

# numatics®

## NRL Series

Rod Lock





**Numatics, Inc. is a leading manufacturer of pneumatic products and motion control products.**

Our broad spectrum of standard, custom developed products and application components have made a significant impact on pneumatic innovation as well as pneumatic and motion control technology. Our company has an extensive history of generating innovative concepts and technological breakthroughs. Many of today's standard features in pneumatic technology were industry firsts from Numatics. We continue our innovative approach to product development by developing electric motion control solutions and enhancing our embedded Fieldbus and I/O products to continually meet and solve our customer's application requirements.



**Today Numatics is proud to be a part of the Emerson Electric Co.**

Emerson (NYSE:EMR), based in St. Louis, Missouri (USA), is a global leader in bringing technology and engineering together to provide innovative solutions for customers in industrial, commercial, and consumer markets through its network power, process management, industrial automation, climate technologies, and appliance and tools businesses. For more information, visit [www.Emerson.com](http://www.Emerson.com).



**EMERSON**™



Numatics Express Shipping Program guarantees<sup>†</sup> product shipment in two, three or five business days. Unlike most traditional quick ship programs, the Numatics Express Shipping Program includes the most comprehensive offering in the industry. This program encompasses the range and options that you require!

Numatics is committed to offering you the highest level of customer service, quality and performance.



Numatics Express 2Day shipping program guarantees<sup>†</sup> product shipment in two business days. The program includes the most popular valve, air preparation and actuator products and includes applicable switches and mounting accessories.

Numatics guarantees<sup>†</sup> to ship any order received before 3 pm EST for up to 10 2Day products\* in two business days.



Numatics Express shipping program offers a 3Day shipping program that guarantees<sup>†</sup> product shipment of a fully assembled and tested valve manifold in 3 business days. The program includes the most popular manifold configurations of the 2000 and Mark series valves:

- Sub D, Terminal Strip and Fieldbus Electronic Options
- Can be configured for DIN Rail Mounting and Muffled Exhaust
- Shipped complete and 100% tested

The 3Day Express shipping program enables you to create a 2 to 8 station manifold assembly complete with any combination of valves, regulators, and blank stations that can be configured from the valve model charts in this catalog.

Numatics guarantees<sup>†</sup> to ship any order received before 3 pm EST for up to 5 manifold assemblies configured from this catalog in three business days or Numatics pays the shipping cost.



We are pleased to expand Numatics Express to include a broad range of products in a 5Day shipping program. Numatics guarantees<sup>†</sup> to ship up to 10 of any 5Day product\*\* for orders received before 3 pm EST in 5 business days or Numatics pays the shipping cost.

We are committed to providing you with an unmatched level of customer service, quality, and reliability. If you cannot locate the specific product for your application or need additional product specifications, visit [www.numatics.com](http://www.numatics.com) or call 888-686-2842. Numatics Express orders cannot be canceled or adjusted once entered. Saturdays, Sundays, and Holidays are excluded.

<sup>†</sup>As industry requirements change, Numatics reserves the right to modify the contents of this catalog and program without notification. Updates on this program can be obtained from the Numatics website [www.numatics.com](http://www.numatics.com) or by calling 888-686-2842, or by contacting your local Numatics representative or distributor and referencing the Numatics Express program.

**\*Sentronic<sup>D</sup> Proportional Valves, CGT Compact Slides, NR Series Rodless and Air Bellows are limited to orders up to 5.**

**\*\*A Series Large Bore NFPA, ASP Series Steel Body NFPA and G Series Guide Rail Rodless are limited to orders up to 5.**

# Welcome to the World of Fluid Automation...

Since 1945, Numatics has emerged as the prominent specialist in developing and manufacturing pneumatic and fluid power components for a widely diverse field of automated industry. From idea to implementation, leading engineers choose Numatics as their single source for:

- Quality Fluid Power components
- Technologically advanced design resources
- Quick response time in delivery and service from around the world



