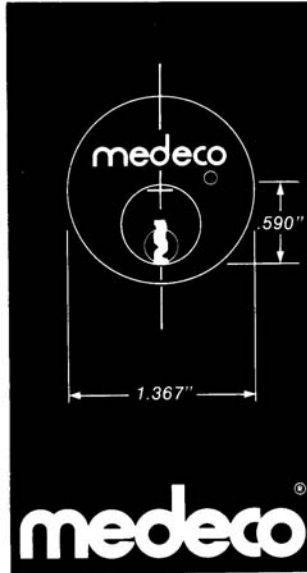


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# **technical service manual**

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# **technical service manual**

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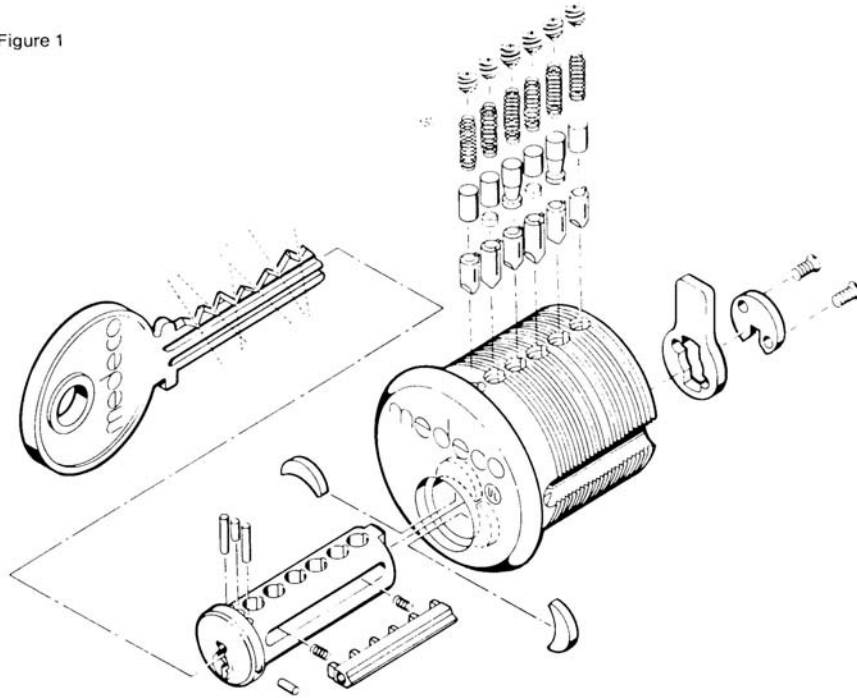
## **section one: service data**

## OPERATING PRINCIPLE

Before we study in detail the specifications of Medeco locks, it's first necessary to have a basic understanding of the principle by which these locks operate. Medeco's 10- through 50-series locks incorporate the basic principles of a standard pin tumbler lock mechanism--a plug, rotating within a shell, that turns a tail cam when pins of various length are aligned at a shear line by a key. The rotation of the plug in a Medeco lock is blocked by the secondary locking action of a sidebar protruding into the shell. Pins in a Medeco lock have a slot along one side, and the pins must be rotated so that this slot aligns with the legs of the sidebar. The tips of the bottom pins in a Medeco lock are chisel pointed, and they are rotated by the action of the tumbler spring seating them on the corresponding angle cuts on a Medeco key. (See figure 1) The pins must be elevated to the shear line and rotated to the correct angle simultaneously before the plug will turn within the shell. This dual-locking principle and the cylinder's exacting tolerances account for Medeco's extreme pick resistance.

Medeco cylinders are also protected against other forms of physical attack by hardened, drill resistant inserts. There are two hardened crescent shaped plates within the shell protecting the shear line and the sidebar. There are also hardened rods within the face of the plug and a ball bearing in the front of the sidebar. The combination of Medeco's dual locking principle, exacting tolerances, and drill resistant inserts make a Medeco cylinder highly resistant to all forms of attack.

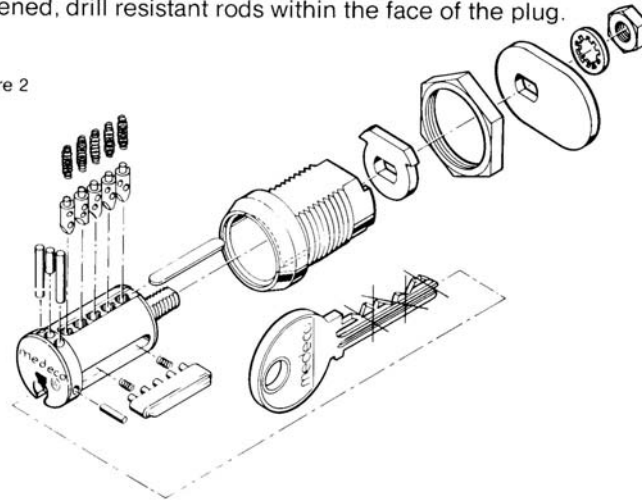
Figure 1



To fit within the smaller dimensions necessary in a cam lock, Medeco developed the principle of a driverless rotating pin tumbler. It is used in the 60- through 65-series locks. The tumbler pin and springs are completely contained within the plug diameter. (See figure 2) The rotation of the plug is blocked by the locking action of a sidebar protruding into the shell. The pins are chisel pointed and have a small hole drilled into the side of them. The pins must be rotated and elevated by corresponding angled cuts on the key so that each hole aligns with a leg of the sidebar and allows the plug to rotate.

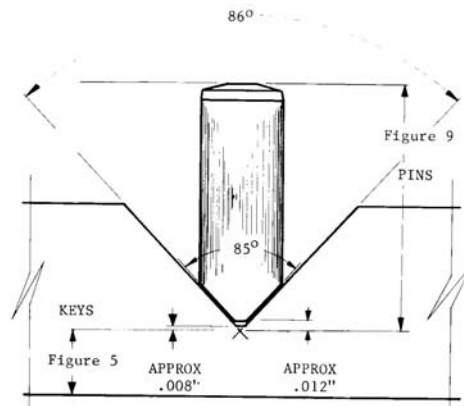
In addition, the cylinder is protected against other forms of physical attack by four hardened, drill resistant rods within the face of the plug.

Figure 2



In spite of the exacting tolerances and additional parts, Medeco's cylinders are less susceptible to wear problems than conventional cylinders. As in all standard pin tumbler locks, the tips of the pins and the ridges formed by the adjacent cuts on the key wear from repeated key insertion and removal. In a Medeco lock, this wear has little affect on its operation. In contrast to a standard lock cylinder, the tips of the pins in a Medeco lock never contact the flat bottoms of the key cuts. Rather, they rest on the sides of the key cut profile, thus the wear on the tips of the pins does not affect the cylinder's operation. (See figure 3) Cycle tests in excess of one million operations have proven Medeco's superior wear resistance.

Figure 3



## MEDECO PRODUCT SERIES DESIGNATIONS

10-Series	Replacement High Security Mortise and Rim cylinders includes the Ultra 700, a unit type deadbolt with mortise cylinders.
11-Series	Medeco High Security Auxiliary Tubular Deadbolt Locks.
20-Series	Replacement High Security Cylinders for Cylindrical and Auxiliary Tubular Locksets and Padlocks.
23-Series	Replacement High Security Mortise, Rim and Profile Cylinders for Export Market.
31-Series	Replacement High Security Removable Core Cylinders.
32-Series	Medeco High Security Removable Core Cylinders.
50-Series	Medeco High Security Padlocks.
60-Series	Medeco High Security Cam Locks.
61-Series	Medeco High Security Locks for Rotary Switches.
63-Series	Medeco High Security Screw Thread and Extension Locks.
64-Series	Medeco High Security Specialty Locks for Vending Machines.
65-Series	Medeco High Security Electric Switch Locks.
95-Series	Medeco Key Machines.
CP-Series	Component Parts.
CT-Series	Cams, Tailpieces, Threaded Extensions.
KY-Series	Keys.
TP-Series	Tumbler Pins, Master Wafers, and Drivers.

Individual products are listed in the catalog and numerically in section 2.

For example, 10-0100-XX is a 5 pin 1" mortise cylinder XX designates keyway.

For locks furnished coded but less keys add 50 to the product number, ie. 10-0150-XX.

For locks furnished sub-assembled (less keys, pins, springs and spring caps) suffix S to the product number, ie. 10-0150-XXS.

For 60-65 Series locks with the old style short head, delete the T from the product number, ie. 60-2150-XX.

## THICKHEAD CAM & SWITCH LOCKS

Originally, the 10- through 50-series locks and the 60- through 65- series locks were developed as two distinct product lines with different end users: the 10- through 50- series represents the door hardware and padlocks, and the 60- through 65-series represents the ¼ inch diameter vending machine and cam locks. The locks were designed with different head thicknesses to segregate the keying.

With the increase in electronic security and access control systems, there has developed a need to incorporate locks of both types within the same keying schedule. For this reason, Medeco also manufactures the 60-series cam and switch lock in a thickhead configuration. The head of the plug is .028" thicker than the standard cam and switch lock, making the head thickness the same as the other Medeco rim-, mortise-, and knob-type lock cylinders. Medeco key blank #KY-115400-60 (old #60-610-6000) (5-pin) can be used to crosskey between the two lock series. (See figure 4)

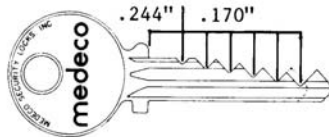
## SPECIFICATIONS OF THE KEYS

There are four dimensional specifications for each cut on a Medeco key. They are (1) the cut profile, (2) the cut spacing, (3) the cut depth, and (4) the cut angular rotation. The profile of the cut on all Medeco keys must maintain an 86° angle. This dimension is critical since the pins in a Medeco lock are chisel pointed and seat upon the sides of the cut profile rather than at the bottom of the cut. (See figure 3) Prior to June, 1975, Medeco keys were manufactured with a perfect "V" shaped profile. After this date, the keys were manufactured with a .015" wide flat at the bottom.

Spacing of the cut on a Medeco key must be to manufacturer's specifications. For the 10-series stock keys, Medeco part KY-105600-0000 (old #10-010-0000) and KY-106600-0000 (old #10-011-0000), the distance from the upper and lower shoulder to the center of the first cut is .244". Subsequent cuts are centered an additional .170". (See figure 4) For the 60-series stock keys, Medeco part KY-105400-6000 (old #60-010-6000) (5 pin) and KY-104400-6000 (old #60-011-6000) (4 pin), the distance from the upper shoulder to the center of the first cut is .216". Subsequent cuts are centered an additional .170". The distance from the bottom shoulder to the center of the first cut is .244" on this and all Medeco keys. For the 60-series thickhead keys, Medeco part KY-115400-6000 (old #60-610-6000) (5 pin) and KY-114400-6000 (old #60-611-6000) (4 pin), the distance from the shoulder to the center of the first cut is .244". Subsequent cuts are centered an additional .170".

