



P1M SERIES MOBILE OPEN CIRCUIT

Variable Displacement Axial Piston Pumps
Design Series B (B-mod)
Catalog: MSG28-2717-01/P1M/US
Effective: Sept 2025



Table of Contents

General Information & Technical Specs	3
Technical Specifications	4
P1M Model Ordering Code	5
Control Options - Control Pad	6
Control Options - Control Bore	9
Performance Data.....	10
Dimensional Data	
Mounting Flange & Input Shaft Details	12
P1M 028	13
P1M 045/054	15
P1M 065/073	17
Controls.....	20
Shaft Loading Information.....	21
Maximum Flange Moment Ratings.....	21
Installation Information	22
Conversions & Formulas	23
Extensive Hydraulic Product Offering.....	24



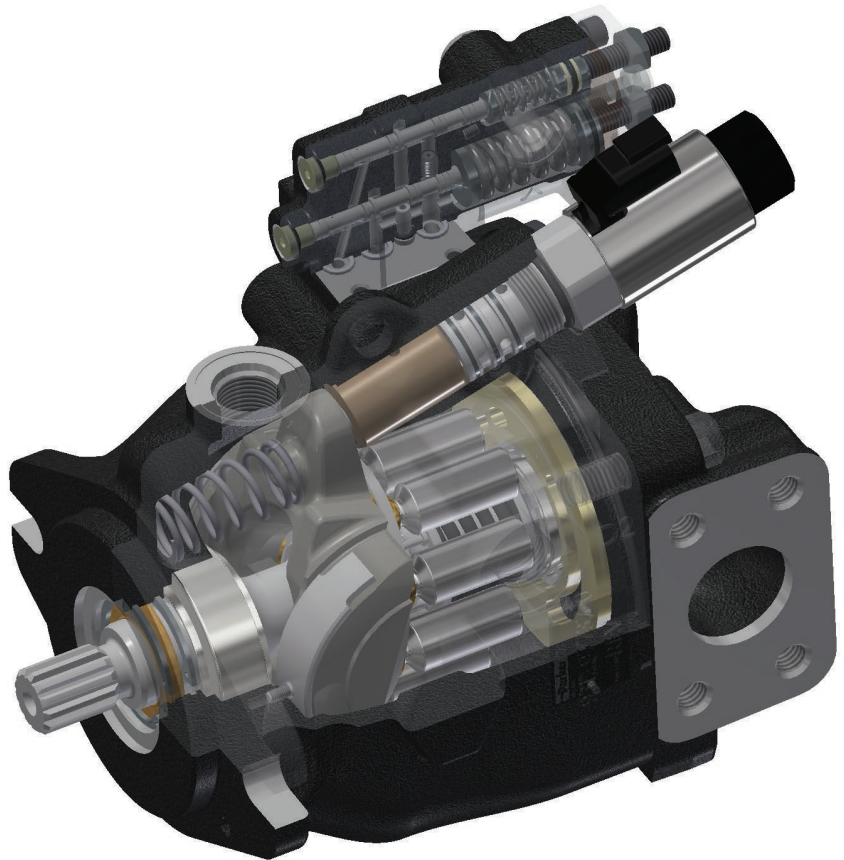
If you have questions about the products contained in this catalog, or their applications, please contact:
Parker Hannifin Hydraulic Pump and Motor Division
parker.com/hps

FEATURES & BENEFITS

Designed for Mobile. Built to Perform.

P1M Series delivers higher speeds and efficiency that increases machine productivity, reduces costs, and extends pump life in a robust, compact envelope.

- 1 Patented inlet design increases speed ratings and fill capabilities while reducing erosion, cavitation, & pressure ripples
- 2 Compact package provides Best-in-Class power density
- 3 Patented high response electronic displacement control for simplified programming and increased productivity
- 4 High efficiency for increased fuel efficiency or battery run time
- 5 Nine piston design reduces pressure ripples
- 6 Optional dual shaft seals for wet PTO mounting for all sizes



Note: For additional information, including the P1M eConfigurator, visit the P1M homepage at <https://discover.parker.com/P1M>

TECHNICAL SPECIFICATIONS

Model	28cc	45cc	54cc	65cc	73cc
Displacement, cm ³ /rev (cu.in./rev)	28 (1.71)	45 (2.75)	54 (3.29)	65 (3.97)	73 (4.45)
Outlet Pressure – Continuous, bar (psi)	280 (4060)	280 (4060)	250 (3625)	280 (4060)	250 (3625)
Intermittent*, bar (psi)	320 (4640)	320 (4640)	290 (4205)	320 (4640)	290 (4205)
Peak, bar (psi)	350 (5075)	350 (5075)	320 (4640)	350 (5075)	320 (4640)
Maximum Speed (1.0 bar abs inlet), rpm	3300	3000	2900	2800	2800
Maximum Speed (0.8 bar abs inlet), rpm	3200	2900	2800	2700	2700
Inlet Pressure – Maximum	11 bar absolute (160 psi)				
Rated	1.0 bar absolute (14.5 psi)				
Minimum	0.8 bar absolute (11.6 psi)				
Case Pressure – Peak, bar	4.0 bar absolute (58 psi) and less than 0.5 bar (7.3 psi) above inlet pressure				
Rated, bar	2.0 bar absolute (29 psi) and less than 0.5 bar (7.3 psi) above inlet pressure				
Fluid Temperature Range, °C	-40 to +95				
Fluid Temperature Range, °F	-40 to +203				
Fluid Viscosity – Rated, cSt	7 to 160				
Optimum Range, cSt	14-50 cSt.				
Max. Intermittent, cSt	5000 (cold start only)				
Min. Intermittent, cSt	6 (less than 1% of duty cycle)				
Weight** – End Port, kg (lb)	16.2 (36)	19.8 (44)	19.9 (44)	24.3 (53)	24.2 (53)
Side Port, kg (lb)	16.2 (36)	20.0 (44)	20.1 (44)	24.7 (54)	24.6 (54)
Thru-Drive, kg (lb)***	19.8 (44)	23.6 (52)	23.7 (52)	28.7 (63)	28.6 (63)
Moment of Inertia kg-mm ²	1359	2874	3167	5010	4843
Moment of Inertia Thru-Drive, kg-mm ²	1395	2937	3230	5151	4985

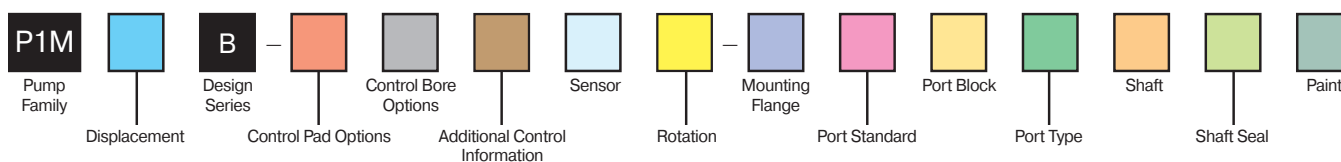
*Intermittent is defined as less than 10% of operation time, not exceeding 20 successive seconds.

**Add 1.4 kg (3 lbs) for SAE-C mount for 65 & 73cc

***Add 2.9 kg (6 lbs) for SAE-C thru adapter

Note: For additional information include the P1M eConfigurator, visit the P1M homepage: <https://discover.parker.com/P1M>

P1M MODEL CODE



Displacement	
028	28cc/rev
045	45cc/rev
054	54cc/rev
065	65cc/rev
073	73cc/rev

Control Options - Control Pad	
PC	Pressure Compensator
LS	Load Sense with Pressure Compensator
RC	Remote Compensator
FD	Electronic Fan Drive

Control Options - Control Bore	
00	None
ED	Electronic Displacement
VS	Maximum Volume Stop

Additional Electronic Control Information	
00	Not Applicable
1H	12 VDC; Max Default
1L*	12 VDC; Min Default
2H	24 VDC; Max Default
2L*	24 VDC; Min Default

* Not available with FD or Unload control

Sensor	
0	None

Rotation	
R	Clockwise from Shaft End
L	Counterclockwise from Shaft End

Mounting Flange	
B2	SAE-B 2-bolt (28, 45, 54, 65, & 73cc)
C6	SAE-C 2/4-bolt (65, 73, 85, & 105cc)

Port Standard	
S	SAE Work & Aux Ports
M	Metric Work & Aux Ports

Port Block	
S	Side Ports, no thru-drive
E	End Ports, no thru-drive
A	SAE-A 2-bolt Thru-Drive; 9T coupling
H	SAE-A 2-bolt Thru-Drive; 11T coupling
B	SAE-B 2-bolt Thru-Drive; 13T coupling
Q	SAE-B 2-bolt Thru-Drive; 15T coupling
T	Thru-Drive with Cover, no coupling

Port Type	
F	Flanged
T	Threaded*

* Not available with 85, 105, or 45, 54, 65, & 73 thru drive

Shaft	
B	SAE-B, 13T (28, 45, 54, 65, & 73cc)
Q	SAE-BB, 15T (28, 45, 54, 65 & 73cc)
J	SAE-BB, 15T, no undercut (45 & 54cc)
C	SAE-C, 14T (65, 73, 85, & 105cc)

Shaft Seal	
S	Single FKM Shaft Seal
D	Dual FKM Shaft Seal

Paint	
P	Standard Black Paint

Thru-Drive Options Per Displacement					
Code	28cc	45cc	54cc	65cc	73cc
A	✓	✓	✓	✓	✓
H	✓	✓	✓	✓	✓
B	✓	✓	✓	✓	✓
Q		✓	✓	✓	✓
C				✓	✓
N					

Note: Contact factory for part number of desired model code configuration. Setting information will be required for part number release

CONTROL OPTIONS - CONTROL PAD

Control Option “PC”

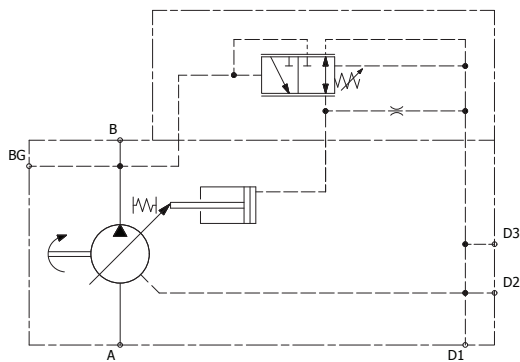
Pressure Compensator

The “PC” pressure compensator control is used to limit the maximum system pressure. The control acts such that full pump displacement is achieved unless system pressure reaches the setting of the control. Then the control will de-stroke the pump to restrict flow to either maintain system pressure at the compensator setting or allow system pressure to fall back below the compensator setting. Once the system pressure falls below the compensator setting, the control will vent the pressure in the control piston and allow the pump to come back on stroke.

