

## Cruise Control Installation on a Porsche 968 (1993 Cabrio) Using Components from a Porsche 944S2 (1991 Cabrio)

This report is constructed by Roboman and Waylander for 968Forums.com. It should be noted that although the concept and components are not complicated, the practicalities can be challenging.

### Components :

1. CC column switch Part No: 928 613 313 01-01 ?? (lots of options due to world location and headlamp washers)
2. CC computer (same as 944S2) (944 617 132 00)
3. Clutch switch (same as 944S2) ( LHD 944 613 413 00, RHD 928 613 413 01)
4. CC throttle cable Part No: (LHD 944 423 025 05, RHD 945 423 025 03 )
5. CC actuator and mounting (same as 944S2, but assembled differently)
6. Wiring looms .... you will need to search around to see what is on your model and create whatever is missing. In my case part of the CC wiring was already in place, but I needed to buy 4m of 7-strand cable to make the CC brain-actuator loom.

Look around by the clutch pedal for a trailing two pin socket with a brown and brown/white wire, if yes then you have at least the signal input loom for the CC brain. This might be different for RHD.

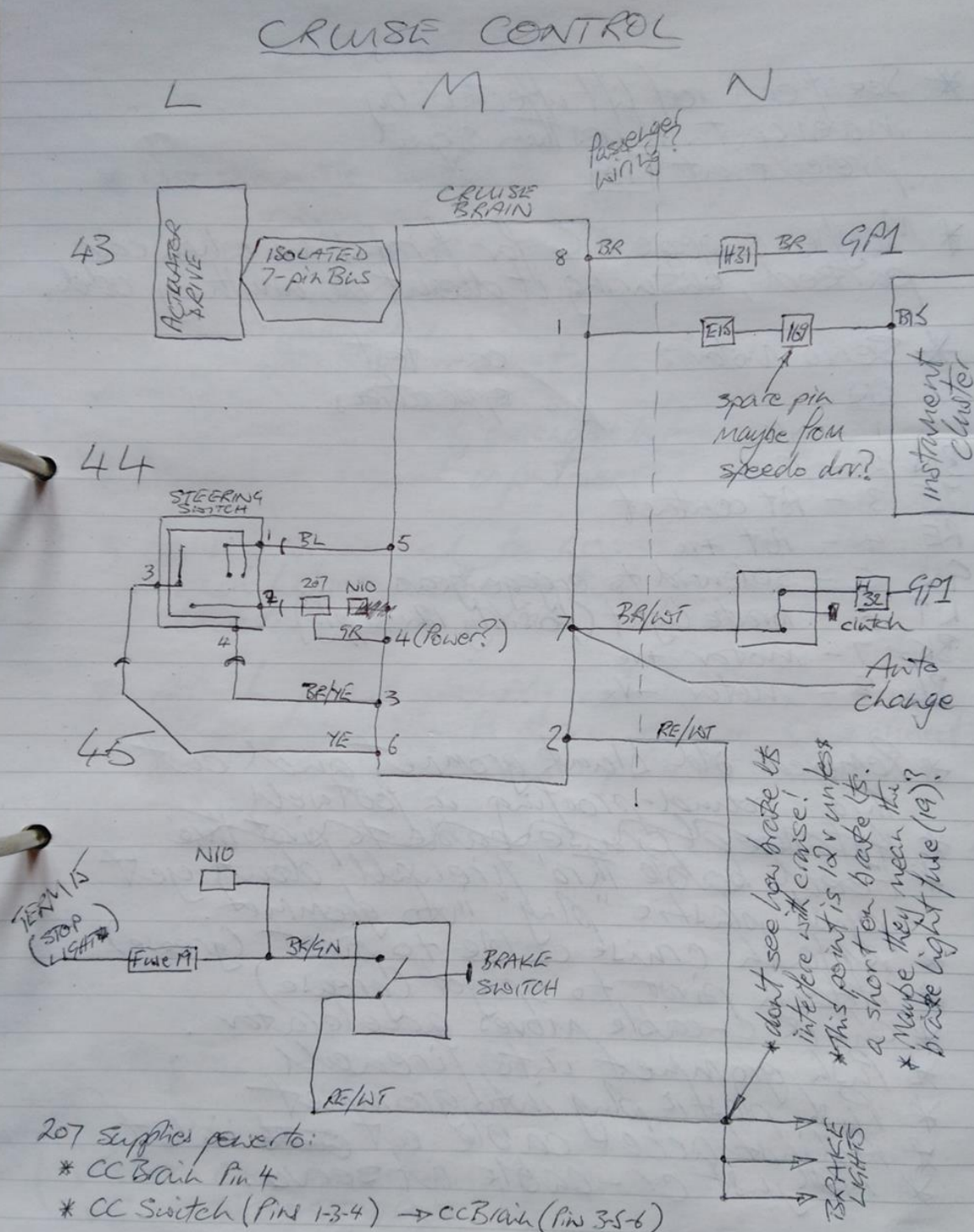
Tools: you should have an electrician's multimeter, a soldering iron, and you're going to need a socket driver with about 10"-12" reach, and wire for making up the CC brain-actuator loom and any other missing looms.