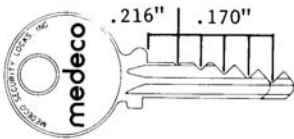
Standard Medeco keys in the 10- through 50-series are cut to six levels with a full .030" increment in depths. Keys used in extensive masterkeyed systems and on restricted and Omega keyways are cut to eleven levels with half step .015" increment in depths. The depths as shown in figure 5 represent the amount of metal left in the key from the theoretical point of the cut profile to the bottom of the key blank.

Figure 4



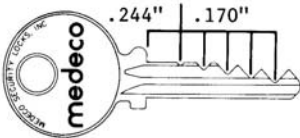
**Standard**

5 Pin KY-105600-0000 (Old #10-010-0000)  
6 Pin KY-106600-0000 (Old #10-011-0000)



**Old Style**

4 Pin KY-104400-6000 (Old #60-011-6000)  
5 Pin KY-105400-6000 (Old #60-010-6000)



**Thick Head**

4 Pin KY-114400-6000 (Old #60-611-6000)  
5 Pin KY-115400-6000 (Old #60-610-6000)

When measuring the depth of the cut with a standard key micrometer, the dimension will read approximately .008" more than those listed in the chart. The reason for this is that the depths listed by Medeco are to the lower theoretical point of the cut and not to the flat. i/-

Because of the size limitations, Medeco keys in the 60- through 65-series are cut to four levels with a .030" increment in depth. Keys used in extensive masterkeyed systems and Omega keyways are cut to seven levels with a .015" increment in depth. The relationship between the depths of the 10- through 50-series keys and the 60- through 65-series keys is shown in figure 5. The 60- through 65-series keys use only the corresponding deeper cuts because of their smaller size.

In addition to the dimensions above, each cut in a Medeco key may be cut with any one of three angular rotations.

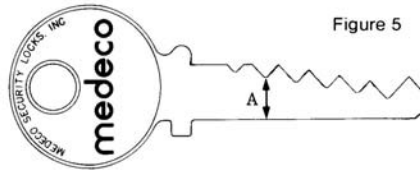


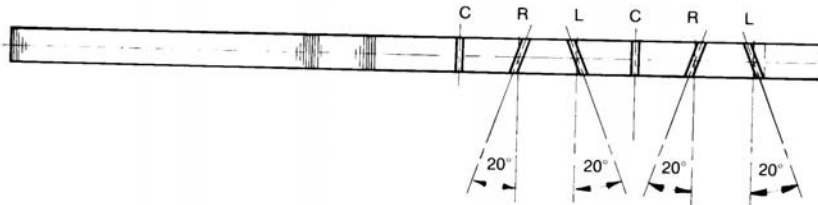
Figure 5

### KEY DEPTHS

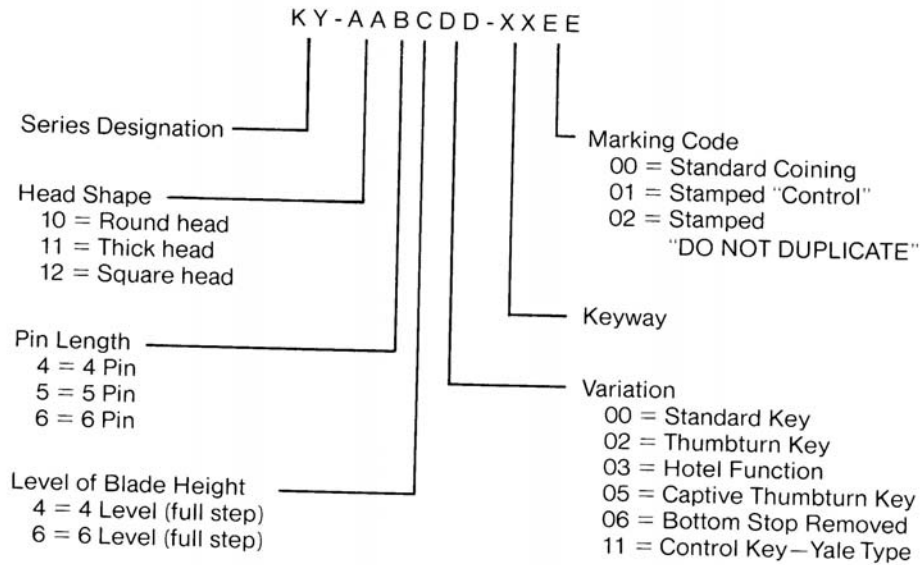
Theoretical Dimension A	Architectural Hardware Locks		Cam & Switch Locks	
	Full Step .030" Increment	Half Step .015" Increment	Full Step .030" Increment	Half Step .015" Increment
.258	1	0		
.243		1		
.228	2	2		
.213		3		
.198	3	4	1	4
.183		5		5
.168	4	6	2	6
.153		7		7
.138	5	8	3	8
.123		9		9
.108	6	X	4	X

These rotations are designated as right (R), left (L), or center (C). When looking into the cuts of a Medeco key as illustrated in figure 6, concentrating on the flats of the cut, one will notice that flats which are positioned perpendicular to the blade of the key are designated as a center angle. Flats which point upward to the right are designated as right angles, and flats pointing upward to the left are designated as left angles. Right and left angles are cut on an axis 20° from perpendicular to the blade of the key.

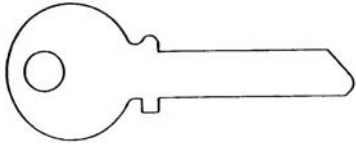
Figure 6



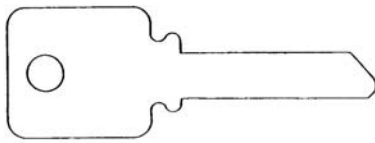
### Part Numbering System for Key Blanks



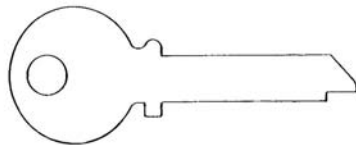




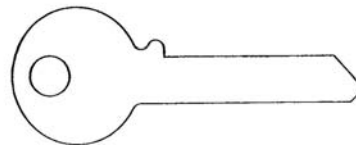
Standard Round Head  
KY-106600-0000  
Old #10-011-00



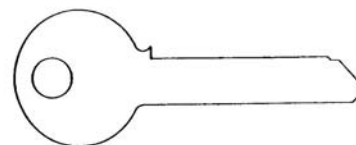
Control Key Square Head  
KY-126600-0001  
Old #32-011-00



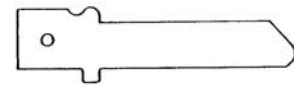
Hotel Function  
KY-106603-0000  
Old #41-311-00



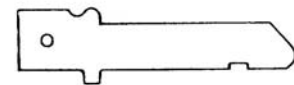
Bottom Stop Removed  
KY-106606-0000  
Old #10-046-00



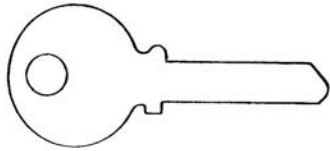
Control Key—Yale Type  
KY-106611-0000  
Old #10-011A-00



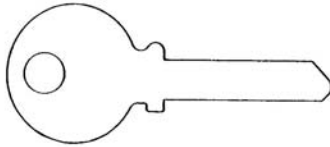
Thumbturn Key  
KY-106602-00  
Old #10-011D-00



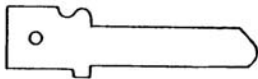
Captive Thumbturn Key  
KY-106605-00  
Old #10-011DR-00



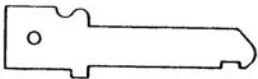
Old Style Cam Lock  
KY-105400-6000  
Old #60-010-60



Thick Head Cam Lock  
KY-115400-6000  
Old #60-610-60



Thumbturn Key  
KY-115402-6000  
Old #60-610D-60



Captive Thumbturn Key  
KY-115405-6000  
Old #60-610DR-60

**Keyways & Key Blanks.** The entire line of Medeco locks is available in numerous keyways. The use and distribution of key blanks of various keyways is part of Medeco's systematic approach to key control. Medeco Security Locks, Incorporated, is the sole source of key blanks for Medeco locks and has taken positive action in U.S. Courts to protect against their unauthorized manufacture and distribution. Medeco offers four levels of key control. Each level has unique features which provide for increasingly stringent control on key duplication.

**Level I, Commercial Keyway.** The AIR Keyway is Medeco's stock keyway. Locks and key blanks are sold by Medeco distributors to locksmiths so that they can provide their customers with cylinders, establish and service master key systems, and cut additional Medeco keys on this keyway. AIR keys in cut form are supplied from the factory with a small metal tag bearing a code number which may be used by the locksmith in conjunction with the Medeco Code Book to determine the combination of the key and lock. This code designation will usually consist of a seven-digit number with a letter prefix. The number is used for reference in the Medeco Code Book. The letter prefix indicates the key blank upon which the combination is to be cut. There are six key blanks available in the AIR Keyway. They are explained below.

Figure 7

**Level I Air Keyway**

<b>Code Prefix</b>	<b>Standard Keyblank Number</b>	<b>Description</b>
A	KY-106600-0000	6 pin key cut to 6 levels
B	KY-105600-0000	5 pin key cut to 6 levels
CA	KY-126600-0001	6 pin key cut to 6 levels Control key for 32 series interchangeable core
CB	KY-125600-0001	5 pin key cut to 6 levels Control key for 32 series interchangeable core
F	KY-105400-6000	5 pin key cut to 4 levels
G	KY-104400-6000	4 pin key cut to 4 levels
SF	KY-115400-6000	5 pin thickhead key cut to 4 levels
SG	KY-114400-6000	4 pin thickhead key cut to 4 levels

**Level II, Card Controlled Keyway.** The SKY Keyway offers a higher level of key control to the end user. Locks and keys in the SKY Keyway are supplied from the factory with a control card embossed with control data and including a signature panel to be signed by the original purchaser. To sell additional keys, a participating locksmith will imprint the control data on a special order form supplied by Medeco, indicate the number of keys required, have the customer sign the order form and compare signatures with that on the control card. The order form must then be sent to an area distributor who will make the additional keys for the locksmith. The Level II distributors are bound by contract to forward a copy of the authorization form to a central key records control department and must account for every key with an order form signed by a customer. Key blanks are retained as the property of Medeco Security Locks, Incorporated, until they are cut for the end user.

The entire line of Medeco locks is available in the SKY Keyway with the following exception. The 60-series locks are available only in the thickhead configuration to simplify stocking requirements.

The blind code number used for non-masterkeyed SKY cut keys may be used by a locksmith in conjunction with a Medeco Code Book to determine the combination of the key and lock. This code designation usually consists of a seven-digit number with a letter prefix. The number is used for reference in the Medeco Code Book. The letter prefix indicates the cut key stock number. There are four cut keys available in the SKY Keyway. They are explained below.

