

# Valves

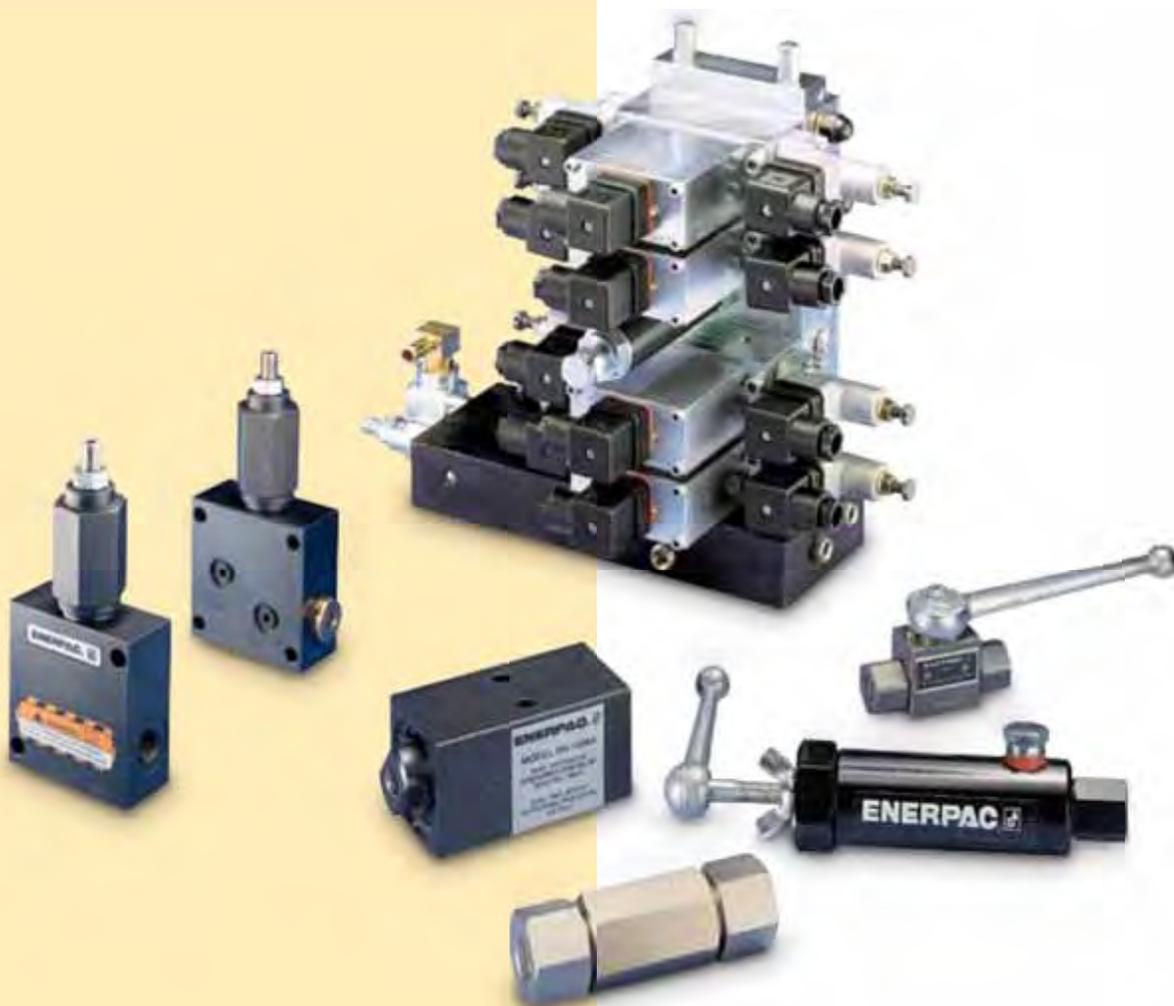
## Technical support

Refer to the “Yellow Pages” of this catalog for:

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

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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.



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Shown: VP-12



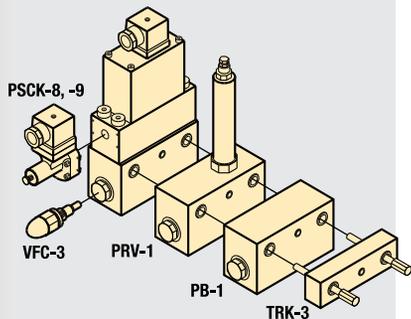
## VP-series

Solenoid directional valves control the direction of the oil flow to each cylinder port.

### Application

With the use of a -12 manifold, these valves allow quick and easy assembly of hydraulic control valves on your Enerpac ZW-series pump. For remote mounting of these valves use a WM-10 manifold.

### VP-series



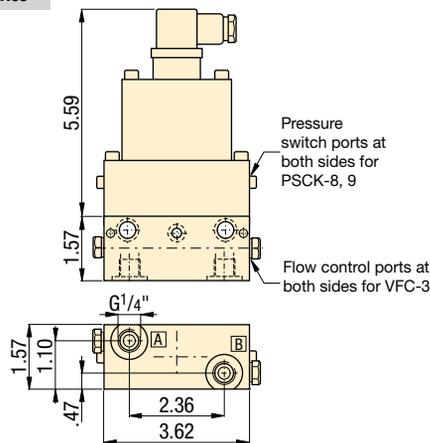
■ Enerpac VP-series valves mounted on -12 manifold, mounted on a ZW-series workholding pump.



## Solenoid directional valves

- Dual poppet valve design for zero internal leakage
- Inlet check-valve standard
- High cycle switching
- Stackable to 8 valve stations high
- 250-5000 psi operational pressure
- Oil flow capacity 427 in<sup>3</sup>/min @ 5000 psi
- Oil flow capacity 915 in<sup>3</sup>/min @ 0 psi
- G1/4" oil connections and integrated filtration
- 24 VDC and 110 VAC available

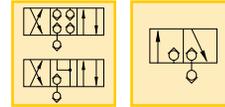
### VP series



Pressure: 5000 psi

Max. Flow: 915 in<sup>3</sup>/min

- Ⓔ Válvulas de control
- Ⓕ Electro distributeurs
- Ⓖ Wegesitzventile



## Options

### WM-10 series manifolds

▣ 139 ▶

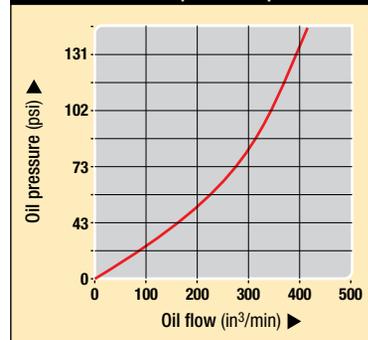


### Tie rod kits

▣ 139 ▶



### Oil flow vs pressure drop



## Product selection

Voltage @ current	Model number	Flow path	Used with cylinder(s)
at 50/60 Hz			
<b>▼ 4/3 Closed center</b>			
24 VDC @ 1.13 A	<b>VP-11</b>		1x Dbl-act.
110 VAC @ 500 mA	<b>VP-12</b>		1x Dbl-act.
<b>▼ 4/3 Float center</b>			
24 VDC @ 1.13 A	<b>VP-21</b>		1x Dbl-act.
110 VAC @ 500 mA	<b>VP-22</b>		1x Dbl-act.
<b>▼ 3/2 Normally closed</b>			
24 VDC @ 1.13 A	<b>VP-31</b>		1x Dbl-act. / 2x Sgl-act.
110 VAC @ 500 mA	<b>VP-32</b>		1x Dbl-act. / 2x Sgl-act.
<b>▼ 3/2 Normally open</b>			
24 VDC @ 1.13 A	<b>VP-41</b>		1x Dbl-act. / 2x Sgl-act.
110 VAC @ 500 mA	<b>VP-42</b>		1x Dbl-act. / 2x Sgl-act.
<b>▼ 3/2 1 port normally closed, 1 port normally open</b>			
24 VDC @ 1.13 A	<b>VP-51</b>		1x Dbl-act. / 2x Sgl-act.
110 VAC @ 500 mA	<b>VP-52</b>		1x Dbl-act. / 2x Sgl-act.

Note: DIN 43650 electrical connector included. Valve weight 6.5 lbs (3,0 kg.).

# PSCK, VFC-series Pressure switches, Flow control valve

Pressure: 5000 psi

Flow: 427 in<sup>3</sup>/min @ 5000 psi

Voltage: 115 VAC, 24 VDC

- E** Presostatos
- F** Pressostats
- D** Druckschalter



## To control your hydraulic system

- Mounts directly into VP-series modular valves
- In-line installation
- Cartridge type flow control valve and pressure switches can be manifold mounted for remote use
- Lockable adjustment screw on PSCK models

Shown: PSCK-8, VFC-3



## Options

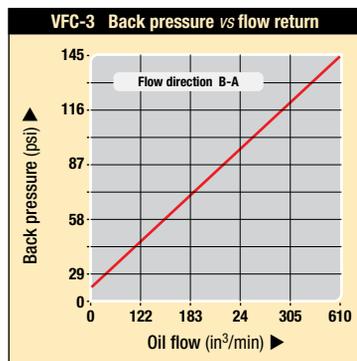
**PB-1 Auxiliary block**

139 ▶



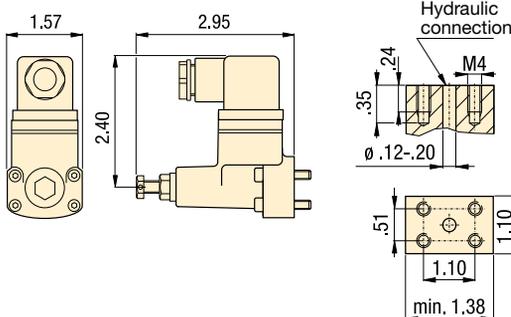
**Pressure reducing valves**

138 ▶



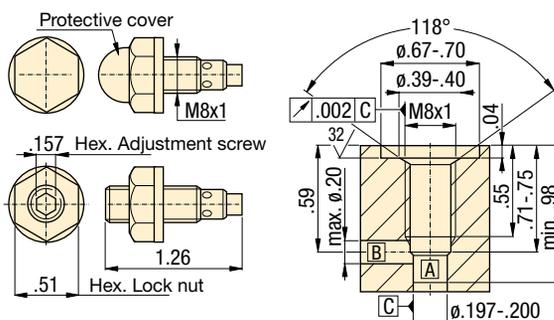
PSCK-8, 9

PSCK-8, 9 mounting dimensions



VFC-3

VFC-3 mounting dimensions



## Product selection

Solenoid voltage @ current	Model number	Hydraulic scheme	Pressure range	Deadband	Maximum oil flow
at 50/60 Hz			psi	psi	in <sup>3</sup> /min
▼ Pressure switch					
24 VDC @ 2 A	PSCK-8		1450 - 5000	261 - 501	427
115 VAC @ 2 A					
▼ Pressure switch					
24 VDC @ 2 A	PSCK-9		290 - 3045	87 - 218	427
115 VAC @ 2 A					
▼ Flow control valve					
screw-in	VFC-3		0-5000	-	427
throttle					
valve					

## PSCK-8, 9

Adjustable pressure switches will open or close electrical contacts when the desired pressure value is reached.

