CATALOG

air cylinders

NB Series

Compact Air Cylinders

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EMERSON.
Industrial Automation

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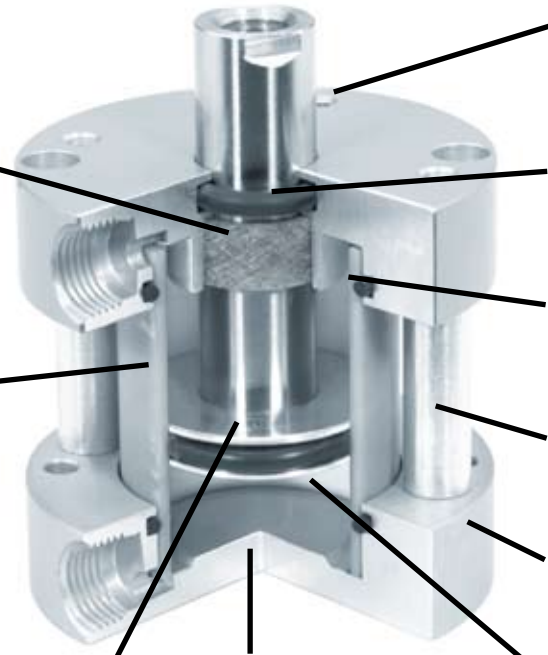
The NB Series



Hard chrome plated stainless steel piston rod

Improved Piston Rod Bushing:
- Captive in cylinder head
- Non-metallic (Duralon®)
- Self lubricating
- Elevated load bearing capacity
- Low coefficient of friction

Captive rod seal
- In precision machined groove
- Internally lubricated Buna-N O'Ring

Buna N O'Ring tube seals

Durable Cylinder Tube Construction
- High strength composite
- Highly impact resistant
- Self lubricating
- Extremely smooth interior
- Low coefficient of friction
- Minimal heat build up

Aluminum alloy spacers (clear anodized) enclose stainless steel tie bolts

Aluminum alloy heads (clear anodized)

Internally lubricated Buna N O'Ring (or optional U-Cup seals)

High strength threaded fastener and adhesive mates piston to rod assembly

Extra thick cover prevents impact damage

Compact Interchangeable Air Cylinders that are loaded with Features and Benefits

Value-Added Features – Stainless steel tie bolts and aluminum spacers lock precision machined heads tightly around a unique, high strength, composite cylinder tube. The tube is extremely smooth, the self-lubricating interior surface insures highly reliable performance and extended seal life. Its high impact resistance reduces chances of cylinder failure due to dings or dents. Zero slip-stick avoids problems that metal cylinders encounter when they sit in a static condition for extended periods of time. Combined with hard chrome plated stainless steel piston rods and a unique, non-metallic rod bearing.

Exceptional Piston Rod Bearing – The better the bearing, the more cycle life you can expect from your air cylinders. ***The NB Series*** cylinders incorporate a truly superior rod bearing material - Duralon®. Duralon® is a composite with a Teflon®/Dacron® fabric liner bonded to a supporting filament-wound, high strength, fiberglass and epoxy resin shell. Resistant to corrosion, moisture and temperature to 325°F, the bearing is reliable in any environment. It has an extremely high load bearing capacity, very low friction, and will not gall or score the piston rod.

Duralon® Rod Bearings Excel

Load Capacity (psi) Machine Design 1972/73 Bearing Reference Issue	
Porous Bronze	4,500
Porous iron	8,000
Phenolics	6,000
Nylon®	1,000
TFE	500
Reinforced Teflon®	2,500
*TFE fabric	60,000
Polycarbonate	1,000
Acetal	1,000
Carbon-graphite	600

Friction Properties Coefficient Slip-stick		
Steel-on-steel	.50	Yes
Bronze-on-steel	.35	Yes
Sintered Bronze-on-steel with mineral oil	.13	No
Bronze-on-steel with mineral oil	.16	No
Copper lead alloy-on-steel	.22	Yes
Acetal-on-steel	.20	No
Nylon-on-steel	.32	Yes
Duralon-on-steel	.05 - .16	No

* Shows Duralon bearing classification. Not to be used for design purposes.

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Features

- Double acting, single rod
- Double acting, double rod
- Double acting, hole thru double rod
- Single acting, spring retracted rod
- Reverse acting, spring extended rod
- 8 Bore sizes 1/2" thru 4"
- Strokes to 4" (standard)

Ratings-Standard Units All Series

Tube ..... Self-lubricating composite
End Caps ..... Clear anodized aluminum alloy
Tie Bolts ..... Stainless steel
Rod ..... Chrome plated stainless steel
Piston ..... Aluminum alloy
Rod End ..... Female thread with wrench flats
Ports ..... Position #1
Seals ..... Internally lubricated Buna-N
Rod Bushing ..... PTFE composite bearing
Stroke Tolerance ..... ± 1/64"
Media ..... Air
Max Pressure Rating ..... 200 psi
Min. Operating Pressure ..... 15 psi
Temperature Rating Cylinder ..... -25° to ± 221°F (-32° to ± 105°C)
Temperature Rating
Electronic Sensors ..... -4° to ± 176° F (-20 to +80°C)

Approximate Spring Forces

BORE	MAXIMUM FORCE	Spring Rate (lbs/Inch) for Stroke Range			
		0.12 to 1" Stroke	1.001 to 2" Stroke	2.001 to 3" Stroke	3.001 to 4" Stroke
1/2	5.25	4.25	2.13	1.42	1.06
3/4	10.00	6.00	3.00	2.00	1.50
1-1/16	13.00	6.50	3.25	2.17	1.63
1-1/2	13.00	6.50	3.25	2.17	1.63
2	13.00	6.50	3.25	2.17	1.63
2-1/2	25.00	12.50	6.25	4.17	3.13
3	25.00	12.50	6.25	4.17	3.13
4	25.00	12.50	6.25	4.17	3.13

Cylinder Sizing Guide

BORE	ROD DIAMETER	ROD AREA	EXTEND AREA (Single Rod)	EXTEND AREA (Double Rod)	RETRACT AREA
1/2	0.25	0.05	0.20	0.15	0.15
3/4	0.31	0.08	0.44	0.36	0.36
1-1/16	0.50	0.19	0.88	0.69	0.69
1-1/2	0.63	0.31	1.76	1.45	1.45
2	0.75	0.44	3.14	2.66	2.66
2-1/2	0.75	0.44	4.91	4.47	4.47
3	0.88	0.60	7.07	6.47	6.47
4	1.00	0.79	12.57	11.78	11.78

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How to Order

NB S D 2 – CB 01 A – LB – 1A01A

Series
NB = Compact Interchangeable

Model
S = Single Rod
W = Double Rod
T = Double Hollow Rod

Action
D = Double Acting
R = Single Acting, Spring Retract
X = Single Acting, Spring Extend

Single Acting only on "S" Model

Bore
1 = 1/2"
2 = 3/4"
3 = 1-1/16"
4 = 1-1/2"
5 = 2"
6 = 2-1/2"
7 = 3"
8 = 4"

Mounting
CA = Threaded Mounting Holes, Both Ends
CB = Threaded Mounting Holes, Front
CC = Threaded Mounting Holes, Rear
CD = Screw Clearance Holes, Both Ends [1]
CE = Screw Clearance Holes, Front [1]
CF = Screw Clearance Holes, Rear [1]
CN = Nose Mount (All except double rod models)[2]
CP = Pivot Mount, Pin 90° From Port
CR = Pivot Mount, Pin In-line with Port
CS = Trunnion Mount, Both Ends [3]
CT = Trunnion Mount, Front [3]
CU = Trunnion Mount, Rear [3]
CX = Basic No Mount

[1] Screw clearance to allow bolt head to pass through; no counterbores
[2] Includes heavy duty rear head and rod wiper
[3] Not available in 1/2" bore

Full Stroke
01 = 1" Stroke
02 = 2" Stroke
03 = 3" Stroke
04 = 4" Stroke

Fractional Stroke
A = 0"
C = 1/8"
E = 1/4"
G = 3/8"
I = 1/2"
K = 5/8"
M = 3/4"
O = 7/8"

Options
AA = No Options
BA = Bumpers, Both Ends [1]
BC = Bumper, Cap End [1]
BH = Bumper, Head End [1]
CF = Coarse Female Rod Thread
CM = Male Rod End Coarse Thread
EM = Magnetic Piston [2]
FM = Male Rod End Fine Thread
TN = Blank Rod End
HD = Heavy Duty Cap
FS = Double-Acting w/ Safety Spring Return [3]
LB = Low Breakaway Seals
VA = Viton Seals
WA = Wearband
WI = Rod Wiper
LT = Low Temp Seals

[1] Stroke is reduced .03" per end; .06" for option BA; Spring Retracted, BC only; Spring extended, BH only.
[2] Not available with Viton seals or low temp. seals.
[3] Not available on 1/2" bore.

