PD 028 P S 02 S R S 5 B C0 0 E 1 2 0 00 00

Pump Series	Displacement 28cc/rev. (1.71 in³/rev)	Open Circuit	Mounting & Ports	Shaft Options	Single Shaft Seal	Shaft Rotation	Configuration	Fluorocarbon Seal Material	Design Letter	Control Options	Additional Control Options	Port Orientation	Adjustable Displacement Stops	Port Type	Thru-Drive Mounting Pad/Coupling	Paint	Special Features
PD	028	P	S	02	S	R	S	5	B	C0	0	E	1	2	0	00	00

30-320 BAR
435-4640 PSI

Pump Series	
P1	Mobile
PD	Industrial

Mounting & Ports	
S	SAE B Pilot SAE Work Ports with SAE Aux Ports
A	SAE B Pilot Metric Work Ports with BSPP Aux Ports
M	ISO - 100MM Pilot Metric Work Ports with Aux Ports
B	ISO - 100MM Pilot Metric Work Ports with BSPP Aux Ports

Shaft Options	
01	Splined shaft - SAE B-B 15T
02	Keyed shaft - SAE B-B 1" Dia.
04	ISO keyed 25MM Dia.
08	Splined shaft - SAE B 13T

Shaft Rotation	
R	Clockwise
L	Counterclockwise

Configuration	
M	Mobile (P1)
S	Industrial (PD)

Control Options	
C0	Pressure limiter 942-4061 PSI (65-280 bar)
C1	Pressure limiter 290-1160 PSI (20-80 bar)
L0	Load sensing 145-435 PSI ΔP (10-30 bar ΔP) with pressure limiter 942-4061 PSI (65-280 bar)
L2	Load sensing 145-435 PSI ΔP (10-30 bar ΔP) with bleed & pressure limiter 942-4061 PSI (65-280 bar)
AN*	Pilot operated pressure limiter with ISO4401 interface & SAE 4 Vent Port
AM	Pilot operated pressure limiter with mechanical adjustment and SAE 4 Vent Port
AE	Pilot operated pressure limiter with mechanical and electrical adjustment 12 VDC
AF	Pilot operated pressure limiter with mechanical and electrical adjustment 24 VDC
##	See chart below for electronic control options

*Not functional control as such

Additional Control Options	
0	No other options
2	Displacement sensor **

** mandatory with "W**", "X**", "Y**", "Z**" "D*" and "Y*"

Port Orientation	
E	End Ports
R	Side ported with ripple chamber
T	Side ported with through drive

Adjustable Displacement Stops* (For E & R Port Orientation Only)	
0	None
1*	Adjustable maximum displacement stop
2*	Adjustable minimum displacement stop
3*	Adjustable maximum and minimum displacement stop

*Not available with Thru-Drive

Port Type	
0	Flange Ports
2	Threaded Ports

Thru-Drive Mounting Pad/Coupling	
0	No Thru-Drive
A	SAE 82-2 (A), 16 (A), 9T coupling
H	SAE 82-2 (A), 19 (--), 11T coupling
B	SAE 101-2 (B), 22 (B) , 13T coupling
Q	SAE 101-2 (B), 25 (B-B), 15T coupling

Paint	
00	No Paint
PB	Black Paint

Electronic Control Options	
#	#

0	No ECU - 9 VDC valve
M	No ECU - 24 VDC valve
D	Proportional displacement control
Y	Proportional pressure and displacement control

P	Electronic valve with zero displacement default
T	Electronic valve with max displacement default
S	Electronic valve with zero displacement default and hydromechanical Pmax
U	Electronic valve with max displacement default and hydromechanical Pmax
W	Electronic valve with zero displacement default (CANBUS compatible)
Y	Electronic valve with max displacement default (CANBUS compatible)
X	Electronic valve with zero displacement default and hydromechanical Pmax (CANBUS compatible)
Z	Electronic valve with max displacement default and hydromechanical Pmax (CANBUS compatible)

