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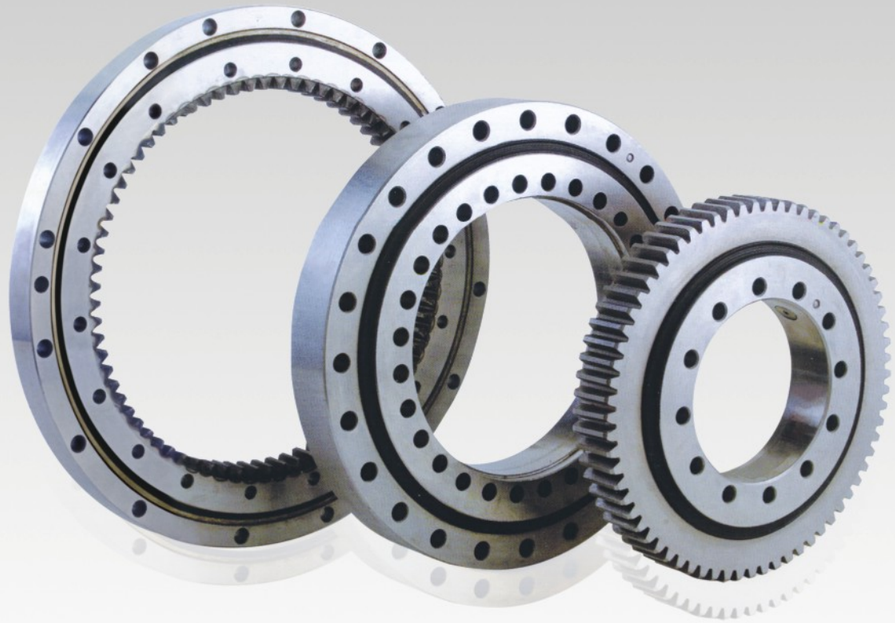
SALES AGENT:

SLEWING BEARINGS

NPB bearings

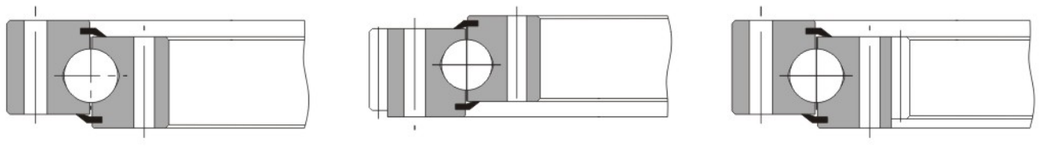


Structures of Slewing Bearing

A Slewing Bearing is a large size bearing which can carry large axial load and radial load simultaneously while tilting moment etc. Generally, slewing bearings have mounting holes, lubricating oil hole, and seals to satisfy the different needs of users in various conditions. Due to the compact structure, easily guided rotation, simple installation and maintenance, slewing bearings are used in a wide variety of rotary equipment such cranes, transport machinery, and military equipment.

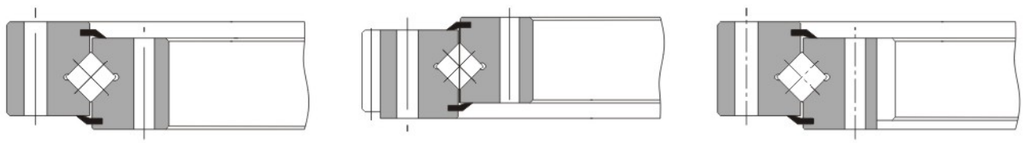
NPB slewing bearings come in different varieties such as the four point contact ball slewing bearing, the double-row angular contact thrust ball slewing bearing, the crossed cylindrical roller slewing bearing, the three-row cylindrical roller combined slewing bearing, roller and ball combination slewing bearings and so on. Some types have external teeth, internal teeth, or no teeth at all.

The different types of slewing bearings are made to meet the demands of users and different load conditions. The characteristics of these slewing bearings can be summarized as following.



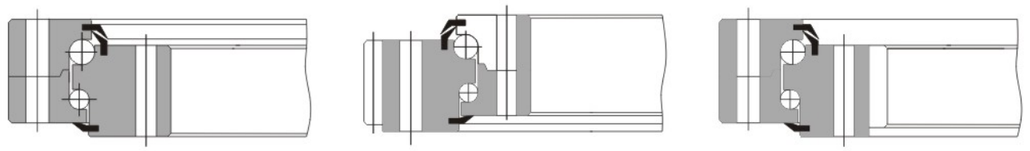
Single row four point contact ball slewing bearing

Features：The single four point contact ball slewing bearing has a high capacity to bear dynamic loads, transmitting radial and axial forces simultaneously as well as resulting tilting moment. Applications of this kind of bearings are hoisting, mechanical handing and mechanical engineering etc.



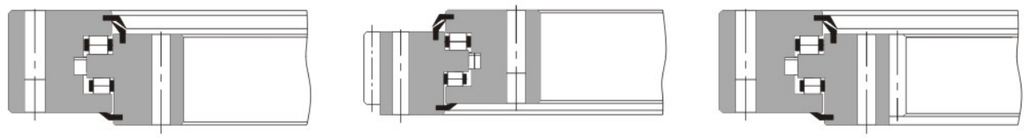
Single row crossed roller slewing bearing

Features：This kind of slewing bearing can support large radial load, medium axial load and tilting moment with small or zero clearance. Main applications of this kind of bearing are hoisting, mechanical handing and mechanical engineering etc.



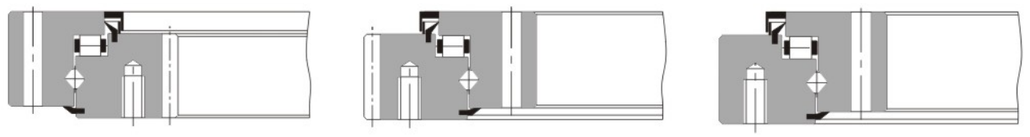
Double row different ball diameter slewing bearing

Features：This kind of bearing can support high static loads with simple structures. They are mainly used in situations with variational load position, direction and continuously rotating. Main applications of this kind of bearing are deck hoisting, mining and material handing etc.



Three row cylindrical roller slewing bearing

Features：This kind of bearing has a high load carrying capacity. Under similar loads, these bearings have relatively small diameterss allowing for compact installation. Main applications of this kind of bearing are hoisting, mechanical handing, mining and materials handing, offshore technology and general mechanical engineering etc.

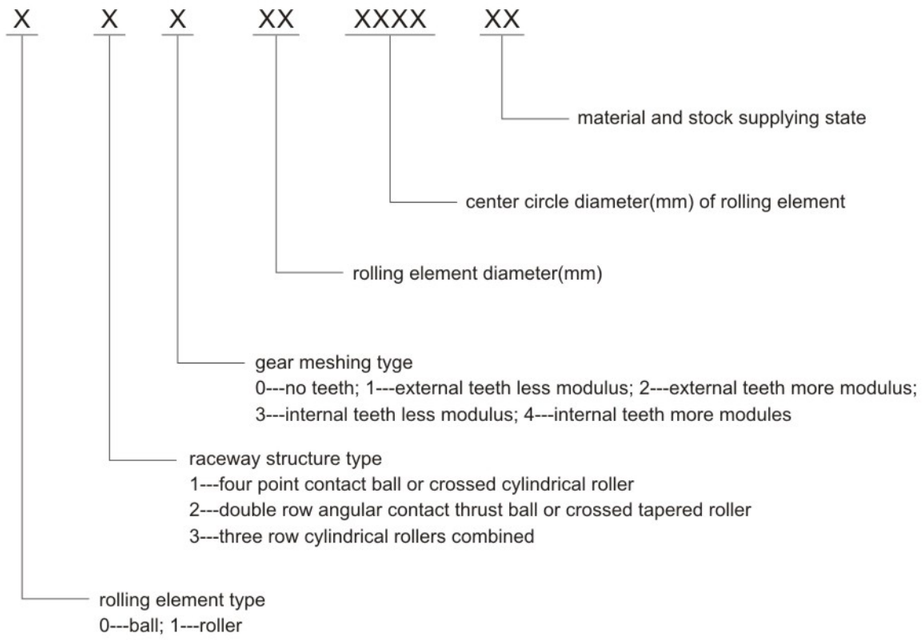


Roller/ball combination slewing bearing

Features： This kind of bearings can support high axial load with relatively low tilting moment. The the dimensions are relatively large. Main applications of this kind of bearing are mining and material machining etc.

Formulation of Slewing Bearing Number

NPB slewing bearing number is indicated with 4 sections Arabic numerals, each section is partitioned by " · "each number means as follows.



The symbol of bearing ring material and stock supplying state is stipulated according to Table 2. "T" in it means roughcast of ring is in a hardened and tempered hardening tempering state, "Z" means stock of ring is in normalized state.

Table 2

Number	03	04	11	12	13
Material and stock state	42CrMoT	42CrMoZ	50MnT	50MnZ	other materials

Example

Center circle diameter of rolling element is 2500mm, ball diameter is 60mm, gear modulus m=18mm, the material of rings in 50Mn, the stock is in normalized state, four point contact slewing bearing with internal teeth is indicated as 013.60.2500.12

Material

Excellent design and reasonable selection of bearing materials assures NBP bearings have high technical performance and reliability. To maintain superior quality, performance, and reliability; only the best materials are used in the construction of the bearings.

Materials of bearing rings and rolling elements

Generally, all the rolling elements of NBP slewing bearings are made with hardened carbon bearing steel, the type is GCr15 or GCr15SiMn. The bearing rings are made with surface hardened steel. The type is 50Mn steel and 42CrMo. By special order, these can also be made with other types such as 5CrMnMo.

Cage materials

There are many types of NPB slewing bearing cages such as the integral cage, section cage, separator type cage, etc. The integral cage uses No. 20 steel ZI102 cast alloy. The separator type cage uses polyamide 1010 resin, ZL102 cast alloy, or QA110-3-1.5 aluminum-bronze. Recently, nylon GRPA66.25 has become more widely available in section cage design.

Sealing materials

The sealing materials of NPB slewing bearings are made of oil butadiene acrylonitrile rubber, but a few early made slewing bearings used woolen felt sealing.

Package and Storage

The package of slewing bearing

Each set of NBP slewing bearings sent to users arelubricated and applied with rust proofing oil on the inner and outer surface. They also come wrapped in plastic a film and plastic belt. For the large size bearings with an outside diameter D>2900mm, a flat plastic belt is needed outside. For the outside diameter D≤ 2900mm, a wooden box is required.

Storage

NBP slewing bearing have been treated with rust prevention to preserve their quality. Under normal storage conditions, the bearings can be kept from rust for 12 months after leaving factory. The Slewing Bearings can be kept in long-term storage as long as the original packaging is kept intact, but if it exceed the limit preservation period and still needs to be stored, bearings should be washed and applied with rust proofing again.

Slewing bearings should be stored at dry, ventilated, and smooth place, it should be far from chemicals and other caustic goods. When stacking the bearings, three wooden blocks of equal thicknes should be placed between layers around the circumference.

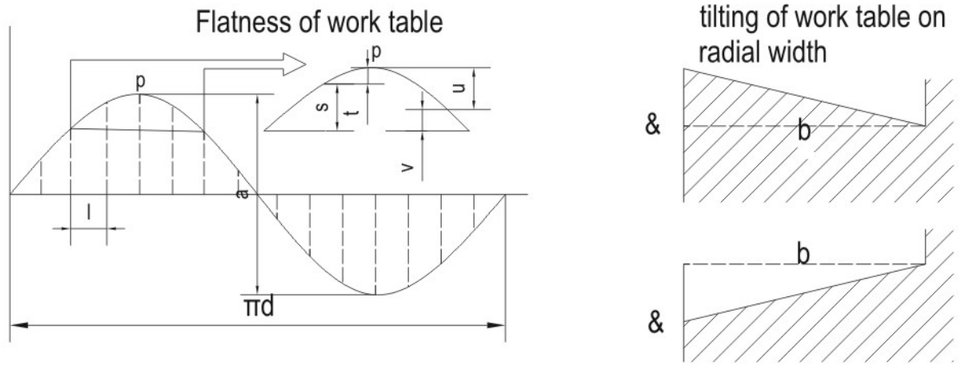
Mounting and Maintenance

Mounting

Before installation, a thorough examination should be given to each bearing and it's mounting sarface. The components of supporting bearings should have enough rigidity. The mountion surface should be machined and sundries and burrs on the surface should be cleared. The technical requirements of the mounting surface of supporting components should conform to Table 3.

Table 3 The technical requirements of the mounting surface of supporting components

Bore center diameter		Flatness	Tilting variation of same direction at circumference adjacent unit length(L=1 hole distance) (s−t)mm	Tilting variation of contrary direction at circumference adjacent unit length(L=1 hole distance) (s+u)mm	The batter of radial width b	The roughness of endface
DIORD2 mm		a			δ	Ra
Tolerance classes of the bearings						
Over	incl.	PO P6 P5	PO P6 P5	PO P6 P5	PO P6 P5	PO P6 P5
250	400	120 80 50	0.0002L 0.00013L 0.00008L	0.0002L 0.00013L 0.00008L	60 40 25	2.5 1.25 0.8
400	630	150 100 60			80 50 30	2.5 1.25 0.8
630	1000	200 120 80			100 60 40	2.5 1.25 0.8
1000	1600	250 150 100			120 80 50	3.2 2.5 1.25
1600	2500	300 200 120			150 100 60	3.2 2.5 1.25
2500	4000	400 250 150			200 120 80	3.2 2.5 1.25
4000	6300	500 300 200			250 150 100	3.2 2.5 1.25



Circumference development

The endface of bearing ring is marked with symbol ‘s’ on quenching soft band, the soft band should be positioned at non-load or not often load zone, for example, the filling plug is always at soft band. Install at the radial location first, then screw in the mounting bolt and check the rotary condition. Before tightening the bolt completely, the gear meshing should be inspected. When tightening the bolt preloading is necessary. Preload to 70% of the yield limit of the bolt material. The mounting bolt should be fitted with a washer, not a spring washer. When mounting the slewing bearing, the bolt must reach the required preload, the different preloads of each bolt diameter are shown in table 4.

