

Assembly manual

1. Pre-fitting kit preparation

Gran Turismo barrels are an iron casting and as such are produced in a sand mould. This is an extremely hot process, which can sometimes leave a small residue of casting sand in the ports or at the base of the fins. It is important to check that the internal ports of the barrel and the manifold are clear of any such debris from the manufacturing process before installation. This is done by washing the parts in a degreaser and scraping any affected areas with a suitably sacrificial screwdriver.

2. Installation preparation

This installation will greatly increase the performance of your standard Lambretta engine. It is advisable that you check or replace the main bearings & oils seals before installation. If you intend to use an expansion chamber it is highly advisable to install a GP crank & electronic ignition. With all installations the crank taper, key-way, big end bearing & con rod MUST all be in excellent condition. The crank must also be straight and true, this is a professional job and requires specialist equipment.

Suitable engines for this kit are: Li 125/150 series 1,2&3, GP125. It is not advisable to use new Indian GP or unstamped casings as on occasion the material quality & machining accuracy is lacking.

All ignition systems must be reliable and timed accurately to 19 degrees BTDC (2mm BTDC with 58mm stroke and 107mm rod), electronic ignition is preferable. Barrel studs & threads must be in good condition. Gear selectors, clutch and chain must also be in good condition. Series 1 & 2 cranks with plain bush small-end bearings should not be used.

Kit contains the following parts:

- 1pcs Cast iron barrel
- 1pcs Piston, rings, pin & circlips
- 4pcs M6 SS cap head bolts, spring washers and plain washers
- 1pcs Inboard reed valve gasket
- 1pcs Outboard reed valve gasket
- 1pcs Reed valve
- 1pcs 25mm Inlet manifold
- 1pcs Wide small end bearing

In addition to the kit you will need:

1. Good tools & a quality 5mm ball end allen key.
2. 2pcs M7 exhaust studs, nuts and washers
3. Suitable carburettor & cable choke conversion
4. Suitable base & head gasket and or silicon sealant
5. Big bore exhaust gasket
6. Suitable exhaust (42mm clubman or better)
7. Suitably profiled cylinder head

If your engine has not been removed from the scooter prepare your scooter for installation in the following way:

1. Remove foot boards on both sides
2. Remove bump stop & rear shock absorber
3. Remove carburettor
4. Remove exhaust and head cowling
5. Remove cylinder head, barrel and piston
6. Clean base gasket area, removing old gasket and dirt

3. GT186 Stock Touring Installation steps

1. Offer up base gasket to barrel and trim off excess gasket around transfer ports
2. Fit base gasket to engine casing.
3. Measure & "gap" the piston rings in the barrel. For reliability we recommend a large ring gap of .2-0.3mm. Worn out rings are cheap to replace, damaged pistons and barrels are not.
4. Fit piston rings & right hand circlip into piston. Do not forget to add the corrugated metal spacer that fits underneath the lower piston ring.
5. Wipe the barrel bore with oil and half insert the piston.
6. Offer up the barrel and piston over barrel mounting studs and slide half way down.
7. Lubricate the small end & fit into con rod.
8. Line up con rod with the piston, press the pin home & fit the left-hand circlip.
9. Slide the piston further up the barrel past the inlet port (the rings might need to be pressed in to help this action).



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10. Fit the inboard inlet gasket, reed valve, out board inlet gasket and inlet manifold. Tighten down with the SS fixings, use the ball end drive on the 5mm allen key. Space is restricted, take your time and be patient.
11. Slide the barrel all the way home into the engine casing
12. Fit the head gasket and cylinder head and bolt down EVENLY.
13. "Turn the engine over" (without sparkplug) a few times by rotating the flywheel by hand. You should feel a smooth rotation with no snagging. This confirms that the installation has no interference problems and the rings are free. Kick it over a couple of times with no plug to check.
14. Offer up the head cowling and cut out portion of cowling around inlet manifold to insure good fit. All head cowlings can be used with the exception of series one cowlings, which are too short.
15. Loosely fit exhaust down pipe and offer up head cowling again. Remove portion of cowling around exhaust where necessary.
16. Fit exhaust down pipe and head cowling.
17. Replace rear shock absorber.
18. Replace bump stop.
19. Fit the rest of the exhaust system.
20. Fit rubber mount, carburettor & control cables.
21. Test start your installation before finally re-assembling the machine.



