aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

P1/PD Series
Medium Duty Axial Piston Pumps

Variable Displacement
Catalog HY28-2665-01/P1/EN
Effiective: November 01, 2009

Parker

ENGINEERING YOUR SUCCESS.

Contents

Parker Hannifin Corporation
Hydraulic Pump Division
Marysville, Ohio USA

General Information

Description

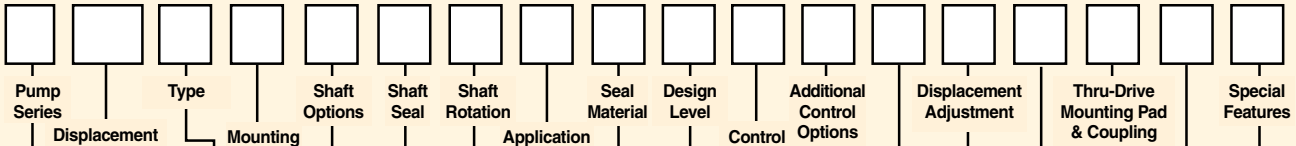
- Variable displacement, axial piston pump for open-circuit applications
- Medium pressure, continuous operation at pressures up to 280 bar
- High drive speed models for mobile markets and low noise models for industrial markets
- Quiet and efficient control capability

Benefits

- Compact overall package size
- Quiet operation
- Low flow ripple to further reduce noise
- Elastomer seals that eliminate gaskets and external leakage
- High operating efficiency for lower power consumption and reduced heat generation
- Simple hydraulic controls with “no-leak” adjustments
- SAE and ISO standard mounting flanges and ports
- Long life, tapered-roller shaft bearings
- Long life, low friction, hydrostatically balanced swash plate saddle bearings
- Full power through-drive capability
- End or side inlet and outlet ports
- Case drain ports for horizontal or vertical, shaft-up mounting
- Optional minimum and maximum displacement adjustments
- Optional case-to-inlet check valve to extend shaft seal life
- Easy to service

P1 Series

PD Series



Code	Series
P1	Mobile
PD	Industrial

Code	Displacement
018	**18 cc/rev** (1.10 in³/rev)
028	**28 cc/rev** (1.71 in³/rev)
045	**45 cc/rev** (2.75 in³/rev)

Code	Type
P	Open circuit, variable displacement

Code	Design Level
A	Current Design Series

Code	Seal Material
5	Fluorocarbon

Code	Application
M	Mobile (P1)
S	Industrial (PD)
U*	Universal

* Available on 45 cc , "S" Mounting & Port Option Pumps only.

Code	Shaft Rotation
R	Clockwise
L	Counterclockwise

Code	Shaft Seal
S	Single Shaft Seal

Code	Paint
00	No Paint
PB	Black Paint

Code	Special Features
00	No Special Features
M2	Special Modification

Code	Mounting & Ports See Catalog Table for Complete Information									
	018 Mount	018 Threaded	018 Aux Ports	028 Mount	028 Threaded	028 Aux Ports	045 Mount	045 Threaded	045 4 Bolt Flange	045 Aux Ports
S	82-2 SAE A	SAE 16/12	SAE 4/6	101-2 SAE B	SAE 20/12	SAE 4/8	101-2 SAE B	SAE 24/16	38/25mm Code 61	SAE 4/10
A	82-2 SAE A	M33/27	BSPP 1/4,3/8"	101-2 SAE B	M42x2 M27x2	BSPP 1/4",1/2"	101-2 SAE B	M48x2 M33x2	38/25mm DIN51/25	BSPP 1/4",1/2"
M	ISO	M33/27	M12x1.5, M16x1.5	ISO	M42x2, M27x2	M12x1.5, M22x1.5	ISO	M48x2, M33x2	38/25mm DN51/25	M12x1.5, M22x1.5
B	ISO	M33/27	BSPP 1/4,3/8"	ISO	M42x2, M27x2	BSPP 1/4", 1/2"	ISO	M48x2, M33x2	38/25mm DN51/25	BSPP 1/4", 1/2"

Code	Thru-Drive Mounting Pad/ Coupling*
0	No Thru-Drive
A	SAE 82-2 (A) Pilot & SAE A 9T Coupling
H	SAE 82-2 (A) Pilot & SAE A 11T Coupling
B	SAE 101-2 (B) Pilot & SAE B 13T Coupling
Q	SAE 101-2 (B) Pilot & SAE B-B 15T Coupling

* For 045 only

Code	Case-to-Inlet Check Valve/Port Type
0	No/45 4 Bolt Flange Main Ports
1	Yes/45 4 Bolt Flange Main Ports
2	No/18cc & 28cc, 45 Threaded Main Ports
3	Yes/18cc & 28cc, 45 Threaded Main Ports

Code	018 Shaft Options	028 Shaft Option	045 Shaft Option
01	SAE A 11T Spline	SAE B-B 15T Spline	SAE B-B 15T Spline
02	SAE 19-1 Key .75" Dia.	SAE Key 1" Dia. B-B	SAE Key 1" Dia. B-B
04	ISO/DIN Key 20mm Dia.	ISO/DIN Key 25mm Dia.	ISO/DIN Key 25mm Dia.
06	SAE A 9T Spline	—	—
08	—	SAE B 13T Spline	SAE B 13T Spline

Code	Displacement Adjustment
0	None
1*	Adjustable Maximum Displacement
2*	Adjustable Minimum Displacement
3*	Adjustable Max & Min Displacement

* Displacement adjustment not available on thru-drive.

Code	Control Options
C0	Pressure Limiter, 80-280 bar Adjustment Range
C1	Pressure Limiter, 20-80 bar Adjustment Range
L0	Load sensing, 10-30 bar ΔP and Pressure Limiter 80-280 bar
L1	Load sensing, 10-30 bar ΔP and Pressure Limiter 20-80 bar
L2	Load sensing, 10-30 bar ΔP and Pressure Limiter 80-280 bar with bleed orifice
AE	Pilot Operated Pressure Limiter Control with Proportional Electronic Adjustment (12V)
AF	Pilot Operated Pressure Limiter Control with Proportional Electronic Adjustment (24V)
AN*	Pilot Operated Control with ISO-4401 (NG6) Interface and Shipping Cover
AM	Pilot Operated Pressure Limiter Control with Mechanical Adjustment and Vent Port

* Not a functional control as shipped . See control description on page 7.

Code	Port Orientation
E	End Ports
R	Side Ports with Ripple Chamber
T	Side Ports with Thru-Drive 45 only

Code	Additional Control Options
0	None
T	Torque Limiter 45cc L0T, AMT only

Parker Hannifin Corporation
Hydraulic Pump Division
Marysville, Ohio USA

Code	Series
P1	Mobile
PD	Industrial

Code	Displacement
060	60 cc/rev (3.66 in³/rev)
075	75 cc/rev (4.58 in³/rev)
100	100 cc/rev (6.41 in³/rev)
140	140 cc/rev (8.85 in³/rev)

Code	Type
P	Open circuit, variable displacement

Code	Shaft Rotation
R	Clockwise
L	Counterclockwise

Code	Shaft Seal
S	Single Shaft Seal

Code	Application
M	Mobile (P1)
S	Industrial (PD)
U*	Universal

* Available on "S" Mounting & Port Option Pumps only.

Code	Design Level
A	Current Design Series

Code	Seal Material
5	Fluorocarbon

Code	Paint
00	No Paint
PB	Black Paint

Code	Special Features
00	No Special Features
M2	Special Modification

Code	Mounting & Ports See Catalog Table for Complete Information											
	060 Mount	060 Flange Ports mm	060 Aux Ports	075 Mount	075 Flange Ports mm	075 Aux Ports	100 Mount	100 Flange Ports mm	100 Aux Ports	140 Mount	140 Flange Ports mm	140 Aux Ports
S	SAE mounting with SAE ports											
	127-4 (C)	50/25 Code 61	SAE 4/10	127-4 (C)	50/25 Code 61	SAE 4/10	127-4 (C)	63/32 Code 61/62	SAE 4/12	152-4 (D)	63/32 Code 61/62	SAE 4/16
A	SAE mounting with BSPP drain, pilot, & gage ports, and metric 4-bolt inlet/outlet ports											
	127-4 (C)	50/25 Code 61	1/4"-3/4"	127-4 (C)	50/25 Code 61	1/4"-3/4"	127-4 (C)	63/32 Code 61/62	1/4"-3/4"	152-4 (D)	63/32 Code 61/62	1/4"-1"
M	ISO mounting with metric ports											
	ISO	50/25 DN51	M12/ M22	ISO	50/25 DN51	M12/ M22	ISO	63/32 DN64/32	M12/ M27	ISO	63/32 DN64/32	M12/ M33
B	ISO mounting with BSPP ports											
	ISO	50/25 DN51	1/4"-3/4"	ISO	50/25 DN51	1/4"-3/4"	ISO	63/32 DN64/32	1/4"-3/4"	ISO	63/32 DN64/32	1/4"-1"
C*	*SAE C 2 bolt mtg w/ SAE ports											
	127-2 (C)	50/25 Code 61	SAE 4/10	127-2 (C)	50/25 Code 61	SAE 4/10	N/A	N/A	N/A	N/A	N/A	N/A
D*	*SAE C 2 bolt mtg w/ BSPP auxiliary ports											
	127-2 (C)	50/25 Code 61	1/4"-3/4"	127-2 (C)	50/25 Code 61	1/4"-3/4"	N/A	N/A	N/A	N/A	N/A	N/A

* 60cc/r and 75cc/r only

Code	060 Shaft Options	075 Shaft Options	100 Shaft Options	140 Shaft Options
01	SAE C 14T Spline	SAE C 14T Spline	SAE C-C 17T Spline	SAE D 13T Spline
02	SAE C 32-1 Key	SAE C 32-1 Key	SAE C-C 38-1 Key	SAE D 44-1 Key
04	ISO\DIN Key 32mm Dia.	ISO\DIN Key 32mm Dia.	ISO\DIN Key 40mm Dia.	ISO\DIN Key 50mm Dia.
06	—	—	SAE C 14T Spline	—

Code	Control Options
C0	Pressure Limiter, 80-280 bar Adjustment Range
C1	Pressure Limiter, 20-80 bar Adjustment Range
L0	Load sensing, 10-30 bar ΔP and Pressure Limiter 80-280 bar
L1	Load sensing, 10-30 bar ΔP and Pressure Limiter 20-80 bar
L2	Load sensing, 10-30 bar ΔP and Pressure Limiter 80-280 bar with bleed orifice
AE	Pilot Operated Pressure Limiter Control with Proportional Electronic Adjustment (12V)
AF	Pilot Operated Pressure Limiter Control with Proportional Electronic Adjustment (24V)
AN*	Pilot Operated Control with ISO-4401 (NG6) Interface and Shipping Cover
AM	Pilot Operated Pressure Limiter Control with Mechanical Adjustment and Vent Port

* Not a functional control as shipped . See control description on page 7.

Code	Thru-Drive Mounting Pad/Coupling	# Teeth
0	None (only valid for end or side ported)	–
A	SAE 82-2 (A) & 16 (A) Coupling	9T
H	SAE 82-2 (A) & 19 (--) Coupling	11T
B	SAE 101-2 (B) & 22 (B) Coupling	13T
Q	SAE 101-2 (B) & 25 (B-B) Coupling	15T
C	SAE 127-4 (C) & 32 (C) Coupling	14T
N*	SAE 127-4 (C) & 38 (C-C) Coupling	17T
D**	SAE 152-4 (D) & 44 (D&E) Coupling	13T
J***	SAE 101-2 (B) rotated 45 degrees, 22 (B) coupling	13T
K***	SAE 101-2 (B) rotated 45 degrees, 25 (B-B) coupling	15T

* Available on 100 thru 140 models.
** Available on 140 models.
*** Available on "S" Mounting & Port Option Pumps only.

Code	Case-to-Inlet Check Valve
0	No
1	Yes

Code	Mechanical Displacement Adjustment
0	None
1*	Adjustable Maximum Displacement
2*	Adjustable Minimum Displacement
3*	Adjustable Max & Min Displacement

* Displacement adjustment not available on thru-drive.

Code	Port Orientation
E	End Ports
S	Side Ports
T	Side Ports with Thru-Drive

Code	Additional Control Options
0	None
T	Torque limiter used w/ AM & L0 Control Option

Technical Data

Model	P1/PD 018	P1/PD 028	P1/PD 045	P1/PD 060	P1/PD 075	P1/PD 100	P1/PD 140
Maximum Displacement, cm^3/rev cu.in./rev	18 1.10	28 1.71	45 2.75	60 3.66	75 4.58	100 6.01	140 8.54
Outlet Pressure – Continuous, bar psi	280 4000						
Intermittent*, bar psi	320 4500						
Peak, bar psi	350 5000						
P1 Maximum Speed – Boosted Inlet, rpm	3200	3200	3000	2800	2700	2500	2400
P1 (1.0 bar abs inlet), rpm	3200	3200	2600	2500	2300	2100	2000
P1 (0.8 bar abs inlet), rpm	2700	2800	2200	2000	1900	1800	1800
PD Maximum Speed (1.0 bar abs inlet), rpm	1800						
PD (0.8 bar abs inlet), rpm	1800						
Minimum Speed, rpm	600						
Inlet Pressure – Maximum, bar psi	10 (gage) 145						
Rated, bar psia	1.0 absolute (0.0 gage) 14.5						
Minimum, bar psia	0.8 absolute (-0.2 gage) 11.6						
Case Pressure – Peak, bar	4.0 absolute (3.0 gage) and less than 0.5 bar above inlet pressure						
Rated, bar	2.0 absolute (1.0 gage) and less than 0.5 bar above inlet pressure						
Fluid Temperature Range, °C °F	-40 to +95 -40 to +203						
Fluid Viscosity – Rated, cSt	6 to 160						
Max. Intermittent, cSt	5000 (for cold starting)						
Min. Intermittent, cSt	5						
Fluid Contamination – Rated, ISO	20/18/14						
Maximum, ISO	21/19/16						
SAE Mounting – Flange	82-2 (A)	101-2 (B)	101-2 (B)	127-2 (C) or 127-4 (C)		127-4 (C)	152-4 (D)
ISO Mounting - Flange	80 mm	100 mm	100 mm	125 mm	125 mm	125 mm	180 mm
SAE Keyed Shafts	19-1, A	25-1, BB	25-1, BB	32-1, C	32-1, C	38-1, CC	44-1, D
ISO Keyed Shafts	20 mm	25 mm	25 mm	32 mm	32 mm	40 mm	50 mm
SAE Spline Shafts	9T, A 11T, A	13T, B 15T, BB	13T, B 15T, BB	14T, C	14T, C	17T, CC	13T, D
Weight – End Port, kg (lb)	13.4 (29.5)	17.7 (39.0)	18 (40)	29 (64)	30 (66)	51 (112)	66 (145)
Side Port, kg (lb)	14.2 (31.3)	18.1 (40.0)	19 (42)	30 (67)	31 (68)	53 (117)	67 (147)
Thru-Drive, kg (lb)	—	—	22 (49)	34 (75)	35 (77)	55 (121)	82 (180)

*Intermittent pressure is defined as less than 10% of operation time, not exceeding 6 successive seconds.

Typical Control Reponse Times*

Control Description	Pump Operating Condition	Typical Control Response Time (ms)						
		018	028	045	060	075	100	140
"C" Pressure Limiter	Maximum Displacement to Zero	25	25	25	37	21	26	30
	Zero Displacement to Maximum	80	80	106	119	89	108	125
"L" Load Sensing	Maximum Displacement to Zero	40	40	30	54	40	43	45
	Zero Displacement to Maximum	70	70	120	186	97	189	280
"A" Pilot Operated Control	Maximum Displacement to Zero	25	25	46	43	37	39	40
	Zero Displacement to Maximum	80	80	131	125	115	123	130

* Based on NFPA testing standards

For max volume stops:

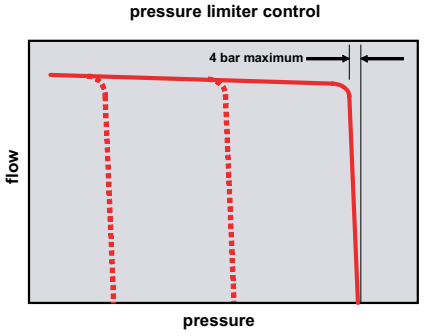
Pump Size	% Stroke reduction per turn		
P*060	6.76	P*018	9
P*075	6.2	P*028	8.2
P*100	5.5	P*045	7.5
P*140	4.8		

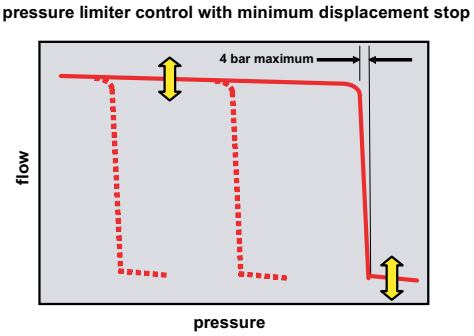
Control Adjustment Sensitivity:

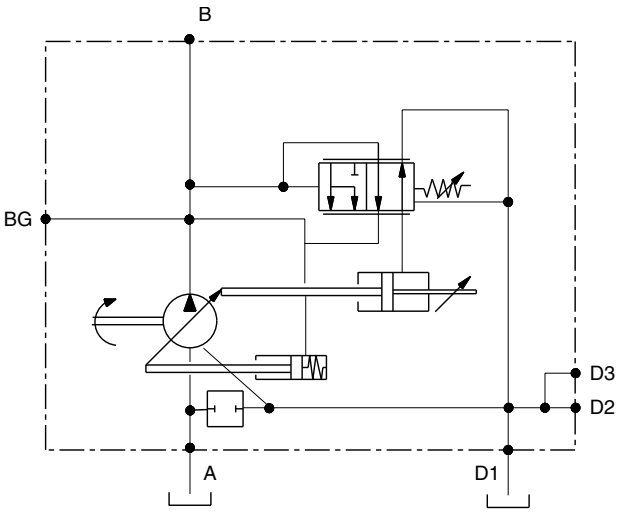
- Load Sense 28 Bar/Turn
- Pressure Compensator 80 to 280 bar range (C0) = 40 Bar/Turn
- Pressure Compensator 20 to 80 bar range (C1) = 18.6 Bar/Turn

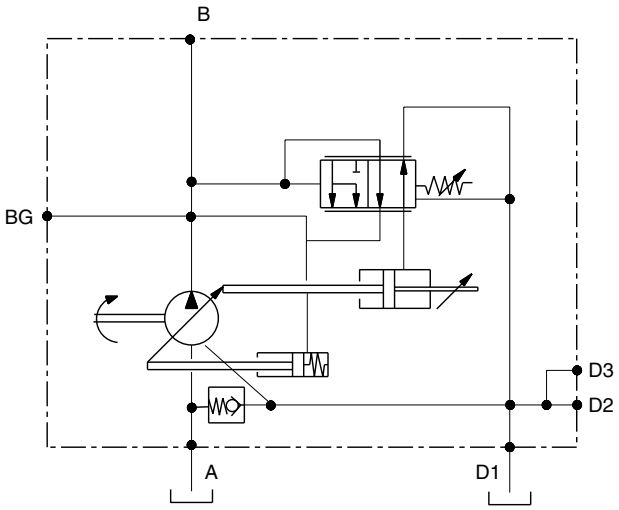
Control Option "C"
Pressure Limiter Control

The pressure limiter control is used to limit the maximum system pressure. The control acts such that full pump displacement is achieved unless the system valve restricts the output flow or the load pressure reaches the maximum setting of the control. If pump flow is restricted by the system valve, the pump will provide only the flow demanded, but at the maximum pressure setting of the compensator control. If the outlet flow is completely blocked, the pump will destroke to zero displacement and maintain the pressure at the setting of the compensator spring.









Pressure Limiter Control

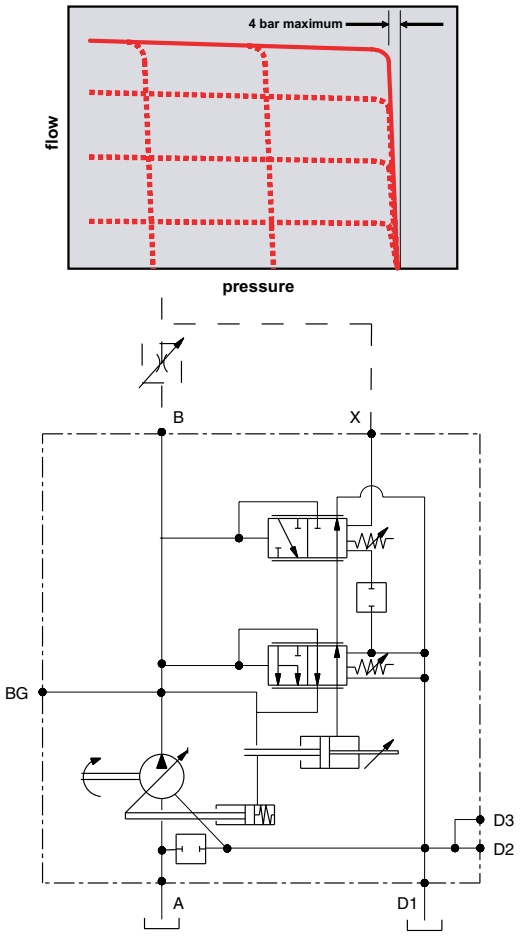
Pressure Limiter Control
with Optional Maximum & Minimum Displacement Adjustments and Case-to-Inlet Check Valve
(A minimum displacement stop requires the use of a system relief valve.)

Refer to page 4 for typical control characteristics.

Control Option "L"
Load Sensing and Pressure Limiter Control

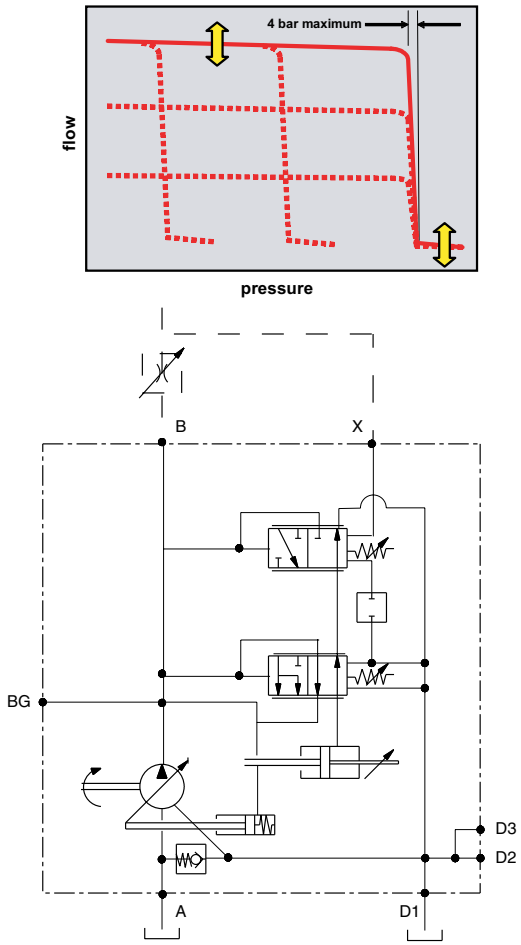
These controls feature load sensing and maximum pressure compensation. Load sense controls are used to match pump flow and pressure to system demands, thus minimizing losses due to wasted horsepower. The pump automatically adjusts for changes in drive speed and load pressures to match the pump output flow to the load requirement. Since the pump load sense control will maintain a constant pressure drop across the main system throttling valve, the flow rate will remain constant, independent of changes in load pressure and pump shaft speed.

load sensing and pressure limiter control



Load Sensing and Pressure Limiter Control

load sensing and pressure limiter control with minimum displacement stop



Load Sensing and Pressure Limiter Control with Optional Minimum & Maximum Displacement Adjustments and Case-to-Inlet Check Valve
(A minimum displacement stop requires the use of a system relief valve.)

Refer to page 4 for typical control characteristics.

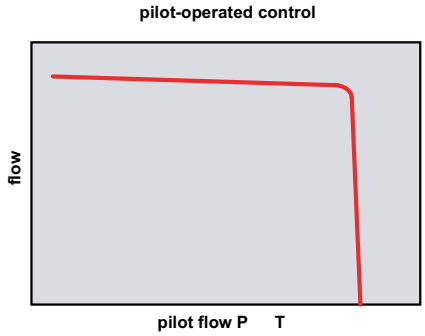
Parker Hannifin Corporation
Hydraulic Pump Division
Marysville, Ohio USA

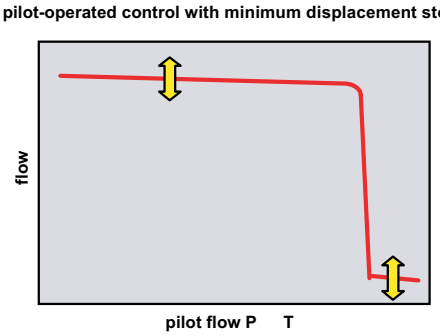
Control Options “AN”

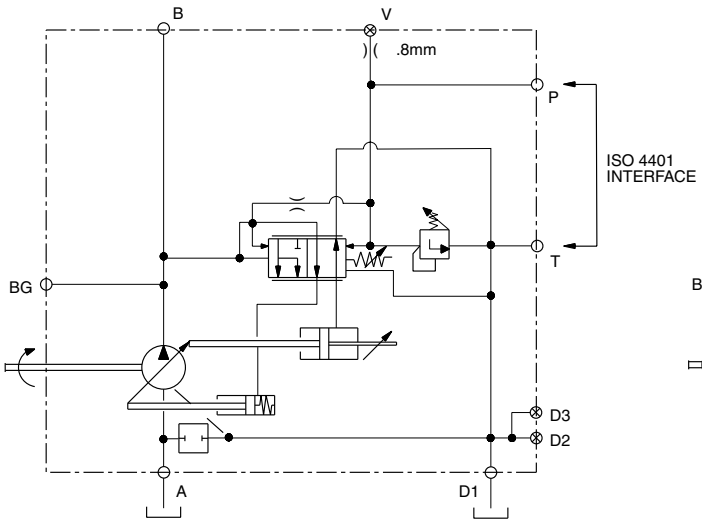
Pilot Operated Control with ISO 4401 NG6 Interface for Customer Added Pressure Limiter

This control is a standard pressure compensator, but with a NG6 (D03) valve interface. This interface allows the integral mounting of valves to achieve a variety of pressure control circuits, as well as pump standby mode.

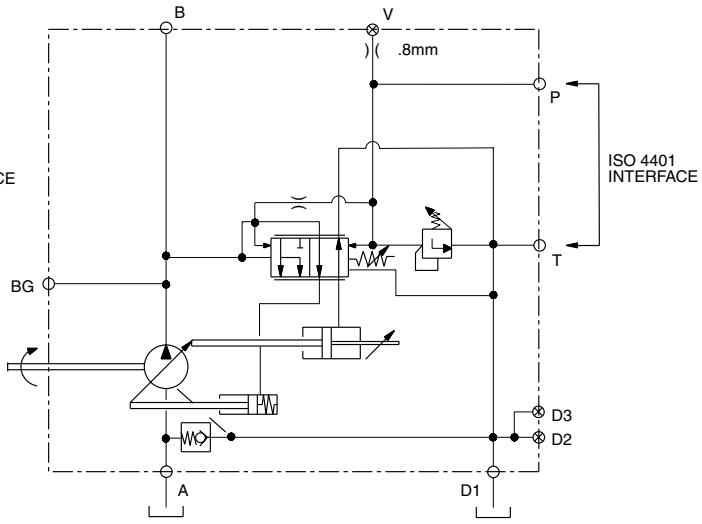
(Caution : Pumps shipped with the “AN” control need to have a valve mounted to the NG6 interface for operation. This is not a functional control as shipped, but is intended for customers that desire to mount accessory valves for pressure control to in place of plumbing the control valves externally.)







“AN”
Pilot Operated Control with ISO 4401 NG6 Interface



“AN”
with Optional Minimum & Maximum Displacement Adjustments and Case-to-Inlet Check Valve
(A minimum displacement stop requires the use of a system relief valve.)

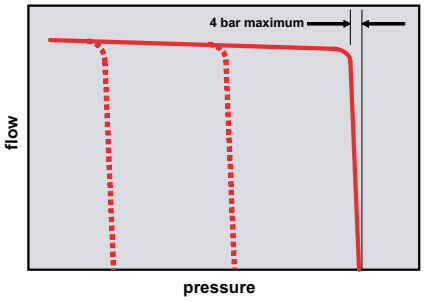
Refer to page 4 for typical control characteristics.

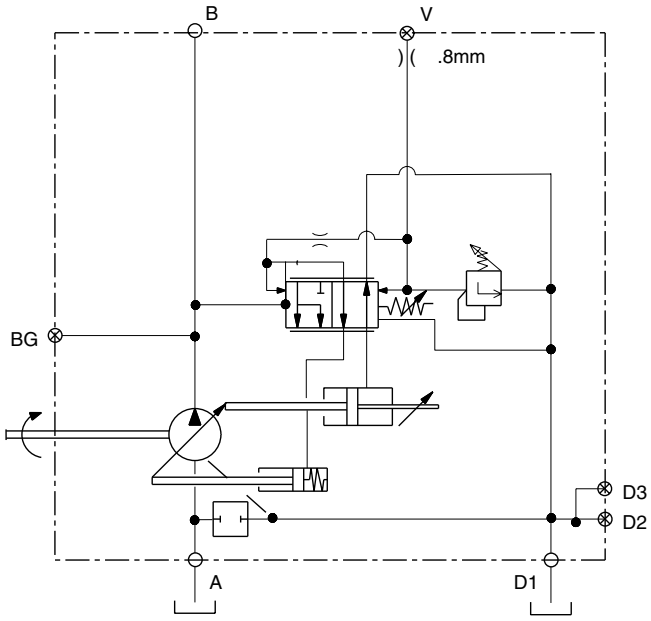
Control Options "AM"

Pilot Operated Pressure Limiter Control with Vent Port V

This control allows the pump pressure compensator setting to be adjusted from a remote relief valve. The control acts such that full pump displacement is achieved unless the system valve restricts the output flow or the load pressure reaches the maximum setting of the control. If pump flow is restricted by the system valve, the pump will provide only the flow demanded, but at the maximum pressure setting of the compensator control. If the outlet flow is completely blocked, the pump will destroke to zero displacement and maintain the pressure at the setting of the remote relief valve.

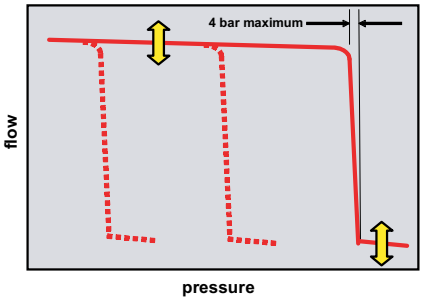
pilot-operated pressure limiter control

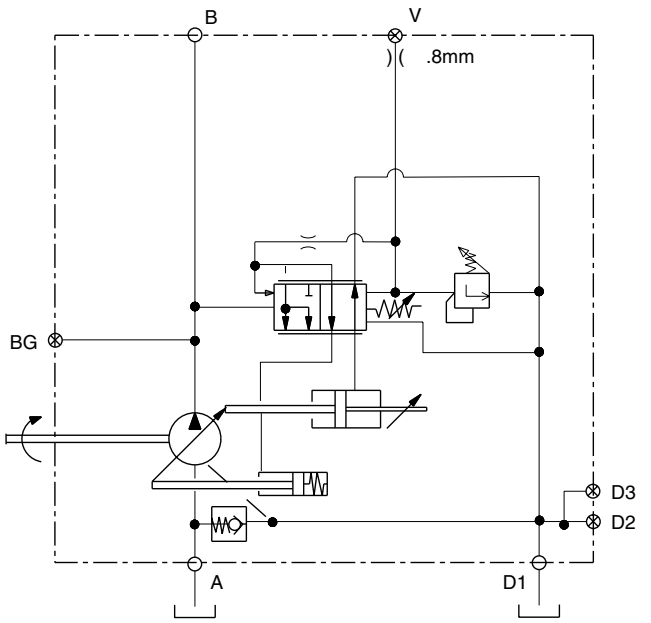




"AM"
Pilot Operated Pressure Control

pilot-operated pressure limiter control with minimum displacement stop





"AM"
with Optional Minimum & Maximum Displacement Adjustments and Case-to-Inlet Check Valve
(A minimum displacement stop requires the use of a system relief valve.)

Refer to page 4 for typical control characteristics.

Parker Hannifin Corporation
Hydraulic Pump Division
Marysville, Ohio USA

Control Options "AE" and "AF"
Pilot Operated Pressure Limiter Control with Proportional Electronic Adjustment

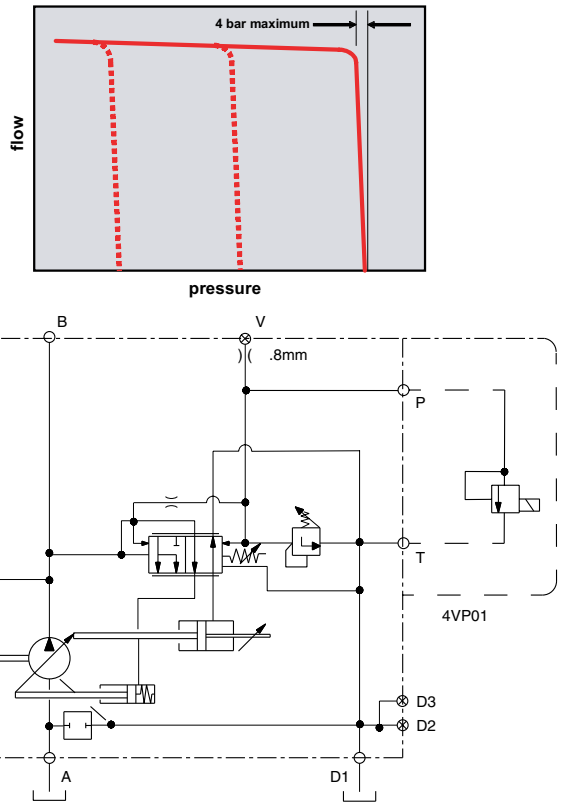
This control allows the pump pressure compensator setting to be adjusted by an on-board 4VP01 proportional, electronic relief valve. The control acts such that full pump displacement is achieved unless the system valve restricts the output flow or the load pressure reaches the maximum setting of the control. If pump flow is restricted by the system valve, the pump will provide only the flow demanded, but at the maximum pressure setting of the compensator control. If the outlet flow is completely blocked, the pump will destroke to zero displacement and maintain the pressure at the setting of the relief valve.

