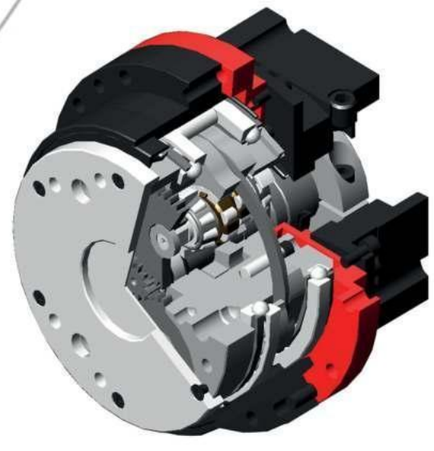
赛劲®

Cycloidal Kinetic



摆线传动 精密控制用减速机

所有人孜孜以求，但至今无人企及…
Everybody strives for,Nobody has achieved yet…

Cycloidal Kinetic Transmission

Robust Performer

High Precision
Universal Installation
Full Protection IP65
Compact Size
High Tilting Rigidity
Slient Operation
High Dynamics
Impact Resistance
Simple To Use

Everyboby strives for ,
Nobody has achieved yet...

所有人都孜孜以求，但迄今无人企及…
Everybody strives for, Nobody has achieved yet...

Cycloidal Hollow Transmission

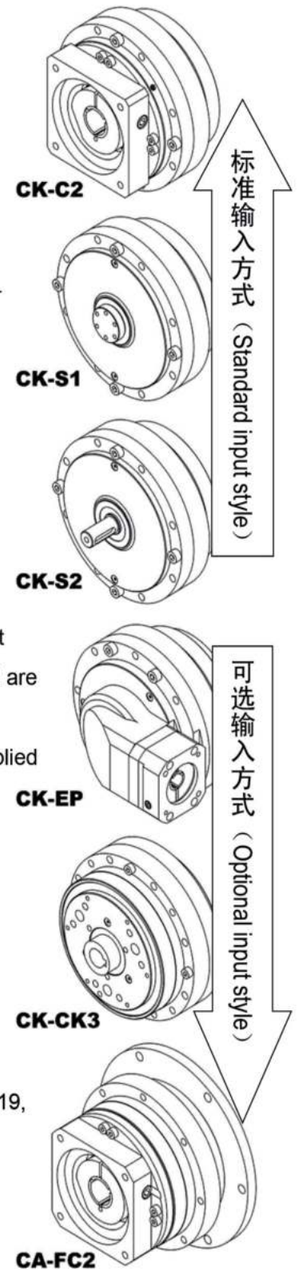
Robust Performer
High Precision
Universal Installation
Full Protection IP65
Compact Size
High Tilting Rigidity
Slient Operation
High Dynamics
Impact Resistance
Simple To Use

CK 命名规则 [CK ordering information]

CK 000 S/E - 000 - S - C2/(CK3)/S1/S2/(S3)/(EP)/(FC2) - 00X00 - XXXXXX
① ② ③ ④ ⑤ ⑥ - ⑦

① 名称：摆线动力传输 Cycloidal Kinetic Transimission
② 型号：额定输出扭矩（约×10Nm）
③ 输出轴承类型：S-标准，E-高级
④ 减速比
⑤ 输入方式：C2-简单易用，夹紧环输入，有较大的输入轴径；S1-密封型面输入；S2-密封型轴输入；EP-直角型输入；C3, CK3, S3-输入与输出端在同侧；FC2, FS2-机身转动输入，为可选的输入方式。
⑥ 可插入输入轴轴径 X 匹配的电机轴径 （若两者不同，使用轴套）或者空白（针对S1, S2, S3, FS2输入方式）
⑦ CK电机代码或空白（针对 S1, S2, S3, FS2输入方式）

① **Model name**: Cycloidal Kinetic transmission
② **Model Number** : Rated output torque (× approximately 10Nm)
③ **Output bearing type**: **S**-Standard, **E**-Enhanced
④ **Reduction ratio**
⑤ **Input style**: **C2**-Easy to use, clamp input, big input diameter, **S1**-Flange input with sealing, **S2**-Input shaft with sealing. **EP**-Elbow Pancake (right angle), input & output structure in the same side **C3, CK3, S3**, main frame turning **FC2, FS2** are available as optional for CK.
⑥ 'Insertable input shaft diameter X Applied motor shaft diameter'(if different, applied bushing), or blank (for S1, S2, S3, FS2 input style)
⑦ CK motor code, or blank (for S1, S2, S3, FS2 input style)



实例 [Examples]

CK020S-73-S-C2-19X16-A080PY

CK020，标准输出轴承，73速比，C2输入方式，可插入的输入轴轴径19,电机轴径16（需使用19 -16的轴套），匹配的电机为SGMA 750W。

[CK020 Standard output bearing, Ratio 73, C2 input style, insertable input shaft dia. 19, applied motor shaft 16 (include 19 -16 bushing), Applied motor SGMA 750W.]

CK020E-73-S-S2

CK020, 高级输出轴承，73速比，S2输入方式。

[CK020, Enhanced output bearing, Ratio 73, S2 input style.]

CH 命名规则 [CH ordering information]

CH 000 S/E - 000 - S - B1/B2/(B3)/C2/S1/S2/ (ET)/(P2) - 00X00 - XXXXXX
① ② ③ ④ ⑤ ⑥ ⑦

① 名 称：摆线动力传输
② 型 号：额定输出扭矩(约×10Nm)
③ 输出轴承类型：**S**-标准, **E**-高级
④ 减速比
⑤ 输入方式：**B1**-密封、中空、直连式输入结构，无空心管，空心轴随输入端转动, **B2**-密封、中空、直连输入结构，采用空心管，空心管随输出端转动, **C2**-简单易用，夹紧环输入，有较大输入轴径， **S1**-带密封的法兰输入，**S2**-带密封的轴输入
⑥ '可插入输入轴径X电机轴径"(若两者不同，使用轴套，仅适用于C2, ET, P2输入方式), 或空白(适用于 B1, B2, B3, S1, S2输入方式)
⑦ **CH** 电机法兰 (适用于 C2, ET, P2 输入方式), 或空白(适用于B1, B2, B3, S1, S2 输入方式)

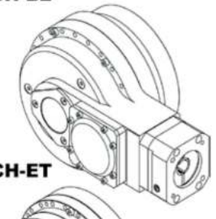

CH-C2


CH-S1


CH-S2


CH-B1


CH-B2


CH-ET


CH-B3

① **Model name :** ***Cycloidal Hollow transmission***
② **Model Number :** Rated output torque (×approximately 10Nm)
③ **Output bearing type : S**-Standard, **E**-Enhanced
④ **Reduction ratio**
⑤ **Input style : B1**-Sealed, hollow, direct connecting input structure, without hollow tube, hollow shaft turn by input speed, **B2**-Sealed, hollow, direct connecting input structure, with hollow tube, hollow tube turn by output speed. **C2**-Easy to use, clamp input, big input diameter, with sealing, **S1**-Flange input with sealing, **S2**-Input shaft with sealing. Extremely thin right angle ET, combine with planetary gear at input for ratio higher than 1000 P2, input & output structure in the same side B3 is available as optional.
⑥ 'Insertable input shaft diameter X Applied motor shaft diameter'(if different, applied bushing, C2, ET, P2 input style only), or blank (for B1, B2, B3, S1, S2 input style)
⑦ **CH** motor code (for C2, ET, P2 input style), or blank (for B1, B2, B3, S1, S2 input style)

