

Instruction 510-0007
10-5-10

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845-744-4889
www.lloydz.com

25 Railroad Ave
PO Box 11
Pine Bush, NY 12566

Installation Instructions for Lloydz Motorworkz 107" and 114" Big Bore Kit for Victory® Motorcycles

KIT CONTENTS:

- 2 – 4.125" (104.77mm) pistons matched to cylinders
- 2 – piston pins
- 2 – Piston ring sets for front and rear pistons
- 4 – Piston pin clips
- 2 – Head gaskets
- 2 – Victory® cylinders sleeved and machined

ADDITIONAL PARTS REQUIRED:

- 2 – 5244365 Stock Victory base gaskets
- 2 – Stock Victory rocker cover gaskets for the specific model you are working on
- Any other o-rings, gaskets, assembly lube, and oil called out in your Victory Service Manual for performing an engine build and installation into the specific motorcycle you are working on.

SPECIAL TOOL REQUIREMENTS:

- Victory service manual – Available through Polaris® dealers
- Piston C-clip installer
- Piston ring compressor
- Piston ring expander
- Piston ring end gap filing tool
- Digital or dial calipers
- Feeler gauge
- Air fuel ration meter



Lloydz Motorworkz Big Bore Kit

WARNING

- **The safety of the motorcycle rider is dependent on proper installation of this product. If you are not certain of your capabilities or do not have the correct tools for this installation, please consult a dealer to have it done. Improper installation of this product could result in injury or death to the rider.**
- **Be sure to disconnect the battery of your motorcycle before starting on this procedure. Accidental starting of the motorcycle could cause injury to you or others around you during the installation.**
- **Air/Fuel mixture MUST be checked prior to riding. A proper A/F ratio must be obtained to ensure longevity and prevent premature failure. Engine damage caused by incorrect fuel ratios will not be covered under warranty.**

ENGINE SPECIFICATIONS AND GENERAL INFORMATION

- The rear pistons are notched to accommodate a 108mm stroke crank with 175.5mm connecting rod.
- The big bore kit is intended for all 2003 and up Victory® motorcycles.
- Lloydz Motorworkz recommends using the stock 100" / 106" green clutch spring and the Variable Pressure Plate Clutch when installing the 107"/114" big bore kit.
- It is up to the technician to ensure that the motorcycle is running the proper air/fuel mixture.
- In all cases it is the engine builder's responsibility to confirm proper engine clearances and thoroughly read and understand the assembly instructions prior to assembly to ensure the proper tools and parts are present to complete the engine build.
- Pistons are fit to the cylinders in which they are received and must be kept together.
- The 107" and 114" big bore kits are intended to use stock Victory base gaskets, part number 5244365.
- The 107" and 114" big bore kits are designed to use the supplied head gaskets in the kit.
- Failure to follow instructions and perform required clearancing, installation and/or break-in procedures may result in damage to pistons and or other engine components not covered under warranty.

CLEANING AND PREPARATION OF PISTONS AND CYLINDERS

WARNING

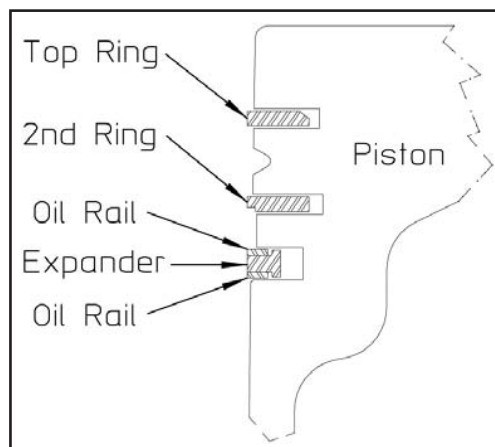
Always wear eye protection when using parts cleaner and compressed air.

- 1- Thoroughly clean the front and rear cylinders for assembly. Lloydz Motorworkz recommends cleaning the cylinders in mineral spirits to clean the oil from the cylinder walls and then clean with hot soapy water and a soft plastic brush or cloth wash rag. Rinse soap off with hot water and blow dry with compressed air. Immediately coat the cylinder lines with a film of engine oil.
- 2- Wash pistons in mineral spirits to clean oil from the pistons and then with hot soapy water and wash rag. Rinse pistons with hot water and blow dry with compressed air. Immediately coat the cylinder liners with a film of engine oil.

