187 E. 670 S., Kamas, UT 84036
435.783.6040 888.796.2476
https://wkfluidhandling.com

PSD16 Owner's Manual

Manuals available online at: wkfluidhandling.com/owners-manuals

Manual Part #18200-LM-0036

2/28/2023 Version 1.1.9

187 E. 670 S., Kamas, UT 84036
435.783.6040 888.796.2476

Table of Contents

Manual content and data are subject to change without notification.
Manuals available online at: wkfluidhandling.com/owners-manuals

187 E. 670 S., Kamas, UT 84036
435.783.6040 888.796.2476

1 Introduction

Thank You for Purchasing White Knight Products

You have purchased a White Knight product that has been designed to our exacting specifications and built by a team of technicians with the highest commitment to quality!

White Knight is the world leader in zero-metal, ultra-high purity pumps and continues to drive the industry with new technology and products. Since the inception of White Knight in 1995, we have been awarded over 14 US design patents and have multiple other patents pending! White Knight currently produces over 30 sizes/models of pumps in varying materials to meet our customers' stringent requirements in numerous applications, including ultra-high temperature re-circulation; high pressure chemical delivery systems, slurry, industrial chemical, and industrial applications.

White Knight has received many prestigious awards for its designs and continues to lead the industry in quality because White Knight controls the manufacturing process from raw materials to finished goods in our facility located in Kamas, UT. This allows us to rigorously manage our quality control process to ensure that our strict cleanliness procedures are always followed and that components are built under consistent methods and conditions for maximum reliability.

Our strict manufacturing process controls include assembling and testing White Knight products in a clean environment. White Knight products also pass a battery of functional tests to ensure operational integrity.

Before installing your White Knight product, please carefully review the product manual. There are many helpful hints and ways to optimize the setup and use of your White Knight product as well as instructions and requirements for installation. In addition, you will also find many accessories in the manual that will enhance the functionality of your White Knight product.

Our team has gone to great lengths to provide you with the highest quality products at the best value and we back them up with excellent warranties and world class support! We hope you agree our products will serve your exacting needs and meet your stringent requirements every time you purchase a White Knight Product.

Sincerely,

Brian Callahan
President
White Knight Fluid Handling

2 Specifications & Performance

2.1 Pump Specifications

PSD16 Pump Performance Specification[1]								
Flow Rate	Theoretical Displacement Per Cycle	Suction Lift Wet	Suction Lift Dry	Sound Pressure[3] dB(a)	Sound Power[3] dB(a)	Max. Size of Passible Solids[4]	Max Operating Temperature	Air Supply Pressure Limits[5]
142 lpm (37.5 gpm)	.560 L (148 gal)	9.5 L (31.2 ft²)	4 m (13.1 ft)	66.64 83.28	61.57 78.27	6 mm 0.24 in	100°C TE 70°C UH	30 psi 100 psi

All tests performed with water at ambient temperatures and PTFE check balls

1. Pump Specifications are subject to change based on configuration ordered
2. Suction lift diminishes with wear of pump, minimize suction lift to maximize performance
3. dB Level at 100 psi 50CPM (top) and 100 psi maximum CPM (bottom).
4. The passing of solids may shorten the life of a pump
5. Minimum startup pressure (Max supply pressure)

STORAGE

PSD pumps that are not put into operation upon delivery must be stored in an environment where they are protected from moisture, extreme temperatures, UV radiation, vibration, and should be kept clean. White Knight recommends an environment of ambient temperature (between 60° F (15°C) and 80°F (25°C)) with a humidity level below 65%.

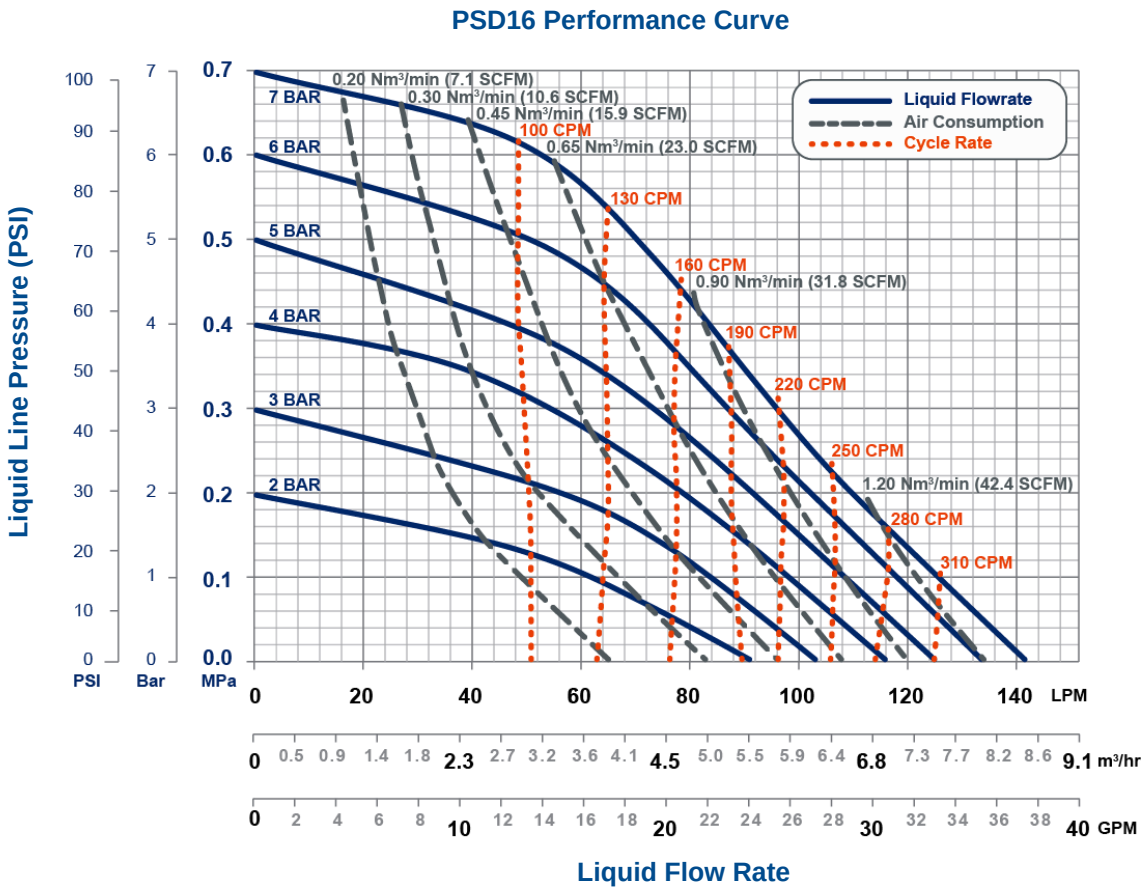
Maintenance and Torque Values

Upon installation of the pump, as well as after a few hours of operating the pump, the head and manifold bolts must be re-torqued. Tie bolts and manifold bolts must be re-torqued to values specified in the table below. Re-torquing will be required after the pump has set for extended periods of time, run in thermal cycling applications, been dismantled, or when there is a large difference between environmental and fluid temperatures. See torquing instructions on page 17.