Rod Extension
Note: Leave blank if rod extension is not required.
1A = Front Rod Extension (must specify extension)
Example: 1A01A (full and fractional length)
1B = Rear Rod Extension (must specify extension)
Example: 1B01A (full and fractional length)
D1 = Front and Rear Rod Extension (must specify extension)
Example: D101A01A (full and fractional length)

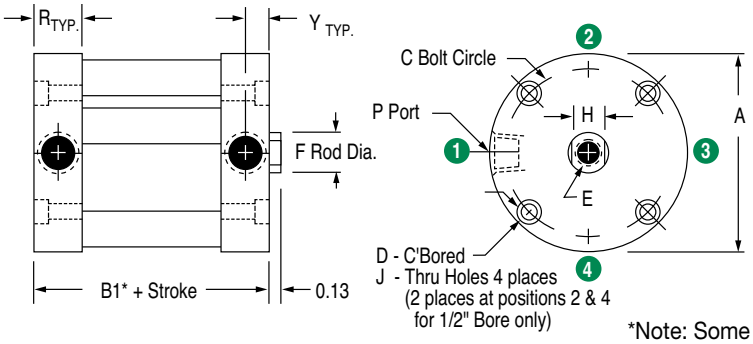
How to Order Example:

NBTD4-CB02I-VA

NB Series with double rod hole thru, double-acting, 1-1/2" bore, front threaded mounting holes, 2-1/2" stroke, and Viton seals.

*Note that some options effect cylinder length. See page 7 for length adders.

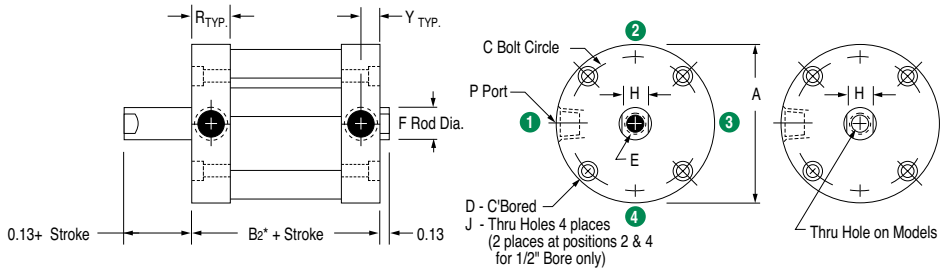
Double Acting, Single Rod



*Note: Some options effect cylinder length

Standard Strokes – All Models: 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1-1/4, 1-1/2, 1-3/4, 2, 2-1/2, 3, 3-1/2, 4
Special strokes available on request.

Double Acting, Double Rod
Double Acting, Hole Thru Double Rod



*Note: Some options effect cylinder length

Hole Thru Diameter

BORE	FEMALE ROD THREAD	MALE ROD THREAD
1/2 (1)	0.14	N/A
3/4 (2)	0.14	0.09
1-1/16 (3)	0.22	0.16
1-1/2 (4)	0.28	0.19
2 (5)	0.38	0.25
2-1/2 (6)	0.38	0.25
3 (7)	0.44	0.31
4 (8)	0.50	0.38

Dimensions

				B3* for Stroke Range				B4* for Stroke Range					
BORE	A	B1*	B2*	0-1	1.001-2	2.001-3	3.001-4	0-1	1.001-2	2.001-3	3.001-4	C	D C'BORE
1/2 (1)	1.12	0.56	0.69	0.81	1.38	1.96	2.52	1.06	1.62	2.14	3.21	0.88	0.20 x 0.13 dp
3/4 (2)	1.49	0.56	0.69	0.81	1.38	1.94	2.50	1.06	1.62	2.19	2.75	1.22	0.24 x 0.15 dp
1-1/16 (3)	1.99	0.88	0.94	0.88	1.50	2.13	2.75	1.38	2.00	2.63	3.25	1.69	0.24 x 0.15 dp
1-1/2 (4)	2.62	0.88	1.00	0.88	1.50	2.13	2.75	1.38	2.00	2.63	3.25	2.19	0.34 x 0.22 dp
2 (5)	3.12	0.94	1.06	0.94	1.56	2.19	2.81	1.44	2.06	2.69	NA	2.69	0.34 x 0.22 dp
2-1/2 (6)	3.75	1.19	1.31	1.19	2.06	2.94	3.81	1.94	2.81	2.81	NA	3.25	0.40 x 0.27 dp
3 (7)	4.25	1.25	1.38	1.25	2.12	3.00	3.88	2.00	2.88	2.88	NA	3.78	0.40 x 0.27 dp
4 (8)	5.50	1.56	1.69	1.56	2.44	3.31	4.19	2.31	3.19	3.19	NA	4.94	0.49 x 0.33 dp

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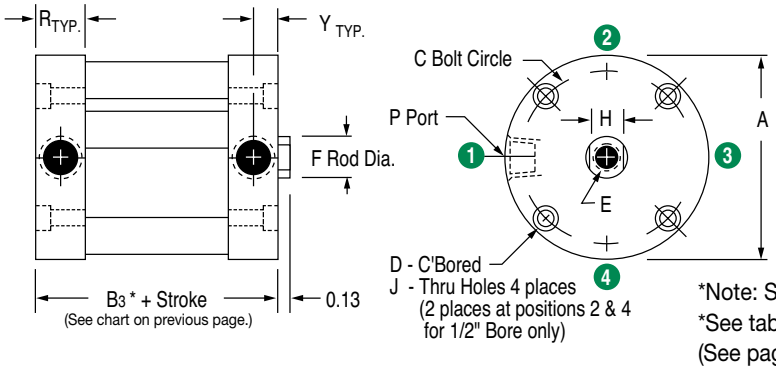
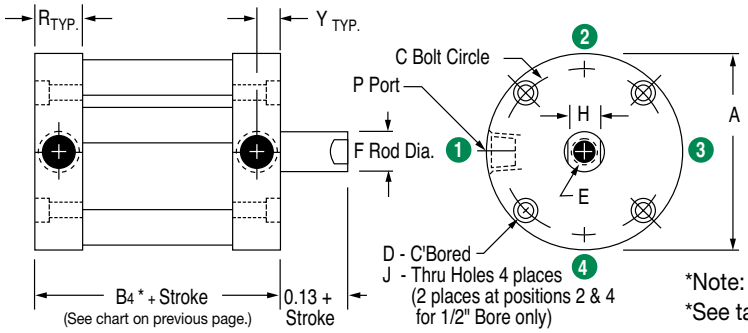
Single Acting, Spring Retract



*Note: Some options effect cylinder length
*See table on page 2 for spring forces
(See page 7 for length adders.)

Standard Strokes – All Models: 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1-1/4, 1-1/2, 1-3/4, 2, 2-1/2, 3, 3-1/2, 4
Special strokes available on request.

Single Acting, Spring Extended



*Note: Some options effect cylinder length
*See table on page 2 for spring forces

Approximate Cylinder Weights (ounces)

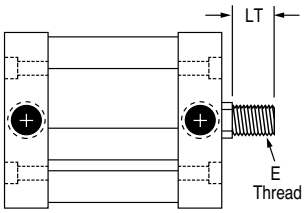
Double Acting, Single Rod Single Acting, Spring Return			Double Acting, Double Rod Double Acting, Hole Thru Rod			Single Acting, Spring Extend		Nose Mount Option
BORE	BASE	Added per 1/8 of Stroke	BASE	Added per 1/8 of Stoke	Added per 1/8 of Stoke	BASE	Added per 1/8 of Stoke	Added to Base Weight
1/2 (1)	1.15	.06	1.26	.14	.08	1.25	.06	0.1
3/4 (2)	1.82	.08	2.03	.18	.13	1.92	.08	0.2
1-1/16 (3)	4.70	.24	5.61	.37	.25	5.09	.24	1.1
1-1/2 (4)	9.22	.32	10.84	.55	.42	10.08	.32	1.8
2 (5)	12.48	.40	14.71	.64	.50	13.44	.40	2.7
2-1/2 (6)	21.50	.48	27.10	.74	.59	24.00	.48	3.1
3 (7)	27.74	.64	36.78	1.01	.76	31.20	.64	3.5
4 (8)	53.47	.80	69.50	1.20	.92	59.33	.80	5.9

Dimensions

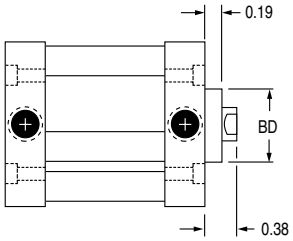
			E Depth for Stroke Range							
BORE	E Standard	E Coarse	1/8-1/2	5/8 +	F	H	J Hole	P Port	R	Y
1/2 (1)	#8-32 UNC	N/A	0.30-0.46	0.46	0.25	0.22	0.13	#10-32 UNF	0.34	0.14
3/4 (2)	#10-32 UNF	#10-24 UNC	0.30-0.46	0.46	0.31	0.25	0.15	#10-32 UNF	0.34	0.14
1-1/16 (3)	5/16-24 UNF	5/16-18 UNC	0.37-0.63	0.70	0.50	0.44	0.15	1/8 NPT	0.50	0.25
1-1/2 (4)	3/8-24 UNF	3/8-16 UNC	0.37-0.70	0.70	0.63	0.50	0.20	1/8 NPT	0.50	0.25
2 (5)	1/2-20 UNF	1/2-13 UNC	0.30-0.63	0.70	0.75	0.63	0.20	1/8 NPT	0.53	0.25
2-1/2 (6)	1/2-20 UNF	1/2-13 UNC	0.42-0.70	0.70	0.75	0.63	0.26	1/4 NPT	0.66	0.33
3 (7)	5/8-18 UNF	5/8-11 UNC	0.45-0.73	0.73	0.88	0.75	0.26	1/4 NPT	0.69	0.33
4 (8)	3/4-16 UNF	3/4-10 UNC	0.40-0.70	0.80	1.00	0.88	0.33	3/8 NPT	0.84	0.42

