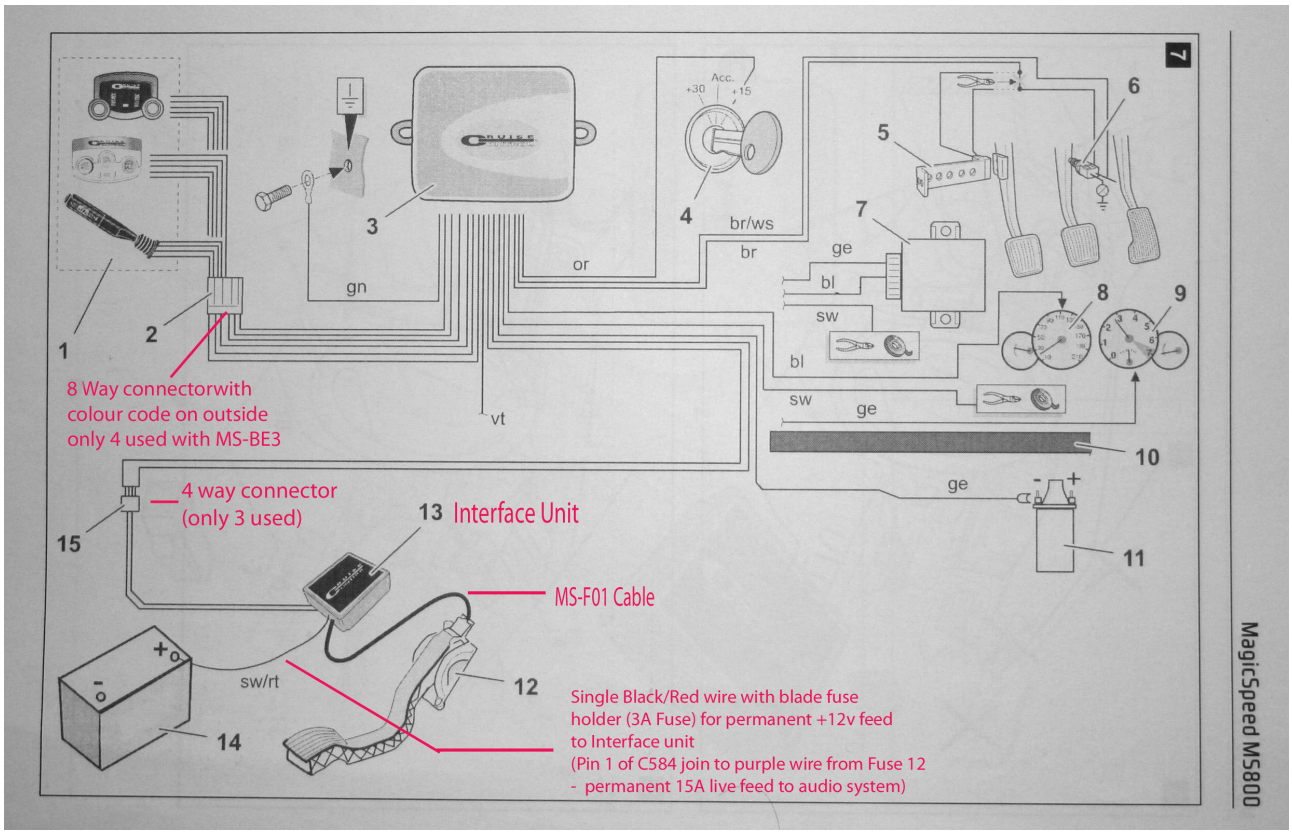
Fitting Aftermarket Cruise Control to an ’06 Manual TD4 Freelander

Aftermarket options considered - WAECO MS800 or Bearmach (SPAL) unit - both about the same price, check them both out yourself.

The WACO unit is available on Ebay from whr-online (Germany) they responded via email to queries and they post the installation instructions on-line in pdf so you can see what you are getting before you buy. Their dispatch was ok – less than 2 weeks from order.

As I want to eventually use the original switches I went for the cheap stick-on MS-BE3 unit, after mailing them for more details I confirmed that the MS-F01 cable would plug and play on the Freelander so I went that way rather than cut and join the throttle wiring (no-brainer that one).
After searching the Rave for CC switch/sensor/ECU functions and wiring details, I had a good look around the connectors at the fuse box and under the centre console – a few line up with the Rave diagrams but some have wrong colour wires (according to the Rave) so I eventually ignored what I found of what could have been cruise control wiring (some of it was just not there at the connectors even allowing for the different engine and market options?).

