E325e

ENERPAC

Hydraulic Power
for all Industrial Applications

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ENERPAC
Hydraulic Technology Worldwide

Model Number Index

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ENERPAC The World-

A complete range of quality high force tools for all industrial applications, with local availability and after sale service anywhere in the world…. this is what has made Enerpac the undisputed global market leader in high pressure hydraulics.

Across every continent, Enerpac's network of authorized distributors and service centers can reach even the most remote locations, supplying and servicing products that are designed to enhance productivity and performance, while making the workplace safer.

With over 150 sales specialists and a network of service and engineering support in 17 countries across the globe, Enerpac has become the product of choice in industries such as manufacturing, construction, energy, oil & gas, shipbuilding, railroads, mining, and metals transformation.

Always at the leading edge of technology, Enerpac has continued to develop its range of time and cost-savings tools, utilizing modern engineered materials to improve productivity and minimize operator fatigue.

Enerpac's commitment to the continued development of quality high force tools ensures that the products you purchase are the best tools in the industry. We will continue to lead the way in the development of quality high force tools for all industrial applications.

Class Brand

10 Good Reasons to Work with Enerpac

- Expert Design
- Highly Reliable
- Service Excellence
- Worldwide Experience
- Application Support
- Availability
- Quality
- Value
- Innovative Products
- Systems Solutions

Total Quality

Our products are tested to the most exacting standards. These high standards guarantee the quality, price and performance requirements of the markets we serve around the globe.

Global Network

Enerpac has an extensive network of authorized distributors and service centers located in more than 90 countries worldwide. You can rely on Enerpac for the products and technical support you need to get your job done, anywhere in the world.

Logistics Excellence

Enerpac's mission is to maintain service excellence in the ever-changing world of modern distribution. Providing our extensive range of products to our thousands of distributors worldwide demands a logistic expertise only a market leader can provide.

A Tradition of Innovation

Enerpac has a long history of finding new solutions to better meet the challenges of the industries we serve. We were the first to develop a composite hand pump and the first to offer a computerized lifting system. Our latest innovations include a full range of aluminium cylinders…. cylinders with the strength of steel and the advantages of aluminium and the Z-Class series of power pumps…. pumps that were designed to run cooler, use less electricity and are easy to service.
And to support the demands of new technologies in the construction industry, Enerpac has continued to develop Integrated System capabilities. These capabilities will provide synchronized movement control for your most challenging applications.

ENERPAC®
Hydraulic Technology Worldwide

Enerpac Hydraulic Cylinders

ENERPAC
Hydraulic Technology Worldwide

ENERPAC hydraulic cylinders are available in hundreds of different configurations. Whatever the industrial application... lifting, pushing, pulling, bending, holding... whatever the force capacity, stroke length, or size restrictions... single- or double-acting, solid or hollow plunger, you can be sure that Enerpac has the cylinder to suit your high force application.

Enerpac cylinders fully comply to ASME B30.1.

Golden Ring Design

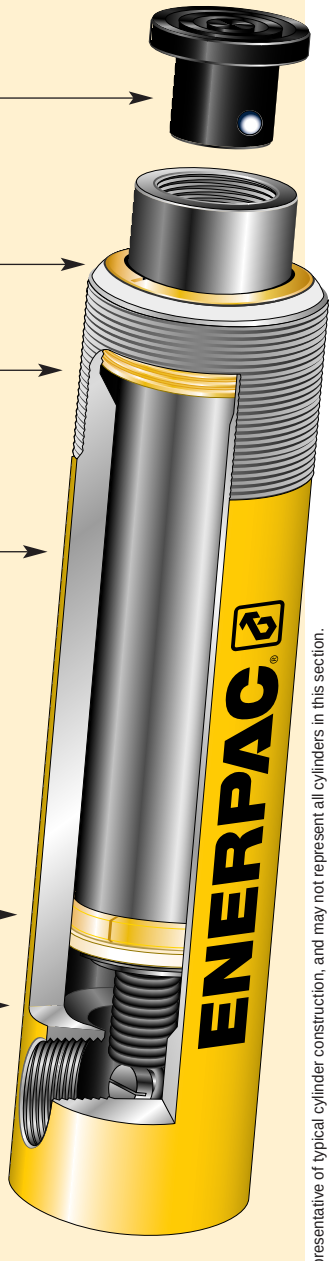
The exclusive Golden Ring Design is a unique bearing design which absorbs eccentric load stresses to protect your cylinder against abrasion, over-extending or plunger blow-outs and jamming or top-end mushrooming. As a result, Golden Ring cylinders provide long, trouble-free operation.

Hardened Saddle
prevents plunger from mushrooming and jamming in the top bearing. Snap-in design.

Plunger Wiper
reduces contamination, extending cylinder life.

Golden Ring
absorbs eccentric loading without galling cylinder parts.

Plated Plunger
resists wear and rust.



Golden Ring
absorbs eccentric loading without galling cylinder parts.

Plunger Return Spring
enables fast plunger retraction on single-acting cylinders.

Note: The cut-away drawing is representative of typical cylinder construction, and may not represent all cylinders in this section.

Cylinder-Pump Sets

For your ordering convenience cylinders are available in **sets** (cylinder, gauge, couplers, hose and pump).

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Cylinder Section Overview

Capacity [1] ton (kN)	Stroke Range (mm)	Cylinder type and functions	Series	Page
5 - 95 (45-933)	**16 - 362**	**General Purpose Cylinders, Single-Acting, (incl. accessories)**	**RC**	 **8** ▶
20-150 (229-1589)	**50-250**	**Aluminium Cylinders, Single-Acting, Lock Nut, Hollow Plunger, Double-Acting**	**RAC RACL RACH RAR**	 **13** ▶
5-520 (45-5114)	**6-62**	**Pancake and Low Height Cylinders, Single-Acting**	**CLP RSM RCS**	 **22** ▶ **24** ▶
2,5-50 (24-505)	**16 - 362**	**Pull Cylinders, Single-Acting**	**BRC BRP**	 **26** ▶
13-145 (125-1429)	**8-258**	**Hollow Plunger Cylinders Single- and Double-Acting**	**RCH RRH**	 **28** ▶ **30** ▶
4-23 (35-222)	**28-260**	**Precision Production Cylinders, Double-Acting (incl. mounting attachments)**	**BRD**	 **32** ▶
10-520 (101-5108)	**16 - 1219**	**Long Stroke Cylinders, Double-Acting**	**RR**	 **34** ▶
50-1000 (496-10260)	**50-300**	**High Tonnage Cylinders, with integral stop ring Single-Acting,**	**CLSG**	 **38** ▶
50-1000 (496-10260)	**50-300**	**High Tonnage Cylinders, with reduced collapsed height Single-Acting,**	**CLS**	 **42** ▶
50-1000 (496-10265)	**50-300**	**High Tonnage Cylinders, Double-Acting**	**CLRG**	 **46** ▶
50-1000 (496-10260)	**50-300**	**High Tonnage Cylinders, Single-Acting with Mechanical Lock Nut, Corrosion Protected**	**CLL**	 **50** ▶
10-1000 (101-10260)	**5000 max.**	**Synchronous Lift Systems Stage Lift Systems Synchronous Hoisting Systems**	**SLS BLS, SL SHS**	 **54** ▶ **58** ▶
1,4-150 (13-1335)	**76-508**	**Aluminium and Steel Jacks** **Bottle Jacks**	**JHA, JH EBJ**	 **60** ▶ **61** ▶
10-25 (101-232)	**54-158**	**High Temperature and Corrosion Resistant Cylinders, Hand Pumps and Valves**	**RC P, V**	 **62** ▶

[1] All ton values specified in this catalog are metric ton and are for cylinder class identification only. Please refer to the kN data for calculations.

▼ From left to right: **RC-506, RC-50, RC-2510, RC-154, RC-10010, RC-55, RC-1010**

The Industry Standard General Purpose Cylinder

- **Collar threads, plunger threads and base mounting holes enable easy fixturing (on most models)**
- **Designed for use in all positions**
- **Removable strap handles for unobstructed fixturing (RC-5013, RC-7513 and both 95 ton models)**
- **High strength alloy steel for durability**
- **Heavy duty return springs**
- **Baked enamel finish for increased corrosion resistance**
- **CR-400 coupler and dust cap included on all models**
- **Plunger wiper reduces contamination, extending cylinder life**

Saddles

All RC cylinders are equipped with hardened removable grooved saddles. For tilt and flat saddles, see the RC-Series accessory page.

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Base Plates

To ensure the stability of cylinders for lifting applications, base plates are available for 10, 25 and 50 ton RC cylinders.

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Specialty Attachments

For solving all kinds of application problems, specialty attachments are available for 5, 10 and 25 ton RC cylinders.

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▼ *Stage lifting set up in Greece, where assembled pipes, 25 meters in length, were stage lifted with six RC-2514 cylinders.*

▼ *RC cylinder mounting attachments greatly extend the application possibilities (available for 5, 10,15 and 25 ton cylinders).*

Think Safety

Manufacturer's rating of load and stroke are maximum safe limits. Good practice encourages using only 80% of these ratings.

RC Series

Capacity:
5 - 95 ton

Stroke:
16 - 362 mm

Maximum Operating Pressure:
700 bar

▼ QUICK SELECTION CHART

For complete technical information see next page.

Cylinder Capacity ton (kN)	Stroke (mm)	Model Number	Cylinder Effective Area (cm^2)	Oil Capacity (cm^3)	Collapsed Height (mm)	(kg)
5 (45)	16	**RC-50****	6,5	10	41	1,0
	25	**RC-51**	6,5	16	110	1,0
	76	**RC-53**	6,5	50	165	1,5
	127	**RC-55***	6,5	83	215	1,9
	177	**RC-57**	6,5	115	273	2,4
	232	**RC-59**	6,5	151	323	2,8
10 (101)	26	**RC-101**	14,5	38	89	1,8
	54	**RC-102***	14,5	78	121	2,3
	105	**RC-104**	14,5	152	171	3,3
	156	**RC-106***	14,5	226	247	4,4
	203	**RC-108**	14,5	294	298	5,4
	257	**RC-1010***	14,5	373	349	6,4
	304	**RC-1012**	14,5	441	400	6,8
	356	**RC-1014**	14,5	516	450	8,2
15 (142)	25	**RC-151**	20,3	51	124	3,3
	51	**RC-152**	20,3	104	149	4,1
	101	**RC-154***	20,3	205	200	5,0
	152	**RC-156***	20,3	308	271	6,8
	203	**RC-158**	20,3	411	322	8,2
	254	**RC-1510**	20,3	516	373	9,5
	305	**RC-1512**	20,3	619	423	10,9
	356	**RC-1514**	20,3	723	474	11,8
25 (232)	26	**RC-251**	33,2	86	139	5,9
	50	**RC-252***	33,2	166	165	6,4
	102	**RC-254***	33,2	339	215	8,2
	158	**RC-256***	33,2	525	273	10,0
	210	**RC-258**	33,2	697	323	12,2
	261	**RC-2510**	33,2	867	374	14,1
	311	**RC-2512**	33,2	1033	425	16,3
	362	**RC-2514***	33,2	1202	476	17,7
30 (295)	209	**RC-308**	42,1	880	387	18,1
50 (498)	51	**RC-502**	71,2	362	176	15,0
	101	**RC-504**	71,2	719	227	19,1
	159	**RC-506***	71,2	1131	282	23,1
	337	**RC-5013**	71,2	2399	460	37,6
75 (718)	156	**RC-756**	102,6	1601	285	29,5
	333	**RC-7513**	102,6	3417	492	59,0
95 (933)	168	**RC-1006**	133,3	2239	357	59,0
	260	**RC-10010**	133,3	3466	449	72,6

* Available as set, see note on this page.
** RC-50 cylinder has a non removable grooved saddle and no collar thread.

Ultra-Lightweight Aluminium Cylinders

If you need a higher cylinder capacity-to-weight-ratio the **RAC-Series** are the perfect choice.

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High Temperature and Corrosion Resistant Cylinders

Some cylinders are available with Viton seals and nickel plating for use in extreme environments.

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Gauges

Minimize the risk of overloading and ensure long, dependable service from your equipment. Refer to the System Components Section for a full range of gauges.

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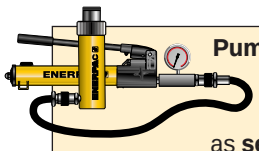

Pump and Cylinder Sets

All cylinders marked with an * are available as **sets** (cylinder, gauge, couplers, hose and pump) for your ordering convenience.

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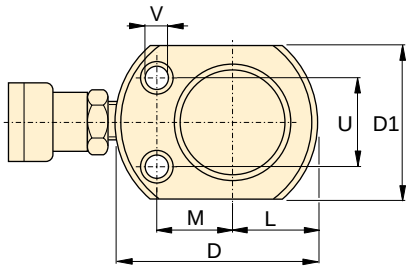
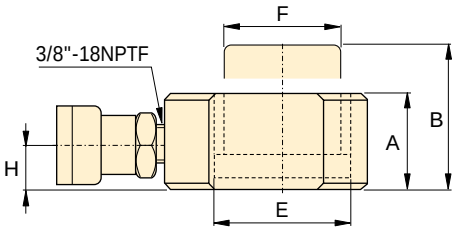
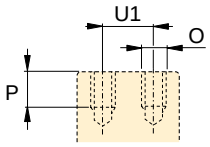
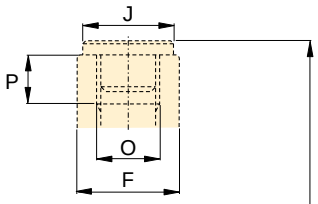


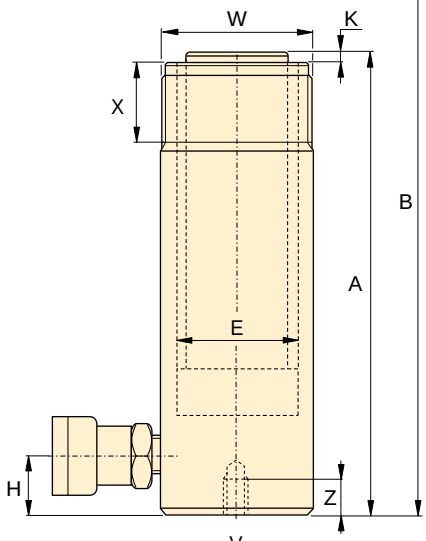


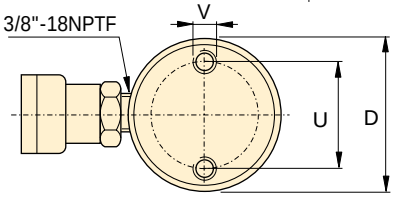
RC-50

RC-101 only
(U1 = 19 mm)

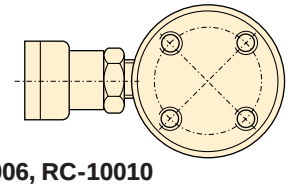




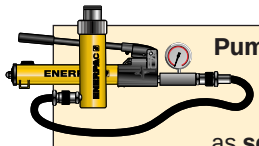




RC-51 - RC-7513



RC-1006, RC-10010



Pump and Cylinder Sets

All cylinders marked with an * are available as **sets** (cylinder, gauge, couplers, hose and pump) for your ordering convenience.

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◀ For full features see previous page.

Cylinder Capacity ton (kN)	Stroke (mm)	Model Number	Cylinder Effective Area (cm^2)	Oil Capacity (cm^3)	Collapsed Height A (mm)	Extended Height B (mm)	Outside Dia. D (mm)
5 (45)	16	**RC-50****	6,5	10	41	57	58***
	25	**RC-51**	6,5	16	110	135	38
	76	**RC-53**	6,5	50	165	241	38
	127	**RC-55***	6,5	83	215	342	38
	177	**RC-57**	6,5	115	273	450	38
	232	**RC-59**	6,5	151	323	555	38
10 (101)	26	**RC-101**	14,5	38	89	115	57
	54	**RC-102***	14,5	78	121	175	57
	105	**RC-104**	14,5	152	171	276	57
	156	**RC-106***	14,5	226	247	403	57
	203	**RC-108**	14,5	294	298	501	57
	257	**RC-1010***	14,5	373	349	606	57
	304	**RC-1012**	14,5	441	400	704	57
	356	**RC-1014**	14,5	516	450	806	57
15 (142)	25	**RC-151**	20,3	51	124	149	69
	51	**RC-152**	20,3	104	149	200	69
	101	**RC-154***	20,3	205	200	301	69
	152	**RC-156***	20,3	308	271	423	69
	203	**RC-158**	20,3	411	322	525	69
	254	**RC-1510**	20,3	516	373	627	69
	305	**RC-1512**	20,3	619	423	728	69
	356	**RC-1514**	20,3	723	474	830	69
25 (232)	26	**RC-251**	33,2	86	139	165	85
	50	**RC-252***	33,2	166	165	215	85
	102	**RC-254***	33,2	339	215	317	85
	158	**RC-256***	33,2	525	273	431	85
	210	**RC-258**	33,2	697	323	533	85
	261	**RC-2510**	33,2	867	374	635	85
	311	**RC-2512**	33,2	1033	425	736	85
	362	**RC-2514***	33,2	1202	476	838	85
30 (295)	209	**RC-308**	42,1	880	387	596	101
50 (498)	51	**RC-502**	71,2	362	176	227	127
	101	**RC-504**	71,2	719	227	328	127
	159	**RC-506***	71,2	1131	282	441	127
	337	**RC-5013**	71,2	2399	460	797	127
75 (718)	156	**RC-756**	102,6	1601	285	441	146
	333	**RC-7513**	102,6	3417	492	825	146
95 (933)	168	**RC-1006**	133,3	2239	357	525	177
	260	**RC-10010**	133,3	3466	449	709	177

* Available as set, see note on this page.
** RC-50 cylinder has a non removable grooved saddle and no collar thread.
*** D1 = 41 mm, L = 20 mm, M = 25 mm.

Single-Acting, General Purpose Cylinders

Speed Chart
See the Enerpac Cylinder Speed Chart in our 'Yellow Pages' to determine your approximate cylinder speed.

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Capacity:
5 - 95 ton

Stroke:
16 - 362 mm

Maximum Operating Pressure:
700 bar

RC Series

	Cylinder Bore Dia. E (mm)	Plunger Dia. F (mm)	Base to Adv. Port H (mm)	Saddle Dia. J (mm)	Saddle Protr. from Plgr. K (mm)	Plunger Internal Thread O	Plunger Thread Length P (mm)	Base Mounting Holes			Collar Thread W	Collar Thread Length X (mm)	(kg)	Model Number
								Bolt Circle U (mm)	Thread V	Thd. Depth Z (mm)				
	28,7	25,4	19	**	**	**	**	28	5,6 mm	—	—	—	1,0	**RC-50****
	28,7	25,4	19	25	6	3/4" - 16	14	25	1/4"- 20UN	14	1 1/2" - 16	28	1,0	**RC-51**
	28,7	25,4	19	25	6	3/4" - 16	14	25	1/4"- 20UN	14	1 1/2" - 16	28	1,5	**RC-53**
	28,7	25,4	19	25	6	3/4" - 16	14	25	1/4"- 20UN	14	1 1/2" - 16	28	1,9	**RC-55***
	28,7	25,4	19	25	6	3/4" - 16	16	25	1/4"- 20UN	14	1 1/2" - 16	28	2,4	**RC-57**
	28,7	25,4	19	25	6	3/4" - 16	16	25	1/4"- 20UN	14	1 1/2" - 16	28	2,8	**RC-59**
	42,9	38,1	19	–	–	#10 - 24UN	6	39	5/16"- 18UN	12	2 1/4" - 14	26	1,8	**RC-101**
	42,9	38,1	19	35	6	1" - 8	19	39	5/16"- 18UN	12	2 1/4" - 14	28	2,3	**RC-102***
	42,9	38,1	19	35	6	1" - 8	19	39	5/16"- 18UN	12	2 1/4" - 14	26	3,3	**RC-104**
	42,9	38,1	19	35	6	1" - 8	19	39	5/16"- 18UN	12	2 1/4" - 14	28	4,4	**RC-106***
	42,9	38,1	19	35	6	1" - 8	19	39	5/16"- 18UN	12	2 1/4" - 14	26	5,4	**RC-108**
	42,9	38,1	19	35	6	1" - 8	19	39	5/16"- 18UN	12	2 1/4" - 14	28	6,4	**RC-1010***
	42,9	38,1	19	35	6	1" - 8	19	39	5/16"- 18UN	12	2 1/4" - 14	26	6,8	**RC-1012**
	42,9	38,1	19	35	6	1" - 8	19	39	5/16"- 18UN	12	2 1/4" - 14	26	8,2	**RC-1014**
	50,8	41,4	19	38	9	1" - 8	25	47	3/8"- 16UN	12	2 3/4" - 16	30	3,3	**RC-151**
	50,8	41,4	19	38	9	1" - 8	25	47	3/8"- 16UN	12	2 3/4" - 16	30	4,1	**RC-152**
	50,8	41,4	19	38	9	1" - 8	25	47	3/8"- 16UN	12	2 3/4" - 16	30	5,0	**RC-154***
	50,8	41,4	25	38	9	1" - 8	25	47	3/8"- 16UN	12	2 3/4" - 16	30	6,8	**RC-156***
	50,8	41,4	25	38	9	1" - 8	25	47	3/8"- 16UN	12	2 3/4" - 16	30	8,2	**RC-158**
	50,8	41,4	25	38	9	1" - 8	25	47	3/8"- 16UN	12	2 3/4" - 16	30	9,5	**RC-1510**
	50,8	41,4	25	38	9	1" - 8	25	47	3/8"- 16UN	12	2 3/4" - 16	30	10,9	**RC-1512**
	50,8	41,4	25	38	9	1" - 8	25	47	3/8"- 16UN	12	2 3/4" - 16	30	11,8	**RC-1514**
	65,0	57,2	25	50	10	1 1/2" - 16	19	58	1/2"- 13UN	19	3 5/16" - 12	49	5,9	**RC-251**
	65,0	57,2	25	50	10	1 1/2" - 16	25	58	1/2"- 13UN	19	3 5/16" - 12	49	6,4	**RC-252***
	65,0	57,2	25	50	10	1 1/2" - 16	25	58	1/2"- 13UN	19	3 5/16" - 12	49	8,2	**RC-254***
	65,0	57,2	25	50	10	1 1/2" - 16	25	58	1/2"- 13UN	19	3 5/16" - 12	49	10,0	**RC-256***
	65,0	57,2	25	50	10	1 1/2" - 16	25	58	1/2"- 13UN	19	3 5/16" - 12	49	12,2	**RC-258**
	65,0	57,2	25	50	10	1 1/2" - 16	25	58	1/2"- 13UN	19	3 5/16" - 12	49	14,1	**RC-2510**
	65,0	57,2	25	50	10	1 1/2" - 16	25	58	1/2"- 13UN	19	3 5/16" - 12	49	16,3	**RC-2512**
	65,0	57,2	25	50	10	1 1/2" - 16	25	58	1/2"- 13UN	19	3 5/16" - 12	49	17,7	**RC-2514***
	73,2	57,2	57	50	10	1 1/2" - 16	25	—	—	—	3 5/16" - 12	49	18,1	**RC-308**
	95,2	79,5	33	71	2	—	—	95	1/2"- 13UN	19	5" - 12	55	15,0	**RC-502**
	95,2	79,5	33	71	2	—	—	95	1/2"- 13UN	19	5" - 12	55	19,1	**RC-504**
	95,2	79,5	35	71	2	—	—	95	1/2"- 13UN	19	5" - 12	55	23,1	**RC-506***
	95,2	79,5	35	71	2	—	—	95	1/2"- 13UN	19	5" - 12	55	37,6	**RC-5013**
	114,3	95,2	30	71	5	—	—	—	—	—	5 3/4" - 12	44	29,5	**RC-756**
	114,3	95,2	30	71	5	—	—	—	—	—	5 3/4" - 12	44	59,0	**RC-7513**
	130,3	104,9	41	71	2	—	—	139	3/4"- 10UN	25	6 7/8"- 12	44	59,0	**RC-1006**
	130,3	104,9	41	71	2	—	—	139	3/4"- 10UN	25	6 7/8" - 12	44	72,6	**RC-10010**

▼ SELECTION CHART

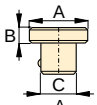
For use with Cylinder Capacity ton (kN)	Saddles			Base Plate	Mounting Block	Clevis Eyes	
	Flat	Grooved[1]	Tilt			Base[4]	Plunger
							
5 (45)	A-53F[2]	A-53G[2]	–	–	RB-5[2], AW-51[2], AW-53[2]	REB-5[2]	REP-5[2]
10 (101)	A-12[5], A-102F[3]	A-102G[3]	CAT-10[3]	JBI-10	RB-10, AW-102	REB-10	REP-10[3]
15 (142)	–	A-152G	CAT-10	–	RB-15	REB-15	REP-10
25 (232)	A-29[5]	A-252G	CAT-50	JBI-25	RB-25	REB-25	REP-25
30 (295)	A-29[5]	A-252G	CAT-50	–	RB-25	–	REP-25
50 (498)	–	–	CAT-100	JBI-50	–	–	–
75 (718)	–	–	CAT-100	–	–	–	–
95 (933)	–	–	CAT-100	–	–	–	–

[1] Standard on 5-30 ton RC-cylinders [2] Except RC-50 [3] Except RC-101 [4] Mounting screws are included. [5] Used with Bender Sets.

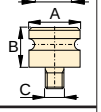
▼ DIMENSION CHARTS

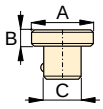
Model Nr.	Saddle Dimensions (mm)		
	A	B	C
	Flat		
A-53F	25	6	17
A-102F	35	6	22
A-12	51	48	1"-8UNC
A-29	51	48	1½"-16UNC
	Grooved		
A-53G	25	6	17
A-102G	35	6	22
A-152G	38	9	22
A-252G	50	9	35

A-53F, A-102F

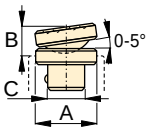


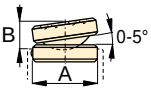
A-12, A-29



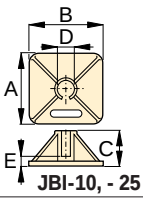


Model Nr.	Tilt Saddle Dimensions (mm)		
	A	B	C
	Tilt		
CAT-10	35	15	22
CAT-50	50	23	35
	Tilt		
CAT-100	71	24	–

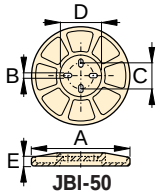




Model Nr.	Base Plate Dimensions (mm)				
	A	B	C	D	E
JBI-10	228	228	135	58	20
JBI-25	279	279	140	86	26
JBI-50	304	15	95	131	31

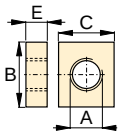


JBI-10, - 25

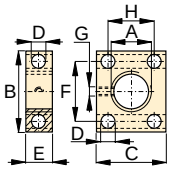


JBI-50

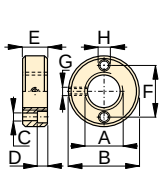
Model Nr.	Mounting Block Dimensions (mm)							
	A	B	C	D	E	F	G	H
RB-5	1½"- 16	88	76	–	25	–	–	–
AW-51	1½"- 16	70	59	10	24	54	¼"- 20	41
AW-53	1½"- 16	72	7	7	19	57	¼"- 20	10
RB-10	2¼"- 14	114	88	–	25	–	–	–
AW-102	2¼"- 14	100	82	16	30	76	7/16"- 20	58
RB-15	2¾"- 16	101	114	–	38	–	–	–
RB-25	3 5/16"- 12	127	165	–	50	–	–	–



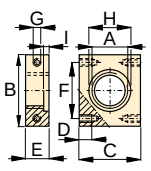
RB-5, -10 RB-15, -25



AW-51

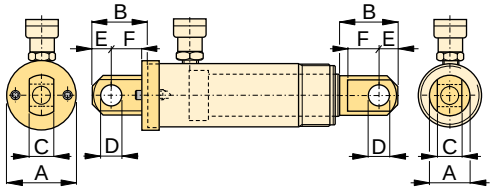


AW-53



AW-102 (l=4,8)

Type	Model Nr.	Clevis Eye Dimensions (mm)					
		A	B	C	D	E	F
Base[4]	**REB-5**	44	47	14	16	16	25
	REB-10	63	66	25	22	25	35
	REB-15	76	66	25	22	25	35
	REB-25	95	79	38	31	31	41
Plunger	**REP-5**	28	41	14	16	16	19
	REP-10	42	61	25	22	25	28
	REP-25	57	74	38	31	31	35



REB REP

See our 'Yellow Pages' for application information on these accessories.

The Enerpac Lightweight Aluminium Cylinders

▼ From left to right: **RAC-5010, RACL-5010, RAC-1504, RAR-5010**

- **Lightweight, easy to carry and position to allow a higher cylinder capacity-to-weight-ratio**
- **Non-corrosive by design, aluminium has always been a good material for use in many caustic environments**
- **Composite Bearings on all moving surfaces guarantee NO metal-to-metal contact, to resist side loads and increase cylinder life**

Removable Hardened Saddle, protects plunger from being damaged by abrasive surface contact.

Stop Ring on all models absorbs eccentric loading and prevents plunger over-extension.

Composite Bearing material to prevent metal to metal contact, reducing side-load issues and increasing life.

Hard-coated Plunger and Base resist wear and prevent galling.

7075-T6 Aluminium Alloy Components for maximum strength and minimum weight.

Plunger Return Spring on all single-acting models for prompt cylinder return.

Composite Bearing material to prevent metal to metal contact, reducing side-load issues and increasing life.

Steel Base Plate protects cylinder base from abrasive surfaces and load-induced damage.

RAC, RACL, RACH, RAR Series

Capacity:
20-150 ton @ 700 bar

Stroke:
50-250 mm

Aluminium versus Steel

Aluminium cylinders, while offering the most lightweight solution, also have some unique limitations due to material properties. It differs from steel in that it has a lower finite fatigue life. Aluminium cylinders should NOT be used in high-cycle applications such as production. These cylinders are designed to provide 5000 cycles at their recommended pressure. **This limit should not be exceeded**. In normal lifting and many maintenance applications, this should provide a lifetime of use.

RAC-Series, Single-Acting, Cylinders

The lightweight general purpose spring return aluminium cylinders.

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RACL-Series, Lock Nut, Cylinders

The lightweight spring return aluminium cylinders with lock nut for mechanical load holding.

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RACH-Series, Hollow Plunger Cylinders

For both push and pull forces with a single-acting cylinder.

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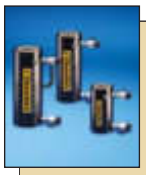

RAR-Series, Double-Acting Cylinders

The lightweight aluminium cylinders for lifting and lowering.

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▼ Shown from left to right: **RAC-5010, RAC-15010, RAC-304, RAC-208**

Lightweight for Maximum Portability

- **Composite bearings prevent metal-to-metal contact, increasing cylinder life and resistance to side-loads of up to 10%**
- **Hard-Coat finish on all surfaces resists damage and extends cylinder life**
- **Handles standard on all models**
- **Steel base plate and saddle for protection against load-induced damage**
- **Integral stop ring prevents plunger over-travel and is capable of withstanding the full cylinder capacity**
- **High strength return spring for rapid cylinder retraction**
- **CR-400 coupler and dustcap included on all models**
- **All cylinders meet ASME B-30.1 and ISO 10100 standards**

Saddles

All RAC-cylinders are equipped with bolt-on removable hardened steel saddles. For Tilt Saddles see next page.

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Lightweight Hand Pumps

The Enerpac composite lightweight hand pumps **P-392** or **P-802** make the optimal lightweight set.

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Lock Nut Cylinders

When positive mechanical load holding is required, RACL-Series Aluminium Lock Nut Cylinders are the ideal choice.

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▼ **SELECTION CHART**

Cylinder Capacity @ 700 bar ton (kN)	Stroke (mm)	Model Number *	Cylinder Effective Area (cm^2)
20 (218)	50	**RAC-202**	31,2
	100	**RAC-204**	31,2
	150	**RAC-206**	31,2
30 (309)	50	**RAC-302**	44,2
	100	**RAC-304**	44,2
	150	**RAC-306**	44,2
50 (496)	50	**RAC-502**	70,9
	100	**RAC-504**	70,9
	150	**RAC-506**	70,9
100 (1002)	100	**RAC-1004**	143,1
	150	**RAC-1006**	143,1
	200	**RAC-1008**	143,1
150 (1589)	150	**RAC-1506**	227,0

* Note: Every RAC-cylinder is available with a stroke of 50, 100, 150, 200 and 250 mm.

◀ *The unique Enerpac RA-Series jacks – lightweight and entirely made of aluminium alloy – these RAC-506 jacks are ideal for the submergence and positioning procedure of tunnel elements at the bottom of the the rivers in the High Speed Train Line (HSL) project in Holland.*

RAC Series

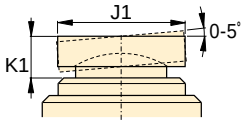
Capacity:
20-150 ton

Stroke:
50 - 250 mm

Maximum Operating Pressure:
700 bar

Optional Bolt On Tilt Saddle Dimensions (mm)

For Cylinder Model / Capacity ton	Tilt Saddle Model Number	Tilt Saddle Diameter J1	Saddle Protrusion from Plunger K1
RAC-50	CATG-50	50	24
RAC-100	CATG-150	91	31
RAC-150	CATG-200	118	35



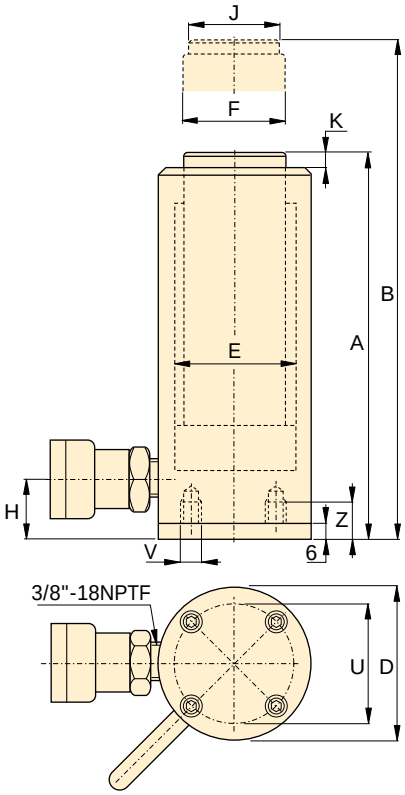
Steel Base Plate Mounting Holes

The mounting holes in these aluminium cylinders are designed for fixturing the steel base plate. They will not withstand the capacity of the cylinder. The steel base plate protects the cylinder from damage and should not be removed.

Steel Base Plate Mounting Holes

Cylinder Model / Capacity ton	Bolt Circle U (mm)	Thread V (mm)	Thread Depth [1] Z (mm)
RAC-20	70,0	M6	12
RAC-30	80,0	M6	12
RAC-50	110,0	M6	12
RAC-100	160,0	M6	12
RAC-150	200,0	M6	12

[1] Including Base Plate Height of 6 mm.



High Temperature and Corrosion Resistant Products

Some cylinders, hand pumps and valves are available with Viton seals and nickel plating for use in extreme environments.

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Hoses

Enerpac offers a complete line of high quality hydraulic hoses. To ensure the integrity of your system, specify only Enerpac hydraulic hoses.

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Oil Capacity (cm^3)	Collapsed Height A (mm)	Extended Height B (mm)	Outside Diameter D (mm)	Cylinder Bore Diameter E (mm)	Plunger Diameter F (mm)	Bottom to Advance Port H (mm)	Saddle Diameter J (mm)	Saddle Protrusion from Plunger K (mm)	(kg)	Model Number *
156	174	224	85	63,0	50,0	27	40	3	3,6	RAC-202
312	224	324	85	63,0	50,0	27	40	3	4,1	RAC-204
468	274	424	85	63,0	50,0	27	40	3	4,6	RAC-206
221	181	231	100	75,0	60,0	32	40	3	4,5	RAC-302
442	231	331	100	75,0	60,0	32	40	3	5,2	RAC-304
663	281	431	100	75,0	60,0	32	40	3	5,9	RAC-306
354	186	236	130	95,0	80,0	30	50	3	8,5	RAC-502
709	236	336	130	95,0	80,0	30	50	3	9,8	RAC-504
1063	286	436	130	95,0	80,0	30	50	3	11,1	RAC-506
1431	271	271	180	135,0	110,0	46	94	3	19,6	RAC-1004
2147	321	471	180	135,0	110,0	46	94	3	21,9	RAC-1006
2863	371	571	180	135,0	110,0	46	94	3	24,2	RAC-1008
3405	343	493	230	170,0	140,0	51	113	3	33,3	RAC-1506

▼ Shown from left to right: **RACL-1006, RACL-504, RACL-5010**

- **Aluminium Lock Nut provides mechanical load holding for extended periods**
- **Hardened steel stop ring increasing cylinder life and resistance to side-loads of up to 5%**
- **Hard-Coat finish on all surfaces resists damage and extends cylinder life**
- **Handles standard on all models**
- **Steel base plate and saddle for protection against load-induced damage**
- **Integral stop ring prevents plunger over-travel and is capable of withstanding the full cylinder capacity**
- **High strength return spring for rapid cylinder retraction**
- **CR-400 coupler and dustcap included on all models**
- **All cylinders meet ASME B-30.1 and ISO 10100 standards**

◀ *The portable lock nut cylinder RACL-1506 used for extended load supports during epoxy injection for bridge reinforcement.*

To Secure Loads Mechanically

Saddles

All RACL-cylinders are equipped with bolt-on removable hardened steel saddles. For Tilt Saddles see next page.

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Remote Lifting

For heavy lifting in remote locations use the Enerpac ZE-Series electric pumps.

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Hoses

Enerpac offers a complete line of high quality hydraulic hoses. To ensure the integrity of your system, specify only Enerpac hydraulic hoses.

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Gauges

Minimize the risk of overloading and ensure long, dependable service from your equipment. Refer to the System Components Section for a full range of gauges.

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▼ SELECTION CHART

Cylinder Capacity @ 700 bar ton (kN)	Stroke (mm)	Model Number *	Cylinder Effective Area (cm^2)
50 (496)	50	**RACL-502**	70,9
	100	**RACL-504**	70,9
	150	**RACL-506**	70,9
100 (1002)	50	**RACL-1002**	143,1
	100	**RACL-1004**	143,1
	150	**RACL-1006**	143,1
150 (1589)	50	**RACL-1502**	227,0
	100	**RACL-1504**	227,0
	150	**RACL-1506**	227,0

* Note: Every RACL-cylinder is available with a stroke of 50, 100, 150, 200 and 250 mm.

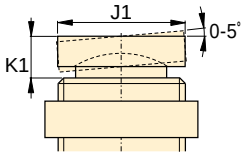
RACL Series

Capacity:
50-150 ton

Stroke:
50 - 150 mm

Maximum Operating Pressure:
700 bar

Optional Bolt On Tilt Saddle Dimensions (mm)				
For Cylinder Model / Capacity ton	**Tilt Saddle Model Number**	Tilt Saddle Diameter J1	Saddle Protrusion from Plunger K1	
RACL-50	**CATG-50**	50	24	
RACL-100	**CATG-150**	91	31	
RACL-150	**CATG-200**	118	35	

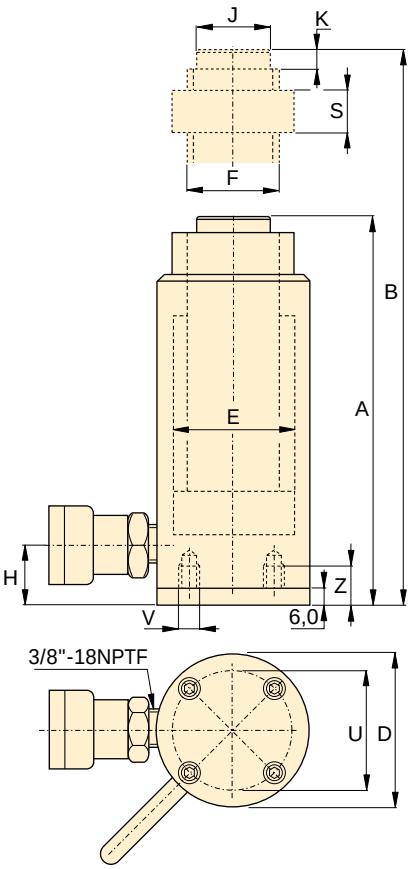


Steel Base Plate Mounting Holes

The mounting holes in these aluminium cylinders are designed for fixturing the steel base plate. They will not withstand the capacity of the cylinder. The steel base plate protects the cylinder from damage and should not be removed.

Steel Base Plate Mounting Holes			
Cylinder Model / Capacity ton	Bolt Circle U (mm)	Thread V (mm)	Thread Depth [1] Z (mm)
RACL-50	110,0	M6	12
RACL-100	160,0	M6	12
RACL-150	200,0	M6	12

[1] Including Base Plate Height of 6 mm.



Other Cylinder Capacities

Lock Nut Aluminium Cylinders are also available in capacities of 20 and 30 ton.

Additional Stroke Lengths

All cylinder models are available with standard stroke lengths of 50, 100, 150, 200 and 250 mm.
Visit **www.enerpac.com** for all cylinder models and details.

Lifting an Unbalanced Load

When lifting an unbalanced load Enerpac Integrated Lifting Systems can be the solution with multiple lift point capabilities from 4 to 64 points.

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	Oil Capacity (cm³)	**Collapsed Height** A (mm)	Extended Height B (mm)	Outside Diameter D (mm)	Cylinder Bore Diameter E (mm)	Plunger Diameter (Threaded) F (mm)	Bottom to Advance Port H (mm)	Saddle Diameter J (mm)	Saddle Protrusion fr. Plunger K (mm)	Lock Nut Height S (mm)	(kg)	**Model Number ***
	354	236	286	130	95,0	Tr 80 x 4	30	50	3	50	9,3	**RACL-502**
	709	286	386	130	95,0	Tr 80 x 4	30	50	3	50	10,6	**RACL-504**
	1063	336	486	130	95,0	Tr 80 x 4	30	50	3	50	11,9	**RACL-506**
	716	296	346	180	135,0	Tr 110 x 6	46	94	3	75	21,9	**RACL-1002**
	1431	346	446	180	135,0	Tr 110 x 6	46	94	3	75	24,2	**RACL-1004**
	2147	396	546	180	135,0	Tr 110 x 6	46	94	3	75	26,5	**RACL-1006**
	1135	323	373	230	170,0	Tr 140 x 6	51	113	3	80	32,2	**RACL-1502**
	2270	373	473	230	170,0	Tr 140 x 6	51	113	3	80	36,2	**RACL-1504**
	3405	423	573	230	170,0	Tr 140 x 6	51	113	3	80	40,2	**RACL-1506**

ENERPAC
Hydraulic Technology Worldwide

▼ Shown from left to right: **RACH-1504, RACH-15010, RACH-206, RACH-306**

The Lightweight Solution for Tensioning and Testing

- **Hollow plunger design allows for both pull and push forces**
- **Composite bearings prevent metal-to-metal contact, increasing cylinder life and resistance to side-loads of up to 10%**
- **Hard-Coat finish on all surfaces resists damage and extends cylinder life**
- **Floating center tube increases seal and product life**
- **Handles standard on all models**
- **Steel base plate and saddle for protection against load-induced damage**
- **Integral stop ring prevents plunger over-travel and is capable of withstanding the full cylinder capacity**
- **High strength return spring for rapid cylinder retraction**

Saddles

All RACH-cylinders are equipped with bolt-on hollow removable saddles of hardened steel.

Lightweight Hand Pumps

The Enerpac composite lightweight hand pumps **P-392** or **P-802** make the optimal lightweight set.

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Lifting an Unbalanced Load

When lifting an unbalanced load Enerpac Integrated Lifting Systems can be the solution with multiple lift point capabilities from 4 to 64 points.

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▼ **SELECTION CHART**

Cylinder Capacity @ 700 bar ton (kN)	Stroke (mm)	Model Number *	Cylinder Effective Area (cm^2)
20 (229)	50	**RACH-202**	32,7
	150	**RACH-206**	32,7
30 (358)	50	**RACH-302**	51,1
	150	**RACH-306**	51,1
60 (596)	100	**RACH-604**	84,7
	150	**RACH-606**	84,7
100 (1157)	150	**RACH-1006**	164,6

* Note: Every RACH-cylinder is available with a stroke of 50, 100, 150, 200 and 250 mm.

◀ *An RACH-306 powered by a P-392 hand pump used to extract corroded carriage pins of refuse collection vehicles.*

Single-Acting, Aluminium Hollow Plunger Cylinders

Aluminium versus Steel

Aluminium cylinders, while offering the most lightweight solution, also have some unique limitations due to material properties. It differs from steel in that it has a lower finite fatigue life. Aluminium cylinders should NOT be used in high-cycle applications such as production.

These cylinders are designed to provide 5000 cycles at their recommended pressure. **This limit should not be exceeded**. In normal lifting and many maintenance applications, this should provide a lifetime of use.

RACH Series

Capacity:
20-100 ton

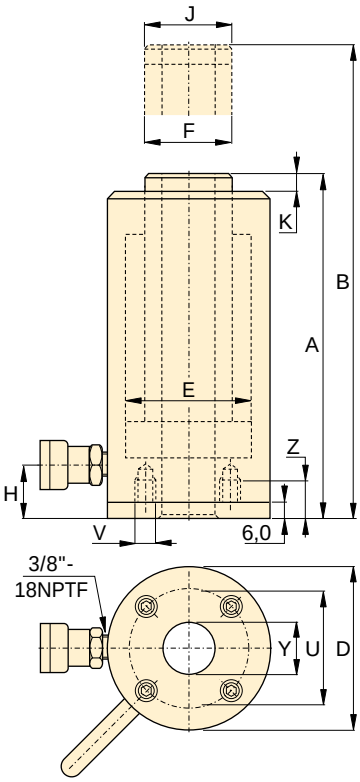
Stroke:
50 - 150 mm

Center Hole Diameter:
27 - 79 mm

Maximum Operating Pressure:
700 bar

Steel Base Plate Mounting Holes

The mounting holes in these aluminium cylinders are designed for fixturing the steel base plate. They will not withstand the capacity of the cylinder. The steel base plate protects the cylinder from damage and should not be removed.



Steel Base Plate Mounting Holes

Cylinder Model / Capacity ton	Bolt Circle U (mm)	Thread V (mm)	Thread Depth [1] Z (mm)
RACH-20	80,0	M6	12
RACH-30	110,0	M6	12
RACH-60	160,0	M6	12
RACH-100	230,0	M6	12

[1] Including Base Plate Height of 6 mm.

Other Cylinder Capacities

Aluminium Hollow Plunger Cylinders are also available in capacities of 150 ton.

Additional Stroke Lengths

All cylinder models are available with standard stroke lengths of 50, 100, 150, 200 and 250 mm.
Visit **www.enerpac.com** for all cylinder models and details.

Standard Features

- CR-400 coupler and dustcap included on all models.
- All cylinders meet ASME B-30.1 and ISO 10100 standards.

Oil Capacity (cm^3)	Collapsed Height A (mm)	Extended Height B (mm)	Outside Diameter D (mm)	Cylinder Bore Diameter E (mm)	Plunger Diameter F (mm)	Bottom to Adv. Port H (mm)	Saddle Diameter J (mm)	Saddle Protrusion from Plunger K (mm)	Center Hole Diameter Y (mm)	(kg)	Model Number *
164	188	238	100	75,0	55,0	29	55	10,0	27,0	5,2	**RACH-202**
491	315	465	100	75,0	55,0	29	55	10,0	27,0	7,1	**RACH-206**
256	208	258	130	95,0	70,0	29	70	10,0	34,0	8,0	**RACH-302**
766	333	483	130	95,0	70,0	29	70	10,0	34,0	11,2	**RACH-306**
847	315	415	180	130,0	100,0	61	100	12,0	54,0	19,5	**RACH-604**
1270	380	530	180	130,0	100,0	61	100	12,0	54,0	22,8	**RACH-606**
2487	391	541	250	185,0	145,0	61	145	14,0	79,0	46,2	**RACH-1006**

▼ Shown from left to right: **RAR-5010, RAR-308, RAR-204**

Portable Power Lifters for Double-Acting Applications

- **Composite bearings prevent metal-to-metal contact, increasing cylinder life and resistance to side-loads of up to 10%**
- **Hard-Coat finish on all surfaces resists damage and extends cylinder life**
- **Handles standard on all models**
- **Steel base plate and saddle for protection against load-induced damage**
- **Integral stop ring prevents plunger over-travel and is capable of withstanding the full cylinder capacity**
- **Built-in safety valve prevents accidental over-pressurization**
- **Double-acting for rapid retraction, regardless of hose lengths or system losses**

Saddles

All RAR-cylinders are equipped with bolt-on removable hardened steel saddles. For Tilt Saddles see next page.

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Hoses

Enerpac offers a complete line of high quality hydraulic hoses. To ensure the integrity of your system, specify only Enerpac hydraulic hoses.

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Remote Lifting

For heavy lifting in remote locations use the Enerpac ZE-Series electric pumps. A double-acting cylinder must be powered by a pump with a 4-way valve.

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▼ *RAR-cylinder used in a stage lift application.*

▼ **SELECTION CHART**

Cylinder Capacity @ 700 bar ton	Stroke (mm)	Model Number *	Maximum Cylinder Capacity (kN) Push	Maximum Cylinder Capacity (kN) Pull	Cylinder Effective Area (cm^2) Push	Cylinder Effective Area (cm^2) Pull	Oil Capacity (cm^3) Push	Oil Capacity (cm^3) Pull
50	50	**RAR-502**	496	187	70,9	26,7	354	134
	100	**RAR-504**	496	187	70,9	26,7	709	267
	150	**RAR-506**	496	187	70,9	26,7	1063	401
100	100	**RAR-1004**	1002	557	143,1	79,5	1431	795
	150	**RAR-1006**	1002	557	143,1	79,5	2147	1193
	200	**RAR-1008**	1002	557	143,1	79,5	2863	1590
150	150	**RAR-1506**	1589	924	227,0	132,0	3405	1980

* Note: Every RAR-cylinder is available with a stroke of 50, 100, 150, 200 and 250 mm.

Double-Acting, Aluminium Cylinders

RAR Series

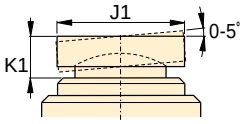
Capacity:
50-150 ton

Stroke:
50 - 200 mm

Maximum Operating Pressure:
700 bar

Optional Bolt On Tilt Saddle Dimensions (mm)

For Cylinder Model / Capacity ton	Tilt Saddle Model Number	Tilt Saddle Diameter J1	Saddle Protrusion from Plunger K1
RAR-50	CATG-50	50	24
RAR-100	CATG-150	91	31
RAR-150	CATG-200	118	35



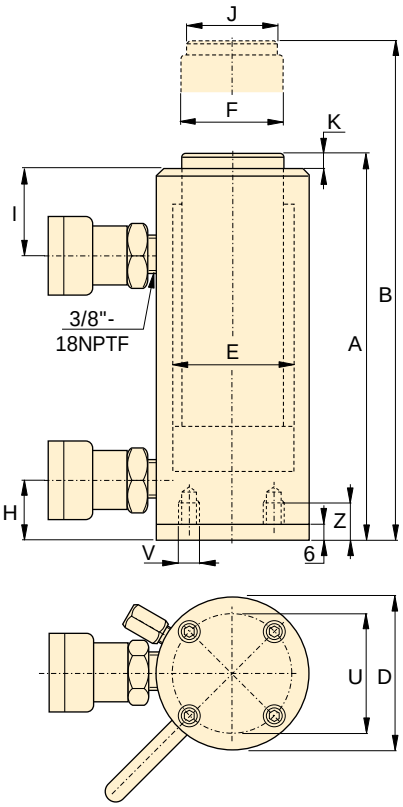
Steel Base Plate Mounting Holes

The mounting holes in these aluminium cylinders are designed for fixturing the steel base plate. They will not withstand the capacity of the cylinder. The steel base plate protects the cylinder from damage and should not be removed.

Steel Base Plate Mounting Holes

Cylinder Model / Capacity ton	Bolt Circle U (mm)	Thread V (mm)	Thread Depth [1] Z (mm)
RAR-50	110,0	M6	12
RAR-100	165,0	M6	12
RAR-150	200,0	M6	12

[1] Including Base Plate Height of 6 mm.



Other Cylinder Capacities

Double-Acting Aluminium Cylinders are also available in capacities of 20-30 ton.

Additional Stroke Lengths

All cylinder models are available with standard stroke lengths of 50, 100, 150, 200 and 250 mm.
Visit **www.enerpac.com** for all cylinder models and details.

Lifting an Unbalanced Load

When lifting an unbalanced load Enerpac Integrated Lifting Systems can be the solution with multiple lift point capabilities from 4 to 64 points.

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Collapsed Height A (mm)	Extended Height B (mm)	Outside Diameter D (mm)	Cylinder Bore Diameter E (mm)	Plunger Diameter F (mm)	Bottom to Advance Port H (mm)	Top to Retract Port I (mm)	Saddle Diameter J (mm)	Saddle Protrusion from Plunger K (mm)	(kg)	Model Number *
201	251	145	95,0	75,0	30	56	50	3	11,1	RAR-502
251	351	145	95,0	75,0	30	56	50	3	12,7	RAR-504
301	451	145	95,0	75,0	30	56	50	3	14,3	RAR-506
301	401	185	135,0	90,0	43	80	94	3	19,3	RAR-1004
351	501	185	135,0	90,0	43	80	94	3	22,2	RAR-1006
401	601	185	135,0	90,0	43	80	94	3	25,1	RAR-1008
348	498	230	170,0	110,0	38	75	113	3	33,2	RAR-1506

CLP-Series, Pancake Lock Nut Cylinders

ENERPAC
Hydraulic Technology Worldwide

▼ Shown from left to right: **CLP-2002, CLP-5002**

The Lowest Power Lifter

- **Extremely low height for use in confined areas**
- **Lock nut for positive and safe load holding over a long period of time**
- **Single-acting, load return**
- **Optional special synthetic coating for improved corrosion resistance and lower friction for smoother operation to withstand side load forces up to 3% of rated cylinder capacity without scoring**
- **Overflow port functions as a stroke limiter**
- **CR-400 coupler and dust cap included on all models**

Tilt Saddles

All CLP-Series cylinders include integral tilt saddles with maximum tilt angles up to 5°.

Gauges

Minimize the risk of overloading and ensure long, dependable service from your equipment. Refer to the System Components Section for a full range of gauges.

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Hoses

Enerpac offers a complete line of high quality hydraulic hoses. To ensure the integrity of your system, specify only Enerpac hydraulic hoses.

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▼ *Only the extreme low height CLP-cylinder fits in this confined area to lift the construction.The V-82 needle valve is used to control cylinder speed during lifting and lowering.*

Cylinder Capacity ton (kN)	Stroke (mm)	Model Number*	Cylinder Effective Area (cm^2)	Oil Capacity (cm^3)
60 (606)	50	**CLP-602**	86,6	432
100 (1027)	50	**CLP-1002**	146,8	734
160 (1619)	45	**CLP-1602**	231,3	1040
200 (1999)	45	**CLP-2002**	285,6	1285
260 (2567)	45	**CLP-2502**	366,8	1650
400 (3916)	45	**CLP-4002**	559,5	2517
520 (5114)	45	**CLP-5002**	730,6	3287

* For special synthetic coating add suffix 'C' to model number.

Single-Acting, Pancake Lock Nut Cylinders

Speed Chart

See the Enerpac Cylinder Speed Chart in our 'Yellow Pages' to determine your approximate cylinder speed.

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Longer Stroke Lock Nut Cylinders

For longer stroke lock nut applications the **RACL** and **CLL-Series** cylinders are the perfect choice.

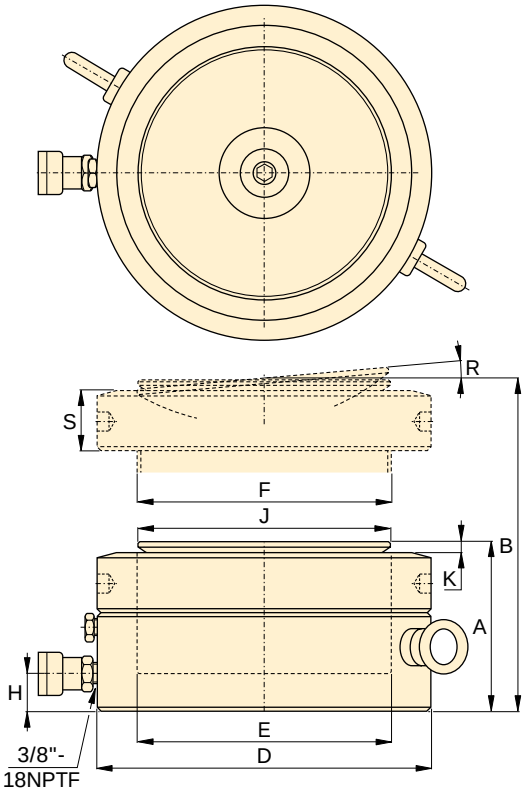
Page: 7

CLP Series

Capacity:
60-520 ton

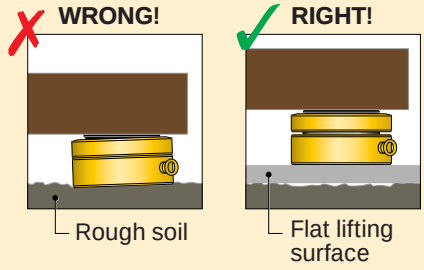
Stroke:
45-50 mm

Maximum Operating Pressure:
700 bar



ALL CLP-SERIES CYLINDERS REQUIRE A SOLID LIFTING SURFACE FOR CORRECT SUPPORT.

USE OF PANCAKE CYLINDERS ON SURFACES SUCH AS SAND, MUD OR DIRT, MAY RESULT IN CYLINDER DAMAGE!



For more safety instructions see our 'Yellow Pages'.

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	Collapsed Height A (mm)	Extended Height B (mm)	Outside Diameter D (mm)	Cylinder Bore Diameter E (mm)	Plunger Diameter F (mm)	Base to Advance Port H (mm)	Saddle Diameter J (mm)	Saddle Protrusion from Plgr. K (mm)	Saddle Max. Tilt Angle R	Lock Nut Height S (mm)	(kg)	Model Number*
	125	175	140	105,0	Tr 104 x 4	19	96	6	5°	28	15	**CLP-602**
	137	187	175	136,7	Tr 136 x 6	21	126	8	5°	31	26	**CLP-1002**
	148	193	220	171,6	Tr 171 x 6	27	160	9	5°	40	44	**CLP-1602**
	155	200	245	190,7	Tr 190 x 6	30	180	10	5°	43	57	**CLP-2002**
	159	204	275	216,1	Tr 216 x 6	32	200	11	5°	44	74	**CLP-2502**
	178	223	350	266,9	Tr 266 x 6	39	250	11	4°	55	134	**CLP-4002**
	192	237	400	305,0	Tr 305 x 6	48	290	10	3°	62	189	**CLP-5002**

RSM/RCS-Series, Low Height Cylinders

▼ Shown from left to right: **RSM-1000, RSM-300, RSM-50, RCS-1002, RCS-302**

Maximum Power-to-Height Ratio

Saddles

All RCS-Series cylinders have plunger mounting holes for installation of tilt saddles. See table for selection and dimensional information.

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Lifting the first few millimeters

The **LW-16** Lifting Wedge and **SOH-Series** Machine Lifts are the perfect choice for lifting the first few millimeters.

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RSM-series, Flat-Jac® Cylinders

- **Compact, flat design for use where most other cylinders will not fit**
- **Single-acting, spring return**
- **RSM-750, 1000 and 1500 have handles for easy carrying**
- **Mounting holes permit easy fixturing**
- **Baked enamel finish for increased corrosion resistance**
- **CR-400 coupler and dust cap included on all models, except RSM-50 which is fitted with an AR-400 coupler.**
- **Hard chrome plated high quality steel plungers**
- **Grooved plunger ends require no saddle**

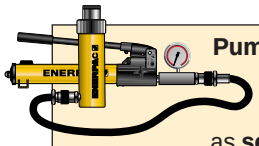
RCS-series, Low Height Cylinders

- **Lightweight, low profile design for use in confined spaces**
- **Single-acting, spring return**
- **Baked enamel finish for increased corrosion resistance**
- **Plunger wiper reduces contamination, extending cylinder life**
- **CR-400 coupler and dust cap included on all models**
- **Grooved plunger end with threaded holes for mounting tilt saddles**
- **Integral handle on RCS-1002 for easy carrying**
- **Plated steel plungers**

▼ *Only a couple of centimeters will do for an RSM-cylinder to lift a large construction. The V-82 needle valve is used to control cylinder speed during lifting and lowering.*

Cyl. Capa-city ton (kN)	Stroke (mm)	Model Number	Cyl. Effect. Area (cm^2)	Oil Cap. (cm^3)
5 (45)	6	**RSM-50**	6,5	4
10 (101)	12	**RSM-100**	14,5	18
20 (201)	11	**RSM-200**	28,7	32
30 (295)	13	**RSM-300**	42,1	55
45 (435)	16	**RSM-500**	62,1	99
75 (718)	16	**RSM-750**	102,6	164
90 (887)	16	**RSM-1000**	126,7	203
150 (1386)	16	**RSM-1500**	198,1	317
10 (101)	38	**RCS-101***	14,5	55
20 (201)	45	**RCS-201***	28,7	129
30 (295)	62	**RCS-302***	42,1	261
45 (435)	60	**RCS-502***	62,1	373
90 (887)	57	**RCS-1002***	126,7	722

* Available as set, see note on next page.



Pump and Cylinder Sets

All cylinders marked with an * are available as **sets** (cylinder, gauge, couplers, hose and pump) for your ordering convenience.

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RSM RCS Series

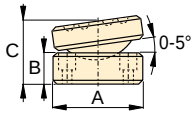
Capacity:
5 - 150 ton

Stroke:
6 - 62 mm

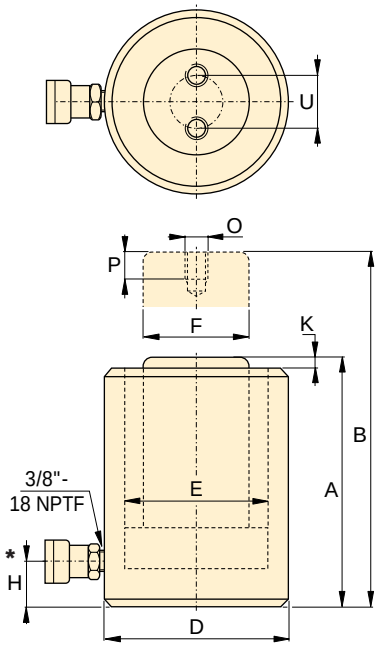
Maximum Operating Pressure:
700 bar

Optional Bolt On Tilt Saddle Dimensions (mm)

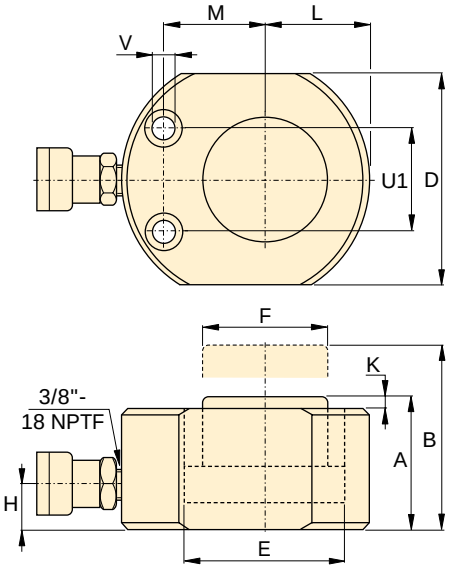
For Cylinder Model:	Model Number	A	B	C*
RCS-101	CAT-11	35	11	21
RCS-201, -302, -502	CAT-51	50	15	29
RCS-1002	CAT-101	71	17	35



* 'C' dimension equals saddle protrusion from plunger. Mounting screws are included.



RCS-Series



RSM-Series

* 5° angle position of coupler on RCS-101, 201,302

RSM Cylinder Mounting Hole Dimensions (mm)

Model Number	Bolt Circle U1	Hole Dia. V	Counter Bore Dia.	Counter Bore Depth
RSM-50	28,5	5,5	9,1	4,3
RSM-100	36,6	7,1	10,7	7,9
RSM-200	49,3	10,0	15,1	9,9
RSM-300	52,3	10,0	15,9	11,2
RSM-500	66,5	11,0	19,0	12,7
RSM-750	76,2	13,5	20,6	14,2
RSM-1000	76,2	13,5	20,6	14,2
RSM-1500	117,3	13,5	20,6	14,2

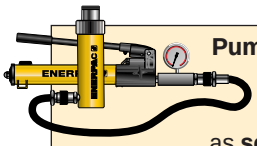
Collapsed Height A (mm)	Extended Height B (mm)	Outside Diameter D (mm)	Cylinder Bore Dia. E (mm)	Plunger Dia. F (mm)	Base to Advance Port H (mm)	Plunger Protrusion from Base K (mm)	Plunger to Base L (mm)	Plunger to Mtg. Hole M (mm)	Thread O (mm)	Thread Depth P (mm)	Bolt Circle U (mm)	(kg)	Model Number
32	38	58 x 41	28,7	25,4	16	1	20	22	–	–	–	1,0	RSM-50
43	54	82 x 55	42,9	38,1	19	1	27	34	–	–	–	1,4	RSM-100
51	62	101 x 76	60,5	50,8	19	1	39	39	–	–	–	3,1	RSM-200
58	71	117 x 95	73,2	63,4	19	2	47	44	–	–	–	4,5	RSM-300
66	82	140 x 114	88,9	69,8	19	2	57	53	–	–	–	6,8	RSM-500
79	95	165 x 139	114,3	82,6	19	2	69	66	–	–	–	11,3	RSM-750
85	101	178 x 153	127,0	92,2	19	2	76	74	–	–	–	14,5	RSM-1000
100	116	215 x 190	158,8	114,3	23	2	95	82	–	–	–	26,3	RSM-1500
88	126	69	42,9	38,1	17	5	–	–	M4	8	26	4,1	RCS-101*
98	143	92	60,5	50,8	17	3	–	–	M5	8	39	5,0	RCS-201*
117	179	101	73,2	66,5	19	3	–	–	M5	8	39	6,8	RCS-302*
122	182	124	88,9	69,8	23	2	–	–	M5	8	39	10,9	RCS-502*
141	198	165	127,0	92,2	31	1	–	–	M8	10	55	22,7	RCS-1002*

BRC/BRP-Series, Pull Cylinders

▼ Shown from left to right: **BRC-25, BRC-46, BRP-306, BRP-606, BRP-106C**

- **High strength alloy steel construction**
- **Plunger blow-out protection to prevent rod over-extension**
- **Hard chrome-plated plunger for long life**
- **Replaceable links on BRP-models**
- **Baked enamel finish for increased corrosion resistance**
- **CR-400 coupler and dust cap included on all models**
- **Plunger wiper reduces contamination, extending cylinder life**
- **Single-acting, spring return**

For use with Subassemblies and Modules



Pump and Cylinder Sets

All cylinders marked with an * are available as **sets** (cylinder, gauge, couplers, hose and pump) for your ordering convenience.

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Gauges

Minimize the risk of overloading and ensure long, dependable service from your equipment. Refer to the System Components Section for a full range of gauges.

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Attachments and Accessories

BRC-25 and BRC-46 units have base, collar and plunger threads to affix a range of optional attachments and accessories, such as chains, saddles and extension tubes.

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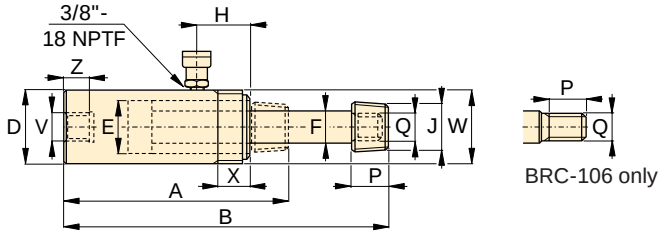
▼ *Ship building, welding and Enerpac pull cylinders go hand in hand.*

▼ *To lift a load bearing mast into place, BRP-series cylinders were used to tension the supporting cables.*

BRC Cylinder Mounting Dimensions (mm)				
Model Number	Base Mounting Hole V	Collar Thread W	Collar Thd. Lgth. X	Mtg. Thd. Lgth. Z
BRC-25	3/4" - 14 NPT	1 1/2" - 16 UN	24	17
BRC-46	1 1/4" - 11 1/2 NPT	2 1/4" - 14 UN	26	24
BRC-106	M30 x 2	M85 x 2	25	24



BRC-25, -46, 106

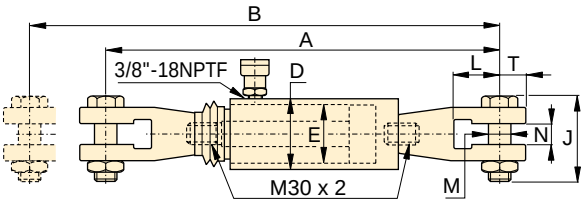
BRC/ BRP Series

Capacity:
2,5 - 50 ton

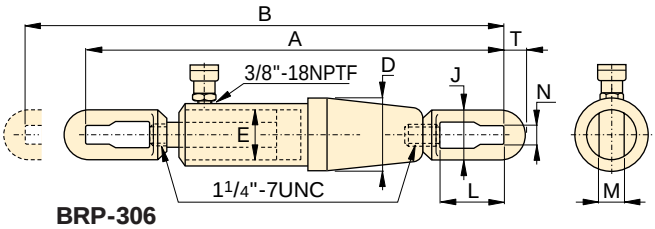
Stroke:
127-155 mm

Maximum Operating Pressure:
700 bar

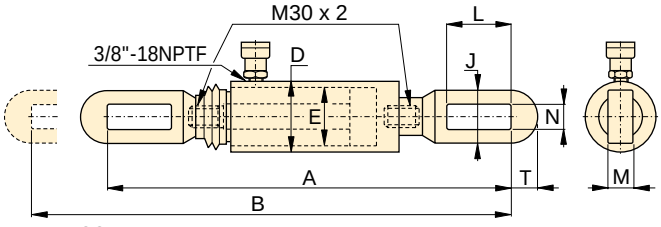
Cylinder Capacity ton (kN)	Stroke (mm)	Model Number	Cyl. Effect. Area (cm^2)	Oil Cap. (cm^3)	Coll. Height A (mm)	Ext. Height B (mm)	Outs. Dia. D (mm)	Cyl. Bore Dia. E (mm)	Plgr. Dia. F (mm)	Top to Inlet Port H (mm)	Saddle Diameter J (NPT)	Plgr. Thd. Lgth. P (mm)	Plunger Outside Thread Q	(kg)
2,5 (24)	127	**BRC-25**	3,5	45	264	391	48	28,4	19,0	45	3/4" - 14	28	11/16" - 24	1,8
5 (51)	140	**BRC-46**	7,3	101	301	441	57	42,9	30,2	42	1 1/4" - 11 1/2	32	1 3/16" - 16	4,5
10 (105)	151	**BRC-106**	15,0	228	289	440	85	54,1	31,8	39	–	25	M30x2	9,5



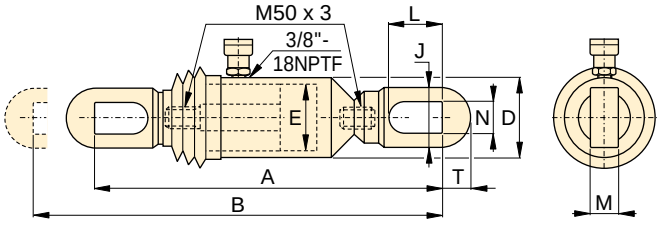
BRP-106C



BRP-306



BRP-106L



BRP-606

Cylinder Capacity ton (kN)	Stroke (mm)	Model Number	Cyl. Effect. Area (cm^2)	Oil Cap. (cm^3)	Coll. Height A (mm)	Ext. Height B (mm)	Outside Dia. D (mm)	Cyl. Bore Dia. E (mm)	Link Height J (mm)	Link Opening L (mm)	Link Thickness M (mm)	Link Width N (mm)	Slot to Link End T (mm)	(kg)
10 (105)	151	**BRP-106C***	15,0	227	587	738	85	54,1	119	62	30	35	32	15,9
	151	**BRP-106L***	15,0	227	541	692	85	54,1	67	115	22	30	32	13,2
30 (326)	155	**BRP-306***	46,6	722	1085	1240	136	88,9	114	145	35	39	50	48,1
50 (505)	152	**BRP-606***	72,1	1096	719	871	140	110,0	130	149	39	50	70	53,5

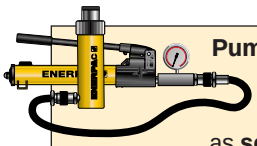
* Available as set, see note on previous page. NOTE: BRP-106C, BRP106L and BRP-606 are fitted with rubber bellows for rod protection.

RCH-Series, Hollow Plunger Cylinders

▼ Shown from left to right: **RCH-306, RCH-120, RCH-1003**

- **Hollow plunger design allows for both pull and push forces**
- **Single-acting, spring return**
- **Nickel-plated, floating center tube on models over 20 ton increases product life**
- **Baked enamel finish for increased corrosion resistance**
- **Collar threads for easy fixturing**
- **RCH-120 includes AR-630 coupler and has 1/4" NPTF port**
- **RCH-121 and RCH-1211 have FZ-1630 reducer and AR-630 coupler, all other models feature CR-400 coupler**

Versatility in Testing, Maintenance and Tensioning Applications



Pump and Cylinder Sets

All cylinders marked with an * are available as **sets** (cylinder, gauge, couplers, hose and pump) for your ordering convenience.

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Ultra-Lightweight Aluminium Cylinders

If you need a higher cylinder capacity-to-weight-ratio the Ultra-lightweight **RACH-Series** are the perfect choice.

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Saddles

Most RCH-Series cylinders are equipped with smooth saddles. See table at next page for optional threaded saddles and all dimensional information.

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▼ *Hollow plunger cylinder RCH-1003 used in an application for intermediate boom suspension on a dragline.*

Cylinder Capacity ton (kN)	Stroke (mm)	Model Number	Cyl. Effect. Area (cm^2)	Oil Cap. (cm^3)
13 (125)	8	**RCH-120**	17,9	14
	42	**RCH-121***	17,9	75
	42	**RCH-1211**	17,9	75
	76	**RCH-123**	17,9	136
20 (215)	49	**RCH-202***	30,7	150
	155	**RCH-206**	30,7	476
30 (326)	64	**RCH-302***	46,6	298
	155	**RCH-306**	46,6	722
60 (576)	76	**RCH-603***	82,3	626
	153	**RCH-606**	82,3	1259
95 (931)	76	**RCH-1003***	133,0	1011

* Available as set, see note on this page.

Hoses

Enerpac offers a complete line of high quality hydraulic hoses. To ensure the integrity of your system, specify only Enerpac hydraulic hoses.

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RCH Series

Capacity:
13-95 ton

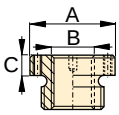
Stroke:
8-155 mm

Center Hole Diameter:
19,6 - 79,0 mm

Maximum Operating Pressure:
700 bar

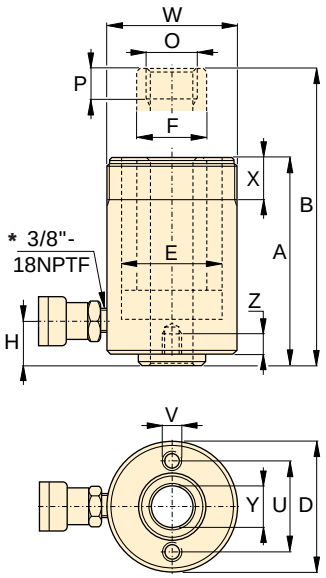
Optional Heat Treated Hollow Saddles

Saddle Type	Cylinder Model Number	Saddle Model Nr.	Saddle Dimensions (mm) A	B	C
Threaded Hollow	RCH-202, 206	HP-2015	53	1"- 8	9
	RCH-302, 306	HP-3015	63	$1^1/_4$"- 7	9
	RCH-603, 606	HP-5016	91	$1^5/_8$"- $5^1/_2$	12
	RCH-1003	HP-10016	126	$2^1/_2$"- 8	13

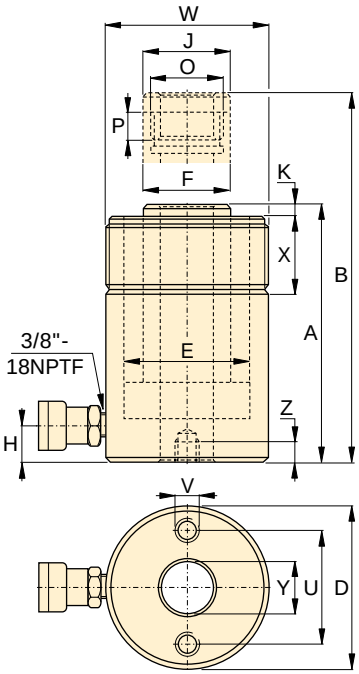


Smooth hollow saddles are standard on all RCH-models (except RCH-120, RCH-1211).

RCH-121 and RCH-1211 have a 47 mm dia. boss that protrudes 6 mm from base.



RCH-120 to RCH-123 models
* 1/4" NPT for RCH-120 only



RCH-202 to RCH-1003 models

Base Mounting Hole Dimensions (mm)

Model Number	Bolt Circle U	Thread V	Thread Depth Z
RCH-120	50,8	$^5/_{16}$"- 18 UNC	9,0
RCH-121	–	–	–
RCH-1211	–	–	–
RCH-123	50,8	$^5/_{16}$" - 18 UNC	12,7
RCH-202	82,6	$^3/_8$"- 16 UNC	9,4
RCH-206	82,6	$^3/_8$" - 16 UNC	9,4
RCH-302	92,2	$^3/_8$" - 16 UNC	14,0
RCH-306	92,2	$^3/_8$" - 16 UNC	14,0
RCH-603	130,3	$^1/_2$" - 13 UNC	14,0
RCH-606	130,3	$^1/_2$" - 13 UNC	14,0
RCH-1003	177,8	$^5/_8$" - 11 UNC	19,0

Coll. Height A (mm)	Ext. Height B (mm)	Out. Dia. D (mm)	Cyl. Bore Dia. E (mm)	Plgr. Dia. F (mm)	Cyl. Base to Advance Port H (mm)	Saddle Dia. J (mm)	Saddle Protrusion from Plgr. K (mm)	Plunger Internal Thread O	Plunger Thread Length P (mm)	Collar Thread W	Collar Thread Length X (mm)	Center Hole Dia. Y (mm)	(kg)	Model Number
55	63	69	54,1	35,1	9	–	–	$^3/_4$"- 16 UN	16	$2^3/_4$"- 16	30	19,6	1,5	RCH-120
120	162	69	54,1	35,1	19	–	–	–	–	$2^3/_4$"- 16	30	19,6	2,8	RCH-121*
120	162	69	54,1	35,1	19	–	–	$^3/_4$"- 16 UN	16	$2^3/_4$"- 16	30	19,6	2,8	RCH-1211
184	260	69	54,1	35,1	19	–	–	–	–	$2^3/_4$"- 16	30	19,6	4,4	RCH-123
162	211	98	73,1	54,1	19	54	9,7	$1^9/_{16}$"- 16 UN	19	$3^7/_8$"- 12	38	26,9	7,7	RCH-202*
306	461	98	73,1	54,1	25	54	9,7	$1^9/_{16}$"- 16 UN	19	$3^7/_8$"- 12	38	26,9	14,1	RCH-206
178	242	114	88,9	63,5	21	63	9,0	$1^{13}/_{16}$"- 16 UN	22	$4^1/_2$"- 12	42	33,3	10,9	RCH-302*
330	485	114	88,9	63,5	25	63	9,0	$1^{13}/_{16}$"- 16 UN	22	$4^1/_2$"- 12	42	33,3	21,8	RCH-306
247	323	159	123,9	91,9	31	91	12,0	$2^3/_4$"- 16 UN	19	$6^1/_4$"- 12	48	53,8	28,1	RCH-603*
323	476	159	123,9	91,9	31	91	12,0	$2^3/_4$"- 16 UN	19	$6^1/_4$"- 12	48	53,8	35,4	RCH-606
254	330	212	165,1	127,0	38	126	12,0	4"- 16 UN	25	$8^3/_8$"- 12	60	79,0	63,0	RCH-1003*

▼ Shown from left to right: **RRH-3010, RRH-1001, RRH-6010**

Versatility in Testing, Maintenance and Tensioning Applications

- **Relief valves prevent damage in case of over-pressurisation**
- **Baked enamel finish for increased corrosion resistance**
- **Collar threads enable easy fixturing (except RRH-1001 and RRH-1508)**
- **Double-acting version for fast retraction**
- **Nickel-plated, floating center tube increases product life**
- **Hollow plunger allows for both pull and push forces**
- **CR-400 coupler and dust cap included on all models**
- **Plunger wiper reduces contamination, extending cylinder life**

Pump Selection

A double-acting cylinder must be powered by a pump with a 4-way valve.

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Gauges

Minimize the risk of overloading and ensure long, dependable service from your equipment. Refer to the System Components Section for a full range of gauges.

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Saddles

All RRH-Series cylinders are equipped with smooth saddles. See table at next page for optional threaded saddles and all dimensional information.

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▼ *Double-acting hollow plunger cylinders are applied for bridge launching systems.*

Cylinder Capacity ton	Stroke (mm)	Model Number	Max. Cylinder Capacity (kN)		Cylinder Effective Area (cm^2)		Oil Capacity (cm^3)	
			Advance	Retract	Advance	Retract	Advance	Retract
30	178	**RRH-307**	326	213	46,6	30,4	829	541
	258	**RRH-3010**	326	213	46,6	30,4	1202	784
60	89	**RRH-603**	576	380	82,3	54,2	733	482
	166	**RRH-606**	576	380	82,3	54,2	1366	900
	257	**RRH-6010**	576	380	82,3	54,2	2115	1393
95	38	**RRH-1001**	931	612	133,0	87,4	505	333
	76	**RRH-1003**	931	612	133,0	87,4	1011	666
	153	**RRH-1006**	931	612	133,0	87,4	2035	1337
	257	**RRH-10010**	931	612	133,0	87,4	3420	2246
145	203	**RRH-1508**	1429	718	204,1	102,6	4144	2083

Double-Acting, Hollow Plunger Cylinders

Hoses

Enerpac offers a complete line of high quality hydraulic hoses. To ensure the integrity of your system, specify only Enerpac hydraulic hoses.

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RRH Series

Capacity:
30 - 145 ton

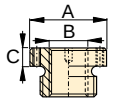
Stroke:
38 - 258 mm

Center Hole Diameter:
33,3 - 79,2 mm

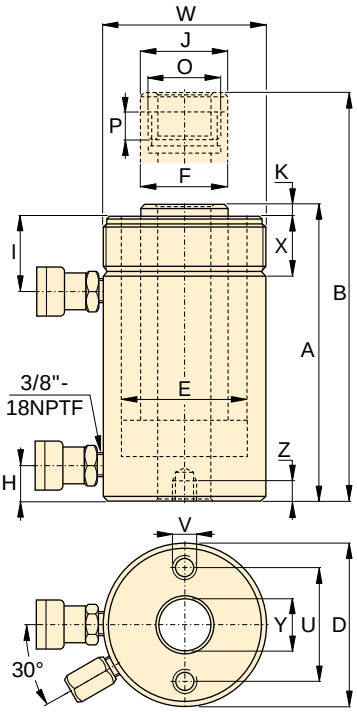
Maximum Operating Pressure:
700 bar

Optional Heat TreatedHollow Saddles

Saddle Type	Cylinder Model Number	Saddle Model Nr.	Saddle Dimensions (mm) A	B	C
Threaded Hollow	RRH-307, 3010	HP-3015	63	1 1/4"- 7	9
	RRH-603, 606, 6010	HP-5016	91	1 5/8"- 5 1/2	12
	RRH-1001, 1003, RRH-1006, 10010	HP-10016	126	2 1/2"- 8	13



Smooth hollow saddles are standard on all RRH-models.