CHECKING AND SETTING RING END GAPS

NOTES:

- **Important!** The gap of the second ring should be larger than the top ring; this will help keep the top ring seated for improved performance.
- Each piston ring must be fit to the particular cylinder in which they will be installed.
- Oil rails can be installed without adjusting the end gap. The minimum gap should be 0.010"
- See diagram below for the order of piston rings assembled on the piston.



NOTE: The top piston ring has a shiny chrome color and has a letter "N" that designates the top of the ring. The second ring has a dull black finish and has a letter "N" that designates the top of the ring. In both cases the letter "N" should face upwards toward the top of the piston. The oil rails and expanders can be installed in either direction.

SUGGESTED RING END GAPS			
Ring	Ring Gap Tolerance (inches)		Target Gap
	Min	Max	
Top	0.018"	0.023"	0.018"
2nd	0.022"	0.027"	0.022"
Oil ring rails	0.010"	0.050"	0.015" to 0.050"

1- Check the ring end gap by placing the ring into the cylinder. Use a piston or caliper to ensure that the ring is placed squarely in the bore as illustrated in **Picture 1**.



Picture 1

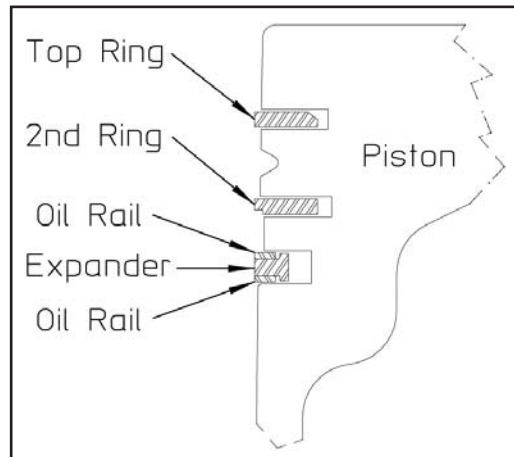
2- Measure the ring end gap with a feeler gauge as illustrated in **Picture 2**.



Picture 2

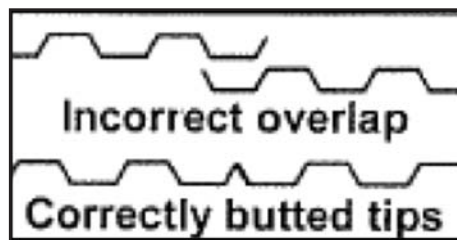
- 3- See table for proper end gap measurement. If adjustment to the gap must be made, use a proper ring end gap filing tool.
- 4- Always file from the ring face towards the inside diameter to avoid damaging the face coating.
- 5- Remove material from only one end of the ring.
- 6- Ensure that ring end gaps are square.
- 7- Remove sharp edges and burrs.
- 8- Recheck gap measurement and adjust as necessary.
- 9- Repeat procedure with the other rings.

PISTON RING INSTALLATION



NOTE: The top piston ring has a shiny chrome color and has a letter "N" that designates the top of the ring. The second ring has a dull black finish and has a letter "N" that designates the top of the ring. In both cases the letter "N" should face upwards toward the top of the piston. The oil rails and expanders can be installed in either direction.

- 1- Install the oil ring expander to the bottom groove of the piston. The expander ring has a gold finish. Make sure the end of the expander ring is butted together and not overlapping. If the tips are overlapped, excessive oil consumption will occur. Orient the expander gap according to the diagram below.
- 2- Install oil rails. The oil rails are the thinnest of all the rings. Either side can be placed up. Use a ring expander to install the rails into the groove.

