

Linear cylinders

Linear Cylinders


A wide variety of styles and features make Enerpac's linear cylinder line the most complete in the industry. Ranging from compact short stroke spring return cylinders to heavy-duty industrial grade double-acting automation cylinders, Enerpac has the cylinder to meet every application need. Whether you have to push it, pull it, clamp it, punch it, stamp it, press it, or hold it in place for days at a time, Enerpac has the cylinder to meet your need.



Technical support

Refer to the "Yellow Pages" of this catalog for:

- Safety instructions
- Basic hydraulic information
- Advanced hydraulic technology
- FMS (Flexible Machining Systems) technology
- Conversion charts and hydraulic symbols

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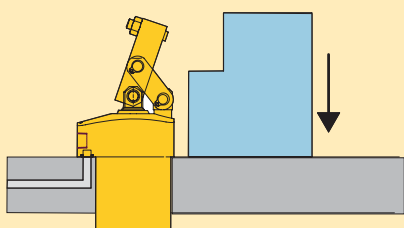
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Shown: LUCS-31

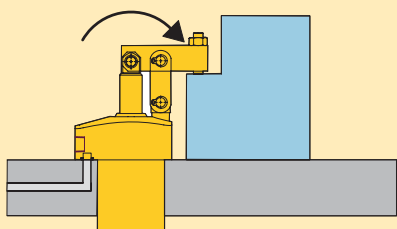


▶ Link clamp allows unobstructed part loading and high clamping forces. The hydraulic cylinders extend to provide clamping force, and retract to allow part removal.

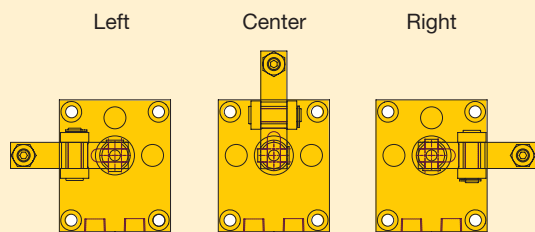
Arm completely retracts to allow part loading.



As cylinder extends, arm rotates to clamp part in place.



Arm location is changed easily without the use of tools.



Quick and accurate clamping action

- Hydraulic cylinder pushes linkage, rotating clamp arm into position
- Design ensures repeatable clamping location
- Linkage can be re-positioned to clamp at 90, 180, or 270 degrees from ports
- Clamps can be mounted using supplied bolts or held in place with flange nut
- Standard arm or long arm ordered separately

Product selection

Clamping force ¹⁾	Stroke	Model number	Cylinder effective area	Oil capacity	Standard clamp arm (Sold separately)	Long clamp arm (Sold separately)
▼ Single acting						
675	0.73	LUCS-31	0.19	0.14	LCAS-32	LCAL-32
1750	0.93	LUCS-81	0.48	0.44	LCAS-82	LCAL-82
2650	1.20	LUCS-121	0.64	0.77	LCAS-122	LCAL-122
4200	1.40	LUCS-191	0.99	1.38	LCAS-192	LCAL-192
6100	1.85	LUCS-281*	1.49	2.76	LCAS-282	LCAL-282
▼ Double acting						
700	0.73	LUCD-31	0.19	0.14	LCAS-32	LCAL-32
1800	0.93	LUCD-81	0.48	0.44	LCAS-82	LCAL-82
2700	1.20	LUCD-121	0.64	0.77	LCAS-122	LCAL-122
4300	1.40	LUCD-191	0.99	1.38	LCAS-192	LCAL-192
6300	1.85	LUCD-281*	1.49	2.76	LCAS-282	LCAL-282

Contact Enerpac for models with metric threads and BSPP ports.

* This product is made to order. Please contact Enerpac for delivery information before specifying in your design.

Dimensions in inches []

Model number	Port Size	C1	C2	C3	D	D1	D2	E
▼ Single acting								
LUCS-31	SAE#2	1.10	1.44	2.17	1.875-16UN	2.44	2.20	28.0°
LUCS-81	SAE#2	1.18	1.56	2.48	2.50-16UN	3.23	2.76	25.4°
LUCS-121	SAE#4	1.46	1.95	3.15	3.125-16 UN	4.02	3.46	27.1°
LUCS-191	SAE#4	1.57	2.30	3.70	3.50-16 UN	4.69	4.02	27.1°
LUCS-281*	SAE#4	1.97	2.60	4.45	4.125-16 UN	5.31	4.72	27.1°
▼ Double acting								
LUCD-31	SAE#2	1.10	1.44	2.17	1.875-16 UN	2.44	2.20	28.0°
LUCD-81	SAE#2	1.18	1.56	2.48	2.50-16 UN	3.23	2.76	25.4°
LUCD-121	SAE#4	1.46	1.95	3.15	3.125-16 UN	4.02	3.46	27.1°
LUCD-191	SAE#4	1.57	2.30	3.70	3.50-16 UN	4.69	4.02	27.1°
LUCD-281*	SAE#4	1.97	2.60	4.45	4.125-16 UN	5.31	4.72	27.1°

Contact Enerpac for models with metric threads and BSPP ports.

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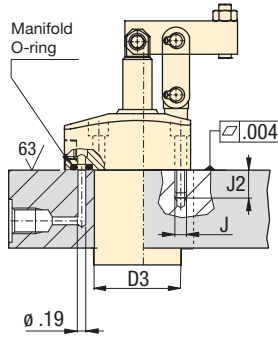


Installation dimensions in inches

Pull ¹⁾ force lbs	Fixture hole Ø D3	Mounting thread J UNF	Min. depth J2	Manifold O-ring ²⁾ ARP No. or Inside Ø x thickness
700	1.885	.250-28	0.65	-010
1800	2.510	.312-24	0.75	-010
2700	3.135	.312-24	0.75	-010
4300	3.515	.375-24	0.88	-010
6300	4.140	.500-20	0.94	-010

¹⁾ With standard clamp arm.
²⁾ Polyurethane, 92 Durometer

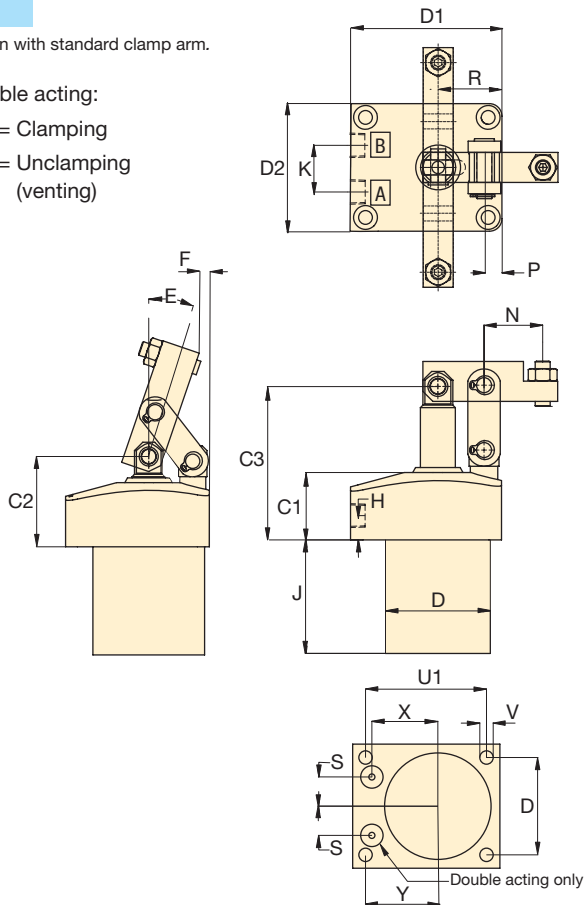
Note: Mounting bolts and O-rings included.



all models

Dimensions shown with standard clamp arm.

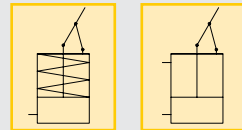
Double acting:
A = Clamping
B = Unclamping (venting)



	F	H	J	K	N	P	R	S	U1	U2	V	X	Y	lbs
Single acting ▼														
0.04	0.41	1.85	-	0.93	0.33	1.10	0.412	2.05	1.81	0.28	1.130	1.14	2.7	
0.01	0.43	2.56	-	1.26	0.35	1.38	0.552	2.68	2.20	0.32	1.517	1.57	5.5	
0.03	0.47	2.80	-	1.48	0.47	1.73	0.633	3.46	2.91	0.32	1.739	2.01	10.0	
0.09	0.59	3.46	-	1.63	0.59	2.01	0.714	3.98	3.23	0.41	1.961	2.32	15.2	
0.11	0.79	3.90	-	2.01	0.63	2.36	0.821	4.53	3.94	0.51	2.257	2.52	25.9	
Double acting ▼														
0.04	0.41	1.85	0.79	0.93	0.30	1.10	0.857	2.05	1.81	0.28	0.799	1.14	2.7	
0.01	0.43	2.56	0.94	1.26	0.41	1.38	1.000	2.68	2.20	0.32	1.191	1.57	5.5	
0.03	0.47	2.80	1.18	1.48	0.55	1.73	1.039	3.46	2.91	0.32	1.484	2.01	10.0	
0.09	0.59	3.46	1.30	1.63	0.57	2.01	1.112	3.98	3.23	0.41	1.926	2.32	15.2	
0.11	0.79	3.90	1.50	2.01	0.61	2.36	1.181	4.53	3.94	0.51	2.046	2.52	25.9	


- Clamp force: 700-6300 lbs**
- Stroke: 0.73-1.85 inch**
- Pressure: 500-5000 psi**

- E** Cilindros Amarre de enlace
- F** Bride basculante
- D** Gelenkspanner



Options

Clamp arms  [44 ▶](#)

Work supports  [30 ▶](#)

Important

Single-acting cylinders use a regenerative circuit; oil is sent to both sides of the piston at the same time. This eliminates the breather port, reducing damage from coolant and contamination.

Clamp arm should be parallel to cylinder mounting surface within 3° to avoid damage to cylinder and linkage. Use the included set screw to adjust clamp arm alignment.

Linear cylinders Power sources Valves System components Yellow pages

Clamp arms *for link clamps*

Shown: LCAS-31



Swing cylinders
Work supports

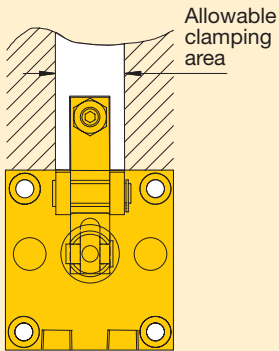
Linear cylinders

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▶ **Standard arms are readily available from Enerpac to meet most applications. In applications that require a custom designed arm, the machining information is supplied on page 45.**

⚠ Important

Clamp point must be within the boundaries of the anchor links on the clamp. Clamping outside of this area will cause damage to the linkage, leading to premature failure.

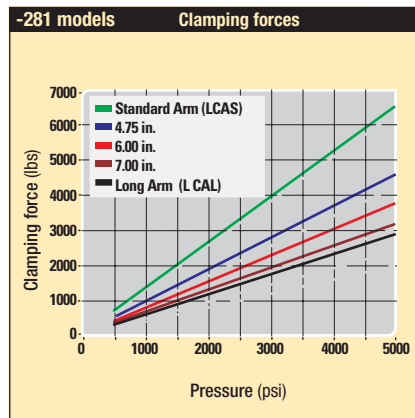
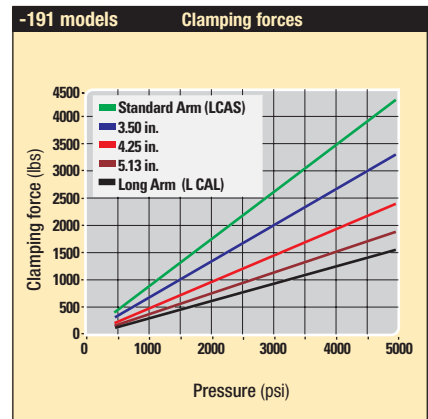
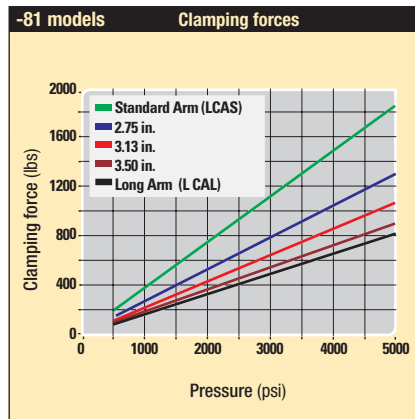
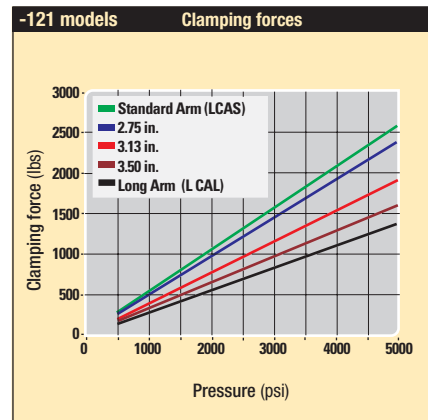
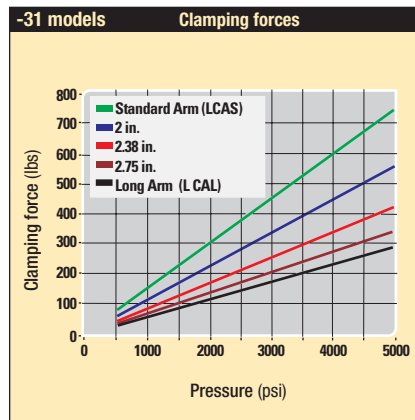


Standard or custom built

- Available from Enerpac in standard or extended length
- Standard arm includes set screw and lock nut
- Long arm can be machined on-site to match your needs
- Make your own custom arm to suit specific applications

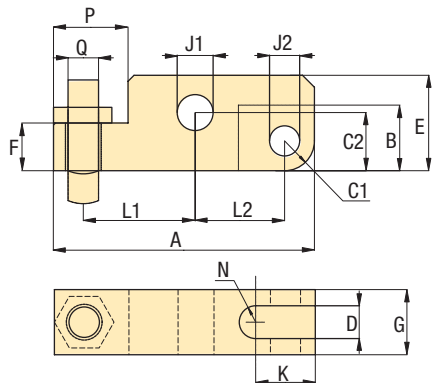
📊 Pressure vs clamping force

Different length clamp arms will determine the amount of clamping force transferred to the workpiece. As the length increases, the clamping force decreases.





LCAS models Standard Arm

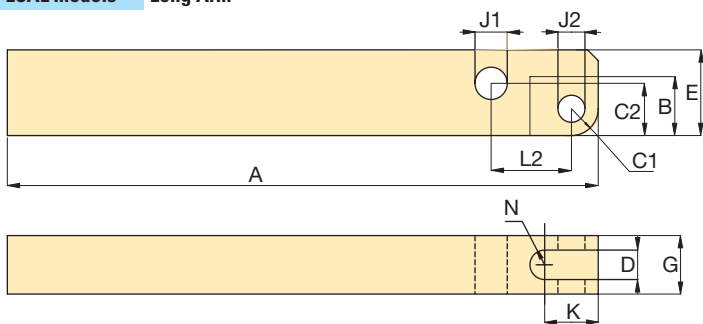


Dimensions in inches []

Clamp capacity lbs	Model number	A	B	C1	C2	D	E	F	G
▼ Standard clamp arms									
700	LCAS-32	2.13	0.51	0.24	0.37	0.24	0.63	0.31	0.47
1800	LCAS-82	2.93	0.69	0.31	0.61	0.39	0.98	0.51	0.74
2700	LCAS-122	3.44	0.87	0.39	0.77	0.43	1.26	0.63	0.86
4300	LCAS-192	4.04	1.02	0.43	0.94	0.51	1.50	0.87	0.98
6300	LCAS-282	4.92	1.20	0.51	1.14	0.63	1.77	1.06	1.25

Clamp capacity lbs	Model number	J1	J2	K	L1	L2	N	P	Q
▼ Standard clamp arms									
700	LCAS-32	0.237-0.239	0.237-0.239	0.51	0.93	0.73	0.12	0.51	M6 x 1,0
1800	LCAS-82	0.396-0.398	0.317-0.319	0.63	1.26	0.96	0.20	0.87	M10 x 1,5
2700	LCAS-122	0.474-0.476	0.396-0.398	0.79	1.48	1.18	0.22	0.98	M12 x 1,75
4300	LCAS-192	0.593-0.595	0.474-0.476	0.94	1.63	1.42	0.26	1.22	M16 x 2,0
6300	LCAS-282	0.711-0.713	0.593-0.595	1.10	2.01	1.73	0.31	1.50	M20 x 2,5

LCAL models Long Arm



NOTE: Custom arms should be manufactured using this print. Make sure to follow all precautions listed.

Dimensions in inches []

Clamp capacity lbs	Model number	A	B	C1	C2	D	E	G	J1	J2	K	L2	N
▼ Long clamp arms													
800	LCAL-32	3.35	0.51	0.24	0.37	0.24	0.63	0.47	0.237-0.239	0.237-0.239	0.51	0.73	0.12
1800	LCAL-82	4.13	0.69	0.31	0.61	0.39	0.98	0.74	0.396-0.398	0.317-0.319	0.63	0.96	0.20
2700	LCAL-122	4.33	0.87	0.39	0.77	0.43	1.26	0.86	0.474-0.476	0.396-0.398	0.79	1.18	0.22
4300	LCAL-192	6.30	1.02	0.43	0.94	0.51	1.50	0.98	0.593-0.595	0.474-0.476	0.94	1.42	0.26
6300	LCAL-282	8.66	1.20	0.51	1.14	0.63	1.77	1.25	0.711-0.713	0.593-0.595	1.10	1.73	0.31

Force: 700-6300 lbs

Pressure: 500-5000 psi

- E** Brazos de amarre
- F** Bras de bridage
- D** Spannarme

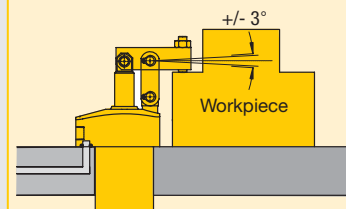
Options

Work supports ▶ 30

Accessories ▶ 76

Important

Clamp arm should be parallel to cylinder mounting surface within 3° to avoid damage to cylinder and linkage. Use the included set screw to adjust clamp arm alignment.



Shown: PLSS-121, WPTC-110, PUSD-121

Swing cylinders
Work supports

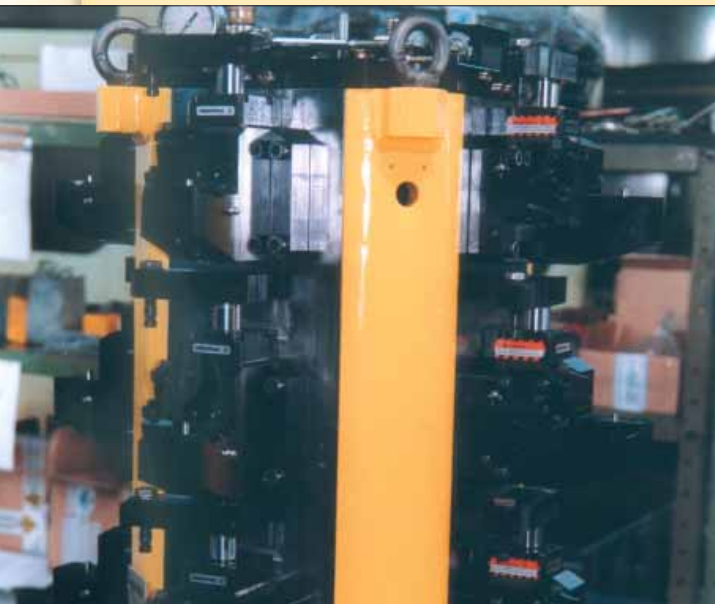
Linear cylinders



▶ Hydraulic pull cylinders utilize hydraulic pressure to hold down parts in a fixture. The guided plunger maintains orientation during the full clamping cycle, eliminating the need for an external guide. Internally threaded plunger ends accept various custom attachments to assist in the clamping process.

Enerpac offers both single- and double-acting pull cylinders, with capacities ranging from 600 to 9600 lbs. for pulling and 1,200 to 18,400 lbs. for pushing applications.

■ Hydraulic fixture with pull and swing cylinders, manifold and threaded cylinders for positioning and holding the work piece during milling process of gun breeches.