Figure 8

**Level II Sky Keyway**

<b>Code Prefix</b>	<b>Key Stock Number</b>	<b>Description</b>
R or CR	KY-156600-0401	6 pin key cut to 6 levels
S or CS	KY-155600-0401	5 pin key cut to 6 levels
T	KY-155400-6701	5 pin thickhead key cut to 4 levels
U	KY-154400-6701	4 pin thickhead key cut to 4 levels

Any variation from the type of blind code designation as shown in figure 7, Level I and figure 8, Level II, will indicate that the key is cut on a restricted key section or is part of a master system.

**Level III, Restricted Keyways.** Level III Restricted Keyways are controlled by Medeco. Key blanks are not available to Medeco distributors or dealers. Keys are duplicated at the Medeco factory. At the time of an original order, an authorization signature must be supplied to the factory. This signature is kept on file for comparison with the signature on subsequent orders. No order is processed without this authorized signature. Requests for duplicate keys or additional cylinders on the restricted keyways must be accompanied by the authorized signature.

**Level IV, Omega Keyway.** There are no key blanks available in the Omega series and there are no provisions for making duplicate keys. Cut keys may be ordered in any quantity, however are usually ordered in groups of 4, 7, or 10. Each set of keys is contained on a sealed ring and each key is individually identified to account for its part of a complete set. For example, 1 of 4, 2 of 4, 3 of 4, and 4 of 4, etc. The entire line of Medeco locks is available in the Omega Keyway with the following exceptions. Omega cylinders cannot be ordered masterkeyed and the 60- through 65-series locks are available only in the thickhead configuration.

In order to change combinations on a cylinder in the Omega Keyway, a locksmith can order sealed key sets cut to new codes. Stock numbers are shown below.

<b>Level IV Omega Keyway</b>		
<b>Code Numbers</b>	<b>Cut Key Stock Number</b>	<b>Description</b>
NONE	KY-156650-0700	6 pin key cut to 11 levels (half step)
NONE	KY-155650-0700	5 pin key cut to 11 levels (half step)
NONE	KY-155450-6800	5 pin thickhead key cut to 7 levels (half step)
NONE	KY-154450-6800	4 pin thickhead key cut to 7 levels (half step)

**Physical Limitations.** To avoid key breakage problems, a locksmith originating cut AIR Medeco keys should not use a cut deeper than .138" in the first pin position, i.e., no deeper than a number 5 in the full step .030" increment key, and a number 8 in the half step .015" increment key.

It is not physically possible to cut a Medeco key with adjacent cut depths differing by greater than .120". The cut profile angle of 86° would eliminate the side of the adjacent cut and the pin would not seat correctly, i.e., a full step .030" increment key cannot use adjacent cuts, 1-6 or 6-1, and a half step .015" increment key cannot use adjacent cuts, 0-9, 0-X, X-0, 9-0.

### **SPECIFICATIONS OF THE 10-SERIES PINS**

Medeco bottom pins differ significantly from standard cylinder pins in four respects. The differences are: (1) the diameter, (2) the chisel point, (3) the locator tab, and (4) the sidebar slot.

Medeco pins have a diameter of .135", that is .020" larger than the .115" diameter pin in a standard pin tumbler cylinder.

All Medeco bottom pins are chisel pointed with an 85° angle. The tip is also blunted and beveled to allow for smooth key insertion. Because the sides of the chisel point rest on the sides of the cut profile on the key and the tips of the pin never contact the flat bottom of the key cut, the dimensions listed in figure 9 represent the length from the top of the pin to the theoretical chisel point. The length of a pin measured with a standard micrometer will be approximately .012" less than the dimensions listed.

The locator tab is a minute swaged projection at the top end of the tumbler pin. The locator tab is confined in a broaching in the shell and the plug and prevents the bottom pin from rotating a full 180°. A 180° rotation would cause a lockout since the sidebar leg would not be able to enter the sidebar slot in the pin.

The sidebar slot is a longitudinal groove milled in the side of the bottom pins to receive the sidebar leg.

### Part Numbers for Tumbler Pins, Wafers, and Drivers

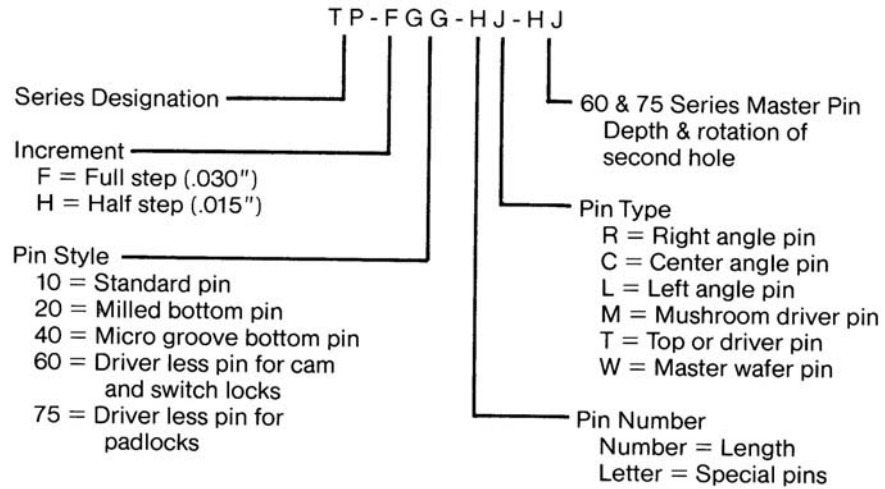
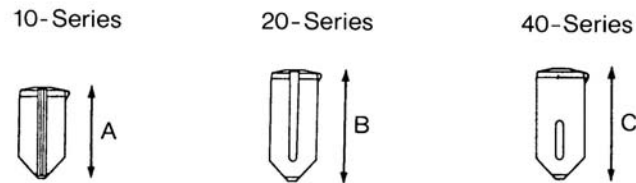


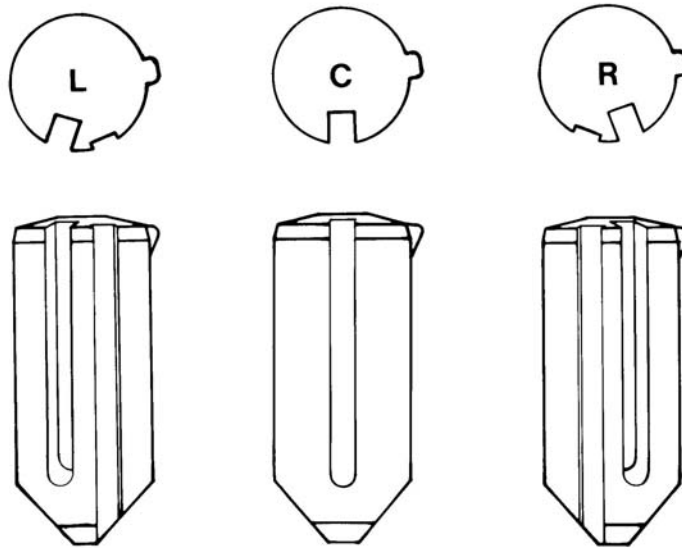
Figure 9



	Reference Length	Pin Number	
		Full Step .030" Increment	Half Step .015" Increment
A	.245	1	0
A	.260	—	1
A	.275	2	2
A	.290	—	3
ABC	.305	3	4
ABC	.320	—	5
ABC	.335	4	6
ABC	.350	—	7
ABC	.365	5	8
ABC	.380	—	9
ABC	.395	6	X

The sidebar slot is milled at one of three locations in relationship to the axis of the chisel point. The pins are designated left (L), center (C), and right (R). The center pin has the sidebar slot cut along the chisel point axis. A left pin is cut 20° to the left and a right pin is cut 20° to the right of this axis. (See figure 10) For added pick resistance, left and right pins have an additional false notch--a shallow groove cut the length of the pin beside the sidebar slot.

Figure 10



Prior to June, 1974, all 10-series bottom pins were manufactured with the sidebar slot milled the complete length of the pin. During June, 1974, the slot on the 3- through 6-depth pin was closed off at the chisel point. (To allow enough clearance to accept the sidebar legs, a pin shorter than #3 must have the sidebar slot extending the full length of the pin.) (See figure 9) In May, 1978, an additional pin was introduced. It has the sidebar slot on the 3- through 6-depth pins closed on both the bottom and top ends. It is used occasionally in the pin chambers that do not involve masterkeying as a variation to offer additional security.

Standard Medeco 10- through 50-series cylinders in the AIR and SKY keyways are furnished with full step bottom pins of six levels with a .030" increment in length. Cylinders used in extensive masterkey systems and Omega keyways are furnished with half step bottom pins of eleven levels with a .015" increment in length. The stock numbers and lengths of the various bottom pins are shown in figure 9. The material used in all Medeco bottom pins is CDA340 hard brass rod and is electroless nickel plated.

Medeco 10-series driver pins are available in eight lengths, as shown in figure 11. They are also available as mushroom drivers in four lengths. (See figure 12) The 10- through 50-series master wafer pins are identical to the standard driver pins except that they are shorter in length. They are available in nine different lengths as shown in figure 13.

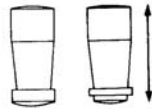
Figure 11



**10-SERIES TOP OR DRIVER PINS**

Pin Length	Pin Number	
	Full Step .030" Increment	Half Step .015" Increment
.330	B	
.300	C	
.270 *	1	0
.240 *	2	1 & 2
.210	3	3 & 4
.180	4	5 & 6
.150	5	7 & 8
.120	6	9 & X

Figure 12



**10- 50-SERIES MUSHROOM DRIVER PINS**

Pin Length	Pin Number	
	Full Step .030" Increment	Half Step .015" Increment
.270	1	0
.240	2	1 & 2
.210	3	3 & 4
.180	4	5 & 6

\* Drill resistant

NOTE: Pins designated B and C are only used in locks manufactured prior to May 1977.





### 10- 50-SERIES SPRING

CP-030001

Figure 13



### 10- 50-SERIES MASTER WAFER PINS

Pin Length	Pin Number	
	Full Step .030" Increment	Half Step .015" Increment
.030	1	2
.045	—	3
.060	2	4
.075	—	5
.090	3	6
.105	—	7
.120	4	8
.135	—	9
.150	5	X

### SPECIFICATIONS OF THE 60-SERIES PINS

Like the 10-series pins, the 60-series pins have a diameter of .135". They are also chisel pointed with an 85° angle and the tip is blunted and beveled to allow for smoother key insertion. To limit the rotation of the pin, they have a locator tab at the top end.

Instead of a sidebar slot, these pins have a small hole drilled into the side of the pin to receive the leg of the sidebar. Figure 14 illustrates the location of this hole. The holes are drilled along three longitudinal lines in relation to the axis of the chisel point. A center pin is drilled along this axis. A left pin is drilled along a line 20° to the left and a right pin is drilled along a line 20° to the right of this axis.

