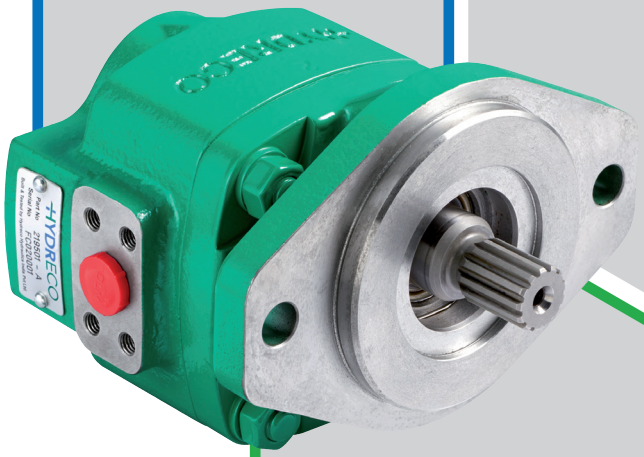
HYDRECO

ADVANCED HYDRAULIC TECHNOLOGIES

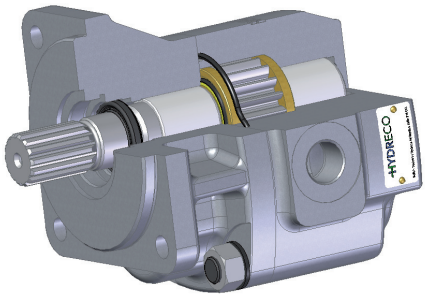
WSP50

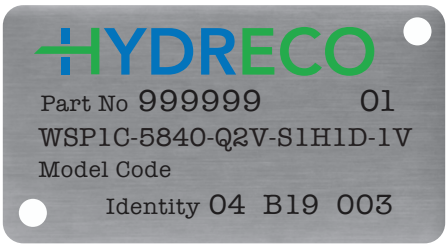
EXTERNAL GEAR PUMPS

20 to 88 cc/rev 350 bar



TECHNICAL CATALOGUE





OPERATING PARAMETERS

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.

World Series 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 Hydreco Hydraulics representative.

Max outlet port pressures	350 rated - 360 peak	
Inlet port pressures	0.7 - 3 bar abs	
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 quoted for mineral oils HM and HV. For fire resistant and environmentally aware fluids please contact your Hydreco Hydraulics representative.	
Rotation	Clockwise or Anti-clockwise viewed from shaft end (not reversible).	

SUPER QUIET, HIGH PERFORMANCE HYDRAULIC PUMPS

World Series pumps incorporates a purpose designed form of spur gear technology to give the highest performance with lowest noise levels.

The purpose designed form of spur gear reduces the effects of flow and pressure ripple to significantly reduce generated noise while large diameter shafts and bearings combined with rigidly aligned cast iron housings ensure long life in the most arduous applications.

Accuracy of components and pressure compensated side plates ensure that high performance levels are maintained.

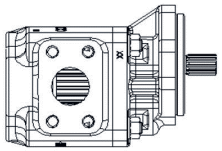
A RANGE OF SINGLE AND MULTIPLE PUMPS

Pump elements are available with displacements from 20 to 88 cm^3/rev (1.22 to 5.37 in^3/rev) for maximum continuous operating pressures upto 350 bar.

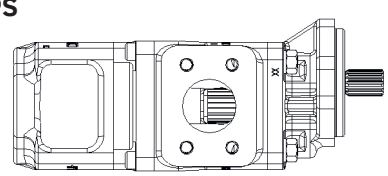
Pumps can be supplied as single, double, triple or quadruple units. There is a limit on the combinations that are available in doubles, triples and quadruples.

Please discuss your specific requirements with your local Hydreco Hydraulics representative.