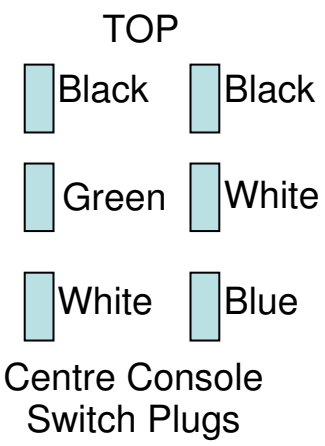
By this stage I had found that by far the easiest way to work around this area of the electrics was to remove the driver’s seat (less than half hour). Battery off (SRS safety 15min wait) unplug CD changer, heated seats, restraint system and whatever else under seat, remove plastic rail covers, remove four torx bolts holding seat and remove whole unit from car. You can then sit inside out of the rain and get up under the dash.



I checked out the various ways that the WACO unit can be connected up and decided that the simplest if not most elegant was the magnetic clutch switch and road speed input combination. The installation manual does cover all of the options available in several languages.
The control unit (3 in the diagram) comes with some ready wired connectors for the interconnection of the supplied part and 8 long wires for you to connect up to the various inputs options and power etc.
The Orange wire is the Control Unit +12v power feed and has an in line fuse holder for a 3A fuse.
The Interface Unit has plug and play connectors except for the +12v feed via the Black/red wire which also has an in-line fuse holder for a 3A fuse.

I cut all of the long wires from the control unit short (around 150mm) leaving the fuse holder attached to the control unit and fitted an 8-way male multi-way connector. (1/4" spade type - ebay again)

Remove the centre arm rest, gear knob and gaiter (with HDC switch) then the centre console as a complete unit (may take some juggling of gear stick and plastic parts to disconnect all of the switches, especially the cigarette lighter. All this stuff is covered in the Rave except the awkward bits! The diagram right helps get the connectors back on the right switches afterwards.



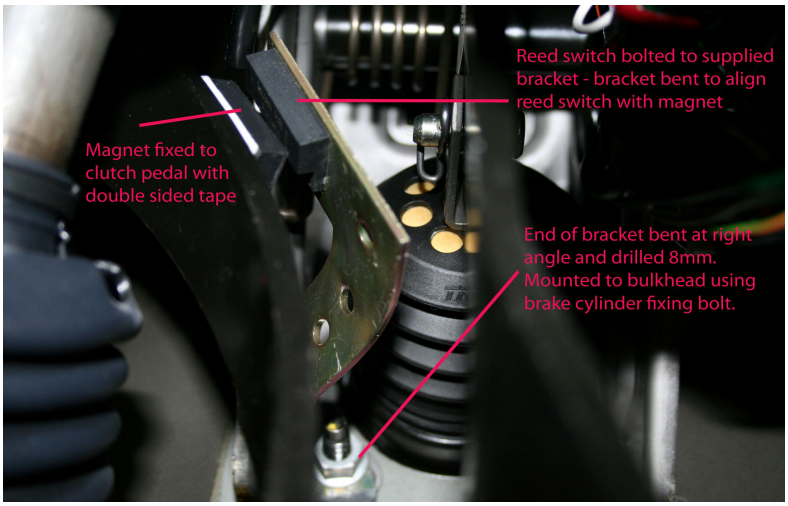
Centre Console Switch Plugs

When the console of off you can remove the radio unit and lay it towards the passenger side. The road speed signal is the red/white wire in the grey multi-plug (pin 1) on the radio (it's used to make the radio louder as you go faster but it is a feed from the ABS unit giving a wheel-speed signal). Using a jeweller's screwdriver I extracted the contact from the multi-plug and carefully joined a new wire (about 300mm long) onto this connector (P1). I soldered and sleeved the joint then reinserted the contact into the multi-plug.

Getting the drop down fuse panel cover off was a bind. There are two plastic hinge pins with flat levers on one end under the facia, (you can only feel for these up behind the facia) the other end is split and has snap in tabs to hold it in place. You need to squeeze the pin so that the slot closes and use the levers to wiggle the pin out. Takes time but they will come out - putting them back is a lot easier!!
I then removed all of the multi-plugs and fixing screws from the front of the fuse panel. I removed the three bolts holding the metal frame supporting the fuse panel and with some juggling slid it over the fuse panel to remove it. This allows the fuse panel (including immobiliser ECU) to be moved away for better access to the pedal area.