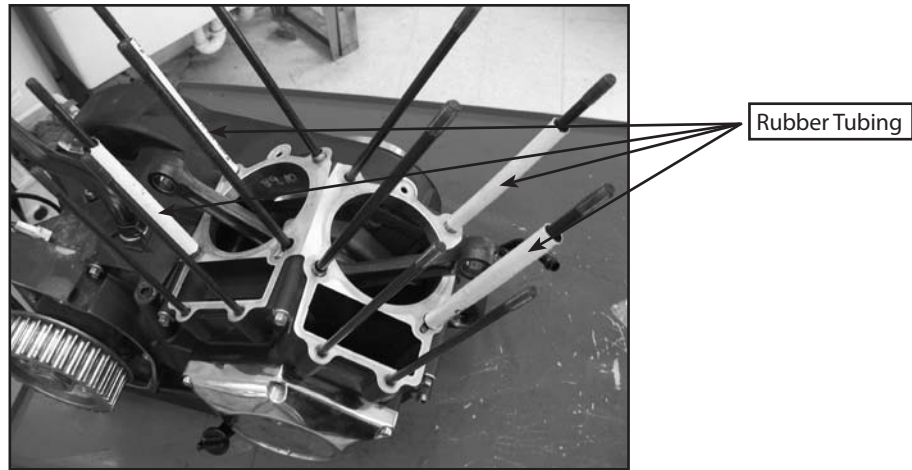


Install one rail above the expander, and one below.

- 3- Install the 2nd ring with the letter "N" facing up. The 2nd ring has a dull black finish. Use an expander to install the ring to the 2nd groove in the piston.
- 4- Install the top ring with the letter "N" facing up. The top ring has a shiny chrome color. Use an expander to install the ring to the top groove.

FRONT PISTON INSTALLATION

- 1- Place rubber tubing over cylinder studs to prevent damage to the pistons and rings during assembly as illustrated in **Picture 3**.

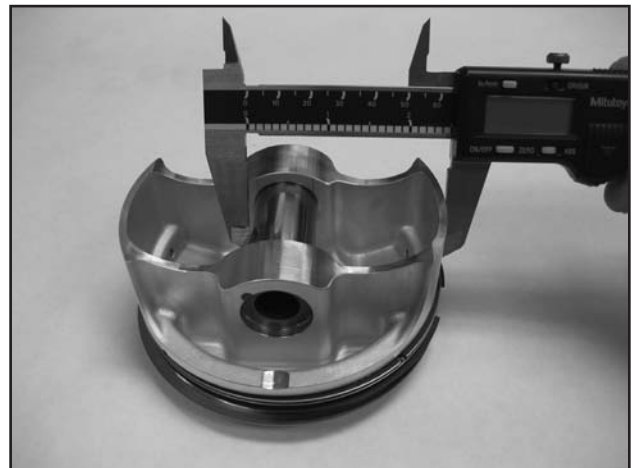


Picture 3

- 2- Place a clean piece of plastic sheeting over the crankcase openings to prevent anything from dropping into the crankcase.
- 3- Pistons have a .020" offset piston pin and the offset must go toward the rear of the engine. Slide the piston pin into the piston and lay the piston with the top side down on your work bench. Using dial or digital calipers take a measurement from the pin to the piston skirt on both sides as illustrated in **Picture 4 and 5** and record your measurement. The measurement with the least amount of distance from the pin to the skirt will go toward the rear of the engine. A Sharpie® can be used to mark the direction of offset on the piston pin boss as illustrated in **Picture 6**.



