

Fitting, Engines – MBgm RT Cylinders

FITTING MBgm RACE -TOUR 195/200 – 225/230

These are a quicker simplified fitting instructions for the new MBgm Race-Tour 65mm 195-200cc and 70mm 225-230cc cylinder kits.

You need to also read elsewhere

- In depth cylinder fitting instructions
- bgm's fitting instruction
- Setting squish clearance
- Setting up an engine and carburation
- Setting up ignitions
- Setting up packing plates

You can read the story and the technical side of the Race-Tour cylinder kits and the differences between the early UK versions and the latest versions

- MB UK 190, 195, 200 kit
- MB UK 200, 210, 220, 225, 230, 235, 240, 255 kits
- MBgm 195 – 200 kit
- MBgm 225 – 230 kit

In the box, you should have

- MBgm Race-Tour Alloy plated cylinder
- MBgm Race-Tour CNC billet cylinder head
- MBgm piston kit 65 mm or 70mm
- MBgm cylinder studs, nuts and washers – these can be upgraded to the MB versions
- MBgm exhaust studs
- MBgm Brass exhaust nuts
- 7mm plain and spring washers
- Gaskets
- MB gm 0.5 and 0.7mm cylinder alloy base gasket/packers

It may seem over the top giving customers so much setting up information, but you really do need to know these things and a customer should take some responsibility for himself and the engine parts you are fitting. At the same time you may learn a lot more about the engines internals and how a engine should run. The more information we give the less blame you can give us.

Read and read again, if you are not sure take it to a professional to do.

The MBgm Race-Tour kit is probably the most versatile cylinder kit on the market allowing setting the kit up on a number of crankshaft/con rod combinations with very little modifications.

So to start with, have clean hands and use a clean cloth to wipe oil, dust and dirt and make that a habit rebuilding engines

First off check everything has arrived in good order, make your self aware of the cylinders design and it's improvements over other kits. You will notice the head varies over other kits. It is now made from solid billet and is CNC machined. Note the combustion chamber area is designed to drop into the bore to locate and centralise the head to get perfect squish clearances.

Check the head fits into the bore, it should slide in if you enter it centrally, put it in on an angle and it will lock up. All it needs is to wiggle or tap by hand to get the head into the bore. Note also the head and cylinder has four extra bolt/stud holes compared to other cylinders. Also note the new exhaust port stud features 4 stud holes, you can use the two original positioned studs if you are using a standard type oval exhaust flange. Or if you are using the MBgm Clubman you can use all four studs. Or you can cut and weld on our MB thicker 4 holed flange to your exhaust. Check out the piston and note the arrow which points to the exhaust port on assembly. And finally check the extra cylinder head extended nuts and welded studs, these have also been Allen cap heads – its best to upgrade to the MB extra cylinder head studs/nuts/washers.

Once you're happy the head slides in to the bore. Next check the cylinder slides into the casing.

If you are doing a new engine rebuild, then it's worth checking out the transfer ports on the casing if they are standard then it's no problem the kit is designed to fit standard casings. But if the transfers have been tuned in some way for another kit, it will be an advantage to match the cylinder to the casing, but you don't have to. This is an easy job to do, the transfers on the cylinder are designed so Joe Bloggs can easily open them out using a burr in a drill or use a Dremil type tool, very little needs doing as the transfers are on a taper and open easy. Of course MB can do this for you.

Providing you have read the in depth fitting instructions with regards crankshafts and casing quality you can start assembly.

Remove the original cylinder studs, this can be a job in it's self, but it really does need doing. Try the double nut trick first, then the double nut trick with a mole wrench on the stud as well. If still tight, tap the end of the stud with a hammer, this sometimes loosens them off. Failing that if you have time use penetration oil on the studs, this can take a few days in a bad case and failing that they may need some heat from a gas torch and finally a really seized stud may need cutting off a steel nut dropping down the stud and welded on. Worst case the stud may need drilling out.

If a stud hole is damaged then use either a Timesert insert or a Helicoil but I prefer a stepped stud, don't use a Tapex! If it's cracked it needs welding professionally, don't just think it will hold! Most cylinder studs come out quiet easy, when they do it's worth running a tapered 8 x 1.25mm tap down to clean out the threads and blow out any swarf.

with the longer RT cylinder studs. If it doesn't check the cylinder for any burrs, damage or high spots, the chances are it will be the casing especially if it's a Spanish version. If so clean or lightly grind/file/polish any high

spots.