SINGLE PUMPS



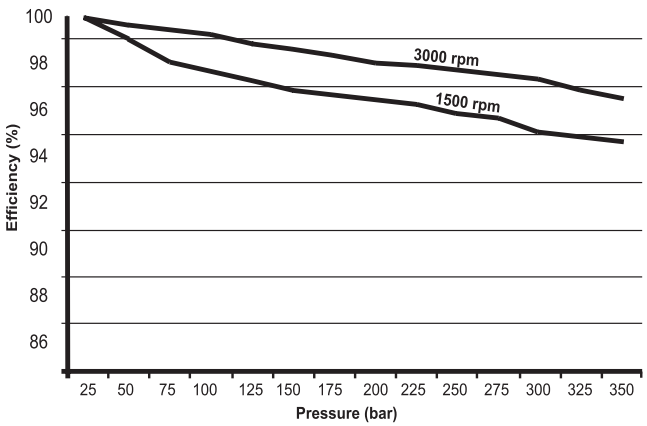
DOUBLE PUMPS



DISPLACEMENT RANGE

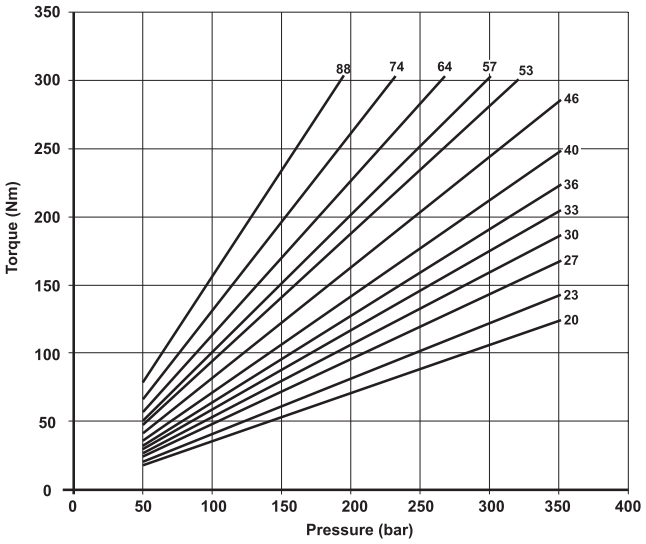
Model	Displacement cm^3/rev (in^3/rev)	Rated Pressure bar (psi)	Peak Pressure bar (psi)	Speed	
				Max	Min
				rpm	rpm
5020	20.0 (1.22)	350 (5075)	360 (5220)	3500	450
5023	23.0 (1.40)	350 (5075)	360 (5220)	3500	450
5027	27.0 (1.65)	350 (5075)	360 (5220)	3500	450
5030	30.0 (1.83)	350 (5075)	360 (5220)	3500	450
5033	33.0 (2.01)	350 (5075)	360 (5220)	3500	450
5036	36.0 (2.20)	350 (5075)	360 (5220)	3500	450
5040	40.0 (2.44)	350 (5075)	360 (5220)	3500	450
5046	46.0 (2.81)	350 (5075)	360 (5220)	3500	450
5053	53.0 (3.24)	320 (4640)	330 (4786)	3500	450
5057	57.0 (3.47)	300 (4350)	310 (4496)	3500	450
5064	64.0 (3.91)	275 (3990)	285 (4133)	3500	450
5074	74.0 (4.52)	230 (3335)	240 (3480)	3500	450
5088	88.0 (5.37)	190 (2755)	200 (2300)	3500	450

VOLUMETRIC EFFICIENCES



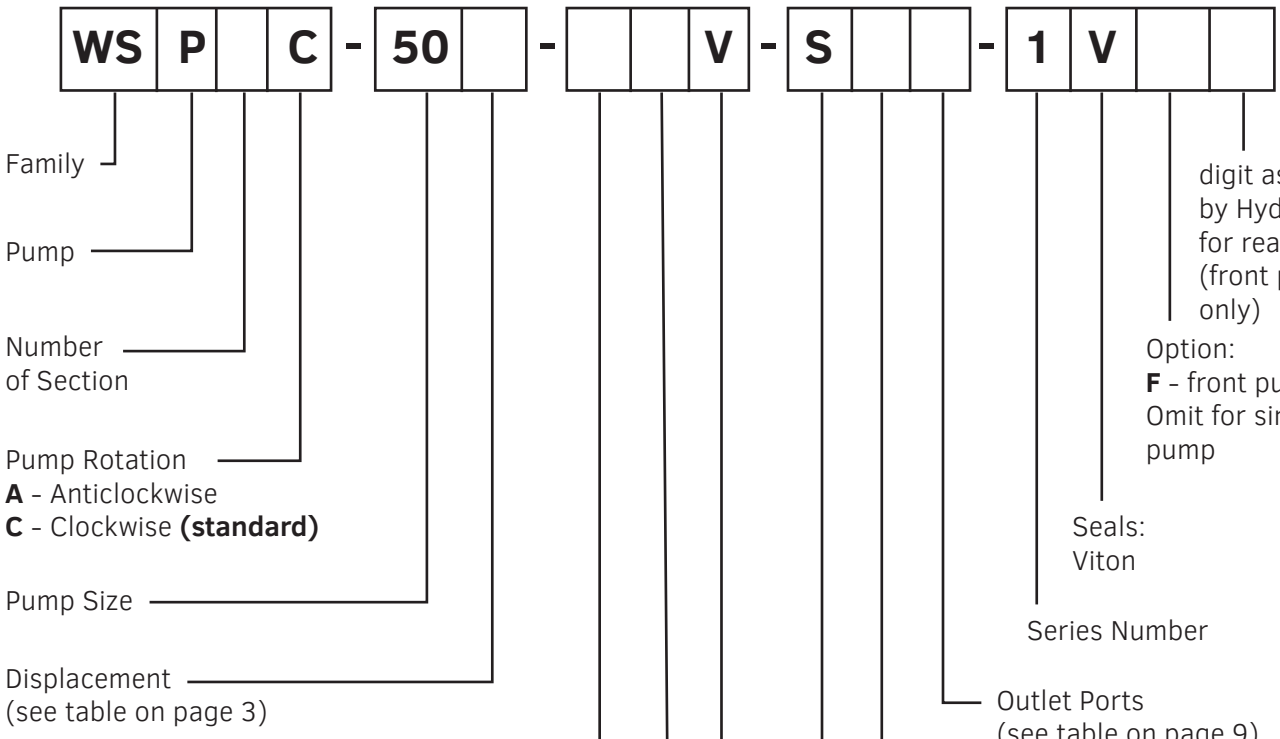
NOTE: These are actual volumetric efficiences measured on a 34 cc/rev pump.
Efficiences for pumps at other displacements will vary up or down from this curve.

