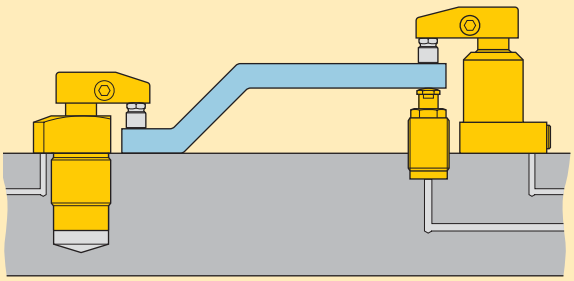
Work supports *Application & selection*

Shown: WPFS-100, WFL-111, WFC-72, WFL-441

88-046

The Enerpac work support is a hydraulic means of positively supporting the workpiece to minimize deflections.

The work support automatically adjusts to the contour of the workpiece, and then locks in position. This support then adds rigidity to the fixtured component to minimize machining variations.



Lower flange work supports, placed close to the machining area to minimize deflection of the workpiece.

99-044

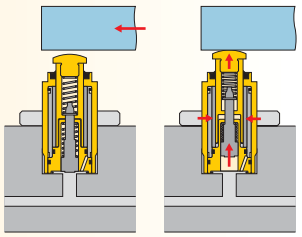
Wide range of sizes and types to efficiently support workpiece

- Low pressure lock-up capability enables the use of machine tool hydraulic systems
- High rated support capacities allow for more compact fixture design
- Corrosion resistant materials, compatible with most coolants and environments
- Threaded and manifold air vent ports allow fixturing that prevents coolants from being drawn into the system
- Minimized deflection increases machining accuracy
- Multiple mounting configurations allow design flexibility
- *Collet-Lok*® positive locking models: Hydraulic actuation / mechanical holding allows for palletized systems which do not permit live hydraulics

Select your work support method:

WF series, Hydraulic advance

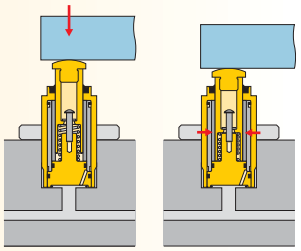
- Retracted plunger allows unobstructed workpiece loading.
- Internal hydraulic plunger advances allowing external plunger to advance under spring load. Bronze sleeve squeezes and holds plunger in fixed position.



34

WS series, Spring advance

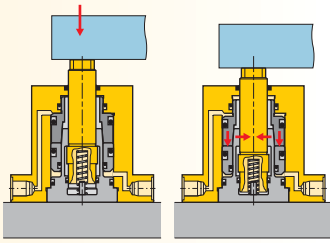
- Workpiece weight compresses the spring of the extended plunger.
- When pressurized, the internal bronze sleeve squeezes and holds the plunger in fixed position.
- Can be operated as air advance.



36

WP series, *Collet-Lok*® positive locking

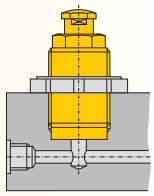
- Unique in the industry.
- Allows the work support to maintain support after pressure has been removed.
- Extremely low deflections due to the structural design of the collet system.
- Low lockup pressure.



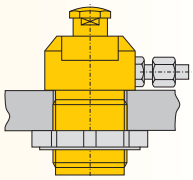
38

Select your mounting method:

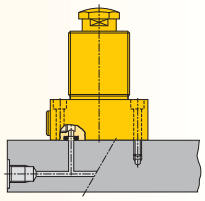
Manifold mount
- Does not require external plumbing
- Compact design, when space is at a premium
- Internal plunger thread for optional contacts



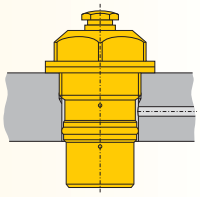
Threaded body
- Ability to adjust height
- Plumbed from either side or bottom
- Internal plunger thread for optional contacts



Lower flange
- Plumbed directly or manifold mounted
- No fixture hole required
- Easy to assemble or disassemble
- Internal plunger thread for optional contacts



Cartridge style
- Does not require external plumbing
- Allows close clustering of work supports
- Compact design, when space is at a premium
- Internal plunger thread for optional contacts



Product selection

Maximum support force	Stroke	Manifold mount	Threaded body	Lower flange	Cartridge style
lbs	in				
▼ Hydraulic advance		Model number			
1650	.38	WFM-71	WFT-71	–	WFC-72
2500	.38	–	–	WFL-111	WFC-112
5000	.41	–	–	WFL-221	WFC-222
7500	.53	–	–	WFL-331	–
10,000	.65	–	–	WFL-441	–
▼ Spring advance		Model number			
1650	.38	WSM-71	WST-71	–	WSC-72
2500	.38	–	–	WSL-111	WSC-112
5000	.41	–	–	WSL-221	WSC-222
7500	.53	–	–	WSL-331	–
10,000	.65	–	–	WSL-441	–
▼ Positive locking		Model number			
2000	.39	–	WPTS-100	WPFS-100	–
4000	.39	–	WPTS-200	WPFS-200	–

