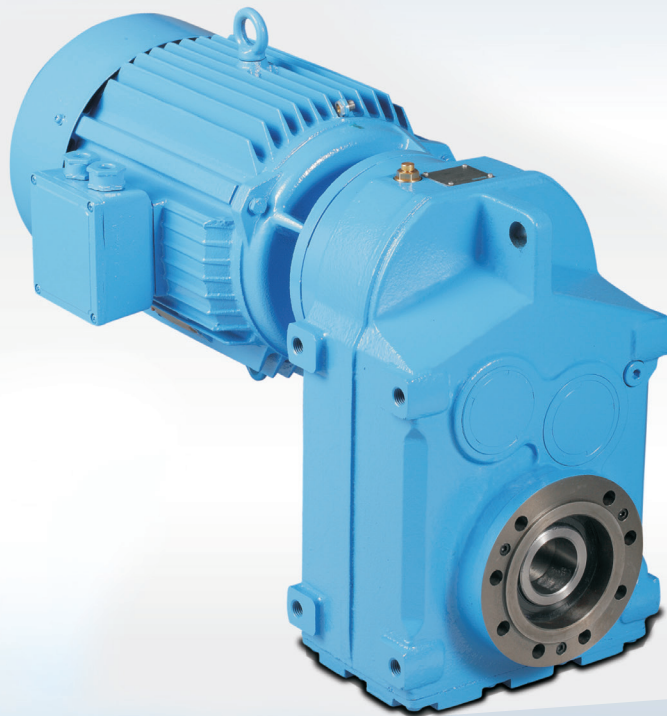


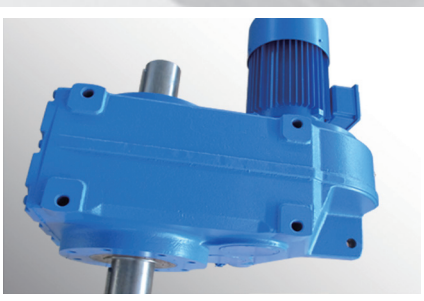
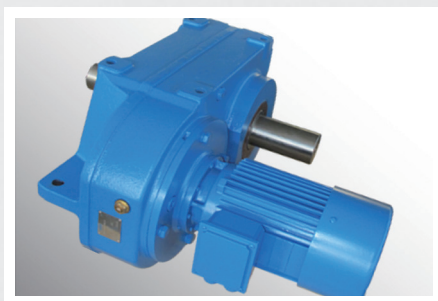
BONENG



博能 F 平行轴齿轮马达

F Parallel Shaft Gearmotor

06/2017



F 平行轴齿轮马达

- ◆ 高度的模块化设计,零部件互换程度高,供货周期短。
- ◆ 传动比划分细,范围广,组合机型可获得较大的传动比。减速机适合在任意空间角度安装。
- ◆ 采用整体式铸造箱体,箱体结构刚度好,易于提高轴的强度和轴承寿命。
- ◆ 齿轮采用低碳合金钢淬火磨齿工艺和修形技术使产品具有更高的承载能力,运行可靠,噪音低,效率高,寿命长。
- ◆ 平行输出、结构紧凑、传递扭矩大、工作平稳、噪音低、寿命长。
- ◆ 安装方式: 底座安装、法兰安装、扭力臂安装。
- ◆ 输入方式: 电机直联、轴输入、连接法兰输入。

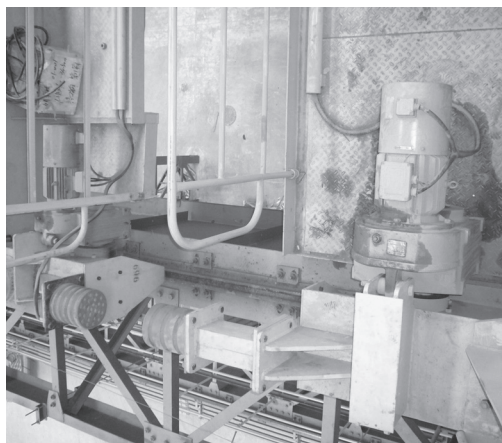
公司产品广泛应用于港口船舶、冶金其中、物流运输、舞台行业、电力能源、煤炭矿山、水泥建材、林业造纸、农业机械、轻工纺织、化工塑料、节能环保等各个领域。公司总部和各大区域的技术专家、以及各区域办事处的应用工程师、售后服务技师竭诚为您提供全面的技术咨询和完善的服



Parallel Shaft Gearmotor

- ◆ Highly modular design makes all the spare parts standardization and reducing the delivery time.
- ◆ Ratio in details and widely range, combination model can reach high ratio. Gearbox is suitable for installation in any angles.
- ◆ En-block casting housing and well rigidity structure, increase the shaft strength and lifespan of bearing.
- ◆ Low carbon alloy steel gear using carburizing grinding precision and modification to improve the loading capacity, cooling and noise reduction performance.
- ◆ Parallel output, compact structure, high transfer torque and precision gear ensure the long and smoothly operation.
- ◆ Mounting position: Foot-mounted, flange mounted, torque arm mounted and small-flange mounted.
- ◆ Input model: Motor connection, shaft input and flange input.

Company products are widely used in ports, metallurgy, hoist, logistics, transportation, arena, electric power, coal mining, cement, building materials, paper & forestry, agricultural machinery, light industry, textile, chemical plastics, energy conservation, environmental protection and other fields. The technical experts from headquarter and large arena, the application engineer from the regional offices and the after-sales service technician will provide you with comprehensive technical advice and perfect service.



注意事项！必须严格遵守以下各项！

Note: You must conform to the following instructions

- ◆ 样本中的结构示意图、外形图及其他附图只属于范例，无严格比例要求。（未注尺寸单位均为mm）。
- ◆ 所注重量仅为平均值，并不具有约束力。
- ◆ 为防止意外事故发生，所有旋转部件均按照使用者所在的国家和地区的安全规范购置方加罩保护。
- ◆ 试车之前必须认真阅读使用说明书。
- ◆ 齿轮箱在供货时已处于准运行状态，运行前需要加注润滑油。
- ◆ 本样本中注油量只作为参考值，实际注油量应以油镜上的标记为准。
- ◆ 润滑油粘度齿轮箱使用工况及使用环境温度选取。
- ◆ 只能采用国际知名牌的润滑油。
- ◆ The structure scheme, appearance diagram and other attached diagrams in sample and examples, there is no strict proportion requirement. (The unmarked dimension units are mm).
- ◆ We can only refer to the marked weight in the manual.
- ◆ To prevent accidents, all the rotation parts should be added with protective covers according to local safety regulations and laws.
- ◆ Before testing, users should read instruction manual carefully.
- ◆ Gearbox has been tested before delivered, users should add lubrication oil before running.
- ◆ We can only refer to the marked oil in the manual, Actual oil filling level should be the same with the mark on oil immersion lens.
- ◆ Lubrication oil viscosity should be selected according to working conditions and the temperature of local environment.
- ◆ Users can only use high quality lubrication oil.

产品功能标识/Product Function Mark



油 镜 / Oil glass



通气帽 / Breather



进油孔 / Oil filler



放油孔 / Oil drain



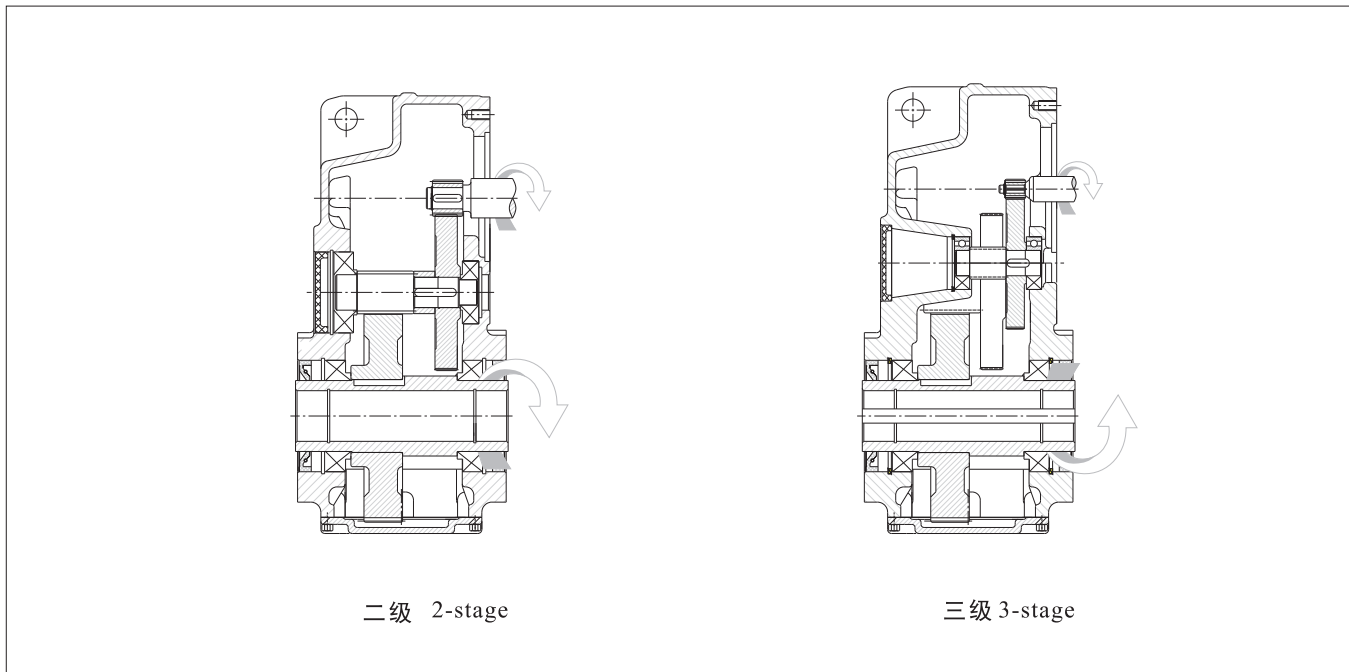
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1 结构示意图:

1 Sectional Drawings:



2 型号表示方法:

2 Type Designation

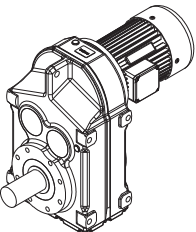
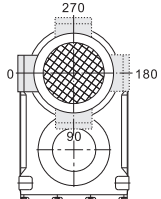
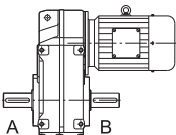
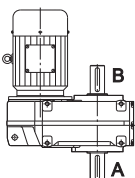
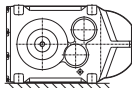
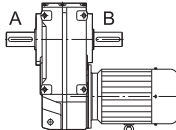
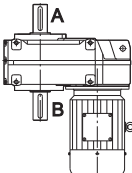
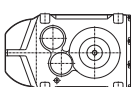
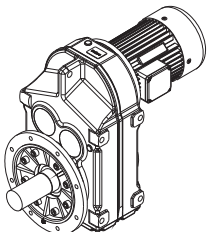
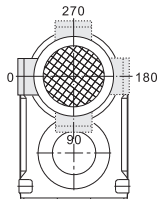
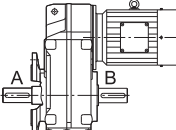
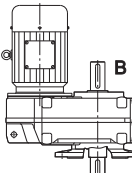
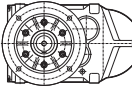
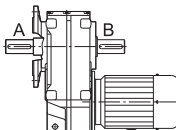
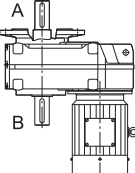
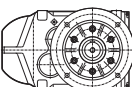
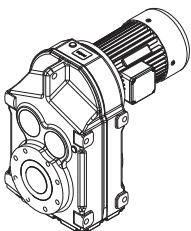
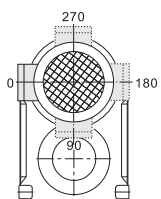
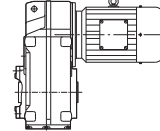
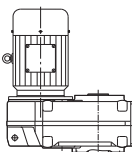
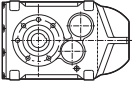
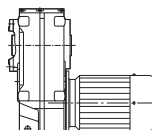
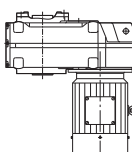
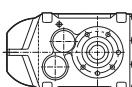
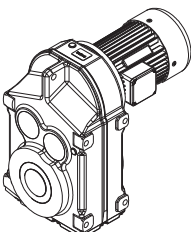
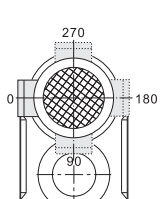
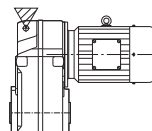
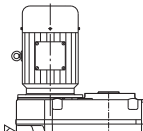
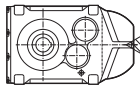
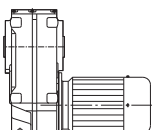
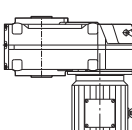
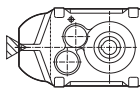
	FF	97	A	25.3	M5.5	T21	B51	90
F系列安装形式/F Series								
F = 底座式安装平键实心轴 Foot-mounted solid shaft with parallel key								
FH = 底座式带锁紧盘空心轴 Foot-mounted hollow shaft with shrink disk								
FW = 底座式平键空心轴 Foot-mounted hollow shaft with flat key								
FN = 底座式渐开线花键空心轴 Foot-mounted hollow shaft with involute spline								
FF = 法兰式平键实心轴 Flange-mounted solid shaft with parallel key								
FL = 法兰式平键空心轴 Flange-mounted hollow shaft with parallel key								
FHL = 法兰式带锁紧盘空心轴 Flange-mounted hollow shaft with shrink disk								
FNF = 法兰式渐开线花键空心轴 Flange-mounted hollow shaft with involute spline								
FA = 扭力臂式平键空心轴 Torque-arm-mounted hollow shaft with parallel key								
FHA = 扭力臂式带锁紧盘空心轴 Torque-arm-mounted hollow shaft with shrink disk								
FNA = 扭力臂式渐开线花键空心轴 Torque-arm-mounted hollow shaft with involute spline								
FZ = 小法兰式平键空心轴 Short-flange-mounted hollow shaft with parallel key								
FHZ = 小法兰式带锁紧盘空心轴 Short-flange-mounted hollow shaft with shrink disk								
FNZ = 小法兰式渐开线花键空心轴 Short-flange-mounted hollow shaft with involute spline								
机座号/Size								
输出轴方向/Output Shaft Direction								
A\B=单向/Unidirectional output shaft								
S=双向/Bidirectional output shaft								
公称减速比/Nominal Ratio								
输入部分/Input Part								
M=电机/Motor								
AE=轴输入/Input Shaft								
AG=法兰连接/Connection Flange								
附件和特殊要求/Accessories and Special Requests								
安装方位/Mounting Positions								
电机接线盒位置/Positions of Motor Terminal Box								

