mazda

BRITISH MOTOR HERITAGE APPROVED

MG

Vitesse

MGA Gearbox Conversion Kit

Fitting Instructions

QMS ISO 9001 REGISTERED

Ver. 8

KIT CONTENTS

- Mazda MX-5 5 Speed Transmission:
  - Vitesse Gearbox Case
  - Vitesse Bellhousing
  - Vitesse Machined Front Plate
  - Modified rear case to accept Mazda mechanical Speedo Drive, and to position the gear lever correctly
- Mazda MX-5 OE Clutch Friction Plate with Spacers
- For 1500/1600/1622/Twin Cam engines: MGB Clutch Cover
- For Twin Cam and Deluxe: Replacement Clutch Master Cylinder
- Vitesse Bespoke Shift Lever and Gear Knob
- Concentric Slave Cylinder Assembly with feed and bleed pipes
- Prop Shaft
- Spigot Bush with Mazda needle roller bearing assembly
- Speedo Drive Cable with Grommet and Blanking Plate
- Gearbox Rear Mount Bracket Assembly and Isolator
- Clutch Alignment Tool
- All required fixings- see next page

FIXINGS

- The gearbox, bellhousing, concentric slave cylinder assembly and speedo drive are all pre-assembled, ensuring that the installation to your vehicle is as straightforward as possible.
- The following fixings are all that is required to fit the Vitesse kit to your vehicle:

1. 7X 5/16UNF X 2 ½" HEX HEAD BOLTS
2. 7X 5/16UNF NUTS
3. 7X 5/16UNF WASHERS
4. 7X 5/16UNF SPRING WASHERS
5. 10X M8X20mm FLANGE BOLTS
6. 5X M8 FLANGE NUTS
7. 1X CAPTIVE NUT / RESTRICTOR
8. 3X M6X12mm DOMED CAP SCREWS
9. 1X BANJO BOLT
10. 2X COPPER WASHERS
11. 1X CLUTCH PIPE ADAPTER (AS REQUIRED)
12. 6X CLUTCH COVER SPACERS
13. 3X CLUTCH COVER FITTED BOLTS AND SPRING WASHERS (FOR MGA FLYWHEEL ONLY)

VEHICLE AND WORKSHOP PREPARATION

- Ensure you have a clean, safe working environment with enough room around your vehicle.
- We strongly recommend the use of a vehicle lift and an engine hoist with a ratchet winch, so the angle of inclination can be adjusted when removing / refitting the engine and gearbox assembly.
- Use a torque wrench to ensure all fixings are torqued correctly.
- Ensure clutch cable is in the correct orientation for the hand of drive of vehicle.
    - Hold the cable upright over the gearbox.
    - The banjo eyelet should point to the DRIVER'S SIDE FRONT WHEEL if the gearbox were to be installed in the vehicle:
    - For RHD vehicles the banjo eyelet should point to the right front wheel
    - For LHD vehicles the banjo eyelet should point to the left front wheel
- Two modifications are required to allow this gearbox kit to be fitted- the removal of the existing gearbox mounts, and the enlarging of the tunnel aperture. Refer to the relevant section for details of the modifications.
- **NOTE:**

  The gearbox comes pre-filled with oil, unless the oil has been drained and supplied in bottles (for some international markets). As there is residual oil in the gearbox there is sufficient oil in the bottles to refill to the specified levels. The main case and shift case have separate oil, and should be filled as follows:

  OIL GRADE: API Service GL-4 or GL-5

  OIL VISCOSITY: SAE 75W-90

  OIL CAPACITY: 2.0L {2.1 US qt, 1.8 Imp qt}

  SHIFT CONTROL CASE OIL CAPACITY: 290-330ml {17.69—20.13 cu in}

  OIL SERVICE INTERVAL: Every 5 years or 62,000 miles (100,000km), whichever comes first

DISASSEMBLY

The installation can be performed either through the engine bay (installing the engine and gearbox assembly as one) or through the cabin, which allows fitment of the gearbox without disturbing the engine.

The chassis modifications and access to the rear mount are much easier with the floorboards removed, so the through cabin method is recommended if the fitter is confident the floorboards can be removed without damage.

