Small block – Cast Iron 125 – 175

SMALL BLOCK CAST IRON 125, 150, 175

This section gives a traditional insight into what can be done to genuine Italian, Spanish and Indian cast iron oval type 125, 150 and 175 cylinders. Today these conversions have been put on a back burner as there are so many new kits available for the small block engine casing (these are covered more in depth on other sections) These genuine style cylinders done correctly can give excellent results and years of life, in fact these conversions are making a comeback because of simplicity that has stood the test of time.

125cc = Bore 52mm x Stroke 58mm
150cc = Bore 57mm x Stroke 58mm
175cc = Bore 62mm x Stroke 58mm

Adding a 60mm crankshaft will increase the cc of the engine and help with pulling power, but these are not always a straight swap. There are 61, 62, 63 and 64mm stroke crankshafts but these are really not required for any of these conversions.
125, 150 and 175 ENGINE BASICS

Li 125, 150 Series 1
Li 125, 150 Series 2
Li / Sx / 125 Series 3

Tuning to the original cylinder is not really recommended because much work is involved for very little improvement (Except 150 Series 2, these are OK). Boring the 125 cylinder beyond 150 cannot be done so MB would prefer to convert to a series 3 150 cylinder or a 175 cylinder and then use a 2 ring 175-conversion piston.

We recommend that the original con-rod or crankshaft be replaced for a series three type or upgrade to a GP standard or race crankshaft. If upgrading the crankshaft then upgrade the flywheel and stator to a later type, or better still upgrade to GP electronic ignition. MB don’t recommend SX electronic ignitions the flywheel weight is too heavy for the crankshaft and snapping of the taper or crank pin can occur, it is also prone for the cam to split!

If upgrading to a GP crankshaft high load bearings are required. (Series ones require a later type magneto housing.)

GP 125

Tuning to the original cylinder is not really recommended because much work is involved for very little improvement. Boring the 125 cylinder beyond 150 can not be done so MB would prefer to convert to a Series 3 150 cylinder or a 175 cylinder and then use a 2 ring 175-conversion piston.

The original crankshaft and ignition can be used but MB Developments recommend converting to GP200 standard or race type crankshafts, upgrade

bearings and convert to GP electronic ignitions.
We recommend that the crankshaft be replaced as the original crankshaft uses an SX type crank pin and has been know to snap!

Li / Sx / Special / Pacemaker 150, Series 3, GP 150

Tuning to any type of cylinder can be done, MB recommend boring out to 175 then use a conversion 2-ring piston. The original crankshaft and ignition can be used but MB recommend converting to GP standard or race type crankshafts, upgrade bearings and convert to GP electronic ignitions.

Tv 175 Series 2
Tv 175 Series 3

Tuning is no problem but the original piston is not very good for other than a mild tune. Converting to a MB RT 30/31mm compression height piston or Suzuki 190 (32mm) piston is a better option to suit the TV116mm rod length. Ideally MB would convert the crankshaft to a Li / Sx with the shorter rod or better still convert to GP standard or race type crankshafts or rod conversion, then use the better quality 2 ring 175 conversion pistons.

MB SCOOTERS LTD TUNED KIT RECOMMENDATIONS

125, 150 engines

Tuning and boring 125 and 150 engines is usually a waste of time, it is more beneficial to jump to the a Tv175 cylinder and conversion piston to suit the 107mm con rod or do a 150 – 175 conversion. MB recommend a number of conversions that have proved to be the best set-up for all round performance.

1) 150 – 175/190/195 conversion

150 cylinders bored to 175cc (or use 175 cylinders) then use a performance conversion piston starting at 62mm. Or convert to our own MB forged pistons starting at 64mm

PROS: Good quality piston kits with a good selection of oversizes, from 62 to 63mm for Vertex pistons although there are a lot of Indian copy pistons around these days. Or use our excellent MB forged pistons from 64-66mm. A good kit to do either Stage 2, 3, 4 or a mild stage 5 kit when using Lambretta pistons. Full stage 5 or 6 tunes are ideal with the MB piston. A cheap conversion and can use existing crankshaft / ignition set up. No cylinder machining is required.

CONS: None really, Lambretta pistons are not really suited to full stage 5 race conversions but still work fine.

2) 150 / 175 – 190 Suzuki conversion

150 cylinders bored to 190cc or better still 175 cylinders bored to 190cc using a Japanese Suzuki piston starting at 64mm with a compression height of 32mm or use our own MB Race-Tour pistons at 64mm with a compression height of 30/31/32mm. 150 cylinders should not be bore straight out to 66mm (200cc) but

175 cylinders can be and have been ok in the past.

Use the original crankshaft (107mm) and ignition set up or convert to standard or race type GP crankshafts.

PROS: Excellent quality Suzuki piston kits either genuine or pattern and easily available with a good selection of oversizes 64 to 65mm (Japanese style) then 65.5 to 66mm (Wiseco) Good kit to do Stage 5 or 6. MB offer 64, 64.5, 65, 65.5 and 66mm.

