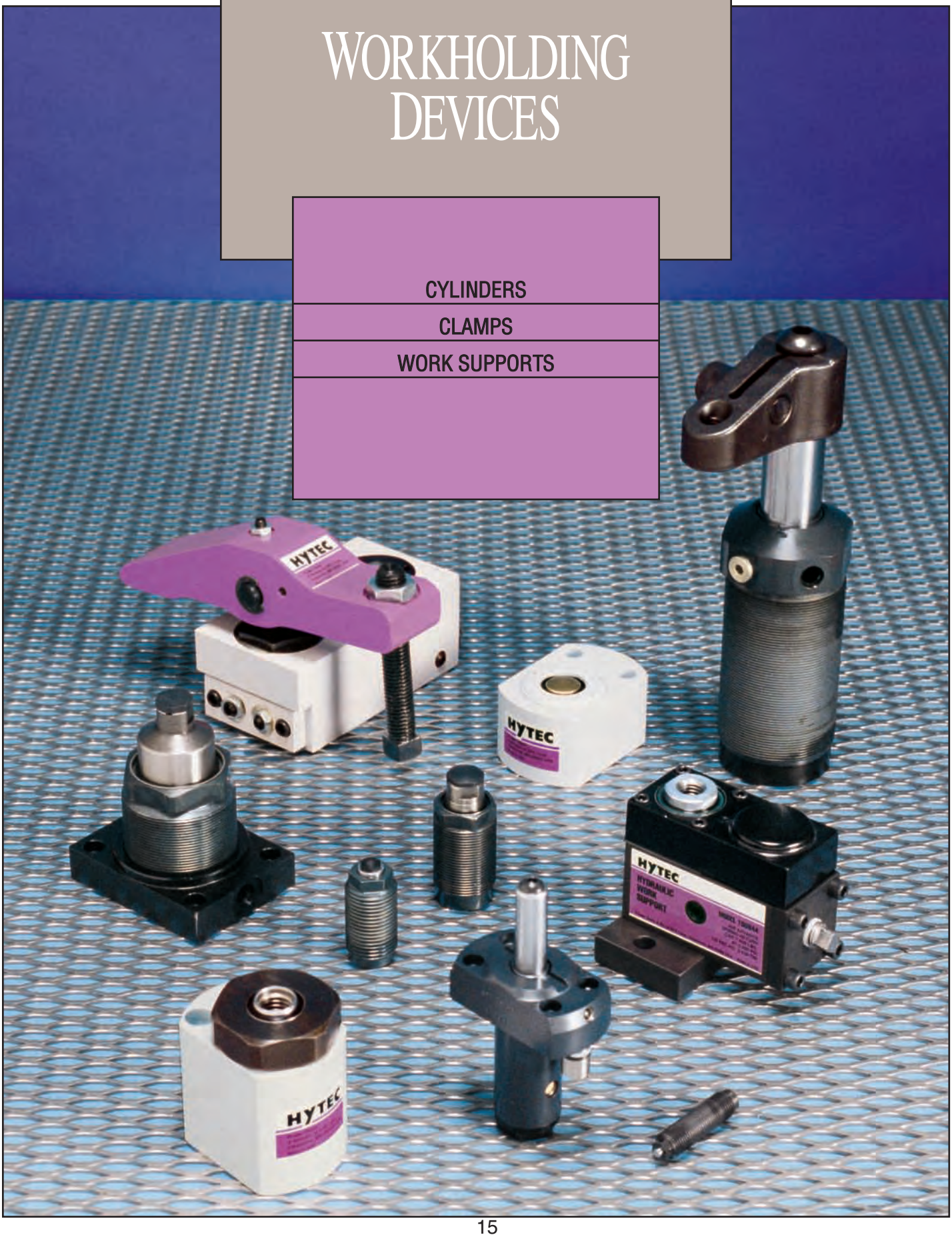
WORKHOLDING DEVICES

CYLINDERS

CLAMPS

WORK SUPPORTS



CYLINDERS

Hytec's wide variety of reliable, versatile cylinder styles makes choosing the one that's right for your job easier than ever before.

Threaded Body Cylinders

These cylinders are designed specifically to get the highest clamping force in the smallest area. Their compact size allows them to be mounted very close together or close to other components on the fixture.

Threaded body cylinders are single-acting, spring-return, and because of their versatility, can be outfitted for a wide variety of applications. Available in either Unified National Coarse or Fine threads, they're ideal for manifold mounting, but can also be used with external plumbing connections when fitted with a feeder cap. Mounting brackets and jam nuts are also available. The threaded pistons accept optional Hytec pointed or crowned threaded inserts, flat faced toggle pads, or custom designed attachments.

Cylindrical Body Cylinders

Compared to other mounting methods, these cylinders take up much less fixture space thanks to the snap ring method of securing them to the fixture.

They are double-acting only and do not contain return springs, making them perfect for applications where rapid, positive return is essential, or where both pushing and pulling forces are necessary.

Cylinder control can be simplified in certain applications by supplying one side of the cylinder with a constant air pressure source to control the return force. The other port can then be pressurized or released hydraulically as if it were a single-acting component.

New threaded piston rods make it easy to use these cylinders in a variety of applications because they can be used with Hytec threaded inserts or custom designed attachments.

Mount the cylinders by simply inserting them into a drilled hole and securing with snap rings (included). For conventionally mounted applications, the optional feeder caps have both side and end ports for plumbing variations. Or, use the manifold mounting option and mount directly on a flat surface. Optional mounting brackets are also available.

Center Hole Cylinders

One of the most common uses for this cylinder is to convert a strap clamp from manual to power operation. The nut used to create the clamping force is replaced by the center-hole cylinder, threaded right onto the stud and secured with the same nut. When the cylinder is extended, the studs tension creates clamping force just as when the nut was torqued.

Center-hole cylinders can be used as single or double-acting workholding devices. The piston return spring cavity is sealed, ported, and plugged with a breather, making it ready for use in single-acting operations. Remove the breather and connect a hydraulic or air line, and the cylinder is converted for double-acting operation.

Mounting can be done several ways: use the thru-holes for top mounting, use the tapped holes in the bottom for mounting from underneath, or secure with a single stud or rod through the center. The pistons are threaded to accept the optional crowned threaded inserts, used when the cylinder contacts the work directly.

Piston force is equal whether it's being extended or retracted, so these cylinders are ideal for pushing and pulling applications and will accept any user-designed pushing or pulling attachment. A double-acting cylinder can handle heavy attachments when a single-acting one won't.

Low Profile Cylinders

These single-acting, spring-return cylinders are designed for uses where high force and low overall height are requirements – the largest is only 2" high – making them ideal for clamping fixtures where space is limited. The crowned piston rods make them ideal for powering toggle clamps, levers, and linkages, or for directly contacting and clamping the workpiece. Cylinder bodies are specially heat treated for exceptional wear and corrosion resistance. Each cylinder has a built-in heavy-duty spring for fast return, and case hardened piston for long service life. Also you may choose from base mounted or side mounted versions.

Cartridge Pull Cylinders

Hytec's "Pull" cylinders retract when hydraulically pressurized. They were created to permit the user to design a cylinder into a fixture while maintaining the replaceability and long life of a heat treated, corrosion resistant cylinder body. Typical applications of these cylinders include installation behind fixture plates or buried in tombstones where they can supply clamping force without taking up valuable fixture space.

These pull cylinders were designed for cartridge mounting in a cavity supplied by the user. The required cavity is simply a cylindrical bore with a properly deburred pressure port intersecting it, providing the hydraulic fluid connection.

Paired with Uniforce® clamps, these cylinders will provide consistent clamping forces while taking a minimum of fixture space.

Block Style Cylinders

Hytec's block style cylinders are double-acting only and do not contain return springs, making them perfect for applications where rapid positive return is essential or where both pushing and pulling forces are required.

Now, more applications are possible thanks to the new threaded piston rods. Hytec threaded inserts or any custom-designed attachments may be used.

The simplest to mount – from either top or bottom – these cylinders require only a flat surface with a bolt hole. A locating hole in the bottom can be used to prevent rotation when necessary.

Cylinder control can be simplified in certain applications by supplying one side of the cylinder with a constant air pressure source to supply the return force. The other port of the cylinder can then be pressurized and released as if it were single-acting.

NOTE: For longest service life, all single acting cylinder applications should be designed to use 75% (or less) of the available stroke.

Threaded Body Cylinders

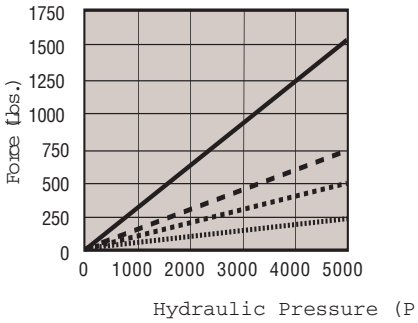
SPX HYTEC

Our most versatile cylinder style, these threaded body cylinders are single-acting, spring-return, and can be outfitted for a wide variety of applications. Available in either Unified National Coarse or Fine threads, they're ideal for manifold mounting, but can also be used for external plumbing connections when fitted with a feeder cap. Mounting brackets and jam nuts can be specified for added mounting versatility. The threaded pistons will accept optional Hytec pointed or crowned threaded inserts, flat faced toggle pads, or you can custom design your own attachments. These cylinders should always be used with a threaded insert to prevent damage to the workpiece and the cylinder.

