

850 1997/S70/V70/V70 XC 1998-2000/V70 XC 2001-1997-

Section	Group	No.	Year	Month
4	46	0005	01	01

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Vehicles involved: AWD/XC

AWD Wheels/Tires, Information and function test

Background

This service bulletin contains information to ensure that the all-wheel drive (AWD) system is not damaged when servicing wheels and tires. It also contains information about checking the freewheel and viscous coupling for the all-wheel drive (AWD) system.

Service personnel: Please circulate, read and initial

Service Manager	Parts Manager	Workshop Manager	Workshop Foreman	Service Technicians								



Wheels and Tires, Information and function test

Information about wheels and tires and function test

Note! To prevent deterioration in the function of the power transmission system on All-wheel drive (AWD) cars, it is important to follow the instructions below.

1

All Wheel Drive vehicles have special requirements for tires and wheels. It is very important that the tire replacement guidelines below are followed. Failure to do so can result in damage to the AWD components (angle gear, viscous coupling/freewheel unit).

Always drive on tires of identical brand, size, construction (radial), tread pattern, load-, speed-, traction-, temperature-, and treadwear rating.

Never drive on mixed tires, except for brief periods when the temporary spare tire is in use.

Always use properly inflated tires of correct dimensions. Tire size and inflation pressures are shown on the tire pressure label located inside the fuel filler door.

Caution! Failure to always drive on properly inflated, identical tires of correct dimensions may result in a circumference difference between tires on the front and rear axles. This will cause excessive tire wear and may damage the transmission and all wheel drive system.

2

Replacing the tires

When tire replacement is necessary, Volvo strongly recommends replacing all four tires at the same time with identical tires as explained above. Failure to do so can result in circumference differences that may damage the transmission and all wheel drive system.

If only one or two tires are replaced, the new tire(s) must be identical to the tires with which the car was built, and must be mounted on the **FRONT AXLE ONLY!** Failure to do this may damage the transmission and all wheel drive system.

3

Spare wheel 'Temporary spare'

The temporary spare tire is for temporary, low-speed, short-distance use only. Do not drive on the temporary spare at speeds above 50 mph (80km/h) or for distances greater than 50 miles (80 km) or transmission and all wheel drive system damage may result.

4

Snow chains all-wheel drive (AWD)

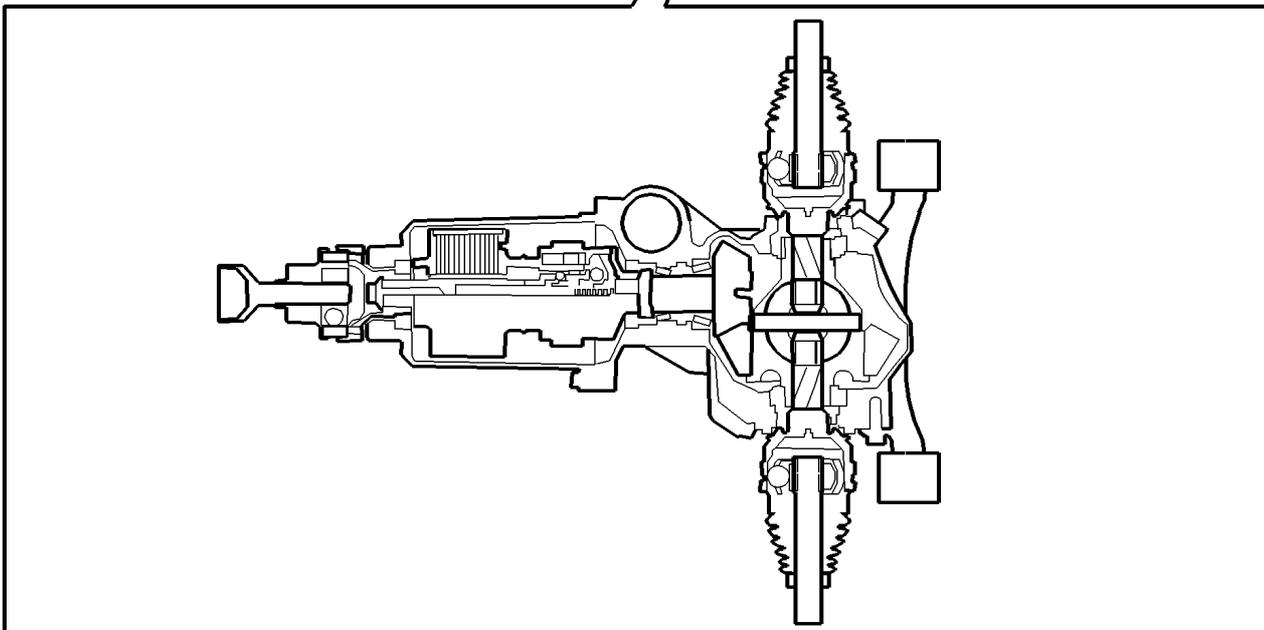
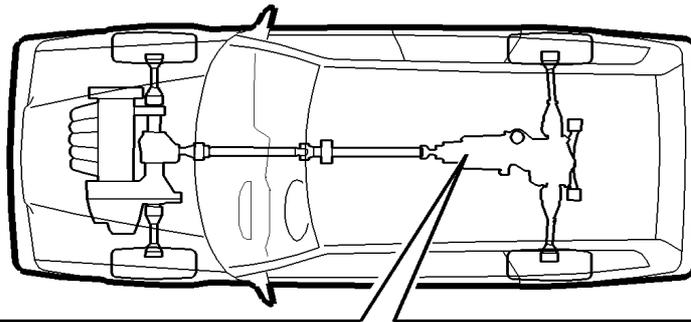
On all-wheel drive cars, (AWD), snow chains must **only** be mounted on the front wheels. Only snow chains intended for all-wheel drive (AWD) cars can be used. Never install snow chains on a temporary spare tire

