Products

Collet-Lok® *Application & selection*

Shown: WPTR-100V and WPFR-100V

98-037

Enerpac Collet-Lok® cylinders are designed to mechanically hold the workpiece after hydraulic pressure is removed. Clamping capacities range from 1000 lbs. to 8500 lbs.

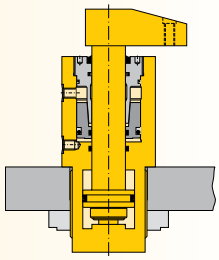
Hydraulic actuation with mechanical lock

- *Collet-Lok®* technology combines hydraulic actuation for clamping or supporting with an internal locking collet
- Clamp bodies are available in either threaded mount or flange mount
- Flange mount units feature both tubing ports and bottom manifold ports
- Flange top manifold ports available as a special
- VITON seals are standard

Collet-Lok® Designs:

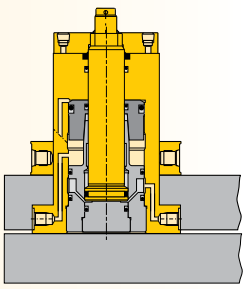
Collet-Lok® Swing Clamps

- Available in 1000-, 2000-, and 8500 lb. models
- Available in Right Hand or Left Hand Swing and Straight (guided) models



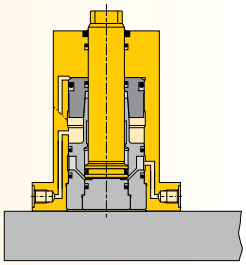
Collet-Lok® Work Supports

- Available in 2,000-, 4,000- and 10,000 lb. models
- Spring advance design to maintain contact with the work piece



Collet-Lok® Push Cylinders

- Available in 2,500- and 5,000 lb. models
- Designed for Push only
- Can be used as a heavy-duty Work Support



MPTL-100 and MPTR-100 Collet-Lok® Swing Clamps are used to securely clamp these exhaust manifolds.

Why use Collet-Lok®?

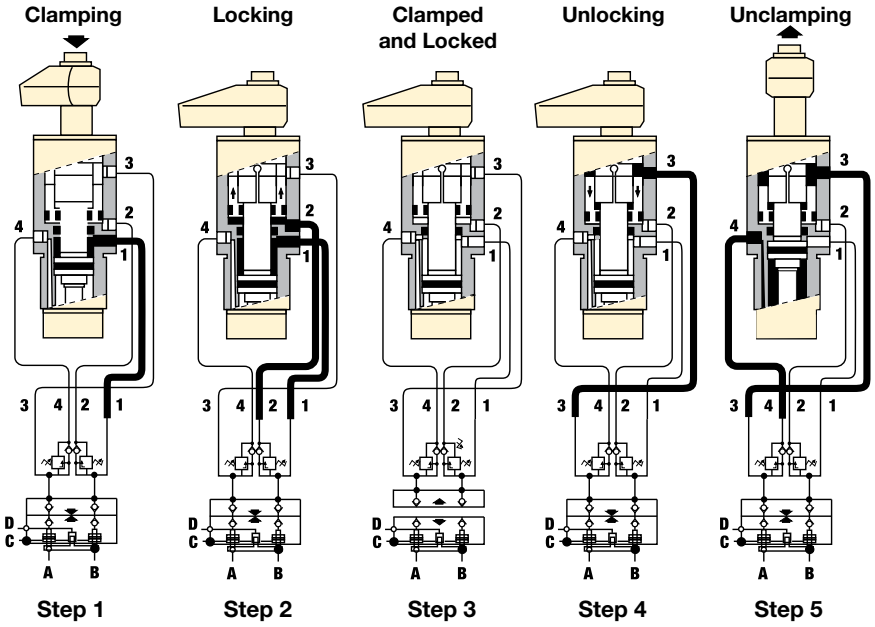
Collet-Lok® technology from Enerpac combines hydraulic actuation with mechanical locking to provide the automation and control of hydraulics and the long term security of a mechanical lock. Available in Swing Clamps, Push Cylinders and Work Supports, *Collet-Lok*® is a unique solution that is well suited to today's demanding manufacturing environment.

Force: 1000 - 8500 lbs

Stroke: .94 - 1.65 inch

Pressure: 1400 - 5000 psi

Collet-Lok® Clamping and Unclamping Cycle



WPTR-100 Collet-Lok® swing cylinder

1 = 90˚ Rotation + Clamp
2 = Lock
3 = Unlock
4 = Unclamp + 90˚ Rotation

WCA-62, WPA-62 Auto coupler

A = Pressure line from pump to swing cylinder
B = Pressure line from pump to swing cylinder
C = Auto coupler advance
D = Auto coupler retract

How Does Collet-Lok® Work?

