

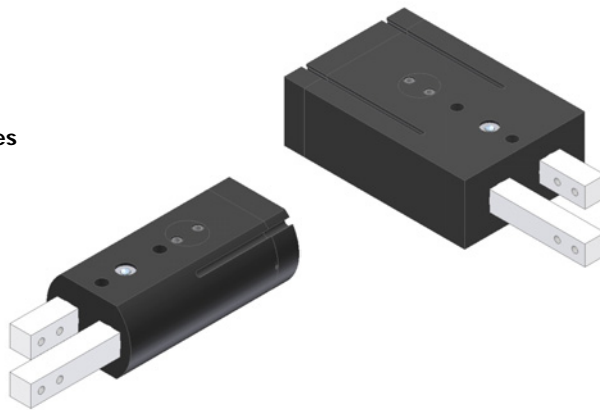
## ESCAPEMENT DEVICES

### BC SERIES

#### STANDARD LINE

- Full range of sizes and strokes
- Hard Stops
- Robust design
- Few moving parts
- Extremely Durable
- Fully field serviceable
- Sensors Available

See  
Page **2-1.2**





## BC-SERIES

**DURA-SCAPE BC Series** Escapement Devices is designed to isolate parts at the end of feed chutes or raceways to facilitate individual feeding of parts. These air-operated devices provide positive part control by forcing one finger to always be in contact with the parts. This process eliminates any possibility of jammed parts and multiple feeds.

### FEATURES

**DURA-SCAPE BC Series** sets the industry standard for their extreme durability and rugged construction while still being low in cost. They provide a practical, reliable alternative for expensive escapement mechanisms. The two finger holders are square in the cross-section to present large, slide bearing surfaces to minimize surface wear. A flush type oiler with a ball closure permits lubricating both finger holders simultaneously while maintaining a compact package. Hard stops are provided for accurate and repeatable finger strokes with multiple standard strokes available for specific design requirements. Finger strokes can even be customized by end users to fit any need. The units are fully field repairable with available repair kits. Furthermore sensors are available for the entire product series.

### MOUNTING STYLES

**DURA-SCAPE BC Series** provides precision ground fingers with standard mounting holes allowing tooling to be shaped to accommodate a wide array of part sizes and shapes. A wide variety of body mounting holes are provided across the product line to allow positioning of the units in a horizontal, vertical or angular plane to suit the feed chute arrangement.

**The BC series of feed escapements are perfect for demanding applications where accurate, repeatable, and reliable part isolation are required.**

## TECHNICAL SPECIFICATION

Pneumatic Specifications	ENGLISH	METRIC
Pressure Range	40-100 psi	3-7 bar
Cylinder Type	Double Acting	
Dynamic Seals	Buna-N	
Required Valves	4-way, 2 position	
<b>Temperature Range</b>		
Buna-N Seals (standard)	-30 to 180 F	-35 to 80 C
Viton Seals (-V option)	-20 to 300 F	-30 to 150 C

### COMPACT LIGHT DUTY

### BC-1

- 9/16" [14.3] Cylinder Bore



See Page **2-1.3**

### STANDARD DUTY

### BC-2B

- 5/8" [15.9] Cylinder Bore

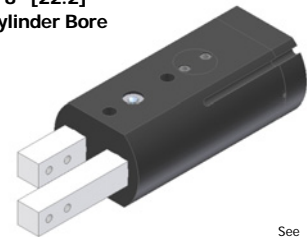


See Page **2-1.7**

### HEAVY DUTY

### BC-4B

- 7/8" [22.2] Cylinder Bore

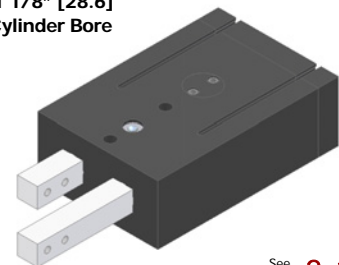


See Page **2-1.8**

### HEAVY DUTY

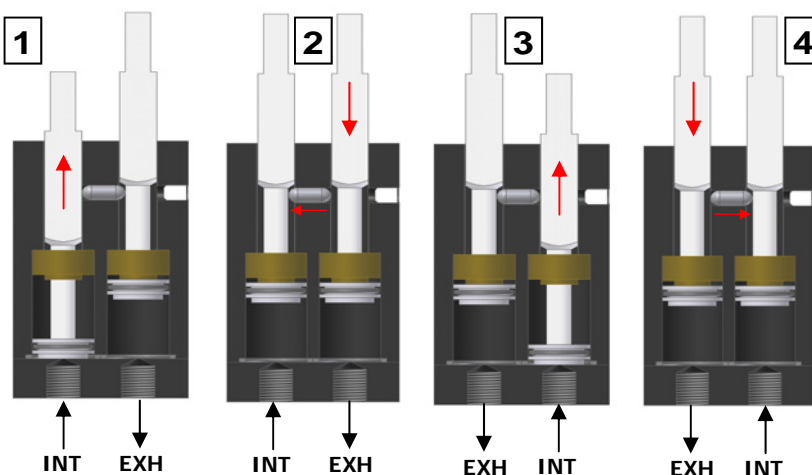
### BC-6B

- 1 1/8" [28.6] Cylinder Bore



See Page **2-1.10**

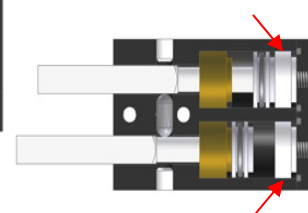
## OPERATING PRINCIPLES



THIS PROCESS PRODUCES ONE ESCAPED PART

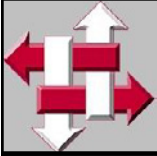
- (1) Pressure pushes both fingers in opposing directions through internal porting
- (2) With first finger fully extended the second finger pushes the locking pin and retracts.
- (3) With second finger fully retracted pressure is reversed and finger extends.
- (4) With second finger fully extended the first finger pushes the locking pin and retracts. Process repeats

NOTE: *Fingers must be allowed to fully extend for proper operation*



### STROKE ADJUSTMENT

Achieved with nylon plugs to limit the amount the finger returns. If ordering stroke below max stroke the unit will include stops specific to ordered stroke. Hard stop kits are also available for user modification. (see parts page for ordering information)



**PRODUCT FEATURES**

- Aircraft Grade Aluminum  
2024 with black anodize
- Simple and Highly Durable  
Time tested, field approved design
- Extremely Compact  
Designed for tight applications