The Carburettor mouth is in approximately the same place as the original Lambretta air hose. Some machines will require a later air hose to fit the larger carburettor mouths. Intelligent use of the 90degree metal parts in the choke and carburettor kits will make a very neat installation with out having to change the throttle or choke cables. If your throttle cable is too short you will have to change it, in this case refer to your dealer's advice. Fit the small adjustable cable nipple to the throttle cable at the headset end. This will prevent a loose nipple falling off and being sucked into the engine. The small soldered nipple end is used at the carburettor end.

Important Note Installation of this kit will increase your machines cubic capacity to 186cc or higher. It is the owner/rider's responsibility to advise their insurance company or any controlling authority of this change to the original machines specification.



4. Air box installation amendments

When running through the existing air box and filter a small modification is required to make the induction process more effective.

Series 1 & 2

We would suggest that the air scoop under the seat is removed completely. If you have separate seat we advise finding a spare scoop and removing the lower portion of the intake area to improve the volume of airflow.

Alternatively, if you have a series two air box with a "strangle neck" type pipe to the air scoop. We would recommend finding a TV type box with a wider neck or sacrificing a "strangle neck" air box by drilling a series of 12mm holes in a honey comb pattern on one side of the box. These holes are then reasonably well hidden by the fuel tank or glove

box. The top inlet pipe of a "strangle neck" air box has a diameter between 19-24mm, this is a great restriction on the induction process and must be changed if improvements in performance are required.

Series 3

For the purest look the scoop can be left but it will require the internal web to be completely removed. If the scoop is hidden under a single seat we would suggest removing the scoop completely. This is to prevent destruction of a perfectly good scoop. Alternatively a sacrificial air box can be used such as the description above. Once drilled as described the inlet will draw most of its air supply through the drilled holes and not the air scoop.

Remember if running through an air box the main jetting will usually have to be reduced. It is therefore important that the air hose is well connected with jubilee clips. If the integrity of the air hose is compromised then the mixture will become weak. This may result in piston damage, and other associated problems.



It is highly recommended that all installations use an air filter to prevent damage and premature wear from debris that can be sucked in through the induction process.

5. Carburettors, jetting & sparkplugs

The conversion will accept most small body 24-25mm carburettors that use a flexible rubber mounting. Check the clearance of the carburettor before committing to purchase. Two of the obvious makes that work well are the following:

25mm Dellorto. Part number: PHBL25. Cable choke conversion Part number: 53003

With air box. We would suggest between a 93-97 main jet and B7 plug

Without air box & filter. We would suggest a 102 main jet and B7 plug

24mm Mikuni flat slide. Part number: TM24, 001-017. Cable choke conversion MK-412

With air box. We would suggest a 210 main jet with B7 plug

Without air box & filter. We would suggest a (TBC) main jet with B7 plug

Other carburettor options for 30mm manifold:

Dellorto VHS30 flat slide

Dellorto PHBH30 (caution this carb has restricted access to air screw and idle stop adjustment when fitted)

Caution: Be aware that exhaust systems do vary in their jetting requirements, **these jet setting are only a guide.** It is important to check the spark plug regularly to insure the jetting is correct. On long runs it is always advisable to increase the oil mixture, in all cases the plug colour is the principle indicator. Remember that if your jetting and plug colour was correct in winter and spring it will need to be checked again in summer or prolonged hot periods.

Be aware that different sparkplug numbers have different properties, hot or cold running types. We recommend that you settle on one make and change plug according to the ambient conditions. We would recommend starting with a cool-ish running plug such as a NGK B7 SE.