### Application

To open or close an electric circuit when a preset pressure value is reached. The electrical circuit is used to control further working cycles, such as actuating control valves or to terminate a working cycle. Directly mounted into Enerpac VP-series valves.

## VFC-3

Screw-in throttle type valve to control the amount of oil flow to the hydraulic cylinder.

### Application

Used to control cylinder speed in hydraulic circuits. Directly mounted into Enerpac VP-series valves or custom made manifolds for remote applications.

■ PSCK-8 and VFC-3 directly mounted on VP-valves.



Shown: PRV-1



## PRV series

These valves regulate system pressure for all subsequent valves, according to the adjusted pressure. Maintains a constant pressure in a secondary circuit. Includes a check valve that prevents pressure drop on secondary side.

### Application

Used when a hydraulic supply with a higher pressure (primary side) must also be used for another circuit with a lower pressure (secondary circuit). PRV-1 can be stack built between VP-series valves.

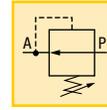
## Precise control of hydraulic pressure

- Stackbuilding with VP series modular valves
- Stackable for multiple pressures on one valve stack assembly
- Tool adjustable knob can be locked
- Precise control of pressure

Pressure: 5000 psi

Flow: 417 in<sup>3</sup>/min

- Ⓔ Válv. reguladora de presión
- Ⓕ Valve de pression réglable
- Ⓖ Druckreduzierventil



## Options

### VP-Modular valves

136 ▶



### Pressure switches

188 ▶

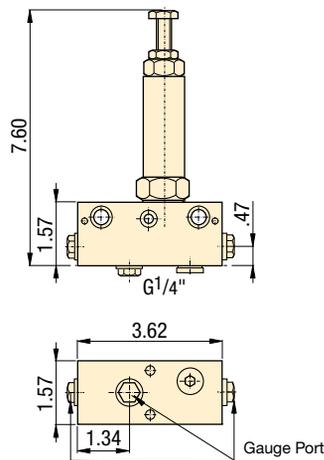


### Tie rod kits

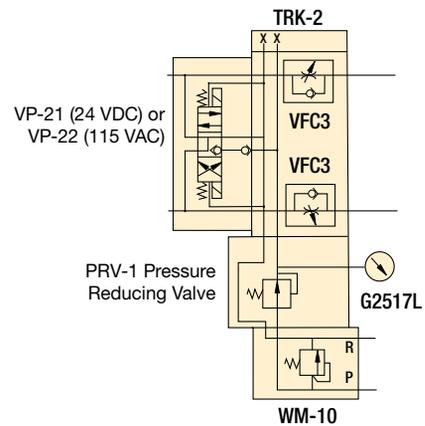
139 ▶



### PRV-1, PRV-5



### Valve stacking example



■ PRV-1 connected with remote manifold WM-10.



## Product selection

Mounting style	Adjustable pressure range	Maximum pressure	Model number	Oil ports	Maximum oil flow	
	psi	psi		BSPP	in <sup>3</sup> /min	lbs
VP-series	435 - 4350	5000	PRV-1	G1/4"	427	3.5
VP-series	75 - 2000	5000	PRV-5	G1/4"	427	3.5

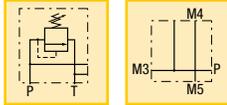
# TRK, WM/PB-series Tie rod kits, Remote/porting manifolds

Mounting: 1-8 VP valve stations

Pressure: 5000 psi max.

Flow: 915 in<sup>3</sup>/min

- E** Pernos de montaje de válv.
- F** Vis de montage de distrib.
- D** Zugstangen



## Options

Pressure switches

188 ▶



VP-series directional valves

130 ▶

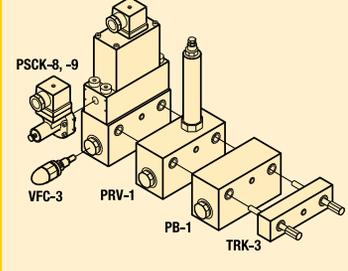


Gauges

189 ▶



VP-series



## Simplifies valve and accessory mounting

### TRK-series tie rods

- Connects 1 to 8 VP-series valves station high
- Provide leak-free sealing valves
- G1/4" oil connection

### WM-10 remote manifold

- Allows remote VP-series valve mounting
- Adjustable relief valve incorporated
- G1/4" oil connection

### PB-1 porting manifold

- Provide 3 auxiliary pressure lines
- G1/4" oil connection

Shown: WM-10, TRK-4, PB-1



### TRK-series

Tie Rod Kits mount Enerpac VP-series modular valves to the WM-10 manifold and can accommodate one to eight VP-valve stations.

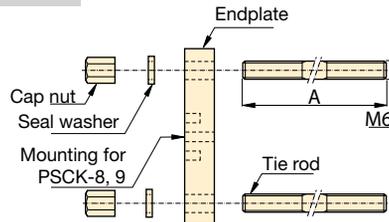
### WM-10

Remote manifold allows mounting of VP-series modular valves to a remote location from the pumping unit. This manifold has a built-in adjustable relief valve.

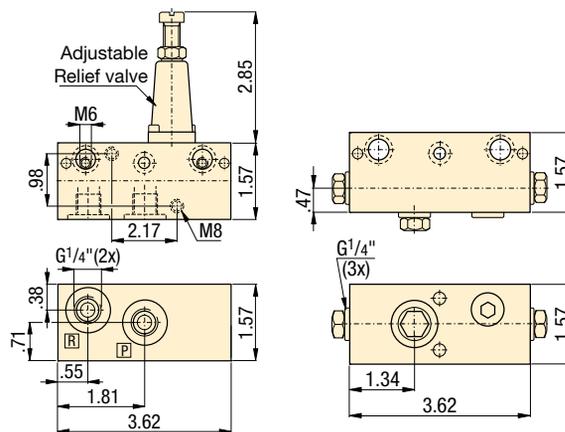
### PB-1

Porting manifold provides three pressure ports for auxiliary lines or accessories, such as a pressure gauge. Mounts between VP-series modular valve stations using TRK-series tie rod kits.

### TRK



### WM-10



## Product selection

Quantity of stackable VP-series directional valves	Model number	Tie rod length A	Mounting thread
		inch	mm
<b>▼ Tie rod kits</b>			
1	TRK-1	3.45	M6
2	TRK-2	4.92	M6
3	TRK-3	6.50	M6
4	TRK-4	8.07	M6
5	TRK-5	9.65	M6
6	TRK-6	11.22	M6
7	TRK-7	12.80	M6
8	TRK-8	14.37	M6

## Product selection

Oil ports	Model number	Hydraulic schematic	Maximum pressure
			psi
BSPP			
<b>▼ Remote manifold with pressure relief</b>			
2x G1/4"	WM-10		5000
<b>▼ Porting manifold (P port connection)</b>			
3x G1/4"	PB-1		5000

Shown: VST-1401D, VSS-2210D



## VSS, VST-series

Solenoid and air piloted directional control valves. Poppet design for zero leakage promote system efficiency. Increases the life of your workholding pump by decreasing internal valve leakage.

### Application

Advance and retract for single- and double-acting cylinders. The valves require check valves for positive load holding and can be installed for the same independent operation with single-acting cylinders by blocking the B port.

## Zero leakage poppet valves increase efficiency

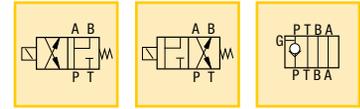
- Poppet valve design for zero leakage
- 4-way, 2-position float offset or normally open
- D03 or CETOP3 mounting pattern
- DIN-standard rectifier plugs for easy connection to power source
- Air operated models eliminate need for electricity
- Including O-rings and mounting bolts
- SAE manifold ports simplify plumbing
- Inline check valve provides positive load holding

Pressure: 0-5000 psi

Flow: 690 in<sup>3</sup>/min max.

Voltage: 115 VAC, 24 VDC

- E** Electroválvulas
- F** Electro distributeurs
- D** Elektromagnetische Ventile



## Options

### D03 Manifolds MB-series

144 ▶



### Fittings

194 ▶

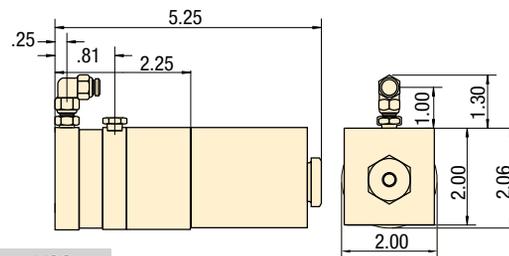


## Important

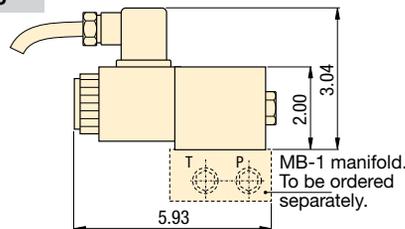
For multiple circuit applications, the VD1P inline check valve is recommended to prevent pressure drop on the holding circuit.

Order bolt kit BKD-71 to mount VD1P with VAS/VSS/VST valves.