The following are recommended to drive the proportional valve on the AE or AF pump:

Parker Part#	Description
027-22071-0	Dual Driver Module (12/24V)
027-22067-0	Plug-Top-Driver 12V (0-10V command)
027-22066-0	Plug-Top-Driver 24V (0-10V command)
701-00600-8	Proportional Amplifier 12V (Eurocard)
701-00601-8	Proportional Amplifier 24V (Eurocard)
EX00-S05	Eurocard Holder

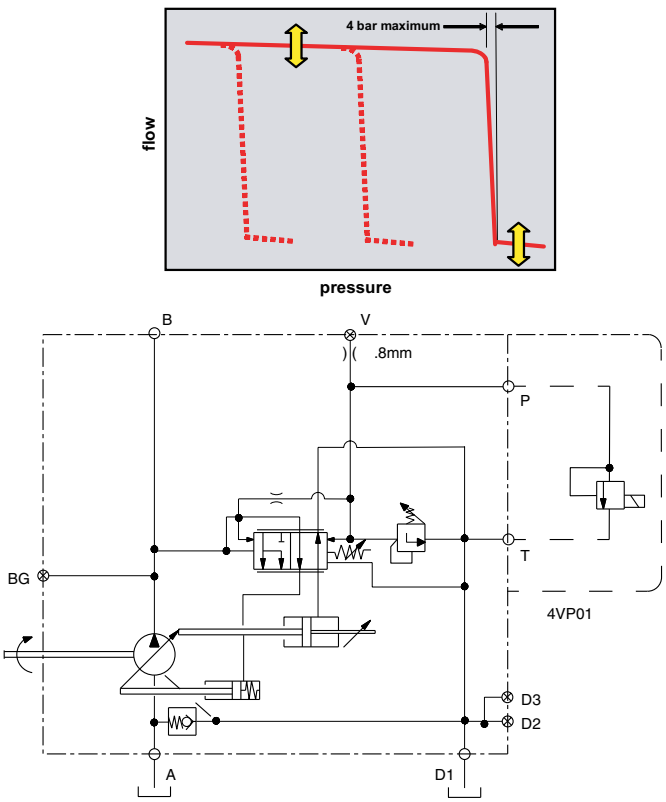
Note: Consult Factory for more driver options and information.

pilot-operated pressure limiter control



"AE" and "AF"
Pilot Operated Pressure Limiter Control with Proportional Electcronic Adjustment

pilot-operated pressure limiter control with minimum displacement stop

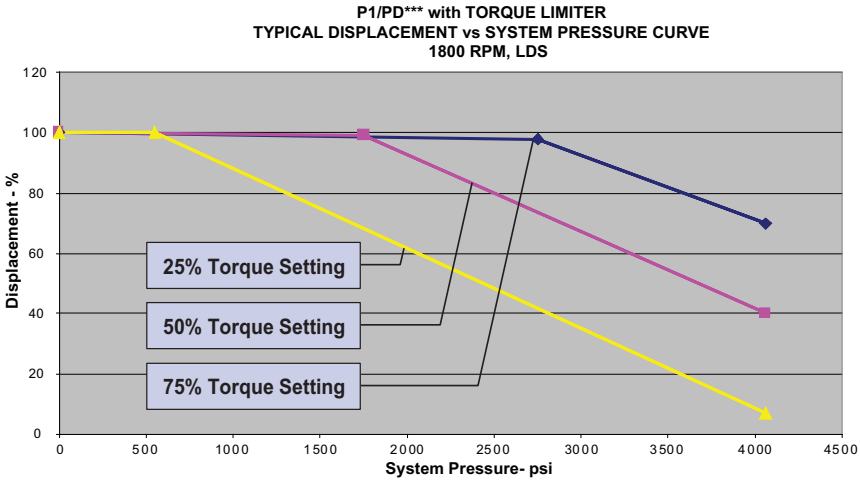


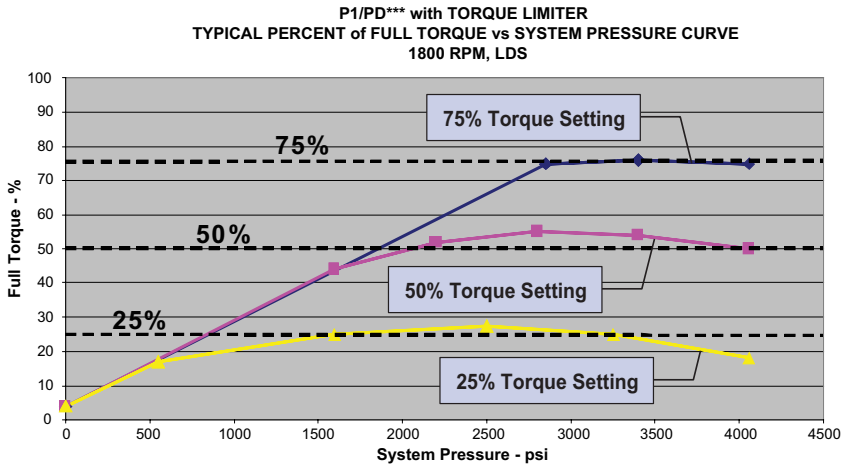
"AE" and "AF"
with Optional Minimum & Maximum Displacement Adjustments and Case-to-Inlet Check Valve
(A minimum displacement stop requires the use of a system relief valve.)

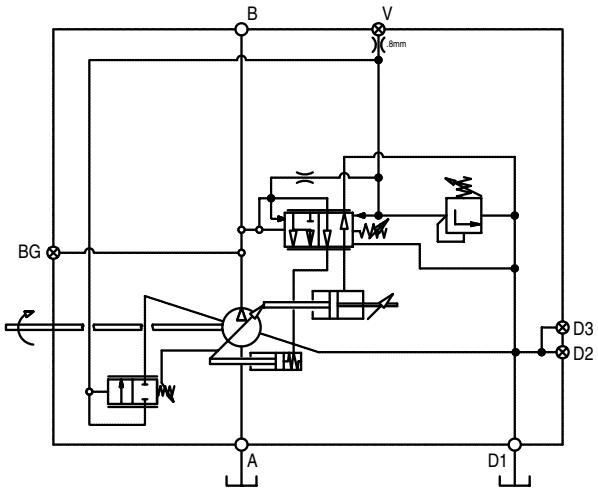
AE denotes the 12vdc soleniod.
AF denotes the 24vdc soleniod.
Refer to page 4 for typical control characteristics.

Torque Limiting Control
with Maximum Pressure Limiter
LOT, AMT

These controls provide the benefit of pressure limiting control , plus the ability to limit the input torque the pump will draw. These controls are beneficial when the power available from the prime mover for the hydraulics is limited; or the application power demand has both high flow/low pressure and low flow/high pressure duty cycles.







Torque Limiter
AMT Shown

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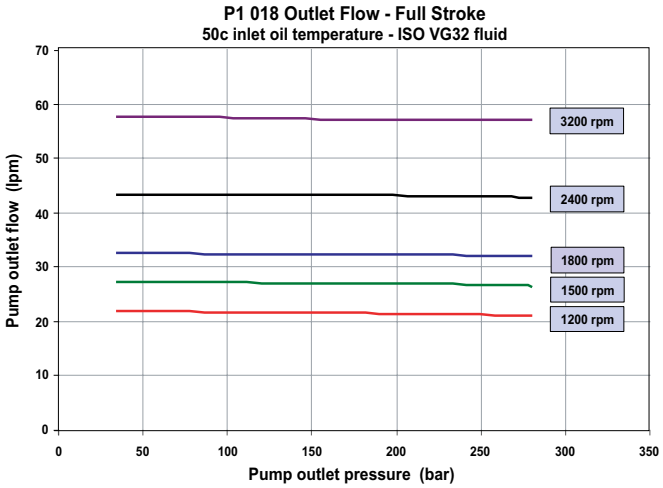
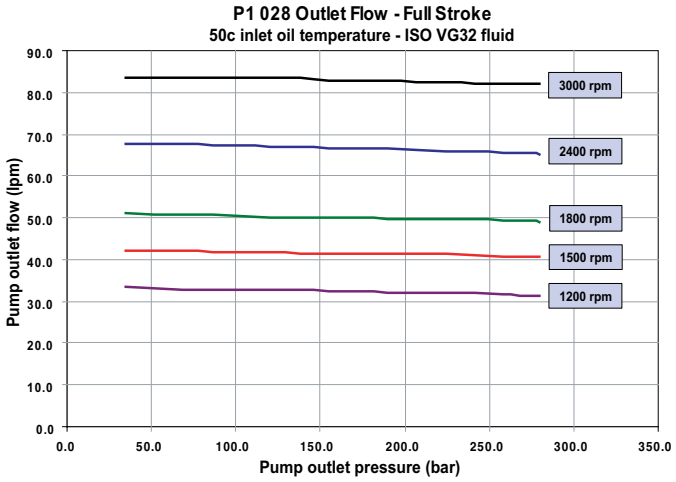
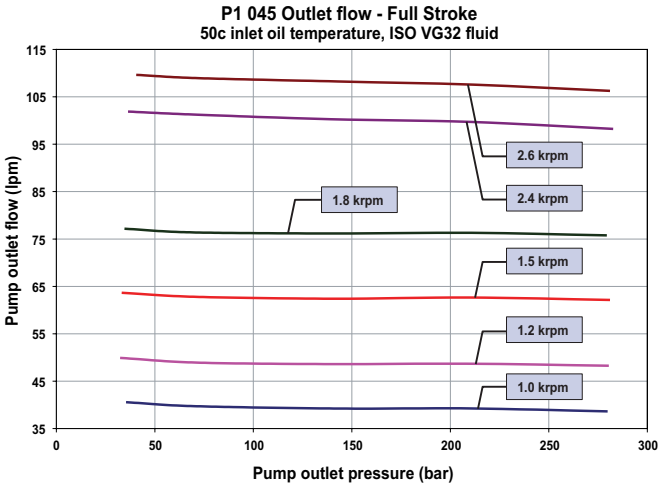
P1 Series Pump Outlet Flow







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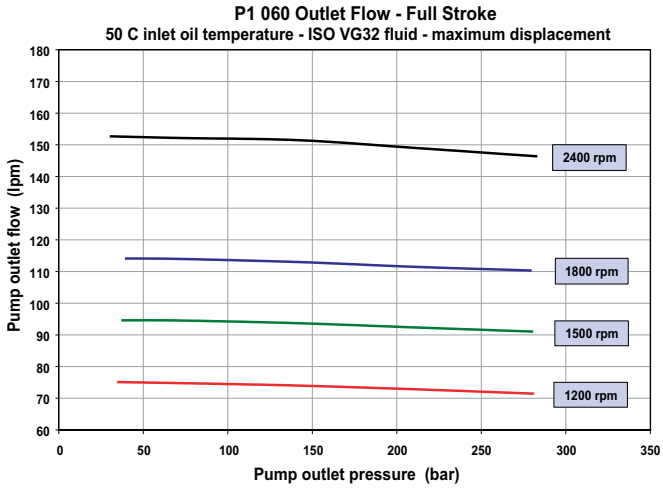
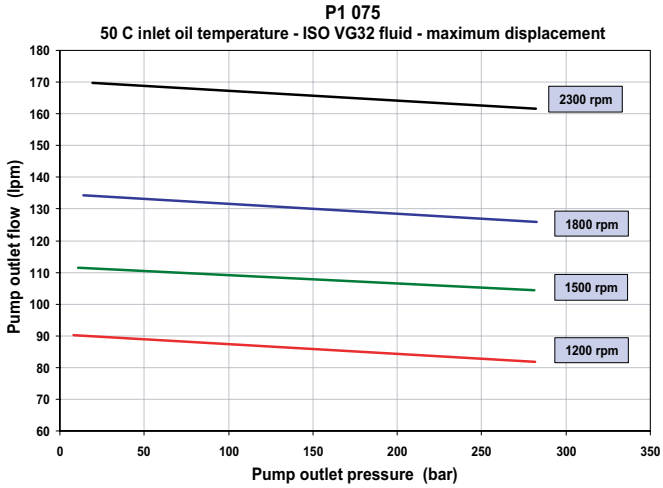
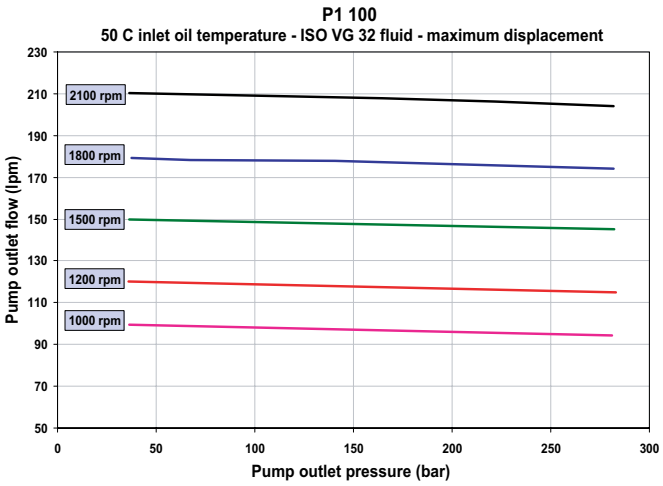
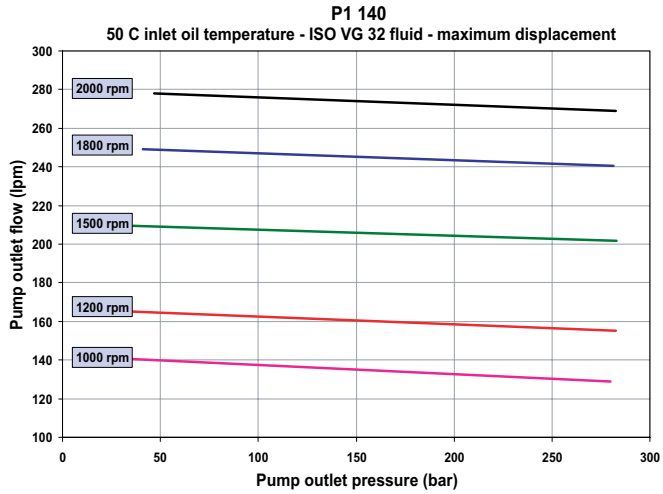
P1 Series Pump Outlet Flow

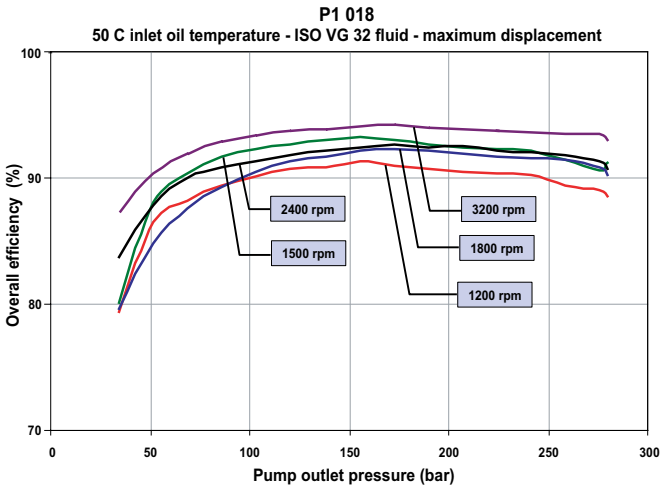


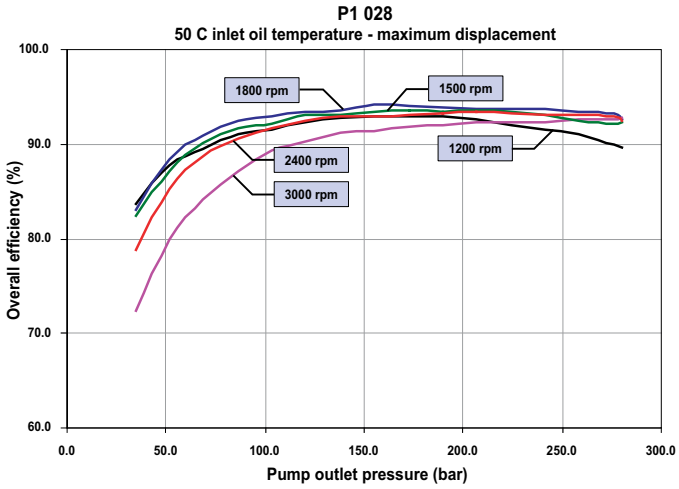


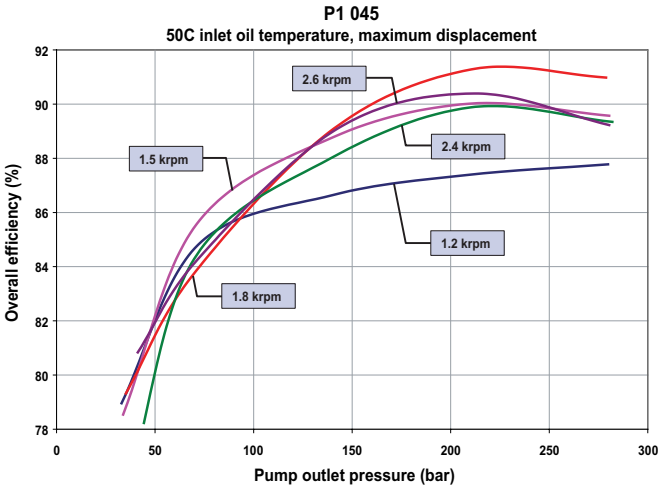




P1 Series Overall Efficiency

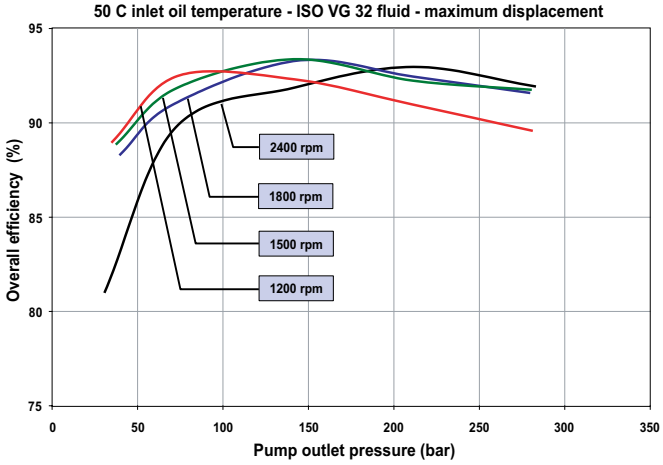




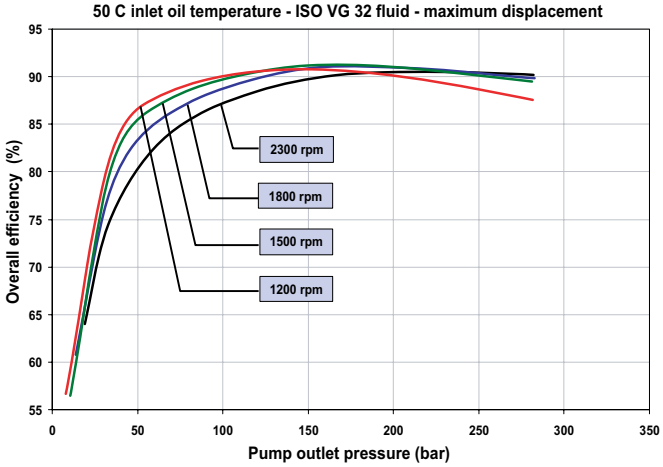


P1 Series Overall Efficiency

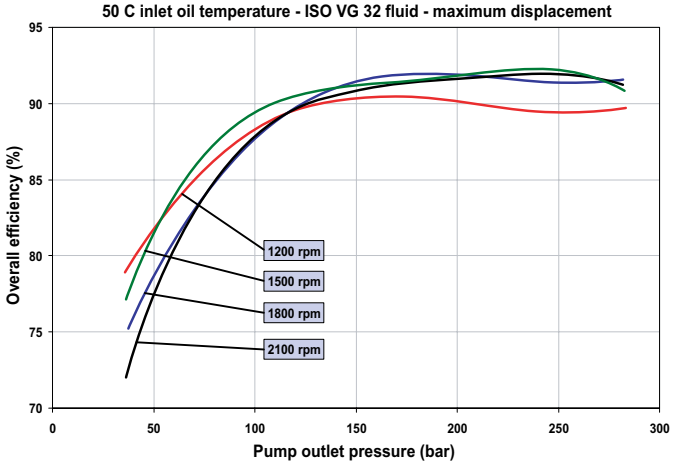
P1 060
50 C inlet oil temperature - ISO VG 32 fluid - maximum displacement



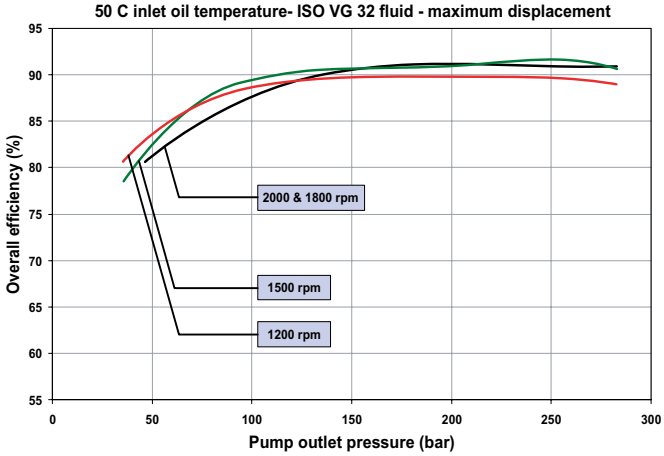
P1 075
50 C inlet oil temperature - ISO VG 32 fluid - maximum displacement



P1 100
50 C inlet oil temperature - ISO VG 32 fluid - maximum displacement

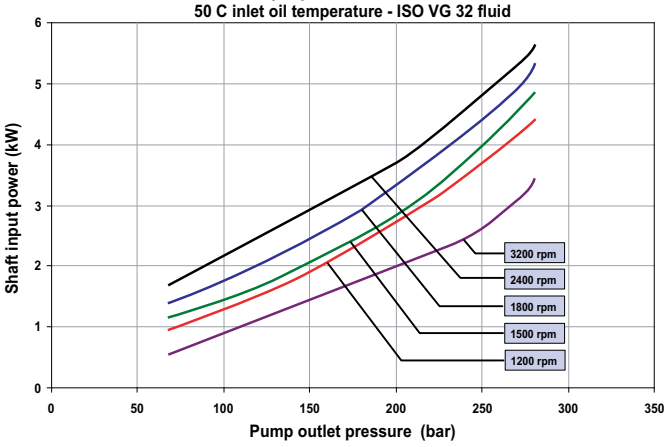


P1 140
50 C inlet oil temperature- ISO VG 32 fluid - maximum displacement

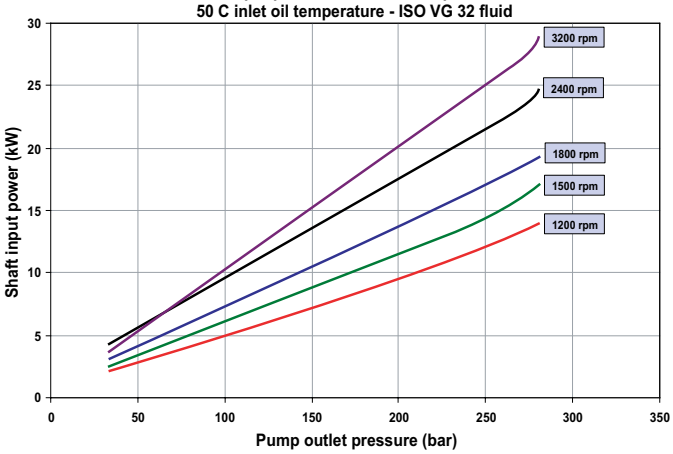


P1 Series Shaft Input Power

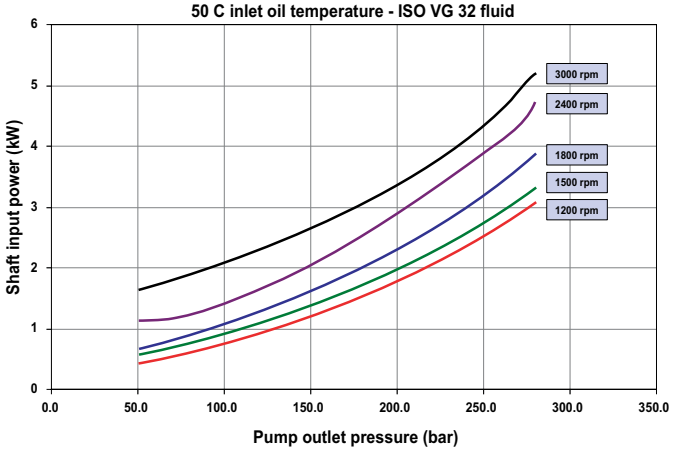
P1 018
shaft input power at zero outlet flow
50 C inlet oil temperature - ISO VG 32 fluid



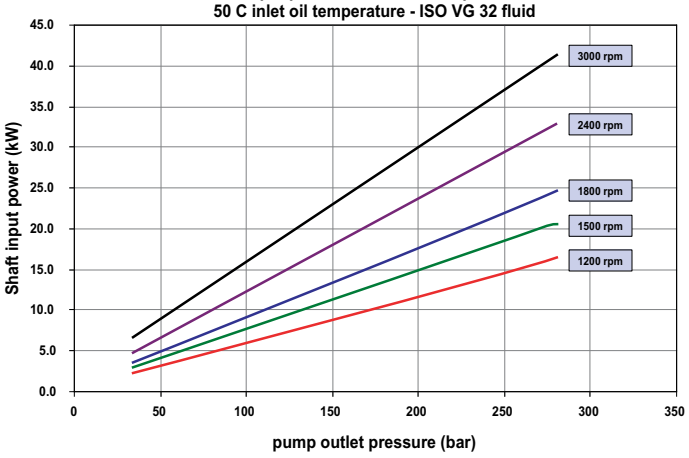
P1 018
shaft input power at maximum displacement
50 C inlet oil temperature - ISO VG 32 fluid



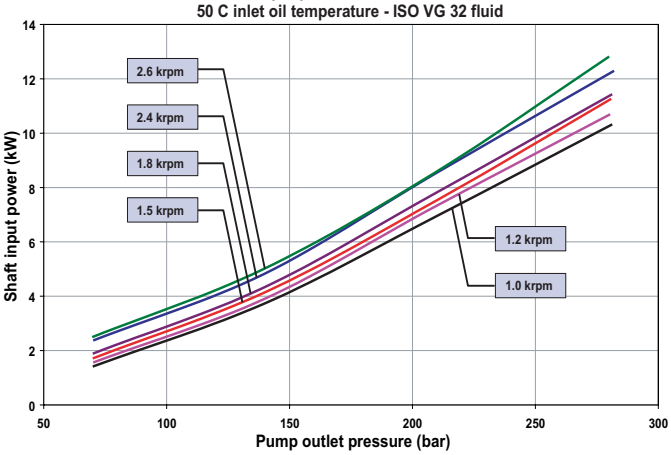
P1 028
shaft input power at zero outlet flow
50 C inlet oil temperature - ISO VG 32 fluid



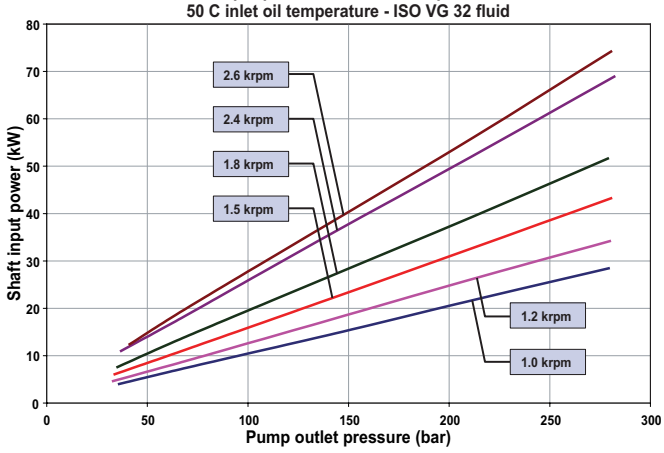
P1 028
shaft input power at maximum displacement
50 C inlet oil temperature - ISO VG 32 fluid



P1 045
shaft input power at zero outlet flow
50 C inlet oil temperature - ISO VG 32 fluid



P1 045
shaft input power at maximum displacement
50 C inlet oil temperature - ISO VG 32 fluid



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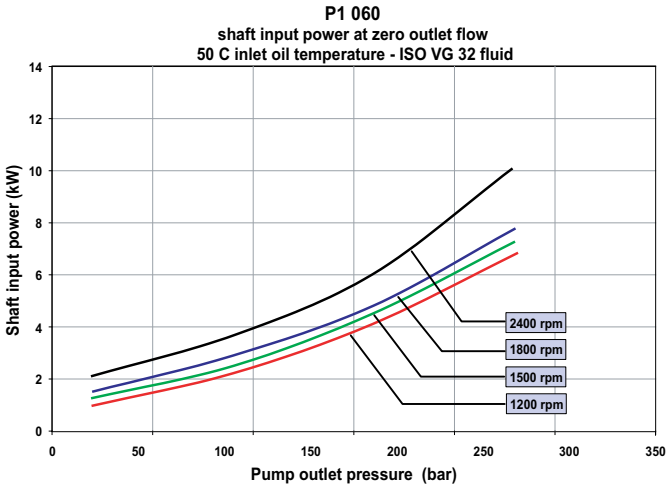
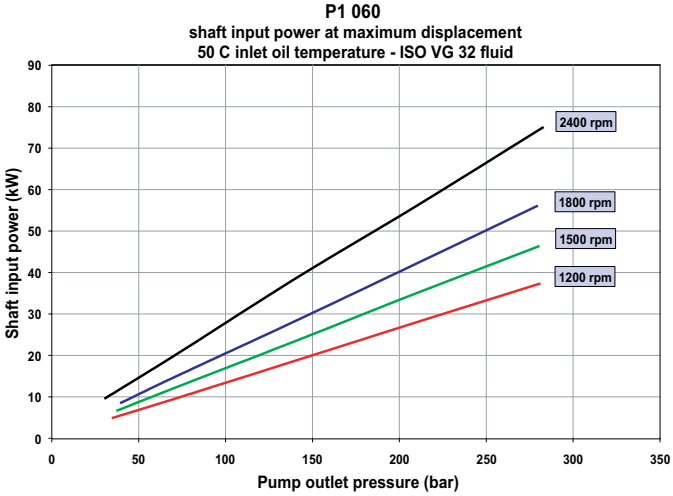
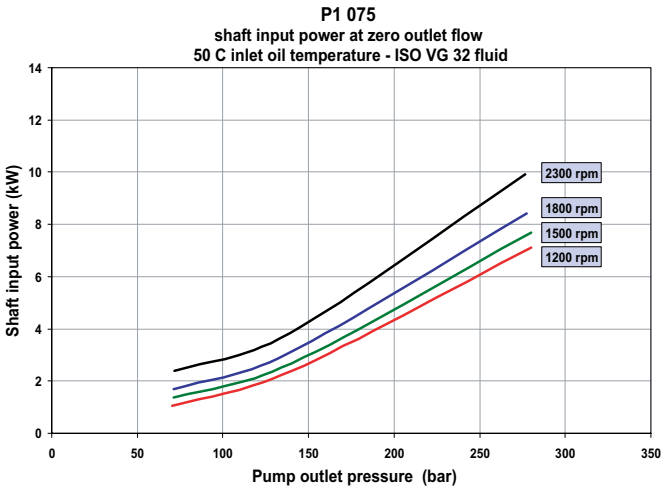
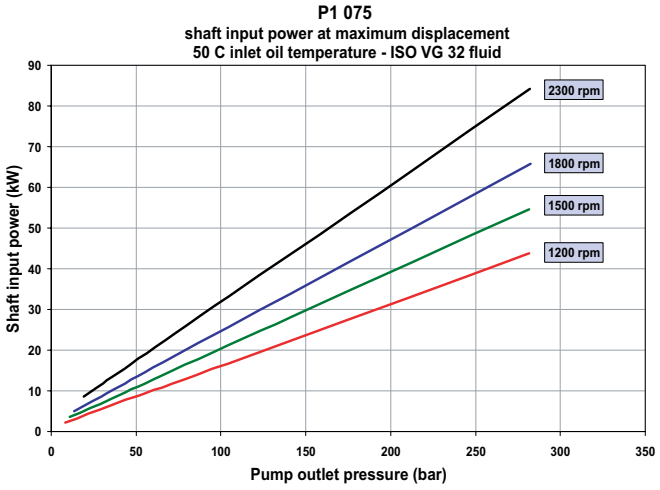
P1 Series Shaft Input Power

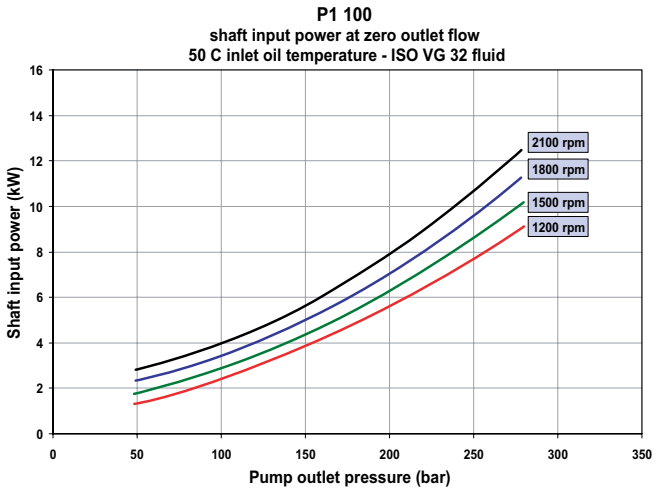


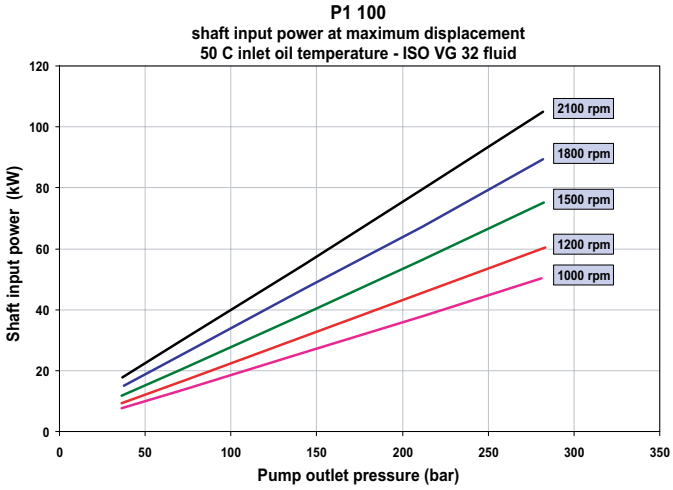


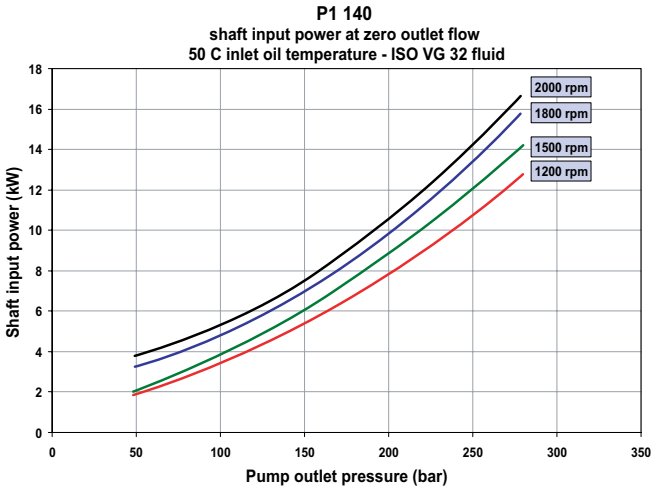


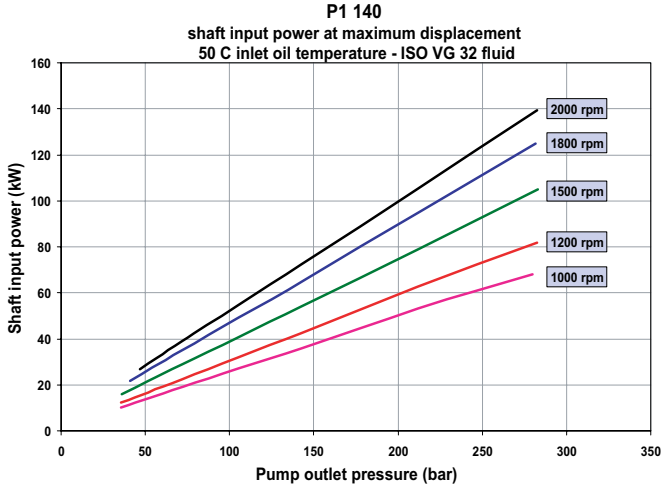


P1 Series Shaft Input Power









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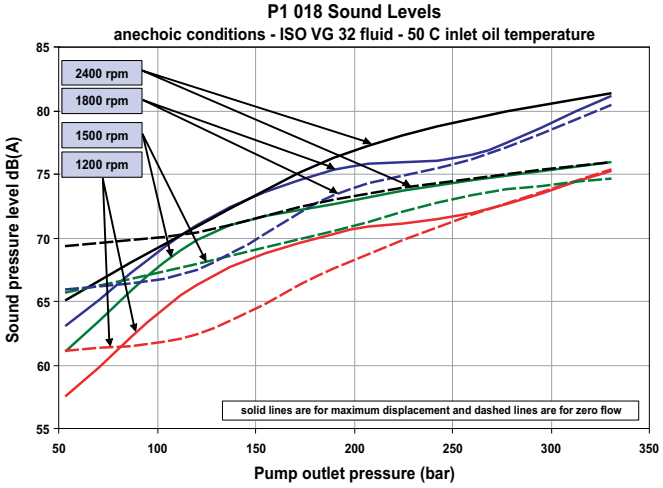
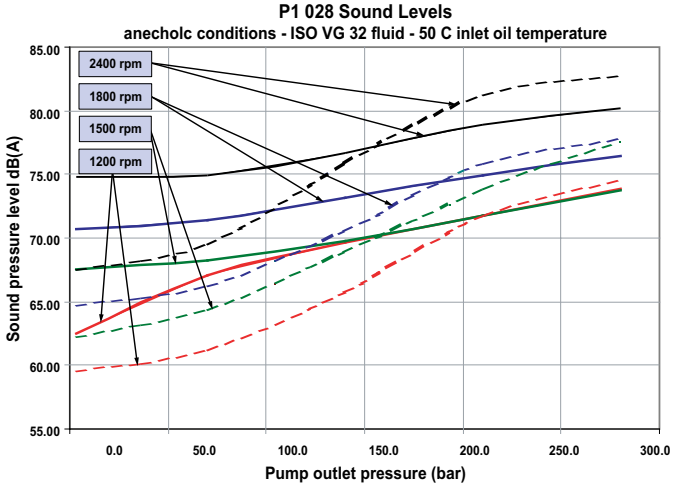
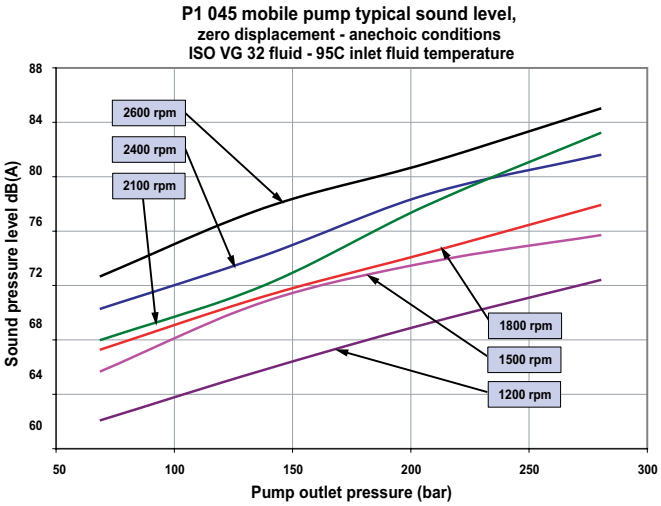
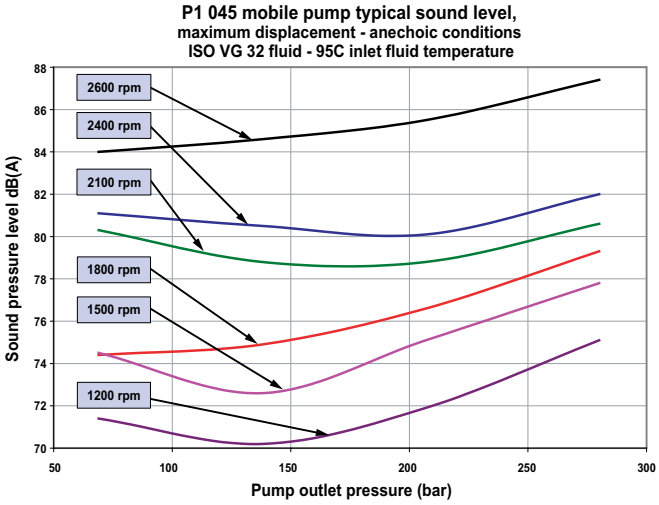
P1 Series Typical Noise Characteristics