	Assembly Torque in-lbs. (kg-cm)	Re-torque Spec in-lbs. (kg-cm)
Tie Bolts	60 (69.1)	55 (63.4)
Manifold Bolts	60 (69.1)	55 (63.4)

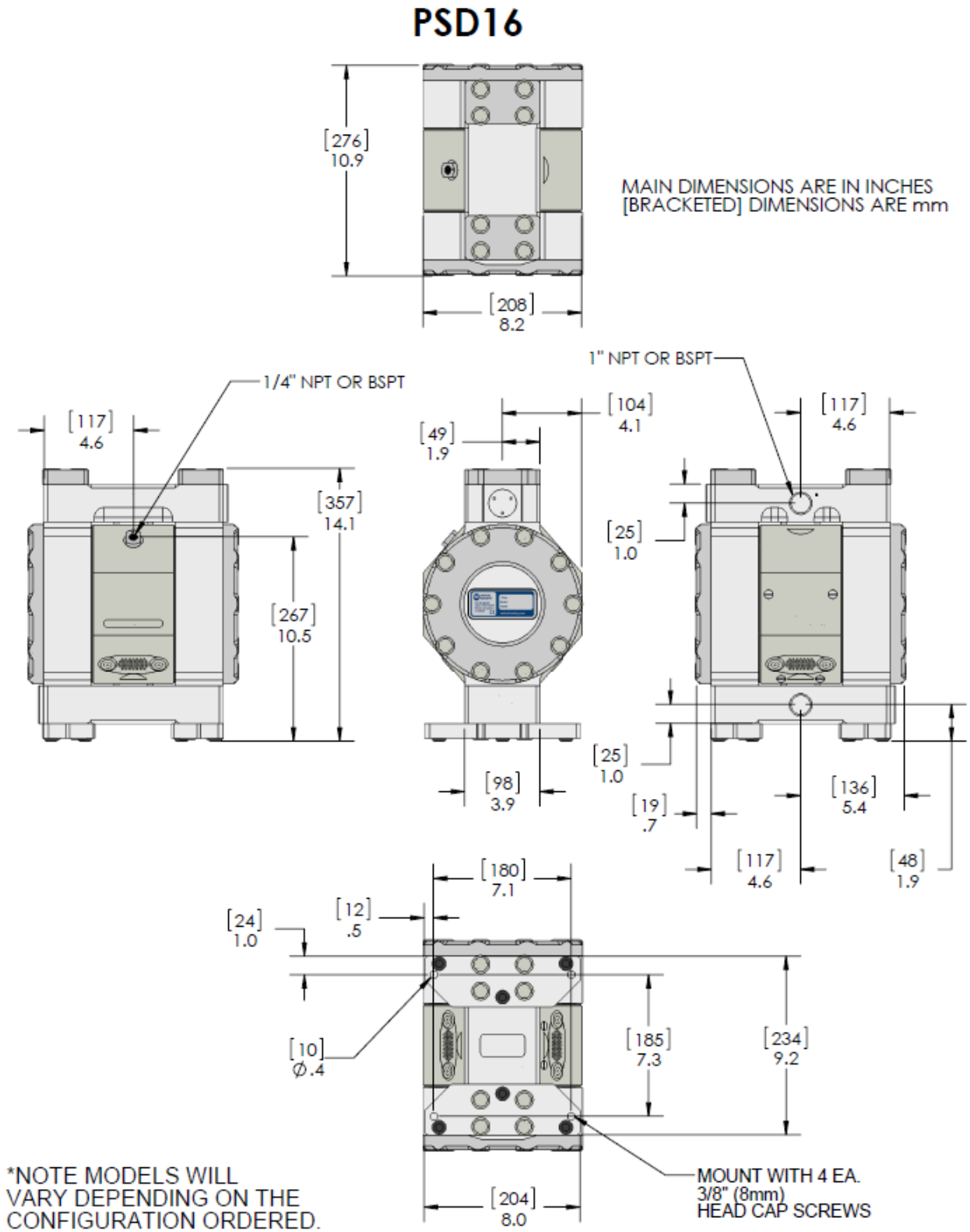
187 E. 670 S., Kamas, UT 84036
435.783.6040 888.796.2476

2.2 PSD16 Performance Curves



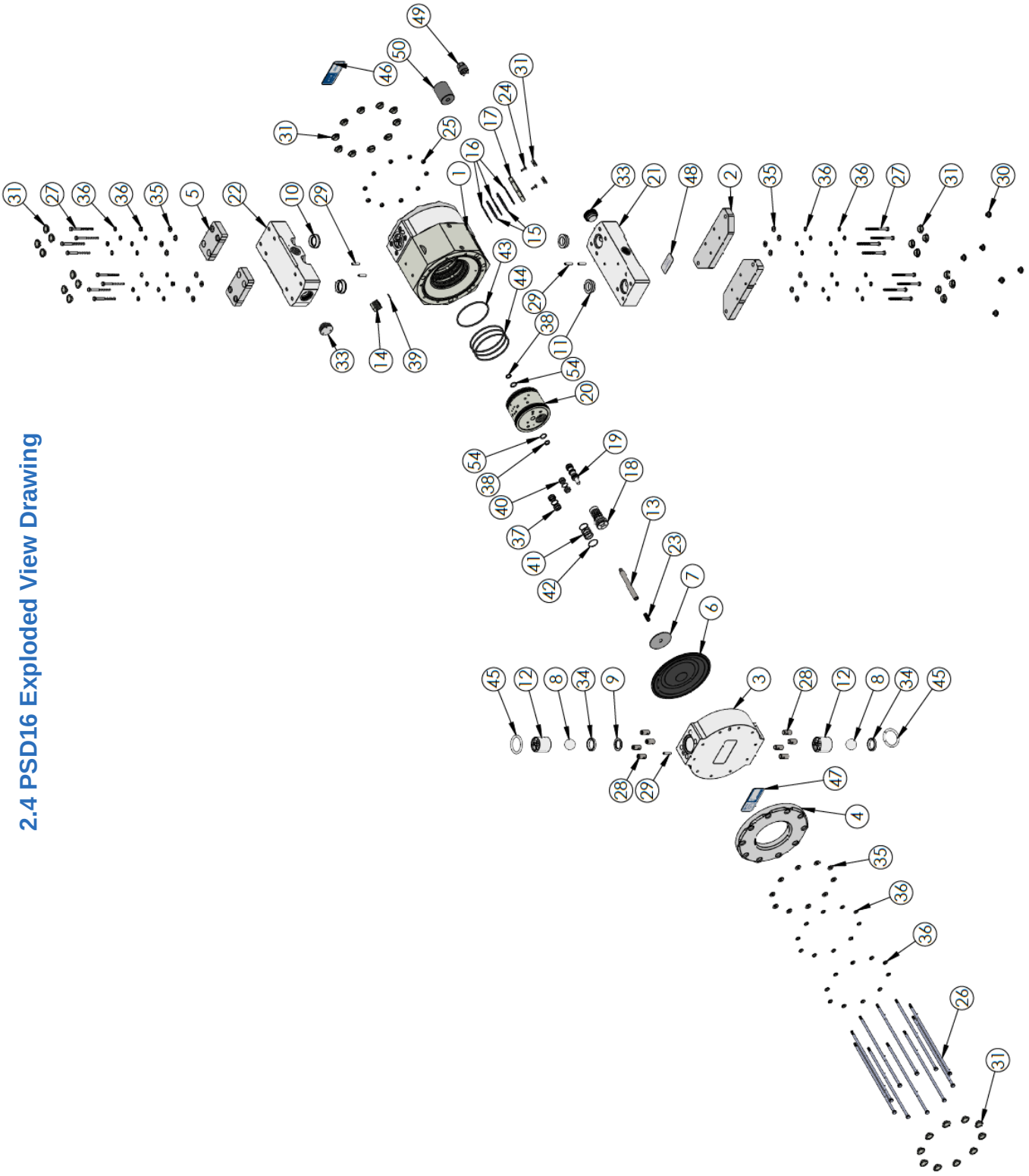
187 E. 670 S., Kamas, UT 84036
435.783.6040 888.796.2476