Model Options

Male Rod Ends
(Option CM or FM)



Rod Wiper
(Option WI Buna-N only)



Thread Sizes

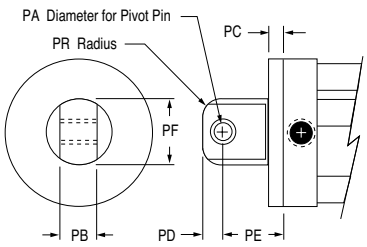
E Thread			
BORE	CM (Coarse)	FM (Fine)	LT
1/2 (1)	#8-32 UNC	N/A	0.38
3/4 (2)	#10-24 UNC	#10-32 UNF	0.38
1-1/16 (3)	5/16-18 UNC	5/16-24 UNF	0.50
1-1/2 (4)	3/8-16 UNC	3/8-24 UNF	0.50
2 (5)	1/2-13 UNC	1/2-20 UNF	0.63
2-1/2 (6)	1/2-13 UNC	1/2-20 UNF	0.63
3 (7)	5/8-11 UNC	5/8-18 UNF	0.75
4 (8)	3/4-10 UNC	3/4-16 UNF	0.75

Boss Diameter

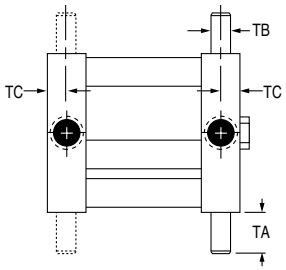
BORE	BD
1/2 (1)	0.56
3/4 (2)	0.69
1-1/16 (3)	0.88
1-1/2 (4)	1.00
2 (5)	1.13
2-1/2 (6)	1.13
3 (7)	1.25
4 (8)	1.38

Mounting Options

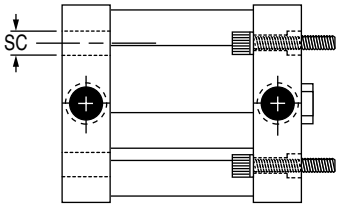
Pivot Mount
Complete with bronze pivot bushing. Not available as an accessory. (CR shown)



Trunnion Mount
Available rear, front or both. Not available on 1/2" bore. (CT shown solid)



Screw Clearance Holes
Available either or both ends. (CF shown)



Dimensions (inches)

BORE	PA	PB	PC	PD	PE	PF	PR	SC	TA	TB	TC
1/2 (1)	0.19	0.38	0.19	0.25	0.75	0.63	0.19	0.17	NA	NA	NA
3/4 (2)	0.19	0.38	0.19	0.25	0.75	0.75	0.19	0.23	0.31	0.125	0.17
1-1/16 (3)	0.19	0.38	0.25	0.25	0.81	0.75	0.19	0.25	0.50	0.250	0.25
1-1/2 (4)	0.38	0.75	0.25	0.44	1.19	1.38	0.38	0.34	0.50	0.250	0.25
2 (5)	0.38	0.75	0.31	0.44	1.25	1.38	0.38	0.34	0.50	0.250	0.25
2-1/2 (6)	0.38	0.75	0.38	0.44	1.31	1.38	0.38	0.41	0.63	0.312	0.33
3 (7)	0.63	1.00	0.38	0.56	1.69	1.88	0.38	0.41	0.63	0.312	0.33
4 (8)	0.63	1.00	0.44	0.56	1.75	1.88	0.38	0.50	0.75	0.375	0.42

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Deviation from Standard Dimensions

Length Adder (inches)

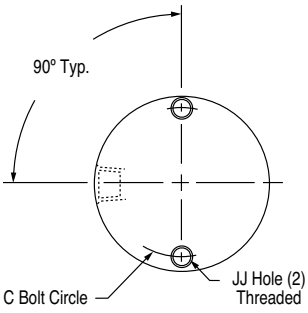
BORE	Low Friction Seals (LB)	Heavy Duty Rear Head (HD)	Magnetic Position Sensing (EM) Double Acting, Single Rod Double Acting, Double Rod Double Acting, Hole Thru Rod	Single-Acting, Spring Return	Single-Acting, Spring Extend	WA Adder
1/2 (1)	0.25	0.13	0.88	0.63	0.38	0.13
3/4 (2)	0.25	0.13	0.88	0.88	0.88	0.13
1-1/16 (3)	0.38	0.19	0.88	0.88	0.88	0.13
1-1/2 (4)	0.38	0.19	0.88	0.88	0.88	0.25
2 (5)	0.38	0.19	0.88	0.88	0.88	0.25
2-1/2 (6)	0.38	0.25	0.88	0.88	0.88	0.25
3 (7)	0.50	0.25	0.88	0.88	0.88	0.25
4 (8)	0.50	0.38	0.88	0.88	0.88	0.25

‡ Heavy duty rear head is recommended for applications where the cylinder is mounted on the front face or trunnion-mounted, and impact loading (20 or more cycles/minute) occurs between the piston and rear head. It increases the overall length of the cylinder as shown. † A minimum stroke of 3/8" is required to sense end-of-stroke positions. For low friction seals used in conjunction with magnetic position sensing, use "EM" length adder only.

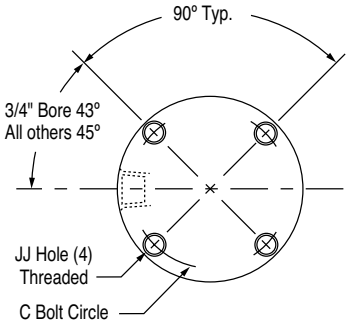
Threaded Mounting Holes

1/2" Bore

Available either or both ends. (CC shown)

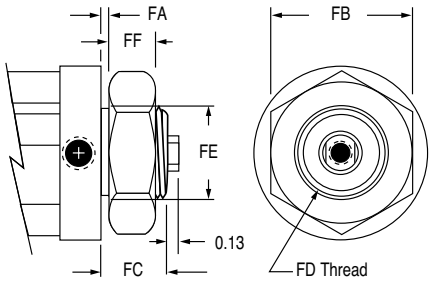


3/4" Bore & Up



Nose Mount

Available on: Double Acting, Single Rod; Single Acting, Spring Return; Single Acting, Spring Extend. Includes rod wiper and heavy duty rear head. See length adder above.



Dimensions (inches)

BORE	C	JJ	FA	FB	FC	FD	FE	FF
1/2 (1)	0.88	#4-40 UNC	.06	0.75 Hex	.38	1/2-20 UNF-2A	.50	.31
3/4 (2)	1.22	#6-32 UNC	.06	0.75 Hex	.38	5/8-18 UNF-2A	062	.25
1-1/16 (3)	1.69	#6-32 UNC	.13	1.50 Hex	.75	1-14 UNF-2A	1.00	.55
1-1/2 (4)	2.19	#10-24 UNC	.13	1.88 Hex	.75	1-1/4-12 UNF-2A	1.25	.52
2 (5)	2.69	#10-24 UNC	.19	1.88 Hex	.88	1-3/8-12 UNF-2A	1.38	.52
2-1/2 (6)	3.25	1/4-20 UNC	.25	1.88 Hex	1.00	1-3/8-12 UNF-2A	1.38	.52
3 (7)	3.78	1/4-20 UNC	.25	1.88 Hex	1.00	1-3/8-12 UNF-2A	1.38	.52
4 (8)	4.94	5/16-18 UNC	.19	2.62 Hex	1.12	1-3/4-12 UNF-2A	1.75	.88

Maximum Torque for Nose Mount Option

BORE	Foot-Pounds
1/2 (1)	12
3/4 (2)	28
1-1/16 (3)	100
1-1/2 (4)	120
2 (5)	130
2-1/2 (6)	130
3 (7)	130
4 (8)	150

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Non-rotating, double acting
4 Bore sizes 3/4" thru 2"
Strokes to 4" standard

Twin piston rods are incorporated into the cylinder head to achieve NON-ROTATION. The rods are securely fastened to the piston and tied together externally by a rod end tool bar. The tool bar insures that the rods move in tandem and provides an ideal mounting surface for any attachments required by your application. The tool bar is furnished with threaded mounting holes or optional counter-bored mounting holes.

Ratings-Standard Units All Series

Tube	Self-lubricating composite
End Caps	Clear anodized aluminum alloy
Tie Bolts	Stainless steel
Rod	Chrome plated stainless steel
Piston	Stainless steel
Rod End	Tool Bar
Ports	Position #1
Seals	Internally lubricated Buna-N
Rod Bushing	Bronze
Stroke Tolerance	± 1/64"
Media	Air
Max Pressure Rating	200 psi
Min. Operating Pressure	15 psi
Temperature Rating Cylinder	-25° to + 221°F (-32° to + 105°C)
Temperature Rating Electronic Sensors	-4° to + 176° F (-20 to +80°C)

Allowable Torsion Load and Rotational Tolerance

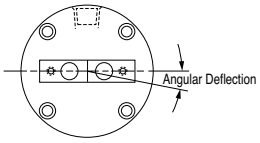
Side loading should be avoided for any cylinder application. The smaller diameter twin rods will have more deflection due to side load than the one standard rod in a comparable NB Series cylinder. However, those cylinders are designed to work satisfactorily against pure torsional loads. Maximum torsional load per bore size is shown in the following table.