I found that by starting at the throttle control and laying in the MS-F01 cable allowed the Interface unit to be located against the side of the cubby box in the drivers side fuse panel (vertical plastic area LHS of fuse panel behind fuse panel facia). Drilling a hole into the cubby box allowed the in-line 3A fuse holder from the Interface unit (black/red wire) to be mounted so that the fuse is accessible from under the fuse panel with the cover down.

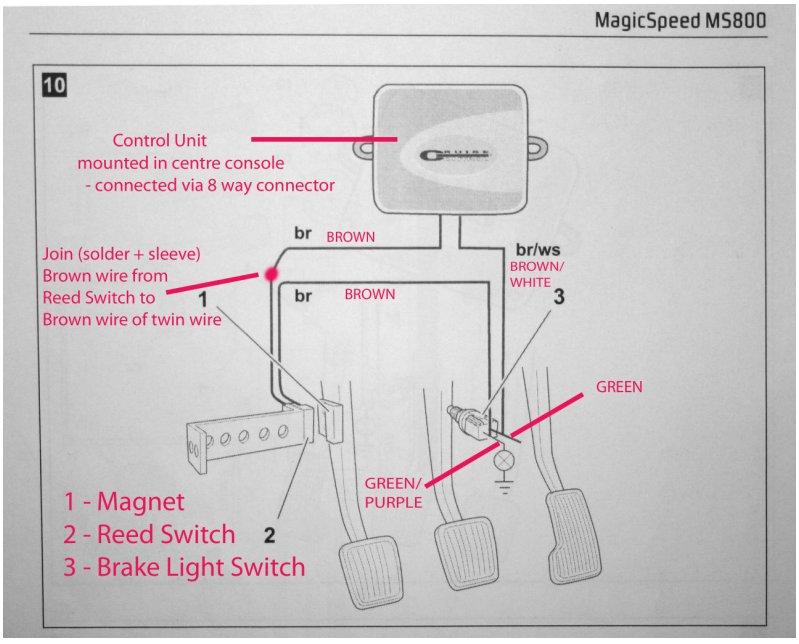
Fitting the brake/clutch switch set-up is fairly simple using the supplied parts. I have included pictures of how I mounted the switch using the bracket supplied and a diagram of how the wiring goes together.
There are two switches on the brake pedal, one is a mechanical switch (used for the lights) and the other is an electronic one for the ECU (don't mess with that one). I removed the plug from the brake light switch (there are three wires into the plug) and cut, joined, soldered and sleeved the two new wires into the existing loom next to the plug.



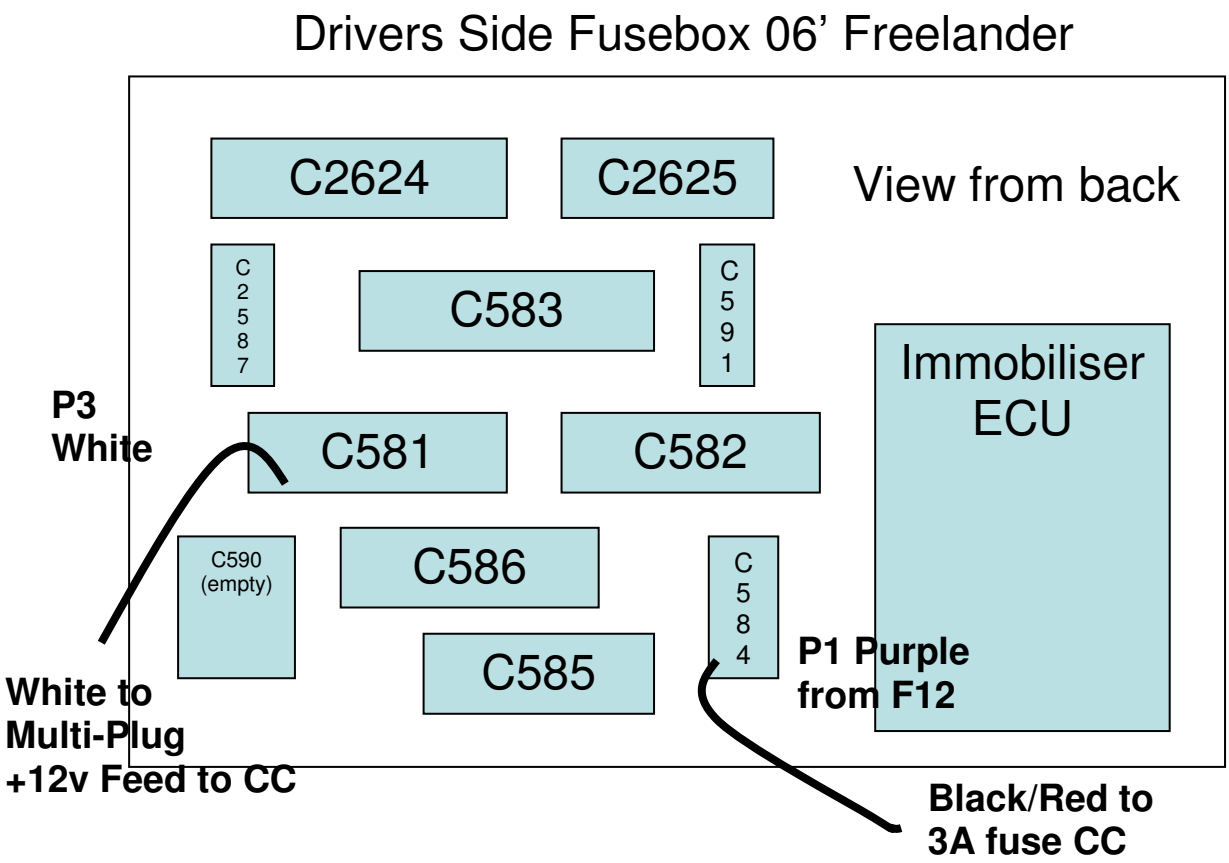
Above shows the reed switch and magnet positioning, this has the reed closed when the clutch is released (at rest) and the switch opens as soon as the pedal moves from rest (before the clutch bites). Check this with a meter or lamp and bend the bracket to adjust the switching point. This is to stop the engine over-revving when the clutch is used while CC is on – important safety over-ride for CC. Picture on the left is a clearer view of the bracket mounting.

