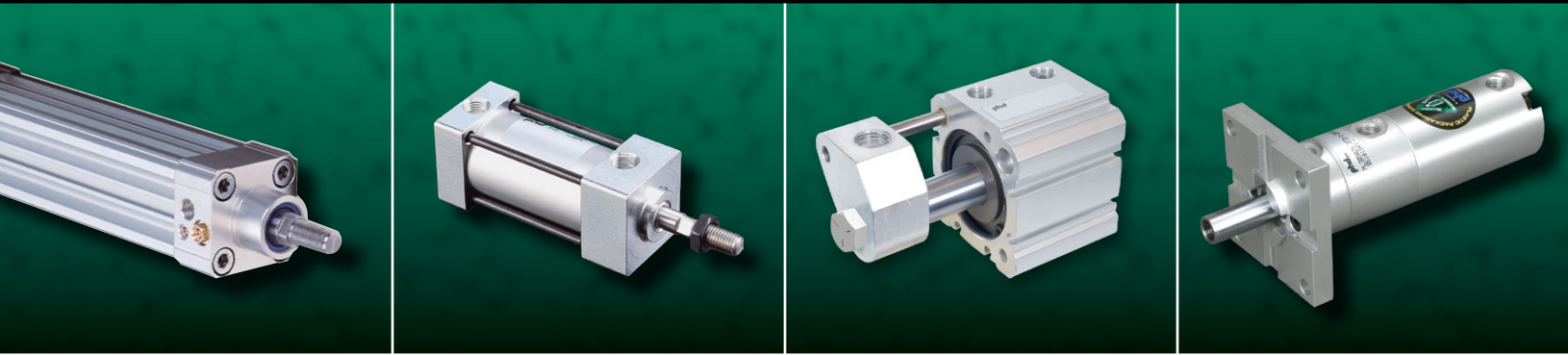


CONTINUOUS EXTRUSION PROCESS IMPROVEMENTS



INCREASE PRODUCTION • REDUCE MAINTENANCE • REDUCE DOWNTIME • REDUCE SCRAP



NEEDLE CYLINDERS
KNOCKOUT CYLINDERS

We understand



your unique requirements

Focused on the specific needs of the plastic packaging industry, PHD has worked with a wide range of continuous extrusion OEMs and user accounts to produce a variety of improved solutions for the industry.

Our components are the actuators of choice. Designed for long life, PHD products keep your blow molding lines running while increasing productivity and reducing downtime and scrap.

We also offer the added benefit of our rebuild program which refurbishes your existing PHD components, enabling even longer service life and savings.



To request more literature, visit
www.phdinc.com/resources/inforequest/

Easy Drop-in

With longer life,
reduced maintenance,
and reduced downtime

We offer a wide variety of direct replacement components. Our drop-in components save you money by reducing costly production downtime and maintenance costs.

Many of our components provide up to twice the life of the original unit. This means longer run time for higher production and higher profits.

Superior Delivery

FASTER
delivery than
competitor

Excellent delivery saves you money by getting you back to business faster.

Unique Solutions

**Special
Requirements**

PHD offers a variety of components already designed to fit unique requirements. If your application requires a modified component from outside our large database of designs, our team is ready to help. We welcome special requests, regardless of quantity or frequency of order. See page 14.

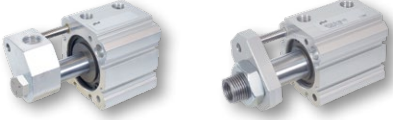
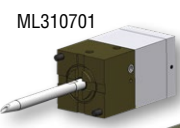
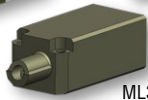
Rebuild Program

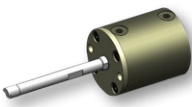
**Return
to Service**

Our products can be rebuilt and put back in service for continued savings. Plus you will receive a "like new" warranty. See page 15 for more information.



Replacement Reference Chart & Contents

NEEDLE CYLINDERS		PAGE
Series BCT		4
Series BCN		11
Other Unique Solutions	 ML310701  ML304949  ML306733	14

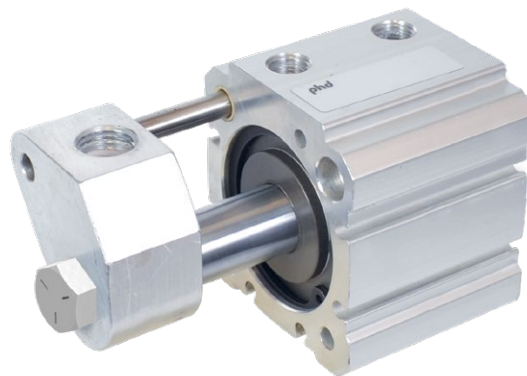
KNOCKOUT CYLINDERS		PAGE
Series CV Style		14
Series AV Style		14
Special Rod Style		14

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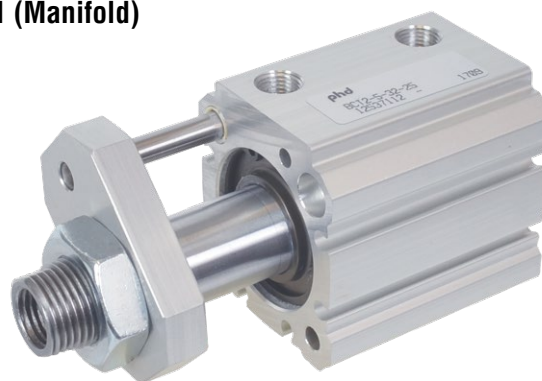
Needle Cylinder

Major Benefits

- Direct OEM solution used in continuous extrusion wheels are available in three bore sizes and provide superior blow pressure and exhaust
- Non-rotating shaft to keep needle tip in correct orientation
- BCT2 (High Flow) version increases run time between cleaning of “plate out” material
- Standard NPT ports for extend, retract and blow
- Internal shock pads standard on extend and retract
- Lubricated internally at factory for life of cylinder using lubricant per FDA Regulation 21CFR 178.3570
- Option -H96 for mirrored porting and non-rotating shaft, designed to help eliminate machine interferences
- Cylinders are easily field repairable to maximize your investment

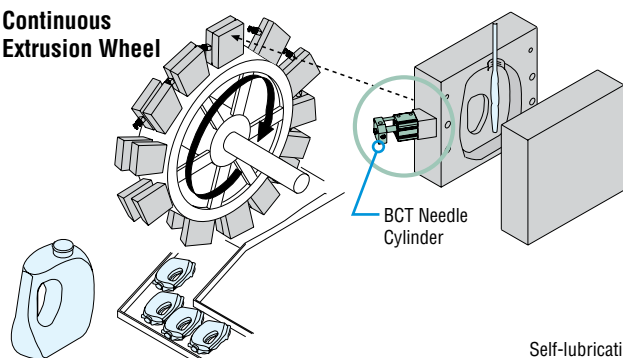


BCT1 (Manifold)



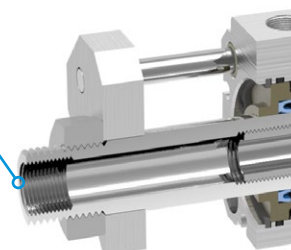
BCT2 (High Flow)