The ports on Collet products are conveniently labeled in the order that they are used during a clamping or unclamping cycle.

The typical *Collet-Lok*® circuit pairs the Clamp circuits with the Lock circuits by using a sequence valve to delay the Lock function until the clamping pressure is almost reached. When unclamping, the Unlock and Unclamp circuits are also paired with a sequence valve so the Lock is released before the clamp extends to Unclamp. An alternate approach to controlling these circuits is to use a PLC to operate individual valves for the Clamp/Unclamp and Lock/Unlock functions.

Because *Collet-Lok*® provides a mechanical lock to hold the clamping force onto the work piece, support components used in standard hydraulic clamping circuits such as pilot operated check valves and accumulators are not needed. In typical applications, the hydraulic circuit in a fixture with *Collet-Lok*® clamps is de-pressurized after the clamping cycle is completed. This allows for complete security during the machining cycle, or if the work pieces are pre-clamped and staged in a pallet pool for extended periods of time.

Collet-Lok® Sequence:

Step 1
2-passage Auto coupler connects external power source with pallet receiver and the Collet-Lok® cylinder is activated for hydraulic clamping.

Step 2
After reaching maximum clamping pressure the sequence valve is opened and actuates the internal wedge hydraulically.

Step 3
The wedge system secures the plunger position mechanically and the hydraulic pressure is taken off, then the auto coupler retracts. The work piece on the pallet is now securely clamped, without being connected to a power source.

Step 4
After being in the machine the pallet returns to the loading and unloading position and the auto coupler is connected again to release the wedge.

Step 5
The hydraulic plunger is now retracted and the pallet is free for unloading and loading.

Options

***Collet-Lok*® swing clamps** 8 ▸

Collet-Lok® work supports 16 ▸

Collet-Lok® push clamps 18 ▸

Swing cylinders - *Collet-Lok®* design

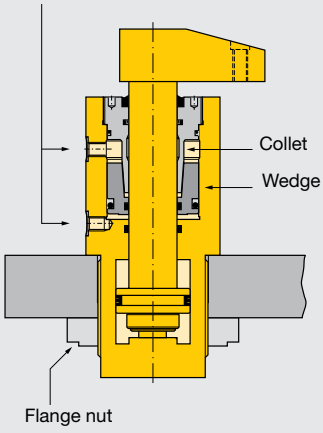
Shown: WPTR-100V, WPFR-100V

98-042

WP series

Enerpac Collet-Lok® cylinders are designed to mechanically hold the workpiece after hydraulic pressure is removed. Clamping capacities range from 1000 lbs. to 8500 lbs.

SAE oil connection



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

Lower flange Collet-Lok® swing cylinder mounted on a pallet.

98-004

Ideal when live hydraulics are not available

- Double acting Collet-Lok® action allows fully automated operation
- Additional level of safety since live hydraulics are not required to maintain clamping force
- Collet-Lok® swing cylinders can be mounted by the flange or threaded into the fixture. Flanged models have manifold ports and tubing ports.
- Viton seals are standard

Selection chart

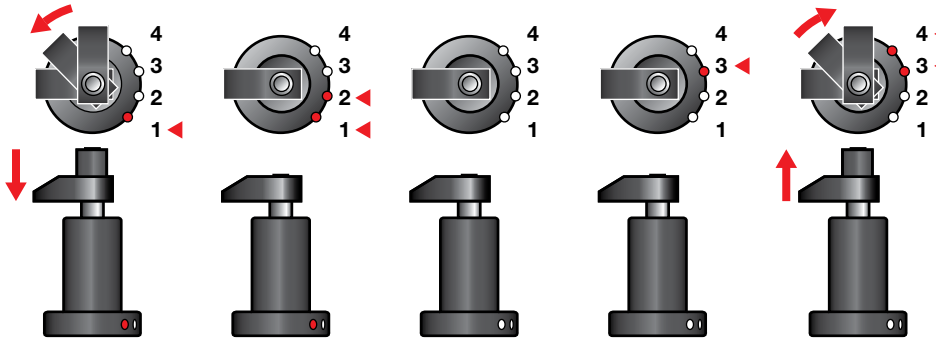
Clamping force[1]	Stroke		Left turning / Right turning (90°)		Cylinder effective area		Oil capacity		Max. oil flow[1]	Standard clamp arm
	in				in²		in³			Sold separately
lbs	Clamp	Total			Clamp	Un-clamp	Clamp	Un-clamp	in³/min	
▼ Lower flange			Model number							
1000	.32	.95	WPFL-50V	WPFR-50V	.25	.71	.24	.67	122	CA-540
2000	.47	1.11	WPFL-100V	WPFR-100V	.50	1.11	.55	1.22	305	CA-1050
8500	.39	1.65	WPFL-300V*	WPFR-300V*	2.05	3.45	3.40	5.70	600	CA-3070
▼ Threaded body			Model number							
2000	.47	1.11	WPTL-100V	WPTR-100V	.50	1.11	.55	1.22	305	CA-1050
8500	.39	1.65	WPTL-300V*	WPTR-300V*	2.05	3.45	3.40	5.70	600	CA-3070

