

Saab Cruise Control Diagnosis

All 9000's and all 900's with systems that use a vacuum pump for actuation(82-91) (91-93 and 94 Convertibles are similar)

Tools Needed

Various drivers for removing the panels to access components (Possibly a Phillips screwdriver, a 25 Torx, a 20 Torx, a 10 Torx)

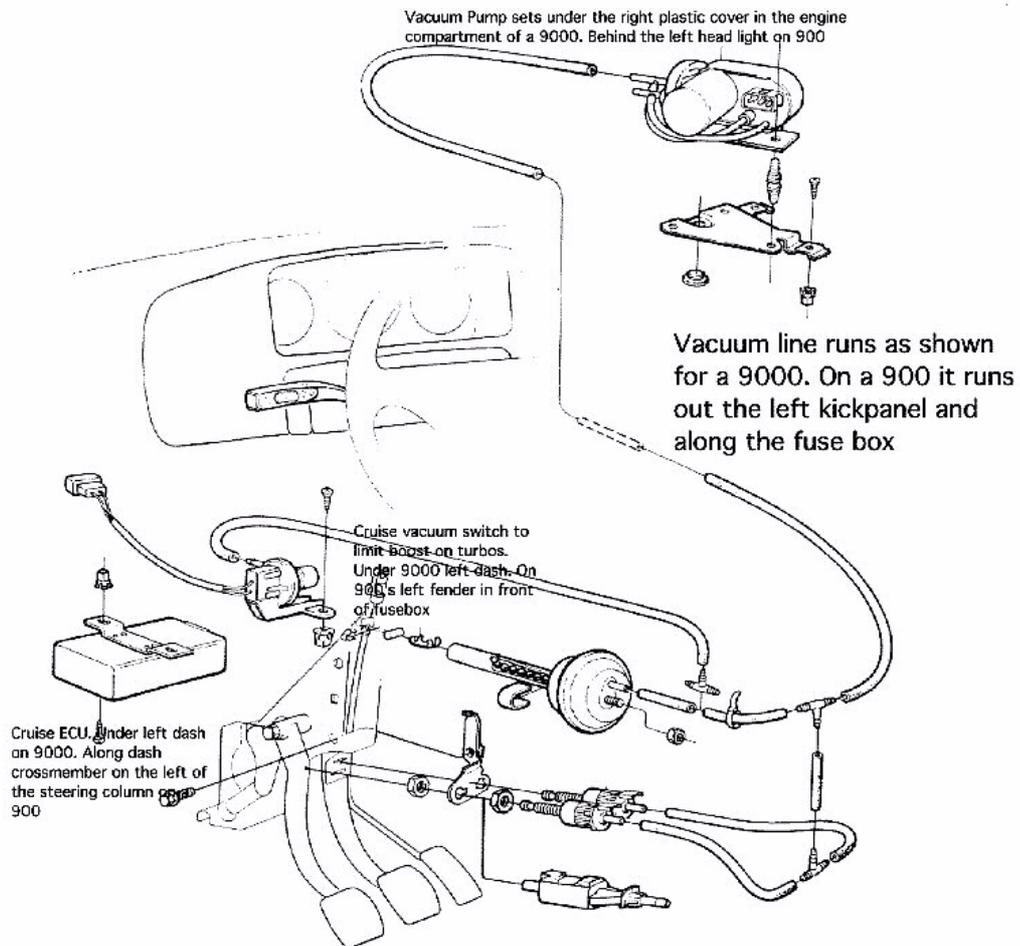
Voltmeter that will read on a 12V DC scale

A 12 V DC Test Light will make some of the checks faster, but can't do all the voltmeter can

10 and 13 mm sockets in case the kick panel needs to be removed

8 mm socket for the later 9000 engine compartment panel

A length of 7 mm vacuum line to attach at various points to trace a vacuum leak if present

