

**** SOLUTION ****

Title Volvo Chassis - Volvo Hill Start Assist System Information

Volvo Models

Volvo Model VN

**** SOLUTION ****

Cause Limited information in Trucks Dealer Portal (TDP)

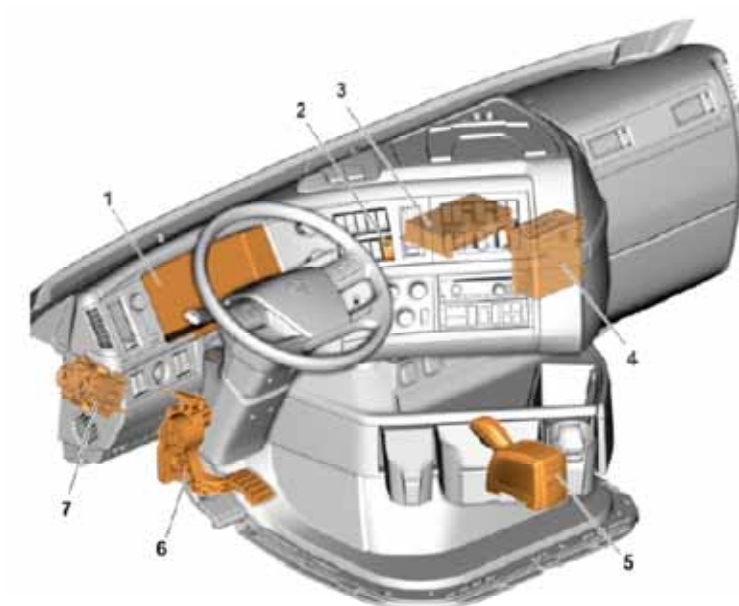
Solution **Volvo Hill Start Assist HILLSTA2**

Hill start assist, function description

Impact Meta Data	
Valid From	04.07.2019
Valid To	01.01.2099
PD string	VN, HILLSTA2

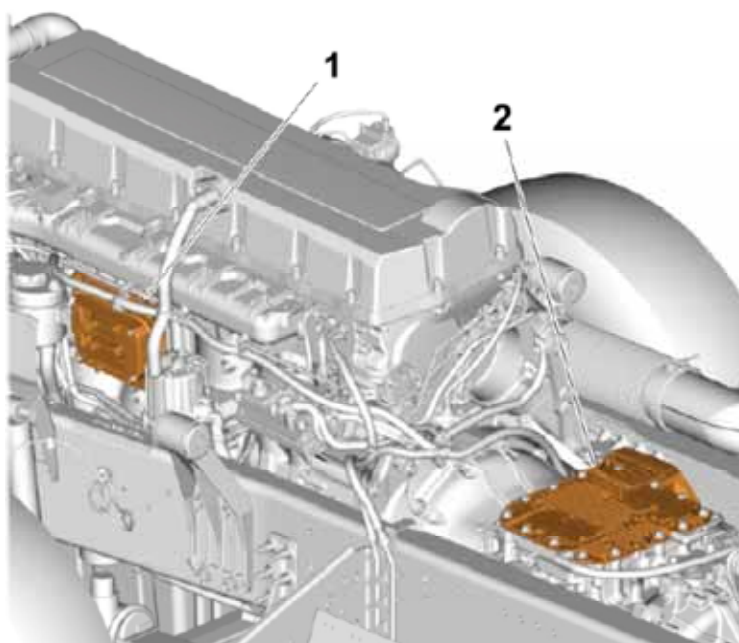
Hill start assist component location, dashboard

1	Instrument cluster (A03)
2	Hill start assist switch (S212)
3	Brake control unit (A12B)
4	VECU (Vehicle Electronic Control Unit) (A17)
5	GLU (Gear Lever Unit) switch (S171)
6	Accelerator pedal sensor (B25A)
7	Brake pedal valve switch (S59)



