Medeco X4

Technical Service Manual

medeco®

ASSA ABLOY

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in door opening solutions

Medeco x4 Technical Service Manual

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History of High Security and Key Control by Medeco®

The birth of key control and high security locks occurred in October 1968 in Salem, Virginia. A unique locking principle of elevating and rotating pin tumblers was developed that provided millions of key combinations and a level of security that was unmatched in its time. Special angled cuts on the key, a sidebar and hardened steel inserts were used to produce a cylinder that was highly resistant to virtually all forms of attack. Medeco locks soon became the standard for high security and key control.

A utility patent was issued, protecting the operation of the cylinder and also covering the key restricting other manufacturers from producing the cylinder or key blank. The principle of exclusive manufacturing rights over key blanks was tested in court many times over the life of the patent.

The Biaxial® design was introduced in 1985, also providing high security and key control through the use of an elevating and rotating tumbler design and also provided enhanced master keying capability with the addition of an offset pin tip.

Introduced in 2003, Medeco^3 adds to the proven high security design of elevating and rotating pins and sidebar with the addition of a slider mechanism. A utility patent is still used today to provide protection against unauthorized manufacture and duplication of key blanks through the 2021 key patent expiration.

History of Key Control by Medeco

In 1921 a removable core lock was designed by Best Lock Co. allowing quick and easy lock changes by an untrained person removing and replacing a core. This design was the industry standard for many decades, but didn't always meet the customer's need for strict control over duplication of their keys.

In 1995 Medeco introduced KeyMark, a cylinder to retrofit the Best® style small format interchangeable core (SFIC), and added large format interchangeable core (LFIC) to retrofit Corbin Russwin, Sargent, Schlage, and Yale style cores, and conventional non-interchangeable core cylinders using the same key. KeyMark cylinders were protected by a utility patent on both the cylinder and the key providing the ultimate in patented key control. KeyMark is now known as Medeco KM.

In 2008, Medeco introduced the next generation of quality key control cylinders, now known as Medeco X4, (previously KeyMark x4). Like the original KeyMark product line, Medeco X4 is available is SFIC, LFIC, as well as a large variety of conventional non-interchangeable core cylinders. The addition of a special locking pin and slider mechanism greatly increases the number of possible keying combinations on specific end user keyways allowing Medeco X4 to provide much larger master keying capability compared to other SFIC products. Medeco X4 keys and cylinders are patented in the U.S. and other many countries around the world.

For over 45 years Medeco has set the standard for high security and key control in the retrofit cylinder marketplace.

Program Policies

The combination of a Best style Interchangeable Core with a full line of retrofit cylinders and legally protected principles and practices of strict key control is the essence of Medeco X4. As with other Medeco products, several key control program options are available in End User & Dealer keyways, as well as a hybrid Distributor option.

A. End User Program
This level of key control is designed for use by large institutions with a o locksmith on staff. Institutions may order through any Medeco X4 authorized dealer/distributor by presenting a properly signed letter of authorization to Medeco as part of their order. All key blanks are shipped directly to the end user. Product (including cut keys) may be shipped to the dealer/distributor or to the end user. Entirely unique families of multiplex keyways are available at this level, but only used when required.

Typically an end user customer meets the following criteria:
1. 250 or more lockable doors within the institution.
2. Locksmith on staff.
3. Key Control Agreement between end user and Medeco.
4. End user must have an acceptable key machine or punch machine to cut keys.
5. Product is not sold directly to the institution; rather it is sold through authorized distribution or retail based locksmiths.

B. Locksmith Dealer Restricted Program
1. Key Control Agreement between dealer and Medeco.
2. Key blanks are drop shipped to the dealer, even when purchased through a distributor.
3. Dealer must have an acceptable key machine or punch machine to cut keys.

Restricted keyways are assigned geographically and by size, and each dealer has exclusive rights over the systems they sell on their keyway.

C. Medeco X4 Chrome Distributor Program
The Medeco X4 Chrome Distributor program is a hybrid, allowing for keys to be cut at the distributor on custom coined distributor blanks and sold to a dealer or end user as cut keys.

1. If the end user or dealer later requests the option to cut their own keys, a three way agreement between the distributor, the end user (or dealer), and Medeco is initiated.
2. Once the end user (or dealer) has completed the key control agreement and purchased a coining die, they may order custom coined blanks from the distributor.
3. The distributor may continue to provide cut keys to the dealer or end user as well.

No Key Control Agreement is necessary for a dealer or end user not be cutting keys and who purchases all cut keys from the distributor. The three way agreement is only initiated for a dealer or end user who determines the need to independently cut keys.

Medeco X4 Patents

1. Slider/Locking Pin Patent – expires in 2028
2. Key Section/Keyway Patent – expires in 2027

Medeco X4 Key Control Agreements

If the essence of the KeyMark technology in both Medeco KM or Medeco X4 is key control, then, to preserve the keyway integrity, Medeco, the locksmith, and the end user must all work together to control the issuance of keys. Part of Medeco's task in this is to set up strong procedures to preserve the secure distribution of the restricted key blanks, the storage of those key blanks, and the procedures for cutting authorized keys.

Thus, all KeyMark technology program options are controlled with a key control agreement. To enroll in any Medeco X4 program, a "Restricted Key Section Agreement" must be signed to commit adherence to the proper key control procedures. Through vigorous enforcement and periodic monitoring by Medeco of the provisions in the key control agreement, the strength of our utility patented key control and the correct jurisdiction over your keying systems provide protection against unauthorized duplicate keys.

A. Key Control Agreement Overview

To preserve the integrity of Medeco X4 key control, Medeco, the locksmith, and the end user must all work together to control the issuance of keys. Medeco will set up strong procedures to preserve the secure distribution of the Medeco X4 patented key blanks, the storage of those key blanks, and the procedures for cutting authorized keys.

B. Key Control Agreement Highlights

The following topics are covered in the Medeco X4 Key Control Agreement

1. Necessary security of blanks and key machines
2. Key control record keeping
3. Specific keyway assignment
4. Custom coining policies
5. Prohibition on resale of Medeco X4 products (by end users)
6. Prohibition on resale of Medeco x4 key blanks by dealer or end user. A distributor may sell blanks only to dealers or end user with properly executed agreements and custom coining dies
7. Necessary signature authorization
8. Indemnification and termination
9. Key Control Agreement is between end user or dealer and

C. Process to Complete Key Control Agreement

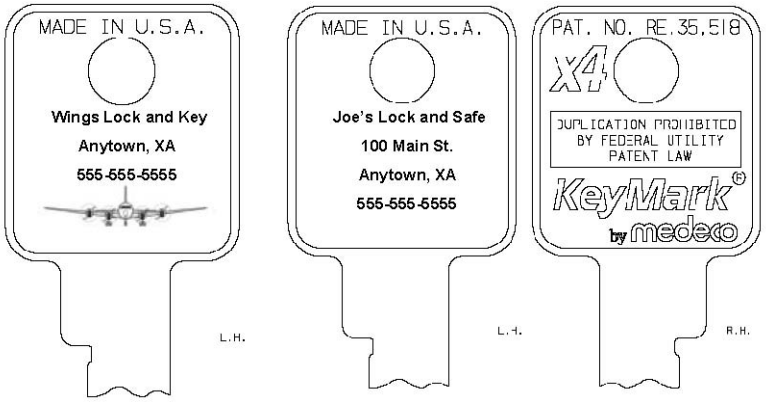
1. Contact your Medeco sales representative or Medeco customer service at 1-800-839-3157 for a contract request form.
2. Return two signed copies to Medeco
3. Order for initial product and key blanks
4. Custom Coining Die Form returned
5. Master Key System Request (if new master key system required)
6. Premise survey provided in digital format if a master key system is ordered
7. Letters of authorization if new end user system setup.

Custom Coining

To further enhance the safety and control of Medeco X4 keys and blanks, all key blanks released to the field must be custom coined with a unique identifiable name, number, or code. Custom coining, which is the same process the United States mint uses to produce coins, produces a jewelry-quality finish and is an excellent advertisement for a Medeco X4 dealer or end user. If, for security reasons, an end user chooses not to explicitly identify their key blanks by the name of the institution, an appropriate blind code may be assigned instead.