Force: 1650 - 10,000 lbs

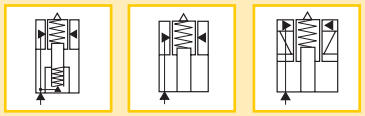
Stroke: .38 - .65 inch

Pressure: 700 - 5000 psi

(E) Cilindros de soporte

(F) Vérin anti-vibreur

(D) Abstützzylinder



Options

Swing cylinders 10 ▶

Accessories 78 ▶

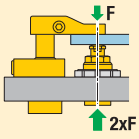
In line filters 157 ▶

Sequence valves 136 ▶

Important

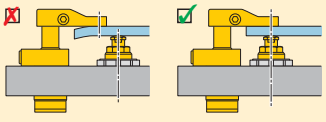
WARNING!

Support force and clamping force must be matched. Support force should be at least 200% of clamping force.



Do not exceed maximum flow rates to avoid premature lockup.

Always center load over work support.



Work supports - Hydraulic advance

Shown: WFM-71, WFL-111

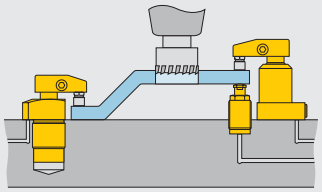
98-047

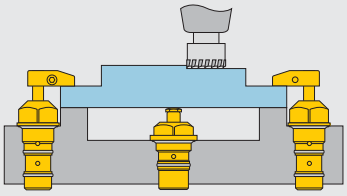
For unobstructed part loading

- Plunger stays retracted until pressure is applied allowing unobstructed loading
- Low pressure lock-up capability enables the use of machine tool hydraulic systems
- High rated support capacities allow for more compact fixture design
- Corrosion resistant materials – compatible with most coolants and environments
- Threaded and manifold air vent ports allow fixturing that prevents coolants and debris from being ingested into the mechanism
- Minimized deflection increases machining accuracy
- Multiple mounting configurations for design flexibility
- Contact bolt included

WF 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.





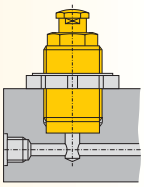
In order to load the workpiece sideways over the work supports, hydraulic advanced models are being used.

99-045

Four mounting styles

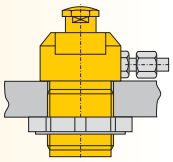
WFM series, Manifold models

Eliminates the need for fittings and tubing on the fixture.



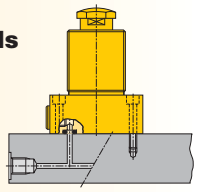
WFT series, Threaded models

Offers the flexibility of side or bottom porting.



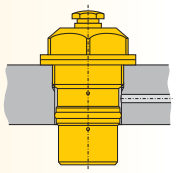
WFL series, Lower flange models

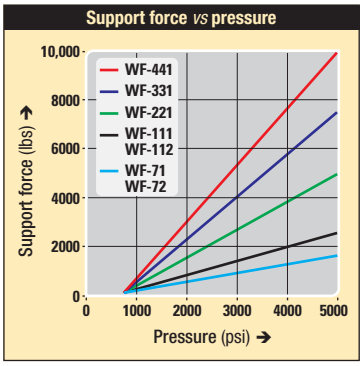
Plumbed directly – no fixture hole required.

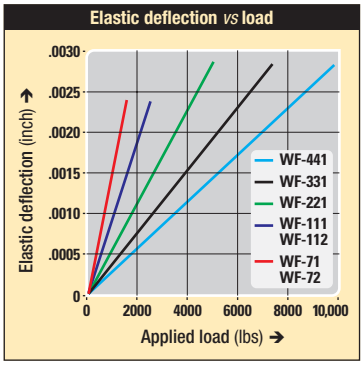


WFC series, Cartridge models

Can be designed into narrow fixture plates as thru-hole mounting is fully functional.

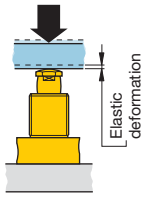






Deflection chart:

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



Product selection

Max. support force lbs	Support plunger stroke in	Manifold mount	Threaded body	Lower flange	Cartridge style	Operating pressure psi min.	Operating pressure psi max.	Plunger contact spring force lbs ext.	Plunger contact spring force lbs retr.	Oil capacity in³	Max. oil flow in³/min
1650	.38	WFM-71	WFT-71	–	WFC-72	700	5000	2.0	5.8	.04	40
2500	.32	–	–	WFL-111	WFC-112	700	5000	3.4	5.2	.06	60
5000	.41	–	–	WFL-221	WFC-222	700	5000	2.1	19.5	.19	190
7500	.53	–	–	WFL-331	–	700	5000	4.0	17.5	.24	240
10,000	.65	–	–	WFL-441*	–	700	5000	3.3	22.0	.30	300

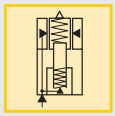
* This product is made to order. Please contact Enerpac for delivery information before specifying in your design.