Control units, chassis

1	ECM (Engine Control Module) (A14)
2	TECU (Transmission Electronic Control Unit) (A13)



Function behavior

General information

Hill start assist variants

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Variant symbol	Variant description
HILLSTA2	Hill start assist, all wheels and trailer
UHILLST	Without hill start assist

Description

Hill start assist is safety feature in the truck which helps the driver to avoid rolling back while truck taking a gradient. This feature allows the truck to hold in a uphill with a forward gear or in a down hill with reverse gear when the service brake is released. The hill start assist program is activated when the driver releases the brake pedal and the brake pressure being hold for 3 seconds until the truck is sufficient to move on without roll back.

The brake pressure in the brake chambers being held by the hill start pneumatic solenoid valve via brake control unit. The TECU calculates the required engine torque with load dependency and releases the hill start assist program while truck starts move on without rolling back.

The hill start assist program activates automatically in the truck with predefined conditions. If the driver wants to deactivate the program by selecting the dashboard disable switch. The program will re-enables when the ignition key covers a cycle of OFF-ON or else the driver can chose the disable switch again to re-enable the program.

Functionality conditions

Conditions to hill start assist activation

- Key switch in the ignition position and engine rpm is present
- Vehicle speed is equal to 0 km/h
- Vehicle is in a forward gear on an incline equal to or greater than 2%
- Vehicle is in a reverse gear on an decline equal to or greater than 2%
- The brake pressure should not below at 10 psi
- Service brake is activated
- Hill start assist disable switch is not selected
- No brake failures with active J1939 communication faults
- System is not in a downgraded mode

Conditions to hill start assist deactivation

- Vehicle Speed is greater than 20 km/h (12 mph)
- Hill start assist disable switch is in ON position



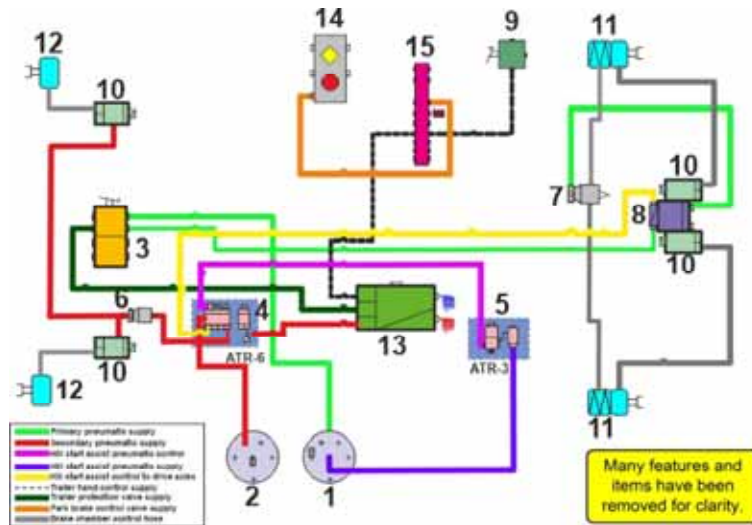
Note:

Hill start assist will not work (applies brake) when the system attains low brake pressure. It

will activate when the brake pressure is at 10 psi or greater.

