



Hi Tech
Engine's Components

INSTALLATION INSTRUCTIONS

➤ CYLINDER PREPARATION

Cast Iron Sleeved Cylinders

To ensure proper ring seal, it is necessary to hone the cylinder with a rigid or brush hone. DO NOT install a new piston without honing the cylinder to break the glaze. Finish hone with a 280 grit. Crosshatch is necessary to ensure proper ring seal and adequate lubrication. If the cylinder is in good condition, simply honing the cylinder may be enough to restore the bore to an acceptable condition. However in some cases, boring may be necessary to insure the cylinder bore is within the tolerances outlined in the service manual.

Plated Cylinders

Includes nickel ceramic coatings (Nikasil), chrome, Electrofusion, and boron composite. If the plated cylinder is in good condition, honing may not be necessary. If deglazing is necessary, DO NOT use a ball hone. Use a rigid or brush type diamond hone. Plated cylinders cannot be bored oversize without re-plating or re-sleeving. Any time a cylinder is bored or honed, all ports must be chamfered. The top of the cylinder should be deburred, and the bottom should be generously chamfered for ease of piston and ring installation. When boring a cylinder with an exhaust bridge, the face of the bridge must be relieved .002"-.004" to allow for bridge expansion. Without proper bridge clearance, engine damage could occur.

IMPORTANT: After honing, the cylinder must be washed with warm soapy water to remove all honing grit. Be sure to wash away any grit that may have traveled into the transfer and exhaust ports during honing. The cylinder is NOT clean until you can wipe the cylinder wall with a clean, oil dampened cloth, and it does not pick up any honing grit. Lightly oil the cylinder bore to prevent oxidation and assist with piston installation.

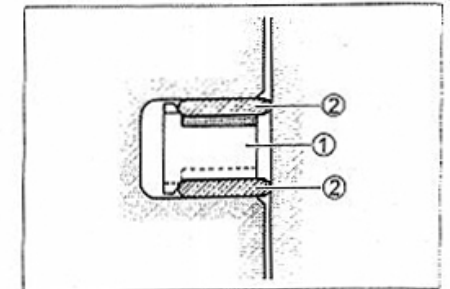
PISTON RING AND PISTON RESSEMBLY

PISTON RING

- Install the piston rings in the order of oil ring and 1st ring.
- The first member to go into the oil ring groove is a spacer (1). After placing the spacer, fit the two side rails (2).

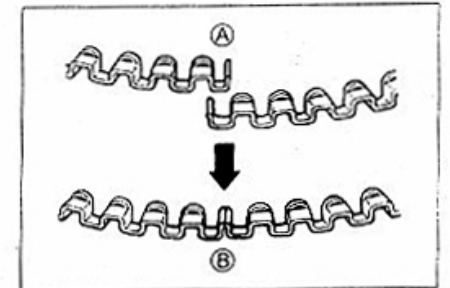
NOTE:

Side designations, top and bottom, are not applied to the spacer and side rails: you can position each either way.



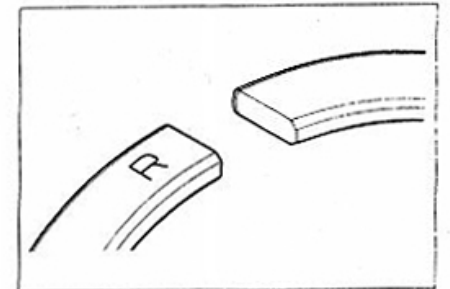
CAUTION

When installing the spacer (1), be careful not to allow its two ends to overlap in the groove.



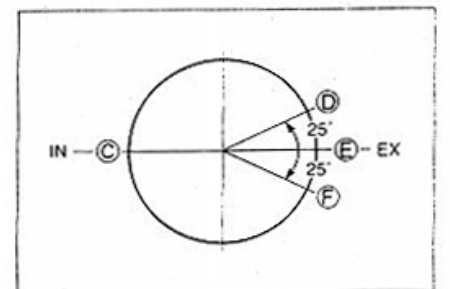
- Ⓐ INCORRECT
- Ⓑ CORRECT

- Install the 1st ring so that the "R" mark faces up.



- Position the gaps of the two ring as shown. Before inserting a piston into the cylinder, check that the gaps are so located.

- Ⓒ 1st ring
- Ⓓ Upper side rail
- Ⓔ Spacer
- Ⓕ Lower side rail



➤ PISTON INSTALLATION

VERTEX PISTONS are designed to run at a specific piston to cylinder clearance, and are manufactured under controlled conditions for a specific bore size. Finish hone the cylinder to achieve the recommended piston to cylinder clearance, which can be found on the below spreadsheet:

2 STROKE ENGINES Dirt / ATV / Snow / PWC / Street

FEATURES	50/124cc		125/249cc		250cc & over		
	inches	mm	inches	mm	inches	mm	
Piston/Cylinder clearance	from	0.0019	0.05	0.0019	0.05	0.0019	0.05
	to	0.0023	0.06	0.0023	0.06	0.0031	0.08
Piston's usage for	20 hours max		20 hours max		15 hours max		

2 STROKE ENGINES Go Kart

FEATURES	50/124cc		125/249cc		
	inches	mm	inches	mm	
Piston/Cylinder clearance	from	0.0031	0.08	0.0023	0.06
	to	0.0039	0.10	0.0031	0.08
Piston's usage for	2 hours max		4 hours max		