组合型举例/Combi-type Designation:F87A/CRL47-295-M1.1+E01-B6-90



3 安装方位、电机接线盒位置和输出轴方向：

3 Mounting Positions, Position of Motor Terminal Box and Output Shaft Direction:

 F..FW..\FH..\FN..		 B6	 V5	 B3
		 B61	 V6	 B31
 FF..\FL..\FHL..\FNF..		 B5	 V1	 B52
		 B51	 V3	 B53
 FZ..\FHZ..\FNZ..		 H1	 H5	 H4
		 H2	 H6	 H3
 FA..\FHA..\FNA..		 H1	 H5	 H4
		 H2	 H6	 H3



4 选型及举例：

4 Type Selection and Example:

序号/Steps	说明/Specification	代号/Symbol	参数计算/Calculate parameter			
1	被驱动设备系数 Driven Machine Factor	f ₁	负荷性质 Load Characteristic	每天使用时间 (小时)Operating hours per day (h)		
			≤2	2~10	10~24	
			均匀负载 /Uniform	1.00 (1.00)	1.00 (1.25)	1.25 (1.50)
			一般冲击 /Moderate	1.00 (1.25)	1.25 (1.50)	1.50 (1.75)
			强烈冲击 /Heavy	1.25 (1.50)	1.50 (1.75)	1.75 (2.00)
注: 当每小时起动、停止次数≥10次, 请使用括号内数值。 Note: Apply values in the brackets when starts per hour are 10 times or more.						
2	输入转速 /Input Speed	n ₁	≤1800r/min 更高转速请咨询 Consult us if higher speed required.			
3	确定减速比 Calculation of the Ratio	i	i=n ₁ /n ₂			
4	齿轮传动效率 Transmission Efficiency	η	二级2-stage		96%	
			三级3-stage		94%	
5	以被驱动设备所需的扭矩或功率, 确定齿轮箱的输入功率 Calculation of the input power of the gear unit on basis of the torque and power required by the driven machine.	P ₁	$P_1=T_2 \cdot n_1/ (9550 \cdot i \cdot \eta)$ 或 $P_1=P_2/ \eta$ or			
6	根据计算, 查传动能力表, 确定齿轮箱规格, 直联电机时需查直联电机功率表 Determination of gear unit type referring to the table of transmission capacity after calculation, For directly-connected motor, require to refer to directly-connected motor power table.	T _{2N} 、P _{1N}	$T_{2N} \geq T_2 \cdot f_1$ 或 $P_{1N} \geq P_1 \cdot f_1$ or			
7	径向力、轴向力校核 Check the radial and axial forces on the shafts.	Fr ₁ /Fr ₂ Fa ₁ /Fa ₂	查第12页Fr ₁ 、Fr ₂ 表。 See P12.			
8	确认润滑方式 Determination of Lubrication System		一般采用飞溅润滑 /Generally Splash Lubrication			
9	确认冷却方式 Determination of Cooling System		一般采用自然冷却/Generally Air Cooling			
10	按型号表示方法确定各项 Determination of every item included in the Type Designation		型号表示方法见第1页 /For details about Type Designation, see P 1.			
11	一般环境条件 Normal ambient conditions		环境温度: -10至40℃, 空旷场地通风良好, 海拔高度1000米以下, 一般工厂灰尘。 Ambient temperature -10 to 40℃, ample space, good ventilation, altitude not exceeding 1000m and common plant dust.			
12	特殊环境条件 Special ambient conditions		高温、低温、灰尘多, 化学作用 (例: 酸碱等), 露天 (直接日照、冰、水淋等), 请咨询。 For higher or lower temperature, dusty sites, chemical reaction (acids, alkaline, etc), or open field (sunlight, ice, rain, etc), please consult us!			



选型举例

Example

1) 减速电机

已知条件:

- 1、被驱动设备所需功率 $P_2=2.2\text{kW}$, 所需转速 $n_2=51\text{ r/min}$;
- 2、普通电机: 4极, 转速 $n_1=1450\text{r/min}$;
- 3、负荷性质: 强烈冲击, 工作16小时/天, 启动频率6次/小时;
- 4、安装输出形式: 法兰安装, 安装方位B52, 单向实心轴输出A向, 接线盒位置90.

选型步骤:

- 1、根据负荷性质查表可得出被驱动设备系数 $f_1=1.75$;
- 2、确定速比 i_N :
 $i = n_1/n_2 = 1450/51 = 28.4$, 取公称速比 $i_N=28.2$;
- 3、计算输入功率并确定电机功率(查表得出齿轮传动效率 $\eta=94\%$):
 $P_1 = P_2/\eta = 2.2/0.94 = 2.3\text{kW}$, 取电机功率为 3kW ;
查直联电机功率表, 可直联;
- 4、确定减速机额定功率 P_{1N} :
 $P_{1N} \geq P_2 \cdot f_1/\eta = 2.2 \cdot 1.75/0.94 = 4.1\text{kW}$;
- 5、根据已知条件和以上数据, 查传动能力表可选出减速机型号为:
FF67A-28.2-M3-B52-90

2) 减速机

已知条件:

- 1、被驱动设备所需扭矩 $T_2=1000\text{N} \cdot \text{m}$, 所需转速 $n_2=70\text{r/min}$;
- 2、用户自配电机的要求: 4极, 转速 $n_1=1450\text{r/min}$;
- 3、负荷性质: 一般冲击, 工作8小时/天, 连续运转;
- 4、安装输入输出形式: 轴输入, 底脚安装, 平键空心轴输出A向, 安装方位B51.

选型步骤:

- 1、根据负荷性质查表可得出被驱动设备系数 $f_1=1.25$;
- 2、确定速比 i_N :
 $i = n_1/n_2 = 1450/70 = 20.7$, 取公称速比 $i_N=21.1$;
- 3、确定减速机额定扭矩 T_{2N} 及额定功率 P_{1N} (传动效率 $\eta=96\%$):
 $T_{2N} \geq T_2 \cdot f_1 = 1000 \cdot 1.25 = 1250\text{N} \cdot \text{m}$;
 $P_{1N} \geq P_1 \cdot f_1 = T_2 \cdot f_1 \cdot n_1 / (9550 \cdot i_N \cdot \eta)$
 $= 1000 \times 1.25 \times 1450 / (9550 \times 21.1 \times 0.96)$
 $= 9.37\text{kW}$;
根据传动能力表可得出F77满足要求($T_{2N}=1500\text{N} \cdot \text{m}$, $P_{1N}=10.6\text{kW}$);
- 4、确定输入部分:
根据 $P_{1N} \geq P_1 = T_2 \cdot n_1 / (9550 \cdot i_N \cdot \eta)$
 $= 1000 \times 1450 / (9550 \times 21.1 \times 0.96) = 7.5\text{kW}$;
用户自配电机功率取 7.5kW , 查轴输入尺寸图表选AE4即可;
- 5、根据已知条件和以上数据, 可初选出减速机型号为:
FL77A-21.1-AE4-B51

1) Geared motor

Known Criteria:

1. The power required by the driven machine $P_2=2.2\text{kW}$, speed $n_2=51\text{r/min}$
2. Common motor: 4-pole, speed $n_1=1450\text{r/min}$
3. Load characteristics: moderate, working 16 hours/d and starting 6 times/h
4. Mounting mode: flange-mounted, mounting position B52, One-way solid output shaft A direction, terminal box position 90

Selection Steps:

1. By referring to the table of Load Characteristic, we get the driven machine factor $f_1=1.75$.
2. Calculation of the Ratio:
As $i = n_1/n_2 = 1450/51 = 28.4$, nominal ratio $i_N=28.2$ is appropriate.
3. Calculation of the input power and determination of the motor power (transmission efficiency $\eta=94\%$):
 $P_1 = P_2/\eta = 2.2/0.94 = 2.3\text{kW}$, so 3kW motor is selected.
Refer to the directly-connected motor power table, it can be directly-connected.
4. Determination of the nominal power of the geared motor P_{1N} :
 $P_{1N} \geq P_2 \cdot f_1/\eta = 2.2 \times 1.75/0.94 = 4.1\text{kW}$
5. The type selected:
FF67A-28.2-M3-B52-90

2) Gear Unit

Known Criteria:

1. The torque required by the driven machine $T_2=1000\text{N} \cdot \text{m}$ and speed $n_2=70\text{r/min}$
2. The motor supplied by the users: 4-pole, speed $n_1=1450\text{r/min}$
3. Load characteristic: moderate, operating 8h/d continuously
4. Mounting mode: shaft input, foot-mounted, Parallel key solid shaft output A direction, mounting position B51.

Selection steps:

1. By referring to the table of Load Characteristic, we get the driven machine factor $f_1=1.25$.
2. Calculation of the ratio i_N :
As $i = n_1/n_2 = 1450/70 = 20.7$, nominal ratio $i_N=21.1$ is appropriate
3. Determination of the nominal torque T_{2N} and nominal power P_{1N} of the gear unit (transmission efficiency $\eta=96\%$):
 $T_{2N} \geq T_2 \cdot f_1 = 1000 \times 1.25 = 1250\text{N} \cdot \text{m}$;
 $P_{1N} \geq P_1 \cdot f_1 = T_2 \cdot f_1 \cdot n_1 / (9550 \cdot i_N \cdot \eta)$
 $= 1000 \times 1.25 \times 1450 / (9550 \times 21.1 \times 0.96)$
 $= 9.37\text{kW}$
In the table of Transmission Capacity, F77 meets the requirements ($T_{2N}=1500\text{N} \cdot \text{m}$, $P_{1N}=10.6\text{kW}$)
4. Determination of the input mode:
As $P_{1N} \geq P_1 = T_2 \cdot n_1 / (9550 \cdot i_N \cdot \eta)$
 $= 1000 \times 1450 / (9550 \times 21.1 \times 0.96) = 7.5\text{kW}$
and power of the user-supplied motor is specified as 7.5kW , in the table of Dimensions of the AE Input Shaft, AE4 is selected.
5. The type selected:
FL77A-21.1-AE4-B51



5 传动能力表:

5 Transmission Capacity:

			F..37			F..47			F..67			F..77		
n_1 (r/min)	n_{2N} (r/min)	i_N	T_{2N} (N·m)	i_{ex}	P_{1N} (kW)	T_{2N} (N·m)	i_{ex}	P_{1N} (kW)	T_{2N} (N·m)	i_{ex}	P_{1N} (kW)	T_{2N} (N·m)	i_{ex}	P_{1N} (kW)
1450	337	4.3	110	4.28	3.902	173	4.34	6.05	305	4.38	10.6	470	4.18	17.1
	280	5.2	120	5.09	3.58	191	5.21	5.57	330	5.22	9.6	555	5.17	16.3
	252	5.8	125	5.58	3.401	191	5.92	4.9	355	5.93	9.09	605	5.76	15.9
	219	6.6	140	6.45	3.296	200	6.57	4.62	385	6.58	8.88	670	6.65	15.3
	195	7.4	145	7.5	2.935	225	7.36	4.22	410	7.37	8.45	720	7.4	14.8
	174	8.3	170	8.34	3.095	230	8.25	3.88	440	8.3	8.05	765	8.28	14
	160	9.1	175	8.89	2.989	250	9	5.34	450	9.04	7.56	765	8.84	13.1
	134	10.8	185	10.58	2.655	380	10.8	5.62	800	10.8	9.42	1180	10.9	16.4
	117	12.4	200	12.15	2.499	400	12.3	4.95	800	12.3	9.92	1280	12.2	16
	105	13.8	200	13.39	2.268	400	13.6	4.46	820	13.6	8.91	1420	14.1	15.3
	94	15.5	200	15.58	1.949	400	15.2	3.99	820	15.2	8.17	1500	15.6	14.6
	83	17.4	200	17.33	1.752	400	17.1	3.55	820	17.1	7.27	1500	17.5	13
	74	19.5	200	19.46	1.56	400	19.4	3.13	820	19.4	6.41	1500	19.7	11.5
	69	21.1	200	20.64	1.471	400	21.3	2.86	820	21.3	5.85	1500	21.4	10.6
	57	25.3	-	-	-	300	25.3	1.8	620	25.3	3.72	1500	25.5	8.93
1450	51	28.2	200	27.79	1.093	400	28.1	2.16	820	28.4	4.39	1500	28.5	7.99
	43	34.0	200	34.25	0.887	400	33.5	1.81	820	33.9	3.68	1500	34	6.7
	38	38.3	200	38.23	0.794	400	38.5	1.58	820	38.4	3.24	1500	38.6	5.9
	33	43.6	200	42.87	0.708	400	42.4	1.43	820	42.8	2.91	1500	42.9	5.32
	29.8	48.7	200	48.35	0.628	400	49.3	1.23	820	47.8	2.61	1500	48	4.75
	26.6	54.5	200	54.93	0.553	400	54.9	1.11	820	53.7	2.32	1500	53.9	4.22
	24.0	60.5	200	60.08	0.505	400	59.7	1.02	820	59.7	2.08	1500	60.4	3.77
	21.4	67.8	200	67.05	0.453	400	68.6	0.89	820	67.8	1.84	1500	68.6	3.32
	18.8	77.0	200	75.19	0.404	400	75.6	0.8	820	75.4	1.65	1500	76.2	2.99
	16.8	86.1	200	84.81	0.358	400	88	0.69	820	84.2	1.48	1500	85.3	2.67
	15.0	96.4	200	96.35	0.315	400	97.8	0.62	820	94.7	1.31	1500	96	2.37
	13.6	107	200	103	0.295	400	110	0.55	820	107	1.16	1500	109	2.1
	12.3	118	200	118.8	0.256	400	117	0.52	820	118	1.06	1500	119	1.91
	10.3	141	200	138.7	0.219	400	141	0.43	820	140	0.89	1500	142	1.61
	9.0	161				400	163	0.37	820	159	0.78	1500	165	1.38
	8.4	173				400	176	0.35	820	170	0.73	1500	175	1.3
	7.3	198							820	197	0.63	1500	198	1.15
	6.4	227										1500	226	1.01
	6.0	241										1150	244	0.72
	5.3	273												



F..87			F..97			F..107			F..127			F..157		
T _{2N} (N • m)	i _{ex}	P _{1N} (kW)	T _{2N} (N • m)	i _{ex}	P _{1N} (kW)	T _{2N} (N • m)	i _{ex}	P _{1N} (kW)	T _{2N} (N • m)	i _{ex}	P _{1N} (kW)	T _{2N} (N • m)	i _{ex}	P _{1N} (kW)
1260	4.41	43.4	1690	4.2	61	2290	4.2	82.8	4150	4.29	147			
1510	5.25	43.7	2150	5.2	62.8	2290	5.2	66.9	4900	5.17	144			
1530	5.85	39.7	2250	5.79	59	2290	5.79	60.1	4900	5.76	129			
1530	6.75	34.4	2360	6.68	53.6	2290	6.68	52.1	6030	6.65	138			
1530	7.51	30.9	2360	7.43	48.2	2730	7.43	55.8	6000	7.4	123			
1530	8.4	27.7	2360	8.32	43.1	3090	8.32	56.4	7000	8.28	128			
2880	9.32	46.9	2360	8.9	40.3	3090	8.9	52.7	9040	9.13	150	15000	9.1	250.3
3000	11	41.4	4100	11	56.5	4000	11	55.2	9040	11	125	16000	10.94	222.1
3000	12.3	37.1	4300	12.3	53.2	4540	12.3	56.2	10000	12.3	124	16000	12.66	191.9
3000	14.2	32.2	4300	14.2	46.1	5410	14.2	58.1	11000	14.2	118	17000	14.01	184.2
3000	15.8	28.9	4300	15.8	41.5	6120	15.8	59	11000	15.8	106	18000	15.59	175.3
3000	17.6	25.9	4300	17.6	37	6120	17.6	52.7	11000	17.6	94.7	18000	17.36	157.4
3000	19.9	22.9	4300	19.9	32.9	7090	19.9	54.2	10800	19.9	82.6	17000	19.2	134.4
3000	21.6	21.1	4300	21.6	30.3	7840	21.6	55.2	12000	21.6	84.5	18000	21.36	127.9
3000	25.7	17.7	4300	25.7	25.4	7500	25.7	44.3	8500	25.7	50.3	15000	25.41	89.63
3000	27.9	16.3	4300	28.8	22.7	7840	28.8	41.3	12000	28.9	63.1	18000	28.01	97.57
3000	34.5	13.2	4300	34.4	19	7400	34.4	32.7	12000	34.4	52.9	18000	33.76	80.95
3000	38.5	11.8	4300	38.4	17	7680	38.4	30.4	12000	38.9	46.8	18000	37.71	72.47
3000	44.3	10.3	4300	44.3	14.8	7680	44.3	26.4	12000	44.8	40.6	18000	43.44	62.91
3000	49.3	9.24	4300	49.2	13.3	7680	49.2	23.7	12000	49.7	36.7	18000	48.32	56.56
3000	55.1	8.26	4300	55	11.9	7680	55	21.2	12000	55.3	33	18000	54.04	50.57
3000	60.8	7.49	4300	60.8	10.7	7680	60.8	19.2	12000	60.3	30.2	18000	59.9	45.63
3000	67.9	6.71	4300	67.9	9.61	7680	67.9	17.2	12000	68.2	26.7	18000	66.9	40.85
3000	78.3	5.82	4300	78.3	8.34	7680	78.3	14.9	12000	78.5	23.2	18000	77.07	35.46
3000	87	5.23	4300	87	7.5	7680	87	13.4	12000	86.9	21	18000	85.72	31.88
3000	97.3	4.68	4300	97.3	6.71	7680	97.3	12	12000	96.8	18.8	18000	95.88	28.5
3000	110	4.15	4300	110	5.96	7680	110	10.6	12000	108	16.8	18000	108	25.31
3000	119	3.82	4300	119	5.47	7680	119	9.77	12000	119	15.3	18000	117.5	23.26
3000	142	3.21	4300	142	4.6	7680	142	8.22	12000	141	12.9	18000	139.8	19.55
3000	160	2.85	4300	160	4.08	7680	160	7.29	12000	159	11.4	18000	157.6	17.34
3000	175	2.6	4300	175	3.72	7680	175	6.65	12000	175	10.4	18000	172.7	15.83
3000	193	2.36	4300	204	3.21	7680	204	5.73	12000	203	8.99	18000	190.4	14.35
2800	227	1.87	4300	227	2.88	7680	227	5.14	12000	226	8.06			
1900	241	1.19	4300	241	2.71	7680	241	4.85	12000	240	7.61			
1900	273	1.06				7680	275	4.25	12000	271	6.71			



组合型传动能力表:

Combi-type Transmission Capacity:

			F..37/CRL37			F..47/CRL37			F..67/CRL37			F..77/CRL37		
n_1 (r/min)	n_{2N} (r/min)	i_N	T_{2N} (N·m)	i_{ex}	P_{1N} (kW)	T_{2N} (N·m)	i_{ex}	P_{1N} (kW)	T_{2N} (N·m)	i_{ex}	P_{1N} (kW)	T_{2N} (N·m)	i_{ex}	P_{1N} (kW)
1450	8.58	169	200	164.3	0.20	400	165.8	0.40	820	165.6	0.82	1500	164.7	1.5
	7.75	187	200	185.3	0.18	400	187	0.35	820	186.8	0.72	1500	155.7	1.59
	6.87	211	200	210.6	0.16	400	212.5	0.31	820	212.3	0.64	1500	211	1.17
	6.20	234	200	235.5	0.14	400	237	0.28	820	236.7	0.57	1500	237.8	1.04
	5.58	260	200	263	0.13	400	264.7	0.25	820	264.4	0.51	1500	265.6	0.93
	4.92	295	200	294.8		400	296.7	0.22	820	296.3	0.46	1500	297.6	0.83
	4.35	333	200	335.3		400	337.5	0.20	820	337	0.4	1500	338.5	0.73
	3.54	410	200	412.9		400	415.6	0.16	820	415	0.33	1500	416.9	0.59
	3.13	463	200	461.1		400	464.1	0.14	820	463.5	0.29	1500	465.5	0.53
	2.78	521	200	516.9		400	520.2	0.13	820	519.6	0.26	1500	521.9	0.47
	2.51	578	200	583		400	586.8		820	586.1	0.23	1500	588.7	0.42
	2.23	651	200	662.5		400	666.9		820	666	0.2	1500	668.9	0.37
	2.00	724	200	708.4		400	713		820	712.1	0.19	1500	715.3	0.35
	1.82	797	200	816.2		400	821.5		820	820.5	0.16	1500	824.1	0.3
	1.53	950	200	953.1		400	959.3		820	958.1	0.14	1500	962.3	0.26
	1.39	1042	200	1039		400	1046		820	1044	0.13	1500	1049	0.24
	1.14	1268	200	1280		400	1289		820	1287		1500	1293	0.19
	1.02	1425	200	1429		400	1438		820	1437		1500	1443	0.17
	0.90	1616	200	1602		400	1613		820	1611		1500	1618	0.15
	0.80	1823	200	1822		400	1832		820	1832		1500	1840	0.13
	0.63	2287	200	2246		400	2257		820	2257		1500	2267	
	0.57	2551	200	2506		400	2519		820	2519		1500	2531	
	0.51	2861	200	2810		400	2840		820	2840		1500	2876	
	0.45	3227	200	3196		400	3229		820	3229		1500	3271	
	0.36	4048	200	3939		400	3980		820	3980		1500	4031	
	0.32	4515	200	4396		400	4442		820	4442		1500	4499	
	0.29	5065	200	4930		400	4982		820	4982		1500	5046	
	0.25	5729	200	5560		400	5619		820	5619		1500	5691	
	0.23	6400	200	6316		400	6383		820	6383		1500	6465	
	0.21	7051	200	6755		400	6826		820	6826		1500	6914	
	0.18	8146	200	7989		400	7854		820	7854		1500	7962	
	0.16	9100	200	9076		400	8923		820	8923		1500	9045	
	0.14	10026	200	9706		400	9542		820	9542		1500	9673	
	0.13	11086	200	11187		400	10998		820	10998		1500	11149	
	0.11	13207	200	13065		400	12844		820	12844		1500	13020	
	0.10	15135												
	0.09	16388												
	0.08	18509												



F..87/CRL47			F..97/CRL67			F..107/CRL77			F..127/CRL87			F..157/CRL97		
T _{2N} (N·m)	i _{ex}	P _{1N} (kW)	T _{2N} (N·m)	i _{ex}	P _{1N} (kW)	T _{2N} (N·m)	i _{ex}	P _{1N} (kW)	T _{2N} (N·m)	i _{ex}	P _{1N} (kW)	T _{2N} (N·m)	i _{ex}	P _{1N} (kW)
3000	162	3.05	4300	162.6	4.36	7680	164.8	7.68	12000	167.4	11.8	18000	173.7	17.1
3000	188.5	2.62	4300	181.7	3.9	7680	184.6	6.85	12000	186.3	10.6	18000	193.3	15.3
3000	209.9	2.35	4300	204.3	3.47	7680	207.7	6.09	12000	208.6	9.48	18000	216.5	13.7
									F..127/CRL77					
3000	230.1	2.15	4300	234.2	3.02	7680	225.8	5.6	12000	231.9	8.53	18000	228.5	13
3000	264.3	1.87	4300	265.7	2.67	7680	256.5	4.93	12000	263.4	7.51	18000	255.3	11.6
3000	290.8	1.7	4300	295.3	2.4	7680	284.9	4.44	12000	292.6	6.76	18000	294.1	10.1
3000	336.6	1.47	4300	337.5	2.1	7680	318.7	3.97	12000	327.2	6.04	18000	326.9	9.07
3000	401.2	1.23	4300	403.2	1.76	7680	400.1	3.16	12000	410.9	4.81	18000	402.7	7.36
3000	460.5	1.07	4300	457.3	1.55	7680	454.3	2.79	12000	466.5	4.24	18000	448.7	6.61
3000	507	0.97	4300	508.8	1.39	7680	504.3	2.51	12000	517.9	3.82	18000	517.4	5.73
3000	590.1	0.84	4300	568.7	1.25	7680	564.9	2.24	12000	580.1	3.41	18000	575.8	5.15
3000	657.1	0.75	4300	639.4	1.11	7680	635.8	1.99	12000	652.9	3.03	18000	644.8	4.6
3000	735.9	0.67	4300	724.2	0.98	7680	719.2	1.76	12000	738.5	2.68	18000	726.3	4.08
3000	781.3	0.63	4300	794.1	0.89	7680	787.7	1.61	12000	808.9	2.44	18000	788.9	3.76
3000	947.1	0.52	4300	944.6	0.75	7680	937.8	1.35	12000	963	2.05	18000	939	3.16
3000	1065	0.46	4300	1049	0.68	7680	1046	1.21	12000	1074	1.84	18000	1019	2.91
3000	1270	0.39	4300	1251	0.57	7680	1255	1.01	12000	1289	1.53	18000	1261	2.35
3000	1458	0.34	4300	1437	0.49	7680	1425	0.89	12000	1463	1.35	18000	1404	2.11
3000	1605	0.31	4300	1582	0.45	7680	1582	0.8	12000	1624	1.22	18000	1620	1.83
3000	1868	0.26	4300	1841	0.38	7680	1771	0.71	12000	1819	1.09	18000	1803	1.64
3000	2334	0.21	4300	2296	0.31	7680	2255	0.56	12000	2316	0.85	18000	2273	1.3
3000	2601	0.19	4300	2562	0.28	7680	2512	0.5	12000	2580	0.77	18000	2479	1.2
3000	2834	0.17	4300	2798	0.25	7680	2854	0.44	12000	2848	0.69	18000	2874	1.03
3000	3299	0.15	4300	3256	0.22	7680	3196	0.4	12000	3189	0.62	18000	3198	0.93
3000	4121	0.12	4300	4062	0.17	7680	4068	0.31	12000	4060	0.49	18000	4033	0.74
3000	4591		4300	4532	0.16	7680	4532	0.28	12000	4523	0.44	18000	4398	0.67
3000	5055		4300	4989	0.14	7680	5031	0.25	12000	5021	0.39	18000	5074	0.58
3000	5883		4300	5806	0.12	7680	5634	0.22	12000	5623	0.35	18000	5646	0.53
3000	6550		4300	6465		7680	6320	0.2	12000	6307	0.31	18000	6321	0.47
3000	7335		4300	7240		7680	7171	0.18	12000	7156	0.28	18000	7118	0.42
3000	8431		4300	8322		7680	8076	0.16	12000	7975	0.25	18000	8092	0.37
3000	9386		4300	9265		7680	9058	0.14	12000	8945	0.22	18000	9060	0.33
3000	10513		4300	10376		7680	10278	0.12	12000	10150	0.19	18000	10202	0.29
3000	11165		4300	11018		7680	11268		12000	11127	0.18	18000	11084	0.27
3000	13530		4300	13355		7680	13413		12000	13246	0.15	18000	13193	0.22
3000	15604		4300	15389		7680	15226		12000	15037	0.13	18000	14861	0.2
3000	16850		4300	16626		7680	16304		12000	16101	0.12	18000	16300	0.18
						7680	18861		12000	18626		18000	17978	0.16