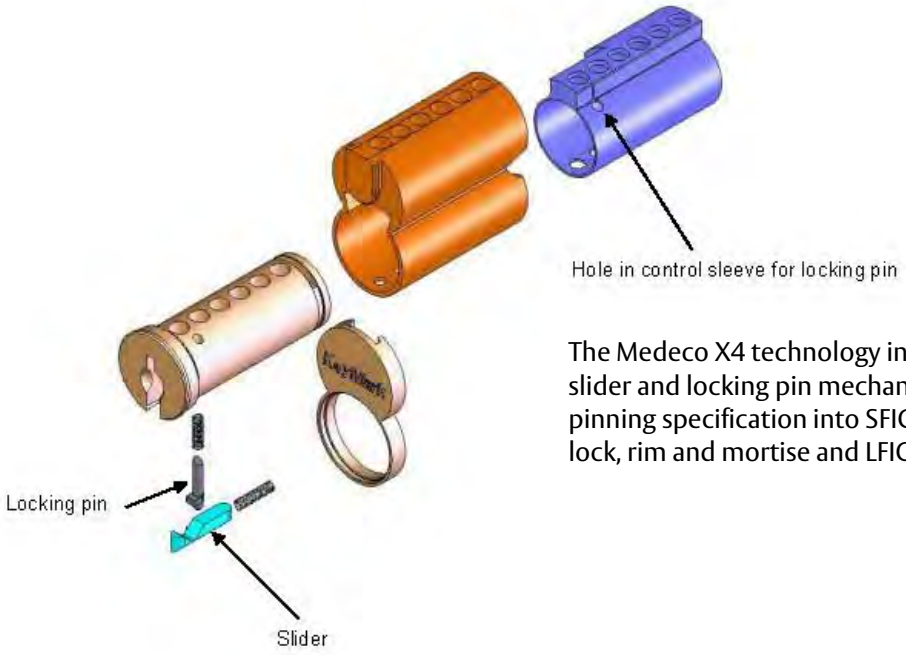
Custom coining designs may be as elaborate or simple as desired and are available in two Medeco X4 bow styles, large (38 bow) and small (32 bow).

All Medeco X4 key blanks are coined with a unique, identifiable name, number or code. This is provided by Medeco following design of the coining die.

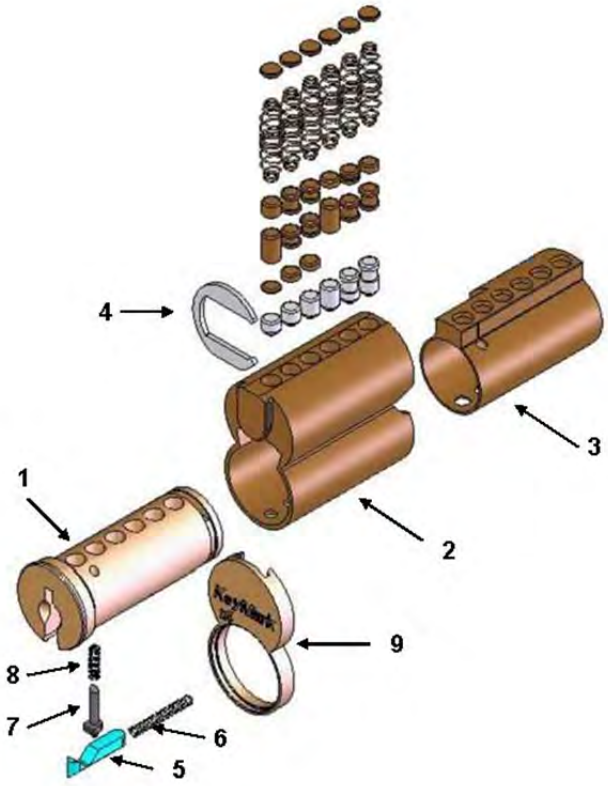


A Custom Coining die is required for all restricted keyway program blanks. If you already have a custom coining die, it will work with Medeco X4 blanks. Custom coining produces a look, feel and finish of jewelry-like quality and is an excellent advertisement for a dealer or end user. A minimum of 200 key blanks may be ordered at a single time.

The Medeco X4 keyblank part number includes a keyway number, followed by "99" for Custom Coining.



The Medeco X4 technology incorporates a proprietary slider and locking pin mechanism paired with the A2 pinning specification into SFIC and conventional KIK, cam lock, rim and mortise and LFIC cylinders.



Item	Part #	Description
1	1236800N-Keyway	Plug
2	1355800K-Finish	Shell
3	CP 022161	Retainer Sleeve
4	CP-021810	Retaining Ring
5	CP-087690-XX	Slider
6	CP-031180	Slider Spring
7	CP-064230	X4 Locking Pin
8	CP-031170	Locking Pin Spring
9	CP-182881-XX	Front Plate

SINGLE SHEAR LINE (NON IC) REPLACEMENT CYLINDERS

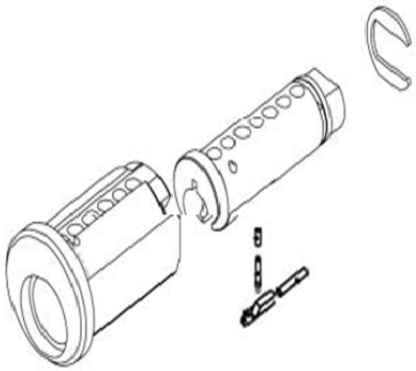
A full line of non I-Core replacement cylinders for retrofit into other manufacturers' locksets is available. By using the same keys, it is possible to combine a retrofit of Best®/Arrow®/Falcon® style interchangeable cores with most other lock types without changing any hardware except the cylinder. In addition, standard Medeco cams and tailpieces can be used on the Medeco x4 retrofit line. These cylinders are available in 6 pin versions only, except cam lock, rim and mortise cylinders which can accommodate 7 pins. Therefore, any key system that will use both I-core and conventional retrofit cylinders should be planned from the outset as a 6 pin system. For part numbers, see the Medeco catalog.

KIK Exploded View

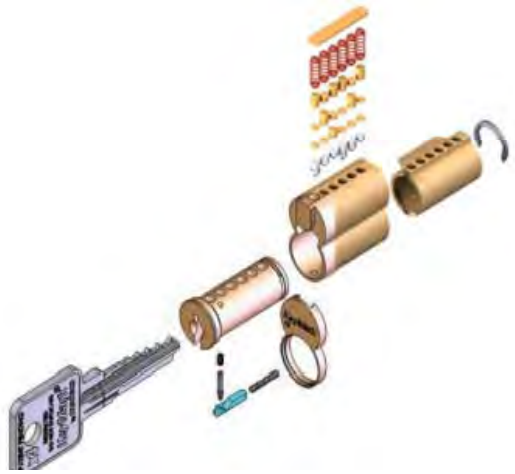
Stack Height = 19 for KIK, Rim, Mortise

Medeco X4 Cam Lock Kit

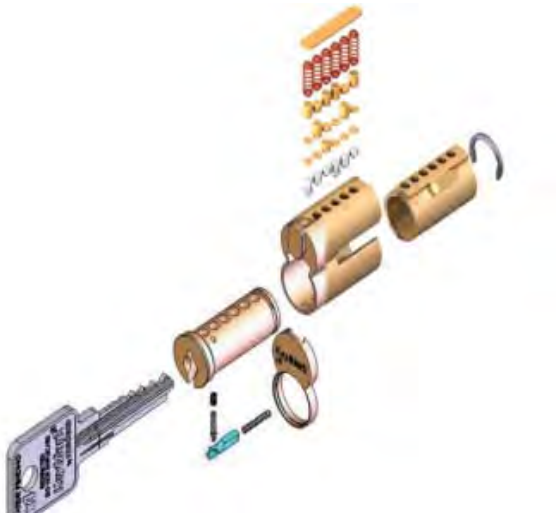
210503 N 26 (7 Pin Cylinder)
Stack Height = 12
Standard Medeco X4 A2 pin kit