The pressure compensator can be mechanically adjusted by loosening the locknut on the adjustment screw and turning the screw. Clockwise to increase the pressure setting and counterclockwise to decrease the pressure setting.

This control is commonly used in applications where there is only a single function driven by the pump, or if there are multiple functions, but those functions operate at or near the same pressure.

The adjustment range for the pressure compensator is 26-320 bar (380-4600 psi). Before adjusting the compensator above the continuous pressure rating of 280 bar (4060 psi), contact the factory to review the application duty cycle.



PC Schematic

Control Option “RC”

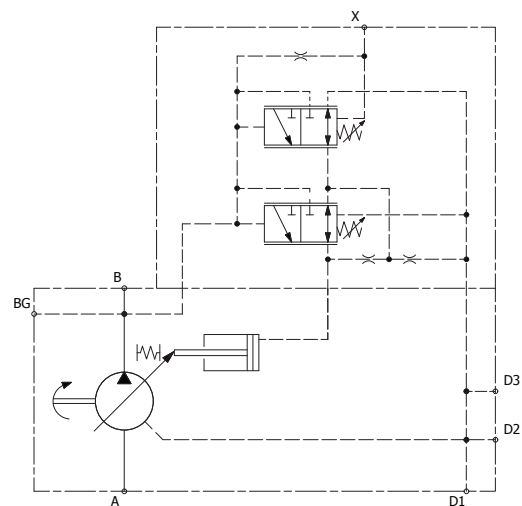
Remote Operated Pressure Compensator

The “RC” remote compensator control enables the user to remotely control the setting at which the pump compensates. A proportional pressure relief valve can be mounted remotely and plumbed to the “X” port on the pump control. By electronically adjusting the setting of the proportional relief valve, the user can vary the pressure at which the pump compensates. The pump will compensate when the system pressure reaches the relief setting plus the differential spool spring setting.

There is also a pressure compensating function similar to the “PC” control where the maximum allowable pressure can be set by adjusting the pressure compensator setting. When this setting is reached, the pump will de-stroke the pump regardless of the remote relief setting.

Remote compensator controls are commonly used on applications where multiple functions operate sequentially but at different pressures. This allows the user to more efficiently match the maximum pump output pressure to the different actuator requirements.

The adjustment range for the pressure compensator is 26-320 bar (380-4600 psi). Before adjusting the compensator above the continuous pressure rating of 280 bar (4060 psi), contact the factory to review the application duty cycle.



RC Schematic

Note: P1M-028 does not have BG port

Control Option “LS” & “LB”

Load Sensing with Pressure Compensator

“LS” = Load Sensing without bleed orifice

“LB” = Load Sensing with bleed orifice

The “LS” and “LB” controls feature a load sensing or flow control function in addition to the functionality of the pressure compensator “PC” control. For the “LS” and “LB” control, a load sense line needs to connect the load pressure (downstream of the main throttling valve) to the “X” port on the pump control. This enables the pump to sense the pressure required to move the load and adjust the output flow such that a constant pressure drop is maintained across the main system throttling valve. If the pressure drop across the valve is constant given a certain valve opening, then flow through that opening will be constant.

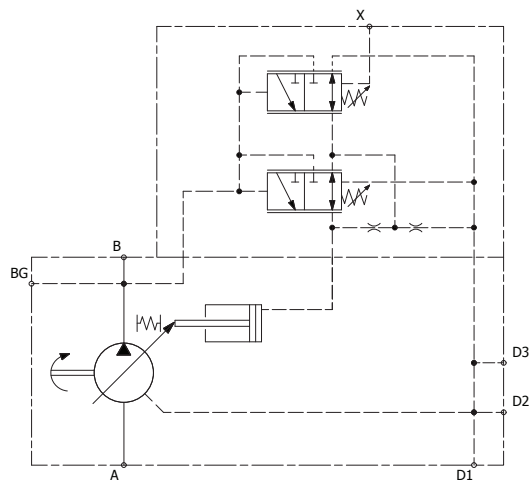
The differential spring setting determines the difference between the load pressure and pump outlet pressure. If the load pressure changes, or the main throttling valve opens or closes to change the actuator speed, the differential pressure between the pump outlet and the actuator will

momentarily change. This will cause the pump control to either increase or decrease the stroke of the pump in order to get back to the desired differential pressure.

Choose the “LB” option if bleeding the load sense line at the pump is desired instead of at the valve.

Load sense control is commonly used in applications where multiple functions are operating simultaneously and have different operating pressures. In these situations, the load sense control reduces power losses by closely matching the pump flow and pressure with the system flow and pressure demands.

The adjustment range of the pressure compensator is 26-320 bar (380-4600 psi) and the adjustment range for the differential is 10-35 bar (145-510 psi). Before adjusting the compensator above the continuous pressure rating of 280 bar (4060 psi), contact the factory to review the application duty cycle.



LS Schematic

Note: P1M-028 does not have BG port

Control Option “FD”

Fan Drive Control - Electronic Pressure Control with Pressure Compensator

FD**1H = 12 VDC

FD**2H = 24 VDC

The “FD” control is a direct operating electronic proportional pressure control designed specifically for fan drive systems. This control allows the user to electronically set the pump outlet pressure equivalent to a desired fan speed, and the pump will regulate itself to maintain that pressure regardless of pump speed, which allows the fan speed to be controlled independently of pump speed.

The “FD” control is designed specifically to operate in a stable manner with low natural frequency systems such as fan drives, and is not recommended to be used outside of fan drive applications.

The “FD” control also has a built-in adjustable hydromechanical pressure compensator that functions similar to the “PC” control. The pressure compensator setting determines what the current vs pressure curve looks like per the graph below. If no current is given to the control, then the pump outlet pressure defaults to the pressure compensator setting so that maximum fan speed is achieved. This is important because in a loss of signal condition, maximum cooling is preferred to no cooling.

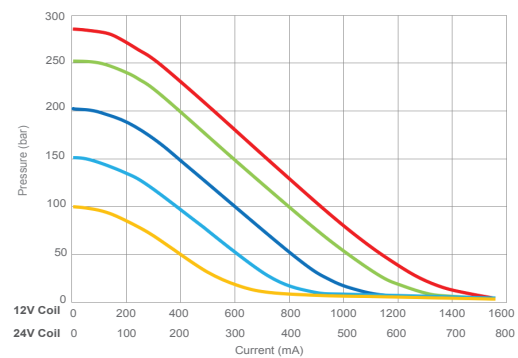
Because this control is direct operated, not pilot operated, it does not work off of a differential pressure. Therefore, a very low stand-by pressure can be achieved (5-10 bar) and parasitic losses are reduced, thus reducing the heat generated by the pump.

The adjustment range for the pressure compensator function is 100-280 bar (1450-4060 psi).

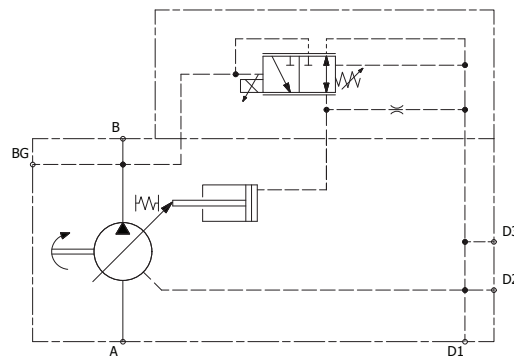
FD Control Coil Specs		
Technical Data	12VDC	24VDC
Resistance (@ 20 C)	5.5 Ohm	22.1 Ohm
Max Current	2.2 A	1.1 A
PWM Signal*	100-200 Hz	
Recommended min Dither Amplitude	350 mA	175 mA
Connector	Deutsch DT04-2P	
IP Rating	IP67 & IP69K	

*With FD control, a superimposed 35Hz dither may be required

**Electronic Pressure Control (max default)
Nominal Characteristics**



Electronic Pressure Control (max default)



FD Control Schematic

Note: P1M-028 does not have BG port

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CONTROL OPTIONS - CONTROL BORE

Control Option “ED”

Electronic Displacement Control

ED1H = 12 VDC; maximum displacement default

ED1L = 12 VDC; minimum displacement default

ED2H = 24 VDC; maximum displacement default

ED2L = 24 VDC; minimum displacement default

The “ED” control is an electronic proportional displacement control where pump displacement is a function of the command current. The displacement is directly proportional to the command current and is maintained via a feedback spring within the control which modulates the control spool such that the relationship between the current given to the coil and the angle of the swashplate is maintained. Therefore, the pump can be controlled in an open loop manner and a displacement sensor is not required.

When selecting the “ED” control, either a maximum or minimum default condition must also be selected and this will determine whether the pump goes to full or zero displacement when no current command is given.

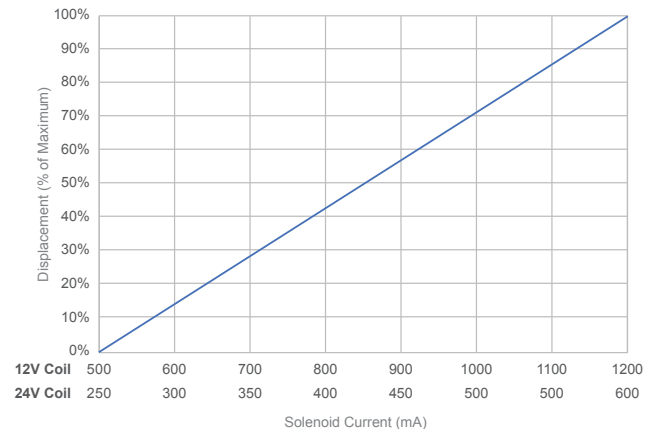
The patented “ED” control also allows the user to do a step change in command when changing displacement because the control spool cannot physically overshoot into the default condition. Thus, a ramped control command is not required.