TORQUE CURVE



NOTE: this is typical torque date with an assumed mechanical efficiency of 90%

Identification code for single and front pump



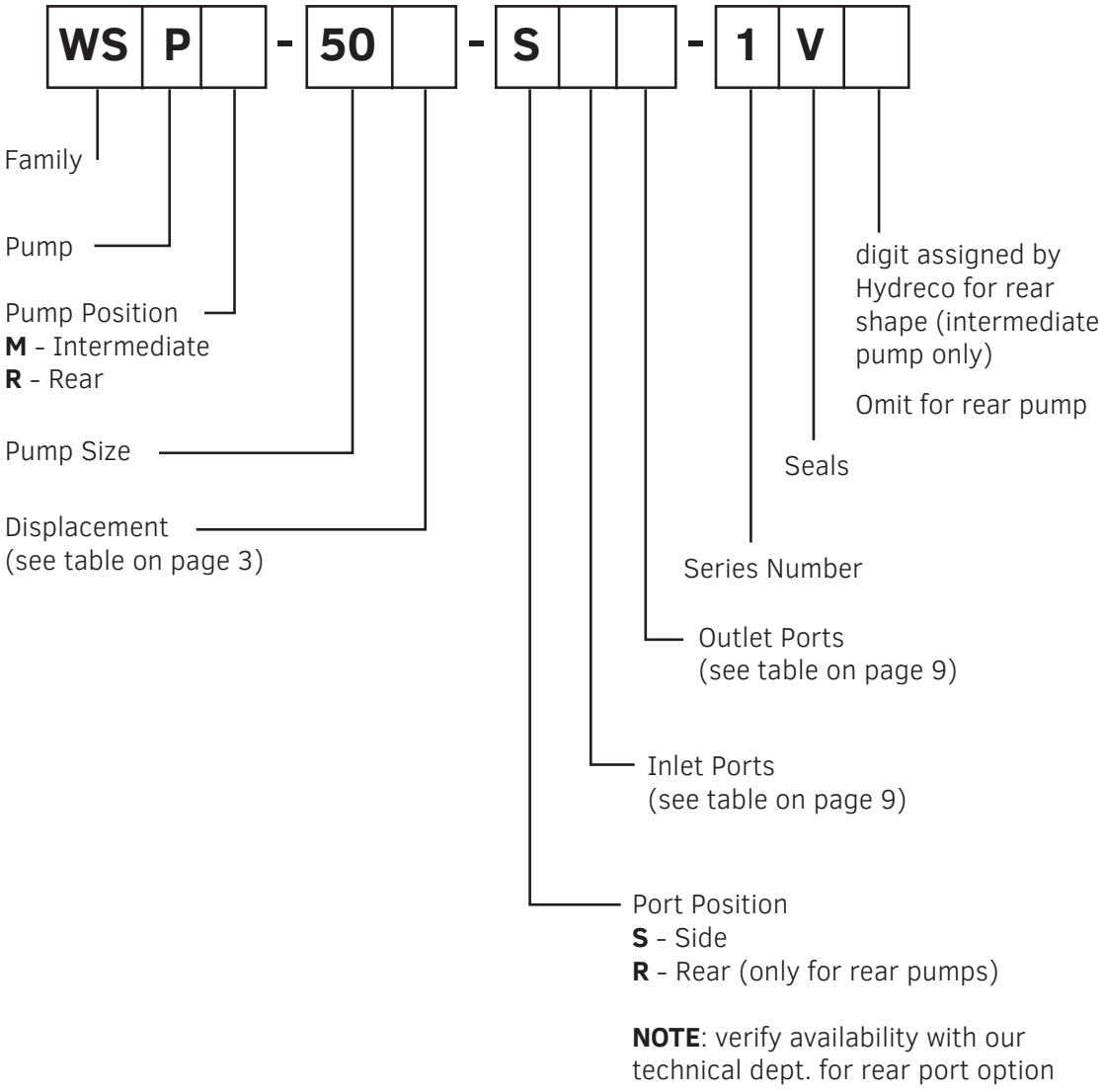
Single Pump Example:

WSP1C-5040-Q2V-S1H1D-1V

Front Pump Example:

WSP1C-5040-Q2V-S1H1D-1VF**

Identification code for multiple pumps



Identification code for double pumps

Identification Code Front Pump + Identification Code Rear Pump

Example: WSP2C-5040-Q2V-S1H1D-1VF** + WSPR-5040-S1H1D-1V

Identification code for triple pumps

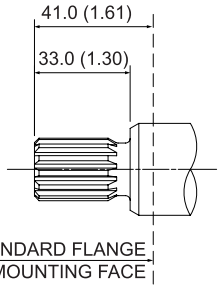
Identification Code Front Pump + Identification Code Intermediate Pump + Identification Code Rear Pump

Example: WSP3C-5040-Q2V-S1H1D-1VF** + WSPM-5040-S1H1D-1V** + WSPR-5040-S1F1B-1V

SHAFT OPTIONS

Code B — SAE 22-4 (B) 7/8" spline

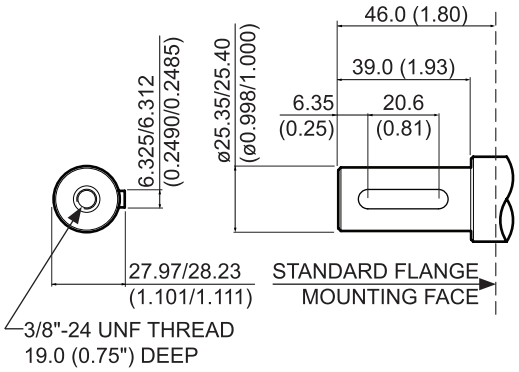
Involute Spline
13 teeth
16/32 DP
Flat root, side fit
30 deg pressure angle
Major dia 21.79/21.69
(0.858/0.854)