One Part Body Design  
Extremely Durable and Rugged

Available Magnetic Sensors  
Dovetail with Quick Disconnect

Sensor Magnet  
Standard in piston

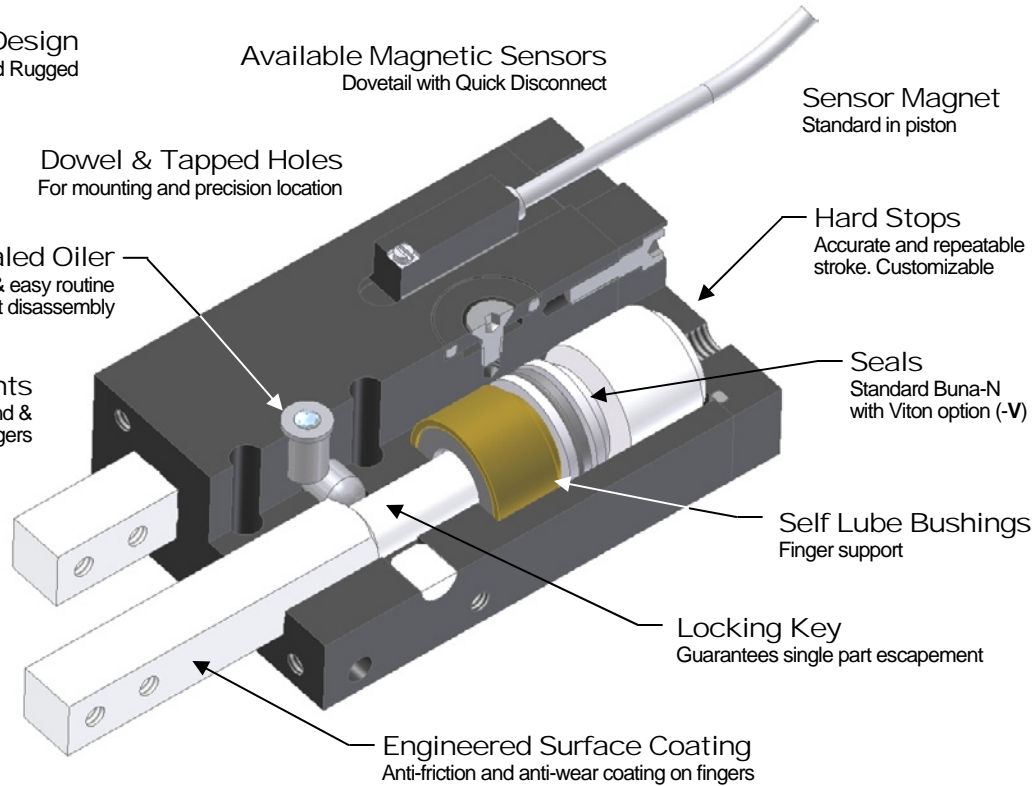
Dowel & Tapped Holes  
For mounting and precision location

Sealed Oiler  
Allows for fast & easy routine  
oiling without disassembly

Hard Stops  
Accurate and repeatable  
stroke. Customizable

Quality Components  
Precision Ground &  
hardened fingers

Seals  
Standard Buna-N  
with Viton option (-V)



Self Lube Bushings  
Finger support

Locking Key  
Guarantees single part escapement

Engineered Surface Coating  
Anti-friction and anti-wear coating on fingers

**DESIGNED - MANUFACTURED - ASSEMBLED IN THE USA**

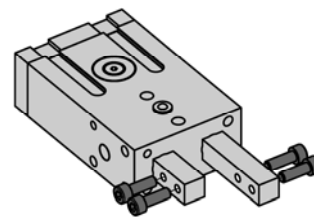
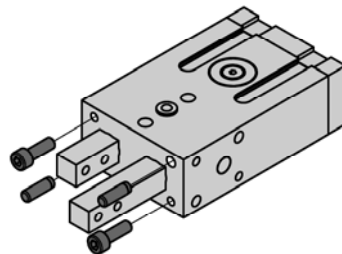
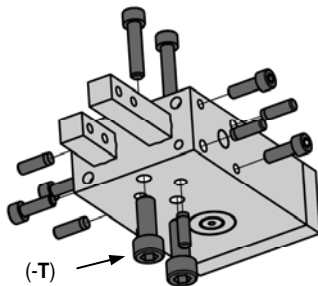
**MOUNTING INFORMATION**

**Mounts and operates in any orientation**

See **DURA-SCAPE AT-1-LD** Page  
for Universal Tooling for the BC-1

**MAIN BODY**

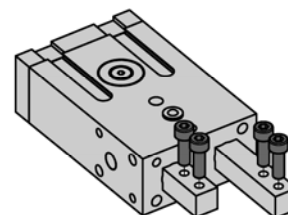
**TOOLING**



Mount tooling to fingers using  
Tapped holes. Key tooling to  
precision ground fingers for  
positive location.

**Side Mount** to Main body using Tapped holes  
with Dowel Pins for positive location.

**Front Mount** to Main body using Tapped  
holes with Dowel Pins for positive location.

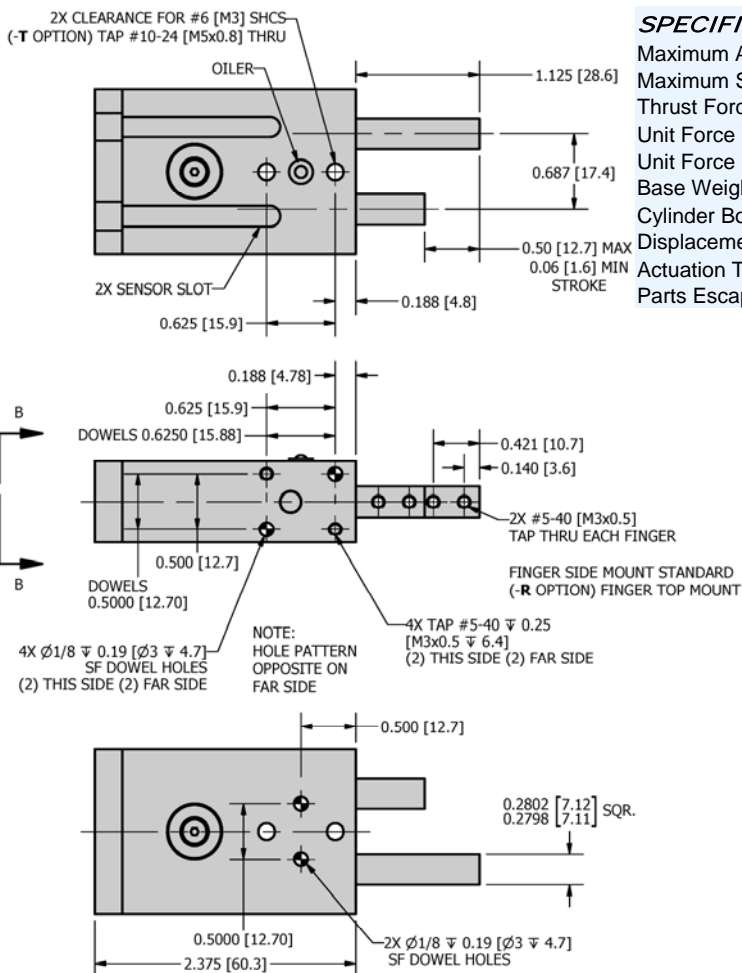


**(-R)** Option rotates fingers 90  
degrees if required for custom  
tooling

**Bottom Mount** thru Main body with Clearance  
holes and Dowel Pins for positive location.  
**(-T)** option turns Clearance holes into Tapped  
holes

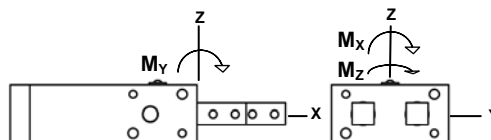
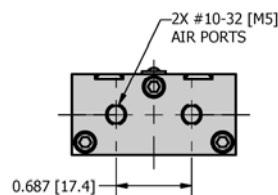
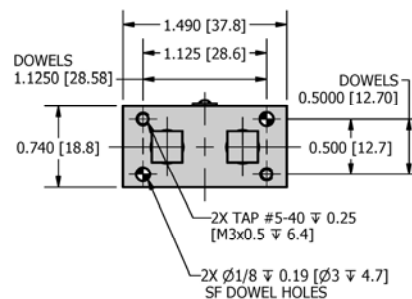


**DIMENSIONAL DRAWING**



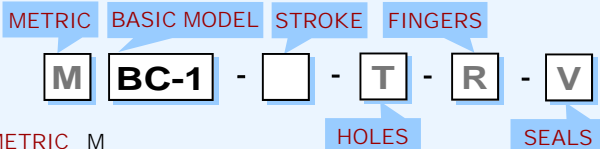
**SPECIFICATIONS**

	BC-1	M BC-1
Maximum Air Pressure	100 psi	6.9 bar
Maximum Stroke	0.500"	12.7 mm
Thrust Force @ 100 psi / 6.9 bar	24.8 lbf	110.3 N
Unit Force Factor - Extend	0.25 lbf/psi	16.0 N/bar
Unit Force Factor - Retract	0.20 lbf/psi	12.9 N/bar
Base Weight	0.29 lb	0.13 kg
Cylinder Bore Diameter	0.562"	11.10 mm
Displacement (per escaped part)	0.56 in <sup>3</sup>	9.16 cm <sup>3</sup>
Actuation Time (per escaped part)	0.40 sec	
Parts Escaped Per Minute	150	