In the standard 60- through 65-series locks (AIR and SKY Keyways), the pins are drilled at four levels with a full step .030" increment in distance from the chisel point reference, 60- through 65-series locks used in extensive masterkey systems and restricted or Omega keyways are furnished with half step pins of seven levels with a .015" increment.

Pins manufactured after July 1980 may have a shallow groove cut around them, instead of a false hole.

Figure 14



**60-SERIES PINS**

**60-SERIES SPRING**

CP-030017



Reference Length	Pin Number	
	Full Step .030" Increment	Half Step .015" Increment
.090	1	4
.105		5
.120	2	6
.135		7
.150	3	8
.165		9
.180	4	X

To masterkey a 60- through 65-Series lock, it is necessary to use special pins with two fence holes drilled in them. These pins are illustrated in Figure 14A.

Figure 14A

**60-SERIES MASTER PINS**

Full Step Hole Locations .030" Increment	Half Step Hole Locations .015" Increment	Full Step Hole Locations .030" Increment	Half Step Hole Locations .015" Increment
	4L & 7R		5L & 8R
1L & 3C	4L & 8C		5L & 9C
1L & 3R	4L & 8R		5L & 9R
	4L & 9L		5L & XL
	4L & 9C		5L & XC
	4L & 9R		5L & XR
1L & 4L	4L & XL		5C & 9L
1L & 4C	4L & XC		5C & 9R
1L & 4R	4L & XR		5C & XL
1C & 3L	4C & 8L		5C & XC
1C & 3R	4C & 8R		5C & XR
	4C & 9L		5R & 8L
	4C & 9C		5R & 9L
	4C & 9R		5R & 9C
1C & 4L	4C & XL		5R & XL
1C & 4C	4C & XC		5R & XC
1C & 4R	4C & XR		5R & XR
	4R & 7L		6L & 9R
1R & 3L	4R & 8L	2L & 4C	6L & XC
1R & 3C	4R & 8C	2L & 4R	6L & XR
	4R & 9L	2C & 4L	6C & XL
	4R & 9C	2C & 4R	6C & XR
	4R & 9R		6R & 9L
1R & 4L	4R & XL	2R & 4L	6R & XL
1R & 4C	4R & XC	2R & 4C	6R & XC
1R & 4R	4R & XR		7L & XR
			7R & XL

## SPECIFICATIONS OF THE 75-SERIES PINS

Like the 10-series pins, the 75-series pins have a diameter of .135". They are also chisel pointed with an 85° angle and the tip is blunted and beveled to allow for smoother key insertion. To limit the rotation of the pin, they have a locator tab at the top end.

Instead of a sidebar slot, these pins have a small hole drilled into the side of the pin to receive the leg of the sidebar. Figure 15 illustrates the location of this hole. The holes are drilled along three longitudinal lines in relation to the axis of the chisel point. A center pin is drilled along this axis. A left pin is drilled along a line 20° to the left and a right pin is drilled along a line 20° to the right of this axis.

While similar in design to the 60-series pins, these pins are taller in overall height to accommodate drilling holes at six levels with a full step .030" increments in distance from the chisel point reference. They are also available with holes drilled at eleven half step .015" increments of elevation.

For additional security, the 75-series pins have a spring retainer post on the top that limits the elevation of the pin. For pick resistance, the pins have a shallow false hole drilled in the side at a location normally used to drill a true fence hole. Pins manufactured after July 1980 may have a shallow groove cut around them, instead of a false hole.

Figure 15



**75-SERIES PINS**

Reference Length	Pin Number	
	Full Step .030" Increment	Half Step .015" Increment
.080	1	0
.095	—	1
.110	2	2
.125	—	3
.140	3	4
.155	—	5
.170	4	6
.185	—	7
.200	5	8
.215	—	9
.230	6	X

**75-SERIES SPRING**  
CP-030004



To masterkey with 75-Series pins it is necessary to use special pins with two fence holes drilled in them. They are available in the full step .030" increment lengths only. These are illustrated in figure 15A.

Figure 15A

**FULL STEP  
HOLE LOCATIONS  
.030" INCREMENT**

Left Angle	Center Angle	Right Angle
1L-2L	1C-2C	1R-2R
1L-3L	1C-3C	1R-3R
1L-4L	1C-4C	1R-4R
1L-5L	1C-5C	1R-5R
1L-6L	1C-6C	1R-6R
2L-3L	2C-3C	2R-3R
2L-4L	2C-4C	2R-4R
2L-5L	2C-5C	2R-5R
2L-6L	2C-6C	2R-6R
3L-4L	3C-4C	3R-4R
3L-5L	3C-5C	3R-5R
3L-6L	3C-6C	3R-6R
4L-5L	4C-5C	4R-5R
4L-6L	4C-6C	4R-6R
5L-6L	5C-6C	5R-6R

## LOCKS AND CYLINDER ASSEMBLIES

**U.L. Listed.** Medeco locks and cylinder assemblies are listed with Underwriter's Laboratories and are in compliance with U.L. Standard #437. This is indicated by the U.L. logo and the model numbers:

D11—for tubular deadbolt locks

32S—for removable core cylinders

51S—for the rim, mortise, cylindrical, auxiliary, tubular lockset and padlock cylinders

65S—for the electric switch locks

72S—for the cam, screw thread, extension and vending machine locks

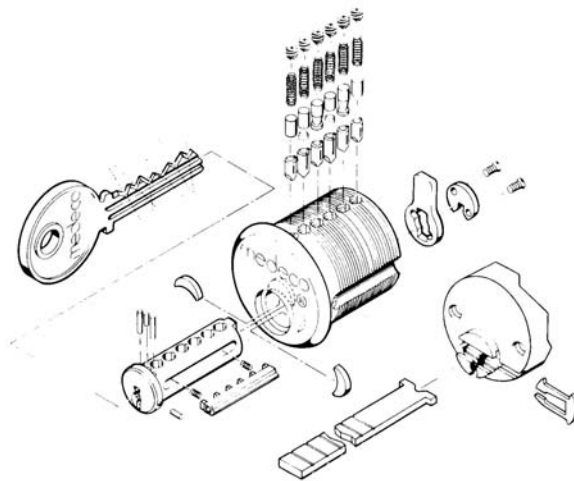
70S—for the electric switch locks prior to 1983

**Lubrication.** In the factory, Medeco lock cylinders are lubricated with Molykote Z powder, a molybdenum disulfide dry lubricant. Smooth operation of the cylinder requires an even lubrication without a buildup of dirt or lubricant within the sidebar broaching of the shell. Liquid lubricants that become viscous will trap particles and build up dirt. Excessive graphite will also block the sidebar action; thus for lubrication in the field, Medeco recommends Poxylube, an air-dry film lubricant. It is available in a six-ounce aerosol can from Medeco distributors.

**Key Changes.** The mathematical combination of three different angles times six different depths (.030" increment) within a 6 pin cylinder yields over thirty-four million theoretical key changes. Eliminating impossible and impractical combinations leaves over 23-million useable key codes in any one keyway. With eleven different depths(.015" increment) the useable key codes increases to over 175 million.

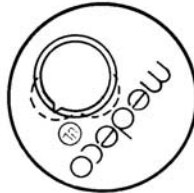
**10-Series Cylinders.** Figure 16 is an exploded view of the Medeco mortise cylinder #10-0200-XX and rim cylinder #10-0400-XX. Medeco cylinders are always pinned by using the pin chamber holes in the top of the shell to insert the pins. If it is necessary to disassemble a Medeco cylinder, first remove the tailpiece and plug retainer. The hardened drill plates are free floating and may

Figure 16



be resting against the outer diameter of the plug. If you attempt to push the plug out of the shell without rotating it, the sidebar will catch on the drill plate. After rotating the plug, it can be pushed out with a standard follower. The sidebar is inserted into the plug and not attached to it, therefore, care must be taken that the sidebar and its two springs are not lost. For reassembly, the two sidebar springs should be placed in the sidebar and the sidebar reinserted into the plug. Since the drill plates are free floating, it is easier to insert them if the shell is inverted as shown in figure 17. Now the plug and sidebar should be inserted into the shell and the cam or tailpiece attached. In pinning and masterkeying a Medeco cylinder, the pins should always be inserted through the pin chamber holes in the top of the shell. Prior to May, 1977, rim and mortise

Figure 17



cyinders used a curved sheet metal spring retainer to seal the pin chamber holes. After this date, the cylinders were manufactured tapped for an 8-32 Allenhead set screw, which may be inserted or removed with a 5/64" Allen wrench.

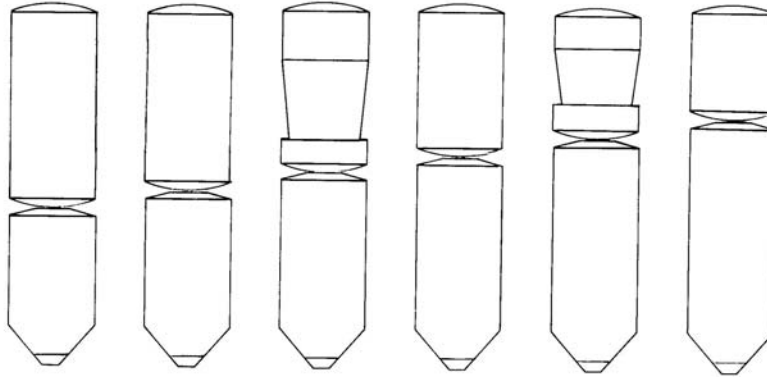
The Medeco lock cylinder is engineered to operate with a specific amount of spring pressure in each in chamber. Too much pressure could cause spring fatigue or failure; too little pressure could cause malfunction because the pins would not seat and rotate to the correct angle. To maintain the correct spring pressure, the total height of all the pins within an individual pin chamber must be constant.

In Medeco 10-series locks using a sheet metal spring retainer, the sum of the pin lengths must be .575". This is illustrated in figure 18. For example, a number 4R bottom pin (.335") would require a number 2 driver pin (.240") to achieve a stack height of .575".

Because the set screw occupies .060" more of the pin chamber than the sheet metal spring retainer, it is necessary to adjust the stack height to compensate. In Medeco 10-series locks using set screw spring retainers the sum of the pin lengths must be .515". This is illustrated in figure 19. For example, a number 4R bottom pin (.335") would require a number 4 driver pin (.180") to achieve a stack height of .515".

Additionally, a number 1R bottom pin (.245") combined with a number 3 master wafer (.090") would require a number 4 driver pin (.180") to achieve a total stack height of .515".