[1] Using standard clamp arm. Clamp arms are sold separately (14).

Note: - Call Enerpac for models with metric thread and BSPP port connections.
- Minimum working pressure for Collet-Lok® system is 1400 psi.

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

Collet-Lok® sequence



Step 1
Pressurize port #1.
Plunger turns 90° and clamps part.

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

Step 3
Depressurize port #1 and #2.
Uncouple cylinder from hydraulic power source.
Part will be held in place.

Step 4
Pressurize port #3.
Plunger will be unlocked and the clamp force released.

Step 5
Keep port #3 pressurized.
Pressurize port #4.
Plunger will extend and turn to its original position.

Product dimensions in inches [⌯]

Left turning models*	A	B	C	C1	D Ø	D1 Ø	F Ø	H1	H2	H3
▼ Lower flange										
WPFL-50V	7.92	6.97	6.74	0.98	2.28	3.35	0.75	0.39	0.49	–
WPFL-100V	8.77	7.67	6.48	0.98	2.68	3.94	0.88	0.39	0.49	–
WPFL-300V	12.67	11.02	10.82	0.98	3.53	5.19	1.38	0.43	0.49	–
▼ Threaded body										
WPTL-100V	8.39	7.28	4.78	3.56	1.875-16 UN	2.76	0.88	1.24	2.64	2.97
WPTL-300V	12.22	10.57	6.46	4.53	3.125-16 UN	3.66	1.38	1.5	3.62	3.96

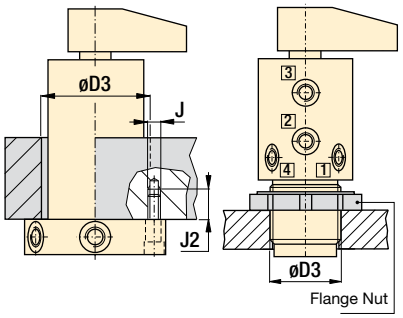
Note: Dimensions shown with standard clamp arm.
* For nonrotational model replace "L" with "N". Example: WPFN-100V

Installation dimensions
in inches

Clamping force[1] lbs	Fixture hole Ø D3	Mounting thread J mm	Minimum depth J2
▼ Lower flange			
1000	2.301 ±.012	M6 x 1,00	.68
2000	2.701 ±.012	M8 x 1,25	.72
8500	3.565 ±.012	M10 x 1,50	.72

Clamping force[1] lbs	Fixture hole Ø D3	Mounting flange Sold separately ⍞ 87 ▶	Mounting nut Sold separately ⍞ 86 ▶
▼ Threaded body			
2000	1.875-16 un	MF-481	FN-481
8500	3.125-16 un	MF-801	FN-801

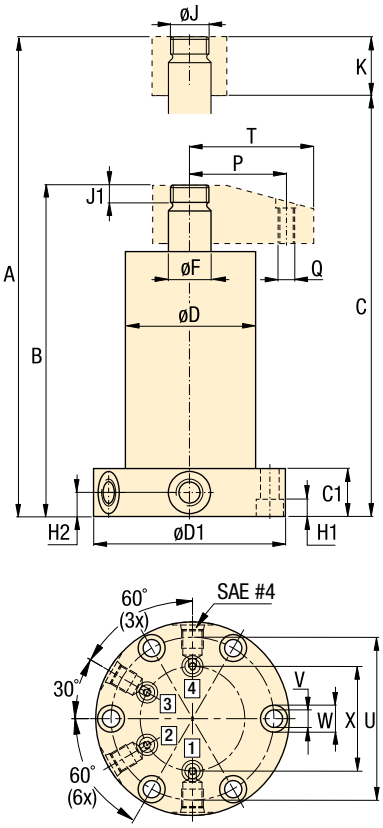
[1] With standard clamp arm.