2.3 PSD16 Dimensional Drawing



187 E. 670 S., Kamas, UT 84036
435.783.6040 888.796.2476

2.4 PSD16 Exploded View Drawing



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	1125-NP-0002	BODY, PUMP	1
2	1146-PV-0001	BASE PLATE	2
3	2127-TE-0050	HEAD	2
3	2127-UH-0002	HEAD	
4	2129-PV-0003	RETAINER, HEAD	2
5	2129-PV-0004	RETAINER, MANIFOLD	2
6_N	3200-BN-0002	DIAPHRAGM	2
6_O	3200-EM-0002	DIAPHRAGM	
6_E	3200-TE-0002	DIAPHRAGM	
7	3300-SS-0003	STRIKE PLATE	2
8_T	4100-TE-0004	CHECK BALL- 1-1/8"	4
8_E	4100-EM-0002	CHECK BALL- 1-1/8"	
8_S	4100-SS-0002	CHECK BALL- 1-1/8"	
8_N	4100-NB-0002	CHECK BALL- 1-1/8"	
9	4135-TE-0012	WEARABLE SEAT	2
9	4135-UH-0004	WEARABLE SEAT	
10	4135-TE-0015	TOP MANIFOLD WEAR SEAT	2
10	4135-UH-0007	TOP MANIFOLD WEAR SEAT	
11	4135-TE-0016	BOTTOM MANIFOLD WEAR SEAT	2
11	4135-UH-0008	BOTTOM MANIFOLD WEAR SEAT	
12	4137-TE-0005	CHECK CAGE	4
12	4137-UH-0003	CHECK CAGE	
13	5144-SS-0002	SHAFT	1
14_N	6060-NP-0007	INLET ADAPTER, 1/4" NPT	1
14_B	6060-NP-0008	INLET ADAPTER, 1/4" BSPT	
15	6140-FP-0006	BAFFLE	4
16	6140-PP-0001	SPACER BAFFLE	6
17	6150-NP-0009	MUFFLER CAP	2
18	6550-PT-0002	SLEEVE	2
19	6560-PT-0001	SPOOL	2
20	6600-NP-0002	AIR MOTOR	1
21_N	7500-TE-0003	MANIFOLD INLET NPT	1
21_B	7500-TE-0007	MANIFOLD INLET BSPT	
21_N	7500-UH-0003	MANIFOLD INLET NPT	
21_B	7500-UH-0007	MANIFOLD INLET BSPT	

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
22_N	7500-TE-0004	MANIFOLD OUTLET NPT	1
22_B	7500-TE-0008	MANIFOLD OUTLET BSPT	
22_N	7500-UH-0004	MANIFOLD OUTLET NPT	
22_B	7500-UH-0008	MANIFOLD OUTLET BSPT	
23	10010-SS-0007	THREADED STUD	2
24	10010-SS-0010	SCREW	4
25	10010-SS-0013	NUT	10
26	10010-SS-0107	TIE HEX BOLT	10
27	10010-SS-0017	SCREW	16
28	10011-SS-0002	MANIFOLD NUT	16
29	10020-WC-0001	DOWEL PIN	6
30	10040-NB-0001	FOOT RUBBER	6
31	10040-PE-0009	CAP PLUG	40
32	10040-TE-0003	NPT PLUG	4
33	10040-TE-0013	PLUG	2
34	10050-MP-0001	D-RING	4
34	10050-UH-0006	D-RING	
35	10050-SS-0002	WASHER NO 12	36
36	10050-SS-0005	WASHER, BELLEVILLE	72
37	10050-UH-0003	GLIDE SEAL	10
38	10050-UH-0004	GLIDE SEAL	2
39	10080-EM-014-70	-014 O-RING	1
40	10080-EM-015-70	-015 O-RING	10
41	10080-EM-020-70	-020 O-RING	10
42	10080-EM-022-70	-022 O-RING	2
43	10080-EM-113-50	-113 O-RING	2
44	10080-EM-238-70	-238 O-RING	1
45	10080-EM-240-70	-240 O-RING	3
46	10080-TE-326	-326 O-RING	4
47	19100-PP-0038	PRODUCT LABEL	1
48	19100-PP-0058	CE LABEL	1
49	19100-PP-0124	PATENT STICKER	1
50	12100-PV-0030	SLEEVE WRENCH	1
51	12100-PV-0032	WEAR SEAT INSTALLATION TOOL	1

PTFE CONFIG

UHMW CONFIG

WHITE KNIGHT®
engineer approved™
187 E. 670 S., Kamas, UT 84036
435.783.6040 888.796.2476

3 Installation

3.1 Installation Precautions

Required Air Flow and Operating Pressure
Required Air Flow for the PSD16 is 3/8” minimum orifice unrestricted. An adaptor is included for ¼”NPT or ¼” BSPT with all pumps, NPT or BSPT is decided on based on the liquid fittings requested. Max air supply for the PSD16 is 7 Bar (100 PSI).
Restriction of Liquid Inlet Line
Restricting the liquid supply of the pump forces the pump to work harder than normal and should be avoided whenever possible, especially when pumping viscous liquids. Attempting to operate the pump against a closed liquid inlet will cause serious damage to the pump, and will void the warranty. If you wish to slow or stop your pump this may be done by closing off the liquid outlet.
Supply Pressure Recommendations
The life of your pump may be extended significantly by operating your pump 30%-40% below redline operating supply pressures. The use of undersized regulators, valves, and supply lines can decrease pump performance and longevity significantly.
Orientation
White Knight does not recommend installing your pump in any position other than its upright position. Check valves within White Knight PSD pumps are actuated by gravity and/or flow and perform optimally in the upright position.
Failure Potential
It is possible that the diaphragm may fail. In such a situation it is possible that chemical could enter the air side of the pump, and may even escape through the muffler. In such a situation the muffler media must be replaced and the air side purged. White Knight recommends that the implementation of a one way valve on the air side to protect air lines from contamination in the event of a diaphragm failure.
Muffler
Pump performance may be restricted in the event of a clogged muffler. Regular inspection of air lines and muffler media is recommended to maintain performance.
Product Testing
Each pump is tested before being packaged for shipment. White Knight recommends the flushing of each pump before servicing if water can contaminate the process.

3.2 PSD Installation Advantages

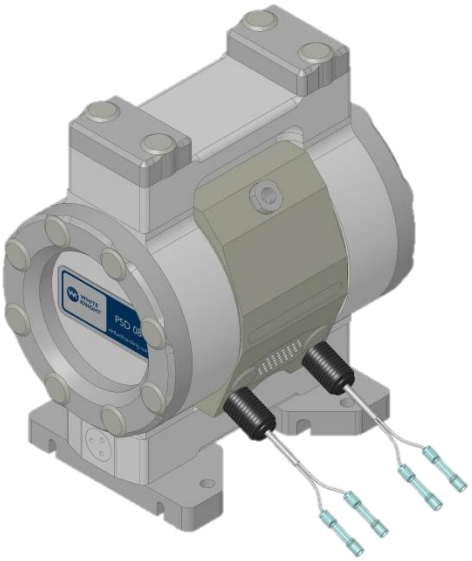
Head Pressure / Dead-Head
White Knight PSD pumps may be controlled by opening and closing the outlet of the pump and may be installed in any head pressure situation up to dead-head. Dead-head occurs when air supply pressure and the liquid line (head) pressure are equal. Dead-head conditions allow for no flow. Under dead-head conditions the PSD will cease to cycle (limiting wear) until conditions change allowing for flow.
Passing Solids
All damage caused by passing solids (wafer shards, etc.) is coverable under warranty when your pump is used in conjunction with a White Knight Catcher™ pre-pump filter.
Running Dry
White Knight PSD pumps are capable of running dry without damage other than normal wear to the pump. When a pump is run dry it cycles faster than normal, accelerating the rate of normal wear.

