1. SUMMARIZE

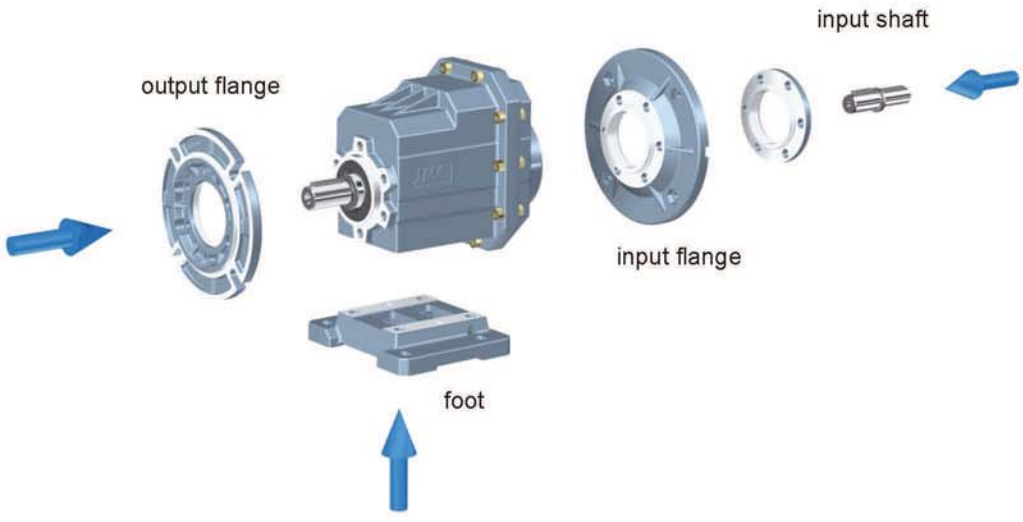
HG Series helical gearbox is designed basing on the modular system.

1.1 Products characteristics

- Modularity;
- High efficiency;
- Low noise;
- Space effective, refined design;
- Universal mounting;
- Aluminium housing, light in weight;
- Gears in carbonize hard,durable;
- Multistructure, can be combined in many forms to meet needs of all kinds of transmission conditions.

HG Series helical gear units has more than 4 types. Power 0.12-4KW; Ratio 3.66-54;Torque max 120-500Nm. It can be connected (foot, flange) discretionary and use multi-mounting positions according to customers' requirements.

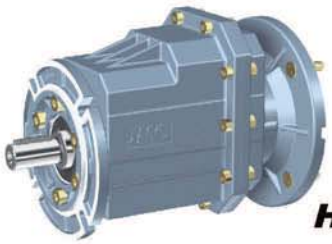
1.2 Structure feature



2. PRODUCT STRUCTURE PICTURE

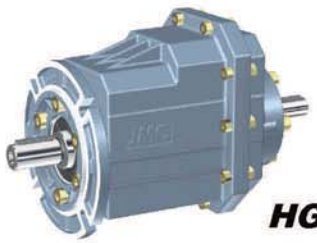
HGP..(IEC)
Foot-mounted helical gear unit

HGP..HS
Shaft input foot-mounted helical gear unit



HGF..(IEC)

Flange-mounted helical gear unit



HGF..HS

Shaft input flange-mounted helical gear unit

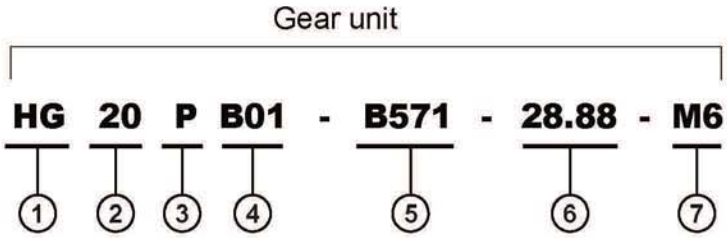
HGZ..(IEC)