Continuous Extrusion Wheel

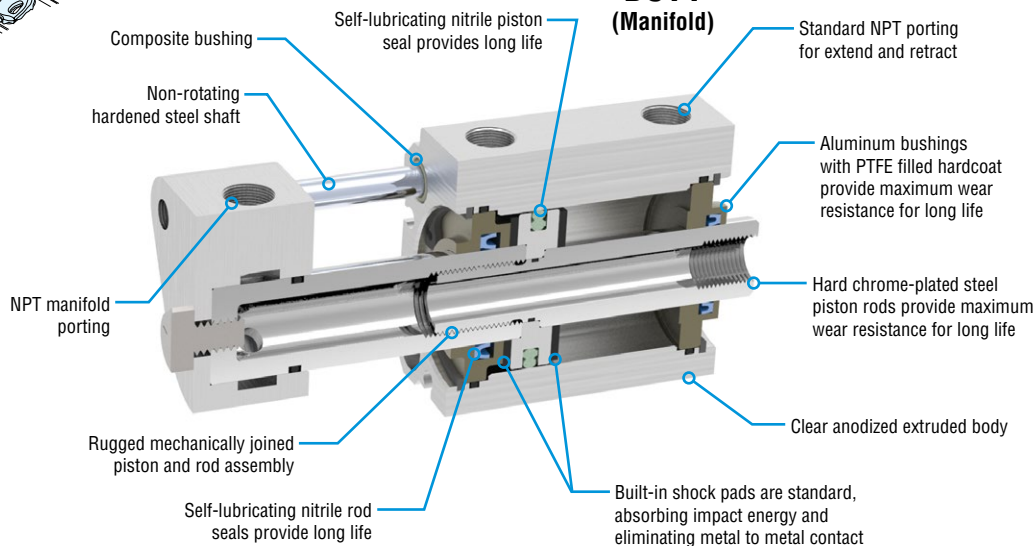


BCT2 (High Flow)

NPT end porting for higher flow requirements and increased time interval between cleaning



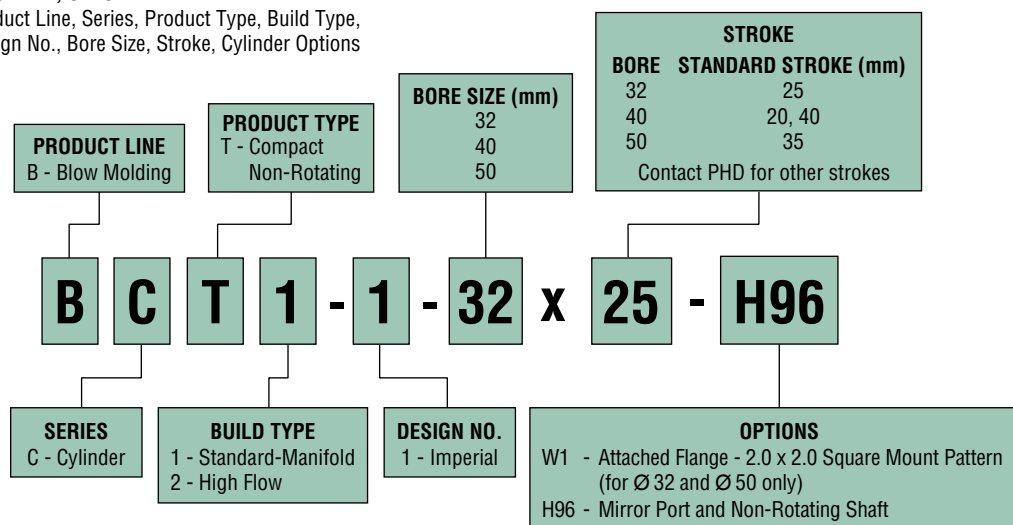
BCT1 (Manifold)



ORDERING DATA: SERIES BCT NEEDLE CYLINDER

TO ORDER, SPECIFY:

Product Line, Series, Product Type, Build Type,
Design No., Bore Size, Stroke, Cylinder Options



NOTES:

- 1) Standard Needle Cylinder ordering number is as follows:
BCT1-1-50 x 35
- 2) -W1 option needs to be specified for flange to be attached to unit

ENGINEERING DATA: SERIES BCT NEEDLE CYLINDER

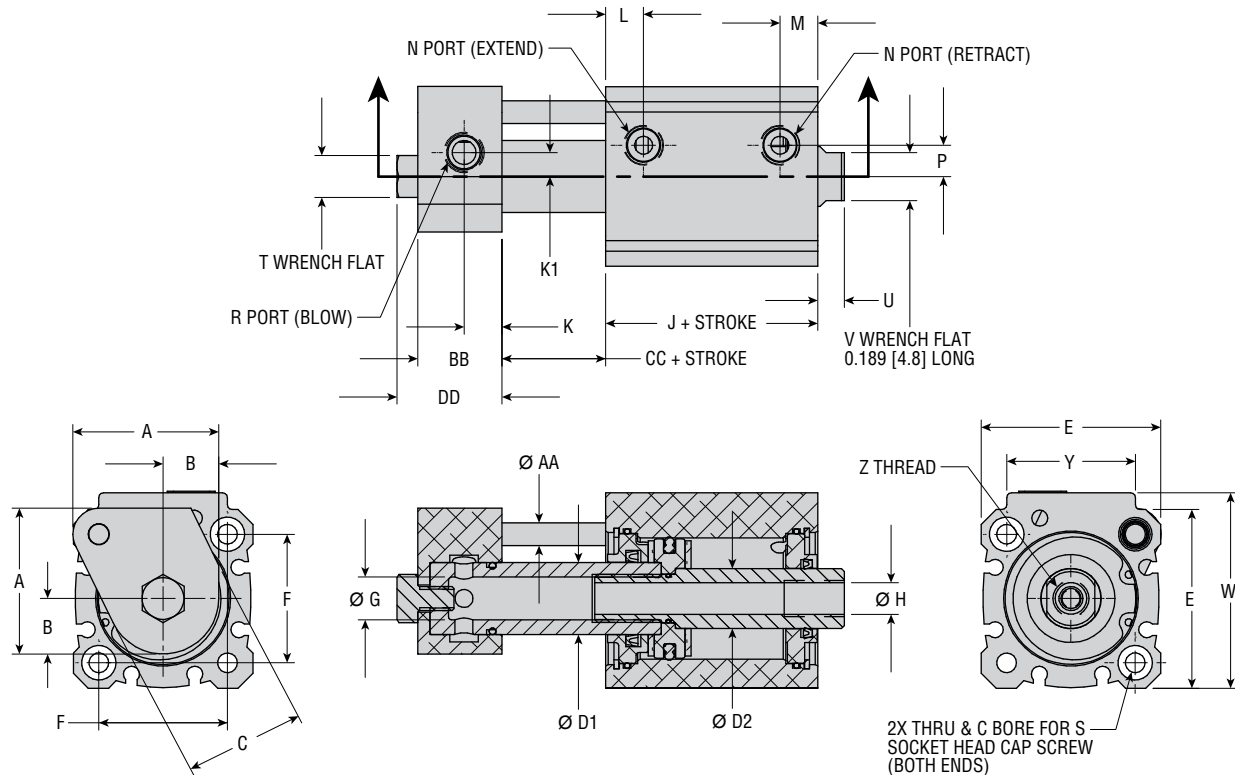
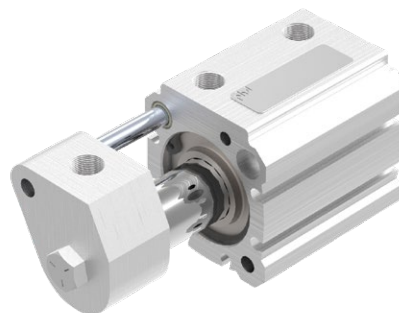
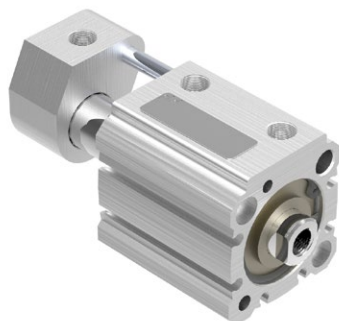
SPECIFICATIONS	SERIES BCT
OPERATING PRESSURE	20 psi min to 150 psi max at zero load [1.4 bar min to 10 bar max] air
STROKE TOLERANCE	±0.031 in [0.8 mm]
TEMPERATURE LIMITS	-20 to +180°F [-28 to +82°C]
VELOCITY	20 in/sec [0.5 m/sec] typical min, zero load at 100 psi [7 bar]
LIFE EXPECTANCY	30 million linear inches [762000 linear meters] min
LUBRICATION	Lubrication per FDA Regulation 21CFR 178.3570
MAINTENANCE	Field repairable