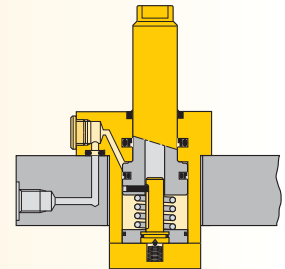
Compact and full featured design

- Guided linear plunger movement
- Compact design allows for efficient fixture layout
- Variety of mounting styles to meet design needs
- Internal plunger thread and flats across plunger top allow easy mounting of attachments
- Choice of porting styles to meet system and design requirements
- Single- and double-acting cylinders to suit a variety of hydraulic requirements

i Select your pull cylinder type:

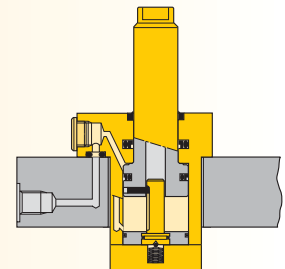
Single acting

- The obvious choice when there are few system restrictions, and there are not many units retracting simultaneously
- Fewer valving requirements which results in a less complex circuit



Double acting

- When greater control is required during the unclamp cycle
- When heavy attachments are being used
- When timing sequences are critical: less sensitive to system back pressures resulting from long tube lengths or numerous components being retracted at the same time



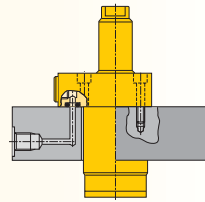
For Collet-Lok® push cylinders, see 54 ▶



i Select your mounting method:

PU series, Upper flange mounting

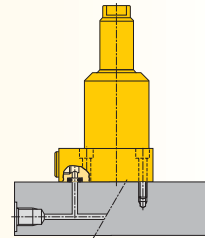
- Flexible design allows for manifold or threaded oil port connection
- Fixture hole does not require tight tolerances
- Easy installation with only 3 or 4 mounting bolts



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PL series, Lower flange mounting

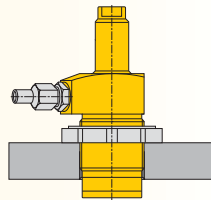
- Flexible design allows for manifold or threaded port connection
- No fixture hole required
- Easy installation with only 3 or 4 mounting bolts



50 ▶

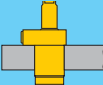


PT series, Threaded body mounting

- Body thread for precise cylinder height positioning
- Threaded oil port connection
- Can be threaded directly into the fixture and secured in position by means of standard flange nuts



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g Product selection

Cylinder capacity		Stroke in	Upper flange	Lower flange	Threaded body
lbs Pull	lbs Push				
▼ Single acting			Model number		
1250	-	.89	PUSS-51	PLSS-51	PTSS-51
2950	-	1.12	PUSS-121	PLSS-121	PTSS-121
▼ Double acting			Model number		
1400	2950	.89	PUSD-51	PLSD-51	PTSD-51
2475	6300	.87	PUSD-92	PLSD-92	PTSD-92
3150	6150	1.12	PUSD-121	PLSD-121	PTSD-121

Note: - Call Enerpac to order models with metric thread and BSPP port connections.
- Pull forces for single-acting cylinders reduced to overcome spring force.

Pull force: 1250-3150 lbs

Push force: 2950-6300 lbs

Stroke: 0.87-1.12 inch

Pressure: 500-5000 psi

E Cilindros de tracción

F Verins traction

D Zugzylinder



i Options

Accessories

76 ▶



Collet-Lok® push cylinders

54 ▶



Work supports

30 ▶



Swing cylinders

10 ▶



Sequence valves

120 ▶



Pull cylinders - Upper flange models

Shown: PUSS-51, PUSD-121



Swing cylinders
Work supports

Linear cylinders

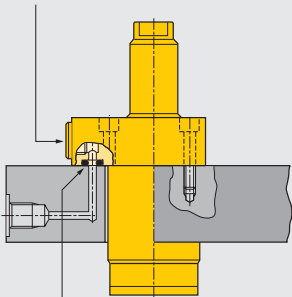
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PU series

Upper flange pull cylinders are designed for integrated manifold mounting solutions.

Hydraulic connections are made through SAE or BSPP oil connection or the standard integrated O-ring ports.

SAE oil connection



Integrated O-ring port

■ Enerpac upper flange pull cylinders in a fixture for gun breech production.



99_063-2

Minimal mounting height

...when space is at a premium

- Guided linear plunger movement
- Flexible design allows for manifold or threaded port connection
- Low profile mounting style allows body to be below mounting surface
- Internal plunger thread allows easy mounting of attachments
- Simple mounting preparation
- Easy to machine fixture hole: does not require tight tolerances
- Easy assembly: 3 or 4 mounting bolts
- Double oil connection: threaded port or manifold mount

Product selection

Cylinder capacity		Stroke in	Model number	Cylinder effective area		Oil capacity	
lbs Pull	Push			in ² Pull	Push	in ³ Pull	Push
▼ Single acting							
1250	–	.89	PUSS-51	.28	–	.25	–
2950	–	1.12	PUSS-121	.63	–	.70	–
▼ Double acting							
1400	2950	.89	PUSD-51	.28	.59	.25	.53
2475	6300	.87	PUSD-92	.49	1.25	.42	1.08
3150	6150	1.12	PUSD-121	.63	1.23	.70	1.40

Note: - Call Enerpac to order models with BSPP oil connections.
- Pull forces for single-acting cylinders reduced to overcome spring force.

Dimensions in inches []

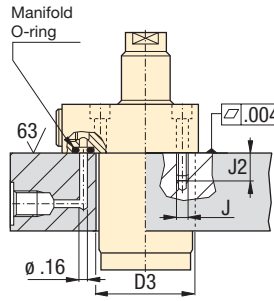
Model number	A	B	C1	D	D1	D2	E	E1	F	H
					ø			ø	ø	ø
▼ Single acting										
PUSS-51	5.06	4.17	.98	1.37	2.13	2.25	.63	.59	.52	.39
PUSS-121	6.31	5.19	1.00	1.88	2.63	2.88	.87	.82	.68	.38
▼ Double acting										
PUSD-51	5.06	4.17	.98	1.37	2.13	2.25	.63	.59	.52	.39
PUSD-92	5.12	4.25	.98	1.88	2.76	2.12	.98	.93	.71	.51
PUSD-121	6.31	5.19	1.00	1.88	2.63	2.88	.87	.82	.68	.38



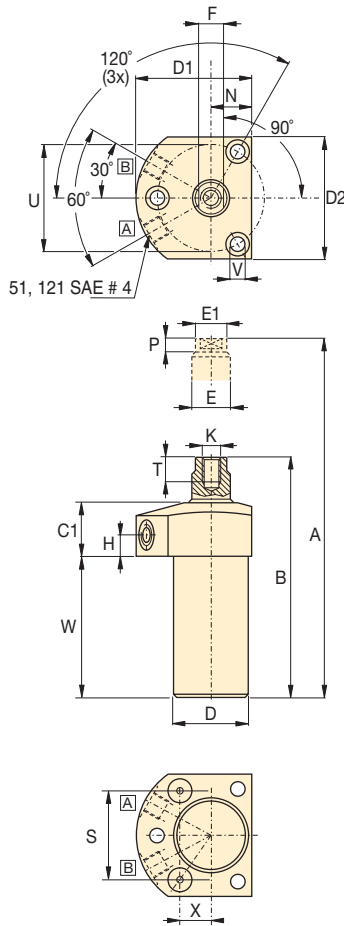
Installation dimensions in inches

Pull force lbs	Fixture hole Ø D3	Mounting thread J UNF	Min. depth J2	Manifold O-ring ¹⁾ ARP numbers or Inside Ø x thickness
1400	1.39	.250-28	.65	568-011
2475	1.93	M6	.59	.17 x .139
3150	1.89	.312-24	.80	568-011

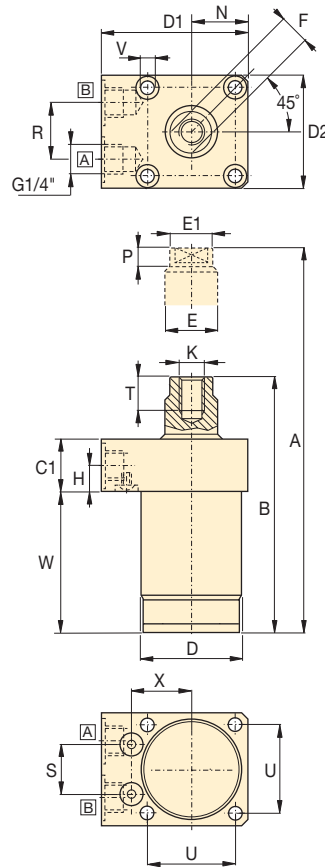
¹⁾ O-ring material: polyurethane, 92 Durometer



-51, 121



-92



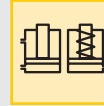
[A] = Pull
[B] = Push (venting)

	K	N	P	R	S	T	U	V	W	X	lbs	Model number
						ø	ø					
												Single acting ▼
	.312-24 UNF	.75	.23	-	1.614	.62	1.97	.27	2.60	0.565	2.5	PUSS-51
	.500-20 UNF	1.00	.38	-	2.048	.75	2.50	.35	3.38	0.717	3.5	PUSS-121
												Double acting ▼
	.312-24 UNF	.75	.23	-	1.614	.62	1.97	.27	2.60	0.565	2.5	PUSS-51
	M10 x 1,50	1.06	.41	1.02	.93	.63	1.65	.27	2.67	1.128	4.4	PUSS-92
	.500-20 UNF	1.00	.38	-	2.048	.75	2.50	.35	3.38	0.717	3.5	PUSS-121

NOTE: U= bolt circle

- Pull force: 1250-3150 lbs
- Push force: 2950-6300 lbs
- Stroke: .87-1.12 inch
- Pressure: 500-5000 psi

- E Cilindros de tracción
- F Verins traction
- D Zugzylinder



Options

Accessories [76](#)

Collet-Lok® push cylinders [54](#)

Swing cylinders [10](#)

Sequence valves [120](#)

Important

Single-acting cylinders can be vented through the manifold port.

The upper flange pull cylinder has a bolt pattern which is identical to its lower flange equivalent, enabling interchangeability.

In case there is a risk of machining coolants and debris being inhaled via the breather vent, it is recommended to pipe this port to an area outside the fixture that is protected from machining coolants and debris.

Linear cylinders

Power sources

Valves

System components

Yellow pages

Pull cylinders - Lower flange models

Shown: PLSD-51, PLSD-121



Swing cylinders
Work supports

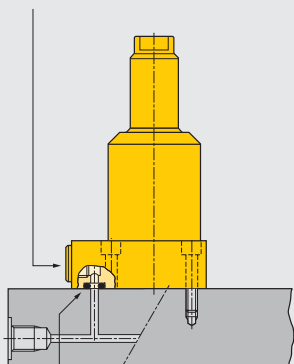
Linear cylinders

89 064

▶ PL series

The lower flange cylinders are designed for integrated manifold mounting solutions. Hydraulic connections are made through SAE or BSPP oil connection or the standard integrated O-ring ports.

SAE oil connection



Integrated O-ring port

Minimal mounting height

...when space is at a premium

- Guided linear plunger movement
- Flexible design allows for manifold or threaded port connection
- Low profile mounting style allows body to be below mounting surface
- Internal plunger thread allows easy mounting of attachments
- Easiest mounting preparation in the line
- Easy to machine fixture hole: does not require tight tolerances
- Easy assembly: 3 or 4 mounting bolts
- Double oil connection: threaded port or manifold mount

🌐 Product selection

Cylinder capacity		Stroke in	Model number	Cylinder effective area		Oil capacity	
lbs Pull	Push			in ² Pull	Push	in ³ Pull	Push
▼ Single acting							
1250	–	.89	PLSS-51	.28	–	.25	–
2950	–	1.12	PLSS-121	.63	–	.70	–
▼ Double acting							
1400	2950	.89	PLSD-51	.28	.59	.25	.53
2475	6300	.87	PLSD-92	.49	1.25	.42	1.08
3150	6150	1.12	PLSD-121	.63	1.23	.70	1.40

Note: - Call Enerpac to order models with BSPP oil connections.
- Pull forces for single-acting cylinders reduced to overcome spring force.

ⓐ Dimensions in inches []

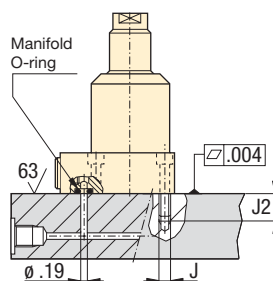
Model number	A	B	C	C1	D	D1	D2	E	E1	F	H
▼ Single acting											
PLSS-51	5.06	4.17	3.33	.98	1.37	2.13	2.25	.63	.59	.52	.55
PLSS-121	6.31	5.19	4.38	1.00	1.88	2.63	2.88	.87	.82	.68	.62
▼ Double acting											
PLSD-51	5.06	4.17	3.33	.98	1.37	2.13	2.25	.63	.59	.52	.55
PLSD-92	5.43	4.57	4.00	.98	1.88	2.76	2.12	.98	.93	.71	.51
PLSD-121	6.31	5.19	4.38	1.00	1.88	2.63	2.88	.87	.82	.68	.62



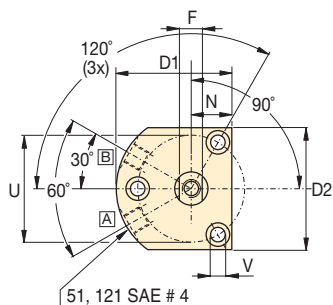
Installation dimensions in inches

Pull force lbs	Mounting thread J UNF	Minimum depth J2	Manifold O-ring ¹⁾ ARP numbers or inside Ø x thickness
1400	.250-28	.65	568-011
2475	M6	.59	.17 x .139
3150	.312-24	.80	568-011

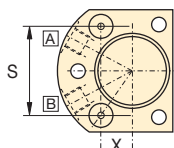
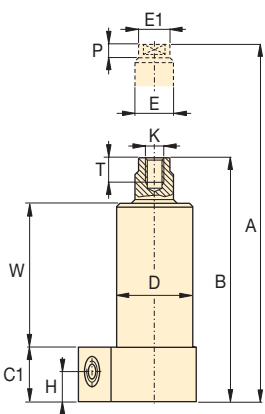
¹⁾ O-ring material: polyurethane, 92 Durometer



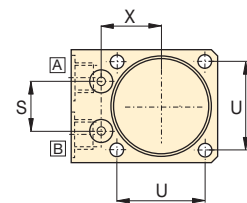
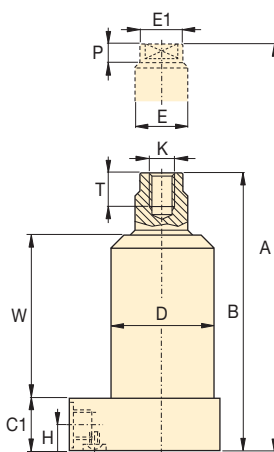
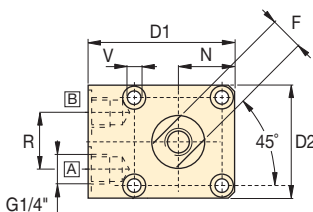
-51, 121



51, 121 SAE # 4



-92



A = Pull
B = Push (venting)


	K	N	P	R	S	T	U	V	W	X	lbs	Model number
							ø			ø		
	.312-24 UNF	.75	.23	-	1.614	.62	1.97	.27	2.69	0.565	2.5	PLSS-51
	.500-20 UNF	1.00	.38	-	2.048	.75	2.50	.35	3.48	0.717	3.5	PLSS-121
	.312-24 UNF	.75	.23	-	1.614	.62	1.97	.27	2.69	0.565	2.5	PLSD-51
	M10 x 1.50	.41	1.06	1.02	.93	.63	1.65	.27	3.09	1.128	4.4	PLSD-92
	.500-20 UNF	1.00	.38	-	2.048	.75	2.50	.35	3.48	0.717	3.5	PLSD-121

- Pull force: 1250-3150 lbs**
- Push force: 2950-6300 lbs**
- Stroke: .87-1.12 inch**
- Pressure: 500-5000 psi**


- E Cilindros de tracción**
- F Verins traction**
- D Zugzylinder**




Options

Accessories  [76](#)

Collet-Lok® push cylinders  [54](#)

Swing cylinders  [10](#)

Sequence valves  [120](#)

Important

Single-acting cylinders can be vented through the manifold port.

The lower flange pull cylinder has a bolt pattern which is identical to its upper flange equivalent, enabling interchangeability.

In case there is a risk of machining coolants and debris being inhaled via the breather vent, it is recommended to pipe this port to an area outside the fixture that is protected from machining coolants and debris.

Linear cylinders

Power sources

Valves

System components

Yellow pages

Pull cylinders - Threaded body models

Shown: PTSD-51



Swing cylinders
Work supports

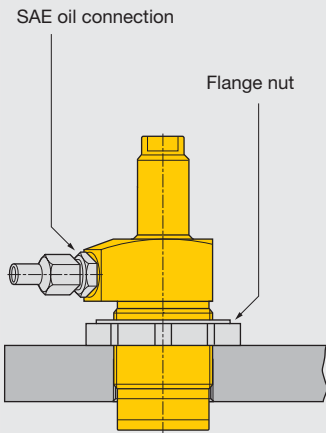
Linear cylinders

09_065

PT series

The threaded body pull cylinders can be bolted to the fixture. This allows easy installation or removal of the unit and does not require machined fixture holes.

The cylinder is adjusted to the appropriate height, and then locked in place using a flange nut (□78).



■ Threaded body pull cylinder with modified clamp arm, mounted on a frame-straightening fixture.



08_026

Threaded directly into the fixture

...can be secured at any height

- Guided linear plunger movement
- Threaded port connection
- Internal plunger thread allows easy mounting of attachments
- Simple mounting preparation
- Easy installation and removal
- Greatest flexibility in fixture design

Product selection

Cylinder capacity		Stroke in	Model number	Cylinder effective area		Oil capacity	
lbs Pull	Push			in ² Pull	Push	in ³ Pull	Push
▼ Single acting							
1250	–	.89	PTSS-51	.28	–	.25	–
2950	–	1.12	PTSS-121	.63	–	.70	–
▼ Double acting							
1400	2950	.89	PTSD-51	.28	.59	.25	.53
2475	6300	.87	PTSD-92	.49	1.25	.42	1.08
3150	6150	1.12	PTSD-121	.63	1.23	.70	1.40

Note: - Call Enerpac to order models with BSPP oil connections.
- Pull forces for single-acting cylinders reduced to overcome spring force.

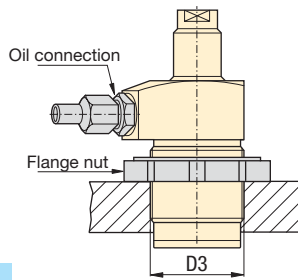
Dimensions in inches []

Model number	A	B	C	C1	D ø	D1	D2
▼ Single acting							
PTSS-51	5.06	4.17	3.33	.98	1.375-18 UNEF	1.97	1.50
PTSS-121	6.31	5.19	4.38	.98	1.875-16 UN	2.38	2.00
▼ Double acting							
PTSD-51	5.06	4.17	3.33	.98	1.375-18 UNEF	1.97	1.50
PTSD-92	5.12	4.25	3.66	.98	M48 x 1,5	2.46	1.89
PTSD-121	6.31	5.19	4.38	.98	1.875-16 UN	2.38	2.00

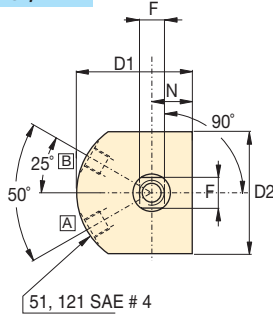


Installation dimensions in inches

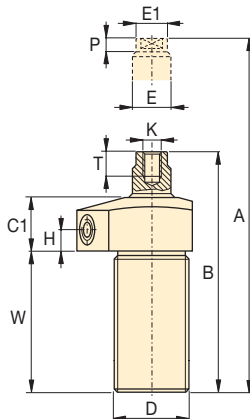
Pull force lbs	Fixture hole thread size D3
1400	1.375-18 UNEF
2475	M48 x 1,5
3150	1.875-16 UNF



-51, 121

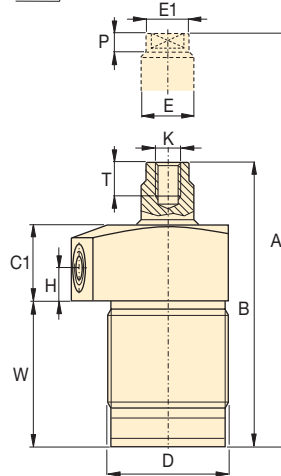
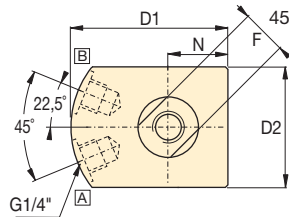


51, 121 SAE # 4



- [A] = Pull
- [B] = Push (venting)

-92



Accessory chart

Model number	Mounting flange Sold separately	Flange nut Sold separately
	[79]	[78]

▼ Single acting

PTSS-51	MF-351	FN-351
PTSS-121	MF-481	FN-811

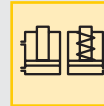
▼ Double acting

PTSD-51	MF-351	FN-351
PTSD-92	MF-482	FN-482
PTSD-121	MF-481	FN-481

E	E1	F	H	K	N	P	T	W	lbs	Model number
∅	∅									
Single acting ▼										
.63	.59	.52	.39	.312-24 UNF	.75	.23	.62	2.60	2.5	PTSS-51
.87	.82	.68	.38	.500-20 UNF	1.00	.38	.75	3.38	3.5	PTSS-121
Double acting ▼										
.63	.59	.52	.39	.312-24 UNF	.75	.23	.62	2.60	2.5	PTSD-51
.98	.93	.71	.51	M10 x 1,5	.94	.41	.63	2.47	4.4	PTSD-92
.87	.82	.68	.38	.500-20 UNF	1.00	.38	.75	3.38	3.5	PTSD-121

- Pull force:** 1250-3150 lbs
- Push force:** 2950-6300 lbs
- Stroke:** .87-1.12 inch
- Pressure:** 500-5000 psi

- E** Cilindros de tracción
- F** Verins traction
- D** Zugzylinder



Options

Accessories [76]

Collet-Lok® swing cylinders [54]

Swing cylinders [10]

Sequence valves [120]

Important

Single-acting cylinders can be vented through the manifold port.