Features:

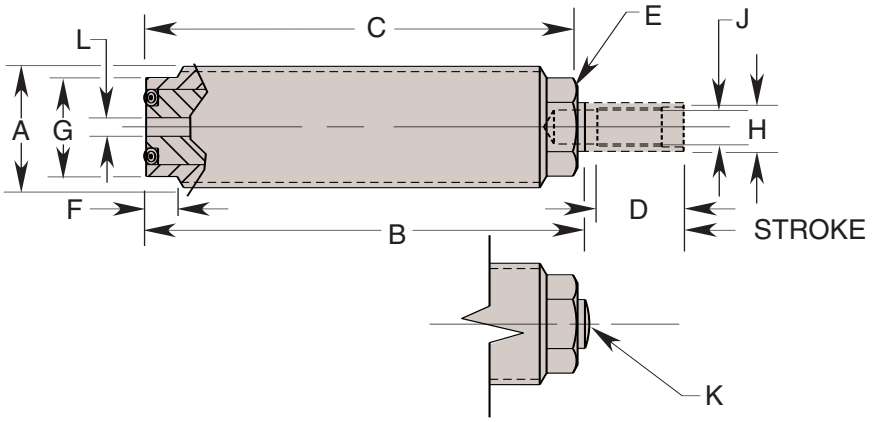
- Manifold or conventional mounting
- Heavy duty return springs
- Optional jam nuts, feeder caps and mounting brackets
- Threaded, plated piston rod
- Fine or coarse threads
- "O" ring seal included
- 100% corrosion resistant
- Single-acting
- Power-Tech treated body for long wear and corrosion resistance

Note: See page 23 for threaded inserts.



Performance

- Cylinder Nos. 100064, 100065 100156, 100157
- Cylinder Nos. 100139 100148,100159,100166
- Cylinder Nos. 100167, 100153 100149, 100171
- Cylinder Nos. 100172, 100173



Fine Thd. Body Cyls.		Coarse Thd. Body Cyls.		Specifications				Dimensions (In Inches)									
Cat. No.	A Thread Size	Cat. No.	A Thread Size	*Force (Lbs.)	Stroke (In.)	Eff. Area (Sq. in.)	Oil Cap. (Cu. in.)	B	C	D Thd. Depth	E Hex.	F	G Dia.	H Dia.	J Thread Size	K Radius	L Dia.
100156	½-20 UNF	100064	½-13 UNC	245	.250	.049	.012	1.636	1.568	—	.312	.156	.399	.156	—	.375	.062
100157		100065			.500		.024	2.042	1.974								
100159	⅝-18 UNF	100139	⅝-11 UNC	550	.250	.110	.027	1.655	1.625	.438	.438		.502	.250	10-32 UNF	—	.094
100166		100148			.500		.055	2.225	2.187								
100167	¾-16 UNF	100149	¾-10 UNC	750		.150	.075	1.756	1.718		.531	.187	.615	.300			.125
100171		100153			1.000		.150	2.475	2.437								
100172	1-12 UNF	—	—	1535	.500	.307	.153	2.005	1.937	.500	.750		.875	.500	⅝-24 UNF		.187
100173		—			1.000		.307	2.629	2.562								

NOTE: * Based on 5,000 psi max. operating pressure.

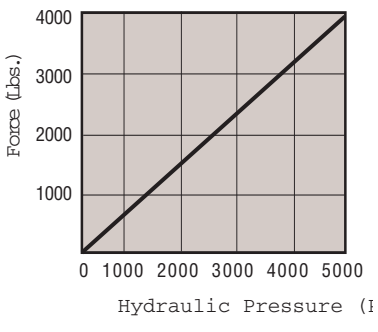
Threaded Body Cylinders

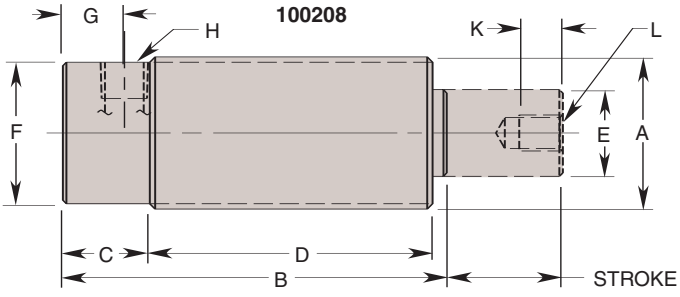
This is our highest capacity cylinder in the threaded body style. This premium grade cylinder includes a gland bearing, wiper seal, and extension style return spring. Its plated, threaded piston rod resists wear and corrosion and accepts Hytec threaded inserts or custom made attachments. The 100208 can be mounted by threading it into a tapped hole in the fixture or by inserting it into a drilled hole and locking it on both sides using two hex jam nuts (optional). This conventionally mounted 1" stroke, single-acting cylinder has a 1/8" NPT side port for making hydraulic connections. Like our smaller, threaded body cylinders, the 110132 is intended for manifold mounting and requires only a flat-bottom hole for installation.

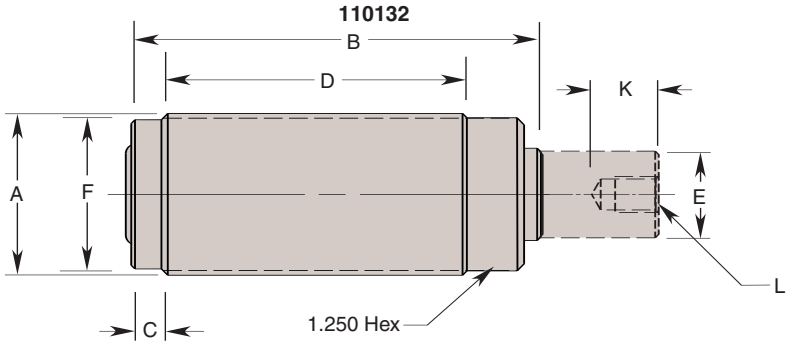
Features:

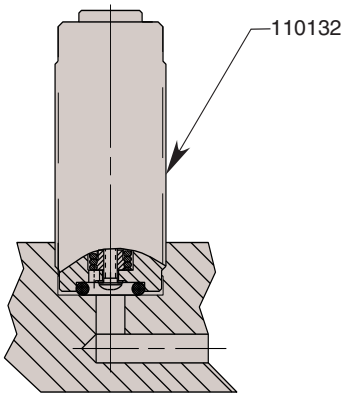
- Threaded body design
- Single-acting
- Threaded, plated piston rod
- Optional hex jam nut
- Rod wiper seal in gland bearing
- Power-Tech™ treated body for long wear and corrosion resistance

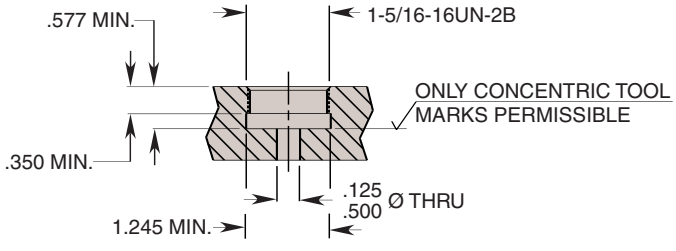
Note: See page 23 for threaded inserts.
See page 19 for jam nut.









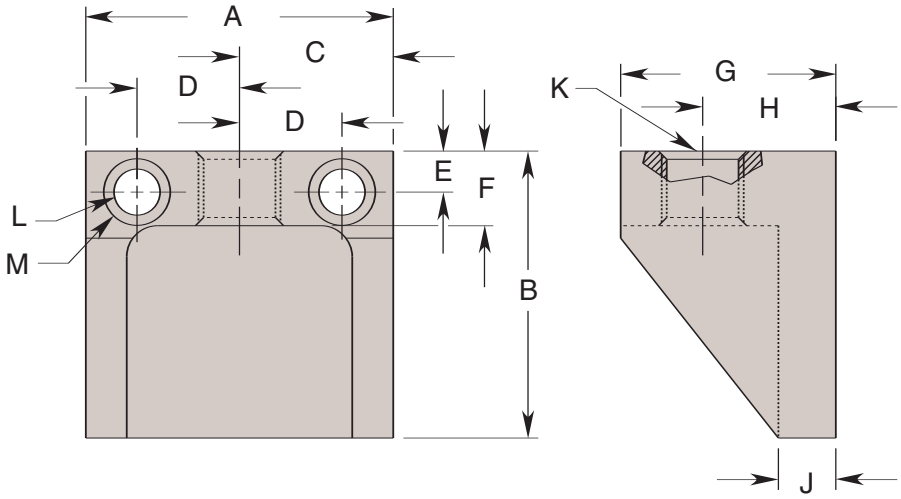


Mounting Cavity (110132)

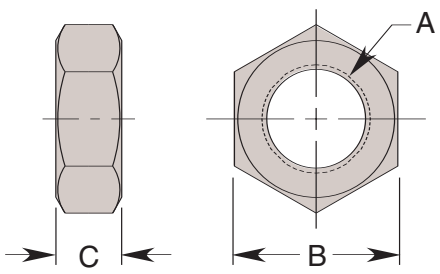
Cat. No.	Specifications				Dimensions (In Inches)									
	*Force (Lbs.)	Stroke (In.)	Eff. Area (Sq. In.)	Oil Cap. (Cu. In.)	A Thread Size	B	C	D	E Dia.	F Dia.	G	H Thread Size	K Thread Depth	L Thread Size
100208	3,927	1.000	.785	.785	1 5/16-16UN	3.312	.750	2.438	.750	1.210	.531	1/8 NPTF	.375	5/16-24 UNF
110132							.250				–	–		

NOTE: *Based on 5,000 psi max. operating pressure.