*** W, X, Y and Z only available with *D* and *Y*

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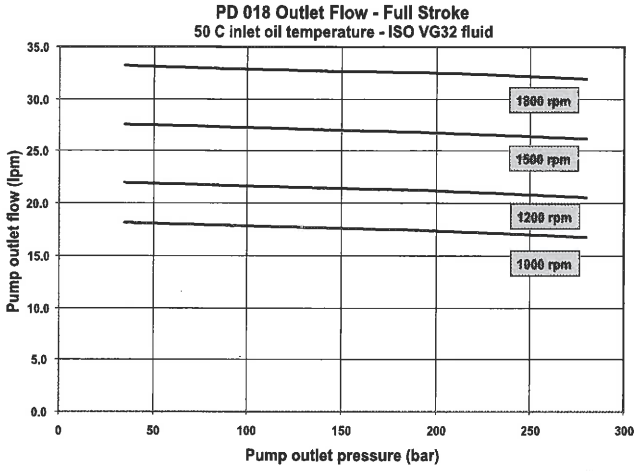
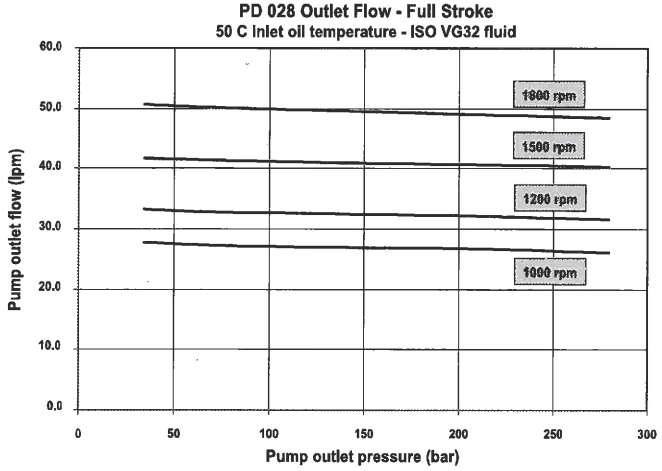
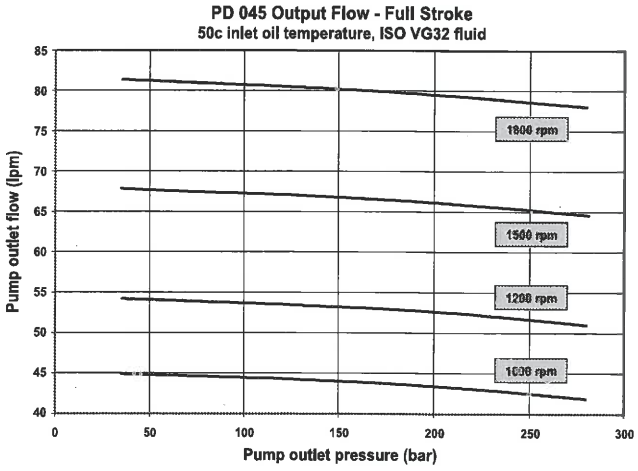
PD Series Typical Pump Outlet Flow







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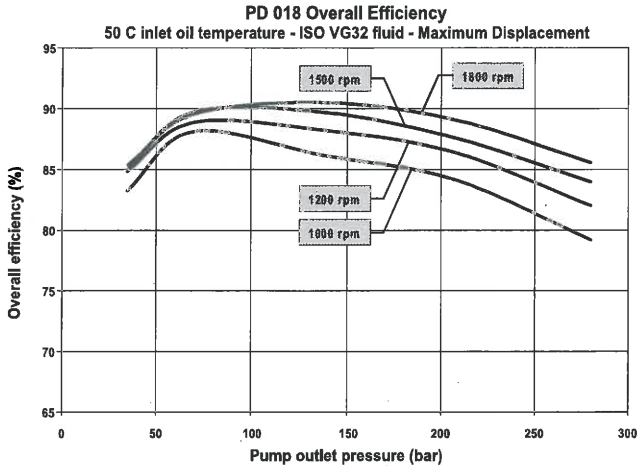
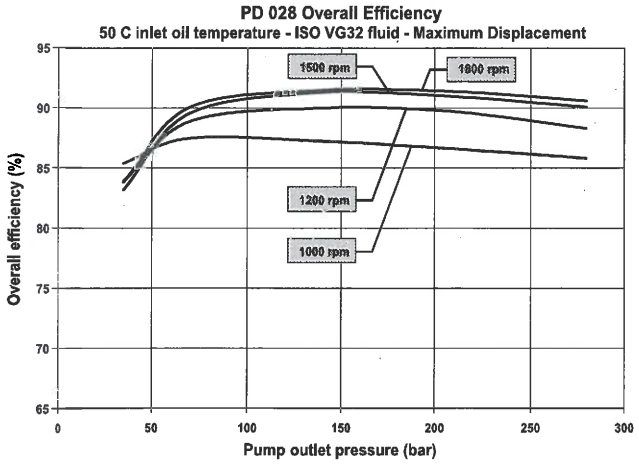
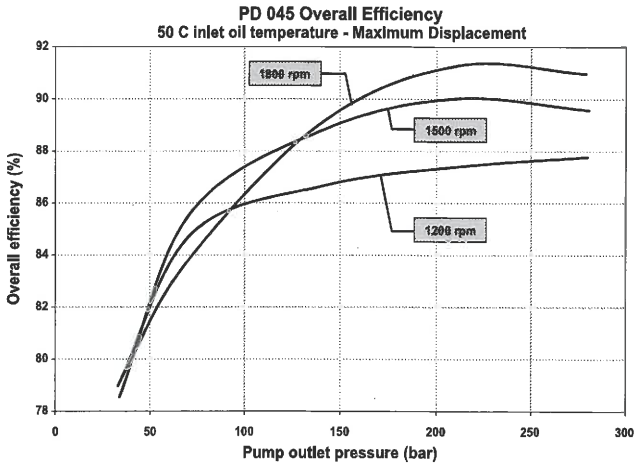
PD Series Typical Overall Efficiency







