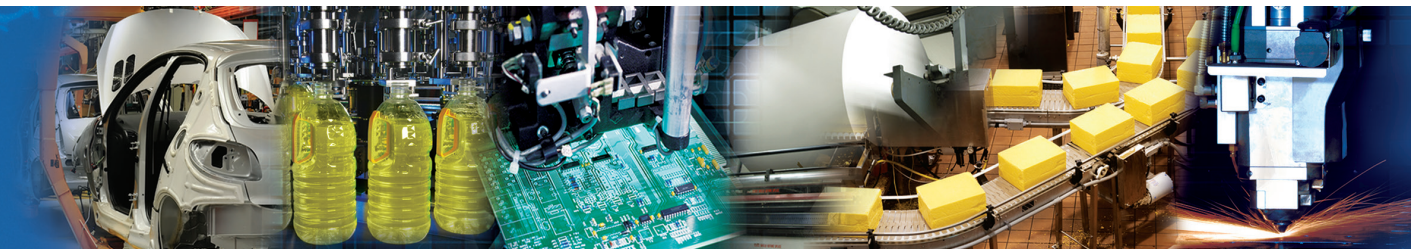


# numatics®

## 450, 452, 453 Series

Standard Cylinder to ISO 15552



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



**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 Industrial Automation Division of 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).





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.

## 2DAY

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.

## 3DAY

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.

## 5DAY

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

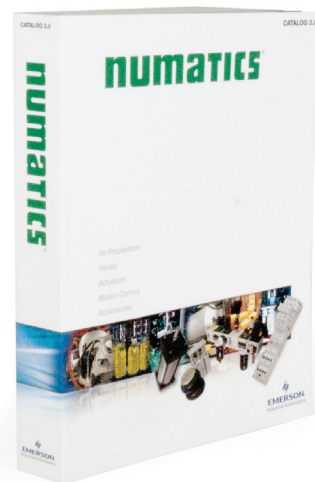
**\*\*A Series Large Bore NFPA, ASP Series Steel Body NFPA and G Series Guide Rail Rodless are limited to orders up to 5.**



# ***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

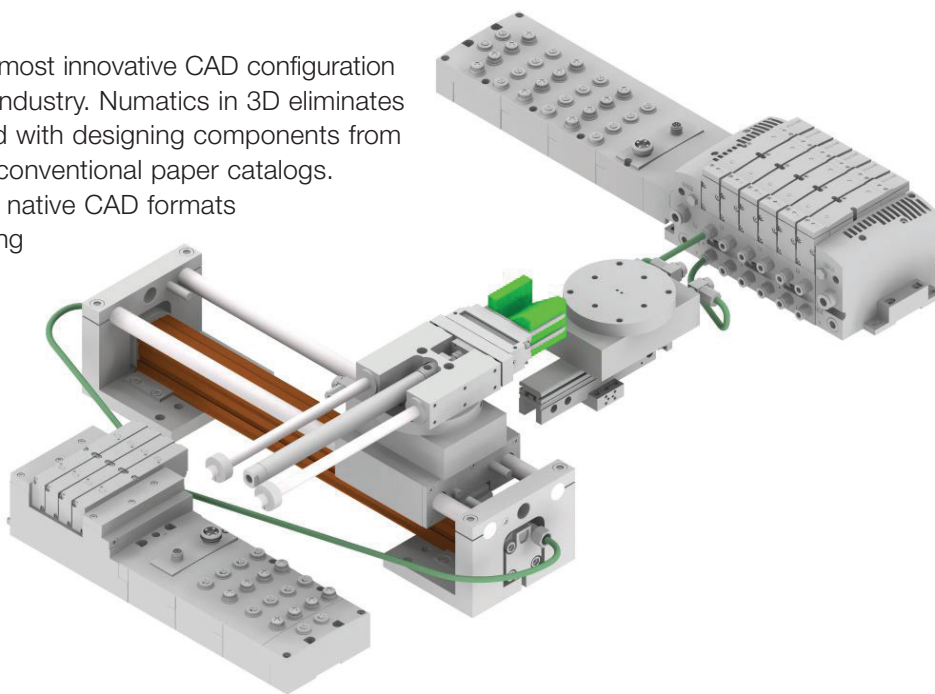
**Numasizing®**

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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## Nu Lock

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## Mountings

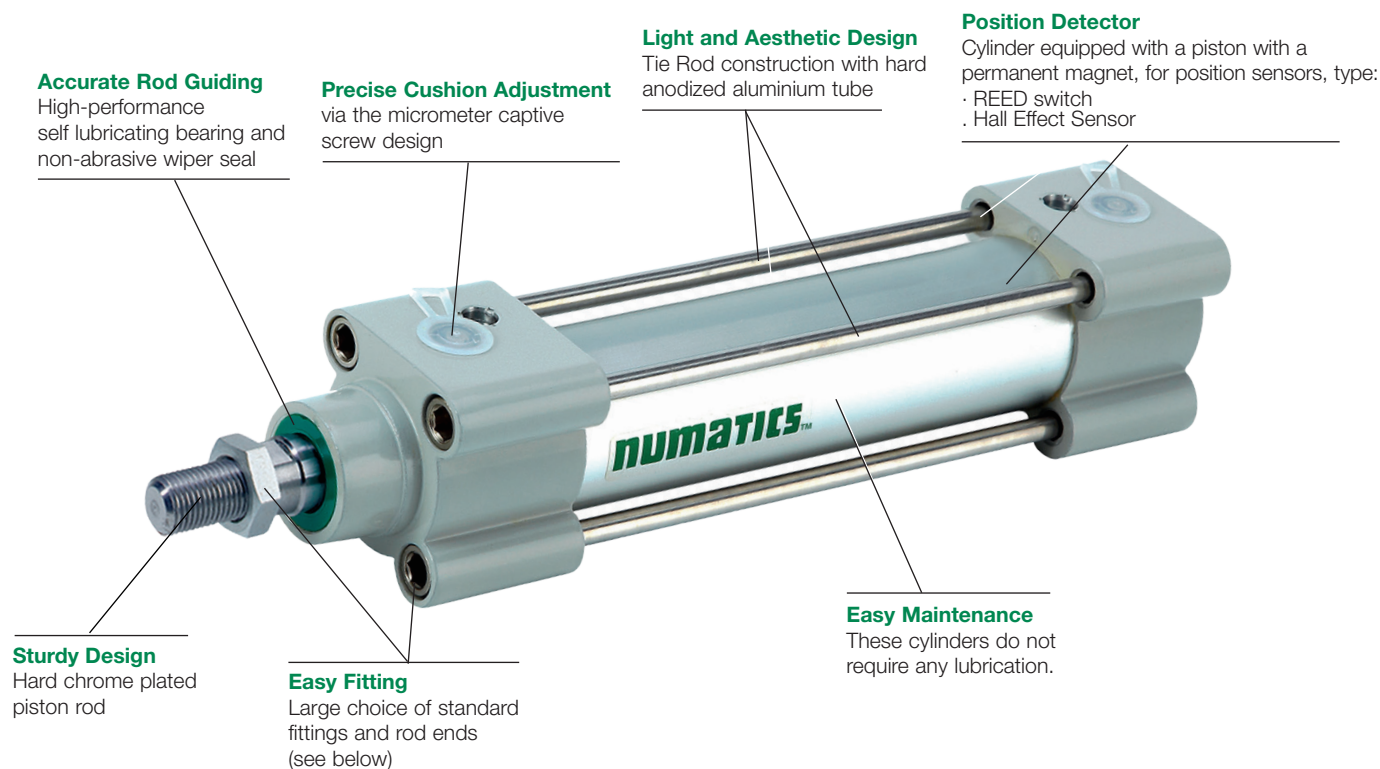
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## 450 Series

The 450 Series is an aluminum body with stainless steel tie rod air cylinder line that is designed to meet all ISO 15552 requirements. The 450 Series offers an extensive range of accessories allowing easy installation for virtually every application. This durable tie rod cylinder design allows customers to achieve maximum productivity desired with low friction.



## General

<b>Detection</b>	Equipped for magnetic position detectors
<b>Fluid</b>	Compressed Air
<b>Max. Operating pressure</b>	145 psi (10 Bar)
<b>Ambient temperature</b>	-4°F to + 158°F (-20°C to + 70°C)
<b>Optimal max. speed</b>	≤ 1 m/s (for optimal service life)
<b>Max. speed rate</b>	2 m/s
<b>Standards</b>	ISO 15552

## Construction

<b>Tube</b>	Hard anodized aluminium alloy	
<b>Tie Rods</b>	Stainless steel (Ø32-100)	
<b>Head and Cap</b>	Aluminium alloy	
<b>Bearing</b>	Self-lubricating metal	
<b>Cushioning Seals</b>	PUR (polyurethane)	
<b>Cushioning</b>	Pneumatic, adjustable from both sides with captive screw	
<b>Piston Rod</b>	Hard chrome plated steel	
<b>Rod Nut</b>	Galvanised steel	
<b>Piston</b>	Ø 32 to 80 mm	POM (polyacetal)
	Ø 100	light alloy
<b>Piston Seals</b>	fitted with an annular reed magnet	
	PUR (polyurethane)	

### How to Order

**G 450 A 3 S K 0050 A00**

#### Thread Connection

G = ISO 228/1

#### Product Series

450 Series

#### Revision Letter

A = Revision Level

#### Bore (mm)

3 = 32  
4 = 40  
5 = 50  
6 = 63  
8 = 80  
1 = 100

#### Cylinder Type

S = Single Rod, Double Acting  
2 = Double Rod, Double Acting  
3 = 303 Stainless Steel Single Rod, Double Acting  
4 = 303 Stainless Steel Double Rod, Double Acting

#### Rod Option

K = Standard  
1 = NuLock Rod Lock Ready  
3 = NuLock Rod Lock

#### Options

A00 = No Option  
C01 = Foot Bracket (Outside) Mount  
C03 = Foot Bracket (Inside) Mount  
C07 = Oscillating Bracket with Lugs  
C08 = Oscillating Bracket with Wide Fork Type Mount  
C13 = Spherical Eye Mount (Back Side)  
C14 = Oscillating Bracket with Narrow Fork Type Mount  
CD4 = Rod Clevis Mount Both Ends (Double Rod)  
CD5 = Spherical Eye Mount Both Sides (Double Rod)  
CF2 = Front Flange Mount  
CF4 = Rod Clevis Mount  
CF5 = Spherical Rod Eye Mount (Front Side)  
CR2 = Rear Flange Mount  
FMT = Fixed Mid Trunnion (Axis Perpendicular to Ports)  
FST = Fixed Mid Trunnion (Axis Parallel to Ports)  
MS3 = High Foot Mount  
AB7 = Angular Clevis Bracket  
AB5 = Angular Clevis Bracket Spherical Bearing  
CF6 = Alignment Compensator  
01A = Front Rod Extension  
01B = Rear Rod Extension  
02A = Front Thread Extension  
02B = Rear Thread Extension

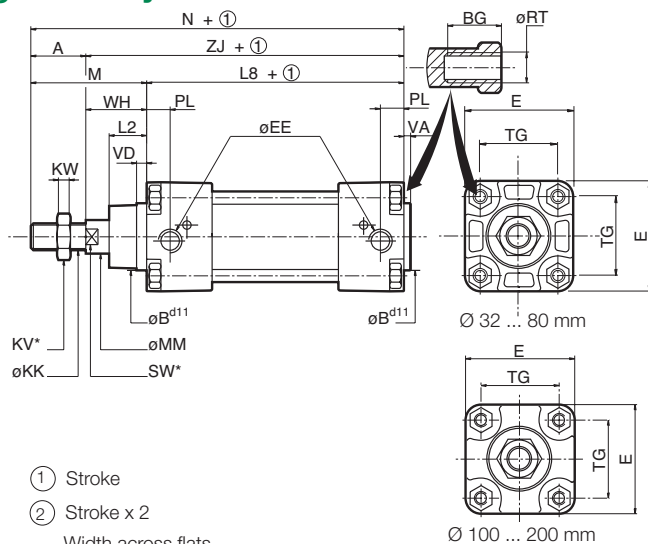
#### Recommended standard strokes (mm)

