

Medeco 4 Technical Information

Supplement to Medeco³ Technical Manual

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Medeco 4 (M4)

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Introduced January 2021, patent pending Medeco 4 is Medeco's latest patented high security offering. M4 keys incorporate innovative designs to protect against the latest duplication threats such as 3D printing. M4 cylinders are ANSI/BHMA A156.5 & A156.30 certified and UL 437 listed for physical strength and high security with solid brass construction and strategically placed hardened-steel inserts to thwart drilling attacks.

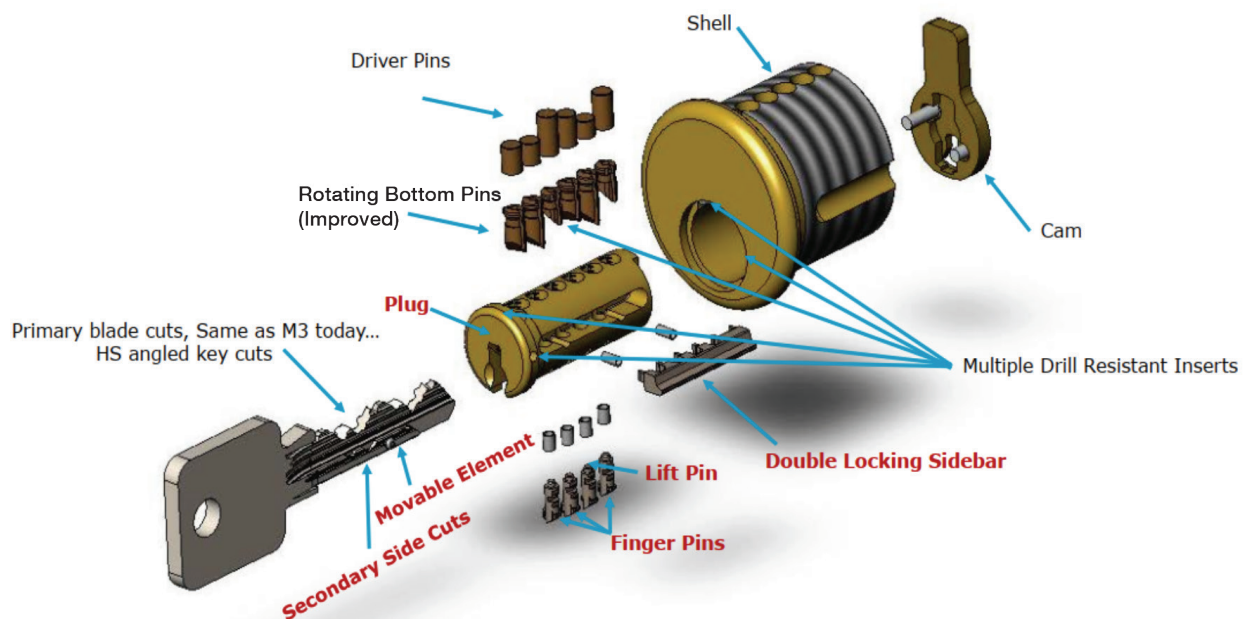
The M4 key design includes the following innovations:

1. Four secondary sidecuts on the key to interact with the cylinder (3 on 5 pin keys) sidepins
2. A moveable element located in one of the sidecut positions that is required to interact with a corresponding lift pin in the cylinder to engage

The M4 cylinder design includes:

1. Newly designed plug to accommodate the sidepins and new sidebar design
2. Four proprietary sidepins available in four depths
3. One sidepin is a lift pin designed to interact with the key's moveable element
4. A newly designed sidebar which must interact with the sidepins in order to slide radially into the plug

New Design Elements Labeled In Red



Cylinder Side Pins, Shuttle Lift Pin, & Key Movable Element (ME)

Terminology and Definitions

- Profile = cross-sectional opening in plug
- Keyway = profile
- Key Section = milling on key blank
- Shuttle Pin = movable element in key
- Lift Pin = sidepin interacting with shuttle pin
- Finger Pin = side combination pin
- Sidepin = finger pin and/or lift pin
- Sidecode = lift pin location + finger pin cuts. Represented by 3 digit code in the part number.
- Movable Element = shuttle pin in key
- Technology & Pinning Codes:
 - H = M4 Biaxial
 - P = M4 Bilevel
 - Q = M4 CLIQ
 - M = Master Pinned (blade pins only)
 - N = No sidepins
 - P = Pinned (includes sidepins)
 - R = Master pinned (blade & sidepins)
 - S = Sub-assembled (with sidepins)
 - Sample Keyway = M4 keyway x 624 6 pin sidecode or 130 5 pin sidecode.