In case there is a risk of machining coolants and debris being inhaled via the breather vent, it is recommended to pipe this port to an area outside the fixture that is protected from machining coolants and debris.

Threaded cylinders *Application & selection*

Shown: CST-9381, CST-571, CST-18251, CDT-18131, CDT-40251

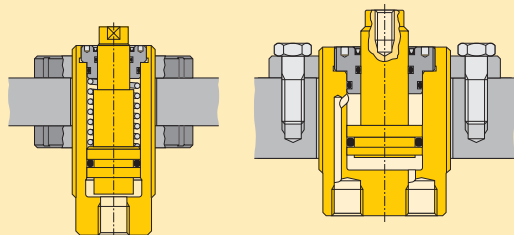


Swing cylinders
Work supports

Linear cylinders

98_100

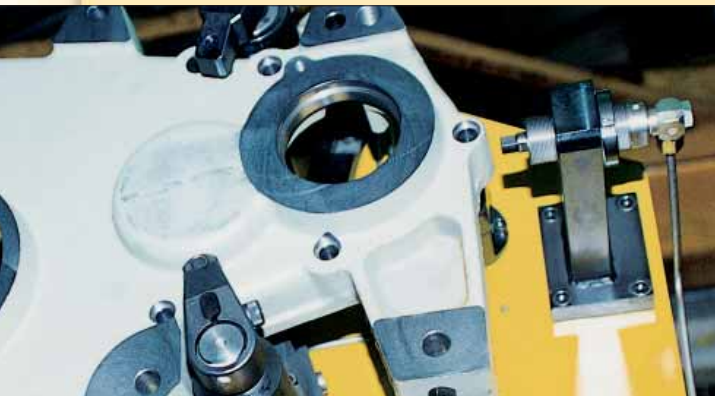
Threaded cylinders are designed for workpiece positioning, holding and ejecting applications where space is at a premium. Double-acting models are also suited to manufacturing applications, such as production punching.



Accessory chart

Body thread	Mounting flange Sold Separately □ 79 ▶	Flange nut Sold Separately □ 78 ▶	Plunger thread	Contact bolt □ 78 ▶
D			K	
0.500-20 UN	MF-121	FN-121	#6-32 UN	BS-21
0.750-16 UN	MF-201	FN-201	#8-32 UN	BS-41
1.000-12 UN	MF-251	FN-251	0.250-28 UN	BS-61
1.313-16 UN	MF-331	FN-331	0.313-24 UN	BS-81
1.625-16 UN	MF-421	FN-421	0.375-16 UN	BS-91
1.875-16 UN	MF-481	FN-481	0.500-13 UN	BS-101
2.125-16 UN	MF-551	FN-551		
2.500-16 UN	MF-651	FN-651		

■ *Threaded cylinder, mounted with horizontal bracket to position the workpiece against the stops. Enerpac swing cylinders are then activated to clamp the work piece before machining operations begin.*



98_050A

High clamping forces in a compact body

- Minimum cylinder diameter combined with maximized clamping forces
- Threaded body allows fine positioning and easy installation
- Internal plunger wipers allow maintenance-free, high-cycle performance
- Center-tapped plungers will hold workpiece contact buttons
- Single-acting models with spring return simplify hydraulic tubing requirements
- Double-acting models are recommended for high-cycle applications

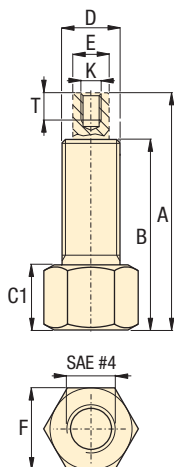
Product selection

Cylinder capacity at 5000 psi lbs	Nominal stroke in	Model number	Effective area in ²		Oil capacity in ³		
			push	pull	push	pull	
▼ Single acting							
380	-	0.28	CST-271	0.08	-	0.02	-
380	-	0.39	CST-2101	0.08	-	0.03	-
380	-	0.51	CST-2131	0.08	-	0.04	-
980	-	0.28	CST-471	0.20	-	0.05	-
980	-	0.51	CST-4131	0.20	-	0.10	-
980	-	0.75	CST-4191	0.20	-	0.15	-
980	-	0.98	CST-4251	0.20	-	0.19	-
980	-	1.50	CST-4381	0.20	-	0.29	-
1950	-	0.28	CST-971	0.39	-	0.11	-
1950	-	0.51	CST-9131	0.39	-	0.20	-
1950	-	0.75	CST-9191	0.39	-	0.29	-
1950	-	0.98	CST-9251	0.39	-	0.38	-
1950	-	1.50	CST-9381	0.39	-	0.58	-
3950	-	0.51	CST-18131	0.79	-	0.40	-
3950	-	0.98	CST-18251	0.79	-	0.78	-
3950	-	1.50	CST-18381	0.79	-	1.18	-
3950	-	1.97	CST-18501	0.79	-	1.56	-
6110	-	0.59	CST-27151	1.22	-	0.72	-
6110	-	0.98	CST-27251	1.22	-	1.20	-
6110	-	1.97	CST-27501	1.22	-	2.40	-
8800	-	0.51	CST-40131	1.76	-	0.90	-
8800	-	0.98	CST-40251	1.76	-	1.73	-
8800	-	1.50	CST-40381	1.76	-	2.63	-
8800	-	1.97	CST-40501	1.76	-	3.46	-
▼ Double acting							
3900	2330	0.51	CDT-18131	0.77	0.46	0.40	0.24
3900	2330	0.98	CDT-18251	0.77	0.46	0.78	0.46
3900	2330	1.50	CDT-18381	0.77	0.46	1.18	0.70
3900	2330	1.97	CDT-18501	0.77	0.46	1.52	0.91
6110	4080	0.59	CDT-27151	1.22	0.82	0.72	0.48
6110	4080	0.98	CDT-27251	1.22	0.82	1.20	0.81
6110	4080	1.97	CDT-27501	1.22	0.82	2.40	1.61
8800	5870	0.51	CDT-40131	1.76	1.17	0.90	0.60
8800	5870	0.98	CDT-40251	1.76	1.17	1.73	1.15
8800	5870	1.50	CDT-40381	1.76	1.17	2.63	1.75
8800	5870	1.97	CDT-40501	1.76	1.17	3.46	2.30

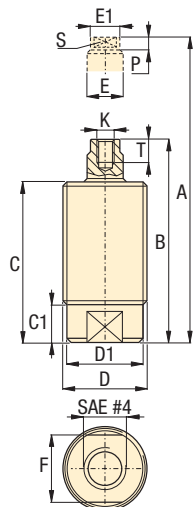
Note: - Seal material: Buna-N, Polyurethane.
- Minimum operating pressure for single-acting models (to overcome return spring force) is 580 psi.



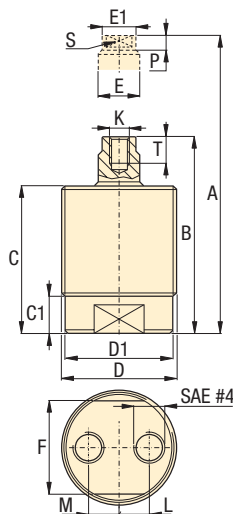
CST-271, -2101, -2131



Other CST models



CDT models



Force: 380-8800 lbs

Stroke: 0.28-1.97 inch

Pressure: 580-5000 psi

- E** Cilindros roscados
- F** Vérins corps filetés
- D** Einschraubzylinder



Options

Accessories



Product dimensions in inches []

Model number	A Ext. height	B Retr. height	C	C1	D	D1	E	E1	F	K	L	M	P	S	T	lbs
▼ Single acting																
CST-271	1.89	1.65	-	0.59	.500-20 UN	-	0.19	-	0.63	#6-32 UN	-	-	-	-	0.19	0.2
CST-2101	2.13	1.78	1.65	0.59	.500-20 UN	-	0.19	-	0.63	#6-32 UN	-	-	-	-	0.19	0.3
CST-2131	2.55	2.03	-	0.59	.500-20 UN	-	0.19	-	0.63	#6-32 UN	-	-	-	-	0.19	0.3
CST-471	2.15	1.87	1.71	0.35	.750-16 UN	0.65	0.27	0.27	0.62	#8-32 UN	-	-	0.16	0.24	0.28	0.4
CST-4131	2.72	2.21	2.05	0.35	.750-16 UN	0.65	0.27	0.27	0.62	#8-32 UN	-	-	0.16	0.24	0.28	0.3
CST-4191	3.37	2.62	2.46	0.35	.750-16 UN	0.65	0.27	0.27	0.62	#8-32 UN	-	-	0.16	0.24	0.28	0.4
CST-4251	3.95	2.97	2.81	0.35	.750-16 UN	0.65	0.27	0.27	0.62	#8-32 UN	-	-	0.16	0.24	0.28	0.5
CST-4381	5.77	4.27	4.11	0.35	.750-16 UN	0.65	0.27	0.27	0.62	#8-32 UN	-	-	0.16	0.24	0.28	0.7
CST-971	2.53	2.25	2.03	0.32	1.000-12 UN	0.88	0.47	0.39	0.79	.250-28 UN	-	-	0.22	0.32	0.39	0.6
CST-9131	3.01	2.50	2.28	0.32	1.000-12 UN	0.88	0.47	0.39	0.79	.250-28 UN	-	-	0.22	0.32	0.39	0.7
CST-9191	3.87	3.11	2.89	0.32	1.000-12 UN	0.88	0.47	0.39	0.79	.250-28 UN	-	-	0.22	0.32	0.39	0.8
CST-9251	4.43	3.43	3.21	0.32	1.000-12 UN	0.88	0.47	0.39	0.79	.250-28 UN	-	-	0.22	0.32	0.39	0.9
CST-9381	5.63	4.12	3.97	0.32	1.000-12 UN	0.88	0.47	0.39	0.79	.250-28 UN	-	-	0.22	0.32	0.39	1.0
CST-18131	3.26	2.75	2.50	0.49	1.313-16 UN	1.22	0.63	0.59	1.06	.313-24 UN	-	-	0.26	0.50	0.47	1.2
CST-18251	4.50	3.52	3.27	0.49	1.313-16 UN	1.22	0.63	0.59	1.06	.313-24 UN	-	-	0.26	0.50	0.47	1.3
CST-18381	5.78	4.27	4.02	0.49	1.313-16 UN	1.22	0.63	0.59	1.06	.313-24 UN	-	-	0.26	0.50	0.47	1.5
CST-18501	6.87	4.90	4.65	0.49	1.313-16 UN	1.22	0.63	0.59	1.06	.313-24 UN	-	-	0.26	0.50	0.47	1.7
CST-27151	3.46	2.87	2.62	0.53	1.625-16 UN	1.52	0.71	0.67	1.37	.375-16 UN	-	-	0.26	0.57	0.47	1.4
CST-27251	4.66	3.68	3.43	0.53	1.625-16 UN	1.52	0.71	0.67	1.37	.375-16 UN	-	-	0.26	0.57	0.47	2.0
CST-27501	7.71	5.74	5.49	0.53	1.625-16 UN	1.52	0.71	0.67	1.37	.375-16 UN	-	-	0.26	0.57	0.47	2.9
CST-40131	3.52	2.94	2.70	0.43	1.875-16 UN	1.79	0.78	0.75	1.63	.500-13 UN	-	-	0.31	0.66	0.47	2.2
CST-40251	4.76	3.71	3.46	0.43	1.875-16 UN	1.79	0.78	0.75	1.63	.500-13 UN	-	-	0.31	0.66	0.47	2.6
CST-40381	6.49	4.93	4.69	0.43	1.875-16 UN	1.79	0.78	0.75	1.63	.500-13 UN	-	-	0.31	0.66	0.47	3.3
CST-40501	7.44	5.41	5.16	0.43	1.875-16 UN	1.79	0.78	0.75	1.63	.500-13 UN	-	-	0.31	0.66	0.47	3.9
▼ Double acting																
CDT-18131	3.55	2.68	2.42	0.63	1.875-16 UN	1.73	0.63	0.59	1.61	.313-24 UN	0.53	0.39	0.26	0.50	0.47	2.4
CDT-18251	4.57	3.23	2.97	0.63	1.875-16 UN	1.73	0.63	0.59	1.61	.313-24 UN	0.53	0.39	0.26	0.50	0.47	2.9
CDT-18381	5.18	3.68	3.42	0.63	1.875-16 UN	1.73	0.63	0.59	1.61	.313-24 UN	0.53	0.39	0.26	0.50	0.47	3.4
CDT-18501	6.12	4.15	3.90	0.63	1.875-16 UN	1.73	0.63	0.59	1.61	.313-24 UN	0.53	0.39	0.26	0.50	0.47	3.9
CDT-27151	3.39	2.80	2.54	0.67	2.125-16 UN	2.02	0.71	0.67	1.87	.375-16 UN	0.65	0.39	0.26	0.62	0.47	2.6
CDT-27251	4.21	3.23	2.97	0.67	2.125-16 UN	2.02	0.71	0.67	1.87	.375-16 UN	0.65	0.39	0.26	0.62	0.47	3.1
CDT-27501	6.18	4.21	3.96	0.67	2.125-16 UN	2.02	0.71	0.67	1.87	.375-16 UN	0.65	0.39	0.26	0.62	0.47	4.1
CDT-40131	3.60	3.09	2.78	0.69	2.500-16 UN	2.38	0.87	0.83	2.25	.500-13 UN	0.80	0.39	0.31	0.66	0.59	4.0
CDT-40251	4.54	3.56	3.25	0.69	2.500-16 UN	2.38	0.87	0.83	2.25	.500-13 UN	0.80	0.39	0.31	0.66	0.59	4.6
CDT-40381	5.57	4.07	3.76	0.69	2.500-16 UN	2.38	0.87	0.83	2.25	.500-13 UN	0.80	0.39	0.31	0.66	0.59	5.6
CDT-40501	6.89	4.92	4.61	0.69	2.500-16 UN	2.38	0.87	0.83	2.25	.500-13 UN	0.80	0.39	0.31	0.66	0.59	6.6

Shown: WRT-22, CYDA-15, WMT-39



Swing cylinders
Work supports

Linear cylinders

89-100

▶ Threaded cylinders for workpiece positioning, holding and ejecting applications where space is at a premium. The advance and retract mode of double-acting models allow installation of clamping accessories to the plunger for pull and push action. Cylinders can be mounted with horizontal bracket to position the workpiece against the stops. Ideal for supporting or positioning a part.

Fine positioning and convenient installation

...can be fixtured into manual strap
or bridge clamp assemblies

- Maximum clamping force in a compact design
- Threaded body allows exact positioning and easy installation
- Center-tapped plungers allow a variety of attachments
- Single-acting spring return models simplify hydraulic tubing requirements
- Double-acting models are ideal for applications requiring powered pulling or fast automated control
- Removable base allows CYDA-15 to be threaded into a custom manifold

i Single or Double acting

Single acting

- The obvious choice when there are few system restrictions, and there are not many units retracting simultaneously
- Fewer valving requirements which results in a less complex circuit

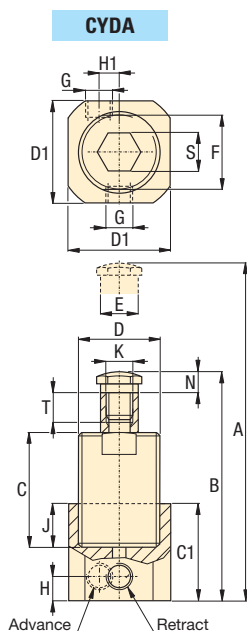
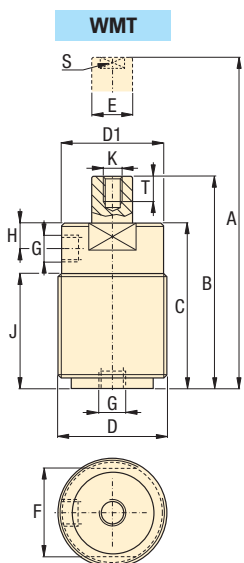
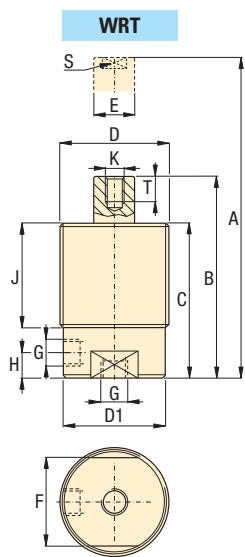
Double acting

- Used when greater control is required during the unclamp cycle
- When timing sequences are critical
- Less sensitive to system back pressures, resulting from long tube lengths or numerous components being retracted at the same time

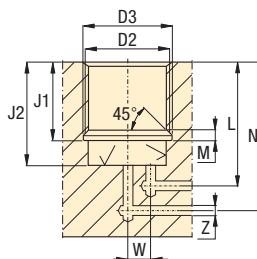
Product selection

Cylinder capacity at maximum pressure	Stroke		Model number	Effective area		Oil capacity		Operating pressure
	in			in ²		in ³		
	push	pull		push	pull	push	pull	
▼ Single acting								
3900	–	.50	WRT-21	.79	–	.39	–	150-5000
3900	–	1.00	WRT-22	.79	–	.79	–	150-5000
▼ Double acting								
1200	600	1.56	CYDA-15	.41	.20	.62	.31	150-3000
3900	2700	.50	WMT-39	.79	.54	.39	.27	150-5000
3900	2700	1.00	WMT-40	.79	.54	.79	.54	150-5000

Note: - Seal material CYDA-15: Buna-N, Polyurethane
- Seal material WMT and WRT series: Buna-N, Polyurethane, Teflon.



Manifold dimensions using CYDA-15 without base



Surface roughness must be 63 micro-inches

Manifold dimensions in inches

Cylinder capacity lbs	D2	D3	J1	J2	L	M	N	W	Z
	UNF								
▼ For using CYDA-15 without base									
1200	1.000-12	1.02	.775-.790	1.00	1.19	.12	1.94	.259	.09

Accessory chart

Body Thread	Mounting Flange	Flange Nut	Plunger Thread	Contact Bolt
	Sold Separately	Sold Separately		
D	MF-251	FN-251	K	
1.000-12 UN	MF-251	FN-251	0.250-28 UN	BS-61
1.375-18 UN	MF-351	FN-351	0.313-24 UN	BS-81


Product dimensions in inches [\pm]

Model number	A	B	C	C1	D	D1	E	F	G	H	H1	J	K	N	S	T	lbs
▼ Single acting																	
WRT-21	3.75	3.25	2.95	-	1.375-18	1.23	.75	.50	SAE #2	.62	-	1.7	.250-28	-	.50	.32	1.2
WRT-22	4.75	3.75	3.45	-	1.375-18	1.23	.75	.50	SAE #2	.62	-	2.2	.250-28	-	.50	.32	1.4
▼ Double acting																	
CYDA-15	5.97	4.41	2.97	1.75	1.000-12	1.25	.50	.88	.125-27 NPT	.38	.20	1.00	.313-24	.31	.50	.50	1.2
WMT-39	3.76	3.26	2.99	-	1.375-18	1.30	.56	1.06	.125-27 NPT	.73	-	2.05	.250-28	-	.50	.39	1.0
WMT-40	4.78	3.78	3.51	-	1.375-18	1.30	.56	1.06	.125-27 NPT	.73	-	2.56	.250-28	-	.50	.39	1.2

- Force: 600-3900 lbs
- Stroke: .50-1.56 inch
- Pressure: 150-5000 psi
- E** Cilindros roscados
- F** Vérins corps filetés
- D** Einschraubzylinder



Options

Cylinder accessories  [78](#)

Important

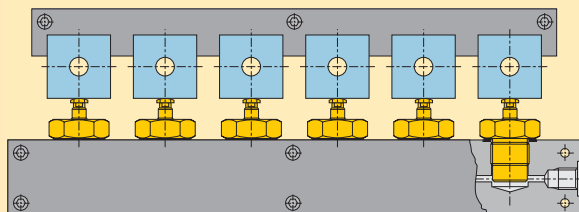
Apply Loctite 222 or equivalent to threads and torque CYDA-15 in cavity to 72-96 in-lbs. Cavity must be designed to withstand hydraulic forces.

