

**Limora Zentrallager**  
 Industriepark Nord 21  
 D- 53567 Buchholz  
 Tel: 49 (0) 26 83- 97 99 0  
 E-Mail: [Limora@Limora.com](mailto:Limora@Limora.com)  
 Internet: [www.Limora.com](http://www.Limora.com)

**Filialen:**  
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## Fitting Instruction for TR3 (late) to TR6 4 pot Caliper brake kits

**Warning:** As the braking system of the car will be disturbed, the utmost care and attention must be taken to ensure the installation is safe before the car is driven. If in doubt leave the installation to a competent installer.

1. Disconnect the battery. Jack up the car and set on axle stands. Remove the front wheels.
2. Remove the cap from the braking system fluid reservoir and remove sufficient fluid to ensure the fluid does not spill over when the existing pads are pushed back and removed.
3. Remove the existing caliper arrangement in accordance with the appropriate workshop manual.
4. Caliper Only Kit RTR4461K
  - 4.1 Where a caliper only kit is being fitted, the existing discs should be thoroughly inspected and if not in excellent condition, they should be replaced. Failure to observe this point will reduce the efficiency of your new brake system and if the discs are badly worn, this could be dangerous.
  - 4.2 If necessary order from the following list of 280mm diameter discs.
    - 2 x Plain discs part number 203189
    - 2 x Slotted discs part number RTR4144SL.
    - 2 x Cross-drilled and slotted discs part number RTR4144XDSL.
5. This operation does not apply to RTR4461K where the original discs are to be retained and there is therefore no need to remove the hubs.
  - 5.1 Using the workshop manual remove the front hubs. Clean out and inspect the bearings and the hubs. Replace these if not in perfect condition. The wheel bearing outer races should not spin in the hub unit, nor should the inner races spin on the stub axle. If any of these parts are sub standard they should be replaced.  
 The parts you may need are:
    - 2 x Hub bearing kit part number GHK1021 (one hub set)
    - 2 x Replacement hub Aluminium part number 114284AL.
 Steel hubs can be supplied but are more expensive than

aluminium, are no stronger and do not offer the unsprung weight saving of aluminium hubs.

4 x friction disc to hub screws, part number 113150  
 2 x stub axle shafts, part number 115763

You may also want to consider our hub bearing strengthening kit RTR3463K which greatly reduces pad knock common all TR's 3-6.

- 5.2 Remove the old discs from the hubs by removing 4 screws and spring washers. This is best done by sitting the hub in a road wheel, locating the studs or spline and kneeling on the tyre to react against the force of undoing the 4 screws.
- 5.3 Remove the dust shields. These will not fit with the new callipers and will be left off.
- 5.4 Clean up the hub face where the new disc will fit. Complete cleanliness is important to ensure the new discs sit correctly on the hubs.
- 5.5 Fit the new discs to the hubs. Torque the attachment screws to the correct figure for your car. Mount the hub to the stub axle. Check run out (accept 0.12 mm or less). If unsatisfactory, re clean the mating faces and/or choose another position for the disc to sit on the hub.
- 5.6 Fit and adjust the hub bearing castellated nut observing correct end float in accordance with the workshop manual ensuring a new split pin is used (or follow the instructions with kit RTR3436K if that is being fitted).
6. Trial fit the adaptor bracket and Caliper to the caliper carrier without the pads fitted, noting that the Calipers are handed (bleed nipples go upwards). Don't use spring washers whilst trial fitting but use extra plain washers with the adaptor to caliper carrier bolts to ensure the bolts do not bottom out. Check that the Disc is central in the Caliper, if not introduce thin washers between the original caliper carrier and the adaptor bracket to effect centralisation. Use feeler gauges to check both sides of the disc to the caliper. Check at the top of the caliper and at the bottom. This test may reveal that the carrier is twisted. If this is the case, the carrier will need replacing. The adaptor bracket can be fitted either way round and this should be attempted first to see which way round gives the best centralisation, prior to introducing spacing washers. It is

not necessary to strive for exact centralisation, if you are close and the pads will fit easily, that will be good enough as the pistons will finalise the centralisation.

