ENERPAC

Workholding Solutions

World Class Selection

ENERPAC WORKHOLDING

Swing Cylinders and Clamp Arms

Work holding Solutions

Swing Cylinders and Work Supports

Enerpac's complete line of clamping and support cylinders provides maximum force in the smallest possible package. Our variety of mounting and operation styles was designed with our customers' broad range of needs in mind.

The four different mounting styles of swing clamping cylinders turn 90° to ensure unobstructed unloading of parts. Enerpac offers clamping cylinders in a wide variety of styles, mounting options and shapes. They can be used not only for clamping, but for positioning, punching, pressing… just about any operation you can think of.

Support cylinders, which are typically placed underneath the part, not only support the workpiece but also absorb unwanted vibrations. Serving as a variable datum point on the fixture, allowing for part irregularities, these flexible cylinders are designed to accommodate great variety in fixture design.

In order to load the workpiece sideways over the work supports hydraulic advanced worksupports are being used in combination with swing cylinders.

Swing Cylinders and Clamp Arms

Force:	**1,3 - 37,8 kN**
Stroke:	**13,0 - 47,5 mm**
Pressure:	**35 - 350 bar**

Compact and full featured design

- Compact design allows for efficient fixture layout
- Variety of mounting styles to meet design needs
- Double and single-acting cylinders to suit a variety of hydraulic requirements
- All cylinders are available as left and right turning models
- Large ball and cam design on 11, 22, 52 and 121 models, allows swing rotation to be changed easily
- Kick-out mechanism on 92, 202, and 352 models prevents damage to cylinder from high flow rates or misapplication
- Enerpac Collet-Lok® positive locking cylinders are designed to maintain clamping force after hydraulic pressure is removed

Patented clamp arm design

- Innovative clamp arm design allows quick and precise clamp arm positioning while swing cylinder is mounted in fixture

T-arms

- T-arms are used to clamp two workpieces

Clamping force	Stroke mm		Upper flange	Lower flange	Threaded body	Cartridge Style	Standard arm[1]	Long arm[1]
kN	clamping	total						
▼ **Single-acting**			Model number [2]					
2,1	8,1	16,5	SURS-22	SLRS-22	STRS-22	SCRS-22	CAS-22	CAL-22
4,9	9,9	22,6	SURS-52	SLRS-52	STRS-52	SCRS-52	CAS-52	CAL-52
8,0	11,9	22,1	SURS-92	SLRS-92	STRS-92	–	CAS-92	CAL-92
10,7	12,7	28,4	SURS-121	SLRS-121	STRS-121	SCRS-122	CAS-121	CAL-122
17,4	14,0	27,9	SURS-202	SLRS-202	STRS-202	–	CAS-202	CAL-202
33,1	16,0	30,0	SURS-352	SLRS-352	STRS-352	–	CAS-352	CAL-352
▼ **Double-acting**			Model number [2]					
1,3	6,6	13,0	SURD-11	SLRD-11	STRD-11	–	CAS-11	CAL-11
2,2	8,1	16,5	SURD-22	SLRD-22	STRD-22	SCRD-22	CAS-22	CAL-22
5,6	9,9	22,6	SURD-52	SLRD-52	STRD-52	SCRD-52	CAS-52	CAL-52
9,0	11,9	22,1	SURD-92	SLRD-92	STRD-92	–	CAS-92	CAL-92
9,0	32,0	41,9	SURDL-92	–	–	–	CAS-92	CAL-92
11,6	12,7	28,4	SURD-121	SLRD-121	STRD-121	SCRD-122	CAS-121	CAL-122
11,6	31,8	47,5	SURDL-121	–	–	–	CAS-121	CAL-122
18,7	14,0	27,9	SURD-202	SLRD-202	STRD-202	–	CAS-202	CAL-202
33,8	16,0	30,0	SURD-352	SLRD-352	STRD-352	–	CAS-352	CAL-352
33,8	31,8	46,5	SURDL-352	–	–	–	CAS-352	CAL-352
▼ **Positive locking *Collet-Lok*®**			Model number [2]					
4,4	8,1	23,9	–	MPFR-50	–	–	MA-540	–
8,9	11,9	27,9	–	MPFR-100	MPTR-100	–	MA-1050	–
37,8	9,9	41,9	–	MPFR-300	MPTR-300	–	MA-3070	–

[1] Clamp arms are sold separately.
[2] For left turning swing cylinders replace the R in the model number for an L.
Note: Call Enerpac to order models with imperial thread and SAE port connections.

