VOLVO
Construction Equipment

Service Information

Document Title: **Error codes when calibrating**	Function Group: **400**	Information Type: **Service Information**	Date: **2014/4/29**
Profile: **WLO, L110F [GB]**			

Error codes when calibrating

When calibrating the hydraulic transmission with VCADS Pro, the following error messages may be shown.

Error message	Possible cause	Check/Action
An undefined error/failure has occurred.	VCADS Pro does not recognize the value.	Restart calibration. VCADS Pro, 40901-3 Sensors, transmission, test. VCADS Pro, 40025-3 Solenoid valves, test. Checking pressure, 421 Hydraulic transmission, checking oil pressure . Check-measuring solenoids 302 PWM4213 - PWM4218, description and measuring .
The turbine rpm did not reach the lower rpm level during calibration of each clutch.	Failure turbine rpm sensor. Binding solenoid core. Binding in disc pack. Oil leakage in clutch shaft.	VCADS Pro, 40901-3 Sensors, transmission, test. VCADS Pro, 40025-3 Solenoid valves, test. Checking pressure, 421 Hydraulic transmission, checking oil pressure . Check-measuring solenoids , 302 PWM4213 - PWM4218, description and measuring .
The turbine rpm did not leave the lower rpm level during calibration of each clutch.		
The calibration values are above the upper level for each clutch.		
The calibration values are below the lower level for each clutch.		
Too big difference between values for subsequent calibrations.		

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Service Information

Document Title: **Transmission, component position**	Function Group: **421**	Information Type: **Service Information**	Date: **2014/4/29**
Profile: **WLO, L110F [GB]**			

Transmission, component position

Component position

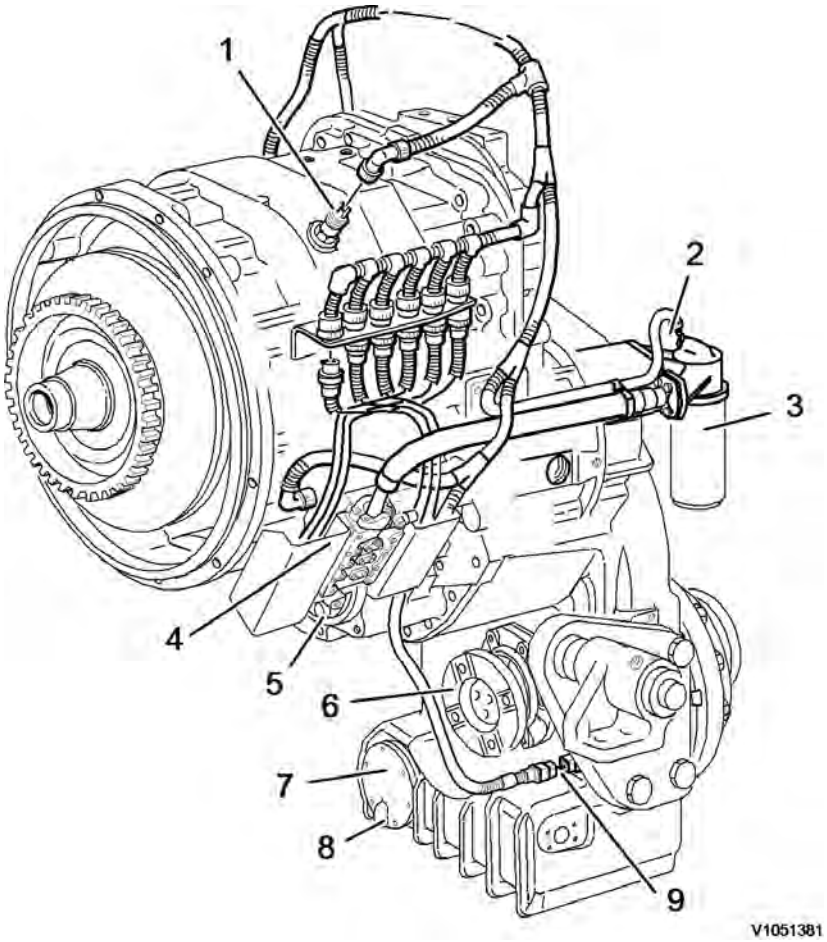


Figure 1

1. Frequency sensor, engine speed flywheel (SE2704)
2. Filter indicator / pressure sensor transmission oil filter (SE4902)
3. Transmission oil filter
4. Pressure sensor, transmission oil pressure (SE4901), positioned behind guard plate
5. Gear changing unit
6. Shaft, output power rearwards
7. Suction strainer
8. Drain plug
9. Level sensor, transmission oil level (SE4904)

