



HYDRAULIC SOLUTIONS PROVIDER

BI-ROTATIONAL PUMP SERIES

PUA (41 Series)



Positive Displacement External Gear Pump
15 to 115 cm³/rev (0.92 to 7.02 cu.in/rev)
up to 250 bar (3625 psi) rated pressure

BI-ROTATIONAL SERIES - PUA TECHNICAL DATA

OPERATING PARAMETERS

Transport PUA pumps are spur gear and are designed and manufactured to be highly efficient and 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	see page 3	
Inlet port pressures	see below.	
Speed Range	All models	450 - 2000 rev/min (2500 rpm intermittent)
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 mm ² /sec (9,000 SSU)
	Maximum continuous	250 mm ² /sec (1150 SSU)
	Minimum continuous	10 mm ² /sec (60 SSU)
	Optimum	15-25 mm ² /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)
	Maximum axial load	250 N (56 lb) - without support bearing
Shaft Loads	Maximum radial load	500 N (112 lb) - without support bearing
	All data is quoted for mineral oils HM and HV.	
Fluids	For fire resistant and environmentally aware fluids please contact your Hydreco Hydraulics representative.	
	Rotation	
	Clockwise or Anti-clockwise viewed from shaft end - determined by piping.	

INLET CONDITIONS

It is essential that pumps are installed so that they can always fill with fluid.

World Series PUA 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.**

Ideally, inlet fluid velocity should not exceed 2.5 m/sec (8.0 ft/sec) calculated by:

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

however, where shorter tank to pump hoses are used, and/or of larger diameter, then this ideal velocity can be exceeded.

- **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

BI-ROTATIONAL SERIES DISPLACEMENT RANGE

DISPLACEMENT RANGE

DISPLACEMENT cm ³ /rev (in ³ /rev)	RATED PRESSURE bar (psi)	PEAK PRESSURE bar (psi)
15.0 (0.92)	250 (3625)	280 (4060)
25.0 (1.53)	250 (3625)	280 (4060)
35.0 (2.14)	250 (3625)	280 (4060)
45.0 (2.75)	250 (3625)	280 (4060)
55.0 (3.36)	250 (3625)	280 (4060)
65.0 (3.97)	250 (3625)	280 (4060)
75.0 (4.58)	230 (3335)	260 (3770)
90.0 (5.49)	230 (3335)	260 (3770)
115.0 (7.02)	210 (3045)	240 (3480)

VOLUMETRIC EFFICIENCY

Volumetric efficiency is dependent upon a number of factors:-

1. Displacement
2. Operating Speed
3. Oil Viscosity
4. Pressure

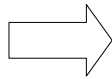
But typically, a 115 cc/rev pump running at 1500 rpm with an oil of viscosity of 20 cSt will have a minimum volumetric efficiency of 95% at maximum operating pressure under normal test conditions, while a 15 cc/rev pump running under the same test conditions will have a minimum volumetric efficiency of 88%. These are the normal test requirements and actual volumetric efficiency will be at this level or better.

However, variations in the factors defined above will vary these efficiency figures, either up or down, and deterioration of pump component quality during the operation of the machine over time will also lower volumetric efficiency.

BI-ROTATIONAL SERIES MODEL SELECTION

Displacements

DISPLACEMENT	
cm ³ /rev	in ³ /rev
15.0	0.92
25.0	1.53
35.0	2.14
45.0	2.75
55.0	3.36
65.0	3.97
75.0	4.58
90.0	5.49
115.0	7.02



Port Thread Options

 3/4" BSP
 1" BSP
 1 1/4" BSP


Port Position Options

 Side Ports only
 Side & Rear Ports

Mounting Flange / Drive Shaft Combinations

- Powauto 08
- ISO 7653 with Support Bearing
- ISO 7653 without Support Bearing
- Select one from this list (see page 5)

OR

Mounting Flanges

- SAE 82-2 (A- 2 bolt)
- SAE 101-2 (B - 2 + 4 bolt combination)
- Select a separate Mounting Flange and Separate Drive Shaft from these two lists (see page)

Drive Shaft

- SAE 16-4 (A) 5/8" Spline
- SAE 22-4 (B) 7/8" Spline
- SAE 25-4 (BB) 1" Spline
- SAE 22-1 (B) 7/8" Parallel
- SAE 25-1 (BB) 1" Parallel

Shaft Seals

- Seal and Wiper - (Code A)
- 2 Seals with Tell Tale - (Code C)

Operating Pressure

Before ordering please check that the pump will be operated within quoted parameters and that drive shaft "pD" factors are not exceeded.