Work Supports

Force: 7,3 - 44,5 kN

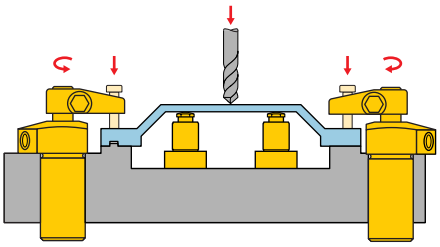
Stroke: 9,7 - 20,1 mm

Pressure: 50 - 350 bar

Wide range of sizes and styles to efficiently support workpieces

- Low pressure lock-up capability enables the use of machine tool hydraulic systems
- Threaded and manifold air vent ports allow fixturing that prevents coolants from being drawn into the system
- Collet-Lok® positive locking models: Hydraulic actuation / mechanical holding allows for palletized systems which do not permit live hydraulics

Maximum support force kN	Stroke mm	Manifold mount	Threaded body	Lower flange	Cartridge style
▼ Hydraulic advance			Model number		
7,3	9,7	WFM-72	WFT-72	–	WFC-72
11,1	9,7	–	–	WFL-112	WFC-112
22,2	10,4	–	–	WFL-222	WFC-222
33,4	13,5	–	–	WFL-332	–
44,5	16,5	–	–	WFL-442	–
▼ Spring advance			Model number		
7,3	9,7	WSM-72	WST-72	–	WSC-72
11,1	9,7	–	–	WSL-112	WSC-112
22,2	10,4	–	–	WSL-222	WSC-222
33,4	13,5	–	–	WSL-332	–
44,5	16,5	–	–	WSL-442	–
▼ Positive locking *Collet-Lok®*			Model number		
8,9	9,9	–	MPTS-100	MPFS-100	–
17,8	9,9	–	MPTS-200	MPFS-200	–
44,5	20,1	–	–	MPFS-450	–



Pull/Push Cylinders

Pull force: 2,6 - 43,5 kN

Push force: 5,3 - 81,9 kN

Stroke: 15,0 - 30,0 mm

Pressure: 35 - 350 bar

Compact and full featured design

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

Cylinder capacity kN Pull	Push	Stroke mm	Upper flange	Lower flange	Threaded Body
▼ Single-acting				Model number	
2,6	–	16,5	PUSS-22	PLSS-22	PTSS-22
5,6	–	22,6	PUSS-52	PLSS-52	PTSS-52
13,3	–	28,4	PUSS-121	PLSS-121	PTSS-121
▼ Double-acting				Model number	
2,7	5,3	16,5	PUSD-22	PLSD-22	PTSD-22
6,3	13,3	22,6	PUSD-52	PLSD-52	PTSD-52
11,2	28,0	22,1	PUSD-92	PLSD-92	PTSD-92
14,3	27,4	28,4	PUSD-121	PLSD-121	PTSD-121
43,5	81,9	30,0	PUSD-352	PLSD-352	PTSD-352
▼ Positive locking				Model number	
–	11,1	15,0	-	MPFC-110	MPTC-110
–	22,2	15,0	-	MPFC-210	MPTC-210
–	39,1	15,0	-	MPFC-410	MPTC-410

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

Linear Cylinders

Block Cylinders

Force: 10,9 - 274,8 kN

Stroke: 8 - 56 mm

Pressure: 40 - 350 bar

Versatile, all purpose cylinder

- Six clamping capabilities, enable you to choose the right size for your application
- Variety of strokes to meet design needs
- Two oil connection possibilities:
  – with BSPP threaded oil ports (BS, BD models)
  – manifold O-ring ports (BMS, BMD models)

Clamping force at 350 bar kN push	pull	Stroke mm	Model number Manifold O-ring oil port
▼ **Single-acting**			
10,9	–	8	**BMS-1082**
10,9	–	18	**BMS-10182**
17,0	–	10	**BMS-18102**
17,0	–	25	**BMS-18252**
43,6	–	12	**BMS-40122**
43,6	–	25	**BMS-40252**
68,2	–	12	**BMS-70122**
68,2	–	25	**BMS-70252**
174,9	–	20	**BMS-180202**
273,4	–	25	**BMS-280252**
▼ **Double-acting**			
11,0	7,0	16	**BMD-10162**
11,0	7,0	36	**BMD-10362**
17,2	10,1	20	**BMD-18202**
17,2	10,1	50	**BMD-18502**
44,0	26,8	25	**BMD-40252**
44,0	26,8	50	**BMD-40502**
68,7	40,6	25	**BMD-70252**
68,7	40,6	50	**BMD-70502**
175,8	107,2	25	**BMD-180252**
175,8	107,2	50	**BMD-180502**
274,8	165,7	28	**BMD-280282**
274,8	165,7	56	**BMD-280562**