6. Running in

We would suggest a minimum running in period of 250 miles. During this time the spark plug needs to be inspected regularly to confirm correct jetting. For the first 100 miles we would suggest using a 5% two-stroke oil mix in the petrol.

Full throttle is permitted during running in but always back the throttle off once the engine has accelerated away. Do not allow the engine to reach maximum revs (no more than approximately 70% throttle, maximum). Vary speeds and do not over rev when going through the gears. Do not hold throttle open for extended periods while climbing or descending hills. Use the running in period to evaluate how the engine characteristics have changed.

7. Care and maintenance

The barrel and piston maintenance is identical to standard iron barrels with a couple of small exceptions. Firstly the barrel is now working a lot harder than the original equipment, cooling is therefore important. It is advisable that the

flywheel has all it's fins and that the cooling fins on the head / barrel are not blocked by debris or caked in oil / road dirt. Good "running in" is very important to the longevity of the installation. With care and sympathetic use the barrel will last as long as the originals.

It is advisable to inspect the reed petals for damage every year or so dependent on how often and how hard the engine is used. Replacement reeds can be purchased separately if necessary.

Oversized pistons are available up to 66.5mm diameter. The iron barrel can be re-bored and honed just like the original units. The installation will require "running in" after each re-bore. We suggest a piston to barrel clearance of between 0.09 to 0.1mm. The piston measurement is taken from the widest point of the piston. In the case of the piston supplied with this kit the widest point is found at the base of the piston skirt. A 0.09 to 0.1mm clearance is probably considered a very large piston clearance by most re-bore standards but it has proved very reliable in this iron barrel configuration. Always insure that honing is performed on a proper honing machine (Sunnen or Delapina types) power drill attachments with spring loaded stones do not provide acceptable quality standards.

8. Tuning & performance

Always be aware that most tuning will be at the expense of reliability and certainly longevity (with the exception of point 5). Having said this there are several ways you can increase the performance of this kit.

1. Matching the gasket faces. The iron barrel has larger transfer ports than the engine casing. Matching (sometimes known as "blue printing") the casing to the larger barrel ports will make an appreciable increase in power.
2. Exhaust system. The intended use of the kit is as a fast touring kit, usually with the use of big bore exhaust systems. Fitting a suitable expansion chamber (Zirri, Scorpion, PM or JL) will increase this power but usually at the expense of some low-end power. In most cases a noticeable "power band" becomes evident.
3. Inlet. The standard inlet feeds from the left-hand side of the engine for standard looks. A 30mm inlet manifold can be bought to feed more directly from the right hand side and utilise larger carburettor bodies. Obviously this will be at the expense of the battery tray on most scooters.
4. Porting work. This principally involves grinding & polishing ports, inlet and piston. It is a "black art" and a job best done by a respectable professional.
5. Gearing. This is by far the easiest improvement to make and will give instant results with no reliability problems. With the extra power provided by the conversion, it is very beneficial to increase the gear ratio to improve top speed. For 150 gearboxes a simple change to a 16 tooth primary drive will give improved performance at a low cost. For Li125 gearboxes a combination of half link chain and 17 tooth primary drive sprocket. For GP125 a change to 18/47 ratio (GP200 gearing) will be beneficial.

9. Disclaimer

While every effort has been made to ensure that these instructions are accurate and concise, they are only intended as a guide for general fitting. Your machine may differ slightly from the one described and illustrated. Granturismo accept no responsibility for any damage or injury caused by the fitting or use of a Granturismo conversion kit. For additional information please consult the Lambretta workshop manual or your dealer. If you feel that you are insufficiently equipped to carry out the installation safely and correctly, we recommend you consult your nearest dealer before proceeding.

This conversion kit carries no type approvals. Verifying the legality of the installation for road use is solely the responsibility of the customer/rider.

10. Trouble shooting

This section is a practical guide to fault finding, although it is not fully comprehensive it does cover the majority of problems that we have encountered over the years. This section offers no warranties and makes no guarantees, if your engine still does not start or run properly seek additional help from your Lambretta workshop manual or a competent Lambretta dealer.