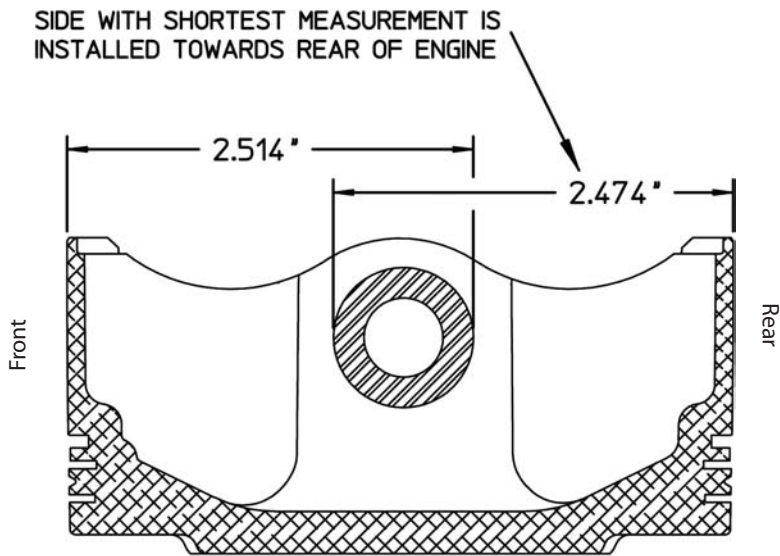
Picture 4



Picture 5



Picture 6

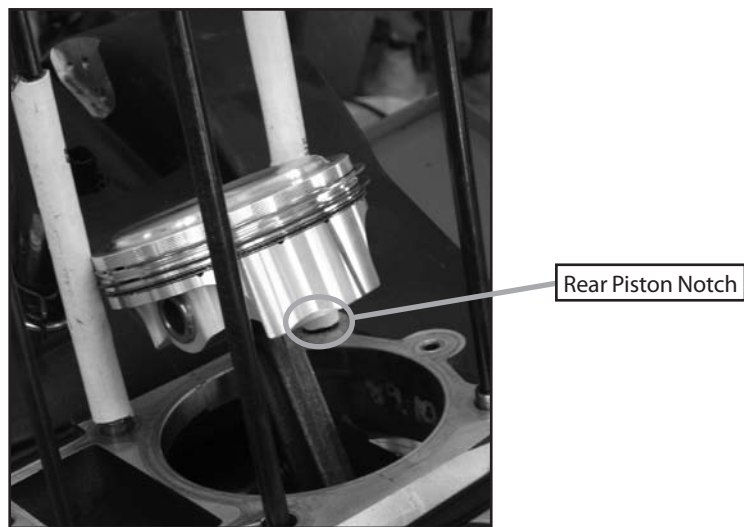


Section Through Piston

- 4- With the front piston on your work bench install one of the piston pin clips into the piston on the cam chain side. Make sure the piston pin clip opening is facing up when installed.
- 5- Lightly oil the piston pin, piston pin bore and upper connecting rod bushing with clean Victory® 20W-40 motor oil.
- 6- Hold the piston over the connecting rod with the piston facing the correct direction and the piston pin bore and upper bushing bores lined up.
- 7- Install the piston pin through the piston pin bore and through the connecting rod bushing until the pin contacts the clip.
- 8- Install the other piston clip with the opening facing up. Ensure that both clips are fully seated.

REAR PISTON INSTALLATION

- 1- The rear piston is notched for piston to piston clearance and must be assembled with the notch facing the front of the engine as illustrated in **Picture 7**.

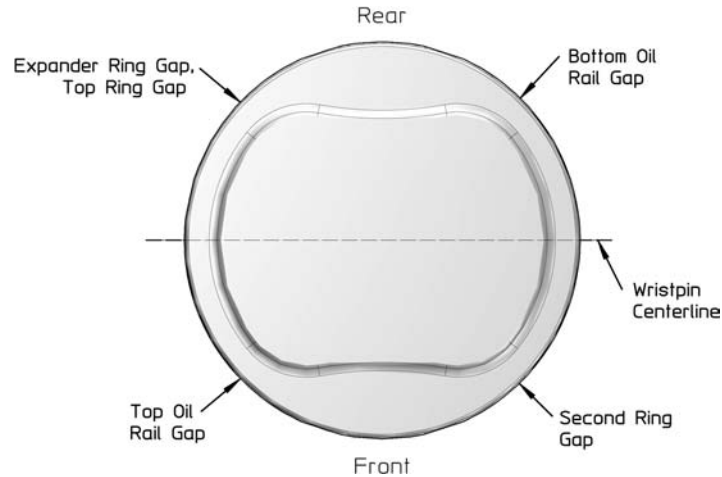


Picture 7

- 2- Lightly oil the piston pin, piston pin bore and upper connecting rod bushing with clean Victory® 20W-40 motor oil.
- 3- Hold the piston over the connecting rod with the piston facing the correct direction and the piston pin bore and upper bushing bores lined up.
- 4- Install the piston pin through the piston pin bore and through the connecting rod bushing until the pin contacts the clip.
- 5- Install the other piston clip with the opening facing up. Ensure that both clips are fully seated.

PISTON RING ORIENTATION

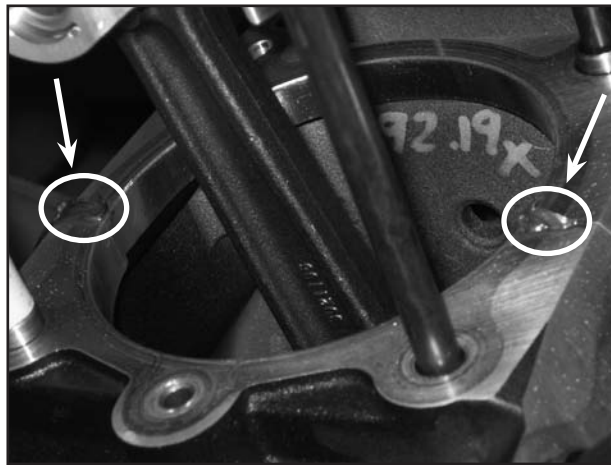
- 1- Piston ring gaps will need to be oriented to proper position before the cylinder is installed. Follow the diagram below for proper orientation of piston ring gaps.