Approximate Angular Deflection (Degrees) due to max torsional load

BORE	Torsional Load Max.	Stroke 0 to 1-1/2	2	2-1/2	3	3-1/2	4
3/4 (2)	0.3	less than 0.22	0.51	0.98	1.67	2.62	3.88
1-1/16 (3)	1.0	less than 0.15	0.33	0.64	1.09	1.71	2.53
1-1/2 (4)	5.0	less than 0.08	0.18	0.36	0.61	0.95	1.41
2 (5)	10.0	less than 0.03	0.07	0.13	0.22	0.34	0.50

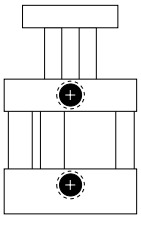
Rotational Tolerance

BORE	Max. Rotation
3/4 (2)	±1°
1-1/16 (3)	±3/4°
1-1/2 (4)	±1/2°
2 (5)	±1/2°



Cylinder Sizing Guide

BORE DIAMETER	ROD DIAMETER	ROD AREA	PUSH AREA	PULL AREA
3/4 (2)	0.19	0.05	0.44	0.39
1-1/16 (3)	0.25	0.10	0.88	0.78
1-1/2 (4)	0.38	0.22	1.76	1.54
2 (5)	0.50	0.38	3.14	2.76



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How to Order

NB N D 2 – CB 01 A – AA – 1A01A

Series
NB = Compact Interchangeable

Model
N = Non-Rotating, Twin Rod

Action
D = Doube Acting

Bore
2 = 3/4"
3 = 1-1/16"
4 = 1-1/2"
5 = 2"

Mounting
CA = Threaded Mounting Holes, Both Ends
CB = Threaded Mounting Holes, Front
CC = Threaded Mounting Holes, Rear
CD = Screw Clearance Holes, Both Ends
CE = Screw Clearance Holes, Front
CF = Screw Clearance Holes, Rear
CP = Pivot Mount, Pin 90° From Port
CR = Pivot Mount, Pin In-line with Port
CS = Trunnion Mount, Both Ends
CT = Trunnion Mount, Front
CU = Trunnion Mount, Rear
CX = Basic No Mount

Rod Extension
Note: Leave blank if rod extension is not required.
1A = Front Rod Extension (must specify extension)
Example: 1A01A (full and fractional length)

Options
AA = No Option
CB = Counterboard Tooling Plate
EM = Magnetic Piston
LT = Low Temperature Seals
VA = Viton Seals

Fractional Stroke
A = 0"
C = 1/8"
E = 1/4"
G = 3/8"
I = 1/2"
K = 5/8"
M = 3/4"
O = 7/8"

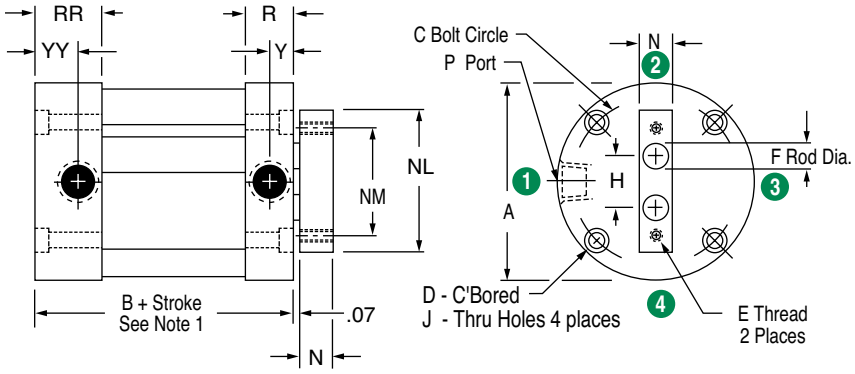
Full Stroke
01 = 1" Stroke
02 = 2" Stroke
03 = 3" Stroke
04 = 4" Stroke

How to Order Example:

NBND5-CA02A-AA

- NB Series-Non-Rotating, Twin Rod
- Double Acting
- 2" Bore
- Threaded Mounting Hole at both ends
- 2" Stroke
- No Option

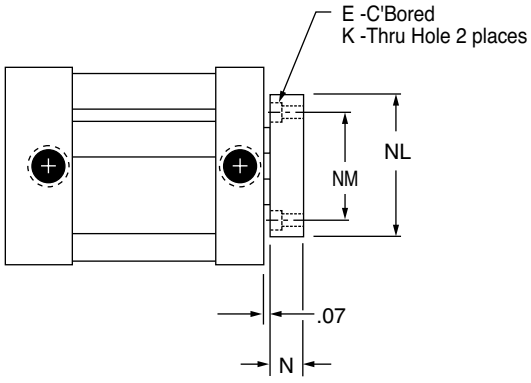
Basic Model-Twin Rod, Non-rotating, Double Acting



*Note 1: Magnetic Position Sensing Length Adder = 0.63
A minimum stroke of 3/8" is required to sense end-of-stroke positions

Standard Strokes – All Models: 1/8, 1/4, 3/8, 1/2, 5/8, 3/4, 7/8, 1, 1-1/4, 1-1/2, 1-3/4, 2, 2-1/2, 3, 3-1/2, 4
Special stroke available on request.

Counterbored Tooling Plate Option
Option CB



C'Bore Hole Dimensions (inches)

BORE	E C'Bore	K
3/4 (2)	0.24 x 0.15 dp	0.15
1-1/16 (3)	0.29 x 0.18 dp	0.18
1-1/2 (4)	0.40 x 0.27 dp	0.26
2 (5)	0.49 x 0.33 dp	0.33

Dimensions (inches)

BORE	A	B	C	D	E Thread	F	H	J	N	NL	NM	P	R	RR	Y	YY
3/4 (2)	1.49	0.94	1.22	0.24 x 0.15 dp	#6-32 UNC	0.19	0.332	0.15	0.38	1.25	0.88	#10-32 UNF	0.34	0.47	0.14	0.27
1-1/16 (3)	1.99	1.31	1.69	0.24 x 0.15 dp	#8-32 UNC	0.25	0.422	0.15	0.38	1.44	1.06	1/8 NPT	0.50	0.69	0.25	0.44
1-1/2 (4)	2.62	1.31	2.19	0.34 x 0.22 dp	1/4-20 UNC	0.38	0.562	0.20	0.50	2.00	1.50	1/8 NPT	0.50	0.69	0.25	0.44
2 (5)	3.12	1.38	2.69	0.34 x 0.22 dp	5/16-18 UNC	0.50	0.750	0.20	0.63	2.50	1.88	1/8 NPT	0.53	0.72	0.25	0.44

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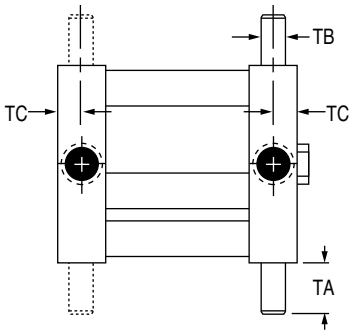
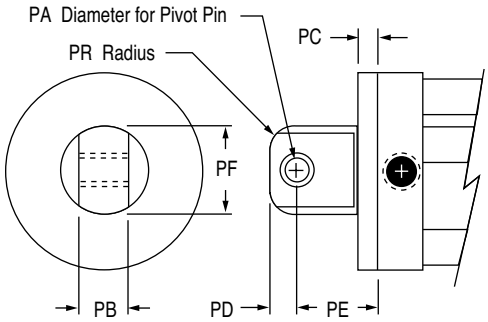
Mounting Options

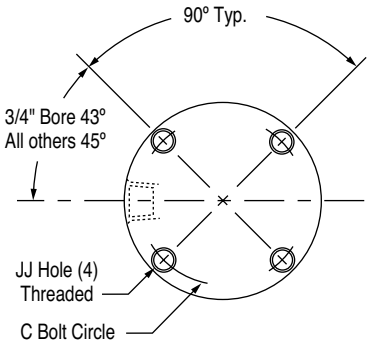
Trunnion Mount
Available rear, front or both.
(CT shown solid)



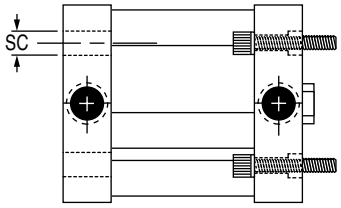
Pivot Mount
Complete with bronze pivot bushing. Not available as an accessory. (CR shown)



Threaded Mounting Holes
Available either or both ends.
(CC shown)



Screw Clearance Holes
Available either or both ends.
(CF shown)