Viscous coupling function

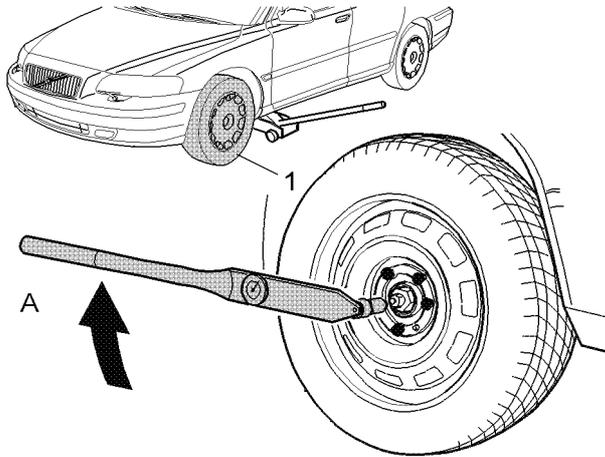
The viscous coupling transmits driving power to the rear wheels when necessary. In normal driving conditions on dry asphalt, only a small percentage of driving power is transmitted to the rear wheels via the viscous coupling. However, the slightest difference in speed between the front and rear wheels causes more power to be transmitted to the rear wheels to ensure traction. The viscous coupling consists of plates alternately connected to the input and output shafts. These plates are encased in a housing filled with silicone oil.

Because of the viscosity of the oil and the difference in speed between the plates, the oil transmits power to the rear wheels. The viscous coupling automatically locks up to protect itself from overheating in the event of extended slipping.

Viscous coupling



Viscous coupling test method



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Ensure that the viscous unit remains at room temperature.

- Raise the left or right-hand front wheel so that it rotates freely. The other wheels must be in contact with the ground.
- Select neutral.
- Position a torque wrench horizontally as illustrated. Read the torque value.

Note! It is important that the torque wrench points towards the center of the wheel to provide the correct torque reading.

- Turn the torque wrench half a turn (180°) clockwise with even torque for 25 seconds.
- The torque must be GREATER than 50 Nm (37 lb ft) during the entire turn.

The test method assumes that all the other components included in the system function correctly. If the torque is below 50 Nm (37 lb ft), the viscous coupling is outside the specification and/or damaged.

The function of the freewheel unit

A freewheel unit is connected to the viscous coupling. It is located after the viscous coupling and has **two** functions:

- Dis-engaging rear-wheel drive during braking.
- Engaging four-wheel drive when reversing.

The freewheel unit has an input and an output shaft. These shafts can be connected via a freewheel and via a centrifugal roller lock-up mechanism.

The freewheel unit, which has a centrifugal roller lock-up mechanism, also makes it possible to reverse with four-wheel drive at up to approximately **50 km/h** (30 mph).

Freewheel

- When driving forward, power can be transmitted from the input shaft to the output shaft (rear axle) via the freewheel.
- During braking the rear wheels may rotate faster than the front wheels. In this case the freewheel is driven in the " (opposite) direction by the output shaft. No power can be transmitted this way because the freewheel is free. The rear wheels can never drive the front wheels thereby negatively affect braking stability.
- When reversing, the freewheel is driven by the input shaft in the "opposite" direction. The freewheel is free and cannot transmit power. In certain cases, power can instead be transmitted via the centrifugal lock-up mechanism.