Operating Speed

Hydraulic Fluid Type

- Premium Mineral Oil
- Other (please state)

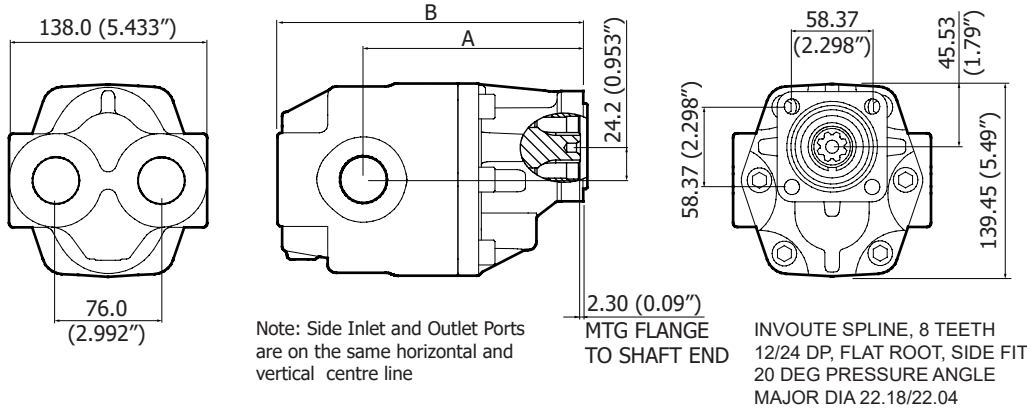
Application

Contact Details (Company, Name, Address, Tel., E-Mail, etc)

Any Other Relevant Information

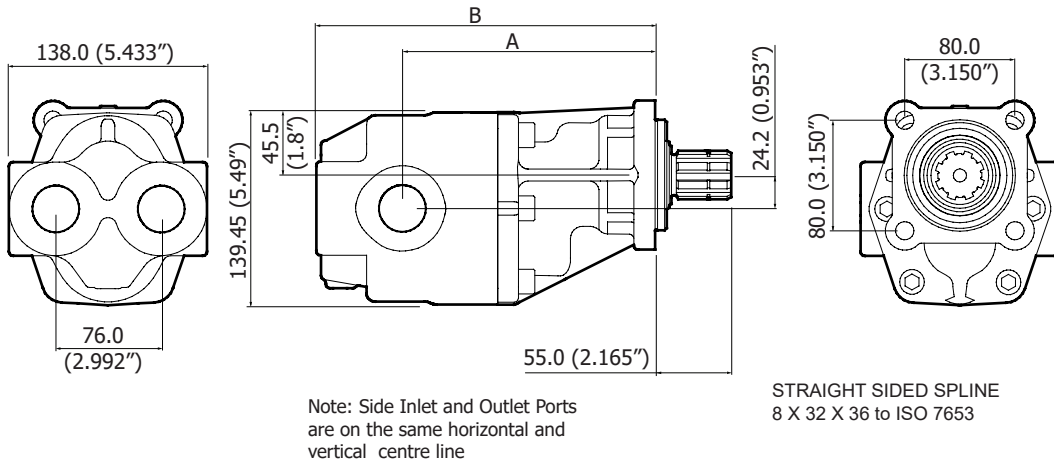
BI-ROTATIONAL SERIES FLANGE / SHAFTS COMBINATIONS

POW AUTO 08 VERSION



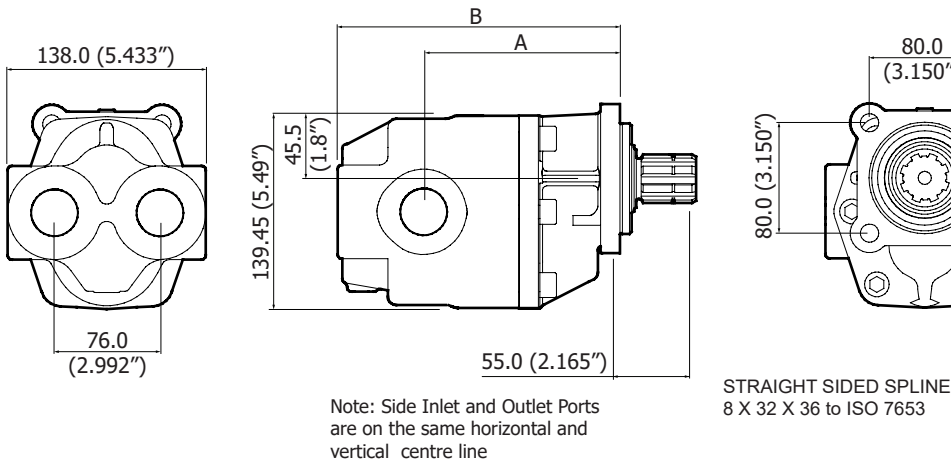
DISPLACEMENT cc/rev (in3/rev)	A mm (inch)	B mm (inch)
15 (0.916)	142.1 (5.49")	178.1 (7.05")
25 (1.526)	149.2 (5.87")	186.2 (7.33")
35 (2.137)	156.3 (6.16")	193.3 (7.61")
45 (2.747)	151.5 (5.96")	200.5 (7.89")
55 (3.358)	158.6 (6.24")	207.6 (8.17")
65 (3.968)	165.7 (6.53")	214.7 (8.45")
75 (4.579)	149.9 (5.90")	221.9 (8.74")
90 (5.495)	160.6 (6.32")	232.6 (9.16")
115 (7.021)	178.4 (7.02")	250.4 (9.86")