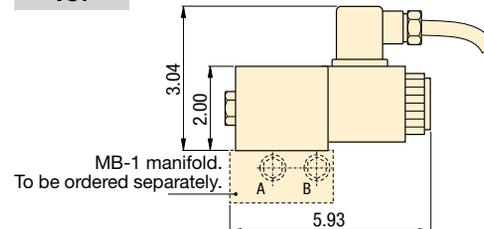
### VAS/VAT



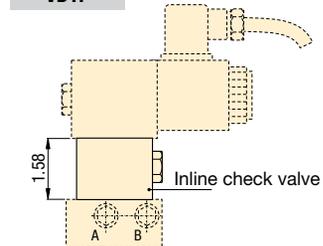
### VSS



### VST



### VD1P



## Product selection

Valve flow path	Solenoid voltage @ current at 50/60 Hz	Model number	Hydr. symbol	Pressure range psi	Pressure drop <sup>1)</sup> psi	Max. oil flow in <sup>3</sup> /min
<b>▼ Solenoid poppet valves – Normally open</b>						
4-way, 2 position	60-100 psi max.	VAS-0710D		0-5000	180	690
4-way, 2 position	24VDC @ 1.60 A	VSS-1410D		0-5000	180	690
4-way, 2 position	115VAC @ .40 A	VSS-2210D		0-5000	180	690
<b>▼ Solenoid poppet valves – Normally closed</b>						
4-way, 2 position	60-100 psi max.	VAT-0710D		0-5000	180	690
4-way, 2 position	24VDC @ 1.60 A	VST-1410D		0-5000	180	690
4-way, 2 position	115VAC @ .40 A	VST-2210D		0-5000	180	690
<b>▼ Inline check valve</b>						
-	-	VD1P		0-5000	0	690

<sup>1)</sup> Pressure drop from P-A or P-B at maximum oil flow of 690 in<sup>3</sup>/min.

■ VSS-2210D mounted directly on a Turbo II air pump for use on positive clamping fixture.



Collet-Lox® product line  
Swing clamps  
Work supports  
Linear clamps  
Power sources  
Valves

Pressure: 0-5000 psi

Flow: 3-15 gpm

Voltage: 24 VDC, 110 VAC

- E** Electroválvulas
- F** Electro distributeurs
- D** Elektromagnetische Ventile

## Options

D03 Manifolds  
MB-series

144 ▶



Fittings

194 ▶



## VP03 Directional Valves and accessories

- D03/CETOP 3 mounting pattern
- Directional valves
- Pilot operated check valve
- Dual flow control
- Pressure reducing valve

Shown: VP03



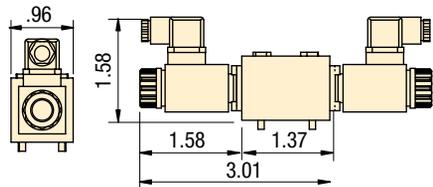
## VP03-series

VP03 valves are zero leakage, solenoid operated poppet valves.

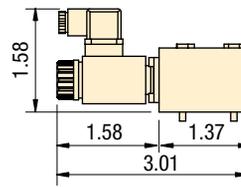
### Application

Used to control the advance and retract of single acting and double acting cylinders.

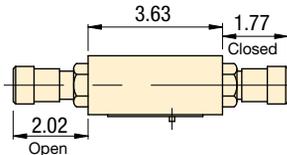
VP03-11, 12, 21, 22



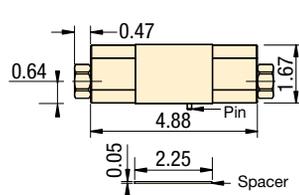
VP03-51, 52



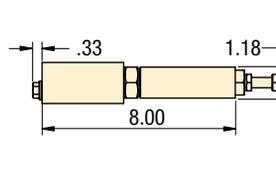
VFC-4



VD2P



PRV-6, PRV-7



## Product selection

Valve flow path	Solenoid voltage 50/60 hz	Model number	Hydraulic symbol	Pressure range	Maximum oil flow
				psi	gpm
3-position/4 way, Closed center	24 VDC	VP03-11		0-5000	5
	110 VAC	VP03-12		0-5000	5
3-position/4 way, Float center	24 VDC	VP03-21		0-5000	5
	110 VAC	VP03-22		0-5000	5
2-position/4 way	24 VDC	VP03-51		0-3626	4
	110 VAC	VP03-52		0-3626	4
Dual flow control	-	VFC-4		0-5000	10
Dual pilot operated check valve	-	VD2P		0-5000	15
Pressure reducing valve	-	PRV-6		435-4350	3.2
	-	PRV-7		75-2000	1.6

## Important

VP03 series valves are zero leakage and can be used with pressure shut down electric pumps and air driven Turbo II pumps.

VP03-11 valve on PASG-3002SB Turbo pump.



Shown: VEX-11 valve



## VE-series

Spool style solenoid valves and control modules are used in circuits that do not require zero leakage.

### Application

Used to control the advance and retract of single acting and double acting cylinders. The dual check valve can be used to lock pressure in a group of cylinders. The dual flow control offers independent control of cylinder advance and retract speeds. The pressure reducing valve sets a circuit pressure lower than the main pump pressure.

## D03 Direction Valve and accessories

- D03 mounting pattern
- Directional valves
- Pilot operated check valve
- Dual flow control
- Pressure reducing valve

Pressure: 0-5000 psi

Flow: 3-15 gpm

Voltage: 24 VDC

- (E) Electroválvulas
- (F) Electro distributeurs
- (D) Elektromagnetische Ventile

### Options

D03 Manifolds MB-series

144 ▶



Fittings

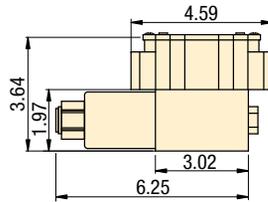
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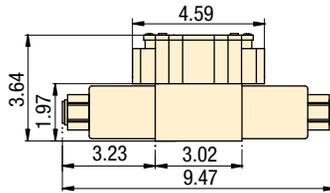
### Important

To hold the pressure in a clamping circuit, use the VEX11 valve with the VD2P check module. Do not use D03 spool valves with pressure shutdown pumps.

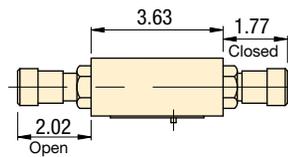
VEW-11



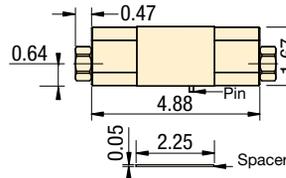
VET-11, VEX-11



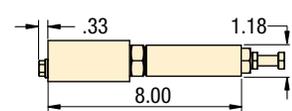
VFC-4



VD2P



PRV-6, PRV-7



## Product selection

Valve flow path	Solenoid voltage 50/60 hz	Model number	Hydraulic symbol	Pressure range	Pressure drop	Maximum oil flow
				psi	psi	gpm
2-position/4 way	24 VDC 1.32 Amps	VEW-11		0-5000	125	8
3-position/4 way, Closed center	24 VDC 1.32 Amps	VET-11		0-5000	150	8
3-position/4 way, Float center	24 VDC 1.32 Amps	VEX-11		0-5000	165	8
Dual flow control	-	VFC-4		0-5000	-	10
Dual pilot operated check valve	-	VD2P		0-5000	200	15
Pressure reducing valve	-	PRV-6 / PRV-7		435-4350 75-2000	-	3

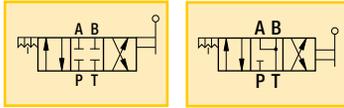
VEX-11 valve on ZW5020HG-FT21 pump.



Pressure: 5000 psi

Flow: 1040 in<sup>3</sup>/min

- E** Válvulas de control de 4 vías
- F** Distributeurs à 4 voies
- D** 4-Wege-Ventiler



## Options

**VD1P, Inline check valve**

◀ 140

**D03 Manifolds**

144 ▶



**Hoses and couplers**

192 ▶



**Fittings**

194 ▶



## Important

For multiple circuit applications, the VD1P inline check valve is recommended to prevent pressure drop on the holding circuit.

See page 145 for mounting bolt information.

Pressure on return side (tank) should not exceed 250 psi.

## Product selection

Valve mounting pattern	Mounting bolts included	Oil ports	Model number	Hydraulic symbol	Pressure range	Pressure drop <sup>1)</sup>	Max. oil flow
					psi	psi	in <sup>3</sup> /min
<b>▼ 4-way, 3-position control valves</b>							
Panel mtg.	-	SAE #4	<b>VMTD-001</b>		0-5000	70	1040
D03/CETOP 3	#10-24UN	-	<b>VMMD-001</b>		0-5000	70	1040
Panel mtg.	-	SAE #4	<b>VMTD-003</b>		0-5000	70	1040
D03/CETOP 3	#10-24UN	-	<b>VMMD-003</b>		0-5000	70	1040

<sup>1)</sup> Pressure drop from P-A or P-B at maximum oil flow of 1040 in<sup>3</sup>/min. Seal material: Buna-N, Polyurethane.

## Manual control of single and double-acting cylinders

- Near zero leakage pressure seal design
- 4-way, 3-position
- Detented handle positions
- Low handle effort 12 lbs, even at full pressure
- Handle can be repositioned for side by side valve mounting
- Compact size for directly mounting on fixture for individual circuit control
- D03/CETOP 3 mounting pattern

Shown: VMMD-001, VMTD-001



## VMM and VMT-series

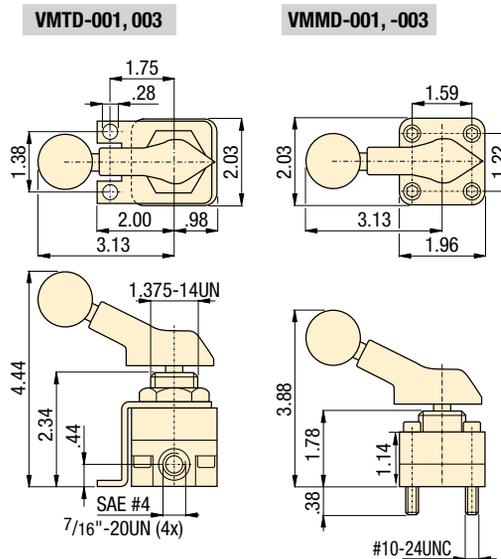
Manual directional control valves for single- and double-acting cylinder control. Lapped pressure seal surface provide near zero leakage.

The VMTD series has threaded port connections and removable holding bracket for panel mounting.

### Application

Panel mounting on fixtures for control of individual circuits. The blocked pressure port in the center position allows demand style pumps to stall out, saving energy.

The valves require check valves for positive load holding.



■ Several VMTD-001 valves mounted on fixture waiting to be transferred to machine.