An example cylinder part number

| | | | | | | |
|-------------|---------------|--------|--------|--------------|-----|----------|
| 100200 | H | 26 | M4 | S | Z01 | 624 |
| Base Part # | M4 Technology | Finish | Keyway | Pinning Code | Cam | Sidecode |

Part number would be **100200H 26 M4 S Z01 624**

An example key part number

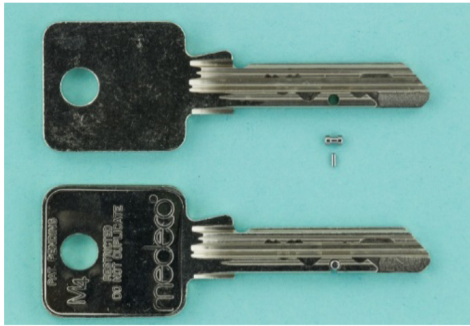
| | | | | | |
|------------------|----------|---------|--------|---------|----------|
| KYC or KYB | 4L or 4S | X600 | XX | XX | XXX |
| Cut or blank key | Bow size | Pinnage | Keyway | Marking | Sidecode |

Part number might be **KYB 4L 6600 M4 99 624** for a large bow, 6 pin key blank in the M4 keyway, custom coined with a 624 sidecode.

Movable Key Element or Shuttle Pin

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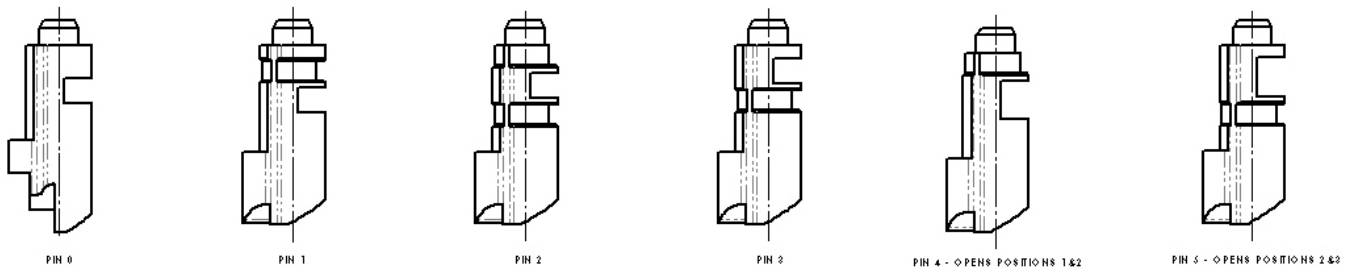


The Shuttle Pin is made of 303 stainless steel, and is permanently retained by a stainless steel pin in the bottom of the key blade

NOTE: It is not possible to change the position of the Shuttle Pin. The Shuttle Pin is not removable.

M4 Sidepins

The below diagram shows the different sidepins and their dimensions — PIN 0 is the Lift Pin which interacts with the Shuttle Pin on the key in order to engage the sidebar.



Sidepinning

Sidepinning can be accomplished using the following guidelines:

Pinning is done from bow to tip, so decode the sidecuts from bow to tip on the key, and then working from the front of the plug towards the back begin pinning the cylinder.

1. Remove the sidebar and sidebar springs from the plug and set to the side.
2. Insert the sidepin springs into the sidepin chambers in the plug. If it is a 6 pin plug there will be 4 sidepin chambers, if it is a 5 pin plug, there will be 3 sidepin chambers.
3. Using the decoded depths, insert the sidepins into the sidepin chambers in the plug.
 - a. There are three possible depths with the shallowest labeled 1, and deepest labeled 3
 - b. Combination sidepins used are TP-F57-1 for a 1 depth, TP-F57-2 for a 2 depth, and TP-57-3 for a 3 depth.
 - c. The chamber in the plug that will interact with the Shuttle Pin on the key must have a TP-F57-0 pin, which is the Lift Pin.

Movable Key Element or Shuttle Pin *(cont.)*

4. Insert the sidebar springs into the grooves for the springs in the plug, holding the plug parallel to the pinning mat or pinning surface will ensure that they do not move from their position
5. Carefully reinsert the sidebar, making sure that it is oriented correctly and that the sidebar spring pockets in the sidebar line up with the sidebar springs in the plug.
6. With your finger and or thumb holding the sidebar and sidepins in place, insert a key and make sure that the sidebar will collapse successfully inside the plug shear line.

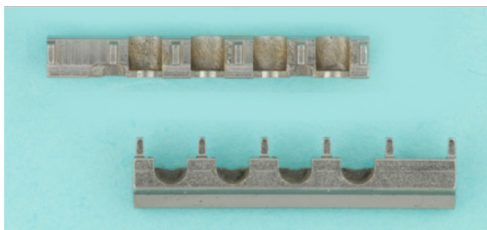
Once sidepinning is complete, you can then proceed to primary pinning of the cylinder. Instructions for this can be found in the M3 Technical Manual.

Pinning Notes:

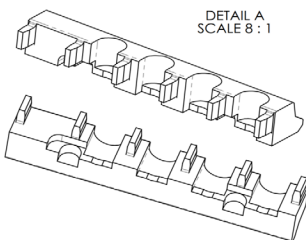
- When reassembling a cylinder make sure that each sidepin chamber has a spring and the correct sidepin. If a cylinder is reassembled without a sidepin spring in a chamber, it will affect the function of the cylinder, and will be difficult to disassemble to resolve the problem!
- Sidepinning is unique to cylinder pinnage. A 5 pin key will not operate a cylinder pinned to a 6 pin sidecode. To key a 6 pin cylinder to a 5 pin key, the 4th sidepin would need to be removed from the 6 pin cylinder (along with the 6th primary pin stack).