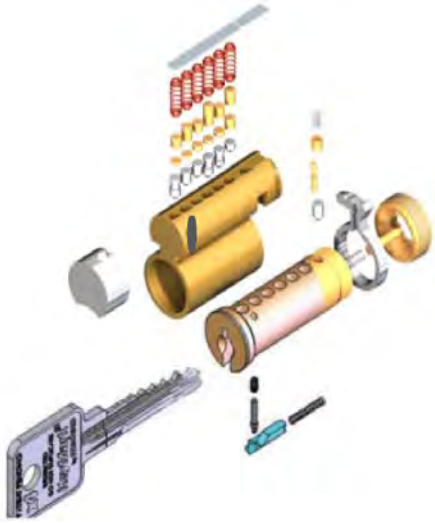
x4 Corbin Russwin LFIC



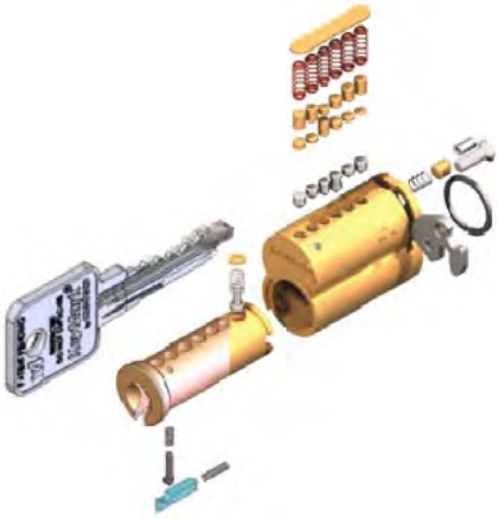
X4 Sargent LFIC



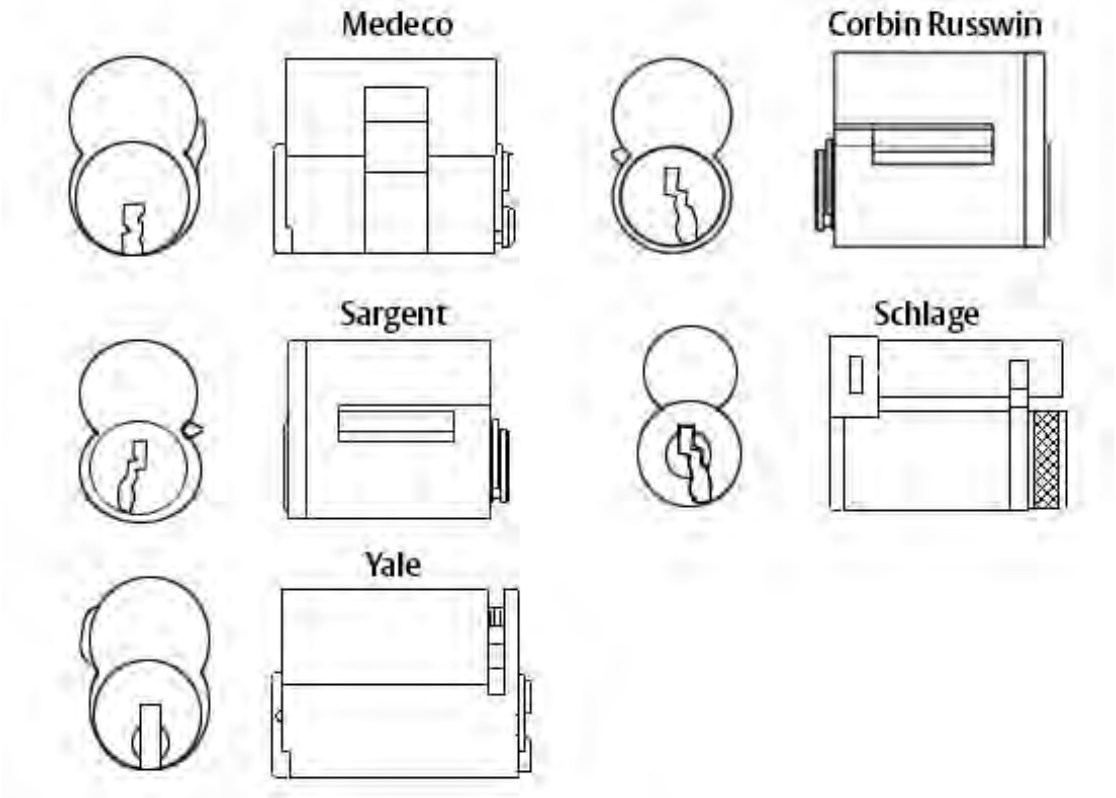
Schlage LFIC



Yale LFIC

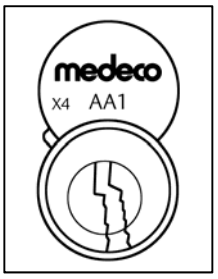


Brand of Hardware	*M3 or KM*	*Unique Control Key Blank*	*Const. Cores?*
Medeco HS 320101 (5 pin) 320201 (6 pin) 321201 (6 pin hotel)	M3	Different Marking KYB XX 6 6 20 XX 05 (Hotel)	320201CC BI R1P W
M3 BiLevel 320201 J	M3	Different Marking	High Security Only
Corbin Russwin 322301	M3 & KM	No	N/A
Sargent 322401	KM	No	N/A
Schlage 322201 322201 C	KM, Medeco Logic	KYB 32 7 6 31 XX 15 (KM Classic) KYB 32 7 9 31 XX XX (KM X4) KYB 38 7 9 31 XX XX (KM X4)	N/A
Yale 310100 (6 pin) 310100A (6 pin HS or 7 pin KM for 7 pin housing) 310100 S & 310100A S	M3, KM & M3 Logic	KYB 34 6 6 11 XX XX (6 pin M3/KM CL) KYB 34 7 6 00 XX XX (7 pin M3) KYB 38 7 6 11 XX XX (7 pin KM Classic) KYB 38 X 9 11 XX XX (6/7 pin KM X4) EA-44X012-XXX/EA-45X012 (M3 L E2) EA-44X013-XXX/EA-45X013 (M3 L E3)	310100CC BI R1P

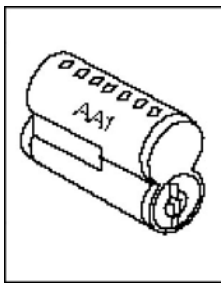


VISUAL KEY CONTROL

Visual key control (VKC) can be furnished on the face of the core. For better security, we recommend Concealed Key Control (CKC) on the side of the core where it cannot be seen until the core is removed with the control key.



VKC



CKC

CONSTRUCTION CORES

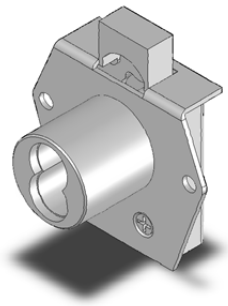
Construction keying for Medeco X4 I-Cores is available through the use of specially marked, temporary cores. Construction cores will be furnished in a distinct finish (Black Imron) which will provide easy identification to users when they make the change to permanent cores. Cores will all be keyed alike.

Construction cores are ordered on a "loaner" status and are intended to maintain security while a facility is under construction or repair. The part number for 6-pin is 33K600001-BI. For 7-pin cores, specify 33K700001-BI. Construction cores are not provided in the same keyway as the final cores will be.

Customers are charged for the construction cores and the number of keys required (maximum number of keys is twelve: 11 operation and 1 control). Pricing is the same as standard, combinated cores. Upon return of cores and keys, a credit will be issued at the price the account was charged. The customer may order the construction core cylinders at any time. The order for permanent cores does not necessarily need to be placed with the order for permanent shells and/or construction cores.

ADDITIONAL PRODUCTS

Medeco also has mortise and rim housings, padlocks, deadbolts, cabinet locks, and International type cylinder housings to accept the X4 SFIC cylinders. Medeco X4 will also work in SFIC housings manufactured by other companies.



Medeco X4 Pins

Medeco X4 cylinders use pin segments with the same lengths and diameter as Best®/Arrow®/Falcon®.
However, for added security, selected and various top and bottom pins will be available with spool type pins. While other manufacturers' pin kits can be used in Medeco X4 cylinders for the master, build up and top pins, the strict tolerances of Medeco X4 pins and the added security from the spool pins are good reasons to use original Medeco X4 pins. Also, use of non-factory original pins can void your warranty.

Medeco X4 bottom pins are made of high quality nickel silver. This distributes wear evenly between the key and the pins. Top pins and master pins are made of brass. Using brass bottom pins will cause premature wear in the cylinder.