Shown: MB-4, MB-1



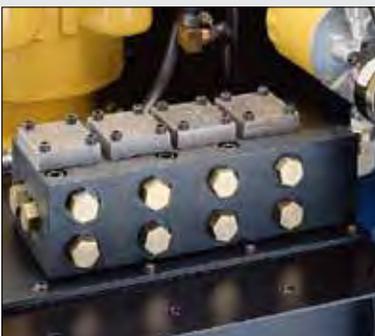
## MB-series

Single or multiple station manifolds allow installation of VSS and VST-series positive seal control valves or other D03/CETOP 3 valves. Ideal in applications where independent control of multiple cylinders is required.

## Important

Use MC-1 (D03) / MC-3 (CETOP 3) cover plates to seal non-used manifold stations.

Each non-used valve station on manifolds must be sealed with MC-1 cover plate.



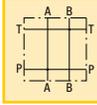
## When independent control of multiple cylinders is required

- Multi-station manifolds with SAE or CETOP 3 porting – minimizes plumbing
- Mounting patterns for: VSS/VST Valves (D03 or CETOP 3); VE Valves (D03 or CETOP 3); VP03 Valves (D03 or CETOP 3); VMMD Valves (D03 or CETOP 3)
- Manifolds allow use of accessories, such as pressure switches and gauges

Mounting: 1-4 valves

Pressure: 5000 psi max.

- (E) Colectores
- (F) Manifolds
- (D) Verkettungsblöcke



## Options

VSS, VST-series valves

140 ▶



Pressure switches

188 ▶



Gauges and accessories

190 ▶



Fittings

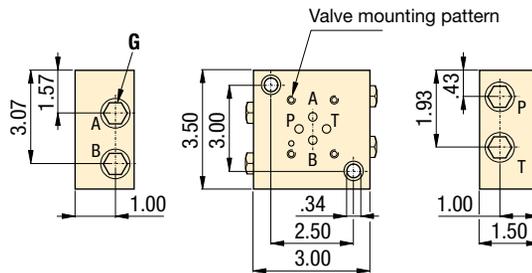
194 ▶



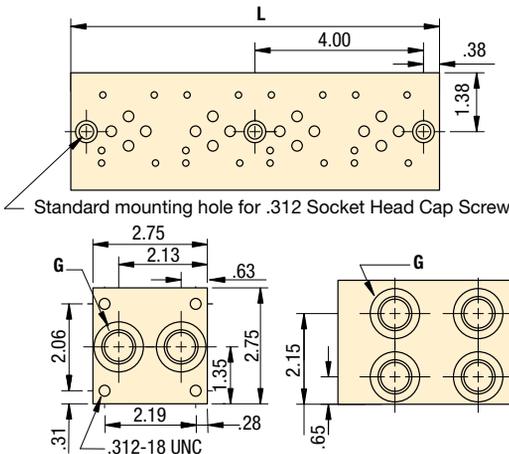
## Important

Use MC-1 / MC-3 cover plates to seal unused manifold stations.

MB-1



MB-2, -4



## Product selection

Valve mounting pattern	Number of valve stations	Model number	Oil ports cover plate	Coverplate model number*	Manifold	Weight
			G		L	lbs
<b>▼ Single station manifold</b>						
D03	1	MB-1	SAE #4	-	-	1.0
CETOP 3	1	MB-12	G1/4"	-	-	1.0
<b>▼ Multiple station manifolds</b>						
D03	2	MB-2	SAE #8	MC-1	4.75	3.3
CETOP 3	2	MB-22	G3/8"	MC-3	4.75	3.3
D03	4	MB-4	SAE #8	MC-1	8.75	6.1
CETOP 3	4	MB-42	G3/8"	MC-3	8.75	6.1

\*Note: - MC-1 manifold cover plate must be ordered separately. Includes gasket and mounting bolts.

- E** Kits de fijación para válvulas
- F** Kits de montage robinet
- D** Zugstangen-Satz

## Options \_\_\_\_\_

**VD1P, Inline check valve**

◀  140

**D03 Manifolds**

◀  144



**Hoses and couplers**

 192 ▶



**Fittings**

 194 ▶



## Important \_\_\_\_\_

The mounting stud must project into the manifold a minimum of .375" (9,5 mm). After installation, torque the stud nuts to 45 in-lbs (5 Nm)

To calculate the required stud length, add the stud length for the directional valve and each accessory module used in the valve stack. Add .78" (19,81 mm) to this length. The mounting studs should be cut to this total length.

## Use Stud Bolt Kits to assure the correct bolt length

- Studs are easily cut to length
- Stud nuts make installation easier
- Pre-mount the studs into the manifold to help guide the valve components into place

Shown: BKD71, BKD72



## BKD-series

Always have the right bolt length required to mount the components in your valve stack by using these stud bolt kits.

Refer to chart to determine the required bolt length

## Example

Description	Model number	Stud Length	
		in	mm
Directional valve	VP03-11	1.87	47,49
Dual flow control	VFC-4	1.57	39,88
Dual P.O. check	VD2P	1.57	39,88
Stud nut	VD2P	0.40	10,16
Manifold	V-19	0.38	9,65
<b>Total length:</b>		<b>5.79</b>	<b>147,06</b>

## Product selection

Description	Model number	Stud Length	
		in	mm
Imperial stud kit (#10-24)*	BKD71	7.00	—
Metric stud kit (M5)*	BKD72	—	177,80
<b>▼ Valve mounting bolt lengths using stud kits</b>			
Stud Nut	BKD71, BKD72	0.40	10,16
Manifold	MB1, MB2, MB3	0.38	9,65
Solenoid valve	VAS/VSS/VST	1.63	41,40
Solenoid valve	VEW/VET/VEX	1.25	31,75
Solenoid valve	VP03	1.87	47,49
Manual valve	VMMD001/VMMD003	1.13	28,70
Pressure Reducing Valve	PRV6/PRV7	1.57	39,88
Check valve, on "P"	VD1P	1.57	39,88
Dual P.O. check valve	VD2P	1.57	39,88
Dual flow control	VFC-4	1.57	39,88

\*Note: Stud kit includes 4 studs and 4 stud nuts

Shown: VEC-15600D, VEC-15000B, VEK-15000B



## ▶ VE-series

Solenoid modular valves are especially well suited for workholding and production applications. With 11 possible flowpaths and 2 manifolds, for either Enerpac's submerged pump or a remote NPT mount, you can "custom build" a valve for almost any application.

### Application

Ideal when mounted on remote manifold for applications where independent control of multiple cylinders is required.

## Unmatched combination of possibilities

- Relief valve and pilot-operated check accessory valves are stackable eliminating external plumbing
- Remote and pump mounting
- Mounting bolts included with each modular valve

## Select the required valve flow path

Valve flow path	For cylinder	Valve code	Hydraulic symbol
<b>▼ 2-way, 2-position (2/2)</b>			
Normally closed	Unloading *	<b>VEH</b>	
Normally open	Unloading *	<b>VEK</b>	
<b>▼ 3-way, 2-position (3/2)</b>			
Normally open	Single-acting	<b>VEP</b>	
<b>▼ 3-way, 3-position (3/3)</b>			
Tandem center	Single-acting	<b>VEF</b>	
Closed center	Single-acting	<b>VEG</b>	
<b>▼ 4-way, 2-position (4/2)</b>			
Crossover offset	Double-acting	<b>VEE</b>	
Float offset	Double-acting	<b>VEM</b>	
<b>▼ 4-way, 3-position (4/3)</b>			
Open center	Double-acting	<b>VEA</b>	
Closed center	Double-acting	<b>VEB</b>	
Tandem center	Double-acting	<b>VEC</b>	
Float center	Double-acting	<b>VED</b>	

\* VEH and VEK valve models require the use of tank port for dump or unloading.

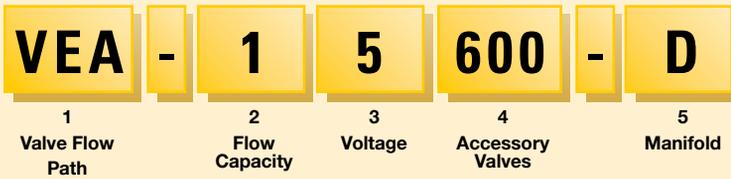
## Product specifications

Pressure range	Maximum oil flow	Voltage @ Hz	Amperage draw	
			inrush	holding
psi	in <sup>3</sup> /min			
0-10,000	920	24 VDC @ 50/60 Hz	-	2.5
0-10,000	920	115 VAC @ 60 Hz	3.6	1.0
0-10,000	920	220/240 VAC @ 50 Hz	1.3/1.4	.45/.53
0-10,000	920	230 VAC @ 60 Hz	1.8	.50 A

**Note:** Seal material: Buna-N, Polyurethane.  
DIN43650 Valve plug included on remote mounted valves.

**Custom build your modular valves**

▼ This is how a Solenoid Modular Valve Model Number is built up:



**1 Modular valve code**

- A = 4/3 Open center
- B = 4/3 Closed center
- C = 4/3 Tandem center
- D = 4/3 Float center
- E = 4/2 Crossover offset
- F = 3/3 Tandem center
- G = 3/3 Closed center
- H = 2/2 Normally closed
- K = 2/2 Normally open
- M = 4/2 Float offset
- P = 3/2 Normally open

**2 Oil flow capacity**

- 1 = 920 in<sup>3</sup> per minute

**3 Solenoid voltage**

- 1 = 24 VDC, 50 / 60 Hz
- 2 = 230 V, 1 ph, 50 Hz
- 5 = 115 V, 1 ph, 60 Hz
- 6 = 230 V, 1 ph, 60 Hz

**4 Accessory valves**

- 000 = No accessory valves
- 100 = VS-11 Relief valve only
- 150 = VS-11 Relief valve and VS-51 3-way pilot operated check valve VEF/VEG only
- 160 = VS-11 Relief valve and VS-61 4-way pilot operated check valve VEA/VEB/VEC/VED only
- 500 = VS-51 3-way pilot operated check valve VEF/VEG only
- 600 = VS-61 4-way pilot operated check valve VEA/VEB/VEC/VED only

**5 Manifold**

- A = No manifold
- B = Remote mounted manifold
- D = Pump mounted manifold VEA/VEC/VEF only

**Example**

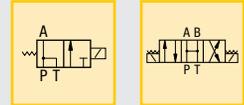
The **VEA-15600-D** is a modular valve with a 4-way, 3-position open center flowpath, 115 VAC, and an integrated pilot-operated check valve, for mounting on an Enerpac pump. Bolt Kit **BK-2** is included.