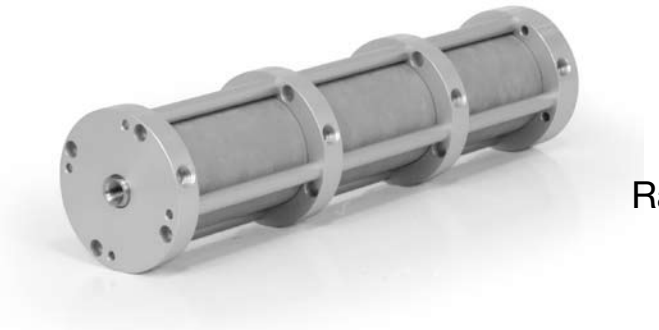


Approximate Cylinder Weights (ounces)

BORE	Base	Adder per 1/8 of Stroke
3/4 (2)	3.1	0.1
1-1/16 (3)	7.4	0.5
1-1/2 (4)	14.3	0.7
2 (5)	21.5	0.9

Dimensions (inches)

BORE	C	JJ	PA	PB	PC	PD	PE	PF	PR	SC	TA	TB	TC
3/4 (2)	1.22	#6-32 UNC	0.19	0.38	0.19	0.25	0.75	0.75	0.19	0.23	0.31	0.125	0.17
1-1/16 (3)	1.69	#6-32 UNC	0.19	0.38	0.25	0.25	0.81	0.75	0.19	0.25	0.50	0.250	0.25
1-1/2 (4)	2.19	#10-24 UNC	0.38	0.75	0.25	0.44	1.19	1.38	0.38	0.34	0.50	0.250	0.25
2 (5)	2.69	#10-24 UNC	0.38	0.75	0.31	0.44	1.25	1.38	0.38	0.34	0.50	0.250	0.25

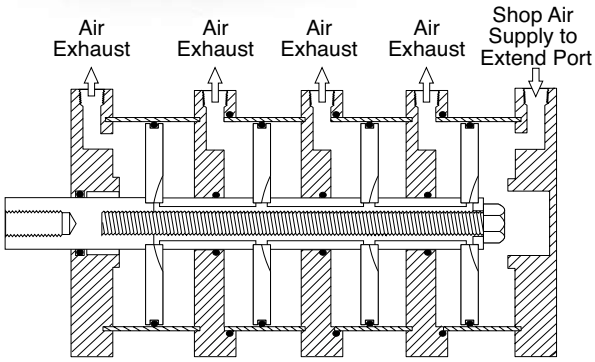


Features

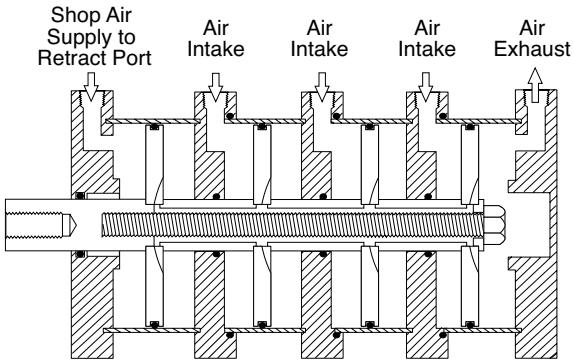
- Double acting, single rod end
- Cylinders multiply force output
- 3 Bore sizes 2-1/2" thru 4"
- Strokes to 4" standard

Ratings-Standard Units All Series

Tube	Lubricating composite
End Caps	Clear anodized aluminum alloy
Tie Bolts	Stainless steel
Rod	Chrome plated stainless steel
Piston	Stainless steel
Rod End	Tool Bar
Ports	Position #1
Seals	Internally lubricated Buna-N
Rod Bushing	Bronze
Stroke Tolerance	± 1/64"
Media	Air
Max Pressure Rating	200 psi
Min. Operating Pressure	15 psi
Temperature Rating Cylinder	-25° to + 221°F (-32° to + 105°C)
Temperature Rating Electronic Sensors	-4° to + 176° F (-20 to +80°C)



Extend Port - Air supplied to all pistons



Retract Port - Air supplied to front piston only

How it Works

We attach multiple pistons to a common shaft and provide internal air passages through the shaft to all pistons.

When air pressure is applied to the extend port, all pistons are pressurized simultaneously, enabling tremendous thrust forces to be obtained. (See the cylinder sizing guide below for the force multiplying factors.)

When air pressure is applied to the retract port only one piston is pressurized.

Cylinder Sizing Guide

BORE	BORE MODEL DESIGNATION	EXTEND POWER FACTOR M2	EXTEND POWER FACTOR M3	EXTEND POWER FACTOR M4	RETRACT POWER FACTOR
2-1/2 (6)	6	9.4	13.8	18.3	4.5
3 (3)	7	13.5	20.0	26.5	6.5
4 (8)	8	24.3	36.1	47.9	11.8

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How to Order

NB M2 6 – CB 01 A – LB – 1A01A

Series
NB = Compact Interchangeable

Model
M2 = 2 Stage extend, Single Stage Retract
M3 = 3 Stage extend, Single Stage Retract
M4 = 4 Stage extend, Single Stage Retract

Bore
6 = 2-1/2"
7 = 3"
8 = 4"

Mounting
CA = Threaded Mounting Holes, Both Ends
CB = Threaded Mounting Holes, Front
CC = Threaded Mounting Holes, Rear
CD = Screw Clearance Holes, Both Ends
CE = Screw Clearance Holes, Front
CF = Screw Clearance Holes, Rear

Rod Extension
Note: Leave blank if rod extension is not required.
1A = Front Rod Extension (must specify extension)
Example: 1A01A (full and fractional length)

Options
AA = No Options
CF = Coarse Female Rod Thread
CM = Male Rod End Coarse Thread
EM = Magnetic Piston
FM = Male Rod End Fine Thread
LB = Low Breakaway Seals
LT = Low Temperature Seals
TN = Blank Rod End
VA = Viton Seals
WI = Rod Wiper

Fractional Stroke
A = 0"
C = 1/8"
E = 1/4"
G = 3/8"
I = 1/2"
K = 5/8"
M = 3/4"
O = 7/8"

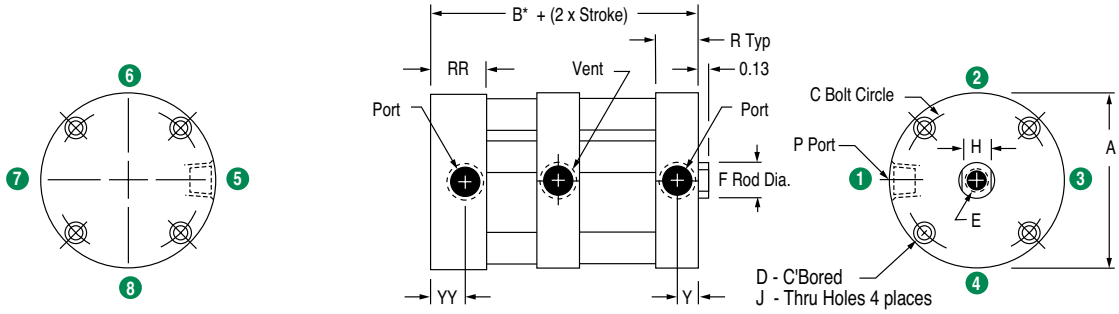
Full Stroke
01 = 1" Stroke
02 = 2" Stroke
03 = 3" Stroke
04 = 4" Stroke

How to Order Example:

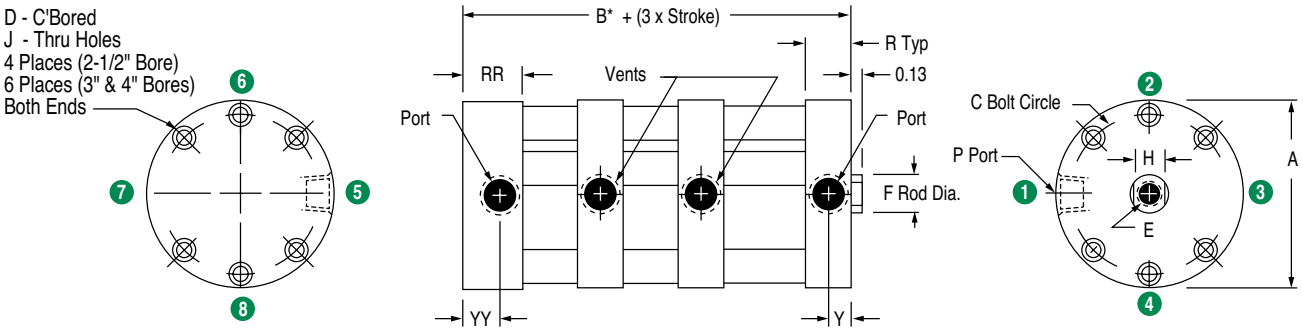
NBM27 - CC04I - LT

- Multi-Stage NB Series
- 2 Stage Extend, Single Stage Retract
- 3" Bore
- Threaded Mounting Holes, Rear
- 4-1/2" Stroke
- Low Temperature Seals

