

# Alltune Engineering

## Mazda MX5 (Miata) / Nissan SR-20 engine installation notes.

This kit comprises the engine and gearbox mounting system for fitment of Nissan S-13, S-14 & S15 SR-20 engines into Mazda MX5 (Miata) using the S-13, S-14 5 speed manual gearbox. The special fully fabricated sump and engine and gearbox mounts allow the installation **without any** cutting of bodywork, subframe or bonnet. No exchange parts are required.

The entire kit is a bolt-on addition to a standard Nissan engine and gearbox, to match up to the Mazda chassis. No welding is required to install and gear lever fits the original body position. Depending upon the choice of exhaust manifold, some slight clearancing may be required for the turbo outlet; this can be formed into the body with no cutting or heating.

The subframe, steering rack, suspension are totally unaltered and is designed to clear both right-hand and left-hand drive steering racks. The Mazda handling is retained due to the all-aluminium engine maintaining the weight distribution.

Parts can be purchased individually, or as a kit comprising:

- Fully fabricated aluminium baffled sump with integral oil pick-up.
- Stainless steel oil separator tray across all 4 cylinders.
- Steel engine mount adapters, LH and RH sides.
- Steel Gearbox Cage, to connect to Mazda torque rail.
- Rear gearbox mount, to torque rail.
- Six separate bolt kits, for ease of assembly.
- All parts laser cut and fully TIG welded for strength.
- All bolts and steel mounts zinc plated for durability.

This kit is **NOT** a total conversion, but designed to take all the major mounting problems away and give an engineered bolt-in engine solution. Due to the variables of different engine management systems, turbos, intercoolers, manifolds, exhaust and intake systems a full conversion is not available at this stage, but depending upon demand this may change.

Whilst the hard work has been completed to give your project a great start, it still requires attention to detail to assemble correctly. The following notes cover kit installation and cautions. Please read carefully and take note of warnings and cautions.

## Sump assembly:

1. Separate SR-20 engine from gearbox and remove clutch and flywheel then mount engine onto engine stand. Drain engine oil and invert engine so sump is uppermost to assist removal and fitting of new parts.
2. Remove Nissan sump, oil pick-up and oil separator plate from the main bearing cage. Remove the two M6 studs from the rear of the sump flange, being careful not to scratch the sealing flange surface.
3. Clean the sealant from the engine block sump surface ensuring no sealant is dropped into engine or down the oil pump inlet and use solvent cleaner to ensure all sealing surfaces are oil-free.
4. Fit the new oil separator plate to the main bearing cage with (7x) M6 x 12 cap screws using Loctite 242 or equivalent thread locking compound. Tighten all screws fully. \* Caution\* Take care not to drop any item into the engine.
5. Fit the (2x) special machined M8 screws into the oil pump inlet using Loctite 242. Only lightly tighten these two screws into the oil pump inlet, as they are designed to be locating pins and some threads will be still visible above the flange surface, when correctly fitted. Lightly grease these two pins.
6. Apply light grease to the o-ring grooves of the oil pump adapter block, the o-rings and the oil pump flange. Fit o-rings to both sides of the block, check that both are fully seated into grooves and held in place with the grease. Fit adapter block onto the oil pump flange, locating over both pins. The block should not be tight, but have slight movement on the pins to allow correct alignment.
7. From the new sump assembly, remove the red sealing plug from the oil port and using compressed air clean any dust out of the sump and the oil gallery. Trial fit the sump to the engine to prove that the o-rings have a minimum of 1mm crush to correctly seal. This can be proven by checking the gap at the front of the sump flange at the oil pump area. Correct gap should be 1.0mm to 2.5mm.
8. Remove sump and check that oil pump adapter block is correctly fitted and both o-rings are seated correctly. Apply oil resistant silicone sealant to the engine block sump sealing area using one continuous bead 4mm in diameter, around the entire sealing flange on the inner side of the screw thread holes.
9. Fit sump to engine using (16x) M8 x 20 cap screws and (2x) M6 x 16 cap screws. Put silicone sealant around the threads of the (2x) M6 screws. Hand fit all screws evenly before any are tightened.

Evenly tighten screws in several stages. Fit sump plug to fitting using a small amount of sealant.

10. Cut the oil dipstick at the lower level mark, round the edges and slightly curl the end to ensure it fits in correct position. Engine oil capacity is 3.5 litres.

## Engine Mounts

11. Fit the original MX5 (Miata) rubber engine mounts to the new engine mount adapters, engaging the locating tags into the square holes provided.
12. Trial fit the original steel shrouds to the rubber mounts and mark the front edge of the RH shroud. Grind 8 to 10mm from the front edge to ensure clearance to the new engine mount adapter and taper out the cut area along the upper and lower edges. Note: LHS & RHS of vehicle is taken as viewed from the drivers seat facing forward.
13. Fit engine mount adapters to their respective sides of the engine block, using bolt kits provided. See photos for fitment position.