The “ED” control can be combined with any of the Control Pad control options. Based on pump tolerances the actual displacement vs command current may vary slightly from the nominal characteristics shown in the graph below.

ED Control Coil Specs		
Technical Data	12VDC	24VDC
Resistance (@ 20 C)	5.5 Ohm	22.7 Ohm
Max Current	2.2 A	1.1 A
PWM Signal*	100-200 Hz	
Recommended min Dither Amplitude	350 mA	175 mA
Connector	Deutsch DT04-2P	
IP Rating	IP67 & IP69K	

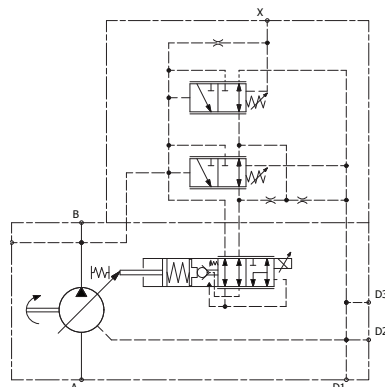
*With ED Control, a superimposed 35 Hz dither is required

**Electrical Displacement Control
Nominal Characteristics**



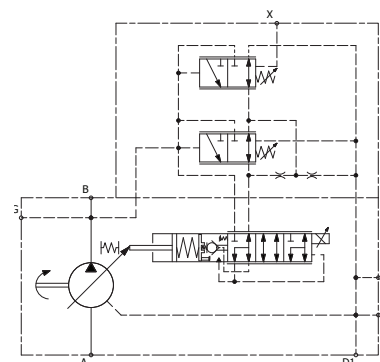
Example Schematics

**Electronic Displacement (min default)
with Remote Compensator**



RCED*L Schematic

**Electronic Displacement (max default) with
Load Sense and Pressure Compensator**



LSED*H Schematic

Note: P1M-028 does not have BG port

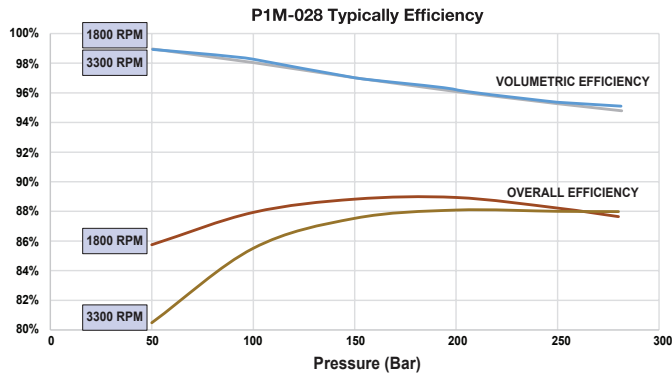
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PERFORMANCE DATA

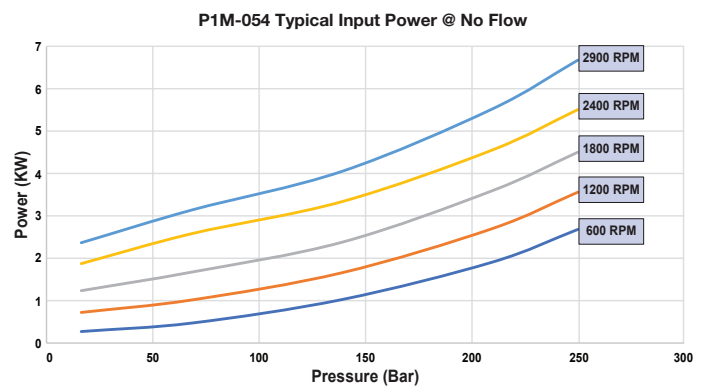
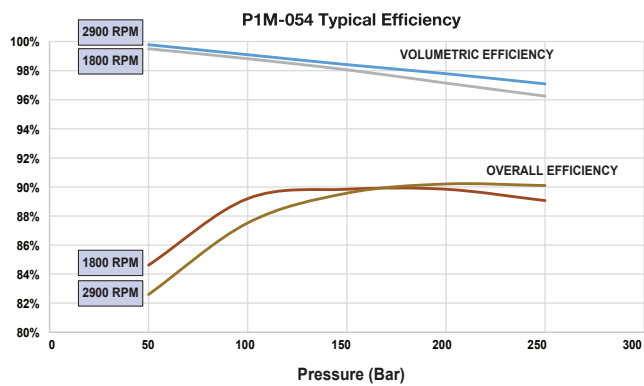
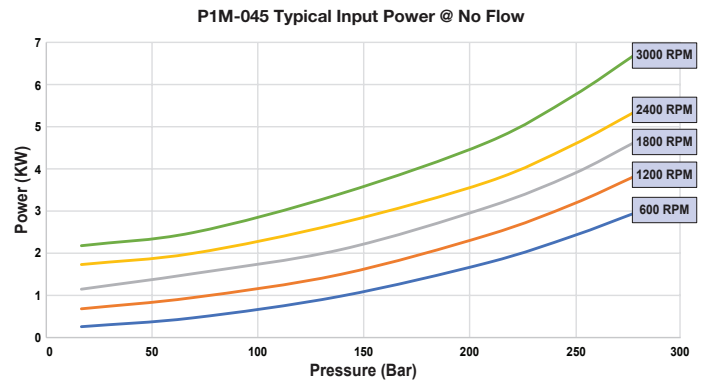
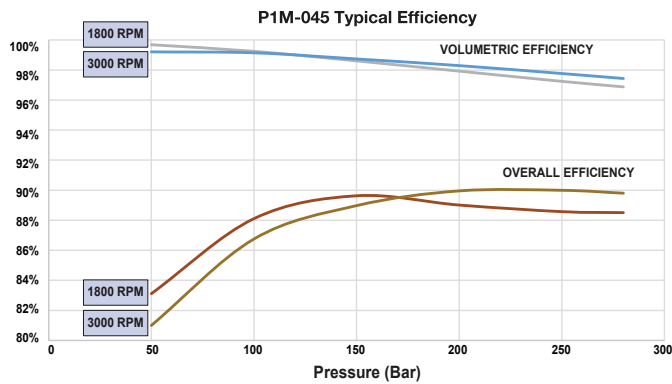
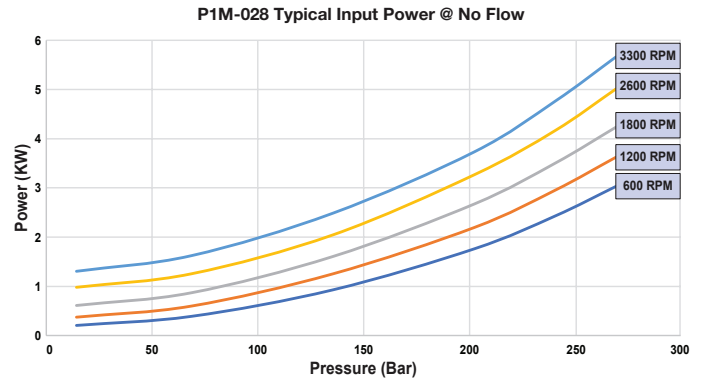
Typical Volumetric & Overall Efficiency

50C Inlet Temp - ISO VG 32 Fluid



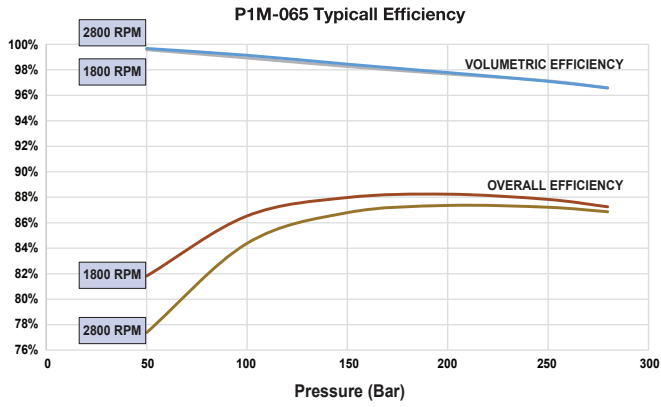
Typical Compensated Power Consumption (No Flow)

