KAHA POST MOUNT

BLEED MANUAL

MARCH 2024 V4.0

Thank you for choosing to use Radic's KAHA brakes!

This manual will give you the necessary information to complete the initial installation & routine maintenance of your Radic KAHA brakes.

It is recommended that upon initial installation, the bleeding procedure is completed.

We welcome any feedback you have about the installation, maintenance and operation of your Radic KAHA brakes, so please don't hesitate to let us know! We are always looking for ways to improve our products and services.

As we receive feedback and answer questions, we like to add the frequently asked ones to this document. This means this document is continuously evolving with common updates. Be sure to check back in the future for any updates.

If you have any issues, concerns or questions, please email technical@radicperformance.com

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⚠ WARNING

Please read through the entirety of the instructions before beginning any installation or service work on your Radic KAHA brakes.

Wear safety glasses and gloves at all times.

SAFETY INSTRUCTIONS

1. Follow the safety instructions listed here. Any failure to follow these safety instructions could cause you to crash while riding your bicycle, which could result in serious and/or fatal injuries.

2. We recommend you have your brakes installed, secured, and maintained by a qualified bicycle mechanic. Follow the instructions in the user manual for proper installation.

3. Brakes are a safety-critical component of a bicycle. Improper installation or use of brakes can result in loss of control of the bicycle which can lead to a crash that can cause severe injury and/or death.

4. Disc brakes offer increased stopping power over rim brakes and take less effort to lock up a wheel when braking. Wheel lockup may cause you to lose control and lead to injury. Practice braking techniques on a flat, level, surface prior to aggressive riding.

5. Braking effectiveness is dependent on many conditions over which RADIC has no control including: bicycle speed, braking force, condition of the bike, the weight of the rider, weather, terrain, and a variety of other factors. Always ride under control. It takes longer to stop in wet conditions. To reduce the possibility of a crash avoid locking up your wheels.

6. RADIC levers & calipers are designed as a system. Do not use brake components from another manufacturer other than RADIC.

7. Use the designated fluid for the seals you have chosen to run. Either DOT 5.1 or Mineral Oil fluids with RADIC hydraulic brakes. Do not use any other fluid, or alternate between fluids with changing the seals, as it will damage the system and render the brakes unsafe to use.

8. Do not allow any brake fluid to make contact with the brake pads. If this occurs, the pads are considered to be contaminated and must be replaced.

9. Do not allow any brake fluid to make contact with the rotors. If this occurs, clean the rotors with isopropyl alcohol. Do not touch the braking surface of the rotor with your bare hands as the oils from your fingers will degrade braking performance. Always wear gloves or handle the rotor by the spokes.

10. Do not touch the disc brake rotors or calipers immediately after use as they become very hot during use and could cause burns. Instead, allow the brakes to cool prior to making any adjustments.

CLEANING

Before installing the brakes, ensure the brake rotors are clean from any oils or potential contaminants that could damage the brake pads. If the brake pads have become contaminated, replace them.
(Some contaminants can't be seen and aren't obvious to visually identify, therefore, it is always best practice to wipe the rotors down anyway.)

To clean the rotor:

1. Use isopropyl alcohol (IPA) and a lint-free shop towel.
2. Thoroughly wipe the rotor until the towel wipes clean.
3. Follow the bedding in procedure to re-deposit the transfer layer to the brake rotor. *(Ensure this step is completed otherwise, there may be an initial 'lack of power' feeling.)*

General washing shall be completed with soapy water, followed by rinsing with non-soapy water.

DO NOT USE 'AUTOMOTIVE BRAKE CLEANER' ON ANY PART OF THE BRAKING SYSTEM!!!

Automotive brake cleaner is very aggressive and generally leaves a residue that is not able to be burnt off in general bicycle braking events. This will generally end up contaminating the brake pads and rotor requiring replacement.

BRAKE FLUID OPTIONS

DOT 5.1 and Mineral oil are not compatible with each other, therefore special care must be taken to ensure the correct fluid is being used with each setup. The reservoir cap on the lever body will state the fluid currently being used.

