



A B1 B2 C L M N P R S D E F H J K
 DE4R - [] - [] - [] - [] - [] - [] - [] - [] - [] - [] - [] - [] - [] - []

R Ports - Third Section

Code	Description	
101	1 1/16-12 side inlet, 7/8-14 side outlet	SAE O-ring boss ports No integrated valves
103	1 5/16-12 side inlet, 7/8-14 side outlet	
104	1 5/16-12 side inlet, 1 1/16-12 side outlet	
113	No inlet, 7/8-14 side outlet	
125	1 5/8-12 side inlet, 1 1/16-12 side outlet	
126	No inlet, 1 1/16-12 side outlet	
341	No inlet, 3/4 side split flange outlet (SAE Code 61)	SAE Split Flange Ports - No integrated valves
342	1 1/4 side split flange inlet, 3/4 side split flange outlet (SAE Code 61)	
402	3/4-14 side inlet, 1/2-14 side outlet	British Standard Pipe Parallel (BSPP) threads - No integrated valves
403	1-11 side inlet, 1/2-14 side outlet	
404	1 1/4-11 side inlet, 1/2-14 side outlet	
407	1-11 side inlet, 3/4-14 side outlet	
408	1 1/4-11 side inlet, 3/4-14 side outlet	Beaded tube inlet port SAE O-ring boss outlet port No integrated valves
704	1 1/4 side tube inlet, 7/8-14 side ORB outlet	
708	1 1/4 side tube inlet, 1 1/16-12 side ORB outlet	
716	1 1/2 side tube inlet, 1 1/16-12 side ORB outlet	
717	1 1/2 side tube inlet, 7/8-14 side ORB outlet	

S Displacement - Fourth Section

Code	Description	Code	Description
07	7.0 cm ³ /rev [0.43 in ³ /rev]	23	22.5 cm ³ /rev [1.37 in ³ /rev]
10	9.5 cm ³ /rev [0.58 in ³ /rev]	25	25.4 cm ³ /rev [1.55 in ³ /rev]
11	10.8 cm ³ /rev [0.66 in ³ /rev]	29	29.0 cm ³ /rev [1.77 in ³ /rev]
13	12.6 cm ³ /rev [0.77 in ³ /rev]	32	31.8 cm ³ /rev [1.94 in ³ /rev]
14	14.3 cm ³ /rev [0.87 in ³ /rev]	36	36.1 cm ³ /rev [2.20 in ³ /rev]
17	17.0 cm ³ /rev [1.04 in ³ /rev]	38	38.0 cm ³ /rev [2.32 in ³ /rev]
19	19.0 cm ³ /rev [1.16 in ³ /rev]	41	41.0 cm ³ /rev [2.50 in ³ /rev]
21	20.5 cm ³ /rev [1.25 in ³ /rev]	45	45.1 cm ³ /rev [2.75 in ³ /rev]



A B1 B2 C L M N P R S D E F H J K
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D Rear Cover: Port Options, Integrated Valves and Auxiliary Flange

Code	Inlet	Outlet	Description	
N101	1 1/16-12 side inlet	7/8-14 side outlet	SAE O-ring boss ports No integrated valves No auxiliary flange	
N103	1 5/16-12 side inlet	7/8-14 side outlet		
N104	1 5/16-12 side inlet	1 1/16-12 side outlet		
N125	1 5/8-12 side inlet	1 1/16-12 side outlet		
N501	1 1/16-12 rear inlet	7/8-14 rear outlet		
N503	1 5/16-12 rear inlet	7/8-14 rear outlet		
N504	1 5/16-12 rear inlet	1 1/16-12 rear outlet		
N252	M33x2-6H rear inlet	M22x1.5-6H side outlet		SAE Metric Ports – No Integrated Valves
N402	3/4-14 side inlet	1/2-14 side outlet		British Standard Pipe Parallel (BSPP) threads - No integrated valves
N403	1-11 side inlet	1/2-14 side outlet		
N404	1 1/4-11 side inlet	1/2-14 side outlet		
N407	1-11 side inlet	3/4-14 side outlet		
N408	1 1/4-11 side inlet	3/4-14 side outlet	SAE split flange ports No integrated valves - No auxiliary flange	
N342	1 1/4 side split flange inlet	3/4 side split flange outlet (SAE code 61)		
N704	1 1/4 side tube inlet	7/8-14 side ORB outlet	Beaded tube inlet port, SAE O-ring boss outlet port No integrated valves No auxiliary flange	
N708	1 1/4 side tube inlet	1 1/16-12 side ORB outlet		
N715	1 1/4 side tube inlet	1 1/16-12 side ORB outlet		
N720	1 1/4 side tube inlet	7/8-14 side ORB outlet		
B103*	1 5/16-12 side inlet	7/8-14 side outlet,	SAE-A 2-Bolt Auxiliary Flange SAE O-ring boss ports No integrated valves	
B104*	1 5/16-12 side inlet	1 1/16-12 side outlet		
R104	1 5/16-12 side inlet	1 1/16-12 side outlet	Integrated Relief Valve - Internally Drained Maximum Displacement 23cc	

* Integrated auxiliary flange requires use of input shaft option AH or AC

** Requires use of mounting flange option AC or AP

*** Requires use of mounting flange option BC or BP

A variety of integrated valve options including PFD, Steering Covers, and Load sense priority flow dividers covers are available with D Series multiple pumps. Please contact your technical representative to determine which hardware best suits specific application needs.



A B1 B2 C L M N P R S D E F H J K
 DE4R - [] - [] - [] - [] - [] [] [] - [] - [] - [] - [] - [] - []

D Rear Cover: Port Options, Integrated Valves and Auxiliary Flange

Code	Inlet	Description
F09A**	1 5/16-12 side inlet, 3/4-16 side priority, 7/8-14 side secondary (SAE A flange)	Integrated Priority Flow Divider, cartridge style relief for settings up to: 221bar and 34.3 l/min [3200 psi and 9 US gal/min]
F09B***	1 5/16-12 side inlet, 3/4-16 side priority, 7/8-14 side secondary (SAE B flange)	
F13A**	1 5/8-12 rear inlet, 3/4-16 rear priority, 7/8-14 rear secondary (SAE A flange)	
F13B***	1 5/8-12 rear inlet, 3/4-16 rear priority, 7/8-14 rear secondary (SAE B flange)	
F21A**	1 5/8-12 side inlet, 3/4-16 side priority, 7/8-14 side secondary (SAE A flange)	
F21B***	1 5/8-12 side inlet, 3/4-16 side priority, 7/8-14 side secondary (SAE B flange)	
F25A**	1 5/16-12 rear inlet, 3/4-16 rear priority, 7/8-14 rear secondary (SAE A flange)	
F25B***	1 5/16-12 rear inlet, 3/4-16 rear priority, 7/8-14 rear secondary (SAE B flange)	
D23A*	1 5/16-12 side inlet, 3/4-16 side priority, no secondary port (SAE A flange)	Integrated Steering Cover, Priority Relief Valve (Cartridge Style) for settings up to: 221 bar and 34.3 l/min [3200 psi and 9 US gal/min]
D23B**	1 5/16-12 side inlet, 3/4-16 side priority, no secondary port (SAE B flange)	
D24A*	1 5/16-12 rear inlet, 3/4-16 rear priority, no secondary port (SAE A flange)	
D24B**	1 5/16-12 rear inlet, 3/4-16 rear priority, no secondary port (SAE B flange)	
L01A**	1 5/16-12 side inlet, 3/4-16 side priority, 7/8-14 side secondary, 7/16-20 side LS (SAE-A flange)	Integrated Load Sense Divider (Dynamic), Priority Relief Valve
L01B***	1 5/16-12 side inlet, 3/4-16 side priority, 7/8-14 side secondary, 7/16-20 side LS (SAE-B flange)	
L08A**	1 5/16-12 rear inlet, 3/4-16 rear priority, 7/8-14 rear secondary, 7/16-20 rear LS (SAE-A flange)	
L08B***	1 5/16-12 rear inlet, 3/4-16 rear priority, 7/8-14 rear secondary, 7/16-20 rear LS (SAE-B flange)	



E Flow Control Valve

Code	Description
NNN	No flow control setting, standard for units without integrated flow control valves
04X	3.8 l/min [1 US gal/min]
08X	7.6 l/min [2 US gal/min]
11X	11.4 l/min [3 US gal/min]
15X	15.1 l/min [4 US gal/min]
19X	18.9 l/min [5 US gal/min]
23X	22.7 l/min [6 US gal/min]
27X	26.5 l/min [7 US gal/min]
30X	30.3 l/min [8 US gal/min]
34X	34.3 l/min [9 US gal/min]
38A	10 bar standby
38L	10 bar standby
R1N	Maximum flow not to exceed 75 l/min, pressure range from 7-55 bar
R2N	Maximum flow not to exceed 75 l/min, pressure range from 41-248 bar

	For integrated PFD
	Steering cover with cartridge style relief valve (Cover options F09A, F09B, F13A, F13B, F21A, F21B, F25A or F25B)
	For integrated load sense divider (use with L08A or L08B rear ports)
	For integrated load sense divider (use with L01A or L01B side ports)
	For integrated relief valve, internally drained (without flow control) Use with R104 cover option 23cc and under
	For integrated relief valve, internally drained (without flow control) Use with R104 cover option 23cc and under



F Pressure Control Valve

Code	Description
000	No pressure control settings
034	34 bar [500 psi]
041	41 bar [600 psi]
048	48 bar [700 psi]
055	55 bar [800 psi]
062	62 bar [900 psi]
069	69 bar [1000 psi]
076	76 bar [1100 psi]
083	83 bar [1200 psi]
090	90 bar [1300 psi]
097	97 bar [1400 psi]
103	103 bar [1500 psi]
110	110 bar [1600 psi]
117	117 bar [1700 psi]
124	124 bar [1800 psi]
131	131 bar [1900 psi]
138	138 bar [2000 psi]
145	145 bar [2100 psi]
152	152 bar [2200 psi]
159	159 bar [2300 psi]
165	165 bar [2400 psi]
172	172 bar [2500 psi]
179	179 bar [2600 psi]
186	186 bar [2700 psi]
193	193 bar [2800 psi]
200	200 bar [2900 psi]
207	207 bar [3000 psi]
214	214 bar [3100 psi]
221	221 bar [3200 psi]

Change Description to:
 For integrated priority flow divider (PFD) cover with cartridge style relief valve
 (Cover options F09A, F09B, F13A, F13B, F21A, F21B, F25A, F25B)
 and
 For integrated steering cover with cartridge style relief valve
 (Cover options D23A, D23B, D24A, D24B)
 and
 For integrated load sense (LS) cover with cartridge relief valve
 (Cover options L01A, L01B, L08A, L08B)



H Assembly Screws

Code	Description
**	Will be assigned by Turolla upon receipt of order

J Nameplate

Code	Description
AN	Standard nameplate

K Special Feature

Code	Description
NNN	No special features, standard black paint



D Series Options

Shaft Options

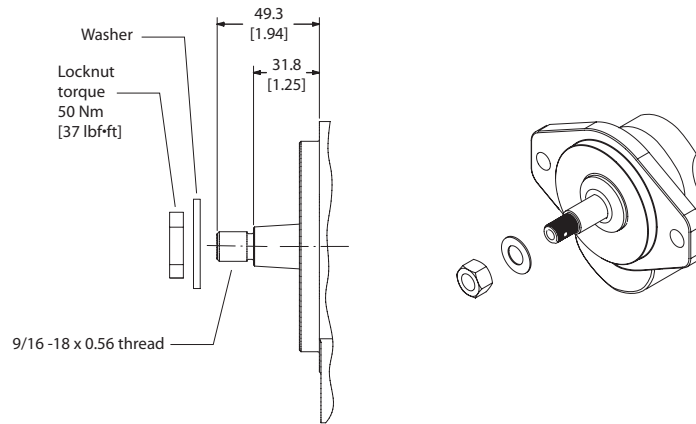


<p>Code SE SAE 9-tooth 16/32-pitch flat root side fit 31.8 mm [1.25 in] length</p> <p>Allowable shaft torque: 118.6 N•m [1050 lbf•in]</p>	<p>Code SC and AC SAE 11-tooth 16/32-pitch flat root side fit 38.1 mm [1.50 in] length</p> <p>AC option has 9T auxiliary drive output spline</p> <p>Allowable shaft torque: 176.3 N•m [1560 lbf•in]</p>	<p>Code SF SAE 11-tooth 16/32-pitch flat root side fit (modified length) 31.8 mm [1.25 in] length</p> <p>Allowable shaft torque: 176.3 N•m [1560 lbf•in]</p>
<p>Code SH and AH SAE 13-tooth 16/32-pitch flat root side fit 41.2 mm [1.62 in] length</p> <p>AH option has 9T auxiliary drive output spline</p> <p>Allowable shaft torque: 248.6 N•m [2200 lbf•in]</p>	<p>Code SV SAE 15-tooth 16/32-pitch flat root side fit 46.0 mm [1.81 in] length</p> <p>Allowable shaft torque: 452 N•m [4000 lbf•in]</p>	<p>Code PB - 22.2mm SAE 7/8 in straight keyed, 1/4 in key 41.2 mm [1.62 in] length</p> <p>Allowable shaft torque: 248.6 N•m [2200 lbf•in]</p>
<p>Code PD 19mm [3/4 inch] Dia. x 51mm [2.0 inch] 3/16 inch key</p> <p>Allowable shaft torque: 158.2 N•m [1400 lbf•in]</p>	<p>Code PZ 25.4mm [1 inch] Dia. x 46mm [1.62 inch] 1/4 inch key</p> <p>Allowable shaft torque: 452 N•m [4000 lbf•in]</p>	<p>Dimensions mm [in]</p> <p>P108 171E</p>



