



Description:

Axial piston unit of bent axis design with fixed displacement, for use as either pump or motor in hydrostatic drivers, in open or closed circuit

If operated as a pump, the flow is proportional to the drive speed and displacement. If operated as a motor, the output speed is proportional to the swept volume and in-versely proportional to displacement. The output torque increases with the pressure drop between the high and low pressure sides.

Special Features:

High performance rotary group with well-proven special control area with the advantages: self-centering low peripheral speed, high efficiency.

Robust rolling bearings endure long service life.

Drive shaft capable of adopting radial loading.

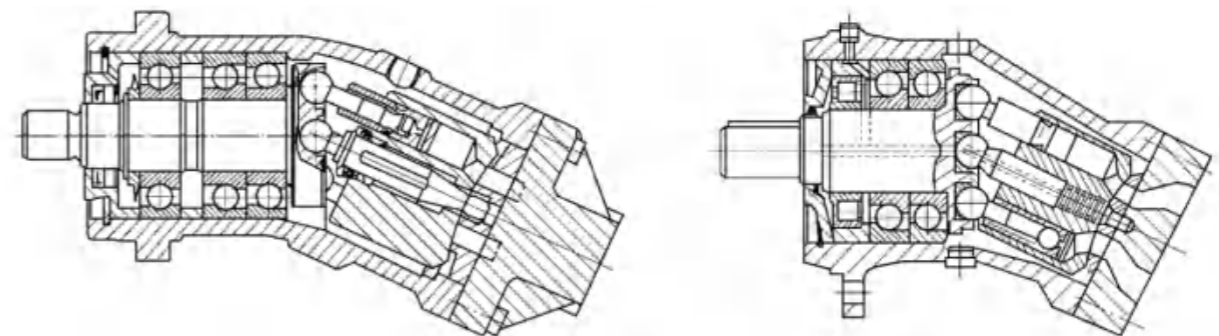
ISO mounting flange, uniform for fixed displacement Pumps/motors and variable motors from size 55.

May be used in conjunction with fire-resistant fluids.

Low noises generation.

Section:

Series 5, Sizes 200-500



Fixed piston pump/motor A2F

Type Code

Type		A2F	55	R	2	P	1
Fixed displacement Pump/motor		A2F					
Size	Displacement(Vgmin~Vgmax)						
10	(9.4ml/r)						
12	(11.6ml/r)						
23	(22.7ml/r)						
28	(28.1ml/r)						
45	(44.3ml/r)						
55	(54.8ml/r)						
63	(63.0ml/r)						
80	(80.0ml/r)						
107	(107ml/r)						
125	(125ml/r)						
160	(160ml/r)						
200	(200ml/r)						
225	(225ml/r)						
250	(250ml/r)						
355	(355ml/r)						
500	(500ml/r)						

Rear cover	
Port Plate	1
Port Plate	2
Port Plate	3
Port Plate	4
Port Plate	5
Port Plate	6
Port Plate	7

shaft End	
keyed shaft GB 1096-79	P
splines shaft DIN 5480	Z
splines shaft GB 3478.1-83	S

Series	
Series	1
Series	2
Series	3
Series	4
Series	5

Direction of Rotation	
(Viewed on drive shaft)	
Clock wise	R
Anti-clock wise	L
Alternating	W

(not for pumps in open circuit)

Ordering Example:

A2F、55、R、2、P、1
 Fixed displacement pump A2F, Size 55,
 clockwise rotation, series 2, Keyed shaft, port plate 1

Technical Data

Inlet Operating Pressure:

Pump :

Minimum pressure at ports S, A or B: Pabs—0.08MPa In closed circuits, the feed pressure must be between 0.2MPa and 0.6MPa, depending on pump speed and viscosity of hydraulic fluid.

•Motor: Pressure at port A or B:

Nominal pressure—Pn =35MPa

Peak pressure—Pmax=40MPa

The sum of the pressures at ports A and B must not exceed 70MPa

(individual pressure on either side max 40MPa)

• outlet Operating Pressure

• Pump: Nominal pressure—Pn =35MPa

Peak pressure—Pmax=40MPa

Maximum permissible case pressure(at port T):

P abs—0.2MPa

•Oil Temperature Range:-25°C~80°C

•Viscosity Range

T min—10mm²/s

T max—(for short periods) 1000mm²/s

Optimum Operating Viscosity:—16-25mm²/s

Fluid Recommendation : 40 low-solidifing

•Filtration of hydraulic Fluid:

Recommended filtration 10µm. Coarser filtration of 25 to 40µm is acceptable, However longer service life is achieved.

