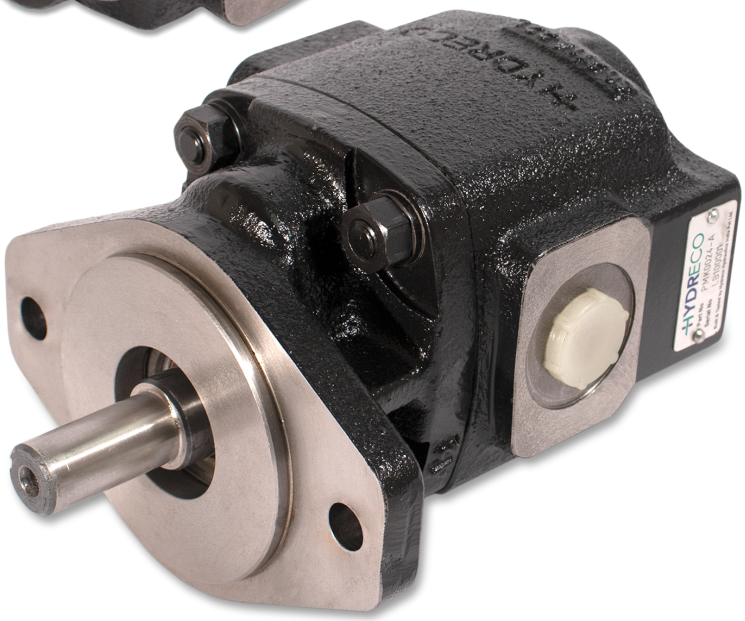
WSP50

Plain Bearings Gear Pump, Unidirectional

WSP50



► DESCRIPTION:

World Series pumps use a purpose designed form of spur gear which reduces the amount of fluid borne noise generated by the pump and hence transmitted into the hydraulic system. This results in a reduction in the amount of airborne noise emitted from the machine.

Pumps are highly efficient and are designed to provide high performance levels and long life when operated within the parameters shown below. For operation outside these parameters please consult your Continental Hydraulics and Hydreco representative.

► PERFORMANCE:

Max Outlet Port Pressures		Rated: 350 bar (5076.3 psi) Peak: 360 bar (5221.4 psi)
Inlet Condition	Maximum vacuum	0.7 bar absolute (20.6 Hg)
	Maximum pressure	3.0 bar absolute (43 psig)
Speed Range	All models	450 - 3500 rev/min
Temperature	Minimum at start-up	-40°C (-40°F)
	Maximum continuous	+80°C (+176°F)
	Maximum intermittent	+100°C (+212°F)
Viscosity	Maximum at start-up	2000 mm²/sec (9,000 SSU)
	Maximum continuous	250 mm²/sec (1150 SSU)
	Minimum continuous	10 mm²/sec (60 SSU)
	Optimum	15-25 mm²/sec (78-124 SSU)
Fluid Cleanliness	To ISO4406 solid contaminant	
	Start-up period	21/17
	Maximum in service	19/15
	Optimum	16/11
	Maximum water	0.1%
Fluid Velocity	Maximum in INLET line	2.5 m/sec (8 ft/sec)
	Recommended in INLET line	1.5 m/sec (5 ft/sec)
Shaft Loads	Maximum axial load	250 N (56 lb)
	Maximum radial load	500 N (112 lb)
Fluids	All data is calculated for use with mineral oils HM and HV. For fire resistant and environmentally friendly fluids please contact your Continental/Hydreco Hydraulics representative.	
Rotation	Clockwise or counter-clockwise viewed from shaft end (not reversible).	

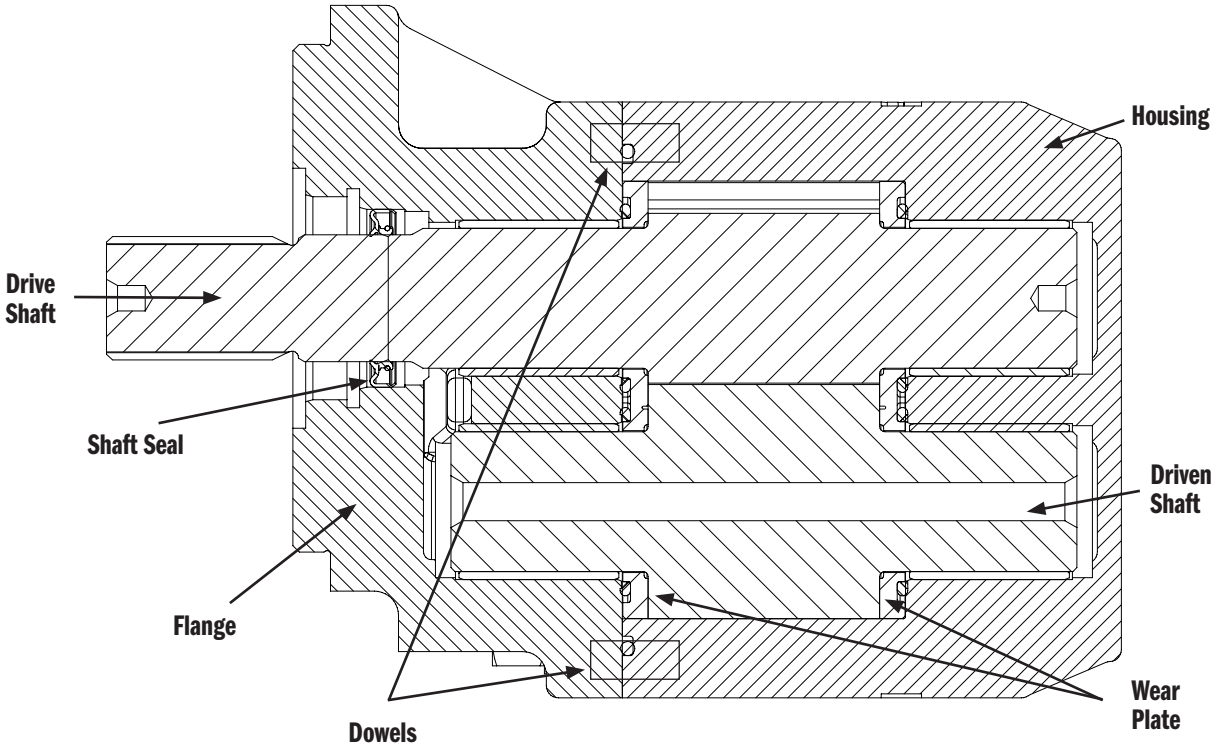
WSP RPM RATINGS				
Model	**Rated Pressure bar (psi)**	**Peak Pressure bar (psi)**	**Speed**	
			Max rpm	**Min rpm**
5020	350 (5075)	360 (5220)	3500	450
5023	350 (5075)	360 (5220)	3500	450
5027	350 (5075)	360 (5220)	3500	450
5030	350 (5075)	360 (5220)	3500	450
5033	350 (5075)	360 (5220)	3500	450
5036	350 (5075)	360 (5220)	3500	450
5040	350 (5075)	360 (5220)	3500	450
5046	350 (5075)	360 (5220)	3500	450
5053	320 (4640)	330 (4786)	3500	450
5057	300 (4350)	310 (4496)	3500	450
5064	275 (3990)	285 (4133)	3500	450
5074	230 (3335)	340 (3480)	3500	450
5088	190 (2755)	200 (2300)	3500	450

► FEATURES:

- **HIGH PERFORMANCE HYDRAULIC PUMPS**
  The WSP50 pump features a unique Spur Gear design that reduces pump ripple which lowers pump noise dB levels. The improved spur gear design combined with large diameter shafts & bearings, pressure compensated side plates, and a rugged cast-iron housing provides reliable performance and long life in the most challenging operating conditions.
- **A RANGE OF SINGLE AND MULTIPLE PUMPS**
  The Hydreco WSP50 pump offers a wide variety of options to include SAE and international mounts, displacements, shaft sizes, port sizes, and multiple pump configurations including double, triple, and quadruple pump assemblies. Contact your local Continental/Hydreco representative if your application require special features not shown in this catalog.

