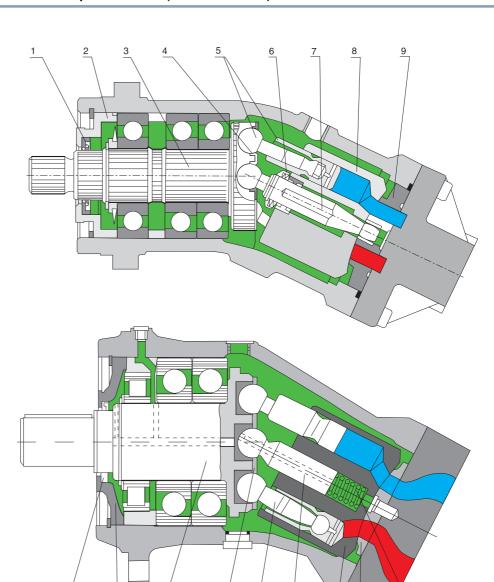
A2F Fixed Displacement Pump / Motor (1~5 Series)

GY-A2F Series 1~4 (Size 10~160) Section



10

GY-A2F Series 5 (Size 200~500) Section

- 1. Oil Seal Kit
- 2. Cover
- 3. Shaft
- 4. Retainer Plate
- 5. Piston, Piston Rod
- 6. Wash Spring
- 7. Center Pin
- 8. Cylinder Block
- 9. Port Plate
- 10. Spring

Descriptions

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

When operated as a pump, the flow is proportional to the drive speed and the displacement.

When operated as motor, the output speed is proportional to the flow and inversely proportional to the displacement.

The output torque increases with the pressure drip between the high and low pressure sides.

Features

Self-centering spherical control area allows torque free cylinder bearing.

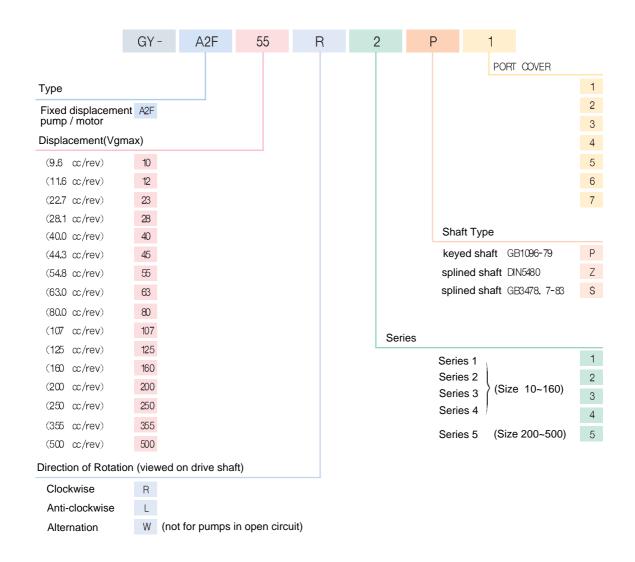
Low peripheral speed and high efficiency.

Drive shaft capable of accepting radial loading.

Low noise level.

A2F Fixed Displacement Pump / Motor (1~5 Series)

Model Code



Series		2.	/4	2	/3			1	/2			:	2		;	5	
Size		10	12	23	28	40	45	55	63	80	107	125	160	200	250	355	500
Postoperculum	1	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
	2				•	•	•	•	•	•	•	•	•	•	•	•	•
	3					•	•	•	•	•	•	•					
	4	•	•	•	•												
	5																
	6						•										
	7								•	•		•					

M

A2F

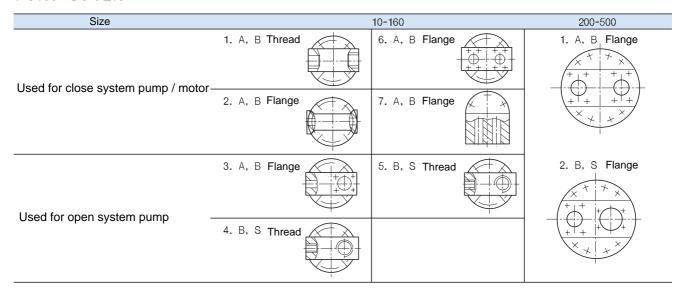
Ordering Example

GY-A2F, 80, R, 2, P, 2

Fixed displacement pump A2F, Size 80, clockwise rotation, series 2, keyed shaft, port plate 2