Symptom	Possible problem	Check or perform the following
Engine does not start or stops after short time	No fuel getting through	Check tap, check filter, check float valve is screwed up, check float is free. Smother carb with hand and prime by kicking over
Engine does not start, is hard to start or misfires	No Spark, intermittent or weak spark	Look for short in loom, Check ignition and replace parts accordingly. Faults in new ignition components are not uncommon, test as you go.
Engine does not start No Compression but crank turns over	Compression problems, from loss of rings, seals, petals or hole in piston	Check reed valve and petals are closing properly. Check for holed piston, damaged rings/piston. Check timing and jetting if piston holed.
Engine runs erratically has intermittent misfires	Possible carb or ignition problems	Check ignition & loom for correct operation, check carb for air leaks, loose jets & needle valves.

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Engine starts and idles but misfires when ridden	Carb, fuel & compression is OK but timing mysteriously seems to move	Possible broken crank, loose timing/pickup, loose flywheel or flywheel boss, damaged woodruff key
Back firing & ignition problems	Reed petal broken and pushed inside reed block	Re-time ignition, or replace ignition. Replace broken petals and clean out petal debris from crank case & barrel
Light heat seizure, caught before wheel locks	Barrel over heating and tight ring gap tolerances. Possible weak mixture, air leaks or no oil. Engine not "run in" long enough	Light hone of barrel to remove marks, replace piston and rings if damaged and generously re-gap
Medium heat seizure, wheel locks up. Barrel scored, rings bent and light damage to piston.	Barrel over heating and tight ring gap tolerances. Possible weak mixture, air leaks or no oil. Engine not "run in" long enough	Hone/re-bore barrel to remove marks, replace piston (possible next over size dependant on damage) and rings generously re-gap
Heavy heat seizure, sharp screeching noise, wheel locks up, possible bang & rattle followed by no compression. Barrel heavily scored, rings shattered and blown into exhaust, piston is history & looks like Ben Hurr's helmet.	Barrel over heating and tight ring gap tolerances. Possible weak mixture, air leaks, catastrophic failure of rod & bearings, barrel stud loose or pulled out or no oil. Engine not "run in" long enough and running flat out.	Re-bore barrel to next oversize. Replace piston & rings with next oversize. Clean out debris from exhaust, and crank case. Inspect for damage to crank, crankcase and cylinder head.
In winter engines runs sluggish and does not achieve peak power, but runs well in the wet.	Possible carburettor restriction, related to weather conditions.	Check to see if your over-trousers stuffed under the seat are blocking the air scoop before getting the spanners out.
Spark plug colours	Colour indication	Action
Spark plug insulator & electrode is very dark or black and oily	Fuel mixture is rich and or oily. This is expected during "running in".	Keep spare plug, brush, clean and rotate use during "running in". If not running in reduce jetting. Check your oil / fuel ratios. Possible drive side oil seal failure.
Spark plug is white, light grey or very light brown and slightly shiny around the insulator	Fuel mixture is lean, weak and or fuel starvation. Warning, Prolonged running like this will cause damage.	Check for air leaks, correct oil mixture and or increase jetting. Possible mag side oil seal failure
Spark plug insulator is a dark dusty coffee brown colour (coffee with a bit of milk)	Mixture is correct (some say a lighter brown colour is better but best to stay on the richer mixture side we think)	All is well in the world, pat yourself on the back and go down the pub (do not drink and drive / ride)

11. Cylinder head specifications

Depending on the specification of engine you wish to build there are several cylinder head options. For those without the tools or skill required an exchange head program is available, exchange heads are CNC machined. For those with time and skill on their hands these are the drawings and specifications required to construct a suitable head.

We recommend using one of the three most common heads available. We will refer to these heads as 150cc side squish, 125cc side squish and 125cc centre squish (we do not advocate the use of 175cc heads).