Manifold cylinders *Application & selection*

Shown: CSM-10131, CSM-571, CSM-18251

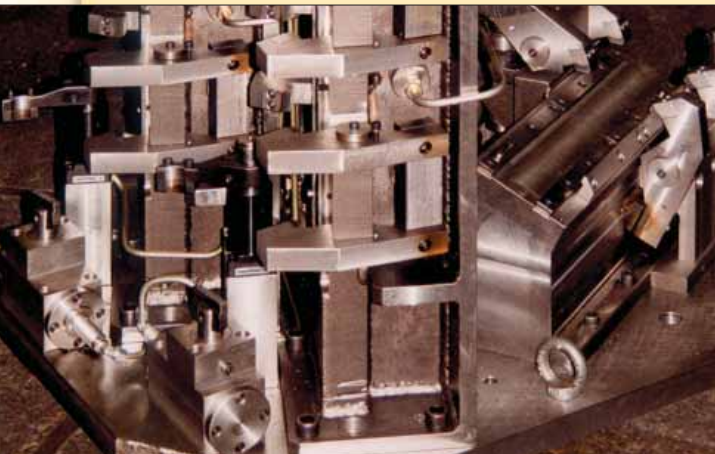


▶ These compact, fixture-integrated cylinders are designed for workpiece positioning, holding and ejecting applications where space is at a premium. No exposed tubing.



Six CSM series manifold cylinders are used to clamp piston blocks for machining. The hydraulic flow to the cylinders is side-ported in order to minimize the required manifold thickness.

■ Threaded cylinders are used here to position engine manifolds for drilling, tapping and mill finish.

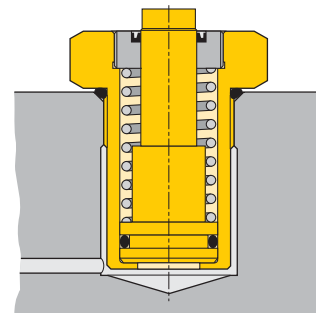


Compact, fixture-integrated positioning and holding

- Design eliminates the need for fittings and tubing, minimizing space requirements and facilitating easy removal of chips and dirt
- Minimal cylinder height enables extremely compact fixture designs
- Cylinder body is fully recessed within the fixture allowing the workpiece to be positioned near-flush with the fixture surface, saving space
- Nitro carburized bodies and internal plunger wipers allow maintenance-free, high cycle performance
- Center-tapped plungers will hold workpiece contact buttons
- Standard SAE bodies make manifold cavity preparation easy

i Manifold mount

Manifold cylinders are designed to be screwed directly into a manifold or fixture. Enerpac's manifold cylinders feature SAE dimensions, enabling the use of standard SAE porting tools for easy cavity preparation. An SAE O-ring, included with each cylinder, provides an effective seal between the cylinder and manifold.



Product selection

Cylinder capacity at 5000 psi	Stroke	Model number	Effective area	Oil capacity
			in ²	in ³
lbs	in			
380	0.28	CSM-271	0.08	0.02
380	0.51	CSM-2131	0.08	0.04
1190	0.28	CSM-571	0.24	0.07
1190	0.51	CSM-5131	0.24	0.12
2590	0.28	CSM-1071	0.50	0.14
2590	0.51	CSM-10131	0.50	0.26
2590	0.75	CSM-10191	0.50	0.38
3900	0.51	CSM-18131	0.79	0.40
3900	0.98	CSM-18251	0.79	0.77
6110	0.59	CSM-27151	1.22	0.72
6110	0.98	CSM-27251	1.22	1.20

Note: - Seal material: Buna-N, Polyurethane.

Swing cylinders
Work supports

Linear cylinders

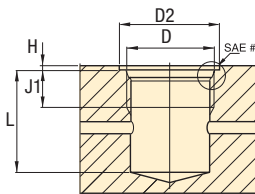
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Installation dimensions in inches []

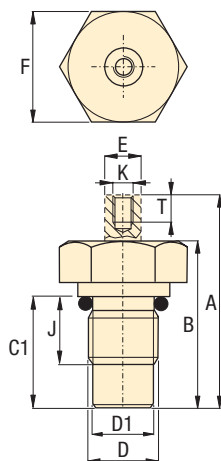
Model number	D thread SAE	D2 min. ϕ	H max.	J1 min.	L min.
CSM-271	SAE#6 (9/16"-18 UN)	0.97	0.097	0.50	.96
CSM-2131	SAE#6 (9/16"-18 UN)	0.97	0.097	0.50	1.45
CSM-571	SAE#10 (7/8"-14 UN)	1.34	0.100	0.66	1.20
CSM-5131	SAE#10 (7/8"-14 UN)	1.34	0.100	0.66	1.53
CSM-1071	SAE#12 (1-1/16"-12 UN)	1.63	0.130	0.75	1.20
CSM-10131	SAE#12 (1-1/16"-12 UN)	1.63	0.130	0.75	1.44
CSM-10191	SAE#12 (1-1/16"-12 UN)	1.63	0.130	0.75	2.05
CSM-18131	SAE#16 (1-5/16"-12 UN)	1.91	0.130	0.75	1.57
CSM-18251	SAE#16 (1-5/16"-12 UN)	1.91	0.130	0.75	2.34
CSM-27151	SAE#20 (1-5/8"-12 UN)	2.27	0.132	0.75	1.66
CSM-27251	SAE#20 (1-5/8"-12 UN)	2.27	0.132	0.75	2.38

Installation dimensions

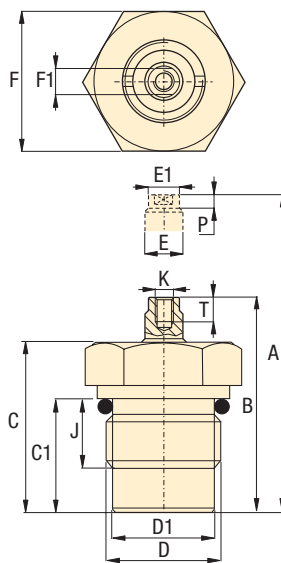


Note: - O-rings included. For additional cavity machining information, refer to SAE standards for straight internal thread, O-ring boss, or call Enerpac's Technical Service Department.

CSM-271, -2131



other models



Product dimensions in inches []

Model number	A Ext. height	B Retr. height	C	C1	D thread	D1 ϕ	E ϕ	E1 ϕ	F	F1	J	K thread	P	T	lbs
CSM-271	1.56	1.28	-	0.98	.563-18 UN	0.47	0.19	-	0.75	-	0.47	#6-32 UN	-	0.19	0.2
CSM-2131	2.20	1.69	-	1.38	.563-18 UN	0.47	0.19	-	0.75	-	0.47	#6-32 UN	-	0.19	0.3
CSM-571	1.78	1.50	1.34	0.93	.875-14 UN	0.75	0.27	0.27	1	0.25	0.51	#8-32 UN	0.16	0.28	0.4
CSM-5131	2.34	1.83	1.67	1.26	.875-14 UN	0.75	0.27	0.27	1	0.25	0.51	#8-32 UN	0.16	0.28	0.6
CSM-1071	2.15	1.87	1.65	1.14	1.062-12 UN	0.94	0.47	0.43	1.25	0.38	0.59	.312-24 UN	0.22	0.39	1.1
CSM-10131	2.62	2.11	1.89	1.38	1.062-12 UN	0.94	0.47	0.43	1.25	0.38	0.59	.312-24 UN	0.22	0.39	1.3
CSM-10191	3.47	2.72	2.50	1.99	1.062-12 UN	0.94	0.47	0.43	1.25	0.38	0.63	.312-24 UN	0.22	0.39	1.4
CSM-18131	2.88	2.37	2.11	1.55	1.312-12 UN	1.18	0.63	0.59	1.61	0.63	0.63	.312-24 UN	0.26	0.47	1.1
CSM-18251	4.11	3.13	2.89	2.30	1.312-12 UN	1.18	0.63	0.59	1.61	0.63	0.63	.312-24 UN	0.26	0.47	1.3
CSM-27151	3.15	2.56	2.31	1.60	1.625-12 UN	1.52	0.71	0.67	2.17	0.59	0.79	.375-16 UN	0.26	0.47	1.50
CSM-27251	4.29	3.31	3.06	2.33	1.625-12 UN	1.52	0.71	0.67	2.17	0.59	0.79	.375-16 UN	0.26	0.47	2.00

Force: 380-6110 lbs

Stroke: .28-.98 inch

Pressure: 580-5000 psi

- E** Cilindros para colector
- F** Vérins pour bloc foré
- D** Einbauszylinder



Accessory chart

Plunger Thread K	Contact Bolt $\square 78$
#6-32 UN	BS-21
#8-32 UN	BS-41
0.313-24 UN	BS-81
0.375-16 UN	BS-91

Options

Accessories
Contact bolts

$\square 78$



Important

Tighten manifold cylinders according to specifications in the instruction sheet.

Return springs in single-acting cylinders should not be used to pull back heavy attachments consistently.

Shown: CDB-10162, CDB-70502, CSB-18252



Block cylinders are used for punching, pressing, riveting and bending applications. In general, these cylinders are used for moving, positioning, lifting, opening and closing.

The versatile Enerpac block cylinders, fixture mounted for clamping applications.

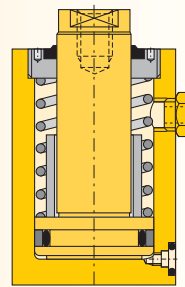
Versatile, all purpose cylinder

- Six clamping capabilities enable you to choose the right size for your application
- Variety of strokes, to meet design needs
- Double acting and Single acting (spring return), allows selection of cylinder that best conforms to your hydraulic system
- Oil connection alternatives: cylinders incorporate both manifold mount and plumbed options to meet your fixturing needs
- Compact cylinder design does not require large amounts of space on your fixture
- Integral wiper ring, keeps contaminants out of cylinder to extend life

Select your block cylinder type:

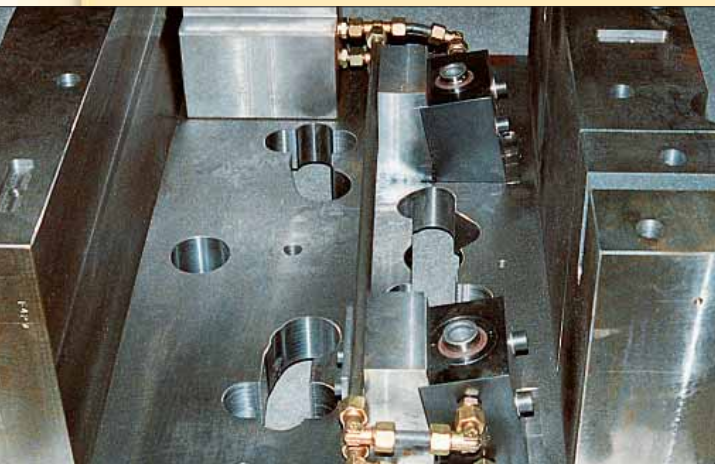
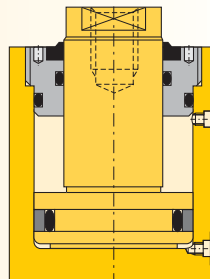
CSB series, Single acting

- Internal threaded plunger
- Manifold O-ring ports
- Black oxide base
- Hard chrome-plated plunger
- BSPP oil port
- Strong return spring
- Filtered vent plug



CDB series, Double acting

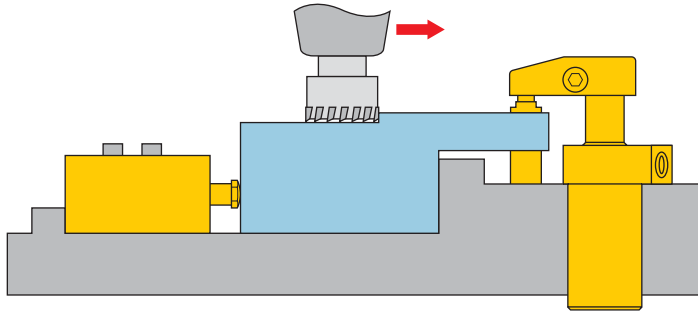
- Internal threaded plunger
- Manifold O-ring ports
- Black oxide base
- Hard chrome-plated plunger
- BSPP oil port





i Application example

Block cylinder positions workpiece against fixed point with further clamping coming from an Enerpac swing cylinder.



- Force: 2400-60,850 lbs**
- Stroke: .63-2.20 inch**
- Pressure: 580-5000 psi**

- E Cilindros tipo bloque**
- F Vérins cube**
- D Blockzylinder**



Accessory chart

Plunger Thread K	Contact Bolt □78 ▶
M6 X 1,0	BS-62
M8 X 1,25	BS-82
M16 X 2,0	BS-16
M20 X 2,5	BS-20
M30 X 3,5	BS-30
M36 X 4,0	BS-36

Product selection

Piston Ø	Rod Ø	Clamping force at 5000 psi		Stroke	Model number	Cylinder effective area		Cylinder oil capacity		Minimum spring return force	
		push	pull			push	pull	push	pull	lbs	lbs
in	in	lbs	lbs	in		in ²	in ²	in ³	in ³	lbs	lbs
						push	pull	push	pull		
▼ Single acting											
.79	.47	2400	-	.71	CSB-10182	.48	-	.35	-	24	2.6
.98	.63	3800	-	.98	CSB-18252	.76	-	.75	-	35	4.0
1.57	.98	9750	-	.98	CSB-40252	1.95	-	1.92	-	85	5.9
1.97	1.26	15,200	-	.98	CSB-70252	3.04	-	3.00	-	96	9.7
▼ Double acting											
.79	.47	2400	1550	.63	CDB-10162	.48	.31	.31	.20	-	2.0
.79	.47	2400	1550	1.42	CDB-10362	.48	.31	.69	.44	-	2.6
.98	.63	3800	2250	.79	CDB-18202	.76	.45	.60	.35	-	2.9
.98	.63	3800	2250	1.97	CDB-18502	.76	.45	1.50	.90	-	4.0
1.57	.98	9750	4900	.98	CDB-40252	1.95	.98	1.92	.96	-	4.2
1.57	.98	9750	4900	1.97	CDB-40502	1.95	.98	3.83	1.93	-	5.7
1.97	1.26	15,200	9000	.98	CDB-70252	3.04	1.80	3.00	1.77	-	7.1
1.97	1.26	15,200	9000	1.97	CDB-70502	3.04	1.80	5.99	3.54	-	9.5
3.15	1.97	38,900	23,700	.98	CDB-180252	7.80	4.74	7.66	4.67	-	20.5
3.15	1.97	38,900	23,700	1.97	CDB-180502*	7.80	4.74	15.33	9.34	-	25.4
3.94	2.48	60,850	36,650	2.20	CDB-280562*	12.17	7.33	26.83	16.18	-	40.1

* This product is made to order. Please contact Enerpac for delivery information before specifying in your design.

Linear cylinders
Power sources
Valves
System components
Yellow pages

Block cylinders *Application & selection*

Shown: CDB-10162, -70502, CSB-18252

Swing cylinders
Work supports

Linear cylinders

09 022

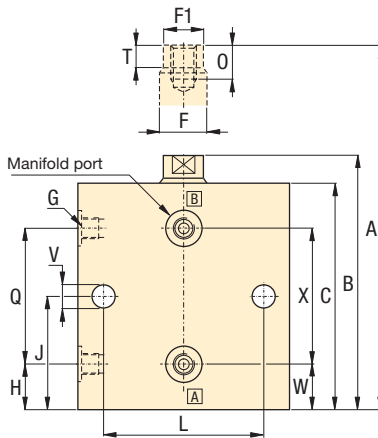
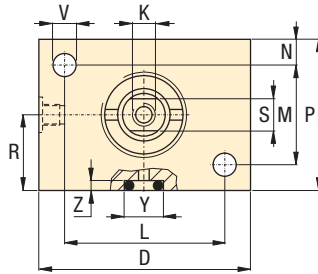


CDB, CSB series

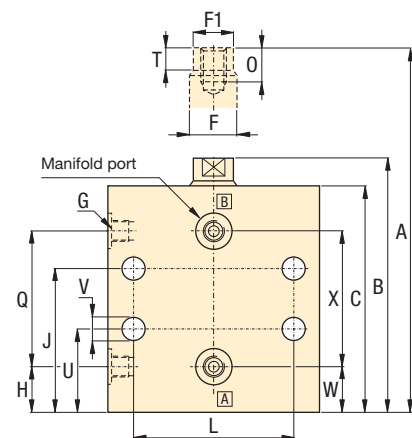
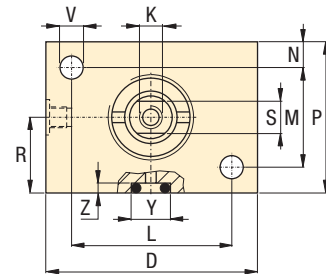
These compact block cylinders are easily mounted in horizontal or vertical position for a range of special tooling applications.

They can be used for positioning, clamping, pushing, pressing or punching operations. The plunger has an internal thread to accommodate accessories such as contact bolts.

CDB-10162, -18202, -40252, -70252, -180252



All other models



Dimensions in inches [mm]

Model number	A	B	C	D	F	F1	G	H	J	K	L	M
					ø	ø				ø		
▼ Single acting												
CSB-10182	3.94	3.23	2.91	2.36	.47	.43	G1/8"	.47	1.73	M6 x 1,0	1.77	.98
CSB-18252	4.92	3.94	3.62	2.56	.63	.59	G1/8"	.47	2.24	M8 x 1,25	1.97	1.18
CSB-40252	5.12	4.13	3.66	3.15	.98	.94	G1/8"	.35	2.24	M16 x 2,0	2.36	1.38
CSB-70252	5.63	4.65	4.09	3.94	1.26	1.22	G1/4"	.47	2.52	M20 x 2,5	3.15	1.77
▼ Double acting												
CDB-10162	3.03	2.40	2.17	2.36	.47	.43	G1/8"	.47	.97	M6 x 1,0	1.77	.98
CDB-10362	4.65	3.23	2.91	2.36	.47	.43	G1/8"	.47	1.75	M6 x 1,0	1.77	.98
CDB-18202	3.54	2.76	2.44	2.56	.63	.59	G1/8"	.47	1.06	M8 x 1,25	1.97	1.18
CDB-18502	5.91	3.94	3.62	2.56	.63	.59	G1/8"	.47	2.24	M8 x 1,25	1.97	1.18
CDB-40252	4.13	3.15	2.68	3.15	.98	.94	G1/8"	.35	1.26	M16 x 2,0	2.36	1.38
CDB-40502	6.10	4.13	3.66	3.15	.98	.94	G1/8"	.35	2.24	M16 x 2,0	2.36	1.38
CDB-70252	4.53	3.54	2.99	3.94	1.26	1.22	G1/4"	.51	1.42	M20 x 2,5	3.15	1.77
CDB-70502	6.61	4.65	4.09	3.94	1.26	1.22	G1/4"	.47	2.51	M20 x 2,5	3.15	1.77
CDB-180252	5.16	4.17	3.50	5.51	1.97	1.93	G1/4"	.59	1.63	M30 X 3,5	4.33	3.15
CDB-180502*	7.28	5.31	4.65	5.51	1.97	1.93	G1/4"	.47	2.78	M30 x 3,5	4.33	3.15
CDB-280562*	8.19	5.98	5.24	6.69	2.48	2.44	G1/4"	.71	3.06	M36 x 4,0	5.31	3.54

Block cylinder used for punching applications.



09 001

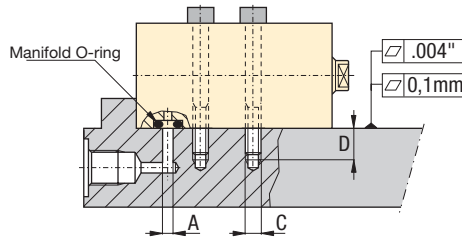


i Installation instructions

When operating above 2000 psi in applications as shown in the figure below, provide cylinder back-up using a support to eliminate shear loads on the mounting bolts.

Manifold mounting

When hydraulic connections are made through the standard integrated O-ring ports as shown in figure, the sealing surface must have a roughness of 63 micro-inches.



Single-acting cylinders

If the risk of machining coolants or debris being entering via the breather vent (port B) exists, it is recommended that this port be connected to a clean, remote termination point.

A Installation dimensions in inches []

Clamping capacity	Oil channel diameter	Mounting thread	Min. thread length	Torque (bolt type 12.9 DIN 912)	Manifold O-ring ¹⁾	
					Inside Ø x thickness	ARP No.
lbs	A	C	D	Ft.lbs		
2400	.20	M6	.43	13	.31 x .06	568-011
3800	.20	M8	.51	30	.31 x .06	568-011
9750	.20	M10	.63	63	.31 x .06	568-011
15,200	.20	M12	.75	107	.31 x .06	568-011
38,900	.31	M16	.94	260	.38 x .09	568-110
60,850	.31	M20	1.10	498	.38 x .09	568-110

¹⁾ Manifold O-rings include

N	O	P	Q	R	S	T	U	V	W	X	Y	Z	Model number
mín.													
													Single acting ▼
.31	.39	1.57	1.77	.79	.35	.22	.94	.28	.47	1.77	.43	.05	CSB-10182
.31	.47	1.77	2.36	.91	.51	.24	1.06	.35	.47	1.97	.43	.05	CSB-18252
.39	.98	2.17	2.44	1.06	.87	.37	1.06	.39	.39	2.36	.43	.05	CSB-40252
.39	1.18	2.60	2.68	1.30	1.06	.43	1.14	.47	.59	2.55	.43	.05	CSB-70252
													Double acting ▼
.28	.39	1.57	.98	.79	.35	.22	-	.28	.47	.98	.43	.05	CDB-10162
.31	.39	1.57	1.77	.79	.35	.22	.94	.28	.47	1.77	.43	.05	CDB-10362
.31	.47	1.77	1.18	.91	.51	.24	-	.35	.47	1.18	.43	.05	CDB-18202
.31	.47	1.77	2.36	.91	.51	.24	1.06	.35	.47	2.36	.43	.05	CDB-18502
.39	.98	2.17	1.50	1.06	.87	.37	-	.39	.37	1.50	.43	.05	CDB-40252
.39	.98	2.17	2.44	1.06	.87	.37	1.06	.39	.39	2.46	.43	.05	CDB-40502
.43	1.18	2.60	1.54	1.30	1.06	.43	-	.47	.47	1.57	.43	.05	CDB-70252
.39	1.18	2.60	2.68	1.30	1.06	.43	1.14	.47	.59	2.56	.43	.05	CDB-70502
.59	1.77	4.33	1.77	2.17	1.61	.57	-	.67	.59	1.77	.43	.07	CDB-180252
.59	1.77	4.33	3.03	2.17	1.61	.57	1.22	.67	.79	2.76	.43	.07	CDB-180502*
.71	1.97	4.92	3.15	2.44	1.97	.67	1.50	.83	.71	3.15	.43	.07	CDB-280562*

* This product is made to order. Please contact Enerpac for delivery information before specifying in your design.