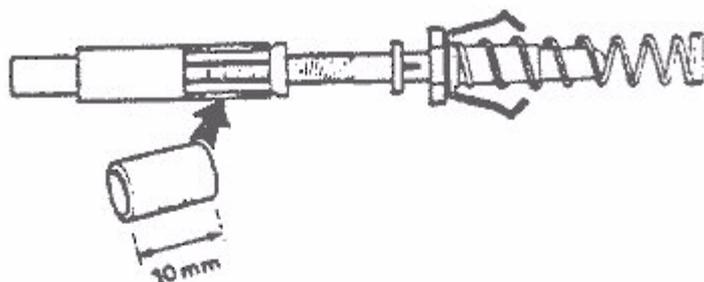


First always check the fuses. Check all of them just to be sure.

Next thing to do is verify the vacuum side of the system is working. Locate the vacuum line running from the pump to inside the car. Of the two ports on the pump projecting forward, only one, the black one should have the vacuum line on it. Look at the pic above or below to see which port this is. The other port is open to allow the vacuum to vent. Remove it from the pump and apply vacuum to the hose (suck on it). The throttle should move at the throttle plate. If so, the vacuum side is good. If not, trace the leak. Likely places are the line itself. they crack especially where the hose bends, like right at the pump or as the hose bends to go into the car on a 900. 9000s seem to have fewer problems except on the very ends of the hose. We replace the hose with a woven encased vacuum line. VWs and Mercedes used this stuff a lot. Its there for a while. Note there are quite a few lines under the dash. You may need to check all of them.

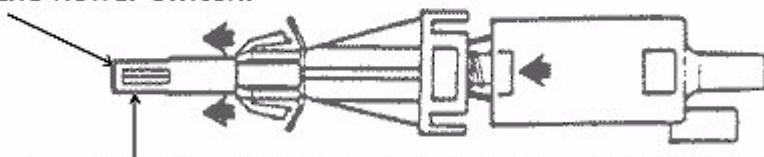
After the lines are traced, check the dump valves on the pedals for misadjustment and not holding vacuum. Try adjusting them.

Cruise control dump valves should hold vacuum and have continuity across their pins when the brake and clutch pedals are released. A quick check for the vacuum if it is the valves slightly out of adjustment is to lift up on the pedals and see if the little bit more is enough to make them seal. If it does, then adjustment is usually enough to take care of them. If pulling the pedal up doesn't get the system to hold vacuum, you should still inspect the dump valves



Fit a 10 mm long piece of heat shrink tubing over the spring loaded portion of the pushrod.

This is the part that will adjust its self too far in. You can modify your switch as shown here if this happens repeatedly. Best thing is to replace it with the newer switch.



You adjust by installing switch in the bracket, pushing down pedal and pulling this plunger out. Slowly releasing the pedal will adjust the switch.

Reassemble the switch and check that the pushrod slides freely.

The vacuum servo with the chain attached should hold vacuum and collapse with vacuum applied. As it collapses it pulls the chain attached to the top of the gas pedal, pulling the throttle open. Make sure the chain is attached to the pedal. 9000s had a campaign to place clips at either chain attachment point to secure it. the clips work on 900's as well. Also on a 900, there is a guard that goes on the side of the heater control valve to prevent the chain from getting caught on the screws there. Make sure it is in place, or your car could suddenly run away from you should the chain hang up.

Don't forget to check the boost limiting vacuum switch on the left fender on 900 turbos and under the dash on equipped 9000s. It is a red capped two wire switch with a brown body. It should hold vacuum.

ELECTRICAL DIAGNOSIS

92 and up cars have a bit more complicated system. Though similar in component checking, not all test for them are given here. You can trace individual components as here by making measurements at the components, not at an ECU.