Threaded Cylinders

Force: 1,7 - 39,2 kN

Stroke: 7,1 - 50,0 mm

Pressure: 10 - 350 bar

Extremely compact positioning and fixturing

- Minimum cylinder diameter combined with maximized clamping forces
- Stainless steel bodies and internal plunger wipers allow maintenance-free, high cycle performance
- Threaded body allows fine positioning and easy installation

Cylinder capacity (at 350 bar) kN push	pull	Stroke mm	Model number	Mounting thread D ø
▼ **Single-acting**				
1,7	–	7,1	**TS-272ST**	M12X1,5
1,7	–	13,0	**TS-2132ST**	M12X1,5
5,3	–	7,1	**TS-572ST**	M20X1,5
5,3	–	13,0	**TS-5132ST**	M20X1,5
5,3	–	19,1	**TS-5192ST**	M20X1,5
5,3	–	38,1	**TS-5382ST**	M20X1,5
11,3	–	7,1	**TS-1072ST**	M28X1,5
11,3	–	13,0	**TS-10132ST**	M28X1,5
11,3	–	19,1	**TS-10192ST**	M28X1,5
11,3	–	38,1	**TS-10382ST**	M28X1,5
17,2	–	13,0	**TS-18132ST**	M35X1,5
17,2	–	24,9	**TS-18252ST**	M35X1,5
26,9	–	13,0	**TS-25131ST**	M42X1,5
26,9	–	24,9	**TS-25252ST**	M42X1,5
39,1	–	13,0	**TS-40132ST**	M48X1,5
39,1	–	24,9	**TS-40252ST**	M48X1,5
39,1	–	50,0	**TS-40502ST**	M48X1,5
▼ **Double-acting**				
17,2	10,4	13,0	**TD-18132ST**	M48X1,5
17,2	10,4	24,9	**TD-18252ST**	M48X1,5
26,9	18,1	13,0	**TD-25132ST**	M55X1,5
26,9	18,1	24,9	**TD-25252ST**	M55X1,5
39,1	26,1	13,0	**TD-40132ST**	M65X1,5
39,1	26,1	24,9	**TD-40252ST**	M65X1,5
39,1	26,1	50,0	**TD-40502ST**	M65X1,5

Note: Seal material: Buna-N, Polyurethane. Minimum operating pressure for single-acting models (to overcome return spring force) is 40 bar.

Manifold Cylinders

Force: 1,7 - 27,1 kN

Stroke: 7,1 - 24,9 mm

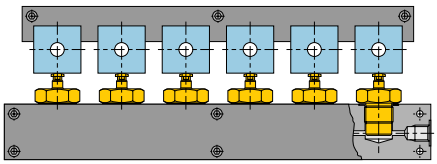
Pressure: 40 - 350 bar

Compact fixture-integrated positioning and holding

- Fixture-integrated design eliminates the need for fittings and tubing, minimizing space requirements and facilitating easy removal of chips and dirt
- Minimal cylinder height relative to the plunger stroke enables extremely compact fixture designs
- Single-acting spring return

Cylinder capacity (at 350 bar) kN	Stroke mm	Model number	Mounting thread D ø
1,7	7,1	**MS-272ST**	M12X1,5
1,7	13,0	**MS-2132ST**	M12X1,5
5,3	7,1	**MS-572ST**	M20X1,5
5,3	13,0	**MS-5132ST**	M20X1,5
11,5	7,1	**MS-1072ST**	M28X1,5
11,5	13,0	**MS-10132ST**	M28X1,5
11,5	19,1	**MS-10192ST**	M28X1,5
17,3	13,0	**MS-18132ST**	M36X1,5
17,3	24,9	**MS-18252ST**	M36X1,5
27,1	13,0	**MS-25132ST**	M42X1,5
27,1	24,9	**MS-25252ST**	M42X1,5

Note: Seal material: Buna-N, Polyurethane.