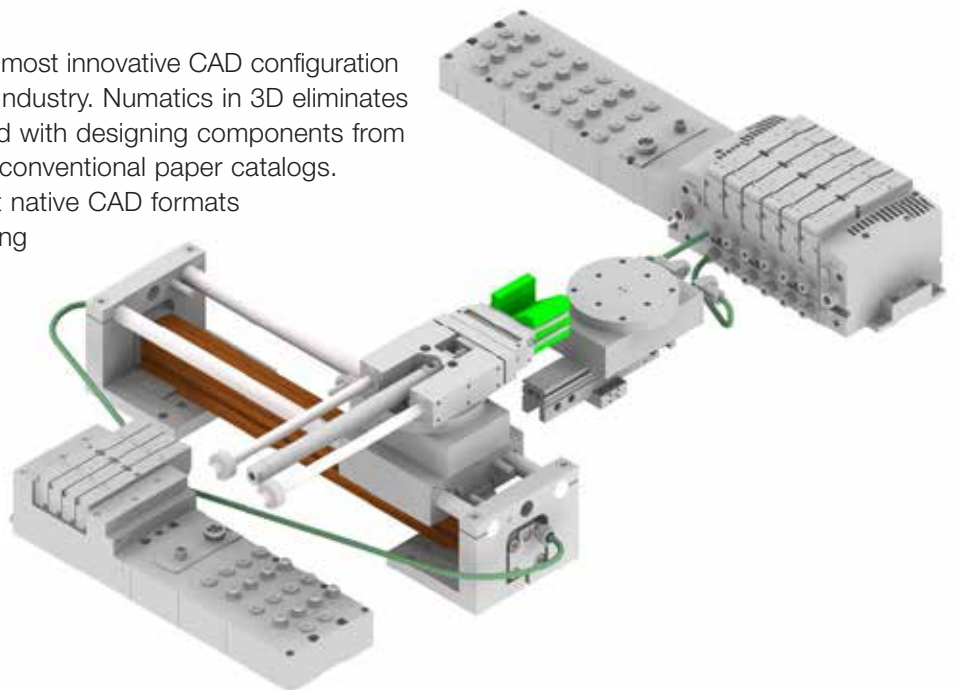
## Numasizing®

Developed by Numatics, Numasizing® offers a whole new level of fluid power system optimization. Compare large amounts of component and process data against user objectives and industry benchmarks for the best possible size, pneumatic pressure, actuator stroke velocities and other part and process variable determinations.

## CAD Modeling

Save critical development time with the most innovative CAD configuration program in the pneumatic component industry. Numatics in 3D eliminates the time consuming process associated with designing components from scratch based on information found in conventional paper catalogs.

The models are available in 85 different native CAD formats in 2D drawings and 3D models, including all the popular formats including Catia, I-DEAS, Pro/Engineer, SolidWorks, Unigraphics and more.



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## NRL Series Rod Lock

**Numatics new generation of linear holding/locking devices take rod locking technology to the next level. With superior performance, these spring-engaged, air-released units supplement air cylinders and guide rods for holding in power-off/e-stop situations. High clamping forces ensure positive holding with minimal air required for release. Choose from our standard products, or we will work with you to meet your unique application specifications.**



### Precision Operation Maintains Accurate Positioning

The NRL Series of Rod Locks guarantees accurate positioning and provides precision holding while other operations are performed. The Rod Lock engages without causing any rod displacement, and also features extremely low backlash making them ideal for precision applications.

### Large Clamping Surface Ensures Consistent Performance

The NRL line is designed with a large clamping surface that provides uniform force to the rod contact area on every engagement. The clamping mechanism utilizes numerous ball bearing to reduce friction.

### Spring-engaged Units Engage in Power-off Situations

Numatics Rod Locks are spring-engaged, so they operate even in power-off situations. Multiple springs ensure reliable performance and redundancy. The fast response time of these spring-engaged products also increases positioning accuracy. Numatics Rod Locks also feature locking mode sensing capability that allows engagement/disengagement feedback with the use of an optional inductive sensor.

### Sealed to Withstand Harsh Environments

Every NRL Rod Lock is sealed to protect internal components. These seals are designed to withstand even harsh wash-down environments and are IP67/ NEMA 4X rated. Rod Locks are available in natural clear anodized aluminum or with a black anodized coating.

### Manual Release

The cam operated manual release feature mechanically disengages the rod lock with the simple turn of a hex screw using a standard wrench. The default-to-lock function springs back to the engaged position when released.