Table 4

bolt class of strength LSO898			8.8			10.9			12.9		
yield limit N/mm²			M≤16 640 M>16 640			940			1100		
bolt dia.	spiral stress area mm²	spiral cross section mm²	bolt mounting preloading FMN	theoretical fastening moment MANm	torsional moment Nm M=0.9MA	bolt mounting preloading FMN	theoretical fastening moment MANm	torsional moment Nm M=0.9MA	bolt mounting preloading FMN	theoretical fastening moment MANm	torsional moment Nm M=0.9MA
5	14.2	12.7	6400	6.1	5.5	9300	8.9	8.0	10900	10.4	9.3
6	20.1	17.9	9000	10.4	9.3	13200	15.5	13.9	15400	18	16.2
8	36.6	32.8	16500	25	22.5	24200	37	33	28500	43	38
10	58	52.3	26000	51	45	38500	75	67	45000	87	78
12	84.3	76.2	38500	87	78	56000	120	117	66000	150	135
14	115	105	53000	150	126	77000	205	184	90000	240	216
16	157	144	72000	245	193	106000	310	279	124000	370	333
18	193	175	91000	300	270	129000	430	387	151000	510	459
20	245	225	117000	430	387	166000	620	558	194000	720	648
22	303	282	146000	580	522	208000	830	747	243000	970	873
24	353	324	168000	740	666	239000	1060	954	280000	1240	1116
27	459	427	221000	1100	990	315000	1550	1395	370000	1850	1665
30	561	519	270000	1500	1350	385000	2100	1890	450000	2500	2250
33	694	647	335000	need to use bolt hydraulic take up device		48000	need to use bolt hydraulic take up device		560000	need to use bolt hydraulic take up device	
36	817	759	395000			56000			660000		
39	976	913	475000			67000			790000		
42	1120	1045	542000			772000			904000		
45	1300	1224	635000			905000			105900		
48	1470	1377	714000			1018000			119100		
52	1760	1652	857000			1221000			1429000		
56	2030	1905	989000			1408000			1648000		
60	2360	2227	11560000			1647000			1927000		

Maintenance

After 100 hours continuous running of NPB slewing bearings, the preloading moment of the bolt should be checked. Then, repeat this check every 500 hours of continuous running.

After installation is completed, fill in certain grease while slewing the bearings. The grease can be lost after running for a period of time, the grease should be refilled every 50~100 hours depending on the working conditions. As to the working conditions with high temperature and dust, the periods should be shorter. When the machine is sealed up for keeping long time, enough grease shall also be filled.

Lubrication and Sealing

Effective lubrication and sealing are essential to ensure the safety, smooth operation, and also to prevent early wear and damage.

Lubrication

Slewing bearings often work under over loading and low speed conditions. Generally, filling grease to bearings is satisfactory. Common greases used are of a calcium base, lithium base, aluminum base, and sometimes for high temperature conditions special greases are used. Users can choose suitable grease according to specific conditions. Greases in Table 5 are recommended.

Sealing

Slewing bearings are sealed to prevent grease from leaking out, and dust, water, or other impurities from getting in. Because slewing bearings work under heavy loads and low speed conditions, rubber and labyrinth seals are often used. The rubber seal has many advantages such as a simple design, small profile, and overall reliability. However in high temperature conditions a rubber seal will wear down much faster. So for high temperatures, a labyrinth seal is recommended.

Table 5

support structures and seal forms	working condition		lubrication position	grease name	brand
integral cage, segment cage, plastic separator rubber ring sealing	low, normal, temperature, wet -40℃~+60℃		raceway	calcium base grease	
			gear	graphite calcium base grease	
multi-separator labyrinth seal		40℃~140℃	raceway	lithium base grease	
				MoS2 compound calcium grease	
			gear	No.4 high temp. grease	
		80℃~180℃	raceway	MoS2 compound calcium grease	
			gear	No.4 high temp.	
		normal temp, seawater-resistant ~50℃	raceway	No.2 aluminum base grease	
			gear	No.2 aluminum base grease	

Slewing Bearing Clearance

The slewing bearing clearance mainly compensates manufacturing and mounting errors of supporting components and the machine assembly position in order to assure the operation. The axial clearance of our slewing bearings are listed on Table 6~Table 9 respectively according to structure, tolerance class and rolling element center diameter.

Table 6 axial clearance in four point contact ball slewing bearings μm

Dpw mm		tolerance class					
		PO		P6		P5	
		axial clearance					
over	incl	min	max	min	max	min	max
280	450	70	170	50	130	30	90
450	710	100	220	70	170	40	120
710	1120	120	280	100	220	50	150
1120	1500	150	350	100	260	60	180
1800	2800	200	440	150	350	80	240
2800	4500	260	540	200	440	100	300

Table 7 axial clearance in double row angular contact thrust ball slewing bearings μm

Dpw mm		tolerance class					
		PO		P6		P5	
		axial clearance					
over	incl	min	max	min	max	min	max
280	450	50	130	30	90	25	70
450	710	70	170	40	120	30	90
710	1120	100	220	50	150	40	120
1120	1800	100	260	60	180	40	140
1800	2800	150	350	80	240	60	180
2800	4500	200	440	100	300	80	240

Table 8 axial clearance in crossed cylindrical slewing bearings μm

Dpw mm		tolerance class					
		PO		P6		P5	
		axial clearance					
over	incl	min	max	min	max	min	max
280	450	50	130	30	90	25	70
450	710	70	170	40	120	30	90
710	1120	100	220	50	150	40	120
1120	1800	100	260	60	180	40	140
1800	2800	150	350	80	240	60	180
2800	4500	200	440	100	300	80	240

Table 9 clearance in three row cylindrical roller combined slewing bearings μm

Dpw mm		tolerance class											
		PO				P6				P5			
		axial clearance		radial clearance		axial clearance		radial clearance		axial clearance		radial clearance	
over	incl	min	max	min	max	min	max	min	max	min	max	min	max
280	450	30	90	50	130	25	70	30	90	10	50	25	70
450	710	40	120	70	170	30	90	40	120	15	65	30	90
710	1120	50	150	100	220	40	120	50	150	20	80	40	120
1120	1800	60	180	100	260	40	140	60	180	20	100	40	140
1800	2800	80	240	150	350	60	180	80	240	30	130	60	180
2800	4500	100	300	200	440	80	240	100	300	40	160	80	240

Selection of Slewing Bearing

Most of the slewing bearings work under eccentric load because of its differing working conditions. The bearing can carry not only radial and axial load, but also tilting moment. At present, the widely used method of selecing slewing bearings is based upon the load curve on the load-Moment Chart.

1.Load curve of slewing bearing

1.1 Structure of load curve

The horizontial axis indicates the equivalent axial load that is forced on the bearing, and the vertical axis indicate the equivalent tilting moment that is forced on the bearing.

The load curve 1 of slewing bearing is a permissible static load curve, which is made of 42CrMo in this catalogue. Permissible contact stress for ball bearings is 3850 Mpa, and for roller bearings is 2700 Mpa.

The load curve 2 is a dynamic load curve with 90% reliability and 3×104 life at full gyroscopic motion under a low radial load, low speed and precision,

The load curve 3 is a permissible static load curve, which is made of 50Mn in this catalogue. Permissible contact stress for ball bearings is 3400 Mpa, and for roller bearings is 2100 Mpa.

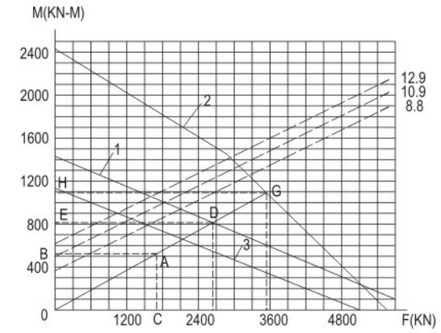


Fig1

A set of parallel lines indicate the critical load curve of bolts respectively with strength grade of 8.8, 10.9 and 12.9. Bolts limiting load curve are determined when connection length is 5 times of bolts diameter and the pre-stress is 70% of the yielding limit of bolt material.

The load curve of slewing bearings in this catalogue is only a part of our products, for any specific requirements please contact us for more information.

1.2 Application of load curve

Most of the NPB bearings listed in this catalog are allocated with critical load curve for their static load capacity as well as service life curves. For defining the required bearing load capacity, the determined loads must be multipled by the load factor fs indicated in table 11.

Locate the calculated equivalent axial load Fac and equivalent tilting moment Mc on the corresponding axis, then it can be easily judged whether the bearing selected can meet the operation conditions according to the place of the intersection A on the load curve.

The point A(Fac,Mc) must located below the static critical load curve of the selected bearing.

The static load factor fs can be calculated according to the point D the intersection of curve 1 and the connection line between original point and point A.

fs=ED/AB=DF/AC

In the similar way, the load factor for life fe can be calculated according to the point G the intersection of dynamic load curve 2 and the connection line between original point and point A.

fe=GH/AB=GK/AC

2.Calculation of bearing load service life

2.1 Equivalent axial load and tilting moment calculation

2.1.1 Method of equivalent axial load and tilting moment calculation under permanent load

Load calculation should be carried out separately as static and dynamic situation, as slewing bearings have different structures, the detail calculation is shown in table 10

Table 10

Calculation structure	Equivalent static load	Equivalent dynamic load
Four point contact ball slewing bearing(a=45°)	When Fr≤0.44Fa Fao=(Fa+2.3Fr) · fs When Fr>0.44Fa, the method of calculation Fa, please contact our engineers for more information Mo=M · fs	When Fr≥0.8Fa Fac=(0.59Fa+1.18Fr) · fe When Fr>0.8Fa, Fac=(Fa+0 66Fr) · fe Mc=M · fe
Double row angular contact ball thrust ball slewing bearing	When Fr≤10%Fa Fao=Fa · fs When Fr>10%Fa, the method of calculation Fa, please contact our engineers for more information Mo=M · fs	When Fr≤10%Fa Fao=Fa · fe When Fr>10%Fa, the method of calculation Fa, please contact our engineers for more information Mc=M · fe
Crossed cylindrical roller slewing bearing(a=45°)	When Fr≤0.44Fa Fao=(Fa+2.3Fr) · fs When Fr>0.44Fa, the method of calculation Fa, please contact our engineers for more information Mo=M · fs	When Fr≥0 67Fa Fac=(0.67Fa+1.5Fr) · fe When Fr>0.8Fa, Fac=(Fa+Fr) · fe Mc=M · fe
Three row combined cylindrical roller slewing bearing	Fao=Fa · fs Mo=M · fs	Fac=Fa · fe Mc=M · fe
	Radial load Fr is carried by one row roller	

Where,
Fa-Total axial load, KN

Fr-Total radial load, KN

M-Total tilting moment, KN·m

Fao-Equivalent axial load under static working condition, KN

Fa-Equivalent axial load under dynamic working condition, KN

Mo-Equivalent tilting moment under static working condition, KN·m

Mc-Equivalent tilting moment under dynamic working condition, KN·m

fs-Static load safety factors

fe-Load factor of life expectancy

2.2. Selection of load factors and service life for bearing

The static load safety factor and service life of our bearing are listed in table 11

Table 11

Applications			Static load safety factors fs	Load factor for life fe	Service life in full revolutions lf
Turntable for floating crane, mobile crane, ship deck crane (continuous rotation)			1.10	1.0	30000
Tower crane	**Bearing at top**	**Mf≤0.5M**	1.25	1.0	30000
		0.5M<Mf<0.8M		1.15	45000
		Mf≤0.8M		1.25	60000
	Bearing on the base			1.0	30000
	Portal crane, marine crane			1.15	45000
Crane for steel mill			1.45	1.5	100000
Mobile crane(grab or heavy handing service) Turntable crane (grab or magnet) Wheal crane (grab or magnet) Bridge crane (grab or magnet) Floating crane				1.7	150000
				2.15	30000
Excavator, stacker and reclaimer conveyer			1.0	Please contact us for selection	
Railway crane			1.1		
Cable conveyor			1.25		
Hydraulic tunneller using four point contact ball bearing			1.25		
Other bearing types Bucket volume<1.5m³			1.45		
Bucket volume≤1.5m³			1.75		
Ladle car			1.75		

Note: Mf = tilting moment without load

2.1.2 Method of equivalent axial load and tilting moment calculation under variable load

$$Fac=(n1\cdot Fa^{\varepsilon}1+ n_2\cdot Fa^{\varepsilon}_2+n_3\cdot Fa^{\varepsilon}_3+\ldots\ldots+n_n\cdot Fa^{\varepsilon}_n)^{1/\varepsilon}$$

$$Mc=(n1\cdot M1^{\varepsilon}+ n2\cdot M2^{\varepsilon}+n3\cdot M3^{\varepsilon}+\ldots\ldots+n_n\cdot M_n^{\varepsilon})^{1/\varepsilon}$$

Here: Fac—Equivalent dynamic load under various loads;
Mc—Equivalent tilting moment under various loads;
Fa1; Fa2; Fa3…… Fan;—Dynamic axial load during percentage of operating time, KN;
M1; M2; M3…… Mn;—Tilting moment during percentage of operating time, Kn·m;
n1; n2; n3…… nn;—Percentage of operating time,

2.3 Calculation of static load safety factor and service life

2.3.1 Calculation of static load safety factor

Fs=Faoc/Fao=Moc/Mo

Here: fs—Static load safety factor

Faoc—The axial load of the intersection point between the line connecting origin point and static load point and the static load curve, KN

Moc—The tilting moment of the intersection point between line connecting origin point and static load curve, Kn•m

2.3.2 Bearing life calculation

● Life calculation under permanent load

The service life predicted by the load curve is directly related to the load factor for bearing life. According to the load curve , the service life can be calculated as follows:

$Lf=(fe)^{\varepsilon}\cdot 30000$ fe=Facc/Fac=Mcc/Mc

Here: Lf—Service life under permanent load

fe—Life load factor

ε —Life index, for ball bearing, $\varepsilon=3$; for roller bearing, $\varepsilon=10/3$;

Facc—The axial load of the intersection point between the line connecting origin point and static load point and the dynamic load curve, KN

Mcc—The tilting moment of the intersection point between line connecting origin point and dynamic load curve,

● Life calculation under various load

$Lf=1/(n_1/L_1+ n_2/L_2+ n_3/L_3\ldots\ldots n_n/L_n)$

Here: n_1; n_2 ; n_3 ; ……n_n percentage of operating time

L_1; L_2 ; L_3 ; ……L_n service life during percentage of operation time

3. Example of a bearing and calculation

Example 1.