You will frequently be working with one hand, trying to locate nuts onto bolts in hard-to-reach places, I recommend a little grease in the socket to keep the nut inside it. A magnet on a stalk came in handy a few times, if you have the space, removal of the seats may improve access dramatically.



Top to bottom on this table is: 7-wire cable for the cruise brain-actuator loom, the actuator throttle cable, the accelerator pivot, 944 mounting bracket, clutch switch, cruise brain with sockets attached, actuator socket, the actuator with 944 mounting attached.

7. Wiring diagram constructed from the various pages of the 968 workshop manual.

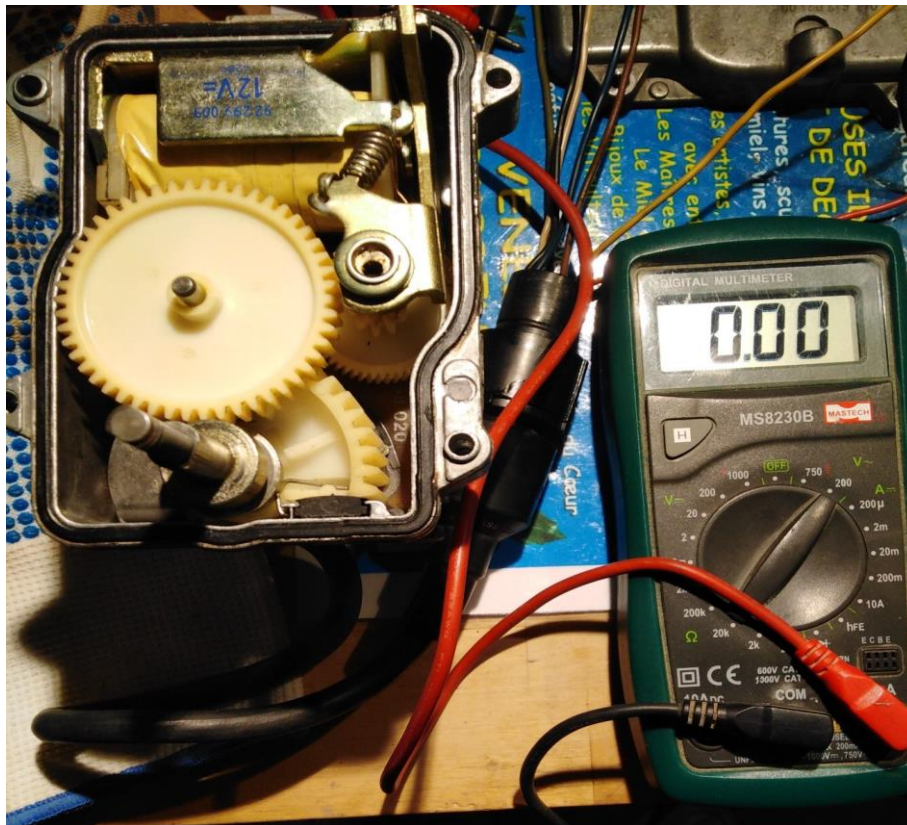


Power comes thro' fuse 19 to Brake SW and 207



While you have all the components out of the car it would be wise to test each one, and hence eliminate as many components as possible from the equation in the case of malfunction.