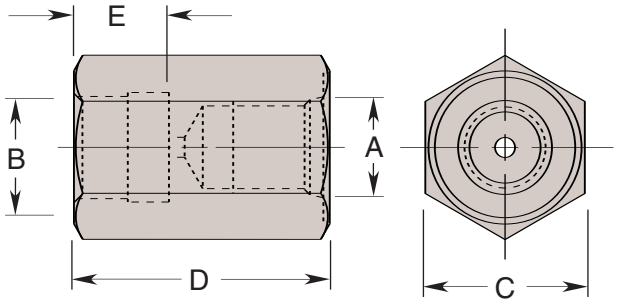
Foot Mounting Bracket



Jam Nut



Feeder Cap



FOOT MOUNTING BRACKETS

Cat. No.	Dimensions (In Inches)												
	A	B	C	D	E	F	G	H	J	K Thread Size	L Dia.	M	
												Dia.	Depth
400000	1.875	1.750	.938	.625	.250	.455	1.312	.812	.350	½-13 UNC	.281	.410	.218
400001	2.000	1.875	1.000		.312	.562	1.625	.938	.312	⅝-11 UNC	.359	.504	.406
400002		2.000		.656	.344	.687	1.687	1.062	.375	¾-10 UNC	.422	.598	.343
400003	2.500	2.500	1.250	.812	.375	.750	2.000	1.182		1-12 UNF			

JAM NUTS

Cat. No.	Dimensions (In Inches)		
	A Thread Size	B Hex.	C
10391	½-13UNC	.750	.312
10390	½-20UNF	.750	.312
10395	⅝-11UNC	.938	.375
10394	⅝-18UNF	.938	.375
10397	¾-10UNC	1.125	.422
10396	¾-16UNF	1.125	.422
201029	1-12UNF	1.500	.562
216207	1 5⁄16-16UN	2.000	.719

FEEDER CAPS

SAE Ports		NPT Ports		Dimensions (In Inches)			
Cat. No.	A Thread Size	Cat. No.	A Thread Size	B Thread Size	C Hex.	D	E
100927	7⁄16-20UNF SAE-4	500097	⅛-NTPF	½-20UNF	0.750	1.200	0.437
100928		500100		½-13UNC			
100929		500098	¼-NTPF	⅝-18UNF	0.875	1.390	0.500
100930		500101		⅝-11UNC			
100931		500099		¾-16UNF	1.000		
100932		500102		¾-10UNC			
100933		500103		1-12UNF	1.250		

NOTE: 5,000 psi max. operating pressure.

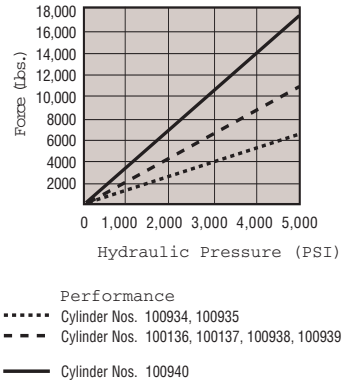
Center Hole Cylinders

Our center-hole cylinders can be used as single- or double-acting workholding devices.

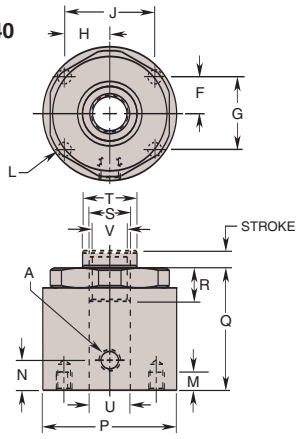
Mounting can be done in any of several ways: use the thru-holes for mounting from the top, use the tapped holes in the bottom for mounting from underneath, or secure with a single stud or rod through the center. The pistons are threaded to accept the optional crowned threaded inserts, used when the cylinder contacts the work directly.

Features:

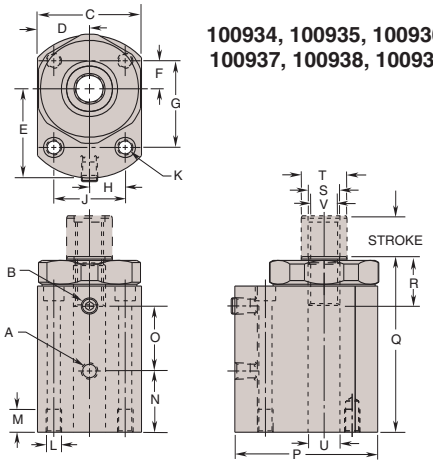
- Single- or double-acting
- Multiple mounting options
- Heavy-duty return spring
- Converts manual clamping to hydraulics
- Plated, threaded piston rods



100940



100934, 100935, 100936, 100937, 100938, 100939



SAE Ports			Specifications			
Cat. No.	A Adv. Port Thd. Size	B Ret. Port Thd. Size	* Force (Lbs.)	Stroke (In.)	Extend and Retract Eff. Area (Sq. In.)	Extend and Retract Oil Cap. (Cu. In.)
100934	7/16-20UNF SAE-4	7/16-20UNF SAE-4	6,630	.500	1.326	.663
100935				1.000		1.326
100936			10,735	.500	2.147	1.074
100937				1.000		2.147
100938				.500		1.074
100939				1.000		2.147
100940		—	17,120	.375	** 3.424	** 1.284

Cat. No.	Dimensions (In Inches)									
SAE Ports	C	D	E	F	G	H	J	K Dia.	L Thd. Size	M Thd. Depth
100934	2.000	1.000	1.750	.562	1.812	.625	1.250	.322	3/8-16UNC	.562
100935										
100936	2.550	1.275	2.188	.688	2.125	.875	1.750			
100937										
100938										
100939										
100940	–	–	–	.972	1.944	.972	1.944	–	1/4-20UNC	.312

Cat. No.	Dimensions (In Inches)								
SAE Ports	N	O	P Dia.	Q	R Piston Thd.	S Thd. Size	T Dia.	U Dia.	V Inside Dia.
100934	.938	1.000	2.812	3.203	1.000	5/8-11UNC	.750	.516	.547
100935	1.438	1.500		4.203					
100936	1.000	1.094	3.500	3.304	1.188	3/4-10UNC	1.125	.781	.656
100937	1.500	1.594		4.304					
100938	1.000	1.094		3.304	1.375	7/8-9UNC		.906	.781
100939	1.500	1.594		4.304					
100940	.756	–	3.370	3.140	1.275	1-8UNC	1.375	1.031	.875

NOTE: * Based on 5,000 psi max. operating pressure ** Extend Only

Low Profile Cylinders

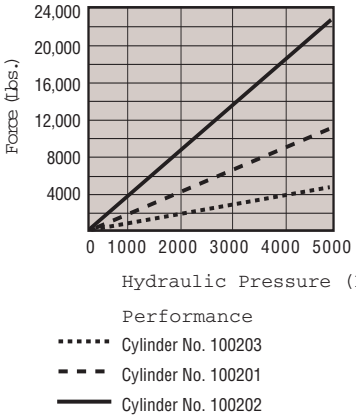
SPX HYTEC

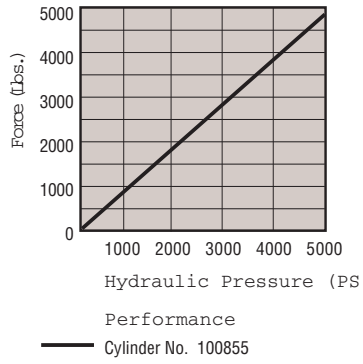
These single-acting, spring-return cylinders are designed for applications where high force and low overall height are requirements. Ideal for clamping fixtures where space is limited. The crowned piston makes them perfect for powering strap clamps, linkages or for direct contact with the workpiece. Cylinder bodies are heat treated using a special process for exceptional wear and corrosion resistance. Three sizes to choose from – the largest being only 2" high – with maximum forces ranging from 4,920 lbs. to 22,150 lbs. Each cylinder has a built-in heavy-duty spring for fast return, and case hardened piston for long service life.

The 100855 and 100925 use the same rugged design with different mounting options. Designed for side mounting, four grade 8 mounting screws can easily resist the force of the clamp so no additional stops or clamp mounting structure is necessary.

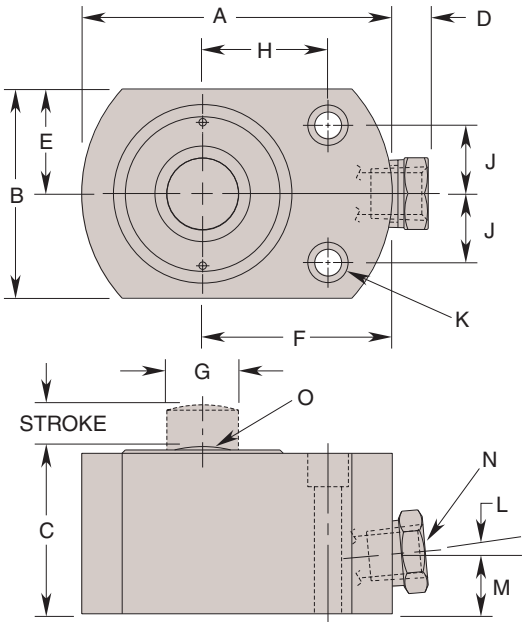
Features:

- Low overall height
- Bronze plated piston
- Piston rod wiper seal
- Heavy-duty return spring
- Heat treated and plated cylinder body
- Single-acting
- Power-Tech™ treated body for long wear and corrosion resistance

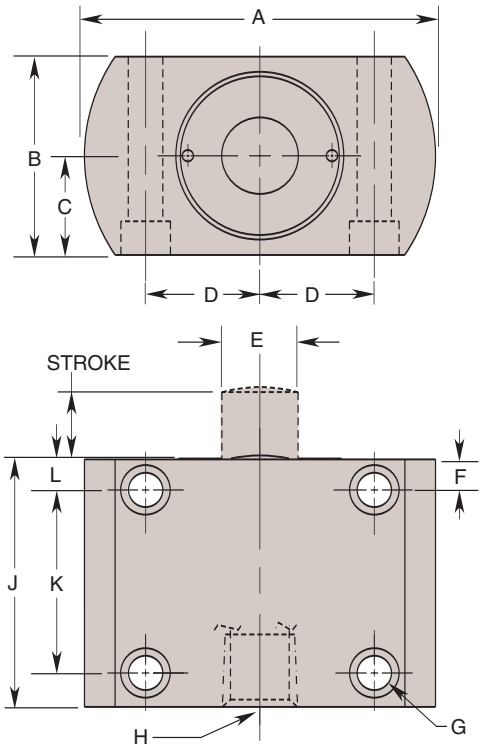




100201, 100202, 100203



100855, 100925



Cat. No.	Specifications				Dimensions (In Inches)												
	*Force (Lbs.)	Stroke (In.)	Eff. Area (Sq. In.)	Oil Cap.	A	B	C	D	E	F	G	H	J	K	L	M	N
100855	4,920	.562	.994	.620	2.875	1.625	.812	.937	.625	.250	.281	1/4 NPTF	2.062	1.500	.282	–	–
100925		.875		.870						.250			3.002			1/4 NPTF	.550

NOTE: * Based on 5,000 psi max. operating pressure.

