

PISTON CROWN MARKINGS

ALL IN THE PISTON CROWN

The different piston crown markings and what they mean:

Looking at a piston, the markings on the piston crown attract attention. In addition to dimensional and clearance specifications, most pistons show information about their fitting orientation. The pistons are marked with fitting orientations according to specifications from our production customers – the engine manufacturers.

Many customers – this means also many different requests and specifications for piston markings. This multitude of markings may appear to the onlooker somewhat like Egyptian hieroglyphs.

For this reason, we are giving you here an overview of the most important markings and their meaning:

SYMBOL	FITTING ORIENTATION IN ENGINE	EXAMPLE
	Steering side (opposite power output/clutch)	MB, VW, Opel, BMW
	Flywheel (power output/clutch)	Peugeot, Opel
Notch <i>(cast-in)</i>	Steering side (opposite power output/clutch)	Perkins, Opel
AV	Steering side (opposite power output/clutch) „AV“ stands for the French word „avant“ = in front	Citroen, Renault
AR	Flywheel (power output/clutch) „AR“ stands for the French word „arrière“ = at the back	Citroen, Renault
V	Flywheel (power output/clutch) „V“ stands for the French word „volant“ = flywheel	Renault, Peugeot
	Flywheel (power output/clutch)	Renault, Peugeot, Citroen
FRONT	Steering side (opposite power output/clutch)	GM, Perkins
vorn	Steering side (opposite power output/clutch)	Hatz, Liebherr
Abluft	Exhaust-air side for some air cooled engine	Deutz, MWM
	Special case for two-stroke engines: direction exhaust manifold	Zündapp, Husqvarna
	Special case for some V engines: direction engine centre	MB

Why is it important to observe the fitting orientation for pistons?

Pistons with asymmetric crown shape or pistons that are designed with different sizes of valve pockets in the piston head can only be fitted to the engine in a particular orientation. This applies also to pistons with combustion cavities that are not in the centre of the piston crown.

However, there are also pistons that appear to be completely symmetrical and have a plain piston crown for instance. Even for these pistons, it may be necessary to observe a particular fitting orientation. The reason for this is the so-called ‘pin bore offset’. This means that the piston pin is not exactly in the middle of the piston, but slightly offset to the side. It is not always possible to recognize this with the unaided eye, as the offset may be less than a millimetre, depending on the particular design.

Why do most pistons have a pin bore offset?

Due to the rotation of the crankshaft, the connecting rods are at an angle in most positions. This is pressing the piston towards one side of the cylinder bore during its upward movement. At the upper piston dead centre, the connecting rod stands exactly vertical and then starts to form an angle towards the other side. Also the piston begins now to lean towards the other side of the cylinder bore. In order to soften the impact of the piston against the opposite side and to make it as silent as possible, the pin bore is slightly offset to one side. As a result, the piston tilts slightly around the pin axis during this change of leaning direction. The piston does therefore not hit the cylinder bore with its entire length, but touches the cylinder wall first only with the lower skirt end and settles then into a sliding movement against the other side. This reduces not only engine noise, but also the mechanical stress on the components significantly.

The pin bore is usually offset towards the pressure side of the piston. However, there are exceptions to the rule: some pistons are offset towards the other side, however, the effect is the same.