•Speed Range:

No limitation on minimum speed,

If high uniformity of rotation is required, nmin should not be less than 50r/min, See table on page 5 for maximum speed.

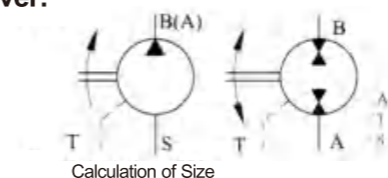
•Mounting position:

Arbitrarily Choose, the housing must be filled with oil;

•Flow direction:

Clockwise: A to B S to B(Open Circuit)
 Anticlockwise: B to A S to A(Open Circuit)

Rear cover:



Calculation of Size

pump: Output Flow $Q = \frac{V_g \times n \times \eta_v}{1000}$

Input Torque $M = 0.159 \times V_g \times \Delta P / \eta_m$

Input power $P = \frac{Q \times \Delta p}{60 \times \eta_v}$

Motor: Input Flow $Q = \frac{V_g \times n}{1000 \times \eta_v}$

Output Speed $n = \frac{Q \times 1000 \times \eta_v}{V_g}$

Output Torque $M = 0.159 \times V_g \times \Delta P \times \eta_m$

Output power $P = \frac{Q \times \Delta p \times \eta_v}{60}$

V_g =max geometric displacement

M =torque

ΔP =differential pressure

n =speed

η_v =volumetric efficiency

η_m =mechanical- hydraulic efficiency

η_t =overall efficiency

PressurePort Drain Port Suction	system	10~160	200~ 500
[L/min]	1.A,B Thread	6.A,B Flange	1. A,B Flange
Used for close system pump /motor	2. A,B Flange	7. A,B Flange	
[N:m]			2.B,S Flange
[Kw]	3. A,B Flange	5. B,S Prick Worm	
[L/min]			
Used for open system pump	4.B,S Thread		
[Nm]			
[Kw]			
[ml/r]			
[N.m]			
[Mpa]			
[r/min]			

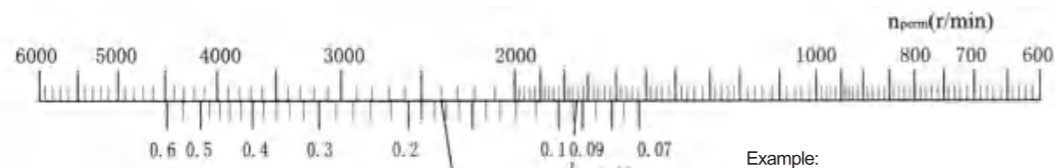
Technical Data Theoretical Values, Without Considering η_m and η_v , Values rounded Off.

Size	10	12	23	28	45	55	63	80	107	125	160	200	250	355	500		
Displacement Vg(ml/r)	9.4	11.6	22.7	28.1	44.3	54.8	63	80	107	125	160	200	250	355	500		
Max Speed n max(r/min)	Close Circuit	7500	6000	5600	4750	4500	3750	4000	3350	3000	3150	2650	2500	2500	2240	2000	
	Open Circuit	0.09	4700	3750	3750	2800	2850	2360	2550	2120	1900	2120	1650	1700	1400	1250	1120
	Inlet Pressure (Pabs=MPa)	0.10	5000	4000	4000	3000	3000	2500	2700	2240	2000	2240	1750	1800	1500	1320	1200
Max Flow Q max(l/min)	Close Circuit	71	70	127	133	199	206	253	268	321	394	424	500	625	795	1000	
	Open Circuit	0.09	43	42	83	76	122	125	156	165	197	257	256	330	340	430	543
	Inlet Pressure (Pabs=MPa)	0.10	46	45	88	82	129	133	165	174	208	272	272	349	364	455	582
Max Power Pmax(Kw) $\Delta P=35MPa$	Close Circuit	41	41	74	78	116	120	147	156	187	230	247	292	365	454	583	
	Open Circuit	0.09	25	25	48	44	71	73	91	96	115	150	149	192	198	251	317
	Inlet Pressure (Pabs=MPa)	0.10	27	26	51	48	75	78	96	101	121	159	159	204	212	265	340
Electric Motor Speed n=1450/min	Flow Close Circuit	13.6	16.8	32.9	40.7	64.2	79.5	91.3	116	155.2	181.2	232	290	363	515	725	
	Q(l/min) Open Circuit	13.2	16.3	31.9	39.5	62.3	77.1	88.6	112.5	150.5	175.8	225	281	352	499	703	
	P(Kw) Close	7.9	9.8	19.2	23.7	27.4	46	53	67.7	90	106	135	169	212	300	423	
Torque(N.m)	$\Delta P=10MPa$	15	18	36	44.7	70	87	100	127	170	199	254	318	398	564	795	
	$\Delta P=35MPa$	52	65	126	156	247	305	351	445	595	696	890	1113	1391	1976	2783	
	Approx Weight (kg)	5	5	12	12	23	23	33	33	44	63	63	88	88	138	185	