B14 Flange-mounted helical gear unit

HGZ..HS

Shaft input B14 flange-mounted helical gear unit

3. MODEL ILLUMINATE



No	Comments
1	HG: code for gear units series
2	Specification code of gear units 20, 25, 30, 35
3	1). P : Foot-mounted 2). F1: B5 flange mounted size I 2). F2: B5 flange mounted size II 2). F3: B5 flange mounted size III 3). Z : B14 flange mounted
4	Foot code: B01, B02, B03, B04, M01, M02, M03, M04
5	1). IEC Motor adapters 2). HS: Shaft input
6	Transmission ratio of gear units i
7	M1: Mounting positio, default mounting position M1 not to write out is ok

Example : **HG20PB01 - B571 - 28.50**

HG30Z - HS - 6.31

HG25F3 - B1480 - 8.78

4. RELEVANT PARAMETER

4.1 Power P

$$P_1 = \frac{P_2}{\eta} \text{ [kW]}$$

$$P_{1n} \geqslant P_1 \cdot f_s \text{ [kW]}$$

P_1 Input power
P_2 Output power
P_{1n} Rated input motor power
f_S Service factor
η Transmission efficiency

HG Series helical gear units has **2 stage** and the efficiency is about **96%**.

4.2 Rotation speed n

n_1 Gear units input speed
n_2 Gear units output speed

If driven by the external gearing,1400r/min or lower rotation speed is suggested so as to optimize the working conditions and prolong the service life. Higher input rotation speed is permitted, but in this situation, the rated torque M_2 will be reduced.

4.3 Transmission ratio i

$$i = \frac{n_1}{n_2}$$

Usually transmission ratio is decimal fraction with 2 radix point tagged in selection tables.

4.4 Torque M

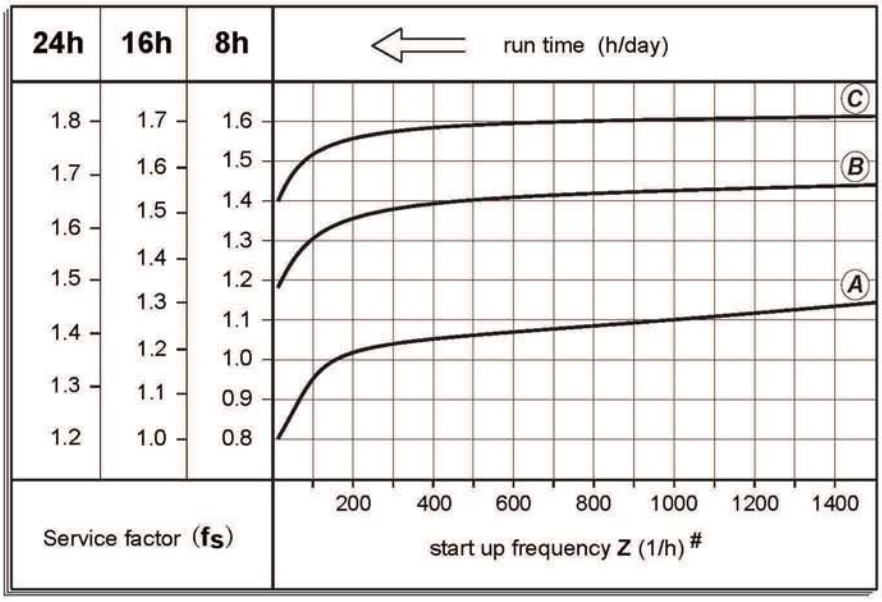
$$M_2 = \frac{9550 \cdot P_1 \cdot \eta}{n_2} \text{ [Nm]}$$

$$M_{2n} \geqslant M_2 \cdot f_s \text{ [Nm]}$$

M_2 Output torque
M_{2n} Rated output torque
P_1 Input power
η Transmission efficiency
f_S Service factor

4.5 Service factor fs

The effect of the driven machine on the gear unit is taken into account to a sufficient level of accuracy using the service factor fs. The service factor is determined according to the daily operating time and the starting frequency Z. Three load classifications are considered depending on the mass acceleration factor. You can read off the service factor applicable to your application in following Figure. The service factor selected using this diagram must be less than or equal to the service factor as given in the performance parameter table.