THROUGH ENGINE BAY METHOD:

1. Remove bonnet to aid engine bay access, or disconnect bonnet stay so it can be fully opened, and then retain.
2. Drain coolant.
3. Remove alternator.
4. Disconnect choke and throttle cable.
5. Disconnect fuel line from carbs.
6. Loosen all engine mount bolts.
7. Disconnect heater matrix feed from engine block.

LIFT VEHICLE

8. Remove exhaust system.
9. Remove prop shaft.
10. Remove slave cylinder and speedo cable from gearbox.
11. Disconnect starter motor harness.
12. Remove gearbox isolator bolts from crossmember.

LOWER VEHICLE

13. Remove gear lever and gaiter.
14. Remove starter motor bolts.
15. Remove distributor cap to allow for more clearance.
16. Fit engine hoist to lifting points on head.
17. Lift engine and gearbox, and remove starter motor when possible.
18. Lift engine and gearbox further and remove from vehicle.
19. Drain clutch lines and remove from master cylinder.

ENGINE AND GEARBOX

20. Remove gearbox from engine.
21. Remove clutch cover and clutch disc from flywheel.
22. Remove spigot bush from crank using a slide hammer, or by carefully chiselling it out and removing all swarf.
23. Clean up engine back plate in preparation for gearbox refit.

It is highly recommended that the flywheel and clutch cover are inspected at this point, and a new (or re-ground) flywheel and new clutch cover sourced and fitted if necessary.

DISASSEMBLY

The installation can be performed either through the engine bay (installing the engine and gearbox assembly as one) or through the cabin, which allows fitment of the gearbox without disturbing the engine. The latter method is only recommended if the fitter is confident the floorboards can be removed without damage.

THROUGH CABIN METHOD:

1. Raise vehicle on to axle stands or similar.
2. Remove seats.
3. Remove carpets.
4. Remove gear lever gaiters.
5. Remove floorboards.
6. Remove tunnel.
7. Remove exhaust system rearwards of the engine.
8. Remove prop shaft.
9. Remove slave cylinder and speedo cable from gearbox.
10. Disconnect starter motor harness.
11. Remove gearbox isolator bolts from crossmember. Leave crossmember fitted to chassis for now to support gearbox.
12. Remove gear lever and gaiter.
13. Remove starter motor bolts.
14. Drain clutch lines and remove from master cylinder.

ENGINE AND GEARBOX

15. Pull gearbox from engine and remove from vehicle.
16. Remove clutch cover and clutch disc from flywheel.
17. Remove spigot bush from crank using a slide hammer, or by carefully chiselling it out and removing all swarf.
18. Clean up engine back plate in preparation for gearbox refit.

It is highly recommended that the flywheel and clutch cover are inspected at this point, and a new (or re-ground) flywheel and new clutch cover sourced and fitted if necessary.

VEHICLE MODIFICATION

GEARBOX MOUNT REMOVAL

1. Once the vehicle has been stripped down, the gearbox mounts can be removed. Use an angle grinder to remove the mounts, and then clean up the area to ensure no sharp edges or burrs remain. The new gearbox mount is bolted to this crossmember, so it needs to be cleaned up before fitting.

2. Repaint crossmember to ensure it will not rust in future.

- NOTE replacement brackets are supplied ready for welding to the chassis if the original gearbox is to be refitted in future.

ASSEMBLY

ENGINE AND GEARBOX

The transmission is delivered fully assembled, with the concentric slave cylinder assembly, speedo drive and rear bracket and isolator assembly fitted and ready to be installed to the engine.

Engine and gearbox can be reinstalled separately to vehicle if a transmission jack is available. It can be easier to install in this way only if the required equipment is available.

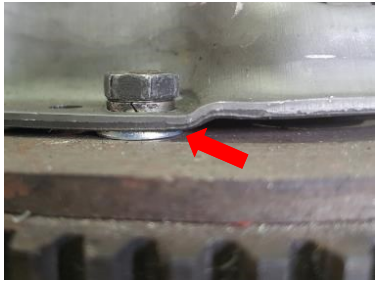
The following assumes only an engine crane is to hand, so is more suited to a home installation.

1. Fit Spigot Bush assembly in to crank with mallet. Knurled section should be a tight fit in to the crank. If slightly loose due to crankshaft wear, apply threadlock and refit.