3.3 System and Pump Environment

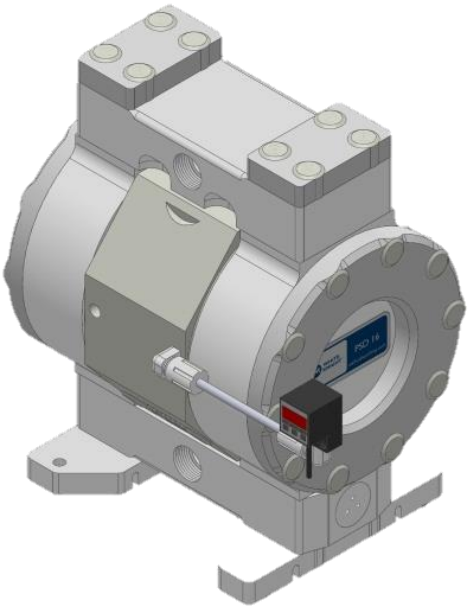
Clean Dry Supply Air (CDA)
Operation of the point of 5 PSD16 requires class 4 quality air for particles, moisture, and oils. (maximum particle size 15 microns, 3° C Dew 5 mg/m³) per ISO8573 – 1.
Flammable Solvents
Any system used to pump flammable solvents should be properly grounded. A test from River's Edge on using isolative pumps to pump flammable liquids indicated that the liquid itself must be grounded and that other procedures should be followed. A copy of the test is available upon request from White Knight.
Abrasive Slurries
For slurry applications White Knight recommends use of the PSD UH pump.
Pumping Liquids Near Boiling Point
The boiling point of a liquid is reduced under vacuum (suction) conditions. Due to the vacuum caused by a pump, liquid could boil in the inlet line of the pump when it is not boiling in the tank (or other supply reservoir). Placing the pump as close as possible to the tank and with as little vertical lift as possible (the pump being flooded by gravity is ideal) minimizes boiling in the inlet line. Boiling of the liquid in the inlet line causes a pump to "race" and accelerates the wear of the pump. Boiling liquids may cause cavitation to occur. Damage to wearable or non-wearable components of the pump caused by cavitation is not covered under warranty.
Running a Submerged Pump
When running the PSD in submerged mode, the exhaust air must be sealed and redirected above the surface of the media. Take care that all pump parts (air side and wet side) are resistant to the media being used. It may be necessary to mount the pump to the bottom of the tank. Operating this pump while submerged requires use of a remote muffler adaptor kit.
Temperature
The PSD may be operated safely in low temperature applications. Take care to avoid freezing or crystallization of the fluid inside or outside of the pump. Running the pump at temperatures below freezing may accelerate the wear of the elastomer components within the pump. In applications where the media or pump temperature varies, torque values (tension) of the manifold and head bolts must be monitored. TE versions of the PSD Series pumps can be operated at temperatures up to 100°C (212° F). UH versions of the PSD Series pumps can be operated at temperatures up to 70°C (158°F).

3.4 Control and Monitoring Connections

- **PUMP MONITORING:** Pump monitoring can be performed by solid state pressure switch monitoring. This option is described on our website in the accessories section and is available for new orders and for retrofits in the field.



Conductivity Leak Detection



Pressure Switch Stroke Detection

- Pump Control: Run mode and flow rate are two of the items which the CPT-1 can control/monitor.

3.5 PSD 16 Installation Instructions

1. 

- Fix base plate to work station with four 3/8” or 10 mm bolts. (Bolts not included.)

2. 

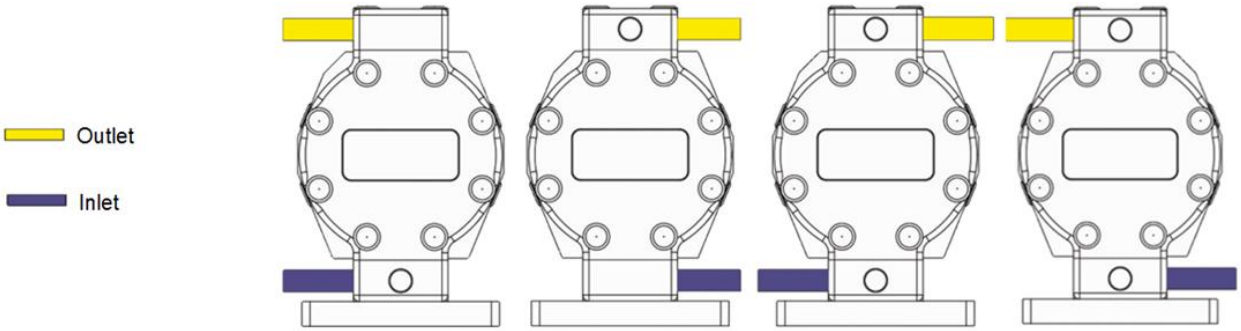
- Attach 1” liquid fittings to pump. Excessive force may damage threads.

3. 

Use appropriate air fitting adapter for ¼” NPT or ¼” BSPT

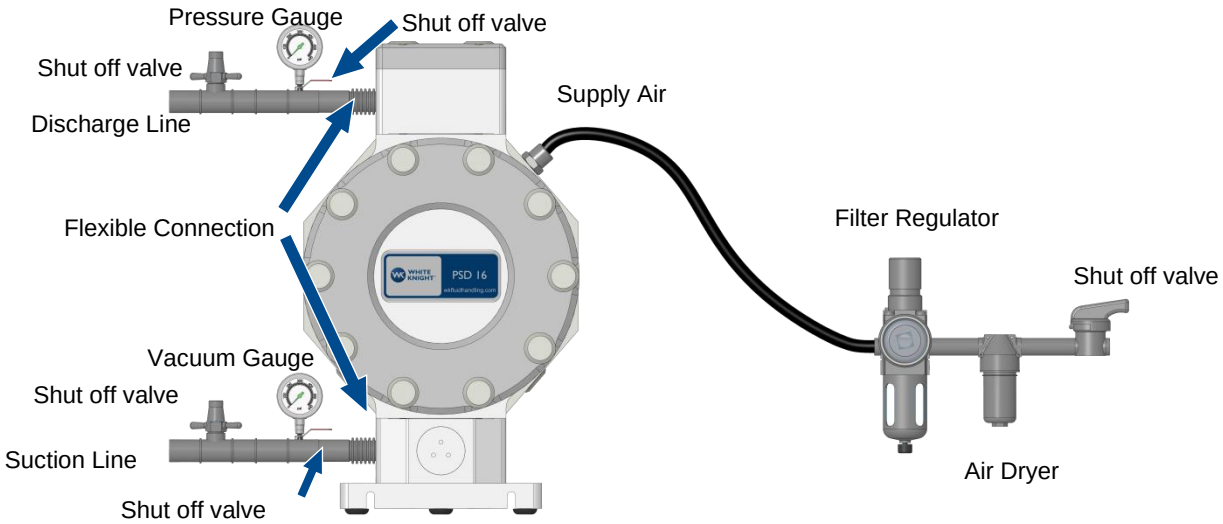
- Ensure airline is free of solids before attaching. Supply air via ¼” NPT air fitting with flexible connection.

Inlet/Outlet Configurations



Some configurations require re-orientation of crossover manifolds. See Disassembly and Assembly Instructions.

Recommended Set Up



Caution: closing suction line while pump is operating will cause irreversible damage to the pump.

WHITE KNIGHT® engineer approved™
187 E. 670 S., Kamas, UT 84036
435.783.6040 888.796.2476

4 Pump Service & Rebuilds

4.1 PSD Ordering instructions

Configuration

Required *Optional*

PSD08 TE - O T N - SP1 - LC0 - EK - AB

0	1	2	3	4	5	6	7	8
Pump Model (Orifice Dia.)	Fluid Path Materials	Diaphragms	Check Balls	Connections	Stroke Detect	Leak Detect	Exhaust	Air Inlet

PSD24 *PSD16* *PSD08* *PSD06* *PSD04*

Instructions

Options 0-4 are required. Options 5-8 are not required.
Contact support for revision or copy exact information.

