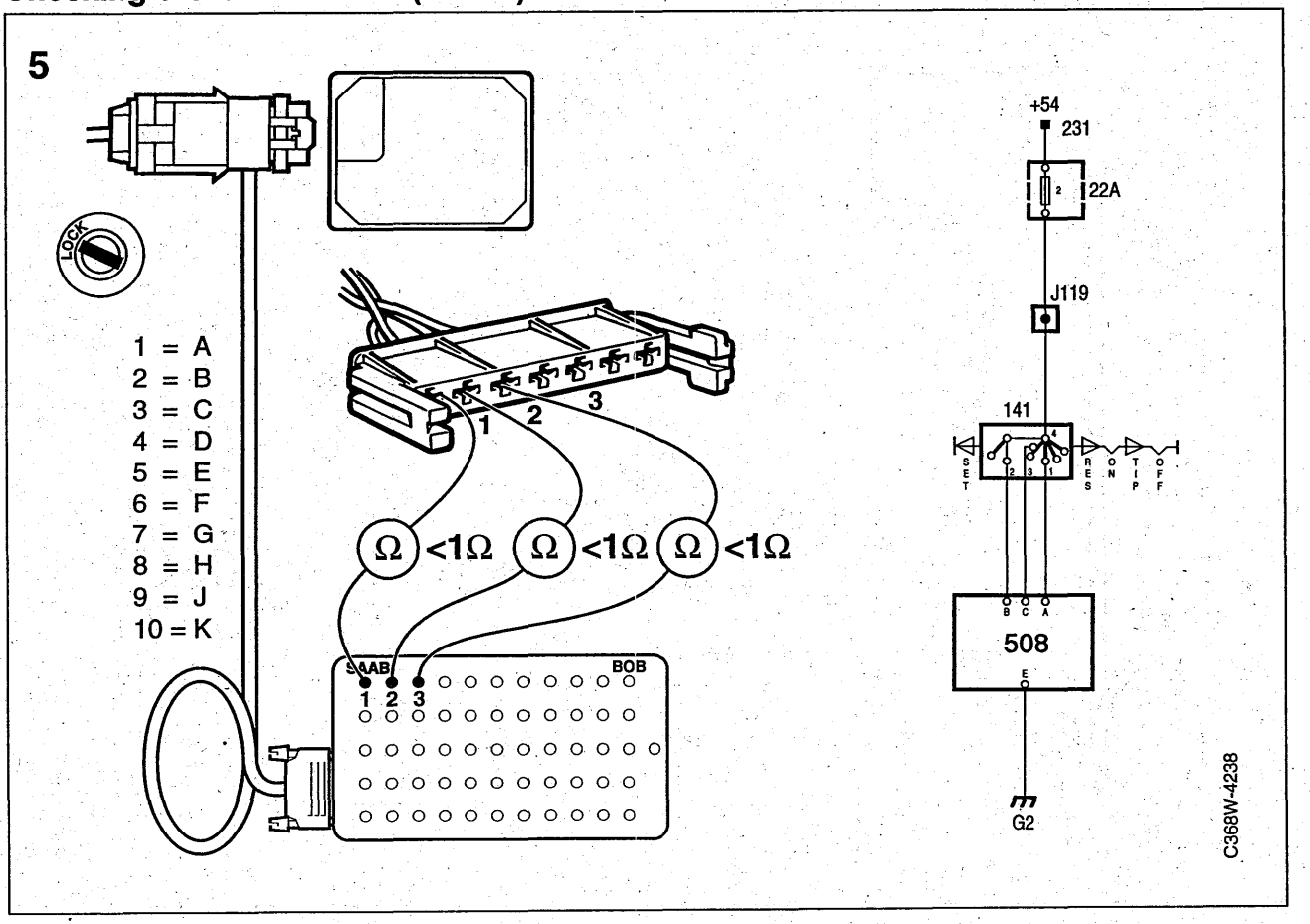
3 If no voltage is present, check the wiring for continuity or a short circuit by measuring the resistance across the load side of the fuse and pin 4 of the switch connector.

If the resistance is > 1 ohm, rectify the fault.

4 Check the switch by setting it in the ON position and measuring the resistance across pins 4 and 1. Hold the switch in the RESUME position and measure the resistance across pins 4 and 3. Press the SET button and measure the resistance across pins 4 and 2.

If the resistance reading obtained in any measurement is > 1 ohm, fit a new switch.

Checking the ON function (contd.)



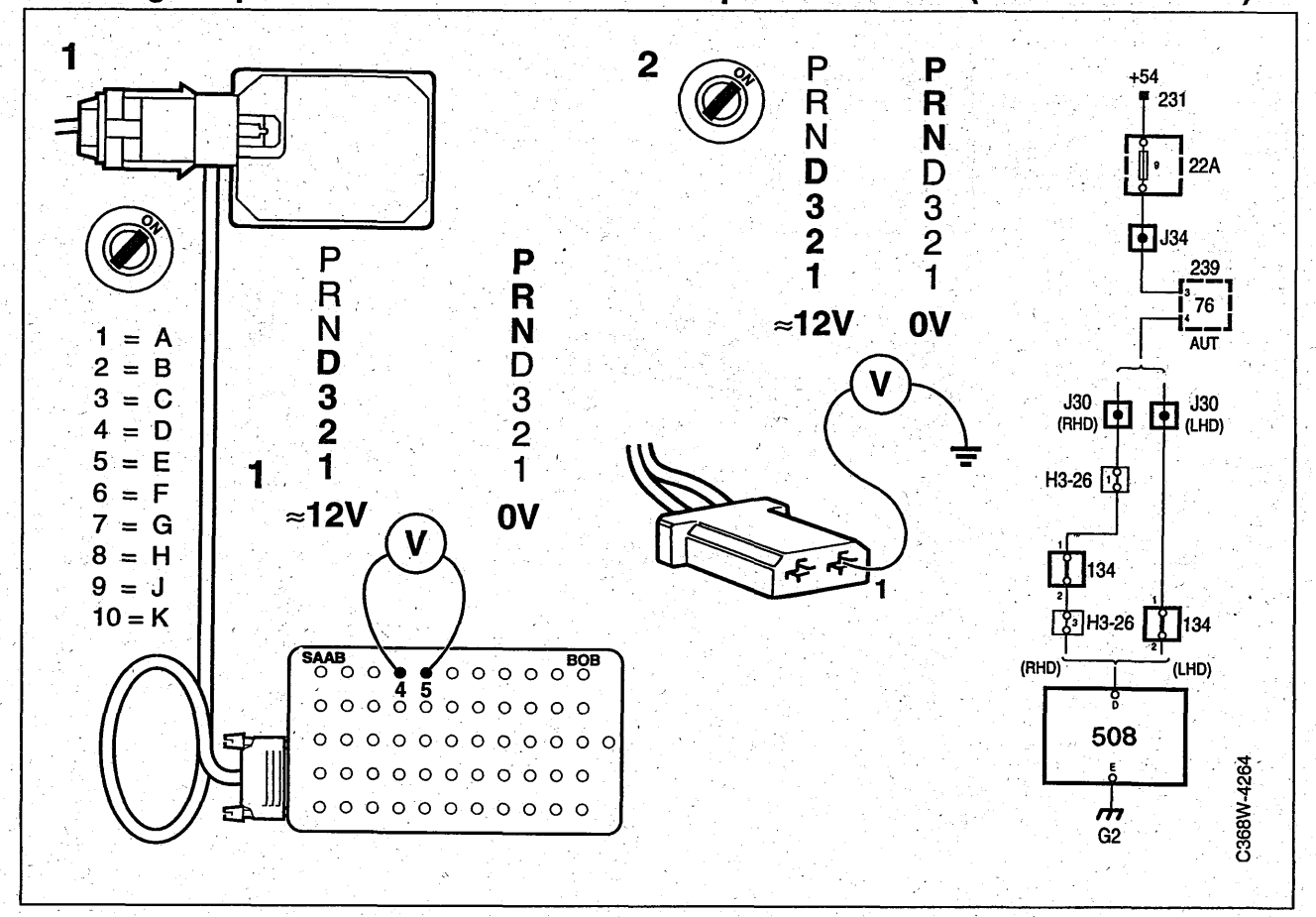
5 If the resistance is ≤ 1 ohm, check the wiring for continuity or a short circuit by measuring the resistance across:

- pin 2 of the switch connector and pin B of the Cruise Control connector.
- pin 3 of the switch connector and pin C of the Cruise Control connector.
- pin 1 of the switch connector and pin A of the Cruise Control connector.

If the resistance is > 1 ohm, rectify the fault.

6 If no fault has been found after carrying out the above checks, continue fault diagnosis as described on page 48.

Checking the pedal switch and selector lever position sensor (aut. transmission)



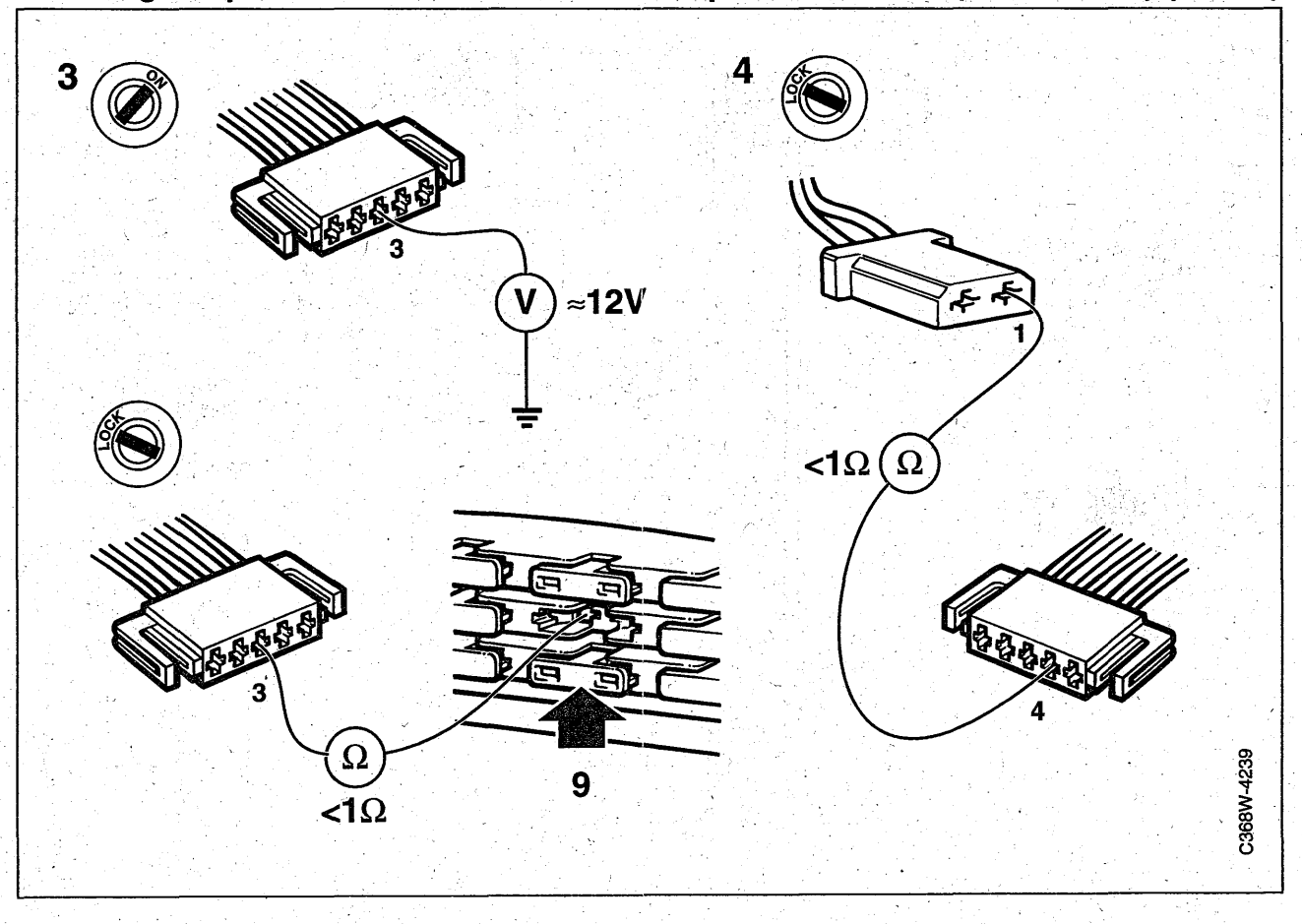
1 Connect the BOB and check that about 12 V is present across pin D (4) of the Cruise Control connector and a good ground when the selector lever is in position D, 1, 2 or 3.

There should be zero voltage (0 V) when the selector lever is in position P, R or N.

2 If the voltage reading is not OK, check that about 12 V is present on pin 1 of the brake pedal switch when the selector lever is in position D, 1, 2 or 3 and 0 V when it is in position P, R or N.

If the voltage is OK, continue with point 5.

Checking the pedal switch and selector lever position sensor (aut. transm.) (contd.)



3 If the voltage is not OK, check that about 12 V is present on pin 3 of the selector lever's 4-pin connector.

If the voltage is OK, continue with point 4.

If the voltage is not OK, measure the resistance across the load side of the fuse and pin 3 of the selector lever's 4-pin connector.

If the resistance is > 1 ohm, check the wiring and rectify the fault.

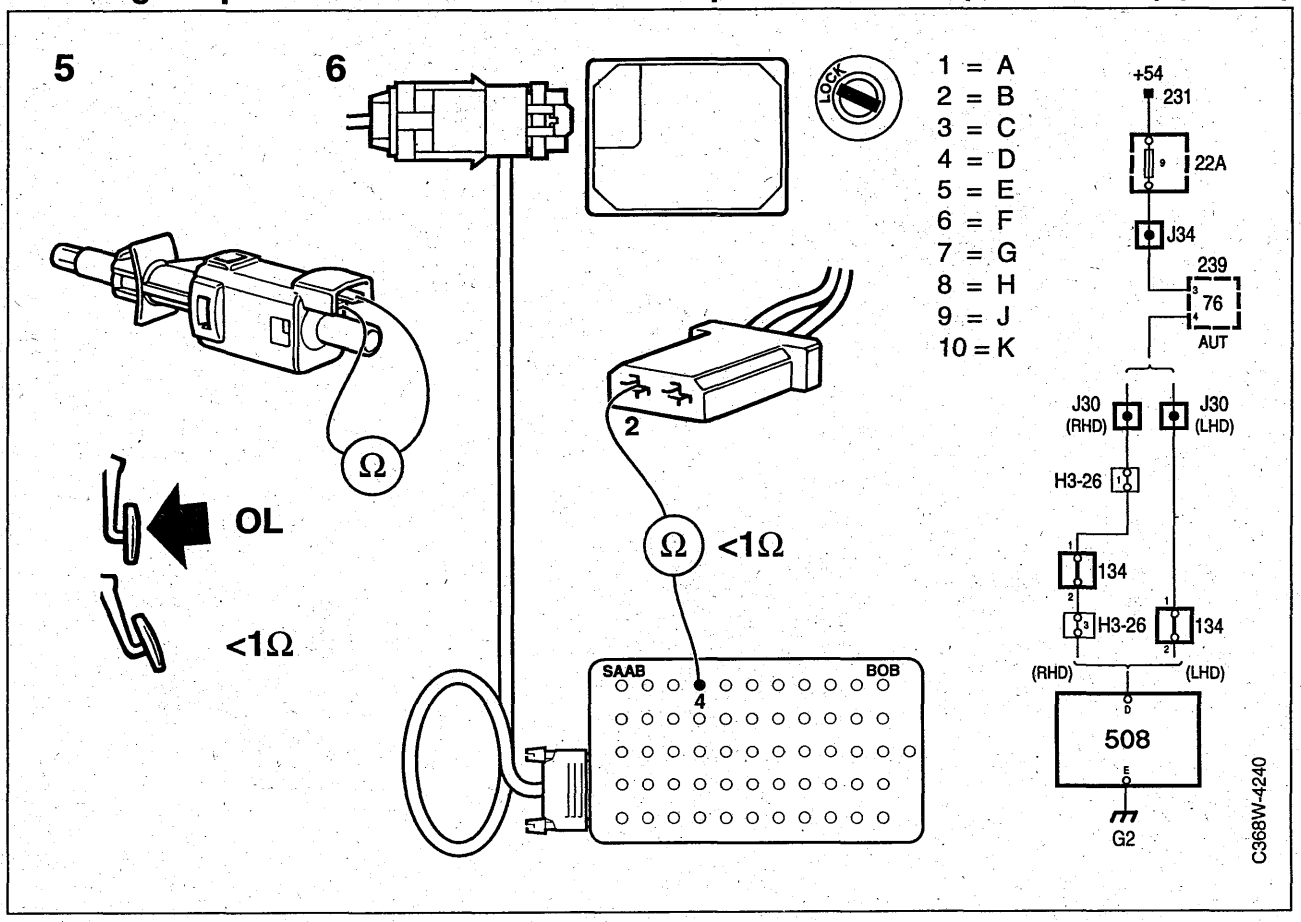
4 Check the wiring for continuity or a short circuit by measuring the resistance across pin 4 of the selector lever's 4-pin connector and pin 1 of the brake pedal switch connector.