Fit the new studs with the double nut trick or use our MB stud fitting tool. You can use a fine smear of loctite stud lock or retainer on the thread of the stud, this will seal any porosity in the casing which is the usual point of air leaks. Never put grease or loctite under the thread it will hydro lock and can crack the casing.

A point to note – the RT kits have always been supplied with straight machined studs, these work perfectly. Some circles say these are no good and you need other studs from a Vespa or standard studs! We've always used straight studs, providing the cylinder holes are 9mm.

A perfect upgrade, is the MB long relieved cylinder studs – these are slightly thinner along the length, this helps any over heating issues (if any) but at the casing end uses the correct size to stop the cylinder moving side to side making sure the cylinder locates perfectly.

Fit the studs and check the cylinder slides down the 4 studs, some RT kits come from the factory with the wrong sized cylinder holes, these need drilling to 9mm as the kit was designed for.

Check the piston slides in the bore, position it in it's correct position with the arrow to the exhaust port and slide it up and down to make sure it's free, this should be done with no rings fitted. Once fitted move onto fitting the piston.

At this point its worth setting up the cylinder with a dry build to check ports, squish clearance and gaskets required. Check the small end drops easily into the piston area where the gudgeon pin fits and check it doesn't lock up or fit. If this happens there is something wrong with the small end bearing size.

Note – small end bearings don't come with the kit they are a separate item. Small end bearings come with some new crankshafts. Check the piston fits over the con rod eye, if it does fit the small end. Offer the piston in place and slide the gudgeon pin through the piston. You don't need oil at this point, do it dry and keep things clean.

With the piston on the con rod, turn the motor to make sure the piston clears the casing at BDC, if it touches then investigate and rectify.

CRANKSHAFTS

Crankshafts effect how a cylinder kit can be set up, the standard length 107mm con rod limits the cylinders set up. In a normal Italian Innocenti engine casing with a standard 58 x 107mm crankshaft everything should fit and set up perfect with no head gasket needed.

But you only have 0.4 – 0.5mm of adjustment in the standard base gasket area. You can use no base gasket providing you seal it on the final assembly.

Do not use a standard fibre base gasket, these will fail because of the

modern materials used to make them and modern fuels. This is why we prefer the thin alloy packers/gaskets supplied.

If you use a 60mm crankshaft with a 107mm con rod then things get complicated as the stroke goes 1mm towards the casing, where the piston has more chance to lock up on the casing at bdc. Also on some crankshafts with a fat big end bearing area they can lock on the casing and may need the mouth opening to clear, so be careful.

As the stroke goes 1mm towards the casing it will also go 1mm towards top dead center so it will need a head gasket to suit to get the correct squish clearance. A 60mm with 107mm really limits any adjustment of the cylinder height and getting the all important port timings correct without machining the cylinders base face or lifting the exhaust port. If you know what you are doing and with a little work they do fit and work. If you are setting up one of these crankshafts then the port timings work out okay to use but not perfect and can be slower than a 58mm version with correct port timings.

Its much better to use a 110mm con rod then you can really set a standard cylinder up to work well.

With a 110mm con rod on a 58 or 60mm crankshaft (or 61, 62mm, 63 and 64mm) then things change for the better as you have 3mm extra to play with at the bottom of the cylinder. It's just a case of playing with cylinder packing plates and head gaskets to get what you want from the kits and this has been MB's preferred con rod conversion from the 90's.

107mm con rods

As I've said you are really limited especially if you use a Spanish, Indian or Casa (high) casings. If you use one that has been converted or welded and milled flat – expect to use a fatter packer/gasket. If the casing is a short version then you get more adjustment, if it is a high one then you are limited. You will have to set the cylinder up as the crank says – not how you want it to.

Of course it will work but the all important port timings which are designed into the kit will be slightly out, which could make for a good kit or a slightly slower kit. You would expect by fitting a 60mm crank you would hope to gain some power. Yes you can – but you need to get the set up correct or the exhaust port will be low giving a lower power out put. This gets much worse if you use the 61/62mm with a 107mm con rod which are not recommended at all as they are a pig to set up.

DRY BUILD 58 x 107mm

When using these crankshafts fit the 0.3, 0.5 or 0.7mm alloy packer/gasket usually supplied. Slide the cylinder over the piston until it drops to the gasket, ideally use some spacers on the cylinder studs and tighten down with nuts so the cylinder is firmly clamping the packer/gasket. We can also use our handy 8mm tooling to help out.

