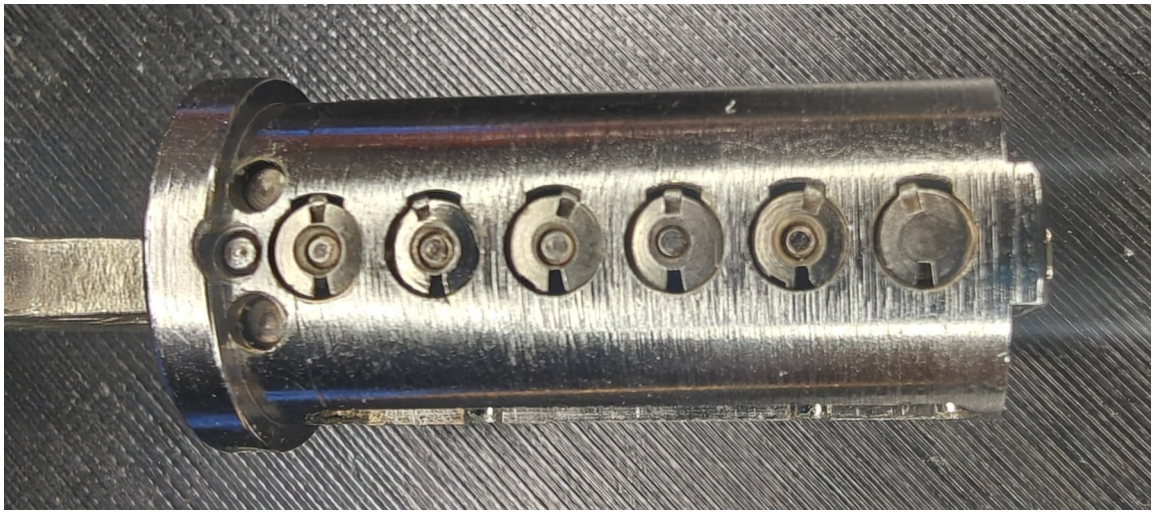
Medeco Picking Guide

by LockManipulator

Variations

There are 4 generations: classic, biaxial, m3, and m4. I don’t have a classic but it works and picks the exact same as the biaxial. Throughout this guide, everything about the biaxial also pertains to the classic unless otherwise noted. All generations utilize chisel tip pins that rotate to mate with a sidebar. The sidebar sticks out of the right side of the plug to prevent rotation. It has vertical fingers that fit into vertical grooves (also called gates) on the pins. The pins rotate by the key having angled cuts for the chisel tip pins to fit into. The pins also have a “finger” at the top that fits into a corresponding cutout in the plug. This is to keep the pins from rotating too far for the key to rotate the pins back.



Above is the top of the plug of an m4 with the correct key inserted. You can see the vertical gates of each pin pointing to the right side of the plug. Opposite that, you can see each pin has a finger that protrudes into a cutout in the plug. Each pin has 3 possible rotations; left, right, or center which is determined by the position of the finger. You can also see some of the pins have a shallow gate, called a false gate, that helps to deter picking attempts. The biaxial, m3, and m4 will be identical to this. The classic differs in that the fingers point towards the back of the plug instead of to the left.

This is the back of a lock to show the cutout in the housing which holds the sidebar. The cutout has each side at an angle so that rotating the plug will attempt to push the sidebar into the plug.