Pressure: 0-10,000 psi

Flow max.: 920 in<sup>3</sup>/min

Voltage: 24, 115, 230 V

- E** Válvulas de control
- F** Electro distributeurs
- D** Wegesitzventile



**Options**

Gauges and accessories

190 ▶



Fittings

194 ▶



**Accessory Valves and Bolt Kits**

Use **VS-11** relief valve to add system pressure control to VE-series valves.

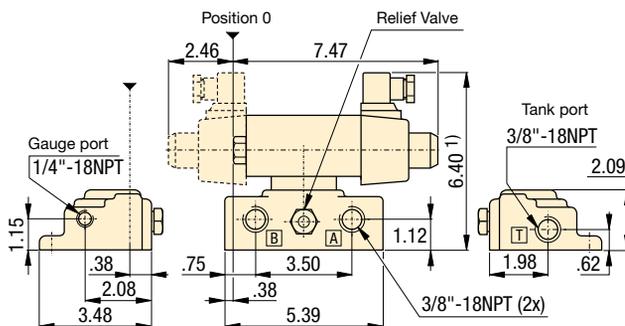
Use **VS-51** 3-way pilot operated check valve to convert 3-way VE-valve into load-holding valve.

Use **VS-61** 4-way pilot operated check valve to convert 4-way VE-valve into load-holding valve.

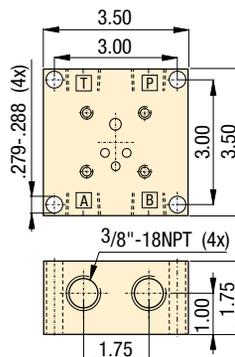
To install accessory valves to stack build modular valves use bolt kits:

- BK-2** for 1 VS valve;
- BK-3** for 2 VS valves.

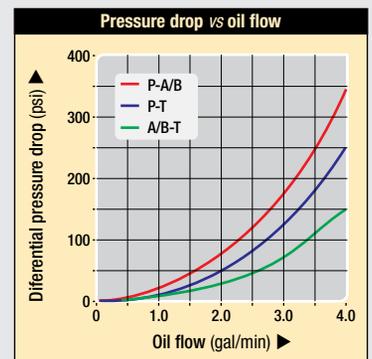
**VE series Modular Valve Pump Mounted**



**Modular Valve Remote Mounted**



<sup>1)</sup> add 1.85 inch for each Accessory Valve.  
Note: BK-1 Bolt Kit is included with each modular valve.



# 3-way directional manual control valves *Application & selection*

Shown: VM-2, VM-3



## V-series

Manual operated 3-way, 2-position and 3-way, 3-position directional control valves for operation of single-acting cylinders. Remote mount valves include return line kit for connecting the valves to pump reservoir.

### Application

Pump mounted valves provide centralized control of pump output for cylinder cycling. Remote mounted at any convenient point along the system where control of cylinders is needed.

## Reliable control of single-acting cylinders

- Directional control valves provide advance/hold/retract operation for use with single-acting cylinders
- Remote or pump mounting on most Enerpac pumps
- Return line kit included with remote valves
- Available “locking” option on VC and VM-series valves for load-holding applications

## Select the required center position

### Non-locking

- Use in simple clamping circuits. Has interflow between ports when shifted.

### Closed center

- For multiple valve and cylinder operation. All ports blocked in the center position.

### Locking center

- For positive load holding without loss of pressure. Cylinder travel can only resume by shifting valve from hold position.

### Tandem center

- For one or multiple cylinder operation. Pump flow is directed back to tank in the center position.

## Product selection

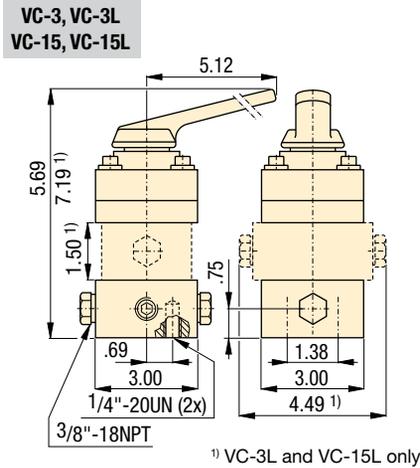
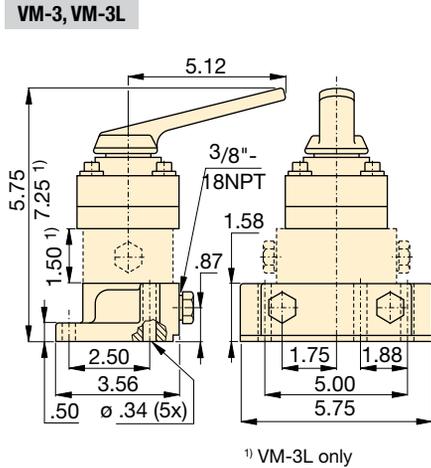
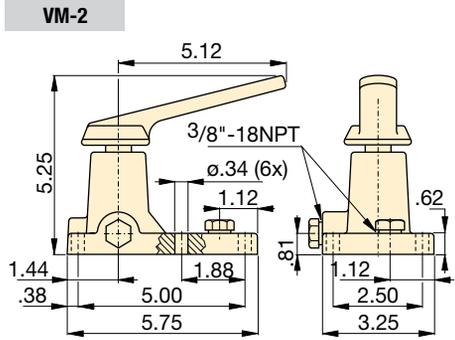
Valve type	Valve mounting location	Model number	Hydraulic symbol
<b>▼ Manual 3-way, 2-position (3/2)</b>			
–	Pump	VM-2	
<b>▼ Manual 3-way, 3-position (3/3)</b>			
Tandem center	Pump	VM-3	
Tandem center	Remote	VC-3	
<b>▼ Manual 3-way, 3-position (3/3)</b>			
Tandem center, locking	Pump	VM-3L	
Tandem center, locking	Remote	VC-3L	
Closed center	Remote	VC-15	
Closed center, locking	Remote	VC-15L	

■ Four VC-15 Enerpac manual valves mounted on fixture to give independent control of several hydraulic circuits.



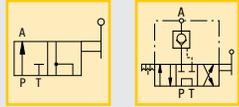
Collet-Lok® product line  
Swing clamps  
Work supports  
Linear clamps  
Power sources  
Valves

99-123



Pressure: 0-10,000 psi  
Flow max.: 1040 in<sup>3</sup>/min

- E** Válvulas de control
- F** Distributeurs à 3 voies
- D** 3-Wege-Ventile



**Product specifications**

Model number	Pressure range	Used for cylinder	Schematic flowpath			lbs
			Advance	Hold	Retract	
	psi					
<b>▼ Manual 3-way, 2-position (3/2)</b>						
<b>VM-2</b>	0-10,000	Single-acting		—		4.8
<b>▼ Manual 3-way, 3-position (3/3)</b>						
<b>VM-3</b>	0-10,000	Single-acting				4.6
<b>VC-3</b>	0-10,000	Single-acting				6.4
<b>▼ Manual 3-way, 3-position (3/3)</b>						
<b>VM-3L</b>	0-10,000	Single-acting				8.6
<b>VC-3L</b>	0-10,000	Single-acting				10.3
<b>VC-15</b>	0-10,000	Single-acting				6.4
<b>VC-15L</b>	0-10,000	Single-acting				10.3

**Options**

- Gauges and accessories** [190](#)
- Hoses and couplers** [192](#)
- Fittings** [194](#)

**Important**

**Locking Valves**  
For applications that require positive load holding, most VM and VC valves are available with pilot operated check valve. This option provides hydraulic locking of the load until valve is shifted into retract position. To order this feature, place an "L" at the end of the model number.

**Valving help**  
See Basic System Set-up and Valve information in our "Yellow Pages". [197](#)

Valves  
Pallet components  
System components  
Yellow pages

# 4-way directional manual control valves *Application & selection*

Shown: VC-20, VM-4



## V-series

Manual operated 4-way, 3-position directional control valves for operation of double-acting or two single-acting cylinders. Remote mount valves include return line kit for connecting the valves to pump reservoir.

### Application

Pump mounted valves provide centralized control of pump output for cylinder cycling. Remote mounted at any convenient point along the system where control of cylinders is needed.

## Reliable control of double-acting cylinders

- Directional control valves provide advance/hold/retract operation for use with double-acting or two single-acting cylinders
- Remote or pump mounting on most Enerpac pumps
- Return line kit included with remote valves
- Available “locking” option on VC and VM-series valves for load-holding applications

## Select the required center position

### Non-locking

- Use in simple clamping circuits. Has interflow between ports when shifted.

### Closed center

- For multiple valve and cylinder operation. All ports blocked in the center position.

### Locking center

- For positive load holding without loss of pressure. Cylinder travel can only resume by shifting valve from hold position.

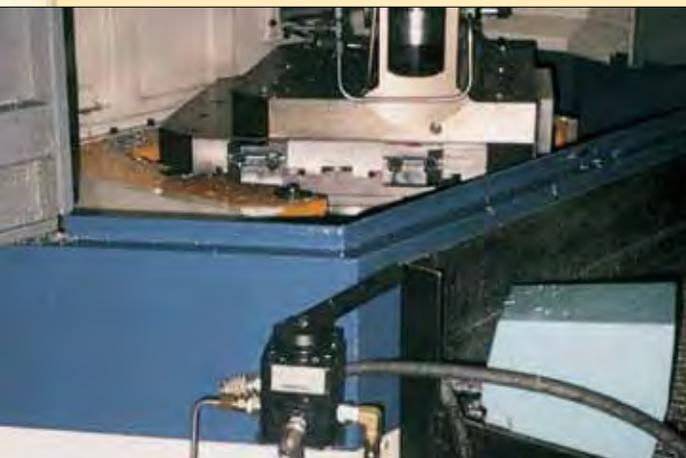
### Tandem center

- For one or multiple cylinder operation. Pump flow is directed back to tank in the center position.