M4 Sidebar

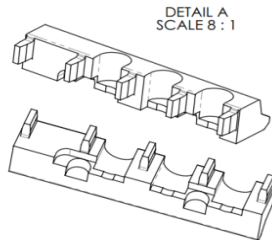
The photos below show the new M4 design sidebar. Note the pockets for the sidepin slots and the grooves for the sidebar springs.



6-pin sidebar



5-pin sidebar

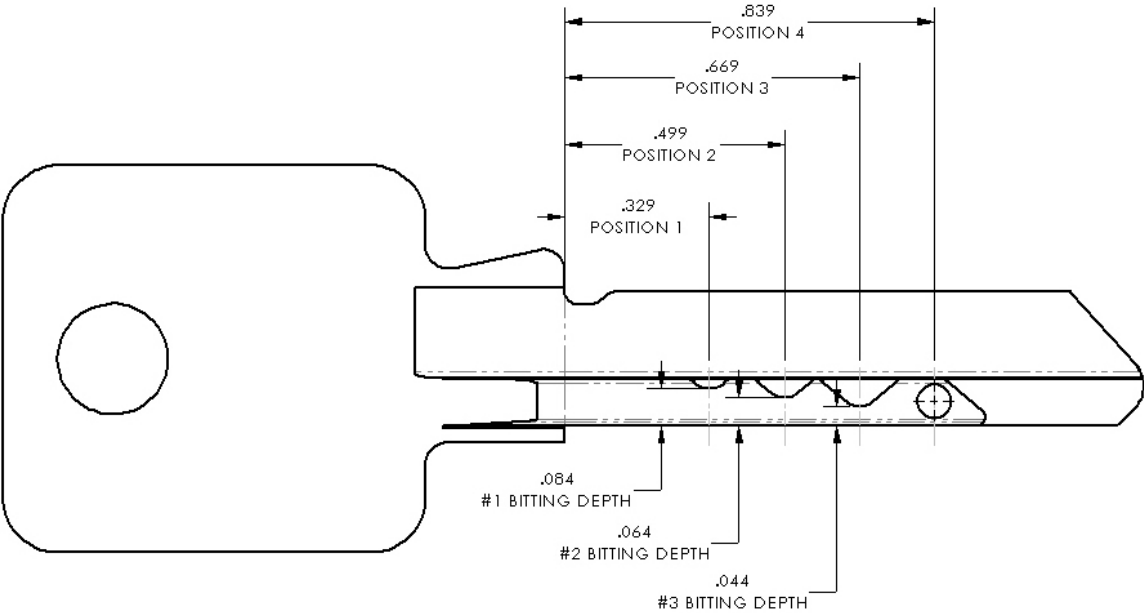


SideCut Spacing and Depths



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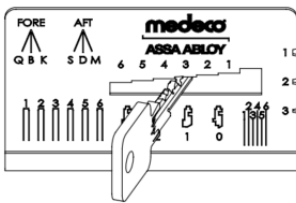
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Key Decoder

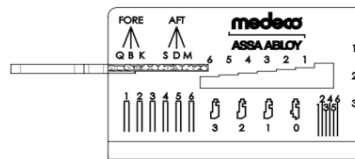
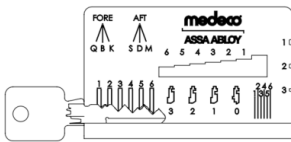
The M4 Key Decoder can be used to decode both M4 and M3 keys. Enhancements to the decoder include the ability to decode the sidecuts on the key, and the ability to decode the sidepins as well. See diagrams below for instructions.

Decoding Primary Cuts (M4, M3, Biaxial)



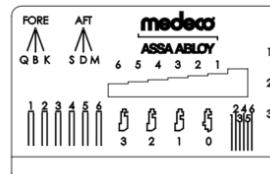
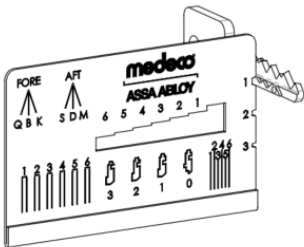
When decoding, line up the key's cut in the opening and move from position 1 towards position 6. When the key stops take the number above and to the right. Decode from tip to bow.

Decoding Angles Fore and Aft, Left Center and Right (M4, M3, Biaxial)



Laying the key flat against the lower left side of the decoder with the shoulder resting against the decoder's raised edge will give the key's fore and aft offset cut positions. Sitting the key on its edge and using the Fore and Aft guides at the top left hand corner will help to determine the angle letters based on left, center, or right angles.

Decoding Sidecuts and Sidepins (M4 only)



Three depths on the right edge of the decoder are used to decode the three possible depths on the side of the M4 key. Starting at the smallest #3 cutout, check each of the four cuts to decode these. You also have the ability to decode the sidepins using the drawings under the key gauge.