A port crane Fig 1, the center of gyration of the bearing is 2.5m or so, the load is as below

Q=196.2KN L_{max}=23m

A=67KN a_{max}=11m

O=450KN o=0.75m

G=900KN g=3m

W=27KN r=6.5m

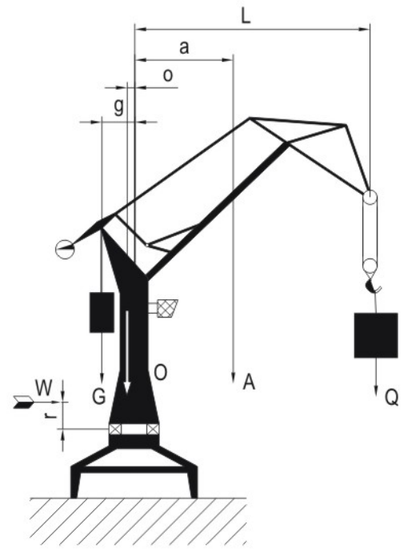


Fig 2

(1) If the crane can work with 25% possible overloads, the static load is calculated as below:

$Fao=(Q\times 1.25+A+O+G+2.3W)\times fs$

$=(196.2\times 1.25+67+450+900+2.3\times 27)\times 1.25$

$=2155.4KN$

$Mo=(Q\times 1.25\times L_{max}+A\times a_{max}+W\times r-O\times o-G\times g)\times 1.25$

$=(196.2\times 1.25\times 23+67\times 11+27\times 6.5-450\times 0.75-900\times 3)\times 1.25$

$=4394.7KN-m$

(2) If the circumferential force of the bearing gear Ft=375KN while working, the dynamic load is calculated as below:

$Fac=Q+A+O+G+0.66Ft\times tg20^{0}$

$=196.2+67+450+900+0.66\times 375tg20^{0}$

$=1703.3KN$

$Mc'=Q\times L_{max}.A\times a_{max}-O\times o-G\times g$

$=196.2\times 23+67\times 11-450\times 0.75-900$

$=221.21KN\text{-}m$

According to the calculating results, we can select 0.12.60.2240 four point contact ball slewing bearing with internal gear, the negative point is below curve 1 and 2 shown in Fig 2, The bearing can meet the requirement of the load.

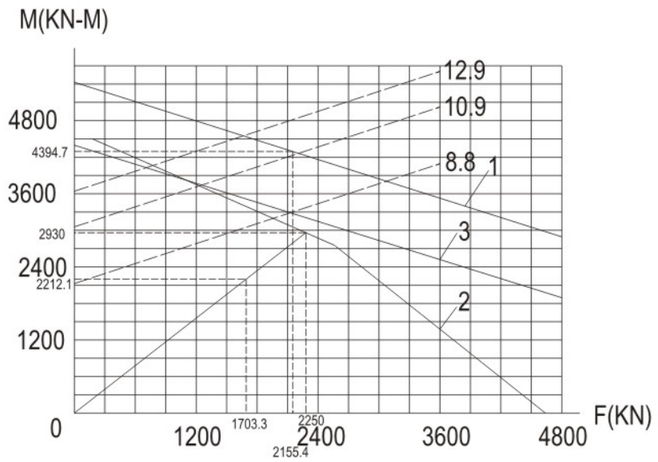


Fig 3

Shown in Fig 2, the axial load is Facc=2256KN, tilting moment Mcc=2930KN-m, calculation of service life is as below:

fe=Facc/Fac =2250/1703.3=1.32

fe=Mcc/Mc =2930/2212.1=1.32

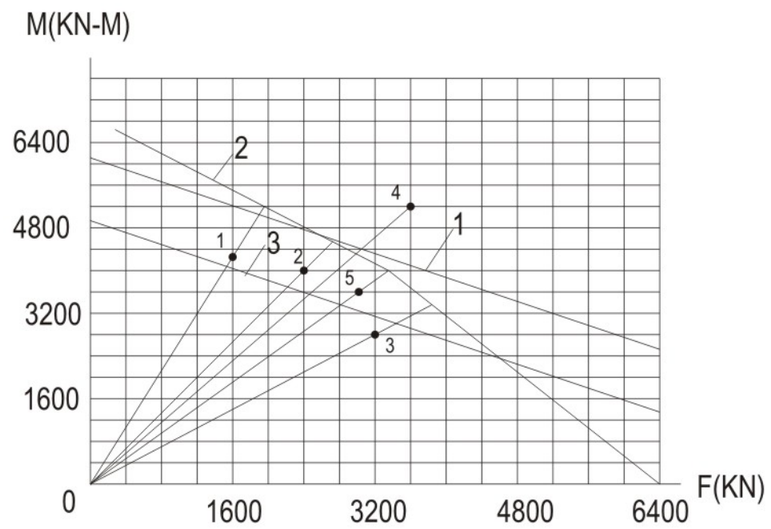
$Lf=(1.32)^3\times 30000=69000$(revolution)

Example 2.

010.60.2000 four point contact ball slewing bearing, the load curve is show in Fig3, the load spectrum is shown in Table 12

Table 10

Load point	Operating time	Loads		Loads on load curve	
		Fac KN	Mc KN–m	Facc KN	Mcc KN–m
1	10	1600	4400	1900	5200
2	25	2400	4000	2750	4580
3	60	3200	2800	3900	3420
5	5	3600	5200	3050	4350



Load curve of 010.60.2000 slewing bearing

Fig 4

Calculating sample 1

According to formula

$Lf=1/(n_1/L1_+n_2L_2+n_3/L_3\cdots\cdots n_n/L_n)$

Service life of each condition

Operating time 10%

$fe_1=Facc_1/Fac_1=1900/1600=1.1875$

$fe_1=Mcc_1/Mc_1=5200/4400=1.1818$(take minimum value)

$L_1=(1.1818)^3\times30000\backsimeq49500$(revolution)

Operating time 25%

$fe_2=Facc_2/Fac_2=2750/2400=1.146$

$fe_2=Mcc_2/Mc_2=4580/4000=1.145$(take minimum value)

$L_2=(1.145)^3\times30000\backsimeq45000$revolution)

Operating time 60%

$fel_3=Facc_3/Fac_3=3900/3200=1.219$

$fel_3=Mcc_3/Mc_3=3420/2800=1.1221$(take minimum value)

$L_3=(1.219)^3\times30000\backsimeq54000$revolution)

Operating time 5%

$fe_4=Facc_4/Fac_4=3050/3600=0.847$

$fe_4=Mcc_4/Mc_4=4350/5200=0.836$(take minimum value)

$L_4=(0.836)^3\times30000\backsimeq17500$(revolution)

Estimated service life

$Lf=1/(0.10/49500+0.25/45000+0.60/54000+0.05/17500)\backsimeq46400$(revolution)

Calculating sample 2

According to formula

$Fac=(n_1\cdot Fa^{\varepsilon}_1+n_2\cdot Fa^{\varepsilon}_2+n_3\cdot Fa^{\varepsilon}_3+\cdots\cdots+n_n\cdot Fa^{\varepsilon}_n)^{1/\varepsilon}$

$Mc=(n_1\cdot M^{\varepsilon}_1+n_2\cdot M^{\varepsilon}_2+n_3\cdot M^{\varepsilon}_3+\cdots\cdots+n_n\cdot M^{\varepsilon}_n)^{1/\varepsilon}$

Then:

$Fac=(0.1\times1600^3+0.25\times2400^3+0.6\times3200^3+0.05\times3600^3)^{1/\varepsilon}=2956.9$KN

$Mc=(0.1\times4400^3+0.25\times4000^3+0.6\times2800^3+0.05\times5200^3)^{1/\varepsilon}=3459.2$KN-m

Form above the calculation, load point 5 in Fig 3 can be obtained Facc=3400KN, Mcc=4080KN-m

$fe=Facc/Fac=3400/2956.9=1.149$

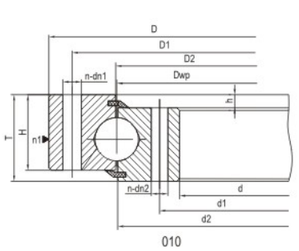
$fe=Mcc/Mc=4080/3549.2=1.149$

Estimated service life:

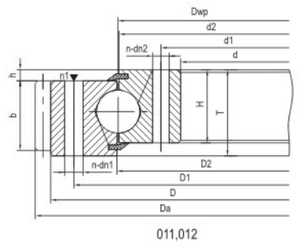
$Lf=(1.149)^3\times3000\backsimeq45500$（revolution）

The two calculations are approximate.

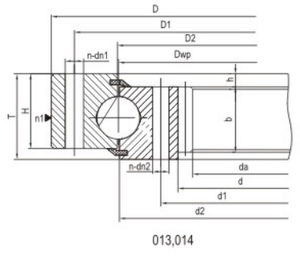
Single–Row Four Point Contact Ball Slewing Bearing (Standard Series 01) JB/T2300–1999



010



011,012



013,014

Number	Basic type			Configuration Size			Mounting Size			
	Without Gear	External Gear	Internal Gear	D mm	d mm	T mm	D1 mm	d1 mm	n	dn1 dn2 mm
1	010.20.200	011.20.200	—	280	120	60	248	152	12	16
2	010.20.224	011.20.224	—	304	144	60	272	176	12	16
3	010.20.250	011.20.250	—	330	170	60	298	202	18	16
4	010.20.280	011.20.280	—	360	200	60	328	232	18	16
5	010.25.315	011.25.315	013.25.315	408	222	70	372	258	20	18
6	010.25.355	011.25.355	013.25.355	448	262	70	412	298	20	18
7	011.25.400	044.25.400	013.25.400	493	307	70	457	323	24	18
8	011.25.450	011.25.450	013.25.450	543	357	70	507	393	24	18
9	010.30(25).500	011.30(25).500 012.30(25).500	013.30(25).500 014.30(25).500	602	398	80	566	434	20	18
10	010.30(25).560	011.30(25).560 012.30(25).560	013.30(25).560 014.30(25).560	662	458	80	626	494	20	18
11	010.30(25).630	011.30(25).630 012.30(25).630	013.30(25).630 014.30(25).630	732	528	80	696	564	24	18
12	010.30(25).710	011.30(25).710 012.30(25).710	013.30(25).710 014.30(25).710	812	608	80	776	644	24	18
13	010.40(30).800	011.40(30).800 012.40(30).800	013.40(30).800 014.40(30).800	922	678	100	878	722	30	22
14	010.40(30).900	011.40(30).900 012.40(30).900	013.40(30).900 014.40(30).900	1022	778	100	978	822	30	22
15	010.40(30).1000	011.40(30).1000 012.40(30).1000	013.40(30).1000 014.40(30).1000	1122	878	100	1078	922	36	22
16	010.40(30).1120	011.40(30).1120 012.40(30).1120	013.40(30).1120 014.40(30).1120	1242	998	100	1198	1042	36	22
17	010.45.(35).1250	011.45(35).1250 012.45(35).1250	013.45(35).1250 014.45(35).1250	1390	1110	110	1337	1163	40	26
18	010.45(35).1400	011.45(35).1400 012.45(35).1400	013.45(35).1400 014.45(35).1400	1540	1260	110	1487	1313	40	26
19	010.45(35).1600	011.45(35).1600 012.45(35).1600	013.45(35).1600 014.45(35).1600	1740	1460	110	1687	1513	45	26
20	010.45(35).1800	011.45(35).1800 012.45(35).1800	013.45(35).1800 014.45(35).1800	1940	1660	110	1887	1713	45	26
21	010.60(40).2000	011.60(40).2000 012.60(40).2000	013.60(40).2000 014.60(40).2000	2178	1825	144	2110	1891	48	33
22	010.60(40).2240	011.60(40).2240 012.60(40).2240	013.60(40).2240 014.60(40).2240	2418	2065	144	2350	2131	48	33
23	010.60(40).2500	011.60(40).2500 012.60(40).2500	013.60(40).2500 014.60(40).2500	2678	2325	144	2610	2391	56	33
24	010.60(40).2800	011.60(40).2800 012.60(40).2800	013.60(40).2800 014.60(40).2800	2978	2625	144	2910	2691	56	33
25	010.75(50).3150	011.75(50).3150 012.75(50).3150	013.60(40).3150 014.60(40).3150	3376	2922	174	3286	3014	56	45

Characteristics of Structure, Performance and Application

The single-row four points contact ball slewing bearing is comprised of 2 seat rings and is lightweight. The balls contact with the circular race at four points and are capable to bear axial force, radial force and tilting moment simultaneously. Applications for these kinds of bearings are hoisting, mechanical handing and general mechanical engineering etc.

Notes:

1.n1-number of lubricating holes, evenly distributed, lubricating nipple M10×1JB/T7940.1-JB/T7940.2.