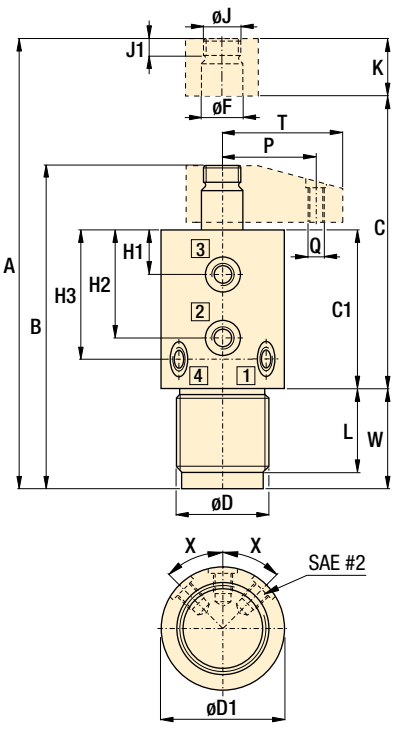
Oil port functions

1 90° Rotation and clamp
2 Locks system
3 Unlocks system
4 Unclamp and 90° rotation

WPF models



WPT models

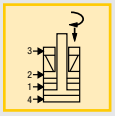


X = 45° WPT-100 models
X = 30° WPT-300 models

J Ø	J1	K	L	P	Q Ø	T	U Ø	V Ø	W	X Ø	lbs	Right turning models
												Lower flange ▼
.625-18 UNF	0.31	1.18	–	1.57	.313-24 UNF	2.13	2.76	0.35	Ø 0.55	1.89	5.1	WPFR-50V *
.750-16 UNF	0.35	1.18	–	1.97	.375-24 UNF	2.52	3.31	0.35	Ø 0.55	2.13	7.7	WPFR-100V*
1.250-12 UNF	0.39	1.85	–	2.76	.625-18 UNF	3.66	4.41	0.43	Ø 0.67	3.78	26.5	WPFR-300V*
												Threaded body ▼
.750-16 UNF	0.35	1.18	1.63	1.97	.375-24 UNF	2.52	–	–	2.44	–	6.6	WPTR-100V*
1.250-12 UNF	0.39	1.85	3.35	2.76	.625-18 UNF	3.66	–	–	3.92	–	24.2	WPTR-300V*

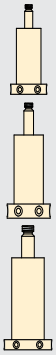
Force: 1000 - 8500 lbs
Stroke: .94 - 1.65 inch
Pressure: 1400 - 5000 psi

E Cilindros giratorios
F Vérins de bridage pivotants
D Schwenkspannzylinder

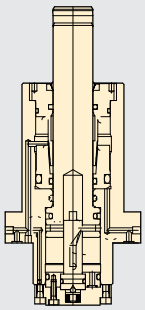


Custom Options Available

Intermediate capacities



Different flange locations



Flexible Machining Systems
See Yellow Pages (⍞ 224)

Options

Clamp arms
⍞ 14 ▶


Collet-Lok® work supports
⍞ 16 ▶


Sequence valves
⍞ 152 ▶


Accessories
⍞ 86 ▶


Important

Minimum unlock pressure must be at least 1500 psi above lock pressure.

Swing cylinders, CA Series *Dimensions & options*

Force: 1000 - 8500 lbs

Stroke: 500 - 5000 psi

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

Options

Gauges 190

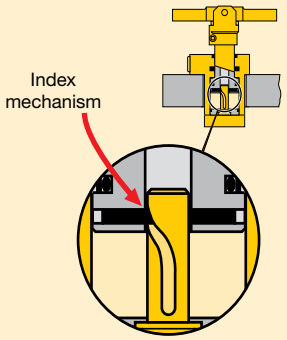
Flow control valves 155

Sequence valves 152

Important

Do not exceed maximum oil flow.

If flow rates are exceeded, swing cylinder indexing mechanism may be permanently damaged.

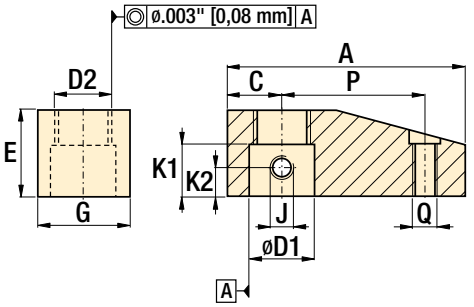


When designing custom clamp arms, the flow rates must be further reduced. This rating should be in proportion to the mass and the center of gravity of the clamp arm.

Example:

If the mass of the arm is twice that of the long arm, flow rates must be reduced by 50%.