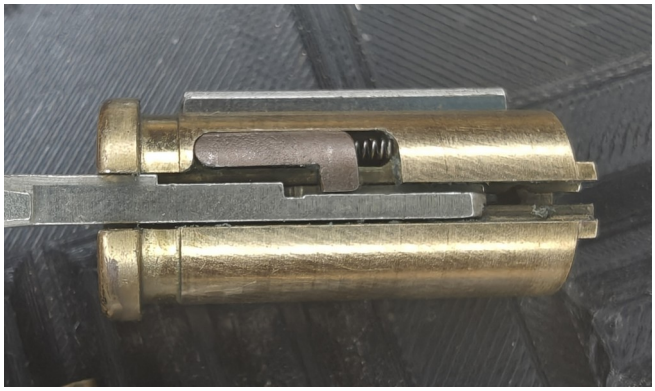
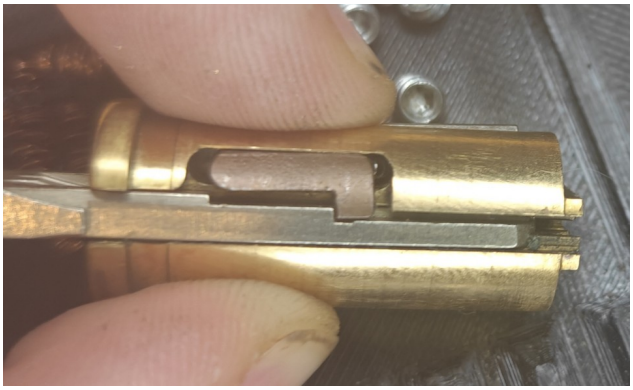
Biaxial

Here is a the plug, pins, and sidebar of a biaxial. The sidebar has two springs that keep it pushed out of the plug when at rest. You can see the plug has a cutout for the sidebar to fit into, with slots for the fingers on the sidebar to pass through. The pins must align their true gate with the slots in the plug and the side bar will be allowed to fully enter the plug. The third, fourth, and sixth pins also have serrations so that they will catch and not drop back down if they are over lifted. These locks also commonly employ mushroom driver pins as visible in the third, fourth, and fifth pin stack. For the most part, these pick and feel like standard spool pins. The difference is that some of these mushroom pins have a lip at the bottom (third and fourth pin stack) which can bind if not lifted high enough.

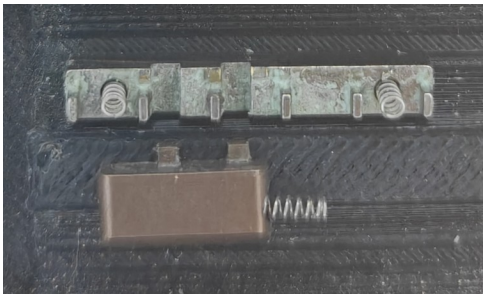
You can clearly see the angled cuts on the key which allow the pins to rotate.

M3

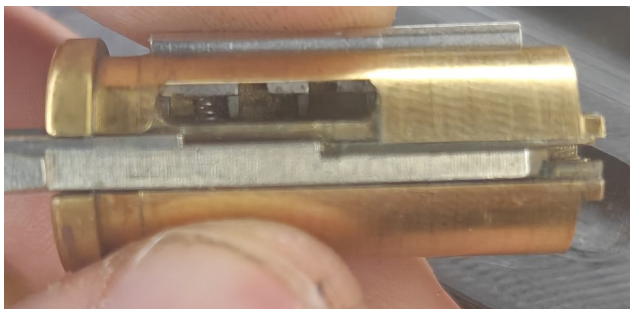
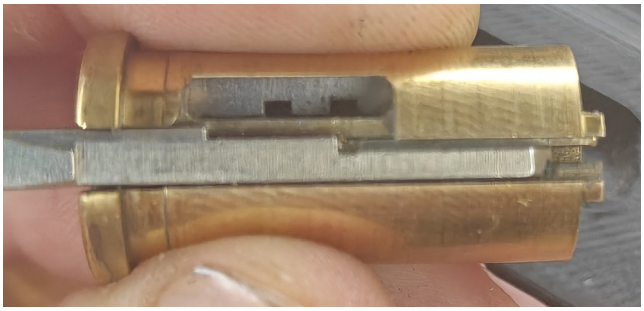
The m3 has an addition called a “slider”. This sits in the bottom right of the plug with a spring keeping it pushed towards the face of the plug. The key has extra metal to push the slider towards the back of the lock. The slider blocks the sidebar from entering the plug if it is not pushed back to the correct position. The left image shows the slider at rest with the sidebar sticking out of the plug. The right image shows the key fully inserted and pushing the slider back, allowing the sidebar to enter the plug (if the other pins are correctly lifted and rotated).