CYLINDER FORCE CALCULATIONS		
	Imperial	Metric
$F = P \times A$	$F = P \times A$	$F = 0.1 \times P \times A$
F = Cylinder Force	lbs	N
P = Operating Pressure	psi	bar
A = Effective Area (Extend or Retract)	in ²	mm ²

CYLINDER FORCE AND WEIGHT

BORE		ROD DIRECTION	OUTLET ROD DIAMETER		EFFECTIVE AREA		BCT1 BASE WEIGHT		BCT2 BASE WEIGHT		ADDER PER 5 mm OF STROKE	
mm	in		in	mm	in ²	mm ²	lb	kg	lb	kg	lb	kg
32	1.260	Extend	0.750	19.1	0.805	519	0.62	0.23	0.59	0.22	0.07	0.03
		Retract	0.625	15.9	0.904	583						
40	1.575	Extend	0.750	19.1	1.506	972	0.69	0.26	0.64	0.24	0.13	0.05
		Retract	0.625	15.9	1.641	1059						
50	1.969	Extend	0.750	19.1	2.603	1679	1.03	0.38	0.97	0.36	0.10	0.04
		Retract	0.750	19.1	2.603	1679						

DIMENSIONS: SERIES BCT1 NEEDLE CYLINDER



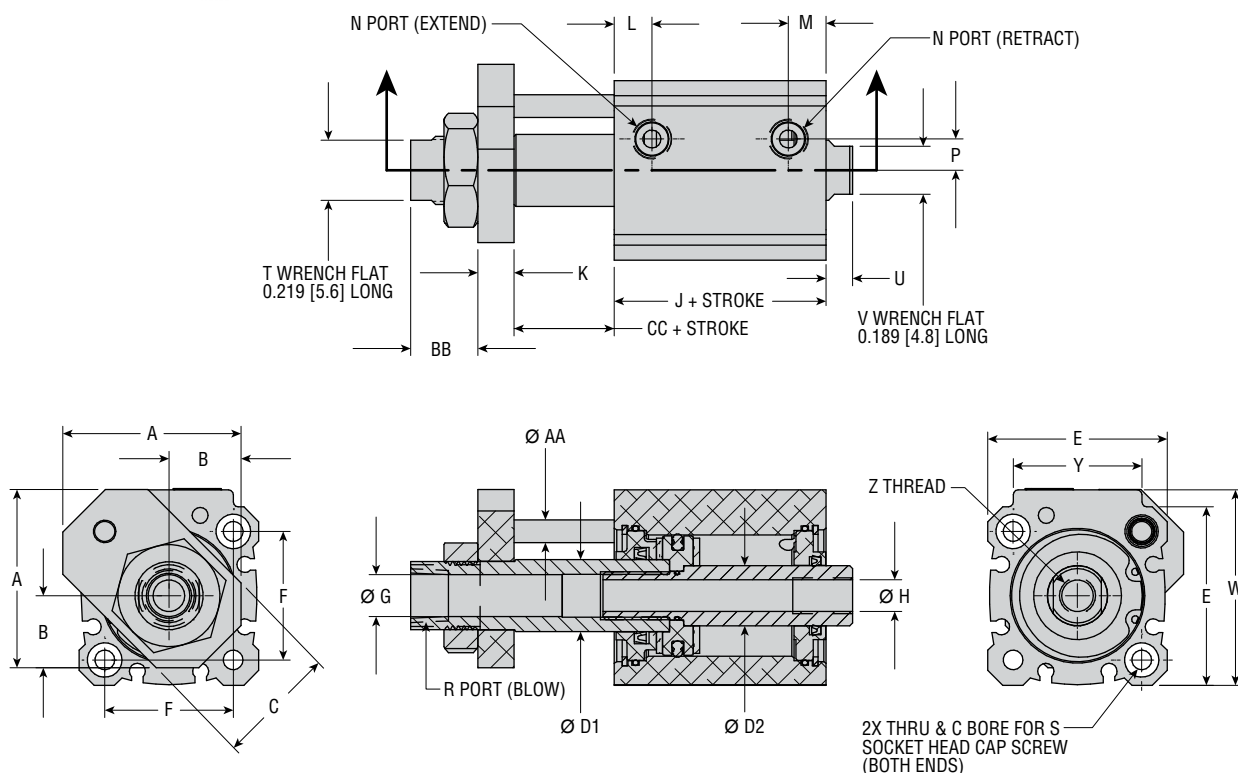
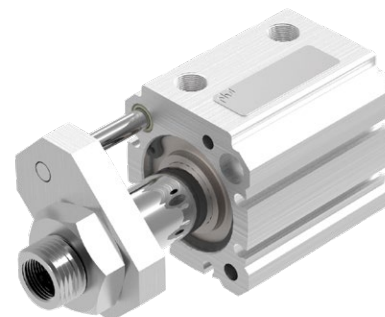
BORE	DIMENSIONS													
	A	B	C	D1	D2	E	F	G	H	J	K	K1	L	M
32	1.519 [38.6]	0.579 [14.7]	1.250 [31.8]	0.750 [19.1]	0.625 [15.9]	1.870 [47.5]	1.339 [34.0]	0.437 [11.1]	0.330 [8.4]	1.224 [31.1]	0.394 [10.0]	0.250 [6.4]	0.394 [10.0]	0.394 [10.0]
40	1.699 [43.2]	0.600 [15.2]	1.250 [31.8]	0.750 [19.1]	0.625 [15.9]	2.205 [56.0]	1.574 [40.0]	0.437 [11.1]	0.330 [8.4]	1.148 [29.2]	0.394 [10.0]	0.349 [8.9]	0.394 [10.0]	0.394 [10.0]
50	1.876 [47.7]	0.626 [15.9]	1.250 [31.8]	0.750 [19.1]	0.750 [19.1]	2.598 [66.0]	1.968 [50.0]	0.437 [11.1]	0.330 [8.4]	1.292 [32.8]	0.394 [10.0]	0.438 [11.1]	0.470 [11.9]	0.470 [11.9]

BORE	DIMENSIONS													
	N	P	R THREAD	S	T	U	V	W	Y	Z THREAD	AA	BB	CC	DD
32	1/8 NPT	0.326 [8.3]	1/4 NPT	10-24	0.394 [10.0]	0.276 [7.0]	0.500 [12.7]	2.037 [51.7]	1.340 [34.0]	3/8-24 x 0.625	0.236 [6.0]	0.875 [22.2]	0.098 [2.5]	1.094 [27.8]
40	1/8 NPT	0.365 [9.3]	1/4 NPT	10-24	0.394 [10.0]	0.276 [7.0]	0.500 [12.7]	2.363 [60.0]	1.420 [36.1]	3/8-24 x 0.625	0.236 [6.0]	0.875 [22.2]	0.175 [4.4]	1.094 [27.8]
50	1/4 NPT	0.476 [12.1]	1/4 NPT	1/4-20	0.394 [10.0]	0.315 [8.0]	0.625 [15.9]	2.795 [71.0]	1.600 [40.6]	1/2-20 x 0.750	0.236 [6.0]	0.875 [22.2]	0.108 [2.7]	1.094 [27.8]

DIMENSIONS IN [] ARE mm

All dimensions are reference only unless specifically toleranced.