## Gearbox Cage

14. The Gearbox Cage bolts to the RH side of the Nissan gearbox to provide a mounting for the Mazda torque rail. Identify the 5 bolts around the centre flange that align with the cage flange and remove all 5 bolts. See photos for position.
15. Grip the oil breather vent on top of the gearbox and twist the breather tube directly rearwards. Breather tube needs to be secured to torque rail to keep it on the RH side away from the exhaust.
16. Remove the Nissan gearbox mount.
17. Lower the Gearbox Cage over the extension housing and into place onto the centre flange of gearbox. Check that the Cage does not interfere with any gearbox casting ribs when seated against the flange.
18. Lift the Cage upwards to enable the 5 screws with spring washers to be fitted into the mounting holes and into the gearbox. Using a ball-end 6mm Hex key only hand fit these screws at this point, DO NOT fully torque. Fit the 12mm bolts through the lower Cage mount into the gearbox using the special nuts provided. Partially tighten the lower 12mm bolts, and then fully tighten the 5 screws. Finally fully tighten the 12mm bolts.

## Gearbox Rear Mount

19. The rear mount locates the lower edge of the torque rail. Connect the rear mount to the gearbox extension-housing end with the bolts provided.

## General notes

20. To obtain the best ground clearance, the bell housing lower edge can be trimmed in line with the new sump and lower edge of the subframe. Use the profile supplied to mark and then cut the steel plate between the engine and gearbox. Use this plate in turn to mark the gearbox bell housing flange. Grind away the edge to the marked line; this will cut through one bolt hole, as these lower bolts are not used with the new fabricated sump.
21. If using the standard Nissan turbo and exhaust manifold, the end of the body rail behind the turbo may have to be reshaped slightly to clear the turbo outlet pipe. The lip at the top of this rail may need to be rolled upwards to gain additional access to the mounting bolts.
22. Engine and gearbox can be fitted as a unit. Turbo and manifold can be removed with engine in place. Trial fit engine to determine clearance for turbo outlet pipe.
23. The heater pipes extending from the Mazda body will interfere with the casting lug at the extreme LHS rear of the SR-20 cylinder head. The lug needs to be sawn, or ground off. Ensure engine openings are all sealed during this operation.
24. Space has been provided for the fitment of the Nissan air conditioner compressor if required.
25. Oil filter can be accessed from behind the RH wheel, through the side of the subframe. A remote oil filter may be easier, allow space for this during installation if required.
26. A larger radiator is recommended, depending upon the state of tune of engine and size of intercooler.
27. During any future engine work, if sump is removed, o-ring seals on the adapter block must be replaced – only with Viton o-rings, BS-117 size. Never use a standard nitrile o-ring, replace only with a Viton o-ring.

Retain these instructions for future reference.

**Alltune** Engineering

16-07-06

# Ailtune Engineering Design - MX5/SR-20 Bolt Kits Listing

Qty	Description	Location & installation Notes
<b>Left Side Eng. Mount - Bolt Kit "A"</b>		
2	M10 x 25 Socket head cap screws (SHCS)	Fitted to the upper two holes into eng. block
2	M10 x 35 SHCS	Fitted to the lower holes of engine mount
4	M10 Spring washers - square section	Use on screws above
<b>Right Side Eng. Mount - Bolt Kit "B"</b>		
3	M10 x 30 SHCS	Fitted to the rear 3 holes into engine block
2	M10 x 25 SHCS	Fitted to the front two holes of engine mount
5	M10 Spring washers - square section	Use on screws above
<b>Gearbox Cage - Bolt Kit "C"</b>		
5	M8 x 75 SHCS	Through Cage flange and into gearbox.
5	M8 spring washers - square section	Use on SHCS above.
1	12 x 1.5 x 60 H.T. bolt	Through Cage lower & into gearbox mounting
1	12 x 1.5 x 45 H.T. bolt	Through Cage lower & into gearbox mounting
2	12 x 1.5 Nut - welded to lock plates	Fits into special recess on Nissan gearbox
2	M12 Spring washers - square section	Use on bolts above
<b>Gearbox Rear Mount - Bolt Kit "D"</b>		
1	12 x 1.5 x 30 H.T. Bolts	Connecting Torque rail to Gearbox Cage
1	12 x 1.5 Nylock nuts	Use on bolts above
2	M12 Thick plain washers	Use on bolts above
2	M10 x 30 SHCS	Connecting rear mount to gearbox
2	M10 Nylock nuts	Use on screws above
4	M10 Thick plain washers	Use on screws above
<b>Torque Rail - Bolt Kit "E"</b>		
4	12 x 1.5 x 30 H.T. Bolts	Connecting torque rail to gearbox cage
2	12 x 1.5 Nylock nuts	Use on bolts above
6	M12 Thick plain washers	Use on bolts above
<b>Sump Assembly - Bolt Kit "F"</b>		
16	M8 x 20 SHCS	Sump flange screws
2	M6 x 16 SHCS	Sump flange screws
7	M6 x 12 SHCS	Connecting oil separator tray to engine
2	M8 - special studs	Into oil pump inlet - locating adapter block
1	Aluminium oil adapter block	Joining oil pump to sump oil gallery
2	Viton O-rings	Sealing adapter block to sump and oil pump
1	3/8" NPT tapered pressure plug	Sump plug