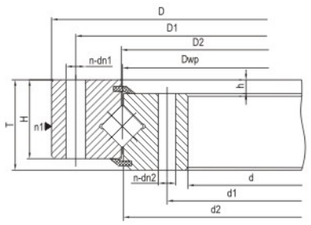
2.Mounting hole n-dn1,n-dn2, may be replaced with screw hole, tooth width b may be taken as H-h.

3.Gear force of periphery given in the table is its maximum value, nominal force of periphery is taken 1/2 of the given value.

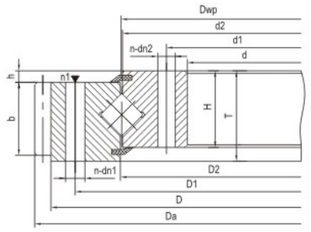
4.The trim top coefficient of outer ring and inner ring are respectively 0.1 and 0.2.

Structural Size					Gear Data			Ext Gear		Int Gear		Tangential Toothing Load		Reference weight kg
n1	d2 mm	D2 mm	H mm	h mm	b mm	X	m mm	Da mm	Z	da mm	Z	Normalizing z 10³n	Tempering T 10³n	
2	201	199	50	10	40	0	3	300	98	—	—	—	—	19
2	225	223	50	10	40	0	3	312	105	—	—	—	—	21
2	251	249	50	10	40	0	4	352	86	—	—	—	—	23
2	281	279	50	10	40	0	4	384	94	—	—	—	—	26
2	316	314	60	10	50	0	5	435	85	190	40	2.9	4.4	41
2	356	354	60	10	50	0	5	475	93	235	49	2.9	4.4	46
2	401	399	60	10	50	0	6	528	86	276	48	3.5	5.3	54
2	451	499	60	10	50	0	6	576	94	324	56	3.5	5.3	60
4	501	498	70	10	60	+0.5	5 6	629 628.8	123 102	367 368.4	74 62	3.7 4.5	5.2 6.2	85
4	561	558	70	10	60	+0.5	5 6	689 688.8	135 112	427 428.4	86 72	3.7 4.5	5.2 6.2	95
4	631	628	70	10	60	+0.5	6 8	722.8 774.4	126 94	494.4 494.2	83 62	4.5 6.0	6.2 8.3	110
4	711	708	70	10	60	+0.5	6 8	850.8 854.4	139 104	572.4 571.2	96 72	4.5 6.0	6.2 8.3	120
6	801	798	90	10	80	+0.5	8 10	966.4 968	118 94	635.2 634	80 64	8.0 10.0	11.1 14.0	220
6	901	898	90	10	80	+0.5	8 10	1062.4 1068	130 104	739.2 734	93 74	8.0 10.0	11.1 14.0	240
6	1001	998	90	10	80	+0.5	10 12	1188 1185.6	116 96	824 820.8	83 69	10.0 12.0	14.0 16.7	270
6	1121	1118	90	10	80	+0.5	10 12	1298 1305.6	127 106	944 940.8	95 79	10.0 12.0	14.0 16.7	300
5	1252	1248	100	10	90	+0.5	12 14	144936 1453.2	118 101	1048.8 1041.6	88 75	13.5 15.8	18.8 21.9	420
5	1402	1398	100	10	90	+0.5	12 14	1605.6 1607.7	131 112	1192.8 1195.6	100 86	13.5 15.8	18.8 21.9	480
5	1602	1598	100	10	90	+0.5	14 16	1817.2 1820.8	127 111	1391.6 1382.4	100 87	15.8 18.1	21.9 25.0	550
5	1802	1798	100	10	90	+0.5	14 16	2013.2 2012.8	141 123	1573.6 1574.4	113 99	15.8 18.1	21.9 25.0	610
8	2002	1998	132	12	120	+0.5	16 18	2268.8 2264.4	139 123	1734.4 1735.2	109 97	24.1 27.1	33.3 37.5	1100
8	2242	2238	132	12	120	+0.5	16 18	2492.8 2498.4	153 136	1990.4 1987.2	125 111	24.1 27.1	33.3 37.5	1250
8	2502	2498	132	12	120	+0.5	18 20	2768.4 2776	151 136	2239.2 2228	125 112	27.1 30.1	37.5 41.8	1400
8	2802	2798	132	12	120	+0.5	18 20	3074.4 3076	168 151	2527.2 2528	141 127	21.1 30.1	37.5 41.8	1600
8	3152	3147	162	12	120	+0.5	20 22	3476 3471.6	171 155	2828 2824.8	142 129	37.7 41.5	52.2 57.4	2800

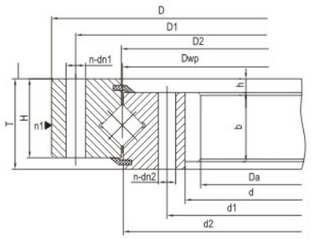
Single–Row Crossed Roller Slewing Bearing (Standard Series 11)



110



111,112



113,114

Number	Basic type			Configuration Size			Mounting Size			
	Without Gear	External Gear	Internal Gear	D mm	d mm	T mm	D1 mm	d1 mm	n	Φ mm
1	110.25.500	111.25.500 112.25.500	113.25.500 114.25.500	602	398	75	566	434	20	18
2	110.25.560	111.25.560 112.25.560	113.25.560 114.25.560	662	458	75	626	494	20	18
3	110.25.630	111.25.630 112.25.630	113.25.630 114.25.630	732	528	75	696	564	24	18
4	110.25.710	111.25.710 112.25.710	113.25.710 114.25.710	812	608	75	776	644	24	18
5	110.28.800	111.28.800 111.28.800	113.25.800 114.25.800	922	678	82	878	722	30	22
6	110.28.900	111.28.900 112.28.900	113.28.900 114.28.900	1022	778	82	978	822	30	22
7	110.28.1000	111.28.1000 112.28.1000	113.28.1000 114.28.1000	1122	878	82	1078	922	36	22
8	110.28.1120	111.28.1120 112.28.1120	113.28.1120 114.28.1120	1242	998	82	1198	1042	36	22
9	110.32.1250	111.32.1250 112.32.1250	113.32.1250 114.32.1250	1390	1110	91	1337	1163	40	26
10	110.32.1400	111.32.1400 112.32.1400	113.32.1400 114.32.1400	1540	1260	91	1487	1313	40	26
11	110.32.1600	111.32.1600 112.32.1600	113.32.1600 114.32.1600	1740	1460	91	1687	1513	45	26
12	110.32.1800	111.32.1800 112.32.1800	113.32.1800 114.32.1800	1940	1660	91	1887	1713	45	26
13	110.40.2000	111.40.2000 112.40.2000	113.32.2000 114.32.2000	2178	1825	112	2110	1891	48	33
14	110.40.2240	111.40.2240 112.40.2240	113.40.2240 114.40.2240	2418	2065	112	2350	2131	48	33
15	110.40.2500	111.40.2500 112.40.2500	113.40.2500 114.40.2500	2678	2325	112	2610	2391	56	33
16	110.40.2800	111.40.2800 112.40.2800	113.40.2800 114.40.2800	2978	2625	112	2910	2691	56	33
17	110.50.3150	111.50.3150 112.50.3150	113.50.3150 114.50.3150	3376	2922	112	3286	3014	56	45

Characteristics of Structure, Performance and Application

The single-row crossed roller slewing bearing is composed of two seat rings. It is compact in design, light in weight, and has small fitting clearance. As the rollers are arranged 1:1 across, it is suitable for high precision mounting and is capable of axial force, tilting moment, and relatively large forces.

It is widely used for hoisting, transporting, construction machinery as well as for military products.

Notes:

1.n1-number of lubricating holes, evenly distributed, Lubricating nipple M10×1JB/T7940.1-JB/T7940.2.

2.Mounting hole n-dn1, n-dn2 Maybe replaced with screw hole, tooth width b maybe taken as H-h.

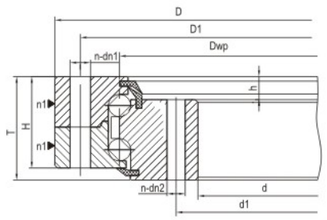
3.Gear force of periphery given in the table is its maximum value, nominal force of periphery is taken 1/2 of the given value.

4.The trim top coefficient of outer and inner tooth 0.1 and 0.2 respectively.

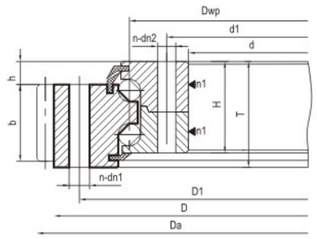
Structural Size					Gear Data		Ext Gear		Int Gear		Tangential Toothing Lood		Reference weight kg
n1	d2 mm	D2 mm	H mm	h mm	b mm	X	m mm	Da mm	Z	da mm	Z	Normalizing z 10'n	Tempering T 10'n	
4	498	502	65	10	60	+0.5	5 6	629 628.8	123 102	367 368.4	74 62	3.7 4.5	5.2 6.2	80
4	558	562	65	10	60	+0.5	5 6	689 688.8	135 112	427 428.4	86 72	3.7 4.5	5.2 6.2	90
4	628	632	65	10	60	+0.5	6 8	772.8 744.4	126 94	494.4 491.2	83 62	4.5 6.0	6.2 8.3	100
4	708	712	65	10	60	+0.5	6 8	850.8 854.4	139 104	572.4 571.2	96 72	4.5 6.0	6.2 8.3	110
6	798	802	72	10	65	+0.5	8 10	966.4 968	118 94	635.2 634	80 64	6.5 8.1	9.1 11.4	170
6	898	902	72	10	65	+0.5	8 10	1062.4 1068	130 104	739.2 734	93 74	6.5 8.1	9.1 11.4	190
6	998	1002	72	10	65	+0.5	10 12	1188 1185.6	116 96	824 820.8	83 69	8.1 9.7	11.4 13.6	210
6	1118	1122	72	10	65	+0.5	10 12	1298 1305.6	127 106	944 940.8	95 79	8.1 9.7	11.4 13.6	230
5	1248	1252	81	10	75	+0.5	12 14	1449.6 1453.2	118 101	1048.8 1041.6	88 75	11.3 13.2	15.7 18.2	350
5	1398	1402	81	10	75	+0.5	12 14	1605.6 1607.2	131 112	1192.8 1195.6	100 86	11.3 13.2	15.7 18.2	400
5	1598	1602	81	10	75	+0.5	14 16	1817.2 1820.8	127 111	1391.6 1382.4	100 87	13.2 15.1	18.2 22.4	440
5	1798	1802	81	10	75	+0.5	14 16	2013.2 2012.8	141 123	1573.6 1574.4	113 99	13.2 15.1	18.2 22.4	500
8	1997	2003	100	12	90	+0.5	16 18	2268.8 2264.4	139 123	1734.4 1735.2	109 97	18.1 20.3	25.0 28.1	900
8	2237	2243	100	12	90	+0.5	16 18	2492.8 2498.4	153 136	1990.4 1987.2	125 111	18.1 20.3	25.0 28.1	1000
8	2497	2503	100	12	90	+0.5	18 20	2768.4 2776	151 136	2239.2 2228	125 112	20.3 22.6	28.1 31.3	1100
8	2797	2803	100	12	90	+0.5	18 20	3074.4 3076	168 151	2527.2 2528	141 127	20.3 22.6	28.1 31.3	1250
8	3147	3153	122	12	110	+0.5	18 20	3476 3471.6	171 155	2828 2824.8	142 129	27.6 30.4	38.3 42.1	2150

Double–Row Ball Slewing Bearing (Standard Series 02)

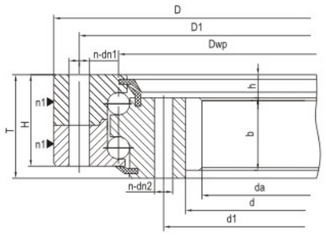
JB/T2033–1999



020



021,022



023,024

Number	Basic type			Configuration Size			Mounting Size			
	Without Gear	External Gear	Internal Gear	D mm	d mm	T mm	D1 mm	d1 mm	n	dn1 dn2 mm
1	020.25.500	021.25.500 022.25.500	023.25.500 024.25.500	616	384	106	580	420	20	18
2	020.25.560	021.25.560 022.25.560	023.25.560 024.25.560	676	444	106	640	480	20	18
3	020.25.630	021.25.630 022.25.630	023.25.630 024.25.630	746	514	106	710	550	24	18
4	020.25.710	021.25.710 022.25.710	023.25.710 024.25.710	826	594	106	790	630	24	18
5	020.30.800	021.30.800 022.30.800	023.30.800 024.30.800	942	658	124	898	702	30	22
6	020.30.900	021.30.900 022.30.900	023.30.900 024.30.900	1042	758	124	998	802	30	22
7	020.30.1000	021.30.1000 022.30.1000	023.30.1000 024.30.1000	1142	858	124	1098	902	36	22
8	020.30.1120	021.30.1120 022.30.1120	023.30.1120 024.30.1120	1262	978	124	1218	1022	36	22
9	020.40.1250	021.40.1250 022.40.1250	023.40.1250 024.40.1250	1426	1074	160	1374	1126	40	26
10	020.40.1400	021.40.1400 022.40.1400	023.40.1400 024.40.1400	1576	1224	160	1524	1272	40	26
11	020.40.1600	021.40.1600 022.40.1600	023.40.1600 024.40.1600	1776	1424	160	1724	1476	45	26
12	020.40.1800	021.40.1800 022.40.1800	023.40.1800 024.40.1800	1976	1624	160	1924	1676	45	26
13	020.50.2000	021.50.2000 022.50.2000	023.50.2000 024.50.2000	2215	1785	190	2149	1851	48	33
14	020.50.2240	021.50.2240 022.50.2240	023.50.2240 024.50.2240	2455	2025	190	2389	2091	48	33
15	020.50.2500	021.50.2500 022.50.2500	023.50.2500 024.50.2500	2715	2285	190	2649	2351	56	33
16	020.50.2800	021.50.2800 022.50.2800	023.50.2800 024.50.2800	3015	2585	190	2949	2651	56	33
17	020.60.3150	021.60.3150 022.60.3150	023.60.3150 024.60.3150	3428	2872	190	3338	2962	56	45
18	020.60.3550	021.60.3550 022.60.3550	023.60.3550 024.60.3550	3828	3272	226	3738	3362	56	45
19	020.60.4000	021.60.4000 022.60.4000	023.60.4000 024.60.4000	4278	3700	226	4188	3812	60	45
20	020.60.4500	021.60.4500 022.60.4500	023.60.4500 024.60.4500	4778	4222	226	4688	4312	60	45

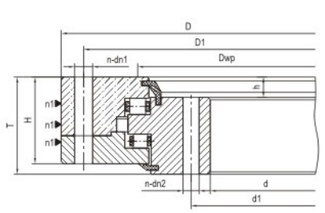
Characteristics of Structure, Performance and Application

The double row roller slewing bearing has three seat rings, The steel ball and the spacers can be directly arranged into the upper and lower races. Two rows of steel balls with different diameters are fitted according to the force born. This makes it especially suitable. The load angles of both the upper and lower race are 90°, which enable it to bear large axial force and tilting moment. Especially suitable for situations with various load positions, direction and continuous rotating. When the radial force is larger than 1/10 of the axial force, the races should be specially designed.