DIMENSIONS: SERIES BCT2 NEEDLE CYLINDER



BORE	DIMENSIONS												
	A	B	C	D1	D2	E	F	G	H	J	K	L	M
32	1.856 [47.1]	0.751 [19.1]	1.250 [31.8]	0.750 [19.1]	0.625 [15.9]	1.870 [47.5]	1.339 [34.0]	0.437 [11.1]	0.330 [8.4]	1.224 [31.1]	0.375 [9.5]	0.394 [10.0]	0.394 [10.0]
40	1.856 [47.1]	0.751 [19.1]	1.250 [31.8]	0.750 [19.1]	0.625 [15.9]	2.205 [56.0]	1.574 [40.0]	0.437 [11.1]	0.330 [8.4]	1.148 [29.2]	0.375 [9.5]	0.394 [10.0]	0.394 [10.0]
50	2.036 [51.7]	0.666 [16.9]	1.250 [31.8]	0.750 [19.1]	0.750 [19.1]	2.598 [66.0]	1.968 [50.0]	0.437 [11.1]	0.330 [8.4]	1.292 [32.8]	0.375 [9.5]	0.470 [11.9]	0.470 [11.9]

BORE	DIMENSIONS												
	N	P	R THREAD	S	T	U	V	W	Y	Z THREAD	AA	BB	CC
32	1/8 NPT	0.326 [8.3]	1/4 NPT	10-24	0.632 [16.1]	0.276 [7.0]	0.500 [12.7]	2.037 [51.7]	1.340 [34.0]	3/8-24 x 0.625	0.236 [6.0]	0.702 [17.8]	0.098 [2.5]
40	1/8 NPT	0.326 [8.3]	1/4 NPT	10-24	0.632 [16.1]	0.276 [7.0]	0.500 [12.7]	2.363 [60.0]	1.420 [36.1]	3/8-24 x 0.625	0.236 [6.0]	0.702 [17.8]	0.098 [2.5]
50	1/4 NPT	0.476 [12.1]	1/4 NPT	1/4-20	0.632 [16.1]	0.315 [8.0]	0.625 [15.9]	2.795 [71.0]	1.600 [40.6]	1/2-20 x 0.750	0.236 [6.0]	0.702 [17.8]	0.067 [1.7]

DIMENSIONS IN [] ARE mm

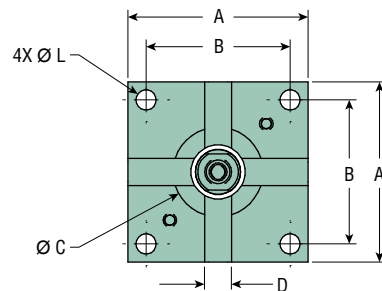
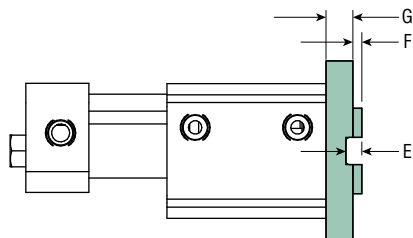
All dimensions are reference only unless specifically toleranced.

OPTIONS: SERIES BCT NEEDLE CYLINDER

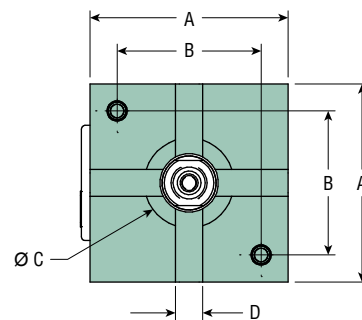
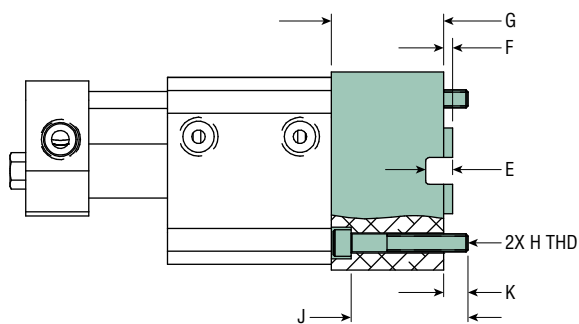
W1 ATTACHED MOUNTING FLANGE OPTION 2" x 2" HOLE PATTERN

This option attaches a mount plate with a 2" x 2" mounting hole pattern to the cylinder and includes all fasteners. For Ø 32 and Ø 50 bore sizes only.

BCTx-1-32



BCTx-1-50



BORE	DIMENSIONS										
	A	B	C	D	E	F	G	H THD	J	K	L
32	2.500 [63.5]	2.000 [50.8]	1.247 [31.7]	0.375 [9.5]	0.224 [5.7]	0.125 [3.2]	0.375 [9.5]	— —	— —	— —	0.281 [7.1]
50	2.750 [69.9]	2.000 [50.8]	1.247 [31.7]	0.375 [9.5]	0.375 [9.5]	0.125 [3.2]	1.562 [39.7]	1/4-20 1/4-20	1.625 [41.3]	0.338 [8.6]	— —

DIMENSIONS IN [] ARE mm

All dimensions are reference only unless specifically toleranced.

OPTIONS: SERIES BCT NEEDLE CYLINDER

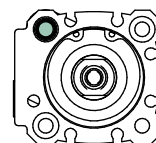
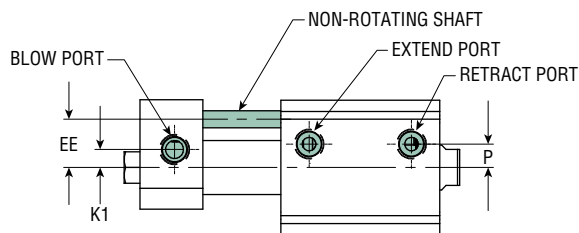
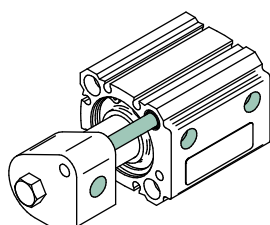
H96 MIRROR PORT AND NON-ROTATING SHAFT OPTION

This option mirrors the ports and non-rotating shaft over the centerline of the cylinder to allow for additional machine clearance in some instances.

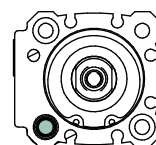
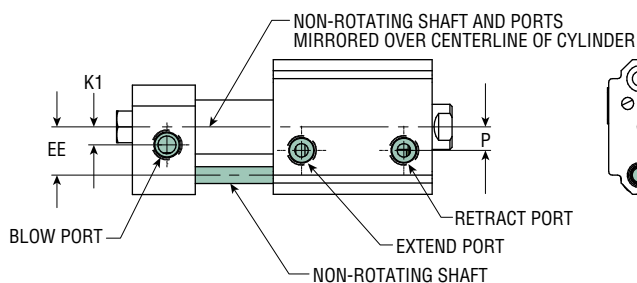
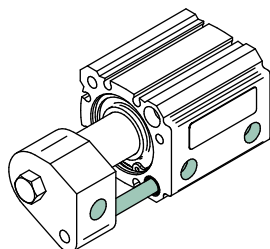
BORE	DIMENSIONS		
	K1	P	EE
32	0.250 [6.4]	0.326 [8.3]	0.579 [14.7]
40	0.349 [8.9]	0.365 [9.3]	0.600 [15.2]
50	0.438 [11.1]	0.476 [12.1]	0.626 [15.9]

DIMENSIONS IN [] ARE mm

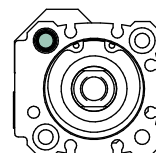
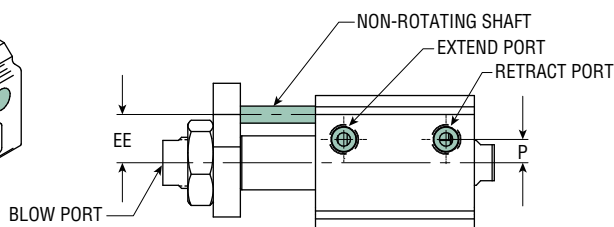
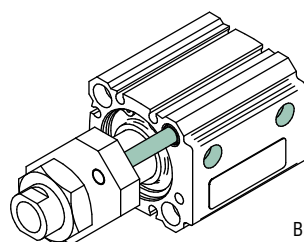
BCT1 STANDARD UNIT



