Disc brake Installation & Service Manual

Mono6ti

Mono M4

Mono Mini

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1. Introduction

Thank you for purchasing a Hope Technology disc brake system. Please read the contents of this service manual to fully acquaint yourself with the correct installation and safe operation of your brake.

1.1. Instruction manual coverage

This manual covers the installation and servicing of the Mono Mini, Mono M4 and Mono6-ti hydraulic disc brakes.

1.2. Safety first

This brake system must be fitted by a competent cycle mechanic using the correct tools. Incorrect installation can result in brake failure that can cause serious personal injuries.

Your braking performance will improve in almost all riding conditions but care must be taken to ride within your own ability. The stopping power of any bicycle is always limited by the traction of the tyre on the ground so take the time to become familiar with your new brake and its braking characteristics.

Before each ride always check the brake for proper function and the brake pads for wear and that there is no system damage resulting in fluid leaks.

If you have any doubts or questions please contact your dealer or the appropriate Hope distributor for your country.

1.3. System identification

There are three current brake designs; the Mono Mini, Mono M4 and Mono6-ti, all using the Mini lever

All the brakes are open systems.

The following table shows examples of each caliper. The caliper profiles can vary depending on the disc rotor size and bolt mounting pattern and the table shows common examples.

Caliper and Lever identification

The Mono Mini caliper - A caliper with 2 pistons. The caliper is anodised black with “mono mini” etched onto the back of the caliper. One cap is screwed into the front of the caliper. The caliper number is etched onto the back of the lower mounting bracket. Open system. The caliper must be used with a Mini lever.
160mm front caliper shown.





The Mono M4 caliper - A caliper with 4 pistons. The caliper is anodised black with “mono m4” etched onto the back of the caliper. Two caps are screwed into the front of the caliper. The caliper number is etched onto the back of the lower mounting bracket. Open system. This caliper must be used with a Mini lever.
180mm front caliper shown.



Mono6ti caliper - A caliper with 6 pistons. The caliper is anodised black with “mono6ti etched onto the back of the caliper. Three caps are screwed into the front of the caliper. Open system.
The caliper must be used with a Mini lever.
205mm IS adaptor shown bolted onto caliper.



The Mini lever - A two finger lever with automatic pad adjustment and manual reach adjustment.

2. Installation

The disc brake system is supplied fully assembled and bled, i.e. containing brake fluid.

The Cycle Dealer is responsible for supplying the caliper with the correct bolt mounting pattern to fit your particular fork or frame. Some installations may require an additional mount bracket as advised by your dealer.

In the first instance it is recommended that you install the brake as supplied without disconnecting and routing the hose through frame guides (if present) or attempting to shorten the hose. Once you have experienced the fully working brake you may decide at a later date to make some hose routing or shortening modifications as described later in this manual.

2.1. The bicycle wheel

The wheel should be built by a skilled wheelbuilder using a 3 cross lacing pattern and correctly tensioned. Your dealer will advise whether the hub in your wheel is compatible with this Hope disc brake. There are two types of compatible hubs; splined Hope hubs that require a 5 bolt disc spider (purchased separately) and International Standard 6 bolt hubs (made by Hope and other hub manufacturers) where the disc rotor bolts directly to the hub.

2.2. Attaching the disc rotor to the hub

For Hope splined hubs fit the spider to the hub splines and ensure it is squarely seated before securing it with the spider lockring. Hubs using a spider require a disc rotor with a 5 bolt pattern.

Attach the disc rotor to the hub with the orientation of the rotor arms as shown in Figure 1 (6 bolt disc rotor shown).

It is recommended that a mild engineering adhesive often referred to as 'threadlock' is used on the bolt threads to prevent them unscrewing. Do not use a permanent adhesive or this will prevent removing the disc rotor at a later date.

Replace the wheel with the attached disc rotor in the forks (or frame) making sure the wheel axle is sitting square in the dropouts and that the wheel skewer is correctly tightened.

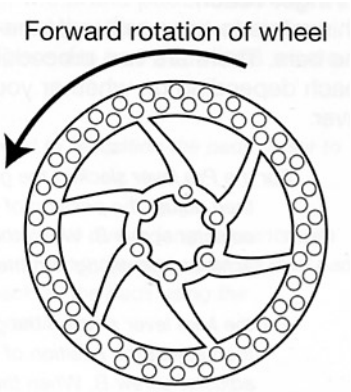


Figure 1

2.3. Attaching the lever

Attach the lever assembly to the handlebars and route the caliper down to the fork disc mount or along the frame to the rear disc mount. Take care to avoid situations that can damage the brake hose when the bicycle is used such as trapping the hose within suspension fork or rear suspension linkage movements, and also to avoid chaffing on the tyre.