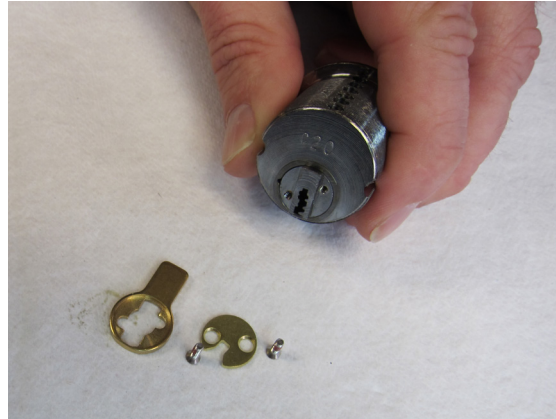
Cylinder Disassembly



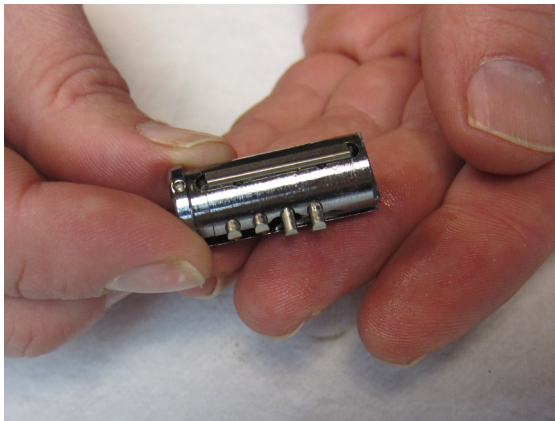
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Step 1-Remove the cam using a #1 Phillips head screwdriver (older cylinders may use single-slotted screws)



Step 2-Remove the plug from the cylinder by inserting a key and turning slightly

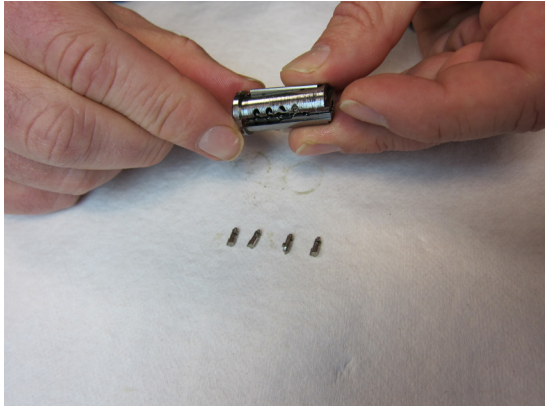


Step 3 - Remove the crescents from the face of the shell



Cylinder Disassembly *(cont.)*

Step 4 - Remove the Sidepins



Notes

- Make sure to keep track of which pin goes into which chamber for reassembly
- Notice the different shear lines on the sidepins as well as the difference between the lift pin in the third chamber, and the finger pins
- Notice the difference in the plug where the lift pin is inserted to engage the shuttle pin on the key

Step 5 - Remove the sidebar



Notes

- Notice the location of the sidebar springs, and how they go into grooves in the plug
- Notice that the sidebar is oriented with the sidepin pockets toward the front of the plug, and the sidebar spring grooves at the bottom

Step 6 - Remove the sidebar and sidepin springs



Notes

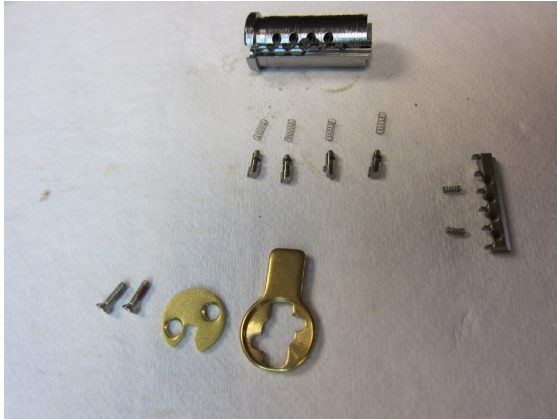
- Sidebar springs are smaller and are easily removed
- Sidepin springs can be more difficult to remove, they can be removed by tapping the plug face on a hard surface, or by using tweezers

Cylinder Disassembly *(cont.)*

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Disassembled M4 Mortise cylinder



Cylinder Assembly

Step 1 - Insert the hardened steel crescents, standing the shell upright after installing



Step 2 - Insert the sidepin springs into the sidepin chambers



Cylinder Assembly (cont.)



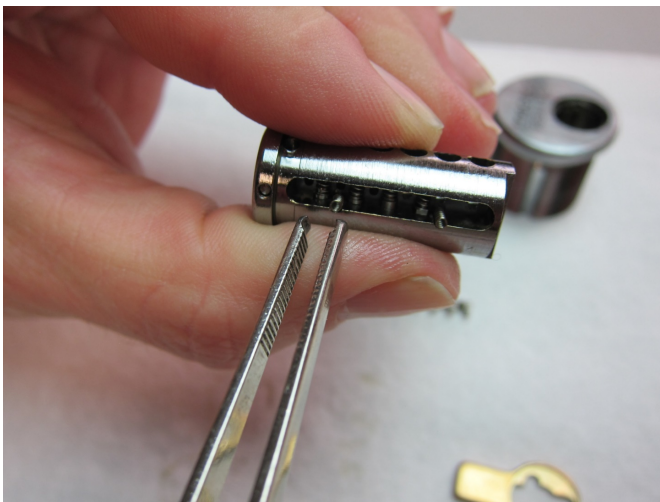
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Step 3 - Insert the sidepins into the correct chambers