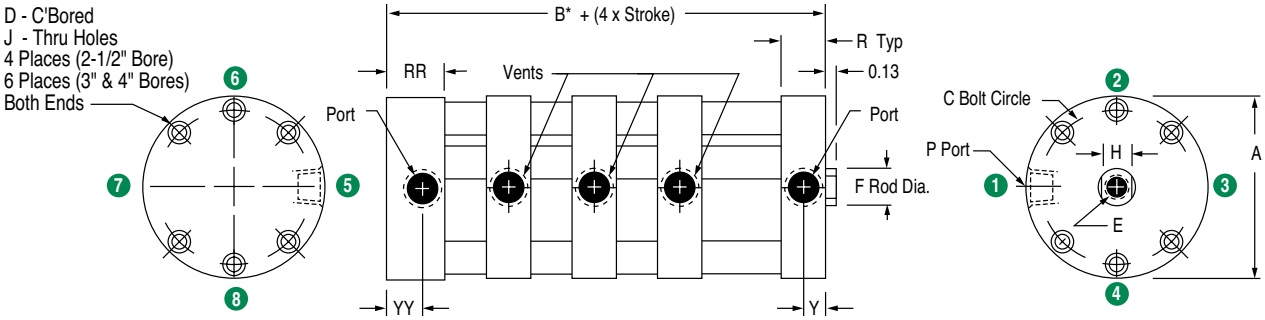
Model M2



Model M3



Model M4



*Dimension "B" for Strokes .125, .188 and .250

	.125 Stroke			.188 Stroke			.250 Stroke		
BORE	M2	M3	M4	M2	M3	M4	M2	M3	M4
2-1/2 (6)	2.65	3.64	4.63	2.71	3.76	4.81	2.77	3.87	4.97
3 (7)	2.75	3.77	4.79	2.81	3.90	4.98	2.88	4.01	5.15
4 (8)	3.38	4.61	5.85	3.44	4.74	6.04	3.53	4.89	6.24

Dimensions (inches)

		B* (strokes over .250)					E Female Thread		E Depth for Stroke Range								
BORE	A	M2	M3	M4	C	D c'Bore	E Standard	E Course	1/8-1/2	5/8 +	F	H	J	R	RR	Y	YY
2-1/2 (6)	3.75	2.29	3.15	4.02	3.25	0.40 x 0.27 dp	1/2-20 UNF	1/2-13 UNC	0.42-0.70	0.70	0.75	0.63	0.26	0.66	0.91	0.33	0.58
3 (7)	4.25	2.39	3.28	4.18	3.78	0.40 x 0.27 dp	5/8-18 UNF	5/8-11 UNC	0.45-0.73	0.73	0.88	0.75	0.26	0.69	0.94	0.33	0.58
4 (8)	5.50	3.04	4.15	5.27	4.94	0.49 x 0.33 dp	3/4-16 UNF	3/4-10 UNC	0.40-0.70	0.80	1.00	0.88	0.33	0.84	1.22	0.42	0.80

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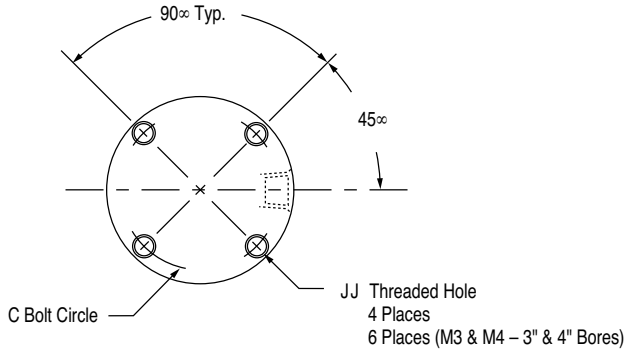
Mounting Options

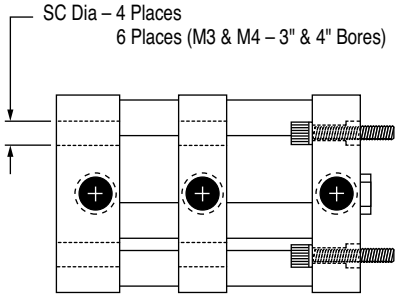
Threaded Mounting Holes

Available either or both ends.
(CC shown)



Screw Clearance Holes

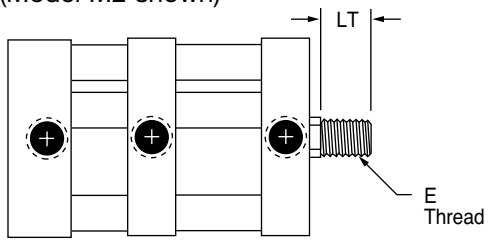
Available either or both ends. (CF shown)
Screw clearance holes are standard on all center sections.



Model Options

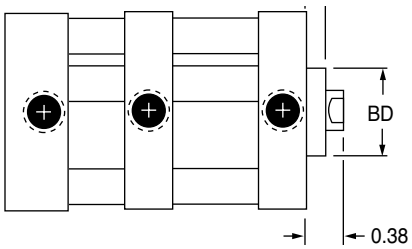
Male Rod Ends (Options CM or FM)

(Model M2 shown)



Rod Wiper (Option WI)

Buna-N only. (Model M2 shown)



Length Adder for Options (inches)

BORE	SE-RIES	Low Friction Seals (LB)	Magnetic Position Sensing (EM)	Low Friction Seals & Magnetic Position Sensing (LB or EM)
2-1/2	M2	0.75	0.88	1.25
	M3	1.13		1.63
	M4	1.50		2.00
3	M2	1.00	0.88	1.38
	M3	1.50		1.88
	M4	2.00		2.38
4	M2	1.00	0.88	1.38
	M3	1.50		1.88
	M4	2.00		2.38

‡ 1) A minimum stroke of 3/8" is required to sense end-of-stroke positions.
2) Magnet is applied to front piston.

Approximate Cylinder Weights (ounces)

	M2		M3		M4	
BORE	BASE	Adder per 1/8 Stroke	BASE	Adder per 1/8 Stroke	BASE	Adder per 1/8 Stroke
2-1/2 (6)	37.2	1.2	53.5	1.8	69.4	2.4
3 (7)	49.9	1.6	71.0	2.4	92.1	3.2
4 (8)	93.1	2.0	133.8	3.0	174.5	4.0

Dimensions (inches)

				E Male Thread			
BORE	BD	C	JJ	CM (Coarse)	FM (Fine)	LT	SC
2-1/2 (6)	1.13	3.25	1/4-20 UNC	1/2-13 UNC	1/2-20 UNF	0.63	0.41
3 (7)	1.25	3.78	1/4-20 UNC	5/8-11 UNC	5/8-18 UNF	0.75	0.41
4 (8)	1.38	4.64	5/16-18 UNC	3/4-10 UNC	3/4-16 UNF	0.75	0.50

Other multi-position cylinders
(4 position, 5 position, etc.)
are available as specials.

Features

- Double acting, single rod end
- Cylinder provides 3 positions
- 8 Bore sizes 1/2" thru 4"
- Strokes to 4" standard

Ratings-Standard Units All Series

Tube..... Self-lubricating composite
End Caps ..... Clear anodized aluminum alloy
Tie Bolts ..... Stainless steel
Rod..... Chrome plated stainless steel
Piston ..... Aluminum alloy
Rod End ..... Female thread with wrench flats
Ports..... Position #1
Seals..... Internally lubricated Buna-N
Rod Bushing..... PTFE composite bearing
Stroke Tolerance..... ± 1/64" per stroke
Media..... Air
Max Pressure Rating..... 200 psi
Min. Operating Pressure ..... 15 psi
Temperature Rating Cylinder..... -25° to + 221°F (-32° to ± 105°C)
Temperature Rating
Electronic Sensors ..... -4° to + 176° F (-20 to +80°C)

Cylinder Sizing Guide

BORE DIAMETER	ROD DIAMETER	ROD AREA	PUSH AREA	PULL AREA
1/2 (1)	0.25	0.05	0.20	0.15
3/4 (2)	0.31	0.08	0.44	0.36
1-1/16 (3)	0.50	0.19	0.88	0.69
1-1/2 (4)	0.63	0.31	1.76	1.45
2 (2)	0.75	0.44	3.14	2.66
2-1/2 (6)	0.75	0.44	4.91	4.47
3 (7)	0.88	0.60	7.07	6.47
4 (8)	1.00	0.79	12.57	11.78

Information subject to change without notice. For ordering information or regarding your local sales office visit www.numatics.com.

