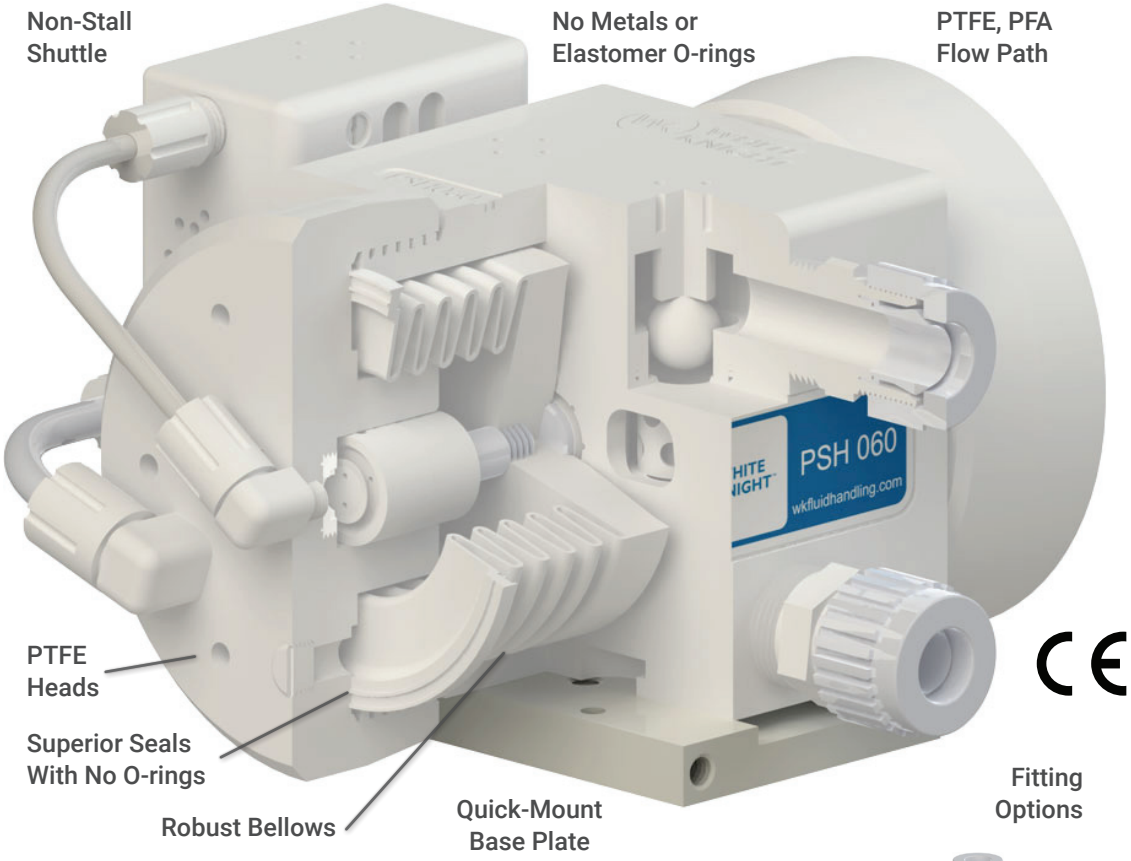
WHITE KNIGHT®
engineer approved™

PSH SERIES PUMPS

Ultrapure Pumps for Advanced Chemical Processes

Metal-free pumps with PTFE, PFA flow paths for ultrapure chemical processes. PSH Series pumps are capable of 145°C (293°F) fluid temperatures and 5.5 Bar (80 psi) air pressures. PSHSD models can run dry for more than one hour without damage. PSH015, PSH030, PSH060 and PSH140 pumps offer maximum flow rates of 15, 30, 60 and 140 lpm, respectively.