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

T = 252 Nm T = 186 lb.ft

Code H — SAE 25-1 (BB) 1" parallel

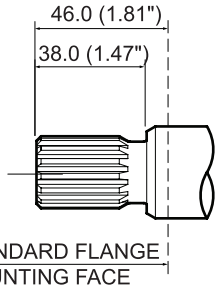


p x D = 22450 (bar x cm³/rev)*
p x D = 19869 (psi x cu.in/rev)*

T = 397 Nm T = 293 lb.ft

Code Q — SAE 25-4 (BB) 1" spline

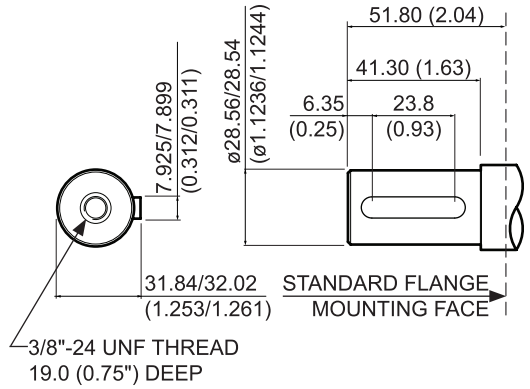
Involute Spline
15 teeth
16/32 DP
Flat root, side fit
30 deg pressure angle
Major dia 24.87/24.97
(0.979/0.983)



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 R — 1 1/8" parallel

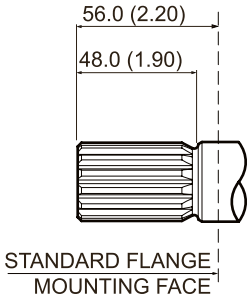


p x D = 31000 (bar x cm³/rev)*
p x D = 27435 (psi x cu.in/rev)*

T = 609 Nm T = 449 lb.ft

Code C — SAE 32-4 (C) 1 1/4" spline

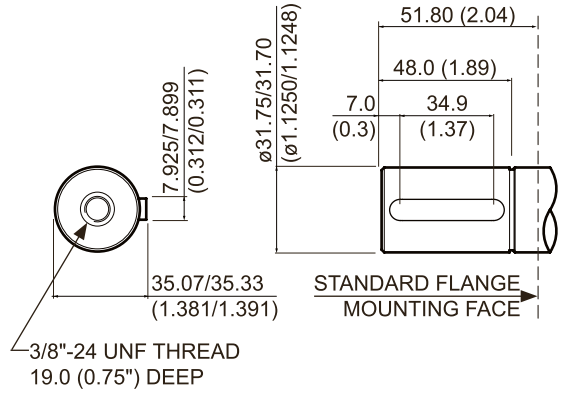
Involute Spline
14 teeth
12/24 DP
Flat root, side fit
30 deg pressure angle
Major dia 31.22/31.12
(1.229/1.225)



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 G — 1 1/4" parallel



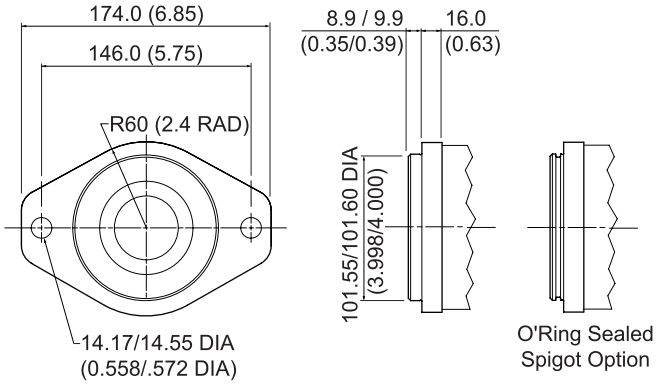
p x D = 45565 (bar x cm³/rev)*
p x D = 40325 (psi x cu.in/rev)*

T = 806 Nm T = 594 lb.ft

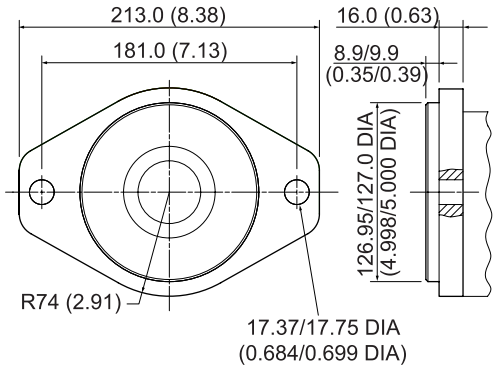
* p = pressure, D = displacement. The stated values must not be exceeded.
Note: For multiple pumps the sum of the p x D or torque values must not exceed the stated value.

FLANGES OPTIONS

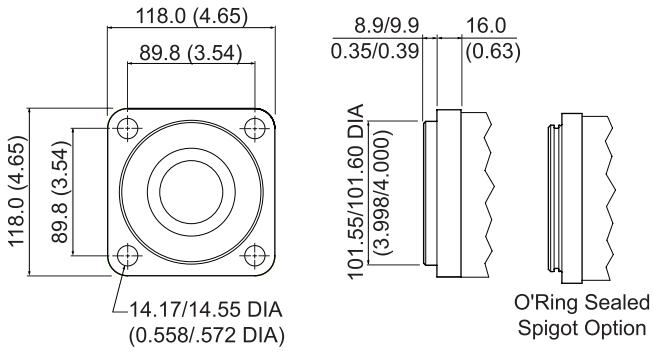
Code 2 SAE 101-2 (B - 2 bolt)