How to Order

NB MU 2 – CB 00 G – 02 A – LB – 1A01A

Series
NB = Compact Interchangeable

Model
MU = Multi-Position, Double Acting

Bore
1 = 1/2"
2 = 3/4"
3 = 1-1/16"
4 = 1-1/2"
5 = 2"
6 = 2-1/2"
7 = 3"
8 = 4"

Mounting
CA = Threaded Mounting Holes, Both Ends
CB = Threaded Mounting Holes, Front
CC = Threaded Mounting Holes, Rear
CD = Screw Clearance Holes, Both Ends
CE = Screw Clearance Holes, Front
CF = Screw Clearance Holes, Rear
CP = Pivot Mount, Pin 90° from Port
CR = Pivot Mount, Pin In-line with Port
CX = Basic No Mount

Rod Extension
Note: Leave blank if rod extension is not required.
1A = Rod Extension (must specify extension)
Example: 1A01A (full and fractional length)

Options
AA = No Options
CF = Coarse Female Rod Thread
CM = Male Rod End Coarse Thread
EM = Magnetic Piston
FM = Male Rod End Fine Thread
LB = Low Breakaway Seals
LT = Low Temperature Seals
TN = Blank Rod End
VA = Viton Seals
WA = Wearband
WI = Rod Wiper

Stroke "B" Fractional Stroke
A = 0"
C = 1/8"
E = 1/4"
G = 3/8"
I = 1/2"
K = 5/8"
M = 3/4"
O = 7/8"

Stroke "B" Full Stroke
01 = 1" Stroke
02 = 2" Stroke
03 = 3" Stroke
04 = 4" Stroke

Stroke "A" Fractional Stroke
A = 0"
C = 1/8"
E = 1/4"
G = 3/8"
I = 1/2"
K = 5/8"
M = 3/4"
O = 7/8"

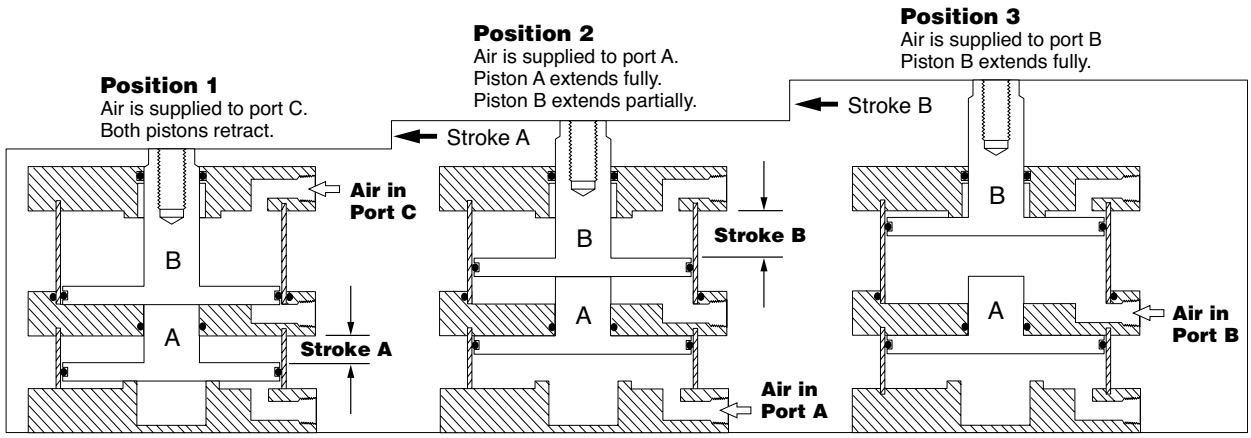
Stroke "A" Full Stroke
01 = 1" Stroke
02 = 2" Stroke
03 = 3" Stroke
04 = 4" Stroke

How to Order Example:

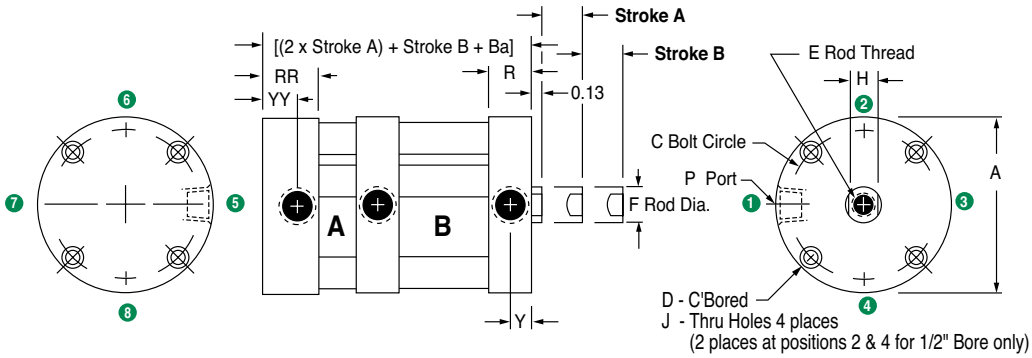
NBMU5-CA04M-03A-TN

- Multi-Position, Double Acting
- 2" Bore
- Threaded Mounting Holes, Both Ends
- 4-3/4" Front Stroke
- 3" Rear Stroke
- Blank Rod End

How it Works



Basic Model



Minimum Stroke*

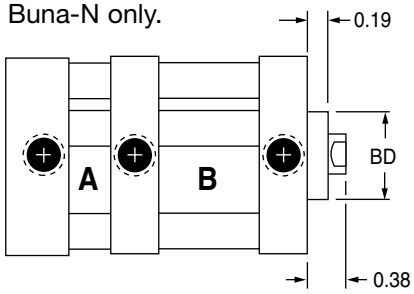
BORE	Base Model Stroke A
1/2 (1)	0.19
3/4 (2)	0.19
1-1/16 (3)	0.25
1-1/2 (4)	0.25
2 (5)	0.25
2-1/2 (6)	0.38
3 (7)	0.38
4 (8)	0.34

*Note:
1) No minimum for stroke B.
2) No minimum for stroke A or B with Low Breakaway Option -LB

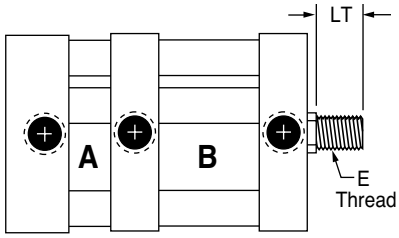
Model Options

Rod Wiper (Option WI)

Buna-N only.



Male Rod Ends (Options CM or FM)



Deviations from Standard Dimensions (Options LB or EM)

Length Adder (inches)

BORE	Low Friction Seals (LB)	Magnetic Position Sensing (EM)	Low Friction Seals & Magnetic Position Sensing (LB or EM)
1/2 (1)	0.50	0.88	1.13
3/4 (2)	0.50	0.88	1.13
1-1/16 (3)	0.75	0.88	1.25
1-1/2 (4)	0.75	0.88	1.25
2 (5)	0.75	0.88	1.25
2-1/2 (6)	0.75	0.88	1.25
3 (7)	1.00	0.88	1.38
4 (8)	1.00	0.88	1.38

‡ 1) A minimum stroke of 3/8" is required to sense end-of-stroke positions.
2) Magnet is applied to front piston.

Dimensions (inches)

BORE	A	BA	BD	C	D C'Bore	E Female Thread		E Depth for Stroke Range		F	H	J	P	R	RR	Y	YY
						E Standard	E Course	1/8-1/2	5/8 +								
1/2 (1)	1.12	1.14	0.56	0.88	0.20 x 0.13 dp	#8-32 UNC	N/A	0.30-0.46	0.46	0.25	0.22	0.13	#10-32 UNF	0.34	0.47	0.14	0.27
3/4 (2)	1.49	1.14	0.69	1.22	0.24 x 0.15 dp	#10-32 UNF	#10-24 UNC	0.30-0.46	0.46	0.31	0.25	0.15	#10-32 UNF	0.34	0.47	0.14	0.27
1-1/16 (3)	1.99	1.67	0.88	1.69	0.24 x 0.15 dp	5/16-24 UNF	5/16-18 UNC	0.37-0.63	0.70	0.50	0.44	0.15	1/8 NPT	0.50	0.69	0.25	0.44
1-1/2 (4)	2.62	1.70	1.00	2.19	0.34 x 0.22 dp	3/8-24 UNF	3/8-16 UNC	0.37-0.70	0.70	0.63	0.50	0.20	1/8 NPT	0.50	0.69	0.25	0.44
2 (5)	3.12	1.80	1.13	2.69	0.34 x 0.22 dp	1/2-20 UNF	1/2-13 UNC	0.30-0.63	0.70	0.75	0.63	0.20	1/8 NPT	0.53	0.72	0.25	0.44
2-1/2 (6)	3.75	2.25	1.13	3.25	0.40 x 0.27 dp	1/2-20 UNF	1/2-13 UNC	0.42-0.70	0.70	0.75	0.63	0.26	1/4 NPT	0.66	.91	0.33	0.58
3 (7)	4.25	2.34	1.25	3.78	0.40 x 0.27 dp	5/8-18 UNF	5/8-11 UNC	0.45-0.73	0.73	0.88	0.75	0.26	1/4 NPT	0.69	0.94	0.33	0.58
4 (8)	5.50	3.00	1.38	4.94	0.49 x 0.33 dp	3/4-16 UNF	3/4-10 UNC	0.40-0.70	0.80	1.00	0.88	0.33	3/8 NPT	0.84	1.22	0.42	0.80

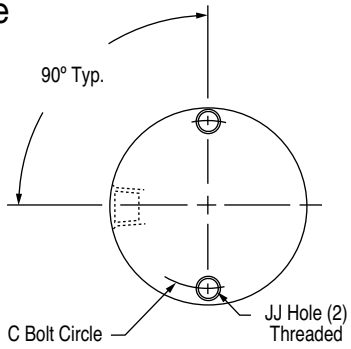
Information subject to change without notice. For ordering information or regarding your local sales office visit www.numatics.com.