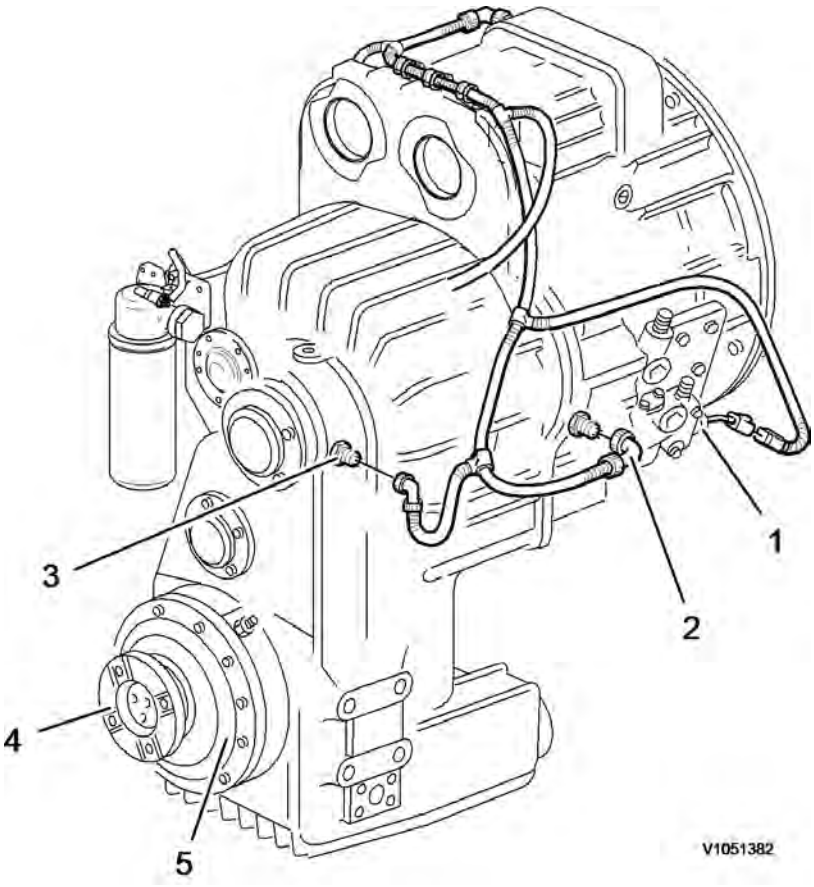


Figure 2

1. Temperature sensor, transmission oil temperature (SE4903)
2. Frequency sensor, turbine speed (SE4213)
3. Frequency sensor, output speed transmission (SE4307)
4. Shaft, output power forwards
5. Parking brake (built-in in transmission)

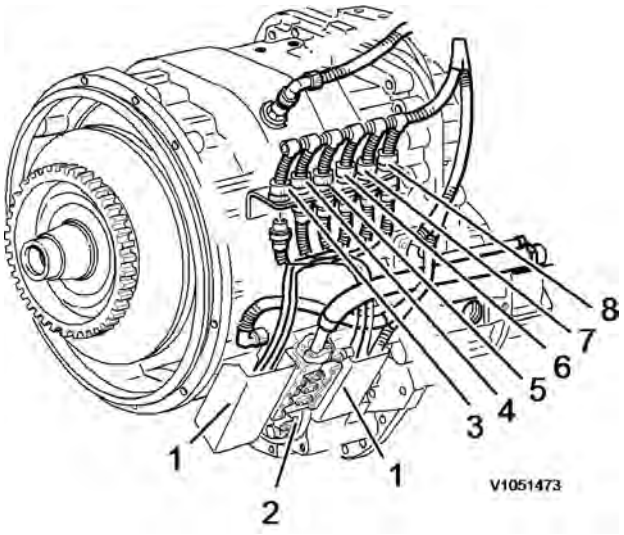


Figure 3
Connectors and gear changing unit

1. Protecting plate, 2 pcs

2. Gear changing unit
3. SB, connector for gear-shifting solenoid (1st gear, checking point B)
4. SD, connector for gear-shifting solenoid (Reverse gear, checking point D)
5. SF, connector for gear-shifting solenoid (3rd gear, checking point F)
6. SE, connector for gear-shifting solenoid (4th gear, checking point E)
7. SC, connector for gear-shifting solenoid (2nd gear, checking point C)
8. SA, connector for gear-shifting solenoid (Forward gear, checking point A)

