

DESIGN

INNOVATIVE ENGINEERING SOLUTIONS FOR HIGH PERFORMANCE INLET MANIFOLDS WITH HIGHLY RESPONSIVE LINKAGES- Patent pending 0922289.4 **INSTALLATION INSTRUCTIONS**

TEMPLATE PORT MATCHING SYSTEM

ONE MANIFOLD FITS ALL HEADS - EXACTLY

Matching one aftermarket performance inlet manifold to the varying port centres in the many different Datsun L6 head castings has always created considerable problems, and requires many hours of work to achieve what is still often a compromise result. Not only do the port centres vary in position and shape, but the stud centre positions also vary. To accommodate this problem, in the standard manifold, the stud holes are drilled oversize by at least 1.0mm. As the manifold has no exact location, this creates a miss-match of up to 1.0mm. If the manifold drops 0.5mm, the top of the head port is shrouded by 0.5mm and the bottom of the port drops below the head port, not only does it blank off the port, but it can also induce turbulence.

The only way that an accurate and repeatable match can be achieved is by dowelling the head and manifold together. This simple and unique template system has enabled us to average out all the inaccuracies of the standard heads into one set of CNC machined port centres, and the studs no longer locate the ports. Therefore one manifold will match every head precisely every time.



TEMPLATE SYSTEM

- Clean cylinder head manifold face.
- Place template over studs - Lightly tighten nuts on 4 of the top studs
- The port centres and shapes of the different Datsun head castings may vary substantially
The opening in the template is 37.0mm.
The ports in the Mangoletsi manifold are machined at 35.0mm.

Move the template around the head ports to achieve the best centralization of the irregular standard ports to the holes in the Template. This will be a compromise, due to the inaccuracy of the original head ports. When the best position is obtained, tighten the retaining nuts.

- Drill the dowel holes in head. The drill depth must be accurate to avoid breaking in to water gallery.

* Fit 5mm drill bit (supplied) in to the chuck

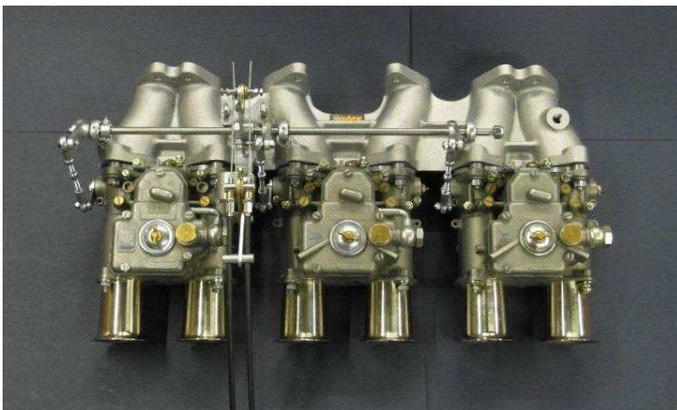
- * Slide steel sleeve supplied over the drill bit until the distance from the end of the sleeve to the point of the drill bit is **no more than 9.0mm**.
 - * Drill dowel holes in to head. Ensure all swarf is cleaned out.
 - * Insert dowels into head
 - * Place template over dowels
 - * Scribe around the inside of the 37.0mm template apertures of all six ports. The inside diameter of that circle will be approximately 36.5mm. You should aim to open the head port to within 0.5mm of the scribed circle, giving a 35.5mm head port diameter. This will avoid any chance of an overlap with the inlet manifold and gasket, which would cause a blockage to the air flow.
 - * Match head port by using the flap wheel supplied. Rough out all the six ports first – this will condition the grit for final polishing.
 - * For bigger head ports than 35mm, the 36.5mm circles give a datum to position them accurately.
- Another advantage of the template system is that, if you already have a big port head, which may not have the same port centres as the Mangoletsi manifold, you can reverse the use of the template and transfer the positions of your enlarged ports to the new inlet manifold, and then open it up. Additionally, if the standard head ports are so far out, you can open up the nw manifold more to achieve a match, and likewise if you have a big port head.