Standard options are highlighted

0. Pump Model *(determined by orifice diameter)*	
1/4-inch orifice	PSD04
3/8-inch orifice	PSD06
1/2-inch orifice	PSD08
1-inch orifice	PSD16
1-1/2-inch orifice	PSD24

1. Fluid Path	
PTFE	TE
PE (UHMW)	UH

2. Diaphragms	
Over-Molded PTFE/EPDM	O
EPDM	E
NBR	N

3. Check Balls	
PTFE	T

Connection Compatibility

4. Connections			PSD04	PSD06	PSD08	PSD16	PSD24
NPT (same diameter as orifice)		N	✓	✓	✓	✓	✓
BSPT (same diameter as orifice)		B	✓	✓	✓	✓	✓
Flaretek Compatible 	1/4 in.	F04	✓	✓	-	-	-
	3/8 in.	F06	✓	✓	-	-	-
	1/2 in.	F08	-	✓	✓	✓	-
	3/4 in.	F12	-	✓	✓	✓	-
	1 in.	F16	-	-	✓	✓	-
	1-1/4 in.	F20	-	-	✓	✓	-
Pillar S-300 	1/4 in.	P04	✓	✓	-	-	-
	3/8 in.	P06	✓	✓	✓	-	-
	1/2 in.	P08	-	✓	✓	✓	-
	3/4 in.	P12	-	✓	✓	✓	-
	1 in.	P16	-	-	✓	✓	-
	1-1/4 in.	P20	-	-	✓	✓	-
	1-1/2 in.	P24	-	-	-	✓	-
Primelock 	1/2 in.	L08	-	✓	✓		
	3/4 in.	L12	-	✓	✓	-	-
	1 in.	L16	-	-	✓	✓	-
	1-1/4 in.	L20	-	-	-	✓	-
Tube Adapter 	3/8 in.	T06	-	✓	-	-	-
	1/2 in.	T08	-	✓	✓	-	-
	3/4 in.	T12	-	✓	✓	✓	-
	1 in.	T16	-	-	✓	✓	-
	1-1/4 in.	T20	-	-	✓	✓	-
	1-1/2 in.	T24	-	-	-	✓	-
Weldable 	1/2 in.	W08	-	✓	-	-	-
	3/4 in.	W12	-	✓	✓	✓	-
	1 in.	W16	-	-	✓	✓	-

5. Stroke Detection	
No Stroke Detection	*blank*
Pressure Switch (NPN)	SP1
Pressure Switch (PNP)	SP4

6. Leak Detection	
No Lead Detection	*blank*
15 ft. Conductivity Cable	LC0
25 Ft. Conductivity Cable	LC1

7. Exhaust	
Standard Exhaust	*blank*
Remote Exhaust Kit	EK

8. Air Inlet	
NPT Air Inlet	*blank*
BSPT Air Inlet	AB

4.2 Rebuild Kit Ordering Instructions

PSD16 Rebuild Kits

Part Name	Part Number
PSD16 Dry Rebuild Kit	RBPSD16-1
PSD16 Alternate Dry Rebuild Kit (Air Motor)	RBPSD16-2
PSD016TE-OT Wet Rebuild Kit	RBPSD16TE-OT
PSD016TE-ET Wet Rebuild Kit	RBPSD16TE-ET
PSD016TE-NT Wet Rebuild Kit	RBPSD16TE-NT
PSD016UH-OT Wet Rebuild Kit	RBPSD16UH-OT
PSD016UH-ET Wet Rebuild Kit	RBPSD16UH-ET
PSD016UH-NT Wet Rebuild Kit	RBPSD16UH-NT
PSD16TE-OT Combined Rebuild Kit	RBPSD16TE-OT-1*
PSD16TE-ET Combined Rebuild Kit	RBPSD16TE-ET-1*
PSD16TE-NT Combined Rebuild Kit	RBPSD16TE-NT-1*
PSD16UH-OT Combined Rebuild Kit	RBPSD16UH-OT-1*
PSD16UH-ET Combined Rebuild Kit	RBPSD16UH-ET-1*
PSD16UH-NT Combined Rebuild Kit	RBPSD16UH-NT-1*
PSD16TE-OT Combined Alternate Rebuild Kit	RBPSD16TE-OT-2**
PSD16TE-ET Combined Alternate Rebuild Kit	RBPSD16TE-ET-2**
PSD16TE-NT Combined Alternate Rebuild Kit	RBPSD16TE-NT-2**
PSD16UH-OT Combined Alternate Rebuild Kit	RBPSD16UH-OT-2**
PSD16UH-ET Combined Alternate Rebuild Kit	RBPSD16UH-ET-2**
PSD16UH-NT Combined Alternate Rebuild Kit	RBPSD16UH-NT-2**

***Contains all parts of RBPSD16-1 and the applicable wet kit**
****Contains all parts of RBPSD16-2 and the applicable wet kit**

Parts Included in the RBPSD16-1 Rebuild Kit

Part Number	Description	Quantity
6140-FP-0006	Baffle, Porous Poly, PSD08/16	4
10040-PE-0009	Screw Caps for WK pumps, PSD08/16	5
14850-PT-0003	Spool/Sleeve Assembly for WL Pump PSD16	2
10300-XX-0001	PTFE Lubricant, Squeeze Tube	1

Parts Included in the RBPSD16-2 Rebuild Kit

Part Number	Description	Quantity
14860-NP-0002	PSD16 Air Motor Assembly	1
10080-EM-238-70	#238 EPDM O-ring Seal	1
10080-EM-240-70	#240 EPDM O-ring Seal	3
10300-XX-0001	PTFE Lubricant, Squeeze Tube	1
6140-FP-0006	Baffle, Porous Poly, PSD08/16	4
10040-PE-0009	Screw Caps for WK pumps, PSD08/16	5

Parts Included in the RBPSD16TE-OT Rebuild Kit

Part Number	Description	Quantity
10080-EM-113-50	#113 EPDM O-ring Seal	2
10050-UH-0004	Shaft Glide Seal for WK Pump PSD08	2
5144-SS-0002	Diaphragm Shaft for WK Pump, PSD16	1
10010-SS-0007	Stud, Threaded Plate, Strike	2
3300-SS-0003	Strike Plate for WK Pump, PSD16	2
3200-TE-0002	PTFE Over-molded Diaphragm for WK Pump, PSD16	2
4137-TE-0005	Retainer, Ball, 1-5/8", PTFE	4
4100-TE-0004	1-1/8" Check Ball for WK Pump, PSD16, PTFE	4
10050-MP-0001	D-ring	4
10080-TE-326	#326 O-ring Seal, PTFE	4
10040-PE-0009	Screw Caps for WK pumps, PSD08/16	36
10300-XX-0001	PTFE Lubricant, Squeeze Tube	1
4135-TE-0012	PSD16TE Wear Seat	2
4135-TE-0016	Bottom Manifold Wear Seat, PSD16TE	2
4135-TE-0015	Top Manifold Wear Seat, PSD16TE	2

Parts Included in the RBPSD16TE-ET Rebuild Kit

Part Number	Description	Quantity
10080-EM-113-50	#113 EPDM O-ring Seal	2
10050-UH-0004	Shaft Glide Seal for WK Pump PSD08	2
5144-SS-0002	Diaphragm Shaft for WK Pump, PSD16	1
10010-SS-0007	Stud, Threaded Plate, Strike	2
3300-SS-0003	Strike Plate for WK Pump, PSD16	2
3200-EM-0002	EPDM Diaphragm for WK Pump, PSD16	2
4137-TE-0005	Retainer, Ball, 1-5/8", PTFE	4
4100-TE-0004	1-1/8" Check Ball for WK Pump, PSD16, PTFE	4
10050-MP-0001	D-ring	4
10080-TE-326	#326 O-ring Seal, PTFE	4
10040-PE-0009	Screw Caps for WK pumps, PSD08/16	36
10300-XX-0001	PTFE Lubricant, Squeeze Tube	1
4135-TE-0012	PSD16TE Wear Seat	2
4135-TE-0016	Bottom Manifold Wear Seat, PSD16TE	2
4135-TE-0015	Top Manifold Wear Seat, PSD16TE	2

Parts Included in the RBPSD16TE-NT Rebuild Kit

Part Number	Description	Quantity
10080-EM-113-50	#113 EPDM O-ring Seal	2
10050-UH-0004	Shaft Glide Seal for WK Pump PSD08	2
5144-SS-0002	Diaphragm Shaft for WK Pump, PSD16	1
10010-SS-0007	Stud, Threaded Plate, Strike	2
3300-SS-0003	Strike Plate for WK Pump, PSD16	2
3200-BN-0002	NBR Diaphragm for WK Pump, PSD16	2
4137-TE-0005	Retainer, Ball, 1-5/8", PTFE	4
4100-TE-0004	1-1/8" Check Ball for WK Pump, PSD16, PTFE	4
10050-MP-0001	D-ring	4
10080-TE-326	#326 O-ring Seal, PTFE	4
10040-PE-0009	Screw Caps for WK pumps, PSD08/16	36
10300-XX-0001	PTFE Lubricant, Squeeze Tube	1
4135-TE-0012	PSD16TE Wear Seat	2
4135-TE-0016	Bottom Manifold Wear Seat, PSD16TE	2
4135-TE-0015	Top Manifold Wear Seat, PSD16TE	2