Advanced Pump Technologies



2 YEAR WARRANTY

PURITY
ULTRA HIGH

RECIRC. / DELIVERY
UP TO 5.5 BAR / 80 PSI

TEMPERATURE
UP TO 145˚C 293˚F

SHIFT METHOD
SHUTTLE VALVE

Features & Benefits

- Process-safe PTFE, PFA flow paths
- Contains no metals or elastomers
- Durable machined design with minimal parts
- Reliable, safe operation with leak-free seals and no O-rings
- On-board, non-stall shuttle saves space and eliminates resets
- Robust bellows allow for 5.5 Bar (80 psi) supply pressure
- Pneumatic Logic™ minimizes liquid pulsation and pump vibration
- Lubricant-free shifting eliminates potential contamination
- No electric motors, which generate heat
- Class 100 cleanroom assembly, testing, and packaging
- No preventative maintenance during two-year warranty

Industries

Semiconductor
LEDs & Electronics
Flat-Panel Displays
Photovoltaic / Solar
Aerospace

Applications

Chemical Delivery
Chemical Circulation
Chemical Processing
Chemical Reclaim
Bulk Transport
CMP Slurry

https://wkfluidhandling.com/psh-series/

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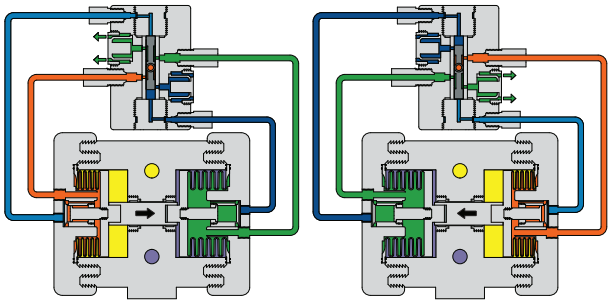
PSH SERIES PUMPS

Operation

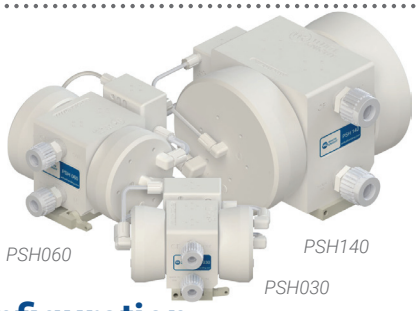
Pneumatic Logic™ minimizes pulsation, vibration, and wear. It ensures correct spool placement at the end of each stroke and resets shuttle valves after shutdowns. It has no detents to fail or seals to fatigue.

See online animation.



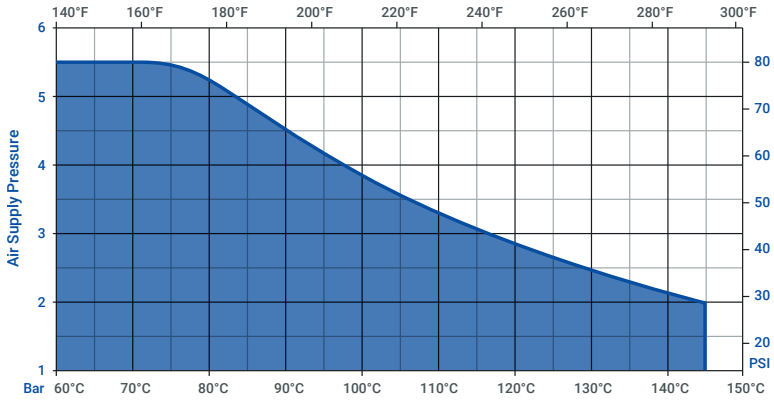
Supply air to left side | Supply air to right side