Cat. No.	Specifications				Dimensions (In Inches)													
	*Force (Lbs.)	Stroke (In.)	Eff. Area (Sq. In.)	Oil Cap. (Cu. In.)	A Dia.	B	C	D	E	F	G Dia.	H	J	K Dia.	L Port Angle	M	N Thread Size	O Radius
100203	4,920	.562	.994	.62	2.562	1.635	1.667	.375	.812	1.750	.625	1.000	.562	.219	0°	.770	1/4 NPTF	1.150
100201	11,180	.437	2.236	1.00	3.250	2.190	1.750		1.095	1.985	.750	1.312	.718	.281	5°	.630		1.250
100202	22,150		4.430	2.00	4.000	3.000	2.000		1.500	2.270	1.125	1.560	.968	.406				1.280

NOTE: *Based on 5,000 psi max. operating pressure.

Block Style Cylinders

Hytec's block style cylinders are double-acting only and do not contain return springs, making them perfect for applications where rapid positive return is essential or where both pushing and pulling forces are required.

Now, more applications are possible thanks to the new threaded piston rods. Hytec threaded inserts or any custom-designed attachments may be used.

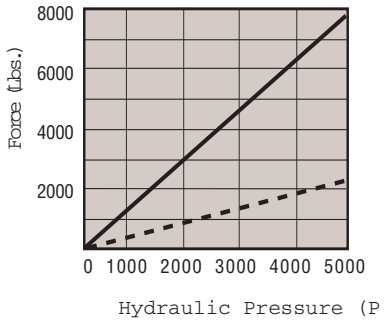
The cylinders can be mounted from top or bottom using a single cap screw and either the thru-hole on the top or the tapped hole in the bottom. A locating hole in the bottom can be used to prevent rotation when necessary.

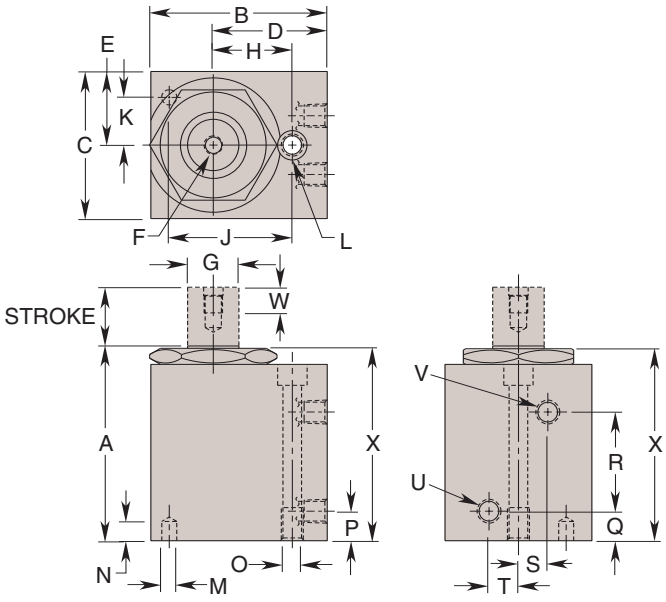
Cylinder control can be simplified in certain applications by supplying one side of the cylinder with a constant air pressure source to supply the return force. The other port of the cylinder can then be pressurized and released as if it were single-acting.

Features:

- Threaded, plated piston rod
- Double-acting
- Single screw mounting
- Piston threads withstand full retract forces.

Note: See page 23 for threaded inserts.



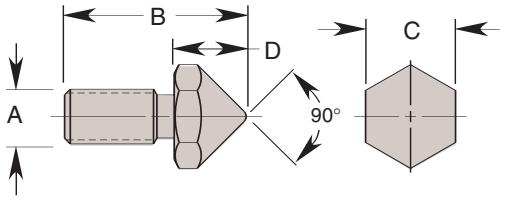


Cat. No.	Specifications							Dimensions (In Inches)													
	*Force (Lbs.)		Stroke (In.)	Eff. Area (Sq. in.)		Oil Cap. (Cu. In.)		A	B	C	D	E	F Thread Size	G Dia.	H	J	K	L Dia.	M Dia.	N	O Thread Size
	Adv.	Ret.		Adv.	Ret.		Ret.														
100055B	2210	1225	.500	.442	.245	.221	.123	2.312	2.500	1.500	1.844	.750	5/16-24 UNF	.500	1.094	1.490	.500	.257	.257	.328	5/16-18 UNC
100056B	2210	1225	1.000	.442	.245	.442	.245	2.812	2.500	1.500	1.844	.750	5/16-24 UNF	.500	1.094	1.490	.500	.257	.257	.328	5/16-18 UNC
100061B	7425	4415	.500	1.485	.883	.742	.442	2.812	3.000	2.500	1.938	1.250	5/16-24 UNF	.875	1.344	2.094	.812	.312	.257	.328	3/8-16 UNC
100062B	7425	4415	1.000	1.485	.883	1.485	.883	3.312	3.000	2.500	1.938	1.250	5/16-24 UNF	.875	1.344	2.094	.812	.312	.257	.328	3/8-16 UNC

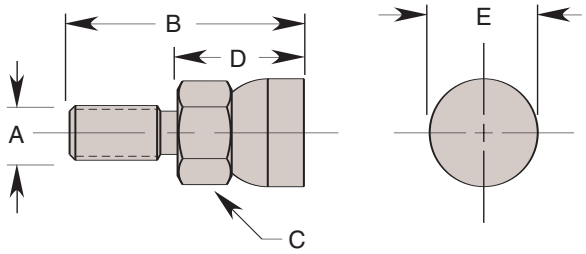
Cat. No.	Dimensions (In Inches)								
	P Min.	Q	R	S	T	U Advance Port	V Retract Port	W Thread Depth	X (REF)
100055B	.500	.375	1.000	.344	.344	1/8-NPTF	1/8-NPTF	.438	2.23
100056B	.500	.375	1.500	.344	.344	1/8-NPTF	1/8-NPTF	.438	2.73
100061B	.625	.500	1.188	.500	.500	1/8-NPTF	1/8-NPTF	.438	2.76
100062B	.625	.500	1.688	.500	.500	1/8-NPTF	1/8-NPTF	.438	3.26

NOTE: * Based on 5,000 psi max. operating pressure

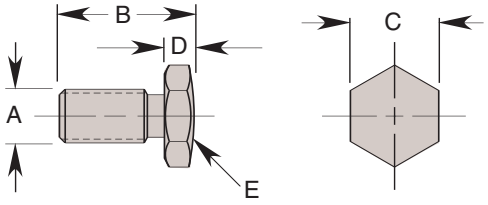
Pointed Threaded Insert
(500161, 500164)



Toggle Pad Threaded Insert
(500162, 500165)



Crowned Threaded Insert
(500160, 500163, 201884)

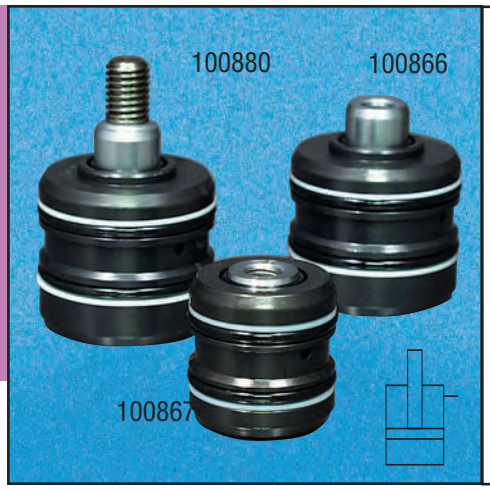


POINTED THREADED INSERTS					
Cat. No.	Dimensions (In Inches)				
	Used With Cat. No.	A Thread Size	B	C Hex.	D
500161	100139, 100148, 100149, 100153, 100159, 100166, 100167, 100171	10-32 UNF	.630	.312	.250
500164	100172, 100173, 100208, 100043B, 100044B, 100049B, 100050B, 100055B, 100056B, 100061B, 100062B	5/16-24 UNF	.630	.375	.250

TOGGLE PAD THREADED INSERTS						
Cat. No.	Dimensions (In Inches)					
	Used With Cat. No.	A Thread Size	B	C Hex.	D	E Dia.
500162	100139, 100148, 100149, 100153, 100159, 100166, 100167, 100171	10-32 UNF	.812	.312	.438	.375
500165	100172, 100173, 100208, 100043B, 100044B, 100049B, 100050B, 100055B, 100056B, 100061B, 100062B	5/16-24 UNF	1.156	.563	.750	.688

