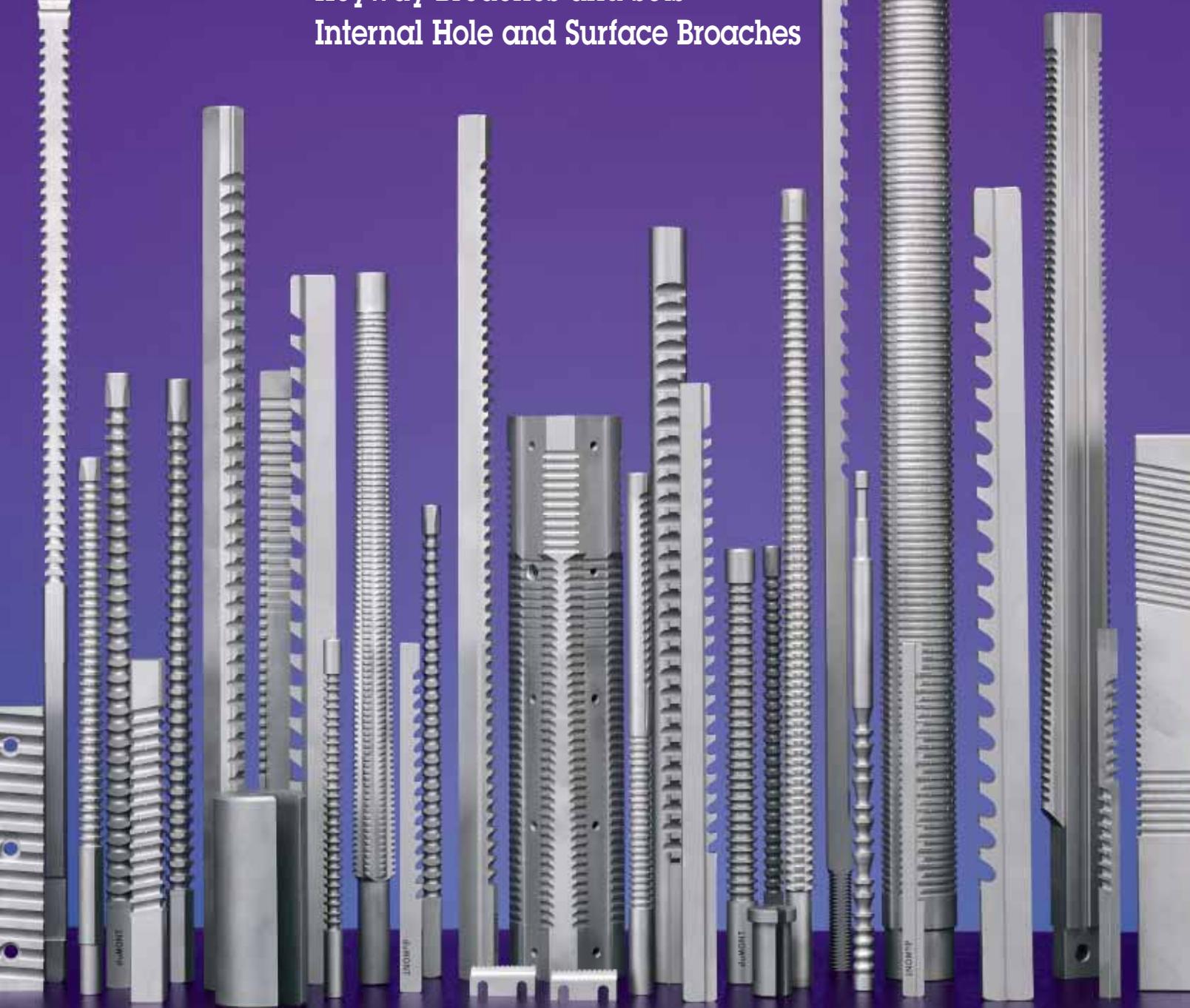




# duMONT Minute Man® Broaches

Standard and Special Broaches  
Keyway Broaches and Sets  
Internal Hole and Surface Broaches



The duMONT Company, Greenfield, Massachusetts  
[www.dumont.com](http://www.dumont.com)



# The duMONT Company

## A Reputation for Excellence



The duMONT Company, has been designing and manufacturing Precision Broaches since 1945 – Broaches recognized all over the world for quality, durability, and engineering detail.

We are the largest supplier of Push-Type Broaches in America, offering Broaches to a wide variety of businesses through a vast national and international distribution network. Our record of design ingenuity, fast delivery, and courteous follow-up is unsurpassed.

### Materials

All duMONT Broaches are manufactured of the finest quality high speed steel. We are equipped to fabricate from a variety of grades to meet your specifications. Contact your industrial distributor or the duMONT Engineering Department for details.

### Call Your Industrial Distributor

Your industrial distributor is your best source for Minute Man® Broaches. If your regular distributor does not carry duMONT products call us and we will be happy to give you the name of your nearest duMONT distributor. For special technical assistance call the duMONT Engineering Department at 413-773-3674 or 800-628-9648.

### Fast Delivery

An order for stock items placed by your industrial distributor with us by 2PM Eastern Standard Time will almost always be shipped on the same working day.

### Warning

Cutting tools may shatter. Eye protection should be worn wherever and whenever cutting tools are being used.

### Material Safety Data Sheet

Available on request or at [www.dumont.com](http://www.dumont.com).

### General Ordering Information

When ordering stock Minute Man® Broaches from your distributor please specify EDP No., size, and description to ensure proper fulfillment.

### Transportation

All shipments are made via United Parcel Service where weight limitations allow. Express shipments, both surface and air, are available at your request. Shipments are F.O.B. Greenfield, MA unless otherwise stated.

### Prices

Please contact us for current pricing or refer to current price list for prices on all stock items. Prices are subject to change without notice.

### TiN or TiAIN Coating

All standard items are available with coatings from stock or short delivery. Please contact factory for details.

## Ordering Special Broaches

### Let Us Meet Your Special Broach Requirements

duMONT Special Broaches can be ordered from your industrial distributor. Before ordering a Special Broach, check to see if a standard item will serve your needs. Using standard items means off-the-shelf delivery and substantially lower cost. When standard items are not appropriate, we would be pleased to design and manufacture a Broach to meet your specific needs. See pp. 20–21 for more information on duMONT Special Broaches.

### What We Need To Know

A fully dimensioned drawing of the finished part, casting, forging, or Broach would be most helpful. When a part print is unavailable, the following information should be provided:

1. Description of Cut (Size/Shape/Tolerance)
2. Length of Cut
3. Type of Material to be Broached
4. Size and Shape of Hole or Surface to be Broached (For cast holes, give minimum hole size, including draft and fillet radii, if any)

5. For Keyway Broaches Give:
  - a. Minimum Bore Size
  - b. Depth of Keyway Across Bore
  - c. Width of Keyway
  - d. Tolerance
6. Type of Broaching Machine (Push or Pull/Tonnage/Ram Travel/Daylight Opening)
7. Number of Pieces to Broach



## The duMONT Company

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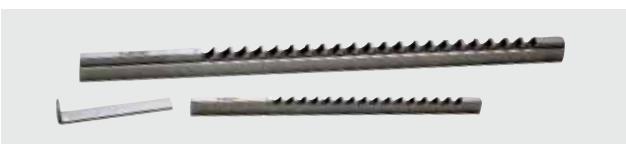
### 2-6 Broach Sets

duMONT packages the most popular combinations of Keyway Broaches and Bushings in attractive wooden cases, with all necessary Shims included. On hand when you need them for general maintenance or short run production.



### 7-10 Keyway Broaches/Bushings/Shims

Individual Broaches, Bushings, and Shims fabricated to precision tolerances in a wide range of inch and metric sizes. For specific applications, short run production, general maintenance, or for replacements in Minute Man® Broach Sets.



### 11-12 One-Pass & Production Keyway Broaches

duMONT's One-Pass Broaches offer a cost-effective way to perform short production runs without the need for shims. duMONT's Production Broaches are the fastest way to accomplish high volume production with extreme accuracy cutting keyways in a single pass without Shims or Bushings.



### 13 Keyseating Broaches, Type AF and AFS

For superior broaching with Hansford-Davis keyseating machines Models 4, 5, and 15. Type AF sizes up to 1 inch and 25mm and Type AFS sizes up to 1½ inch are in stock. Other inch and metric sizes are readily available.



### 14-15 Pull Type Production Keyway Broaches

A full line of Industry Standard 500 and 600 Series and 5M and 6M Series Keyway Broaches are available.



### 16 Square Broaches

Standard Square Broaches in the most popular American Standard sizes. Proven design and quality materials ensure superior performance and longer tool life.



### 17 Full Square and Round Broaches

Full Square Broaches leave no radii on the flats of the broached teeth generating a true square. Round Broaches cut Round holes with far greater accuracy than other methods. All Round Broaches are furnished with variable pitch for greater precision and reduced wear.



### 18 Hexagon Broaches

Broach precision Hexagon holes with duMONT Hexagon Broaches. Choose from a wide range of stock sizes or take advantage of our extensive capability to design and engineer broaches to your specifications.



### 19 Metric Square and Hexagon Broaches

Most popular Metric size Square and Hexagon Broaches available from stock.



### 20-21 Special Broaches

Special Broaches to almost any specification in Push or Pull-Types. We can manufacture from your part prints or custom-design for your applications. All types of Keyway, Internal hole, and Surface Broaches in both inch and metric sizes are available.



### 22-24 Engineering Section

### 25 Presses

# Keyway Broach Sets

1/16 through 3/8 inch sizes

## Applications:

- Short Run Production
- General Maintenance



All Minute Man® Broach Sets are furnished in handsome varnished wood boxes, and come complete with Precision Broaches, slotted Bushings, and necessary Shims.

## No. 00 Precision Set

The most common combinations for small keyways and bores.  
3 Broaches and 5 Bushings = 15 Keyway combinations.

Keyway Sizes	Broach Style	Bushing Diameters (bore sizes)
1/16, 3/32, 1/8	A	1/4, 5/16, 3/8, 7/16, 1/2
EDP No.	11101 Std 11301 TiN	collared bushings only
		collared bushings only

## No. 10 Standard Set

Our best selling Broach Set.  
4 Broaches and 9 Bushings = 18 Keyway combinations.

Keyway Sizes	Broach Style	Bushing Diameters (bore sizes)
1/8, 3/16	B	1/2, 5/8, 3/4, 7/8
1/4, 3/8	C	1, 1 1/8, 1 1/4, 1 3/8, 1 1/2
EDP No.	11104 Std 11304 TiN	collared bushings only
		collared bushings only

## No. 10A Standard Set

Same as No. 10 Set, but for sixteenth-sized bores.  
4 Broaches and 9 Bushings = 18 Keyway combinations.

Keyway Sizes	Broach Style	Bushing Diameters (bore sizes)
1/8, 3/16	B	9/16, 11/16, 13/16
1/4, 3/8	C	15/16, 11/16, 13/16, 15/16, 17/16, 19/16
EDP No.	11108 Std 11308 TiN	collared bushings only
		collared bushings only

## No. 30 Standard Set

A great starter set.  
3 Broaches and 9 Bushings = 15 Keyway combinations.

Keyway Sizes	Broach Style	Bushing Diameters (bore sizes)
1/8	B	1/2, 5/8, 3/4
3/16, 1/4	C	7/8, 1, 1 1/8, 1 1/4, 1 3/8, 1 1/2
EDP No.	11112 Std 11312 TiN	collared bushings only
		collared bushings only

## No. 30A Standard Set

Same as No. 30 Set, but for sixteenth-sized bores.  
3 Broaches and 9 Bushings = 15 Keyway combinations.

Keyway Sizes	Broach Style	Bushing Diameters (bore sizes)
1/8	B	9/16, 11/16, 13/16
3/16, 1/4	C	15/16, 11/16, 13/16, 15/16, 17/16, 19/16
EDP No.	11115 Std 11315 TiN	collared bushings only
		collared bushings only

## Specials

All standard items are available with **TiAIN** coating from stock or short delivery. Please contact factory for details.

# Keyway Broach Sets

1/8 through 3/8 inch sizes

## Applications:

- Short Run Production
- General Maintenance



All Minute Man® Broach Sets are furnished in handsome varnished wood boxes, and come complete with Precision Broaches, slotted Bushings, and necessary Shims.

## No. 10-10A Combination Set

Combines 10 and 10A Sets. Features all bore sizes in 1/16 inch increments for keyways 1/8 to 3/8 inches.