Figure 18

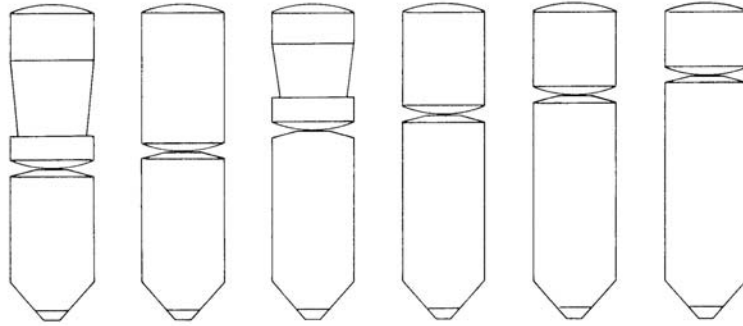


**“.575” DRIVER OR TOP PIN SELECTION CHART**  
**For Rim and Mortise Cylinders**  
**With Sheet Metal Spring Retainers**

Bottom Pin Length	Bottom Pin Number		Driver or Top	
	.030" Increment	.015" Increment	Pin Length	Pin Number
.245	1	0	.330	B
.260	—	1	.300	C
.275	2	2	.300	C
.290	—	3	.270	1
.305	3	4	.270	1
.320	—	5	.240	2
.335	4	6	.240	2
.350	—	7	.210	3
.365	5	8	.210	3
.380	—	9	.180	4
.395	6	X	.180	4



Figure 19

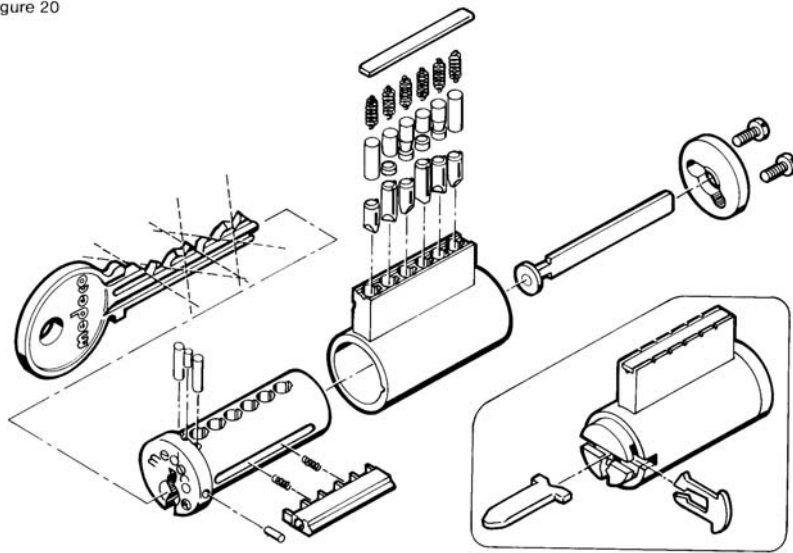


**“.515” DRIVER OR TOP PIN SELECTION CHART**  
**For Rim and Mortise Cylinders With Set Screw Spring Retainers**  
**and All Cylindrical, Tubular and Padlock Cylinders**

Bottom Pin Length	Bottom Pin Number		Driver or Top	
	.030" Increment	.015" Increment	Pin Length	Pin Number
.245	1	0	.270	1
.260	—	1	.240	2
.275	2	2	.240	2
.290	—	3	.210	3
.305	3	4	.210	3
.320	—	5	.180	4
.335	4	6	.180	4
.350	—	7	.150	5
.365	5	8	.150	5
.380	—	9	.120	6
.395	6	X	.120	6

**20-Series Cylinders.** Figure 20 is an exploded view of the Medeco tubular deadbolt cylinder 20-0901-XX and cylindrical knob lock cylinder 20-0100-XX. All Medeco cylinders are pinned and masterkeyed using the pin chamber holes in the top of the shell to insert the pins. To maintain the correct spring pressure, the sum of the pin lengths within an individual pin chamber must be .515". This constant is maintained on 20-series locks with either sheet metal spring retainers or set screws. Use figure 19 to determine the correct driver pin.

Figure 20



### 32-SERIES MEDECO HIGH SECURITY INTERCHANGEABLE CORE CYLINDERS Locksmith Service Notes

The Medeco High Security Interchangeable core cylinders are available in 5 or 6 pin configuration to fit Medeco mortise, rim, and D11-Series deadbolt housings. The patented Medeco dual locking principle is incorporated into these cylinders for standard operation and for operation of the core retainer. In addition these cylinders are protected by hardened drill resistive inserts, and are UL listed.

For keyed alike and keyed different cylinders, it is not necessary to use master wafers for control key operation. Figure 21A illustrates a Medeco interchangeable core with the standard operating key inserted; the pins are correctly elevated and rotated for the standard shear line. The centrally located core retainer is darkened. Figure 21B illustrates the same core with the control key inserted; the pins are correctly elevated and rotated for the control shear line. Pins in cut position 3 & 4 are elevated .090" higher than the operational shear line so that the retainer will release.

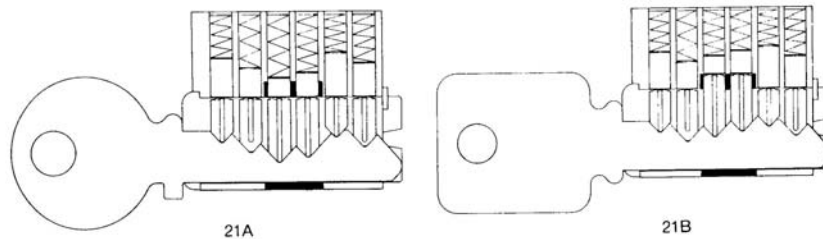


Figure 21

For full step (.030") increment systems, standard operating keys should only use depths 4, 5 or 6 in the cut positions 3 & 4. Control keys will be cut .090" higher and use depths 1, 2, or 3 in these same positions.

## **PINS**

These interchangeable core cylinders use Medeco 10-, 20- and 40-Series tumbler pins. Because the control key operation requires that the 3rd and 4th pins be elevated .090" to the control shear line, pins operating the core retainer must be 10-Series pins with the side bar slot cut the full length of the pin. (See figure 22)



Figure 22

The stack height of the pins in any chamber should equal .515". The springs and pins are retained with a curved, brass, sheet metal cap.

## **KEY CODES**

Removable core cylinders supplied keyed different and not masterkeyed by Medeco will be supplied with an operational key and a control key, each of which will have its own code number designation referenced to Medeco's commercial code book. The operational key will have a standard Medeco blind code reference and the control key will have a standard Medeco blind code reference with the prefix letter "C". For example, a cylinder supplied with an operational key designated A4362001 would also be supplied with a control key bearing the code designation CA1197001.

## 65-SERIES SWITCH LOCKS

### Locksmith Service Notes

Medeco switch locks use 60-series driverless rotating pin tumblers. The pins, along with the springs are completely contained within the plug, capped with a sheet metal retainer. The plug face contains hardened drill resistant rods to protect against physical attack. The plug is held within the shell by two retainers. Several different switch assemblies are available and are attached to the back of the shell with screws.

Shells for Medeco switch locks have three key pull slots. The number of key pulls in a lock is determined by the selection of the stop washer. The stop washer will limit or allow the rotation of the plug's sidebar to a key pull slot in the shell.

Actuators and stop washers determine the specific lock functions. Depending upon the desired function, several actuators are available. The actuators determine when switches change electrical connections from normally open to normally closed. As the plug is rotated, the plunger on the small switch rides in the groove of the actuator and will release or depress to change the status of the lock. The chart below lists the lock functions with their appropriate stop washer and actuator.

Figure 23

OPER. CODE	STOP	ACTIVATOR	DESCRIPTION
011	CP-040741	CP-100130	KEY PULL AT "A" ONLY ROTATES TO "B"
012	CP-040641	CP-100130	KEY PULL AT "A" & "B"
021	* CP-040741	CP-100130	KEY PULL AT "A" ONLY ROTATES TO "B"
101	CP-040741	CP-100130	KEY PULL AT "A" ONLY ROTATES TO "B"
102	CP-040641	CP-100130	KEY PULL AT "A" & "B"
111	* CP-040741	CP-100130	KEY PULL AT "A" ONLY ROTATES TO "B" & "C"
121	CP-040731	CP-100190	KEY PULL AT "A" ONLY ROTATES TO "B" & "C"
122	CP-040661	CP-100150	KEY PULL AT "A" & "B" ROTATES TO "C"
131	CP-040731	CP-100190	KEY PULL AT "A" ONLY ROTATES TO "B" & "C"
132	CP-040661	CP-100150	KEY PULL AT "A" & "B" ROTATES TO "C"
133	CP-040681	CP-100150	KEY PULL AT "A", "B" & "C"
175	*** CP-040761	CP-100160	KEY PULL AT "C" ONLY ROTATES TO "A"
184	CP-040751	CP-100160	KEY PULL AT "C" & "A" ROTATES "C" TO "A"
185	CP-040761	CP-100160	KEY PULL AT "C" ONLY ROTATES TO "A"

\* INDICATES MOMENTARY SPRING (CP-030033) REQUIRED  
 \*\*\* INDICATES MOMENTARY SPRING (CP-030034) REQUIRED

To assemble, align the uncut thicker side of the stop washer with the plug's sidebar. If a momentary function is required, the hole in the stop washer should be at the bottom of the keyway. (Figure 24A.) Next, place the actuator spring on the plug (Figure 24B). Then, place the actuator on top of the spring with the cast arrow pointing toward the sidebar. (Figure 24C.)

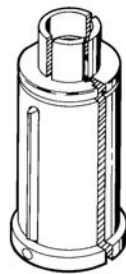


Figure 24

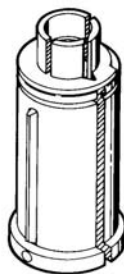


Figure 24A

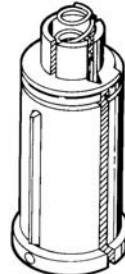


Figure 24B

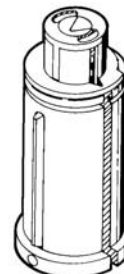
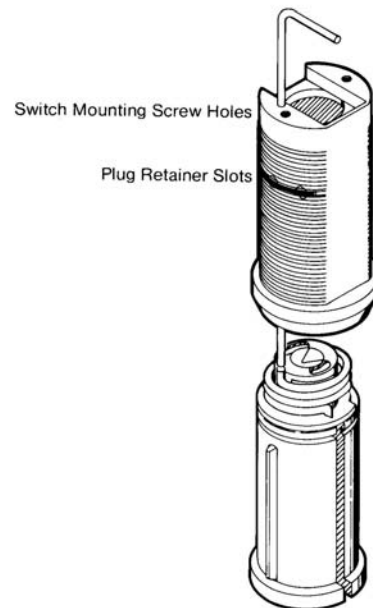


Figure 24C

Next, insert the plug into the shell. (If momentary function is desired, insert switch lock tool through the hole in back of the shell. Align the hollow end of the tool with the momentary spring. See Figure 25.) Taking care not to tilt the actuator, guide the plug into the shell using the key to test the lock's function. Insert plug retainers into slots on either side of shell. Stake retainers into place.