Force: 1650 - 10,000 lbs

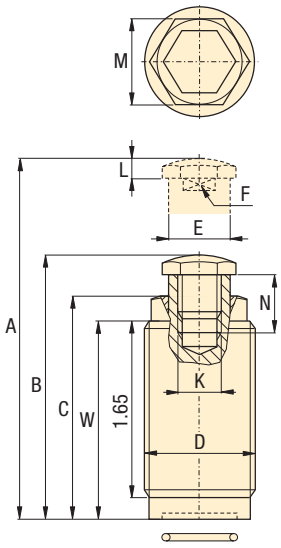
Stroke: .38 - .65 inch

Pressure: 700 - 5000 psi

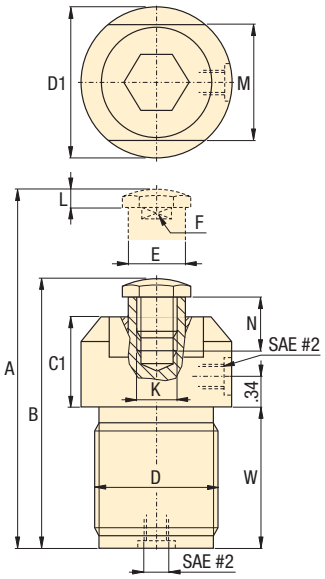
- **E** Cilindros de soporte
- **F** Vérin anti-vibreur
- **D** Abstützzylinder



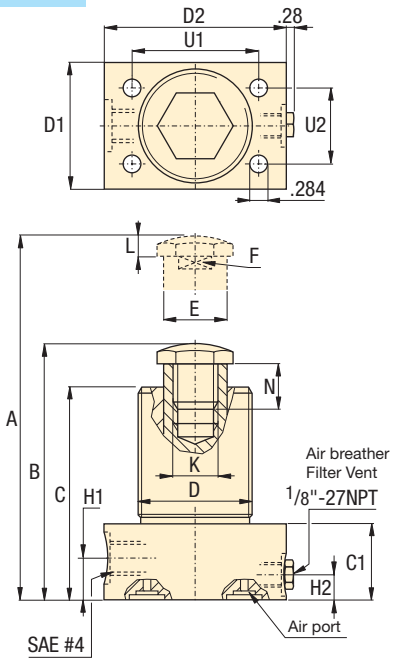
WFM series



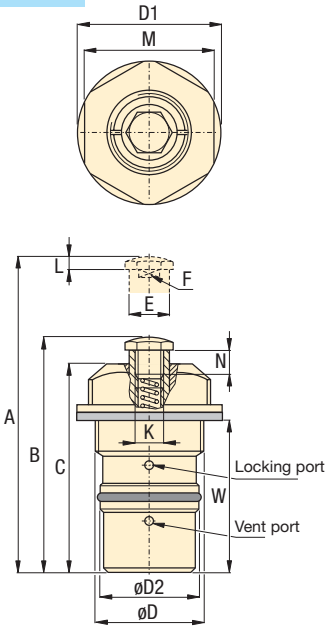
WFT series



WFL series



WFC series



Options

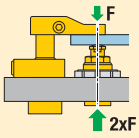
Accessories ⧉78 ▶

In-line filters ⧉157 ▶

Important

WARNING!

Support force and clamping force must be matched. Support force should be at least 200% of clamping force.



Do not exceed maximum flow rates to avoid premature lockup.

Custom cylinders including longer stroke lengths are available on request.

Product dimensions in inches [⧉]