In relation to brake fluid options for your KAHA brakes, these are:

- DOT 5.1 requires seals to be of material type EPDM. For Radic these seals are Black.
- Mineral oil requires seals to be of material type NBR. For Radic these seals are Purple.

The use of incorrect fluid will permanently damage the seals and will require replacement.

If you wish to change the type of fluid in your Radic brakes, you must:

1. Fully drain the system of all brake fluid.

2. Disassemble all parts of the system and wash with soapy water, followed by a rinse with non-soapy water. This includes hoses.

3. Allow the parts to completely dry.

4. Reassemble the parts with the new seals. Black (EPDM, DOT 5.1) or Purple (NBR, Mineral).

5. Change the reservoir cap to have the appropriately labelled fluid.

6. Complete a fresh bleed of the system with the new fluid. When bleeding the system, ensure the bleed kit used is compatible with the fluid you are running. If not, the seals in the bleed kit could swell and become damaged.

Please refer to the Radic KAHA Service Instructions for the brake rebuild procedure.
(Separate document.)

WARNING; please note that DOT brake fluids will damage painted surfaces. If any fluid comes in contact with a painted surface, wipe it off immediately and clean it with water or isopropyl alcohol. Used DOT brake fluid must also be recycled or disposed of in accordance with local and federal regulations. Never pour used DOT brake fluid down a sewage or drainage system or into the ground or body of water.

MINERAL OIL RECOMMENDATIONS:

If you are using the Mineral version of the Kaha these are the mineral oils we recommend using:

Bionol by Danico

Boiling Point (°C):	420
CentiStokes @40°C:	8.56
CentiStokes @100°C:	2.8
Viscosity Index:	200

DATA SHEET

- The "Gold Standard"
- Pure plant oil
- Toxin free
- Not hazardous to water
- Completely biodegradable
- Very high boiling point
- Maximum compressive strength
- Low viscosity

Maxima Mineral Oil

Boiling Point (°C):	215
CentiStokes @40°C:	8.67
CentiStokes @100°C:	2.84
Viscosity Index:	202

DATA SHEET

- OEM Proven (Sram)
- Easy to source
- Similar viscosity to Bionol
- Similar boiling point to DOT 5.1

Putoline HPX R 2.5W

Boiling Point (°C):	-
CentiStokes @40°C:	6.76
CentiStokes @100°C:	2.93
Viscosity Index:	425

DATA SHEET

- Very low viscosity when cold
- High viscosity index (Low change in viscosity with temperature)
- Relatively easy to source
- Low cost
- Actual boiling point is unspecified. Flashpoint 87°C.
- Special additives to reduce the amount of bubbles. Makes it very easy to bleed and holds a good bleed.

We have had some negative experiences with specific mineral oils. This can sometimes result in inconsistencies in brake feel and performance.

Some mineral oils we recommend **not** using include:

- Shimano Mineral Oil
- Magura Royal Blood
- TRP Mineral Oil

DOT 5.1 OIL RECOMMENDATIONS:

Almost all DOT 5.1 oils are the same due to the need to follow set manufacturing standards.

No, you dont need to use bicycle-specific DOT 5.1.

Choose a brake fluid that is relatively easy to source. The more money you pay, the more specific additives and marginal gains you will see to the “Wet Boiling Point”.

The wet boiling point is defined as the boiling point once the fluid has absorbed moisture from the air. Specifically 3.7% weight by volume. After this amount of water absorption takes place, the fluid is considered “saturated” and needs to be changed.

The dry boiling point is fresh brake fluid from a new unopened bottle, that hasn't been exposed to the atmosphere and had the chance to absorb moisture.

CALIPER HOSE REALIGNMENT

TOOLS REQUIRED

- T25 Torx

STEPS

1. Loosen the banjo bolt ONLY enough to start turning the banjo fitting without leaking brake fluid or letting air enter the system.
   (If in doubt, complete the bleeding procedure.)

2. Turn the banjo to your desired direction then re-tighten. Torque up to 6Nm.
   (Ensure the o-ring hasn't slipped out and been caught. If the o-ring appears to be damaged, replace it.)