实例 [Examples]

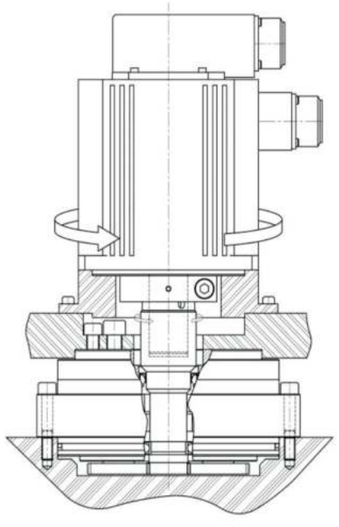
CH020S-63-S-C2-19X16-A080PY

CH020，标准输出轴承，63速比，C2 输入方式，可插入的输入轴径19，
电机轴径16 (需使用19-16的轴套)，匹配的电机为 SGMA 750W。

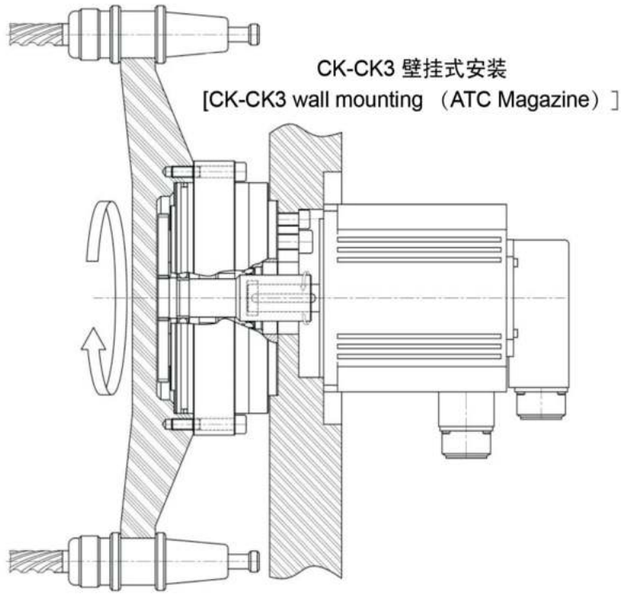
[**CH020** Standard output bearing, Ratio 63, C2 input style, insertable input shaft dia. 19, applied motor shaft 16 (include 19->16 bushing), Applied motor SGMA 750W.]

应用实例 [Application Examples]

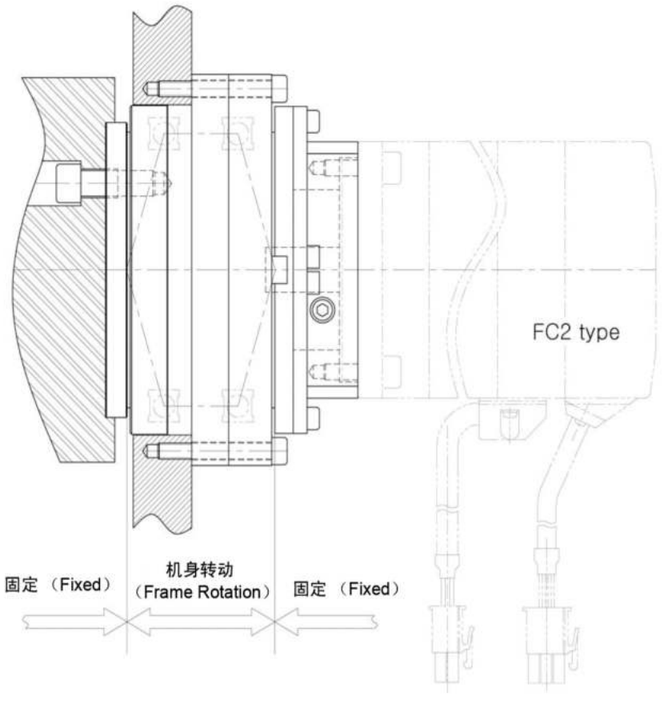
CK-C3 落地式安装
[CK-C3 floor mounting]



CK-CK3 壁挂式安装
[CK-CK3 wall mounting （ATC Magazine）]