Pinning SFIC vs. Conventional

Medeco X4 SFIC have a plug diameter of .434 and use the same pins and are also pinned in the same manner as first generation KeyMark (Medeco KM). Detailed keying instructions are found below.
Medeco X4 conventional KIK, Mortise and Rim cylinders have a .511 plug diameter and must use different *bottom pins* that are longer than the SFIC bottom pins to compensate for the larger diameter plug and still allow for the same key to operate both the SFIC and conventional cylinder. The longer bottom pins are the same diameter, and have the same depth increment but start with a longer #0 bottom pin.

SFIC

KIK, Rim & Mortise, Yale & Schlage LFIC

Cylinder Type	Plug Diameter	Stack Height
SFIC	.434	23
Cam lock	.434	12
Corbin Russwin/Sargent LFIC	.434	23
Schlage/Yale LFIC	.511	19
Conventional (KIK/rim/mortise)	.511	19

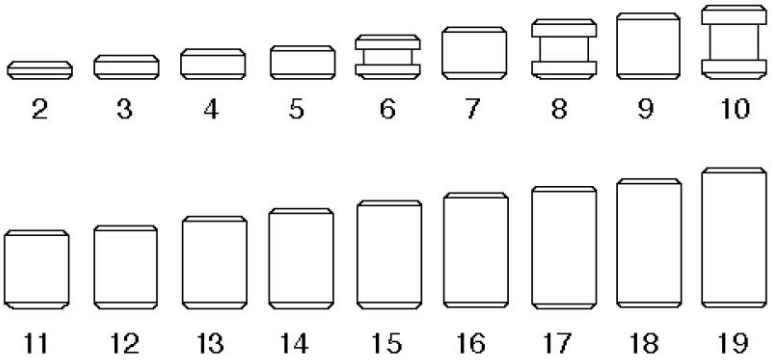
Pins for SFIC TP-F40-XXX

Part #	Pin #	Length
TP-F40-00B	0	.110"
TP-F40-01B	1	.1225"
TP-F40-02B	2	.135"
TP-F40-03B	3	.1475"
TP-F40-04B	4	.160"
TP-F40-05B	5	.1725"
TP-F40-06B	6	.185"
TP-F40-07B	7 (Spool)	.1975"
TP-F40-08B	8 (Spool)	.210"
TP-F40-09B	9 (Spool)	.2225"

.511 Bottom Pins for Conventional (non-sfic) Cylinders TP-F43-XXX

Part #	Pin #	Length
TP-F43-00B	0	.1860"
TP-F43-01B	1	.1985"
TP-F43-02B	2	.2110"
TP-F43-03B	3	.2235"
TP-F43-04B	4	.2360"
TP-F43-05B	5	.2485"
TP-F43-06B	6	.2610"
TP-F43-07B	7 (Spool)	.2735"
TP-F43-08B	8 (Spool)	.2860"
TP-F43-09B	9 (Spool)	.2985"

Master Wafer, Build Up, and Top Pins for Conventional & SFIC Cylinders TP-F40-XXX

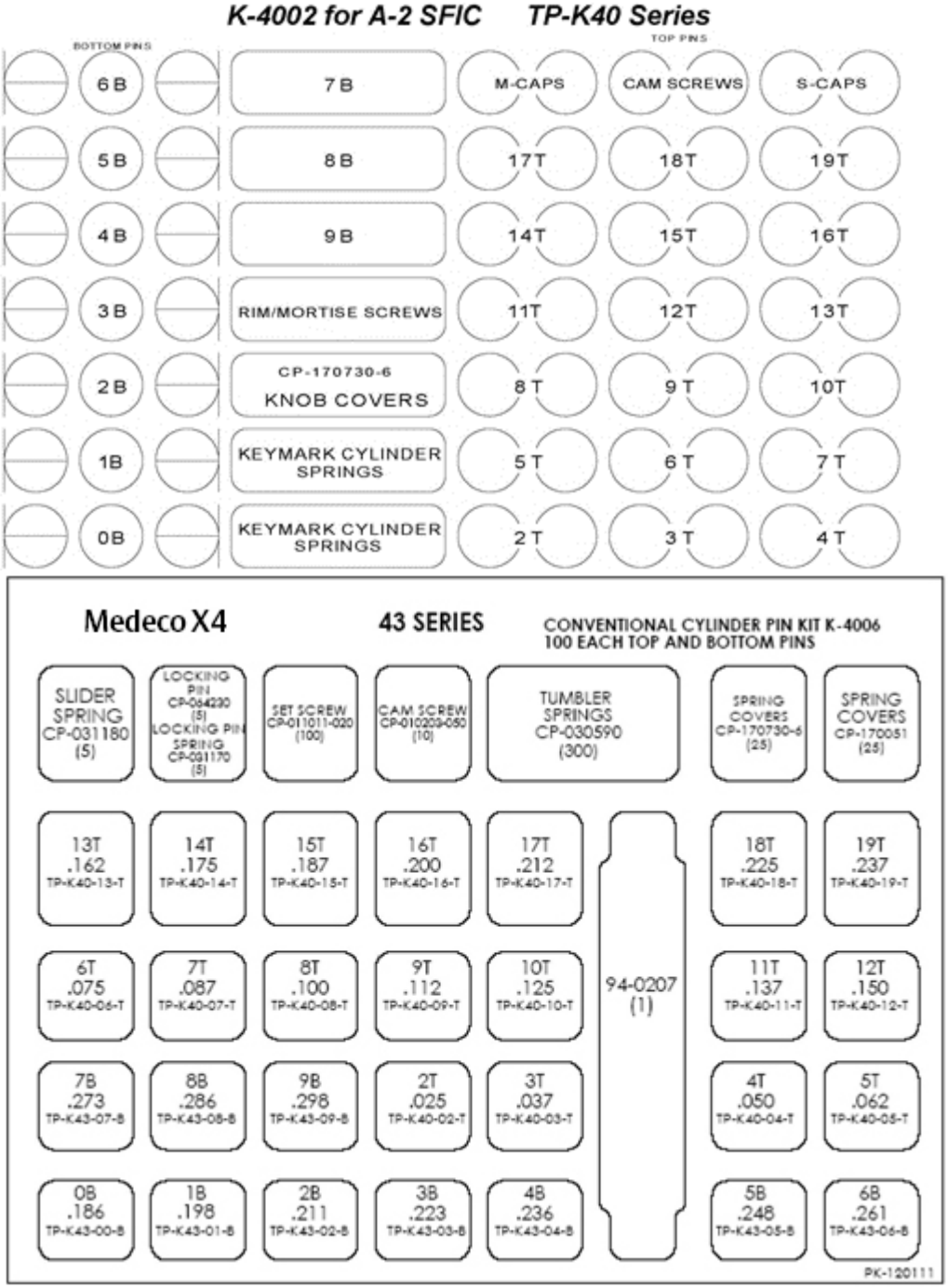


Part Number	Pin #	Length
TP-F40-02T	2	.025"
TP-F40-03T	3	.0375"
TP-F40-04T	4	.050"
TP-F40-05T	5	0625"
TP-F40-06T	6 (Spool)	.075"
TP-F40-07T	7	.0875"
TP-F40-08T	8 (Spool)	.100"
TP-F40-09T	9	.1125"
TP-F40-10T	10 (Spool)	.125"
TP-F40-11T	11	.1375"
TP-F40-12T	12	.150"
TP-F40-13T	13	.1625"
TP-F40-14T	14	.175"
TP-F40-15T	15	.1875"
TP-F40-16T	16	.200"
TP-F40-17T	17	.2125"
TP-F40-18T	18	.225"
TP-F40-19T	19	.2375"

Medeco X4 Pin increment is .0125" (like all A2 systems)
Medeco X4 Pin diameter is .1085"

Bottom pins are precision machined out of solid nickel silver. Bottom Pins 7, 8, and 9 are spool pins for slight additional pick resistance. Top pins 6, 8, and 10 are also spool type pins. The same top pins are used with the TP-F40 and TP-F43 bottom pins.

