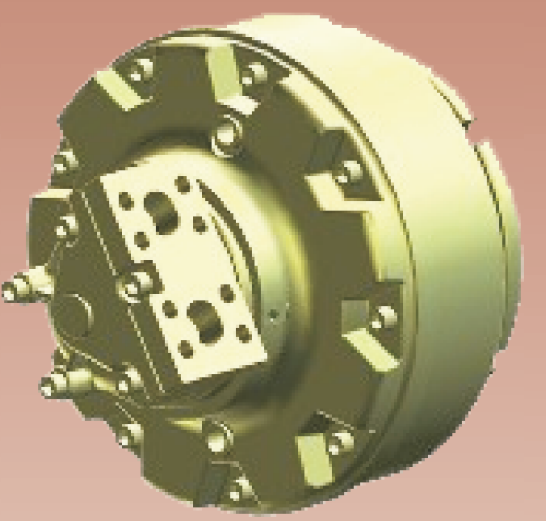
SAI

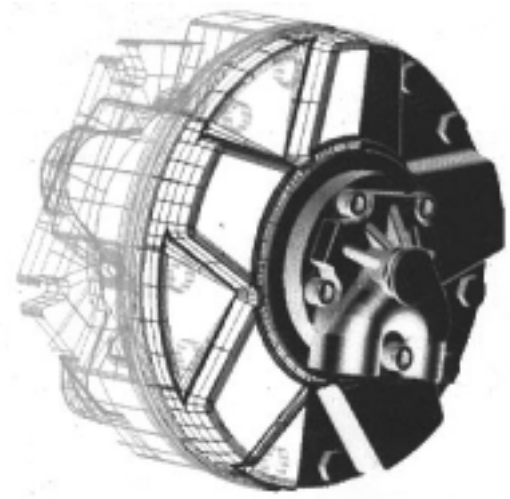
HYDRAULIC MOTORS



BD Series Motors

GD Series Motors

Crankshaft Design
Radial Piston Hydraulic Motors



BD SERIES
GD SERIES
TECHNICAL CATALOG

CONTENTS **PAGE**

012703REV0

GENERAL CHARACTERISTICS & FEATURES

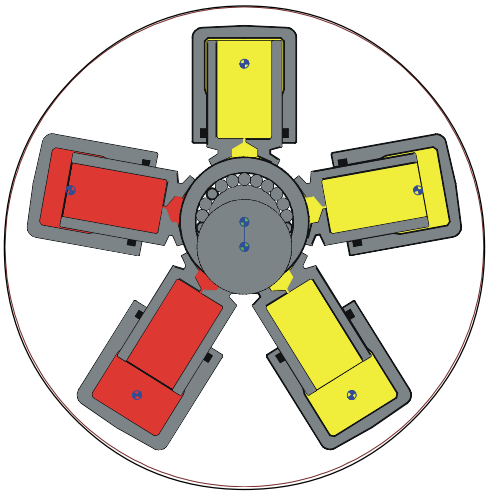
Five cylinder crankshaft design radial pistion hydraulic motor

The BD Series motor utilizes many of the proven components from the GM Series motors, well known for their high performance and reliability. The innovative design of the new sliding central bearing arrangement, made possible by the latest materials and manufacturing techniques increases the range of possible options in SAI hydraulic motors.

These include the possibility to change displacement, fit taper roller bearings for axial load capability, have a hollow through shaft option, and fit a counterbalance weight to smooth out high speed vibration. Its also possible to accept higher radial loading of the motor shaft due to a larger cross section giving extra strength.

CHANGE OF DISPLACEMENT

Change of motor displacement in the BD Series is achieved by changing the stroke of the crankshaft. This is achieved by a low pressure external pilot signal and changes from high to low displacement and vice versa can take place both dynamically, with a smooth speed variation, and statically.



FREEWHEELING

The BD Series motors can be freewheeled in full cavitation.

