

ZERO GAP PISTON RING PREPARATION & INSTALLATION INSTRUCTIONS

CYLINDER WALL PREPARATION: There are four major considerations when selecting the proper stones for honing: relative combustion pressure (normally aspirated or supercharged engines), piston ring hardness (Stainless Chrome or Moly), method of honing (hand operated or power hone) and cylinder wall type, ie., ductile vs. cast iron. Based on experience, the most consistent results can be obtained by using a Sunnen CK-10 honing machine. For your convenience, we have included a Sunnen stone reference chart at the bottom of this page.

NORMALLY ASPIRATED ENGINES WITH STAINLESS CHROME OR G2000 RINGS

When using a hand-operated unit, rough finish with an AN-301 stone and then finish hone with a N-37-J85 (making sure you remove .0001 to .0002" maximum, which should just remove the peak of the rough hone).

With a power hone, start with an EHU-525 or EHU-625 and finish with a JHU-820.

NORMALLY ASPIRATED ENGINES WITH MOLY RINGS

When using a hand-operated unit, rough finish with an AN-301, and follow this with the N-37-J85, only removing .0005" to .0006" maximum.

CROSSHATCH PATTERN: All hone finishes should have a crosshatch pattern ranging from 22 degrees minimum to 30 degree maximum. As an extra caution, be careful not to "burn" the cylinder walls, and make sure the stones are not "loaded" and the stone pressure is not excessively high. Also, use only full-flow honing oil.

SUNNEN STONE REFERENCE NUMBERS

APPROX. MICRO FINISH	GRIT SIZE	SUNNEN AUTOMATIC STONE SET NUMBER	APPROX. MICRO FINISH	GRIT SIZE	SUNNEN HAND-HELD STONE SET NUMBER
85-105	70	EHU-133	135-170	70	AN-101
25-35	220	EHU-525	25-40	150	AN-201
14-23	280	JHU-625	20-25	220	AN-301
8-13	400	JHU-820 / Moly, Tool Steel and Stainless	15-20	280	AN-501
4-8	600	C-30-CO3-81	5-10	400	N-37-J85
			3-5	600	NN-40-C05

PISTON RING END GAP: The amount of end gap required is dependent upon the amount of heat developed in the combustion chamber. In certain engine applications this varies greatly, so be sure and take this into consideration when setting piston ring end gap. Hypereutectic Pistons require more end gap on top combustion rings as shown.

SUGGESTED BASELINES FOR VARIOUS ENGINE COMBINATIONS:

* For Hypereutectic Piston contact piston manufacturer.

- For Nitrous Assisted Engines add .0008 extra end gap per inch of cylinder bore.

RING	APPLICATION	MINIMUM END GAP Per Inch of Bore*
TOP RING Dura-Moly, Ductile iron, G2000 (Tool Steel), or	Supercharged Fuel	.008
	Supercharged Alcohol	.007
	Supercharged Gasoline	.008
	Injected Fuel	.006
	Injected Alcohol	.005
Stainless Chrome compression rings. .043, .017, .020, .031 1/16", and 5/64"	DIESEL APPLICATION .022 MIN—.024 MAX	
2nd RING Ductile iron and cast iron second groove rings	Carbureted & Injected Gasoline	.005
	Super Stock (drag racing)	.004
	Stock (drag racing)	.003
	Injected Gasoline	.004
	Carbureted Gasoline (street use)	.004
	Carbureted Alcohol	.004
2nd RING Ductile iron and cast iron second groove rings	Supercharged Fuel	.005
	Supercharged Alcohol	.004
	Supercharged Gasoline	.004
	Inject Fuel	.004
	Injected Alcohol	.004
	Carbureted & Injected Gasoline	.003
ZGTF 2ND Rings	See supplemental instruction sheet in ZGS box.	Min .016 - .040 Max
3rd Groove OIL RINGS	Upper and lower rail end gap Min of .010 Max .055 stainless expanders are factory pre-set for proper length. LOW, STD, & HI: .090-.250	

PISTON RING LATERAL GROOVE CLEARANCE: Special attention should be paid when checking piston ring groove clearance. Too much clearance is just as bad as too little clearance. Experience has shown the following tolerance range effective for high performance applications:

	MINIMUM	MAXIMUM
1st and 2nd groove rings	.0012"	.003"
3rd groove rings	.0025"	.004"

SPECIAL NOTE: 3/16" Low Tension Oil Control Ring: This ring will show 9-12 lbs. traction pull upon installation. This will reduce to approx. 8 lbs. after break-in (about 5 minutes running time). The ring will hold at minimum required tension levels as opposed to rings with lower traction pulls, which can go below acceptable standards.