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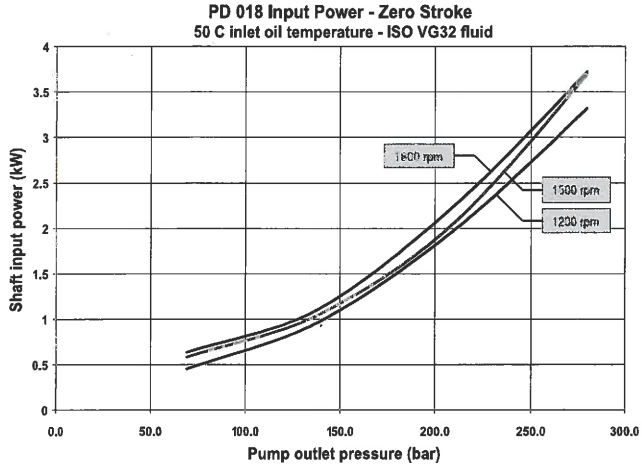
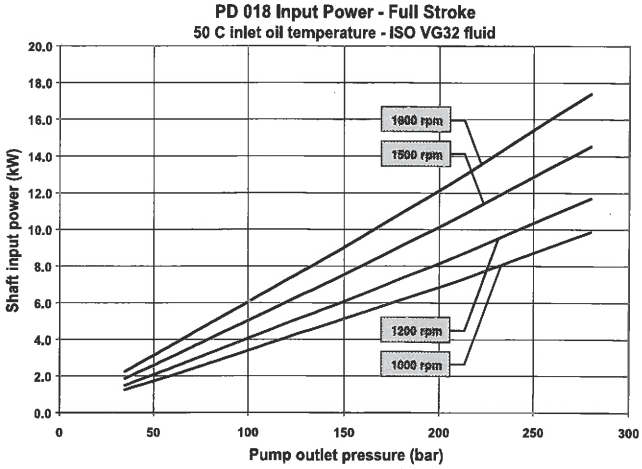
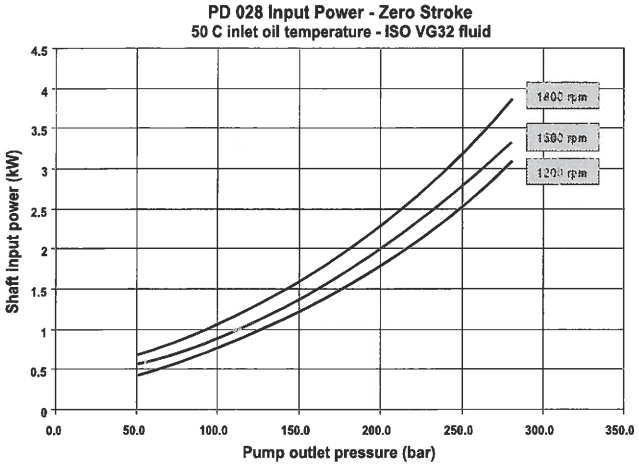
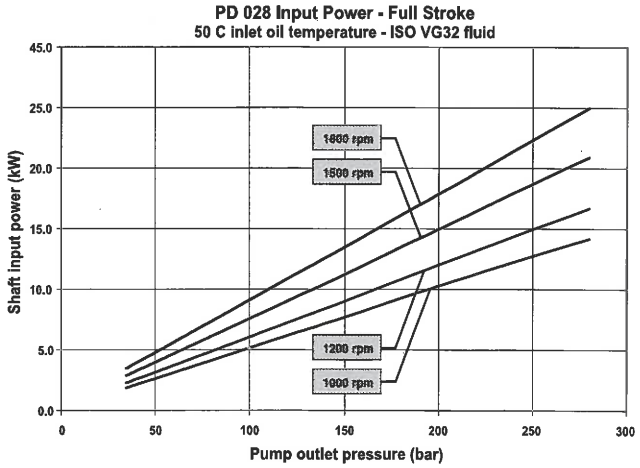
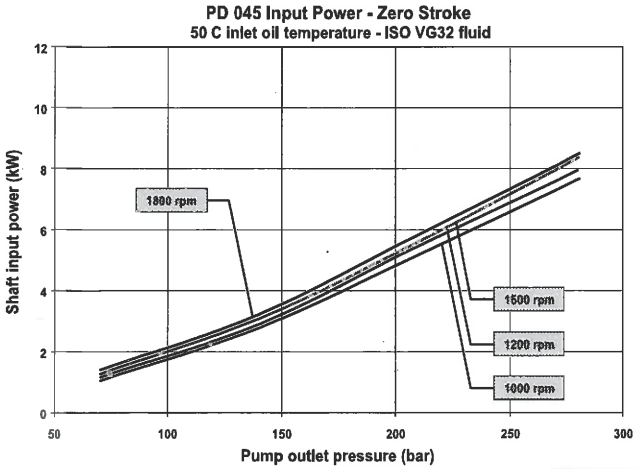
PD Series Typical Shaft Input Power