DESIGN & OPERATION

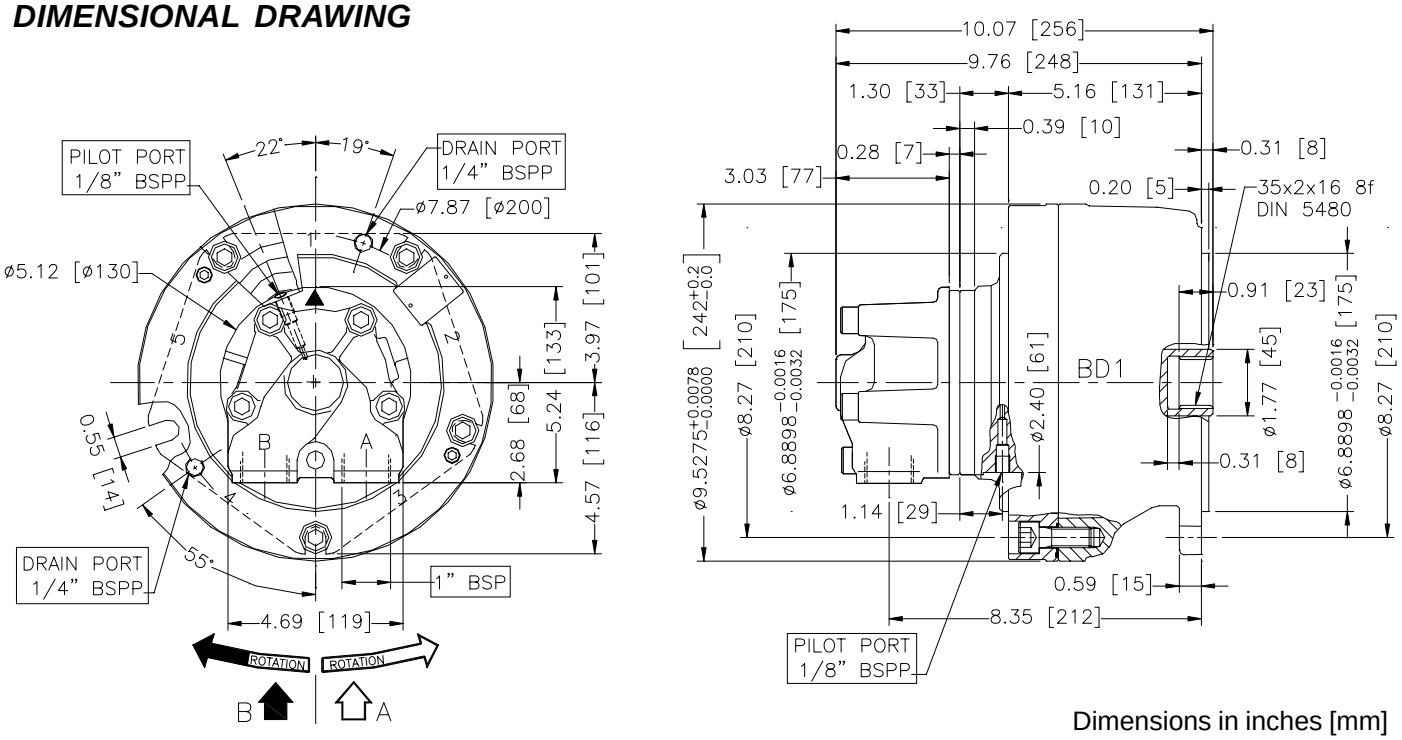
The sliding bearing has an extremely low coefficient of friction and as a consequence gives very high starting torque efficiency, and continues to achieve higher then average mechanical efficiencies both in high and low displacement modes. At present, the maximum running speed is restricted to the flow which can pass through distributor which is fitted to this series of motors.

STARTING & LOW SPEED TORQUE

The motors are capable of working at low speeds with a high degree of speed stability. The minimum stable speed depends on the displacement of the motor. Output torque remains very constant and does not fall away at very low speeds or under stall or start conditions.

Prototypes still under testing, subject to development. Values can be changed.