1. CC column switch is three integrated switches with a single input from pin4. Use MM on ohms to check switch function against the wiring diagram.
2. CC computer is contained in an aluminium box, it is worth while unbending the tags and having a look for obvious damage..... bulging capacitors, solder in poor condition. When unbending/bending the aluminium tags take care not to force against the plastic plug assembly.
3. CC clutch switch should move smoothly and operate when it is almost completely pushed in. Use MM on ohms to check switch function. You will also need to check that your clutch pedal is correctly adjusted, ie when released it moves back to the clutch switch mount. The CC will not function if that switch isn't fully depressed.
4. CC throttle cable. You may as well lubricate the throttle cable whilst you can hold it vertically. I used WD40 to smooth the path for 3-in-one light oil. (I also lubricated and adjusted the main throttle cable whilst I was thinking about it.)
5. CC actuator. You can lift the lid on this item without too much risk of bits flying out.
  - Remove the mounting assembly.
  - Remove the actuator arm using a small spanner on the spindle to counter the torque of undoing the 13mm retaining nut.
  - Undo the 4 cover retaining screws.
  - PUT YOUR THUMB on top of the spindle and push down while you lift the cover up. The cover will lift up passed the spindle revealing the inner workings of the actuator..... see photo below for correct assembly.



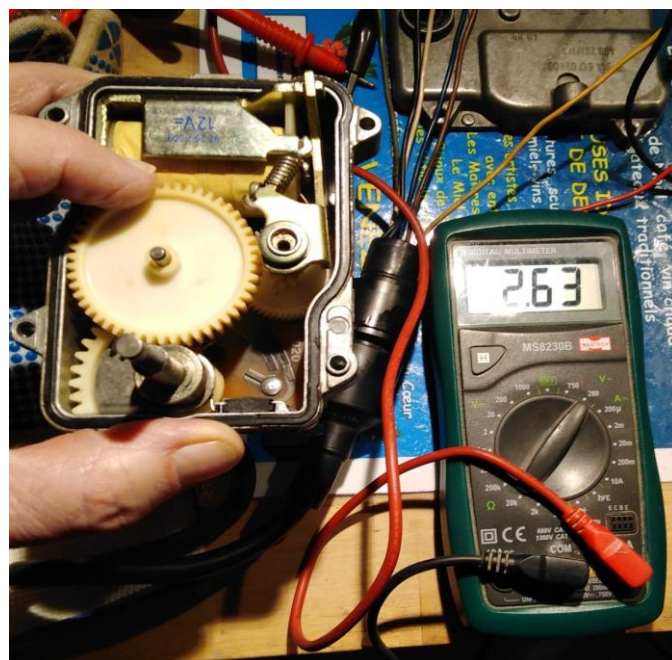
- You may wish to remove the top/largest gear and the 1/4 round gear in order to carefully clean the electrical contacts, clean off old grease and reapply new grease.

In the previous photo you can see both ends of the spring attached to the 1/4 round gear, one end within a groove on the 1/4 gear and the other just below it but hooked onto the actuator casing. The spindle should rotate through 90 degrees with no resistance. This is because when the plastic 1/4 round gear is driven anti-clockwise by the actuator it will take the spindle with it, and the spring on the 1/4 round gear ensures it will return clockwise to zero when CC is canceled. However, it is the accelerator throttle cable, when attached, that causes the spindle to return to zero. Without the throttle cable the spindle just flops about.

### 968 Cruise Control Servo Testing

Pin	Colour	Function
1.	N/C	•
1.	BN	Ground
2.	YE	Pot wiper
3.	RE	Pot +
4.	GN	Electromagnet ..... engages servo gears
5.	WT	Power from fuse 19 Brake circuitry
6.	BK	Motor +ve
7.	BL	Motor -ve

Testing	Pins	Comments
Electromagnet engages and disengages gears	<ul style="list-style-type: none"> <li>• 2 – Gnd</li> <li>• 5 – "slow tap" 12v</li> </ul>	Electromagnet should engage, and then disengage the gears as the coiled spring pulls it away. Do this test first so you are sure the gears are disengaged prior to the the next test.
Motor rotation	<ul style="list-style-type: none"> <li>• 7 – 12v</li> <li>• 8 – Gnd</li> </ul>	The motor is free to spin
Potentiometer feedback	<ul style="list-style-type: none"> <li>• 3 – multimeter Ohms -ve</li> <li>• 4 – multimeter Ohms +ve</li> </ul>	When you move the servo actuator gear the pot resistance changes. Mine went from 0-2.6Kohms



- If all tests out okay, then reassemble the actuator.