LOADING	BC-1	M BC-1
Max Static Moment <b>M<sub>x</sub>, M<sub>y</sub>, M<sub>z</sub></b>	50 lbf-in	5.6 N-m
Max Dynamic Moment <b>M<sub>x</sub>, M<sub>y</sub>, M<sub>z</sub></b>	5.0 lbf-in	0.6 N-m

**HOW TO ORDER : BASIC UNIT**



- METRIC** M
- STROKE** Inch: MAX-0.50", 0.25"  
mm: MAX-12.7, 6.4  
If Stroke is not specified, one Hard Stop Kit (BC-1-HSK) will be included and unit will have max stroke.
- HOLES** T - Tapped Body
- FINGERS** R - Fingers Rotated 90°
- SEALS** V - Viton (standard Buna - N)

**SAMPLE ORDER: BC-1-R**

Ex) BC-1 with rotated fingers, includes Hard Stop Kit (no stroke is specified)

**ACCESSORIES (order separately)**

**MAGNETIC SENSOR KITS \* (Dovetail mounted)**  
DSK-N - Magnetic Sensor NPN w/ quick disconnect Kit  
DSK-P - Magnetic Sensor PNP w/ quick disconnect Kit  
\* Sensor kits include (2) sensors and (2) 5 meter cables.

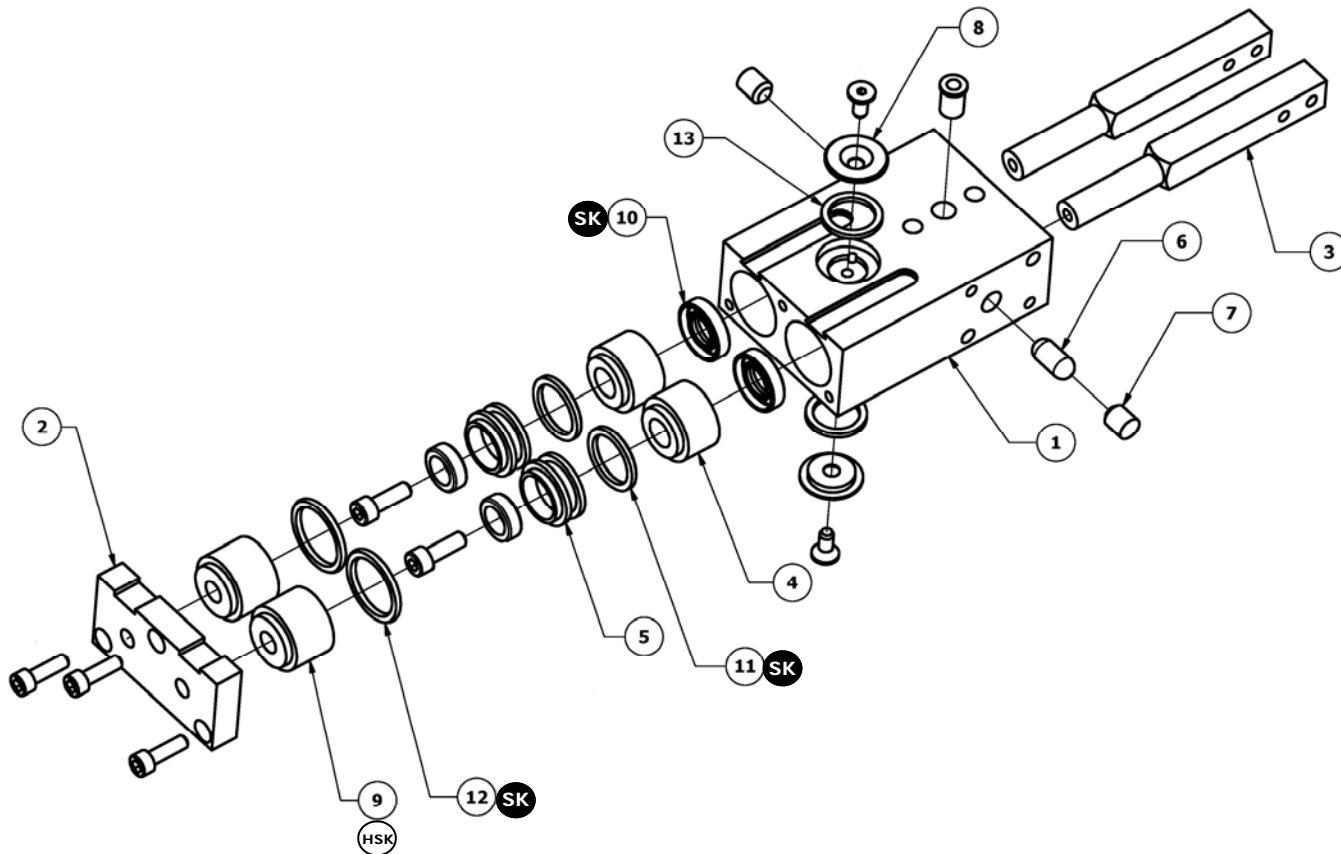
**MAGNETIC SENSORS \* (Dovetail mounted)**  
DS-N - Magnetic Sensor NPN w/ quick disconnect  
DS-P - Magnetic Sensor PNP w/ quick disconnect  
\* Includes (1) sensor.

**SENSOR CABLE**  
SENCAB-5 - Quick Disconnect PUR Cable 5M Length

**TOOLING**  
AT-1-LD - Universal Tooling - Adjustable, Spring Loaded  
(see DURA-SCAPE Accessories Pages for AT-1-LD info)



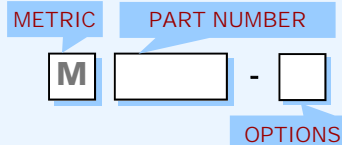
EXPLODED VIEW



PARTS LIST

HOW TO ORDER PARTS

ITEM	REQ'D	NAME	BC-1	OPTIONS
1	1	Main Body	BC-101	-T <sup>3</sup>
2	1	End Cap	BC-102	
3	2	Finger	BC-103	
4	2	Bushing *	BC-104	
5	2	Piston	BC-105	
6	1	Shuttle Pin *	BC-106	
7	2	Plug *	BC-207	
8	2	Air Disc	BC-108	
9	2	Hard Stop	BC-109	-S <sup>1</sup>
10	2	Shaft Seal *	SSA-210	-V <sup>2</sup>
11	2	O-ring (Piston) *	ORG-013	-V <sup>2</sup>
12	2	O-ring (End Cap) *	ORG-014	-V <sup>2</sup>
13	2	O-ring (Air Disc) *	ORG-012	-V <sup>2</sup>
SK	1	Seal Kit #*	BC-1-SK	-V <sup>2</sup>
HSK	1	Hard Stop Kit @*	BC-1-HSK	



**SAMPLE ORDER: BC-109-0.25**

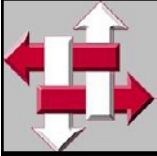
Ex) BC-1 Hard Stop for 0.25" stroke

OPTIONS (see product pages for information)

- 1 - S = Stroke (only required for units that have specified strokes below maximum listed on product page)
- 2 - V = Viton Seals option
- 3 - T = Tapped Holes option

NOTES

- \* - Metric code not required
- # - Seal Kit includes req'd qty of parts marked with SK
- @ - Hard Stop Kit includes (2) full length Stops for user to modify