Step 4 - With the plug held parallel to the table, and your finger or thumb holding the sidepins in place, insert the sidebar springs into the plug, resting them in the sidebar spring grooves

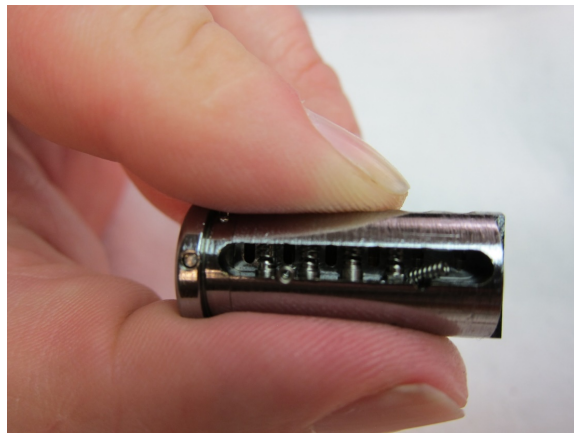


Cylinder Assembly *(cont.)*

Step 5 - Carefully line up the sidebar with the sidebar slot in the plug, and insert — make sure the sidebar springs are in the correct alignment



Incorrect spring alignment



Step 6 - With finger and thumb on sidebar and sidepins to prevent them from falling out, carefully insert a key to engage and collapse the sidebar, then drop plug into vertical standing shell



Cylinder Assembly *(cont.)*

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Step 7 - Attach the cam to the back of the plug, making sure it is oriented correctly



M4 BiLevel

M4 BiLevel cylinders operate much like a standard pin tumbler lock, with the addition of a slider designed to interact with the moveable element in the key and a legless sidebar for additional protection against picking and key interchange.

BiLevel cylinders are not UL437 listed or ANSI/BHMA A156.30 certified. BiLevel cylinders are designed for use in applications where patented key control is needed, but physical security is not critical.

For comparison, below are the faces of an M4 high security cylinder and an M4 BiLevel cylinder:



More details about M4 BiLevel cylinders:

1. Standard Medeco M4 keys are used in BiLevel cylinders; however, the M4 key must utilize all aft cuts due to the use of conventional, conical style pins.
2. M4 BiLevel cylinder plug faces are thicker than normal to accommodate the aft cut key requirement.
3. M4 BiLevel cylinders are pinned with the same pins that are utilized in Medeco 3 BiLevel cylinders.
4. M4 BiLevel cylinders use the same sidebar that is found in Medeco 3 BiLevel cylinders.
5. There are no side pins in a M4 BiLevel cylinder.
6. There are three different sliders designed for M4 BiLevel cylinders to interact with the moveable element in the key. The slider that is used depends on the location of the moveable element.

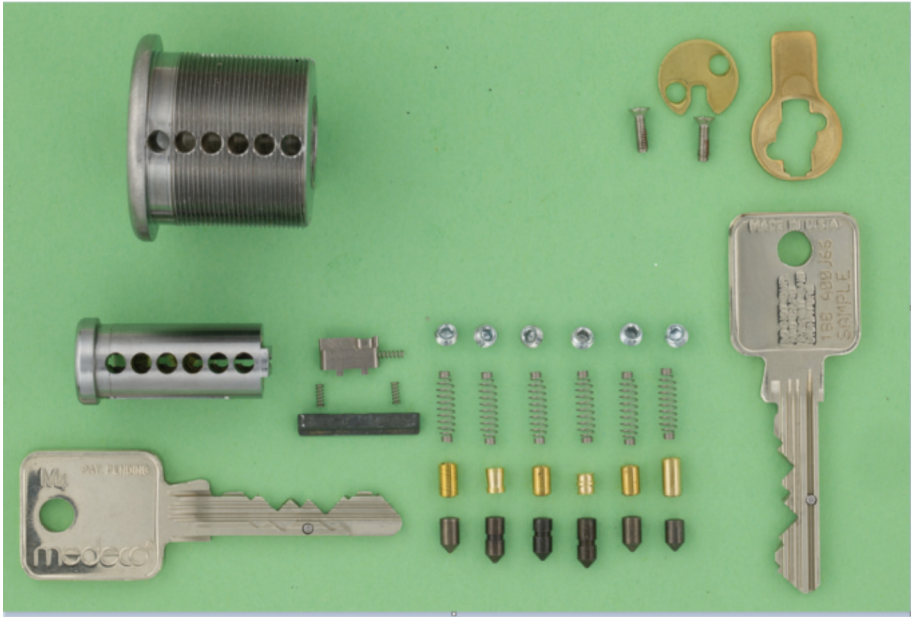
M4 BiLevel (cont.)