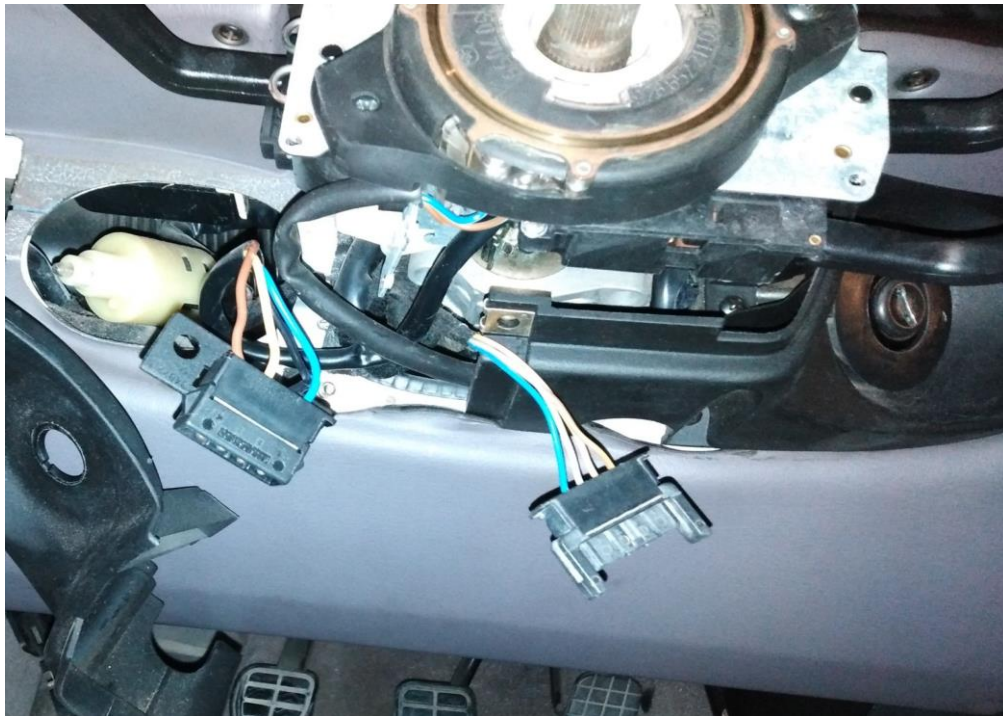
You will now need as much access space as possible within the car foot-wells. So .....

- a) Park your car, preferably under cover, and to maximise access during installation, move the seats as far back as possible, windows down, and if you have a cabrio put the top down. Then disconnect the battery, leave the car for at least 20 minutes before removing the driver's air bag and removing the steering wheel. You will need as much space as possible as you are about to spend a lot of time upside-down in the foot-well(s).
- b) Remove the plastic trim holding the light switches to give access to the column switch; replace column switch as necessary.
- c) If you have the signal inputs loom, then tucked in behind dash you will find the socket for the column switch.

If not you will need to source a CC brain socket and make up the following:

- 1 wire from the speedo (169 on the wiring diagram, N43)
- 1 wire from the brake switch
- 4-wire from the CC column switch
- 1 wire from the clutch switch

- d) Plug in the CC switch.



*On the left is the CC switch output, the pin assembly to the right was tucked in under the steering column.*



The signal socket for the CC brain was found above the bonnet/hood release just under the fuse box. I had to remove the plastic plate that holds fuse 43 and the alarm horn, and then spotted the socket tied to other cables, right at the top of the foot-well. It is an 8-pin socket and in my case had nothing else attached. I believe if you have the rest of the loom, ie the wires going to the cable actuator, then you will find that socket in the same place, possibly bound to the signal socket. So you need to reach up, release the socket and clean off 25 years of dust!



***In this photo you can see the 8-pin signal socket to the loom. Also at 11 o'clock a short distance away from the socket is one of the bolts onto which the CC brain box will be attached. The other bolt is hidden behind the various wires closer to the underside of the fuse box, you are going to need to get onto it later! The gray carpet which surrounds the bonnet release is to the bottom right.***

With the CC switch and clutch switch plugged in (and if you had to make up the signal loom, then the Ground and brake line too ) test the correct connections to the signal socket.

***Signal input socket test ..... ignition ON, MM on volts dc, you will find the bolt onto which the alarm horn plate was mounted makes a convenient ground for the MM.***

Pin	Function	Comment
1.	From instrument cluster, speed information	Nothing on here presently, but you can infer a signal at a later date when CC is installed: if a signal is present you cannot operate your roof when driving at more than 10Kph
2.	Brake switch	0v goes to 12v when brake pedal pressed
3.	CC cancel signal	12v goes to 0v when CC switch pulled
4.	12v	Power to CC brain from fuse 19, the same fuse that powers the brake lights.
5.	CC resume	0v goes to 12v when CC switch pressed down
6.	CC on/accelerate	0v goes to 12v when CC switch pushed
7.	0v when clutch released	When clutch switch plunger pushed in you should get 0v. When released you may get an odd reading as the contact is now floating, there must be a pull-up resister on the CC PCB.
8.	0v	GP1