Mounting dimensions ⧉40 ▶

Model number	A	B	C	C1	D	D1	D2	E	F	H1	H2	K	L	M	N**	U1	U2	W	lbs
												mm							
WFM-71	3.00	2.62	2.16	–	1.250-16 UN	–	–	.591	.51	–	–	M10x1,5	.18	.94	.53	–	–	1.96	.5
WFT-71	3.51	3.13	–	1.02	1.375-18 UNEF	1.71	–	.591	.51	–	–	M10x1,5	.18	1.34	.53	–	–	1.65	.5
WFL-111	3.91	3.53	3.10	1.08	1.375-18 UNEF	1.50	2.38	.629	.49	.56	.70	M10x1,5	.18	–	.73	1.62	.94	–	1.4
WFL-221	4.02	3.73	3.07	1.04	2.625-20 UN	2.75	3.25	1.496	1.00	.54	.52	M20x2,5	.24	–	.31	2.18	2.18	–	4.8
WFL-331	4.40	3.87	3.46	1.06	2.88	3.00	3.50	1.771	1.18	.53	.42	M20x2,5	.24	–	.31	2.44	2.44	–	6.3
WFL-441*	5.07	4.42	4.05	1.18	3.38	3.50	4.00	2.165	1.44	.53	.42	M20x2,5	.24	–	.62	2.94	2.94	–	9.5
WFC-72	3.20	2.82	2.46	–	M33x1,5	1.62	1.16	.591	.51	–	–	M10x1,5	.18	1.50	.53	–	–	1.98	.9
WFC-112	4.03	3.65	3.23	–	M42x1,5	2.25	1.44	.630	.49	–	–	M10x1,5	.18	2.00	.73	–	–	2.38	2.0
WFC-222	4.52	4.11	3.60	–	M60x1,5	3.00	2.25	1.496	1.00	–	–	M20x2,5	.24	2.75	.31	–	–	2.70	4.0

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

** **Note:** Dimension N is factory set. May change on types **221, 331** and **441** due to adjusted contact spring force.

Note: For manifold mounting dimensions (⧉40).

Work supports - Spring advance

Shown: WSL-111, WST-71

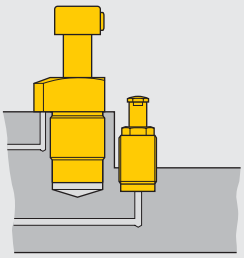
99-048

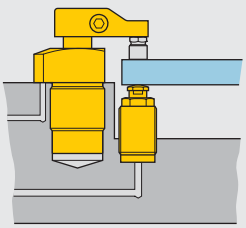
Spring advance work support contacts workpiece as it is loaded into fixture

- Low pressure lock-up capability enables the use of machine tool hydraulic systems
- High rated support capacities allow for more compact fixture design
- Corrosion resistant materials, compatible with most coolants and environments
- Threaded and manifold air vent ports allow fixturing that prevents coolants from being drawn into the system
- Minimized deflection increases machining accuracy
- Multiple mounting configurations allow design flexibility
- Can be operated as air advance by removing the spring and applying air pressure on the vent port

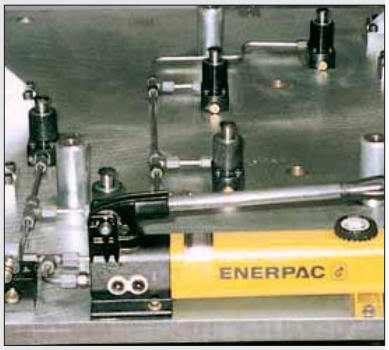
WS series

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.





Spring advance work supports with extended plungers, waiting for the next workpiece.

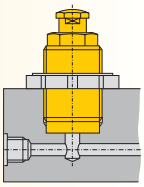


99-046

Mounting style

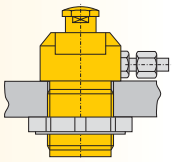
WSM series, Manifold mount

Eliminates the need for fittings and tubing on the fixture.



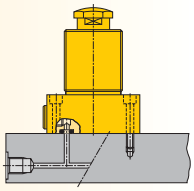
WST series, Threaded body

Offers the flexibility of side or bottom porting.



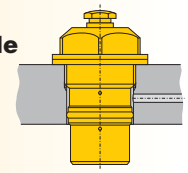
WSL series, Lower flange

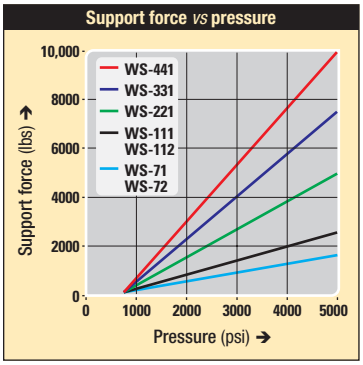
Plumbed directly – no fixture hole required.

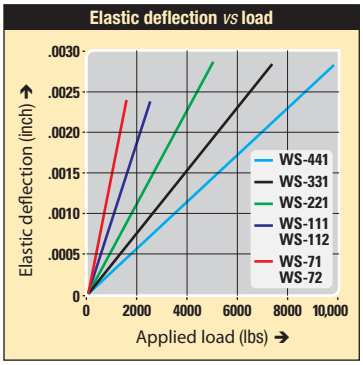


WSC series, Cartridge mount style

Can be designed into narrow fixture plates as thru-hole mounting is fully functional.