4 Broaches and 18 Bushings = 36 Keyway combinations.

Keyway Sizes	Broach Style	Bushing Diameters (bore sizes)
1/8	B	1/2, 9/16, 5/8, 11/16,
3/16	B	3/4, 13/16, 7/8
1/4	C	15/16, 1, 11/16, 11/8, 13/16,
5/16	C	11/4, 15/16, 13/8, 17/16, 11/2, 19/16
<b>EDP No.</b>	11120 Std	collared bushings only
	11320 TiN	collared bushings only

## No. 30-30A Combination Set

Combines 30 and 30A Sets. Features all bore sizes in 1/16 inch increments.

3 Broaches and 18 Bushings = 30 Keyway combinations.

Keyway Sizes	Broach Style	Bushing Diameters (bore sizes)
1/8	B	1/2, 9/16, 5/8, 11/16, 3/4, 13/16
3/16	C	7/8, 15/16, 1, 11/16, 11/8, 13/16,
1/4	C	11/4, 15/16, 13/8, 17/16, 11/2, 19/16
<b>EDP No.</b>	11124 Std	collared bushings only
	11324 TiN	collared bushings only

## No. 20 Combination Set

Same as No. 10-10A Combination Set, but adds a 5/16 inch keyway for 11 extra combinations.

5 Broaches and 18 Bushings = 47 Keyway combinations.

Keyway Sizes	Broach Style	Bushing Diameters (bore sizes)
1/8	B	1/2, 9/16, 5/8, 11/16,
3/16	B	3/4, 13/16, 7/8
1/4	C	15/16, 1, 11/16, 11/8, 13/16,
5/16	C	11/4, 15/16, 13/8,
3/8	C	17/16, 11/2, 19/16
<b>EDP No.</b>	11121 Std	collared bushings only
	11321 TiN	collared bushings only

## Specials

All standard items are available with **TiAIN** coating from stock or short delivery. Please contact factory for details.

# Keyway Broach Sets

5/16 through 3/4 inch sizes

## Applications:

- Short Run Production
- General Maintenance



## No. 40A Set

The most common keyway combinations for medium-sized keyways and bores.

4 Broaches and 8 Bushings = 32 Keyway combinations.

Keyway Sizes	Broach Style	Bushing Diameters (bore sizes)
5/16, 3/8	D	1 1/2, 1 5/8, 1 3/4, 1 7/8,
7/16, 1/2	D	2, 2 1/8, 2 1/4, 2 1/2
<b>EDP No.</b>	11127 Std	plain bushings only
	11327 TiN	plain bushings only

## No. 40 Set

Same as No. 40A Set, but for sixteenth-sized bores.

4 Broaches and 8 Bushings = 32 Keyway combinations.

Keyway Sizes	Broach Style	Bushing Diameters (bore sizes)
5/16, 3/8	D	1 7/16, 1 9/16, 1 11/16, 1 13/16,
7/16, 1/2	D	1 15/16, 2 3/16, 2 7/16, 2 15/16
<b>EDP No.</b>	11129 Std	plain bushings only
	11329 TiN	plain bushings only

## No. 40 1/2 A Heavy Duty Set

The most common keyway combinations for large keyways and bores.

2 Broaches and 6 Bushings = 12 Keyway combinations.

Keyway Sizes	Broach Style	Bushing Diameters (bore sizes)
5/8	E	2 3/8, 2 1/2, 2 5/8,
3/4	E	2 3/4, 2 7/8, 3
<b>EDP No.</b>	11131 Std	plain bushings only
	11331 TiN	plain bushings only

## No. 40 1/2 Heavy Duty Set

Same as No. 40 1/2 A Set, but for sixteenth-sized bores.

2 Broaches and 6 Bushings = 12 Keyway combinations.

Keyway Sizes	Broach Style	Bushing Diameters (bore sizes)
5/8	E	2 5/16, 2 7/16, 2 9/16,
3/4	E	2 11/16, 2 13/16, 2 15/16
<b>EDP No.</b>	11133 Std	plain bushings only
	11333 TiN	plain bushings only

## Specials

All standard items are available with **TiAIN** coating from stock or short delivery. Please contact factory for details.



# Keyway Broach Sets

1/8 through 3/4 inch sizes

## Applications:

- Virtually all standard broaching operations – our most complete set



### No. 50 Heavy Duty Set

Includes the most common keyway combinations for medium and large keyways.

3 Broaches and 17 Bushings = 29 Keyway combinations.

Keyway Sizes	Broach Style	Bushing Diameters (bore sizes)
1/2	D	2, 2 <sup>1</sup> / <sub>16</sub> , 2 <sup>1</sup> / <sub>8</sub> , 2 <sup>3</sup> / <sub>16</sub> , 2 <sup>1</sup> / <sub>4</sub>
5/8	E	2 <sup>5</sup> / <sub>16</sub> , 2 <sup>3</sup> / <sub>8</sub> , 2 <sup>7</sup> / <sub>16</sub> , 2 <sup>1</sup> / <sub>2</sub> , 2 <sup>9</sup> / <sub>16</sub> , 2 <sup>5</sup> / <sub>8</sub>
3/4	E	2 <sup>11</sup> / <sub>16</sub> , 2 <sup>3</sup> / <sub>4</sub> , 2 <sup>13</sup> / <sub>16</sub> , 2 <sup>7</sup> / <sub>8</sub> , 2 <sup>15</sup> / <sub>16</sub> , 3
<b>EDP No.</b>	11135 Std	plain bushings only
	11335 TiN	plain bushings only

### No. 100 Heavy Duty Combination Set

The most complete Minute Man® Broach Set available; including all popular combinations without duplication. This set is furnished in three handsome varnished wood boxes for convenient handling and storage, and comes with Broaches, slotted Bushings, and necessary Shims.

9 Broaches and 44 Bushings = 102 Keyway combinations.

Keyway Sizes	Broach Style	Bushing Diameters (bore sizes)
1/8	B	1/2, 9/ <sub>16</sub> , 5/ <sub>8</sub> , 11/ <sub>16</sub> ,
3/16	B	3/4, 13/ <sub>16</sub> , 7/ <sub>8</sub>
1/4	C	15/ <sub>16</sub> , 1, 11/ <sub>16</sub> , 11/ <sub>8</sub> , 13/ <sub>16</sub> , 11/ <sub>4</sub> ,
5/16	C	15/ <sub>16</sub> , 13/ <sub>8</sub> , 17/ <sub>16</sub> , 11/ <sub>2</sub> , 19/ <sub>16</sub>
3/8	D	17/ <sub>16</sub> , 11/ <sub>2</sub> , 19/ <sub>16</sub> , 15/ <sub>8</sub> , 111/ <sub>16</sub> ,
7/16	D	13/ <sub>4</sub> , 113/ <sub>16</sub> , 17/ <sub>8</sub> , 15/ <sub>16</sub> , 2,
1/2	D	21/ <sub>16</sub> , 21/ <sub>8</sub> , 23/ <sub>16</sub> , 21/ <sub>4</sub>
5/8	E	25/ <sub>16</sub> , 23/ <sub>8</sub> , 27/ <sub>16</sub> , 21/ <sub>2</sub> , 29/ <sub>16</sub> , 25/ <sub>8</sub> ,
3/4	E	211/ <sub>16</sub> , 23/ <sub>4</sub> , 213/ <sub>16</sub> , 27/ <sub>8</sub> , 215/ <sub>16</sub> , 3
<b>EDP No.</b>	11136 Std	collared B and C bushings, plain D and E bushings
	11336 TiN	collared B and C bushings, plain D and E bushings

### Specials

All standard items are available with **TiAIN** coating from stock or short delivery. Please contact factory for details.

# Metric Keyway Broach Sets

2mm through 18mm (I.S.O.)

## Applications:

- Short Run Production
- General Maintenance



### No. 60 Metric Set

The most common metric keyway combination for small keyways and bores.

2 Broaches and 3 Bushings = 6 Keyway combinations.

Keyway Sizes	Broach Style	Bushing Diameters (bore sizes)
2mm	A	6, 8, 10
3mm	A	
<b>EDP No.</b>	44497 Std	collared bushings only
	44397 TiN	collared bushings only

### No. 70 Metric Set

Our most popular metric broach set.

4 Broaches and 13 Bushings = 26 Keyway combinations.

Keyway Sizes	Broach Style	Bushing Diameters (bore sizes)
4mm	B1	12, 14,
5mm	B1	15, 16
6mm	C	18, 19, 20, 22,
8mm	C	24, 25, 26, 28, 30
<b>EDP No.</b>	44498 Std	collared bushings only
	44398 TiN	collared bushings only

### No. 80 Metric Set

The most common metric keyway combination for medium-sized keyways and bores.

3 Broaches and 12 Bushings = 36 Keyway combinations.

Keyway Sizes	Broach Style	Bushing Diameters (bore sizes)
10mm	D	32, 34, 35, 36,
12mm	D	38, 40, 42, 44,
14mm	D	45, 46, 48, 50
<b>EDP No.</b>	44499 Std	plain bushings only
	44399 TiN	plain bushings only

### No. 90 Metric Set

The most common metric keyway combination for large keyways and bores.

2 Broaches and 8 Bushings = 16 Keyway combinations.

Keyway Sizes	Broach Style	Bushing Diameters (bore sizes)
16mm	E	52, 54, 55, 56,
18mm	E	58, 60, 62, 65
<b>EDP No.</b>	44500 Std	plain bushings only
	44300 TiN	plain bushings only

### Specials

All standard items are available with **TiAIN** coating from stock or short delivery. Please contact factory for details.

# Keyway Broaches

1/16 through 1 1/2 inch sizes

## Applications:

- Short Run Production
- General Maintenance



## Stock Keyway Broaches

Broaches are supplied with necessary Shims unless otherwise noted. For extra or replacement Shims see the table below.

Std EDP No.	TiN EDP No.	TiAIN EDP No.	Broach Size	Tolerances	Broach Dimensions	Shims Req'd.	Length of Cut* Min. & Max.	Pressure Req'd. for Max. L/C*
22201	22301	22801	1/16-A	.0625 -.0635	1/8 x 5	0	13/64 1 1/8	390 lbs.
22202	22302	22802	3/32-A	.0938 -.0948	1/8 x 5	0	13/64 1 1/8	780
22203	22303	22803	1/8-A	.1252 -.1262	1/8 x 5	1	13/64 1 1/8	650
22204	22304	22804	3/32-B	.0938 -.0948	3/16 x 6 3/4	0	19/64 1 11/16	930
22205	22305	22805	1/8-B	.1252 -.1262	3/16 x 6 3/4	1	19/64 1 11/16	720
22206	22306	22806	5/32-B	.1564 -.1574	3/16 x 6 3/4	1	19/64 1 11/16	1320
22207	22307	22807	3/16-B	.1877 -.1887	3/16 x 6 3/4	1	19/64 1 11/16	1860
22208	22308	22808	3/16-C	.1877 -.1887	3/8 x 11 3/4	1	25/64 2 1/2	1540
22209	22309	22809	1/4-C	.2502 -.2512	3/8 x 11 3/4	1	25/64 2 1/2	2520
22210	22310	22810	5/16-C	.3127 -.3137	3/8 x 11 3/4	2	25/64 2 1/2	3960
22211	22311	22811	3/8-C	.3755 -.3765	3/8 x 11 3/4	2	25/64 2 1/2	4340
22212	22312	22812	5/16-D	.3127 -.3137	9/16 x 13 7/8	2	1 6	8000
22213	22313	22813	3/8-D	.3755 -.3765	9/16 x 13 7/8	2	1 6	7000
22214	22314	22814	7/16-D	.4380 -.4390	9/16 x 13 7/8	3	1 6	9400
22215	22315	22815	1/2-D	.5006 -.5016	9/16 x 13 7/8	3	1 6	9800
10142	10342	10842	9/16-D	.5631 -.5641	9/16 x 13 7/8	4	1 6	8900
22216	22316	22816	5/8-E	.6260 -.6270	3/4 x 15 1/2	4	1 6	9600
22217	22317	22817	3/4-E	.7515 -.7525	3/4 x 15 1/2	5	1 6	11900
22218	22318	22818	7/8-F	.8765 -.8775	1 x 20 1/4	6	1 6	9800
22219	22319	22819	1-F	1.0015 -.1.0025	1 x 20 1/4	7	1 6	11100
10171			1 1/8	1.1265 -.1.1275	1 1/8 x 20 1/4	8	1 6	14750
10172			1 1/4	1.2520 -.1.2530	1 1/4 x 20 1/4	9	1 1/2 8	22100
10173			1 3/8	1.3770 -.1.3780	1 3/8 x 20 1/4	10**	1 1/2 8	23500
10174			1 1/2	1.5020 -.1.5030	1 1/2 x 20 1/4	11**	1 1/2 8	26500

\*Based on mild steel

\*\*Shims are not supplied with these Broaches

## Extra Shims

Extra Shims are provided in necessary Shim Sets only. For Broaches larger than 1 1/4" progressive Shims are available as special items. Please specify EDP No. when ordering extra or replacement Shims. Shims correspond to Broach size, not to Bushing type.