Starting frequency **Z**: The cycles include all starting and braking procedures as well as change overs from low to high speed.

4.5.1 Load classifications

Ⓐ Uniformshock load, permitted mass acceleration factor ≤0.2

Ⓑ Moderate shock load, permitted mass acceleration factor ≤3

Ⓒ Heavy shock load, permitted mass acceleration factor ≤10

Load classifications see the addendum.

4.5.2 Mass acceleration factor

The mass acceleration factor is calculated as follows:

$$fa = \frac{Jc}{Jm}$$

fa Mass acceleration factor

Jc All external mass moments of inertia [kgm^2]

Jm Mass moment of inertia on the motor end [kgm^2]

If mass acceleration factors **fa**＞10, please call our Technical Service.

To keep the service-life of gear units, the use factor $\mathbf{f_S}$ selected from the catalogue must be equal or slightly higher than the calculated use factor $\mathbf{f_S}$.

4.6 Radial loads Fr

When determining the resulting radial loads, the type of transmission elements, mounted on the shaft end must be considered. Various transmission elements are corresponding with following transmission element factors f_Z:

Transmission element	Transmission element factor F_Z	Comments
Gears	1.00	⩾ 17 teeth
	1.15	< 17 teeth
Chain sprockets	1.00	⩾ 20 teeth
	1.25	< 20 teeth
	1.40	< 13 teeth
Narrow V-belt pulleys	1.75	Influence of the tensile force
Flat belt pulleys	2.50	Influence of the tensile force
Toothed belt pulleys	2.50	Influence of the tensile force

The overhung loads exerted on the motor or gear shaft is then calculated as follows:

$$F_r = \frac{M \cdot 2000 \cdot f_z}{d_0} \text{ [N]}$$

Fr Resulting radial load [N]
M Torque on the shaft [Nm]
d_0 Mean diameter of the mounted transmis sion element in [mm]
f_z Transmission element factor

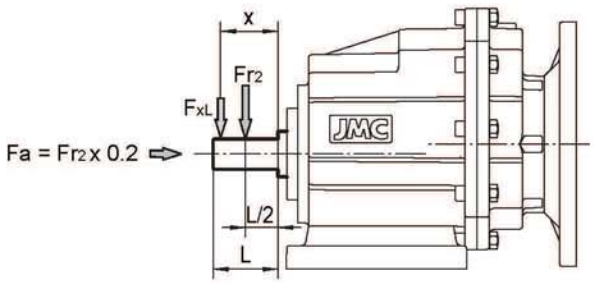
The allowed radial load force on the shaft is calculated with the following formula:

$$FxL \leq \frac{Fr2 \cdot a}{(b+x)} \text{ [N]}$$

Fr2 Permitted overhung load (x = L/2) for foot-mounted gear units according to the selection tables in [N]
a, b Gear unit constant for overhung load conversion [mm]
x Distance from the shaft shoulder to the force application point in (mm)
The values of a , b , Fr2 are given in the following tables:

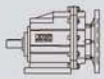
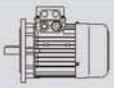
	HG20	HG25	HG30	HG35
a	103	116.5	130	147
b	83	91.5	100	112

Output shafts radial loads & axial loads Fr2, Fa



n2 [min^{-1}]		10	40	60	80	100	120	150	180	250	400
Fr2 [N]	HG20	2500	2500	2180	1980	1840	1630	1400	1320	1080	920
	HG25	5000	5000	4370	3970	3680	3470	2710	2550	2150	1840
	HG35	6500	6500	5550	5040	4510	3800	3530	3320	2800	2390
	HG35	8000	8000	6590	5990	5230	4570	4240	3900	3350	2860