- Low noise (Unique Spur Gear Design)
- Smooth pump flow (low pump ripple)
- High efficiency
- Robust construction
- 5000 psi continuous rating
- -40°F to +212°F operating range

CROSS SECTION WSP50 SERIES PUMP/MOTOR



► IDENTIFICATION CODE: Single and Front Pump

WSP □ □ - □ - □ □ **V - S** □ □ - **1 V** □ □

- WSP □ □ - FAMILY/PUMP
- WSP □ □ - NUMBER OF SECTIONS
- WSP □ □ - PUMP SIZE AND DISPLACEMENT RANGE
- WSP □ □ - PUMP ROTATION
- WSP □ □ - DRIVE SHAFT
- WSP □ □ - MOUNTING FLANGES
- WSP □ □ - SHAFT SEAL
- WSP □ □ - PORT POSITION
- WSP □ □ - INLET PORTS (See table: page 8)
- WSP □ □ - OUTLET PORTS (See table: page 8)
- WSP □ □ - SERIES NUMBER
- WSP □ □ - SEALS VITON
- WSP □ □ - OPTION
- WSP □ □ - DIGIT ASSIGNED BY HYDRECO FOR REAR SHAPE (FRONT PUMP ONLY)

PUMP ROTATION	
CODE	DESCRIPTION
A	Anti-clockwise
C	Clockwise **(standard)**

DRIVE SHAFT	
CODE	NAME
B	SAE B 13T splined **(standard)**
Q	SAE BB 15T splined
C	SAE C 14T splined
F	SAE B 22-1 parallel
H	SAE BB 25-1 parallel
G	SAE C 32-1 parallel
R	1 1/8" parallel
ON ROAD PTO SHAFT	
BD	ISO 8T splined

PORT POSITION	
CODE	NAME
S	Side
R	Rear

SHAFT SEAL	
CODE	NAME
V	Seal & wiper **(standard)**
T	Seal & wiper + tell tale

OPTION	
CODE	NAME
F	front pump Omit for single pump

PUMP SIZE AND DISPLACEMENT RANGE	
CODE	Displacement cm³/rev (in³/rev)
5020	20.0 (1.22)
5023	23.0 (1.40)
5027	27.0 (1.65)
5030	30.0 (1.83)
5033	33.0 (2.01)
5036	36.0 (2.20)
5040	40.0 (2.44)
5046	46.0 (2.81)
5053	53.0 (3.24)
5057	57.0 (3.47)
5064	64.0 (3.91)
5074	74.0 (4.52)
5088	88.0 (5.37)

MOUNTING FLANGES	
CODE	NAME
2	SAE 101-2 (B - 2 bolts) **(standard)**
3	SAE 101-4 (B - 4 bolts)
4	SAE 127-2 (C - 2 bolts)
5	SAE 127-4 (C - 4 bolts)
ON ROAD PTO FLANGE	
38	ISO 7653 (4 bolts)

TYPICAL ORDERING CODE: Single Pump
WSP1C-5040-Q2V-S2H2D-1V

TYPICAL ORDERING CODE: Front Pump
WSP1C-5040-Q2V-S2F2B-1VF**

► IDENTIFICATION CODE: Mulitiple Pump

W S P [ ] - [ ] - **S** [ ] [ ] - **1 V** [ ] [ ]

FAMILY/PUMP

INLET PORTS — See table: page 8

OUTLET PORTS — See table: page 8

SERIES NUMBER

PUMP POSITION	
CODE	**DESCRIPTION**
M	Intermediate
R	Rear

PORT POSITION	
CODE	**NAME**
S	Side
R	Rear

NOTE:
Verify availability with our technical dept. for rear port option.

SEALS VITON

OPTION	
CODE	**NAME**
F	front pump Omit for single pump

DIGIT ASSIGNED BY HYDRECO FOR REAR SHAPE (INTERMEDIATE PUMP ONLY) OMIT FOR REAR PUMP

PUMP SIZE AND DISPLACEMENT RANGE	
CODE	**Displacement cm^3/rev (in^3/rev)**
5020	20.0 (1.22)
5023	23.0 (1.40)
5027	27.0 (1.65)
5030	30.0 (1.83)
5033	33.0 (2.01)
5036	36.0 (2.20)
5040	40.0 (2.44)
5046	46.0 (2.81)
5053	53.0 (3.24)
5057	57.0 (3.47)
5064	64.0 (3.91)
5074	74.0 (4.52)
5088	88.0 (5.37)

Identification code for double pumps

Identification Code Front Pump + Identification Code Rear Pump

Example: WSP2C-5040-Q2V-S2H2D-1VF** + **WSPR-5040-S2H2D-1V**

Identification code for triple pumps

Identification Code Front Pump + Identification Code Intermediate Pump + Identification Code Rear Pump

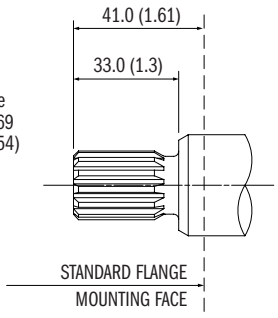
Example: WWSP3C-5040-Q2V-S2H2D-1VF** + **WSPM-5040-S2H2D-1V** + **WSPR-5040-S2F2B-1V**

► SHAFT OPTIONS:

Dimensions mm (inch)

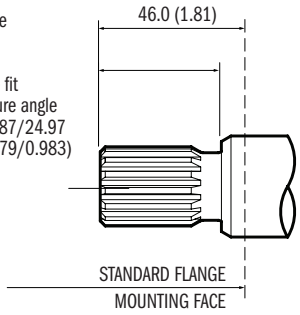
CODE [B] SAE 22-4 (B) 7/8" SPLINE

Involute Spline
13 teeth
16/32 DP
Flat root, side fit
30 deg pressure angle
Major dia 21.79/21.69
(0.858/0.854)



CODE [Q] SAE 25-4 (BB) 1" SPLINE

Involute Spline
15 teeth
16/32 DP
Flat root, side fit
30 deg pressure angle
Major dia 24.87/24.97
(0.979/0.983)