A2F Fixed Displacement Pump / Motor (1~5 Series)

PORT COVER



Technical Data

Calculation of Size

- Pump

Output Flow
$$Q = \frac{V_g \cdot N \cdot \eta_V}{1000}$$
 (1/min)

Input Torque
$$M = \frac{1.59 \cdot V_g \cdot \Delta P}{10 \cdot \eta_m}$$
 $(n \cdot m)$

Input Power
$$P = \frac{M \cdot N}{9549} = \frac{\Delta P \cdot Q}{60 \cdot \eta_1}$$
 (kW)

- Motor

Input Flow
$$Q = \frac{Vg \cdot N}{1000 \cdot \eta_{V}}$$
 (1/min)

Output Torque
$$M = \frac{1.59 \cdot V_g \cdot \triangle P \cdot \eta_m}{10} (n \cdot m)$$

Output Power
$$P = \frac{M \cdot N}{9549} = \frac{\triangle P \cdot Q \cdot \eta_t}{60}$$
 (kW)

Output Speed
$$N = \frac{Q \cdot 100 \cdot \eta_t}{V_q}$$
 (r/min.

Vg : Max geometric displacement [cc/r], M : Torque [N.m], N : Speed [r/min]

 η_v : Volumetric efficiency $-\eta_m$: Mechanical hydraulic efficiency

 η_{ℓ} : Overall efficiency $\triangle P$: Differential pressure

Inlet Operating Pressure

- Pump

In close circuits, the pressure must be between 0.2 MPa and 0.6 MPa, depending on pump speed and viscosity of hydraulic fluid.

- Motor

Pressure at ports A or B:

The sum of the pressure at ports A and B must not exceed 70MPa (individual pressure on either side max.40 MPa)

Outlet Operating Pressure

- Pump

 Nominal pressure
 PN=35MPa

 Peak pressure
 Pmax=40MPa

- Pressure for Drain

Condition of Hydraulic Fluid

- Fluid Recommendation: 40 low-solidifing
- Fluid Temperature Range : -25~80℃
- Viscosity Range: 10~1000 mm²/s(1000 mm²/s: short periods)
- Optimum Operating Viscosity: 16~25mm²/s
- Filtration of Hydraulic Fluid :

Recommended filtration 10 μm . Coarser filtration of 25 to 40 μm 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 50 r/min. See next page for maximum speed.

Mounting Position

Arbitrarily Choose. The housing must be filled with oil.

Flow Direction

Clockwise Anti-clockwise

A to B A to B

S to B (Open Circuit) S to B (Open Circuit)



A, B: Pressure Port (Discharge Port)

T : Drain PortS : Suction Port

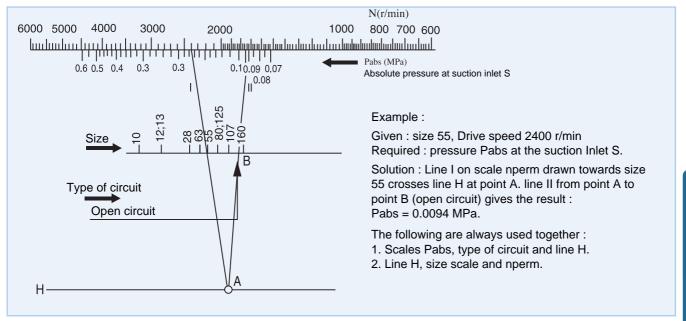
A2F Series Pump / Motor

A2F Fixed Displacement Pump / Motor (1~5 Series)

