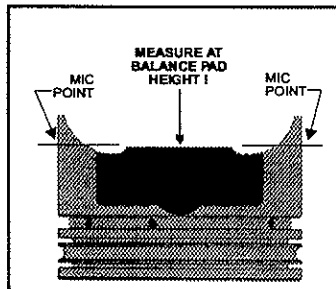


Special Clearance Requirements of KB Pistons

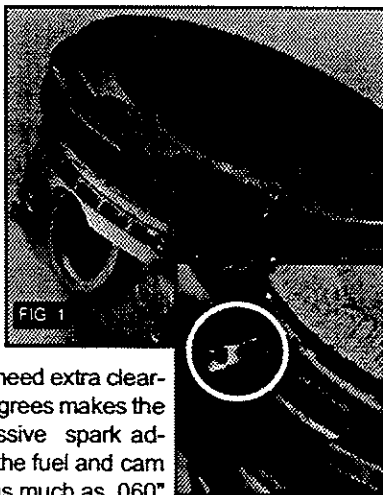
SUGGESTED PISTON TO WALL CLEARANCE

KB pistons can be installed tighter than other performance pistons. A close fitting piston rocks less, supports the ring better and seals the engine for maximum power. When a loose fit engine is desired, the rigid skirt design of the KB piston allows the builder a choice without fear of piston damage. The chart below shows minimum and realistic maximum loose fit clearance for KB pistons.



SPECIAL NOTICE ON TOP RING END GAP

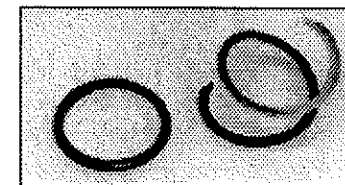
The Keith Black piston's unique thermal conductivity, ring location and varied end use requires special attention be paid to top ring end gap. KB pistons make more HP by reflecting heat energy back into the combustion process and, as a result, the top ring runs hotter and requires additional end clearance. Increasing ring end gap does not affect performance or oil control because normal end gaps are realized at operating temperatures. Failure to provide sufficient top ring end gap will cause a portion of the top ring land to break (Fig. 1) as the ring ends butt and lock tight in the cylinder. The broken piece may cause further piston or engine damage. Safe top ring end gaps can be found by multiplying the bore diameter by the appropriate ring end gap factor from the adjoining chart. Example: 3.5" bore "Street Normally Aspirated" = 3.5" bore x .0065 = .023 top ring end gap. NOTE: Second ring end gaps do not need extra clearance. As a general rule, retarding spark timing 2 to 4 degrees makes the best horsepower when KB pistons are used. Excessive spark advance, lean fuel mixture or too much compression for the fuel and cam used will make heat sufficient to butt piston rings with as much as .060" ring end gap. Nitrous engines need a spark retard.



APPLICATION	RING END GAP FACTOR	PISTON TO WALL CLEARANCE
STREET NORMALLY ASPIRATED	.0065"	.00075"-.0015"
STREET NITROUS OR SUPERCHARGED	.0080"	.0015"-.0025"
FLAT TRACK GASOLINE	.0080"	.0010"-.0030"
FLAT TRACK ALCOHOL	.0060"	.0010"-.0030"
DRAG GASOLINE	.0075"	.0010"-.0030"
DRAG ALCOHOL	.0065"	.0010"-.0030"
DRAG SUPERCHARGED OR NITROUS GAS	.0095"	.0015"-.0030"
DRAG SUPERCHARGED ALCOHOL	.0085"	.0010"-.0030"
DRAG SUPERCHARGED FUEL	.0115"	.0020"-.0040"

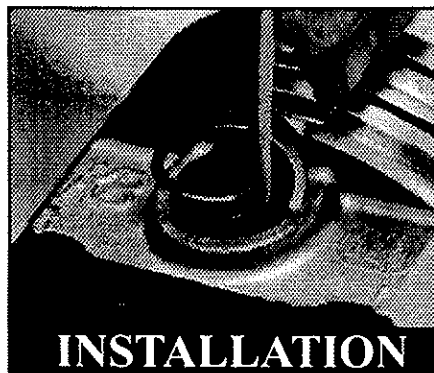
Spiral Retaining Ring Installation

All KB pistons are supplied with spiral retaining rings. This retaining ring was specifically required by Keith Black because it resists breakage and stays in place. To install the retainer, you must first stretch it to approximately 3/4" by grasping the two ends and stretching it (SEE PHOTO AT RIGHT).



INSTALLATION of the spiral retaining ring requires one small screwdriver. We suggest that the retaining ring be expanded before installation. To install the retaining ring, place the end of the retaining ring in the retaining ring groove and, using the small screwdriver, press the retaining ring in place, moving around the pin hole in a circular pattern to spiral each coil into place.

REMOVAL of the retaining ring requires two screwdrivers. Secure the piston with the connecting rod and soft materials so as to prevent piston or rod damage. Pick the end of the retaining ring out of the groove with the first screwdriver, and with the second screwdriver spiral the retaining ring clear of the pin hole.

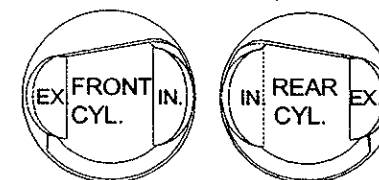


PISTON ORIENTATION

Evolution 1200cc and 1340cc flat tops, and the late Shovelhead (KB288) have large intake and small exhaust valve reliefs, and can be installed in either the front or rear cylinder. Install the large intake valve relief toward the center of the engine.

Knucklehead, Panhead and Early Shovelhead (KB263) pistons have symmetrical intake and exhaust valve reliefs. These pistons do not require valve relief orientation, and can be installed in either the front or rear cylinder.