**PRODUCT FEATURES**

- Aircraft Grade Aluminum  
2024 with black anodize
- Simple and Highly Durable  
Time tested, field approved design
- One Part Body Design  
Extremely Reliable and Durable

Fully Field Serviceable  
With parts and factory repair kits

Available Magnetic Sensors  
Round Body with Quick Disconnect

Sealed Oiler  
Allows for fast & easy routine  
oiling without disassembly

Quality Components  
Precision Ground &  
Case hardened fingers

Hard Stops  
Accurate and repeatable  
stroke. Customizable

Seals  
Standard Buna-N  
with Viton option (-V)

Self Lube Bushings  
Finger support

Locking Key  
Guarantees single part escapement

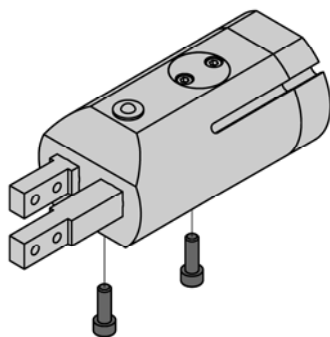
Engineered Surface Coating  
Anti-friction and anti-wear coating on fingers

**DESIGNED - MANUFACTURED - ASSEMBLED IN THE USA** 

**MOUNTING INFORMATION**

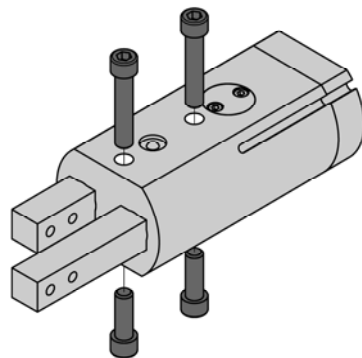
**Mounts and operates in any orientation**

**MAIN BODY**



**BC-2**

**Bottom Mount** to Main body using  
Tapped holes.

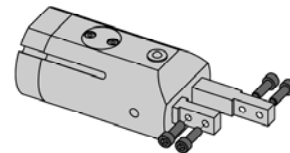


**BC-4**

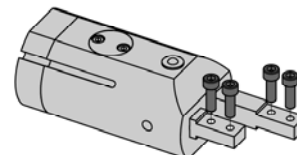
**Bottom Mount** to Main body using Tapped  
holes or thru Main body with Clearance holes

**TOOLING**

BC-2 and BC-4



Mount tooling to fingers using  
Tapped holes. Key tooling to  
precision ground fingers for  
positive location.



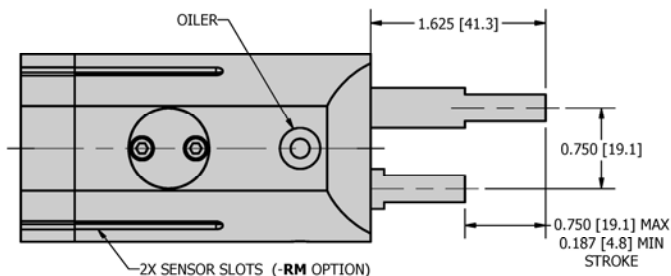
(-R) Option rotates fingers 90  
degrees if required for custom  
tooling

See **DURA-SCAPE AT-2-LD** Page  
for Universal Tooling for the BC-2



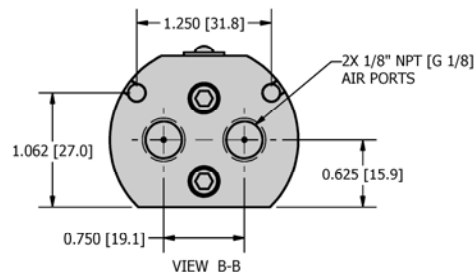
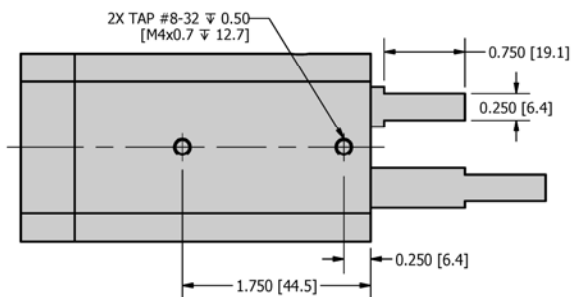
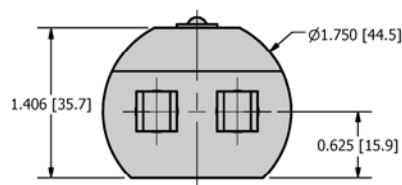
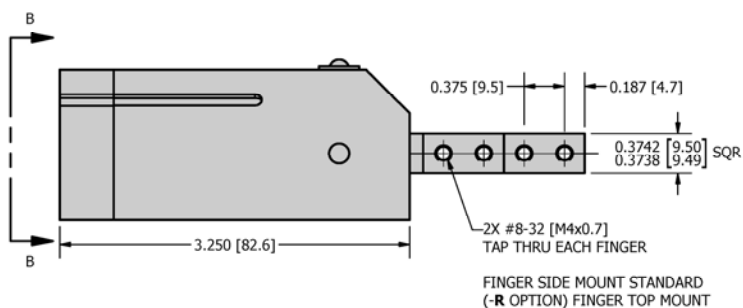


**DIMENSIONAL DRAWING**

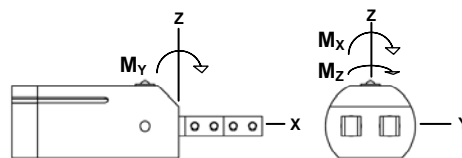


**SPECIFICATIONS**

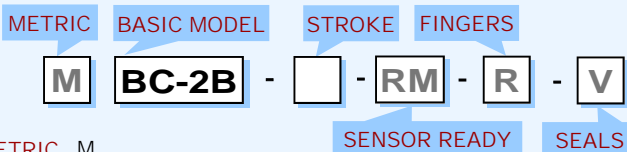
	BC-2B	M BC-2B
Maximum Air Pressure	100 psi	6.9 bar
Maximum Stroke	0.750"	19.05 mm
Thrust Force @ 100 psi / 6.9 bar	30.7 lbf	136.4 N
Unit Force Factor - Extend	0.31 lbf/psi	19.8 N/bar
Unit Force Factor - Retract	0.26 lbf/psi	16.6 N/bar
Base Weight	0.76 lbs	0.34 kg
Cylinder Bore Diameter	0.625"	15.86 mm
Displacement (per escaped part)	0.848 in <sup>3</sup>	13.88 cm <sup>3</sup>
Actuation Time (per escaped part)	0.60 sec	
Parts Escaped Per Minute	100	



LOADING	BC-2B	M BC-2B
Max Static Moment $M_x, M_y, M_z$	150 lbf-in	16.9 N-m
Max Dynamic Moment $M_x, M_y, M_z$	15.0 lbf-in	1.7 N-m



**HOW TO ORDER : BASIC UNIT**



- METRIC** M
- STROKE** Inch: MAX-0.75", 0.50", 0.25"  
mm: MAX-19.1, 12.7, 6.4  
If Stroke is not specified, one Hard Stop Kit (BC-2-HSK) will be included and unit will have max stroke.
- SENSOR** RM - Magnetic Sensor Ready  
Includes Sensor slots and Piston Magnets. Sensors sold separately - see Magnetic Sensors
- FINGERS** R - Fingers Rotated 90°
- SEALS** V - Viton (standard Buna - N)

**SAMPLE ORDER: BC-2B-R**

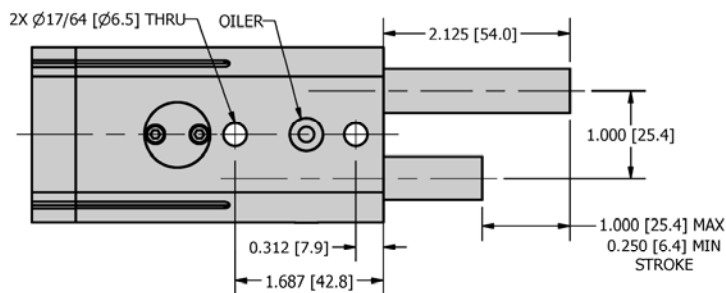
Ex) BC-2B with rotated fingers, includes Hard Stop Kit (no stroke is specified)