HOSE RESIZING

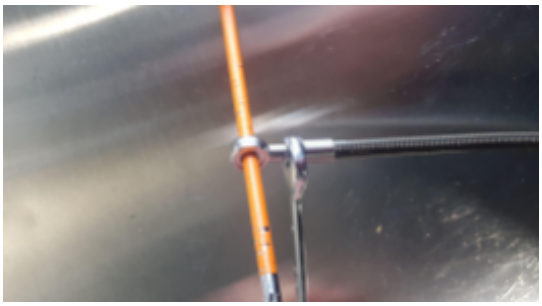
TOOLS REQUIRED

- Isopropyl alcohol
- Paper towels
- T25 Torx
- 8 mm ring spanner
- Cable Cutting Pliers.
    a. In-house, we specifically use the Irwin Cable Cutting Pliers. They provide a clean sharp cut every time and handle the stainless braided hose very well.
- Circlip pliers (or a similar tapered shape tool. Ensure they are clean!)

STEPS

1. Identify the caliper end, the hose will be easier to shorten from this end.
2. Remove the caliper from the bike.
3. Remove the banjo fitting from the caliper using the T25 Torx. *(Have some paper towels handy to catch the dripping fluid.)*

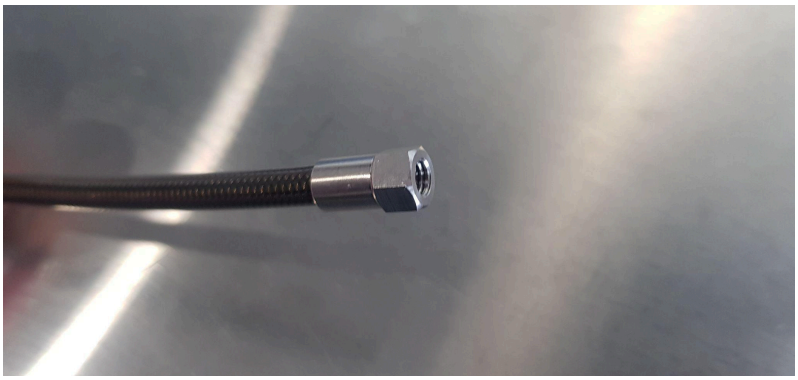
4. Remove the banjo fitting and set aside the two o-rings.
5. Insert the T25 Torx spanner into the inside of the banjo fitting and undo it using the 8 mm spanner. *(Instead of inserting the T25 Torx, you could clamp in a vice with aluminium or plastic soft jaws. **DO NOT** clamp it with steel jaws as this will damage the mating surface of the banjo.)*



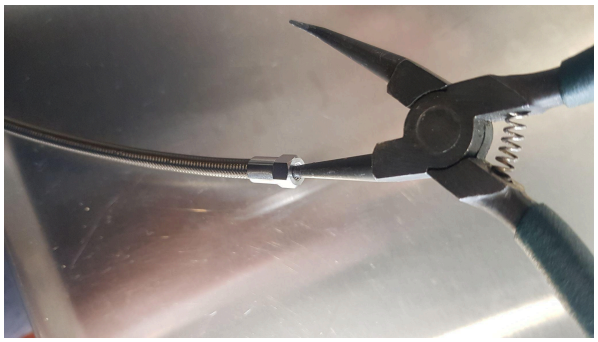
6. Remove the hose collar.

7. Trim the hose with the wire cutters. *(Ensure you get a clean, straight cut. If it is crushed a little, that is ok. Try not to fray the ends of the hose or you will need to trim it again.)*

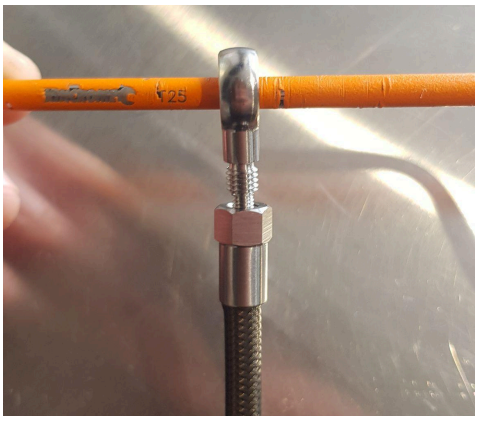
8. Add a little bit of lube to the hose end to help slide the collar back on. Try working it on from an angle and push the other side in. **Ensure it is in all the way!** It helps to twist it on like a screw.