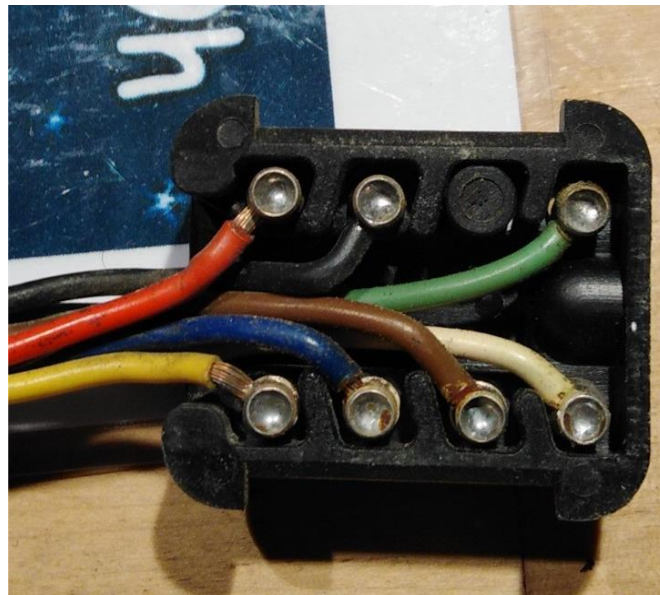
Now you need to find a way for the 7-wire loom which goes from the CC brain to the actuator, to get through the firewall. I searched all over the place, also hoping to find the engine bay CC loom. But it wasn't there, so the following photos shows how I got my light gray cable through a grommet beside the fuse box, emerging into the footwell above and between the and clutch pedal and steering column.



***Lift the edge of the grommet to find a hole in the bulkhead which can accommodate the addition of the brain-actuator cable. If enough room, then just snip a small hole in the grommet and slide the cable through.***



*The cable needs to be pulled through and soldered to the other CC brain socket. Remember to route the cable for your final design BEFORE soldering, as it will be more difficult to reroute once the socket has been soldered to the cable.  
Note the clutch switch, upper-left in this photo.*



*Shown here is the old cable. I used a solder-sucker to clean out the old solder and then soldered this socket directly on to the new CC brain-actuator loom.*

- Attach the clutch switch.
- Plug in the brain-actuator cable.



Now it starts to get painful because of the confined space and hence severely restricted movement. There's no easy way, it just requires some dexterity and lots of patience and perseverance ....



The CC brain box mounts above the bonnet release onto two bolts that are welded to the top of the footwell. You need to feed the brain onto the bolt closest to the rear of the car, then put the nut on a couple of turns to hold the brain loosely in place. Now you can manipulate the brain over the frontmost bolt, I had to wedge other wiring out of the way whilst trying to move the brain laterally and over the bolt. I found it very difficult to get a nut screwed onto this bolt, the angle was difficult as was line of sight. In the end I removed the carpet around the bonnet release. This gave a better angle and I needed a 10" socket drive to reach up there! A bendy screwdriver may work.

- Bolt the brain in place and plug in both brain sockets.
- Now pull the actuator loom back up through the grommet beside the fuse box and make it neat in the footwell (I can see I need to replace the clutch pedal rubber!)

Time to feed the brain-actuator loom over to the actuator itself .....

I chose to bring the loom across in front of the blowers and then into the engine bay via a large grommet as seen here. Solder the wires onto the actuator plug/socket. Forgive the mess of wires going to the actuator socket, I need a pin extractor so I can finish this off neatly.



The actuator mounting seemed straightforward, just three nuts, but in reality it caused malfunctions during road-testing. I'll briefly recount the relevant part of the road-test now so the photos of mounting the actuator make sense.....

Drove at 60Kph, PUSHED to engage CC ..... system held nicely at 60Kph ..... good start! PULLED to cancel ..... system disengaged and car slowed ... still good!

Pressed RESUME .... accelerator pedal floored and stayed there, pulled CC switch to cancel – no effect, depressed clutch – engine red-lined, switch off ignition and drift for a little while (one of the benefits of living in the countryside is that one can do this sort of thing without endangering other drivers), turn on ignition – flat out again, turn off ignition and get off the road. This was not entirely unexpected given all the CC problems I have recently read, but the CC brain was being blamed and this felt more mechanical.

Bonnet up, inspect the actuator .... I expected it to be stuck, but everything seemed normal.