6 Directly connected motor power table:

[illegible]

Note: 1.  means permissible directly-connected motor,
2.  means permissible directly-connected motor (The motor's power is more than nominal input power of gear unit, $P_1 > P_{1N}$),
3.  means unallowed directly-connected motor.
4. The selection of motor shall be suitable for driver machine factor and regulations of type selection.
5. The motor is 4-pole motor.



iN	P_m (kW)	0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30
4.3																											
5.2																											
5.8																											
6.6																											
7.4																											
8.3																											
9.1																											
10.8																											
12.4																											
13.8																											
15.5																											
17.4																											
19.5																											
21.1																											
25.3																											
28.2																											
34																											
38.3																											
43.6																											
48.7																											
54.5																											
60.5																											
67.8																											
77																											
86.1																											
96.4																											
107																											
118																											
141																											
161																											
173																											
198																											
227																											
241																											
273																											

iN	P_m (kW)	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30	37	45	2.2	3	4	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
4.3																													
5.2																													
5.8																													
6.6																													
7.4																													
8.3																													
9.1																													
10.8																													
12.4																													
13.8																													
15.5																													
17.4																													
19.5																													
21.1																													
25.3																													
28.2																													
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43.6																													
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141																													
161																													
173																													
198																													
227																													
241																													
273																													

注: 1. 符号表示可直联电机;
2. 符号表示可直联电机(电机功率大于减速机的额定输入功率, 即 $P_1 > P_{1N}$);
3. 符号表示不可直联电机;
4. 电机功率的选择应符合相应的被驱动设备系数及选型规定;
5. 电机为4极电机。

Note: 1. means permissible directly-connected motor,
2. means permissible directly-connected motor(The motor's power is more than nominal input power of gear unit, $P_1 > P_{1N}$),
3. means unallowed directly-connected motor.
4. The selection of motor shall be suitable for driver machine factor and regulations of type selection.
5. The motor is 4-pole motor.



i_N \ P_m (kW)	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160
9.1														
10.8														
12.4														
13.8														
15.5														
17.4														
19.5														
21.1														
25.3														
28.2														
34														
38.3														
43.6														
48.7														
54.5														
60.5														
67.8														
77														
86.1														
96.4														
107														
118														
141														
161														
173														
198														

注: 1. 符号表示可直联电机;
2. 符号表示可直联电机(电机功率大于减速机的额定输入功率, 即 $P_1 > P_{1N}$);
3. 符号表示不可直联电机;
4. 电机功率的选择应符合相应的被驱动设备系数及选型规定;
5. 电机为4极电机。

Note: 1. means permissible directly-connected motor,
2. means permissible directly-connected motor(The motor's power is more than nominal input power of gear unit, $P_1 > P_{1N}$),
3. means unallowed directly-connected motor.
4. The selection of motor shall be suitable for driver machine factor and regulations of type selection.
5. The motor is 4-pole motor.



7 允许径向力和轴向力:

7 Permissible Radial Force and Axial Force on Shaft:

7.1 输入轴径向力Fr1表(N):

7.1 Radial Force on Input Shaft (Fr1)(N):

	Fr1(N)								
	F..37	F..47	F..67	F..77	F..87	F..97	F..107	F..127	F..157
AE2	803	803	803	803	803	/	/	/	/
AE3	/	/	1504	1504	1504	1504	1504	/	/
AE4	/	/	/	2188	2188	2188	2188	2188	/
AE5	/	/	/	/	4207	4207	4207	4207	4207
AE6	/	/	/	/	/	5664	5664	5664	5664
AE7	/	/	/	/	/	/	/	9957	9957
AE8	/	/	/	/	/	/	/	12546	12546

7.2 输出轴径向力Fr2表(N):

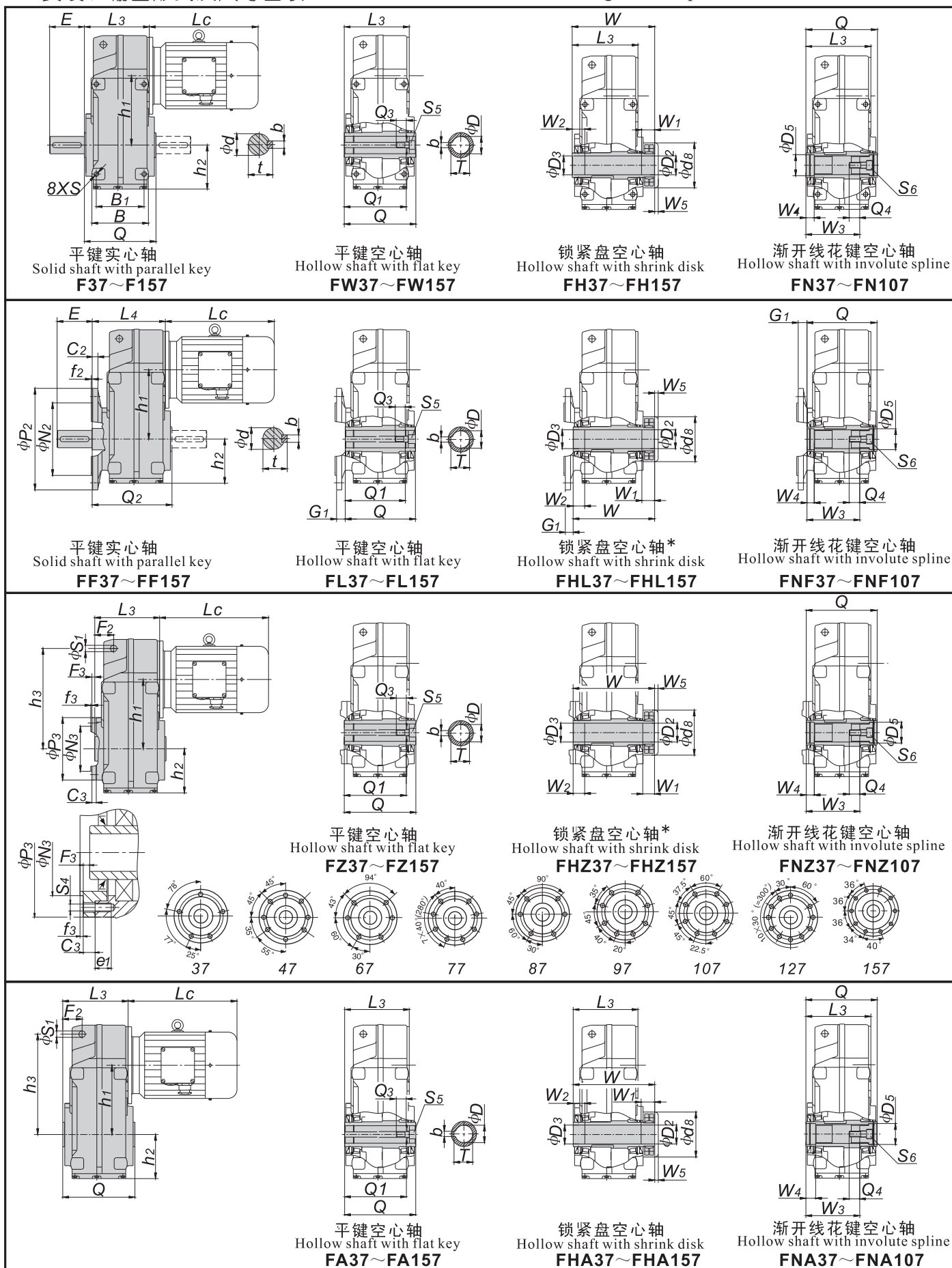
7.2 Radial Force on Output Shaft (Fr2)(N):

n_{2N} (r/min)	Fr2(N)								
	F..37	F..47	F..67	F..77	F..87	F..97	F..107	F..127	F..157
315 ~ 425	1827	2079	7641	9180	5382	9090	11000	26550	/
280 ~ 315	1908	2115	7965	9630	5787	9540	14000	28530	/
224 ~ 280	1971	2151	8280	10170	6318	10080	15300	28800	/
200 ~ 224	2043	2223	8694	10800	7011	10080	18990	28980	/
180 ~ 200	2115	2277	9090	11250	7452	10530	20880	33300	/
160 ~ 180	2115	2646	9810	11790	8001	11520	21600	32760	/
140 ~ 160	2214	2925	10260	12420	4545	12240	22500	31500	31450
125 ~ 140	2322	3096	9270	12780	4770	12240	20610	30600	33150
112 ~ 125	2475	3366	9270	13410	5310	9450	21870	32760	37350
100 ~ 112	2547	3555	9270	14130	5733	9900	22050	32760	38250
90 ~ 100	2763	3888	9270	14130	6651	10710	22700	33840	40410
80 ~ 90	2862	4005	9270	14130	7236	11880	24300	36000	42300
71 ~ 80	3051	4293	9270	14130	7956	13140	25290	37800	45810
63 ~ 71	3150	4527	9270	14130	8577	13500	27000	37800	45900
56 ~ 63	3519	4923	9270	14130	9990	15120	28980	48600	55350
45 ~ 56	3654	5247	9270	14130	12510	16110	30330	42750	54720
40 ~ 45	3861	5328	9270	14130	13140	18270	34470	47340	71370
35.5 ~ 40	3861	5328	9270	14130	13860	23400	35550	49320	74070
31.5 ~ 35.5	3861	5328	9270	14130	14220	21240	37800	52110	79020
28 ~ 31.5	3861	5328	9270	14130	14850	23220	39150	55620	83520
25 ~ 28	3861	5328	9270	14130	15930	23220	41850	58770	88470
22.4 ~ 25	3861	5328	9270	14130	15120	26100	43020	60660	74250
≤22.4	3861	5328	9270	14130	17640	26910	44820	63450	78300



8 安装、输出形式及尺寸图表：

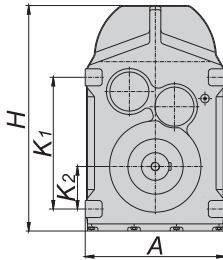
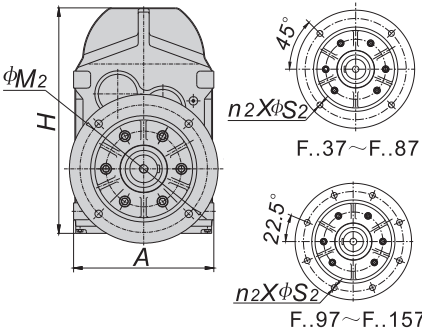
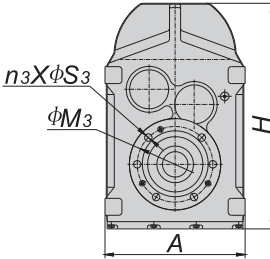
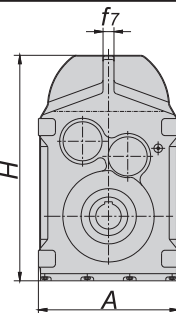
8 Mounting and Output Modes and Dimensions:



* 在FHL、FHZ中锁紧盘只能处在法兰的异侧。

* For FHL, FHZ, shrink disk should be installed on the opposite side of flange.



