

Document Title: Power transmission, description	Function Group: 400	Information Type: Service Information	Date: 2014/3/19
Profile: BHL, BL61 PLUS [GB]			

Power transmission, description

Gearbox

The gearbox is a four forward, four reverse power shuttle gearbox with torque converter, hydraulic shuttle control and column mounted electro-hydraulic direction control. The transmission has switchable four wheel drive. The torque converter is a fluid clutch.

Front axle

Drive is provided to the front axle by a propeller shaft direct from the transmission.

The front axle consists of a beam casing, housing the differential in the middle and a wheel hub unit at each end. The differential, of "open" type, is supported by two bearings.

The wheel hubs containing the epicyclic reduction gears are supported by two tapered roller bearings and are powered by a hydraulically-operated steering valve.

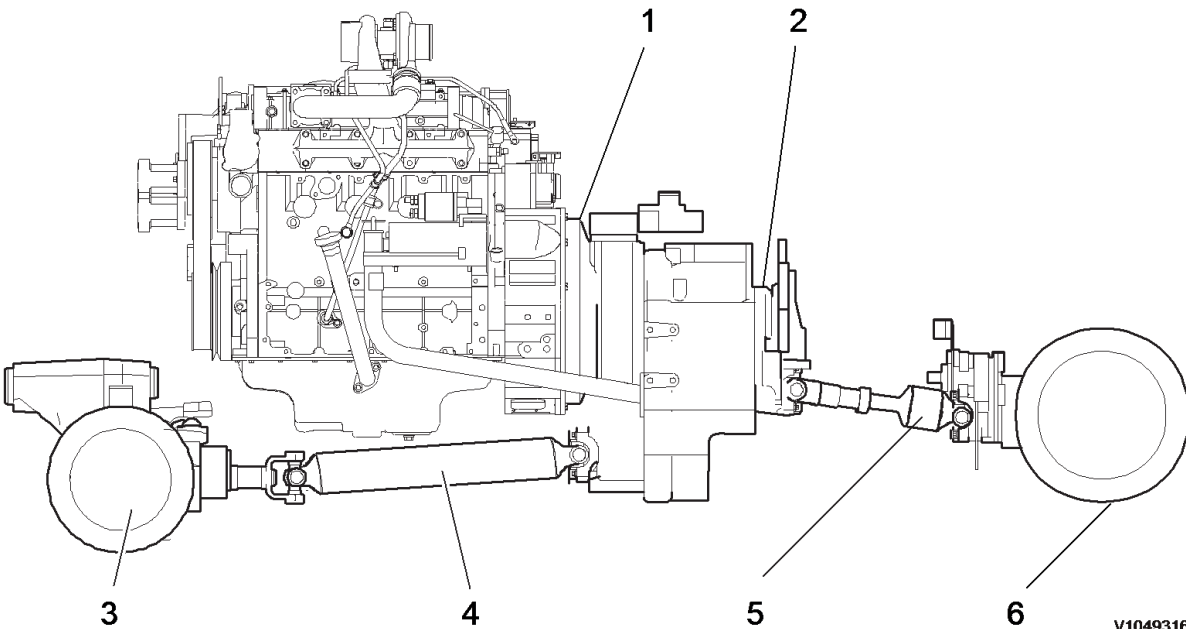
Rear axle

The rear axle features permanent drive, via a propeller shaft direct from the transmission. The axle features spiral crown and pinion driving through epicyclic hubs, differential lock and inboard oil-immersed brakes.

The rear axle consists of a beam casing, housing the differential in the middle and a wheel hub unit at each end. The differential, type "mechanical lock", is supported by two bearings.

The wheel hubs containing the epicyclic reduction gears are supported by two tapered roller bearings.

Furthermore, the rear axle has a braking system, that provides braking force to both the service brake and the parking brake.



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Figure 1
Power transmission

1. Torque converter
2. Gearbox
3. Front axle
4. Propeller shaft, front
5. Propeller shaft, rear
6. Rear axle

Document Title: Powershift transmission, description	Function Group: 400	Information Type: Service Information	Date: 2014/3/19
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Powershift transmission, description

The Power Shift transmission is a fully automatic transmission with torque converter. The transmission has four forward gears and four reverse gears and operator controlled 4WD/2WD. Gear shifting is controlled by the position of the gear selector, SW4, and an electronic control unit, T-ECU. Engagement of gears is controlled by the electro-hydraulic control system. The engine output torque is transmitted and reinforced by the torque converter to the transmission. The transmission is supplied with hydraulic pressure from a pump driven by the input shaft from the engine. Gears are selected by using the gear selector, SW4, placed on the steering column. Engagement of gears is controlled by the transmission control unit after impulses from the speed sensor, SE5. Clutches in the transmission are activated by solenoid valves on the transmission control system. The four wheel drive, is operated by a spring applied clutch in the transmission. When supplied with hydraulic pressure from the control valve, the four wheel drive is disengaged.