0005 = 5mm (Minimum Stroke)  
2000 = 2000mm (Maximum Stroke)

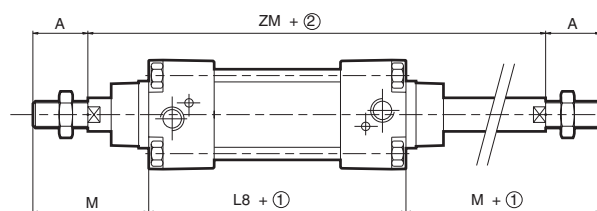


**Dimensions: mm**

**Single Rod Cylinder**



**Double Rod Cylinder**

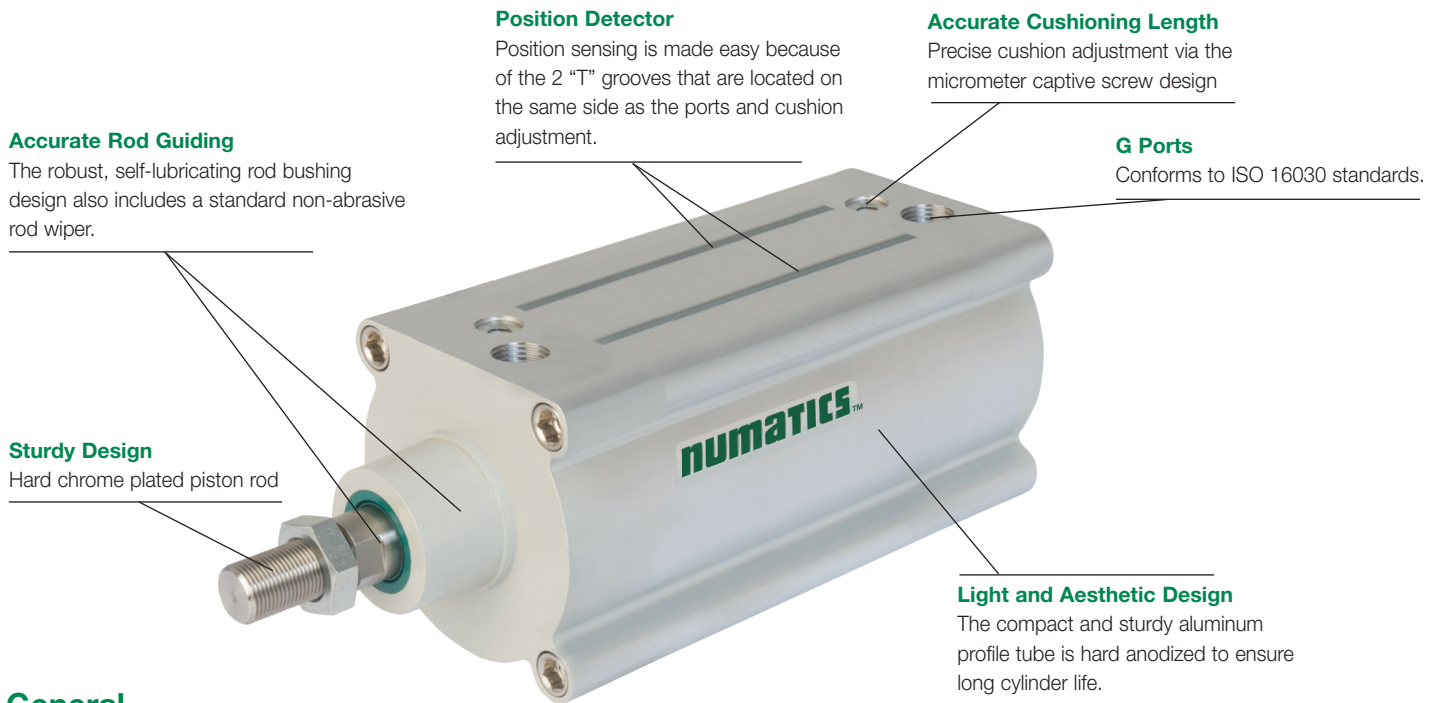


Ø (mm)	A	ØBd11	BG	E	ØEE	ØKK	KV	KW	L2	L8	M	ØMM	N	PL	ØRT	SW (5)	TG	VA	VD min.	WH	ZJ	ZM	Weight (kg)	
																							Base	Stroke Adder (mm)
32	22	30	16	50	G1/8	M10x1.25	16	5	17	94	48	12	142	14	M6x1	10	32.5	4	4	26	120	146	0.590	0.235
40	24	35	16	57.5	G1/4	M12x1.25	18	6	19	105	54	16	159	16	M6x1	13	38	4	4	30	135	165	0.840	0.335
50	32	40	16	65	G1/4	M16x1.5	24	8	24	106	69	20	175	18.5	M8x1.25	17	46.5	4	4	37	143	180	1.200	0.510
63	32	45	16	79	G3/8	M16x1.5	24	8	24	121	69	20	190	17	M8x1.25	17	56.5	4	4	37	158	195	1.500	0.540
80	40	45	17	100	G3/8	M20x1.5	30	10	33	128	86	25	214	16.5	M10x1.5	22	72	4	4	46	174	220	2.860	0.840
100	40	55	17	120	G1/2	M20x1.5	30	10	35.5	138	91	25	229	21	M10x1.5	22	89	4	4	51	189	240	3.675	1.185
125	54	60	24	145	G1/2	M27x2	41	13.5	40	160	119	32	279	32	M12x1.75	27	110	6	6	65	225	290	6.955	1.360
160	72	65	29.5	180	G3/4	M36x2	55	18	58	180	152	40	332	35.5	M16x2	36	140	6	6	80	260	340	12.835	2.100
200	72	75	29.5	220	G3/4	M36x2	55	18	58	180	167	40	347	35	M16x2	36	175	6	6	95	275	370	17.575	2.500



## Series 452 (Profile Tube)

The Series 452 is an aluminum body air cylinder line that is designed to meet all international cylinder requirements. The Series 452 meets the following international standards: ISO/DIS 15552 & AFNOR. The combination of robust construction and a multitude of value-added features make the Series 452 the superior ISO 15552 cylinder line in the market.



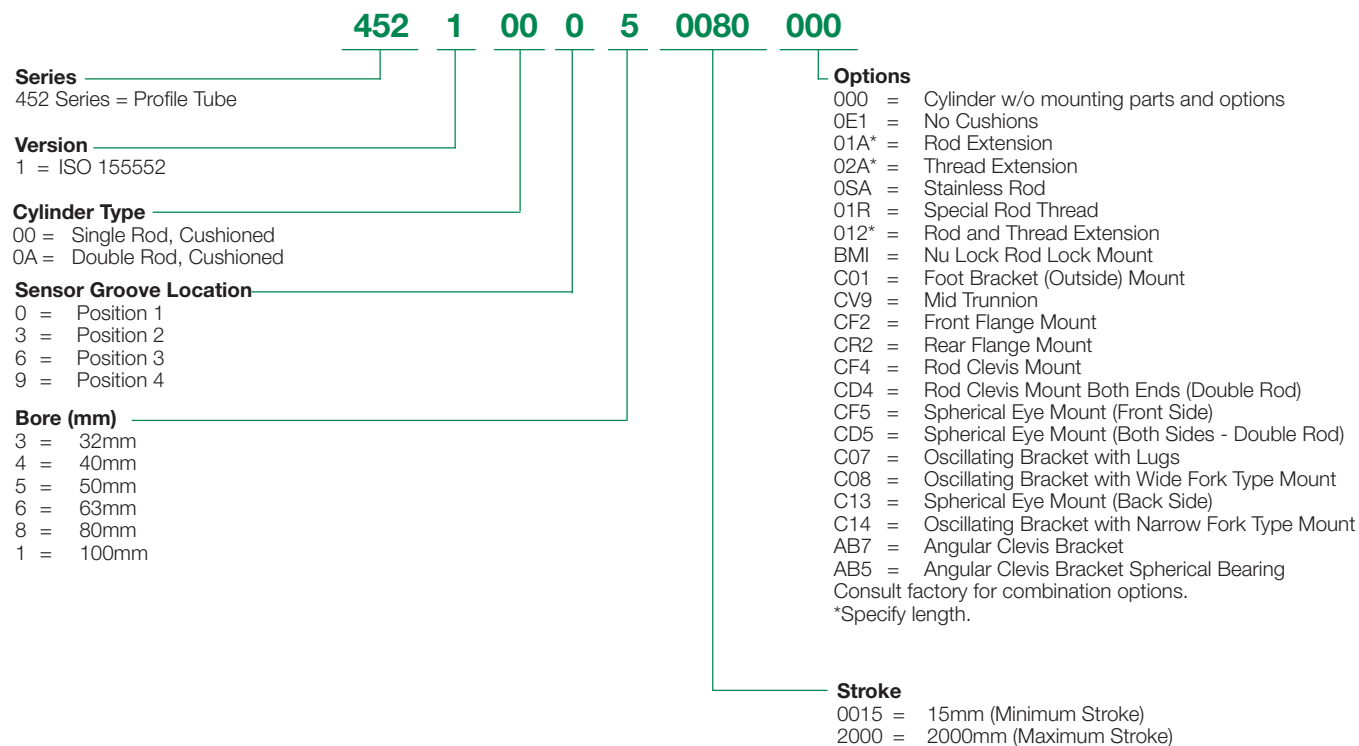
## General

<b>Detection</b>	Equipped for magnetic position sensors
<b>Fluid</b>	Compressed Air
<b>Operating Pressure</b>	10 bar max./150 PSI
<b>Ambient Temperature</b>	-20°C to +70°C ('4°F to 158°F)
<b>Optimal Max Speed</b>	≤ 1 m/s (for optimal service life)
<b>Max. Speed Rate</b>	2 m/s
<b>Standards</b>	ISO 15552-AFNOR NF ISO 15552-DIN ISO 15552 (replace ISO 6431-AFNOR NFE 49003-VDMA 24562)

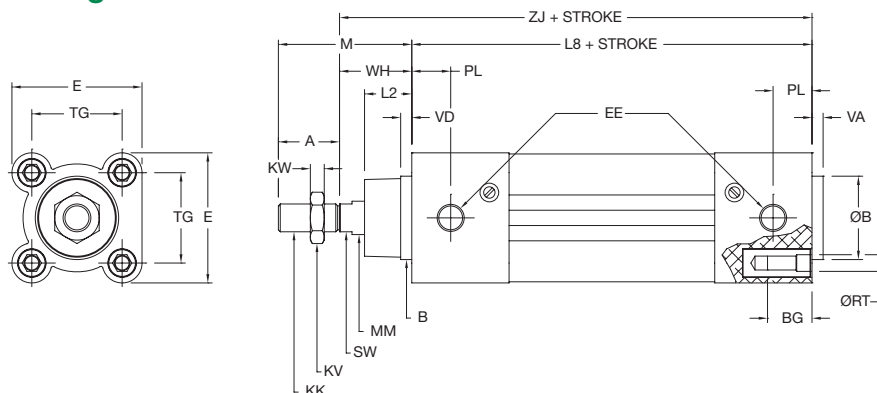
## Construction

<b>Tube</b>	Hard anodized aluminum alloy
<b>Head and Caps</b>	Aluminum alloy
<b>Tube/End Cap Connection</b>	Steel sleeve bolts
<b>Bearing</b>	Self lubricating steel backed composite
<b>Cushioning Seals</b>	PUR (polyurethane)
<b>Cushioning</b>	Pneumatic, adjustable from both sides with captive screw
<b>Piston Rod</b>	Hard chrome plated steel
<b>Rod Nut</b>	Galvanized steel
<b>Piston</b>	Ø 32 to 80 mm: POM (polyacetal) Ø 100 mm: light alloy, fitted with an annular Reed magnet
<b>Piston Seals</b>	PUR (polyurethane)