DIMENSIONAL DRAWING

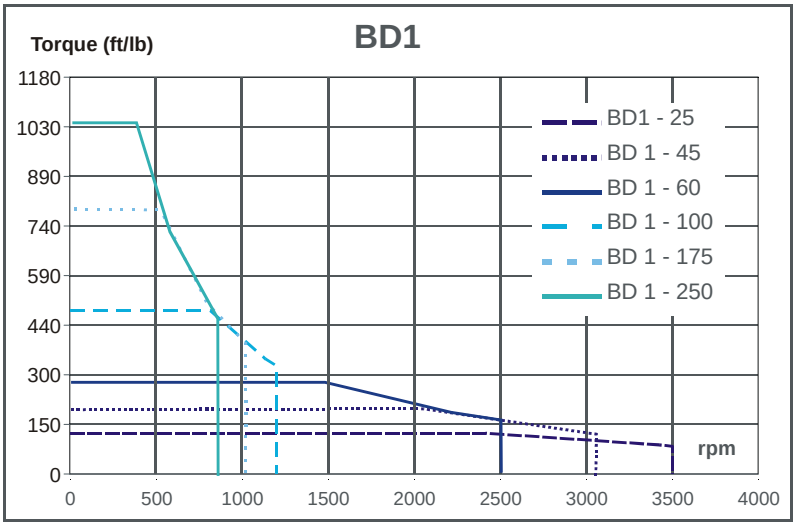


Dimensions in inches [mm]

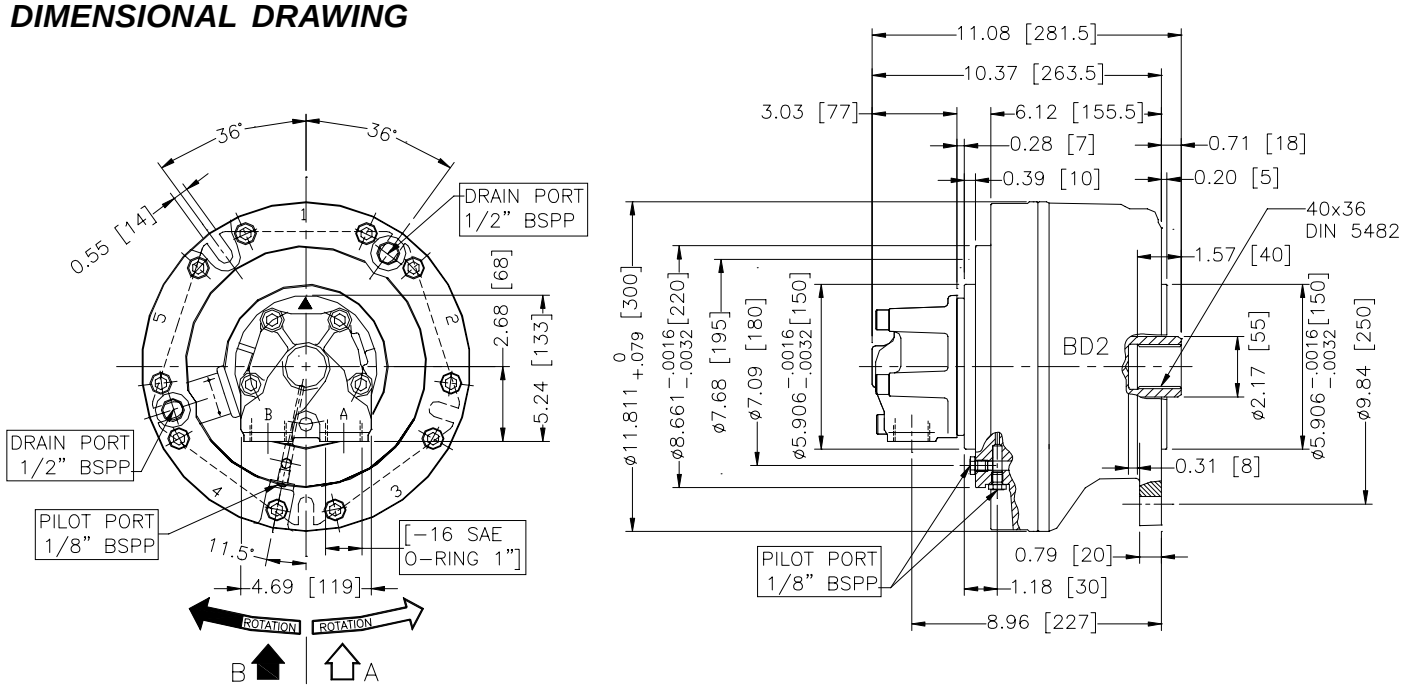
TABLE OF AVAILABLE DISPLACEMENTS & PERFORMANCES DATA

BD1		**100**	**25**	**175**	**45**	**250**	**60**
Displacement	in³/rev	6.04	1.53	10.50	2.75	14.83	3.66
Bore	mm	28		37		44	
Stroke	mm	32	8	32	8	32	8
Specific Torque	lb.ft/100 psi	7.83	1.98	13.63	3.41	19.28	4.83
Pressure rating	psi	4500		4000		3500	
Peak pressure	psi	6000		5500		5500	
Cont. speed	rpm	500	1500	500	1500	500	1500
Max. speed	rpm	1500	3500	1000	3000	850	2500
Peak power	hp	75	55	75	75	75	75