Centrifugal lock-up mechanism

The centrifugal lock-up mechanism consists of:

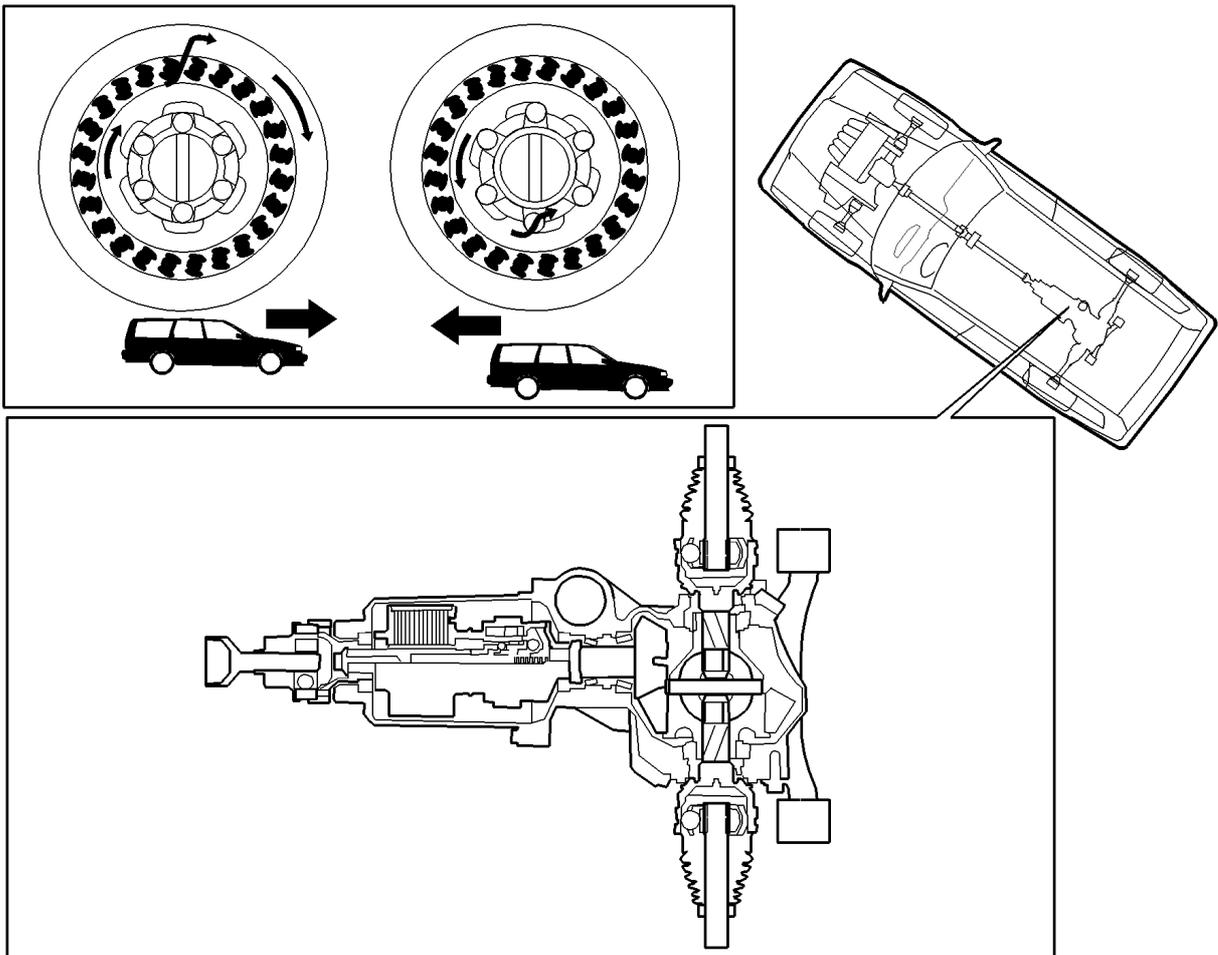
- Centrifugal weights in the form of ball bearings.
- A spring-loaded cage with a ball holder.
The ball holder has ramps and six small ball bearings.
- Internal cutouts in the input shaft.

At low speeds, the small ball bearings are forced out of the ramps, and engage with the cutouts in the input shaft. Power is then transmitted from the input shaft via the ball bearings.

When speed increases, the centrifugal weights are thrown outward.

At approximately **50 km/h** (30 mph) the centrifugal weights press back the spring-loaded cage and ball holder. The ball bearings are freed from the input shaft and power can no longer be transmitted via the roller lock-up.

Freewheel unit



Testing the function of the freewheel:

Raise the car using a two-post workshop lift so that the wheels rotate freely.

Warning! Screen off the wheels to prevent stones flying off, or remove stones from the wheels. Ensure that there is nothing in front of or behind the car.

Start the engine, select reverse gear and accelerate gradually to **50 km/h** (30 mph).

Accelerating above 50 km/h (30 mph) disengages the rear wheels and they rotate more slowly than the front wheels.

Depress the clutch pedal (manual transmissions) or release the accelerator pedal (automatic transmissions). Allow the rotation speed of the wheels to slow gradually.

It is normal that a loud noise can occur when the rear wheels connect again.

WARRANTY STATEMENT: Claims may be submitted under the New Car Warranty when there is a documented customer complaint, using claim type 01.

Operation No.	Labor description	Time allowance
46915-2	Testing the function of the freewheel	0.1 hr
46916-2	Testing the function of the viscous coupling	0.1 hr