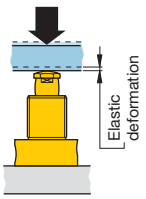






Deflection chart:

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

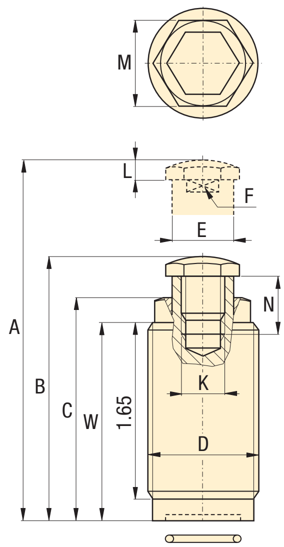


Product selection

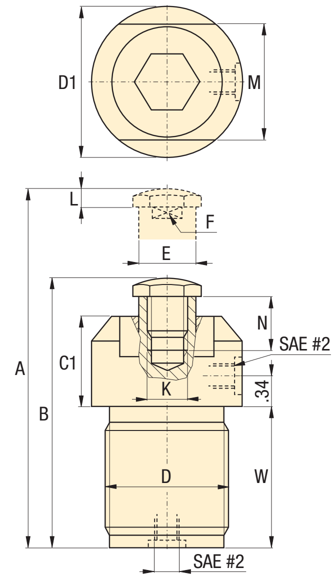
Max. support force lbs	Support plunger stroke in	Manifold mount	Threaded body	Lower flange	Cartridge style	Operating pressure psi min.	Operating pressure psi max.	Plunger contact spring force lbs ext.	Plunger contact spring force lbs retr.	Oil capacity in³	Max. oil flow in³/min
1650	.38	WSM-71	WST-71	–	WSC-72	700	5000	2.0	5.8	.04	40
2500	.38	–	–	WSL-111	WSC-112	700	5000	3.4	5.2	.06	60
5000	.41	–	–	WSL-221	WSC-222	700	5000	2.1	19.5	.19	190
7500	.53	–	–	WSL-331	–	700	5000	4.0	17.5	.24	240
10,000	.65	–	–	WSL-441*	–	700	5000	3.3	22.0	.30	300

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

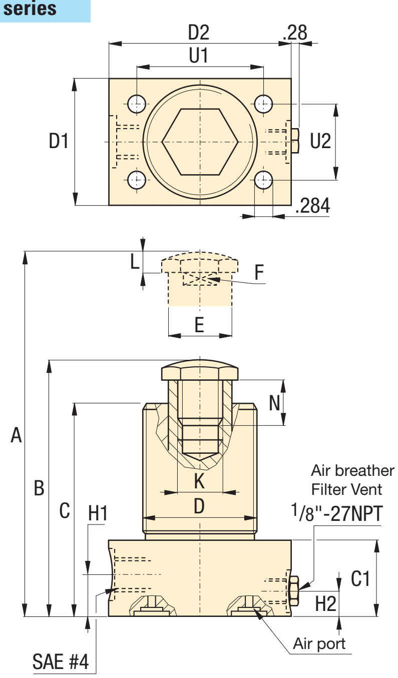
WSM series



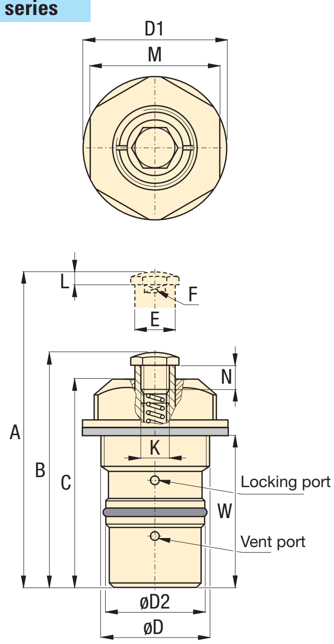
WST series



WSL series



WSC series



Force: 1650 - 10,000 lbs

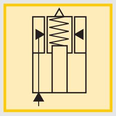
Stroke: .38 - .65 inch

Pressure: 700 - 5000 psi

E Cilindros de soporte

F Vérin anti-vibreur

D Abstützzylinder



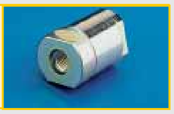
Options

Accessories

78 ▶

In-line filters

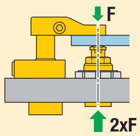
157 ▶



Important

WARNING!

Support force and clamping force must be matched. Support force should be at least 200% of clamping force.



Do not exceed maximum flow rates to avoid premature lockup.

Custom cylinders including longer stroke lengths are available on request.