CROWNED THREADED INSERTS						
Cat. No.	Dimensions (In Inches)					
	Used With Cat. No.	A Thread Size	B	C Hex.	D	E Radius
500160	100139, 100148, 100149, 100153, 100159, 100166, 100167, 100171	10-32 UNF	.480	.312	.100	.875
500163	100172, 100173, 100208, 100043B, 100044B, 100049B, 100050B, 100055B, 100056B, 100061B, 100062B	5/16-24 UNF	.480	.375	.100	.875
201884	100226, 100141, 100844, 100847, 100926	1/2-13 UNC	1.315	.750	.190	1.500

Cartridge Pull Cylinders

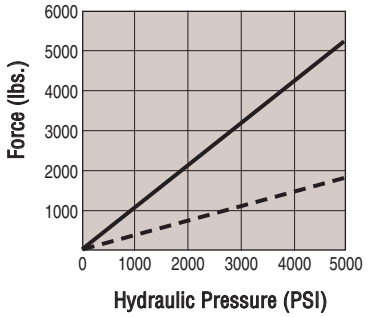


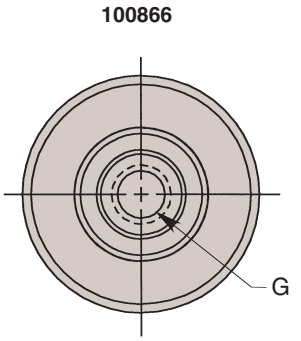
These "Pull" cylinders retract when hydraulically pressurized. They were created to permit the user to design a cylinder into a fixture while maintaining the replaceability and long life of a heat treated, corrosion resistant cylinder body. Typical applications of these cylinders include installation behind fixture plates or buried in tombstones where they can supply clamping force without taking up valuable fixture space.

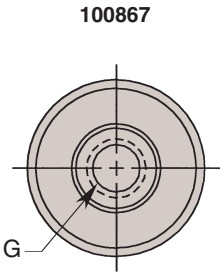
These pull cylinders were designed for cartridge mounting in a cavity supplied by the user. The required cavity is simply a cylindrical bore with a properly deburred pressure port intersecting it, providing the hydraulic fluid connection. They are for single acting systems only where the force for cylinder return (extension) is supplied manually or through a spring designed into the application by the user. A return spring that can be built into the application is available.
(No. 251549 Order Separately)

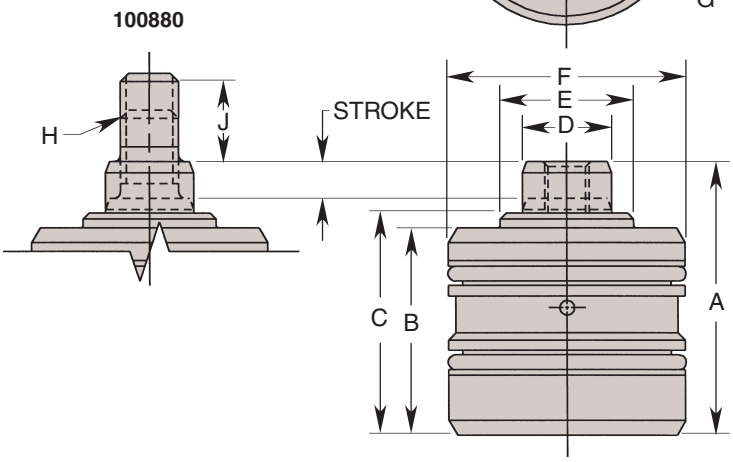
Features:

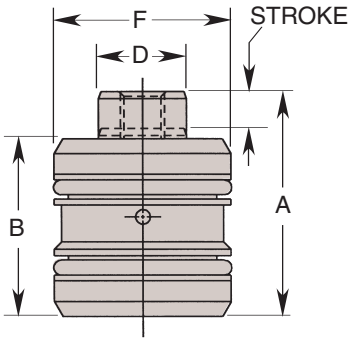
- Compact design
- Manifold mounting eliminates tubing
- Threaded, plated piston rod
- Power-Tech™ treated body for long wear and corrosion resistance
- 5,000 psi maximum pressure rate
- Rod wiper to exclude contaminants
- Single-Acting







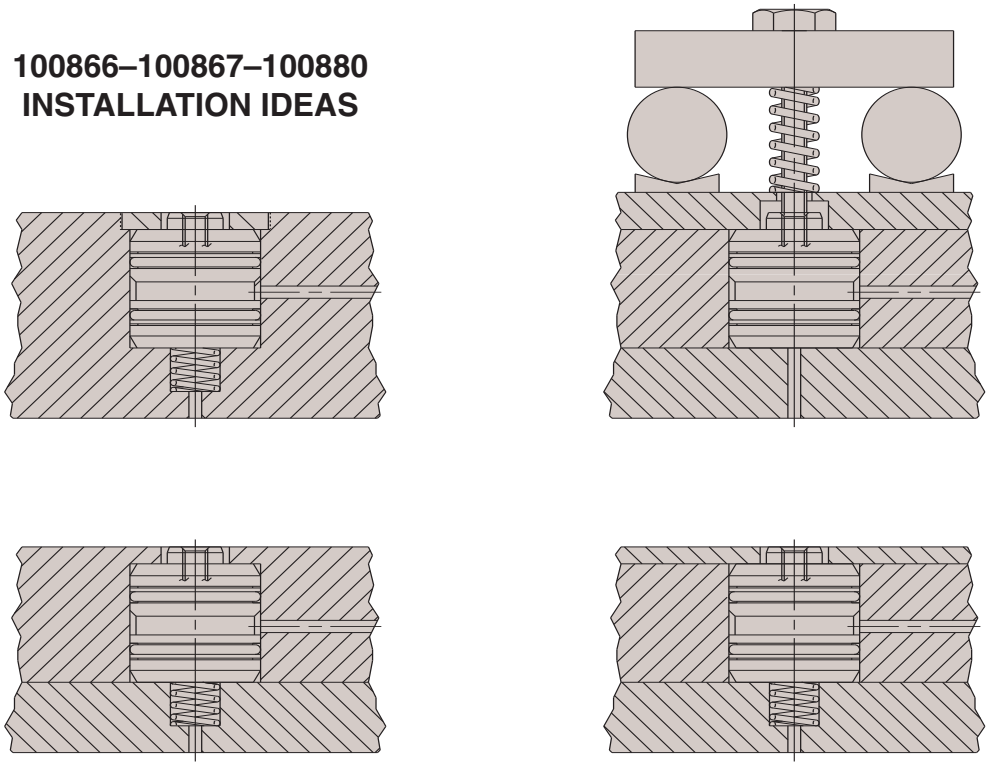




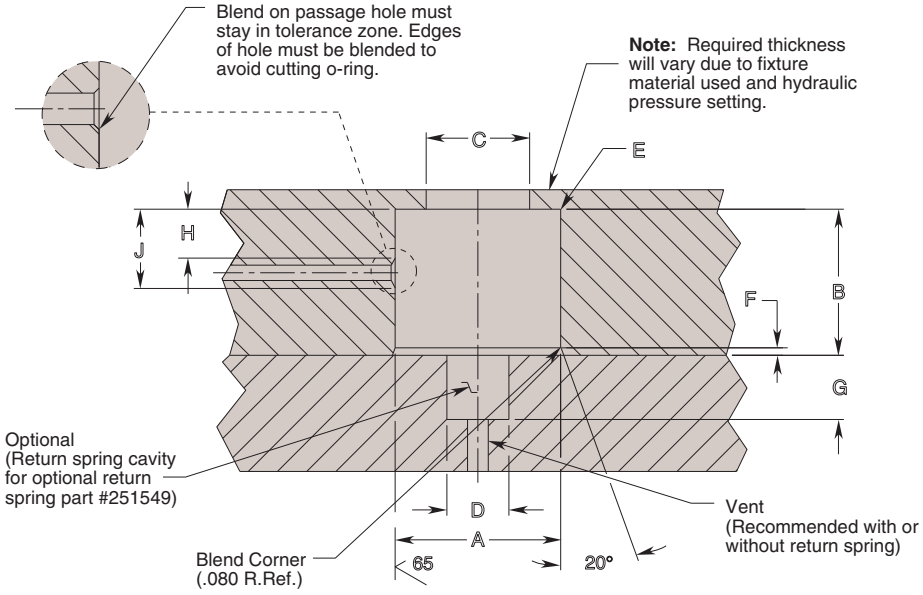
Cat. No.	Specifications				Dimensions (In Inches)									
	*Force (Lbs.)	Stroke (in.)	Eff. Area (Sq. In.)	Oil Cap. (Cu. In.)	A	B	C	D Dia.	E Dia.	F Dia.	G Thread Size	G Thread Depth	H Thread Size	J
100866	5,215	.312	1.043	.325	2.312	1.750	1.875	.750	1.125	2.000	⅜-16 UNC	.500	—	—
100867	1,740		.348	.108	1.902	1.500	—	.750	—	1.500			—	—
100880	5,215		1.043	.325	2.312	1.750	1.875	.750	1.125	2.000	—	—	½-13 UNC	.750

Note: * Based on 5,000 psi max. operating pressure.