Base Mounting Hole Dimensions (mm)

Model Number	Bolt Circle U	Thread V	Thread Depth Z
RRH-307	92,2	3/8" - 16	15,7
RRH-3010	92,2	3/8" - 16	15,7
RRH-603	130,0	1/2" - 13	14,0
RRH-606	130,0	1/2" - 13	14,0
RRH-6010	130,0	1/2" - 13	14,0
RRH-1001	177,8	5/8" - 11	19,0
RRH-1003	177,8	5/8" - 11	19,0
RRH-1006	177,8	5/8" - 11	19,0
RRH-10010	177,8	5/8" - 11	19,0
RRH-1508	–	–	–

Coll. Height A (mm)	Ext. Height B (mm)	Out. Dia. D (mm)	Cyl. Bore Dia. E (mm)	Plgr. Dia. F (mm)	Cyl. Base to Adv. Port H (mm)	Cyl. Top to Return Port I (mm)	Saddle Dia. J (mm)	Saddle Protr. fr. Plgr. K (mm)	Thread O	Plunger Thread Length P (mm)	Collar Thread W	Collar Thread Length X (mm)	Center Hole Dia. Y (mm)	(kg)	Model Number
330	508	114	88,9	63,5	25	60	63	9	1 13/16"- 16	22	4 1/2"- 12	42	33,3	21	RRH-307
431	689	114	88,9	63,5	25	60	63	9	1 13/16"- 16	22	4 1/2"- 12	42	33,3	27	RRH-3010
247	336	159	123,9	91,9	31	66	91	12	2 3/4"- 16	19	6 1/4"- 12	48	53,8	28	RRH-603
323	489	159	123,9	91,9	31	66	91	12	2 3/4"- 16	19	6 1/4"- 12	48	53,8	35	RRH-606
438	695	159	123,9	91,9	31	66	91	12	2 3/4"- 16	19	6 1/4"- 12	48	53,8	45	RRH-6010
165	203	212	165,1	127,0	38	44	126	12	4"- 16	25	–	–	79,2	33	RRH-1001
254	330	212	165,1	127,0	38	85	126	12	4"- 16	25	8 3/8"- 12	60	79,2	61	RRH-1003
342	495	212	165,1	127,0	38	85	126	12	4"- 16	25	8 3/8"- 12	60	79,2	79	RRH-1006
460	717	212	165,1	127,0	38	85	126	12	4"- 16	25	8 3/8"- 12	60	79,2	106	RRH-10010
349	552	247	190,5	152,4	38	60	127	4	4 1/4"- 12	25	–	–	79,2	111	RRH-1508

BRD-Series, Precision Production Cylinders

ENERPAC Hydraulic Technology Worldwide

▼ Shown from left to right: **BRD-2510, BRD-96, BRD-256, BRD-41, BRD-166**

High Precision and High Cycle Performance

Speed Chart

See the Enerpac Cylinder Speed Chart in our 'Yellow Pages' to determine your approximate cylinder speed.

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Golden Ring Design

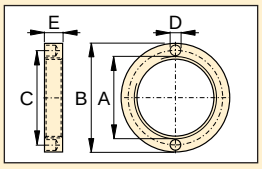
Enerpac BRD-Cylinders are provided with the Golden Ring Design, for long, trouble-free performance.

- **Designed for long life, the best choice for production applications**
- **Unique mounting configurations simplify fixturing**
- **Baked enamel finish for increased corrosion resistance**
- **Double-acting operation develops force in both directions, providing maximum versatility**
- **Plunger wiper reduces contamination, extending cylinder life**
- **Imperial models (RD-series) available on request**

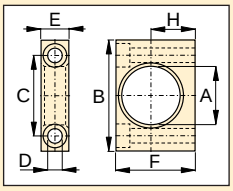
▼ *Clamping application using Enerpac BRD cylinders (with clevis eye attachments on both ends) for their high pressure capability and mounting flexibility.*

Cylinder Capacity (ton)	Stroke (mm)	Model Number	Max. Cylinder Capacity (kN)		Cylinder Effective Area (cm^2)		Oil Capacity (cm^3)		Coll. Height A (mm)	Ext. Height B (mm)	Body Length C (mm)	Out. Dia. D (mm)	Cyl. Bore Dia. E (mm)	Plgr. Dia. F (mm)
			Advance	Retract	Advance	Retract	Advance	Retract						
4	28	BRD-41	35	16	5,1	2,2	14	6	186	214	162	50	25,4	19,0
	79	BRD-43	35	16	5,1	2,2	40	17	237	316	213	50	25,4	19,0
	155	BRD-46	35	16	5,1	2,2	79	34	313	468	289	50	25,4	19,0
8	28	BRD-91	80	44	11,4	6,3	32	18	223	251	198	65	38,1	25,4
	79	BRD-93	80	44	11,4	6,3	90	50	274	353	249	65	38,1	25,4
	155	BRD-96	80	44	11,4	6,3	177	98	350	505	325	65	38,1	25,4
	257	BRD-910	80	44	11,4	6,3	293	162	452	709	427	65	38,1	25,4
15	159	BRD-166	142	77	20,3	10,6	323	169	389	548	359	80	50,8	35,0
	260	BRD-1610	142	77	20,3	10,6	528	276	491	751	461	80	50,8	35,0
23	159	BRD-256	222	98	31,7	13,7	504	218	424	583	397	92	63,5	47,8
	260	BRD-2510	222	98	31,7	13,7	824	356	526	786	499	92	63,5	47,8

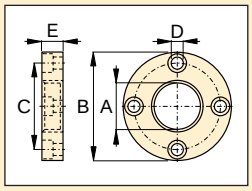
▼ BRD CYLINDER ATTACHMENTS



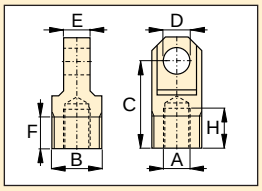
Retainer Nut
For locking foot or flange mountings. Tightens onto cylinder collar threads (Included with foot and flange mounting kits).



Foot Mounting
Mounts onto cylinder collar.



Flange Mounting
Mounts onto cylinder collar.



Clevis Eye
Threads onto plunger or into cylinder base.

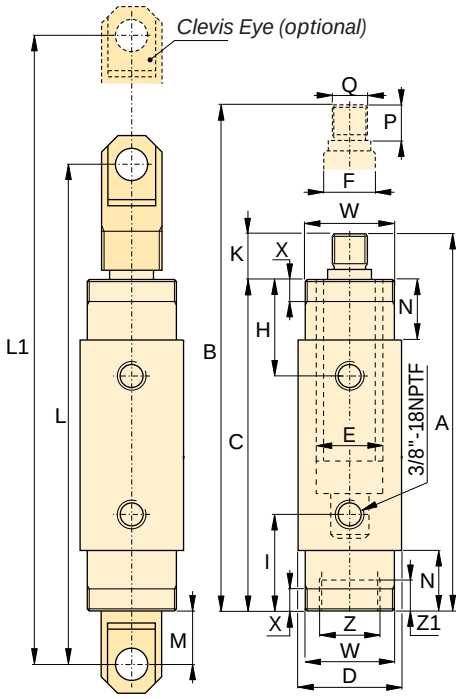
Model Number	BRD-Cyl. (ton)	Dimensions (mm) A	B	C	D	E	F	H
Foot Mounting with Retainer Nut								
BAD-141	**4**	42,1	80	58,0	10,5	20,0	57,0	31,8
BAD-171	**8**	56,1	105	78,0	13,5	25,0	82,5	44,5
BAD-181	**15**	70,1	127	95,2	20,0	35,0	100,0	52,4
BAD-191	**23**	85,1	159	117,5	26,5	45,0	125,0	63,5
Flange Mounting with Retainer Nut								
BAD-142	**4**	42,1	98,4	78,6	11,0	19,0	–	–
BAD-172	**8**	56,1	121	98,4	11,0	25,4	–	–
BAD-182	**15**	70,1	143	115,9	16,0	35,0	–	–
BAD-192	**23**	85,1	159	135,7	17,0	44,5	–	–
Retainer Nut								
BAD-143	**4**	M42 x 1,5	57	49,5	6,3	9,5	–	–
BAD-173	**8**	M56 x 2	75	65,5	6,7	12,7	–	–
BAD-183	**15**	M70 x 2	92	81,0	6,7	19,0	–	–
BAD-193	**23**	M85 x 2	108	96,5	6,7	25,4	–	–
Clevis Eye (see chart below for mounting dimensions L, L1 and M)								
BAD-150	**4**	M16 x 1,5	M30 x 1,5	52,4	16,0	15,9	19,1	23,8
BAD-151	**8**	M22 x 1,5	M42 x 1,5	57,1	20,0	25,4	25,4	23,8
BAD-152	**15**	M30 x 1,5	M56 x 2	77,8	25,0	31,8	25,4	30,2
BAD-153	**23**	M42 x 1,5	M70 x 2	77,8	32,0	38,2	25,4	27,0

BRD Series

Capacity:
4-23 ton

Stroke:
28-260 mm

Maximum Operating Pressure:
700 bar



Model Number	Top to Retract Port H (mm)	Bottom to Advance Port I (mm)	Plunger Protrusion K (mm)	Clevis Eye Mounting Dimensions L (mm)	L1 (mm)	M (mm)	Neck Length N (mm)	Plunger Thread Length P (mm)	Plunger External Thread Q (mm)	Cylinder Mounting Dimensions (mm) Collar Thread W	Collar Thread Length X	Int. Base Thread Z	Int. Base Thread Length Z1	(kg)
BRD-41	47	47	24	258	286	41	29	22	M16 x 1,5	M42 x 1,5	11	M30 x 1,5	9	2,0
BRD-43	47	47	24	308	387	41	29	22	M16 x 1,5	M42 x 1,5	11	M30 x 1,5	9	2,6
BRD-46	47	47	24	385	540	41	29	22	M16 x 1,5	M42 x 1,5	11	M30 x 1,5	9	3,6
BRD-91	57	57	25	295	323	38	38	22	M22 x 1,5	M56 x 2	14	M42 x 1,5	14	3,0
BRD-93	57	57	25	346	425	38	38	22	M22 x 1,5	M56 x 2	14	M42 x 1,5	14	4,2
BRD-96	57	57	25	422	577	38	38	22	M22 x 1,5	M56 x 2	14	M42 x 1,5	14	5,6
BRD-910	57	57	25	524	781	38	38	22	M22 x 1,5	M56 x 2	14	M42 x 1,5	14	7,3
BRD-166	73	73	30	492	651	52	54	28	M30 x 1,5	M70 x 2	22	M56 x 2	24	10,2
BRD-1610	73	73	30	593	853	52	54	28	M30 x 1,5	M70 x 2	22	M56 x 2	24	14,5
BRD-256	89	89	27	524	683	53	70	25	M42 x 1,5	M85 x 2	29	M70 x 2	26	16,0
BRD-2510	89	89	27	626	886	53	70	25	M42 x 1,5	M85 x 2	29	M70 x 2	26	20,3

▼ Shown from left to right: **RR-10013, RR-1502, RR-20013, RR-1010, RR-7513**

Most Versatile Performers

Rugged enough for the toughest job site uses and precision designed for high-cycle industrial uses

- **Collar threads, plunger threads and base mounting holes for easy fixturing (on most models)**
- **Baked enamel finish for increased corrosion resistance**
- **Removable hardened saddles protect plunger during lifting and pressing**
- **Built-in safety valve prevents accidental over-pressurization**
- **CR-400 couplers included on all models**
- **Plunger wiper reduces contamination, extending cylinder life**

Saddles

RR-Series cylinders up to 75 ton have plunger mounting holes for installation of CAT-Series tilt saddles.

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Remote Lifting

For heavy lifting in remote locations use the Enerpac ZE-Series electric pumps.

A double-acting cylinder must be powered by a pump with a 4-way valve.

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▼ *These long stroke RR-cylinders are attached in a sliding and guiding system pulling the arched roof assembly of Athens Olympic Stadium step by step into the final position.*

▼ *RR-cylinders provide power and precision in a special hydraulic press.*

Double-Acting Long Stroke Cylinders

Cylinder retract capacity for certain RR cylinders may be less than theoretical values, as a result of reduced relief valve pressure settings:

RR-308/3014: 275 bar
RR-506/5013/5020: 480 bar
RR-756/7513: 495 bar

▼ QUICK SELECTION CHART
For complete technical information see next page.

Cylinder Capacity ton (kN)	Stroke (mm)	Model Number	Cylinder Effective Area (cm²) Push	Cylinder Effective Area (cm²) Pull	Oil Capacity (cm³) Push	Oil Capacity (cm³) Pull	Coll. Height (mm)
10 (101)	254	**RR-1010***	14,5	4,8	368	122	409
	305	**RR-1012***	14,5	4,8	442	147	457
30 (295)	209	**RR-308***	42,1	19,1	879	400	387
	368	**RR-3014***	42,1	19,1	1549	703	549
50 (498)	156	**RR-506**	71,2	21,5	1111	335	331
	334	**RR-5013**	71,2	21,5	2378	718	509
	511	**RR-5020**	71,2	21,5	3638	1099	733
75 (718)	156	**RR-756**	102,6	31,4	1601	490	347
	333	**RR-7513**	102,6	31,4	3417	1046	525
95 (933)	168	**RR-1006**	133,3	62,2	2238	1045	357
	333	**RR-10013**	133,3	62,2	4439	2071	524
	460	**RR-10018**	133,3	62,2	6132	2861	687
140 (1386)	57	**RR-1502**	198,1	95,4	1129	544	196
	156	**RR-1506**	198,1	95,4	3090	1488	385
	333	**RR-15013**	198,1	95,4	6597	3177	582
	815	**RR-15032**	198,1	95,4	16145	7775	1116
200 (1995)	152	**RR-2006**	285,0	145,3	4332	2209	430
	330	**RR-20013**	285,0	145,3	9405	4795	608
	457	**RR-20018**	285,0	145,3	13025	6640	765
	610	**RR-20024**	285,0	145,3	17385	8863	917
	914	**RR-20036**	285,0	145,3	26049	13280	1222
	1219	**RR-20048**	285,0	145,3	34741	17712	1527
325 (3201)	153	**RR-3006**	457,3	243,2	6997	3721	485
	305	**RR-30012**	457,3	243,2	13947	7418	638
	457	**RR-30018**	457,3	243,2	20889	11114	790
	609	**RR-30024**	457,3	243,2	27850	14811	943
	915	**RR-30036**	457,3	243,2	41843	22253	1247
	1219	**RR-30048**	457,3	243,2	55745	29646	1552
440 (4292)	152	**RR-4006**	613,1	328,1	9319	4987	538
	305	**RR-40012**	613,1	328,1	18700	10007	690
	457	**RR-40018**	613,1	328,1	28018	14995	843
	610	**RR-40024**	613,1	328,1	37400	20014	995
	914	**RR-40036**	613,1	328,1	56037	29988	1300
	1219	**RR-40048**	613,1	328,1	74737	39996	1605
520 (5108)	153	**RR-5006**	729,7	405,4	11164	6203	577
	305	**RR-50012**	729,7	405,4	22256	12365	730
	457	**RR-50018**	729,7	405,4	33347	18526	882
	609	**RR-50024**	729,7	405,4	44440	24689	1035
	915	**RR-50036**	729,7	405,4	66768	36973	1339
	1219	**RR-50048**	729,7	405,4	88951	49418	1644

RR Series

Capacity:
10 - 520 ton

Stroke:
57-1219 mm

Maximum Operating Pressure:
700 bar

Enerpac CLRG-Series
If your application does not require high cycle, Enerpac CLRG-Series cylinders may be the right alternative.
Page: **46**

Speed Chart
See the Enerpac Cylinder Speed Chart in our 'Yellow Pages' to determine your approximate cylinder speed.
Page: **119**

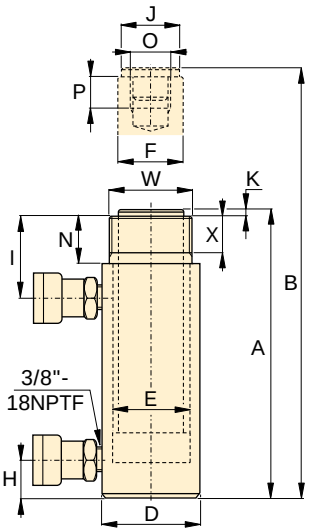
Optional Snap-in Saddles
Optional snap-in saddles for RR-Series double-acting cylinders:

Saddle Type	Cylinder Model Number	Saddle Model Number
Flat	RR-1010, 1012	**A-102F**
Tilt	RR-1010, 1012	**CAT-10**
	RR-308, 3014	**CAT-50**
	RR-506, 5013 RR-5020, 756 RR-7513	**CAT-100**

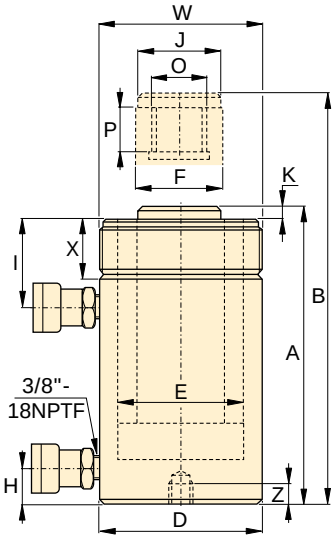
Standard Saddles:

Grooved	RR-1010, 1012	**A-102G**
	RR-308, 3014	**A-252G**

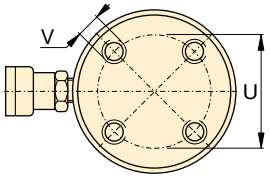
For additional information on saddles:
Page: **12**



RR-1010 - RR-3014

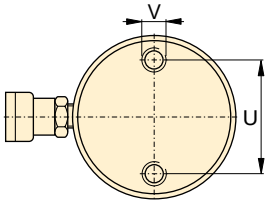


RR-506 - RR-50048



RR-1006 - RR-30048

No mounting holes on:
RR-506, 5013
RR-756, 7513
RR-1502, 15013



RR-4006 - RR-50048

Base mounting hole location is for reference only, as it is affected by assembly.

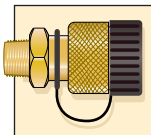
Cylinder retract capacity for certain RR cylinders may be less than theoretical values, as a result of reduced relief valve pressure settings:
RR-308/3014: 275 bar
RR-506/5013/5020: 480 bar
RR-756/7513: 495 bar

◀ For full features see previous page.

Cylinder Capacity ton	Stroke (mm)	Model Number	Max. Cylinder Capacity (kN) Push	Max. Cylinder Capacity (kN) Pull	Cylinder Effective Area (cm^2) Push	Cylinder Effective Area (cm^2) Pull	Oil Capacity (cm^3) Push	Oil Capacity (cm^3) Pull	Coll. Height A (mm)	Ext. Height B (mm)	Outside Dia. D (mm)
10	254	RR-1010*	101	33	14,5	4,8	368	0122	409	663	73
	305	RR-1012*	101	33	14,5	4,8	442	147	457	762	73
30	209	RR-308*	295	53	42,1	19,1	879	400	387	596	101
	368	RR-3014*	295	53	42,1	19,1	1549	703	549	917	101
50	156	RR-506	498	103	71,2	21,5	1111	335	331	487	127
	334	RR-5013	498	103	71,2	21,5	2378	718	509	843	127
	511	RR-5020	498	103	71,2	21,5	3638	1099	733	1244	127
75	156	RR-756	718	156	102,6	31,4	1601	490	347	503	146
	333	RR-7513	718	156	102,6	31,4	3417	1046	525	858	146
95	168	RR-1006	933	435	133,3	62,2	2238	1045	357	525	177
	333	RR-10013	933	435	133,3	62,2	4439	2071	524	857	177
	460	RR-10018	933	435	133,3	62,2	6132	2861	687	1147	177
140	57	RR-1502	1386	668	198,1	95,4	1129	544	196	253	203
	156	RR-1506	1386	668	198,1	95,4	3090	1488	385	541	203
	333	RR-15013	1386	668	198,1	95,4	6597	3177	582	915	203
	815	RR-15032	1386	668	198,1	95,4	16145	7775	1116	1931	203
200	152	RR-2006	1995	1017	285,0	145,3	4332	2209	430	582	247
	330	RR-20013	1995	1017	285,0	145,3	9405	4795	608	938	247
	457	RR-20018	1995	1017	285,0	145,3	13025	6640	765	1222	247
	610	RR-20024	1995	1017	285,0	145,3	17385	8863	917	1527	247
	914	RR-20036	1995	1017	285,0	145,3	26049	13280	1222	2136	247
	1219	RR-20048	1995	1017	285,0	145,3	34741	17712	1527	2746	247
325	153	RR-3006	3201	1703	457,3	243,2	6997	3721	485	638	311
	305	RR-30012	3201	1703	457,3	243,2	13947	7418	638	943	311
	457	RR-30018	3201	1703	457,3	243,2	20889	11114	790	1247	311
	609	RR-30024	3201	1703	457,3	243,2	27850	14811	943	1552	311
	915	RR-30036	3201	1703	457,3	243,2	41843	22253	1247	2162	311
	1219	RR-30048	3201	1703	457,3	243,2	55745	29646	1552	2771	311
440	152	RR-4006	4292	2297	613,1	328,1	9319	4987	538	690	358
	305	RR-40012	4292	2297	613,1	328,1	18700	10007	690	995	358
	457	RR-40018	4292	2297	613,1	328,1	28018	14995	843	1300	358
	610	RR-40024	4292	2297	613,1	328,1	37400	20014	995	1605	358
	914	RR-40036	4292	2297	613,1	328,1	56037	29988	1300	2214	358
	1219	RR-40048	4292	2297	613,1	328,1	74737	39996	1605	2824	358
520	153	RR-5006	5108	2838	729,7	405,4	11164	6203	577	730	397
	305	RR-50012	5108	2838	729,7	405,4	22256	12365	730	1035	397
	457	RR-50018	5108	2838	729,7	405,4	33347	18526	882	1339	397
	609	RR-50024	5108	2838	729,7	405,4	44440	24689	1035	1644	397
	915	RR-50036	5108	2838	729,7	405,4	66768	36973	1339	2254	397
	1219	RR-50048	5108	2838	729,7	405,4	88951	49418	1644	2863	397

* For RR-1010 and RR-1012: N = 32 mm; for RR-308 and RR-3014: N = 55 mm.

Double-Acting Long Stroke Cylinders



Couplers Included!
CR-400 couplers included on all models. Fits all HC-Series hoses.

Capacity:
10 - 520 ton

Stroke:
57-1219 mm

Maximum Operating Pressure:
700 bar

RR Series

Cyl. Bore Dia. E (mm)	Plgr. Dia. F (mm)	Base to Adv. Port H (mm)	Top to Ret. Port I (mm)	Saddle Dia. J (mm)	Saddle Protr. fr. Plgr. K (mm)	Plunger Internal Thread O	Plunger Thread Length P (mm)	Base Mounting Holes			Collar Thread W	Collar Thread Length X (mm)	(kg)	Model Number
								Bolt C. Dia. U (mm)	Thread V	Thd. Depth Z (mm)				
42,9	34,9	36	57	35	6	1"- 8	25	–	–	–	2 1/4"- 14	26	12	RR-1010*
42,9	34,9	36	57	35	6	1"- 8	25	–	–	–	2 1/4"- 14	26	14	RR-1012*
73,2	54,1	39	81	50	10	1 1/2"- 16	25	–	–	–	3 5/16"- 12	49	18	RR-308*
73,2	54,1	39	81	50	10	1 1/2"- 16	25	–	–	–	3 5/16"- 12	49	29	RR-3014*
95,2	79,5	28	76	71	2	1"- 12	25	–	–	–	5"- 12	44	30	RR-506
95,2	79,5	28	76	71	2	1"- 12	25	–	–	–	5"- 12	44	52	RR-5013
95,2	79,5	57	76	71	2	1"- 12	25	76	1/2"- 13	25	5"- 12	44	68	RR-5020
114,3	95,2	30	76	71	6	1"- 12	38	–	–	–	5 3/4"- 12	38	41	RR-756
114,3	95,2	30	81	71	6	1"- 12	38	–	–	–	5 3/4"- 12	38	68	RR-7513
130,3	95,2	38	71	76	3	1 3/4"- 12	35	139	3/4"- 10	25	6 7/8"- 12	50	61	RR-1006
130,3	95,2	38	71	76	3	1 3/4"- 12	35	139	3/4"- 10	25	6 7/8"- 12	50	93	RR-10013
130,3	95,2	41	92	76	3	1 3/4"- 12	35	139	3/4"- 10	25	6 7/8"- 12	50	117	RR-10018
158,8	114,3	22	66	114	19	–	–	–	–	–	–	–	49	RR-1502
158,8	114,3	49	84	114	19	3 3/8"- 16	35	158	3/4"- 16	28	8"- 12	55	93	RR-1506
158,8	114,3	49	84	114	19	3 3/8"- 16	35	158	3/4"- 16	28	8"- 12	55	124	RR-15013
158,8	114,3	76	88	114	19	3 3/8"- 16	35	–	–	–	8"- 12	55	238	RR-15032
190,5	133,4	57	96	133	22	–	–	127	1"- 8	25	–	–	147	RR-2006
190,5	133,4	57	96	133	22	2 1/2"- 12	63	127	1"- 8	25	9 3/4"- 12	54	199	RR-20013
190,5	133,4	85	101	133	22	2 1/2"- 12	63	127	1"- 8	25	9 3/4"- 12	54	204	RR-20018
190,5	133,4	85	101	133	22	2 1/2"- 12	63	127	1"- 8	25	9 3/4"- 12	54	279	RR-20024
190,5	133,4	85	101	133	22	2 1/2"- 12	63	127	1"- 8	25	9 3/4"- 12	54	383	RR-20036
190,5	133,4	85	101	133	22	2 1/2"- 12	63	127	1"- 8	25	9 3/4"- 12	54	483	RR-20048
241,3	165,1	88	114	165	28	2 1/2"- 12	82	158	1 1/4"- 7	44	12 1/4"- 12	58	200	RR-3006
241,3	165,1	88	114	165	28	2 1/2"- 12	82	158	1 1/4"- 7	44	12 1/4"- 12	58	312	RR-30012
241,3	165,1	88	114	165	28	2 1/2"- 12	82	158	1 1/4"- 7	44	12 1/4"- 12	58	385	RR-30018
241,3	165,1	88	114	165	28	2 1/2"- 12	82	158	1 1/4"- 7	44	12 1/4"- 12	58	469	RR-30024
241,3	165,1	88	114	165	28	2 1/2"- 12	82	158	1 1/4"- 7	44	12 1/4"- 12	58	628	RR-30036
241,3	165,1	88	114	165	28	2 1/2"- 12	82	158	1 1/4"- 7	44	12 1/4"- 12	58	780	RR-30048
279,4	190,5	108	133	190	28	3"- 12	95	203	1 1/2"- 6	50	14 1/8"- 8	65	303	RR-4006
279,4	190,5	108	133	190	28	3"- 12	95	203	1 1/2"- 6	50	14 1/8"- 8	65	399	RR-40012
279,4	190,5	108	133	190	28	3"- 12	95	203	1 1/2"- 6	50	14 1/8"- 8	65	453	RR-40018
279,4	190,5	108	133	190	28	3"- 12	95	203	1 1/2"- 6	50	14 1/8"- 8	65	597	RR-40024
279,4	190,5	108	133	190	28	3"- 12	95	203	1 1/2"- 6	50	14 1/8"- 8	65	792	RR-40036
279,4	190,5	108	133	190	28	3"- 12	95	203	1 1/2"- 6	50	14 1/8"- 8	65	980	RR-40048
304,8	203,2	120	152	203	28	3 1/4"- 12	108	203	1 3/4"- 5	57	15 5/8"- 8	79	432	RR-5006
304,8	203,2	120	152	203	28	3 1/4"- 12	108	203	1 3/4"- 5	57	15 5/8"- 8	79	589	RR-50012
304,8	203,2	120	152	203	28	3 1/4"- 12	108	203	1 3/4"- 5	57	15 5/8"- 8	79	680	RR-50018
304,8	203,2	120	152	203	28	3 1/4"- 12	108	203	1 3/4"- 5	57	15 5/8"- 8	79	816	RR-50024
304,8	203,2	120	152	203	28	3 1/4"- 12	108	203	1 3/4"- 5	57	15 5/8"- 8	79	1002	RR-50036
304,8	203,2	120	152	203	28	3 1/4"- 12	108	203	1 3/4"- 5	57	15 5/8"- 8	79	1224	RR-50048

▼ Shown from left to right: **CLSG-506, CLSG-5006, CLSG-4006**

- **Integral stop ring provides piston blow-out protection**
- **Baked enamel outside finish and plated pistons provide superior corrosion protection**
- **Unique bearing design withstands sideload forces up to 10% of rated cylinder capacity without scoring**
- **Interchangeable, hardened grooved saddles are standard**
- **Base mounting holes are standard on all models**
- **Plunger wiper reduces contamination, extending cylinder life**
- **Single-acting, load return**

▼ *Eight CLSG-2506 equipped with tilting saddles lifted the planking of the bridge as the pier heads were being rebuilt.*

The Single-Acting Heavy Lifting Solution with Integral Stop Ring

Saddles

All CLSG-Series cylinders are equipped with bolt-on removable grooved saddles. For information on optional tilt saddles, see selection chart.

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Gauges

Minimize the risk of overloading and ensure long, dependable service from your equipment. Refer to the System Components Section for a full range of gauges.

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Remote Lifting

For heavy lifting in remote locations use the Enerpac ZE-series electric pumps.

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Low Height - High Tonnage

When low height with high force is required, CLP-Series Pancake Cylinders with locknut offer the solution to lift the first few centimetres.

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Standard Features

- Interchangeable, hardened grooved saddles
- Top and side mounted lifting eyes
- CR-400 coupler and dustcap
- All cylinders meet ASME B-30.1 and ISO 10100 standards.

CLSG Series

Capacity:
50-1000 ton

Stroke:
50 - 300 mm

Maximum Operating Pressure:
700 bar

▼ **QUICK SELECTION CHART**
For complete technical information see next page.

Cylinder Capacity ton (kN)	Stroke (mm)	Model Number	Cylinder Effective Area (cm^2)	Oil Capacity (cm^3)	Collapsed Height (mm)	(kg)
50 (539)	50	**CLSG-502**	77,0	385	162	17
	100	**CLSG-504**	77,0	770	212	20
	150	**CLSG-506**	77,0	1155	262	23
	200	**CLSG-508**	77,0	1540	312	27
	250	**CLSG-5010**	77,0	1924	362	31
	300	**CLSG-5012**	77,0	2309	412	34
100 (929)	50	**CLSG-1002**	132,7	664	182	19
	100	**CLSG-1004**	132,7	1327	232	29
	150	**CLSG-1006**	132,7	1991	282	40
	200	**CLSG-1008**	132,7	2655	332	50
	250	**CLSG-10010**	132,7	3318	382	61
	300	**CLSG-10012**	132,7	3982	432	71
150 (1390)	50	**CLSG-1502**	198,6	993	196	39
	100	**CLSG-1504**	198,6	1986	246	52
	150	**CLSG-1506**	198,6	2978	296	65
	200	**CLSG-1508**	198,6	3971	346	78
	250	**CLSG-15010**	198,6	4964	396	92
	300	**CLSG-15012**	198,6	5957	446	105
200 (1861)	50	**CLSG-2002**	265,9	1330	216	55
	150	**CLSG-2006**	265,9	3989	316	91
	300	**CLSG-20012**	265,9	7977	466	146
250 (2565)	50	**CLSG-2502**	366,4	1832	235	102
	150	**CLSG-2506**	366,4	5497	335	136
	300	**CLSG-25012**	366,4	10993	485	207
300 (3193)	50	**CLSG-3002**	456,2	2281	312	184
	150	**CLSG-3006**	456,2	6843	412	232
	300	**CLSG-30012**	456,2	13685	562	303
400 (3919)	50	**CLSG-4002**	559,9	2800	375	270
	150	**CLSG-4006**	559,9	8399	475	330
	300	**CLSG-40012**	559,9	16797	625	421
500 (5114)	50	**CLSG-5002**	730,6	3653	419	401
	150	**CLSG-5006**	730,6	10959	519	480
	300	**CLSG-50012**	730,6	21918	669	599
600 (5987)	50	**CLSG-6002**	855,3	4276	429	474
	150	**CLSG-6006**	855,3	12829	529	565
	300	**CLSG-60012**	855,3	25659	679	701
800 (8234)	50	**CLSG-8002**	1176,3	5881	474	741
	150	**CLSG-8006**	1176,3	17644	574	880
	300	**CLSG-80012**	1176,3	35288	724	1058
1000 (10260)	50	**CLSG-10002**	1465,7	7329	564	1062
	150	**CLSG-10006**	1465,7	21986	664	1213
	300	**CLSG-100012**	1465,7	43972	814	1439

Higher Capacities

1500 and 2000 ton models available on request.

Additional Stroke Lengths

Models above 150 ton are also available with standard stroke lengths of 100, 200 and 250 mm. Please contact Enerpac for ordering information.

Lifting an Unbalanced Load

When lifting an unbalanced load **Enerpac Integrated Lifting Systems** can be the solution with multiple lift point capabilities from 4 to 64 points. See our "Yellow Pages" for multi-cylinder set-ups.

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Optional features

To add optional features to your cylinders, add the following suffixes to the end of the model number.

Collar thread *	**E002**

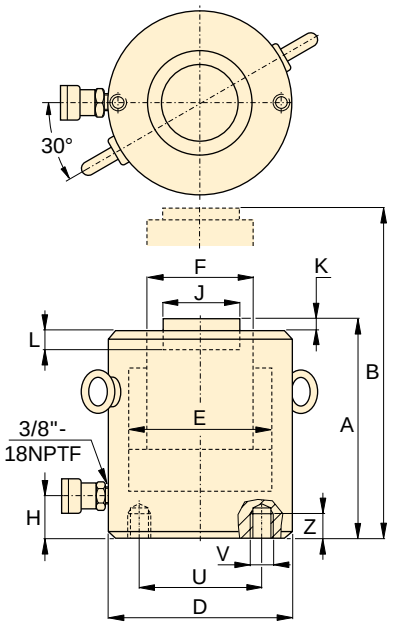
* On 400 ton models and higher.

Example:

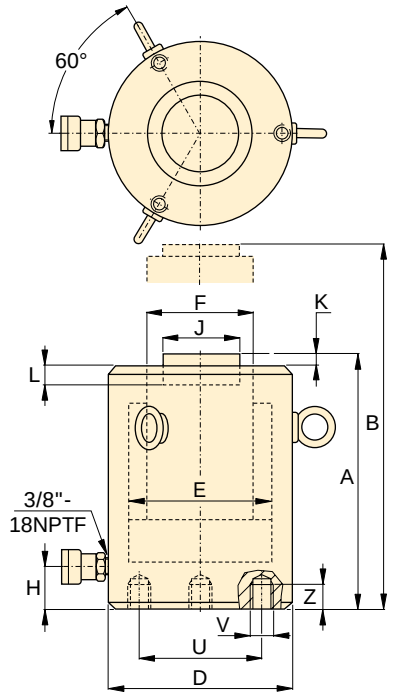
- For CLSG-5006 cylinder with collar thread, order: **CLSG-5006E002**

Technical specifications for these features are available from Enerpac.

CLSG-Series, High Tonnage Cylinders



CLSG-502 - CLSG-15012



CLSG-2002 - CLSG-100012

Base Mounting Hole [1] Dimensions (mm)			
Model / Capacity ton	Bolt Circle U	Thread Size V	Min. Thread Depth Z
CLSG-50	65	2x M12	22
CLSG-100	95	2x M12	22
CLSG-150	130	2x M12	22
CLSG-200	165	3x M12	22
CLSG-250	190	3x M12	22
CLSG-300	180	3x M16	30
CLSG-400	205	3x M16	30
CLSG-500	250	3x M24	36
CLSG-600	275	3x M24	36
CLSG-800	330	3x M24	36
CLSG-1000	375	3x M24	36

[1] Base mounting holes are random positioned in regard to coupler position.

Speed Chart

See the Enerpac Cylinder Speed Chart in our 'Yellow Pages' section.

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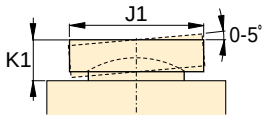
◀ For full features see previous page.

Cylinder Capacity ton (kN)	Stroke (mm)	Model Number	Cylinder Effective Area (cm^2)	Oil Capacity (cm^3)
50 (539)	50	**CLSG-502**	77,0	385
	100	**CLSG-504**	77,0	770
	150	**CLSG-506**	77,0	1155
	200	**CLSG-508**	77,0	1540
	250	**CLSG-5010**	77,0	1924
	300	**CLSG-5012**	77,0	2309
100 (929)	50	**CLSG-1002**	132,7	664
	100	**CLSG-1004**	132,7	1327
	150	**CLSG-1006**	132,7	1991
	200	**CLSG-1008**	132,7	2655
	250	**CLSG-10010**	132,7	3318
	300	**CLSG-10012**	132,7	3982
150 (1390)	50	**CLSG-1502**	198,6	993
	100	**CLSG-1504**	198,6	1986
	150	**CLSG-1506**	198,6	2978
	200	**CLSG-1508**	198,6	3971
	250	**CLSG-15010**	198,6	4964
	300	**CLSG-15012**	198,6	5957
200 (1861)	50	**CLSG-2002**	265,9	1330
	150	**CLSG-2006**	265,9	3989
	300	**CLSG-20012**	265,9	7977
250 (2565)	50	**CLSG-2502**	366,4	1832
	150	**CLSG-2506**	366,4	5497
	300	**CLSG-25012**	366,4	10993
300 (3193)	50	**CLSG-3002**	456,2	2281
	150	**CLSG-3006**	456,2	6843
	300	**CLSG-30012**	456,2	13685
400 (3919)	50	**CLSG-4002**	559,9	2800
	150	**CLSG-4006**	559,9	8399
	300	**CLSG-40012**	559,9	16797
500 (5114)	50	**CLSG-5002**	730,6	3653
	150	**CLSG-5006**	730,6	10959
	300	**CLSG-50012**	730,6	21918
600 (5987)	50	**CLSG-6002**	855,3	4276
	150	**CLSG-6006**	855,3	12829
	300	**CLSG-60012**	855,3	25659
800 (8234)	50	**CLSG-8002**	1176,3	5881
	150	**CLSG-8006**	1176,3	17644
	300	**CLSG-80012**	1176,3	35288
1000 (10260)	50	**CLSG-10002**	1465,7	7329
	150	**CLSG-10006**	1465,7	21986
	300	**CLSG-100012**	1465,7	43972

Optional Tilt Saddle *



Capacity:
50-1000 ton

Stroke:
50 - 300 mm

Maximum Operating Pressure:
700 bar

CLSG Series

Collapsed Height A (mm)	Extended Height B (mm)	Outside Dia. D (mm)	Cylinder Bore Dia. E (mm)	Plunger Dia. F (mm)	Base to Adv. Port H (mm)	Standard Saddle Dia. J (mm)	Saddle Protr. from Plgr. K (mm)	Depth of Plunger Hole L (mm)	(kg)	Model Number	* Optional Tilt Saddle		
											Saddle Dia. J1 (mm)	Saddle Height K1 (mm)	Saddle Model Number
162	212	130	99,0	70,0	52	50	1	19	17	CLSG-502	50	24	CATG-50
212	312	130	99,0	70,0	52	50	1	19	20	CLSG-504	50	24	CATG-50
262	412	130	99,0	70,0	52	50	1	19	23	CLSG-506	50	24	CATG-50
312	512	130	99,0	70,0	52	50	1	19	27	CLSG-508	50	24	CATG-50
362	612	130	99,0	70,0	52	50	1	19	31	CLSG-5010	50	24	CATG-50
412	712	130	99,0	70,0	52	50	1	19	34	CLSG-5012	50	24	CATG-50
182	232	165	130,0	95,0	54	75	1	19	19	CLSG-1002	73	29	CATG-100
232	332	165	130,0	95,0	54	75	1	19	29	CLSG-1004	73	29	CATG-100
282	432	165	130,0	95,0	54	75	1	19	40	CLSG-1006	73	29	CATG-100
332	532	165	130,0	95,0	54	75	1	19	50	CLSG-1008	73	29	CATG-100
382	632	165	130,0	95,0	54	75	1	19	61	CLSG-10010	73	29	CATG-100
432	732	165	130,0	95,0	54	75	1	19	71	CLSG-10012	73	29	CATG-100
196	246	205	159,0	114,0	61	94	1	19	39	CLSG-1502	91	31	CATG-150
246	346	205	159,0	114,0	61	94	1	19	52	CLSG-1504	91	31	CATG-150
296	446	205	159,0	114,0	61	94	1	19	65	CLSG-1506	91	31	CATG-150
346	546	205	159,0	114,0	61	94	1	19	78	CLSG-1508	91	31	CATG-150
396	646	205	159,0	114,0	61	94	1	19	92	CLSG-15010	91	31	CATG-150
446	746	205	159,0	114,0	61	94	1	19	105	CLSG-15012	91	31	CATG-150
216	266	235	184,0	133,0	67	113	1	24	55	CLSG-2002	118	35	CATG-200
316	466	235	184,0	133,0	67	113	1	24	91	CLSG-2006	118	35	CATG-200
466	766	235	184,0	133,0	67	113	1	24	146	CLSG-20012	118	35	CATG-200
235	285	275	216,0	165,0	73	145	1	24	102	CLSG-2502	144	46	CATG-250
335	485	275	216,0	165,0	73	145	1	24	136	CLSG-2506	144	46	CATG-250
485	785	275	216,0	165,0	73	145	1	24	207	CLSG-25012	144	46	CATG-250
312	362	310	241,0	197,0	101	177	1	19	184	CLSG-3002	160	62	CATG-300
412	562	310	241,0	197,0	101	177	1	19	232	CLSG-3006	160	62	CATG-300
562	862	310	241,0	197,0	101	177	1	19	303	CLSG-30012	160	62	CATG-300
375	425	350	267,0	216,0	114	196	3	27	270	CLSG-4002	193	51	CATG-400
475	625	350	267,0	216,0	114	196	3	27	330	CLSG-4006	193	51	CATG-400
625	925	350	267,0	216,0	114	196	3	27	421	CLSG-40012	193	51	CATG-400
419	469	400	305,0	248,0	114	228	3	27	401	CLSG-5002	228	63	CATG-500
519	669	400	305,0	248,0	114	228	3	27	480	CLSG-5006	228	63	CATG-500
669	969	400	305,0	248,0	114	228	3	27	599	CLSG-50012	228	63	CATG-500
429	479	430	330,0	267,0	114	247	3	27	474	CLSG-6002	241	76	CATG-600
529	679	430	330,0	267,0	114	247	3	27	565	CLSG-6006	241	76	CATG-600
679	979	430	330,0	267,0	114	247	3	27	701	CLSG-60012	241	76	CATG-600
474	524	505	387,0	317,0	149	297	3	27	741	CLSG-8002	287	75	CATG-800
574	724	505	387,0	317,0	149	297	3	27	880	CLSG-8006	287	75	CATG-800
724	1024	505	387,0	317,0	149	297	3	27	1058	CLSG-80012	287	75	CATG-800
564	614	560	432,0	343,0	174	323	3	27	1062	CLSG-10002	311	93	CATG-1000
664	814	560	432,0	343,0	174	323	3	27	1213	CLSG-10006	311	93	CATG-1000
814	1114	560	432,0	343,0	174	323	3	27	1439	CLSG-100012	311	93	CATG-1000

▼ Shown from left to right: **CLS-1002, CLS-506, CLS-502**

The Single-Acting Heavy Lifting Solution With Reduced Collapsed Height

- **Lowest collapsed height for use in confined spaces**
- **Overflow port functions as a stroke limiter**
- **Plunger wiper reduces contamination, extending cylinder life**
- **Interchangeable, hardened grooved saddles are standard**
- **Special synthetic coating for improved corrosion resistance and lower friction for smoother operation**
- **CR-400 coupler and dust cap included on all models**
- **Single-acting, load return**

▼ *CLS-cylinders doing their job, synchronised lifting a complete fly-over for exact positioning.*

Saddles

All CLS cylinders are equipped with bolt-on removable grooved saddles. For information on optional tilt saddles, see selection chart.

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Gauges

Minimize the risk of overloading and ensure long, dependable service from your equipment. Refer to the System Components Section for a full range of gauges.

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Remote Lifting

For heavy lifting in remote locations use the Enerpac ZE-Series electric pumps.

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Low Height - High Tonnage

When low height with high force is required, CLP-Series Pancake Cylinders with locknut offer the solution to lift the first few centimetres.

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Synchronous Lifting Systems

The solution for multiple lift point capabilities from 4 to 64 points.

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CLS Series

Capacity:
50-1000 ton

Stroke:
50 - 300 mm

Maximum Operating Pressure:
700 bar

▼ QUICK SELECTION CHART

For complete technical information see next page.

Cylinder Capacity ton (kN)	Stroke (mm)	Model Number	Cylinder Effective Area (cm^2)	Oil Capacity (cm^3)	Collapsed Height (mm)	(kg)
50 (496)	50	**CLS-502**	70,9	355	128	14
	100	**CLS-504**	70,9	709	178	18
	150	**CLS-506**	70,9	1064	228	23
	200	**CLS-508**	70,9	1418	278	28
	250	**CLS-5010**	70,9	1773	327	33
	300	**CLS-5012**	70,9	2127	378	38
100 (929)	50	**CLS-1002**	132,7	664	143	24
	100	**CLS-1004**	132,7	1327	193	32
	150	**CLS-1006**	132,7	1991	243	40
	200	**CLS-1008**	132,7	2654	293	49
	250	**CLS-10010**	132,7	3318	343	58
	300	**CLS-10012**	132,7	3981	392	66
150 (1390)	50	**CLS-1502**	198,6	993	165	43
	100	**CLS-1504**	198,6	1986	215	55
	150	**CLS-1506**	198,6	2979	265	69
	200	**CLS-1508**	198,6	3972	315	82
	250	**CLS-15010**	198,6	4965	365	95
	300	**CLS-15012**	198,6	5958	414	108
200 (1859)	50	**CLS-2002**	265,6	1330	193	66
	150	**CLS-2006**	265,6	3989	293	101
	300	**CLS-20012**	265,6	7977	443	154
250 (2562)	50	**CLS-2502**	366,1	1832	193	90
	150	**CLS-2506**	366,1	5496	293	137
	300	**CLS-25012**	366,1	10996	443	208
300 (3193)	50	**CLS-3002**	456,2	2281	235	137
	150	**CLS-3006**	456,2	6843	335	198
	300	**CLS-30012**	456,2	13710	485	288
400 (3919)	50	**CLS-4002**	559,9	2800	265	200
	150	**CLS-4006**	559,9	8399	365	275
	300	**CLS-40012**	559,9	16770	515	390
500 (5118)	50	**CLS-5002**	731,1	3656	295	289
	150	**CLS-5006**	731,1	10967	395	390
	300	**CLS-50012**	731,1	21900	545	540
600 (5983)	50	**CLS-6002**	854,8	4277	310	350
	150	**CLS-6006**	854,8	12830	410	465
	300	**CLS-60012**	854,8	25710	560	640
800 (8238)	50	**CLS-8002**	1176,9	5882	355	549
	150	**CLS-8006**	1176,9	17645	455	709
	300	**CLS-80012**	1176,9	35370	605	950
1000 (10260)	50	**CLS-10002**	1466,4	7329	385	729
	150	**CLS-10006**	1466,4	21986	485	921
	300	**CLS-100012**	1466,4	43950	635	1210

Higher Capacities

1500 and 2000 ton models are available on request.

Additional Stroke Lengths

Models above 150 ton are also available with standard stroke lengths of 100, 200 and 250 mm. Please contact Enerpac for ordering information.

Lifting an Unbalanced Load?

See our 'Yellow Pages' for multi-cylinder set-ups.

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Optional features

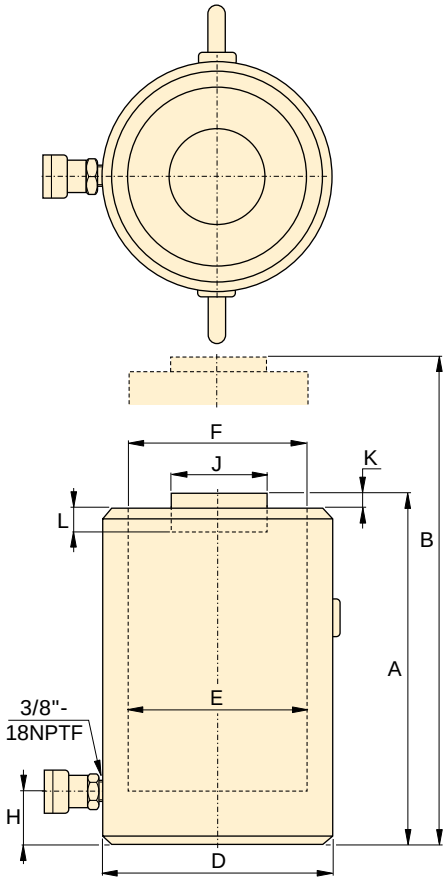
To add optional features to your cylinders, add the following suffixes to the end of the model number.

Spring return	**E001**

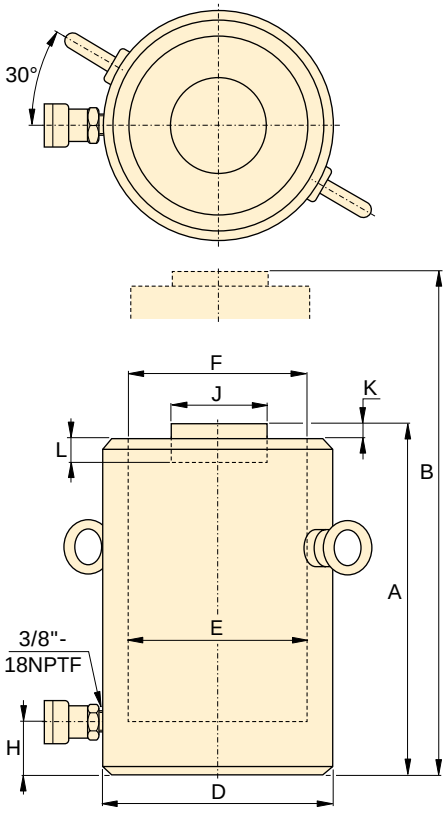
Example:

- For CLS-5006 cylinder with spring return, order: **CLS-5006E001**

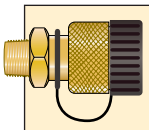
Technical specifications for these features are available from Enerpac.



CLS-502 - CLS-25012



CLS-3002 - CLS-100012



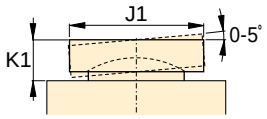
Couplers Included!
CR-400 couplers included on all models. Fit all HC-Series hoses.

◀ For full features see previous page.

Cylinder Capacity ton (kN)	Stroke (mm)	Model Number	Cylinder Effective Area (cm^2)	Oil Capacity (cm^3)
50 (496)	50	**CLS-502**	70,9	355
	100	**CLS-504**	70,9	709
	150	**CLS-506**	70,9	1064
	200	**CLS-508**	70,9	1418
	250	**CLS-5010**	70,9	1773
	300	**CLS-5012**	70,9	2127
100 (929)	50	**CLS-1002**	132,7	664
	100	**CLS-1004**	132,7	1327
	150	**CLS-1006**	132,7	1991
	200	**CLS-1008**	132,7	2654
	250	**CLS-10010**	132,7	3318
	300	**CLS-10012**	132,7	3981
150 (1390)	50	**CLS-1502**	198,6	993
	100	**CLS-1504**	198,6	1986
	150	**CLS-1506**	198,6	2979
	200	**CLS-1508**	198,6	3972
	250	**CLS-15010**	198,6	4965
	300	**CLS-15012**	198,6	5958
200 (1859)	50	**CLS-2002**	265,6	1330
	150	**CLS-2006**	265,6	3989
	300	**CLS-20012**	265,6	7977
250 (2562)	50	**CLS-2502**	366,1	1832
	150	**CLS-2506**	366,1	5496
	300	**CLS-25012**	366,1	10996
300 (3193)	50	**CLS-3002**	456,2	2281
	150	**CLS-3006**	456,2	6843
	300	**CLS-30012**	456,2	13710
400 (3919)	50	**CLS-4002**	559,9	2800
	150	**CLS-4006**	559,9	8399
	300	**CLS-40012**	559,9	16770
500 (5118)	50	**CLS-5002**	731,1	3656
	150	**CLS-5006**	731,1	10967
	300	**CLS-50012**	731,1	21900
600 (5983)	50	**CLS-6002**	854,8	4277
	150	**CLS-6006**	854,8	12830
	300	**CLS-60012**	854,8	25710
800 (8238)	50	**CLS-8002**	1176,9	5882
	150	**CLS-8006**	1176,9	17645
	300	**CLS-80012**	1176,9	35370
1000 (10260)	50	**CLS-10002**	1466,4	7329
	150	**CLS-10006**	1466,4	21986
	300	**CLS-100012**	1466,4	43950

Single-Acting, High Tonnage Cylinders

Optional Tilt Saddle *



Capacity:
50-1000 ton

Stroke:
50 - 300 mm

Maximum Operating Pressure:
700 bar

CLS Series

Collapsed Height A (mm)	Extended Height B (mm)	Outside Dia. D (mm)	Cylinder Bore Dia. E (mm)	Plunger Dia. F (mm)	Base to Adv. Port H (mm)	Standard Saddle Dia. J (mm)	Saddle Protr. from Plgr. K (mm)	Depth of Plunger Hole L (mm)	(kg)	Model Number	* Optional Tilt Saddle		
											Saddle Dia. J1 (mm)	Saddle Height K1 (mm)	Saddle Model Number
128	178	125	95,0	95,0	30	71	2	13	14	**CLS-502**	71	24	**CAT-100**
178	278	125	95,0	95,0	30	71	2	13	18	**CLS-504**	71	24	**CAT-100**
228	378	125	95,0	95,0	30	71	2	13	23	**CLS-506**	71	24	**CAT-100**
278	478	125	95,0	95,0	30	71	2	13	28	**CLS-508**	71	24	**CAT-100**
327	578	125	95,0	95,0	30	71	2	13	33	**CLS-5010**	71	24	**CAT-100**
378	678	125	95,0	95,0	30	71	2	13	38	**CLS-5012**	71	24	**CAT-100**
143	193	165	130,0	130,0	30	71	2	13	24	**CLS-1002**	71	24	**CAT-100**
193	293	165	130,0	130,0	30	71	2	13	32	**CLS-1004**	71	24	**CAT-100**
243	393	165	130,0	130,0	30	71	2	13	40	**CLS-1006**	71	24	**CAT-100**
293	493	165	130,0	130,0	30	71	2	13	49	**CLS-1008**	71	24	**CAT-100**
343	593	165	130,0	130,0	30	71	2	13	58	**CLS-10010**	71	24	**CAT-100**
392	693	165	130,0	130,0	30	71	2	13	66	**CLS-10012**	71	24	**CAT-100**
165	215	205	159,0	159,0	39	130	2	25	43	**CLS-1502**	130	20	**CAT-200**
215	315	205	159,0	159,0	39	130	2	25	55	**CLS-1504**	130	20	**CAT-200**
265	415	205	159,0	159,0	39	130	2	25	69	**CLS-1506**	130	20	**CAT-200**
315	515	205	159,0	159,0	39	130	2	25	82	**CLS-1508**	130	20	**CAT-200**
365	615	205	159,0	159,0	39	130	2	25	95	**CLS-15010**	130	20	**CAT-200**
414	715	205	159,0	159,0	39	130	2	25	108	**CLS-15012**	130	20	**CAT-200**
193	243	235	183,9	183,9	50	130	2	25	66	**CLS-2002**	130	20	**CAT-200**
293	443	235	183,9	183,9	50	130	2	25	101	**CLS-2006**	130	20	**CAT-200**
443	743	235	183,9	183,9	50	130	2	25	154	**CLS-20012**	130	20	**CAT-200**
193	243	275	215,9	215,9	50	150	2	25	90	**CLS-2502**	150	21	**CAT-250**
293	443	275	215,9	215,9	50	150	2	25	137	**CLS-2506**	150	21	**CAT-250**
443	743	275	215,9	215,9	50	150	2	25	208	**CLS-25012**	150	21	**CAT-250**
235	285	310	241,0	241,0	59	139	5	25	137	**CLS-3002**	195	75	**CAT-300**
335	485	310	241,0	241,0	59	139	5	25	198	**CLS-3006**	195	75	**CAT-300**
485	785	310	241,0	241,0	59	139	5	25	288	**CLS-30012**	195	75	**CAT-300**
265	315	350	267,0	267,0	70	159	5	25	200	**CLS-4002**	225	85	**CAT-400**
365	515	350	267,0	267,0	70	159	5	25	275	**CLS-4006**	225	85	**CAT-400**
515	815	350	267,0	267,0	70	159	5	25	390	**CLS-40012**	225	85	**CAT-400**
295	345	400	305,1	305,1	80	179	5	25	289	**CLS-5002**	250	91	**CAT-500**
395	545	400	305,1	305,1	80	179	5	25	390	**CLS-5006**	250	91	**CAT-500**
545	845	400	305,1	305,1	80	179	5	25	540	**CLS-50012**	250	91	**CAT-500**
310	360	430	329,9	329,9	85	194	5	25	350	**CLS-6002**	275	96	**CAT-600**
410	560	430	329,9	329,9	85	194	5	25	465	**CLS-6006**	275	96	**CAT-600**
560	860	430	329,9	329,9	85	194	5	25	640	**CLS-60012**	275	96	**CAT-600**
355	405	505	387,1	387,1	100	224	5	25	549	**CLS-8002**	320	123	**CAT-800**
455	605	505	387,1	387,1	100	224	5	25	709	**CLS-8006**	320	123	**CAT-800**
605	905	505	387,1	387,1	100	224	5	25	950	**CLS-80012**	320	123	**CAT-800**
385	435	560	432,1	432,1	110	249	5	25	729	**CLS-10002**	360	136	**CAT-1000**
485	635	560	432,1	432,1	110	249	5	25	921	**CLS-10006**	360	136	**CAT-1000**
635	935	560	432,1	432,1	110	249	5	25	1210	**CLS-100012**	360	136	**CAT-1000**

CLRG-Series, High Tonnage Cylinders

▼ Shown from left to right: **CLRG-506, CLRG-5006, CLRG-4006**

- **Double-acting, for push and pull**
- **Safety valve in retract side of cylinder helps to prevent damage in case of accidental over-pressurization**
- **Special bearing design withstands sideload forces up to 10% of rated cylinder capacity without scoring**
- **Plunger wiper reduces contamination, extending cylinder life**
- **CR-400 coupler and dust cap included on all models**
- **Baked enamel finish and plated pistons provide superior corrosion resistance**

▼ *CLRG-cylinders supported and positioned these automobile deck elements.*

Double-Acting Power Lifters

Saddles

All CLRG cylinders are equipped with bolt-on removable grooved saddles. For information on optional tilt saddles, see selection chart.

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Safety Device

A pilot-operated check valve (**V-42**) can be inserted between cylinder and pump. This valve provides a safety lock on the cylinder under load at any position and remote control for unlocking.

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Low Height - High Tonnage

When low height with high force is required, Pancake Cylinders with locknut offer the solution to lift the first few centimetres.

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Standard Features

- Interchangeable, hardened grooved saddles
- Top and side mounted lifting eyes
- CR-400 coupler and dustcap
- All cylinders meet ASME B-30.1 and ISO 10100 standards.

▼ *Replacing adjustment rolls under a fly-over with CLRG cylinders, for controlled lifting and lowering.*

RR-series

For loads below 50 ton Enerpac RR-series cylinders are a good alternative.

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▼ QUICK SELECTION CHART

For complete technical information see next page.

Cylinder Capacity ton (kN)	Stroke (mm)	Model Number	Cylinder Effective Area (cm^2) Push	Cylinder Effective Area (cm^2) Pull	Oil Capacity (cm^3) Push	Oil Capacity (cm^3) Pull	Collapsed Height (mm)
50 (539)	50	**CLRG-502**	77,0	38,5	385	192	162
	100	**CLRG-504**	77,0	38,5	770	385	212
	150	**CLRG-506**	77,0	38,5	1155	577	262
	200	**CLRG-508**	77,0	38,5	1540	770	312
	250	**CLRG-5010**	77,0	38,5	1924	962	362
	300	**CLRG-5012**	77,0	38,5	2309	1155	412
100 (929)	50	**CLRG-1002**	132,7	61,9	664	309	179
	100	**CLRG-1004**	132,7	61,9	1327	619	229
	150	**CLRG-1006**	132,7	61,9	1991	928	279
	200	**CLRG-1008**	132,7	61,9	2655	1237	329
	250	**CLRG-10010**	132,7	61,9	3318	1546	379
	300	**CLRG-10012**	132,7	61,9	3982	1856	429
150 (1390)	50	**CLRG-1502**	198,6	96,5	993	482	196
	100	**CLRG-1504**	198,6	96,5	1986	965	246
	150	**CLRG-1506**	198,6	96,5	2978	1447	296
	200	**CLRG-1508**	198,6	96,5	3971	1930	346
	250	**CLRG-15010**	198,6	96,5	4964	2412	396
	300	**CLRG-15012**	198,6	96,5	5957	2895	446
200 (1861)	50	**CLRG-2002**	265,9	127,0	1330	635	212
	150	**CLRG-2006**	265,9	127,0	3989	1905	312
	300	**CLRG-20012**	265,9	127,0	7977	3809	462
250 (2565)	50	**CLRG-2502**	366,4	152,6	1832	763	235
	150	**CLRG-2506**	366,4	152,6	5497	2289	335
	300	**CLRG-25012**	366,4	152,6	10993	4578	485
300 (3193)	50	**CLRG-3002**	456,2	151,4	2281	757	322
	150	**CLRG-3006**	456,2	151,4	6843	2270	422
	300	**CLRG-30012**	456,2	151,4	13685	4541	572
400 (3919)	50	**CLRG-4002**	559,9	193,5	2800	967	374
	150	**CLRG-4006**	559,9	193,5	8399	2902	474
	300	**CLRG-40012**	559,9	193,5	16797	5804	624
500 (5114)	50	**CLRG-5002**	730,6	247,6	3653	1238	419
	150	**CLRG-5006**	730,6	247,6	10959	3713	519
	300	**CLRG-50012**	730,6	247,6	21918	7427	669
600 (5987)	50	**CLRG-6002**	855,3	295,4	4276	1477	429
	150	**CLRG-6006**	855,3	295,4	12829	4431	529
	300	**CLRG-60012**	855,3	295,4	25659	8862	679
800 (8234)	50	**CLRG-8002**	1176,3	387,0	5881	1935	484
	150	**CLRG-8006**	1176,3	387,0	17644	5806	584
	300	**CLRG-80012**	1176,3	387,0	35288	11611	734
1000 (10260)	50	**CLRG-10002**	1465,7	541,7	7329	2709	564
	150	**CLRG-10006**	1465,7	541,7	21986	8126	664
	300	**CLRG-100012**	1465,7	541,7	43972	16252	814

CLRG Series

Capacity:
50-1000 ton

Stroke:
50 - 300 mm

Maximum Operating Pressure:
700 bar

Pump Selection

A double-acting cylinder must be powered by a pump with a 4-way valve.

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Higher Capacities

1500 and 2000 ton models are available on request.

Additional Stroke Lengths

Models above 150 ton are also available with standard stroke lengths of 100, 200 and 250 mm. Please contact Enerpac for ordering information.

Optional features

To add optional features to your cylinders, add the following suffixes to the end of the model number.

Collar thread *	**E002**
Plunger thread	**E003**
Collar * and plunger thread	**E005**

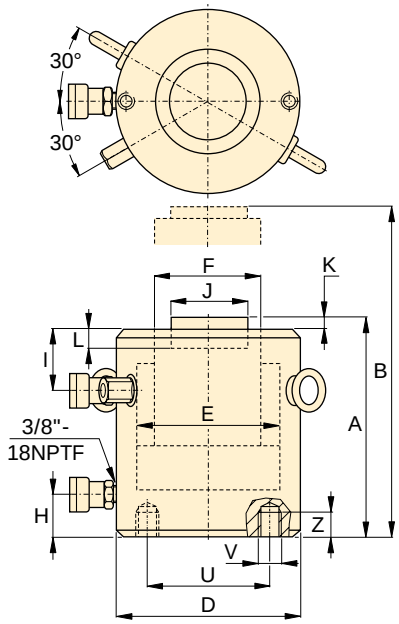
* On 400 ton and higher

Example:

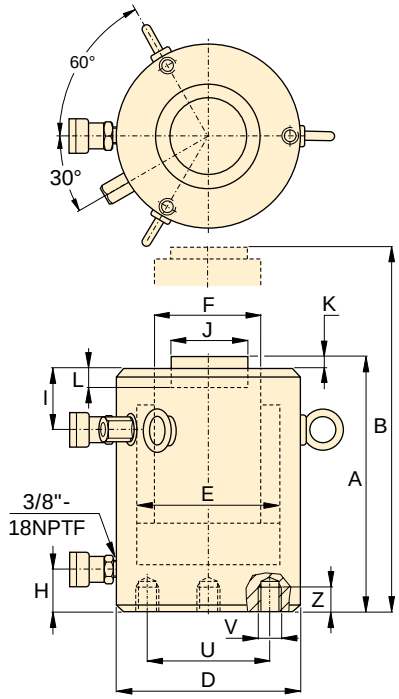
- For CLRG-5006 cylinder with collar thread, order: **CLRG-5006E002**

Technical specifications for these features are available from Enerpac.

CLRG-Series, High Tonnage Cylinders



CLRG-502 - CLRG-15012



CLRG-2002 - CLRG-100012

Base Mounting Hole [1] Dimensions (mm)			
Model / Capacity ton	Bolt Circle U	Thread Size V	Min. Thread Depth Z
CLRG-50	65	2x M12	22
CLRG-100	95	2x M12	22
CLRG-150	130	2x M12	22
CLRG-200	165	3x M12	22
CLRG-250	190	3x M12	22
CLRG-300	180	3x M16	30
CLRG-400	205	3x M16	30
CLRG-500	250	3x M24	36
CLRG-600	275	3x M24	36
CLRG-800	330	3x M24	36
CLRG-1000	375	3x M24	36

[1] Base mounting holes are random positioned in regard to coupler position.

Speed Chart

See the Enerpac Cylinder Speed Chart in our 'Yellow Pages' section.

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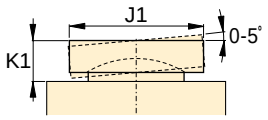
◀ For full features see previous page.

Cylinder Capacity (ton)	Stroke (mm)	Model Number	Maximum Cylinder Capacity (kN)		Cylinder Effective Area (cm^2)		Oil Capacity (cm^3)	
			Push	Pull	Push	Pull	Push	Pull
50	50	**CLRG-502**	539	269	77,0	38,5	385	192
	100	**CLRG-504**	539	269	77,0	38,5	770	385
	150	**CLRG-506**	539	269	77,0	38,5	1155	577
	200	**CLRG-508**	539	269	77,0	38,5	1540	770
	250	**CLRG-5010**	539	269	77,0	38,5	1924	962
	300	**CLRG-5012**	539	269	77,0	38,5	2309	1155
100	50	**CLRG-1002**	929	433	132,7	61,9	664	309
	100	**CLRG-1004**	929	433	132,7	61,9	1327	619
	150	**CLRG-1006**	929	433	132,7	61,9	1991	928
	200	**CLRG-1008**	929	433	132,7	61,9	2655	1237
	250	**CLRG-10010**	929	433	132,7	61,9	3318	1546
	300	**CLRG-10012**	929	433	132,7	61,9	3982	1856
150	50	**CLRG-1502**	1390	675	198,6	96,5	993	482
	100	**CLRG-1504**	1390	675	198,6	96,5	1986	965
	150	**CLRG-1506**	1390	675	198,6	96,5	2978	1447
	200	**CLRG-1508**	1390	675	198,6	96,5	3971	1930
	250	**CLRG-15010**	1390	675	198,6	96,5	4964	2412
	300	**CLRG-15012**	1390	675	198,6	96,5	5957	2895
200	50	**CLRG-2002**	1861	889	265,9	127,0	1330	635
	150	**CLRG-2006**	1861	889	265,9	127,0	3989	1905
	300	**CLRG-20012**	1861	889	265,9	127,0	7977	3809
250	50	**CLRG-2502**	2565	1068	366,4	152,6	1832	763
	150	**CLRG-2506**	2565	1068	366,4	152,6	5497	2289
	300	**CLRG-25012**	2565	1068	366,4	152,6	10993	4578
300	50	**CLRG-3002**	3193	1060	456,2	151,4	2281	757
	150	**CLRG-3006**	3193	1060	456,2	151,4	6843	2270
	300	**CLRG-30012**	3193	1060	456,2	151,4	13685	4541
400	50	**CLRG-4002**	3919	1354	559,9	193,5	2800	967
	150	**CLRG-4006**	3919	1354	559,9	193,5	8399	2902
	300	**CLRG-40012**	3919	1354	559,9	193,5	16797	5804
500	50	**CLRG-5002**	5114	1733	730,6	247,6	3653	1238
	150	**CLRG-5006**	5114	1733	730,6	247,6	10959	3713
	300	**CLRG-50012**	5114	1733	730,6	247,6	21918	7427
600	50	**CLRG-6002**	5987	2068	855,3	295,4	4276	1477
	150	**CLRG-6006**	5987	2068	855,3	295,4	12829	4431
	300	**CLRG-60012**	5987	2068	855,3	295,4	25659	8862
800	50	**CLRG-8002**	8234	2709	1176,3	387,0	5881	1935
	150	**CLRG-8006**	8234	2709	1176,3	387,0	17644	5806
	300	**CLRG-80012**	8234	2709	1176,3	387,0	35288	11611
1000	50	**CLRG-10002**	10260	3792	1465,7	541,7	7329	2709
	150	**CLRG-10006**	10260	3792	1465,7	541,7	21986	8126
	300	**CLRG-100012**	10260	3792	1465,7	541,7	43972	16252

Double-Acting, High Tonnage Cylinders



* **Optional Tilt Saddle**

Capacity:
50-1000 ton

Stroke:
50 - 300 mm

Maximum Operating Pressure:
700 bar

CLRG Series

Collaps. Height A (mm)	Extend. Height B (mm)	Outside Dia. D (mm)	Cyl. Bore Dia. E (mm)	Plunger Dia. F (mm)	Base to Advance Port H (mm)	Top to Retract Port I (mm)	Standard Saddle Dia. J (mm)	Saddle Protr. from Plgr. K (mm)	Depth of Plunger Hole L (mm)	(kg)	Model Number	Optional Tilt Saddle *		
												Saddle Dia. J1 (mm)	Saddle Height K1 (mm)	Saddle Model Number
162	212	130	99	70	52	33	50	1	19	17	CLRG-502	50	24	CATG-50
212	312	130	99	70	52	33	50	1	19	20	CLRG-504	50	24	CATG-50
262	412	130	99	70	52	33	50	1	19	23	CLRG-506	50	24	CATG-50
312	512	130	99	70	52	33	50	1	19	27	CLRG-508	50	24	CATG-50
362	612	130	99	70	52	33	50	1	19	31	CLRG-5010	50	24	CATG-50
412	712	130	99	70	52	33	50	1	19	34	CLRG-5012	50	24	CATG-50
179	229	165	130	95	54	48	75	1	19	29	CLRG-1002	73	29	CATG-100
229	329	165	130	95	54	48	75	1	19	34	CLRG-1004	73	29	CATG-100
279	429	165	130	95	54	48	75	1	19	40	CLRG-1006	73	29	CATG-100
329	529	165	130	95	54	48	75	1	19	46	CLRG-1008	73	29	CATG-100
379	629	165	130	95	54	48	75	1	19	52	CLRG-10010	73	29	CATG-100
429	729	165	130	95	54	48	75	1	19	58	CLRG-10012	73	29	CATG-100
196	246	205	159	114	61	56	94	1	19	39	CLRG-1502	91	31	CATG-150
246	346	205	159	114	61	56	94	1	19	52	CLRG-1504	91	31	CATG-150
296	446	205	159	114	61	56	94	1	19	65	CLRG-1506	91	31	CATG-150
346	546	205	159	114	61	56	94	1	19	78	CLRG-1508	91	31	CATG-150
396	646	205	159	114	61	56	94	1	19	92	CLRG-15010	91	31	CATG-150
446	746	205	159	114	61	56	94	1	19	105	CLRG-15012	91	31	CATG-150
212	262	235	184	133	67	66	113	1	24	55	CLRG-2002	118	35	CATG-200
312	462	235	184	133	67	66	113	1	24	91	CLRG-2006	118	35	CATG-200
462	762	235	184	133	67	66	113	1	24	146	CLRG-20012	118	35	CATG-200
235	285	275	216	165	73	78	145	1	24	89	CLRG-2502	144	46	CATG-250
335	485	275	216	165	73	78	145	1	24	136	CLRG-2506	144	46	CATG-250
485	785	275	216	165	73	78	145	1	24	207	CLRG-25012	144	46	CATG-250
322	372	310	241	197	101	75	177	1	19	184	CLRG-3002	160	62	CATG-300
422	572	310	241	197	101	75	177	1	19	232	CLRG-3006	160	62	CATG-300
572	872	310	241	197	101	75	177	1	19	303	CLRG-30012	160	62	CATG-300
374	424	350	267	216	114	105	196	3	27	270	CLRG-4002	193	51	CATG-400
474	624	350	267	216	114	105	196	3	27	330	CLRG-4006	193	51	CATG-400
624	924	350	267	216	114	105	196	3	27	421	CLRG-40012	193	51	CATG-400
419	469	400	305	248	114	135	228	3	27	401	CLRG-5002	228	63	CATG-500
519	669	400	305	248	114	135	228	3	27	480	CLRG-5006	228	63	CATG-500
669	969	400	305	248	114	135	228	3	27	599	CLRG-50012	228	63	CATG-500
429	479	430	330	267	114	135	247	3	27	474	CLRG-6002	241	76	CATG-600
529	679	430	330	267	114	135	247	3	27	565	CLRG-6006	241	76	CATG-600
679	979	430	330	267	114	135	247	3	27	701	CLRG-60012	241	76	CATG-600
484	534	505	387	317	149	135	297	3	27	741	CLRG-8002	287	75	CATG-800
584	734	505	387	317	149	135	297	3	27	868	CLRG-8006	287	75	CATG-800
734	1034	505	387	317	149	135	297	3	27	1058	CLRG-80012	287	75	CATG-800
564	614	560	432	343	174	170	323	3	27	1062	CLRG-10002	311	93	CATG-1000
664	814	560	432	343	174	170	323	3	27	1213	CLRG-10006	311	93	CATG-1000
814	1114	560	432	343	174	170	323	3	27	1439	CLRG-100012	311	93	CATG-1000

CLL-Series, Lock Nut Cylinders

ENERPAC
Hydraulic Technology Worldwide

▼ Shown from left to right: **CLL-5010, CLL-502, CLL-1006**

- **Single-acting, load return**
- **Safety Lock Nut for mechanical load holding**
- **Special synthetic coating for improved corrosion resistance and lower friction for smoother operation**
- **Withstands sideload forces up to 5% of rated cylinder capacity without scoring**
- **Overflow port functions as a stroke limiter**
- **Interchangeable, hardened grooved saddles are standard**
- **CR-400 coupler and dust cap included on all models**

To Secure Loads Mechanically

Saddles

All CLL cylinders are equipped with bolt-on removable grooved saddles. For information on optional tilt saddles, see selection chart at next page.

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Gauges

Minimize the risk of overloading and ensure long, dependable service from your equipment. Refer to the System Components Section for a full range of gauges.

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Low Height - High Tonnage

When low height with high force is required, Pancake Cylinders with lock nut offer the solution to lift the first few centimetres.

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▼ *For this curved bridge, CLL-cylinders were used to support the concrete beams, to level the pierhead and to place 4000 ton slide bearings between pier and pierhead.*

▼ *CLL cylinder, mechanically locked, after positioning the curved bridge.*

▼ QUICK SELECTION CHART

For complete technical information see next page.

Cylinder Capacity ton (kN)	Stroke (mm)	Model Number	Cylinder Effective Area (cm^2)	Oil Capacity (cm^3)	Collapsed Height (mm)	(kg)
50 (496)	50	**CLL-502**	70,9	355	164	15
	100	**CLL-504**	70,9	709	214	20
	150	**CLL-506**	70,9	1064	264	25
	200	**CLL-508**	70,9	1418	314	30
	250	**CLL-5010**	70,9	1773	364	35
	300	**CLL-5012**	70,9	2127	414	40
100 (929)	50	**CLL-1002**	132,7	664	187	30
	100	**CLL-1004**	132,7	1327	237	39
	150	**CLL-1006**	132,7	1991	287	48
	200	**CLL-1008**	132,7	2654	337	56
	250	**CLL-10010**	132,7	3318	387	64
	300	**CLL-10012**	132,7	3981	437	73
150 (1390)	50	**CLL-1502**	198,6	993	209	53
	100	**CLL-1504**	198,6	1986	259	66
	150	**CLL-1506**	198,6	2979	309	78
	200	**CLL-1508**	198,6	3972	359	92
	250	**CLL-15010**	198,6	4965	409	104
	300	**CLL-15012**	198,6	5958	459	117
200 (1859)	50	**CLL-2002**	265,6	1330	243	83
	150	**CLL-2006**	265,6	3989	343	117
	300	**CLL-20012**	265,6	7995	493	170
250 (2562)	50	**CLL-2502**	366,1	1832	249	116
	150	**CLL-2506**	366,1	5496	349	162
	300	**CLL-25012**	366,1	10995	499	234
300 (3193)	50	**CLL-3002**	456,2	2281	295	173
	150	**CLL-3006**	456,2	6843	395	233
	300	**CLL-30012**	456,2	13740	545	323
400 (3919)	50	**CLL-4002**	559,9	2800	335	250
	150	**CLL-4006**	559,9	8399	435	327
	300	**CLL-40012**	559,9	16800	585	441
500 (5118)	50	**CLL-5002**	731,1	3653	375	367
	150	**CLL-5006**	731,1	10959	475	466
	300	**CLL-50012**	731,1	21930	625	617
600 (5983)	50	**CLL-6002**	854,8	4277	395	446
	150	**CLL-6006**	854,8	12830	495	562
	300	**CLL-60012**	854,8	25650	645	737
800 (8238)	50	**CLL-8002**	1176,9	5882	455	709
	150	**CLL-8006**	1176,9	17645	555	870
	300	**CLL-80012**	1176,9	35370	705	1110
1000 (10260)	50	**CLL-10002**	1466,4	7329	495	949
	150	**CLL-10006**	1466,4	21986	595	1141
	300	**CLL-100012**	1466,4	43980	745	1430

CLL Series

Capacity:
50-1000 ton

Stroke:
50 - 300 mm

Maximum Operating Pressure:
700 bar

Higher Capacities

1500 and 2000 ton models are available on request.

Additional Stroke Lengths

Models above 150 ton are also available with standard stroke lengths of 100, 200 and 250 mm. Please contact Enerpac for ordering information.

Lifting an Unbalanced Load?

See our 'Yellow Pages' for multi-cylinder set-ups.

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Speed Chart

See the Cylinder Speed Chart in our 'Yellow Pages' section to determine the approximate cylinder speed.

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Optional features

To add optional features to your cylinders, add the following suffix to the end of the model number.

Spring return	**E001**

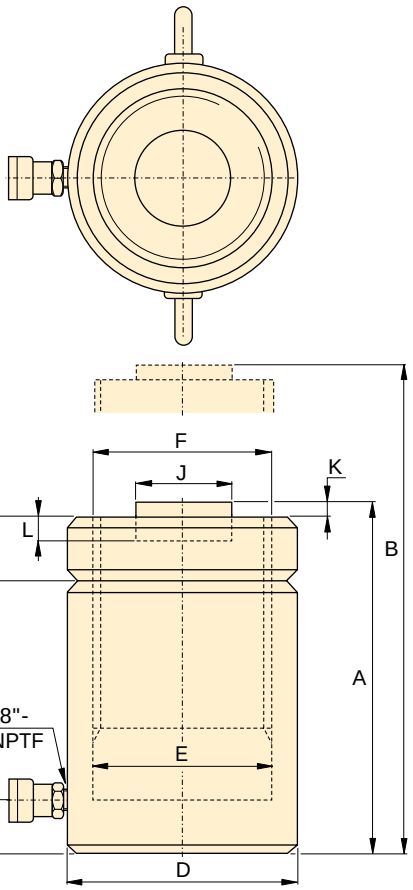
Example:

- For CLL-5006 cylinder with spring return, order: **CLL-5006E001**

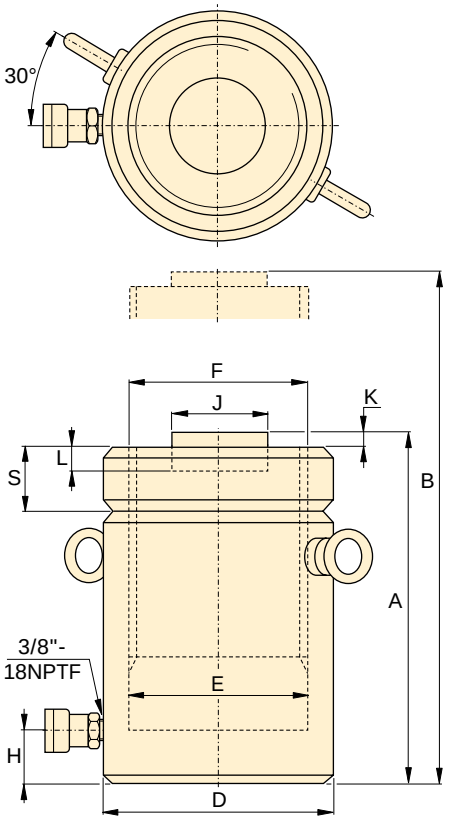
Technical specifications for these features are available from Enerpac.

CLL-Series, Lock Nut Cylinders

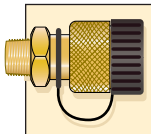
ENERPAC
Hydraulic Technology Worldwide



CLL-502 - CLL-25012



CLL-3002 - CLL-100012



Couplers Included!

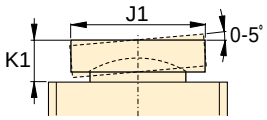
CR-400 couplers included on all models. Fit all HC-Series hoses.

◀ For full features see previous page.