Product dimensions in inches [ ]

Mounting dimensions 40 ▶

Model number	A	B	C	C1	D	D1	D2	E	F	H1	H2	K	L	M	N**	U1	U2	W	lbs
												mm							
WSM-71	3.00	2.62	2.16	–	1.250-16 UN	–	–	.591	.51	–	–	M10x1,5	.18	.94	.53	–	–	1.96	.5
WST-71	3.51	3.13	–	1.02	1.375-18 UNEF	1.71	–	.591	.51	–	–	M10x1,5	.18	1.34	.53	–	–	1.65	.5
WSL-111	3.35	2.97	2.54	.94	1.375-18 UNEF	1.50	2.38	.629	.49	.44	.30	M10x1,5	.18	–	.73	1.62	.94	–	1.4
WSL-221	3.80	3.39	2.95	.98	2.625-20 UN	2.75	3.25	1.496	1.00	.48	.40	M20x2,5	.24	–	.31	2.18	2.18	–	4.8
WSL-331	4.28	3.75	3.36	1.06	2.88	3.00	3.50	1.771	1.18	.53	.42	M20x2,5	.24	–	.31	2.44	2.44	–	6.3
WSL-441*	4.98	4.33	3.95	1.18	3.38	3.50	4.00	2.165	1.44	.53	.42	M20x2,5	.24	–	.62	2.94	2.94	–	9.5
WSC-72	3.20	2.82	2.46	–	M33x1,5	1.62	1.16	.591	.51	–	–	M10x1,5	.18	1.50	.53	–	–	1.98	.9
WSC-112	3.36	2.98	2.56	–	M42x1,5	2.25	1.50	.630	.49	–	–	M10x1,5	.18	2.00	.73	–	–	2.38	2.0
WSC-222	3.96	3.51	3.00	–	M60x1,5	3.00	2.21	1.496	1.00	–	–	M20x2,5	.24	2.75	.31	–	–	2.10	4.0

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

** **Note:** Dimension N is factory set. May change on types **221, 331** and **441** due to adjusted contact spring force.

Note: For manifold mounting dimensions (40).

Work supports - *Collet-Lok*® design

Shown: WPFS-100, WPTS-100

98-049

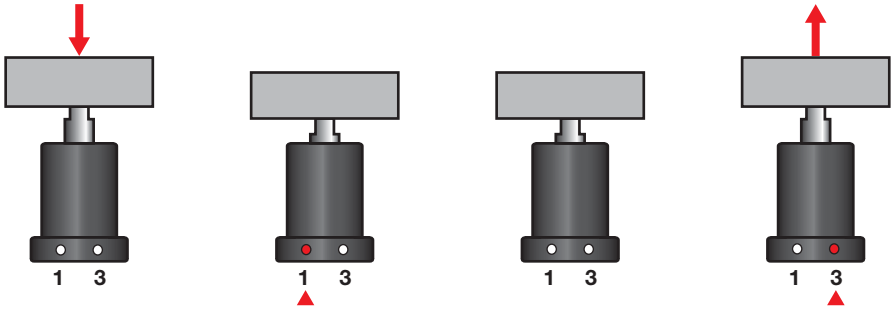
Hydraulically locked, mechanically maintained work support

- *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 on request

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.

Collet-Lok® sequence

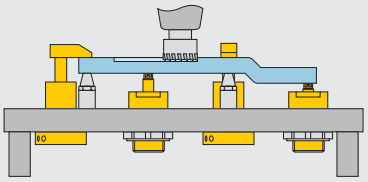


Step 1
Install the workpiece on the support cylinder. The plunger position will adjust to the contour of the workpiece.

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.

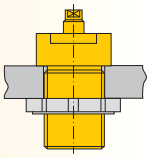
Step 4
Pressurize oil port #3. The plunger will be unlocked. When the workpiece is removed, plunger will extend into its original position.



Mounting style

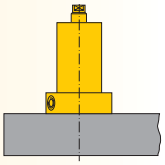
WPT series, Threaded mount

Offers the flexibility of side or bottom porting.