Locations of components

- | | | | |
|-----|---|------|--|
| 3 | Earthing point, facia at the left-hand front speaker socket | 141 | Selector for Cruise Control on the direction indicator stalk, on the left-hand side of the steering column |
| 7 | Earthing point on the left-hand wheel housing | 177 | Control unit for the APC system under the left-hand front seat |
| 9 | Earthing point in the luggage compartment, at the left-hand light cluster | 179 | Solenoid valve on the radiator fan casing |
| 20 | Ignition switch on the right-hand side of the steering column | 187 | Vacuum pump for Cruise Control on the right-hand side of the engine compartment |
| 22A | Fuse board behind the access panel in the glove compartment | 228A | Filament monitor in the electrical distribution box behind the glove compartment |
| 29 | Brake light switch at the brake pedal | 230 | Distribution terminal +30 in the electrical distribution box behind the glove compartment |
| 30 | Brake lamps in the rear light clusters | 231 | Distribution terminal +54 in the electrical distribution box behind the glove compartment |
| 47U | Cruise Control indicating lamp in the combined instrument, on the circuit board for the indicating and warning lamps | 233 | Vacuum switch under the facia, to the left of the steering column |
| 57 | 3-pole connector one at the speedometer one in the luggage compartment lid (5-D) | 343 | Control unit for the DI-APC system under the left-hand front seat |
| 59 | 2-pole connector (RHD) one on the left-hand side, below the facia one in the luggage compartment lid (5-D) | | |
| 60 | Single-pole connector three under the facia, to the left of the steering column | | |
| 76 | Switch for raising the engine idling speed, auto under the centre console at the gear selector lever, in gear selector switch 239 | | |
| 98 | 10-pole connector under the right-hand front seat | | |
| 109 | High-level brake light on the interior side of the rear window | | |
| 122 | 8-pole connector at the left-hand rear wheel housing | | |
| 123 | 4-pole connector under the right-hand front seat | | |
| 131 | Control unit for Cruise Control under the facia, to the left of the steering column | | |
| 132 | Sensor for the speed transmitter in the speedometer, in the combined instrument | | |
| 133 | Clutch switch for the Cruise Control at the clutch pedal | | |
| 134 | Brake switch for the Cruise Control at the brake pedal | | |

As mentioned previously check the fuses. On a 9000 they are Fuses 2, 5, 9 and 24 in the glove box fuse compartment. On a 900, fuses 8,13,22, and 31 are all involved, all in the engine compartment fuse box.

The easiest place to do the tests is to go straight to the ECU and unplug its connector. Pin 1 there, a brown wire, should have 12 V on it with the key on. Pin 8, a black wire, should be grounded at all times. Check between it and pin 1 for 12V. If there, the supply and ground are good.

Pin 2, a red and white wire on a 9000 and a green wire on a 900, should have 12 V anytime the key is on and the cruise switch SET button is depressed. this comes from pin 2 of the stalk switch. If no signal here, check at the rear of the stalk switch. If none there, first check the switches other pins for power and ground as outlined below and if they are present, the switch is bad. See the bulletin on replacing the early stalk switches without a TIP function for modifications necessary to replace it with a newer style switch, the old ones are no longer available.

SAAB

Saab-Scania of America, Inc.

FILE IN	VOL.
S.I. Man.	I
SEC.	PG.
A-3	117

Service Information

Subject: Cruise Control Switch Replacement
Application: 1984-88 900 Models With Cruise Control

Issue: 12/89-1201
Supersedes: 03/89-1122

The original stalk switch for the 1984-88 900 cruise control, P/N 85 83 536, is no longer available. For replacement purposes, kit 85 47 960, which contains the 1989 style switch and new electrical connectors, must be used. Detailed below are the steps that must be followed when replacing the original switch.