50C Inlet Temp - ISO VG 32 Fluid



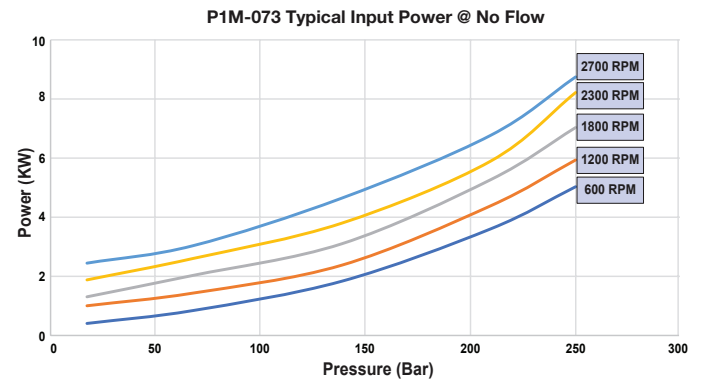
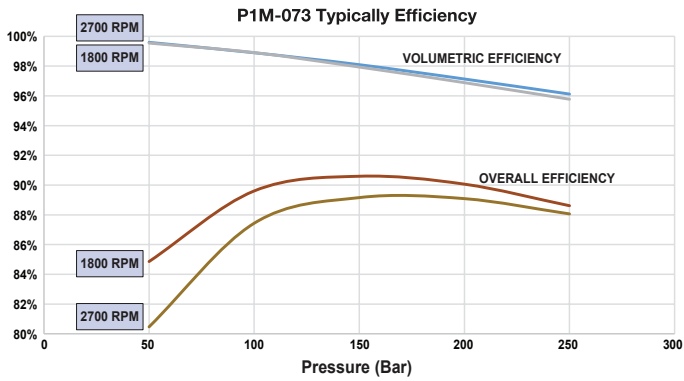
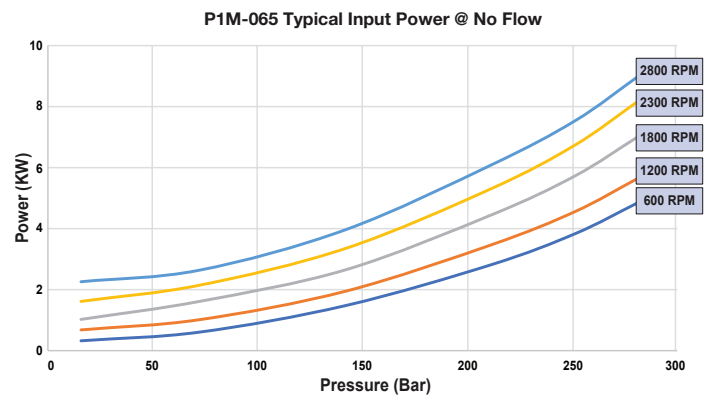
Typical Volumetric & Overall Efficiency

50C Inlet Temp - ISO VG 32 Fluid



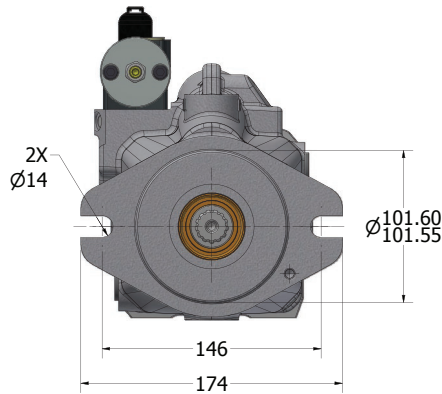
Typical Compensated Power Consumption (No Flow)

50C Inlet Temp - ISO VG 32 Fluid

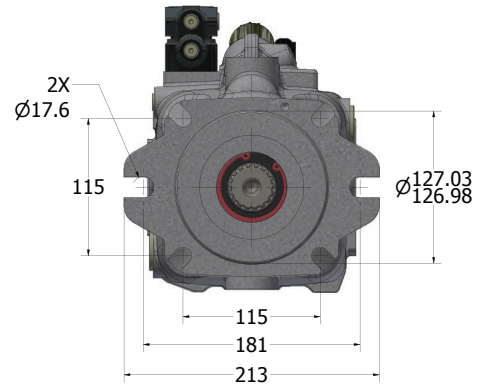


DIMENSIONAL DATA

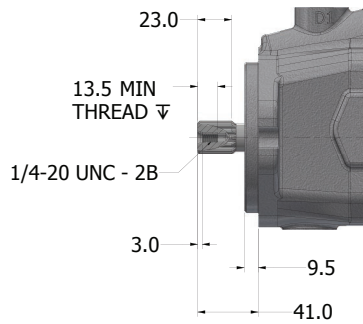
Mounting Flange & Input Shaft Details



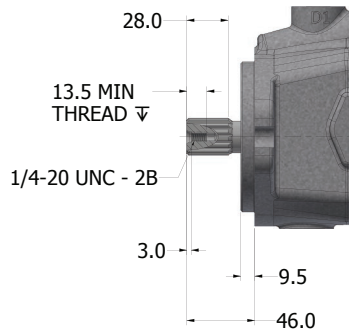
SAE-B 2-Bolt Mount
Per SAE J744: JUN96 101-2 (B)



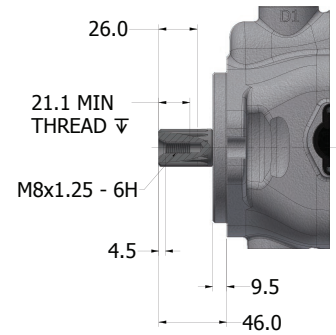
SAE-C 2/4-Bolt Mount
Per SAE J744: JUN96 127-2/4 (C)



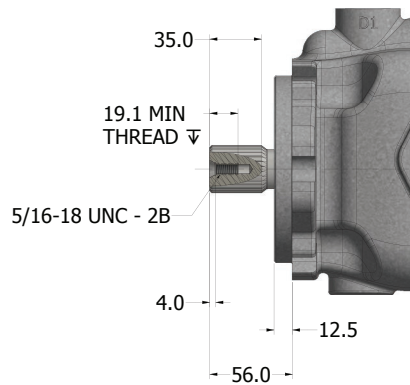
Shaft "B" - SAE-B 13T shaft



Shaft "Q" - SAE-BB 15T shaft



Shaft "J" - SAE-BB 15T shaft with no undercut



Shaft "C" - SAE-C 14T shaft (03E-97823-001-0)

P1M Shaft Details			
Shaft "B"	Shaft "Q"	Shaft "J"	Shaft "C"
SPLINE: ANSI B92.1-1996 SAE 22-4 (B) INVOLUTE SPLINE CLASS 7 FLAT ROOT SIDE FIT NUMBER OF TEETH - 13 PITCH - 16/32 PRESSURE ANGLE - 30° MAJOR DIAMETER - 22.23/21.67 PITCH DIAMETER - 20.638	SPLINE: ANSI B92.1-1996 SAE 25-4 (B-B) INVOLUTE SPLINE CLASS 7 FLAT ROOT SIDE FIT NUMBER OF TEETH - 15 PITCH - 16/32 PRESSURE ANGLE - 30° MAJOR DIAMETER - 25.40/24.84 PITCH DIAMETER - 23.813	SPLINE: ANSI B92.1-1996 SAE 25-4 (B-B) INVOLUTE SPLINE CLASS 7 FLAT ROOT SIDE FIT NUMBER OF TEETH - 15 PITCH - 16/32 PRESSURE ANGLE - 30° MAJOR DIAMETER - 25.40/24.84 PITCH DIAMETER - 23.813	SPLINE: ASA-B5.15-1960 SAE 32-4 (C) INVOLUTE SPLINE CLASS 1 FLAT ROOT SIDE FIT NUMBER OF TEETH - 14 PITCH - 12/24 PRESSURE ANGLE - 30° MAJOR DIAMETER - 31.22/31.09 PITCH DIAMETER - 29.634

P1M-028

End & Side Ports

CW Rotation Shown

Note: For CCW rotation, inlet and outlet port locations are swapped.

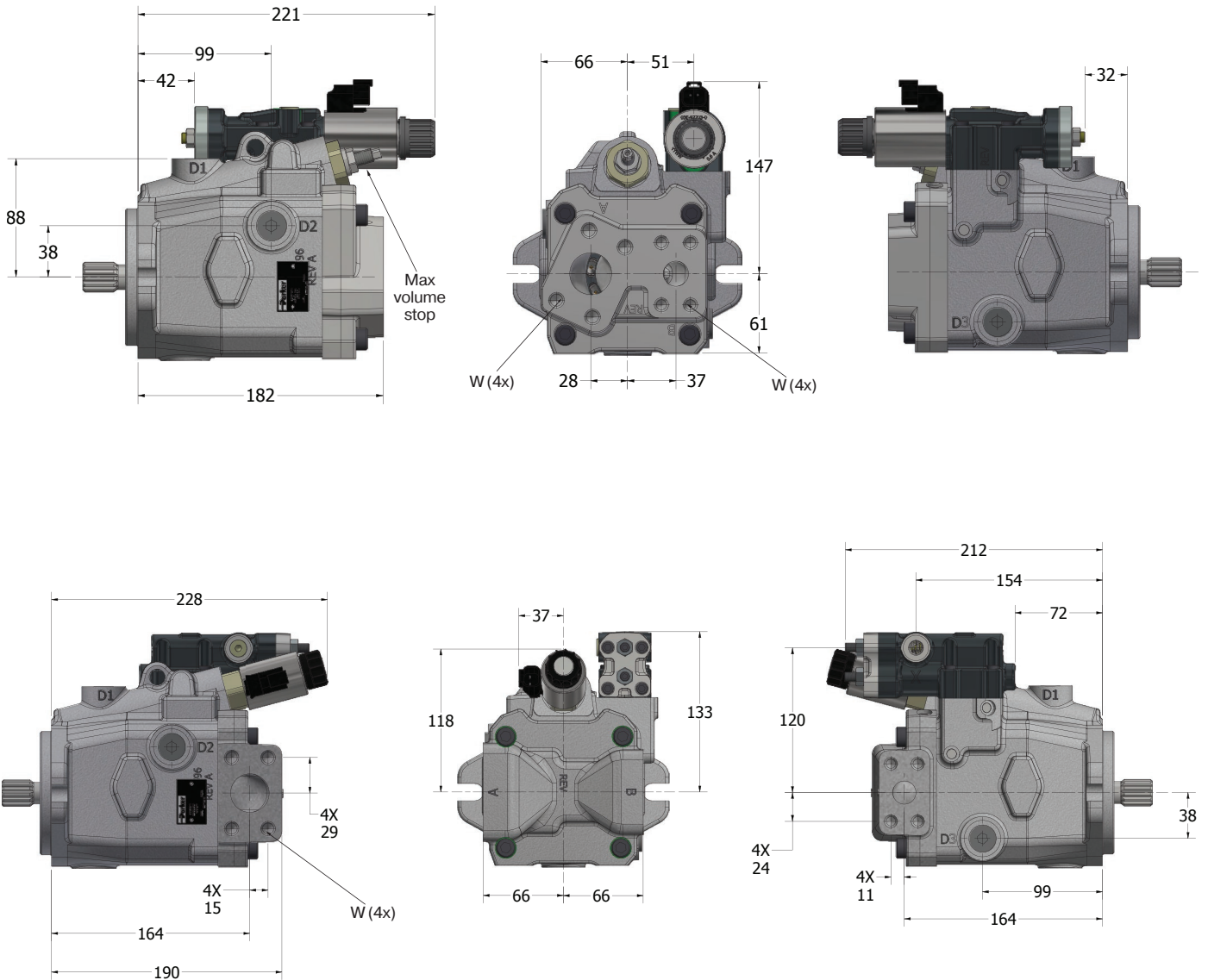
P1M-028 Port Sizes				
Ports	SAE Flanged	SAE Threaded	Metric Flanged	Metric Threaded
"A" Inlet	1-1/4" Code 61	SAE-20	DN32	M42x2
W Threads	7/16-14 UNC-2B	-	M10x1.5-6H	-
"B" Outlet	3/4" Code 61	SAE-12	DN19	M27x2
Y Threads	3/8-16 UNC-2B	-	M10x1.5-6H	-
X	SAE-4		M12x1.5	
D1, D2, D3	SAE-8		M22x1.5	

Note A: SAE flanged ports conform to SAE J518

Note B: SAE o-ring port conforms to SAE J514

Note C: Metric flanged ports conform to ISO 6162

Note D: Metric o-ring boss port conforms to ISO 6149-1



P1M-028

Side Ports with Thru-Drive

CW Rotation Shown

Note: For CCW rotation, inlet and outlet port locations are swapped.