Now look down the bore to see the piston at BDC and look at the position of

the piston to the bottom of the transfer ports. Ideally the bottom of the transfer port should be level with the piston, this should give the desired important transfer timings and the other timings follow on correctly.

On a 225 cylinder the exhaust port will also be level with the transfer port and start of piston crown.

On a 195 cylinder the exhaust port is slightly below the transfer port height and the exhaust port will be below the piston with the transfers level, this is normal.

If the piston is below the bottom of the transfer port at BDC, then remove the cylinder, remove the packer/gasket and try again with a smaller one.

If the piston is above the bottom of the transfer port at BDC, then remove the cylinder, remove the packer/gasket and try again with a larger one.

And that's the limitation with a 107mm con rod. Either no base gasket, a packer/gasket at 0.3mm or 0.5mm or 0.7mm (small block) 0.3mm or 0.5mm or 0.7mm (large block). If for some strange reason you need a larger base packer/gasket we stock them at MB. However this is done – we are talking about a touring kit and 0.5mm in port timings are not so important unless you want to be anal and get the most from it.

Then you need to check your squish clearance here you can read the in depth way to check the squish clearance.

This is VERY important for two reasons.

- Have enough clearance so the piston doesn't hit the head
- Reduce the clearance to get a better power spread
- To set perfect compression ratios

With the transfer height set, fit the head and tighten the 4 head nut and washers on the long studs and check the important squish clearance. It should ideally be 1.00 – 1.20mm but anything up to 1.50mm will be fine but 1mm is preferred. IF the clearance is too tight you can add a RT head gasket (not supplied in the kit, but available from MB in sizes of 0.3, 0.5, 0.7, 1.00, 1.2, 1.5, 1.8, 2.0, 2.5, 3, 3.5mm) or tweak the base packer/gasket up or down which gives a fine 0.2mm adjustment but this won't effect power output that you can feel.

You should be happy with any of the ways mentioned above as the kit is designed to work like this.

DRY BUILD 60 x 107-110mm

Do the same procedure as with the 58 x 107mm crankshaft, but remember the 60mm crank pulls the piston towards the crank by 1mm. You may have to cut some off the piston to allow it to turn and it needs 1mm clearance, from piston to crankcase. This will alter inlet port timings! A 60 x 107mm will drop the piston 1mm below the transfer ports. So you may have to remove the base packer/gasket and that's all you can do, this will throw out port

timings but will still work within reason but may not work as well as a 58 x 107mm so no advantage in fitting a 60 x 107mm.

If like me you want to be anal and want the kit to really work well then you need to do a transfer timing test and expect to have to machine the base of the cylinder by usually 1-1.5mm. The piston skirt may need cutting and again because of the longer stroke the piston is pushed towards the head 1mm more, the chances are you will need a combination of gaskets fitting to get the correct squish clearance. Normally to get port timings correct you would have to machine the base and use a 2mm head gasket (you can use a combination of up to 4.5mm of head gaskets if you want and the head still locates (not that you will need a 4mm head gasket)

Our advice is to have a crank using a 110mm con rod, see MB – crankshafts section. Or use a bgm 58 x 110mm crank or a bgm 60 x 110 crank. Or a SIP 60 x 110.

With a 110mm con rod fitted you can move the cylinder up and down with different cylinder base packers and head gaskets, even with a 60mm crankshaft setting up an RT cylinder kit is much easier. See setting up cylinders using packers.

Basically a RT kit fitted with a 58 x 110mm crankshaft you would need a 3.5mm cylinder packing plate (comes in a bgm crank). But as with casings from Italy, India and Spain, or with so many repaired and machined versions or remade casings – casings heights vary so it could need a 2.5mm or 3.5mm packer. The only problem been, is you need to buy a series of packers. Its the same for the 60 x 110mm crankshafts, ok the con rod is also 3mm longer but the stroke of the crank has changed, in reality the chances are, you will need a 2 – 2.50mm packer to take up the rod/stroke difference and set the squish clearance with the difference in stroke with a thicker 1.5 – 2mm head gasket.

Tip – when using a 60 x 110mm crank, set the transfer port 0.5mm above the piston at bdc, this sets the timings very well with no extra tuning required.