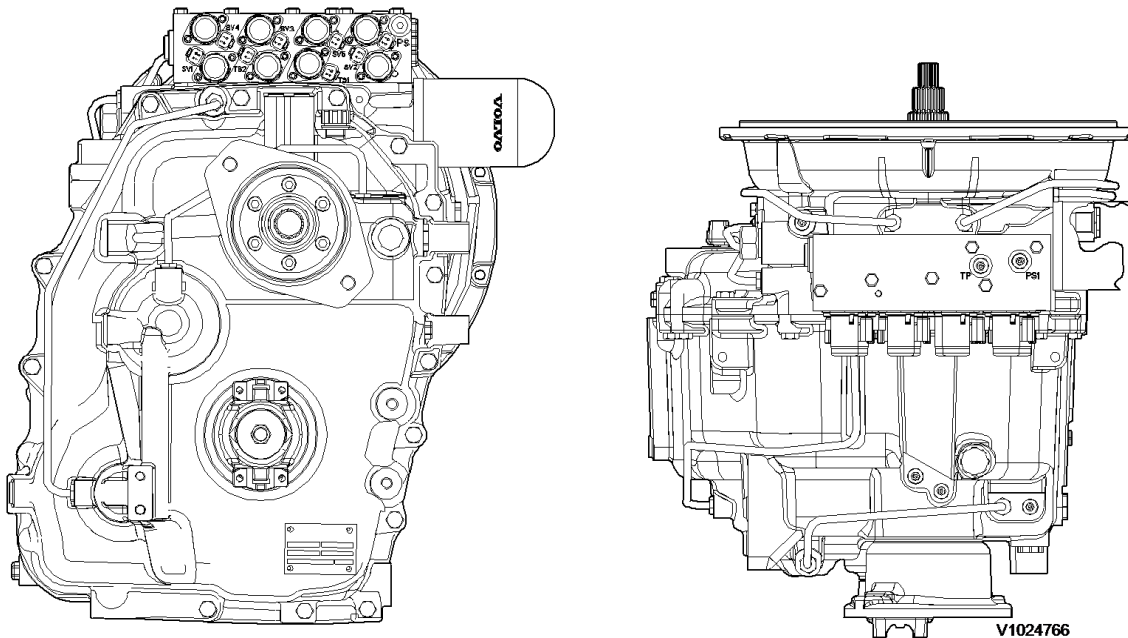
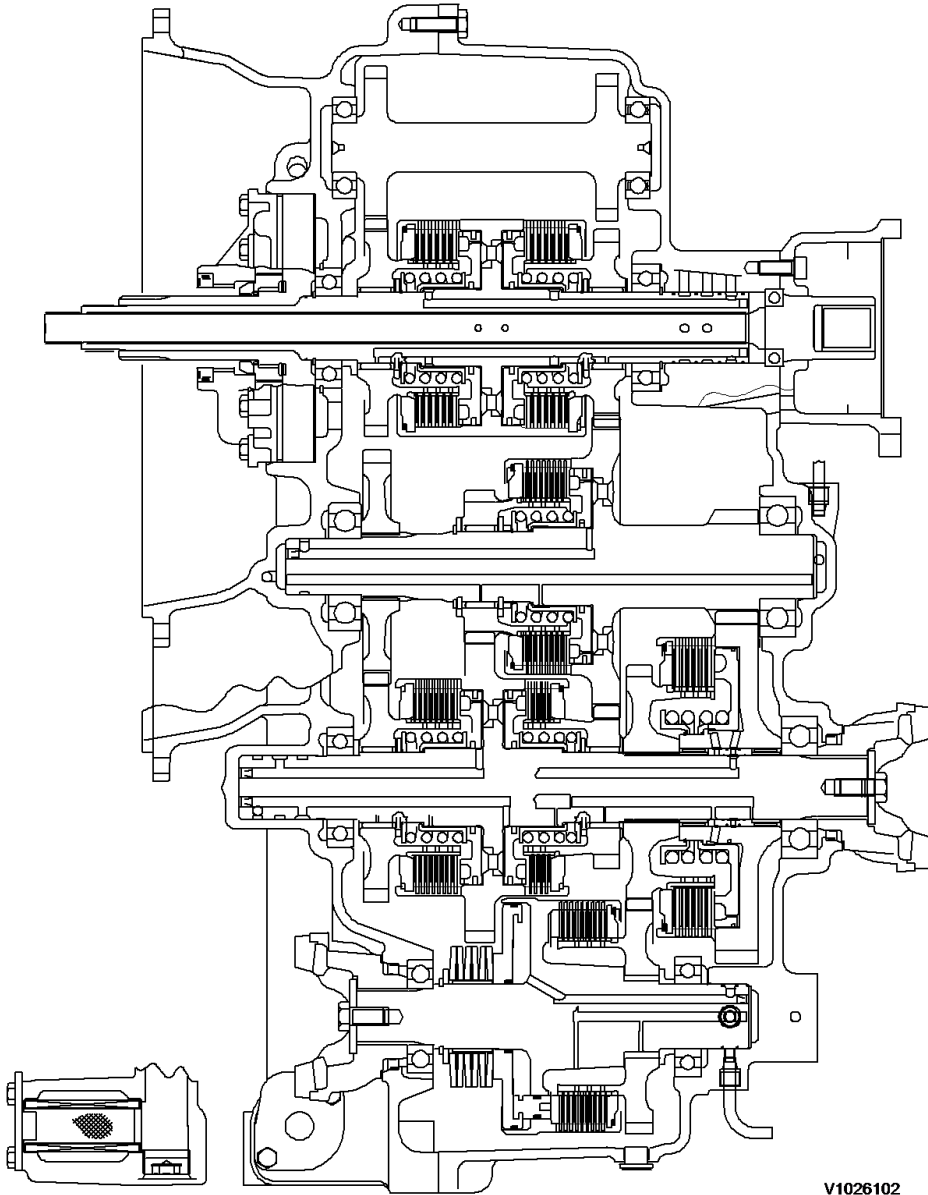