## Product selection

Valve type	Valve mounting location	Model number	Hydraulic symbol
<b>▼ Manual 4-way, 3-position (4/3)</b>			
Tandem center	Pump	<b>VM-4</b>	
Tandem center	Remote	<b>VC-4</b>	
Tandem center, locking	Pump	<b>VM-4L</b>	
Tandem center, locking	Remote	<b>VC-4L</b>	
Closed center	Remote	<b>VC-20</b>	
Closed center, locking	Remote	<b>VC-20L</b>	

■ Enerpac VC-4 manual valves mounted to control hydraulic circuit on pallet fixture

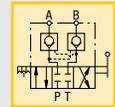
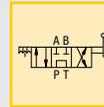


Collet-Lock® product line  
Swing clamps  
Work supports  
98-139  
Linear clamps  
Power sources  
Valves

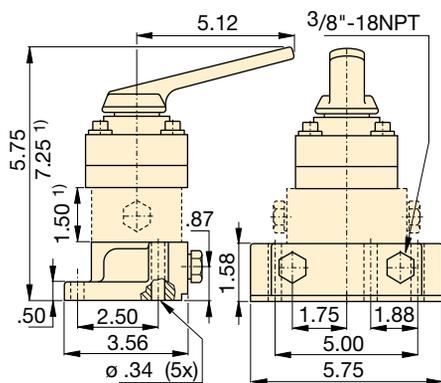
Pressure: 0-10,000 psi

Flow max.: 1040 in<sup>3</sup>/min

- E** Válvulas de control
- F** Distributeurs à 4 voies
- D** 4-Wege-Ventile

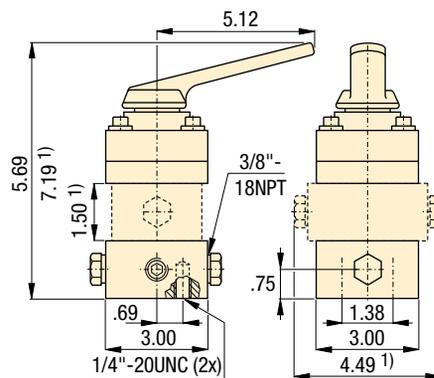


**VM-4, VM-4L**



<sup>1)</sup> VM-4L only

**VC-4, VC-3L  
VC-20, VC-20L**



<sup>1)</sup> VC-4L and VC-20L only

**Product specifications**

Model number	Pressure range	Used for cylinder	Schematic flowpath			lbs
			Advance	Hold	Retract	
<b>▼ Manual 4-way, 3-position (4/3)</b>						
VM-4	0-10,000	Double-acting				4.6
VC-4	0-10,000	Double-acting				6.4
VM-4L	0-10,000	Double-acting				8.6
VC-4L	0-10,000	Double-acting				10.3
VC-20	0-10,000	Double-acting				6.4
VC-20L	0-10,000	Double-acting				10.3

**Options**

- Gauges and accessories**  [190](#)
- Hoses and couplers**  [192](#)
- Fittings**  [194](#)

**Important**

**Locking Valves**  
 For applications that require positive load holding, most VM and VC valves are available with pilot operated check valve. This option provides hydraulic locking of the load until valve is shifted into retract position.  
 To order this feature, place an "L" at the end of the model number.

**Valving help**  
 See Basic System Set-up and Valve information in our "Yellow Pages". [197](#)

Shown: WVP-5, MVPM-5



## Sequence valves

Sequence valves block the oil to a secondary hydraulic circuit until pressure in the primary circuit reaches a preset level. The sequence valves have a built-in check system to allow the oil to flow back without external piping.

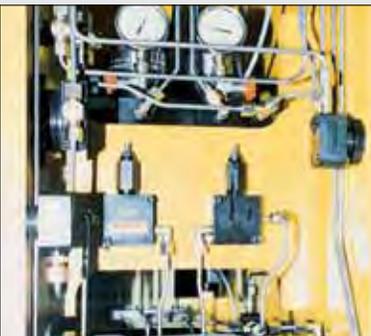
Pressure settings for the V-2000 can be adjusted by screwing the slotted pin in or out. The pressure settings for the other models is adjusted by loosening the jam nut and turn the set screw to reach your setting.

## Application

The sequence valves can be mounted in-line or fixture mounted using mounting bolts.

A typical application for the sequence valve would be to build pressure within work supports before the swing cylinders are applied to the supported part, to prevent deflection in the part.

- Two WVP-5 sequence valves used in conjunction with Enerpac WCA-series Auto Coupler to provide system automation.



## Pressure dependent sequence control

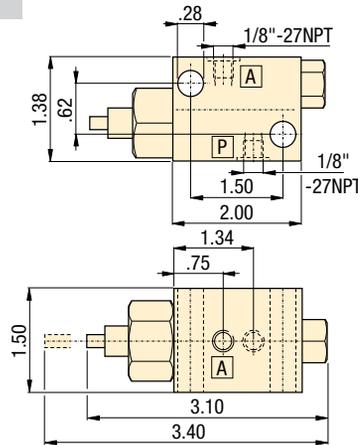
### MVPM-5, WVP-5, MVPC-5

- Direct accurate pressure setting
- Pressure setting between 500-5000 psi for secondary circuit is secured with lock nut
- Mounting holes on WVP-5, manifold mounting ports on MVPM-5
- MVPC-5 features cartridge body

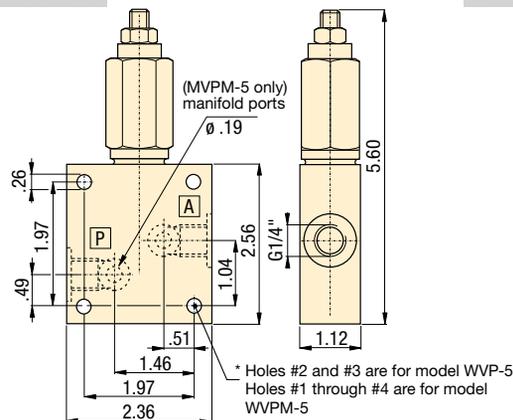
### V-2000

- Direct accurate pressure setting
- Pressure setting between 200-2000 psi for secondary circuit
- Flag indicator appears everytime the valve is operated

### V-2000



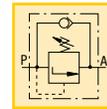
### MVPM-5/WVP-5



Pressure: 5000 psi

Flow: 250-366 in<sup>3</sup>/min max.

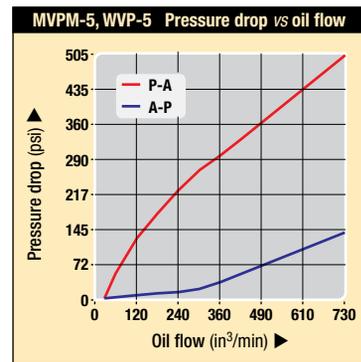
- E Válvulas de secuencia
- F Valve de séquence
- D Folgeventil



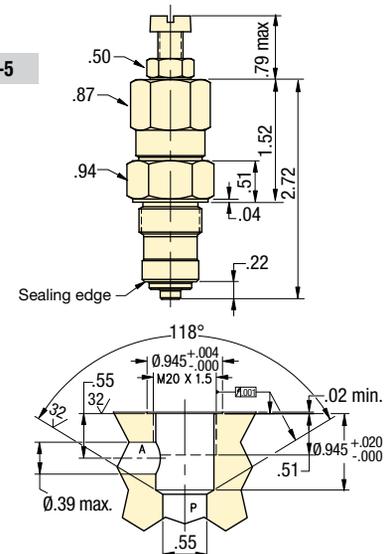
## Options

Gauges and accessories

190



### MVPC-5



## Product selection

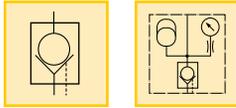
Pressure adjustment range	Maximum pressure	Maximum oil flow	Model number	Oil ports	Opening pressure	A	
psi	psi	in <sup>3</sup> /min			psi	in	lbs
200-2000	5000	250	V-2000	1/8"-27 NPT	—	—	2.0
500-5000	5000	620	MVPC-5	—	10	—	0.35
500-5000	5000	366	MVPM-5	G 1/4"	20	1.12	2.9
500-5000	5000	366	WVP-5	SAE #4	20	0.98	1.8

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

Pilot ratio: 7:1

Flow: 10 gpm max.

- E** Válvulas antiretorno pilotada
- F** Clapets antiretour piloté
- D** Rückschlagventile



## 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
- Manifold mount body MVM-72

Shown: V-72

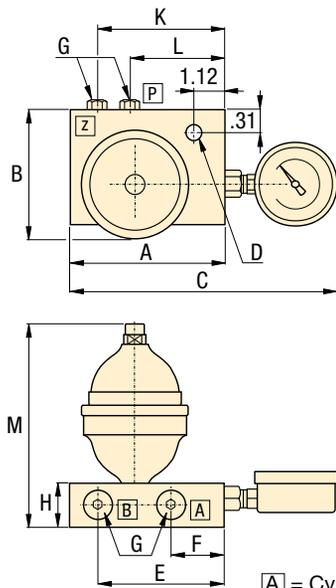


## Product selection

Pilot ratio	Accumulator included	Maximum oil flow	Maximum pressure	Model number	Oil ports	Optional charging tool for ACL	Weight
		GPM	psi				lbs
7:1	-	10	5000	<b>V-72</b>	SAE #4	-	4.0
7:1	ACL-22	10	5000	<b>MV-722B</b>	G 1/4"	WAT-2	6.0
7:1	ACL-202	10	5000	<b>MV-7202B</b>	G 1/4"	WAT-2	7.5
7:1	-	10	5000	<b>MVM-72</b>	G 1/4"	-	3.0

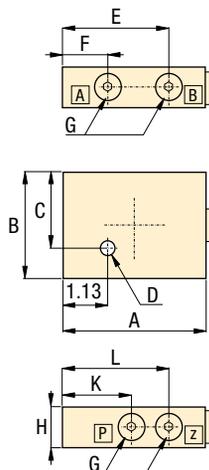
For more information on ACL-series Accumulators see page 124.

MV-722B, -7202B

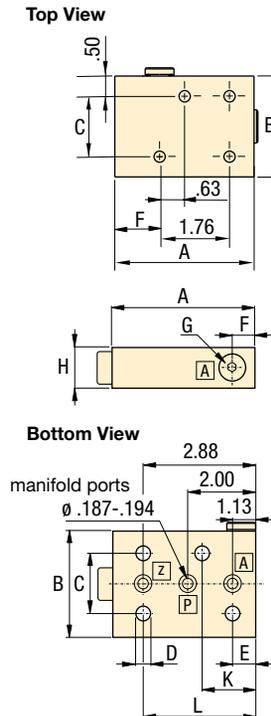


- [A] = Cylinder advance
- [B] = Cylinder retract
- [P] = Pressure
- [Z] = Pilot

V-72



MVM-72



## Product dimensions in inches [ $\pm$ ]

Model number	A	B	C	D	E	F	G	H	K	L	M
<b>V-72</b>	3.50	2.50	2.19	.28	2.88	1.13	SAE #4	1.25	2.00	2.88	-
<b>MV-722B</b>	3.50	2.80	7.25	.28	2.88	1.12	G 1/4"	1.25	2.88	2.00	5.71
<b>MV-7202B</b>	3.50	3.64	7.13	.28	2.88	1.12	G 1/4"	1.25	2.88	2.00	7.28
<b>MVM-72</b>	3.50	2.50	1.50	.28	1.13	1.12	G 1/4"	1.25	1.75	2.88	-

Seal material: Buna-N.