Evolution 883cc conversion dish and the 1340cc pop-up also feature large intake and small exhaust valve reliefs. At installation, the large intake ports must be towards the center of the engine. The flat or quench area must be on the carburetor side of the engine (see photo below).



Oil ring installation with Roll Pin Locator EVO 1200 & 883/1200 CONVERSION

Some Keith Black pistons have very short compression heights. The resulting short distance between the piston head and wrist pin crowds the rings so that the oil ring must be positioned over the **wrist pin hole**. The bottom oil ring rail must span a 3/4" gap and must not be allowed to migrate into this oil groove gap (fig. 1). Many solutions for keeping the ring out of the oil groove gap and pin bore area have been tried. We feel the roll pin locator design gives the best oil control with the least added weight (fig. 2). The time required to slightly modify a lower oil ring rail for each piston is nominal, all that is needed is clearance for the 3/32" roll pin (fig. 3). Most light weight ring expanders will slip over the roll pin. Do not butt ring expander ends against the roll pin.

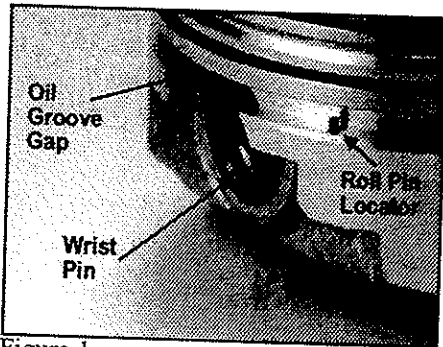


Figure 1

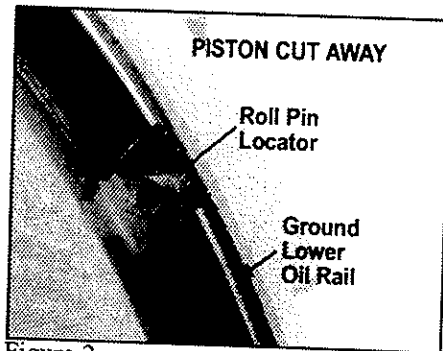


Figure 2

Note that the oil ring expander does not need to be positively located, it only needs to provide clearance for the roll pin (fig. 4). Be sure the top oil ring rail is free to rotate on the piston. Grinding the bottom oil ring rail is usually done on a bench grinder that has a nice square stone (fig. 5). Remove burrs with a small file.

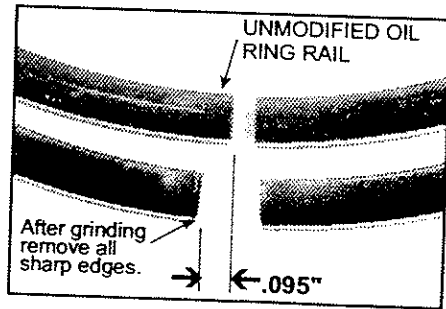


Figure 3

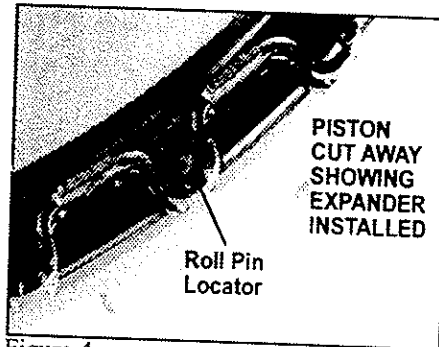


Figure 4

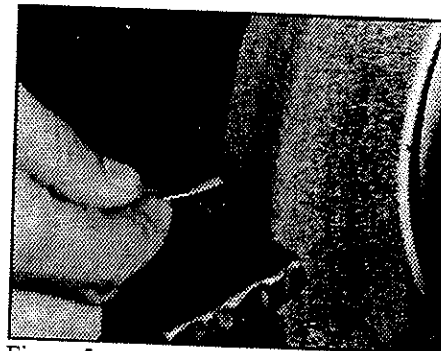


Figure 5

KB PERFORMANCE PISTONS

A DIVISION OF U.E.M. CO., INC.

Harley Davidson Installation Bulletin

The Keith Black series of Harley Davidson pistons has evolved from the successful line of Keith Black automotive pistons. The success of the automotive pistons is attributed to the performance design and special hypereutectic T6 alloy used in all KB pistons.

The Keith Black 390 Hypereutectic alloy gives a whole new dimension to design. This alloy makes it possible to build a light weight piston that makes more power, runs quiet, uses less fuel and lasts longer than any other type of piston being made today. We can now forget about running loose, noisy oil burning pistons. The low heat transfer of the alloy keeps the skirts cool so piston expansion is minimal. Test engines have been run with as little as .0005" (1/2 thousandth) piston-to-wall clearance. The combination of a low heat transfer piston alloy and high compression ring placement increases power and economy. The high ring placement alone reduces detonation and increases the top ring temperature. **It is important to see our ring end gap instructions to avoid ring butting.** The KB piston will make maximum power at 2 to 4 degrees less total timing than conventional pistons.

Volume production with steel permanent molds allow design flexibility for strength and manufacturing economies that make the best piston available at a reasonable price.

IMPORTANT NOTICE: *KB PERFORMANCE PISTONS* supplies two pin sizes for Harley Davidson motorcycles. All pistons except the KB263 are supplied with a .792" pin dia.. The KB263 is supplied with a .791" pin dia.. Large pins can be ordered from the factory, but you will have to hone your KB263 pistons and rod to suit.

KB263 oversizes .060, .070 & .080 are supplied with ring set oversizes that do not match the piston oversize. The KB263 +.060 uses a 2M6127-STD, KB263 +.070 uses a 2M6127-.010, and KB263+ .080 uses a 2M6127-.020.

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