2. Assemble the clutch cover and friction plate to flywheel, using the supplied Mazda clutch alignment tool to ensure correct positioning. Due to the extra thickness of the Mazda clutch plate, fit the 6 spacers under the clutch cover fixings- see image.

3. For MGA (two dowel) flywheels, only one of the existing dowels will align with the clutch cover. Fit the supplied clutch cover, replacing 3 of the original bolts with the supplied shouldered “fit bolts” in opposing positions to correctly locate cover to flywheel. The spacers should still be fitted as per (2).

Torque clutch cover bolts in rotation to **25-30lb/ft**.



ASSEMBLY

ENGINE AND GEARBOX

4. Lift gearbox assembly in to vehicle. Ensure rear gearbox bracket is lifted over rear body crossmember. Support gearbox with a jack or similar. Loose fit the top and bottom two bellhousing bolts at this point, as access can be difficult past the lower crossmember and bulkhead once the input shaft is engaged with the engine.

5. Drop engine in to place, and loosely fit one bolt and nut through each engine mount point to ensure it is safe. If fitting within the vehicle, put upper and lower bellhousing bolts in to position in bellhousing as access is restricted by crossmember.

6. Line up input shaft to crank, and fit gearbox to engine using:
   - 7X 5/16UNF x 2 ½" HEX HEAD BOLTS
   - 7X 5/16UNF NUTS
   - 7X 5/16UNF WASHERS
   - 7X 5/16UNF SPRING WASHERS

Fit the fixings, with nuts and spring washers on the engine side and washers on the bolt side.

Fit and hand-tighten the top-right and bottom-left nuts & bolts first to ensure alignment of the rest of the fixings (these are the locators), then fit remaining fixings and torque all to **19lb/ft.**

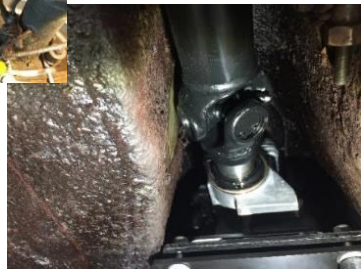
- **CARE POINT**: Attach a socket to the front pulley bolt and turn the engine over, to ensure the assembly is turning freely.

7. Lift gearbox up with a trolley jack or similar to allow for rear mount assy to be fitted.

8. Fit Prop Shaft slip yoke in to gearbox using a little gearbox oil to lubricate yoke and bush. Fit prop shaft flange to differential, replacing fixings if originals are in poor condition.

9. Due to MGA tunnel variations, we have allowed for some float on the rear mounting. There should be 5-8mm clearance between the gearbox and the right hand side of the tunnel, and the same clearance between the prop shaft yoke and the left hand side of the tunnel. Ensure this measurement is taken at the closest point, and then secure position by tightening bolts to the rear bracket. This then allows sufficient clearance for the gear lever to pass through the standard aperture and for all gears to be selected without contacting the tunnel aperture.

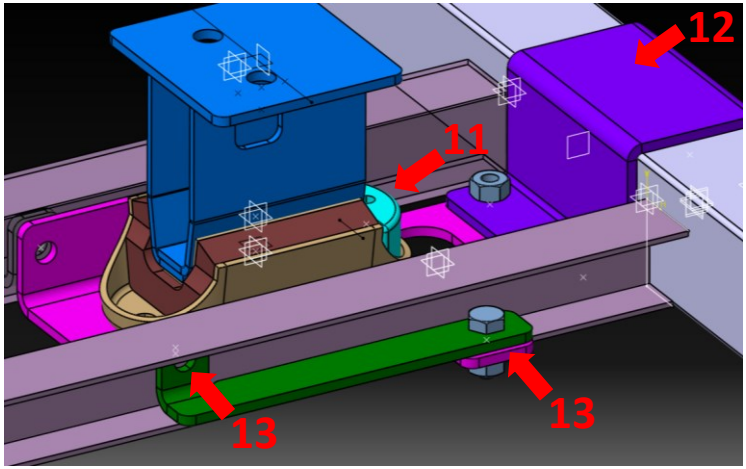
10. On some MGAs, there may be a need to give 1-2mm extra clearance to the gearbox body by levering between the tunnel and the gearbox.