EDP No.	Broach Size	#/Set	Shim Thickness
22250	1/8-A	1	.031
22252	1/8-B	1	.031
22253	5/32-B	1	.042
22254	3/16-B	1	.050
22255	3/16-C	1	.050
22256	1/4-C	1	.0625

EDP No.	Broach Size	#/Set	Shim Thickness
22257	5/16-C	2	.055
22258	3/8-C	2	.0625
22259	5/16-D	2	.056
22260	3/8-D	2	.0625
22261	7/16-D	3	.056
22262	1/2-D	3	.0625
22269	9/16-D	4	.056

EDP No.	Broach Size	#/Set	Shim Thickness
22263	5/8-E	4	.0625
22264	3/4-E	5	.0625
22265	7/8-F	6	.0625
22266	1-F	7	.0625
22267	1 1/8	8	.0625
22268	1 1/4	9	.0625

For Broaches larger than 1 1/4" Progressive Shims are available as special items.

## Specials

We are fully equipped to manufacture Special Keyway Broaches not listed above. **TiN or TiAIN coatings** are available. Please contact factory for details.

# Keyway Bushings

## Bushing Styles A through F



### Applications:

- To use Keyway Broaches in various bore sizes

### Keyway Bushings

duMONT Keyway Bushings enable the operator to use individual Keyway Broaches in a variety of bore sizes. Both Bushings and Broaches are designated by a letter which signifies the width of the Keyway Broach and Bushing opening. For proper fit, use Bushings with the same letter designation as the Broach being used – i.e. "A" Bushings with "A" Broaches, "B" Bushings with "B" Broaches, etc.

### A Bushings for A Broaches

Dia.	Length	EDP No. Collared Only
1/4	1 1/8	33301
5/16	1 1/8	33302
3/8	1 1/8	33303
7/16	1 1/8	33304
1/2	1 1/8	33305

### B Bushings for B Broaches

Dia.	Length	EDP No. Collared Only
1/2	1 11/16	33313
9/16	1 11/16	33314
5/8	1 11/16	33315
11/16	1 11/16	33316
3/4	1 11/16	33317
13/16	1 11/16	33318
7/8	1 11/16	33319

### C Bushings for C Broaches

Dia.	Length	EDP No. Collared Only
3/4	2 1/2	33334
13/16	2 1/2	33335
7/8	2 1/2	33336
15/16	2 1/2	33337
1	2 1/2	33338
1 1/16	2 1/2	33339
1 1/8	2 1/2	33340
1 3/16	2 1/2	33341
1 1/4	2 1/2	33342
1 5/16	2 1/2	33343
1 3/8	2 1/2	33344
1 7/16	2 1/2	33345
1 1/2	2 1/2	33346
1 9/16	2 1/2	33347

### Specials

We are fully equipped to manufacture Special Bushings not listed above. Please contact factory for details.



### D Bushings for D Broaches

Dia.	Length	EDP No. Plain Only
17/16	4	33348
1 1/2	4	33349
19/16	4	33350
15/8	4	33351
1 11/16	4	33352
1 3/4	4	33353
1 13/16	5	33354
1 7/8	5	33355
1 15/16	5	33356
2	5	33357
2 1/16	5	33358
2 1/8	5	33359
2 3/16	5	33360
2 1/4	5	33361
2 5/16	5	33362
2 3/8	6	33363
2 7/16	6	33364
2 1/2	6	33365
2 9/16	6	33366
2 5/8	6	33367
2 11/16	6	33368
2 3/4	6	33369
2 13/16	6	33370
2 7/8	6	33371
2 15/16	6	33372
3	6	33373

### E Bushings for E Broaches

Dia.	Length	EDP No. Plain Only
2 5/16	6	33374
2 3/8	6	33375
2 7/16	6	33376
2 1/2	6	33377
2 9/16	6	33378
2 5/8	6	33379
2 11/16	6	33380
2 3/4	6	33381
2 13/16	6	33382
2 7/8	6	33383
2 15/16	6	33384
3	6	33385
3 1/16	6	33386
3 1/8	6	33387
3 3/16	6	33388
3 1/4	6	33389
3 5/16	6	33390
3 3/8	6	33391
3 7/16	6	33392
3 1/2	6	33393
3 9/16	6	33394
3 5/8	6	33395
3 11/16	6	33396
3 3/4	6	33397
3 13/16	6	33398
3 7/8	6	33399
3 15/16	6	33400
4	6	33401

### F Bushings for F Broaches

Dia.	Length	EDP No. Plain Only
3 1/16	6	33500
3 1/8	6	33501
3 3/16	6	33502
3 1/4	6	33503
3 5/16	6	33504
3 3/8	6	33505
3 7/16	6	33506
3 1/2	6	33507
3 9/16	6	33508
3 5/8	6	33509
3 11/16	6	33510
3 3/4	6	33511
3 13/16	6	33512
3 7/8	6	33513
3 15/16	6	33514
4	6	33515
4 1/16	6	33516
4 1/8	6	33517
4 3/16	6	33518
4 1/4	6	33519
4 5/16	6	33520
4 3/8	6	33521
4 7/16	6	33522
4 1/2	6	33523
4 9/16	6	33524
4 5/8	6	33525
4 11/16	6	33526
4 3/4	6	33527
4 13/16	6	33528
4 7/8	6	33529
4 15/16	6	33530
5	6	33531

# Metric Keyway Broaches

2mm through 45mm (I.S.O.)

## Applications:

- Short Run Production
- General Maintenance



## Stock Keyway Broaches

Broaches are supplied with necessary Shims unless otherwise noted. For extra or replacement Shims see the table below.

Std EDP No.	TiN EDP No.	TiAIN EDP No.	Broach Size mm	Tolerances (Decimal Equiv.)	Broach Dimensions in Inches	Standard Millimeter Keys	Shims Req'd.	Length of Cut* Min. & Max.	Pressure Req'd. for Max. L/C*
44401	44301	44801	2-A	.0782 - .0791	1/8 x 5	2 x 2	0	13/64 1 1/8	720 lbs.
44402	44302	44802	3-A	.1176 - .1185	1/8 x 5	3 x 3	1	13/64 1 1/8	650
44403	44303	44803	4-B1	.1569 - .1579	1/4 x 6 3/4	4 x 4	1	19/64 11 1/16	1140
44404	44304	44804	5-B1	.1963 - .1972	1/4 x 6 3/4	5 x 5	1	19/64 11 1/16	1860
44405	44305	44805	5-C	.1963 - .1972	3/8 x 11 3/4	5 x 5	1	25/64 2 1/2	1470
44406	44306	44806	6-C	.2356 - .2366	3/8 x 11 3/4	6 x 6	1	25/64 2 1/2	2100
10232	10332	10832	7-C	.2749 - .2763	3/8 x 11 3/4	7 x 6	1	25/64 2 1/2	2900
44407	44307	44807	8-C	.3143 - .3155	3/8 x 11 3/4	8 x 7	2	25/64 2 1/2	3680
44408	44308	44808	10-D	.3930 - .3942	9/16 x 13 7/8	10 x 8	2	1 6	6500
44409	44309	44809	12-D	.4716 - .4730	9/16 x 13 7/8	12 x 8	2	1 6	8400
44410	44310	44810	14-D	.5503 - .5517	9/16 x 13 7/8	14 x 9	2	1 6	11100
44411	44311	44811	16-E	.6290 - .6304	3/4 x 15 1/2	16 x 10	3	1 6	9400
44412	44312	44812	18-E	.7078 - .7092	3/4 x 15 1/2	18 x 11	3	1 6	10600
44413	44313	44813	20-F	.7864 - .7880	1 x 20 1/4	20 x 12	3	1 6	8800
44414	44314	44814	22-F	.8651 - .8667	1 x 20 1/4	22 x 14	4	1 6	9400
44415	44315	44815	24-F	.9439 - .9455	1 x 20 1/4	24 x 14	5	1 6	10600
44494	44394	44894	25-F	.9832 - .9848	1 x 20 1/4	25 x 14	4	1 6	12300
10233			28	1.1025 - 1.1035	1 1/8 x 20 1/4	28 x 16	5	1 6	12000
10234			32	1.2600 - 1.2610	1 1/4 x 20 1/4	32 x 18	5	1 1/2 8	20600
10235			36	1.4175 - 1.4185	1 7/16 x 20 1/4	36 x 20	7**	1 1/2 8	24200
10236			40	1.5753 - 1.5760	1 9/16 x 20 1/4	40 x 22	7**	1 1/2 8	22500
10237			45	1.7718 - 1.7728	1 3/4 x 20 1/4	45 x 25	8**	1 1/2 8	27200

\*Based on mild steel

\*\*Shims are not supplied with these Broaches

## Extra Shims

Extra Shims are provided in necessary Shim Sets only. For Broaches larger than 32mm, progressive Shims are available as special items. Please specify EDP No. when ordering extra or replacement Shims. Shims correspond to Broach Size, not to Bushing type.

EDP No.	Broach Size mm	#/Set	Shim Thickness
44480	3-A	1	.031
44481	4-B1	1	.038
44482	5-B1	1	.050
44483	5-C	1	.047
44484	6-C	1	.0625
44577	7-C	1	.0625
44485	8-C	2	.050

EDP No.	Broach Size mm	#/Set	Shim Thickness
44486	10-D	2	.056
44487	12-D	2	.056
44488	14-D	2	.0625
44489	16-E	3	.056
44490	18-E	3	.056

EDP No.	Broach Size mm	#/Set	Shim Thickness
44491	20-F	3	.0625
44492	22-F	4	.056
44493	24-F	5	.0625
44496	25-F	4	.056
44478	28	5	.056
44479	32	5	.0625

For Broaches larger than 32mm Progressive Shims are available as special items.

## Specials

We are fully equipped to manufacture Special Keyway Broaches not listed above. **TiN or TiAIN coatings** are available. Please contact factory for details.

# Metric Keyway Bushings

## Bushing Styles A through F

### Applications:

- To use metric Keyway Broaches in various metric bore sizes



### A Bushings for A Broaches

Dia. mm	Dec. Equiv.	EDP No. Collared Only
6	.2362	44501
8	.315	44431
10	.3937	44432
12	.4724	44502
15	.5905	44503

### D Bushings for D Broaches

Dia. mm	Dec. Equiv.	EDP No. Plain Only
32	1.2598	44449
34	1.3386	44450
35	1.3779	44451
36	1.4173	44452
38	1.4961	44453
40	1.5748	44454
42	1.6535	44455
44	1.7323	44456
45	1.7716	44457
46	1.8110	44458
48	1.8898	44459
50	1.9685	44460
52	2.0472	44461
54	2.1260	44462
56	2.2047	44463

### B1 Bushings for B1 Broaches

Dia. mm	Dec. Equiv.	EDP No. Collared Only
12	.4724	44433
14	.5512	44434
15	.5905	44504
16	.6299	44435
17	.6693	44505
18	.7087	44436
19	.7480	44506

### E Bushings for E Broaches

Dia. mm	Dec. Equiv.	EDP No. Plain Only
52	2.0472	44464
54	2.1260	44465
55	2.1653	44466
56	2.2047	44467
58	2.2835	44468
60	2.3622	44469
62	2.4409	44470
63	2.4803	44471
64	2.5197	44472
65	2.5590	44473
66	2.5984	44474
68	2.6772	44475
70	2.7559	44476
72	2.8346	44477

### Metric Keyway Bushings

duMONT Metric Keyway Bushings enable the operator to use individual Metric Keyway Broaches in a variety of bore sizes. Both Bushings and Broaches are designated by a letter which signifies the width of the Keyway Broach and Bushing opening. For proper fit, use Bushings with the same letter designation as the Broach being used i.e. Metric "A" Bushings with Metric "A" Broaches, Metric "B1" Bushings with Metric "B1" Broaches, etc.