If the resistance is ≤ 1 ohm, the fault is in the selector lever.

Check or adjust the selector lever as described in Service Manual 4:3 "Automatic transmission".

If the resistance is > 1 ohm, check the wiring and rectify the fault.

Checking the pedal switch and selector lever position sensor (aut. transm.) (contd.)



5 Measure the resistance across pins 1 and 2 of the brake pedal switch when the brake pedal is depressed and also when it is not depressed.

If the resistance with the pedal in the normal position (not depressed) is > 1 ohm, adjust the pedal switch or perhaps fit a new one.

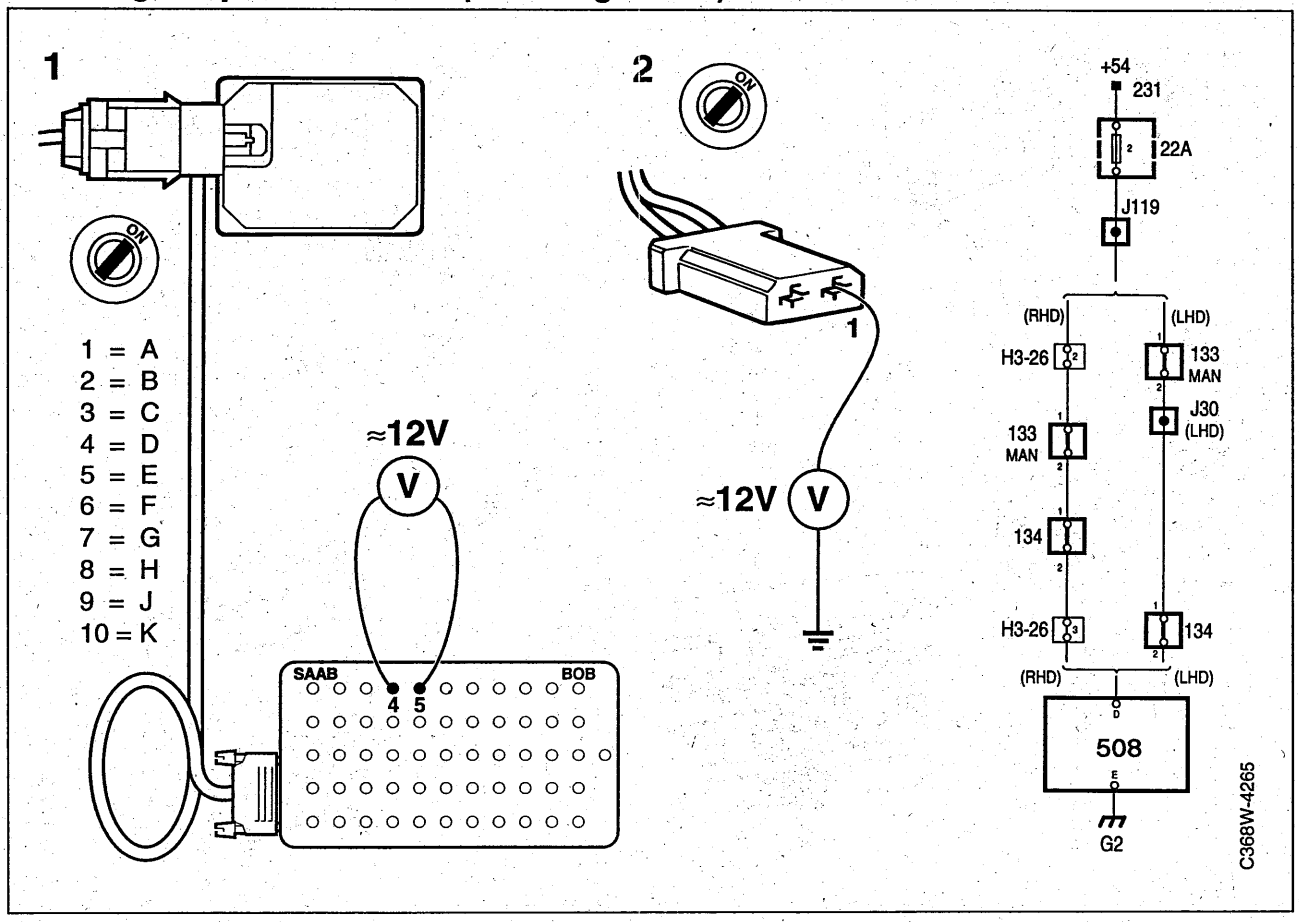
Depressing the pedal breaks the circuit. If resistance can be measured in the circuit, fit a new pedal switch.

6 If the pedal switch is OK, check the wiring for continuity or a short circuit by measuring the resistance across pin 2 of the brake pedal connector and pin D (4) of the Cruise Control connector.

The resistance should be ≤ 1 ohm.
If it is > 1 ohm, check the wiring and rectify the fault.

7 If no fault has been found after carrying out the above checks, continue fault diagnosis as described on page 48

Checking the pedal switches (manual geabrox)

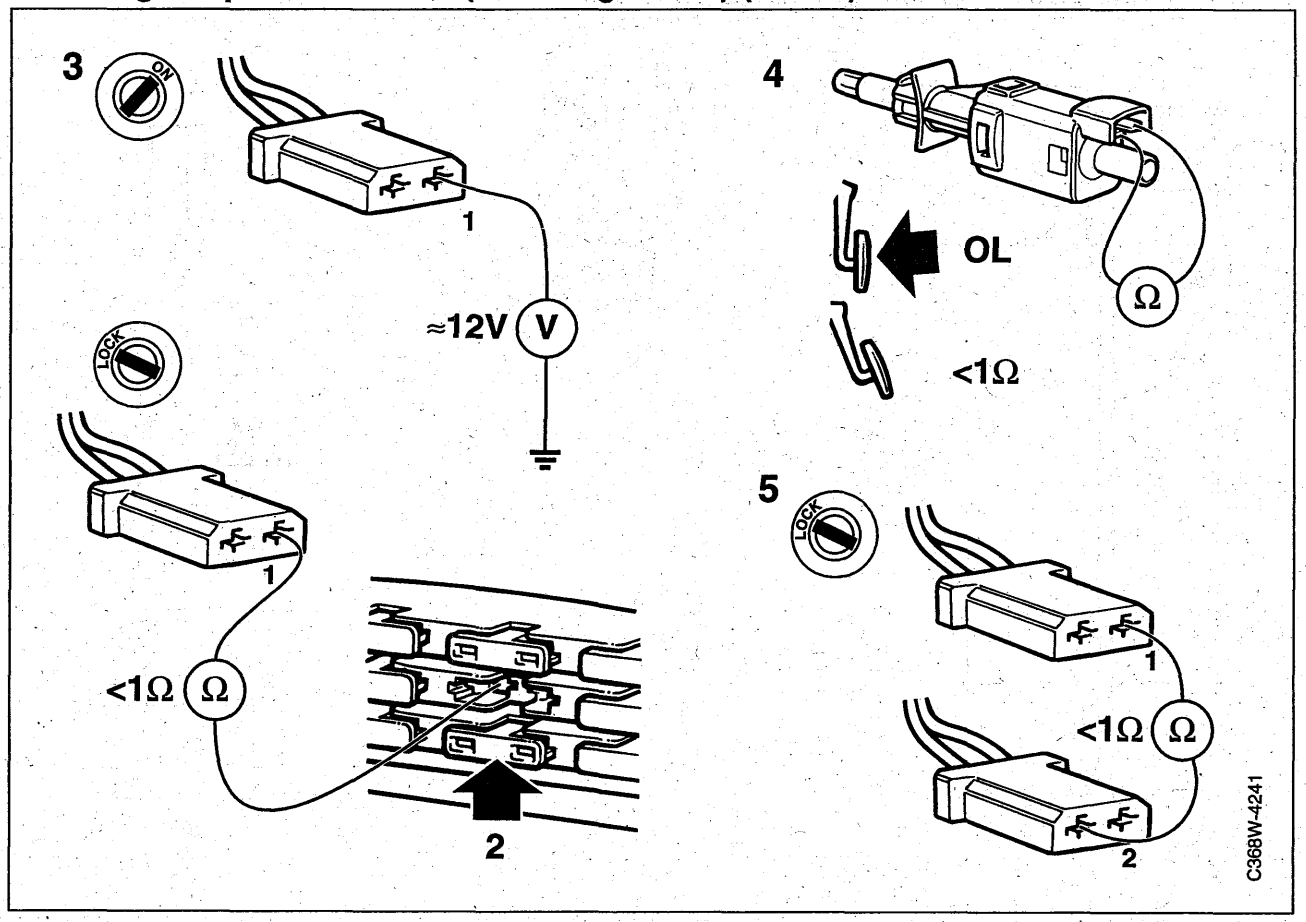


1 Connect the BOB and check that about 12 V is present across pin D (4) of the Cruise Control connector and a good ground.

2 If the voltage is not OK, check that about 12 V is present across pin 1 of the brake pedal switch connector and a good ground.

If the voltage is OK, continue with point 6.

Checking the pedal switches (manual gearbox) (contd.)



3 If the voltage is not OK, check that about 12 V is present across pin 1 of the clutch pedal switch and a good ground.

If the voltage is OK, continue with point 4.

If the voltage is not OK, measure the resistance across the load side of the fuse and pin 1 of the clutch pedal switch connector.

The resistance should be ⩽ 1 ohm.

If the resistance is > 1 ohm, check the wiring and rectify the fault.

4 Measure the resistance across pins 1 and 2 of the clutch pedal switch when the clutch pedal is depressed and also when it is not depressed.

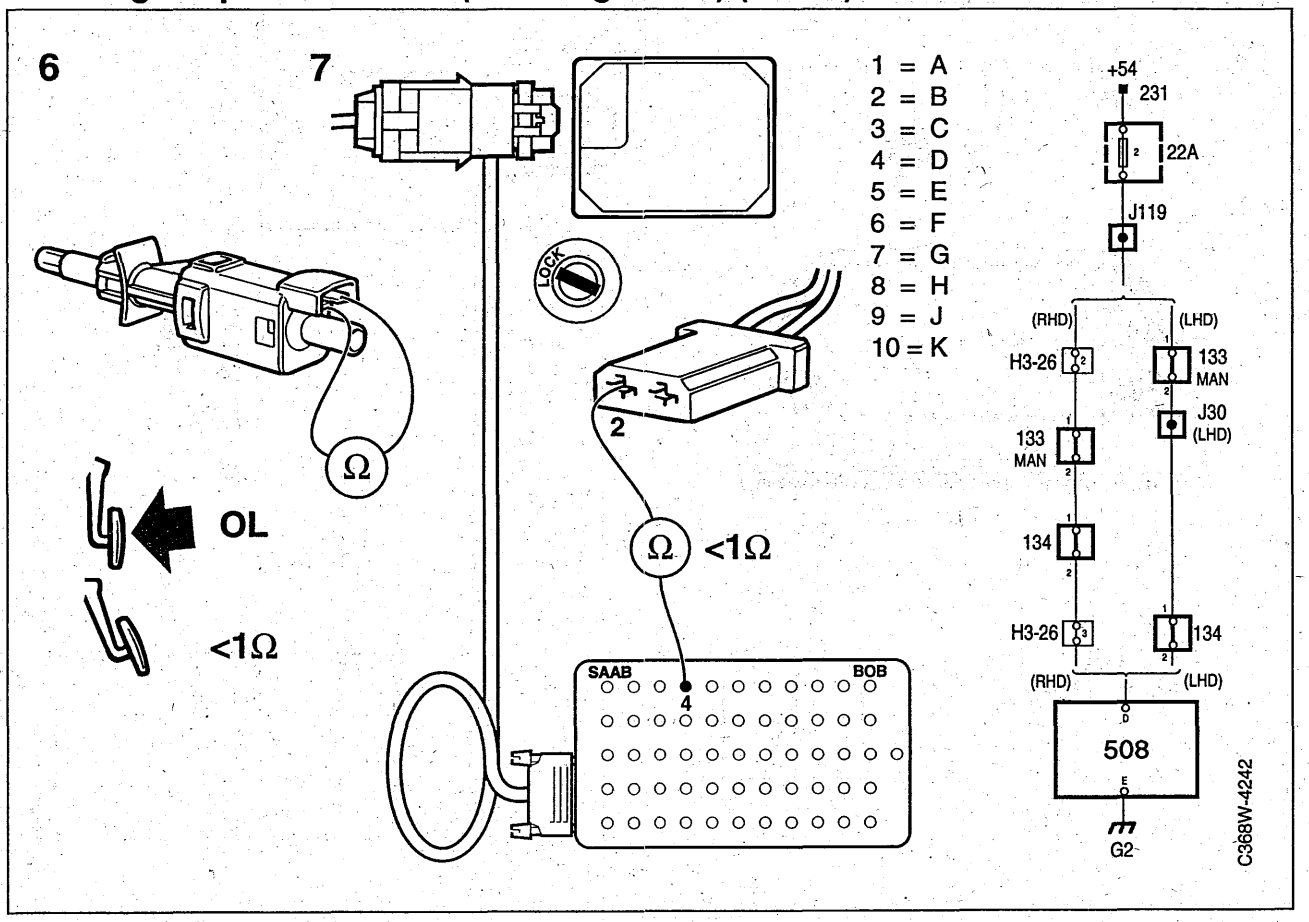
If the resistance with the pedal in the normal position (not depressed) is > 1 ohm, adjust the pedal switch or perhaps fit a new one.