Technical Data Theoretical Values, \	Without Considering 7m	and η ∨	. Values rounded Off.
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						_			•								
	Size		10	12	23	28	45	55	63	80	107	125	160	200	250	355	500
Displacem	ent (cc/rev)		9.4	11.6	22.7	28.1	44.3	54.8	63	80	107	125	160	200	250	355	500
Max. Speed	Close Circuit		7500	6000	5600	4750	4500	3750	4000	3350	3000	3150	3650	2500	2500	2240	2000
•	Open Circuit	0.09	4700	3750	3750	2800	2850	2360	2550	2120	1900	2120	1650	1700	1400	1250	1120
n _{max}	Inlet Pressure	0.10	5000	4000	4000	3000	3000	2500	2700	2240	2000	2240	1750	1800	1500	1320	1200
(r/min)	(Pabs=MPa)	0.15	6000	4900	4900	3600	3650	3000	3300	2750	2450	2750	2100	2180	1850	1650	1500
Max. Flow	Close Circuit		71	70	127	133	199	206	252	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
Qmax (I/min)	Inlet Pressure	0.10	46	45	88	82	129	133	165	174	208	272	272	349	364	455	582
(1/11111)	(Pabs=MPa)	0.15	55	55	108	98	157	159	202	213	254	333	326	423	449	568	728
Max. Power	Close Circuit		41	41	74	78	116	120	147	156	187	230	247	292	365	464	583
	Open Circuit	0.09	25	25	48	44	71	73	91	96	115	150	149	192	198	251	317
Pmax(kW) ⊿P= 35MPa	Inlet Pressure	0.10	27	26	51	48	75	78	96	101	121	159	159	204	212	265	340
⊿i – wivii a	(Pabs=MPa)	0.15	32	32	63	57	92	93	118	124	148	194	190	247	262	331	424
Electric Mot	or 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	72
Speed	$\mathbb{Q}(\sqrt{\min}) \text{Open Circuit}$		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
N ₌ = 1450	P(kW) Close Circuit		7.9	9.8	19.2	23.7	37.4	46	53	67.7	90	106	135	169	212	300	423
/min _	P=35MPa Open Circuit		7.7	9.5	18.6	23	36.3	45	51.7	66	88	103	131	164	205	291	410
Torque	⊿ P= 10MPa		15	18	36	44.7	70	87	100	127	170	199	254	318	398	564	795
$M(N \cdot m)$	⊿ P= 35MPa		52	65	126	156	247	305	351	445	595	696	890	1113	1391	1976	2783
Approx. V	Veight (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 a absolute pressure at suction inlet S and when operated on mineral oil.



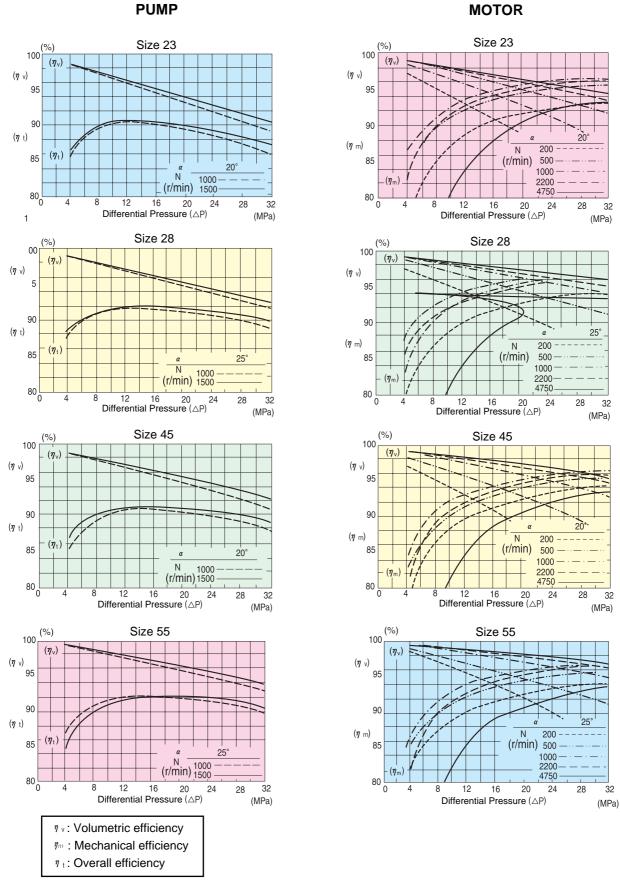
- Permissible speed Nperm can be determined from the nomograph.
 In motor operation the permissible speed for closed circuit system and boosted operation are also valid for open circuit system.
- 2. When suction pressure Pabs > 0.1MPa, the permissible speed can be increased in open circuits (Self-suction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