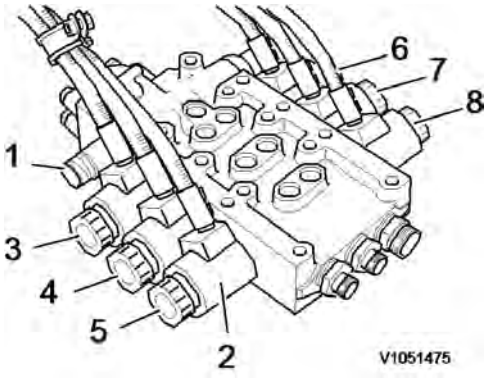


Figure 4
Gear changing unit

1. Pressure sensor, transmission oil pressure (SE4901)
2. Coil
3. Gear-shifting solenoid, forward gear (A)
4. Gear-shifting solenoid, 2nd gear (C)
5. Gear-shifting solenoid, 4th gear (E)
6. Gear-shifting solenoid, 1st gear (B)
7. Gear-shifting solenoid, reverse gear (D)
8. Gear-shifting solenoid, 3rd gear (F)

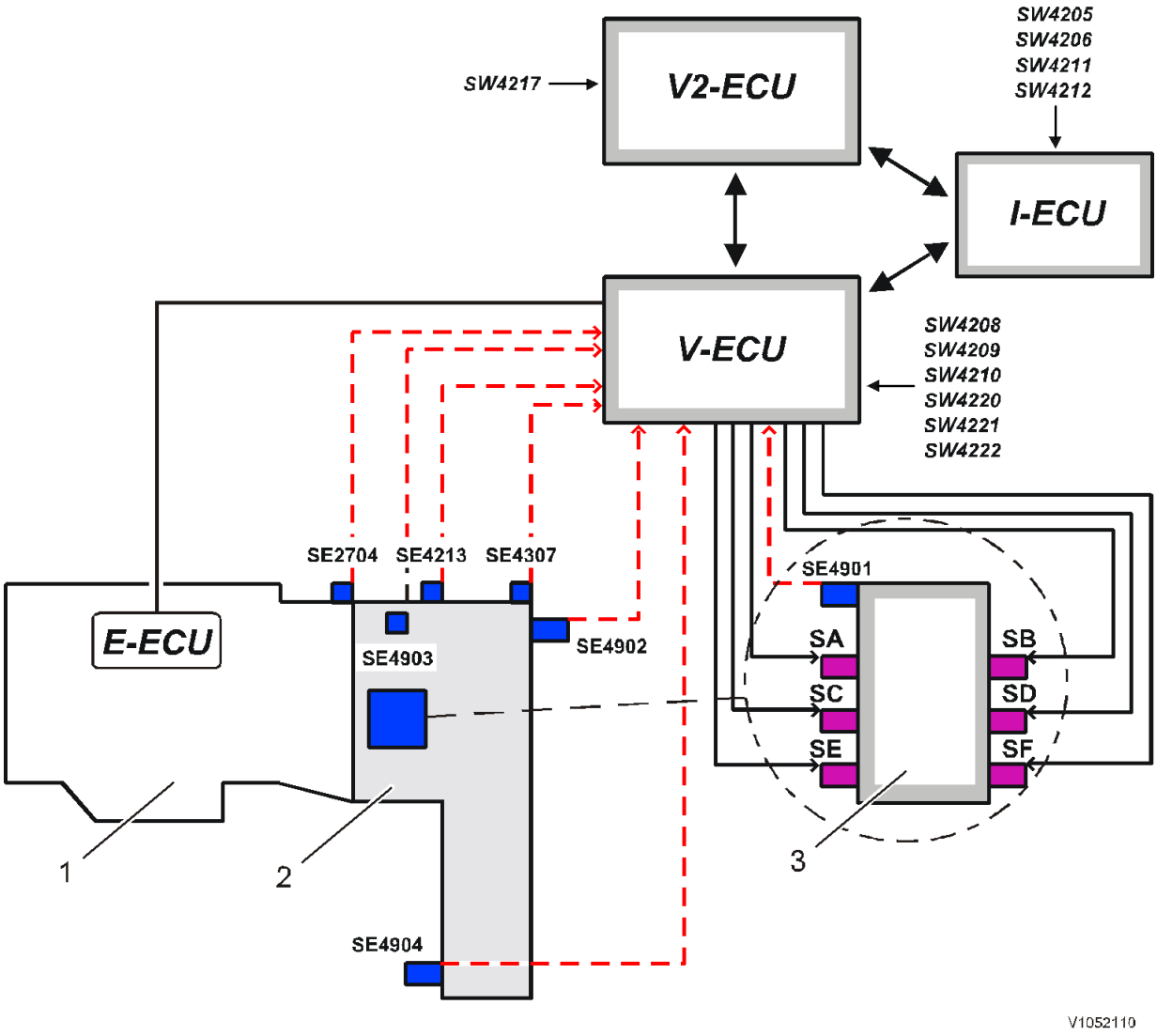


Figure 5
Overview of components in the gear-shifting system

1. Engine
2. Transmission
3. Gear changing unit

SE2704 – Frequency sensor, engine speed flywheel
SE4213 – Frequency sensor, turbine speed
SE4307 – Frequency sensor, output speed timing gears (travelling speed)
SE4901 – Pressure sensor, transmission oil pressure
SE4902 – Filter indicator (pressure sensor, transmission oil filter)
SE4903 – Temperature sensor, transmission oil temperature
SE4904 – Level sensor, transmission oil level

SW4205 – Forward/Reverse
SW4206 – Gear selector control
SW4208 – Forward/Reverse, control lever carrier