The beauty of the RT kit – is the cylinder is extended at the top so is longer by 6mm this is done for two reasons

- To allow the head to drop in the bore, to perfectly centralise the head, to make squish clearance easier and produce more power and to prevent head gaskets blowing
- To allow the use of long stroke crankshafts. When using these crankshafts the cylinder will need to drop towards the casing to get the important transfer port timings correct. When lowering a standard or after market type Lambretta cylinder the piston would poke out of the top of the cylinder. The RT is designed to allow long stroke cranks with longer con rods with out machining a recess into the head or welding the top of the cylinder. If you do the job right with long stroke cranks the exhaust port will unfortunately need increasing to get the desired exhaust port timing (we couldn't do anything about this, if we did the common 58mm set up would be wrong). As much as we designed the cylinder

to work best with all set ups it's impossible to be perfect on everything so its a compromise. RT kits are designed to work for Mr Average 58 and 60mm cranks. Depending on the stroke depends on the head gasket used. If using the longer 62-64mm stroke cranks the chances are you will need to add a number of head gaskets to get the correct squish clearance or have the head machined.

61, 62, 63 and 64mm crankshafts can be used with the RT cylinders, the limitations are con rods, as mentioned the 107mm con rod is the main one, dont even try! Ideally use a 110mm con rod if using a standard RT piston with a crown height of 39mm.

RT kits work with these crankshafts

- 60 x 110mm – 39mm crown height piston
- 61 x 110mm – 39mm crown height piston
- 62 x 110mm – 39mm crown height piston
- 63 x 110mm – 39mm crown height piston
- 64 x 110mm – 39mm crown height piston

Basically if you set the transfer ports as explained, then the longer the crank stroke the smaller the exhaust port gets, so needs raising.

You can use crankshafts with longer rods in theory to smooth out the engines vibration and aid power, providing you use a shorter crown height piston. MB have offered shorter crown height pistons to suit the 115mm Yamaha con rod and the uprated TV175 con rod. We have supplied 30 and 31mm crown height pistons in the past but phased these out for the more versatile 32mm crown height piston which fits better in the common 60mm crankshaft as you will need a base packer and allows for some of this all important movement!

These crankshaft combinations can be used

- 60 x 115/116mm – 30, 31 or 32mm crown height piston
- 61 x 115/116mm – 30, 31 or 32mm crown height piston
- 62 x 115/116mm – 30, 31 or 32mm crown height piston
- 63 x 115/116mm – 30, 31 or 32mm crown height piston
- 64 x 115/116mm – 30, 31 or 32mm crown height piston

Using 60mm crankshafts – Moving the cylinder up and down only alters the transfer timing by a small amount. If you aim at piston level with the bottom of the transfer port then timings are about spot on. This will give a much smaller exhaust port timing, so power and revs are down compared to the 58mm version. This should give some pulling power feel due to a smaller exhaust port timing. Also on the 60mm the inlet power timing is out. Its not uncommon to see the lower edge of the transfer port 0.5 – 1mm above the piston and everything still works, transfer timings go up a little but the exhaust port goes up to a more usable timing.

The same goes for the 62/64mm cranks, the exhaust port needs raising and inlet timing checking.

If you want to increase power on the 58/60mm versions you can lift the

cylinder 0.5 – 1mm. This will put the lower edge of the transfer port higher than the piston. It will increase transfer and exhaust port timings. But the piston will need cutting on the inlet side to get inlet port timings to a better spec.

There are also odd ball crankshafts and con rods out there which could also have oddball con rods with 18mm gudgeon pins which needs Jap style pistons but whats the point. The RT225/230 kit is designed to use the Lambretta style piston but if you have to, you can use any 70mm piston port piston to get you out of trouble or a reed piston if you do a reed conversion.

You can use a 115/116mm con rod with a standard RT piston with a crown height at 39mm but this will require a very large cylinder packer at around 8mm, we keep these but really you should not go down this route as it's an oddball and moves the whole cylinder assembly to the frame and puts out the exhaust and creates an air gap between the cowlings. Do your self a favour and swap the piston to a 32mm crown height or swap the rod – make life easy for your self.

As we phased out our MB pistons, we've had to drop to the Wossner pistons these have a 30mm crown height, with a longer skirt these are much harder to set up and you have to machine the base of the cylinder and skirt.

Regardless of crankshaft and con rod used it's the same setting up procedure. 61 – 64mm cranks are real oddballs in the mass market and you really need to know how to set up port timings and be prepared to tune the exhaust port with special tools. Best left to the experts and of course it's a service MB specialise in. If you are happy with your dry build then it's time to fit it properly.

Remove the head and do the timing set up procedure first.