Cylinder Capacity ton (kN)	Stroke (mm)	Model Number	Cylinder Effective Area (cm^2)	Oil Capacity (cm^3)
50 (496)	50	**CLL-502**	70,9	355
	100	**CLL-504**	70,9	709
	150	**CLL-506**	70,9	1064
	200	**CLL-508**	70,9	1418
	250	**CLL-5010**	70,9	1773
	300	**CLL-5012**	70,9	2127
100 (929)	50	**CLL-1002**	132,7	664
	100	**CLL-1004**	132,7	1327
	150	**CLL-1006**	132,7	1991
	200	**CLL-1008**	132,7	2654
	250	**CLL-10010**	132,7	3318
	300	**CLL-10012**	132,7	3981
150 (1390)	50	**CLL-1502**	198,6	993
	100	**CLL-1504**	198,6	1986
	150	**CLL-1506**	198,6	2979
	200	**CLL-1508**	198,6	3972
	250	**CLL-15010**	198,6	4965
	300	**CLL-15012**	198,6	5958
200 (1859)	50	**CLL-2002**	265,6	1330
	150	**CLL-2006**	265,6	3989
	300	**CLL-20012**	265,6	7995
250 (2562)	50	**CLL-2502**	366,1	1832
	150	**CLL-2506**	366,1	5496
	300	**CLL-25012**	366,1	10995
300 (3193)	50	**CLL-3002**	456,2	2281
	150	**CLL-3006**	456,2	6843
	300	**CLL-30012**	456,2	13740
400 (3919)	50	**CLL-4002**	559,9	2800
	150	**CLL-4006**	559,9	8399
	300	**CLL-40012**	559,9	16800
500 (5118)	50	**CLL-5002**	731,1	3653
	150	**CLL-5006**	731,1	10959
	300	**CLL-50012**	731,1	21930
600 (5983)	50	**CLL-6002**	854,8	4277
	150	**CLL-6006**	854,8	12830
	300	**CLL-60012**	854,8	25650
800 (8238)	50	**CLL-8002**	1176,9	5882
	150	**CLL-8006**	1176,9	17645
	300	**CLL-80012**	1176,9	35370
1000 (10260)	50	**CLL-10002**	1466,4	7329
	150	**CLL-10006**	1466,4	21986
	300	**CLL-100012**	1466,4	43980

Single-Acting, Lock Nut Cylinders

Optional Tilt Saddle *



Capacity:
50-1000 ton

Stroke:
50 - 300 mm

Maximum Operating Pressure:
700 bar

CLL Series

Coll. Height A (mm)	Ext. Height B (mm)	Outs. Dia. D (mm)	Cyl. Bore Dia. E (mm)	Plunger Dia. (threaded) F (mm)	Base to Adv. Port H (mm)	Standard Saddle Dia. J (mm)	Saddle Protr. from Plgr. K (mm)	Depth of Plunger Hole L (mm)	Lock-nut Height S (mm)	(kg)	Model Number	* Optional Tilt Saddle		
												Saddle Dia. J1 (mm)	Saddle Height K1 (mm)	Saddle Model Number
164	214	125	95,0	Tr 95 x 4	30	71	2	13	36	15	**CLL-502**	71	24	**CAT-100**
214	314	125	95,0	Tr 95 x 4	30	71	2	13	36	20	**CLL-504**	71	24	**CAT-100**
264	414	125	95,0	Tr 95 x 4	30	71	2	13	36	25	**CLL-506**	71	24	**CAT-100**
314	514	125	95,0	Tr 95 x 4	30	71	2	13	36	30	**CLL-508**	71	24	**CAT-100**
364	614	125	95,0	Tr 95 x 4	30	71	2	13	36	35	**CLL-5010**	71	24	**CAT-100**
414	714	125	95,0	Tr 95 x 4	30	71	2	13	36	40	**CLL-5012**	71	24	**CAT-100**
187	237	165	130,0	Tr 130 x 6	30	71	2	13	44	30	**CLL-1002**	71	24	**CAT-100**
237	337	165	130,0	Tr 130 x 6	30	71	2	13	44	39	**CLL-1004**	71	24	**CAT-100**
287	437	165	130,0	Tr 130 x 6	30	71	2	13	44	48	**CLL-1006**	71	24	**CAT-100**
337	537	165	130,0	Tr 130 x 6	30	71	2	13	44	56	**CLL-1008**	71	24	**CAT-100**
387	637	165	130,0	Tr 130 x 6	30	71	2	13	44	64	**CLL-10010**	71	24	**CAT-100**
437	737	165	130,0	Tr 130 x 6	30	71	2	13	44	73	**CLL-10012**	71	24	**CAT-100**
209	259	205	159,0	Tr 159 x 6	39	130	2	25	44	53	**CLL-1502**	130	20	**CAT-200**
259	359	205	159,0	Tr 159 x 6	39	130	2	25	44	66	**CLL-1504**	130	20	**CAT-200**
309	459	205	159,0	Tr 159 x 6	39	130	2	25	44	78	**CLL-1506**	130	20	**CAT-200**
359	559	205	159,0	Tr 159 x 6	39	130	2	25	44	92	**CLL-1508**	130	20	**CAT-200**
409	659	205	159,0	Tr 159 x 6	39	130	2	25	44	104	**CLL-15010**	130	20	**CAT-200**
459	759	205	159,0	Tr 159 x 6	39	130	2	25	44	117	**CLL-15012**	130	20	**CAT-200**
243	293	235	184,0	Tr 184 x 6	50	130	2	25	50	83	**CLL-2002**	130	20	**CAT-200**
343	493	235	184,0	Tr 184 x 6	50	130	2	25	50	117	**CLL-2006**	130	20	**CAT-200**
493	793	235	184,0	Tr 184 x 6	50	130	2	25	50	170	**CLL-20012**	130	20	**CAT-200**
249	299	275	216,0	Tr 216 x 6	50	150	2	25	56	116	**CLL-2502**	150	21	**CAT-250**
349	499	275	216,0	Tr 216 x 6	50	150	2	25	56	162	**CLL-2506**	150	21	**CAT-250**
499	799	275	216,0	Tr 216 x 6	50	150	2	25	56	234	**CLL-25012**	150	21	**CAT-250**
295	345	310	241,0	Tr 241 x 6	59	139	5	25	60	173	**CLL-3002**	195	75	**CAT-300**
395	545	310	241,0	Tr 241 x 6	59	139	5	25	60	233	**CLL-3006**	195	75	**CAT-300**
545	845	310	241,0	Tr 241 x 6	59	139	5	25	60	323	**CLL-30012**	195	75	**CAT-300**
335	385	350	267,0	Tr 266 x 6	70	159	5	25	70	250	**CLL-4002**	225	85	**CAT-400**
435	585	350	267,0	Tr 266 x 6	70	159	5	25	70	327	**CLL-4006**	225	85	**CAT-400**
585	885	350	267,0	Tr 266 x 6	70	159	5	25	70	441	**CLL-40012**	225	85	**CAT-400**
375	425	400	305,0	Tr 305 x 6	80	179	5	25	80	367	**CLL-5002**	250	91	**CAT-500**
475	625	400	305,0	Tr 305 x 6	80	179	5	25	80	466	**CLL-5006**	250	91	**CAT-500**
625	925	400	305,0	Tr 305 x 6	80	179	5	25	80	617	**CLL-50012**	250	91	**CAT-500**
395	445	430	330,0	Tr 330 x 6	85	194	5	25	85	446	**CLL-6002**	275	96	**CAT-600**
495	645	430	330,0	Tr 330 x 6	85	194	5	25	85	562	**CLL-6006**	275	96	**CAT-600**
645	945	430	330,0	Tr 330 x 6	85	194	5	25	85	737	**CLL-60012**	275	96	**CAT-600**
455	505	505	387,0	Tr 387 x 6	100	224	5	25	100	709	**CLL-8002**	320	123	**CAT-800**
555	705	505	387,0	Tr 387 x 6	100	224	5	25	100	870	**CLL-8006**	320	123	**CAT-800**
705	1005	505	387,0	Tr 387 x 6	100	224	5	25	100	1110	**CLL-80012**	320	123	**CAT-800**
495	545	560	432,0	Tr 432 x 6	110	249	5	25	110	949	**CLL-10002**	360	136	**CAT-1000**
595	745	560	432,0	Tr 432 x 6	110	249	5	25	110	1141	**CLL-10006**	360	136	**CAT-1000**
745	1045	560	432,0	Tr 432 x 6	110	249	5	25	110	1430	**CLL-100012**	360	136	**CAT-1000**

▼ **Typical layout for a 4 points synchronous lifting system.**

Controlled Hydraulic Movement

- **4 to 64 points, load and stroke monitored and controlled**
- **Capacities from 10 up to 1000 ton per lifting point**
- **Up to 1 mm accuracy over full plunger stroke**
- **PLC-control unit with user-friendly touch screen**
- **Automatic data storage and read-out for reporting and graphical representation**
- **System secured with warning and stop features to achieve optimal safety.**

System Options:

- **Load and force measurement**
- **Load cells for precise force measurement up to 0,1% of full scale**
- **Digital stroke sensors for:**
  - **up to 0,1 mm accuracy over full stroke**
  - **up to max. 1 km distance between control unit and lifting points**
- **Two-axis tilting control to level structures**
- **Oil heater or heat exchanger for extreme conditions.**

Typical Synchronous Lifting Applications

- Bridge lifting and repositioning
- Bridge launching
- Lifting and lowering of heavy equipment
- Leveling of existing structures and buildings
- Structural testing
- Lifting and weighing of oil platforms
- Tunnel jacking and pushing.

See **www.enerpac.com** for more application information.

Heavy Lifting Cylinders

For a complete line of double-acting cylinders see the Enerpac Cylinder Overview.

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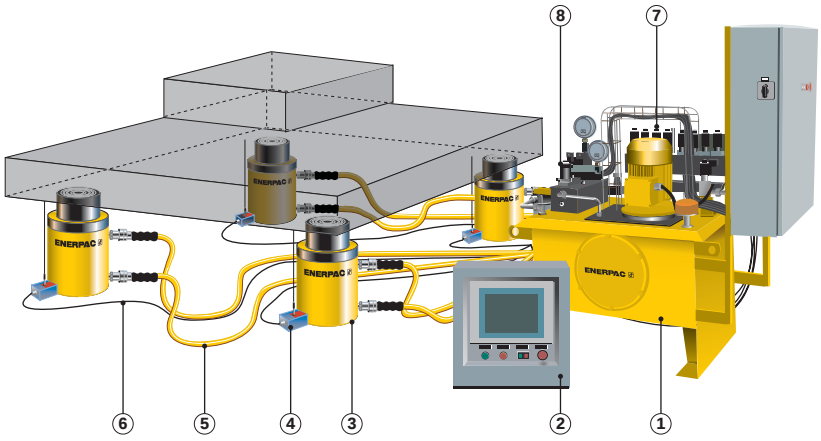
▼ *One of the world's first and largest lifting jobs for maintenance of a 3500 ton mining dragline was successfully done with an Enerpac synchronous hydraulic system: exact aligning of bearings on the rail on which this dragline rotates.*

Multiple Points Synchronous Lift System

Typical layout for a 4 points synchronous lifting system.



①	Hydraulic pump	⑤	Hydraulic hoses
②	PLC-control with touch screen	⑥	Sensor cables
③	Hydraulic cylinders	⑦	Solenoid control valves
④	Stroke sensors	⑧	Pressure transducer

SLS Series

Capacity Per Lifting Point:
10 - 1000 ton

Maximum Stroke:
5000 mm

Accuracy Over Full Stroke:
Up to 0,1 mm

Maximum Operating Pressure:
700 bar

◀ *Bridge lifting and launching system. The load is balanced on groups of CLL-Series lock nut cylinders. The hydraulic lifting, launching and balancing movements are synchronized with PLC-control.*

Contact Enerpac!

Contact your distributor or the Enerpac office nearest to you for advice and technical assistance in the layout of your ideal Lift System. You can also ask Enerpac for assistance by e-mail at **info@enerpac.com**.

▼ *Enerpac synchronous lifting system with PLC-control unit used to lift temporary support towers during launching of the Millau Viaduct in France.*

Basic & Premium System Management & Control Features

X = Standard, O = Optional

Features	Basic	Premium
Analog stroke sensors	X	X
Digital stroke sensors	–	O
Stroke controlled movement	X	X
Load controlled movement	–	X
Max. accuracy (depends on components)	± 1,0 mm	± 0,1 mm
Recording capabilities	–	X
Graphical representation	–	O
Intercommunication capabilities	–	O
Sensor cables	X	X

Alarms	Basic	Premium
Stroke limitation	X	X
Load limitation	–	X
Low oil level	–	X
Oil filter warning	–	X
Oil temperature warning	–	X

▼ 250 ton Double-Acting Aluminium Stage-Lift Cylinder (with optional stroke sensor)

Solution For Longer Distances

- **Allows heavy duty lifting over long distances**
- **PLC-controlled synchronized stage-lifting**
- **Double-acting jacks with solid plunger design using Enerpac RAR, RR and CLRG-Series**
- **Double-acting jacks with hollow plunger design using Enerpac RRH-Series**
- **Lifting capacities from 10 to 1000 ton per lift point**

Stage-Lift Systems

Stage-Lift Systems overcome the usual limitation of lift height imposed by the cylinder's plunger stroke length. Large objects can be lifted, held and lowered for maintenance where other lifting methods are impractical.

Typical Stage-Lift Applications

- Tank jacking and lowering
- Lifting of buildings and structures
- Synchronized jacking
- Ship lifts

See **www.enerpac.com** for more application information.

Synchronous Systems

When lifting an unbalanced load Enerpac PLC-controlled Synchronous Systems can be the solution with multiple lift point capabilities from 4 to 64 points.

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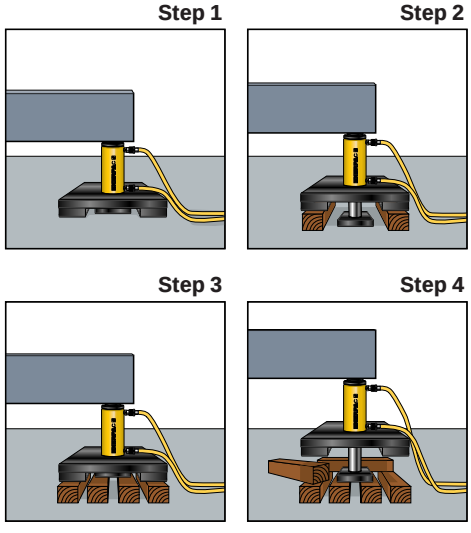
▼ *PLC-controlled hydraulic movement: Enerpac stage -ift systems lift and lower the umbrella deck on the world's largest concrete block builder with 0,01 mm accuracy, provided by 30 hydraulic climbing units in an integrated hydraulic system.*

▼ *Each climbing unit consists of two 70 tons double-acting cylinders and two 20 tons locking cylinders.*

Double-Acting, Stage-Lift Systems

▼ *This 55 meters long absorber was hydraulically lifted and lowered prior to transportation by ship. The Enerpac PLC-controlled stage-lift system was the ideal solution because the use of cranes was not possible.*

▼ *Horizontal stage-lift system: These long stroke RR-Series cylinders are attached to a sliding and guiding system, pulling the arched roof assembly of Athens Olympic Stadium step by step into the final position.*



Stage-Lifting Sequence

Step 1: The Stage-Lift cylinder is placed on a solid support under the load (retracted plunger).

Step 2: Plunger extends, lifting the load and giving clearance to insert two outer cribbing blocks under the spreading plate.

Step 3: Plunger retracts, giving clearance to position the central cribbing blocks which will support the plunger plate for the next extension.

Step 4: Plunger extends, lifting the load and giving clearance to insert two new cribbings blocks, placed crosswise under the spreading plate.

BLS SL Series

Capacity Per Lift Point:
10 - 1000 ton

Stroke Per Stage:
50-1219 mm

Maximum Operating Pressure:
700 bar

Contact Enerpac!

Contact your distributor or the Enerpac office nearest to you for advice and technical assistance in the layout of your ideal Lift System. You can also ask Enerpac for assistance by e-mail at **info@enerpac.com**.

max 80%

To avoid overload situations, cylinders should be used within 80% of their maximum capacity.

Remote Lifting

For heavy lifting in remote locations use the Enerpac ZE-series electric pump.

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Split Flow Pumps

Multi-cylinder arrangements can be powered and fully synchronised by Enerpac split-flow pumps.

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Hoses

Enerpac offers a complete line of high-quality hydraulic hoses. To ensure the integrity of your system, specify only Enerpac hydraulic hoses.

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▼ 4 Points SyncHoist System positioning a steel roof segment

Turns Lifting with Crane into High Accuracy Hoisting and Load Positioning

- **High precision load manoeuvering, vertically and horizontally – using one crane**
- **Eliminates the risk of damage from oscillations of wire rope due to sudden crane starts/stops**
- **Vastly improving operating speed and worker safety**
- **Weather conditions play less critical role**
- **Intelligent hydraulics turn lifting into high accuracy hoisting and load positioning system**
- **High accuracy (+/- 1,0 mm)**
- **700 bar double-acting push/pull cylinders with parachute valves for added safety in case of hose rupture or coupler damage**
- **Cost reduction when compared to conventional load positioning methods.**

Three options for system management & control:

- **Manual control: stroke control and system warning functions**
- **Extended manual control: stroke control, load and stroke display and system warning functions**
- **PLC-control: fully monitorized system with programmable functions using touch screen and wireless remote control and system warning functions.**

◀ *The designs of Santiago Calatrava (architect) often require creative technological solutions. Enerpac SyncHoist System is one of them and was used for roof positioning of the Palace of the Arts in Valencia (Spain). Segments are hoisted from the ground, being positioned with four fully monitorized cylinders.*

Typical SyncHoist Functions and Applications

Functions

- High precision load positioning
- Pre-programmed positioning, tilting and aligning
- Counterweighing – determining centre of gravity

Applications

- Positioning of roof sections, concrete elements, steel structures
- Positioning of turbines, transformers, fuel rods
- Precise machinery loading, mill rod changes, bearing changes
- Precise positioning of pipe lines, blow out valves
- Positioning and aligning of ship segments prior to assembly.

Lifting an Unbalanced Load

Visit **www.enerpac.com** to learn more about SyncHoist. Download the animation to see how it works step-by-step.

SyncHoist - High Precision Load Positioning

Enerpac synchoist systems

System Load Capacity	**240 ton**	**320 ton**	**440 ton**
Max. handing load [1]	4x60 ton	4x80 ton	4x110 ton
Number of lifting points [2]	4	4	4
System reach	1500 mm	1500 mm	1500 mm
Cylinder configuration			
Push force @ 90 bar	10,5 ton	14,0 ton	22,0 ton
Pull force @ 700 bar	60,0 ton	80,0 ton	110,0 ton
Plunger stroke [2]	1500 mm	1500 mm	1500 mm
Pump single-stage			
Oil flow at 700 bar	4,0 l/min	4,0 l/min	4,0 l/min
Control options & system management [3]			
Manual	option	option	option
Extended manual	option	option	option
PLC-control [4]	option	option	option

[1] Subject to angle and position of lifting cylinders.
[2] Each cylinder equiped with parachute valve for added safety in event of hose/coupler damage.
Note: Enerpac SyncHoist have standard 4 lifting points. In the event that more or less lifting points are required, contact your local Enerpac representative.
[3] See chart below for detailed control features.
[4] Required for counterweighing (centre of gravity).

SHS Series

Capacity Per Lifting Point:
60 - 110 ton

Maximum Stroke:
1500 mm

Accuracy Over Full Stroke:
+/- 1,0 mm

Maximum Operating Pressure:
700 bar

Three options for system management and control
Contact Enerpac for the following options.

1. Manual control
- **Plunger stroke control**
- **System warnings for:**
  – oil level, filter indication, thermal motor protection.

2. Extended manual control
- **Plunger stroke control**
- **Load & stroke display**
- **System warnings for:**
  – maximum cylinder load control setting
  – oil level, filter indication, thermal motor protection.

3. PLC-control
- **Touch screen**
- **Remote wireless radio control**
- **Load and stroke monitoring**
- **Load calculations (centre of gravity)**
- **Pre-programmable motions and data recording**
- **System warnings for:**
  – maximum cylinder load control setting
  – stroke and position control
  – oil level, filter indication, thermal motor protection.

▼ *Roof lifting of the Auditorium at Tenerife at the Canary Island – Spain. A 4-points Enerpac hydraulic SyncHoist system is used for accurate roof positioning.*

Aluminium and Steel Jacks

ENERPAC
Hydraulic Technology Worldwide

▼ Shown from left to right: **JHA-73, JH-506**

JH/JHA Series

Capacity:
7-150 ton

Stroke:
76 -155 mm

Maximum Operating Pressure:
700 bar

- **Internal relief valve to prevent overloading**
- **Machined flat front and bottom surfaces permit flush alignment in tight corners**
- **Chrome plated plungers**
- **Pumping handle included**
- **All-directional operation on 7, 15 and 35 ton JHA-series**
- **Automatic by-pass port to prevent over-extension (JH-series)**

Lifting Wedge and Machine Lifts

Ideal to lift the load the first few centimeters. The **LW-16** Lifting Wedge requires a very small access gap of only 10 mm.

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Load Skates

For moving heavy loads easily and safely.

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Style	Jack Capacity ton (kN)	Stroke (mm)	Model Number	Jack Effective Area (cm^2)	Collapsed Height (mm)	Extended Height (mm)	Bottom Plate Dimensions (W x L) (mm)	Plunger Diameter (mm)	Pump Speed	(kg)
Conventional Jacks	**7** (62)	76	**JHA-73**	9,6	133	209	73 x 158	30,2	Single	5,0
	15 (133)	153	**JHA-156**	20,3	247	401	92 x 238	41,4	Single	13,2
	35 (311)	155	**JHA-356**	45,6	257	412	117 x 254	54,1	Single	18,1
	75 (667)	153	**JHA-756**	102,6	285	439	174 x 325	114,3	Single	42,6
	150 (1335)	155	**JHA-1506**	197,9	327	482	241 x 407	158,8	2-Speed	95,3
Steel Jacks	**30** (267)	155	**JH-306**	38,3	254	409	95 x 242	69,9	Single	26,8
	50 (445)	154	**JH-506**	62,1	260	414	127 x 258	88,9	2-Speed	40,8
	100 (890)	153	**JH-1006**	133,1	287	440	181 x 328	130,1	2-Speed	74,4

Steel Bottle Jacks

▼ Shown from left to right: **EBJ-4GC, EBJ-50GC, EBJL-15GC, EBJ-12GC**

EBJ Series

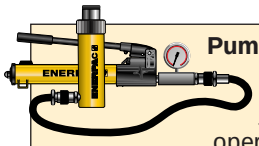
Capacity:
1,4-90,7 ton

Stroke:
77-508 mm

Maximum Operating Pressure:
700 bar

Screw Feature
Heat treated, adjustable extension screw with cleated saddle on selected EBJ models helps adjusting and prevents slipping.

- **Low handle effort reduces operator fatigue**
- **Fully serviceable**
- **Cast pump linkage and beam**
- **Pumping handle included on all models**
- **Safety relief valve to prevent overload**
- **Automatic bypass port to prevent over-extension**
- **Wiper seal for extended life**
- **Chrome plating on both plungers**



Pump and Cylinder Sets
As an alternative to jacks where the operator is required to stand remote from the jacking point, see our range of pump-cylinder sets.

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Jack Capacity ton (kN)	Stroke (mm)	Model Number	Additional Screw Extension (mm)	Collapsed Height (mm)	Extended Height (mm)	Bottom Plate Dimensions W x L (mm)	Plunger diameter (mm)	Pump Speed	(kg)
1,4 (13)	457	**EBJL-15GC**	-	552	1009	92 x 127	22,3	Single speed	5,8
1,8 (18)	95	**EBJ-2GC**	70	175	340	96 x 102	22,1	Single speed	3,0
2,7 (27)	508	**EBJL-3GC**	-	668	1176	108 x 140	28,4	Single speed	10,0
3,6 (36)	120	**EBJ-4GC**	70	195	385	105 x 112	28,2	Single speed	4,2
5,4 (53)	130	**EBJ-6GC**	80	210	420	114 x 120	34,0	Single speed	5,5
7,3 (71)	140	**EBJ-8GC**	80	220	440	119 x 125	38,1	Single speed	6,2
10,9 (107)	155	**EBJ-12GC**	80	240	475	130 x 135	43,2	Single speed	8,0
10,9 (107)	77	**EBJS-12GC**	43	155	275	130 x 135	43,2	Single speed	6,6
13,6 (133)	150	**EBJ-15GC**	80	240	470	138 x 145	48,0	Single speed	9,4
18,1 (178)	155	**EBJ-20GC**	80	250	485	145 x 155	53,0	Single speed	11,4
18,1 (178)	79	**EBJS-20GC**	41	165	285	145 x 155	53,0	Single speed	9,0
27,2 (267)	175	**EBJ-30GC**	-	285	460	150 x 190	71,1	Single speed	25,8
45,4 (445)	105	**EBJ-50GC**	-	240	345	190 x 255	85,1	Two speed	42,0
90,7 (890)	150	**EBJ-100GC**	-	310	460	240 x 300	124,2	Two speed	90,2

All EBJ-Series Jacks meet or exceed: ANSI, PALD, CE, prEN 1494: 1994 standards.

▼ From left to right: **P-142ALSS, P-392ALSS, V-152NV, V-66NV, RC-256NV, RC-106NV, RC-53NV**

Solutions for maximum corrosion resistance in extreme environments

Cylinders

- **Nickel-plated steel**
- **Viton® seals provide heat and chemical resistance**
- **Single-acting, spring return**
- **Collar thread, plunger thread and base mounting holes**
- **Plunger wiper reduces contamination, extends cylinder life**

Hand Pumps

- **Viton® seals provide heat and chemical resistance**
- **Anodized aluminium pump reservoirs and plastic encapsulated pump bodies**
- **Stainless steel pump pistons and inserts will not corrode or rust**
- **Second handle on P-142ALSS for two hand use**
- **Internal pressure relief valve for overload protection**
- **Handles lock for easy carrying**

Pressure Relief and Check Valve

- **Nickel-plated steel**
- **Viton® seals provide heat and chemical resistance**
- **Check valve V-66NV for load holding**
- **Pressure relief valve V-152NV limits pressure in hydraulic circuit**

Applications

For use in wet environments such as food processing, pulp and paper, mining, construction and applications in high temperature or in welding areas.

Aluminium Cylinders

If you need a higher cylinder capacity-to-weight-ratio the lightweight **RAC-Series** are the perfect choice.

Page: 14

Hoses

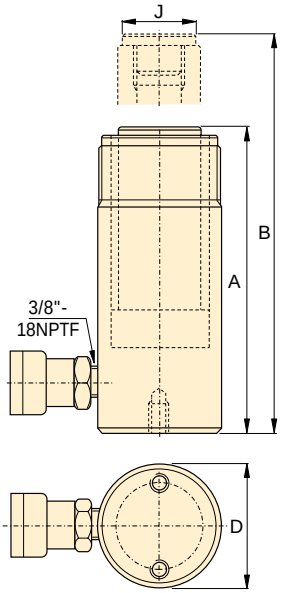
Enerpac offers a complete line of high quality hydraulic hoses. To ensure the integrity of your system, specify only Enerpac hydraulic hoses.

Page: 122

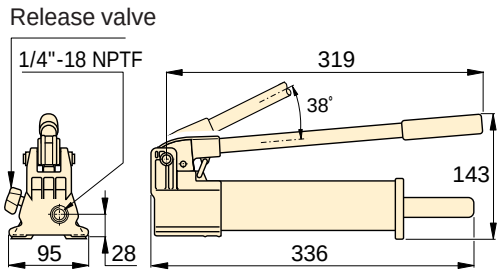
Stainless Steel Gauge

Minimize the risk of overloading and ensure long, dependable service from your equipment. The alloy steel gauge **T6003L** is the perfect choice.

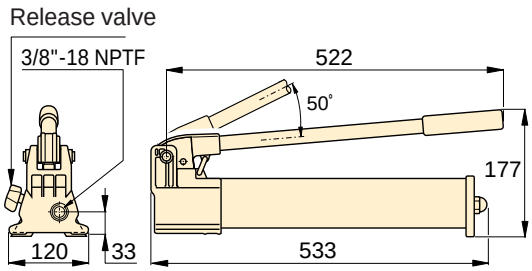
Page: 132



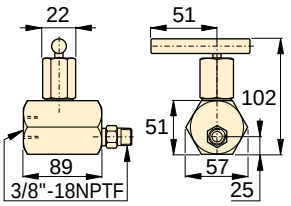
RC-Series



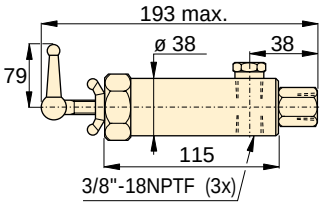
P-142ALSS



P-392ALSS



V-66NV



V-152NV

RC P V Series

Cylinder Capacity:
5 - 25 ton

Stroke:
54 - 158 mm

Maximum Operating Pressure:
700 bar

Multifluid Hand Pumps

MP-Series corrosion resistant hand pumps for low pressure filling and high pressure testing applications, suitable for a wide range of fluids.

Page: 74

Single-Acting Cylinders

Cylinder Capacity at 700 bar ton (kN)	Stroke (mm)	Model Number [1]	Cylinder Effective Area (cm^2)	Oil Capacity (cm^3)	Collapsed Height A (mm)	Extended Height B (mm)	Outside Diameter D (mm)	Saddle Diameter J (mm)	(kg)
5 (45)	76	**RC-53NV**	6,5	50	165	241	38	25	1,5
10 (101)	54	**RC-102NV**	14,5	78	121	175	57	57	2,3
	156	**RC-106NV**	14,5	226	247	403	57	57	4,4
25 (232)	158	**RC-256NV**	33,2	525	273	431	85	85	10,0

[1] For more dimensional information see page 10.

Two-Speed Hand Pumps

Pump Type	Usable Oil Capacity (cm^3)	Model Number [1]	Pressure Rating (bar) 1st stage	Pressure Rating (bar) 2st stage	Oil Displacement per stroke (cm3) 1st stage	Oil Displacement per stroke (cm3) 2st stage	Max. Handle Effort (kg)	Piston Stroke (mm)	(kg)
Two Speed	327	**P-142ALSS**	13	700	3,62	0,90	35,4	12,7	2,1
	901	**P-392ALSS**	13	700	11,26	2,47	42,2	25,4	4,1

[1] For more hand pump information see page 68.

Manual Valves

Valve Type	Model Number [1]	Valve Function	(kg)
Manual Check Valve	**V-66NV**	Load holding with cylinders	1,8
Pressure Relief Valve	**V-152NV**	Limits pressure in system, adjustment range 55 - 700 bar	1,6

[1] For more information see page 140.

▼ Shown cylinder-pump set: **SCR-1010H**

The Quickest and Easiest Way to Start Working Right Away

- **Optimum match of individual components**
- **All sets are ready-for-use**
- **Sets include 1,8 m safety hose and gauge with gauge adaptor**
- **All hand pumps are two-speed**

Speed Chart
See the Enerpac Cylinder Speed Chart in our 'Yellow Pages' section.
Page: **119**

1 Cylinder Selection
(See Cylinder Section of this catalog for full product descriptions)

	Set Capacity ton (kN)	Cylinder Model Number	Stroke (mm)	Collapsed Height (mm)
 **Single-Acting, General Purpose Cylinders:** For maximum versatility. **RC-Series** *Page:* **8**	**5** (45)	RC-55	127	215
	10 (101)	RC-102	54	121
		RC-106	156	247
		RC-1010	257	349
	15 (142)	RC-154	101	200
		RC-156	152	271
	25 (232)	RC-252	50	165
		RC-254	102	215
		RC-256	158	273
		RC-2514	362	476
	50 (498)	RC-506	159	282
 **Single-Acting, Low Height Cylinders:** Ideal where space is restricted. **RCS-Series** *Page:* **24**	**10** (101)	RCS-101	38	88
	20 (201)	RCS-201	45	98
	30 (295)	RCS-302	62	117
	45 (435)	RCS-502	60	122
	90 (887)	RCS-1002	57	141
 **Single-Acting, Hollow Cylinders:** For pushing and pulling applications. **RCH-Series** *Page:* **28**	**13** (125)	RCH-121	42	120
	20 (215)	RCH-202	49	162
	30 (326)	RCH-302	64	178
	60 (576)	RCH-603	76	247
	95 (933)	RCH-1003	76	254
 **Pull Cylinders:** For use with subassemblies and modules. **BRP-Series** *Page:* **26**	**10** (105)	BRP-106C	151	587
		BRP-106L	151	541
	30 (326)	-	-	-
		BRP-306	155	1085
	50 (505)	BRP-606	152	719

Single-Acting Cylinder-Pump Sets

SET SELECTION:

1. **Select the cylinder**
2. **Select the pump**
3. **Find the set model number in the blue matrix**

SELECTION EXAMPLE

Selected cylinder:
- RC-106, Single-Acting cylinder with 156 mm stroke

Selected pump:
- P-392, Lightweight hand pump

Set model number:
- SCR-106H

Included:
- HC-7206 hose
- GF-10B gauge
- GA-2 adaptor

SC Series

Capacity:
5 - 95 ton

Stroke:
38 - 362 mm

Maximum Operating Pressure:
700 bar

2 Pump selection [1]					Accessories included		
Hand Pump P-142	Hand Pump P-392	Hand Pump P-80	Foot Pump P-392FP	Turbo Air Pump PATG-1102N	Hose Model Number	Gauge Model Number	Gauge Adaptor Model Nr.
							
SCR-55H	–	–	–	–	HC-7206	GP-10S	GA-4
–	**SCR-102H**	–	**SCR-102FP**	**SCR-102A**	HC-7206	GF-10B	GA-2
–	**SCR-106H**	–	**SCR-106FP**	**SCR-106A**	HC-7206	GF-10B	GA-2
–	**SCR-1010H**	–	**SCR-1010FP**	**SCR-1010A**	HC-7206	GF-10B	GA-2
–	**SCR-154H**	–	**SCR-154FP**	**SCR-154A**	HC-7206	GP-10S	GA-2
–	**SCR-156H**	–	**SCR-156FP**	**SCR-156A**	HC-7206	GP-10S	GA-2
–	**SCR-252H**	–	**SCR-252FP**	**SCR-252A**	HC-7206	GF-20B	GA-2
–	**SCR-254H**	–	**SCR-254FP**	**SCR-254A**	HC-7206	GF-20B	GA-2
–	**SCR-256H**	–	**SCR-256FP**	**SCR-256A**	HC-7206	GF-20B	GA-2
–	–	**SCR-2514H**	–	**SCR-2514A**	HC-7206	GF-20B	GA-2
–	–	**SCR-506H**	–	**SCR-506A**	HC-7206	GF-50B	GA-2
–	**SCL-101H**	–	**SCL-101FP**	**SCL-101A**	HC-7206	GF-10B	GA-2
–	**SCL-201H**	–	**SCL-201FP**	**SCL-201A**	HC-7206	GF-230B	GA-2
–	**SCL-302H**	–	**SCL-302FP**	**SCL-302A**	HC-7206	GF-230B	GA-2
–	**SCL-502H**	–	**SCL-502FP**	**SCL-502A**	HC-7206	GF-510B	GA-2
–	–	**SCL-1002H**	–	–	HC-7206	GF-510B	GA-2
SCH-121H	–	–	–	–	HB-7206	GF-120B	GA-4
–	**SCH-202H**	–	**SCH-202FP**	**SCH-202A**	HC-7206	GF-813B	GA-3
–	**SCH-302H**	–	**SCH-302FP**	**SCH-302A**	HC-7206	GF-813B	GA-3
–	–	**SCH-603H**	–	**SCH-603A**	HC-7206	GF-813B	GA-3
–	–	**SCH-1003H**	–	–	HC-7206	GP-10S	GA-2
–	**SCP-106CH**	–	**SCP-106CFP**	–	HC-7206	GP-10S	GA-2
–	**SCP-106LH**	–	**SCP-106LFP**	–	HC-7206	GP-10S	GA-2
–	–	–	–	–	–	–	–
–	–	**SCP-306H**	–	–	HC-7206	GP-10S	GA-2
–	–	**SCP-606H**	–	–	HC-7206	GP-10S	GA-2

[1] See the Pump Section in this catalog for full product descriptions.

Enerpac Hydraulic Pumps

ENERPAC Hydraulic Technology Worldwide

ENERPAC hydraulic pumps are available in over 1000 different configurations. Whatever your high-pressure pump needs are... speed, control, intermittent or heavy duty cycle you will find an Enerpac pump suited to the application.

Featuring Hand, Electric, Air and Gasoline powered models, with multiple reservoir and valve configurations, Enerpac offers the most comprehensive pump line available.

Pump Selection
For help in selecting the correct pump for your application, please review our '**Yellow Pages**'.

If you require further assistance, contact the Enerpac office located near you.

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Torque Wrench Pumps
System matched air and electric pumps provide control to operate hydraulic torque wrenches.

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Hydraulic Pumps Section Overview

Power Source	Pump Types	Maximum Reservoir Capacity (litres)	Max. Flow at Rated Pressure (l/min)	Max. Power Consumption	Series		Page
Manual	**Lightweight Hand Pumps** Exclusively from Enerpac	2,5	2,5 (cm^3/stroke)	–	P		68 ▶
	Steel Hand Pumps **Low Pressure Hand Pumps**	7,4 3,3	4,75 9,50 (cm^3/stroke)	–	P P		70 ▶ 72 ▶
	Multifluid Hand Pumps Pumping fluids up to 1000 bar	–	21,8 (cm^3/stroke)	–	MP		74 ▶
	Foot Pump For handsfree operation	0,5	2,47 (cm^3/stroke)	–	P		75 ▶
	Ultra-High Pressure Hand Pumps	1,0	2,49 (cm^3/stroke)	–	P/11		76 ▶
Electric	**Economy Series** Compact and Portable	3,8	0,32	0,37 (kW)	PU		78 ▶
	Submerged Series Powerful and Low-Noise	5,5	0,27	0,37 (kW)	PE		80 ▶
	Z-Class Pumps ZU4-Series Portable Pumps	40	1,0	1,25 (kW)	ZU4		84 ▶ 86 ▶
	Z-Class Pumps ZE3 to ZE6-Series Stationary Pumps	40	2,73	5,60 (kW)	ZE		84 ▶ 90 ▶
	8000 and 9000-Series High Flow / Split Flow Pumps	80	8,0	9,5 (kW)	PP		96 ▶
Air	**Turbo II Air Hydraulic Pumps** The New Air Pump Standard	5,0	0,16	340 (l/min)	PAMG PATG PARG		98 ▶
	Air Hydraulic Pumps Single and Twin-Air Motor	1,3 8,0	0,13 0,15	255 510 (l/min)	PA PAM		100 ▶ 101 ▶
	Z-Class Air Hydraulic Pumps Modular Design	40	1,31	2840 (l/min)	ZA4		102 ▶
Gaso-line	**Atlas Series** Your Gasoline Pump Solution	40	1,64	4,0 (kW)	PGM		106 ▶

P-Series, Lightweight Hand Pumps

ENERPAC Hydraulic Technology Worldwide

▼ Pumps shown, from top to bottom: **P-802, P-842, P-202, P-142**

- **Lightweight and compact design**
- **Durable glass-filled nylon reservoir and nylon encapsulated aluminium pump base for maximum corrosion resistance**
- **Two-speed operation reduces handle strokes by as much as 78% over single speed pumps**
- **Lower handle effort to minimize operator fatigue**
- **Integral 4-way valve on P-842 for operation of double-acting cylinders**
- **Handle lock and lightweight construction for easy carrying**
- **Large oil capacities to power a wide range of cylinders or tools**
- **Non-conductive fiberglass handle for operator safety**
- **Internal pressure relief valve for overload protection**

Exclusively from Enerpac

Cylinder Matching Chart

For help in selecting the correct hand pump for your application, please refer to the Cylinder Matching Chart located in the 'Yellow Pages'.

Page: **112**

Speed Chart

To determine how a specific pump will operate your cylinder, see the Pump-Cylinder Speed Chart in the 'Yellow Pages'.

Page: **119**

Tank Kits:

When a return-to-tank port is required, the Tank Kits provide a $^{7}/_{16}$"-20 port at the rear of the reservoir.

PC-20	Fits P-141, P-142
PC-25	Fits P-202, P-391, P-392

High Temperature and Corrosion Resistant Hand Pumps

The P-142 and P-392 hand pumps are available with Viton seals, stainless steel pistons and anodized aluminium reservoir for use in extreme environments.

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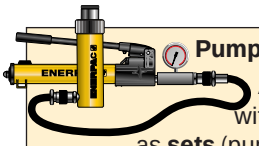
▼ *Cylinder-pump set SCR-254H used to support the construction while monitoring pressure and load with the gauge.*

Pump Type	Usable Oil Capacity (cm^3)	Model Number	Pressure Rating** (bar) 1st stage	Pressure Rating** (bar) 2nd stage	Oil Displacement per Stroke (cm^3) 1st stage	Oil Displacement per Stroke (cm^3) 2nd stage	Max. Handle Effort (kg)
Single-Speed	327	**P-141**	-	700	-	0,90	32,7
	901	**P-391**	-	700	-	2,47	38,6
Two-Speed	327	**P-142***	13	700	3,62	0,90	35,4
	901	**P-202**	13	700	3,62	0,90	28,6
	901	**P-392***	13	700	11,26	2,47	42,2
	2540	**P-802**	27	700	39,33	2,47	43,1
	2540	**P-842**	27	700	39,33	2,47	43,1

* Available as set, see note on next page.
** Contact Enerpac for applications where operating pressure is less than 10% of pressure rating.



Pump and Cylinder sets

All Pumps marked with an ∗ are available as **sets** (pump, cylinder, gauge, couplers and hose) for your ordering convenience.

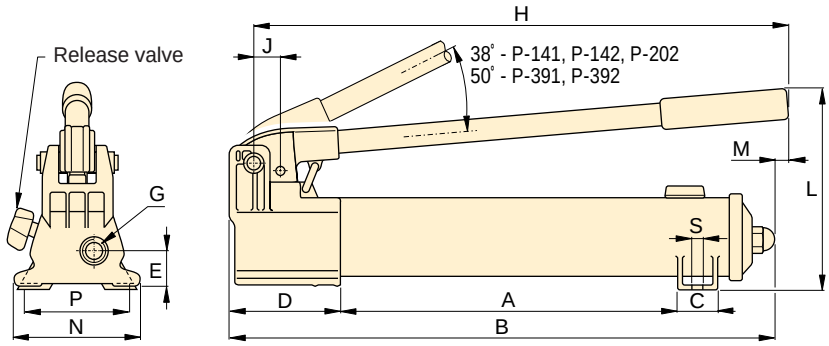
Page: 64

P Series

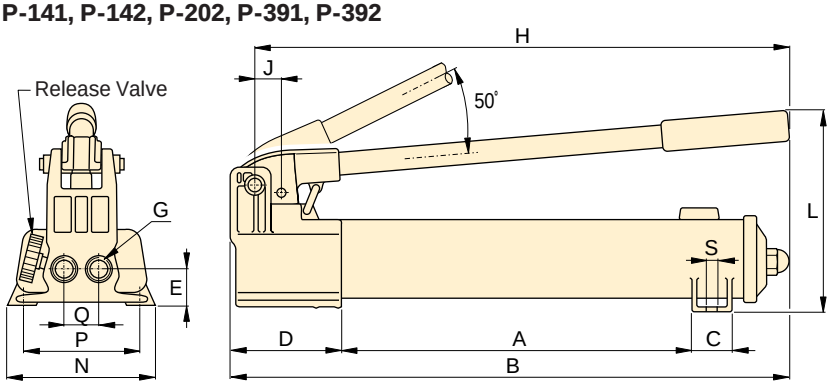
Reservoir Capacity:
327 - 2540 cm³

Flow at Rated Pressure:
0,90 - 2,47 cm³/stroke

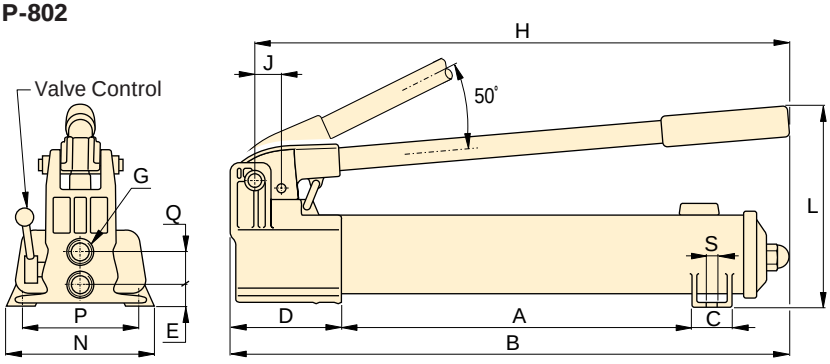
Operating Pressure:
700 bar



P-141, P-142, P-202, P-391, P-392



P-802



P-842

Hoses

Enerpac offers a complete line of high quality hydraulic hoses. To ensure the integrity of your system, specify only genuine Enerpac hydraulic hoses.

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Gauges

Minimize the risk of overloading and ensure long, dependable service from your equipment. Refer to the System Components section for a full range of gauges.

Page: 121

Foot Pump P-392FP

For handsfree operation the lightweight and robust **P-392FP** Foot Pump is the perfect choice.

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Piston Stroke	Dimensions (mm)															Model Number
(mm)	A	B	C	D	E	G	H	J	L	M	N	P	Q	S	(kg)	
12,7	185	336	28	85	28	1/4"-18 NPTF	319	19	143	–	95	80	–	7	2,4	**P-141**
25,4	344	533	36	99	33	3/8"-18 NPTF	522	30	177	16	120	–	–	–	4,1	**P-391**
12,7	185	336	28	85	28	1/4"-18 NPTF	319	19	143	–	95	80	–	7	2,4	**P-142***
12,7	344	509	36	85	28	1/4"-18 NPTF	400	19	144	16	95	–	–	–	3,4	**P-202**
25,4	344	533	36	99	33	3/8"-18 NPTF	522	30	177	16	120	–	–	–	4,1	**P-392***
25,4	337	552	45	133	35	3/8"-18 NPTF	527	55	228	–	181	120	35	10	8,2	**P-802**
25,4	337	552	45	133	20	3/8"-18 NPTF	527	55	228	–	181	120	36	10	10,0	**P-842**

P-Series, Steel Hand Pumps

ENERPAC
Hydraulic Technology Worldwide

▼ Shown from top to bottom: **P-462, P-84, P-801, P-77, P-80, P-39**

The Solution for Tough Jobs

- **Two-speed operation for reduced operator fatigue (except P-39)**
- **4-way valving on the P-84 and P-464 for operation of double-acting cylinders**
- **External load release valve on remaining models for single-acting cylinder operation**
- **Internal pressure relief valve for overload protection**
- **Large oil capacity to power a wide range of cylinders or tools**

Two Speed

Recommended for applications where cylinder plunger must advance rapidly to load contact, and applications where greater oil capacities are required, such as multiple cylinder hook-ups.

Foot Pump Conversion Kits

Convert your P-39 to foot power with the **PC-10** Kit. Includes instructions for easy conversion.

Gauges

Minimize the risk of over-loading and ensure long, dependable service from your equipment. Refer to the System Components section for a full range of gauges.

Page: **121**

4-Way Control Valve

P-84 and P-464 feature a manual 4-way control valve, designed for use with one double-acting or two single-acting cylinders. For system Set-up information:

Page: **114**

▼ *In the absence of a power supply, the P-80 Hand Pump offers a powerful solution.*

Pump Type	Usable Oil Capacity (cm^3)	Model Number	Pressure Rating** (bar) 1st stage	Pressure Rating** (bar) 2nd stage	Oil Displacement per Stroke (cm^3) 1st stage	Oil Displacement per Stroke (cm^3) 2nd stage	Max. Handle Effort (kg)
Single	655	**P-39**	-	700	-	2,62	50
Two-Speed	770	**P-77**	14	700	16,00	2,41	43
	2200	**P-80***	25	700	16,22	2,46	47
	4080	**P-801**	25	700	16,22	2,46	47
	2200	**P-84**	25	700	16,22	2,46	47
	7423	**P-462**	14	700	126,20	4,75	49
	7423	**P-464**	14	700	126,20	4,75	49

* Available as a set, see note on next page.
** Contact Enerpac for applications where operating pressure is less than 10% of pressure rating.

High Temperature and Corrosion Resistant Hand Pumps

Some hand pumps are available with Viton seals, stainless steel pistons and anodized aluminium reservoir for use in extreme environments.

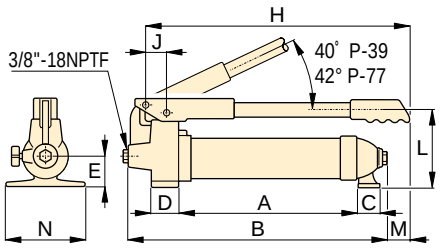
Page: 62

P Series

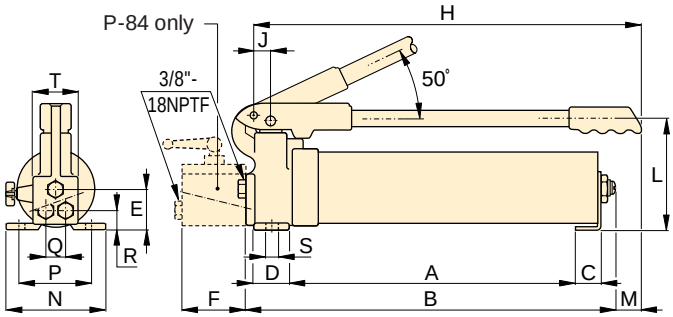
Reservoir Capacity:
655-7423 cm³

Flow at Rated Pressure:
2,46-4,75 cm³/stroke

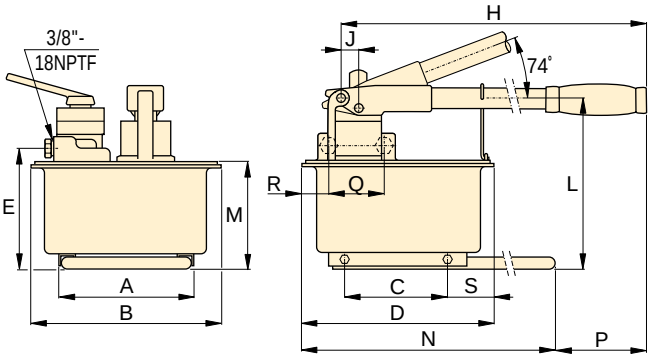
Maximum Operating Pressure:
700 bar



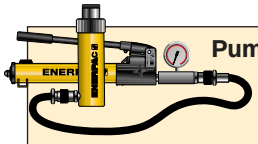
P-39, P-77



P-80, P-801, P-84



P-462, P-464



Pump and Cylinder sets

P-80 is also available as **set** (pump, cylinder, gauge, couplers and hose) for your ordering convenience.

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Speed Chart

To determine how a specific pump will operate your cylinder, see the Pump-Cylinder Speed Chart in the 'Yellow Pages'.

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Cylinder Matching Chart

For help in selecting the correct hand pump for your application, please refer to the Cylinder Matching Chart located in the 'Yellow Pages'.

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Piston Stroke	Dimensions (mm)																	Model Number
(mm)	A	B	C	D	E	F	H	J	L	M	N	P	Q	R	S	T	(kg)	
20,6	393	520	33	38	32	–	464	30	119	65	133	–	–	–	–	–	5,9	**P-39**
25,4	418	525	33	40	52	–	560	34	115	50	120	–	–	–	–	–	6,8	**P-77**
25,4	425	539	25	44	54	–	527	29	174	19	146	121	–	21	8	67	10,9	**P-80***
25,4	659	782	25	44	54	–	772	29	174	–	146	121	–	21	8	67	14,1	**P-801**
25,4	425	539	25	44	–	64	527	29	174	19	146	121	38	43	8	67	13,2	**P-84**
38,1	210	308	163	320	195	–	671	25	270	175	650	92	–	–	80	–	27,7	**P-462**
38,1	210	308	163	320	195	–	671	25	270	175	650	92	89	68	80	–	27,7	**P-464**

P-Series, Low Pressure Hand Pumps

ENERPAC
Hydraulic Technology Worldwide

▼ Shown from left to right: **P-51, P-25, P-18**

- **Bi-directional pumping on the P-25 and P-50 allows operation on both handle strokes**
- **External load-release valve**
- **Internal pressure-relief valve for overload protection**
- **P-51 can be operated in horizontal and vertical position with pump head and oil outlet facing downwards**
- **P-50 and P-51 pump oil in both forward and reverse handle movement improving overall efficiency, ideal when mounting space is restricted.**

Gauges

Minimize the risk of over-loading and ensure long, dependable service from your equipment. Refer to the System Components section for a full range of gauges.

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Foot Pump Conversion Kits

Convert your P-18 to foot power with the **PC-10** Kit. Includes instructions for easy conversion.

Foot Pump P-392FP

For handsfree operation the lightweight and robust **P-392FP** Foot Pump is the perfect choice.

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▼ *P-18 hand pump used for locking the rotating table for marble polishing.*

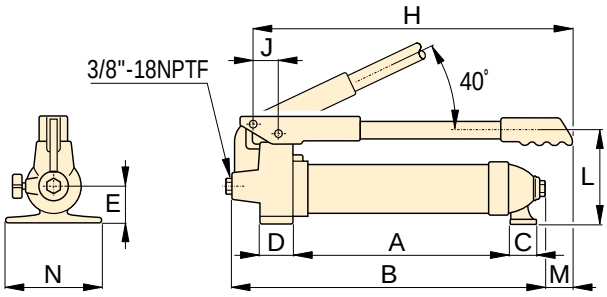
Pump Type	Usable Oil Capacity (cm³)	Model Number	Pressure Rating (bar)	Oil Displacement per Stroke (cm³)	Max. Handle Effort (kg)
Single-Speed	295	**P-18**	200	2,62	26
	3277	**P-25**	175	9,50	27
	3277	**P-50**	350	4,75	27
	819	**P-51**	200	4,10	27

P Series

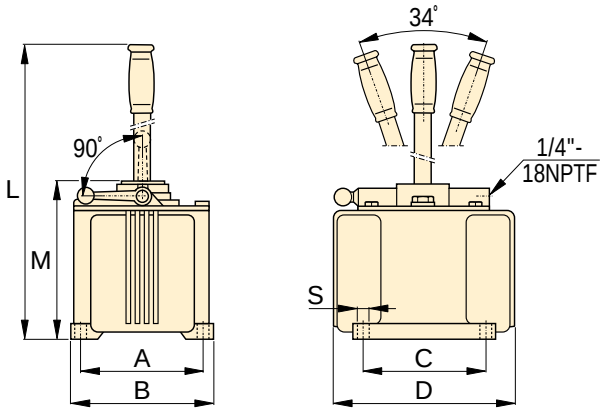
Reservoir Capacity:
295-3277 cm³

Flow at Rated Pressure:
2,62-9,50 cm³/stroke

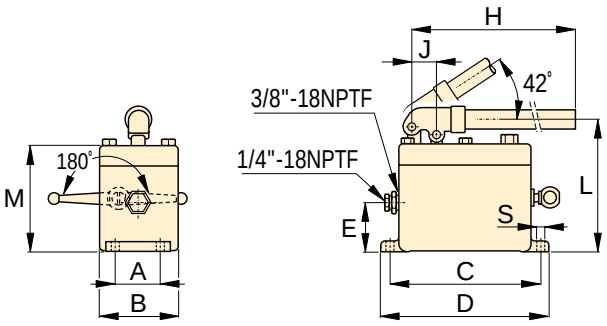
Operating Pressure:
175-350 bar



P-18



P-25, P-50



P-51

Hoses

Enerpac offers a complete line of high quality hydraulic hoses. To ensure the integrity of your system, specify only genuine Enerpac hydraulic hoses.

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Multifluid Hand Pumps

Corrosion resistant hand pumps for low pressure filling and high pressure testing applications, suitable for a wide range of fluids.

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P-25 hand pumps used with RC-serie cylinders to keep wooden layers under pressure during lamination of plates. ▶

Piston Stroke	Dimensions (mm)												Model Number
(mm)	A	B	C	D	E	H	J	L	M	N	S	(kg)	
20,6	210	327	33	38	48	216	30	111	13	133	–	5,0	**P-18**
38,1	152	173	152	240	–	–	–	684	200	–	10	16,3	**P-25**
38,1	152	173	152	240	–	–	–	684	200	–	10	16,8	**P-50**
25,4	52	92	181	200	57	610	29	160	129	–	9	5,4	**P-51**

MP-Series, Multifluid Hand Pumps

ENERPAC
Hydraulic Technology Worldwide

▼ Shown: **MP-110**

- **Unbeatable corrosion resistance**
- **Standard supplied with Nitrile seals – can be used for a wide range of fluids such as demineralised water, oil/water emulsions, waterglycols, mineral oils**
- **Two speed pumps up to 1000 bar pressure**
- **Buna Nitrile seals can be exchanged with optional EPDM seal for use with Skydrol or brake fluids**
- **Impregnated aluminium anodized pump housing with stainless steel internal pumping components**
- **Externally adjustable pressure relief valve**
- **1/4" NPTF gauge port.**

MP-Series Multifluid Pumps Typical Applications

- Filling and testing of aircraft systems such as shock absorbers
- Testing of aircraft systems using Skydrol fluid
- Testing of pressure vessels
- Operation of single-acting hydraulic tools and cylinders.

Gauges

Minimize the risk of over-loading and ensure long, dependable service from your equipment.

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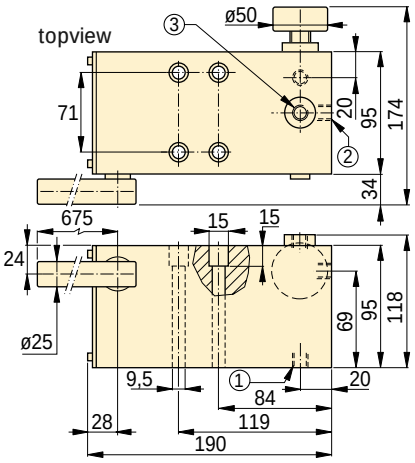
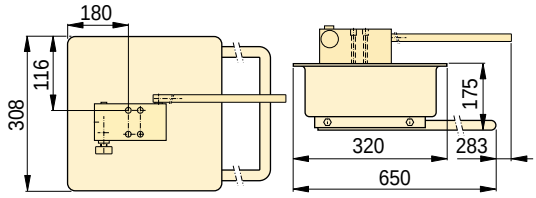
Optional Reservoir Kit

The 10 litres reservoir kit **MP-10T** includes tank with skid frame, top plate with reservoir seal, suction pipe and mounting bolts. Useable oil capacity is 7,4 litres.



MP-110, 350, 700, 1000

① Suction / Tank return port 3/8"-18 NPTF
② Pressure port 3/8"-18 NPTF
③ Gauge port 1/4"-18 NPTF



MP-10T

▼ *MP-Series pumps are ideal for testing and filling applications.*

Pump Type	Usable Oil Capacity (cm³)	Model Number	Pressure Rating (bar) 1st stage	Pressure Rating (bar) 2nd stage	Oil Displacement per Stroke (cm³) 1st stage	Oil Displacement per Stroke (cm³) 2nd stage	Max. Handle Effort (kg)	Piston Stroke (mm)	(kg)
Two Speed	*	**MP-110**	35	110	52,60	21,80	45	26,5	6,6
	*	**MP-350**	35	350	52,60	7,80	45	26,5	6,6
	*	**MP-700**	35	700	52,60	3,10	45	26,5	6,6
	*	**MP-1000**	35	1000	52,60	2,20	45	26,5	6,6

Note: MP-Pump includes 1,5 mm thick gasket for reservoir mounting.
MP-Series pumps requires the use of an external reservoir.

Lightweight Hydraulic Foot Pump

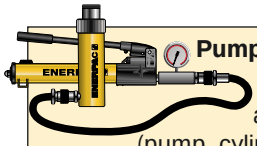
▼ Shown: **P-392FP**

P Series

Reservoir Capacity:
492 cm³

Flow at Rated Pressure:
2,47 cm³/stroke

Maximum Operating Pressure:
700 bar



Pump and Cylinder sets

The P-392FP is available as **sets** (pump, cylinder, gauge, couplers and hose) for your ordering convenience.

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Hoses

Enerpac offers a complete line of high quality hydraulic hoses. To ensure the integrity of your system, specify only genuine Enerpac hydraulic hoses.

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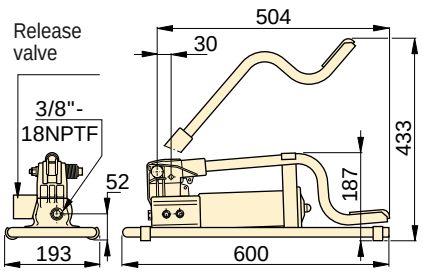
- **Robust, durable and compact**
  - **Steel frame for maximum stability**
  - **Steel pumping handle**
  - **Aluminium reservoir**
- **Foot pedal lock and lightweight construction for easy carrying**
- **Two-speed operation reduces foot pedal strokes as much as 78% over one-speed pumps**
- **Controllable load return circuit for improved control under load and faster no-load retraction of spring or gravity return single-acting cylinders**
- **Large release valve foot pad for easy control for slowly metering loads down**
- **Internal pressure relief valve for overload protection.**



▼ *The great advantage of the P-392FP – easily operated by foot, making your hands free to handle the tool or cylinder.*

Usable Oil Capacity (cm³)	Model Number	Pressure Rating (bar) 1st stage	Pressure Rating (bar) 2nd stage	Oil Displacement per Stroke (cm³) 1st stage	Oil Displacement per Stroke (cm³) 2nd stage	Max. Handle Effort (kg)	Piston Stroke (mm)	(kg)
492	**P-392FP ***	15	700	11,26	2,47	42	25,4	7,0

* Available as set, see note on this page.

▼ Shown from left to right: **11-100, P-2282**

Ultra-High Pressure up to 2800 bar

- **Two-speed operation on the P-2282 allows for faster fill operation, reducing cycle times for many testing applications**
- **303 Stainless steel construction on the 11-100 and 11-400 models enable use with many different fluids, such as distilled water, diesters, silicones, soluble oils and petroleum**
- **Large release knob for improved control of pressure release**
- **Outlet ports are 3/4"-16 cone for 2800 bar rating**

2-Way Shut-Off Valve 72-750

For 2800 bar applications requiring a shut-off valve or gauge snubber. Made of 318 Stainless Steel and utilizing .38 inch cone fittings, it is the perfect selection for use with your Ultra-High Pressure hand pump.

Test System Gauges

Ideal for monitoring pressure in your hydraulic circuit, Test System Gauges, such as the T6010L, are available with cone threads or NPT threads and a variety of pressure ranges.

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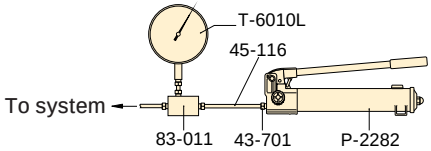
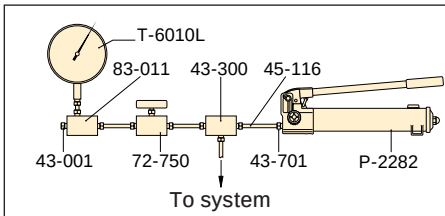


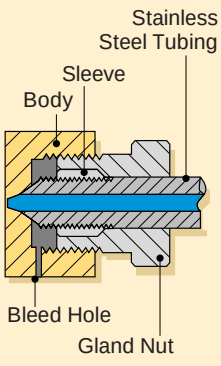
▲ Typical Test System



▲ Test System with Gauge Snubber

Cone Seal

Stainless Steel High Pressure fittings seal on a 'cone' surface and do not require pipe sealer. The Gland Nut holds the sleeve and tubing tight against the cone surface to provide a 2800 bar seal.



Pump Type	Usable Oil Capacity (cm^3)	Model Number	Pressure Rating* (bar) 1st stage	Pressure Rating* (bar) 2nd stage	Oil Displacement per Stroke (cm^3) 1st stage	Oil Displacement per Stroke (cm^3) 2nd stage	Max. Handle Effort (kg)
Two-Speed	983	**P-2282**	13	2800	16,22	0,61	48,1
Single-Speed	737	**11-100**	-	700	-	2,49	54,4
	737	**11-400**	-	2800	-	0,62	54,4

* Contact Enerpac for applications where operating pressure is less than 10% of pressure rating.

▼ Optional Ultra-High Pressure Fittings and Tubings

Description		Connection	Model Nr.
2800 bar			
Gland Nut Plug		.38" cone	**43-001**
Elbow		.38" cone	**43-200**
Tee		.38" cone	**43-300**
Gauge Tee		.38" cone side/ .25" cone gauge port	**43-301**
Gauge Adaptor		.38" cone side/ .25" cone gauge port	**83-011**
Coupling		.38" cone	**43-400**
Cross		.38" cone	**43-600**
Gland Nut with Sleeve		.38" cone	**43-701**
Tubing		100 mm tube, O.D. .38" * 200 mm tube, O.D. .38" * 300 mm tube, O.D. .38" *	**45-116** **45-126** **45-136**
700 bar only			
Adaptor		.38F cone to 1/4" M NPTF .38F cone to 3/8" M NPTF	**41-146** **41-166**
Adaptor		.38F cone to 1/4" F NPTF .38F cone to 3/8" F NPTF	**41-246** **41-266**

Note: .25" cone fittings use 9/16"-18 threads, 3/8" cone fittings use 3/4"-16 threads.

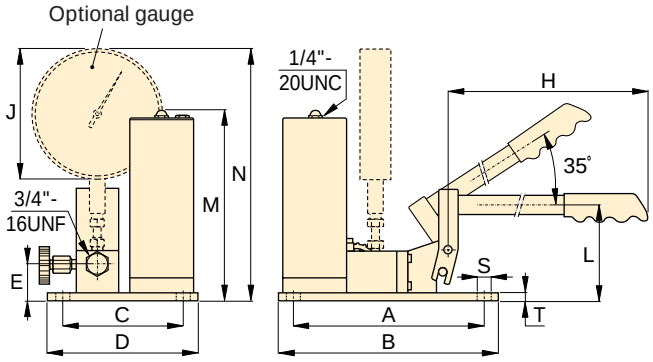
* Actual tubing lengths are 19 mm less than nominal size shown. These dimensions make distance between centers of valves and fittings multiples of 100 mm spaces.

P/11 Series

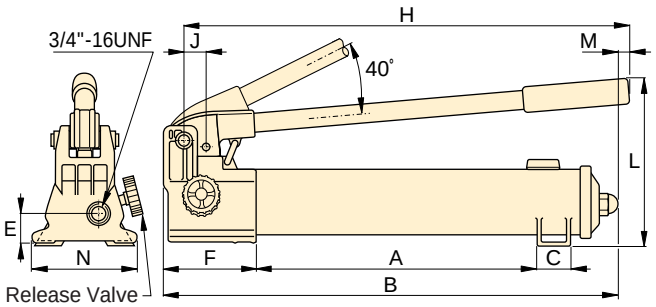
Reservoir Capacity:
737 - 983 cm³

Flow at Rated Pressure:
0,61 - 2,49 cm³/stroke

Operating Pressure:
700 - 2800 bar



11-100, 11-400



P-2282

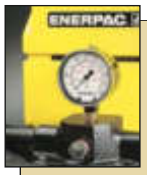
	Piston Stroke	Dimensions (mm)														Model Number
	(mm)	A	B	C	D	E	F	H	J	L	M	N	S	T	(kg)	
	25,4	344	558	35	–	31	133	527	29	228	7	120	–	–	6,4	**P-2282**
	19,8	240	266	151	177	45	–	635	162	114	237	314	7	9	10,0	**11-100**
	19,8	240	266	151	177	45	–	635	162	114	237	314	7	9	10,0	**11-400**

▼ Shown: **PUD-1300E**

Heavy on Performance, Light on Weight

- **Lightweight and compact design: 11,8 to 18,6 kg**
- **Large easy-carry handle for maximum portability**
- **Two-speed operation reduces cycle times for improved productivity**
- **230 VAC 50/60-cycle universal motor will operate on voltages as low as 115 volts**
- **24 VDC remote motor control, 3 m length for operator safety**
- **Starts under full load**
- **High strength molded shroud, with integral handle, protects motor from contamination and damage**

▼ *An Economy pump PUJ-1200E is used with an RC-2514 to reposition a stamping die to simplify maintenance.*



Gauges

Minimize the risk of overloading and ensure long, dependable service from your equipment. For use with the Economy pump the following gauges are suggested:

For Pump Model Number	Gauge Model Number	Gauge Adaptor Model Nr.
PUD-1100E, 1101E	**G-2536L**	**GA-3**
PUJ-1200E, 1201E	**G-2536L**	**–**
PUD-1300E, 1301E	**G-2535L**	**GA-3**
PUJ-1400E, 1401E	**G-2536L**	**GA-3**

For a full range of gauges, please refer to the System Components section.

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Hoses

Enerpac offers a complete line of high quality hydraulic hoses. To ensure the integrity of your system, specify only genuine Enerpac hydraulic hoses.

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Speed Chart

To determine how a specific pump will operate your cylinder, see the Pump-Cylinder Speed Chart in the 'Yellow Pages'.

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Pump Type (Used with cylinder)	Usable Oil Capacity (litres)	Model Number*	Pressure Rating (bar) 1st stage	Pressure Rating (bar) 2nd stage
Single-Acting	1,9	**PUD-1100E**	13	700
	3,8	**PUD-1101E**	13	700
	1,9	**PUJ-1200E**	13	700
	3,8	**PUJ-1201E**	13	700
	1,9	**PUD-1300E**	13	700
	3,8	**PUD-1301E**	13	700
Double-Acting	1,9	**PUJ-1400E**	13	700
	3,8	**PUJ-1401E**	13	700

* For 115 volt applications replace 'E' suffix with 'B'.

** Electric dump valve for auto-retract of cylinders.

Economy Electric Pumps

About the Economy Pump

The Economy pump is best suited to power small to medium size cylinders or hydraulic tools. Its lightweight and compact design make it ideal for applications which require easy transport of the pump. The universal motor works well on long extension cords or generator-driven electrical power supplies.

For further application assistance refer to the 'Yellow Pages'.

PUD-1100 Series
- Provides advance-retract of single-acting cylinders
- Ideal for punching applications
- For applications not requiring load holding
- 3 m pendant controls motor and valve operation.

PUD-1300 Series
- Provides advance-hold-retract of single-acting cylinders
- Ideal for punching applications
- For applications requiring remote valve operations
- 3 m pendant controls motor and valve operation.

PUJ Series
- Available with 3- and 4-way valves for single or double-acting cylinders
- 3 m pendant controls the motor operation
- Manual valves provide advance-hold-retract tool operation.

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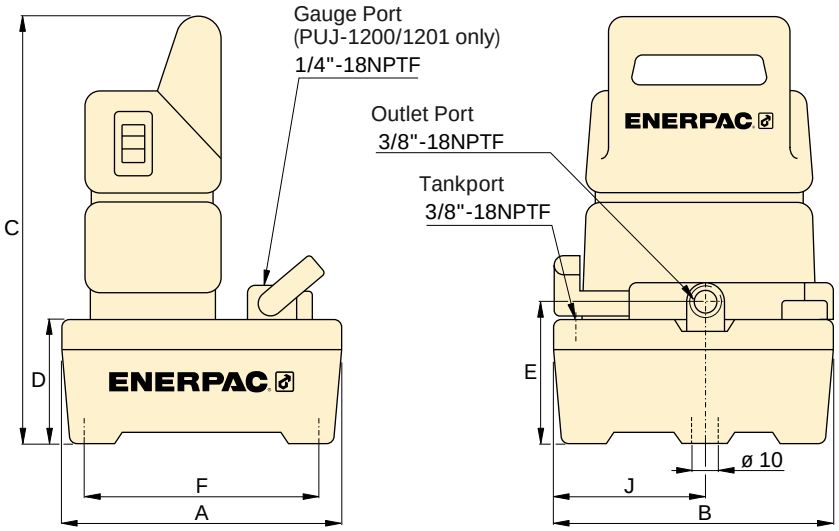
PU Series

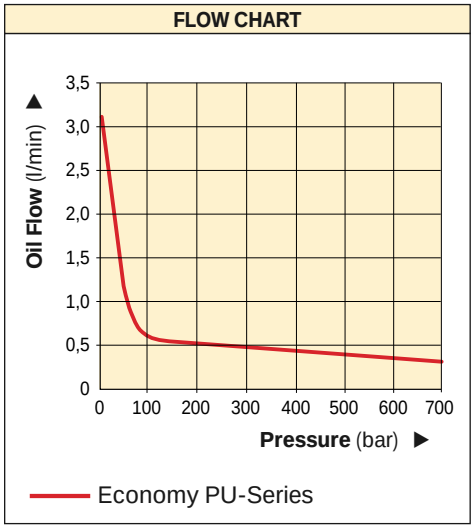
Reservoir Capacity:
1,9 - 3,8 litres

Flow at Rated Pressure:
0,32 l/min

Motor Size:
0,37 kW

Maximum Operating Pressure:
700 bar





Output Flow Rate (l/min)		Valve Type	Valve Function	Current Draw	Motor Voltage	Sound Level	Dimensions (mm)								Model Number*
1st stage	2nd stage			(Amps)	(VAC)	(dBA)	A	B	C	D	E	F	J	(kg)	
3,31	0,32	Dump**	Advance/Retract	3,2	230	85	244	244	362	101	119	203	133	11,8	**PUD-1100E**
3,31	0,32			3,2	230	85	368	309	373	105	130	323	142	17,2	**PUD-1101E**
3,31	0,32	3-way, 2-pos.	Adv/Hold/Retr.	3,2	230	85	244	244	362	101	119	203	133	10,0	**PUJ-1200E**
3,31	0,32			3,2	230	85	368	309	373	105	130	323	142	15,4	**PUJ-1201E**
3,31	0,32	Solenoid 3/2	Adv/Hold/Retr.	3,2	230	85	244	244	362	101	119	203	133	12,0	**PUD-1300E**
3,31	0,32			3,2	230	85	368	309	373	105	130	323	142	17,5	**PUD-1301E**
3,31	0,32	4-way, 3-pos	Adv/Hold/Retr.	3,2	230	85	244	244	362	101	119	203	133	13,2	**PUJ-1400E**
3,31	0,32			3,2	230	85	368	309	373	105	130	323	142	18,6	**PUJ-1401E**

PE-Series, Submerged Electric Pumps

ENERPAC
Hydraulic Technology Worldwide

▼ Shown: **PEJ-1401E**

- **Two-speed operation reduces cycle times for improved productivity**
- **Powerful 0,37 kW induction motor is submerged in the oil reservoir to run cooler, protect the motor, simplify the pump interface, save space and reduce noise**
- **Large 5,5 litres reservoir allows operation of a wide range of cylinders**
- **24 VDC remote pendant control on certain models for safer operation**
- **Externally adjustable relief valve allows control of operating pressure without opening the pump**
- **40-micron internal return line filter keeps oil clean, promoting longer pump life**
- **Full length side tube for easy monitoring of oil level**

◀ *The Remote Jog Model of the Submerged Pump simplifies repair on this construction crane.*

Best Performance on Mid-Range Cylinders and Tools

▼ **SELECTION CHART**
For more technical information see next page.

5 BASIC PUMP TYPES Select the model that suits your application. For special requirements see **page 83** or contact your Enerpac office.
PED Series: with Dump Valve • Ideal for punching, crimping and cutting • For use when load holding is not required • Control pendant with 3 m cord controls valve and motor
PEM Series: with Manual Valve • Ideal choice for most applications • Manual valve control, for both single-acting and double-acting applications • Manual motor control
PER Series: with Solenoid Valve • Ideal for production and lifting • All valves are 3 position for Advance-Hold-Retract • Control pendant with 3 m cord for remote valve operation
PEJ Series: with Remote Jog • For light production and lifting applications • Manual valve control for single-acting or double-acting cylinders • Control pendant with 3 m cord for remote motor operation
PES Series: with Pressure Switch • Designed for continuous pressure applications, such as clamping, workholding and testing • All versions include manual valves for directional control

* See the Valve Section in this catalog for technical information on valve types.

Submerged Electric Pumps

Submerged Pump Application

The Submerged pump is best suited to power small to medium size cylinders or hydraulic tools, or whenever quiet, intermittent duty cycle is needed. With its low sound level and the addition of the optional oil cooler, the Submerged pump is suited to light production work as well.

Its lightweight and compact design also make it ideal for applications which require some transport of the pump.

For further application assistance see the 'Yellow Pages' or contact your local Enerpac office.

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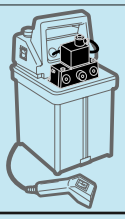
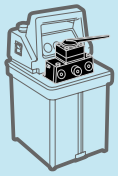
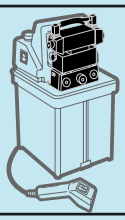
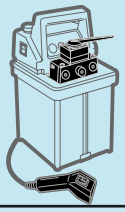
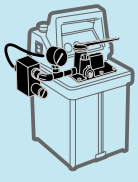
PE Series

Reservoir Capacity:
5,5 litres

Flow at Rated Pressure:
0,27 l/min

Motor Size:
0,37 kW

Maximum Operating Pressure:
700 bar

	Pump Type	Used with Cylinder	Valve Function	Valve Type*	Usable Oil Capacity (litres)	Model Number 230 VAC, 1 ph	(kg)
		Single-Acting	Advance/Retract	Dump	5,5	**PED-1001E**	24,9
		Single-Acting	Advance/Retract	Manual, 3-way, 2-position	5,5	**PEM-1201E**	24,0
		Single-Acting	Advance/Hold/Retract	Manual, 3-way, 3-position	5,5	**PEM-1301E**	24,0
		Double-Acting	Advance/Hold/Retract	Manual, 4-way, 3-position	5,5	**PEM-1401E**	24,0
		Single-Acting	Advance/Hold/Retract	Solenoid, 3-way, 3-position	5,5	**PER-1301E**	29,5
		Double-Acting	Advance/Hold/Retract	Solenoid, 4-way, 3-position	5,5	**PER-1401E**	29,5
		Single-Acting	Advance/Retract	Manual, 3-way, 2-position	5,5	**PEJ-1201E**	24,9
		Single-Acting	Advance/Hold/Retract	Manual, 3-way, 3-position	5,5	**PEJ-1301E**	24,9
		Double-Acting	Advance/Hold/Retract	Manual, 4-way, 3-position	5,5	**PEJ-1401E**	24,9
		Single-Acting	Advance/Retract	Manual, 3-way, 2-position	5,5	**PES-1201E**	28,1
		Double-Acting	Advance/Hold/Retract	Manual, 4-way, 3-position	5,5	**PES-1401E**	28,1

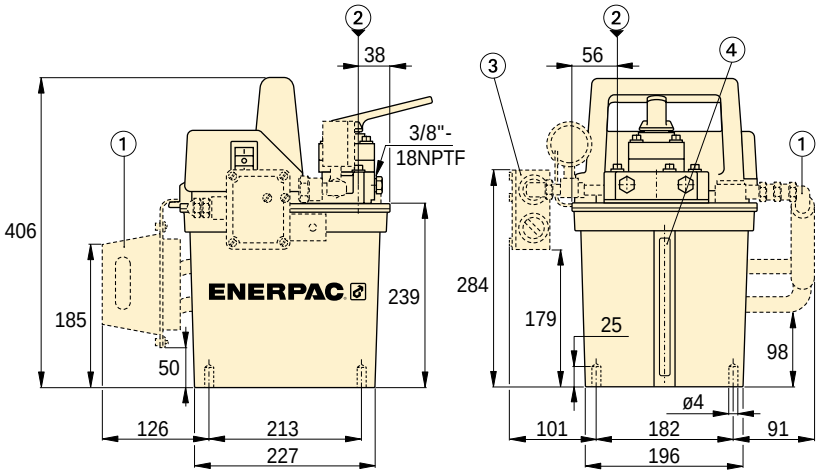
PE-Series, Submerged Electric Pumps

ENERPAC Hydraulic Technology Worldwide

◀ For full features see previous page.

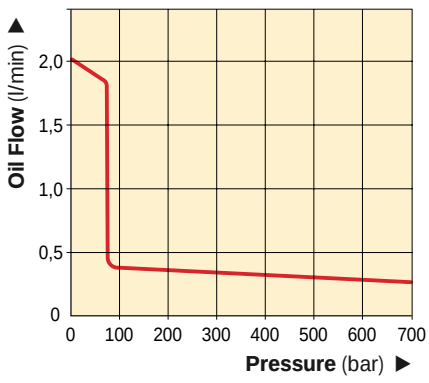
SUBMERGED PUMP PERFORMANCE							
Motor Size	Pressure Rating (bar)		Output Flow Rate at 50 Hz (l/min)		Motor Electrical Specifications*	Sound Level	Relief Valve Adjustment Range
(kW)	1st stage	2nd stage	1st stage	2nd stage	(Amps @ Volts-Ph-Hz)	(dBA)	(bar)
0,37	70	700	2,0	0,27	13 @ 115-1-50/60 6,75 @ 230-1-50/60	62-70	70-700

* At full load. See ordering matrix footnote for frequency notations.



① Heat Exchanger (optional for all models)
② Fill Port
③ Pressure Switch (PES-series, optional for other models)
④ Oil Level Indicator

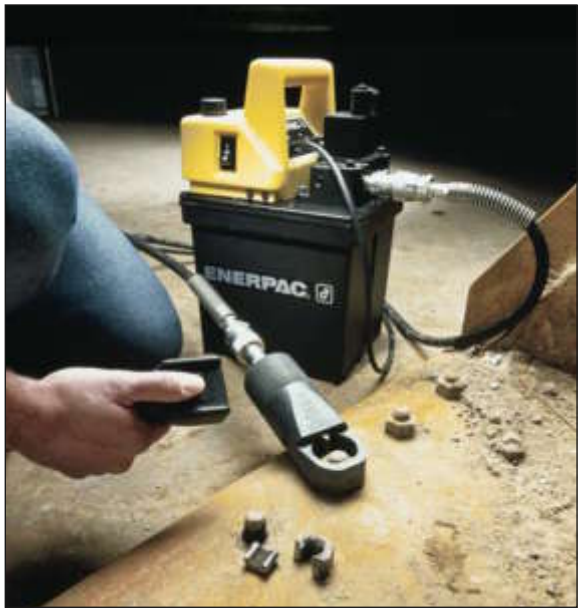
FLOW CHART



Speed Chart

To determine how a specific pump will operate your cylinder, see the Pump-Cylinder Speed Chart in the 'Yellow Pages'.

Page: **119**



◀ *This PED-1001E Submerged pump quickly and quietly powers a hydraulic nut cutter in this bucket maintenance application.*

CUSTOM BUILD YOUR SUBMERGED PUMP
If the Submerged Pump that would best fit your application cannot be found in the chart on page 81, here you can easily build your custom submerged pump.

▼ This is how a Submerged Pump Model Number is built up:

P	E	M	-	1	3	01	E
1 Product Type	2 Motor Type	3 Pump Type		4 Pump Series	5 Valve Type	6 Reservoir Size	7 Motor Voltage

1 Product Type
P = Pump

2 Motor Type
E = Electric Motor

3 Pump Type
D = Dump
J = Jog
M = Manual
R = Remote (Solenoid)
S = Pressure Switch

4 Pump Series
1 = 0,37 kW, 700 bar

5 Valve Type
0 = Dump
2 = 3-way, 2-position, normally open
3 = 3-way, 3-position, tandem center
4 = 4-way, 3-position, tandem center

6 Reservoir Capacity
01 = 5,5 litres

7 Motor Voltage and Heat Exchanger
B = 115 V, 1 Ph, 50/60 Hz [1]
D = 115 V, 1 Ph, 50/60 Hz [1] with Heat Exchanger
E = 230 V, 1 Ph, 50/60 Hz [2]
F = 230 V, 1 Ph, 50/60 Hz [2] with Heat Exchanger

[1] Solenoid valves operate only at 60 Hz. Can run on 50 Hz with manual valves.

[2] Solenoid valves operate only at 50 Hz. Can run on 60 Hz with manual valves.

Ordering Example

Model Number: PER-1301E

The PER-1301E is a 0,37 kW, 700 bar, submerged electric pump, with 5,5 litres usable oil capacity, a 3-way, 3-position, solenoid remote valve and a 230 V, 1 Phase, 50/60 Hz motor.

PE Series

Reservoir Capacity:
5,5 litres

Flow at Rated Pressure:
0,27 l/min

Motor Size:
0,37 kW

Maximum Operating Pressure:
700 bar

Hoses
Enerpac offers a complete line of high quality hydraulic hoses. To ensure the integrity of your system, specify only genuine Enerpac hydraulic hoses.
Page: 122

Gauges
Minimize the risk of over-loading and ensure long, dependable service from your equipment. Refer to the System Components section for a full range of gauges.
Page: 121

Z-Class, Innovation in Pump Design

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Hydraulic Technology Worldwide

By reducing the number of moving parts, improving flow dynamics and decreasing friction, Z-Class pumps will stay on the job longer, require less energy to operate and when needed, have lower service costs.

Z-Class pump element – the heart of your hydraulic system

Highly efficient design provides increased flow rates, reduced heat generation and a decrease in power consumption. This means improved tool speed and increased service life – which results in higher productivity and lower operating costs.
Heavy-duty bearings extend pump life by reducing friction, reducing surface-loading and lowering bearing stresses.
Pump cavity oil bath extends pump life by reducing heat, improving lubrication and reducing wear.
Self-priming, high-flow 1st stage pump increases pump performance by super-charging the 2nd stage piston pump – improving oil flow in both hot and cold weather operation.
Balanced rotating components reduce vibration creating a smoother running pump – reducing wear, friction and sound levels.
Replaceable piston check-valves increase service life of major pump components.
Ergonomic and durable low-voltage pendant features sealed switches and operates on 15 Volts.

ZU4-Electric Pump

- **For manual valve operation**
- **User adjustable relief valve on all valves**
- **Oil flow 1,0 l/min at 700 bar**
- **Skid Bar option (see page 88-89)**
- **Oil level sight glass or indicators**
- **Single phase electric motors include motor on/off switch and overload protection**

ZU4-Electric Pump with LCD

- **All the features of standard electric pump**
- **For manual and solenoid valve operation**
- **Back-lit LCD provides essential user information:**
  - **Pump usage information, hour and cycle counts**
  - **Low-voltage warning and recording**
  - **Self-test, diagnostic and read-out capabilities**
  - **Pressure read-out and auto-mode pressure settings (when used with optional pressure transducer)**
- **All options available (see page 88-89)**

ZU4-Series Pump Applications

- **Portable:** when frequent pump transport is required and/or on remote locations
- **Universal motor:** 1-phase, runs well under poor voltage supply, using generator power supply or using long extension cord
- **Duty-cycle:** for intermittent applications
- **Cylinders & tools:** for medium to large size single- and double-acting applications and high speed.