Positive Clamping Cylinders

Force: 8,5 - 37,8 kN

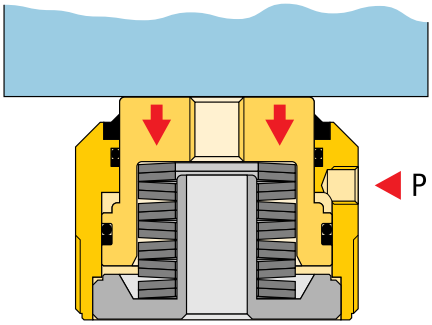
Stroke: 2,3 - 5,6 mm

Pressure: 140 - 350 bar

Ideal for palletized applications

- Heavy disk springs maintain the clamping force – hydraulic pressure is used for release
- Single-acting design allows easy setup of hydraulic system
- Hollow plunger design allows easy retrofit for mechanical clamping

Cylinder capacity at 350 bar kN	Effective clamping stroke mm	Model number
12,0	2,3	MRS-1
26,7	2,3	MRS-2
51,2	2,3	MRS-5
8,5	2,5	MRS-1001
16,5	2,5	MRS-2001
25,8	2,5	MRS-3001
37,8	3,0	MRS-5001



Pull Down Clamp

Force: 3,9 - 17,4 kN

Stroke: 5,1 - 7,9 mm

Pressure: 15 - 350 bar

Low profile clamp

...for unobstructed top face machining

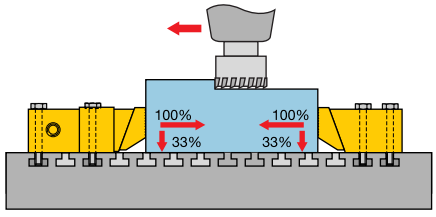
- Independent horizontal and vertical movement for a true pull down effect
- Manifold and BSPP porting
- Oil ports on both sides for mounting flexibility

▼ Hydraulic pull down clamps

Lateral clamping force (at 350 bar) kN	Pull down force (at 350 bar) kN	Stroke mm	Model number
3,9	1,3	5,1	ECH-52
17,3	5,8	7,9	ECH-202

▼ Mechanical counter holds

Holding force kN	For pull down clamp Model number	Model number
3,9	ECH-52	ECM-5
17,3	ECH-202	ECM-20



Hollow Plunger Cylinders

Force: 11,6 - 160 kN

Stroke: 6 - 64 mm

Pressure: 55 - 350 bar

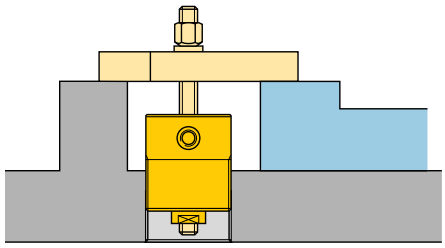
For high force push & pull applications on and around the fixture

- Load can be attached to either end of the cylinder, providing a choice of push or pull actions – both realizing full cylinder capacity
- Spring return operation allows for easy unloading of the workpiece

Cylinder capacity [1] kN	Stroke mm	Center hole diameter mm	Model number	Operating pressure bar
17,8	8	13	MRH-20	200
21,5	10	11	HCS-20	350
56,3	12	13	HCS-50	350
61,3	8	20	MRH-120	350
61,3	25	20	RWH-121	350
80,8	14	17	HCS-80	350
104,4	13	27	RWH-200	350
104,4	51	27	RWH-202	350
113,3	16	21	HCS-110	350
160	13	33	RWH-300	350
160	25	33	RWH-301	350
160	64	33	RWH-302	350

[1] At maximum operating pressure.

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



Work holding Solutions

Power sources

Whether you need to run your parts once a day or 24 hours a day, Enerpac has the power source to help you get the job done. Power sources range from simple manual pumps to air operated, to fully customizable electric motor driven units.

With a wide variety of accessories to choose from, Enerpac power units are easily the most versatile and reliable in the industry.

Hydraulic Boosters

Enerpac Air hydraulic boosters are a cost effective alternative in cases the required hydraulic pressure is not on hand; by means of compressed air the required hydraulic pressure can be generated.

Pressure Intensifiers

When hydraulic pressure from an existing power source is limited, Enerpac oil-to-oil intensifiers serve to increase output pressure to satisfy the required application.

In an automated clamping set-up with both hydraulic and pneumatic components, AHB series boosters are used as a power source for the hydraulic system.