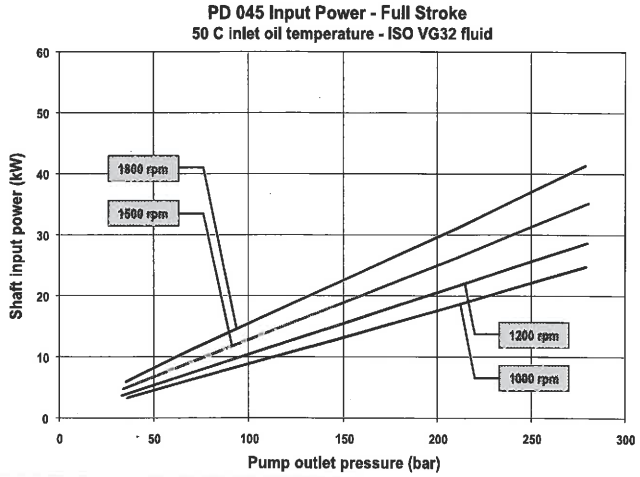












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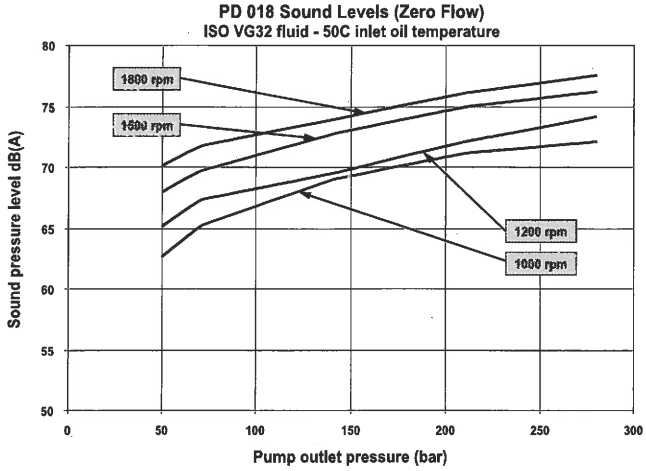
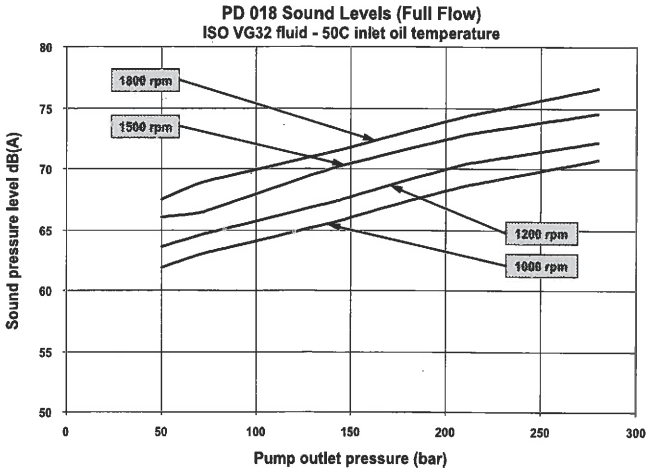
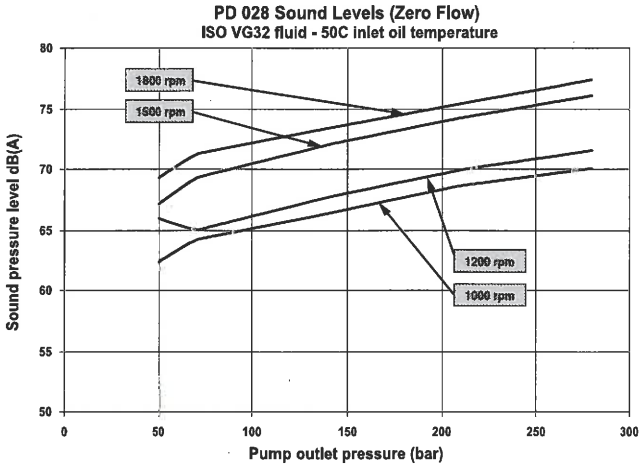
Hydraulic Pump Division
Marysville, Ohio USA