4.7 SELECTION TABLES COMMENTS

P_{1n} [kW]	n_2 [r/min]	M_{2n} [Nm]	i	fs			Page

P_{1n} Rated power driving motor **[kW]**;

n_2 Output speed **[r/min]**;

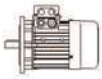
M_{2n} Rated output torque **[Nm]**;

$M_{2\,max}$ Permissible output torque **[Nm]**;

i Gear unit ratio;

f_S Service factor;

 Gear unit type;

 Motor type;

page Dimension sheet page no;

* Finite gear unit reduction ratio.

5. SELECTION EXAMPLE

5.1 Gear units

Example: The required torque on driven machine is 400Nm, works for 6 hours per day, Uniform shock load, start-up frequency is 400 times per hour, ø200mm output flange-mounted, n_2=30 r/min.

see tables, f_S=1.05

$$M_{2n} \geqslant M_2 \cdot f_s = 400 \times 1.05 = 420[Nm]$$

$$i = \frac{n_1}{n_2} = \frac{1400}{30} = 46.67$$

Choose type:

HG35F2 - B590 - 44.18

5.2 Gear motor

Example: The required power on driven machine 1kW, works for 8 hours per day, moderate shock load, start-up cootinnously, M6 foot-mounted, foot code is B01, n_2=95 r/min.

see tables, fs=1.35

$$i = \frac{n_1}{n_2} = \frac{1400}{95} = 14.74$$

$$P_{1n} \geq P_1 \cdot f_s = \frac{P_2}{\eta} \cdot f_s = \frac{1}{0.96} \times 1.35 = 1.41[kW]$$

Choose type:

HG25PB01- B590 - 14.81 - M6

6. RATIO AND IEC MOTOR ADAPTERS

HG20(IEC)

i	B563	B571 B1471	B580 B1480	B590 B1490
53.33				
45.89				
40.10				
35.47				
28.50				
23.56				
19.83				
17.86				
14.62				
13.80*				
11.90				
9.81				
9.17				
7.72				
5.69				
4.63				
3.82				

HG25(IEC)

i	B563	B571 B1471	B580 B1480	B590 B1490
54.00*				
46.46*				
40.60*				
35.91*				
28.88*				
23.85*				
20.08*				
17.10				
14.81*				
13.21				
12.05				
9.93				
8.78				
7.39				
5.45				
4.43				
3.66				

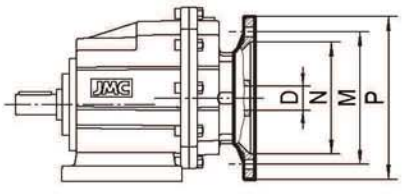
HG30(IEC)

i	B571	B580 B1480	B590 B1490	B5100 B14100	B5112 B14112
51.30*					
44.18*					
38.63					
34.20*					
30.57					
24.99					
21.15*					
19.24*					
18.21*					
15.30*					
13.30*					
12.60					
10.93*					
9.08					
7.93*					
6.31					
5.48					
4.50					
3.74					

HG35(IEC)

i	B580 B1480	B590 B1490	B5100 B14100	B5112 B14112
51.30*				
44.18*				
38.63				
34.20*				
30.57				
24.99				
21.15*				
19.24*				
18.21*				
15.30*				
13.30*				
12.60				
10.93*				
9.08				
7.93*				
6.31				
5.48				
4.50				
3.74				

"*" Finite gear unit reduction ratio



IEC	B563	B571	B1471	B580	B1480	B590	B1490	B5100	B14100	B5112	B14112
D_{E8}	11	14		19		24		28		28	
P	140	160	105	200	140	200	140	250	160	250	160
M	115	130	85	165	115	165	115	215	130	215	130
N	95	110	70	130	95	130	95	180	110	180	110