A2F

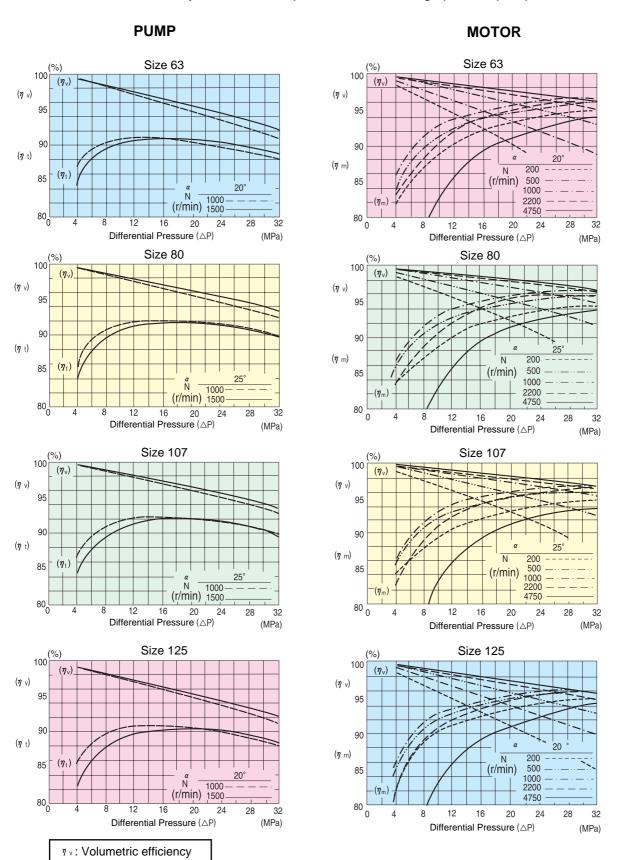
A2F Fixed Displacement Pump / Motor (1~5 Series)

Performance curve of efficiency for differential pressure and rotating speed of pump & motor



A2F Fixed Displacement Pump / Motor (1~5 Series)

Performance curve of efficiency for differential pressure and rotating speed of pump & motor



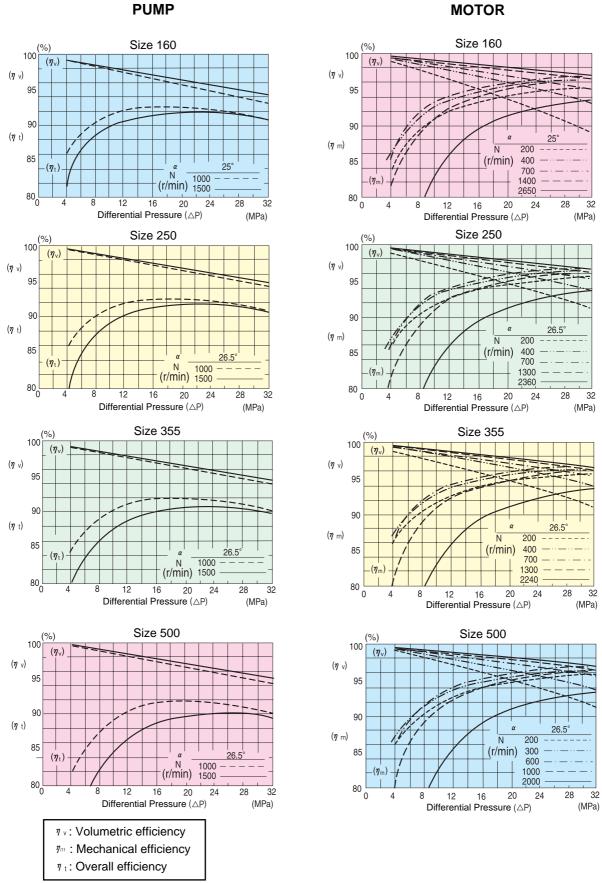
M

A2F

7m : Mechanical efficiency7t : Overall efficiency

A2F Fixed Displacement Pump / Motor (1~5 Series)

Performance curve of efficiency for differential pressure and rotating speed of pump & motor



A2F Series Pump / Motor

A2F Fixed Displacement Pump / Motor (1~5 Series)