For 200cc heads start by converting a new head gasket to 66mm diameter. This is done by scribing a concentric 66mm diameter circle around the original. This can be achieved by offering up the barrel as a template to scribe around the inside. Use a small abrasive "flap wheel" to trim out the gasket to the new diameter.

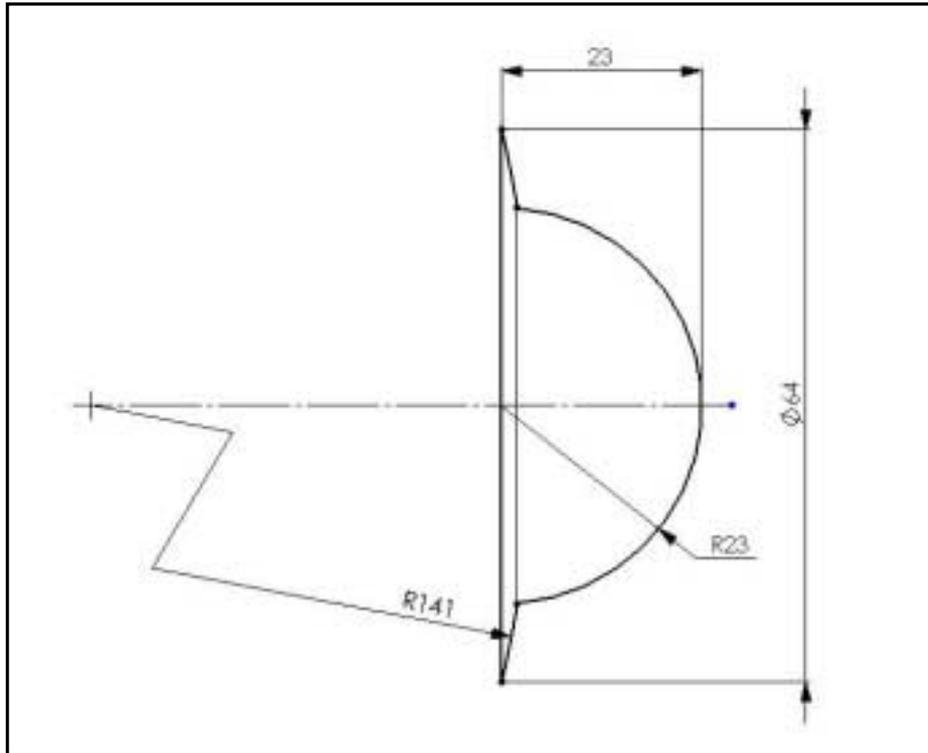
150cc side squish head conversion.

This is the easiest conversion for GT186 barrels. For 186 conversions use a 175cc head gasket, usually they do not need trimming out to 64mm.

The head of the piston is very flat compared to the original piston profile. This means the only modification for the 186cc head is to scribe a concentric 64mm circle using the barrel offered up as a template. With the use of a burr, lightly trim out the profile of the original head to meet the new 64mm circumference line. Squish volume does not need to be changed. A drawing is not required for this conversion.