### C Bushings for C Broaches

Dia. mm	Dec. Equiv.	EDP No. Collared Only
18	.7087	44437
19	.7480	44438
20	.7874	44439
22	.8661	44440
24	.9449	44441
25	.9842	44442
26	1.0236	44443
28	1.1024	44444
30	1.1811	44445
32	1.2598	44446
34	1.3386	44447
35	1.3779	44507
36	1.4173	44448

### F Bushings for F Broaches

Dia. mm	Dec. Equiv.	EDP No. Plain Only
75	2.9527	44540
80	3.1496	44541
85	3.3464	44542
90	3.5433	44543
95	3.7401	44544
100	3.9370	44545
105	4.1338	44546
110	4.3307	44547
115	4.5275	44548
120	4.7244	44549

### Specials

We are fully equipped to manufacture Special Bushings not listed above. Please contact factory for details.

# One-Pass Broaches

1/8 through 3/8 inch sizes  
3mm through 14mm (I.S.O.)

## Applications:

- High Speed Operation
- Accurate Small Run Production



## One-Pass Keyway Broaches

duMONT Minute Man® One-Pass Keyway Broaches are designed for smaller production runs of identical keyways in varying bores. Used with the appropriate Bushing size (American Standard or Metric) and Style (see pages 8 and 10) to cut to full width and depth in one-pass, no shimming required. Reminder – Broach and Bushing Style must match – "A" Broaches with "A" Bushings, "B" Broaches with "B" Bushings, etc. A special chamfering feature that will deburr the keyway while it is being broached is also available.

TiN or TiAlN coatings available.

## Stock One-Pass Broaches – Inch

EDP No.	Broach Size	Broach Dimensions	Tooth Pitch	Length of Cut* Min. & Max.		Pressure Req'd. for Max. L/C*
				19/64	1 11/16	
55507	1/8-B	3/16 x 10 <sup>3</sup> /4	1/4	19/64	1 11/16	800 lbs.
55508	5/32-B	3/16 x 10 <sup>3</sup> /4	1/4	19/64	1 11/16	1450
55509	3/16-B	3/16 x 10 <sup>3</sup> /4	1/4	19/64	1 11/16	2050
55501	1/8-C	3/8 x 14 <sup>1</sup> /8	9/32	19/64	2	900
55502	5/32-C	3/8 x 14 <sup>1</sup> /8	9/32	19/64	2	1360
55503	3/16-C	3/8 x 17	9/32	19/64	2	1570
55504	1/4-C	3/8 x 17	9/32	19/64	2	2560
55505	5/16-C	3/8 x 18 <sup>1</sup> /2	9/32	19/64	2	3900
55506	3/8-C	3/8 x 18 <sup>1</sup> /2	9/32	19/64	2	5300

\*Based on mild steel

## Stock One-Pass Broaches – Metric

EDP No.	Broach Size mm	Broach Dimensions	Tooth Pitch	Length of Cut* Min. & Max.		Pressure Req'd. for Max. L/C*
				13/64	1	
55510	3-A	1/8 x 7 <sup>3</sup> /4	3/16	13/64	1	675 lbs.
55511	4-B1	1/4 x 10 <sup>3</sup> /4	1/4	3/8	1 5/8	1550
55512	5-B1	1/4 x 10 <sup>3</sup> /4	1/4	3/8	1 5/8	2430
55513	6-C	3/8 x 17	9/32	3/8	1 3/4	2240
55514	8-C	3/8 x 18 <sup>1</sup> /2	5/16	3/8	2	3485
55515	10-D	9/16 x 24	3/8	25/64	2	3410
55516	12-D	9/16 x 24	3/8	25/64	2	4220
55517	14-D	9/16 x 24	3/8	25/64	2	5670

\*Based on mild steel

## Specials

We are fully equipped to manufacture Special One-Pass Broaches to your specifications. A special chamfering feature that will deburr the keyway while it is being broached is also available. All standard items are available with TiN or TiAlN coatings from stock or short delivery. Please contact factory for details.

# Production Keyway Broaches

## Push-Type Keyway Broaches

### Applications:

- High Speed Operation
- Accurate Long Run Production



### Production Broach Construction



*Shoulders and back are form-ground to fit bore.  
These 3 supporting surfaces extend the full  
length of the broach.*

### Production Keyway Broaches

Minute Man® Production Keyway Broaches offer maximum speed and accuracy in production runs of identical bores, using either hydraulic or hand-operated presses. These Broaches are self-supporting – no Shims or Bushings are required.

### Stock Production Keyway Broaches

Production Keyway Broaches are designed for large production runs of identical keyways with identical bores. No Shims or Bushings required. A special chamfering feature that will deburr the keyway while it is being broached is also available. **TiN or TiAlN coatings available.**

EDP No.	Keyway Width	Body Diameter	A Dimension	Broach Length	Tooth Pitch	Length of Cut* Min. & Max.	Pressure Req'd for Max. L/C*
55520	1/16	3/16	.224	5 5/8	3/16	13/64 1	390 lbs.
55521	1/16	1/4	.287	6 3/16	3/16	13/64 1	390
55522	1/8	3/8	.437	8 1/2	1/4	17/64 1 1/4	850
55523	1/8	1/2	.565	11 3/4	3/8	25/64 2 1/2	1440
55524	1/8	9/16	.630	11 3/4	3/8	25/64 2 1/2	1440
55525	1/8	5/8	.693	11 3/4	3/8	25/64 2 1/2	1440
55526	3/16	5/8	.716	14 3/4	3/8	25/64 2 1/2	2170
55528	3/16	3/4	.844	14 3/4	3/8	25/64 2 1/2	2170
55530	3/16	7/8	.970	14 3/4	3/8	25/64 2 1/2	2170
55532	1/4	1	1.121	18	3/8	25/64 2 1/2	2870
55533	4mm	10mm	11.9mm .468	12	9/32	19/64 1 7/8	1550

\*Based on mild steel

### Specials

We are fully equipped to manufacture Special Production Style Broaches to your specifications. A special chamfering feature that will deburr the keyway while it is being broached is also available. All standard items are available with **TiN or TiAlN coatings** from stock or short delivery. Please contact factory for details.

# Keyseating Broaches

1/16 through 1 1/2 inch sizes  
2mm through 25mm (I.S.O.)

## Applications:

- For Hansford Davis Keyseating machine Modes 4, 5, and 15



## Stock Keyseating Broaches, Type AF

Minute Man® Keyseating Broaches feature superior tooth design and are ground to precision keyway tolerances. Sizes for cutting the most common keyway widths are available. TiN or TiAlN coatings available.



### Type AF Inch

EDP No.	Broach Size	Overall Length	Tooth Height	Tooth Pitch
55550	1/16*	16	3/8	3/8
55551	3/32*	16	3/8	3/8
55552	1/8*	16	7/16	3/8
55553	5/32	16	1/2	3/8
55554	3/16	16	9/16	3/8
55555	1/4	16	3/4	3/8
55556	1/4	20	3/4	3/8
55557	5/16	16	7/8	17/32
55558	5/16	20	7/8	17/32
55559	3/8	16	7/8	17/32
55560	3/8	20	7/8	17/32
55561	7/16	20	1	17/32
55562	1/2	20	1	17/32
55563	9/16	20	1	17/32
55564	5/8	20	1	17/32
55565	3/4	20	1	17/32
55566	7/8	20	1	17/32
55567	1	20	1	17/32

\*Reinforced body width 3/16" thick

## Stock Keyseating Broaches, Type AFS

Staggered Tooth AFS Type Keyseating Broaches provide a stagger tooth design, promoting an efficient cut.

TiN or TiAlN coatings available.

### Type AFS Inch

EDP No.	Broach Size	Overall Length	Tooth Height	Tooth Pitch
55601	3/8	20	1	17/32
55602	3/8	20	1 1/2	3/4
55603	7/16	20	1	17/32
55604	1/2	20	1	17/32
55605	9/16	20	1	17/32
55606	5/8	20	1	17/32
55607	3/4	20	1	17/32
55608	7/8	20	1	17/32
55609	1	20	1	17/32
55610	1 1/8	20	1 3/4	3/4
55611	1 1/4	20	1 3/4	3/4
55612	1 1/2	20	1 3/4	3/4

\*Reinforced body width 3/16" thick

## Specials

We are fully equipped to manufacture Special Keyseating Broaches not listed above. All standard items are available with TiN or TiAlN coatings from stock or short delivery. Please contact factory for details.

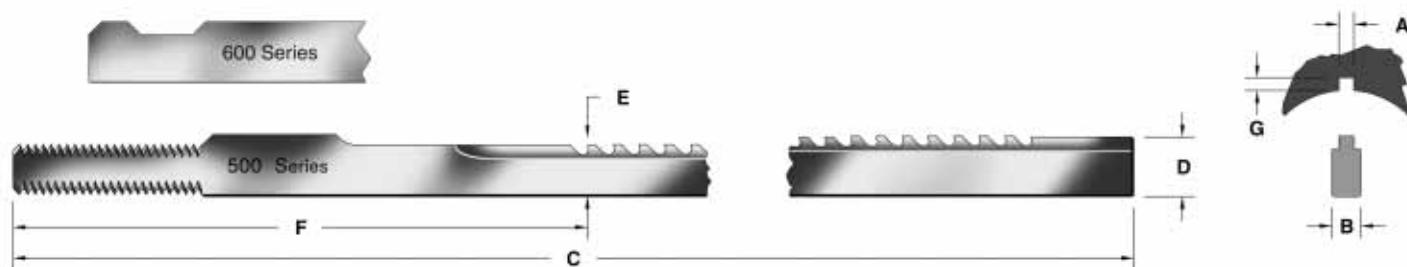
# Pull-Type Keyway Broaches

Industry Standard 500 and 600 Series

1/16 through 1 inch sizes

## Applications:

- For high volume production pull-type machines



## Industry Standard 500 and 600 Series

duMONT Minute Man® offers the most common American Standard (1/16-1") Pull-Type Keyway Broaches for use in high volume production. Available either as Industry Standard 500 Series with threaded pull end or 600 Series with notched pull end.