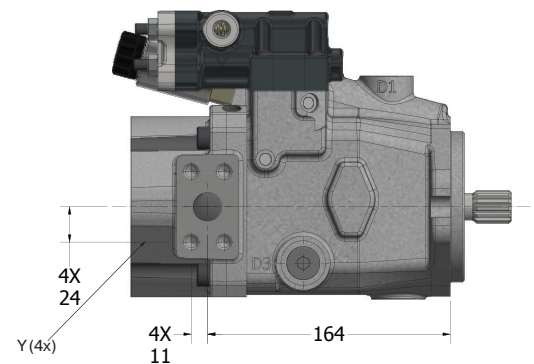
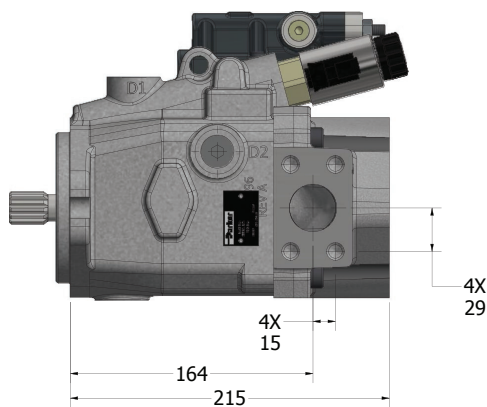
P1M-028 Port Sizes				
Ports	SAE Flanged	SAE Threaded	Metric Flanged	Metric Threaded
"A" Inlet	1-1/4" Code 61	SAE-20	DN32	M42x2
W Threads	7/16-14 UNC-2B	-	M10x1.5-6H	-
"B" Outlet	3/4" Code 61	SAE-12	DN19	M27x2
Y Threads	3/8-16 UNC-2B	-	M10x1.5-6H	-
X	SAE-4		M12x1.5	
D1, D2, D3	SAE-8		M22x1.5	

Note A: SAE flanged ports conform to SAE J518

Note B: SAE o-ring port conforms to SAE J514

Note C: Metric flanged ports conform to ISO 6162

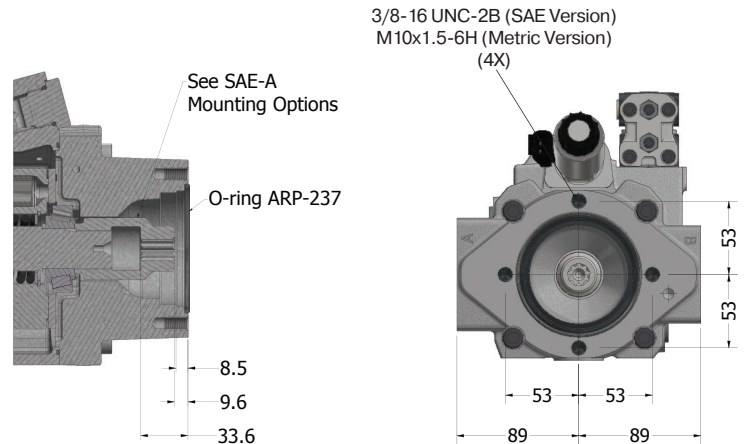
Note D: Metric o-ring boss port conforms to ISO 6149-1



Thru-Drive Mounting Options

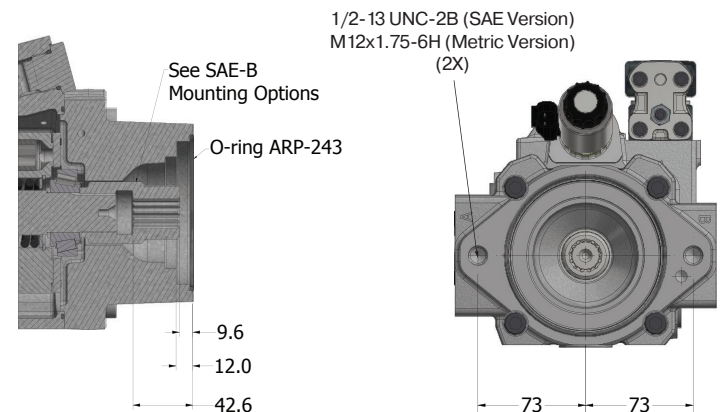
SAE-A Mounting Options Information

Model Number: A Spline: ANSI B92.1 1996 SAE 16-4 (A) Involute Spline Class 7 Flat Root Side Fit Number of Teeth - 9 Pitch - 16/32 Pressure Angle - 30° Major Diameter - 13.06/12.93 mm Pitch Diameter - 14.29 mm	Model Number: H Spline: ANSI B92.1 1996 SAE 19-4 Involute Spline Class 7 Flat Root Side Fit Number of Teeth - 11 Pitch - 16/32 Pressure Angle - 30° Minor Diameter - 16.14/16.02 mm Pitch Diameter - 17.46 mm
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SAE-B Mounting Options Information

Model Number: B Spline: ANSI B92.1 1996 SAE 22-4 (B) Involute Spline Class 7 Flat Root Side Fit Number of Teeth - 13 Pitch - 16/32 Pressure Angle - 30° Minor Diameter - 19.28/19.15 mm Pitch Diameter - 20.64 mm	Model Number: Q Spline: ANSI B92.1 1996 SAE 25-4 (B-B) Involute Spline Class 7 Flat Root Side Fit Number of Teeth - 15 Pitch - 16/32 Pressure Angle - 30° Minor Diameter - 22.40/22.28 mm Pitch Diameter - 23.81 mm
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P1M-045/054

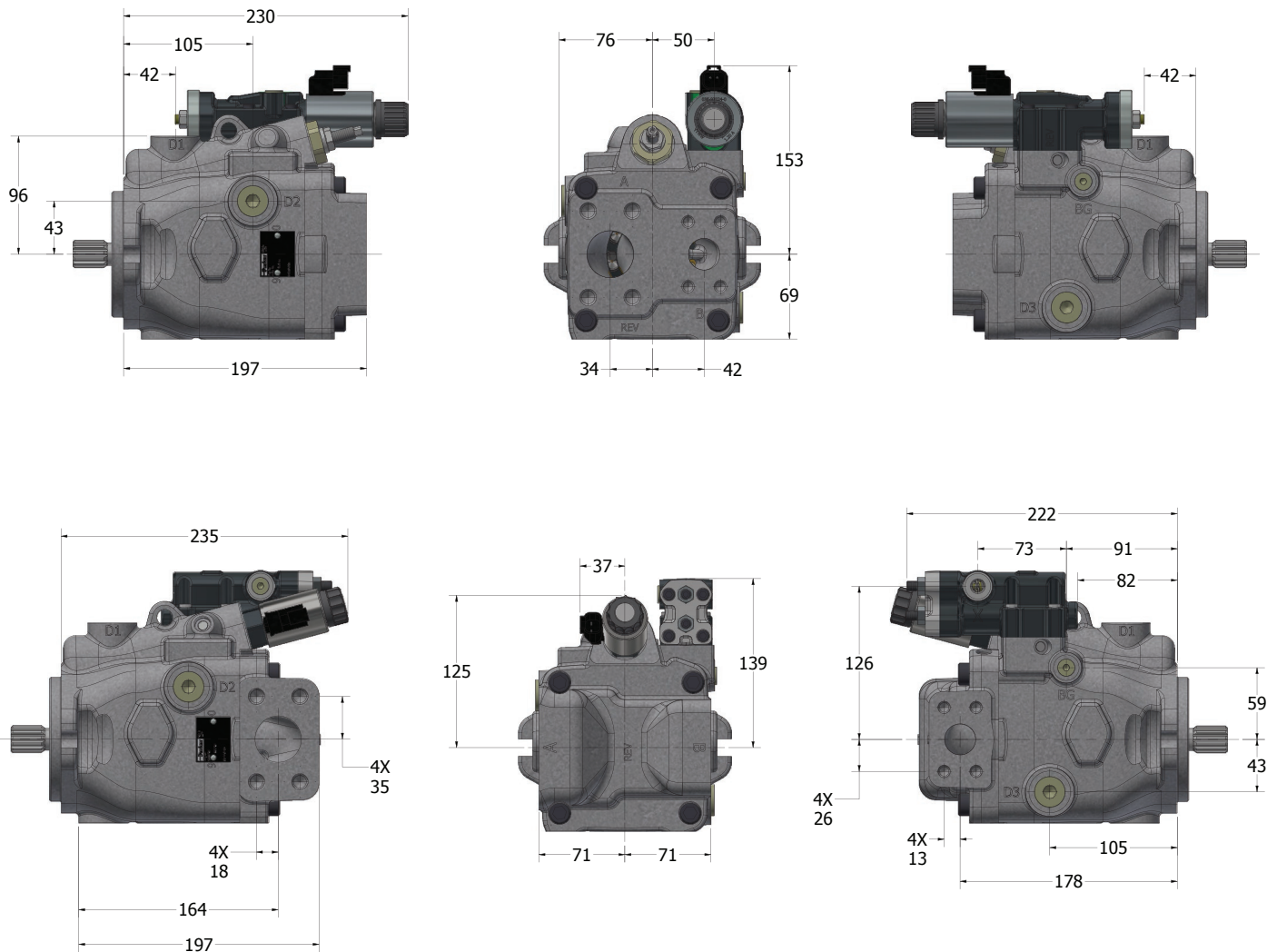
End & Side Ports

CW Rotation Shown

Note: For CCW rotation, inlet and outlet port locations are swapped.