The lever will work in any position providing the master cylinder is not totally upside down. The master cylinder need only be horizontal when bleeding the system.

2.4. Attaching the caliper

Before attaching the caliper ensure that the brake pads are fully retracted in the caliper. New brakes will be supplied fully retracted, if you need to perform this operation yourself remove the pads to avoid damaging them and gently prise the pistons back with a plastic tyre lever (or similar).

The aim is to position the caliper central over the disc rotor using some of the supplied shim washers between the caliper and disc mount to achieve the central positioning. This is trial and error until the correct position is achieved.

If the pistons on one side of the caliper are moving while the opposite are not, hold the disc against the moving piston while pumping the lever. This will allow the sticking pistons to begin moving. This technique can also be used to centralise the pistons to the disc.

It is recommended that the frame or forks be machined with a suitable tool to ensure they are square to the axis of the hub before fitting a disc brake.

When the caliper (and lever) are attached, secure the hose to the frame using ties or hose guides and check for unrestricted handlebar movement and that the hose is not trapped or pinched.

Setting the angle of the hose from the caliper

The 90 degree connector on the Mono Mini and Mono M4 can be rotated to achieve better hose routing. This is achieved by undoing the connector bolt an 1/8th turn, and while holding the bolt in position, rotate the connector to the desired angle. Re-tighten the connector bolt.

2.5. Personal settings

Finger reach

This refers to the position of the lever blade relative to the bars.

Adjust the position of the lever using the adjuster screw A.



Figure 2

Lever travel (pad position)

This is the amount of lever travel between the brakes off and on position.

For the Mono Brakes there is no manual adjustment and lever travel is determined by the piston seals in the caliper body which retract the pads. When the brake pads have been manually retracted (by pushing the pistons back into their bores) these calipers will require several pulls of the lever to reset themselves, during this period the lever may travel all the way to the bars.

2.6. Break in period

Before riding check the correct action of the brake and that braking effort is applied as the lever is pulled. To achieve the maximum braking effort the new brake pads need bedding in. Bed in the pads by riding a short distance with the brake applied. This procedure will achieve good braking performance but will reach its full potential after a few rides.

2.7. On the trail

Mono brakes do not provide any means of manual pad adjustment. They do however feature an expansion chamber within the brake lever master cylinder which automatically compensates for pad wear and similarly compensates for fluid expansion as the brake heats up and cools down.

With the caliper correctly centred relative to the disc there should be no disc rub on the Mono brakes. Even if there is a slight amount of disc rub it will not slow the bike down in any way and will not be audible against the ground noise from the tyres.

If you remove your wheels from your bicycle take care not to pull the brake levers otherwise the pistons can pump out. If this happens then simply push the pistons back. If the pistons are so far out that the pads are touching then you will need to remove the pads in order to get at the pistons. If you transport your bicycle with the wheels removed then it is advisable to insert a piece of packing between the pads to keep them in place.

3. Service

3.1. Regular maintenance

Cleaning your brake

The braking performance will be severely reduced if the disc rotor and pads become contaminated with oil, brake fluid or after-market degreasing and cleaning agents. Clean your brake with water or approved cleaners such as Hope's own "Sh1t Shifer".

If the disc rotor becomes contaminated it can be cleaned by wiping with a rag with isopropyl alcohol. Heavily contaminated brake pads will need replacing.

Checking for system leaks

Check the hose for any damage such as chaffing against the bike, or whenever the bike has been rough handled or dropped. A split hose (however tiny) will cause a system leak which will severely impair braking performance. A damaged hose will need replacing.

Check the caliper and lever assemblies for any signs of fluid loss. See the Troubleshooting section for fixing any problems.

Checking the brake pads

The brake pads will need replacing when the friction material is worn down to 0.5mm. Do not wait until the friction material has worn through to the backing plate because the brake will not function and you will damage the disc rotor.

3.2. Changing the brake pads

1. On Mono Mini brakes, remove the wheel. For Mono M4 and Mono6ti brakes the wheel can be left in.
2. Remove the 'R' clips using pliers, push out the retaining pins and slide out the old pads from the caliper.
1. Gently prise the pistons back into the caliper using a plastic tyre lever (or similar).
2. Clean the inside of the caliper with a clean rag and insert the new brake pads, and new springs. The new pads must be genuine Hope compatible pads for the appropriate caliper. Note: lubricate the o-ring on the pad retaining pin before fitting.
3. Refit the wheel and adjust the pad position, (see section 2.5).
4. Bed in the new pads (see section 2.6).