Depressing the pedal breaks the circuit. If resistance can be measured in the circuit, fit a new pedal switch.

5 If the clutch pedal switch is OK, check the wiring for continuity or a short circuit by measuring the resistance across pin 3 of the clutch pedal switch connector and pin 1 of the brake pedal switch connector.

The resistance should be ⩽ 1 ohm.

Checking the pedal switches (manual gearbox) (contd.)



6 Measure the resistance across pins 1 and 2 of the brake pedal switch when the brake pedal is depressed and also when it is not depressed.

If the resistance with the pedal in the normal position (not depressed) is > 1 ohm, adjust the pedal switch or perhaps fit a new one.

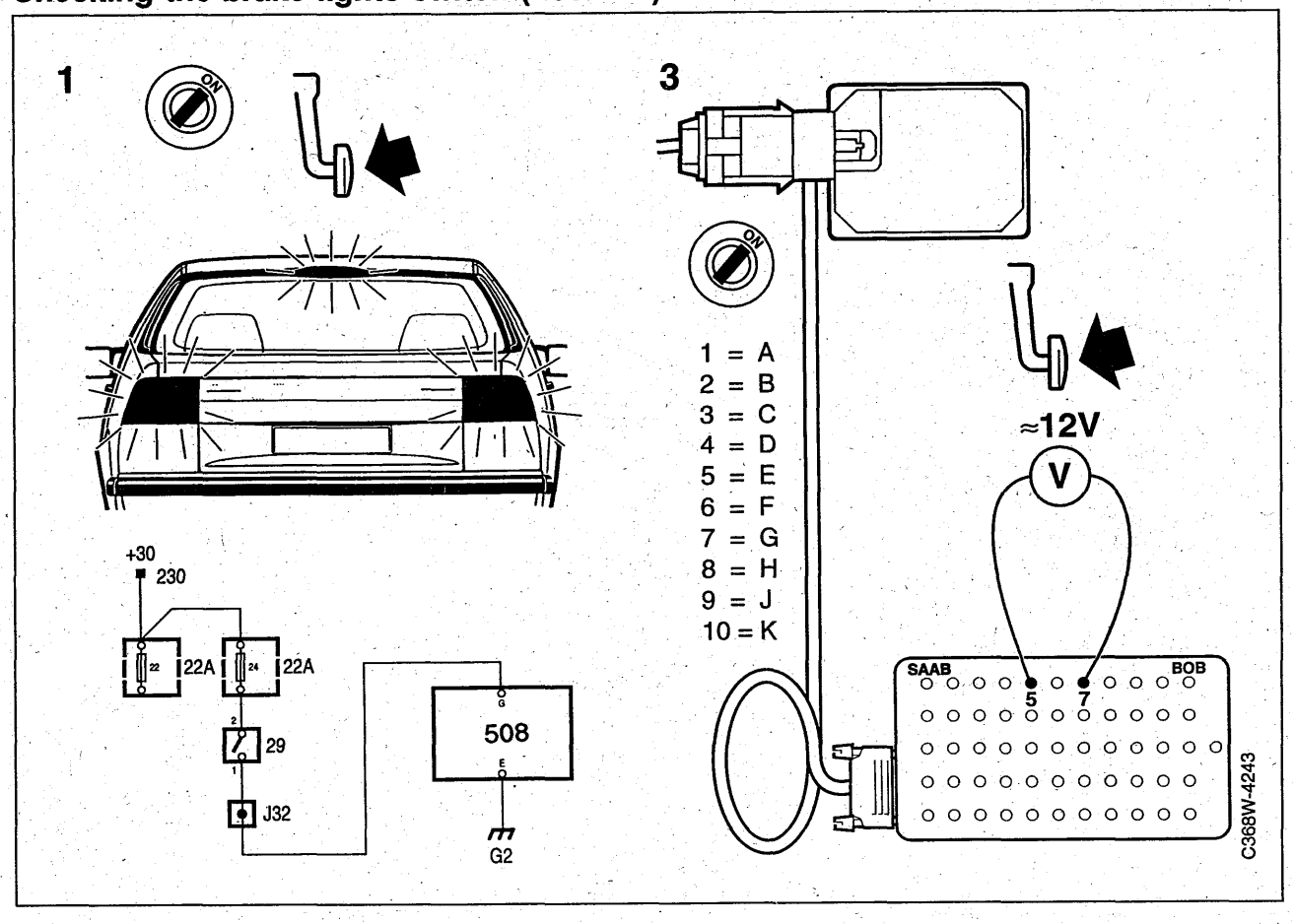
Depressing the pedal breaks the circuit. If resistance can be measured in the circuit, fit a new pedal switch.

7 If the brake pedal switch is OK, check the wiring for continuity or a short circuit by measuring the resistance across pin 2 of the brake pedal switch connector and pin D (4) of the Cruise Control connector.

If the resistance is > 1 ohm, rectify the fault.

8 If no fault has been found after carrying out the above checks, continue fault diagnosis as described on page 48

Checking the brake lights switch (not TCS)



In order for the Cruise Control system to work, at least one of the brake light bulbs must be OK.

This means that pin G (7) of the Cruise Control connector must be grounded (through the brake light bulbs) before the Cruise Control system can be activated.

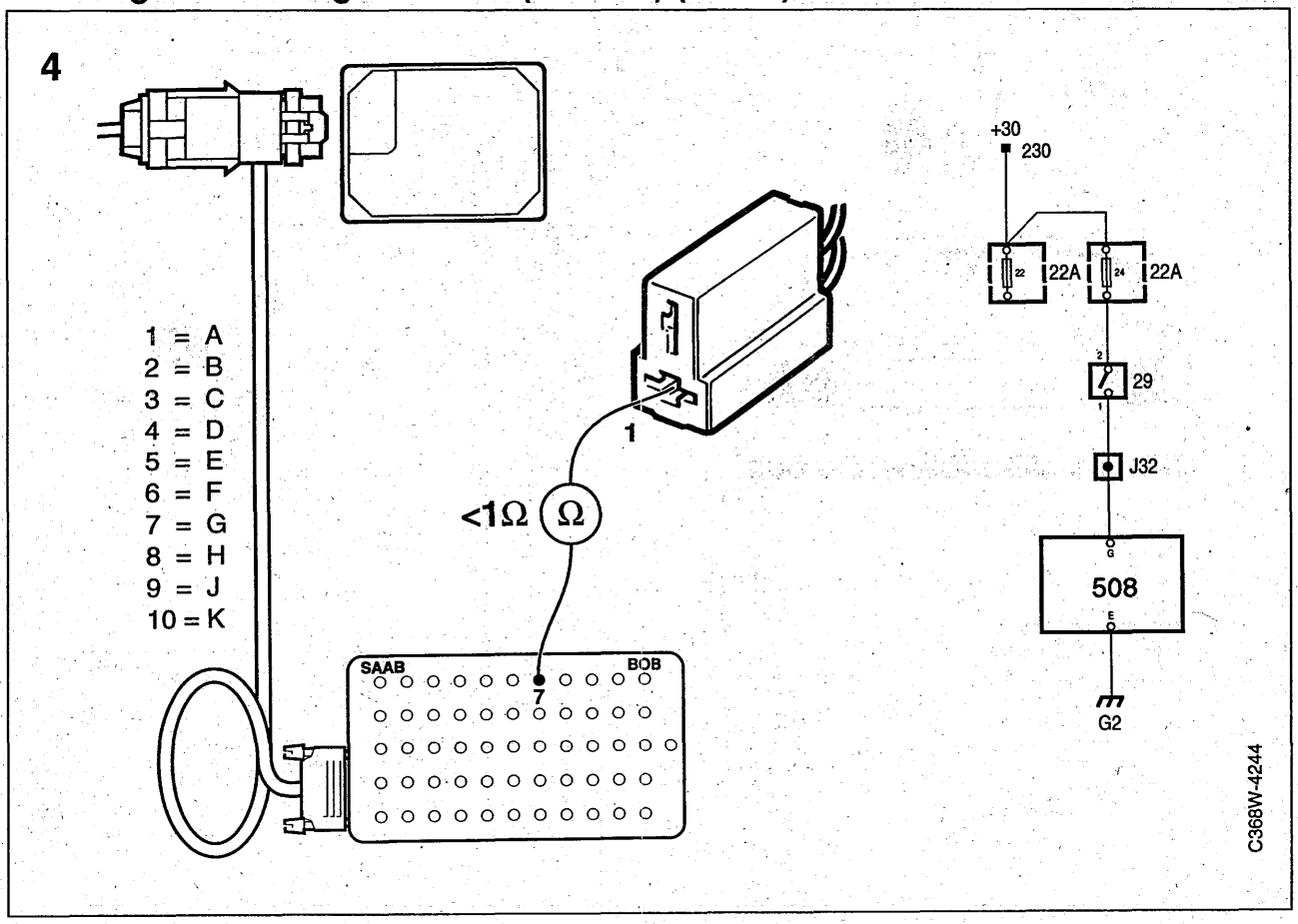
1 Check that the brake light bulbs are OK.

If they are not, change them.

2 If the brake lights do not work, continue fault diagnosis as described in the "Brake lights" section of Service Manual 3:2 "Electrical system, system diagrams, operation and fault-tracing".
If the brake lights work, check the operation of the Cruise Control system.

3 If the Cruise Control system still does not work, check that about 12 V is present across pin G (7) of the Cruise Control connector and a good ground when the brake pedal is depressed.
If the voltage is OK, continue fault diagnosis as described on page 48

Checking the brake lights switch (not TCS) (contd.)

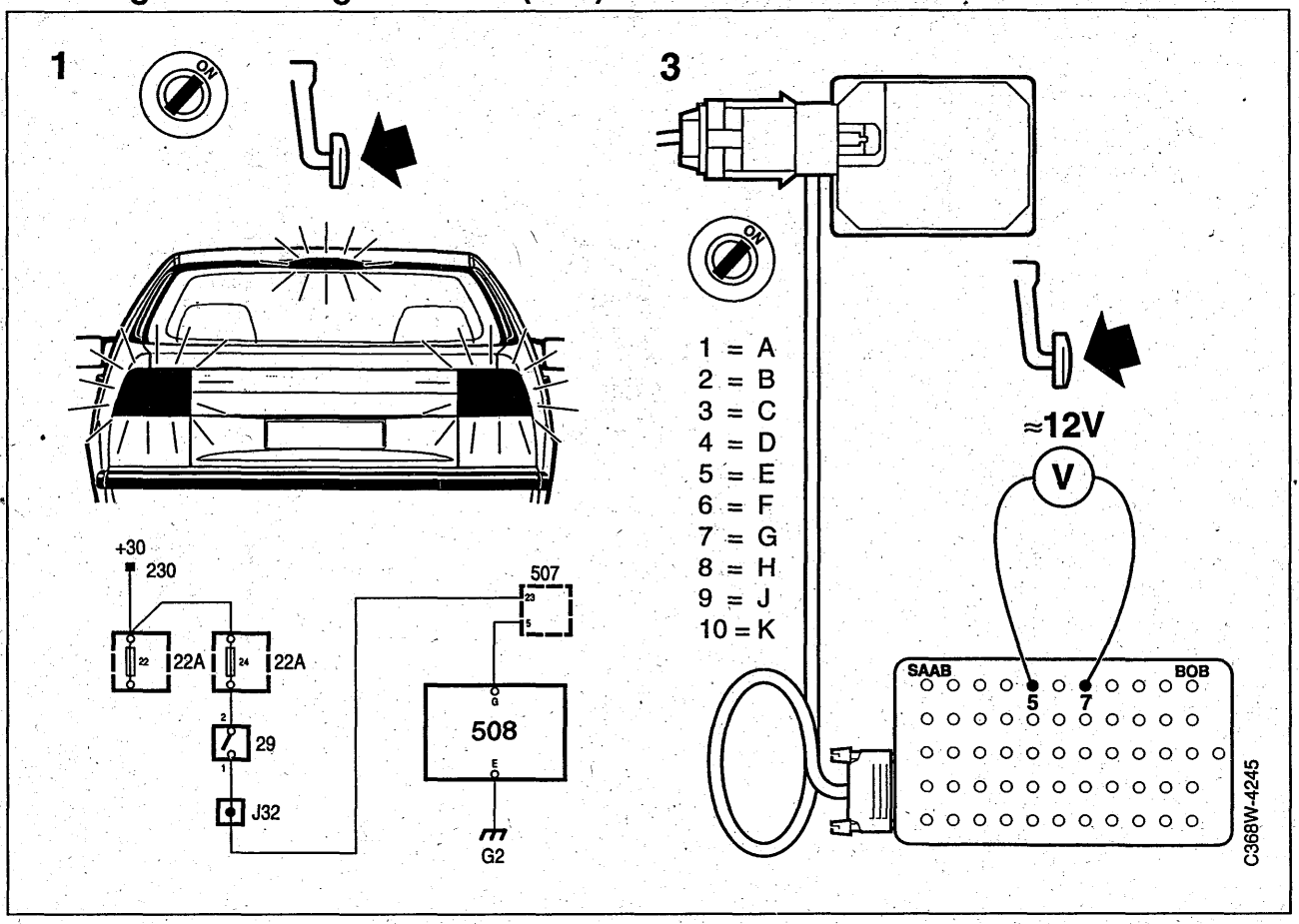


4 If the voltage is not OK, check the wiring for continuity or a short circuit by measuring the resistance across pin 1 of the brake lights switch and pin G (7) of the Cruise Control.

If the resistance is > 1 ohm, rectify the fault.

If the resistance is ≤ 1 ohm, continue fault diagnosis as described in the "Brake lights" section of Service Manual 3:2 "Electrical system, system diagrams, operation and fault-tracing".

Checking the brake lights switch (TCS)



In order for the Cruise Control system to work, at least one of the brake light bulbs must be OK.

This means that pin G (7) of the Cruise Control connector must be grounded (through the brake light bulbs) before the Cruise Control system can be activated.