EDP No. 500 Series	EDP No. 600 Series	A Nom. Dim. <sup>†</sup>	Min. Decimal Dim. <sup>†</sup>	Min. Hole Size	Min. Length Cut#	Max. Length Cut*	B	C	D	E	F	G	No. of Cuts	Thread Size
10501	10601	1/16	.0635	3/8	3/8	1 1/4	.1552	20	.313	.271	7 13/16	.042	1	1/4 - 20
10502	10602	3/32	.0948	7/16	1/2	1 1/2	.1865	24	.367	.309	8 1/4	.058	1	5/16 - 18
10503	10603	3/32	.0948	9/16	5/8	2 1/2	.2490	33	.491	.433	10	.058	1	3/8 - 16
10504	10604	1/8	.1260	1/2	1/2	1 1/2	.2490	30	.438	.364	9	.074	1	3/8 - 16
10505	10605	1/8	.1260	11/16	5/8	2 1/2	.3115	33	.594	.520	10	.074	1	1/2 - 13
10506	10606	5/32	.1572	19/32	1/2	1 1/2	.2490	30	.525	.436	9	.089	1	3/8 - 16
10507	10607	5/32	.1572	23/32	5/8	2 1/2	.3115	33	.625	.536	10	.089	1	1/2 - 13
10508	10608	3/16	.1885	11/16	5/8	2 1/2	.3740	36	.581	.476	10	.105	1	1/2 - 13
10509	10609	3/16	.1885	7/8	11/16	3 1/2	.3740	36	.796	.691	10 11/16	.105	1	1/2 - 13
10510	10610	7/32	.2198	11/16	5/8	2 1/2	.3740	33	.557	.437	10	.120	1	1/2 - 13
10511	10611	7/32	.2198	15/16	11/16	3 1/2	.3740	42	.813	.693	11 1/16	.120	1	1/2 - 13
10512	10612	1/4	.2510	3/4	5/8	2 1/2	.3740	36	.612	.476	10	.136	1	1/2 - 13
10513	10613	1/4	.2510	1	11/16	4	.4990	45	.877	.741	12	.136	1	5/8 - 11
10514	10614	1/4	.2510	13/8	7/8	6	.6240	51	1.250	1.114	13 3/4	.136	1	3/4 - 10
10515	10615	9/32	.2828	7/8	11/16	4	.4990	42	.716	.564	11 5/8	.152	1	5/8 - 11
10516	10616	9/32	.2828	11/4	7/8	6	.4990	51	1.093	.941	13 1/2	.152	1	5/8 - 11
10517	10617	5/16	.3140	11/16	11/16	4	.4990	45	.908	.741	12	.167	1	5/8 - 11
10518	10618	5/16	.3140	15/16	7/8	6	.4990	51	1.158	.991	13 3/4	.167	1	5/8 - 11
10519	10619	3/8	.3765	11/16	11/16	4	.4990	45	.938	.739	12	.199	1	5/8 - 11
10520	10620	3/8	.3765	15/16	7/8	6	.4990	54	1.189	.990	13 1/2	.199	1	5/8 - 11
10521	10621	7/16	.4390	19/16	11/16	4	.6240	48	1.390	1.160	12	.230	1	3/4 - 10
10522	10622	7/16	.4390	13/4	1	8	.6240	48	1.611	1.496	15 5/8	.230	2	3/4 - 10
10523	10623	1/2	.5015	11/2	11/16	4	.6240	48	1.312	1.051	12	.261	1	3/4 - 10
10524	10624	1/2	.5015	19/16	1	8	.6240	48	1.377	1.246	16 1/2	.261	2	3/4 - 10
10525	10625	9/16	.5645	111/16	11/16	4	.6865	54	1.438	1.146	11 13/16	.292	1	1 - 8
10526	10626	9/16	.5645	15/8	1	8	.6865	51	1.391	1.245	16	.292	2	1 - 8
10527	10627	9/16	.5645	115/16	11/8	12	.8740	60	1.641	1.495	20	.292	2	1 - 8
10528	10628	5/8	.6270	17/8	11/16	4	.7490	60	1.625	1.301	12	.324	1	1 - 8
10529	10629	5/8	.6270	115/16	1	8	.8740	54	1.657	1.495	16 3/8	.324	2	1 - 8
10530	10630	5/8	.6270	115/16	11/8	12	.8740	60	1.657	1.495	20	.324	2	1 - 8
10531	10631	3/4	.7520	115/16	11/16	4	.8740	60	1.625	1.239	12	.386	1	1 - 8
10532	10632	3/4	.7520	21/16	1	8	.9990	60	1.688	1.495	16 1/4	.386	2	1 1/4 - 7
10533	10633	3/4	.7520	21/16	11/8	12	.9990	60	1.688	1.560	20	.386	3	1 1/4 - 7
10534	10634	7/8	.8770	21/4	11/16	4	1.1240	63	1.875	1.426	12 3/8	.449	1	1 1/4 - 7
10535	10635	7/8	.8770	21/8	1	8	1.1240	63	1.719	1.494	15 3/4	.449	2	1 1/4 - 7
10536	10636	7/8	.8770	21/8	11/8	12	1.1240	63	1.719	1.569	20	.449	3	1 1/4 - 7
10537	10637	1	1.0020	21/4	5/8	2 1/2	1.2490	63	1.750	1.239	10 1/2	.511	1	1 1/2 - 6
10538	10638	1	1.0020	21/4	7/8	6	1.2490	63	1.750	1.494	14 1/4	.511	2	1 1/2 - 6
10539	10639	1	1.0020	21/4	11/8	12	1.2490	63	1.750	1.580	20	.511	3	1 1/2 - 6

† Tolerance - Based on +/- .0005

# Minimum length of part recommended to prevent part from dropping in between broach teeth

\*Based on mild steel

## Specials

We are fully equipped to manufacture Special Pull-Type Keyway Broaches to your specifications. A special chamfering feature that will deburr the keyway while it is being broached is also available. All standard items are available with **TiN or TiAlN coatings** from stock or short delivery. Please contact factory for details.

# Pull-Type Keyway Broaches

Industry Standard 5M and 6M Series  
2mm through 25mm (I.S.O.)

## Applications:

- For high volume production pull-type machines



## Industry Standard Metric 5M and 6M Series

duMONT Minute Man® offers the most common Metric (2–25mm) Pull-Type Keyway Broaches for use in high volume production. Available either as Industry Standard 5M Series with threaded pull end or 6M Series with notched pull end. See image page 14.

EDP No. 5M Series	EDP No. 6M Series	A Nom. Dim.	Min. Hole Size	Min. Length Cut#	Max. Length Cut*							No. of Cuts	Thread Size	
						B	C	D	E	F	G			
10561	10661	2	.0792	9 .354	9.5 3/8 1 1/4	31.8	3.942	508	7.95	6.60	197	1.35	1	1/4 - 20
10562	10662	3	.1186	11 .433	12.7 1/2 1 1/2	38	4.737	610	9.32	7.49	197	1.83	1	5/16 - 18
10563	10663	4	.1581	13 .512	12.7 1/2 1 1/2	38	6.325	838	11.13	8.81	229	2.31	1	3/8 - 16
10564	10664	4	.1581	13 .512	15.9 5/8 2 1/2	63.5	6.325	915	11.07	8.76	254	2.31	1	3/8 - 16
10565	10665	5	.1974	14 .551	14.3 9/16 1 3/4	44.5	7.91	915	11.07	8.18	248	2.89	1	1/2 - 13
10566	10666	5	.1974	23 .906	15.9 5/8 3	76.2	9.5	1067	20.65	17.75	279	2.89	1	1/2 - 13
10567	10667	6	.2368	18 .709	15.9 5/8 2 1/2	63.5	9.5	915	15.54	11.96	254	3.58	1	1/2 - 13
10568	10668	6	.2368	26 1.024	17.5 11/16 4	102	12.67	1143	22.28	18.69	305	3.58	1	5/8 - 11
10569	10669	8	.3157	27 1.063	17.5 11/16 4	102	12.67	1143	23.06	18.77	305	4.29	1	5/8 - 11
10570	10670	8	.3157	33 1.299	22.2 7/8 6	152	12.67	1295	29.41	25.12	353	4.29	1	5/8 - 11
10571	10671	10	.3944	27 1.063	17.5 11/16 4	102	12.67	1143	23.27	18.77	305	4.49	1	5/8 - 11
10572	10672	10	.3944	36 1.417	22.2 7/8 6	152	15.85	1295	31.75	27.25	353	4.49	1	3/4 - 10
10573	10673	12	.4733	39 1.535	17.5 11/16 4	102	15.85	1219	34.06	29.46	302	4.60	1	3/4 - 10
10574	10674	12	.4733	39 1.535	25.4 1 8	203	15.85	1524	34.06	29.46	406	4.60	1	3/4 - 10
10575	10675	14	.5520	40 1.575	17.5 11/16 4	102	17.44	1372	34.39	29.11	295	5.28	1	1 - 8
10576	10676	14	.5520	44 1.732	25.4 1 8	203	19.02	1524	38.33	33.04	400	5.28	1	1 - 8
10577	10677	16	.6308	47 1.850	17.5 11/16 4	102	19.02	1524	41.28	35.46	305	5.82	1	1 - 8
10578	10678	16	.6308	48 1.890	28.6 1 1/8 12	305	22.2	1524	41.28	38.35	508	5.82	2	1 - 8
10579	10679	18	.7095	48 1.890	17.5 11/16 4	102	22.2	1524	41.28	35.26	305	6.02	1	1 - 8
10580	10680	18	.7095	51 2.008	28.6 1 1/8 12	305	25.37	1524	42.88	39.85	513	6.02	2	1 1/4 - 7
10581	10681	20	.7884	56 2.205	17.5 11/16 4	102	28.55	1600	47.63	40.94	302	6.68	1	1 1/4 - 7
10582	10682	20	.7884	53 2.087	28.6 1 1/8 12	305	28.55	1600	43.66	40.31	503	6.68	2	1 1/4 - 7
10583	10683	22	.8672	57 2.244	17.5 11/16 4	102	28.55	1600	47.63	40.39	302	7.24	1	1 1/4 - 7
10584	10684	22	.8672	53 2.087	28.6 1 1/8 12	305	28.55	1600	43.66	40.03	503	7.24	2	1 1/4 - 7
10585	10685	25	.9853	56 2.205	17.5 11/16 4	102	31.72	1600	44.45	36.98	270	7.47	1	1 1/2 - 6
10586	10686	25	.9853	56 2.205	28.6 1 1/8 12	305	31.72	1600	44.45	40.72	508	7.47	2	1 1/2 - 6

† Tolerance - Based on +/- .0005    # Minimum length of part recommended to prevent part from dropping in between broach teeth    \*Based on mild steel

## Specials

We are fully equipped to manufacture Special Pull-Type Keyway Broaches to your specifications. A special chamfering feature that will deburr the keyway while it is being broached is also available. All standard items are available with **TiN or TiAlN coatings** from stock or short delivery. Please contact factory for details.

# Square Push Broaches

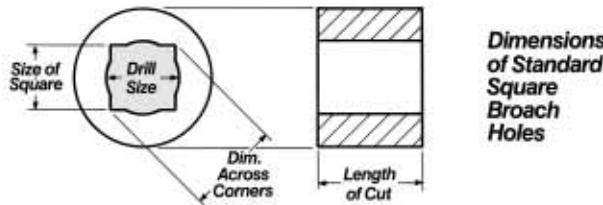
1/8 through 1 inch square

## Applications:

- Drives, jigs, fixtures, and other square broaching operations



## Dimensions of Standard Square Broach Holes



## Square Push Broaches

dUMONT Minute Man® Standard Square Broaches are designed to generate in one-pass a Standard Square hole in a previously cast or drilled round hole. Standard Square Broaches begin in an oversized pilot hole and generate the square hole while leaving small radii on the flats. Available from stock in the most common American Standard sizes (1/8–1").

TiN or TiAlN coatings available.

## Stock Standard Square Broaches

EDP No.	Square Size	Tolerances	Broach Length	Pilot† Diameter	Drill Size	Dimension Across Corners	Tooth Pitch	Length of Cut* Min. & Max.	Pressure Req'd. for Max. L/C*
66601	1/8	.1255 - .1265	4 <sup>1</sup> / <sub>8</sub>	.1285	No. 30	.1750 - .1770	1/8	3/16	1/2
66602	5/32	.1565 - .1575	5 <sup>1</sup> / <sub>8</sub>	.1590	No. 21	.2180 - .2200	5/32	1/4	1/2
66603	3/16	.1880 - .1890	5 <sup>9</sup> / <sub>16</sub>	.1935	No. 10	.2620 - .2640	5/32	1/4	5/8
66604	7/32	.2190 - .2200	6 <sup>3</sup> / <sub>8</sub>	.2280	No. 1	.3060 - .3080	3/16	1/4	3/4
66605	1/4	.2505 - .2515	6 <sup>1</sup> / <sub>2</sub>	.2656	17/64	.3510 - .3530	3/16	1/4	3/4
66606	9/32	.2815 - .2825	7 <sup>3</sup> / <sub>4</sub>	.2969	19/64	.3930 - .3950	7/32	5/16	1
66607	5/16	.3130 - .3140	7 <sup>7</sup> / <sub>8</sub>	.3281	21/64	.4370 - .4390	7/32	3/8	1
66608	11/32	.3440 - .3450	9 <sup>3</sup> / <sub>8</sub>	.3594	23/64	.4830 - .4850	1/4	3/8	1 1/4
66609	3/8	.3755 - .3765	9 <sup>3</sup> / <sub>8</sub>	.3906	25/64	.5240 - .5260	1/4	3/8	1 1/4
66610	13/32	.4065 - .4075	10 <sup>5</sup> / <sub>8</sub>	.4219	27/64	.5690 - .5710	9/32	1/2	1 3/8
66611	7/16	.4380 - .4390	10 <sup>7</sup> / <sub>8</sub>	.4531	29/64	.6110 - .6130	5/16	1/2	1 3/8
66612	15/32	.4690 - .4700	12	.5000	1/2	.6570 - .6590	5/16	1/2	1 3/8
66613	1/2	.5005 - .5015	12	.5312	17/32	.6990 - .7010	5/16	1/2	1 3/8
66614	9/16	.5630 - .5640	14 <sup>3</sup> / <sub>4</sub>	.5938	19/32	.7870 - .7890	3/8	1/2	1 1/2
66615	5/8	.6260 - .6270	16 <sup>5</sup> / <sub>16</sub>	.6562	21/32	.8730 - .8750	7/16	5/8	1 5/8
66616	11/16	.6885 - .6895	17 <sup>3</sup> / <sub>4</sub>	.7500	3/4	.9630 - .9650	7/16	5/8	1 5/8
66617	3/4	.7510 - .7520	17 <sup>3</sup> / <sub>4</sub>	.8125	13/16	1.0450 - 1.0470	7/16	5/8	1 5/8
66618	7/8	.8765 - .8775	22 <sup>3</sup> / <sub>4</sub>	.9375	15/16	1.2270 - 1.2290	7/16	5/8	2
66619	1	1.002 - 1.0030	24 <sup>1</sup> / <sub>8</sub>	1.0938	13/32	1.4030 - 1.4050	7/16	5/8	2

†Tolerances-Basic minus .0005-.001 inches

\*Based on mild steel

## Specials

We are fully equipped to manufacture Special Square Broaches not listed above to your specifications. All standard items are available with **TiN or TiAlN coatings** from stock or short delivery. Please contact factory for details.

