Twin Cruiser - Retro-fitting Hella Cruise Control to a Rover SD1 Twin Plenum Vitesse

Having driven and thoroughly enjoyed three VDP Efi's with cruise control I decided to try and retrofit a standard Hella System to my Twin Plenum Vitesse. Initially I sent out an appeal for any help/information via the Rover SD1 Club Magazine and received some useful replies. I then successfully performed the transplant in 1996 and this is my account of how D330 ENH became the first ever "Twin Cruiser", and has worked faultlessly ever since.

Thanks were due to Jim Robinson (N.I.) who traded a spare vacuum dump switch complete with pipes. Also, Roger Popp for explaining a static test for the vacuum pump and actuator (though he falsely concluded the energy was inadequate for a Twin Plenum throttle and put his own project on hold as a result). Finally, to Craig Williams who sent me a copy of a Hella Cruise training manual which threw light on why Roger's vacuum experiments had stalled. The guide book is a bible for trouble shooting too!

Anyway! If you want to retro-fit Hella Cruise to your Twin Plenum Manual Vitesse and assuming that the transplant originates from a VDP Auto, then the following details give the full account including modifications. Retro-fiting a system to a standard Single Plenum is pretty much a straight transplant without the modifications needed for the Twin Plenum.

It will be a good idea to familiarise yourself with all the parts and their proper location on the engine/bay or in the drivers footwell using the drawing at the end of this article.

Actuator Mounting (involving a bit of trial and error)

1, Drill a new spigot hole in the actuator mounting bracket immediately adjacent to the existing hole enabling it to rotate approx 5 degrees clockwise to allow the actuator lateral axis to align with the shaft of the throttle quadrant.

2, Using a vice, bend the bracket outwards allowing the actuator horizontal axis to incline about 10 degrees and point directly at the "at rest" position of the throttle cable nipple.

3, When fitting the bracket, ease the heater water pipe behind and around the bracket/actuator and ensure it doesn't pull or chafe.

Quadrant Modification

1, Drill out the small hole nearest to the cable nipple in the 'quadrant' to take the 5mm mounting bolt for the 'lever' removed from the Vdp system.

2, Drill a new spigot hole exactly on the centre line of the quadrant to accept the lever spigot.

3, Bolt the lever to the quadrant and check that the grooved boss aligns exactly with both axis' of the actuator on it's modified bracket. Minor adjustments may be needed.

4, Good alignment is important so bend the boss away from the quadrant marginally, to assist.

5, Check and relieve the quadrant clamp when re- assembling as it is a crude design and will distort or not tighten properly.

Actuator Pull Rod and Loop

1, With existing 'pull rod' as a pattern either make a new item or modify the original to an overall length of 9" including a new loop of 3".

2, For a new 'loop' use 16 swg piano wire (generally available from model airplane shops) and a standard 5mm plated screw with a 1/16" hole drilled right through. Solder/braise the wire into the screw after checking for length and adjustment.

3, Curve the loop end of the rod to aid alignment.

Assembly

1, With the actuator mounted on it's modified bracket, the lever/quadrant assembled to it's shaft and the new pull rod connected to both; carefully compress the actuator and see the throttle rotate through it's arc.

2, You won't quite get full rotation but as it's a cruise, not a turbo, you'll hardly need it!

3, Check for obvious foul-ups, mechanical resistance and mis-alignment, adjusting as required, to get a smooth pull directly along the actuator's axis.

nb:- From here on the jobs are much easier with glove box and fittings, steering wheel and driver's seat all removed from the car, laying face-up on the floor with feet on rear seat! Also the large ventilation system hose below the dash needs to be squeezed rearwards to make some space!

SAFETY NOTE: To prevent facial injury when removing steering wheel, loosen but don't remove the fixing nut before freeing the wheel!!

Vacuum Dump Switch(s) Bracket and Vacuum Line

1, Remove the existing stop light switch 'bracket' from the pedal box and replace it with the '3 switch' bracket removed from the Donor car (or make a new one!).

2, Fit the stop light switch, and brake and clutch 'vacuum dump switches' into their mounting holes.

3, Using the Donor car brake pedal as a pattern mark the positions for a pair of dump switch strikers on brake and the clutch pedals and fabricate 2 right angle bend strikers from 16 swg steel sheet.