Supply Air | Shift Air | Liquid Out
Exhaust Air | Ambient Air | Liquid In



PSH060 PSH140 PSH030

Temperature Limitations



Specifications

Model		PSH015	PSH030	PSH060	PSH140
Max Flow Rate*		13.4 lpm (3.54 gpm)	22.8 lpm (6.02 gpm)	58.3 lpm (15.40 gpm)	118 lpm (31.3 gpm)
Displacement Per Cycle*		0.074 liters (0.019 gal)	0.074 liters (0.019 gal)	0.178 liters (0.047 gal)	0.500 liters (0.132 gal)
Cycles per min		≤ 216	≤ 292	≤ 348	≤ 254
Air Connection		1/4 in FNPT	1/4 in FNPT	1/4 in FNPT	3/8 in FNPT
Weight		4.6 kg (10.05 lb)	4.6 kg (10.05 lb)	7.3 kg (16.1 lb)	18.5 kg (40.9 lb)
Suction Lift*		≤ 1 m (3 ft)	≤ 1 m (3 ft)	≤ 1 m (3 ft)	≤ 1 m (3 ft)
Sound	Pressure**	74.00 dB(a) 79.90 dB(a)	74.00 dB(a) 79.90 dB(a)	73.11 dB(a) 82.50 dB(a)	71.73 dB(a) 75.42 dB(a)
	Power**	63.01 dB(a) 69.90 dB(a)	63.01 dB(a) 69.90 dB(a)	64.29 dB(a) 74.11 dB(a)	70.46 dB(a) 75.27 dB(a)

Stroke Detection	Fiber optic with or without D10 sensor, or solid state pressure switch (NPN or PNP)
Leak Detection	Fiber optic with or without sensor, or conductivity
Electronic Control	CPC, CPT, or custom. Call for details.

Max Fluid Temperature	145°C (293°F)
Max Supply Air Pressure	5.5 Bar (80 psi)
Min Startup Air Pressure	1.4 bar (20 psi)
Fluid Path Materials	PTFE, PFA
Non-Fluid Path Materials	PTFE, PFA, Ceramic

** May vary by configuration and system. Suction lift diminishes over time. Recommended installation level less than 3 ft above source. To calculate displacement, divide flow rate by CPM.*
*** dB at 80 psi 50 CPM (top) and 80 psi max. CPM (bottom). Sound levels measured in accordance with ISO9614-2:1997.*
****Dry-run capable PSHSD pumps require flooded suction, and may have a reduced warranty. Contact White Knight for details.*

Configuration

PSH 060 _ - F 12 - LF0 - SF0 - T P 08 - _
⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ *(optional)*

⓪ Pump Model
PSH = Standard
PSHSD = Dry-run capable

① Pump Size (max discharge)
015 = 15 lpm (4 gpm)
030 = 30 lpm (8 gpm)
060 = 60 lpm (16 gpm)
140 = 140 lpm (36 gpm)

② Check ball material
blank (default) = PTFE
F = PFA check balls

③ Fitting Style
F = Flaretek® compatible
P = Pillar S-300®
N = Female NPT (FNPT)
L = PrimeLock
T = Tube Out
W = Weldable

④ Fitting Size
04 = 1/4 in
06 = 3/8 in
08 = 1/2 in
12 = 3/4 in
16 = 1 in
20 = 1-1/4 in
24 = 1-1/2 in

⑤ Leak Detection *(optional)*
LF0 = 15 ft fiber optic cable, no amplifier
LF1 = 15 ft fiber optic cable, D10 amplifier
LF2 = 25 ft fiber optic cable, no amplifier
LF3 = 25 ft fiber optic cable, D10 amplifier
LC0 = 15 ft conductivity cable
LC1 = 25 ft conductivity cable

⑥ Stroke Detection
SF0 = Single probe, 15 ft fiber optic cable, no amplifier
SF1 = Single probe, 15 ft fiber optic cable, D10 amplifier
SF2 = Single probe, 25 ft fiber optic cable, no amplifier
SF3 = Single probe, 25 ft fiber optic cable, D10 amplifier
SP1 = Single Pressure Switch (NPN)
SP2 = Dual NPN Pressure Switch (each with two DP2)*
SP4 = Single PNP Pressure Switch
SP5 = Dual PNP Pressure Switch (each with two DP2)

⑦ Liquid Outlet Position
F = Front straight liquid outlet
T = Top straight liquid outlet

⑧⑨ Liquid Outlet Style and Size
Choices are same as ③ and ④ above

⑩ Shuttle
blank (default) = PTFE
VX0 = No shuttle, standard ports*
VG1 = Gravity reset with remote exhaust
VM0 = Mag detent with standard exhaust**
VM1 = Mag detent with remote exhaust**

Define optional items only if desired. Define outlet fitting options (6-8) if they differ from inlet fitting options (2)(3).