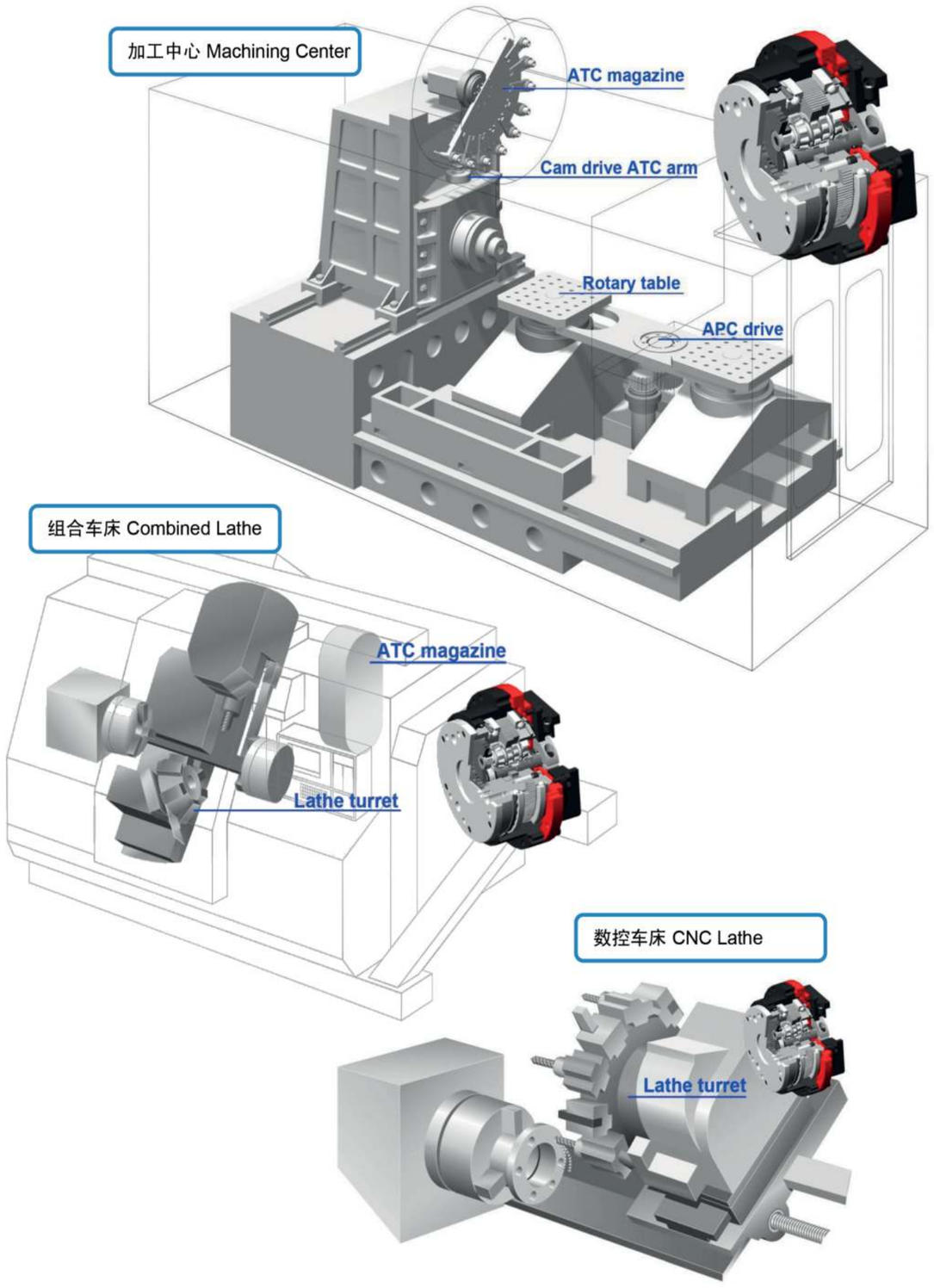


CK-FC2（可选）输入方式安装实例 [CK-FC2 (Optional) input style installation examples]



① 各系列FC2输入方式安装的详细情况，请联系赛劲。
② FS2 输入方式是可选的。
③ FC2, FS2输入方式的情况下，减速比减小1。
请参考"旋转方向和速比"。

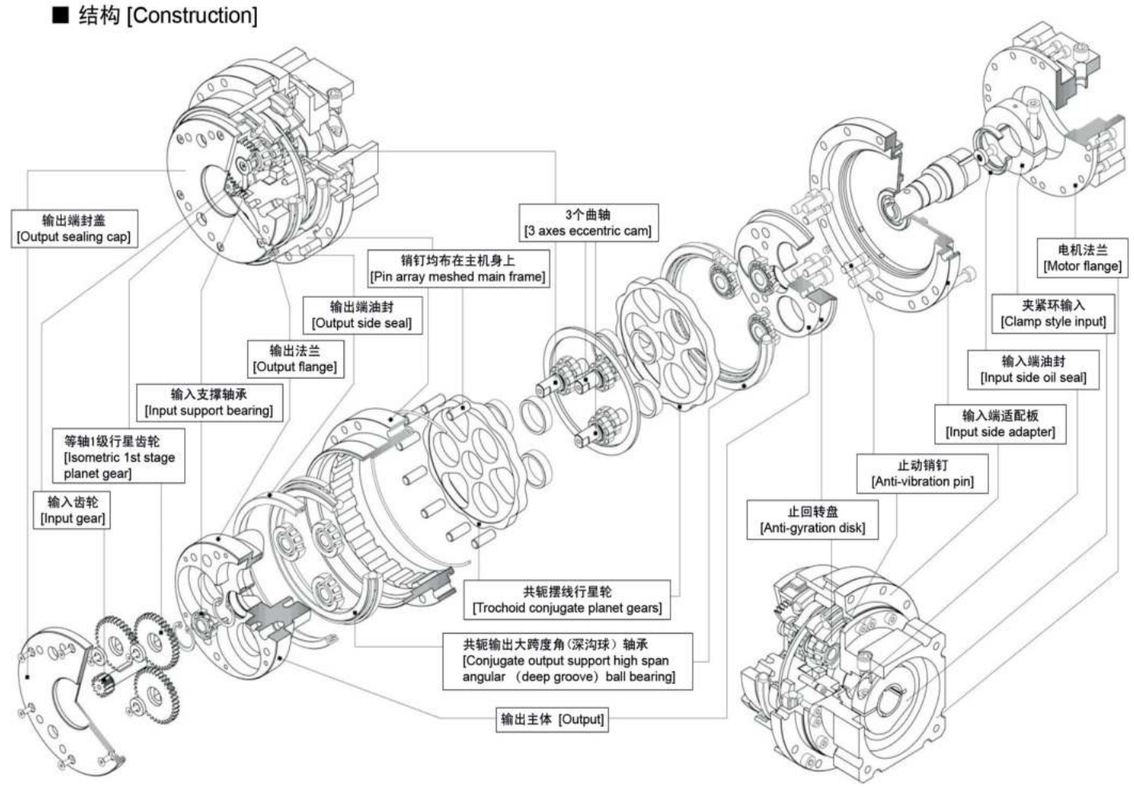
① For each series FC2 input style, please contact SEJINiGB.
② FS2 input style is available.
③ In case of FC2, FS2, reduction ratio reduced by 1.
Refer 'Rotary Direction & Speed Ratio'.



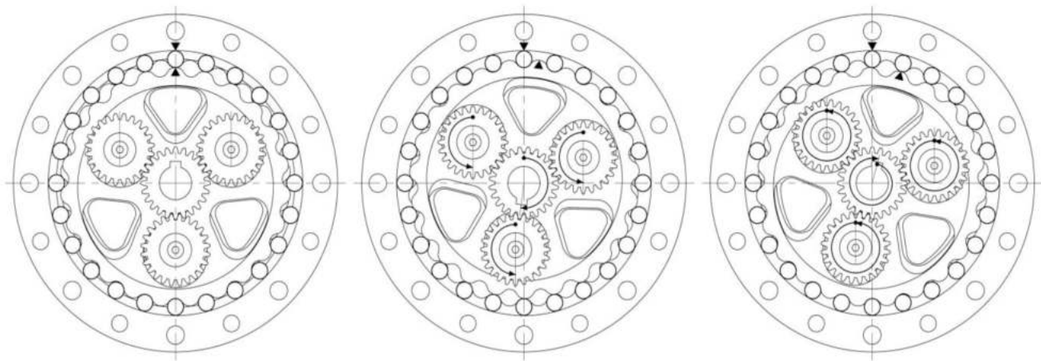
摆线动力传输 Cycloidal Kinetic Transmission
be precise with SAIZIN®

结构和工作原理 [Construction and Operation principle]

■ 结构 [Construction]



■ 工作原理 [Operating principle]



1级行星齿轮 0°
[1st stage planet gear 0°]

1级行星齿轮 180°
[1st stage planet gear 180°]