As the axial and radial dimension of the double row slewing bearing are rather large, the structure is rigid. Hence these bearings are especially suitable for tower cranes which require more than a medium range working radius, as well as a mobile crane for loading and unloading machinery.

Structural Size			Gear Data				Ext Gear		Int Gear	Tangential Toothing Lood		Reference weight kg
n1	H mm	h mm	b mm	X	m mm	Da mm	Z	da mm	Z	Normalizing z 10⁴n	Tempering T 10⁴n	
4	96	26	60	+0.5	5 6	644 646.8	126 105	357 350.4	72 59	3.7 4.5	5.2 6.2	100
4	96	26	60	+0.5	5 6	704 706.8	138 115	417 410.4	84 69	3.7 4.5	5.2 6.2	115
4	96	26	60	+0.5	6 8	790.8 790.4	129 96	482.4 475.2	81 60	4.5 6.0	6.2 8.3	130
4	96	26	60	+0.5	6 8	862.8 862.4	141 105	560.4 555.2	94 70	4.5 6.0	6.2 8.3	140
6	114	29	80	+0.5	8 10	982.4 988	120 96	619.2 614	78 62	8.0 10.0	11.1 14.1	200
6	114	29	80	+0.5	8 10	1086.4 1088	133 106	715.2 714	90 72	8.0 10.0	11.1 14.0	250
6	114	29	80	+0.5	10 12	1198 1197.6	117 97	814 796.8	82 67	10.0 12.0	14.0 16.7	300
6	114	29	80	+0.5	10 12	1318 1317.6	129 107	924 916.8	93 77	10.0 12.0	14.0 16.7	340
5	150	39	90	+0.5	12 14	1497.6 1495.2	122 104	1012.8 1013.8	85 73	13.5 15.8	18.8 21.9	580
5	150	39	90	+0.5	12 14	1641.6 1649.2	134 115	1156.8 1153.6	97 83	13.5 15.8	18.8 21.9	650
5	150	39	90	+0.5	14 16	1845.2 1852.8	129 113	1349.6 1350.4	97 85	15.8 18.1	21.9 25.0	750
5	150	39	90	+0.5	14 16	2055.2 2060.8	144 126	1545.6 1542.4	111 97	15.8 18.1	21.9 25.0	820
8	178	47	120	+0.5	16 18	2300.8 2300.4	141 125	1702.4 1699.2	107 95	24.1 27.1	33.3 37.5	1150
8	178	47	120	+0.5	16 18	2540.8 2552.4	156 139	1942.4 1933.2	122 108	24.1 27.1	33.3 37.5	1500
8	178	47	120	+0.5	18 20	2804.4 2816	153 138	2203.2 2188	123 110	27.1 30.1	37.5 41.8	1700
8	178	47	120	+0.5	18 20	3110.4 3116	170 153	2491.2 2488	139 125	27.1 30.1	37.5 41.8	1900
8	214	56	150	+0.5	20 22	3536 3537.6	174 158	2768 2758.8	139 126	37.7 41.5	52.2 57.4	3300
8	214	56	150	+0.5	20 22	3936 3933.6	194 176	3168 3176.8	159 145	37.7 41.5	52.2 57.4	3700
10	214	56	150	+0.5	22 25	4395.6 4395	197 173	3616.8 3610	165 145	41.5 17.1	57.4 65.2	4200
10	214	56	150	+0.5	22 25	4879.6 4895	219 193	4122.8 4110	188 165	41.5 47.1	57.4 65.2	4700

Three–Row Roller Slewing Bearing (Standard Series 13)



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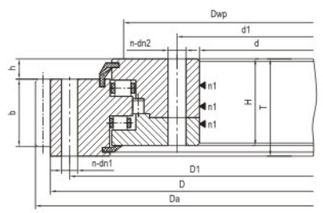

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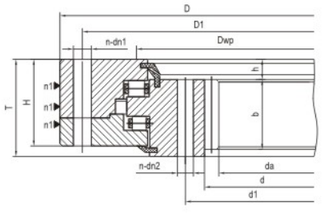

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Number	Basic type			Configuration Size			Mounting Size			
	Without Gear	External Gear	Internal Gear	D mm	d mm	T mm	D1 mm	d1 mm	n	dn1 dn2 mm
1	130.25.500	131.25.500 132.25.500	133.25.500 134.25.500	634	366	148	598	402	24	18
2	130.85.560	131.25.560 132.25.560	133.25.560 134.25.560	694	426	148	658	462	24	18
3	130.25.630	131.25.630 132.25.630	133.25.630 134.25.630	764	496	148	728	532	28	18
4	130.25.710	131.25.710 132.25.710	133.25.710 134.25.710	844	576	148	808	612	28	18
5	130.32.800	131.32.800 132.32.800	133.30.800 134.30.800	964	636	182	920	680	36	22
6	130.32.900	131.32.900 132.32.900	133.30.900 134.30.900	1064	736	182	1020	780	36	22
7	130.32.1000	131.32.1000 132.32.1000	133.30.1000 134.30.1000	1164	836	182	1120	880	40	22
8	130.32.1120	131.32.1120 132.32.1120	133.30.1120 134.30.1120	1284	956	182	1240	1000	340	22
9	130.40.1250	131.40.1250 132.40.1250	133.40.1250 134.40.1250	1445	1055	220	1393	1107	45	26
10	130.40.1400	131.40.1400 132.40.1400	133.40.1400 134.40.1400	1595	1205	220	1543	1257	45	26
11	130.40.1600	131.40.1600 132.40.1600	133.40.1600 134.40.1600	1759	1405	220	1743	1457	48	26
12	130.40.1800	131.40.1800 132.40.1800	133.40.1800 134.40.1800	1995	1605	220	1943	1657	48	26
13	130.45.2000	131.45.2000 131.45.2000	133.50.2000 134.50.2000	2221	1779	231	2155	1845	60	33
14	130.45.2240	131.45.2240 132.45.2240	133.50.2240 134.50.2240	2461	2019	231	2395	2085	60	33
15	130.45.2500	131.45.2500 132.45.2500	133.50.2500 134.50.2500	2721	2279	231	2655	2345	72	33
16	130.45.2800	131.45.2800 132.45.2800	133.50.2800 134.50.2800	3021	2579	231	2955	2645	72	33
17	130.50.3150	131.50.3150 132.50.3150	133.60.3150 134.60.3150	3432	2868	270	3342	2958	72	45
18	130.50.3550	131.50.3550 132.50.3550	133.60.3550 134.60.3550	3832	3268	270	3742	3358	72	45
19	130.50.4000	131.50.4000 132.50.4000	133.60.4000 134.60.4000	4282	3718	270	4192	3808	80	45
20	130.50.4500	131.50.4500 132.50.4500	133.60.4500 134.60.4500	4782	4218	270	4692	4308	80	45

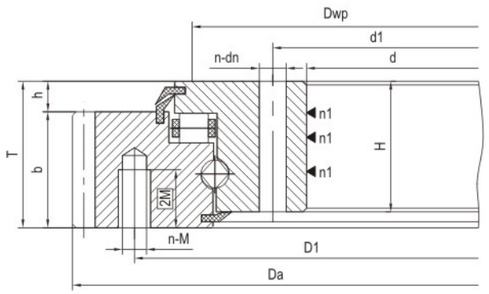
Characteristics of Structure, Performance and Application

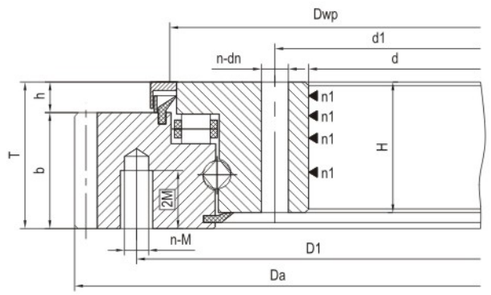
The three row roller slewing bearing has three seat rings and three rows of cylindrical rollers which enable the bearings to carry high radial load ,axial load and tilting moment. The load capacity is the largest among the four models.

Under similar loads, these kinds of bearings have much smaller diameters which can make the bearing more compact. Main applications are heavy machinery, such as bucket wheeled excavator, wheeled crane, ship crane, ladle turrets, heavy duty mobile crane etc.

Structural Size			Gear Data				Ext Gear		Int Gear	Tangential Toothing Lood		Reference weight kg
n1	H mm	h mm	b mm	X	m mm	Da mm	Z	da mm	Z	Normalizing z 10³n	Tempering T 10³n	
4	138	32	80	+0.5	5 6	664 664.8	130 108	337 338.4	68 57	5.0 6.0	6.7 8.0	200 200
4	138	32	80	+0.5	5 6	724 724.8	142 118	397 398.4	80 67	5.0 6.0	6.7 8.0	224 224
4	138	32	80	+0.5	6 8	808.8 806.4	132 98	458.4 459.2	77 58	6.0 8.0	8.0 11.0	262 257
4	138	32	80	+0.5	6 8	886.8 886.4	145 105	536.4 539.2	90 68	6.0 8.0	8.0 11.0	295 291
4	172	40	120	+0.5	8 10	1006.4 1008	123 98	595.2 594	75 60	12.1 15.1	16.7 20.9	490 487
4	172	40	120	+0.5	8 10	1102.4 1108	135 108	691.2 694	87 70	12.1 15.1	16.7 20.9	549 564
5	172	40	120	+0.5	10 12	1218 1221.6	119 99	784 784.8	79 66	15.1 18.1	20.9 25.1	631 631
5	172	40	120	+0.5	10 12	1338 1341.6	131 109	904 904.8	91 76	15.1 18.1	20.9 25.1	710 710
5	210	50	150	+0.5	12 14	1509.6 1509.2	123 105	988.8 985.6	83 71	22.9 26.3	31.4 36.6	1137 1126
5	210	50	150	+0.5	12 14	1665.6 166.32	136 116	1144.8 1139.6	96 82	22.9 26.3	31.4 36.6	1299 1281
6	210	50	150	+0.5	14 16	1873.2 1868.8	131 114	1335.6 1334.4	96 84	26.3 30.2	36.6 41.7	1501 1471
6	210	50	150	+0.5	14 16	2069.2 2076.8	145 127	1531.6 1526.4	110 96	26.3 30.2	36.6 41.7	1682 1697
6	219	54	160	+0.5	16 18	2300.8 2300.4	141 125	1702.4 1699.2	107 95	32.2 36.2	44.5 50.1	2147 2129
6	219	54	160	+0.5	16 18	2556.8 2552.4	157 139	1926.4 1933.2	121 108	32.2 36.2	44.5 50.1	2501 2461
8	219	54	160	+0.5	18 20	2822.4 2816	154 138	2185.2 2188	122 110	36.2 40.2	50.1 55.6	2786 2731
8	219	54	160	+0.5	18 20	3110.4 3116	170 153	2491.2 2488	139 125	36.2 40.2	50.1 55.6	3067 3079
8	258	65	180	+0.5	20 22	3536 3537.6	174 158	2768 2758.8	139 126	45.2 49.8	62.6 68.9	5025 5009
8	258	65	180	+0.5	20 22	3936 3933.6	194 176	3168 3154.8	159 144	45.2 49.8	62.6 68.9	5113 5661
8	258	65	180	+0.5	22 25	4395.6 4395	197 173	3116.8 3610	165 145	49.8 56.5	68.9 78.3	6508 6449
8	258	65	180	+0.5	22 25	4901.6 4895	220 193	4122.8 4110	188 165	49.8 56.5	68.9 78.3	7438 7308

Ball/Roller Combination Slewing Bearing





NO.	Bearing Code	Configuration Size			Mounting Size	
		Da	d	T	D1	d1
		mm	mm	mm	mm	mm
1	221.32.3550.**	3772.8	3358	159	3638	3418
2	221.32.3750.**	3980.8	3558	159	3846	3618
3	221.32.4000.**	4220.8	3808	159	4086	3868
4	221.32.4250.**	4476.8	4058	159	4342	4118
5	221.36.4000.**	4244.4	3792	175	4095	3858
6	221.36.4250.**	4496.4	4042	175	4347	4108
7	221.36.4500.**	4748.4	4292	175	4599	4358
8	221.36.4750.**	5000.4	4542	175	4851	4608
9	221.40.4500.**	4776	4276	183	4612	4348
10	221.40.4750.**	5016	4526	183	4852	4598
11	221.40.5000.**	5276	4776	183	5112	4848
12	221.40.5300.**	5576	5076	183	5412	5148
13	221.45.5000.**	5297.6	4747	203	5117	4825
14	221.45.5300.**	5605.6	5047	203	5425	5125
15	221.45.5600.**	5891.6	5347	203	5711	5425
16	221.45.6000.**	6287.6	5747	203	6107	5825

Typical applications

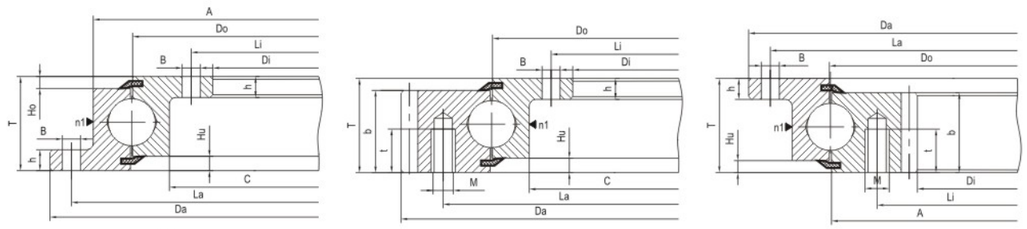
Reclaimers, stackers and other equipment for bulk materials handing, turntables.

