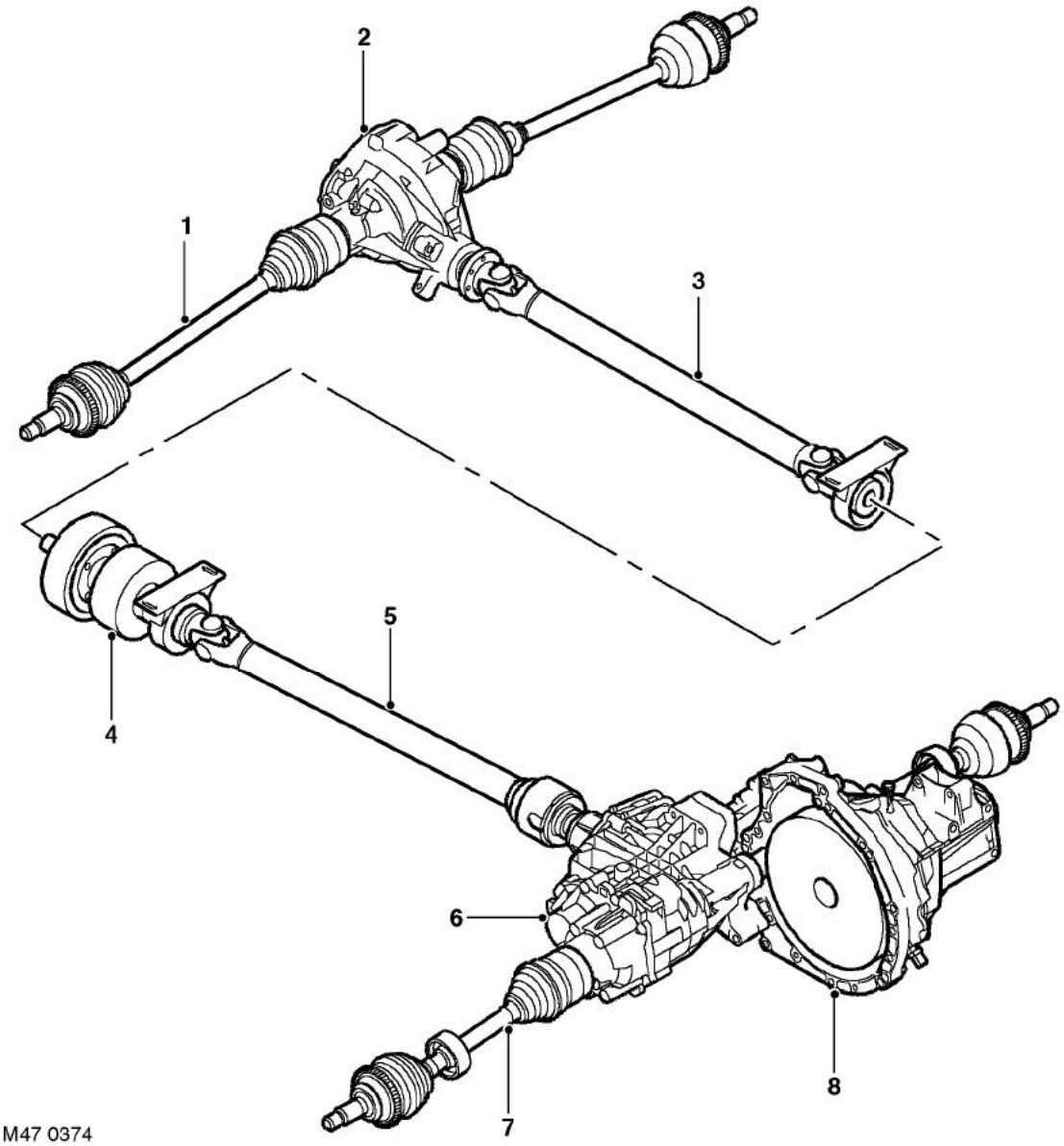
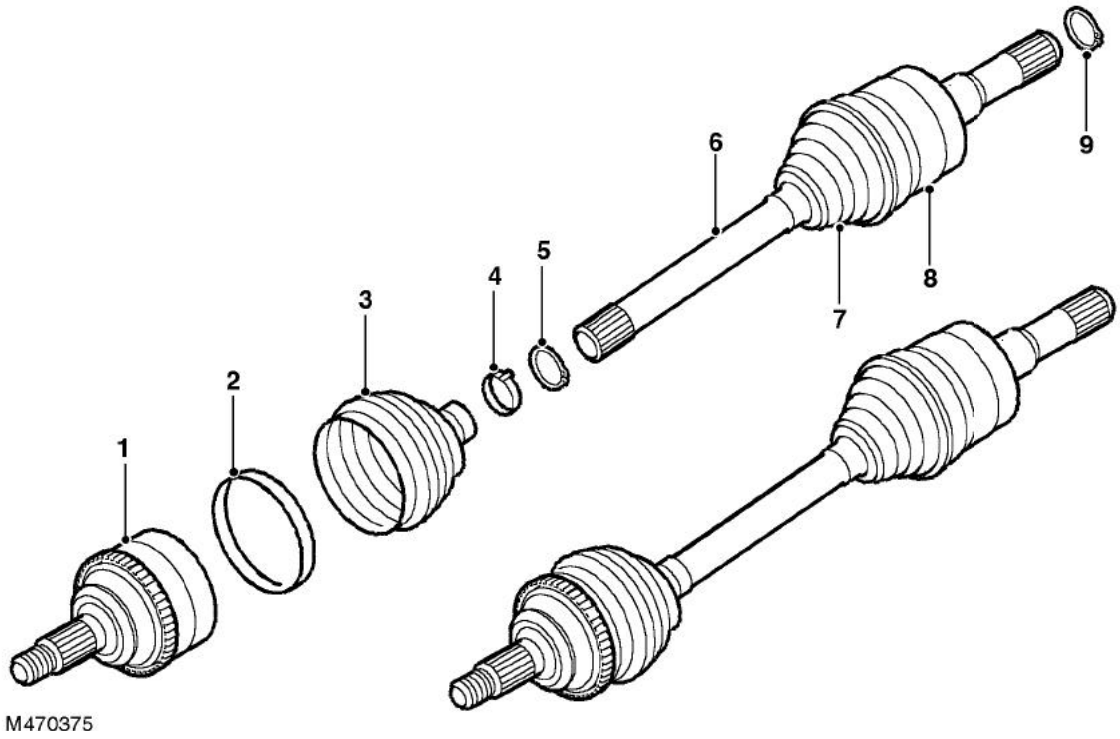
Drive Shaft and Propeller Shaft Component Layout