Code TH

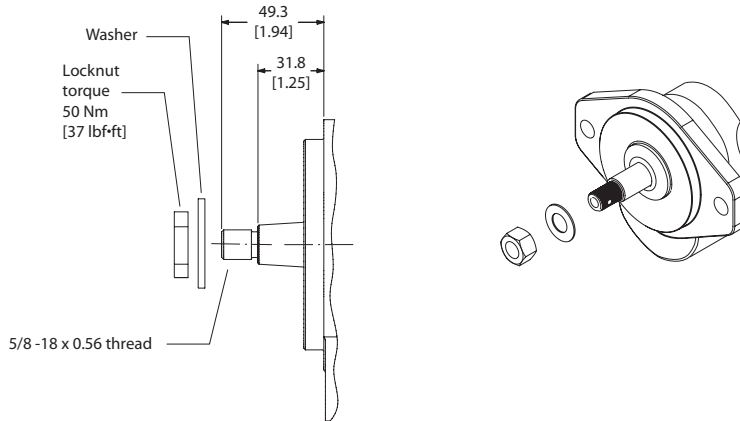
1:8 taper, 22mm [7/8 inch] diameter x 49.3 mm [1.94 in] length, threaded, with nut and washer



Allowable shaft torque:
225.9 N•m [2000 lbf•in]

Code TG

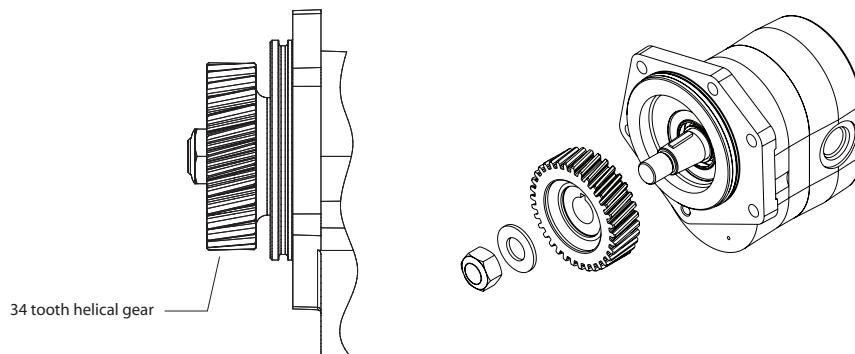
1:8 taper, 22mm [7/8 inch] diameter x 50.0 mm [1.95 in] length, threaded, with nut and washer



Allowable shaft torque:
225.9 N•m [2000 lbf•in]

Code WT

1:8 taper, 22mm [7/8 in] diameter x 49mm [1.94 in] length, threaded, with locknut, washer and 34 tooth helical gear for Perkins engine mount



Code WT - Only available in 17cc, 19cc, 25cc, 32cc with clockwise (RH) rotation.
Use PP mounting flange option.

P108 172E

Multiple pump connecting shaft

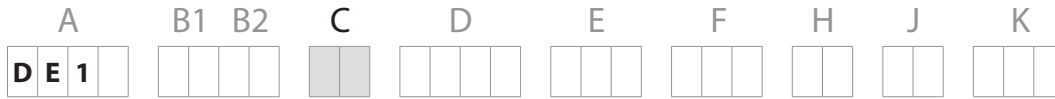
Allowable shaft torque between sections is 144 N•m [1273 lbf•in].

Limit operating pressures when applying multiple section pumps. This ensures the maximum simultaneous input torque through the drive shaft and connecting shafts.

Do not exceed the **Allowable Shaft Torque Limits**.



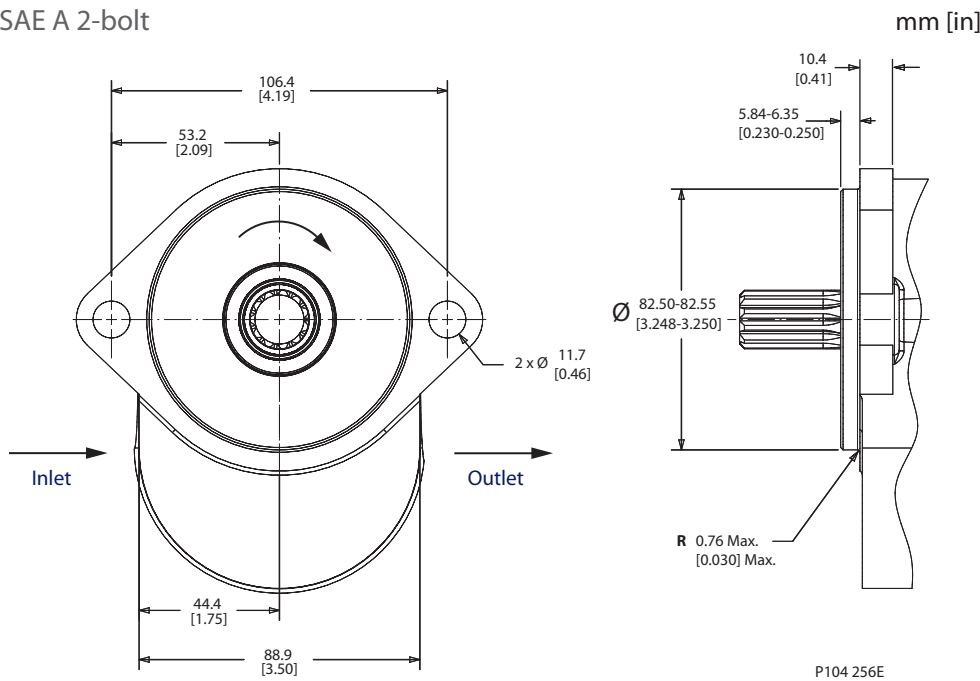
Mounting Flanges



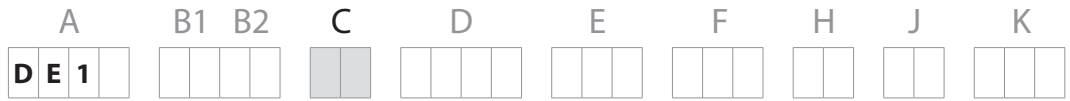
C Mounting Flange

Code	Description
AA	SAE A 2-bolt
AC	SAE A 2-bolt, use with integral PFD/Steering Cover
AM	SAE A 2-bolt, with T seal
AP	SAE A 2-bolt, with T seal, use with integral PFD/Steering cover
AR	SAE A 2-bolt, use with PZ or SV input drive
AS	SAE A 2-bolt, use with integral PFD/Steering cover and PZ or SV input drive
AL	SAE A 2-bolt, two shaft seals with weep hole
AT	SAE A 2-bolt, two shaft seals with weep hole, use with integral PFD/Steering cover

SAE A 2-bolt

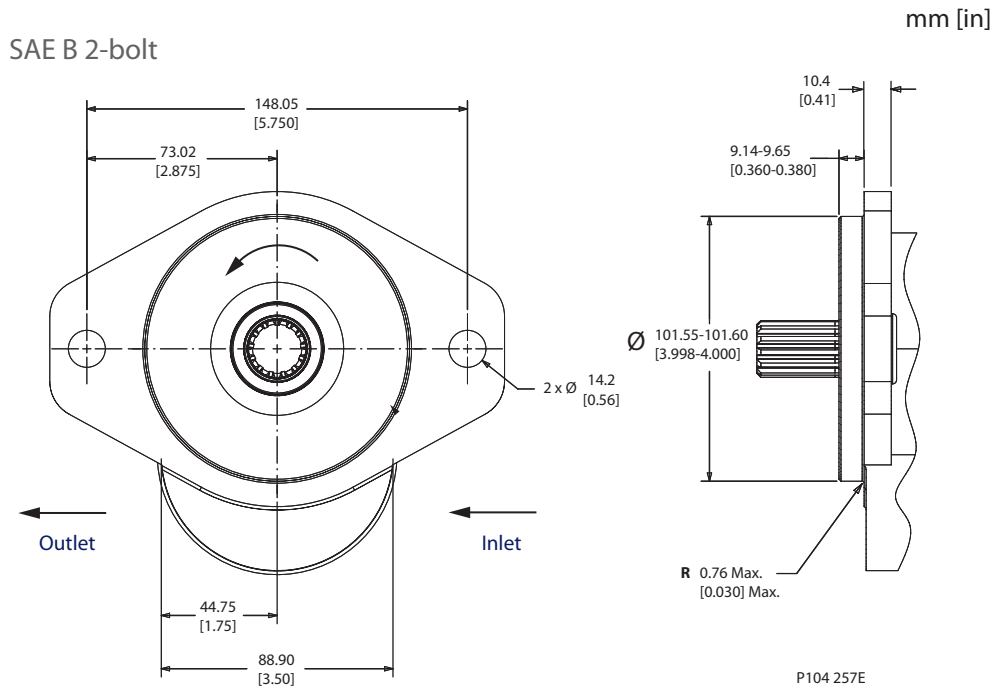


The optional **T-Seal** is a single piece shaft seal with back-to-back sealing lips. It is most commonly used to prevent mixing of internal/external fluids.



C Mounting Flange

Code	Description
BB	SAE B 2-bolt
BC	SAE B 2-bolt, use with integral PFD/Steering cover
BM	SAE B 2-bolt, with T seal
BP	SAE B 2-bolt, with T seal, use with integral PFD/Steering cover
BR	SAE B 2-bolt, use with PZ or SV input drive
BS	SAE B 2-bolt, use with integral PFD/Steering cover and PZ or SV input drive
BW	SAE B 2-bolt, two shaft seals with weep hole
BT	SAE B 2-bolt, two shaft seals with weep hole, use with integral PFD/Steering cover



The optional **T-Seal** is a single piece shaft seal with back-to-back sealing lips. It is most commonly used to prevent mixing of internal/external fluids.

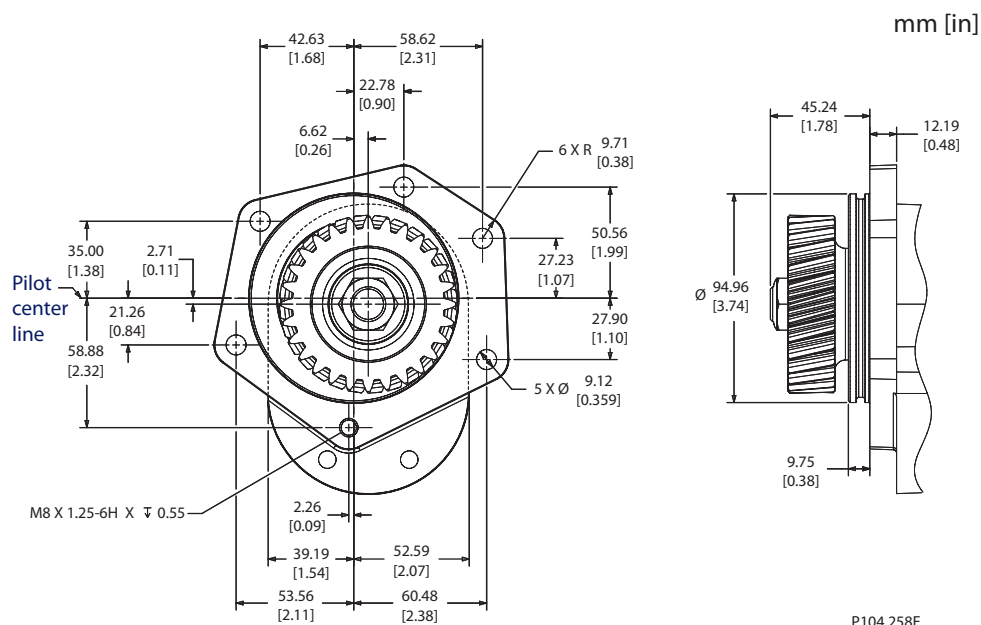


A	B1	B2	C	D	E	F	H	J	K
DE 1									

C Mounting Flange

Code	Description
PP	Perkins 6 bolt flange with (2) seals (use with WT input shaft and clockwise rotation)

Perkins® 1000 Series Engine Mount, shown with drive gear option WT and clockwise rotation



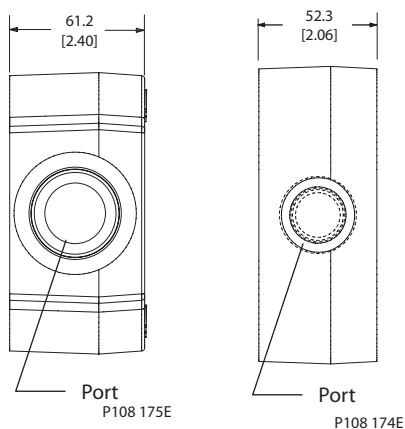
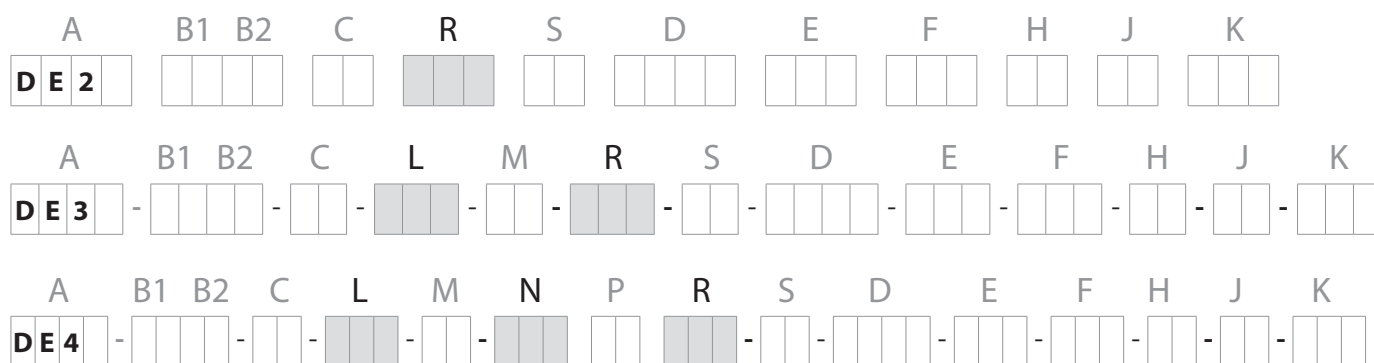
P104 258E



Multiple Pump Port Options

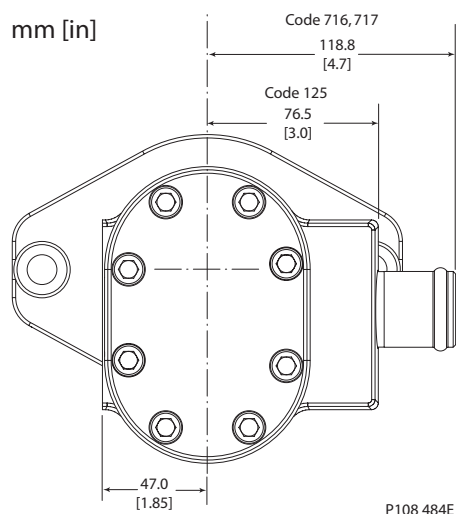
The D Series pump is uniquely designed to accommodate multiple pumps with a variety of porting configurations including units with a reduced number of inlets. Reducing the number of inlets can eliminate unnecessary hoses and fittings, thereby providing an overall system savings. A typical D series multiple pump does not have isolated sections. Applications requiring sealing between sections should use the SAE auxiliary flange to ensure separation of fluids between sections.