MANIFOLD FITTING

Gasket Preparation

- Centralise the gasket (not supplied) to the template port openings.
- Clamp them together, drill through the 2 jig bushes and through the gasket with the 5mm drill. Whilst still clamped, check the 5mm dowels will push through the bushes and the holes in the gasket.
- Gaskets are not always accurate. It is very important that the gaskets are well clear of the inlet ports. The drilled dowel holes in the gasket will not be exact, due to the nature of the material. The dowels should be fitted to the manifold and the gasket pushed over them to fully clear the holes. Ensure the ports in the gasket are clear of the inlet head ports by at least 0.5mm all round.

Fitting Manifold, carburettor or throttle body - The linkage on the manifold comes pre-assembled



- 3 x Weber DCOE levers are supplied with a fixed stud, to which the rose joint is bolted. The heavy duty 3mm thick steel lever is usually tight on the flats of the shaft. Push it on, keep it square and once the threads are exposed, slowly tighten a nut to drive it along the shaft. Leave a small clearance between the lever and the carburettor body.
- Fix the carburetors to the manifold with studs, O ring blocks, double coil washers, and Nylok nuts. Ensure the washer coils are not over-tightened and have clearance between them. The length of the rose joint hex bar connectors is pre-set, and they should be fixed to the Weber levers with the Staytite nuts. It is **essential** that the 5mm washer (spares supplied), which is fitted between the aluminium levers and the top rose joint, is always in position. Otherwise they may foul each other.
- **Rose Joint Hex bar set up – The gap between rose joint bodies is preset at 45mm.** The top end of the rose joint assembly should be bolted through the **end** hole of the aluminium billet levers. **Important – ensure that a 5mm washer is between the aluminium lever and the rose joint, otherwise they may foul.** Connect carburetor end – no washer required.

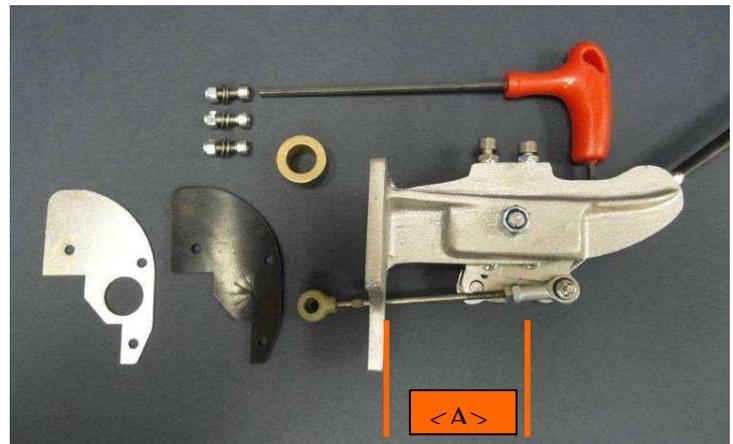
- For injection throttle bodies – the levers to suit the Mangoletsi Datsun linkage will be supplied by the throttle body manufacturer, along with the studs/nuts and gaskets, fuel rails etc. Jenvey have special levers to suit the kit. Please specify the dedicated Mangoletsi levers.

Fitting Bulkhead Twin Cable Quadrant Bracket - fits both LHD & RHD cars – RHD illustrated



- A steel backing plate is supplied, which strengthens the bulkhead and provides a flat surface on which to bolt up the cast bulkhead linkage bracket. It also serves as the template for positioning the bracket and drilling the 3 holes for fixing. A nitrile rubber gasket is supplied to fit between the backing plate and the bulkhead. It also seals the push rod to avoid fumes entering the cockpit.

- Line up the 20mm hole in the bulkhead with the 20mm clearance hole in the template backing plate. Then press in the centralizing bush (supplied) through the plate and the bulkhead. Ensure the backing plate is vertical.
- Then drill 5.0mm top left hand hole. Bolt plate to bulkhead with 20mm centralizing bush still in position. Drill other two holes.
- Remove centralising bush and template backing plate. Place template backing plate on mounting face of bulkhead bracket – then the gasket fits next to the bulkhead.



