

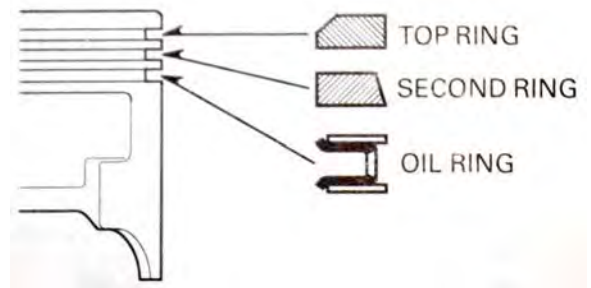


4-STROKE PISTON RING ASSEMBLY TIPS

Please note, the following tips for assembly and installing the rings on your 4-Stroke piston. Proper ring installation is mandatory to proper engine function. Failure to correctly install the rings will cause numerous problems.

Ring Gap: All ring sets **MUST** have the gap checked. The ring gap is checked by sliding each ring into bottom of the cylinder and measuring the end gap with a feeler gauge. The proper ring gap is .004" per one inch of bore size. For example: a cylinder with a 3.0" bore would have a ring gap of .012". Generally the ring gap will be too tight. To open the gap to the proper specification it is recommended to use a proper ring filer to adjust the gap to its correct size. After any rings have been filed you must check for burrs on the ends. Rings must be assembled burr free.

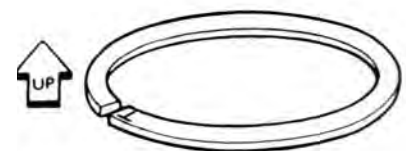
Figure 1



Ring Order Installation: Installing the rings it is best to install them in the following order. First install the 3- piece oil ring, 2nd install the middle ring, 3rd install the top ring. Failure to install rings from bottom of piston up will cause problems. Follow more elaborate instructions listed below.

Trade Mark Up: All Top and 2nd Rings have some identification mark on one end. This marks serves to identify upside of the ring. The I.D. mark can come in many forms. For Example: numbers letters or dots may be used 50, R, etc. The I.D mark **ALWAYS** goes up (Figure 2). Generally the 3-Piece oil ring has no trademarks and there is no specific upside. If there is absolutely no I.D. mark of any kind, look for a bevel or taper, this would go up. If there is both an I.D. mark and a bevel. The I.D. mark side should go up.

Figure 2



Top Ring: The top ring also referred to, as the compression ring must always be installed. This ring is usually lighter silver in color. Engine should **NEVER** be run without top ring. Power loss will occur along with engine damage.

The top ring is harder than the other rings.

2nd Ring: The number 2 ring will look similar to top ring but is generally dark in color. 2nd ring will also have an I.D. mark to designate the upside. The number 2 ring is not always critical to proper function. On some piston designs there is no second ring groove, this means you do not use the second ring on pistons of this design. If there is a 2nd ring groove machined in piston you must run 2nd ring.

Oil Ring: The 3rd ring is the Oil Ring. The oil ring is a 3-piece Design. Consisting of (1) expander and (2) scraper/wiper rings. After the gap is checked on all 3 rings, the expander is installed First. Then install scraper/wiper rings, one on each side of expander. It is very important that the ends of the expander do not over lap (Figure 3). This will damage expander causing power loss and engine to smoke unnecessarily. Gaps on scraper/wiper rings and expander may not be lined up. Lower scraper must be positioned at least 1" to the right of expander ring end. Upper scraper/wiper ring must be positioned at least 1" to the left of expander ring end.

It is also very important not to damage the flared tabs on inside of the expander ring (Figure 4) The inside edges of the scraper/wiper rings ride against these and the tension from the expander ring applies pressure to the scraper/wiper rings so they can do their job of wiping the oil off the cylinder while moving up and down the cylinder.

Figure 3

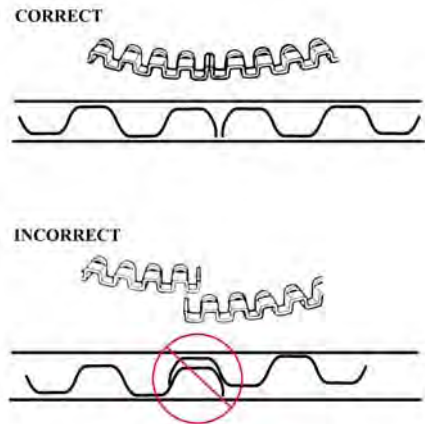


Figure 4



Piston/Ring Installation into cylinder: For proper ring installation ring gaps for each of the 3 rings should be staggered every 120 degrees (Figure 5). When installing cylinder down onto piston it is advisable to support piston. (A good way to do this is by putting some thin aluminum blocks under piston between piston skirt and base gasket surface). The cylinder must be gently slide down over piston simultaneously us a very small screwdriver or scribe to push in rings. **DO NOT FORCE CYLINDER DOWN.** It is advisable to check cylinder chamfer on bottom of cylinder wall and lubricate cylinder, specifically on bottom so ring will have less friction when the rings slide into cylinder. After piston /ring assembly is slide into cylinder. Slide cylinder into place. Turn crankshaft over 4-5 times. Listen for unnatural sounds.

Figure 5