(These are anechoic sound pressure readings)



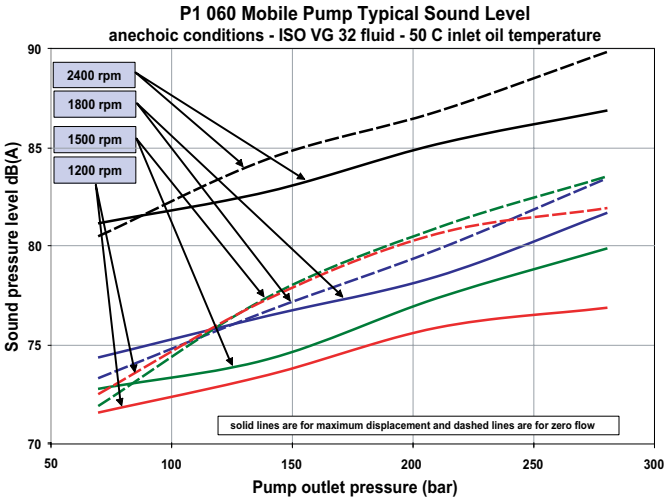


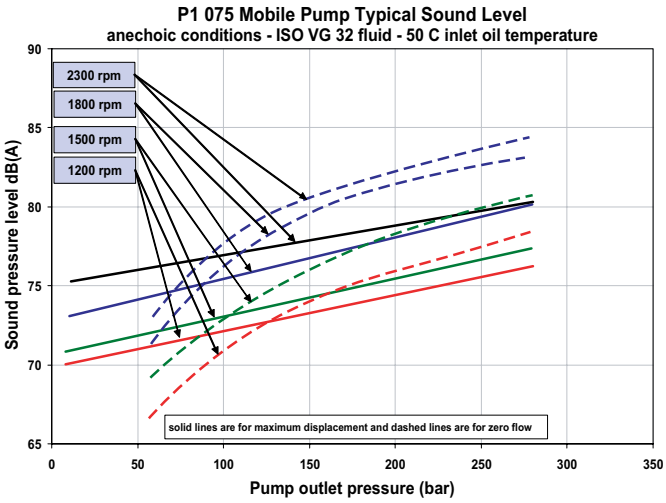


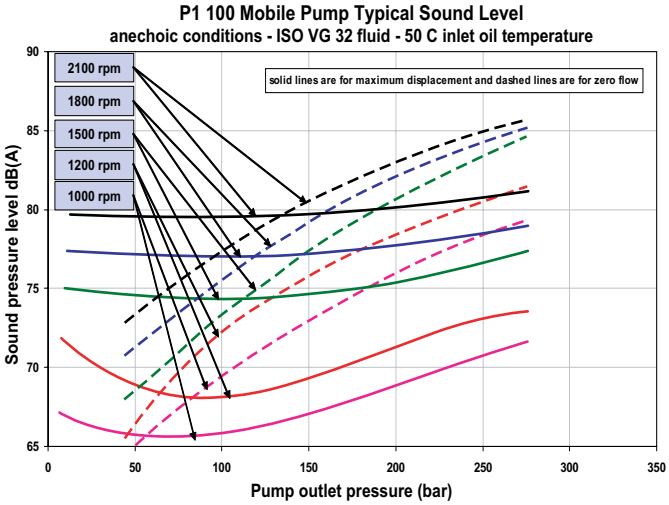


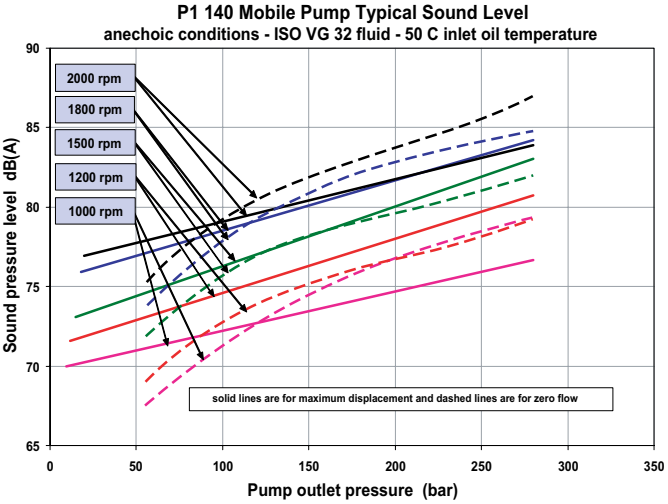
P1 Series Typical Noise Characteristics

(These are anechoic sound pressure readings)