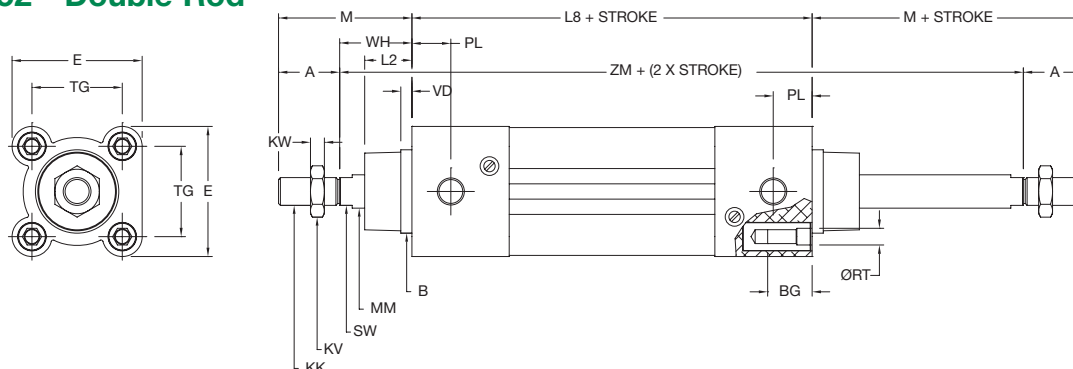
## How To Order



## Series 452 - Single Rod



## Series 452 - Double Rod

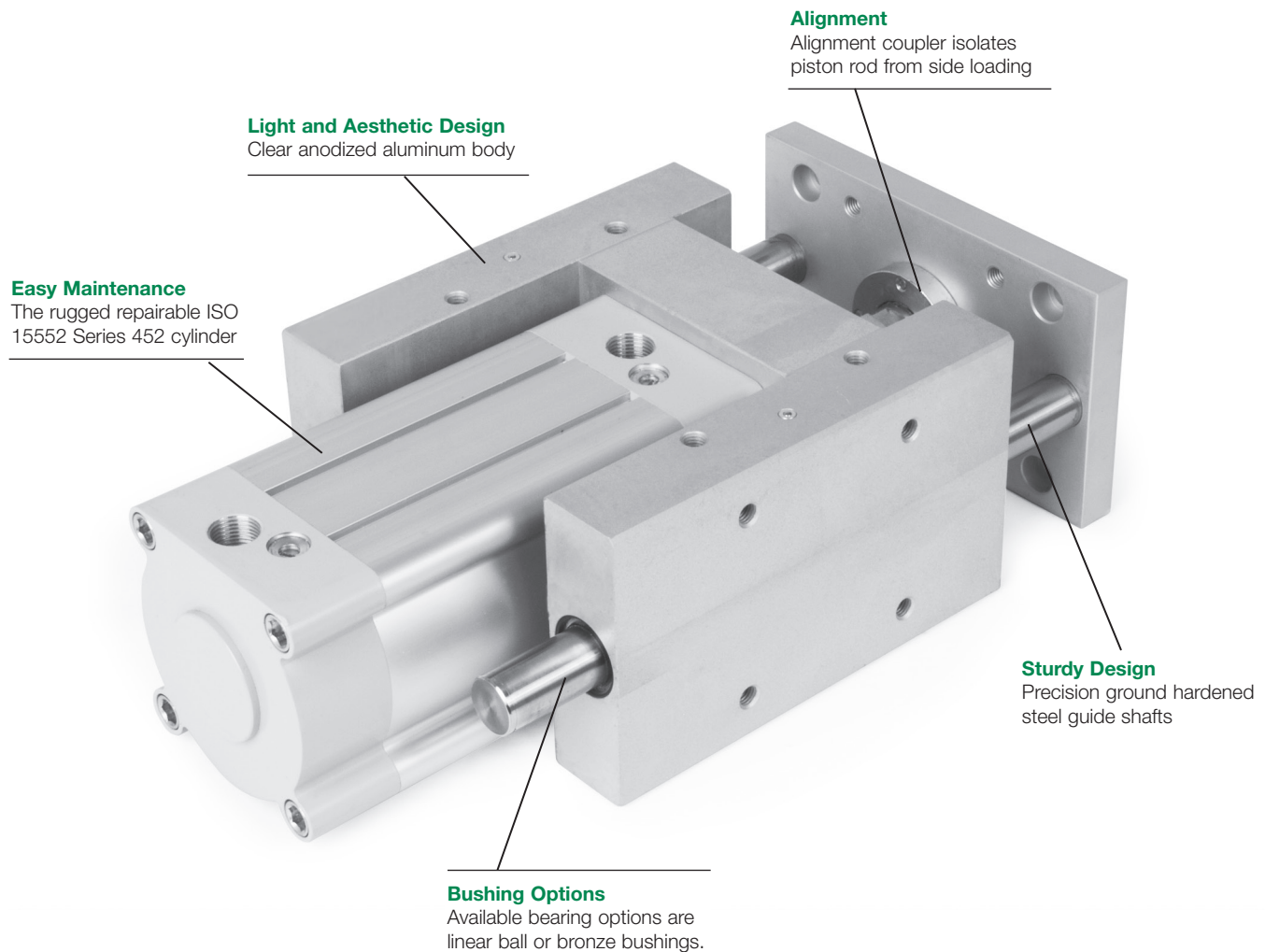


Ø	A	*ØBd11	BG	E	EE	KK	KV	KW	L2	L8	M	ØMM	PL	ØRT	SW	TG	VA	VD (min.)
32	22	30	16	46.5	G1/8	M10x1.25	16	5	17	94	48	12	14	M6x1.00	10	32.5	4	4
40	24	35	16	52	G1/4	M12x1.25	18	6	19	105	54	16	16	M6x1.00	13	38	4	4
50	32	40	16	64	G1/4	M16x1.5	24	8	24	106	69	20	18.5	M8x1.25	17	46.5	4	4
63	32	45	16	74	G3/8	M16x1.5	24	8	24	121	69	20	19	M8x1.25	17	56.5	4	4
80	40	45	17	92	G3/8	M20x1.5	30	10	33	128	86	25	16.5	M10x1.50	22	72	4	4
100	40	55	17	109	G1/2	M20x1.5	30	10	35.5	138	91	25	19.5	M10x1.50	22	89	4	4

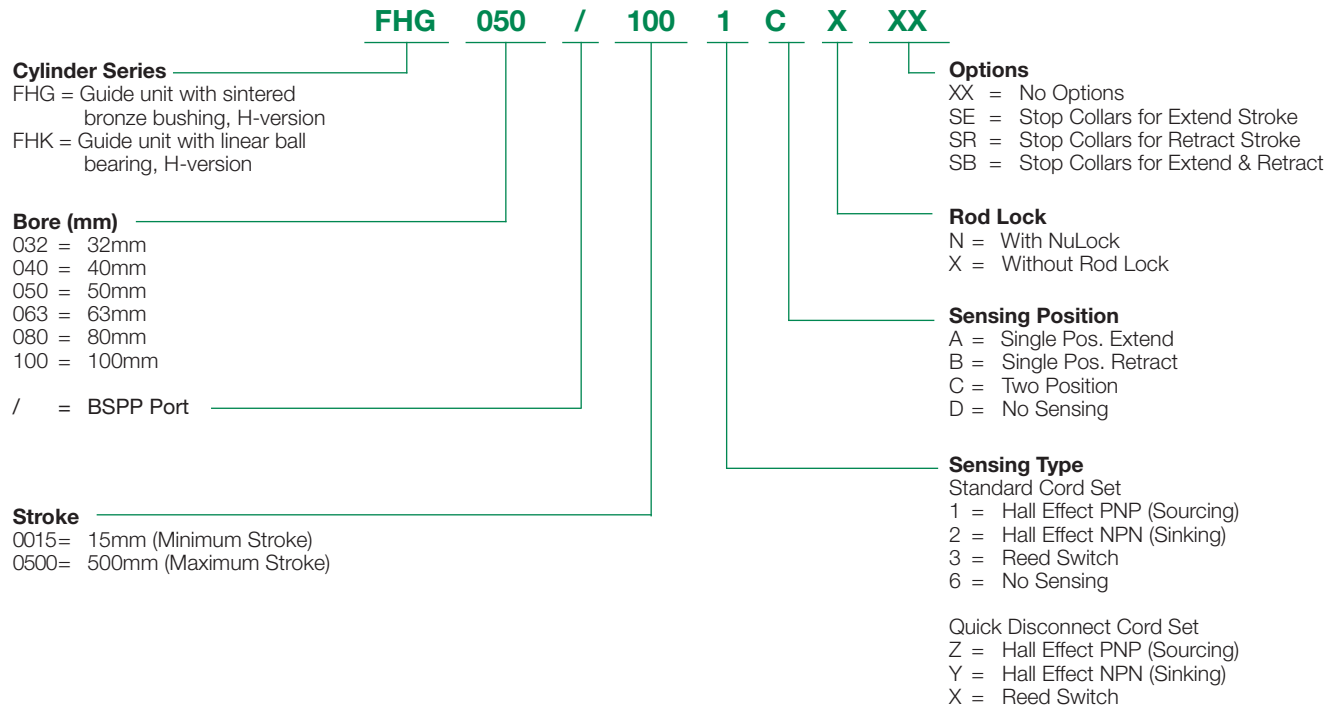
Ø	WH	ZJ	ZM	Weight (kg)	
				Base	Stroke Adder (mm)
32	26	120	146	0.417	0.256
40	30	135	165	0.687	0.341
50	37	143	180	0.875	0.492
63	37	158	195	1.152	0.542
80	46	174	220	2.052	0.818
100	51	189	240	3.045	0.913

\*Dimensional tolerances according to standard ISO 15552

Utilizing ISO cylinders, these guide units offer high load carrying capabilities.



### How to Order Complete Guide Units (Guide Units Include Cylinder)



### Weights: Kg

Type FHG; Piston Diameter (mm)	32	40	50	63	80	100
0 mm stroke	1.30	2.40	3.50	4.60	8.40	11.8
To be added per 100 mm stroke	0.17	0.31	0.50	0.50	0.77	0.77

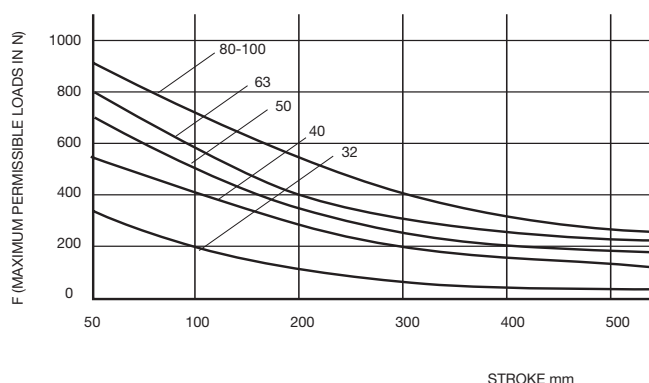
Type FHK; Piston Diameter (mm)	32	40	50	63	80	100
0 mm stroke	1.30	2.40	3.50	4.60	8.40	11.8
To be added per 100 mm stroke	0.17	0.31	0.50	0.50	0.77	0.77

Lbs. = Kg X 2.205  
 Weights for guide unit only.