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ZE-Series Pump Applications

- **Stationary:** when pump remains on one location
- **Induction motor:** 1 and 3-phase for high cycle usage
- **Duty-cycle:** for heavy-duty, extended cycle applications
- **Cylinders & tools:** for medium to large size single- and double-acting applications and high speed.

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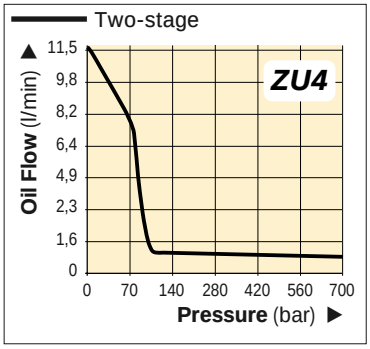


▼ **ZU4-SERIES PERFORMANCE CHART**

Pump Series	Output Flow Rate (l/min) low pressure at 7 bar	low pressure at 50 bar	high pressure at 350 bar	high pressure **at 700 bar**	Available Reservoir Sizes (useable oil) (litres)	Motor Size (kW)	Sound Level (dBA)
ZU4 *	11,5	8,8	1,2	**1,0**	4-8-10-20-40	1,25	85-90

* Two stage pump unit. Relief valve adjustment range 140-700 bar.

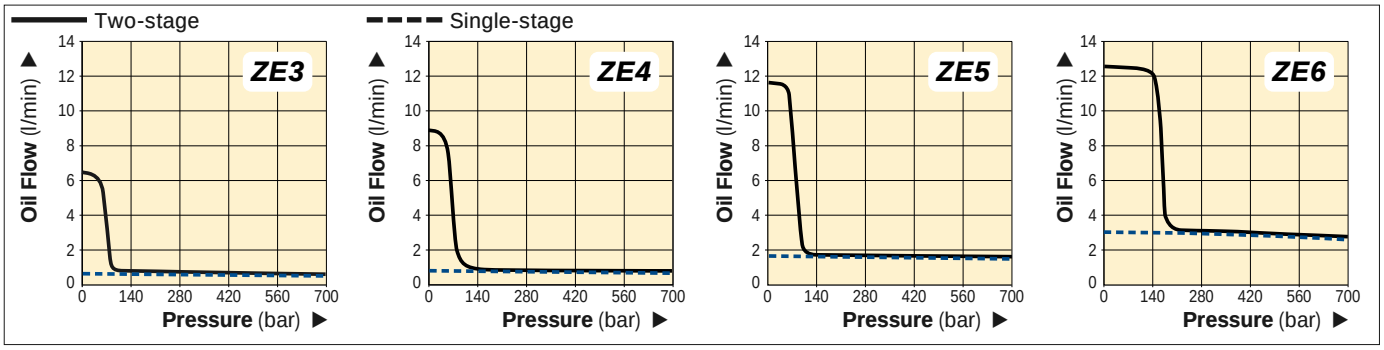
ZU4 & ZE-Series, Pump Types and Specifications

ZE-Electric Pump

- For manual valve operation
- User adjustable relief valve on all valves
- Oil flows from 0,55 to 2,73 l/min at 700 bar
- All non-electric options available (see page 92-93)
- Oil level sight glass or indicators
- Single phase electric motors include motor on/off switch and overload protection
- Carrying handles on all models.

ZE-Electric Pump with LCD-Electric Box

- For solenoid or manual valve operation
- User adjustable relief valve on all valves
- Oil flows from 0,55 to 2,73 l/min at 700 bar
- All options available (see page 92-93)
- Back-lit LCD provides essential user information:
  - Pump usage information, hour and cycle counts
  - Low-voltage warning and recording
  - Self-test, diagnostic and read-out capabilities
  - Pressure read-out and auto-mode pressure settings (when used with optional pressure transducer)
- All single and three phase units include motor control and overload protection.



▼ ZE-SERIES PERFORMANCE CHART

Pump Series	Output Flow Rate at 50 Hz * (l/min) low pressure at 7 bar	low pressure at 50 bar	high pressure at 350 bar	high pressure **at 700 bar**	Pump Unit	Available Reservoir Sizes (useable oil) (litres)	Motor Size (kW)	Relief Valve Adjust-ment Range (bar)	Sound Level (dBA)
ZE3	0,59	0,59	0,57	**0,55**	Single-stage	4-8-10-20-40	0,75	70-700	75
	6,15	5,26	0,57	**0,55**	Two-stage				
ZE4	0,87	0,87	0,84	**0,82**	Single-stage	4-8-10-20-40	1,12	70-700	75
	8,88	8,20	0,84	**0,82**	Two-stage				
ZE5	1,75	1,72	1,68	**1,64**	Single-stage	10-20-40	2,24	70-700	75
	11,61	11,27	1,68	**1,64**	Two-stage				
ZE6	3,00	2,94	2,86	**2,73**	Single-stage	10-20-40	5,60	70-700	80
	12,29	12,15	2,86	**2,73**	Two-stage				

* Oil flow will be approximately 6/5 of these values at 60 Hz.

Single or Two-Stage

Choose single-stage pumps for applications that require constant flow regardless of pressure such as testing or clamping. Two-stage pumps have an increased output flow at low pressure to allow fast movement towards the load, for reduced cycle times and increased productivity.

ZU4-Series, 700 Bar Electric Pumps

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▼ Shown from left to right: **ZU4108DE-T, ZU4420SE-H, ZU4304ME-K**

ZU4 CLASS

Tough, Dependable and Innovative

- **High-efficiency two-speed pump design – higher oil flow and bypass pressure, cooler running and requires 18% less current draw than comparable pumps**
- **Powerful 1,25 kW universal electric motor provides high power-to-weight ratio and excellent low-voltage operating characteristics**
- **High-strength, moulded composite shroud protects motor and electronics, while providing an ergonomic, non-conductive handle for easy transport**
- **Durable steel reservoirs**
- **LCD provides self test, diagnostic and read-out capabilities never before offered on a portable electric pump**
- **Designed to last and easy to service**

ZU4-Series Features and Options

For special requirements see factory installed features and options.

Page: 88

▼ **COMMON PUMP MODELS**
For technical information and other options see next page.

BASIC PUMP TYPES Select the model that suits your application. For special requirements contact your Enerpac office.	
Dump Valve *) • Ideal for punching, crimping and cutting. • For use when load-holding is not required.	
Manual Valve • Ideal choice for most applications. • Manual valve control, for single-acting or double-acting applications. • Motor control on shroud.	
Solenoid Valve *) • Ideal for lifting applications and where remote control is required. • Motor runs continuously on pumps with VE33 and VE43 valves. With VE32 valve, motor only runs during the advance function, while holding and retracting, the motor is off.	
Manual Valve with Pendant *) • For light production, lifting and post tensioning applications. • Manual valve for single- or double-acting cylinders. • Manual valve with power seat (VM43LPS), ideal for post-tensioning applications.	

* Low-voltage control pendant with 3m. cord controls valve and motor.

◀ *Designed to be tough, the ZU4-Series with steel reservoirs will take the abuse of today's construction sites.The ZU4908JE is the ideal pump for post tensioning applications. For post tensioning tools see page 182.*

ZU4-Series, Electric Pumps

ZU4-Series Pump Applications

The ZU4-Series pump is best suited to power medium to large size cylinders or hydraulic tools, or wherever high speed, intermittent duty cycle is needed.

Patent-pending ***Z-Class*** technology provides high by-pass pressures for increased productivity, specifically in applications using long hose runs and high-pressure drop circuits like heavy lifting or certain double-acting cylinders and tools.

Its lightweight and compact design make it ideal for applications which require easy transport of the pump. It utilises a universal motor which will work well on long extension cords or generator driven electrical power supplies.

For further application assistance contact your local Enerpac office.

CE [1)]

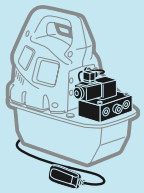
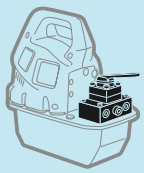
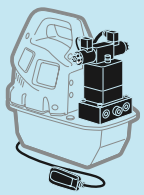
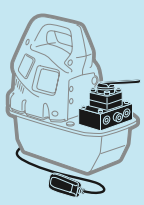
ZU4 Series

Reservoir Capacity:
4 - 40 litres

Flow at Rated Pressure:
1,0 l/min

Motor Size:
1,25 kW

Maximum Operating Pressure:
700 bar

	Pump Type	For use with cylinder	Valve Function [2)]	Valve Type [2)]	Pump Control	Usable Oil Capacity (litres)	Model Number [1)] 230 V / 1 phase [3)] STD (Standard) Electric	Model Number [1)] 230 V / 1 phase [3)] LCD Electric	(kg) [4)]
		Single-Acting	Advance/Retract	VE32D	Remote	4	–	ZU4104DE	28,5
		Single-Acting	Advance/Retract	VE32D	Remote	8	–	ZU4108DE	33,1
							–	–	
							–	–	
							–	–	
							–	–	
		Single-Acting	Advance/Retract	VM32	Manual	4	ZU4204ME	ZU4204LE	26,1
		Single-Acting	Advance/Retract	VM32	Manual	8	ZU4208ME	ZU4208LE	31,3
		Single-Acting	Advance/Hold/Retract	VM33	Manual	4	ZU4304ME	ZU4304LE	28,5
		Single-Acting	Advance/Hold/Retract	VM33	Manual	8	ZU4308ME	ZU4308LE	31,7
		Double-Acting	Advance/Hold/Retract	VM43	Manual	4	ZU4404ME	ZU4404LE	27,2
		Double-Acting	Advance/Hold/Retract	VM43	Manual	8	ZU4408ME	ZU4408LE	31,7
		Single-Acting	Advance/Hold/Retract	VE32	Remote	4	–	ZU4204SE	28,5
		Single-Acting	Advance/Hold/Retract	VE32	Remote	8	–	ZU4208SE	33,1
		Single-Acting	Advance/Hold/Retract	VE33	Remote	8	–	ZU4308SE	38,5
		Double-Acting	Advance/Hold/Retract	VE43	Remote	8	–	ZU4408SE	38,5
							–	–	
							–	–	
							–	–	
							–	–	
		Single-Acting	Advance/Retract	VM32	Remote (Man.)	4	ZU4204JE	ZU4204KE	27,2
		Single-Acting	Advance/Retract	VM32	Remote (Man.)	8	ZU4208JE	ZU4208KE	31,7
		Single-Acting	Advance/Hold/Retract	VM33	Remote (Man.)	8	ZU4308JE	ZU4308KE	32,2
		Double-Acting	Advance/Hold/Retract	VM43	Remote (Man.)	8	ZU4408JE	ZU4408KE	32,2
							–	–	
		Double-Acting	Advance/Hold/Retract	VM43LPS	Remote (Man.)	8	ZU4908JE	ZU4908KE-T	34,5

1) All models meet CE safety requirements. “E” voltage versions also meet all requirements of the European EMC-Directive.
2) See pages 133-137 for hydraulic symbol of these valves.
3) See custom ordering matrix on page 89 for other voltage options.
4) Subtract 1,4 kg. for STD Electric models.

ZU4, Factory Installed Features & Options

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Back-lit LCD [1]

- **Pump usage information, hour and cycle counts**
- **Low-voltage warning and recording**
- **Self-test and diagnostic capabilities**
- **Information can be displayed in six different languages [2]**

[1] Included on pumps with solenoid valves. Can be factory installed on pumps with manual valve.

[2] English, French, German, Italian, Spanish and Portuguese.

Pressure Transducer [3]

- **More durable than analog gauges**
- **More accurate than analog gauges**
- **Calibration can be fine tuned for certification**
- **Easy-viewing variable rate display**
- **"Set pressure" feature turns off motor at user defined pressure [4]**
- **Display pressure in bar, MPa or psi**

[3] Requires LCD Electric.

[4] Or shifts valve to neutral position on pump models with VE33 and VE43 solenoid valves.

ZU4-Series Features & Options

The LCD-display and Heat Exchanger are factory installed features and cannot be ordered separately. The Skidbar and Pressure Transducer can be installed by customer or ordered pump mounted from factory. Refer to pages 86-87 for selection chart and page 89 for ordering matrix.

Pressure Transducer

This pressure transducer is more durable against mechanical and hydraulic shock than analog gauges.

- Digital pressure read-out provides accuracy of 0,5% of full scale.
- Easy-viewing variable rate display automatically varies increments between 3, 14, 35 and 145 bar as rate of pressure change increases.
- "Set pressure" feature turns off motor at user defined pressure (or shifts valve to neutral on models with VE33 and VE43 solenoid valves).

Heat Exchanger [5]

- **Removes heat from the bypass oil to provide cooler operation**
- **Stabilizes oil viscosity, increasing oil life and reduces wear of pump and other hydraulic components**

[5] Requires LCD Electric. Heat Exchanger adds 4,1 kg to pump weight.

Skidbar [6]

- **Provides easy two-hand lift**
- **Provides greater pump stability on soft or uneven surfaces**
- **Also available as kit (Modelnr. SBZ-4)**

[6] 4 and 8 litres reservoirs only. Skidbar adds 2,2 kg to pump weight.

Heat Exchanger

Can be factory installed on ZU4-Series LCD Electric pumps.

- Extends system life.
- Stabilizes oil temperature at a maximum of 54 °C at 21 °C ambient temperature.

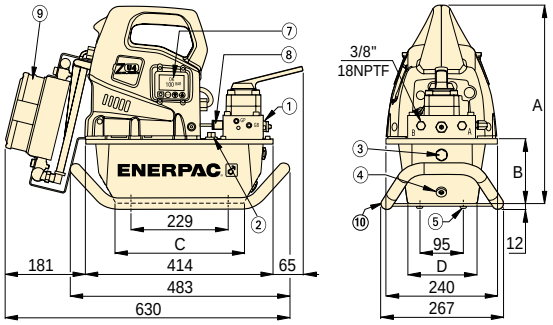
Do not exceed maximum oil flow and pressure ratings. Heat exchanger is not suitable for water-glycol or high water based fluids.

Thermal Transfer *		Maximum pressure	Maximum oil flow	Voltage
Btu/h	kJoule	(bar)	(l/min)	(VDC)
900	950	20,7	26,5	12

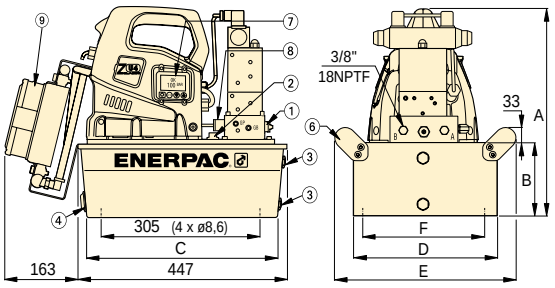
* At 1,9 l/min at 21 °C ambient temperature.

ZU4-Series, Dimensions & Ordering Matrix

ZU4-Series with 4 and 8 litres reservoirs



ZU4-Series with 10, 20 and 40 litres reservoirs
(left view shown without side handle)



ZU4 Dimensions (mm)					
	Reservoir Size (liter)				
	4	8	10	20	40
A	432	495	447	472	559
B	142	203	155	180	270
C	279	287	419	414	399
D	152	167	305	422	505
E	–	–	384	501	576
F	–	–	279	396	480

① User adjustable relief valve.
② Oil fill port SAE #10 $^{7}/_{8}$"-14 UNF-2B.
③ Oil level sight gauge.
④ Oil drain $^{1}/_{2}$" NPTF.
⑤ M8, 12 mm deep.
⑥ Handles on all 10, 20 and 40 litres reservoirs.

Factory installed features & options:
⑦ Back-lit LCD Electric.
⑧ Pressure transducer.
⑨ Heat Exchanger
⑩ Skid Bar (Modelnr. SBZ-4). Fits 4 and 8 litres reservoirs.

ZU4 Series

Reservoir Capacity:
4 - 40 litres

Flow at Rated Pressure:
1,0 l/min

Motor Size:
1,25 kW

Maximum Operating Pressure:
700 bar

See page 84 for ZU4-Series flow diagram

▼ This is how a ZU4-Series pump model number is built up:

Z	U	4	1	04	D	E	-	H	K	T
1 Product Type	2 Motor Type	3 Flow Group	4 Valve Type	5 Reservoir Size	6 Valve Operation	7 Voltage		8 Factory installed features and options		

1 Product Type
Z = Pump Class

2 Prime Mover
U = Universal electric motor

3 Flow Group
4 = 1,0 l/min @ 700 bar

4 Valve Type
(see page 133-137 for valve details)
1 = Dump VE32D
2 = 3-way, 2-pos. manual VM32 or electric VE32
3 = 3 way, 3 pos. manual VM33 or electric VE33
4 = 4 way, 3 pos. manual VM43 or electric VE43
6 = 3 way, 3 pos. manual locking valve VM33-L with pilot operated check.
8 = 4 way, 3 pos. manual locking valve VM43-L with pilot operated check.

5 Reservoir Size
(usable oil capacity)
04 = 4 litres
08 = 8 litres
10 = 10 litres [1]
20 = 20 litres [1]
40 = 40 litres [1]
[1] reservoir includes side handles.

6 Valve Operation
D = Dump (solenoid valve with pendant and LCD Electric)
J = Jog (manual valve with pendant and Standard Electric i.e. without LCD)
K = Jog (manual valve with pendant and LCD Electric)
L = Manual valve with LCD Electric (without pendant)
M = Manual valve with Standard Electric (i.e. without LCD, without pendant)
S = Solenoid valve with pendant and LCD Electric.

7 Voltage
B = 115V, 1 phase, 50/60 Hz
E [2] = 208-240V, 1 phase, 50/60 Hz (with European plug EMC directive compliant).

8 Factory installed features & options
(see page 88 for details)
H Heat exchanger (requires pump with LCD Electric) adds 4,1 kg.
K Skid bar (fits 4 and 8 litres reservoir) adds 2,2 kg.
T Pressure transducer (requires pump with LCD Electric).

ORDERING EXAMPLES

Model Nr: **ZU4104DE-HKT**
Two stage LCD Electric pump with dump valve and 4 litres reservoir, 230V motor, heat exchanger, skidbar and pressure transducer.

Model Nr: **ZU4408JE**
Two stage STD (standard) Electric pump with manual valve with pendant (jog) and 8 litres reservoir, 230V motor.

ZE-Series, 700 Bar Electric Pumps

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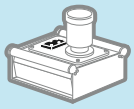
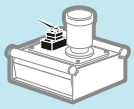
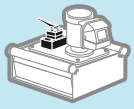
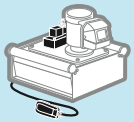
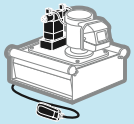
▼ Shown from left to right: **ZE3208MW, ZE5420SW-FHR**

Z CLASS

The New Standard for Industrial Applications

Oil Level Glass

All ZE-Series pumps have an oil sight glass and steel reservoirs. Full sight oil level glass on 10, 20 and 40 litres reservoirs, oil level indicators on 4 and 8 litres reservoirs.

	PUMP CONFIGURATIONS For options and other model numbers see ordering matrix or contact your Enerpac office. *Page:* 95	**Pump Type**	**Used with Tool or Cylinder**		**Valve Function** [1]			**Valve** [1] **Model Number**	**Useable Oil Capacity** (litres)
	No Valve, without Electric Box [2] • For remote valves or pump mounting Enerpac VM-series valves • For remote valve mounting order BSS1090 high pressure connecting plate.							–	4
								–	10
								–	20
								–	40
MANUAL VALVE CONTROL	**With Manual Valve, without Electric Box** • For single-acting or double-acting applications • On/off switch on 1-phase electric motor.		●	–	●	–	●	VM32	4
			●	–	●	●	●	VM33	8
			●	–	●	●	●	VM33L	10
			–	●	●	●	●	VM43	20
			–	●	●	●	●	VM43L	40
MANUAL VALVE CONTROL	**With Manual Valve, with Electric Box** • For single-acting or double-acting applications • On/off switch on 1-phase electric motor • All options available.		●	–	●	–	●	VM32	4
			●	–	●	–	●	VM32	8
			●	–	●	●	●	VM33	10
			●	–	●	●	●	VM33L	10
			–	●	●	●	●	VM43	20
			–	●	●	●	●	VM43L	40
REMOTE VALVE CONTROL	**With Solenoid Dump Valve, with Electric Box** • Ideal for punching, crimping and cutting • For use when load holding is not required • Push-button pendant [3] controls valve and motor • All options available.		●	–	●	–	●	VE32D	4
			●	–	●	–	●	VE32D	8
			●	–	●	–	●	VE32D	10
			●	–	●	–	●	VE32D	20
			●	–	●	–	●	VE32D	40
REMOTE VALVE CONTROL	**With Solenoid 3-position Valve, with Electric Box** • Ideal for production and lifting applications • 3-position valves (advance/hold/retract) • Push-button pendant [3] controls valve and motor • All options available.		●	–	●	●	●	VE33	4
			●	–	●	●	●	VE33	8
			●	–	●	●	●	VE33	10
			–	●	●	●	●	VE43	10
			–	●	●	●	●	VE43	20
			–	●	●	●	●	VE43	40

[1] See Valve Section for hydraulic symbols and details.
[2] For No Valve, with Electric Box, see ordering matrix on page 95.
[3] Pendant includes 3 meters cord.

ZE-Series, 700 Bar Electric Pumps

- **High-efficiency pump design – higher oil flow and bypass pressure, cooler running and requires 18% less current draw than comparable pumps**
- **High-strength, moulded electrical box protects electronics, power supplies and LCD readout and stands up to harsh industrial environments**
- **IP54 protection and isolation class**
- **Back-lit LCD provides self test, diagnostic and read-out capabilities never before offered on an industrial pump (included on pump with electric valves, optional on other models)**
- **Totally enclosed, fan-cooled industrial electric motors supply extended life and stand up to harsh industrial environment**
- **User adjustable relief valve built-in on manual and solenoid valves. Oil ports on valves are 3/8" NPTF**
- **Steel fan guard on all electric motors**
- **Full sight oil level glass**
- **40 micron filter breather with splash guard**
- **Durable steel reservoirs.**

ZE Series

Reservoir Capacity:
4 - 40 litres

Flow at Rated Pressure:
0,55 - 2,73 l/min

Motor Size:
0,75 - 5,60 kW

Maximum Operating Pressure:
700 bar

	ZE3-Series 0,55 l/min at 700 bar Two-stage pump		ZE4-Series 0,82 l/min at 700 bar Two-stage pump		ZE5-Series 1,64 l/min at 700 bar Two-stage pump		ZE6-Series 2,73 l/min at 700 bar Two-stage pump	
	Model Nr. [4] 400V / 3 phase	(kg)	Model Nr. [4] 400V / 3 phase	(kg)	Model Nr. [4] 400V / 3 phase	(kg)	Model Nr. [4] 400V / 3 phase	(kg)
	ZE3004NW	36	ZE4004NW	40	–	–	–	–
	ZE3010NW	45	ZE4010NW	49	ZE5010NW	54	ZE6010NW	72
	ZE3020NW	57	ZE4020NW	61	ZE5020NW	66	ZE6020NW	84
	ZE3040NW	80	ZE4040NW	84	ZE5040NW	89	ZE6040NW	107
	ZE3204MW	39	ZE4204MW	43	–	–	–	–
	ZE3308MW	44	ZE4308MW	48	–	–	–	–
	ZE3610MW	50	ZE4610MW	54	ZE5610MW	59	ZE6610MW	77
	ZE3420MW	60	ZE4420MW	64	ZE5420MW	69	ZE6420MW	87
	ZE3840MW	85	ZE4840MW	89	ZE5840MW	94	ZE6840MW	112
	ZE3204LW	42	ZE4204LW	46	–	–	–	–
	ZE3208LW	47	ZE4208LW	51	–	–	–	–
	ZE3310LW	51	ZE4310LW	55	ZE5310LW	60	ZE6310LW	78
	ZE3610LW	53	ZE4610LW	57	ZE5610LW	62	ZE6610LW	80
	ZE3420LW	63	ZE4420LW	67	ZE5420LW	72	ZE6420LW	90
	ZE3840LW	88	ZE4840LW	92	ZE5840LW	97	ZE6840LW	115
	ZE3104DW	44	ZE4104DW	48	–	–	–	–
	ZE3108DW	49	ZE4108DW	53	–	–	–	–
	ZE3110DW	53	ZE4110DW	57	ZE5110DW	62	ZE6110DW	79
	ZE3120DW	65	ZE4120DW	69	ZE5120DW	74	ZE6120DW	92
	ZE3140DW	88	ZE4140DW	92	ZE5140DW	97	ZE6140DW	115
	ZE3304SW	49	ZE4304SW	53	–	–	–	–
	ZE3308SW	54	ZE4308SW	58	–	–	–	–
	ZE3310SW	58	ZE4310SW	62	ZE5310SW	67	ZE6310SW	85
	ZE3410SW	58	ZE4410SW	62	ZE5410SW	67	ZE6410SW	85
	ZE3420SW	70	ZE4420SW	74	ZE5420SW	79	ZE6420SW	97
	ZE3440SW	93	ZE4440SW	97	ZE5440SW	102	ZE6440SW	120

[4] See custom ordering matrix on page 95 for other voltages.

User Adjustable Relief Valve

All VM and VE-Series have a user adjustable relief valve to allow the operator to easily set the optimum working pressure.

Locking Valves

For applications requiring positive load holding, VM-Series valves (except VM32) are available with a pilot-operated check valve. This provides hydraulic locking of the load until the valve is shifted into the retract position. To order this feature on your ZE-series pump see the valve type in the order matrix.

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Single or Two-Stage

Choose single-stage pumps for applications that require constant flow regardless of pressure such as testing or clamping.

Two-stage pumps have an increased output flow at low pressure to allow fast movement towards the load, for reduced cycle times and increased productivity.

Electric Box [1]

- **Back-lit LCD**
- **Pump usage information, hour and cycle counts**
- **Low-voltage warning and recording**
- **Self-test and diagnostic capabilities**
- **Pressure read-out [2]**
- **Auto-mode pressure setting [2]**
- **Information can be displayed in six languages [3]**

[1] Included on pumps with solenoid valves. Can be factory installed on pumps with manual valve.
[2] When used with optional pressure transducer.
[3] English, French, German, Italian, Spanish and Portuguese.

Level/Temperature Switch [4]

- **Shuts down pump before oil level reaches an unsafe level, avoiding damage due to cavitation**
- **Shuts down pump when unsafe oil temperature is reached**
- **Ideal if pump is used in remote area without visual access to oil level.**

[4] 24 V, requires Electric Box. Available for 10, 20 and 40 litres reservoirs.

Acces-sory Kit Modelnr.	Fixed Temperature Signal (°C)	Operating Tempe-rature (°C)	Max. Pressure (bar)
ZLS-U4 *	80	5 - 110	10

* Add suffix **L** for factory installation.

Return Line Filter

- **25 micron nominal filter removes contaminants from return oil flow before allowing it back into tank**
- **Internal by-pass valve prevents damage if filter is dirty**
- **With maintenance indicator**
- **Replaceable filter element PF25.**

Acces-sory Kit Modelnr.	Maximum Pressure (bar)	Maximum Oil Flow (l/min)	By-pass Setting (bar)
ZPF *	13,8	45,4	1,7

* Add suffix **F** for factory installation.

Roll Bars

- **For easy portability and hoisting**
- **Protects pump and electric box**
- **Available for all reservoir sizes.**

Accessory Kit Nr.	Fits on reservoir	(kg)
ZRB-04 *	4 and 8 litres	5,5
ZRB-10 *	10 litres	6,0
ZRB-20 *	20 litres	6,0
ZRB-40 *	40 litres	6,0

* Add suffix **R** for factory installation.

Skid Bar

- **Provides easy two-hand lift**
- **Provides greater pump stability on soft or uneven surfaces.**

Acces-sory Kit Nr.	For ZE-Series pumps with reservoir	(kg)
SBZ-4 *	4-8 ltr, without heat exchanger	2,2
SBZ-4L *	4-8 ltr, with heat exchanger	3,2

* Add suffix **K** for factory installation.

Foot Switch [5]

- **Hands-free remote control on solenoid dump and 3-position valves**
- **With 3 meters cord.**

[5] 15 V, requires Electric Box.

Accessory Kit Nr.	Can be used on ZE-Series pumps with
ZCF-2 *	Solenoid VE-Series valves

* Add suffix **U** for factory installation.

Factory Options & Accessory Kits for ZE-Series Pumps

Pressure Transducer [1]

- **Displays pressure on LCD in bar, MPa or psi**
- **More accurate than analog gauge**
- **Calibration can be fine-tuned for certification**
- **Easy-viewing variable rate display**
- **"Set pressure" feature turns off motor at user defined pressure.**

1) 24 V, requires Electric Box.

Acces-sory Kit Modelnr.	Adjustable Pressure Range (bar)	Switch-point repea-tability	Dead-band (bar)
ZPT-U4 *	3,5 - 700	± 0,5%	3,5

* Add suffix **T** for factory installation.

Pressure Switch [2]

- **Controls pump, monitors system**
- **Adjustable pressure 35-700 bar**
- **Includes glycerine filled 1000 bar pressure gauge G2536L**
- **Accuracy ± 1,5% of full scale.**

2) 24 V, requires Electric Box. Not available in combination with pressure transducer.

Acces-sory Kit Modelnr.	Switch-point repea-tability	Deadband (bar)	Oil Ports (NPTF)
ZPS-E3 *	± 2%	8 - 38	3/8"

* Add suffix **P** for factory installation.

Pendants [3]

- **For pump types with valve operation "W" (No Valve, with Electric Box, without pendant)**

3) When ordering Enerpac VE-Series solenoid valve the pendant must be ordered separately. Pendant connection to be plugged into electric box

Pendant Model Nr.	To be used with solenoid valve:
ZCP-1	VE32D
ZCP-3	VE32, VE33, VE43

Heat Exchanger [4]

- **Removes heat from bypass oil to provide cooler operation**
- **Stabilizes oil viscosity, increasing oil life and reduces wear of pump and other hydraulic components.**

Accessory Kit Nr.	Fits on reservoir	(kg)
ZHE-E04 *	4 and 8 litres	4,1
ZHE-E10 *	10, 20 and 40 litres	4,1

4) 24 VDC, requires electric box.
* Add suffix **H** for factory installation.

Options

Accessory Kits can be installed by customer. See chart below for options on Standard Electric (without electric box) or LCD Electric (with electric box). Refer to page 95 for ordering matrix.

ZE-Series Options	Factory Installed		Accessory Kits	
	Std. Electr.	LCD Electr.	Std. Electr.	LCD Electr.
Return Line Filter	F	F	ZPF	ZPF
Skid Bar [1]	K	K	SBZ	SBZ
Roll Bar	R	R	SRB	SRB
Single-stage	S	S	–	–
Heat Exchanger	–	H	–	ZHE
Pressure Gauge [2]	G	G	–	–
Pressure Switch [3]	–	P	–	ZPS-E3
Pressure Transducer [4]	–	T	–	ZPT-U4
Level/Temp Switch [5]	–	L	–	ZLS-U4
Foot Switch [6]	–	U	–	ZCF-2

1) Available for 4 and 8 litres reservoirs.
2) Not available on pumps with pressure transducer.
3) Includes 1000 bar gauge. Only available on manual valves without locking feature.
4) Electric box can accept either pressure switch or pressure transducer, but not both.
5) Available for 10, 20 and 40 litres reservoirs.
6) For control of solenoid dump and 3-position valves.

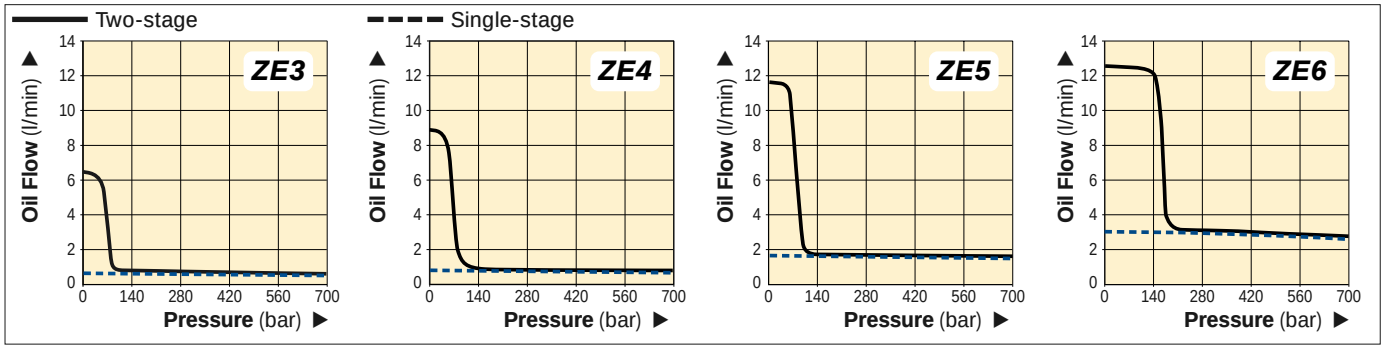
ZPT-U4 Pressure Transducer

More durable against mechanical and hydraulic shock than analog gauges.

- Digital pressure read-out provides accuracy of 0,5% of full scale.
- Easy-viewing variable rate display automatically varies increments between 3, 14, 35 and 145 bar as rate of pressure change increases.
- "Set pressure" feature turns off motor at user defined pressure (or shifts valve to neutral on VE33 and VE43 valves).

ZHE-Series Heat Exchangers

Heat exchanger stabilizes oil temperature at 54 °C at 21 °C ambient temperature. Thermal transfer at 1,9 l/min and 21 °C ambient temperature: 900 Btu/hour [950 kJ].
Do not exceed max. oil flow of 26,5 l/min and max. pressure of 20,7 bar.
Not suitable for water-glycol or high water based fluids.



▼ **ZE-SERIES PERFORMANCE CHART**

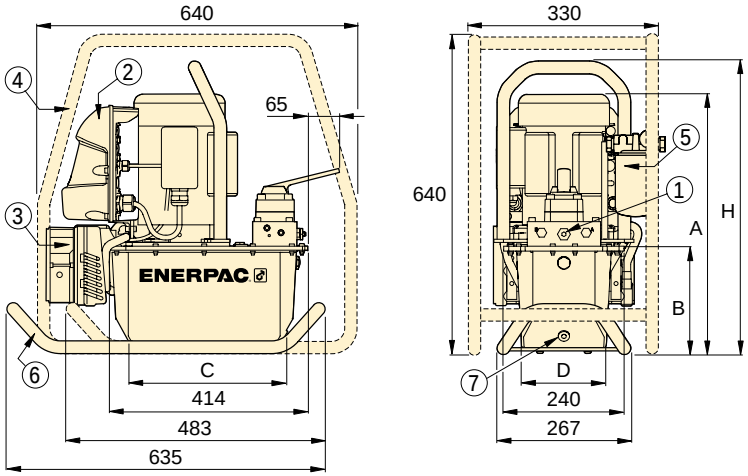
Pump Series	Output Flow Rate at 50 Hz * (l/min) low pressure at 7 bar	low pressure at 50 bar	high pressure at 350 bar	high pressure **at 700 bar**	Pump Unit	Available Reservoir Sizes (useable oil) (litres)	Motor Size (kW)	Relief Valve Adjustment Range (bar)	Sound Level (dBA)
ZE3	0,59	0,59	0,57	**0,55**	Single-stage	4-8-10-20-40	0,75	70-700	75
	6,15	5,26	0,57	**0,55**	Two-stage				
ZE4	0,87	0,87	0,84	**0,82**	Single-stage	4-8-10-20-40	1,12	70-700	75
	8,88	8,20	0,84	**0,82**	Two-stage				
ZE5	1,75	1,72	1,68	**1,64**	Single-stage	10-20-40	2,24	70-700	75
	11,61	11,27	1,68	**1,64**	Two-stage				
ZE6	3,00	2,94	2,86	**2,73**	Single-stage	10-20-40	5,60	70-700	80
	12,29	12,15	2,86	**2,73**	Two-stage				

* Oil flow will be approximately 6/5 of these values at 60 Hz.

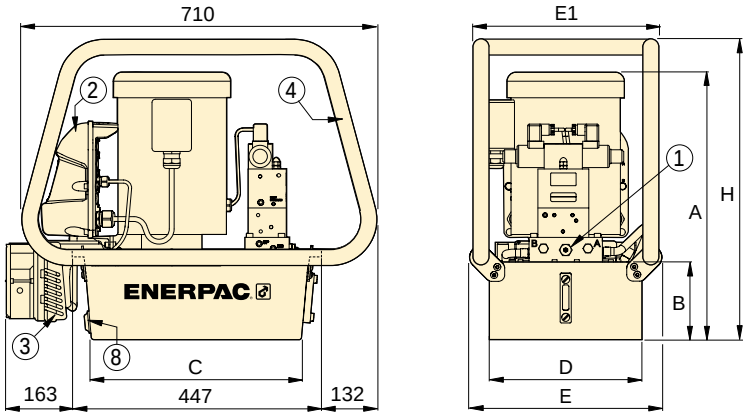
Single or Two-Stage

Choose single-stage pumps for applications that require constant flow regardless of pressure such as testing or clamping.

Two-stage pumps have an increased output flow at low pressure to allow fast movement towards the load, for reduced cycle times and increased productivity.



ZE-Series Pumps with 4 - 8 litres reservoir



ZE-Series Pumps with 10 - 20 - 40 litres reservoir

① User adjustable relief valve on all manual and solenoid valves.
3/8" NPTF on A and B ports;
1/4"NPTF on auxiliary ports.
② Electric Box
③ Heat Exchanger
④ Roll Bar
⑤ Return Line Filter
⑥ Skid Bar
⑦ Oil Drain
⑧ Oil Drain / Oil Level/Temperature Switch

Reservoir Size (useable oil) (litres)	ZE-Series Pump Dimensions (mm) A	B	C	D	E	E1	H
4	457	143	279	152	–	–	520
8	519	205	287	168	–	–	582
10	533	155	419	305	384	340	600
20	558	180	419	422	501	490	625
40	648	270	399	505	576	572	715

ZE-Series, Pump Ordering Matrix

▼ This is how ZE-Series pump model numbers are built up:

Z	E	4	1	10	D	W	-	F	H	L	T
1 Product Type	2 Motor Type	3 Flow Group	4 Valve Type	5 Reser-voir Size	6 Valve Operation	7 Motor Voltage		8 Factory installed options			

1 Product Type

Z = Pump Class

2 Prime Mover

E = Induction electric motor

3 Flow Group

3 = 0,55 l/min @ 700 bar (0,75 kW)
4 = 0,82 l/min @ 700 bar (1,12 kW)
5 [1] = 1,64 l/min @ 700 bar (2,24 kW)
6 [1] = 2,73 l/min @ 700 bar (5,60 kW)

4 Valve Type

0 = No valve, with coverplate
1 = 3/2 Dump valve VE32D
2 = 3/2 manual VM32
3 = 3/3 manual VM33 or electric VE33
4 = 4/3 manual VM43 or electric VE43
6 = 3/3 manual locking valve VM33L with pilot operated check.
8 = 4/3 manual locking valve VM43L with pilot operated check.

5 Reservoir Size, useable oil

04 [2] = 4 litres
08 [2] = 8 litres
10 = 10 litres
20 = 20 litres
40 = 40 litres

6 Valve Operation

D = Dump valve (solenoid), with pendant and Electric Box
L = Manual valve, without pendant, with Electric Box
M = Manual valve, without pendant, without Electric Box
N = No valve, without Electric Box
S = Solenoid valve, with pendant and Electric Box
W = No valve, with Electric Box, without pendant [10]

7 Motor Voltage

Single phase motor [3]
B [3] = 115V, 1 ph, 50-60Hz
E [3] = 208-240V, 1 ph, 50-60 Hz [4]
I [3] = 208-240V, 1 ph, 50-60 Hz (with USA plug).

Three phase motor [5]
M [5] = 190-200V, 3 ph, 50-60Hz
G [5] = 208-240V, 3 ph, 50-60 Hz
W [5] = 380-415V, 3 ph, 50-60 Hz
K [5] = 440V, 3 ph, 50-60 Hz
J [5] = 460-480V, 3 ph, 50-60 Hz
R [5] = 575V, 3 ph, 60 Hz

8 Factory installed options

F = Return Line Filter
G [6] = 1000 bar gauge
H [7] = Heat exchanger
K = Skid Bar (only on 4-8 litres)
L [7] = Oil Level/Temperature Switch [8]
N = No reservoir handles (includes lifting eyes)
P [7] = Pressure Switch (only available on manual valves without locking feature)
R = Roll Bar
S = Single-stage pump unit
T [7] = Pressure transducer [9]
U [7] = Foot Switch

[1] ZE5 and ZE6-Series only available with 3-phase electric motors.
[2] 4 and 8 litres only available on ZE3 and ZE4-Series.
[3] ZE3 and ZE4-Series only available with 1-phase motors.
[4] 208-240V, 1 ph with European plug EMV directive compliant.
[5] Models with 3-ph motors without Electric Box shipped without cord, motor starter or overload protection.
[6] Not available on pumps with pressure transducer (T).
[7] Requires Electric Box.
[8] Not available on 4 and 8 litres reservoir.
[9] Provides digital pressure read-out on LCD-display of electric box.
[10] When using solenoid valve on valve type "W" order optional pendant.

All Z-Class electric pumps comply with CSA and CE requirements.

ZE Series

Reservoir Capacity:
4 - 40 litres

Flow at Rated Pressure:
0,55 - 2,73 l/min

Motor Size:
0,75 - 5,60 kW

Maximum Operating Pressure:
700 bar

How to Order Single-Stage Pumps

To specify a single-stage pump, place the letter "**S**" at the end of the model number. For example:

ZE4210ME-S
ZE4-Series pump, oil flow 0,82 l/min at 700 bar, VM32 manual valve, 10 litres reservoir, without electrical box, without pendant, 240 Volt 1-phase electric motor and single-stage pump unit.

ZE3120DW-S
ZE3-Series pump, oil flow 0,55 l/min at 700 bar, VE32D solenoid dump valve, 20 litres reservoir, with electrical box, without pendant, 400 Volt 3-phase electric motor and single-stage pump unit.

Pendants

When ordering Enerpac VE-Series solenoid valve for use on "W" type valve operation (No Valve, with Electric Box, without pendant) the pendant must be ordered separately. Pendant connection to be plugged into electric box.

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▼ Shown: **PPE-9483-4**

The Axial Piston Pump with four independant outlets

- **Single-speed operation with two and four independent split-flow outlets**
- **Two-speed operation with high-flow outlet**
- **Oil delivery of each outlet remains equal regardless of pressure**
- **60 litres usable oil capacity allows operation of a wide range of cylinders**
- **Powerful 4 and 9,5 kW motor, available in three voltage options.**

Hoses

Enerpac offers a complete line of high quality hydraulic hoses. To ensure the integrity of your system, specify only genuine Enerpac hydraulic hoses.

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Gauges

Minimize the risk of over-loading and ensure long, dependable service from your equipment. Refer to the System Components section for a full range of gauges.

Page: **121**

Locking Valves

Pumps with VM33 or VM43 manual valves may be ordered with locking valves. This locking feature provides a hydraulic lock for the cylinder using pilot-operated check valves.
To order this option, just place an "**L**" suffix at the end of the model number. For more information, contact your local Enerpac office.

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▼ *To lift a rigid construction, four double-acting RR-2006 cylinders are powered by a 4-split electric PPE-9483-4 pump.*

Pump Type	Motor Size (kW)	Usable Oil Capacity (litres)	Pump Series*	Pressure Rating (bar)		Output Flow Rate (l/min)	
				1st stage	2nd stage	1st stage	2nd stage
Two-speed	4,0	60	**PPN-8000**	190	700	14,5	1 x 4,2
	9,5	60	**PPN-9000**	300	700	14,5	1 x 8,0
Single-speed	9,5	60	**PPN-9000-2**	–	700	–	2 x 5,0
	9,5	60	**PPN-9000-4**	–	700	–	4 x 2,5

* The "N" in the model number stands for No Valve. All pump models can be ordered with Manual or Solenoid Valves. See selection chart on next page.

▼ This is how 8000- and 9000-Series Pump Model Numbers are built up:

PP	E	-	9	4	8	3	-	2
1 Product Type	2 Valve Control		3 Pump Series	4 Valve Type	5 Reservoir Capacity	6 Motor Voltage		7 Split-flow Outlets

1 Product Type
PP = Power Pump

2 Valve Control
N = No Valve
M = Manual
E = Solenoid (Electrical)

3 Pump Series
8 = 8000-Series, 4 kW
9 = 9000-Series, 9,5 kW

4 Valve Type
0 = No Valve
3 = 3-way, 2-position, manual valve (VM33)
4 = 4-way, 3-position, manual (VM43) or solenoid valve (VE43)

5 Reservoir Capacity
8 = 80 litres (usable 60 ltr)

6 Motor Voltage*
3 = 400 V, 3 ph, 50 Hz
5 = 230 V, 3 ph, 50 Hz
6 = 440 V, 3 ph, 50 Hz

* In the selection chart below only 400V models (suffix **3**) are shown. To order 230V or 440V models, change this suffix to **5** or **6**.

7 Split-Flow Outlets
9000-Series only
2 = 2 equal flow outlets of 5,0 l/min. at 700 bar
4 = 4 equal flow outlets of 2,5 l/min. at 700 bar

PP Series

Reservoir Capacity:
80 litres

Flow at Rated Pressure:
4 x 2,5 to 8,0 l/min

Motor Size:
4,0 - 9,5 kW

Maximum Operating Pressure:
700 bar

Speed Chart
To determine how a specific pump will operate your cylinder, see the Pump-Cylinder Speed Chart in the 'Yellow Pages'.
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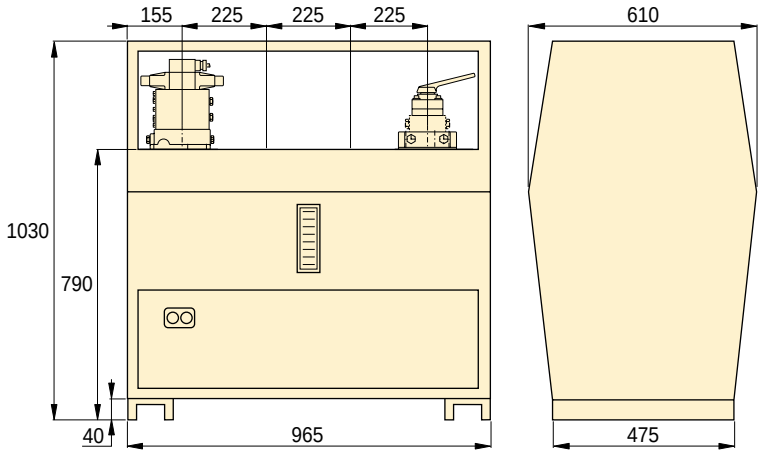
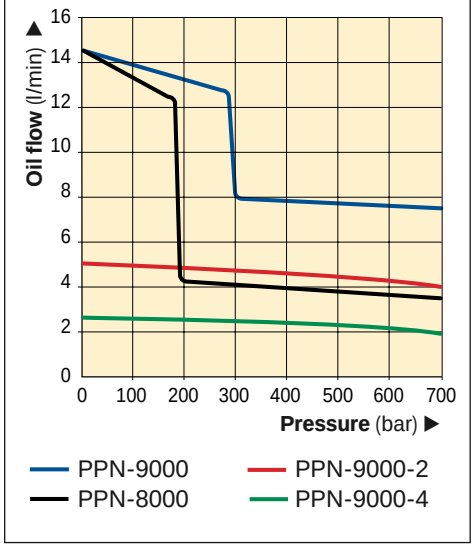


FLOW CHART



Used with Cylinder*		Valve Control	Valve Function			Valve Model Number	8000-Series High-flow outlet		9000-Series High-flow outlet		9000-Series 2 Split-flow outlets		9000-Series 4 Split-flow outlets	
							Model Number	(kg)	Model Number	(kg)	Model Number	(kg)	Model Number	(kg)
–	–	–	–	–	–	–	PPN-8083	274	PPN-9083	303	PPN-9083-2	304	PPN-9083-4	328
•		Manual	•	•	•	VM33	PPM-8383	275	PPM-9383	316	PPM-9383-2	319	PPM-9383-4	333
	•	Manual	•	•	•	VM43	PPM-8483	275	PPM-9483	316	PPM-9483-2	319	PPM-9483-4	333
	•	Solenoid	•	•	•	VE43	PPE-8483	286	PPE-9483	330	PPE-9483-2	340	PPE-9483-4	372

* = Single-Acting = Double-Acting

Turbo II Air Hydraulic Pumps

ENERPAC
Hydraulic Technology Worldwide

▼ Shown from top to bottom: **PAMG-1402N, PARG-1102N, PATG-1102N, PATG-1105N**

- **External adjustable pressure relief valve (behind sight glass)**
- **Lower air consumption and operating costs**
- **Return-to-tank port for use in remote valve applications**
- **Internal pressure relief valve provides overload protection**
- **Quieter operation – reduced noise level to 75 dBA reduces operator fatique**
- **Operating air pressure: 1,7-8,6 bar, enables pump to start at extremely low pressure**
- **High efficiency cast aluminium air motor**
- **Reinforced heavy-duty lightweight reservoir for applications in tough environments**
- **Air pendant for remote control operation**
- **Composite air piston seal allows operation on completely dry air supply.**

▼ *Easily operated by hand or by foot.*

Setting New Standards…

… in efficiency and reliability

RFL-102 Regulator-Filter-Lubricator

Recommended for use with all Turbo air pumps. Provides clean, lubricated air and allows for air pressure adjustment. Steel bowl guards are standard.

Large Reservoir Models

The Turbo II Air Pump is also available with an enlarged reservoir: **PATG-1105N, PAMG-1405N** and **PARG-1105N.**

Hoses

Enerpac offers a complete line of high quality hydraulic hoses. To ensure the integrity of your system, specify only genuine Enerpac hydraulic hoses.

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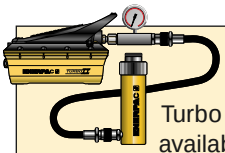

Pump and Cylinder Sets

Turbo II Air Pumps are also available as **sets** (pump, cylinder, gauge, couplers and hose) for your ordering convenience.

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Used with Cylinder	Usable Oil Capacity (cm^3)	Model Number
Single-Acting	2081	PATG-1102N*
	3770	PATG-1105N
Single-Acting	2081	PARG-1102N
	3770	PARG-1105N
Double-Acting	2081	PAMG-1402N
	3770	PAMG-1405N

* Available as set. See note at this page.

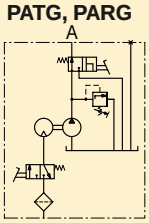
Turbo II Air Hydraulic Pumps

PATG-models use a foot or hand operated treadle to control air and valve functions.

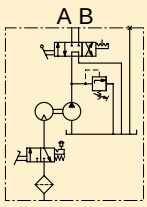
PAMG-models use a treadle with a locking feature to control air, and a 4-way manual valve to control hydraulics.

PARG-models use air pendant for remote control.

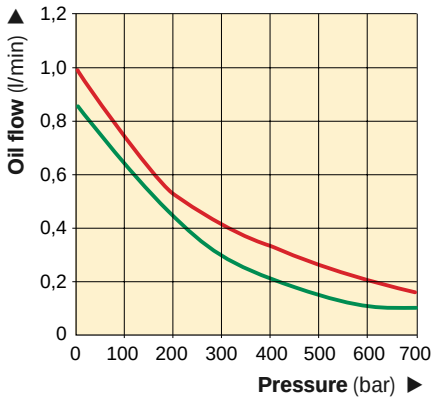
PATG, PARG



PAMG



FLOW CHART



PATG PAMG PARG Series

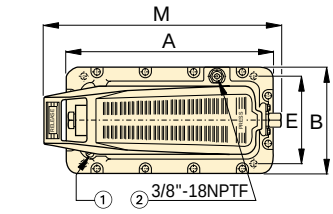
Reservoir Capacity:
2,5 - 5,0 litres

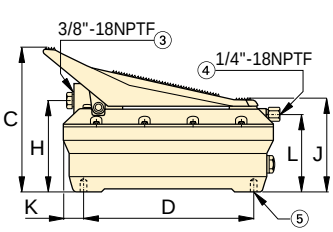
Flow at Rated Pressure:
0,08 - 0,16 l/min

Air Consumption:
227 - 340 l/min

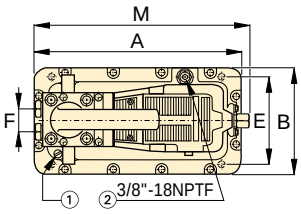
Maximum Operating Pressure:
700 bar

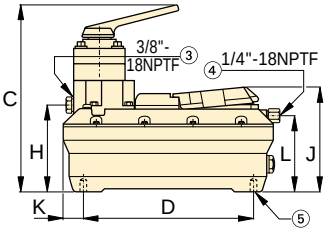
Maximum Pressure	Output Flow Rate (l/min) air supply to pump		air supply to pendant		Pump Series	Valve function	Air Pressure Range	Air Consumption air supply to (l/min) @ 5,2 bar air		Sound Level
(bar)	No Load	Load	No Load	Load			(bar)	Pump	Pendant	(dBA)
700	1,00	0,16	–	–	**PATG**	Advance / Hold / Retract	1,7 - 8,6	340	–	75
700	0,76	0,08	0,84	0,10	**PARG**	Advance / Hold / Retract	2,8 - 10,3	227	285	75
700	1,00	0,16	–	–	**PAMG**	Advance / Hold / Retract	1,7 - 8,6	340	–	75



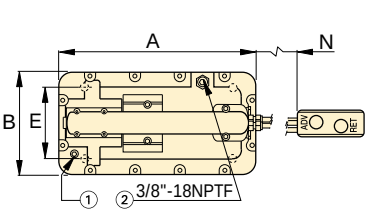


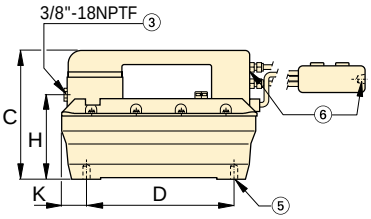
PATG-1102N
PATG-1105N





PAMG-1402N
PAMG-1405N





PARG-1102N
PARG-1105N

① Filtered 'Permanent' Tank Vent
② Return-to-Tank/Auxiliary Vent/Fill Tank Port
③ Hydraulic Output
④ Swivel Air Input with Filter
⑤ 4 Mounting Holes for #10 thread forming screw. Maximum depth into reservoir = 19 mm
⑥ Air Input with Filter on PARG models 1/4"-18NPTF

	Valve Operation	Turbo II Dimensions (mm)													Model Number
		A	B	C	D	E	F	H	J	K	L	M	N	kg	
	Treadle 3/3	313	165	211	230	102	–	129	146	42	113	347	–	8,2	**PATG-1102N***
		396	201	209	230	102	–	131	146	86	112	437	–	9,9	**PATG-1105N**
	Air Pendant 3/3	313	165	200	230	102	–	129	–	42	–	–	4500	10,0	**PARG-1102N**
		396	201	209	230	102	–	131	–	86	–	–	4500	11,7	**PARG-1105N**
	Manual 4/3	313	165	267	230	102	36	130	152	42	113	315	–	11,0	**PAMG-1402N**
		396	201	267	230	102	36	132	152	86	112	405	–	12,7	**PAMG-1405N**

▼ Shown from top to bottom: **PA-1150, PA-133**

PA
Series

Reservoir Capacity:
0,6-1,3 litres

Flow at Rated Pressure:
0,13 l/min

Air Consumption:
255 l/min

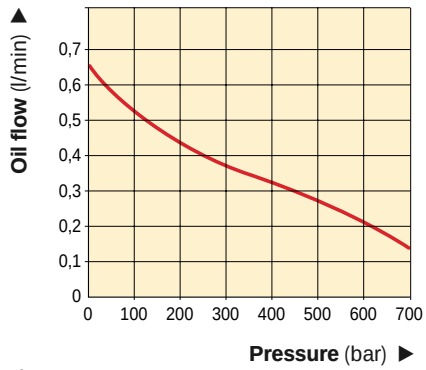
Maximum Operating Pressure:
700 bar

PC-66 Reservoir Conversion Kit

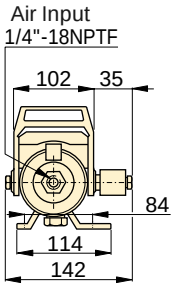
Double the reservoir capacity of your existing PA-133 with this easy to install conversion kit.

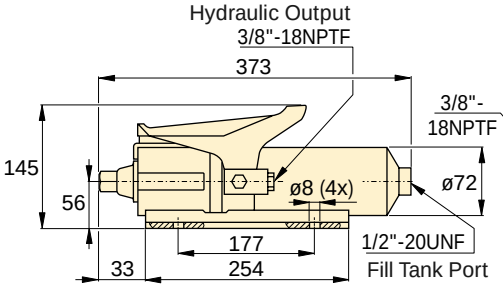
- **Rugged construction – built for long life and easy service**
- **Swivel coupling simplifies hydraulic connection and pump operation**
- **Three-position treadle provides cylinder advance, hold or retract operation**
- **Operates in all positions for increased versatility in use and mounting (except PA-1150)**
- **Base mounting slots provided on PA-133.**

FLOW CHART

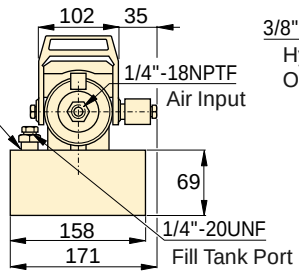


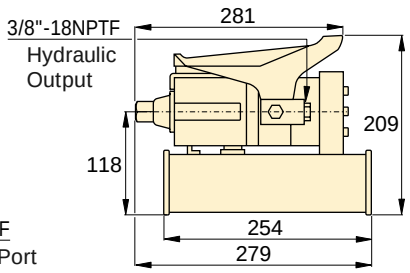
Air pressure:
PA-Series (@ 6,9 bar)





PA-133 (mm)





PA-1150 (mm)

Used with Cylinder	Usable Oil Capacity (cm^3)	Model Number	Pressure Rating (bar)	Output Flow Rate (l/min) No load	Output Flow Rate (l/min) Load	Valve Function	Air Pressure Range* (bar)	Air Consumption (l/min)	Sound Level (dBA)	(kg)
Single-Acting	589	**PA-133**	700	0,65	0,13	Advance/Hold/Retract	2,7-6,9	255	85	5,4
	1311	**PA-1150**	700	0,65	0,13	Advance/Hold/Retract	2,7-6,9	255	85	8,2

* Recommended Regulator-Filter-Lubricator: RFL-102.

▼ Shown: **PAM-1041**

PAM
Series

Reservoir Capacity:
4,0 - 8,0 litres

Flow at Rated Pressure:
0,15 l/min

Air Consumption:
510 l/min

Maximum Operating Pressure:
700 bar

Locking Valves

Pumps with 4/3 manual valves are available with 4/3 manual locking valves instead. Add suffix “L” to pump model number.

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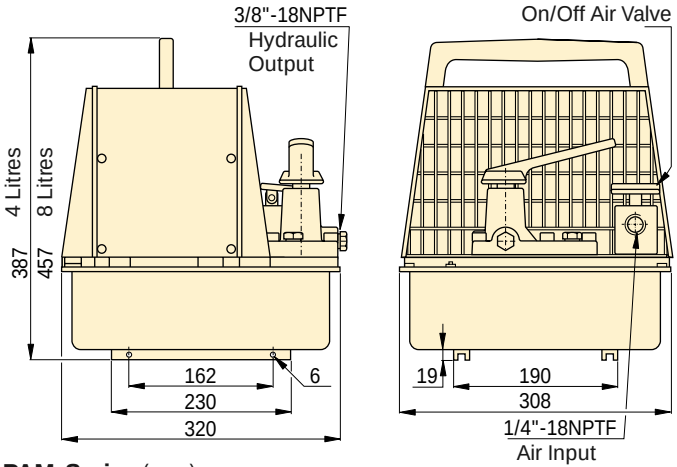
VA-2 Remote Valve

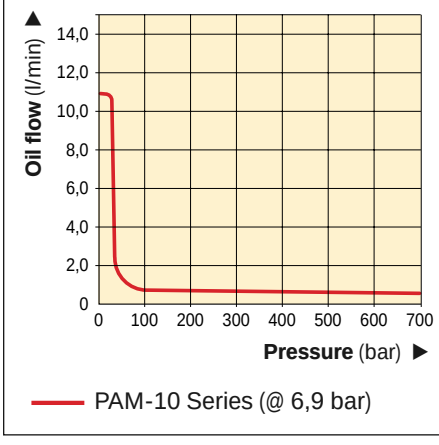
For remote operation of PAM-Series air pumps. Permits either hand or foot operation.

- **Twin air motor configuration delivers high-flow performance in first stage, up to 14 bar, for rapid cylinder advance**
- **4 and 8 litres reservoirs for use with a wide range of cylinders**
- **Integral shroud protects air motors and provides easy carry.**



PAM-Series (mm)

FLOW CHART



Used with Cylinder	Usable Oil Cap. (litres)	Model Number with Shroud	Pressure Rating (bar)	Output Flow Rate (l/min) 1st stage	Output Flow Rate (l/min) 2nd stage	Valve Function	Valve Type	Air Pressure Range* (bar)	Air Consumption (l/min)	Sound Level (dBA)	(kg)
Single-Acting	2,6	**PAM-1021**	700	10,65	0,15	Adv./Hold/Retr.	3/2	2,7-6,9	510	87	22,7
	7,6	**PAM-1022**	700	10,65	0,15	Adv./Hold/Retr.	3/2	2,7-6,9	510	87	27,2
Double-Acting	2,6	**PAM-1041**	700	10,65	0,15	Adv./Hold/Retr.	4/3	2,7-6,9	510	87	22,7
	7,6	**PAM-1042**	700	10,65	0,15	Adv./Hold/Retr.	4/3	2,7-6,9	510	87	27,2

* Recommended Regulator-Filter-Lubricator: RFL-102.

ZA4-Series, Air Hydraulic Pumps

ENERPAC
Hydraulic Technology Worldwide

▼ Shown: **ZA4208MX, ZA4420MX**

Z CLASS
Tough, Dependable, Innovative

- **Features Z-Class high efficiency pump design, higher oil flow and bypass pressure**
- **Two-speed operation reduces cycle time for improved productivity**
- **User adjustable relief valve built-in on manual valves. Oil ports on valves are 3/8" NPTF**
- **Optional heat exchanger warms exhaust air to prevent freezing and cools the oil**
- **Full sight oil level glass on 10, 20 and 40 litres reservoirs, oil level indicators on 4 and 8 litres reservoirs.**

Speed Chart
To determine how a specific pump will operate your cylinder, see the Pump-Cylinder Speed Chart in the 'Yellow Pages'.
Page: **119**

Hoses
Enerpac offers a complete line of high quality hydraulic hoses. To ensure the integrity of your system, specify only genuine Enerpac hydraulic hoses.
Page: **122**

User Adjustable Relief Valve
All VM-Series have a user adjustable relief valve to allow the operator to easily set the optimum working pressure.
Page: **135**

Used with Cylinder	Usable Oil Capacity (litres)	Manual Valve [1] Model Number	Valve Function	Model Number	Output Flow Rate [3] (l/min) at 7 bar	at 50 bar	at 350 bar	**at 700 bar**	Relief Valve Adjustment Range (bar)	Maximum Air Consumption [4] (l/min)
–	4,0	– [2]	–	**ZA4004NX** [2]	13,93	11,06	1,80	**1,31**	–	2840
Single-acting	4,0	VM32	Advance/Retract	**ZA4204MX**	13,93	11,06	1,80	**1,31**	70 - 700	2840
	8,0	VM33	Advance/Hold/Retract	**ZA4308MX**	13,93	11,06	1,80	**1,31**	70 - 700	2840
	10,0	VM33L	Advance/Hold/Retract	**ZA4620MX**	13,93	11,06	1,80	**1,31**	70 - 700	2840
Double-acting	4,0	VM43	Advance/Hold/Retract	**ZA4404MX**	13,93	11,06	1,80	**1,31**	70 - 700	2840
	8,0	VM43	Advance/Hold/Retract	**ZA4408MX**	13,93	11,06	1,80	**1,31**	70 - 700	2840
	10,0	VM43L	Advance/Hold/Retract	**ZA4810MX**	13,93	11,06	1,80	**1,31**	70 - 700	2840
	20,0	VM43	Advance/Hold/Retract	**ZA4420MX**	13,93	11,06	1,80	**1,31**	70 - 700	2840
	40,0	VM43	Advance/Hold/Retract	**ZA4440MX**	13,93	11,06	1,80	**1,31**	70 - 700	2840

[1] See pages 135-139 for hydraulic symbols of these valves.
[2] For remote valve mounting order **BSS1090** high pressure connecting plate.
[3] Actual oil flow will vary with air supply.
[4] Dynamic air pressure range: 4 - 7 bar.

▼ This is how a ZA4-Series pump model number is built up:

Z	A	4	2	08	M	X	-	F	H	R	
1 Product Type	2 Motor Type	3 Flow Group	4 Valve Type	5 Reser-voir Size	6 Valve Operation	7 Motor Voltage		8 Factory installed options			

1 Product Type
Z = Pump Class

2 Prime Mover
A = Air motor

3 Flow Group
4 = 1,31 l/min @ 700 bar

4 Valve Type
0 = No valve, with coverplate
2 = 3/2 manual valve VM32
3 = 3/3 manual valve VM33
4 = 4/3 manual valve VM43
6 = 3/3 manual locking valve VM33L with pilot operated check
8 = 4/3 manual locking valve VM43L with pilot operated check.

5 Reservoir Size, useable oil
04 = 4 litres
08 = 8 litres
10 = 10 litres
20 = 20 litres
40 = 40 litres

6 Valve Operation
M = Manual valve
N = No valve

7 Motor Voltage
X = Not applicable

8 Factory installed options
F = Return Line Filter
G = 1000 bar gauge
H = Heat exchanger
K = Skid Bar (only on 4-8 litres reservoir)
N = No reservoir handles (includes lifting eyes on 10, 20 and 40 litres)
R = Roll Bar

Ordering Example
Model Number: **ZA4208MX-FHK**
ZA4208MX-FHK is an air operated pump with a 3-way, 2-position manual valve, 8 litres reservoir, filter, heat exchanger and skid bar.

ZA4 Series

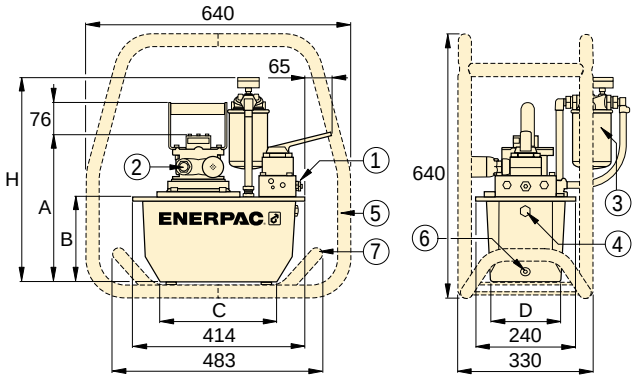
Reservoir Capacity:
4 - 40 litres

Flow at Rated Pressure:
1,31 l/min

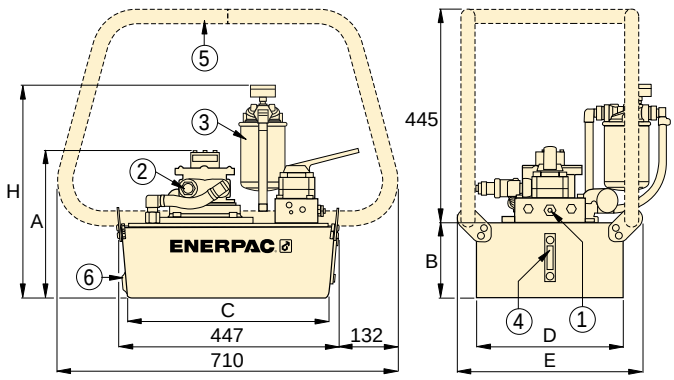
Air Consumption:
2840 l/min

Maximum Operating Pressure:
700 bar

① User adjustable relief valve on all manual valves. 3/8" NPTF on A and B ports; 1/4"NPTF on auxiliary ports.
② Air inlet 1/2" NPTF
③ Return Line Filter
④ Oil Sight Gauge
⑤ Roll Bar
⑥ Oil Drain
⑦ Skid Bar (Modelnr. SBZ-4)



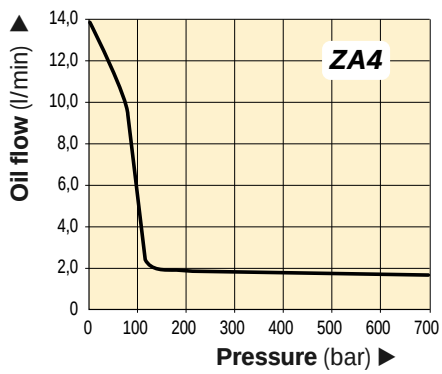
ZA4-Series Pumps with 4 - 8 litres reservoir



ZA4-Series Pumps with 10, 20 and 40 litres reservoir

Sound Level (dBA)	Motor Size (kW)	Dimensions (mm) A	B	C	D	E	H	Weight (kg)	Model Number
80 - 95	3,0	295	142	279	152	–	429	27	**ZA4004NX** [2]
80 - 95	3,0	295	142	279	152	–	429	30	**ZA4204MX**
80 - 95	3,0	356	203	287	168	–	490	34	**ZA4308MX**
80 - 95	3,0	330	180	414	421	500	467	51	**ZA4620MX**
80 - 95	3,0	295	142	279	152	–	429	31	**ZA4404MX**
80 - 95	3,0	356	203	287	168	–	490	35	**ZA4408MX**
80 - 95	3,0	305	155	419	305	384	442	40	**ZA4810MX**
80 - 95	3,0	330	180	414	421	500	467	52	**ZA4420MX**
80 - 95	3,0	419	269	399	505	584	556	75	**ZA4440MX**

FLOW CHART
at 7 bar air & 2000 l/min air consumption



PAH-Series, Air Hydraulic Pumps

ENERPAC
Hydraulic Technology Worldwide

▼ Shown: **PAH-90**

The High-Flow 'Multi-Fluid' Pump

- **Converts 2-7 bar air pressure to 18-900 bar hydraulic pressure**
- **Can be used with hydraulic oil or other non corrosive liquids such as water, kerosene, gasoline etc.**
- **Six models offer many pressure-flow combinations**
- **User supplied valving and reservoir provides system flexibility**
- **Exhaust-air muffler lowers sound level for reduced operator fatigue**
- **Heavy duty construction for long life, even in harsh environments**
- **Ideal for multi-fluid testing applications.**

Multifluid Hand Pumps

Corrosion resistant hand pumps for low pressure filling and high pressure testing applications, suitable for a wide range of fluids.

Page: **74**

Hoses

Enerpac offers a complete line of high quality hydraulic hoses. To ensure the integrity of your system, specify only genuine Enerpac hydraulic hoses.

Page: **122**

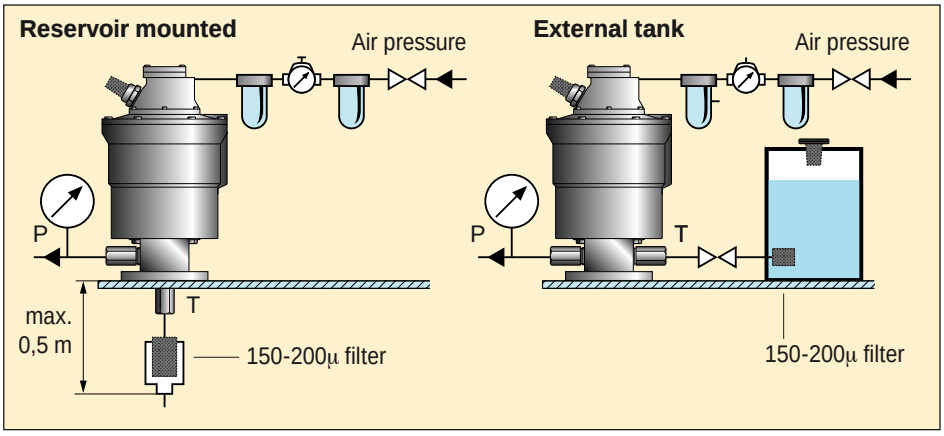
Gauges

Minimize the risk of overloading and ensure long, dependable service from your equipment. Refer to the System Components section for a full range of gauges.

Page: **121**

▼ *The PAH-05 was selected for pumping water at high flow for testing a heat exchanger.*

▼ *The PAH-Serie pumps can be reservoir mounted (except PAH-90) or connected to an external tank.*



All PAH-Series air hydraulic pumps require a user supplied remote valve and reservoir.

For more ordering information, call your Enerpac distributor. For a full range of valves, please refer to the valve section of this catalogue.

Page: 135

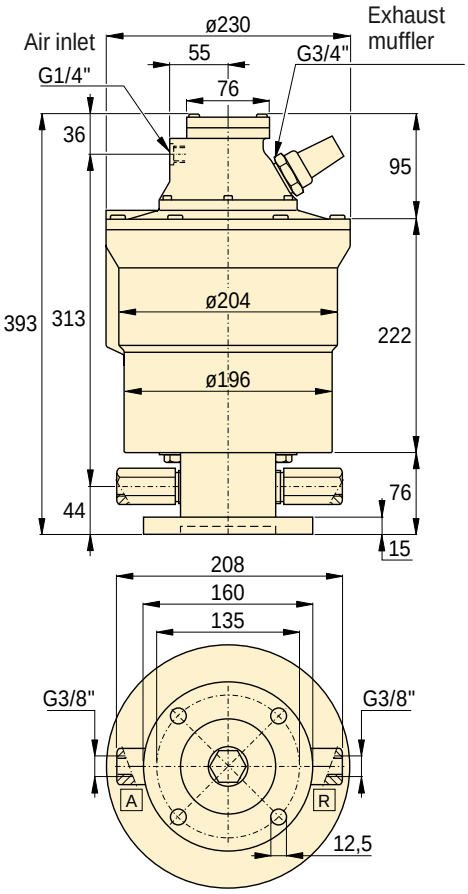
PAH Series

Pressure Intensification Ratio:
1:9 - 1:165

Flow at Rated Pressure:
0,17-5,00 l/min

Air Consumption:
3000 l/min

Maximum Operating Pressure:
56-900 bar



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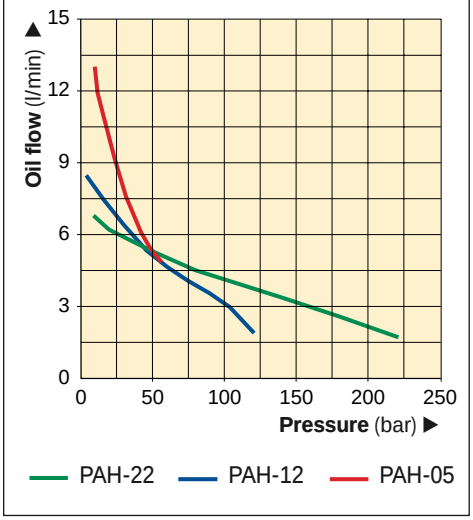

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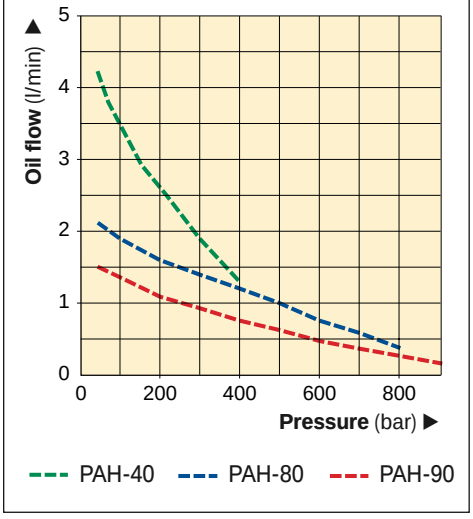


Maximum Pressure Rating (bar)	Output Flow Rate (l/min) no load	Output Flow Rate (l/min) load	Model Number	Air Pressure Range (bar)	Pressure Intensification Ratio	Sound Level (dBA)	(kg)
56	13,0	5,0	**PAH-05**	2-7	1:9	80-85	19
120	8,5	2,0	**PAH-12**	2-7	1:20	80-85	19
220	6,8	1,7	**PAH-22**	2-7	1:36	80-85	19
400	4,2	1,3	**PAH-40**	2-7	1:67	80-85	19
800	2,1	0,38	**PAH-80**	2-7	1:127	80-85	19
900	1,5	0,17	**PAH-90**	2-7	1:165	80-85	19

PGM-Series, Gasoline Pumps

ENERPAC
Hydraulic Technology Worldwide

▼ Shown from left to right: **PGM-3410R, PGM-2408R, PGM-5410R**

Featuring Genesis Technology

- **Patented Genesis Technology means**
  - coaxial piston design ensures high performance
  - first-stage piston pump for improved efficiency
- **High by-pass pressures improve productivity**
- **All Atlas pumps feature sturdy Roll Cages for use in tough environments**
- **4, 8, 20 and 40 litres reservoirs for use with a wide range of cylinders**
- **Available in three four-cycle motor sizes: 2,2 - 3,7 - 4,0 kW.**

Hoses

Enerpac offers a complete line of high quality hydraulic hoses. To ensure the integrity of your system, specify only Enerpac hydraulic hoses.

Page: **122**

Gauges

Minimize the risk of over-loading and ensure long, dependable service from your equipment. Refer to the System Components section for a full range of gauges.

Page: **121**

▼ *This PGM-5310R is used to power a hydraulic re-bar cutter on a construction site before power was available.*

Used with Cylinder	Usable Oil Capacity (litres)	Model Number	Pressure Rating (bar)	Output Flow Rate (l/min) 1st stage	Output Flow Rate (l/min) 2nd stage
Single-Acting	3,8	**PGM-2304R***	700	3,2	0,66
Double-Acting	3,8	**PGM-2404R***	700	3,2	0,66
Single-Acting	7,6	**PGM-2308R***	700	3,2	0,66
Double-Acting	7,6	**PGM-2408R***	700	3,2	0,66
Single-Acting	9,5	**PGM-3310R**	700	7,8	0,90
	18,9	**PGM-3320R**	700	7,8	0,90
Double-Acting	9,5	**PGM-3410R**	700	7,8	0,90
	18,9	**PGM-3420R**	700	7,8	0,90
Single-Acting	9,5	**PGM-5310R**	700	7,8	1,6
	18,9	**PGM-5320R**	700	7,8	1,6
Double-Acting	9,5	**PGM-5410R**	700	7,8	1,6
	18,9	**PGM-5420R**	700	7,8	1,6
	37,8	**PGM-5440R**	700	7,8	1,6

* Note: The PGM-20 series are available with a carrying handle instead of a rollcage. For ordering omitt the 'R' from the model number

Atlas Gasoline Pump Performance

Elevation can affect the performance of any gasoline engine. Atlas pumps are designed to develop rated performance at elevations up to 1500 m.

For applications above this elevation, please consult your Enerpac office.

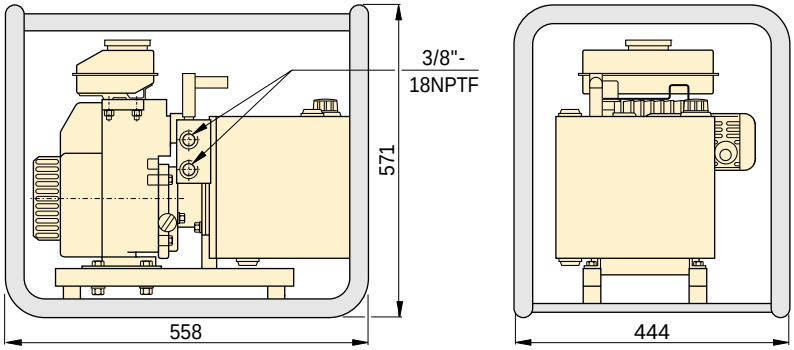
PGM Series

Reservoir Capacity:
4, 8, 20 and 40 litres

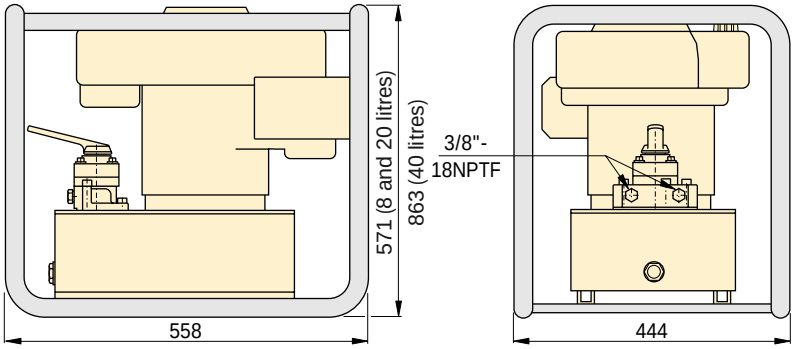
Flow at Rated Pressure:
0,66 -1,6 l/min

Motor Size:
2,2- 4,0 kW

Maximum Operating Pressure:
700 bar



PGM-20 series



PGM-30 and PGM-50 Series

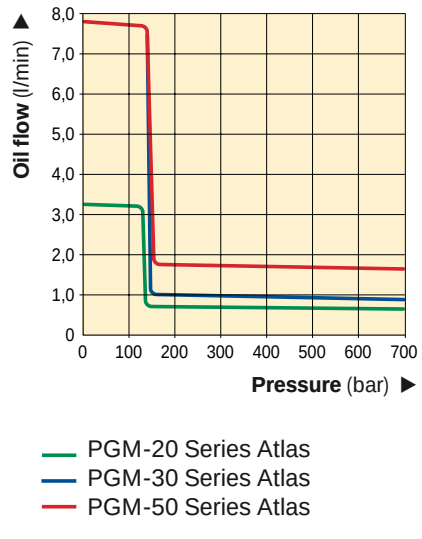
Speed Chart

See the Enerpac Cylinder Speed Chart in our 'Yellow Pages' section.

Page: **119**

By-Pass Pressure (bar)	Valve Type	Valve Function	Motor Type / Size	Sound Level (dBA)	(kg)
140	3-way, 3-position	Advance/ Hold/Retract	Honda 2,2 kW	89	25
140	4-way, 3-position			89	25
140	3-way, 3-position	Advance/ Hold/Retract	Honda 2,2 kW	89	33
140	4-way, 3-position			89	33
140	3-way, 3-position	Advance/ Hold/Retract	Briggs 3,7 kW	93	55
140	3-way, 3-position			93	68
140	4-way, 3-position			93	55
140	4-way, 3-position			93	68
140	3-way, 3-position	Advance/ Hold/Retract	Honda 4,0 kW	93	59
140	3-way, 3-position			93	75
140	4-way, 3-position			93	59
140	4-way, 3-position			93	75
140	4-way, 3-position			93	93

FLOW CHART



Global Warranty Policy

ENERPAC Hydraulic Technology Worldwide

ENERPAC products are warranted to be free of defects in materials and workmanship under normal use for as long as they are owned by the original purchaser, subject to the exclusions and limitations described below. This warranty does not cover ordinary wear and tear, overloading, alterations, (including repairs or attempted repairs by parties other than ENERPAC or its authorised service representatives), improper fluid, use in a manner for which they are not intended or use which is contrary to instructions for the products. THIS WARRANTY IS LIMITED TO NEW PRODUCTS SOLD THROUGH ENERPAC AUTHORISED DISTRIBUTORS, ORIGINAL EQUIPMENT MANUFACTURERS OR OTHER DESIGNATED CHANNELS OF DISTRIBUTION. NO AGENT, EMPLOYEE, OR OTHER REPRESENTATIVE OF ENERPAC HAS THE AUTHORITY TO IN ANY WAY CHANGE OR AMEND THIS WARRANTY.

Electronic products and components are warranted against defects in material and workmanship for a period of two years from the date of purchase.