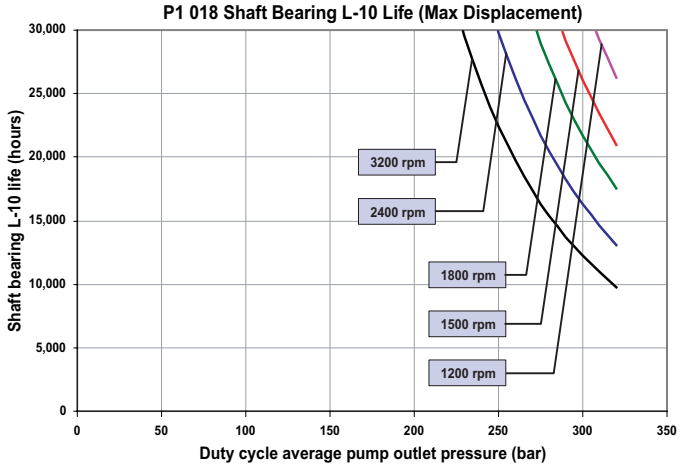


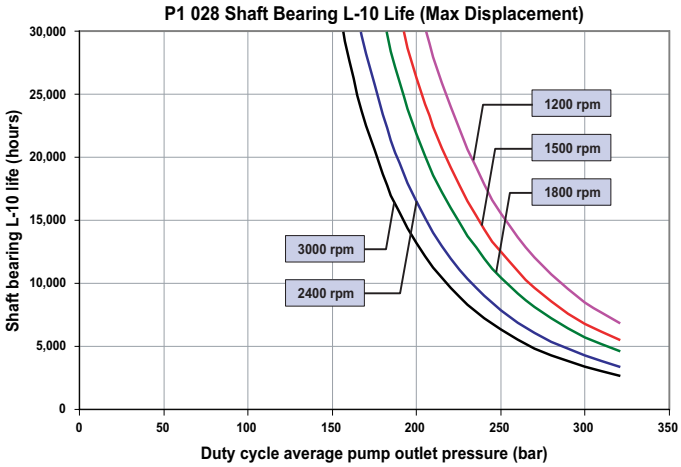


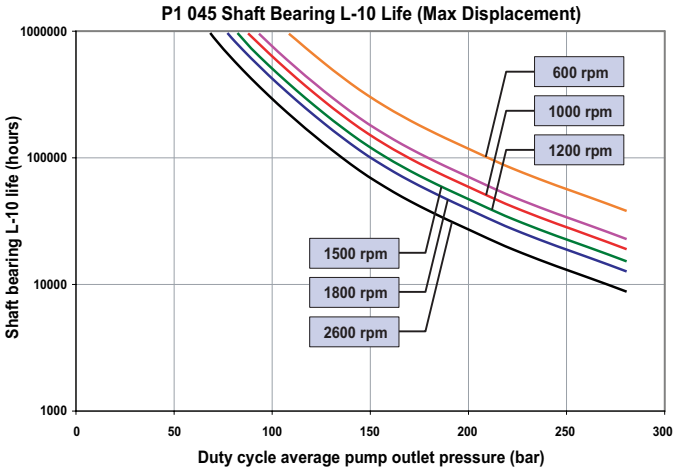




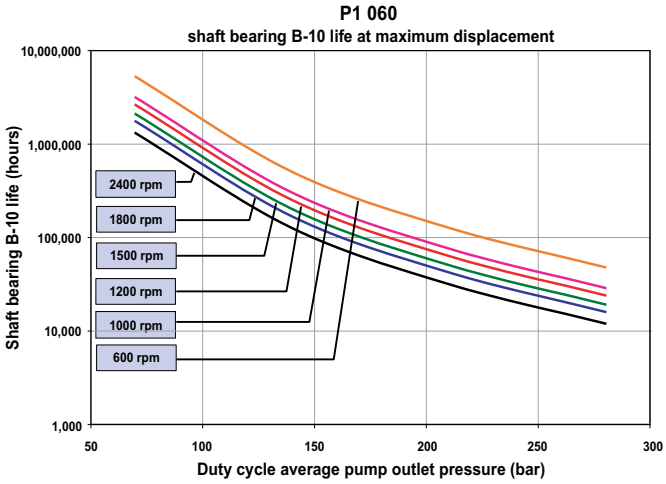
P1 Series Shaft Bearing Life

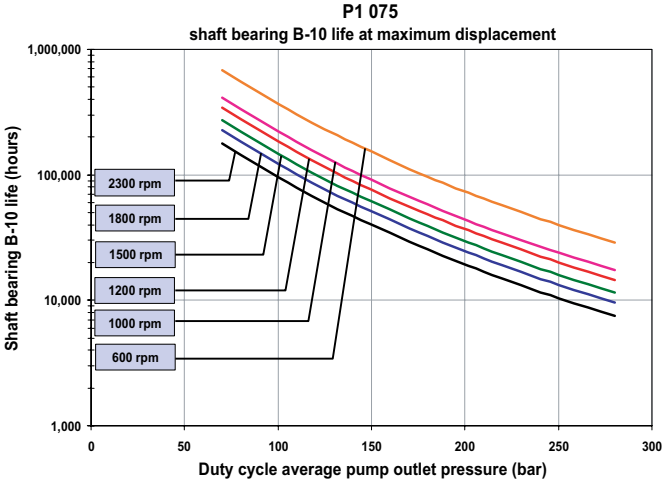


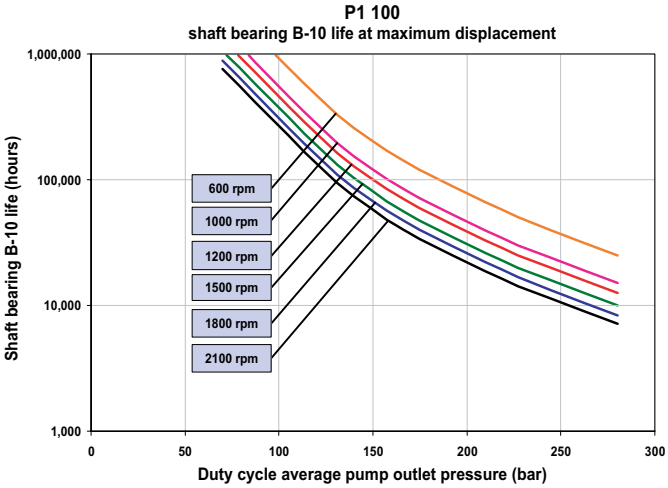


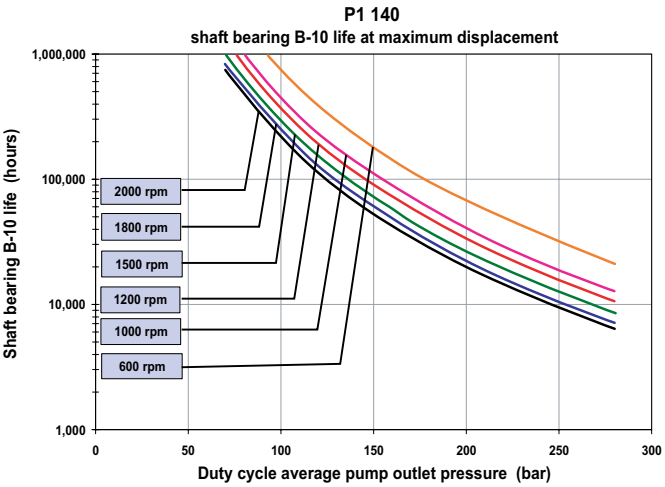


P1 Series Shaft Bearing Life

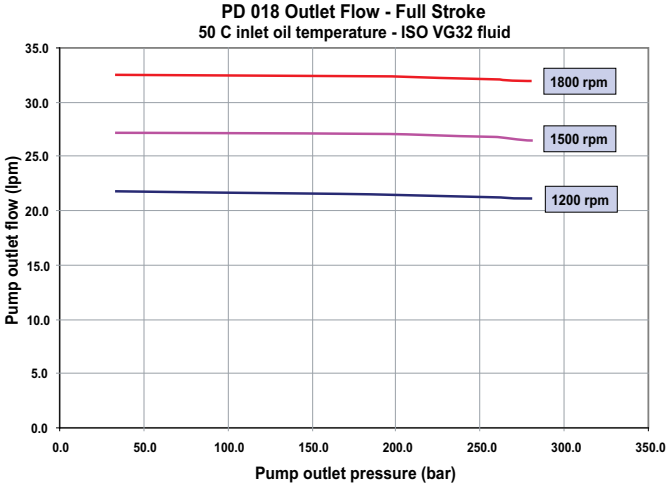


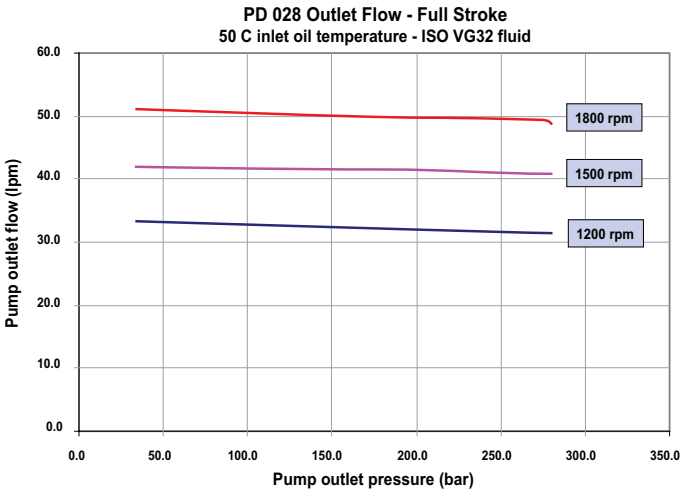


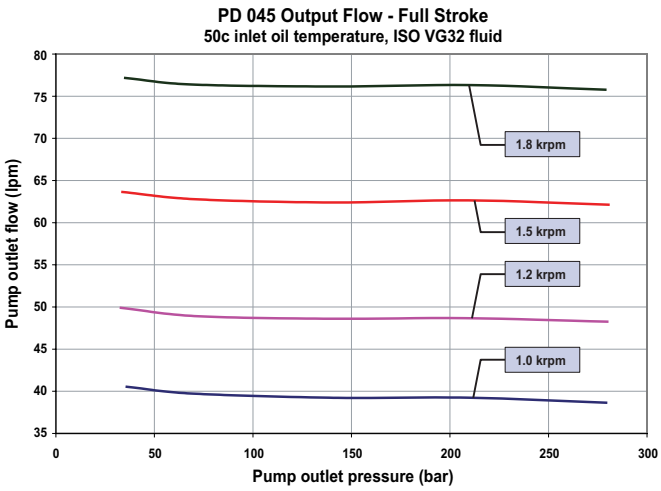




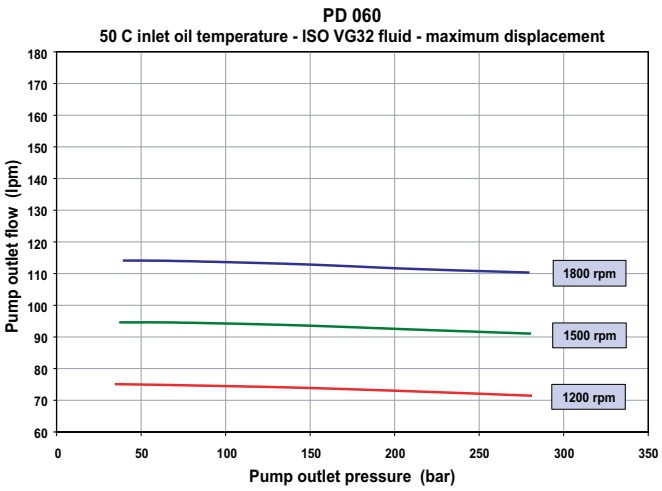
PD Series Pump Outlet Flow

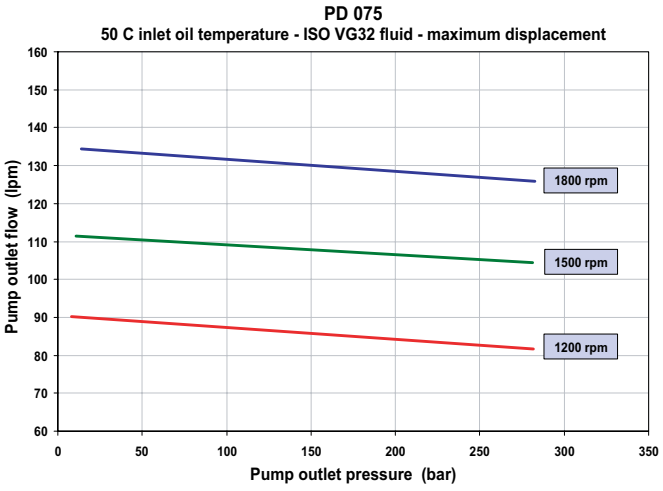


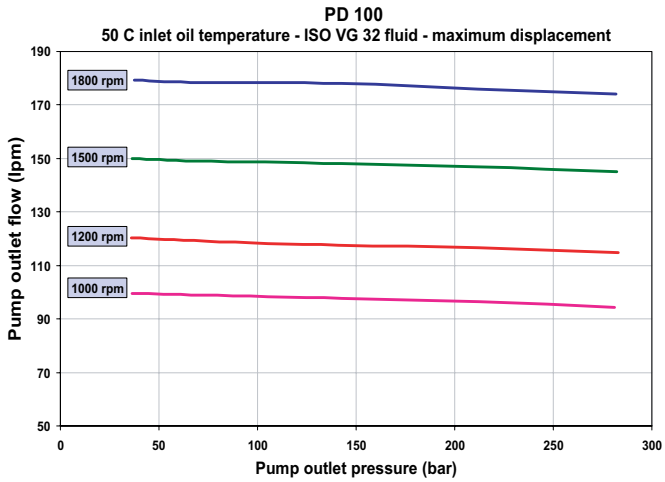


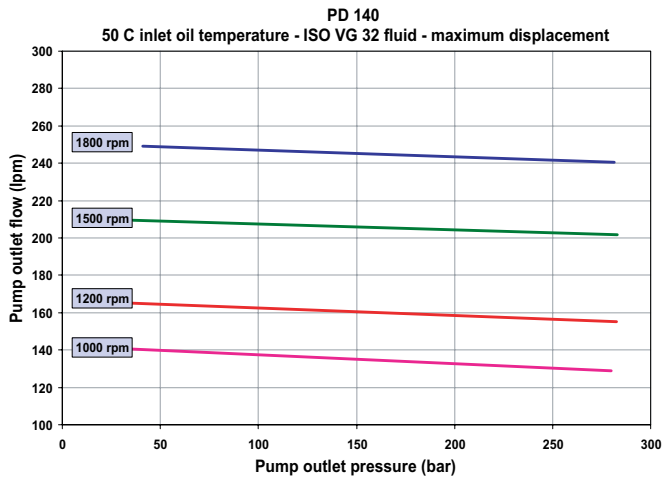


PD Series Pump Outlet Flow

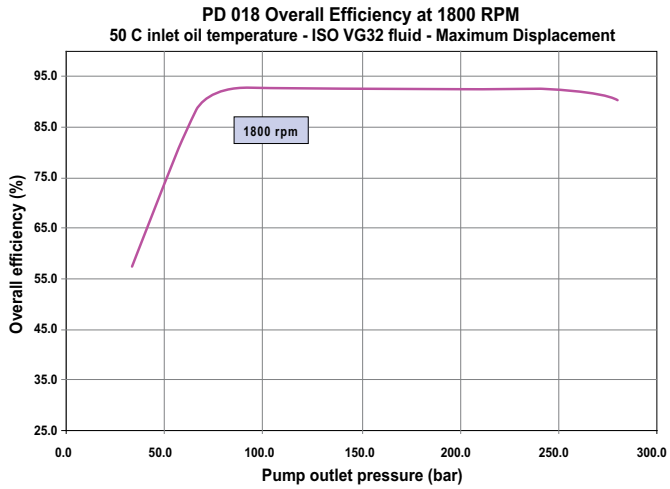


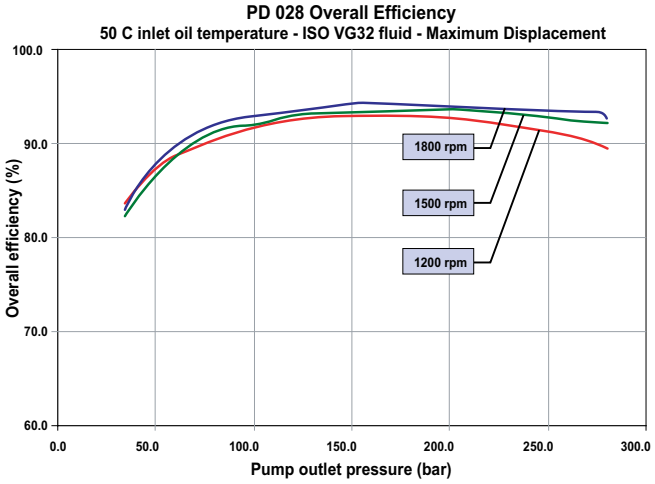


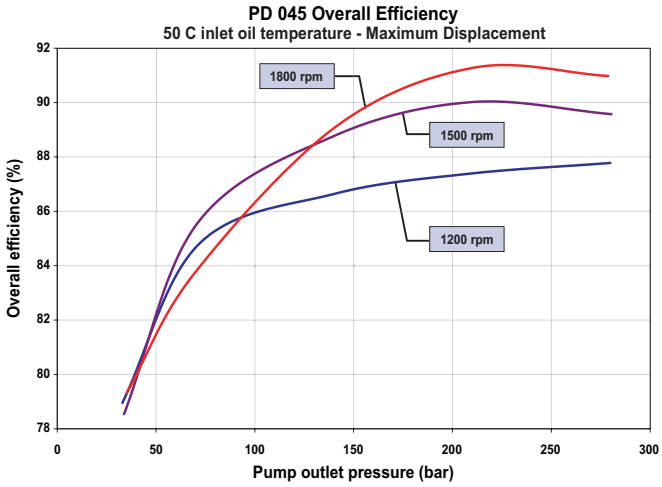




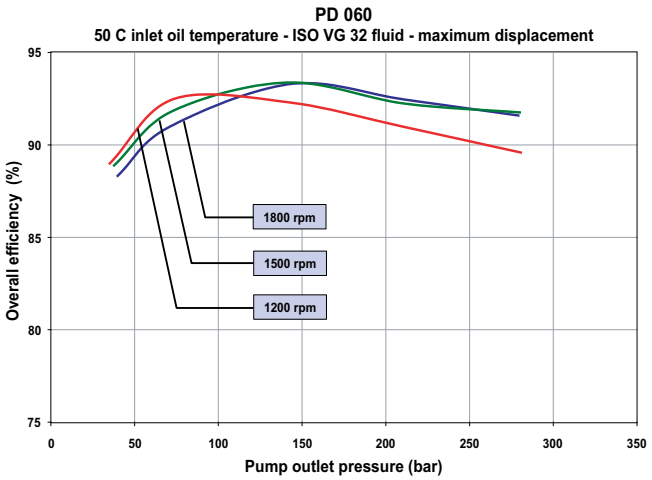
PD Series Overall Efficiency

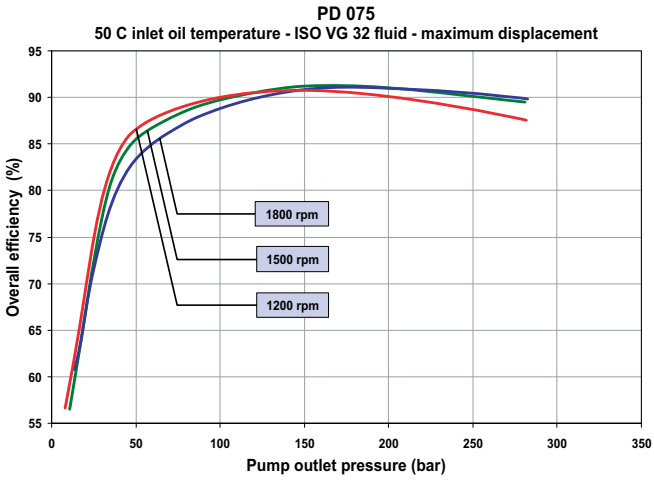


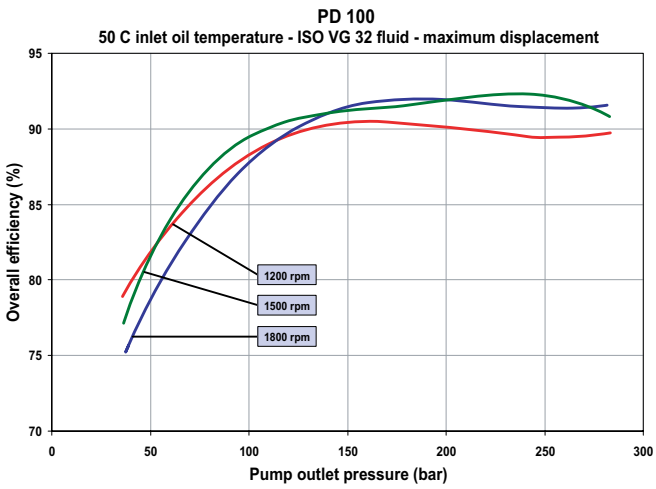


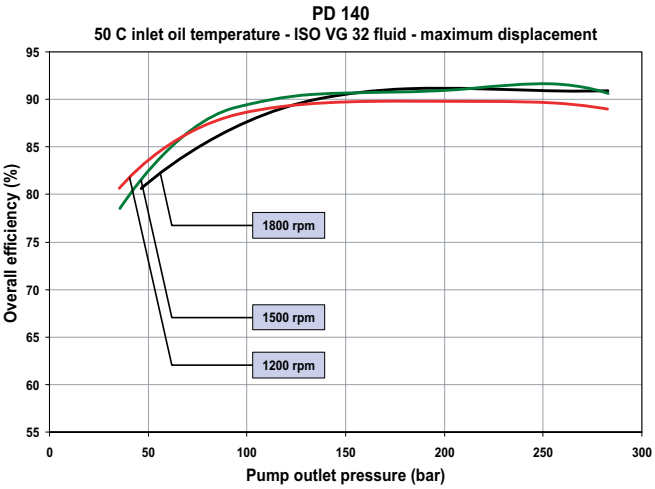


PD Series Overall Efficiency

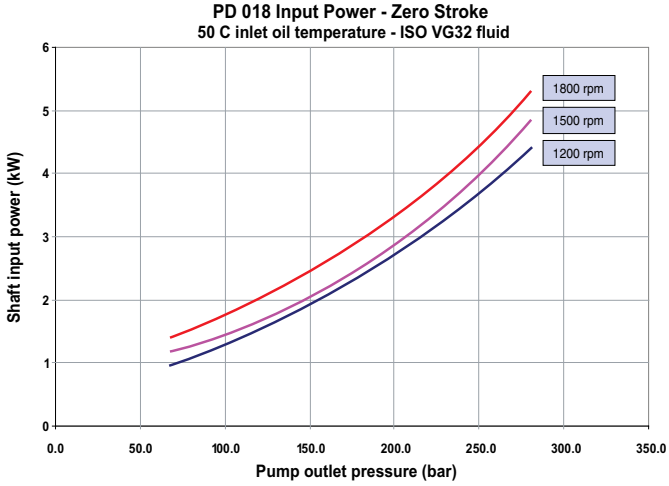


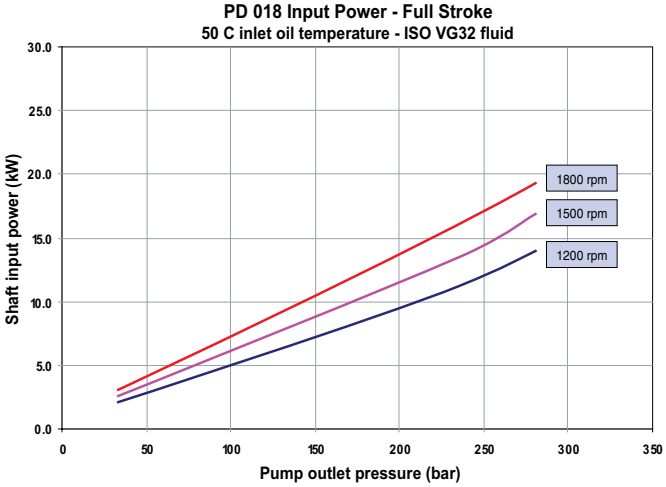


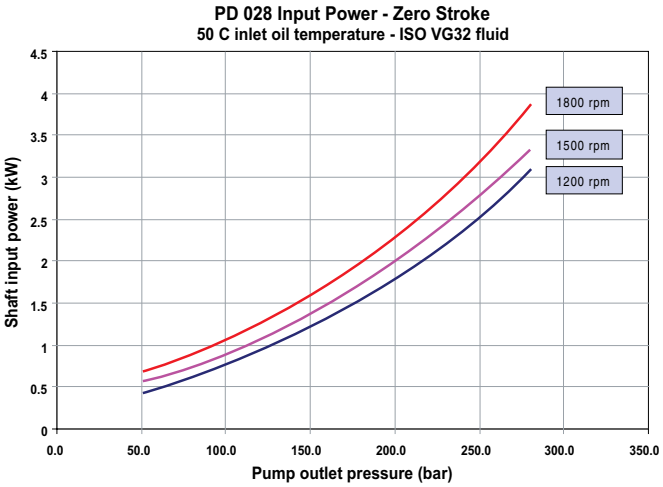


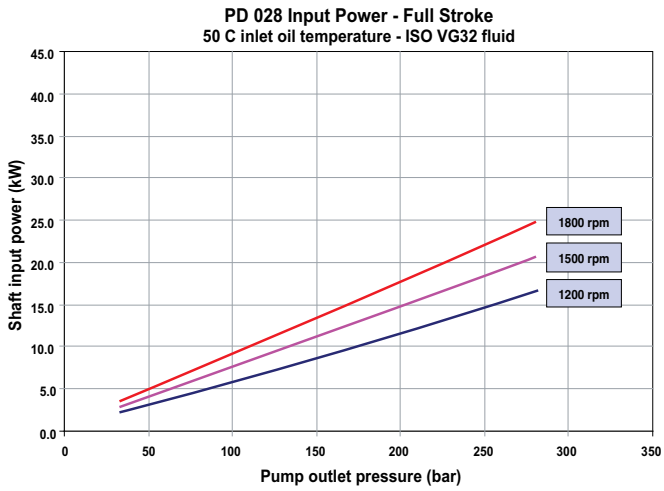


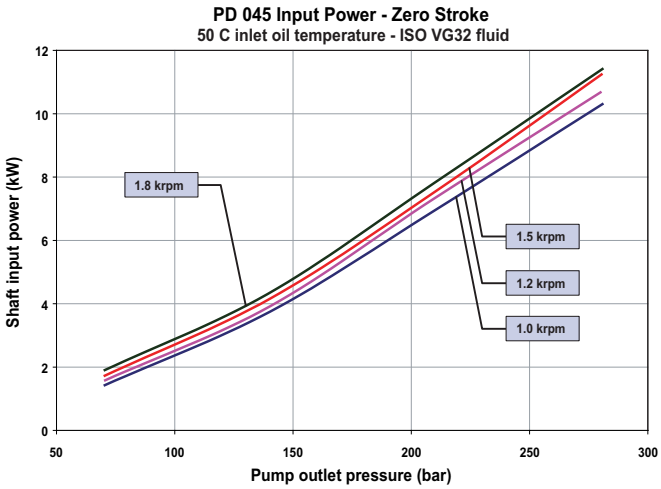
PD Series Shaft Input Power

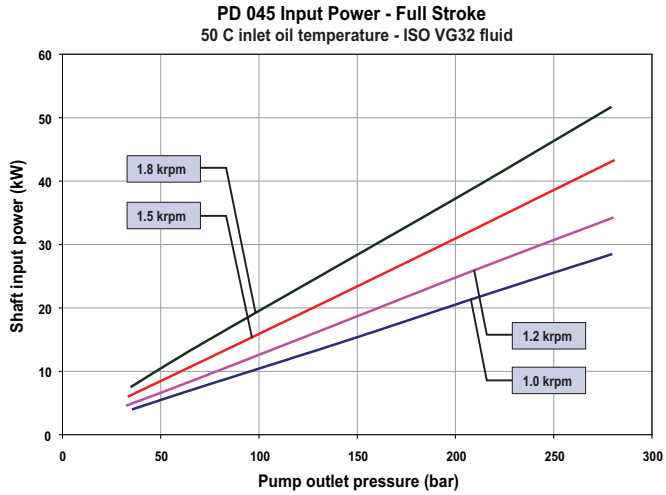




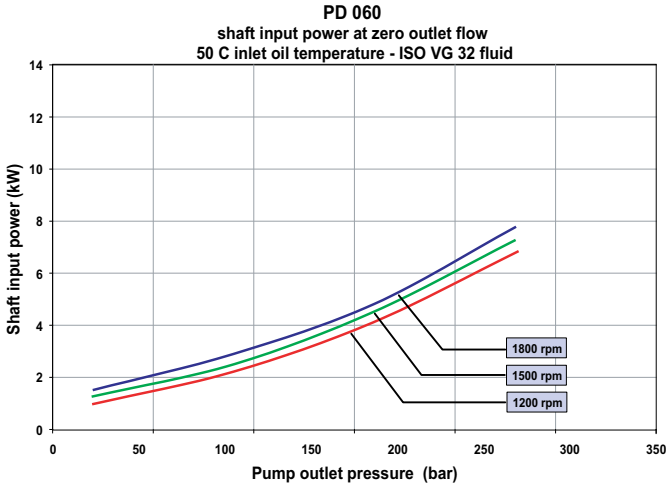


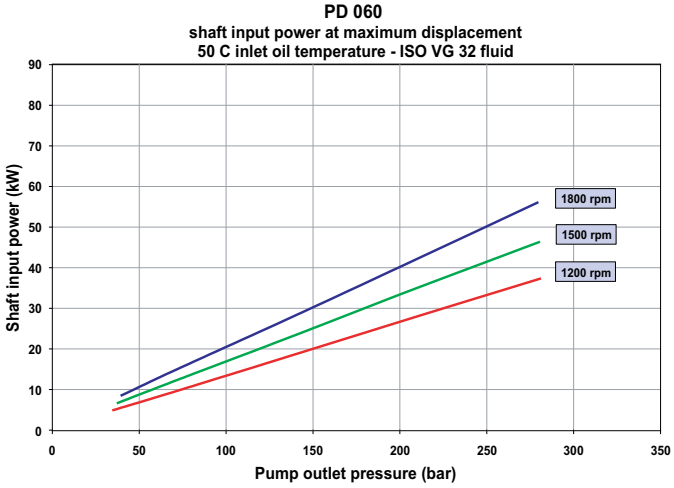


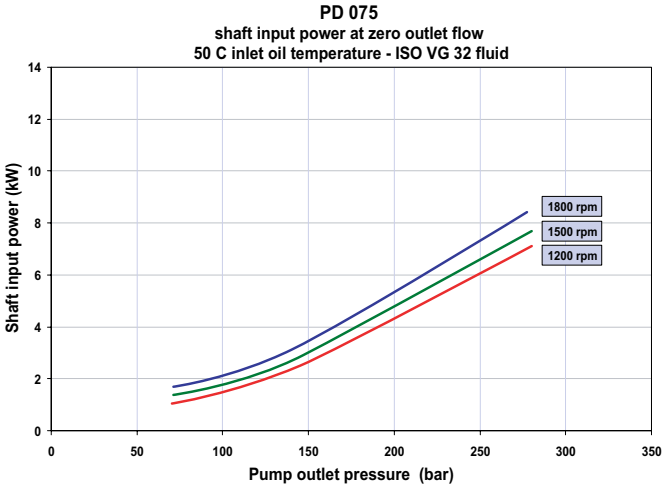


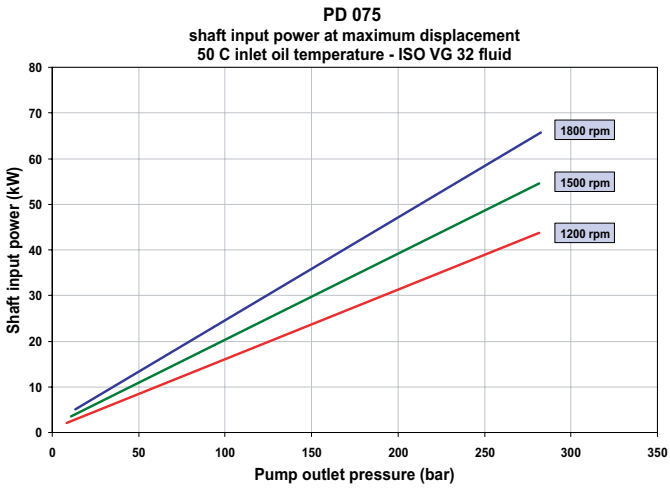


PD Series Shaft Input Power

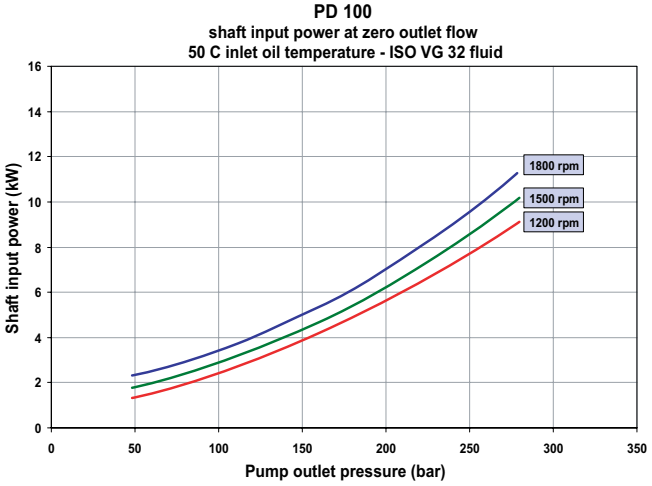


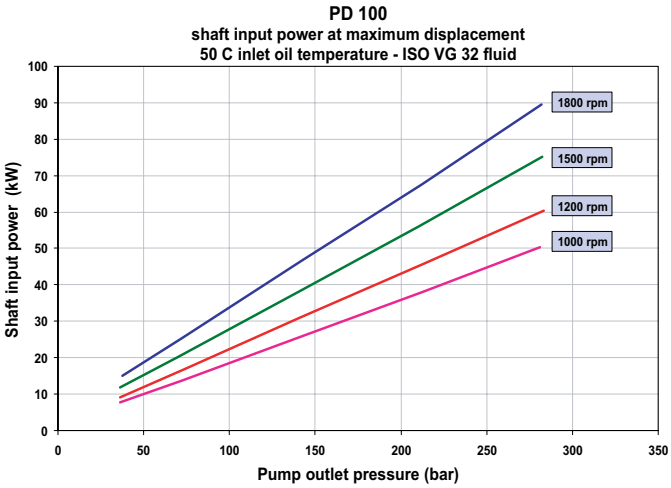


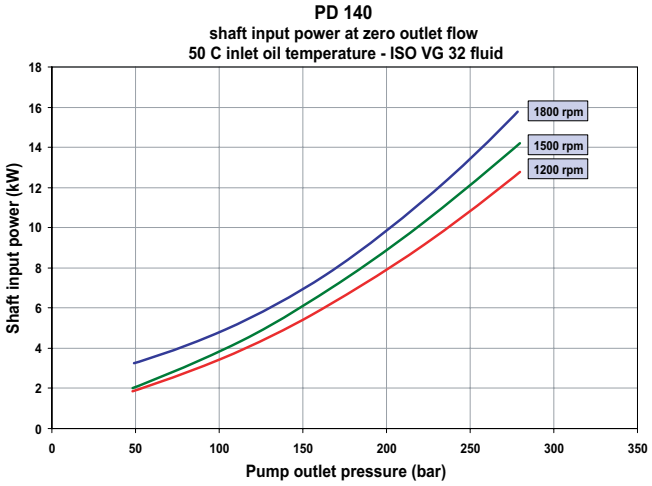


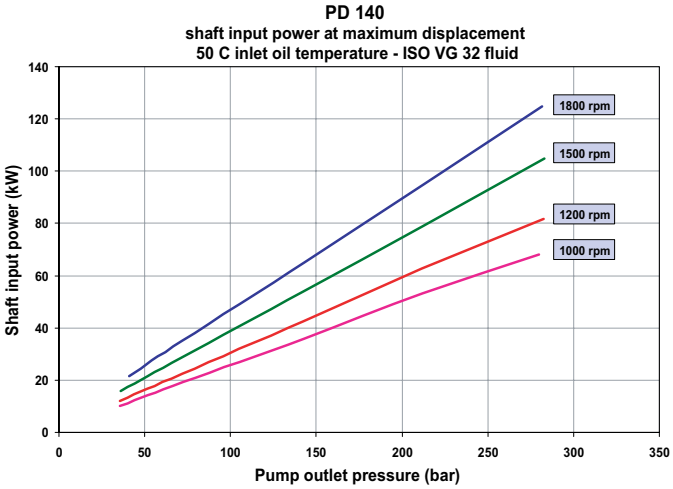


PD Series Shaft Input Power



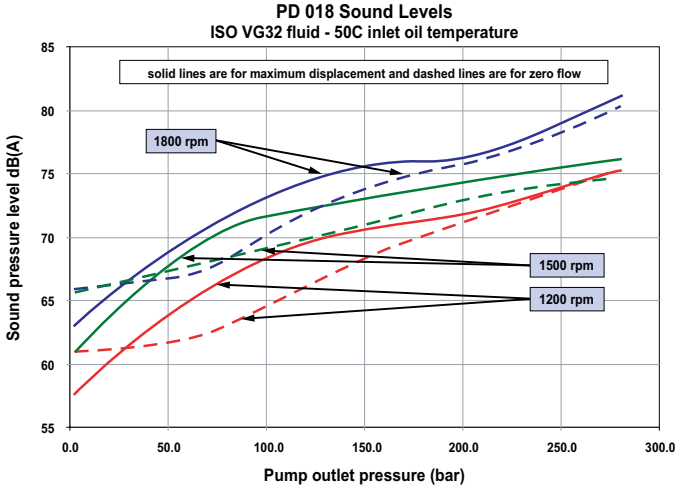


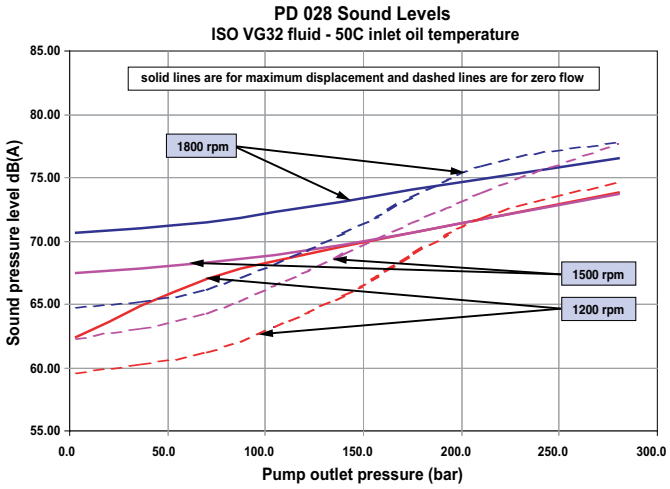


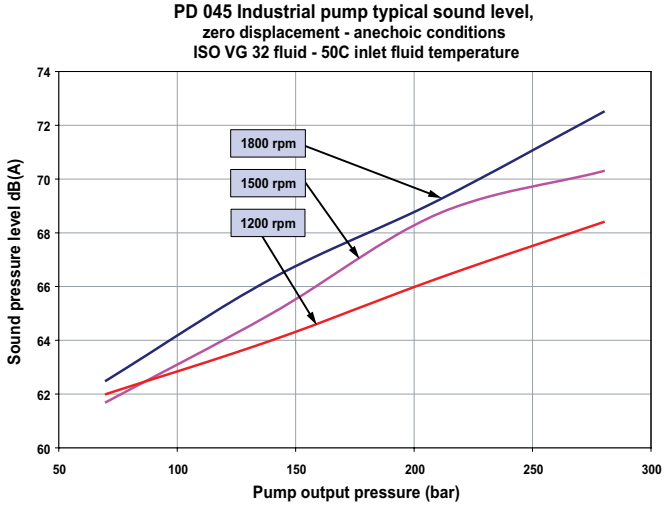


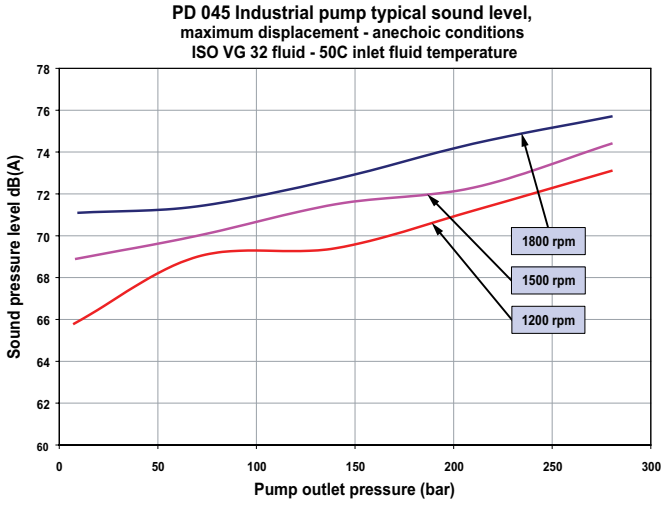
PD Series Typical Noise Characteristics

(These are anechoic sound pressure readings)









Parker Hannifin Corporation
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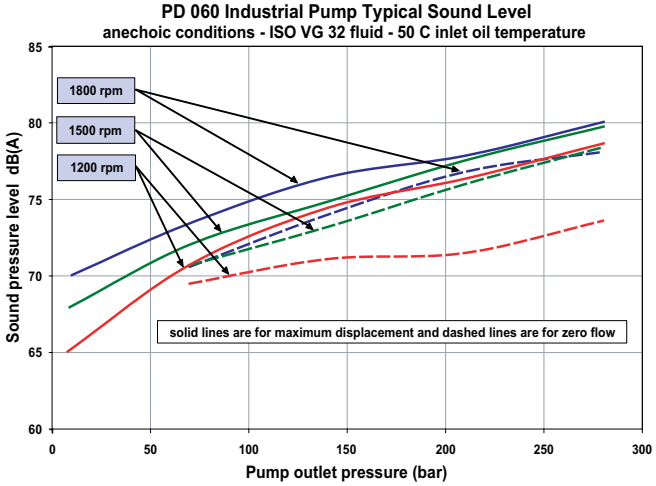
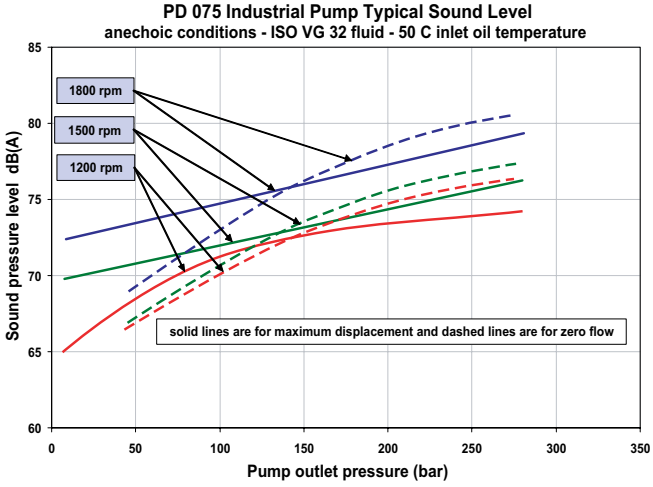
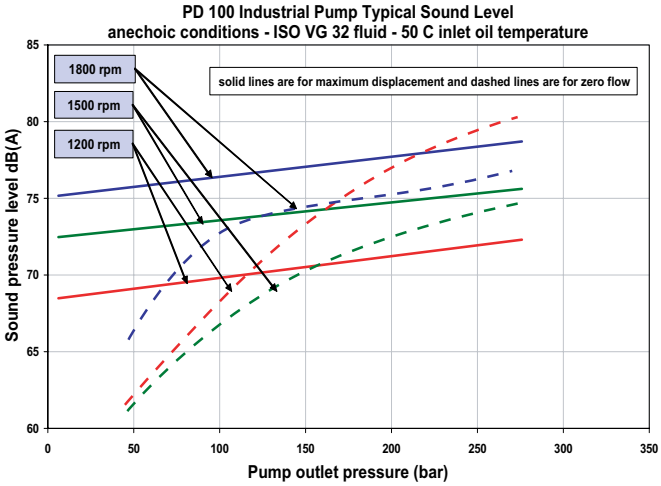
Marysville, Ohio USA

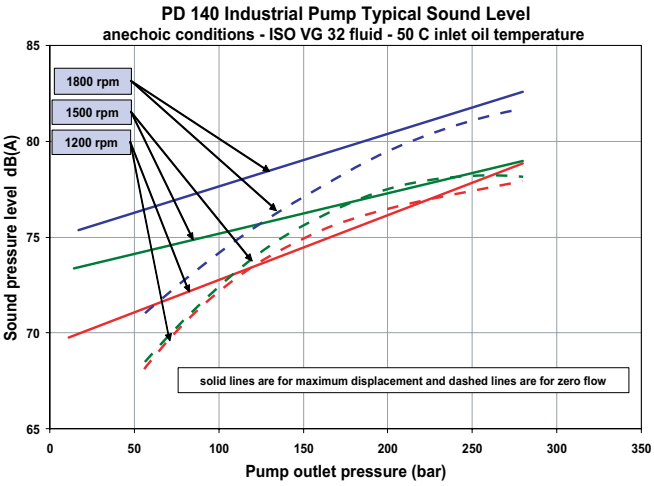
PD Series Typical Noise Characteristics

(These are anechoic sound pressure readings)

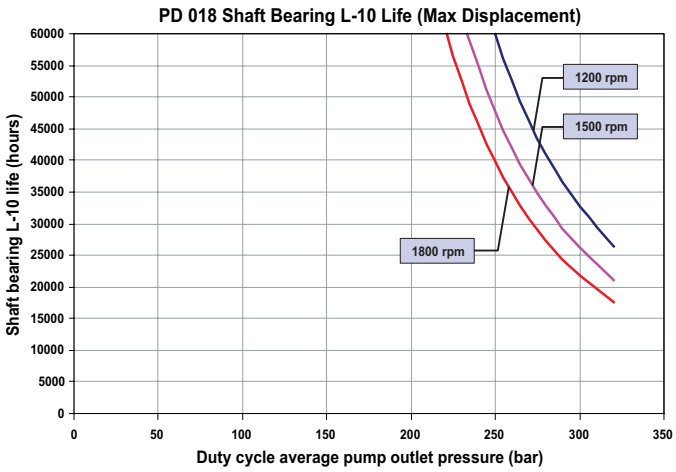


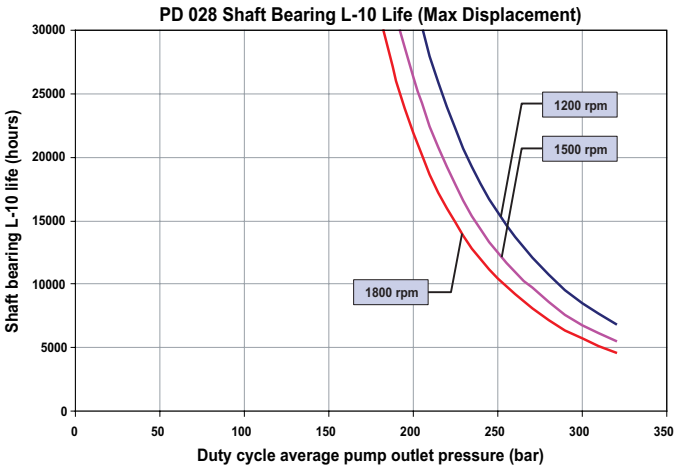


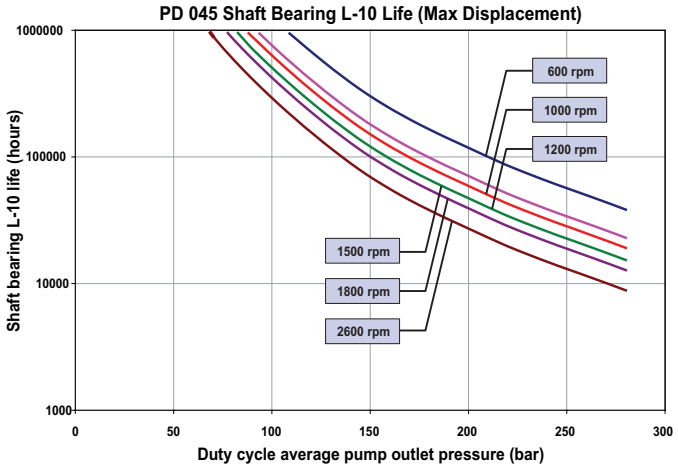




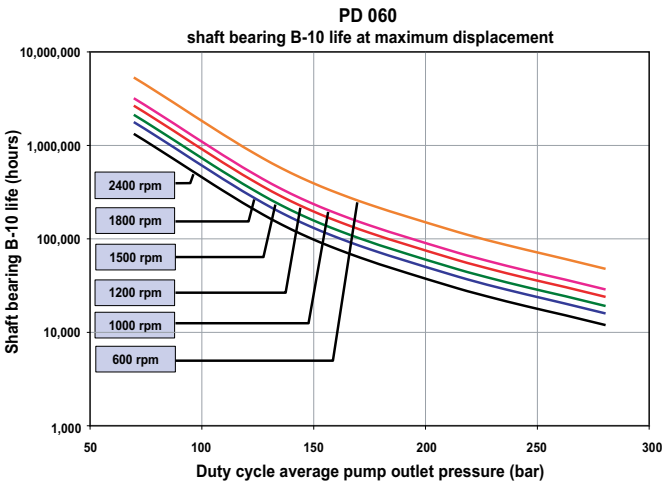
PD Series Shaft Bearing Life

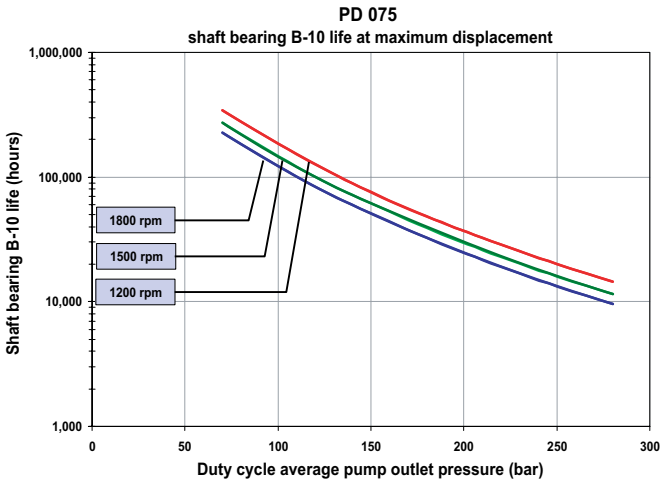


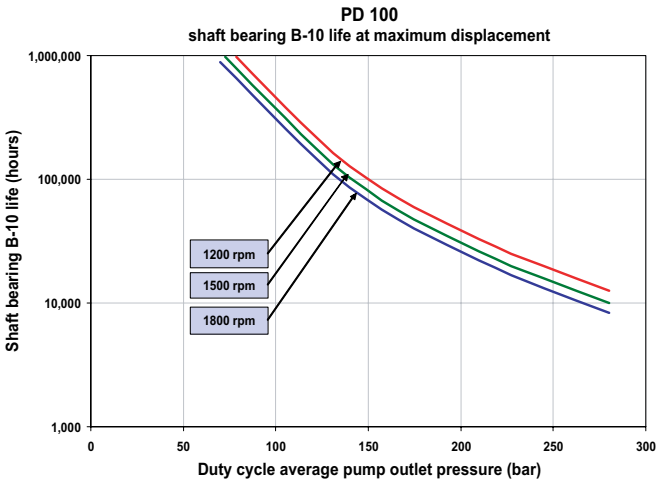


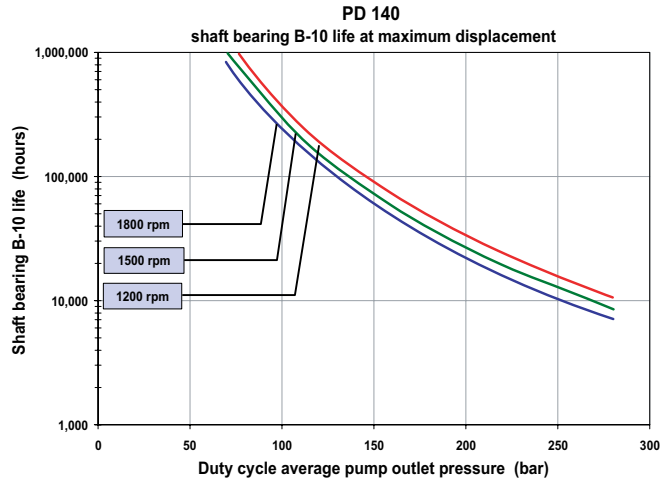


PD Series Shaft Bearing Life

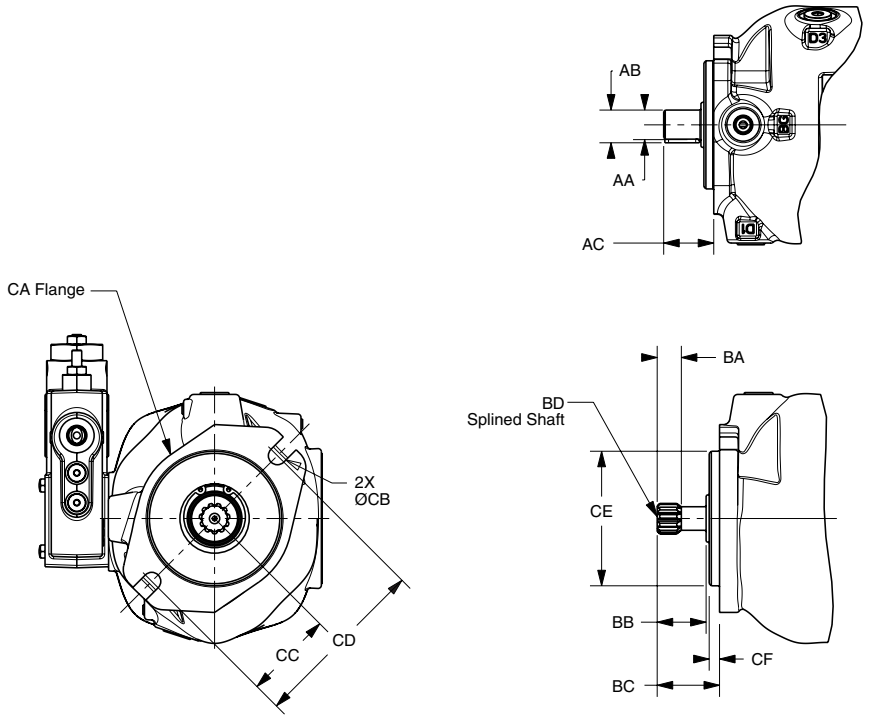






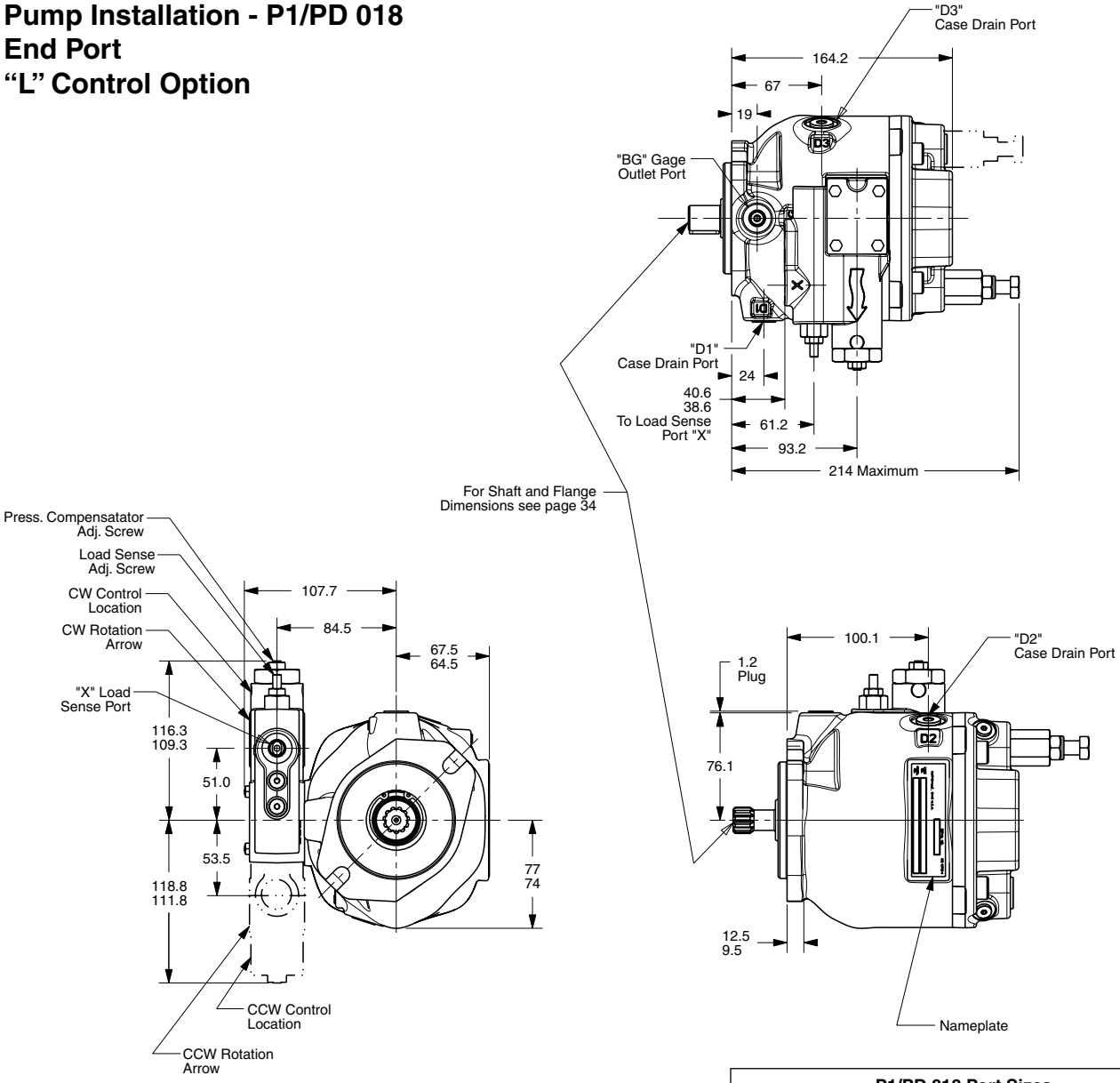


Pump Installation - P1/PD 018
Input Shaft Dimensions



P1/PD 018	ISO Key (Code 04)	SAE (Code 01 or 02)
AA	20.00/19.97	19.05/19.02
AB	28.03/28.00	21.13/21.10
AC	44.3/43.7	32.8/31.2
AD	ISO E20N	SAE J744 19-1
BA	N/A	14.82
BB	N/A	30.00
BC	N/A	38.7/37.7
BD	N/A	SPLINE: SAE J744 SAE 19-4 INVOLUTE SPLINE DATA CLASS 7 FLAT ROOT SIDE FIT NUMBER OF TEETH - 11 PITCH - 16/32 PRESSURE ANGLE - 30 MAJOR DIAMETER - 19.05/18.49 MM PITCH DIAMETER - 17.463
CA	ISO 3019-2 100A2	SAE J744: JUN96 82-2 (A)
CB	11.21/10.99	11.21/10.99
CC	54.5	53.2
CD	109	106.4
CE	80.00/79.95 ISO 3019-2:2001(E)	82.55/82.50 SAE J744
CF	7.50/7.00	6.4/6.0
Key Width	6.00	4.76

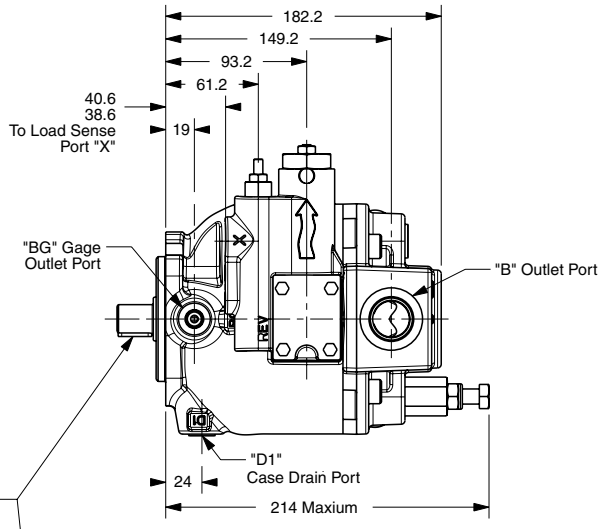
Pump Installation - P1/PD 018
End Port
"L" Control Option

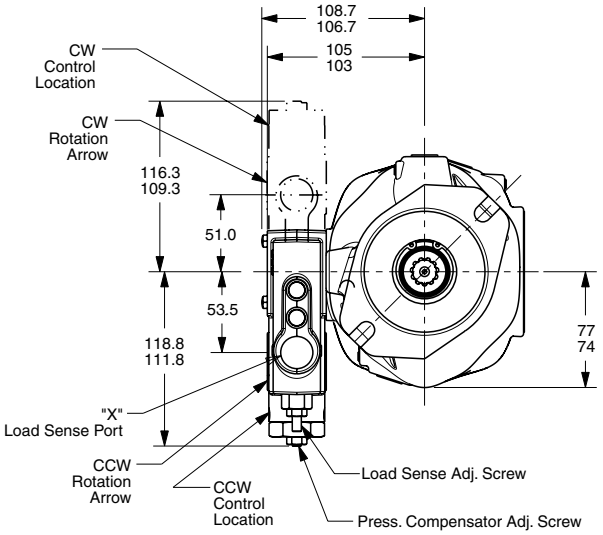


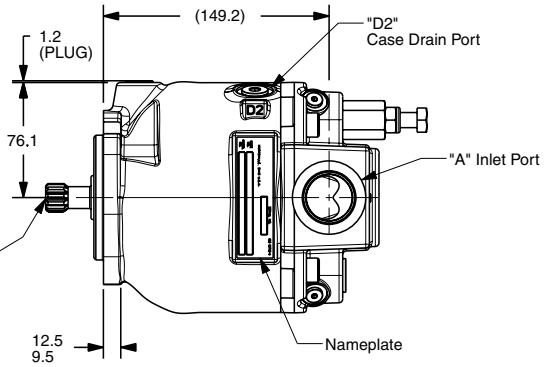
P1/PD 018 Port Sizes			
	SAE	**ISO**	**BSP**
"A" Inlet	SAE-16[B]	M33x2[A]	-
"B" Outlet	SAE-12[B]	M27x2[A]	-
"BG"	SAE-4[B]	M12x1 5[A]	1/4"[C]
D1 D2 D3	SAE-6[B]	M16x1 5[A]	3/8"[C]
"X"	SAE-4[B]	M12x1 5[A]	1/4"[C]

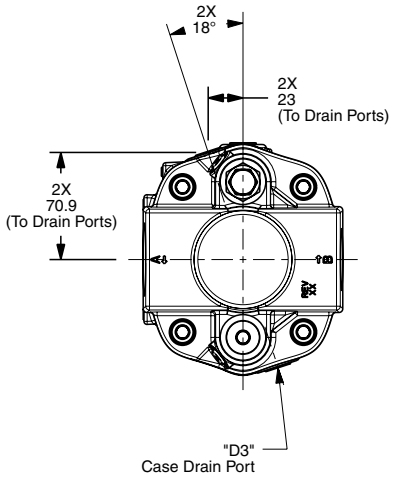
Note A: Metric o-ring boss port conforms to ISO 6149-1
Note B: Inch o-ring port conforms to SAE J514
Note C: BSP port conforms to ISO 228-1

Pump Installation - P1/PD 018
Side Port
“L” Control Option







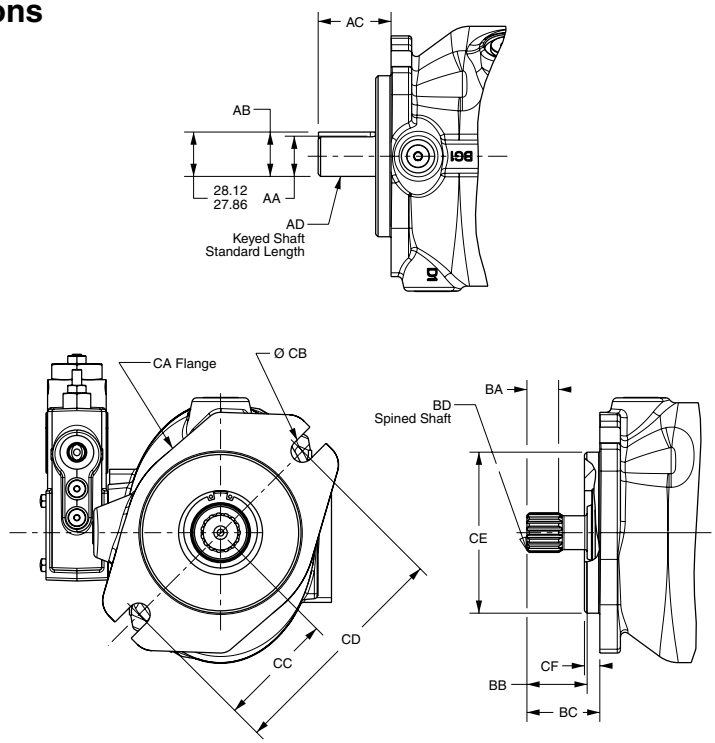


P1/PD 018 Port Sizes			
	SAE	**ISO**	**BSP**
"A" Inlet	SAE-16[B]	M33x2[A]	-
"B" Outlet	SAE-12[B]	M27x2[A]	-
"BG"	SAE-4[B]	M12x1 5[A]	1/4"[C]
D1 D2 D3	SAE-6[B]	M16x1 5[A]	3/8"[C]
"X"	SAE-4[B]	M12x1 5[A]	1/4"[C]