ISO 7653 VERSION with OUTBOARD BEARING



DISPLACEMENT cc/rev (in3/rev)	A mm (inch)	B mm (inch)
15 (0.916)	165.1 (6.50")	202.1 (7.96")
25 (1.526)	172.3 (6.78")	209.3 (8.24")
35 (2.137)	179.4 (7.06")	216.4 (8.52")
45 (2.747)	174.5 (6.87")	223.5 (8.80")
55 (3.358)	181.7 (7.15")	230.7 (9.08")
65 (3.968)	188.8 (7.43")	237.8 (9.36")
75 (4.579)	172.9 (6.81")	244.9 (9.64")
90 (5.495)	183.6 (7.23")	255.6 (10.06")
115 (7.021)	201.5 (7.93")	273.5 (10.77")

ISO 7653 VERSION without OUTBOARD BEARING



DISPLACEMENT cc/rev (in3/rev)	A mm (inch)	B mm (inch)
15 (0.916)	123.6 (4.87")	160.6 (6.32")
25 (1.526)	130.7 (5.15")	167.7 (6.60")
35 (2.137)	137.8 (5.43")	174.8 (6.88")
45 (2.747)	133.0 (5.24")	182.0 (7.16")
55 (3.358)	140.1 (5.52")	189.1 (7.45")
65 (3.968)	147.2 (5.80")	196.2 (7.73")
75 (4.579)	131.4 (5.17")	203.4 (8.01")
90 (5.495)	142.1 (5.59")	214.1 (8.43")
115 (7.021)	159.9 (6.30")	231.9 (9.13")

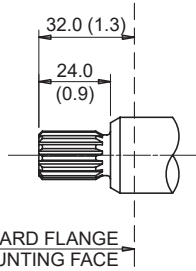
NOTE: No Axial or Radial Loads are permissible on this version

BI-ROTATIONAL SERIES DRIVE SHAFTS

Code **A**

SAE 16-4 (A) 5/8" spline

INVOLUTE SPLINE
9 TEETH
16/32 DP
FLAT ROOT
SIDE FIT
30° PRESSURE ANGLE
MAJOR DIA: 15.44/15.34
(0.608/0.604)



STANDARD FLANGE
MOUNTING FACE

$p \times D = 5200$ (bar x cm^3/rev)*
 $p \times D = 4600$ (psi x cu.in/rev)*

ISO 7653 Spline

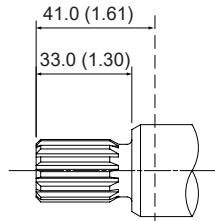
(Dimensions are shown on previous page)

$p \times D = 27140$ (bar x cm^3/rev)

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)

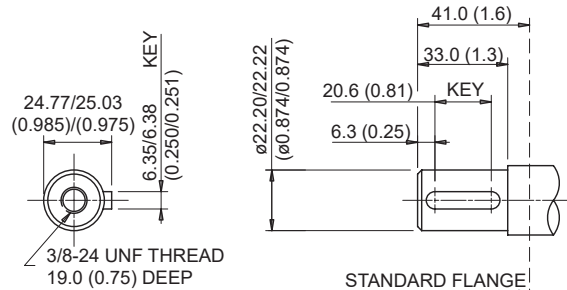


STANDARD FLANGE
MOUNTING FACE

$p \times D = 14226$ (bar x cm^3/rev)*
 $p \times D = 12590$ (psi x cu.in/rev)*

Code **F**

SAE 22-1 (B) 7/8" Parallel



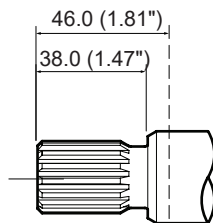
STANDARD FLANGE
MOUNTING FACE

$p \times D = 14226$ (bar x cm^3/rev)*
 $p \times D = 12590$ (psi x cu.in/rev)*

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 24.97/24.87 (0.983/0.979)