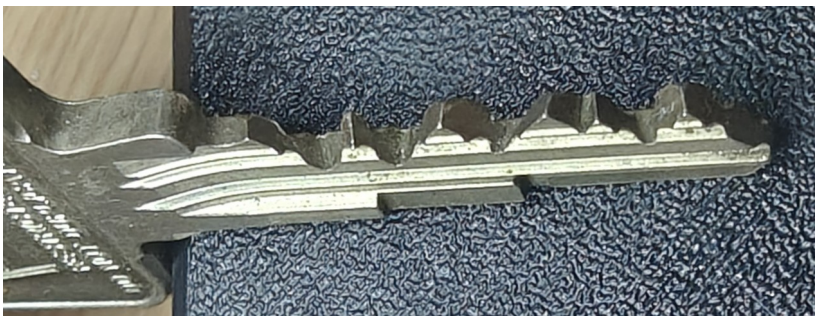
On the right we can see the slider and sidebar by itself. The sidebar is flipped to show the two gates for the fingers on the slider to fit into. If the slider is not pushed far enough, or too far, they won’t fit into the gates and the sidebar won’t be able to enter the plug. There is no “bitting” and every slider moves the same amount.



Below on the left is the plug without the slider. With the sidebar out we can see a gap the slider fingers will fit into. Below on the right you can see how the slider fingers fit into the side bar when the sidebar is in the plug.

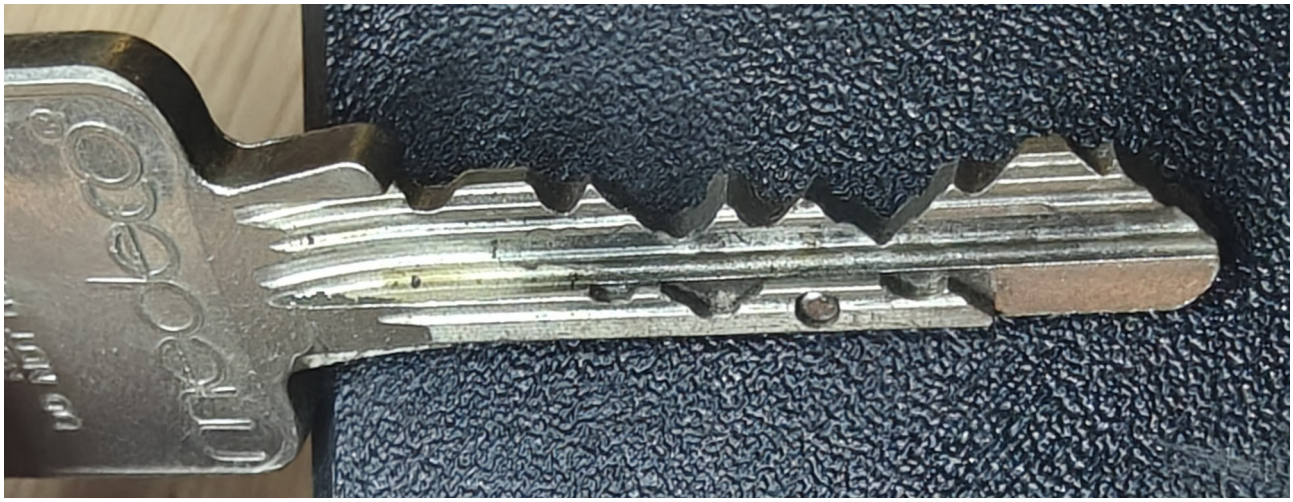



The slider can be seen from the front of the lock if you look in the lower right corner of the keyway. It protrudes into the keyway to interface with the side of the key below.