Manifold O-rings included with MVM-72. For manifold mounting installation information consult Enerpac for surface preparation.

[www.enerpacwh.com](http://www.enerpacwh.com)

## MV and V-series

Pilot operated check valves check the oil flow with a built-in pilot circuit providing fast, automatic check-off for your workholding applications.

The pilot operated check valves with built-in accumulator help to maintain system pressure due to minor oil loss.

## Application

Added capability to open with pilot pressure to allow cylinders to retract. By using a pilot operated check valve, cylinder retraction can be accomplished automatically without operator activity.

## Options

### Fittings



□ 194 ▶

Shown: PRV-3



## PRV series

These valves regulate system pressure for all subsequent valves, according to the adjusted pressure. Maintains a constant pressure in a secondary circuit. Includes a check valve that prevents pressure drop on secondary side.

### Application

Used when a hydraulic supply with a higher pressure (primary side) must also be used for another circuit with a lower pressure (secondary circuit).

The PRVM-2 manifold can be manifold mounted or plumbed with tubing. The PRV-8 and PRV-9 use this manifold to provide a pre-assembled valve. PRV-3 and 4 are for remote mounting. The cartridge from PRV-3 and 4 can be removed from manifold for direct integration into gundrilled fixture. Order the cartridge separately as PRV-3T or PRV-4T.

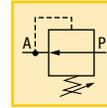
## Precise control of hydraulic pressure

- Tool adjustable knob can be locked
- Precise control of pressure
- G1/4" oil connection
- Remote mount
- PRVM-2 manifold has both 1/4" BSPP and manifold ports
  - Gauge port- 1/8" NPT

Pressure: 5000 psi

Flow: 427 in<sup>3</sup>/min

- (E) Válv. reguladora de presión
- (F) Valve de pression réglable
- (D) Druckreduzierventil



## Options

### Gauges

190 ▶

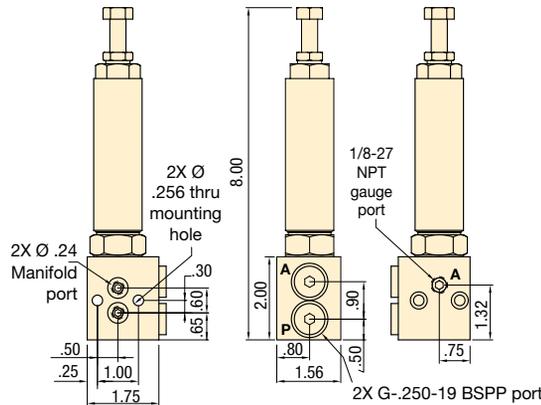


### Fittings

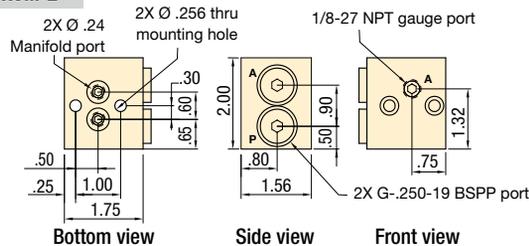
194 ▶



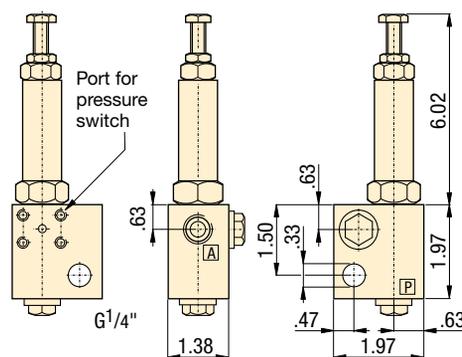
### PRV-8 & PRV-9



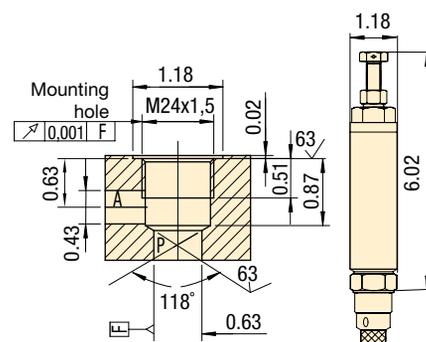
### PRVM-2



### PRV-3, -4



### PRV-3T, -4T



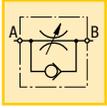
## Product selection

Mounting style	Adjustable pressure range psi	Maximum pressure psi	Model number	Oil ports	Maximum oil flow	🏠 lbs
				BSPP	in <sup>3</sup> /min	
Remote	435 - 4350	5000	PRV-3	G1/4"	427	2.9
Cartridge	435 - 4350	5000	PRV-3T	-	427	1.5
Remote	75 - 2000	5000	PRV-4	G1/4"	427	2.9
Cartridge	75 - 2000	5000	PRV-4T	-	427	1.5
Remote	435 - 4350	5000	PRV-8	G1/4"	427	2.4
Remote	72 - 2000	5000	PRV-9	G1/4"	427	2.4
Remote	-	5000	PRVM-2	G1/4"	427	1.3

Max. Flow: 10 gpm

Pressure: 0-5000 psi

- E** Válv. reguladoras de caudal
- F** Valves de control débit
- D** Stromregelventile



## Regulate the flow of oil

- Poppet valve design for zero leakage
- Color coded flow indicator
- Free flow return
- Fine metering capability
- Lockable
- Standard Viton seals

## Options

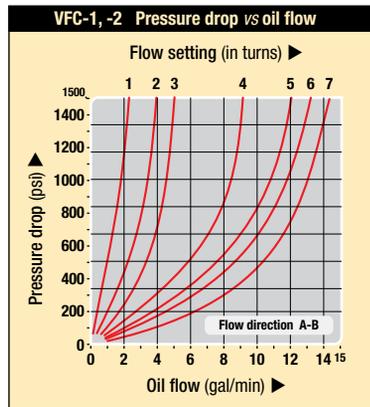
### Fittings

194 ▶

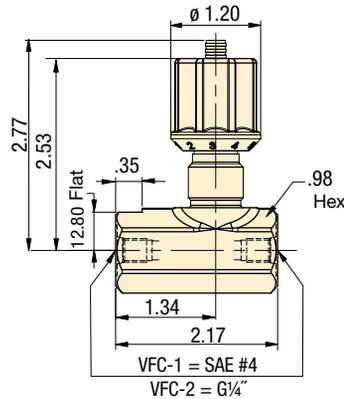


### High pressure filter

193 ▶



VFC-1, -2



## Product selection

Maximum oil flow	Pressure range	Oil ports	Model number	Flow path	Maximum pressure drop	
gpm	psi				psi	lbs
<b>▼ Flow control valves</b>						
10	0-5000	SAE #4	VFC-1		1500	1.8
10	0-5000	G 1/4"	VFC-2		1500	1.8

Seal material: Viton

Shown: VFC-1



## VFC-series

Provide repeatable oil flow control. The internal check valve allows metered flow in one direction and free flow in the opposite direction. Precise control is achieved with a micro-meter style adjustment knob, which can be locked with the set screw.

### Application

Use VFC-series flow control valves in-line with the Enerpac WE-series workholding pump to protect your components from damage due to high flow rates.

■ In-line installation of a VFC-1 flow control valve.



Shown: HV-1000A, V-17, V-10, V-12, V-152



## Accessory valves

Enerpac accessory valves are available in a wide variety and many configurations to control hydraulic pressure or oil flow. These valves are used in conjunction with other valves and system components to provide full automation and control.

### Application

Accessory valves are used to automate clamp cycles, prevent pressure loss and provide additional operator and component safety.

## Your hydraulic control solution

- Regulate oil flow or system pressure
- All valves feature NPT or SAE porting to insure against leakage at rated pressure
- Can easily be installed in any system
- All valves are painted, coated or plated for corrosion resistance

## Product selection

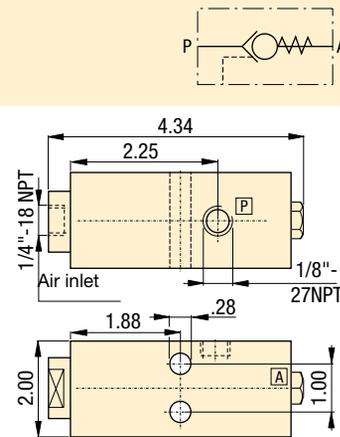
Valve type	Maximum pressure psi	Model number	Oil ports
Holding valve, air pilot	3000	<b>HV-1000A</b>	1/8" NPT
Holding valve, modular	3000	<b>MHV-1</b>	1/8" NPT
Pressure limiting valve	3000	<b>PLV-40013B</b>	1/8" NPT
Manual shut-off valve	5000	<b>V-12</b>	SAE #4
Auto-damper valve	10,000	<b>V-10</b>	1/2" NPT
Safety check valve	10,000	<b>V-17</b>	3/8" NPT
Pressure relief valve	10,000	<b>V-152</b>	3/8" NPT

## Product specification

### HV-1000A

#### Air pilot holding valve

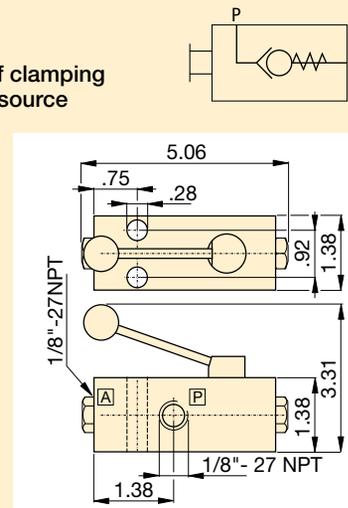
- Holds fluid under pressure offering independent control of different branches of the same fixture
- Valve can control the pilot air and the booster in sequence
- Max. oil flow 305 in<sup>3</sup>/min
- Works with the VA-42 four-way air valve and a booster



### MHV-1

#### Modular holding valve

- Allows separate operation of clamping fixtures with a single power source
- Ideal for applications when fluid feed lines are impractical. If system pressure is interrupted, the MHV-1 will hold the pressure beyond the valve
- Max. oil flow 305 in<sup>3</sup>/min
- To release system pressure, rotate valve handle in either direction 90° to release and retract system pressure



■ V-17 Safety check valve installed on a fixture.