**CAUTION:** This static rod lock is suitable for infrequent dynamic braking (emergency stops) when used with hardened shaft material. Repeated dynamic stops may cause rod and/or collar wear, reducing holding forces.

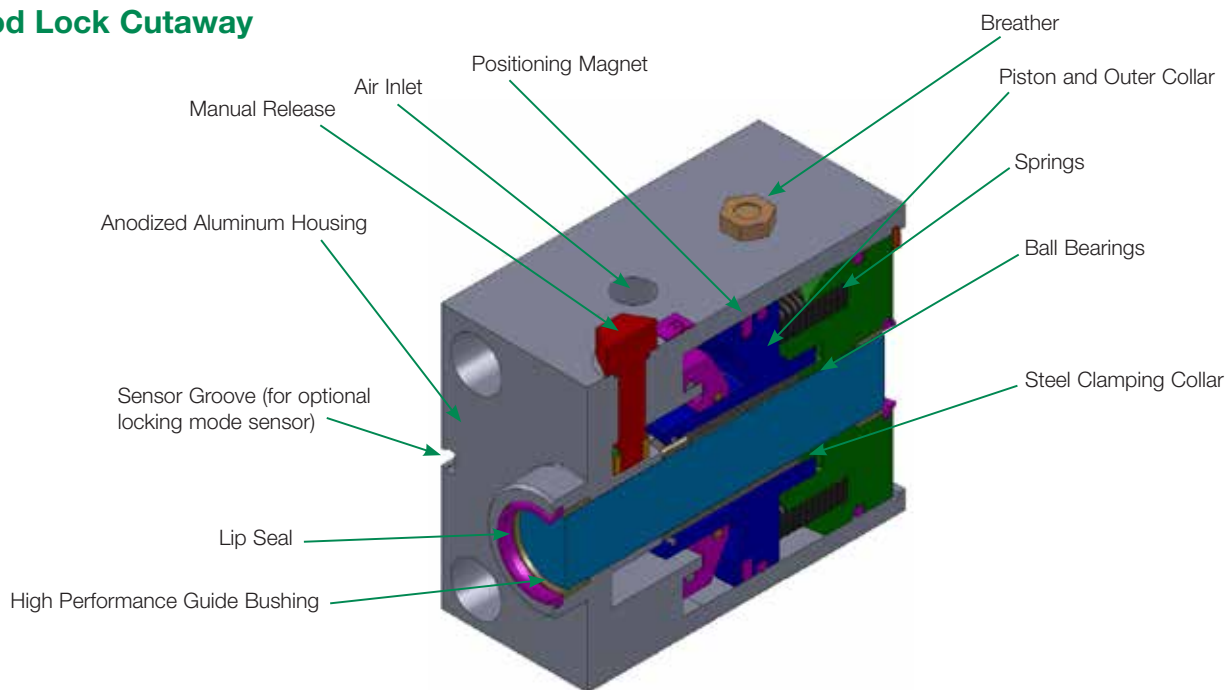
Numatics Static Rod Locks deliver precision holding with virtually no backlash, providing high accuracy in demanding applications. These spring-engaged, air-released units come in both ISO and NFPA sizes and will accept standard accessories.

The Rod Lock's large clamping surface ensures high clamping/holding force. Customers can further increase holding forces by stacking multiple Rod Locks together. The patent pending design is sealed and features a natural clear anodized aluminum finish or a corrosion-resistant, anodized finish. Whatever your application, precision operation with hassle-free performance come standard with each compact unit.

## Applications

- Machine Tools
- Hydraulic Presses
- Scissor-Lift Tables
- Positioning Equipment
- Amusement Ride Equipment
- Printing & Paper Handling Equipment
- Theatrical Equipment (platforms)
- Injection Molding Machines
- Automation Equipment
- Elevators and Lifts
- Mining Applications

## Rod Lock Cutaway



Features	Benefits
No Rod Displacement on Engagement	Maintains Accurate Positioning
Large Clamping Surface	Consistent Clamping Force
IP67 Rated [exceeds NEMA 4X]	Suitable for Wash-Down Areas
Fast Response Time	High Cycle Rates, Accuracy
Extremely Low Backlash	Precision Holding
Spring-Engaged Units	Holds Load During Power/Pressure Loss
Profile Matches Cylinder	Compact Unit, Easy Integration
60 psi Release Pressure	Broad Application
Manual Release	Release Without Air Pressure
Sensor (Optional)	Detects Locking Mode

## Numatics Rod Locks

Numatics cylinder mounted NRL Rod Locks match the cylinder profiles for easy, compact integration.