All fittings are not available in all sizes, and all fittings are not compatible with all pump sizes. Call for details.

Operating pumps in timer mode requires end-of-stroke detection to prevent over stroking. Operating a pump in timer mode without stroke detection voids the warranty.

**Comes without White Knight shuttle valve.*

***Not available with PSH015 or PSH030*

Contact White Knight for copy exact information.

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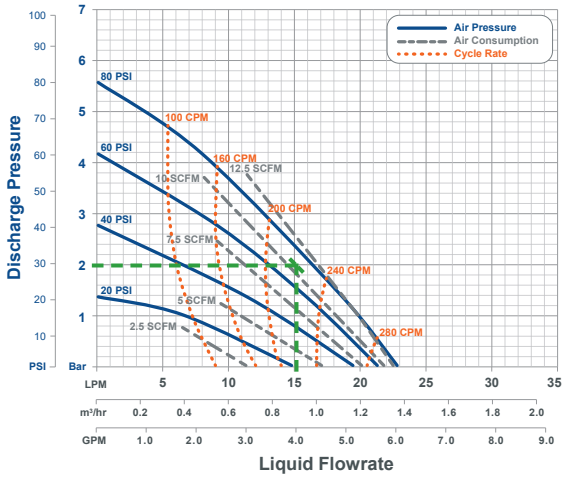
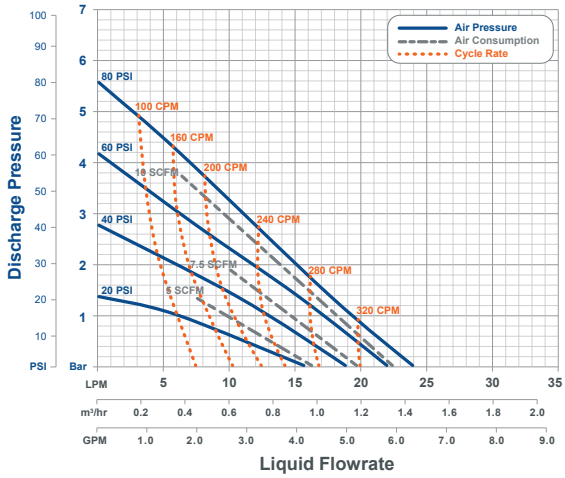
Performance