9. Use the circlip pliers (or a similar tool) to open up the PTFE inner tubing of the hose to help thread the banjo. *(This is critical to help ease of assembly when carrying out the next few steps!)*



10. Holding by the hose (not the collar) push the banjo in and start threading. *(It helps to put the Torx tool back in the banjo to push on while turning. Keep threading until the banjo engages with the collar.)*



11. Use the 8 mm spanner and the Torx to tighten firmly.

(*To help align the banjo fitting, screw the collar and banjo together, have the lever mounted and hose routed on the bike. This is when the hose is in the most relaxed position. Align the fitting with how the caliper will be mounted and make a mark on some masking tape on the hose to remember this position. When pushing the collar on, align it with the mark. This will ensure that when the banjo is tightened it is facing the correct orientation.)*

12. Refit the two o-rings, one on each side of the banjo. Insert the banjo bolt and partially re-thread to the caliper. *(If either o-ring appears to be damaged, replace it.)*

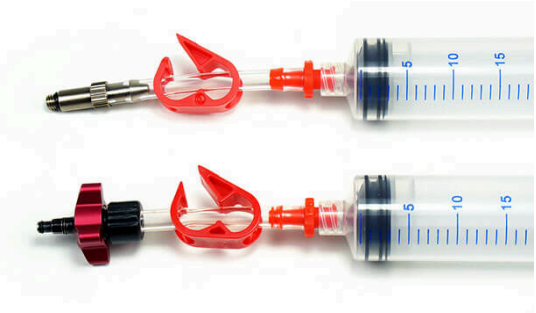
13. Turn the banjo to your desired direction then tighten it fully. Torque up to 6 Nm.
(Ensure the o-ring hasn't slipped out and been caught. If the o-ring appears to be damaged, replace it.)

14. Complete a brake bleed to ensure there is no air trapped in the system. See the Bleeding section of the Bleed Manual.

15. Fully clean and wipe down the caliper with isopropyl alcohol.

BLEEDING

TOOLS REQUIRED



- Isopropyl alcohol
- Paper towels
- T25 Torx
- 4 mm Allen key
- Bleed kit
    a. (Must have bleeding edge)

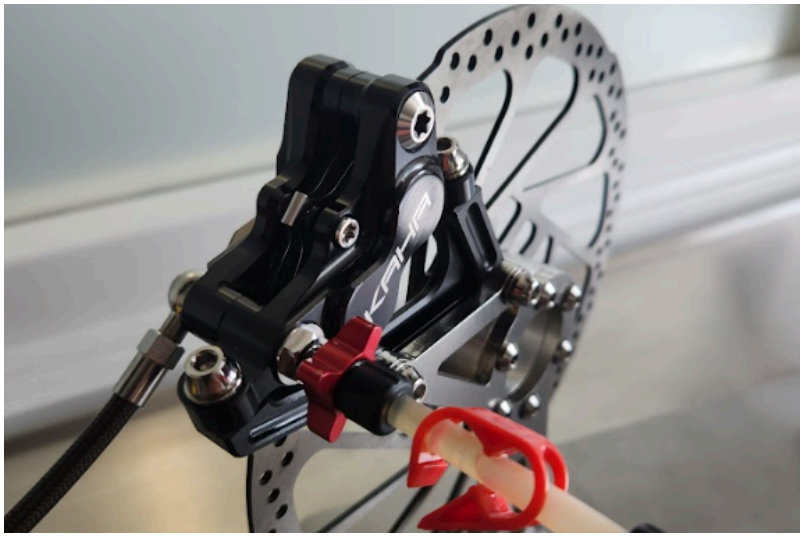
STEPS

1. Prepare the caliper by:
    a. Cleaning out the bleed port. *(Ensure there are no contaminants that will enter the system.)*
    b. 'Crack' open the bleed screw with a 4 mm Allen key. *(Don't fully undo the fitting, this just helps when turning the bleed screw with the syringe fitting.)*