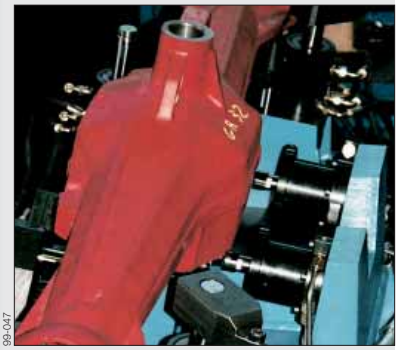


WPF series, Flange models

Plumbed directly, no fixture hole required



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

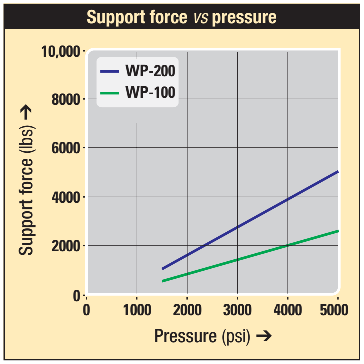


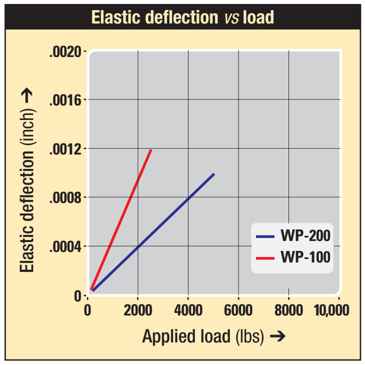
99-047

Product selection

Max. support force	Support plunger stroke	Flange models	Threaded models	Operating pressure		Locking system displacement		Plunger contact spring	Max. oil flow
				psi		in³			
lbs	in			min.	max.	ext.	retr.	in³	min
2000	.39	WPFS-100	–	1450	5000	.24	.24	4.50	400
4000	.39	WPFS-200	–	1450	5000	.37	.37	7.90	400
2000	.39	–	WPTS-100	1450	5000	.24	.24	3.37	400
4000	.39	–	WPTS-200	1450	5000	.37	.37	6.74	400

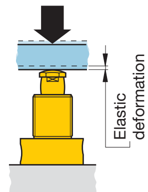
Capacities up to 10,000 lbs. available on request.





Deflection chart:

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



Force: 2000 - 4000 lbs

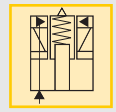
Stroke: 0.39 inch

Pressure: 1450 - 5000 psi

E Cilindros de soporte

F Vérin anti-vibreur

D Abstützzylinder



Options

***Collet-Lok®* swing cylinders**

24

Autocouplers

146

Positive clamping cylinders

70

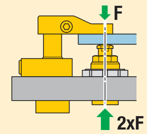
Sequence valves

136

Important

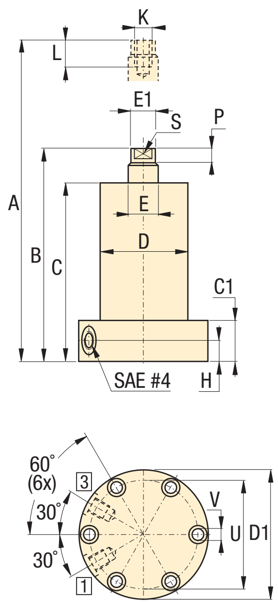
WARNING!

Support force and clamping force must be matched. Support force should be at least 200% of clamping force.

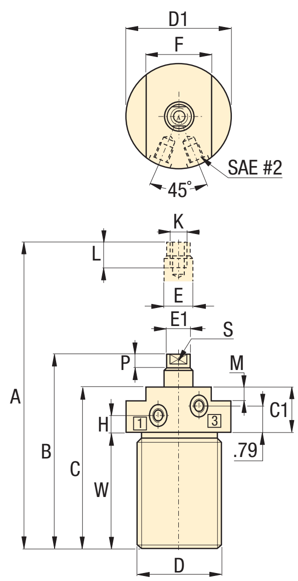


For proper application, clamp force, pressures and timing, consult Enerpac for support.

WPFS-100, -200



WPTS-100, -200



Product dimensions in inches

Model number	A	B	C	C1	D	D1	E	E1	F	H	K UNF	L	M	P	S	U	V	W	lbs
▼ **Flange models**																			
WPFS-100	4.88	4.49	4.17	.98	2.99	4.33	.62	.55	–	.49	.313-24	.59	–	.20	.47	3.70	.35	–	8.8
WPFS-200	4.88	4.49	4.17	.98	3.62	5.12	.98	.90	–	.49	.500-20	.79	–	.20	.75	4.41	.35	–	13.2
▼ **Threaded models**																			
WPTS-100	4.84	4.45	4.13	1.50	2.375-12	2.94	.62	.55	2.16	.62	.313-24	.59	.79	.20	.47	–	–	2.63	6.6
WPTS-200	4.92	4.53	4.13	1.50	3.125-16	3.74	.98	.90	2.75	.62	.500-20	.79	.79	.26	.75	–	–	2.63	8.8

Mounting dimensions *for work supports*

Shown: WFL-111 holding a casting in place.

Foto B

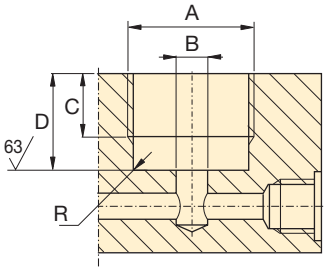
Mounting work supports

Enerpac work supports are offered in a wide variety of mounting styles. Dimensions for fixture holes and cavity preparation are specified for each mounting style separately.

Manifold work support mounting dimensions

Eliminates the need for fittings and tubing on the fixture. Use a flange nut to secure your manifold work support.

WFM/WSM



Product dimensions in inches [⌲ ⌖]

Model number	A	B ø	C	D	R	Manifold O-ring [1]	Flange nut
▼ For manifold mount work supports							
WFM-71	1.250-16 UN 2B	.37-.39	.58-.60	.93-.95	.015	ARP-017	FN-301
WSM-71	1.250-16 UN 2B	.37-.39	.58-.60	.93-.95	.015	ARP-017	FN-301

[1] Polyurethane 92 duro.