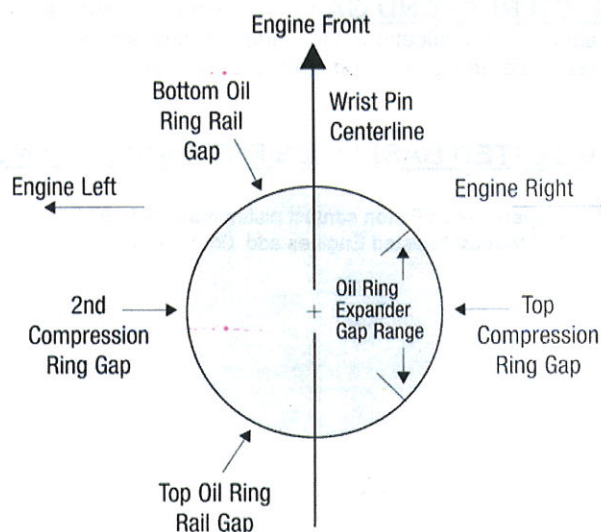
ASSEMBLY LUBRICATION: Use 50w motor oil.

NEVER ASSEMBLE AN ENGINE DRY! ALWAYS USE LUBRICANT!

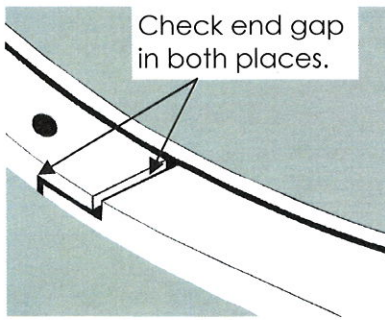
RING INSTALLATION & SUGGESTIONS

- Starting with the oil ring expander, place in third groove of piston paying attention 2 ends butt but do not overlap. Wrap bottom rail around expander and piston assembly followed by top rail. Rotate end gaps of rails away from expander ends while placing expander ends on non thrust side of cylinder bank.
- Place second ring dot up, bevel down in second groove on piston, being careful not to over-expand ring (this can cause breakage).
- Place top ring dot up bevel up in top groove on piston.
- Rotate rings to desired end gap locations on pistons.
- Using a ring compressor, install piston and ring assembly after appropriately lubricating rings with 50W motor oil.

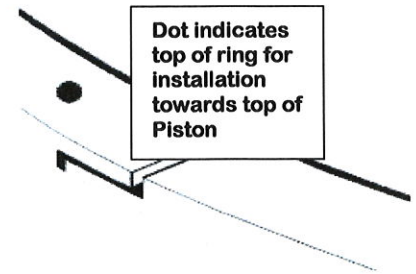
RING ORIENTATION DIAGRAM



HAISLEY MACHINE
FAIRMOUNT, IN
(877)948-3164



ZERO GAP TAPER FACE SECOND RING RING INSTALLATION INSTRUCTIONS



PLEASE NOTE: Do not assemble engine before checking all piston ring end gaps.

The ZGS piston ring is a pre-factory gapped but should always be checked prior to final engine assembly. The ZGS ring is manufactured to the nominal bore diameter and is not a .005" oversize ring. Proper end gap range is from a minimum of .016" to a maximum of .040". Check end gaps as shown in picture above.

The ZGS ring is a taper design. The dot on the ring indicates the top of the ring to be installed. When installed, the dot faces the top of the piston.

When installing the ZGS ring, put the inner boot into ring groove first. Then install ZGS ring into groove with the ZGS step gap 180° from the gap of the inner boot.

Be sure to liberally lubricate all of the piston rings, pistons, and cylinder bore with 50w engine oil to assure proper ring seating.