The reference drawings and model code options (R, L, and N) below, describe the first and intermediate port sections of multiple pump configurations. Refer to module D for port options on the final section of a multiple pump.



Port code options for modules R, L and N in multiple pump

Code	Inlet port	Outlet port	Maximum recommended inlet flow l/min [US gal/min]
101	1 1/16 - 12, SAE side	7/8 - 14, SAE side	49 [13]
103	1 5/16 - 12, SAE side	7/8 - 14, SAE side	91 [24]
104	1 5/16 - 12, SAE side	1 1/16 - 12, SAE side	91 [24]
113	No inlet	7/8 - 14 SAE, side	N/A
126	No inlet	1 1/16 - 12, side	N/A
704	1 1/4 side tube inlet	7/8 - 14, SAE side ORB	151 [40]
708	1 1/4 side tube inlet	1 1/16 - 12, SAE side ORB	151 [40]



Codes 125, 716 and 717 are commonly used for large displacements and multiple pumps with reduced number of inlets

Code	Inlet port	Outlet port	Maximum recommended inlet flow l/min [US gal/min]
125	1 5/8 - 12, SAE side	1 1/16 - 12, side	151 [40]
716	1 1/2 side tube inlet	1 1/16 - 12, SAE side ORB	204 [54]
717	1 1/2 side tube inlet	7/8 - 14, SAE side ORB	204 [54]



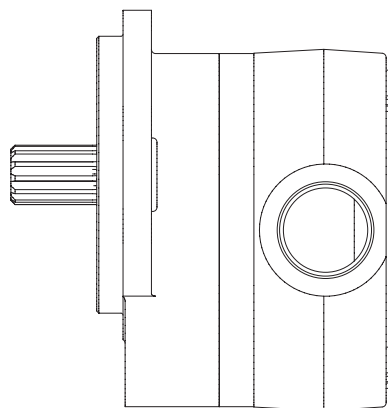
Rear Cover – Port Options

Integrated Valves and Auxiliary Flange

SAE O-ring boss ports - No integrated valves - No auxiliary flange

Code	Inlet port	Outlet port	Maximum recommended inlet flow l/min [US gal/min]
N101	1 1/16 - 12, SAE side	7/8 - 14, SAE side	49 [13]
N103	1 5/16 - 12, SAE side	7/8 - 14, SAE side	91 [24]
N104	1 5/16 - 12, SAE side	1 1/16 - 12, SAE side	91 [24]
N113	None*	7/8 - 14 SAE, side	- N/A -
N126	None*	1 1/16 - 12, side	- N/A -

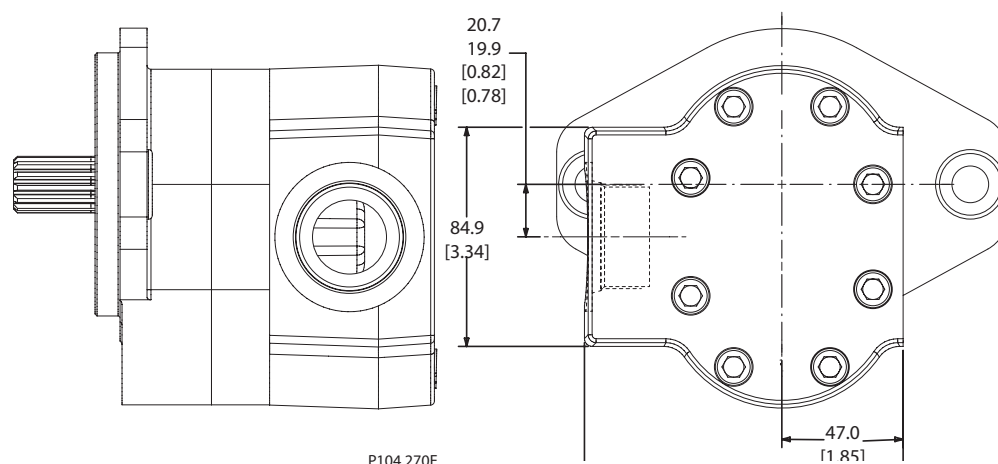
* Used with multiple pump configurations



P104 268E

Code	Inlet port	Outlet port	Maximum recommended inlet flow l/min [US gal/min]
N125	1 5/8 - 12, SAE, side	1 1/16 - 12, SAE, side	151 [40]

Dimensions mm [in]



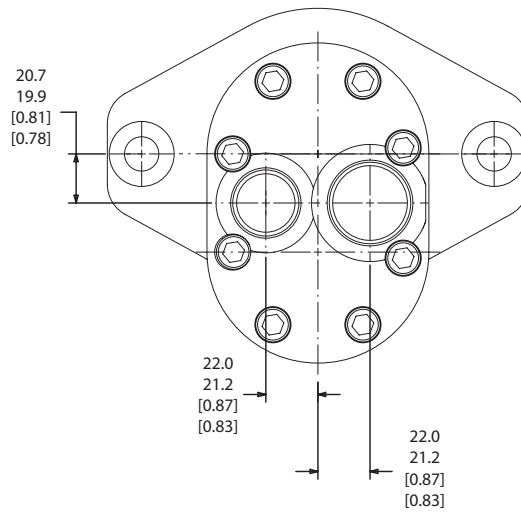
P104 270E



SAE O-ring boss ports - No integrated valves - No auxiliary flange

Code	Inlet port	Outlet port	Maximum recommended inlet flow l/min [US gal/min]
N501	1 1/16 - 12, SAE rear	7/8 - 14 SAE, rear	49 [13]
N503	1 5/16 - 12, SAE rear	7/8 - 14, rear	91 [24]
N504	1 5/16 - 12, SAE rear	1 1/16 - 12, SAE rear	91 [24]

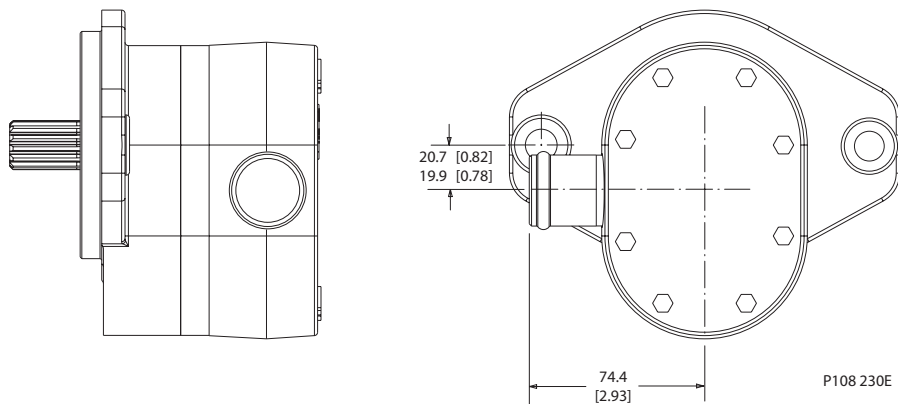
Dimensions mm [in]



P104 269

Beaded tube inlet port, SAE O-ring boss ports - No integrated valves - No auxiliary flange

Code	Inlet port	Outlet port	Maximum recommended inlet flow l/min [US gal/min]
N704	1 1/4 inch side	7/8 - 14 ORB side	151 [40]
N708	1 1/4 inch side	1 1/16-12 ORB side	151 [40]
N715	1 1/4 inch rear	1 1/16-12 ORB rear	151 [40]
N720	1 1/4 inch side	7/8 - 14 ORB rear	151 [40]





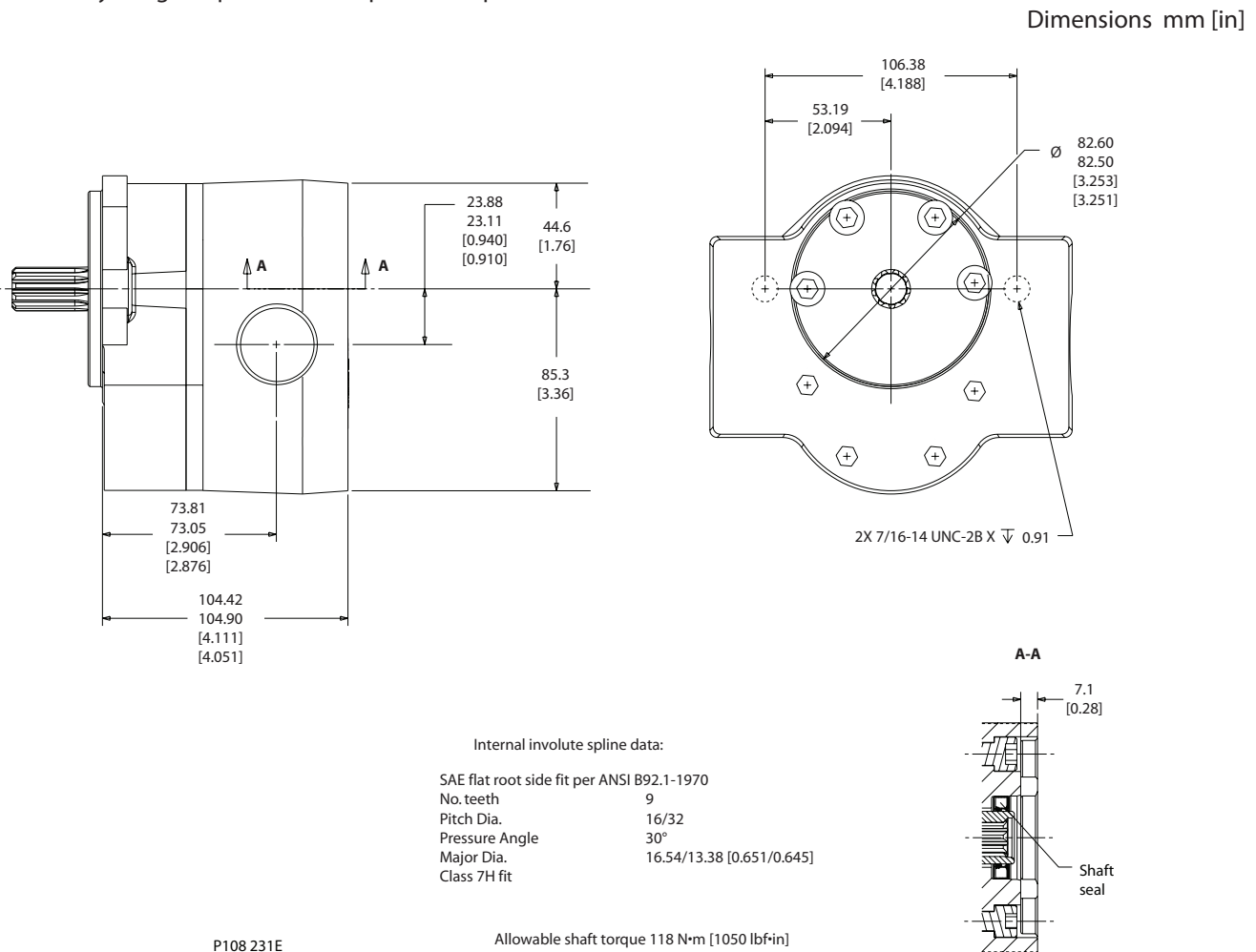
SAE-A 2-bolt auxiliary flange - SAE O-ring boss ports - No integrated valves

D Series pumps are available with an optional SAE-A 2-bolt auxiliary flange. Benefits include:

- Flexibility to auxiliary mount any product with SAE-A mounting flange
- Easily combine different product families including D Series with SNP2 aluminum pumps
- Enables sealing between sections to keep fluids isolated for applications where fluids may be drawn from different reservoirs or where sections operate with different fluid types
- Provides capability for customer add-on option

Code	Auxiliary drive	Inlet port	Outlet port	Maximum recommended inlet flow l/min [US gal/min]
B103*	SAE-A 2-bolt, 9T	1 5/16-12 side	7/8 - 14 side	91 [24]
B104*	SAE-A 2-bolt, 9T	1 5/16-12 side	1 1/16-12 side	91 [24]

*Auxiliary flange requires use of input shaft option AC or AH



The auxiliary flange option does not ship with a running cover. If the pump will be operated without an auxiliary pump, install a running cover to prevent environmental contamination.



Integrated Priority Flow Divider

D series pumps are available with an optional Priority Flow Divider (PFD) valve integrated into the rear cover. The PFD divides the flow and provides a fixed amount of Controlled Flow (CF) to priority functions such as steering. The remaining flow is routed to the Excess Flow (EF) port for additional functions such as directional control valves and fan drives. The priority flow is pressure compensated and is therefore independent of the excess flow working pressures. The priority flow circuit has an integral, direct acting pilot relief valve with internal drain.

Relief valves are available to suit application pressure and flow requirements.
Cartridge style relief - pressures to 221 bar (3200 psi), flows to 34.3 l/min (9 US gal/m)

The D series PFD can be used in tandems and other multiple pump configurations, but only in the rear pumping section. A variety of port sizes and port locations are available. Pumps with PFD covers are rotation specific and require a unique front mounting flange to accommodate the spacing of the assembly bolts.