Force: 2400-60,850 lbs

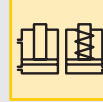
Stroke: .63-2.20 inch

Pressure: 580-5000 psi

E Cilindros tipo bloque

F Vérins cube

D Blockzylinder



! Important

Must include shear back-up with ability to withstand full load.

Linear cylinder support is required at operating pressures above 2000 psi. Follow the instructions on this page.

i Options

Contact bolts

78



Fittings

158



Pressure gauges

154



High pressure filters

157

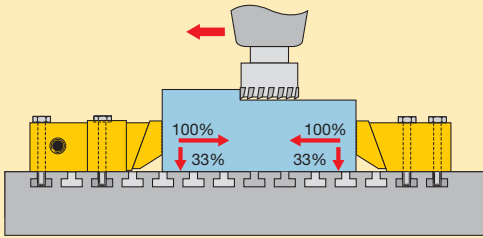


Pull down clamps *Application & selection*

Shown: ECM-20, ECH-202, ECM-5, ECH-52

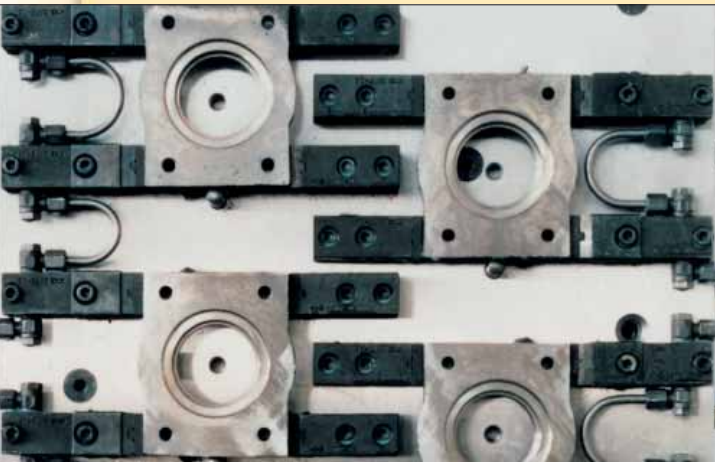


Enerpac pull down clamps are designed to allow unobstructed top face machining. Independent horizontal and vertical movement achieves high lateral and pull down forces to hold the workpiece firmly down against the machine table or fixture. The pull down forces are approximately 33% of the clamping force.



The pull down clamps can be permanently mounted using the supplied mounting bolts. Optional T-nuts can be used for adapting to varying workpiece sizes.

■ *Enerpac hydraulic pull down clamps and their mechanical counter parts used to manufacture tie-rod cylinder end caps.*

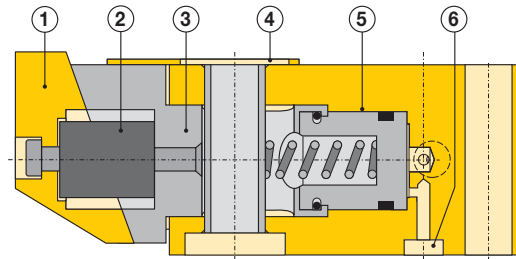


Low profile clamp

.....for unobstructed top face machining

- Independent horizontal and vertical movement for a true pull down effect
- Compact size and low height allows more flexible and economic mounting than comparable dedicated vise
- Manifold and BSPP porting
- Investment high-alloy cast, heat-treated clamping jaw and plunger
- Contamination resistant design for low maintenance, removable guard for chip removal
- Oil ports on both sides for mounting flexibility
- Optional mechanical counter hold provides pull down on end stop for large parts
- Mounting bolts included for ease of installation

i Pull down clamp operation



The moveable jaw (1) and the flexible connection design (2) allows lateral movement and eliminate any bending moment. Roller finished cylinder bore (3) improves seal life. The removable guard (4) prevents the entry of chips and allows easy cleaning. Heat treated, centerless ground plunger (5) for extremely close tolerances and long life. The clamps feature both manifold mount (6) and plumbed oil connection.

i Product selection

Lateral clamping force at 5000 psi	Pull down force at 5000 psi	Stroke	Model number	Effective area	Oil capacity	Mounting bolts ¹⁾ (included)
lbs	lbs	in		in ²	in ³	mm

▼ Hydraulic pull down clamps

870	290	.20	ECH-52	.18	.03	M8 x 45
3900	1300	.31	ECH-202	.78	.24	M12 x 80

Holding force	For pull down clamp model number	Model number	Mounting bolts included ¹⁾ number	Replaceable ribbed jaws model
lbs			mm	

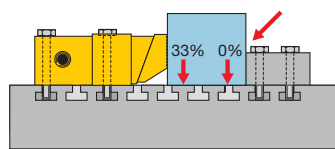
▼ Mechanical counter holds

870	ECH-52	ECM-5	M8 x 35	ECJR-5
3900	ECH-202	ECM-20	M12 x 65	ECJR-20

¹⁾ Torque M8 with 18 Ft.lbs, M12 with 63 Ft.lbs. The use of T-nuts requires longer bolts.



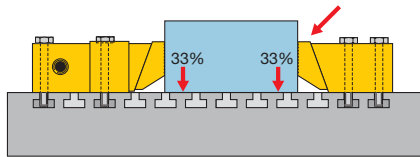
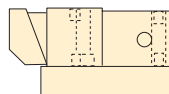
i Pull down force



Fixed stop set-up

A very workable set-up for workpieces that are not larger or wider than twice the width of the edge clamp. The pull down force of the hydraulic actuated edge clamp is sufficient to pull down and hold the product during actual machining.

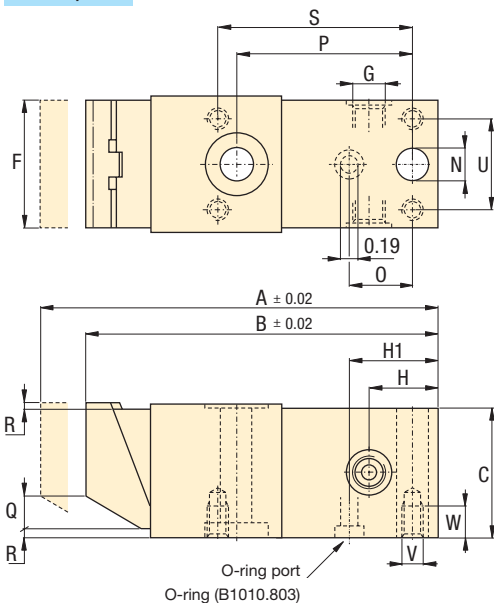
The mounting surface must extend out under the jaw.



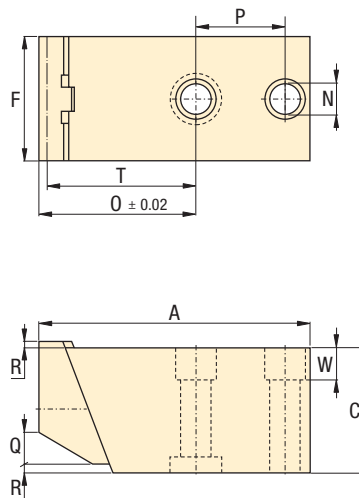
Counter hold set-up

For workpieces larger than twice the width of the edge clamp used, it is recommended to install a mechanical counter hold. The counter hold also produces a pull down force equal to 1/3 of the lateral force of the hydraulic edge clamp applied. In this way the grip on the workpiece is very tight. Another advantage of this set-up is the repeated accuracy of machining results.

ECH-52, -202

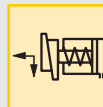


ECM-5, -20





- Force: 870-3900 lbs**
- Stroke: .20-.31 inch**
- Pressure: 225-5000 psi**


- E Garras de empuje oblicuo**
- F Crampons plaqueurs**
- D Niederzugspanner**



i Options

Fittings  **158**

Threaded cylinders  **56**

Positive clamping cylinders  **70**

! Important

Threaded push cylinders (CST, CDT, CSM series) or spring loaded cylinders (MRS-series) can be used to hold the workpiece against the side locators during part clamping.

Do not allow the clamping jaw to extend below the lower surface of the clamp body.

A Product dimensions in inches [\pm]

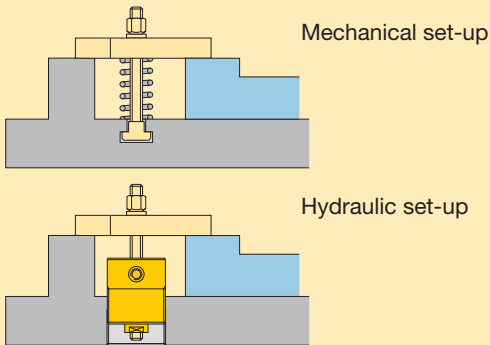
Model number	A	B	C	F	G	H	H1	N	O	P	Q	R	S	T	U	V	W	lbs
	mm																	
▼ Hydraulic pull down clamps																		
ECH-52	4.14	3.94	1.18	1.18	G1/8"	.75	.74	.33	.46	2.09	.12	.08	2.32	-	.87	M5 x 0,8	.24	1.5
ECH-202	5.62	5.31	1.97	1.97	G1/4"	.98	.93	.49	.54	2.64	.55	.12	2.91	-	1.42	M8 x 1,25	.47	5.5
▼ Mechanical counter holds																		
ECM-5	3.11	-	1.18	1.18	-	-	-	.33	1.65	1.02	.12	.08	-	1.61	-	-	.31	1.3
ECM-20	4.02	-	1.97	1.97	-	-	-	.49	2.36	1.18	.55	.12	-	2.32	-	-	.51	4.1

Hollow plunger cylinders *Application & selection*

Shown: HCS-20, RWH-121, RWH-202

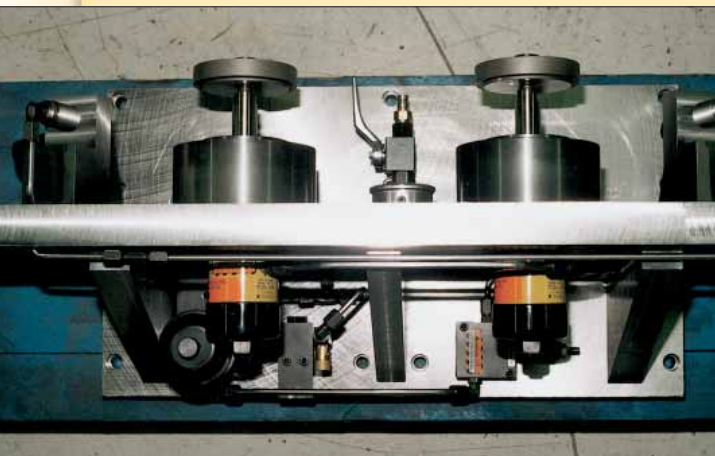


These cylinders are regularly used for upgrading mechanical clamping to faster and easier hydraulic clamping. Other typical applications include production pressing, punching and crimping operations.



Traditional mechanical elements in a clamping fixture are replaced by a hollow plunger hydraulic cylinder.

Two Enerpac RWH-121 hollow cylinders mounted at the back side of a fixture.



For high force push and pull applications on and around the fixture

- Load can be attached to either end of the cylinder, providing a choice of push or pull actions - both realizing full cylinder capacity
- Very high cylinder capacities contained within small dimensions allow compact fixture designs
- Spring return operation allows for easy unloading of the workpiece
- Threaded collars and base mounting holes allow mounting flexibility, including table-top surfaces and T-slots
- Nickel-plated plungers, plunger wipers and internal venting prevent corrosion and support longer operation life on all HCS models
- The CY series hollow plunger cylinders can be manifold mounted (except for CY-1254-25)

Product selection

Cylinder capacity ¹⁾	Stroke	Center hole diameter	Model number	Effective area	Oil capacity	Operating pressure
2610	.25	.39	CY1254-25	.87	.22	3000
4000	.31	.53	RWH-20	1.33	.41	3000
4000	.31	.53	RWH-21	1.33	.41	3000
4830	.39	.43	HCS-20*	.96	.38	5000
7410	.31	.76	CY2129-25	2.47	.77	3000
7410	.63	.76	CY2129-5	2.47	1.56	3000
12,660	.47	.51	HCS-50*	2.52	1.19	5000
13,320	.63	.89	CY2754-5	4.44	2.80	3000
13,800	.31	.77	QDH-120	2.76	.86	5000
13,800	.31	.77	RWH-120	2.76	.86	5000
13,800	1.00	.77	RWH-121	2.76	2.76	5000
18,180	.55	.67	HCS-80*	3.63	1.99	5000
23,500	.50	1.06	RWH-200	4.74	2.37	5000
23,500	2.00	1.06	RWH-202	4.74	9.48	5000
25,490	.63	.83	HCS-110*	5.06	3.19	5000
36,000	.50	1.31	RWH-300	7.22	3.60	5000
36,000	1.00	1.31	RWH-301	7.22	7.22	5000
36,000	2.50	1.31	RWH-302	7.22	18.00	5000

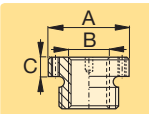
¹⁾ At maximum operating pressure. **Note:** Seal material Buna-N, Polyurethane, Teflon.

* This product is made to order. Please contact Enerpac for delivery information before specifying in your design.



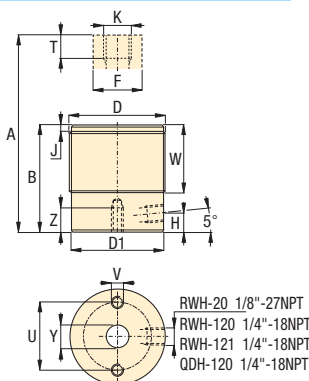
i Optional Heat Treated Hollow Saddles

Saddle type	Cylinder model number	Saddle model No.	Saddle Dimensions		
			A	B	C
Threaded hollow	RWH-200, 202	HP-2015	2.11	1" - 8	.38
	RWH-300, 301, 302	HP-3015	2.49	1 1/4" - 7	.38

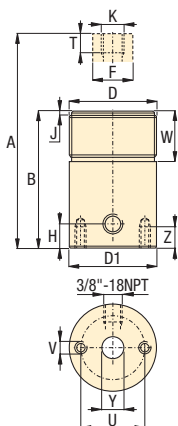


Smooth hollow saddles are standard on all RWH 20 and 30 ton models (12 ton models are not equipped with saddles).

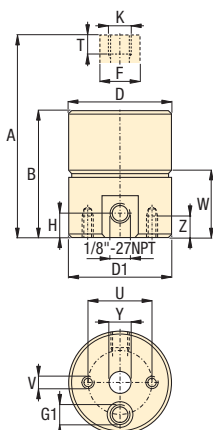
RWH-20, 120, 121, QDH-20



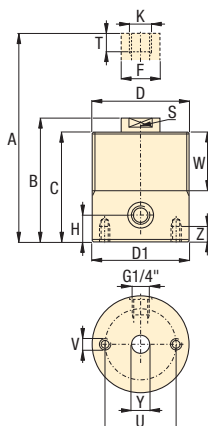
other RWH model



CY models

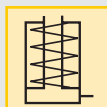


HCS models



- Force:** 2610-36,000 lbs
- Stroke:** .25-2.50 inch
- Pressure:** 800-5000 psi

- E** Cilindros de émbolo hueco
- F** Vérins a piston creux
- D** Hohlkolbenzylinder



i Options

Flange nuts



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! Important

Use Grade 8 (DIN12.9) bolt quality or better for pulling.
Use Grade B7 (DIN10.9) threaded rod quality or better for pulling applications.

RWH cylinders can be used up to 10,000 psi maximum working pressure (except RWH-20).

A Product dimensions in inches [$\pm \text{tolerance}$]

Model number	A	B	C	D	D1	F	H	J	K	S	T	U	V	W	Y	Z	lbs
CY1254-25	2.25	2.00	-	1.75	1.75	.56	.29	-	.375-16 UNC	-	.62	1.25	.250-20 UNC	.91	.39	.38	1.0
RWH-20	2.38	2.06	-	1.875-16 UN	1.79	1.00	.28	.12	0.53	-	.88	1.38	.250-20 UNC	1.50	.500-20 UNF	.25	1.4
RWH-20U001	2.38	2.06	-	1.875-16 UN	1.79	1.00	.28	.12	.500-20 UNF	-	.88	1.38	.250-20 UNC	1.50	.53	.25	1.4
HCS-20*	3.31	2.92	2.60	M58 x 1,5	2.28	.63	.43	-	M10 x 1,5	.55	1.02	1.57	M6 x 1,0	1.57	.43	.39	2.4
CY2129-25¹⁾	2.31	2.00	-	2.63	2.63	1.13	.31	-	.750-10 UNC	-	1.13	1.75	.375-16 UNC	.75	.76	.38	2.5
CY2129-5¹⁾	3.36	2.73	-	2.63	2.63	1.13	.31	-	.750-10 UNC	-	1.13	1.75	.375-16 UNC	1.48	.76	.44	3.0
HCS-50*	3.78	3.31	2.95	M65 x 1,5	2.56	1.10	.55	-	M12 x 1,75	.87	.96	1.77	M8 x 1,25	1.77	.51	.47	3.3
CY2754-5¹⁾	3.63	3.00	-	3.50	3.50	1.25	.31	-	.875-9 UNC	-	1.20	2.12	.375-16 UNC	1.55	.89	.44	6.0
QDH-120	2.50	2.19	-	2.750-16 UN	2.75	1.38	.39	.19	.750-10 UNC	-	.63	2.00	.312-18 UNC	1.19	.77	.25	3.0
RWH-120	2.50	2.19	-	2.750-16 UN	2.75	1.38	.39	.19	.750-16 UNF	-	.63	2.00	.312-18 UNC	1.19	.77	.25	3.1
RWH-121	4.19	3.19	-	2.750-16 UN	2.75	1.38	.53	.19	.750-16 UNF	-	1.00	2.00	.312-18 UNC	1.19	.77	.25	4.8
HCS-80*	4.29	3.74	3.35	M75 x 1,5	2.95	1.26	.67	-	M16 x 2,0	.94	1.28	2.16	M8 x 1,25	1.97	.67	.47	5.1
RWH-200	5.31	4.81	-	3.875-12 UN	3.88	2.13	.75	.19	1.562-16 UN	-	.75	3.25	.375-16 UNC	1.50	1.06	.38	13.6
RWH-202	8.31	6.00	-	3.875-12 UN	3.88	2.13	.75	.19	1.562-16 UN	-	.75	3.25	.375-16 UNC	1.50	1.06	.38	17.0
HCS-110*	4.72	4.09	3.66	M90 x 2,0	3.54	1.57	.75	-	M20 x 2,5	1.26	1.43	2.56	M10 x 1,5	2.36	.83	.59	7.9
RWH-300	5.50	4.62	-	4.500-12 UN	4.50	2.50	.85	.19	1.812-16 UN	-	.88	3.62	.375-16 UNC	1.66	1.31	.62	19.0
RWH-301	6.12	5.12	-	4.500-12 UN	4.50	2.50	.85	.19	1.812-16 UN	-	.88	3.62	.375-16 UNC	1.66	1.31	.62	21.5
RWH-302	9.12	6.62	-	4.500-12 UN	4.50	2.50	.85	.19	1.812-16 UN	-	.88	3.62	.375-16 UNC	1.66	1.31	.62	24.0

¹⁾ For these models G1 = manifold and .125-27 NPTF

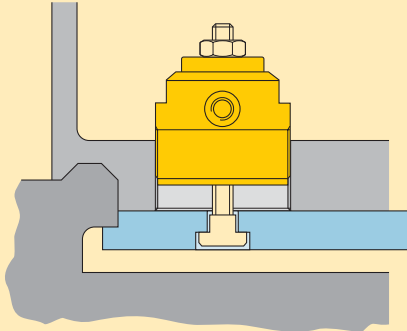
Positive clamping cylinder *Application & selection*

Shown: MRS-1, MRS-1001, MRS-5001



These cylinders are designed for prolonged clamping applications in moveable machine parts, tools, fixtures, pallets and workpieces.