SW4209 – Kick-down, control lever carrier
SW4210 – Engine braking, control lever carrier
SW4211 – Fully automatic downshifting
SW4212 – Mode selector (APS)
SW4217 – Forward/Reverse, comfort drive control
SW4220 – Kick-down, comfort drive control
SW4221 – Forward – neutral – reverse, single lever control

SW4222 – Kick-down, single lever control

E–ECU – Engine control unit
I–ECU – Instrument control unit
V–ECU – Vehicle control unit

Checking points

The transmission checking points for clutch pressure are located on the gear changing unit.

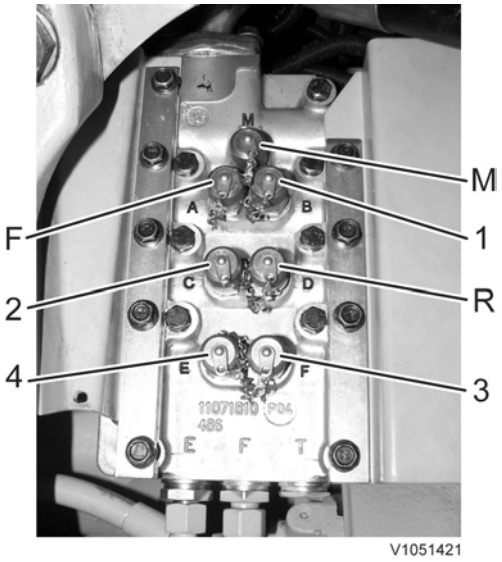


Figure 6
Checking points on gear changing unit

M – Checking point M, main pressure
F – Checking point A, forward gear
1 – Checking point B, 1st gear
2 – Checking point C, 2nd gear
R – Checking point D, reverse gear
4 – Checking point E, 4th gear
3 – Checking point F, 3rd gear

The other checking points for pressure on the transmission are positioned in a block on the left side of the machine (below the cab).