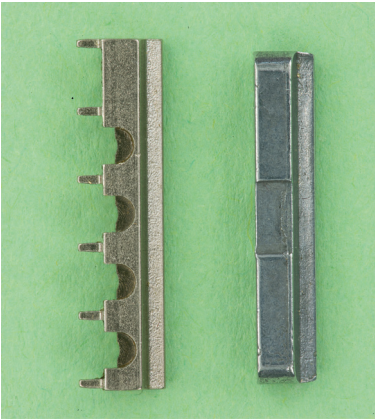
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Exploded view of the components of an M4 BiLevel cylinder

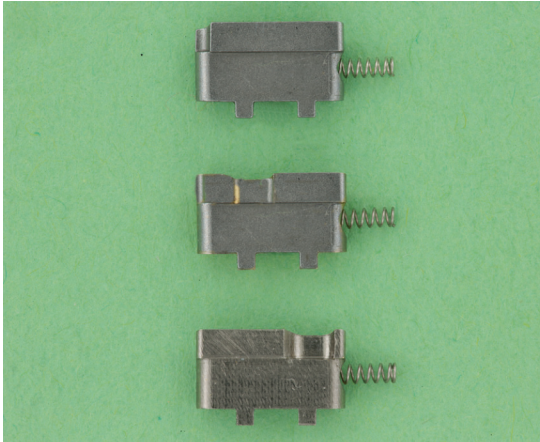


M4 and M4 BiLevel Sidebar Comparison

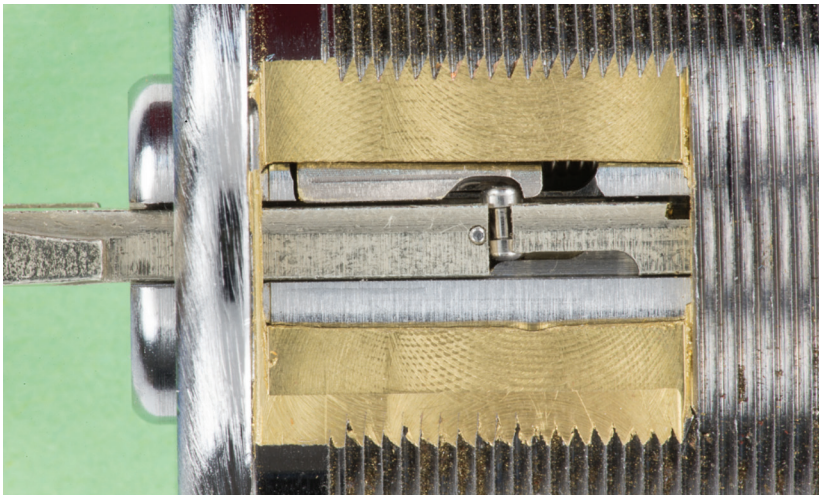


M4 BiLevel *(cont.)*

M4 BiLevel Sliders - 3 positions available



Slider engagement with Moveable Element



M4 BiLevel *(cont.)*

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Medeco M4 BiLevel Part Numbers

| Pins | | |
|--------------------------|-------------|---|
| BiLevel Bottom Pins | TP-F15-X | (X is 1-6, same pins used for M3 BiLevel) |
| BiLevel Top Pins | TP-F15-XT | (X is 1-6, same pins used for M3 BiLevel) |
| BiLevel Master Wafers | TP-50_XW | (X is 1-5, same wafers used for M3 BiLevel) |
| BiLevel Pin Kit | KJ1501 | (Kit is same for both M3 and M4 BiLevel) |
| Sidebar | | |
| BiLevel Sidebar | CP-083551 | (Same sidebar used for M3 BiLevel) |
| Slider | | |
| Medeco M4 BiLevel Slider | CP-088090-X | |

NOTE: This is unique to Medeco M4 BiLevel, X represents Moveable Element Position

Sample Medeco M4 BiLevel Mortise Cylinder Part Number

| | | | | | | |
|-------------|-----------------------|--------|--------|--------------|-----|-----------|
| 100200 | P | 26 | 44 | S | Z01 | 624 |
| Base Part # | M4 BiLevel Technology | Finish | Keyway | Pinning Code | Cam | Side Code |

100200P-26-44 S-Z01-624

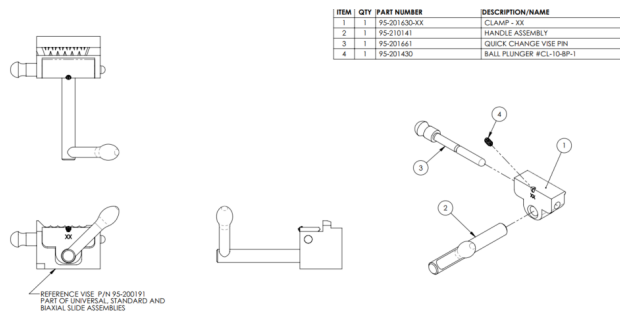
Key Machine Parts and Pinning Components

Key cutting:

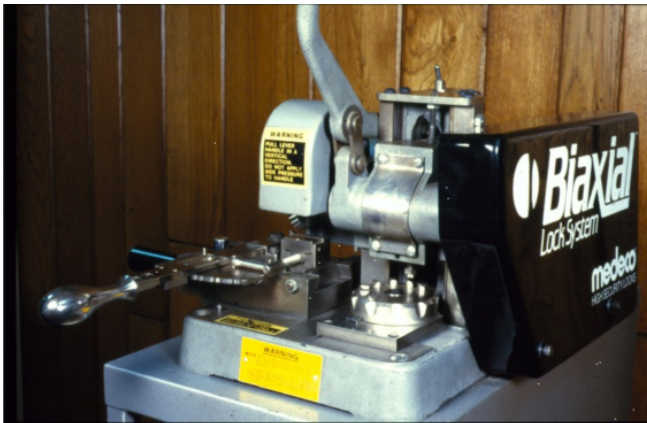
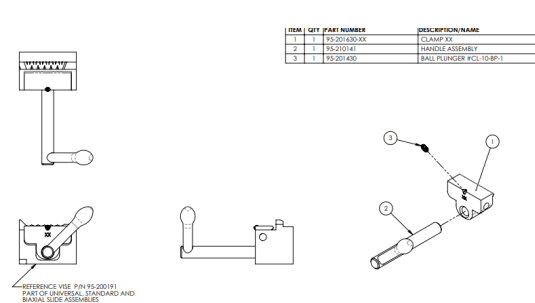
- Medeco M4 keys can be cut using the following key machines
 - New Medeco manual key machine with clamp kit 95-210100-MED4
 - Existing Medeco manual key machine with retrofit clamp kit 95-210130-MED4
 - ITL 9700 A (new jaw required)
 - Framon KX-1 (new jaw required)
 - HPC 1200 CM, 1200MAX Code Max, TigerShark2 (new jaw required)

Note: the retrofit clamp kit does not come with the quick change vise pin

p/n 95-210100-MED4



p/n 95-210130-MED4



Note: M4 keys can be cut on existing Medeco machines with the proper Key Clamp Kit installed

Key Machine Parts and Pinning Components *(cont.)*

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95-210100-MED4

Key Clamp Kit (new machines)-clamp, handle, and quick-change pin

95-210130-MED4

Key Clamp Retrofit Kit-clamp, handle

NOTE: Key machines that can cut M3 keys will also cut M4 keys—secondary cuts on M4 keys are factory cut, like the side biting on M3.

TP-F57-X

Side Finger Pins - #1, #2, #3 (packs of 10)

TP-F57-X

Side Master Pins - #4, #5 (packs of 10)

TP-F57-0

Lift Pins - #0 (pack of 10)

CP-031560

Sidepin Springs (pack of 100)

CP-0845A0

5 pin sidebar

CP-0846A0

6 pin sidebar

KH5701

Sidepin Dealer Kit-30 each sidepins, including master pins and key decoder, 400 side springs, plus 3 each 5 pin & 6 pin sidebars with 50 sidebar springs

KH5702

Sidepin Distributor Kit-100 each sidepins, 800 side springs, key decoder, plus 3 each 5 pin & 6 pin sidebars with 50 sidebar springs

94-0323

Key Decoder

10H0400 CUT

M4 Cut-away cylinder

NOTE: M4 primary pins are the same Biaxial pins used for Biaxial and M3 high security cylinders. For part number information on these see the M3 Technical Manual.

Master Keying Enhancements

Historic Medeco Theoretical Keying Capacities (actual numbers vary based on system parameters)

- Original Product
 - 34 Million Possible Codes
 - 15,625 Theoretical Codes in a 2 Level MKS
- Biaxial Product
 - 2 Billion Possible Codes
 - 1 Million Theoretical Codes in a 2 Level MKS
- Medeco 3 Product
 - 13 Billion Possible Codes
 - 6 Million Theoretical Codes in a 2 Level MKS

M4 Master Keying Allows for 9 Million Theoretical Combinations in a 2 Level MKS

Master Keying possibilities are enhanced through the addition of the 4 sidepins, giving the key 10 possible key cut positions, and the cylinder 10 pin positions. Primary pins are the biaxial style pins allowing for 6 possible angles in six possible depths in each pinning chamber. Secondary sidepins allow for 4 additional position combinations with 3 possible depths in each position.

Master Keying is accomplished in the following methods

- Use of master pins in the primary pin chambers (most common method)
- Use of double-cut keys (most commonly done for larger, more complex master key systems)
- For extremely large systems, master sidepins can also be progressed
 - Sidecuts have 3 possible depths
 - Sidepin MP #4 is designed to accept sidecuts of depth 1 & 2
 - Sidepin MP #5 is designed to accept sidecuts of depth 2 & 3