Threaded work support mounting dimensions

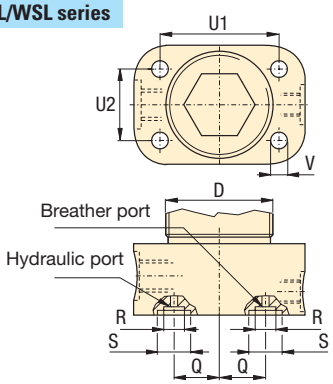
Threaded body work supports can be mounted directly into a fixture. The thread size (D) can be found in the dimension charts on ⍁35 (WFT) and ⍁37 (WST models). Use a flange nut to secure your threaded work support in the required position.

Lower flange work support mounting dimensions

Lower flange work supports can be bolted straight onto a fixture, or can be mounted into a fixture. Flange nuts can be used to secure the cylinders at the required height.

Note: It is critical to keep breather port open to clean dry location.

WFL/WSL series



The combination of Enerpac swing cylinders and work supports guarantee clamping without deformation.

30007_5

Product dimensions in inches [⌲ ⌖]

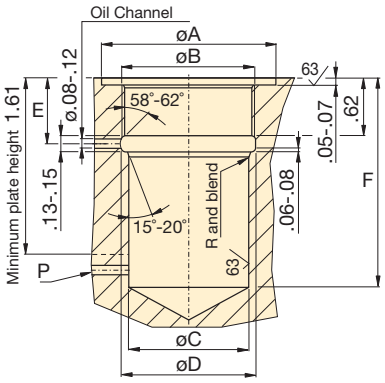
Model numbers	D	Q	R ø	S ø	U1	U2	V	Manifold O-ring [1]	Flange nut
▼ For lower flange work supports									
WFL-111	1.375-18UNEF	.57	.23	.37	1.62	.94	.284	ARP-010	FN-351
WFL-221	2.625-20UN	1.08	.34	.56	2.18	2.18	.284	ARP-110	—
WFL-331	2.88	1.20	.34	.56	2.44	2.44	.284	ARP-110	—
WFL-441	3.38	1.44	.34	.56	2.94	2.94	.284	ARP-110	—
WSL-111	1.375-18UNEF	.57	.23	.34	1.62	.94	.284	ARP-010	FN-351
WSL-221	2.625-20UN	1.08	.34	.56	2.18	2.18	.284	ARP-110	—
WSL-331	2.88	1.20	.34	.56	2.44	2.44	.284	ARP-110	—
WSL-441	3.38	1.44	.34	.56	2.94	2.94	.284	ARP-110	—

[1] Polyurethane 92 duro.

Cartridge work support mounting dimensions

Can be designed onto narrow fixture plates as thru-hole mounting is fully functional.

WFC/WSC



Dimensions in inches [⌲ ⌖]

Model numbers	A	B	C	D	E	F	Ventilation below F required
		mm				min.	
▼ **Hydraulic advance**							
WFC-72	1.68-1.70	M33x1,5	1.182-1.184	1.31-1.33	.62-.68	2.08	No
WFC-112	2.26-2.28	M42x1,5	1.499-1.501	1.67-1.69	.69-.75	2.46	Yes
WFC-222	3.01-3.03	M60x1,5	2.249-2.251	2.38-2.40	.69-.72	2.80	Yes
▼ **Spring advance**							
WSC-72	1.68-1.70	M33x1,5	1.182-1.184	1.31-1.33	.62-.68	2.08	No
WSC-112	2.26-2.28	M42x1,5	1.499-1.501	1.67-1.69	.69-.75	1.80	Yes
WSC-222	3.01-3.03	M60x1,5	2.249-2.251	2.38-2.40	.69-.72	2.20	Yes

Note: Ventilation required on WFC-112, 222 below 1.61 inch when mounted in blind cavity.

Positive locking work support mounting dimensions

Positive locking work support mounting dimensions are indicated in the dimension chart on ⌷39. For threaded models, use a flange nut to secure the work support in the required position.

Force: 1650 - 10,000 lbs

Stroke: .38 - .65 inch

Pressure: 700 - 5000 psi

(E) Cilindros de soporte

(F) Vérin anti-vibreur

(D) Abstützzylinder

Options

Accessories ⌷78 ▶

In-line filters ⌷157 ▶

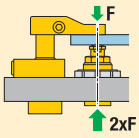
Fittings ⌷158 ▶

Swing cylinders ⌷10 ▶

Important

WARNING!

Support force and clamping force must be matched. Support force should be at least 200% of clamping force.



Do not exceed maximum flow rates to avoid premature lockup.

Always center load over work support.