### Cylinder Requirements

- Extra length = rod extension required (RE) – cylinder pilot length (see below)
- RE = Rod Extension
- Mounting bolts included with ISO and NFPA\*
- **Operating dynamic forces must not exceed the static holding force**

\*With the exception of the NFPA 8" bore, where extended tie rods and hex nuts are used.



## Numatics Rod Lock Specifications

### NFPA Rod Locks (in)\*

Bore Ø	Rod Ø	Holding Force (lbs)	Rod Extension (RE)
1.500	0.625	180	2.625
2.000	0.625	314	2.875
2.000	1.000	250	3.875
2.500	0.625	491	2.875
3.250	1.000	830	4.500
3.250	1.375	830	4.875
4.000	1.000	1,256	4.875
4.000	1.375	1,256	5.125
5.000	1.000	1,963	5.375
5.000	1.375	1,963	5.750
6.000	1.375	2,830	6.375
6.000	1.750	2,830	6.875
8.000	1.750	5,026	7.125

\* Dimensions shown in inches

### ISO Rod Locks (mm)\*

Bore Ø	Rod Ø	Holding Force (N)	Rod Extension (RE)
32	12	800	70
40	16	890	75
50	20	1,400	98
63	20	2,225	97
80	25	3,560	116
100	25	5,500	127

\* Dimensions shown in millimeters

### Locking Mode Sensors

NPN Flying Leads	P494A0022400A00
NPN w/ a Quick Disconnect	P494A0022700A00
PNP Flying Leads	P494A0022300A00
PNP w/ Quick Disconnect	P494A0022600A00



## Rod Lock Operation Specifications

- All of Numatics Rod Locks will operate in both directions, engaging with the same holding force.
- Rod Locks can be mounted in any position.
- Rod rotation is not allowed when a Rod Lock is engaged (not intended for torsional braking).
- Release pressures can range from 60-120 psi (4-8 bar).
- The Buna-N seals used are rated to 160°F (71°C).
- Allowable operating temperatures range from 33°F-150°F (0.5°C-66°C).

## Rod Lock Air Chamber Volume & Engagement Time

### NFPA Rod Locks (in)\*

Bore Ø	Rod Ø	Air Chamber Volume	Approximate Engagement Time (seconds)
1.500	0.625	0.250in <sup>3</sup>	0.030
2.000	0.625	0.710in <sup>3</sup>	0.040
2.000	1.000	0.680in <sup>3</sup>	0.040
2.500	0.625	1.260in <sup>3</sup>	0.045
3.250	1.000	3.200in <sup>3</sup>	0.070
3.250	1.375	2.110in <sup>3</sup>	0.060
4.000	1.000	6.730in <sup>3</sup>	0.100
4.000	1.375	4.780in <sup>3</sup>	0.100
5.000	1.000	11.500in <sup>3</sup>	0.150
5.000	1.375	9.500in <sup>3</sup>	0.130
6.000	1.375	14.080in <sup>3</sup>	0.175
6.000	1.750	12.750in <sup>3</sup>	0.165
8.000	1.750	23.210in <sup>3</sup>	0.265