1 Check that the brake light bulbs are OK.

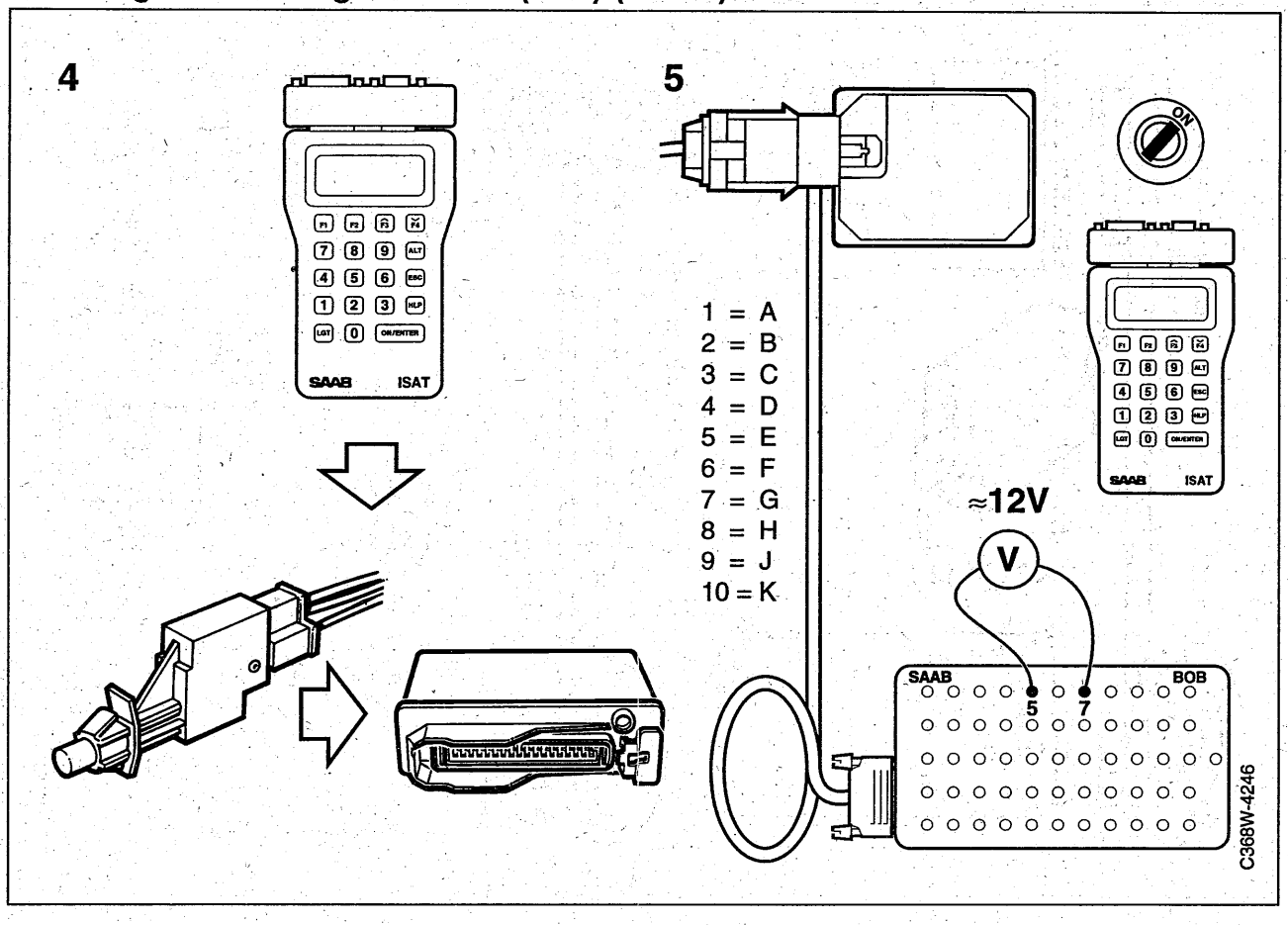
If they are not, change them and check the brake lights once again.

2 If the brake lights do not work, continue fault diagnosis as described in the "Brake lights" section of Service Manual 3:2 "Electrical system, system diagrams, operation and fault-tracing".

If the brake lights work, check the operation of the Cruise Control system.

3 If the Cruise Control system still does not work, check that about 12 V is present across pin G (7) of the Cruise Control connector and a good ground when the brake pedal is depressed.
If the voltage is OK, continue fault diagnosis as described on page 48

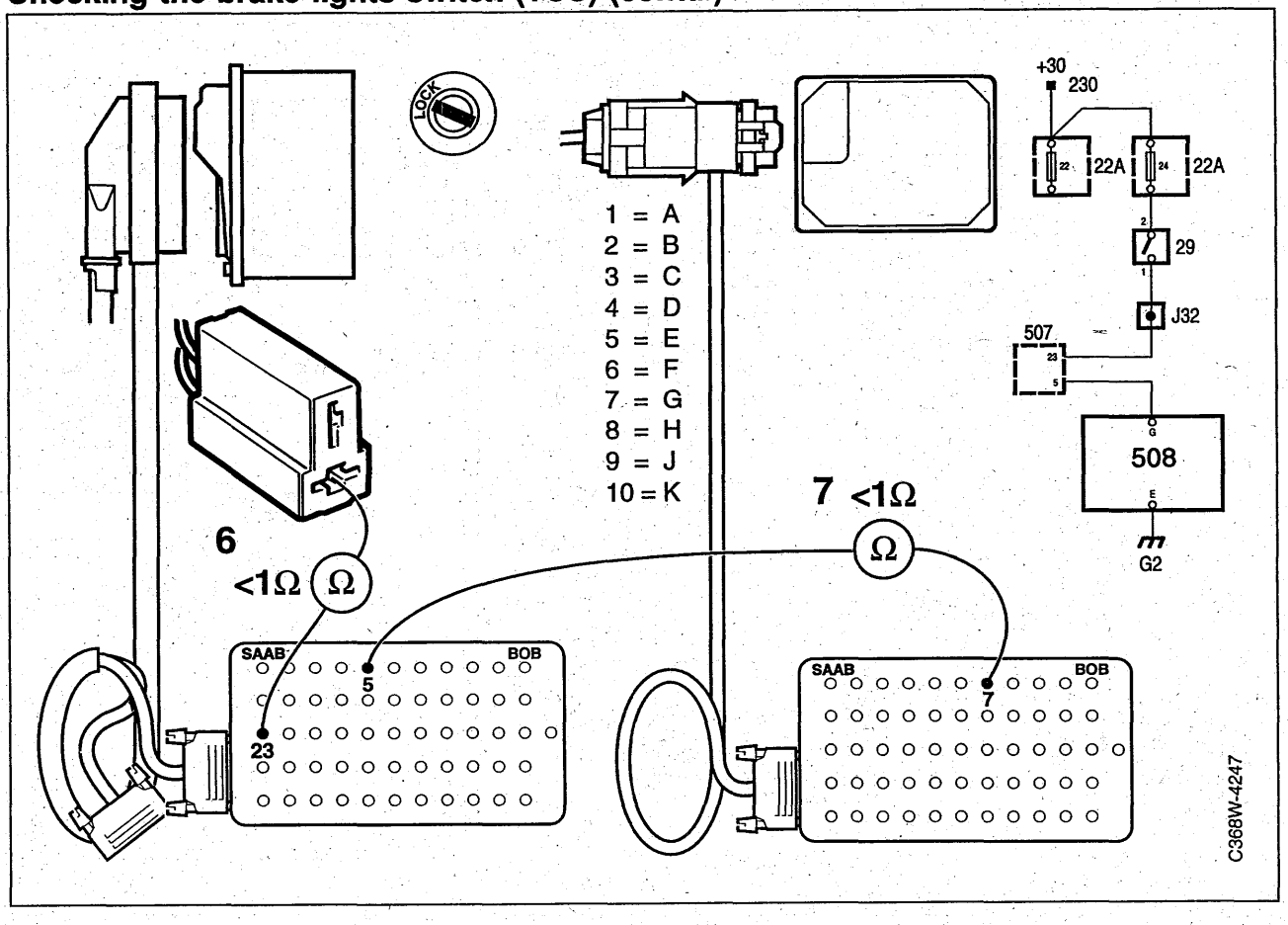
Checking the brake lights switch (TCS) (contd.)



4 If the voltage is not OK, connect an ISAT Scan Tool and go to the TCS system. Select "BRAKE LIGHT SWITCH" in the "OBTAIN READOUTS" menu. Check system operation.
If OK, continue with point 5.
If not OK, proceed to point 6.

5 Select "DISENG CRUISE CONT" in the Scan Tool's "OBTAIN READOUTS" menu and measure the voltage across pin G (7) and a good ground.
When "DISENG CRUISE CONT" is ON, the voltage should be about 12 V.
If the voltage is OK, continue fault diagnosis as described on page 48
If the voltage is not OK, continue with point 7.

Checking the brake lights switch (TCS) (contd.)



6 Check the wiring for continuity or a short circuit by measuring the resistance across pin 1 of the brake lights switch connector and pin 23 of the TCS control module connector.

If the resistance is > 1 ohm, rectify the fault.

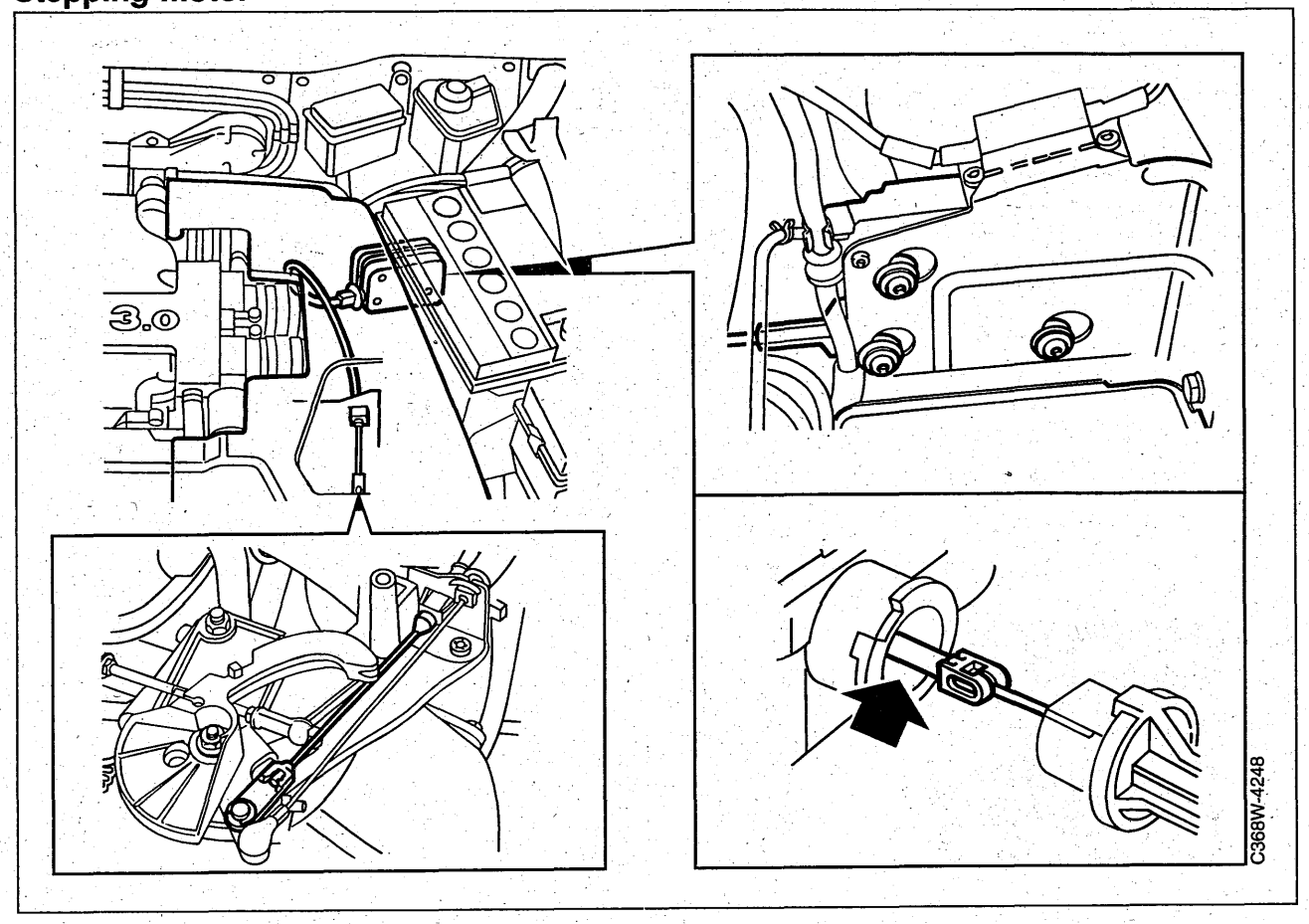
If the resistance is ≤ 1 ohm, continue with point 8.

7 Check the wiring for continuity or a short circuit by measuring the resistance across pin 5 of the TCS control module connector and pin G (7) of the Cruise Control connector.

If the resistance is > 1 ohm, rectify the fault.

If the resistance is ≤ 1 ohm, continue fault diagnosis as described in Service Manual 2:7 "Traction Control System".

Stepping motor



Important

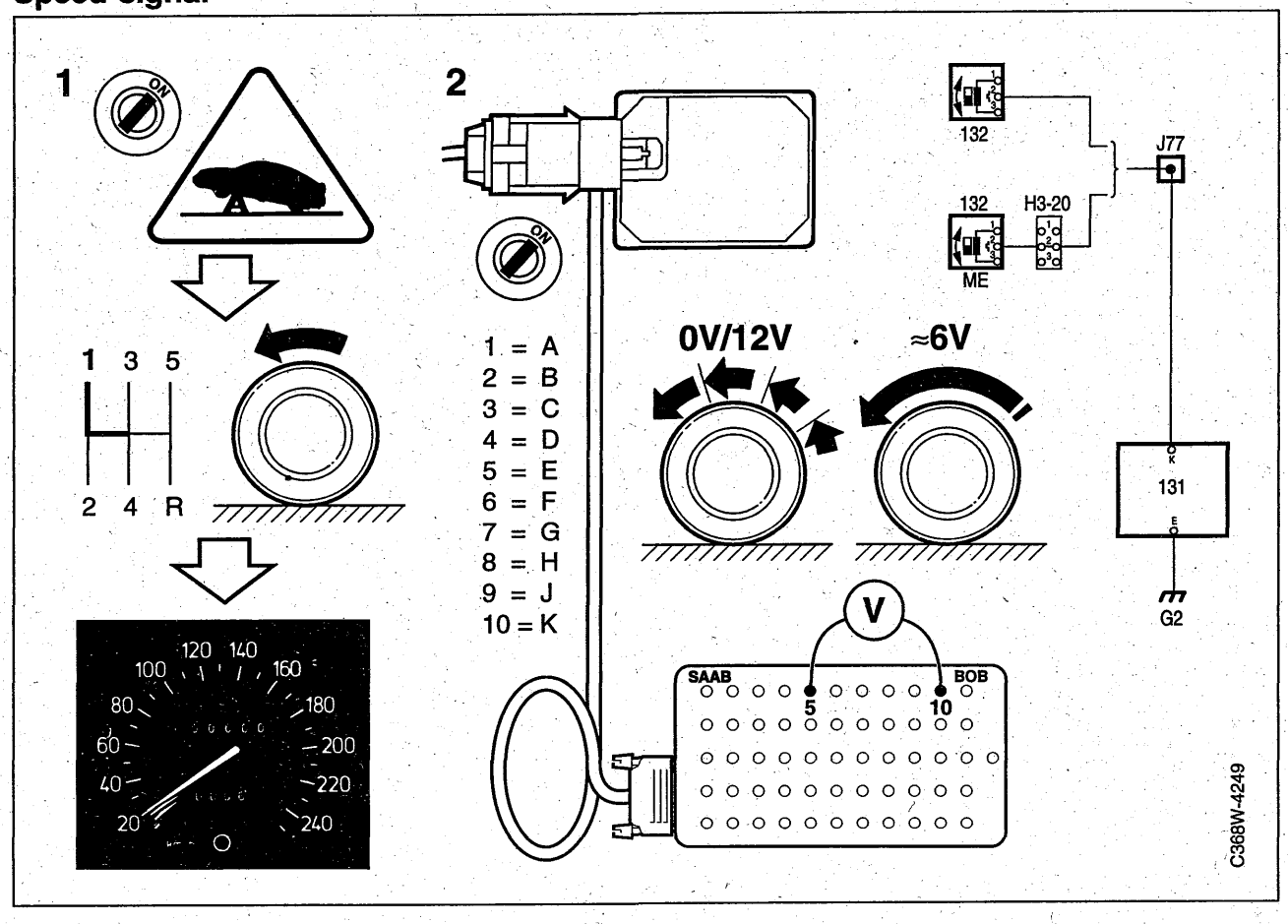
The stepping motor is integrated in the control module of the Cruise Control system and the cable to the throttle body is connected directly to the control module.