3.3. Bleeding the brake

Bleeding the brake is the procedure whereby new brake fluid is introduced into the system either as a replacement or to flush out any trapped air.

There are several reasons why a bleed operation may be necessary, for example shortening a brake hose, changing the brake fluid, or to remedy a situation described later in the troubleshooting guide (section 4).

Important notes regarding Brake fluid

This Hope disc brake contains **DOT 5.1** hydraulic brake fluid which is available from cycle retailers and motor accessory stores. If you cannot obtain DOT 5.1 then DOT 4 is acceptable but you must flush out all the old DOT 5.1 first.

Use of other types of brake fluid, in particular mineral oil, will seriously damage your brake and cause brake failure.

Please read the care instructions that come with the DOT brake fluid, in particular we draw your attention to the following:

- Use only new brake fluid from a closed bottle and replace the bottle's cap afterwards to prevent contamination of the fluid (DOT 5.1 fluid absorbs moisture).
- Brake fluid will strip paint so wipe off any spillage immediately and clean the area with isopropyl alcohol.
- Brake pads contaminated with brake fluid will need replacing because the braking performance of the pad will be greatly diminished.
- Discard old brake fluid in a responsible manner and do not pollute drains or the environment.

Bleeding the Mono disc brakes

Item number references refer to the diagram of the Mini lever in section 5.1.

Wear safety glasses.

1. Remove the wheel and brake pads to prevent contamination.
2. Push the caliper pistons back into their bores and insert a spacer between the pistons to prevent them coming out during the bleed operation.
3. If necessary reposition the brake lever so that the lever and master cylinder is horizontal to the ground.
4. Remove the master cylinder cap (item 4) using a 2mm allen key. Then remove the rubber diaphragm.
5. Place the closed end of an 8mm spanner over the bleed nipple on the brake caliper. Fit a length of clear plastic hose (approximately 30cm) onto the bleed nipple and place the free end into an empty container. The hose should be a snug fit and not fall off, the free end does not need to be submerged under brake fluid.

6. Fill the master cylinder reservoir with brake fluid.
7. Open the bleed nipple a 1/4 turn. Slowly pull the brake lever to the handle bars and hold. Close the bleed nipple. Release the lever.
8. Repeat step 8 until no air is seen coming out of the bleed nipple. You will need to keep refilling the reservoir during this operation. **Caution**, if bleeding a rear brake be careful not to spill brake fluid onto the front brake caliper and disc.
9. Ensure the pistons are fully retracted in the caliper, the pistons may require manually pressing back.
10. Place a rag around the master cylinder to catch any spillage and fill the master cylinder to just below the top surface.
11. Place the diaphragm onto the master cylinder by rolling it across the top of the master cylinder and allow the fluid to overflow. Close the bleed nipple and remove the bleed hose. **Caution**, do not over tighten the bleed nipple. Wipe away any spilt fluid from the caliper and lever.
12. Fit the master cylinder cap and gently tighten with a 2mm allen key. **Caution**, do not over tighten cap as you are only sealing the rubber diaphragm.
13. Replace the pads and insert the wheel. Pull the lever several times to allow the pads to reset themselves to the disc.
14. Check the brake for correct function and that there are no any system leaks.

When to change the brake fluid

For high performance usage, typically downhill racing and applications that use lots of braking effort it is recommended you change the brake fluid once per year. For normal use change the fluid every four years.

To change the brake fluid follow the preceding instructions for bleeding the brake and ensure that the master cylinder is filled (and pumped through) at least four times.

3.4. Shortening or re-routing the hose

Your disc brake is supplied fully assembled and bled by the Hope factory and the hose length will suit the majority of forks and frames. If desired, the following procedure can be used to shorten the hose. The same procedure can be used to detach the hose and route it through existing frame guides.

1. Remove the wheel and brake pads to prevent contamination and push the pistons back into the caliper body.
2. At the lever, unscrew the aluminium shroud (item 25) and slide it away from the connector (item 23).
3. Prise open the brass olive (item 24) using a screwdriver and slide the olive away from the connector.
4. Push the end of a small fine blade screwdriver under the hose end and prise the hose away from the connector. Once it has eased away from the connector it should be

possible to detach the hose by gently pulling it. This operation must be done carefully or the inner section of the hose will separate from the outer. **Caution**, hold the separated hose carefully, the hose contains brake fluid and it will leak out if you allow the hose to swing freely.