Turbo II Air-Hydraulic Pumps

Quick and powerful hydraulic supply in an economical air-powered unit

- On-demand stall-restart operation maintains system pressure, providing clamping security
- Five valve mounting options provide flexibility in setup and operation
- Easy adjustable pressure relief valve (behind sight glass)

Oil Flow:	**2,0-3,0 l/min**
Pressure:	**85 - 350 bar**
Air:	**340 l/min**

For cylinder [1]	3000 series Modelnumber Oil Flow 3,0 l/min [2]	5000 series Modelnumber Oil Flow 2,0 l/min [2]	Usable oil capacity liter	Air pressure range bar	Maximum hydraulic pressure bar
SA	PATG-3102PB	PATG-5102PB	2,1	1,7 - 8,6	350
SA	PACG-3002PB	PACG-5002PB	2,1	1,7 - 8,6	350
SA/DA	PASG-3002PB	PASG-5002PB	2,1	1,7 - 8,6	350
SA/DA	PAMG-3402PB	PAMG-5402PB	2,1	1,7 - 8,6	350
SA/DA	PARG-3105PB	PARG-5105PB	3,7	1,7 - 8,6	350

[1] SA = Single Acting, DA = Double Acting

[2] At 0 bar hydraulic and 7 bar air pressure.

Air Hydraulic Boosters

One shot air/hydraulic booster ...for high production applications

- High speed operation
- Extended service life
- Constant hydraulic output

Ratio:	**1:16 - 1:64**
Pressure:	**110 - 350 bar**
Oil flow:	**60 - 295 cm^3/stroke**
Air:	**27 - 64,1 cm^3/cycle**

Oil pressure bar at 5 bar air pressure	Oil pressure bar at 7 bar air pressure	Oil volume per stroke cm^3	Air to oil pressure ratio	Model number
▼ **AHB series, double-acting**				
80	112	295	1:16	**AHB-17**
170	238	139	1:34	**AHB-34**
230	322	100	1:46	**AHB-46**
320	–	74	1:64	**AHB-66**
▼ **B series, one shot, spring return**				
150	200	102	1:30	**B-3006**
250	350	61	1:50	**B-5003**

Note: Seal material Buna-N, Polyurethane.

Oil/Oil Intensifiers

High flow units intensify low inlet oil pressure to high outlet pressure

- Wide range of intensification ratios allows for adapting to various operating pressure requirements
- Compact and self-contained design allows for easy installation
- PID series includes dump valve, eliminating the need for an external pilot check valve

Ratio: 1:3,2 - 1:6,6

Flow: 1,2 - 2,5 l/min

Pressure: 65 - 700 bar

Maximum output pressure bar	Pressure ratio	Inlet pressure range bar min	max	Maximum output flow l/min	Model number
700	1 : 3,2	21	218	2,5	**PID-322**
700	1 : 4,0	21	175	2,0	**PID-402**
700	1 : 5,0	21	140	1,6	**PID-502**
700	1 : 6,6	21	106	1,3	**PID-662**

PID-Series intensifier utilizes low pressure machine hydraulics to power clamping cylinders.

Electric Submerged Pumps

Best performance for mid-range cylinders

- Two speed pump unit provides rapid cylinder advance
- Submerged motor - runs cooler and quieter
- Dual voltage induction motor 115/230V - 1 ph - 0,37 kW
- Externally adjustable pressure relief valve
- Auxiliary return port - no need for separate adaptor

Oil Flow: 0,55 l/min

Pressure: 350 bar

Reservoir: 5,7 liter

Max Oil flow bar 1st	2st	Pressure rating 1st	2st	For Cyl [1]	Valve type	Model number [2] 230V	Usable oil capacity (l)
▼ **With dump valve**							
2,05	0,55	70	350	SA	2/2	**WED-1001E**	5,7
▼ **With manual valve**							
2,05	0,55	70	350	SA	3/2	**WEM-1201E**	5,7
2,05	0,55	70	350	SA	3/3	**WEM-1301E**	5,7
2,05	0,55	70	350	DA	4/3	**WEM-1401E**	5,7
▼ **With remote solenoid valve operation**							
2,05	0,55	70	350	SA	3/3	**WER-1301E**	5,7
2,05	0,55	70	350	DA	4/3	**WER-1401E**	5,7

[1] SA = Single Acting DA = Double Acting.

[2] For 115V motor replace E with B suffix. Example: WED-1401B.

Work holding Solutions

WP Series Workholding Pumps

Enerpac's workholding pump unit features an innovative range of zero leakage, poppet design, directional valves. With the modular valve design, one or two independent single-acting or double-acting circuits can be realised.

Isolating valves

For some particular applications, i.e. when a workpiece has to be positioned and clamped with different forces, it is recommended to have different operating pressures in independent circuits. A pressure switch in the hydraulic line to the cylinder actuaties a valve with a closed centre position and isolates the circuit when the pre-set pressure has been reached. In case of pressure drop, the switch opens the valve to compensate. In SA circuits, the solating valve is a 3/3-valve with closed centre. In DA circuits, the isolating valve is the standard 4/3 valve. The pressure switch is, via the central control box, connected to the valve. The isolating valve is ready for opereation.