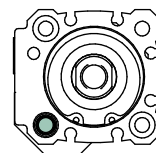
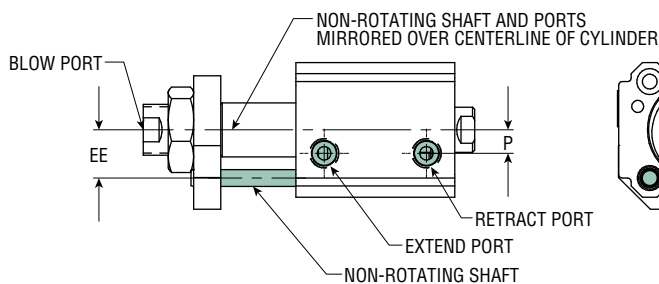
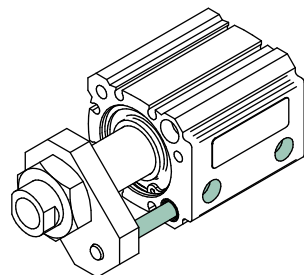
BCT1 -H96 OPTION



BCT2 STANDARD UNIT



BCT2 -H96 OPTION

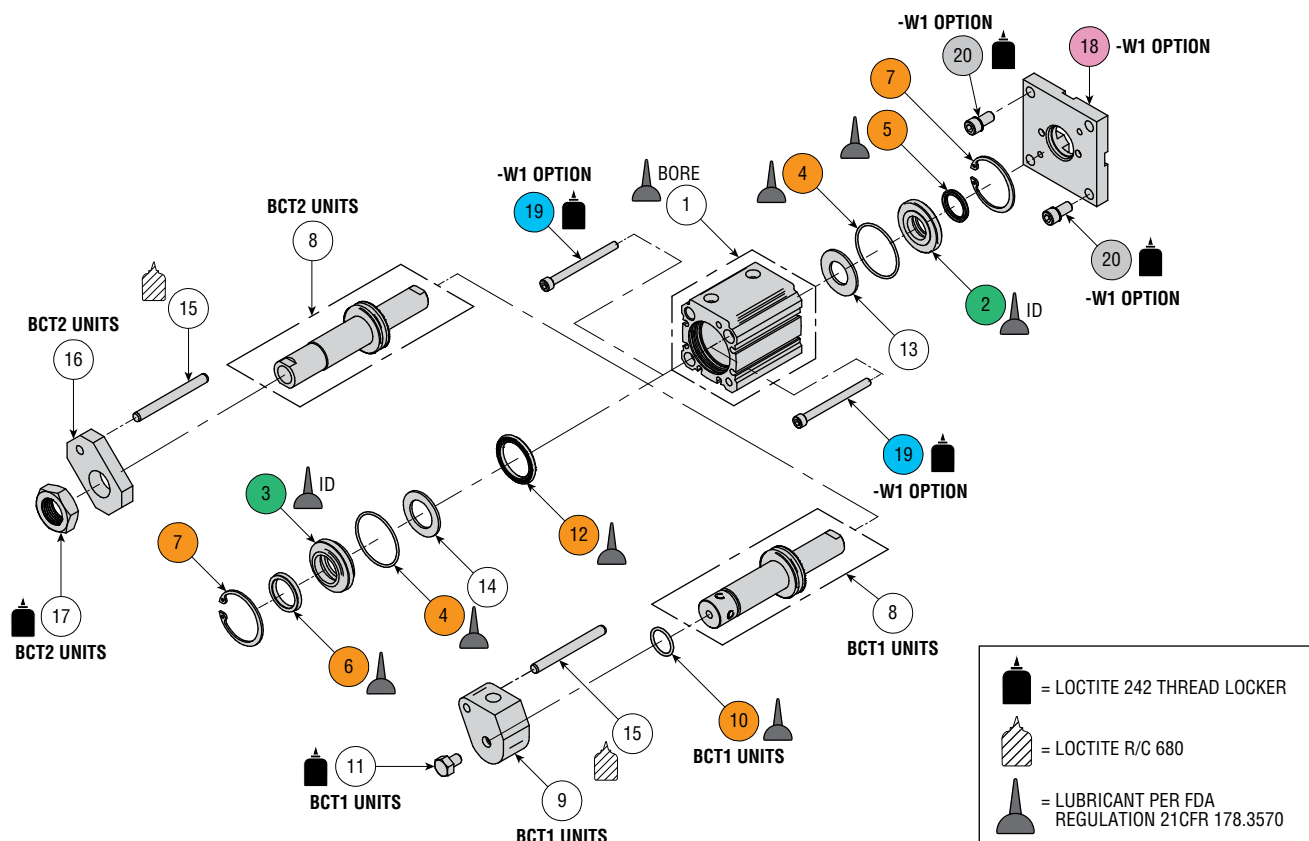


BORE	DIMENSIONS	
	P	EE
32	0.326 [8.3]	0.579 [14.7]
40	0.365 [9.3]	0.600 [15.2]
50	0.476 [12.1]	0.626 [15.9]

DIMENSIONS IN [] ARE mm

All dimensions are reference only unless specifically toleranced.

PARTS LIST & REPAIR KITS: SERIES BCT NEEDLE CYLINDER



KEY	PART DESCRIPTION	32 mm	40 mm	50 mm
1	Body Assembly	Full unit description and -H2400		
2	Outlet Rod Bushing	74049	73872	73873
3	Inlet Rod Bushing	88457	88519	73873
4	O-Ring Seal	3642-027-1	3642-028-1	3642-029-1
5	Outlet Rod Seal	18521-016	18521-016	18521-007
6	Inlet Rod Seal	18521-007	18521-007	18521-007
7	Retaining Ring	1987-073	1987-079	1987-085
8	Piston and Rod Assembly	Full unit description and -H1000		
9	Manifold	Full unit description and -H6400		
10	O-Ring Seal	1950-016-1	1950-016-1	1950-016-1
11	Hex Head Bolt	57021-025	57021-025	57021-025
12	Piston Seal	74042-008	74042-009	74042-010
13	Outlet Shock Pad	74029	74029	74030
14	Inlet Shock Pad	88452	88452	74030
15	Non-Rotating Shaft	17831-102	17831-102	17831-102
16	Non-Rotating Plate	88458	86738	86739
17	Nut	3204-084	3204-084	3204-084
18	Flange	Sold as part of Flange Kit		
19	Cylinder to Flange SHCS	Sold as part of Flange Kit		
20	Flange Mounting SHCS	Sold as part of Flange Kit		

KIT DESCRIPTION	KIT NUMBER	COLOR CODE*
Seal Kit	Full unit description and -H9000	
Repair Kit	Full unit description and -H9010	

* Color code designates parts to be included in kit

32 mm Bore Flange Kit

KIT DESCRIPTION	KIT NUMBER	COLOR CODE*
-W1 Option	Full unit description and -H2000	