P1M-045/054 Port Sizes				
Ports	SAE Flanged	SAE Threaded	Metric Flanged	Metric Threaded
"A" Inlet	2" Code 61	SAE -32	DN51	M52x4
W Threads	1/2-13 UNC-2B	-	M12x1.75-6H	-
"B" Outlet	1" Code 61	SAE -16	DN25	M33x2
Y Threads	3/8-16 UNC-28	-	M10x1.5-6H	-
BG, X	SAE-4		M12x1.5	
D1, D2, D3	SAE-10		M22x1.5	

Note A: SAE flanged ports conform to SAE J518
Note B: SAE o-ring port conforms to SAE J514
Note C: Metric flanged ports conform to ISO 6162
Note D: Metric o-ring boss port conforms to ISO 6149-1



P1M-045/054

Side Ports with Thru-Drive

CW Rotation Shown

Note: For CCW rotation, inlet and outlet port locations are swapped.

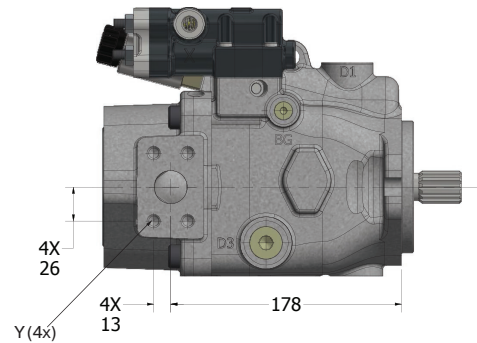
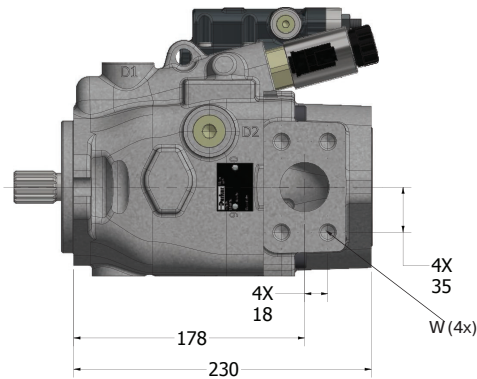
P1M-045/054 Port Sizes				
Ports	SAE Flanged	SAE Threaded	Metric Flanged	Metric Threaded
"A" Inlet	1-1/2" Code 61	SAE-24	DN38	M48x2
W Threads	1/2-13 UNC-2B	-	M12x1.75-6H	-
"B" Outlet	1" Code 61	SAE-16	DN25	M33x2
Y Threads	3/8-16 UNC-28	-	M10x1.5-6H	-
X	SAE-4		M12x1.5	
D1, D2, D3	SAE-10		M22x1.5	

Note A: SAE flanged ports conform to SAE J518

Note B: SAE o-ring port conforms to SAE J514

Note C: Metric flanged ports conform to ISO 6162

Note D: Metric o-ring boss port conforms to ISO 6149-1

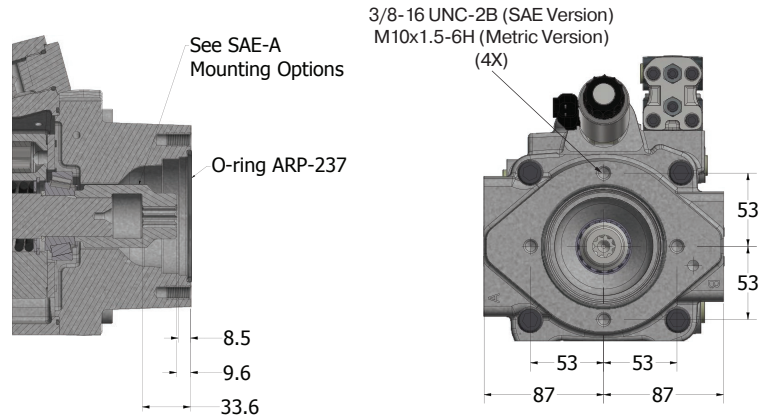


Thru-Drive Mounting Options

SAE-A Mounting Options Information

Model Number: A
Spline: ANSI B92.1 1996
SAE 16-4 (A) Involute Spline
Class 7 Flat Root Side Fit
Number of Teeth - 9
Pitch - 16/32
Pressure Angle - 30°
Major Diameter - 13.06/12.93 mm
Pitch Diameter - 14.29 mm

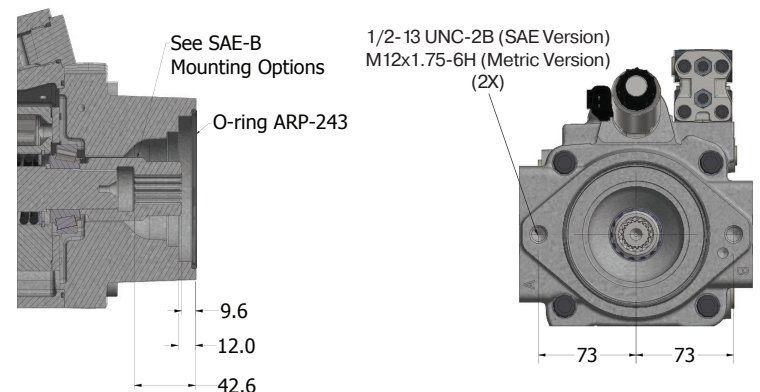
Model Number: H
Spline: ANSI B92.1 1996
SAE 19-4 Involute Spline
Class 7 Flat Root Side Fit
Number of Teeth - 11
Pitch - 16/32
Pressure Angle - 30°
Minor Diameter - 16.14/16.02 mm
Pitch Diameter - 17.46 mm



SAE-B Mounting Options Information

Model Number: B
Spline: ANSI B92.1 1996
SAE 22-4 (B) Involute Spline
Class 7 Flat Root Side Fit
Number of Teeth - 13
Pitch - 16/32
Pressure Angle - 30°
Minor Diameter - 19.28/19.15 mm
Pitch Diameter - 20.64 mm

Model Number: Q
Spline: ANSI B92.1 1996
SAE 25-4 (B-B) Involute Spline
Class 7 Flat Root Side Fit
Number of Teeth - 15
Pitch - 16/32
Pressure Angle - 30°
Minor Diameter - 22.40/22.28 mm
Pitch Diameter - 23.81 mm



P1M-065/073

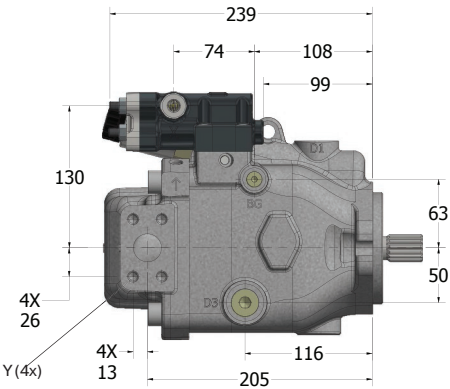
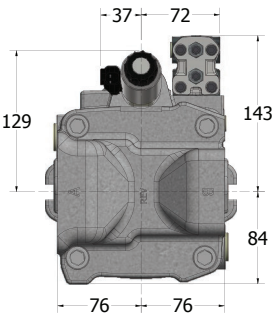
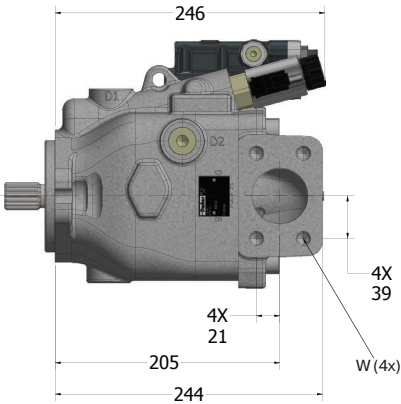
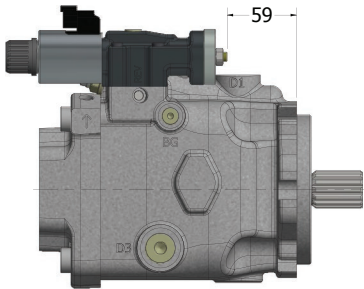
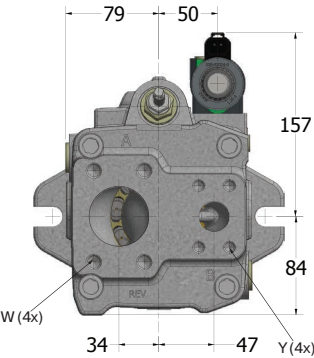
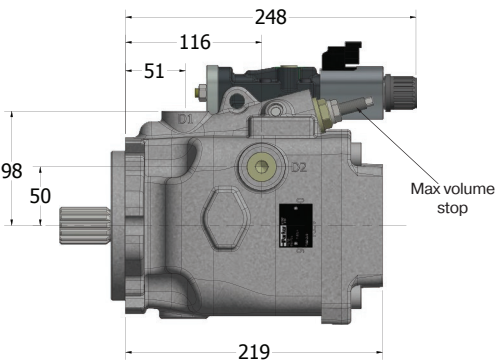
End & Side Ports

CW Rotation Shown

Note: For CCW rotation, inlet and outlet port locations are swapped.