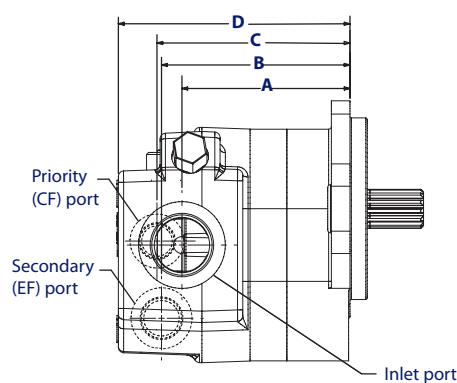
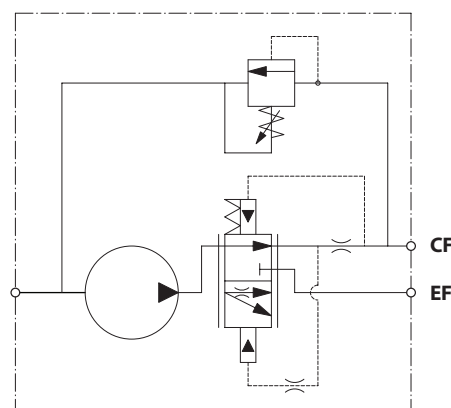


Illustration of right-hand (CW) rotation
Refer to dimensions on page 8

P104 274E



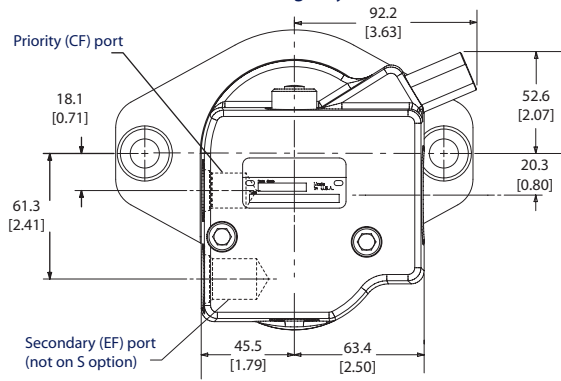
P106 105E

Description	Code	07	10	13	14	17	19	21	23	25	29	32	36	38	41	45
Displacement	cm ³ /rev	7.0	9.5	12.6	14.3	17.0	19.0	20.5	22.5	25.4	29.0	31.8	36.0	38.0	41.0	45.1
	in ³ /rev	0.43	0.58	0.77	0.87	1.04	1.16	1.25	1.37	1.55	1.77	1.94	2.20	2.32	2.50	2.75
Weight	kg	8.8	9.0	9.2	9.3	9.4	9.6	9.6	9.8	9.9	10.1	10.3	10.6	10.7	10.7	11.0
	lb	19.5	19.8	20.2	20.4	20.8	21.1	21.2	21.5	21.9	22.3	22.7	23.3	23.5	23.9	24.4
Dimension A1 Inlet port distance up to 1-5/16 SAE	mm	80.5	82.9	86.1	88.3	90.4	92.5	94.0	95.8	98.8	102.4	105.2	109.4	111.4	114.4	118.6
	in	3.17	3.27	3.39	3.48	3.56	3.64	3.70	3.77	3.89	4.03	4.14	4.31	4.39	4.50	4.67
Dimension A2 Inlet port distance 1-5/8 SAE	mm	90.2	92.6	95.8	97.9	100.1	102.1	103.6	105.5	108.5	112.0	114.8	119.1	121.1	124.1	128.3
	in	3.55	3.65	3.77	3.86	3.94	4.02	4.08	4.15	4.27	4.41	4.52	4.69	4.77	4.88	5.05
Dimension B Secondary port distance	mm	91.9	94.4	97.5	99.7	101.9	103.9	105.4	107.3	110.2	113.8	116.6	120.9	122.8	125.8	130.0
	in	3.62	3.72	3.84	3.93	4.01	4.09	4.15	4.22	4.34	4.48	4.59	4.76	4.84	4.95	5.12
Dimension C priority port distance	mm	94.5	96.9	100.1	102.2	104.4	106.4	108.0	109.8	112.8	116.4	119.1	123.4	125.4	128.4	132.6
	in	3.72	3.82	3.94	4.03	4.11	4.19	4.25	4.32	4.44	4.58	4.69	4.86	4.94	5.05	5.22
Dimension D overall length	mm	116.1	118.5	121.7	123.8	126.0	128.0	129.5	131.4	134.4	137.9	140.7	145.0	147.0	150.0	154.2
	in	4.57	4.67	4.79	4.88	4.96	5.04	5.10	5.17	5.29	5.43	5.54	5.71	5.79	5.90	6.07

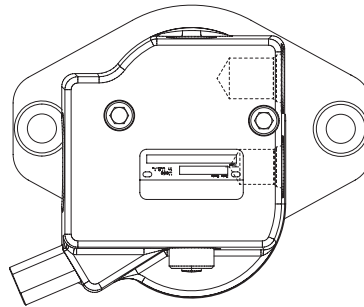


Integrated Priority Flow Divider

Side Ports (CW rotation), cartridge style

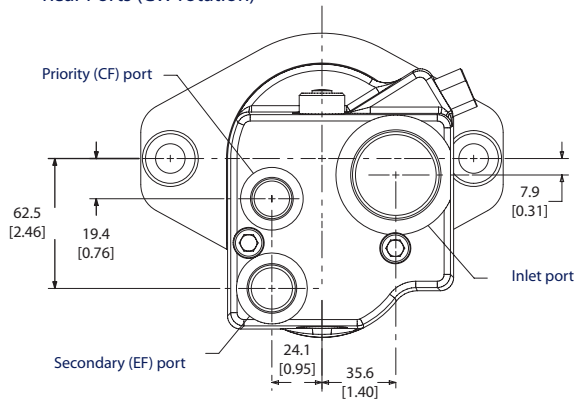


Side Ports (CCW rotation), cartridge style

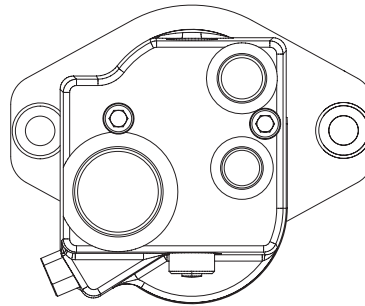


P108 182E

Rear Ports (CW rotation)



Rear Ports (CCW rotation)



P108 183E

Integrated priority flow dividers require use of mounting flange options AC, AB, AP or BF.

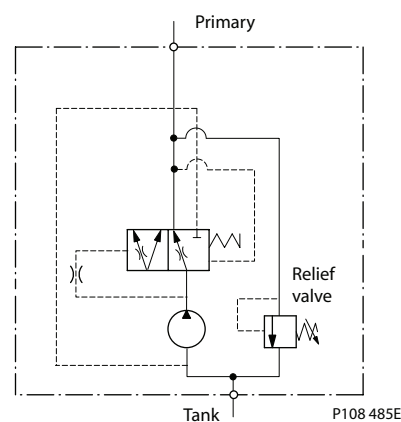


Integrated Priority Flow Divider, cartridge style relief for settings up to 221bar and 34.3 l/min [3200 psi and 9 US gal/min]	
Code	Description
F09A	1 5/16-12 side inlet, 3/4-16 side priority, 7/8-14 side secondary (SAE A flange)
F09B	1 5/16-12 side inlet, 3/4-16 side priority, 7/8-14 side secondary (SAE B flange)
F13A	1 5/8-12 rear inlet, 3/4-16 rear priority, 7/8-14 rear secondary (SAE A flange)
F13B	1 5/8-12 rear inlet, 3/4-16 rear priority, 7/8-14 rear secondary (SAE B flange)
F21A	1 5/8-12 side inlet, 3/4-16 side priority, 7/8-14 side secondary (SAE A flange)
F21B	1 5/8-12 side inlet, 3/4-16 side priority, 7/8-14 side secondary (SAE B flange)
F25A	1 5/16-12 rear inlet, 3/4-16 rear priority, 7/8-14 rear secondary (SAE A flange)
F25B	1 5/16-12 rear inlet, 3/4-16 rear priority, 7/8-14 rear secondary (SAE B flange)

Integrated Steering Cover

D series pumps are available with an optional steering valve integrated into the rear cover. The steering valve provides a fixed amount of Controlled Flow (CF) for priority functions such as steering. The remaining flow is routed internally to the inlet. The control flow circuit has an integral, direct acting pilot relief valve with internal drain. The relief valve is a cartridge style design suitable for pressures to 221 bar (3200 psi) and flows to 34.3 l/min (9 US gal/m).

The D series steering cover can be used in tandems and other multiple pump configurations, but only in the rear pumping section. A variety of port sizes and port locations are available. Pumps with steering covers are rotation specific and require a unique front mounting flange to accommodate the spacing of the assembly bolts.

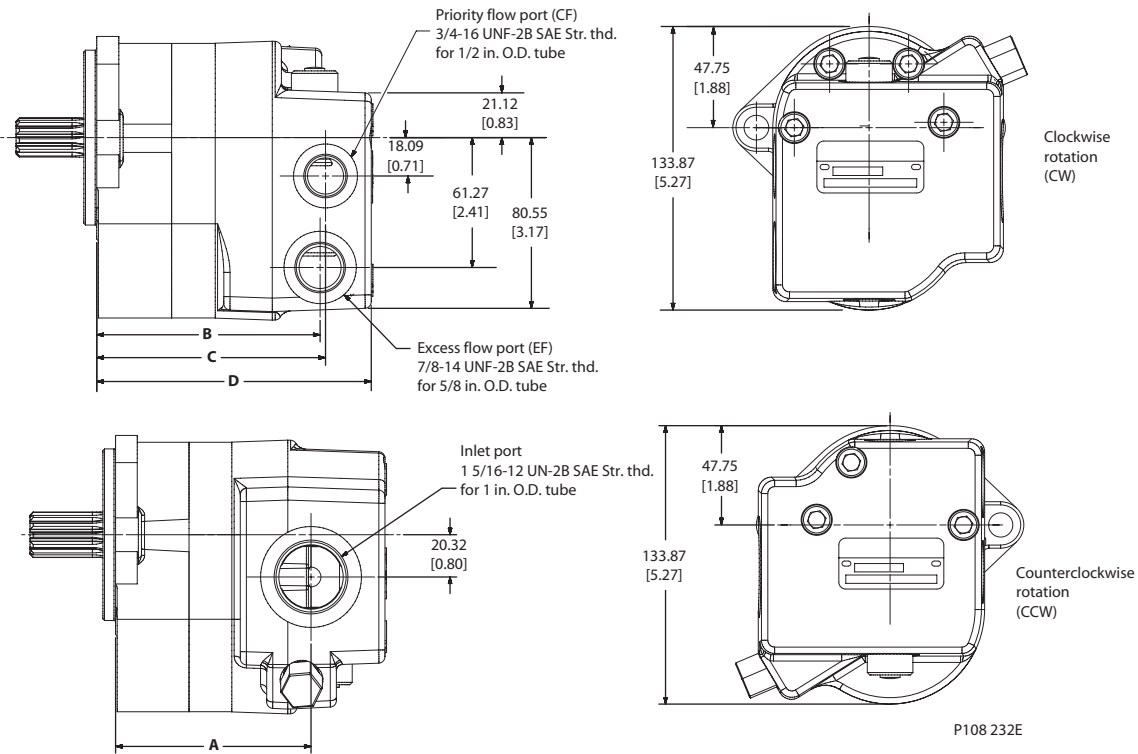




Integrated Steering Cover

Integrated Steering Cover, cartridge style relief for settings up to [3200 psi and 9 US gal/m*]	
Code	Description
D23A	1 5/16-12 side inlet, 3/4-16 side priority, use with SAE-A mounting flange. No secondary port
D23B	1 5/16-12 side inlet, 3/4-16 side priority, use with SAE-B mounting flange. No secondary port
D24A	1 5/16-12 rear inlet, 3/4-16 rear priority, use with SAE-A mounting flange No secondary port
D24B	1 5/16-12 rear inlet, 3/4-16 rear priority, use with SAE-B mounting flange No secondary port

* Requires use of mounting flange option AC, BC, AP or BP



Dimension	Displacement cm ³ /rev [in ³ /rev]															
	7.0	9.5	12.6	14.3	17.0	19.0	20.5	22.5	25.4	29.0	31.8	36.0	38.0	41.0	45.1	
	[0.43]	[0.58]	[.077]	[0.87]	[1.04]	[1.16]	[1.25]	[1.37]	[1.55]	[1.77]	[1.94]	[2.20]	[2.32]	[2.50]	[2.75]	
A	mm	80.5	82.9	86.1	87.8	90.4	92.5	94.0	95.8	98.8	102.4	105.2	109.4	111.4	114.4	118.6
	in	3.17	3.27	3.39	3.46	3.56	3.64	3.70	3.77	3.89	4.03	4.14	4.31	4.39	4.50	4.67
B	mm	92.0	94.4	97.5	99.2	101.9	103.9	105.4	107.3	110.2	113.8	116.6	120.9	122.8	125.8	130.1
	in	3.62	3.72	3.84	3.91	4.01	4.09	4.15	4.22	4.34	4.48	4.59	4.76	4.84	4.95	5.12
C	mm	94.5	96.9	100.1	101.7	104.4	106.4	108.0	109.8	112.8	116.4	119.1	123.4	125.4	128.4	132.6
	in	3.72	3.82	3.94	4.01	4.11	4.19	4.25	4.32	4.44	4.58	4.69	4.86	4.94	5.05	5.22
D	mm	116.1	118.5	121.7	123.3	126.0	128.0	129.6	131.4	134.4	138.0	140.7	145.0	147.0	150.0	154.2
	in	4.57	4.67	4.79	4.86	4.96	5.04	5.10	5.17	5.29	5.43	5.54	5.71	5.79	5.90	6.07

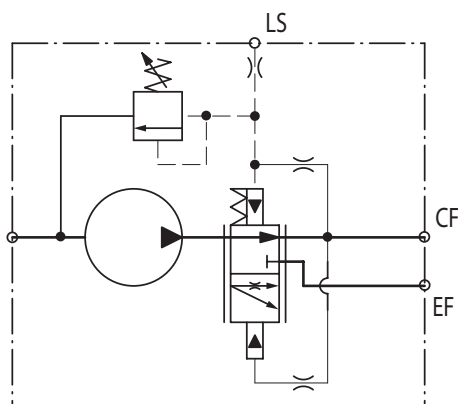


Load Sense Priority Flow Valve

D series pumps are available with an optional Load Sense (LS) priority valve integrated into the rear cover. The LS priority valve supplies priority flow on demand to functions such as load sense steering, while the Excess Flow (EF) is available for secondary functions such as directional control valves and fan drives.