The following items supplied with ENERPAC products are excluded from this warranty:

- Components not manufactured by ENERPAC, including air motors, electric motors, gasoline engines, and diesel engines. Such items are warranted to the extent of the warranty provided by the manufacturers of such items.
- Consumable items, including cutter blades, nut splitter chisels, punches and dies.
- Chains

If the customer believes a product is defective, the product must be delivered, or shipped freight prepaid, to the nearest ENERPAC Authorised Service Center. The customer should contact ENERPAC to locate an Authorised Service Center in the customer's area. Products that do not conform to this warranty will be repaired or replaced at ENERPAC's expense and returned by ground transportation, freight prepaid.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

The remedy of repair, replacement or refund is customer's exclusive remedy in the event of breach of this warranty.
SELLER SHALL NOT BE SUBJECT TO AND DISCLAIMS:

(a) ANY OTHER OBLIGATIONS OR LIABILITIES ARISING OUT OF BREACH OF CONTRACT OR OF WARRANTY,
(b) ANY OBLIGATIONS WHATSOEVER ARISING FROM TORT CLAIMS (INCLUDING NEGLIGENCE AND STRICT LIABILITY) OR ARISING UNDER THEORIES OF LAW WITH RESPECT TO PRODUCTS SOLD OR SERVICES RENDERED BY SELLER OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO, AND
(c) ALL CONSEQUENTIAL, INCIDENTAL AND CONTINGENT DAMAGES WHATSOEVER.

ENERPAC's liability in all cases is limited to, and shall not exceed, the purchase price paid.

Effective June 1, 1997

Enerpac 'Yellow Pages' *stand for* Hydraulic Information!

If selecting hydraulic equipment is not your daily routine, then you will appreciate these pages. The 'Yellow Pages' are designed to help you work with hydraulics. They will help you to better understand the basics of hydraulics, of system set-ups and of the most commonly used hydraulic techniques. The better your choice of equipment, the better you will appreciate hydraulics. Take the time to go through these 'Yellow Pages' and you will benefit even more from Enerpac High Pressure Hydraulics.

GLOBAL LIFETIME WARRANTY STATEMENT

www.enerpac.com
Visit our web site for the complete Global Lifetime Warranty or call your Authorized Service Center.

Page: 108

Enerpac products are warranted to be free of defects in materials and workmanship. Any product that does not conform to specification will be repaired or replaced at Enerpac's expense, anywhere in the world; simple as that !!

This warranty does not cover ordinary wear and tear, abuse, misuse, alterations, or the use of improper fluids. Determination of the authenticity of a warranty claim will be made only by Enerpac or its Authorized Service Centers.

Enerpac is certified for several quality standards. These standards require compliance with standards for management, administration, product development and manufacturing.
Enerpac worked hard to earn the quality rating ISO 9001, in its ongoing pursuit of excellence.

ASME B30.1
Our cylinders fully comply with the criteria set forth by the American National Standards Institute (except 'BRD', 'CLL' and CLS series).

UL approved
All electrical components used on Enerpac products carry the UL rating when possible.

IP 54
All electric motors used on Enerpac power pumps meet this protection and insulation classification.

DIN 20024
Enerpac thermoplastic hoses are related to the criteria set forth in Deutsche Industrie Norm 20024.

Canadian Standards Association
Where specified, Enerpac electric pump assemblies meet the design, assembly and test requirements of the Canadian Standards Association.

Product Design Criteria
All hydraulic components are designed and tested to be safe for use at maximum 700 bar pressure unless otherwise specifically noted.

EMC Directive 89/336/EEC
Where specified, Enerpac electric power pumps meet the requirements for Electro-magnetic Compatibility per EMC Directive 89/336/EEC.

CE Marking & Conformity
Enerpac provides a Declaration of Conformity and CE marking for products that conform with the European Community Directives.

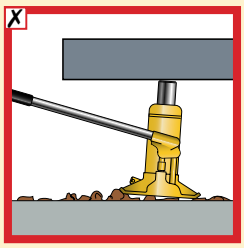
Safety Instructions

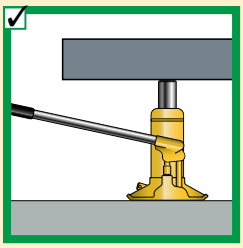
ENERPAC
Hydraulic Technology Worldwide

Hydraulic power is one of the safest methods of applying force to your work - when used correctly. And to that end we offer some DOs and DON'Ts, simple common sense points which apply to practically all Enerpac hydraulic products.

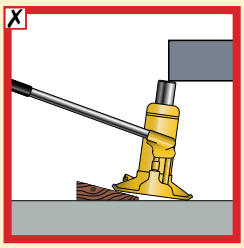
The line drawings and application photo's of Enerpac products throughout this catalog are used to portray how some of our customers have used hydraulics in industry. In designing similar systems, care must be taken to select the proper components that provide safe operation and fit your needs. Check to see if all safety measures have been taken to avoid the risk of injury and property damage from your application or system. Enerpac can not be held responsible for damage or injury, caused by unsafe use, maintenance or application of its products. Please contact the Enerpac office or a representative for guidance when you are in doubt as to the proper safety precautions to be taken in designing and setting up your particular system.
In addition to these tips, every Enerpac product comes with instructions spelling out specific safety information. Please read them carefully.

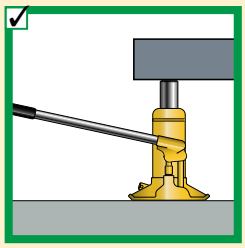
Jacks



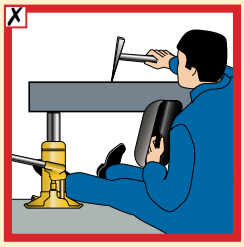


◄ Provide a level and solid support for the entire jack base area.

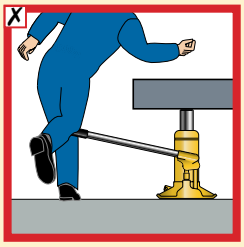


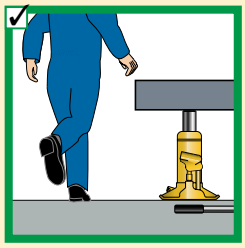


◄ The entire jack saddle must be in contact with the load. Movement of the load to be in the same direction as jack plunger.



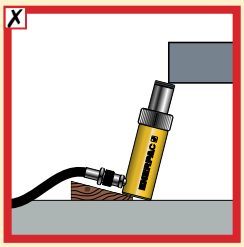
◄ Never place any part of your body under the load. Ensure the load is on a solid support before venturing under.

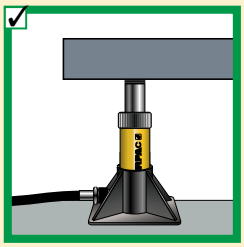




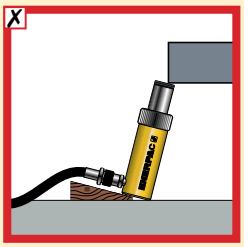
◄ Remove the jack handle when it is not being used.

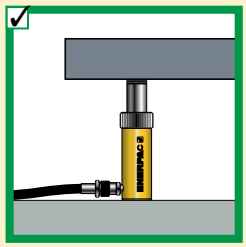
Cylinders



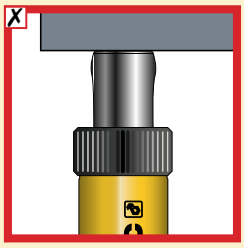


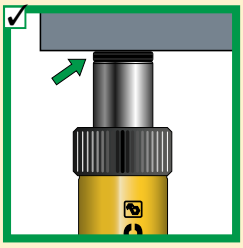
◄ Provide a solid support for the entire cylinder base area. Use cylinder base attachment for more stability.



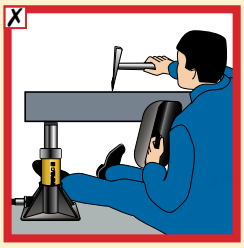


◄ The entire cylinder saddle must be in contact with the load. Movement of the cylinder must be parallel with the movement of the load.



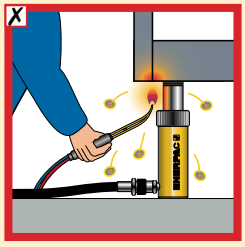


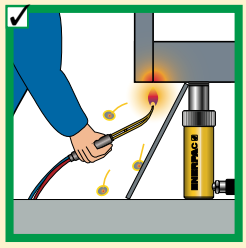
◄ Do not use cylinder without saddle. This will cause plunger to "mushroom". Saddles distribute load evenly on the plunger.



◄ As with jacks, never place any part of your body under the load. Load must be on cribbing before venturing under.

◄ Always protect cylinder threads for use with attachments.



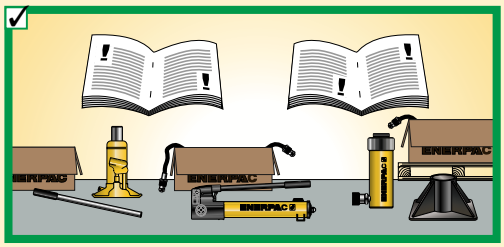


◄ Keep hydraulic equipment away from open fire and tempertures above 65 °C (150 °F).

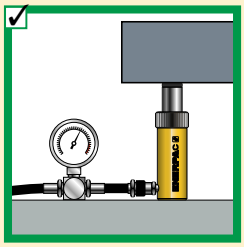
Safety Instructions

General

**Manufacturer's rating of load and stroke are maximum safe limits.
Good practice encourages using only 80% of these ratings!**

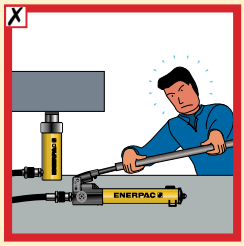


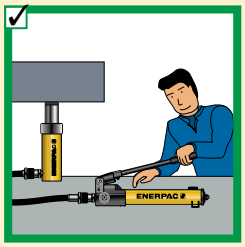
◂ Always read instructions and safety warnings that come with your Enerpac hydraulic equipment.



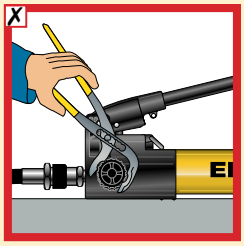
◂ Don't override the factory setting of relief valves. Always use a gauge to check system pressure.

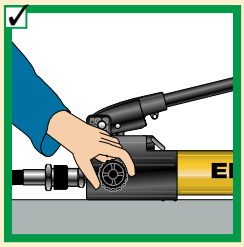
Pumps



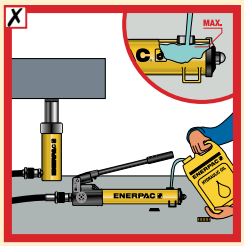


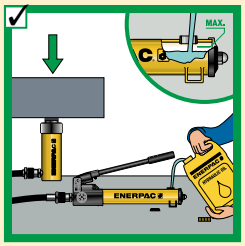
◂ Don't use handle extenders. Hand pumps should be easy to operate when used correctly.



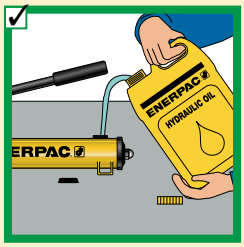


◂ Close release valve finger tight. Using force will ruin the valve.



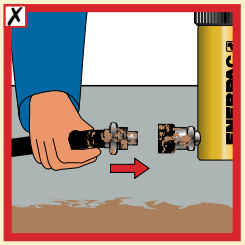


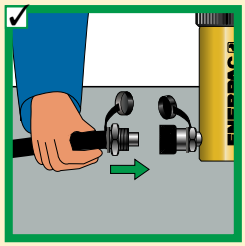
◂ Fill pump only to recommended level. Fill only when connected cylinder is fully retracted.



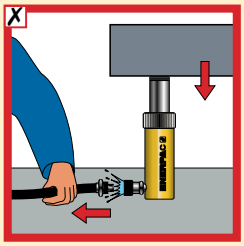
◂ Use only genuine Enerpac hydraulic oil. Wrong fluid can destroy seals and pump and will render your warranty null and void your guarantee.

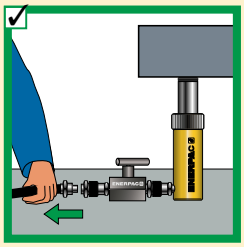
Hoses and couplers



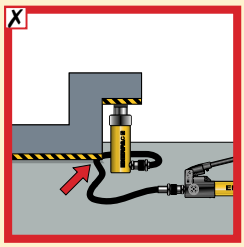


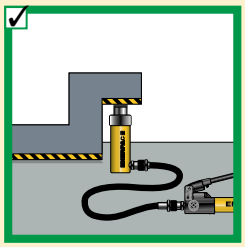
◂ Clean both coupler parts before connecting. Use dust caps when coupler parts are not connected.



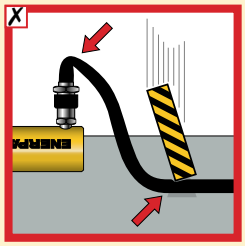


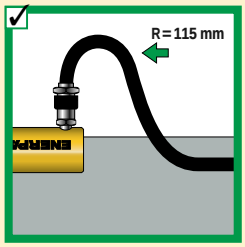
◂ Detach cylinder only when fully retracted or use shut-off valves or safety valves to lock-in cylinder pressure



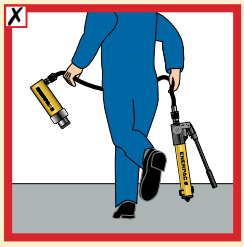


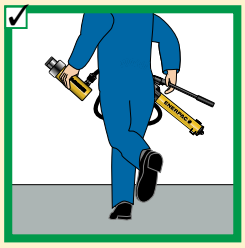
◂ Keep hoses away from the area beneath loads.





◂ Don't kink hoses. Bending radius should be at least 115 millimetres. Don't drive over or drop heavy objects on hoses.





◂ Don't lift hydraulic equipment by the hoses.

- Lift slowly and check often
- Avoid standing in the line of force
- Anticipate possible problems and take steps to avoid them

Pump Selection

ENERPAC
Hydraulic Technology Worldwide

▼ HAND PUMP AND SINGLE-ACTING CYLINDER MATCHING CHART

Capacity (ton) ▸ / ▼ Stroke	5 t	10 t	15 t	25 t	30 t	50 t	60 t	75 t	100 t	150 t
< 25 mm										
25 mm										
50 mm										
75 mm										
100 mm										
125 mm										
150 mm										
175 mm										
200 mm										
225 mm										
250 mm										
300 mm										
325 mm										
350 mm										
	 P-392 Page: 68			 P-80 Page: 70		 P-462 Page: 70				

Note: Selection based on oil capacity requirements of cylinders.

▼ POWER PUMP SELECTION CHART

Oil Flow*	Low (0,1 - 0,3 l/min)		Medium (0,5 -2,0 l/min)		High (2,0 - 14,5 l/min)	
Usable Oil Capacity	1,9 - 3,8 litres	5,7 litres	4 - 40 litres	4 - 40 litres	10 - 40 litres	60 litres
Duty Cycle**	Intermittent	Extended	Intermittent	Extended	Extended	Extended
Portable/Stationary***	Portable	Stationary	Portable	Stationary	Stationary	Stationary
Recommended Series	**PU-Series Economy**	**PE-Series Submerged**	**ZU4-Series**	**ZE3-, ZE4- and ZE5-Series**	**ZE6-Series**	**8000-Series 9000-Series**
						
	Page: 78	Page: 80	Page: 86	Page: 90	Page: 90	Page: 96

* Oil Flow
- Determined by motor size
- Directly affects electrical power requirements
- Determines cylinder or tool speed

** Duty Cycle
- Extended applications require more than one hour of interrupted pump use
- Intermittent would be used less than one hour of continuous pump use.

*** Portability

Portable
- Ergonomic handles
- Flexible power requirements

Stationary
- Mounting options
- Normally requires stable power

Selection Worksheet

▼ **Complete the following information to select the right products:**

Cylinder Selection

Question:	*Tips/help*	*Data*	*Model Number*
Total force required in tons:	Total load		
Number of cylinders required:	Number of lifting points		
Force per cylinder in ton:	Should be 80% of total cylinder cap.		
Stroke required:	Plunger travel		
Single or double-acting (D/A):	D/A used when pull force is required, or retract speed is critical		
Type of plunger required:	Hollow or solid		
Collapsed height required:			
Optional saddle required:	Tilt, Grooved, Flat		
Cylinder base:	Improves stability		
Cylinder attachments: (RC-series)	Expanded functions		
Selected cylinder model:		▶	
Including coupler model:			

Pump Selection

The three most commonly selected pumps are hand pumps, electric pumps and air-driven pumps. Gas powered pumps, however can be selected in the same way.

Available power source: ☐ **Manual** ☐ **Electric** ☐ **Compressed Air** ☐ **Petrol**

Hand pump	Not for high cycle applications		
Single- or double-acting operation	Use 4-way valve for D/A applications		
	Check speed chart on page 117 for number of mm per stroke)		
Selected hand pump:		▶	
Electric or Compressed Air pump			
Need for portability:			
Duty cycle:	Intermittent or extended		
Required usable oil capacity:	Intermittent =1,2 x oil capacity		
	high cycle = 2 x oil capacity		
Available Voltage:			
Lifting speed (Important/not important):	Use speed chart on page 117		
Type of control:	Manual/remote pendant		
Type of actuation/function:	Advance/hold/retract		
Accessories:	Filter Kit, Level Switch, Roll bar ...		
Selected pump:		▶	
Including Coupler:	Oil connection		

System Components

Number of hoses and length required:			
Selected Hoses:		▶	
Manifold or tee:		▶	
Extra hose per manifold (2):		▶	
Gauge (kN or bar scale):	GF-series for high cycle	▶	
Gauge adapter:		▶	
Fittings:		▶	
Pressure Relief Safety Valve:		▶	
Load-holding Valve(s):		▶	
Hydraulic oil:		▶	

1 Cylinder
Applies hydraulic force.
Page **7**

2 Cylinder Base Plate
For applications like lifting where additional cylinder stability is required.
Page **12**

3 Pump
Provides hydraulic flow.
Page **67**

4 Hose
Transports hydraulic fluid.
Page **120-121**

5 Male Coupler
For quick connection of the hose to system components.
Page **122-123**

6 Female Coupler
For quick connection of the hose end to the system components.
Page **120-121**

7 Gauge
To monitor pressure of the hydraulic circuit.
Page **126-131**

8 Gauge adaptor
For quick and easy gauge installation. *Page* **132**

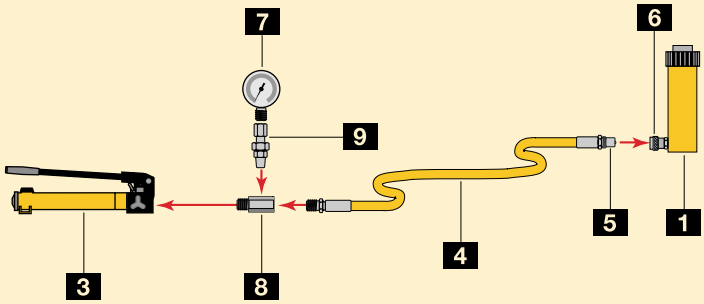
9 Swivel connector
Allows proper allignment of valves and/or gauges. Used when units being connected cannot be rotated.
Page **132**

10 Auto-Damper Valve V-10
Used to protect gauge from damage due to sudden pressure pulses in the system. Needs no adjustment and allows correct positioning of gauge, prior to tightening.
Page **138-139**

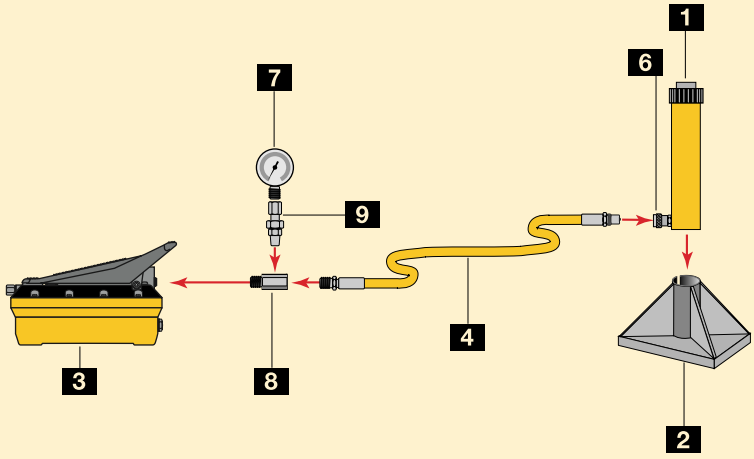
11 4-Way Directional Control Valve
Controls the direction of hydraulic fluid in a double-acting system.
Page **136**

Single-acting push application, such as in a press. The handpump offers controlled cylinder advance, but may require many handpump strokes in longer stroke applications when the cylinder capacity is 25 ton or above.

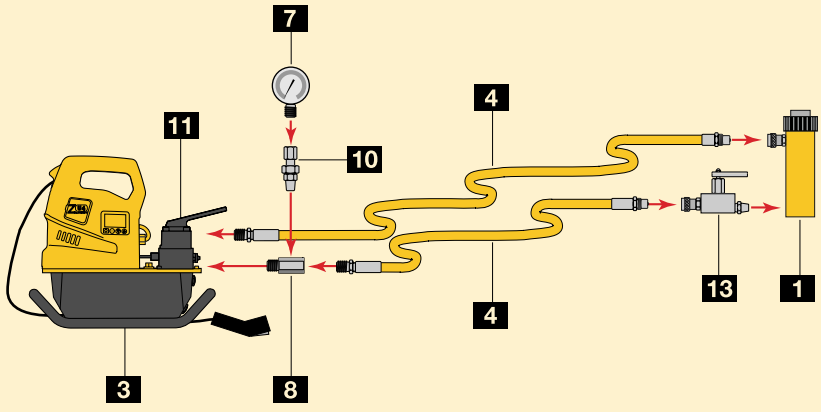
Examples of pump, hose and cylinder sets can be found on page 64.



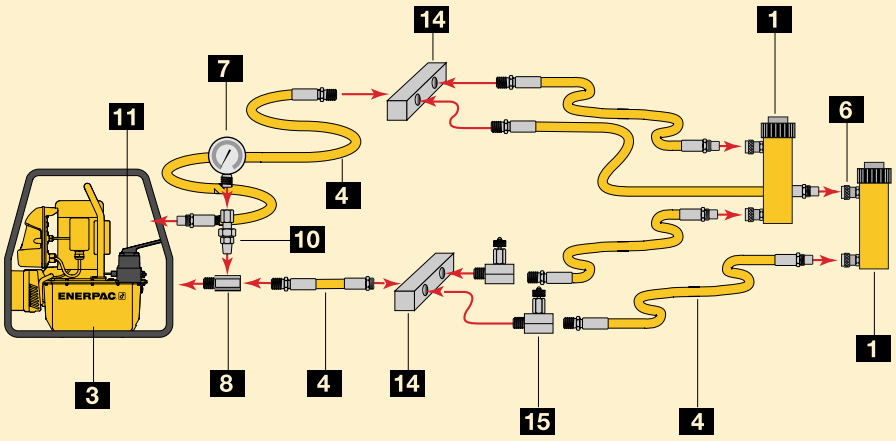
Single-acting cylinder with longer stroke used for lifting applications.



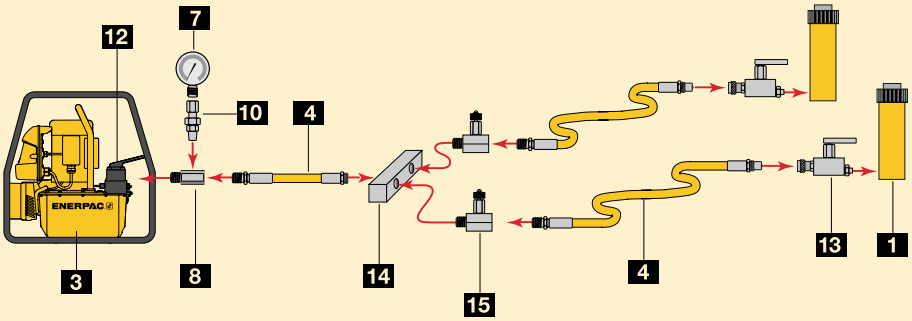
Double-acting cylinder set-up used for lifting applications where a slow controlled descent of the load must be maintained.



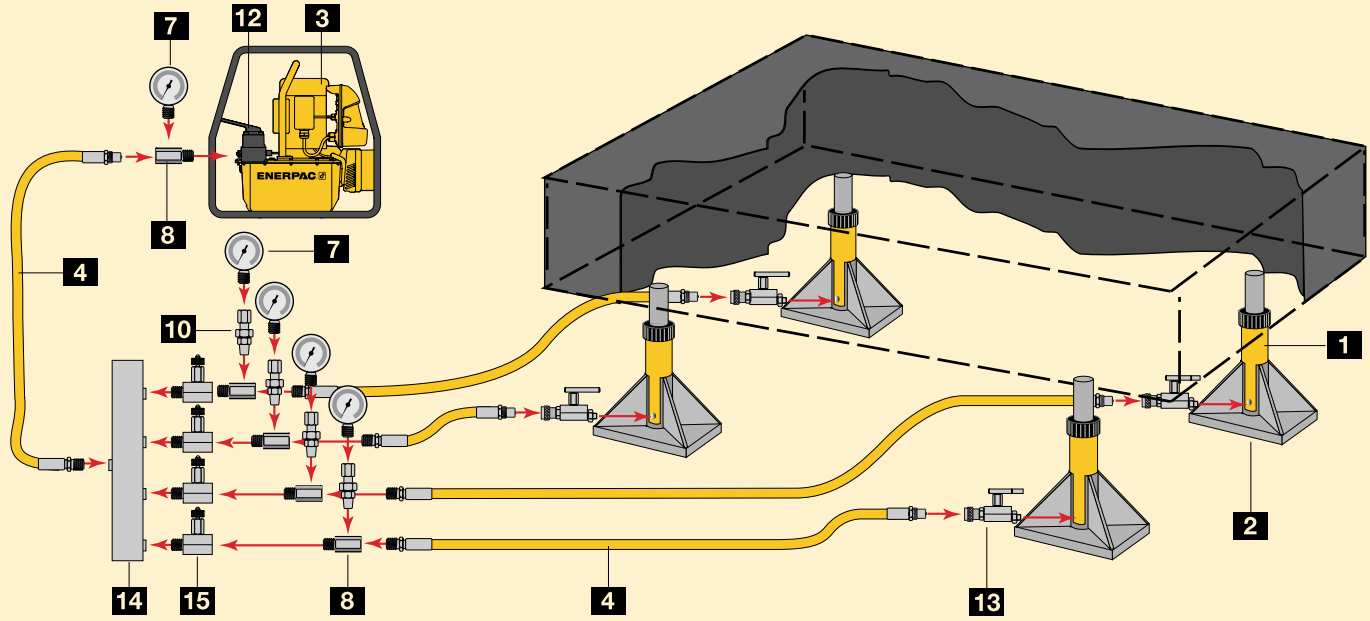
Double-acting cylinder set-up used in a push/pull application.



Two point lifting set-up using single-acting cylinders.



Four point lifting set-up, using single-acting cylinders and directional control valves.



12 3-Way Directional Control Valve
Controls the direction of hydraulic fluid in a single-acting system.
Page **134**

13 Safety Holding Valve
Controls load descent in lifting applications.
Page **138-139**

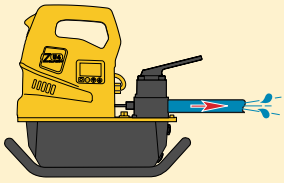
14 Manifold
Allows distribution of hydraulic fluid from one power source to several cylinders
Page **124**

15 Needle valve
Regulates the flow of hydraulic fluid to or from the cylinders.
Page **138-139**

www.enerpac.com
Visit our web site to learn more about hydraulics and system set-ups.

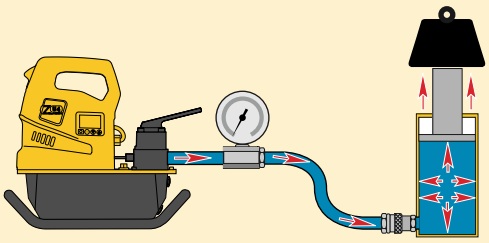
Flow

A hydraulic pump produces flow.



Pressure

Pressure occurs when there is resistance to flow.



Pascal's Law

Pressure applied at any point upon a confined liquid is transmitted undiminished in all directions (Fig.1).
This means that when more than one hydraulic cylinder is being used, each cylinder will lift at its own rate, depending on the force required to move the load at that point (Fig. 2).

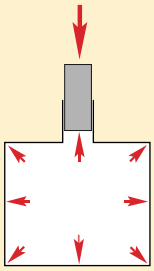


Figure 1

Cylinders with the lightest load will move first, and cylinders with the heaviest load will move last (Load A), as long as the cylinders have the same capacity.

To have all cylinders operate uniformly so that the load is being lifted at the same rate at each point, either control valves (see Valve section) or Synchronous Lift System components (see Cylinder section) must be added to the system (Load B).

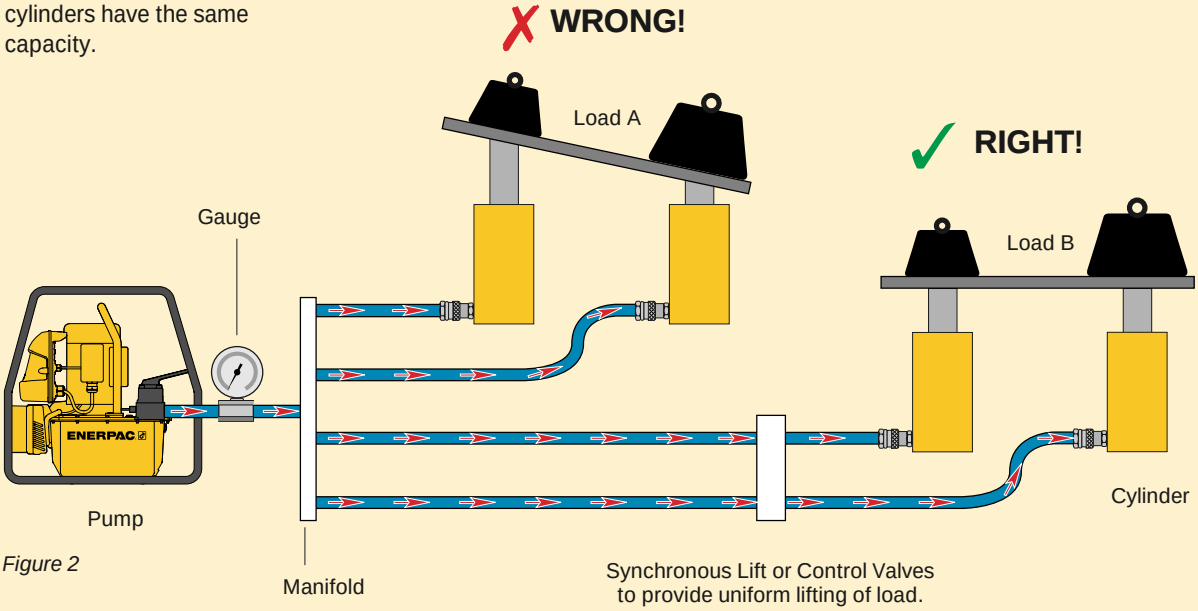


Figure 2

CAUTION!

When lifting or pressing, always use a gauge.
A gauge is your 'window' to the system. It lets you see what's going on. You will find the gauges in the System Components section.

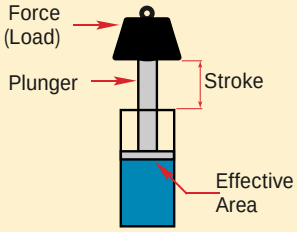
Page: 121

Learn more about hydraulics

Visit **www.enerpac.com** to learn more about hydraulics and system set-ups.

Force

The amount of force a hydraulic cylinder can generate is equal to the hydraulic pressure times the "effective area" of the cylinder (see cylinder selection charts).



Force	=	Hydraulic Working Pressure	x	Cylinder Effective Area
F	=	P	x	A

Use this formula to determine either force, pressure or effective area if two of the variables are known.

Example 1
An RC-106 cylinder with 14,5 cm^2 effective area operating at 700 bar will generate what force?
Force = 7000 N/cm^2 x 14,5 cm^2 = 101500 N = 101,5 kN

Example 2
An RC-106 cylinder lifting 7000 kg will require what pressure?
Pressure = 7000 x 9,8 N ÷ 14,5 cm^2 = 4731,0 N/cm^2 = 473 bar.

Example 3
An RC-256 cylinder is required to produce a force of 190.000 N. What pressure is required?
Pressure = 190.000 N ÷ 33,2 cm^2 = 5722,9 N/cm^2 = 572 bar.

Example 4
Four RC-308 cylinders are required to produce a force of 800.000 N. What pressure is required?
Pressure = 800.000 N ÷ (4 x 42,1 cm^2) = 4750,6 N/cm^2 = 476 bar.
Remember, since four cylinders are used together, the area for one cylinder must be multiplied by the number of cylinders used.

Example 5
A CLL-2506 cylinder is going to be used with a power source that is capable of 500 bar. What is the theoretical force available from that cylinder?
Force = 5000 N/cm^2 x 366,4 cm^2 = 1.832.000 N = 1832 kN.

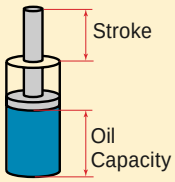
Cylinder Oil Capacity

The volume of oil required for a cylinder (cylinder oil capacity) is equal to the effective area of the cylinder times the stroke*.

Cylinder Oil Capacity	=	Cylinder Effective Area	x	Cylinder Stroke

* Note: these are theoretical examples and do not take into account the compressibility of oil under high pressure.

Example 1:
An RC-158 cylinder with 20,3 cm^2 effective area and 200 mm stroke requires what volume of oil?
Oil Capacity = 20,3 cm^2 x 20 cm = 406 cm^3



Example 2:
An RC-5013 cylinder has an effective area of 71,2 cm^2 and a stroke of 320 mm. How much oil will be required?
Oil Capacity = 71,2 cm^2 x 32 cm = 2278,4 cm^3

Example 3:
An RC-10010 cylinder has an effective area of 133,3 cm^2 and a stroke of 260 mm. How much oil will it require?
Oil Capacity = 133,3 cm^2 x 26 cm = 3466 cm^3

Example 4:
Four RC-308 cylinders are being used, each with an effective area of 42,1 cm^2 and a stroke of 209 mm. How much oil will be required?
Oil Capacity = 42,1 cm^2 x 20,9 cm = 880 cm^3 for one cylinder
Multiply by four to obtain the required capacity: 3520 cm^3

CAUTION!
Enerpac oil will compress 2,28% at 350 bar and 4,1% at 700 bar.

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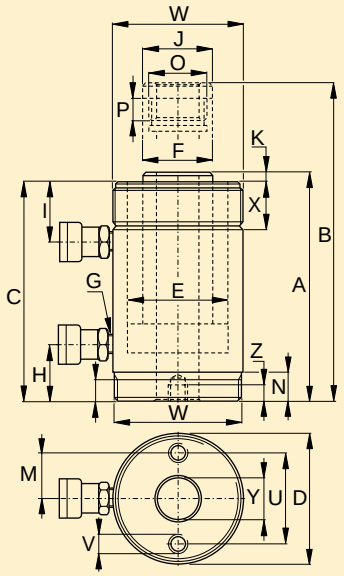
Conversion Tables

ENERPAC Hydraulic Technology Worldwide

Key to cylinder dimensions

Dimensions shown in the Selection Charts of the cylinder section are identified on the relevant drawings by the capital letter references listed here: A for collapsed height through Z_1 for depth of internal base thread.



A = Collapsed height
B = Extended height
C = Cylinder body length
D = Cylinder outside diameter
D_1 = Cylinder width
E = Cylinder inside diameter
F = Plunger rod diameter
G = Oil inlet thread
H = Cylinder bottom to advance port
I = Cylinder top to retract port
J = Saddle outside diameter
K = Cylinder rod protrusion at collapsed height
L = Plunger centre to side of base
M = Mounting holes to plunger centre
N = Length of smaller cylinder part
O = Plunger hole or thread of saddle
P = Plunger thread length
Q = Plunger outside thread
U = Bolt circle diameter of mounting holes
V = Thread of cylinder mounting holes
W = Collar thread
X = Collar thread length
Y = Centre hole diameter
Z = Internal base thread
Z_1 = Depth of internal base thread

Key to measurements

All capacities and measurements in the catalog are expressed in uniform values.
The conversion chart provides helpful information for their translation into equivalent systems.

All ton values specified in this catalogue are metric tonnes and are for cylinder class identification only.
Please refer to the kN data for calculations.

Free Conversion Calculator
Visit **enerpac.com** and download the free conversion calculator.

Pressure:

1 psi	= 0,069 bar
1 bar	= 14,50 psi
	= 9,8 N/cm²
	= 100.000 Pa
1 kPa	= 0,145 psi

Volume:

1 in³	= 16,387 cm³
1 cm³	= 0,061 in³
1 litre	= 61,02 in³
	= 0,264 gal
1 USgal	= 3785 cm³
	= 3,785 l
	= 231 in³

Weight:

1 pound (lb)	= 0,4536 kg
1 kg	= 2,205 lbs
1 metric ton	= 2205 lbs
	= 1000 kg
1 ton (short)	= 2000 lbs
	= 907,18 kg

Temperature:

To Convert °C to °F:
$T^{\circ F} = (T_{\circ C} \times 1{,}8) + 32$
To Convert °F to °C:
$T_{\circ C} = (T_{\circ F} - 32) \div 1{,}8$

Other measurements:

1 in	= 25,4 mm
1 mm	= 0,039 in
1 in²	= 6,452 cm²
1 cm²	= 0,155 in²
1 hp	= 0,746 kW
1 kW	= 1,359 hp
1 Nm	= 0,73756 Ft.lbs
1 Ft.lbs	= 1,355818 Nm
1 kN	= 225 lbs

Imperial to metric

Inches	Decimal	mm
1/16	.06	1,59
1/8	.13	3,18
3/16	.19	4,76
1/4	.25	6,35
5/16	.31	7,94
3/8	.38	9,53
7/16	.44	11,11
1/2	.50	12,70
9/16	.56	14,29
5/8	.63	15,88
11/16	.69	17,46
3/4	.75	19,05
13/16	.81	20,64
7/8	.88	22,23
15/16	.94	23,81
1	1.00	25,40

Cylinder Speed Charts

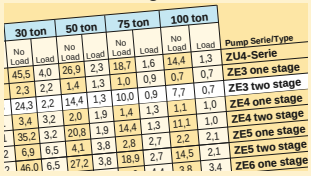
Cylinder Speed

This chart will help you calculate the time required for an Enerpac cylinder to lift a load when powered by a 700 bar Enerpac hydraulic pump. The Cylinder Speed Chart can also be used to determine the pump type and model best suited for an application when you know the plunger speed required.

To determine:

Cylinder plunger speed

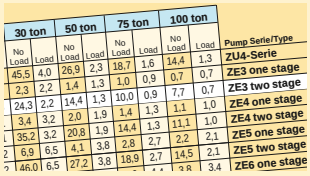
An RC-256 cylinder (25 ton) is powered by a ZE3-Series two stage pump. While lifting the load, the cylinder plunger travels at 3,0 mm per second. While extending towards the load, the cylinder plunger travels at 30,9 mm per second.



To determine:

Best matching pump

Your 25 ton cylinder needs to move a load at a speed of 3,0 mm per second. Simply go down from the top of the chart, to the value of 3,0 mm per second. Follow the chart to the right to find that the ZE3-Series pump is most suitable for your application.



Millimetres of Cylinder Plunger Travel per Hand Pump Plunger Stroke

Cyl. Capacity ▶	5 ton		10 ton		15 ton		25 ton		30 ton		50 ton		75 ton		100 ton			
▼ Power Source	No Load	Load	No Load	Load	No Load	Load	No Load	Load	No Load	Load	No Load	Load	No Load	Load	No Load	Load	Pump Type	Page
Manual	3,9	3,9	1,7	1,7	1,2	1,2	0,7	0,7	0,6	0,6	0,3	0,3	0,2	0,2	0,2	0,2	**P-391**	**68**
	17,6	3,9	7,8	1,7	5,5	1,2	3,4	0,7	2,6	0,6	1,6	0,3	1,0	0,2	0,8	0,2	**P-392**	**68**
	25,3	3,8	11,2	1,7	7,9	1,2	4,9	0,7	3,7	0,6	2,3	0,3	1,5	0,2	1,1	0,2	**P-80/801/84**	**70**
	61,4	3,9	27,1	1,7	19,3	1,2	11,8	0,7	9,0	0,6	5,5	0,3	3,5	0,2	2,8	0,2	**P-802/842**	**70**
	197	7,4	87,1	3,3	61,8	2,3	37,9	1,4	29,0	1,1	17,7	0,7	11,4	0,4	8,8	0,3	**P-462/464**	**70**

Millimetres per Second of Cylinder Plunger Travel

Cyl. Capacity ▶	5 ton		10 ton		15 ton		25 ton		30 ton		50 ton		75 ton		100 ton			
▼ Power Source	No Load	Load	No Load	Load	No Load	Load	No Load	Load	No Load	Load	No Load	Load	No Load	Load	No Load	Load	Pump Serie/Type	Page
Electric (speed based on 50 Hz)	86	8,3	38	3,7	27	2,6	17	1,6	13	1,3	7,7	0,7	5,4	0,5	4,1	0,4	**PU Economy**	**78**
	53	7,1	24	3,2	17	2,2	10	1,4	8,1	1,1	4,8	0,6	3,3	0,4	2,6	0,3	**PE Submerged**	**80**
	295	25,6	132	11,5	94,4	8,2	57,7	5,0	45,5	4,0	26,9	2,3	18,7	1,6	14,4	1,3	**ZU4-Series**	**84, 86**
	15,1	14,1	6,8	6,3	4,8	4,5	3,0	2,8	2,3	2,2	1,4	1,3	1,0	0,9	0,7	0,7	**ZE3 one stage**	**84, 90**
	158	14,1	70,7	6,3	50,5	4,5	30,9	2,8	24,3	2,2	14,4	1,3	10,0	0,9	7,7	0,7	**ZE3 two stage**	**84, 90**
	22,3	21,0	10,0	9,4	7,1	6,7	4,4	4,1	3,4	3,2	2,0	1,9	1,4	1,3	1,1	1,0	**ZE4 one stage**	**84, 90**
	228	21,0	102	9,4	72,9	6,7	44,6	4,1	35,2	3,2	20,8	1,9	14,4	1,3	11,1	1,0	**ZE4 two stage**	**84, 90**
	44,9	42,1	20,1	18,9	14,4	13,5	8,8	8,2	6,9	6,5	4,1	3,8	2,8	2,7	2,2	2,1	**ZE5 one stage**	**84, 90**
	298	42,1	133	18,9	95,3	13,5	58,3	8,2	46,0	6,5	27,2	3,8	18,9	2,7	14,5	2,1	**ZE5 two stage**	**84, 90**
	76,9	70,0	34,5	31,4	24,6	22,4	15,1	13,7	11,9	10,8	7,0	6,4	4,9	4,4	3,8	3,4	**ZE6 one stage**	**84, 90**
	315	70,0	141	31,4	101	22,4	61,7	13,7	48,7	10,8	28,8	6,4	20,0	4,4	15,4	3,4	**ZE6 two stage**	**84, 90**
	Use the formula below to calculate cylinder plunger speed																**PP 8000/9000**	**96**
Air (at 6,9 bar air pressure)	25,9	4,2	11,6	1,9	8,2	1,3	5,0	0,8	4,0	0,6	2,3	0,4	1,6	0,3	1,3	0,2	**Turbo II Air**	**98**
	17	3,4	7,6	1,5	5,4	1,1	3,3	0,7	2,6	0,5	1,5	0,3	1,1	0,2	0,8	0,2	**PA-Series**	**100**
	277	3,8	123	1,7	88	1,2	53	0,7	42	0,6	25	0,3	17	0,2	13,0	0,2	**PAM-Series**	**101**
	357	33,6	160	15,1	114	10,8	69,9	6,6	55,1	5,2	32,6	3,1	22,6	2,1	17,4	1,6	**ZA4-Series**	**102**
Petrol	85	17	38	7,6	27	5,4	16	3,3	13	2,6	7,7	1,5	5,3	1,1	4,1	0,8	**PGM-20 Atlas**	**106**
	205	23	91	10	65	7,4	39	4,5	31	3,6	18	2,1	13	1,5	9,8	1,1	**PGM-30 Atlas**	**106**
	205	43	91	19	65	13	39	8,2	31	6,5	18	3,8	13	2,7	9,8	2,0	**PGM-50 Atlas**	**106**

No Load indicates the plunger speed as the plunger extends towards the load (1st stage).

Load indicates the plunger speed as the load is lifted at a system pressure of 700 bar (2nd stage).

$$\text{Cylinder Plunger Speed (mm/sec)} = \frac{\text{Pump Oil Flow } (cm^3/min) \times 10}{\text{Cylinder Effective Area } (cm^2) \times 60}$$

Example: At what speed (V) will the RC-256 (25 ton) cylinder move when powered by a ZE3-Series pump?

RC-256 Cylinder Effective Area = 33,2 cm^2

ZE3-Series pump oil Flow (no load) = 6150 cm^3/min

$$\text{Speed V} = \frac{6150\ cm^3/min \times 10}{33,2 \times 60} = 30,9\ mm/sec$$

Valve Information

ENERPAC
Hydraulic Technology Worldwide

Ways

The (oil) ports on a valve.
A 3-way valve has 3 ports:
pressure (P), tank (T), and cylinder (A).
A 4-way valve has 4 ports:
pressure (P), tank (T), advance (A) and retract (B).

Single-Acting cylinders require at least a 3-way valve, and can, under certain instances, be operated with a 4-way valve.

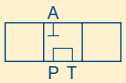
Double-Acting cylinders require a 4-way valve, providing control of the flow to each cylinder port.

Positions

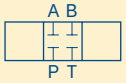
The number of control points a valve can provide. A 2-position valve has the ability to control only the advance or retraction of the cylinder. To be able to control the cylinder with a hold position, the valve requires a 3rd position.

Centre Configuration

The centre position of a valve is the position at which there is no movement required of the hydraulic component, whether a tool or cylinder.

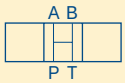


The most common is the **Tandem Centre**. This configuration provides for little to no movement of the cylinder and the unloading of the pump. This provides for minimum heat build-up.

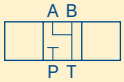


The next most common is the **Closed Centre** configuration, which is used mostly for independent control of multi-cylinder applications. This configuration again provides for little to no movement of the cylinder, but also dead-heads the pump, isolating it from the circuit.
Use of this type of valve may require some means of unloading the pump to prevent heat build-up.

There are many more type of valves, such as Open Centre and Float Centre.
These valves are used mostly in complex hydraulic circuits and require other special considerations.



Open Centre

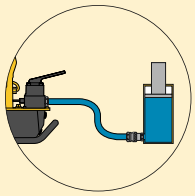


Float Centre

Directional Control Valves

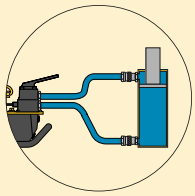
3-Way Valves

are used with single-acting cylinders



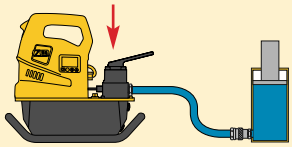
4-Way Valves

are used with double-acting cylinders

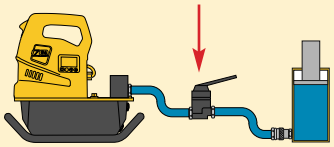


Valves may be either pump mounted or remote mounted.

Pump Mounted

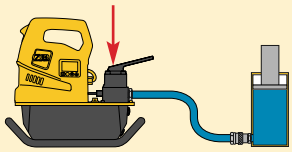


Remote Mounted

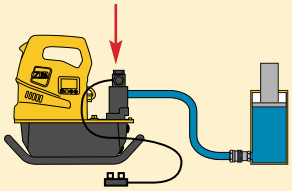


Valves may be either manually or solenoid operated.

Manually Operated



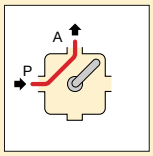
Solenoid Operated



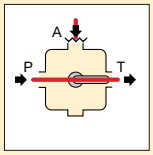
Advance Hold Retract

Single-acting cylinder

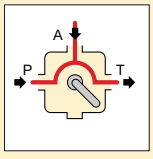
Controlled by a 3-way, 3-position valve.



Advance
The oil flows from the pump pressure port P to the cylinder port A: the cylinder plunger will extend.



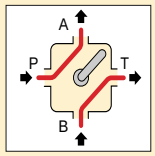
Hold
The oil flows from the pump pressure port P to the tank T. The cylinder port A is closed: the cylinder plunger will maintain its position.



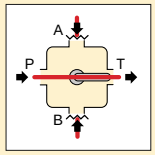
Retract
The oil flows from the pump and cylinder port A to the tank T: the cylinder plunger will retract.

Double-acting cylinder

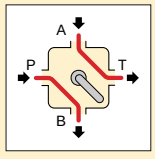
Controlled by a 4-way, 3-position valve.



Advance
The oil flows from the pump pressure port P to the cylinder port A and from cylinder port B to tank T.



Hold
The oil flows from the pump pressure port P to the tank T. The cylinder ports A and B are closed: the cylinder plunger will maintain position.



Retract
The oil flows from the pump pressure port P to cylinder port B and from cylinder port A to tank T: the cylinder plunger will retract.

System Components Section Overview

ENERPAC System Components:

All the additional elements you need to complete your high pressure hydraulic system and get started.

Engineered to work with your Enerpac cylinders, pumps and tools, all Enerpac components are designed to the most exacting standards.

With this complete line of hydraulic hoses, couplers, fittings, manifolds, oil and gauges, Enerpac has the accessories to complement your system and ensure the efficient operation, long life and safety of your hydraulic equipment.

700-Series, High Pressure Hoses

▼ Shown from top to bottom: **HA-7206B, HC-7206, H-7206**

Thermo-Plastic Safety Hoses (700-Series)

- **For demanding applications, featuring a 4:1 design factor**
- **Maximum working pressure of 700 bar**
- **Four layer design, including two high strength steel wire braids**
- **Outside jacket is polyurethane, to provide maximum abrasion resistance**
- **Exhibits low volumetric expansion under pressure to enhance overall system efficiency**
- **Crimped-on rubber strain relief for improved life and durability on all models**

▼ *To prevent back pressure and to increase cylinder retraction speed, when using long hoses with single-acting cylinders, the Enerpac HC-7300-Series of hoses with increased internal diameter is the best choice.*

Safety and Quality

To ensure the integrity of your system, specify only Enerpac hydraulic hoses.

WARNING !

- **Do not exceed 700 bar maximum pressure.**
- **Do not handle hoses which are under pressure.**

More safety instructions in our 'Yellow pages'.

Page: **110**

▼ **Hose End Couplings**

1/4" NPTF	
3/8" NPTF	
A-604	
A-630	
AH-604	
AH-630	
C-604	
CH-604	

High Pressure Hydraulic Hoses

700 Series

Inside Diameter:
6,4 and 9,7 mm

Length:
0,6 - 15 m

Maximum Operating Pressure:
700 bar

Internal Diameter	Hose End Assemblies and Couplers*		Hose Length	Model Number	
(mm)	End one	End two	(m)		(kg)
6,4	1/4" NPTF			–	
				–	
		A-630	1,8	HB-7206QB	1,1
				–	
		CH-604	1,8	HC-7206Q	1,0
	3/8" NPTF	3/8" NPTF	0,6	H-7202	0,5
			0,9	H-7203	0,7
			1,8	H-7206	0,9
			3,0	H-7210	1,4
			6,1	H-7220	2,8
			9,1	H-7230	4,5
			15	H-7250	7,0
		A-604		–	
			1,8	HA-7206B	1,1
				–	
		AH-604		–	
				–	
			1,8	HA-7206	1,0
			3,0	HA-7210	1,5
		AH-630	1,8	HB-7206	1,0
		C-604	0,9	HC-7203B	1,0
			1,8	HC-7206B	1,3
			3,0	HC-7210B	1,8
		CH-604	0,9	HC-7203	0,8
			1,8	HC-7206	1,0
			3,0	HC-7210	1,5
			6,1	HC-7220	2,9
	CH-604	CH-604	1,8	HC-7206C	1,1
			15	HC-7250C	7,0
9,7	3/8" NPTF	3/8" NPTF	1,8	H-7306	1,6
			–	–	–
			3,0	H-7310	2,4
			6,1	H-7320	4,5
			9,1	H-7330	7,3
			15	H-7350	11,5
		CH-604	1,8	HC-7306	1,7
			3,0	HC-7310	2,5
			6,1	HC-7320	5,1

* For technical information on couplers see next page.

Torque Wrench Hoses

Use Enerpac THC and THQ-Series twin safety hoses with double-acting wrenches to ensure the integrity of your hydraulic system.

Page: 208

Fittings

For additional fittings see the fitting page of the System Components section.

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Hose Oil Capacity

When using greater hose lengths, it is sometimes necessary to fill the pump reservoir after filling the hoses. To determine the hose oil capacity, use the following:

For 6,4 mm inside diameter hoses:
Capacity (cm^3) = 32,1699 x Length (m)

For 9,7 mm inside diameter hoses:
Capacity (cm^3) = 73,8981 x Length (m)

▼ Shown: **FH-604, FR-400, AR-630, C-604, AH-604, AR-400**

Quick Connection of Hydraulic Lines

Thread sealer

To seal NPTF threads use one of the new anaerobic thread sealers or Teflon paste. When using Teflon Tape, apply the tape one thread from the end of a fitting to prevent it from winding up in the hydraulic system.

WARNING!
Couplers should be pressurized only when completely connected and should not be coupled or uncoupled when pressurized.

More safety instructions in our 'Yellow Pages'.

Page: 110

3/8" High Flow Couplers

- **Standard equipment on most Enerpac cylinders**
- **Recommended for use on all Enerpac pumps and cylinders where space and porting permits**
- **Includes "2-in-1" dust cap for use on male and female coupler halves**

3/8" High Pressure 'Flush-face' Couplers

- **Featuring "Push-to-connect" operation, to guarantee good connection every time**
- **Flush-face, zero-leak operation for minimal spillage**
- **HTMA* recognized for safety and performance**
- **Will not interchange with low pressure couplers**

3/8" Regular Spee-D-Coupler®

- **For medium duty applications with hand pumps**
- **Includes female aluminium dust cap**

1/4" Regular Coupler

- **For use with small cylinders and hand pumps**
- **Includes female aluminium dust cap**

1/4" Spin-on Torque Wrench Couplers

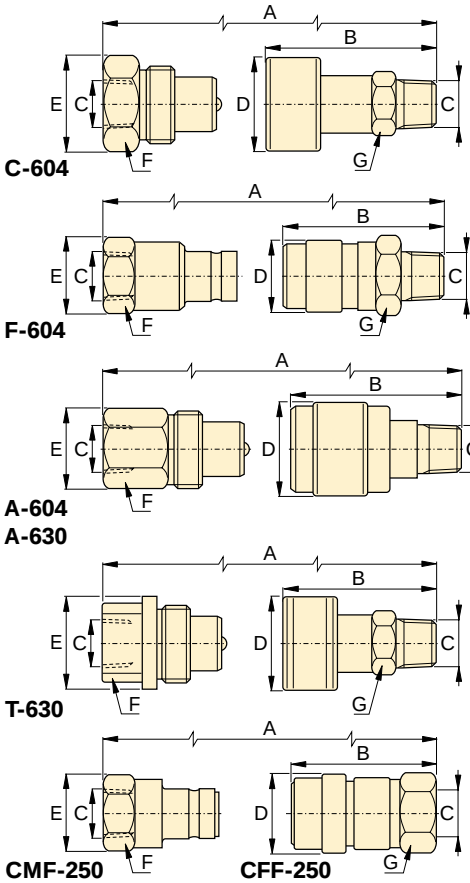
- **Use with 700 bar S and W-series torque wrenches, THQ-series hoses and torque wrench pumps with suffix "Q"**

1/4" Lock-ring Torque Wrench Couplers (dustcaps included)

- **Use with 800 bar SQD and HXD-series torque wrenches, THC-series hoses and torque wrench pumps**

* Hydraulic Tool Manufacturers Association

▼ *With the use of Enerpac High Flow Couplers, hoses are easily installed for multiple hydraulic line connections in this 34 points PLC-controlled lifting system.*

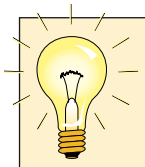


A / C
F / T
Series

Maximum Flow Capacity:
6,1 - 40,0 l/min

Thread:
1/4" and 3/8" NPTF

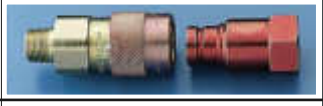
Maximum Operating Pressure:
700 and 800 bar



Metal Dust Caps

Steel dust caps are available for the C-604 series couplers. Order model number:

CD-411M for female half
CD-415M for male half

Maximum Flow Capacity (l/min)	Coupler Type	Model Numbers			Dimensions (mm)							Dust Cap(s)
		Complete Set	Female Half	Male Half	A*	B	C	D	E	F	G	
35	700 bar High-Flow Coupler 	C-604	CR-400	CH-604	83	64	3/8" NPTF	35	36	32	25	(2x) CD-411
40	700 bar Flush-Face coupler 	F-604	FR-400	FH-604	110	72	3/8" NPTF	31	31	26	28	–
7,6	700 bar Regular Spee-D-Coupler© 	A-604	AR-400	AH-604	77	42	3/8" NPTF	28	26	23	19	Z-410 female only
7,6	700 bar Regular Coupler 	A-630	AR-630	AH-630	66	35	1/4" NPTF	22	20	19	15	Z-640 female only
11,4	700 bar Spin-on Coupler 	T-630	TR-630	TH-630	73	60	1/4" NPTF	29	29	19	21	–
6,1	800 bar Lock-ring Coupler 	–	CFF-250	CMF-250	76	58	1/4" NPTF	23	28	24	22	–

* Value A is total length when male and female half are connected.

▼ Shown : **A-65, FZ-1625, HF-95Y, FZ-1634, FZ-1607, A-64, AM-21**

The Genuine Range

- **Maximum pump volumetric efficiency**
- **Maximum internal heat transfer**
- **Prevents pump cavitation**
- **Additives prevent rust, oxidation and sludge**
- **High viscosity index**
- **Maximum film protective lubricity**

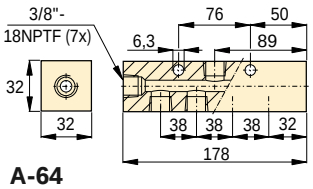
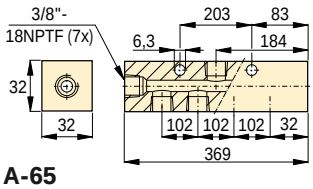
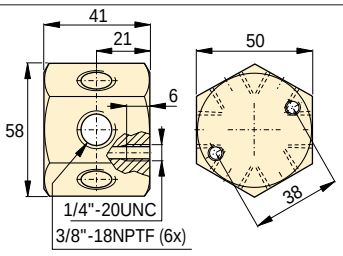
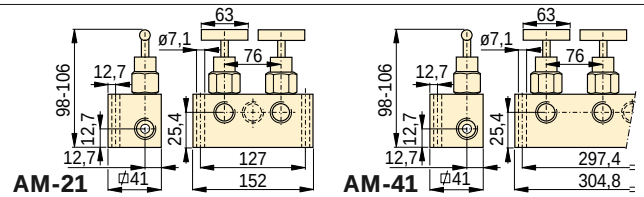
Hydraulic Oil

Contents	Model Number	
1 litre	**HF-95X**	Use only genuine Enerpac Hydraulic Oil. The use of any other fluid will render your Enerpac warranty null and void.
5 litres	**HF-95Y**	
60 litres	**HF-95Z**	

▼ **Oil Specifications chart**

Viscosity Index	100 min
Viscosity at 210°F	42/45 S.U.S.
Viscosity at 100°F	150/165 S.U.S.
Viscosity at 0°F	<12,000 S.U.S.
API Gravity	31.0/33.0
Flash, C.O.C.°F	400
Pour Point, °F	-25
Aniline Point, °F	210/220
Paraffinic Base Colour	Blue

Manifolds

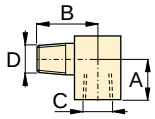
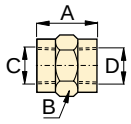
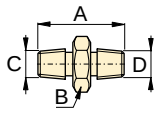
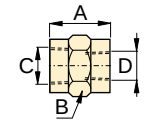
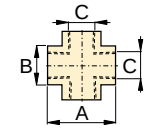
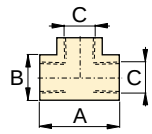
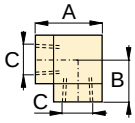
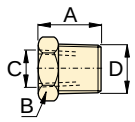
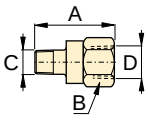
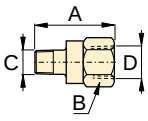
Description		Model Number	Dimensions (mm)
178 mm Long Manifold with 7 female ports		**A-64**	 **A-64**
369 mm Long Manifold that allows direct mounting of control valves to the manifold. Plugs .38 NPTF.		**A-65**	 **A-65**
6-Port Hexagon Manifold. Plugs furnished for all ports 3/8"-18 NPTF.		**A-66**	
Premounted Manifolds Split-flow valve to control two or four single-acting cylinders simultaneously. AM-21 with 5 ports 3/8" NPTF. AM-41 with 7 ports 3/8" NPTF.		**AM-21** **AM-41**	

Recommended Tubing

Enerpac does not supply high-pressure pipe or tubing, but recommends the use of cold drawn steel tubing in stead of regular pipe in the following dimensions:
In stead of .25" pipe, use 13 mm O.D. x 11 ga. (3 mm) wall.
In stead of .38" pipe, use 9 mm Schedule 80 seamless pipe.
In steadof .50" pipe, use 21 mm O.D. x .4 mm wall.
This tubing can be threaded with standard pipe threading dies.

A, AM
BFZ
FZ
HF
Series

Fittings 700 bar

			Model Number	Dimensions (mm)				
				A	B	C	D	
Street Elbow								
From:	3/8"-NPTF Male		**FZ-1616**	23	33	3/8"-18 NPTF	3/8"-18 NPTF	
To:	3/8"-NPTF Female							
Reducing Connector								
From:	3/8"-NPTF Female		**FZ-1615**	28	25	3/8"-18 NPTF	1/4"-18 NPTF	
To:	1/4"-NPTF Female							
From:	1/2"-NPTF Female		**FZ-1625**	47	29	1/2"-14 NPTF	3/8"-18 NPTF	
To:	3/8"-NPTF Female							
Hexagon Nipple								
From:	To:							
1/4"-NPTF	1/4"-NPTF		**FZ-1608**	38	16	1/4"-18 NPTF	1/4"-18 NPTF	
3/8"-NPTF	3/8"-NPTF		**FZ-1619**	51	19	3/8"-18 NPTF	3/8"-18 NPTF	
3/8"-NPTF	3/8"-NPTF		**FZ-1617**	37	19	3/8"-18 NPTF	3/8"-18 NPTF	
Coupling								
From:	To:							
3/8"-NPTF	3/8"-NPTF		**FZ-1614**	29	23	3/8"-18 NPTF	3/8"-18 NPTF	
1/4"-NPTF	1/4"-NPTF		**FZ-1605**	29	19	1/4"-18 NPTF	1/4"-18 NPTF	
Cross			**FZ-1613**	45	25	3/8"-18NPTF	–	
From:	3/8"-NPTF Female							
To:	3/8"-NPTF Female							
Tee								
From:	To:							
3/8"-NPTF	3/8"-NPTF		**FZ-1612**	45	25	3/8"-18 NPTF	–	
1/4"-NPTF	1/4"-NPTF		**FZ-1637**	45	24	1/4"-18 NPTF	–	
3/8"-NPTF	3/8"-NPTF		**BFZ-16312**	57	3/8"-18 NPTF	3/8"-18 NPTF	–	
Elbow								
From:	To:							
3/8"-NPTF	3/8"-NPTF		**FZ-1610**	33	20	3/8"-18 NPTF	–	
1/4"-NPTF	1/4"-NPTF		**FZ-1638**	36	24	1/4"-18 NPTF	–	
Reducer								
From:	To:							
3/8"-NPTF	1/4"-NPTF		**FZ-1630**	19	19	1/4"-18 NPTF	3/8"-18 NPTF	
1/4"-NPTF	1/2"-NPTF		**BFZ-1630**	28	22	1/4"-18 NPTF	1/2"-14 NPTF	
3/8"-NPTF	G1/4"		**BFZ-16301**	19	19	G 1/4"	3/8"-18 NPTF	
Adaptor								
From:	To:							
G 1/4"	1/4"-NPTF		**BFZ-16411**	35	19	1/4"-18 NPTF	G 1/4"	
G 1/4"	1/8"-NPTF		**BFZ-16421**	31	19	1/8"-27 NPTF	G 1/4"	
G 3/8"	1/4"-NPTF		**BFZ-16323**	43	24	1/4"-18 NPTF	G 3/8"	
G 3/8"	3/8"-NPTF		**BFZ-16324**	43	24	3/8"-18 NPTF	G 3/8"	
Adaptor								
From:	To:							
1/4"-NPTF	3/8"-NPTF		**FZ-1055**	44	23	1/4"-18 NPTF	3/8"-18 NPTF	
1/4"-NPTF	1/8"-NPTF		**FZ-1642**	30	19	1/8"-27 NPTF	1/4"-18 NPTF	
1/2"-NPTF	3/8"-NPTF		**FZ-1634**	42	28	3/8"-18 NPTF	1/2"-14 NPTF	

▼ Shown from left to right: **GP-230B, GF-835B, GP-10S**

- **GF-series gauges: calibrated with dual scale reading for pressure and force in bar and kN**
- **GF-series gauges: all pressure sensing parts are sealed and dampened by glycerine for long life**
- **GP-series gauges: calibrated with dual scale reading for pressure in bar and psi**
- **Excellent readability: gauge face dimensions 100 mm**
- **Fast, easy installation**
- **Stainless steel gauge cases for corrosion resistance**

▼ *A GP-10S gauge is used on this press to check the hydraulic pressure required to bend flat steel bar.*

Visual Reference for System Pressure and Force

Auto-Damper Valve V-10

For automatic control of gauge fluctuations, the V-10 Auto-Damper Valve controls the movement of the gauge needle by restricting oil flow in and out of the gauge. No adjustments needed.

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Snubber Valve V-91

Infinitely adjustable for metering oil out of a gauge. The V-91 Snubber Valve is also suitable as a shut-off valve to protect the gauge during high cycle applications.

Page: 141

	Used With
	All Cylinders
	All Cylinders
	All 5 ton Cylinders
	All 10 ton Cylinders
	All 25 ton RC-Cylinders
	All 50 ton Cylinders
	13 ton RCH-Series
	RCS-201, 302
	RCS-502, 1002
	RCH-202, 302, 603
	All 25, 30, 50 ton cylinders
	All 75, 100 ton cylinders
	All 150, 200 ton cylinders
	10 ton VLP Presses
	25 ton VLP Presses
	50 ton VLP, BPR Presses
	100 ton VLP, BPR Presses
	200 ton VLP, BPR Presses

Maximum Indicator Pointer

Indicator retains peak readings of pressure or force generated by the system. Order model nr: **BSA-881**.

Can easily be installed on GP-Series dry gauges.

Pressure Gauges

To measure the input pressure into cylinders or high pressure systems. Also for all testing applications.

Load Gauges

To measure external load supported by a cylinder or jack in kN. For pressing parts together under pre-determined loads, weighing, testing, etc.

GP-Series are dry gauges.
GF-Series are glycerine filled gauges.

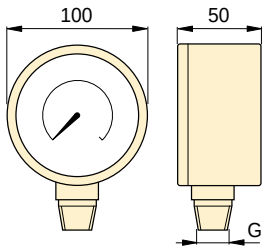
GF GP Series

Pressure Range:
0 - 1000 bar

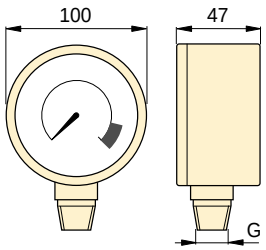
Force Range:
0 - 2000 kN

Gauge Face Diameter:
100 mm

Accuracy, % of full scale:
± 1%



GP-serie



GF-serie

Gauge Type and Calibration				Units per Division	Model Number*	Thread G	Gauge Adaptor		
							 134		
							Required		
bar	psi	bar	kN				GA-1	GA-2	GA-3
0-700	0-10.000	–	–	10 bar, 100 psi	**GP-10S**	½" NPTF	●	●	
0-1000	0-15.000	–	–	10 bar, 200 psi	**GP-15S**	½" NPTF	●	●	
–	–	0-700	0-45	10 bar, 0,5 kN	**GF-5B**	½" NPTF	●	●	
–	–	0-700	0-100	10 bar, 1 kN	**GF-10B**	½" NPTF	●	●	
–	–	0-700	0-232	10 bar, 2 kN	**GF-20B**	½" NPTF	●	●	
–	–	0-700	0-500	10 bar, 5 kN	**GF-50B**	½" NPTF	●	●	
–	–	0-700	0-124	10 bar, 1 kN	**GF-120B**	½" NPTF	●	●	
–	–	0-700	0-175/275	10 bar, 2 + 5 kN	**GF-230B**	½" NPTF	●	●	
–	–	0-700	0-450/900	10 bar, 5 + 10 kN	**GF-510B**	½" NPTF	●	●	
–	–	0-700	0-210/320/570	10 bar, 5 kN	**GF-813B**	¼" NPTF			●
–	–	0-700	0-232/300/500	10 bar, 5 kN	**GF-835B**	¼" NPTF			●
–	–	0-700	0-720/930	10 bar, 10 kN	**GF-871B**	¼" NPTF			●
–	–	0-700	0-1400/2000	10 bar, 25 kN	**GF-200B**	¼" NPTF			●
–	–	0-700	0-100	10 bar, 1 kN	**GF-10B**	½" NPTF	●	●	
–	–	0-700	0-232	10 bar, 2 kN	**GF-20B**	½" NPTF	●	●	
–	–	0-700	0-500	10 bar, 5 kN	**GF-50B**	½" NPTF	●	●	
–	–	0-700	0-720/930	10 bar, 10 kN	**GF-871B**	¼" NPTF			●
–	–	0-700	0-1400/2000	10 bar, 25 kN	**GF-200B**	¼" NPTF			●

* GF-Series Force gauges with imperial scale reading (psi, lbs) are available by changing the suffix 'B' into 'P'.

▼ Shown from left to right: **H4049L, G-2534R, G-4089L, G-2535L, G-4040L**

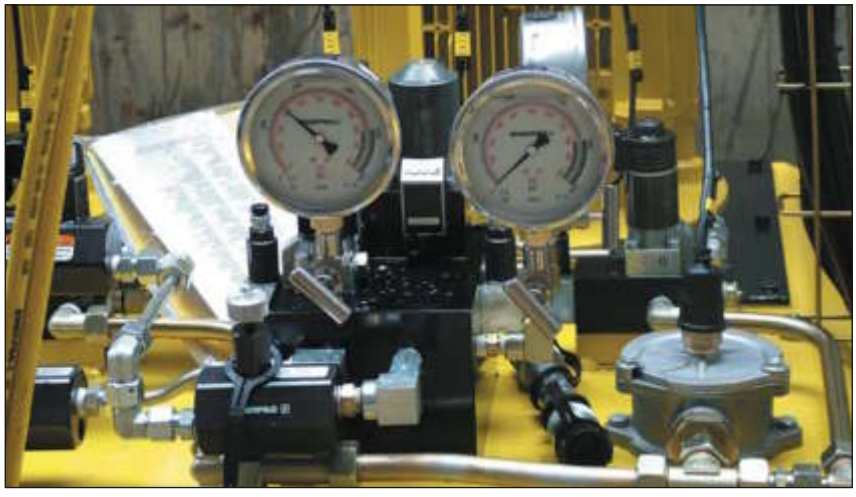
Visual Reference of System Pressure

Glycerine Filled (G-Series)

- **Dual scale reading calibrated in bar and psi**
- **All pressure sensing parts sealed and dampened by glycerine for long life**
- **Includes safety blow-out disk and pressure equalizing membrane**
- **Gauge snubbers or needle valves recommended for high cycle applications**

High Cycle Dry Gauges (H-Series)

- **Dual scale reading calibrated in bar and psi**
- **Ideal for use in many applications, specifically for high cycle and harsh environments**
- **Gauge snubbers or needle valves recommended to shut off gauge when not in use**



◀ *When lifting or pressing, always use a gauge. A gauge is your 'window' to the system. It lets you see what's going on.*

Gauge adaptor

For easy gauge installation into almost any system, Enerpac offers a complete line of gauge adaptors.

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Snubber Valve V-91

Infinitely adjustable for metering oil out of a gauge. The V-91 Snubber Valve is also suitable as a shut-off valve to protect the gauge during high cycle applications.

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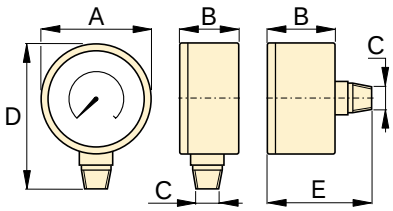

Dimensions (mm)						
Size	Connection	A	B	C	D	E
63	Lower Mount	63	37	1/4" NPTF	84	–
63	Center Rear	63	37	1/4" NPTF	–	63
100	Lower Mount	100	29	1/4" NPTF	121	–
100	Lower Mount	100	49	1/2" NPTF	136	–

Note: dimensions for reference only.

G
H
Series

Pressure Range:
0-1000 bar/15.000 psi

Face Diameter:
63-100 mm

Accuracy, % of full scale:
±1,0 - 1,5%

Maximum Indicating Pointer

Indicator retains peak readings of pressure or force generated by the system.
Order model number: **BSA-881**.

Note: For use on H-Series of gauges only.

▼ SELECTION CHART

Gauge Series	Pressure Range		Model Number				Major Graduation		Minor Graduation		Major Graduation		Minor Graduation	
			ø 63 1/4 NPTF Lower Mount	ø 63 1/4 NPTF Center Rear	ø 100 1/4 NPTF Lower Mount	ø 100 1/2 NPTF Lower Mount	bar				psi			
	(bar)	(psi)	Accuracy: ± 1,5 %		Accuracy: ± 1,0 %		ø 63	ø 100	ø 63	ø 100	ø 63	ø 100	ø 63	ø 100
G-Series	0-7	0-100	**G2509L**	–	–	–	1	–	0,01	–	10	–	2	–
	0-11	0-160	**G2510L**	–	–	–	1	–	0,02	–	10	–	2	–
	0-14	0-200	**G2511L**	–	–	–	1	–	0,02	–	50	–	5	–
	0-20	0-300	**G2512L**	–	–	–	5	–	0,50	–	50	–	5	–
	0-40	0-600	**G2513L**	–	–	–	10	–	1	–	100	–	10	–
	0-70	0-1.000	**G2514L**	**G2531R**	–	–	10	–	1	–	100	–	20	–
	0-140	0-2.000	**G2515L**	–	–	–	10	–	2	–	500	–	50	–
	0-200	0-3.000	**G2516L**	–	–	–	50	–	5	–	500	–	50	–
	0-400	0-6.000	**G2517L**	**G2534R**	–	–	100	–	10	–	1000	–	100	–
	0-700	0-10.000	**G2535L**	**G2537R**	**G4088L**	**G4039L**	100	100	10	10	2000	1000	200	100
	0-1000	0-15.000	**G2536L**	**G2538R**	**G4089L**	**G4040L**	100	100	20	20	3000	3000	200	200
H-Series	0-700	0-10.000	–	–	**H4049L**	**H4071L**	–	100	–	10	–	1000	–	100

Test System Gauges

ENERPAC
Hydraulic Technology Worldwide

▼ Gauge shown: **T-6003L**

T Series

Pressure Range:
0 - 3500 bar

Face Diameter:
152 mm

Accuracy, % of full scale:
±0,5 - 1,5%

- **Dual scale reading calibrated in bar and psi**
- **All gauges have spring-loaded backs with rubber blow-out plugs to protect case assembly in case of over-pressurization**
- **Integral maximum indicator pointer standard included**
- **2800 and 3500 bar models include flange mounting**
- **1/2" NPTF versions are made of high strength alloy steel**
- **0,25" cone models are made of 316 stainless steel, with 403 stainless steel on 2800 and 3500 bar models**

Cone Mount Gauge Adaptor

Contains fittings to connect 0,25" cone fitting gauge to 0,38" cone system. Kit includes 43-301 tee and 43-704 gauge adaptor. Order model number: **83-011**.

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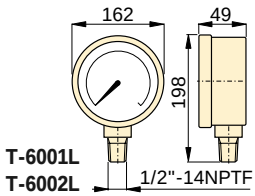
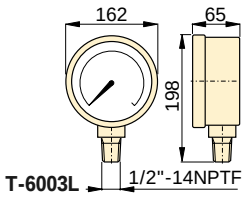
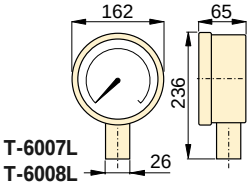
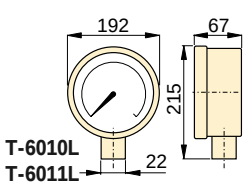
Cone Mount Gauge Connector

For connecting gauges with 0,25" cone fitting directly to model number **11-100** or **11-400** pump (page 76). May be used with other 0,25" cone systems
Order model number: **43-704**









▼ *An Enerpac P-2282 hand pump equipped with a T-6011L test system gauge is used for proof pressure testing of hydraulic valves.*

Pressure Range (bar)	Pressure Range (psi)	Model Number: Alloy Steel 1/2 NPTF	Model Number: Stainless Steel 0,25" Cone	Number Intervals (bar)	Graduation Intervals (bar)	Number Intervals (psi)	Graduation Intervals (psi)
0-70 [1]	0-1000	**T-6001L**	–	10	1	100	10
0-350 [1]	0-5000	**T-6002L**	–	50	5	500	50
0-700 [1]	0-10.000	**T-6003L**	**T-6007L**	100	10	1.000	100
0-1400 [1]	0-20.000	–	**T-6008L**	200	20	1.000	100
0-2800 [2]	0-40.000	–	**T-6010L**	500	20	5.000	200
0-3500 [2]	0-50.000	–	**T-6011L**	500	50	5.000	200

[1] Acccuracy ± 0,5%

[2] Acccuracy ± 1,5%

Digital Hydraulic Pressure Gauges

▼ Shown: **DGR-1**

DGR Series

Pressure Range:
0 -1000 bar

Voltage:
3 Volt (battery)

Accuracy, % of full scale:
± 0,2%

- **Two modes**
  - **Automatic shut off (15 min)**
  - **Continuous display**
- **Zero reset - ensures that gauge reads actual system pressure**
- **Maximum and minimum pressure displayed**
- **Peak On/Off mode for 5000/second measuring mode**
- **Rated for system pressure up to 1000 bar**
- **IP65 protection**
- **Displays high pressure in bar, psi, and MPa; low pressure in kPa, MPa, hPa and mbar**
- **Display can be rotated 355 degrees for easy reading and use in all positions**
- **3 Volt battery included (type CR2430) with 1400 hours continuous operation in standard mode**

Gauge adaptor

For easy gauge installation into almost any system, Enerpac offers a complete line of gauge adaptors.

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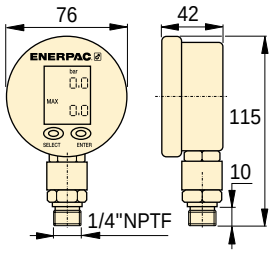
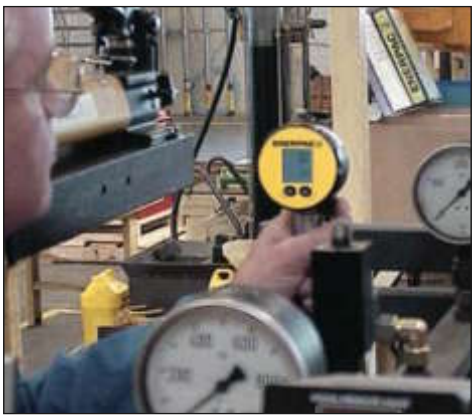


High Pressure Rating bar		High Pressure Rating MPa		Model Number	Low Pressure Rating kPa		Low Pressure Rating mbar, hPa	
Range	Interval	Range	Interval		Range	Interval	Range	Interval
0-1000	0,2	0-100	0,02	**DGR-1**	0-20.000	200	0-20.000	200

High Pressure Rating: 0-15.000 psi, interval 3 psi. Weight: 0,23 kg.

▼ *Greater accuracy and easier to read: enhance your ability to monitor and control hydraulic system pressure up to 1000 bar.*



▼ Shown from left to right: **GA-3, V-91, GA-1, GA-2, GA-4, NV-251, GA-918**

GA/NV/V Series

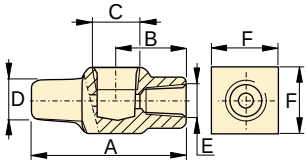
Operating Pressure:
700 bar

▼ *A gauge is easily installed into your hydraulic system using a gauge adaptor.*

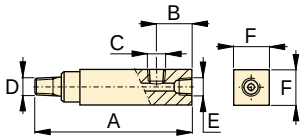
Gauge Adaptors (GA-Series)

- For easy mounting of a pressure gauge onto your system
- Male end screws into pump or cylinder port, female end accepts hose or coupler, 3rd port is for gauge connection
- GA-918 provides for swivel connection

Model Number	Gauge Port (NPTF)	Male End (NPTF)	Female End (NPTF)	Dimensions (mm)					
				A	B	C	D	E	F
GA-1	1/2"	3/8"	3/8"	71	31	1/2" NPTF	3/8" NPTF	3/8" NPTF	32
GA-2	1/2"	3/8"		155	35	1/2" NPTF	3/8" NPTF	3/8" NPTF	32
GA-3	1/4"	3/8"		133	48	1/4" NPTF	3/8" NPTF	3/8" NPTF	32
GA-4	1/2"	1/4"		111	35	1/2" NPTF	1/4" NPTF	3/8" NPTF	32



GA-1

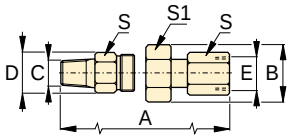


GA-2, GA-3, GA-4

Swivel Adaptor (GA-918)

- Simplifies gauge installation and reading

Model Number	Dimensions (mm)						
	A	B	C	D	E	S	S1
GA-918	117	43	1/2" NPTF	28,5	1/2" NPTF	29	38

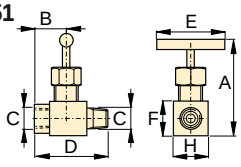


Needle Valves (V- and NV-Series)

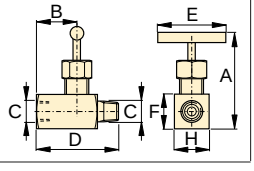
- Both NV-251 and V-91 provide positive shut-off
- 303 stainless steel stem, 16 threads/in (NV-251)

Model Number	Orifice (mm)	Thread Size	Dimensions (mm)						
			A	B	C	D	E	F	H
NV-251	4,3	1/4" NPTF	57	29	1/4" NPTF	57	46	19	19
V-91	4,8	1/2" NPTF	89	32	1/2" NPTF	64	32	37	37

NV-251



V-91



Valves Section Overview

ENERPAC hydraulic valves are available in a wide variety of models and configurations.

Whatever your requirements… directional control, flow control, or pressure control… you can be sure that Enerpac has the correct valve to match your application exactly.

Designed and manufactured for safe operation up to 700 bar, the range of Enerpac valves allows for direct pump mounting, remote mounting, manual or solenoid actuation, and in-line installation, giving you flexible solutions to control your hydraulic system.