Recommended ignition timing for RT kits

- As an average 17 degrees seems to still work well with today's fuels and the slightly lower RT compression ratio
- If you want to be super safe then try 16 – 15 degrees, but this may lower power
- Old timings of 21 and 19 degrees is border line with modern fuels, but be careful. We even tested these timings and you loose power over 17 degrees! We have known RT kits work with 28 degrees and not blow up as the cylinder kit cools so well – but we don't recommend these timings.

SPARK PLUGS

We prefer Nippon Denso for their reliability, of course there are others. Whichever plug you choose – set the gap to 0.018" – 0.022" with older ignitions. With some of the newer ignitions .025" works better. We suggest W22ESU for town riding only, W24ESU for town/country roads plodding around with short flat out blasts and W27ESU for an all round plug, a little bit of town but mainly country roads and motorways when riding hard.

When the timing is set up then remove the cylinder and piston and fit a

piston ring 10 – 15mm from the top of the cylinder. Use the piston to centralise the rings in the bore and check the ring gap it should be around 0.012 – 0.015” from new, if it’s tighter then the ring gap will need filing to increase the gap. This is very important, check both rings we do not do this in the factory. If correct, oil the piston ring grooves, fit the rings, these can be fitted either way and note the ring peg positioning which are on the inlet side of the piston.

Fit the new small end bearing, we recommend the INA small end bearing or Koyo small end. These are a separate part to the cylinder kit. Both 195 and 225 kits uses a 20mm standard width small end bearing. Oil the bearing, oil inside the piston and oil the gudgeon pin. Offer the piston onto the con rod and make sure the arrow on the piston points towards the exhaust port. Slide the gudgeon pin through the piston, through the small end bearing and through into the other side of the piston. If the gudgeon pin is tight, you can warm the piston or as we do ream the piston slightly. Next fit the circlips and make sure they are located in the grooves, spend a bit of time here to double check the circlips are seated. I’ve fitted these circlips in any position and never known any to come out as long as they are in the grooves.

At this point it should be easier to fit inlet and exhaust studs, note the short end of the stud screws into the cylinder, use a smear of loctite on the threads and double nut the stud and lock them into place or use our MB fitting tool. Make sure you fit the studs in the correct 2 holes if still using a standard type exhaust or fit all 4 if using the MBgm Clubman.

Check you have a 200 inlet manifold as both small and large block MBgm kits use 200 inlet studded inlet manifolds to standardise the kit and get a good inlet port shape. Check you have a correct small inlet stud to suit whatever inlet manifold you are using. These are available separately in different lengths to suit different manifolds. The small inlet stud doesnt come with the RT kits but MB supply them. Separately supplied MB inlet manifolds come with the long inlet bolt/screw.

It’s an advantage before you fit the cylinder to match whatever inlet manifold you are using. As much as we tried to make a cylinder with a correct sized inlet port we could not suit all the manifolds on the market. Whatever manifold is used some tweaking will be required, this can be done at home or given to a professional. Of course MB offer this service where we either supply the manifold and then match the inlet manifold to the inlet port.

MB offer different inlet manifolds

- 22 – 25mm PHBL Dellorto, large block to suit choppers, cut downs or Series 1/2 with Tea strainer
- 22 – 25mm PHBL Dellorto, large block flange type to suit running a standard air box or remote filter
- 26, 28, 30mm PHBH Dellorto, large block to suit choppers, cut downs or Series 1/2 with Tea strainer
- 26, 28, 30mm PHBH Dellorto, large block flange type to suit Tea strainers or remote filters

MB offer two ways to match the inlet port

- Match and flow inlet manifold
- Match and flow inlet manifold bolted down race style

The RT kit comes with a MB universal inlet gasket, which can be trimmed to suit the manifold and inlet port. When we 'bolt a manifold and flow it' we don't use inlet gaskets and choose a petrol resistant sealer on the faces of the manifold so there is no interruption at the joint which always makes a better running motor. Of course you don't have to match the manifold, most are as close as a standard set ups so you can just bolt it on. If you are fitting the inlet manifold to the cylinder with the engine on the bench then there is no problems to think about when fitting the engine to the frame. If fitting the cylinder/inlet manifold with the engine in the frame, depending on inlet manifold used you may have to do some jiggery pockery, some manifolds are short and will allow the cylinder to slide down the studs, some are longer and may foul on the frame so may need to be fitted once the cylinder is fitted. A simple trick would be to undo and remove the engine bar and drop the engine.