Note A: Metric o-ring boss ports conform to ISO 6149-1
Note B: Inch o-ring ports conform to SAE J514
Note C: BSP ports conform to ISO 228-1

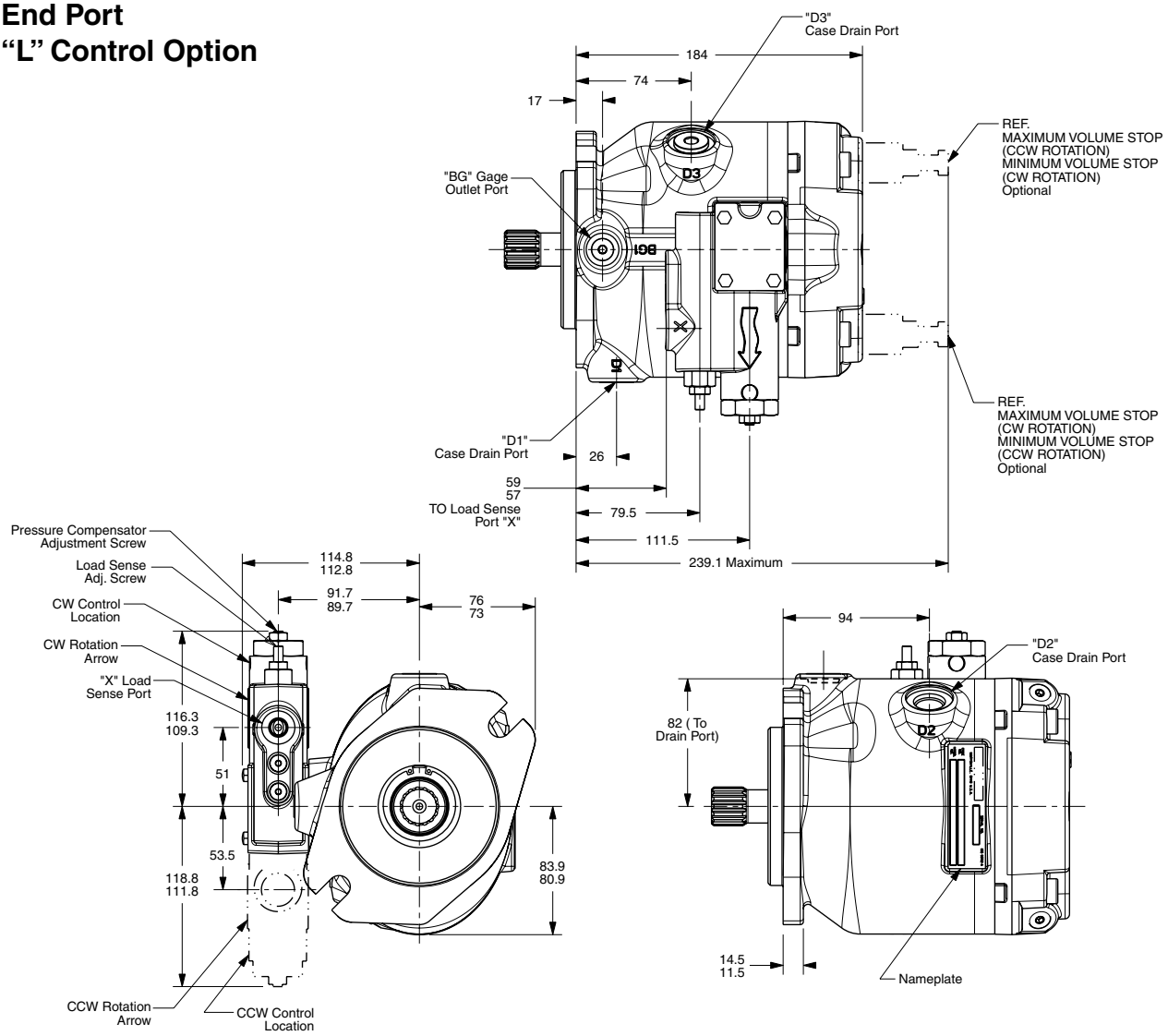
Parker Hannifin Corporation
Hydraulic Pump Division
Marysville, Ohio USA

Pump Installation - P1/PD 028
Input Shaft Dimensions



P1/PD 028	ISO (Code 04)	SAE (Code 01 or 02)
AA	25.013/24.992	25.40/25.35
AB	28.13/27.87	28.23/27.97
AC	45.80/44.20	46.3/45.7
AD	ISO E25N	SAE J744 25-1 (B-B)
BA	N/A	20.00
BB	N/A	38.00
BC	N/A	46.8/45.2
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
CA	ISO 3019-2: 100A2	SAE J744: JUN96 101-2 (B)
CB	13.77/13.50	14.65 / 14.27
CC	70	73
CD	140	146.0
CE	100.00/99.95 ISO 3019-2:2001(E)	101.60/101.55 SAE J744
CF	9.50/9.00	9.7/9.19
Key Width	8.00	6.35

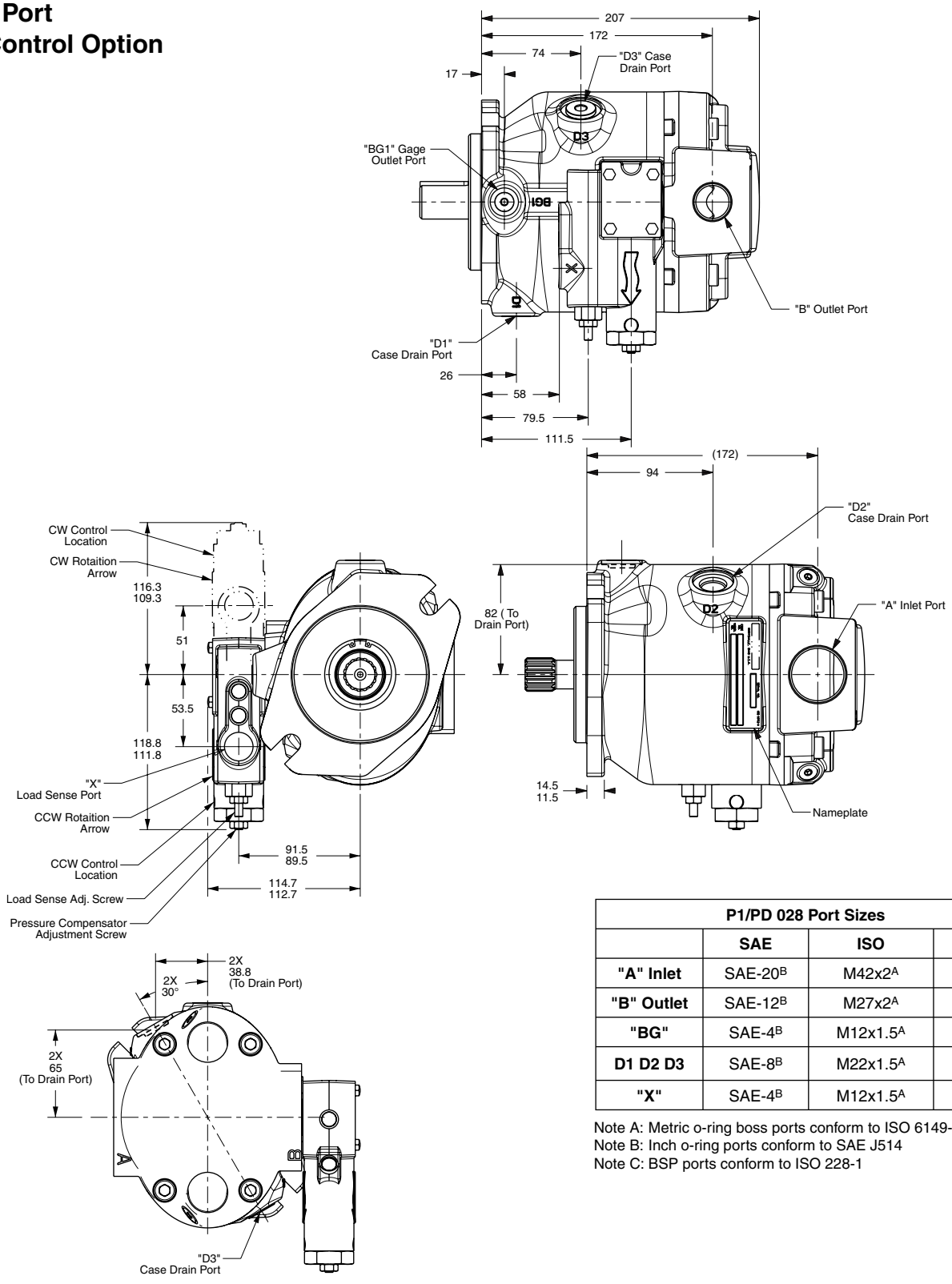
Pump Installation - P1/PD 028
End Port
“L” Control Option



P1/PD 028 Port Sizes			
	SAE	**ISO**	**BSP**
"A" Inlet	SAE-20[B]	M42x2[A]	-
"B" Outlet	SAE-12[B]	M27x2[A]	-
"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

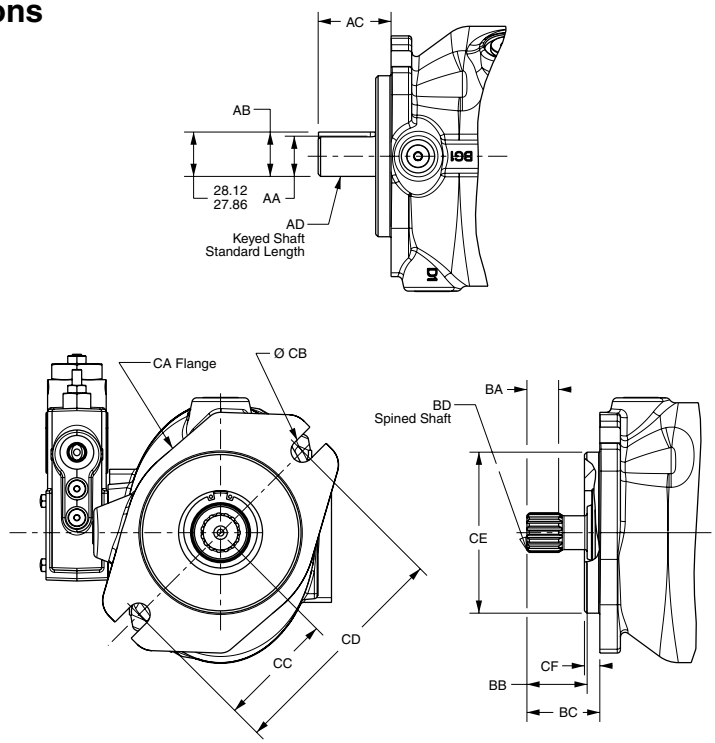
Pump Installation - P1/PD 028
Side Port
“L” Control Option



P1/PD 028 Port Sizes			
	SAE	**ISO**	**BSP**
"A" Inlet	SAE-20[B]	M42x2[A]	-
"B" Outlet	SAE-12[B]	M27x2[A]	-
"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]

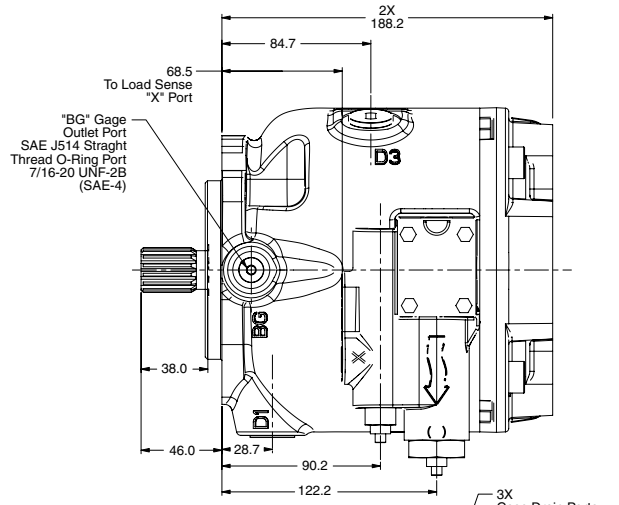
Note A: Metric o-ring boss ports conform to ISO 6149-1
Note B: Inch o-ring ports conform to SAE J514
Note C: BSP ports conform to ISO 228-1

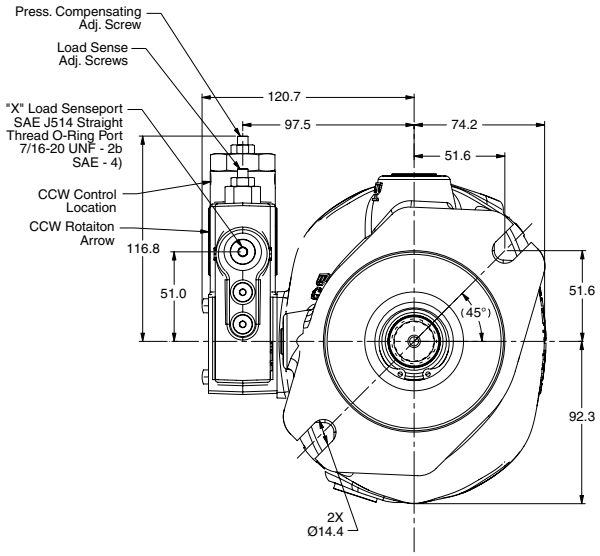
Pump Installation - P1/PD 045
Input Shaft Dimensions

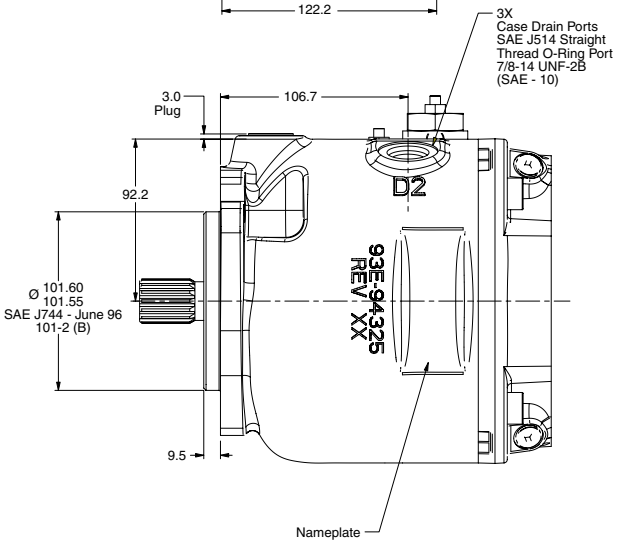


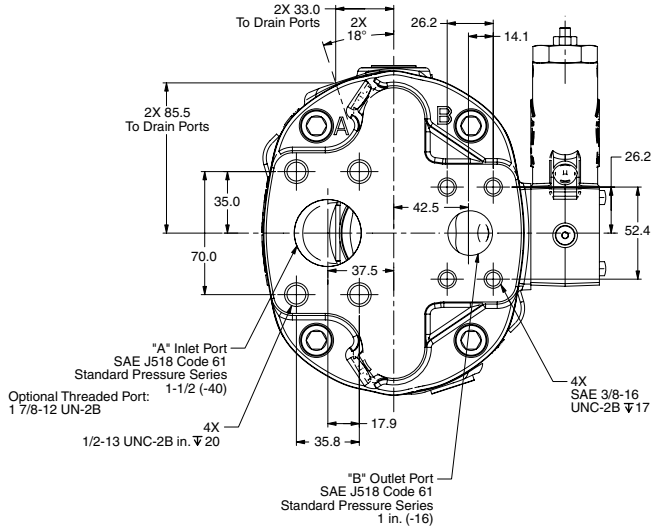
P1/PD 045	ISO (Code 04)	SAE (Code 01 or 02)
AA	25.013/24.992	25.40/25.35
AB	28.13/27.87	28.23/27.97
AC	45.80/44.20	46.3/45.7
AD	ISO E25N	SAE J744 25-1 (B-B)
BA	N/A	31.50
BB	N/A	38.00
BC	N/A	46.8/45.2
BD	N/A	SPLINE: SAE J744 SAE 25-4 INVOLUTE SPLINE DATA CLASS 7 FLAT ROOT SIDE FIT NUMBER OF TEETH - 15 PITCH - 16/32 PRESSURE ANGLE - 30 MAJOR DIAMETER - 25.40 / 25.273 MM PITCH DIAMETER - 23.8125
CA	ISO 3019-2: 100A2	SAE J744: JUN96101-2 (B)
CB	13.77/13.50	14.65 / 14.27
CC	70	73
CD	140	146.0
CE	100.00/99.95 ISO 3019-2:2001(E)	101.60/101.55 SAE J744
CF	9.50/9.00	9.7/9.19
Key Width	8.00	6.35

Pump Installation - P1/PD 045
End Port
“L” Control Option





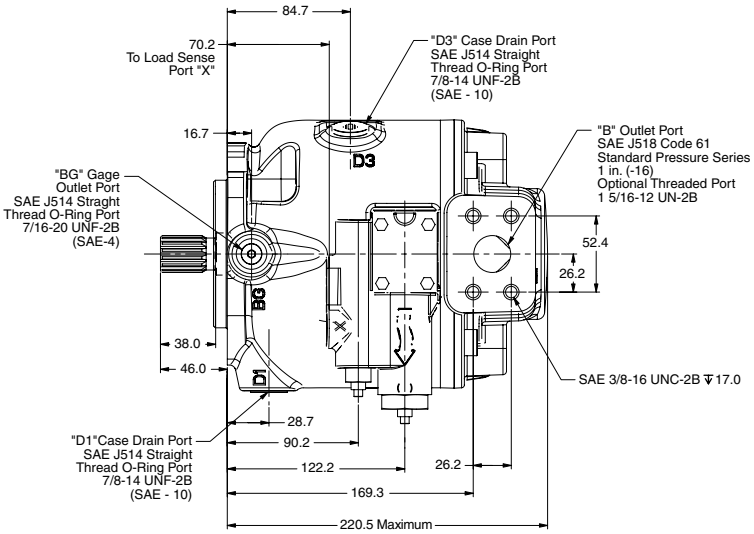


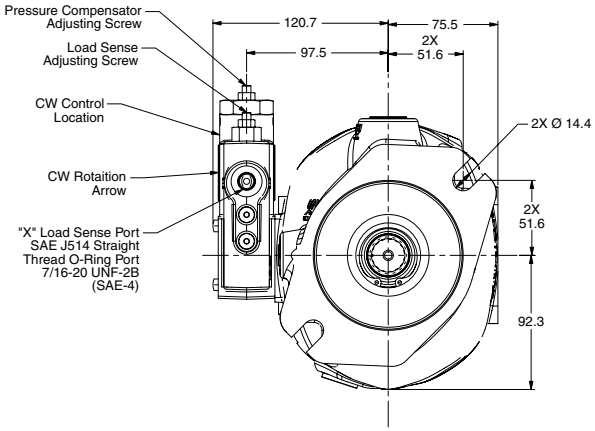


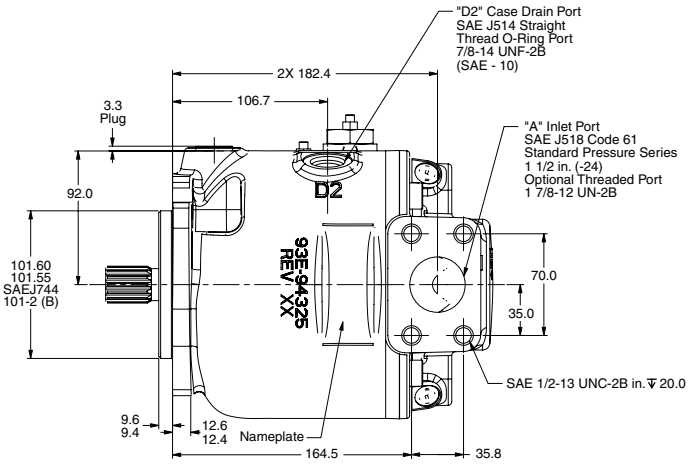
P1/PD 045 Port Sizes				
	SAE 4 Bolt	**SAE Threaded**	**ISO**	**BSP**
"A" Inlet	38mm Code 61[D]	SAE-24	38mm DN51[E]	-
"B" Outlet	25mm Code 61	SAE-16	25mm DN25[E]	-
"BG"	SAE-4[B]		M12x1.5[A]	1/4"[C]
D1 D2 D3	SAE-10[B]		M22x1.5[A]	1/2"[C]
"X"	SAE-4[B]		M12x1.5[A]	1/4"[C]

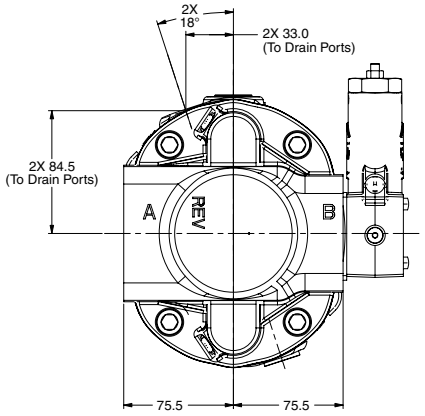
Note A: Metric o-ring boss port conforms to ISO 6149-1
Note B: Inch o-ring port conforms to SAE J514
Note C: BSPP port conforms to ISO 228-1
Note D: Inch 4-bolt flange port conforms to SAE J518
Note E: Metric 4-bolt flange port conforms to ISO 6162

Pump Installation - P1/PD 045
Side Port
“L” Control Option





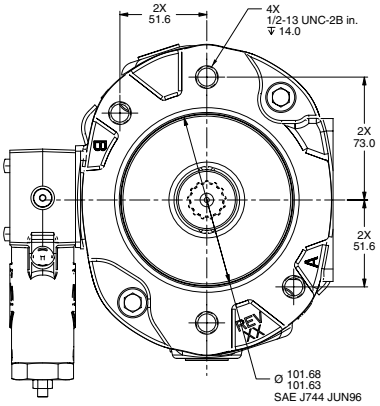




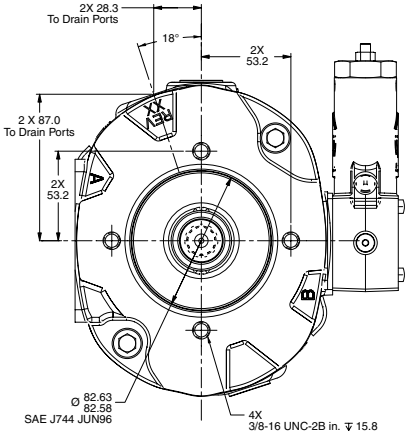
P1/PD 045 Port Sizes				
	SAE 4 Bolt	**SAE Threaded**	**ISO**	**BSP**
"A" Inlet	38mm Code 61[D]	SAE-24	38mm DN51[E]	-
"B" Outlet	25mm Code 61	SAE-16	25mm DN25[E]	-
"BG"	SAE-4[B]		M12x1.5[A]	1/4"[C]
D1 D2 D3	SAE-10[B]		M22x1.5[A]	1/2"[C]
"X"	SAE-4[B]		M12x1.5[A]	1/4"[C]

Note A: Metric o-ring boss port conforms to ISO 6149-1
Note B: Inch o-ring port conforms to SAE J514
Note C: BSPP port conforms to ISO 228-1
Note D: Inch 4-bolt flange port conforms to SAE J518
Note E: Metric 4-bolt flange port conforms to ISO 6162

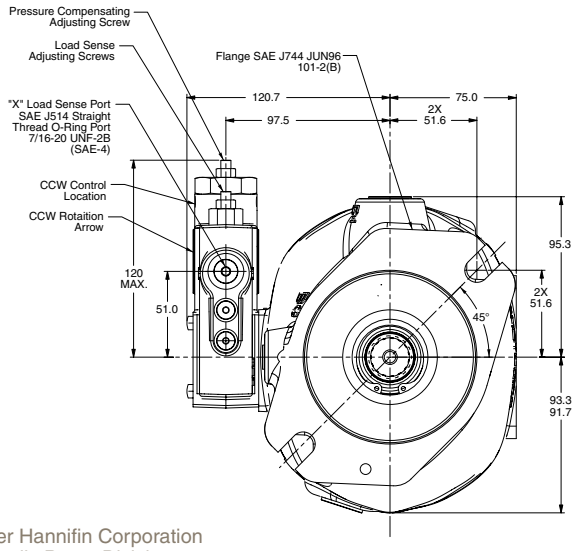
Pump Installation - P1/PD 045 Side Ports with Thru-Drive "L" Control Option

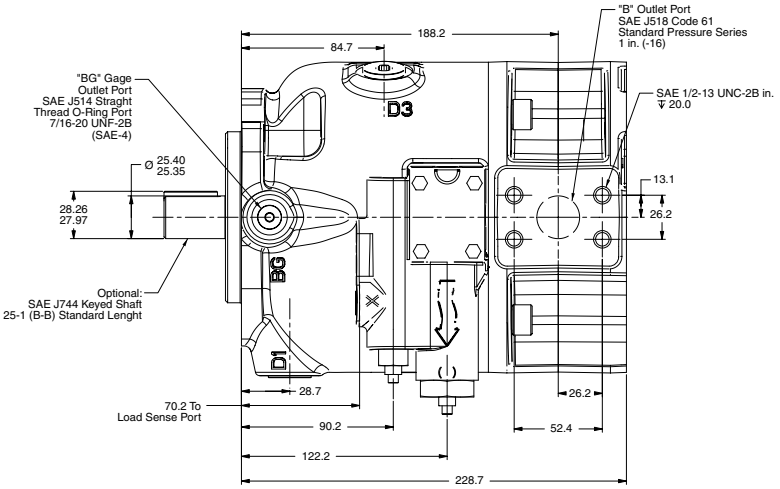


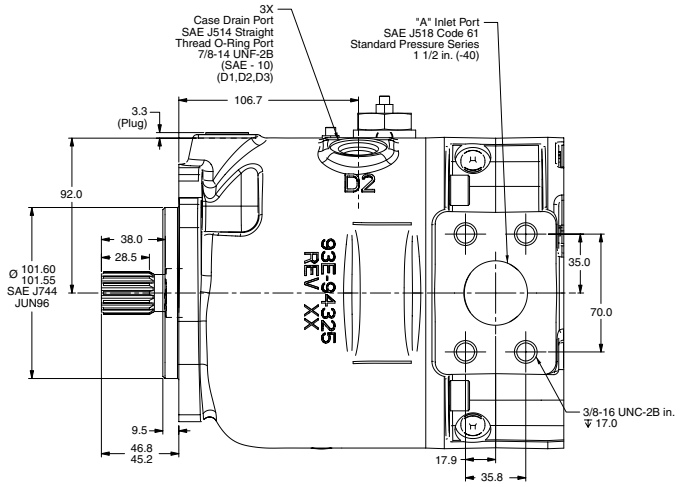
View Showing SAE "B" Mounting Pad



View Showing SAE "A" Mounting Pad





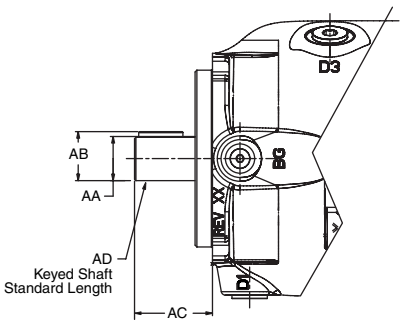


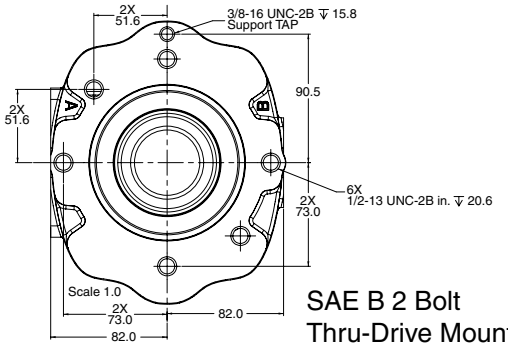
Shaft Code	P1/PD 045 Shaft Size & Type	Max Shaft Torque Capacity (Nm)
01	Spline (B-B)	545 Nm
02	Key (B-B)	357 Nm
03	Spline ISO	515 Nm
04	Key ISO	337 Nm
08	Spline (B)	362 Nm
N/A	Coupling	316 Nm

P1/PD 045 Port Sizes				
	SAE 4 Bolt	SAE Threaded	ISO	BSP
"A" Inlet	38mm Code 61[D]	SAE-24	38mm DN51[E]	-
"B" Outlet	25mm Code 61	SAE-16	25mm DN25[E]	-
"BG"	SAE-4[B]		M12x1.5[A]	1/4"[C]
D1 D2 D3	SAE-10[B]		M22x1.5[A]	1/2"[C]
"X"	SAE-4[B]		M12x1.5[A]	1/4"[C]

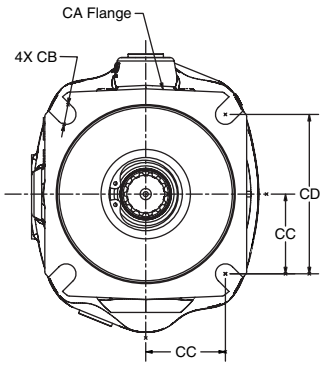
Note A: Metric o-ring boss port conforms to ISO 6149-1
Note B: Inch o-ring port conforms to SAE J514
Note C: BSPP port conforms to ISO 228-1
Note D: Inch 4-bolt flange port conforms to SAE J518
Note E: Metric 4-bolt flange port conforms to ISO 6162

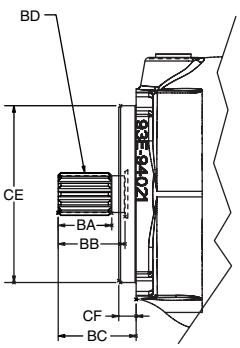
Pump Installation - P1/PD 060
Input Shaft Dimensions

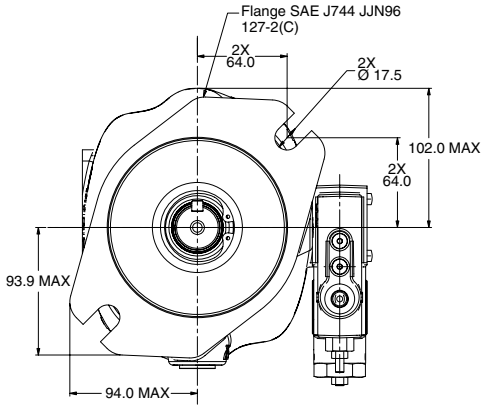




SAE B 2 Bolt
Thru-Drive Mounting
Options for J & K



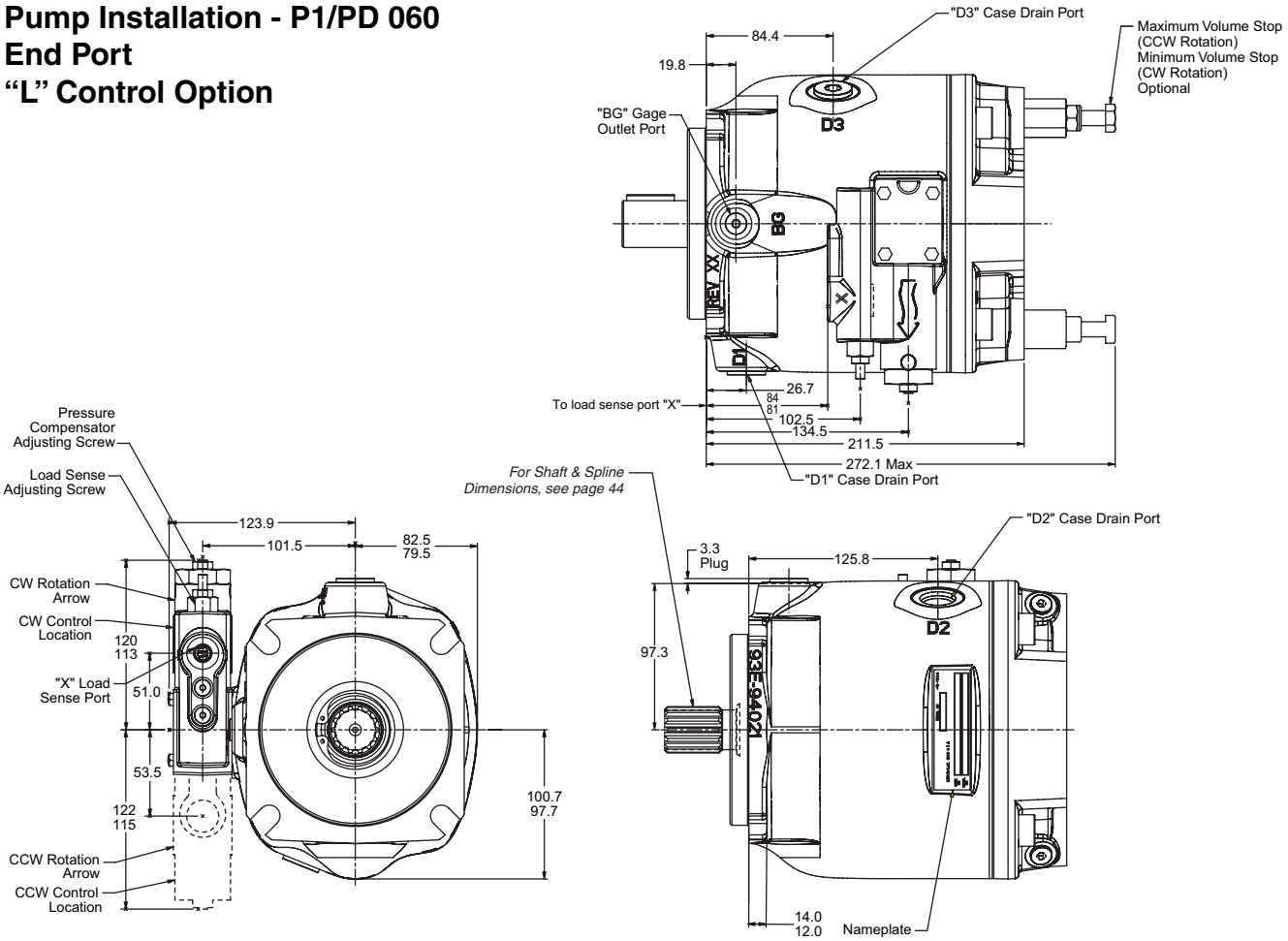




2 Bolt C Mount

P1/PD 060	ISO (Code 04)	SAE (Code 01 or 02)
AA	32.021/32.002	31.75/31.70
AB	35.00/34.71	35.33/35.02
AC	68.8/67.2	56.8/55.2
AD	ISO E32N	SAE J744 32.1 C
BA	N/A	38.00
BB	N/A	48.00
BC	N/A	56.8/55.2
BD	N/A	SPLINE: SAE J744 SAE 32-4C INVOLUTE SPLINE DATA CLASS 2 FLAT ROOT SIDE FIT NUMBER OF TEETH - 14 PITCH - 12/24 PRESSURE ANGLE - 30 MAJOR DIAMETER - 1.2268/1.4763 IN PITCH DIAMETER - 1.1666
CA	ISO 3019/202991 125B4SW	SAE J744 JUN96 127-4 C
CB	13.77/13.50	14.4 DIA.
CC	56.6	57.2
CD	113.2 SQUARE	114.5 SQUARE
CE	125.00/124.94 ISO 3019/2	127.00/126.95 SAE J744
CF	9.5/9.0	12.7/12.2
Key Width	10.00	7.94

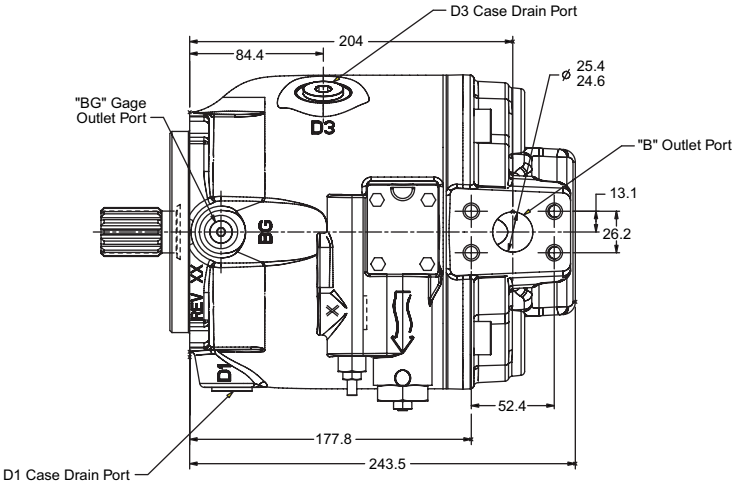
Pump Installation - P1/PD 060
End Port
"L" Control Option

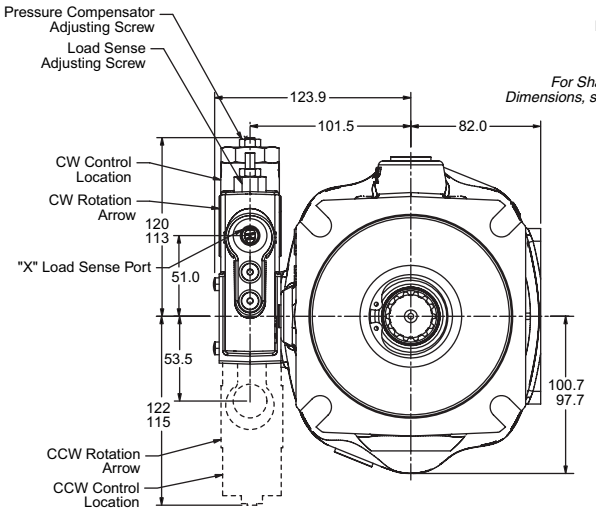


	P1/PD 060 Port Sizes		
	SAE	**ISO**	**BSP**
∅A Inlet	50mm code 61[C]	50mm DN 51[B]	—
W Threads	½ - 13 UNC-2B[C]	M12 x 1.75[B]	—
∅B Outlet	25mm code 61[C]	25mm DN25[B]	—
Y Threads	⅜- 16 UNC-2B[C]	M10 x 1.5[B]	—
BG	SAE-4[D]	M12x1.5[A]	¼"[E]
D1 D2 D3	SAE-10[D]	M22x1.5[A]	¾"[E]
X	SAE-4[D]	M12x1.5[A]	¼"[E]

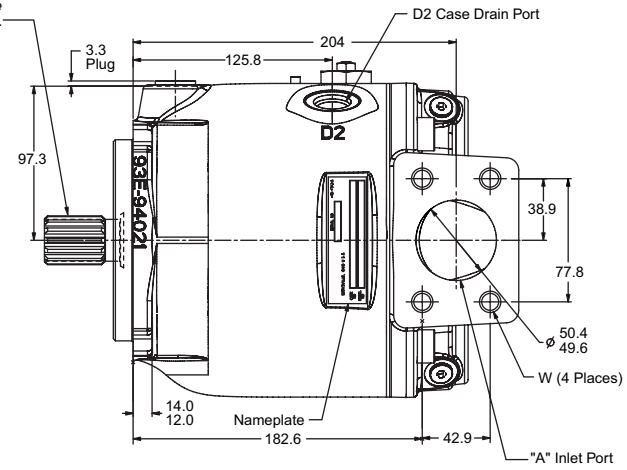
Note A: Metric o-ring boss port conform to ISO 6149-1
Note B: Metric 4-bolt flange port conforms to ISO 6162
Note C: Inch 4-bolt flange port conforms to SAE J518
Note D: Inch o-ring boss port conforms to SAE J514
Note E: BSP boss port conforms to ISO 228-1

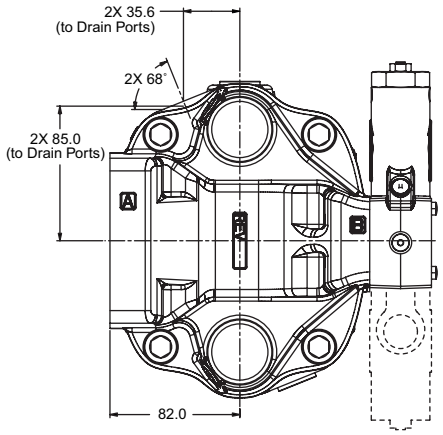
Pump Installation - P1/PD 060
Side Port
"L" Control Option





For Shaft & Flange Dimensions, see page 44.