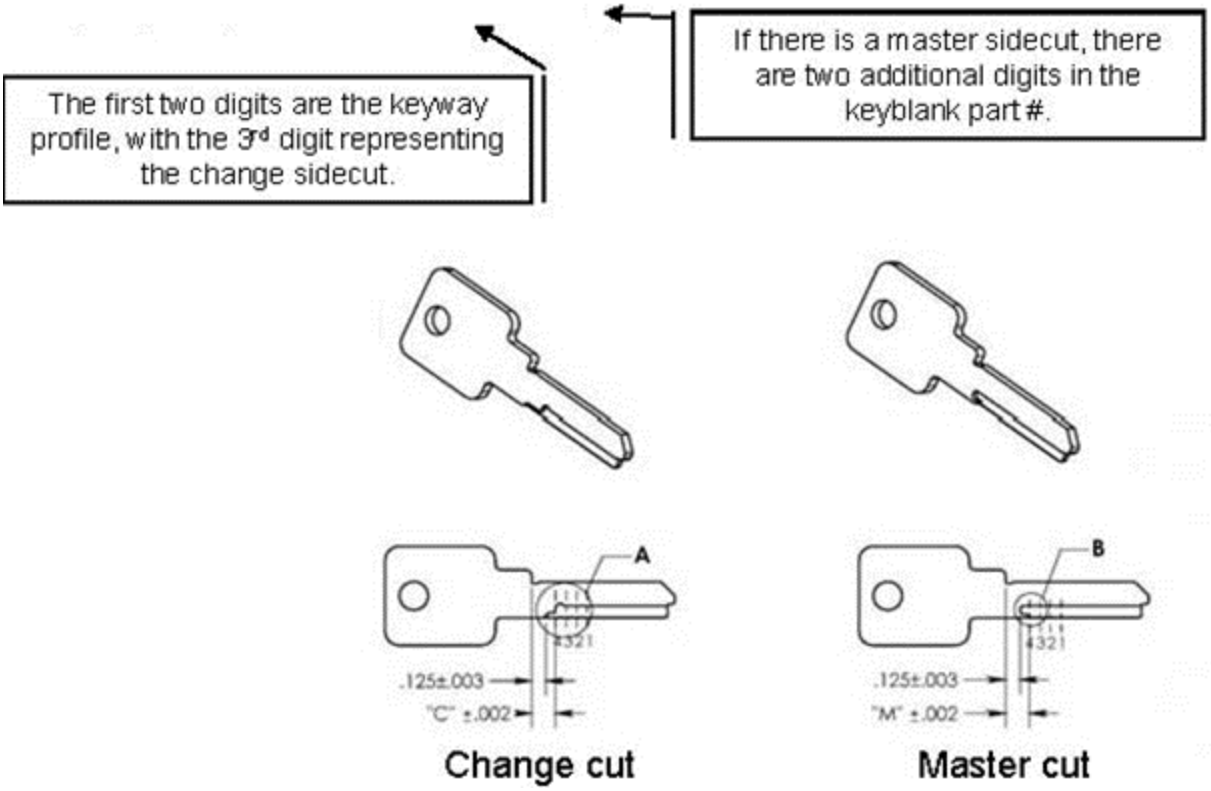
The pin kit required for Medeco X4 SFIC cylinders uses A-2 pinning increment. The pin kit part numbers are K4001 (100 ea.) and K4002.
A separate pin kit is required for Medeco X4 conventional cylinders. (K4006)



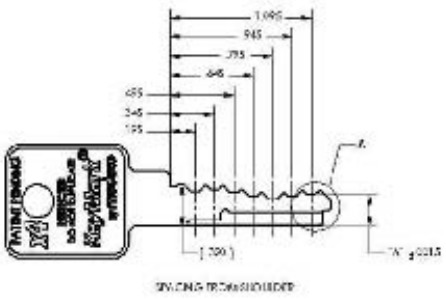
The keyblank part number includes information on the sidecut.

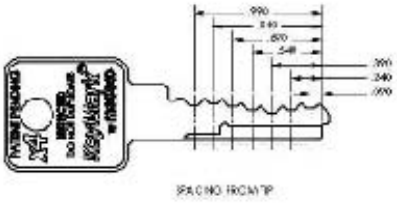
Medeco X4 keys have a unique side bitting that interacts with the slider mechanism in the cylinder. These side bittings are cut at the factory and cannot be created or modified in the field. On certain specific end user keyways, there is also the potential to have a Master sidecut. That is, all Medeco X4 keys will include a change sidecut; for some extremely large master key systems there may also be keys with a master sidecut.

The keyblank part number includes information on the sidecut.
Example keyblank part#:KYB 32 6 9 00 XXX 91 XX



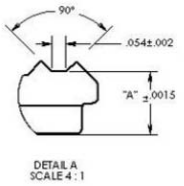
Medeco X4 keys can be 6 or 7 pin and have both a shoulder stop (used for conventional cylinders) and a tip stop (used for SFIC). These two stops allow you to mix SFIC and conventional cylinders in one keying system.





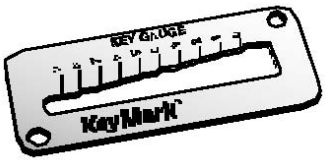
Decoding/Cutting Keys

- Medeco X4 uses the Best "A-2" system of key cut depths.
- Keys are read and cut TIP TO BOW!
- Spacing dimensions can be referenced either from the shoulder or the tip stop.
- MACS (Maximum Adjacent Cut Specification) = 9. There are no MACS violations in the A-2 system.
- Cutter angle is 90 degrees (+ or – .001°). Cut flat is .054" (+ or – .002").
- Cut depth increment is .0125".
- All key blanks are made of nickel silver.



To decode keys:

1) Use the Medeco X4 key gauge.



2) Or, use a micrometer or caliper. Measure each depth from the ledge of the key to the root of the cut. Use the chart above to translate the measurement in thousandth of an inch to the numerical value of the key cut.

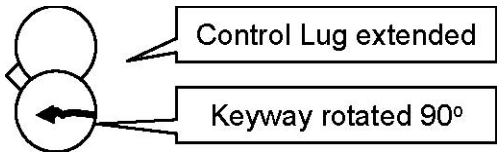
3) Always remember to read from tip to bow!

Bitting	Dimension from bottom of Blade
0	.3180
1	.3055
2	.2930
3	.2805
4	.2680
5	.2555
6	.2430
7	.2305
8	.2180
9	.2055

Complete the pinning sheet to determine the correct pins if you don't have a copy of cylinder pinning created from the master key system. The following information provides the basics of pinning a cylinder, but the calculation may be more easily determined with the pinning calculation sheets.

1.) If the core is already pinned, use the Medeco X4 pin ejector to eject all pins and springs. Insert the ejector tool through each ejector hole in the bottom of the core and force the pins and pin cap out through the top of the core out through the top of the core. Discard the used pins and springs.

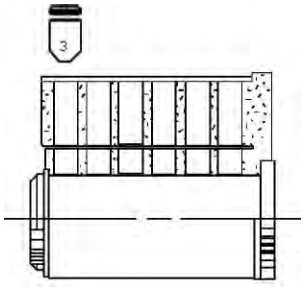
2.) Turn the plug 90 degrees counter-clockwise from center, making sure that the control lug is fully projected. Be sure that the shell and sleeve pin chambers are aligned.



Plug position for pinning

3.) Always load the core from back to front. Tumbler pins are always loaded through the top of the core and individually capped. Keys are always cut tip to bow and key bittings are listed from tip to bow.

4.) Load the bottom pin first. If the cylinder is master keyed, pin to the shallowest cut (smaller pin) first, then use master pins to build up to the deeper cut (longer pin).



For example: CK: 3 2 4 5 4 9 (Tip to bow)

TMK : 5 6 4 1 8 3

2	4	-	4	4	6	Master Pins
3	2	4	1	4	3	Bottom Pins

5) Load the Build-Up Pins next. These pins are the same type as the master wafers. The Build-Up pins bring the shear line up to the level of the control sleeve so that the Control Key may retract it.

The build-up pins are calculated by adding 10 to the control key depths and subtracting the total of the bottom pin and master wafer from this number. If our Control key has a #7 in the first cut position, our control # is 17. Since the bottom pin is 3 and a 2 master wafer, subtract 5 from 17 to determine the build-up pin of 12. The control number is different for each position, so the Build-up pin is also different. (example on next page)

Calculating Build-Up Pins example:

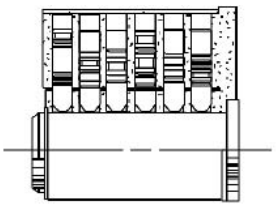
Control Key = 7 2 4 3 2 1
Control *Number* = 17 12 14 13 12 11

12	6	10	8	4	2	Build-up Pins
2	4	-	4	4	6	Master Pins
3	2	4	1	4	3	Bottom Pins

6) Add the Top Pins that bring the total stack height to 23. Top Pins are also the same type of pin as the Master Wafers and Build-Up Pins. An easy way to calculate the top pin is to subtract the Control Number from 23 for each position. (e.g. 23-17=6)

6	11	9	10	11	12	Top Pins
12	6	10	8	4	2	Build-up Pins
2	4	-	4	4	6	Master Pins
3	2	4	1	4	3	Bottom Pins

Tip: If the numbers were calculated correctly and the correct pins inserted, a visual check of the pins stacks will show the same height with all pins sitting just below the edge of the cylinder shell.

