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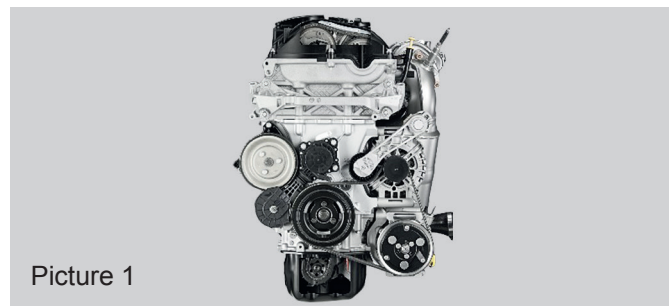
Damage to the water pump drive

Complete water pump kits for PSA and MINI vehicles

OPTIMAL AG & Co. KG is one of the first car part suppliers to offer complete kits for repairing water pump drive wheels in PSA and MINI (BMW Group) vehicles. The standard kit comprises a water pump with a seal together with a belt pulley and matching screws, while the extended version also includes a friction wheel and additional connection accessories. We also stock a range of individual products for repairing water pumps.

Diagnosis

Damaged water pumps in PSA and MINI vehicles present a challenge even to experienced mechanics. Although loud metallic noises may, for example, be indicative of a damaged crankshaft bearing, in 1.6 litre, four-cylinder petrol engines with turbocharging and direct injection (105 kW, manufactured from 2006 onwards, picture 1) this diagnosis is often made incorrectly.



Cause of failure

The cause of the noise should instead be looked for on the water pump's friction wheel or drive wheel. Why is this? During operation, the coupling of the friction wheel may result in friction on certain areas of the vulcanised surface of the water pump drive wheel, leading it to wear in places (picture 2). Furthermore, damage to the bearings on the friction wheel caused by the high dynamic forces exerted during coupling and decoupling may generate additional noise.



Repair work using OPTIMAL water pump kits

When replacing the water pumps of affected models, we recommend not only changing the water pump and seal, but also other parts such as the belt pulley, screws and friction wheel together with the electrical connection and connection accessories.



OPTIMAL now offers various water pump kits as **all-in-one solutions** for this repair work.

OPTIMAL water pump kits:

| Product image | OPTIMAL number | Contents/description |
|---------------|----------------|---|
| | AQ-2188-1 | Water pump with seal and belt pulley (including screws) |

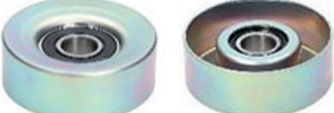



Wasserpumpen water pump kits:

| Product image | OPTIMAL number | Contents/description |
|---|----------------|---|
|  | AQ-2188-A | Water pump with seal and belt pulley (including screws) and friction wheel |
|  | AQ-2188-B | Water pump with seal and belt pulley (including screws), friction wheel with electrical connection and connection accessories |

In addition to these kits, OPTIMAL offers the following **individual products** for carrying out repairs.

Individual products from OPTIMAL:

| Product image | OPTIMAL number | Contents/description |
|---|----------------|-----------------------|
|  | 0-N2237 | Friction wheel pulley |
|  | AQ-2188 | Water pump with seal |

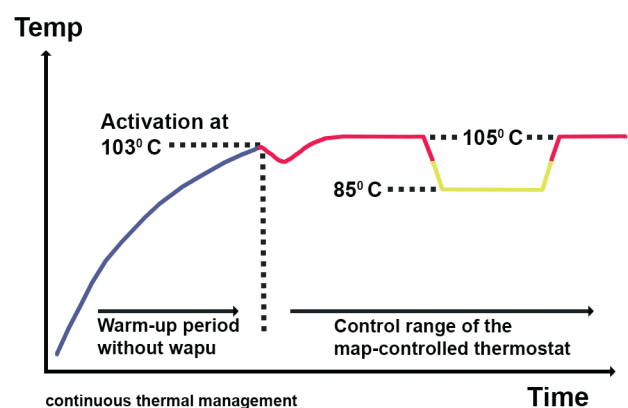
Background: benefits of the PSA/MINI water pump and how it works

To reduce harmful emissions, the PSA Group and MINI have developed a unique water pump system in which a friction wheel, capable of being uncoupled mechanically and electronically, is used to ensure that the water pump is only activated when needed (see also Technical Tip 11/14).

As a result, cooling fluid is not circulated until the engine reaches an operating temperature of 103 °C, reducing fuel consumption by approximately one percent. Furthermore, vehicle safety is increased in winter because the later activation of the water pump results in the passenger compartment becoming warmer more quickly and any snow and ice on the windscreen melting sooner.

When the water pump is not activated, mechanical forces that would otherwise be needed to drive the water pump are not lost, making around an extra 2 kW of power available to the drivetrain.

Moreover, in addition to creating the on-demand water pump, the engineers have developed a map-controlled thermostat that completes the thermal management system. In order to optimise the volumetric efficiency and avoid knocking, this allows the engine to run at a coolant temperature of 105 °C when working at part throttle and of 85 °C when working at full throttle.



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