100866–100867–100880 INSTALLATION IDEAS



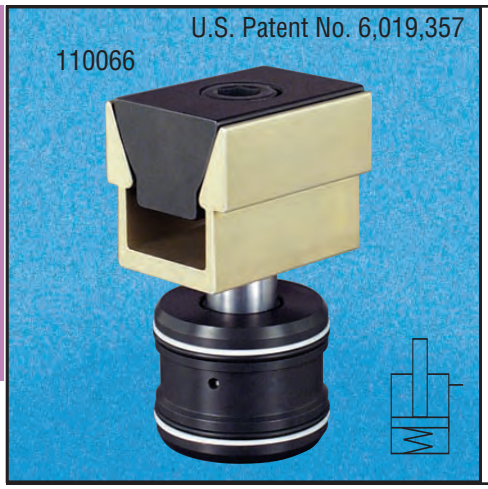
MOUNTING CAVITY



Cat. No.	Cavity Dimensions							Oil Passage Location	
	A Dia.	B Cylinder Body Cavity	C Dia.	D Dia.	E Chfr. / Rad. Max.	†F	G	*H Min.	*J Max.
100866	2.000 2.003	1.755 1.765	1.750 1.135	.744 .754	.065	.080 .100	.760 .790	.485	1.020
100867	1.500 1.503	1.500 1.510	1.250 .780					.510	.970
100880	2.000 2.003	1.755 1.765	1.750 1.135					.485	1.020

* Tolerance zone for blended oil passage hole. Tolerance zone does not allow any up and down motion of cylinder body.
† Chamfer to be located at end of bore "A" from which the cylinder will be assembled.

Uniforce® Hydraulic Clamp



These clamps are a combination of Mitee-Bite® Products Uniforce® Clamp and Hytec's cartridge pull cylinders. Two pull cylinders are offered to power each of five of the most popular Uniforce clamps. One will create the force necessary to achieve the clamp's rated force at 5,000 psi hydraulic pressure. The other powers the clamp to its maximum rating at only 2,500 psi. This allows the efficient use of these clamps in lower pressure systems however, ***never exceed the maximum pressure rating*** of the clamp/cylinder assembly.

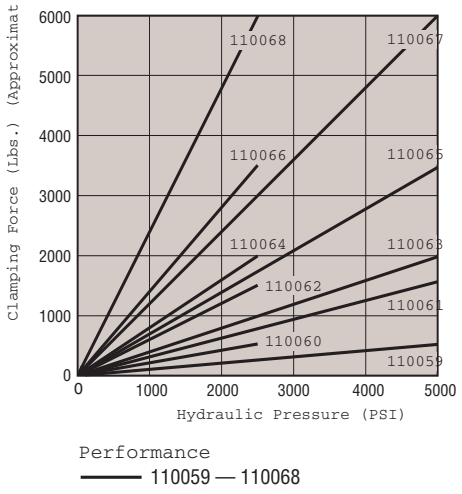
The pull cylinders are designed for cartridge mounting in a cavity supplied by the fixture builder. The required cavity is simply a cylindrical bore with a properly deburred pressure port intersecting it, providing the fluid connection. Where possible, pins inserted in the back of the piston are provided.

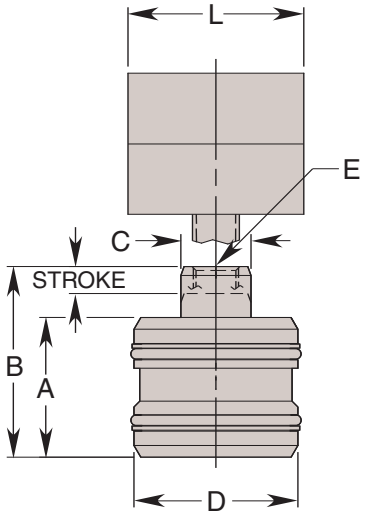
These pins can be guided by holes drilled in the sub-plate to prevent cylinder rotation when adjustments are made. A breather hole should always be provided and may be combined with the pin holes where appropriate.

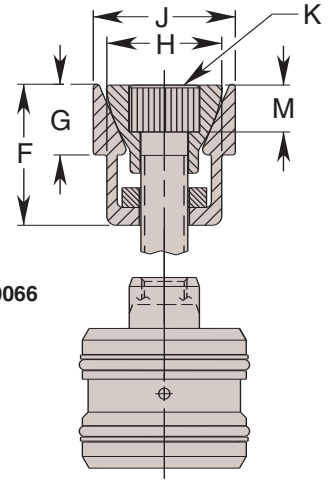
An external stop prevents over-travel of the clamp if actuated without a workpiece in place.

Features:

- Minimal space requirements
- Reduces repetitive motion injuries
- 5,000 psi and 2,500 psi max. versions
- Cylinders require no additional fixture space
- Rod wiper excludes contaminants
- Plating & Power-Tech™ processes resist corrosion
- Single-acting, spring return



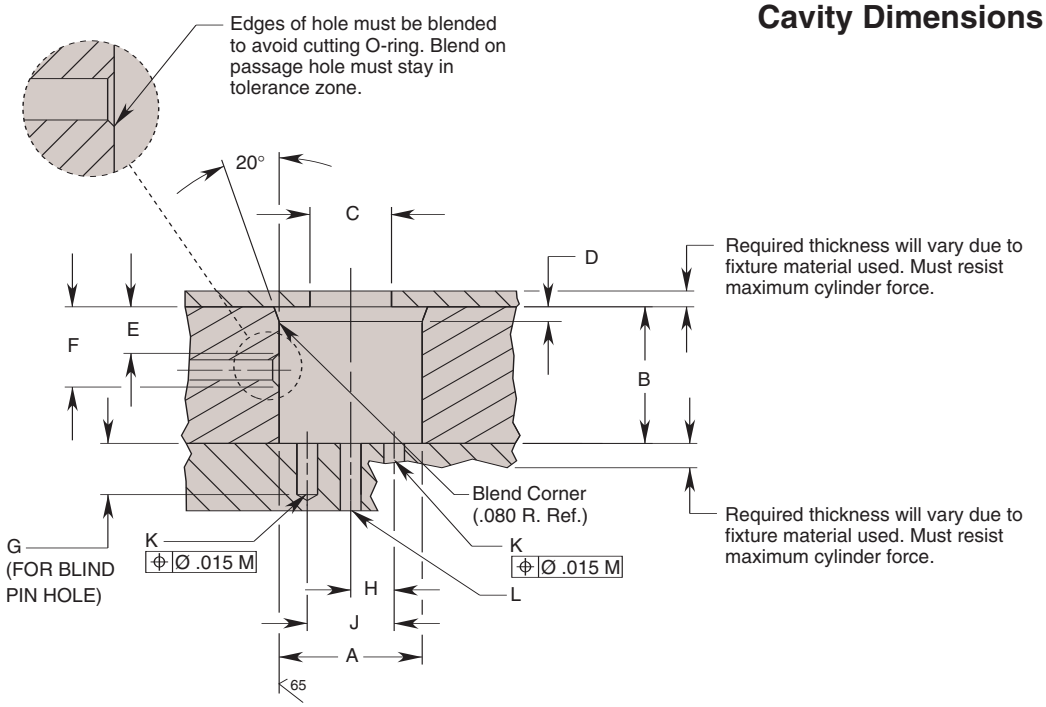




Clamp & Cylinder Assembly Cat. No.	Clamp Assembly Specifications			Cylinder Specifications			Cylinder Dimensions (In Inches)					
	Operating Pressure Max. (psi)	Holding Force Max. (Lbs.)	Clamp Spread Max.	Stroke (In.)	Eff. Area (Sq. in.)	Oil Cap. (Cu. in.)	A	B	C	D	E Piston Thread Size	E Piston Thread Depth
110059	5,000	290	.565	.123	.137	.017	1.115	1.210	.373	.810	8-32 UNC	.320
110060	2,500				.353	.043			.560	1.185		
110061	5,000	1,500	.830	.178		.063	1.240	1.325			¼-20 UNC	.375
110062	2,500				.537	.096		1.417		1.309		
110063	5,000	2,000	1.120								5/16-18 UNC	.470
110064	2,500				1.042	.185	1.365	1.470	.748	1.748		
110065	5,000	3,500	1.650								½-13 UNC	.500
110066	2,500			.288	1.802	.519	1.490	1.605	.873	2.123		
110067	5,000	6,000	2.175					1.690			⅝-11 UNC	.625
110068	2,500				3.542	1.020	1.615	2.000	1.059	2.873		

Clamp & Cylinder Assembly Cat. No.	Uniforce Clamp Dimensions (In Inches)								Uniforce Clamp (only) Cat. No.
	F	G	H	J	K Cap Screw Thd. Size	K Cap Screw Length	L	M C'Bore Depth	
110059	.575	.220	.410	.485	8-32 UNC	.625	.625	.165	500184
110060									
110061	.790	.375	.635	.735	¼-20 UNC	.875	.940	.255	500185
110062									
110063	1.090	.500	.820	.980	5/16-18 UNC	1.250	1.250	.310	500186
110064									
110065	1.590	.750	1.215	1.470	½-13 UNC	2.000	1.875	.510	500187
110066									
110067	2.090	1.000	1.625	1.960	⅝-11 UNC	2.500	2.500	.625	500188
110068									

110059 — 110068 Cavity Dimensions



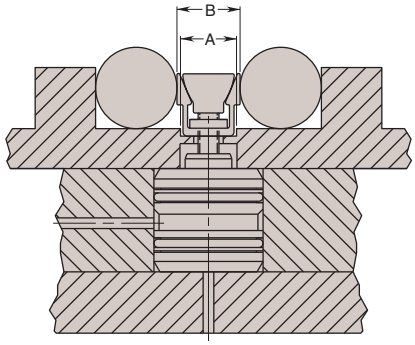
Cat. No.	Cavity Dimensions (In Inches)				Oil Passage Location (In Inches)		Cavity Dimensions (In Inches)				
	A Dia.	B Cyl. Body Length Max.	C Dia.	†D	E Min.	F Max.	G Min.	H	J	K Dia.	*L Vent Dia. Min.
110059	.812 .815	1.120 1.130	.387 .577	.125 .145	.475	.728	—	—	—	—	.125
110060	1.187 1.190		.572 .911		.427	.710					
110061		1.245 1.255			.437	.787					
110062	1.312 1.315		.572 1.000		.476	.734					
110063											
110064	1.750 1.753	1.370 1.380	.760 1.437		.531	.819					
110065											
110066	2.125 2.128	1.495 1.505	.885 1.812		.526	.943	.510	.550	1.100	.270 .280	
110067											
110068	2.875 2.878	1.620 1.630	1.074 2.500			1.001	.650	.785	1.570		

Note: * Cavity must be vented
† Chamfer to be located at end of bore "A" from which the cylinder will be assembled.