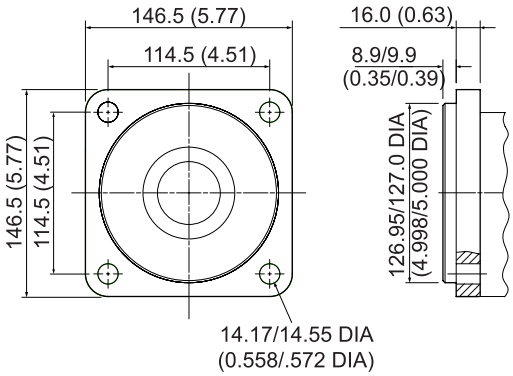
Code 4 SAE 127-2 (C - 2 bolt)



Code 3 SAE 101-4 (B - 4 bolt)

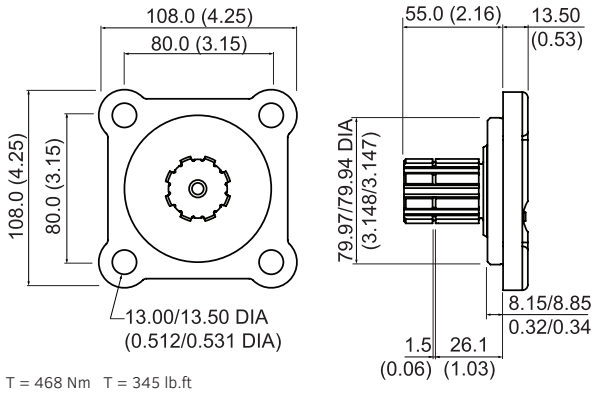


Code 5 SAE 127-4 (C - 4 bolt)



ON ROAD PTO SHAFT AND FLANGES OPTIONS

50BD ISO 7653 Shaft/Flange

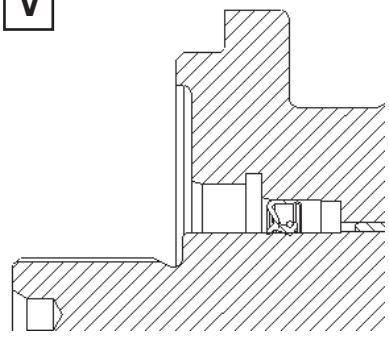


T = 468 Nm T = 345 lb.ft

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

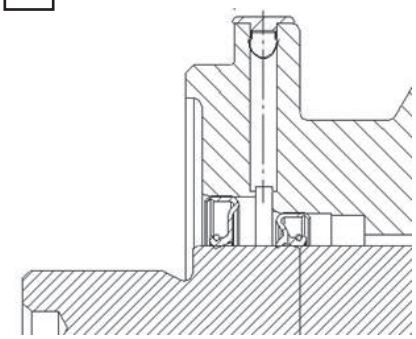
FLANGE / SHAFT SEAL

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.

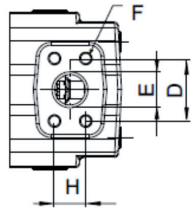
Please refer to hydreco sales Dept. for other flange and shaft seal options.

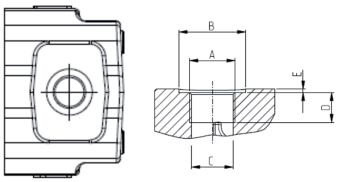
SHAFTS & FLANGES

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)	●	O	O	O	O	O	-
	3	SAE 101-4 (B - 4 bolt)	O	O	O	O	O	O	-
	4	SAE 127-2 (C - 2 bolt)	O	O	O	O	O	O	-
	5	SAE 127-4 (C - 4 bolt)	O	O	O	O	O	O	-
	50	ISO 7653 (on road)	-	-	-	-	-	-	●

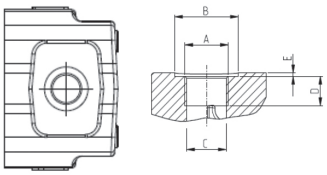
●	Standard
O	Available on Request
-	Not Available

PORT DETAILS

SAE FLANGED PORTS (3000 PSI series) Compliant with SAE J518	Ordering Code	Port Size	Dimension				Preferred Ports		
			E	D	H	F	Displacement	IN	OUT
	**1A**	1/2”	2.7	38.1	17.48	M8x1.25	20	1F	1B
	1B	3/4”	19.05	47.63	22.23	M10x1.5	23	1F	1B
	1D	1”	25.4	52.37	26.19	M10x1.5	27	1F	1B
	1F	1 1/4”	31.75	58.72	30.18	M10x1.5	30	1F	1B
	1H	1 1/2”	38.1	69.85	35.71	M12x1.75	33	1F	1B
	1K	2”	50.8	77.77	42.88	M12x1.75	36	1H	1D
	1L	2 1/2”	63.5	88.9	50.8	M12x1.75	40	1H	1D
	1M	3”	76.2	106.37	61.93	M16x2.0	46	1H	1D
	1N	4”	101.6	130.18	77.77	M16x2.0	53	1H	1D
							57	1K	1F
							64	1K	1F
							74	1K	1F
							88	1K	1F

BSP THREADED PORTS Compliant with ISO 228	Ordering Code	Port Size	Dimension				Preferred Ports		
			B	C	D	E	Displacement	IN	OUT
	**3A**	1/2”	38.1	19.05	19.05	0.5	20	3F	3B
	3B	3/4”	47.63	24.59	22.23	0.5	23	3F	3B
	3D	1”	50.8	30.94	25.4	0.5	27	3F	3B
	3F	1 1/4”	66.68	39.29	28.58	0.5	30	3F	3B
	3H	1 1/2”	76.2	45.24	28.58	0.5	33	3F	3B
	3K	2”	76.2	57.15	31.75	0.5	36	3H	3D
							40	3H	3D
							46	3H	3D
							53	3H	3D
							57	3H	3F
							64	3H	3F
							74	3H	3F
							88	3H	3F