M4

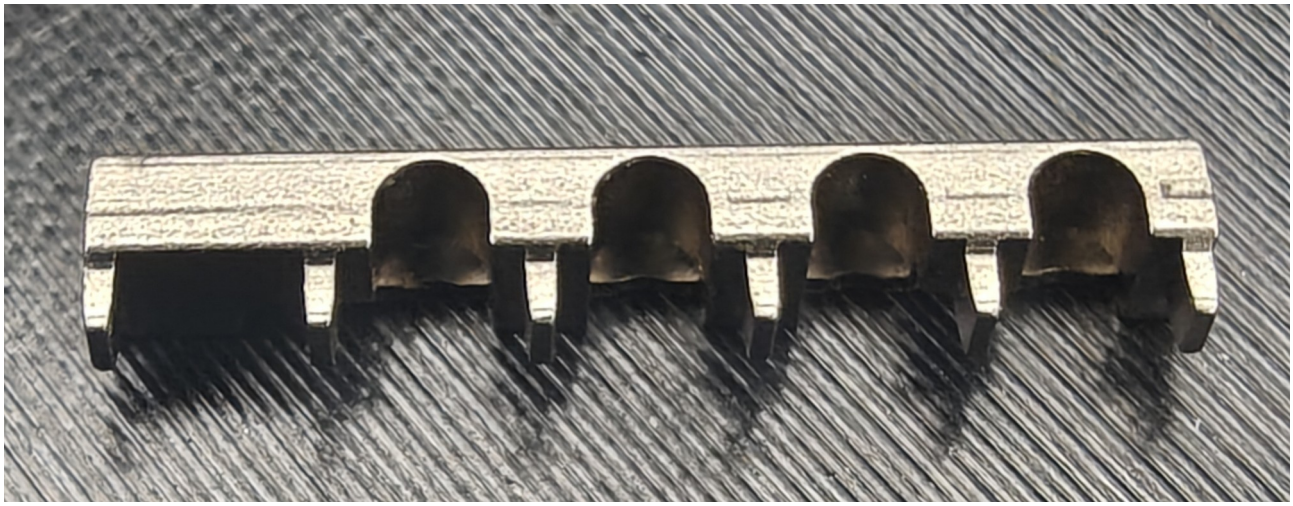
Instead of a slider, the m4 has four additional pin chambers where the slider would be. These each contain a pin called a side pin which has a gate for the sidebar to fit into. These pins only lift and do not rotate. Three will have false gates while one won't which is always lifted to the same height. This is due to the key having a movable element in it which lifts this pin. Each side pin has a finger at the bottom which sticks into the keyway to interface with side cuts on the key. The finger on the third pin is different as it interfaces with the movable element in the key, seen below as a silver circle in the side bitting.



The m4 also has additional features to be more pick resistant. Barrel driver pins are present in these locks. These have thin lips at the top and bottom to catch is what is called counter-milling. These are grooves at the top of a pin chamber in the plug. Each chamber in the image has 2 grooves except the third chamber which has none to help keep smooth operation of the key. The grooves match the size of the lip on the barrel pins.

Below shows the side pins with the correct key. The true gate of each pin aligns with the floor of the space for the sidebar. You can see the false gates on pins one and four sticking up.