- Push the three 5mm socket head cap screws through all three components and through the bulkhead holes, checking that the assembly is still vertical.
- Bolting the bracket to the bulkhead is a two man job. Tightening the 3 nuts and spring washers behind the bulkhead is a little awkward, but the result is a very rigid quadrant bracket assembly. A long series 5mm x 150mm T socket wrench is supplied.

Initial Set up – Linkage and throttle pedal

The Mangoletsi Datsun sliding set up system is unique. The bulkhead twin cable quadrant assembly is fully assembled and pre-set to give pedal travel of 40mm. The rose jointed linkage is pre-assembled on the manifold and the rest of the linkage components of the sliding set up system are all mounted on a CNC bracket, which is bolted to the manifold

The rose joint connection to accelerator pedal

The open and closed quadrant stops are pre-set to give 40mm rod travel (this replicates the standard pedal travel). Run the 4mm locknut (supplied) to the shank of the original rod that passes through the bulkhead (see above). Screw the rod assembly into the rose joint that is already assembled on the quadrant. End of rose joint body to face of bracket (gap A above) should be 55mm. Adjust if necessary with the forward stop adjuster.

The back adjuster is the **fully open** stop. The gap from the end of the rose joint to the bracket should be 15mm, giving 40mm travel. When you have finished the whole linkage set up, finally adjust the pedal height. With the quadrant in the throttle fully closed position, you can wind the rod and plastic ball in and out of the rose joint body to alter the pedal position. Finally tighten up the 4mm locknut

Cable Connections from bulkhead cable adjusters to manifold linkage.

The 2 inner cables have barrel end attachments that slot into the aluminium quadrant. To insert the barrels, turn the quadrant until it is clear of the casting and slide the ends of the 2 cables into the cross drilling until they are in line with the grooves. Feed the cables under the cross bar, which is positioned just above the cable grooves, and also prevents the cables jumping out of the grooves. Then feed the inner cables through the cable adjusters. Fit the outer cables over the inner cables. With the bulkhead quadrant in the fully closed position, feed the cables through the adjustable cable support. Pass the inner cables through the cable adjusters on the sliding spring plate with the outer cables fitting in to the adjusters. Then pass the inner cables through the sliding cable clamp.



With the accelerator pedal and linkage quadrant in the **fully closed** position, run the cables from the bulkhead bracket to the linkage assembly through the cable support bar, as illustrated. At this stage do not clamp up the inner cables.

The outer cables should have smooth curves and be supported wherever possible (RHD examples shown)

The LHD installation has shorter cables that run directly from the bulkhead bracket in a smooth curve to the carburettor linkage. On the LHD installation **one outer cable** is slightly shorter – this should be positioned on the inside of the curve so they run parallel.

Prior to Start Up – Carburettor linkage set up.

- Angle the cable support so that the cables point to the middle of the height variation that occurs on the cable clamp as the main operating lever rotates from closed to fully open position.
- With the carburettor idle adjuster screws fully backed off, ensure that the throttle plates fully close without sticking.
- The 3 hexagon bar rose joint assemblies have left and right hand threads to enable final adjustment. The aluminium billet levers are positively fixed to the cross shaft with socket screws that locate in drillings in the shaft and are clamped to the shaft for further security. Back off the left and right hand threaded hex bar locknuts so that the length of the rose joint assemblies can be adjusted individually.
- The pull off springs should be holding the throttle plates tightly closed
- Adjust the hex bar lengths so that they simultaneously open and close all 6 throttle plates – tighten.
- Open idle screws $\frac{3}{4}$ of a turn ready to run.



At the Carburettor end

1. With the twin linkage pull-off springs in tension, the throttles will be closed. The main linkage operating lever with the 2 slots will therefore be located in the closed position.
2. The top of the inner cable sliding clamp plate has been pre-set at 10mm below the top of the slotted operating lever pressing to match the 40mm of travel pre-set at the bulkhead quadrant.
3. When handling the inner cable, be careful not to kink it. Whilst carrying out the installation/setup it may be necessary to tighten and release the cable clamps several times. For this procedure you should tighten them lightly – when finally tightening up, apply sufficient load on the clamp screw until the cable starts to deflect, then tighten locknuts. Make sure that 2 x 6mm washers are between the cable and the bush on each side of the main lever.