A load sense signal line from the priority circuit to the gear pump's LS port governs flow to the primary circuit. As the load sense signal pressure increases, priority (CF) flow also increases. When the controlled function is idle (no load sense demand), full pump flow is available for the secondary functions.

- The D series LS priority valve is available with 40 l/min [10 US gal/min] and 80 l/min [21 US gal/min] flow settings.
- The priority circuit is available with an optional integral direct acting pilot relief valve with internal drain. Pressure settings range from 34 to 172 bar [500 to 2500 psi].
- The load sense valve is dynamic and has a constant flow of 0.5 to 1.0 l/min [0.13 to 0.26 US gal/min] present at all times to ensure fast reaction.
- The D series PFD can be used in tandems and other multiple pump configurations, but only in the rear pumping section.
- Rear and side porting options are available.

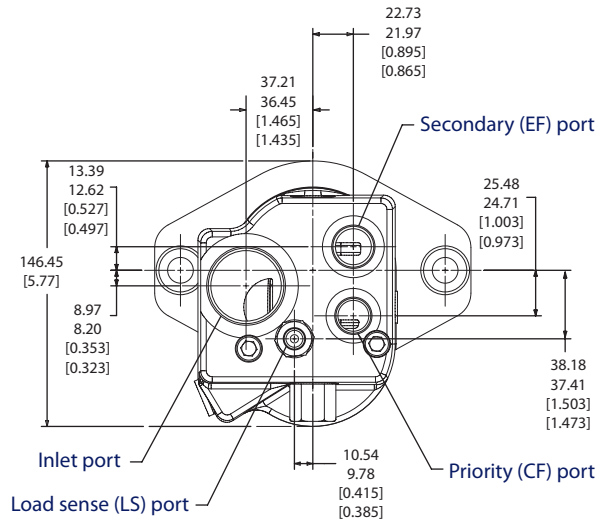
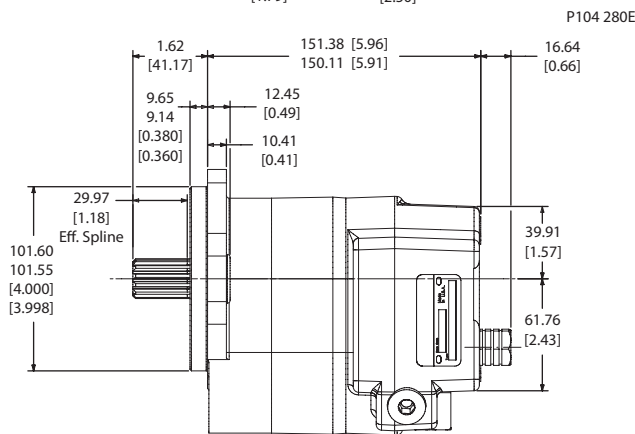
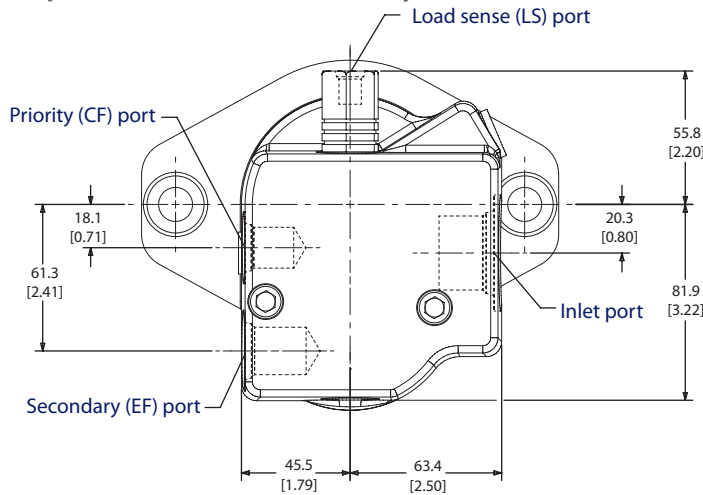


P104 279

Contact your Turolla representative for information concerning load sense port options.



Pumps with Load Sense Priority Flow Valves



Dimensions mm [in]
Load Sense Pump Dimensions

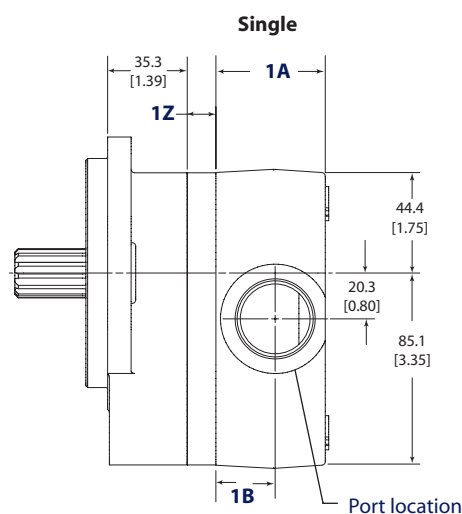
Description	Code	07	10	11	13	14	17	19	21	23	25	29	32	36	38	41	45
Displacement	cm ³ /rev	7.0	9.5	10.8	12.6	14.3	17.0	19.0	20.5	22.5	25.4	29.0	31.8	36.0	38.0	41.0	45.1
	in ³ /rev	0.43	0.58	0.66	0.77	0.87	1.04	1.16	1.25	1.37	1.55	1.77	1.94	2.20	2.32	2.50	2.75
Weight	kg	8.8	9.0	9.1	9.2	9.3	9.4	9.6	9.6	9.8	9.9	10.1	10.3	10.6	10.7	10.7	11.0
	lb	19.5	19.8	20.0	20.2	20.4	20.8	21.1	21.2	21.5	21.9	22.3	22.7	23.3	23.5	23.9	24.4
Dimension A1 Inlet port distance sizes up to 1-5/16 in SAE	mm	80.5	82.9	84.5	86.1	88.3	90.4	92.5	94.0	95.8	98.8	102.4	105.2	109.4	111.4	114.4	118.6
	in	3.17	3.27	3.31	3.39	3.48	3.56	3.64	3.70	3.77	3.89	4.03	4.14	4.31	4.39	4.50	4.67
Dimension A2 Inlet port distance 1-5/8 in SAE	mm	90.2	92.6	94.0	95.8	97.9	100.1	102.1	103.6	105.5	108.5	112.0	114.8	119.1	121.1	124.1	128.3
	in	3.55	3.65	3.69	3.77	3.86	3.94	4.02	4.08	4.15	4.27	4.41	4.52	4.69	4.77	4.88	5.05
Dimension B	mm	91.9	94.4	95.8	97.5	99.7	101.9	103.9	105.4	107.3	110.2	113.8	116.6	120.9	122.8	125.8	130.0
Secondary port distance	in	3.62	3.72	3.78	3.84	3.93	4.01	4.09	4.15	4.22	4.34	4.48	4.59	4.76	4.84	4.95	5.12
Dimension C priority port distance	mm	94.5	96.9	98.5	100.1	102.2	104.4	106.4	108.0	109.8	112.8	116.4	119.1	123.4	125.4	128.4	132.6
	in	3.72	3.82	3.88	3.94	4.03	4.11	4.19	4.25	4.32	4.44	4.58	4.69	4.86	4.94	5.05	5.22
Dimension D overall length	mm	116.1	118.5	120.0	121.7	123.8	126.0	128.0	129.5	131.4	134.4	137.9	140.7	145.0	147.0	150.0	154.2
	in	4.57	4.67	4.71	4.79	4.88	4.96	5.04	5.10	5.17	5.29	5.43	5.54	5.71	5.79	5.90	6.07



D Series Dimensions Drawings

Dimensions

One Section (Single)



Dimension	Section 1	
	1A	1B
Standard Ports: N101, N103, N113, N126, N501, N503, N504	45 [1.91]	24 [0.96]
Oversized Ports N125, N704, N708	63.5 [2.5]	31.75 [1.25]

P108 179E

Displacement	Units	07	10	11	13	14	17	19	21	23	25	29	32	36	38	41	45
Dimension Z	mm	7.1	9.7	10.9	12.7	14.4	17.0	19.1	20.6	22.5	25.4	29.0	31.8	36.1	38.1	41.0	45.2
	in	0.28	0.38	0.43	0.50	0.57	0.67	0.75	0.81	0.88	1.00	1.14	1.25	1.42	1.50	1.61	1.78

How to determine overall length

The overall length of the single section pump (as measured from the mounting flange) can be calculated by adding the dimension of the mounting flange to the combined length of the pumping section. The length of the pumping section is dependent upon the displacement (dimension Z) and the selection of ports (standard or oversized).

$$\text{Overall length of single section pump} = 35.3 [1.39] + 1Z + 1A$$

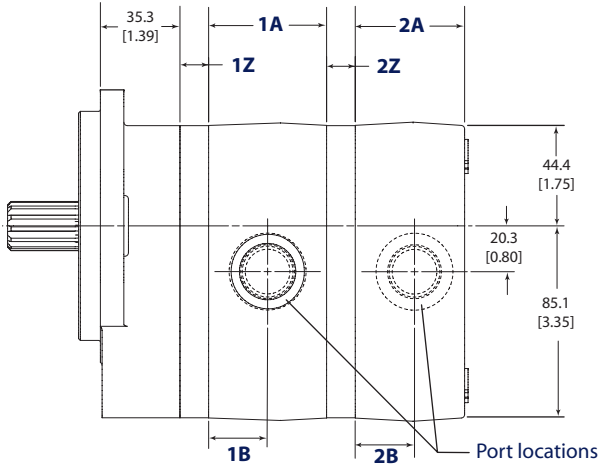
How to determine the position of inlet/outlet ports

Generally speaking, the inlet and outlet ports are centrally located within each port section. Therefore, the position of the inlet/outlet port (as measured from the mounting flange) can be calculated as follows:

$$\text{Location of port 1} = 35.3 [1.39] + 1Z + 1B$$



Two Section - Tandem



P108 177E

Dimension	Section 1		Section 2	
	1A	1B	2A	2B
Standard Ports: 101, 103, 104, 113, 126, 704, 708 N101, N103, N113, N126, N501, N503, N504	52.3 [2.06]	26.15 [1.03]	48.5 [1.91]	24.25 [1.03]
Oversized Ports: 125, 716, 717, N125, N704, N708	61.2 [2.4]	30.6 [1.2]	63.5 [2.5]	31.75 [1.25]

Displacement	Units	07	10	11	13	14	17	19	21	23	25	29	32	36	38	41	45
Dimension Z	mm	7.1	9.7	10.9	12.7	14.4	17.0	19.1	20.6	22.5	25.4	29.0	31.8	36.1	38.1	41.0	45.2
	in	0.28	0.38	0.43	0.50	0.57	0.67	0.75	0.81	0.88	1.00	1.14	1.25	1.42	1.50	1.61	1.78

How to determine overall length

The overall length of the two section pump (as measured from the mounting flange) can be calculated by adding the dimension of the mounting flange to the combined length of each section. The length of the section is dependent upon the displacement (dimension Z) and the selection of ports (standard or oversized).

$$\text{Overall length of two section pump} = 35.3 [1.39] + 1Z + 1A + 2Z + 2A$$

How to determine the position of inlet/outlet ports

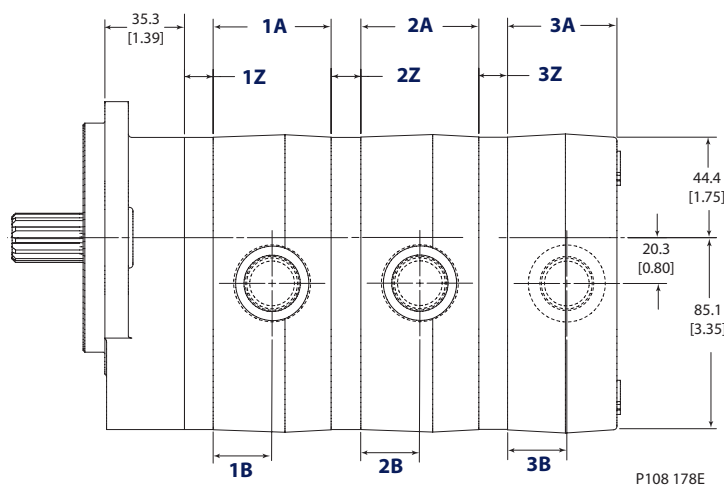
Generally speaking, the inlet and outlet ports are centrally located within each port section. Therefore, the position of each port (as measured from the mounting flange) can be calculated as follows:

$$\text{Location of port 1} = 35.3 [1.39] + 1Z + 1B$$

$$\text{Location of port 2} = 35.3 [1.39] + 1Z + 1A + 2Z + 2B$$



Three Section - Triple



Dimension	Section 1 and 2		Section 3	
	1A	1B	2A	2B
Standard Ports: 101, 103, 104, 113, 126, 704, 708	52.3 [2.06]	26.15 [1.03]	48.5 [1.91]	24.25 [1.03]
N101, N103, N113, N126, N501, N503, N504	61.2 [2.4]	30.6 [1.2]	63.5 [2.5]	31.75 [1.25]
Oversized Ports: 125, 716, 717, N125, N704, N708				

Displacement	Units	07	10	11	13	14	17	19	21	23	25	29	32	36	38	41	45
Dimension Z	mm	7.1	9.7	10.9	12.7	14.4	17.0	19.1	20.6	22.5	25.4	29.0	31.8	36.1	38.1	41.0	45.2
	in	0.28	0.38	0.43	0.50	0.57	0.67	0.75	0.81	0.88	1.00	1.14	1.25	1.42	1.50	1.61	1.78