\* Dimensions shown in inches

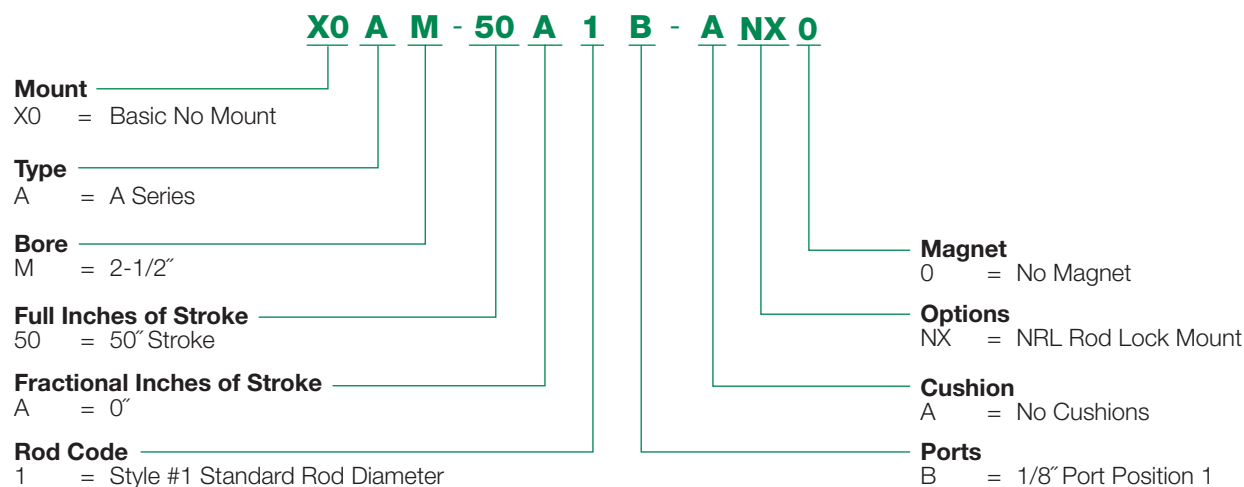
### ISO Rod Locks (mm)\*

Bore Ø	Rod Ø	Air Chamber Volume	Approximate Engagement Time (seconds)
32	12	4.750cm <sup>3</sup>	0.030
40	16	6.720cm <sup>3</sup>	0.030
50	20	9.180cm <sup>3</sup>	0.035
63	20	13.440cm <sup>3</sup>	0.045
80	25	31.950cm <sup>3</sup>	0.060
100	25	112.740cm <sup>3</sup>	0.100

\* Dimensions shown in millimeters

## NFPA How to Order

A Series cylinders with “NX” in the option code include the NRL Series rod lock unit assembled to the cylinder. Note that the cylinder includes the correct amount of rod extension.

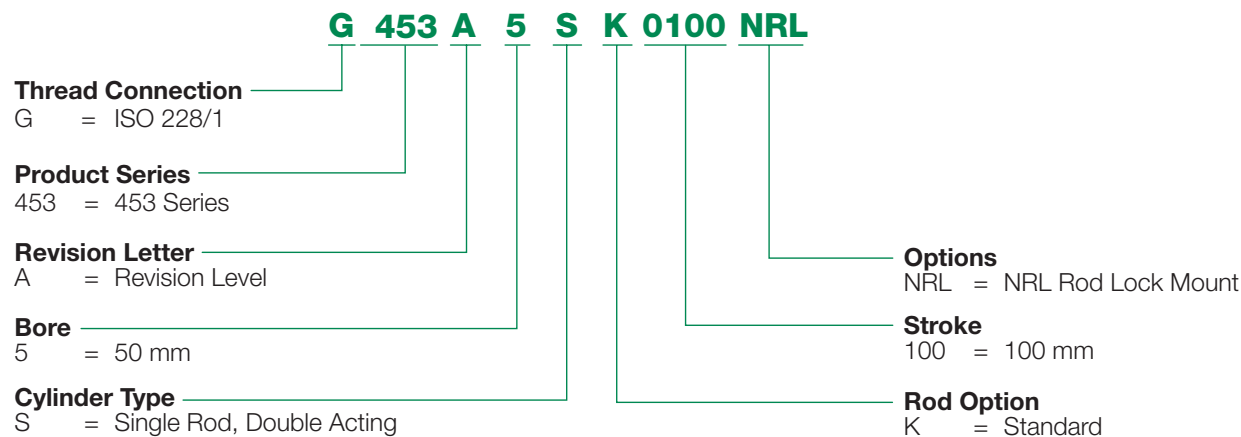


## NFPA Examples

A Series	X0AR-25A1B-ANX0
EQ Series	F1EQR-50A4O-GNX2

## ISO 15552 How to Order

ISO 15552 cylinders with “NRL” in the option code include the NRL Series rod lock unit assembled to the cylinder. Note that the cylinder includes the correct amount of rod extension.