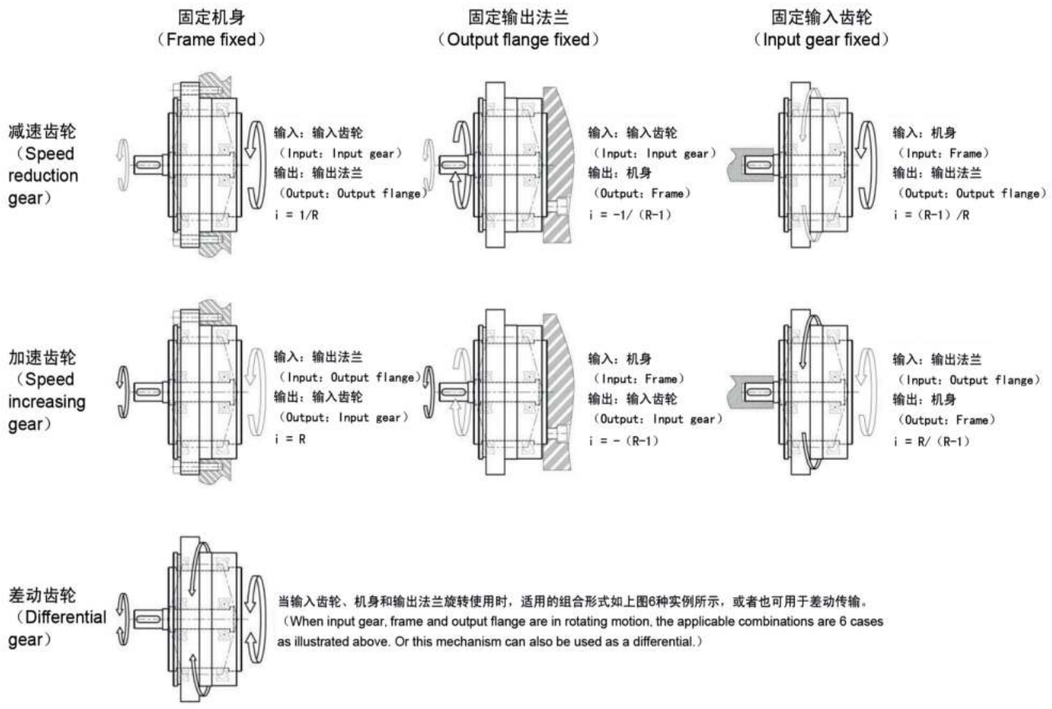
1级行星齿轮 360°
[1st stage planet gear 360°]

旋转方向和速比 [Rotary direction and Speed ratio]

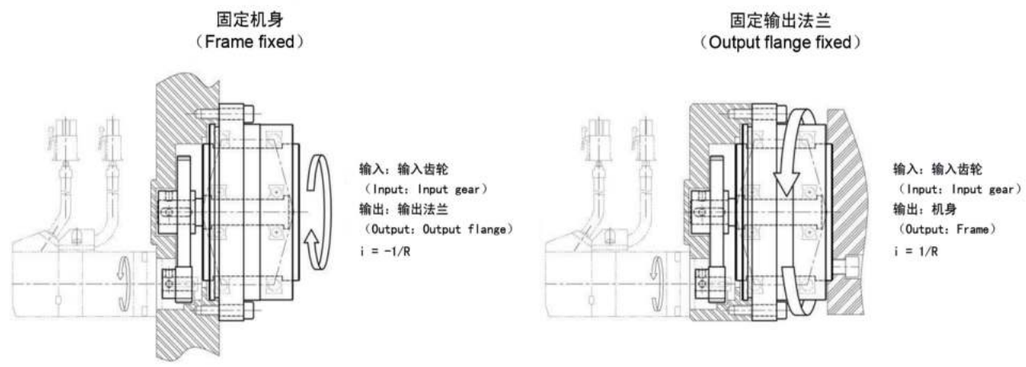
■ CK 旋转方向和速比 [CK Rotary direction and Speed ratio]

CK系列有多种使用方式，下图显示有6种不同的旋转方向和速比的组合形式，根据下图可选择一个最适合的应用。（图中"-"号表示输入和输出方向相反。）

[The CK series may be used in various ways. The following figures show six combinations of the rotary direction and speed ratio. Use the following figure to select a mechanism most suitable for application. (In a figure, "- "signifies input and output in the opposite direction.)]



■ CK 有额外输入减速结构的情况下旋转方向和速比
[CK rotary direction and speed ratio with extra input reduction structure]



CK 使用说明 [How to use CK Specifications]

额定使用寿命

CK系列减速机的使用寿命是根据3个曲轴上的轴承的额定寿命为基础进行计算的。所有型号和速比的减速机在额定扭矩和额定转速条件下运行，其使用寿命为$L_{10}=K=6000hrs$。根据实际运行情况，使用寿命可通过以下公式计算：

$$L_h = K \times \frac{N_o}{N_m} \times \left(\frac{T_o}{T_m}\right)^{\frac{10}{3}} \cdots\cdots \text{公式（1）}$$

其中，L_h是使用寿命（hour），No是额定输出转速（rpm），N_m是平均输出转速（rpm），To是额定输出扭矩（Nm），T_m是平均输出扭矩。额定输出转速从50到240rpm不等，请参考各系列额定参数表。

计算的使用寿命是以90%可靠性为基础得出的。平均使用寿命可以预期为计算结果的5倍以上。（更高的可靠性请参考表1）

可靠性 [Reliability]	可靠性系数 [Reliability coefficient]
90%	1
95%	0.62
96%	0.53
97%	0.44
98%	0.33
99%	0.21

表1 可靠性及可靠性系数
[Table 1 Reliability & reliability coefficient]

额定输出扭矩

CK的使用寿命公式计算参考了额定输出扭矩这个因素。如果实际负载和转速分别与额定输出扭矩和额定转速相同，那么CK的使用寿命为额定寿命L_{10}（6000小时），具有90%的可靠性。更高的可靠性请参照表1。当然，CK是根据间歇运行而设计的，额定寿命（L_{10}）的计算需要同时考虑额定输出扭矩和额定输出转速，在选型时，不能仅仅只考虑额定输出扭矩。在安装、组装和移动设备等过程中，加载在输出轴上的静负载应不超过额定输出扭矩。

最大平均输出扭矩

当CK是在一个可变的负载环境下工作，平均输出扭矩是以整个运行周期（包括间歇时间）来计算的。（请参考"CK选型"）计算值应不超过额定参数表上的最大平均输出扭矩。即使额定输出转速很低，以满足CK使用寿命的要求，允许的最大平均输出扭矩也不可超过规定值。

Rated Service Life

The service life expectancy of *CK* is based on the rating of the bearings used for the 3 axes eccentric cams when run continuously at rated torque. The service life is set as $L_{10}=K=6000hrs$ for all models and ratios at rated torque and at rated output speed. When *CK* is installed in actual service, the service life can be calculated by the following formula:

$$L_h = K \times \frac{N_o}{N_m} \times \left(\frac{T_o}{T_m}\right)^{\frac{10}{3}} \cdots\cdots \text{Eq（1）}$$

where, L_h is service life (hour), N_o is rated output speed (rpm), N_m is average output speed (rpm), T_o is rated output torque (Nm), T_m is average output torque (Nm). Rated output speed is from 50 to 240rpm (Refer rating table for each series).