CA models **Standard clamp arms for Collet-Lok® swing clamps**



Product dimensions in inches [⌲ ⌖]

Clamp. force lbs	Model number	A	C	D1 Ø	D2 UNF	E	G	J UNF	K1	K2	P	Q UNF	lbs
▼ **Standard clamp arms for Collet-Lok® swing clamps**													
1000	**CA-540**	2.94	.71	.749-.750	.625-18	1.18	1.26	.313-24	.75	.39	1.57	.313-24	1.2
2000	**CA-1050**	3.27	.75	.878-.879	.75-16	1.18	1.38	.313-24	.71	.39	1.97	.375-24	1.2
8500	**CA-3070**	5.04	1.38	1.377-1.378	1.25-12	1.85	2.32	.313-24	1.26	.67	2.76	.625-18	5.0

Special configurations are available

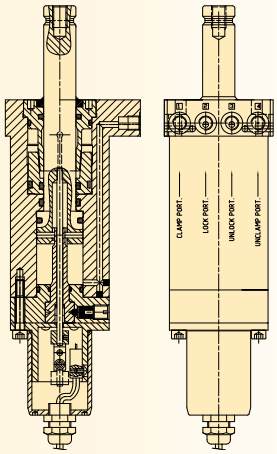
Model: MPFL100PE001-S

Body style: Upper flange

Clamp capacity: 2000 lbs (9 kN)

Clamping stroke: .71 in. (18 mm)

Special feature: Position sensing



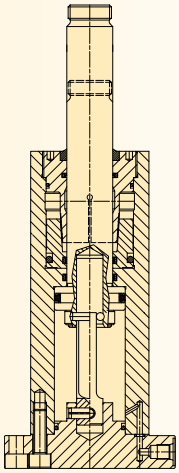
Model: MPFN300VE002

Body style: Lower flange

Clamp capacity: 8800 lbs (39 kN)

Clamping stroke (straight):
2.25 in. (57,4 mm)

Special feature: Viton seals
Long stroke



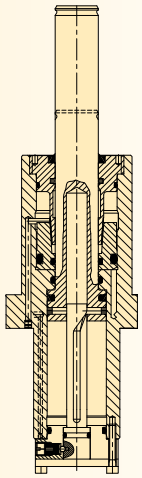
Model: MPFL200VE100

Body style: Mid-body flange

Clamp capacity: 3900 lbs (20 kN)

Clamping stroke (left hand):
2.50 in. (63,5 mm)

Special feature: Viton seals
Long stroke
Mid-flange body



Special features for Swing Cylinders*

Enerpac can design Collet-Lok® cylinders with special features to meet the needs of your production fixtures:

- Special mounting
- Special manifold port location
- Longer stroke
- Special rotation
- Internal clutch to protect rotation mechanism
- Viton seals
- Special rod end
- Position sensing

*Special features also available for Collet-Lok® Push Cylinders and Work Supports.

Work supports - *Collet-Lok*® design

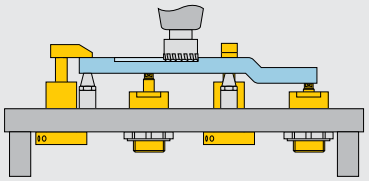
Shown: WPFS-100, WPTS-100

Hydraulically locked, mechanically maintained work support

- *Collet-Lok*® design allows the work support to maintain support position after the hydraulic pressure is removed
- *Collet-Lok*® maintains a higher level of safety, as it is not dependent on hydraulic supply pressure
- Low deflection: lowest deflection of any work support available
- Threaded or flanged body increases mounting flexibility
- Capacities up to 10,000 lbs available

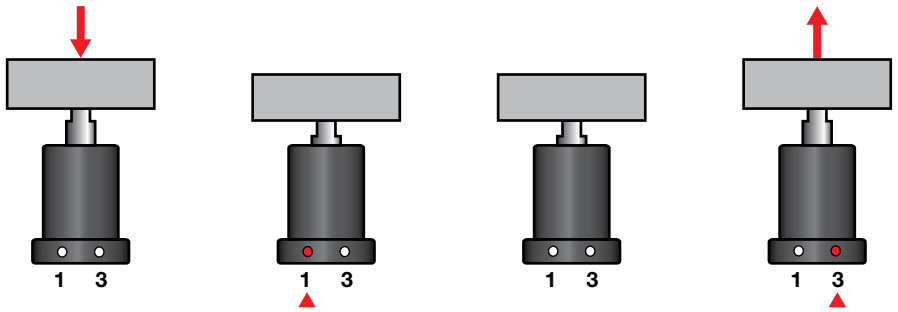
WP series

Enerpac work supports provide either additional non-fixed location points to the clamps, or support to larger or thin section workpiece components, always in order to minimize workpiece deflection during machining. The *Collet-Lok*® design does not require hydraulic system pressure to maintain support position.