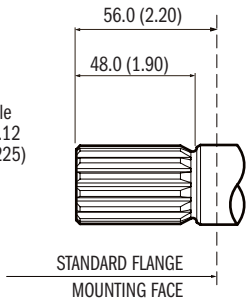


p x D = 22450 (bar x cm3/rev)*
p x D = 19869 (psi x cu.in/rev)*

T = 397 Nm T = 293 lb.ft

CODE [C] SAE 32-4 (C) 1 1/4" SPLINE

Involute Spline
14 teeth
12/24 DP
Flat root, side fit
30 deg pressure angle
Major dia 31.22/31.12
(1.229/1.225)

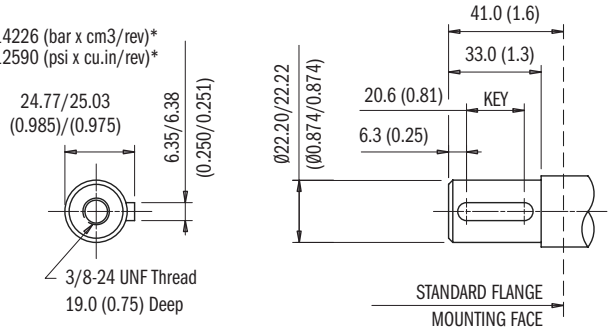


p x D = 45565 (bar x cm3/rev)*
p x D = 40325 (psi x cu.in/rev)*

T = 806 Nm T = 594 lb.ft

CODE [F] SAE 22-1 (B) 7/8" PARALLEL

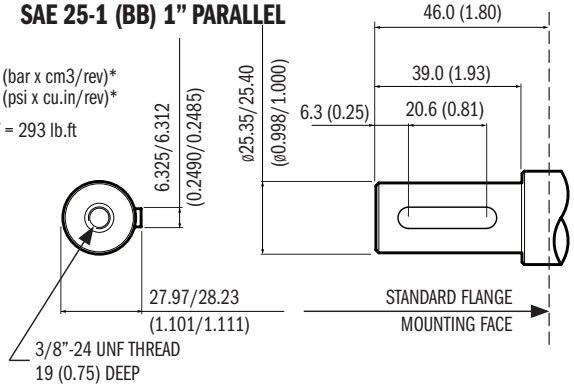
p x D = 14226 (bar x cm3/rev)*
p x D = 12590 (psi x cu.in/rev)*



CODE [H] SAE 25-1 (BB) 1" PARALLEL

p x D = 22450 (bar x cm3/rev)*
p x D = 19869 (psi x cu.in/rev)*

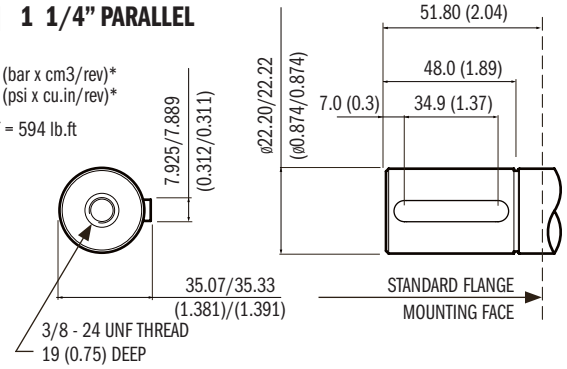
T = 397 Nm T = 293 lb.ft



CODE [G] 1 1/4" PARALLEL

p x D = 45565 (bar x cm3/rev)*
p x D = 40325 (psi x cu.in/rev)*

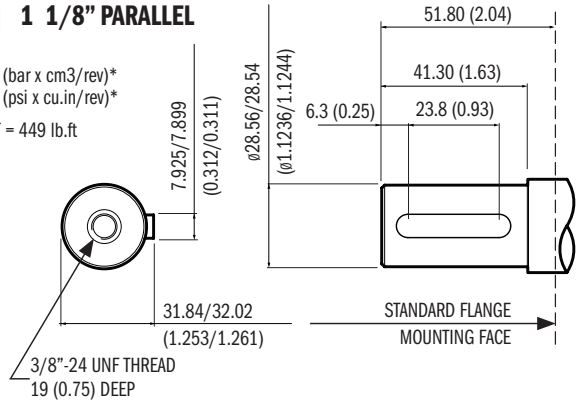
T = 806 Nm T = 594 lb.ft



CODE [R] 1 1/8" PARALLEL

p x D = 31000 (bar x cm3/rev)*
p x D = 27435 (psi x cu.in/rev)*

T = 609 Nm T = 449 lb.ft

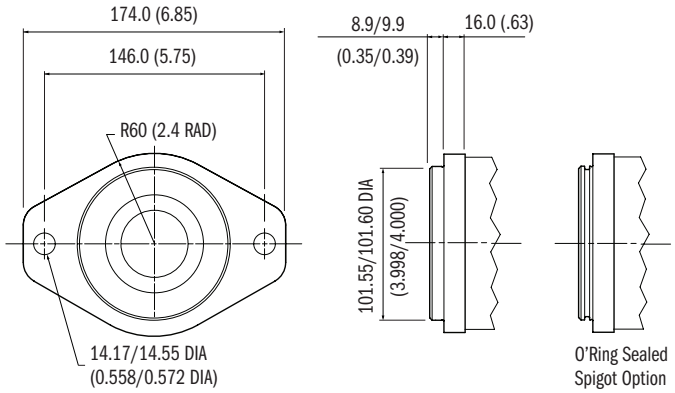


* p = pressure, D = displacement. The stated values must not be exceeded.
Note: For multiple pumps the sum of the p x D or torque values must not exceed the stated value.

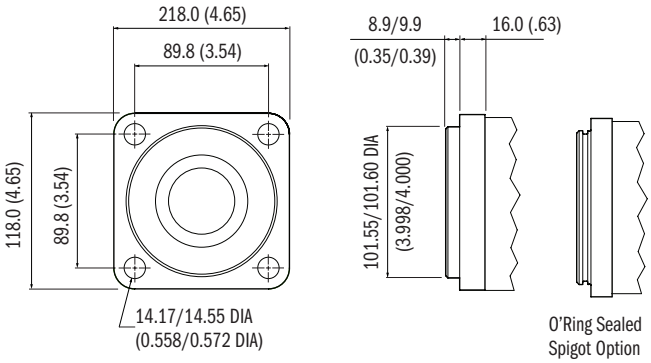
► FLANGE OPTIONS:

Dimensions mm (inch)

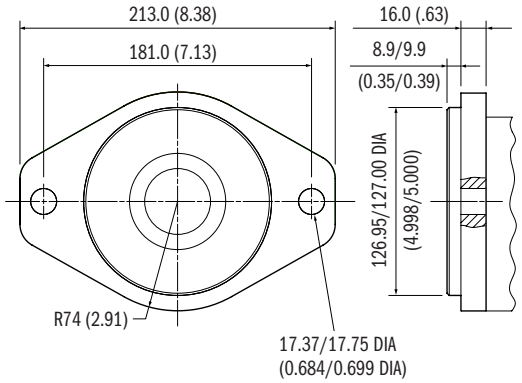
CODE [2] SAE 101-2 (B - 2 BOLT)