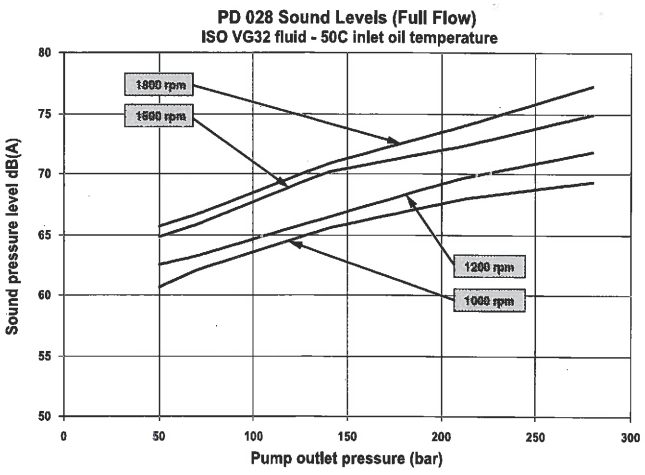
PD Series Typical Noise Characteristics

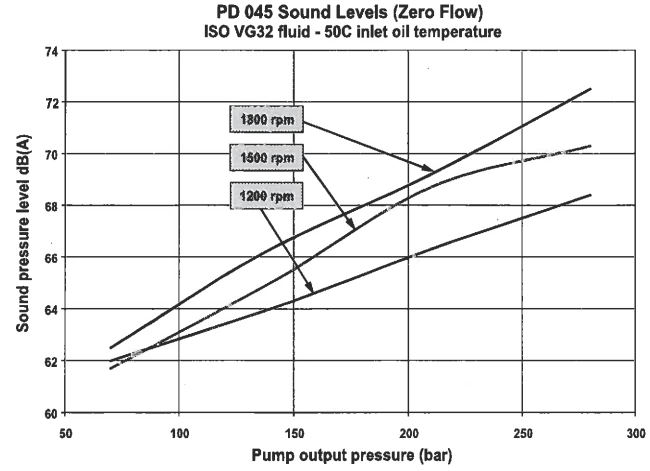
(These are anechoic sound pressure readings)