**ACCESSORIES (order separately)**

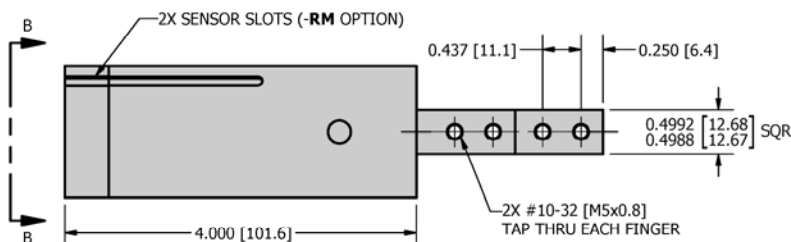
- MAGNETIC SENSOR KITS \* (Round track mounted)**  
RSK-N - Magnetic Sensor NPN w/ quick disconnect Kit  
RSK-P - Magnetic Sensor PNP w/ quick disconnect Kit  
\* Requires Sensor Ready (-RM). Sensor kits include (2) sensors and (2) 5 meter cables.
- MAGNETIC SENSORS \* (Round track mounted)**  
RS-N - Magnetic Sensor NPN w/ quick disconnect  
RS-P - Magnetic Sensor PNP w/ quick disconnect  
\* Requires Sensor Ready (-RM). Includes (1) sensor.
- SENSOR CABLE**  
SENCAB-5 - Quick Disconnect PUR Cable 5M Length
- TOOLING**  
AT-2-LD - Universal Tooling - Adjustable, Spring Loaded  
(see DURA-SCAPE Accessories Pages for AT-2-LD info)



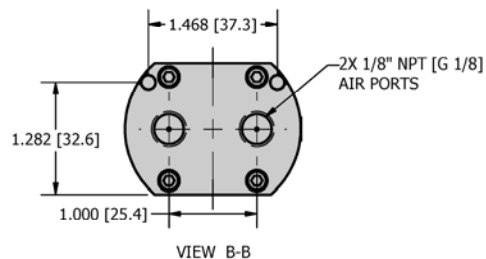
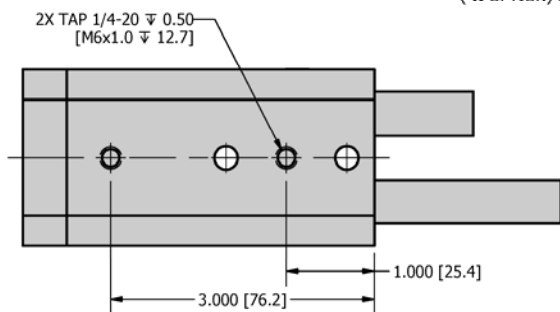
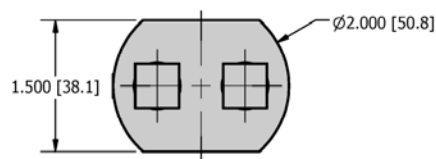
**DIMENSIONAL DRAWING**



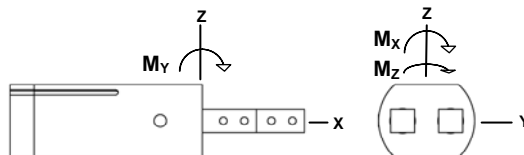
<b>SPECIFICATIONS</b>	BC-4B	M BC-4B
Maximum Air Pressure	100 psi	6.9 bar
Maximum Stroke	1.000"	25.4 mm
Thrust Force @ 100 psi / 6.9 bar	60.1 lbf	267.3 N
Unit Force Factor - Extend	0.60 lbf/psi	38.8 N/bar
Unit Force Factor - Retract	0.49 lbf/psi	31.6 N/bar
Base Weight	1.36 lb	0.62 kg
Cylinder Bore Diameter	0.875"	22.22 mm
Displacement (per escaped part)	2.184 in <sup>3</sup>	35.8 cm <sup>3</sup>
Actuation Time (per escaped part)	0.70 sec	
Parts Escaped Per Minute	85	



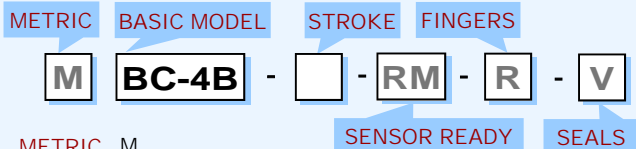
FINGER SIDE MOUNT STANDARD  
(-R OPTION) FINGER TOP MOUNT



<b>LOADING</b>	BC-4B	M BC-4B
Max Static Moment $M_x, M_y, M_z$	250 lbf-in	28.2 N-m
Max Dynamic Moment $M_x, M_y, M_z$	25.0 lbf-in	2.8 N-m



**HOW TO ORDER : BASIC UNIT**



- METRIC** M
- STROKE** Inch: MAX-1.00", 0.75", 0.50"  
mm: MAX-25.4, 19.1, 12.7  
If Stroke is not specified, one Hard Stop Kit (BC-4-HSK) will be included and unit will have max stroke.
- SENSOR** RM - Magnetic Sensor Ready  
Includes Sensor slots and Piston Magnets . Sensors sold separately - see Magnetic Sensors
- FINGERS** R - Fingers Rotated 90°
- SEALS** V - Viton (standard Buna - N)

**SAMPLE ORDER: BC-4B-R**

Ex) BC-4B with rotated fingers, includes Hard Stop Kit (no stroke is specified)

**ACCESSORIES (order separately)**

- MAGNETIC SENSOR KITS \* (Round track mounted)**
- RSK-N - Magnetic Sensor NPN w/ quick disconnect Kit
- RSK-P - Magnetic Sensor PNP w/ quick disconnect Kit
- \* Requires Sensor Ready (-RM). Sensor kits include (2) sensors and (2) 5 meter cables.

- MAGNETIC SENSORS \* (Round track mounted)**
- RS-N - Magnetic Sensor NPN w/ quick disconnect
- RS-P - Magnetic Sensor PNP w/ quick disconnect
- \* Requires Sensor Ready (-RM). Includes (1) sensor.