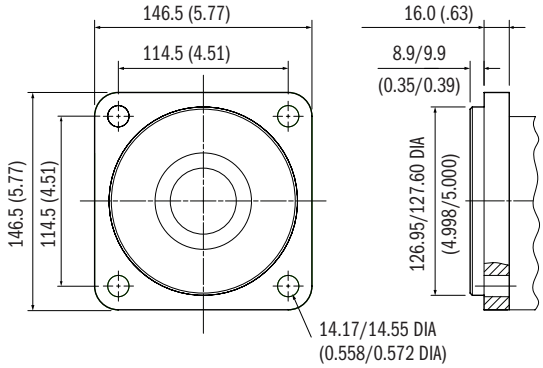
CODE [3] SAE 101-4 (B - 4 BOLT)



CODE [4] SAE 127-2 (C - 2 BOLT)

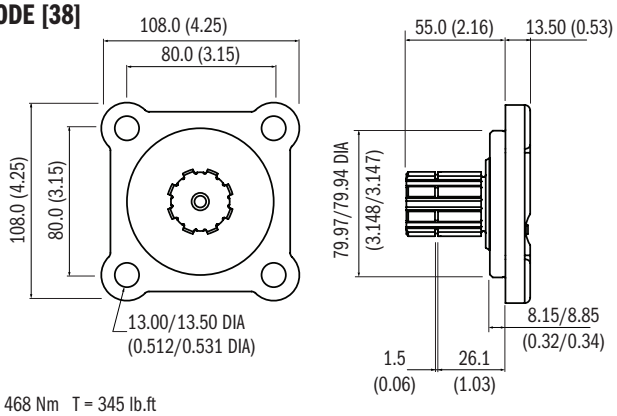


CODE [5] SAE 127-4 (C - 4 BOLT)



50BD ON ROAD PTO SHAFT AND FLANGES OPTIONS:

ISO 7653 SHAFT/FLANGE 50BD
CODE [38]



T = 468 Nm T = 345 lb.ft

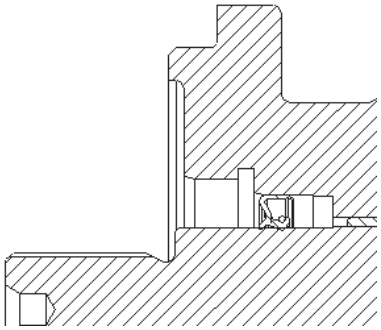
Note: This Flange is available with or without and External Bearing.
There is no difference with any external dimensions.

► SHAFT SEAL & FLANGE OPTIONS:

Dimensions mm (inch)

[V]

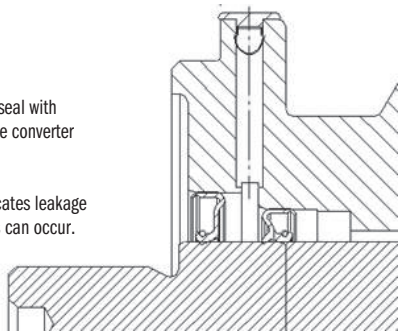
Shaft seal and wiper for external drives



[T]

Shaft seal, wiper and seal with tell-tale hole for torque converter and gearbox.

The tell-tale hole indicates leakage before mixing of fluids can occur.



Please refer to hydreco sales Dept. for other flange and shaft seal options.

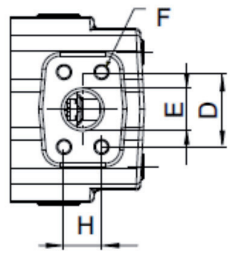
SHAFTS & FLANGES

Pump Size	Flanges Availability		Drive Shafts availability						
			Splined			Parallel			On Road Shafts
			B	C	Q	G	H	R	BD
	Code	Description	SAE B 13T	SAE C 14T	SAE BB 15T	1 1/4"	SAE BB 25-1	1 1/8"	ISO 8T
WSP50	2	SAE 101-2 (B - 2 bolt)	●	○	○	○	○	○	-
	3	SAE 101-4 (B - 4 bolt)	○	○	○	○	○	○	-
	4	SAE 127-2 (C - 2 bolt)	○	○	○	○	○	○	-
	5	SAE 127-4 (C - 4 bolt)	○	○	○	○	○	○	-

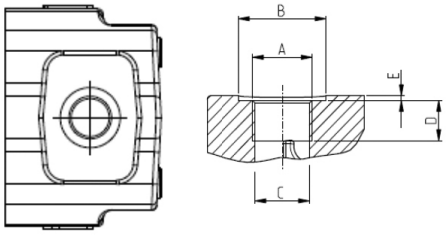
●	Standard
○	Available on Request
-	Not Available

► PORT DETAILS:

Dimensions mm (inch)

SAE FLANGED PORTS (3000 PSI series) Compliant with SAE J518	Ordering Code	Port Size	Dimensions			
			E	D	H	F
	2A	1/2"	2.7 (.5)	38.1 (1.5)	17.48 (0.69)	5/16-18
	2B	3/4"	19.05 (.75)	47.63 (1.88)	22.23 (0.88)	3/8-16
	2D	1"	25.4 (1.0)	52.37 (2.06)	16.19 (0.64)	3/8-16
	2F	1 1/4"	31.75 (1.25)	58.72 (2.31)	30.18 (1.19)	7/16-14
	2H	1 1/2"	38.1 (1.5)	69.85 (2.75)	35.71 (1.41)	1/2-13
	2K	2"	50.8 (2.00)	77.77 (3.062)	42.88 (1.688)	1/2-13
	2L	2 1/2"	63.5 (2.50)	88.9 (3.500)	50.8 (2.000)	1/2-13
	2M	3"	76.2 (3.000)	106.37 (4.188)	61.93 (2.438)	5/8-11
	2N	4"	101.6 (4.000)	130.18 (5.125)	77.77 (3.062)	5/8-11

*Preferred Ports		
Displacement	IN	OUT
20	2F	2B
23	2F	2B
27	2F	2B
30	2F	2B
33	2F	2B
36	2H	2D
40	2H	2D
46	2H	2D
53	2H	2D
57	2K	2F
64	2K	2F
74	2K	2F
88	2K	2F

UNF THREADED PORTS with O-Ring Compliant with SAEJ1926	Ordering Code	Port Size	Dimensions			
			B	C	D	E
	4D	1" UNF "O" Ring	38.48 ( )	23.34 ( )	19.05 (0.75)	1.5 ( )
	4E	1 1/16" UNF "O" Ring (=#12)	41.28 ( )	24.92 ( )	19.05 (0.75)	1.5 ( )
	4F	1 1/4" UNF "O" Ring	46.49 ( )	29.69 ( )	19.05 (0.75)	1.5 ( )
	4G	1 5/16" UNF "O" Ring (=#16)	48.51 ( )	31.27 ( )	19.05 (0.75)	1.5 ( )
	4H	1 1/2" UNF "O" Ring	30.36 ( )	36.04 ( )	19.05 (0.75)	1.5 ( )
	4J	1 5/8" UNF "O" Ring (=#20)	57.66 ( )	39.22 ( )	19.05 (0.75)	1.5 ( )
	4K	2" UNF "O" Ring	68.25 ( )	48.74 ( )	19.05 (0.75)	1.5 ( )
32	4L	2 1/2" UNF "O" Ring	88.39 ( )	61.44 ( )	19.05 (0.75)	1.5 ( )
-24	4P	1 7/8" UNF "O" Ring (=#24)	65.02 ( )	45.57 ( )	19.05 (0.75)	1.5 ( )