Charateristics

- High axial load capacity
- Long service life if mainly axial loads
- High rigidity
- Good running precision

Installation Dimension				Structural Size			Gear Data		weight kg
n	dn	M	n1	H	h	b	m	Z	kg
				mm	mm	mm			
76	30	27	10	143	50	109	16	232	2028
80	30	27	10	143	50	109	16	246	2186
84	30	27	12	143	50	109	16	261	2278
90	30	27	12	143	50	109	16	276	2455
76	33	30	12	159	50	125	18	232	2792
80	33	30	12	159	50	125	18	247	2981
84	33	30	14	159	50	125	18	261	3171
90	33	30	14	159	50	125	18	275	3363
72	36	33	14	167	50	133	20	236	3673
76	36	33	14	167	50	133	20	248	3796
80	36	33	16	167	50	133	20	261	4082
84	36	33	16	167	50	133	20	276	4389
76	39	36	16	187	50	153	22	238	5201
80	39	36	16	187	50	153	22	252	5602
84	39	36	18	187	50	153	22	265	5764
90	39	36	18	187	50	153	22	282	6129

Single–Row Four Point Contact Ball Slewing Bearing With Flange (Light Series L)



LU (No teeth)

LW (Outer teeth)

LN (Inner teeth)

NO.	Type	Configuration Size mm			Mounting Size mm							Gear Data mm						Gear Data mm				weight kg
		Da	Di	T	La	Li	na	B/M	ni	B/M	t	n1	h	A	C	Hu	Ho	m	z	k	b	
1	LU414.20	518	304	56	490	332	8	18	12	18	—	4	12	453	375	10.5	10.5	—	—	—	—	23.4
2	LU544.20	648	434	56	620	462	10	18	14	18	—	4	12	583	505	10.5	10.5	—	—	—	—	31.0
3	LU644.20	748	534	56	720	562	12	18	16	18	—	4	12	683	605	10.5	10.5	—	—	—	—	36.4
4	LU744.20	848	634	56	820	662	12	18	16	18	—	4	12	783	705	10.5	10.5	—	—	—	—	42.8
5	LU844.20	948	734	56	920	762	14	18	18	18	—	4	12	883	805	10.5	10.5	—	—	—	—	47.8
6	LU944.20	1048	834	90	1020	862	16	18	20	18	—	4	12	983	905	10.5	10.5	—	—	—	—	53.1
7	LU1094.20	1198	984	90	1170	1012	16	18	20	18	—	4	12	1133	1055	10.5	10.5	—	—	—	—	61.9
8	LU955.30	1100	805	90	1060	845	30	22	30	22	—	6	21	1017	893	19	19	—	—	—	—	131
9	LU1055.30	1200	905	90	1160	945	30	22	30	22	—	6	21	1117	993	19	19	—	—	—	—	145
10	LU1155.30	1300	1005	90	1260	1045	36	22	36	22	—	6	21	1217	1093	19	19	—	—	—	—	159
11	LU1255.30	1400	1105	90	1360	1145	42	22	42	22	—	6	21	1317	1193	19	19	—	—	—	—	172
12	LU1355.30	1500	1205	90	1460	1245	42	22	42	22	—	6	21	1417	1293	19	19	—	—	—	—	186
13	LU1455.30	1600	1305	90	1560	1345	48	22	48	22	—	6	21	1517	1393	19	19	—	—	—	—	200
1	LW414.20	504	304	56	455	332	10	M12	12	18	20	4	12	–	375	10.5	–	5	99	-0.1	45.5	29.3
2	LW544.20	640.8	434	56	585	462	14	M12	14	18	20	4	12	–	505	10.5	–	6	105	-0.1	45.5	39.5
3	LW644.20	742.8	534	56	685	562	16	M12	16	18	20	4	12	–	605	10.5	–	6	122	-0.1	45.5	47.6
4	LW744.20	838.8	634	56	785	662	18	M12	16	18	20	4	12	–	705	10.5	–	6	138	-0.1	45.5	53.5
5	LW844.20	950.4	734	56	885	762	18	M12	18	18	20	4	12	–	805	10.5	–	8	117	-0.1	45.5	65.1
6	LW944.20	1046.4	834	56	958	862	20	M12	20	18	20	4	12	–	905	10.5	–	8	129	-0.1	45.5	69.6

Characteristics of Structure, Performance and Application

Single-Row four point contact ball slewing bearing (Light Series L) is composed of two rings with flange. It's features include, lightweight and compact design, and a circular raceway containing four points being contacted simultaneously. It may be used in medium, small, and light-duty machinery such as slewing conveyors, welding operating consoles, and clearing machinery.

NO.	Type	Configuration Size			Mounting Size							Gear Data						Gear Data				weight kg
		Da	Di	H	La	Li	na	B/M	ni	B/M	t	n1	h	A	C	Hu	Ho	m	z	k	b	
7	LW1094.20	1198.4	984	56	1135	1012	22	M12	20	18	20	4	12	—	1055	10.5	—	8	148	-0.1	45.5	83.0
8	LW955.30	1096.2	805	90	1016	845	30	M20	30	22	40	6	21	—	893	19	—	9	120	-0.1	71	165
9	LW1055.30	1198	905	90	1116	945	30	M20	30	22	40	6	21	—	993	19	—	10	118	-0.1	71	183
10	LW1155.30	1298	1005	90	1216	1045	36	M20	36	22	40	6	21	—	1093	19	—	10	128	-0.1	71	200
11	LW1255.30	1398	1105	90	1316	1145	42	M20	42	22	40	6	21	—	1193	19	—	10	138	-0.1	71	216
13	LW1355.30	1498	1205	90	1416	1245	42	M20	42	22	40	6	21	—	1293	19	—	10	148	-0.1	71	234
13	LW1455.30	1598	1305	90	1516	1345	48	18	48	22	40	6	21	453	1393	19	—	10	158	-0.1	71	250
1	LN414.20	518	326.5	56	490	375	8	18	12	M12	20	4	12	583	—	10.5	—	5	67	-0.15	45.5	27.1
2	LN544.20	648	445.2	56	620	505	10	18	16	M12	20	4	12	683	—	10.5	—	6	76	-0.1	45.5	36.9
3	LN644.20	748	547.2	56	720	605	12	18	18	M12	20	4	12	783	—	10.5	—	6	93	-0.1	45.5	43.7
4	LN744.20	848	649.2	56	820	705	12	18	20	M12	20	4	12	883	—	10.5	—	6	110	-0.1	45.5	51.5
5	LN844.20	948	737.6	56	920	805	14	18	20	M12	20	4	12	983	—	10.5	—	8	94	-0.1	45.5	61.6
6	LN944.20	1048	841.6	56	1020	905	16	18	22	M12	20	4	12	1133	—	10.5	—	8	107	-0.1	45.5	65.8
7	LN1094.20	1198	985.6	56	1170	1055	16	22	24	M12	20	4	12	1017	—	10.5	—	8	125	-0.1	45.5	80.7
8	LN955.30	1100	812	90	1060	894	30	22	30	M20	40	6	21	1117	—	19	—	10	83	-0.1	71	159
9	LN1055.30	1200	912	90	1160	994	30	22	30	M20	40	6	21	1217	—	19	—	10	93	-0.1	71	176
10	LN1155.30	1300	1012	90	1260	1094	36	22	36	M20	40	6	21	1217	—	19	—	10	103	-0.1	71	192
11	LN1255.30	1400	1112	90	1360	1194	42	22	42	M20	40	6	21	1317	—	19	—	10	113	-0.1	71	208
12	LN1355.30	1500	1212	90	1560	1294	42	22	42	M20	40	6	21	1417	—	19	—	10	123	-0.1	71	226
13	LN1455.30	1600	1312	90	1560	1394	48	22	48	M20	40	6	21	1517	—	19	—	10	133	-0.1	71	243

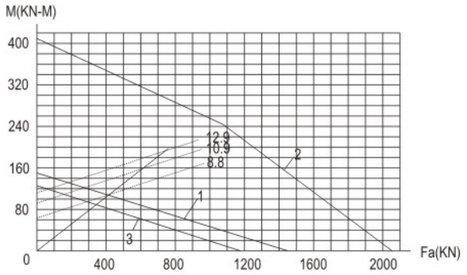


Fig.1-1 01x.30.500.12

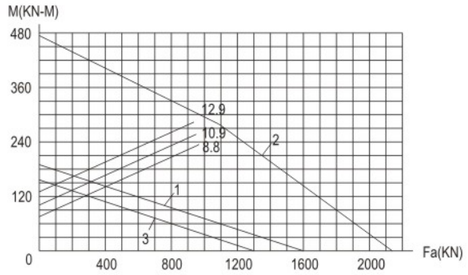
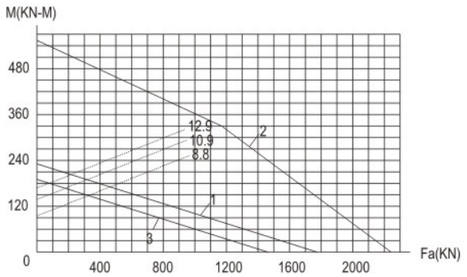


Fig.1-2 01x.30.560.12



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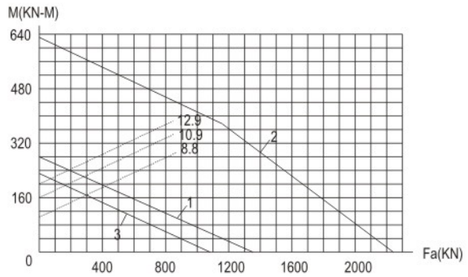


Fig.1-4 01x.30.710.12

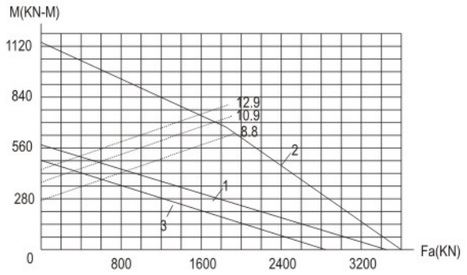


Fig.1-5 01x.40.800.12

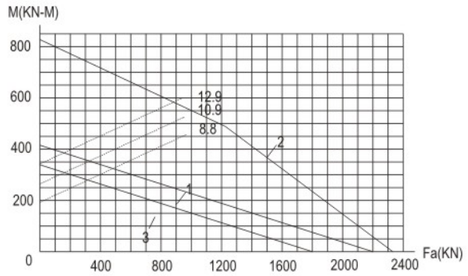
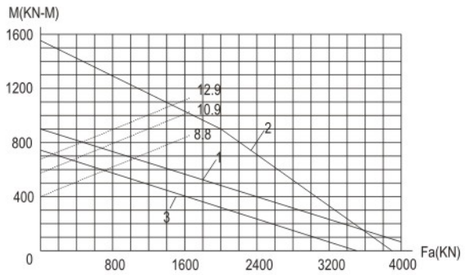


Fig.1-6 01x.30.900.03



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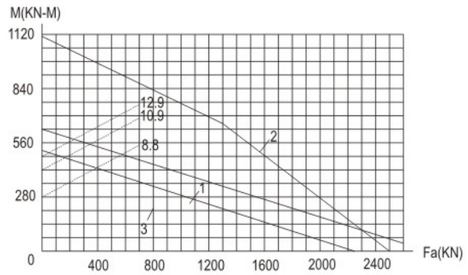

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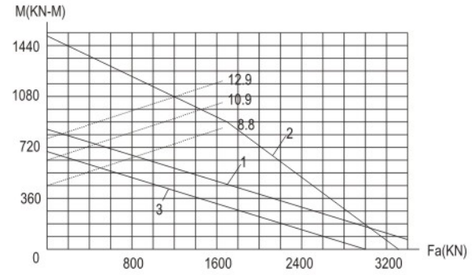

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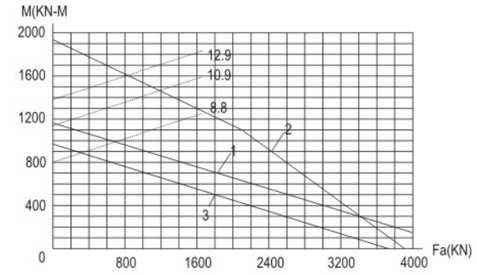


Fig.1-10 01x.45.1250.03

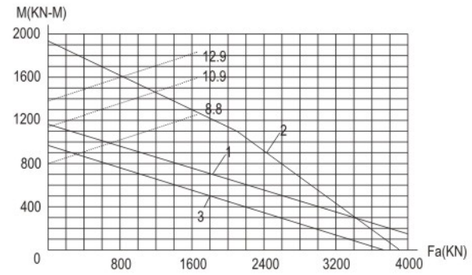
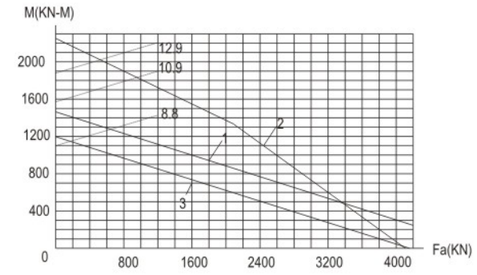