P1M-065/073 Port Sizes				
Ports	SAE Flanged	SAE Threaded	Metric Flanged	Metric Threaded
"A" Inlet	2" Code 61	SAE -32	DN51	M52x4
W Threads	1/2-13 UNC-2B	-	M12x1.75-6H	-
"B" Outlet	1" Code 61	SAE -16	DN25	M33x2
Y Threads	3/8-16 UNC-28	-	M10x1.5-6H	-
BG, X	SAE-4		M12x1.5	
D1, D2, D3	SAE-10		M22x1.5	

Note A: SAE flanged ports conform to SAE J518
Note B: SAE o-ring port conforms to SAE 1926
Note C: Metric flanged ports conform to ISO 6162
Note D: Metric o-ring boss port conforms to ISO 6149-1



P1M-065/073

Side Ports with Thru-Drive

CW Rotation Shown

Note: For CCW rotation, inlet and outlet port locations are swapped.

P1M-065/073 Port Sizes				
Ports	SAE Flanged	SAE Threaded	Metric Flanged	Metric Threaded
"A" Inlet	2" Code 61	SAE -32	DN51	M52x4
W Threads	1/2-13 UNC-2B	-	M12x1.75-6H	-
"B" Outlet	1" Code 61	SAE -16	DN25	M33x2
Y Threads	3/8-16 UNC-28	-	M10x1.5-6H	-
X	SAE-4		M12x1.5	
D1, D2, D3	SAE-10		M22x1.5	

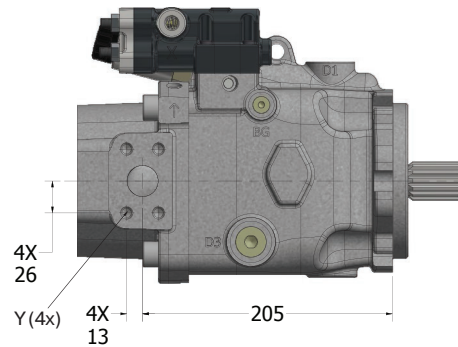
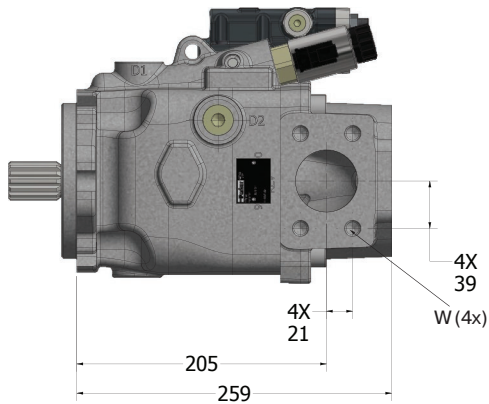
Note A: SAE flanged ports conform to SAE J518

Note B: SAE o-ring port conforms to SAE J514

Note C: Metric flanged ports conform to ISO 6162

Note D: Metric o-ring boss port conforms to ISO 6149-1

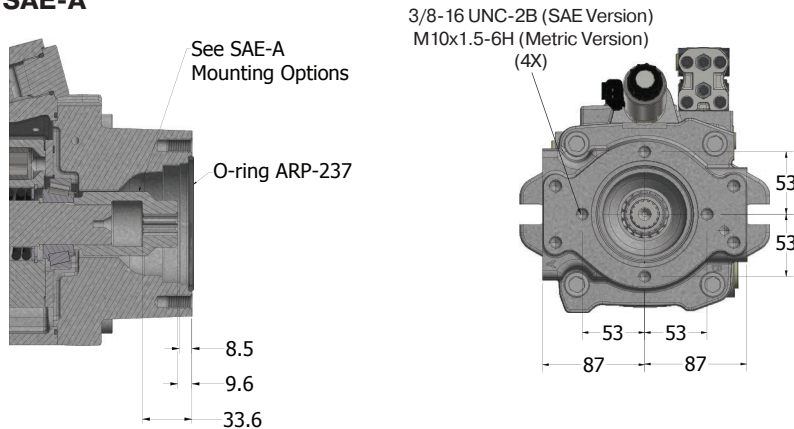
SAE-A & SAE-B Thru-Drive



P1M-065/073

Thru-Drive Mounting Options

SAE-A

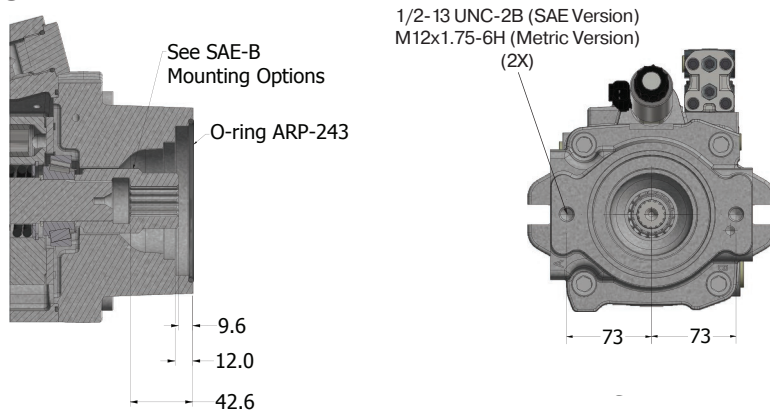


SAE-A Mounting Options Information

Model Number: A
Spline: ANSI B92.1 1996
SAE 16-4 (A) Involute Spline
Class 7 Flat Root Side Fit
Number of Teeth - 9
Pitch - 16/32
Pressure Angle - 30°
Major Diameter - 13.06/12.93 mm
Pitch Diameter - 14.29 mm

Model Number: H
Spline: ANSI B92.1 1996
SAE 19-4 Involute Spline
Class 7 Flat Root Side Fit
Number of Teeth - 11
Pitch - 16/32
Pressure Angle - 30°
Minor Diameter - 16.14/16.02 mm
Pitch Diameter - 17.46 mm

SAE-B



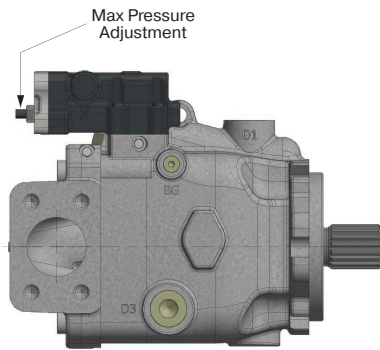
SAE-B Mounting Options Information

Model Number: B
Spline: ANSI B92.1 1996
SAE 22-4 (B) Involute Spline
Class 7 Flat Root Side Fit
Number of Teeth - 13
Pitch - 16/32
Pressure Angle - 30°
Minor Diameter - 19.28/19.15 mm
Pitch Diameter - 20.64 mm

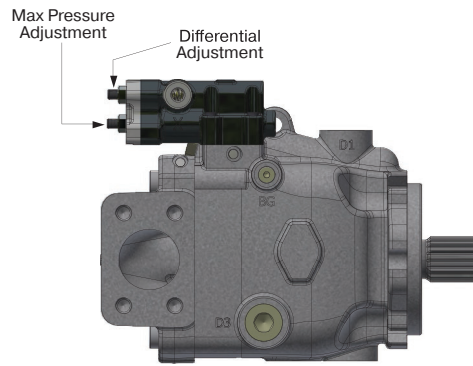
Model Number: Q
Spline: ANSI B92.1 1996
SAE 25-4 (B-B) Involute Spline
Class 7 Flat Root Side Fit
Number of Teeth - 15
Pitch - 16/32
Pressure Angle - 30°
Minor Diameter - 22.40/22.28 mm
Pitch Diameter - 23.81 mm

Controls

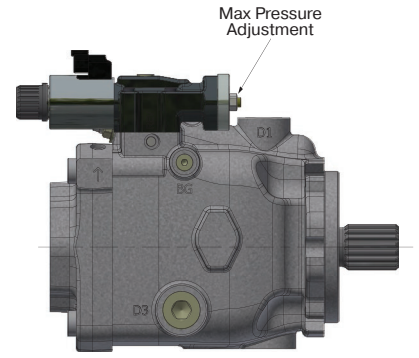
PC Control



LS/LB/RC Control



FD Control



Note: For PC, LS, LB, RC, FD, VS, & ED control dimensions, see frame size dimensional data

SHAFT AND MOUNT INFORMATION

Shaft Torque Ratings

	Units	B	Q	J	C
Maximum input shaft torque	Nm	209	337	473	641
	ft.lbs	155	249	351	473

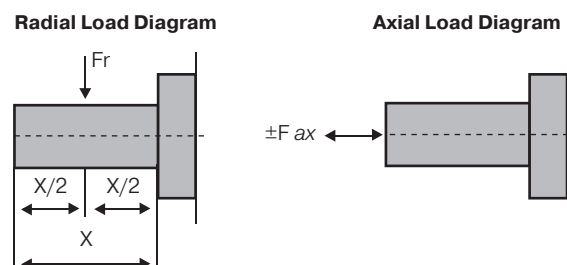
	Units	28cc	45/54cc	65/73cc
Maximum thru-torque	Nm	209	263	445
	ft.lbs	155	195	330

Shaft Rotational Stiffness

Shaft Designation	Units	28cc	45/54cc	65/73cc
B	ft-lb/Rad	15,270	19,402	22,548
	Nm/Rad	20,580	26,148	30,388
Q	ft-lb/Rad	18,945	24,590	30,190
	Nm/Rad	25,533	33,140	40,687
J	ft-lb/Rad	N/A	26,326	N/A
	Nm/Rad		35,480	
C	ft-lb/Rad	N/A	N/A	41,697
	Nm/Rad			56,195

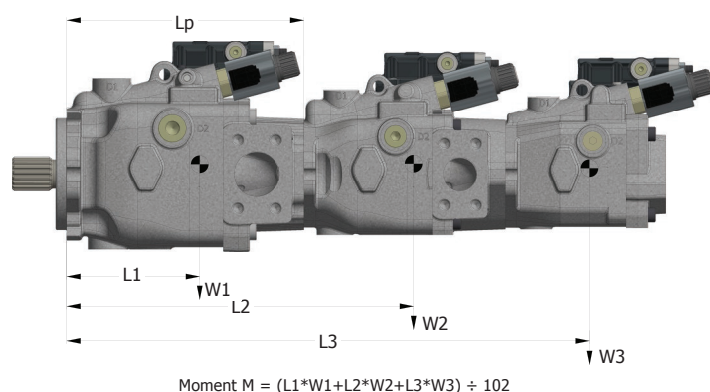
NOTE: Values apply to non-thru drive units. For thru drive units, consult factory.