Cylinder head cowlings may need to be modified so any after market inlet and exhaust manifolds fit, always allow a few millimeters around the manifolds so nothing touches and wears into the manifolds.

FITTING THE CYLINDER

Once the piston and small end bearing is correctly fitted it's time to fit the cylinder. What ever base packer/gasket or no gasket is to be used from your dry rebuild always rough up the joint surfaces with fine emery or Scotch Brite on all gasket faces. This allows the sealer to stick to the faces for a good seal. Don't try to use sealer on areas where there is grease or oil – it does not work.

Sealers comes in many makes, sizes and colours, which ever you use only use the bare minimum just lightly smear in the areas where the faces will touch, making sure there is some all the way around each cylinder stud and if the casings have been opened up – spend some time to add more at these areas. If you over do it the silicone will squirt inside as much as it does on the outside!

I personally I like to wipe the silicone sealer around the joints to smooth it off and make a cleaner assembled job. With petrol resistant sealer lightly smeared on the jointing area offer up the cylinder to the studs and slide them down slowly, as it comes to the piston and rings make sure the ring gaps are close to the ring pegs. These rings are strong and springy but can quiet easily be pushed together with your fingers as you do this wiggle and tap the cylinder so the rings enter the chamfer on the start of the spigot.

IF it's tight do not hit anything with a hammer, if the piston doesn't go in the cylinder with a slight tap then pull it back and check the ring gap over the piston pegs. As the piston enters the cylinder when the two rings disappear and has full support then you can tap by hand the top of the

cylinder until it drops down to the base area. Unlike some other cylinders you should have no problems with rings locking in the top of the inlet port. The trick is to gently tap the cylinder down quickly with feel to get the rings through the inlet port and up the bore.

Once the cylinder is down, don't mess about you need to get the head on and torqued down so the silicone doesn't go off, if for some reason it does go off you have to redo it all again or it may not seal. Have the head/head gasket combination at hand, I use a very fine smear of petrol resistant sealer on either side of the head gasket and on one side of the head or cylinder faces.

With the head on, fit the 4 thick washers onto the long studs and screw on the special head nuts by hand, don't forget to get the longer version for the head cowl in the correct position. Take the 4 (allen screws early kits) or the (stud welded nut versions later kits) and fit their washers and hand screw them down through the head into the cylinder. Or use the improved MB special stud and nut kit.

When all 4 studs and 4 nuts are in place tighten the main 4 nuts, diagonally slowly increasing the torque until you get to the required figure of 24 – 27 Nm. Don't go over that – it is really not required and will only distort the cylinder to maybe cause the 4 seize points at the studs which has always been a common fault of the Lambretta cylinder.

Ideally you should tighten the 4 allen/welded screws. Again diagonally slowly increasing each one until you hit the desired figure of 24 – 27 Nm. This will help spread the load across the head and stop the head distorting and blowing, another advantage over all the other cylinders on the market.

Swapping to the better MB extra stud and nut kit is an advantage as it will standardise the the cylinder head assembly. Go over all 8 nuts again once tightened and the sealer is squeezed out.

Finally recheck the squish clearance is the same as when you did the dry build.

Now you can fit the exhaust, cowlings etc as normal and set up the carb and electrics but make sure you read the setting up procedures.

Nothing is ever simple to the untrained eye, but it really is. MrBee as a designer can not control the casing height of your casing, we can not control what crank you have. What we have done is look at every eventuality and designed a kit to fit all and work for most. Of course there will always be an oddball, we have come across them that's why we offer so many different head and base gaskets to help out.

Extra spares if required

Race-Tour 8 stud head gaskets Small Block 195 – 200cc

- 0.3mm
- 0.5mm

- 0.7mm
- 1.0mm
- 1.2mm
- 1.5mm
- 1.8mm
- 2.0mm
- 2.5mm

Race-Tour 8 stud head gaskets Large Block 225 – 230cc

- 0.3mm
- 0.5mm
- 0.7mm
- 1.0mm
- 1.2mm
- 1.5mm
- 1.8mm
- 2.0mm
- 2.5mm

Cylinder base packers/gaskets Small Block 195 – 200cc

- 0.3mm
- 0.5mm (comes with the kit)
- 0.7mm (comes with the kit)
- 1.0mm
- 1.2mm
- 1.5mm
- 1.8mm
- 2.0mm
- 2.5mm
- 3.0mm
- 3.5mm
- 4.0mm