- 2 – Once the front and rear piston ring gaps are properly oriented you can move on to cylinder installation.

FRONT CYLINDER INSTALLATION

- 1- Remove plastic sheeting from crankcase and wipe the engine case base gasket surface clean of any oil or debris on both front and rear gasket surfaces.
- 2- Apply Loctite® 598 sealer or an equivalent sealer to the crankcase parting line where the front base gasket will be placed as illustrated in **Picture 8**.



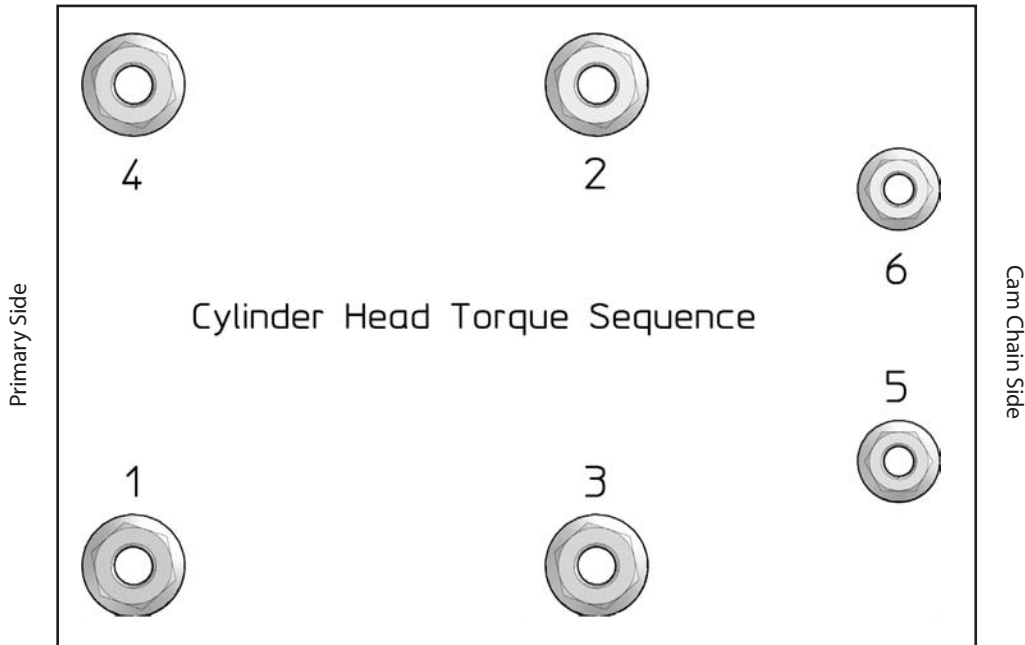
Picture 8

- 3- Remove the rubber tubing from the front cylinder studs and install a new Polaris® base gasket, Polaris part number 5244365.
- 4- With the front piston at Top Dead Center (TDC) apply a light coating of oil to the piston, rings and cylinder walls.
- 5- Verify that the ring gaps are orientated correctly and install a piston ring compressor around the piston and rings and compress the rings so the cylinder can be installed.
- 6- Install cylinder over piston and piston rings and remove ring compressor.
- 7- Finish sliding the cylinder down until it seats against the base gasket.
- 8- If there is excess oil from cylinder installation on the head gasket surface of the cylinder wipe it off at this time.
- 9- Install one of the supplied head gaskets on top of the cylinder. Both head gaskets are the same and can only be installed in one direction. Head gaskets are designed to be installed dry. Make sure there is no oil on the machined cylinder gasket surface or the head gasket.
- 10- Install the cylinder head followed by the cam carrier.

NOTE: If the cam is installed into the cam carrier assembly, make sure the lobes of the cam are facing down so the rocker arms are not opening the valves when torqued down.

- 11- Apply Victory® 20W-40 engine oil to the threads of all cylinder head nuts, nut bases, and washers.
- 12- Install all washers and nuts on cylinder studs and finger tighten.
- 13- Follow the cylinder head torque procedure and sequence below to ensure accurate final torque.