Radial and Axial Shaft Loading



NOTE: For applications that exert a radial or axial force on the pump shaft like shown by the illustrations above, the shaft bearing life could be reduced. For these applications, contact the factory for shaft load limits and the impact on pump bearing life.

Maximum Flange Moment Ratings



Measurement	Units	28	45/54	65/73
Maximum Static Moment	Nm	650	1000	1200
Distance L1 (no thru-drive)	mm	92	102	112
Distance L1 (SAE A or B thru-drive)	mm	108	116	129
Distance L1 (SAE-C thru-drive)	mm	N/A	N/A	138
Distance Lp (SAE A or B thru-drive)	mm	215	230	259
Distance Lp (SAE-C thru-drive)	mm	N/A	N/A	287

NOTE: To find the allowable shock or acceleration limit, divide the maximum static moment by the calculated moment "M"

INSTALLATION INFORMATION

Mounting

These pumps are designed to operate with the shaft horizontal or pointing downward. For shaft up mounting consult factory. The pump shaft must be in alignment with the shaft of the source driver and should be checked with a dial indicator. The mating pilot bore and coupling must be concentric. This concentricity is particularly important if the shaft is rigidly connected to the driven load without a flexible coupling.

Shaft Information

The spline shafts can accept a maximum misalignment of 0.15mm total indicator reading. Angular misalignment must be less than ± 0.12 degrees. The coupling interface must be lubricated. PARKER recommends lithium molydisulfide or similar grease. The internal coupling should be hardened to Rc 27-34 and must conform to SAE-J498c, class 5 flat root side fit.

Fluid Connections

Connect inlet and outlet lines to the port block of the pump. Plumb the case drain line to the reservoir. The pump has three case drain ports for various installation orientations. Use the upper most case drain port. DO NOT undersize the case drain line. It should be the same size as the case drain port or larger. Make sure there are no restrictions in the case drain line. The case pressure must never exceed inlet pressure by more than 0.5 bar (7 psi). When connecting case drain line make certain that drain plumbing passes above highest point excess of the pump before draining to the reservoir. The case leakage line must be of sufficient size to prevent excess back pressure and returned to the reservoir below the surface of the oil as far from the supply inlet as possible. All fluid lines, whether pipe, tubing, or hose must be adequate size and strength to assure free flow through the pump. An undersize inlet line will prevent the pump from operating properly at full rated speed. An undersize outlet line will cause back pressure and cause heat generation and increased noise. Flexible hose lines are recommended. If rigid piping is used, the workmanship must be accurate to eliminate strain on the pump port block or to the fluid connections. Sharp bends in the lines must be eliminated wherever possible, especially in the suction line. They could cause a pressure drop which can create noise and affect pump longevity. All system piping must be cleaned and flushed before installing pump. Make sure the entire hydraulic system is free of dirt, lint, scale, or other foreign material.

CAUTION: Do not use galvanized pipe. Galvanized coating can flake off with continued use.

System Relief Valves

Although the P1M series pumps have very fast off-stroke compensator response, system relief valves are recommended in all cases for safety considerations.

Recommended Fluids

The fluid used in these pumps should have a petroleum base and contain agents which provide oxidation inhibition and anti-rust, anti-foam and de-aerating properties as described in PARKER standard HF-1. Where anti-wear additive fluids are specified, see PARKER standard HF-0. Fluid must be compatible with FKM seals and have a temperature vs viscosity profile such that the viscosity of the fluid remains within catalog limits during operation. Parker is not responsible for selecting the appropriate fluid. That is the responsibility of the machine designer or end user.

Fluid Cleanliness

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

Maintenance

The pump is self-lubricating and preventative maintenance is limited to keeping system fluid clean by changing filters frequently. Keep all fittings and screws tight. Do not operate at pressures and speeds in excess of the recommended limit.

CONVERSIONS & FORMULAS

Conversion Factors

DEFINITION & UNIT

Displacement	$\text{in}^3/\text{rev} \times 16.387 = \text{cm}^3/\text{rev}$	$\text{cm}^3/\text{rev} \times 0.06102 = \text{in}^3/\text{rev}$
Flow	$\text{gpm} \times 3.78 = \text{L}/\text{min}$	$\text{L}/\text{min} \times 0.2642 = \text{gpm}$
Power	$\text{hp} \times 0.7457 = \text{kW}$	$\text{kW} \times 1.341 = \text{hp}$
Torque	$\text{lb-ft} \times 1.3567 = \text{Nm}$	$\text{Nm} \times 0.7376 = \text{lb-ft}$
Pressure	$\text{lbs}/\text{in}^2 (\text{psi}) \times 0.06895 = \text{bar}$ $\text{lbs}/\text{in}^2 (\text{psi}) \times 6.895 = \text{kPa}$	$\text{bar} \times 14.50 = \text{lbs}/\text{in}^2 (\text{psi})$ $\text{kPa} \times 0.1450 = \text{lbs}/\text{in}^2 (\text{psi})$
Weight	$\text{lb} \times 0.4536 = \text{kg}$	$\text{kg} \times 2.205 = \text{lbs}$
Force	$\text{lb} \times 4.448 = \text{N}$	$\text{N} \times 0.2248 = \text{lbs}$
Volume	$\text{in}^3 \times 16.387 = \text{cm}^3$	$\text{cm}^3 \times 0.06102 = \text{in}^3$
Area	$\text{in}^2 \times 6.452 = \text{cm}^2$	$\text{cm}^2 \times 0.1550 = \text{in}^2$
Length	$\text{in} \times 25.4 = \text{mm}$	$\text{mm} \times 0.03937 = \text{in}$
Temperature	$\frac{\text{degree F} - 32}{1.8} = \text{°C}$	$1.8 \times \text{°C} + 32 = \text{°F}$
Viscosity	$\text{cSt} \times 1.0 = \text{mm}^2/\text{sec}$ $\text{SSU} = \text{cSt} \times 4.25 + 14$	$\text{mm}^2/\text{sec} \times 1.0 = \text{cSt}$ $20 \text{ cSt} = 99 \text{ SSU}$

FLUID POWER FORMULAS

Pump output flow	U.S. gpm	$\frac{\text{rpm} \times \text{displacement (in}^3/\text{rev)} \times \text{volumetric eff.}}{231}$
Pump input torque	ft lbs	$\frac{\text{pressure (psi)} \times \text{displacement (in}^3/\text{rev)}}{24 \times \text{mech. eff.}}$
Pump input power	hp	$\frac{\text{rpm} \times \text{torque (ft-lbs)} \times 2}{33000} = \frac{\text{flow (GPM)} \times \text{pressure (psi)}}{1714 \times \text{overall eff.}}$
Fluid motor speed	rpm	$\frac{231 \times \text{flow rate (U.S. gpm)} \times \text{volumetric eff.}}{\text{displacement (in}^3/\text{rev)}}$
Fluid motor torque	ft lbs	$\frac{\text{pressure (psi)} \times \text{displacement (in}^3/\text{rev)} \times \text{mech. eff.}}{24}$
Fluid motor power	hp	$\frac{\text{rpm} \times \text{torque (ft-lbs)} \times 2}{33000} = \frac{\text{flow (GPM)} \times \text{pressure (psi)} \times \text{overall eff.}}{1714}$
(Metric)		
Pump output flow	Lpm	$\frac{\text{rpm} \times \text{displacement (cm}^3/\text{rev)} \times \text{volumetric eff.}}{1000}$
Pump input torque	Nm	$\frac{\text{pressure (bar)} \times \text{displacement (cm}^3/\text{rev)}}{20 \times \text{mech. eff.}}$
Pump input power	kW	$\frac{\text{rpm} \times \text{torque (Nm)} \times 2}{60000} = \frac{\text{flow (Lpm)} \times \text{pressure (bar)}}{600 \times \text{overall eff.}}$
Fluid motor speed	rpm	$\frac{1000 \times \text{flow rate (Lpm)} \times \text{volumetric eff.}}{\text{displacement (cm}^3/\text{rev)}}$
Fluid motor torque	Nm	$\frac{\text{pressure (bar)} \times \text{displacement (cm}^3/\text{rev)} \times \text{mech. eff.}}{20}$
Fluid motor power	kW	$\frac{\text{rpm} \times \text{torque (Nm)} \times 2}{60000} = \frac{\text{flow (Lpm)} \times \text{pressure (bar)} \times \text{overall eff.}}{600}$

PARKER HYDRAULIC PRODUCT OFFERING

Accumulators



Piston, bladder and diaphragm type accumulators, gas bottles and KleenVent reservoir isolators.

www.parker.com/accumulator

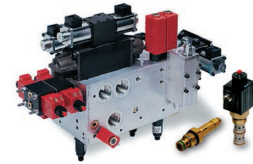
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www.parker.com/cylinder

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WARNING - USER RESPONSIBILITY

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- This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise.
- The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety, and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.
- To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based on data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.
- The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

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PARKER HANNIFIN INDIA PVT. LTD.

Manufacturing Locations

Mumbai

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TTC Industrial Area, Mahape,
Navi Mumbai - 400710, India
Contact: +91 22 41242500

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IDA Patancheru – 502319,
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Nagpur

Parker Hannifin India Pvt. Ltd.
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153/3,157,
Amravati Road, Bazargaon,
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Contact: +91 7118 665202

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Parker Hannifin India Pvt. Ltd.
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Chengalpattu-Dist,
Chennai, Tamil Nadu 603002.
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4391 0799

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Kohinoor World Tower Pvt.Ltd.
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Contact: 020-69148400