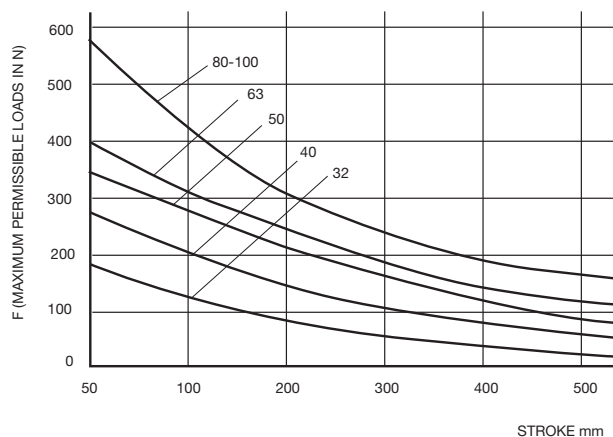


## Maximum permissible loads in relation to stroke

FHG Sintered Bronze bushing  
Static ratings (Dynamic = load X .5)



FHK Linear Ball  
Static ratings (Dynamic = load X .65)



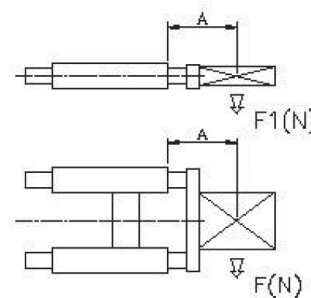
FHG: Guide unit, long, with sintered bronze bushing  
FHK: Guide unit, long, with linear ball bearing

- With short strokes up to 60 mm, a reduction of load with linear ball bearings occurs. This is already taken into account in the diagrams.
- Increasing of max. load by 25% results in a reduction of lifetime of linear ball bearing to  $2 \times 10^6$  m.
- For shock applications with linear ball bearings multiply load capacity by factor 0.5.

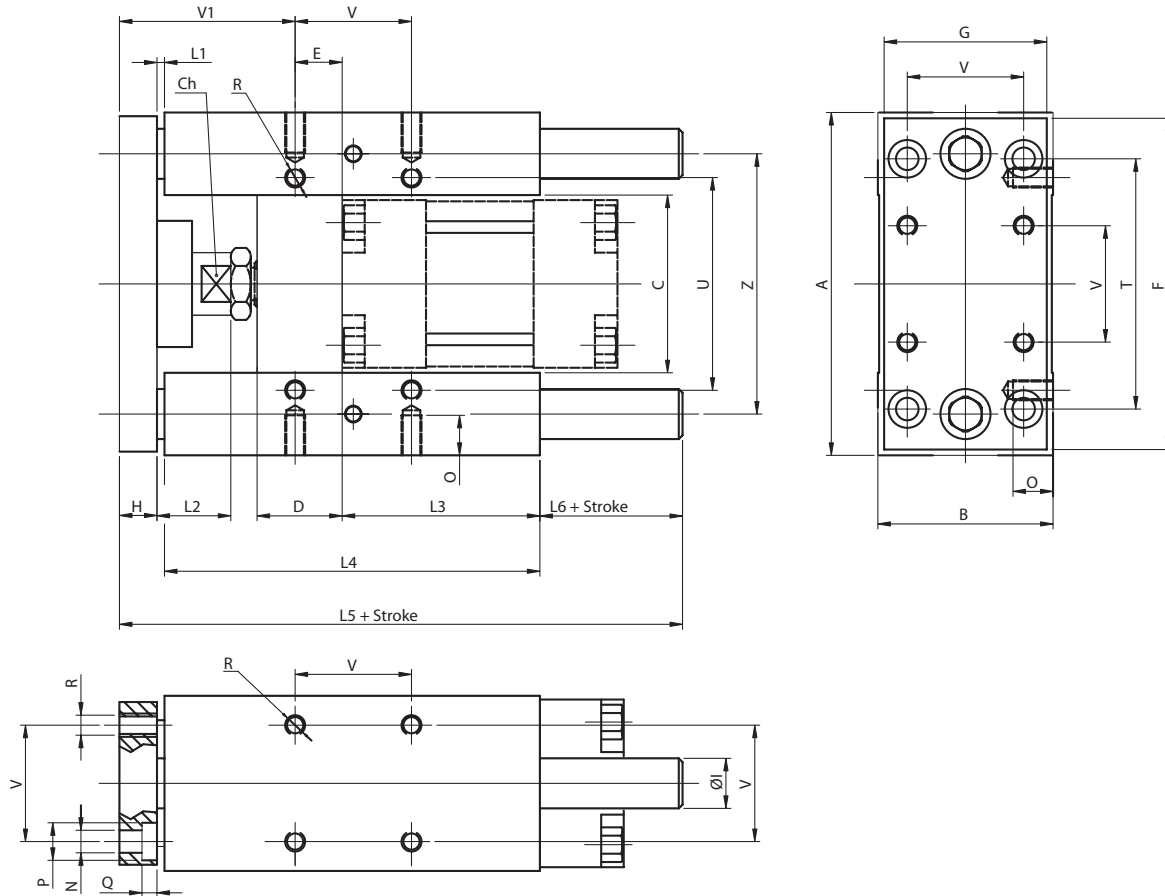
FHG: Guide unit, long, with sintered bronze bushing  
FHK: Guide unit, long, with linear ball bearing

- The total deflection of the guide rods against rod projection is the sum of deflection by own weight and deflection by load.
- Deflection in function of load is linear (with double load double deflection).

$$F1 = F \times 0.9N$$



### Guide Units



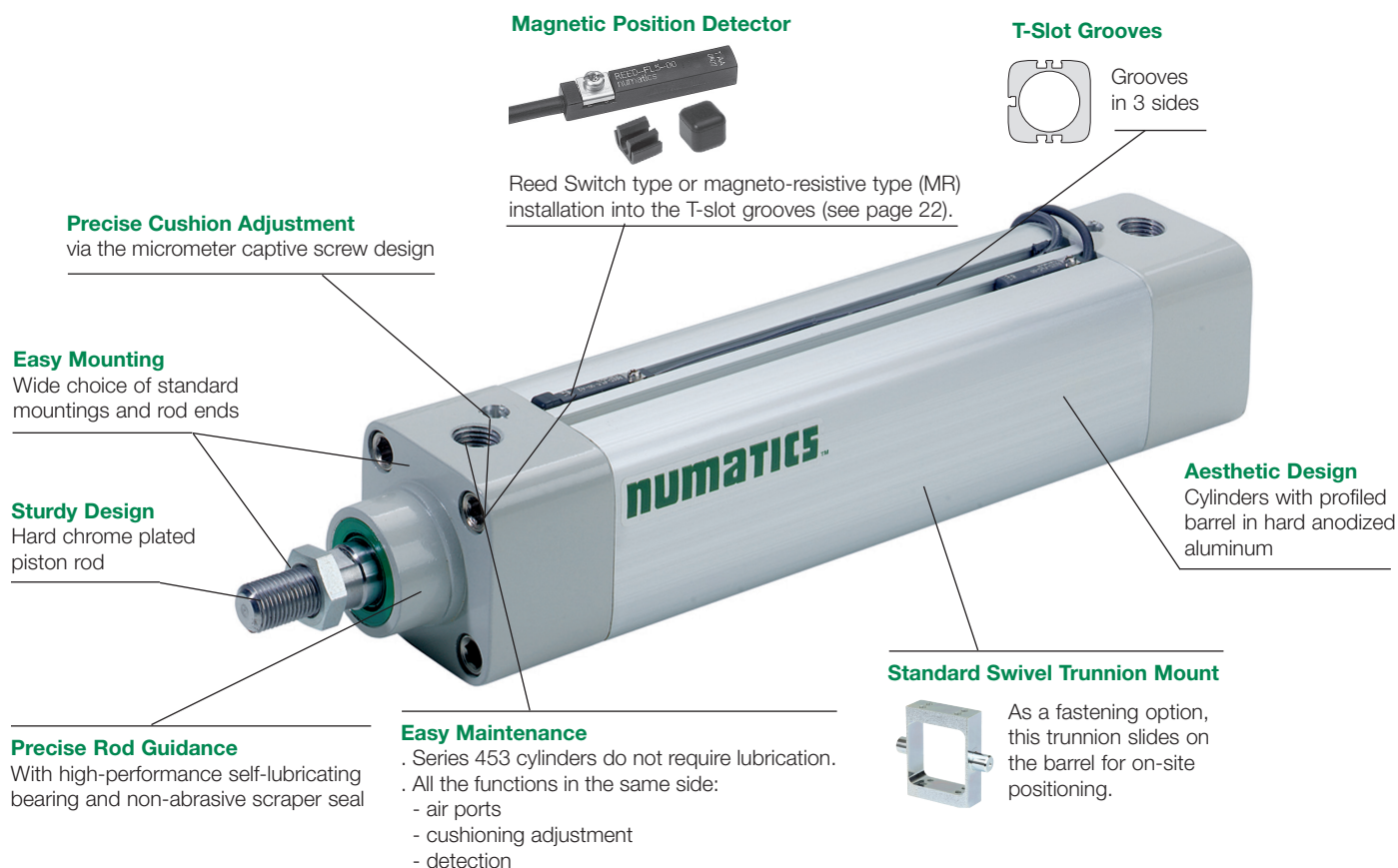
Bore Ø (mm)	A	B	C	CH	D	E	F	G	H	ØI	L1*	L2	L3	L4	L5*	L6
32	97	49	51	15	24	4.3	93	45	12	12	3	19	75	125	187	47
40	115	58	58.2	15	28	11	112	55	12	16	3	24	80	140	207	52
50	137	70	70.2	20	34	18.8	134	65	15	20	3	27	78	148	223	57
63	152	85	85.2	20	34	15.3	147	80	15	20	3	27	106	178	243	47
80	189	105	105.5	26	50	25	180	100	20	25	3	27	111	195	267	49
100	213	130	130.5	26	55	30	206	120	20	25	3	27	128	218	290	49

\*Add an additional 22 mm when ordered with retract stop collars.

Bore Ø (mm)	N	O	P	Q	R	T	U	V	V1*	Z
32	6.6	12	11	6.5	M6x1	78	61	32.5	60.7	74
40	6.6	12	11	6.5	M6x1	84	69	38	64	87
50	9	16	15	8.5	M8x1.25	100	85	46.5	70	104
63	9	16	15	9	M8x1.25	105	100	56.5	74.7	119
80	11	20	18	11	M10x1.5	130	130	72	82	148
100	11	20	18	11	M10x1.5	150	150	89	83	173

## 453 Series

The 453 Series is an aluminum body air cylinder that is designed to meet all ISO 15552 requirements. The 453 Series is a lighter and modern-looking cylinder with a sturdy tie rod design inside for optimal technical performance.



## General

<b>Detection</b>	Equipped for magnetic position sensors
<b>Fluid</b>	Compressed Air
<b>Operating Pressure</b>	10 bar max./150 PSI
<b>Ambient Temperature</b>	-20°C to +70°C (-4°F to 158°F)
<b>Optimal Max Speed</b>	≤ 1 m/s (for optimal service life)
<b>Max. Speed Rate</b>	2 m/s
<b>Standards</b>	ISO 15552-AFNOR NF ISO 15552-DIN ISO 15552 (replace ISO 6431-AFNOR NFE 49003-VDMA 24562)

## Construction

<b>Tube</b>	Hard anodized aluminium alloy	
<b>Head and Cap</b>	Aluminium alloy	
<b>Bearing</b>	Self-lubricating metal	
<b>Cushioning Seals</b>	PUR (polyurethane)	
<b>Cushioning</b>	Pneumatic, adjustable from both sides with captive screw	
<b>Piston Rod</b>	Hard chrome plated steel	
<b>Rod Nut</b>	Galvanized steel	
<b>Piston</b>	Ø 32 to 80 mm	POM (polyacetal)
	Ø 100 mm	light alloy
	Fitted with an annular Reed magnet	
<b>Piston Seals</b>	PUR (polyurethane)	

### How to Order

**G 453 A 3 S K 0050 A00**

#### Thread Connection

G = ISO 228/1

#### Product Series

453 Series

#### Revision Letter

A = Revision Level

#### Bore (mm)

3 = 32  
4 = 40  
5 = 50  
6 = 63  
8 = 80  
1 = 100

#### Cylinder Type

S = Single Rod, Double Acting  
2 = Double Rod, Double Acting  
3 = 303 Stainless Steel Single Rod, Double Acting  
4 = 303 Stainless Steel Double Rod, Double Acting

#### Rod Option

K = Standard  
1 = NuLock Rod Lock Ready  
3 = NuLock Rod Lock  
Extended piston rod, consult us.