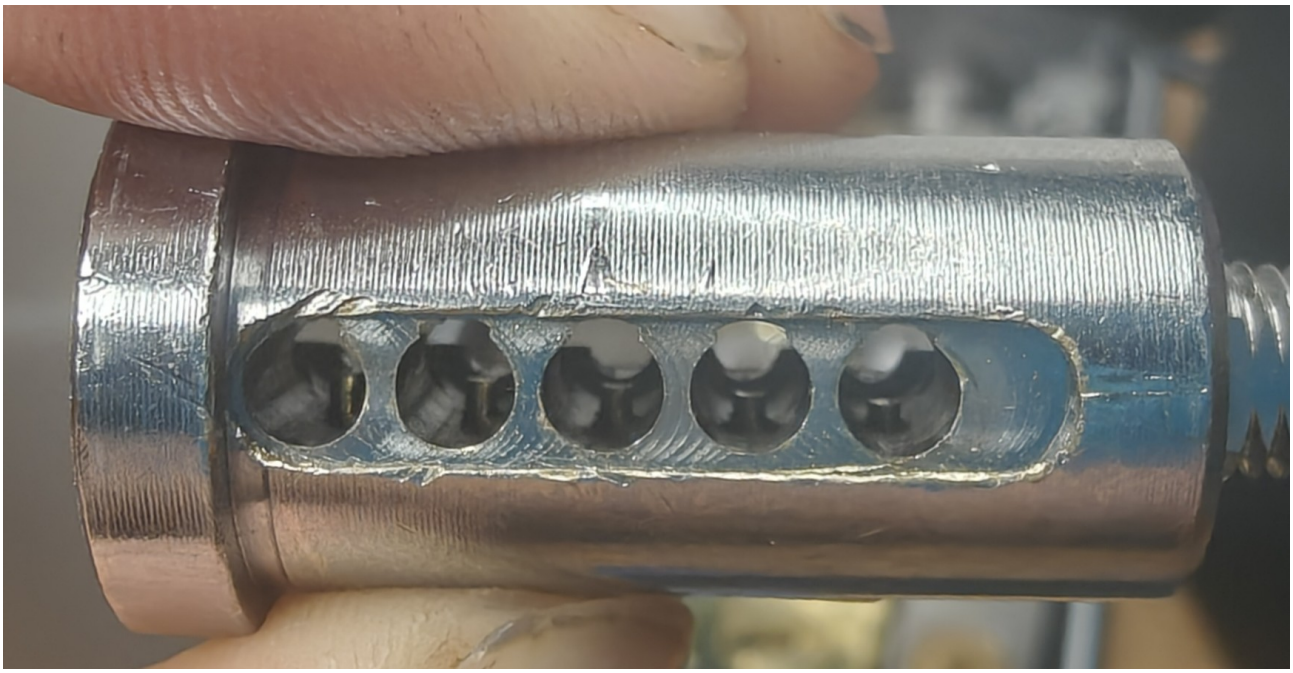
The sidebar has 4 cutouts to fit the side pins. In each cutout is a horizontal finger that will slot into the gates on the side pins.



Cam

This differs quite obviously from the others as there is no bible to hold a pin stack. There are pins though; asymmetric chisel tip key pins like the biaxial. However, there are no driver pins in this lock. The sidebar fits into the key pins instead of driver pins and the key pins have a singular hole instead of a vertical groove for the sidebar fingers. There are grooves carved around each pin to catch the sidebar fingers and help prevent lifting of the pin during picking.

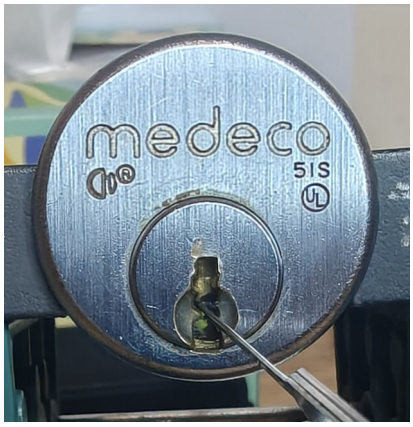
Here we can see there are very few parts. Only one pin per chamber and each pin has a hole for the sidebar fingers. You can also see the grooves on each pin. Below shows the fingers of the sidebar extending into the plug when pressed in.