Figure 25



The small switches for these locks are normally furnished with silver contacts and they are rated 7 amps, 250 VAC. For low current applications, gold plated contacts are available as an option. To mount a double switch or a single switch to the shell, align the mounting holes and attach with screws. A single switch assembly has offset mounting blocks and occasionally must be assembled prior to mounting. For single switch assembly, see Figure 26.

Figure 26



## **PINS**

These interchangeable core cylinders use Medeco 10-, 20- and 40-Series tumbler pins. Because the control key operation requires that the 3rd and 4th pins be elevated .090" to the control shear line, pins operating the core retainer must be 10-Series pins with the side bar slot cut the full length of the pin. (See figure 22)



Figure 22

The stack height of the pins in any chamber should equal .515". The springs and pins are retained with a curved, brass, sheet metal cap.

## **KEY CODES**

Removable core cylinders supplied keyed different and not masterkeyed by Medeco will be supplied with an operational key and a control key, each of which will have its own code number designation referenced to Medeco's commercial code book. The operational key will have a standard Medeco blind code reference and the control key will have a standard Medeco blind code reference with the prefix letter "C". For example, a cylinder supplied with an operational key designated A4362001 would also be supplied with a control key bearing the code designation CA1197001.



## 65-SERIES SWITCH LOCKS

### Locksmith Service Notes

Medeco switch locks use 60-series driverless rotating pin tumblers. The pins, along with the springs are completely contained within the plug, capped with a sheet metal retainer. The plug face contains hardened drill resistant rods to protect against physical attack. The plug is held within the shell by two retainers. Several different switch assemblies are available and are attached to the back of the shell with screws.

Shells for Medeco switch locks have three key pull slots. The number of key pulls in a lock is determined by the selection of the stop washer. The stop washer will limit or allow the rotation of the plug's sidebar to a key pull slot in the shell.

Actuators and stop washers determine the specific lock functions. Depending upon the desired function, several actuators are available. The actuators determine when switches change electrical connections from normally open to normally closed. As the plug is rotated, the plunger on the small switch rides in the groove of the actuator and will release or depress to change the status of the lock. The chart below lists the lock functions with their appropriate stop washer and actuator.

Figure 23

OPER. CODE	STOP	ACTIVATOR	DESCRIPTION
011	CP-040741	CP-100130	KEY PULL AT "A" ONLY ROTATES TO "B"
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102	CP-040641	CP-100130	KEY PULL AT "A" & "B"
111	* CP-040741	CP-100130	KEY PULL AT "A" ONLY ROTATES TO "B" & "C"
121	CP-040731	CP-100190	KEY PULL AT "A" ONLY ROTATES TO "B" & "C"
122	CP-040661	CP-100150	KEY PULL AT "A" & "B" ROTATES TO "C"
131	CP-040731	CP-100190	KEY PULL AT "A" ONLY ROTATES TO "B" & "C"
132	CP-040661	CP-100150	KEY PULL AT "A" & "B" ROTATES TO "C"
133	CP-040681	CP-100150	KEY PULL AT "A", "B" & "C"
175	*** CP-040761	CP-100160	KEY PULL AT "C" ONLY ROTATES TO "A"
184	CP-040751	CP-100160	KEY PULL AT "C" & "A" ROTATES "C" TO "A"
185	CP-040761	CP-100160	KEY PULL AT "C" ONLY ROTATES TO "A"

\* INDICATES MOMENTARY SPRING (CP-030033) REQUIRED  
 \*\*\* INDICATES MOMENTARY SPRING (CP-030034) REQUIRED

To assemble, align the uncut thicker side of the stop washer with the plug's sidebar. If a momentary function is required, the hole in the stop washer should be at the bottom of the keyway. (Figure 24A.) Next, place the actuator spring on the plug (Figure 24B). Then, place the actuator on top of the spring with the cast arrow pointing toward the sidebar. (Figure 24C.)

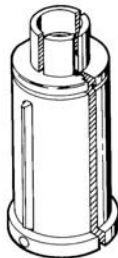


Figure 24

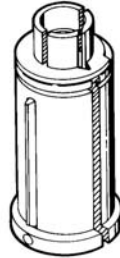


Figure 24A

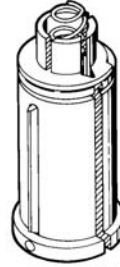


Figure 24B

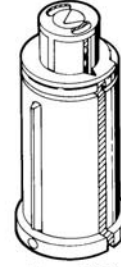
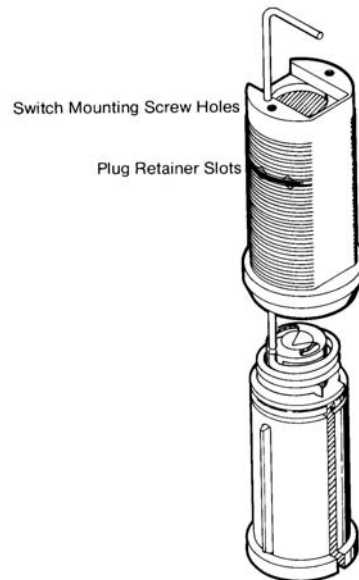


Figure 24C

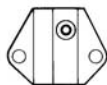
Next, insert the plug into the shell. (If momentary function is desired, insert switch lock tool through the hole in back of the shell. Align the hollow end of the tool with the momentary spring. See Figure 25.) Taking care not to tilt the actuator, guide the plug into the shell using the key to test the lock's function. Insert plug retainers into slots on either side of shell. Stake retainers into place.

Figure 25



The small switches for these locks are normally furnished with silver contacts and they are rated 7 amps, 250 VAC. For low current applications, gold plated contacts are available as an option. To mount a double switch or a single switch to the shell, align the mounting holes and attach with screws. A single switch assembly has offset mounting blocks and occasionally must be assembled prior to mounting. For single switch assembly, see Figure 26.

Figure 26



## MASTER KEYING MEDECO LOCKS

Master keying of most Medeco locks is done in much the same manner as common pin tumbler locks. However, because of the differences in design construction of the unique Medeco cylinders, there are special variations encountered. Each version of cylinder has its own limitations and additional limitations will be encountered when combining several versions into one system. In the following, we discuss the technical aspects of each version and the aspects of combining them.

### DOOR HARDWARE CYLINDERS— 10-0000 THROUGH 30-9999 SERIES

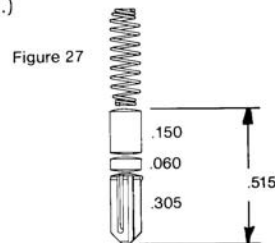
Master keying these cylinders requires the use of the bottom pin, a master wafer pin, and a top or driver pin. Medeco master wafer pins are .135" in diameter, however, they do not have the sidebar slot required on the bottom pins. Medeco master wafers are available in .015" increments beginning at .030". (Figure 13.)

When master keying Medeco cylinders, basic techniques and master keying principles apply, however, additional limitations will also be encountered. In writing progression lists for use with Medeco cylinders, it will be necessary to eliminate some keys because of adjacent bittings. It is not physically possible to cut a Medeco key with adjacent cut depths differing by greater than .120". The cut profile angle of 86° would eliminate the side of the adjacent cut and the pin would not seat correctly, i.e., a full step .030" increment key cannot use adjacent cuts, 1-6 or 6-1, and a half step .015" increment key cannot use adjacent cuts, 0-9, 0-X, X-0, 9-0.

The policy of varying depths by at least .030" is recommended.

The length of all the pins in each chamber must equal the stack height of .515" as shown on Figure 19, page 23.

Additionally, the angles of every change key in the system must be the same as the highest level master key in the system. (It is possible to vary the depth by inserting a master wafer but the angle is determined by the slot cut into the side of the bottom pin.)



### REMOVABLE CORE TYPES 31-0000 THROUGH 31-9999 SERIES

Medeco manufactures a direct replacement for the Yale 6 pin core #1210. The Medeco part number for this core is 31-0100. To master key this core, use the same procedure as in 10-0000 through 30-9999 series locks. The control key for this cylinder is a longer key blank and the control sleeve is operated by the tip of this blank. Medeco part number for this blank is KY-106611-0000.

### 32-0000 THROUGH 32-9999 SERIES

Medeco patented a new type removable core cylinder in which the core retainer is operated by the third and fourth pin chambers. The core retainer sleeve is .090" thick. Since this dimension is equal to three full step increments, the control key will always be cut three increments higher than the master in these two chambers. Control key cuts in the third and fourth positions will be 1, 2, or 3. Similarly, the master key cuts in position three and four will be 4, 5, or 6. (See page 25, 32-series locks.)

Master key systems can be created by using 10-series master wafers in the 1st, 2nd, 5th, and 6th chambers. If larger systems are necessary, wafers can be used in the 3rd, and 4th chambers. To avoid interchanges, refer to Figure 28 for usable depths in these control sleeve chambers.

Figure 28

Master Cuts	Change Possibilities	Control Cuts
4	5 or 6	1
5	1 or 3	2
6	1 or 2	3

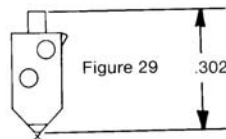
A cylinder coded to a master key and a change key will automatically operate with the control key. Do not pin set to the control key depths.

### 50-0000 THROUGH 50-0599 SERIES

To master key this series, use the same procedure as in 10-0000 through 30-9999 series.

### 50-0600 THROUGH 59-9999 SERIES

These cylinders use a 75-series driverless rotating pin tumbler with a small hole drilled in the side of the pin to receive the leg of the sidebar. (See Figure 29.)



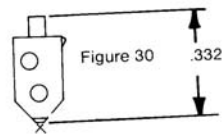
To master key this cylinder, the pin is modified to have two holes instead of one. Restrictions regarding the master keying of these cylinders are:

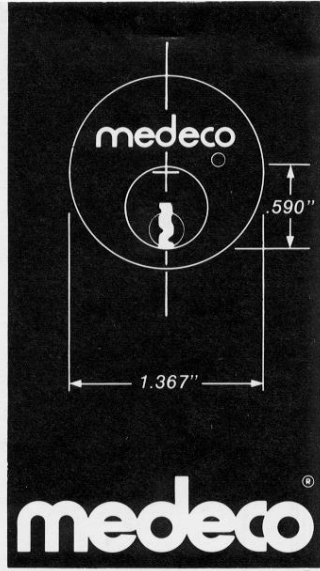
1. Master pins in the half step (.015") increment system are not available.
2. Use no more than two different cut increments to operate the same pin chamber. (Pins are available with a maximum of 2 holes.)
3. Presently, the pin kits available are supplied with pins of different depths and the same angle, so the angles used for the master key must be used for every key within the system. (Available pins are shown in Figure 15A, page 19.)