4, With pedals removed, fix the strikers with nuts/bolts, rivets or weld and fettle them to operate the dump switches pretty much in the centre of their adjustment range.

5, Use 'elbows' and 'T' piece (from say Halfords ?) to route the (quite stiff) vacuum pipe from both dump switches to the engine bay via the exit hole behind the R/H Rocker cover.

6, Ensure closed glove box won't foul pipes/brackets.

Cruise ECU, Control Switch and Wiring Loom

1, The 'Cruise ECU' mounting plate is fixed to the two lower bolts of the brake servo behind the pedals.
2, The cruise 'loom' is routed from the ECU and over-speed relay and connected under the dash into main loom via the spare red connector (which is there hanging around - waiting for you). The 3 way

pneumatic control unit connector is routed into the engine bay along with the vacuum line. Use a skirted grommet to seal the hole and prevent chafing.

3, The 'fuse holder' is routed upwards through a hole in the base of the instrument binnacle and clipped to a metal bracket.

4, The 'control switch' bracket is fastened to forward facing holes at the back of the steering column stalk switch module with 2 machine screws. The switch is slotted on the bracket and secured with a self tapper.

5, Route the wires down the column, inside the guard, and into main loom via the spare blue connector. Use tie wraps as appropriate and check the cables are not trapped when adjusting the steering culumn.

6, Replace the steering column upper cowl with the slotted "cruise" version or carefully cut a new slot in the old one to clear the control switch.

7, Connect the two dump switches by breaking into the blue wire and use a couple of small female spades (loudspeaker size) and an extra piece of (light green) wire to complete the connections to the second (clutch) dump switch as per the circuit diagram found in the workshop manual.

Pneumatic Control Unit

1, Fix bracket and unit to offside suspension turret.

2, The hard black vacuum pipe is joined to a rubber elbow on the black output pipe of the unit to the actuator with a short braided rubber hose and directly into the pipe routed from the dump switches.

Set-up and Testing

1, Adjust the stop light and dump switches on brake and clutch as per the workshop manual.

2, To test the pneumatics, remove 3 way connector to vacuum unit. Carefully connect 12V supply to pump terminals. ie:- +ve to 15A, -ve to P on schematic!!

(**DON'T CONNECT 12V TO WIRING LOOM OR YOU WILL DAMAGE THE CRUISE ECU**)

3, Prise off the oval lid (it's sealed with thin "O" ring). Press the solenoid valve within the housing and the actuator opens the throttle. Release the solenoid and the throttle _slowly_ closes!

4, Test for stiffness in the mechanicals and any hang- up of the throttle assembly when vacuum is released. Lubricate with (graphite) grease to retain smooth operation.

5, Some Twins have an ugly retro fitted 'centre pull' spring from mid throttle to the top of plenum chamber. These mods are various and were added because the system was prone to hang-up. The extra tension may overload the actuator making it unsuitable for cruise modification. If so a careful and specific throttle assembly overhaul should eliminate the need for the centre-pull option.
nb: Removing the plenum chamber for cleaning and adjustment often reveals masses of Gummy Goo and will definitely improve throttle/airway function.

6, Adjust the dump switches according to the manual instructions and check that operating either pedal dumps vacuum and the throttle <u>quickly</u> closes (Alternatively suck the vacuum line to check both valves are dumping OK!).

<u>(THE ABOVE IS A CARDINAL STEP BEFORE ROAD TESTING IN CASE THE VALVE SET-UP IS FAULTY!)</u>

7, Double check all the wiring connections. Check the fuse and that the stop light operates OK!

8, No other static tests are required so the system can be road tested according to your workshop manual.

9, As a precaution, I "road tested" my installation with the car raised on axle stands and operated all the cruise functions before entrusting them to a live road test.

With a Manual (Twin?) Cruiser you can twinkle thro' 'Clutch'/'Gear shift'/'Resume' <u>without</u> even using the accelerator and although some folks poo-poo cruise I guarantee you'll find it relaxing, easier to stay 'speed legal' and much more economical. Excellent assets for any vehicle, let alone a fast and thirsty SD1.