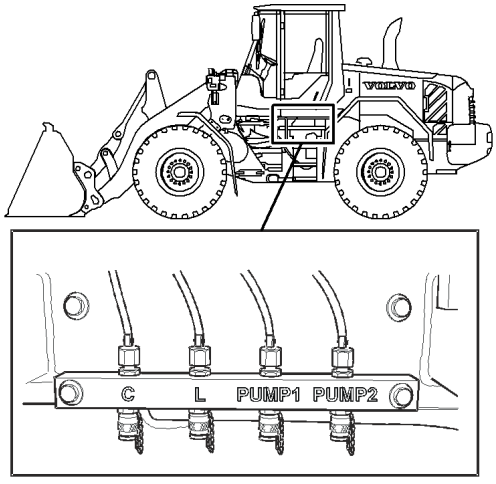


Figure 7
Other checking points on the machine

C – Checking point , torque converter pressure
L – Checking point , lubricating oil pressure
PUMP 1 – Checking point , hydraulic pump 1
PUMP 2 – Checking point , hydraulic pump 2

Oil filler point and level sight glass

Oil filler point and level sight glass are located under the steps on the left side of the machine.

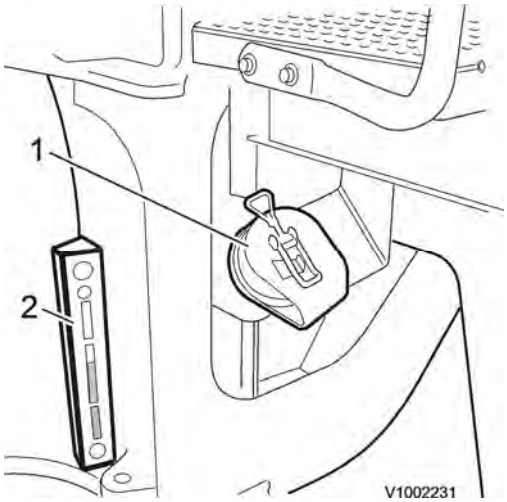


Figure 8
Oil filler point and level sight glass

1. Oil filler point
2. Level sight glass

General

HTE204 (L110F) and HTE205 (L120F) are automatically shifted transmissions with oil-filled disc clutches (gears) controlled by gear-shifting solenoids.

The transmission has four forward gears and four reverse gears.

The clutch hubs for the different gears rotate freely on the clutch shafts. When a gear is engaged, the clutch hub, which is transferring the power, is mechanically connected to the respective clutch shaft by the disc clutches hydraulically actuated at the time.

All pistons on the clutch shafts are of the single stage type.

The application sequence, which is controlled by the V-ECU, controls the oil flow and the filling times for the disc clutches.

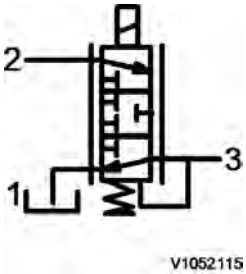


Figure 9
Solenoid valve function

1. Tank connection
2. Pressure connection
3. Outlet to clutch

Gear changing unit

The transmission has a gear changing unit with Pulse Width Modulation controlled (PWM-controlled) solenoid valves. The gear-shifting solenoids are controlled by the V-ECU and provide possibility of better control and comfort at the application of the respective disc clutch because of the variable PWM control. The application time is controlled electronically through a variable signal from the V-ECU.