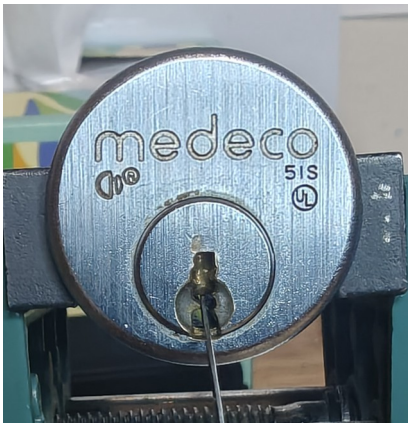


Picking Counterclockwise

Picking these locks require that the pins are lifted and (except for the m4 side pins) rotated. There are two main methods of picking these locks and the method you choose depends on the direction you want to pick the lock. If one method is easier for you than the other, you can always pick in that direction and use a plug spinner for when it needs to be opened in the other direction. The direction matters because either the lift or the rotation will bind first. Picking counterclockwise will cause the sidebar to push into the pins, thus binding the rotation, before the pins bind at shear and vice versa for clockwise picking.

If picking counterclockwise, you must rotate each pin to it's correct rotation before lifting any to the shear line. The chisel tip on the pins are not symmetrical and can be angled with the longer chisel towards (aft) or away (fore) from the front of the lock (except the classic which has a symmetrical tip). The side with the longer chisel will be the easiest to use to rotate the pins. Whether a pin is fore or aft can be felt with a pick. Get a feel for this by swapping the first pin in a lock between the two or ensure the first two chambers have different pins. To rotate a pin, you either pull (fore pins) or push (aft pins) on the left or right side of the pin. Just tilt the pick to the left or right and pull/push. A *slight* lift as you pull or push can help but try not to lift very much. As you start setting more rotations, some pins may actually set at the shear line early and this can give the illusion the rotation is set when it's not. You can lift a pin with your pick centered to bring it back to a centered rotation. The images show me pulling left, center, and right and you can see the pin rotation changing.





Since these pins bind in two ways, if all rotations are set then you will still have a binding pin as it will bind to shear. You can know you have the rotations set and that it's time to lift the pins by the amount of plug movement. On the left is the plug at rest. In the middle is tension applied but no/few rotations are set. On the right is all rotations are set. The difference is much easier felt than seen as it is often accompanied by a "crunchy" feeling of the sidebar engaging.

When all the pin rotations are set, the plug will also exhibit lateral left-right movement as well. This can be hard to see but pay attention to the left side of the plug. The left image shows minimal tension; not enough to engage the sidebar. The right image shows hard tension. You can see a gap has appeared on the left side of the plug. Fill only the first pin chamber to both get a feel for rotating the pins as well as the plug movement when all rotations are set.

You will start picking by applying tension and finding the binding pin. The furthest back pin can often seem to always be binding so I ignore it until there are no other binding pins. When you find a binding pin, release tension completely and rotate the pin in any direction. Reapply tension. If the pin is still binding, rotate it the other direction and reapply tension to feel for binding. Sometimes pins can be resistant to rotation so you may need to do this a few times per pin. To align a pin with center rotation, you can just gently rotate it. I sometimes also do a constant tension on, tension off, while I rotate since the sidebar fingers can snap into the gate if it's close enough. False gates are not much of a concern since once each finger is in a gate, true or false, the falsely rotated pins will bind. If you have a lock where the back pin is always binding, I rotate it and use the plug movement to determine if it's set which is why I prefer to save it for last; going from one unset pin to all set pins will generally give greater change in plug movement than from three unset pins to two unset pins.

Once you have determined that all pins are rotationally set, you can begin picking to shear as you would any normal pin tumbler. Even if you over set a pin and must release tension, the rotation of the pins stay the same and you don't need to rotate the pins again. This essentially means your progress is saved and why most people prefer to pick clockwise. Occasionally, a pin may rotate (you'll notice the plug has less movement) but that's a quick search and rotate of it. The only difference at this point is to not lift pins unless tension is applied or you risk changing the rotation. Tension will push the sidebar fingers into the pins to hold their rotation as you lift. Just remember, the mushrooms drivers may have a lip that gets caught so if the lock isn't opening and you can't find a binding pin, just lightly lift each key pin and tap the bottom of the driver to nudge it up.