Start engine, now at correct idle speed so off we go again .... note to self "don't press RESUME".

Engaged CC again, worked fine, depressed clutch – revs dropped to idle, released clutch, accelerator flat out again!! Get off the road again, bonnet up again – but this time I heard a clicking sound at the same time as the bonnet released ??

Closer inspection of the actuator revealed that the throttle pull arm was catching on the underside of the bonnet; the actuator arm was strong enough to jam it in to the bonnet but the throttle spring wasn't strong enough to pull it back out again.

Here are the marks left by the actuator arm ...



So I reworked the mounting brackets, and where to mount them, in order to lower the actuator. If you look at the previous photo of the CC loom joining the actuator, you will see the bracket is mounted below the tag on the shock tower instead of above it, also the smaller bracket was reworked by bending it and elongating the hole, see next photo. So it seems I should buy the 968 brackets.





Continue with installation..... again the restricted access makes this tough.

The cruise throttle cable fits through a bulkhead hole beside the accelerator cable. Cut the grommet out of hole as the new cable comes complete with its own grommet. Poke a screwdriver through the hole and through the soundproofing into the footwell. Get into the footwell and cut out the sound proofing around the screwdriver ....feed the cable through. Do NOT push the plastic end of the cable sleeve into the grommet, this is better done, I think, after the cable has been attached and after the grommet has been eased into the firewall hole.

Attach the cruise cable to the accelerator pivot BEFORE putting the pivot on its mount. The end of the cruise cable is rubber with a hole through it, and holds itself on the pivot without clips. Put a bit of grease into the hole and squeeze it on to the pivot.

Before the next steps I suggest pushing a cloth up behind the accelerator to catch any clips/plastic inserts that slip off ..... else they fall into the little gap between the carpet and firewall never to be seen again :(

Mount the pivot .... I wasn't happy with how the roller was aligning with the accelerator pedal, so put a packing washer onto the mount before sliding on the pivot; moving the roller a little to the left and so positioning the roller more centrally on the accelerator lever.

Insert the clip to hold the mechanism in place, I could not see to do this, you just have to feel the clip into place on the mount and then push.



Climb out of the footwell, take the other end of the cruise cable, snap it onto the actuator, and adjust so that it has just a little play before the inlet rocker lifts. Ready to roll!!

Static testing:

1. With the car in neutral, turn on the ignition (don't start the engine). Feel the cruise brain for over heating (mine remained stone cold), sniff for electrical burning, if none then go and feel the actuator for over heating/burning (again mine was cold).
2. Go through the cruise switch operations (push, pull, press down) again sensing anything untoward.
3. Start engine and repeat 2 above.
4. If nothing adverse happened then road test.

Road testing: I recommend you keep you right foot touching the accelerator pedal during testing as it will give you feedback as to what is happening.

The CC should engage at anything above 35Kph, initially it may waver slightly as the feedback settles.

	Action	Reaction
1.	Push the CC switch when you are ready to cruise.	Feel the pedal move under your feet, it may surge a little and then fall back.
2.	Pull the CC switch to cancel and then immediately push to re-engage.	You should feel the pedal click against your foot as the CC cancels, and then move away from your foot as it re-engages at possibly a slightly slower speed.
3.	Pull the CC switch to cancel, then immediately press down to resume.	You should feel the pedal click against your foot as the CC cancels, and then move away from your foot a little more than above as it brings you back to the original speed.
4.	Pull the CC to cancel and this time permit the speed to drop off by say 10Kph, then press down to resume.	This time the pedal will go flat to the floor. Follow the pedal with your foot and you should feel it push back as the original speed it reached.
5.	Push the CC switch	The accelerator will press down and the car increases in speed.
6.	Press the brake	You should feel the pedal click against your foot as the CC cancels.
7.	Press the clutch, then release the clutch	You should feel the pedal click against your foot and the revs go to idle, then when the clutch pedal is released the car resumes its previous speed.
8.	Change gear	Same as above

If all that worked then put the injector cover back in place and tidy everything up.



As a final note: many forums/blogs suggest that if a brake light is not working then the 968 cruise control ceases to function.

To clarify:

- If the CC has been assembled as per the 968/93 LHD wiring diagram used, the CC system works fine even if a brake light has expired .... the passenger rear light cluster was disconnected and the CC still functioned properly.
- If the brake wiring somehow shorts to earth, then fuse19 will blow. Under that circumstance the brake lights no longer work and neither will the CC as it is also powered from the same fuse.