Parts Included in the RBPSD16UH-OT Rebuild Kit

Part Number	Description	Quantity
10080-EM-113-50	#113 EPDM O-ring Seal	2
10050-UH-0004	Shaft Glide Seal for WK Pump PSD08	2
5144-SS-0002	Diaphragm Shaft for WK Pump, PSD16	1
10010-SS-0007	Stud, Threaded Plate, Strike	2
3300-SS-0003	Strike Plate for WK Pump, PSD16	2
3200-TE-0002	PTFE Over-molded Diaphragm for WK Pump, PSD16	2
4137-UH-0003	UHMW Check Cage, PSD16UH	4
4100-TE-0004	1-1/8" Check Ball for WK Pump, PSD16, PTFE	4
10050-MP-0001	D-ring	4
10080-TE-326	#326 O-ring Seal, PTFE	4
10040-PE-0009	Screw Caps for WK pumps, PSD08/16	36
4135-UH-0004	Wear Seat, PSD16UH	2
4135-UH-0008	Bottom Manifold Wear Seat, PSD16UH	2
4135-UH-0007	Top Manifold Wear Seat, PSD16UH	2
10300-XX-0001	PTFE Lubricant, Squeeze Tube	1

Parts Included in the RBPSD16UH-ET Rebuild Kit

Part Number	Description	Quantity
10080-EM-113-50	#113 EPDM O-ring Seal	2
10050-UH-0004	Shaft Glide Seal for WK Pump PSD08	2
5144-SS-0002	Diaphragm Shaft for WK Pump, PSD16	1
10010-SS-0007	Stud, Threaded Plate, Strike	2
3300-SS-0003	Strike Plate for WK Pump, PSD16	2
3200-EM-0002	EPDM Diaphragm for WK Pump, PSD16	2
4137-UH-0003	UHMW Check Cage, PSD16UH	4
4100-TE-0004	1-1/8" Check Ball for WK Pump, PSD16, PTFE	4
10050-MP-0001	D-ring	4
10080-TE-326	#326 O-ring Seal, PTFE	4
10040-PE-0009	Screw Caps for WK pumps, PSD08/16	36
10300-XX-0001	PTFE Lubricant, Squeeze Tube	1
4135-UH-0004	Wear Seat, PSD16UH	2
4135-UH-0008	Bottom Manifold Wear Seat, PSD16UH	2
4135-UH-0007	Top Manifold Wear Seat, PSD16UH	2

Parts Included in the RBPSD16UH-NT Rebuild Kit

Part Number	Description	Quantity
10080-EM-113-50	#113 EPDM O-ring Seal	2
10050-UH-0004	Shaft Glide Seal for WK Pump PSD08	2
5144-SS-0002	Diaphragm Shaft for WK Pump, PSD16	1
10010-SS-0007	Stud, Threaded Plate, Strike	2
3300-SS-0003	Strike Plate for WK Pump, PSD16	2
3200-BN-0002	NBR Diaphragm for WK Pump, PSD16	2
4137-UH-0003	UHMW Check Cage, PSD16UH	4
4100-TE-0004	1-1/8" Check Ball for WK Pump, PSD16, PTFE	4
10050-MP-0001	D-ring	4
10080-TE-326	#326 O-ring Seal, PTFE	4
10040-PE-0009	Screw Caps for WK pumps, PSD08/16	36
10300-XX-0001	PTFE Lubricant, Squeeze Tube	1
4135-UH-0004	Wear Seat, PSD16UH	2
4135-UH-0008	Bottom Manifold Wear Seat, PSD16UH	2
4135-UH-0007	Top Manifold Wear Seat, PSD16UH	2

4.3 Configurable Rebuild Ordering Instructions

Pages 12 and 13 list the standard rebuild kits White Knight offers. Use this section for alternate rebuild kits not found in the previous section.

PSD Wet Side Rebuild Kit Ordering Instructions

Required Fields					
RBPSD	08 ①	TE ②	O ③	T ④	N ⑤

Please select one option from each of the required fields (1 - 5). To configure your pump with options such as stroke detection, please select options from the appropriate additional options (6-8).

①②③④ Pump Size and Wetted Components

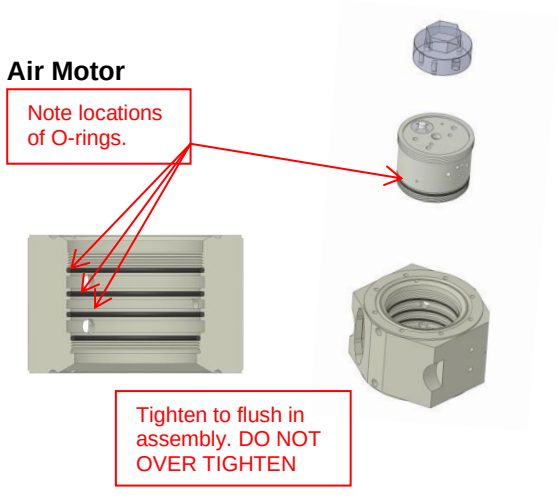
① Pump/orifice size	
04	= 1/4"
06	= 3/8"
08	= 1/2"
16	= 1"
24	= 1-1/2"

② Wetted Material*	
TE	PTFE
UH	PE (UHMW)

③ Diaphragm Material	
O	Over molded PTFE/EPDM
E	EPDM
N	NBR

④ Check Ball Material	
T	PTFE Ball

* Option C is only available for 04 and 06 size pumps
* Performance may change between ball materials



Air Motors do not need to be removed from the pump for service. However, complete air motors with all components (tested and certified) are available from White Knight. They can be removed and installed in the pump body as shown in the figure using the air motor pin wrench tool. (Rotate counter clockwise to remove.)

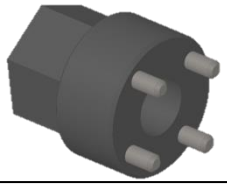
Part Number for Air Motor Assembly:

14860-NP-0002

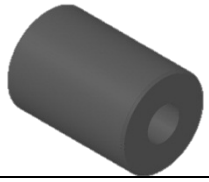
4.4 Tools

Part Name	Part Number	QTY.
Pin Wrench ¾" X 1/8" & ½" X 1/8"	12100-PV-0030	1
Pin Wrench ½" and 1" Air Motor*	12100-PV-0025	1
Wearable Surface Installation Tool	12100-PV-0032	1

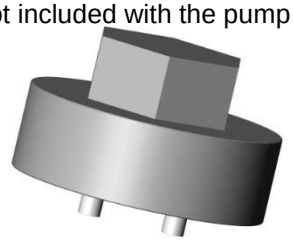
*Air motor does not need to be removed to service pump. The air motor wrench is not included with the pump but is available from White Knight.