- SENSOR CABLE**
- SENCAB-5 - Quick Disconnect PUR Cable 5M Length



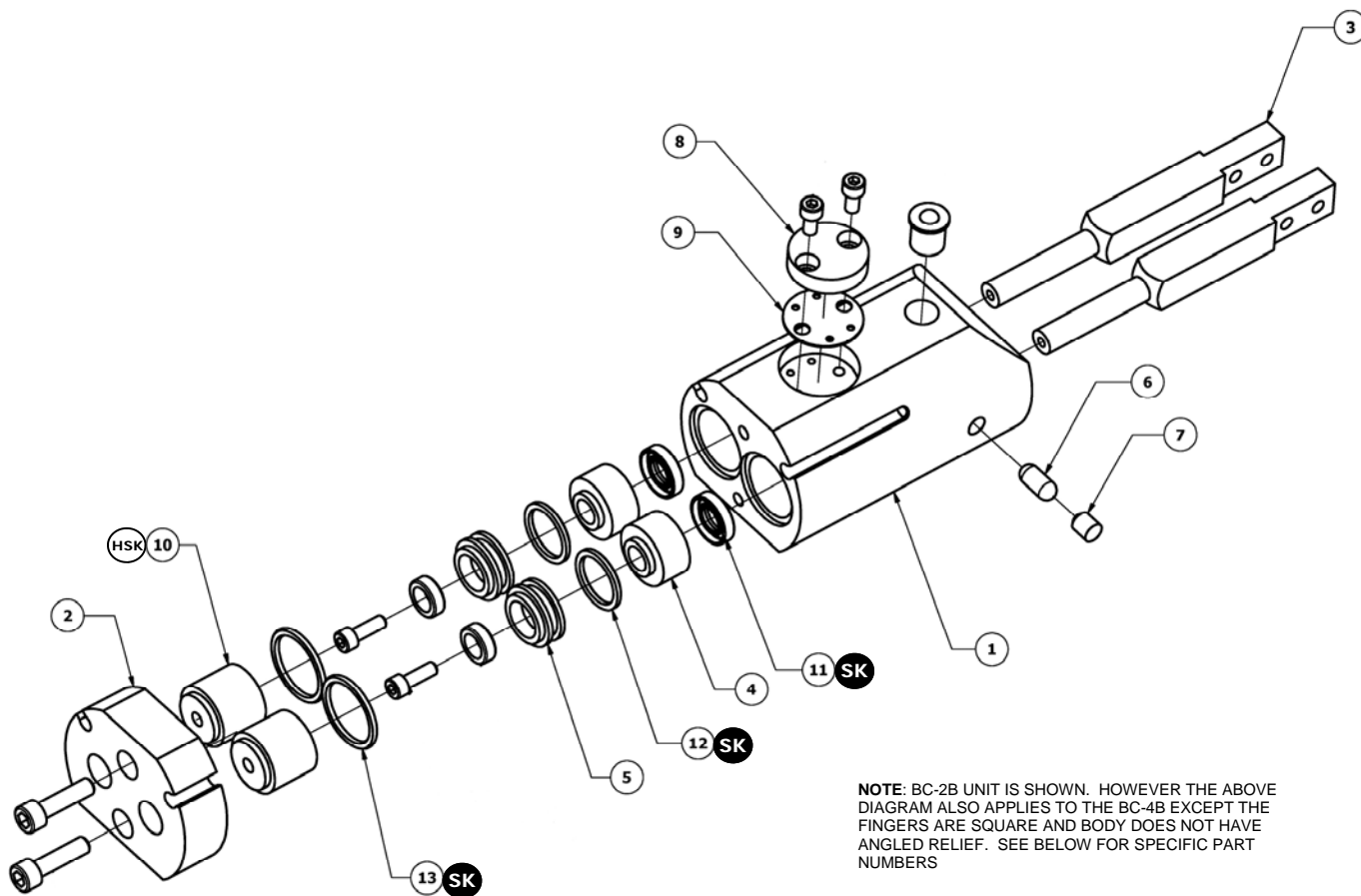


**R&I**  
MANUFACTURING CO.

**DURA-SCAPE**  
ESCAPEMENT DEVICES

**BC-2B/4B**   
ROUND BODY

EXPLODED VIEW

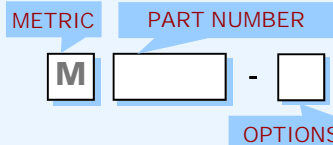


**NOTE:** BC-2B UNIT IS SHOWN. HOWEVER THE ABOVE DIAGRAM ALSO APPLIES TO THE BC-4B EXCEPT THE FINGERS ARE SQUARE AND BODY DOES NOT HAVE ANGLED RELIEF. SEE BELOW FOR SPECIFIC PART NUMBERS

**PARTS LIST**

**HOW TO ORDER PARTS**

ITEM	REQ'D	NAME	BC-2B	BC-4B	OPTIONS
1	1	Main Body	BC-201B	BC-401B	-RM <sup>3</sup>
2	1	End Cap	BC-202	BC-402	-RM <sup>3</sup>
3	2	Finger	BC-203	BC-403	
4	2	Bushing *	BC-204	BC-404	
5	2	Piston	BC-205	BC-405	-RM <sup>3</sup>
6	1	Shuttle Pin *	BC-206	BC-406	
7	1	Plug *	BC-207	BC-407	
8	1	Air Disc	BC-208		
9	1	Gasket *	BC-209		
10	2	Hard Stop	BC-210	BC-410	-S <sup>1</sup>
11	2	Shaft Seal *	SSA-210	SSA-215	-V <sup>2</sup>
12	2	O-ring (Piston) *	ORG-014	ORG-018	-V <sup>2</sup>
13	2	O-ring (End Cap) *	ORG-016	ORG-020	-V <sup>2</sup>
SK	1	Seal Kit #*	BC-2-SK	BC-4-SK	-V <sup>2</sup>
HSK	1	Hard Stop Kit @*	BC-2-HSK	BC-4-HSK	



**SAMPLE ORDER: BC-210-0.50**

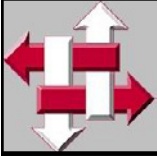
Ex) BC-2B Hard Stop for 0.50" stroke

**OPTIONS** (see product pages for information)

- <sup>1</sup> - S = Stroke (only required for units that have specified strokes below maximum listed on product page)
- <sup>2</sup> - V = Viton Seals option
- <sup>3</sup> - RM = Sensor Ready

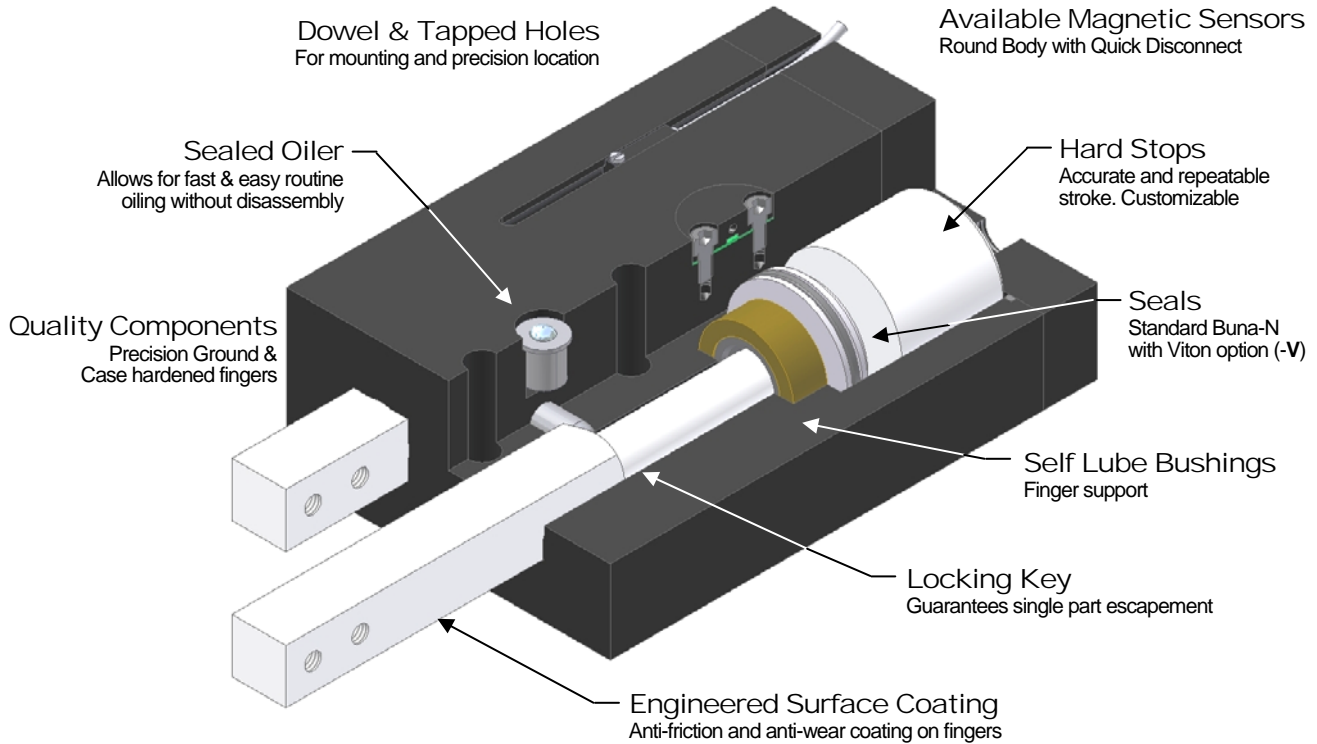
**NOTES**

- \* - Metric code not required
- # - Seal Kits include req'd qty of parts marked with SK
- @ - Hard Stop Kits includes (2) full length Stops for user to modify