Mounting Options

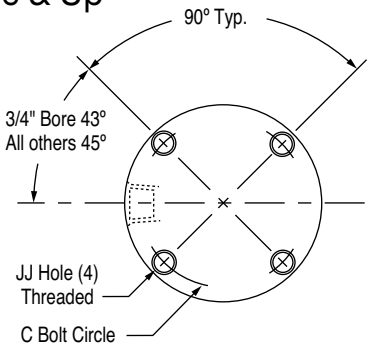
Threaded Mounting Holes

Available either or both ends.
(CC shown)

1/2" Bore

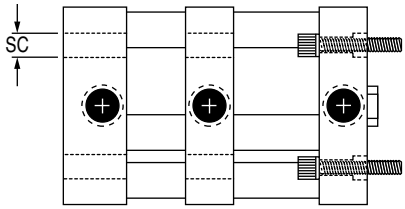


3/4" Bore & Up



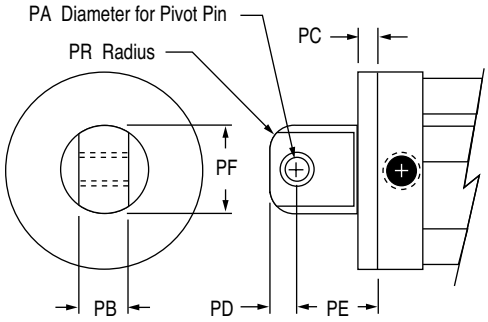
Screw Clearance Holes

Available either or both ends. (CF shown)
Screw clearance holes are standard on all center sections.



Pivot Mount

Complete with bronze pivot bushing. Not available as an accessory. (CR shown)



Dimensions (inches)

BORE	C	JJ	PA	PB	PC	PD	PE	PF	PR	SC
1/2 (1)	0.88	#4-40 UNC	0.19	0.38	0.19	0.25	0.75	0.63	0.19	0.17
3/4 (2)	1.22	#6-32 UNC	0.19	0.38	0.19	0.25	0.75	0.75	0.19	0.23
1-1/16 (3)	1.69	#6-32 UNC	0.19	0.38	0.25	0.25	0.81	0.75	0.19	0.25
1-1/2 (4)	2.19	#10-24 UNC	0.38	0.75	0.25	0.44	1.19	1.38	0.38	0.34
2 (5)	2.69	#10-24 UNC	0.38	0.75	0.31	0.44	1.25	1.38	0.38	0.34
2-1/2 (6)	3.25	1/4-20 UNC	0.38	0.75	0.38	0.44	1.31	1.38	0.38	0.41
3 (7)	3.78	1/4-20 UNC	0.63	1.00	0.38	0.56	1.69	1.88	0.38	0.41
4 (8)	4.94	5/16-18 UNC	0.63	1.00	0.44	.056	1.75	1.88	0.38	0.50

Approximate Cylinder Weights (ounces)

BORE	Base	Adder per 1/8 of Stroke
1/2 (1)	3.3	0.16
3/4 (2)	4..5	0.2
1-1/16 (3)	9.9	0.6
1-1/2 (4)	18.7	0.8
2 (5)	24.5	1.0
2-1/2 (6)	41.3	1.2
3 (7)	52.9	1.6
4 (8)	102.7	2.0

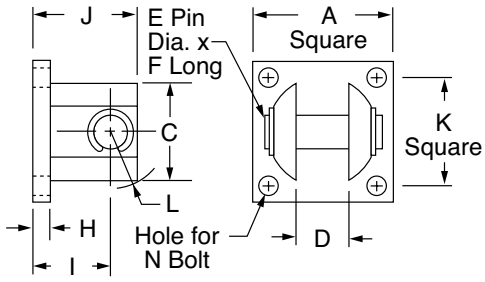
Accessories

Selection Guide

Accessory	Standard Series	PND Series	Multi-Power Series	P3D Series
Clevis Bracket	Yes	Yes	N/A	Yes
Trunnion Bracket	Yes	Yes	N/A	N/A
Rod Eye	Yes	N/A	Yes	Yes

Clevis Bracket

Anodized aluminum alloy.
Chrome plated steel pin included



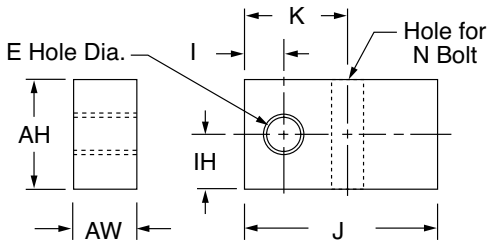
The bracket is intended for mounting with either a rod pivot or pivot mount; it is not intended to mount directly with the rear cylinder head.

Dimensions (inches)

Kit No.	Bore	A	C	D	E	F	H	I	J	K	L	N
CB-3	1/2 (1) 3/4 (2) 1-1/16 (3)	1.00	0.71	0.39	0.187	0.93	0.16	0.56	0.78	0.75	0.42	#6
CB-6	1-1/2 (4) 2 (5) 2-1/2 (6)	1.75	1.37	0.75	0.375	1.63	0.22	0.94	1.34	1.38	0.80	#10
CB-8	3 (7) 4 (8)	2.50	2.10	1.00	0.625	2.42	0.25	1.25	1.81	2.00	1.19	1/4

Trunnion Bracket (pair)

Anodized aluminum alloy
complete with bronze pivot bushings

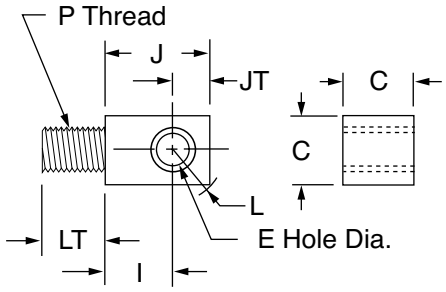


Dimensions (inches)

Kit No.	Bore	AH	AW	E	I	IH	J	K	N
TB-2	3/4 (2)	0.63	0.31	0.126	0.22	0.30	1.12	0.56	#10
TB-5	1-1/16 (3) 1-1/2 (4) 2 (5)	0.88	0.50	0.251	0.31	0.38	1.50	0.81	1/4
TB-7	2-1/2 (6) 3 (7)	1.00	0.63	0.313	0.38	0.45	1.63	0.94	5/16
TB-8	4 (8)	1.25	0.75	0.376	0.44	0.55	1.88	1.06	3/8

Rod Eye

Steel with bronze pivot bushing and nut



Dimensions (inches)

Kit No.	Bore	C	E	I	J	JT	L	LT	P
RE-1	1/2 (1)	0.38	0.187	0.47	0.72	0.25	0.32	0.38	#8-32 UNC
RE-2	3/4 (2)	0.38	0.187	0.47	0.72	0.25	0.32	0.38	#10-32 UNF
RE-3	1-1/16 (3)	0.38	0.187	0.47	0.72	0.25	0.32	0.63	5/16-24 UNF
RE-4	1-1/2 (4)	0.75	0.375	0.72	1.16	0.44	0.58	0.63	3/8-24 UNF
RE-6	2 (5) 2-1/2 (6)	0.75	0.375	0.72	1.16	0.44	0.58	0.75	1/2-20 UNF
RE-7	3 (7)	1.00	0.625	1.00	1.63	0.63	0.80	0.88	5/8-18 UNF
RE-8	4 (8)	1.00	0.625	1.00	1.63	0.63	0.80	0.88	3/4-16 UNF

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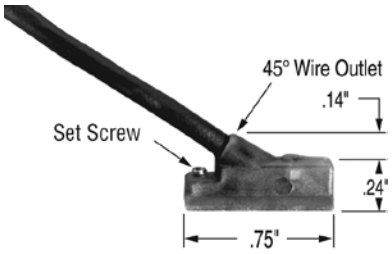
Sensor Specifications & Ordering Information

- Encased in a plastic housing, dovetail style electronic sensors are corrosion resistant. 45° wire outlet allows close mounting.



Ordering Guide-Dovetail Style Magnetic Sensor with LED

Sensor Type	Prewired 9 ft Part No.	Quick Disconnect Part No*	Wire Leads	Electrical Characteristics
Electronic	949-000-031	949-000-331	3	Sourcing PNP 6-24 VDC, 0.20 Amp Max current, 0.5 Voltage Drop
Electronic	949-000-032	949-000-332	3	Sinking NPN 6-24 VDC, 0.20 Amp Max current, 0.5 Voltage Drop

Note*: Quick disconnect styles are supplied with 6 inch pigtail with male connector.
Order female cordsets separately.

Female Cordsets for Quick Disconnect

Length	Part No.
5 Meter	PXCST

Sensor Temperature Range
-20° to +80° C (-4° to +176° F)

Notes

numatics

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WORLD HEADQUARTERS
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P: 248-887-4111
F: 248-887-9190
E: marketing@numatics.com

UNITED STATES

Numatics – Air Preparation
P: 810-667-3900
F: 810-667-3902
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E: sales@numaticsactuator.com

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P: 519-452-1777
F: 519-452-3995
E: sales@numatics.ca

CANADA

Ontario
Numatics, Ltd.
P: 519-452-1777
F: 519-452-3995
E: sales@numatics.ca

Quebec
Numatics, Ltd.
P: 514-332-6444
F: 514-332-9273
E: prov.qc@numatics.ca

British Columbia
Numatics, Ltd.
P: 604-538-0400
F: 604-538-3774
E: bc@numatics.ca

MEXICO
Numatics de Mexico S.A. de C.V.
P: +52 222 284 6176
F: +52 222 284 6179
E: numatics@prodigy.net.mx

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