I fed the two brown wires from the reed switch through a plastic sleeve and tied them to a convenient metal bracket just above the pedals and then across to the brake switch where the joining was done.
One of the thin brown wires from the reed switch is connected to the green/purple at the brake light switch.
The other brown wire from the reed switch is joined to the brown wire (from the twin wire) that I cut off from the Control Unit.
The brown/white wire is joined to the green wire at the brake light switch.

The brown & brown/white (the twin wire) is then fed along the loom back to the centre console area. Plenty of cable ties to avoid any chaffing or fouling on any moving parts.



The only other feed needed was the switched +12v feed for the Control unit – should be from F35 via C0580 P3 white wire to header C0292 according to Rave – not on my one it ain't. Haynes says F6 feeds Cruise Control and Auto box start inhibit – matches the pictogram shown on the fuse box cover but where? I did some tracing out and located two feeds that will meet the requirements for CC. The diagram below shows the layout of the rear of the fuse panel and the points to where I picked up the new feeds from.



I removed the spade connectors from the blocks in the back of the fuse panel, soldered and sleeved the new wires onto the connectors and re-inserted them into the connector blocks. These feeds are from the fuse protected sides of the two feeds. The new white wire is fed along the wiring loom to the centre console area using plenty of cable ties to avoid any chaffing or fouling on any moving parts. The Black/Red runs across the wiring bundle to the Interface Unit via the fuse holder mounted onto the cubby box.

The length of green wire (chassis ground) cut from the Control Unit was connected under one of the facia mounting bolts (6mm) below the radio in the centre console. The chassis ground connection was checked with a meter to the pedal mounts and proved good.
The blue wire cut from the Control Unit is a screened wire and has a centre wire and a screen braid these were separated and treated as two wires into the new 8 way connector. The braid was sleeved separately and taken to its own connector.

Wires from Control Unit (new 8 way plug)		Wires installed for CC (new 8 way socket)	
Orange	+12v Supply	Pin 1	White wire from C581 P3 via Fuse 6
Green	Ground (0v return)	Pin 2	Green wire to facia bolt to chassis
Brown	Brake light sense	Pin 3	Brown to brake light switch sense wire
Brown/White	Brake light reference	Pin 4	Brown/White brake light switch +12v feed
Purple	Speed regulator i/p	Pin 5	Not Connected
Yellow	Engine speed i/p	Pin 6	Not Connected
Blue	Road (travel) speed i/p	Pin 7	Red/White wire from P1 of Grey Radio connector
Blue/braid	Braid (screen)	Pin 8	Not Connected

The pre-wired connectors from the Control Unit were fed along the loom route to the fuse panel area and connected to the Interface Unit and switch unit (MS-BE3). I routed the flat wire from the switch unit under the edge of the facia and into the instrument cowl without any holes – it's coming out again later.
The Control Unit is stuck inside the centre console below the radio and the Interface unit is stuck to the side of the cubby box inside the fuse panel both using the double sided tape supplied in the kit (cleaned both areas with alcohol first).