Fig.1-11 01x.45.1250.12



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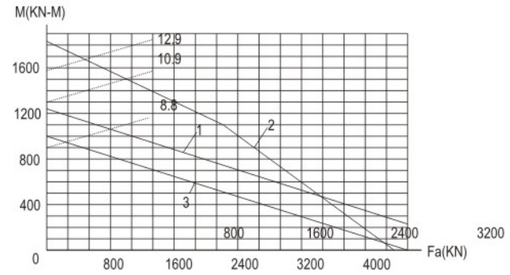

Fig.1-13 01x.35.1400.03

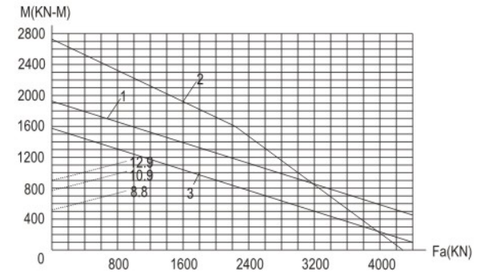

Fig.1-14 01x.45.1600.12

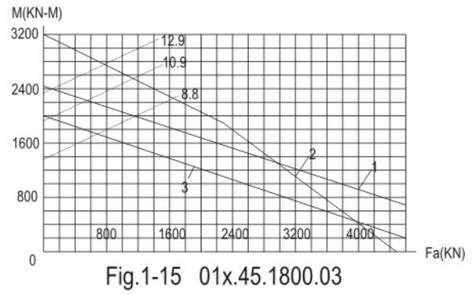

Fig.1-15 01x.45.1800.03

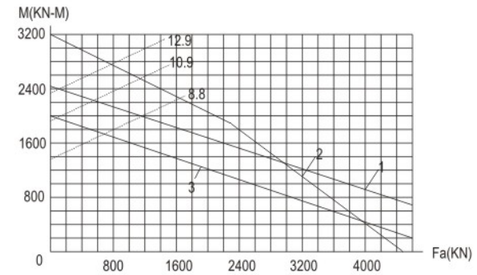

Fig.1-16 01x.45.1800.12

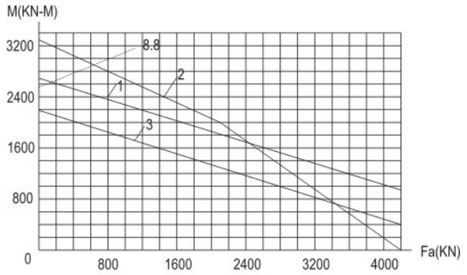

Fig.1-17 01x.40.2000.12

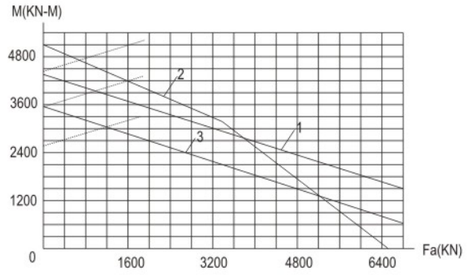

Fig.1-18 01x.60.2000.12

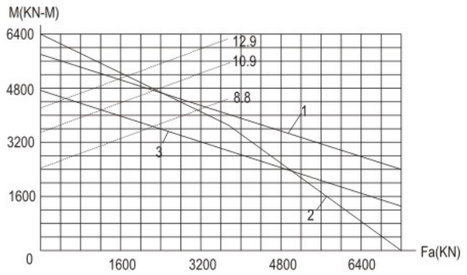

Fig.1-19 01x.60.2240.03

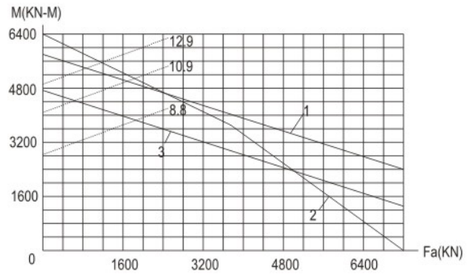

Fig.1-20 01x.60.2240.12

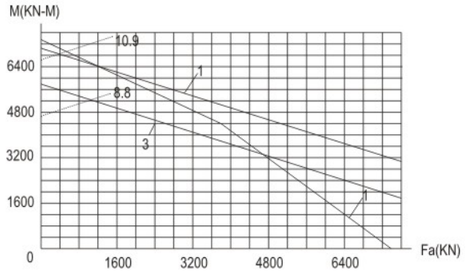

Fig.1-21 01x.60.2500.03

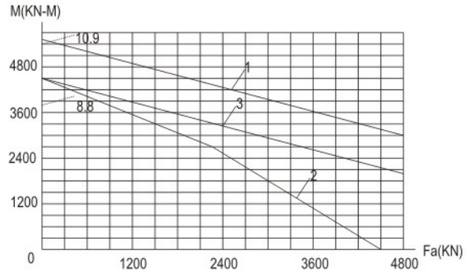

Fig.1-22 01x.40.2500.12

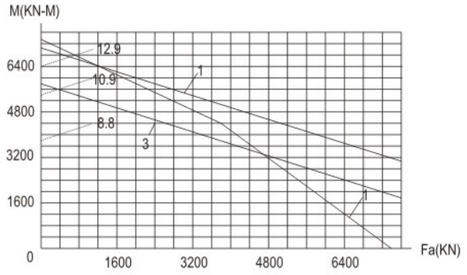

Fig.1-23 01x.60.2500.12

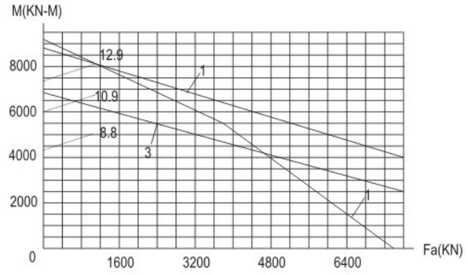

Fig.1-24 01x.60.2800.03

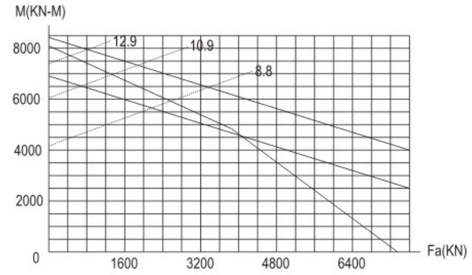

Fig.1-25 01x.60.2800.12

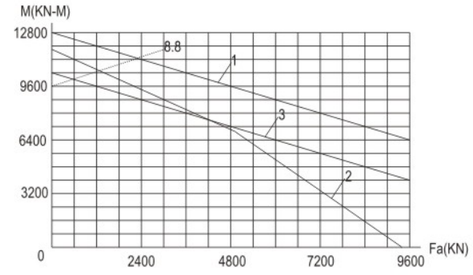

Fig.1-26 01x.75.3150.03

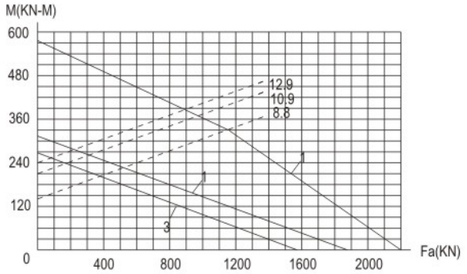

Fig.2-1 11x.25.710.12K

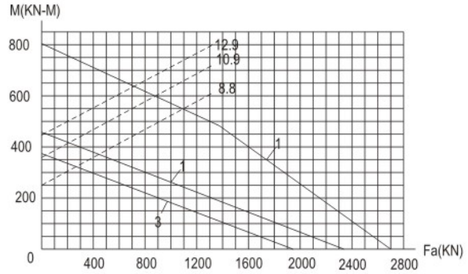

Fig.2-2 11x.28.800.12

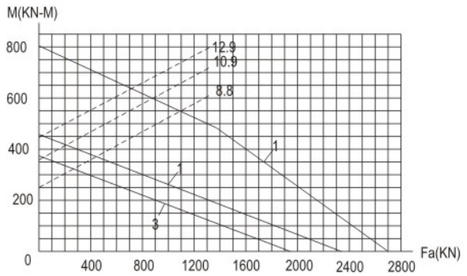

Fig.2-3 11x.28.800.04

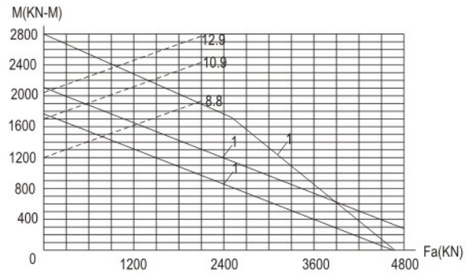

Fig.2-4 11x.32.1600.04

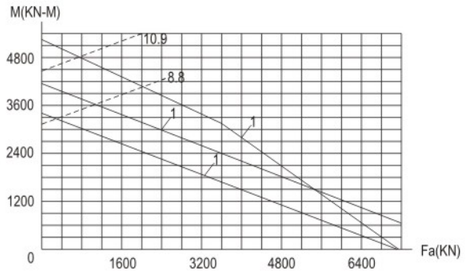

Fig.2-5 11x.40.2000.11

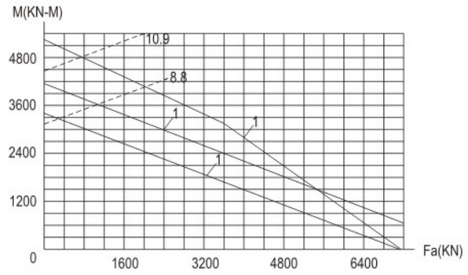

Fig.2-6 11x.40.2000.12

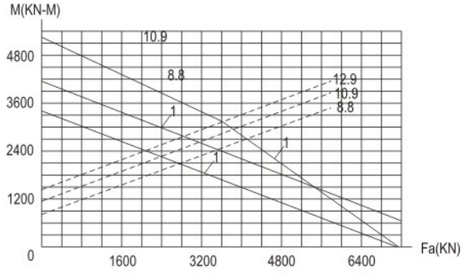

Fig.2-7 11x.40.2000.03K

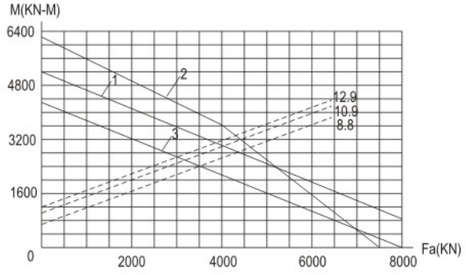

Fig.2-8 11x.40.2240.12K

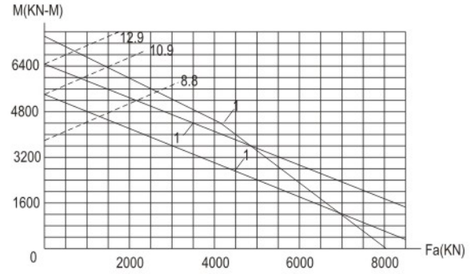

Fig.2-9 11x.40.2500.12

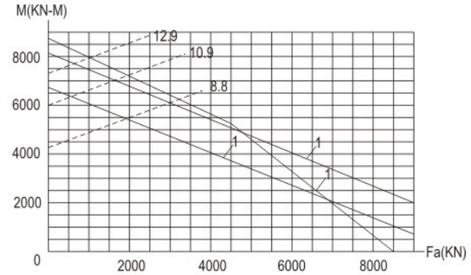

Fig.2-10 11x.40.2800.03

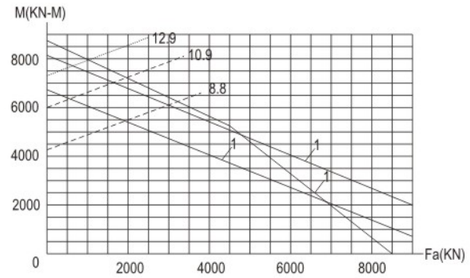

Fig.2-11 11x.40.2800.12

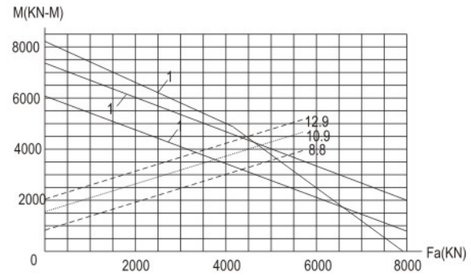

Fig.2-12 11x.40.2800.11K

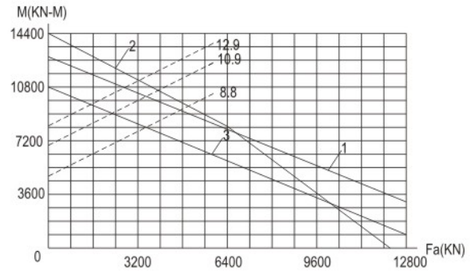

Fig.2-13 11x.50.3150.03K

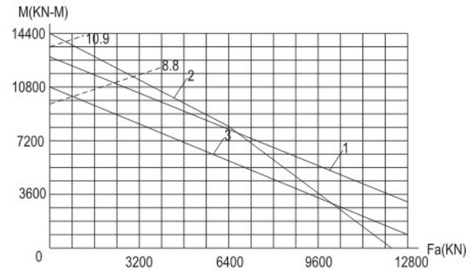

Fig.2-14 11x.50.3150.12