# Full Square Push Broaches

3/16 through 1/2 inch full square

## Round Push Broaches

1/4 through 1 inch round

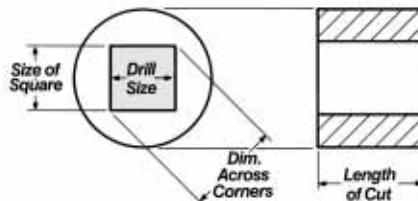


### Applications:

- Drives, jigs, and fixtures
- Sizing and finishing



### Dimensions of Full Square Broach Holes



### Full Square Broaches

duMONT Minute Man® Full Square Broaches are designed to generate in one-pass a Full Square hole in a previously cast or drilled round hole. The Broach leaves no radii on the flats of the broached piece and the pilot diameter equals the finished full square size. **TiN or TiAlN coatings available.**

### Stock Full Square Broaches

EDP No.	Full Square Size	Tolerances (Dec. Equiv.)	Broach Length	Pilot Diameter†	Drill Size	Dimension Across Corners	Tooth Pitch	Length of Cut* Min. & Max.	Pressure Req'd. for Max. LOC*
66403	3/16	.1880 - .1890	6	3/16	3/16	.2630 - .2650	1/8	3/16 1/2	870 lbs.
66405	1/4	.2505 - .2515	8 1/2	1/4	1/4	.3510 - .3530	5/32	1/4 5/8	1310
66407	5/16	.3130 - .3140	10 1/2	5/16	5/16	.4390 - .4410	3/16	5/16 7/8	1895
66409	3/8	.3755 - .3765	13 1/8	3/8	3/8	.5260 - .5280	7/32	5/16 1	2410
66411	7/16	.4385 - .4395	14 1/4	7/16	7/16	.6140 - .6160	7/32	5/16 1	3090
66413	1/2	.5005 - .5015	14 3/4	1/2	1/2	.7010 - .7030	1/4	3/8 1	3860

†Tolerances-Basic minus .0005-.001 inches

\*Based on mild steel

### Round Broaches

duMONT Minute Man® Round Broaches are designed to generate in one-pass a precision round hole in a previously cast, drilled or reamed round hole. These Internal Hole Broaches are ideal for precise tolerances, sizing and finish for those applications demanding precision and finish. Broaches are finished with variable pitch teeth and available in American Standard sizes (1/4-1"). A burnishing section can be furnished. Metric sizes available upon request.

**TiN or TiAlN coatings available.**



### Stock Round Broaches

EDP No.	Nominal Diameter	Tolerances	Broach Length	Pilot† Diameter	Drill Size	Length of Cut* Min. & Max.	Pressure Req'd. for Max. L/C*
77730	1/4	.2505 - .2510	5 7/8	.2344	15/64	5/16 3/4	840 lbs.
77731	5/16	.3130 - .3135	5 7/8	.2469	19/64	5/16 3/4	1050
77732	3/8	.3755 - .3760	6 7/8	.3594	23/64	3/8 1	1440
77733	7/16	.4380 - .4385	6 7/8	.4219	27/64	3/8 1	1680
77734	1/2	.5005 - .5010	8	.4844	31/64	1/2 1 1/4	2240
77736	5/8	.6255 - .6260	8 1/2	.6094	39/64	1/2 1 1/4	2500
77738	3/4	.7505 - .7510	9 1/8	.7344	47/64	5/8 1 1/2	3720
77740	7/8	.8755 - .8765	9 1/4	.8594	55/64	5/8 1 1/2	4340
77742	1	1.0005 - 1.0015	10 1/4	.9844	63/64	5/8 1 3/4	4970

†Tolerance-Basic minus .0005-.001 inches for standard drilled hole

\*Based on mild steel

### Specials

We are fully equipped to manufacture Special Full Square Broaches and Special Round Broaches not listed above to your specifications. All standard items are available with **TiN or TiAlN coatings** from stock or short delivery. Please contact factory for details.

# Hexagon Push Broaches

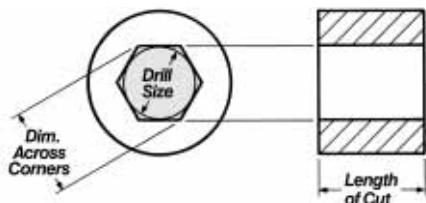
1/8 through 1 inch hex sizes

## Applications:

- Drives, jigs, fixtures, and other hexagonal broaching operations



## Dimensions of Standard Hexagon Broach Holes



## Hexagon Broaches

duMONT Minute Man® Hexagon Broaches are designed to generate in one-pass a Hexagon hole in a previously cast or drilled round hole. Available from stock in the most common American Standard sizes (1/8-1").  
TiN or TiAlN coatings available.

## Stock Hexagon Broaches

EDP No.	Hex Size	Tolerances	Broach Length	Pilot† Diameter	Drill Size	Dimension Across Corners	Tooth Pitch	Length of Cut* Min. & Max.	Pressure Req'd. for Max. L/C*
77701	1/8	.1255 - .1265	4 <sup>1</sup> / <sub>8</sub>	1/8	1/8	.1445 - .1455	1/8	3/16      3/8	200 lbs.
77702	5/32	.1565 - .1575	4 <sup>15</sup> / <sub>16</sub>	5/32	5/32	.1800 - .1815	1/8	1/4      1/2	300
77703	3/16	.1880 - .1890	5 <sup>1</sup> / <sub>16</sub>	3/16	3/16	.2160 - .2180	5/32	1/4      5/8	560
77704	7/32	.2190 - .2200	5 <sup>3</sup> / <sub>8</sub>	7/32	7/32	.2500 - .2520	5/32	1/4      3/4	775
77705	1/4	.2505 - .2515	6	1/4	1/4	.2870 - .2890	3/16	1/4      3/4	1025
77706	9/32	.2815 - .2825	7 <sup>1</sup> / <sub>4</sub>	9/32	9/32	.3230 - .3250	3/16	5/16      1	1290
77707	5/16	.3130 - .3140	7 <sup>3</sup> / <sub>4</sub>	5/16	5/16	.3590 - .3610	7/32	3/8      1	1510
77708	11/32	.3440 - .3450	7 <sup>3</sup> / <sub>4</sub>	11/32	11/32	.3950 - .3970	7/32	3/8      1 <sup>1</sup> / <sub>4</sub>	2280
77709	3/8	.3755 - .3765	8 <sup>1</sup> / <sub>2</sub>	3/8	3/8	.4310 - .4330	7/32	3/8      1 <sup>1</sup> / <sub>4</sub>	2400
77710	13/32	.4065 - .4075	9 <sup>5</sup> / <sub>8</sub>	13/32	13/32	.4670 - .4690	1/4	1/2      1 <sup>3</sup> / <sub>8</sub>	2790
77711	7/16	.4380 - .4390	10 <sup>1</sup> / <sub>2</sub>	7/16	7/16	.5040 - .5060	1/4	1/2      1 <sup>3</sup> / <sub>8</sub>	2700
77712	15/32	.4690 - .4700	11 <sup>7</sup> / <sub>8</sub>	15/32	15/32	.5390 - .5410	9/32	1/2      1 <sup>3</sup> / <sub>8</sub>	2700
77713	1/2	.5005 - .5015	11 <sup>7</sup> / <sub>8</sub>	1/2	1/2	.5750 - .5770	9/32	1/2      1 <sup>3</sup> / <sub>8</sub>	3025
77714	9/16	.5630 - .5640	13 <sup>3</sup> / <sub>4</sub>	9/16	9/16	.6480 - .6500	5/16	1/2      1 <sup>5</sup> / <sub>8</sub>	4800
77715	5/8	.6260 - .6270	16 <sup>1</sup> / <sub>4</sub>	5/8	5/8	.7200 - .7220	3/8	5/8      2	5400
77716	11/16	.6885 - .6895	16 <sup>3</sup> / <sub>4</sub>	11/16	11/16	.7920 - .7940	3/8	5/8      2	6000
77717	3/4	.7510 - .7520	17 <sup>1</sup> / <sub>4</sub>	3/4	3/4	.8650 - .8670	3/8	5/8      2	6960
77718	7/8	.8765 - .8775	18 <sup>1</sup> / <sub>2</sub>	7/8	7/8	1.0080 - 1.0100	3/8	5/8      2	8400
77719	1	1.0020 - 1.0030	19 <sup>3</sup> / <sub>4</sub>	1	1	1.1520 - 1.1540	3/8	5/8      2	11100

†Tolerances-Basic minus .0005-.001 inches   \*Based on mild steel

## Specials

We are fully equipped to manufacture Special Hexagon Broaches not listed above. All standard items are available with **TiN or TiAlN coatings** from stock or short delivery. Please contact factory for details.

**Metric Square**

4mm through 25mm square (I.S.O.)

**Hexagon Broaches**

4mm through 25mm hex (I.S.O.)

**Applications:**

- Metric drives, jigs, fixtures, and other square and hexagonal broaching operations

**Stock Metric Standard Square Broaches**

TiN or TiAlN coatings available.

EDP No.	Square Size mm	Tolerances (Dec. Equiv.)	Broach Length	Pilot† Diameter	Drill Size mm	Dimension Across Corners	Tooth Pitch	Length of Cut* Min. & Max.	Pressure Req'd. for Max. L/C*
66630	4	.1575 - .1580	5 <sup>1</sup> / <sub>8</sub>	.1614	4,1	.2205 - .2220	5/32	1/4 1/2	480 lbs.
66631	5	.1968 - .1973	6 <sup>1</sup> / <sub>2</sub>	.2047	5,2	.2765 - .2780	5/32	1/4 1/2	800
66632	6	.2362 - .2370	6 <sup>11</sup> / <sub>16</sub>	.2519	6,4	.3300 - .3320	3/16	1/4 3/4	1300
66633	7	.2756 - .2764	7 <sup>3</sup> / <sub>4</sub>	.2913	7,4	.3850 - .3870	7/32	3/8 1	1800
66634	8	.3150 - .3158	7 <sup>7</sup> / <sub>8</sub>	.3307	8,4	.4400 - .4420	7/32	3/8 1	2300
66639	9	.3543 - .3551	9 <sup>3</sup> / <sub>8</sub>	.3701	9,4	.4970 - .4990	1/4	3/8 11/4	3500
66635	10	.3937 - .3945	10 <sup>1</sup> / <sub>4</sub>	.4094	10,4	.5530 - .5550	1/4	3/8 11/4	3600
66636	12	.4724 - .4732	12	.5039	12,8	.6620 - .6640	5/16	1/2 13/8	4200
66637	14	.5512 - .5520	14 <sup>3</sup> / <sub>4</sub>	.5826	14,8	.7730 - .7750	3/8	1/2 11/2	5600
66638	16	.6302 - .6310	16 <sup>5</sup> / <sub>16</sub>	.6614	16,8	.8790 - .8810	7/16	5/8 15/8	6000
66640	18	.7090 - .7097	17 <sup>7</sup> / <sub>8</sub>	.7716	19,6	.9930 - .9950	7/16	5/8 15/8	5200
66641	20	.7874 - .7882	20 <sup>7</sup> / <sub>8</sub>	.8504	21,6	1.1030 - 1.1050	7/16	5/8 15/8	6600
66642	22	.8663 - .8671	22 <sup>3</sup> / <sub>4</sub>	.9291	23,6	1.2130 - 1.2150	7/16	5/8 2	8900
66643	24	.9453 - .9460	24	1.0079	25,6	1.3230 - 1.3250	7/16	5/8 2	9200
66644	25	.9845 - .9852	24 <sup>1</sup> / <sub>8</sub>	1.0630	27,0	1.3790 - 1.3810	7/16	5/8 2	9200

†Tolerances-Basic minus .0005-.001 inches \*Based on mild steel Refer to the diagram on page 16 for dimensions of standard Square Broach holes

**Stock Metric Hexagon Broaches**

TiN or TiAlN coatings available.