 底座式安装 /Foot-mounted	外形尺寸 /Outline dimension	规格	37	47	67	77	87	97	107	127	157
		A	165	180	212	270	330	400	450	530	660
 法兰式安装 /Flange-mounted		B	95	109	135	169	195	240	260	320	364
		B1	77	93	112	140	165	205	220	270	310
 小法兰安装 /Short-flange mounted		C2	10	12	15	16	18	22	22	25	28
		C3	11	11	12	14	15	18	22	28	58
 轴装式安装 (可用于扭力臂安装) Shaft-mounted (Applicable for torque arm mounted)	输出轴尺寸 /output shaft dimension	f2	3.5	3.5	4	4	5	5	5	5	6
		f3	3	3	3.5	3.5	4	4	4	5	5
		f7	12	14	16	20	26	30	36	40	45
		F2	31.5	32	41	50	62	70	88	112.5	152
		F3	9.5	9.5	10	12	13	16	19.5	25.5	25
		h1	112	128.1	159.5	200	246.7	285	332.4	382.6	447
		h2	68	77	97	116	152	178	193	235	286
		h3	158	170	218	278	346	395	485	550	660
		P3	110	120	155	170	215	260	304	350	400
		N3	80h7	80h7	105h7	125h7	155h7	180h7	210h7	250h7	290h7
		H	244	269	343	420	531	623	715	853	1024
		e1	14	14	20	20	26	26	32	32	36
		K1	115	145	190	240	310	350	400	450	540
		K2	31	43	60	70	100	120	125	142	170
		L3	110.5	139	160	192	220.5	274	312	367.5	443
		L4	134.5	164	183	229	250.5	315.5	352.5	431	505
		M2	130	165	215	265	300	400	400	500	600
		M3	94	102	125	142	178	220	260	300	340
		n2	4	4	4	4	4	8	8	8	8
		n3	5	8	6	8	6	8	8	11	10
		N2	110h7	130h7	180h7	230h7	250h7	350h7	350h7	450h7	550h7
		P2	160	200	250	300	350	450	450	550	660
		S1	14	14	14	22	22	26	26	33	33
		S	M8	M10	M12	M16	M16	M20	M24	M30	M36
		S2	9	11	13.5	13.5	17.5	17.5	17.5	17.5	22
		S3	9	9	13.5	13.5	17.5	17.5	22	22	26
		S4	M8	M8	M12	M12	M16	M16	M20	M20	M24
		b	8	10	12	14	18	20	25	28	32
		d	25k6	35k6	40k6	50k6	60m6	70m6	90m6	100m6	120m6
		D	30H7	35H7	40H7	50H7	60H7	70H7	90H7	100H7	120H7
		D2	30H7	35H7	40H7	50H7	65H7	75H7	85H7	105H7	115H7
		D3	30H7	35H7	40H7	50H7	65H7	75H7	90H7	105H7	125H7
		D5	37	37	42	55	72	72	90	/	/
		d8	86	86	96	122	150	160	207	252	302
		E	50	60	80	100	120	140	170	210	210
		G1	24	25	23	37	30	41.5	40.5	51	62
		Q	120	150	180	210	240	300	350	410	500
		Q1	105	132	156	183	210	270	313	373	460
		Q2	144	175	204	247	270	341.5	391	461	562
		Q3	17	22	29	35	44	43	40	40	46
		Q4	16	18	18	31	36.5	36.5	36.5	/	/
		S6	M10	M10	M10	M16	M20	M20	M20	/	/
		S5	M10	M12	M16	M16	M20	M20	M24	M24	M24
		t	28	38	43	53.5	64	74.5	95	106	127
		T	33.3	38.5	43.3	53.8	64.4	74.9	95.4	106.4	127.4
		W	146	177	208	241	281	345	405	485	580
		W1	31	32	38	36	41	55	65	85	90
		W2	20	20	20	30	40	50	60	70	80
		W3	91	118	144	162	182	242	292	/	/
		W4	18	18	25	23	25	25	26	/	/
		W5	12	12	12	9	9	11	38	23	33
		m*	1.25	2	2	2	2	2	3	/	/
		Z*	22	16	16	24	31	34	27	/	/
		α*	30	30	30	30	30	30	30	/	/
		D6*	30	35	35	50	65	70	85	/	/
		重量** (kg)	12.6	16	30	50	92	160	240	400	680

注: 1) * 内花键 DIN 5480, 模数m×齿数Z×压力角α×大径D6×9H。

2) ** 重量不含电机和润滑油。

Note: 1) * Involute spline acc. to DIN 5480 Module M × number of teeth Z × Pressure angle × Major diameter D6 × 9H.

2) ** The weight of motor and lubricant is not included.

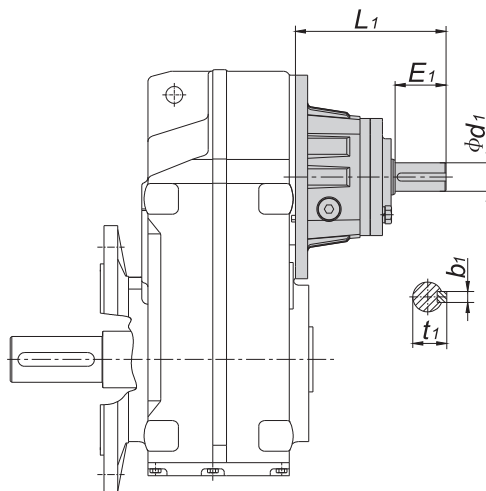
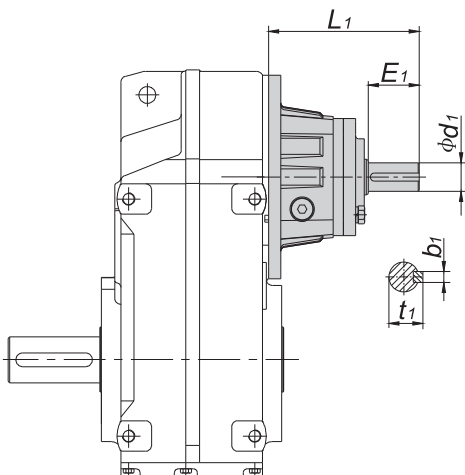


9 输入部分：

9.1 AE轴输入尺寸图表：

9 Input Part:

9.1 Dimensions of AE Input Shaft:



规格/Size	输入轴型号 Input Shaft	适用功率范围* Range of Power	d1	E1	L1	b1	t1	重量/Weight (kg)
37、47	AE2	0.12~1.1kW	19k6	40	117	6	21.5	3.2
67	AE2	0.12~1.1kW	19k6	40	119	6	21.5	3.9
	AE3	1.5~5.5kW	28k6	60	175	8	31	7.5
77	AE2	0.12~1.1kW	19k6	40	111	6	21.5	4.7
	AE3	1.5~5.5kW	28k6	60	165	8	31	8.5
	AE4	7.5~11kW	38k6	80	216	10	41	12.8
87	AE2	0.12~1.1kW	19k6	40	108	6	21.5	5.9
	AE3	1.5~5.5kW	28k6	60	158	8	31	9.9
	AE4	7.5~11kW	38k6	80	209	10	41	14.5
	AE5	15~22kW	42k6	110	271	12	45	25.4
97	AE3	1.5~5.5kW	28k6	60	156	8	31	11.9
	AE4	7.5~11kW	38k6	80	203	10	41	17
	AE5	15~22kW	42k6	110	265	12	45	26.6
	AE6	30~45kW	48k6	110	327	14	51.5	51.6
107	AE3	1.5~5.5kW	28k6	60	146	8	31	13.9
	AE4	7.5~11kW	38k6	80	190	10	41	19.3
	AE5	15~22kW	42k6	110	252	12	45	29.1
	AE6	30~45kW	48k6	110	314	14	51.5	50.8
127	AE4	7.5~11kW	38k6	80	176	10	41	23.7
	AE5	15~22kW	42k6	110	238	12	45	37.3
	AE6	30~45kW	48k6	110	298	14	51.5	57.2
	AE7	55~90kW	55m6	110	297	16	59	64
	AE8	110~132kW	70m6	140	377	20	74.5	84.4
157	AE5	15~22kW	42k6	110	228	12	45	48.8
	AE6	30~45kW	48k6	110	280	14	51.5	66
	AE7	55~90kW	55m6	110	279	16	59	73.8
	AE8	110~160kW	70m6	140	361	20	74.5	96

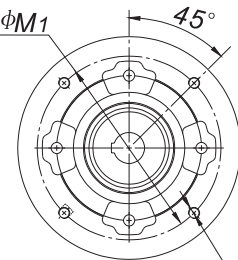
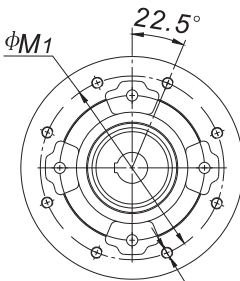
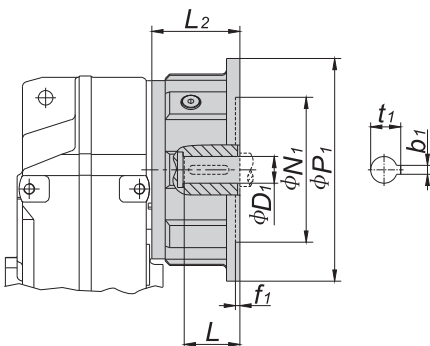
*适用功率范围按4极电机。

* Range of Power is based on 4-pole motor.



9.2 AG连接法兰尺寸图表:

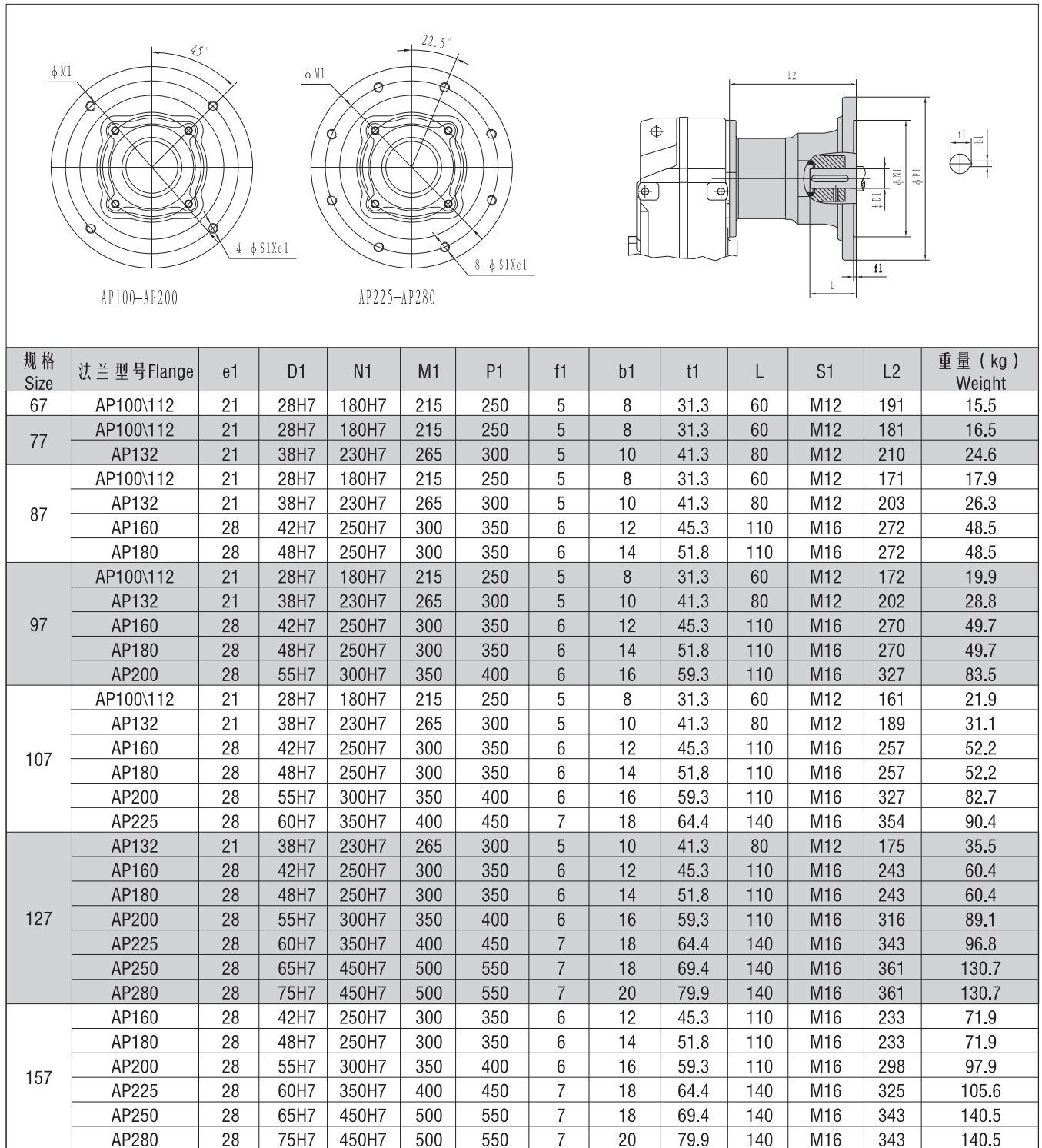
9.2 Dimensions of AG Connection Flange:

 AG63-AG200  AG225-AG315 													
规格/Size	法兰型号 Flange	e1	D1	N1	M1	P1	f1	b1	t1	L	S1	L2	重量/Weight (kg)
37 47	AG 63	14	11H7	95H7	115	140	4	4	12.8	23	M8	59	4.5
	AG 71	14	14H7	110H7	130	160	4	5	16.3	30	M8	59	4.5
	AG 80	18	19H7	130H7	165	200	4	6	21.8	40	M10	74	7.3
67	AG 63	14	11H7	95H7	115	140	4	4	12.8	23	M8	61	4.6
	AG 71	14	14H7	110H7	130	160	4	5	16.3	30	M8	61	4.6
	AG 80	18	19H7	130H7	165	200	4	6	21.8	40	M10	76	8
	AG 90	18	24H7	130H7	165	200	4	8	27.3	50	M10	81	9.1
	AG 100\112	21	28H7	180H7	215	250	5	8	31.3	60	M12	96	13.1
77	AG 71	14	14H7	110H7	130	160	4	5	16.3	30	M8	53	5.5
	AG 80	18	19H7	130H7	165	200	4	6	21.8	40	M10	68	9.7
	AG 90	18	24H7	130H7	165	200	4	8	27.3	50	M10	73	10.6
	AG 100\112	21	28H7	180H7	215	250	5	8	31.3	60	M12	86	13.9
	AG 132	21	38H7	230H7	265	300	5	10	41.3	80	M12	103	19.7
87	AG 80	18	19H7	130H7	165	200	4	6	21.8	40	M10	65	10.2
	AG 90	18	24H7	130H7	165	200	4	8	27.3	50	M10	70	11.1
	AG 100\112	21	28H7	180H7	215	250	5	8	31.3	60	M12	83	15.8
	AG 132	21	38H7	230H7	265	300	5	10	41.3	80	M12	96	22.6
	AG 160	28	42H7	250H7	300	350	6	12	45.3	110	M16	143	37.2
	AG 180	28	48H7	250H7	300	350	6	14	51.8	110	M16	143	37.2
97	AG 90	18	24H7	130H7	165	200	4	8	27.3	50	M10	64	14.1
	AG 100\112	21	28H7	180H7	215	250	5	8	31.3	60	M12	78	17
	AG 132	21	38H7	230H7	265	300	5	10	41.3	80	M12	94	24.5
	AG 160	28	42H7	250H7	300	350	6	12	45.3	110	M16	137	40.4
	AG 180	28	48H7	250H7	300	350	6	14	51.8	110	M16	137	40.4
	AG 200	28	55H7	300H7	350	400	6	16	59.3	110	M16	167	51.9
107	AG 100\112	21	28H7	180H7	215	250	5	8	31.3	60	M12	69	19.6
	AG 132	21	38H7	230H7	265	300	5	10	41.3	80	M12	83	25.4
	AG 160	28	42H7	250H7	300	350	6	12	45.3	110	M16	124	43.4
	AG 180	28	48H7	250H7	300	350	6	14	51.8	110	M16	124	43.4
	AG 200	28	55H7	300H7	350	400	6	16	59.3	110	M16	154	52.4
	AG 225	28	60H7	350H7	400	450	6	18	64.4	140	M16	182	89
127	AG 132	21	38H7	230H7	265	300	5	10	41.3	80	M12	71	33.1
	AG 160	28	42H7	250H7	300	350	6	12	45.3	110	M16	110	50
	AG 180	28	48H7	250H7	300	350	6	14	51.8	110	M16	110	50
	AG 200	28	55H7	300H7	350	400	6	16	59.3	110	M16	138	60.3
	AG 225	28	60H7	350H7	400	450	6	18	64.4	140	M16	166	98.6
	AG 250	28	65H7	450H7	500	550	7	18	69.4	140	M16	171	122.6
	AG 280	28	75H7	450H7	500	550	7	20	79.9	140	M16	171	122.6
157	AG 160	28	42H7	250H7	300	350	6	12	45.3	110	M16	100	59.7
	AG 180	28	48H7	250H7	300	350	6	14	51.8	110	M16	100	59.7
	AG 200	28	55H7	300H7	350	400	6	16	59.3	110	M16	120	70.72
	AG 225	28	60H7	350H7	400	450	7	18	64.4	140	M16	148	100.9
	AG 250	28	65H7	450H7	500	550	7	18	69.4	140	M16	153	133.8
	AG 280	28	75H7	450H7	500	550	7	20	79.9	140	M16	153	133.8
	AG 315	35	80H7	550H7	600	660	7	22	85.4	170	M20	200	221.7



9.3 F系列AP连接法兰尺寸图表:

9.3 F Series Dimensions of AP Connection Flange :



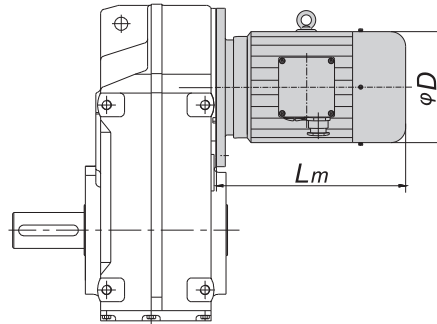
注：推荐用于化工搅拌等需24h连续运转以及电机频繁正反转等负载冲击场合。
如需AP315请来电咨询。

Note:The recommended applications would be load impactive occasions,e.g.chemical mixing industry etc,where equipments keep working 24h a day and motors run with positive and reverse direction frequently.For AP315 flange please consult us.



9.4 F系列直联电机尺寸图表:

9.4 F series straight motor size chart:



4极 功率/Power of 4P (kW)		0.12	0.18	0.25	0.37	0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
Lm (mm)	M	249	249	249	249	313	313	358	358	409	409	454	482	517	594	637	652	652	710	797	797	836	946	946
	MH	/	/	/	/	/	291	309	341	387	407	429	522	558	584	629	642	688	725	732	757	/	/	/
	MP	/	/	/	/	/	311	341	369	407	442	464	522	558	629	659	642	688	725	732	757	/	/	/
	ME	287	287	287	287	358	358	403	403	474	474	519	555	592	689	734	747	747	805	887	887	966	1081	1081
	MEE	/	/	/	/	/	/	/	413	479	479	529	582	617	679	724	757	757	800	/	/	/	/	/
	MV	338	338	338	338	408	408	443	443	514	514	564	602	637	709	754	782	782	825	922	922	976	1091	1091
	MVE	338	338	338	338	408	408	443	443	514	514	564	602	637	709	754	782	830	870	872	897	941	1061	1061
D(mm)		147	147	147	147	159	159	176	176	200	200	220	259	259	314	314	356	356	397	446	446	485	547	547
重量 Weight (kg)	M	12	12	15	15	22	22	29	29	42	42	64	115	115	182	182	220	220	303	463	463	482	731	731
	MH	/	/	/	/	/	30	32	36	56	61	70	78	93	139	161	237	244	288	332	362	/	/	/
	MP	/	/	/	/	/	32	35	44	63	68	73	91	102	160	179	243	249	292	342	372	/	/	/
	ME	13	13	16	16	25	25	35	30	47	47	69	123	123	211	211	240	240	332	501	501	520	769	769
	MEE	/	/	/	/	/	/	/	39	55	55	76	134	134	223	223	260	260	358	521	521	540	800	800
	MV	13	13	16	16	24	24	40	30	44	44	66	117	117	184	184	223	223	307	394	394	489	742	742
	MVE	14	14	17	17	26	26	45	35	59	59	71	125	125	203	203	240	240	336	423	423	527	780	780

4极 功率/Power of 4P (kW)		0.12	0.18	0.25	0.37	0.55	0.75	1.1	1.5	2.2	3	4	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90
Lm (mm)	YZ	/	/	/	/	/	/	/	/	432	432	434	517	547	649	649	657	657	721	/	/	/	/	/
	YZE	/	/	/	/	/	/	/	/	507	507	509	592	652	744	744	743	743	803	/	/	/	/	/
	YZP	/	/	/	/	/	/	/	/	552	552	554	637	672	764	764	778	778	821	922	922	976	1091	1091
	YZPE	/	/	/	/	/	/	/	/	552	552	554	637	672	764	764	778	778	821	922	922	976	1091	1091
	YPG	/	/	/	/	/	/	/	/	432	432	434	517	547	649	649	657	657	721	797	797	836	946	946
D(mm)		/	/	/	/	/	/	/	/	259	259	259	259	259	314	314	356	356	356	446	446	485	547	547
重量 Weight (kg)	YZ	/	/	/	/	/	/	/	/	47	47	69	120	120	187	187	228	228	311	/	/	/	/	/
	YZE	/	/	/	/	/	/	/	/	52	52	74	128	128	216	216	248	248	340	/	/	/	/	/
	YZP	/	/	/	/	/	/	/	/	49	49	71	122	122	189	189	231	231	315	402	402	497	750	750
	YZPE	/	/	/	/	/	/	/	/	54	54	76	130	130	208	208	248	248	344	431	431	535	788	788
	YPG	/	/	/	/	/	/	/	/	47	47	69	120	120	187	187	228	228	311	463	463	482	731	731

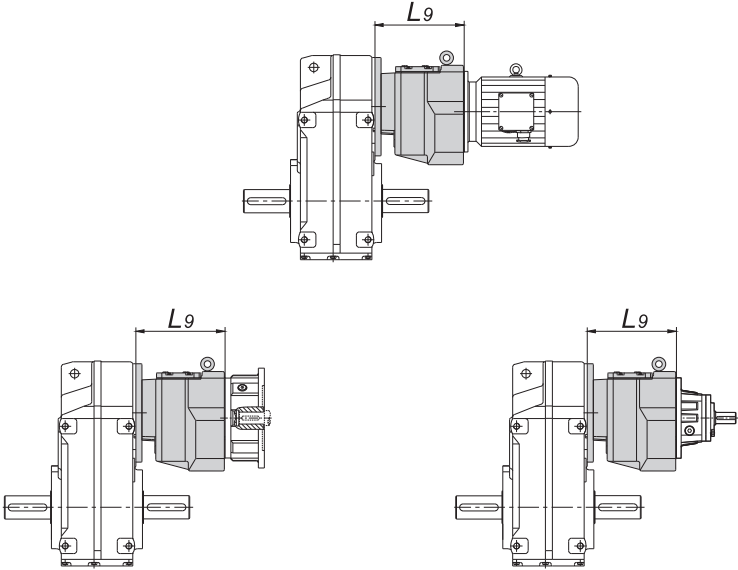
注: (1)表中Lm尺寸为直联减速机时专用电机参考长度;
(2)表中YB数据为标准防爆电机参考值;
(3)若MV、MVE、YZP、YZPE配编码器时,“Lm”尺寸相应加长80mm;
(4)电机未注明外形尺寸按IEC标准。

(1) Lm size is specific motor reference length for directly-connected gear units.
(2) The above data of explosion-proof motor is reference value of standard explosion-proof motor.
(3) If MV or MVE is equipped with encoder, "Lm" size should be respectively added 80mm.
(4) Unspecified dimension size for motor complies with IEC standards.



10 组合型尺寸图表：

10 Combi-type Dimensions：

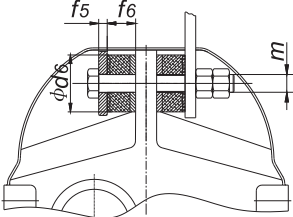
	型号/Type	L9
	F..37/CRL37	181
	F..47/CRL37 F..67/CRL37	183
	F..77/CRL37	173
	F..87/CRL47	180
	F..97/CRL67	225
	F..107/CRL77	238.5
	F..127/CRL77	227
	F..127/CRL87	281
	F..157/CRL97	322

11 附件：

11 Accessories:

11.1 扭力臂附件(附件代号T21):

11.1 Torque-arm(Accessory code T21):

	规格 Size	37	47	67	77	87	97	107	127	157
	d6	40	40	40	60	60	80	80	100	120
	f5	5	5	5	10	10	12	12	15	15
	f6	20	20	20	30	30	40	40	60	60
	m	M12	M12	M12	M20	M20	M24	M24	M30	M30

11.2 润滑油:

11.2 Oil:

油 量 表 Oil level (L)						
安装方位 规格/Size Mounting position	B5、B6、H1	V3、V6、H6	B51、B61、H2	V1、V5、H5	B3、B52、H4	B53、B31、H3
37	1	1.2	0.7	1.3	1	1.1
47	1.6	1.9	1.1	1.9	1.5	1.7
67	2.7	3.8	1.9	3.8	2.9	3.2
77	5.1	7.3	4.3	8.1	6	6.3
87	10.3	13.2	7.8	14.1	11	11.2
97	19	22.5	12.6	25.5	18.9	20.5
107	25.5	32	19.5	38.5	27.5	28
127	41.5	56	34	63	46.5	49
157	72	105	64	106	87	79

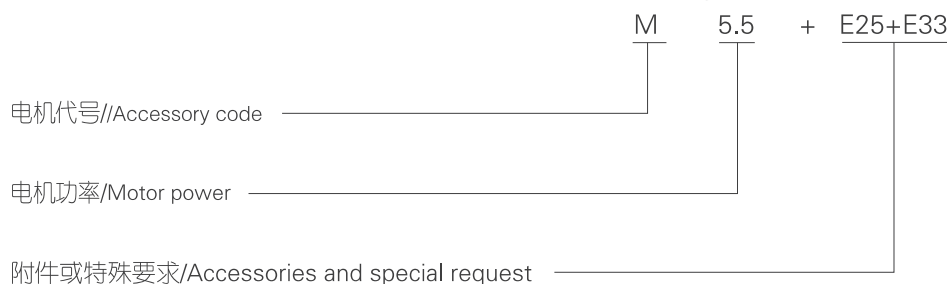
注:在环境温度-10℃~+40℃时,F系列润滑油牌号为VG220(ISO粘度等级),附件代号V22。

Note: When ambient temperature is -10℃~+40℃,for F series products,lubricant brand is VG220(ISO viscosity class),accessory code is V22.