PERFORMANCES RANGE

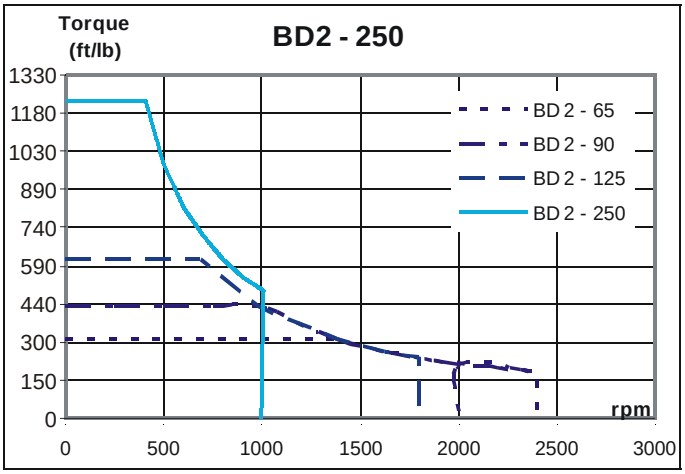


DIMENSIONAL DRAWING

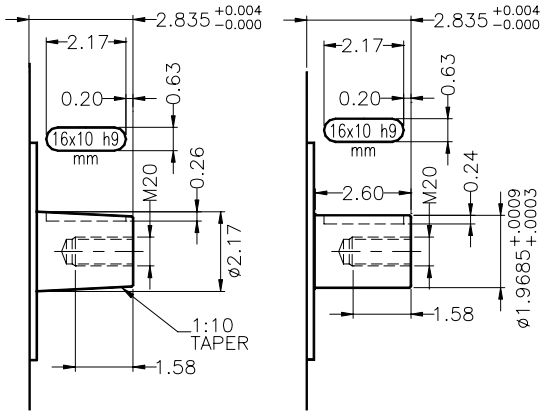


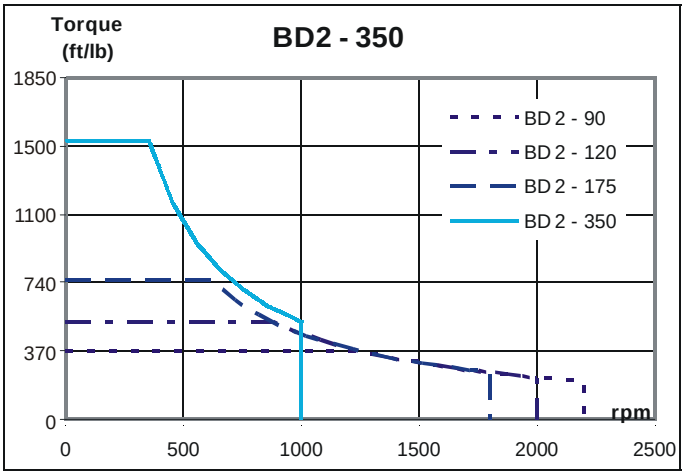
Dimensions in inches [mm]