Calculated service life is based on 90% reliability, for median lifetime L_{50} is more than 5 times of calculated value. (Ref. Table 1 for higher reliability)

Rated Output Torque

The rated output torque is reference value for the calculation of *CK* lifetime. If load is the same as rated output torque and *CK* output shaft runs the same as rated output speed, then *CK* will achieve L_{10} life 6000 hours with 90% reliability. To improve reliability, may need to refer table 1. However, *CK* is designed based on intermittent periodic duty, and rated life (L_{10}) should be taken into account with rated output torque and rated output speed, rated output torque should not consider alone for *CK* selection. Also, loaded static torque on output shaft, during installation, assembly, moving equipment or etc., should not exceed this value.

Maximum Average Output Torque

When *CK* is used under a variable load, an average output torque should be calculated for the entire operating cycles include pause time. (Refer *CK* Model Selection) The calculated average output torque should not exceed given maximum average output torque on the rating table. Even though, rated output speed is low enough to satisfy *CK* lifetime equation or quick selection formula, loaded average torque should not exceed this value.

Acc./Dec. Torque

In case of intermittent periodic duty，output torque varies depending on acceleration or deceleration condition. Acc./Dec. torque is maximum allowable output torque.This value can be calculated if the static load, load of inertia, and acceleratin

加减速扭矩

在间歇运行条件下，根据加减速条件，输出轴负载扭矩是变动的，允许的最大输出扭矩就是加减速扭矩。加减速扭矩可通过静负载、负载惯量和加减速时间计算出来。一般加减速输出扭矩比匀速时的输出扭矩要大，但因摩擦、质量和负载的变化，也有例外。在这种情况下，加减速扭矩可以作为运行输出扭矩的极限值。也就是说，实际使用的平均输出扭矩和最大输出扭矩应控制在额定输出扭矩和允许的加减速扭矩以内。

瞬时扭矩

CK在运行过程中由于碰撞或急停会产生一个瞬时扭矩。运行中，冲击的幅度和频率必须保持在最低限度内，而且无论什么情况下都应该按照标示的规定进行操作。允许可承受瞬时扭矩冲击的次数，可通过公式2计算：

$$E_n = \frac{775\times\left(\frac{T_{max}}{T_k}\right)^{\frac{10}{3}}}{40\times\frac{N_k}{60}\times t_k} \quad \cdots\cdots \text{公式（2）}$$

其中，E_n是允许可承受瞬时扭矩冲击的次数，T_{max}是额定参数表上的瞬时扭矩值，T_k是实际瞬时扭矩，N_k是实际瞬时扭矩时的输出转速，t_k是实际瞬时扭矩所持续的时间。

最大输出转速

CK的最大输出转速受制于输入和输出端油封的摩擦产生的热量、运行效率和安装结构的热容量等因素。增加安装结构的热容量、强制冷却、密封润滑等方法，使CK主体温度稳定在80℃以下，可允许CK以超过最大输出转速的速度运行，但这样做会导致润滑油失效和噪音增加。这种情况下需要做初期实验。

背隙、空回和扭转刚性

当输入端固定，输出轴上施加一个力矩时，因为CK传动结构的空隙和弹性变形，会产生一个扭转角。这个扭转角的大小会因施加在输出轴上的力矩的不同而不同。两者之间的关系可以用滞后曲线表示。

利用滞后曲线可以定义背隙、空回和扭转刚性。如图1所示，输入端固定，在输出轴加载两个方向（顺时针和逆时针）的力矩，移除这个力矩后所测量的扭转角的差值即被称为背隙或滞后损失。

(or deceleration) time are known. Generally, the peak torque that occurs during acceleration or deceleration is higher than constant speed periods; however, there are exceptions, because of varying friction, mass, or load during constant speed periods. In this case, Acc./Dec torque may apply as limited output torque during operations. This means actual average output torque and maximum output torque should be limited by rated output torque and acc./dec. torque on rating tables.

Momentary Peak Torque

CK may be subject to momentary peak torques as a limit in the event of collision or emergency stop. The magnitude and frequency of occurrence of such impact must be kept to a minimum and they should under no circumstance occur during the nominal operation. The allowable number of momentary peak torque can be calculated by the Eq(2).

$$E_n = \frac{775\times\left(\frac{T_{max}}{T_k}\right)^{\frac{10}{3}}}{40\times\frac{N_k}{60}\times t_k} \quad \cdots\cdots \text{Eq（2）}$$

where, E_n is number of momentary peak torque, T_{max} is momentary peak torque at rating table, T_k is actual peak torque, N_k is actual output speed at peak torque, t_k is actual duration for peak torque.

Maximum Output Speed

Maximum output speed of *CK* is limited by heat which depends on friction of input and output seal, operation rate, heat capacity of installed structure and etc. It may override as long as *CK* surface temperature is stable under 80℃, by means of increasing heat capacity of installed structure, forced cooling, oil based lubrication and etc., however, it may cause aging lubrication, increasing noise level. In this case, it needs extra caution or initial experiments.

Backlash, Lost-motion & Torsional Rigidity

When a torque is applied to the output shaft while the input is fixed, torsional twist angle, which is caused by clearance and elastic deformation of *CK* transmission structure, is generated according to the torque value on output shaft. The proportional drawing of torsion angle and torque on output shaft is hysteresis curve.

Backlash, lost motion and torsional rigidity can be defined by using this hysteresis curve. As it described at figure 1, while input is fixed, if some torque is applied on output shaft both direction (CW, CCW) and removes the torque on output shaft, then measuring the difference of torsion angle is so called backlash or hysteresis loss.

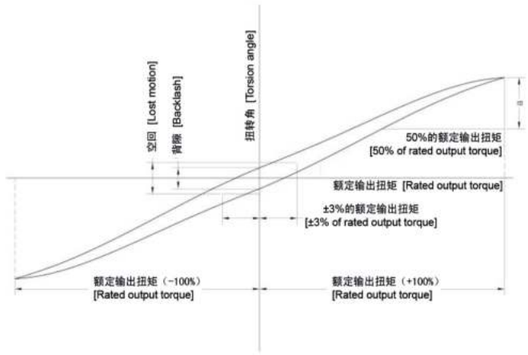


图1 滞后曲线 [Figure 1 Hysteresis curve]

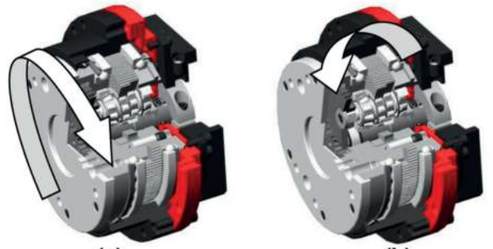


图2 外部力矩负载 [Figure 2 Ext. moment load of CK]

如果在输出轴增加约为额定输出扭矩3%的两个方向的扭矩（即±3%），这时所测量的扭转角的差值即被称为空回。一般情况下，空回比背隙大，因为空回包括了除背隙外的传动结构的弹性变形。

固定输入端，额定输出扭矩的50%和作用在输出轴的负载由额定输出扭矩的50%增加到100%所产生的扭转角差值的比值即被定义为扭转刚性。扭转刚性可通过以下公式计算：

$$T_r = \frac{T_{0.5}}{a} \quad \cdots\cdots \text{公式(3)}$$

T_r代表扭转刚性，$T_{0.5}$代表50%的额定输出扭矩，a代表作用在输出轴的负载由额定输出扭矩的50%增加到100%所产生的扭转角差值。

倾覆刚性

图2所示的是允许的CK外部力矩负载，可分为平行于输出轴旋转面的倾覆力矩负载，即与额定输出扭矩相关（a），和垂直于输出轴旋转面的倾覆力矩负载，即与主轴承倾覆力矩负载相关（b）。图中（a）方向所示的倾覆力矩负载还关系到空回、额定输出扭矩、加减速扭矩、瞬时扭矩和扭转刚性。（b）方向所示的倾覆力矩负载关系到倾覆刚性、倾覆力矩负载和最大倾覆力矩负载等。

And if the measuring of difference of torsion angle is achieved while ±3% of rated output torque is applied to output shaft, then it is lost motion. In general, lost motion is bigger than backlash, since it includes torsional elastic deformation of transmission structure.