### 60-0000 THROUGH 69-9999 SERIES

These cylinders use a 60-series driverless rotating pin tumbler. Master keying is accomplished by using special pins with a second hole in the side. As shown in Figure 30, the 60-series pin tumbler is smaller in height than the 75-series pins used in the 50-0600 through 59-9999 series locks. Master pins for this series may have the second hole at a different height, a different angle, or both. (Available pins are shown in Figure 14A, page 17.)

To key alike the 60-0000 through 69-9999 cylinders with Medeco architectural hardware cylinders, the 60-0000 through 69-9999 locks require a thick head, (add the suffix "T" to the part number). Master keying of the two styles of cylinders is not recommended. In the architectural hardware cylinders the angles of the master key and change key must remain constant for every lock within the system. In the 60-0000 through 69-9999 series, there are only a few pins where the angles are constant. The number of key changes available when master keying these two styles of locks together will be very limited.





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# technical service manual

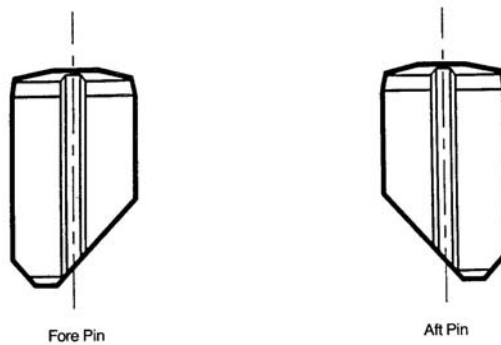
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section three: ***Biaxial***  
*Lock System*

## BIAXIAL LOCK SYSTEM PIN SPECIFICATION

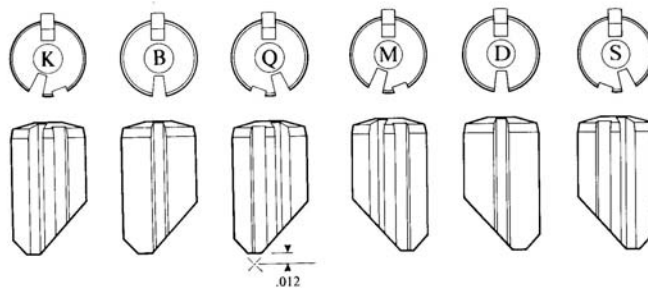
Biaxial Pins differ from original Medeco pins in three respects. These differences are (1) the chisel point, (2) the locator tab, and (3) pin length. Biaxial pins are made of CDA340 hard brass and are electroless nickel plated. They have a diameter of .135" and are chisel pointed with an 85° angle. However, this chisel point is offset 0.031" in front of or to the rear of the true axis or center line of the pin.

Figure 1



Fore pins are available in three angles, B, K, and Q and Aft pins are available in three angles, D, M, and S. Pins B and D will have a slot milled directly above the true centerline of the pins. Pins K and M will have a slot milled 20° to the left of the true centerline of the pin. Pins Q and S will have slots milled 20° to the right of the true centerline of the pin.

Figure 2





The locator tab, the minute swaged projection limiting the pin rotation, has been moved to the side of the pin, roughly 90°. It is now located along the centerline of the pin opposite the area for sidebar slot.

Figure 3



Biaxial Medeco pins are available in six lengths in .025" increments. The dimensions in Fig. 4 represent the length from the top of the pin to the theoretical chisel point. The length of a pin measured with a standard micrometer will be approximately .012" less than the dimension listed.

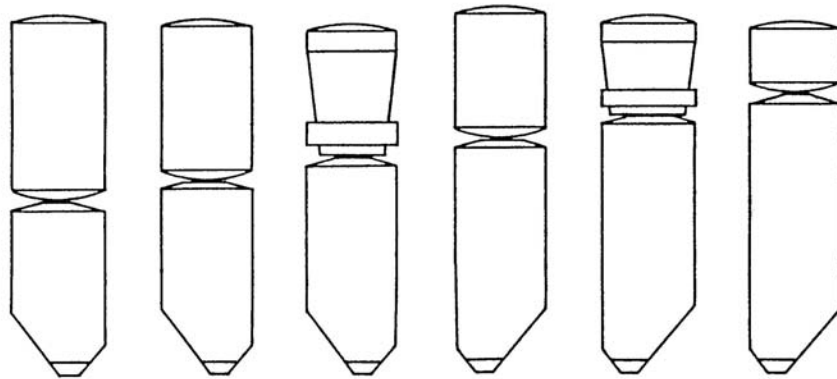
Figure 4

**PIN REFERENCE LENGTHS**

<b>Pin Reference Length</b>	<b>"Measured"</b>	<b>Pin Number F-50 Series</b>
.239	.227	1
.264	.252	2
.289	.277	3
.314	.302	4
.339	.327	5
.364	.352	6

Biaxial cylinders do not use a constant stack height. However, stack height in the pin chambers should not be less than .499 nor more than .524. Medeco top pins are furnished in only five lengths. See Fig. 5 for various top pin lengths and their use with appropriate bottom pins. Mushroom pins are available in two lengths, number 3 and 5 only.

Figure 5



**TOP PIN SELECTION CHART**

Bottom Pin Ref. Length	Bottom Pin No.	Top Pin Length	Top Pin No.	Stack Height
.239	1	.270	1	.509
.264	2	.240	2	.504
.289	3	.210	3	.499
.314	4	.210	3	.524
.339	5	.180	4	.519
.364	6	.150	5	.514

Five master pins are available in a .025" increment. (See Figure 6).

Figure 6

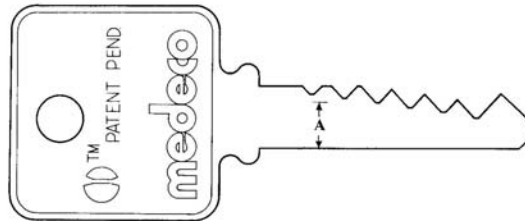
**MASTER PINS**

<b>Pin Length</b>	<b>Pin Numbers</b>
.025	1
.050	2
.075	3
.100	4
.125	5

## KEY SPECIFICATIONS

There are four dimensional specifications of a Biaxial Medeco key. They are (1) the cut profile, (2) the cut depth, (3) the cut spacing, and (4) the cut angular rotation. The cut profile of the Biaxial Medeco keys remains at 86°. However, keys in the 10 thru 50 series locks are cut to six levels with a full .025" increment in depths. The depths shown in figure 7 represent the amount of material left in the key from the theoretical point of the cut profile to the bottom of the key blank. When measuring the depth of the cut with a standard micrometer, the dimension will read approximately .008" more than those listed in the chart.

Figure 7



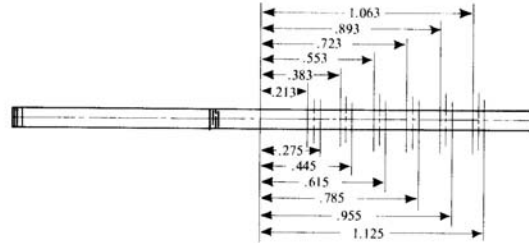
## KEY REFERENCE DEPTHS

Reference Dimension	Architectural Hardware Locks .025"
.264	1
.239	2
.214	3
.189	4
.164	5
.139	6

Spacing of the cut on Biaxial Medeco keys must be to manufacturer's specifications. Because Biaxial Medeco pins have the chisel point forward or aft of the pin centerline, the dimensional spacing on the Biaxial key blank can change from chamber to chamber.

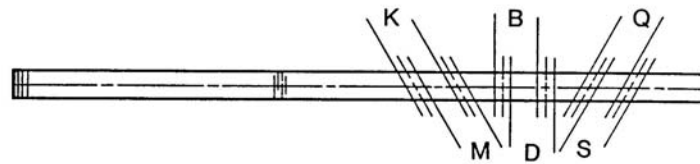
From the shoulder to the center of the first cut, using a fore pin (either B, K, or Q), the dimension will be .213". From the shoulder to the center of the first cut, using an aft pin (either a D, M, or S), the dimension will be a .275". Subsequent fore cuts and subsequent aft cuts are spaced at .170". See figure 8.

Figure 8



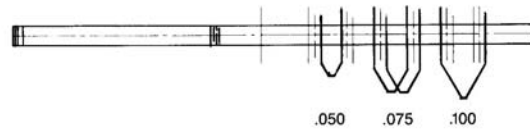
While there are only three angular rotations on a key, each rotation can be used with either a fore pin or aft pin. Angular cuts B and D are perpendicular to the blade of the key; "B" will be a fore cut and "D" an aft cut. Angular cuts "K" and "M" have flats pointing upwards to the left; "K" will be a fore cut and "M" will be an aft cut. Angular cuts "Q" and "S" have flats pointing upwards to the right; "Q" will be a fore cut and "S" will be an aft cut. K, M, Q, and S angles are cut on an axis 20° from perpendicular to the blade of the key. See Figure 9.

Figure 9



The dimensional problem of adjacent cuts on a Biaxial key can vary from cut position to cut position. Use fig. 10 to determine the MACS (Maximum Adjacent Cut Specification) for Biaxial Medeco cylinders.

Figure 10



aft to fore	– .050"	MACS 2
fore to fore	– .075"	MACS 3
aft to aft	– .075"	MACS 3
fore to aft	– .100"	MACS 4

# ARX™

Attack Resistance X-tended

by

**medeco**  
HIGH SECURITY LOCKS



**Medeco ARX High Security Locks**

"Extending the solution to sophisticated security threats"

## What is ARX™?

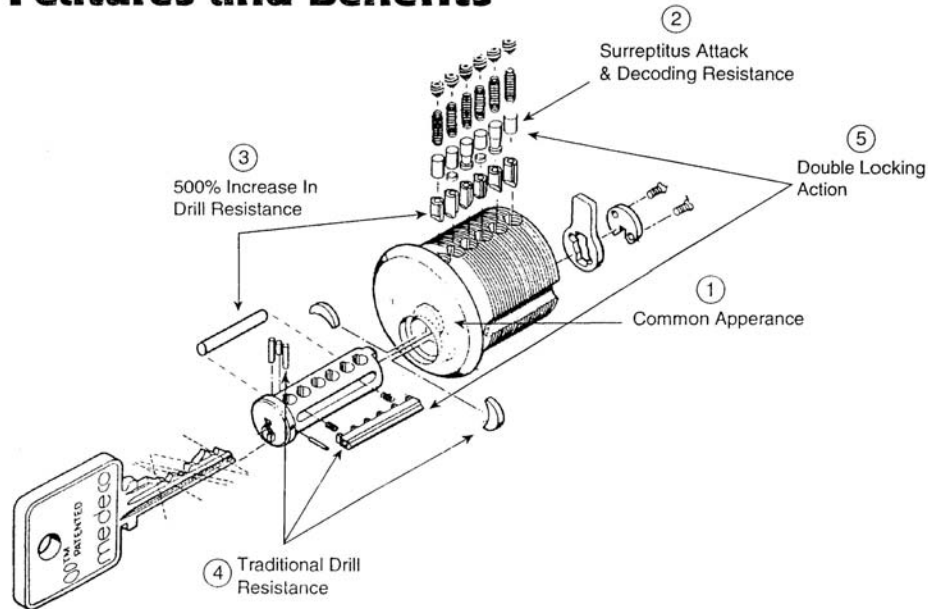
Surreptitious attacks are continually evolving, and Medeco has always provided its customers with intelligent protection against advanced criminal assaults.