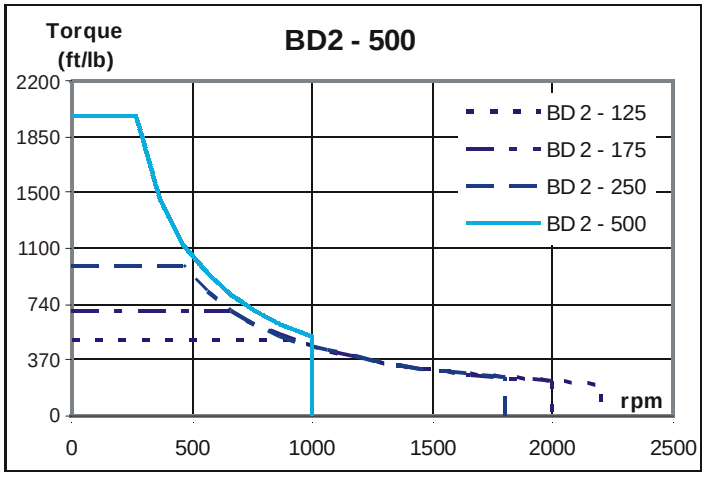
PERFORMANCES RANGE



OUTPUT SHAFT OPTIONS AVAILABLE







TABLES OF AVAILABLE DISPLACEMENTS & PERFORMANCES DATA

BD2 250		250	125	250	90	250	65
Displacement	in^3/rev	15.32	7.69	15.33	5.37	15.33	3.84
Bore	mm	40					
Stroke	mm	40	20	40	14	40	10
Specific Torque	lb.ft/100 psi	19.93	10.02	20.32	6.97	20.32	4.98
Pressure rating	psi	3500		3500		3500	
Peak pressure	psi	6000		6000		6000	
Cont. speed	rpm	700	1500	700	1500	700	1500
Max. speed	rpm	1000	1800	1000	2000	1000	2400
Peak power	hp	95	80	95	80	95	80

BD2 350		350	175	350	125	350	90
Displacement	in^3/rev	21.47	10.56	21.47	7.38	21.47	5.31
Bore	mm	47					
Stroke	mm	40	20	40	14	40	10
Specific Torque	lb.ft/100 psi	27.57	13.73	28.09	9.61	28.09	6.92
Pressure rating	psi	3500		3500		3500	
Peak pressure	psi	5500		5500		5500	
Cont. speed	rpm	700	1500	700	1500	700	1500
Max. speed	rpm	1000	1800	1000	2000	1000	2200
Peak power	hp	100	90	100	90	100	90

BD2 500		500	250	500	175	500	125
Displacement	in^3/rev	30.08	15.07	30.67	10.56	30.67	7.38
Bore	mm	56					
Stroke	mm	40	20	40	14	40	10
Specific Torque	lb.ft/100 psi	39.12	19.58	39.86	13.73	39.86	9.77
Pressure rating	psi	3500		3500		3500	
Peak pressure	psi	5000		5000		5000	
Cont. speed	rpm	400	800	400	1100	400	1500
Max. speed	rpm	800	1600	800	2000	800	2200
Peak power	hp	100	90	100	90	100	90

ORDER CODES

MOTOR CODE BD1, BD2

1. Nominal displacement - See motor displ. table

2. Shaft options: 9 = Int. 40-3-12 DIN 5480
6 = Int. 40-3-12 DIN 5482
2 = Tapered Keyed
8 = Parallel Keyed

3. Bearings: H = Roller Bearings
GP = Spherical Roller Bearings on motor cover

4. Other options:
U = Without shaft seal
SV = Shaft seal protection stainless steel sleeve corr.
V = Viton seals
I = Case press. relief valve
A = High pressure shaft seal (73 psi cont., 218 psi peak)