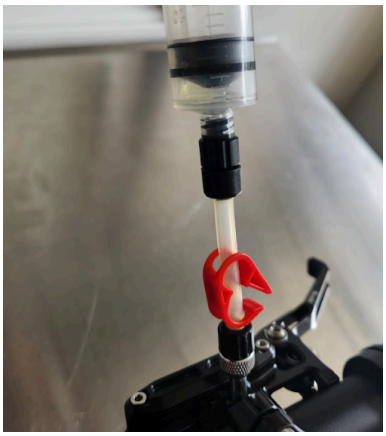
2. Draw out some brake fluid with the syringe, and wipe the end so it does not drip. *(This should be done with the non-threaded syringe, pictured below.)*

It is advised to draw the brake fluid slowly and smoothly. If done quickly, it can cause the fluid to cavitate and bubbles to form. These bubbles can remain in the fluid for some time and may potentially be pushed into the system during the bleeding procedure, resulting in a 'spongy' feeling. Let the syringe sit for a couple of minutes and bubbles disperse from the fluid.
Trust me, it is worth the couple extra minutes!

3. Plug the syringe into the caliper and turn the RED bleeding edge fitting counter-clockwise to 'OPEN' the bleed port. *(Some force may be required. Ensure the o-ring on the syringe fitting is not damaged.)*



4. Prepare the lever by removing the T25 Torx fitting and threading in the other syringe. *(Once the syringe is installed, we find it helps to pull a little on the syringe to create a small vacuum. This helps to get the bleeding started. Keep the lever body at a slight downward angle, this helps the air to escape out of the bleed port.)*

5. Start pushing the brake fluid through the lines. *(If it is hard to push oil through the system, try flicking the lever. This will help reset the piston seals and move air through the system. The firm force required is a result of the small ports used in the master cylinder. Small ports help to shorten the dead stroke of the lever.)*

6. Once you have cycled through ~90 % of the syringe, 'CLOSE' the bleed port on the caliper by turning the RED bleeding edge fitting clockwise. Leave the syringe installed. *(Ensure to not empty the entire syringe as the air left over can enter the system. It also helps to keep a little brake fluid there to finish the bleeding process in later steps.)*

7. Before removing the lever syringe, complete the bleeding procedure by doing a 'Lever Bleed'. This is done to fully ensure there is no air left in the reservoir.
    a. Syringe Method:
        i. Start by pushing pulling and pushing on the syringe, cycling the syringe oil with the reservoir oil.
        ii. Combine this by flicking the lever and moving the master cylinder around. Try rotating the master cylinder forward to ensure the bleed port is at the highest point.
        iii. Continue pushing and pulling on the syringe plunger until no more air bubbles can be seen escaping the reservoir.
    b. Bleed Cup Method:
        i. Install a bleed cup and fill it with oil.
        ii. Move the master cylinder around and flick the lever to work the air out. Try rotating the master cylinder forward to ensure the bleed port is at the highest point.

    A lever bleed is critical to ensure consistent performance and brake feel.

    Over time, a lever bleed is a quick and easy way to 'Top Up' the reservoir due to pad wear, improve brake feel and remove air from the system.

8. To reassemble the lever:
    a. Start by pulling a very small vacuum in the lever syringe, enough so that when you disconnect the syringe, the syringe doesn't squirt oil everywhere, but not too much that you allow air into the reservoir.
    b. There should be enough oil that when re-threading the bleed fitting, it displaces some oil.
    c. Re-thread the Torx bleed fitting into the lever.