**PRODUCT FEATURES**

- Aircraft Grade Aluminum  
2024 with black anodize
- Simple and Highly Durable  
Time tested, field approved design
- One Part Body Design  
Extremely Reliable and Durable

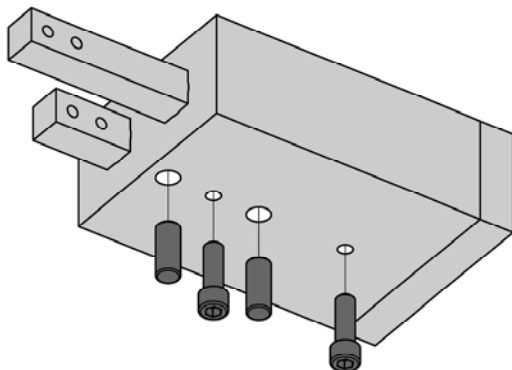


**DESIGNED - MANUFACTURED - ASSEMBLED IN THE USA** 

**MOUNTING INFORMATION**

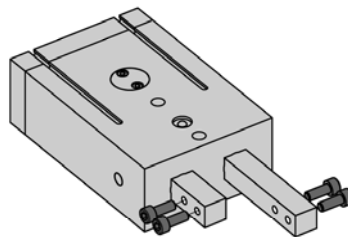
**Mounts and operates in any orientation**

**MAIN BODY**

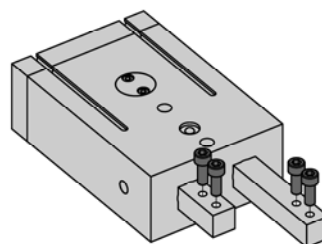


**Bottom Mount** to Main body using Tapped holes with Dowel Pins for positive location. Mount thru unit with Clearance holes.

**TOOLING**



Mount tooling to fingers using Tapped holes. Key tooling to precision ground fingers for positive location.



**(-R)** Option rotates fingers 90 degrees if required for custom tooling

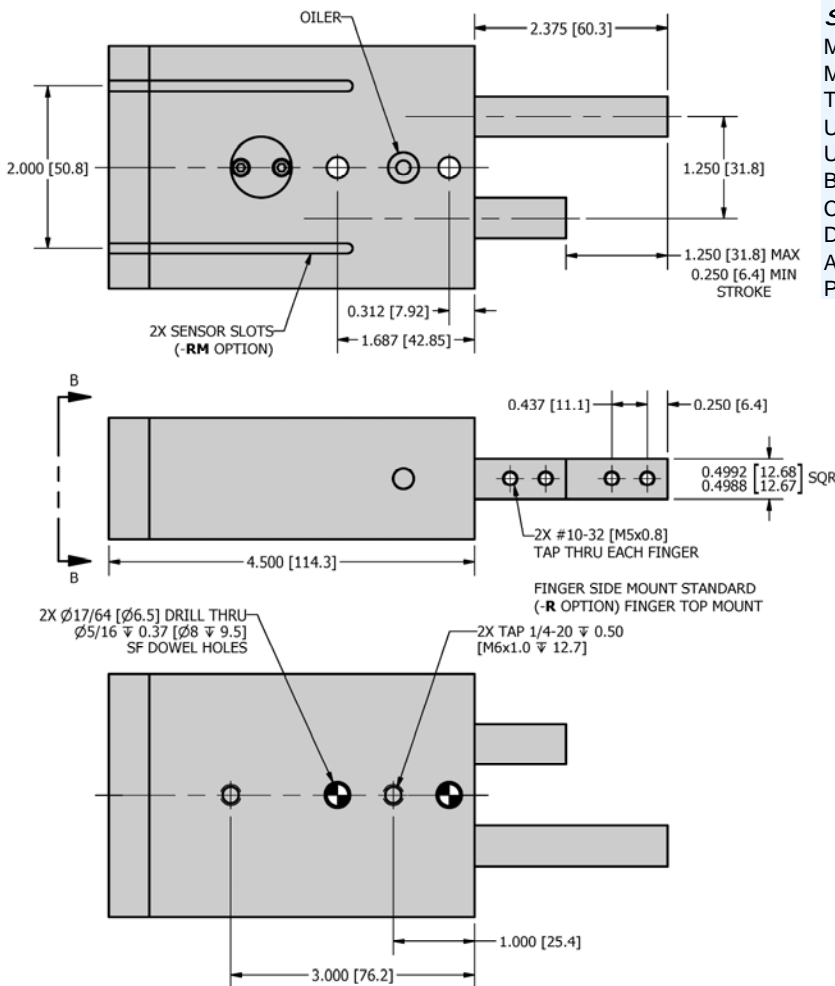


**R&I**  
MANUFACTURING CO.

**DURA-SCAPE**  
ESCAPEMENT DEVICES

**BC-6B** **HEAVY DUTY**

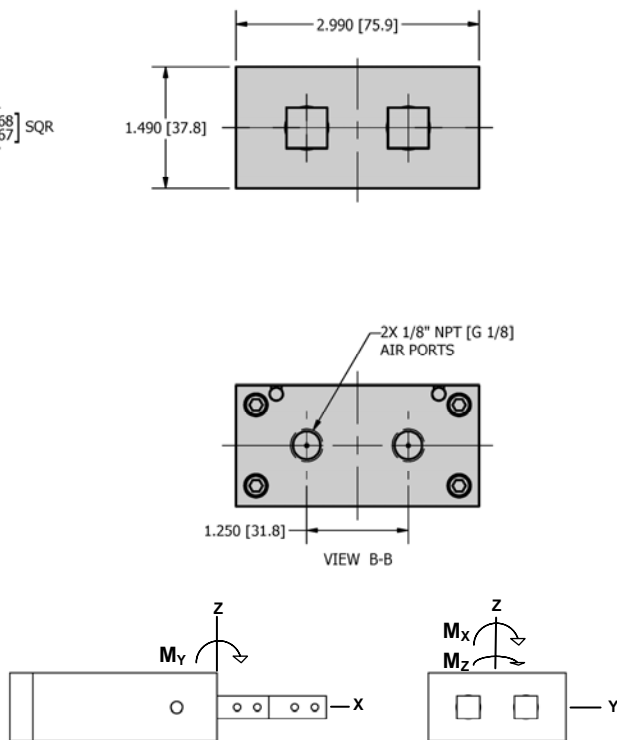
**DIMENSIONAL DRAWING**



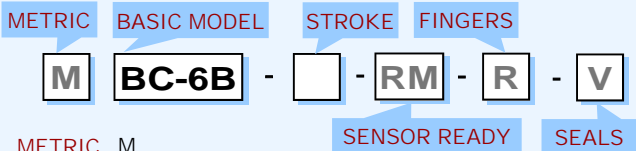
**SPECIFICATIONS**

	BC-6B	M BC-6B
Maximum Air Pressure	100 psi	6.9 bar
Maximum Stroke	1.250"	31.8 mm
Thrust Force @ 100 psi / 6.9 bar	99.4 lbf	441.9 N
Unit Force Factor - Extend	0.99 lbf/psi	64.1 N/bar
Unit Force Factor - Retract	0.88 lbf/psi	57.0 N/bar
Base Weight	2.14 lb	0.97 kg
Cylinder Bore Diameter	1.125"	28.6 mm
Displacement (per escaped part)	4.694 in <sup>3</sup>	76.9 cm <sup>3</sup>
Actuation Time (per escaped part)	0.70 sec	
Parts Escaped Per Minute	85	