## ISO Examples

453 Series	G453A4SK0100NRL
450 Series	G450A4SK0025NRL

## Manual Release Rod Locks for NFPA and ISO Cylinders

### Manual Release Specifications

- Cam operated, default to the lock function
- No special tools needed for manual disengagement, uses standard size hex head
- Steel Disengagement Screw
- Locking mode feedback sensor (optional/ see page 4)

### NFPA Rod Locks (in)\*

Bore Ø	Rod Ø	Air Chamber Volume (in <sup>3</sup> )	Approximate Engagement Time (seconds)	Holding Force (lbs)	Minimum Torque to Override (ft-lbs)
1.500	0.625	0.250in <sup>3</sup>	0.030	180	2
2.000	0.625	0.710in <sup>3</sup>	0.040	314	5
2.000	1.000	0.680in <sup>3</sup>	0.040	250	5
2.500	0.625	1.260in <sup>3</sup>	0.045	491	7
3.250	1.000	3.200in <sup>3</sup>	0.070	830	17
3.250	1.375	2.110in <sup>3</sup>	0.060	830	17
4.000	1.000	6.730in <sup>3</sup>	0.100	1,256	45
4.000	1.375	4.780in <sup>3</sup>	0.100	1,256	45
5.000	1.000	11.500in <sup>3</sup>	0.150	1,963	72
5.000	1.375	9.500in <sup>3</sup>	0.130	1,963	72
6.000	1.375	14.080in <sup>3</sup>	0.175	2,830	135
6.000	1.750	12.750in <sup>3</sup>	0.165	2,830	135
** 8	1.750	23.210in <sup>3</sup>	0.265	5,026	160

\* Dimensions shown in inches

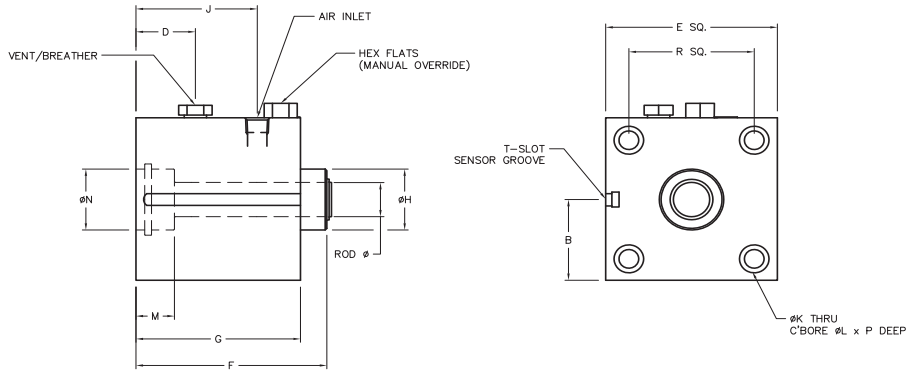
\*\* These products do not have locking mode T slot provisions.

### ISO Rod Locks (mm)\*

Bore Ø	Rod Ø	Air Chamber Volume (cm <sup>3</sup> )	Approximate Engagement Time (seconds)	Holding Force (N)	Minimum Torque to Override (N-m)
32	12	4.750cm <sup>3</sup>	0.030	800	3
40	16	6.720cm <sup>3</sup>	0.030	890	3
50	20	9.180cm <sup>3</sup>	0.035	1,400	7
63	20	13.440cm <sup>3</sup>	0.045	2,225	12
80	25	31.950cm <sup>3</sup>	0.060	3,560	22
100	25	112.740cm <sup>3</sup>	0.100	5,500	65