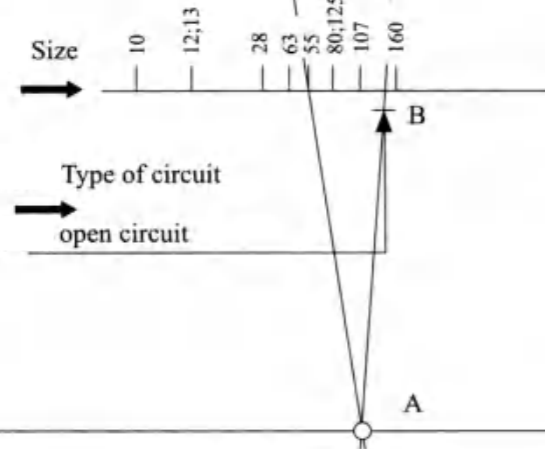
Notes:

1. These values are valid provided there is an absolute pressure at suction inlet S and when operated on mineral oil.

Permissible speed n_{perm} can be determined from the nomograph. In motor operation the permissible speed for closed circuit system and boosted operation are also valid for open circuit system. When suction pressure $P_{abs} > 0.1MPa$, the permissible speed can be increased in open circuits (Self-suction operation). But when suction pressure $P_{abs} < 0.1MPa$, the permissible speed must be reduced.



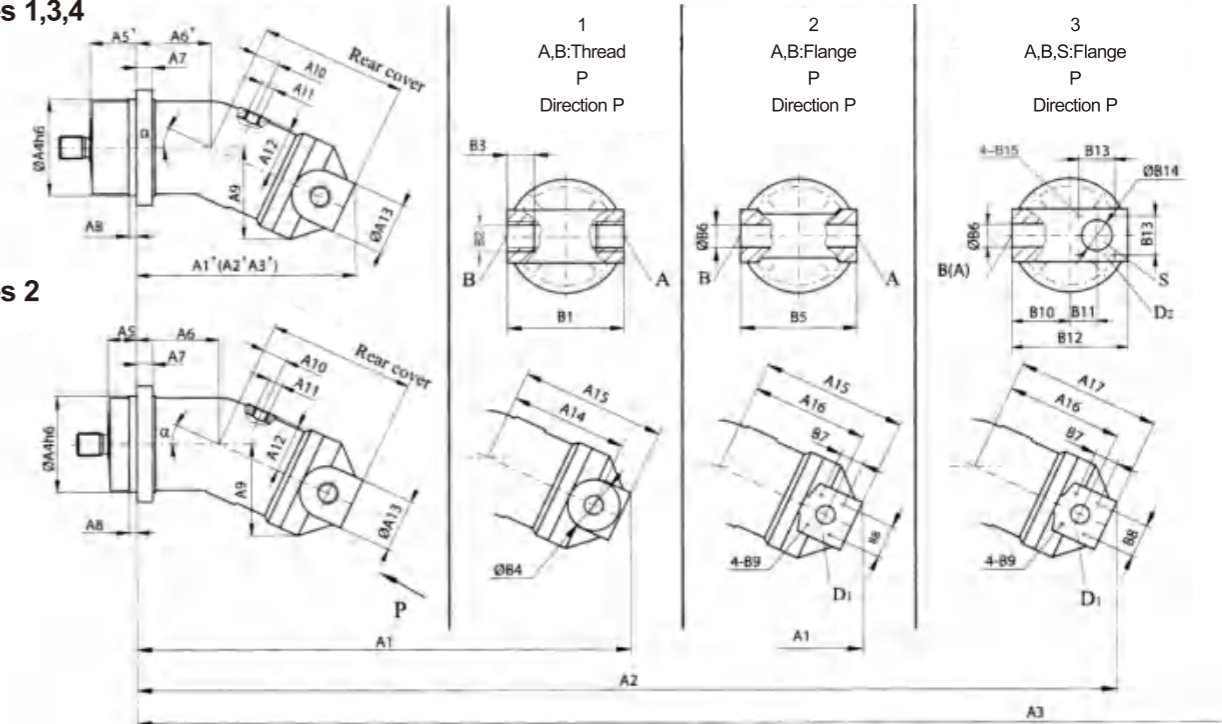
Example:
Given: size 55, Drive speed 2400r/min
Required: pressure Pabs at the suction Inlet S.
Solution: Line 1 on scale n_{perm} drawn towards size 55 crosses line H at point A. Line 11 from point A to point B (open circuit) gives the result:
 $P_{abs} > 0.094MPa$.
The following are always used together:
1. Scales Pabs, type of circuit and line H.
2. Line H, size scale and n_{perm} .