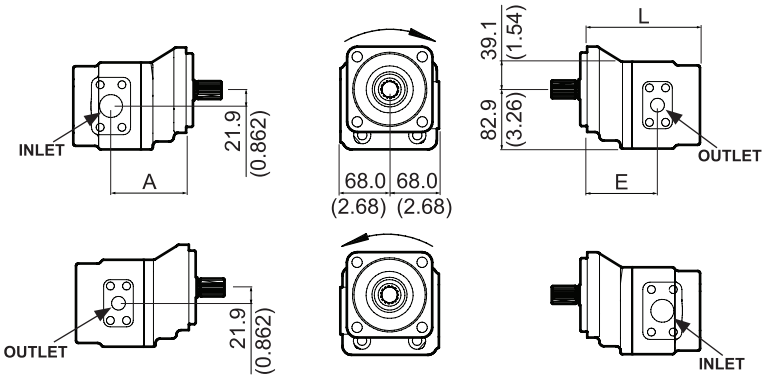
Imperial threaded options also available. Please refer to Hydreco for details.

UNF THREADED PORTS with O-Ring Compliant with SAEJ1926	Ordering Code	Port Size	Dimension				Preferred Ports		
			B	C	D	E	Displacement	IN	OUT
	**4D**	1” UNF “O” Ring	38.48	23.34	19.05	1.5	20	4J	4E
	4E	1 1/16” UNF “O” Ring (=#12)	41.28	24.92	19.05	1.5	23	4J	4E
	4F	1 1/4” UNF “O” Ring	46.49	29.69	19.05	1.5	27	4J	4E
	4G	1 5/16” UNF “O” Ring (=#16)	48.51	31.27	19.05	1.5	30	4J	4E
	4H	1 1/2” UNF “O” Ring	30.36	36.04	19.05	1.5	33	4J	4E
	4J	1 5/8” UNF “O” Ring (=#20)	57.66	39.22	19.05	1.5	36	4J	4G
	4K	2” UNF “O” Ring	68.25	48.74	19.05	1.5	40	4J	4G
	4L	2 1/2” UNF “O” Ring	88.39	61.44	19.05	1.5	46	4J	4G
	4P	1 7/8” UNF “O” Ring (=#24)	65.02	45.57	19.05	1.5	53	4J	4G
							N/A	N/A	N/A
							N/A	N/A	N/A
							N/A	N/A	N/A
							N/A	N/A	N/A