6.1 In the event of a twisted caliper carrier, the parts you may need are:

- 1 x TR3-4 (early) Caliper Carrier Left Hand part number 113123
- 1 x TR3-4 (early) Caliper Carrier Right Hand part number 113124
- 1 x TR4 (late)-TR6 Caliper Carrier Left Hand part number 133500
- 1 x TR4 (late)-TR6 Caliper Carrier Right Hand part number 133499

7 When satisfied with the test at operation 6, finally install the adaptor brackets using the bolts supplied with spring washers.

7.1 TR4A-6 only. The upper attachment bolt secures the adaptor bracket to the carrier along with the hose support bracket (supplied on the hose). A spring washer is employed under the head of the bolt. Leave the hose hydraulic connections unattached until operation 10.

7.2 The lower attachment bolt (and the upper on TR3 (early)-TR4) securing the adaptor bracket to the carrier uses a plain and spring washer.

**Note:** The use of the correct spring and plain washers is VERY important; if not assembled correctly the thread of the bolt will bottom and may work loose with use.

7.3 Nip up the bolts but do not fully tighten at this stage.

8. Fit the calipers, noting that they are handed (bleed nipples go upwards). Each caliper is attached with M10 high tensile bolts and special spring washers. Nip up the bolts without the spring washer whilst test fitting but do not fully tighten at this stage. Spin the disc as the caliper is tightened down. Should the disc begin to foul the caliper on its periphery, remove the caliper and introduce an equal number of 10mm spacer washers to each bolt to ensure the caliper does not touch the periphery of the disc. Remember to fit the spring washers under the head of the bolts later when the installation has been deemed satisfactory.

9. Fit the brake pads, securing with retention pins and 'R' grips noting that there is a small recess in the caliper for the R grip to sit in. See that the pads sit just on the edge of the disc or .5-1mm below. If too high or too low, adjust the number of 10mm spacer washers to give correct positioning.

9.1 Offer up the wheels you intend to use and carefully check for clearance between the caliper and the inside of the wheel. Our experience has shown that Wire wheels and after market wheels offer good clearance but some standard steel wheels are very close or can interfere. The culprits are TR2-5 standard steel wheels and early standard TR6 steel wheels intended for Rostyle trims. The TR6 later wheel where the holes in the rim are on a continuous centre plate clears fine.

9.2 The photograph shows the area in question. Where necessary grind away the offending edge of the pressing to allow for a clearance of 3mm. This should be sufficient to allow for wheel movement during operation.

10. Connect up the hydraulics.

10.1 Remove the protective covers from the caliper inlet ports.

10.2 Install the brake hoses to the calipers with a banjo bolt and two copper washers, one either side of the banjo, initially leaving the banjo bolts loose.

10.3 Attach the free end of the hose to the chassis bracket with the half nut provided then assemble the solid pipe to the hose.

10.4 TR4a-6 only. Align the support bracket mounted on the hose. It may be necessary to slightly loosen the uppermost adaptor bracket to carrier bolt. The hose and bracket should run roughly horizontal.

10.5 TR3-4 only. Assemble the hose as for TR4A-6 but noting that there is no bracket and the hose exits vertically upwards.

11. Turn the hub through all possible axis of movement to ensure the hose cannot touch anything. Do this with the road wheel on and off to explore all possibilities. Re-adjust the attitude of the hoses if necessary. Tighten the banjo bolts whilst maintaining the correct hose orientation.

12. Fill with brake fluid and bleed the system. Test thoroughly for leaks. Check for correct pedal pressure. See 14. below.