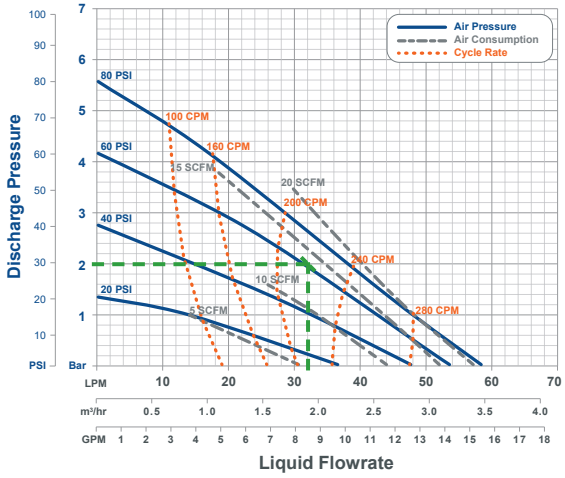
PSH030



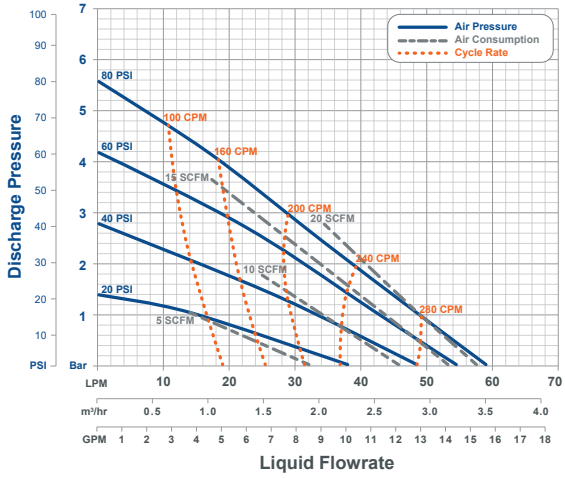
PSHSD030



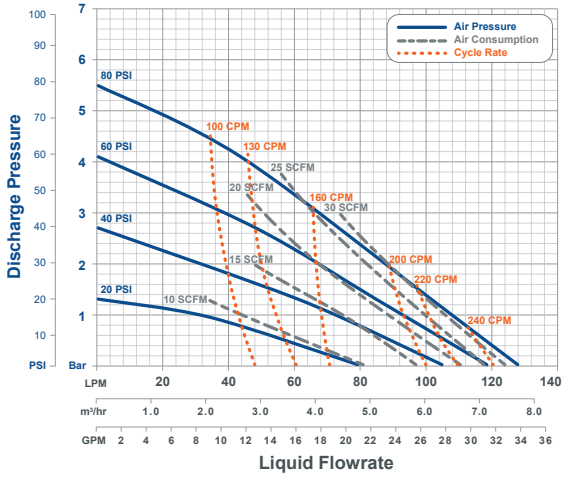
PSH060



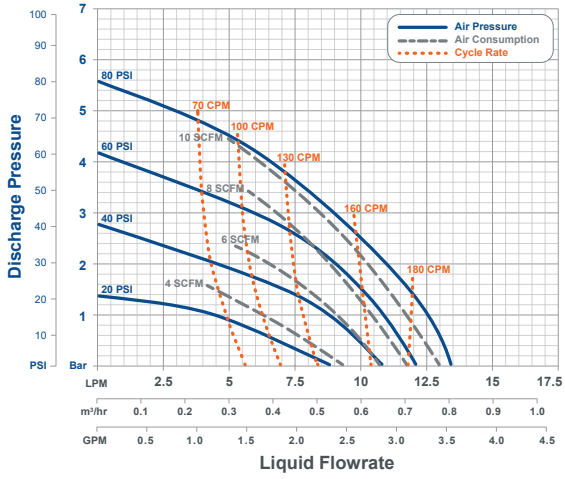
PSHSD060



PSH140



PSH015



Reading Charts

Draw a horizontal line from your discharge pressure and a vertical line through your desired flow rate. At their intersection, estimate required air supply pressure, cycle rate and air consumption.

See green dashed lines in PSH030 and PSH060 charts for examples.

Example 1

At 2 Bar (30 psi) liquid discharge pressure and 70 psi supply pressure, PSH030 pumps provide 15 lpm (4 gpm) liquid flow rate. They would cycle at 220 CPM, and exhaust 10 SCFM of air.

Example 2

At 2 Bar (30 psi) liquid discharge pressure and 60 psi supply pressure, PSH060 pumps provide 32 lpm (8.5 gpm) flow rates. They would cycle at 215 CPM and exhaust 18 SCFM of air.

**Graph is for reference only. Performance was measured utilizing 1/2 in (3/8 in ID) air line and 1-1/4 in (1-1/8 in ID) liquid lines with 1 ft flooded suction. Performance may vary in your system.*