1 Inspect the cable visually to make sure that it has not become entangled with anything or fastened anywhere.

2 The cable is attached to a nylon strap in the control module. From the control module it continues to the throttle body.

3 If no fault has been found after carrying out the above checks, continue fault diagnosis as described on page 48.

Speed signal



> **⚠ WARNING**
>
> If the front (driven) wheels have to be raised (to generate speed signals), all necessary safety measures must be taken.
> This is to prevent the wheels from touching the floor or coming into contact with any loose objects or equipment.

To carry out the test correctly, the engine should be running and a gear should be engaged.

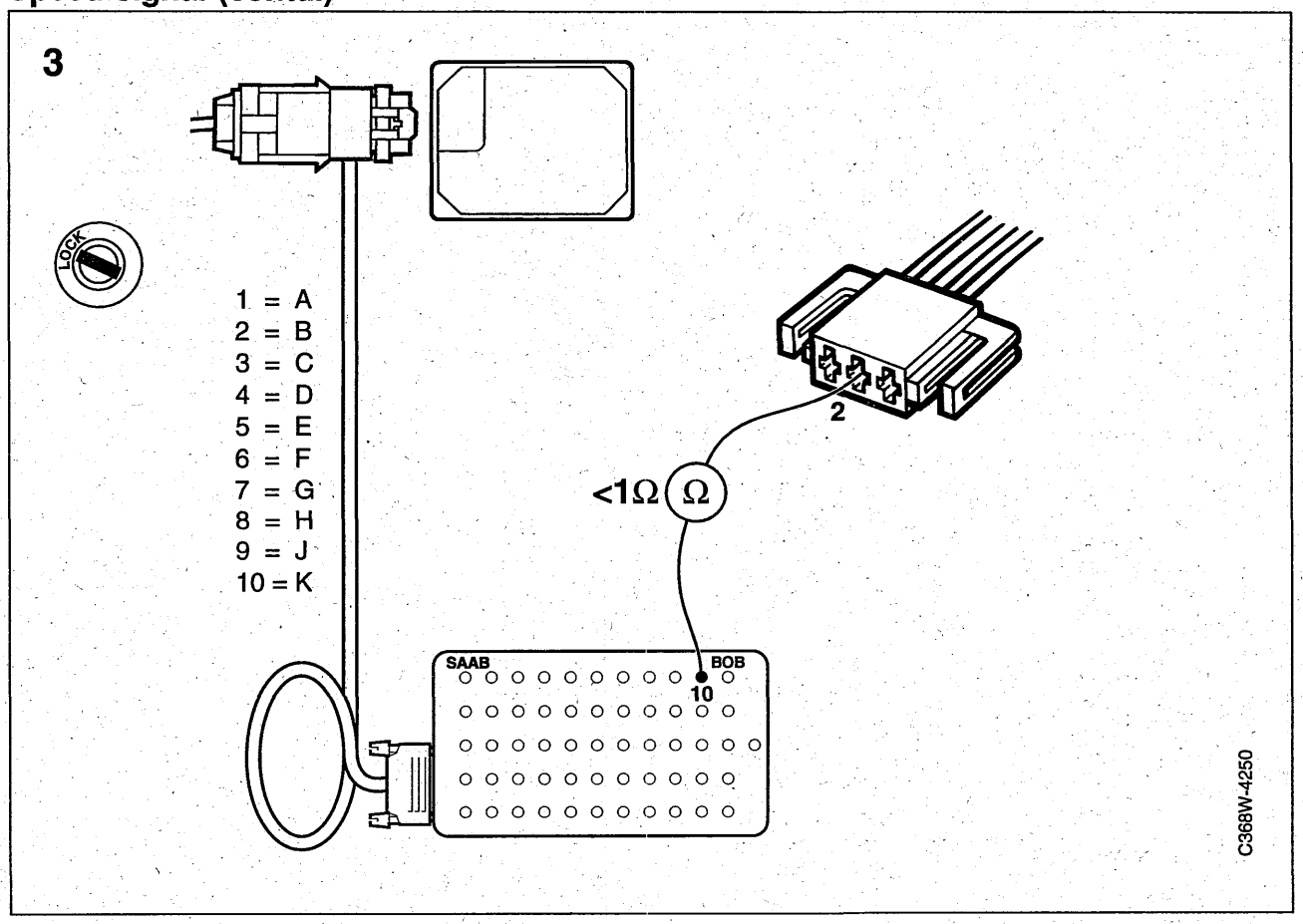
1 Check that the speedometer is in working order.
If it is, continue with point 2.
If it is not, continue fault diagnosis as described in the "Speedometer" section of Service Manual 3:2 "Electrical system, system diagrams, operation and fault-tracing".

2 Connect a BOB to the Cruise Control system control module and measure the speed pulses on pin K (10) with the engine running and the front (driven) wheels either rotating or stationary.

For this to work properly, depress the brake pedal to stop the driven wheels and then release the brake so that the wheels can rotate again. Repeat this procedure until test readings are obtained.

The test readings should be 0 or about 12 V DC (stationary wheels), depending on the stop position of the sensor, and 6 V DC (rotating wheels).

Speed signal (contd.)



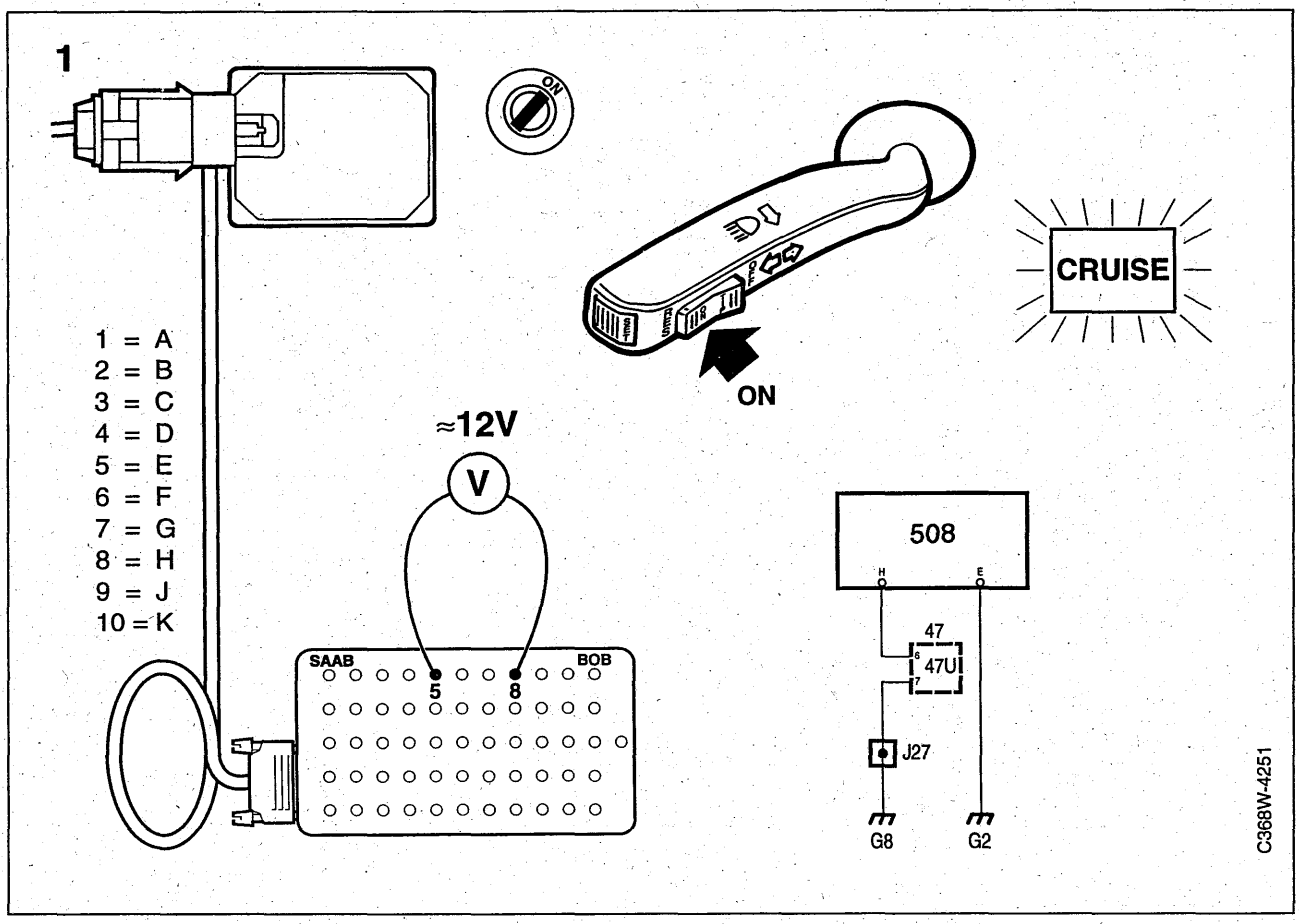
3 If no signal is present, check the wiring.

To check the wiring for continuity or a short circuit, measure the resistance across pin K (10) of the Cruise Control connector and pin 2 of the speedometer connector.

If the resistance is > 1 ohm, rectify the fault.

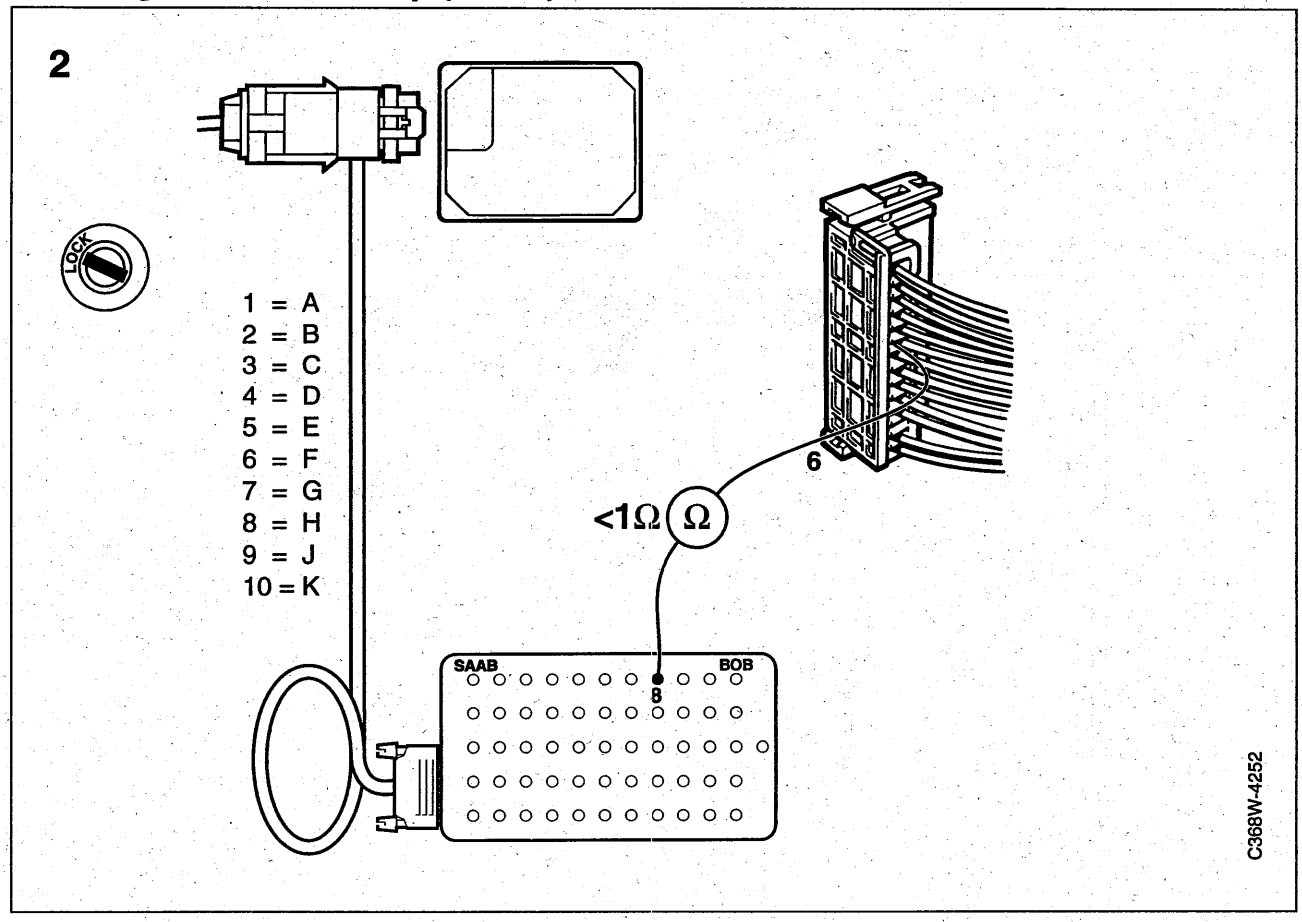
If the resistance is ⩽ 1 ohm, continue fault diagnosis as described on page 48

Checking the CRUISE lamp



1 Check that about 12 V is present across pin 8 (H) of the Cruise Control connector and a good ground when the Cruise Control system is activated.

Checking the CRUISE lamp (contd.)