Parts Required:

- | | |
|---------------------------|---------------|
| Cruise Control Switch Kit | P/N 85 47 960 |
| • Stalk Switch | P/N 95 65 623 |
| • Splice Connector | P/N 95 59 998 |
| • Splice Connector | P/N 95 60 004 |
| • 4-Pin Connector | P/N 91 23 555 |
| • Pins (4) | P/N 91 20 957 |

Cruise Control Switch Kit Installation Procedure

1. Disconnect the negative lead from the battery and cover the terminal post.
2. Remove the lower steering-column cover.
3. Pull the left hand air duct and the sound insulation that is just behind the knee pad down and out of the way.
4. Cut the tie strap that secures the cruise control wire harness to the steering column.
5. Remove the bracket which holds the direction indicator and wiper switches.
6. Cut the wiring harness to the cruise control switch as close to the connector as possible (Figure 1). Remove the switch.
7. Strip the ends of the wires in the harness and fit the four (4) pins. For proper connection, use crimping pliers, P/N 88 18 999. Fit the wires into the 4-pin connector, P/N 91 23 555, as shown in Figure 2.

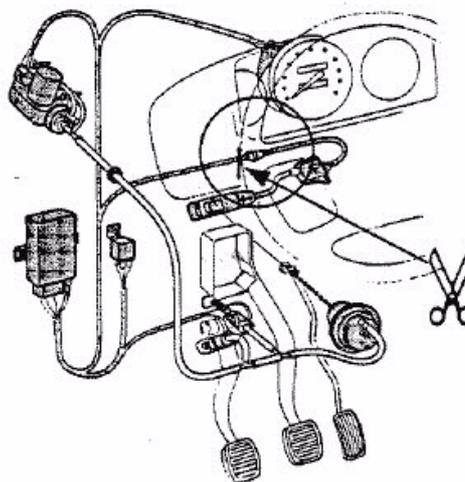


Figure 1. Cut the wires to the Cruise Control Switch.

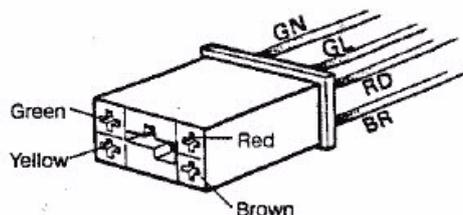


Figure 2. Fit the wires into the connector.

Pin 3, a red wire, has two functions. When the pedals are released, the dump valves should have continuity through them to ground. The ground circuit passes through the brake light bulbs and grounds at the luggage compartment ground point, at the left rear signal assembly on 9000s and at the ground at the center of the 900 luggage compartment near the spare tire. Should a valve fail to open its circuit if a pedal is depressed, the brake LIGHT switch is wired to this pin as well, so if the brakes were depressed the ECU would get 12 V on this pin and would cancel cruise. If 12V is present at this pin, the cruise will not engage, or will disengage, whether the 12 V comes from the brake switch or from the ground through the dump valves being broken.

Pin 4, a gray wire on a 900 and a 9000 , is 12 V out of the vacuum motor when that the ECU grounds to run the vacuum pump. You can't really check this voltage without driving the car. You can check for continuity from here to pin 2 of the vacuum pump. Seldom is this a problem unless the ECU is bad. Check all others first.

Pin 5, a blue wire on the 900 and a green wire on a 9000 is the speed sensor's input. Look for a varying voltage here while driving the car. Leave this to next to last after confirming all the other readings. If there is no voltage here, first make sure the speed sensor on the back of the instrument cluster is connected. If you have continuity from this pin to pin 2 off the speed sensor on three wire sensor cars, pin 1 of the sensor is getting voltage with the key on from fuse 22 on a 900 and from the ignition switch on a 9000(all the time, key on or off) , and the sensor's pin 3 has a ground, the sensor is bad. On two pin sensor 900s, pin 2 of the sensor is connected here. Pin 1 of these cars' sensor is connected to pin 8 of the ECU.

Pin 6, a yellow wire on a 900 and 9000, should receive 12 V when the cruise stalk switch is held to RESUME. This comes from pin 3 of the stalk switch.

Pin 7 an orange wire, should have continuity to pin 1 of the vacuum pump. This is a control for the pump via its ground supply.

Pin 8, a black wire, is the ground for the ECU. On a 9000, it grounds at the left front speaker on the dash support and on a 900 at the left kick panel ground points.