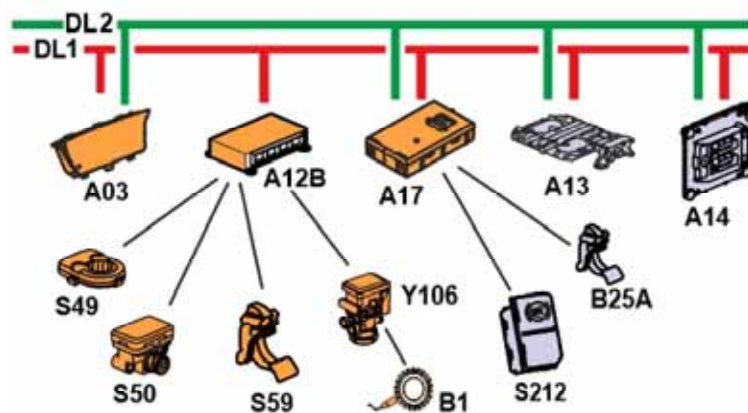
Pneumatic diagram

1	Primary tank
2	Secondary tank
3	Treadle valve (foot brake valve)
4	Central pressure control ATR-6 relay valve
5	Central pressure control ATR-3 relay valve for Hill start assist
6	Quick release valve for front brakes
7	Quick release valve for rear brakes
8	Relay valve for rear brakes
9	Trailer hand control valve
10	ABS Solenoid valves
11	Brake chamber, rear
12	Brake chamber, front
13	Trailer protection valve
14	Park control valve
15	Pedal plate bulkhead



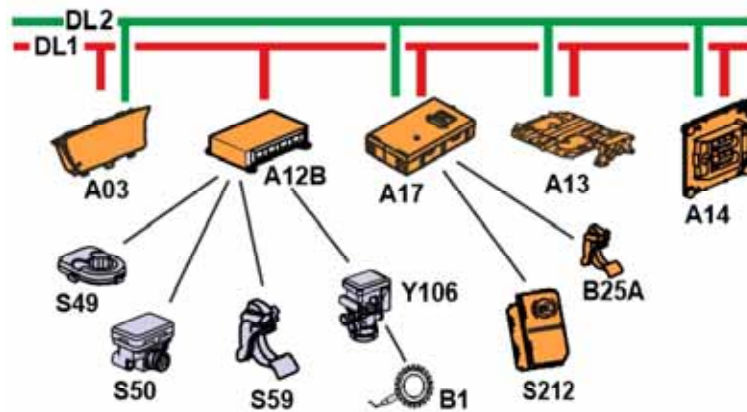
Activation scenario, truck is stopped

1. The brake pedal is released and the brake pedal response information send via foot brake valve switch (S59) and the signal received by brake control unit (A12B).
2. The brake control unit (A12B) receives wheel rotation information via speed sensor (B1).
3. The brake control unit (A12B) receives steering angle position via steering angle sensor (S49) and lateral acceleration via yaw rate sensor (S50).
4. The VECU (A17) analyses the pre conditions of the truck via brake control unit (A12B) to activate hill start assist.
5. The VECU (A17) send information to brake control unit (A12B) to activate hill start assist.
6. The brake control unit (A12B) pulses the solenoid valve (Y106) to hold the brake pressure for the set time.
7. The brake control unit (A12B) sends the status information to instrument cluster (A03) about hill start assist program activation.



Deactivation scenario, truck is driving off

1. The accelerator pedal is depressed and the information is sent via accelerator position sensor (B25A) and the signal received by VECU (A17) or when deactivation switch (S212) is in ON position.
2. The VECU (A17) calculates the available engine torque as well as the driveline torque from ECM (A14) and from TECU (A13).
3. The TECU (A13) calculates the engine torque available from ECM (A14).
4. The VECU (A17) sends the information to brake control unit (A12B) to release the brake pressure from brake chambers via solenoid valve (Y106).
5. The VECU (A17) commands the TECU (A13) to move the truck with available engine torque via ECM (A14).
6. The brake control unit (A12B) sends the status information to instrument cluster (A03) about hill start assist program deactivation.
7. If the brake pressure is below 10 psi, the brake control unit (A12B) calculates the brake pressure value and sends information to VECU (A17) and sends deactivation status to instrument cluster (A03).



Solution visibility **Dealer distribution**

Function(s)/component(s) affected

Function affected VECU , EECU , MID 128 – EMS , MID 130 – TECU , MID 144 – VECU , Braking /Auxiliary Pneumatic Circuits , Diagnostic tool

Function Group

Function Group 5 brake

Customer effect

Main customer effect efficiency/abnormal behavior , stop/start

Conditions

Vehicle operating mode on start-up , uphill

Road conditions very hilly

Administration

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