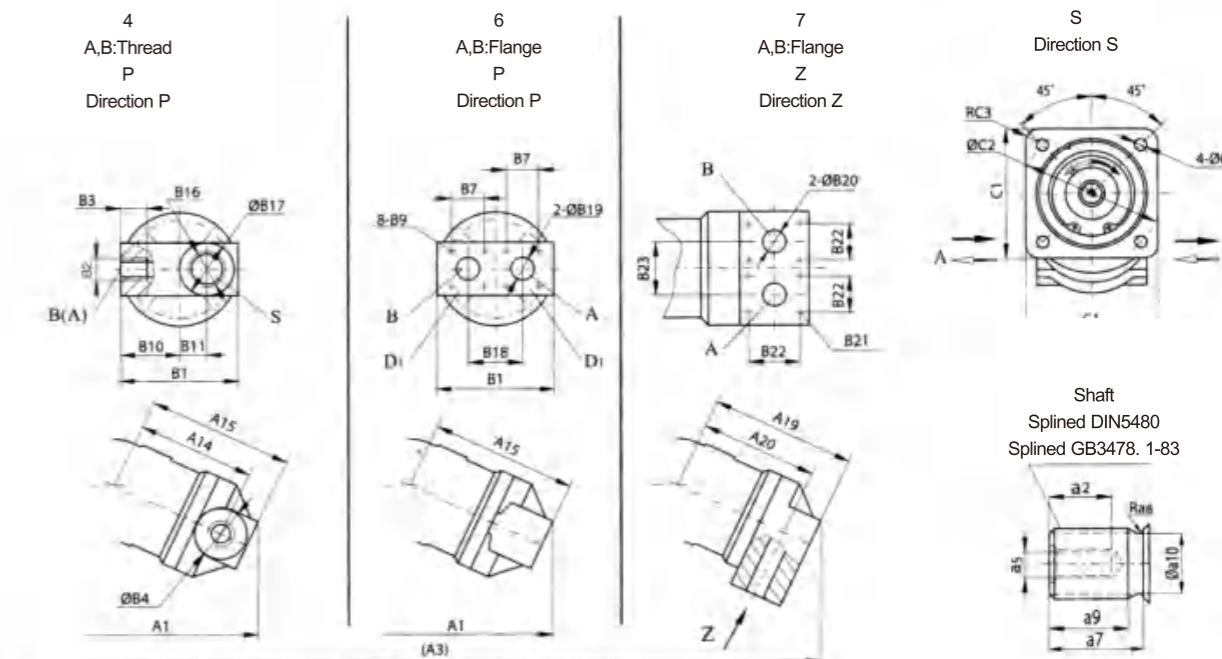
Installation Dimensions

10-160 Unit Dimensions Series 1-4 size 10-160

Series 1,3,4



Series 2



10~160 Unit Dimensions Series 1~4 size 10~160

Size		Series	Rear cover	A1		A2		A3		A4	A5	A6	A5'	A6'	A7'	A8'	A9	
α20°	α25°			α20°	α25°	α20°	α25°	α20°	α25°								α20°	α25°
10	12	2,4	1,4	174	172	—	—	—	—	80	20	62	40	42	12.5	8	69	75
23	28	2,3	1,2,4	223	218	—	—	—	—	100	25	75	50	50	16	8	88	95
45	55	1,2	1,2,3,6	292	289	286	284	—	—	125	32	108	63	77	20	10	110	118
63	80	1,2	1,2,3	350	348	345	342	—	—	140	32	137	83	86	23	10	126	140
87	107	1,2	1,2,3,7	360	356	353	348	358	353	160	40	130	80	90	25	12	138	149
125	160	2	1,2,3,7	422	417	417	410	408	420	180	40	156	—	—	28	10	159	173.5