EDP No.	Hexagon Size mm	Tolerances (Dec. Equiv.)	Broach Length	Pilot† Diameter	Drill Size mm	Dimension Across Corners	Tooth Pitch	Length of Cut* Min. & Max.	Pressure Req'd. for Max. L/C*
77750	4	.1575 - .1580	4 <sup>15</sup> / <sub>16</sub>	.1575	4,0	.1810 - .1825	1/8	1/4 1/2	300 lbs.
77751	5	.1968 - .1973	5 <sup>3</sup> / <sub>8</sub>	.1968	5,0	.2260 - .2275	5/32	1/4 3/4	775
77752	6	.2362 - .2370	6	.2362	6,0	.2710 - .2730	3/16	1/4 3/4	1025
77753	7	.2756 - .2764	7 <sup>1</sup> / <sub>4</sub>	.2756	7,0	.3170 - .3190	3/16	1/4 1	1290
77754	8	.3150 - .3158	7 <sup>3</sup> / <sub>4</sub>	.3150	8,0	.3620 - .3640	7/32	3/8 1	1510
77759	9	.3545 - .3555	8 <sup>1</sup> / <sub>2</sub>	.3543	9,0	.4090 - .4110	7/32	3/8 11/4	2300
77755	10	.3937 - .3945	9 <sup>5</sup> / <sub>8</sub>	.3937	10,0	.4530 - .4550	1/4	1/2 13/8	2790
77756	12	.4724 - .4732	11 <sup>7</sup> / <sub>8</sub>	.4724	12,0	.5430 - .5450	9/32	1/2 13/8	2700
77757	14	.5512 - .5520	13 <sup>3</sup> / <sub>4</sub>	.5512	14,0	.6350 - .6370	5/16	1/2 15/8	4800
77758	16	.6302 - .6310	16 <sup>1</sup> / <sub>4</sub>	.6299	16,0	.7250 - .7270	3/8	5/8 2	5400
77760	18	.7092 - .7097	16 <sup>3</sup> / <sub>4</sub>	.7087	18,0	.8170 - .8190	3/8	5/8 2	6400
77761	20	.7876 - .7886	17 <sup>5</sup> / <sub>8</sub>	.7874	20,0	.9050 - .9070	3/8	5/8 2	7200
77762	22	.8664 - .8674	18 <sup>1</sup> / <sub>2</sub>	.8661	22,0	.9990 - 1.0010	3/8	5/8 2	8200
77763	24	.9450 - .9460	19 <sup>1</sup> / <sub>2</sub>	.9449	24,0	1.0890 - 1.0910	3/8	5/8 2	9700
77764	25	.9845 - .9855	19 <sup>3</sup> / <sub>4</sub>	.9842	25,0	1.1350 - 1.1370	3/8	5/8 2	11000

†Tolerances-Basic minus .0005-.001 inches \*Based on mild steel Refer to the diagram on page 18 for dimensions of Hexagonal Broach holes

**Specials**

We are fully equipped to manufacture Special Metric Square and Hexagon Broaches not listed above. All standard items are available with **TiN or TiAlN coatings** from stock or short delivery. Please contact factory for details.

# Special Broaches

## Push and Pull Types

### Applications:

- Virtually any broaching operation
- Short and long-run production



### Capabilities

The duMONT Company, is a leading specialist in the design and manufacture of Broaches for industrial applications. Along with the extensive assortment of Stock Broaches listed in this catalog, we offer rapid delivery of Special Broaches custom-designed for your application or manufactured from your prints.

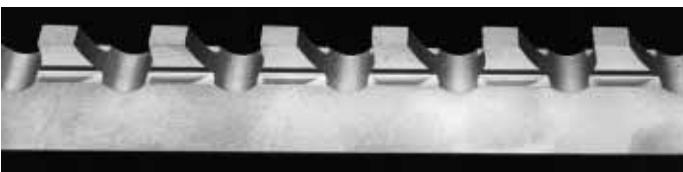
We are fully equipped to manufacture both Standard and Special Broaches in either Push or Pull Styles, including all types of Keyway, Internal Hole, and Surface Broaches. Special features, such as chamfering or deburring for one-pass operation are readily available. All duMONT Special Broaches are manufactured of the highest quality high-speed steel.

duMONT's engineering staff has years of experience designing Special Broaches to replace time-consuming and costly machining operations. Whenever possible we will meet your Special Broach requirements by modifying an existing Stock Broach, thereby reducing both the cost and delivery time ordinarily associated with ordering Specials. With our extensive stock and expertise in designing and manufacturing specials, we are able to serve our customers as a single complete source for all of their broaching needs.

**TiN or TiAIN Coating Available.**

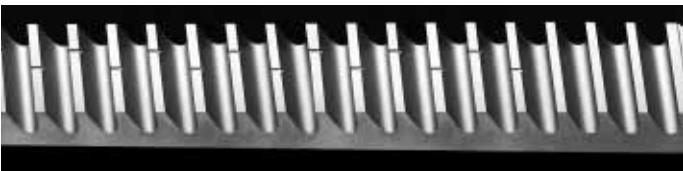
# Special Broaches

## Push and Pull Types



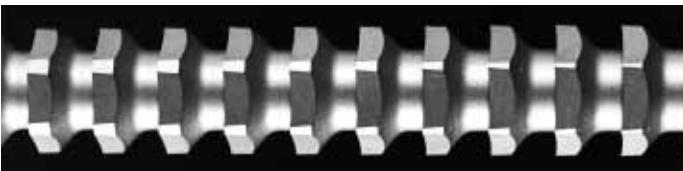
### Keyway Broaches

duMONT manufactures Special Keyway Broaches in either Push or Pull Type in both American Standard and Metric Sizes. Special Application Multi-pass Push Keyway Broaches, and One-Pass Keyway Broaches which require the appropriate guide Bushing can often be manufactured from an existing blank for quick delivery. One-Pass Push Keyway Broaches are also available in a self-guiding Production Style that require no guide Bushing. Both One-Pass Push-Type styles as well as their Pull-Type counterparts are available with a special chamfer feature that will deburr the keyway bore interface. Double-Keyway and Keyseating Broaches are also available. Pull-Type Broaches are available with a variety of pull ends – Threaded, Notched, Pin, and Automatic to name a few.



### Surface Broaches

Surface Broaches are available as either individual Broaches or as inserts for broaching flat surfaces, irregular shapes, external forms, concave or convex surfaces, serrations, cam shaped, corner squaring, and dovetails.

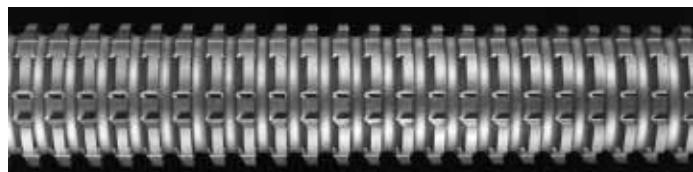


### Internal Hole Broaches

Internal Hole Broaches in Push and Pull-Type including Square, Hexagon, Round, D-Hole, Double-D, Rectangular, Inverted Keyway, and irregularly shaped Broaches are all readily available. Broaches for Burnishing, Sizing and Combination or Cut and Finish applications are also manufactured as either Push or Pull-Type. Pull-Type Broaches are available with a variety of pull ends – Threaded, Notched, Pin, and Automatic to name a few.

### Applications:

- Virtually any broaching operation
- Short and long-run production



### Spline Broaches

Spline Broaches specifically designed and manufactured for your application, duMONT offers straight sided, Involute Spline, and Serration Broaches in both Push or Pull-Type designs. Due to the complex nature of these tools a customer part print is required. Pull-Type Broaches are available with a variety of pull ends – Threaded, Notched, Pin, and Automatic to name a few.

### Let Us Meet Your Special Broach Requirements

duMONT Special Broaches can be ordered from your industrial distributor. Check to see if a standard item will serve your needs, before ordering a Special Broach. Using standard items means off-the-shelf delivery and substantially lower cost. When standard items are not appropriate, we would be pleased to design and manufacture a Broach to meet your specific needs.

### What We Need To Know

A fully dimensioned drawing of the finished part, casting, forging, or broach would be most helpful. When a part print is unavailable, the following information should be provided:

1. Description of Cut (Size/Shape/Tolerance)
2. Length of Cut
3. Type of Material to be Broached
4. Size and Shape of Hole or Surface to be Broached  
(For cast holes, give minimum hole size, including draft and fillet radii, if any)
5. For Keyway Broaches Give:
  - a. Minimum Bore Size
  - b. Depth of Keyway Across Bore
  - c. Width of Keyway
  - d. Tolerance
6. Type of Broaching Machine (Push or Pull/Tonnage/Ram Travel/Daylight Opening)
7. Number of Pieces to Broach

# Engineering Section

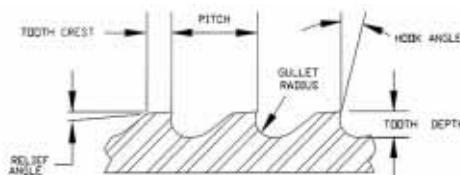
## How to Use Minute Man® Broaches

- Standard Push Broaching Procedures
- Broaching Basics

## Standard Broaching Procedures

duMONT Minute Man® Broaches are designed for fast, accurate, and convenient broaching with arbor or hydraulic presses. A study of the Broaching Procedures presented in this section will familiarize the operator with proper broaching procedures and troubleshooting practices. Following proper broaching fundamentals, paying attention to technique and Broach maintenance will help prevent drifting, deflection and even breakage while providing greater efficiencies in the cutting of your parts. If you have a specific question or problem, contact our Engineering Department at 413-773-3674 / 800-628-9648 or by email at info@dumont.com.

### Broaching Basics



#### Warning Information

Cutting tools may shatter or break, therefore **eye protection should be worn wherever and whenever cutting tools are being used**. Government Regulations require use of safety glasses and other appropriate safety equipment at all times in the vicinity of cutting tool use.

#### Workpiece Material

duMONT Minute Man® stock Broaches can be used on a variety of workpiece materials, it is not practical to Broach material having a Rockwell hardness higher than Rc35. When broaching **Iron or Steel** use the standard Broach as supplied. **Brass and Free Machining Bronze** may require stoning of a slight land on the top of the teeth to prevent drifting (pulling into the work). Special Broaches are designed and engineered to provide the correct tooth form, pitch and rake angles for the material specified.

#### Length of Cut

duMONT Minute Man® Broaches are designed to be used in operations where a minimum of two teeth are engaged at all times. Tooth engagement is required to maintain a smooth cutting action promoting a clean finish. The chip generated during the cutting process must be contained within the gullet of the tooth to avoid binding of the tool. This could cause potential damage to the Broach, the workpiece and injury to the operator. Appropriate chip load allows for smooth cutting, and improved tool life. All individual stock Broaches have recommended Minimum and Maximum Length of Cut guidelines which should be followed. The required force necessary to achieve the Maximum Length of Cut is also provided with the individual Broach specifications. Workpieces may be stacked to establish the Minimum Length of Cut, or to improve the efficiencies of the operation as long as Maximum Length of Cut is not exceeded. Proper nesting and clamping of stacked parts is vital when this approach is taken. The Maximum Length of Cut with Push-Type Keyway Broaches should not exceed the length of the Bushing

being used. **Reminder:** "A" Style Broaches are used with "A" Style Bushings, "B" Style Broaches with "B" Style Bushings, etc. duMONT Minute Man® Special Push-Type and Pull-Type Broaches often can be designed to accommodate your specific length of cut requirements.

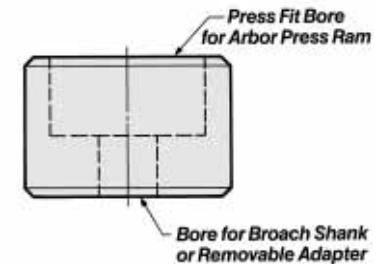
#### Set-Up & Alignment

Successful broaching begins with proper Set-up, and Alignment of the Broach, workpiece and ram. Attention to these details will provide a stable workpiece, and prevent drifting, deflection or even breakage caused by misalignment. The workpiece must be solidly fixed or nested perfectly square with the baseplate and ram face. Make sure all square and parallel surfaces on the face of the ram and baseplate remain true. It is essential to maintain a rigid set-up at all times and caution should be taken when stacking parts to maintain the integrity of the set-up. Never attempt to exceed the Broach's specified Maximum Length of Cut. At the beginning of a cut, be sure the Broach is centered under the ram. Proper alignment is important. After the Broach starts to cut, back off pressure on the ram to allow the Broach to center itself, if not in perfect alignment. If Broach moves out of alignment after starting cut, back off the pressure on the ram and align the broach itself. Repeat this procedure during successive cuts. This will assure a perfectly straight broached hole.