Four pin wrench used to remove/install the Sleeve Pilot Spool Assembly (included with pump). Hex is for use with 19 mm or ¾" socket. (12100-PV-0030)



Tool for inserting wearable surfaces into manifolds and heads (included with pump) (12100-PV-0032)



Pin Wrench for removing air motors from ½" and 1" PSD pumps (Must purchase separately to remove air motor, not included with pump). (12100-PV-0025)

4.5 Torque Instructions

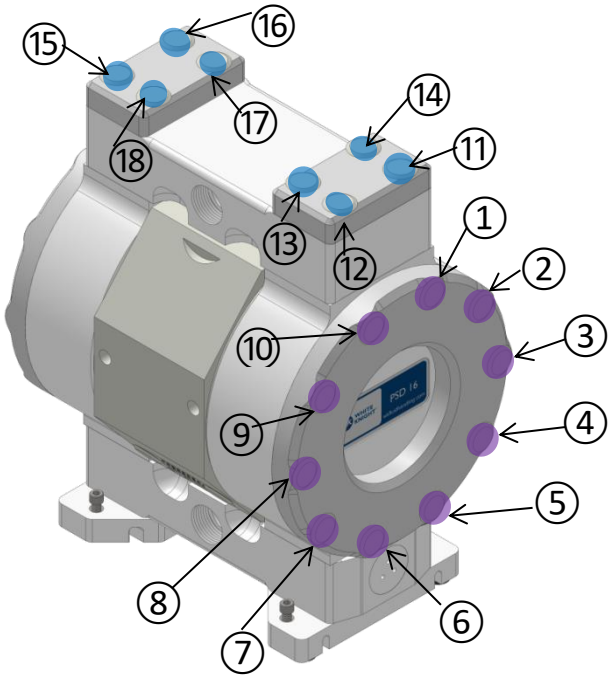
Tie Bolts Crossover Bolts

Tie bolts (purple) on both sides must be torqued **before** manifold bolts (blue) on top and bottom.

Torquing of head bolts should be done in a crossing fashion such as: 1, 6, 8, 3, 5, 10, 2, 7, 4, 9.

Torquing of manifold bolts should be done in a crossing fashion such as 13, 11, 12, 14, 17, 15, 18, 16.

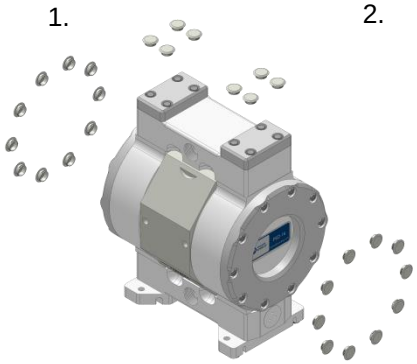
Apply Loctite Antiseize Lubricant LB 8012 (or equivalent) to all bolts. This procedure must be followed for assembly and also re-torquing of bolts.



	Assembly Torque in-lbs. (kg-cm)	Re-torque Spec in-lbs. (kg-cm)
Tie Bolts	60 (69.1)	55 (63.4)
Manifold Bolts	45 (51.84)	40 (46.1)

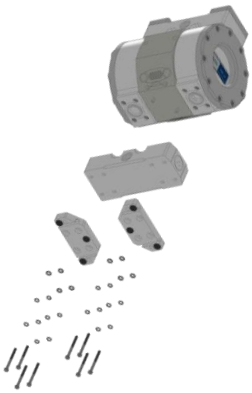
4.6 Disassembly instructions

1.



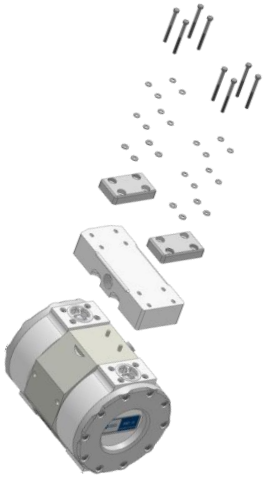
- Remove all plastic caps.

2.



- Use 10mm socket to remove pump base feet and inlet manifold

- Remove Top O-ring, and check valve parts. Without scratching the inner bore, use a hook to remove the check cages.

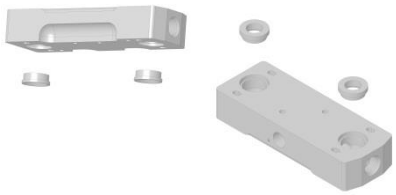


- Use 10mm socket to remove outlet manifold.

5.

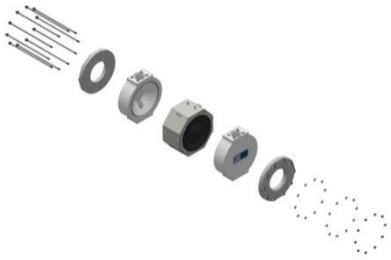
- Remove top check valve parts following process described in step 3. Use hook to remove wear surface placed below check assembly.

6.



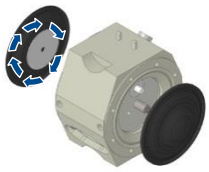
- Remove wear surfaces in top and bottom manifolds. Use hook if necessary.

7.



- Use 10mm socket to remove nuts from bolts on one side of head. Remove both heads.

8.

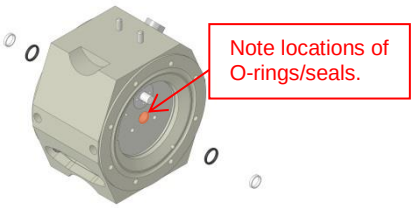


- Remove diaphragms by peeling one back and turning it counter-clockwise. Slide the second diaphragm out with the shaft.

9.

- Use 4mm Allen wrench to remove muffler cap. Remove poly felt muffler pads and inserts.

10.



- Remove the two glide seals seated in the shaft cavity. Then remove O-rings from the same slots. Take care to not damage the shaft bore or the O-ring grooves.

11.

- Use 19mm socket drive and pin wrench to remove pilot assembly. Repeat for other side.

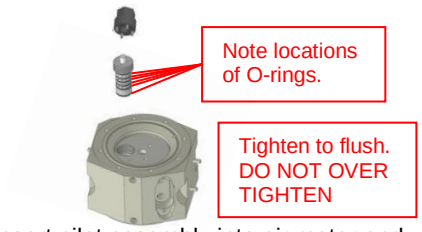
Servicing of Pump

Before servicing the pump make sure that the pump has been drained and cleaned so as to minimize the potential of physical damage and maximize the safety of service personnel.

187 E. 670 S., Kamas, UT 84036
435.783.6040 888.796.2476

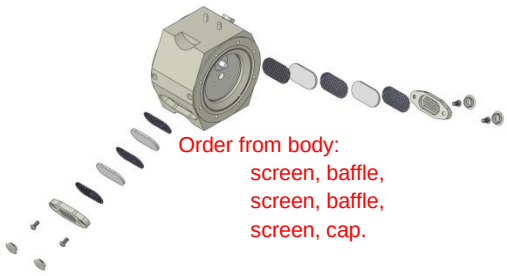
4.7 Assembly Instructions

1.



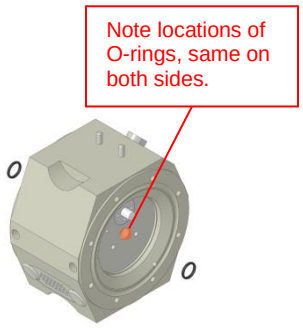
- Insert pilot assembly into air motor and tighten with pin wrench using 9mm socket drive. Repeat for other side.

2.



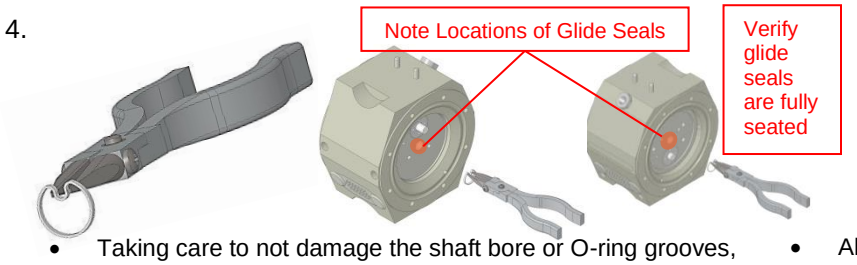
- Replace inserts and porous poly baffles. Secure muffler cap with screws using 4mm Allen Wrench. Torque to 16 in-lbs. (18 kg-cm).

3.



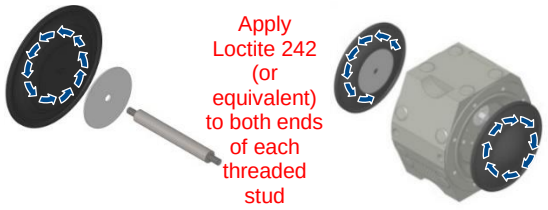
- Taking care to not damage the shaft bore or O-ring grooves, replace the shaft O-rings.