#### Options

A00 = No Option  
C01 = Foot Bracket (Outside) Mount  
C03 = Foot Bracket (Inside) Mount  
C07 = Oscillating Bracket with Lugs  
C08 = Oscillating Bracket with Wide Fork Type Mount  
C13 = Spherical Eye Mount (Back Side)  
C14 = Oscillating Bracket with Narrow Fork Type Mount  
CD4 = Rod Clevis Mount Both Ends (Double Rod)  
CD5 = Spherical Eye Mount Both Sides (Double Rod)  
CF2 = Front Flange Mount  
CF4 = Rod Clevis Mount  
CF5 = Spherical Rod Eye Mount (Front Side)  
CR2 = Rear Flange Mount  
FMT = Fixed Mid Trunnion (Axis Perpendicular to Ports)  
FST = Fixed Mid Trunnion (Axis Parallel to Ports)  
AB7 = Angular Clevis Bracket  
AB5 = Angular Clevis Bracket Spherical Bearing  
CF6 = Alignment Compensator  
01A = Front Rod Extension  
01B = Rear Rod Extension  
02A = Front Thread Extension  
02B = Rear Thread Extension

<sup>(1)</sup> For fixed supplied mid trunnion, consult our Dynamic Product Modeling Tool on [www.numaticsnet.com](http://www.numaticsnet.com) and indicate XV dimension.

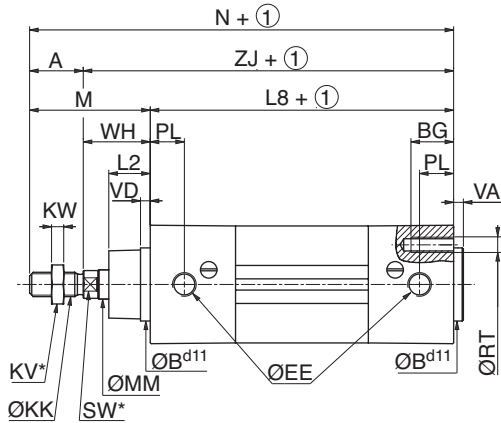
#### Recommended standard strokes (mm)

0005 = 5mm (Minimum Stroke)  
2000 = 2000mm (Maximum Stroke)

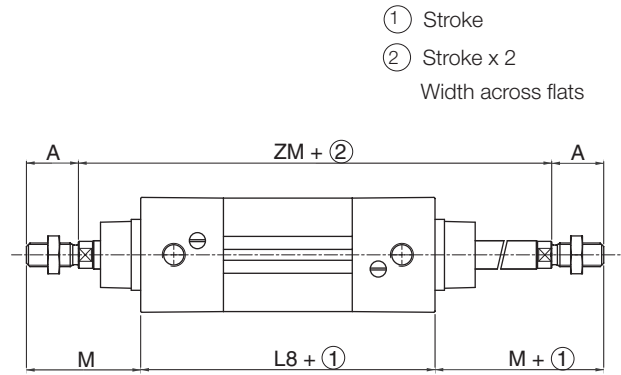
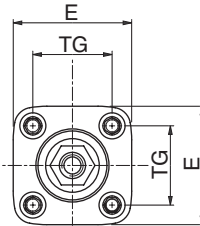


**Dimensions: mm**

**Single Rod Cylinder**



**Double Rod Cylinder**



- ① Stroke
- ② Stroke x 2
- Width across flats

Bore Ø (mm)	A	ØBd11	BG	E	ØEE (3)	ØKK	KV	KW	L2	L8	M	ØMM	N	PL	ØRT	SW	TG	VA	VD min.	WH	ZJ	ZM	Weight (kg)	
																							Base	Stroke Adder (mm)
32	22	30	16	48	G1/8	M10x1.25	16	5	17	94	48	12	142	14	M6x1	10	32.5	4	4	26	120	146	0.49	0.0029
40	24	35	16	54	G1/4	M12x1.25	18	6	19	105	54	16	159	16	M6x1	13	38	4	4	30	135	165	0.78	0.0037
50	32	40	16	66	G1/4	M16x1.5	24	8	24	106	69	20	175	18.5	M8x1.25	17	46.5	4	4	37	143	180	1.00	0.0053
63	32	45	16	78	G3/8	M16x1.5	24	8	24	121	69	20	190	19	M8x1.25	17	56.5	4	4	37	158	195	1.35	0.0057
80	40	45	17	96	G3/8	M20x1.5	30	10	33	128	86	25	214	16.5	M10x1.5	22	72	4	4	46	174	220	2.36	0.0086
100	40	55	17	115	G1/2	M20x1.5	30	10	35.5	138	91	25	229	19.5	M10x1.5	22	89	4	4	51	189	240	3.46	0.0099

Thread connections G have standard thread according to ISO 16030.

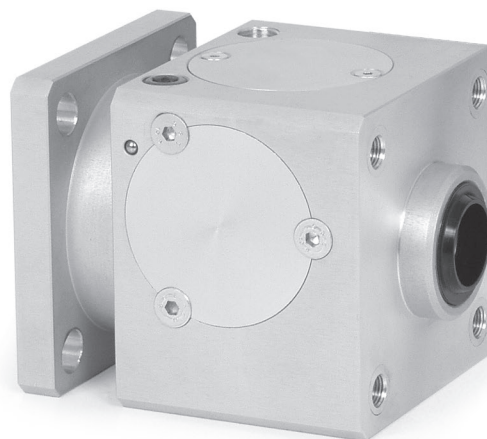


The **Nu Lock Series** is a comprehensive rod lock product line that is designed with safety in mind. The cutting edge design allows for effortless load holding during Emergency Stop (E- Stop) conditions. It is designed to mechanically lock a cylinder piston rod in the event of an air supply failure. Use caution when applying the **Nu Lock Series** rod lock unit. It should not be used to “brake” the cylinder piston rod in dynamic conditions.

### Nu Lock Series Standard Specifications:

- Economical OEM type rod lock
- Compact profile
- VDMA sizes: 32 mm to 125 mm bores
- Minimum unlocking air pressure is 45 psi (3 Bar)
- Maximum unlocking air pressure is 90 psi (6 Bar)
- Clamping force on all Nu Lock Series units is equal to the area of the cylinder piston at 145 psi (10 Bar)
- All standard ISO 15552 mounting accessories can be used with the RL Series installed on the cylinder
- Temperature rating: -10° F to 165° F (-20° C to +70° C)

The **Nu Lock Series** individual locking units are recommended for replacement use only. This particular unit must be used with a chrome plated steel cylinder piston rod. Consult factory for additional details.



### How to Order

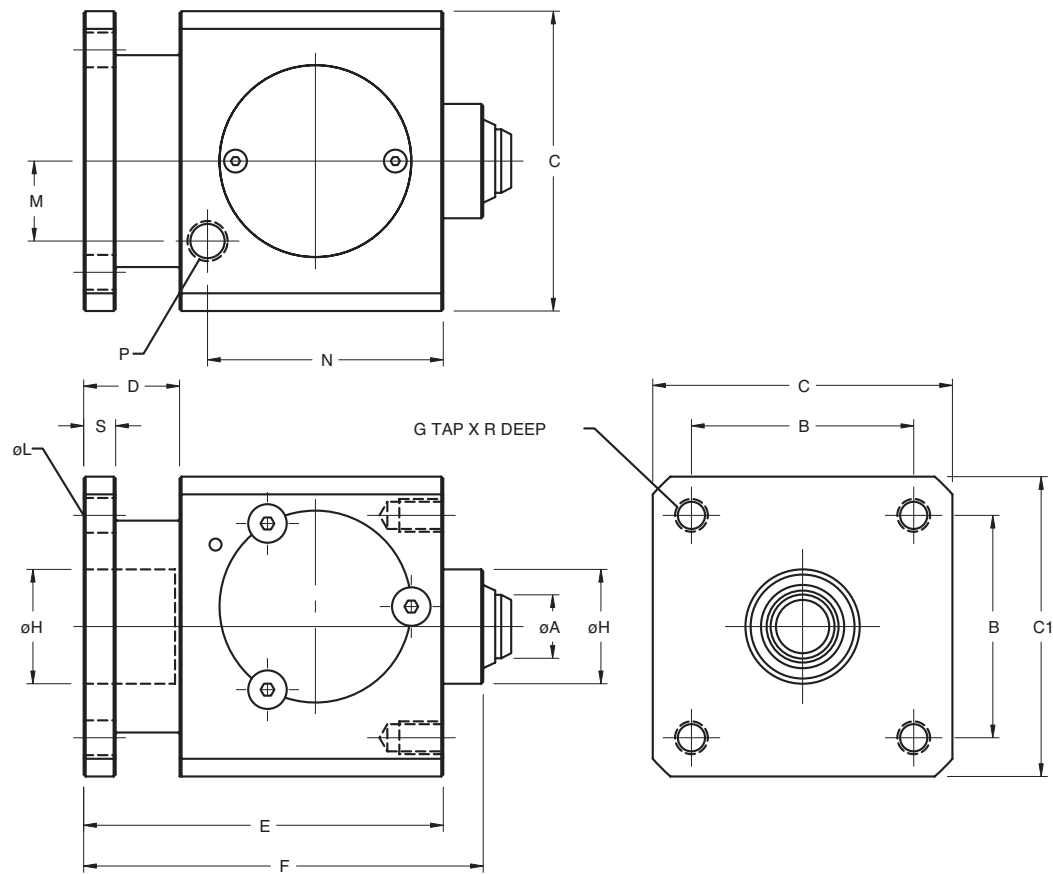
#### Nu Lock Series Rod Lock Units

		<b>BM</b>	<b>I</b>	<b>/</b>	<b>032</b>		
						<b>Type</b>	<b>Cylinder Bore Size</b>
						I = ISO/VDMA	032 = 32 mm (ISO)
							040 = 40 mm (ISO)
							050 = 50 mm (ISO)
							063 = 63 mm (ISO)
							080 = 80 mm (ISO)
							100 = 100 mm (ISO)
							125 = 125 mm (ISO)

#### ISO/VDMA

1. ISO/VDMA cylinders with “BMI” in the option code includes the **Nu Lock Series** rod lock unit **assembled** to the cylinder. Note that the cylinder includes the correct amount of rod extension.
2. ISO/VDMA cylinder with “BOI” in the option code includes a rod extension and sleeve nut mount on the head of the cylinder preparing it to install the **Nu Lock Series** rod lock unit.
3. Standard chrome plated steel material is recommended for rod lock applications.