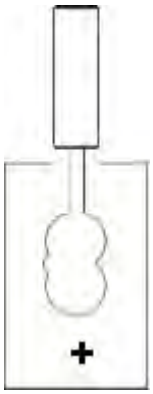


7) Rotate the plug back to the vertical position allowing the pins to fall into the plug. Insert springs in each pin chamber and test the keys while holding your finger over the top of the cylinder.

8) Remove the springs and insert the cylinder into the capping block with the face of the core on the + side of the capping block.

9) Reinsert the springs and add caps in each position, insert the capping tool and tap the caps into place using a small hammer.

10.) Lubricate the cylinder and test the operation of all keys.

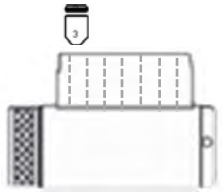


SINGLE SHEAR LINE REPLACEMENT CYLINDER (NON I-CORE)

Conventional cylinders with Medeco x4 technology with a plug diameter of .511 use longer bottom pins than the SFIC cylinders. This pin kit is K-4006. The stack height for rim, mortise, knob, Schlage and Yale LFIC, and deadbolt cylinders is 19 and the cylinders do not include a 'build-up pin' as used in the SFIC to achieve the control sleeve shear line. Rim and mortise cylinders are top loaded by removing the set screw at the top of each pin chamber. Knob and dead lock retrofit cylinders are top loaded with a spring cover installed or replaced after loading.

Cam lock cylinders are pinned using the same pin kit as SFIC (the same bottom, master and top pins), but have a stack height of 12, and are pinned like a conventional cylinder without a control sleeve or build-up pins. (Pin kits K-4001 or K-4002)

1) Always load the cylinder from back to front. Keys are always cut tip to bow and key bittings are listed from tip to bow.



2) Load the bottom pin first. If the cylinder is master keyed, pin to the shallowest cut (smaller pin) first, then use master pins to build up to the deeper cut. Although the bottom pins are slightly longer for the conventional cylinders (except the cam locks), the pins have the same number as the SFIC (e.g. 3 bottom, 2 master if one key is cut to a 3 and the other is cut to a 5)

3) Add the bottom pin and master wafer together and subtract from 19 (12 for cam locks) to determine the Top pin. (E.g. Conventional 2+3=5, 19-5=14, Top Pin = 14 or Cam Lock 12-5=7, Top Pin =7)

For example: CK: 3 2 4 5 4 9 (Tip to bow)
TMK : 5 6 4 1 8 3

Conventional Cylinder Pinning

14	13	15	14	11	10	Top Pins
2	4	-	4	4	6	Master Pins
3	2	4	1	4	3	Bottom Pins

Cam Lock Cylinder Pinning

7	6	8	7	4	3	Top Pins
2	4	-	4	4	6	Master Pins
3	2	4	1	4	3	Bottom Pins

4) Insert springs and test all of the keys. Insert set screws in rim or mortise cylinders or a spring cover in key-in-knob style cylinders. Stake a brass cap on top of the shell to hold springs and pins in place for cam locks and Yale and Schlage LFIC.

Medeco X4 A-2 Cylinder Pinning Sheet

Sample Pinning Sheet for Reference Only

To calculate the pinning for SFIC, you must already have the Control Key cuts, the TMK cuts, and the Change key that you need the pinning for. This sheet will walk you through the process step by step. It is possible to 'skip' some of the steps by writing the results in the section at the bottom instead of writing the results twice, once you become adept at the process.This process doesn't generate a MK system, but simply provides the pinning for an existing system.

Control Key = 724321

TMK = 564183

Change Key = 144705

A	7	2	4	3	2	1	Control Key Cuts
B	10	10	10	10	10	10	Add 10 to Get Control Number Below
C	17	12	14	13	12	11	Control Number (control key cuts + 10)
D	5	6	4	1	8	3	Top Master Key (TMK) Cuts
E	1	4	4	7	0	5	Change Key Cuts
F	1	4	4	1	0	3	Bottom Pins (smaller cut # from ck or mk)
G	4	2	-	6	8	2	Master Pins (difference between ck & mk cuts)
H	17	12	14	13	12	11	Control Number (taken from line C)
I	5	6	4	7	8	5	Bottom & Master Pins (add line F & line G)
J	12	6	10	6	4	6	Build Up Pins (subtract line I from line H)
K	23	23	23	23	23	23	Total Stack Height (pre-set)
L	17	12	14	13	12	11	Control Number (taken from line C)
M	6	11	9	10	11	12	Top Pins (Drivers) (subtract line L from K)
N	23	23	23	23	23	23	When all Pins Below are Added Together They Should = 23
	⇑	⇑	⇑	⇑	⇑	⇑	
O	6	11	9	10	11	12	Top Pins (Drivers) (from line M)
P	12	6	10	6	4	6	Build-Up Pin (from line J)
Q	4	2	-	6	8	2	Master Pin (from line G)
R	1	4	4	1	0	3	Bottom Pin (from line F)

Medeco X4 A-2 Cylinder Pinning Sheet

(6 Pin)

A							Control Key Cuts
B	10	10	10	10	10	10	Add 10 to Get Control Number Below
C							Control Number (control key cuts + 10)
D							Top Master Key (TMK) Cuts
E							Change Key Cuts
F							Bottom Pins (smaller cut # from ck or mk)
G							Master Pins (difference between ck & mk cuts)
H							Control Number (taken from line C)
I							Bottom & Master Pins (add line F & line G)
J							Build Up Pins (subtract line I from line H)
K	23	23	23	23	23	23	Total Stack Height (pre-set)
L							Control Number (taken from line C)
M							Top Pins (Drivers) (subtract line L from K)
N	23	23	23	23	23	23	When all Pins Below are Added Together They Should = 23
	⇑	⇑	⇑	⇑	⇑	⇑	
O							Top Pins (Drivers) (from line M)
P							Build-Up Pin (from line J)
Q							Master Pin (from line G)
R							Bottom Pin (from line F)