M47 0374

1 Rear drive shaft
2 Final drive unit
3 Rear propeller shaft
4 Vicous Coupling Unit (VCU)
5 Front propeller shaft
6 Intermediate reduction drive (IRD)
7 Front drive shaft
8 Gearbox

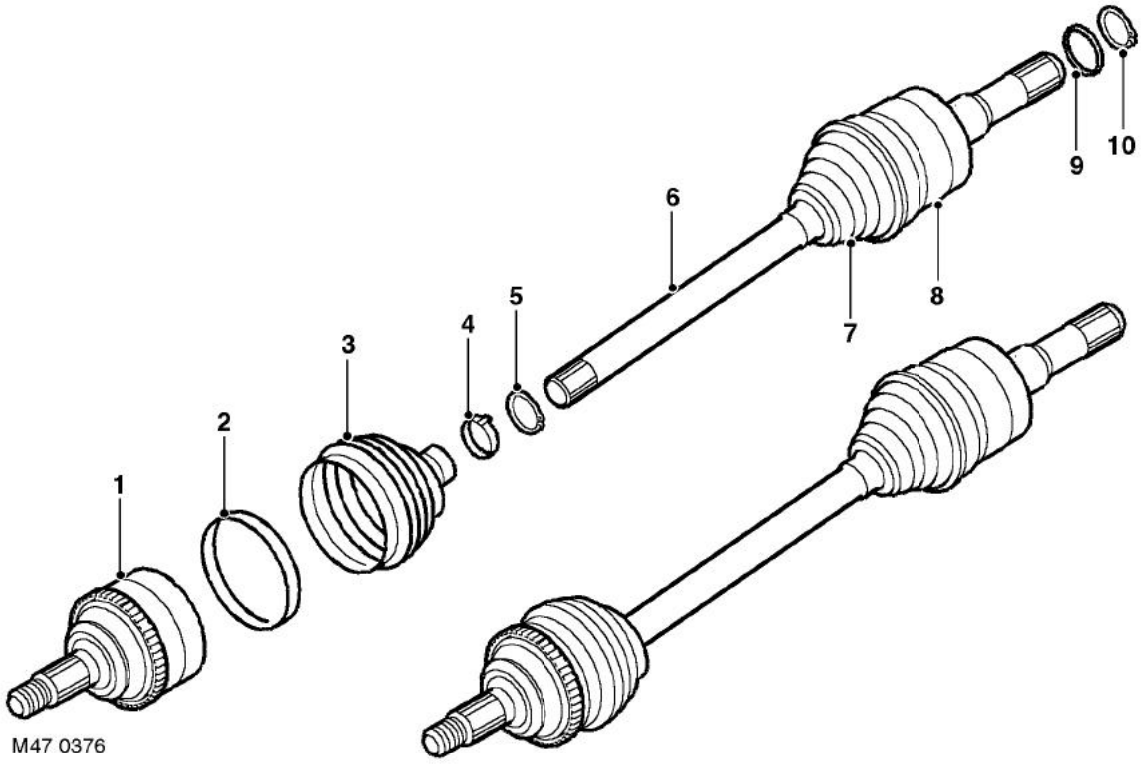
Front Drive Shaft Components



M470375

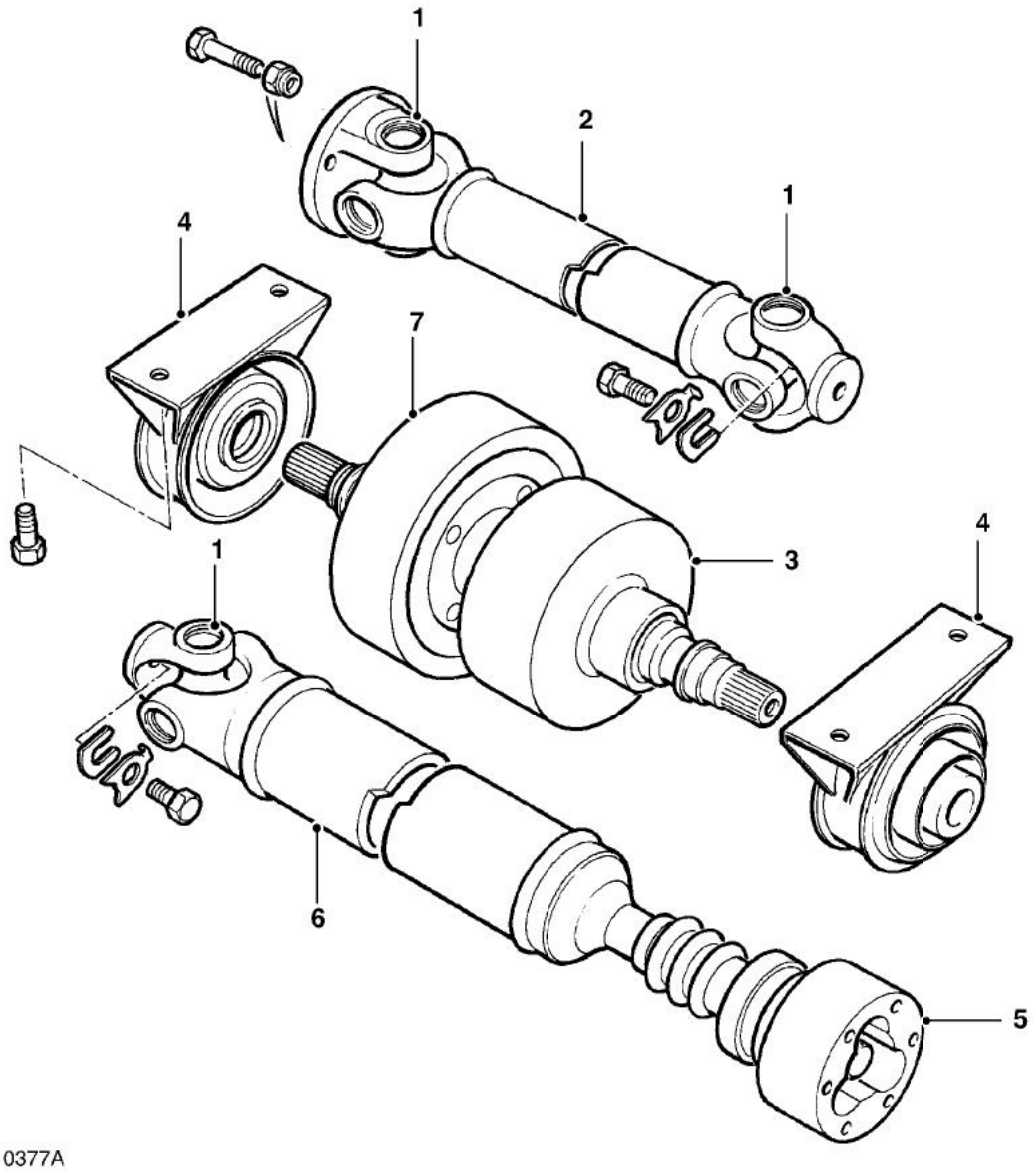
1 Outer joint
2 Clamp
3 Gaiter
4 Clamp
5 Circlip
6 Shaft
7 Gaiter
8 Inner joint
9 Circlip