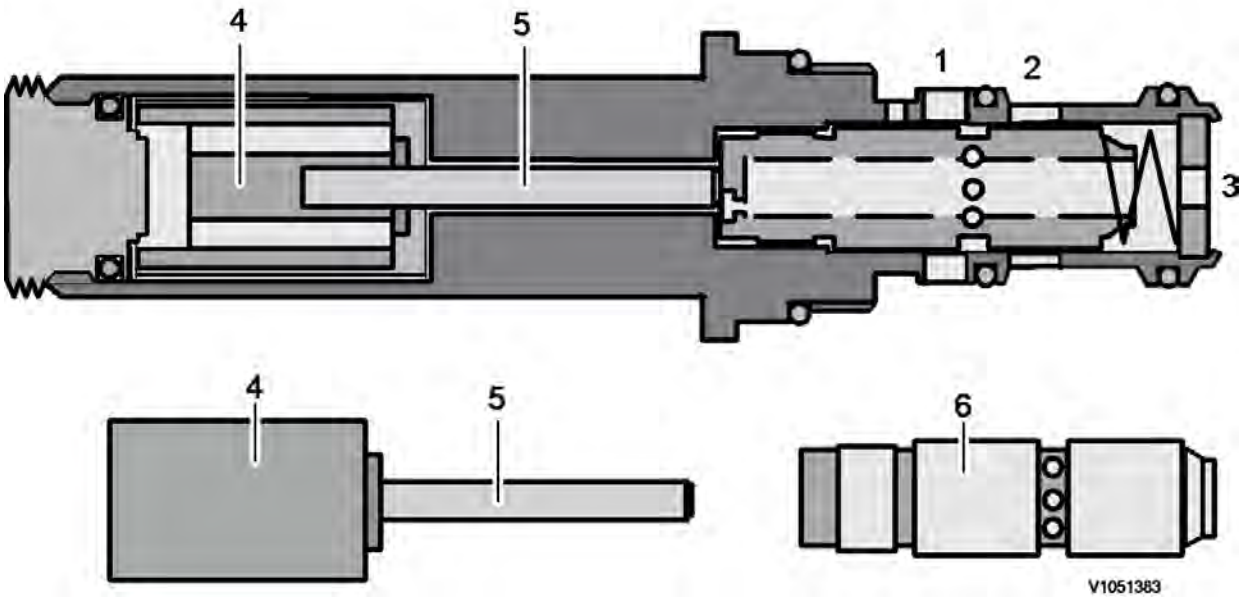


Figure 10
PWM-controlled solenoid valve

1. Tank connection
2. Pressure connection
3. Outlet to clutch
4. Magnet iron core
5. Push rod
6. Valve spool

Document Title: **Transmission, removing**	Function Group: **421**	Information Type: **Service Information**	Date: **2014/4/29**
Profile: **WLO, L110F [GB]**			

Transmission, removing

Op nbr 421-070

9993741 Socket

Ratchet block 1500 kg (3300 lb)

Sling, 1 m (3.3 ft)

Sling, 3 m (10 ft)

Sling 4 m (13 ft), 2 pcs

Lifting eye M20, 2 pcs

Lifting eye M16, 4 pcs

Shackle, 4 pcs

Hose pliers, 4 pcs

1. Place the machine in service position 1, see 191 Service position.
2. Drain the hydraulic oil.
   Amount of hydraulic oil, see 030 Hydraulic system, volume.
3. Drain the transmission oil.
   Capacity: see 030 Hydraulic transmission, capacity.
4. Remove the cab according to 810 Cab, removing.
5. Remove the cover plate from the left side of the hydraulic oil tank.
6. Remove the cover plate on the right side of the machine behind the steps.
7. Disconnect the front propeller shaft flange joint from the transmission.

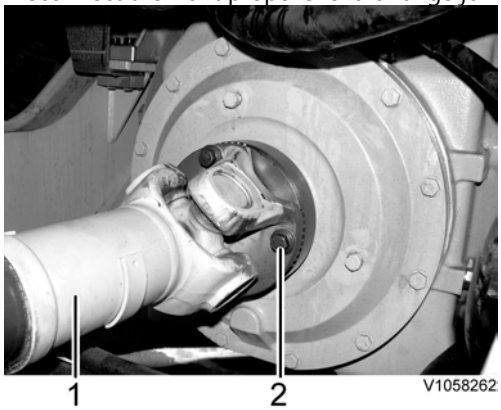


Figure 1
Front propeller shaft

1. Propeller shaft
2. Bolted joint

Use 9993741 Socket.

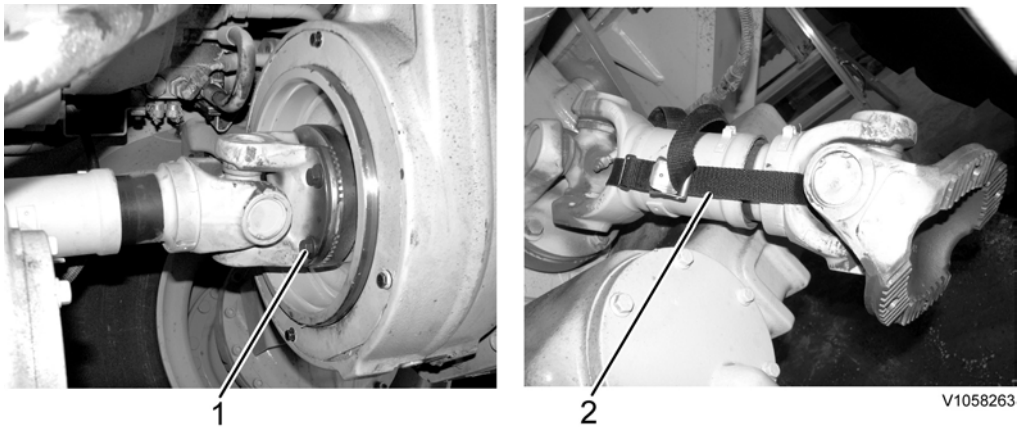
8. 