5. Distributor: D40 = 1" port BSPP
D47 = 1" SAE 3000 psi

6. Tachometer: K = Prepared for tachometer
J = with tachometer coupling

7. Direction of shaft rotation:
R = Clockwise rotation
L = Counter-Clockwise rotation

8. Distributor cover position:
No code = Position DM1
J = With tachometer coupling

GENERAL CHARACTERISTICS & FEATURES

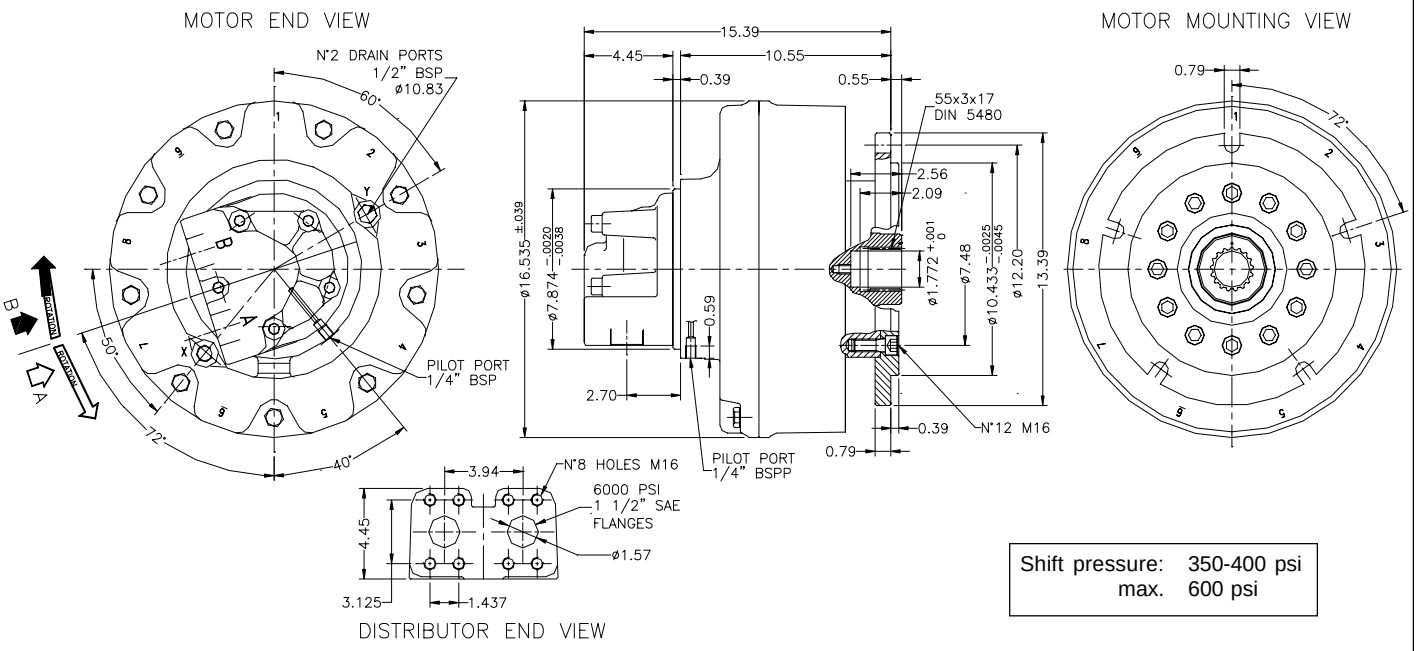
Nine cylinder crankshaft design radial piston hydraulic motor

The GD Series motors utilizes many of the proven components from the GM Series constant displacement motors for greater performance and reliability. The innovative design guarantees a smooth output torque and the variable shaft eccentric is based on a simple reliable mechanism.

DESIGN & OPERATION OF THE TWO SPEED SYSTEM

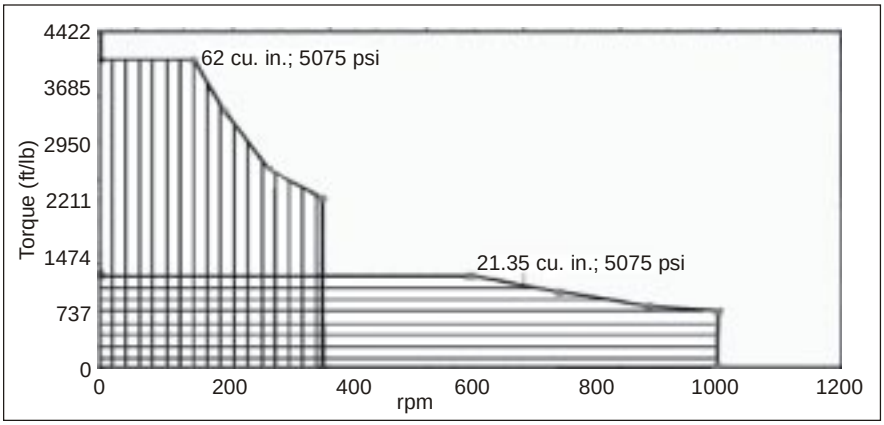
Dual displacement is achieved by a variation of the shaft eccentric cam. The displacement control system is based on a hydraulic device, which actuates a hydraulic control valve mechanism to select minimum or maximum displacement. The dual displacement mode allows the motor to reduce the displacement down to the 10% of the maximum, hence making the speed ten times higher.