12 电机

12.1 型号表示方法



12 Motor

12.1 Type Designation

12.2 代号说明及标准配置

12.2 Code specification and standard allocation

系列 Series	电机种类 Motor type	标准配置参数/Standard configuration parameter		功率范围 Power
M	窄变频 三相异步电动机 Three phase asynchronous electric motor	1.连续工作制 (S1) 2.绝缘等级: F 3.防护等级: IP55 4.额定电压: 400V (3kW及以下为“Y”接法, 4kW及以上为“Δ”接法) 5.额定频率: 50Hz (变频范围: 30–70 Hz) 6.冷却方式: IC411	1.Continuous working system(S1). 2.Class F insulation. 3.IP55 protecton degree. 4.Rated voltage:400V (“Y” conection for power less than 3kW,” Δ” connection for power more than 4kW) 5.Rated frequency:50Hz. (Frequency range:30–70Hz) 6.Cooling method:IC411.	0.09–15kW
MH	高效(3级能效) 三相异步电动机 Three phase asynchronous electric motor	1.连续工作制 (S1) 2.绝缘等级: F 3.防护等级: IP55 4.额定电压: 400V (3kW及以下为“Y”接法, 4kW及以上为“Δ”接法) 5.额定频率: 50Hz 6.冷却方式: IC411	1.Continuous working system(S1). 2.Class F insulation. 3.IP55 protecton degree. 4.Rated voltage:400V (“Y” conection for power less than 3kW,” Δ” connection for power more than 4kW) 5.Rated frequency:50Hz. 6.Cooling method:IC411.	0.75–15kW
MP	超高效(2级能效) 三相异步电动机 Three phase asynchronous electric motor	1.连续工作制 (S1) 2.绝缘等级: F 3.防护等级: IP55 4.额定电压: 400V (3kW及以下为“Y”接法, 4kW及以上为“Δ”接法) 5.额定频率: 50Hz 6.冷却方式: IC411	1.Continuous working system(S1). 2.Class F insulation. 3.IP55 protecton degree. 4.Rated voltage:400V (“Y” conection for power less than 3kW,” Δ” connection for power more than 4kW) 5.Rated frequency:50Hz. 6.Cooling method:IC411.	0.75–15kW
ME	电磁制动 三相异步电动机 with electro magnetic brake	1.连续工作制 (S1) 2.绝缘等级: F 3.防护等级: IP55 4.额定电压: 400V (3kW及以下为“Y”接法, 4kW及以上为“Δ”接法) 5.额定频率: 50Hz 6. 3kW及以下, 制动器额定电压DC103V,整流器外接交流电压AC230V; 4kW及以上,制动器额定电压DC180V,整流器外接交流电压AC400V 7.冷却方式: IC411	1.Continuous working system(S1). 2.Class F insulation. 3.IP55 protecton degree. 4.Rated voltage:400V (“Y” conection for power less than 3kW,” Δ” connection for power more than 4kW) 5.Rated frequency:50Hz. 6.Forpower less than 3kW,brake rated voltage is DC103V,rectifier externam connection voltage is AC230V. For power more than ekW,brake rated voltage is DC180V,rectifier external connection voltage is AC400V; 7.Cooling method:IC411.	0.09–15kW
MV	变频调速 三相异步电动机 with variable frequency adjustable speed	1.连续工作制 (S1) 2.绝缘等级: F 3.防护等级: IP55 4.额定电压: 400V (3kW及以下为“Y”接法, 4kW及以上为“Δ”接法) 5.基准频率: 50Hz (变频范围: 5–100 Hz) 6.冷却方式: IC416 (轴流风机强制冷却)	1.Continuous working system(S1). 2.Class F insulation. 3.IP55 protecton degree. 4.Rated voltage:400V (“Y” conection for power less than 3kW,” Δ” connection for power more than 4kW) 5.Reference frrequency:50Hz (Frequency range:30–70Hz) 6.Cooling method:IC416(Forced cooling with axial-flow fan)	0.12–15kW



系列 Series	电机种类 Motor type	标准配置参数/Standard configuration parameter		功率范围 Power
MVE	变频制动 三相异步电动机 Various frequency speed-adjusting electromagnetic brake three-phase asynchronous motor	1.连续工作制 (S1) 2.绝缘等级: F 3.防护等级: IP55 4.额定电压: 400V (3kW及以下为 “Y” 接法, 4kW及以上为 “Δ” 接法) 5.基准频率: 50Hz (变频范围: 5–100 Hz) 6. 3kW及以下, 制动器额定电压DC103V, 整流器外接交流电压AC230V; 4kW及以上, 制动器额定电压DC180V, 整流器外接交流电压AC400V 7.冷却方式: IC416 (轴流风机强制冷却)	1.Continuous working system(S1). 2.Class F insulation. 3.IP55 protection degree. 4.Rated voltage:400V (“Y” connection for power less than 3kW, “Δ” connection for power more than 4kW) 5.Reference frequency:50Hz (Frequency range:5–100Hz) 6.For power less than 3kW, brake rated voltage is DC103V, rectifier external connection voltage is AC230V. For power more than 4kW, brake rated voltage is DC180V, rectifier external connection voltage is AC400V; 7.Cooling method:IC416(Forced cooling with axial-flow fan)	0.12–15kW
YZ	起重及冶金用 三相异步电动机 Common three-phase asynchronous motor for metallurgy and hoisting industries	1.断续周期工作制 (S3) 2.绝缘等级: F 3.防护等级: IP55 4.额定电压: 400V(“Δ” 接法) 5.额定频率: 50Hz 6.冷却方式: IC411	1.Intermittent cycle duty(S3) 2.Class F insulation. 3.IP55 protection degree. 4.Rated voltage:400V(“Δ” connection) 5.Rated frequency:50Hz. 6.Cooling method:IC411.	2.2–15kW
YZE	起重及冶金用 电磁制动 三相异步电动机 Electromagnetic brake three-phase asynchronous motor for metallurgy and hoisting industries	1.断续周期工作制 (S3) 2.绝缘等级: F 3.防护等级: IP55 4.额定电压: 400V(“Δ” 接法) 5.额定频率: 50Hz 6.制动器额定电压DC180V, 整流器外接交流电压AC400V 7.冷却方式: IC411	1.Intermittent cycle duty(S3) 2.Class F insulation. 3.IP55 protection degree. 4.Rated voltage:400V(“Δ” connection) 5.Rated frequency:50Hz. 6.Brake rated voltage DC180V, rectifier external connection voltage AC400V. 7.Cooling method:IC411.	2.2–15kW
YZP	起重及冶金用 变频调速 三相异步电动机 Three-phase asynchronous motor for metallurgy and hoisting industries	1.断续周期工作制 (S3) 2.绝缘等级: F 3.防护等级: IP55 4.额定电压: 400V(“Δ” 接法) 5.基准频率: 50Hz (变频范围: 5–100 Hz) 6.冷却方式: IC416 (轴流风机强制冷却)	1.Intermittent cycle duty(S3) 2.Class F insulation. 3.IP55 protection degree. 4.Rated voltage:400V(“Δ” connection) 5.Reference frequency:50Hz (Frequency range:5–100Hz) 6.Cooling method:IC416(Forced cooling with axial-flow fan)	2.2–15kW
YZPE	起重及冶金用 变频制动 三相异步电动机 Three-phase asynchronous motor for metallurgy and hoisting industries	1. 断续周期工作制 (S3) 2.绝缘等级: F 3.防护等级: IP55 4.额定电压: 400V(“Δ” 接法) 5.基准频率: 50Hz (变频范围: 5–100 Hz) 6.制动器额定电压DC180V, 整流器外接交流电压AC400V 7.冷却方式: IC416 (轴流风机强制冷却)	1.Intermittent cycle duty(S3) 2.Class F insulation. 3.IP55 protection degree. 4.Rated voltage:400V(“Δ” connection) 5.Reference frequency:50Hz (Frequency range:5–100Hz) 6.Brake rated voltage DC180V, rectifier external connection voltage AC400V. 7.Cooling method:IC416(Forced cooling with axial-flow fan)	2.2–15kW
YPG	变频辊道用 三相异步电动机 Various frequency speed-adjusting electromagnetic brake three-phase asynchronous motor for roller table	1.断续周期工作制 (S3) 2.绝缘等级: F 3.防护等级: IP55 4.额定电压: 400V(“Δ” 接法) 5.基准频率: 50Hz	1.Intermittent cycle duty(S3) 2.Class F insulation. 3.IP55 protection degree. 4.Rated voltage:400V(“Δ” connection) 5.Reference frequency:50Hz	2.2–15kW
YB	隔爆型 三相异步电动机 Explosion proof three phase asynchronous electric motor	1.连续工作制(S1); 2.绝缘等级:F级; 3.防护等级:IP55; 4.额定电压:380V (3kW及以下为 “Y” 接法, 4kW及以上为 “Δ” 接法); 5.额定频率: 50Hz 6. 防爆等级: dIIBT4 7. 冷却方式: IC411	1.Continuous working system(S1). 2.Class F insulation. 3.IP55 protection degree. 4.Rated voltage:380V (“Y” connection for power less than 3kW, “Δ” connection for power more than 4kW) 5.Rated frequency:50Hz. 6.Explosion proof class:d IIBT4 7.Cooling method:IC411.	0.18–15kW



12.3 附件及特殊要求代号表

12.3 Attachment and special requirements code table

代号/Code	说 明/Instruction	具体应用场合 Specified Applicable occasions
E01	防雨罩 /Rainproof cover	0.12kW~90kW
E02	防雨帽 /rainhat	0.12kW~90kW
E10	制动手柄释放/Brake with manual release	0.12kW~90kW (ME/MVE)
E11	螺栓释放/Bolt release	0.12kW~90kW (ME/MVE)
E13	微动开关/Microswitch	2.2kW~90kW (ME/MVE)
E25*	增量型编码器电源电压DC5~30V 防护等级IP54, 脉冲1024, 推挽输出 Incremental encoder power source voltage DC5~30V protection level IP54,pulsh 1024,Push-Pull output	0.12kW~90kW (MV/MVE)
E30	PTC热敏电阻 (120℃ ~ 135℃) / PTC thermistors (120℃ ~ 135℃)	0.12kW~90kW
E32	温度传感器 PT100 /Temperature sensor PT100	0.12kW~90kW
E33	加热带 /Heating belt	0.12kW~90kW
E34	热敏开关 /Thermal switch	0.12kW~90kW
E35	绝缘等级H级 /Insulation class H	0.12kW~90kW
E37	防尘、防盐雾、防霉三防要求, 已含防雨帽和加热带 Dustproof anti salt fog mildew Three proofing requirements, Already contains a rainhat and heating belt	0.12kW~90kW
E38	防护等级IP56 /Protection grade IP56	0.12kW~90kW
E60	风机电压单相220V /Fan single-phase voltage 220V	0.12kW~90kW (MV/MVE)
E62	制动器电压: AC380V /Brake external voltage: AC380V	0.12kW~4kW (ME/MVE)
E70	出线孔C号位 /Cable entry C	0.12kW~90kW
E71	出线孔B号位 /Cable entry B	0.12kW~7.5kW
E72	出线孔D号位 /Cable entry D	0.12kW~7.5kW

* M/ME/YZ/YZE 需配编码器请另咨询。

*其他特殊要求请另咨询。

*M / ME / YZ / YZE Please consult if you need encoder.

*Please consult if you have other special requirements.

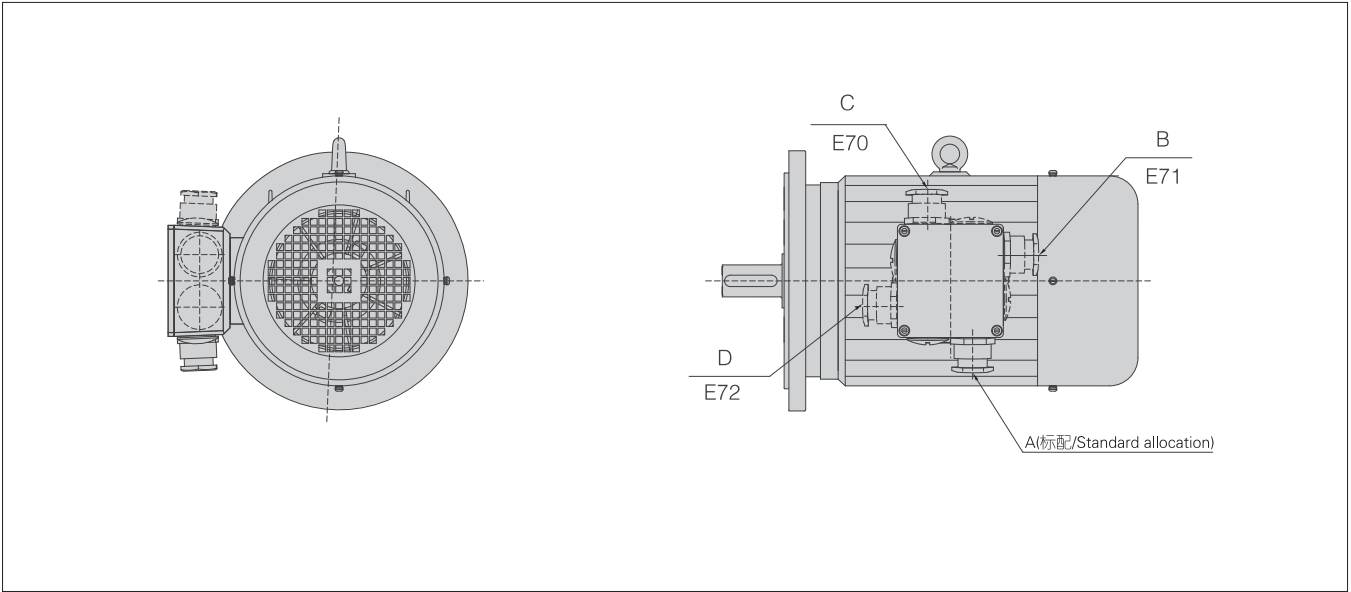


防雨罩（附件代号E01） Rain proof cover(accessory code E01)												
防雨罩/Rain proof cover Rain proof cover(accessory code E01)												
机座号	H71	H80	H90	H100	H112	H132	H160	H180	H200	H225	H250	H280
Lb	22	22	27	32	32	32	62	62	62	62	62	62
D	147	170	178	199	227	279	339	382	420	467	513	567