Rear Drive Shaft Components



1 Outer joint
2 Clamp
3 Gaiter
4 Clamp
5 Circlip
6 Shaft
7 Gaiter
8 Inner joint
9 Flinger - oil seal
10 Circlip

Propeller Shaft and VCU Components



M47 0377A

1 Universal joint
2 Rear propeller shaft
3 VCU
4 Propeller shaft bearing
5 Coupling
6 Front propeller shaft
7 Torsional damper (K1.8 models only)

Description

Drive/Propeller Shafts
Two drive shafts transmit drive from the intermediate reduction drive (IRD) to the front wheels, and to two further drive shafts transmit drive from the final drive (differential) unit to the rear wheels.

Two propeller shafts and a viscous coupling unit (VCU) transmit drive from the IRD to the final drive unit.

Drive Shafts
All four drive shafts are of similar construction, the main difference being in the lengths of the front and rear drive shafts which differ between engine fitments.

Each drive shaft comprises a solid shaft with inner and outer constant velocity joints. The inner joint is of the tripode type with spherical bushing to reduce sliding resistance; the shaft and inner joint are one assembly. The outer joint is of the ball and socket type, with a splined connection between the joint and the shaft. The joints are packed with grease and protected by gaiters.

Front Propeller Shaft
The front propeller shaft consists of a thin walled tube with a coupling welded to the front end and a conventional universal joint welded to the rear end. The coupling bolts to the output flange of the IRD. The universal joint is splined to the input shaft of the VCU and secured by a bolt which is locked by a tabwasher and a 'U' washer.

The coupling reduces vibration and accommodates both angular movement (10 degrees maximum) and axial movement (50 mm maximum) between the propeller shaft and the IRD.

The universal joint incorporates serviceable, sealed needle bearings.