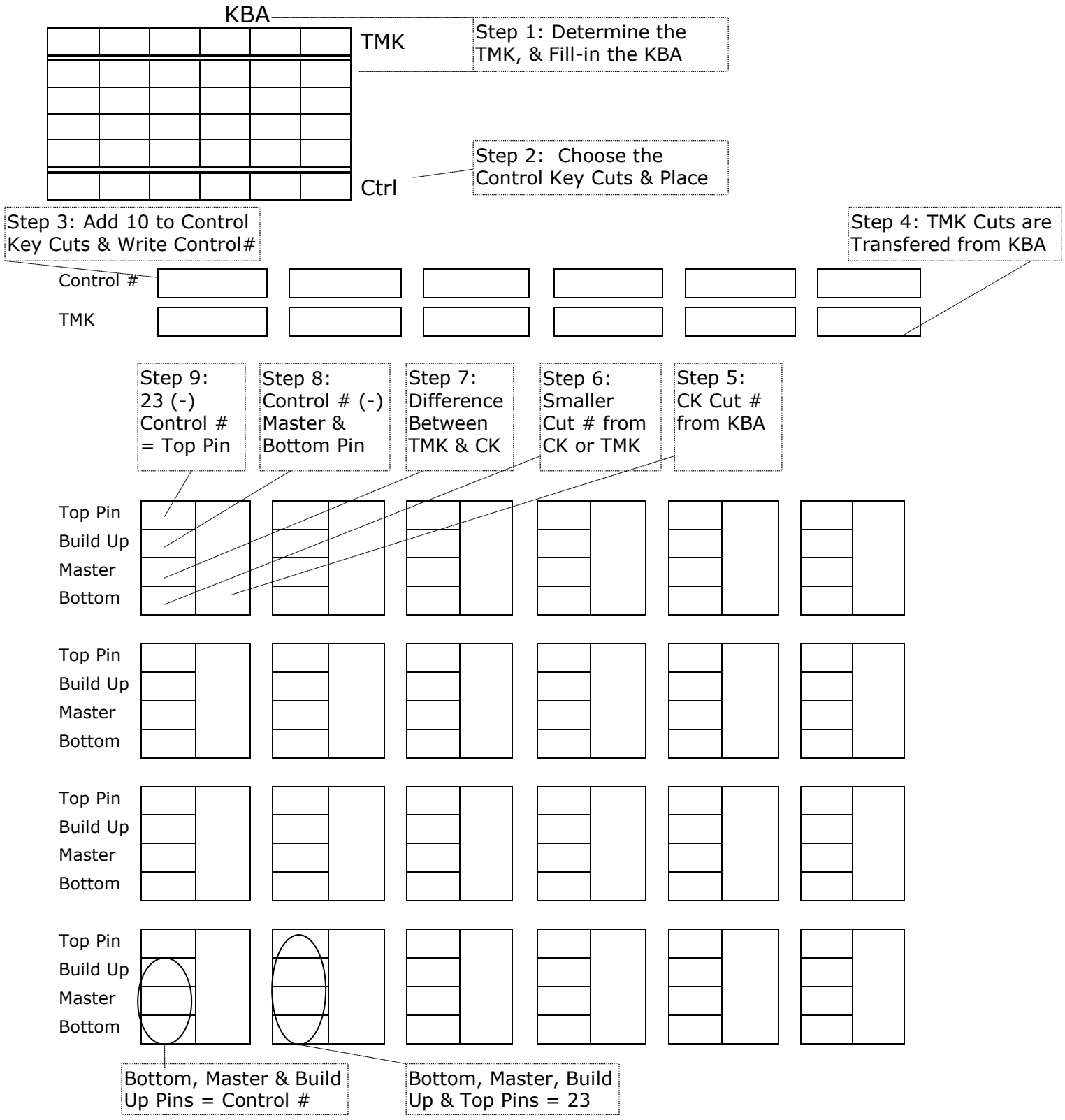
Medeco X4 A-2 Cylinder Pinning Sheet

(7 Pin)

A								Control Key Cuts
B	10	10	10	10	10	10	10	Add 10 to Get Control Number Below
C								Control Number (control key cuts + 10)
D								Top Master Key (TMK) Cuts
E								Change Key Cuts
F								Bottom Pins (smaller cut # from ck or mk)
G								Master Pins (difference between ck & mk cuts)
H								Control Number (taken from line C)
I								Bottom & Master Pins (add line F & line G)
J								Build Up Pins (subtract line I from line H)
K	23	23	23	23	23	23	23	Total Stack Height (pre-set)
L								Control Number (taken from line C)
M								Top Pins (Drivers) (subtract line L from K)
N	23	23	23	23	23	23	23	When all Pins Below are Added Together They Should = 23
	⇑	⇑	⇑	⇑	⇑	⇑	⇑	
O								Top Pins (Drivers) (from line M)
P								Build-Up Pin (from line J)
Q								Master Pin (from line G)
R								Bottom Pin (from line F)

Medeco X4 A-2 KBA Pinning Sheet

Training/KeyMark/ Keymark_pinning.doc



Sample Pinning Sheet for Reference Only

Medeco X4 A-2 KBA Pinning Sheet

Training/KeyMark/ Keymark_pinning.doc

3	7	5	8	5	2	TMK
5	9	7	0	7	4	
7	1	9	2	9	6	
9	3	1	4	1	8	
1	5	3	6	3	0	
7	5	1	6	9	7	Ctrl

Step 1: Determine the TMK, & Fill-in the KBA

Step 2: Choose the Control Key Cuts & Place

3: Add 10 to Control Key Cuts

4: TMK Cuts are transferred

Control #	17	15	11	16	19	17
TMK	3	7	5	8	5	2

8: Control# (-) Master & Bottom Total=Build up

7: Difference of TMK & CK = Master

6: Smaller # of CK or TMK

9: 23 (-) Control # = Top Pin

5: CK Cut #'s

Top Pin	6		8		12		7		4		6	
Build Up	12	5	6	9	4	7	8	0	12	7	13	4
Master	2		2		2		8		2		2	
Bottom	3		7		5		0		5		2	

Top Pin	6		8		12		7		4		6	
Build Up	10	7	8	1	2	9	8	2	10	9	11	6
Master	4		6		4		6		4		4	
Bottom	3		1		5		2		5		2	

Top Pin	6		8		12		7		4		6	
Build Up	8	9	8	3	6	1	8	4	14	1	9	8
Master	6		4		4		4		4		6	
Bottom	3		3		1		4		1		2	

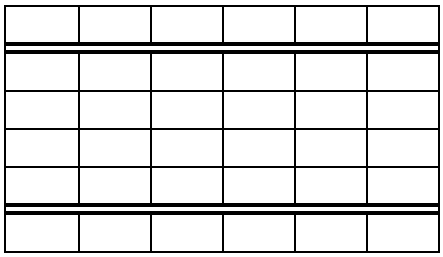
Top Pin	6		8		12		7		4		6	
Build Up	14	1	8	5	6	3	8	6	14	3	15	0
Master	2		2		2		2		2		2	
Bottom	1		5		3		6		3		0	

Bottom, Master & Build Up Pins = Control #

Bottom, Master, Build Up & Top Pins = 23

Medeco X4 A-2 KBA Pinning Sheet

Training/KeyMark/ Keymark_pinning.doc



TMK

Step 1: Determine the TMK, & Fill-in the KBA

Ctrl

Step 2: Choose the Control Key Cuts & Place

3: Add 10 to Control Key Cuts

4: TMK Cuts are transferred

Control #

TMK

9: 23 (-) Control # = Top Pin

5: CK Cut #'s

8: Control# (-) Master & Bottom Total=Build up

7: Difference of TMK & CK = Master

6: Smaller # of CK or TMK

Top Pin
Build Up
Master
Bottom

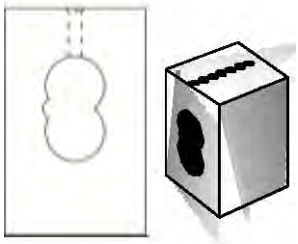
Top Pin
Build Up
Master
Bottom

Top Pin
Build Up
Master
Bottom

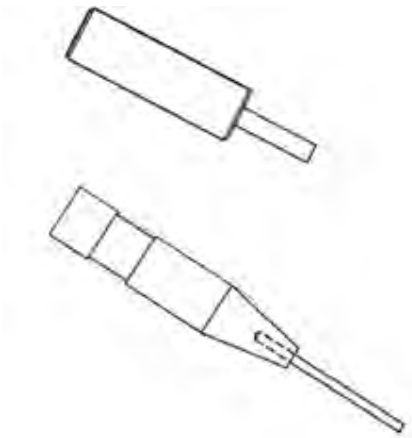
Top Pin
Build Up
Master
Bottom

Bottom, Master & Build Up Pins = Control #

Bottom, Master, Build Up & Top Pins = 23

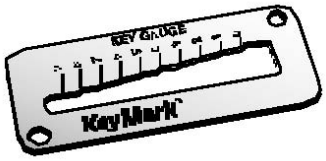


Medeco X4 Pinning Block (I-Cores) **CP-282500**
When used in conjunction with the Medeco X4 Capping Punch, it allows you to properly "seat" the cap.



Medeco X4 Hand Capping Punch (I-Cores) **CP-282540** While the Medeco X4 core is held securely in place by the Pinning Block, the Hand Capping Punch is used to seat the cap, sealing the pins within each barrel of the core.

Medeco X4 Pin Ejector (I-Cores) **CP-282530** Use this handy tool to eject pins and springs from Medeco X4 cores as preparation for recombinating. Insert the Pin Ejector into the ejector pin hole at the bottom of each barrel in the Medeco X4 core and push to eject the components of each barrel. Always discard used pins and springs.