System Components

From the simplest to the most complex system, Enerpac's system components help you to complete your design. Gauges, pressure switches, hoses and couplers are simple but neccessary items for any hydraulic system. And more specialized components as accumulators and auto-coupler systems ensure that whatever you need, Enerpac can help.

Electric Pumps with Remote Valve Control

Oil Flow: 1,7 l/min

Pressure: 100 - 350 bar

Reservoir: 8 litres

- Zero leakage poppet valves
- Circuit isolating valves for all A-ports
- 230/400V - 1,1 kW motor

Oil Flow rate l/min	Pressure Range bar	Voltage V	Model number	Usable oil capacity (l)
▼ For 1x SA circuit + isolating valve for all A-ports				
1,7	100 - 350	230	WP-212313	7,5
1,7	100 - 350	400	WP-222313	7,5
▼ For 2x SA circuit + isolating valve for all A-ports				
1,7	100 - 350	230	WP-212323	7,5
1,7	100 - 350	400	WP-222323	7,5
▼ For 1x DA circuit + isolating valve for all A-ports				
1,7	100 - 350	230	WP-212333	7,5
1,7	100 - 350	400	WP-222333	7,5
▼ For 2x DA circuit + isolating valve for all A-ports				
1,7	100 - 350	230	WP-212343	7,5
1,7	100 - 350	400	WP-222343	7,5

Pressure Gauges

Pressure: 0 - 700 bar

Accuracy: +/- 1,5% of full scale

Gauge Face: ø 63 mm

Reliable accurate pressure sensing

- All pressure sensing parts seal and dampened by glycerine
- With safety blow-out disk and pressure equalizing membrane to prevent overpressurization

Pressure Range bar	Pressure Range psi	Thread NPT	Model number
▼ Lower mount			
0-70	0-1000	1/4"	G-2514L
0-400	0-6000	1/4"	G-2517L
0-700	0-10000	1/4"	G-2535L
▼ Rear mount			
0-70	0-1000	1/4"	G-2531R
0-400	0-6000	1/4"	G-2534R
0-700	0-10000	1/4"	G-2535R

Hoses, Couplers

Pressure: 700 bar

Thread: 3/8" NPT

- Thermoplastic 4:1 safety hoses
- Flush-face zero leakage couplers
- Max. oil flow 40 l/min

▼ 700 bar hoses

Thread ends NPT	Hose length m	Model number
3/8"	0,6	H-7202
3/8"	0,9	H-7203
3/8"	1,8	H-7206
3/8"	3,0	H-7210

▼ 700 bar couplers

Thread ends NPT	Model number Female half	Model number Male half
3/8"	FR-400	FH-400

Use fitting FZ-1055 to mount FR-400 in 1/4" NPT oil ports.

Use fitting FZ-1614 to connect FH-400 to H-700 serie hose

Accumulators

Pressure: 0 - 350 bar
Oil volume: 1,6 - 491,6 cm³
Gas volume: 20,0 - 491,6 cm³

Accumulators
...maintain circuit pressure

- Ideal for high frequency and rapid discharge applications
- High energy storage capacity in a compact package

Accumulator coupler packages
...compact design for easy use of accumulators

- Single design accomodates both single-acting or double-acting circuit
- Relief valve fitted and ball check shut-off
- Glycerin-filled gauge included

Operating pressure bar	Model number	Max. rated oil volume cm³
▼ Pre-charged accumulators		
0-120	ACM-1	1,6
100-350	ACL-22	14,7
100-350	ACL-202	126,2
100-350	ACL-502	337,6
▼ Pre-charged accumulator coupler packages		
100-350	ACBS-22	16,4
100-350	ACBS-202	163,9
▼ Accumulators		
0-350	WA-502	41
0-350	WA-505	90,1
0-350	WA-5010	163,9
0-350	WA-5030	491,6

Auto-coupler Systems

Connection: 2 - 4 ports
Stroke: 5 - 114 mm
Pressure: 40 - 350 bar

For automated coupling of hydraulic circuits on palletized systems

- Sensing feedback of coupler position allows for fully automated applications
- Adjustment stroke allows clearance for pallet indexing
- Coupler elements supplied with air blow-off nozzles to prevent damage from contamination

Station position	Model number	Adjustable stroke mm
▼ 2 port auto-coupler		
Base	MCA-62	5-15
Base	WCA-82	104-114
Pallet	MPA-62	–
▼ 4 port auto-coupler		
Base	MCA-64	5-15
Pallet	MPA-64	–