DIMENSIONAL DRAWING



Shift pressure: 350-400 psi
max. 600 psi

PERFORMANCES RANGE



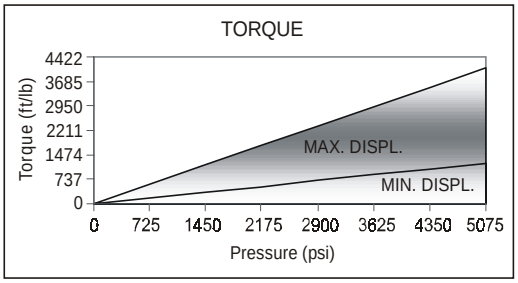


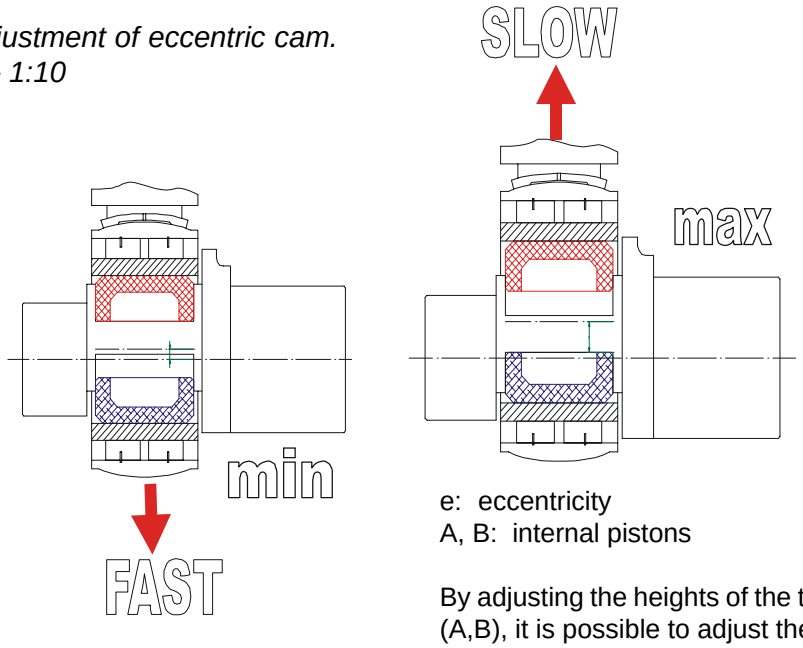
TABLE OF AVAILABLE DISPLACEMENTS

These are the obtainable displacements by varying the eccentric stroke.
The prototypes are under development and other combinations can be possible.

ø44mm		ø56mm		ø60mm		ratio
Displ. min.	Displ. max.	Displ. min.	Displ. max.	Displ. min.	Displ. max.	min./max.
in³/rev	in³/rev	in³/rev	in³/rev	in³/rev	in³/rev	
11.78	33.56	19.02	54.42	21.84	62.45	35%
These displacements are in normal production and can be available in standard delivery time.						

ø44mm		ø56mm		ø60mm		ratio
Displ. min.	Displ. max.	Displ. min.	Displ. max.	Displ. min.	Displ. max.	min./max.
in³/rev	in³/rev	in³/rev	in³/rev	in³/rev	in³/rev	
2.52	23.50	4.11	38.10	4.66	43.74	11%
6.69	23.50	10.86	38.10	12.52	43.74	29%
6.69	28.53	10.86	46.26	12.52	53.07	24%
10.92	23.50	17.67	38.10	20.31	43.74	46%
10.92	28.53	17.67	46.26	20.31	53.07	38%
10.92	32.76	17.67	53.07	20.31	60.86	33%
15.09	23.50	24.48	38.10	28.10	43.74	64%
15.09	28.53	24.48	46.26	28.10	53.07	53%
15.09	32.76	24.48	53.07	28.10	60.86	46%
15.09	36.93	24.48	59.82	28.10	68.71	41%
19.33	23.50	31.29	38.10	35.89	43.74	82%
19.33	28.53	31.29	46.26	35.89	53.07	68%
19.33	32.76	31.29	53.07	35.89	60.86	59%
19.33	36.93	31.29	59.82	35.89	68.71	52%
19.33	41.17	31.29	66.63	35.89	76.50	47%

Principle: hydraulic adjustment of eccentric cam.
Adjustment range 1:2 - 1:10



e: eccentricity
A, B: internal pistons

By adjusting the heights of the two internal pistons (A,B), it is possible to adjust the max. and min. eccentricity, hence the max. and min. displacement.

SAI WORLDWIDE SAI

SAI Hydraulics, Inc.
3905 W. 9th Street
Trainer, PA 19061
(610) 497-0190 Fax (610) 497-0194

SAI Hydraulics Canada Ltd.
6105 Boulevard Couture
St. Leonard, PQ H 1P3G7
(514) 323-4552 Fax (514) 323-8780