The mechanical clamping force of this cylinder is ideal for FMS applications. Hydraulic pressure is used to release the workpiece and is not required to maintain the clamping force on the workpiece. Internal high strength springs produce the required clamping force.



When pressure is released, the Enerpac MRS cylinders clamp the workpiece by pushing it against the frame that is attached to the fixture.

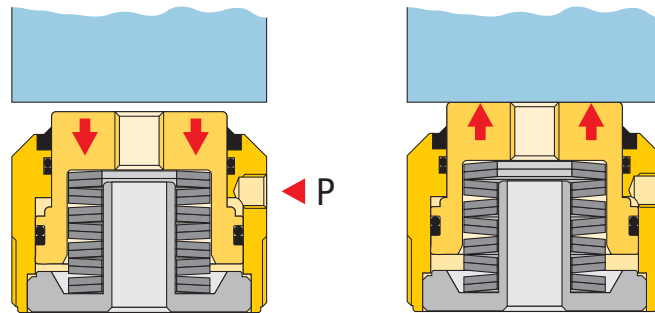
Ideal for palletized applications

- Heavy disk springs maintain the clamping force - hydraulic pressure is used for release
- Single-acting design allows easy setup of hydraulic system
- Hollow plunger design allows easy retrofit for mechanical clamping
- Custom buttons can be fitted into the plunger for clamping directly against a workpiece
- Threaded body allows easy cylinders mounting directly into fixture plate
- Internal threaded plunger allows accessories to be used easily for retrofit applications

Positive clamping operation

The applied clamping force is determined by how far the cylinder's plunger is being retracted when engaging contact with the workpiece (referred to as the effective clamping stroke).

Use the diagrams on the next page as a guide to your fixture set-up. Note that in order to load and unload the workpiece, the plunger must be retracted somewhat further than the effective clamping stroke.



Hydraulic pressure applied

- Plunger retracts
- Work piece is released
- New work piece is loaded

Hydraulic pressure released

- Springs apply force
- Workpiece is clamped
- Machining can take place

Product selection

Cylinder capacity at 5000 psi	Effective clamping stroke	Model number	Required operating pressure ¹⁾	Max. tensioning stroke	Oil capacity
			psi	in	in ³
2700 lbs	.09 in	MRS-1	5000	.09	.05
6000	.09	MRS-2	5000	.09	.26
11,500	.09	MRS-5	5000	.09	.50
1900	.10	MRS-1001	2000	.20	.54
3700	.10	MRS-2001	2700	.20	.73
5800	.10	MRS-3001	2600	.20	1.22
8500	.12	MRS-5001	3400	.22	1.35

¹⁾ Minimum operating pressure to fully retract the plunger.

Note: Seal material Buna-N, Polyurethane.

Swing cylinders
Work supports

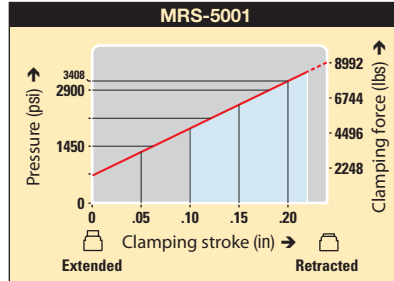
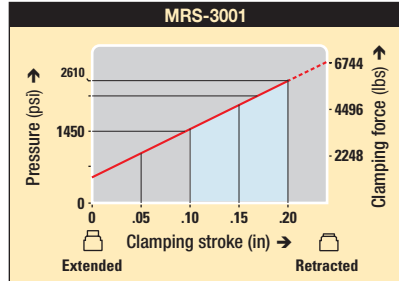
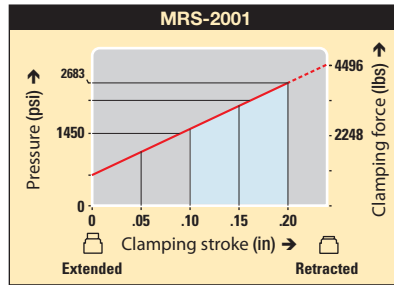
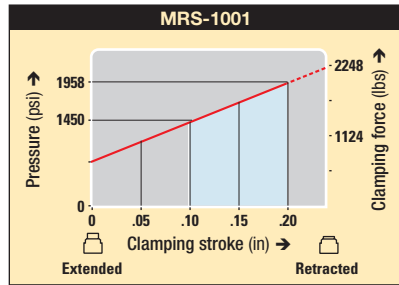
Linear cylinders

99_062

99_050

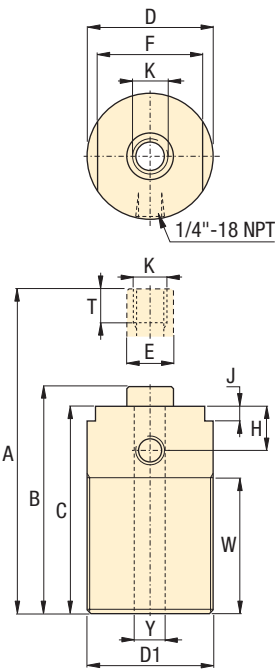


i Stroke/force diagrams for MRS-1001, -2001, -3001, -5001

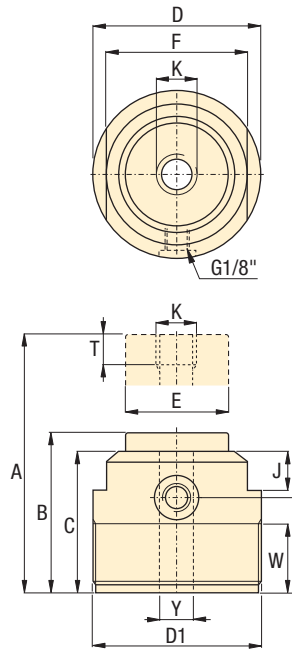


■ = SUGGESTED CLAMPING RANGE

MRS-1, 2, 5



other MRS models



A Product dimensions in inches [$\pm \text{tolerance}$]


Model number	A	B	C	D	D1	E	F	H	J	K	T	W	Y	lbs
MRS-1	3.35	3.26	3.11	1.42	M36 x 1,5	.50	1.18	.71	.24	M8 x 1,25	1.42	1.97	.35	1.1
MRS-2	3.54	3.46	3.31	1.89	M48 x 1,5	.68	1.57	.79	.28	M10 x 1,50	1.50	1.97	.43	2.0
MRS-5	4.92	4.83	4.69	2.36	M60 x 2,0	.87	1.97	.83	.28	M16 x 2,0	1.57	3.35	.67	4.0
MRS-1001	2.44	2.24	2.09	2.56	M65 x 1,5	1.57	2.17	1.38	.59	M12 x 1,75	.79	.98	.51	2.6
MRS-2001	2.56	2.36	2.24	3.15	M80 x 2,0	2.16	2.56	1.50	.59	M 16 x 2,0	.79	1.14	.67	4.6
MRS-3001	2.91	2.72	2.60	3.74	M95 x 2,0	2.36	3.15	1.81	.67	M20 x 2,5	.79	1.46	.83	6.6
MRS-5001	3.78	3.56	2.66	3.74	M95 x 2,0	2.36	3.15	1.81	.67	M20 x 2,5	.79	1.46	.83	7.7


- Force: 1900-11,500 lbs
- Stroke: .09-.22 inch
- Pressure: 2000-5000 psi


- E** Cilindros de amarre
- F** Vérins de bridage positif
- D** Federspannzylinder



Options

Buttons  [78](#)

Flange nuts  [78](#)

Collet-Lok® work supports  [38](#)

! Important

Be sure to refer to the force/stroke chart when selecting cylinders for an application. Piece parts with a large variation at the clamping point may be prone to having variations in clamping force.

Depending on the cycle usage of the application and amount of deflection, the internal disk springs may need to be replaced at scheduled intervals.

Push cylinders - Collet-Lok® design

Shown: WPTC-110, WPFC-210



Swing cylinders
Work supports

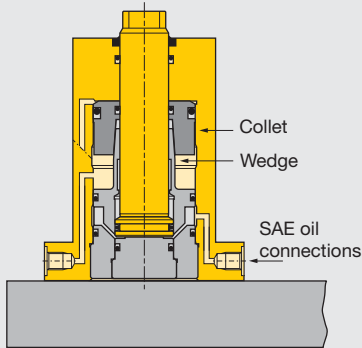
Linear cylinders

09_066

WP series

Collet-Lok® positive locking push cylinders are designed to mechanically hold the workpiece after hydraulic pressure is removed.

Push capacities range from 2500 lbs. to 5000 lbs.



Hydraulic pressure pushes the collet up a wedge, locking the plunger in the clamping position.

■ Lower flange Collet-Lok® push cylinder used for positioning a motorcycle frame.



09_048

Ideal when live hydraulics are not available

...clamping is sustained mechanically so live hydraulics are not required during the machining cycle

- Double-acting Collet-Lok® action allows fully automated operation
- Additional level of safety since live hydraulics are not required
- Collet-Lok® push cylinders can either be mounted by the flange, or threaded into the fixture
- The Collet-Lok® design is an industry exclusive
- Capacities up to 8800 lbs. available on request

Collet-Lok® sequence



Step 1

Pressurize port #1. Plunger extends and clamps workpiece.



Step 2

Keep port #1 pressurized. Pressurize port #2. Plunger will be locked in clamped position.



Step 3

Depressurize port #1 and #2. Cylinder should now be uncoupled from hydraulic power source and will maintain the clamped position.



Step 4

Pressurize port #3. Plunger will be unlocked and the plunger will be released to its original position.

Product selection

Max. push force	Hydr. plunger stroke	Lower flange	Threaded body	Operating pressure		Hydraulic effective area	Oil capacity		Max. oil flow	
				min.	max.		psi adv.	adv.		in ² unlock
2500	.59	WPFC-110	WPTC-110	725	5000	.50	.30	.37	.24	600
5000	.59	WPFC-210	WPTC-210	725	5000	.99	.61	.61	.37	600

Maximum cycle rate: 8 cycles/min.

Note: Call Enerpac to order models with metric thread and BSPP port connections.

Capacities up to 8800 lbs. available on request.

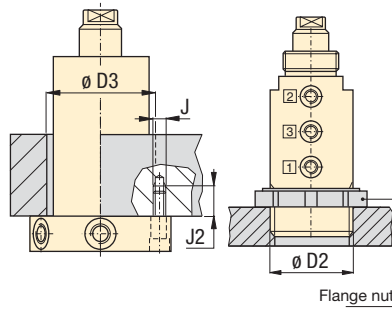
Dimensions in inches []

Model number	A	B	C	C1	D	D1	D2	E	E1	F
▼ Lower flange										
WPFC-110	6.08	5.49	5.16	-	2.76	3.94	-	.62	.59	-
WPFC-210	6.79	6.20	5.87	-	3.07	4.33	-	.87	.79	-
▼ Threaded body										
WPTC-110	6.06	5.47	5.12	.75	2.375-12 UN	2.52	1.500-12 UNF	.62	.59	1.81
WPTC-210	6.73	6.14	5.83	.71	2.750-16 UN	2.91	1.875-16 UN	.87	.79	2.16



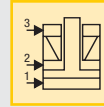
Installation dimensions in inches

Push force lbs	Fixture hole øD3	Mounting thread J	Minimum depth J2
▼ Lower flange			
2500	2.79	M6	.68
5000	3.10	M8	.72
▼ Threaded body			
2500	2.375 12 UN	-	-
5000	2.750 16 UN	-	-



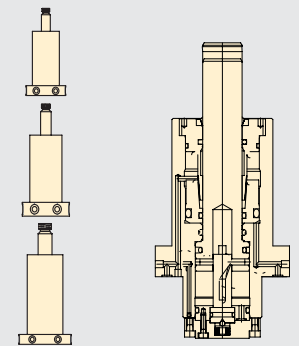
Push force: 2500-5000 lbs
Stroke: .59 inch
Pressure: 725-5000 psi

- E** Cilindros de empuje
- F** Vérins pousseurs
- D** Gesicherter Druckzylinder

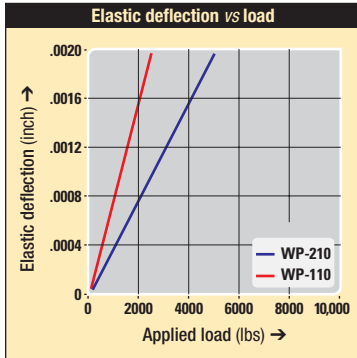
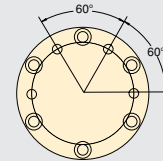


Custom Options Available

- Intermediate capacities
- Different flange locations

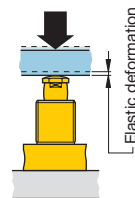


Manifold mounting

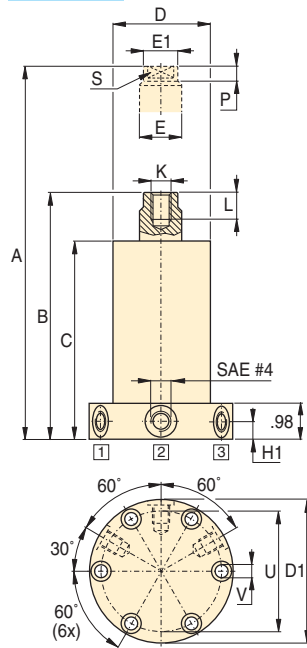


Deflection chart:

Elastic deformation of the plunger resulting from the application of load.



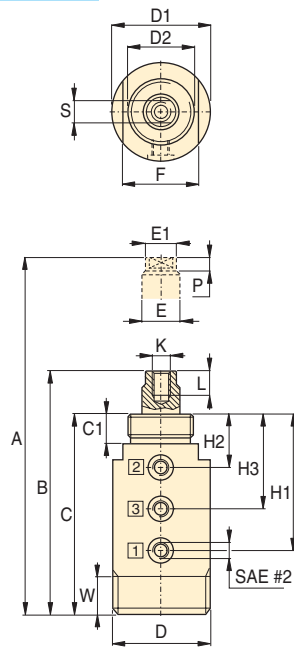
WPFC



Oil port functions

- 1** Clamp
- 2** Lock
- 3** Unlock/Retract


WPTC





H1	H2	H3	K	L	P	S	U	V	W	lbs	Model number
Lower flange ▼											
.49	-	-	.313-24 UNF	.59	.27	.47	3.31	.28	-	8.8	WPFC-110
.49	-	-	.375-24 UNF	.79	.35	.63	3.70	.35	-	11.0	WPFC-210
Threaded body ▼											
3.78	1.30	2.56	.313-24 UNF	.59	.27	.47	-	-	.73	6.6	WPTC-110
4.37	1.26	2.83	.375-24 UNF	.79	.35	.63	-	-	.79	7.5	WPTC-210

Options

Auto couplers  [146](#)

Sequence valves  [136](#)

Accessories  [78](#)

Swing cylinders  [10](#)

Important

For proper application, clamp force, pressures and timing, consult Enerpac for support.

Linear cylinders

Power sources

Valves

System components

Yellow pages

Shown: RW-50, RW-104



▶ Used when high cylinder forces or long strokes are required in a confined area. Can handle a wide range of production tooling applications.

■ Enerpac RW-101 cylinders used in a high pressure toggle style clamping set-up.



Heavy-duty cylinders

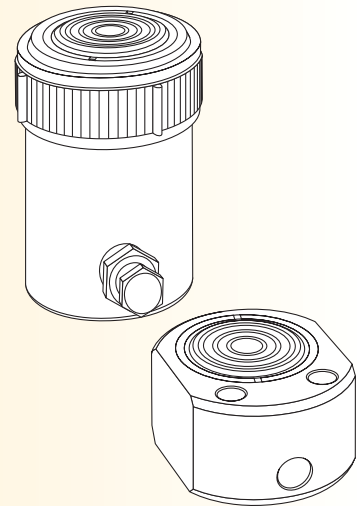
...handle a variety of applications

- High pressure design when additional force is required
- Long stroke lengths in a compact design, well suited for welding applications
- Collar mounting threads and base mounting holes allow flexible mounting options
- Cylinders are provided with hardened saddles for additional plunger protection
- Snap-in saddles are easily removed for adapting to different plunger devices
- Chrome plated plunger with bronze upper and lower bearing provides a long cylinder life

i Block and cylindrical models

Cylindrical models

- Long stroke
- Flexible in fixture design
- Variety of attachments



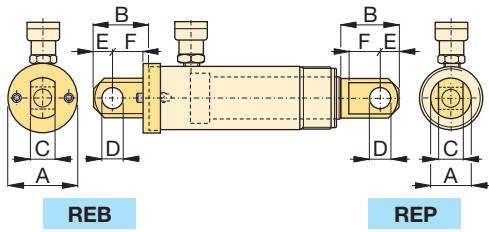
Block models

- Easily mounted
- Compact design

globe Product selection

Cylinder capacity at 5000 psi	Stroke	Model number	Effective area	Oil capacity	Operating pressure
▼ Block models					
4970	.62	RW-41	.99	.62	85-8000
4970	.62	RW-50	.99	.62	600-10,000
▼ Cylindrical models					
4970	1.00	RW-51	.99	.99	600-10,000
4970	3.00	RW-53	.99	2.97	600-10,000
4970	5.00	RW-55	.99	4.95	600-10,000
11,180	1.00	RW-101	2.23	2.23	600-10,000
11,180	2.13	RW-102	2.23	4.75	600-10,000
11,180	4.13	RW-104	2.23	9.21	600-10,000
11,180	6.13	RW-106	2.23	13.67	600-10,000

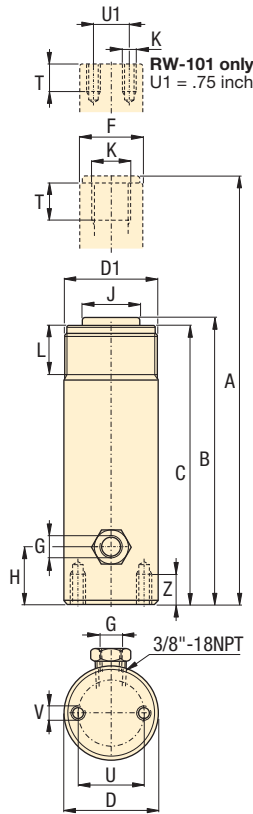
Note: Seal material: Buna-N, Polyurethane, Teflon.



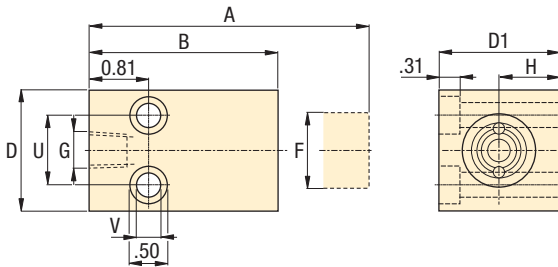
Type	Model number	A	B	C	D	E	F	Pin to pin* in.
Base ¹⁾	REB-5	1.75	1.88	.56	.63	.63	1.00	2.37
	REB-10	2.50	2.63	1.00	.88	1.00	1.38	3.07
Plunger	REP-5	1.13	1.62	.56	.63	.63	.75	—
	REP-10	1.69	2.43	1.00	.88	1.00	1.13	—

* Pin to Pin- REB and REP Clevises fitted. Add cylinder stroke length.
¹⁾ Mounting screws are included.

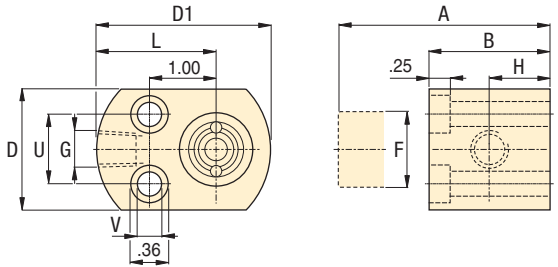
RW-51, -106



RW-41



RW-50



- Force: 4970-11,180 lbs
- Stroke: .62-10.13 inch
- Pressure: 600-5000 psi

- E Cilindros universales
- F Vérins universels
- D Universelle Linearzylinder



Options

Cylinder accessories 78 ▶

Important

These cylinders are intended for medium cycle applications. The return spring is intended for retracting the plunger and heavy devices should not be attached to it.

Plungers should be shielded in welding applications to prevent splatter from sticking to chrome plating.

Do not use these cylinders continuously at full stroke or damage to return spring may result.