	BC-6B	M BC-6B
Max Static Moment $M_x, M_y, M_z$	250 lbf-in	28.2 N-m
Max Dynamic Moment $M_x, M_y, M_z$	25.0 lbf-in	2.8 N-m



**HOW TO ORDER : BASIC UNIT**



- METRIC** M
- STROKE** Inch: MAX-1.25", 1.00", 0.50"  
mm: MAX-31.8, 25.4, 12.7  
If Stroke is not specified, one Plug Kit (BC-6-HSK) will be included and unit will have max stroke.
- SENSOR** RM - Magnetic Sensor Ready  
Includes Sensor slots and Piston Magnets. Sensors sold separately - see Magnetic Sensors
- FINGERS** R - Fingers Rotated 90°
- SEALS** V - Viton (standard Buna - N)

**SAMPLE ORDER: BC-6B-R**

Ex) BC-6B with rotated fingers, includes Hard Stop Kit (no stroke is specified)

**ACCESSORIES (order separately)**

- MAGNETIC SENSOR KITS \* (Round track mounted)**  
RSK-N - Magnetic Sensor NPN w/ quick disconnect Kit  
RSK-P - Magnetic Sensor PNP w/ quick disconnect Kit  
\*Requires Sensor Ready (-RM). Sensor kits include (2) sensors and (2) 5 meter cables.
- MAGNETIC SENSORS \* (Round track mounted)**  
RS-N - Magnetic Sensor NPN w/ quick disconnect  
RS-P - Magnetic Sensor PNP w/ quick disconnect  
\*Requires Sensor Ready (-RM). Includes (1) sensor.
- SENSOR CABLE**  
SENCAB-5 - Quick Disconnect PUR Cable 5M Length

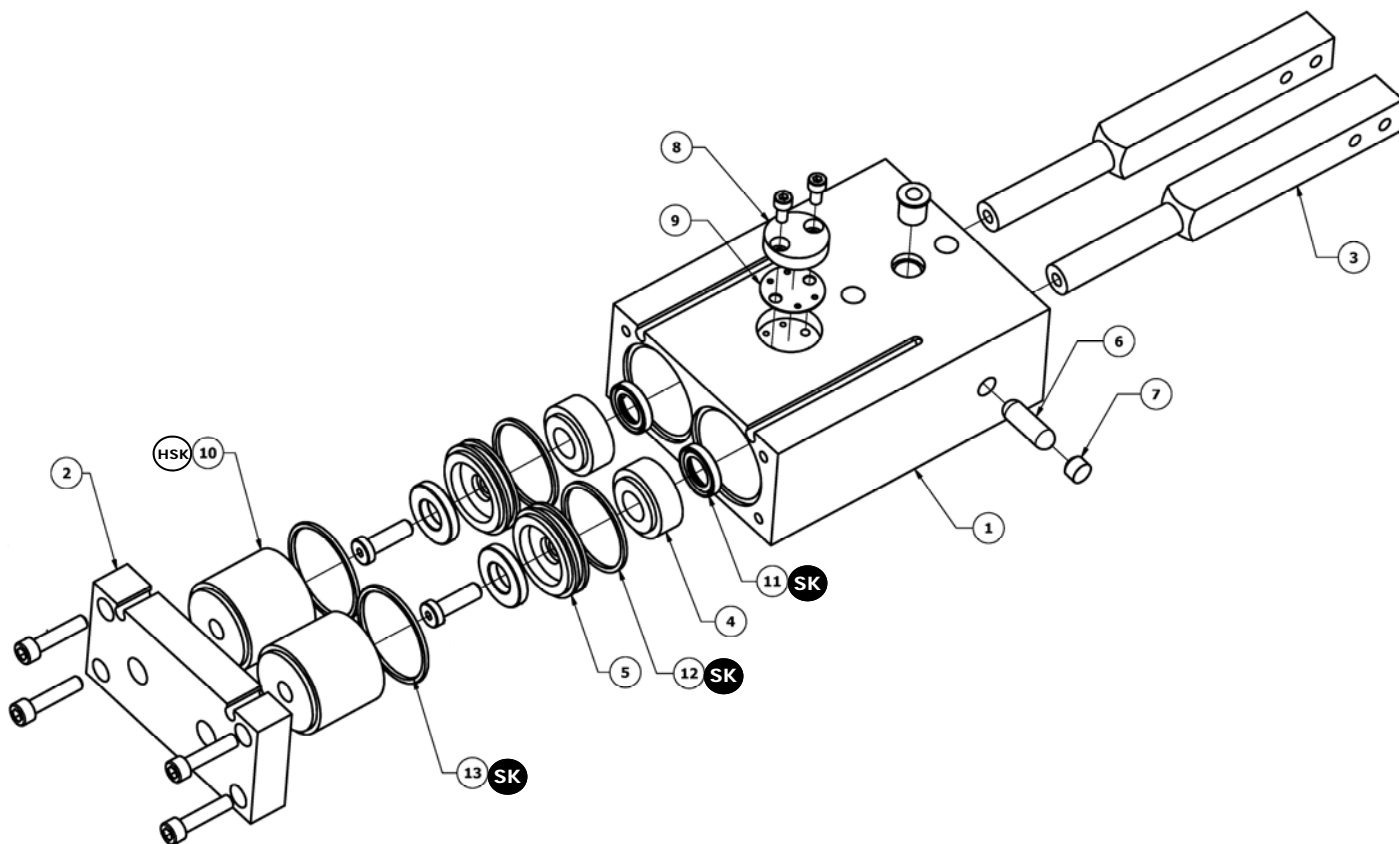


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**DURA-SCAPE**  
ESCAPEMENT DEVICES

**BC-6B**   
HEAVY DUTY

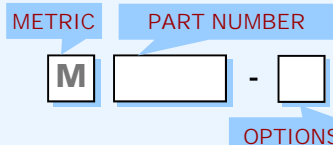
EXPLODED VIEW



**PARTS LIST**

**HOW TO ORDER PARTS**

ITEM	REQ'D	NAME	BC-6B	OPTIONS
1	1	Main Body	BC-601	-RM <sup>3</sup>
2	1	End Cap	BC-602	-RM <sup>3</sup>
3	2	Finger	BC-603	
4	2	Bushing *	BC-404	
5	2	Piston	BC-605	-RM <sup>3</sup>
6	1	Shuttle Pin *	BC-606	
7	1	Plug *	BC-407	
8	1	Air Disc	BC-208	
9	1	Gasket *	BC-209	
10	2	Hard Stop	BC-610	-S <sup>1</sup>
11	2	Shaft Seal *	SSA-215	-V <sup>2</sup>
12	2	O-ring (Piston) *	ORG-022	-V <sup>2</sup>
13	2	O-ring (End Cap) *	ORG-024	-V <sup>2</sup>
SK	1	Seal Kit # *	BC-6-SK	-V <sup>2</sup>
HSK	1	Hard Stop Kit @ *	BC-6-HSK	



**SAMPLE ORDER: BC-610-0.50**

Ex) BC-6B Hard Stop for 0.50" stroke

**OPTIONS** (see product pages for information)

- <sup>1</sup> - S = Stroke (only required for units that have specified strokes below maximum listed on product page)
- <sup>2</sup> - V = Viton Seals option
- <sup>3</sup> - RM = Sensor Ready

**NOTES**

- \* - Metric code not required
- # - Seal Kit includes req'd qty of parts marked with SK
- @ - Hard Stop Kit includes (2) full length Stops for user to modify