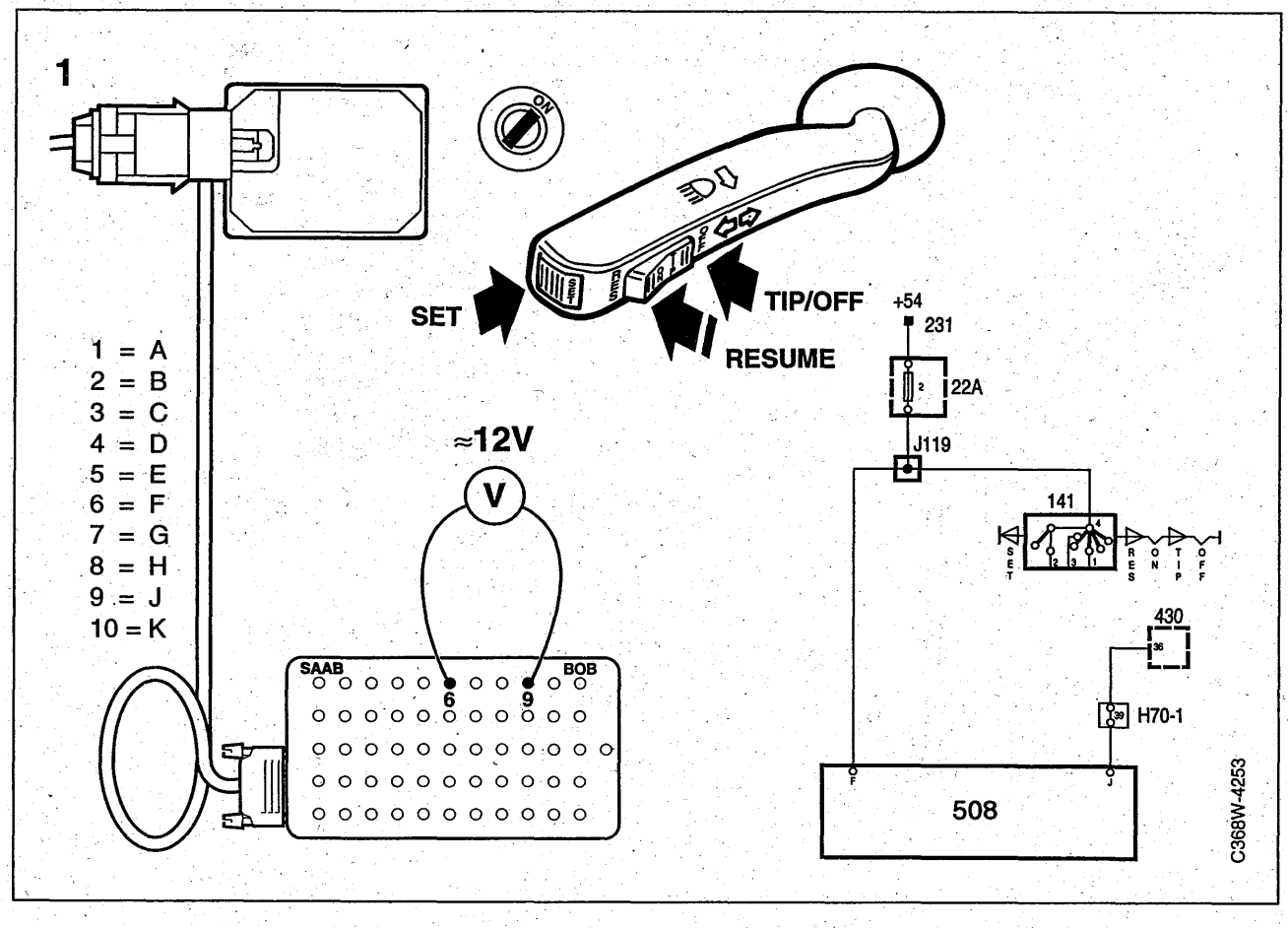
2 If the voltage is OK, check the wiring for continuity or a short circuit by measuring the resistance across pin 8 (H) of the Cruise Control connector and pin 6 of the main instrument display connector.

   If the resistance is ≤ 1 ohm, check the bulb.

   If the resistance is > 1 ohm, check the wiring and rectify the fault.

3 If no fault has been found after carrying out the above checks, continue fault diagnosis as described on page 48

Cruise Control, active signal



Trionic system

Other systems also need to know when the Cruise Control system is engaged.
Information to this effect is therefore supplied by the Cruise Control system from pin J (9).

1 Initiate the diagnostics mode, see page 45.

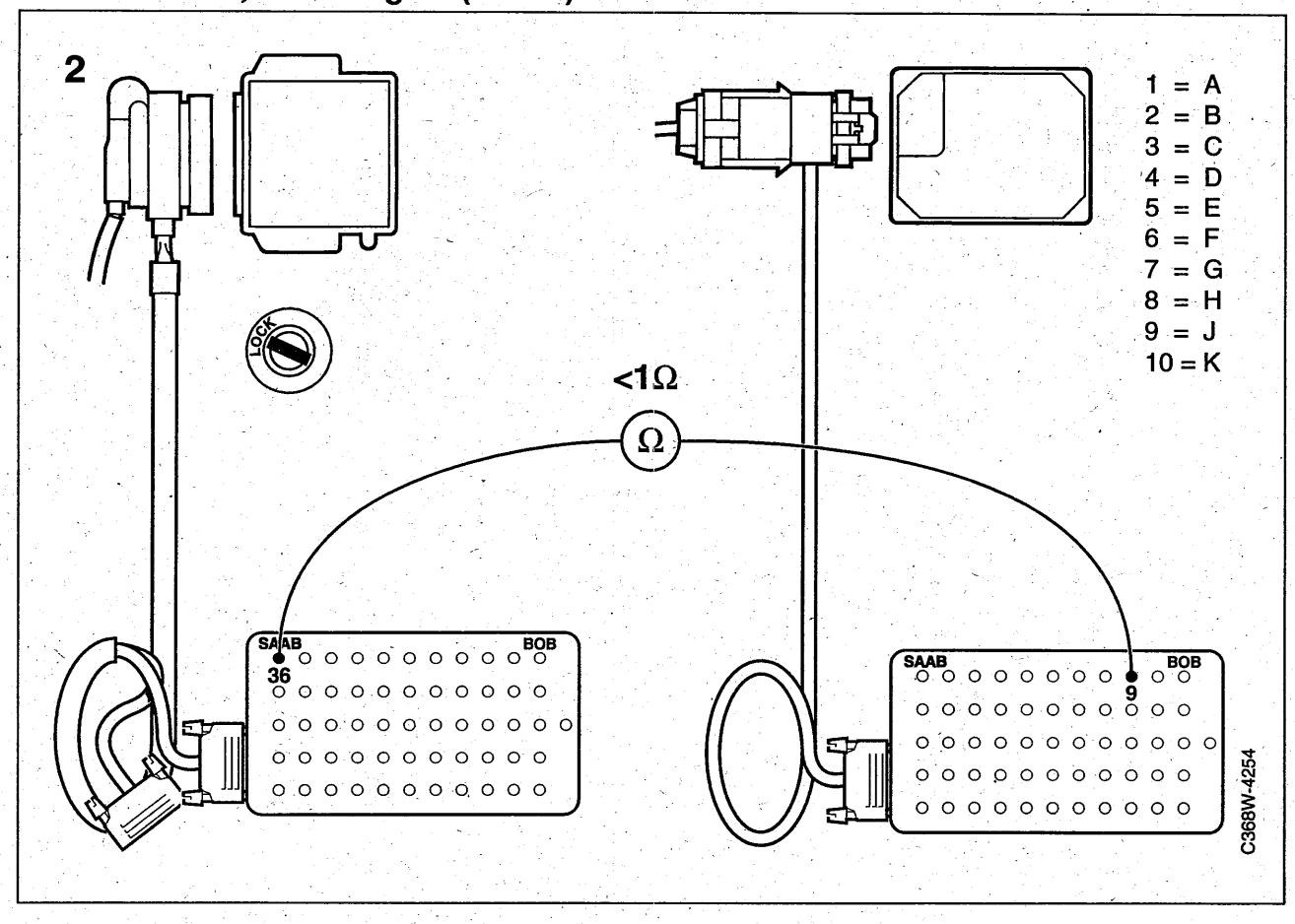
Check the voltage on pin J (9) of the Cruise Control connector.

It should be about 12 V when the switch is in the SET, RESUME or TIP/OFF position.

If the voltage is not OK, go to page 48.

If the voltage is OK, continue with point 2.

Cruise Control, active signal (contd.)



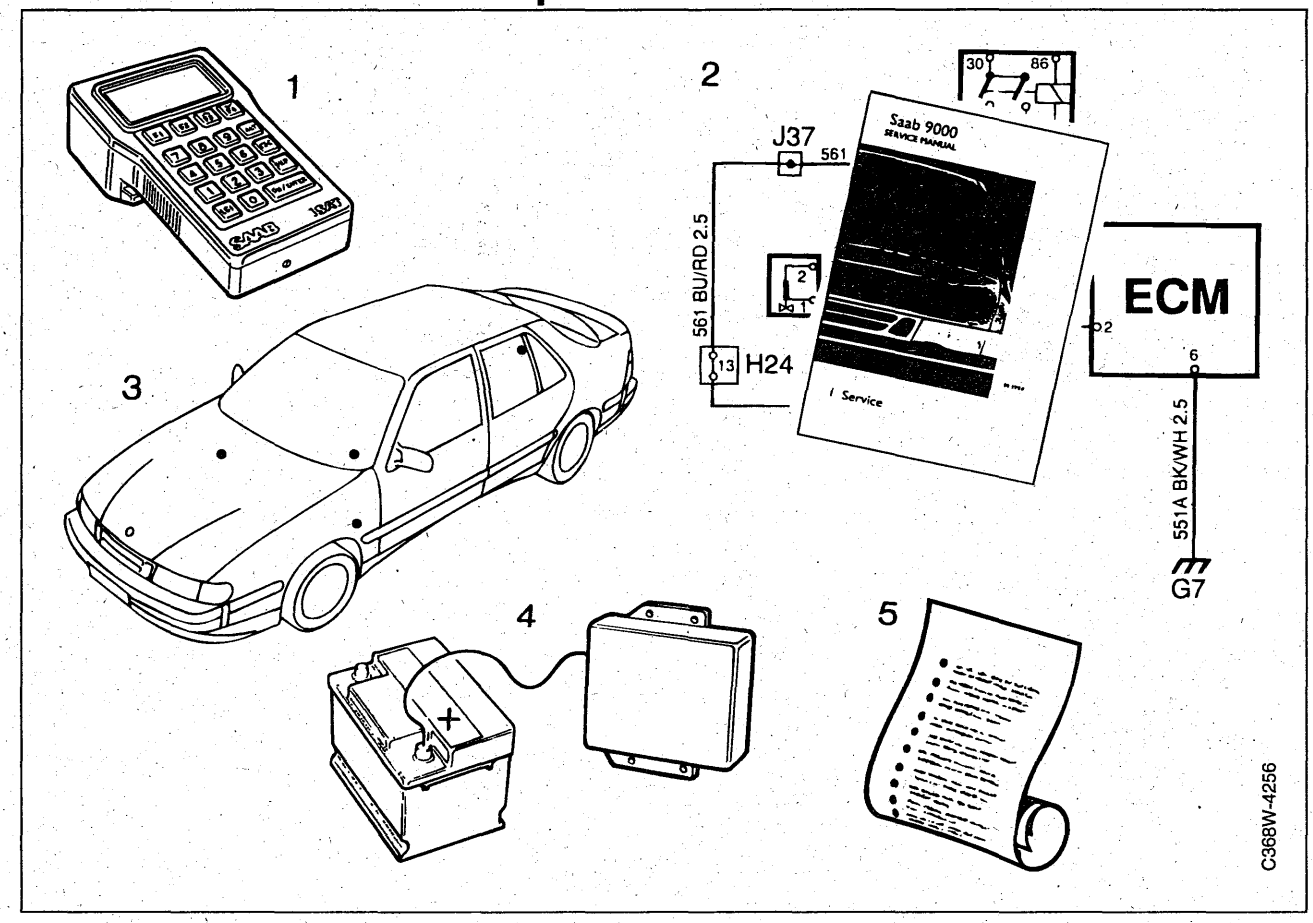
2 Check the wiring for continuity or a short circuit as follows:

Measure the resistance across pin J (9) of the Cruise Control connector and pin 36 of the TRIONIC control module connector.

If the resistance is > 1 ohm, check the wiring and rectify the fault.

If the resistance is ≤ 1 ohm, the fault is in the other system. Continue fault diagnosis as described in Service Manual 2:7 "TRIONIC engine management system".

Before control module replacement



When all checks have been carried out in accordance with the diagnostic procedure and no fault has been detected, it is natural to assume that the control module is defective.

In view of the fact that the control module is a high-quality component and also a costly one, it is important to make as accurate a diagnosis as possible.

Check through the following points with great care before definitely pinpointing the control module as the cause of the fault.

1 Go over all the points once again, checking the operation of systems and components, and also check that all points in the relevant code's fault diagnosis schedule have been covered.

2 Study the wiring diagram of the appropriate circuit and learn how it works. If necessary, consult relevant parts of the technical description and the description of electrical circuits and their operation in Service Manual 3:2 "Wiring diagrams".

3 Check all grounding points. If you have already done so, check them once again.

4 Check the power supply and the control module fuses.

5 Experience gained from model year 1993 cars shows that the majority of all control modules returned in connection with repairs carried out under warranty were in perfect working order.

Be restrictive with the replacement of control modules.

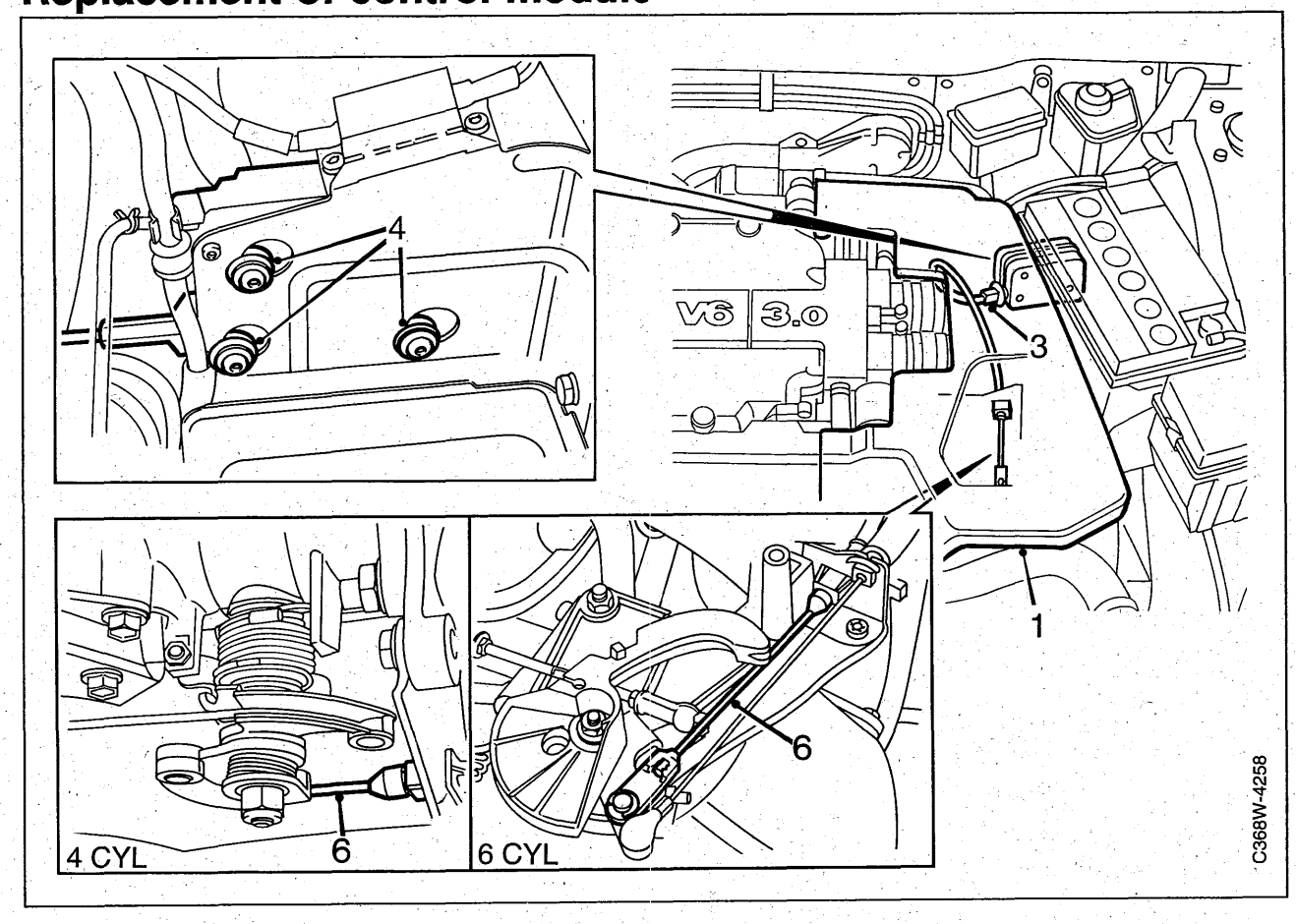
Unnecessary replacement of control modules represents a major expense for Saab Automobile and Saab dealers. Carefully consider all possible causes of the fault before changing the control module.