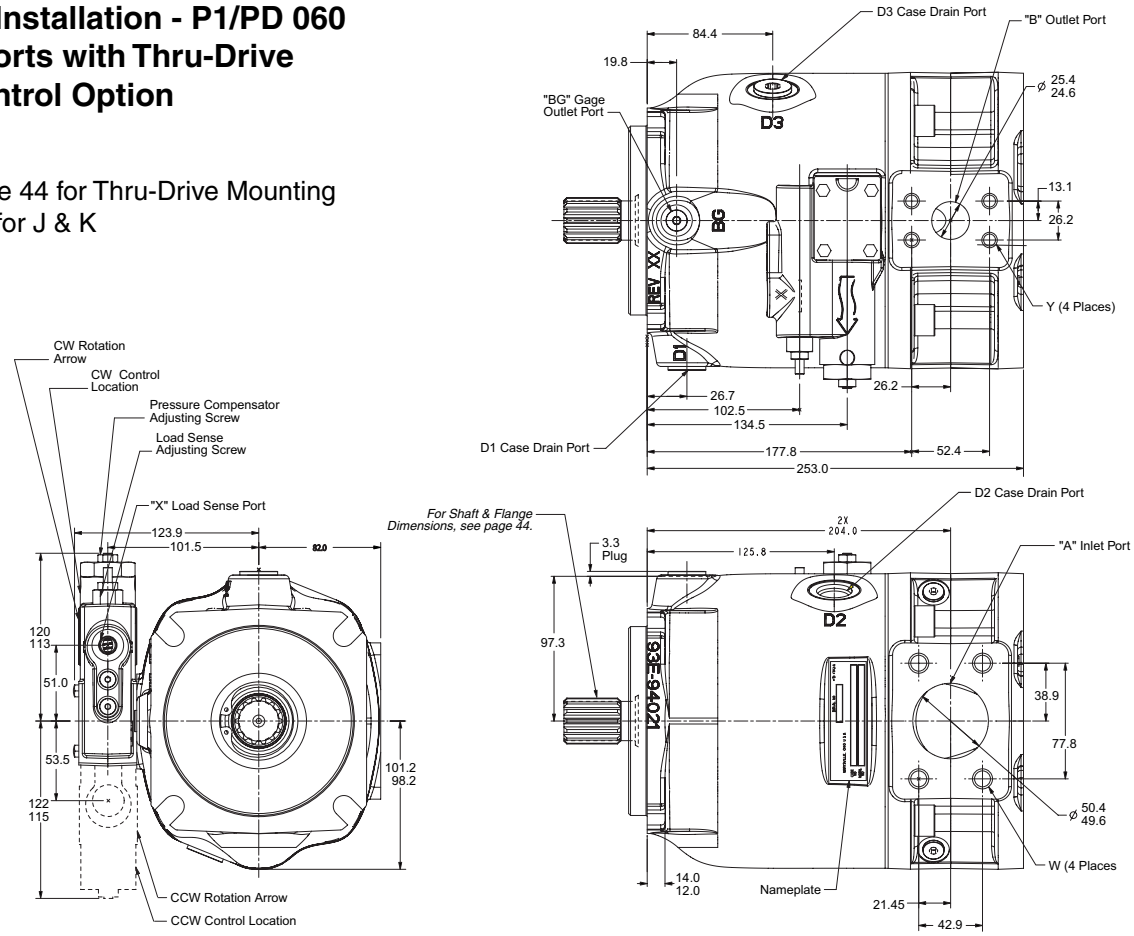


	P1/PD 060 Port Sizes		
	SAE	**ISO**	**BSP**
∅A Inlet	50mm code 61[C]	50mm DN 51[B]	—
W Threads	½ - 13 UNC-2B[C]	M12 x 1.75[B]	—
∅B Outlet	25mm code 61[C]	25mm DN25[B]	—
Y Threads	⅜- 16 UNC-2B[C]	M10 x 1.5[B]	—
BG	SAE-4[D]	M12x1.5[A]	¼"[E]
D1 D2 D3	SAE-10[D]	M22x1.5[A]	¾"[E]
X	SAE-4[D]	M12x1.5[A]	¼"[E]

Note A: Metric o-ring boss port conform to ISO 6149-1
Note B: Metric 4-bolt flange port conforms to ISO 6162
Note C: Inch 4-bolt flange port conforms to SAE J518
Note D: Inch o-ring boss port conforms to SAE J514
Note E: BSP boss port conforms to ISO 228-1

Pump Installation - P1/PD 060 Side Ports with Thru-Drive "L" Control Option

See Page 44 for Thru-Drive Mounting Options for J & K



CCW CONTROL NOT SHOWN

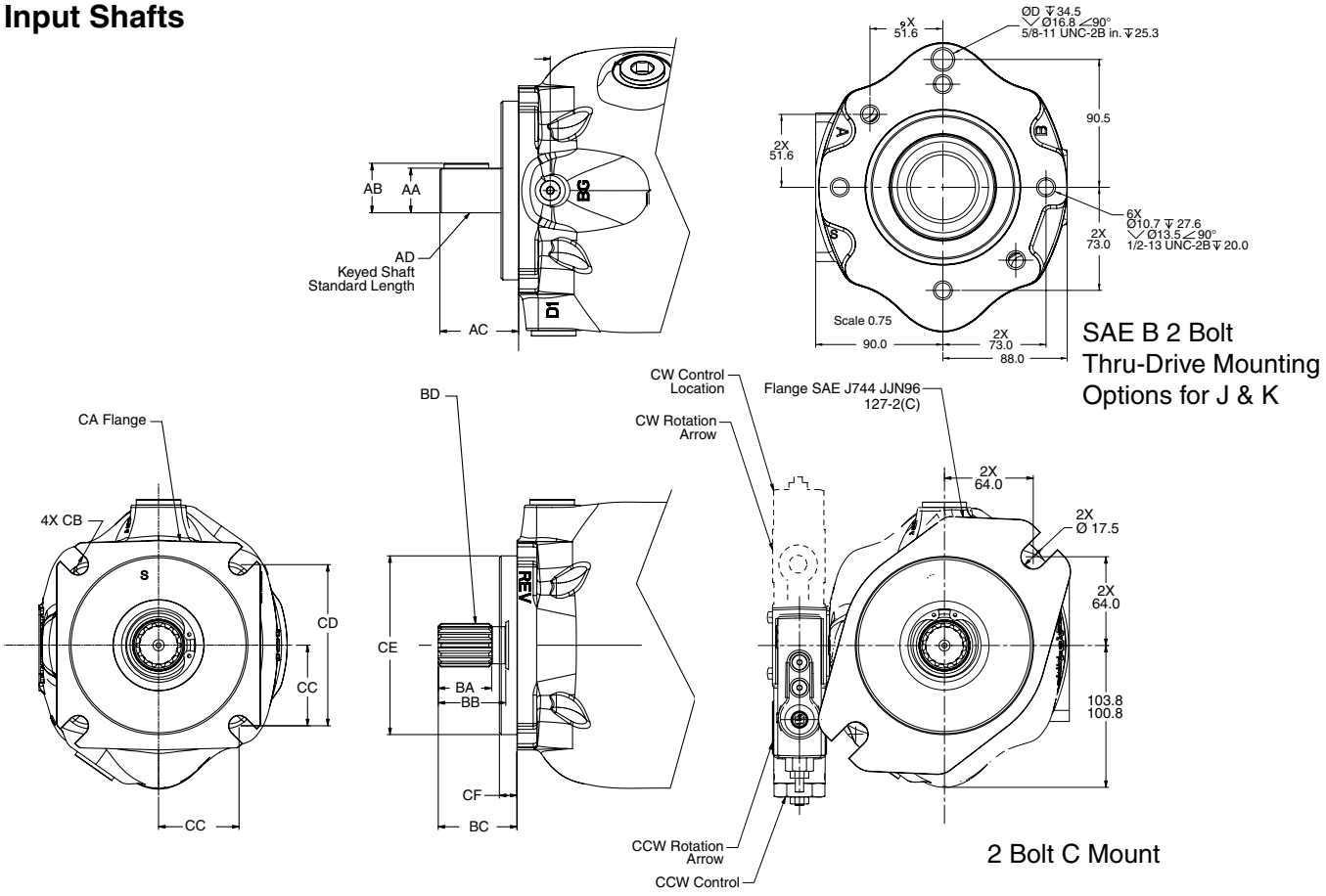
Shaft Location	P1/PD 060 Shaft Size & Type	Shaft Torque Capacity (Nm)
Input End	SAE C 32-1 Key*	562
	SAE C 14T Spline	732
	ISO E32N Key*	576
	ISO 14T Spline	732
Thru-Drive End	Spline Coupling	366

*Consult factory for keyed shaft on P1 Series.

	P1/PD 060 Port Sizes		
	SAE	**ISO**	**BSP**
∅A Inlet	50mm code 61[C]	50mm DN 51[B]	—
W Threads	½ - 13 UNC-2B[C]	M12 x 1.75[B]	—
∅B Outlet	25mm code 61[C]	25mm DN25[B]	—
Y Threads	⅜- 16 UNC-2B[C]	M10 x 1.5[B]	—
BG	SAE-4[D]	M12x1.5[A]	¼"[E]
D1 D2 D3	SAE-10[D]	M22x1.5[A]	¾"[E]
X	SAE-4[D]	M12x1.5[A]	¼"[E]

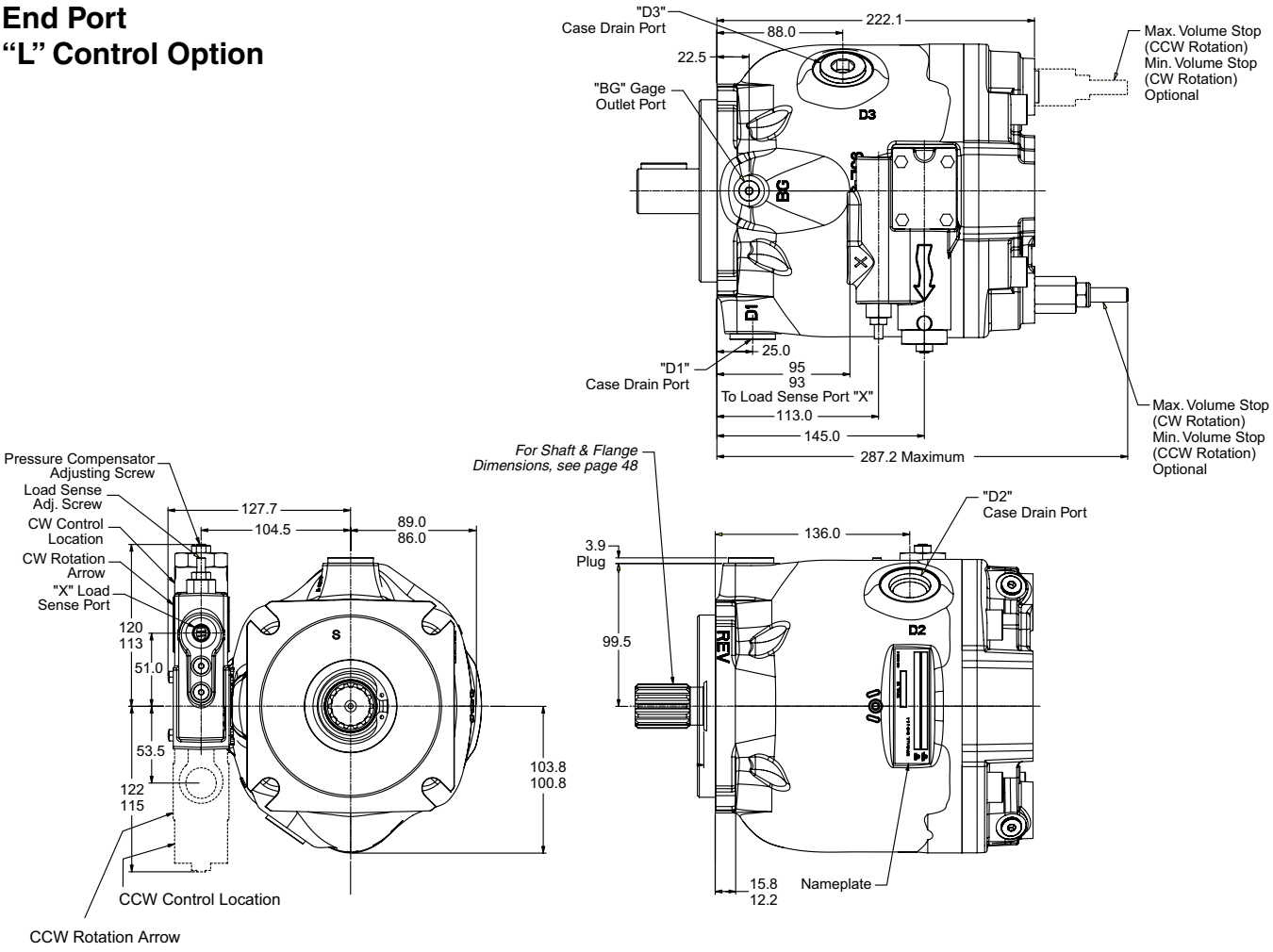
Note A: Metric o-ring boss port conform to ISO 6149-1
Note B: Metric 4-bolt flange port conforms to ISO 6162
Note C: Inch 4-bolt flange port conforms to SAE J518
Note D: Inch o-ring boss port conforms to SAE J514
Note E: BSP boss port conforms to ISO 228-1

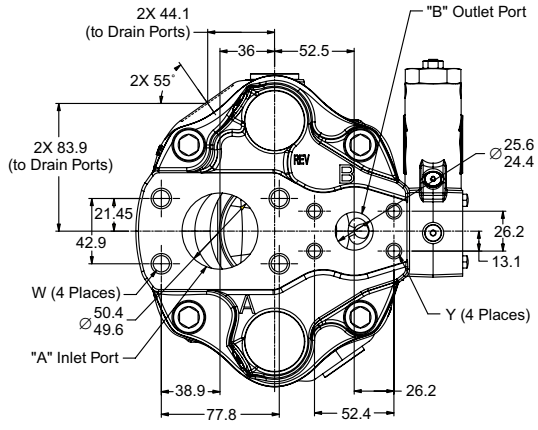
Pump Installation - P1/PD 075
Input Shafts



P1/PD 075	ISO (Code 04)	SAE (Code 01 or 02)
AA	32.021/32.002	31.75/31.70
AB	35.00/34.71	35.33/35.02
AC	68.8/67.2	56.8/55.2
AD	ISO E32N	SAE J744 32.1 C
BA	N/A	38.00
BB	N/A	48.00
BC	N/A	56.8/55.2
BD	N/A	SPLINE: SAE J744 SAE 32-4 (C) INVOLUTE SPLINE DATA CLASS 2 FLAT ROOT SIDE FIT NUMBER OF TEETH - 14 PITCH - 12/24 PRESSURE ANGLE - 30 MAJOR DIAMETER - 1.2268/1.4763 IN PITCH DIAMETER - 1.1666
CA	ISO 3019/202991 125B4SW	SAE J744 JUN96 127-4 C
CB	13.77/13.50	14.4 DIA.
CC	56.6	57.2
CD	113.2 SQUARE	114.5 SQUARE
CE	125.00/124.94 ISO 3019/2	127.00/126.95 SAE J744
CF	9.5/9.0	12.7/12.2
Key Width	10.00	7.94

Pump Installation - P1/PD 075
End Port
"L" Control Option

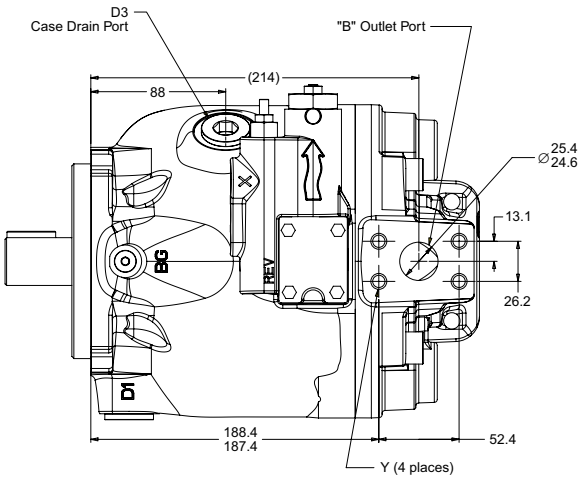


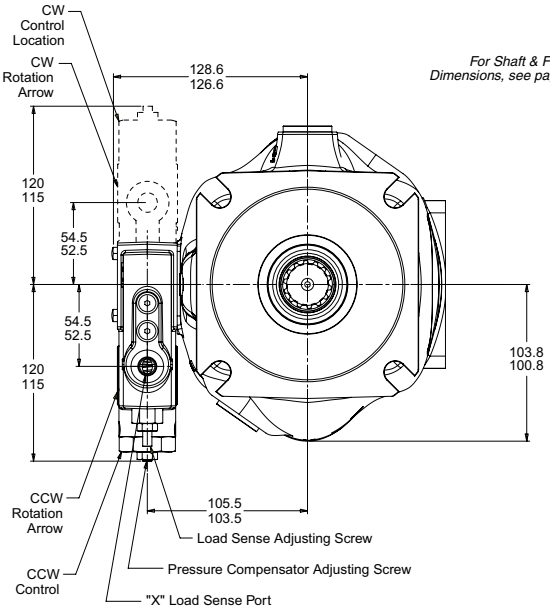


	P1/PD 075 Port Sizes		
	SAE	**ISO**	**BSP**
∅A Inlet	50mm code 61[C]	50mm DN 51[B]	—
W Threads	½ - 13 UNC-2B[C]	M12 x 1.75[B]	—
∅B Outlet	25mm code 61[C]	25mm DN25[B]	—
Y Threads	⅜- 16 UNC-2B[C]	M10 x 1.5[B]	—
BG	SAE-4[D]	M12x1.5[A]	¼"[E]
D1 D2 D3	SAE-12[D]	M27x2[A]	¾"[E]
X	SAE-4[D]	M12x1.5[A]	¼"[E]

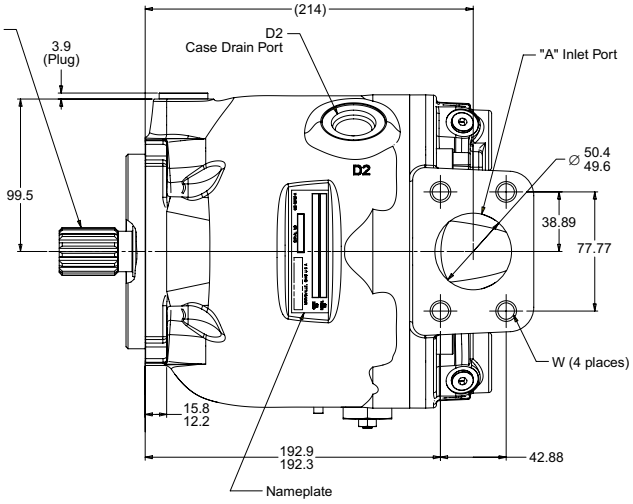
Note A: Metric o-ring boss port conform to ISO 6149-1
Note B: Metric 4-bolt flange port conforms to ISO 6162
Note C: Inch 4-bolt flange port conforms to SAE J518
Note D: Inch o-ring boss port conforms to SAE J514
Note E: BSP boss port conforms to ISO 228-1

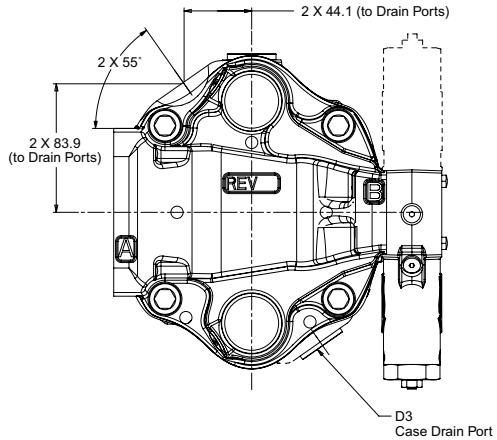
Pump Installation - P1/PD 075
Side Port
“L” Control Option





For Shaft & Flange Dimensions, see page 48





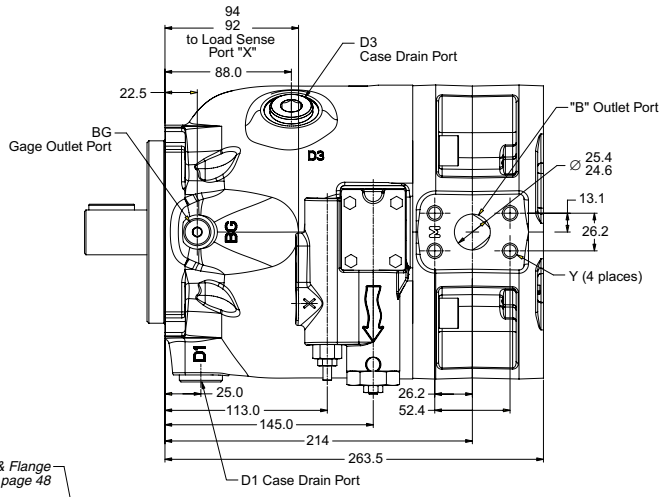
	P1/PD 075 Port Sizes		
	SAE	**ISO**	**BSP**
∅A Inlet	50mm code 61[C]	50mm DN 51[B]	—
W Threads	½ - 13 UNC-2B[C]	M12 x 1.75[B]	—
∅B Outlet	25mm code 61[C]	25mm DN25[B]	—
Y Threads	⅜- 16 UNC-2B[C]	M10 x 1.5[B]	—
BG	SAE-4[D]	M12x1.5[A]	¼"[E]
D1 D2 D3	SAE-12[D]	M27x2[A]	¾"[E]
X	SAE-4[D]	M12x1.5[A]	¼"[E]

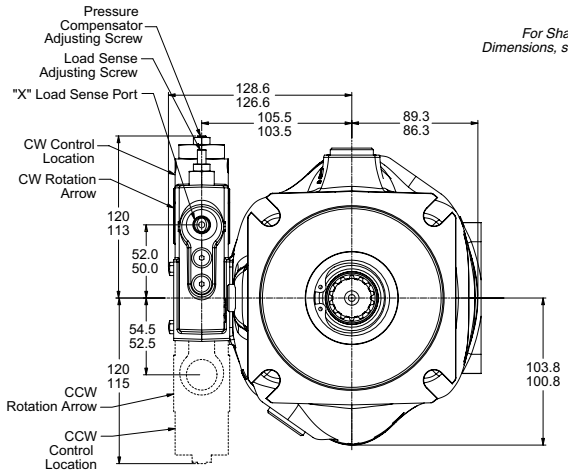
Note A: Metric o-ring boss port conform to ISO 6149-1
Note B: Metric 4-bolt flange port conforms to ISO 6162
Note C: Inch 4-bolt flange port conforms to SAE J518
Note D: Inch o-ring boss port conforms to SAE J514
Note E: BSP boss port conforms to ISO 228-1

Parker Hannifin Corporation
Hydraulic Pump Division
Marysville, Ohio USA

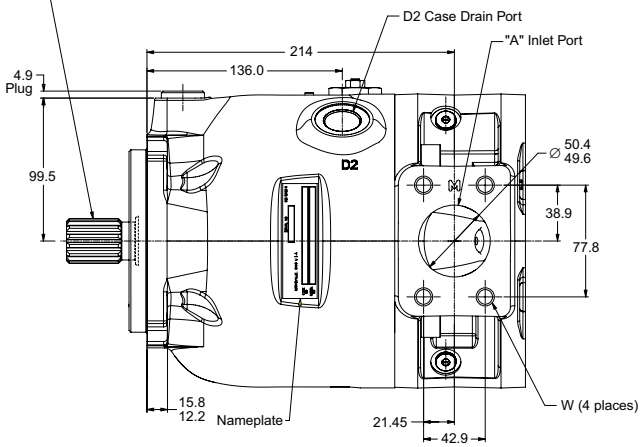
Pump Installation - P1/PD 075 Side Ports with Thru-Drive "L" Control Option

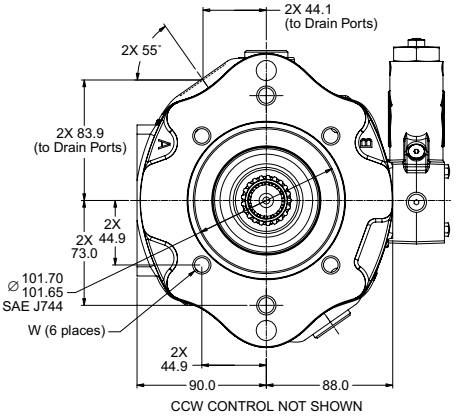
See Page 48 for Thru-Drive Mounting Options for J & K





For Shaft & Flange Dimensions, see page 48



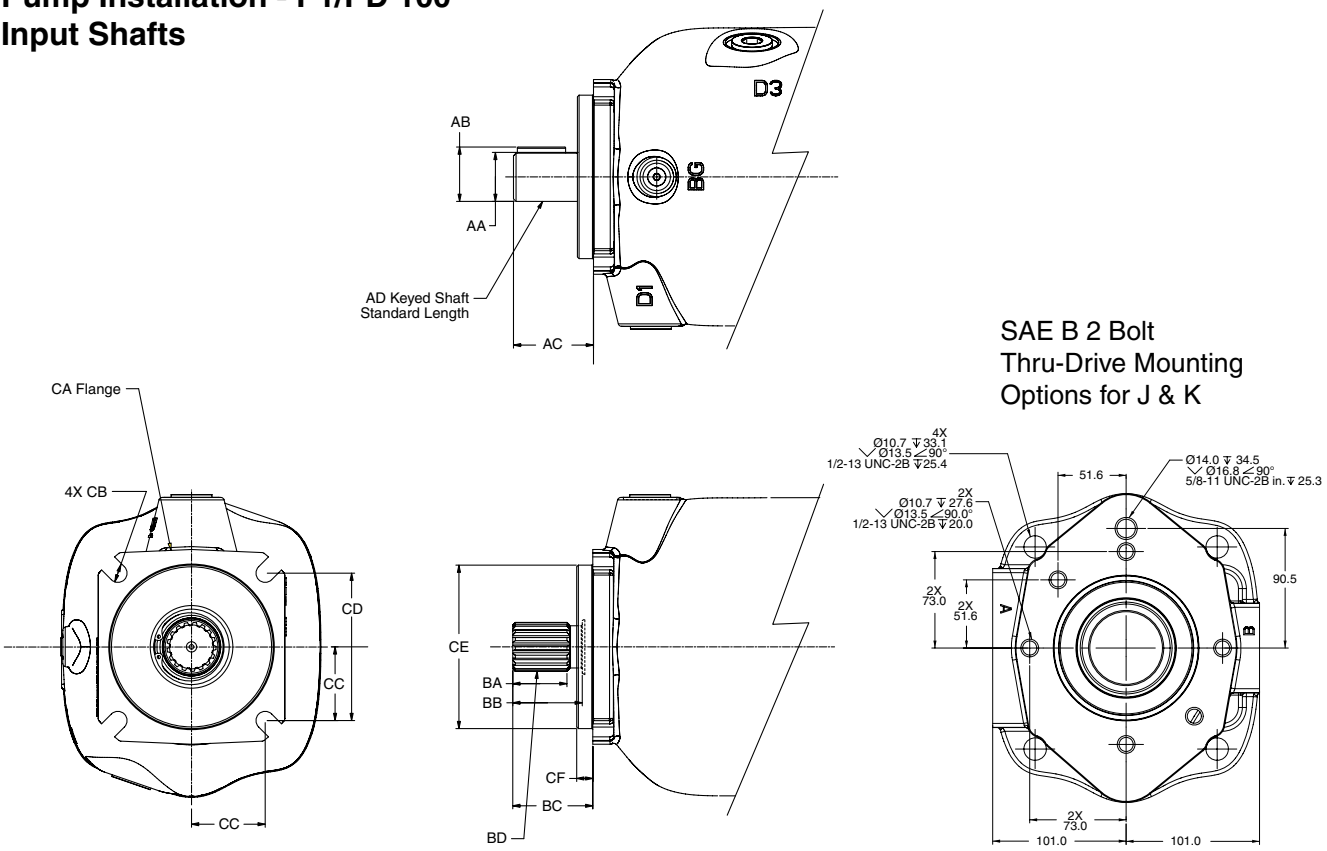


Shaft Location	P1/PD 075 Shaft Size & Type	Shaft Torque Capacity (Nm)
Input End	SAE C 32-1 Key	562
	SAE C 14T Spline	915
	ISO E32N Key	576
	ISO 14T Spline	915
Thru-Drive End	Spline Coupling	458

	P1/PD 075 Port Sizes		
	SAE	**ISO**	**BSP**
∅A Inlet	50mm code 61[C]	50mm DN 51[B]	—
W Threads	½ - 13 UNC-2B[C]	M12 x 1.75[B]	—
∅B Outlet	25mm code 61[C]	25mm DN25[B]	—
Y Threads	⅜- 16 UNC-2B[C]	M10 x 1.5[B]	—
BG	SAE-4[D]	M12x1.5[A]	¼"[E]
D1 D2 D3	SAE-12[D]	M27x2[A]	¾"[E]
X	SAE-4[D]	M12x1.5[A]	¼"[E]

Note A: Metric o-ring boss port conform to ISO 6149-1
Note B: Metric 4-bolt flange port conforms to ISO 6162
Note C: Inch 4-bolt flange port conforms to SAE J518
Note D: Inch o-ring boss port conforms to SAE J514
Note E: BSP boss port conforms to ISO 228-1

Pump Installation - P1/PD 100
Input Shafts



P1/PD 100	ISO (Code 04)	SAE (Code 01 or 02)
AA	40.021/40.002	38.10/38.05
AB	43.00/42.71	42.35/42.17
AC	92.8/91.2	62.8/61.2
AD	ISO E40N	SAE J744 38.1(C-C)
BA	N/A	42.10
BB	N/A	54.00
BC	N/A	62.8/61.2
BD	N/A	SPLINE: SAE ASA-B 1960 SAE 38-4 (C-C) INVOLUTE SPLINE DATA CLASS 2 FLAT ROOT SIDE FIT NUMBER OF TEETH - 17 PITCH - 12/24 PRESSURE ANGLE - 30 MAJOR DIAMETER - 1.4793/1.4763 IN PITCH DIAMETER - 1.4167
CA	ISO 3019/2-2001 125B2SW	SAE J744 JUN96 127-4 C
CB	13.77/13.50	14.4 DIA.
CC	56.6	57.2
CD	113.2 SQUARE	114.5 SQUARE
CE	125.00/124.94 ISO 3019/2	127.00/126.95 SAE J744
CF	9.5/9.0	12.7/12.2
Key Width	12.00	9.52