Cylinder base packers/gaskets Large Block 225 – 230cc

- 0.3mm
- 0.5mm (comes with the kit)
- 0.7mm (comes with the kit)
- 1.0mm
- 1.2mm
- 1.5mm
- 1.8mm
- 2.0mm
- 2.5mm
- 3.0mm
- 3.5mm
- 4.0mm
- 8.0mm

Exhaust gaskets

- 4 hole fibre (comes with the kit)

Inlet fasteners, stainless steel

- Short inlet stud RT
- Short inlet stud longer version
- Universal Long inlet stud
- Long inlet screw

REED VALVING

There is a lot of interest in converting our Race-Tour kits to a reed valve cylinder. This was designed from the beginning to offer a simple piston port standard type cylinder and if you want, or it can be converted to a Reed type. We have done this many times with really good effect with improved power and power spread and that all important fuel economy and ride-ability across the rev range.

Older bgm forged pistons can be converted to reed valve but these were recalled early in production and should not be used. MB forged pistons can be converted or we can supply Reed MB pistons. Later Black coated bgm Meteor piston came in piston port or Reed type, the piston ported pistons should NOT be converted to Reed types they are not strong enough. Kits from 2020 use a stronger piston which can be modified to Reed. If you have a used kit already – as piston port we can supply a Reed version bgm piston.

Reed valve extras are;

- MB 4 petal Reed assembly with MB Viton rubber
- MB 4 petal Reed assembly with Malossi down draft rubber
- Tune a Race-Tour cylinder for Reed Valving

COMPRESSION RATIOS

These are pre set as an average for both a small and large block kit, whether they run on a 58 or 60mm stroke. The compression ratio is set to get the best from the kit with all modern fuels used today. Compression will be slightly lower if using a 58mm crankshaft and raised using the 60mm crankshaft, this avoids us having to supply 2 different heads per crankshaft type. Problems with holes in pistons and seizing should not be down to the kits compression ratios. If you use a 61 – 64mm crank then the compression ratios will need checking but are usually within usable limits.

JETTING CARBS

There are so many carbs/exhausts on the market and because of the nature of a 2 – stroke engine and all the unknown parameters it is difficult to offer a perfect set up. The design of the kit with constant compression ratios and port timings regardless of exhaust fitted within reason jetting is quite standardised and close from one engine to another. Obviously there are so many factors effecting this. MB supply full carb kits, which come pre jetted ready to fit using air filter boxes, open bell mouth or running a MB tea strainer. All our carbs come over jetted to be safe so you can slowly come

down on sizes and we offer spare jets to fine tweak jetting to near perfection as you want.

Here are some jetting details to try to help out as a starting point

25mm Dellorto PHBL, standard piston ported RT kit, starting rich and work down

- Main 105 – 102 – 100 (no filter) 98 – 95 – 92 (with remote filter or through drilled air box) 92 – 90 – 88 (through air box not drilled)
- Atomiser AQ266 – AQ264
- Needles D26 – D22, P1/2
- Idle jet 52 – 50 – 48
- Slide 40
- Choke 60
- Float needle valve 3.50 – 3.00 – 2.50

28/30mm Dellorto PHBH, standard piston ported RT kit, starting rich and work down (28mm would use the weaker selections)

- Main 125 – 122 – 120 (open and tea strainer) 122 – 120 – 118 – 115 (filter)
- Atomiser AV266 – AV264
- Needle X13 – X7/13 – X7, 2nd – 1st down
- Idle jet 52 – 50
- Slide 40 – 45 – 50
- Choke 70 – 60
- Float needle valve 3.50 – 3.00

28/30mm Dellorto PHBH Reed valved converted, again starting rich and work down, Reed tunes tend to need more fueling, so here's some examples (28mm would use the weaker selections)

- Main 130 – 128 – 125
- Atomiser AV266
- Needle X2 – X13/2 – X13 – X7/13, P 1/2
- Idle 62 – 60 – 58 – 55
- Slide 40 – 45
- Choke 70 – 60
- Float needle valve 3.50 – 3.00

We no longer offer advice on PWK type carbs

GEARING RATIOS

As with jetting it is so variable as we don't know you the customer. There's loads to read in our Tech-Site on gearing. But what you need to think is how you ride? How heavy you are? Do you ride 2 up loaded? And how fast do you want to ride? Gearing which has worked for customers varies from 5.20:1 down to 4.3:1.