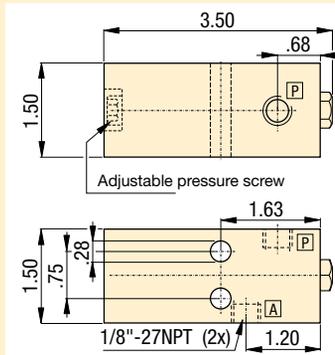
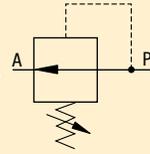
99-122b

Collet-Lox® product line  
Swing clamps  
Work supports  
Linear clamps  
Power sources  
Valves

**PLV-40013B**

**Pressure limiting valve**

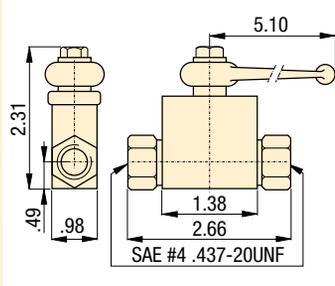
- Allows precise control of pressures reaching specific clamps
- When pressure build-up reaches a preset level, the valve closes, stabilizing pressure to that section of the fixture
- Pressure adjustment between 200 to 1500 psi
- Max. oil flow 305 in<sup>3</sup>/min



**V-12**

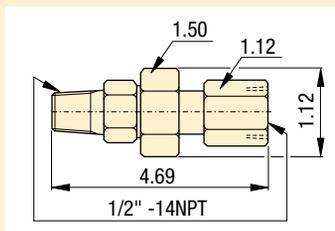
**Manual shut-off valve**

- Ball type valve can be used for the master system shut-off or for isolating separate circuits on a fixture
- Viton seals standard
- Straight through design for easy system plumbing and installation
- Fully open allows high flow return of oil
- Max. oil flow 732 in<sup>3</sup>/min



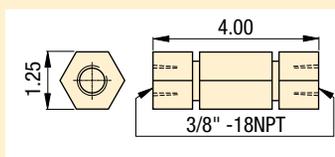
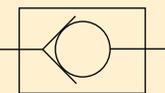
**V-10 Auto-damper valve**

- To protect gauge during high cycle applications
- Creates a flow resistance when load is released suddenly
- No adjustments are necessary
- Fits directly into GA-series gauge adaptor



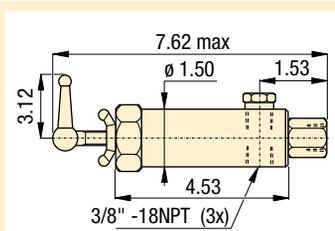
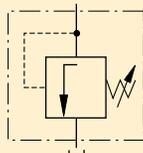
**V-17 Safety check valve**

- Ruggedly built to resist shock and operate with low pressure drop
- Closes smoothly without pounding
- Max. oil flow 1830 in<sup>3</sup>/min



**V-152 Pressure relief valve**

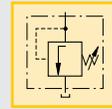
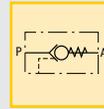
- Limits pressure developed by the pump in hydraulic circuit, thus limiting the force imposed on other components
- 800-10,000 psi adjustment range; ± 3% repeatability
- Valve opens whenever preset pressure is reached. To increase pressure setting, turn handle clockwise
- Max. oil flow 1830 in<sup>3</sup>/min
- Includes 3 ft. return line hose kit



Pressure: 0-10,000 psi

Flow max.: 305-1830 in<sup>3</sup>/min

- E** Válvulas de control
- F** Valves de contrôle
- D** Regelventile



**Options**

**VA-42**  
Air valve

158 ▶



**Gauges and adaptors**

190 ▶



**Hoses and couplers**

192 ▶



**Fittings**

194 ▶



**Important**

**Valving help**  
See Basic System Set-up and Valve information in our "Yellow Pages".

197 ▶

Shown: VA-42, VAS-42



## Air valves

Enerpac's line of directional air valves and accessories complete your workholding system. Used to control air operated hydraulic units, they increase your productivity and efficiency.

### Application

VA-series directional air valves provide either manual or electric control to air operated hydraulic units. Accessories such as rapid exhaust, check valves, silencers and regulators complete the air control system.

- Accessory valves provide greater safety and more efficient clamping cycles
- Recommended for use with all air powered units
- Directional valves to control booster and pump air supply
- Remote air valve permits either hand or foot operation

## To control and regulate air supply

### VA-42 Manual operated air valve 5-way, 2-position

- For control of boosters
- Viton seals standard

### VAS-42 Solenoid operated air valve 5-way, 2-position

- For control of pump and boosters air supply
- Viton seals standard
- Solenoid: 120 VAC, 50/60Hz  
Amperage: inrush .11 Amps, holding .07 Amps
- Maximum cycle rate: 600 cycles per minute

### VR-3 Rapid exhaust valve

- Enables booster to advance and retract faster
- Instantly exhausts air supply from booster to atmosphere

### V-19 Air check valve

- Prevent rapid drop of air pressure to the booster in the event of sudden loss of input air

### RFL-102 Regulator-Filter-Lubricator

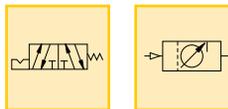
- Regulates air pressure
- Filter air input
- Lubricates air motors with a fine oil vapor mist
- Maximum air flow 48 scfm

### QE-375 Muffler

- Use with VR-3 or VAS/VA-42
- Reduces noise level of exhaust air from pump

Air Pressure: 0-150 psi

- (E) Válvulas de aire
- (F) Valves à air
- (D) Luftventile



## Options

### Gauges and adaptors

□ 190 ▶



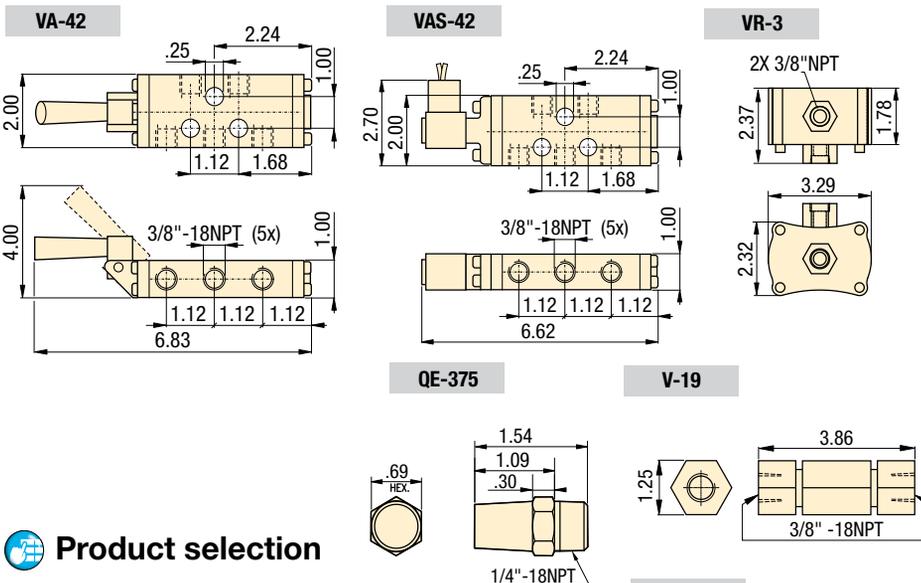
### Hoses and couplers

□ 192 ▶



### Fittings

□ 194 ▶



## Product selection

Maximum pressure psi	Model number
<b>▼ Air valves</b>	
30-150	VA-42
30-150	VAS-42
0-100	VR-3
0-100	V-19
<b>▼ Accessories</b>	
0-125	RFL-102
0-125	QE-375

## Important

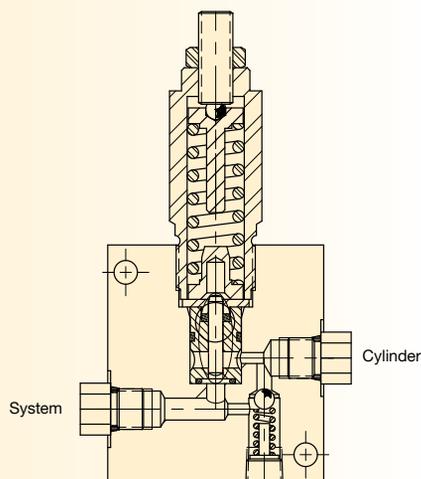
**Valving help**  
See Basic System Set-up and Valve information in our "Yellow Pages".

□ 223 ▶

## Valve Cutaways

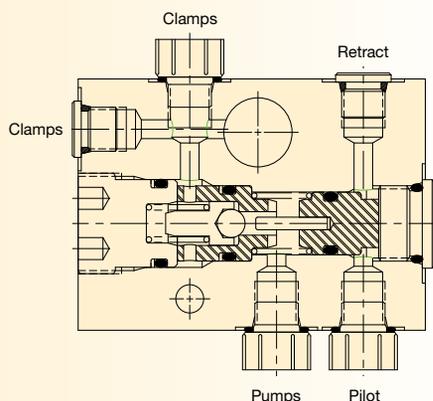
### WVP-5

The opening point is set by the adjustment spring. Incoming pressure is blocked by the valve spindle in the orifice plate. When opening pressure is reached, the spindle is pushed up until fluid will pass. The system pressure level is maintained as pressure builds in the downstream circuit. Reverse flow is through a reverse check valve.



### V-72

System pressure enters through the "Pump" port, flows through the check seat and past the check valve into the cylinder circuit. When system pressure drops, the check ball closes off the seat, blocking flow. To release the cylinder pressure, the "Pilot" port is pressurized, and the pilot piston pushes the check ball off of the seat, allowing reverse flow.



### PRV-3

A check ball is held off of the check seat by a spring loaded spindle. The spring setting determines the closing point of the valve. As pressure builds in the cylinder side of the circuit, the spindle is lifted, and the check seats. Closing off further flow through the valve provides a reduced pressure to the cylinder.