ASSEMBLY

ENGINE AND GEARBOX

11. Bolt lower mounting bracket to rubber mount. Pass the captive nut / restrictor up through the access hole and on to the rubber isolator as shown.
    - 2X M8x20mm FLANGE BOLTS at **19lb/ft**.
    - 1X M8 FLANGE NUT
    - 1X CAPTIVE NUT / RESTRICTOR
12. Fit the upper mounting cup and loosely fit 4 M8X20mm Flange Bolts in to the captive nuts.
13. Position side support plates as shown with the front edge aligned with the lower bracket. This can then be used as a guide to drill four 9mm holes in the chassis rails to match the rear mount hole positions, highlighted in the image on the right. Paint to protect from rust.
14. Torque rear mount fixings in rotation:
    - 8X M8X20mm FLANGE BOLTS AT **19lb/ft**
    - 4X M8 FLANGE NUTS
15. Fit shift lever from inside vehicle using the fixings below. Ensure collar is aligned to recess in shift joint, and pointing forwards. Ensure all gears can be selected and there is no clash to tunnel aperture. If there is a clash, the rear mount needs to be moved across, maintaining some prop clearance to the tunnel wall.
    - 3x M6x12mm DOMED CAP SCREWS at **8lb/ft**
16. Refit tunnel, tunnel top, floorboards and the interior if removed.
17. Remove engine mount bolts and lift engine to allow for starter motor refit. Lower engine back on to mounts and fit all mount fixings.
18. Refit alternator.



ASSEMBLY

ENGINE AND GEARBOX

19. Refit oil cooler pipes and front mounting plate.
20. Refit coolant pipes.
21. Refit fuel line, throttle cable and choke.
22. Refit radiator.
23. Remove original and fit new clutch master cylinder (Twin Cam/ Deluxe only).
24. Fit new clutch pipe to master cylinder with supplied new banjo bolt and copper washers. Use cable ties to retain pipe and keep clear of bonnet hinge. For dual master cylinders an adapter has been supplied to lift the clutch pipe to clear the existing master cylinder bracket.
25. Fill master cylinder with DOT4 brake/ clutch fluid.

26. CLUTCH BLEEDING

Cable tie the bleed pipe to the clutch feed pipe as shown, as it then allows the monitoring of the reservoir fluid level at the same time as controlling the bleed nipple.

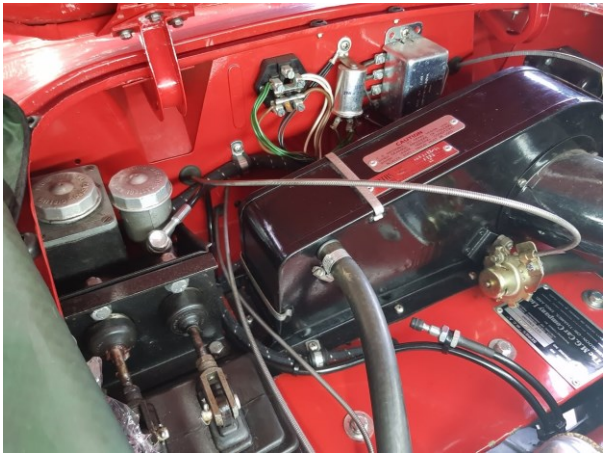
- Use an 8mm spanner to undo the bleed pipe ¼ of a turn.
- Depress the clutch pedal fully.
- Tighten bleed pipe
- Release clutch pedal

Repeat until resistance is felt through the clutch pedal.

This may take a number of cycles and you must keep an eye on the clutch fluid level in the master cylinder throughout the process to ensure air is not pulled through the system.

NOTE On vehicles fitted with the dual master cylinder, it may be difficult to bleed the system in this way as the pedal connecting rod is not retained to the plunger. This means the plunger does not return fully when the pedal is lifted, and fluid cannot enter the system from the reservoir.

In this case, the best method of bleeding is to fill a syringe with fluid, and connect the syringe to the bleed nipple with some flexible tubing. Undo the bleed nipple and then slowly push the fluid up through the system, keeping an eye on the master cylinder reservoir fluid level. Repeat the process until a solid pedal is achieved, and bubbles stop appearing in the master cylinder when pushing fluid through.