**Nu Lock Series**

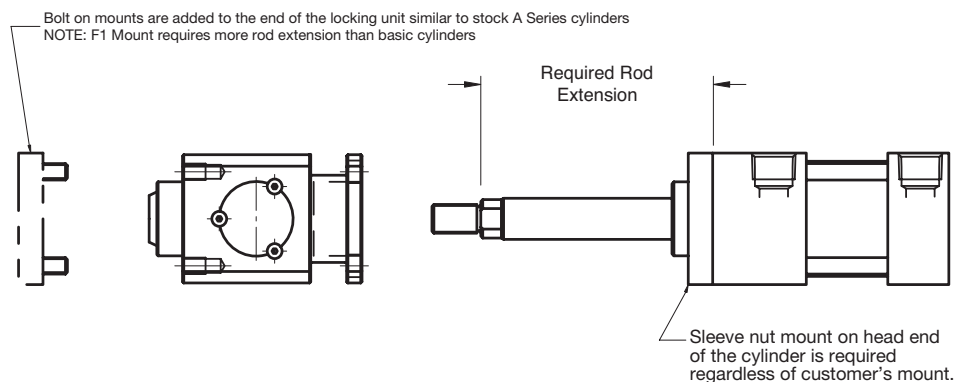


**ISO Locking Unit Dimensions (mm)**

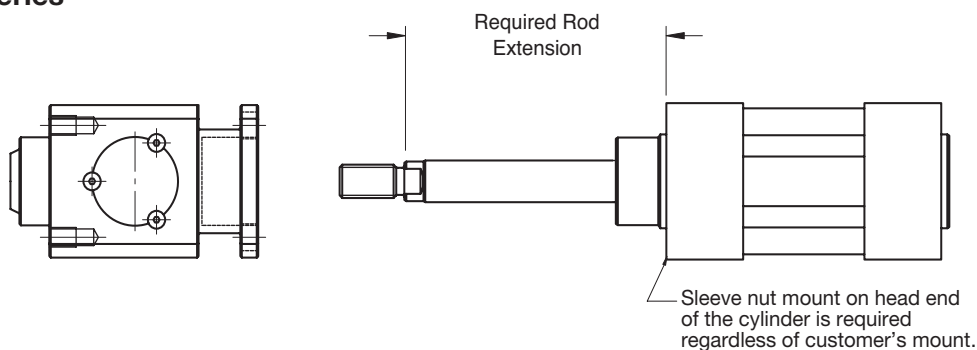
Part No.	Bore	ØA*	B	C	C1	E	F	G	ØH	ØL	M	N	P	R	S	Weight kg
BMI/032	32 mm	12.0	32.5	47.0	47.0	60.0	67.5	M6	30.0	6.5	14.5	33.25	1/8" G	8.0	6.0	0.4
BMI/040	40 mm	16.0	38.0	54.0	54.0	70.0	80.0	M6	34.5	6.5	18.0	42.50	1/8" G	8.0	6.0	0.6
BMI/050	50 mm	20.0	46.5	65.0	65.0	90.0	100.0	M8	40.0	9.0	20.0	58.00	1/8" G	12.0	8.0	1.1
BMI/063	63 mm	20.0	56.5	75.0	75.0	90.0	100.0	M8	45.0	9.0	20.0	59.00	1/8" G	12.0	8.0	1.5
BMI/080	80 mm	25.0	72.0	95.0	95.0	110.0	120.0	M10	45.0	11.0	30.0	69.00	1/4" G	16.0	12.0	2.6
BMI/100	100 mm	25.0	89.0	114.0	114.0	110.0	120.0	M10	55.0	11.0	37.0	69.00	1/4" G	16.0	12.0	3.5
BMI/125	125 mm	32.0	110.0	138.0	138.0	140.0	156.0	M12	60.0	14.0	50.0	84.50	1/4" G	20.0	20.0	6.5

\* Dimension denotes cylinder piston rod diameter.

### Cylinder and Lock Information



### ISO/452 Series



Bore Size (mm)	Standard Mount Rod Extension
32	60.0
40	70.0
50	90.0
63	90.0
80	110.0
100	110.0
125	140.0

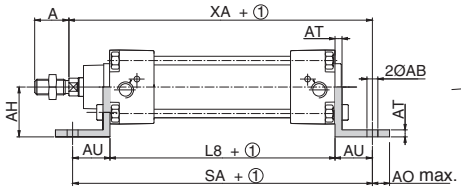
### Installation of a Nu Lock and Cylinder Combination

The Nu Lock unit is not equipped with a manual override. Therefore, to extend and/or retract the piston rod with the locking unit installed requires air pressure to be applied to the supply port of the Nu Lock unit. This pressure must be in a range of 45 to 90 psi. Once unlocked, the cylinder piston rod can be extended and/or retracted as desired for the setup of the machine.

Mounting

Foot Bracket (Outside) Mount

C01



① Stroke

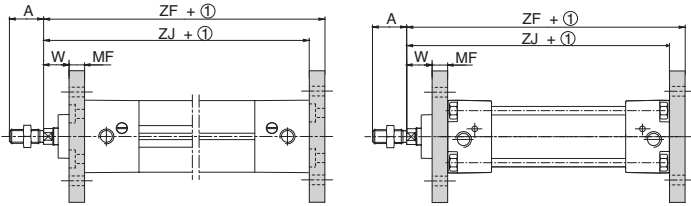
Bore Ø (mm)	QAB	A	AO	AH	AT	AT1	AU	E	L8	SA	TR	TG	UF	US	XA	ZA	Weight (kg) 2 x C01
32	7	22	11	32	4	8	24	50	94	142	32	32.5	54	50	144	44	0.150
40	10	24	15	36	4	8	28	58	105	161	36	38	62	58	163	45	0.190
50	10	32	15	45	5	10	32	70	106	170	45	46.5	77	70	175	45	0.395
63	10	32	15	50	5	10	32	85	121	185	50	56.5	87	85	190	49	0.445
80	12	40	20	63	6	12	41	105	128	210	63	72	110	105	215	54	0.790
100	14.5	40	25	71	6	12	41	130	138	220	75	89	130	130	230	67	1.400

Mounting

Front or rear flange

CF2, CR2

Rectangular



① Stroke

Bore Ø (mm)	A	ØD	E	ØFB	MF	R	TF	UF	W	ZB	ZJ	ZF	Weight (kg)
32	22	30	50	7	10	32	64	86	16	55	120	130	0.190
40	24	35	58	9	10	36	72	96	20	55	135	145	0.245
50	32	40	70	9	12	45	90	115	25	56	143	155	0.500
63	32	45	85	9	12	50	100	130	25	59.5	158	170	0.580
80	40	45	105	12	16	63	126	165	30	66.5	174	190	1.390
100	40	55	130	14	16	75	150	187	35	77.5	189	205	1.630

#### Mounting

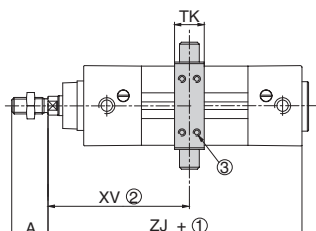
Mid trunnion

**MT4, MS4**

**(Series 453)**

XV Dimension must be specified when ordering.

**Series 453**



① Stroke

② Except when XV dimension is specified when ordering, the position of the trunnion may be adjusted along the unit. Consequently, the mid trunnion is not screwed on and must be adjusted after delivery.

③ 8 locking screws.

#### Mounting

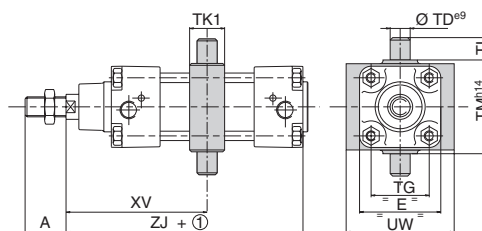
Fixed Mid Trunnion

**FMT, FST**

**(Series 450)**

XV Dimension must be specified when ordering.

**Series 450**

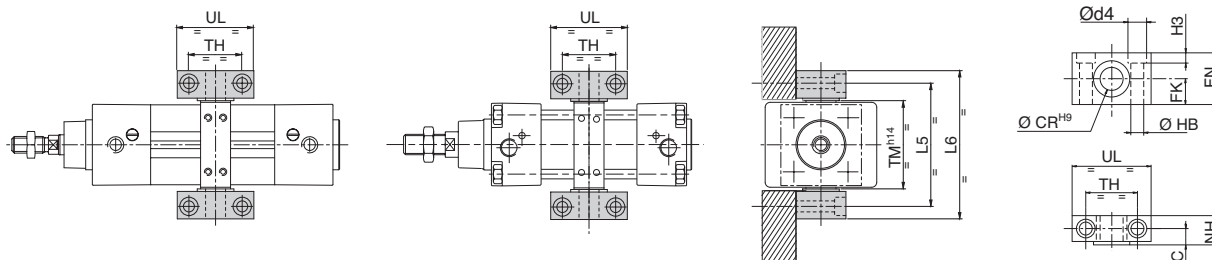


Bore Ø (mm)		A	E	TD	TG	TK	TK1	TL	TM	UW	UWA	ZB	ZJ	XV min.		XV max.		Weight (kg)	
453	450													453	450	453	450	MT4, MS4 or FMT, FST	
32	32	22	56	12	32.5	18	22	12	50	55	64.5	55	120	71.5	72	75	74.5	0.185	0.2
40	40	24	67	16	38	20	28	16	63	58	74.5	55	135	81	83	84.2	82	0.33	0.4
50	50	32	89	16	46.5	20	28	16	75	68	91	56	143	89.5	89.5	91.3	91	0.475	0.5
63	63	32	89	20	56.6	25	35	20	90	84	94	59.5	158	89.5	93.5	102	102.5	0.57	0.9
80	80	40	112	20	72	25	35	20	110	102	130	66.5	174	106.5	106.5	114	114.5	1.12	1.1
100	100	40	112	25	89	30	40	25	132	145	145	87.5	189	116.5	114	124	126.5	1.52	1.86

#### Mounting

Support for mid trunnion (set of 2 items)

**CV9**

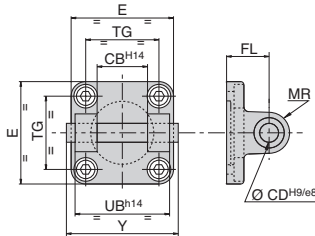


Bore Ø (mm)	C	ØCR	Ød4	FK	FN	HB	H3	L5	L6	NH	TH	TM	UL	Weight (kg)
452														
32	10.5	12	11	15	30	6.6	6.8	71	86	18	32	50	46	0.12
40	12	16	15	18	36	9	9	87	105	21	36	63	55	0.23
50	12	16	15	18	36	9	9	99	117	21	36	75	55	0.23
63	13	20	18	20	40	11	11	116	136	23	40	90	65	0.33
80	13	20	18	20	40	11	11	136	156	23	40	110	65	0.33
100	16	25	20	25	50	13.5	13	164	189	28.5	50	132	75	0.58



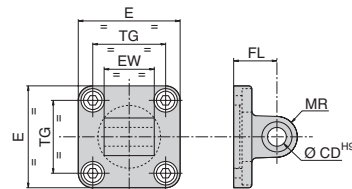
## Rear Mounting

Oscillating Bracket with Wide Fork Type Mount  
**C08**



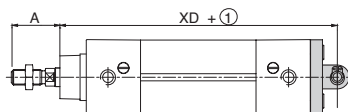
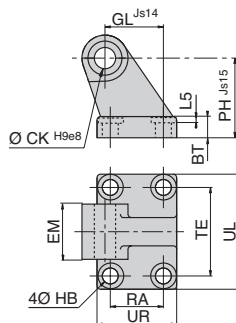
## Rear Mounting

Oscillating Bracket with Lugs  
**C07**



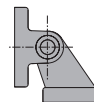
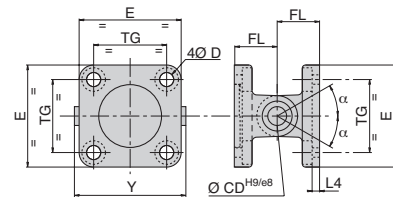
## Rear Mounting

Angular clevis bracket  
**AB7**



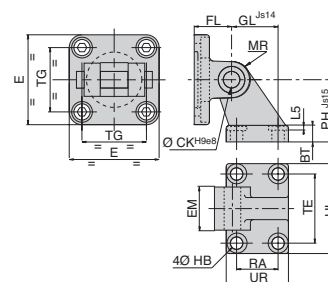
## C08 + C07

Oscillating Bracket with Wide Fork Type Mount  
+  
Oscillating Bracket with Lugs



## C08 + AB7

Oscillating Bracket with Wide Fork Type Mount  
+  
Angular clevis bracket

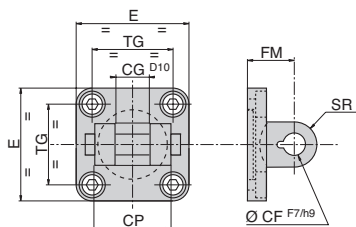


Bore Ø (mm)	Weight (kg)					
	Light Alloy			Cast Iron		
	C08	C07	AB7	C08	C07	AB7
<b>450</b>						
<b>32</b>	0.105	0.085	0.16	0.205	0.21	0.34
<b>40</b>	0.15	0.092	0.23	0.305	0.23	0.45
<b>50</b>	0.24	0.17	0.39	0.43	0.43	0.79
<b>63</b>	0.37	0.25	0.57	0.685	0.62	1.08
<b>80</b>	0.635	0.445	0.95	1.375	1.1	2.09
<b>100</b>	0.99	0.755	0.5	2.1	1.7	2.75