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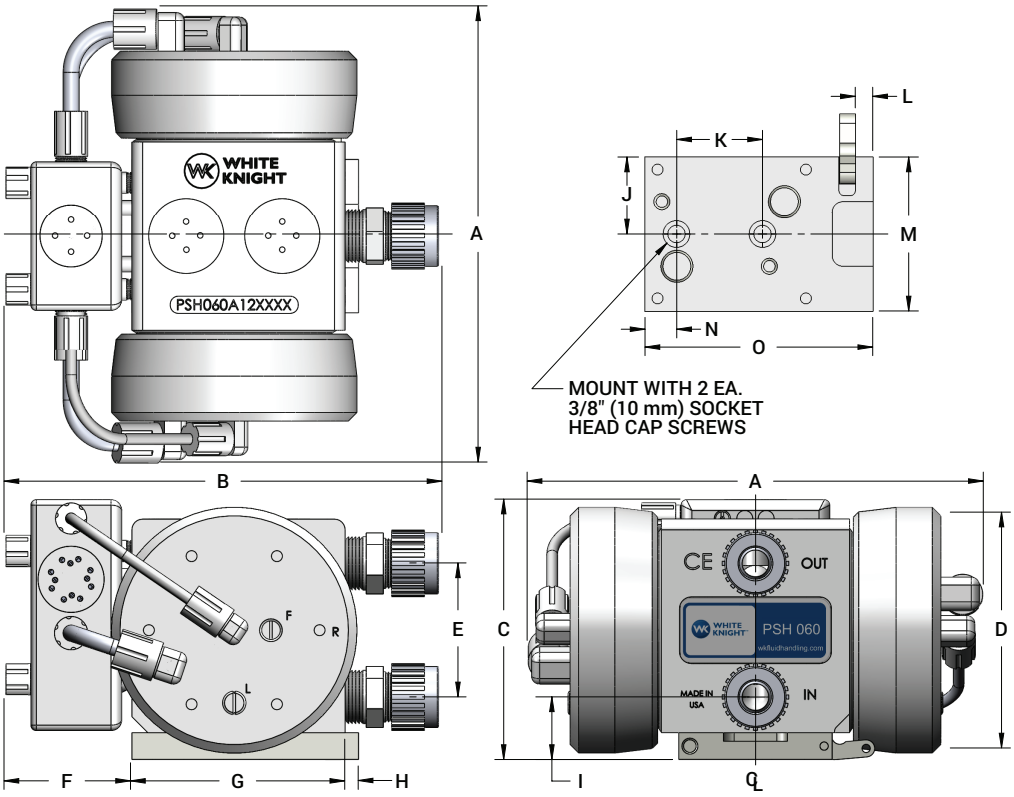
Dimensions

mm (inches)

	PSH015 PSH030	PSH060	PSH140
A	237 (9.3)	270 (10.6)	386 (15.2)
B	209 (8.2)	257 (10.1)	337 (13.3)
C	121 (4.8)	154 (6.1)	241 (9.5)
D	ø116 (4.6)	ø146 (5.8)	239 (9.4)
E	57 (2.2)	79 (3.1)	138 (5.4)
F	66 (2.6)	75 (3.0)	76 (3.0)
G	100 (3.9)	127 (5.0)	205 (8.1)
H	8 (0.3)	8 (0.3)	9 (0.3)
I	32 (1.3)	37 (1.5)	53 (2.1)
J	31 (1.2)	46 (1.8)	47 (1.8)
K	51 (2.0)	51 (2.0)	51 (2.0)
L	11 (0.4)	10 (0.4)	10 (0.4)
M	62 (2.5)	91 (3.6)	94 (3.7)
N	25 (1.0)	19 (0.7)	57 (2.2)
O	111 (4.4)	135 (5.3)	215 (8.4)

Rigid baseplate available. Call for details.

https://wkfluidhandling.com/psh/



White Knight Accessories

Ultrapure Closed-Loop Systems

Automatically control flow or pressure with metal-free systems capable of 210°C, dead-head and suction lift!

Automatically maintain flow or pressure in ultrapure chemical process and delivery systems. Simplify process automation to save time and resources, improve yields and reduce cost.

- Up to 210°C (410°F)
- No metals or elastomers
- No heat generation
- No O-rings or lubrication
- Suction lift & dead-head

https://wkfluidhandling.com/closed-loop/

Pulse Dampeners

Reduce pulsation in fluid systems to improve flow control, increase yields, protect fittings and pipes, and minimize downtime for repairs.

https://wkfluidhandling.com/dampeners/

Pressure Regulators

Control upstream or downstream pressure! A single back-pressure regulator equalizes upstream fluid pressure across multiple discharge outlets. Forward-pressure regulators control downstream pressure.

https://wkfluidhandling.com/regulators/

Cycle-Rate Translator

The CPT enables pump replacements in existing tools. It operates a White Knight pump at its optimal cycle rate and scales the operational cycle rate to that expected by the tool.

https://wkfluidhandling.com/cpt/

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