CONS: Because of the layout of 150/175 cylinder castings, lower tunes are difficult to do with Suzuki pistons using a standard 107mm con rod, which gives a large inlet port timing and or oversized transfer timings as well which will not run right or give a lot of spit back. Expensive, as it requires a new crankshaft, bearings and ignition, requires a lot of machining work to be carried out to the cylinder. Extra machining to the cylinder base makes exhausts difficult to fit.

Change the crankshaft to GP then use a Yamaha con rod (110mm).

PROS: Excellent strong kit, good piston as above and rod set up ideal for stage 2, 3, 4, 5 and 6 tunes, by using the longer con rod less machining is required and improves inlet port timing.

CONS: Expensive requires crankshaft or con rod swap, bearings and ignition change. Could need exhaust modifying to suit the machined cylinder.

Change the crankshaft to GP then use a Yamaha con rod (115mm) this then requires a cylinder packing plate. Or use a standard or uprated 116mm con rod crank shaft.

PROS: Excellent quality piston kits as above with a good selection of oversizes 64 to 66mm. Good kit to do Stage 2, 3, 4, 5 or 6.

CONS: A little more expensive due to the piston, crank or con rod swap required, this is the preferred way to do a 190 conversion.

3) 175 – 195/200 conversions

175 cylinders bored to 195/200cc using our own forged MB 2 ring pistons at 65-66mm allowing for rebores or you could ceramic plate the bore.

PROS: Excellent piston kits, good kit to do Stage 2, 3, 4, 5 or 6. If you used Ceramic plating in theory this means less friction and is harder wearing and longer lasting. The largest safest cast kit available. No cylinder machining is required using a standard 107mm rod.

CONS: The kit requires the expense of normal conversion reboring and tuning work, and; then if required ceramic plating (a chrome plating method) makes the kit expensive.

175 engines

MB Scooters Ltd recommend a number of conversions that have proved to be the best set-up for all round performance.

1) 175 tune

The main difference between all other cylinders and the 175 engine is the con rod length which is 116mm on the 175 and 107mm on the rest of the Lambretta engines.

Mild tune using the original crankshaft and piston set up.

PROS: Cheap kit uses existing parts. Has a number of oversizes. OK for Stage 2 or 3.

CONS: Only mild tuning should be done to look after the original piston. Uses old parts and technology. Pistons are be coming harder to find.

175 cylinders converted to use Series 3 type crankshafts – see 1, 150 – 175 conversions above

2) 175 – 190 Suzuki/MB Race-Tour conversion

175 cylinders bored to 190cc using a Japanese Suzuki piston starting at 64mm. This can be done in a number of ways.

Use the original crankshaft and con rod (116mm) convert the cylinder and head, this then requires a cylinder packing plate.

PROS: Cheapest 175 – 190 kit and uses existing parts. Excellent quality piston kits with a good selection of oversizes 64 to 65mm (Japanese) then 64 to 66mm (Wiseco) and 64 to 66mm (MB Race-Tour)

CONS: Uses existing old parts. Because of this there could be a limitation with tuning spec as the crank and con rod wil be the week link.

Change the crankshaft to GP or (Li / Sx) then use a standard or race type con rod (107mm) then convert the cylinder and head to suit.

PROS: Excellent quality piston kits with a good selection of oversizes 64 to 65mm (Japanese) or 64 to 66mm (Wiseco) and 64-66mm (MB Race-Tour) Good kit to do Stage 5 or 6 tunes.

CONS: Because of 175 cylinder casting, lower tunes are difficult to do because of increased inlet port and transfer timings combination and spit back based on shorting the piston so it doesn’t hit the engine case, this applies to all of the Suzuki 190 piston conversion using standard 107mm rods. Expensive, as it requires a new crankshaft, bearings and ignition, requires more work to be carried out to the cylinder. Extra machining to the cylinder makes exhausts difficult to fit.

Change the crankshaft to GP then use a Yamaha con rod (110mm) then convert the cylinder and head to Suzuki.

PROS: Excellent strong kit, good pistons and rod set up, the extra length in rod reduces inlet port timings and is ideal for stage 2, 3, 4, 5 and 6 tunes.

CONS: Expensive – requires crankshaft, bearings and ignition change. Could need exhaust modifying to suit the machined cylinder.

Change the crankshaft to GP then use a Yamaha con rod (115mm) or race rod at 116mm, convert the cylinder and head, this then requires a cylinder packing plate.

PROS: Excellent strong kit good piston and rod set up ideal for stage 2, 3, 4, 5 and 6 tunes.

CONS: Expensive requires crankshaft, bearings and ignition change.

CYLINDER BARREL DIFFERENCES

There are many differences between cylinders of different models, manufacturers and production runs, it is nearly impossible to know all these differences and as time goes on we will probably never find out!

Whatever the differences, it makes very little difference when tuning or converting to a modern tune!

In terms of modernising a Lambretta with this article we are ignoring all 125cc cylinders and early 150 cylinders.