13. The caliper and adaptor bracket attachment bolts can now be finally tightened. Have an assistant press the brake pedal a few times then apply constant light pressure. This will have the effect of aligning the caliper to the disc in so far as a small amount of free play exists in the attachment bolts. Tighten the bolts, which hold the adaptor bracket to the carrier, and the M10 bolts holding the caliper to the adaptor bracket.

14. If you seem to have an unusually long pedal, there can be a few reasons for this.

14.1 First check for correct bleeding. As the system has been dismantled air may be trapped. Try pressure bleeding.

14.2 Incorrectly set pistons. In manufacture the piston seals are set in a specially shaped groove that arranges for the pistons to be pulled back slightly as pedal pressure is removed. When the pads are first introduced there will be a gap between the pistons and the pad. When pedal pressure is applied, the pistons move to the pad, but may, when pressure is removed, move back too far due to the combination of the initial gap and the pull back effect of the seal. The system would self correct in time as the pads are bedded in, but it may not be safe to drive that far! The cure is simple. With an assistant to push the pedal proceed as follows: Take out each pad one at a time. Apply pedal pressure slowly so that the piston is pushed out just so far to prevent the pad from being inserted. Release pedal pressure and push the pistons back with finger pressure just enough so that the pad can be inserted. Repeat the exercise for the other 3 piston sets. Remember to re-pin the pads!

- 14.3 Follow the correct bedding in procedure. When the pads are new they may not conform exactly to the shape of the disc especial if the disc is not new. This will mean the pad will be forced to the shape of the disc, which will introduce pedal travel.
- 14.4 Faulty master cylinder. Check the master cylinder for the possibility of internal bleed back. It is possible for some master cylinders to leak fluid back to the reservoir under pressure, without any fluid loss. As this would result in a long pedal, which would get worse and worse the longer the pressure is applied, it is easy to check.
15. Finally check all fasteners are secure and that the system holds hydraulic pressure. Refit the road wheels. Torque to the correct setting as follows:  
 Disc to Hub 3/8"UNF 34lbf.ft 47NM  
 Original Caliper Bracket to vertical link (if removed) 3/8"UNF 34 lbf.ft 47NM  
 Adaptor bracket to original caliper Bracket 65lbf.ft 90 NM  
 Caliper to Adaptor Bracket (Hex Bolt) 58 NM Plated bolts, 77 NM Black bolts  
 Note that 1NM = 1kgf-m  
 Remove the car from the stands.
16. Test drive, being mindful that the pads will need to bed in. To ensure bedding in is carried out correctly, We have written a technical instruction on the subject, which has been included with this kit. Follow the procedure in the technical instruction to ensure you get the best performances out of your new braking system. Ensure the wheels rotate freely, pay particular attention to stick on weights inside the wheel, which might hit the caliper.

### Operation and maintenance

These calipers provide a much greater braking effect as they concentrate the pad contact around the periphery of the disc. It is important to appreciate that the braking effort is still provided by your foot! Not by magic! Therefore if you want to stop quicker you must press harder!

### Brake Bedding in Procedure

When reworking or replacing front brake discs and brake pads on all TRs, it is very important that the correct brake bedding in procedure is employed. When non-standard pads and discs are used, especially in our 4 pot caliper kits, following this procedure is essential.

### Proceed as follows:

Observe all local road traffic regulations during this test drive and be aware that the braking efficiency will be poor until the brakes are bedded in.

- 3 x light brake applications from 80 to 50 km/h (approximately 50 to 30 mph) using normal acceleration up to 80 km/h (50 mph).
- 3 x medium brake applications from 110 to 60 km/h, (approximately 70 to 40 mph) using normal acceleration up to 110 km/h (approximately 70 mph).
- 2 x hard brake applications from high speed to 50 km/h, (approximately 30 mph) again using normal acceleration.
- Drive a further 8 kilometres (approximately 5 miles) with minimal brake use.
- Stop in a convenient lay-by and allow the brakes to cool.
- Drive a further 5 miles with normal brake use, then return to the workshop.