After fitting a substitute control module for testing purposes, always refit the original control module.

6 If the original fault still persists in spite of all this, the control module will have to be changed.

Adjustment/replacement of components

Replacement of control module



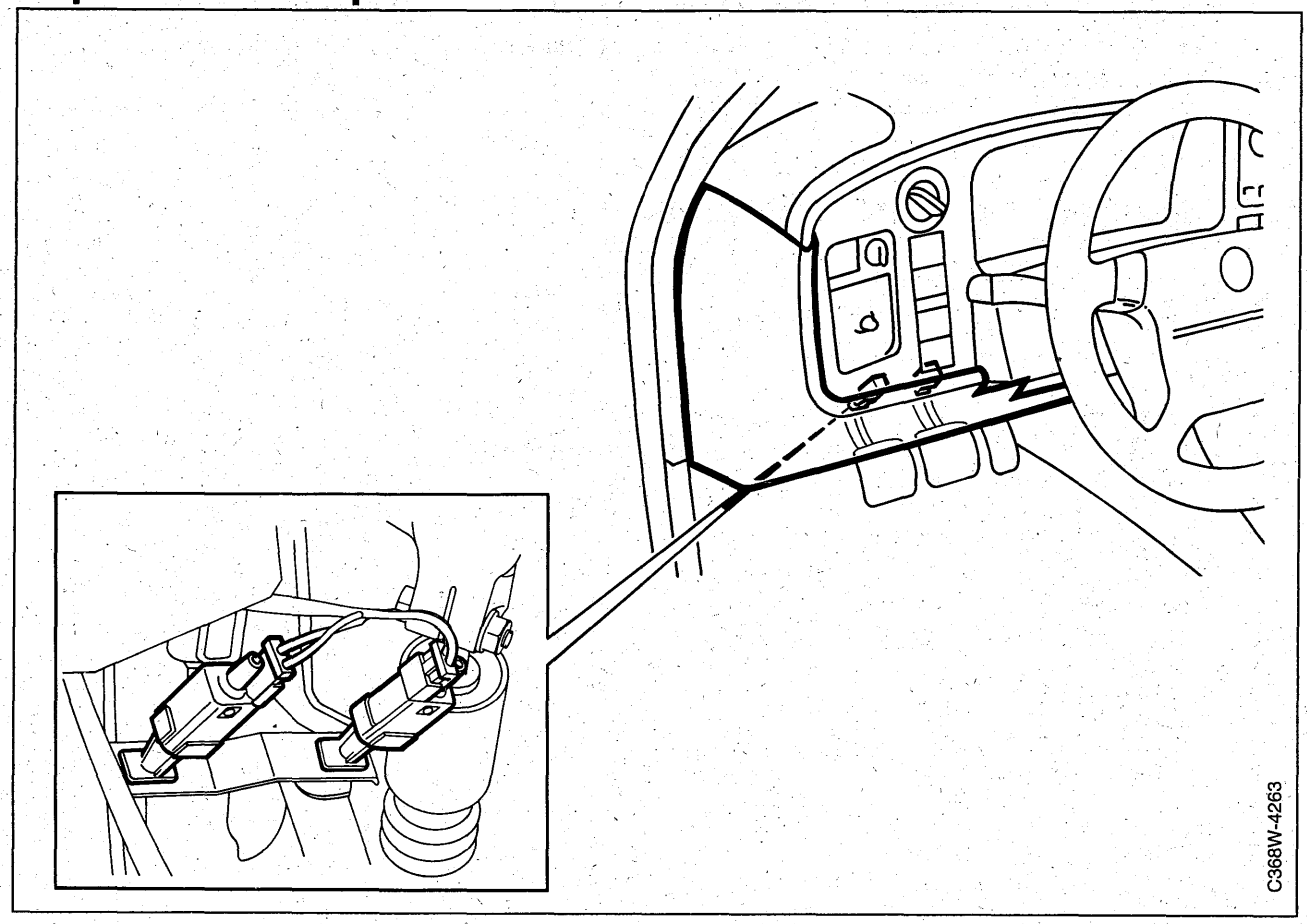
To remove

1 Remove the battery.
2 Remove the engine cover.
3 Unplug the control module connector.
4 Undo the three screws.
5 Lift up the control module.
6 **4-cyl:** Disconnect the cable from the throttle butterfly and snap the cable out of its holder.
6-cyl: Remove the locking washer from the throttle control bracket and snap the cable out of its holder.

To remove

Fit in reverse order.

Replacement of pedal switches



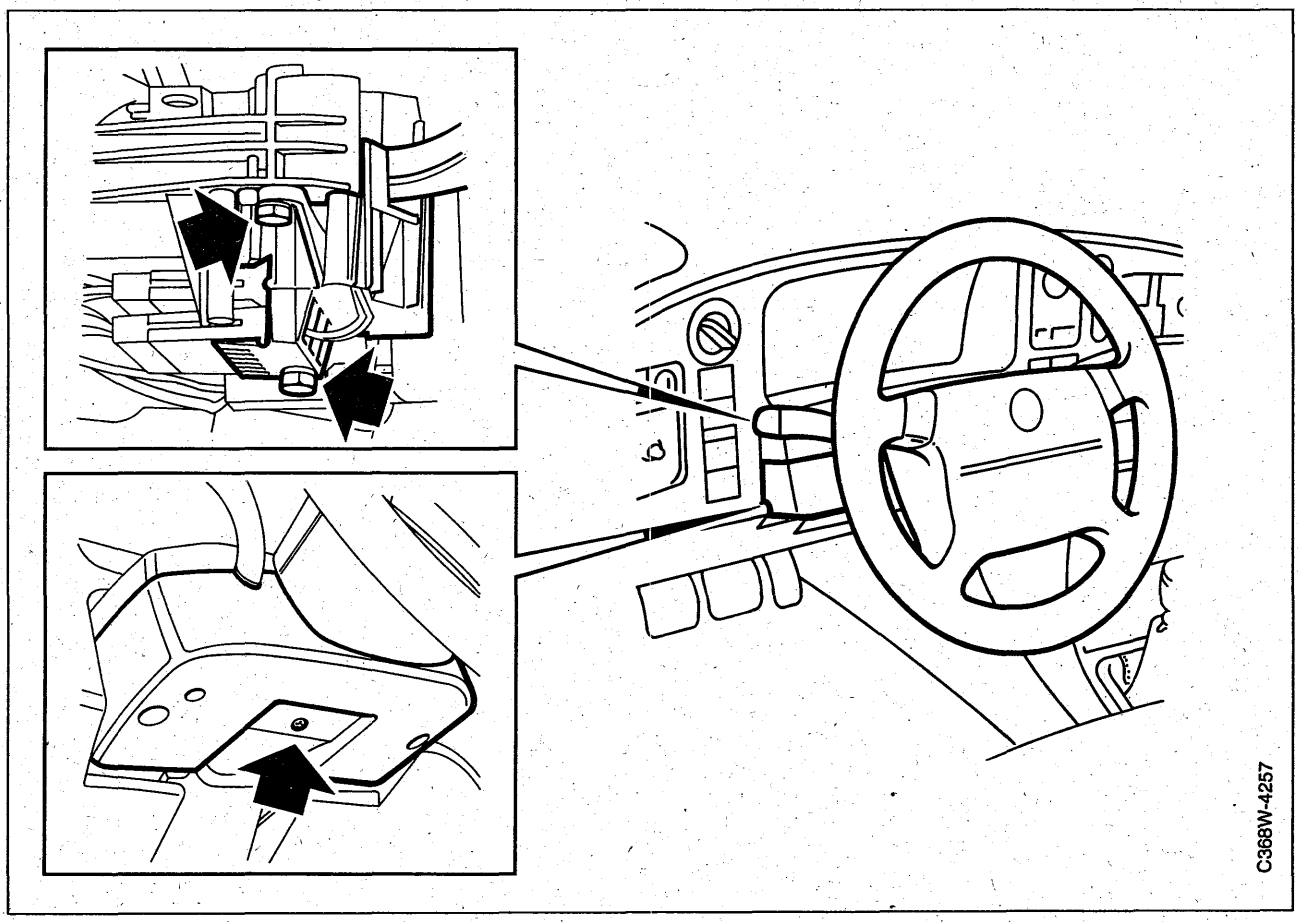
Clutch and brake switches

1 Remove the lower part of the dashboard.
2 Unplug the connector.
3 Prise the switch loose, using a screwdriver.
4 Pull out the switch push rod before fitting. Depress the pedal, fit the switch on the bracket and carefully release the pedal.

Brake lights switch

1 Remove the lower part of the dashboard.
2 Turn the brake lights switch in either direction and lift it out.
3 Unplug the connector.
4 Pull out the switch push rod before fitting. Depress the pedal, fit the switch on the bracket and carefully release the pedal.

Replacement of lights switch



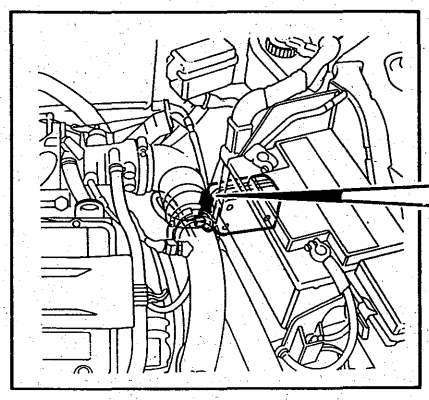
To remove

1 Remove the steering column cowls.
2 Unplug the connector.
3 Unscrew the two bolts securing the lights switch and remove same.

To remove

1 Screw the new lights switch in place by means of the two retaining bolts.
2 Plug in the connector.
3 Fit the steering column cowls.

Connectors and grounding points



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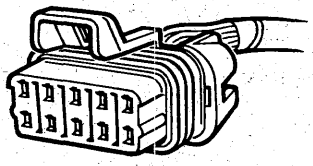
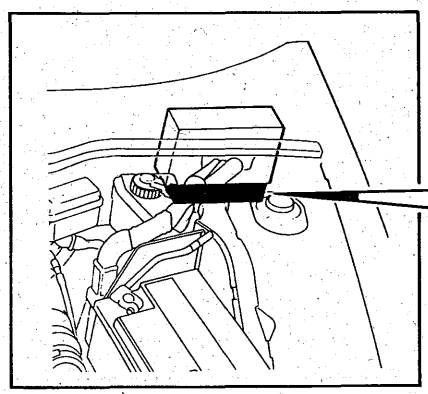
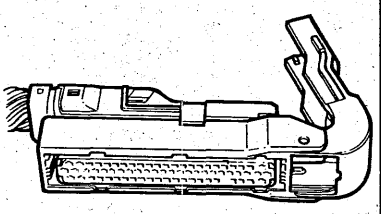
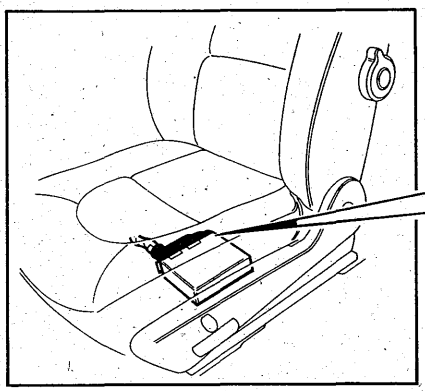


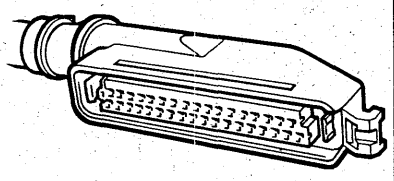


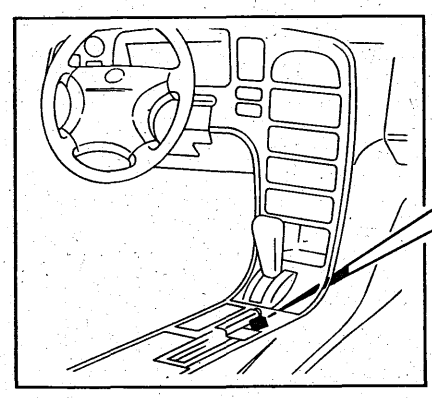
430

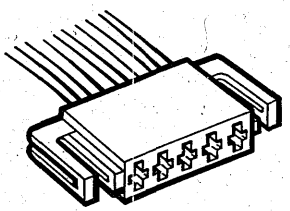




507







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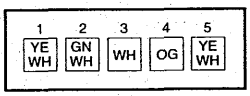
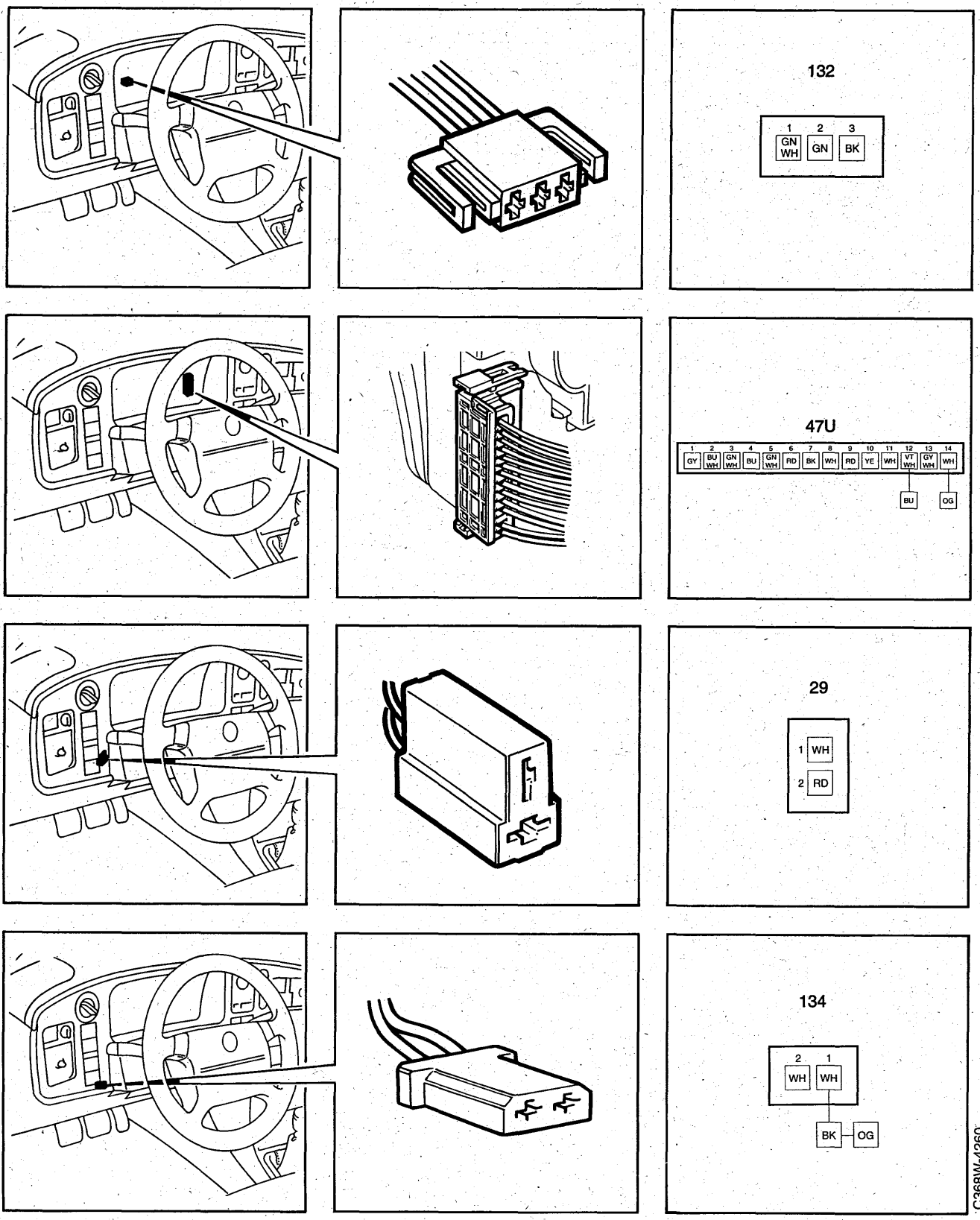


C368W-4259

Connectors and grounding points (contd.)