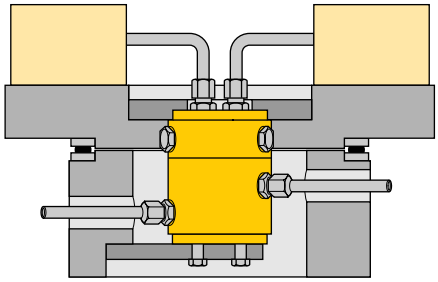
Rotary Couplers

Passages: 1 - 4 lines
Speed: 30 - 100 RPM max
Pressure: 100 - 350 bar

Permanent hydraulic connection on indexing and rotating work stations

- High rotation per minute
- Low starting torque
- Internal oil bearings for increased lifetime
- Rotary couplers are specially designed unions to transfer pressurized fluid from a stationary supply line to a rotating device

Number of radial passages	Model number	Operating pressure range bar
1	CR-112	35-350
2	CRV-222	35-350
4	CRV-442	35-350



Modular Solenoid Valves and Accessories

Work-holding Solutions

Valves

Controlling the operation of your clamping system requires the use of many specialized directional, pressure and flow control valves. Enerpac has the complete line of valving components to complement any hydraulic system. Choose from either manual or electric directional valves, and a wide variety of pressure control, flow control and specialty valves to provide the control and automation that your application needs.

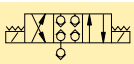
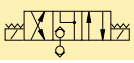
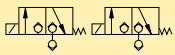
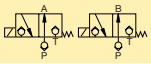
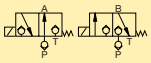
Modular Directional Valves

Pressure: 17-350 bar

Voltage: 24VDC @ 1,13A

Modular directonal valves

- Dual poppet valve design for zero leakage
- Inlet check-valve standard
- Stackable to 8 valve stations high
- Max. oil flow: 15 l/min @ 0 bar; 7 l/min @ 350 bar
- G 1/4" oil connections

Flow path	For cylinder	Model number
▼ 4/3 Closed centre		
	1x DA 2x SA	VP-11
▼ 4/3 Float centre		
	1x DA 2x SA	VP-21
▼ 3/2 normally closed		
	1x DA 2x SA	VP-31
▼ 3/2 normally open		
	1x DA 2x SA	VP-41
▼ 3/2 1x normally open, 1x normally closed		
	1x DA 2x SA	VP-51

▼ Tie Rod Kits

Amount of stackable VP-valves/ accessoiries	Model number	Tie rod length mm
1x	TRK-1	85
2x	TRK-2	125
3x	TRK-3	165
4x	TRK-4	205
5x	TRK-5	245
6x	TRK-6	285
7x	TRK-7	325
8x	TRK-8	365

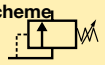
VP-valve accessories

Mounting: 1-8 VP valves

Pressure: 350 bar max

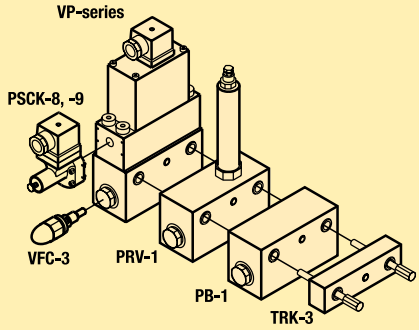
Flow: 15 l/min max

- TRK-tie rod connect 1-8 VP valves, providing leak-free sealing
- WM-10 remote manifold allows remote VP-valve mounting
- PB-1 porting manifold provide 3 auxiliary pressure lines
- PRV-1 pressure reducing valve (30-350 bar) stackable for multiple pressure on one valve stack assembly
- PSCK Pressure switches and VFC-3 flow control valve, cartridge type for in-line installation or directly plugged into VP-valves

Scheme	Model number	Specifications
	WM-10	2 x G1/4"
▼ Remote manifold with pressure relief		
	PRV-1	3 x G1/4" 30-350 bar
▼ Pressure reducing valve		
	VFC-3	0-350 bar
▼ Flow controle valve		
	PSCK-8 PSCK-9	100-350 bar 20-210 bar
▼ Pressure switches 24 VDC @ 2A		
	PB-1	3 x G1/4"

VP-valves and Accessories

VP-valve in combination with all its options as shown in the drawing and the photo below.



TRK-Serie Tie Rods mount VP-series modular valves and accessories to the manifold, providing leakfree sealing.

Sequence, Flow Control and Check Valves

Sequence Valves

Pressure: 350 bar max.