While pallet No. 1 is in the machine, a new work piece is loaded on to pallet No. 2.

Collet-Lok® sequence



Step 1
Install the workpiece on the support cylinder. The plunger position will adjust to the contour of the workpiece.

Step 2
Pressurize oil port #1. The plunger will be locked in the supporting position.

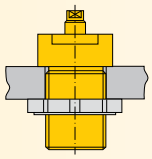
Step 3
Depressurize oil port #1. Cylinder can be uncoupled from hydraulics and still support the workpiece.

Step 4
Pressurize oil port #3. The plunger will be unlocked. When the workpiece is removed, plunger will extend into its original position.

Mounting style

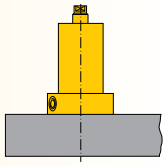
WPT series, Threaded mount

Threaded body can be used with a threaded hole in fixture plate or a jam nut with a bored hole. Ports are located in top collar block.



WPF series, Flange models

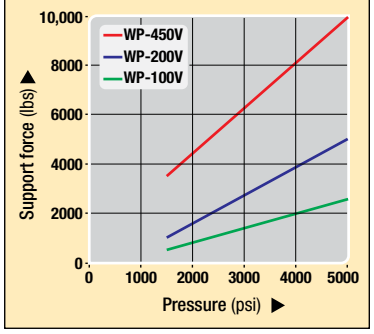
Mounts directly to fixture plate. Offers the flexibility of side ports or manifold ports on the underside of the flange.



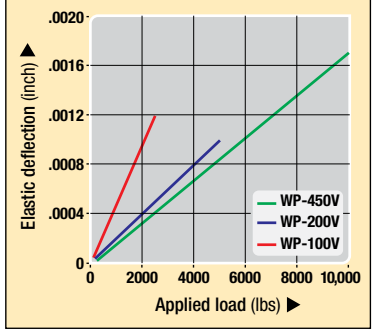
Product selection

Max. support force	Support plunger stroke	Flange models	Threaded models	Operating pressure		Locking system displacement		Plunger contact spring force	Max. oil flow
				psi		in³min			
lbs	in			min.	max.	lock	unlock	lbs	in³min
2000	0.39	WPFS-100V	–	1450	5000	0.24	0.24	4.50	30
4000	0.39	WPFS-200V	–	1450	5000	0.37	0.37	7.90	60
10,000	0.77	WPFS-450V	–	1450	5000	1.10	1.10	67.50	240
2000	0.39	–	WPTS-100V	1450	5000	0.24	0.24	3.37	30
4000	0.39	–	WPTS-200V	1450	5000	0.37	0.37	6.74	60

Support force *vs* pressure

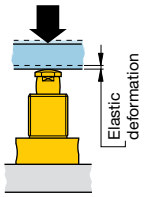


Elastic deflection *vs* load



Deflection chart:

Elastic deformation of the work support resulting from the application of load.



Force: 2000 - 4000 lbs

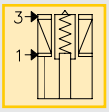
Stroke: 0.39 - .77 inch

Pressure: 1450 - 5000 psi

E Cilindros de soporte

F Vérin anti-vibreur

D Abstützzylinder



Options

***Collet-Lok*® swing cylinders** 12 ▸

Auto couplers 174 ▸

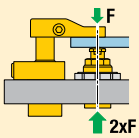
Positive clamping cylinders 80 ▸

Sequence valves 152 ▸

Important

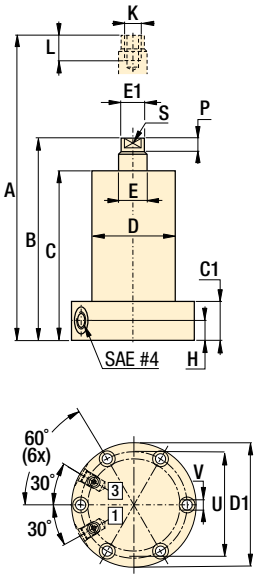
WARNING!

Support force and clamping force must be matched. Support force should be at least 150% of clamping force.

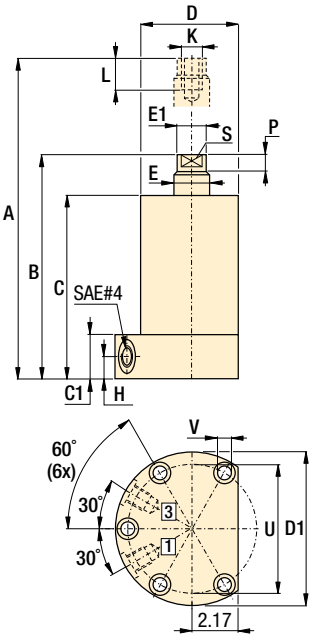


For proper application, clamp force, pressures and timing, consult Enerpac for support.