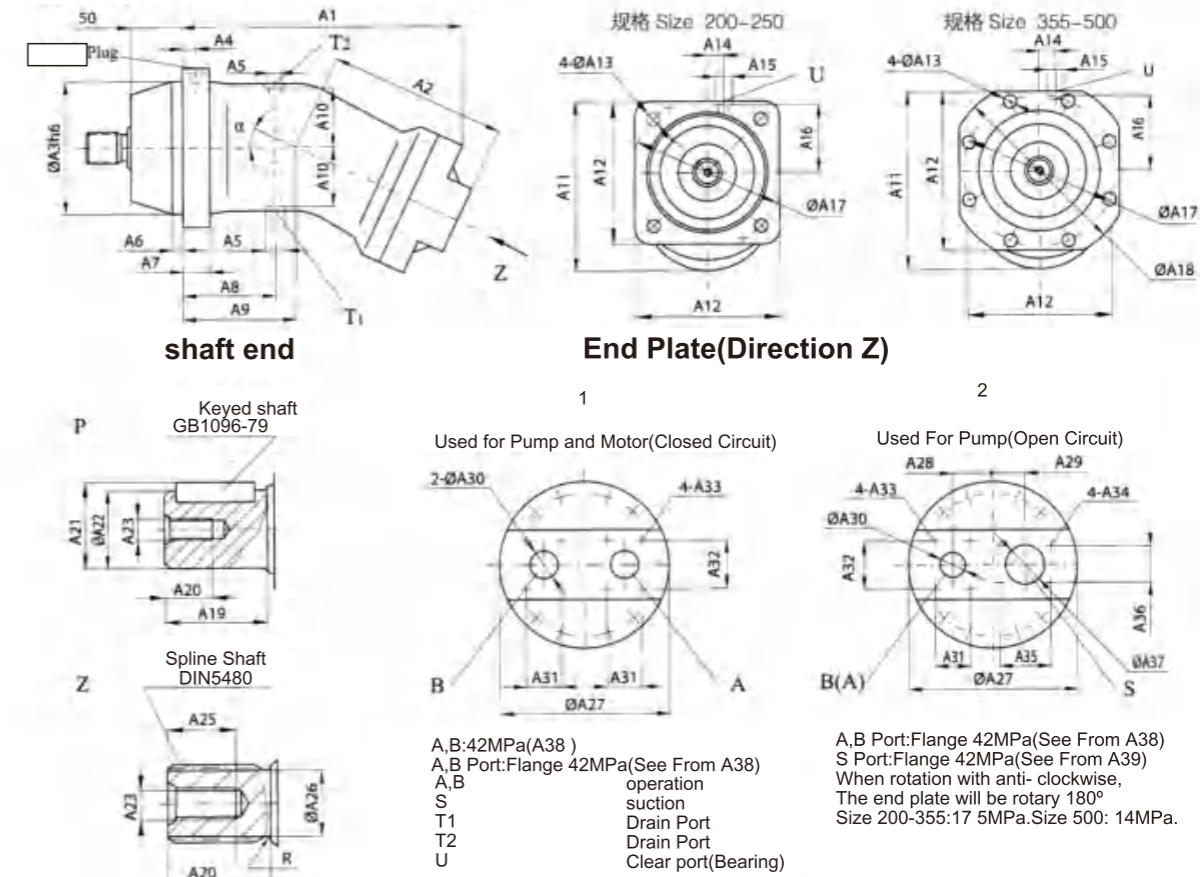
Size		A10	A11	A12	A13	A14	A15	A16	A17	A18		A19	A20	B1	B2	B3	B4
α20°	α25°									α20°	α25°						
10	12	14	M12×1.5	40	—	90	112	—	—	—	—	—	—	89	M22×1.5	14	40
23	28	25	M16×1.5	50	—	118	145	118	—	—	—	—	—	106	M27×2	16	47
45	55	31.5	M18×1.5	63	—	151	183	151	178	—	—	—	—	132	M33×2	18	53
63	80	36	M18×1.5	77	—	174	213	174	208	—	—	—	—	156	M42×2	20	63
87	107	40	M18×1.5	80	—	190	230	190	225	185	200	230	195	165	M42×2	20	66
125	160	45	M22×1.5	93	—	212	262	212	257	204	220	252	212	195	M48×2	22	70