5. Cut the hose to the desired length using hose cutters or a sharp knife to produce a clean square cut. Do not remove too much, the resulting hose length should still permit the full and unrestricted movement of the handlebars.

   At this stage the hose can be routed through existing fork or frame guides taking care not to kink the hose. Take care to avoid a routing situation that can damage the hose when the bicycle is used such as trapping the hose within suspension fork or rear suspension linkage movements and avoid chaffing on the tyre.

6. Pull the lever and hold it once a small drop of fluid has appeared at the end of the connector. Push the hose onto the connector.

7. Slide the brass olive and aluminium shroud into position and tighten.

8. If this procedure is followed correctly there is no need to re bleed the system.

3.5. Hose change

If the hose becomes damaged such that a system leak (however small) occurs then replace the hose. Try to identify how the original damage occurred to prevent the same thing happening again. A new length of genuine Hope Technology hydraulic hose will need purchasing. Follow the procedure for shortening / re routing the hose in section 3.4. Note: The hose is disconnected from the caliper in the same manner as described for disconnecting from the lever.

3.6 Special instructions for Mono calipers

The Mono range of calipers are all machined from one piece of aluminium. This means that we now fit bore caps into the front of the calipers to blank off the holes use to machine the piston bores. These caps do not need to be removed unless you need to change seals. For information on this procedure and more in depth maintenance instructions please consult our website - www.hopetech.com

On the Mono6ti caliper there is a small grub screw in the top of the caliper. This is simply a blanking screw which must not be removed.

3.7. Torque settings

Hose connector	8 Nm
M6 bolts	8 Nm
M5 bolts	4 Nm

4. Troubleshooting

Do not operate the bicycle with defective brakes. Outlined below are some of the common problems and solutions. If the problem persists then contact your dealer or the Hope distributor for your country.

No braking power

Symptoms	Solution
The lever operates as normal but the brake does not deliver a good braking force.	The brake pads are new and not fully bedded in. Follow the instructions in section 2.6. The disc rotor and pads may be contaminated. Clean the disc rotor and pads (see *Cleaning your brake* in section 3.1). If the problem persists then the pads will need replacing.

Lever goes all the way to the bars

Symptoms	Solution
No braking effort and the lever goes all the way to the bars.	If the brakes are new or have had some maintenance done then the brake will require some use to reset the pad position. If the above does not solve the problem then there may be insufficient fluid in the system from a bad bleed (in which case re bleed) or the system has a leak as described later.

Spongy lever

Symptoms	Solution
Reduced braking power and spongy feel when pulling the lever.	Air in the system. Re bleed the system (see section 3.3). Mounts on frame or fork out of alignment. Have frame of forks refaced with suitable tool. Wrong fluid has been used. Seals will be damaged. New seals must be fitted If the problem persists then there may be a system leak described below.

System leak

Symptoms

Hydraulic oil can be seen on the outside of the system, usually associated with a loss of braking performance. A typical cause is after a crash which has wrenched the hose and damaged other items on the brake. Or the brake is very old and the seals have worn out.

Solution

Spare parts are available for your brake. Please consult your dealer who will advise and obtain the required spares.

Lever is stiff and does not return

Symptoms

The lever does not snap back to its return position when released.

Solution

The pivot bush (item 12) will need lubricating. If this does not cure the problem then disassemble the lever pivot and clean the bush, ensuring it moves freely within the lever blade. Also make sure the lever pivot screw (item 18) is not over tightened.

If the wrong fluid has been used then the piston seals in the lever will be ruined causing them to stick and so preventing the smooth operation of the lever. In this case you need to consult your dealer to obtain new seals.

5. Parts Lists

See our website for diagrams

www.hopetech.com

6. Warranty

Hope Technology disc brakes are warranted for a period of one full year from original purchase against defects in materials and workmanship. The warranty only applies to the original owner and proof of purchase is required.

Hope cannot process any warranty claim until the product has been returned to the factory.

Any Hope product that is returned to the factory and is found by Hope to be defective in materials or workmanship will be repaired or replaced at the option of Hope.

This warranty does not cover damage caused through misuse, incorrect assembly or failure to follow this manual or service instructions.

Hope shall not be held liable for any indirect, special or consequential damages.

This warranty does not affect your statutory rights.