Figure 2
Rear propeller shaft

1. Bolted joint
2. Tensioning strap

Detach the rear propeller shaft bolted joint from the rear axle. Use 9993741 Socket.
Pull the propeller shaft together and secure it with a tensioning strap.

9. Disconnect the breather hose from the front rear axle bridge.
Transmission, left side

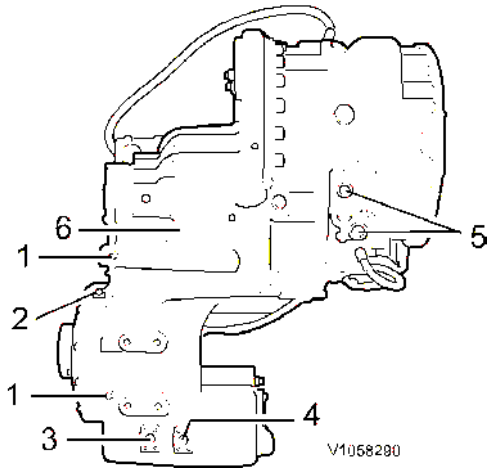


Figure 3

1. Connection for level sight glass
2. Connection for parking brake
3. Connection for filler pipe
4. Connection for return oil pipe
5. Connection for transmission oil cooler
6. Connector for SE4307

10. Remove the bracket by the flywheel housing for the oil pipe that runs between the torque converter and the

transmission.

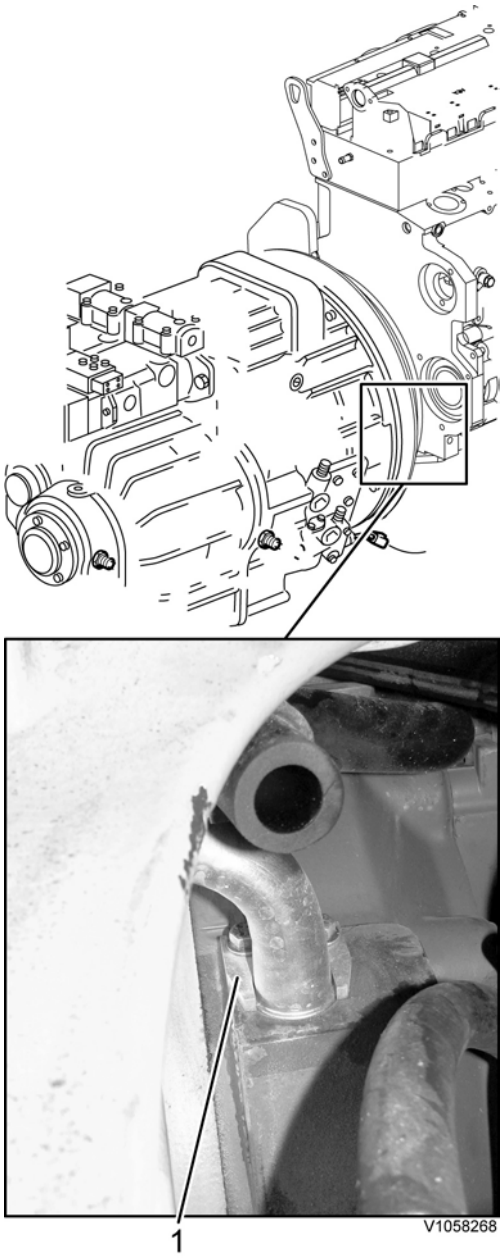


Figure 4

1. Bracket for oil pipe

11. Disconnect the hoses for the transmission oil cooling from the transmission.
Disconnect the test hoses from the transmission.