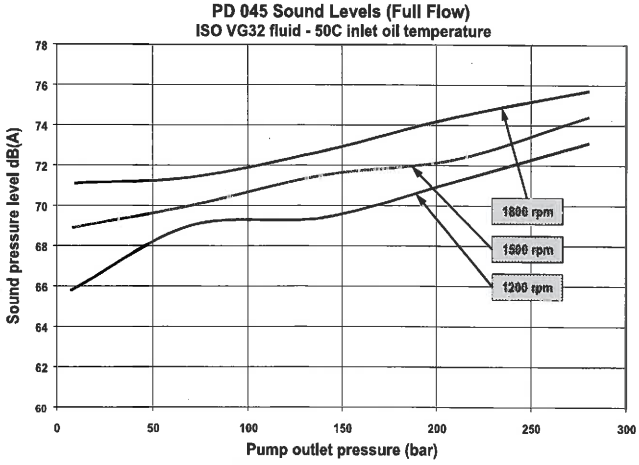












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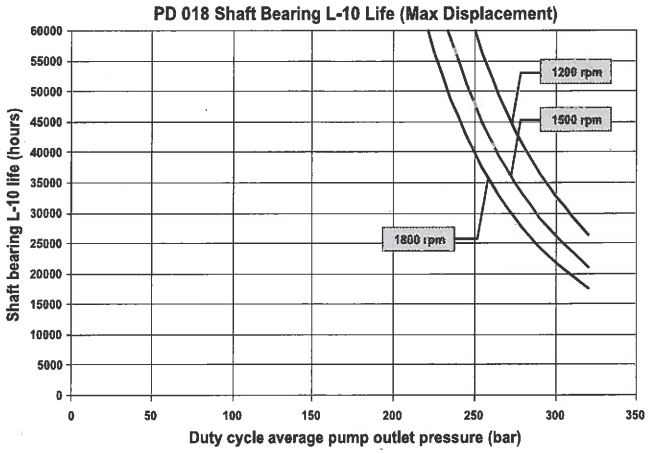
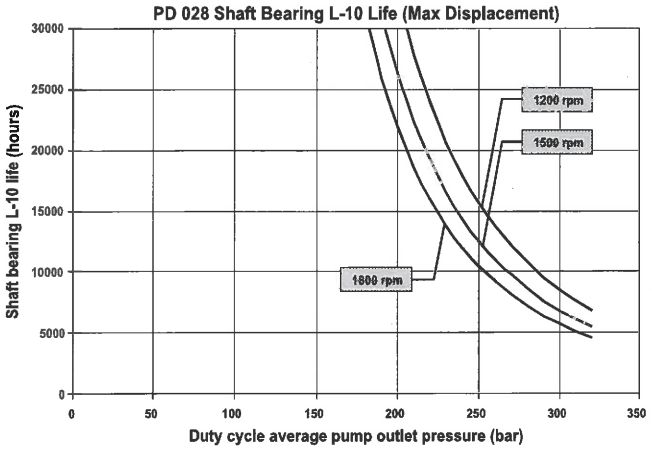
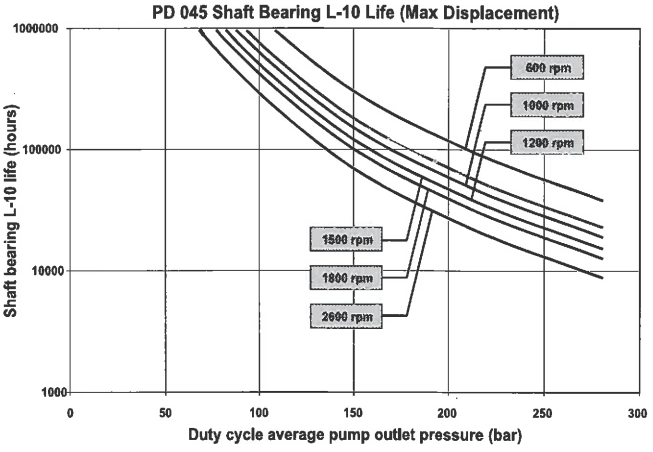
Marysville, Ohio USA

PD Series Typical Shaft Bearing Life







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Pump Installation - P1/PD 028
Input Shaft Dimensions

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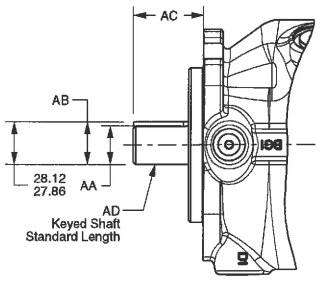

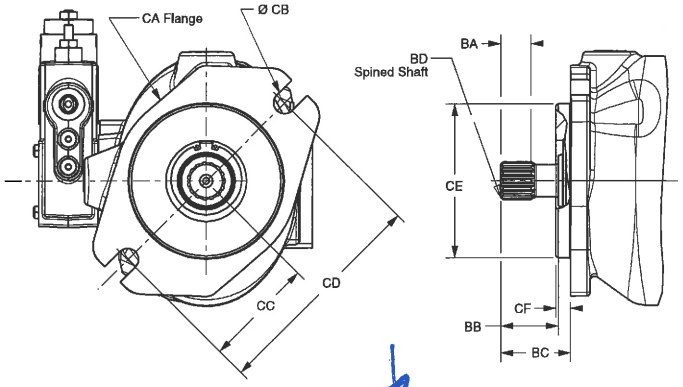

P1/PD 028	ISO (Code 04)	SAE (Code 01 or 02)	SAE (Code 08)
AA	25.013/24.992	25.40/25.35 1.00/.998	N/A
AB	28.13/27.87	28.23/27.97	N/A
AC	45.80/44.20	46.3/45.7 1.82/1.80	N/A
AD	ISO E25N	SAE J744 25-1 (B-B)	N/A
BA	N/A	20.00	15.00
BB	N/A	38.00	33.00
BC	N/A	46.8/45.2	41.20
BD	N/A	SPLINE: SAE J744 SAE 25-4 INVOLUTE SPLINE DATA CLASS 7 FLAT ROOT SIDE FIT NUMBER OF TEETH - 15 PITCH - 16/32 PRESSURE ANGLE - 30 MAJOR DIAMETER - 25.40 / 25.273 MM PITCH DIAMETER - 23.8125	SPLINE: SAE ASA-B 1960 SAE 22-4 (B) INVOLUTE SPLINE DATA CLASS 7 FLAT ROOT SIDE FIT NUMBER OF TEETH - 13 PITCH - 16/32 PRESSURE ANGLE - 30 MAJOR DIAMETER - 22.22 / 22.66 MM PITCH DIAMETER - 20.638
CA	ISO 3019-2: 100A2	SAE J744: JUN96 101-2 (B)	SAE J744: JUN96 101-2 (B)
CB	13.77/13.50	14.65 / 14.27 .58/.56"	14.65 / 14.27
CC	70	73 2.875"	73
CD	140	146.0 5.75"	146.0
CE	100.00/99.95 ISO 3019-2:2001(E)	101.60/101.55 SAE J744 4.00/3.99"	101.60/101.55
CF	9.50/9.00	9.7/9.19 .38/.36"	9.7/9.19
Key Width	8.00	6.35	N/A