Pin 9, a red wire is a 12 V feed into the ECU when the cruise stalk switch is turned on.

Stalk Switch Pin Checks

When the switch is set to ON, 12 V will go out its pin 1 A red wire, to the ECU and to illuminate the CRUISE light in the dash.

Pin 2 of the switch sends 12V to the ECU on its pin 2 when SET is depressed on cars equipped with the later switch with a TIP function in a 900. On earlier 900 switches, the SET voltage goes to a relay mounted beside the ECU. It supplies pin 86 of the relay for its pull down coil. Pin 30 of the relay is connected to pin 2 of the ECU and receives 12 V from it. When the relay gets the 12 V from the SET switch, it connects pin 2 of the ECU to Pin 9 of the ECU, and pin 3 of the vacuum pump. this causes the ECU to set the speed in memory.

Pin 3 of the switch supplies pin 6 of the ECU with 12 V when the RESUME button is depressed.

Pin 4, a brown wire, of the switch should receive 12 V to supply the switch. On a manual transmission car, it comes from the same source as pin 1 of the ECU. On an automatic car, the supply comes through the gear selector switch in the center console. On a 900, this is supplied from fuse 13 to the selector switch pin 2 via a orange wire and comes out the selector switch on pin 3. On a 9000 auto, it is supplied from fuse 9 to pin 3 of the selector switch and out pin 4 of the switch. This also the idle up circuit for the engine speed when engaging gears, either reverse or drive. So the feed is present when the car is put into gear.

If the cruise still doesn't work and has all the pin checks good, the ECU is probably to blame .

For cars that gain or lose speed, check the chain on the pedal, and for any vacuum leaks, but generally this is either a speed sensor or a ECU problem. To find this for sure, you would have to monitor those signals while driving and see which was changing.

To a brief TCS differing function bulletin

**Subject: Cruise Control Operation****Application: 1992 9000 Models with Traction Control**

CATEGORY	
Electrical	
SECTION	PAGE
3	11
ISSUE	CODE
09/91-0132	368

As outlined in the Traction Control System (TCS) Service Manual, Sec. 2:5, the cruise control system for 9000 models with TCS is integrated into the Electronic Throttle System (ETS). The purpose of this PSI is to highlight two features of ETS-operated cruise control that are not found in other Saab cruise control systems.

Stepped adjustment of selected speed

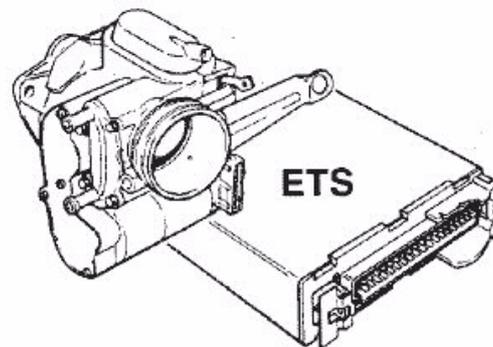
During cruise control operation, it is possible to adjust the set speed in steps of 1 mph up or down.

- To increase the speed in 1 mph increments, briefly press the SET speed button on the end of the turn signal stalk.
- To decrease the selected speed in 1 mph increments, briefly press the RESUME switch.

**Brake input signal check function
(Automatic transmission only)**

The ETS system in automatic transmission-equipped cars requires at least one brake signal input before the cruise control system will function. This means that the cruise control will not function in the unusual event that a driver starts the car, shifts into Drive and accelerates onto a highway without ever pressing the brake pedal. Since the cruise control will become operational after any subsequent brake pedal application, this situation could appear to the customer to be an intermittent fault.

Note that, while the Owner's Manual warns that the brakes should always be applied when shifting from Park to Drive, there is no specific information regarding this cruise control brake signal requirement for automatic transmission TCS cars.



The Electronic Throttle System (ETS) handles the cruise control function on cars equipped with TCS.