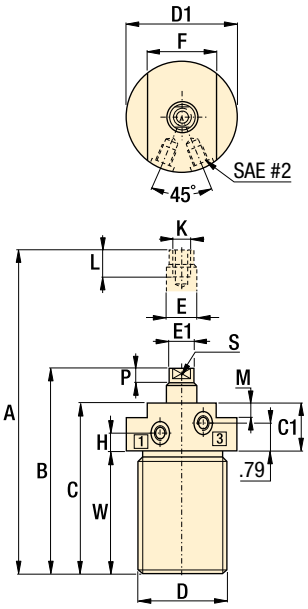
WPFS-100V, -200V



WPFS-450V



WPTS-100V, -200V



Product dimensions in inches [⊟⊕]

Model number	A	B	C	C1	D	D1 Ø	E Ø	E1 Ø	F	H	K UNF	L	M	P	S	U Ø	V Ø	W	X Ø	lbs
▼ Flange models																				
WPFS-100V	4.88	4.49	4.17	0.98	Ø 2.99	4.33	0.62	0.55	–	0.49	.313-24	0.59	–	0.2	Ø.11*	3.7	0.35	–	3.21	8.8
WPFS-200V	4.96	4.56	4.17	0.98	Ø 3.62	5.12	0.98	0.91	–	0.49	.500-20	0.79	–	0.2	Ø.11*	4.41	0.35	–	3.82	13.2
WPFS-450V	7.61	6.84	6.34	0.98	Ø 5.12	6.49	1.97	1.89	–	0.49	.750-16	1.18	–	0.39	1.18**	5.79	0.43	–	4.92	35.2
▼ Threaded models																				
WPTS-100V	4.84	4.45	4.13	1.50	2.375-12	2.94	0.62	0.55	2.17	0.61	.313-24	0.59	0.79	0.20	Ø.11*	–	–	2.64		6.6
WPTS-200V	4.92	4.53	4.13	1.50	3.125-16	3.73	0.98	0.91	2.76	0.61	.500-20	0.79	0.79	0.26	Ø.11*	–	–	2.64		8.8

* Spanner holes (x 2)
** Wrench Flats

Push cylinders - *Collet-Lok*® design

Shown: WPTC-110, WPFC-210

Ideal when live hydraulics are not available

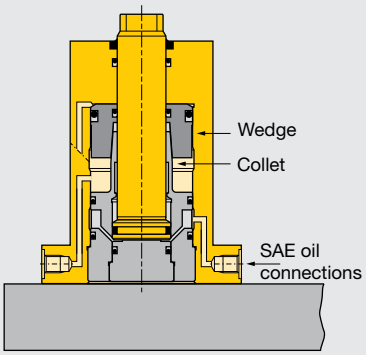
…clamping is sustained mechanically so live hydraulics are not required during the machining cycle

- 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

WP series

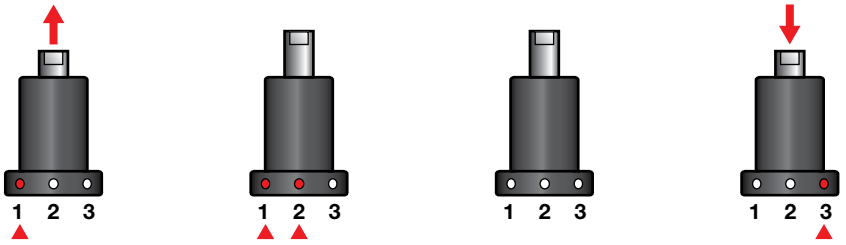
Collet-Lok® positive locking push cylinders are designed to mechanically hold the workpiece after hydraulic pressure is removed.

Push capacities range from 2500 lbs. to 5000 lbs.



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

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
						psi	in²			
lbs	in			min.	max.	adv.	adv.	unlock	retr.	in³/min
		Model number								
2500	.60	WPFC-110V	WPTC-110V	725	5000	.50	.30	.37	.24	600
5000	.60	WPFC-210V	WPTC-210V	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.

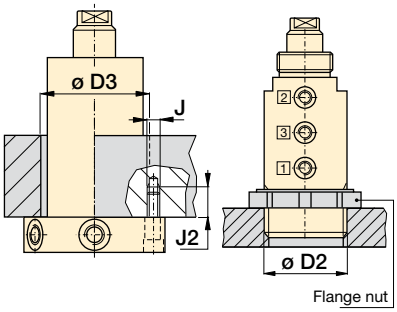
Lower flange Collet-Lok® push cylinder used for positioning a motorcycle frame.