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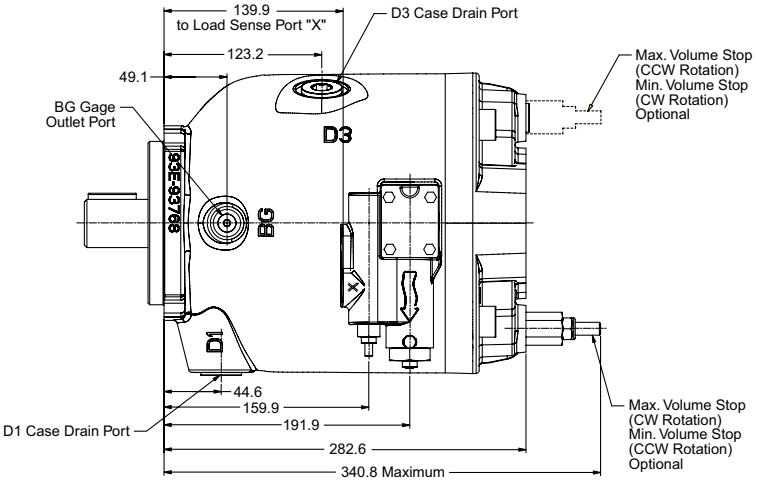
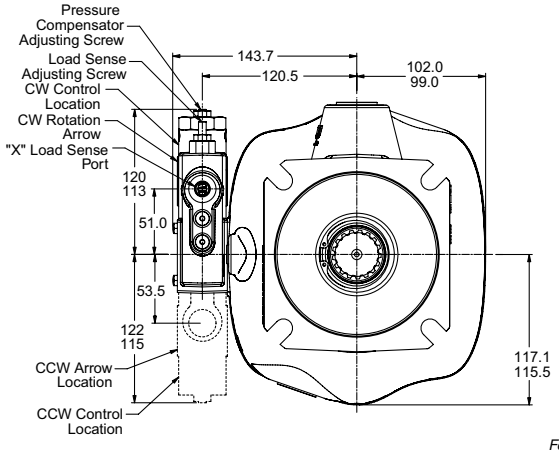
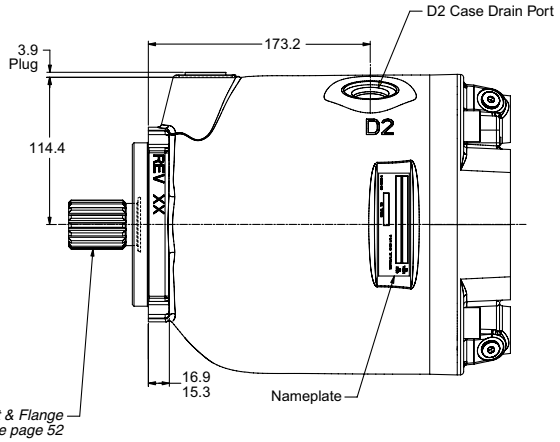
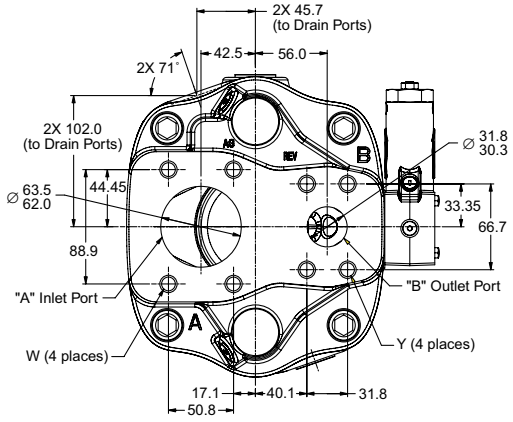
Pump Installation - P1/PD 100
End Ports
"L" Control Option







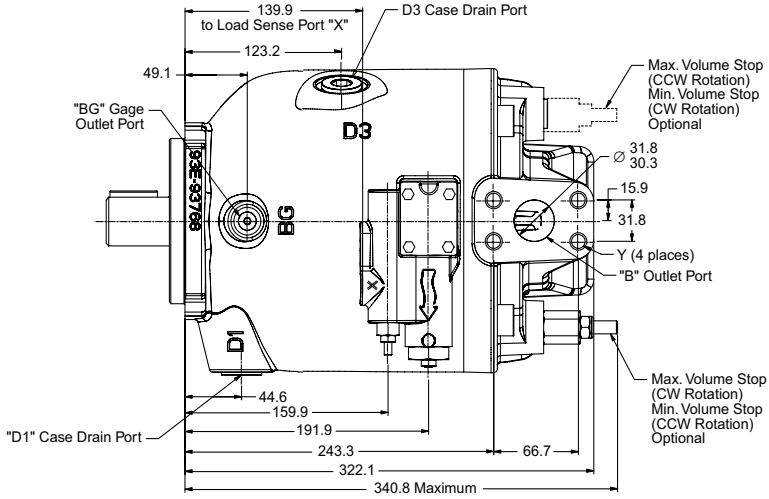
For Shaft & Flange
Dimensions, see page 52

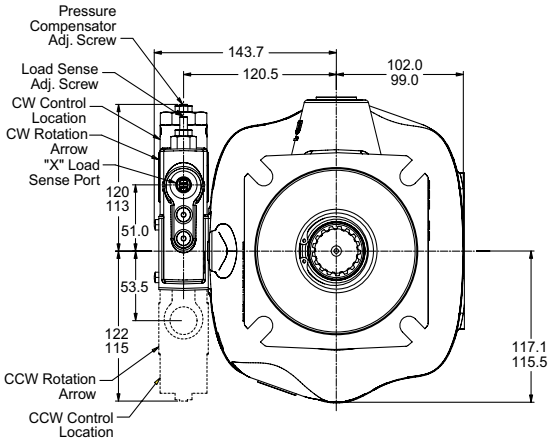


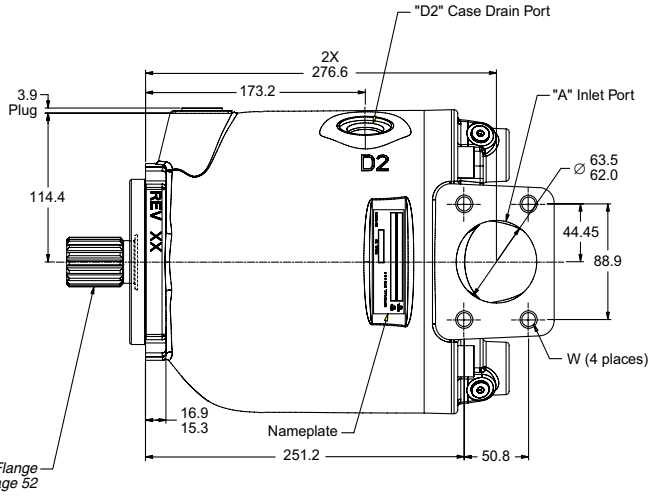
	P1/PD 100 Port Sizes		
	SAE	**ISO**	**BSP**
∅A Inlet	63mm code 61[C]	63mm DN 64[B]	—
W Threads	½ - 13 UNC-2B[C]	M12 x 1.75[B]	—
∅B Outlet	32mm code 62[C]	32mm DN 32[B]	—
Y Threads	½ - 13 UNC-2B[C]	M12 x 1.75[B]	—
BG	SAE-4[D]	M12x1.5[A]	¼"[E]
D1 D2 D3	SAE-12[D]	M27x2[A]	¾"[E]
X	SAE-4[D]	M12x1.5[A]	¼"[E]

Note A: Metric o-ring boss port conform to ISO 6149-1
Note B: Metric 4-bolt flange port conforms to ISO 6162
Note C: Inch 4-bolt flange port conforms to SAE J518
Note D: Inch o-ring boss port conforms to SAE J514
Note E: BSP boss port conforms to ISO 228-1

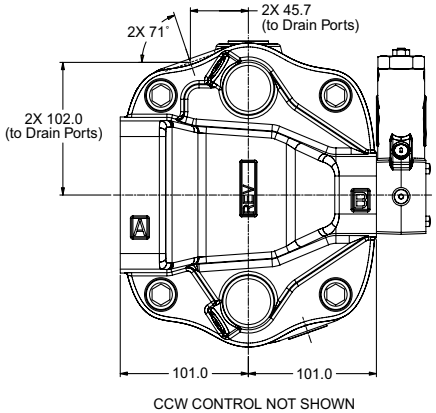
Pump Installation - P1/PD 100
Side Ports
“L” Control Option







For Shaft & Flange Dimensions, see page 52



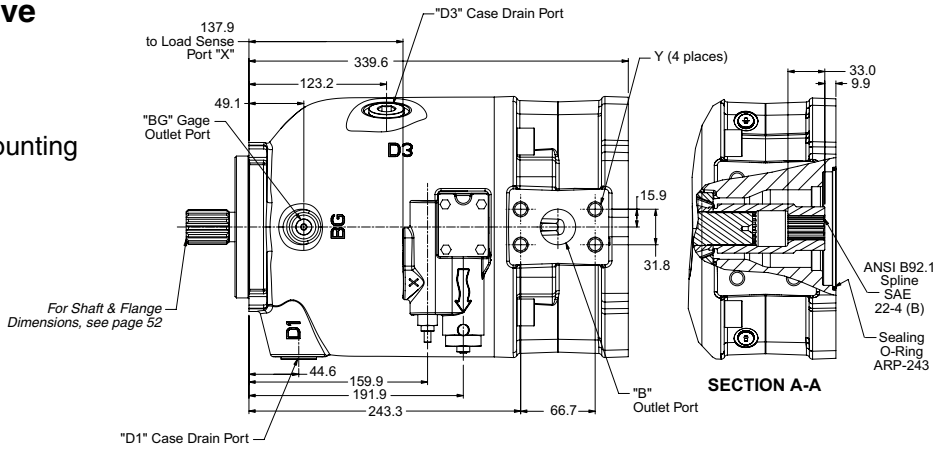
CCW CONTROL NOT SHOWN

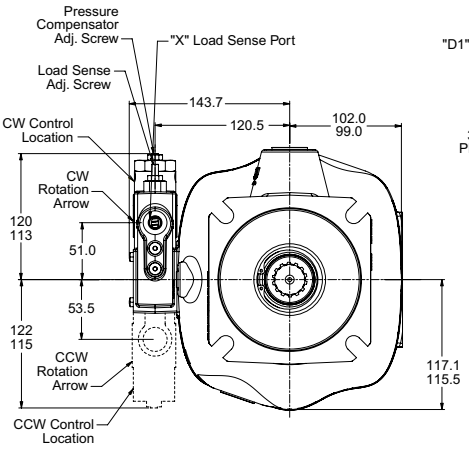
	P1/PD 100 Port Sizes		
	SAE	**ISO**	**BSP**
∅A Inlet	63mm code 61[C]	63mm DN 64[B]	—
W Threads	½ - 13 UNC-2B[C]	M12 x 1.75[B]	—
∅B Outlet	32mm code 62[C]	32mm DN 32[B]	—
Y Threads	½ - 13 UNC-2B[C]	M12 x 1.75[B]	—
BG	SAE-4[D]	M12x1.5[A]	¼"[E]
D1 D2 D3	SAE-12[D]	M27x2[A]	¾"[E]
X	SAE-4[D]	M12x1.5[A]	¼"[E]

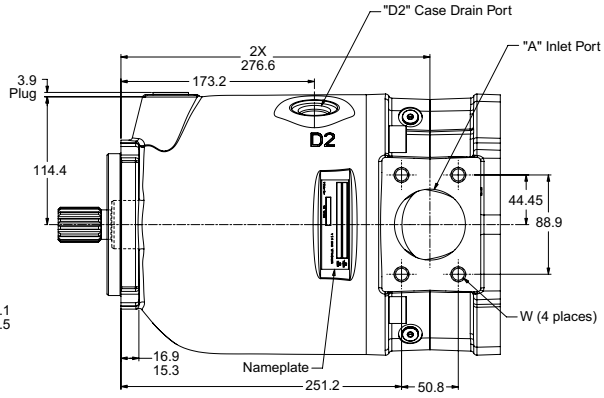
Note A: Metric o-ring boss port conform to ISO 6149-1
Note B: Metric 4-bolt flange port conforms to ISO 6162
Note C: Inch 4-bolt flange port conforms to SAE J518
Note D: Inch o-ring boss port conforms to SAE J514
Note E: BSP boss port conforms to ISO 228-1

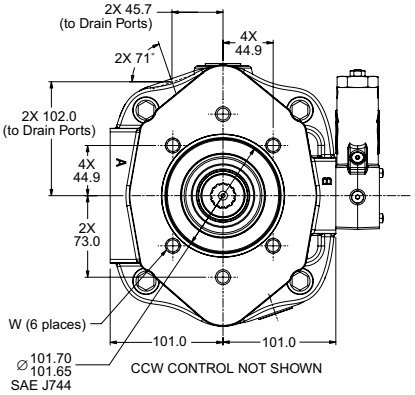
Pump Installation - P1/PD 100 Side Ports with Thru-Drive "L" Control Option

See Page 52 for Thru-Drive Mounting Options for J & K







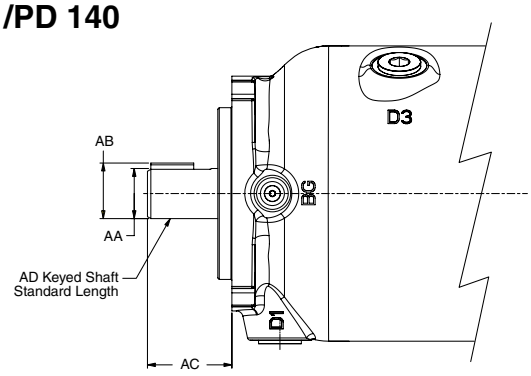


Shaft Location	P1/PD 100 Shaft Size & Type	Shaft Torque Capacity (Nm)
Input End	SAE C-C 38-1 Key	980
	SAE C-C 17T Spline	1220
	ISO E40N Key	1157
	ISO 18T Spline	1220
Thru-Drive End	Spline Coupling	610

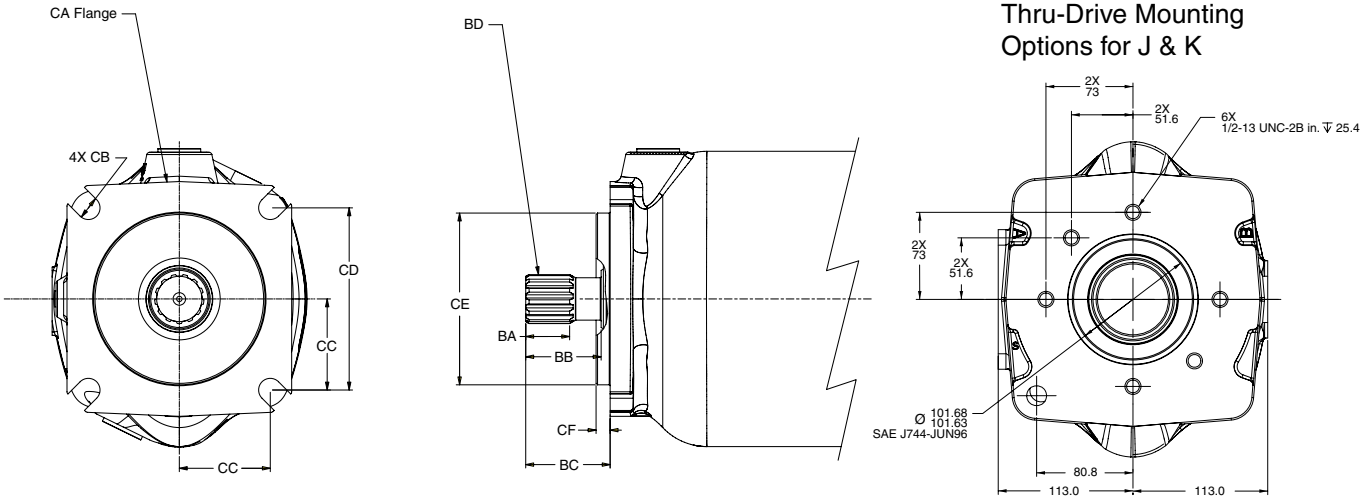
	P1/PD 100 Port Sizes		
	SAE	**ISO**	**BSP**
∅A Inlet	63mm code 61[C]	63mm DN 64[B]	—
W Threads	½ - 13 UNC-2B[C]	M12 x 1.75[B]	—
∅B Outlet	32mm code 62[C]	32mm DN 32[B]	—
Y Threads	½ - 13 UNC-2B[C]	M12 x 1.75[B]	—
BG	SAE-4[D]	M12x1.5[A]	¼"[E]
D1 D2 D3	SAE-12[D]	M27x2[A]	¾"[E]
X	SAE-4[D]	M12x1.5[A]	¼"[E]

Note A: Metric o-ring boss port conform to ISO 6149-1
Note B: Metric 4-bolt flange port conforms to ISO 6162
Note C: Inch 4-bolt flange port conforms to SAE J518
Note D: Inch o-ring boss port conforms to SAE J514
Note E: BSP boss port conforms to ISO 228-1

Pump Installation - P1/PD 140
Input Shafts

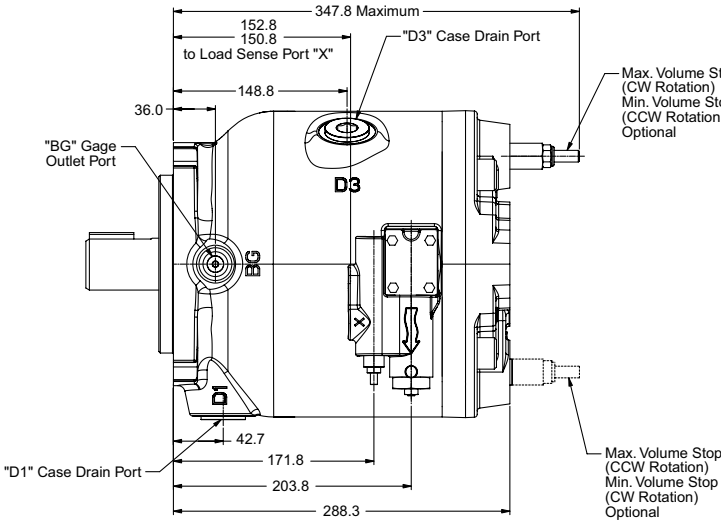


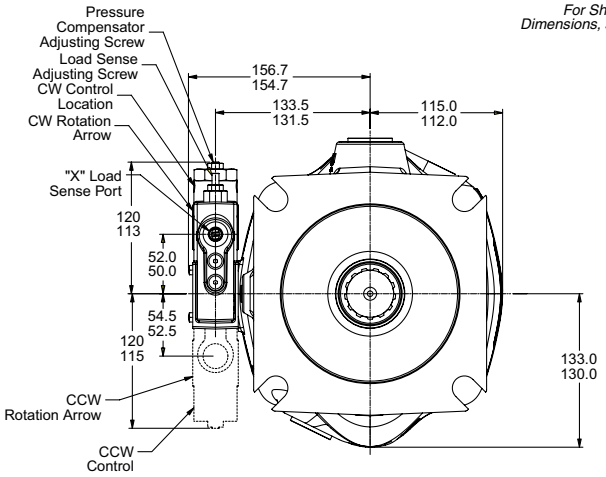
SAE B 2 Bolt
Thru-Drive Mounting
Options for J & K

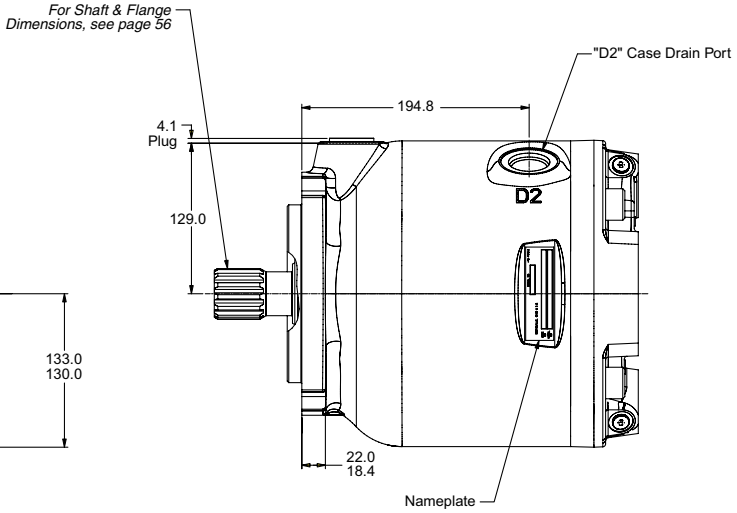


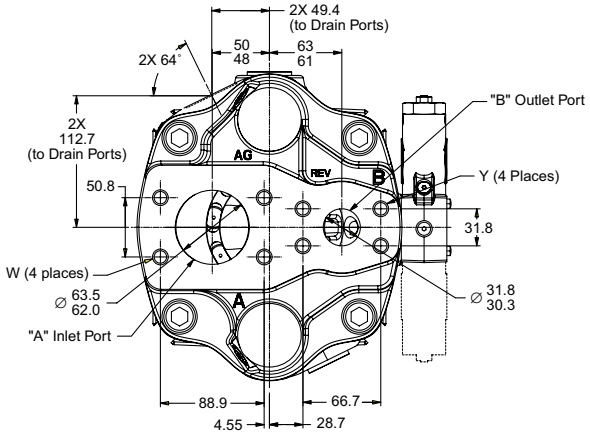
P1/PD 140	ISO (Code 04)	SAE (Code 01 or 02)
ØAA	50.027/50.002	44.45/44.40
AB	53.50/53.21	49.43/49.17
AC	92.8/91.2	75.8/74.2
AD	ISO E50N	SAE J744 44-1(D)
BA	N/A	39.00
BB	N/A	67.00
BC	N/A	75.8/74.2
BD	N/A	SPLINE: SAE J498-B 1969 SAE 44-4(C-C) INVOLUTE SPLINE DATA CLASS 2 FLAT ROOT SIDE FIT NUMBER OF TEETH - 13 PITCH - 8/16 PRESSURE ANGLE - 30 MAJOR DIAMETER - 1.7210/1.7160 IN PITCH DIAMETER - 1.6265
CA	ISO 3019/2-2001 180B4SW	SAE J744 JUN96 152-4(D)
CB	18.20/17.80	20.9/20.5 DIA.
CC	79.2	80.8
CD	158.4 SQUARE	161.6 SQUARE
CE	180.00/179.95 ISO 3019/2	152.40/152.35 SAE J744
CF	9.5/9.0	12.7/12.2
Key Width	14.00	11.11

Pump Installation - P1/PD 140
End Ports
“L” Control Option





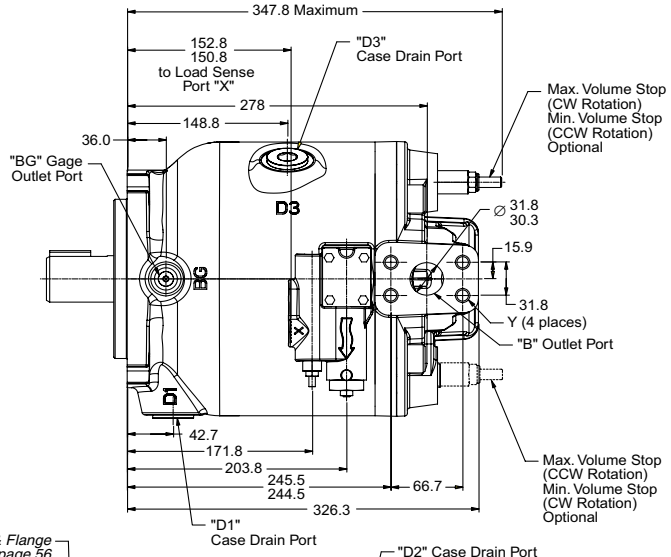


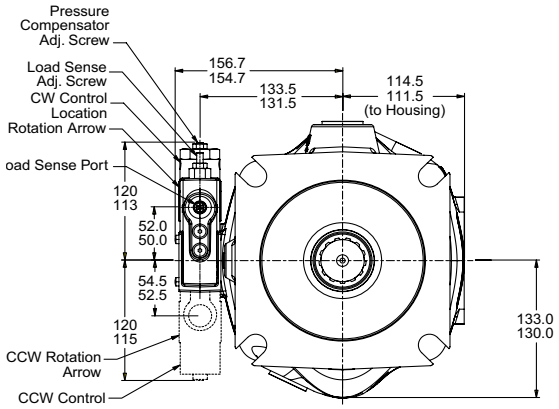


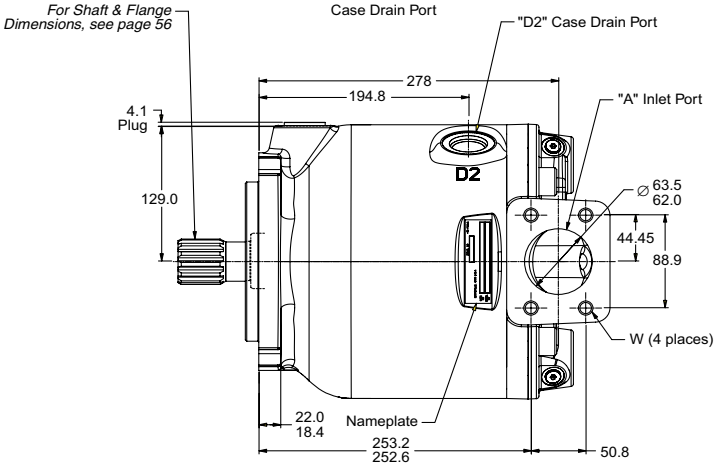
	P1/PD 140 Port Sizes		
	SAE	**ISO**	**BSP**
∅A Inlet	63mm code 61[C]	63mm DN 64[B]	—
W Threads	½ - 13 UNC-2B[C]	M12 x 1.75[B]	—
∅B Outlet	32mm code 62[C]	32mm DN 32[B]	—
Y Threads	½ - 13 UNC-2B[C]	M12 x 1.75[B]	—
BG	SAE-4[D]	M12x1.5[A]	¼"[E]
D1 D2 D3	SAE-16[D]	M33x2[A]	1"[E]
X	SAE-4[D]	M12x1.5[A]	¼"[E]

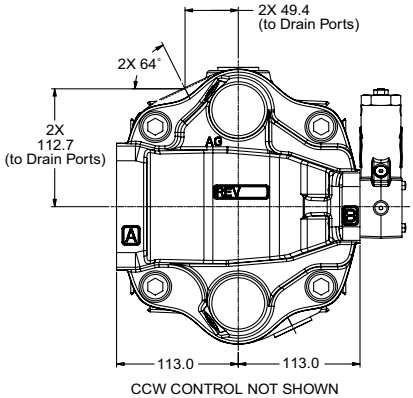
Note A: Metric o-ring boss port conform to ISO 6149-1
Note B: Metric 4-bolt flange port conforms to ISO 6162
Note C: Inch 4-bolt flange port conforms to SAE J518
Note D: Inch o-ring boss port conforms to SAE J514
Note E: BSP boss port conforms to ISO 228-1

Pump Installation - P1/PD 140
Side Ports
"L" Control Option









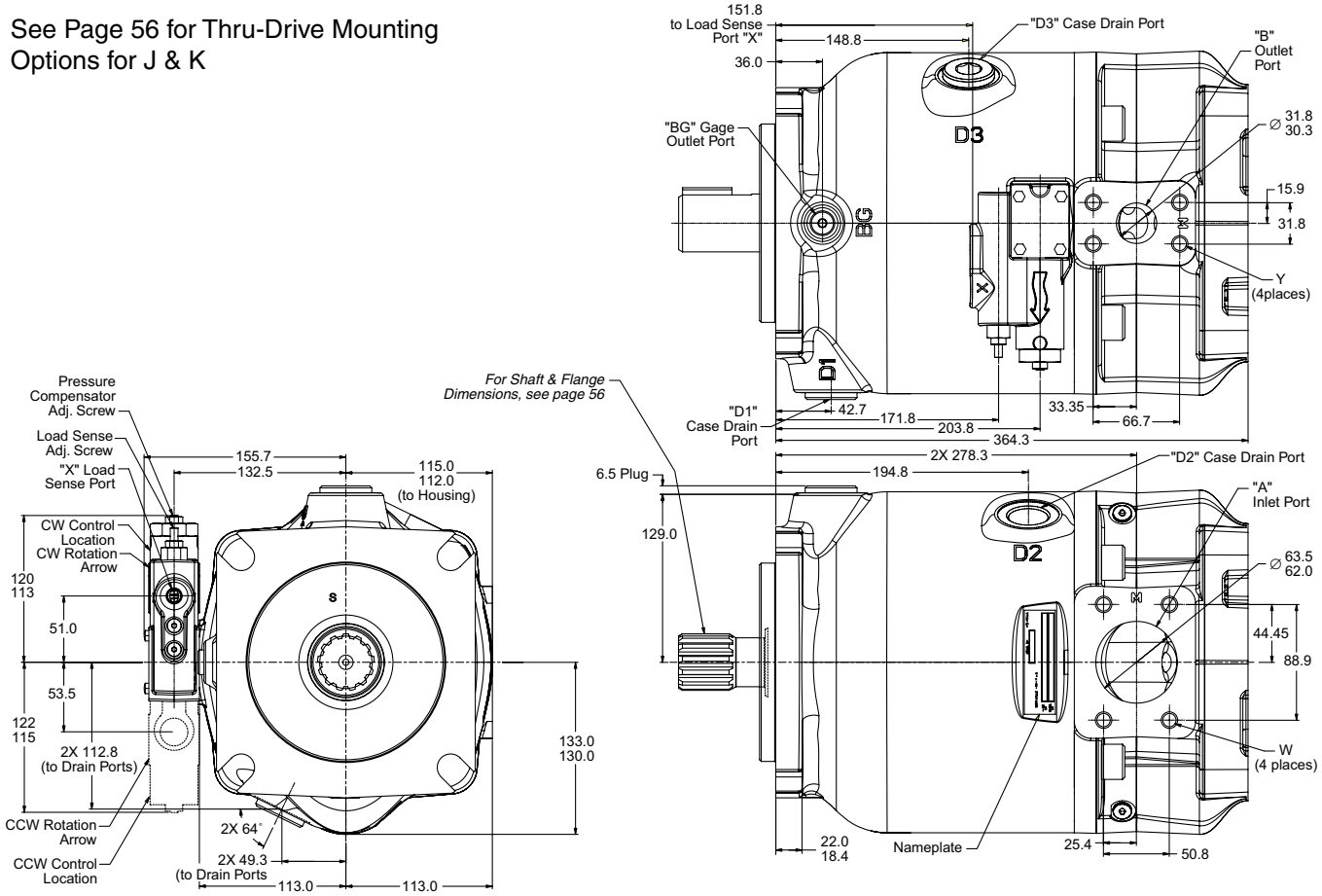
CCW CONTROL NOT SHOWN

	P1/PD 140 Port Sizes		
	SAE	**ISO**	**BSP**
∅A Inlet	63mm code 61[C]	63mm DN 64[B]	—
W Threads	½ - 13 UNC-2B[C]	M12 x 1.75[B]	—
∅B Outlet	32mm code 62[C]	32mm DN 32[B]	—
Y Threads	½ - 13 UNC-2B[C]	M12 x 1.75[B]	—
BG	SAE-4[D]	M12x1.5[A]	¼"[E]
D1 D2 D3	SAE-16[D]	M33x2[A]	1"[E]
X	SAE-4[D]	M12x1.5[A]	¼"[E]

Note A: Metric o-ring boss port conform to ISO 6149-1
Note B: Metric 4-bolt flange port conforms to ISO 6162
Note C: Inch 4-bolt flange port conforms to SAE J518
Note D: Inch o-ring boss port conforms to SAE J514
Note E: BSP boss port conforms to ISO 228-1

Pump Installation - P1/PD 140
Side Ports with Thru-Drive
"L" Control Option

See Page 56 for Thru-Drive Mounting Options for J & K

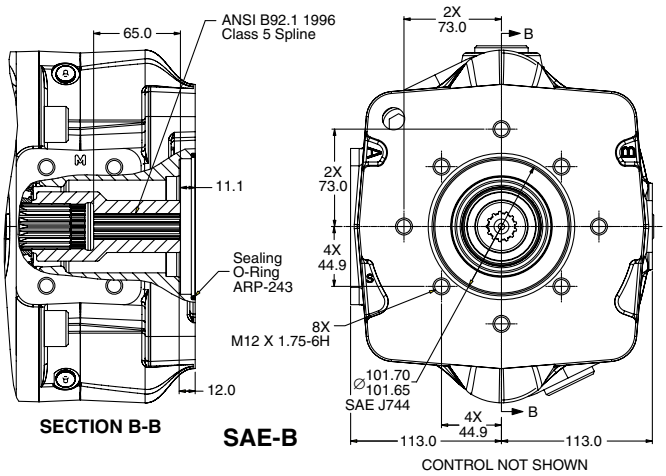


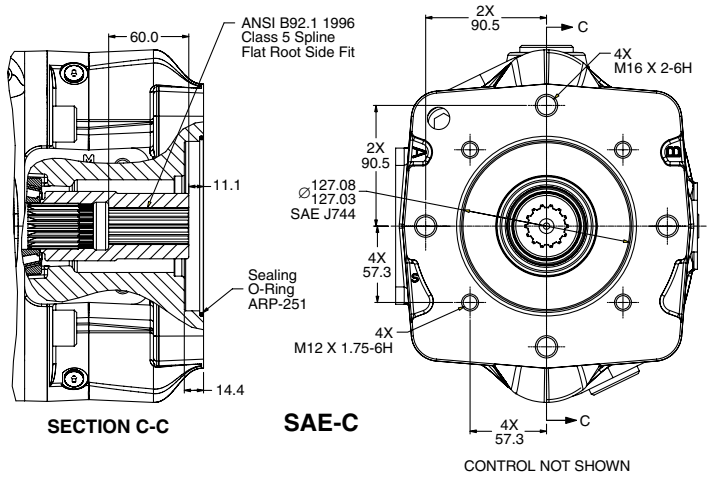
Shaft Location	P1/PD 140 Shaft Size & Type	Shaft Torque Capacity (Nm)
Input End	SAE D 44-1 Key	1708
	SAE D 13T Spline	1708
	ISO E50N Key	1708
	ISO 24T Spline	1708
Thru-Drive End	Spline Coupling	854

	P1/PD 140 Port Sizes		
	SAE	**ISO**	**BSP**
∅A Inlet	63mm code 61[C]	63mm DN 64[B]	—
W Threads	½ - 13 UNC-2B[C]	M12 x 1.75[B]	—
∅B Outlet	32mm code 62[C]	32mm DN 32[B]	—
Y Threads	½ - 13 UNC-2B[C]	M12 x 1.75[B]	—
BG	SAE-4[D]	M12x1.5[A]	¼"[E]
D1 D2 D3	SAE-16[D]	M33x2[A]	1"[E]
X	SAE-4[D]	M12x1.5[A]	¼"[E]

Note A: Metric o-ring boss port conform to ISO 6149-1
Note B: Metric 4-bolt flange port conforms to ISO 6162
Note C: Inch 4-bolt flange port conforms to SAE J518
Note D: Inch o-ring boss port conforms to SAE J514
Note E: BSP boss port conforms to ISO 228-1

Pump Installation - P1/PD 140
Side Ports with Thru-Drive
Mounting Options





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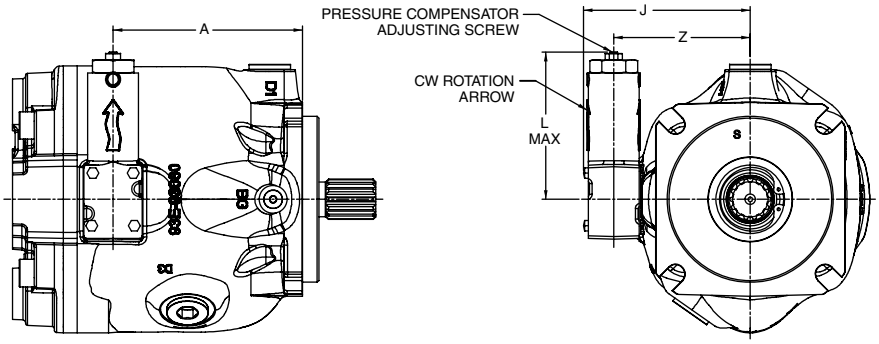
Hydraulic Pump Division
Marysville, Ohio USA