* Color code designates parts to be included in kit

50 mm Bore Flange Kit

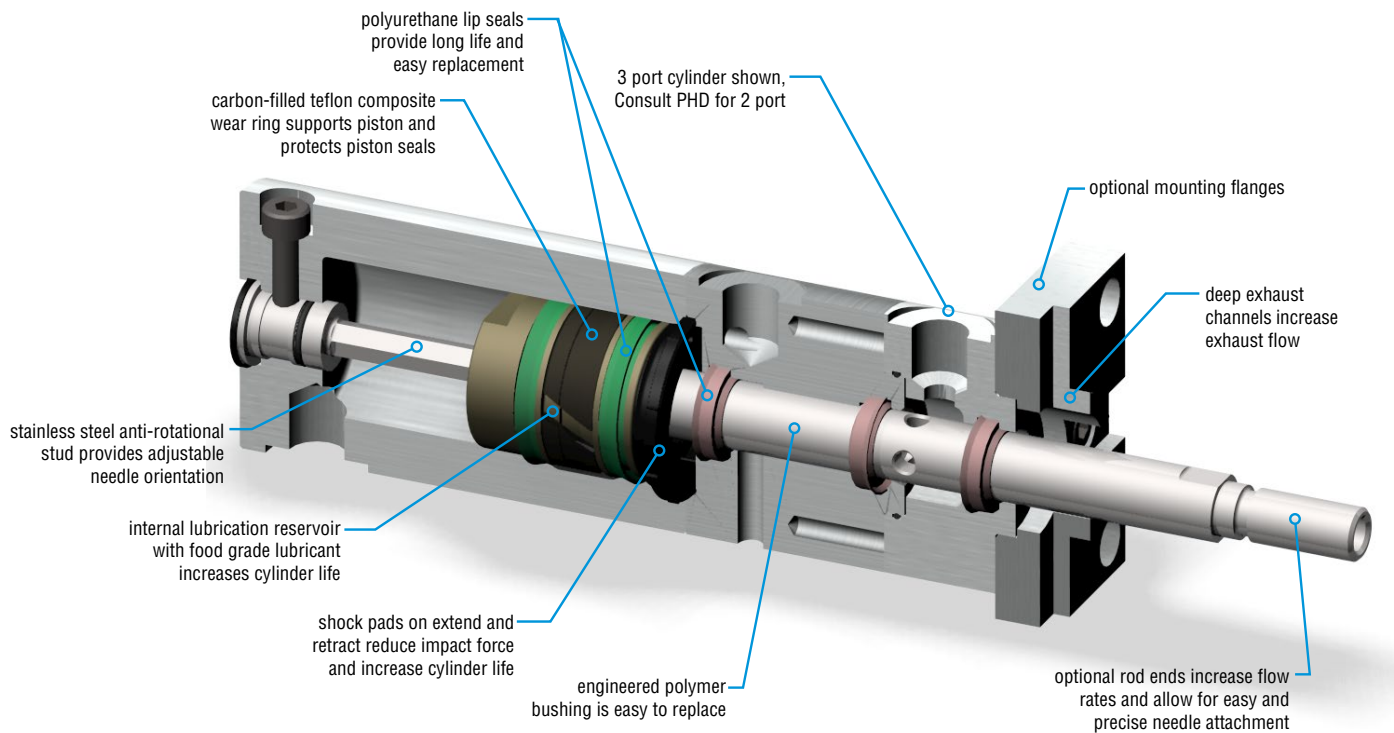
KIT DESCRIPTION	KIT NUMBER	COLOR CODE*
-W1 Option	Full unit description and -H2000	

* Color code designates parts to be included in kit

Needle Cylinder

Major Benefits

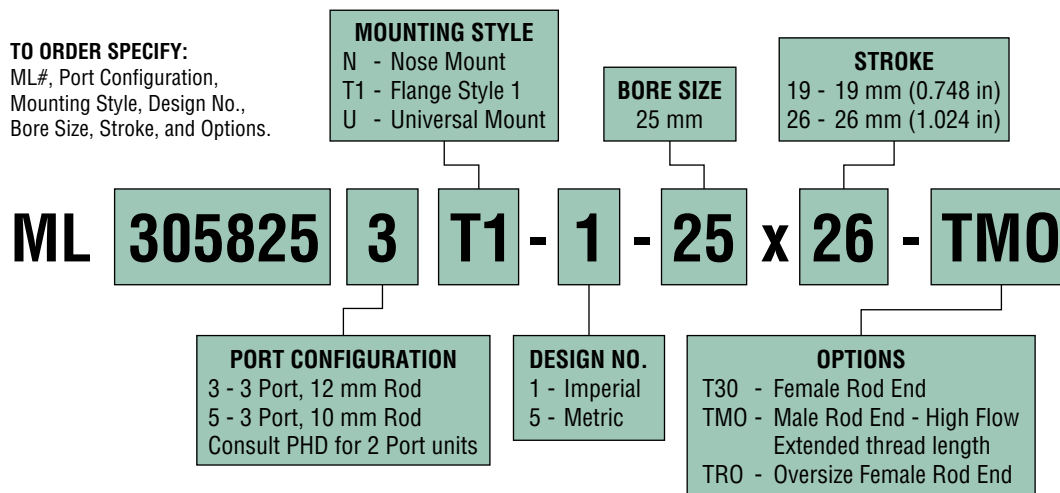
- Direct replacement for continuous extrusion blow molding needle cylinders.
- Provides significantly longer life and reduces maintenance and downtime.
- Internal needle orientation stud provides anti-rotational movement and allows the needle to be infinitely adjustable without increasing package length.
- Unique modular design provides a variety of design configurations without sacrificing delivery and price.
- Male rod ends have piloted ends to reduce concentricity issues with attached needles.
- Consult PHD for other custom needle cylinders and blow molding actuators to meet your automation requirements.



ORDERING DATA: SERIES BCN NEEDLE CYLINDER

TO ORDER SPECIFY:

ML#, Port Configuration,
Mounting Style, Design No.,
Bore Size, Stroke, and Options.



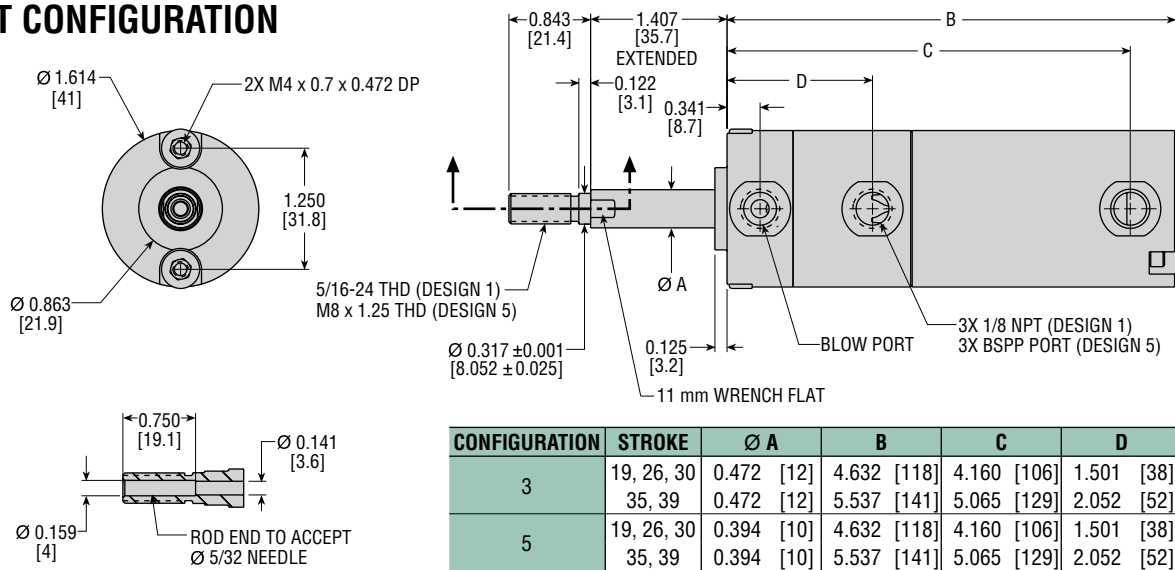
Other configurations are available. Contact PHD for options.