Pump Installation - P1/PD 028
End Port
"L" Control Option

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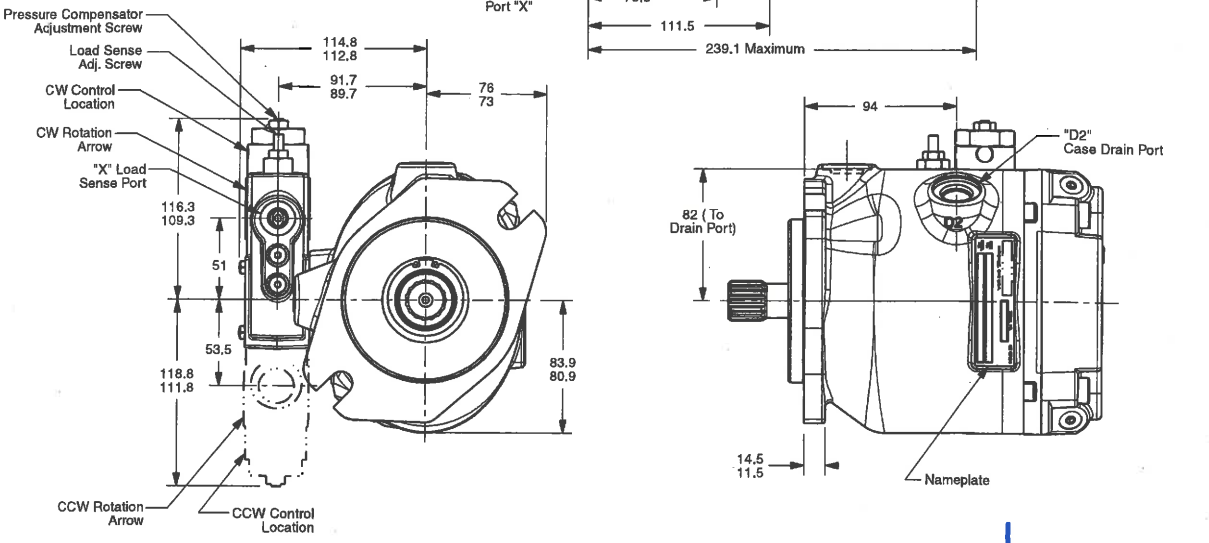

P1/PD 028 Port Sizes				
	SAE 4 Bolt	SAE Threaded	ISO	BSP
"A" Inlet	32mm Code 61[D]	SAE-20[B]	32mm DN32	-
"B" Outlet	19mm Code 61[D]	SAE-12[B]	19mm DN19	-
"BG"	SAE-4[B]		M12x1.5[A]	1/4"[C]
D1 D2 D3	SAE-8[B]		M22x1.5[A]	1/2"[C]
"X"	SAE-4[B]		M12x1.5[A]	1/4"[C]

Note A: Metric o-ring boss port conforms to ISO 6149-1
Note B: Inch o-ring port conforms to SAE J514
Note C: BSP port conforms to ISO 228-1
Note D: Inch 4-bolt flange port conforms to SAE J518

Shaft Torque Ratings

Shaft Code	18	28	45	60	75	100	140
01	Spline - SAE 19-4 11T	Spline - SAE B-B 15T	Spline - SAE B-B 15T	Spline - SAE C 14T	Spline - SAE C 14T	Spline - SAE C-C 17T	Spline - SAE D 13T
02	Key - SAE 19-1 .75" Dia.	Key - SAE B-B 1" Dia.	Key - SAE B-B 1" Dia.	Key - SAE C 32-1 KEY	Key - SAE C 32-1 KEY	Key - SAE C-C 38-1	Key - SAE D 44-1
04	ISO keyed 20MM Dia.	ISO keyed 25MM Dia.	ISO keyed 25MM Dia.	ISO keyed 32MM Dia.	ISO keyed 32MM Dia.	ISO keyed 40MM Dia.	ISO keyed 50MM Dia.
06	Spline - SAE A 9T					Spline - SAE C 14T	
08		Spline - SAE B 13T	Spline - SAE B 13T				