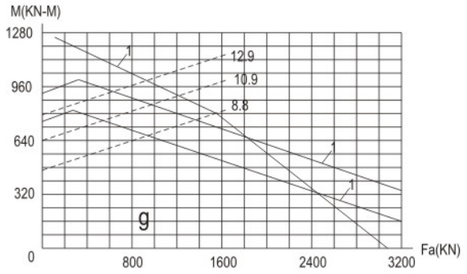

Fig.3-1 02x.30.1120.12

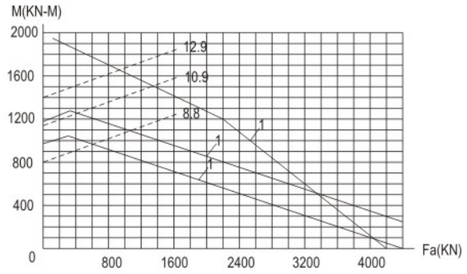

Fig.3-2 02x.40.1250.12

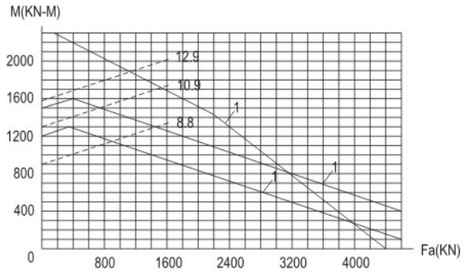

Fig.3-3 02x.40.1400.12

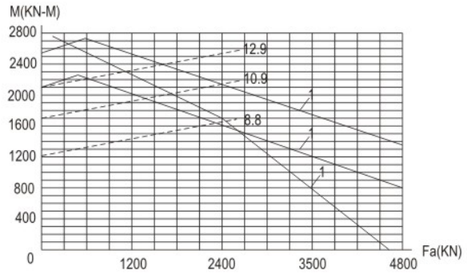

Fig.3-4 02x.40.1600.12

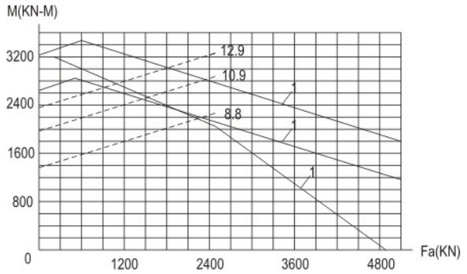

Fig.3-5 02x.40.1800.12

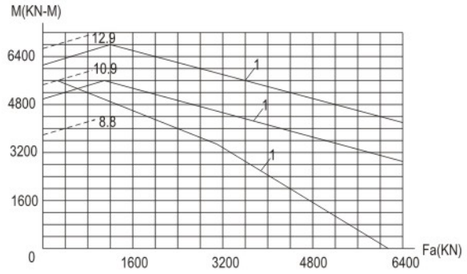

Fig.3-6 02x.50.2500.12

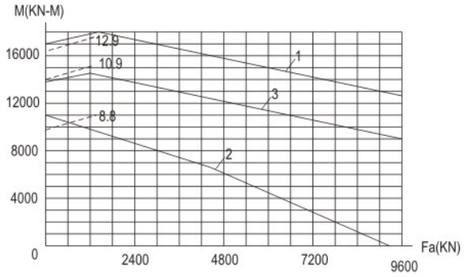

Fig.3-7 02x.60.3150.03

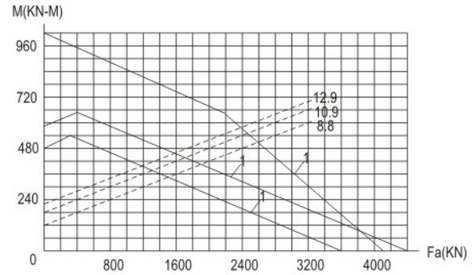

Fig.4-1 13x.25.710.12

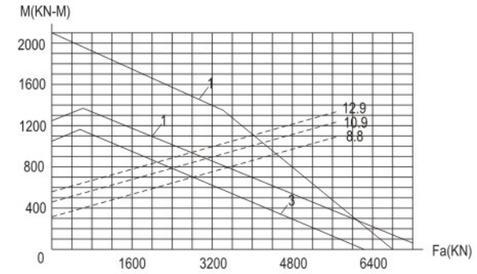

Fig.4-2 13x.32.900.03

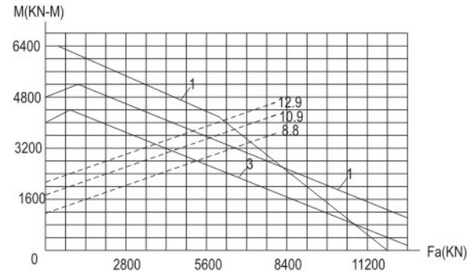

Fig.4-3 13x.40.1600.03

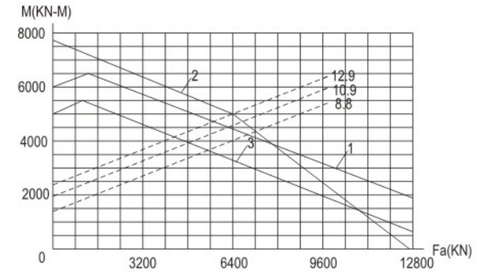

Fig.4-4 13x.40.1800.03

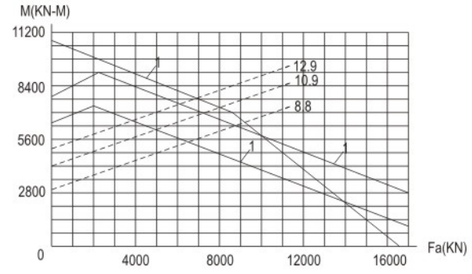

Fig.4-5 13x.45.2000.03

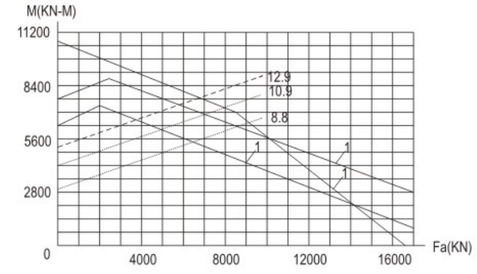

Fig.4-6 13x.45.2000.04

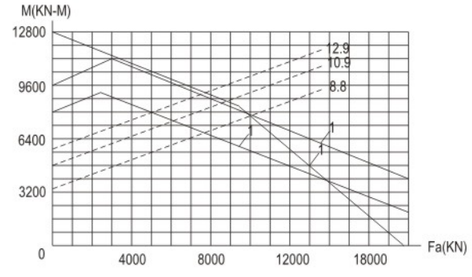

Fig.4-7 13x.45.2240.03

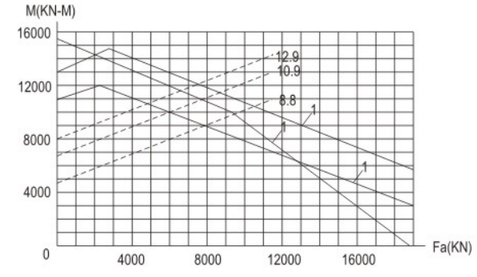

Fig.4-8 13x.45.2500.04

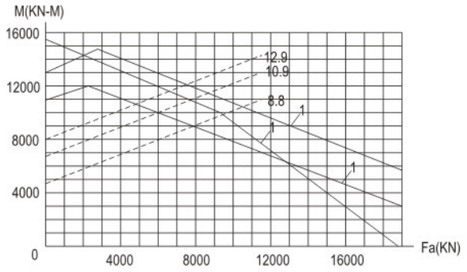

Fig.4-9 13x.45.2500.12

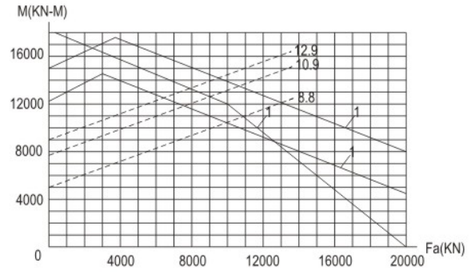

Fig.4-10 13x.45.2800.03

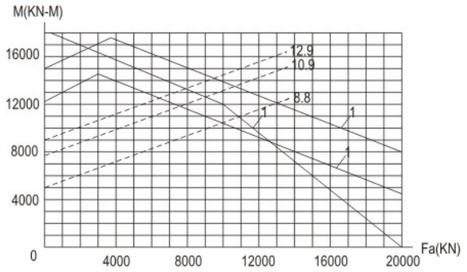

Fig.4-11 13x.45.2800.04

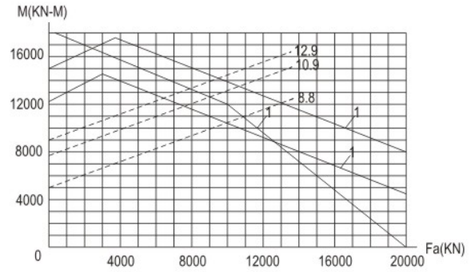

Fig.4-12 13x.45.2800.12

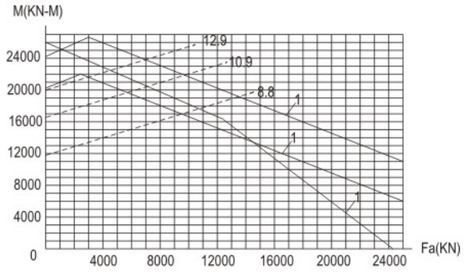

Fig.4-13 13x.50.3150.03

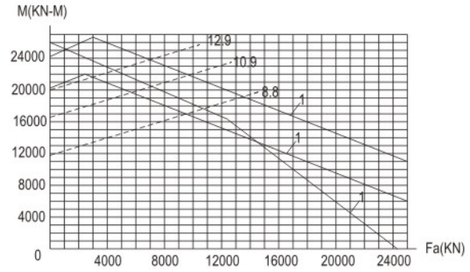

Fig.4-14 13x.50.3150.04

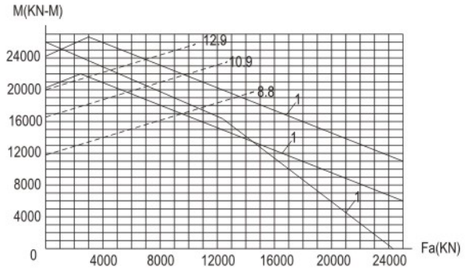

Fig.4-15 13x.50.3150.11

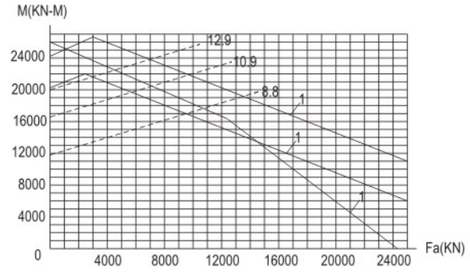

Fig.4-16 13x.50.3150.12

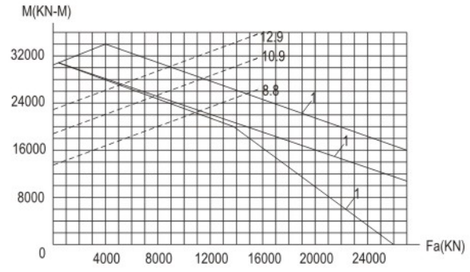

Fig.4-17 13x.50.3550.03

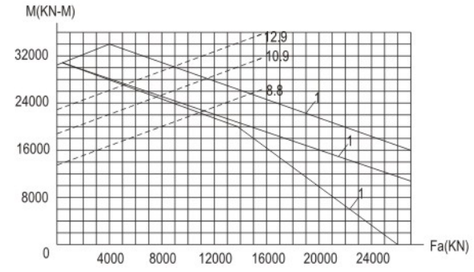

Fig.4-18 13x.50.3550.04

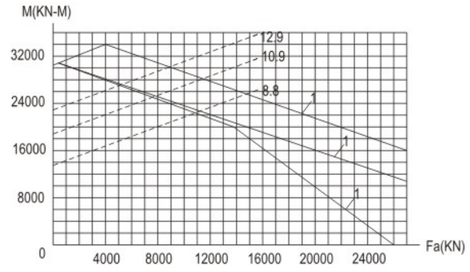

Fig.4-19 13x.50.3550.12

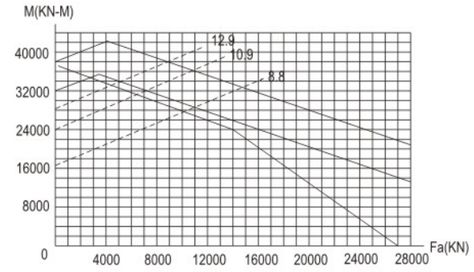

Fig.4-20 13x.50.4000.03

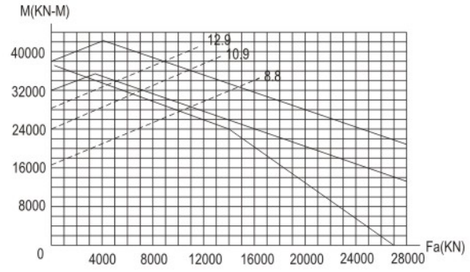

Fig.4-21 13x.50.4000.12

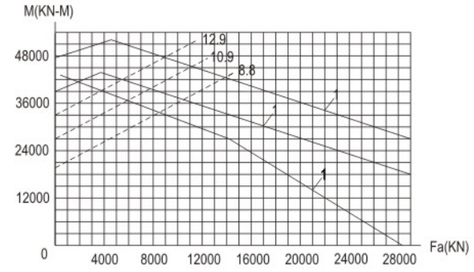

Fig.4-22 13x.50.4500.03

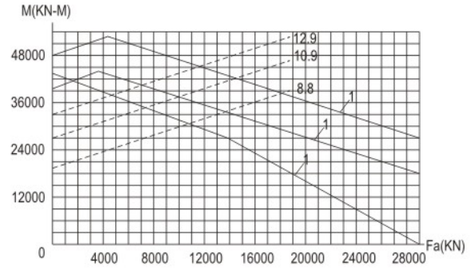

Fig.4-23 13x.50.4500.04