Figure 1
Power Shift transmission



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Figure 2
Power shift transmission, cut view

Document Title: Power transmission, troubleshooting	Function Group: 400	Information Type: Service Information	Date: 2014/3/19
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Power transmission, troubleshooting

Problem	Cause	Action
Machine does not move	Faulty supply to solenoid valves	Check/Replace
	Damaged wiring connections between transmission and machine	Repair/Replace
	Oxidised contacts in electrical wiring	Clean
	Break in electric cable	Replace
	Damaged solenoids	Replace
	Damaged sensors	Replace
	Short circuits or false contacts	Check/Replace fuses
	Incorrect oil level	Top up
	Check for leaks	Repair/Top up
	Blocked intake filter	Clean
	Damaged oil pump	Replace
	Damaged oil pump relief valve	Replace oil pump
	Blocked/Damaged transmission filter	Replace
	Damaged/Jammed control valve	Replace
	Damaged converter	Replace
	Oil temperature below 0 °C (32 °F)	Carefully warm up the machine and all subsystems until the oil has reached working temperature
	Damaged rotary seals	Replace
	Damaged synchronisers	Replace
	Blocked reverser lever	Repair
Worn clutch unit	Replace/Repair clutch unit	
No drive transmission (broken gears, shafts, bearings, etc.)	Check/Repair/Replace	
Machine has reduced power transmission	Incorrect oil temperature	Wait for oil to reach working temperature (stall test)
	Transmission oil overheating	Restore acceptable temperature values
	Incorrect operating pressure	Check hydraulic circuit and replace (oil pump, filters, control valve)
	Damaged converter	Replace
	Incorrect oil level	Top up
	Worn clutch unit	Replace/Repair
	4WD clutch failure	Repair/Replace 4WD shaft group
	Overheating solenoids	Replace
	Damaged transmission and machine wiring connections	Repair/Replace
Damaged sensors	Replace	

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Overheating	Damaged hydraulic cooling system	Repair
	Dirty heat exchanger	Clean
	Parking brake inadvertently activated	Release
	Excessive dirt on axle wheel hubs	Clean
	Seizing (broken gears, shafts, bearings, etc.)	Check/Repair/Replace
	Braking force outside transmission: irregular axle operation	Check/Repair axle
	Clutch plate drag	Repair/Replace
	Damaged converter	Replace
	Damaged oil thermostat	Replace
	Incorrect oil level	Top up
	Worn oil pump	Replace
Wheels rotate when machine is raised	Clutch plate drag	Repair/Replace
	Low oil temperature (high oil viscosity)	Wait for oil to reach working temperature (stall test)
	Incorrect oil specifications	Replace oil and filters
	Damaged control valve	Replace
	Faulty reverser locking	Repair/Replace
Noise	Damaged converter	Replace
	Damaged oil pump	Replace
	Aeration/Cavitation	Check oil level/Check oil specifications
	Seizing (broken gears, shafts, bearings, etc.)	Check/Repair/Replace
	Worn clutch plates	Replace
	Worn synchroniser actuation unit	Replace
	Worn 4WD clutch	Replace
Irregular actuation	Damaged control valve	Replace
	Electrical system fault	Repair/Replace
	Worn clutch plates	Replace
	Damaged converter	Replace
	Low oil temperature (high oil viscosity)	Wait for oil to reach working temperature (stall test)
	Overheating	See "Overheating"
	Damaged hydraulic system	Repair/Replace
Gear remains engaged	Damaged/Jammed shuttleshaft lever	Repair/Replace
	Electrical system fault	Repair/Replace
	Damaged control valve	Replace
	Damaged hydraulic system	Repair/Replace
	Damaged clutch unit	Repair/Replace
	Damaged gear lever rod	Replace
	Damaged synchronisers	Replace
No 4WD power transmission	Damaged 4WD clutch	Replace
	Hydraulic system fault	Repair/Replace
	Damaged control valve	Replace
	Faulty brake sensor	Check/Replace
	Electrical system fault	Repair/Replace
Gear shift won't engage	Damaged shifter	Replace
	Damaged synchronisers	Replace