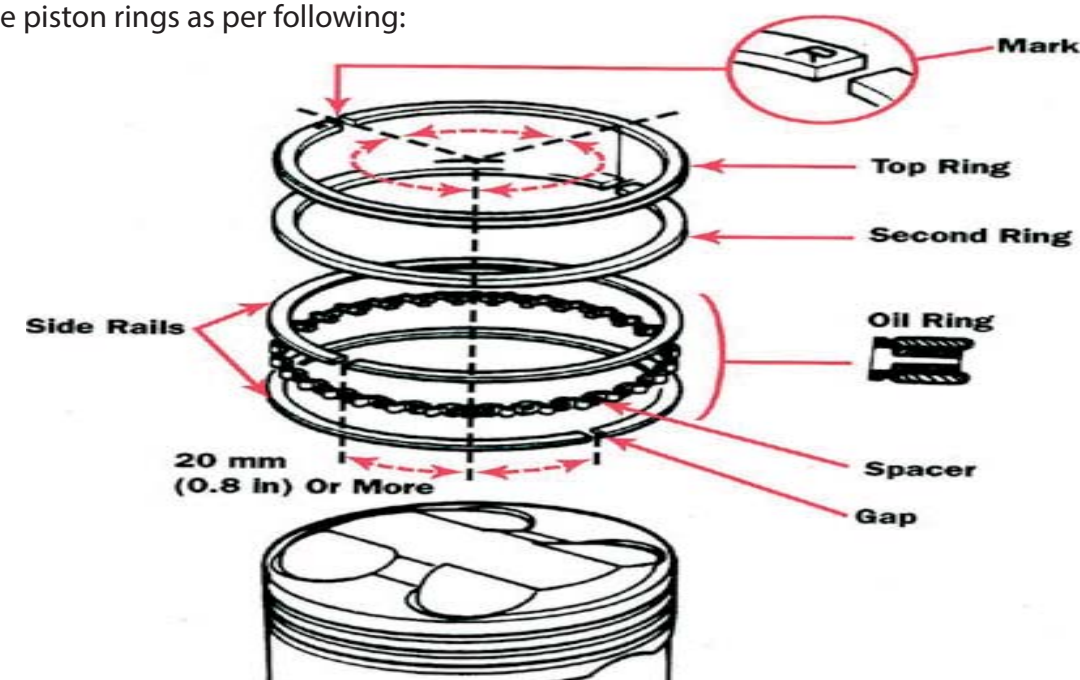
4 STROKE ENGINES Dirt / ATV / Snow / PWC / Street / Go Kart

FEATURES	50/124cc		125/249cc		250cc & over		
	inches	mm	inches	mm	inches	mm	
Piston/Cylinder clearance	from	0.0015	0.04	0.0015	0.04	0.0019	0.05
	to	0.0023	0.06	0.0023	0.06	0.0027	0.07
Piston's usage for	25 hours max		20 hours max		20 hours max		

NOTE: Additional bore clearance may be necessary for modified engines. (May include head or cylinder work, aftermarket pipe, or ignition modifications). **Additional bore clearance may also be necessary for cylinders utilizing a cast iron sleeve.** Always use new gaskets for assembly. No head gasket material should extend into the cylinder bore. When installing a piston that exceeds the OEM overbore sizes, it is recommended that you use an over bore gasket kit. (Most models available from VERTEX, check our catalogue)

➤ RINGS INSTALLATION

Install the piston rings as per following:



Pay strong attention to:

- Install piston rings with the 'letter' facing UP
- Rotate the ring end gaps on four stroke pistons with at least 20mm of separation
- AVOID OVERLAPPING THE ENDS OF THE OIL EXPANDER/SPACER RING

Ring Gap Table Instructions

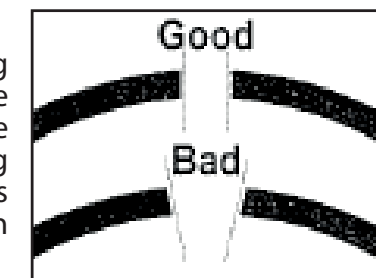
All VERTEX PISTONS rings are already fitted to perform as they are on OE and Cylinder Works cylinders in STD or BB versions. For different make or re-plated cylinders, pay particular attention to minimum gap as per below spreadsheet.

2 Stroke Engines	Minimum Ring Gap Per Inch of Bore		4 Stroke Engines	Minimum Ring Gap Per Inch of Bore	
	inches	mm		inches	mm
Dirt / ATV / Snow / PWC / Street	.006"-.009"	0,15 - 0,23	Dirt / ATV / Snow / PWC / Street	.004"-.006"	0,10 - 0,20

Notes:

Stock engines should be set up on the smaller end gap sizes. Modified engines that produce high engine operating temperatures should be assembled with end gaps at the larger sizes. On 4 stroke engines, the gap on the second ring usually should be larger than the top ring end gap, this will help to reduce top ring flutter or lifting.

ADVICE - Place a shop towel over the engine case opening to avoid dropping any components into the engine. Install the piston with rings onto the connecting rod. The arrow on the dome MUST point toward the exhaust side of the cylinder. Install the cylinder as outlined in the service manual, using proper assembly methods and torque specifications. A break in procedure is necessary for proper ring seal. Refer to the service manual for proper break in procedures, air filter service, and oil premix ratios.



IMPORTANT - Piston pin retainers must be installed with care. Wire type retainers and snap-ring type retainers must not be collapsed smaller than the piston pin-hole diameter when being installed into the piston.

CAUTION - If the piston pin retainers are damaged, crimped, bent, or over-collapsed upon installation, the piston pin retainers may fail as the result of this damage. If piston pin retainers become damaged upon installation, ask VERTEX for new retainers.

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