At this point all the wiring is completed for installing the MS800 and getting it working.

While it was all in bits I also removed the instrument cowl and steering cowls to find/install any wiring needed ready for the eventual conversion to standard LR switching.

The wiring for the CC switch (YUH 500080PUY) is in place behind the dash (C0749) but P1 white/pink should have +12v from F6 (Rave - F35 is wrong - pre-facelift layout?) and P4 white/yellow should go to the non-existent CC interface via C0229 P20 – not on my one it don't. The other two wires P2 & P5 are working ok as instrument light feed and ground return for both leds in the switch. I have opened the switch and removed the small locking pin under the copper spring clip to make the switch non-locking. I have removed and sleeved the original wires and run two new wires in for pins P1 & P4; P1 picks up a +12v feed from the new multi-way plug (P1) in the centre console from F6, P4 will go to the new interface box when I replace the MS-BE3 later. When you push the switch the green led lights to confirm switching (power via F6 is ok) and goes out when you let go.

The wiring for the steering wheel switches under the air bag – the connector (C1254) is there on the rotary coupler; P1 – SET switch, P2 – RES switch, P3 - +12v feed from horn relay coil. P3 also goes to the horn press switches to operate the horn. Under the coupler is connector C0082 – P1 & P2 were empty. I have inserted the connectors and run two new wires along the loom to the centre console ready to replace the MS-BE3 later.

The Rave shows a connection into the instrument cluster for a +12v feed on C0230 P5 (it was spare on mine) tho' it is used on the V6 manual and is fed from the same feed as is used to run the vacuum pump for the manual CC system when active. If the cluster is the same then perhaps this pin will bring the CC light in the instruments on?
I have put a contact in the connector and run a wire back to the centre console anyway – remains still to be tested tho'.

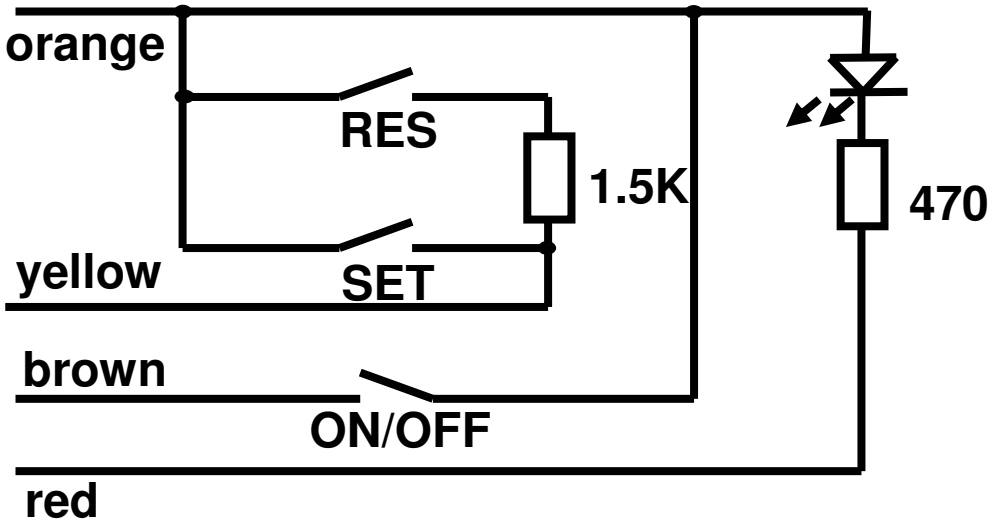
At that point I put it all back together and put the seat back. Re-connected the battery and started it up.
It all still works – double checking pays off after all.

Checked that all seems to be as it should be then started testing the CC. Static tests all ok, followed the standard diagnostics – all ok. Read, reread and reread again the teaching mode instructions – went out to try it and it all worked 1st time. Smooth take up when engaging, smooth deceleration on over-run, smooth take up on hills.

Seems to increase and decrease speed using switches as described – I will just use it as-is until weather warms up enough to sort out an interface and install paddle switches.

The last bit of useful info.

I traced out the internals of the MS-BE3 unit before I installed it – it is shown below;



Note - LED is possibly the wrong way around?

Hope this is of use – I will keep it as notes for what I did anyway.