How to determine overall length

The overall length of the three section pump (as measured from the mounting flange) can be calculated by adding the dimension of the mounting flange to the combined length of each pumping section. The length of each pumping section is dependent upon the displacement (dimension Z) and the selection of ports (standard or oversized).

$$\text{Overall length of three section pump} = 35.3 [1.39] + 1Z + 1A + 2Z + 2A + 3Z + 3A$$

How to determine the position of inlet/outlet ports

Generally speaking, the inlet and outlet ports are centrally located within each port section. Therefore, the position of each port (as measured from the mounting flange) can be calculated as follows:

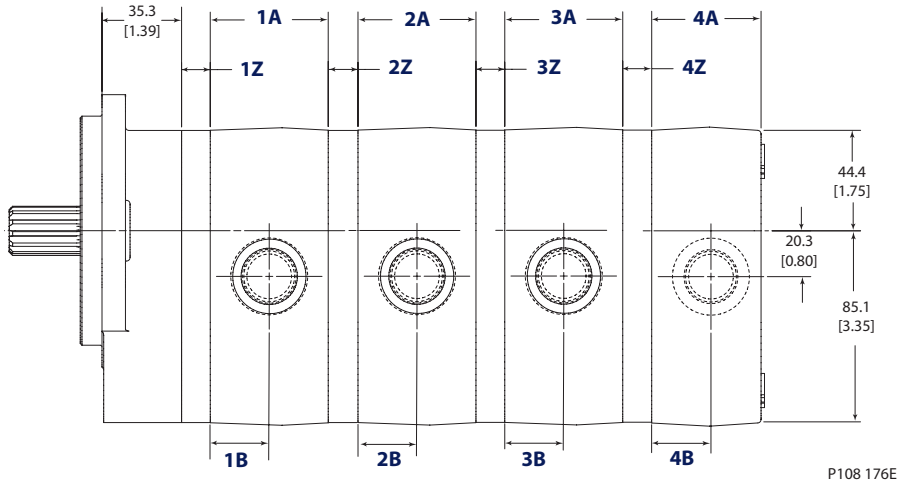
$$\text{Location of port 1} = 35.3 [1.39] + 1Z + 1B$$

$$\text{Location of port 2} = 35.3 [1.39] + 1Z + 1A + 2Z + 2B$$

$$\text{Location of port 3} = 35.3 [1.39] + 1Z + 1A + 2Z + 2A + 3Z + 3B$$



Four Section - Quad



Dimension	Section 1, 2, 3		Section 4	
	1A	1B	2A	2B
Standard Ports: 101, 103, 104, 113, 126, 704, 708	52.3 [2.06]	26.15 [1.03]	48.5 [1.91]	24.25 [1.03]
N101, N103, N113, N126, N501, N503, N504				
Oversized Ports: 125, 716, 717, N125, N704, N708	61.2 [2.4]	30.6 [1.2]	63.5 [2.5]	31.75 [1.25]

Displacement	Units	07	10	11	13	14	17	19	21	23	25	29	32	36	38	41	45
Dimension Z	mm	7.1	9.7	10.9	12.7	14.4	17.0	19.1	20.6	22.5	25.4	29.0	31.8	36.1	38.1	41.0	45.2
	in	0.28	0.38	0.43	0.50	0.57	0.67	0.75	0.81	0.88	1.00	1.14	1.25	1.42	1.50	1.61	1.78

How to determine overall length

The overall length of the four section pump (as measured from the mounting flange) can be calculated by adding the dimension of the mounting flange to the combined length of each pumping section. The length of each pumping section is dependent upon the displacement (dimension Z) and the selection of ports (standard or oversized).

Overall length of four section pump = 35.3 [1.39] + 1Z + 1A + 2Z + 2A + 3Z + 3A + 4Z + 4A

How to determine the position of inlet/outlet ports

Generally speaking, the inlet and outlet ports are centrally located within each port section. Therefore, the position of each port (as measured from the mounting flange) can be calculated as follows:

- Location of port 1 = 35.3 [1.39] + 1Z + 1B
- Location of port 2 = 35.3 [1.39] + 1Z + 1A + 2Z + 2B
- Location of port 3 = 35.3 [1.39] + 1Z + 1A + 2Z + 2A + 3Z + 3B
- Location of port 4 = 35.3 [1.39] + 1Z + 1A + 2Z + 2A + 3Z + 3A + 4Z + 4B

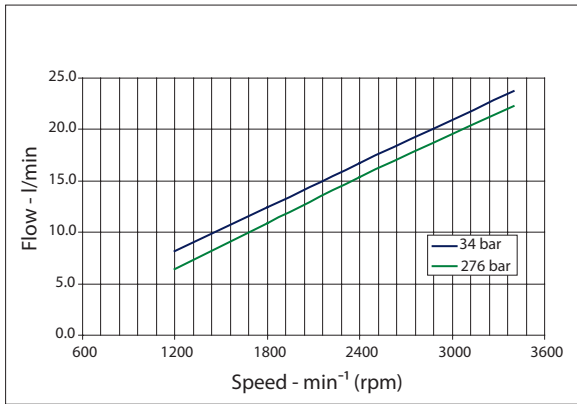


D Series performance data

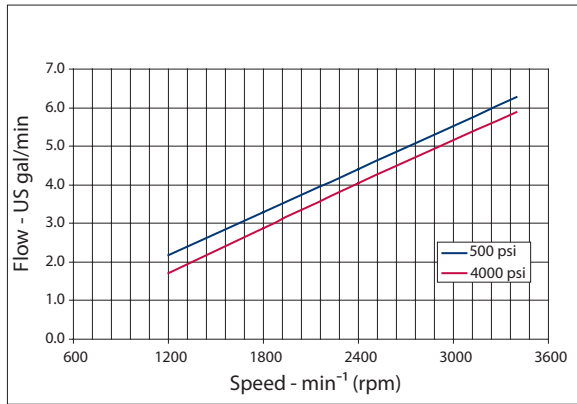
Flow performance

The graphs on this, and the following pages, show output flow for the D series single pumps at various working pressures as a function of speed. Data were taken using hydraulic fluid conforming to ISO VG46 at 50°C (120° F) with viscosity at 28 mm²/sec (cSt) [132 SUS].

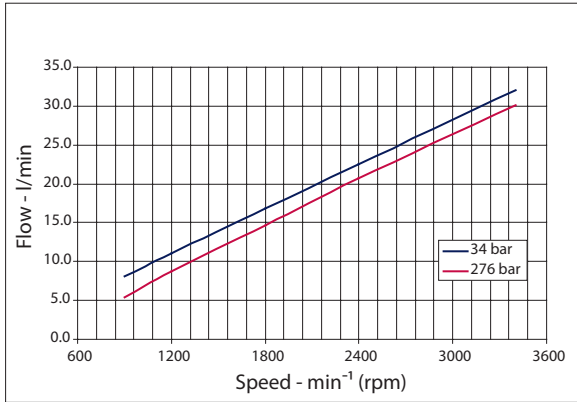
Model 07D (l/min)



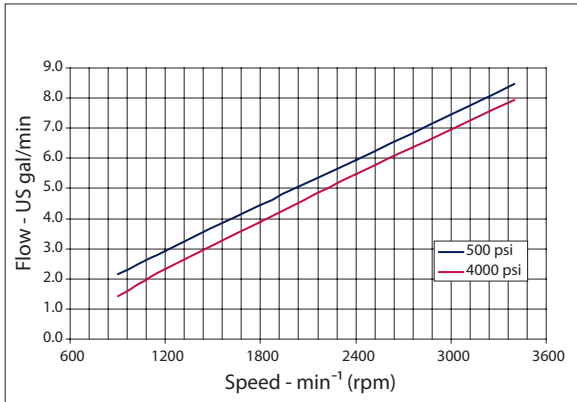
Model 07D (US gal/min)



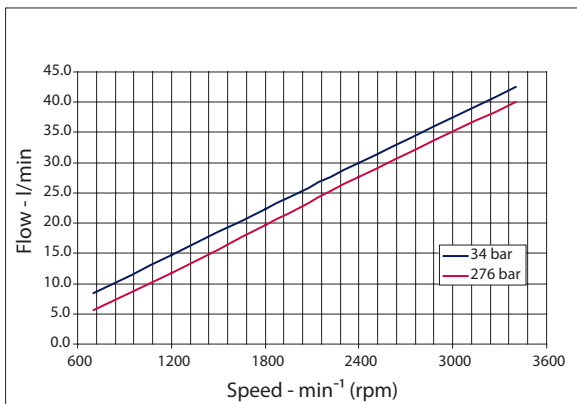
Model 10D (l/min)



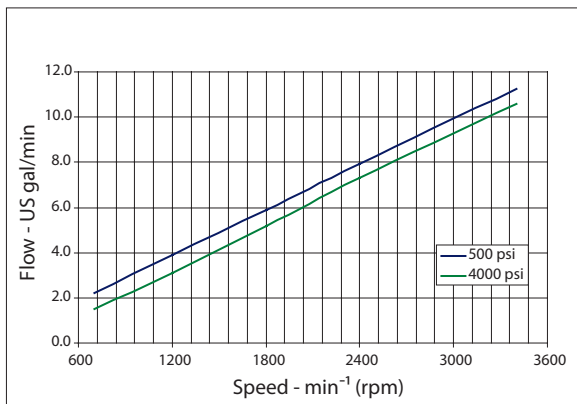
Model 10D (US gal/min)



Model 13D (l/min)

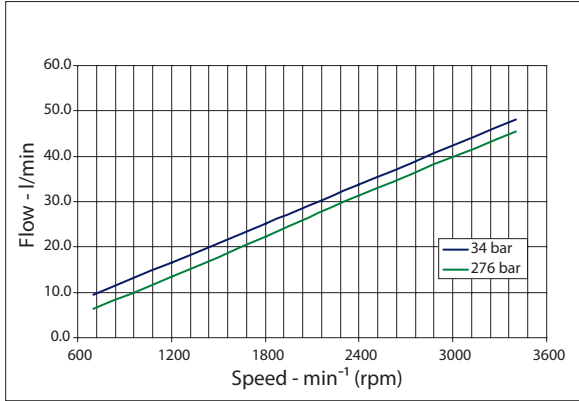


Model 13D (US gal/min)

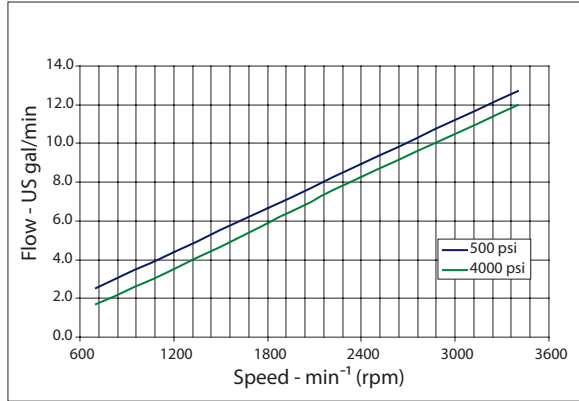




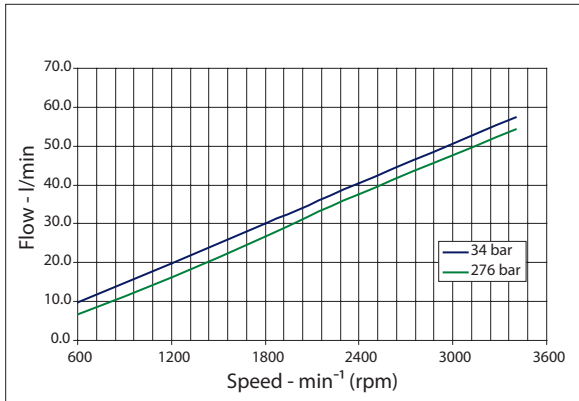
Model 14D (l/min)



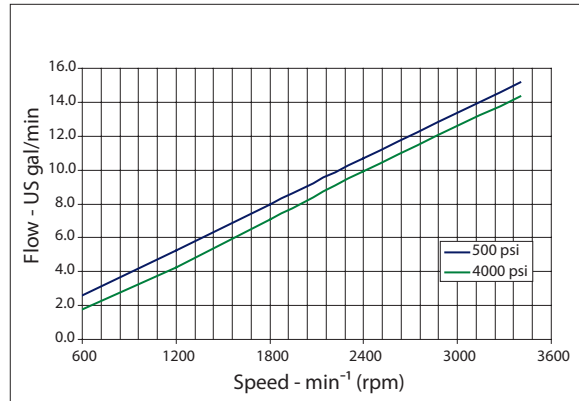
Model 14D (US gal/min)



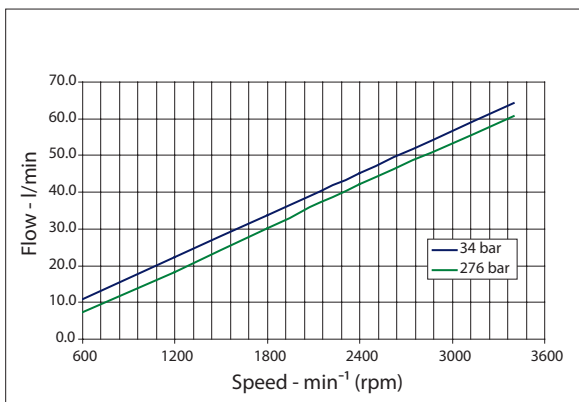
Model 17D (l/min)



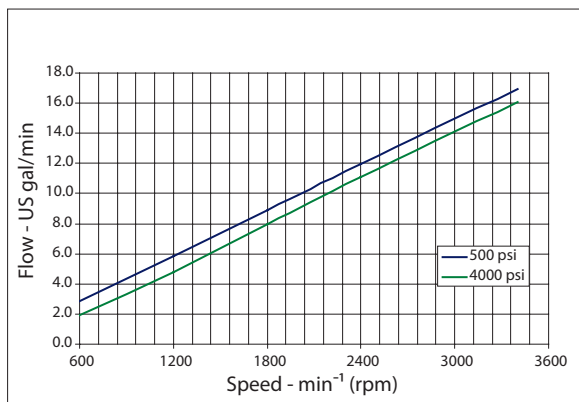
Model 17D (US gal/min)