ASSEMBLY

SPEEDO CABLE

27. An angled drive is supplied with the kit, which should be fitted to the speedo drive on the gearbox and then the speedo cable is screwed in to it. Due to variations over the years, the angle drive may be a little close to the tunnel. If this is the case then the angle drive can be bent a little when fitted to provide clearance.

28. Connect reverse light switch if reverse lights are fitted. The fly leads have been fitted with bullet terminals to be compatible with the existing vehicle wiring.. The fly leads can be extended by bending the clip on the gearbox body out of the way to aid fitment.

29. As an optional safety feature, there is a neutral switch that can be connected in line with the ignition switch. If used, this ensures the engine cannot be started unless the vehicle is in neutral. The neutral switch is the one to the rear of the tailhousing.

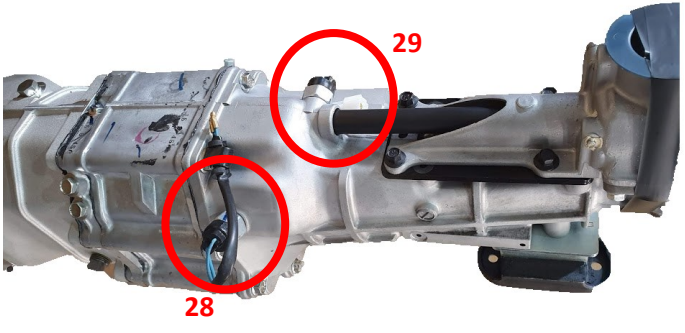
30. Fit gaiter and surround to shift lever.

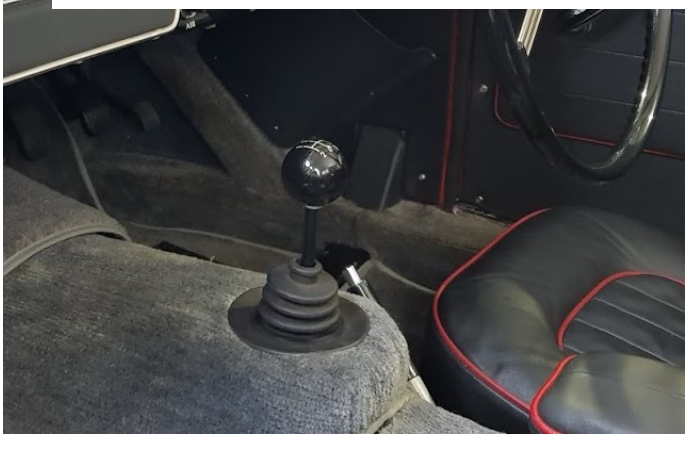
31. Fit shift knob to shift lever, using the locking nut to secure.

32. Test drive vehicle and enjoy!

NOTE:

It is likely that the speedometer will need to be re-calibrated to suit the new gearbox. If in the UK, we recommend Speedy Cables (www.speedycables.com) or Speedograph Richfield (www.speedograph-richfield.com) for this work.





PARTS

SERVICE AND MAINTENANCE PARTS FOR YOUR KIT

PART NO	DESCRIPTION
VP00001-1	TRANSMISSION ASSY STANDARD
M507-17-335A	REAR OIL SEAL
VP00035-1	CLUTCH FRICTION PLATE
VP00152-1	CLUTCH COVER
94ZT-7A564-BA	SLAVE CYLINDER
VIT18392	CLUTCH FEED PIPE
VITESSE-RCB-M8	CLUTCH BLEED PIPE
VP00044-1	SPIGOT BUSH
1596468	SPIGOT BUSH ROLLER BEARING
VP00063-1	PROP SHAFT
VP00078-1	TRANSMISSION REAR ISOLATOR

PART NO	DESCRIPTION
VP00026-1	GEAR LEVER MGA
0398-17-462A	GEAR LEVER BUSH
VP00031-1	GEAR KNOB
VP00056-1	MECHANICAL SPEEDO DRIVE
211779	SPEEDO CABLE EARLY
M528-17-400A	ELECTRONIC SPEEDO DRIVE
VP00172-1	ELECTRONIC SPEEDO HARNESS
83770-22120	SPEEDO ANGLE DRIVE