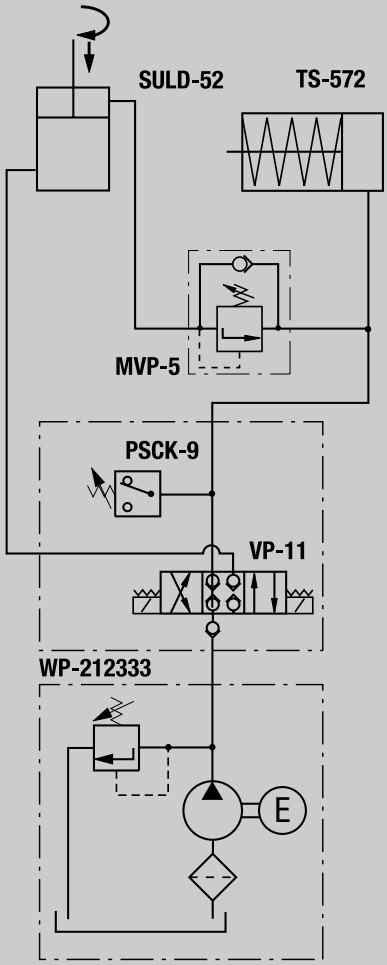
Flow: 6,0 l/min max.

Pressure dependent sequence control

- Sequence valves block the oil to a secondary hydraulic circuit until pressure in the primary circuit reaches a preset level
- Mounting holes on MVP-5
- Manifold mounting ports on MVPM-5
- Oil ports G 1/4"

Pressure adjustment range bar	Model number	Maximum pressure bar
35-350	**MVPM-5**	350
35-350	**MVP-5**	350

Seal material: Buna-N.
Manifold O-rings included with MVPM-5. For manifold mounting installation information consult Enerpac for surface preparation.



Typical clamping system with the MVP-5 sequence valve controling the oil flow to a secondary circuit.

Flow Control Valves

Max. Flow: 38 l/min

Pressure: 350 bar

Regulate the flow of oil

- Color coded flow indicator
- Free flow return
- Max. pressure drop 105 bar
- Fine metering capability
- Lockable
- Standard Viton seals

Pressure range bar	Oil ports	Model number	Flow path
▼ **Flow control valve**			
0-350	G 1/4"	**VFC-2**	

Pilot Operated Check Valves

Pilot ratio: 7:1

Flow: 38 l/min max.

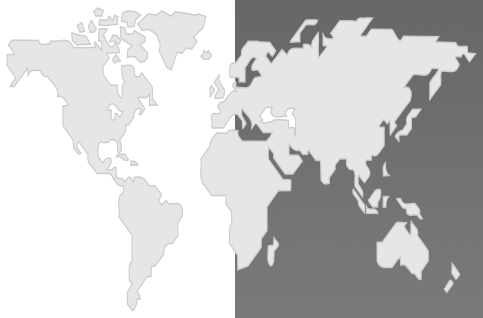
To hold cylinder load and ensure remote unlocking

- Fast check-off response
- Hardened seats ensure long life and positive pressure holding
- Built-in accumulator to maintain system pressure
- Mounting holes MV-72
- Manifold mount body MVM-72

Accumulator included	Model number	Maximum pressure bar
–	**MV-72**	350
ACL-22	**MV-722A**	350
ACL-202	**MV-7202A**	350
–	**MVM-72**	350

Flow control valve regulates the clamping speed.

Workholding Solutions



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- Upper flange swing cylinders
- Lower flange swing cylinders
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- Cartridge model swing cylinders
- Positive locking swing cylinders (*Collet-Lok*®)
- Clamp arms for swing cylinders
- Special swing cylinders
- Hydraulic advance work supports
- Spring advance work supports
- Positive locking work supports (*Collet-Lok*®)

Pull and Linear Cylinders
- Pull cylinders
- Threaded cylinders
- Manifold cylinders
- Block cylinders
- Pull down clamps
- Hollow plunger cylinders
- Positive clamping cylinders
- Universal cylinders

Power Sources
- Air hydraulic pumps
- Electric driven pumps
- Hand pumps
- Boosters
- Pressure intensifiers

Valves
- Directional control valves
- Flow control valves
- Pressure control valves
- Sequence valves
- Manifolds
- Accessory and Air valves

System Components
- Auto-coupler systems
- Rotary couplers
- Accumulators
- Pressure switches
- Gauges and accessories
- Hoses, Couplers, Manifolds
- Pressure Filters, Oil
- Fittings

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