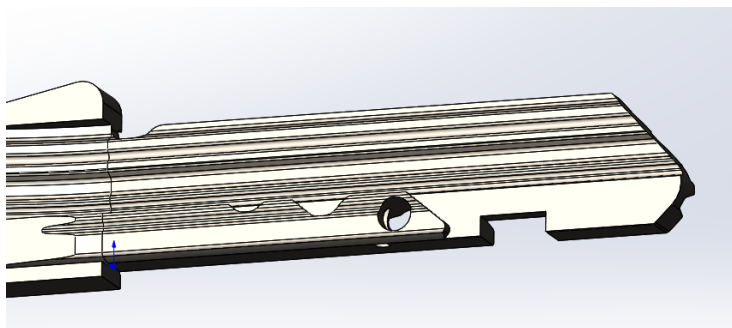
Special Applications

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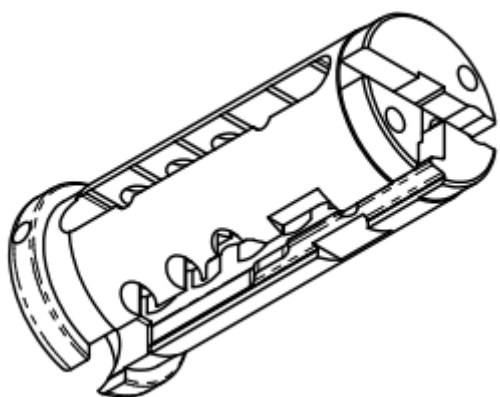
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Medeco Maxum Deadbolt Captive Thumb Turn information

- A Medeco Maxum Deadbolt with the Captive Thumb Turn Key function on the inside in Medeco 4 technology has the limitation that a 6-pin Captive Key will only have 3 sidecut positions, the 4th sidecut is removed on these due to design limitations.
- The plug will also have the 4th position eliminated as this interferes with the slot in the bottom of the plug for the Captive Thumb Turn Key to interact with.
- In the case of a 5-pin Captive Thumbturn Deadbolt, no modifications or exceptions are required.



6 pin Captive Thumb turn Key with 4th sidepin eliminated to accommodate the design of the key



Elimination of the 4th position on the plug as well to accommodate the slot necessary in the plug

Frequently Asked Questions

What is Medeco 4?

Medeco 4 (M4), is Medeco's newest high security retrofit cylinder system. With multiple levels of security and a revolutionary new key, containing a moveable element to enhance security, this is the latest in physical security innovation from Medeco. M4's full line of replacement cylinders will upgrade almost any locking hardware to the highest levels of pick, drill, bump, decode, key control, credential replication, and brute force attack resistance.

For which applications is M4 recommended?

All installations requiring an increased level of security, accountability, and protection...from government and critical infrastructure to residential, any application can benefit from a cylinder that can't be easily compromised. With the ever-increasing availability on the internet of lock picking or hacking tools and skills, more and more applications deserve Medeco.

What is M4's warranty?

M4 is covered by Medeco's standard mechanical warranty as outlined in its current price book. As of this publishing, that is 2 years for defects in materials and workmanship for mechanical cylinders and keys (see price book for the most current information).

Is M4 backwards compatible with M³ key systems?

No, for the highest in key system integrity, M4 uses all new keyway designs and cannot be keyed together with any other Medeco technologies.

What kind of key machines will be available for cutting M4 keys in the field?

A Biaxial or Medeco3 Biaxial key machine can be used for M4 with the addition of an M4 quick change vise jaw. Other commercially available key machines (such as ITL9700 and 9700A, HPC, Framon, etc.) may also be available.

Can M4 sidecuts be cut in the field?

No, all M4 sidecuts will be factory cut.

What is the M4 patent?

M4 patents applied for to protect the cylinder, key and key blanks in the U.S. and internationally, including Canada. Once issued, patent coverage will extend to the year 2040.

What are M4's master keying capabilities?

On a single keyway, M4 theoretical master key changes can surpass most conventional locks by over 2,000 times. This makes M4 capable of handling the largest and most complex master key systems in the world.

What type of lubricant does Medeco recommend for M4?

For best all-around performance under a wide variety of conditions, Medeco recommends Fluid-Film™. <https://www.fluid-film.com/frequently-asked-questions/> Liquid or powdered graphite is not recommended as a lubricant for Medeco cylinder products.

Has M4 been cycle tested?

M4 has been wear tested to 300,000 cycles. Additional testing results are expected soon.

What is the movable element made of?

The movable element in the key is referred to as the shuttle pin. This pin material is 303 stainless steel.

Is the movable element/retainer pin field changeable?

No. The movable element is a permanently installed component.

Will there be a pin kit available for sidepins?

New sidepin kits, specifically, for M4, are available now. KH5701 and KH5702 are the part numbers.

Will Medeco be conducting technical training for M4?

M4 will be added to Medeco's schedule of factory training classes beginning in 2021.

How many keyways will be available in M4?

Since almost all Medeco keyways are restricted, M4 keyway information will be carefully guarded to protect Medeco's customers. Medeco has developed many keyways and key sections as well as angle codes and sidecodes to further differentiate usage and geography. All of this is designed to provide the ultimate in protection for key systems in the most sensitive applications around the world.

What are the standard lead times on M4 product?

M4 lead times will vary but eventually should be similar to M3 and other technologies.

Will M4 be available in Bilevel?

M4 Bilevel is expected by Q4 of 2021.

Will M4 be available in CLIQ?

M4 CLIQ is expected by Q1 2022.

Will M4 be available in cam locks and other Industrial locks?

Cam locks and other Industrial locks are expected by Q1 2022.



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Patent pending and/or patent www.assaabloydss.com/patents

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