Torsional rigidity is defined as proportional ratio between 50% of rated output torque and torsion angle when 50% and 100% of rated output torque are applied on output shaft, while input is firmly fixed. It can be written as equation, as follow;

$$T_r = \frac{T_{0.5}}{a} \quad \cdots\cdots \text{Eq(3)}$$

where, T_r is torsional rigidity, $T_{0.5}$ is 50% of rated output torque, a is torsion angle difference between 50% and 100% of rated output torque applied to output shaft.

Tilting Rigidity

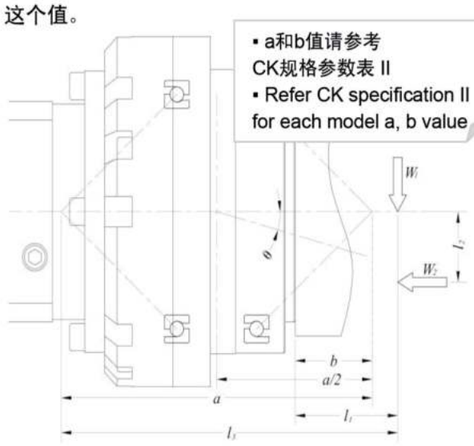
Figure 2 shows allowable external moment loads of *CK*, which are rated output torque related external moment load (a) and main bearing tilting moment load related external moment load (b). (a) direction of figure 2 performance indexes are lost-motion, rated output torque, acc./dec. torque, momentary peak torque, and torsional rigidity. (b) direction of figure 2 performance indexes are tilting

其中，扭转刚性和倾覆刚性是直接关系到产品在应用中的传动精度和效率最重要指标。CK两端的主轴承和支撑轴承的传动结构可提高倾覆刚性。

图3所示的是外部负载图。一般认为图2（b）方向所示的负载距离l_3>a。CK输出轴倾覆量与外部倾覆力矩成比例，当倾覆角为1弧分时，这个外部倾覆力矩即被定义为倾覆刚性。倾覆角可以通过以下公式计算：

$$\theta = \frac{W_1(a/2-b+l_1)+W_2 l_2}{M_R \times 10^3} \quad \cdots\cdots \text{公式(4)}$$

其中，θ是外部倾覆力矩产生的倾覆角（arcmin），M_R是额定参数表上的倾覆刚性（Nm/arcmin），W_1是径向负载（N），W_2是轴向负载（N），a和b的值因各主轴承的不同而异，请参照额定参数表。l_1和l_2是图3所示的距离（mm）。正常运行条件下，外部倾覆力矩不可超过倾覆刚性。这个条件可以作为CK选型时的额定输出扭矩值的参考。在安装、组装和运行过程中，输出轴上的静倾覆负载也不可超过这个值。



▪ a和b值请参考CK规格参数表 II
▪ Refer CK specification II for each model a, b value

图3 外部负载图
[Figure 3 External loading diagram]

倾覆力矩负载

对于间歇运行情况，输出轴上的外部倾覆力矩负载会因加减速条件的不同而变化。倾覆力矩负载是允许的输出轴最大外部力矩。这个条件可作为CK选型时加减速扭矩的参考。一般地，倾覆力矩在加速或减速时比在匀速时更大，当然因摩擦、质量和负载的不同也有例外。在这种情况下，产品以倾覆力矩作为外部倾覆负载的极限值运行，可以达到期望的额定寿命（L_{10}）。额定参数表上倾覆力矩负载指的是在轴向负载最小的条件下允许的外部倾覆负载。如果外部轴向负载和倾覆负载同时应用，请参考输出轴承负载图表选型。

rigidity, tilting moment load, and maximum tilting moment load. Among these performance indexes, torsional rigidity and tilting rigidity are one of most important performance indexes for precision and productivity of application. *CK* has both ends supporting main bearing and multi bearing supporting transmission structure which maximizes enhancing tilting rigidity.

Figure 3 shows external loading diagram. In general, (b) direction of figure 2 applied load can be assumed as l_3>a in figure 3. In this case, *CK* output shaft tilting deflection is proportional to the external tilting moment load. The tilting rigidity is defined as an external tilting moment value, which is required to deflect the *CK* output shaft 1 arcmin. By using this tilting rigidity, tilting deflection angle can be calculated as follows;

$$\theta = \frac{W_1(a/2-b+l_1)+W_2 l_2}{M_R \times 10^3} \quad \cdots\cdots \text{Eq(4)}$$

where, θ is tilting angle (arcmin) by external tilting moment loads, M_R is tilting rigidity (Nm/arcmin) from rating tables, W_1 is radial loads (N), W_2 is axial loads (N), a and b are individual variables for each main bearing from rating tables, and l_1, l_2 are each distance (mm) on figure 3. In normal operation, external tilting moment should not exceed tilting rigidity. This may use *CK* selection as the same concept or method of rated output torque. Also, loaded static tilting moment on output shaft, during installation, assembly, moving equipment or etc., should not exceed this value.

Tilting moment load

In case of intermittent periodic duty, external tilting moment on output shaft varies depending on acceleration or deceleration condition. Tilting moment load is maximum allowable external tilting moment on output shaft. This may use *CK* selection as the same concept or method of acc./dec. torque. Generally, the peak tilting moment that occurs during acceleration or deceleration is higher than constant speed periods; however, there are exceptions, because of varying friction, mass, or load during constant speed periods. In this case, tilting moment load may apply as limited external tilting moment load during operations, to expect rated life (L_{10}). Tilting moment load on ratings describe allowable external tilting moment while axial load is maintained as minimum. If external axial load and tilting moment load are applied together, then refer output bearing load diagram for indicating range of each model.