Suggestions for a drifting or "hogging" Push-Type Keyway Broach:

1. Reverse workpiece or turn Broach so teeth face toward the back of the press.
2. Let the Bushing protrude above the workpiece to give more support to the back of the Broach, thereby helping to keep it aligned. If a collared Bushing is used, place it upside down under the workpiece.

#### Ram Adapter Use



Ram Adapters are used for broaching applications that require Round, Special Shapes such as Oval, D-Holes and Rectangular as well as Square, and Hexagon Broaches 1/4" and 6mm or smaller. A Ram Adapter would also be recommended in situations where an extraordinary high degree of accuracy is required. These Adapters are also referred to as rear guides and provide support and guidance for the Broach at the shank end, minimizing the possibility of deflection or breakage. When an

# Engineering Section

## How to Use Minute Man® Broaches

Adapter is used as a rear guide for the Broach, the hole in the Ram Adapter must be in alignment with the pilot hole in the workpiece. It is important a Ram Adapter provides a tight, true fit to both the press ram and to the Broach shank. An adapter may also be used to allow the shanks of smaller Internal Hole Broaches to be gripped to avoid deflection and breakage.

### Cutting Fluids & Lubrication

Broach lubrication is crucial to tool life and the quality of the finish produced. Lubrication enables chips to slide freely and curl in the tooth gullets minimizing frictional heat. This cuts down on Broach wear and prevents build up on the cutting edge of the teeth. Push-Type Keyway Broaches, regardless of the material to be broached, require lubrication on the back side of the Broach in order to reduce friction. Proper lubrication will increase Broach life and produce a cleaner finish.

Various materials require different lubricants. duMONT Minute Man® recommends the following:

**Mild Steel** – A good quality cutting oil or water soluble coolant brushed on the teeth and back side of the Broach.

**Tough Steels such as Nickel Alloys** – A good grade of a sulfur based cutting oil.

**Brass** – Typically is broached dry.

**Bronze** – Works well with an oil or soluble oil.

**Cast Iron** – Is almost always broached dry but requires lubrication for the backside of the Broach.

**Aluminum** – Straight Kerosene may be used but special lubricants are available.

You may wish to contact your cutting fluid dealer for additional recommendations and availability.

### Coatings Available

duMONT Minute Man® Broaches are available with TiN, and TiAlN coatings. The coatings provide enhanced performance for specific applications, delivering greater value and tool life on your more challenging materials.

**TiN** – provides increased lubricity and wear resistance when broaching abrasive materials such as Fiberglass and some Aluminum Alloys.

**TiAlN** – offers significant increase in surface hardness (Rc low 90's). Applications would include broaching in most Stainless Steels, Alloy Steels, and harder materials.

### Broach Re-sharpening

Broaches, regardless of type, should never be used when dull. The use of a dull Broach may result in poor finish or cause drifting, damage to the teeth or breakage. Correct and timely re-sharpening will increase Broach life and quality of parts. The necessity to sharpen a Broach is dependent on numerous factors; material, tolerance, and required finish, etc.

A number of conditions indicate the need for sharpening:

- Poor finish, tears, galling, etc. on the workpiece.
- Cutting edges showing signs of rollover and teeth dull to the touch.
- When using a Hydraulic Press, the pressure gage showing an increase in pressure required to complete the cut.

- **Standard Push Broaching Procedures**
- **Broach Re-sharpening**

- Nicks, gouges, etc. in the teeth from improper handling.
- Broach sticking in the workpiece, pick-up on tops of teeth.
- Holes gauging undersize.

duMONT Minute Man® offers expert Broach re-sharpening services, with the goal to restore the cutting edges of the Broach to its original condition. Broaches returned for this service are each individually examined and specific regrind instructions are generated for the reconditioning of the tool. Broaches exhibiting excessive wear are evaluated to insure a re-sharpening is appropriate or if it is time to consider replacing the tool. The re-sharpening process is a precision operation, under or over sharpening will produce unsatisfactory results. Removing too much material in the re-sharpening process can dramatically reduce tool life. Improper re-sharpening can result in a departure from original tooth form, creating under sized parts, compromised cutting action and potentially causing irreparable damage. Correct sharpening ensures satisfactory production in terms of time efficiency, conformance to specifications and finish. duMONT Minute Man® is fully equipped to provide expert re-sharpening services. We need to evaluate the Broach, to insure it is able to be adequately reconditioned. Based on this examination a quote for re-sharpening would be provided.

### Broaching with Keyway Sets or Individual Broaches



Use of Individual Push-Type Keyway Broaches or Keyway Broaches from a Broach Set requires the use of a Bushing and Shim(s). The Bushing size and Style are determined by the bore diameter of the workpiece as well as the Style of Broach to be used. "A" Style Broaches are used with "A" Style Bushings, "B" Style Broaches with "B" Style Bushings, etc. The smallest Broaches cut in one pass and require no Shim. Multiple pass Keyway Broaches are furnished with all necessary Shim(s) unless otherwise noted. A Shim is required to compensate for the thickness removed following a Keyway Broach's cutting pass. The addition of a Shim to the bottom of the bushing's slot serves to move the Broach forward towards its standard finished cutting depth. Subsequent passes require the stacking of Shims.

1. Select the right Bushing for the bore (sizes are plainly marked) and insert in the bore of work.
2. Insert Broach (which is also plainly marked for size) into the Bushing slot and check alignment.
3. Place this assembly in the press.
4. Lubricate.

# Engineering Section

## How to Use Minute Man® Broaches

5. Apply pressure to the Broach – back off pressure on Ram to allow the Broach to center itself if not in perfect alignment – reapply pressure to push Broach through the work.
6. Clean Broach using a stiff brush to remove chips from cutting section.
7. Insert Shim and repeat steps 3 thru 6 as required to obtain exact keyway depth.

### Broaching with One-Pass Keyway Broaches

Broaching with One-Pass Keyway Broaches requires the use of a Bushing. The Bushing size and Style are determined by the bore diameter of the workpiece as well as the Style of Broach to be used. "A" Style Broaches are used with "A" Style Bushings, "B" Style Broaches with "B" Style Bushings, etc. No Shims are required. The Broach cuts to full width and depth in one pass.



1. Select the right Bushing for the bore (sizes are plainly marked) and insert in the bore of work.
2. Insert Broach (which is also plainly marked for size) for the desired width of keyway into the Bushing slot and check alignment.
3. Place this assembly in the press.
4. Lubricate.
5. Apply pressure to the Broach – back off pressure on Ram to allow the Broach to center itself, if not in perfect alignment – reapply pressure to push Broach through the work.
6. Clean Broach using a stiff brush to remove chips from cutting section.
7. Repeat steps 2 thru 6 for subsequent parts.

### Broaching with Production Keyway Broaches

Broaching with Production Style Keyway Broaches requires no Shims or Bushings. The back and shoulders of the Broach are ground to fit the diameter of the bore, supporting and guiding itself while cutting the keyway in one pass



1. Select desired Broach and insert pilot into bore of part.
2. Lubricate.
3. Apply pressure to the Broach – back off pressure on Ram to allow the Broach to center itself, if not in perfect alignment – reapply pressure to push Broach through the work.
4. Clean Broach using a stiff brush to remove chips from cutting section.
5. Repeat steps 2 thru 4 for subsequent parts.

- Standard Push Broaching Procedures
- Troubleshooting

### Broaching with Internal Hole Broaches

Broaching with Internal Hole Broaches requires no Shims or Bushings. Round, Square, Hexagon and many Special Shapes are designed to finish in one pass, in cast or drilled bores requiring a through hole finish. The starting hole must be drilled square with the face of the work. Square and Hexagon Broaches, 1/4" and 6mm or smaller, should be gripped by the shank in an adapter to prevent deflection and breakage.



1. Pilot Holes: Properly drilled pilot holes are essential for a true and clean cut. Never use a dull or poorly sharpened drill to make pilot holes.
2. Select desired Broach. Confirm the bore of workpiece is equal to pilot diameter of broach. (The use of a ram adapter is advised with all Round, Oval, D-hole Broaches, and for Square and Hexagon Broaches 1/4" and 6mm or smaller).
3. Insert pilot into bore of part.
4. Ram Speed: Always use proper ram speed to prevent chatter marks and edge wear. (See *Metals Handbook* – Vol. 3 "Machining".)
5. Lubricate.
6. Apply pressure to the Broach – back off pressure on Ram to allow the Broach to center itself, if not in perfect alignment – reapply pressure to push Broach through the work.
7. Clean Broach using a stiff brush to remove chips from cutting section.
8. Repeat steps 3 thru 7 for subsequent parts.

### Troubleshooting

duMONT Minute Man® aims to make your broaching experience efficient, effective and trouble free. Most broaching failures (poor finish, drifting, deflection, breakage, chatter marks, or edge wear) can be attributed to deficiencies in alignment, lubrication, Broach sharpness, tooth configuration or design, material hardness, and incorrect broaching speed or pressure as detailed in this section. If you have specific questions or problems not covered on these pages, contact our Engineering Department.

### The duMONT Company

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[www.dumont.com](http://www.dumont.com)



# duMONT Arbor Presses

## 3 and 5 Ton Models

### Applications:

- Easy-to-operate manual broaching machines for use with most duMONT Broaches

### Arbor Presses

duMONT Minute Man® Arbor Presses are easy to operate Manual Broaching Machines designed for Push Broaching with Keyways and Internal Hole Broaches. These Hand Operated Presses are available in 3 and 5 Ton Models and provide the pressure required to Push Broaches through the work piece.

Both Arbor Presses provide these essential features:

- Ratchet operation with compound leverage for minimum operator effort.
- Pawl between lever and pinion permits positioning lever for most convenient reach and pull.
- Counter weight returns lever to upright rest position.
- Ram positioned by handwheel reduces travel, tests Broach alignment, supports the Broach and workpiece assembly.
- Round ram with rack teeth cut to center concentrates force along the center line to avoid cramping.
- Rugged table machined square with ram, and slotted for Broach drop-through.

Please contact factory for details.



### Arbor Press Specifications

EDP No.	Press Size	Takes Diameters Up To	Height Over Plate	Leverage	Height Overall	Pressure	Takes Broaches	Shipping Weight
88810	No. 2-R	12"	17 <sup>1</sup> / <sub>4</sub> "	45-1	32"	3 ton	A-B-B1-C	220 lbs.
88811	No. 3-R	21"	20 <sup>1</sup> / <sub>2</sub> "	55-1	35"	5 ton	A-B-B1-C-D	517
88812	STAND for No. 2-R Press	—	—	—	22" x 19" x 32"	—	—	85
88813	STAND for No. 3-R Press	—	—	—	26" x 20" x 32"	—	—	117

### Warranty

The duMONT Company, warrants to original equipment manufacturers, distributors and industrial and commercial users of its products that each new product manufactured or supplied by The duMONT Company, shall be free from defects in material and workmanship. The duMONT Company, obligation under this warranty is limited to furnishing without additional charge a replacement or, at its option, repairing or issuing credit for any product which shall within one year from the date of sale be returned freight prepaid to the plant designated by The duMONT Company, representative and which upon inspection is determined by The duMONT Company, to be defective in materials or workmanship. Complete information as to operating conditions, machine setup, and application of cutting fluid should accompany any product returned for inspection. The provisions of this warranty shall not apply to any duMONT Company, product which has been subjected to misuse, improper operating conditions, machine setup or application of cutting fluid or which has been repaired or

altered if such repair or alteration in the judgment of The duMONT Company, would adversely affect performance of the product. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. The duMONT Company, shall have no liability or responsibility on any claim of any kind, whether in contract, tort or otherwise, for any loss or damage arising out of, connected with, or resulting from the manufacture, sale, delivery or use of any product sold hereunder, in excess of the cost of replacement or repair as provided herein. IN NO EVENT SHALL The duMONT Company, BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES. The duMONT Company, makes no other warranty, expressed or implied, except as set forth above; and The duMONT Company, neither assumes nor authorizes any other person or entity to assume for it any other obligation or liability in connection with any of its products.

### Warning

Cutting tools may shatter or break, therefore **eye protection should be worn wherever and whenever cutting tools are being used.** Government Regulations require use of safety glasses and other appropriate safety equipment at all times in the vicinity of cutting tool use.