Valve Type	Series		Page
3-Way Directional Control Valves	VC, VM VE		136 ▶
4-Way Directional Control Valves	VC, VM VE		138 ▶
Pressure and Flow Control Valves	V		140 ▶

3-Way Directional Control Valves

▼ Shown from left to right: **VE32D, VE33, VC-3L, VM33L, VM32**

For Reliable Control of Single-Acting Cylinders

- **User adjustable relief valves on VM- and VE-Series allow the operator to easily set the working pressure for each application**
- **All VM- and VE-series valves feature several gauge ports for “system”, A and B port pressure monitoring**
- **All valves (except VM32, VE32D and VC-Series) include manifold with built-in “System Check” feature, for more precise pressure holding and improved system control**
- **VM33 has improved porting for faster cylinder retraction while pump motor is running**
- **VE-Series solenoid valves include wire and connectors**
- **Manual or solenoid operation.**

Valving Help

See Basic System Set-Up and Valve Information in our ‘Yellow Pages’

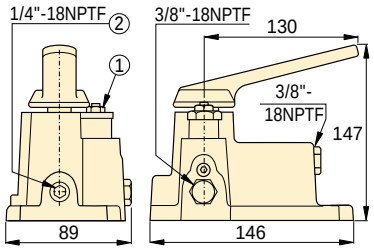
Page: 120

Valve Operation	Valve Location	Valve Type
Manual	Pump Mounted	3-way, 2-position
Manual	Pump Mounted	3-way, 3-position, Tandem Center
Manual	Pump Mounted	3-way, 3-position, Tandem Center, Locking [1]
Manual	Remote Mounted [3]	3-way, 3-position Tandem Center
Manual	Remote Mounted [3]	3-way, 3-position Tandem Center, Locking [1]
Manual	Remote Mounted [3]	3-way, 3-position Closed Center
Manual	Remote Mounted [3]	3-way, 3-position Closed Center, Locking [1]
Solenoid 24 VDC	Pump Mounted	3-way, 2-position [2]
Solenoid 24 VDC	Pump Mounted	3-way, 2-position Dump
Solenoid 24 VDC	Pump Mounted	3-way, 3-position Tandem Center

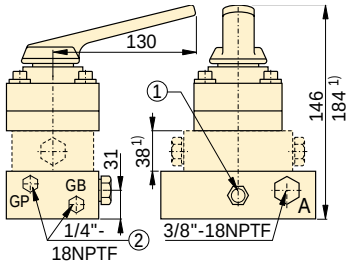
[1] with pilot-operated check valve.
[2] VE32 provides “HOLD” function by turning off pump and holding pressure against system check.

◀ *A typical multi-cylinder control set-up using solenoid directional control valves.*

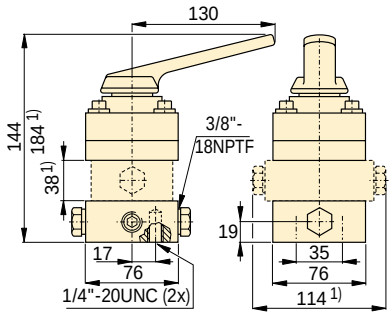
3-Way Directional Control Valves



VM32

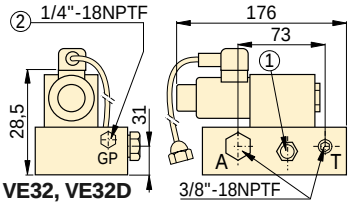


VM33, VM33L 1) for VM33L only



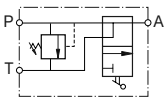
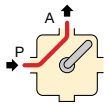
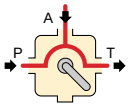
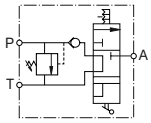
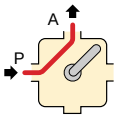
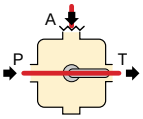
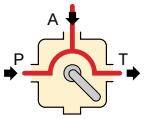
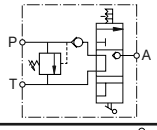
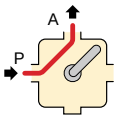
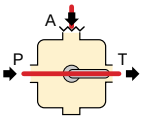
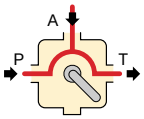
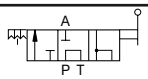
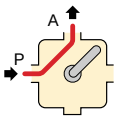
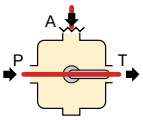
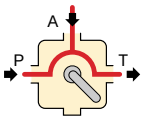
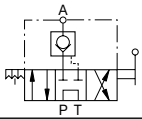
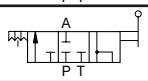
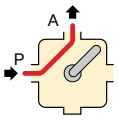
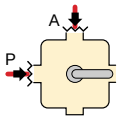
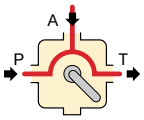
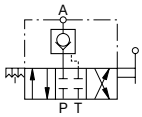
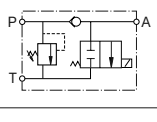
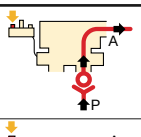
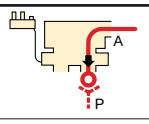
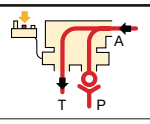
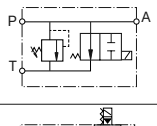
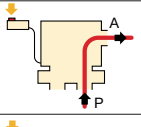
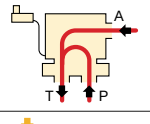
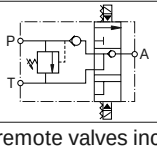
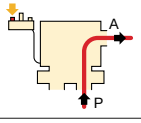
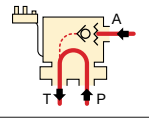
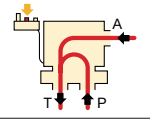
VC-3, VC-3L, VC-15, VC-15L

1) VC-3L and VC-15L only



VE32, VE32D

① adjustable relief valve ② auxiliary ports

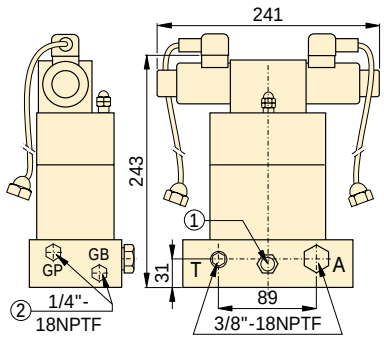
Model Number	Hydraulic Symbol	Schematic Flowpath: Advance	Schematic Flowpath: Hold	Schematic Flowpath: Retract	(kg)
VM32					2,5
VM33					3,0
VM33L					4,8
VC-3 3)					2,9
VC-3L 3)					4,7
VC-15 3)					2,9
VC-15L 3)					4,7
VE32					3,9
VE32D					3,9
VE33					9,2

3) VC-Series remote valves include Return line kit VRL-10.

VC/VM VE Series

Flow Capacity:
17 l/min

Maximum Operating Pressure:
700 bar



VE33

Locking Valves

For applications requiring positive load holding, VM- and VC-Series valves (except VM32) are available with a pilot-operated check valve. This provides hydraulic locking of the load until the valve is shifted into the retract position. To order this feature, place an "L" at the end of the model number.

Pendants for VE-Series Solenoid Valves

When ordering Enerpac VE-Series solenoid valves, the pendant must be ordered separately. Pendant connection to be plugged into electric box of pump.

To be used with solenoid valves:	Pendant Model Nr.
VE32D	ZCP-1
VE32, VE33	ZCP-3

4-Way Directional Control Valves

▼ Shown from left to right: **VM43, VE43, VC-20L**

For Double-Acting Cylinder Control

Valving Help

See Basic System Set-Up and Valve Information in our 'Yellow Pages'

Page: **120**

User Adjustable Relief Valve

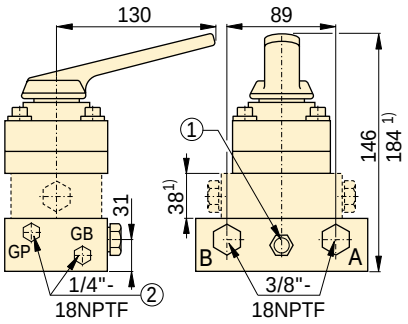
All VM- and VE-Series have a user adjustable relief valve to allow the operator to easily set the optimum working pressure.

- **User adjustable relief valves on VM- and VE-Series allow the operator to easily set the working pressure for each application**
- **All VM- and VE-Series valves feature several gauge ports for "system", A and B port pressure monitoring**
- **All valves (except VC-Series) include manifold with built-in "System Check" feature, for more precise pressure holding and improved system control**
- **VE43 solenoid valve includes wire and connectors**
- **Manual or solenoid operation**

▼ *In a fine control 120 ton hydraulic system for lifting a string of anchors in a subsea pipeline project, the VC-4 remote valve provides safety shutdown capacity on the ship's deck.*

Valve Operation	Valve Location	Valve Type
Manual	Pump Mounted	4-way, 3-position, Tandem Center
Manual	Pump Mounted	4-way, 3-position, Tandem Center, Locking
Manual	Remote Mounted	4-way, 3-position, Tandem Center,
Manual	Remote Mounted	4-way, 3-position, Tandem Center, Locking [1]
Manual	Remote Mounted	4-way, 3-position, Closed Center
Manual	Remote Mounted	4-way, 3-position, Closed Center, Locking [1]
Solenoid 24 VDC	Pump Mounted	4-way, 3-position, Tandem Center

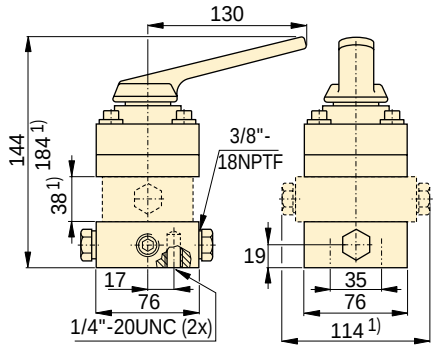
[1] with pilot-operated check valves.



① adjustable relief valve
② auxiliary ports

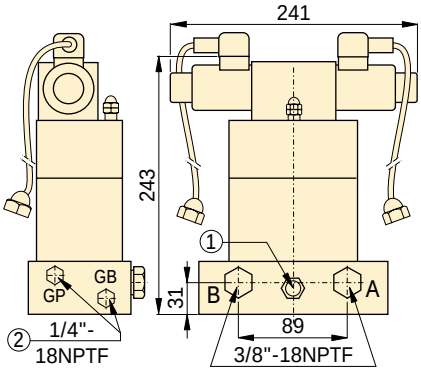
VM43, VM43L

1) for VM43L only

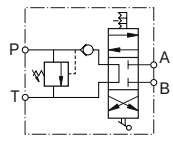
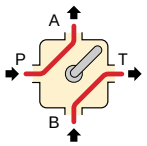
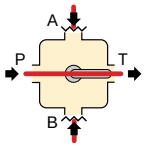
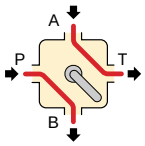
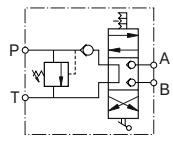
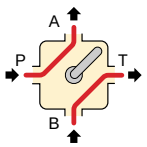
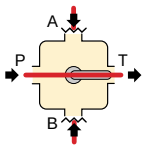
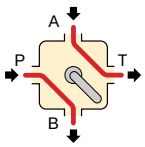
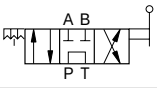
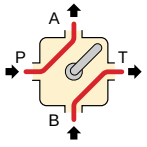
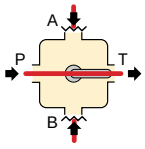
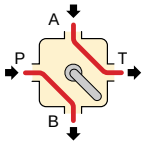
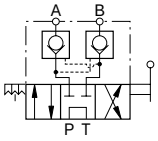
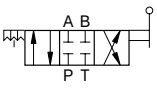
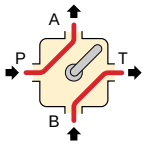
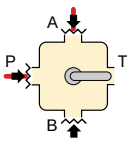
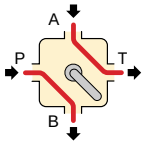
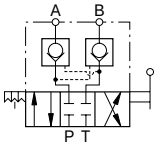
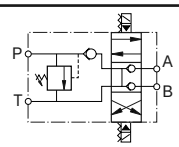
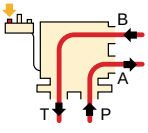
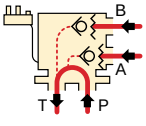
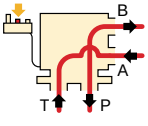


VC-4, VC-4L, VC-20, VC-20L

1) VC-4L and VC-20L only



VE43

	Model Number	Hydraulic Symbol	Schematic Flowpath: Advance	Schematic Flowpath: Hold	Schematic Flowpath: Retract	(kg)
	VM43					3,1
	VM43L					4,9
	VC-4 [2]					2,9
	VC-4L [2]					4,7
	VC-20 [2]					2,9
	VC-20L [2]					4,7
	VE43					9,3

[2] VC-Series remote valves include Return line kit VRL-10.

VC/VM VE Series

Flow Capacity:
17 l/min

Maximum Operating Pressure:
700 bar

Fittings

For additional fittings see the fitting page of the System Components section.

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Locking Valves

For applications requiring positive load holding, VM- and VC-Series valves are available with a pilot-operated check valve. This provides hydraulic locking of the load until the valve is shifted into the retract position. To order this feature, place an “L” at the end of the model number

Pendants for VE-Series Solenoid Valves

When ordering Enerpac VE-Series solenoid valve, the pendant must be ordered separately. Pendant connection to be plugged into electric box of pump.

To be used with solenoid valve:	Pendant Model Nr.
VE43	**ZCP-3**

▼ From left to right: **V-152, V-66, V-82, V-161, V-42, V-17**

Your Hydraulic Control Solution

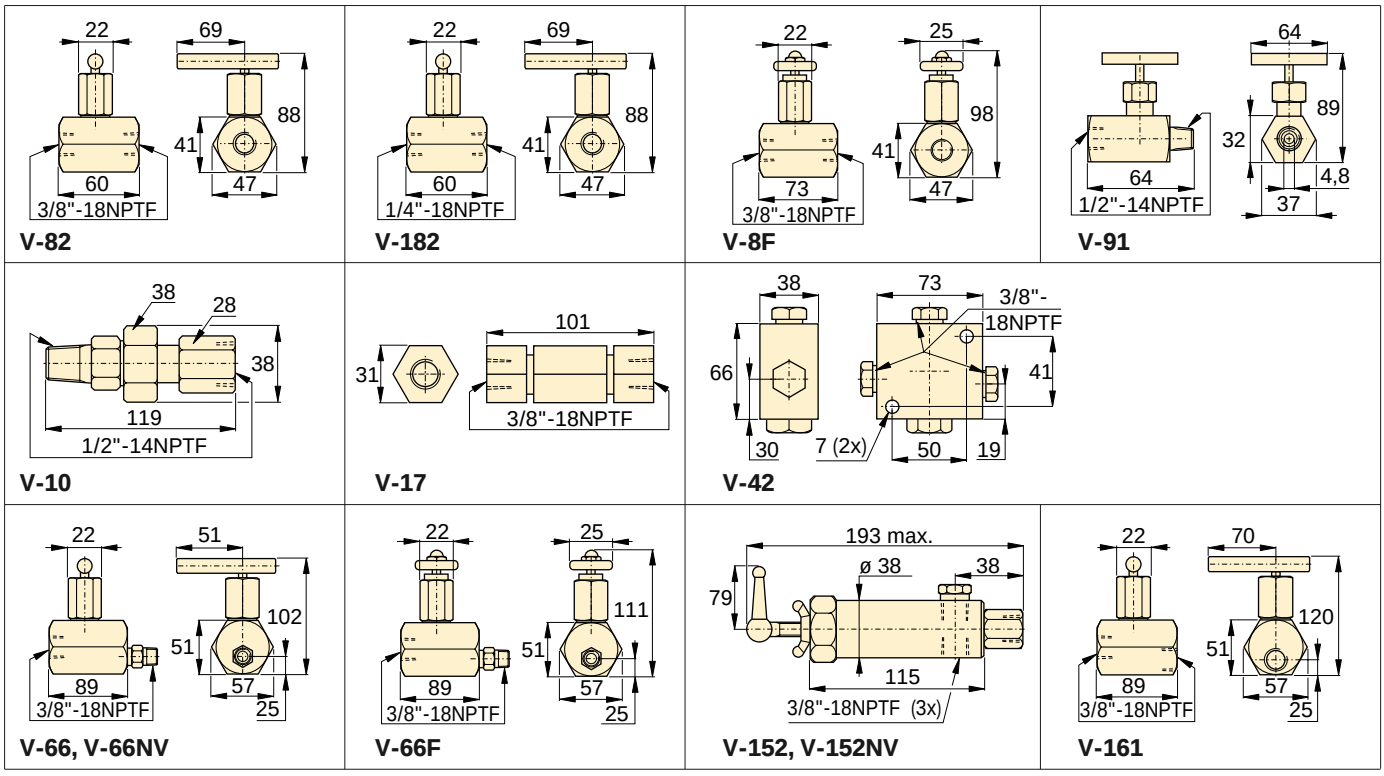
Valve Applications

To see these valves used in typical hydraulic circuits, please see our 'Yellow Pages'.

Page: **114**

▼ *The V-152 pressure relief valve limits the pressure or force developed in the hydraulic system.*

- **All valves are rated for 700 bar operating pressure**
- **All valves feature NPTF porting to insure against leakage at rated pressure**
- **All valves are painted, coated, or plated for corrosion resistance**
- **Viton® seals (in V-66NV and V-152NV) for high temperature applications, nickel-plated for maximum corrosion resistance**



Valve dimensions in mm

Pressure and Flow Control Valves

Premounted Manifolds

For two or four port manifolds with integral flow control valves, see the manifold page of the System Components section.

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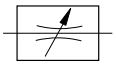
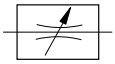
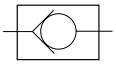
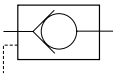
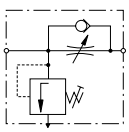
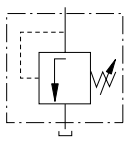
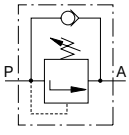
Fittings

For additional fittings see the fitting page of the System Components section.

Page: 127

V Series

Maximum Operating Pressure:
700 bar

Valve Type and Model Number		Description		Hydraulic Symbol
Needle Valve **V-82** **V-182** **V-8F**		**V-82:** To control cylinder speed. Can also be used as shut-off valve for temporary load holding. 3/8" NPTF female ports. **V-182**: Same as V-82, but with	1/4" NPTF female ports. Also suitable for gauge snubbing (also V-82). **V-8F:** Like V-82, but with very fine metering for precise flow control. **Not recommended as shut-off valve.**	
Snubber Valve **V-91**		**V-91:** Infinitely adjustable for metering oil out of a gauge to prevent snapping of gauge pointer when load or pressure is suddenly released. Also suitable as shut-off	valve to protect the gauge during high cycling applications. 1/2" NPTF male and female threads for use with GA-1, GA-2 or GA-4 gauge adaptors.	
Auto Damper® Valve **V-10**		**V-10:** To be used when gauge pressure must be monitored during high cycle applications. Creates a flow resistance when load is released suddenly.	No adjustments are necessary. 1/2" NPTF male and female threads for use with GA-1, GA-2 or GA-4 gauge adaptors.	
Check Valve **V-17**		**V-17:** Ruggedly built to resist shock and operate with low pressure drop. Closes smoothly without pounding. 3/8" NPTF female ports.		
Pilot Operated Check Valve **V-42**		**V-42:** Can be mounted at the cylinder to hold the load in case of system pressure loss. Normally used with double-acting cylinders where pilot port receives pressure from a	Tee-fitting in the cylinder retract line. 3/8" NPTF female ports. Pilot presure ratio 14% (6,5:1).	
Manually Operated Check Valve **V-66, V-66NV *** **V-66F**		**V-66, V-66NV:** For load holding applications with single and double acting cylinders. Valves allow oil to flow back to tank when cylinder retracts. V-66NV with Viton seals,	nickel-plated. **V-66F:** Similar to V-66, but with very fine metering capability for precise flow control. V-66F is not designed for load holding.	
Pressure Relief Valve **V-152** **V-152NV ***		**V-152:** Limits pressure developed by the pump in hydraulic circuit, thus limiting the force imposed on other components. Valve opens whenever preset pressure is reached.	To increase pressure setting, turn handle clockwise. Includes: • 0,9 m return line hose kit, • ±3% repeatability, • 55-700 bar adjustment range.	
Sequence Valve **V-161**		**V-161:** To control oil flow to a secondary circuit. Flow is blocked until system pressure rises to the V-161 setting. When this pressure level is reached, the V-161 opens to	allow flow to the secondary circuit. A pressure differential is always maintained between the primary and secondary circuit. **Min. operating pressure: 140 bar.**	

* See page 62 for more information about products for use in high temperature and extreme environment applications.

Enerpac Hydraulic Presses

ENERPAC Hydraulic Technology Worldwide

ENERPAC Hydraulic Presses are available in a variety of capacities and sizes. The press frames are welded for maximum strength and durability. Strong frames and powerful high-pressure hydraulics will provide years of dependable service in many applications.

Enerpac Presses are available in Bench, C-Frame, Arbor, Workshop and Roll-Frame models.

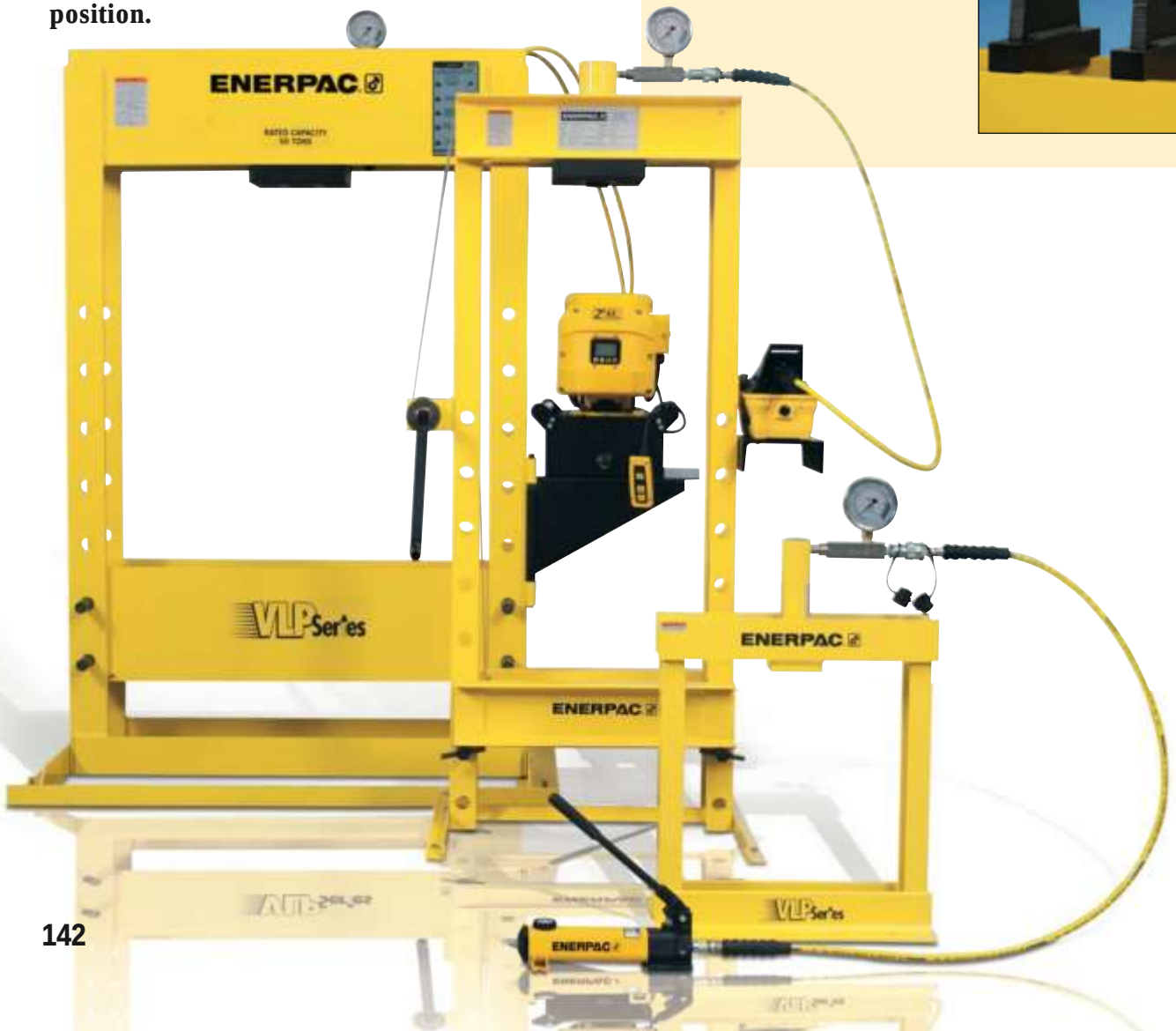
For safety reasons, all Enerpac presses with air and electric-drive pumps can be supplied with hand operated valves. This allows operation only when the valve handle is hand-held in the appropriate position. Once released, the valve automatically returns to the centre (hold) position.

These Press features increase productivity and broaden the range of applications:

The exclusive **"Hydrajust" bed positioning** is standard on 50, 100 and 200 ton VLP-Series workshop presses with double-acting cylinder, allowing adjustment of the lower bed.

Moveable pumptable on presses with electric pumps allow for easy side loading of large workpieces.

Optional "V-blocks" for positioning of complex parts, are designed with high-strength steel for long life.



Press Section Overview

Capacity ton (kN)	Press type and functions	Serie	Page
10 (101)	**Bench Presses**	**VLP**	 **144** ▶
25-200 (232-1995)	**Workshop Presses**	**VLP**	 **144** ▶
50-200 (498-1995)	**Roll-Frame Presses**	**BPR**	 **146** ▶
5-20 (45-178)	**C-Clamp Presses**	**A**	 **148** ▶
10-30 (101-295)	**Arbor Presses**	**A**	 **148** ▶
10-200 (101-1995)	**Press Accessories** **Press Speed Chart**	**VB, A IPL**	 **150** ▶
900-90.000 kg	**Tension Meters** **Load Cells**	**TM LH**	 **151** ▶

Available in capacities from 10 to 200 ton, each Enerpac press consists of three basic high quality components: a press frame, a power source and a cylinder.

Welded Frame
All presses feature a welded steel frame for optimum strength. The larger models include features like workpiece side-loading and height adjustment of the lower bed.

Power Source
Depending on the production requirements, Enerpac presses can be powered by manual, air-hydraulic and electric-drive power sources.

Cylinder
Depending on the application, double-acting cylinders offer increased efficiency. Check out the Selection Charts for the press best suited for your needs.

Gauge
All Workshop presses and Roll-Frame Presses feature an easy to monitor pressure/force gauge for increased safety.

IMPORTANT!
The frameworks of the workshop presses are exclusively designed for pressing operations, not for pulling. For pulling applications please contact Enerpac.

In order to fully comply with CE regulations, some presses must be equipped with specific safety components, such as spring centered valves, two-hand control devices or others.

VLP-Series, Bench and Workshop Presses

ENERPAC Hydraulic Technology Worldwide

▼ From left to right: **VLP-506ZE5S, VLP-1006ZE3S, VLP-106P142, VLP256PAT1**

No Workshop can do without one

- **Quality welded frame for maximum strength and stability**
- **Optimum daylight and bed width**
- **With hand pump, air or electric driven power source**
- **Single or double-acting GOLDEN RING DESIGN cylinders**
- **Standard glycerine filled gauge with scale reading in kN/bar**
- **Moveable pump table on presses with electric pump allows for easy side loading for large workpieces**
- **Height adjustment of lower bed on 25 ton press with a winch**
- **Unique "Hydrajust" bed positioning device on 50, 100 and 200 ton press with double-acting cylinder allows adjustment of the lower bed**

Optional V-Blocks

To facilitate positioning of pipes and bars, or placed upside-down, to serve as a convenient worktable. Featuring precise fit into the press bolster. Each model number includes two V-blocks.

To be used with VLP-press ton	V-Blocks Model Number
10	**VB-10**
25	**VB-25**
50	**VB-501**
100	**VB-101**
200	**A-200**

Page: **150**

Centered Manual Valves

Manual 3-position valves on electric pumps supplied on VLP-Series presses automatically move to the tandem centre position for safety reasons.

▼ SELECTION CHART

Press Capacity ton (kN)	Maximum Daylight (mm)		Press Model Number	Power Source							Cylinder				
				Pump Type			Valve Type		Pump Model Nr.	*Page:*			Stroke (mm)	Cylinder Model Nr.	*Page:*
	Vertical	Horizontal		Man.	Elec.	Air	Man.	Elec.							
10 (101)	430	432	**VLP-106P142**	●			●		P-142	**68**	●		155	RC-106	**8**
	430	432	**VLP-106PAT1**			●	●		PATG-1102N	**98**	●		155	RC-106	**8**
25 (232)	1225	510	**VLP-256P392**	●			●		P-392	**68**	●		159	RC-256	**8**
	1225	510	**VLP-256PAT1**			●	●		PATG-1102N	**98**	●		159	RC-256	**8**
50 (498)	994	1000	**VLP-506P802**	●			●		P-802	**70**	●		159	RC-506	**8**
	994	1000	**VLP-506ZE5S**		●			●	ZE5410SW-S	**90**		●	155	RR-506	**34**
	994	1000	**VLP-506ZE5C**		●		●		ZE5410CW-S	**90**		●	155	RR-506	**34**
	994	1000	**VLP-5013ZE5S**		●			●	ZE5410SW-S	**90**		●	333	RR-5013	**34**
100 (933)	989	1000	**VLP-1006ZE3C**		●		●		ZE3410CW	**90**		●	168	RR-1006	**34**
	989	1000	**VLP-1006ZE3S**		●			●	ZE3410SW	**90**		●	168	RR-1006	**34**
	989	1000	**VLP-10013ZE3S**		●			●	ZE3410SW	**90**		●	333	RR-10013	**34**
200 [1]	1340	1220	**VLP-20013ZE4S**		●			●	ZE4420SW	**90**		●	333	RR-20013	**34**

[1] 1995 kN

= Single-Acting = Double-Acting

Press Gauges

All presses include a gauge and gauge adaptor, matching the press capacity.

Press Capacity ton	Gauge Model Number	Adaptor Model Number
10	GF-10B	GA-4
25	GF-20B	GA-2
50	GF-50B	GA-2
100	GF-871B	GA-3
200	GF-200B	GA-3

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"Hydrajust" Bed Positioning

Allows vertical adjustment of the lower bed on the 50, 100 and 200 ton VLP press.

The "Hydrajust" bed positioning is not designed to withstand full cylinder capacity, only to be used for bed adjustment.

Page: 150

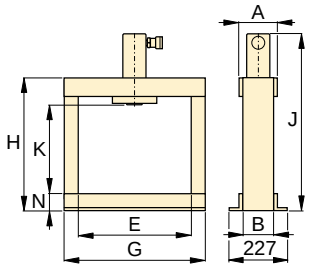
VLP Series

Capacity:
10 - 200 ton

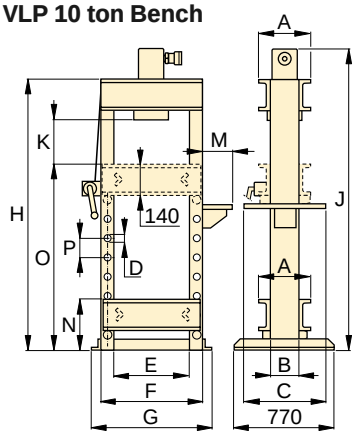
Maximum Daylight x Width:
1340 x 1220 mm

Maximum Operating Pressure:
700 bar

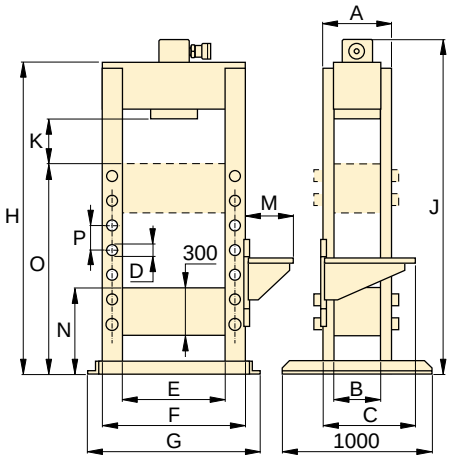
IMPORTANT! The frameworks of the workshop presses are exclusively designed for pressing operations, not for pulling. For pulling applications please contact Enerpac.



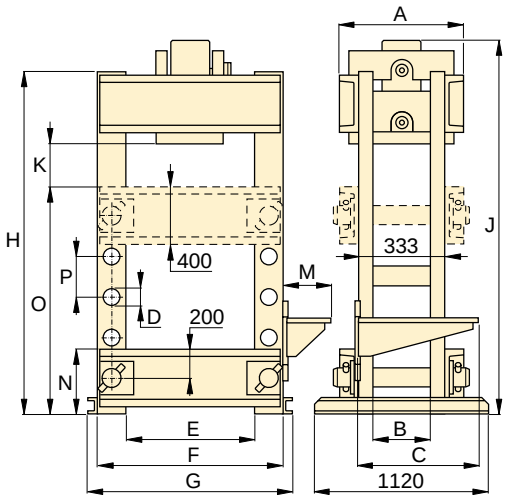
VLP 10 ton Bench



VLP 25 ton



VLP 50 and 100 ton



VLP 200 ton

	Speed (mm/sec)*		Dimensions (mm)															Press Model Number
	Rapid Advance	Pressing	A	B	C	D	E	F	G	H	J	K	M	N	O	P	(kg)	
	{2,5} *	{0,6} *	110	80	–	–	432	–	542	620	748	430	–	80	–	–	49	VLP-106P142
	10,0	1,8	110	80	–	–	432	–	542	620	748	430	–	80	–	–	54	VLP-106PAT1
	{3,4} *	{0,7} *	260	140	510	32	510	630	700	1622	1740	370	140	212	1070	122	165	VLP-256P392
	5,0	0,8	260	140	610	32	510	630	700	1622	1740	370	323	212	1070	122	161	VLP-256PAT1
	{5,5} *	{0,3} *	290	250	560	32	990	1200	1360	1879	1879	244	425	540	1290	150	595	VLP-506P802
	4,1	3,9	290	250	560	32	990	1200	1360	1879	1879	244	425	540	1290	150	675	VLP-506ZE5S
	4,1	3,9	290	250	560	32	990	1200	1360	1879	1879	244	425	540	1290	150	660	VLP-506ZE5C
	4,1	3,9	290	250	560	32	990	1200	1360	1879	2042	244	425	540	1290	150	700	VLP-5013ZE5S
	7,7	0,7	400	340	560	40	990	1240	1400	1879	1885	239	425	540	1290	150	962	VLP-1006ZE3C
	7,7	0,7	400	340	560	40	990	1240	1400	1879	1885	239	425	540	1290	150	970	VLP-1006ZE3S
	7,7	0,7	400	340	560	40	990	1240	1400	1879	2050	239	425	540	1290	150	993	VLP-10013ZE3S
	5,2	0,5	553	233	560	76	1220	1620	1740	2285	2370	377	425	453	1415	254	1992	VLP-20013ZE4S

* {…} = advance speed in mm per handpump stroke.

BPR-Series, Roll-Frame Presses

ENERPAC
Hydraulic Technology Worldwide

▼ Shown: **BPR-5075**

- **Quality welded frame for maximum strength and long life**
- **Frame rolls easily on 4 steel roller bearings**
- **Exclusive 'Hydra-Lift' bolster for effortless adjustment of the vertical daylight**
- **Roller head design is standard to allow lateral movement and locking of the cylinder up to 300 mm left or right of centre**
- **All models in the quick selection chart have been matched to an electric pump, double-acting cylinder, hose and gauge, offering the complete package**
- **Roll-Frame design features a stationary bed with the ability to support heavy loads**

Expert Designed Versatility

Cylinder adjustment
Cylinder adjustment allows horizontal side to side cylinder positioning.

Hydra-Lift
Allows easy, effortless daylight adjustment. Standard on all Roll-Frame presses.

Page: **150**

Optional V-Blocks
These V-Blocks are designed for easy fixturing of round stock and other non-uniform materials. Featuring precise fit into the press bolster.

Page: **150**

Press Capacity ton (kN)	Vertical Daylight A (mm) min.	Vertical Daylight A (mm) max.	Maximum Bed Width E (mm)	Electric Pump Model Number	Page	Press Model Number	Double-Acting Cylinder Stroke (mm)	Double-Acting Cylinder Model Number	Page	Speed (mm/sec) Rapid Advance	Speed (mm/sec) Pressing
50 (498)	152	942	730	ZE5420SW-S	**90**	**BPR-5075**	333	RR-5013	**34**	4,1	3,9
100 (933)	159	1048	889	ZE3420SW	**90**	**BPR-10075**	333	RR-10013	**34**	7,7	0,7
200 (1995)	279	1295	1219	ZE4420SW	**90**	**BPR-20075**	330	RR-20013	**34**	5,2	0,5

▼ *An BPR-20075 Roll-Frame Press is used to remove a large shaft from this pillow-block assembly. The Roll Frame design allows this heavy part to be safely loaded with an overhead crane.*

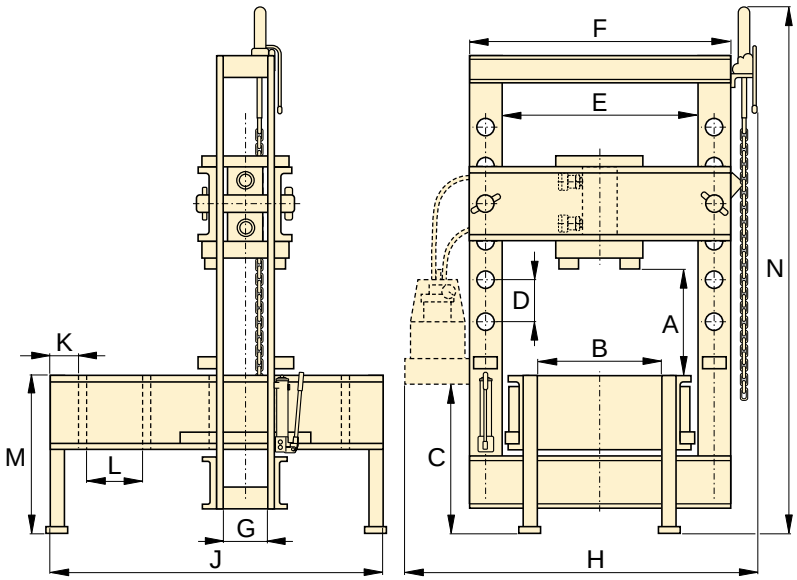
BPR Series

Capacity:
50-200 ton

Maximum Daylight x Width:
1295 x 1219 mm

Maximum Operating Pressure:
700 bar

IMPORTANT!
The frameworks of the presses are exclusively designed for pressing operations, not for pulling. For pulling applications please contact Enerpac.



Gauges

All press models include a gauge and gauge adaptor, matching the press capacity:

Press Capacity ton	Gauge Model Number	Adaptor Model Number
50	**GF-50B**	**GA-2**
100	**GF-871B**	**GA-3**
200	**GF-200B**	**GA-3**

For more information on gauges, please refer to the System Components section.

Page: **128**

Roll-Frame Press Dimensions (mm)														Press Model Number
A (min.-max.)	B	C	D	E	F	G	H	J	K	L	M	N	(kg)	
152-942	526	971	264	730	933	127	1420	1626	203	270	762	2870	917	**BPR-5075**
159-1048	673	965	222	889	1143	146	1605	1676	203	270	813	3021	1767	**BPR-10075**
279-1295	984	933	254	1219	1626	232	2150	2197	203	381	915	3200	4186	**BPR-20075**

▼ Shown from left to right: **A-220, A-330 and A-310**

The Standard Workshop Tools

C-Clamp Press

- **5, 10 and 20 ton capacity**
- **Operational in all positions**

Arbor Press

- **10 and 30 ton capacity**
- **Foot mounting holes for horizontal or vertical positioning**
- **Machined working surfaces for easier fixturing**
- **Slotted back to simplify loading and unloading of longer parts**

Push Pin A-183

For applications requiring precision pressing, such as shaft removal and insertion. This attachment fits 10 ton cylinders and requires the use of a threaded adaptor saddle (A-13).

Smooth Saddle A-185

For pressing applications of delicate parts, such as aluminium castings, this saddle decreases surface marks during the pressing application. Requires 10 ton cylinder and threaded adaptor saddle (A-13).

Page: **170**

10 ton Bench Presses

For 10 ton VLP-Series Bench Presses selection see:

Page: **144**

◀ *A-310 Abor Press used for compacting powder at 10 ton.*

Press Type	Press Capacity ton (kN)	Maximum Vertical Daylight (mm)	Maximum Bed Width (mm)	Press Model Number	Cylinder Model Number *	Page:
C-Clamp	**5** (45)	165	51	**A-205**	5 ton RC-cylinder*	8
	10 (101)	228	57	**A-210**	10 ton RC-cylinder*	8
	20 (178)	305	70	**A-220**	25 ton RC-cylinder**	8
Arbor	**10** (101)	227	135	**A-310**	10 ton RC-cylinder*	8
	30 (295)	260	178	**A-330**	RC-308*	8

* Recommended cylinder must be ordered separately.

** Must be limited to 20 ton.

▼ *A perfect example of the force and versatility of the Enerpac A-220 C-Clamp press.*

A Series

Capacity:
5-30 ton

Maximum Daylight x Width:
305 x 178 mm

Maximum Operating Pressure:
700 bar

For high-cycle production applications, the C-Clamp and Arbor presses should be limited to 50% of their capacity.

Hydraulic Cylinders

Cylinders for C-Clamps and Arbor Presses must be ordered separately.

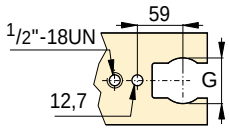
Page: 7

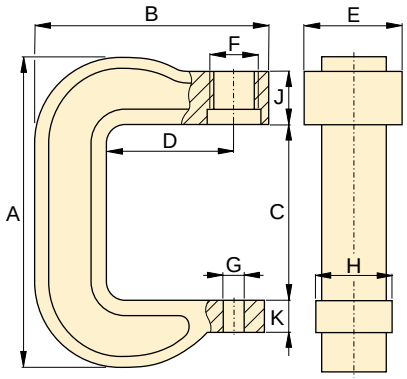
Hydraulic Pumps

Pumps for C-Clamps and Arbor Presses must be ordered separately.

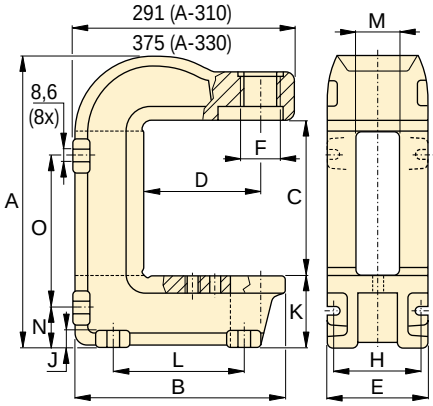
Page: 67

Top View Working Surface





A-205, A-210, A-220

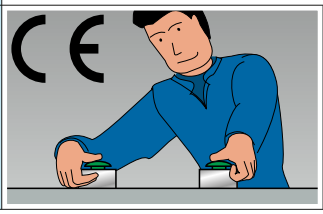


A-310, A-330

Press Dimensions (mm)																Press Model Number
A	B	C	D	E	F	G	H	J	K	L	M	N	O	(kg)	
291	203	165	95	73	$1^{1}/_{2}$-16 UN	26	51	66	25	–	–	–	–	7	**A-205**
406	283	228	152	83	$2^{1}/_{4}$-14 UN	26	76	64	41	–	–	–	–	17	**A-210**
540	346	305	152	108	$3^{5}/_{16}$-12 UN	26	95	70	44	–	–	–	–	38	**A-220**
414	281	227	152	135	$2^{1}/_{4}$-14 UN	63	122	19	97	175	65	54	219	27	**A-310**
557	353	260	152	178	$3^{5}/_{16}$-12 UN	63	140	25	165	203	67	98	276	86	**A-330**

Press Accessories, Press Speed Chart

ENERPAC
Hydraulic Technology Worldwide

Description	Press Type and Capacity	Model Number		Features
V-Blocks	10 ton Bench VLP-Presses 25 ton Workshop VLP-Presses 50 ton Workshop VLP-Presses 100 ton Workshop VLP-Presses 200 ton Workshop VLP-Press 200 ton BPR-Roll-Frame Press	**VB-10** **VB-25** **VB-501** **VB-101** **A-200** **A-200R**		• Facilitate positioning of pipes and bars • All V-Block model numbers include 2 V-blocks.
Hydra-Lift	50 and 100 ton BPR-Roll-Frame Presses 200 ton BPR-Roll-Frame Press	**IPL-R100** **IPL-R200**		• Allows easy, effortless daylight adjustments • Includes accessory chain.
"Hydrajust" Bed Positioning	50 ton Workshop VLP-Presses 100 ton Workshop VLP-Presses 200 ton Workshop VLP-Presses	**VHJ-50** **VHJ-100** **BSS-5380**		• Allowing effortless daylight adjustment by moving the lower bed up and down • Can be used with presses equipped with double-acting cylinder.
Centered Manual Valves	On VLP-Series Workshop Presses equiped with electric pumps with manual valves	**ZE-Series Pumps**		• The handle of the manual 3-position valve will automatically move to the tandem centre position when not operated.
Two-Push-Button Control	All press models with electric operated valves	–		• Two hand operation of the press for maximum operator safety • Call Enerpac for detailed information.

▼ PRESS SPEED CHART

Press Capacity ton (kN)	Cylinder Load	Hand Pumps mm of plunger travel per handpump stroke Two speed P-142	Hand Pumps Two speed P-392	Hand Pumps Two speed P-802	Electric Pumps mm of plunger travel per second Single-speed ZE5410SW-S ZE5410CW-S ZE5420SW-S	Electric Pumps Two speed ZE3410SW ZE3420SW	Electric Pumps Two speed ZE4420SW	Air Pumps Two speed At 6,9 bar air pressure PATG-1102N
10 (101)	No load	2,5	7,8	–	–	–	–	10,0
	Load	0,6	1,7	–	–	–	–	1,8
25 (232)	No load	–	3,4	–	–	–	–	5,0
	Load	–	0,7	–	–	–	–	0,8
50 (498)	No load	–	–	5,5	4,1	–	20,8	–
	Load	–	–	0,3	3,9	–	1,9	–
100 (933)	No load	–	–	–	–	7,7	11,1	–
	Load	–	–	–	–	0,7	1,0	–
200 (1995)	No load	–	–	–	–	–	5,2	–
	Load	–	–	–	–	–	0,5	–

Note: Values are approximate. Cylinder speed may vary in actual application.
See page 117 in the yellow pages for speed of other combinations with pump and cylinder.

▼ Shown: **LH-102 and TM-5** (in middle)

TM LH Series

Capacity:
900 - 90.000 kg

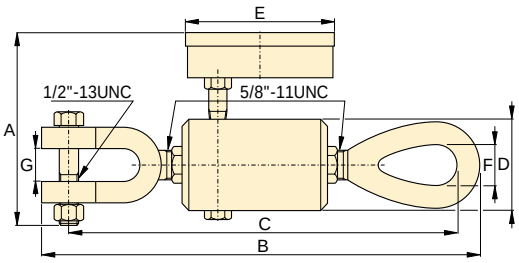
Accuracy, % of full scale:
±2%

Tension Meter TM-5

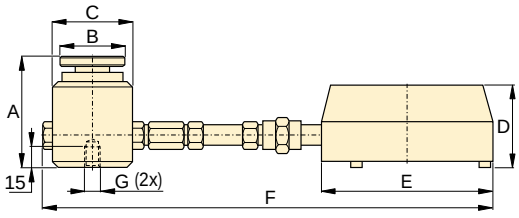
- **Accuracy ±2% of full scale**
- **Zinc and bronze plated to resist corrosion**
- **Dual-range readout in kilograms and pounds**
- **Cushioned metal case provides safe storage and transport**

Load Cells LH-Series

- **Accuracy ±2% of full scale**
- **Swivel loading pad reduces eccentric loading for improved accuracy**
- **Maximum indicating pointer reading pre-selected forces or to maintain maximum force readings**
- **Dual-range readout in kilograms and pounds**



TM-5



LH-Series

Type	Gauge Capacity		Model Number	Minimum Reading		Gauge Increments		Dimensions (mm)						
	(kg)	(lbs)		(kg)	(lbs)	(kg)	(lbs)	A	B	C	D	E	F	G
Direct Mounted	4.500	10.000	**TM-5**	500	1.000	100	100	120	247	236	50	93	22	19
Direct Mounted Load Cell	900	2.000	**LH-10**	100	200	20	20	77	44	57	60	101	215	1/4"- 20, 44,5 BC
	4.500	10.000	**LH-50**	500	1.000	100	100	77	44	57	60	101	215	1/4"- 20, 44,5 BC
Remote Mounted with 0,6 m Hose	900	2.000	**LH-102**	100	200	20	20	77	44	57	60	147	846	1/4"- 20, 44,5 BC
	4.500	10.000	**LH-502**	500	1.000	100	100	77	44	57	60	147	846	1/4"- 20, 44,5 BC
	9.000	20.000	**LH-1002**	1.000	2.000	200	200	77	44	57	60	147	846	1/4"- 20, 44,5 BC
Remote Mounted with 1,8 m Hose	21.000	50.000	**LH-2506**	3.000	5.000	500	500	101	69	85	60	147	2094	3/8"- 24, 63 BC
	45.000	100.000	**LH-5006**	5.000	5.000	1.000	1.000	132	101	127	60	147	2135	3/8"- 24, 89 BC
	90.000	200.000	**LH-10006**	10.000	10.000	1.000	2.500	158	127	158	60	147	2166	3/8"- 24, 102 BC

Hydraulic and Mechanical Pullers

ENERPAC
Hydraulic Technology Worldwide

ENERPAC offers a complete line of pullers with the widest range of sizes, capacities and styles. Whether your application requires mechanical, hydraulic or the patented Posi Lock® system, Enerpac can satisfy your requirements.

Made of high strength steel alloys, you can depend on Enerpac pullers to provide years of trouble-free operation, even in the harshest environments.

Hydraulic Pullers

These hydraulic pullers eliminate time-consuming and unsafe hammering, heating or prying. Damage to parts is minimized through the use of controlled hydraulic power.

Posi Lock® Pullers

The puller that meets the safety challenge. A control cage holds the pulling jaws securely in working position. This patented feature reduces the possibility of the puller jaws slipping off the work surface, thereby increasing productivity and tool life and reducing dangerous situations for the user. The Posi Lock® feature is available in a mechanical or hydraulic version.

WARNING
Do not exceed 50% of the rated puller capacity when using a double crosshead (2 griparms) or when using puller legs in combination with bearing puller attachment.

Always wear Safety Goggles while using pullers.

Puller Section Overview

When selecting a puller it is important to consider 3 basic specifications:

1. The Capacity:

is the amount of force the puller is capable of producing.
Typically, the capacity required for a job can be determined by using the shaft diameter of the part being pulled.
For manual pullers, the center bolt diameter of the puller should be at least half the diameter of the shaft being pulled from.
For hydraulic pullers, the capacity in tons should be 0,28 to 0,4 times the shaft diameter in mm. Use the following chart:

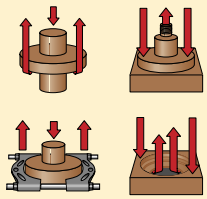
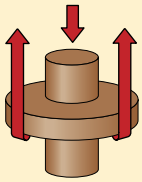
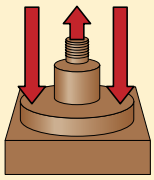
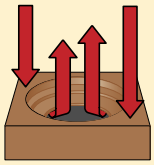
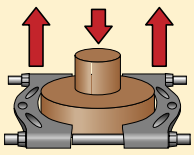
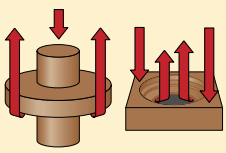
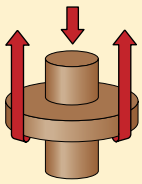
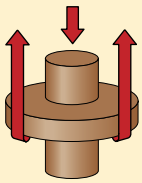
Shaft Diameter	Puller Capacity
0 - 25 mm	10 ton
25 - 50 mm	20 ton
50 - 89 mm	30 ton
89 - 140 mm	50 ton

2. The Reach:

is the distance between the bottom of the base and the jaw flats. The puller's reach must equal or exceed the same distance of the part being pulled.

3. The Spread:

is the distance between the jaws. The puller's spread needs to be greater than the width of the part being pulled.

Puller Function	Capacity ton	Puller Type	Series	Page
	8-50	**Master Puller Sets** Max. Reach: 252 - 700 mm Max. Spread: 250 - 1100 mm	BHP	 154 ▶
	8-50	**Grip Puller Sets** Max. Reach: 249 - 700 mm Max. Spread: 50 - 580 mm	BHP	 155 ▶
	8-50	**Cross Bearing Puller Sets** Max. Reach: 354 - 863 mm Max. Spread: 266 - 570 mm	BHP	 156 ▶
	8-50	**Bearing Cup Pullers** Max. Reach: 110 - 145 mm Max. Spread: 26 - 359 mm	BHP	 157 ▶
	8-50	**Bearing Pullers** Max. Width: 110 - 264 mm Max. Spread: 10 - 245 mm	BHP	 157 ▶
	2-40	**Posi Lock® Mechanical Pullers** Max. Reach: 101 - 355 mm Max. Spread: 12 - 635 mm	EP EPP EPX EPPMI	 158 ▶
	10-50	**Posi Lock® Hydraulic Pullers** Max. Reach: 203 - 355 mm Max. Spread: 304 - 635 mm	EPH EPHR EPHS	 162 ▶
	100	**Posi Lock® Hydraulic Pullers** Max. Reach: 1219 mm Max. Spread: 190 - 1778 mm	EPH	 165 ▶

BHP-Series, Master Puller Sets

ENERPAC
Hydraulic Technology Worldwide

▼ Shown: **Master Puller Set BHP-3751G**

Multi Purpose Puller Set

WARNING
Do not exceed 50% of the rated puller capacity when using a double crosshead (2 griparms) or when using puller legs in combination with bearing puller attachment.

WWW
Visit the **Products** section of our web site for more information and product selection charts regarding puller sets and individual puller component parts.
www.enerpac.com

- **Supplied with a full hydraulic set including pump, hose, cylinder, gauge, gauge adaptor and wooden case**
- **All Master Puller Sets include a Grip Puller, a Cross Bearing Puller, a Bearing Cup Puller and a Bearing Puller Attachment**
- **High quality, forged steel components provide superior reliability and service**
- **Sets include speed crank and adjusting screw for fast contact to work before hydraulics are applied.**

Maintenance engineers throughout the industry greatly appreciate the Enerpac Master Puller sets ▶

▼ **SELECTION CHART**

Master Puller Set Capacity *	**8 ton**	**20 ton**	**30 ton**	**50 ton**	**Page:**
Model Number ▶	**BHP-1752** [1)]	**BHP-2751G**	**BHP-3751G**	**BHP-5751G**	
Included Hydraulics **Set Weight ▶**	37 kg	90 kg	172 kg	298 kg	
• Hand Pump	P-142	P-392	P-392	P-80	**68-71 ▶**
• Cylinder	RWH-121	RCH-202	RCH-302	RCH-603	**28 ▶**
• Saddle	–	HP-2015	HP-3015	HP-5016	**29 ▶**
• Hose	HB-7206QB	HC-7206	HC-7206	HC-7206	**122 ▶**
• Gauge	GF-120B	GF-813B	GF-813B	GF-813B	**128 ▶**
• Gauge Adaptor	GA-4	GA-3	GA-3	GA-3	**134 ▶**
Included Pullers					
10 Grip Puller	BHP-1762	BHP-252	BHP-352	BHP-552	**155 ▶**
20 Cross Bearing Puller	BHP-1772	BHP-262	BHP-362	BHP-562	**156 ▶**
30 Bearing Cup Puller	BHP-180	BHP-280	BHP-380	BHP-580	**157 ▶**
40 Bearing Puller	BHP-181	BHP-282	BHP-382	BHP-582	**157 ▶**
• Case	CM-6	CW-350	CW-350	CW-750	

[1)] Includes Adaptor FZ-1630.
* See warning on this page.

▼ Shown: **Grip Puller Set BHP-351G**

BHP Series

Capacity:
8, 20, 30 and 50 ton

Reach:
252 - 700 mm

Spread:
249 - 1100 mm

Maximum Operating Pressure:
700 bar

- **Precise hydraulic control allows fast, efficient and safe pulling**
- **High quality, forged steel components provide superior reliability and service**
- **Available with and without full hydraulic set.**

Ordering Example

Model Number BHP-251G:
includes Grip Puller BHP-252 and a full hydraulic set. (Hand pump, cylinder, saddle, hose, gauge and gauge adaptor).

Model Number BHP-252:
includes Grip Puller mechanical parts **only,** for use with your existing hydraulics.

▼ SELECTION CHART

Grip Puller Set Capacity**		8 ton	20 ton	30 ton	50 ton
	Model Number ▶	BHP-152 [1)]	BHP-251G	BHP-351G	BHP-551G
Included Hydraulics	Set Weight ▶	22 kg	56 kg	91 kg	160 kg
• Hand Pump		P-142	P-392	P-392	P-80
• Cylinder		RWH-121	RCH-202	RCH-302	RCH-603
• Saddle		–	HP-2015	HP-3015	HP-5016
• Hose		HB-7206QB	HC-7206	HC-7206	HC-7206
• Gauge		GF-120B	GF-813B	GF-813B	GF-813B
• Gauge Adaptor		GA-4	GA-3	GA-3	GA-3
10 Grip Puller	Model Number ▶	BHP-1762*	BHP-252*	BHP-352*	BHP-552*
Maximum Spread (mm)	2-jaw	249	400	593	899
	3-jaw	249	499	800	1100
Maximum Reach (mm)	2-jaw	252	300	387	700
	3-jaw	252	300	387	700
Jaw (mm)	Thickness	15	20	24	30
	Width	23	27	38	39
Adjusting Screw (mm)	Thread	3/4"- 16 UNF	1"- 8 UNC	1 1/4"- 7 UNC	1 5/8"- 5.5 UNC
	Length	400	675	795	975

[1)] Includes Adaptor FZ-1630.
* Grip Puller order number without hydraulics.
** See warning on page 154.

Cross Bearing Puller Sets

ENERPAC
Hydraulic Technology Worldwide

▼ Shown: **Cross Bearing Puller Set BHP-361G**

- **Precise hydraulic control allows fast, efficient and safe pulling**
- **High quality, forged steel components provide superior reliability and service**

BHP Series

Capacity:
8, 20, 30 and 50 ton

Reach:
354- 863 mm

Spread:
266 - 570 mm

Maximum Operating Pressure:
700 bar

WWW

Visit the **Products** section of our web site for more information and product selection charts regarding puller sets and individual puller component parts.
www.enerpac.com

▼ SELECTION CHART

Cross Bearing Puller Set Capacity		8 ton	20 ton	30 ton	50 ton
	Model Number ▶	BHP-162 [1]	BHP-261G	BHP-361G	BHP-561G
Included Hydraulics	Set Weight ▶	26 kg	62 kg	121 kg	185 kg
• Hand Pump		P-142	P-392	P-392	P-80
• Cylinder		RWH-121	RCH-202	RCH-302	RCH-603
• Saddle		–	HP-2015	HP-3015	HP-5016
• Hose		HB-7206QB	HC-7206	HC-7206	HC-7206
• Gauge		GF-120B	GF-813B	GF-813B	GF-813B
• Gauge Adaptor		GA-4	GA-3	GA-3	GA-3
20 Cross Bearing Puller [2]	Model Number ▶	BHP-1772	BHP-262	BHP-362	BHP-562
Spread (mm)	Maximum	266	351	454	570
	Minimum	106	139	179	220
Reach (mm)	Maximum	462	571	711	863
Adjusting Screw (mm)	Diameter	3/4"- 16 UNF	1"- 8 UNC	1 1/4"- 7 UNC	1 5/8"- 5.5 UNS
	Length	400	675	795	975
Leg (mm)	Length	105	239	203	609
	Length	354	419	457	863
	Length	–	571	711	–
	Length	–	114	–	–
Upper Leg Ends (mm)	Thread	3/4"- 16 x 25	3/4"- 16 x 25	1-14 x 35	1 1/4"- 12 x 38
Lower Leg Ends (mm)	Thread	5/8"- 18 x 25	5/8"- 18 x 25	1-14 x 27	1 1/4"- 12 x 38
30 Bearing Cup Puller [2]	Model Number ▶	BHP-180	BHP-280	BHP-380	BHP-580
40 Bearing Puller [2]	Model Number ▶	BHP-181	BHP-282	BHP-382	BHP-582
• Wooden Case		CW-166	CW-166	CW-350	CW-750

[1] Includes Adaptor FZ-1630.
[2] Can be ordered separately without hydraulic components, see next page.

▼ Shown: **BHP-380**

Bearing Cup Puller

- **Made of high strength steel alloy**
- **Easily adapted to Cross Bearing Pullers for fast and efficient removal of the most difficult parts**
- **Adjustable to fit a variety of bearings and seals**

BHP Series

Capacity:
8, 20, 30 and 50 ton

Maximum Reach:
110 - 145 mm

Spread Range:
110 - 359 mm

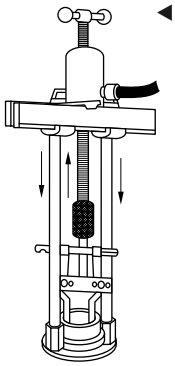
Maximum Operating Pressure:
700 bar

▼ SELECTION CHART

Capacity *		8 ton	20 ton	30 ton	50 ton
30 Bearing Cup Puller					
Model Number		**BHP-180**	**BHP-280**	**BHP-380**	**BHP-580**
Spread**	Max.	110	220	359	359
	Min.	26	25	50	50
Reach**	Max.	110	140	145	145
Center Screw	Thread	3/4"- 16 UNF	1"- 8 UNC	1 1/4"- 7 UNC	1 5/8"- 5.5

* See warning on this page.

WARNING
Do not exceed 50% of the rated puller capacity when using a double crosshead (2 griparms) or when using puller legs in combination with bearing puller attachment.

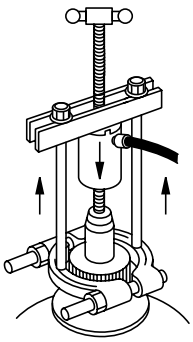


◀ *Bearing Cup Puller shown with Crosshead Puller Attachment.*

▼ Shown: **BHP-382**

Bearing Puller

- **Made of high strength steel alloy**
- **Wedge-shaped edges allow removal of the most hard-to-grip components**
- **Easily adapted to Cross Bearing Pullers for fast and efficient removal of the most difficult parts**



Bearing Puller shown with Crosshead Puller Attachment. ▶

▼ SELECTION CHART

Capacity*		8 ton	20 ton	30 ton	50 ton
40 Bearing Puller					
Model Number		**BHP-181**	**BHP-282**	**BHP-382**	**BHP-582**
Spread**	Max.	104	130	245	245
	Min.	25	9	17	17
Width**		126	150	264	264
Thread		5/8"-18 UNF	5/8"- 18 UNF	1"- 14 UNS	1 1/4"- 12 UNF

* Read warning on this page
** Dimensions are in mm.

Bearing Puller

Bearing Puller has wedge shaped edges for placing puller behind hard to reach bearings, gears, etc., where clearance prevents direct application of grip puller arms.
The Bearing Puller can be used with the Cross Bearing Puller or the Grip Puller.

EP-Series, Posi Lock® Mechanical Pullers

ENERPAC
Hydraulic Technology Worldwide

▼ Shown from left to right: **EP-206, EP-108**

For Safer and Faster Pulling

- **Patented 'Safety Cage' jaw retention system**
- **Roll threaded shafts for less effort when applying high torque**
- **Slim tapered jaws for improved gripping in tight spots**
- **Available in 2 and 3 jaw design and inside and outside pulling configuration**
- **More efficient pulling, as one man can do the job where manual pullers often require two operators**

Long Jaws

Long Jaws are used to increase the reach and spread of manual pullers. They maintain the same pulling capacity as the standard jaws, but reduce clamping force to 25%.

Page: **161**

Shaft Attachments

Shaft protectors and extenders are live centers that fit over the standard puller shaft for tip protection and additional reach.

Page: **161**

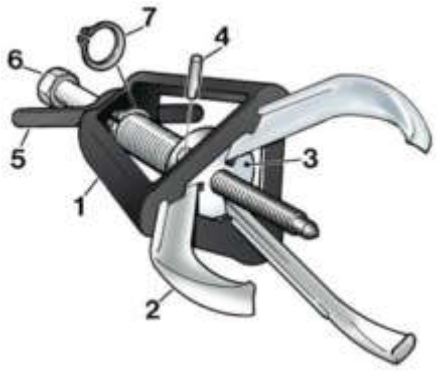
Application Tip

Because of the unique safety cage design, Posi Lock® pullers will grip on surfaces where normal pullers would slip off; e.g. tapered bearings.

◀ *Positioning an EP-104 3-jaw puller on the accessory drive of a diesel engine.*

Posi Lock® Mechanical Grip Pullers

Posi Lock® Pullers



1. Patented 'Safety Cage' guides jaws, holding them securely onto the part.
2. Durable forged jaws provide positive grip.
3. Jaw head provides pivot and reaction point for jaws.
4. Pin, for easy jaw removal and replacement.
5. T-handle provides control of the puller jaws.
6. Drive bolt with rolled threads for increased force with reduced input torque.
7. Snap-ring retains cage to drive bolt and provides quick removal for easy service.

EP
EPPMI
Series

Capacity:
2 - 40 ton

Maximum Reach:
101- 355 mm

Spread Range:
12- 635 mm

▼ QUICK SELECTION CHART EXTERNAL PULLERS

For quick technical information see next page.

Number of Jaws	Maximum Reach (mm)	Spread (mm) min. - max.	Capacity ton (kN)	Model Number	Center Bolt Diameter (mm)	(kg)
2	101	12 - 127	**2** (17)	**EP-204**	14	1,4
3	101	12 - 127	**5** (45)	**EP-104**	14	1,8
2	152	12 - 178	**6** (53)	**EP-206**	16	3,2
3	152	12 - 178	**10** (89)	**EP-106**	16	3,6
2	203	19 - 304	**12** (106)	**EP-208**	20	5,4
3	203	19 - 304	**17** (151)	**EP-108**	20	6,4
2	245	25 - 381	**14** (124)	**EP-210**	20	5,9
3	245	25 - 381	**20** (178)	**EP-110**	20	7,3
2	304	63 - 457	**25** (222)	**EP-213**	29	17,2
3	304	63 - 457	**30** (267)	**EP-113**	29	20,0
2	355	76 - 635	**35** (311)	**EP-216**	31	25,8
3	355	76 - 635	**40** (356)	**EP-116**	31	30,8

Always wear Safety Goggles while using pullers.

Visit the **Products** section of our web site for more information and product selection charts regarding puller sets and individual puller component parts.
www.enerpac.com

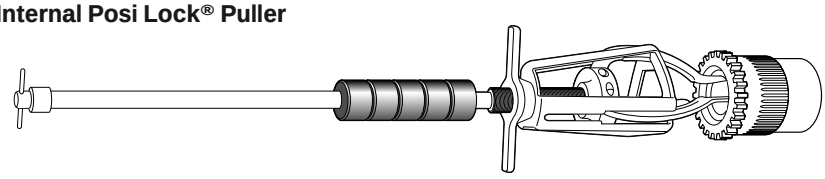
Application Tip

In determining the correct manual puller capacity for your application, use the folllowing rule:
The center bolt diameter of the puller should be at least 1/2 the diameter of the shaft being pulled on.

Example:

A part being pulled from a shaft with a diameter of 38 mm would require a puller with a center bolt diameter of at least 19 mm.

Internal Posi Lock® Puller



▼ QUICK SELECTION CHART INTERNAL PULLERS

Number of Jaws	Maximum Reach (mm)	Spread (mm) min. - max.	Jaw Style	Model Number	Jaw Length (mm)	(kg)
3	168	14 - 101	Standard	**EPPMI-6**	168	3,9
	218	25 - 133	Long		218	3,9

Visit the **Products** section of our web site for more information and product selection charts regarding puller sets and individual puller component parts.
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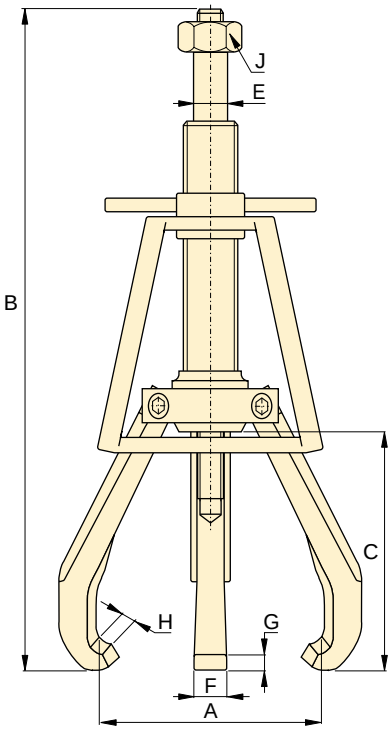
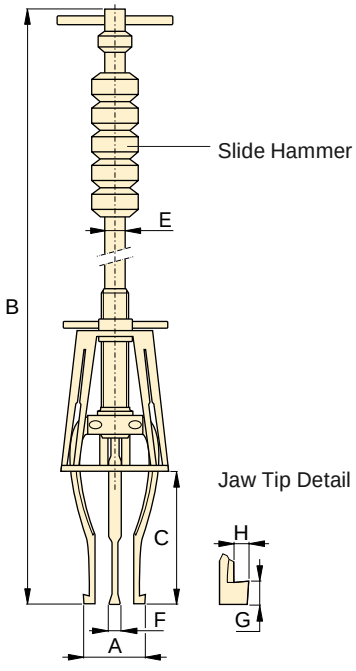
▲ *EP-204 2 jaw puller positioned to pull a water pump.*



2 and 3 Jaw External Puller
EP-Series



Internal Puller
EPPMI-6

▼ QUICK SELECTION CHART EXTERNAL PULLERS

Number of Jaws	Maximum Reach (mm)	Spread (mm) min. - max.	Capacity ton (kN)	Model Number	Center Bolt Diameter (mm)	Maximum Torque (Nm)
2	101	12 - 127	**2** (17)	**EP-204**	14	27
3	101	12 - 127	**5** (45)	**EP-104**	14	54
2	152	12 - 178	**6** (53)	**EP-206**	16	102
3	152	12 - 178	**10** (89)	**EP-106**	16	176
2	203	19 - 304	**12** (106)	**EP-208**	20	203
3	203	19 - 304	**17** (151)	**EP-108**	20	298
2	245	25 - 381	**14** (124)	**EP-210**	20	237
3	245	25 - 381	**20** (178)	**EP-110**	20	373
2	304	63 - 457	**25** (222)	**EP-213**	29	644
3	304	63 - 457	**30** (267)	**EP-113**	29	814
2	355	76 - 635	**35** (311)	**EP-216**	31	1085
3	355	76 - 635	**40** (356)	**EP-116**	31	1153

▼ QUICK SELECTION CHART INTERNAL PULLERS

Number of Jaws	Maximum Reach (mm)	Spread (mm) min. - max.	Jaw Style	Model Number	Jaw Length (mm)	Slide-Hammer weight (kg)
3	168	14 - 101	Standard	**EPPMI-6**	168	1,1
	218	25 - 133	Long		218	1,1

EP EPPMI Series

Capacity:
2 - 40 ton

Maximum Reach:
101- 355 mm

Spread Range:
12- 635 mm

Shaft Attachments

Shaft protectors and extenders are live centers that fit over the standard puller shaft for tip protection and additional reach.

Length (mm)	Dia-meter (mm)	Increases Center Bolt Length (mm)	Order: Model Number
25	19	9	**EPP-4**
50	19	38	**EPX-4**
31	22	12	**EPP-6**
50	22	38	**EPX-6**
31	25	12	**EPP-10**
50	25	38	**EPX-10**
50	35	21	**EPP-1316**

Long Jaws

Long Jaws are used to increase the reach and spread of pullers. They maintain the same pulling capacity as the standard jaws, but reduce clamping force to 25% of rating.

Spread (mm) min. - max.	Max. Reach (mm)	Order: Model Number
57 - 381	245	**EP-11054**
38 - 558	400	**EP-11054L**
38 - 762	508	**EP-11354L**
50 - 965	635	**EP-11654L**
25 - 133	218	**EP-10554L***

* for EPPMI-6 only

Visit the **Products** section of our web site for more information and product selection charts regarding puller sets and individual puller component parts.
www.enerpac.com

Dimensions (mm)								Model Number	Optional accessories		
Spread min. - max. A	Overall Length B	Max. Reach C	Center Bolt Diam. E	Jaw Width F	Tip Clearance G	Tip Depth H	Hex Socket Size (inch) J		Shaft Protectors	Shaft Extenders	Long Jaws
12 - 127	245 - 323	101	14	15	4,1	4,6	7/8"	**EP-204**	EPP-4	EPX-4	–
12 - 127	245 - 323	101	14	15	4,1	4,6	7/8"	**EP-104**	EPP-4	EPX-4	–
12 - 178	323 - 476	152	16	19	8,1	6,1	1 1/16"	**EP-206**	EPP-6	EPX-6	–
12 - 178	323 - 476	152	16	19	8,1	6,1	1 1/16"	**EP-106**	EPP-6	EPX-6	–
19 - 304	412 - 615	203	20	22	6,4	9,1	1 1/8"	**EP-208**	EPP-10	EPX-10	EP-11054
19 - 304	412 - 615	203	20	22	6,4	9,1	1 1/8"	**EP-108**	EPP-10	EPX-10	EP-11054
25 - 381	489 - 736	245	20	25	6,4	9,1	1 1/8"	**EP-210**	EPP-10	EPX-10	EP-11054L
25 - 381	489 - 736	245	20	25	6,4	9,1	1 1/8"	**EP-110**	EPP-10	EPX-10	EP-11054L
63 - 457	660 - 965	304	29	31	12,7	9,7	1 11/16"	**EP-213**	EPP-1316	–	EP-11354L
63 - 457	660 - 965	304	29	31	12,7	9,7	1 11/16"	**EP-113**	EPP-1316	–	EP-11354L
76 - 635	800 - 1155	355	31	36	13,5	11,7	1 13/16"	**EP-216**	EPP-1316	–	EP-11654L
76 - 635	800 - 1155	355	31	36	13,5	11,7	1 13/16"	**EP-116**	EPP-1316	–	EP-11654L

Note: Overall length (B) is dependent on position of center bolt.

Dimensions (mm)							Model Number
Spread min. - max. A	Overall Length B	Max. Reach C	Slide Rod Dia. E	Jaw Width F	Tip Clearance G	Tip Depth H	
14 - 101	736	168	14,2	8	3,0	1,5	**EPPMI-6**
25 - 133	787	218	14,2	8	7,6	4,6	

Always wear Safety Goggles while using pullers.

EPH-Series, Posi Lock® Hydraulic Pullers

ENERPAC Hydraulic Technology Worldwide

▼ Shown: **EPHR-110**

- **Patented 'Safety Cage' jaw retention system**
- **High force hydraulic system for effortless pulling of large components**
- **Slim tapered jaws for better gripping in tight spots**
- **Available in 2 and 3 jaw design**
- **More efficient pulling, as one man can do the job where manual pullers often require two operators**

◀ *An EPHR-116, 50 ton hydraulic Posi Lock® puller easily removes the main drive gear from this metal forming brake press.*

High-Tech Pulling

Transport and Store
Conveniently stores and transports hydraulic pullers and accessories. Order the **EPT-2550** Storage Cart and make your job easier to do!

Long Jaws
Used to increase the reach and spread of pullers. They maintain the same pulling capacity as the standard jaws, but reduce clamping force to 25%.

Page: **163**

Application Tip
Because of the unique safety cage design, Posi Lock® pullers will grip on surfaces where normal pullers would slip off; e.g. tapered bearings.

Visit the **Products** section of our web site for more information and product selection charts regarding puller sets and individual puller component parts.
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Number of Jaws	Maximum Spread (mm)	Capacity ton (kN)	Model Number*
2	304	**10** (101)	**EPH-208**
3	304		**EPH-108**
2	381	**15** (142)	**EPH-210**
3	381		**EPH-110**
2	457	**25** (232)	**EPH-213**
3	457		**EPH-113**
2	635	**50** (498)	**EPH-216**
3	635		**EPH-116**

* Cylinder is not included.

Posi Lock® Hydraulic Grip Pullers

▼ SETS SELECTION CHART

Style	Capa-city (ton)	Basic Puller	Cylinder	Stroke (mm)	Pump Set	Set Model Number*	(kg)
2 Jaw Puller	**10**	EPH-208	RC-106	152	–	**EPHR208**	10
	10	EPH-208	RC-106	152	EP-1E	**EPHS208E**	27
	15	EPH-210	RC-1510	254	–	**EPHR210**	22
	15	EPH-210	RC-1510	254	EP-1E	**EPHS210E**	38
	25	EPH-213	RC-2514	362	–	**EPHR213**	44
	25	EPH-213	RC-2514	362	EP-1E	**EPHS213E**	53
	50	EPH-216	RC-5013	336	–	**EPHR216**	87
	50	EPH-216	RC-5013	336	EP-2E	**EPHS216E**	123
3 Jaw Puller	**10**	EPH-108	RC-106	152	–	**EPHR108**	11
	10	EPH-108	RC-106	152	EP-1E	**EPHS108E**	28
	15	EPH-110	RC-1510	254	–	**EPHR110**	23
	15	EPH-110	RC-1510	254	EP-1E	**EPHS110E**	39
	25	EPH-113	RC-2514	362	–	**EPHR113**	48
	25	EPH-113	RC-2514	362	EP-1E	**EPHS113E**	57
	50	EPH-116	RC-5013	336	–	**EPHR116**	91
	50	EPH-116	RC-5013	336	EP-2E	**EPHS116E**	127

* Standard set EPHS models shipped with 230 VAC pump.

EPH Series

Capacity:
10 - 50 ton

Maximum Reach:
203 - 355 mm

Spread Range:
19-635 mm

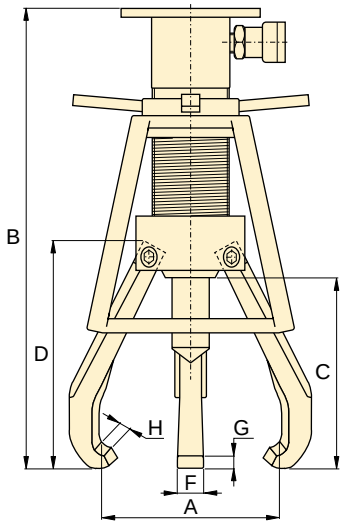
Maximum Operating Pressure:
700 bar

Pump Sets

All Posi Lock Hydraulic Puller Sets that include 230 VAC pumps, will feature the following components:

	EP-1E Pump Set	EP-2E Pump Set
Pump	PUJ-1200E	ZE4210ME
Hose	HC-7210	HC-7210
Gauge	G-2536L	G-2536L
Adaptor	–	GA-3

Components for 115 VAC pumps are available on request.



Dimensions (mm)									Accessories [1]		
									Standard included	Standard included	Optional
Spread min. - max. A	Overall Length B	Maximum Reach C	Jaw Length D	Jaw Width F	Tip Clearance G	Tip Depth H	(kg)	Model Number*			
									Ram Point Sets	Lift Plates	Long Jaws
19 - 304	498	203	237	22	7,4	6,9	6,4	**EPH-208**	EPH-155	EPH-11052	EPH-11054
19 - 304	498	203	237	22	7,4	6,9	7,3	**EPH-108**	EPH-155	EPH-11052	EPH-11054
25 - 381	665	245	270	25	11,2	9,1	10,0	**EPH-210**	EPH-155	EPH-11052	EPH-11054L
25 - 381	665	245	270	25	11,2	9,1	11,3	**EPH-110**	EPH-155	EPH-11052	EPH-11054L
63 - 457	846	304	348	31	12,9	9,7	21,3	**EPH-213**	EPH-257	EPH-11352	EPH-11354L
63 - 457	846	304	348	31	12,9	9,7	25,0	**EPH-113**	EPH-257	EPH-11352	EPH-11354L
76 - 635	919	355	413	36	15,0	11,7	40,8	**EPH-216**	EPH-508	EPH-11652	EPH-21654L
76 - 635	919	355	413	36	15,0	11,7	45,4	**EPH-116**	EPH-508	EPH-11652	EPH-11654L

[1] See next page for details.

Posi Lock® Hydraulic Puller Accessories

ENERPAC Hydraulic Technology Worldwide

▼ RAM POINT SETS SELECTION CHART

Fits Puller Set Model Number	EPH-208, EPH-210 EPH-108, EPH-110	EPH-213 EPH-113	EPH-216 EPH-116
			
Ram Point Set [1] Model Number	**EPH-155**	**EPH-257**	**EPH-508**
Ram Points Included:	**Ram Point Dimensions** Diameter x Length (mm)		
Flat Ram Points	ø25 x 25	ø38 x 57	ø51 x 76
	ø25 x 76	ø51 x 57	ø70 x 76
	–	ø51 x 102	ø70 x 127
Tapered Ram Points	ø25 x 38	ø38 x 64	ø51 x 95
	ø25 x 89	ø51 x 64	ø51 x 95
	–	ø51 x 114	ø70 x 140
Ram Point Adaptor	–	–	ø70 x 57

[1] Standard included in EPH-Series Posi Lock Pullers.

Always wear Safety Goggles while using pullers.

Visit the **Products** section of our web site for more information and product selection charts regarding puller sets and individual puller component parts.
www.enerpac.com

◄ EPHR-116 used to remove electric motor pullies. Puller is positioned using the Lift Plate.

▼ LIFT PLATE SELECTION CHART

Fits Puller Set Model Number	Model Number *	Thick-ness (mm)	Dia-meter (mm)
EPH-208	**EPH-11052**	6,4	ø153
EPH-108	**EPH-11052**	6,4	ø153
EPH-210	**EPH-11052**	6,4	ø153
EPH-110	**EPH-11052**	6,4	ø153
EPH-213	**EPH-11352**	9,7	ø203
EPH-113	**EPH-11352**	9,7	ø203
EPH-216	**EPH-11652**	9,7	ø254
EPH-116	**EPH-11652**	9,7	ø254

* Mounting screws included. Lifting plates are standard included with EPH-Series Pullers.

▼ LONG JAW SELECTION CHART

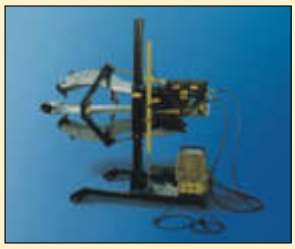
Fits Puller Set Model Number	Model Number	Number of Jaws required	Spread (mm)	Reach (mm)	(kg)
EPH-208	**EPH-11054**	2	57 - 381	246	1,1
EPH-108	**EPH-11054**	3	57 - 381	246	1,1
EPH-210	**EPH-11054L**	2	38 - 559	401	2,5
EPH-110	**EPH-11054L**	3	38 - 559	401	2,5
EPH-213	**EPH-11354L**	2	38 - 762	508	4,8
EPH-113	**EPH-11354L**	3	38 - 762	508	4,8
EPH-216	**EPH-11654L**	2	50 - 965	635	7,5
EPH-116	**EPH-11654L**	3	50 - 965	635	7,5

Long Jaws are optional accessories and used for added reach and spread. They have the same load capacity as standard jaws with 25% of the clamping force.

Posi Lock® 100 Ton Hydraulic Grip Pullers

▼ **EPH-1003E**

EPH Series



Capacity:
100 ton

Maximum Reach:
1219 mm

Spread Range:
190-1778 mm

Maximum Operating Pressure:
700 bar

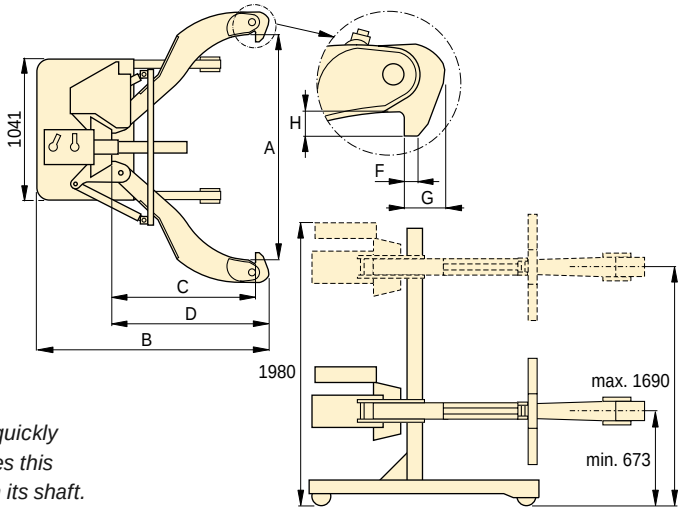
- **Roller cart with power lift**
- **Hydraulically actuated lift cylinder on cart extends puller from ground to a height of 1,7 m**
- **Adjustable jaw tips**
- **Puller easily detaches from cart**
- **Includes electric two stage pump with remote jog switch for fingertip control of the removal process**
- **Puller height range 673 to 1690 mm**
- **Multiple pushing adaptors included**

Pushing Adaptors

All Posi Lock® 100 Ton Hydraulic Pullers include following pushing adaptors.