*Preferred Ports		
Displacement	IN	OUT
20	4J	4E
23	4J	4E
27	4J	4E
30	4J	4E
33	4J	4E
36	4J	4G
40	4J	4G
46	4J	4G
53	4J	4G
57	4L	4P
64	4L	4P
74	4L	4P
88	4L	4P

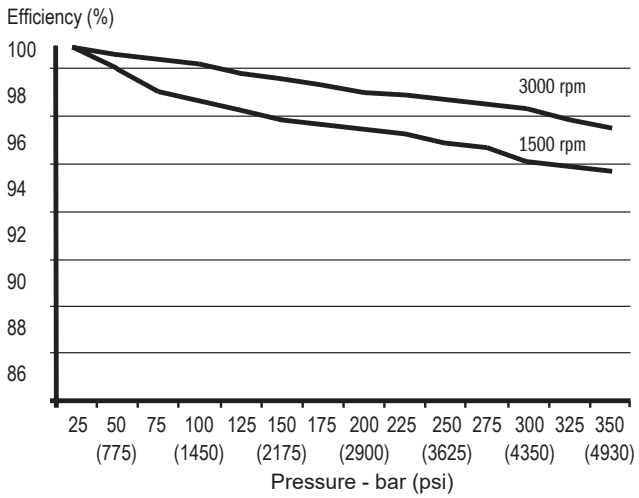
Imperial threaded options also available. Please refer to Continental/Hydreco for details.

NOTE: Please refer to Hydreco in case of different dimensions/machining port requirements and common suction option.

*Verify pressure capabilites of port connections when choosing port sizes. Contact Hydreco if you have specific applications needs.

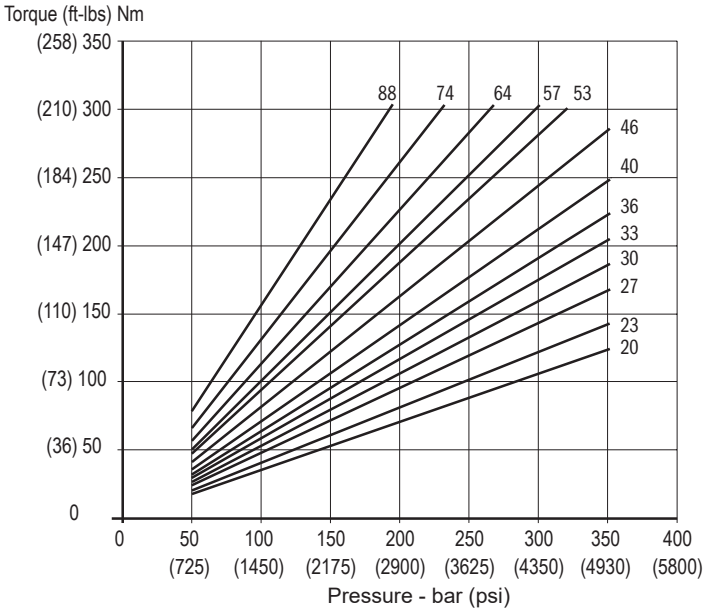
► PERFORMANCE DATA:

VOLUMETRIC EFFICIENCIES



NOTE: Volumetric efficiencies shown was measured with 34 cc pump. Efficiencies may vary slightly for other pump displacements.

TORQUE CURVE



NOTE: Torque data calculated at 90% (assumed) mechanical efficiency.

▶ FLUIDS:

Designation	Fluid Type	Rated Pressure	Max Speed	Fluid Temperature limits	
		bar/psi	rpm	^{0}C min / ^{0}F	^{0}C max / ^{0}F
HM / HV	Mineral based hydraulic Fluid	350/5000	3300	-20/-4	+80/176
HFA	Oil in water emulsion	75/1080	1500	10*/50	60*/140
HFB	Water in oil emulsion	130/1885	1500	10*/50	65*/149
HFC	Water glycol	175/2500	1500	0*/32	65*/149
HFD	Phosphate ester	Refer to Continental/Hydreco	Refer to Continental/Hydreco	Refer to Continental/Hydreco	Refer to Continental/Hydreco
HETG	Triglyceride based fluid	Refer to Continental/Hydreco	Refer to Continental/Hydreco	Refer to Continental/Hydreco	Refer to Continental/Hydreco
HEES	Synthetic ester fluid	Refer to Continental/Hydreco	Refer to Continental/Hydreco	Refer to Continental/Hydreco	Refer to Continental/Hydreco
*Note - may be further limited by fluid supplier					

Inlet Conditions

It is essential that pumps are installed so that they can always fill with fluid.
WSP50 Series pump inlet porting is designed to facilitate full volume fill but the following machine design recommendations should be followed

- Never run pumps dry - particular care should be taken to open any shut-off valves.
- Use large diameter pipes and fittings and avoid sharp bends and long lengths. Inlet fluid velocity should not exceed 2.5 m/sec (8.0 ft/sec) calculated by:

$V = \frac{21.22Q}{D^2}$ m/sec where	V = velocity (m/sec) Q = flow rate (l/min) D = bore diameter (mm)	$V = \frac{0.408Q}{D^2}$ ft/sec where.	V = velocity (ft/sec) Q = flow rate (US gal/min) D = bore diameter (inches)

- If possible mount the pump below the lowest level of fluid in the tank. If necessary prime the pump on start-up.
- Ensure that inlet lines are airtight.
- Particular care should be taken where high speeds and/or high fluid viscosities are involved.

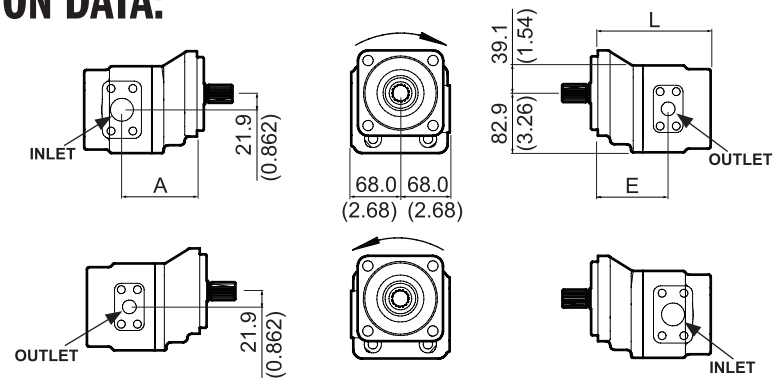
As a general rule pressure at the pump inlet should not be less than 0.8 bar absolute (6” Hg depression) at normal viscosity of 23 mm²/sec (110 SSU) at maximum operating speed.