4.



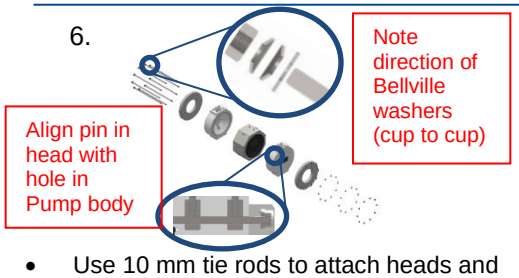
- Taking care to not damage the shaft bore or O-ring grooves, replace the shaft glide seals by pinching glide seal with needle nose pliers (rubber tipped) to form a kidney shape and insert into groove.

5.



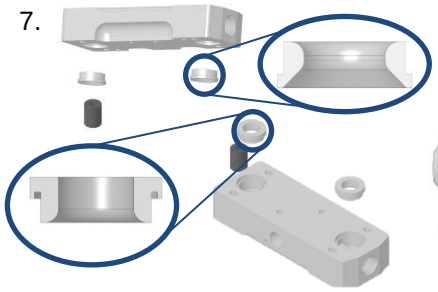
- Align strike plate and thread one diaphragm to the shaft and push it through the shaft bore. Align and thread the second diaphragm and plate onto the shaft. Make sure the diaphragms are snug on the shaft.

6.



- Use 10 mm tie rods to attach heads and retainer rings. Install all rods but **do not tighten**. Verify that top and bottom rods pass through the manifold nuts placed in heads. Apply antiseize lubricant to each tie rod.

7.

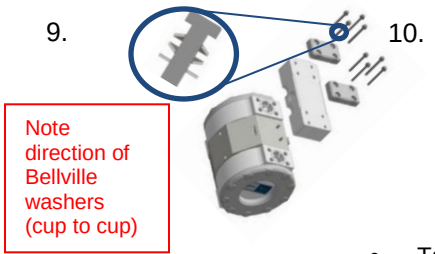


- Press wear-surfaces into grooves in manifolds. Note different parts for top and bottom manifolds.

8.

- Taking care to not damage the check bore areas, replace top check valve parts and O-rings. NOTE ORDER OF VALVE ASSEMBLY

9.

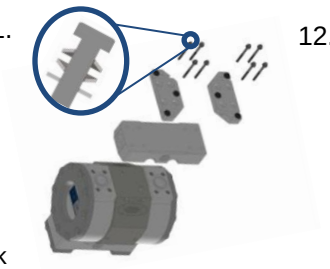


- Replace outlet manifold using 10mm socket. Apply antiseize lubricant to each tie rod. **Do not tighten**.

10.

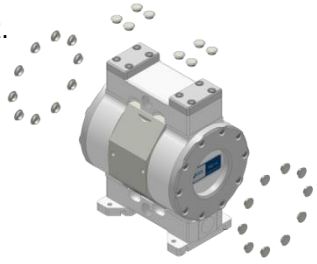
- Take care to not damage the check bore areas. Replace bottom check valve parts and O-rings. **Order of check valve assembly is different from top check valves.**

11.



- Replace bottom crossover using 10mm socket. **Do not tighten**. Return to page 17 and follow torque instructions.

12.



- Replace all plastic caps.

5 Accessories

Remote Muffler Adaptor Kit- (Not included with pump.) Required if pump is to be submerged.

Pump Catcher™

- Inline options available.
- Large through holes to avoid loading.
- Filter may be removed without removing the **Catcher™** from the pump or the line.
- If a pump were damaged by passing solids while using the **Catcher™** it would be repaired under warranty.

Control & Monitoring Options

Stroke Detection

- Solid State Pressure Switch SP1

Control Options – Run mode and flow rate are a few of the items which the **CPT-1** can control/monitor.

6 Warranty

White Knight Fluid Handling follows strict procedures in all phases of manufacturing, assembly, and testing to ensure reliability of its products. Each pump is individually tested to assure its functional operation integrity.

White Knight Fluid Handling warrants the PSD16 pump, subassemblies and components to be free from defects in materials and workmanship to one year from date of start-up or 18 months from the date of shipment whichever applies. Failures due to misuse, abuse or any unauthorized disassembly of a White Knight® pump will nullify this warranty.

The PSD16 pump is warranted for up to 100 PSI air supply pressures. It is not covered under dry run condition. Wearable parts are not covered.

Due to the broad and ever-evolving applications for usage of White Knight® pumps we cannot guarantee the suitability of any pump component or subassembly for any particular or specific application. White Knight Fluid Handling shall not be liable for any consequential damage or expense arising from the use or misuse of its products in any application. Responsibility is limited solely to the replacement or repair of defective White Knight® pumps, components or subassemblies. All options to rebuild or replace aforementioned items shall remain under the judgment of White Knight Fluid Handling. Decisions as to the cause of failure shall be solely determined by White Knight Fluid Handling.

Prior written, faxed or emailed approval must be obtained from White Knight Fluid Handling before returning any pump component or subassembly for warranty consideration.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING ANY WARRANTIES OF SUITABILITY FOR ANY PARTICULAR PURPOSE. NO VARIATIONS OF THIS WARRANTY BY ANYONE OTHER THAN THE PRESIDENT OF WHITE KNIGHT FLUID HANDLING IN A SELF-SIGNED AGREEMENT SHALL BE HONORED OR CONSIDERED LEGALLY BINDING.

Brian Callahan
President
White Knight Fluid Handling

7 Certificate & Declaration of Conformity

CERTIFICATE & DECLARATION OF CONFORMITY FOR CE MARKING

Company contact details:
White Knight Fluid Handling Inc.
187 E. 670 S., Kamas, Utah, 84036, USA

White Knight Fluid Handling Inc. declares that their:
Bellows Pump Line
PSA030, PSA060, PSA140, PSH030, PSH060, PSH140, PSU030, PSU060, PSU140, PSA025, PSA050, PFA030, PFA060, PFA140, PFH030, PFH060, PFH140, PFU030, PFU060, PFU140, PXA030, PXA060, PXA140, PXH030, PXH060, PXH140, PXU030, PXU060, PXU140

Diaphragm Pump Line (Non Conductive)
PSD04TE, PSD06TE, PSD08TE, PSD16TE, PSD24TE, PSD04UH, PSD06UH, PSD08UH, PSD16UH, PSD24UH

Diaphragm Pump Line (Conductive)
PSD04TC, PSD06TC, PSD08TC, PSD16TC, PSD24TC, PSD04UC, PSD06UC, PSD08UC, PSD16UC, PSD24UC

Legacy Pump Line
PLS30, PLS60, PLS120, PLX30, PLX60, PLX120, PX30, PX60, PX120, PLF30, PLF60, PLF120

Metering Pumps
PPM100, PEM100, PEM050

Plastic Pumps
PHC40-2, PPMC300

are classified within the following EU Directives as applicable:
Machinery Directive 2006/42/EC
Low Voltage Directive 2014/35/EU
Electromagnetic Compatibility Directive 2014/30/EU
RoHS 2 Directive 2011/65/EU

and further conform with the following EU Harmonized Standards as applicable:
EN 809:1998+A1:2009 EN 60204-1:2006 + A1:2009 EN 61000-6-2:2005 EN 61000-6-4:2007+A1:2011

Dated: 16 January 2017
Position of signatory: Product Manager **Name of Signatory:** Cory Ammon Simmons
Signed below: on behalf of White Knight Fluid Handling Inc.

187 E. 670 S., Kamas, UT 84036
435.783.6040 888.796.2476

Page left intentionally blank

White Knight Support

187 E. 670 S.
Kamas, UT 84036
Phone: 435.783.6040
Toll Free: 888.796.2476
Fax: 435.783.6128

support@wkfluidhandling.com

https://wkfluidhandling.com/support/