Model 19D (l/min)

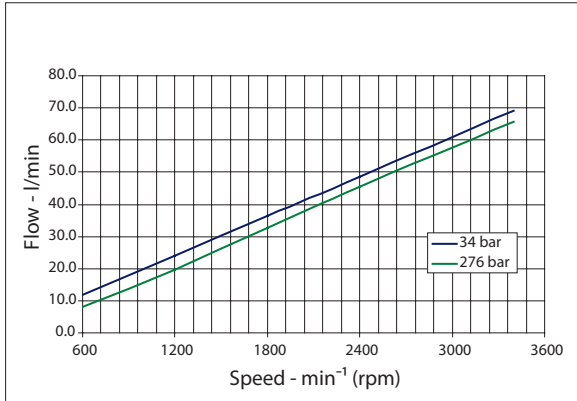


Model 19D (US gal/min)

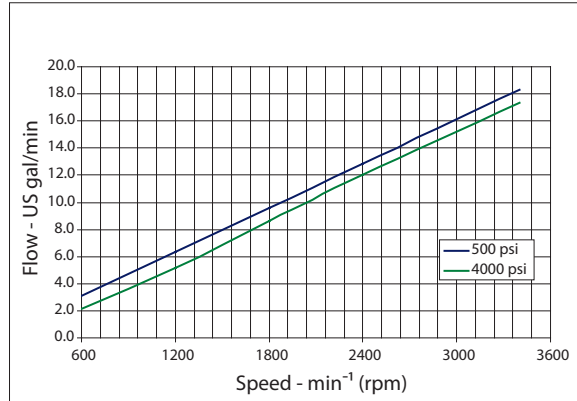




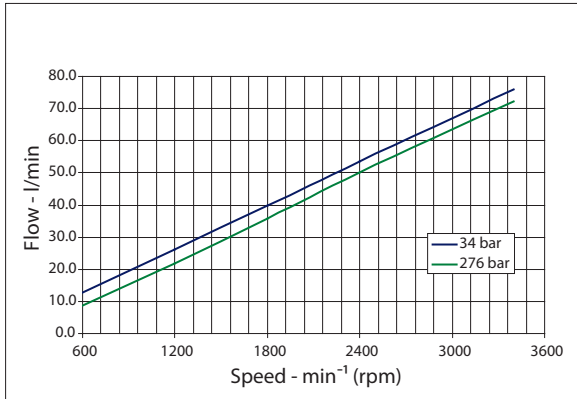
Model 21D (l/min)



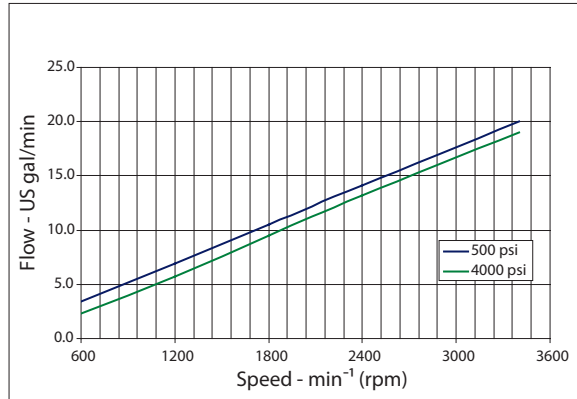
Model 21D (US gal/min)



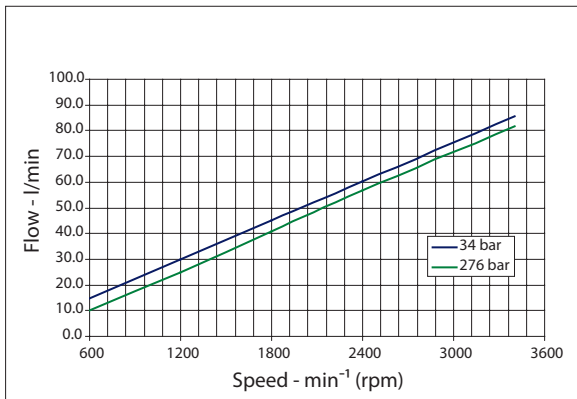
Model 23D (l/min)



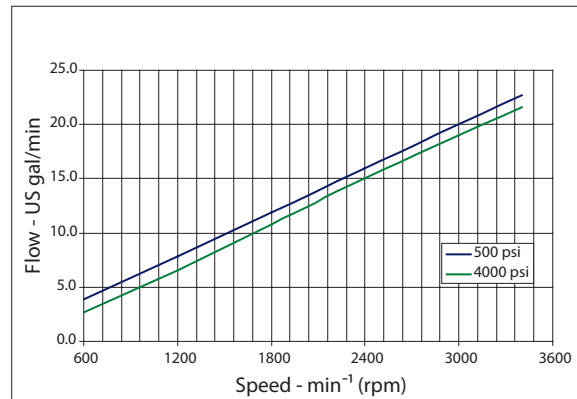
Model 23D (US gal/min)



Model 25D (l/min)

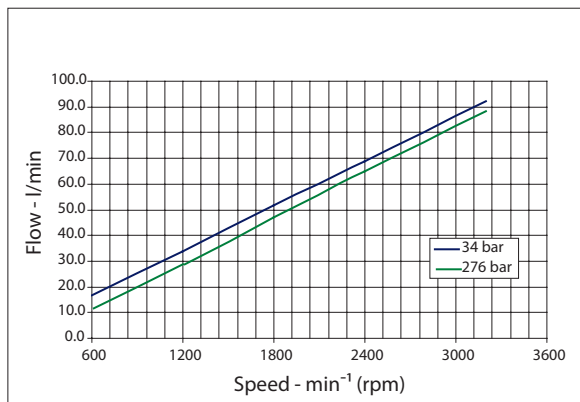


Model 25D (US gal/min)

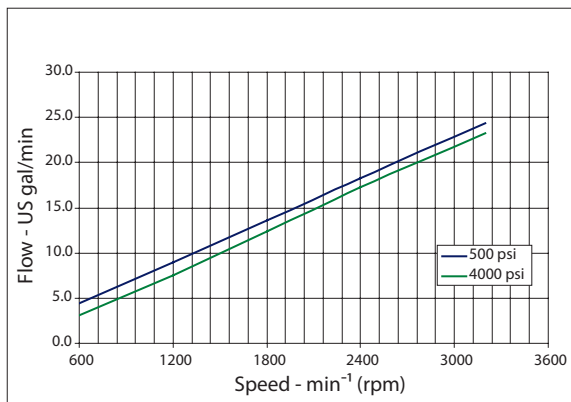




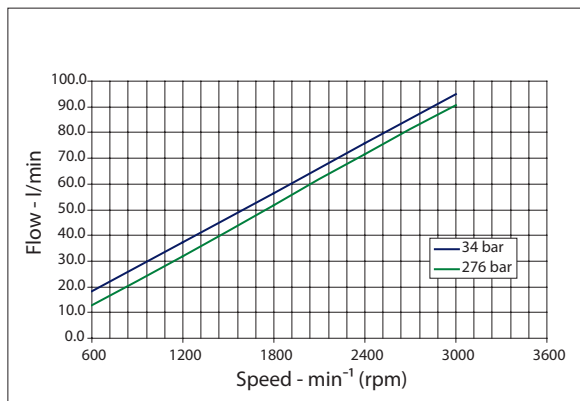
Model 29D (l/min)



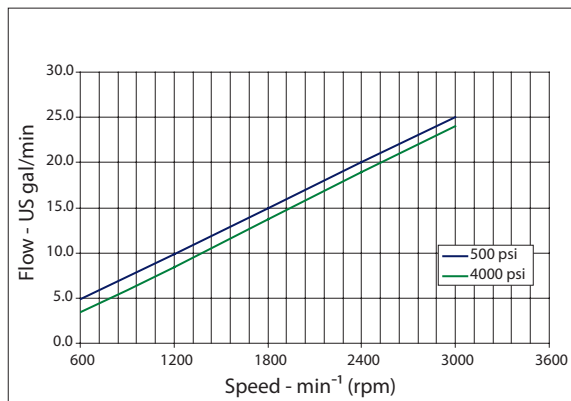
Model 29D (US gal/min)



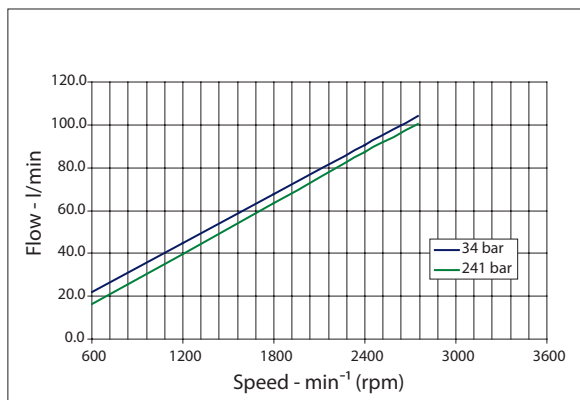
Model 32D (l/min)



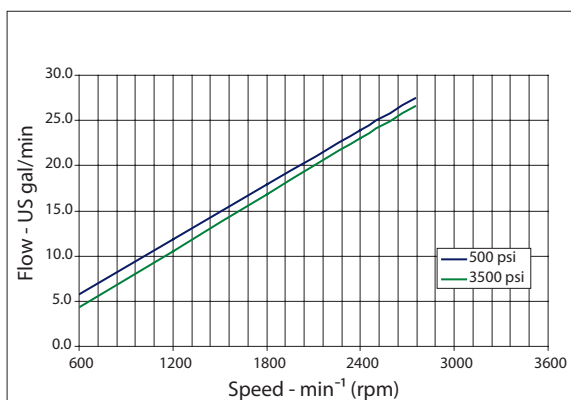
Model 32D (US gal/min)



Model 38D (l/min)

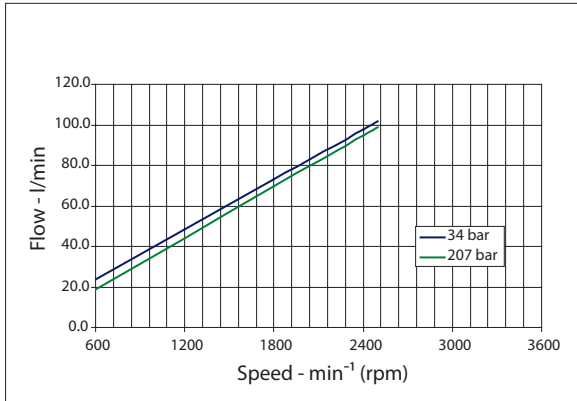


Model 38D (US gal/min)

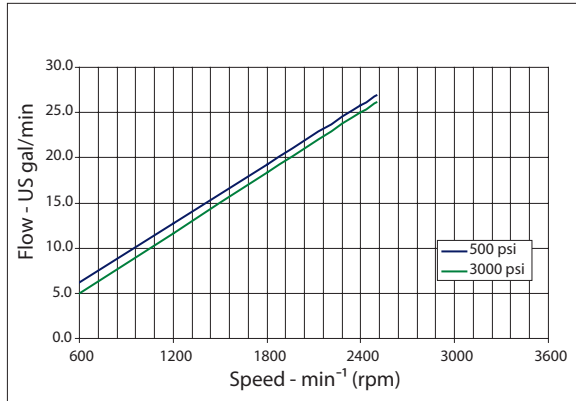




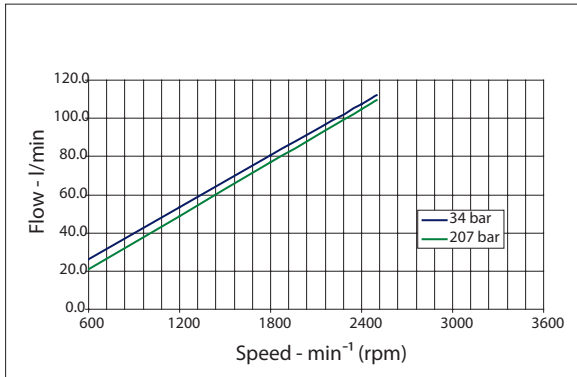
Model 41D (l/min)



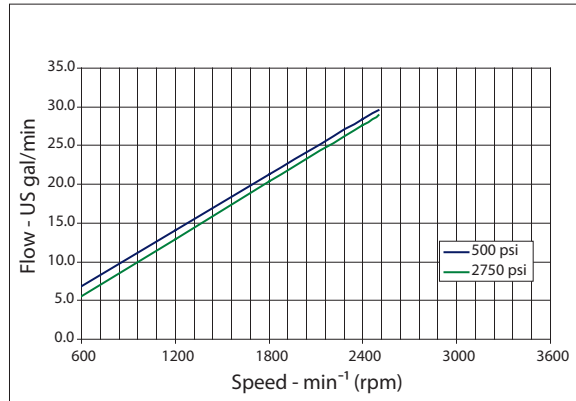
Model 41D (US gal/min)



Model 45D (l/min)



Model 45D (US gal/min)





XD Model Code Information

A	B	C	D	E	F	H	J	K
X D								

A Rotation - viewed from drive shaft

Code	Description
XD	XD Series, Cast Iron Gear Pump
L	Left hand (CCW) Rotation
R	Right hand (CW) Rotation

B Displacement / Input Drive

For the B module, the first two numbers specify the displacement

Code	Description
34	34.0 cc [2.08 CIR]
38	38.0 cc [2.32 CIR]
41	41.0 cc [2.50 CIR]
45	45.0 cc [2.74 CIR]
51	50.8 cc [3.10 CIR]
58	58.0 cc [3.54 CIR]
64	63.6 cc [3.88 CIR]
72	72.0 cc [4.40 CIR]
76	76.0 cc [4.64 CIR]
82	82.0 cc [5.00 CIR]
90	90.2 cc [5.50 CIR]