Continental and Hydreco Hydraulics’ engineers will be pleased to advise on any installation

► INSTALLATION DATA:

Dimensions mm (inch)

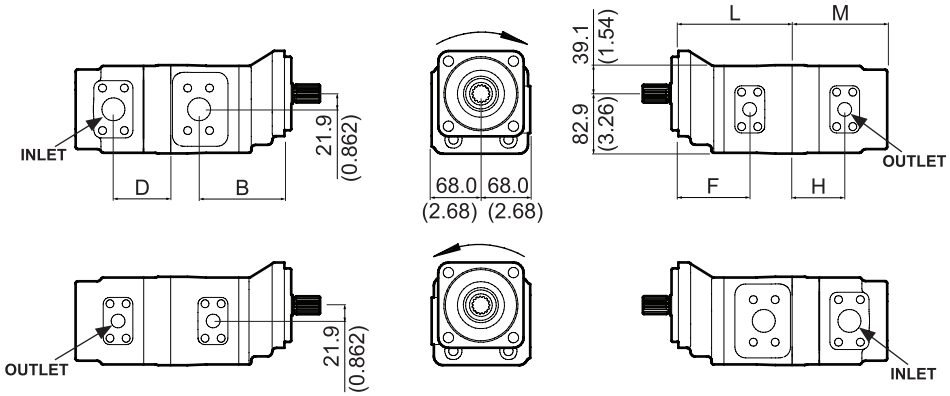
SINGLE PUMP



CLOCKWISE

ANTI-CLOCKWISE

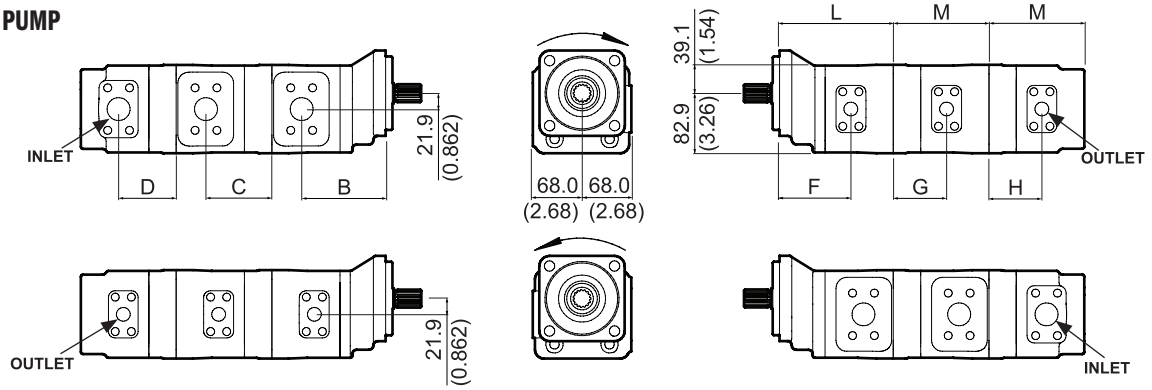
DOUBLE PUMP



CLOCKWISE

ANTI-CLOCKWISE

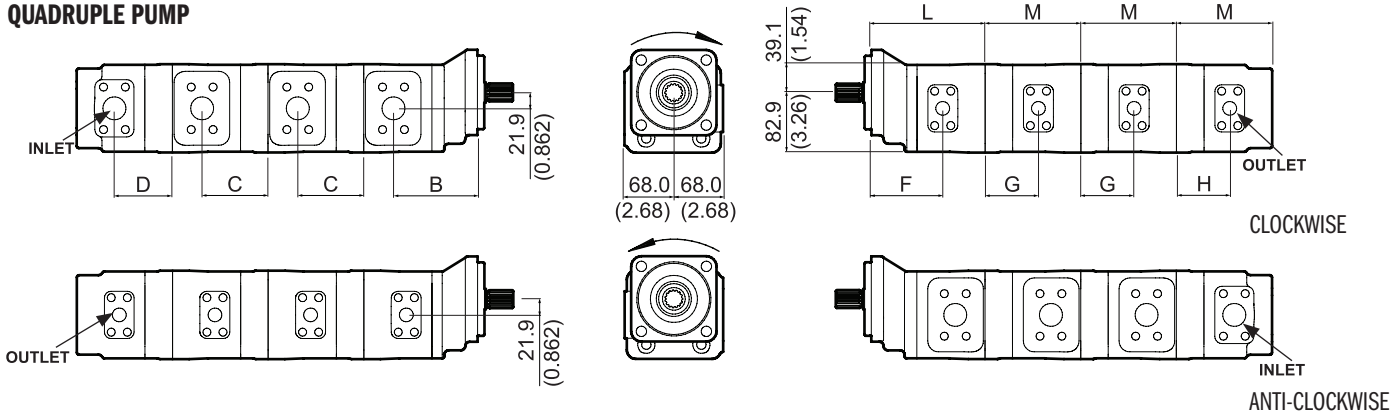
TRIPLE PUMP



CLOCKWISE

ANTI-CLOCKWISE

QUADRUPLE PUMP



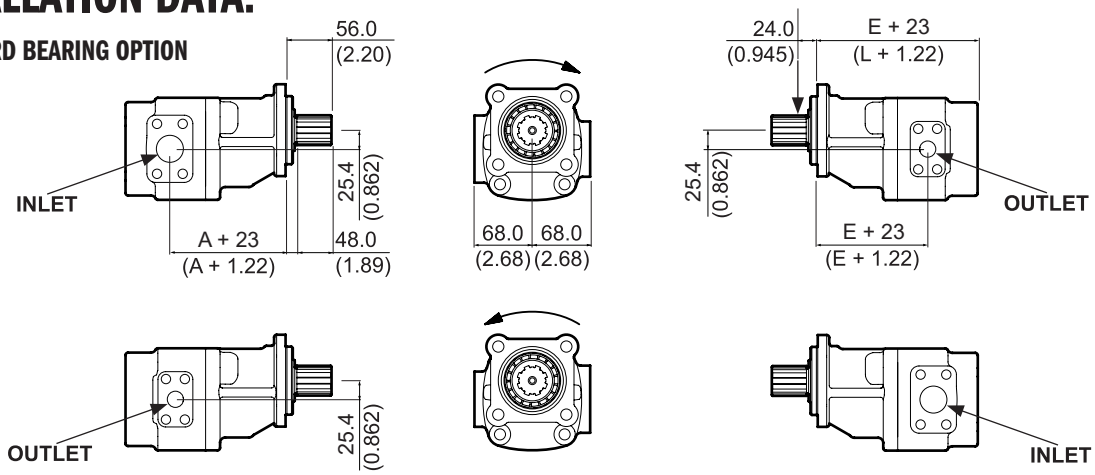
CLOCKWISE

ANTI-CLOCKWISE

▶ INSTALLATION DATA:

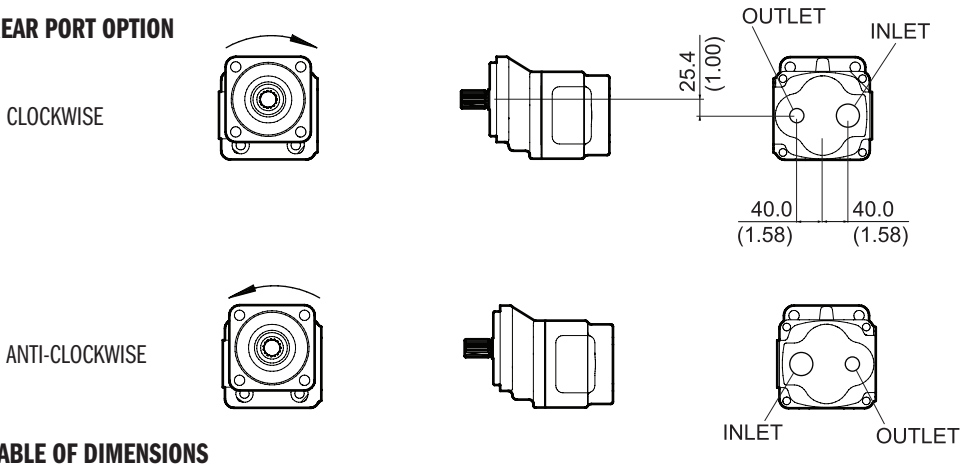
Dimensions mm (inch)

50BD: OUTBOARD BEARING OPTION



Maximum Radial Load (Fr) at 24.0 (0.945) from Mounting Face = 9000N (2025 lbf)
The Outboard Bearing option is only available with the ISO 7653 Mounting Flange

REAR PORT OPTION



Rear Ports are available on Single Pumps and on the Rear Pump Section of Multiple Pump assemblies.

Only threaded ports are available.

The provision of rear ports may be limited on higher speed, larger displacement applications where risk of inlet cavitation may be a risk.

Maximum Inlet Port Size - 1-1/4" BSP or 1-5/16" UNF
Maximum Outlet Port Size - 1" BSP or 1-1/16" UNF

TABLE OF DIMENSIONS

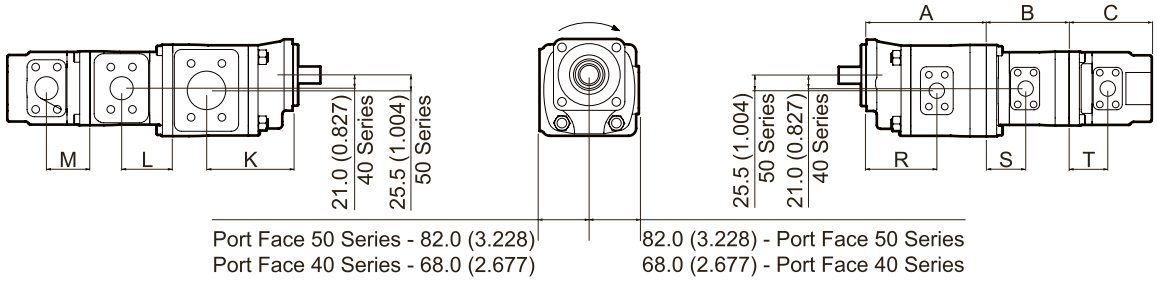
DIMENSION REFERENCE	DISPLACEMENT - cc/rev (in³/rev)										
	27 (1.65)	30 (1.83)	33 (2.01)	36 (2.20)	40 (2.44)	46 (2.81)	53 (3.24)	57 (3.48)	64 (3.91)	74 (4.52)	88 (5.37)
A	107.3 (4.225)	109.7 (4.317)	112.0 (4.409)	108.7 (4.280)	111.8 (4.403)	116.5 (4.588)	122.0 (4.803)	113.7 (4.478)	119.2 (4.694)	127.1 (5.002)	138.0 (5.433)
B	118.3 (4.658)	120.7 (4.750)	123.0 (4.843)	121.2 (4.772)	124.3 (4.895)	129.0 (5.080)	134.5 (5.295)	128.7 (5.069)	134.2 (5.284)	142.0 (5.592)	153.0 (6.024)
C	93.3 (3.674)	95.7 (3.766)	98.0 (3.858)	96.2 (3.778)	93.3 (3.911)	104.0 (4.096)	109.5 (4.311)	103.7 (4.084)	109.2 (4.300)	117.0 (4.608)	128.0 (5.039)
D	82.3 (3.241)	84.7 (3.333)	87.0 (3.425)	83.7 (3.295)	86.8 (3.419)	91.5 (3.604)	97.0 (3.819)	88.7 (3.494)	94.2 (3.709)	102.1 (4.081)	113.0 (4.449)
E	101.3 (3.989)	103.7 (4.081)	106.0 (4.173)	101.7 (4.004)	104.8 (4.127)	109.5 (4.312)	115.0 (4.528)	102.7 (4.045)	108.2 (4.261)	116.1 (4.569)	127.0 (5.000)
F	101.3 (3.989)	103.7 (4.081)	106.0 (4.173)	101.7 (4.004)	104.8 (4.127)	109.5 (4.312)	115.0 (4.528)	102.7 (4.045)	108.2 (4.261)	116.1 (4.569)	127.0 (5.000)
G	76.3 (3.004)	78.7 (3.096)	81.0 (3.189)	76.7 (3.020)	79.8 (3.143)	84.5 (3.328)	90.0 (3.543)	77.7 (3.061)	83.2 (3.276)	91.1 (3.585)	102.0 (4.016)
H	76.3 (3.004)	78.7 (3.096)	81.0 (3.189)	76.7 (3.020)	79.8 (3.143)	84.5 (3.328)	90.0 (3.543)	77.7 (3.061)	83.2 (3.276)	91.1 (3.585)	102.0 (4.016)
L	161.0 (6.339)	163.4 (6.432)	165.7 (6.524)	168.1 (6.617)	171.2 (6.740)	175.9 (6.925)	181.4 (7.140)	184.5 (7.264)	190.0 (7.479)	197.8 (7.787)	208.8 (8.219)
M	136.0 (5.355)	138.4 (5.447)	140.7 (5.540)	143.1 (5.632)	146.2 (5.756)	150.9 (5.940)	156.4 (6.156)	159.5 (6.279)	165.5 (6.795)	172.8 (6.803)	183.8 (7.234)

NOTE: The data in the table above related to the WSP 50 Series images on the previous page for single, double, triple and quadruple configurations and assumes standard Mounting Flanges and a standard Interface Adaptor (on multiple builds)

► MULTIPLE PUMPS: MIXED 50 AND 40 SERIES PUMPS

The data in this section relates to the WSP 50/40 Series mixed builds for single, double, triple and quadruple configurations and assumes standard Mounting Flanges and a standard interface Adaptor (on multiple builds)