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

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

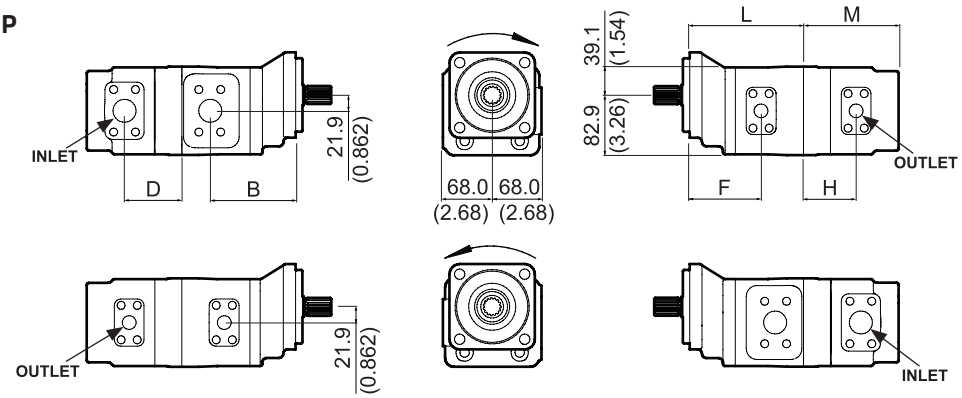
SINGLE PUMP



CLOCKWISE

ANTICLOCKWISE

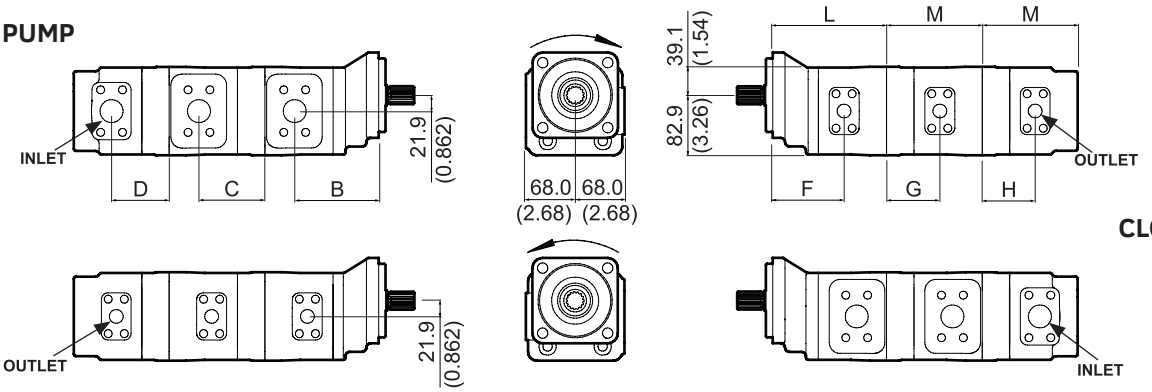
DOUBLE PUMP



CLOCKWISE

ANTICLOCKWISE

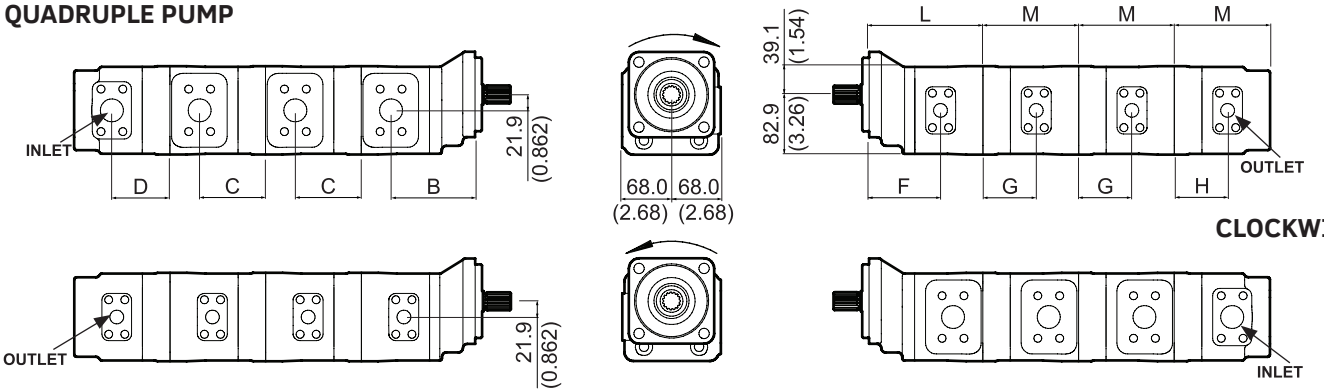
TRIPLE PUMP



CLOCKWISE

ANTICLOCKWISE

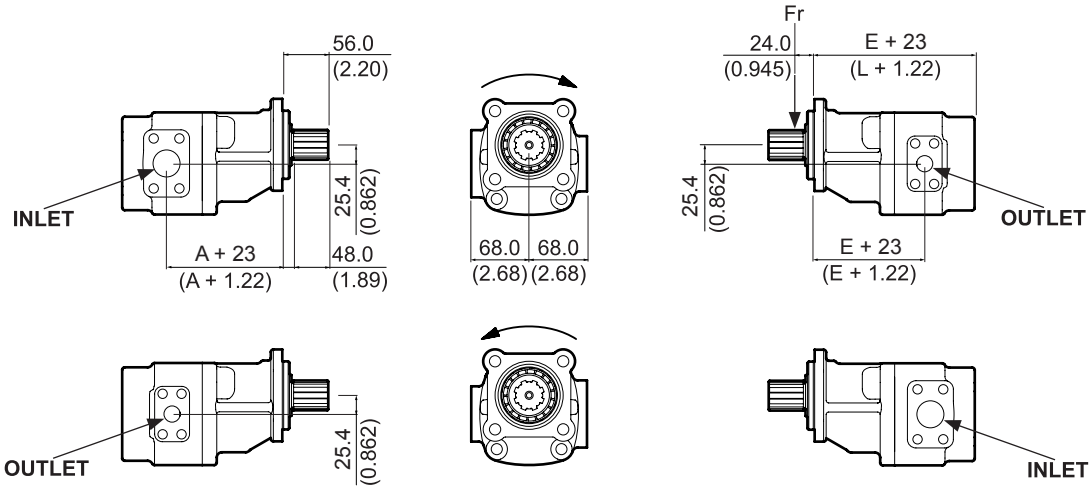
QUADRUPLE PUMP



CLOCKWISE

ANTICLOCKWISE

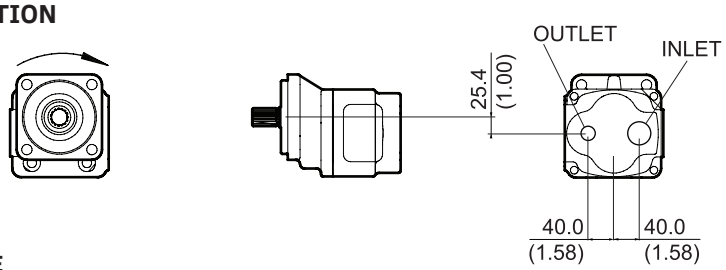
50BD: OUTBOARD BEARING OPTION



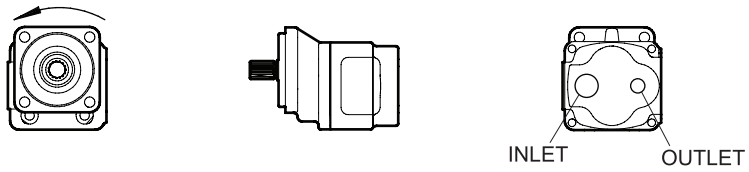
Maximum Radial Load (Fr) at 24.0 (0.945) from Mounting Face = 9000N (2025 lbf)
The Outboard Bearing option is only available with the ISO 7653 Mounting Flange

REAR PORT OPTION

CLOCKWISE



ANTICLOCKWISE



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
SINGLE AND MULTIPLE 50 SERIES PUMPS