CYLINDER HEAD TORQUE PROCEDURE	
Step 1	Torque all nuts to 10 ft.lbs. following the pattern below
Step 2	Torque the 10mm nuts (1-4) to 20 ft.lbs.
Step 3	Torque the 10mm nuts (1-4) to 30 ft.lbs
Step 4	Torque the 10mm nuts (1-4) to 40 ft.lbs.
Step 5	Torque the 8mm nuts (5-6) to 18 ft.lbs.



REAR CYLINDER INSTALLATION

- 1- Apply Loctite® 598 sealer or an equivalent sealer to the crankcase parting line where the rear base gasket will be placed as was done on the front case parting line.
- 2- Remove the rubber tubing from the rear cylinder studs and install a new Polaris® base gasket, Polaris part number 5244365.
- 3- With the rear piston at Top Dead Center (TDC) apply a light coating of oil to the piston, rings and cylinder walls.
- 4- Verify that the ring gaps are orientated correctly and install a piston ring compressor around the piston and rings and compress the rings so the cylinder can be installed.
- 5- Install cylinder over piston and piston rings and remove ring compressor.
- 6- Finish sliding the cylinder down until it seats against the base gasket.
- 7- If there is excess oil from cylinder installation on the head gasket surface of the cylinder wipe it off at this time.
- 8- Install the remaining head gasket on top of the cylinder. Head gaskets are designed to be installed dry. Make sure there is no oil on the machined cylinder gasket surface or the head gasket.
- 9- Install the cylinder head followed by the cam carrier.

NOTE: If the cam is installed into the cam carrier assembly, make sure the lobes of the cam are facing down so the rocker arms are not opening the valves when torqued down.

- 10- Apply Victory® 20W-40 engine oil to the threads of all cylinder head nuts, nut bases, and washers.
- 11- Install all washers and nuts on cylinder studs and finger tighten.
- 12- Follow the cylinder head torque procedure and sequence above to ensure accurate final torque.

FINAL ASSEMBLY

- 1- Finish assembling the remainder of the engine following your factory Polaris® Victory® service manual for the specific motorcycle you're working on. A new oil filter should be installed and new Victory 20W-40 motor oil filled to the proper level.
- 2- Once final assembly is complete the proper tuning must be completed before the engine can be broken in. An aftermarket tuning system must be used to correctly adjust the fuel control system to correctly function with the newly installed parts.

ENGINE BREAK-IN PROCEDURE

NOTE: Lloydz Motorworkz components are designed for high performance use and are not tolerant to inadequate break-in. Correct break-in will ensure longer engine life and will prevent unnecessary engine damage. Engine damage caused by improper break-in is not covered under the warranty.

- 1- Initial start up. Run the engine approximately one minute at 1250-1750rpm. DO NOT crack the throttle or subject the engine to any loads during this period as head gaskets are susceptible to failure at this time. During this time check to see that oil pressure is normal and inspect for leaks.
- 2- Shut off engine and inspect for leaks. Allow engine to cool to the touch.
- 3- Start up engine again and allow the engine to warm up for 3 to 4 minutes. DO NOT crack the throttle or subject the engine to any type of load. Shut down the engine and allow to cool. Repeat this procedure at least 3 more times.
- 4- After the engine has cooled to room temperature you are ready to start the 500 mile engine break-in process. The first 50 miles are the most critical for new rings and piston break-in. Avoid lugging the engine, riding in hot weather or in traffic. Vary the engine speed but do not exceed 2500 RPM. Lloydz Motorworkz recommends changing the oil and filter after the first 50 miles.
- 5- The next 500 miles should be spent varying RPM and running no faster than 3500 RPM or 60 MPH. Avoid lugging the engine and running continuous steady speeds. Lloydz Motorworkz recommends changing the oil again at 500 miles.
- 6- For the balance of the first 1000 miles the engine can be run in a normal but conservative manner. You can be more liberal with the RPM range and the motorcycle can be operated at normal highway speeds. Avoid overheating or putting any hard strain on the engine; no drag racing, dyno runs, excessive speed, trailer towing or side car operation.
- 7- After 1000 miles Lloydz Motorworkz recommends changing the engine oil and filter. Now the motorcycle can be operated normally.

Thank you for choosing Lloydz Motorworkz Performance Products.



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