Unit Dimensions Series 1~4 Size 10~160

Rear Cover Type Series 1, 3, 4 Rear cover A, B Port : Thread S Port : Flange Direction P A, B Port : Thread A, B Port : Flange Direction P Direction P ø B14 B(A) A1'(A2'A3') B10_B1 Rear cover Series 2 A16 A16 4-B9 Direction S A, B Port : Thread A, B Port : Flange A, B Port : Flange S Port : Flange RC3 Direction P Direction Z Direction P 2- ø B20 B16 ØB17 2-øB19 B(Á) 6-B21 B22 SHAFT TYPE A19 Z-Splined DIN5480 A20 S-Splined GB3478.1-83 Ra8 а9 а7 Z P-Keyed shaft GB1096-79 (A3)

- The dimensions of A1, A2, A3 are only valid for series 2. The parallel dimensions of the three above mentioned positions for series 1, 3 and 4 can be calculated according to the follows formulas:
 A1' (A6 A6'); A2 (A6 A6'); A3 (A6 A6').
- 2. Besides above mentioned constructures, we can adjust the design of the present product according to the customers' special needs.



A2F

A2F Fixed Displacement Pump / Motor (1~5 Series)

Unit Dimensions Series 1~4 Size 10~160

S	ize	Series	Rear	А	1	Az	!	A ₃	3	A∠	A 5	A6	A 5′	A6′	Α7	А8	А 9	
a 20°	a 25°	Series	cover	a 20°	a 25°	α20°	α25°	α20°	α25°								a 20°	a 25°
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	17 3.5

Siz	ze	A10	A ₁₁	A12	A ₁₃	A14	A15	A ₁₆	A17	А	N18	A 19	A 20	В1	B ₂	Вз	B∠
<i>a</i> 20°	a 25°									α 20°	a 25°						
10	12	14	$M12 \times 1.5$	40	89	90	112	-	-	-	-	-	-	89	$M22 \times 1.5$	14	34
23	28	25	$M16 \times 1.5$	50	106	118	145	118	-	-	-	-	-	106	$M27 \times 2$	16	48
45	55	31.5	M18×1.5	63	132	150	183	15 1	178	-	-	-	-	132	M33×2	15	53
63	80	36	M18×1.5	77	156	173	213	17 4	208	-	-	-	-	156	$M42 \times 2$	15	53
87	107	40	M18×1.5	80	165	190	230	190	225	185	200	230	195	160	M42×2	20	50
125	160	45	$M22 \times 1.5$	93	195	-	262	212	257	204	220	252	212	195	M48×2	22	70

Si	ze						D		_	_	_	_	_	D		D	_		_	_	_
α20°	a 25°	B5	B ₆	В7	Bs	B ₉	Deep	B 10	B11	B ₁₂	B 13	B14	B ₁₅	Deep	B 16	Deep	B ₁₇	B18	B19	B 20	B 21
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	53	29	129	48	42	M10	13	-	-	-	67	20	-	-
63	80	150	25	27.8	57.1	M12	15	75	35.5	153	60	53	M12	15	-	-	-	-	-	-	-
87	107	160	25	27.8	57.1	M12	17	80	35.5	162.5	60	53	M12	18	-	-	-	-	-	25	M12
125	160	190	32	31.8	66.7	M14	19	95	42.2	192.5	75	68	M16	20	-	-	-	-	-	30	M12

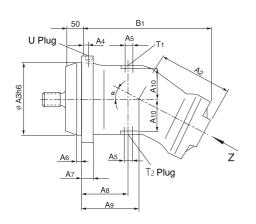
Si	ze	Deep	B22	B23	C ₁	C ₂	Сз	C۷	a 1	æ	a 3	a۷	a 5	æ	a	a 8	a 9	a 10	SAE	Flange
a 20°	a 25°																		D ₁	D ₂
10	12	-	-	-	95	100	10	9	40	16	22.5	20	M6	0.8	34	2	22	16.7	-	-
23	28	-	-	-	118	125	12	11	50	19	27.9	25	M8	0.8	43	1.2	28	21.5	1/2"	-
45	55	-	-	-	150	160	16	13.5	60	28	33	30	M12	1.5	35	1.5	28	25	3/4"	13/2"
63	80	-	-	-	165	180	16	13.5	70	28	38	35	M12	1.6	40	1.5	33	30	1″	2 "
87	107	25	50	78	190	200	20	17.5	80	28	43	40	M12	1.6	45	2	37.5	35	1″	2"
125	160	25	50	78	210	224	20	17.5	90	36	48 .5	45	M16	2.5	50	2.5	43	40	11/4"	23/4"