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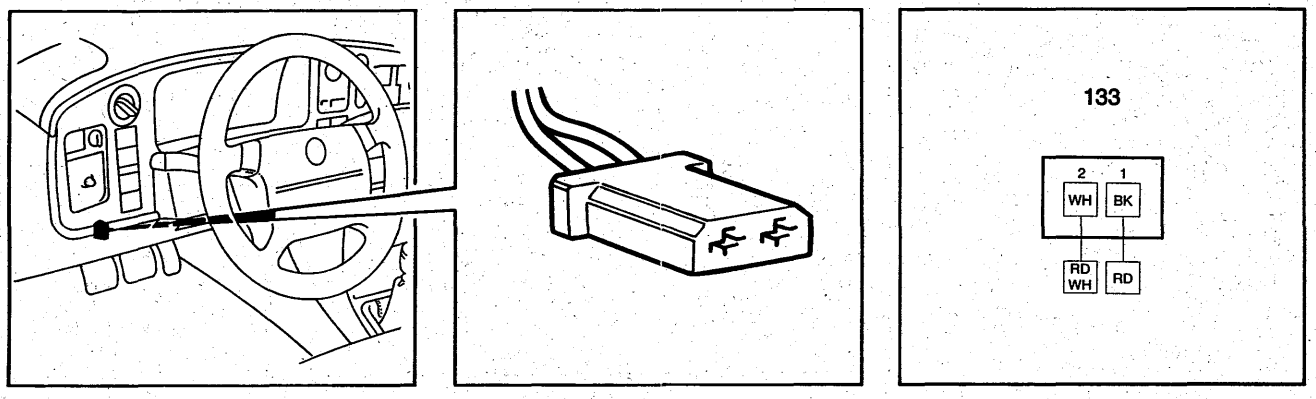
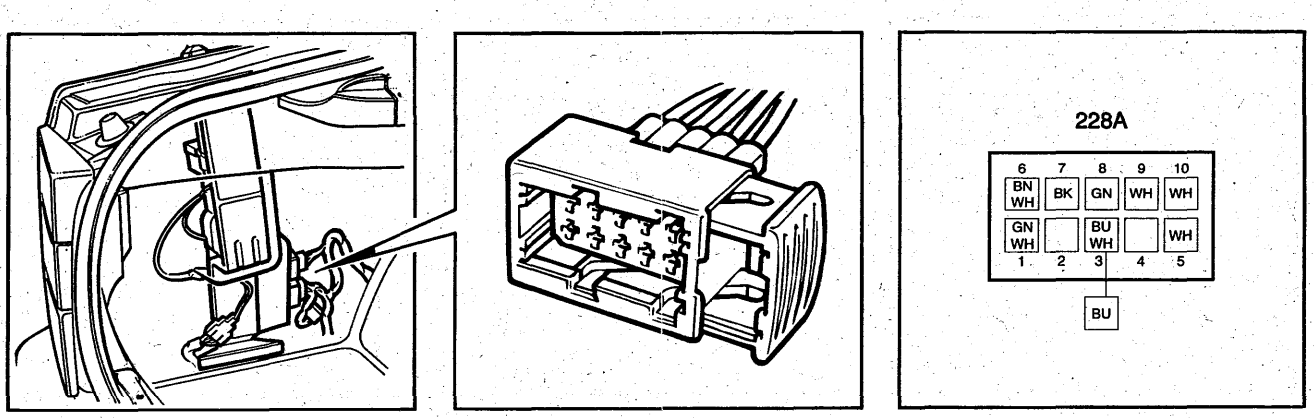
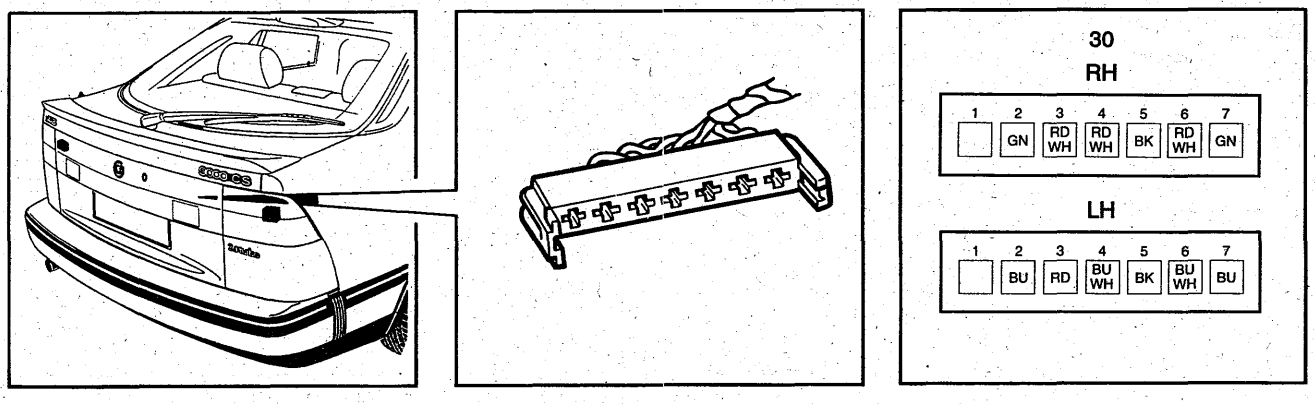
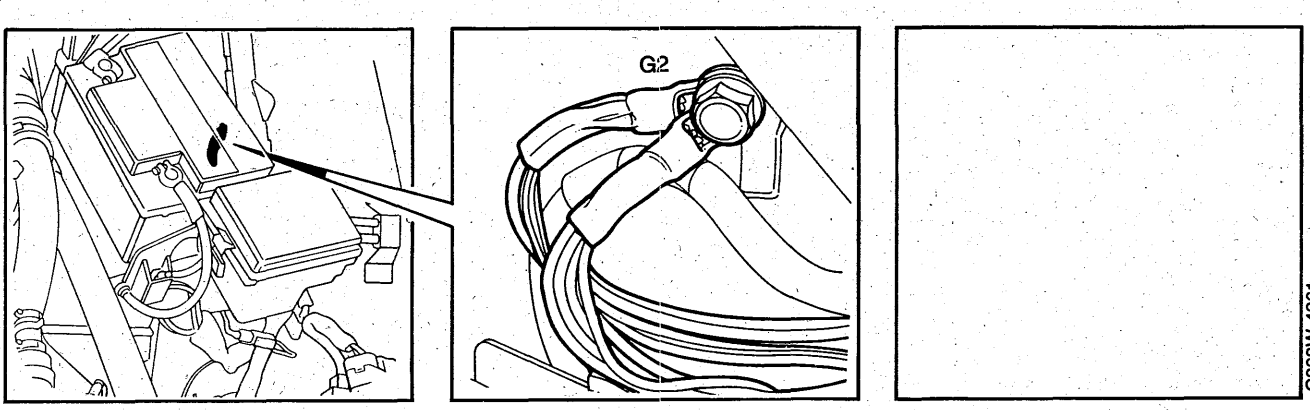


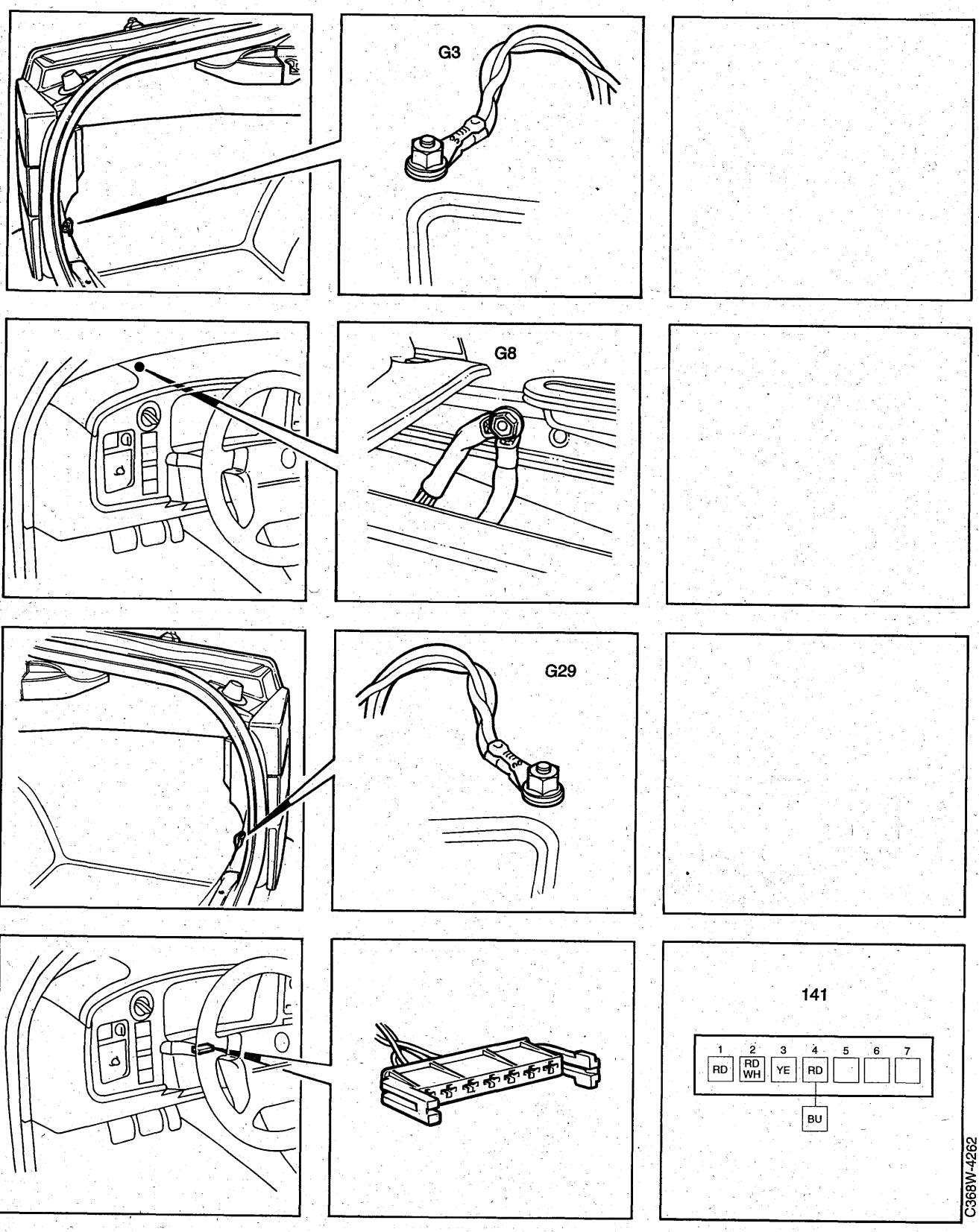






C368W-4261

Connectors and grounding points (contd.)

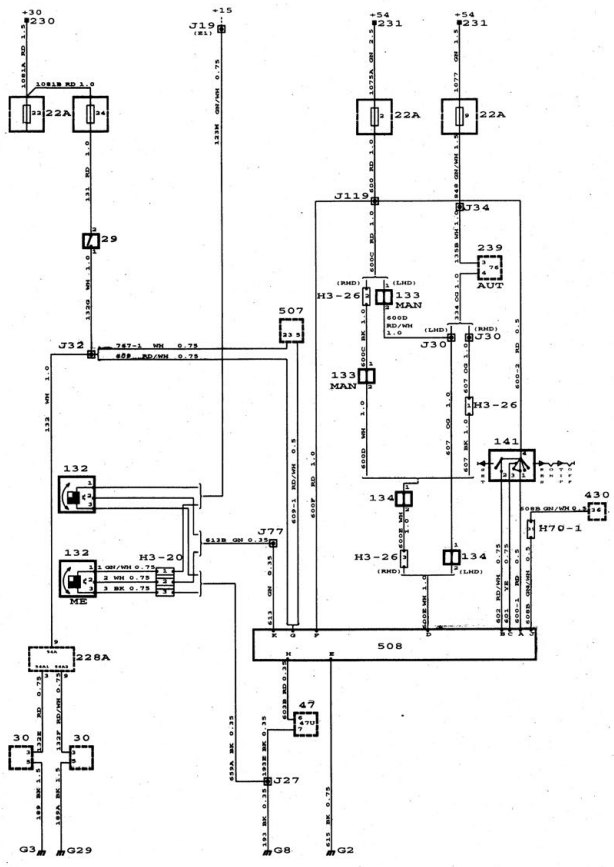


Wiring diagram

Locations of components

22A	Fuse holder in the dashboard
29	Brake lights switch on the pedal assembly
30	Brake light bulbs, right-hand and left-hand rear light clusters
47U	CRUISE indicator lamp in the main instrument display
228A	Filament monitor
133	Clutch switch, Cruise Control, on the clutch pedal
134	Brake pedal switch, on the brake pedal
141	Cruise Control switch, on the lights stalk, on the left-hand side of the steering column
239	Selector lever position sensor, under the selector lever
430	TRIONIC control module, in the cabin, below the right-hand A pillar
132	Speedometer, in the main instrument display
507	TCS control module, under the left-hand front seat
508	Cruise Control system control module, on a bracket in the engine bay
H10-1	10-pin connector, mounted on a bracket behind the battery in the engine bay
H10-3	10-pin connector, mounted on a bracket behind the battery in the engine bay
H3-20	3-pin connector, behind the main instrument display adjacent to the speedometer (ME)
H70-1	70-pin connector, in the false bulkhead space
H3-26	3-pin connector, above the pedal assembly adjacent to the pedal switches
G3	Grounding point, luggage compartment
G8	Grounding point, dashboard
G2	Grounding point, battery tray
G29	Grounding point, right-hand rear light cluster

Wiring diagram



(ENG) **Ordering No. 358663.** English edition. Printed in Sweden.

Saab Automobile AB
Trollhättan, Sweden

Printed in Sweden, Graphic Systems AB, Gbg 1994.23581