Bore Ø (mm)	A	BT	CB EM	CD CK	D	E	EW	FL	GL	HB	L4	L5	MR	PH	RA	TE	TG	UB	UR	UL	XD	XE	Y
<b>32</b>	22	8	26	10	6.6	50	26	22	21	6.6	5.5	1.6	11	32	18	38	32.5	45	31	51	142	73	56
<b>40</b>	24	10	28	12	6.6	58	28	25	24	6.6	5.5	1.6	13	36	22	41	38	52	35	54	160	77	63
<b>50</b>	32	12	32	12	9	70	32	27	33	9	6.5	1.6	13	45	30	50	46.5	60	45	65	170	80	71
<b>63</b>	32	12	40	16	9	85	40	32	37	9	6.5	1.6	17	50	35	52	56.5	70	50	67	190	89	81
<b>80</b>	40	14	50	16	11	105	50	36	47	11	10	2.5	17	63	40	66	72	90	60	86	210	100	101
<b>100</b>	40	15	60	20	11	130	60	41	55	11	10	2.5	21	71	50	76	89	110	70	96	230	118	128

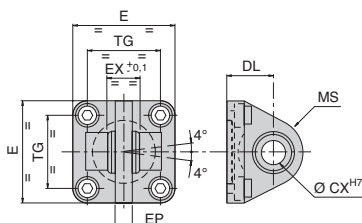
### Rear Mounting

Oscillating Bracket with Narrow Fork Type Mount  
**C14**



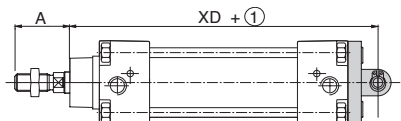
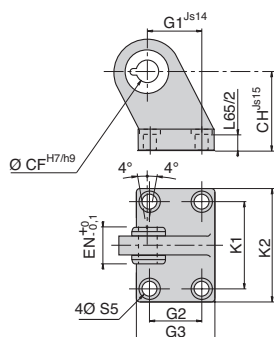
### Rear Mounting

Spherical Eye Mount (Back Side)  
**C13**



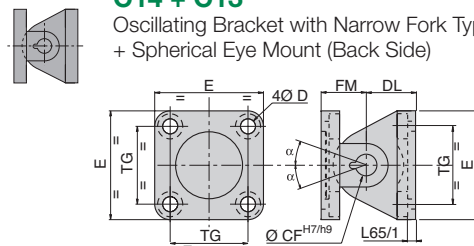
### Rear Mounting

Angular clevis bracket spherical bearing  
**AB5**



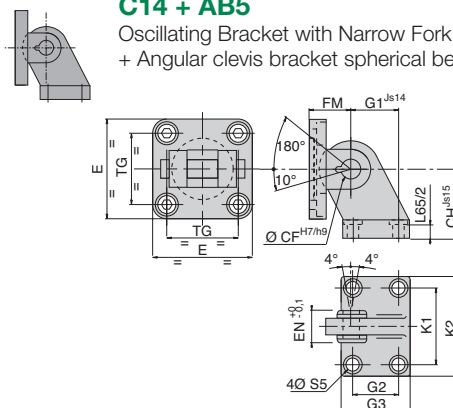
### C14 + C13

Oscillating Bracket with Narrow Fork Type Mount  
+ Spherical Eye Mount (Back Side)



### C14 + AB5

Oscillating Bracket with Narrow Fork Type Mount  
+ Angular clevis bracket spherical bearing

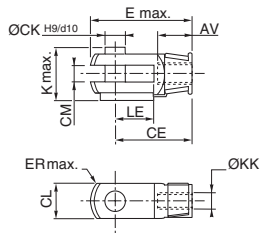


Bore Ø (mm)	A	BT	CB EM	CD CK	D	E	EW	FL	GL	HB	L4	L5	MR	PH	RA	TE	TG	UB	UR	UL	XD	XE	Y
32	22	8	26	10	6.6	50	26	22	21	6.6	5.5	1.6	11	32	18	38	32.5	45	31	51	142	73	56
40	24	10	28	12	6.6	58	28	25	24	6.6	5.5	1.6	13	36	22	41	38	52	35	54	160	77	63
50	32	12	32	12	9	70	32	27	33	9	6.5	1.6	13	45	30	50	46.5	60	45	65	170	80	71
63	32	12	40	16	9	85	40	32	37	9	6.5	1.6	17	50	35	52	56.5	70	50	67	190	89	81
80	40	14	50	16	11	105	50	36	47	11	10	2.5	17	63	40	66	72	90	60	86	210	100	101
100	40	15	60	20	11	130	60	41	55	11	10	2.5	21	71	50	76	89	110	70	96	230	118	128

**Rod Mount**

Rod Clevis Mount

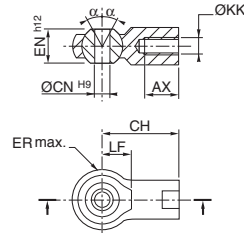
**CF4**



**Rod Mount**

Spherical Rod Eye Mount (Front Side)

**CF5**

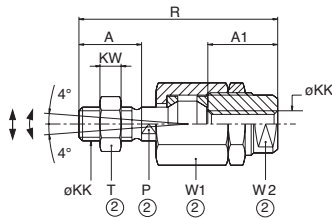


Bore Ø (mm)	AV AX	CE	CH	ØCK	CL	CM	ØCN	E max.	EN	ER max.	K	ØKK	LE	LF	4°	Weight (kg)	
																Steel	
																CF4	CF5
<b>32</b>	20	40	43	10	20	10 + 0.5 / + 0.15	10	56	14	14	26	M10x1.25	20	15	4°	0.1	0.07
<b>40</b>	22	48	50	12	24	12 + 0.5 / + 0.15	12	67	16	16	32	M12x1.25	24	17	4°	0.15	0.12
<b>50</b>	28	64	64	16	32	16 + 0.5 / + 0.15	16	89	21	21	41	M16x1.5	32	22	4°	0.33	0.22
<b>63</b>	28	64	64	16	32	16 + 0.5 / + 0.15	16	89	21	21	41	M16x1.5	32	22	4°	0.33	0.22
<b>80</b>	33	80	77	20	40	20 + 0.5 / + 0.15	20	112	25	25	48	M20x1.5	40	26	4°	0.67	0.39
<b>100</b>	33	80	77	20	40	20 + 0.5 / + 0.15	20	112	25	25	48	M20x1.5	40	26	4°	0.67	0.39

**Rod Mount**

Alignment compensator

**CF6**



① Stroke

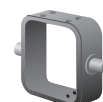
② Width across flats

Bore Ø (mm)	A	A1	P	ØKK	KW	R	T	W1	W2	X min.	ZJ	ZK	Radial Compensation (mm)	Spherical Compensation (°)	Angular Compensation (°)	Weight (kg)
<b>32</b>	22 22	26 23	12 12	M10x1.25 M20x1.25	6 6	73 71	17 17	30 30	19 19	58 56	120 51	0.7 0.7	0.7 0.7	4	4	0.22
<b>40</b>	22 24	26 23	12 12	M10x1.25 M12x1.25	6 7	73 75	17 19	30 30	19 19	58 57	135 52	0.7 0.7	0.7 0.7	4	4	0.23
<b>50</b>	24 32	26 32	12 20	M12x1.25 M16x1.5	7 8	77 103	19 24	30 41	19 27	59 79	143 53	0.7 1	1	4	4	0.66
<b>63</b>	24 32	26 32	12 20	M12x1.25 M16x1.5	7 8	77 103	19 24	30 41	19 27	59 79	158 57	0.7 1	1	4	4	0.66
<b>80</b>	32 40	34 39	19 20	M16x1.5 M20x1.5	8 10	106 119	24 30	42 41	30 27	82 89	174 64	1 1	1	4	4	0.7
<b>100</b>	32 40	34 39	19 20	M16x1.5 M20x1.5	8 10	106 119	24 30	42 41	30 27	82 89	189 77	1 1	1	4	4	0.7

### Specifications



	Foot Bracket (Outside Mount) (set of 2 items) C01	Front or Rear Flange CF2, CR2
<b>Construction</b>	stamped sheet steel	steel
<b>Bore Ø (mm)</b>		
<b>32</b>	P493A3124000A00	P493A3126000A00
<b>40</b>	P493A4124000A00	P493A4126000A00
<b>50</b>	P493A5124000A00	P493A5126000A00
<b>63</b>	P493A6124000A00	P493A6126000A00
<b>80</b>	P493A8124000A00	P493A8126000A00
<b>100</b>	P493A1124000A00	P493A1126000A00



	Mid Trunnion MT4, MS4		Fixed Mid Trunnion FMT, FST		Mid Trunnion CV9
<b>Construction</b>	cast iron	<b>Construction</b>	cast iron	<b>Construction</b>	cast iron
<b>Bore Ø (mm)</b>		<b>Bore Ø (mm)</b>		<b>Bore Ø (mm)</b>	
<b>453</b>		<b>450</b>		<b>452</b>	
<b>32</b>	P493A3111000A00	<b>32</b>	P493A3113000A00	<b>32</b>	410564
<b>40</b>	P493A4111000A00	<b>40</b>	P493A4113000A00	<b>40</b>	410604
<b>50</b>	P493A5111000A00	<b>50</b>	P493A5113000A00	<b>50</b>	410566
<b>63</b>	P493A6111000A00	<b>63</b>	P493A6113000A00	<b>63</b>	410605
<b>80</b>	P493A8111000A00	<b>80</b>	P493A8113000A00	<b>80</b>	410606
<b>100</b>	P493A1111000A00	<b>100</b>	P493A1113000A00	<b>100</b>	410607

## Rear Mountings



**Oscillating Bracket with Wide Fork Type Mount  
C08**

Construction	light alloy
Bore Ø (mm)	
32	P493A3121110A00
40	P493A4121110A00
50	P493A5121110A00
63	P493A6121110A00
80	P493A8121110A00



**Oscillating Bracket with Lugs  
C07**

Construction	light alloy
Bore Ø (mm)	
32	P493A3122100A00
40	P493A4122100A00
50	P493A5122100A00
63	P493A6122100A00
80	P493A8122100A00



	Angular Clevis Bracket AB7	Oscillating Bracket with Narrow Fork Type Mount C14	Spherical Eye Mount (Back Side) C13	Angular Clevis Bracket Spherical Bearing AB5
Construction	light alloy	steel	steel	steel
Bore Ø (mm)				
32	P493A3123110A00	P493A3129000A00	P493A3129000A00	P493A3127000A00
40	P493A4123110A00	P493A4129000A00	P493A4129000A00	P493A4127000A00
50	P493A5123110A00	P493A5129000A00	P493A5129000A00	P493A5127000A00
63	P493A6123110A00	P493A6129000A00	P493A6129000A00	P493A6127000A00
80	P493A8123110A00	P493A8129000A00	P493A8129000A00	P493A8127000A00
100	P493A1123110A00	P493A1129000A00	P493A1129000A00	P493A1127000A00



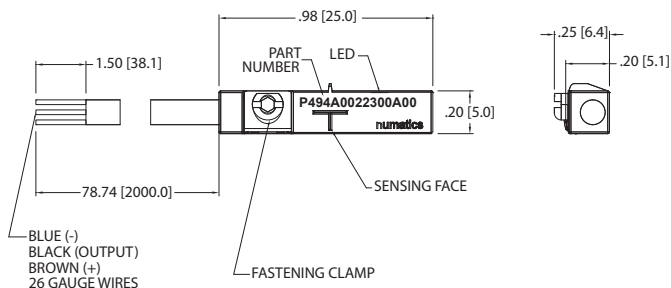
### Rod Mountings



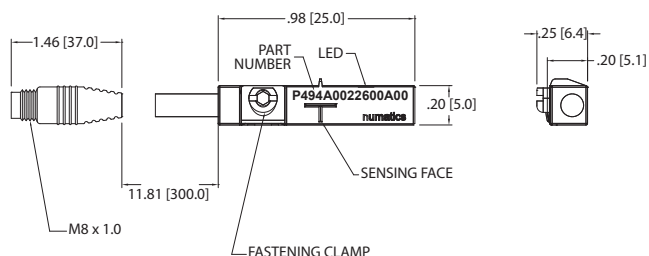
	Rod Clevis Mount CF4	Spherical Rod Eye Mount (Front Side) CF5	Alignment Compensator CF6
Construction	steel	steel	steel
Bore Ø (mm)			
<b>32</b>	P493A3131000A00	P493A3132000A00	P493A3134000A00
<b>40</b>	P493A4131000A00	P493A4132000A00	P493A4134000A00
<b>50-63</b>	P493A5131000A00	P493A5132000A00	P493A5134000A00
<b>80-100</b>	P493A8131000A00	P493A8132000A00	P493A8134000A00