If your'e not bothered about a high top speed but want power all the time in each gear regardless of road conditions and an easy ride – use something like

5.2:1 – Gp125 gears with Gp200 sprockets 18 x 47 which is the same as Li150 Italian gears with standard sprockets 15 x 46. All the kits pull this gearing easy, it will limit top end speed a little but makes a really nice ride-able engine especially if your a big person or you constantly ride 2 up or in a city. We prefer this gearing the RT kit used with Clubmans like to rev – let them rev they love it. It also means the motor doesnt die in top gear from over gearing them!

If you want more top end speed and through the gears, increase the sprockets to get around 4.80:1 gear ratio, which is a Sx/Jet200 gearbox with standard sprockets 15 x 46. The down side is – if you are not in the power, or going up hill or into the wind the motor may die in top gear! We don't recommend over gearing the RT kit.

Larger carbs produce more power, these help you gain power through the rev range. Have a kit tuned or especially Reed valve converted and expect to increase the gearing a bit to really feel the benefit of the kit. If the kit is really good, set up well and pulls well our suggested gear ratio is 5:1 – 4.80:1 this can be obtained in a number of ways including 4 and 5 speed gearboxes.

EXHAUSTS

The UK made and MBgm Race-Tour kits have been exclusivity tested and set up with the Mark Broadhurst MBgm Clubman. Both the kit and the Clubman are designed to work in harmony and with the mild porting of the cylinder the engines produce a very wide spread of horse power and torque with ride-ability. This wide spread of drive-able power usually makes for a better engine as it is so easy to ride and offers such a wide flat power curve regardless of carbs used. But we realise not everyone wants a Wolf in sheeps clothing, standard looking type of Scooter and wish to fit an expansion chamber either in an effort to gain power or to have different looks. But we are seeing some very strange combinations of exhausts used which are really not made for the kit or any type of touring kit with smallish exhaust ports.

Try to avoid the latest range of "Race" exhausts on the market like the JL4, Franspeed Race, NK Race, ADS Race or even some of the equivalent so called touring pipes – most are aimed at the TS1/RB type of engine with a big exhaust port, they do not work well with the RT kits. Ok you may find a higher peak power but compare it to the Clubman they loose low down power and loose revs and the ride-ability of the Clubman. The closest to the MBgm Clubman in terms of power spread is the MB Dev-Tour, these are not available but are aiming for a new version (2023).

DECOMPRESSION HOLES

In recent years these decompression holes are popping up on forums/FB as the must have latest thing! There is nothing new about these and were common place in the bike world in the 70's!

We have tested these holes or hole and they do work well. The Standard RT kit and the Reed converted ones still have quite low exhaust ports, even with the

slightly lower compression ratio some seem hard to kick over! It's the nature of the kickstart design, starting all the way back at the gearbox to the cylinder! Its made worse with the S1 and 2 short kickstart levers! And made worse with lightened flywheels. The decompression ports really help this system without any loss in power!

If you are going to do one – 1 or 2 holes needs to be drilled from the bore 10mm above the exhaust port into the exhaust port without breaking through into the exhaust gasket face.

But be very careful, you can not just drill into the plating into the cylinder. The plating needs grinding away before you drill it, some cylinders will start to flake the plating and then you're in trouble! Once drilled chamfer the hole – ideally with a diamond round burr.

RUNNING IN

Providing you've set up the motor correctly, with your first runs – give it 50 – 100 miles to see how the jetting is and set up things like cables and brakes. As your increasing mileage with some fine tuning of the jetting aim for about 500 miles, the kit should be about run in now. A well built set up engine can be thrashed from a few hundred miles, its nothing like running in a Cast Iron cylinder at 1000 miles!

BUT – Always read the jetting in and running in instructions. don't blame us if it goes wrong, you have to take some personal responsibility for your set up and how you run the motor, all we can do is give as much advice as possible which is all available in our Tech-site. Remember so much effects jetting, ignition timing, exhaust, the way you use the motor, fuels and oils.

OILS

Oil are a mine field!

Like seats and helmets everyone will have a favourite!

We recommend an Ester based fully synthetic based oil mixed at 30/40:1. Or good Semi synthetic oils mixed 30/35:1. Some suggest mineral oils which are so old these days – yes they work but expect to mix at 20/25:1. They maybe cheaper to buy – but you're adding more oil per gallon! And expect the insides of the engine will carbon and gum up! In a short time this can lead to cylinder failure – be careful!

If you have any questions please email mark@mbscooters.co.uk