Diameter (mm)	Length (mm)	Model Number
89	737	**EPHT-1162**
89	483	**EPHT-1163**
89	229	**EPHT-1164**

◀ *The EPH-1003E quickly and easily removes this drive sheave from its shaft.*



Number of Jaws	Spread Range (mm)	Capacity ton (kN)	Model Number	Spread A (mm)	Overall Length B (mm)	Reach C (mm)	Jaw Length D (mm)	Jaw Width F (mm)	Tip Clearance G (mm)	Tip Depth H (mm)	(kg)
2	190 - 1778	**100** (890)	**EPH-1002E**	190 - 1778	1955	1219	1346	76	89	89	771
3	190 - 1778	**100** (890)	**EPH-1003E**	190 - 1778	1955	1219	1346	76	89	89	907

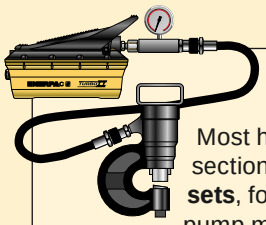
Enerpac Hydraulic Tools

ENERPAC Hydraulic Technology Worldwide

ENERPAC offers an extensive range of dedicated tools for a variety of specific and flexible applications.

Whatever your requirement… cutting, punching, spreading or bending… you can be sure that Enerpac has the correct tool to do your job safely and efficiently.

Featuring maintenance sets, machine lifts and load skates, as well as hole punches, pipe benders and cable cutters, Enerpac has the tools to ensure that even your most demanding applications can be undertaken with the highest degree of safety and accuracy.



Pump and Tool Sets

Most hydraulic tools in this section are available in **sets**, for a perfect tool-pump match.

Hydraulic System Set-up

Check out our 'Yellow Pages' section for help on system set-ups and valving configurations.

Page: 114

Bolting Tools

More Enerpac Tools you will find in our Bolting Tools section in this catalogue.

Page: 186

Hydraulic Tool Section Overview

Capacity ton (kN)	Tool type and functions	Series	Page
2,5-12,5 (22-116)	**Maintenance Sets**	**MS**	 **168** ▶
35 (311)	**Punch** **Punch-Pump Sets**	**MSP, SP, STP**	 **172** ▶
16 (157)	**Lifting Wedge**	**LW**	 **174** ▶
8,5-20 (75-178)	**Machine Lifts**	**SOH**	 **175** ▶
1-80 (8,9-712)	**Load Skates**	**ER, ES, ELP**	 **176** ▶
19-453 litres	**Industrial Storage Cases**	**CM**	 **178** ▶
0,75 - 1,00 (6 - 8,9)	**Hydraulic Wedgie** **Spread Cylinders**	**A, WR**	 **179** ▶
3 - 20 (26-178)	**Hydraulic Cutterheads** **Cutterhead-Pump Sets**	**WHC, WHR, STC**	 **180** ▶
3 - 20 (26-178)	**Self-Contained Hydraulic Cutters**	**WMC**	 **181** ▶
Nominal Bore **1/2 - 4 inch**	**Pipe Benders**	**STB**	 **182** ▶
Strand Diameter **3/8 - 0,6 inch**	**Post Tensioning Tools**	**DPT, PT**	 **184** ▶

▼ Shown: **MS2-10**

The Universal Hydraulic Tool Box

Maintenance Sets

Enerpac Maintenance sets are a complete assortment of hydraulic powered tools. Using these sets allows you to quickly configure a unique tool to meet your most difficult jobs. Built around the Enerpac lightweight hand pump, hose and cylinder, these sets enable you to push, pull, lift, press, straighten, spread and clamp with forces up to 12,5 ton.

- **All sets include Enerpac pump, hose, cylinder and gauge**
- **Lock-on or threaded connectors**
- **Complete maintenance set for almost every maintenance application**

More Information

For detailed information on all included attachments, see the next pages.

Page: **170**

◀ *Clamping a workpiece is just one of the many applications for the Enerpac maintenance sets.*

▼ QUICK SELECTION CHART

Capacity using attachments* **ton** (kN)	**Set Model Number**						**Number of Attachment Components**	(kg)
2,5 (22)	**MS2-4**	**P-142**	**HC-7206**	**RC-55**	**GP-10S**	**GA-2**	35	26
2,5 (22)	**MSFP-5**	**P-142**	**HC-7206**	**RC-55**	**G2535L**	**GA-3**	24	20
5,0 (50)	**MSFP-10**	**P-392**	**HC-7206**	**RC-106**	**G2535L**	**GA-3**	22	48
5,0 (50)	**MS2-10**	**P-392**	**HC-7206**	**RC-106**	**GP-10S**	**GA-2**	40	63
12,5 (116)	**MS2-20**	**P-392**	**HC-7206**	**RC-256**	**GP-10S**	**GA-2**	19	95
5,0-12,5 (50-116)	**MS2-1020**	**P-392**	**HC-7206**	**RC-102, -106, -256**	**GP-10S**	**GA-2**	59	158

* If no attachments are being used, capacity is double these values. Maximum operating pressure is then 700 bar.

Universal Maintenance Sets

CAUTION!
When cylinders are used with maintenance set attachments or components, the maximum system pressure must be limited to half the rated pressure (350 bar).

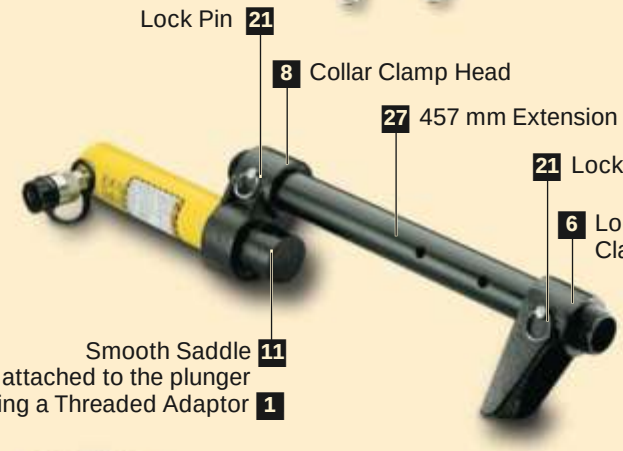
WARNING!
Only use attachments provided with set. Non-Enerpac attachments and longer extension tubes will reduce column strength.

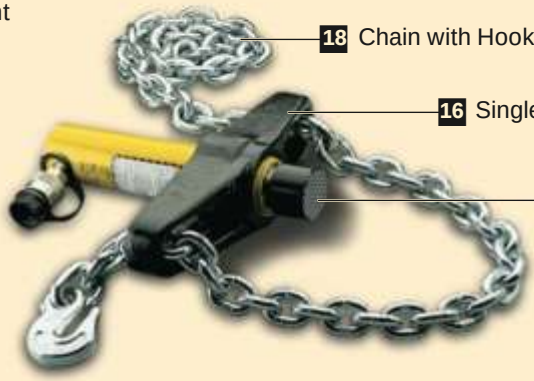
MS Series

Capacity (using attachments):
2,5 - 12,5 ton

Maximum Operating Pressure:
350 bar

▼ APPLICATION EXAMPLES





MS-Series, Maintenance Sets

ENERPAC
Hydraulic Technology Worldwide

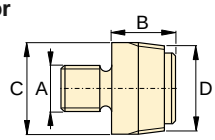
CAUTION! When cylinders are used with maintenance set attachments or components, the maximum system pressure must be limited to half the rated pressure (350 bar).

Note: All dimensions in millimetres.

Set Model Number	MS2-4	MSFP-5	MSFP-10	MS2-10	MS2-20	MS2-1020
Base/Collar/ Plunger Attachments	2,5 tons	2,5 tons	5,0 tons	5,0 tons	12,5 tons	5-12,5 tons
1	A-23	A-23	A-13	A-13	A-28	A-13 / A-28
2	A-25	A-25	A-21	A-21	A-27	A-21 / A-27
3	A-1034	A-1034	A-20	A-20	A-595	A-20 / A-595
4	MZ-4010	MZ-4010	A-14	A-14	A-243	A-14 / A-243
5	A-545	A-545	A-10	A-10	—	A-10 (2x)
6	—	—	—	A-8	—	A-8
7	A-530	A-530	A-6	A-6	—	A-6
8	MZ-4011	—	—	A-192	—	A-192
9	—	—	—	A-305	—	A-305
10	A-531	A-531	A-18	A-18	—	A-18
11	—	—	—	A-185	—	A-185
12	A-532	A-532	A-15	A-15	—	A-15
13	—	—	—	—	A-607	A-607
14	A-629	A-629	A-129	A-129	—	A-129
15	A-539	A-539	A-128	A-128	—	A-128
Chains and Attachments for Pulling	2,5 tons	2,5 tons	5,0 tons	5,0 tons	12,5 tons	5-12,5 tons
16	A-558	—	—	A-132	A-238	A-132, -238
17	—	—	—	A-5 (2x)	—	A-5 (2x)
18	A-557(2x)	—	—	A-141(2x)	A-218(2x)	A-141 (2x) /
						A-218 (2x)
Tubes, Connectors and Adaptors	2,5 tons	2,5 tons	5,0 tons	5,0 tons	12,5 tons	5-12,5 tons
19	A-544			A-19(2x)	A-242(2x)	A-19 (2x) /
						A-242 (2x)
20	WR-5	WR-5	WR-5	A-92	—	A-92
21	MZ-4013(4x)	MZ-4013 (4x)	A-16(4x)	A-16(4x)	—	A-16(4x)
22	MZ-4007(3x)	MZ-4007(3x)	MZ-1050(2x)	MZ-1050 (2x)	—	MZ-1050 (3x)
23	MZ-4008(2x)	—	—	MZ-1051	—	MZ-1051 (2x)
24	MZ-4009	MZ-4009	MZ-1052	MZ-1052	—	MZ-1052
25	—	—	—	A-285	—	A-285
26	A-650	—	—	—	—	—
27 Length: 76mm	MZ-4002	MZ-4002	—	—	—	
127mm	MZ-4003	MZ-4003	MZ-1002	MZ-1002	—	MZ-1002
254mm	MZ-4004	MZ-4004	MZ-1003	MZ-1003	A-239	MZ-1003
						and A-239
457mm	MZ-4005(2x)	MZ-4005	MZ-1004	MZ-1004	A-240	MZ-1004 (2x)
						and A-240
584mm	MZ-4006(2x)	MZ-4006	—	—	—	—
762mm	—	—	MZ-1005	MZ-1005	A-241	MZ-1005 (2x)
Ø 42,5 mm						and A-241
28 Case	CW-350	CW-350	CW-350	CW-350	CW-350	CW-350
Weight	26 kg	20 kg	48 kg	63 kg	95 kg	158 kg

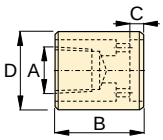
Base/Collar/Plunger Attachments

1 Threaded Adaptor



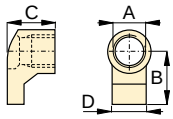
ton	Model Nr.	A	B	C	D
2,5	A-23	3/4"- 16 UN	28	26	3/4"- 14 NPT
5,0	A-13	1"- 8 UN	31	42	1 1/4"- 11 1/2 NPT
12,5	A-28	1 1/2"- 16 UN	47	69	2"- 11 1/2 NPT

2 Base Attachment



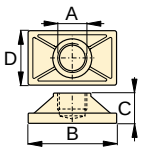
ton	Model Nr.	A	B	C	D
2,5	A-25	3/4"- 14 NPT	50	12	44
5,0	A-21	1 1/4"- 11 1/2 NPT	57	12	65
12,5	A-27	2"- 11 1/2 NPT	63	12	98

3 Collar Toe



ton	Model Nr.	A	B	C	D
2,5	A-1034	1 1/2"- 16 UN	54	50	31
5,0	A-20	2 1/4"- 14 UN	80	57	57
12,5	A-595	3 5/16"- 12 UN	103	51	80

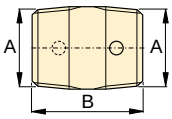
4 Flat Base



ton	Model Nr.	A	B	C	D
2,5	MZ-4010	3/4"- 14 NPT	114	31	63
5,0	A-14	1 1/4"-11 1/2 NPT	165	35	88
12,5	A-243*	2"- 11 1/2 NPT	165	58	165

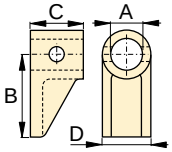
* A-243 is a round base model

5 Threaded Connector



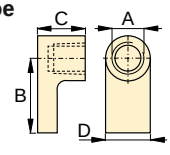
ton	Model Nr.	A	B
2,5	A-545	3/4"- 14 NPT	35
5,0	A-10	1 1/4"- 14 NPT	41

6 Lock-on Clamp Toe



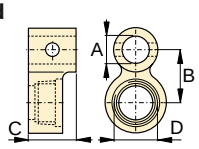
ton	Model Nr.	A	B	C	D
5,0	A-8	43	105	50	57

7 Threaded Plunger Toe

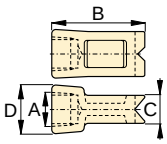
ton	Model Nr.	A	B	C	D
2,5	A-530	3/4" - 14 NPT	57	25	33
5,0	A-6	1 1/4" - 11 1/2 NPT	28	31	57

8 Collar Clamp Head

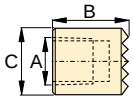
ton	Model Nr.	A	B	C	D
2,5	MZ-4011	3/4" - 14 NPT	49	76	1 1/2" - 16 UN
5,0	A-192	42	63	50	2 1/4" - 14 UN

9 Spreader Toe

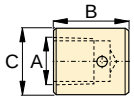
ton	Model Nr.	A	B	C	D
5,0	A-305	1 1/4" - 11 1/2 NPT	114	25	50

10 Serrated Saddle

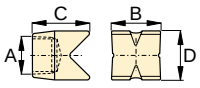
ton	Model Nr.	A	B	C
2,5	A-531	3/4" - 14 NPT	27	31
5,0	A-18	1 1/4" - 11 1/2 NPT	38	50

11 Smooth Saddle

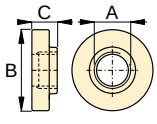
ton	Model Nr.	A	B	C
5,0	A-185	1 1/4" - 11 1/2 NPT	38	50

12 90° V-Base

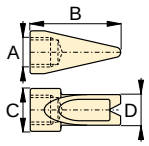
ton	Model Nr.	A	B	C	D
2,5	A-532	3/4" - 14 NPT	38	47	25
5,0	A-15	1 1/4" - 11 1/2 NPT	54	57	54

13 Plunger Base

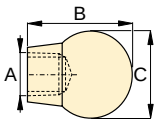
ton	Model Nr.	A	B	C
12,5	A-607	2" - 11 1/2 NPT	166	38

14 Wedge Head

ton	Model Nr.	A	B	C	D
2,5	A-629	3/4" - 14 NPT	69	33	28
5,0	A-129	1 1/4" - 11 1/2 NPT	101	50	44

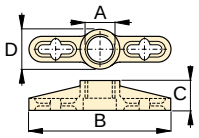
15 Rubber Flex-Head

ton	Model Nr.	A	B	C
2,5	A-539	3/4" - 14 NPT	44	69
5,0	A-128	1 1/4" - 11 1/2 NPT	86	86

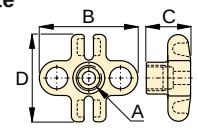
Chains and Attachments for Pulling

16 Single Chain Plate

ton	Model Nr.	A	B	C	D
2,5	A-558	1 1/2" - 16 UN	196	39	44
5,0	A-132	2 1/4" - 14 UN	307	63	79
12,5	A-238	3 5/16" - 12 UN	450	102	125

17 Double Chain Plate

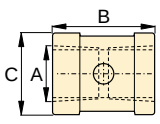
ton	Model Nr.	A	B	C	D
5,0	A-5	1 1/4" - 11 1/2 NPT	130	50	126

18 Chain with Hook

ton	Model Nr.	Chain Length
2,5	A-557	1,5 metres
5,0	A-141	1,8 metres
12,5	A-218	2,4 metres

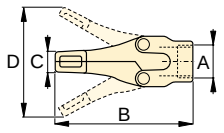
Tubes, Connectors and Adaptors

19 Pipe Coupling

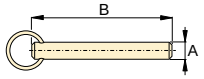
ton	Model Nr.	A	B	C
2,5	A-544	3/4" - 14 NPT	42	33
5,0	A-19	1 1/4" - 11 1/2 NPT	49	54
12,5	A-242	2" - 11 1/2 NPT	88	82

20 Spreader

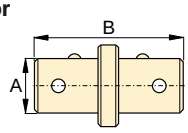
ton	Model Nr.	A	B	C	D
1,0	WR-5	—	223	12,8	94
1,0	A-92	2 1/4" - 14 UN	244	35	158

21 Lock Pin

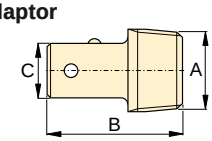
ton	Model Nr.	A	B
2,5	MZ-4013	7,9	41
5,0	A-16	11,2	82

22 Lock-on Connector

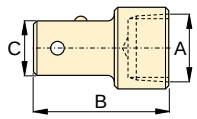
ton	Model Nr.	A	B
2,5	MZ-4007	19	79
5,0	MZ-1050	33	127

23 Male Lock-on Adaptor

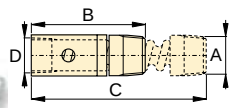
ton	Model Nr.	A	B	C
2,5	MZ-4008	3/4" - 14 NPT	60	19
5,0	MZ-1051	1 1/4" - 11 1/2 NPT	90	33

24 Female Lock-on Adaptor

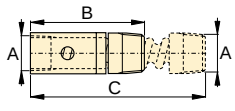
ton	Model Nr.	A	B	C
2,5	MZ-4009	3/4" - 14 NPT	65	19
5,0	MZ-1052	1 1/4" - 11 1/2 NPT	96	33

25 Adjustable Extension

ton	Model Nr.	A	B	C	D
5,0	A-285	1 1/4" - 11 1/2 NPT	335	441	33

26 Slip-Lock Extension

ton	Model Nr.	A	B	C
2,5	A-650	3/4" - 14 NPT	200	365

SP-Series, Lightweight Hydraulic Punch

ENERPAC
Hydraulic Technology Worldwide

▼ Shown: **SP-35S**

- **12,7 mm thick capacity through mild steel**
- **Round, oblong and square punches and dies are available to solve your punching applications**
- **Long life Enerpac single-acting, spring return design**
- **Durable steel case keeps tools and dies together and provides for easy carrying and storage**
- **CR-400 coupler included**

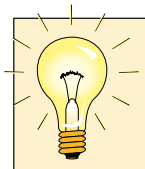
◀ *This PUD-1100E Economy Electric Pump is available as a matched set with the 35 ton punch.*

Much Faster than Drilling

Tool Kit SPK-10

Included with all 35 Ton punches, this tool kit is used to remove and install the punch into the head.

Can be ordered as a replacement under model number **SPK-10**.



Ordering Information

The 35 ton hydraulic Punch may be ordered by itself or as a set, including a pump. A punch or die may also be ordered separately or as a matched set. Please refer to the Quick Selection Chart information on top of the next page.

▼ STANDARD PUNCHES AND DIES SELECTION CHART

Hole Shape	Imperial**		Metric**	
	Hole Size (inch)	Bolt Size (inch)	Hole Size (mm)	Bolt Size (mm)
●	0,31	1/4	7,9	–
●	0,38	5/16	9,5	M8
●	0,44	3/8	11,1	M10
●	0,53	7/16	13,5	M12
●	0,56	1/2	14,3	–
●	0,69	5/8	17,5	M16
●	0,78	–	19,8	M18
●	0,81	3/4	20,6	–
■	0,31	1/4	7,9	–
■	0,38	5/16	9,5	M8
■	0,44	3/8	11,1	M10
■	0,50	7/16	12,7	M12
▬	0,31x0,75	1/4	7,9x19	–
▬	0,38x0,75	5/16	9,5x19	M8
▬	0,44x0,75	3/8	11,1x19	M10
▬	0,50x0,75	7/16	12,7x19	M12

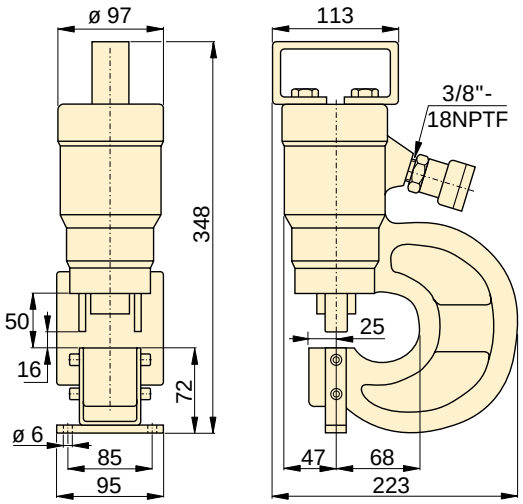
** Material thickness should **not** exceed hole diameter

Single-Acting, Spring Return Hydraulic Punch

▼ QUICK SELECTION CHART

Included						Model Number	
*	Punch & Die Set	Pump	Hose	Gauge	Gauge Adaptor		(kg)
SP-35	Standard**	P-392	HC-7206	GP-10S	GA-2	**STP-35H**	25
SP-35	Standard**	PATG-1102N	HC-7206	GP-10S	GA-2	**STP-35A**	29
SP-35	–	–	–	–	–	**SP-35**	16
SP-35	Standard**	–	–	–	–	**SP-35S**	18
SP-35	Standard**	PUD-1100E	HC-7206	–	–	**SP-35SPE**	29
SP-35	Metric***	–	–	–	–	**MSP-351**	21
SP-35	Metric***	PUD-1100E	HC-7206	–	–	**MSP-351PE**	32

* Punch oil capacity: 76 cm^3
Includes the following punch and die sets:
** SPD-438, SPD-688, SPD-563 and SPD-813
*** SPD-375, SPD-531, SPD-438 and SPD-688



Standard Punch & Die Set	Maximum allowable material thickness to be punched (mm)										
Model Numbers	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)
SPD-313	7,9	7,9	6,4	6,4	6,4	6,4	3,3	4,8	6,4	6,4	6,4
SPD-375	9,7	9,7	7,9	7,9	7,9	7,9	4,8	6,4	7,9	7,9	7,9
SPD-438	11,2	11,2	9,7	9,7	9,7	7,9	4,8	7,9	7,9	7,9	7,9
SPD-531	12,7	12,7	11,2	11,2	11,2	9,7	6,4	7,9	9,7	9,7	9,7
SPD-563	12,7	12,7	12,7	11,2	12,7	11,2	6,4	9,7	11,2	11,2	11,2
SPD-688	12,7	12,7	12,7	11,2	12,7	10,2	6,4	7,9	10,2	10,2	10,2
SPD-781	12,7	12,7	12,7	11,2	12,7	9,7	6,4	7,9	9,7	9,9	9,7
SPD-813	12,7	12,7	12,7	11,2	12,7	7,9	4,8	7,9	7,9	7,9	7,9
SPD-458	7,9	7,9	6,4	6,4	6,4	6,4	3,3	4,8	6,4	6,4	6,4
SPD-549	9,7	9,7	7,9	7,9	7,9	7,9	4,8	6,4	7,9	7,9	7,9
SPD-639	11,2	11,2	9,7	9,7	9,7	7,9	4,8	7,9	7,9	7,9	7,9
SPD-728	12,7	12,7	11,2	11,2	11,2	9,7	6,4	7,9	9,7	9,7	8,6
SPD-106	7,9	7,9	6,4	6,4	6,4	6,4	3,3	4,8	6,4	6,4	6,4
SPD-125	9,7	9,7	7,9	7,9	7,9	7,9	4,8	6,4	7,9	7,9	7,9
SPD-188	11,2	11,2	9,7	9,7	9,7	7,9	4,8	7,9	7,9	7,9	7,9
SPD-250	12,7	12,7	11,2	11,2	11,2	9,7	6,4	7,9	9,7	9,7	9,7

MSP, SP, STP Series

Capacity:
35 ton

Hole Sizes:
7,9 - 20,6 mm

Maximum Operating Pressure:
700 bar

CAUTION!
The chart below is for reference only! Maximum allowable material thickness to be punched varies with set wear.

Steel Qualities (see table):

1) Mild A-7
2) Boiler Plate
3) Structural A-36
4) Struct Corten (ASTM A242)
5) Cold Rolled C-1018
6) Hot Rolled C-1050
7) Hot Rolled C-1095
8) Hot Rolled C-1095 Annealed
9) Stainless Annealed
10) Stainless 304 Hot Rolled
11) Stainless 316 Cold Rolled

Hydraulic Vertical Lifting Wedge

ENERPAC
Hydraulic Technology Worldwide

▼ **LW-16 with SB-2 and optional LWB-1**

LW
Series

Maximum Lifting Force:
16 ton

Lifting Stoke:
21 mm

Tip Clearance / Maximum Spread*:
10 mm / 81,5 mm

Maximum Operating Pressure:
700 bar

Split-Flow Manifolds

Split Flow Valves to control two or four lifting wedges simultaneously.

AM-21 with 3 ports 3/8" NPTF
AM-41 with 5 ports 3/8" NPTF.

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Best Match Hand Pump

To power your Enerpac Lifting Wedge, the Enerpac **P-392** Hand Pump or **P-392FP** Foot Pump is an ideal choice.

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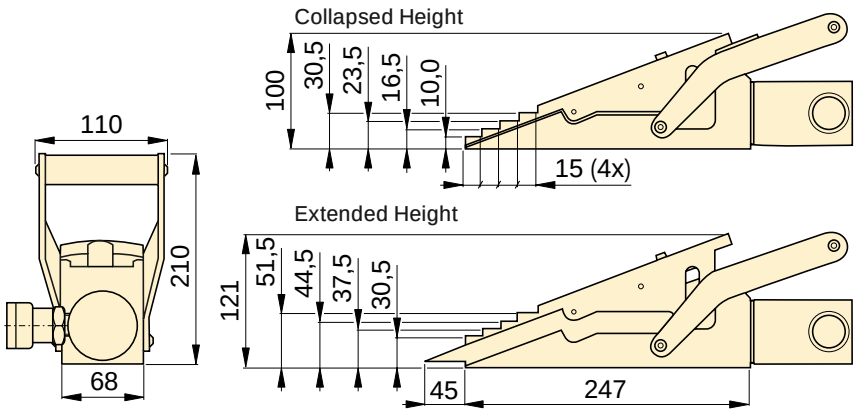
- **Requires very small access gap of only 10 mm**
- **Lifting force 16 ton at 700 bar hydraulic pressure**
- **Each step can spread under full load**
- **Straight vertical lifting**
- **Unique interlocking wedge design: no first step bending and risk of slipping out**
- **Single-acting, spring return cylinder**
- **Lifting wedge LW-16 includes safety block SB-2**
- **Includes RC-Series Cylinder with CR-400 coupler**

▼ *For lifting heavy equipment with minimum floor clearance the LW-16 is the ideal tool.*



Maximum Lifting Force ton (kN)	Lifting Stroke (mm)	Model Number	Tip Clearance (mm)	Maximum Operating Pressure (bar)	Oil Capacity (cm^3)	(kg)
16 (157)	21	**LW-16**	10	700	78	9,0

Use optional stepped block LWB-1 to increase wedge lifting height by 30 mm.
* Using LWB-1.

▼ Shown: **SOH-10-6**

SOH Series

Lifting Capacity:
8,5 - 20 ton

Stroke:
136-157 mm

Toe Clearance:
20 mm

Maximum Operating Pressure:
700 bar

Load Skates

In combination with the Enerpac Machine Lifts we recommend Load Skates for moving heavy loads.

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Best Match Hand Pump

To power your Enerpac Machine Lift, the Enerpac **P-392** hand pump is an ideal choice.

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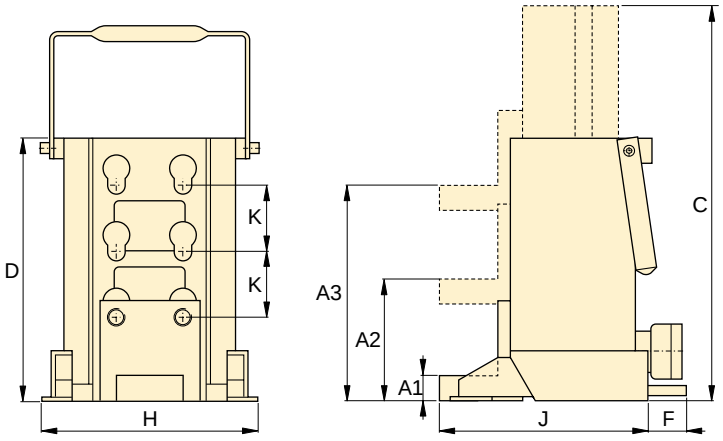
- **For lifting heavy equipment with minimum available access**
- **Separate hydraulic pump enhances safety**
- **Low height lifting toe**
- **Precision guided to reduce friction and isolate cylinder from side-loads**
- **Two extendible support feet provide extra stability**
- **Includes RC-Series Cylinder with CR-400 coupler**



Capacity	Toe Clearance (mm)			Stroke	Model Number	Oil Capacity	Dimensions (mm)						
ton (kN)	Minimum A1	Central A2	Maximum A3	(mm)		(cm³)	Total Ext. Height C	Total Body Height D	F	H	J	K	(kg)
8,5 (75)	20	95	169	136	**SOH-10-6**	224	430	294	–	190	214	74	26
20 (178)	30	110	190	157	**SOH-23-6**	525	472	320	65	265	250	80	45

ER-Series, Heavy Duty Load Skates

ENERPAC
Hydraulic Technology Worldwide

▼Shown: **Set ER-20**

Move Heavy Loads Easily and Safely

- **Rugged and sturdy construction for long life**
- **Low profile construction for increased stability**
- **Low rolling-resistance allows for easy transportation**
- **Attachable load leveling plates and swivel turntables for turning corners**

Sets (see table) include all components necessary to handle a variety of applications.
Two **ELB-1** link-up bars, two **ERH-1** handles (880 mm long) and one **EMB-1** metal box are included.

Optional long handle **ERH-2** (1295 mm) available for 60 and 80 ton only.

Lifting Wedge and Machine Lifts

To place the Load Skates, the load must first be lifted. This can be done easily and safely using the Enerpac Lifting Wedge or Machine Lifts.

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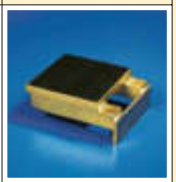
▼**Load Skates may be ordered separately or as a matched set.**

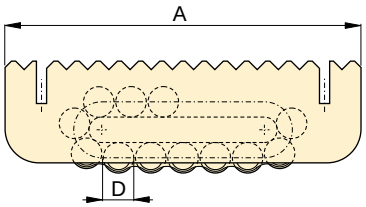
Set Capacity* ton (kN)	Set Model Number	Load Skates (4) 	Turntable Swivels (2) 	Leveling Plates (2) 	Weight Including handles and metal box (kg)
20 (178)	**ERS-20**	ER-10	ES-10	ELP-10	49
30 (267)	**ERS-30**	ER-15	ES-15	ELP-15	55
60 (533)	**ERS-60**	ER-30	ES-30	ELP-30	75

* Sets are designed to enable two skates to take full load for extra safety on uneven floor surfaces

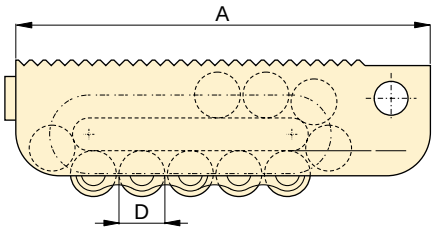
◀ *Heavy transport using Load Skates. The machine is first lifted, using SOH-Series Enerpac Machine Lifts.*

EL/ ER/ ES Series

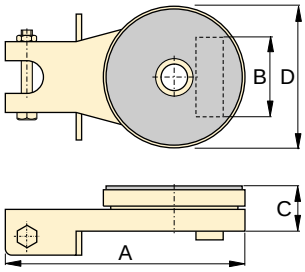
Maximum Carrying Capacity:
80 ton



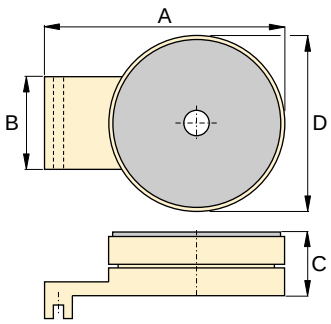
ER-1, ER-10, ER-15, ER-30



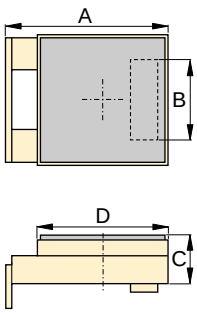
ER-60, ER-80



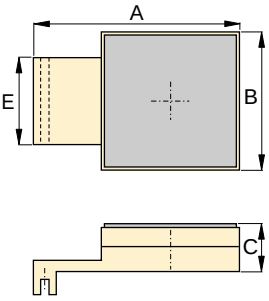
Turntable Swivel
ES-1, ES-10, ES-15, ES-30



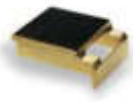
Turntable Swivel
ES-60, ES-80



Leveling Plate
ELP-10
ELP-15
ELP-30



Leveling Plate
ELP-60
ELP-80

	Capacity* ton (kN)	Model Number	Dimensions (mm) A	B	C	D	E	F	Contact Rolls per Skate	Rollers per Skate	(kg)
Load Skates 	**1** (8,9)	**ER-1**	160	100	65	18	51	4	4	11	3,8
	10 (89)	**ER-10**	210	100	66	18	51	6	5	15	5,2
	15 (133)	**ER-15**	220	113	75	24	60	10	4	13	7,3
	30 (267)	**ER-30**	270	130	92	30	68	10	4	13	13,0
	60 (533)	**ER-60**	380	168	125	42	76	16	4	13	31,9
	80 (711)	**ER-80**	530	182	145	50	86	19	6	17	60,9
Turntable Swivel 	**1** (8,9)	**ES-1**	207	86	26	90	–	–	–	–	1,1
	10 (89)	**ES-10**	220	73	42	130	–	–	–	–	3,7
	15 (133)	**ES-15**	220	86	42	130	–	–	–	–	3,7
	30 (267)	**ES-30**	250	96	48	150	–	–	–	–	5,3
	60 (533)	**ES-60**	275	114	61	190	–	–	–	–	13,7
	80 (711)	**ES-80**	360	128	61	220	–	–	–	–	18,9
Leveling Plate 	**10** (89)	**ELP-10**	149	73	42	120	–	–	–	–	3,7
	15 (133)	**ELP-15**	149	86	42	120	–	–	–	–	3,7
	30 (267)	**ELP-30**	178	96	48	130	–	–	–	–	5,3
	60 (533)	**ELP-60**	270	114	61	180	–	–	–	–	13,8
	80 (711)	**ELP-80**	350	128	61	200	–	–	–	–	18,8

▼ **CM-16**

CM
Series

Case Size:
19 - 453 litres

Protect your Equipment

- **Protect your equipment from dust, water, grease and dirt**
- **Reduce losses on the jobsite, maintenance area or shop**
- **Durable steel, painted with rust-resistant primer and finished in durable enamel**
- **Heavy duty hinges and lifting handles**

▼ *When not storing the lifting system, this heavy-duty storage case doubles as a work station.*

Case Size (litres)	Model Number	Dimensions L x W x H (mm)	Thickness (mm)	(kg)
19	**CM-6**	597 x 178 x 178	0,9	7
32	**CM-1**	635 x 292 x 168	0,9	8
127	**CM-4**	787 x 457 x 355	1,5	16
212	**CM-7**	1206 x 381 x 457	1,9	57
453	**CM-16**	1219 x 609 x 609	1,5	55

▼Shown from top to bottom: **WR-15, A-92, WR-5**

A, WR Series

Capacity:
0,75 -1 ton

Tip Clearance:
12,8-35 mm

Maximum Spread:
292 mm

Maximum Operating Pressure:
700 bar

- **WR-5: For use in very confined work areas**
- **WR-15: For long stroke spreading applications**
- **Single-acting, spring return**
- **A-92: Spreader attachment; threads on RC-Series 10 ton cylinders (except RC-101)**

RC-Series Cylinders

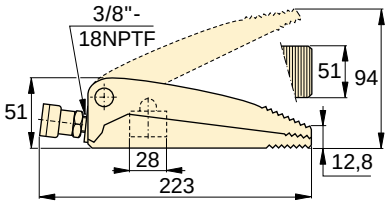
10 ton RC-Series cylinders (except RC-101) fit into A-92 Spreader Attachment.

Page: **8**

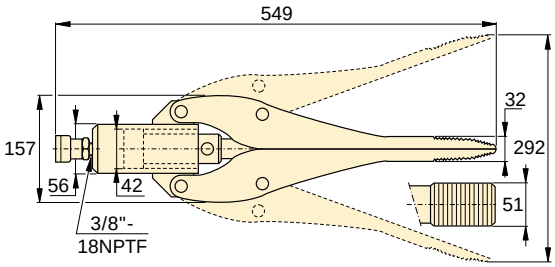
Best Match Hand Pump

To power your Wedgie and Spreader Attachment the **P-392** hand pump is an ideal choice.

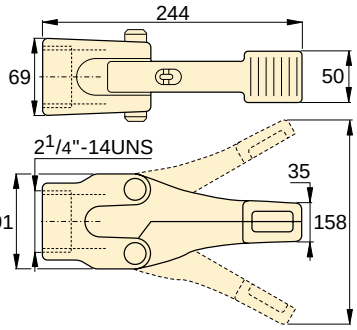
Page: **68**



WR-5



WR-15



Cylinder Capacity ton (kN)	Tip Clearance mm	Model Number	Maximum Spread (mm)	Cylinder Effective Area (cm^2)	Oil Capacity (cm^3)	(kg)
1 (8,9)	12,8	**WR-5**	94	6,5	10,0	2,3
0,75 (6)	32	**WR-15**	292	14,5	64,1	11,3
1 (8,9)	35	**A-92**	158	–	–	3,6

A WR-5 wedgie cylinder is used to position a concrete block on a construction site. ▶

Hydraulic Cutterheads

ENERPAC
Hydraulic Technology Worldwide

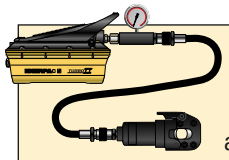
▼ Shown from left to right: **WHC-4000, WHC-750**

WHC, WHR, STC Series

Capacity:
3 - 20 ton

Cutting Capacity:
12 - 101 mm

Maximum Operating Pressure:
700 bar



Tool Sets

Cutterheads marked with an * are available as **sets** (pump, tool, gauge, couplers and hose) for your ordering convenience.

Cutterhead Modelnr.	Pump Modelnr.	Set Model Number
WHC-750	P-392	**STC-750H**
WHC-750	P-392FP	**STC-750FP**
WHC-750	PATG-1102N	**STC-750A**
WHC-1250	P-392	**STC-1250H**
WHC-1250	P-392FP	**STC-1250FP**
WHC-1250	PATG-1102N	**STC-1250A**

- **Single-acting, spring return on all models, except WHR-1250**
- **Guillotine action for easy operation**
- **Lifting handles on larger models for easy transport**
- **Carrying bag included for easy carrying and tool protection**
- **Ideal for use with most Enerpac pumps featuring 3-way valve or dump valve and 700 bar pressure rating (except WHR-1250, which requires 4-way valve)**
- **CR-400 coupler and dust cap included on all models**

▼ *Steel rope is easily cut with the smooth guillotine action of an Enerpac cutterhead.*

▼ **Selection Chart Maximum Cutting Capacities** (ø in mm)

Cutter Head Operation	Capacity ton	Model Number	Oil Capacity (cm^3)	Length (mm)	Steel Wire Rope, Hemp-core or IWRC **6x7 6x12 6x19**	Round Bar: Copper Wire or Bar	Round Bar: Aluminium Wire or Bar	Round Bar: Soft Steel Bolts	Round Bar: Reinforcing Bar	Wire Strand: Bare Copper Wire Strands	Wire Strand: Bare Aluminium Wire Strands **6x7**	Wire Strand: ACSR	Wire Strand: Guy Steel Wire Strands **1x7 1x19**	Cable: Telephone Cable CPP	Cable: Underground Cable (Power)	(kg)	Replacement Blades
Single-Acting	**4**	**WHC-750***	19,7	127	19	19	19	19	12	19	19	19	16	☆	☆	3,2	**WCB-750**
	20	**WHC-1250***	134,4	279	31	28	31	28	25	31	31	31	22	☆	☆	11,3	**WCB-1250**
	13	**WHC-2000**	119,6	381	25	31	31	22	☆	50	50	50	19	☆	50	10,4	**WCB-2000**
	3	**WHC-3380**	65,5	482	☆	☆	☆	☆	☆	41	42	☆	☆	85	85	9,1	**WCB-3380**
	8	**WHC-4000**	137,7	609	☆	☆	☆	☆	☆	☆	☆	☆	☆	101	101	14,5	**WCB-4000**
Dbl.-Act.	**20**	**WHR-1250**	122,9	419	31	31	31	28	25	31	31	31	22	☆	☆	11,8	**WCB-1250**

* Available in sets with P-392 Hand Pump, P-392FP Foot Pump or PATG-1102N Turbo Air Pump.

☆ Will not cut designated material

Self-Contained Hydraulic Cutters

▼Shown from left to right: **WMC-2000, WMC-750**

WMC Series

Capacity:
3 - 20 ton

Cutting Capacity:
14 - 85 mm

Maximum Operating Pressure:
700 bar

Replacement Blades

60-62HRc hardened replacement blades.

For Cutter Model Number	Order Blades Model Number
WMC-580	**WCB-580**
WMC-750	**WCB-750**
WMC-1000	**WCB-1000**
WMC-1250	**WCB-1250**
WMC-1580	**WCB-1580**
WMC-2000	**WCB-2000**
WMC -3380	**WCB-3380**

- **Rotating heads for operator convenience**
- **Guillotine action for easy operation**
- **Carrying bag included for easy carrying and tool protection**
- **Velcro straps to secure handles on larger models for easy carry**
- **Spring return for easy operation**
- **Light weight self-contained tool, can be used anywhere**

CAUTION!: A "☆" in the charts on these pages means that this hydraulic cutter is not designed to cut this size or type of material. Any attempt to do so may result in personal injury and damage to the unit and will void the warranty.

▼ **Selection Chart Maximum Cutting Capacities** (ø in mm)

Capacity ton	Model Number	Length (mm)	Steel Wire Rope, Hemp-core or IWRC 6x7 6x12 6x19	Round Bar: Copper Wire or Bar	Round Bar: Aluminium Wire or Bar	Round Bar: Soft Steel Bolts	Round Bar: Reinforcing Bar	Wire Strand: Bare Copper Wire Strands	Wire Strand: Bare Aluminium Wire Strands 6x7	Wire Strand: ACSR Wire Strands	Wire Strand: Guy Steel Wire Strands 1x7	Wire Strand: Guy Steel Wire Strands 1x19	Cable: Telephone Cable CPP	Cable: Underground Cable (Power)	(kg)
4	**WMC-580**	381	16	16	16	16	☆	16	16	16	14	14	☆	16	3,6
4	**WMC-750**	381	19	17	17	17	☆	19	19	19	14	14	☆	17	3,6
20	**WMC-1000***	679	☆	19	19	19	19	☆	☆	☆	☆	☆	☆	☆	11,3
20	**WMC-1250**	679	31	28	31	31	22	31	31	31	22	25	☆	☆	10,4
6	**WMC-1580**	558	19	19	19	19	☆	38	41	41	16	16	☆	41	6,8
13	**WMC-2000**	628	25	31	31	22	☆	50	50	50	19	19	☆	50	10,9
3	**WMC-3380**	660	☆	☆	☆	☆	☆	46	42	☆	☆	☆	85	85	10,0

* Cuts 12 mm alloy chain grade 70 (type G7 transport or tie-down) or grade 80 (for overhead lifting applications)

☆ Will not cut designated material

STB-Series, Pipe Bender Sets

ENERPAC
Hydraulic Technology Worldwide

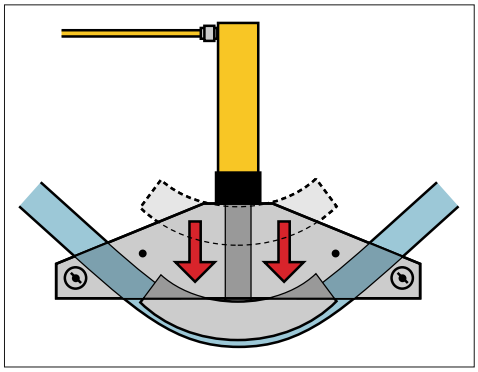
▼ Shown: **STB-101H**

Quick, Safe and Wrinkle-free Bending

'One Shot' and 'Sweep'

One shot shoes give up to a 90° bend without resetting.
Sweep shoes are used where increasing radii are required for multiple parallel pipe installations.

- **Makes smooth, wrinkle-free bends**
- **Sets include genuine Enerpac cylinder, hose and manual, air or electric pump**
- **Sets are also available without hydraulics**
- **Bending shoes and bending frame are lightweight, heat-treated aluminium**
- **All sets include sturdy steel storage case**
- **All sets include BZ-12091 angle indicator for accurate bending**
- **BZ-12377 Shoe Lock Pin included in every set**
- **Eject-O-Matic™ benders (STB-202 models) have double-acting cylinder to eject pipe from the bending shoe**



▲ *Typical one shot bending operation.*

▼ **SELECTION CHART**

Pipe Range Nominal Size (inch)		Set Model Number	Hand Pump*	Air Pump*	Electric Pump*		Cylinder*	Hose*	Saddle*	
										(kg)
One Shot	Sweep									
½ - 2	–	STB-101X	–	–	–	–	–	-	A-12	40
		STB-101N	–	–	–	–	RC-1010	HC-7206	A-12	48
		STB-101H	P-392	–	–	–	RC-1010	HC-7206	A-12	52
		STB-101A	–	PATG-1102N	–	–	RC-1010	HC-7206	A-12	54
		STB-101E	–	–	PUJ-1200E [2]	–	RC-1010	HC-7206	A-12	57
1 - 2	2 ½ - 4	STB-221X	–	–	–	–	–	-	A-29	104
		STB-221N	–	–	–	–	RC-2510	HC-7206	A-29	119
		STB-221H	P-80	–	–	–	RC-2510	HC-7206	A-29	130
1 ¼ - 4	–	STB-202X[1]	–	–	–	–	–	-	A-29	143
		STB-202N[1]	–	–	–	–	RR-3014	HC-7206 (2x)	A-29	174
		STB-202E[1]	–	–	–	ZU4408SE [2]	RR-3014	HC-7206 (2x)	A-29	212

* See corresponding sections in this catalog for more detailed specifications.
[1] Eject-O-Matic™ [2] For 115 volt applications replace the last digit of Set Model Number and pump from 'E' to 'B'.

Nominal Pipe Size (inch)	Wall Thick-ness (mm)	Sche-dule Pipe *	Pipe Bend Inside Radius (inch)	STB-101 ø 1/2 - 2" One Shot	STB-221 ø 1 - 2" One Shot ø 2 1/4 - 4" Sweep	STB-202 ø 1 1/4 - 4" One Shot	One Shot Bending Shoe Model Number	Sweep Bending Shoe Model Number
1/2	2,8	40	2 7/8	Yes	Yes	WS	BZ-12011	–
	3,7	80		Yes	Yes	WS		
	4,7	160		WS	WS	WS		
	7,5	DEH		WS	WS	WS		
3/4	2,9	40	4	Yes	Yes	WS	BZ-12021	–
	3,9	80		Yes	Yes	WS		
	5,5	160		WS	WS	WS		
	7,8	DEH		WS	WS	WS		
1	3,4	40	5 1/8	Yes	Yes	WS	BZ-12031	–
	4,5	80		Yes	Yes	WS		
	6,4	160		WS	WS	WS		
	9,1	DEH		–	WS	WS		
1 1/4	3,6	40	6 7/16	Yes	Yes	Yes	BZ-12041	–
	4,9	80		Yes	Yes	Yes		
	6,4	160		WS	WS	Yes		
	8,7	DEH		–	WS	WS		
1 1/2	3,7	40	7 5/16	Yes	Yes	Yes	BZ-12051	–
	5,1	80		Yes	Yes	Yes		
	7,1	160		WS	WS	Yes		
	10,2	DEH		–	WS	WS		
2	3,9	40	8 5/16	Yes	Yes	Yes	BZ-12061	–
	5,5	80		Yes	Yes	Yes		
	8,7	160		–	WS	Yes		
2 1/2	5,2	40	9 1/2	–	Yes	Yes	BZ-12341	BZ-12382
	7,0	80		–	WS	Yes		
	9,5	160		–	WS	Yes		
3	5,5	40	11 1/4	–	Yes	Yes	BZ-12351	BZ-12383
	7,6	80		–	WS	Yes		
3 1/2	5,7	40	15 1/2	–	Yes	Yes	BZ-12391	BZ-12384
	8,1	80		–	WS	Yes		
4	6,0	40	17 3/4	–	Yes	Yes	BZ-12392	BZ-12385
	8,6	80		–	–	Yes		

***Schedule Pipe: 40** = Standard; **80** = Extra Heavy; **160** = Double Extra Heavy;
DEH = Double Extra Heavy (slightly thicker than 160);
WS = Can be bent using wider spacing for swivel shoes.

STB Series

Nominal Pipe Size:
1/2 - 4 inch

Maximum Bending:
90°

Maximum Operating Pressure:
700 bar

▲ *Steel pipe is quickly and safely bent up to 90° using the STB-101H Pipe Bender Set.*

	Frame Assembly	Pivot Pin	Pivot Shoes	Bending Shoes included (Shoes with 3) are Sweep, all other shoes are One Shot)								Set Model Number
	BZ-12371	BZ-12375	BZ-12071	BZ-12011	BZ-12021	BZ-12031	BZ-12041	BZ-12051	BZ-12061	–	–	STB-101X STB-101N STB-101H STB-101A STB-101E
	BZ-12372	BZ-12376	BZ-13401	BZ-12031	BZ-12041	BZ-12051	BZ-12061	BZ-12382 3)	BZ-12383 3)	BZ-12384 3)	BZ-12385 3)	STB-221X STB-221N STB-221H
	BZ-12374	BZ-12376	BZ-13401	-	BZ-12041	BZ-12051	BZ-12061	BZ-12341	BZ-12351	BZ-12391	BZ-12392	STB-202X 1) STB-202N 1) STB-202E 1)

▼ Shown: **PT20-5SS, DPT20-5PS**

Field-proven Tools feature “soft-grip” handles

ZU4-Series Electric Pumps

Specifically designed to operate with the most popular lines of stressing jacks, the ZU4-Series Pumps have the features, performance and options that are required for use in post-tensioning markets.

Page: **86**

- **"Soft-grip", durable, field-proven designs, with ergonomic handles to help reduce operator fatigue**
- **Single-acting *PT* models, with spring-seating and optional power-seating are equipped with the new Enerpac *RC* Post-tensioning cylinders with a 254 mm stroke; ideal for slab-on-grade applications**
- **Double-acting *DPT* models have an 216 mm stroke and are machined from a steel billet; feature standard power-seating and “gun-drilled” internal hydraulic passages**
- **All jacks have a standard 3" nose assembly; 6" nose assemblies are available as accessories for all models**
- **A full line of grippers is available to tension $^{3}/_{8}$”, $^{7}/_{16}$", $^{1}/_{2}$" and .6" strand diameters**
- **Complete offering of Enerpac parts and soft kits allow quick and easy service**

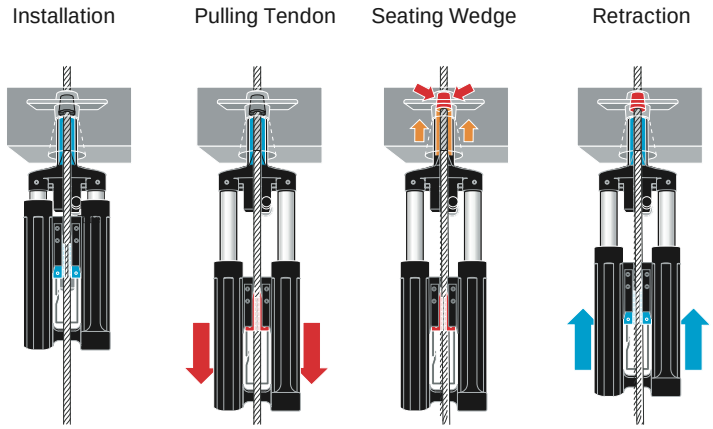
▼ *Designed to be tough, the ZU4-Series with steel reservoirs will take the abuse of today’s construction sites.The ZU4908JE is the ideal pump for post tensioning applications.*

▼ **SELECTION CHART**

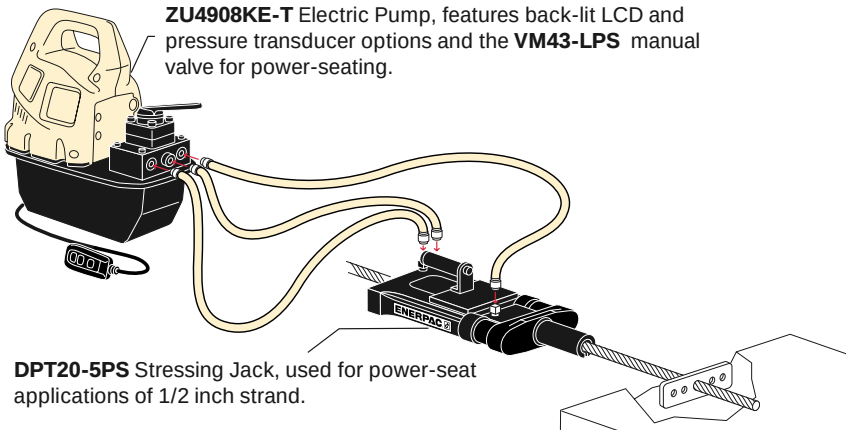
Strand Diameter Range (inch)	Tensioning Capacity at 700 bar ton (kN)	Stroke (mm)	Hydraulic Tool Operation	Model Number	Seater Type	Oil Capacity (cm^3)	Tool Effective Area (cm^2)	(kg)
$^{3}/_{8}$ - $^{1}/_{2}$	**20** (201)	254	Single-Acting	**PT20-5SS**	Spring	743	28,9	25
		254	Single-Acting	**PT20-5PS**	Power	743	28,9	25
		216	Double-Acting	**DPT20-5PS**	Power	869	34,2	19
$^{3}/_{8}$ - .60	**30** (295)	254	Single-Acting	**PT30-6SS**	Spring	1029	40,5	34
		254	Single-Acting	**PT30-6PS**	Power	1029	40,5	34
		216	Double-Acting	**DPT30-6PS**	Power	1108	51,3	24

Mono-Strand Tensioning Tool Operational Sequence

This diagram shows the sequence of operation for the DPT20-5PS tool. The operation of the single-acting, spring-seat models is very similar.



Typical Mono-Strand system set-up



ZU4908KE-T Electric Pump, features back-lit LCD and pressure transducer options and the **VM43-LPS** manual valve for power-seating.

DPT20-5PS Stressing Jack, used for power-seat applications of 1/2 inch strand.

PT, DPT Series

Tensioning Capacity:
20 - 30 ton

Strand Diameters:
3/8 - 7/16 -1/2 - .60 inch

Stroke:
216 - 254 mm

Maximum Operating Pressure:
700 bar

Hoses

Enerpac offers a complete line of high quality hydraulic hoses. To ensure the integrity of your system, specify only Enerpac hydraulic hoses.

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Gauges

Minimize the risk of overloading and ensure long, dependable service from your equipment. Refer to the System Components Section for a full range of gauges.

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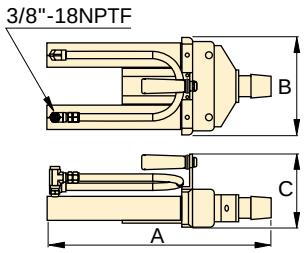
Dimensions (mm)			
Model Nr.	A	B	C
PT20-5SS	533	228	165
PT20-5PS	533	228	165
DPT20-5PS	469	190	165
PT30-6SS	558	259	177
PT30-6PS	558	259	177
DPT30-6PS	469	215	165



▼ Optional and Replacement Accessories Selection Chart

Used with Jack	3" Nose	3" Wedge Seater	6" Nose	6" Wedge Seater	3/8" Dia. Gripper Set	7/16" Dia. Gripper Set	1/2" Dia. Gripper Set	.6" Dia. Gripper Set	Gripper Handle	Gripper Plate	Handle
											
PT20-5SS	PT-NP3	PT-WS3	PT-NP6	PT-WS6	PT-GS375	PT-GS438	PT-GS500	–	PT-RGH	PT-GRP	PT-HG
PT20-5PS	PT-NP3	PT-WS3	PT-NP6	PT-WS6	PT-GS375	PT-GS438	PT-GS500	–	PT-RGH	PT-GRP	PT-HG
DPT20-5PS	DPT-5NP3	DPT-5WS3	DPT-5NP6	DPT-5WS6	DPT-5GS375	DPT-5GS438	DPT-5GS500	–	DPT-RGH	DPT-GRP	PT-HG
PT30-6SS	PT-NP3	PT-WS3	PT-NP6	PT-WS6	PT-GS375	PT-GS438	PT-GS500	PT-GS594	PT-RGH	PT-GRP	PT-HG
PT30-6PS	PT-NP3	PT-WS3	PT-NP6	PT-WS6	PT-GS375	PT-GS438	PT-GS500	PT-GS594	PT-RGH	PT-GRP	PT-HG
DPT30-6PS	DPT-6NP3	DPT-6WS3	DPT-6NP6	DPT-6WS6	DPT-6GS375	–	DPT-6GS500	DPT-6GS594	DPT-RGH	DPT-GRP	PT-HG

Enerpac Bolting Tools

ENERPAC
Hydraulic Technology Worldwide

ENERPAC offers a comprehensive range of bolting tools suited to a wide variety of industries and applications.

Rigid steel and lightweight aluminium hydraulic torque wrenches and torque wrench pumps, nut splitters, flange spreaders and alignment tools… Enerpac has the professional tools to complete your most difficult bolting jobs with the degree of safety and accuracy demanded in today's work environment.

Torque Wrench Pump Selection Matrix

For optimum speed and performance see the torque wrench and pump matrix.

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Torque Wrench Hoses

Use Enerpac THQ- and THC-Series hoses with double-acting torque wrenches to ensure the integrity of your hydraulic system.

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Hexagon Bolt and Nut Sizes

See the table for hexagon sizes of bolts, nuts and related thread diameters.

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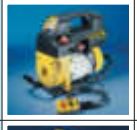
Bolting Tools & Pumps Section Overview

Capacity ton (kN)	Tool type and functions	Series		Page
5 - 90 (45 -801)	**Hydraulic Nut Splitters** **Nut Splitter-Pump Sets**	**NC** **STN**		**188** ▶
5 - 10 (45-101)	**Hydraulic Flange Spreaders** **Flange Spreader-Pump Sets**	**FS** **STF**		**189** ▶
14 (125) **8** (72)	**Hydraulic Wedge Spreaders and Sets** **Mechanical Wedge Spreaders**	**FSH, FSM** **STF**		**190** ▶
0,3 - 3,0 (3 - 27)	**Flange Alignment Tools** Mechanical & hydraulic	**ATM**		**191** ▶
1898 - 34.079 Nm **1400 - 25.150 Ft.lbs**	**Square Drive Torque Wrenches** Rigid steel design & maximum versatility	**S**		**192** ▶
2350 - 27.000 Nm **1735 - 19.875 Ft.lbs**	**Square Drive Torque Wrenches** Lightweight aluminium power wrench	**SQD**		**196** ▶
2712 - 20.337 Nm **2000 - 15.000 Ft.lbs**	**Hexagon Torque Wrenches** Rigid steel design & low profile	**W**		**200** ▶
3290 - 24.210 Nm **2425 - 17.860 Ft.lbs**	**Hexagon Cassette Torque Wrenches** Lightweight aluminium & low profile	**HXD, CC**		**204** ▶

Torque Wrench Pumps — Selection Matrix **208** ▶

Power Source	HydraulicTorque Wrench Pumps	Maximum Reservoir Size	Oil Flow at maximum pressure	Power Consumption	Pump Series		
Electric	**Compact Economy** Portable	**3,0** (litres)	**0,34** (l/min)	**0,37** (kW)	**PME, PMU**		**210** ▶
	Submerged motor Portable	**3,8** (litres)	**0,70** (l/min)	**1,80** (kW)	**PTE**		**211** ▶
	Z-Class innovation Tough, dependable, innovative	**8,0** (litres)	**0,90** (l/min)	**1,25** (kW)	**ZU4T**		**212** ▶
Air Driven	**Portable**	**8** (litres)	**0,33** (l/min)	**1130** (l/min air)	**PTA**		**216** ▶
	High Flow	**8** (litres)	**1,80** (l/min)	**3900** (l/min air)	**PMA**		**217** ▶

Hydraulic Nut Splitters

ENERPAC
Hydraulic Technology Worldwide

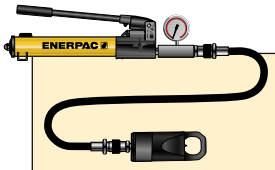
▼ Shown from left to right: **NC-3241, NC-1319, NC-1924**

NC, STN Series

Capacity:
5 - 90 ton

Bolt Range:
M6 - M48

Maximum Operating Pressure:
700 bar



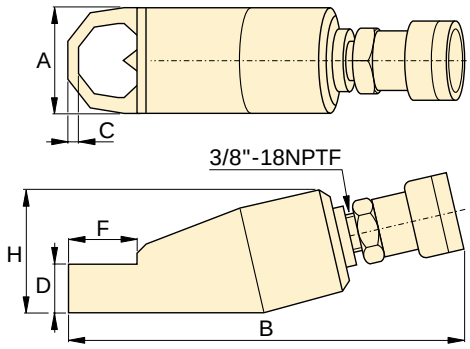
Tool and Pump Sets

Hydraulic Nut Splitters are available as **sets** (pump, tool, gauge, gauge adaptor, couplers and hose) for your ordering convenience.

Nut Splitter Modelnr.	Handpump Modelnr.	Set Model Number
NC-1924	P-392	**STN-1924H**
NC-2432	P-392	**STN-2432H**
NC-3241	P-392	**STN-3241H**

- **Compact and ergonomic design, easy to use**
- **Unique angled head design**
- **Single-acting, spring return cylinder**
- **Heavy duty chisels can be reground**
- **Applications include service trucks, piping industry, tank cleaning, petrochemical, steel construction, mining, etc.**

◀ *Easily removing rusty nuts during railroad construction is just one of many application examples for the Enerpac Nut Splitter.*



Nut Splitters include a spare chisel, a spare set screw and the wrench used to secure the chisel. A CR-400 coupler is standard.

Bolt Range (mm)	Hexagon Nut Range (mm)	Capacity ton	Oil Capacity (cm^3)	Model Number	Dimensions (mm) A	B	C	D	F	H	(kg)	Replacement Chisel Model Number
M6-M12	10 - 19	5	15	**NC-1319**	40	170	7	19	28	48	1,2	**NCB-1319**
M12-M16	19 - 24	10	20	**NC-1924***	54	191	10	26	40	62	2,0	**NCB-1924**
M16-M22	24 - 32	15	60	**NC-2432***	64	222	13	29	51	72	3,0	**NCB-2432**
M22-M27	32 - 41	20	80	**NC-3241***	75	244	17	36	66	88	4,4	**NCB-3241**
M27-M33	41 - 50	35	155	**NC-4150**	94	288	21	45	74	105	8,2	**NCB-4150**
M33-M39	50 - 60	50	240	**NC-5060**	106	318	23	54	90	128	11,8	**NCB-5060**
M39-M48	60 - 75	90	492	**NC-6075**	156	393	26	72	110	181	34,1	**NCB-6075**

* Available as Tool-Pump Set, see note on this page.
Ordering Notes: Maximum allowable hardness to split is HRc-44. Not to be used on square nuts.

Hydraulic Flange Spreaders

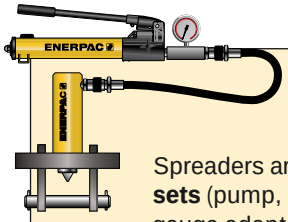
▼ Shown: **FS-56**

FS, STF Series

Capacity:
5 - 10 ton

Spread:
70 - 216 mm

Maximum Operating Pressure:
700 bar



Tool and Pump Sets

Both Flange Spreaders are available as **sets** (pump, tool, gauge, gauge adaptor, couplers and hose) for your ordering convenience.

Spreader Modelnr.	Pump Modelnr.	Set Model Number
FS-56	P-392	**STF-56H**
FS-109	P-392	**STF-109H**
FS-109	PATG-1102N	**STF-109A**

Wedge Spreaders

Friction-free, smooth and parallel wedge movement with unique interlock wedge design. Eliminates flange damage and risk of spreading arm failure.

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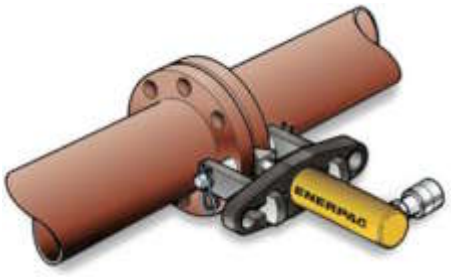
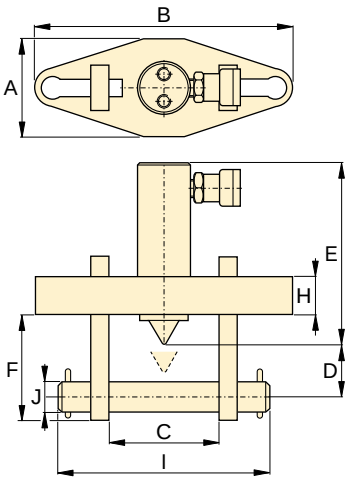
- **Lightweight, ergonomic design for ease of use**
- **Adjustable jaw widths from 70 mm to 216 mm for a wide range of applications**
- **Single-acting, spring return RC-Series cylinders for fast trouble-free operation**





Flange Spreader Matching Chart

ASA Rating (bar)	Pipe Size (mm)	
	FS-56	FS-109
10	127 - 508	558 - 1066
20	63 - 355	406 - 711
27	63 - 304	355 - 609
35	63 - 254	304 - 508
62	12 - 152	203 - 406
103	12 - 88	101 - 203
172	12 - 63	76 - 101

Maximum Flange Thickness (mm)	Stud Size (mm)	Standard Wedge (mm)	Capacity ton	Stroke (mm)	Oil Capacity (cm^3)	Model Number	Dimensions (mm)										Weight (kg)
							A	B	C Min.	C Max.	D	E	F	H	I	J	
2 x 57	19 - 28	3 - 28	5	38	24,6	**FS-56***	76	209	70	155	32	196	88	25	206	19	11,5
2 x 92	31 - 41	3 - 28	10	54	78,7	**FS-109***	108	279	104	216	50	152	114	38	273	31	18,1

* Available as Tool-Pump Set, see note on this page.

▼ **FSH-14 and FSM-8 with safety blocks SB-1**

FSH, FSM, STF Series

Tip Clearance / Maximum Spread [1]:
6 mm / 81 mm

Maximum Spread Force:
8 - 14 ton

Maximum Operating Pressure:
700 bar (FSH-14)

- **For maintenance, commissioning, shutdowns, testing and valve change outs**
- **No need for hammers, chisels, slings or chainblocks**
- **Integrated wedge concept: Friction-free, smooth and parallel wedge movement eliminates flange damage and risk of spreading arm failure**
- **Unique interlocking wedge design - no first step bending and risk of slipping out of joint**
- **Requires very small access gap of only 6 mm**
- **Stepped spreader arm design - each step can spread under full load**
- **Few moving parts mean durability and low maintenance**
- **Safety block SB-1 and ratchet spanner SW-22 included with FSM-8 mechanical wedge spreader**
- **Safety block SB-1 and Enerpac RC-102 single-acting cylinder included with FSH-14 hydraulic wedge spreader**

Stepped Blocks FSB-1

Use stepped blocks to increase wedge opening upto 81 mm. Fits both FSH-14 and FSM-8.

Split-Flow Manifolds

For simultaneously and even spreading of flange joints, 180° apart with FSH-14.

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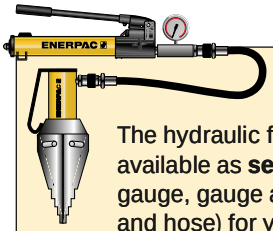
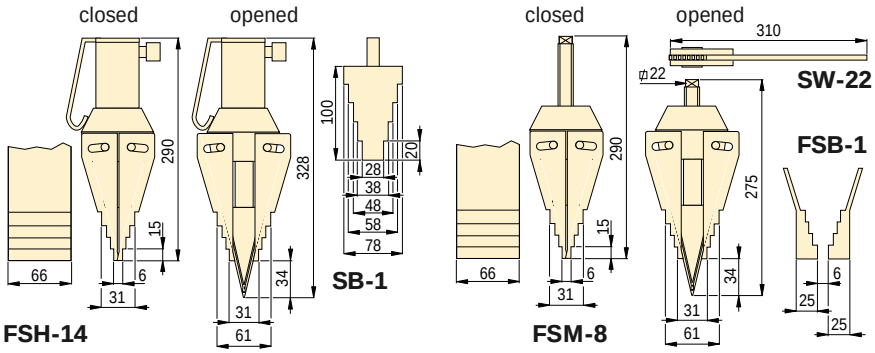


Tool and Pump Sets

The hydraulic flange spreader is available as **set** (pump, tool, gauge, gauge adaptor, couplers and hose) for your ordering convenience.

Spreader Modelnr.	Handpump Modelnr.	Set Model Number
FSH-14	P-392	**STF-14H**

▼ *Two FSH-14 spreaders used simultaneously with Enerpac handpump, hoses and AM-21 split-flow manifold.*



Maximum Spreading Force ton (kN)	Model Number	Tip Clearance (mm)	Maximum Spread [1] (mm)	Spreader Type	Oil Capacity (cm^3)	(kg)
14 (125)	**FSH-14***	6	81	Hydraulic	78	7,1
8 (72)	**FSM-8**	6	81	Mechanical	–	6,5

[1] Using stepped blocks FSB-1

* Available as pump-tool set, see note on this page.

Hydraulic and Mechanical Flange Alignment Tools

▼ From left to right: **ATM-3, ATM-1, ATM-5** (shown without pump and hose)

ATM Series

Minimum Bolt Hole Size:
17 mm 11/16”

Flange Wall Thickness:
17 - 203 mm 11/16 - 8”

Maximum Lifting Force:
0,3 - 5 ton

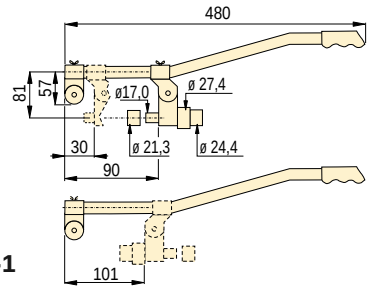
- **Rectifies twist and rotational misalignment without additional stress in pipe lines**
- **For most commonly used ANSI, API, BS and DIN flanges**
- **No slings, hooks, or lifting gear. Extremely safe, high precision**
- **ATM-1 supplied with three bushings for different bolt hole sizes. Can be used in reversed position**
- **ATM-3 fits on the following flanges:**
  – Ring Type Joints: flange wall thickness min 30 - max 100mm
  – Gasket Type Joints: flange wall thickness min 25 - max 115mm
- **ATM-5 Fits when flange joint is:**
  – between 93 - 228 mm [3.75 - 9 inch] apart and
  – bolt hole size 31,5 mm [1.25 inch] or greater
- **Can be installed and used in any position and any location**
- **Stays stable in position under full load**

Adjustable reach on ATM-3

The highly adjustable reach of the wing, the reversable lift hook and manual torque wrench **TW-22** allow precise alignment.

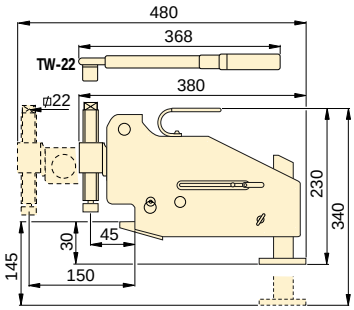
ATM-5 including hydraulics

Including 700 bar hydraulics: RC-53 single-acting cylinder, P-142 two-speed hand pump and 1,8 meters long safety hose (HC-7206C).

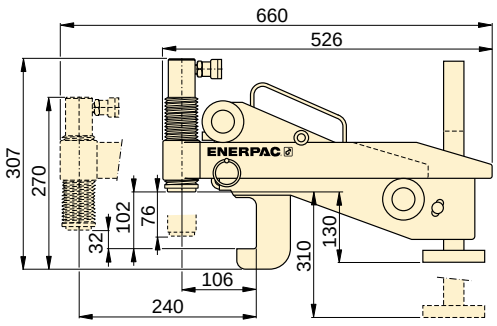


ATM-1

▼ *The Enerpac ATM-3 used to align a large ANSI flange.*



ATM-3



ATM-5

Maximum Lifting Force ton (kN)	Model Number	Bolt Hole Range (mm)	Bolt Hole Range (inch)	Flange Wall Thickness (mm)	Flange Wall Thickness (inch)	(kg)
0,3 (3)	**ATM-1**	17 - 27,2	11/16 - 1 1/8	17 - 50	11/16 - 2	2,0
3,0 (27)	**ATM-3**	25 - 54	1 - 2 1/8	30 - 115	1 3/16 - 4 1/2	9,7
5,0 (45)	**ATM-5 ***	31,5	1 1/4	80-203	3 1/8 - 8	16,2

* At 700 bar maximum operating pressure.
ATM-5 weight including hydraulic cylinder. Total set weight 28,2 kg.

Square Drive Hydraulic Torque Wrenches

ENERPAC
Hydraulic Technology Worldwide

▼ From left to right: **S3000, S6000, S1500**

Rigid Steel Design

The *Professional* Square Drive Solution

Simplicity

- **360° click-on, multi-position reaction arm**
- **Push button square drive release for quickly reversing the square drive for tightening or loosening**
- **Fine tooth ratchet prevents tool "lock-on"**
- **Single 360° hydraulic swivel manifold, complete with screw lock couplings, increases wrench and hose manoeuverability.**

Design

- **Compact, high strength uni-body construction for a small operating radius**
- **Robust design with minimal parts enables easy on-site maintenance without special tools**
- **Lightweight, ergonomic design for easy handling and an easy fit, even in applications where access is limited**
- **Optimised strength-to-weight ratio**
- **Fast operation due to the large nut rotation per wrench cycle (35 degree rotation angle) and rapid return stroke.**

Reliability

- **All wrenches are nickel-plated for excellent corrosion protection and improved durability in harsh environments.**

Accuracy

- **Constant torque output provides high accuracy across the full stroke**
- **Uni-body construction ensures accuracy by reducing internal deflections.**

S-Series, Square Drive Wrenches

This product range has been designed using state-of-the-art CAD techniques to bring you the most advanced square drive torque wrench on the market.

To ensure that the tools you buy meet our own exacting requirements, during the design process every prototype was put through finite element stress analysis, photo-elastic modelling, rigorous cyclic testing and strain gauging.

Special design service

Should you have an application where it is not possible to use the standard range of tools, then we invite you to draw on our extensive experience in providing tailor-made solutions to problems involving bolted joints.

Optional Direct Allen-key Drives

Expanded versatility with a wide range of metric and imperial Allen-key drives for hexagon socket head cap screws.

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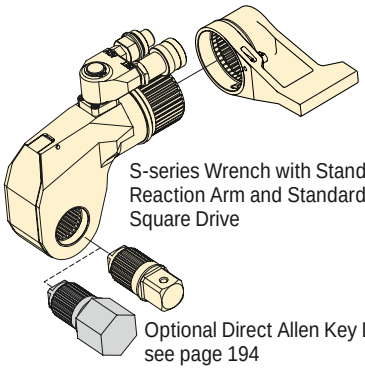
Torque Wrench Hoses

Use Enerpac THQ-700 Series torque wrench hoses with S-Series torque wrenches to ensure the integrity of your hydraulic system.

6 m long, 2 hoses	**THQ-706T**
12 m long, 2 hoses	**THQ-712T**

Double-acting Square Drive Hydraulic Torque Wrenches



S-series Wrench with Standard Reaction Arm and Standard Square Drive

Optional Direct Allen Key Drive, see page 194

Use only Heavy Duty Impact Sockets for power driven torquing equipment, according to ISO2725 and ISO1174; DIN 3129 and DIN 3121 or ASME-B107.2/1995.

S Series

Maximum Torque at 700 bar/10.000 psi:
34.079 Nm / 25.150 Ft.lbs

Square Drive Range:
3/4 - 2 1/2 inch

Nose Radius:
25,0 - 63,5 mm

Maximum Operating Pressure:
700 bar / 10.000 psi

Torque Wrench Pump Selection Matrix

For optimum speed and performance see the torque wrench and pump matrix.

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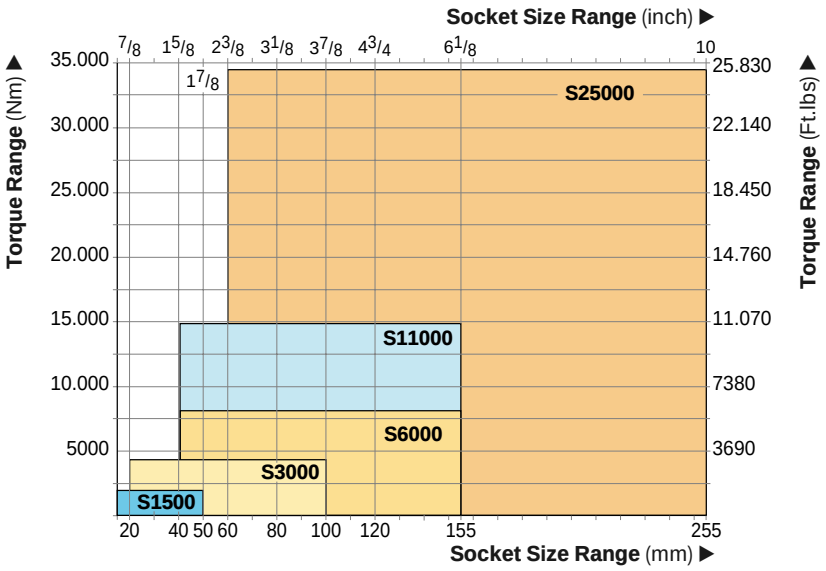
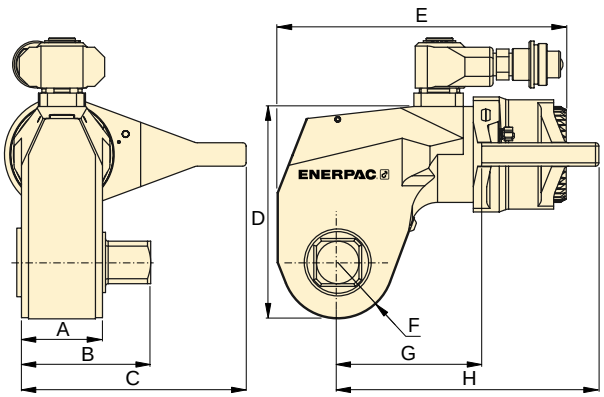
TORQUE WRENCH SELECTION (based on socket size range)





The rigid steel design of S-Series torque wrenches guarantee durability, reliability and safety. These wrenches can be powered by the portable ZU4T-Series pumps. ▶

Typical Socket Size Range		Square Drive Size (inch)	Square Drive Model Nr. (included with wrench)	Maximum Torque [1] at 700 bar		Torque Wrench Model Nr.	Dimensions (mm)								
(mm)	(inch)			(Nm)	(Ft.lbs)		A	B	C	D	E	F	G	H	(kg)
15 - 50	5/8 - 1 7/8"	3/4"	SD15-012	1898	1400	S1500	39	63	110	95	136	25,0	69	119	2,7
20 - 100	7/8 - 3 7/8"	1"	SD30-100	4339	3200	S3000	48	77	134	126	172	33,0	90	159	5,0
41 - 155	1 5/8 - 6 1/4"	1 1/2"	SD60-108	8144	6010	S6000	57	90	179	162	201	42,0	112	187	8,5
41 - 155	1 5/8 - 6 1/4"	1 1/2"	SD110-108	14.914	11.000	S11000	71	111	196	185	226	49,5	132	227	15,0
60 - 255	2 3/8 - 10"	2 1/2"	SD250-208	34.079	25.140	S25000	87	143	244	240	292	63,5	182	292	31,0

[1] Determine maximum torque according to the bolt (nut) size and grade.

SDA-Series, Allen-Key Drives – Metric

ENERPAC
Hydraulic Technology Worldwide

Optional Allen-Key Drives and Reaction Arm

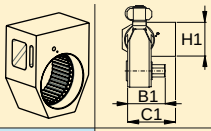
The SRA-Series Reaction Arm for Allen-Key drives must be used instead of standard reaction arm for square drives.

For **S** Series

Maximum Torque at 700 bar:
34.079 Nm

Hexagon Size Allen Drive:
14 - 85 mm

▼ SELECTION CHART

TORQUE WRENCH	OPTIONAL ALLEN-KEY DRIVES, METRIC				SHORT REACTION ARM FOR ALLEN DRIVES		
							
Model Number	Hexagon Size (mm)	Maximum Torque [1] (Nm)	Model Number	Dimension B1 (mm)	Model Number	Dimensions (mm) C1	H1
S1500 (1898 Nm)	14	644	SDA15-14	66	SRA15	67,5	65
	17	1152	SDA15-17	68			
	19	1606	SDA15-19	70			
	22	1897	SDA15-22	73			
	24	1897	SDA15-24	74			
S3000 (4339 Nm)	17	1152	SDA30-17	77	SRA30	80,0	74
	19	1606	SDA30-19	79			
	22	2486	SDA30-22	82			
	24	3232	SDA30-24	84			
	27	4336	SDA30-27	85			
	30	4336	SDA30-30	87			
	32	4336	SDA30-32	88			
S6000 (8144 Nm)	17	1152	SDA60-17	86	SRA60	91,5	89
	19	1606	SDA60-19	88			
	22	2486	SDA60-22	91			
	24	3232	SDA60-24	93			
	27	4600	SDA60-27	94			
	30	6308	SDA60-30	96			
	32	7656	SDA60-32	97			
S11000 (14.911 Nm)	30	6308	SDA110-30	112	SRA110	127,5	106
	32	7656	SDA110-32	114			
	36	10.894	SDA110-36	117			
	41	14.905	SDA110-41	121			
	46	14.905	SDA110-46	127			
S25000 (34.079 Nm)	36	10.894	SDA250-36	140	SRA250	158,5	135
	41	16.098	SDA250-41	144			
	46	22.730	SDA250-46	148			
	50	29.194	SDA250-50	151			
	55	34.079	SDA250-55	154			
	60	34.079	SDA250-60	158			
	65	34.079	SDA250-65	161			
	70	34.079	SDA250-70	164			
	75	34.079	SDA250-75	168			
	85	34.079	SDA250-85	175			

[1] Determine maximum torque according to the bolt size and grade.

Select the Right Torque

Choose your Enerpac Torque Wrench using the untightening rule of thumb: Loosening torque equals about 250% of tightening torque.

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Wedge Spreaders

Friction-free, smooth and parallel wedge movement with unique interlock wedge design. Eliminates flange damage and risk of spreading arm failure.

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ATM-Series Alignment Tools

Rectifies twist and rotational misalignment without additional stress in pipelines.

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SDA-Series, Allen-Key Drives – Imperial

Optional Allen-Key Drives and Reaction Arm

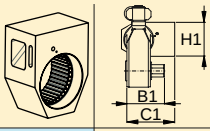
The SRA-Series Reaction Arm for Allen-Key drives must be used instead of standard reaction arm for square drives.