最大倾覆力矩负载

由于碰撞、急停或冲击，CK会产生一个很大的倾覆力矩。因为输出支撑主轴承的限制，这个倾覆力矩有一个最大值。冲击的幅度和频率必须尽可能保持在最低限度内，任何条件下都应按照标示的规定操作产品。

径向负载

额定参数表上的径向负载指的是CK输出端允许的径向载荷。这个值是通过倾覆刚性（或当倾覆力矩负载较小时，取倾覆力矩负载值）除以径向负载距离（a/2-b）计算出来的。一般来讲，实际径向负载距离比额定参数表上的值大。因此在正常运行情况下，径向负载可以使用倾覆刚性除以实际径向负载距离来计算，作为允许的径向负载。在加减速或急停等条件下，各阶段径向负载可以通过各阶段倾覆力矩负载或最大倾覆力矩负载除以实际径向负载距离计算出来。

轴向负载

额定参数表上的轴向负载指的是当倾覆负载最小时，CK输出端旋转中心允许的最大轴向载荷。

如果轴向负载不是作用于输出端旋转中心，而是如图3中W_2所示，与输出端旋转中心有一个作用距离，那么可将这个轴向负载看作一个倾覆力矩负载。当外部倾覆力矩负载和外部轴向负载同时作用时，请参考输出轴承负载额定参数图表选型。

空载启动扭矩

在CK机身固定，输出端空载的条件下，增加输入轴的扭矩，输出端开始转动的瞬间扭矩就是空载启动扭矩。这个值因温度的不同而异，一般将空载启动扭矩在环境温度为+20℃时的平均值作为额定空载启动扭矩。一定时间正常运行后（至少2小时的额定负载间歇运行），空载启动扭矩稳定在平均值左右。最小空载启动扭矩大约是平均值的一半。空载启动扭矩仅作为CK选型时的参考值。

空载运行扭矩

在CK机身固定，输出端空载的条件下，以一定转速转动输入轴所需要的扭矩就是空载运行扭矩。一般，空载运行扭矩的取值是以一定时间（至少2小时的额定负载间歇运行）正常运行后所稳定的平均值作为参考的。环境温度越低、润滑油粘度越高、输入转速越高、输入端密封越大或防护等级越高，所需要的空载运行扭矩越大。

Maximum tilting moment load

A large tilting moment caused by a collision, an emergency stop or external shock may be applied to the *CK*. *CK* may be subjected to maximum tilting moment load in these events for output support main bearings limits. The magnitude and frequency of occurrence of such impact must be kept to a minimum and they should under no circumstance occur during the nominal operation.

Radial load

Radial load on ratings describes allowable radial load at radial load distance i.e. output flange surface of *CK*. This value is converted from dividing tilting rigidity (or tilting moment load, if tilting moment load is smaller) by radial load distance (=*a*/2-*b*). In general, actual radial load distance is bigger than radial load distance on ratings, therefore, the value, which is converted from dividing tilting rigidity by actual radial load distance, may be considered as allowable radial load during the nominal operation. In case of acc./dec. or emergency, radial load for each case may be converted from dividing tilting moment load or maximum tilting load by actual load distance as a meter unit for direct calculation.

Axial load

Axial load on ratings describes allowable maximum axial load, while tilting moment is minimum, at the center of *CK* output flange.

If axial load is out of output flange center, as shown in figure 3 W_2, it can be regarded as tilting moment load. Refer to output bearing load diagram at ratings, when external tilting moment load and external axial load applied together.

No-load starting torque

The no-load starting torque is quasistatic torque required commence rotation of the *CK* input gear (high speed side) with no load applied to the output shaft, while *CK* main frame is fixed. Since, it may vary as a function of temperature, in general, it is described as an approximated mean value at ambient temperature +20℃. It may settle after a certain period of running, such as more than 2 hours with rated intermittent periodic duty, around the mean value. Minimum value is approximately a half of mean value. This value can be used only a reference value while *CK* selection.

No-load running torque

The no-load running torque is the torque required to maintain rotation of input gear of *CK* at a defined input speed with no load applied to the output, while main frame is fixed. In general, it is described as a

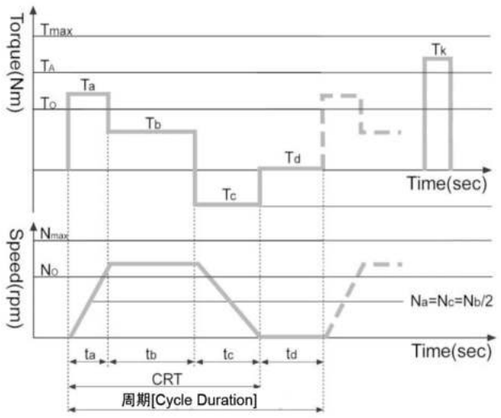


图4 典型扭矩和速度曲线图
Figure 4 Typical torque & speed profile

空载反向驱动扭矩

当CK机身固定，输入端空载，增加输出轴的扭矩，输入端开始转动的瞬间扭矩就是空载反向驱动扭矩。这个扭矩因温度的不同而异。一般将空载反向驱动扭矩在环境温度为+20℃时的平均值作为额定值。一定时间正常运行后，空载反向驱动扭矩稳定在平均值左右。空载反向驱动扭矩受环境温度、运行时间、润滑等因素的影响。外部负载必须考虑到空载反向驱动扭矩。当不允许有空载反向驱动扭矩时，需要安装止动设备。

运行模式（EN60034-1）

当CDR≥60%或者CRT≥20分钟时，认为是连续运行模式；当CDR<60%并且CRT<20分钟时，认为是间歇运行模式。其中，CDR是周期运行率，CRT是周期运行时间。CDR可通过图4和公式（5）计算出来：

$$CDR(\%) = \frac{(t_a + t_b + t_c)}{(t_a + t_b + t_c + t_d)} \times 100 \cdots\cdots \text{公式(5)}$$

一般来讲，CK产品无需重复润滑。当然，在运行温度超过+50℃，或表面温度超过+80℃时，需要定期检查油脂是否污染和失效，需要定期维护。

如果需要新的润滑，需采用赛劲的iGlube Hp0或iGlube Hp3系列润滑油（这两种润滑油可以混合使用）。润滑油的用量需要根据设计形式（如安装方向等）而定。

CK内部需要填充足够的润滑油，特别是在高速转动时，CK一级行星齿轮要充分浸入到油脂中。当然，过多的内部油脂，会因发热而产生内部压力，导致油封破损。所以填充润滑油时，建议预留10%的内部空间。

mean value which is obtained after a certain period of running, such as more than 2 hours with rated intermittent periodic duty. It may be increased by lower ambient temperature, higher viscosity lubrication, higher input speed, bigger input side sealing, or higher degree of protection.

No-load back driving torque

The no-load back driving torque is the torque required to commence rotation of the output shaft with no load applied to the *CK* input gear. Since, it may vary as a function of temperature, in general, it is described as an approximated mean value at ambient temperature +20℃. It may settle after a certain period of running. Minimum value is approximately a half of mean value. Since it may be varied by ambient temperature, operation time, lubrication etc., in no case should the value given be regarded as a margin in a system that must hold an ext. load. Where back-driving is not permissible, a break system must be installed.