Size		B5	B6	B7	B8	B9	Deep	B10	B11	B12	B13	B14	B15	Deep	B16	Deep	B17	B18	B19	B20
α20°	α25°																			
10	12	—	—	—	—	—	—	44.5	18	—	—	—	—	—	M33×2	18	42	—	—	—
23	28	120	13	18.2	40.5	M8	15	53	25	—	—	—	—	—	M42×2	20	48	—	—	—
45	55	126	19	23.8	50.8	M10	15	63	29	129	48	50	M10	13	—	—	—	67	67	—
63	80	150	25	27.8	57.1	M12	15	75	35.5	153	60	56	M12	15	—	—	—	—	—	—
87	107	160	25	27.8	57.1	M12	17	80	35.5	162.5	60	56	M12	18	—	—	—	—	—	25
125	160	190	32	31.8	66.7	M14	19	95	42.2	192.5	75	70	M16	20	—	—	—	—	—	39

Size		B21	Deep	B22	B23	C1	C2	C3	C4	a1	a2	a3	a4	a5	a6	a7	a8	a9	a10
α20°	α25°																		
10	12	—	—	—	—	95	100	10	9	40	16	22.5	20	M6	0.8	34	2	22	16.7
23	28	—	—	—	—	118	125	12	11	50	19	27.9	25	M8	0.8	43	1.2	28	21.5
45	55	—	—	—	—	150	160	16	13.5	60	28	33	30	M12	1.5	35	1.5	28	25
63	80	—	—	—	—	165	180	16	13.5	70	28	38	35	M12	1.6	40	1.5	33	30
87	107	M12	25	50	78	190	200	20	17.5	80	28	43	40	M12	1.6	45	2	37.5	35
125	160	M12	25	50	78	210	224	20	17.5	90	36	48.5	45	M16	2.5	50	2.5	43	40

Size		SAE flange		Paralled	Splined Shaft	Splined Shaft	Weight(kg)
α20°	α25°	D1	D2	BG 1096-79	DIN5480	GB3478-83	
10	12	—	—	Key6x32	W20x1.25x14x9g	EXT14Zx1.25x30Rx 5f	5
23	28	1/2"	1/2"	Key8x40	W25x1.25x18x9g	EXT18Zx1.25x30Rx 5f	12
45	55	3/4"	1 3/4"	Key8x50	W30x2x14x9g	EXT 14Zx2mx30Rx 5f	23
63	80	1"	2"	Key10x56	W35x2x16x9g	EXT16Zx2mx30Rx 5f	33
87	107	1"	2"	Key12x63	W40x2x18x9g	EXT18Zx2mx30Rx 5f	44
125	160	1 1/4"	2 3/4"	Key14x70	W45x2x21x9g	EXT21Zx2mx30Rx 5f	63

Unit Dimensions Series 5



Series 5 Size 200. -500 Table Of Unit Dimensions

Size	α	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15
200	21°	368	232	224	13	M22x1.5	9	25	120	134	107	300	252	22	70	M14x1.5
250	26.5°	370	232	224	13	M22x1.5	9	25	120	134	107	314	252	22	70	M14x1.5
355	26.5°	422	260	280	14	M33x2	15	28	142	160	128	380	335	18	35	M14x1.5
500	26.5°	462	283	315	15	M33x2	15	30	155	175	142	420	375	22	35	M18x1.5

Size	A16	A17	A18	A19	A20	A21	A22	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32	A33
200	122	280	/	82	36	53.5	50k6	M16	58	47	45	216	55	45	32	31.8	66.7	M14
250	122	280	/	82	36	53.5	50k6	M16	58	47	45	216	55	45	32	31.8	66.7	M14
355	166	320	360	105	42	64	60m6	M20	82	69	55	245	60	50	40	36.6	79.4	M16
500	180	360	400	105	42	74.5	70m6	M20	82	67	62.5	270	65	55	40	36.6	79.4	M16

Size	Deep	A34	Deep	R	A35	A36	A37	A38	A39	Paralled	Spline	Weight
										BG1096-79	DIN5480	(kg)
200	22	M12	18	1.2	88.9	50.8	63	1 1/4"	2 1/2"	Key14x80	W50x2x24x9g	88
250	22	M12	18	1.2	88.9	50.8	63	1 1/4"	2 1/2"	Key14x80	W50x2x24x9g	88
355	24	M12	18	1.6	88.9	50.8	63	1 1/2"	2 1/2"	Key18x100	W60x2x28x9g	138
500	24	M16	24	1.6	106.4	62	75	1 1/2"	3"	Key20x100	W70x3x22x9g	185