9. With the caliper syringe still installed and the bleed fitting closed, try pumping the lever to feel how the system is performing. *(If the desired feeling isn't achieved, visit the troubleshooting section.)*

10. Once the desired feeling has been achieved, 'CLOSE' the caliper bleed port firmly and remove the syringe. *(To help, pull a small vacuum in the syringe just before removing it from the caliper. This will help stop any leakage. If you cannot firmly tighten the bleed port with the syringe fitting, nip it up with the 4 mm Allen key.)*

11. Wipe any spills with isopropyl alcohol. *(If brake fluid has touched the brake pads, consider these contaminated and replace them. If brake fluid has touched the rotor, clean well with isopropyl alcohol. See the cleaning section of the bleed manual.)*

12. Once completed, flick the lever while holding the master cylinder at the highest point, this will help remove any further small bubbles. *(If left for some time, the smaller air bubbles will make their way to the reservoir resulting in a firmer feeling brake setup. Undertake a lever bleed to remove these air bubbles to ensure a consistent feeling brake.)*

13. Complete a final checkover to ensure there are no leaks or loose parts.

14. Give an initial test of the brake setup by pushing the bike backwards and forwards.

15. Bed in the brake pads & rotors if not already completed. *(See the "Bedding In" section of the Bleed Manual.)*

BEDDING IN

ABOUT

All new disc brake pads and rotors should be put through a wear-in process called 'bed-in'. The bed-in process, which should be performed prior to your first ride, ensures the most consistent and powerful braking feel along with the quietest braking in most riding conditions. The bed-in process heats up the brake pads and rotors, which deposits an even layer of brake pad material (transfer layer) to the braking surface of the rotor. This transfer layer optimizes braking performance.

⚠ WARNING - CRASH HAZARD

The bed-in process requires you to perform heavy braking. You must be familiar with the power and operation of disc brakes. Braking heavily when not familiar with the power and operation of disc brakes could cause you to crash, which could lead to serious injury and/or death. If you are unfamiliar with the power and operation of disc brakes, you should have the bed-in process performed by a qualified bicycle mechanic. To safely achieve optimal results, remain seated on the bike during the entire bed-in procedure.

Wear the appropriate safety equipment while completing the bedding-in process.

Do not lock up the wheels at any point during the bedding-in process.

STEPS

1. Accelerate the bike to a moderate speed, then firmly apply the brakes until you are at walking speed. Repeat this approximately twenty times.

2. Accelerate the bike to a faster speed, then very firmly apply the brakes until you are at walking speed. Repeat this approximately ten times.

3. Allow the brakes to cool prior to any additional riding or servicing.

4. After bedding-in the caliper may need to be re-centered.

TROUBLESHOOTING

If the brake feels firm when starting riding, then proceeds to get spongy or pulls to the bar later down the trail. The lever can be “pumped up” while stationary but continues to pull to the bar after riding:

- Firstly check to see if the brake has any leaks. This could be where the hose was recently loosened while servicing or during installation. If you have recently had a large crash and a hose got caught or tugged by a tree etc, or if your handle bars rotate around causing the frame to tug the hose.
- If no leaks, complete a lever bleed.
    - There could be the chance that there is residual air in the reservoir after a bleed.
    - When hanging the bike on the shuttle or going down the trail, the brake is shaken up, and air from the reservoir enters the main system. This causes the brake to feel spongy. Flicking the lever will help displace the air with oil. This will help make the brake feel firm again, however, this will only be temporary.
- Another possibility is that the pistons are being pushed back into the caliper whilst riding. This means the first pull of the lever is required to move the pistons forward closer to the rotor, followed by a second pull to apply any force. Some common causes of this include:
    - Bent rotors. With each rotation of the wheel, the rotor pushes the pistons back into the caliper. Constantly resetting the pistons. Attempting to straighten the rotor may help, replacing the rotor will solve the problem.
    - Worn out wheel bearings or rear suspension bearings. When cornering hard, if the wheel is able to move, this can cause the wheel to make the rotor push the pistons back. A simple test for this while stationary is to pump the brake a couple of times and feel the lever travel. Dismount the bike, hold the frame and with your free hand try forcing the rear wheel side to side simulating cornering forces. Now try and feel the brake lever, the very first pull will tell you. If the first pull is longer than the following pulls, the wheel movement is likely pushing the pistons back.