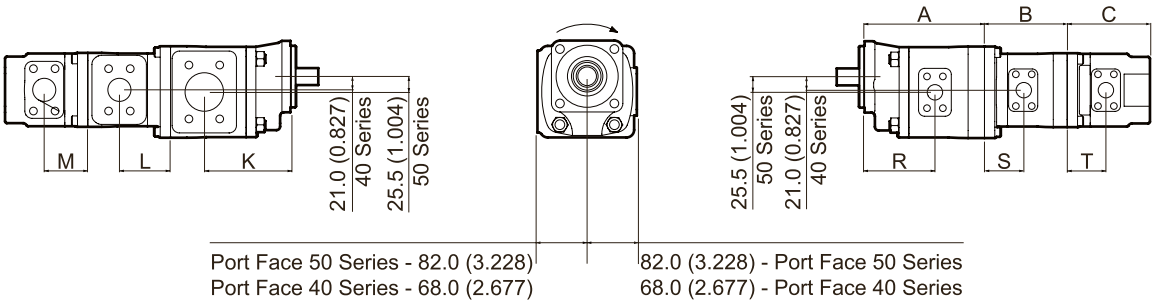
Dimension Reference	Displacement - cc/rev (in³/rev)										
	27 (1.65)	30 (1.83)	33 (2.01)	36 (2.20)	40 (2.44)	46 (2.81)	53 (3.24)	57 (3.48)	64 (3.91)	74 (4.52)	88 (5.37)
A	107.3 (4.225)	109.7 (4.317)	112.0 (4.409)	108.7 (4.280)	111.8 (4.403)	116.5 (4.588)	122.0 (4.803)	113.7 (4.478)	119.2 (4.694)	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 (3.788)	99.3 (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 (4.018)	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 (1.016)
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)	165.0 (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 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



	Displacement cc/rec (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)
50 Series Data	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)	76.2 (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 (1.012)	51.3 (2.020)	51.5 (2.028)	51.1 (2.012)	51.3 (2.020)	51.6 (2.031)	52.0 (2.047)

	Displacement cc/rec (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)
40 Series Data	L	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)
	M	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)
	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 (1.398)	25.9 (1.020)	30.2 (1.189)	34.6 (1.362)	39.0 (1.535)
	T	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 (1.398)	25.9 (1.020)	30.2 (1.189)	34.6 (1.362)	39.0 (1.535)
	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)
	C	70.0 (2.756)	74.2 (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 Hydreco representative for advice.

MULTIPLE PUMPS - TORQUE LIMITS

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.

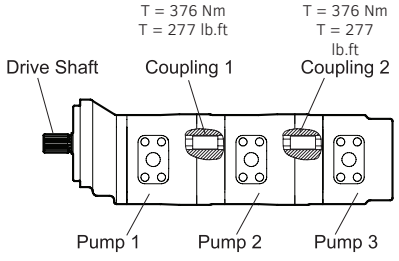
Code	Shaft Type	T = pD Maximum	
		bar x cm³/rev	bar x in³/rev
B	SAE 22-4 (B) 7/8" Spline	14226	12590
F	SAE 22-1 (B) 7/8" Parallel	14226	12590
Q	SAE 25-4 (B) 1" Spline	22450	19869
H	SAE 25-1 (B) 1" Parallel	22450	19869
R	1 1/8" Parallel	31000	27435
BD	ISO 7653	45566	40326
BC	UNI 8953	14226	12590
	Coupling 50 - 40	21250	18803
	Coupling 50 - 50	21250	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)



MULTIPLE PUMPS

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.

FLUIDS

Designation	Fluid Type	Rated Pressure	Max Speed	Fluid Temperature limits	
		bar	rpm	ºC min	ºC max
HM / HV	Mineral based hydraulic Fluid	350	3300	-20	+80
HFA	Oil in water emulsion	75	1500	10*	60*
HFB	Water in oil emulsion	130	1500	10*	65*
HFC	Water glycol	175	1500	0*	65*
HFD	Phosphate ester	Refer to Hydreco	Refer to Hydreco	Refer to Hydreco	Refer to Hydreco
HETG	Triglyceride based fluid	Refer to Hydreco	Refer to Hydreco	Refer to Hydreco	Refer to Hydreco
HEES	Synthetic ester fluid	Refer to Hydreco	Refer to Hydreco	Refer to Hydreco	Refer to 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.
'QX5' 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.

Hydreco Hydraulics' engineers will be pleased to advise on any installation

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

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)

TORQUE

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

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

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)

POWER

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

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CONTACT INFORMATION

EMEA

GERMANY	Hydreco Hydraulics GmbH, Straelen (NRW)	+49 283494303-41	info-de@hydreco.com
ITALY	Hydreco Hydraulics Italia Srl, Vignola (MO)	+39 059 7700411	sales-it@hydreco.com
NORWAY	Hydreco Hydraulics Norway AS, Nittedal	+47 22909410	post-no@hydreco.com
UK	Hydreco Hydraulics Ltd, Poole, Dorset	+44 (0) 1202 627500	info-uk@hydreco.com

AMERICAS

USA	Hydreco Inc, Rock Hill (SC)	+1 704 295 7575	sales-us@hydreco.com
LATIN AMERICA		+1 704 572 6266	sales-es@hydreco.com

APAC

AUSTRALIA	Hydreco Hydraulics Pty Ltd, Seven Hills (NSW)	+61 2 9838 6800	sales-au@hydreco.com
AUSTRALIA	Hydreco Hydraulics Pty Ltd, Smeaton Grange (NSW)	+61 2 4647 6577	au-smeatongrange@hydreco.com
AUSTRALIA	Hydreco Hydraulics Pty Ltd, Welshpool (WA)	+61 8 9377 2211	reception-wa@hydreco.com
INDIA	Hydreco Hydraulics India Private Ltd, Bangalore	+91 80 67656300	sales-in@hydreco.com

QUALITY SYSTEM CERTIFICATION DNV·GL ISO 9001:2015

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WSP50_2020_01