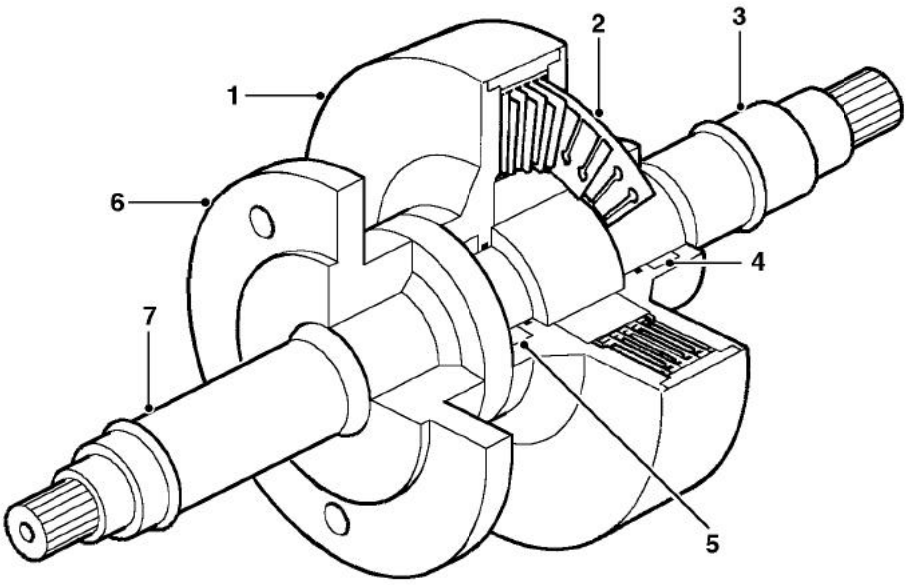
VCU
The VCU automatically controls the transfer of drive to the rear wheels by limiting the speed differential between the front and rear propeller shafts. The unit is supported in two propeller shaft bearings attached to the floor cross member.

The VCU comprises a short cylinder which contains an input shaft supported in a roller bearing race at the front and a ball bearing race at the rear. Within the cylinder, slotted discs are alternately attached to the outer surface of the input shaft and the inner surface of the cylinder. An output shaft is welded onto the rear of the cylinder. The input shaft is attached to the front propeller shaft and the output shaft is attached to the rear propeller shaft.

On models with 1.8 K Series engines, a torsional damper is bolted to a flange on the output shaft.

The cylinder is a sealed unit filled with a silicon jelly. The viscosity of the silicon jelly increases when subjected to shear. When there is a speed differential between the front and rear propeller shafts, adjacent slotted discs in the VCU rotate in relation to each other. The shearing action of the rotating slotted discs increases the viscosity and resistance to rotation of the silicon jelly.

Section Through VCU



M47 0378

1 Cylinder
2 Slotted discs
3 Input shaft
4 Roller bearing
5 Ball bearing
6 Torsional damper flange (K1.8 models only)
7 Output shaft

The rear wheels are 0.8% under driven, so in most conditions the vehicle is effectively front wheel drive, with the rear wheels turning the rear propeller shaft slightly faster than the IRD drives the front propeller shaft. Since the speed differential is low, the increase in viscosity of the silicon jelly is marginal and there is little resistance to relative rotation of the slotted discs.

When there is a significant speed differential between the front and rear propeller shafts , e.g. the front wheels lose traction or traversing rough terrain, the viscosity and resistance to rotation of the silicon jelly increases to a level that slows or stops relative rotation of the slotted discs. With the front and rear propeller shafts locked together, drive is thus transferred from the IRD to the rear wheels.

Propeller Shaft Bearings

The two propeller shaft bearings are identical, and each consist of a roller bearing race mounted into a centre bearing housing. The bearing is sealed-for-life and is a press fit on the input/output shaft of the VCU. Bearing covers and flingers prevent the ingress of moisture.

Rear Propeller Shaft

The rear propeller shaft consists of a thin walled tube with a conventional universal joint welded to each end. The rear universal joint is bolted to the input flange of the final drive unit. The front universal joint is splined to the output shaft of the viscous coupling unit and secured by a bolt which is locked by a tabwasher and a 'U' washer. Both universal joints incorporate serviceable, sealed needle bearings.