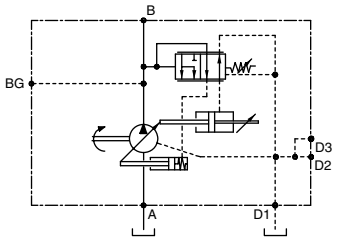
C** Control
Pressure Limiter



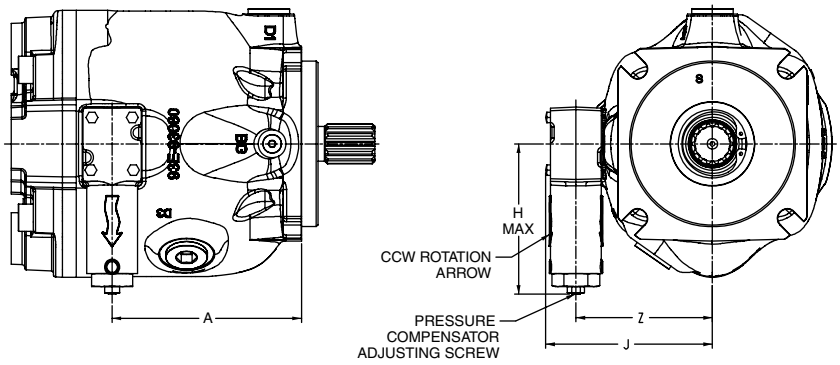
CW ORIENTATION
P*075 Shown

C CONTROL**

ADJUSTMENT SENSITIVITY	
C00	40 Bar per Turn
C10	18.6 Bar per Turn



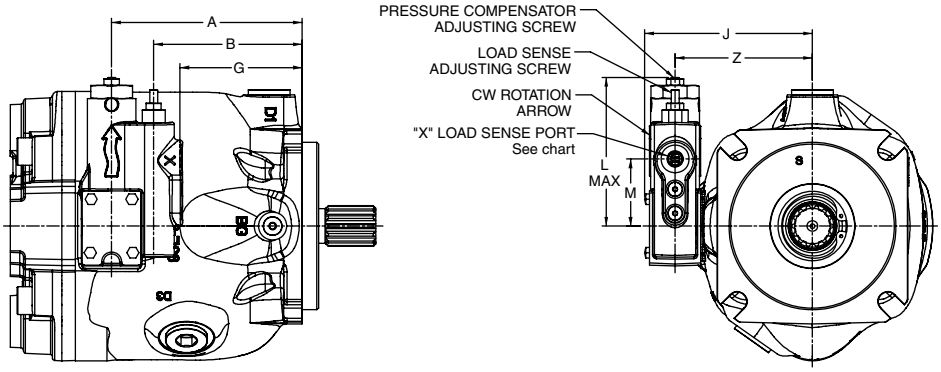
CCW ORIENTATION
P*075 Shown



Dimensions

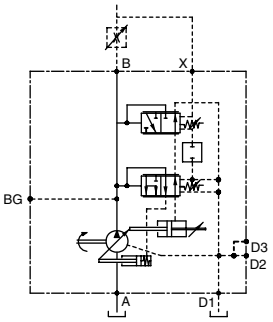
Model	A	H Max	J	L Max	Z
P*018	93.2	119	106.3	116	81.3
P*028	111.5	119	112.7	116	91
P*045	122	122	120.7	120	97.5
P*060	134.5	122	124.7	120	101.5
P*075	145.0	122	127.7	120	104.5
P*100	191.9	122	143.7	120	120.5
P*140	203.8	122	155.7	120	132.5

L** Control
Load Sensing with Pressure Limiter



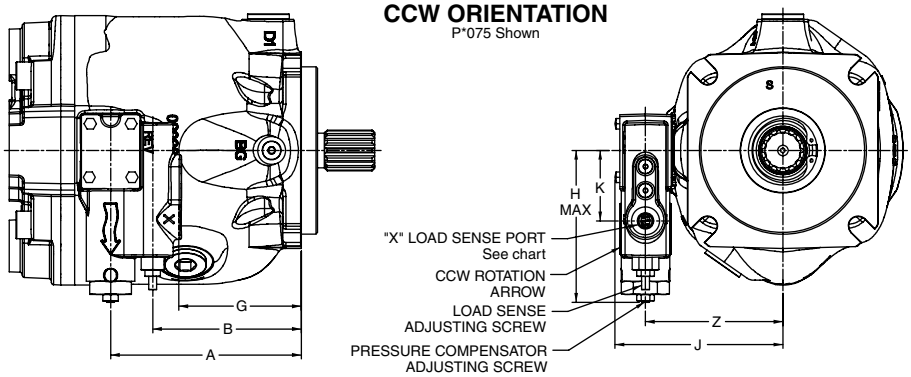
CW ORIENTATION
P*075 Shown

L CONTROL**



ADJUSTMENT SENSITIVITY	
Load Sense	28 Bar per Turn
Pressure Compensator L0	40 Bar per Turn
Pressure Compensator L1	18.6 Bar per Turn

CCW ORIENTATION
P*075 Shown



LOAD SENSE PORT "X"	
P**PS**	SAE J514 Straight Thread O-Ring Port 7/16-20 UNF-2B (SAE-4)
P**PA**	1/4" BSPP per ISO 228-1
P**PB**	1/4" BSPP per ISO 228-1
P**PM**	M12 x 1.5-6H per ISO 6149-1

Dimensions

Model	A	B	G	H Max	J	K	L Max	M	Z
P*018	93.2	61.2	41.2	119	107.7	53.5	116	51.0	84.5
P*028	111.5	79.5	59.5	119	113.8	53.5	116	51.0	90.7
P*045	122	90	70.2	122	120.7	53.5	120	51.0	97.5
P*060	134.5	102.5	82.5	122	124.7	53.5	120	51.0	101.5
P*075	145.0	113.0	93.0	122	127.7	53.5	120	51.0	104.5
P*100	191.9	159.9	139.9	122	143.7	53.5	120	51.0	120.5
P*140	203.8	171.8	151.8	122	155.7	53.5	120	51.0	132.5

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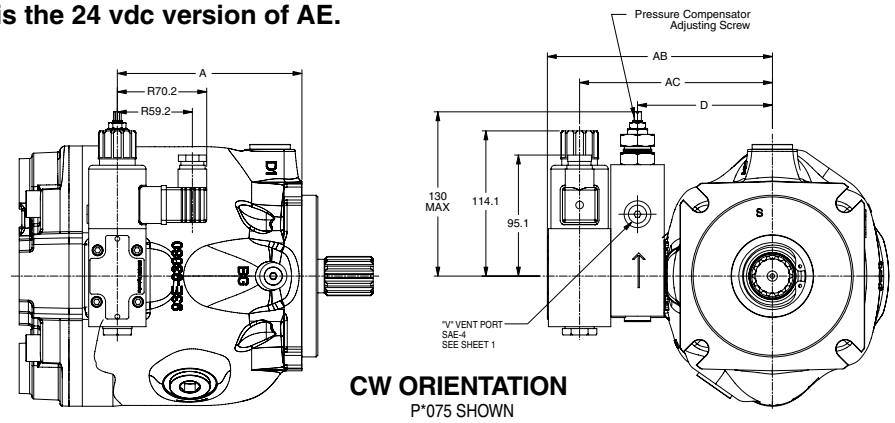
Hydraulic Pump Division
Marysville, Ohio USA

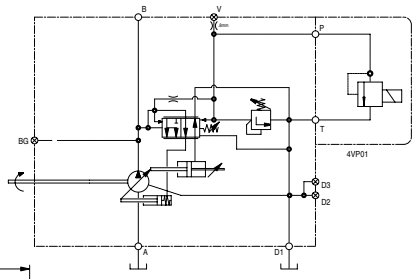
AE or AF Control

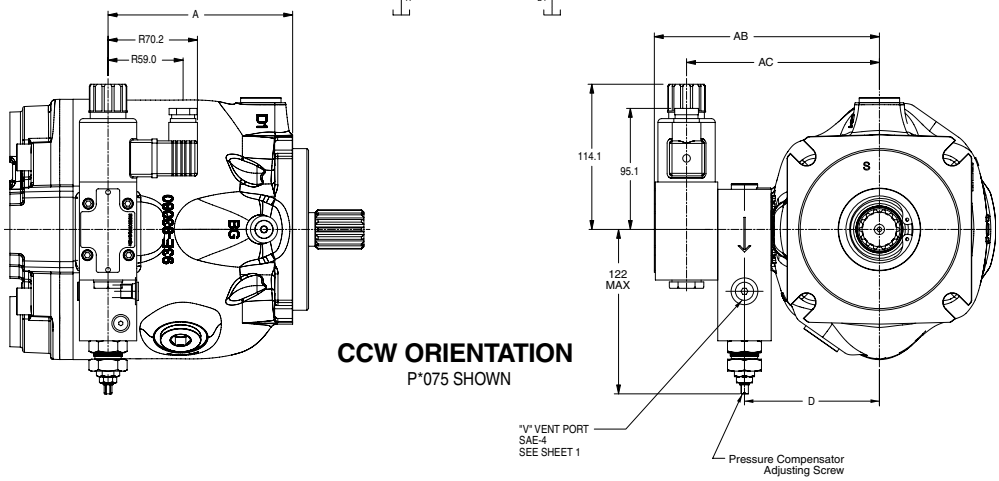
AE is a pilot operated pressure limiter control with proportional electronic adjustment and is a 12 volt dc option. AF is the 24 vdc version of AE.



CW ORIENTATION
P*075 SHOWN

AE* or AF* CONTROL





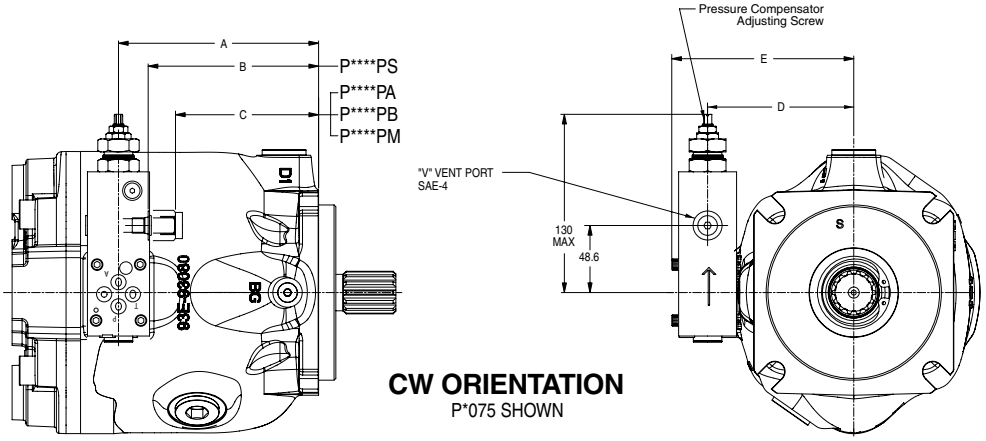
CCW ORIENTATION
P*075 SHOWN

Dimensions

Model	A	D	AB	AC
P*018	93.2	84.5	156.8	131.5
P*028	111.5	93.0	163.8	138.5
P*045	122.0	99.0	169.8	144.5
P*060	134.5	103.0	173.8	148.5
P*075	145.0	106.0	176.8	151.5
P*100	191.9	122.0	192.8	167.5
P*140	203.8	134.0	204.8	179.5

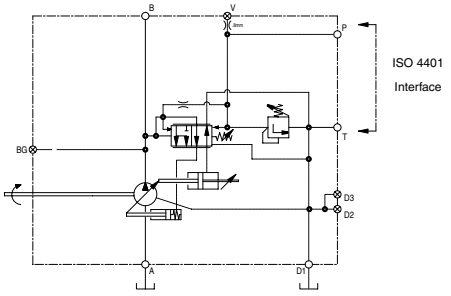
AN Control

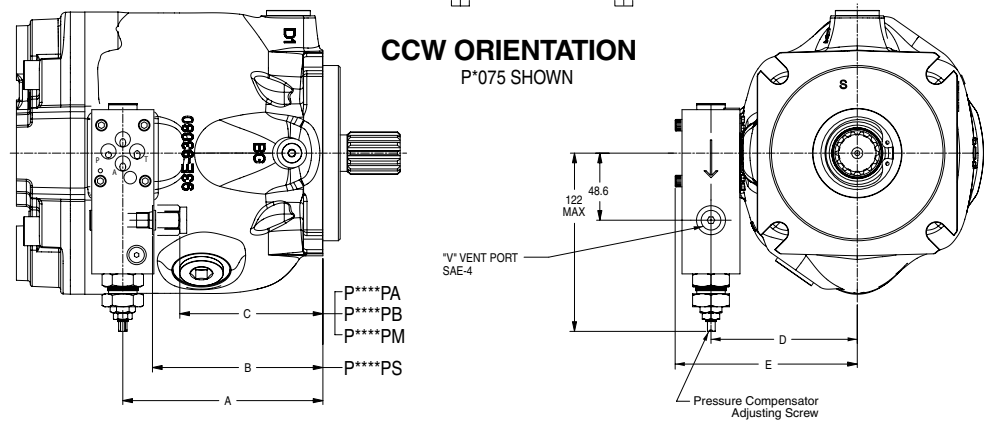
Pilot operated control with ISO-4401 (NG 6) interface and shipping cover.



CW ORIENTATION
P*075 SHOWN

AN* CONTROL





CCW ORIENTATION
P*075 SHOWN

Dimensions

Model	A	D	F
P*018	93.2	85.0	103.7
P*028	111.5	93.0	111.7
P*045	122.0	99.0	120.0
P*060	134.5	103.0	124.0
P*075	145.0	106.0	127.0
P*100	191.9	122.0	143.0
P*140	203.8	134.0	155.0

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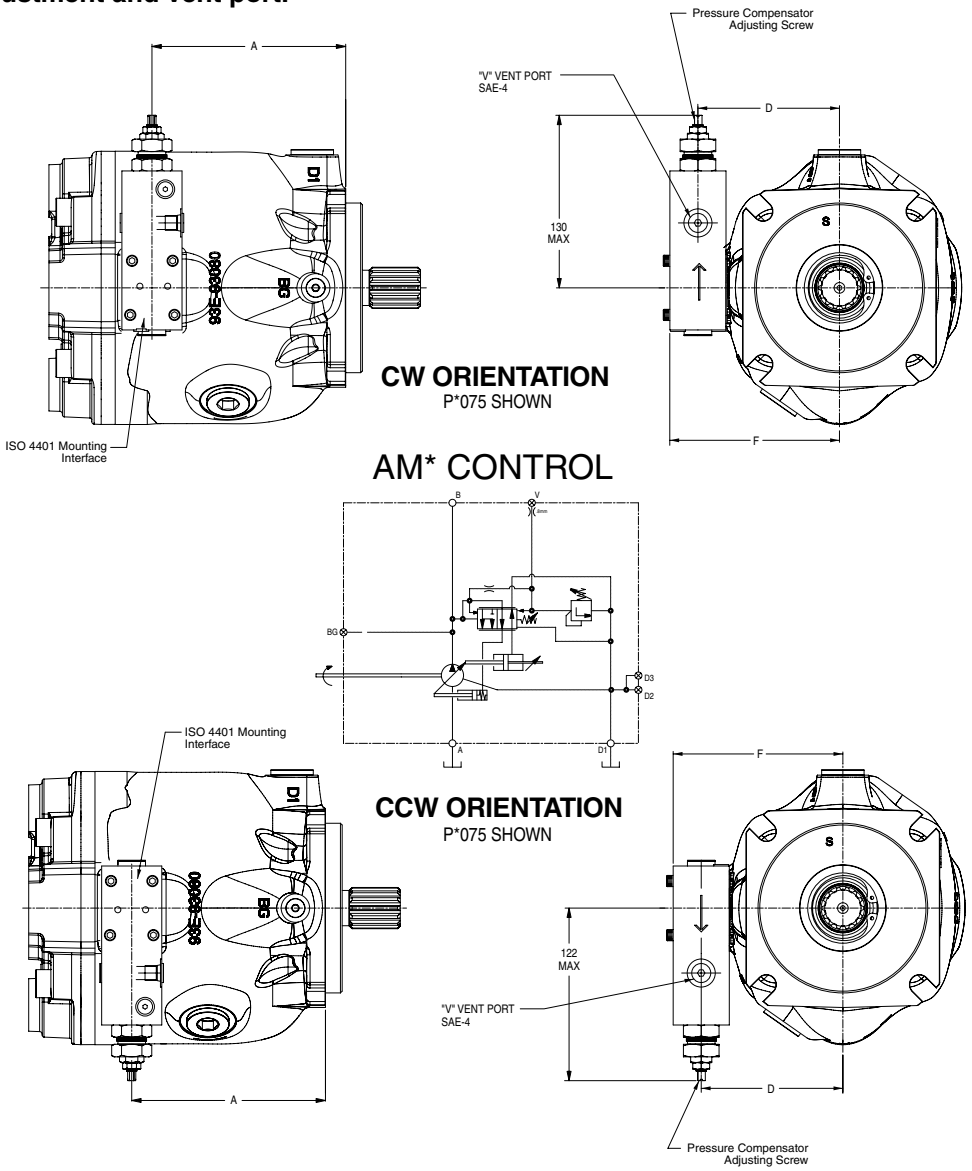
AM Control

Pilot operated pressure limiter control with mechanical adjustment and vent port.

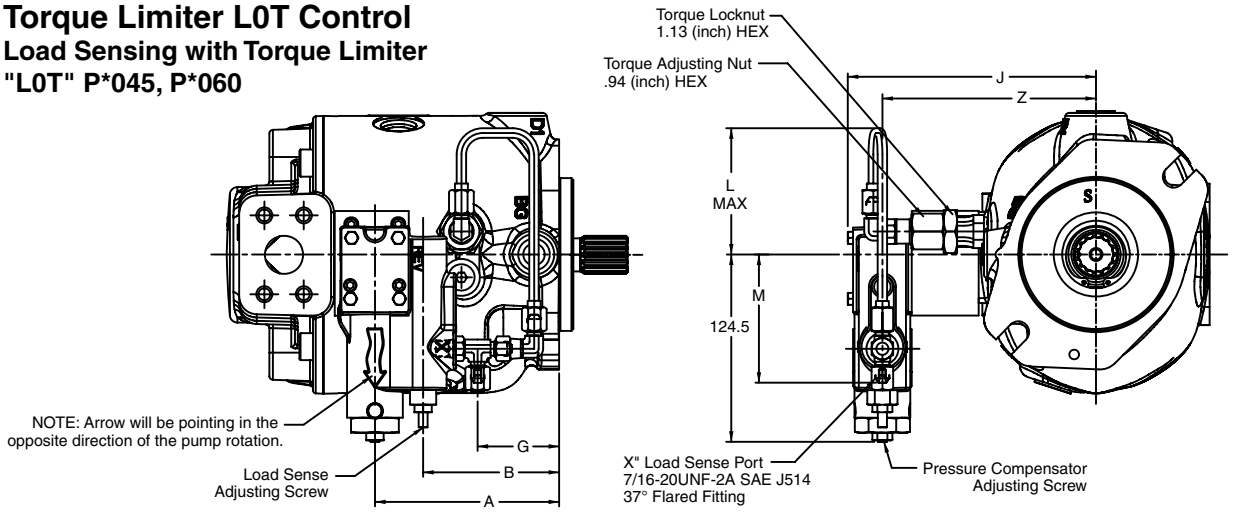


Dimensions

Model	A	B	C	D	E
P*018	93.2	71.8	91.6	85.0	108.7
P*028	111.5	90.0	109.8	93.0	116.7
P*045	122.0	106.2	86.4	99.0	125.0
P*060	134.5	118.7	98.9	103.0	129.0
P*075	145.0	129.2	109.4	106.0	132.0
P*100	191.9	176.3	156.5	122.0	148.0
P*140	203.8	187.0	167.2	134.0	160.0

Torque Limiter L0T Control

Load Sensing with Torque Limiter "L0T" P*045, P*060

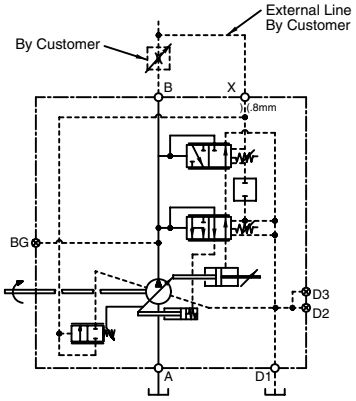


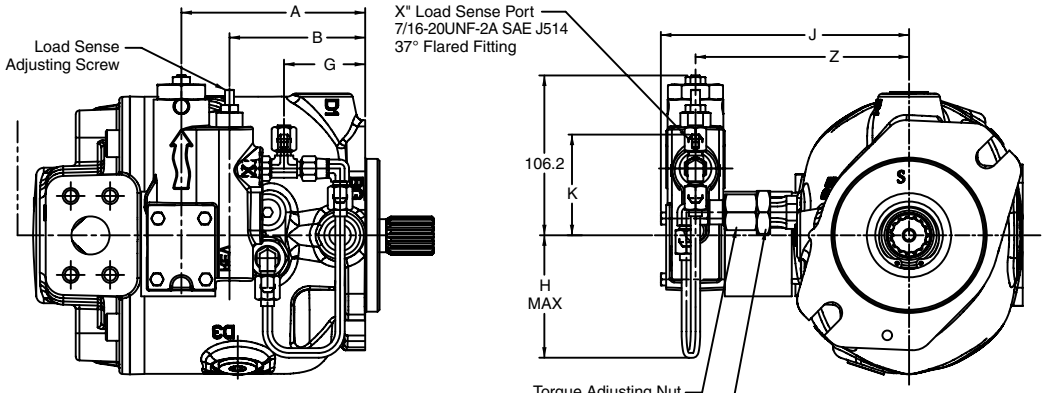
CW ORIENTATION

P*045 SHOWN

L*T Control

Adjustment Sensitivity	
Load Sense	28 BAR per turn
Pressure Compensator L0	40 BAR per turn
Pressure Compensator L1	18.6 BAR per turn





CCW ORIENTATION

P*045 SHOWN

Dimensions

Model	A	B	G	H Max	J	K	L Max	M	Z
P*045	122.4	90.4	53.9	81.4	165.0	67.0	83.9	85.3	142.0
P*060	134.3	102.3	66.0	86.2	169.0	67.0	88.6	85.3	146.0

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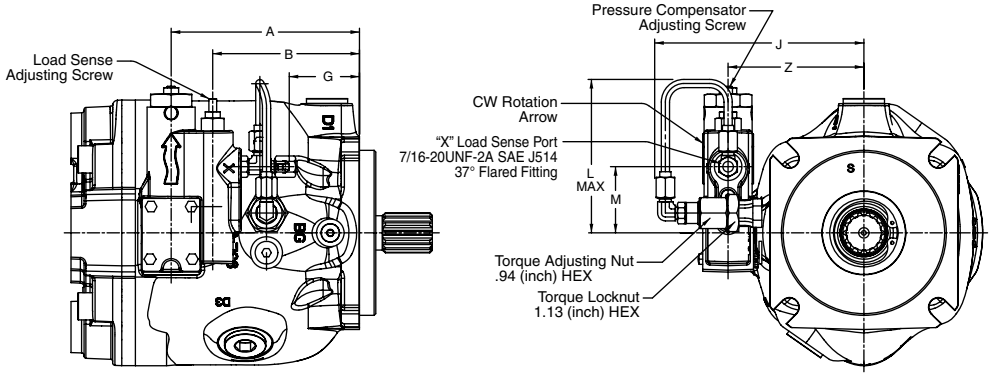
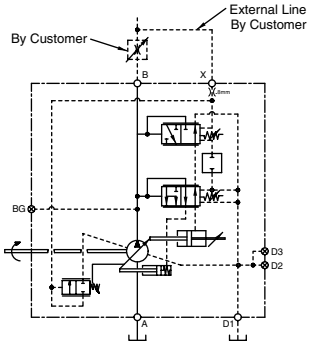
Torque Limiter L0T Control

Load Sensing with Torque Limiter "L0T" P*075

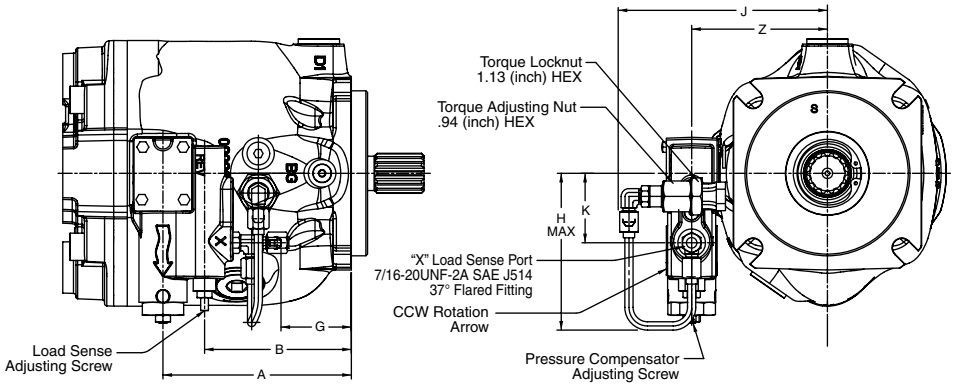


CW ORIENTATION
P*075 SHOWN



L*T Control

Adjustment Sensitivity	
Load Sense	28 BAR per turn
Pressure Compensator L0	40 BAR per turn
Pressure Compensator L1	18.6 BAR per turn



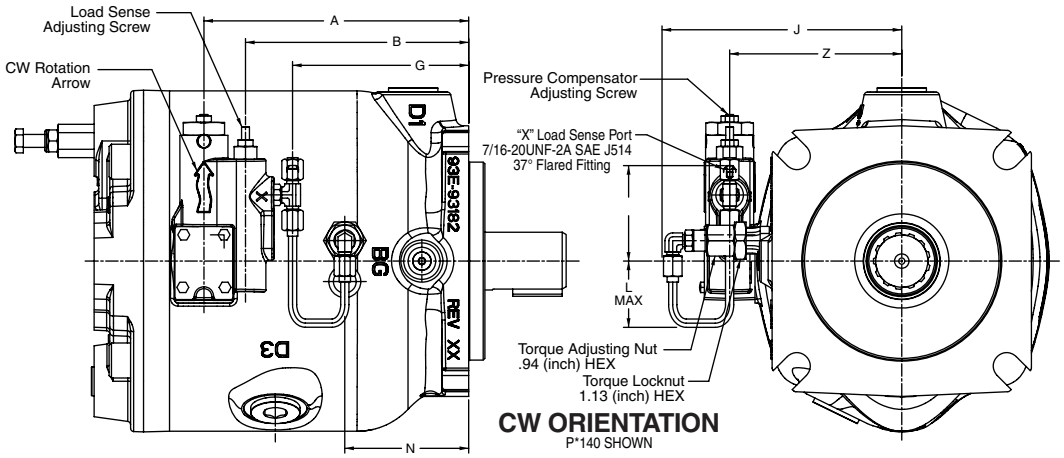
CCW ORIENTATION
P*075 SHOWN

Dimensions

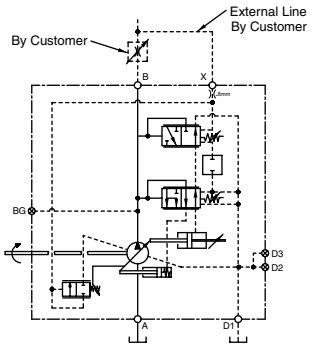
Model	A	B	G	H Max	J	K	L Max	M	Z
P*075	145.0	113.0	54.1	122	161.0	53.5	119	51.0	104.5

Torque Limiter L0T Control

Load Sensing with Torque Limiter
"L0T" P*0100 & P*140

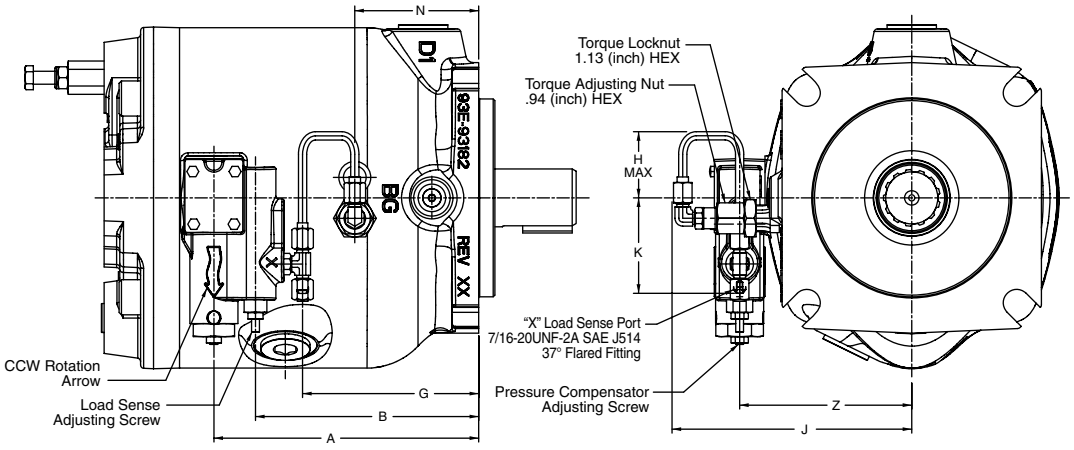


CW ORIENTATION
P*140 SHOWN



L*T Control

Adjustment Sensitivity	
Load Sense	28 BAR per turn
Pressure Compensator L0	40 BAR per turn
Pressure Compensator L1	18.6 BAR per turn



CCW ORIENTATION
P*140 SHOWN

Dimensions

Model	A	B	G	H Max	J	K	L Max	M	N	Z
P*100	191.9	150.9	123.6	51.0	172.5	76.1	51.0	73.5	102.5	120.5
P*140	203.8	171.8	135.5	51.0	184.5	76.1	51.0	73.5	95.4	132.5

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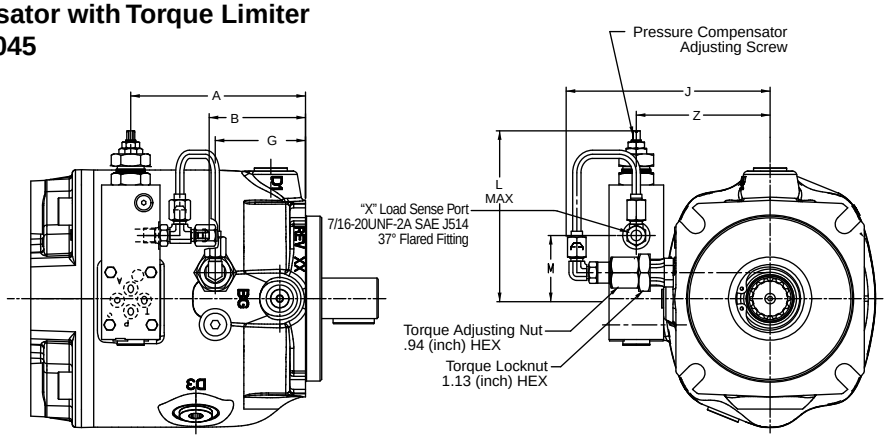
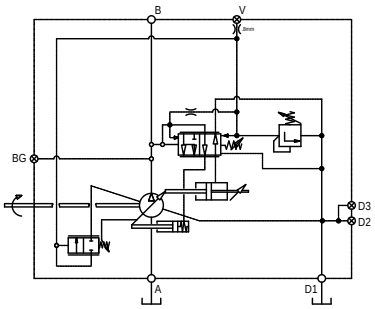
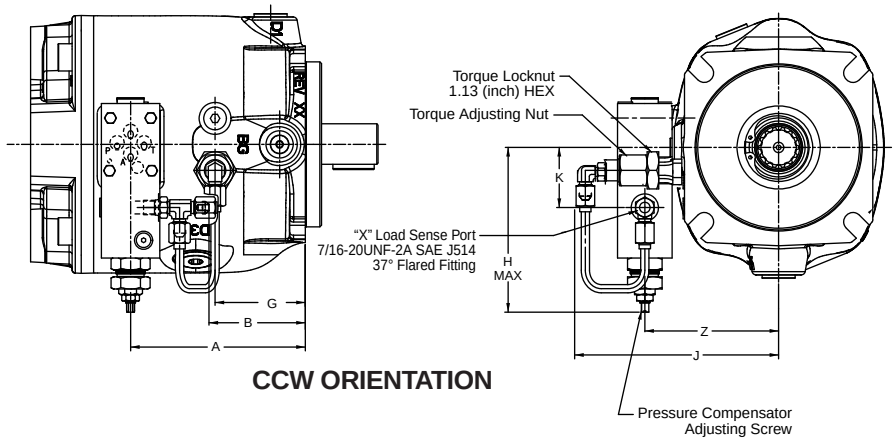
Torque Limiter AMT Control

Pressure Compensator with Torque Limiter "AMT" P*060 & P*045



CW ORIENTATION
P*060 SHOWN





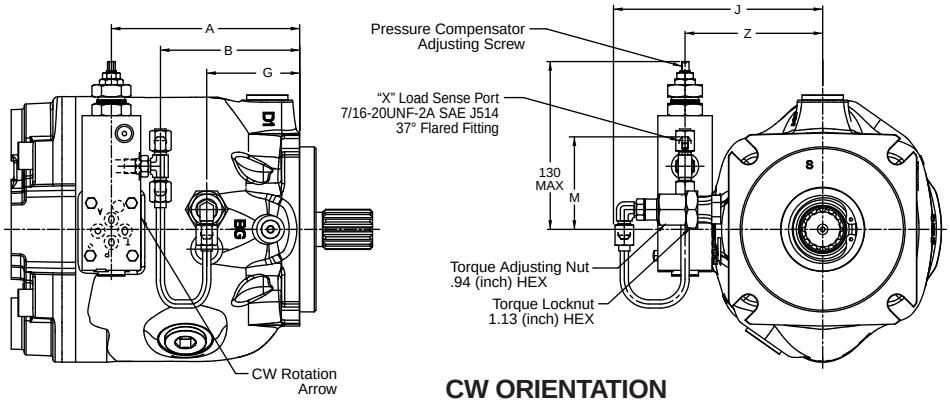
CCW ORIENTATION

Dimensions

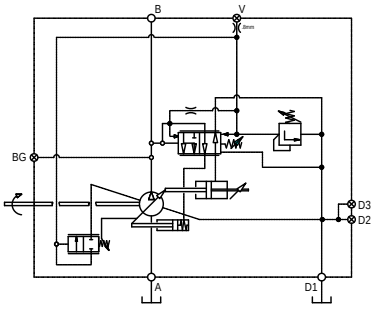
Model	A	B	G	H Max	J	K	L Max	M	Z
P*045	134.5	74.1	69.5	122	157.0	48.6	132	48.6	103.0
P*060	122.2	61.8	64.95	122	145.0	48.6	132	48.6	99.0

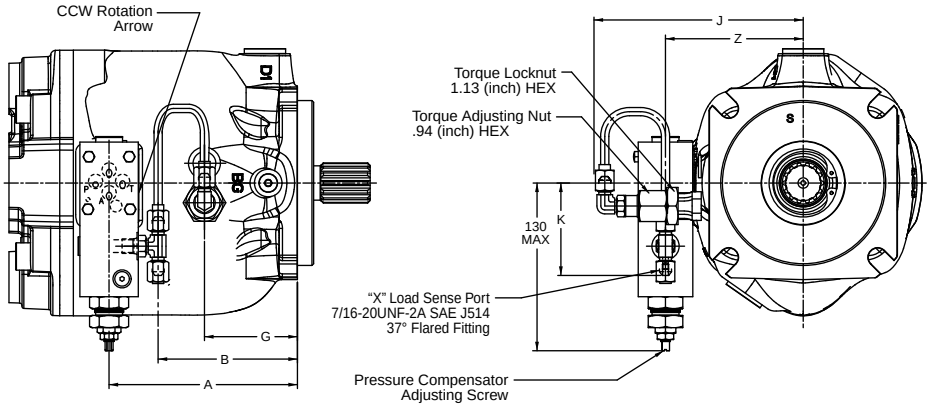
Torque Limiter AMT Control

Pressure Compensator with Torque Limiter "AMT" P*075, P*100 & P*140



CW ORIENTATION
P*075 SHOWN





CCW ORIENTATION
P*075 SHOWN

Dimensions

Model	A	B	F	G	H Max	J	K	L Max	M	Z
P*075	145.0	113.0	127	71.6	122	161.0	71.1	130	71.1	104.5
P*100	191.9	154.1	143	102.5	122	175.5	71.1	130	71.1	122.0
P*140	203.8	166.0	155	95.4	122	184.5	71.1	130	71.1	134.0

Parker Hannifin Corporation
Hydraulic Pump Division
Marysville, Ohio USA

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12. Improper Use and Indemnity. Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

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15. Entire Agreement. This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of the agreement. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.

16. Waiver and Severability. Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

17. Termination. This agreement may be terminated by Seller for any reason and at any time by giving Buyer thirty (30) days written notice of termination. In addition, Seller may by written notice immediately terminate this agreement for the following: (a) Buyer commits a breach of any provision of this agreement (b) the appointment of a trustee, receiver or custodian for all or any part of Buyer's property (c) the filing of a petition for relief in bankruptcy of the other Party on its own behalf, or by a third party (d) an assignment for the benefit of creditors, or (e) the dissolution or liquidation of the Buyer.

18. Governing Law. This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement. Disputes between the parties shall not be settled by arbitration unless, after a dispute has arisen, both parties expressly agree in writing to arbitrate the dispute.

19. Indemnity for Infringement of Intellectual Property Rights. Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

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