B Displacement / Input Drive

For the B module, the second two letters specify the shaft code

Code	Description
SH*	SAE 13 tooth spline, 41 mm [1.62 in] length
SV	15 tooth spline, 46 mm [1.81 in] length (use with mounting flange AR or BR)
PB*	22 mm [7/8 in] diameter, 41 mm [1.62 in] length, with 1/4 key
PZ	25.4 mm [1 in] diameter, 46 mm [1.81 in] length with 1/4 key

* SH and PB shafts are torque limited. Displacements above 51 cc require reduced operating pressures when using these shafts



A	B	C	D	E	F	H	J	K
X D								

C Mounting Flange

Code	Description
AA	SAE A 2-bolt
AR	SAE A 2-bolt, use with 15 T spline input drive
BB	SAE B 2-bolt
BR	SAE B 2-bolt, use with 15 T spline input drive

D Rear Cover - Controls & Ports

Code	Inlet	Outlet
*N150	1 5/8-12 SAE ORB side inlet	1 5/16-12 SAE ORB side outlet
N346	1 1/4 side split flange inlet	1 1/4 side split flange outlet (SAE Code 61)
N736	1 1/2 inch side beaded tube inlet	1 1/4 side split flange outlet (SAE Code 61)
N750	1 5/8-12 side inlet	1 1/16-12 side outlet

* N150 ports are flow limited. Displacements above 45cc require reduced operating speeds when using this port option

E Flow Control Valve Setting

Code	Description
NNN	No flow control setting

F Pressure Control Valve Setting

Code	Description
000	No pressure control settings

J Nameplate

Code	Description
AN	Standard nameplate

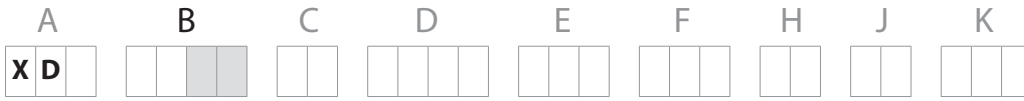
K Special Feature

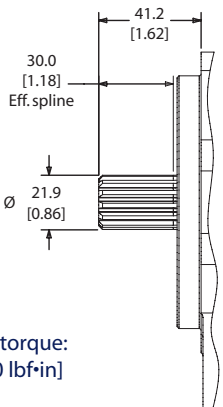
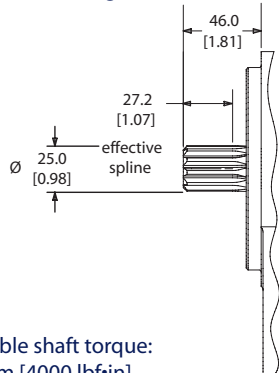
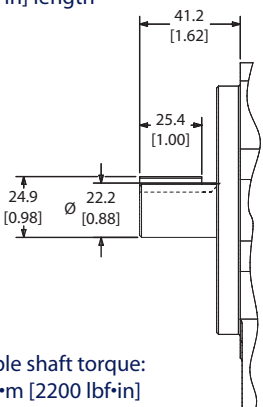
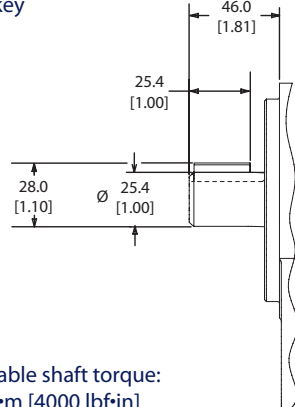
Code	Description
NNN	No special features, standard black paint



XD Options

XD Shaft Options



<p>Code SH SAE 13-tooth 16/32-pitch flat root side fit 41.2 mm [1.62 in] length</p>  <p>Allowable shaft torque: 248.6 N•m [2200 lbf•in]</p>	<p>Code SV SAE 15-tooth 16/32-pitch flat root side fit 46.0 mm [1.81 in] length</p>  <p>Allowable shaft torque: 452 N•m [4000 lbf•in]</p>
<p>Code PB - 22.2mm SAE 7/8 in straight keyed, 1/4 in key 41.2 mm [1.62 in] length</p>  <p>Allowable shaft torque: 248.6 N•m [2200 lbf•in]</p>	<p>Code PZ 25.4mm [1 inch] Dia. x 46mm [1.62 inch] 1/4 inch key</p>  <p>Allowable shaft torque: 452 N•m [4000 lbf•in]</p>



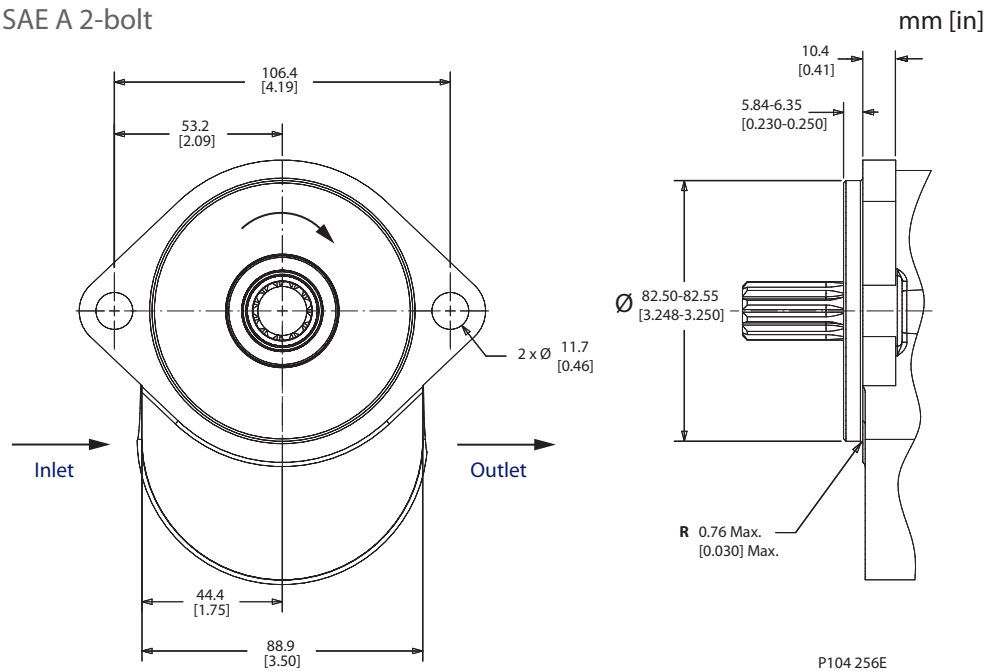
XD Mounting Flanges



C Mounting Flange

Code	Description
AA	SAE A 2-bolt
AR	SAE A 2-bolt, use with PZ or SV input drive

SAE A 2-bolt





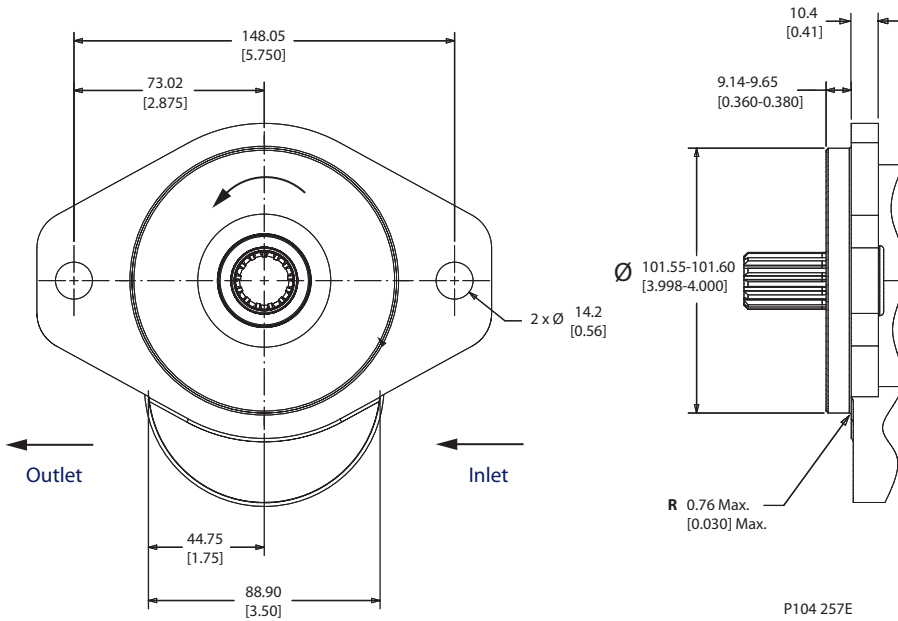
A	B	C	D	E	F	H	J	K
X D								

C Mounting Flange

Code	Description
BB	SAE B 2-bolt
BR	SAE B 2-bolt, use with PZ or SV input drive

SAE B 2-bolt

mm [in]



A	B	C	D	E	F	H	J	K
X D								

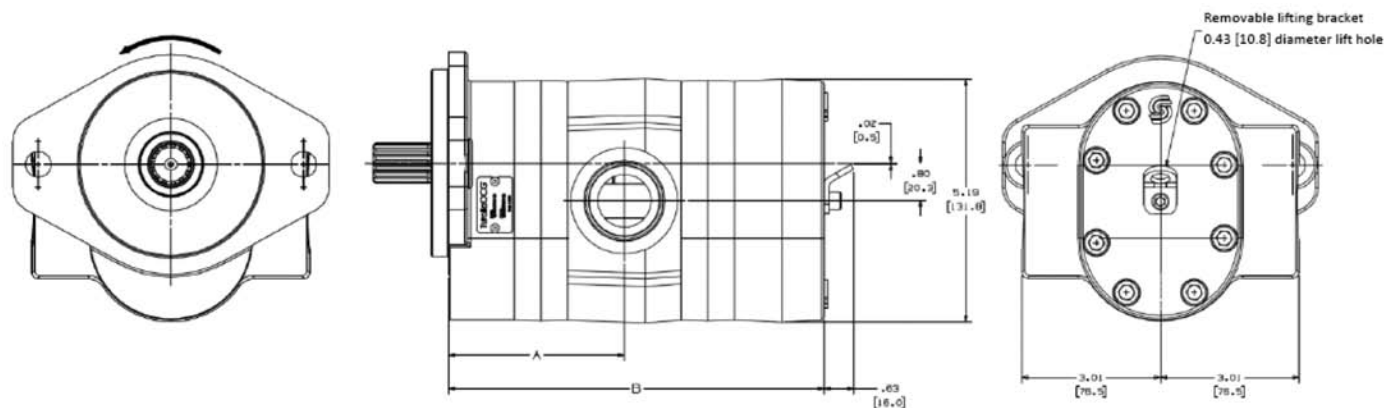
Code	Inlet Port	Outlet Port	Maximum recommended inlet flow l/min [US gal/min]
N150*	1 5/8 – 12, side (SAE ORB)	1 5/16 – 12, side (SAE ORB)	151 [40]
N346	1 ¼ side split flange (SAE code 61)	1 ¼ side split flange (SAE code 61)	151 [40]
N736	1 ½ side beaded tube	1 ¼ side split flange (SAE code 61)	204 [54]
N750	1 ½ side beaded tube	1 5/16 – 12, side (SAE ORB)	204 [54]

* N150 ports are flow limited. Displacements above 45cc require reduced operating speeds when using this port option



XD Dimension Drawings Information

Dimensions



Rating and dimensions

Ratings	Units	34	38	41	45	51	58	64	72	76	82	90
Displacement	cm ³ /rev	34.0	38.0	41.0	45.0	50.8	58.0	63.6	72.2	76.0	82.0	90.2
	in ³ /rev	2.08	2.32	2.50	2.74	3.10	3.54	3.88	4.40	4.64	5.00	5.50
Rated pressure	bar	276	276	276	276	276	276	255	226	215	200	180
	psi	4000	4000	4000	4000	4000	4000	3700	3275	3100	2880	2620
Peak pressure	bar	303	303	303	303	303	303	285	250	235	220	200
	psi	4400	4400	4400	4400	4400	4400	4130	3625	3400	3200	2900
Maximum speed	maximum	3400	3400	3400	3400	3400	3200	3000	2750	2700	2500	2275
Theoretical flow at max speed	l/min	116	129	139	153	173	186	191	199	205	205	205
	US gal/min	31	34	37	40	46	49	50	52	54	54	54
Dimension A	mm	82.9	85.0	86.5	88.3	91.3	94.9	97.7	102	104	106.8	111.1
	in	3.27	3.35	3.41	3.48	3.6	3.74	3.85	4.02	4.1	4.21	4.38
Dimension B	mm	179.1	183.1	186.2	189.7	195.8	202.9	208.5	217.2	221.2	226.8	235.5
	in	7.05	7.21	7.33	7.47	7.71	7.99	8.21	8.55	8.71	8.93	9.27



Reference Literature

Turolla Literature

Literature reference - Software

Title	Type	Order number
SX Microcontroller Fan Drive Personality	Technical Information	11023458

Literature reference - Fan Drive Controls

Title	Type	Order number
Fan Drive Control	Technical Information	11005336
Fan Drive Control Assembly	Technical Information	11005337
Fan Drive Control Temperature Sensors	Technical Information	BLN-95-9063
PLUS+1 compliant Heavy-Duty Pressure Transmitter	Datasheet	520L0801
PLUS+1 compliant Heavy-Duty Pressure Transmitter - SAE Thread Version	Datasheet	11005452
PLUS+1 MC088 015-00000-Controller	Datasheet	11006645

Literature reference - Pumps and Motors

Title	Type	Order number
Series D Hydraulic Gear Pumps	Technical Information	L1022940
Group 1 Gear Pumps	Technical Information	L1016399
Group 2 Gear Pumps	Technical Information	L1016341
Group 3 Gear Pumps	Technical Information	L1016456
Group 1, 2 and 3 Gear Motors	Technical Information	L1016082
SGM2, SGM3 Fan Drive Gear Motors	Technical Information	L1016036
SGM2 Fan Drive Gear Motors	Datasheet	11029652
SGM3 Fan Drive Gear Motors	Datasheet	11056719
Series 45 Open Circuit Pumps	Technical Information	520L0519

Literature reference - Fluids

Title	Type	Order number
Hydraulic Fluids and Lubricants	Technical Information	L1021414