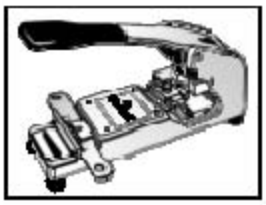
Medeco X4 Gauge **CP-286350** The Medeco X4 key gauge allows accurate and immediate identification of the proper cut depth of Medeco X4 keys. A key gauge comes with every Medeco X4 Key Punch and is sold separately.

Key-in-Knob Capping Tool **94-0207** KIK capping tool holds springs in place to allow spring cap to slide in the top of the bible chamber.

LUBRICATION
Only the following lubricants are approved by the factory:
1.) Medeco Key Lube
2.) Poxylube (Sandstrom Products)
3.) DRI LUBE (Synco Chemical)
Use of any other lubricants will void the Medeco X4 warranty. Never use oil or graphite to lubricate Medeco cylinders! Also, never mix different lubricants.

Key Machines Available From Medeco

95-000601 Medeco KM Electric Key Machine 115 V 4.4 amp (Air Assist)
95-000701 Medeco KM Electric Key Machine 115 V 4.4 amp (Hand)



95-000200 Medeco X4 Technology Key Punch

Key Machines Available From Other Manufacturers

Key machine are available from a number of other manufacturers (HPC, ITL, Framon, and A-1 Mfg., for example) that will cut Medeco X4 keys to the A-2 cut specifications. As long as the key machines jaws hold the key blank snugly, no modifications are necessary to cut the keys.

Are New Tailpieces, Cams, Staking Covers, Plug Retainers, Set Screws and Cam Screws Required For The Conventional Cylinders?

- No. If you are already servicing Medeco 10 and 20 series products, these pieces will work on Medeco X4 conventional rim, mortise and knob cylinders. You do not need to purchase new pieces. Double the effectiveness of your inventory by servicing both Medeco and Medeco X4 with these same pieces.
- The only part that is unique for Medeco X4 ((besides the plug & shell) are the top set screws for Rim & Mortise cylinders. Medeco X4 set screws have a smaller diameter for the smaller diameter tumbler pins than a high security cylinder.

Can Knob Cylinders Tie Into An Interchangeable Core System?

- Yes. The beauty of the Medeco X4 line is its ability to tie both interchangeable core and conventional cylinders together using one key. WARNING: Knob cylinders are only available as 6 pin models. Remember this when designing a system. Most mortise, rim and I/C cylinders are available 7-pin.

How Are Cut Keys Marked?

- Cut keys for non-masterkey systems will not be marked at Medeco.
- For masterkey systems, a registry number and key set (key code) number can be stamped onto cut keys at no charge.
- Any special stamping, such as door number or serialization, can also be included on any cut keys for a slight extra charge

Are Conventional Cylinders Pinned the Same as I-Cores?

- Longer bottom pins are used for Medeco X4 conventional cylinders than in interchangeable cores. The master wafers and top pins are the same in both types of cylinders. The stack height for rim, mortise, knob and deadbolt cylinders is 19. Rim and mortise cylinders are top loaded by removing the set screw at the top of each pin chamber. Knob and deadbolt cylinders are top loaded with a spring cover installed or replaced after loading. Cam lock cylinders have a stack height of 12, but use the same bottom pins, master wafers and top pins as the SFIC.

Medeco® Warranty for Mechanical & Electromechanical Products

Medeco Security Locks Inc. ("Medeco") warrants to the original purchaser of a Medeco branded lock, lock cylinder, or electromechanical door hardware product (referred to collectively as "Product") to be free of defects in material and/or workmanship for a period of two (2) years from the date of original purchase for use. This Warranty may also apply to other specific products. For additional Warranty information or Warranty claim service contact Medeco Customer Service at (800) 839-3157 or in Canada (888) 633-3264.

In the event of a defect in material or workmanship during the Warranty period, Medeco will repair or replace (at its option) the Product under the conditions of this Warranty, this action being the sole remedy available to the purchaser under this express limited Warranty.

Limitations, Exclusions and other Rights:

a. Medeco disclaims liability for implied warranties including but not limited to those of merchantability or fitness for any particular purpose.

b. Medeco disclaims liability for indirect, incidental or consequential damage at any time.

c. Medeco warrants that Maxum deadbolt products are free from defects in materials and workmanship for the life of the product. This warranty does not cover defects or damage arising from improper installation, lack of or improper maintenance, ordinary wear and tear, misuse, abuse, or accident.

d. This Warranty gives specific legal rights and a buyer may also have other rights that may vary from state to state. Some states do not allow limitations on indirect, incidental, and consequential damages or implied warranties so that the above limitations may not fully apply.

e. Medeco keyblanks are made from a special nickel silver alloy. Medeco warrants its keys against defects in workmanship or breakage for the life of the Product. Bitted Medeco keys must be precisely cut to exact angles and depths, and require special duplication. This Warranty shall be void and Medeco disclaims liability of any kind in the event any key other than a genuine Medeco key has been used with the Product or that the key has been cut on any machine other than a Medeco or Medeco-approved key cutting machine.

f. Medeco shall not be held responsible for damage arising from, in its sole judgment, improper installation, failure to provide normal maintenance, extreme environmental conditions, use rates in excess of the industry standards defined for the type of product, use of incompatible parts or products not made or authorized by Medeco, or application of force not resulting from normal use.

g. Unless otherwise specified by separate warranty, finishes are warranted for a period of two years following purchase for use. This finish Warranty shall be considered void after installation if, in the sole judgment of Medeco, the damage to the finish is the direct result of extreme climatic conditions, chemical or abrasive actions.

Medeco X4 Architectural Product Specifications

Cylinders shall be of the knob, rim, mortise, or interchangeable core type. All cylinder components (excluding tumbler pins) shall be constructed of machined extruded brass. All cylinders, cores and housings shall be available in all standard architectural finishes and shall match the cylinder housing and lock and door hardware. Further, cylinders and housings shall be plated, not scalped with the appropriate finish.

Cylinders to be of the 6 or 7 pin tumbler type, providing the maximum unique, non-interchangeable key combinations respectively.

All cylinders shall incorporate two locking elements consisting of pin tumbler elevation and a slider mechanism. Further expansion of a master key system shall be available by use of additional multiplex keyways. Cylinders shall not lose any combinations due to
MACs (maximum adjacent cut) loss.

All cylinders shall use a .150'' space dimension between tumbler pin chambers and shall be capable of using industry standard tumbler pins. Cylinder shall contain standard pins, a portion of which (both bottom and top pins) shall be spooled to resist pick attacks.

All non-I/C rim and mortise cylinders shall be so constructed to use threaded set screws, not staked covers or caps, to cover each individual tumbler pin chamber.

All cut keys, key blanks and cylinders (knob, rim, mortise, and interchangeable core-type) shall be so constructed to be capable of being keyed in the same system, allowing the convenience of one master key to operate all types of listed cylinders. Further, the key or key blank's tip shall be so constructed to correctly locate the bits of the key beneath the proper chamber of an interchangeable core cylinder by locating against a key stop on the rear core. Additionally, the key or key blank's shoulder shall serve as a stop to correctly locate the bits of the key beneath the proper plug chamber of rim, mortise and knob-type cylinders by locating against the front face of the cylinder. The key blank thickness should be no less than .093" (ninety three thousandths).

All cut keys and key blanks shall be utility patented and controlled by a contract between the end user and the manufacturer.

Key blanks for this project shall be delivered directly from the factory to the end user unless otherwise requested in writing by the end user.

All keys must be capable of being configured to allow an upgrade to a dual mechanical/electronic credential by the simple exchange of a field removable key bow.

The key shall incorporate the capacity to include eight possible side bittings along the key blade located on two different planes or surfaces of the key.

All key blanks shall be custom coined with the end user's name or other unique identification mark. All cut keys and key blanks are to be constructed from nickel silver.

All keys shall be capable of being cut by a punch machine that originates the exact cut in the key from the code sheet, instead of using patterns.

Cylinders shall be immediately rekeyable to new combinations or a new system at any time desired and shall be serviceable on location in the field. Installation of the cylinders shall require no modifications to U.S. manufactured commercial grade locksets.

The locking system established for this project shall be proprietary and the owner will furnish the manufacturer a list of those persons and their signatures that will be authorized and required to order additional pinned materials or duplicate keys. Orders not bearing authorized signatures will not be filled.

All cylinders, cores, housings, keys and key blanks shall be made in the USA.

Notes

Notes

Notes

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Customer Service: 1-888-633-3264

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