ENGINEERING DATA: SERIES BCN NEEDLE CYLINDER

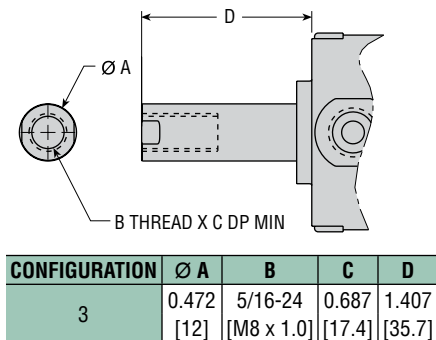
SPECIFICATIONS	IMPERIAL (1)	METRIC (5)
TYPE	Blow Mold Needle Cylinder	
SERIES	BCN	
BORE SIZE	0.984 in	25 mm
BORE AREA	0.761 in ²	4.91 cm ²
THEORETICAL OUTPUT	66.2 lb @ 87 psi	294.5 N @ 6 bar
OPERATION	Double Acting	
OPERATING PRESSURE RANGE	7.5 - 150 psi	0.5 - 10 bar
AMBIENT TEMPERATURE	-18.4° to 176° F	-28° to 80° C
LUBRICATION; FOOD GRADE	FDA Regulation 21CFR 178.3570	
PORT SIZE	1/8 NPT [1/8 BSPP]	
STROKE TOLERANCE	+0.059/-0.000	+1.5/-0.000
WEIGHT @ 25 mm STROKE	1.1 lb	0.50 kg
BUMPERS	Polyurethane, Extend, and Retract	
HEAD	Anodized Aluminum	
CYLINDER BODY	Anodized Aluminum	
PISTON ROD	Chrome Plated Stainless Steel	
ROD BEARING	Engineered Polymer	
PISTON & ROD SEALS	Polyurethane	
PISTON	Hardcoated PTFE Aluminum	

DIMENSIONS: SERIES BCN NEEDLE CYLINDER

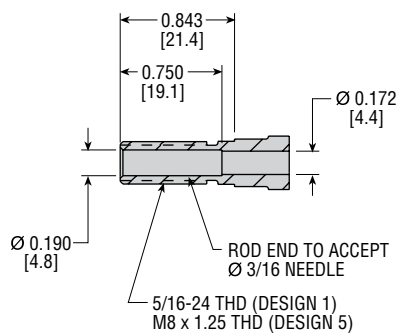
3 PORT CONFIGURATION



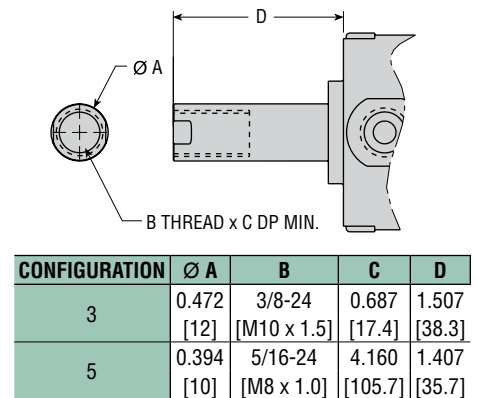
T30 - Female Rod End



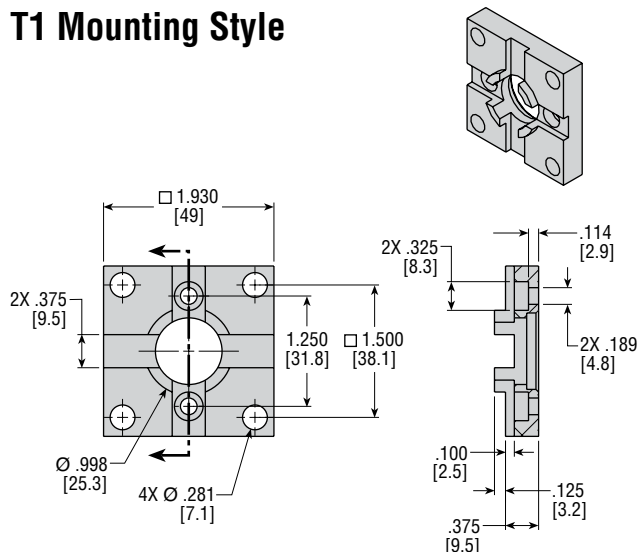
TMO - High Flow Male Rod End



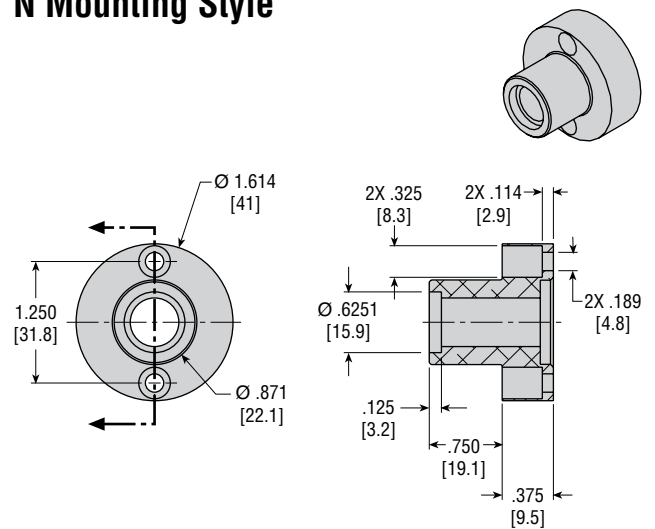
TR0 - Oversize Female Rod End



T1 Mounting Style



N Mounting Style



All dimensions are reference only unless specifically tolerated.



More needle & knockout actuators are available.

PHD has designed direct replacements for various continuous extrusion blow molding needle and knockout cylinders.

In addition, PHD offers the service of our Unlimited Unique Solutions group. With Unique Solutions, we have the ability to design specific needle and knockout cylinder replacements that will fit your particular machine. Benefits include significantly longer life and reduced maintenance and downtime. PHD unique modular designs provide a variety of configurations without sacrificing delivery or price.

PHD needle cylinders offer an internal needle orientation stud which provides anti-rotational movement and allows the needle to be infinitely adjustable without increasing package length.

Male rod ends have piloted ends to reduce concentricity issues with attached needles.

Optimized mold-mounted knockout cylinder designs meet your unique needs while eliminating mechanical or machine mounted knockouts, thus improving the process and product consistency.

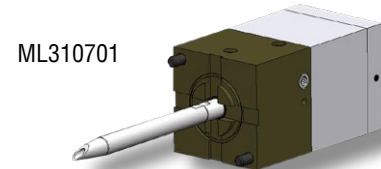
Contact PHD for more needle and knockout cylinder solutions.

- Most quotes delivered within eight working hours
- Dedicated application assistance
- 24 hours a day, 7 days a week service
- Fast delivery and competitive pricing
- CAD files available prior to ordering
- Geared towards short-run requests
- All units receive an "ML" number when ordered. This number, along with all specifications, is kept on permanent record at PHD for future reference and reorders.