4. Operate the pedal and check to see that the pedal travel is approximately 40mm. Having opened and closed the throttles several times, the cables will settle down and usually become slack. Re-position the inner and outer cables and re-clamp the inners. If there is still some movement in the outer cables, take it out with the cable adjusters.
5. The exact match to the pedal travel from the bulkhead quadrant can be achieved by sliding the cable clamp up the slot to match the increased travel, and down the slot to reduce it.
6. With the various adjustments you carry out, the length of the inner cable required will change.
7. If there is still any end float in the outer cables, unscrew the cable adjusters to remove it, and tighten up the staytite nuts. Do not over-tighten as it can slightly crush the oilite spacers to the point that the swivel barrel may not rotate freely. Back off the nut slightly if this occurs.
8. NB: It is not advisable to shorten the inner cables, as any adjustments that you may make to pedal travel etc., requires different lengths of inner cable and, importantly, the end of the multi-strand cable is soldered so that it passes cleanly through the small hole in the clamp. If it is cut, it splays out and is difficult to refit.
9. To change the pull off spring tension the inner cables must be slack – slide the spring carrier until the desired pedal feel is achieved – tighten up. Re-connect inner cables and take out any slack in the outer cables.
10. **Pedal stop adjustments** With the throttle pedal in the fully open position hard against the stop RH (Fig A) push the linkage sliding pedal stop (Fig E) until the upstand simultaneously strikes the cam profile at the bottom of the main operating lever – tighten up both nuts. This protects the carburettors and linkage from taking the pressure of your foot and is of great benefit for hard and competition driving.

11. Run car

12. **Pedal travel** - To change the length of the pedal travel, alter the fully open and fully closed screwed stops on the bulkhead quadrant assembly and re-set the sliding clamp plate to match. NB: All measurements in respect of pedal travel are taken at the bulkhead quadrant. Pedal travel measured at the carburettor linkage end is not representative of the pedal travel as the gearing is different.

NOTES

13. **Spring tension** - As you vary the adjustments of spring tension, pedal travel etc, it is necessary to change the clamped length of the inner cables. Until the linkage settles down, adjustments of the cables should be checked, ensuring that it is reaching full throttle and also returning to idle correctly.
14. **Throttle characteristics** - If you wish to have a slower and more progressive opening of the throttles you should experiment by opening up the centres between the rose joints on the hex bar from 45mm to 48mm. Conversely if you require a quicker throttle opening, reduce the centres.

Rod linkage alternative – for use with the standard pedal/bulkhead linkage layout.



There is much debate about whether a rod or cable linkage is superior. Both are supplied - so you can decide. Our freely rotating, aircraft quality, rose jointed hex bar links, sliding pull-off spring and pedal stop, all contribute to a superior rod linkage over others on the market.

Fitting – the new bulkhead bar fits into the original bulkhead bush. Position the lever on the shaft to connect to the bulkhead swivel rod. The U shaped bracket bolts on to the end of the cross shaft. All the main linkage system remains. Remove the sliding cable clamp, outer cable adjuster barrel and the cable support bar. The pull off springs remain. Adjust the linkage set up as above. Then set the sliding pedal stop.

CUSTOMER FEEDBACK

Our Datsun 240Z Weber conversions were first developed with Janspeed (who supplied Nissan Competition Europe) and for Spike Anderson's Samuris. Motor Magazine first road tested our conversion in 1972. We have always had a policy of working with leading engine builders and installers and have followed the same practice with this development programme. We would like to thank the five leading specialists who have been helping, over a two year period, to develop and perfect our advanced and innovative manifold and linkage kits.

As you can see the unique linkage system can be set up to give any characteristics you wish. Any feedback would be appreciated to supplement our own continuing development. A consensus of the results from varied applications would be helpful in compiling a specific guide. This information will be available only to our customers – please contact us by email.

We have developed the new kits with a range of parts for ease of fitting. We have also endeavoured to make the instructions as comprehensive as possible. However the final judgement lies with the customer – if you have any comments about the kit, installation and performance, we would like to hear from you.

We hope you enjoy your conversion.
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