500184 — 500188 Application Chart

Cat. No.	Dimensions (In Inches)	
	A Groove Width	B Workpiece Spacing
500184	.440	.500
500185	.665	.750
500186	.850	1.000
500187	1.245	1.500
500188	1.655	2.000

Note: Groove "A" is recommended to maintain clamp orientation.



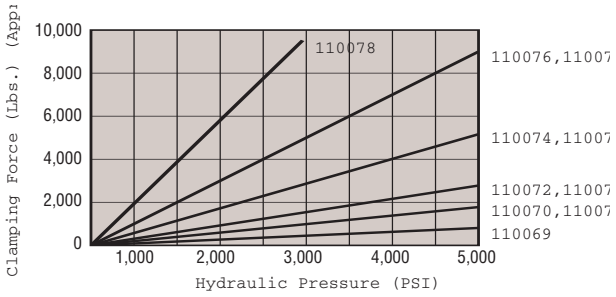
Cartridge Pull Cylinders

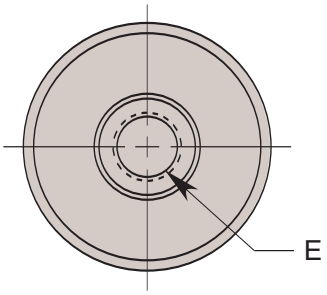
These cylinders retract when hydraulically pressurized to exert a pulling force on clamping elements or mechanisms. For straight pull applications only, they allow the user to design a cylinder into a fixture while maintaining the replaceability and long life of a heat treated, corrosion resistant cylinder body. Designed for single-acting systems only, the cylinder's return spring is built into the piston and requires no additional fixture space.

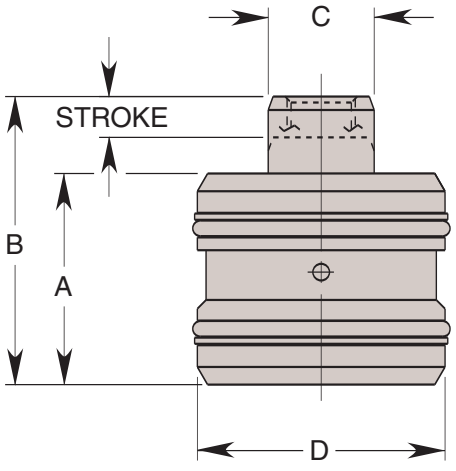
The pull cylinders are designed for cartridge mounting in a cavity supplied by the fixture builder. The required cavity is simply a cylindrical bore with a properly deburred pressure port intersecting it, providing the fluid connection. The depth of the bore matches nominal plate thickness so the cylinder can be easily "sandwiched" between two plates if desired. Where possible, pins inserted in the back of the piston are provided. These pins are guided by holes drilled in the sub-plate and will prevent cylinder rotation when adjustments are made. A breather hole should always be provided and may be combined with the pin holes where appropriate.

Features:

- Minimal space requirements
- 5,000 psi max.
- Rod wiper excludes contaminants
- Manifold mounting eliminates exposed tubing
- Plating & Power-Tech™ processes resist corrosion
- Single-acting, spring-return
- Return spring included
- Power-Tech™ treated body for long wear and corrosion resistance



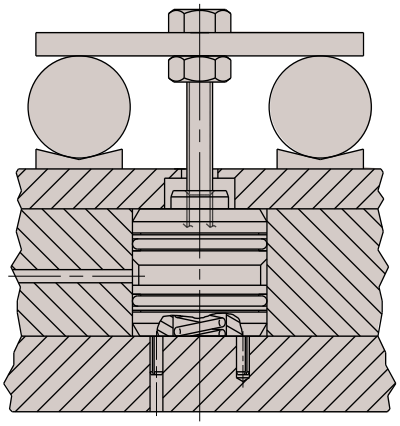


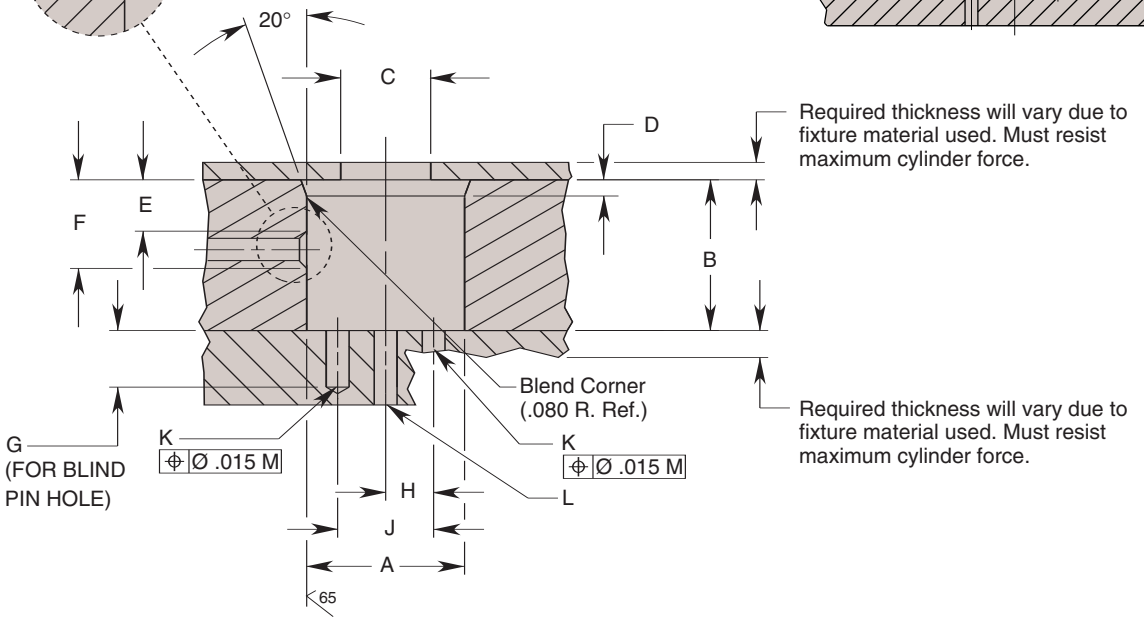


Cat. No.	Specifications				Dimensions (In Inches)					
	Force (Lbs.)	Stroke (In.)	Eff. Area (Sq. In.)	Oil Cap. (Cu. In.)	A	B	C	D	E Piston Thread	
									Size	Depth
110069	685	.123	.137	.017	1.115	1.210	.373	.810	8-32 UNC	.320
***110070**	1,765		.353	.043			.560	1.185		
110071		.178		.063	1.240	1.325			¼-20 UNC	.375
***110072**	2,685		.537	.096		1.417		1.309		
110073									5⁄16-18 UNC	.470
***110074**	5,210		1.042	.185	1.365	1.470	.748	1.748		
110075									½-13 UNC	.500
***110076**	9,010	.288	1.802	.519	1.490	1.605	.873	2.123		
110077						1.690			⅝-11 UNC	.625
***110078**	17,710		3.542	1.020	1.615	2.000	1.059	2.873		

* Intended for lower pressure applications. Operation above 2,500 psi may limit the cycle life of the cylinder and attaching fastener.

110069 — 110078
Cavity Dimensions

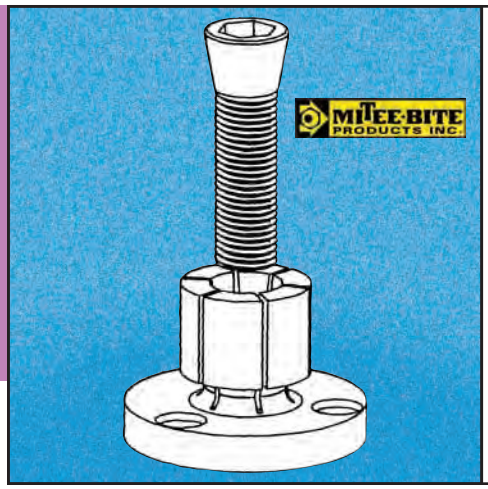




Cat. No.	Cavity Dimensions (In Inches)				Oil Passage Location (In Inches)		Cavity Dimensions (In Inches)				
	A Dia.	B Cyl. Body Cavity	C Dia.	†D	E Min.	F Max.	G Min.	H	J	K Dia.	*L Vent Dia. Min.
110069	.812 .815	1.120 1.130	.387 .577	.125 .145	.475	.728	—	—	—	—	.125
110070	1.187 1.190		.572 .911		.427	.710					
110071		1.245 1.255			.437	.787					
110072	1.312 1.315		.572 1.000		.476	.734					
110073											
110074	1.750 1.753	1.370 1.380	.760 1.437		.531	.819					
110075											
110076	2.125 2.128	1.495 1.505	.885 1.812		.526	.943	.510	.550	1.100	.270 .280	
110077											
110078	2.875 2.878	1.620 1.630	1.074 2.500			1.001	.650	.785	1.570		

† Chamfer to be located at end of bore "A" from which the cylinder will be assembled.