			Displacement cc (cu.in)					
			18 (1.1)	28 (1.71)	45 (2.75)	60 (3.66)	75 (4.58)	100 (6.1)	140 (8.54)
Maximum torque at maximum displacement and maximum pressure*		N.m	79	122	198	263	329	439	614
		ft.lbs	58	90	146	194	243	324	453
Maximum Input shaft torque	01	N.m	134	337	337	641	641	1217	1701
		ft.lbs	99	249	249	473	473	898	1255
	02	N.m	130	357	357	559	665	1134	1732
		ft.lbs	96	264	264	413	491	837	1278
	04	N.m	113	337	337	576	576	1157	1708
		ft.lbs	84	249	249	425	425	854	1260
	06	N.m	58					641	
		ft.lbs	43					473	
	08	N.m		209	209				
		ft.lbs		155	155				
Maximum through-drive shaft torque		N.m	134	210	293	318	329	538	760
		ft.lbs	99	155	217	235	243	397	561

*efficiency not considered

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MOUNTING

These pumps are designed to operate in any position. The pump shaft must be in alignment with the shaft of the source driver and should be checked with a dial indicator. The mating pilot bore and coupling must be concentric. This concentricity is particularly important if the shaft is rigidly connected to the driven load without a flexible coupling.

SHAFT INFORMATION

Splined: The shafts will accept a maximum misalignment of 0.15mm, 0.005 inch, total indicator reading. Angular misalignment at the external and internal spline axis must be less than ± 0,002 mm per mm of shaft radius, ± 0.002 inches per inch of shaft radius. The coupling interface must be lubricated. PARKER recommends lithium molydisulfide or similar grease. The internal coupling should be hardened to Rc 27-34 and must conform to SAE-J498c, class 5 flat root side fit.
Keyed: High strength heat treated keys must be used. Replacement keys must be hardened to 27-34 Rc. The key corners must be chamfered 0.81-1.0 mm, 0.032"-0.040", at 45° to clear radii that exist in the keyway.

SIDE LOAD CAPABILITY

The P1/PD series is designed for inline-drive. Side loading on the shaft is not recommended. If this is unavoidable consult your nearest PARKER representative.

FLUID CONNECTIONS

Connect inlet and outlet lines to the port block of the pump. The maximum case pressure is 2 bar (30 psi) continuous, 4 bar (60 psi) intermittent. The case pressure must never exceed inlet pressure by more than .5 bar (7 psi). When connecting case drain line make certain that drain plumbing passes above highest point of the pump before passing to the reservoir. The case leakage line must be of sufficient size to prevent back pressure in excess of 2 bar (30 psi) and returned to the reservoir below the surface of the oil as far from the supply inlet as possible. All fluid lines, whether pipe, tubing, or hose must be adequate size and strength to assure free flow through the pump. An undersize inlet line will prevent the pump from operating properly at full rated speed. An undersize outlet line will cause back pressure and cause heat generation and increased noise. Flexible hose lines are recommended. If rigid piping is used, the workmanship must be accurate to eliminate strain on the pump port block or to the fluid connections. Sharp bends in the lines must be eliminated wherever possible. All system piping must be cleaned and flushed before installing pump. Make sure the entire hydraulic system is free of dirt, lint, scale, or other foreign material.
Caution: Do not use galvanized pipe. Galvanized coating can flake off with continued use.

SYSTEM RELIEF VALVES

Although the P1/PD series pumps have very fast off-stroke compensator response, system relief valves are recommended in all cases for safety considerations.

RECOMMENDED FLUIDS

The fluid recommended for use in these pumps has a petroleum base and contains agents which provide oxidation inhibition and anti-rust, anti-foam and de-aerating properties as described in PARKER standard HF-1. Where anti-wear additive fluids are specified, see PARKER standard HF-0.

VISCOSITY INDEX

90 V. I. minimum. Higher values extend the range of operating temperature but may reduce the service life of the fluid.

TEMPERATURE

Determined by the viscosity characteristics of the fluid used. Because high temperatures degrade seals, reduce the service life of the fluid and create hazards, fluid temperature should not exceed 110°C (230°F) at the case drain.

MAINTENANCE

The pump is self-lubricating and preventative maintenance is limited to keeping system fluid clean by changing filters frequently. Keep all fittings and screws tight. Do not operate at pressures and speeds in excess of the recommended limit. If the pump does not operate properly, check the troubleshooting chart before attempting to overhaul the unit. Overhauling may be accomplished by referring to the disassembly, rework limits of wear parts, and assembly procedures as provided in this service manual.

FLUID CLEANLINESS

Fluid must be cleaned before and continuously during operation, by filters that maintain a cleanliness level of ISO 20/18/14. Better cleanliness levels will significantly extend the life of the components. As contaminant generation may vary with each application, each must be analyzed to determine proper filtration to maintain the required cleanliness level.

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