Our continual research into our customers' needs has led to the development of Medeco® ARX™ high security locks, a complete line of door hardware cylinders for customers that have sophisticated security threats. ARX stands for:

## Attack Resistance X-tended

We've taken the world's leading high security lock, Medeco® **Biaxial™** and incorporated additional features to extend its ability to thwart sophisticated attacks. The result is a lock that offers greater security than ever before commercially available.

## Features and Benefits



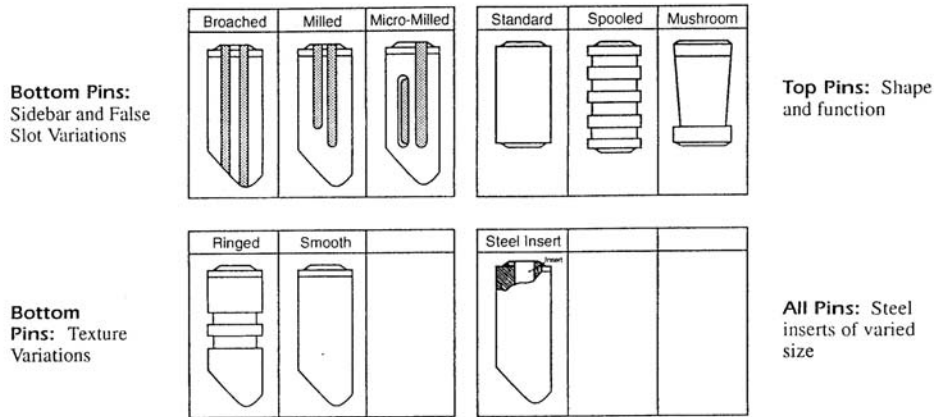
- 1. Common Appearance:** Locks can be furnished blank, without the Medeco logo on the cylinder face, giving the lock an unrecognizable, common appearance.
- 2. Surreptitious Attack and Decoding Resistance:** Over 150 bottom pin variations plus 14 top pin variations work to confuse sophisticated intruders. Each pin has a unique combination of appearance, texture, weight, length and function.
- 3. 500% Increase in Drill Resistance:** ARX™ features two new drill resistant features. First, a carbide rod that runs the length of the plug, installed opposite the sidebar. Second, inside each ARX™ tumbler pin is a steel insert which extends keyway drill time.
- 4. Traditional Drill Resistance:** Standard Medeco® Biaxial™ plugs already include steel ball bearings, drill pins and steel crescents which significantly increase drill attack time.
- 5. Double-Locking Action:** In addition to the tumbler pin shear line, Medeco locks have a sidebar. These dual locking points require simultaneous elevation and rotation of tumbler pins before the cylinder will work.



## Randomization: The solution to Threats of Systematic Decoding

The ARX™ system offers an incredible variety of tumbler pins. Each individual depth pin may be ringed, smooth, broached, and/or micro-milled, just to mention some of the variations.

### ARX™ Tumbler Pin Variations



Medeco pre-mixes tumbler pins having these variations. When a lock is pinned, the correct depth pin is pulled from these mixtures.

Depending on which particular pin is pulled from the mixture, the attributes (appearance, texture, weight, length and function) are purely random. This means that each

individual ARX™ lock contains its own random assortment of pin variations!

Randomization makes disassembly and reverse engineering of ARX™ cylinders confusing and unproductive. Picking, probing and decoding are futile efforts.

## Other Benefits of ARX™

**Q: Can I use ARX™ with existing Medeco® Biaxial™ locks?**

**A:** Yes. Medeco is 100% compatible with Medeco® Biaxial™ cylinders. Add ARX™ to an existing Biaxial™ system or create a new system utilizing both product lines. The keys are interchangeable between Biaxial™ and ARX™ cylinders.

**Q: What types of cylinders are available in ARX™?**

**A:** ARX is available in Medeco's complete door security product lines: **10 Series** (Rim and mortise cylinders); **20 Series** (key-in-knob and key-in-lever cylinders); **32 Series** (interchangeable cores); etc.

**Q: How is the integrity of the ARX™ pin mixture insured?**

**A:** ARX's random pin mixture is stored in a limited access room within the secure Medeco facility. A record of all entries allows Medeco to insure the integrity of the random mixtures and all ARX™ product that is keyed or master-keyed at the factory.

**Q: What about key duplication?**

**A:** ARX™ is available in all current Medeco® Biaxial™ keyways. You get the excellent, patented key control you've come to expect from Medeco.

**Q: How do I pin ARX™ locks in the field?**

**A:** A special pin kit has been created for ARX™ users. This pin kit includes a random assortment of the ARX™ pins used at the factory.

## ARX Questions and Answers Fact Sheet

### Government Customers (6/15/94)

#### 1. Why did Medeco make the ARX product line?

ARX was developed to meet the unique needs of our most sophisticated customers (Government agencies, locksmiths that service the government, prime government contractors and vendors, financial institutions, high rise office buildings, etc.).

#### 2. What does ARX stand for:

##### ***Attack Resistance X-tended***

ARX uses the same angled cuts and fore and aft pins as our Biaxial products, however we have added a few new features that make it more attack resistant.

#### 3. What gives ARX more attack resistance?

ARX increases attack resistance in three ways.

1. A carbide rod inserted in the plug gives it more drill resistance.
2. Rings, grooves, millings, micro-millings and broachings on the pins increase pick resistance.
3. In addition to the 36 types of bottom pins in Biaxial, ARX has over 150 random pin variation combinations on its bottom pins. These random variations increases ARX's resistance to stealth attacks or decoding.

#### 4. When will ARX be available?

ARX locks will be available for shipment in July 1994.

#### 5. Can anyone order ARX?

Yes, any customer with a sophisticated security need should specify ARX.

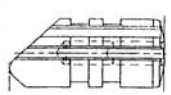
#### 6. How much does ARX cost?

ARX is listed in the Government Net Price Book at \$3.08 more than our current Biaxial locks. For ARX cylinders less logos (blind face), add \$4.08 to the corresponding Biaxial lock's price.

## Bottom Pin Styles

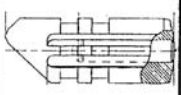
### BROACHED BOTTOM PINS

Part Number	Style	Depths	False Slot			With Rings	Without Rings	Fore Aft	Total Pins
			L	R	Cl-Cr				
Broached	Broached	1-6	✓	✓	✓	✓	✓	48	
Broached	Broached	2-6	✓	✓	✓	✓	✓	40	



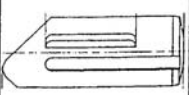
### MILLED BOTTOM PINS

Part Number	Style	Depths	False Slot			With Rings	Without Rings	Fore Aft	Total Pins
			L	R	Cl-Cr				
Milled	Milled	4-6	✓	✓	✓	✓	✓	16	
Milled	Milled	4-6	✓	✓	✓	✓	✓	16	



### MICRO-MILL BOTTOM PINS (Note: Not to be used in Master Keyed locks)

Part Number	Style	Depths	False Slot			With Rings	Without Rings	Fore Aft	Total Pins
			L	R	Cl-Cr				
Micro-Mill	Micro-Mill	4-6	✓	✓	✓	✓	✓	16	
Micro-Mill	Micro-Mill	4-6	✓	✓	✓	✓	✓	16	



### ARX BOTTOM PIN SYSTEM (Depths 1-6) for Non-Master Keyed locks

Part Number	Style	Broached	Mill	Micro	False Slot		With Rings	Without Rings	Fore Aft
					L	R			
TP-F46-XX	Mixed	✓	✓	✓	✓	✓	✓	✓	✓

### ARX BOTTOM PIN SYSTEM (Depths 1-6) for Master Keyed locks

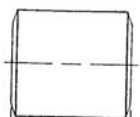
Part Number	Style	Broached	Mill	Micro	False Slot		With Rings	Without Rings	Fore Aft
					L	R			
TP-F47-XX	Mixed	✓	✓	✓	✓	✓	✓	✓	✓

Note: ARX Micro-milled or Milled pins can not be used with Interchangeable Core cylinders in clutch positions 3 and 4. Medeco recommends that Standard Biaxial pins be used with Interchangeable Core cylinders in clutch positions 3 and 4.

# Top Pin Styles

## STANDARD TOP PINS

<u>Part Number</u>	<u>Style</u>	<u>No</u>	<u>Material</u>	<u>Hardness</u>
	STD TOP PIN	1	STEEL	Rc 65
	STD TOP PIN	2	STEEL	Rc 65
	STD TOP PIN	3	STEEL	Rc 65
	STD TOP PIN	4	BRASS	
	STD TOP PIN	5	STEEL	Rc 65
	STD TOP PIN	6	BRASS	



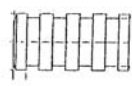
## MUSHROOM TOP PINS

<u>Part Number</u>	<u>Style</u>	<u>No</u>	<u>Material</u>	<u>Hardness</u>
	MUSHROOM TOP	1	BRASS	
	MUSHROOM TOP	2	BRASS	
	MUSHROOM TOP	3	BRASS	
	MUSHROOM TOP	4	BRASS	



## SPOOLED TOP PINS

<u>Part Number</u>	<u>Style</u>	<u>No</u>	<u>Material</u>	<u>Hardness</u>
	SPOOLED TOP	1	BRASS	
	SPOOLED TOP	3	BRASS	
	SPOOLED TOP	5	BRASS	
	SPOOLED TOP	6	BRASS	



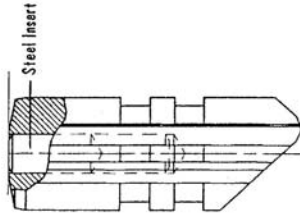
## ARX TOP PIN SYSTEM for Non-Master Keyed and Master Keyed locks

<u>Part Number</u>	<u>Style</u>	<u>No</u>	<u>Material</u>	<u>Hardness</u>
TP-F11-1A	TOP PIN	1	MIXED	MIXED
TP-F11-2A	TOP PIN	2	MIXED	MIXED
TP-F11-3A	TOP PIN	3	MIXED	MIXED
TP-F11-4A	TOP PIN	4	MIXED	MIXED
TP-F11-5A	TOP PIN	5	MIXED	MIXED
TP-F11-6A	TOP PIN	6	MIXED	MIXED

## ARX Drill Protection

ARX will provide two additional forms of drill protection:

1. Steel Pin Insert within each bottom pin:



2. Carbide Rod Insert opposite of the sidebar within the plug (full length):