Tapered Screw Expanded Clamp



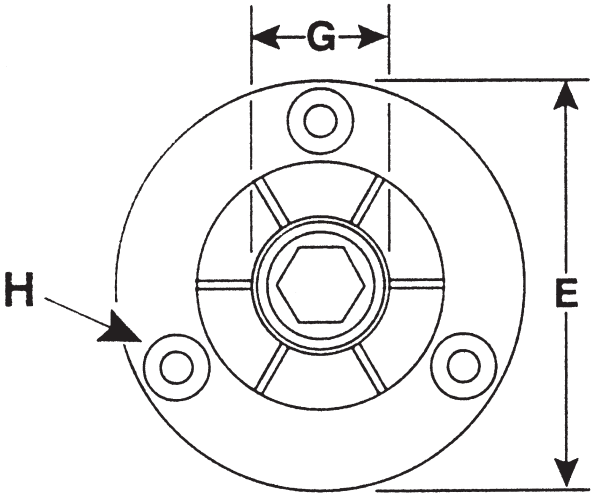
Machining and Installation

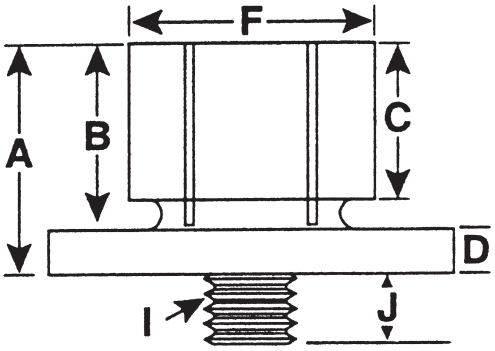
Expand clamp approximately .005 over relaxed diameter and machine to fit workpiece bore, either on lathe or mill.

If machining the clamp on a lathe use the nut provided, on the back of the clamp, to tighten the tapered screw. This nut is used only to machine the clamp.

Machine a pocket, in the fixture, for the close tolerance "E" dimension and drill and tap mounting holes per "H" column. Drill and tap a hole from the "I" column in the center of the pocket for the tapered screw.

A recessed dowel pin may be installed into the flange for additional rigidity if required.

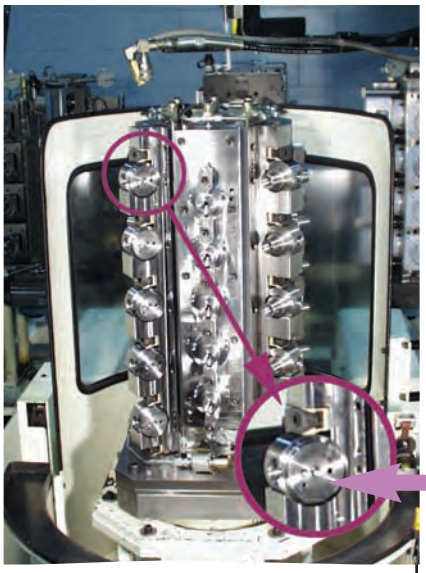




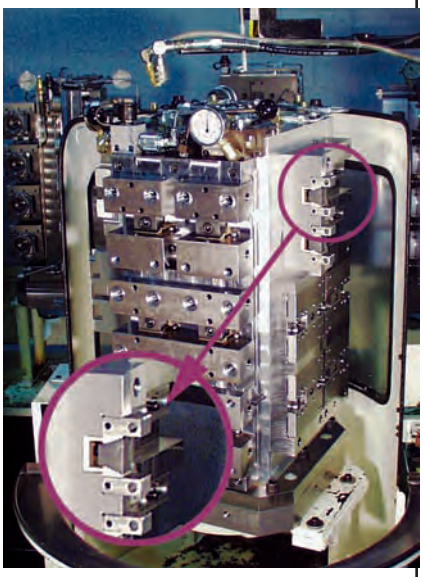
Part Number	Model Number	A	B	C	D	+.000 E -.002	F	G†	H*	I	J
110200	#0	.86	.63	.59	.23	1.170	.49	.28	6-32 on .825 BHC	8-32	.30
110201	#1	.98	.75	.59	.23	1.240	.56	.48	6-32 on .910 BHC	1/4-20	.50
110202	#2	.98	.75	.59	.23	1.476	.79	.53	6-32 on 1.140 BHC	5/16-18	.56
110203	#3	1.13	.88	.69	.25	1.968	1.06	.71	8-32 on 1.550 BHC	3/8-16	.71
110204	#4	1.25	1.0	.81	.25	2.205	1.39	.90	8-32 on 1.790 BHC	1/2-13	.71
110205	#5	1.56	1.25	1.06	.31	2.736	1.65	1.15	10-32 on 2.200 BHC	5/8-11	.79
110206	#6	1.56	1.25	1.06	.31	2.972	2.03	1.15	10-32 on 2.515 BHC	5/8-11	.79
110207	#7	1.79	1.48	1.27	.31	4.232	3.06	1.15	1/4-20 on 3.646 BHC	5/8-11	.79

G† - Minimum diameter the "F" dimension can be machined or turned down to.
H* - (3) Mounting Screws Included.
This product is a registered trademark of Mitee-Bite.

Uniforce® Hydraulic Clamp for a variety of fixturing applications



A



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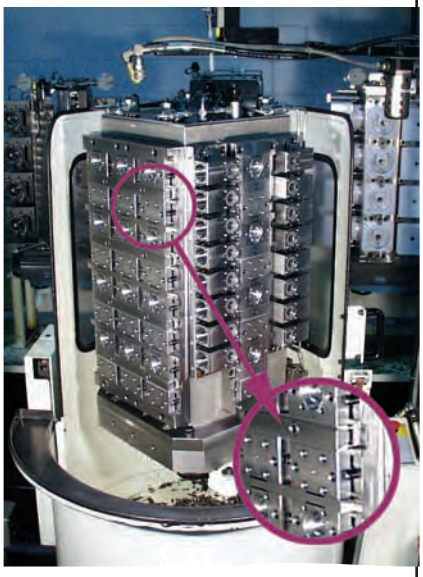

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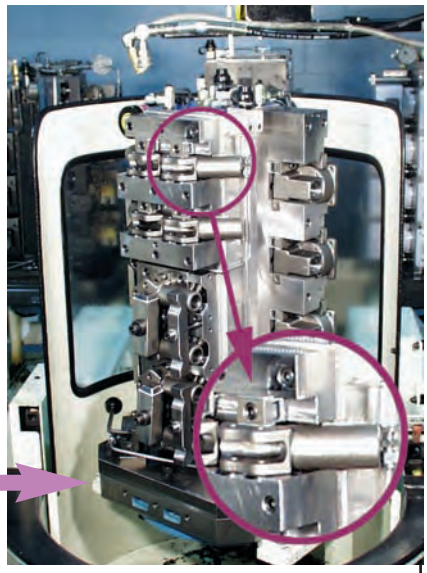

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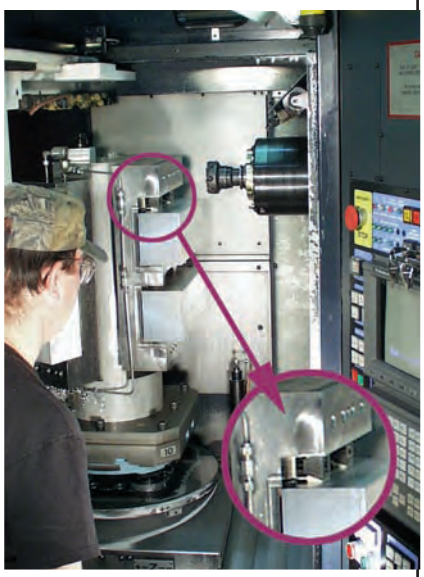

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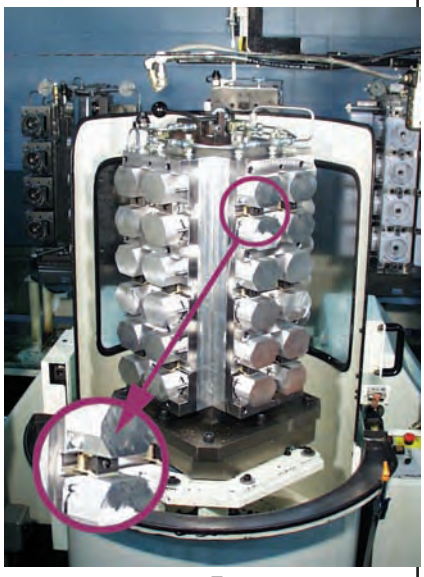

F

The Uniforce Hydraulic Clamp can be the foundation for clamping a wide variety of workpieces:

A. For more than just rectangular workpieces, the Uniforce hydraulic clamp can be equally effective for clamping round workpieces.

B. Often, a single Uniforce hydraulic clamp is all that is necessary to securely hold a workpiece. Or, several clamps can be positioned along the length of the part.

C. The hydraulic actuation of this clamp requires no additional space. Fixture density is not compromised because the hydraulic pull cylinder is buried below the workpieces. The Uniforce clamping elements can be purchased as bar stock and then customized to meet special length requirements.

D. Applications can include castings as well as bar-stock and extrusions. The clamp will accommodate slight imperfections and draft angles.

E. Five clamp sizes, each available in two different pressure ratings are available to fit a wide range of workpiece proportions.

F. The Uniforce Hydraulic Clamp can clamp two workpieces as easily as one. The same clamping force is exerted on workpiece whether clamping one or two.