CLOCKWISE BUILD SHOWN



50 SERIES DATA	DISPLACEMENT - cc/rev (in³/rev)			27 (1.65)	30 (1.83)	33 (2.01)	36 (2.20)	40 (2.44)	46 (2.81)	53 (3.24)	57 (3.48)	64 (3.91)	74 (4.52)	88 (5.37)
	K			76.0 (2.992)	76.1 (2.996)	76.2 (3.000)	76.0 (2.992)	76.1 (2.996)	76.3 (3.004)	76.5 (3.012)	76.1 (2.996)	76.3 (3.004)	76.6 (3.016)	77.0 (3.031)
	L			51.0 (2.008)	51.1 (2.012)	51.2 (2.016)	51.0 (2.008)	51.1 (2.012)	51.3 (2.020)	51.5 (2.028)	51.1 (2.012)	51.3 (2.020)	51.6 (2.031)	52.0 (2.047)
	R			76.0 (2.992)	76.1 (2.996)	76.2 (3.000)	76.0 (2.992)	76.1 (2.996)	76.3 (3.004)	76.5 (3.012)	76.1 (2.996)	76.3 (3.004)	76.6 (3.016)	77.0 (3.031)
	S			51.0 (2.008)	51.1 (2.012)	51.2 (2.016)	51.0 (2.008)	51.1 (2.012)	51.3 (2.020)	51.5 (2.028)	51.1 (2.012)	51.3 (2.020)	51.6 (2.031)	52.0 (2.047)
	A			76.0 (2.992)	76.1 (2.996)	76.2 (3.000)	76.0 (2.992)	76.1 (2.996)	76.3 (3.004)	76.5 (3.012)	76.1 (2.996)	76.3 (3.004)	76.6 (3.016)	77.0 (3.031)
	B			51.0 (2.008)	51.1 (2.012)	51.2 (2.016)	51.0 (2.008)	51.1 (2.012)	51.3 (2.020)	51.5 (2.028)	51.1 (2.012)	51.3 (2.020)	51.6 (2.031)	52.0 (2.047)

40 SERIES DATA	DISPLACEMENT - cc/rev (in³/rev)	12 (0.73)	14 (0.73)	16 (0.98)	19 (1.16)	22 (1.34)	25 (1.53)	28 (1.71)	31 (1.89)	34 (2.07)	38 (2.32)	42 (2.56)	46 (2.81)	50 (3.05)
	K	34.3 (1.35)	36.5 (1.437)	38.7 (1.524)	42.0 (1.654)	39.9 (1.571)	43.1 (1.697)	46.4 (1.827)	49.7 (1.957)	53.0 (2.075)	46.4 (1.827)	50.7 (1.996)	55.1 (2.169)	59.5 (2.343)
	L	26.3 (1.035)	28.5 (1.122)	30.7 (1.209)	34.0 (1.339)	28.9 (1.138)	32.1 (1.264)	35.4 (1.394)	38.7 (1.524)	42.0 (1.654)	33.9 (1.335)	38.2 (1.504)	42.6 (1.677)	47.0 (1.850)
	R	19.3 (0.760)	21.5 (0.846)	23.7 (0.933)	27.0 (1.063)	22.4 (0.882)	25.6 (1.008)	28.9 (1.138)	32.2 (1.268)	35.5 (2.398)	25.9 (1.020)	30.2 (1.189)	34.6 (1.362)	39.0 (1.535)
	S	19.3 (0.760)	21.5 (0.846)	23.7 (0.933)	27.0 (1.063)	22.4 (0.882)	25.6 (1.008)	28.9 (1.138)	32.2 (1.268)	35.5 (2.398)	25.9 (1.020)	30.2 (1.189)	34.6 (1.362)	39.0 (1.535)
	A	70.0 (2.756)	72.2 (2.843)	74.4 (2.929)	77.7 (3.059)	81.0 (3.189)	84.3 (3.319)	87.6 (3.449)	90.8 (3.575)	94.1 (3.705)	98.5 (3.878)	102.9 (4.051)	107.3 (4.224)	111.7 (4.398)
	B	70.0 (2.756)	72.2 (2.843)	74.4 (2.929)	77.7 (3.059)	81.0 (3.189)	84.3 (3.319)	87.6 (3.449)	90.8 (3.575)	94.1 (3.705)	98.5 (3.878)	102.9 (4.051)	107.3 (4.224)	111.7 (4.398)

For any non standard pump build that is not covered in these configurations please contact your local Continental Hydraulics and Hydreco representative for advice.

► MULTIPLE PUMPS: TORQUE LIMITS

TIPS FOR DEALERS: Multiple pumps with aluminium pumps as rear pump are available with different ranges of displacements and maximum operating pressures.

Please refer to Hydreco for details on available configurations.

Multiple pump combinations my be limited by the torque capacity of the drive shaft and couplings. The torque factors listed in the table below must not be exceeded. The examples assumes all pump sections are loaded simultaneously, but in any application this may not be the case, so it is important to understand the operating parameters on any machine.

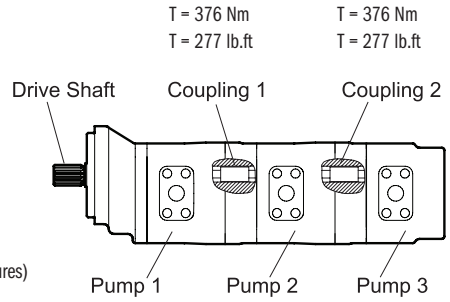
Code	Shaft Type	T = pD Maximum	
		bar x cm³/rev	bar x in³/rev
B	SAE 22-4 (B) 7/8" Spline	14226	12590
F	SAE 22-1 (B) 7/8" Parallel	14226	12590
Q	SAE 25-4 (B) 1" Spline	22450	19869
H	SAE 25-1 (B) 1" Parallel	22450	19869
R	1 1/8" Parallel	31000	27435
BD	ISO 7653	45566	40326
BC	UNI 8953	14226	12590
	Coupling 50 - 40	12500	18803
	Coupling 50 - 50	12500	18803

$T_{shaft} = p_1 D_1 + p_2 D_2 + p_3 D_3$

$T_{coupling\ 1} = p_2 D_2 + p_3 D_3$

$T_{coupling\ 2} = p_3 D_3$

(p1, p2 & p3 are maximum simultaneous pressures)



► INFORMATION:

FLOW RATE

Metric Units

Flow (l/min) = Speed (rpm) x Displacement (cc/rev) / 1000

Imperial Units

Flow (USGPM) = Speed (rpm) x Displacement (cu.in/rev) x 0.004329

TORQUE

Metric Units

Theoretical Torque (Nm) = Pressure (bar) x Displacement (cc/rev) / (20 x Pi)

Actual Torque Nm (90% Mech Efficiency) = Pressure (bar) x Displacement (cc/rev) / (20 x Pi x 0.9)

Imperial Units

Theoretical Torque (lbf.ft) = Pressure (psi) x Displacement (cu in/rev) / 75.36

Actual Torque Nm = Pressure (bar) x Displacement (cc/rev) / (75.36 x 0.9)

FLOW RATE

Metric Units

Power (KW) = Torque (Nm) x angular speed (rad/sec)
= Torque x speed (rpm) x 0.1047

Imperial Units

Power (hp) = Torque (ft lbs) x speed (rpm) / 5,252

FLUID VELOCITY

Metric Units

Velocity (m/s) = 21.22 x Q / D2
Q = flow rate (L/min)
D = Pipe bore (mm)

Imperial Units

Velocity (ft/s) = 0.408 x Q / D2
Q = flow rate (USGPM)
D = Pipe bore (in)

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