If the brake is firm and the pads are clamped on the caliper:

- Remove the caliper from the bike and push the pistons back a little. Ensure to push back evenly, otherwise, the pistons could become ‘tilted’ and damage the seals; or
- Use the caliper syringe to remove a small amount of brake fluid.

If the brake is perfect when cold, then pumps up firmer under heavy riding or even clamps the rotor causing drag or stopping the wheel from turning:

- It is almost certain that you have air in the caliper and the system requires a bleed. Even the tiniest of air bubbles will expand causing the fluid to move and clamp the pads to the rotor.
- Try removing the caliper from the bike when doing a bleed and ensuring it is at the lowest point of the system, allowing all bubbles to rise up the hose to the lever.
- Dont overfill the system with the syringe. If you over-fill the system, the reservoir bladder has no room to move and allow for the expansion of oil.

If the brake is 'dragging' on the rotor:

- The caliper may be misaligned and not parallel to the rotor plane *(See 'Spongy' section for further solutions.)*; or
- The pads are running too close and require the pistons to be pushed back.

If the brake has no pressure and the pads are far from the caliper:

- It could be that the brake pads are wearing thin and a top-up of the reservoir is required.
- Undo the lever bleed port and pump the lever a couple of times. This can help encourage the pistons to advance the gap between the pads and the rotor. Follow this with a lever bleed to top the reservoir back up.
- Remove the caliper from the bike and pump the lever a couple of times to push the pistons out. Proceed to fill the system with more brake fluid with the caliper syringe. *(You may need to push some of the pistons back with an Allen key or ring spanner.)*

If the brake feels 'spongy' or a 'non-crisp bite point':

- There is potentially air still trapped in the line. Complete the bleeding procedure again;
- The master cylinder may not be at the highest point, this needs to always be at the highest point to help the air travel out. Have the hose always rising, with no 'ups' and 'downs'. Air will get trapped in the 'ups'. Depending on the shape of your frame, removing the caliper from the bike to ensure it is at the lowest point can help.
- If the hose fittings have recently been undone for installation or servicing, there is a chance that the PTFE inner bore is blocking the flow of oil. This will likely make the lever have a slow return. Ensure the hose is correctly opened up before rethreading the fitting back in.
- There may be issues with caliper, brake pads & rotor setup. This causes a non-uniform clamping of the brake pads on the rotor. Some issues may be that the:
    - Brake bosses on the frame are not parallel to the rotor plane.
        - If this is the case, take it to a bike shop and ask to face the brake bosses.
    - Unparallel worn brake pads.

        - If this is the case, replace the brake pads.
    - Bent brake rotor.
        - If this is the case, replace the brake rotor.
    - A misaligned caliper setup.
        - If this is the case, re-align the caliper to ensure pads are parallel to the rotor with even clearances.
- If the bleeding procedure has been completed successfully and the setup still feels 'spongy' try:
    - Installing sintered pads instead of organic pads. Sintered pads have less compression due to the large percentage of metallic particles; and/or
    - Installing stainless braided hoses. These hoses expand less under high pressures than standard nylon braided hoses.

If the brake feels good but there is no stopping power:

- The brake pads or rotor have potentially become contaminated;
    - If this is the case, please see the Cleaning Section of the Bleed Manual.
    - Replacement of the brake pads and or rotor may be required.
- The brake rotor is lacking the transfer layer of pad material.
    - See the Bedding In Section of the Bleed Manual.

If there is a 'surging' feeling whilst braking:

- The brake rotor is damaged and is possibly bent or has a variable thickness;
    - If this is the case, replace the brake rotor.
- Another potential cause is from the brake rotor design with larger holes or pockets, where the pad can "fall into" as the rotor passes. Or, the caliper is sitting too low on the brake track and you are feeling the spokes go through the caliper on the brake pad surface. Common when running a 203mm rotor on a 200mm mount. You can feel this feedback in the Kaha brake due to the sensitivity and low friction design.
    - If you think it's mounted too low, try a new, taller, brake mount or some washers/spacers to mount the caliper higher.
    - If it is likely the shape of the rotor, replace the rotor with a better quality, higher performance solution. Here is an example of the pockets where the brake pad can somewhat 'fall into':

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