\* Dimensions shown in millimeters

## Rod Locks with Manual Release for NFPA and ISO Cylinders, Dimensions



### NFPA Rod Locks (in)\*

Bore Ø	Rod Ø	B (to slot)	D	E	F	G	H Ø	J	K Ø	L Ø	M	N Ø	P	R	NPT Air Inlet	Hex Flats
1.500	0.625	0.990	1.005	2.000	3.000	2.625	1.124/1.122	1.906	0.281	0.438	0.652	1.128/1.126	0.910	1.430	1/8 NPT	0.313
2.000	0.625	1.240	1.005	2.500	3.250	2.875	1.124/1.122	1.975	0.344	0.516	0.673	1.128/1.126	1.030	1.840	1/8 NPT	0.500
2.000	1.000	1.240	1.674	2.500	4.375	3.875	1.499/1.497	2.814	0.344	0.516	0.902	1.503/1.501	1.030	1.840	1/8 NPT	0.500
2.500	0.625	1.490	1.039	3.000	3.375	2.875	1.124/1.122	2.119	0.344	0.516	0.673	1.128/1.126	1.030	2.190	1/8 NPT	0.500
3.250	1.000	1.865	1.374	3.750	5.000	4.500	1.499/1.497	2.992	0.406	0.719	0.913	1.503/1.501	1.030	2.760	1/4 NPT	0.625
3.250	1.375	1.865	1.678	3.750	5.500	4.875	1.999/1.997	3.228	0.406	0.719	1.000	2.003/2.001	1.280	2.760	1/4 NPT	0.625
4.000	1.000	2.240	1.685	4.500	5.375	4.875	1.499/1.497	3.154	0.406	0.719	0.875	1.503/1.501	1.030	3.320	1/4 NPT	0.875
4.000	1.375	2.240	1.633	4.500	5.875	5.125	1.999/1.997	3.446	0.406	0.719	1.075	2.003/2.001	1.280	3.320	1/4 NPT	0.875
5.000	1.000	2.740	1.500	5.500	5.875	5.375	1.499/1.497	3.380	0.531	0.844	0.875	1.503/1.501	1.500	4.100	1/4 NPT	0.875
5.000	1.375	2.740	1.545	5.500	6.500	5.750	1.999/1.997	3.425	0.531	0.844	1.070	2.003/2.001	1.500	4.100	1/4 NPT	0.875
6.000	1.375	3.240	1.870	6.500	7.125	6.375	1.999/1.997	3.670	0.545	0.844	1.055	2.003/2.001	1.500	4.880	1/4 NPT	1.313
6.000	1.750	3.240	1.950	6.500	7.750	6.875	2.374/2.372	3.820	0.545	0.844	1.197	2.378/2.376	1.500	4.880	1/4 NPT	1.313
** 8	1.750	4.240	2.100	8.500	8.000	7.125	2.374/2.372	3.975	0.656	-	1.232	2.378/2.376	-	6.440	1/4 NPT	1.313

\*Dimensions shown in inches

\*\* These products do not have locking mode T slot provisions.

### ISO Rod Locks (mm)\*

Bore Ø	Rod Ø	B (to slot)	D	E	F	G	H Ø	J	K Ø	L Ø	M	N Ø	P	R	BSPP Air Inlet	Hex Flats
32	12	29.41	27.60	48.00	87.81	70.82	29.92/29.77	48.80	6.35	10.00	20.60	30.26/30.00	24.00	32.50	1/8 G	8.00
40	16	26.75	31.50	54.00	96.50	75.00	34.92/34.77	56.10	6.35	10.00	22.50	35.25/35.00	24.00	38.00	1/8 G	8.00
50	20	31.75	47.18	64.00	122.30	98.00	39.92/39.77	71.00	8.40	13.00	29.60	40.23/40.08	26.50	46.50	1/8 G	13.00
63	20	47.19	46.48	75.00	117.00	97.00	44.92/44.87	76.71	8.40	13.00	29.51	45.23/45.08	26.50	56.50	1/8 G	13.00
80	25	46.25	44.94	93.00	136.50	116.00	44.94/44.87	80.00	10.50	15.90	35.00	45.25/45.00	44.60	72.00	1/4 G	16.00
100	25	72.96	44.45	110.00	147.50	127.00	54.92/54.87	93.00	10.50	15.90	38.50	55.25/55.00	44.60	89.00	1/4 G	22.00

\* Dimensions shown in millimeters











World Class Supplier of Pneumatic Components



## World Headquarters

### **USA Numatics, Incorporated**

46280 Dylan Drive  
Novi, Michigan 48377

P: 248-596-3200  
F: 248-596-3201

### **Canada Numatics, Ltd**

P: 519-758-2700  
F: 519-758-5540

### **México - Ascomatica SA de CV**

P: 52 55 58 09 56 40 (DF y Area metropolitana)  
P: 01 800 000 2726 (Interior de la República)  
F: 52 55 58 09 56 60

### **Brazil Ascoval Ind.e Comercio Ltda**

P: (55) 11-4208-1700  
F: (55) 11-4195-3970