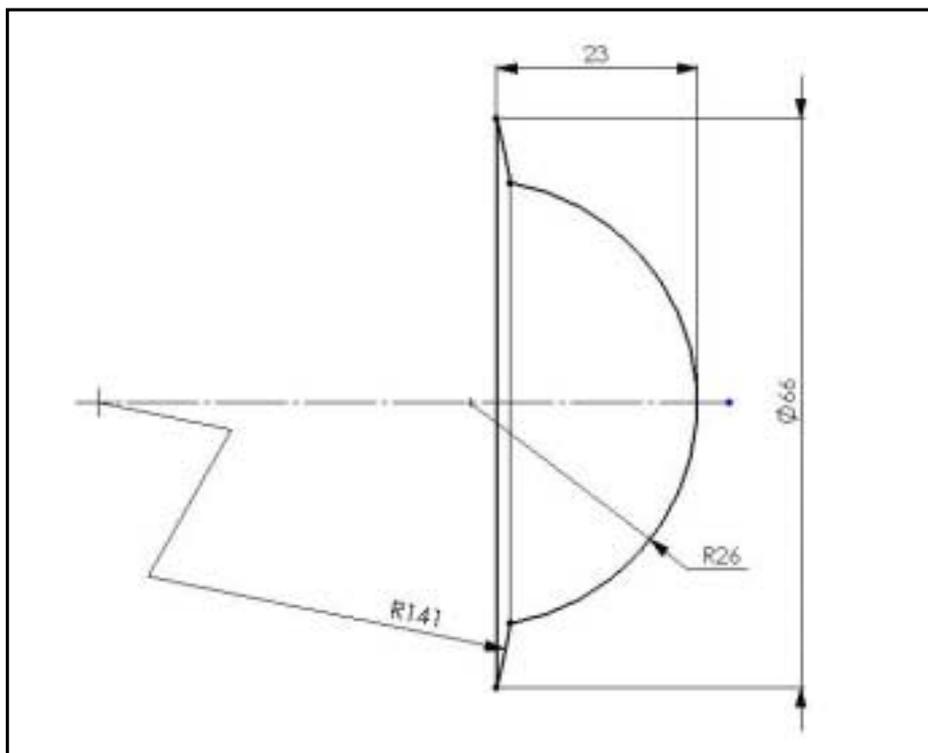
125cc centre squish

This conversion is ideal for GT186 barrels but does require the use of a lathe. The centre squish head makes the neatest conversion with this profile as the complete profile is machined and the plug remains at the correct depth inside the head.



125cc side squish

This conversion is ideal for GT200 barrels it has a larger squish volume but requires the use of a lathe. The 125cc side squish head makes the neatest conversion for this profile as the complete profile is machined and the plug remains at the correct depth inside the head.



12. Suggested specifications

All Lambretta engines will appreciate in value eventually even Li125s. One of the objects of this kit is to utilise the least valuable engines and preserve future collectibles such as the 175's, Li S and SX150 etc.

GT186 Stock Touring (Suitable casings Li 125/150 series1, 2 & 3, GP125/150)

1. GP Crank and Electronic ignition
2. AF Clubman or Indian big bore exhaust
3. New bearings & seals throughout (GP bearing to suit crank)
4. New clutch plates
5. Dellorto PHBL 25BS Carburettor with cable choke conversion
6. GT186 kit with 25mm manifold
7. GT186 exchange profiled head
8. Malossi rubber mount and clips for carburettor
9. Primary drive gearing 16/46 (150 gearbox), 17/46 + half link chain (125 gearbox)
10. Casings not matched.

GT186 Fast Touring (Suitable casings Li 125/150 series1, 2 & 3, GP125)

As above but with:

1. Matched casings
2. Quality GP crank (Mazzuchelli or better)

GT186 Sprint (Suitable casings Li 125/150 series1, 2 & 3, GP125)

As above but with:

1. Zirri snail, PM, Scorpion, NK1 or KRP expansion chamber

GT186 Super Sprint (Suitable casings Li 125/150 series1, 2 & 3, GP125)

As above but with:

1. 30mm Malossi rubber mount and clips for carburettor
2. 30mm flat slide carburettor Dellorto VSH 30
3. Italian GP race crank (Mazzuchelli or better)
4. Good quality expansion chamber like PM, Scorpion or JL
5. GT186 64/58 kit with 30mm manifold
6. Primary drive gearing 17/46 + half link chain (150 gearbox) or perhaps higher.

GT200 conversions

The above specifications are also available as GT200 specifications. In place of the GT186 barrel a GT200 66/58 barrel and piston is used. This conversion still utilises the small casings and appears identical to the GT186 installation but with more power. The GT200 conversion has a very thin barrel skirt and is therefore only recommended for professional installation it is only sold to our distributors (see web site for details).



Example photo of a stock touring conversion