For **S** Series

Maximum Torque at 700 bar/10.000 psi:
34.079 Nm / 25.150 Ft.lbs

Hexagon Size Allen Drive:
1/2 - 21/4 inch

▼ SELECTION CHART

TORQUE WRENCH	OPTIONAL ALLEN-KEY DRIVES, IMPERIAL				SHORT REACTION ARM FOR ALLEN DRIVES		
							
Model Number	Hexagon Size (inch)	Maximum Torque [1] (Nm)	Model Number	Dimension B1 (mm)	Model Number	Dimensions (mm) C1	H1
S1500 (1898 Nm)	1/2"	481	SDA15-008	66	SRA15	67,5	65
	5/8"	935	SDA15-010	67			
	3/4"	1619	SDA15-012	71			
	7/8"	1897	SDA15-014	74			
	1"	1897	SDA15-100	77			
S3000 (4339 Nm)	5/8"	935	SDA30-010	77	SRA30	80,0	74
	3/4"	1619	SDA30-012	80			
	7/8"	2568	SDA30-014	83			
	1"	3828	SDA30-100	86			
	1 1/8"	5454	SDA30-102	88			
	1 1/4"	7480	SDA30-104	89			
	–	–	–	–			
S6000 (8144 Nm)	5/8"	935	SDA60-010	85	SRA60	91,5	89
	3/4"	1619	SDA60-012	89			
	7/8"	2568	SDA60-014	92			
	1"	3828	SDA60-100	95			
	1 1/8"	5454	SDA60-102	97			
	1 1/4"	7480	SDA60-104	98			
	–	–	–	–			
S11000 (14.911 Nm)	1 1/4"	7480	SDA110-104	115	SRA110	127,5	106
	1 3/8"	9953	SDA110-106	117			
	1 1/2"	12.920	SDA110-108	118			
	1 5/8"	14.905	SDA110-110	122			
	1 3/4"	14.905	SDA110-112	125			
S25000 (34.079 Nm)	1 1/2"	12.920	SDA250-108	141	SRA250	158,5	135
	1 5/8"	16.423	SDA250-110	145			
	1 3/4"	20.508	SDA250-112	148			
	1 7/8"	25.230	SDA250-114	149			
	2"	30.617	SDA250-200	151			
	2 1/4"	34.079	SDA250-204	154			
	–	–	–	–			
	–	–	–	–			
	–	–	–	–			
	–	–	–	–			

[1] Determine maximum torque according to the bolt size and grade.

Nut Splitters

Remove rusted or corroded nuts easily with Enerpac Nut Splitters. Capacities up to 75 mm hexagon nut.

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Torque Wrench Pump Selection Matrix

For optimum speed and performance see the torque wrench and pump matrix.

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Hexagon Bolt and Nut Sizes

See the table for hexagon sizes of bolts, nuts and related thread diameters.

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▼ Shown: **SQD-100-I**

Aluminium High Power Wrenches for Sockets or Allen-Keys

- **Very high torque-to-weight ratio**
- **High speed, double-acting operation**
- **High degree of rotation angle for increased productivity**
- **Never-jam mechanism**
- **High repeatability, with accuracy ± 3%**
- **Slim nose radius and 360° swivel hose connection allow easier positioning in confined areas**
- **Few moving parts means durability and low maintenance**
- **Push-button drive release; no tools needed to reverse square or Allen-key drives for tightening or loosening**
- **Lock-ring couplers are standard**
- **Fully corrosion resistant material**
- **Storage case (included) protects from damage, water and dirt**

Swivel Hose Connection

All Enerpac torque wrenches feature lock-ring couplers with a 360° swivel connection to allow easy access in all positions.

Select the Right Torque

Choose your Enerpac Torque Wrench using the untightening rule of thumb: Loosening torque equals about 250% of tightening torque.

Page: **208**

Optional Allen-Key Drives

Expanded versatility with a wide range of metric and imperial Allen-key drives for hexagon socket head cap screws.

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Carrying Handle CH-100

For easy transport to distant jobs. Makes handling and positioning easier, reduces operator fatique. Optional for SQD-75-I to SQD-160-I, standard on the SQD-270-I.

◀ *Easy and reliable service in the field using Enerpac SQD-series torque wrenches powered by the portable PTE-3404W electric torque wrench pump.*

Double-Acting Square Drive Torque Wrenches

◀ *All torque wrenches come standard with swivel connection, lock-ring couplers, square drive and reaction arm for square drive.*

SQD Series

Maximum Torque:
27.000 Nm

Square Drive Range:
3/4 - 2 1/2 inch

Maximum Operating Pressure:
800 bar

Use only Heavy Duty Impact Sockets for power driven torquing equipment, according to ISO 2725 and ISO 1174; DIN 3129 and DIN 3121 or ASME-B107.2/1995.

Torque Wrench Pumps and Hoses

Enerpac system matched air and electric torque wrench pumps provide control to operate hydraulic torque wrenches.

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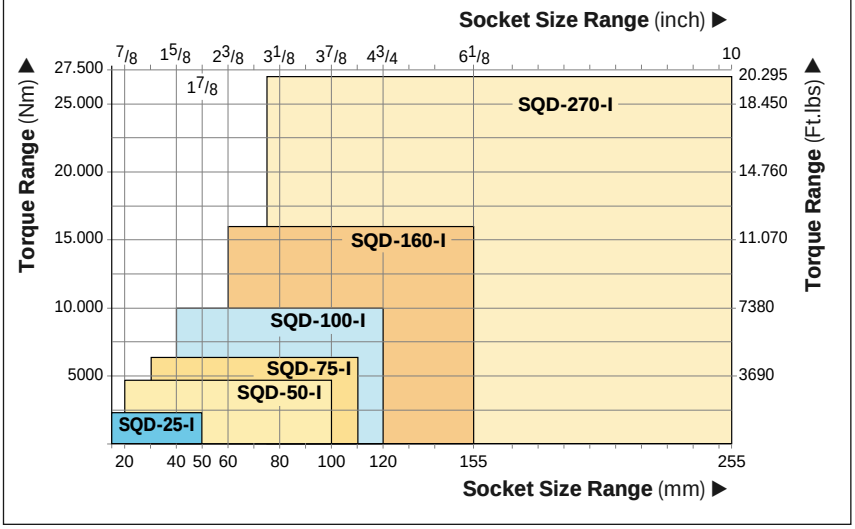
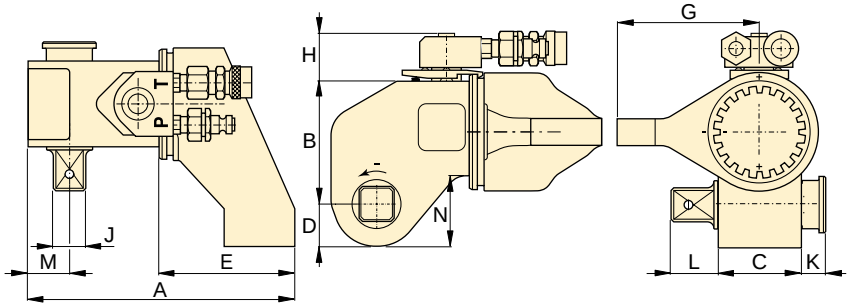
Hexagon Bolt and Nut Sizes

See the table for hexagon sizes of bolts, nuts and related thread diameters.

Page: 218

TORQUE WRENCH SELECTION (based on socket size range)





Typical Socket Size Range [1] (mm)	Typical Socket Size Range [1] (inch)	Square Drive Size J (inch)	Square Drive Model Nr. (square drive included with wrench)	Maximum Torque [2] at 800 bar (Nm)	Maximum Torque [2] at 800 bar (Ft.lbs)	Torque Wrench Model Nr.	Dimensions (mm) A	B	C	D	E	G	H	K	L	M	N	[3] (kg)
15 - 50	11/16 - 1 7/8"	3/4"	25S-075	2350	1735	SQD-25-I	167	72	53	24	108	95	35	6	28	27	36	2,5
20 - 100	7/8 - 3 7/8"	1"	50S-100	4800	3550	SQD-50-I	204	92	68	31	135	115	35	15	33	34	52	4,3
30 - 110	1 1/8 - 4 3/8"	1 1/2"	75S-150	7560	5570	SQD-75-I	226	107	76	36	153	122	35	12	43	39	64	6,7
40 - 120	1 5/8 - 4 3/4"	1 1/2"	100S-150	10.000	7360	SQD-100-I	253	115	84	39	164	130	35	13	39	43	68	8,0
60 - 155	2 3/8 - 6 1/8"	1 1/2"	160S-150	16.000	11.835	SQD-160-I	272	134	100	48	178	150	50	11	45	54	81	12,0
80 - 255	3 1/8 - 10"	2 1/2"	270S-250	27.000	19.875	SQD-270-I	342	164	119	59	218	200	50	18	76	63	99	24,5

[1] Contact ENERPAC for socket specifications.
[2] Determine maximum torque according to the bolt (nut) size and grade.
[3] including reaction arm and square drive.

SQD-Series, Metric Allen-Key Drives

ENERPAC
Hydraulic Technology Worldwide

▼ SELECTION CHART

TORQUE WRENCH	OPTIONAL ALLEN-KEY DRIVES, METRIC			REACTION ARM FOR ALLEN KEY DRIVE
				
Model Number	Hexagon Size (mm)	Maximum Torque [1] (Nm)	Model Number	Model Number
SQD-25-I (2350 Nm)	14	750	25A-14	RAH-25
	17	1300	25A-17	
	19	1800	25A-19	
	22	2350	25A-22	
	24	2350	25A-24	
SQD-50-I (4800 Nm)	17	1300	50A-17	RAH-50
	19	1800	50A-19	
	22	2800	50A-22	
	24	3500	50A-24	
	27	4800	50A-27	
	30	4800	50A-30	
	32	4800	50A-32	
SQD-75-I (7560 Nm)	17	1300	75A-17	RAH-75
	19	1800	75A-19	
	22	2800	75A-22	
	24	3500	75A-24	
	27	5000	75A-27	
	30	7000	75A-30	
	32	7560	75A-32	
SQD-100-I (10.000 Nm)	22	2800	100A-22	RAH-100
	24	3500	100A-24	
	27	5000	100A-27	
	30	7000	100A-30	
	32	8500	100A-32	
	36	10.000	100A-36	
SQD-160-I (16.000 Nm)	30	7000	160A-30	RAH-160
	32	8500	160A-32	
	36	12.000	160A-36	
	41	16.000	160A-41	
	46	16.000	160A-46	
SQD-270-I (27.000 Nm)	36	12.000	270A-36	RAH-270
	41	18.000	270A-41	
	46	25.000	270A-46	
	50	27.000	270A-50	
	55	27.000	270A-55	
	60	27.000	270A-60	
	65	27.000	270A-65	
	70	27.000	270A-70	

[1] Determine maximum torque according to the bolt size and grade.

For SQD Series

Maximum Torque at 800 bar:
27.000 Nm

Allen-Key Drive Range:
14 - 70 mm

Optional Allen-key Drives and Reaction Arm

The RAH-Reaction Arm for allen-key drives must be used instead of reaction arm for square drives.

Torque Wrench Pumps and Hoses

Enerpac system matched air and electric torque wrench pumps provide control to operate hydraulic torque wrenches.

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Flange Spreaders

Separates pipe flanges with ease, enabling efficient maintenance tasks.

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▼ *SQD-50-I with 50A-22 Allen-key drive with RAH-50 Reaction Arm for Allen-key drives.*

▼ SELECTION CHART

TORQUE WRENCH	OPTIONAL ALLEN-KEY DRIVES, IMPERIAL			REACTION ARM FOR ALLEN KEY DRIVE
				
Model Number	Hexagon Size (inch)	Maximum Torque [1] (Nm)	Model Number	Model Number
SQD-25-I (2350 Nm)	1/2"	530	25A-050	RAH-25
	5/8"	1000	25A-063	
	3/4"	1800	25A-075	
	7/8"	2350	25A-088	
	1"	2350	25A-100	
SQD-50-I (4800 Nm)	5/8"	1000	50A-063	RAH-50
	3/4"	1800	50A-075	
	7/8"	2800	50A-088	
	1"	4200	50A-100	
	1 1/8"	4800	50A-113	
	1 1/4"	4800	50A-125	
	–	–	–	
SQD-75-I (7560 Nm)	5/8"	1000	75A-063	RAH-75
	3/4"	1800	75A-075	
	7/8"	2800	75A-088	
	1"	4200	75A-100	
	1 1/8"	5900	75A-113	
	1 1/4"	7560	75A-125	
	–	–	–	
SQD-100-I (10.000 Nm)	7/8"	2800	100A-088	RAH-100
	1"	4200	100A-100	
	1 1/8"	5900	100A-113	
	1 1/4"	8500	100A-125	
	1 3/8"	10.000	100A-138	
	1 1/2"	10.000	100A-150	
SQD-160-I (16.000 Nm)	1 1/4"	8500	160A-125	RAH-160
	1 3/8"	10.500	160A-138	
	1 1/2"	14.000	160A-150	
	1 5/8"	16.000	160A-163	
	1 3/4"	16.000	160A-175	
SQD-270-I (27.000 Nm)	1 1/2"	14.000	270A-150	RAH-270
	1 5/8"	18.000	270A-163	
	1 3/4"	22.000	270A-175	
	1 7/8"	27.000	270A-188	
	2"	27.000	270A-200	
	2 1/4"	27.000	270A-225	
	–	–	–	
	–	–	–	

[1] Determine maximum torque according to the bolt size and grade.

For SQD Series

Maximum Torque at 800 bar/ 11.600 psi:
27.000 Nm / 19.900 Ft.lbs

Allen-Key Drive Range:
1/2 - 21/4 inch

Select the Right Torque

Choose your Enerpac Torque Wrench using the untightening rule of thumb: Loosening torque equals about 250% of tightening torque.

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Nut Splitters

Remove rusted or corroded nuts easily with Enerpac Nut Splitters. Capacities up to 75 mm hexagon nut.

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Hexagon Bolt and Nut Sizes

See the table for hexagon sizes of bolts, nuts and related thread diameters.

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▼ *SQD-100-I with RAH-100 Reaction Arm and Allen-key drive used for loosening hexagon socket head cap screws.*

▼ Shown: **Drive units with interchangeable cassettes**

Simplicity

- **No tools are needed for changing the hexagon cassettes**
- **Innovative, pinless wrench construction incorporates quick release cylinder and automatic crank engagement**
- **Single 360° hydraulic swivel manifold complete with screw lock couplings increases wrench and hose manoeuvrability.**

Design

- **Cylinders and low profile cassettes have been engineered to give ultra slim, compact low clearance tooling with a small nose radius**
- **Robust design with minimal parts enables easy on-site maintenance without special tools**
- **Nut sizes covered range from $1^{1/4}$ - $4^{5/8}$ inch AF (30 – 115 mm)**
- **Optimized strength-to-weight ratio**
- **Fast operation due to the large nut rotation per wrench cycle (30 degree rotation angle) and rapid return stroke**

Reliability

- **All wrenches are nickel-plated for excellent corrosion protection and improved durability in harsh environments**
- **All wrenches are fitted with bronze bushings to ensure the ratchet will never seize in the sideplates, thus eliminating costly repairs**

Accuracy

- **Constant torque output provides high accuracy across the full stroke**
- **In-line reaction foot ensures accuracy by reducing internal deflections.**

Rigid Steel Design

The *Professional* Low Profile Solution

W-Series, Low Profile Torque Wrenches

This product range has been designed using state-of-the art CAD techniques to bring you the most advanced low profile torque wrench on the market. Safety, quality, toughness and reliability are built in.

During the design process every prototype was put through finite element stress analysis, photo-elastic modelling, rigorous cyclic testing and strain gauging.

Special Design Service

Should you have an application where it is not possible to use the standard range of tools, then we invite you to draw on our extensive experience in providing tailor-made solutions to problems involving bolted joints.

Versatility

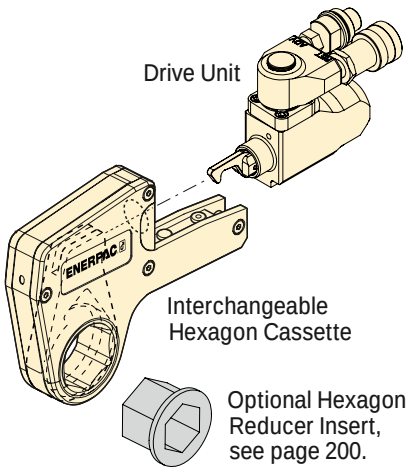
- Quick Release interchangeable low profile hexagon cassettes
- One drive unit per size range can be used to drive any hexagon within that range.

Torque Wrench Hoses

Use Enerpac THQ-700 Series hoses with W-Series torque wrenches to ensure the integrity of your hydraulic system.

6 m long, 2 hoses	**THQ-706T**
12 m long, 2 hoses	**THQ-712T**

Double-Acting Hydraulic Hexagon Torque Wrenches



Hexagon Cassettes and Reducer Inserts

Maximum versatility with the full range of interchangeable hexagon cassettes and hexagon reducing inserts is available in metric and inch sizes.

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W Series

Maximum Torque at 700 bar / 10.000 psi:
20.337 Nm/15.000 Ft.lbs

Hexagon Range:
30-115 mm/$1^{1}/_{4}$ -$4^{5}/_{8}$ inch

Nose Radius:
31,0 - 87,5 mm

Maximum Operating Pressure:
700 bar / 10.000 psi

Torque Wrench Pump Selection Matrix

For optimum speed and performance see the torque wrench and pump matrix.

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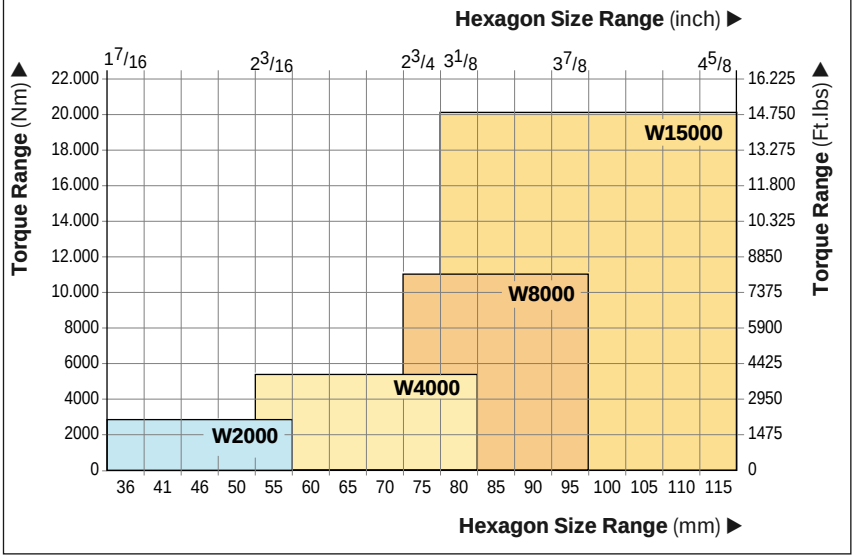
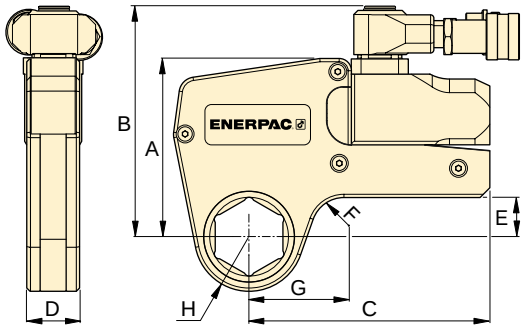
DRIVE UNIT AND INTERCHANGEABLE CASSETTE SELECTION



▼ *These rigid steel wrenches with low profile interchangeable hexagon cassettes guarantee durability and maximum versatility in bolting applications.*



▼ SELECTION CHART

Hexagon Range *  202		Maximum Torque at 700 bar (10.000 psi)		Drive Unit Model Number 	Minimum Torque		Dimensions (mm)						Drive unit without hexagon cassette
(mm)	(inch)	(Nm)	(Ft.lbs)		(Nm)	(Ft.lbs)	A	B	C	D	E	F	(kg)
36 - 55	$1^{7}/_{16}$ - $2^{3}/_{8}$	2712	2000	**W2000**	271	200	109	141	148	32,0	24,0	20	1,4
55 - 80	$1^{5}/_{8}$ - $3^{1}/_{8}$	5423	4000	**W4000**	542	400	136	167	178	41,0	32,8	20	2,0
70 - 95	$2^{3}/_{16}$ - $3^{7}/_{8}$	10.846	8000	**W8000**	1084	800	172	205	208	52,5	41,9	25	3,0
80 - 115	$2^{9}/_{16}$ - 5	20.337	15.000	**W15000**	2033	1500	207	240	253	63,0	50,0	20	5,0

* With in-line reaction foot.

See pages 202-203 for dimensions H and G.

Metric Hexagon Cassettes and Reducer Inserts

ENERPAC
Hydraulic Technology Worldwide

Torque Wrench Pump Selection Matrix

For optimum speed and performance see the torque wrench and pump matrix.

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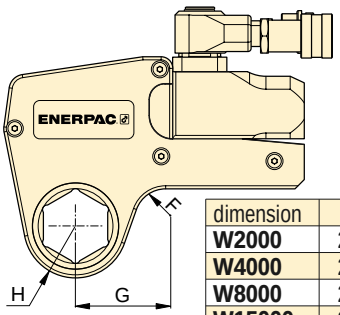
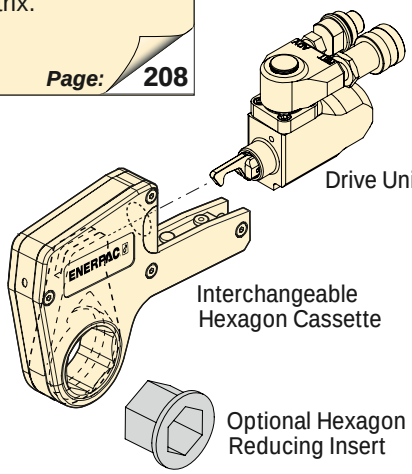


dimension	F
W2000	20
W4000	20
W8000	25
W15000	20



W Series

Maximum Torque at 700 bar:
20.337 Nm

Hexagon Range:
30 - 115 mm

Maximum Operating Pressure:
700 bar

▼ **SELECTION CHART**

Drive Unit Model Nr.	HEXAGON CASSETTES – METRIC											
	Hexagon Size (mm)	Nose Radius H (mm)	Model Number	G (mm)	(kg)	Hexagon Reducer Size (mm)	Hexagon Reducer Insert Model Number	Hexagon Reducer Size (mm)	Hexagon Reducer Insert Model Number	Hexagon Reducer Size (mm)	Hexagon Reducer Insert Model Number	
W2000 (2712Nm)	**36**	31,0	**W2107**	53,7	1,9	–	**–**	–	**–**	–	**–**	
	38	33,5	**W2108**	58,2	2,0	–	**–**	–	**–**	–	**–**	
	41	33,5	**W2110**	58,2	2,0	41/36	**W2110R107**	41/32	**W2110R104**	41/30	**W2110R030M**	
	46	36,5	**W2113**	60,5	2,0	46/41	**W2113R110**	46/36	**W2113R107**	46/32	**W2113R104**	
	50	39,0	**W2200**	63,1	2,0	50/46	**W2200R113**	50/41	**W2200R110**	50/36	**W2200R107**	
	55	41,8	**W2203**	68,6	2,1	55/50	**W2203R200**	55/46	**W2203R113**	55/41	**W2203R110**	
	60	44,5	**W2206**	64,8	2,2	60/55	**W2206R203**	60/50	**W2206R200**	60/46	**W2206R113**	
	–	–	**–**	–	–	–		–	**–**	–	**–**	
W4000 (5423Nm)	**55**	44,0	**W4203**	73,4	3,8	55/50	**W4203R200**	55/46	**W4203R113**	55/41	**W4203R110**	
	60	46,5	**W4206**	70,6	3,9	60/55	**W4206R203**	60/50	**W4206R200**	60/46	**W4206R113**	
	63	49,5	**W4208**	76,2	3,9	63/55	**W4208R203**	63/50	**W4208R200**	63/46	**W4208R113**	
	65	49,5	**W4209**	76,2	3,9	65/60	**W4209R206**	65/55	**W4209R203**	65/50	**W4209R200**	
	70	52,5	**W4212**	78,3	4,0	70/65	**W4212R209**	70/60	**W4212R206**	70/55	**W4212R203**	
	75	55,5	**W4215**	81,6	4,1	75/70	**W4215R212**	75/65	**W4215R209**	75/60	**W4215R206**	1)
	80	58,5	**W4302**	83,5	4,2	80/75	**W4302R215**	80/70	**W4302R212**	80/65	**W4302R209**	
	–	–	**–**	–	–	–	**–**	–	**–**	–	**–**	
W8000 (10.846Nm)	**65**	56,0	**W8209**	84,8	7,8	65/60	**W8209R206**	65/55	**W8209R203**	65/50	**W8209R200**	
	70	56,0	**W8212**	84,8	7,8	70/65	**W8212R209**	70/60	**W8212R206**	70/55	**W8212R203**	
	75	58,0	**W8215**	85,0	7,8	75/70	**W8215R212**	75/65	**W8215R209**	75/60	**W8215R206**	2)
	80	60,5	**W8302**	89,5	7,9	80/75	**W8302R215**	80/70	**W8302R212**	80/65	**W8302R209**	
	85	66,0	**W8085M**	92,2	8,1	85/80	**W8085R080M**	85/75	**W8085R075M**	85/70	**W8085R070M**	
	90	74,0	**W8090M**	102,9	8,7	90/85	**W8090R085M**	90/80	**W8090R080M**	90/75	**W8090R075M**	
	95	74,0	**W8312**	102,9	8,8	95/90	**W8312R090M**	95/85	**W8312R085M**	95/80	**W8312R302**	3)
	–	–	**–**	–	–	–	**–**	–	**–**	–		
W15000 (20.337Nm)	**80**	64,5	**W15302**	92,9	13,7	80/75	**W15302R215**	80/70	**W15302R212**	80/65	**W15302R209**	
	85	69,5	**W15085M**	96,6	14,0	85/80	**W15085R080M**	85/75	**W15085R075M**	85/70	**W15085R070M**	
	90	75,0	**W15090M**	101,8	14,4	90/85	**W15090R085M**	90/80	**W15090R080M**	90/75	**W15090R075M**	
	95	75,0	**W15312**	101,8	14,5	95/90	**W15312R090M**	95/85	**W15312R085M**	95/80	**W15312R302**	4)
	105	80,5	**W15402**	103,1	14,7	105/100	**W15402R100M**	105/95	**W15402R312**	105/90	**W15402R090M**	
	110	87,5	**W15110M**	114,8	15,0	110/105	**W15110R105M**	110/100	**W15110R100M**	110/95	**W15110R095M**	
	115	87,5	**W15115M**	114,8	15,3	115/110	**W15115R110M**	115/105	**W15115R105M**	115/100	**W15115R100M**	
	–	–	**–**	–	–	–	**–**	–	**–**	–	**–**	

1) Additional Reducer Insert is hexagon size 75/55 mm, Modelnr. **W4215R203**, fits in **W4215** hexagon cassette.
2) Additional Reducer Insert is hexagon size 75/55 mm, Modelnr. **W8215R203**, fits in **W8215** hexagon cassette.
3) Additional Reducer Insert is hexagon size 95/75 mm, Modelnr. **W8312R215**, fits in **W8312** hexagon cassette.
4) Additional Reducer Insert is hexagon size 95/75 mm, Modelnr. **W15312R215**, fits in **W15312** hexagon cassette.

Imperial Hexagon Cassettes and Reducer Inserts

Torque Wrench Pump Selection Matrix

For optimum speed and performance see the torque wrench and pump matrix.

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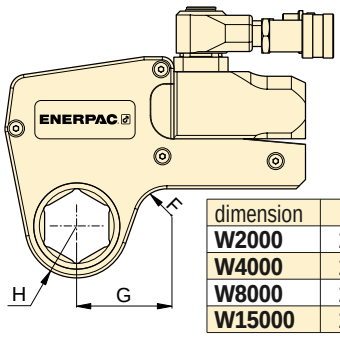
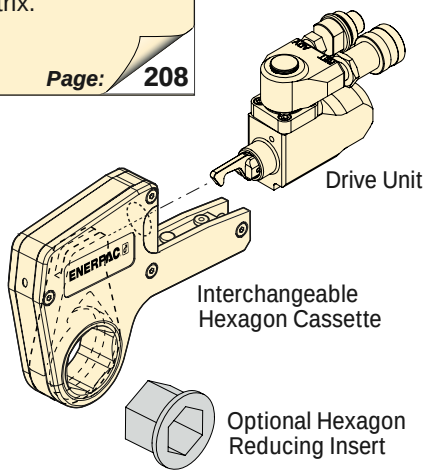


dimension	F
W2000	20
W4000	20
W8000	25
W15000	20



W Series

Maximum Torque at 700 bar/10.000 psi:
20.337 Nm/15.000 Ft.lbs

Hexagon Range:
1 1/4 - 4 5/8 inch

Maximum Operating Pressure:
700 bar / 10.000 psi

▼ **SELECTION CHART**

Drive Unit Model Nr.	HEXAGON CASSETTES – INCHES											
	Hexagon Size (inch)	Nose Radius H (mm)	Model Number	G (mm)	(kg)	Hexagon Reducer Size (inch)	Hexagon Reducer Insert Model Nr.	Hexagon Reducer Size (inch)	Hexagon Reducer Insert Model Nr.	Hexagon Reducer Size (inch)	Hexagon Reducer Insert Model Nr.	
W2000 (2712Nm)	1 7/16	31,0	W2107	53,7	1,9	–	–	–	–	–	–	
	1 1/2	33,5	W2108	58,2	2,0	–	–	–	–	–	–	
	1 5/8	33,5	W2110	58,2	2,0	1 5/8 - 1 7/16	W2110R107	1 5/8 - 1 1/4	W2110R104	–	–	
	1 13/16	36,5	W2113	60,5	2,0	1 13/16 - 1 5/8	W2113R110	1 13/16 - 1 7/16	W2113R107	1 13/16 - 1 1/4	W2113R104	
	2	39,0	W2200	63,1	2,0	2 - 1 13/16	W2200R113	2 - 1 5/8	W2200R110	2 - 1 7/16	W2200R107	
	2 3/16	41,8	W2203	68,6	2,1	2 3/16 - 2	W2203R200	2 3/16 - 1 13/16	W2203R113	2 3/16 - 1 5/8	W2203R110	
	2 3/8	44,5	W2206	64,8	2,2	2 3/8 - 2 3/16	W2206R203	2 3/8 - 2	W2206R200	2 3/8 - 1 13/16	W2206R113	
	–	–	–	–	–	–		–	–	–	–	
W4000 (5423Nm)	2 3/16	44,0	W4203	73,4	3,8	2 3/16 - 2	W4203R200	2 3/16 - 1 13/16	W4203R113	2 3/16 - 1 5/8	W4203R110	
	2 3/8	46,5	W4206	70,6	3,9	2 3/8 - 2 3/16	W4206R203	2 3/8 - 2	W4206R200	2 3/8 - 1 13/16	W4206R113	
	2 1/2	49,5	W4208	76,2	3,9	2 1/2 - 2 3/16	W4208R203	2 1/2 - 2	W4208R200	2 1/2 - 1 13/16	W4208R113	
	2 9/16	49,5	W4209	76,2	3,9	2 9/16 - 2 3/8	W4209R206	2 9/16 - 2 3/16	W4209R203	2 9/16 - 2	W4209R200	
	2 3/4	52,5	W4212	78,3	4,0	2 3/4 - 2 9/16	W4212R209	2 3/4 - 2 3/8	W4212R206	2 3/4 - 2 3/16	W4212R203	
	2 15/16	55,5	W4215	81,6	4,1	2 15/16 - 2 3/4	W4215R212	2 15/16 - 2 9/16	W4215R209	2 15/16 - 2 3/8	W4215R206	1)
	3 1/8	58,5	W4302	83,5	4,2	3 1/8 - 2 15/16	W4302R215	3 1/8 - 2 3/4	W4302R212	3 1/8 - 2 9/16	W4302R209	
	–	–	–	–	–	–	–	–	–	–	–	
W8000 (10.846Nm)	2 9/16	56,0	W8209	84,8	7,8	2 9/16 - 2 3/8	W8209R206	2 9/16 - 2 3/16	W8209R203	2 9/16 - 2	W8209R200	
	2 3/4	56,0	W8212	84,8	7,8	2 3/4 - 2 9/16	W8212R209	2 3/4 - 2 3/8	W8212R206	2 3/4 - 2 3/16	W8212R203	
	2 15/16	58,0	W8215	85,0	7,8	2 15/16 - 2 3/4	W8215R212	2 15/16 - 2 9/16	W8215R209	2 15/16 - 2 3/8	W8215R206	2)
	3 1/8	60,5	W8302	89,5	7,9	3 1/8 - 2 15/16	W8302R215	3 1/8 - 2 3/4	W8302R212	3 1/8 - 2 9/16	W8302R209	
	3 1/2	66,0	W8308	92,2	8,1	3 1/2 - 3 1/8	W8308R302	3 1/2 - 2 15/16	W8308R215	3 1/2 - 2 3/4	W8308R212	
	3 3/4	74,0	W8312	102,9	8,7	3 3/4 - 3 1/2	W8312R308	3 3/4 - 3 1/8	W8312R302	3 3/4 - 2 15/16	W8312R215	3)
	3 7/8	74,0	W8314	102,9	8,8	3 7/8 - 3 1/2	W8314R308	3 7/8 - 3 1/8	W8314R302	3 7/8 - 2 15/16	W8314R215	
	–	–	–	–	–	–	–	–	–	–	–	
W15000 (20.337Nm)	3 1/8	64,5	W15302	92,9	13,7	3 1/8 - 2 15/16	W15302R215	3 1/8 - 2 3/4	W15302R212	3 1/8 - 2 9/16	W15302R209	
	3 1/2	69,5	W15308	96,6	14,0	3 1/2 - 3 1/8	W15308R302	3 1/2 - 2 15/16	W15308R215	3 1/2 - 2 3/4	W15308R212	
	3 3/4	75,0	W15312	101,8	14,5	3 3/4 - 3 1/2	W15312R308	3 3/4 - 3 1/8	W15312R302	3 3/4 - 2 15/16	W15312R215	
	3 7/8	75,0	W15314	101,8	14,5	3 7/8 - 3 1/2	W15314R308	3 7/8 - 3 1/8	W15314R302	3 7/8 - 2 15/16	W15314R215	
	4 1/8	80,5	W15402	103,1	14,7	4 1/8 - 3 7/8	W15402R314	4 1/8 - 3 3/4	W15402R312	4 1/8 - 3 1/2	W15402R308	
	4 1/4	80,5	W15404	103,1	14,7	4 1/4 - 3 7/8	W15404R314	4 1/4 - 3 1/2	W15404R308	4 1/4 - 3 1/8	W15404R302	
	4 5/8	87,5	W15410I	114,8	15,3	4 5/8 - 4 1/4	W15410R404	4 5/8 - 3 7/8	W15410R314	4 5/8 - 3 1/2	W15410R308	
	–		–	–	–	–	–	–	–	–	–	

1) Additional Reducer Insert is hexagon size 2 15/16 - 2 3/16 inch, Modelnr. **W4215R203**, fits in **W4215** hexagon cassette.
2) Additional Reducer Insert is hexagon size 2 15/16 - 2 3/16 inch Modelnr. **W8215R203**, fits in **W8215** hexagon cassette.
3) Additional Reducer Insert is hexagon size 3 3/4 - 2 3/4 inch Modelnr. **W8312R212**, fits in **W8312** hexagon cassette.

See the table of hexagon bolt and nut sizes and related thread diameters on page 216.

▼ Shown from left to right: **HXD-60 with CC-680, HXD-30 with CC-360**

Aluminium Design, Low Profile and Slim Nose Radius

- **High torque-to-weight ratio, slim nose radius and flat design**
- **High speed, high degree of rotation angle, double-acting**
- **Snap in, interchangeable cassettes, no tools required**
- **360˚ swivel hose connection allows easier positioning in confined areas**
- **Lock-ring couplers are standard**
- **High repeatability, with accuracy ± 3%**
- **Strong unibody design, integrated reaction arm and few moving parts make wrenches durable and reliable**
- **Extensive range of metric and imperial hexagon cassettes and reducers**
- **Fully corrosion resistant material**
- **Drive unit and cassette come in storage case to protect from damage, water and dirt**

Select the Right Torque

Choose your Enerpac Torque Wrench using the untightening rule of thumb: Loosening torque equals about 250% of tightening torque.

Page: 208

Hexagon Bolt and Nut Sizes

See the table for hexagon sizes of bolts, nuts and related thread diameters.

Page: 218

Nut Splitters

Remove rusted or corroded nuts easily with Enerpac Nut Splitters. Capacities up to 75 mm hexagon nut.

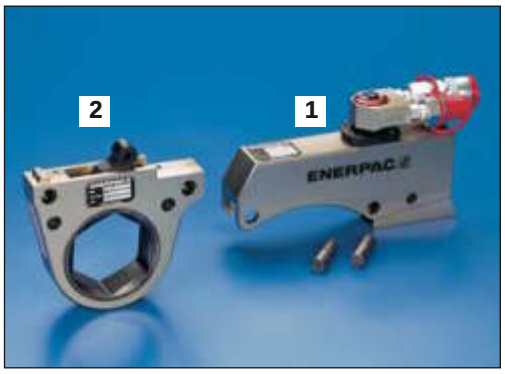
Page: 188

▼ *The HXD-30 drive unit combined with cassette CC-360 is the best solution for this turbine application. The slim nose radius and swivel couplers allow easy access in all positions.*

▼ *An Enerpac hydraulic wrench brings safety and economy to all kinds of maintenance jobs.*

Double-Acting Hydraulic Torque Wrenches

▼ Shown from left to right: **CC-360, HXD-30**



TORQUE WRENCH SELECTION IN 2 STEPS:

1 **DRIVE UNIT**
Select the HXD-Drive Unit using the quick selection chart below.

2 **CASSETTE**
Select the appropriate CC-Cassette from the pages 206 and 207.

HXD Series

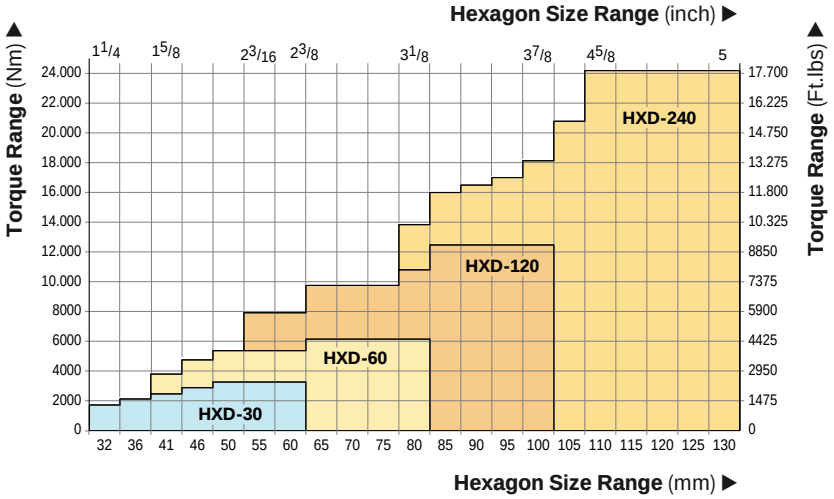
Maximum Torque at 800 bar:
24.210 Nm / 17.860 Ft.lbs

Hexagon Range:
30-130 mm / 1 1/4-5”

Nose Radius:
28,5 - 96,0 mm

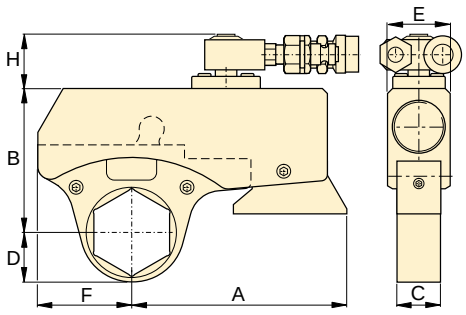
Maximum Operating Pressure:
800 bar

DRIVE UNIT AND INTERCHANGEABLE CASSETTE SELECTION



Reducer Inserts
Expanded versatility with the full range of metric and imperial Reducer Inserts and Holding Rings.
Page: 206

Torque Wrench Pump Selection Matrix
For optimum speed and performance see the torque wrench and pump matrix.
Page: 208



▼ QUICK SELECTION CHART

Hex Cassette & Reducer Range		Maximum Torque		Drive Unit * Model Number	Drive Unit and Cassette Dimensions (mm)							
 Page: 206		at 800 bar	at 11.600 psi									
(mm)	(inch)	(Nm)	(Ft.lbs)		A	B	C	D	E	F	H	(kg)
32 - 60	1 1/4 - 2 3/8	3290	2425	**HXD-30**	135	91 - 103	28	28,5 - 47,5	40	60	38	1,6
41 - 80	1 5/8 - 3 1/8	6190	4565	**HXD-60**	156	115 - 130	35	34,5 - 60,5	50	75	38	2,5
55 - 100	2 3/16 - 3 7/8	12.500	9220	**HXD-120**	200	141 - 156	47	46,5 - 73,5	65	96	38	4,8
65 - 130	2 9/16 - 5	24.210	17.860	**HXD-240**	259	182 - 202	56	62,0 - 96,0	82	125	50	8,2

* With integrated reaction arm.

HXD-Series, Metric Cassettes and Inserts

ENERPAC
Hydraulic Technology Worldwide

The optional Reducer Insert must be secured in the Cassette with a Holding Ring. ▶

Maximum Torque at 800 bar:
24.210 Nm

Hexagon Range:
30 - 130 mm

Maximum Operating Pressure:
800 bar

CC
IN
HR
Series

▼ **SELECTION CHART**

DRIVE UNIT	INTERCHANGEABLE CASSETTES, METRIC					OPTIONAL ADD-ON REDUCER INSERTS, METRIC						HOLDING RINGS
												
Model Number	Max. Torque[1] (Nm)	Hex. Size [2] (mm)	Nose Radius D (mm)	Model Number	(kg)	Hexagon Size (mm)	Model Number	Hexagon Size (mm)	Model Number	Hexagon Size (mm)	Model Number	Model Number
HXD-30 (3290 Nm)	1700	32	28,5	CC-332	0,6	–	–	–	–	–	–	–
	2100	36	31,5	CC-336	0,7	–	–	–	–	–	–	–
	2500	41	34,5	CC-341	0,7	41/36	IN3-4136	41/32	IN3-4132	41/30	IN3-4130	HR-41
	2890	46	38,5	CC-346	0,8	46/41	IN3-4641	46/36	IN3-4636	46/32	IN3-4632	HR-46
	3290	50	42,0	CC-350	0,9	50/46	IN3-5046	50/41	IN3-5041	50/36	IN3-5036	HR-50
		55	45,0	CC-355	1,0	55/50	IN3-5550	55/46	IN3-5546	55/41	IN3-5541	HR-55
		60	47,5	CC-360	1,1	60/55	IN3-6055	60/50	IN3-6050	60/46	IN3-6046	HR-60
HXD-60 (6190 Nm)	3840	41	34,5	CC-641	1,2	41/36	IN6-4136	–	–	–	–	HR-41
	4805	46	39,5	CC-646	1,3	–	–	–	–	–	–	–
	5410	50	43,5	CC-650	1,4	50/46	IN6-5046	50/41	IN6-5041	50/36	IN6-5036	HR-50
		55	46,5	CC-655	1,5	55/50	IN6-5550	55/46	IN6-5546	55/41	IN6-5541	HR-55
		60	48,5	CC-660	1,6	60/55	IN6-6055	60/50	IN6-6050	60/46	IN6-6046	HR-60
	6190	65	52,5	CC-665	1,8	65/60	IN6-6560	65/55	IN6-6555	65/50	IN6-6550	HR-65
		70	55,5	CC-670	1,9	70/65	IN6-7065	70/60	IN6-7060	70/55	IN6-7055	HR-70
		75	57,5	CC-675	2,0	75/70	IN6-7570	75/65	IN6-7565	75/60	IN6-7560	HR-75
		80	60,5	CC-680	2,1	80/75	IN6-8075	80/70	IN6-8070	80/65	IN6-8065	HR-80
HXD-120 (12500 Nm)	8000	55	46,5	CC-1255	2,6	55/50	IN12-5550	55/46	IN12-5546	55/41	IN12-5541	HR-55
		60	48,5	CC-1260	2,7	60/55	IN12-6055	60/50	IN12-6050	60/46	IN12-6046	HR-60
	9800	65	52,5	CC-1265	2,7	65/60	IN12-6560	65/55	IN12-6555	65/50	IN12-6550	HR-65
		70	55,5	CC-1270	2,8	70/65	IN12-7065	70/60	IN12-7060	70/55	IN12-7055	HR-70
		75	57,5	CC-1275	2,9	75/70	IN12-7570	75/65	IN12-7565	75/60	IN12-7560	HR-75
		–	–	–	–	–	–	–	–	–	–	–
	10.860	80	60,5	CC-1280	3,0	80/75	IN12-8075	80/70	IN12-8070	80/65	IN12-8065	HR-80
	12.500	85	64,5	CC-1285	3,5	85/80	IN12-8580	85/75	IN12-8575	85/70	IN12-8570	HR-85
		90	67,5	CC-1290	3,6	90/85	IN12-9085	90/80	IN12-9080	90/75	IN12-9075	HR-90
		95	70,5	CC-1295	3,7	95/90	IN12-9590	95/85	IN12-9585	95/80	IN12-9580	HR-95
		100	73,5	CC-12100	3,8	100/95	IN12-10095	100/90	IN12-10090	100/85	IN12-10085	HR-100
HXD-240 (24.210 Nm)	13.890	80	62,0	CC-2480	5,1	80/75	IN24-8075	80/70	IN24-8070	80/65	IN24-8065	HR-80
	16.030	85	66,0	CC-2485	5,2	85/80	IN24-8580	85/75	IN24-8575	85/70	IN24-8570	HR-85
	16.560	90	69,0	CC-2490	5,2	90/85	IN24-9085	90/80	IN24-9080	90/75	IN24-9075	HR-90
	17.100	95	72,0	CC-2495	5,4	95/90	IN24-9590	95/85	IN24-9585	95/80	IN24-9580	HR-95
	18.170	100	76,0	CC-24100	5,6	100/95	IN24-10095	100/90	IN24-10090	100/85	IN24-10085	HR-100
	20.840	105	80,0	CC-24105	5,7	105/100	IN24-105100	105/95	IN24-10595	105/90	IN24-10590	HR-105
	24.210	110	84,0	CC-24110	5,8	110/105	IN24-110105	110/100	IN24-110100	110/95	IN24-11095	HR-110
		115	87,0	CC-24115	7,1	115/110	IN24-115110	115/105	IN24-115105	115/100	IN24-115100	HR-115
		120	90,0	CC-24120	7,3	120/115	IN24-120115	120/110	IN24-120110	120/105	IN24-120105	HR-120
		125	93,0	CC-24125	7,3	125/120	IN24-125120	125/115	IN24-125115	125/110	IN24-125110	HR-125
		130	96,0	CC-24130	7,4	130/125	IN24-130125	130/120	IN24-130120	130/115	IN24-130115	HR-130

[1] Determine maximum torque according to the bolt (nut) size and grade.
[2] See the table of hexagon bolt and nut sizes and related thread diameters on page 216.

HXD-Series, Imperial Cassettes and Reducer Inserts

The optional Reducer Insert must be secured in the Cassette with a Holding Ring. ▶

Maximum Torque at 800 bar:
24.210 Nm (17860 Ft.lbs)

Hexagon Range:
1 1/4 - 5 inch

Maximum Operating Pressure:
800 bar

CC
IN
HR
Series

▼ **SELECTION CHART**

DRIVE UNIT	INTERCHANGEABLE CASSETTES, IMPERIAL					OPTIONAL ADD-ON REDUCER INSERTS, IMPERIAL				HOLDING RINGS
										
Model Number	Max. Torque[1] (Nm)	Hex. Size[2] (inch)	Nose Radius D (mm)	Model Number	(kg)	Hexagon Size (inch)	Model Number	Hexagon Size (inch)	Model Number	Model Number
HXD-30 (3290 Nm)	1700	1 1/4"	28,5	CC-3125	0,6	–	–	–	–	–
	2100	1 7/16"	31,5	CC-3144	0,7	1 7/16" - 1 1/4"	IN3144-125	–	–	HR-36
	2500	1 5/8"	34,5	CC-3163	0,7	1 5/8" - 1 7/16"	IN3163-144	1 5/8" - 1 1/4"	IN3163-125	HR-41
	2890	1 13/16"	38,5	CC-3181	0,8	1 13/16" - 1 5/8"	IN3181-163	1 13/16" - 1 7/16"	IN3181-144	HR-46
	3290	2"	42,0	CC-3200	0,9	2" - 1 13/16"	IN3200-181	2" - 1 5/8"	IN3200-163	HR-50
		2 3/16"	45,0	CC-3219	1,0	2 3/16" - 2"	IN3219-200	2 3/16" - 1 13/16"	IN3219-181	HR-55
		2 3/8"	47,5	CC-3238	1,1	2 3/8" - 2 3/16"	IN3238-219	2 3/8" - 2"	IN3238-200	HR-60
HXD-60 (6190 Nm)	3840	1 5/8"	34,5	CC-6163	1,2	–	–	–	–	–
	4805	1 13/16"	39,5	CC-6181	1,3	1 13/16" - 1 5/8"	IN6181-163	–	–	HR-46
	5410	2"	43,5	CC-6200	1,4	2" - 1 13/16"	IN6200-181	2" - 1 5/8"	IN6200-163	HR-50
		2 3/16"	46,5	CC-6219	1,5	2 3/16" - 2"	IN6219-200	2 3/16" - 1 13/16"	IN6219-181	HR-55
		2 3/8"	48,5	CC-6238	1,6	2 3/8" - 2 3/16"	IN6238-219	2 3/8" - 2"	IN6238-200	HR-60
	6190	2 9/16"	52,5	CC-6256	1,8	2 9/16" - 2 3/8"	IN6256-238	2 9/16" - 2 3/16"	IN6256-219	HR-65
		2 3/4"	55,5	CC-6275	1,9	2 3/4" - 2 9/16"	IN6275-256	2 3/4" - 2 3/8"	IN6275-238	HR-70
		2 15/16"	57,5	CC-6293	2,0	2 15/16" - 2 3/4"	IN6293-275	2 15/16" - 2 9/16"	IN6293-256	HR-75
		3 1/8"	60,5	CC-6313	2,1	3 1/8" - 2 15/16"	IN6313-293	3 1/8" - 2 3/4"	IN6313-275	HR-80
HXD-120 (12500 Nm)	8000	2 3/16"	46,5	CC-12219	2,6	2 3/16" - 2"	IN12219-200	2 3/16" - 1 13/16"	IN12219-181	HR-55
		2 3/8"	48,5	CC-12238	2,7	2 3/8" - 2 3/16"	IN12238-219	2 3/8" - 2"	IN12238-200	HR-60
	9800	2 9/16"	52,5	CC-12256	2,7	2 9/16" - 2 3/8"	IN12256-238	2 9/16" - 2 3/16"	IN12256-219	HR-65
		2 3/4"	55,5	CC-12275	2,8	2 3/4" - 2 9/16"	IN12275-256	2 3/4" - 2 3/8"	IN12275-238	HR-70
		2 15/16"	57,5	CC-12293	2,9	2 15/16" - 2 3/4"	IN12293-275	2 15/16" - 2 9/16"	IN12293-256	HR-75
		3"	57,5	CC-12300	2,9	3" - 2 3/4"	IN12300-275	3" - 2 9/16"	IN12300-256	HR-75
	10.860	3 1/8"	60,5	CC-12313	3,0	3 1/8" - 2 15/16"	IN12313-293	3 1/8" - 2 3/4"	IN12313-275	HR-80
	12.500	3 3/8"	64,5	CC-12338	3,5	3 3/8" - 3"	IN12338-300	3 3/8" - 2 15/16"	IN12338-293	HR-85
		3 1/2"	67,5	CC-12350	3,6	3 1/2" - 3 1/8"	IN12350-313	3 1/2" - 3"	IN12350-300	HR-90
		3 3/4"	70,5	CC-12375	3,7	3 3/4" - 3 1/2"	IN12375-350	3 3/4" - 3 3/8"	IN12375-338	HR-95
		3 7/8"	73,5	CC-12388	3,8	3 7/8" - 3 1/2"	IN12388-350	3 7/8" - 3 3/8"	IN12388-338	HR-100
HXD-240 (24.210 Nm)	14.000	3 1/8"	62,0	CC-24313 [3]	5,1	3 1/8" - 2 15/16"	IN24313-293	3 1/8" - 2 3/4"	IN24313-275 [3]	HR-80
	15.840	3 3/8"	66,0	CC-24338	5,2	3 3/8" - 3 1/8"	IN24338-313	3 3/8" - 3"	IN24338-300	HR-85
	16.570	3 1/2"	69,0	CC-24350	5,2	3 1/2" - 3 1/8"	IN24350-313	3 1/2" - 3"	IN24350-300	HR-90
	17.320	3 3/4"	72,0	CC-24375	5,4	3 3/4" - 3 1/2"	IN24375-350	3 3/4" - 3 3/8"	IN24375-338	HR-95
	18.050	3 7/8"	76,0	CC-24388 [4]	5,6	3 7/8" - 3 1/2"	IN24388-350	3 7/8" - 3 3/8"	IN24388-338 [4]	HR-100
	21.000	4 1/8"	80,0	CC-24413	5,7	4 1/8" - 3 7/8"	IN24413-388	4 1/8" - 3 3/4"	IN24413-375	HR-105
	24.210	4 1/4"	84,0	CC-24425	6,8	4 1/4" - 3 7/8"	IN24425-388	4 1/4" - 3 3/4"	IN24425-375	HR-110
		4 5/8"	90,0	CC-24463	7,3	4 5/8" - 4 1/4"	IN24463-425	4 5/8" - 4 1/8"	IN24463-413	HR-120
		5"	96,0	CC-24500	7,4	5" - 4 5/8"	IN24500-463	5" - 4 1/4"	IN24500-425	HR-130
	–	–		–	–	–	–	–	–	–
		–		–	–	–	–	–	–	–

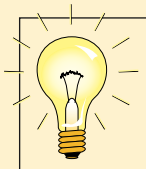
1) Determine maximum torque according to the bolt (nut) size and grade.
2) See the table of hexagon bolt and nut sizes and related thread diameters on page 216.
3) Additional imperial Reducer Insert is 3 1/8" - 2 9/16" **IN24313-256** fits **CC-24313** Cassette, use **HR-80** Holding Ring.
4) Additional imperial Reducer Insert is 3 3/4" - 2 9/16" **IN24375-313** fits **CC-24388** Cassette, use **HR-100** Holding Ring.

Optimum Torque Wrench & Pump Combinations

For optimum speed and performance Enerpac recommends the following system set-up with wrench-pump-hose combinations.

NOTE: For other combinations, consult your Enerpac bolting expert or your authorized Enerpac distributor.

Enerpac Torque Wrenches		Any brand of wrench matching the torque indicated below		ELECTRIC PUMPS				
				PMU-Series		PTE-Series		
								
				Page: 210		Page: 211		
700 bar Torque Wrenches	Model Nr.	Maximum Torque Nm	Ft.lbs	Flow at rated pressure: 0,34 l/min 115V, 1 ph	Flow at rated pressure: 0,34 l/min 230V, 1 ph	Flow at rated pressure: 0,9 l/min 230V, 1 ph	Flow at rated pressure: 0,7 l/min 230V, 3 ph	Flow at rated pressure: 0,9 l/min 400V, 3 ph
 192	S1500	1898	1400	PMU-10427-Q	PMU-10422-Q	–	–	–
	S3000	4339	3200					
	S6000	8144	6010	–	–	PTE-3404E-Q	PTE-3404T-Q	PTE-3404W-Q
	S11000	14.914	11.000					
	S25000	34.079	25.150					
 200	W2000	2712	2000	PMU-10427-Q	PMU-10422-Q	–	–	–
	W4000	5423	4000			PTE-3404E-Q	PTE-3404T-Q	PTE-3404W-Q
	W8000	10.846	8000	–	–			
	W15000	20.337	15.000					
800 bar Torque Wrenches	Model Nr.							
 196	SQD-25-I	2350	1735	PMU-10427	PMU-10422	–	–	–
	SQD-50-I	4800	3550					
	SQD-75-I	7560	5570	–	–	PTE-3404E	PTE-3404T	PTE-3404W
	SQD-100-I	10.000	7360					
	SQD-160-I	16.000	11.835					
	SQD-270-I	27.000	19.875			–	–	–
 204	HXD-30	3290	2425	PMU-10427	PMU-10422	–	–	–
	HXD-60	6190	4565			PTE-3404E	PTE-3404T	PTE-3404W
	HXD-120	12.500	9220	–	–			
	HXD-240	24.210	17.860					



Select the right torque

Choose your Enerpac torque wrench using the untightening rule of thumb:

- Be aware that when loosening a nut or bolt more torque is usually required than when tightening.
- Do not apply more than 75% of the maximum torque when loosening nuts or bolts.

Conditions of bolted joints

- For fully threaded UNC nuts and bolts do not exceed **1 1/2 times** nominal torque for a friction coefficient of 0,1.
- Humidity corrosion (rust) requires up to **2 times** the torque required for tightening.
- Sea water and chemical corrosion requires up to **2 1/2 times** the torque required for tightening.
- Heat corrosion requires up to **3 times** the torque required for tightening.

Torque Wrench, Pump & Hose Selection

ELECTRIC PUMPS		AIR DRIVEN PUMPS			TWIN HOSES	
ZU4T-Series		PTA-Series		PMA-Series	THQ-Series THC-Series	
						
Page: 212		Page: 216	Page: 216	Page: 217		
Flow at rated pressure: 0,9 - 1,0 l/min 115V, 1 ph	Flow at rated pressure: 0,9 - 1,0 l/min 230V, 1 ph	Flow at rated pressure: 0,33 l/min	Flow at rated pressure: 0,50 l/min	Flow at rated pressure: 1,8 l/min		700 bar Torque Wrench Model Nr.
–	–	PTA-1404-Q	–	–	THQ-706T (6m) THQ-712T (12m)	S1500
ZU4208TB-Q	ZU4208TE-Q	–	PTA-3408-Q	PMA-62480-Q		S3000 S6000 S11000 S25000
–	–	PTA-1404-Q	–	–	THQ-706T (6m) THQ-712T (12m)	W2000
ZU4208TB-Q	ZU4208TE-Q	–	PTA-3408-Q	PMA-62480-Q		W4000 W8000 W15000
						800 bar Torque Wrench
–	–	PTA-1404	–	–	THC-7062 (6m) THC-7122 (12m)	SQD-25-I
ZU4208TB-E	ZU4208TE-E	–	PTA-3408	PMA-62480		SQD-50-I SQD-75-I SQD-100-I SQD-160-I SQD-270-I
–	–	PTA-1404	–	–	THC-7062 (6m) THC-7122 (12m)	HXD-30
ZU4208TB-E	ZU4208TB-E	–	PTA-3408	PMA-62480		HXD-60 HXD-120 HXD-240

Torque Wrench Couplers

Refer to the System Components section for ordering couplers for torque wrenches.

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IMPORTANT!

Always make sure that the torque scale on the pump matches the torque wrench size for accurate torque settings.

Portable Electric Torque Wrench Pumps

ENERPAC
Hydraulic Technology Worldwide

▼ **PMU-10422**

PME, PMU Series

Reservoir Capacity:
3,0 litres

Flow at Rated Pressure:
0,34 l/min

Motor Size:
0,37 kW

Maximum Operating Pressure:
700 and 800 bar

- **Powerful two-speed pump is lightweight and easy to carry**
- **Standard heat exchanger package on PMU-Series keeps the oil cool under extreme use**
- **Glycerine filled gauge with scale reading in bar and psi**
- **Transparent overlays in Nm and Ft.lbs for Enerpac torque wrenches provide a quick torque reference**
- **Universal motor for a high power-to-weight ratio;**
- **Adjustable pressure relief valve for accurate torque adjustments and precise repeatability.**

▼ *The lightweight PMU-10422 makes work on remote locations easy.*

Oil Flow Rate (l/min)		Maximum Pressure Rating (bar)		Model Number	Model Number with Heat Exchanger [1]	Usable Oil Capacity	Motor Electrical Specifications	Motor Size	Outside Dimensions L x W x H	
1st stage	2nd stage	1st stage	2nd stage			(litres)	(Amps-Volts-Ph-Hz)	(kW)	(mm)	(kg)
3,3	0,34	50	**700**	**PME-10422-Q**	**PMU-10422-Q**	2,8	9-230-1-50/60	0,37	250x250x360	17
3,3	0,34	50	**700**	**PME-10427-Q**	**PMU-10427-Q**	2,8	9-115-1-50/60	0,37	432x280x381	17
3,3	0,34	50	**800**	**PME-10422**	**PMU-10422**	2,8	9-230-1-50/60	0,37	250x250x360	17
3,3	0,34	50	**800**	**PME-10427**	**PMU-10427**	2,8	9-115-1-50/60	0,37	432x280x381	17

[1] PMU pump with heat exchanger weights 24 kg.

Portable Electric Torque Wrench Pumps

▼ **PTE-3404W**

PTE Series

Reservoir Capacity:
3,8 litres

Flow at Rated Pressure:
0,7 - 0,9 l/min

Motor Size:
1,5 - 1,8 kW

Maximum Operating Pressure:
700 and 800 bar

- **Two stage pump with automatic integrated bypass for faster torque cycles**
- **Submerged motor for low noise and reduced heat build up**
- **Glycerine-filled pressure gauge with scale reading in bar/psi**
- **Transparent overlays in Nm and Ft.lbs, included for Enerpac torque wrenches produce accurate torque settings and precise repeatability**
- **Customer adjustable pressure relief valve**
- **Integrated motor disconnect switch and compact ergonomic design.**

Torque Wrench Pump Selection Matrix

For optimum speed and performance see the torque wrench, pump and hose matrix.

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Transparent Overlays

Transparent torque overlays in Nm and Ft.lbs for Enerpac torque wrenches are included with most Enerpac torque wrench pumps.

Oil Flow Rate (l/min) 1st stage	Oil Flow Rate (l/min) 2nd stage	Maximum Pressure Rating (bar) 1st stage	Maximum Pressure Rating (bar) 2nd stage	Model Number	Usable Oil Capacity (litres)	Motor Electrical Specifications (Amps-Volts-Ph-Hz)	Motor Size (kW)	Outside Dimensions L x W x H (mm)	(kg)
7,0	0,9	145	**700**	**PTE-3404W-Q**	1,1	5-400-3-50	1,5	622x202x443	29
5,4	0,9	145	**700**	**PTE-3404E-Q**	1,7	14-230-1-50	1,8	622x202x443	31
5,0 *	0,7 *	145	**700**	**PTE-3404T-Q**	1,7	7-230-3-50/60 *	1,8	622x202x443	31
7,0	0,9	145	**800**	**PTE-3404W**	1,1	5-400-3-50	1,5	622x202x443	29
5,4	0,9	145	**800**	**PTE-3404E**	1,7	14-230-1-50	1,8	622x202x443	31
5,0 *	0,7 *	145	**800**	**PTE-3404T**	1,7	7-230-3-50/60 *	1,8	622x202x443	31

Operating temperature: 5 - 65 Celsius.

* Flow rate shown at 50Hz. At 60 Hz the flow will be 6/5 higher.

▼ *The portable PTE-3404W pump used to power a SQD-Series aluminium torque wrench.*

▼ **ZU4204TE-EHK** (shown with optional heat exchanger and skidbar)

- **Can be used with any brand of 700 or 800 bar single- and double-acting hydraulic torque wrenches**
- **LCD provides self test, diagnostic and read-out capabilities**
- **Auto cycle feature provides continuous cycle operation as long as the advance button is pressed (pump can be used with or without auto cycle feature)**
- **Available with 4-wrench manifold for simultaneous operation of multiple torque wrenches**
- **Powerful 1,25 kW universal electric motor provides high power-to-weight ratio**
- **High-strength, moulded composite shroud protects motor and electronics, while providing an ergonomic, non-conductive handle for easy transport**

ZU4 CLASS

Tough, Dependable and Innovative

Back-lit LCD and Pressure Transducer

- Digital read-out and "Autocycle" setting
- Pump usage information, hour and cycle counts
- Low-voltage warning and recording
- Self-test and diagnostic capabilities
- Information can be displayed in English, French, German, Italian, Spanish and Portuguese
- Pressure transducer is more accurate and durable than analog gauges
- Easy-viewing variable rate display
- Display pressure in bar, MPa or psi.

▼ *Any brand of hydraulic torque wrench can be powered by the portable ZU4T-Series torque wrench pump.*

Hydraulic Torque Wrench Pumps

ZU4T-Series Pump Applications

The ZU4T-Series pump is best suited to power medium to large size torque wrenches or hydraulic tools, or wherever high speed, intermittent duty cycle is needed.

Patent-pending ***Z-Class*** technology provides high by-pass pressures for increased productivity. Its high power to weight ratio and compact design make it ideal for applications which require easy transport of the pump. It utilizes a universal motor which will work well on long extension cords or generator driven electrical power supplies.

For further application assistance contact your local Enerpac office.

ZU4T Series

Reservoir Capacity:
4 and 8 litres

Flow at Rated Pressure:
0,9 - 1,0 l/min

Motor Size:
1,25 kW

Maximum Operating Pressure:
700 and 800 bar

Torque Wrench Pump Selection Matrix

For optimum speed and performance see the torque wrench, pump and hose selection matrix.

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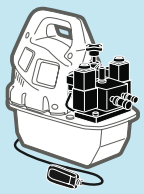
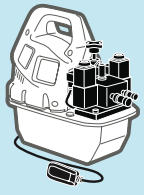
▼ SELECTION CHART

BASIC PUMP TYPES For technical information see options and specifications: *Page:* 214	**Pump Type**	**Maximum Operating Pressure** (bar)	**Motor Voltage (1,25 kW)**	**Usable Oil Capacity** (litres)	**Model Number** [1]	[2] (kg)
800 bar Pumps for Enerpac SQD and HXD-Series torque wrenches • Ideal for bolting applications that require remote pump and valve operation. • Motor on/off and valve control in pendant. Pressing up arrow advances wrench, releasing up arrow retracts wrench (auto cycle off). • Low-voltage control pendant with 6m cord for remote motor and valve operation.		**800**	115 V / 1ph	4,0	**ZU4204TB-E**	32
		800	115 V / 1ph	8,0	**ZU4208TB-E**	36
		800	230 V / 1ph	4,0	**ZU4204TE-E**	32
		800	230 V / 1ph	8,0	**ZU4208TE-E**	36
700 bar Pumps for all Enerpac S and W-Series and other brands of torque wrenches • Ideal for bolting applications that require remote pump and valve operation. • Motor on/off and valve control in pendant. Pressing up arrow advances wrench, releasing up arrow retracts wrench (auto cycle off). • Low-voltage control pendant with 6m cord for remote motor and valve operation.		**700**	115 V / 1ph	4,0	**ZU4204TB-Q**	32
		700	115 V / 1ph	8,0	**ZU4208TB-Q**	36
		700	230 V / 1ph	4,0	**ZU4204TE-Q**	32
		700	230 V / 1ph	8,0	**ZU4208TE-Q**	36

[1] All models meet CE safety requirements and all CSA requirements.
[2] Subtract 1 kg per litre oil for competitive weight comparison.

Skidbar

- **Provides greater pump stability on soft or uneven surfaces, and easy two-hand lift.**

Accessory Kit Nr. *	Can be used on ZU4T-Series torque wrench pumps
SBZ-4	4 and 8 litres reservoir

***** Add suffix **K** for factory installation. Skidbar weight 2,2 kg.

4-Wrench Manifold

- **For simultaneous operation of multiple torque wrenches**
- **Can be factory installed or ordered separately.**

Accessory Kit Nr. *	Can be used on ZU4T-Series torque wrench pumps
ZTM-UE	for 800 bar torque wrenches
ZTM-U4Q	for 700 bar torque wrenches

***** Add suffix **M** for factory installation.

Heat Exchanger [2)]

- **Removes heat from the bypass oil to provide cooler operation**
- **Stabilizes oil viscosity, increasing oil life and reduces wear of pump and other hydraulic components.**

[2)] Add suffix **H** for factory installation. Heat Exchanger adds 4,1 kg to pump weight.

Thermal Transfer *		Max. pressure	Max. oil flow	Voltage
Btu/h	kJoule	(bar)	(l/min)	(VDC)
900	950	20,7	26,5	12

* At 1,9 l/min at 21 °C ambient temperature.

Do not exceed maximum oil flow and pressure ratings. Heat exchanger is not suitable for water-glycol or high water based fluids.

◀ *Any hydraulic torque wrench can be powered by the Enerpac ZU4T-Series torque wrench pump.*

ZU4T-Series, Ordering Matrix & Pump Specifications

▼ This is how a ZU4T-Series pump model number is built up:

Z	U	4	2	08	T	E	-	Q	H	M
1 Product Type	2 Motor Type	3 Flow Group	4 Valve Type	5 Reservoir Size	6 Valve Operation	7 Voltage		8 Factory installed features and options		

1 Product Type
Z = Pump Class

2 Prime Mover
U = Universal electric motor

3 Flow Group
4 = 1,0 l/min @ 700 bar
0,9 l/min @ 800 bar

4 Valve Type
2 = Torque wrench valve

5 Reservoir Size
04 = 4 litres useable oil
08 = 8 litres useable oil

6 Valve Operation
T = Solenoid valve with pendant and LCD Electric.

7 Voltage
B = 115V, 1 phase, 50/60 Hz
E [2] = 208-240V, 1 phase, 50/60 Hz (with European plug EMC)
[2] E-voltage meet all CE requirements.

8 Factory installed features & options
E 800 bar coupler for use with HXD-, SQD-Series or other wrenches
Q 700 bar coupler for use with S- and W-Series or other wrenches
H Heat exchanger
K Skidbar
M 4-wrench manifold.

ZU4T Series

Reservoir Capacity:
4 and 8 litres

Flow at Rated Pressure:
0,9 - 1,0 l/min

Motor Size:
1,25 kW

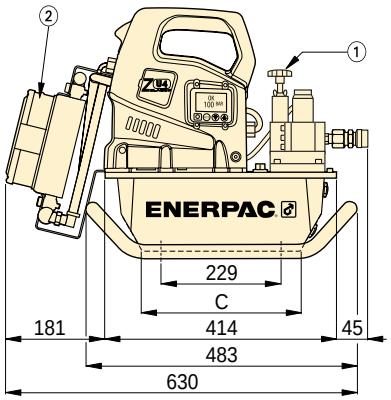
Maximum Operating Pressure:
700 and 800 bar

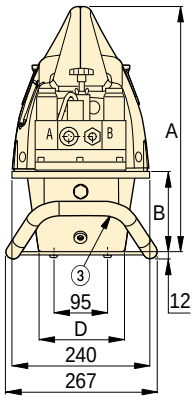
▼ PERFORMANCE CHART

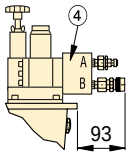
ZU4T-Series Hydraulic Torque Wrench Pumps

Motor Size (kW)	Output Flow Rate (l/min) 7 bar	50 bar	350 bar	700 bar	800 bar	Relief Valve Adjustment Range (bar)	Pump Suffix	Motor [1] Electrical Specification (Volts-ph-Hz)	Current Draw (A)
1,25	11,5	8,8	1,2	1,0	–	**70-700**	**Q**	115-1-50/60 230-1-50/60	21 11
1,25	11,5	8,8	1,2	1,0	0,9	**70-800**	**E**	115-1-50/60 230-1-50/60	24 11

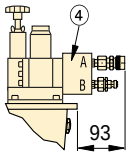
[1] Isolation- and protectionclassification IPX4 / NEMA 3R.
Sound Level 85-90 dBA.







700 bar 4-wrench manifold (**Q**)



800 bar 4-wrench manifold (**E**)

ZU4T-Series Torque Wrench Pumps

Reservoir Size (useable litres)	A	B	C	D
4,0	432	142	279	152
8,0	495	203	287	167

① User adjustable relief valve.
② Heat Exchanger.
③ Skidbar.
④ 4-wrench manifold.

How to order your ZU4T-Series torque wrench pump

Ordering Example 1
Model Nr. ZU4204TE-EHK
800 bar pump for use with Enerpac HXD and SQD-Series or other 800 bar torque wrenches, 230V motor, 4 litres reservoir, optional heat exchanger and skidbar.

Ordering Example 2
Model Nr. ZU4208TB-QMHK
700 bar pump for use with Enerpac S and W-Series and other 700 bar torque wrenches, 115V motor, 8 litres reservoir, 4 wrench manifold, heat exchanger and skidbar.

Refer to the torque wrench pump selection matrix for optimum wrench, pump and hose combinations.

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Air Driven Torque Wrench Pumps

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▼ **PTA-1404**

PTA
Series

Reservoir Capacity:
3,8 - 8,0 litres

Flow at Rated Pressure:
0,3 - 0,5 l/min

Air Consumption:
1130 - 1840 l/min

Maximum Operating Pressure:
700 and 800 bar

- **Two-stage pump with automatic bypass for faster torque cycles**
- **Remote pendant with safety button for one-man operation**
- **Adjustable pressure relief valve for accurate torque adjustment and precise repeatability**
- **Transparent overlays in Nm and Ft.lbs, included for Enerpac torque wrenches produce accurate torque settings and precise repeatability**
- **Glycerine filled pressure gauge with scale reading in bar/psi**
- **Regulator-Filter-Lubricator provides clean, lubricated air and allows for air pressure adjustment. Steel bowl guards are standard**
- **4,5 m air pendant enables easy manoeuvering at the job site**
- **With carrying handle for easy portability.**

▼ *Enerpac PTA-3408 Torque Wrench Pump and the aluminium HXD-120 torque wrench are used to perform maintenance on an injection moulding press.*

Oil Flow Rate (l/min)		**Maximum Pressure Rating** (bar)		**Model Number**	**Usable Oil Capacity**	**Air Consumption at 7 bar air @ 3000 RPM**	**Air Pressure Range**	**Motor Size**	**Outside Dimensions**	
1st stage	2nd stage	1st stage	2nd stage		(litres)	(l/min)	(bar)	(kW)	**L x W x H** (mm)	(kg)
3,30	0,33	120	**700**	**PTA-1404-Q**	2,0	1130	3,4 -7,0	1,1	496 x 310 x 449	24
9,83	0,50	70	**700**	**PTA-3408-Q**	7,2	1840	3,4 -7,0	3,0	897 x 318 x 589	57
3,30	0,33	120	**800**	**PTA-1404**	2,0	1130	3,4 -7,0	1,1	496 x 310 x 449	24
9,83	0,50	70	**800**	**PTA-3408**	7,2	1840	3,4 -7,0	3,0	897 x 318 x 589	57

High Flow Air Driven Torque Wrench Pump

▼ **PMA-62480**

PMA Series

Reservoir Capacity:
8 litres

Flow at Rated Pressure:
1,8 l/min

Air Consumption:
3900 l/min

Maximum Operating Pressure:
700 and 800 bar

- **High-output air driven two-stage pump**
- **For hazardous environments where explosion proof pumps are required**
- **Adjustable pressure relief valve for accurate torque adjustment and precise repeatability**
- **Internal safety relief valve prevents accidental over-pressurization**
- **Glycerine filled pressure gauge with scale reading in bar/psi**
- **Air operated valve with remote control pendant**
- **With carrying handles for easy portability**
- **Heavy duty heat exchanger available; contact Enerpac**

Torque Wrench Pump Selection Matrix

For optimum speed and performance see the torque wrench, pump and hose matrix.

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For hazardous environments where explosion proof pumps are required the air driven PMA-Series torque wrench pumps is the solution. ▶

Oil Flow Rate (l/min) 1st stage	Oil Flow Rate (l/min) 2nd stage	Maximum Pressure Rating (bar) 1st stage	Maximum Pressure Rating (bar) 2nd stage	Model Number	Usable Oil Capacity (litres)	Air Consumption at 8 bar air @ 3000 RPM (l/min)	Air Pressure Range (bar)	Motor Size (kW)	Outside Dimensions L x W x H (mm)	(kg)
11,0	1,8	145	**700**	**PMA-62480-Q**	7,5	3900	4 - 7	3,0	305x205x330	38
11,0	1,8	145	**800**	**PMA-62480**	7,5	3900	4 - 7	3,0	305x205x330	38

Hexagon Bolt and Nut Sizes

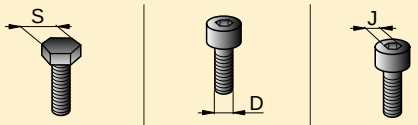
ENERPAC Hydraulic Technology Worldwide

Determine the maximum torque according to the bolt (nut) size and grade. Always consult the manufacturers instructions or engineering recommendations when making bolted connections.

IMPORTANT

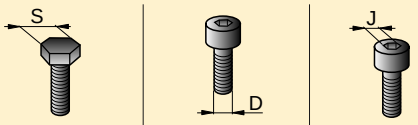
The hexagon sizes shown in the tables below should be used as a guide only. Individual sizes should be checked before specifying any equipment.

METRIC SIZES



Hexagon Size S (mm)	Thread Size D (mm)	Hexagon Size J (mm)
17	M 10	8
19	M 12	10
22	M 14	12
24	M 16	14
27	M 18	14
30	M 20	17
32	M 22	17
36	M 24	19
41	M 27	19
46	M 30	22
50	M 33	24
55	M 36	27
60	M 39	27 (30)
65	M 42	32
70	M 45	-
75	M 48	36
80	M 52	36
85	M 56	41
90	M 60	46
95	M 64	46
100	M 68	50
105	M 72	55
110	M 76	60
115	M 80	65
120	M 85	70
130	M 90	70 (75)
135	M 95	-
145	M 100	85
150	M 105	-
155	M 110	-
165	M 115	-
170	M 120	-
180	M 125	-
185	M 130	-
200	M 140	-
210	M 150	-

IMPERIAL SIZES



Hexagon Size S (inch)	Thread Size D (inch)	Hexagon Size J (inch)
$1^{1}/_{16}$”	$^{5}/_{8}$”	$^{1}/_{2}$”
$1^{1}/_{4}$”	$^{3}/_{4}$”	$^{5}/_{8}$”
$1^{7}/_{16}$”	$^{7}/_{8}$”	$^{3}/_{4}$”
$1^{5}/_{8}$”	1”	$^{3}/_{4}$”
$1^{13}/_{16}$”	$1^{1}/_{8}$”	$^{7}/_{8}$”
2”	$1^{1}/_{4}$”	$^{7}/_{8}$”
$2^{3}/_{16}$”	$1^{3}/_{8}$”	1”
$2^{3}/_{8}$”	$1^{1}/_{2}$”	1”
$2^{9}/_{16}$”	$1^{5}/_{8}$”	-
$2^{3}/_{4}$”	$1^{3}/_{4}$”	$1^{1}/_{4}$”
$2^{15}/_{16}$”	$1^{7}/_{8}$”	$1^{3}/_{8}$”
3”	2”	$1^{1}/_{2}$”
$3^{1}/_{8}$”	2”	$1^{5}/_{8}$”
$3^{3}/_{8}$”	$2^{1}/_{4}$”	$1^{3}/_{4}$”
$3^{1}/_{2}$”	$2^{1}/_{4}$”	$1^{3}/_{4}$”
$3^{3}/_{4}$”	$2^{1}/_{2}$”	$1^{3}/_{4}$”
$3^{7}/_{8}$”	$2^{1}/_{2}$”	$1^{7}/_{8}$”
$4^{1}/_{8}$”	$2^{3}/_{4}$”	2”
$4^{1}/_{4}$”	$2^{3}/_{4}$”	2”
$4^{5}/_{8}$”	3”	$2^{1}/_{4}$”
5”	$3^{1}/_{4}$”	$2^{1}/_{4}$”

Use only Heavy Duty Impact Sockets for power driven torquing equipment, according to ISO 2725 and ISO 1174; DIN 3129 and DIN 3121 or ASME-B107.2/1995.

Always make sure that the gauge template on the pump matches the torque wrench for accurate torque settings.

Torque Wrench Pump Selection Matrix

For optimum speed and performance see the torque wrench, pump and hose matrix.

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While every care has been taken in the preparation of this catalog and all data contained within is deemed accurate at the time of printing, Enerpac does reserve the right to make changes to the specifications of any product, or discontinue any product, contained within this catalog without prior notice.

All illustrations, performance specifications, weights and dimensions reflect the nominal values and slight variations may occur due to manufacturing tolerances. Please consult Enerpac if final dimensions are critical.
All information in this catalog can be changed due to product improvements without prior notice.

▼ Pre-cast segmental bridge building

To support the 80 tons main cast section of a segmental bridge, Enerpac CLL-506 (50 tons) jacks offer beside the required lifting force the positive locking feature called 'mechanical lock-nut'. On each pier of this elevated light train system 4 CLL-506 jacks support and align the cast sections. Once the hanging cast sections are aligned with the main cast sections, the jacks are mechanically locked to allow permanent fixation of this fly-over. Jobs like these are made significantly easier and faster using high pressure hydraulic jacks, instead of temporary supports or mechanical screw jacks.

Products:
• CLL-Series, lock-nut jacks

▼ Lowering bridge sections

For the lifting and final positioning of bridge sections in the Alps, Enerpac CLS-1006 (100 tons, 6 inch/150 mm stroke) jacks were used. The jacks were powered by several ZE4320MW electric pumps.

Products:
• CLS-Series, single-acting high tonnage jacks
• ZE-Series, electric pumps

▼ World-beating heavyweight lifting with pinpoint precision

An Enerpac synchronous hydraulic lifting system has been employed in Queensland (Australia) to lift, within tolerances of 0,5 mm, a huge mining dragline weighing more than 3500 tons.

The PLC-controlled precision hydraulic system with eighty 100-ton hydraulic cylinders was used to lift the dragline for essential maintenance of the bearing surfaces on which the dragline swivels. It also delicately tilted the huge suspended weight to simulate different loads on the structure so bearing surfaces could be precisely machined to accommodate them and maximise the bearing surfaces' lifespan.
Synchronous safety on huge walking dragline reveals efficiency and control benefits for many industries.

Products:
• RR-Series, double-acting jacks
• SLS-Series, Synchronous lifting systems
• Electric split-flow pumps
• PLC-Control units

▼ Millau Viaduct, France – The world's highest bridge

The world's highest bridge is launched and succesfully closed with Enerpac PLC-controlled bridge launching and lifting systems. Since the first hydraulic launch of the bridge's deck in February 2003, another 16 launches were needed to move the 36.000 ton deck over a distance of 2460 meters.

Pushing the deck out into space
The integrated hydraulic systems are designed and constructed in Spain by the Enerpac Construction Centre. It is matter of pushing on to seven concrete piers this deck 27,35 metres wide. During the launching it was supported by seven temporary piers, with telescopic systems designed by Enerpac. Each system comprises a cylinder to lift the deck and several skates with cylinders for launching it. The thrust capacity will be 5280 ton and 2400 ton depending on the side. Valves will ensure the independence of the units.

The nose of the deck
Through its weight, the deck bends and its level is then less than that of the next pier. On the deck an hydraulic nose recovery system makes it possible to compensate this difference.

Controlled Hydraulic Movement
All hydraulic systems for pushing the deck are operated from the PLC-Control Centre on the bridgehead. Hydraulic system integration, of high force hydraulics and advanced control technology, nowadays play and important role in the controlled movement of large-scale civil engineering projects, like the launching of the Millau Viaduct.

Integrated Hydraulic Systems:
- Lock nut jacks
- Double-acting jacks
- Hollow plunger jacks
- Synchronous lifting systems
- Electric split-flow pumps
- PLC-Control units

▼ Underpinning a fly-over

This fly-over needed partially to make way for an underground transit line. An Enerpac 12 point synchronized lifting system controlled the 12 CLL-5004 single-acting jacks in their displacement while positioning the section. The lock nut feature on the CLL Series jacks secures for long term underpinning.

Products:
- CLL-Series, lock nut jacks
- SLS-Series, Synchronous lifting system
- ZE-Series, electric pumps

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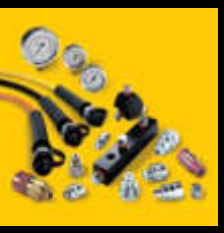

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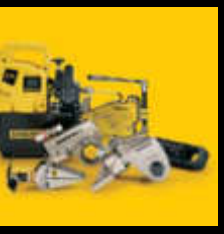

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