If anyone would like further information, please feel free to contact me.
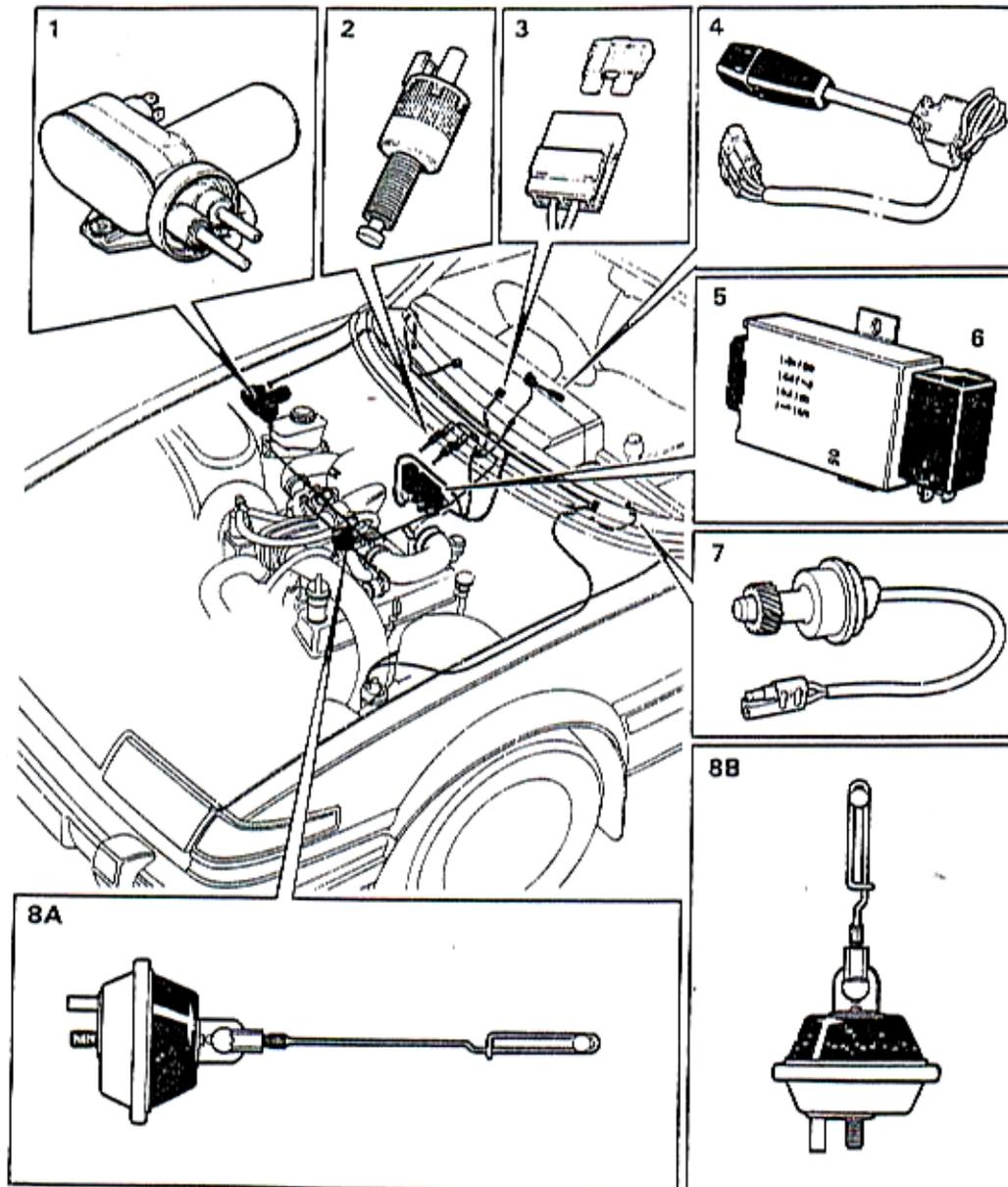
Ramon
Website: http://www.vintagemodelairplane.com
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HELLA CRUISE CONTROL TECHNICAL DESCRIPTION

An Optional Extra Fitted To Rover SD1 Vehicles
From Vehicle Identification Number 288121 Onwards

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Cruise Control Components Location - Hella type GR65 (Right hand steering shown)

1 Vacuum control unit	2 Switch and vent valve	3 Line fuse
4 Control Switch	5 Electronic control unit	6 Overspeed relay
7 Gearbox speed transducer	8 Pneumatic Actuator **A** 3500 **B** 2600	