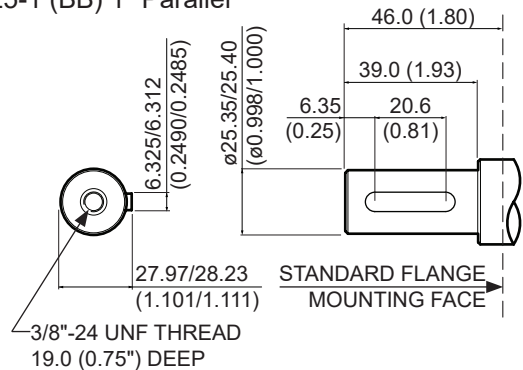


STANDARD FLANGE
MOUNTING FACE

$p \times D = 22450$ (bar x cm^3/rev)*
 $p \times D = 19869$ (psi x cu.in/rev)*

Code **H**

SAE 25-1 (BB) 1" Parallel



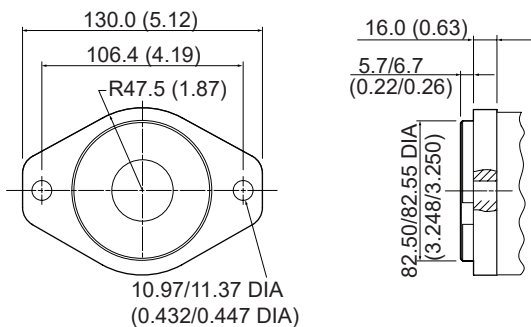
STANDARD FLANGE
MOUNTING FACE

$p \times D = 22450$ (bar x cm^3/rev)*
 $p \times D = 19869$ (psi x cu.in/rev)*

BI-ROTATIONAL SERIES STANDARD MOUNTING FLANGES

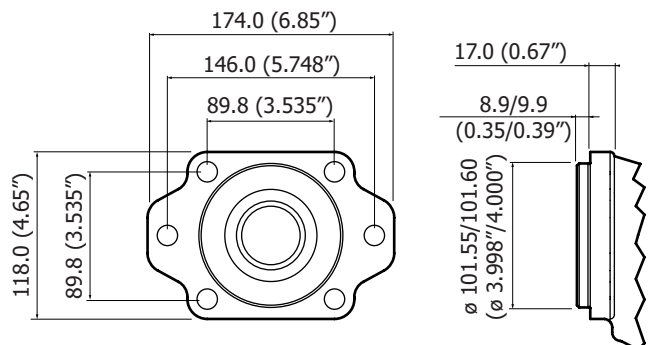
Code **1**

SAE 82-2 (A - 2 bolt)



Code **20**

SAE 101-4/101-2 (B 4 Bolt + B 2 bolt Combined)





CONTACT INFORMATION

EMEA				
GERMANY	Hydreco Hydraulics GmbH, Straelen (NRW)	Tel: +49 2834 94303-41	Fax: +49 2834 94303-64	info-de@hydreco.com
ITALY	Hydreco Hydraulics Italia Srl, Vignola (MO)	Tel: +39 059-7700411	Fax: +39 059-7700425	sales-it@hydreco.com
NORWAY	Hydreco Hydraulics Norway AS, Niittedal	Tel: +47 22 90 94 10	Fax: -	post-no@hydreco.com
UK	Hydreco Hydraulics Ltd, Poole, Dorset	Tel: +44 (0) 1202 627500	Fax: +44 (0) 1202 627555	info-uk@hydreco.com
AMERICAS				
USA	Hydreco Inc, Rock Hill (SC)	Tel: +1 704 295-7575	Fax: +1 704 295-7574	sales-us@hydreco.com
LATIN AMERICA		Tel: +1 704 572-6266		sales-es@hydreco.com
APAC				
AUSTRALIA	Hydreco Hydraulics Pty Ltd, Seven Hills (NSW)	Tel: +61 2 9838 6800	Fax: +61 2 9838 6899	sales-au@hydreco.com
AUSTRALIA	Hydreco Hydraulics Pty Ltd, Smeaton Grange (NSW)	Tel: +61 246 476 577	Fax: +61 2 4648 2257	hydreco-au-narellan@hydreco.com
AUSTRALIA	Hydreco Hoist & Winch Sales (WA) Pty Ltd, Bassendean (WA)	Tel: +61 8 9377 2211	Fax: +61 8 9377 2223	hydreco-au-hhw@hydreco.com
INDIA	Hydreco Hydraulics India Private Ltd, Bangalore	Tel: +91 80 42713100	Fax: +91 80 42713111	sales-in@hydreco.com