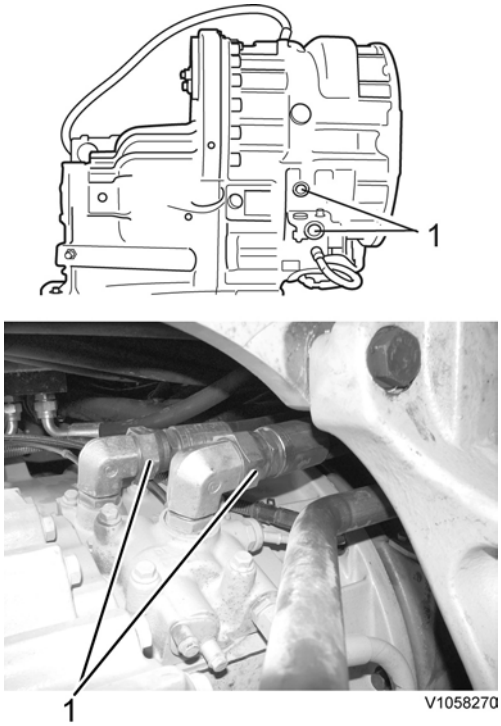


Figure 5

1. Hoses for transmission oil cooling

Collect the waste oil in a suitable vessel.

12. Remove the oil pipe that runs between the torque converter and the transmission.
Disconnect filler hose.

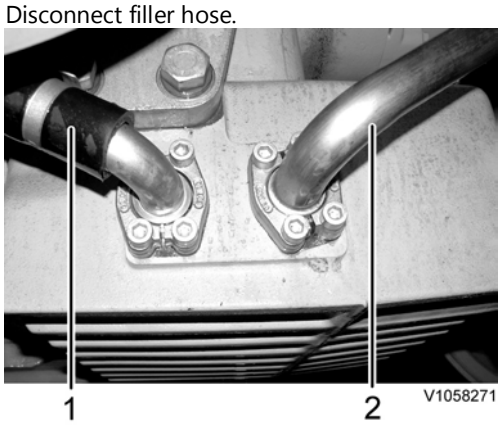


Figure 6

1. Filler hose
2. Oil pipe between transmission and torque converter

13. Disconnect the parking brake hose from the transmission.

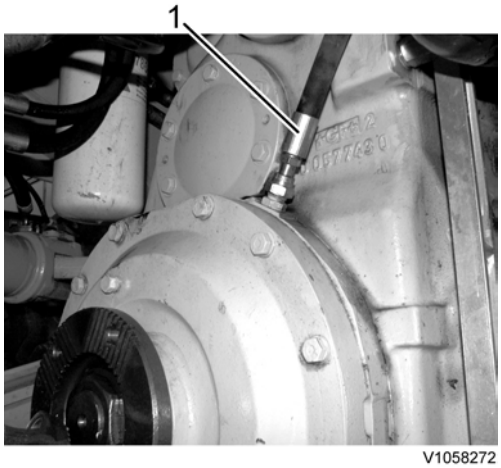


Figure 7

1. Parking brake hose

14. Disconnect hose connections for the level sight glass from the transmission. Leave the level sight glass on the machine.

15. Part the connector at the level sensor for the hydraulic oil tank, SE9101.
Disconnect the transmission breather hose.
Detach the breather filter together with the hose.
Remove the cover together with its mounting above the hydraulic oil tank.

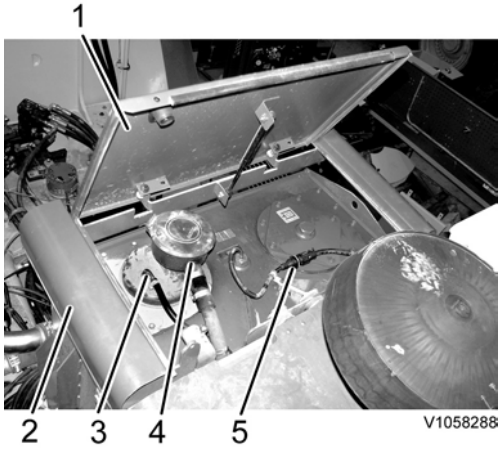


Figure 8

1. Cover
2. Mounting for cover
3. Transmission breather hose
4. Breather filter
5. Connector SE9101

16. Detach the cable clamps from the front of the hydraulic oil tank.
Detach the cable clamp for the AC hoses. [1] ⓘ
Part the connector RM.

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