## Sensing Part Numbers

## P494A0022300A00



## P494A0022600A00



ELECTRICAL DESIGN	DC PNP
OUTPUT	Normally Open
OPERATING VOLTAGE	10-30 VDC
CURRENT RATING	100 mA
SHORT-CIRCUIT PROTECTION	Yes
OVERLOAD PROTECTION	Yes
REVERSE POLARITY PROTECTION	Yes
VOLTAGE DROP	< 2.5 V
CURRENT CONSUMPTION	< 12 mA
REPEATABILITY	< .2mm
POWER-ON DELAY TIME	< 30 ms
SWITCH FREQUENCY	> 3000 Hz
AMBIENT TEMPERATURE	-13°F to 185°F (-25°C to 85°C)
PROTECTION	IP 67, III
HYSTERESIS	1.0mm
MAGNETIC SENSITIVITY	2.0 mT
TRAVEL SPEED	> 10 m/s

HOUSING MATERIAL PA (Polyamide) Black; Fastening Clamp: Stainless Steel

FUNCTION DISPLAY SWITCHING STATUS Yellow LED

CONNECTION Flying Leads, Pur Cable (2m Long, 3 x 26 Gauge Wire)

REMARKS Clamping Screw with Combined Slot/Hexagon Socket Head AF 1.5  
cULus - Class 2 Source Required

ACCESSORIES Rubber Placeholder, Cable Clip, and Cut Sheet to be provided with every switch

AGENCY APPROVALS



ELECTRICAL DESIGN	DC PNP
OUTPUT	Normally Open
OPERATING VOLTAGE	10-30 VDC
CURRENT RATING	100 mA
SHORT-CIRCUIT PROTECTION	Yes
OVERLOAD PROTECTION	Yes
REVERSE POLARITY PROTECTION	Yes
VOLTAGE DROP	< 2.5 V
CURRENT CONSUMPTION	< 12 mA
REPEATABILITY	< .2mm
POWER-ON DELAY TIME	< 30 ms
SWITCH FREQUENCY	> 3000 Hz
AMBIENT TEMPERATURE	-13°F to 185°F (-25°C to 85°C)
PROTECTION	IP 67, III
HYSTERESIS	1.0mm
MAGNETIC SENSITIVITY	2.0 mT
TRAVEL SPEED	> 10 m/s

HOUSING MATERIAL PA (Polyamide) Black; Fastening Clamp: Stainless Steel

FUNCTION DISPLAY SWITCHING STATUS Yellow LED

CONNECTION M8 Connector (Snap Fit) , Pur Cable (.3 m)

REMARKS Clamping Screw with Combined Slot/Hexagon Socket Head AF 1.5  
cULus - Class 2 Source Required

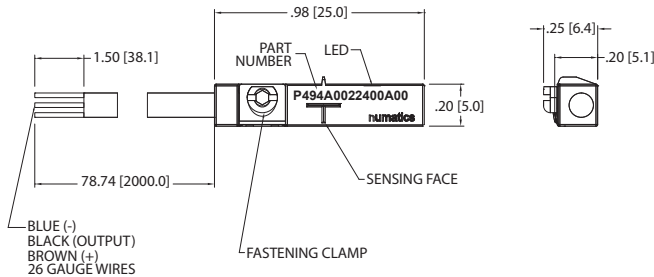
ACCESSORIES Rubber Placeholder, Cable Clip, and Cut Sheet to be provided with every switch

AGENCY APPROVALS



### Sensing Part Numbers

#### P494A0022400A00

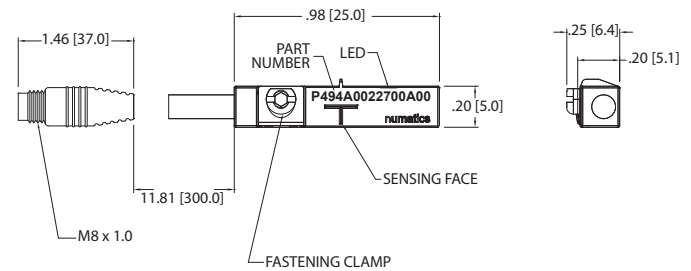


ELECTRICAL DESIGN	DC NPN
OUTPUT	Normally Open
OPERATING VOLTAGE	10-30 VDC
CURRENT RATING	100 mA
SHORT-CIRCUIT PROTECTION	Yes
OVERLOAD PROTECTION	Yes
REVERSE POLARITY PROTECTION	Yes
VOLTAGE DROP	< 2.5 V
CURRENT CONSUMPTION	< 12 mA
REPEATABILITY	< .2mm
POWER-ON DELAY TIME	< 30 ms
SWITCH FREQUENCY	> 3000 Hz
AMBIENT TEMPERATURE	-13°F to 185°F (-25°C to 85°C)
PROTECTION	IP 67, III
HYSTERESIS	1.0mm
MAGNETIC SENSITIVITY	2.0 mT
TRAVEL SPEED	> 10 m/s
HOUSING MATERIAL	PA (Polyamide) Black; Fastening Clamp: Stainless Steel
FUNCTION DISPLAY SWITCHING STATUS	Yellow LED
CONNECTION	Flying Leads, Pur Cable (2m Long, 3 x 26 Gauge Wire)
REMARKS	Clamping Screw with Combined Slot/Hexagon Socket Head AF 1.5 cULus - Class 2 Source Required

ACCESSORIES Rubber Placeholder, Cable Clip, and Cut Sheet to be provided with every switch

AGENCY APPROVALS	
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#### P494A0022700A00

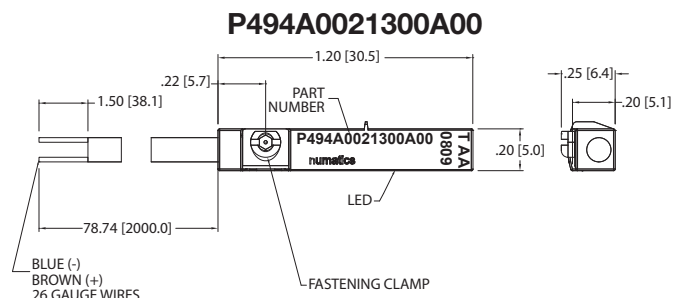


ELECTRICAL DESIGN	DC NPN
OUTPUT	Normally Open
OPERATING VOLTAGE	10-30 VDC
CURRENT RATING	100 mA
SHORT-CIRCUIT PROTECTION	Yes
OVERLOAD PROTECTION	Yes
REVERSE POLARITY PROTECTION	Yes
VOLTAGE DROP	< 2.5 V
CURRENT CONSUMPTION	< 12 mA
REPEATABILITY	< .2mm
POWER-ON DELAY TIME	< 30 ms
SWITCH FREQUENCY	> 3000 Hz
AMBIENT TEMPERATURE	-13°F to 185°F (-25°C to 85°C)
PROTECTION	IP 67, III
HYSTERESIS	1.0mm
MAGNETIC SENSITIVITY	2.0 mT
TRAVEL SPEED	> 10 m/s
HOUSING MATERIAL	PA (Polyamide) Black; Fastening Clamp: Stainless Steel
FUNCTION DISPLAY SWITCHING STATUS	Yellow LED
CONNECTION	M8 Connector (Snap Fit) , Pur Cable (.3 m)
REMARKS	Clamping Screw with Combined Slot/Hexagon Socket Head AF 1.5 cULus - Class 2 Source Required

ACCESSORIES Rubber Placeholder, Cable Clip, and Cut Sheet to be provided with every switch

AGENCY APPROVALS	
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## Sensing Part Numbers



ELECTRICAL DESIGN	AC/DC REED
OUTPUT	Normally Open
OPERATING VOLTAGE	5-120 VAC/DC
CURRENT RATING	100 mA*
SHORT-CIRCUIT PROTECTION	No
OVERLOAD PROTECTION	No
REVERSE POLARITY PROTECTION	Yes
VOLTAGE DROP	< 5 V
REPEATABILITY	± .2mm
MAKETIME INCLUDING BOUNCE	< .6 ms
BREAKTIME	< .1 ms
SWITCHING POWER (MAX)	5 W
SWITCH FREQUENCY	1000 Hz
AMBIENT TEMPERATURE	-13°F to 158°F (-25°C to 70°C)
PROTECTION	IP 67, II
HYSTERESIS	.9mm
HOUSING MATERIAL	PA (Polyamide) Black; Fastening Clamp: Stainless Steel
FUNCTION DISPLAY SWITCHING STATUS	Yellow LED
CONNECTION	Flying Leads, Pur Cable (2m Long, 2 x26 Gauge Wire)

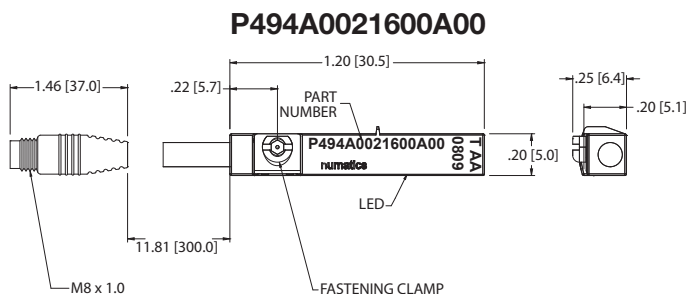
### REMARKS

\*External Protective Circuit for Inductive Load (Valve, Contactor, Etc..) Necessary.  
Conforms to 2008 NEC Section 725 III, Class 2 Circuits

Clamping Screw with Combined Slot/Hexagon Socket Head AF 1.5.  
No LED Function in case of Polarity in DC Operation

ACCESSORIES Rubber Placeholder, Cable Clip, and Cut Sheet to be provided with every switch

### AGENCY APPROVALS



ELECTRICAL DESIGN	AC/DC REED
OUTPUT	Normally Open
OPERATING VOLTAGE	*5-60 VDC / 5-50 VAC
CURRENT RATING	100 mA
SHORT-CIRCUIT PROTECTION	No
OVERLOAD PROTECTION	No
REVERSE POLARITY PROTECTION	Yes
VOLTAGE DROP	< 5 V
REPEATABILITY	± .2mm
MAKETIME INCLUDING BOUNCE	< .6 ms
BREAKTIME	< .1 ms
SWITCHING POWER (MAX)	5 W
SWITCH FREQUENCY	1000 Hz
AMBIENT TEMPERATURE	-13°F to 158°F (-25°C to 70°C)
PROTECTION	IP 67, II
HYSTERESIS	.9mm
HOUSING MATERIAL	PA (Polyamide) Black; Fastening Clamp: Stainless Steel
FUNCTION DISPLAY SWITCHING STATUS	Yellow LED
CONNECTION	M8 Connector (Snap Fit), Pur Cable (.3m)

### REMARKS

\*External Protective Circuit for Inductive Load (Valve, Contactor, Etc..) Necessary.  
Conforms to 2008 NEC Section 725 III, Class 2 Circuits

M8 Connector voltage limited to 5-60 vdc / 5-50 vac to conform with 2008 IEC 61076-2-104

Clamping Screw with Combined Slot/Hexagon Socket Head AF 1.5.  
No LED Function in case of Polarity in DC Operation

ACCESSORIES Rubber Placeholder, Cable Clip, and Cut Sheet to be provided with every switch

### AGENCY APPROVALS













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