防雨帽（附件代号E02） Rain proof cap(accessory code E02)												
防雨帽/Rain proof cap Rain proof cap(accessory code E02)												
机座号	H71	H80	H90	H100	H112	H132	H160	H180	H200	H225	H250	H280
Lb	35	35	40	50	50	50	80	80	80	80	80	80
D	178	199	227	227	279	339	382	420	467	513	567	624

12.4 接线盒出线孔位置：

12.4 Terminal box and wiring outlet hole position:



注：电机接线盒出线孔一般以A号位供货, 如图中所示(与减速机组合时)。

Note: In general, No. position wiring outlet hole for terminal box shall be supplied,as shown in the drawing. (when the motor combined with gear unit)

11.5 其它特殊电机另咨询。

11.5 Other specific motor on request.

11.6 客户自配电机：

11.6 Customers provided motor:

- 1) 购买带B5标准尺寸的联接法兰的产品时，电机自配。
- 2) 对于配F系列的直联电机，本公司提供尺寸图，客户自购，本公司给予组装。

- 1)To buy the product with adapter flange of B5 standard size,customers can provide motors by themselves.
- 2)To directly connected motor with F series products,we provide dimension drawing,and customers buy the motor by themselves,then we assemble them.

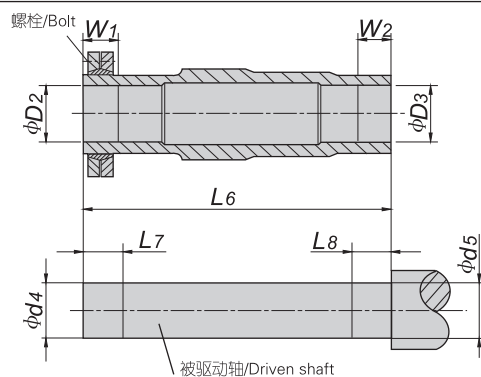


13 被驱动轴推荐尺寸:

13.1 锁紧盘:

13 Recommended dimensions for the driven machine:

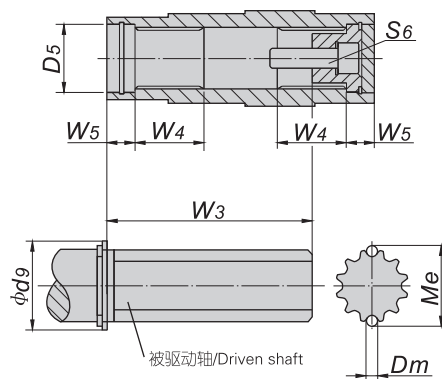
13.1 Shrink Disk:



规格	D2	D3	d4	d5	L6	L7	L8	W1	W2	型号	螺栓	重量 (kg)
37	30H7	30H7	30h6	30h6	146	36	25	31	20	SP2-44X80	M6	0.6
47	35H7	35H7	35h6	35h6	177	37	25	32	20	SP2-44X80	M6	0.6
67	40H7	40H7	40h6	40h6	208	43	25	38	20	SP2-50X90	M6	0.8
77	50H7	50H7	50h6	50h6	241	41	35	36	30	SP2-62X110	M6	1.3
87	65H7	65H7	65h6	65h6	281	46	45	41	40	SP2-80X145	M8	1.9
97	75H7	75H7	75h6	75h6	345	60	55	55	50	SP2-90X155	M8	3.3
107	85H7	90H7	85h6	90h6	405	75	70	65	60	SP2-110X185	M10	5.9
127	105H7	105H7	105h6	105h6	485	95	80	85	70	SP2-140X230	M12	10
157	115H7	125H7	115h6	125h6	580	100	90	90	80	SP2-155X263	M12	15

13.2 花键轴:

13.2 Involute Spline:



规格	D5	Dm	d9	Me	W3	W4	W5	S6
37	37	2.75	42	33.03	85	25	18	M10X30
47	37	4	42	38.92	115	32	18	M10X30
67	42	4	47	38.92	130	42	25	M10X30
77	55	4	62	54.13	160	52	23	M16X50
87	72	4	82	68.96	180	62	25	M20X60
97	72	4	90	74.15	240	72	25	M20X60
107	90	6	105	90.99	290	89	26	M20X60

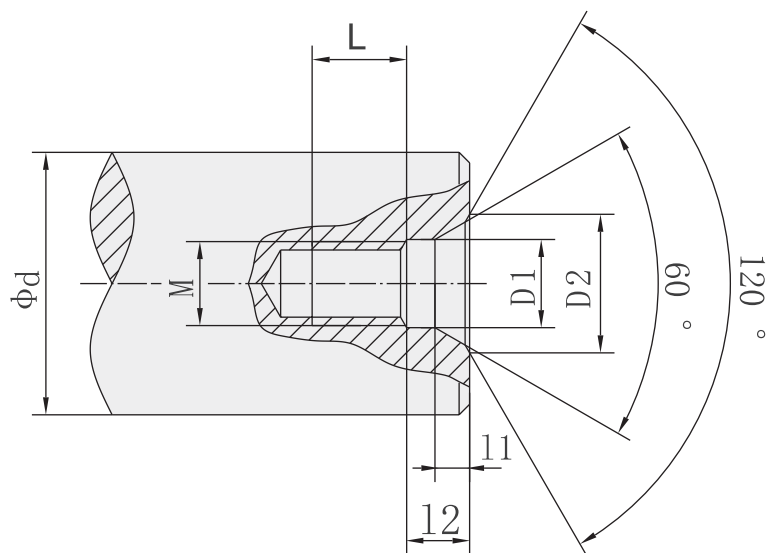


14 轴端中心孔：

14 Shaft end central hole:

轴端C型螺纹中心孔

Shaft end C Type screw central hole

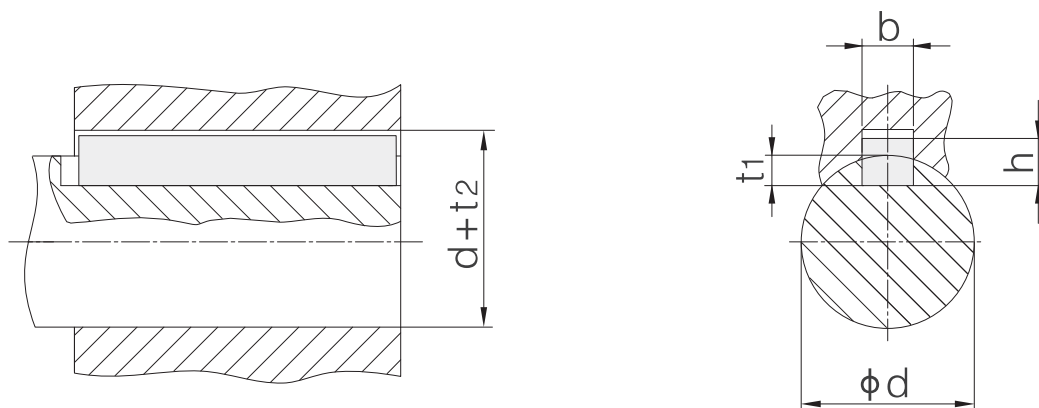


d	M	L	l_2	l_1	D_1	D_2
$7 < d \leq 10$	M3	10	2.6	1.8	3.2	5.8
$10 < d \leq 13$	M4	10	3.2	2.1	4.3	7.4
$13 < d \leq 16$	M5	10	4	2.4	5.3	8.8
$16 < d \leq 21$	M6	12	5	2.8	6.4	10.5
$21 < d \leq 24$	M8	12	6	3.3	8.4	13.2
$24 < d \leq 30$	M10	15	7.5	3.8	10.5	16.3
$30 < d \leq 38$	M12	20	9.5	4.4	13	19.8
$38 < d \leq 50$	M16	25	12	5.2	17	25.3
$50 < d \leq 85$	M20	30	15	6.4	21	31.3
$85 < d \leq 130$	M24	35	18	8	25	38
$130 < d \leq 225$	M30	45	18	11	31	48



15 平键与键槽的尺寸：

15 Dimension of parallel key and keyway:



d	b	h	t ₁	d + t ₂
8 < d ≤ 10	3	3	1.8	d + 1.4
10 < d ≤ 12	4	4	2.5	d + 1.8
12 < d ≤ 17	5	5	3	d + 2.3
17 < d ≤ 22	6	6	3.5	d + 2.8
22 < d ≤ 30	8	7	4	d + 3.3
30 < d ≤ 38	10	8	5	d + 3.3
38 < d ≤ 44	12	8	5	d + 3.3
44 < d ≤ 50	14	9	5.5	d + 3.8
50 < d ≤ 58	16	10	6	d + 4.3
58 < d ≤ 65	18	11	7	d + 4.4
65 < d ≤ 75	20	12	7.5	d + 4.9
75 < d ≤ 85	22	14	9	d + 5.4
85 < d ≤ 95	25	14	9	d + 5.4
95 < d ≤ 110	28	16	10	d + 6.4
110 < d ≤ 130	32	18	11	d + 7.4
130 < d ≤ 150	36	20	12	d + 8.4
150 < d ≤ 170	40	22	13	d + 9.4
170 < d ≤ 200	45	25	15	d + 10.4
200 < d ≤ 230	50	28	17	d + 11.4
230 < d ≤ 260	56	32	20	d + 12.4



Handwriting practice lines consisting of 20 horizontal dashed lines.





A series of horizontal dashed lines for writing, spanning the width of the page.

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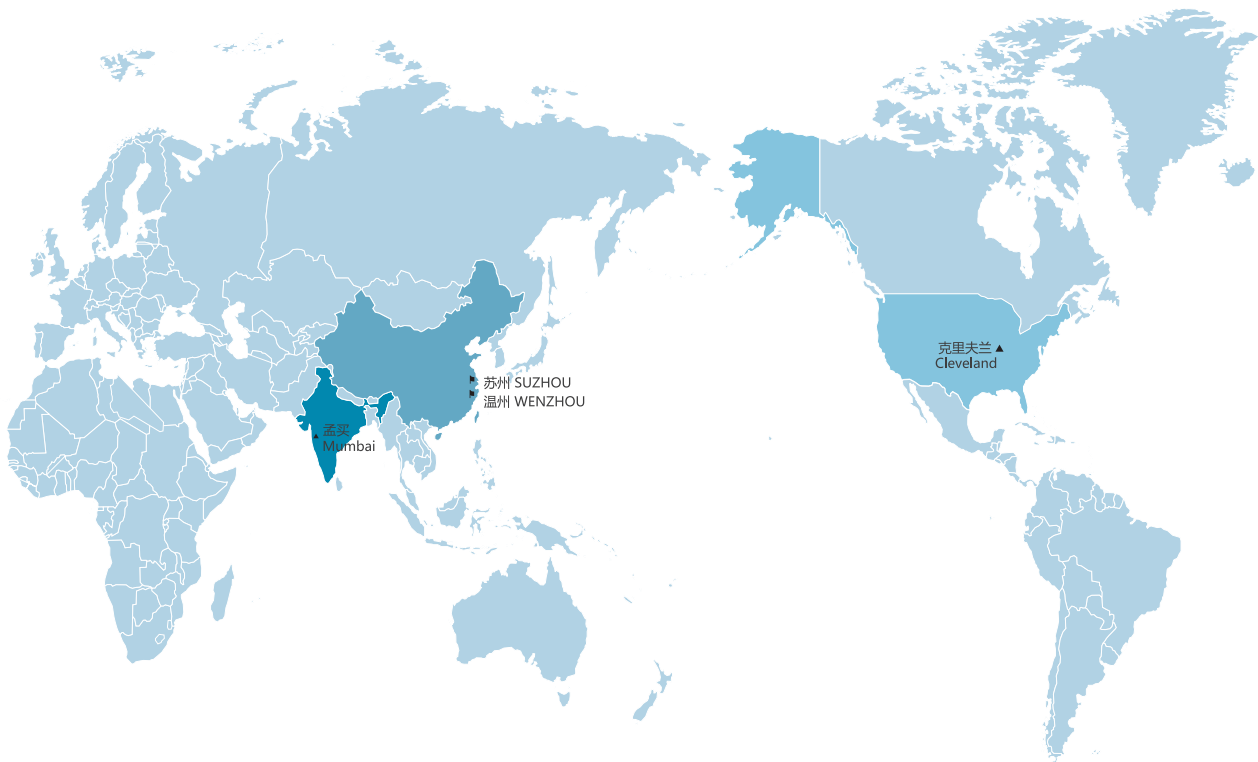
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