Product dimensions in inches []

Model number	A	B	C	D	D1	F	G	H	J	K	L	T	U	V	Z	lbs
▼ Block models																
RW-41	3.18	2.56	—	1.62	1.62	1.00	.250-18	.81	—	—	—	—	1.00	.34	—	1.8
RW-50	2.25	1.63	—	1.62	2.31	1.12	.375-18	.75	—	—	1.50	—	1.12	.22	—	1.8
▼ Cylindrical models																
RW-51	5.34	4.34	4.09	1.50	1.500-16 UN	1.00	.250-18	.75	1.00	.750-16 UN	1.13	.56	1.00	.250-20 UN	.56	2.1
RW-53	9.50	6.50	6.25	1.50	1.500-16 UN	1.00	.250-18	.75	1.00	.750-16 UN	1.13	.56	1.00	.250-20 UN	.56	3.1
RW-55	13.50	8.50	8.25	1.50	1.500-16 UN	1.00	.250-18	.75	1.00	.750-16 UN	1.13	.56	1.00	.250-20 UN	.56	3.9
RW-101	4.53	3.53	3.28	2.25	2.250-14 UN	1.50	.250-18	.75	—	#10-24 UN	1.06	.25	1.56	.312-18 UN	.50	3.8
RW-102	6.91	4.78	4.53	2.25	2.250-14 UN	1.50	.250-18	.75	1.38	1.000-8 UN	1.13	.75	1.56	.312-18 UN	.50	4.9
RW-104	10.88	6.75	6.50	2.25	2.250-14 UN	1.50	.250-18	.75	1.38	1.000-8 UN	1.13	.75	1.56	.312-18 UN	.50	7.0
RW-106	15.88	9.75	9.50	2.25	2.250-14 UN	1.50	.250-18	.75	1.38	1.000-8 UN	1.13	.75	1.56	.312-18 UN	.50	9.6

Linear cylinders
Power sources
Valves
System components
Yellow pages

Universal cylinders - Double acting *Application & selection*

Shown: RD-2510, RD-96, RD-256, RD-41, RD-166



► Used when high cylinder forces with a powered return stroke is required in a confined area.

Cylinders can push or pull a workpiece into position and the threaded plunger allows adapting standard clevis attachments.

■ Clamping application using Enerpac RD cylinders (with clevis eye attachments on both ends) for their high pressure capability and mounting flexibility.



Swing cylinders
Work supports

Linear cylinders

99_142

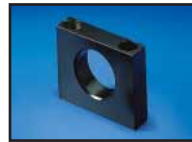
Heavy-duty cylinders

...provide push as well as pull forces

- High pressure design when additional force is required for push or pull applications
- Long strokes in a compact design are well suited for custom toggle style clamping
- Various features for mounting
- Threaded plunger allows a wide range of mounting adapter devices
- Chrome plated plunger provides a long cylinder life

i Optional cylinder attachments

For added cylinder flexibility, a selection of interchangeable mountings is available to fit plunger or cylinder threads.



Foot mounting

Mounts onto cylinder collar thread. Retainer nut included.



Flange mounting

Mounts onto cylinder collar thread. Retainer nut included.



Retainer nut

Locking foot or flange mountings. Mounts onto cylinder base or collar threads. Included with foot and flange mountings.



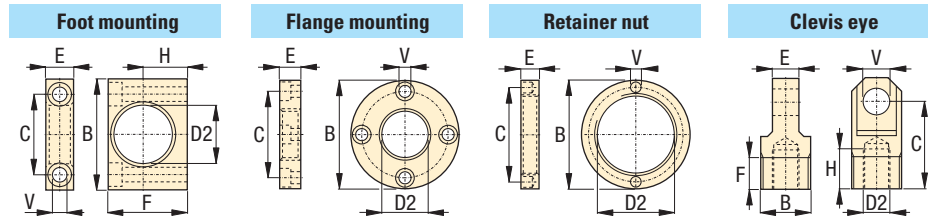
Clevis eye

Threads onto plunger or base.

Product selection

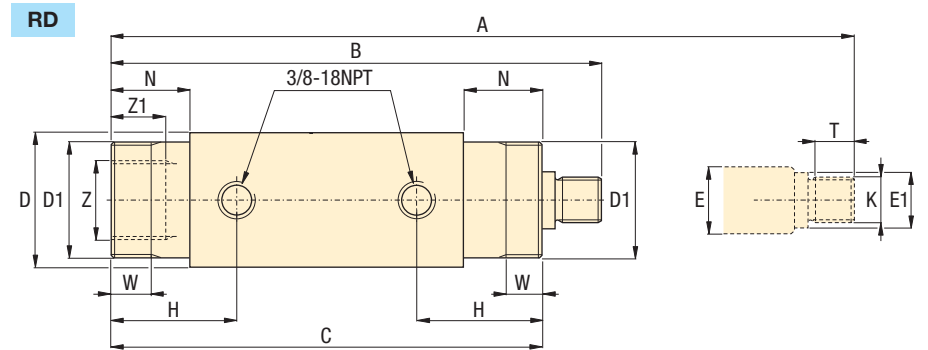
Cylinder capacity at 5000 psi	Stroke		Model number	Effective area		Oil capacity	
	push lbs	pull		in	push in ²	pull	push in ³
3900	1720	1.13	RD-41	.79	.34	.89	.40
3900	1720	3.13	RD-43	.79	.34	2.47	1.10
3900	1720	6.13	RD-46	.79	.34	4.84	2.10
9000	4910	1.13	RD-91	1.77	.98	2.00	1.10
9000	4910	3.13	RD-93	1.77	.98	5.54	3.00
9000	4910	6.13	RD-96	1.77	.98	10.88	6.00
9000	4910	10.13	RD-910	1.77	.98	17.94	9.90
15,500	8300	6.25	RD-166	3.15	1.66	19.67	10.40
15,500	8300	10.25	RD-1610	3.15	1.66	32.26	17.00
24,500	10,750	6.25	RD-256	4.92	2.15	30.73	13.40
24,500	10,750	10.25	RD-2510	4.92	2.15	50.40	22.00

99_048



Cylinder attachments in inches []

Cylinder capacity at		D2	Model number	B	C	E	F	H	V	
5000 psi lbs	10,000 psi lbs									
▼ Foot mounting with retainer nut										
3900	7800	1.38	AD-141	3.00	2.00	.76	2.25	1.25	.41	.9
9000	18,000	2.00	AD-171	4.00	2.88	1.00	3.25	1.75	.53	2.6
15,500	31,000	2.63	AD-181	5.00	3.76	1.38	4.00	2.06	.78	6.4
24,500	49,000	3.25	AD-191	6.26	4.62	1.76	4.88	2.50	1.03	9.9
▼ Flange mounting with retainer nut										
3900	7800	1.38	AD-142	3.88	3.09	.75	-	-	.41	2.2
9000	18,000	2.00	AD-172	4.75	3.88	1.00	-	-	.41	4.6
15,500	31,000	2.63	AD-182	5.63	4.56	1.38	-	-	.53	8.4
24,500	49,000	3.25	AD-192	6.50	5.34	1.75	-	-	.66	13.2
▼ Retainer nut										
3900	7800	1.375-12UN	AD-143	2.25	1.81	.38	-	-	.25	.2
9000	18,000	2.000-12UN	AD-173	3.00	2.50	.50	-	-	.27	.7
15,500	31,000	2.625-16UN	AD-183	3.63	3.12	.75	-	-	.27	1.3
24,500	49,000	3.250-16UN	AD-193	4.25	3.75	1.00	-	-	.27	1.8
▼ Clevis eye										
3900	7800	.500-20UN	AD-150	1.125-20UN	1.12	.63	.75	.94	.63	.5
9000	18,000	.750-16UN	AD-151	1.688-18UN	1.31	1.00	1.00	.94	.75	1.3
15,500	31,000	1.125-12UN	AD-152	2.187-16UN	1.88	1.25	1.00	1.19	1.00	2.9
24,500	49,000	1.500-12UN	AD-153	2.750-16UN	2.00	1.50	1.00	1.06	1.25	4.6



Product dimensions in inches []

Model number	A	B	C	D	D1	E	E1	H	K	N	T	W	Z	Z1	
RD-41	8.44	7.31	6.38	2.00	1.375-12	.75	.69	1.84	.500-20	1.13	.75	.44	1.125-20	.35	4.8
RD-43	12.44	9.31	8.38	2.00	1.375-12	.75	.69	1.84	.500-20	1.13	.75	.44	1.125-20	.35	6.4
RD-46	18.44	12.31	11.38	2.00	1.375-12	.75	.69	1.84	.500-20	1.13	.75	.44	1.125-20	.35	9.0
RD-91	9.88	8.75	7.80	2.50	2.000-12	1.00	.94	2.25	.750-16	1.50	.75	.56	1.688-18	.55	9.0
RD-93	13.91	10.78	9.80	2.50	2.000-12	1.00	.94	2.25	.750-16	1.50	.75	.56	1.688-18	.55	11.0
RD-96	19.91	13.78	12.80	2.50	2.000-12	1.00	.94	2.25	.750-16	1.50	.75	.56	1.688-18	.55	14.0
RD-910	27.91	17.78	16.81	2.50	2.000-12	1.00	.94	2.25	.750-16	1.50	.75	.56	1.688-18	.55	19.0
RD-166	21.56	15.31	14.13	3.00	2.625-16	1.38	1.26	2.88	1.125-12	2.13	1.00	.88	2.187-16	.94	22.0
RD-1610	29.56	19.31	18.11	3.00	2.625-16	1.38	1.26	2.88	1.125-12	2.13	1.00	.88	2.187-16	.94	29.0
RD-256	22.94	16.69	15.63	3.63	3.250-16	1.88	1.77	3.50	1.500-12	2.75	1.00	1.13	2.750-16	1.02	36.0
RD-2510	30.94	20.69	19.61	3.63	3.250-16	1.88	1.77	3.50	1.500-12	2.75	1.00	1.13	2.750-16	1.02	46.0

- Force:** 3900-24,500 lbs
- Stroke:** 1.13-10.25 inch
- Pressure:** 500-10,000 psi
- E** Cilindros universales
- F** Vérins universels
- D** Universelle Linearzylinder



Options

Cylinder accessories

Important

Be certain that the mounting devices can handle forces in the push and pull direction.

RD series cylinders are designed for a maximum operating pressure of 10,000 psi.

When applying 10,000 psi cylinder capacities double as well.

Cylinder accessories

Shown: Cylinder accessories



Swing cylinders
Work supports

Linear cylinders

99_087

▶ These accessories are provided so that you can effectively position, mount and actuate Enerpac hydraulic cylinders according to your specific fixturing or production applications.

For optimum mounting and fixture flexibility

...to match specific applications

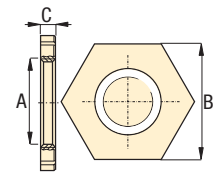
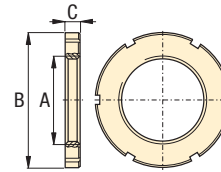
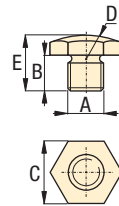
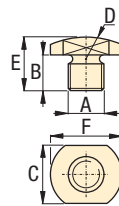
- **Contact bolts**
Allow cylinders to act as a datum point in your clamping applications, and protect the piston when cylinders are used for pushing applications
- **Cylindrical flange nuts**
For mounting threaded body cylinders in any position
- **Mounting brackets**
For bolting cylinders to suit the application

BS-21, -41, -42, -61, -62, -82

other BS models

all others

FN-121, 201, 251



Product dimensions in inches []

A thread	Model number	B	C	D	E	F
▼ Spherical contact bolts						
#6-32 UN	BS-21	.20	.18	.18	.45	.25
#8-32 UN	BS-41	.28	.25	.24	.56	.31
M4 x 0,7	BS-42	.20	.24	.39	.31	.31
.250-28 UN	BS-61	.25	.35	.59	.39	.47
M6 x 1,0	BS-62	.25	.35	.59	.39	.47
.313-24 UN	BS-81	.27	.56	.79	.28	-
M8 x 1,25	BS-82	.25	.51	.79	.41	.63
.375-16 UN	BS-91	.50	.50	.50	.75	-
.500-13 UN	BS-101	.49	.87	1.18	.73	-
M10 x 1,5	BS-102	.25	.67	.91	.43	-
M16 x 2,0	BS-162	.47	.87	.87	.94	-
M20 x 2,5	BS-202	.47	.94	.87	.94	-

A thread	Model number	B	C
▼ Jam nuts			
0.500-20 UN	FN-121	0.75	0.31
M12 x 1,5	FN-122	1.10	0.24
0.750-16 UN	FN-201	1.13	0.42
M20 x 1,5	FN-202	1.12	0.42
1.000-12 UN	FN-251	1.50	0.55
1.125-16 UN	FN-281	1.75	0.38
M28 x 1,5	FN-282	1.97	0.39
1.250-16 UN	FN-301	1.97	0.39
M30 x 1,5	FN-302	1.97	0.39
1.313-16 UN	FN-331	1.88	0.25
1.375-18 UN	FN-351	1.88	0.25
M35 x 1,5	FN-352	2.17	0.43
1.625-16 UN	FN-421	2.25	0.33
M42 x 1,5	FN-422	2.44	0.47
1.875-16 UN	FN-481	2.50	0.50
M48 x 1,5	FN-482	2.95	0.51
2.125-16 UN	FN-551	3.13	0.38
M55 x 1,5	FN-552	3.15	0.51
2.500-16 UN	FN-651	3.25	0.38
M65 x 1,5	FN-652	3.74	0.55
3.125-16 UN	FN-801	4.13	0.50
M80 x 2,0	FN-802	4.53	0.63

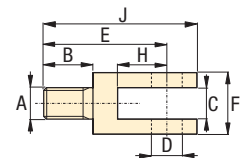
■ Enerpac worksupport locked in position using an FN series self-locking flange nut.



99_093

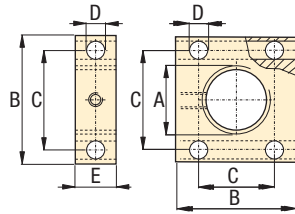
Product dimensions in inches []

A thread	Model number	B	C	D	E	F	H	J
▼ Yoke								
.312-24 UN	Y-3121	.50	.31	.31	1.25	.63	.50	1.88

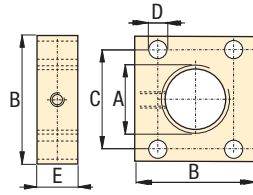




MF and AW-51 models



other AW models



- E** Accesorios de cilindro
- F** Accessoires pour vérins
- D** Zubehör für Zylinder

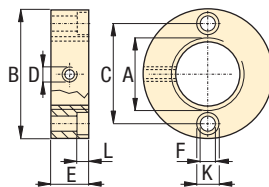
Product dimensions in inches [$\Delta \oplus$]

A	Model number	B	C	D	E
thread				ø	

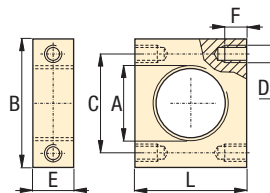
▼ Mounting flanges – Rectangular

1.375-18 UN	AW-5	1.70	1.34	0.27	0.50
1.500-16 UN	AW-51	2.75	2.12	.41	1.00
1.875-16 UN	AW-89	2.25	1.77	0.34	1.00
2.500-16 UN	AW-19	3.25	2.17	0.34	1.00
3.125-16 UN	AW-90	3.75x4.75	2.38x3.50	0.64	1.25
0.500-20 UN	MF-121	1.50	1.00	0.25	1.00
M12 x 1,5	MF-122	1.57	0.98	0.25	0.98
0.750-16 UN	MF-201	2.25	1.50	0.38	1.50
M20 x 1,5	MF-202	2.56	1.75	0.40	1.57
1.000-12 UN	MF-251	2.50	1.75	0.38	1.50
1.125-16 UN	MF-281	2.75	2.00	0.38	1.50
M28 x 1,5	MF-282	2.95	2.00	0.40	1.57
1.313-16 UN	MF-331	3.00	2.25	0.38	1.50
1.375-18 UN	MF-351	3.00	2.25	0.38	1.50
M35 x 1,5	MF-352	3.15	2.25	0.40	1.57
1.625-16 UN	MF-421	3.25	2.50	0.38	1.50
M42 x 1,5	MF-422	3.54	2.50	0.40	1.57
1.875-16 UN	MF-481	3.50	2.75	0.38	1.50
M48 x 1,5	MF-482	3.74	2.75	0.40	1.57
2.125-16 UN	MF-551	4.00	3.00	0.44	1.75
M55 x 1,5	MF-552	4.33	3.25	0.44	1.75
2.500-16 UN	MF-651	4.50	3.50	0.44	1.75
M65 x 1,5	MF-652	4.53	3.50	0.44	1.75
3.125-16 UN	MF-801	5.00	4.00	0.44	1.75
M80 x 2,0	MF-802	5.31	4.25	0.44	1.75

AW-53, -121



AW-102



Product dimensions in inches [$\Delta \oplus$]

A	Model number	B	C	D	E	F	K	L
thread				thread				

▼ Mounting flanges – Cylindrical

1.500-16 UN	AW-53	2.76	2.25	.250-20 UN	.75	.28	.41	.31
2.750-16 UN	AW-121	4.50	3.00	.250-20 UN	.75	.34	.50	.38

▼ Mounting flanges – Rectangular

2.250-14 UN	AW-102	3.25	3.00	.437-20 UN	1.25	.62	–	4.00
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5000 psi Tie Rod Cylinders *Application & selection*

Shown: TRFM-1506, TRFL-3210 and TRCM-3206



► Enerpac 5000 psi Tie Rod cylinders provide a variety of mounting options for pushing and positioning workpieces and fixtures on a machine. Enerpac tie rod cylinders are designed to the highest industry standards to provide long life and worry-free performance in the most demanding applications.

Standard bore sizes

Bore diameter	Rod diameter	Capacity at 5000 psi		Effective area	
		Push lbs	Pull lbs	Push in ²	Pull in ²
1.50	1.00	8,850	4,900	1.77	0.98
2.00	1.38	15,700	8,300	3.14	1.66
2.50	1.75	24,550	12,500	4.91	2.50
3.25	2.00	41,500	25,800	8.30	5.16
4.00	2.50	62,850	38,300	12.57	7.66

Additional bore sizes

Bore diameter	Rod diameter	Capacity at 5000 psi	
		Push lbs	Pull lbs
5.00	3.50	98,170	50,060
6.00	4.00	141,400	78,550
7.00	5.00	192,400	94,220
8.00	5.50	251,400	132,600

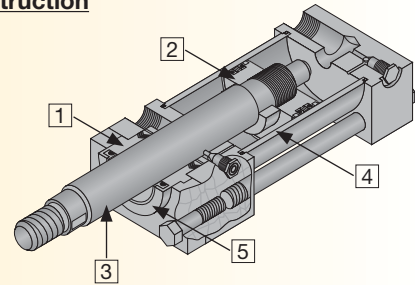
Contact Enerpac for ordering information on additional bore sizes.

Performance tested design features at 5000 psi

- Rod seal (1) uses spring loaded multiple lip vee rings, a supporting bronze bearing ring bushing and a double lip wiper
- Piston seal (2) combines two bi-directional sealing cast iron piston rings with two block vee seals with back-up rings
- Hardened chrome plated piston rod (3) resists scoring and corrosion, assuring maximum life
- Steel tubing barrel (4), honed to a fine finish assures superior sealing, minimum friction and maximum seal life
- Rod bushing and seals can be serviced by merely removing the retainer plate (5) on most models

Tie Rod cylinder construction

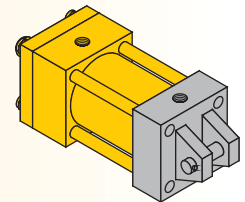
- 1 Rod Seal
- 2 Piston Seal
- 3 Piston Rod
- 4 Barrel
- 5 Retainer Plate



Tie Rod cylinder mounting styles

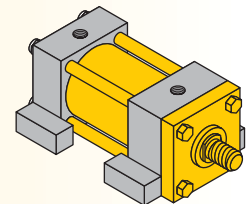
Clevis Mount – TRCM Series

- NFPA style MP1
- Allows cylinder to pivot
- Requires provision for pivoting on rod end



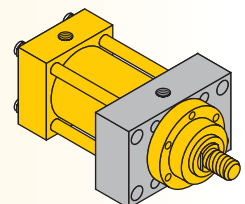
Foot mount – TRFM series

- NFPA style MS2
- Allows easy mounting with only four bolts
- Backup key included in design to ensure long life



Flange mount – TRFL series

- NFPA style ME5
- Allows cylinder length to be buried in machine
- Strongest, most rigid mount





Product selection

Piston diameter	Rod diameter	Stroke	Clevis mount	Foot mount	Flange mount
in	in	in			
1.50	1.00	2	TRCM-1502	TRFM-1502	TRFL-1502
1.50	1.00	4	TRCM-1504	TRFM-1504	TRFL-1504
1.50	1.00	6	TRCM-1506	TRFM-1506	TRFL-1506
1.50	1.00	10	TRCM-1510*	TRFM-1510	TRFL-1510
1.50	1.00	12	TRCM-1512*	TRFM-1512	TRFL-1512
2.00	1.38	2	TRCM-2002	TRFM-2002	TRFL-2002
2.00	1.38	4	TRCM-2004	TRFM-2004	TRFL-2004
2.00	1.38	6	TRCM-2006	TRFM-2006	TRFL-2006
2.00	1.38	10	TRCM-2010	TRFM-2010	TRFL-2010
2.00	1.38	12	TRCM-2012	TRFM-2012	TRFL-2012
2.50	1.75	2	TRCM-2502	TRFM-2502	TRFL-2502
2.50	1.75	4	TRCM-2504	TRFM-2504	TRFL-2504
2.50	1.75	6	TRCM-2506	TRFM-2506	TRFL-2506
2.50	1.75	10	TRCM-2510	TRFM-2510	TRFL-2510
2.50	1.75	12	TRCM-2512	TRFM-2512	TRFL-2512
3.25	2.00	2	TRCM-3202	TRFM-3202	TRFL-3202
3.25	2.00	4	TRCM-3204	TRFM-3204	TRFL-3204
3.25	2.00	6	TRCM-3206	TRFM-3206	TRFL-3206
3.25	2.00	10	TRCM-3210	TRFM-3210	TRFL-3210
3.25	2.00	12	TRCM-3212	TRFM-3212	TRFL-3212
4.00	2.50	2	TRCM-4002	TRFM-4002	TRFL-4002
4.00	2.50	4	TRCM-4004	TRFM-4004	TRFL-4004
4.00	2.50	6	TRCM-4006	TRFM-4006	TRFL-4006
4.00	2.50	10	TRCM-4010	TRFM-4010	TRFL-4010
4.00	2.50	12	TRCM-4012	TRFM-4012	TRFL-4012

Cushions are available for all cylinder models. Cushions slow down heavy loads prior to end of stroke, preventing damage to the cylinder or the machine. To add cushions to your Enerpac Tie Rod cylinder, simply add the letter "C" to the end of any model number. Note: The addition of cushions does not affect the outside dimensions of the cylinder.