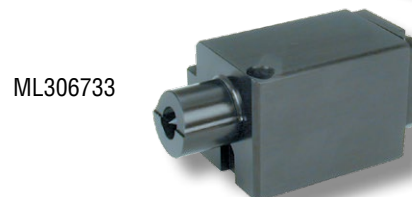


To request a free brochure, visit www.phdinc.com/resources/inforequest/

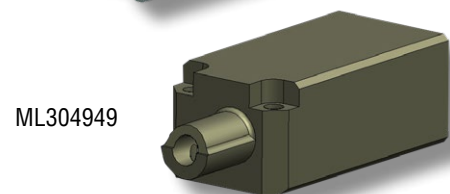
NEEDLE



ML310701



ML306733



ML304949

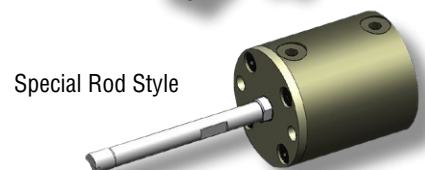
KNOCKOUT



PHD Series CV Style



PHD Series AV Style



Special Rod Style

Rebuild Program

REBUILD REPAIR RECYCLE

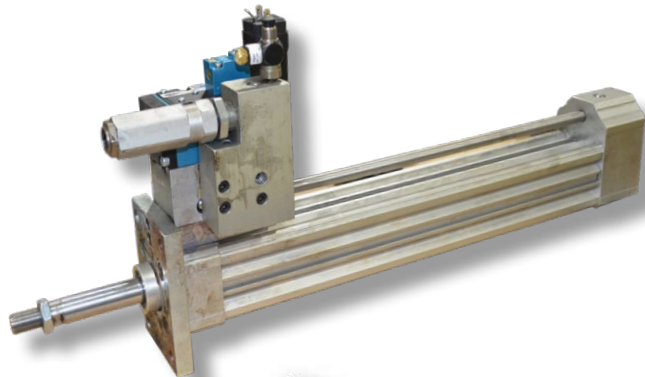
**Return your old
units for rebuilding**

**Get a 12 Month
“Like New”
Warranty**

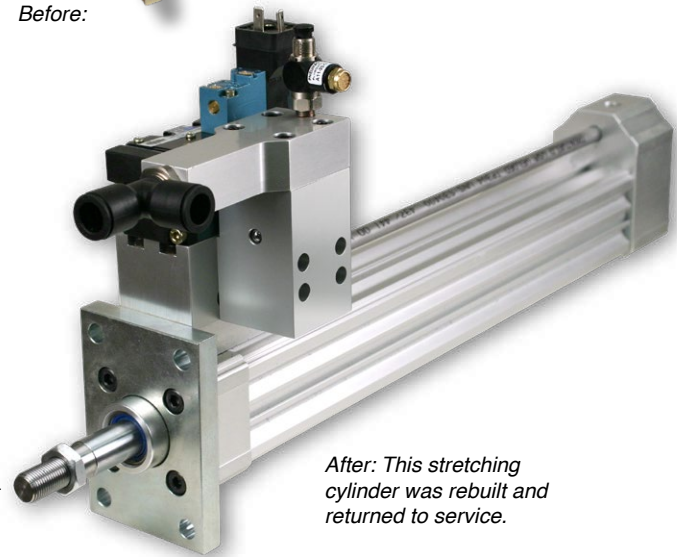
*Plastic Packaging Components such
as Stretching Cylinders, Transfer
Arms, Blow Nozzles, Filler Cylinders,
Slip Sheet Grippers, and Eject Slides
are rebuildable.*

REBUILD IT YOURSELF OR ALLOW PHD?

PHD's rebuild program can save your facility training, additional work load, possible tool requirements, and facility space to perform the rebuilds. In addition, you will receive a 12 month “like new” warranty.



Before:



*After: This stretching
cylinder was rebuilt and
returned to service.*

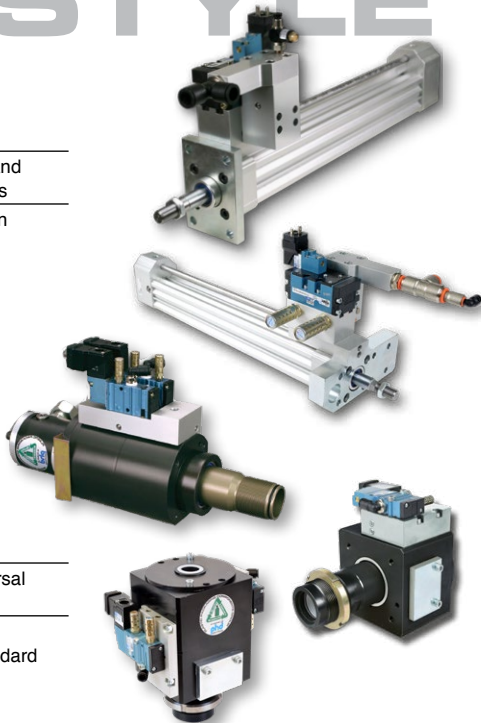
- ➔ PHD's Rebuild Program refurbishes your existing PHD products with all new wear items.
- ➔ Rebuilt units offer the same PHD quality that you're used to, but for a fraction of the cost of a new unit, reducing your total cost of ownership.
- ➔ Rebuilt units are placed back into service, thus reducing your total cost and saving valuable components from scrap.
- ➔ All PHD factory rebuilt units receive a 12 month “like new” warranty.

OTHER SOLUTIONS

'S' STYLE

BCS Stretching Cylinders

'S' Style Series1, Series2, and Universal spare components
X27 PHD check valve option

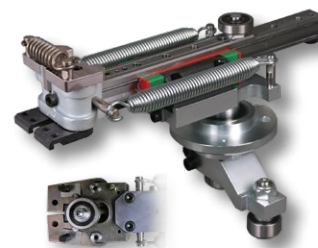


BCZ Nozzle Cylinders

'S' Style Series2 and Universal spare components
Valve manifold assembled to cylinder available as standard

BST1 Transfer Arm

'S' Style Series1 spare component
Significantly more robust and precise than other transfer arms
Designed to operate over 20 million cycles



BST Transfer Arm Preferential Head

BST2 Transfer Arm

'S' Style Series2 spare component
Vertical height adjustment eliminates need for shims
Designed to operate over 20 million cycles



Preform/Bottle Eject Slide

'S' Style Series2 spare component
Consistent preform/bottle ejection
Minimizes stress on transfer arm jaws

'K' STYLE

BCK Stretching Cylinders

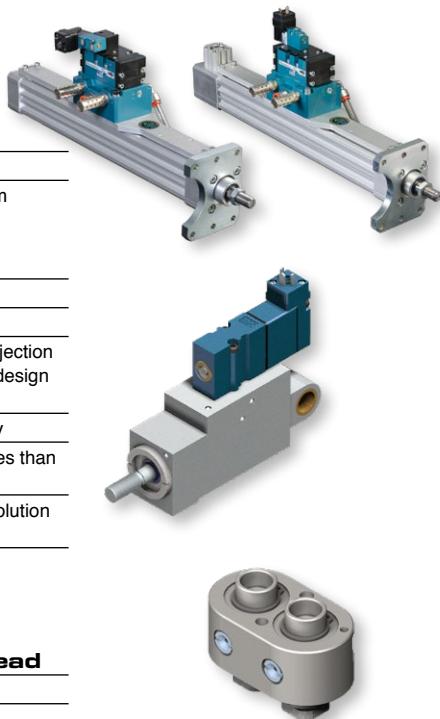
'K' Style spare components
Simplified pneumatic system

Eject Cylinders

ML309880 and ML310656
'K' Style spare components
Provides rapid repeatable ejection function due to MAC valve design and PHD cylinder.
High kinetic energy capacity
Provides faster delivery times than OEM product
In many cases lower cost solution than OEM product
Intended for high speed part rejection

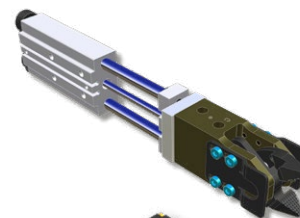
Transfer Arm Head

ML311628
'K' Style spare component



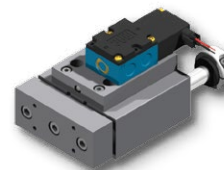
Slip Sheet Gripper

Modular assembly consisting of a clamp, slide, and transition plate
Clamp provides a wide opening so slip sheets are not missed
Quick installation and easy maintenance



Fill Line Eject Slide ML309590

Repeatable ejection
High kinetic energy capacity
Uses proven PHD thruster slide technology



Cam Follower Wheels

Competitive pricing
Longer life than OEM
Available in variety of material



To request more literature, visit
www.phdinc.com/resources/inforequest/