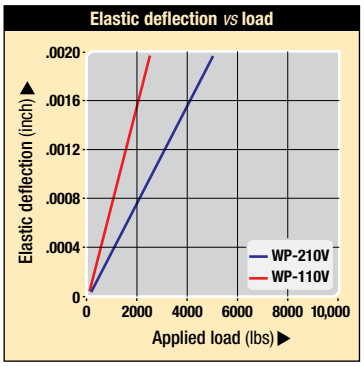
Dimensions in inches [ ]

Model number	A	B	C	C1	D	D1	D2	E	E1	F
						Ø		Ø	Ø	Ø
▼ Lower flange										
WPFC-110V	6.09	5.49	5.16	-	Ø 2.76	3.94	–	0.62	0.59	–
WPFC-210V	6.80	6.20	5.87	-	Ø 3.07	4.33	–	0.87	0.79	–
▼ Threaded body										
WPTC-110V	6.05	5.45	5.12	0.74	2.375-12 UN	2.52	1.500-12 UNF	0.62	0.59	1.81
WPTC-210V	6.76	6.16	5.83	0.71	2.750-16 UN	2.91	1.875-16 UN	0.87	0.79	2.17

Installation dimensions in inches

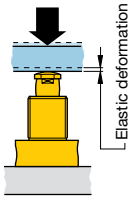
Push force lbs	Fixture hole øD3	Mounting thread J	Minimum depth J2
▼ Lower flange			
2500	2.79	M6	.68
5000	3.10	M8	.72
▼ Threaded body			
2500	2.375-12 UN	–	–
5000	2.750-16 UN	–	–



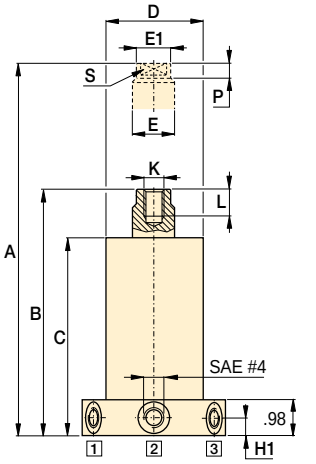


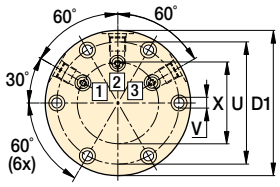
Deflection chart:

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



WPFC

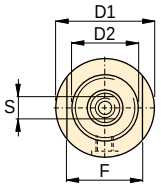


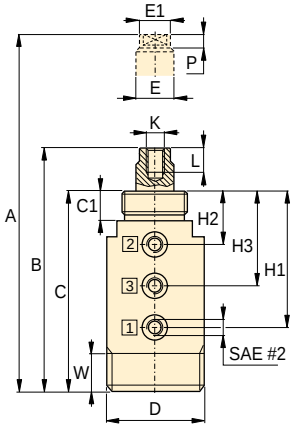


Oil port functions

1. Clamp
2. Lock
3. Unlock/Retract

WPTC





H1	H2	H3	K	L Ø	P	S*	U Ø	V	W	X Ø	lbs	Model number
												Lower flange ▼
0.49	–	–	.313-24 UNF	0.59	0.24	Ø .11*	3.31	0.28	–	2.21	8.8	WPFC-110V
0.49	–	–	.375-24 UNF	0.79	0.2	Ø .11*	3.7	0.35	–	2.76	11.0	WPFC-210V
												Threaded body ▼
3.78	1.30	2.56	.313-24 UNF	0.59	0.24	Ø .11*	–	–	0.75	–	6.6	WPTC-110V
4.37	1.26	2.83	.375-24 UNF	0.79	0.20	Ø .11*	-	-	0.79	-	7.5	WPTC-210V

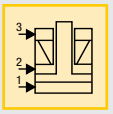
* Spanner holes (x 2)

Push force: 2500-5000 lbs

Stroke: .60 inch

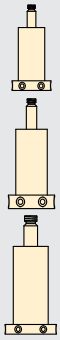
Pressure: 725-5000 psi

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

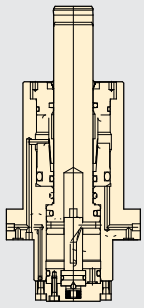


Custom Options Available

Intermediate capacities



Different flange locations



Options

Auto couplers 174 ▶

Sequence valves 152 ▶

Accessories 86 ▶

***Collet-Lok*® swing cylinders** 12 ▶

Important

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