

The offset of piston pins in Porsche engines

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Dear all,

Many Porsche production engines feature a factory-designed offset of the piston pins.

By piston pin offset, we mean a deliberate displacement of the piston axis away from the geometric center of the piston.

This measure results in a targeted redistribution of the forces transmitted from the piston to the connecting rod in our engines.

Some of the key advantages include:

- Reduction of overall engine noise
- Improvement of the lever arm through which the connecting rod acts on the crankshaft
- Tilting and alignment of the piston already during the upward stroke
- Contact of the piston with the thrust side before the next cycle begins

With piston pin offset in our Porsche pistons, we distinguish between:

- **Positive offset** (displacement toward the thrust side)
- **Negative offset** (displacement toward the anti-thrust side)

What does “thrust side” mean?

The thrust side of a piston is the side on which the piston skirt bears against the cylinder wall, for example during the power stroke as the piston travels from top dead center to bottom dead center. In the animation, this is the left-hand side.

For offsetting purposes, piston pins are installed with a displacement of between 0.3 mm and 2.0 mm toward the thrust side.

Due to this off-center support, the force acting on the piston as a result of combustion pressure gains a larger effective lever arm.

What effects does piston pin offset have?

- The piston already tilts slightly during the upward movement, so that the thrust side of the piston is in contact with the cylinder wall before ignition
- The connecting rod straightens before reaching top dead center
- The reversal of force application during the power stroke is significantly quieter
- The piston realigns again at the end of the power stroke
- The marginally higher friction coefficients are almost completely compensated for by high-quality synthetic oils

Avoiding installation errors

To avoid having to re-measure the offset on every piston, arrows are applied to the pistons that *presumably* indicate the correct installation direction.

If a piston is installed incorrectly, which does occur in some Porsche engines due to production-related issues—the piston movement is reversed.

This leads to increased wear, particularly in the already sensitive Porsche water-cooled boxer engines.

The pistons used by Albert Motorsport during engine rebuilds are, of course, installed correctly.

This means that the arrows on the pistons indicate the correct installation direction for only one side of the engine.

Another reason why you should have your engine rebuilt by Albert Motorsport.

If you have any questions, please do not hesitate to contact us.

Kind regards,

Jürgen