This leaves us with Sx150, Li150, Pacemaker and Gp150 cylinders. There are differences between these but are basically the same to look at.

An easy way to find out if a cylinder is a 150 type is to measure the bore (57+mm) and then measure the diameter between the 3rd and 4th fins, a 150 cylinder should measure 69.5mm. The major differences with 150 type cylinders are cylinder and port heights, it is critical to check squish clearances on rebuilding a 150-type tune. These differences can be over come by using a fat base gaskets or packer. The differences show up when doing an old style Suzuki 190 tune. 5mm has to be taken from the base of the cylinder, the piston needs shortening to clear the casing at bottom dead centre. Then when setting up the tune and checking the port timings you find that inlet ports are abnormally small or too large and transfer timings can be spot on or far to big making the barrel slower than standard! For this reason I try to stay clear of this set up tune (Suzuki 190 with 107mm con rod!)

Considering this information if we used the same different cylinders with a Vertex type piston and 58 x 107mm crank the problem doesn’t effect the tune, because of the length of the piston skirt. This is the reason why Suzuki tunes work better with 110 and 115mm Yamaha con rods.

The TV175 to look at is different with transfer, inlet and exhaust port sizes, but done correctly affects nothing using one for a tuned kit. A TV 175 cylinder would have a bore of 62+mm and would measure 80mm between 3rd and 4th fins. The TV type of cylinder is the best to do a 190 conversion as the bore is much thicker. These days Tv175 cylinders are near impossible to find.

Spanish 150 cylinders have different port heights and tend to be slower as standard, but once tuned are fine. (Be very careful with Suzuki 190 tunes with 107mm rods as transfer heights become massive or transfer timings can be good and inlet timings are to big)

Indian 150 cylinders tend to have smaller ports but once tuned are fine, but there really is a lot of work to do with these especially the later types which maybe bored out to 175.

There has been over the years a number of pattern cylinders for 150 and 175 engines, some worked most didn't. Most were very badly cast, machined and were soft, these didn't last very long, these kits are still around today beware! There are also barrels from Lambretta 3 wheelers on the market. These barrels do not work well on Lambretta 2 wheelers!

PISTONS

In the above list different pistons can be used: They are as follows:

Asso/Vertex/Indian copies 150 to 200cc conversion pistons, available sizes are: 62, 62.4, 62.6, 62.8, 63 and 66mm.
Suzuki 190 to 195cc genuine pistons, available sizes are 64, 64.5 and 65mm.
Suzuki 190 to 200cc pattern pistons, available sizes are 64, 64.5, 65, 65.5 and 66mm.
Suzuki 190 to 200cc Wiseco pistons, available sizes are 64, 64.5, 65, 65.5 and 66mm.
MB Race-Tour 190 to 200cc pistons, available in 64, 64.5, 65, 65.5 and 66mm in standard 39mm compression heights or lower 30-31-32mm compression heights.

If you were to convert to a reed valve this opens up more conversions, you can use any of the above and modify the piston to suit or use any of these pistons (To be covered in another section).

Yamaha 190 to 200cc genuine pistons, available sizes are 64, 64.5 and 65mm.
Yamaha 190 to 200cc pattern pistons, available sizes are 64, 64.5, 65, 65.5 and 66mm.
Yamaha 190 to 200cc genuine pistons, available sizes are 64, 64.5, 65, 65.5 and 66mm.
MB Race-Tour 190 to 200cc, available sizes are 64, 64.5, 65, 65.5 and 66mm.
Other piston kits are available some are good some are not.

These makes have or are available. They all use cast iron rings, which in tuned kits do tend to become ring droppers and break. We try to avoid any of these sizes in decent tunes but are ok for standard or very mild tunes with narrow exhaust ports, usually available in sizes 62, 62.2, 62.4, 62.6, 62.8, 63, and 66mm.

Borgo
Heporlite
Diamond
Mahle
GOL (2 ring)

Asso/Vertex (3 ring)
GPM
Meteor
Speed
Siam
Comec
Dinamin

These pistons are usually better and should have better rings but these days you just don’t know

SR
Vertex 2 ring
Asso 2 ring
Asso/Vertex Indian copies boxed as Escorts

We prefer to use these pistons in 150 -175, 175 – 190/195/200 cylinder conversions.

MB Race-Tour
Suzuki

MB offer these services to Small Block tuning

Reboring

- Single rebore and hone
- Up to 2mm rebore and hone
- Up to 4mm rebore and hone
- Up to 5mm rebore and hone

Head reprofiling

- Race compression
- Road compression
- Recess for long strokes

Pistons

- Suzuki TS185 190cc
- Yamaha GT190
- MB RT 64mm 190 107mm con rod
- MB RT 64mm 190 115/116mm con rod

Inlet manifold work

- Match and flow
- Match and flow inlet bolted to cylinder

Tuning

- Stage 2
- Stage 3

- Stage 4
- Stage 5
- Stage 6

If you want to ask a question email Mark on mark@mbscooters.co.uk