Picking Clockwise

Picking counterclockwise is just doing the opposite order. Pick the lock to shear as a normal pin tumbler first. Once all pins are at shear, you'll enter a deeper than normal false set. You must be able to differentiate between the false set from the mushroom drivers and the slightly deeper

rotation from all pins at shear. Once this is done, you can apply tension to find the binding pin. Once you find it though, you can't fully release tension to rotate it. You must lighten your tension just enough for the pin to rotate but not so much that you drop pins from shear. This is the most difficult part and why most find picking counterclockwise to be more challenging. Keep in mind that the sidebar springs are trying to push the sidebar out of the plug and will counter rotate the plug, dropping your pins from shear, if tension becomes too light.

Picking the M3

The slider will randomly bind so when you can't find a binding pin, or just randomly as you pick, push the slider in with your pick. Do a very small push to test if it's binding or not though as if it's springy and not binding and you push too far, the slider may bind too far back similar to an over set pin. You may also put a small 90 degree bend in the end of a paperclip and stick that in the lock to hold the slider in place. Push the slider back and stick the end of the paperclip into the gap that was created by the slider moving back. This will hold the slider in a set position so that you don't have to worry about it as you pick. This lock has a much more open keyway compared to the others because of the slider so there is plenty of room for a tension wrench, paperclip, and a lockpick to fit in there.

Picking the M4

You will want to start with only side pins and maybe just two to start with. Turn your pick flat so the head of the pick can get under the fingers and rotate your pick to lift the side pins. Side pins can bind randomly with your other pins, both during rotation and shear, so you'll want to check for binding side pins as you pick. The side pins are similar to standard pins; bound when binding (or in a false gate), springy when non-binding, and a slight spring with a hard stop when set. The third side pin has a larger cutout for it and it's slightly set back so it can be harder to find. But it has no false gates and is always the same lift so if you can find it, it's the easiest to set. The difficult part is that the false gates on the side pins can be brutal. If a side pin is in a false gate, it will feel completely bound up and will not want to move out of the false gate. Don't try lifting it too hard, as it can cause the pin to jump and over set. Just slowly lighten tension as you lift. You will often find this drops other pins that you'll have to reset. I keep hard tension at this point as the problematic side pin may drop when you re-set the other dropped pins, leading to an endless cycle of re-setting the same pins. If there are problematic side pins, I find that setting a barrel driver in counter-milling allows enough plug rotation to set the side pins without having so much rotation that the side pin feels stuck and unable to be lifted.

To deal with the barrel drivers you can treat them as serrated pins. Just lift the binding pins only and you will end up with a false set where the lips of the barrels are in the counter-milling. Here the pins will either have a slight spring and a hard stop (like a set pin) or bind hard. Just keep finding the binding pins and slowly lifting them, they will click out of the counter-milling and either set at shear or into the next counter-milling. It doesn't matter which as you just keep finding the binding pins (it may be the same pin if it set into the higher counter-milling) and slowly lifting them.

Picking the Cam

The picking direction doesn’t matter as there is no shear line, only the binding of the sidebar. The goal is first to get each pin set in a circular groove. Pins will either be completely springy (non-binding pin), binding hard (binding pin), binding soft (binding in a groove), or be springy then a hard stop (set). Slowly lift each hard binding pin until it clicks and stops binding as hard. Pins in a groove will loosen up but not completely. If it’s set, it will loosen to feel almost like a completely non-binding pin. If the pin clicks and still binds but only a little, rotate the pin to try to set it. Don’t worry if it doesn’t set though. The main thing is to not lift it any more at this point. Don’t try forcing the lift or rotation on a pin. Move on to the next pin. Eventually, you’ll get all pins in a groove/set. Set pins have more spring before the stop compared to other locks so don’t lift springy pins. If a pin is over lifted, you can slowly release tension and oftentimes that pin will fall while leaving the other pins untouched. Practice with just one pin at first. This way you can know what the binding pin should feel like as it goes through the grooves. And while it’s in a picked state, feel the pin to know what a set pin feels like. I personally find these cam locks to be harder than the other variations but they do open faster once you get the hang of it.