* These models are only rated to 4000 psi due to constraints on the mechanical properties of the rod.

Custom build your Tie Rod cylinder

TR	CM	15	12	C
1	2	3	4	5
1 Product Type TR = Tie Rod		3 Bore Diameter 15 = 1.5" 20 = 2.0" 25 = 2.5" 32 = 3.25" 40 = 4.0"	4 Stroke 02 = 2" 04 = 4" 06 = 6" 10 = 10" 12 = 12"	5 Cushions Blank = None C = Cushions both ends
2 Mounting CM = Clevis Mount FM = Foot Mount FL = Flange Mount				

Seal and repair kits

Seal kits include piston, rod and barrel seals. Repair kits include seal kit plus rod bushing and rear bearing ring.

Product dimensions in inches

Bore diameter in	Rod diameter in	Seal kit	Repair kit
1.50	1.00	TR15SK	TR15RK
2.00	1.38	TR20SK	TR20RK
2.50	1.75	TR25SK	TR25RK
3.25	2.00	TR32SK	TR32RK
4.00	2.50	TR40SK	TR40RK

Capacity: 8850-62,850 lbs.

Stroke: 2-12 in.

Pressure: 500-5000 psi

E Cilindros Atirantados

F Vérins à tirants

D Zugankerzylinder

Options

Accessories

85 ▶



ZW Series Pumps

94 ▶



VP Series Valves

122 ▶



Fittings

158 ▶



Important

Consult individual product selection pages for application and installation criteria specific to each mounting style. If you are unsure of an application, contact Enerpac directly.

Enerpac can provide many other tie rod cylinders in a wide variety of mounting styles, bore and stroke sizes. Contact Enerpac directly and talk to our Custom Products group for a quotation.

Shown: TRCM-3204

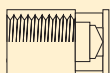


Swing cylinders
Work supports

Linear cylinders

TR series clevis mount
Enerpac clevis mount 5000 psi Tie Rod cylinders provide for motion in two axis, increasing the range of motion on your machine with only one cylinder.

Special rod ends

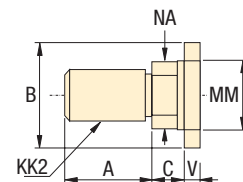
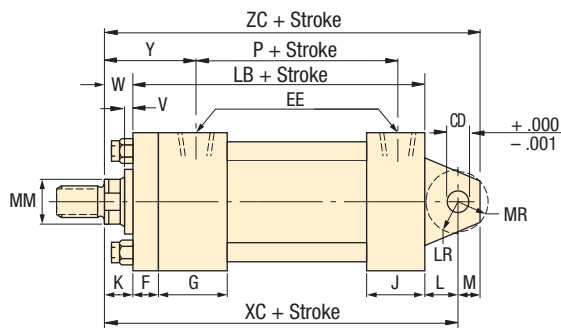
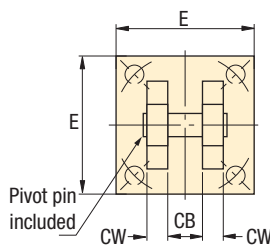


- Either internal or external threads available
- Custom designs to match your tooling requirements

Flexibility of motion

- Clevis mount cylinders include pivot pin for mounting in your machine
- Standard rod eyes and rod clevises available for each bore size.
- NFPA style MP1
- Designed to carry shear loads
- Pivot pins should be carried by rigidly held bearings and closely fit for the entire length of the pin

TRCM models Clevis mount



Capacity: 8850-62,850 lbs.

Stroke: 2-12 in.

Pressure: 500-5000 psi

- E** Cilindros Atirantados
- F** Vérins à tirants
- D** Zugankerzylinder

Options

Accessories

▣85 ▸



ZW Series Pumps

▣94 ▸



VP Series Valves

▣122 ▸



Fittings

▣158 ▸



Dimensions in inches []

Bore diameter	Rod diameter	Model number	A	B	C	CB	CD	CW	D*	E	EE	F	G	J	K
1.50	1.00	TRCM-15xx**	1.13	1.50	0.50	0.75	0.50	0.50	0.88	2.50	SAE #10	0.38	1.75	1.50	0.50
2.00	1.38	TRCM-20xx	1.63	2.00	0.63	1.25	0.75	0.63	1.13	3.00	SAE #10	0.63	1.75	1.50	0.63
2.50	1.75	TRCM-25xx	2.00	2.38	0.75	1.25	0.75	0.63	1.50	3.50	SAE #10	0.63	1.75	1.50	0.63
3.25	2.00	TRCM-32xx	2.25	2.63	0.88	1.50	1.00	0.75	1.69	4.50	SAE #12	0.75	2.00	1.75	0.75
4.00	2.50	TRCM-40xx	3.00	3.13	1.00	2.00	1.38	1.00	2.06	5.00	SAE #12	0.88	2.00	1.75	0.75

* D = Distance across plunger wrench flats.

** 10 and 12 inch models are rated at only 4000 psi.

Bore diameter	Rod diameter	Model number	KK2	L	LB	LR	M	MM	MR	NA	P	V	W	XC	Y	ZC	
																	lbs
1.50	1.00	TRCM-15xx	3/4"-16	0.75	5.00	0.63	0.50	1.00	0.66	0.97	2.13	0.50	1.00	6.75	2.38	7.25	***
2.00	1.38	TRCM-20xx	1"-14	1.25	5.25	1.13	0.75	1.38	0.94	1.34	2.88	0.38	1.00	7.50	2.63	8.25	***
2.50	1.75	TRCM-25xx	1-1/4"-12	1.25	5.38	1.13	0.75	1.75	0.94	1.70	3.00	0.50	1.25	7.88	2.88	8.63	***
3.25	2.00	TRCM-32xx	1-1/2"-12	1.50	6.25	1.25	1.00	2.00	1.19	1.95	3.59	0.38	1.25	9.00	3.09	10.00	***
4.00	2.50	TRCM-40xx	1-7/8"-12	2.13	6.63	1.88	1.38	2.50	1.38	2.45	3.88	0.38	1.38	10.13	3.31	11.50	***

*** For product weights, please reference the price list or contact Enerpac customer service for more information.

Capacity: 8850-62,850 lbs.

Stroke: 2-12 in.

Pressure: 500-5000 psi

E Cilindros Atirantados

F Vérins à tirants

D Zugankerzylinder

Options

Accessories

85 ▶



ZW Series Pumps

94 ▶



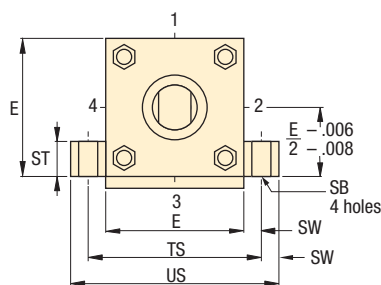
VP Series Valves

122 ▶



Fittings

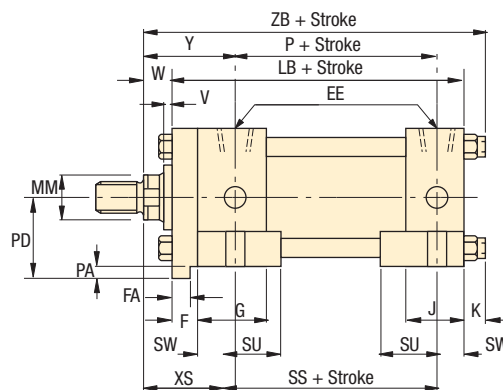
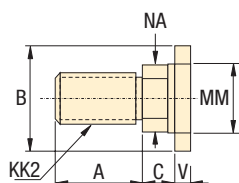
158 ▶



Ease of installation

- Foot mount cylinders provide simplest mounting option with just four bolt holes required
- Standard key mount is included ensuring proper mounting and adding rigidity
- NFPA style MS2
- Compact mounting fits in tight spaces where other cylinders cannot

TRFM models Foot Mount



Dimensions in inches []

Bore diameter	Rod diameter	Model number	A	B	C	D*	E	EE	F	FA	G	J	K	KK2	LB	MM
1.50	1.00	TRFM-15xx	1.13	1.50	0.50	0.88	2.50	SAE #10	0.38	0.310-0.312	1.75	1.50	0.50	3/4"-16	5.00	1.00
2.00	1.38	TRFM-20xx	1.63	2.00	0.63	1.13	3.00	SAE #10	0.63	0.560-0.562	1.75	1.50	0.63	1"-14	5.25	1.38
2.50	1.75	TRFM-25xx	2.00	2.38	0.75	1.50	3.50	SAE #10	0.63	0.560-0.562	1.75	1.50	0.63	1-1/4"-12	5.38	1.75
3.25	2.00	TRFM-32xx	2.25	2.63	0.88	1.69	4.50	SAE #12	0.75	0.684-0.687	2.00	1.75	0.75	1-1/2"-12	6.25	2.00
4.00	2.50	TRFM-40xx	3.00	3.13	1.00	2.06	5.00	SAE #12	0.88	0.809-0.812	2.00	1.75	0.75	1-7/8"-12	6.63	2.50

* D = Distance across plunger wrench flats.

Bore diameter	Rod diameter	Model number	NA	P	PA	PD	SB	SS	ST	SU	SW	TS	US	V	W	XS	Y	ZB	
1.50	1.00	TRFM-15xx	0.97	2.88	0.19	1.44	0.44	3.88	0.50	0.94	0.38	3.25	4.00	0.50	1.00	1.75	2.38	6.50	lbs
2.00	1.38	TRFM-20xx	1.34	2.88	0.31	1.81	0.56	3.63	0.75	1.25	0.50	4.00	5.00	0.38	1.00	2.13	2.63	6.88	***
2.50	1.75	TRFM-25xx	1.70	3.00	0.31	2.06	0.81	3.38	1.00	1.56	0.69	4.88	6.25	0.50	1.25	2.56	2.88	7.25	***
3.25	2.00	TRFM-32xx	1.95	3.59	0.38	2.63	0.81	4.13	1.00	1.56	0.69	5.88	7.25	0.38	1.25	2.69	3.09	8.25	***
4.00	2.50	TRFM-40xx	2.45	3.88	0.44	2.94	1.06	4.00	1.25	2.00	0.88	6.75	8.50	0.38	1.38	3.13	3.31	8.75	***

*** For product weights, please reference the price list or contact Enerpac customer service for more information.

Shown: TRCM-1506



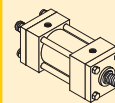
TR series foot mount

Enerpac foot mount 5000 psi Tie Rod cylinders provide a high quality positioning solution using a minimal amount of space.

Important

Some custom options may require reduction of working pressure or special installation considerations. Contact Enerpac Technical Service to discuss your application.

Special rod ends



Double rod ends

- Available on all models except clevis mounts
- The two rod ends can be different on the same cylinder

Shown: TRFL-3206



Swing cylinders
Work supports

Linear cylinders

▶ TR series flange mount
Enerpac flange mount 5000 psi Tie Rod cylinders provide the most rigid mounting ensuring long life and high accuracy on your machine.

Special rod ends

Rod boots

- Rod boots are made from neoprene coated fabric
- Impervious to oil grease and water
- Rated for temperatures from 0° F to 200° F

Metallic wipers

- Recommended in applications where contaminants tend to cling to the rod surface
- Available on all rod diameters

Extra strong

- Flange mount is part of the cylinder end cap, providing maximum strength and rigidity
- Allows length of cylinder to be mounted inside the machine
- NFPA style ME5
- Simple four bolt mounting pattern makes installation easy
- Mounting is best suited for tension applications

Capacity: 8850-62,850 lbs.

Stroke: 2-12 in.

Pressure: 500-5000 psi

Ⓔ Cilindros Atirantados

Ⓕ Vérins à tirants

Ⓖ Zugankerzylinder

Options

Accessories

▶ 85 ▶



ZW Series Pumps

▶ 94 ▶



VP Series Valves

▶ 122 ▶

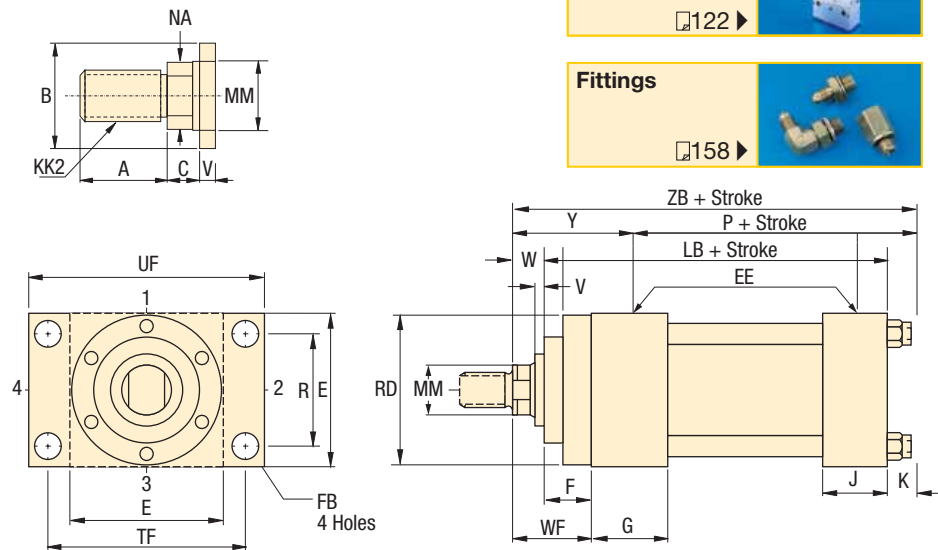


Fittings

▶ 158 ▶



TRFL models Flange Mount



Dimensions in inches [mm]

Bore diameter	Rod diameter	Model number	A	B	C	D*	E	EE	F	FB	G	J	K	KK2
1.50	1.00	TRFL-15xx	1.13	1.50	0.50	0.88	2.50	SAE #10	0.38	0.44	1.75	1.50	0.50	3/4"-16
2.00	1.38	TRFL-20xx	1.63	2.00	0.63	1.13	3.00	SAE #10	0.63	0.56	1.75	1.50	0.63	1"-14
2.50	1.75	TRFL-25xx	2.00	2.38	0.75	1.50	3.50	SAE #10	0.63	0.56	1.75	1.50	0.63	1-1/4"-12
3.25	2.00	TRFL-32xx	2.25	2.63	0.88	1.69	4.50	SAE #12	0.75	0.69	2.00	1.75	0.75	1-1/2"-12
4.00	2.50	TRFL-40xx	3.00	3.13	1.00	2.06	5.00	SAE #12	0.88	0.69	2.00	1.75	0.75	1-7/8"-12

* D = Distance across plunger wrench flats.

Bore diameter	Rod diameter	Model number	LB	MM	NA	P	R	RD	TF	UF	V	W	WF	Y	ZB	⚖️ lbs
1.50	1.00	TRFL-15xx	5.00	1.00	0.97	2.88	1.63	-	3.44	4.25	0.50	1.00	1.38	2.38	6.50	***
2.00	1.38	TRFL-20xx	5.25	1.38	1.34	2.88	2.50	-	4.13	5.13	0.38	1.00	1.63	2.63	6.88	***
2.50	1.75	TRFL-25xx	5.38	1.75	1.70	3.00	2.55	-	4.63	5.63	0.50	1.25	1.88	2.88	7.25	***
3.25	2.00	TRFL-32xx	6.25	2.00	1.95	3.59	3.25	4.00	5.88	7.13	0.38	1.25	2.00	3.09	8.25	***
4.00	2.50	TRFL-40xx	6.63	2.50	2.45	3.88	3.82	4.50	6.38	7.63	0.38	1.38	2.25	3.31	8.75	***

*** For product weights, please reference the price list or contact Enerpac customer service for more information.

For high production applications

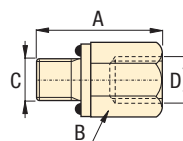
- Fit any style of Enerpac tie-rod cylinder
- Rod eyes and rod clevises
 - Required for proper mounting of TRCM series cylinders
 - Pivot pins supplied separately
- Pivot pins for rod eyes and clevises
 - Provided with cotter pins
 - Must be ordered separately
- Linear alignment coupler
 - Prevents binding caused by misalignment
 - Reduces rod seal and bearing wear

Shown: RRE-15, TRCC-15, TRPP-15, TRAC-15

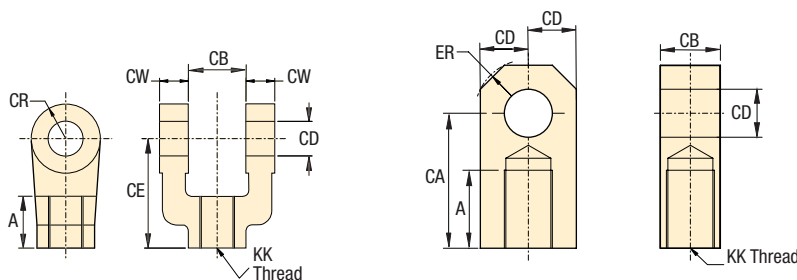


Fittings dimensions in inches []

From	To	Model number	A	B	C	D
SAE #10	3/8" NPT	FZ2077	1.31	1.00	SAE #10	3/8" NPT
SAE #12	3/8" NPT	FZ2078	1.00	1.25	SAE #12	3/8" NPT
SAE #10	SAE #6	FZ2079	1.26	1.00	SAE #10	SAE #6
SAE #12	SAE #6	FZ2080	1.00	1.25	SAE #12	SAE #6



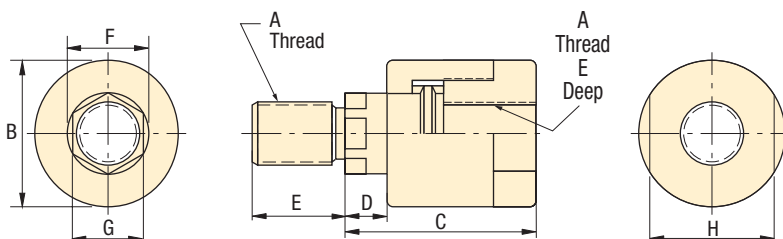
Enerpac 5000 psi Tie-Rod cylinder accessories allow you to complete your design making installation on your machine a simple project.



Rod Clevis and Rod Eye dimensions in inches []

Rod clevis model number	Rod eye model number	Maximum tension load lbs	KK	A	CA	CB	CD	CE	CR	CW	ER	Clevis Pin
TRRC-15	TRRE-15	12,372	3/4"-16	1.13	2.06	1.25	0.75	2.38	0.75	0.63	0.94	TRPP-15
TRRC-20	TRRE-20	20,433	1"-14	1.63	2.81	1.50	1.00	3.13	1.00	0.75	1.13	TRPP-20
TRRC-25	TRRE-25	30,483	1-1/4"-12	2.00	3.44	2.00	1.38	4.13	1.38	1.00	1.56	TRPP-25
TRRC-32	TRRE-32	49,479	1-1/2"-12	2.25	4.00	2.50	1.75	4.50	1.63	1.25	1.88	TRPP-32
TRRC-40	TRRE-40	70,095	1-7/8"-12	3.00	5.00	2.50	2.00	5.50	2.00	1.25	2.00	TRPP-40

* Operating pressures above 5000 psi require high-pressure fittings or intensifier models with BSPP ports. Contact Enerpac for details.



Linear Alignment Coupler in inches []

Model number	Maximum tension load lbs	A	B	C	D	E	F	G	H
TRAC-15	8500	3/4"-16	1.75	2.31	0.50	1.13	0.97	0.88	1.50
TRAC-20	16,000	1"-14	2.50	2.94	0.50	1.63	1.38	1.16	2.25
TRAC-25	19,500	1-1/4"-12	2.50	2.94	0.50	1.63	1.38	1.16	2.25
TRAC-32	33,500	1-1/2"-12	3.25	4.38	0.81	2.25	1.75	1.50	3.00
TRAC-40	60,000	1-7/8"-12	3.75	5.44	0.88	3.00	2.00	1.88	3.50