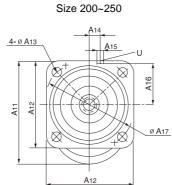
Si	ze	Paralled Shaft	Splined Shaft	Splined Shaft	Weight
a 20°	a 25°	GB1096-79	DIN5480	GB3 478 .1-83	(kg)
10	12	Key 6 ×32	W20 ×1.25 ×14 ×9g	-	5
23	28	Key 8 ×40	W25 ×1.25 ×18 ×9g	-	12
45	55	Key 8 ×50	$W30 \times 2 \times 14 \times 9g$	-	23
63	80	Key 10 × 56	W35×2×16×9g	EXT16 $Z \times 2m \times 30R \times 5f$	33
87	107	Key 12×63	W40 × 2 × 18 ×9g	EXT18 $Z \times 2m \times 30R \times 5f$	44
125	160	Key 14×70	W40×2×21×9g	-	63

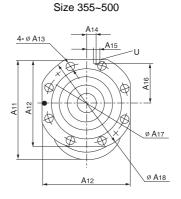
A2F Series Pump / Motor

A2F Fixed Displacement Pump / Motor (1~5 Series)

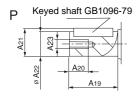
Unit Dimensions Size 200~500 Series 5

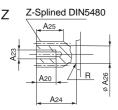


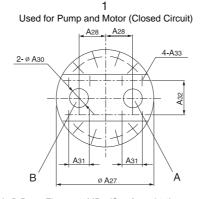




Shaft End





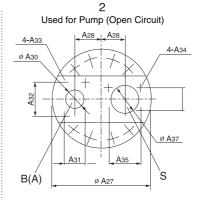


A, B Port : Flange 42MPa (See from A38) A, B: Discharge (Pressure) port

S: Suction port T1: Drain port T2 : Drain port

U: Clear port (Bearing)

End Plate (Direction Z)



A, B Port : Flange 42MPa (See from A38) S Port : Flange 42MPa (See from A39) When rotation with anti-clockwise, the end plate

will be rotary 180 degree.

Size 200~355: 17.5MPa, Size 500: 14MPa.

Unit Dimensions Series 5 Size 200~500

Size	α	A 1	A ₂	Аз	A۷	A 5	A ₆	A 7	A8	A9	A 10	A 11	A 12	A 13	A 14	A ₁₅
200	21°	368	232	224	13	$M22 \times 1.5$	9	25	120	134	107	300	252	22	70	$M14 \times 1.5$
250	26.5°	370	232	224	13	$M22 \times 1.5$	9	25	120	134	107	314	252	22	70	M14×1.5
355	26.5°	422	260	280	14	M33×2	15	28	142	160	128	380	335	18	35	$M14 \times 1.5$
500	26.5°	462	283	315	15	M33×2	15	30	155	175	142	420	375	22	35	M18×1.5

Size	A ₁₆	A ₁₇	A18	A 19	A 20	A 21	A22	A 23	A24	A ₂₅	A ₂₆	A ₂₇	A ₂₈	A39	A ₃₀	A ₃₁	A32	A33
200	122	280	/	82	36	53.5	50	M16	58	47	45	216	55	45	32	31.8	66 .7	M14
250	122	280	/	82	36	53.5	50	M16	58	47	45	216	55	45	32	31.8	66 .7	M14
355	166	320	360	105	42	64	60	M20	82	69	55	245	60	50	40	36.6	79 .4	M16
500	180	360	400	105	42	74.5	70	M20	82	67	62.5	270	65	55	40	36.6	79 .4	M16

Size			D							Paralled Shaft	Splined Shaft	Weight
Size		A34	Deep	R	A 35	A 36	A 37	A 38	A 39	GB1096-79	DIN5480	(kg)
200	22	M12	18	1.2	88.9	50.8	63	11/4"	21/2"	Key 14×80	$W50 \times 2 \times 24 \times 9g$	88
250	22	M12	18	1.2	88.9	50.8	63	11/4"	21/2"	Key 14×80	$W50 \times 2 \times 24 \times 9g$	88
355	24	M12	18	1.6	88.9	50.8	63	11/4"	21/2"	Key 18 × 100	W60×2×28×9g	138
500	24	M16	24	1.6	106.4	62	75	1 1/4"	3″	Key 20 × 100	W70×2×22×9g	185



A2F