Operating mode (EN60034-1)

Continuous running duty (S1) is defined as CDR≥60% or CRT≥20 minutes. Intermittent periodic duty (S4/S5) is defined as CDR<60%, CRT<20 minutes. Where CDR is cycle duration rate and CRT is cycle running time. Refer figure 4 and Eq(5).

$$CDR(\%) = \frac{(t_a + t_b + t_c)}{(t_a + t_b + t_c + t_d)} \times 100 \cdots\cdots \textbf{Eq(5)}$$

In general, a re-lubricant is not necessary. However, in case of ambient temperature more than +50℃, or in case of *CK* surface temperature more than +80℃ operation may need regular checking the grease for contamination and deterioration, to determine the proper maintenance interval for each application.

In case of re-lubricant, recommended lubricants are iGlube Hp0 supplied by *SEJINiGB* or iGlube Hp3 series. (Only both lubricants can be mixed.) The necessary amounts may depend on application design (such as install direction, etc.).

In any case, *CK* itself have to fill with recommended grease, especially high speed operated 1st stage gear of *CK* has to fully cover with lubricants. However, too much filling may cause damage for an oil seal or generating heat with increase of internal pressure. Please leave about 10% of the room inside of *CK* .

In general, *CK* operation ambient temperature range is between -10℃ to +50℃, however, in case of weather observation, military application and etc., may need wider working range to satisfy application.

一般来讲，CK正常运行的环境温度是-10℃到+50℃。但是根据应用领域（如气象观测、军方等）的不同也有更宽松的使用条件。特别是在-30℃的环境下运行时，需要特殊的润滑油。针对低温环境，赛劲可提供iGlube-LT润滑油。详细解决方案请联系赛劲。当然，应用在军方的产品需要符合相关国家的进出口规定。

温度上升

计算表明，CK的齿牙啮合能够产生非常大的力矩。当然，即使强制冷却，在连续运行的过程中，CK也不可能具备必要的热容性能。因此，为了使CK连续运行，建议限制输出力矩的容量。限制条件是以预期的使用寿命与额定转速为基础进行计算的输出扭矩，其允许的输出转速为最大输出转速的60%（最多70%）。通过强制冷却或增加额外热容量使主体温度不超过+60℃。

效率 **[Efficiency]**

型号 [Model]	%	型号 [Model]	%
CK002	90	**CK035**	88
CK004	90	**CK053**	88
CK007	89	**CK080**	88
CK009	89	**CK110**	88
CK014	89	**CK180**	88
CK020	88	**CK320**	88
CK026	88	**CK450**	88

效率值描述的是额定输出扭矩与额定输出转速之间的关系。当以低于额定输出扭矩运行时，需要使用效率校正系数估算效率值。

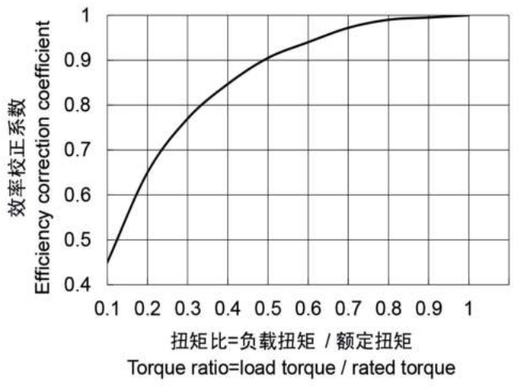
效率校正系数曲线图不包括输入端和各种输入方式密封结构的摩擦或阻力等因素(它大约是曲线图上效率值的0. 95倍)。

效率值可能因温度、润滑油的粘稠度和用量、转速、密封等因素的不同而异。

Specially, low temperature such as -30℃, operation may need special lubricants. SEJINiGB has engineered solution with iGlube-LT lubricant. Contact to SEJINiGB for detail low temperature operation solutions, however, the user may take the necessary procedure in the Foreign Trade Control Act for military applications usage of *CK* .

Temperature Rise

Calculations for *CK* teeth engagement indicate a surprisingly large torque producing capacity. However, a calculated overall size would not have sufficient thermal capacity, even with forced cooling, to deliver a calculated output torque continuously. Due to that fact, *CK* recommends restricted output capacity for continuous operation. The restriction is less than 60% (max.70%) of maximum output speed with output torque, which is calculated by desired life time & output speed, or forced cooling and increasing external thermal capacity to settle *CK* surface temperature at lower than 60℃, should be maintained.



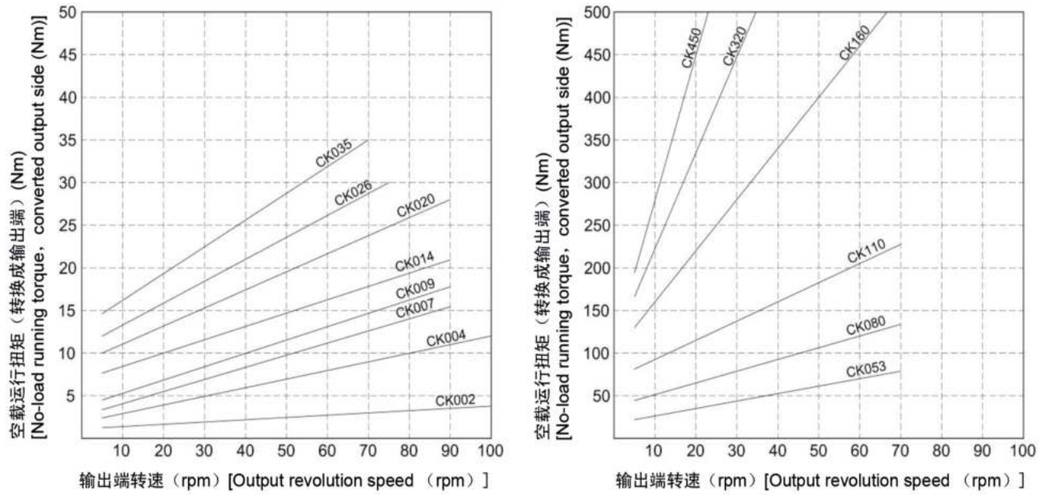
The efficiency values describe at rated output torque with rated output speed. It may be estimated using efficiency correction coefficient for operating below the rated output torque.

The table above does not include agitation resistance or friction of input sealing & input structure of each input style. (It may be approximated by 0.95 times of table value)

The given values may be varied by temperature, viscosity & quantity of lubricant, speed, sealing, and etc.

CK 性能特征 [CK Performance Characteristics]

空载运行扭矩 [No-load running torque]



- 上图曲线的值是CK在20℃的环境温度下，以额定扭矩间歇运行至少2小时后所测量的平均值。
  Diagrams above show mean values obtained after minimum 2 hours with rated intermittent periodic duty at 20℃ ambient temperature.
- 输入端的空载运行扭矩可以通过“输出端的空载运行扭矩除以减速比”计算出来。
  No-load running torque converted to input side can be obtained by ‘no-load running torque at output side/ratio’
- 上图曲线的值并未考虑因输入端密封和输入结构而产生的摩擦和阻力等因素（可认为大约1.2倍）。
  The diagram above does not include agitation resistance or friction of input sealing and input structure. (Approx. 1.2)

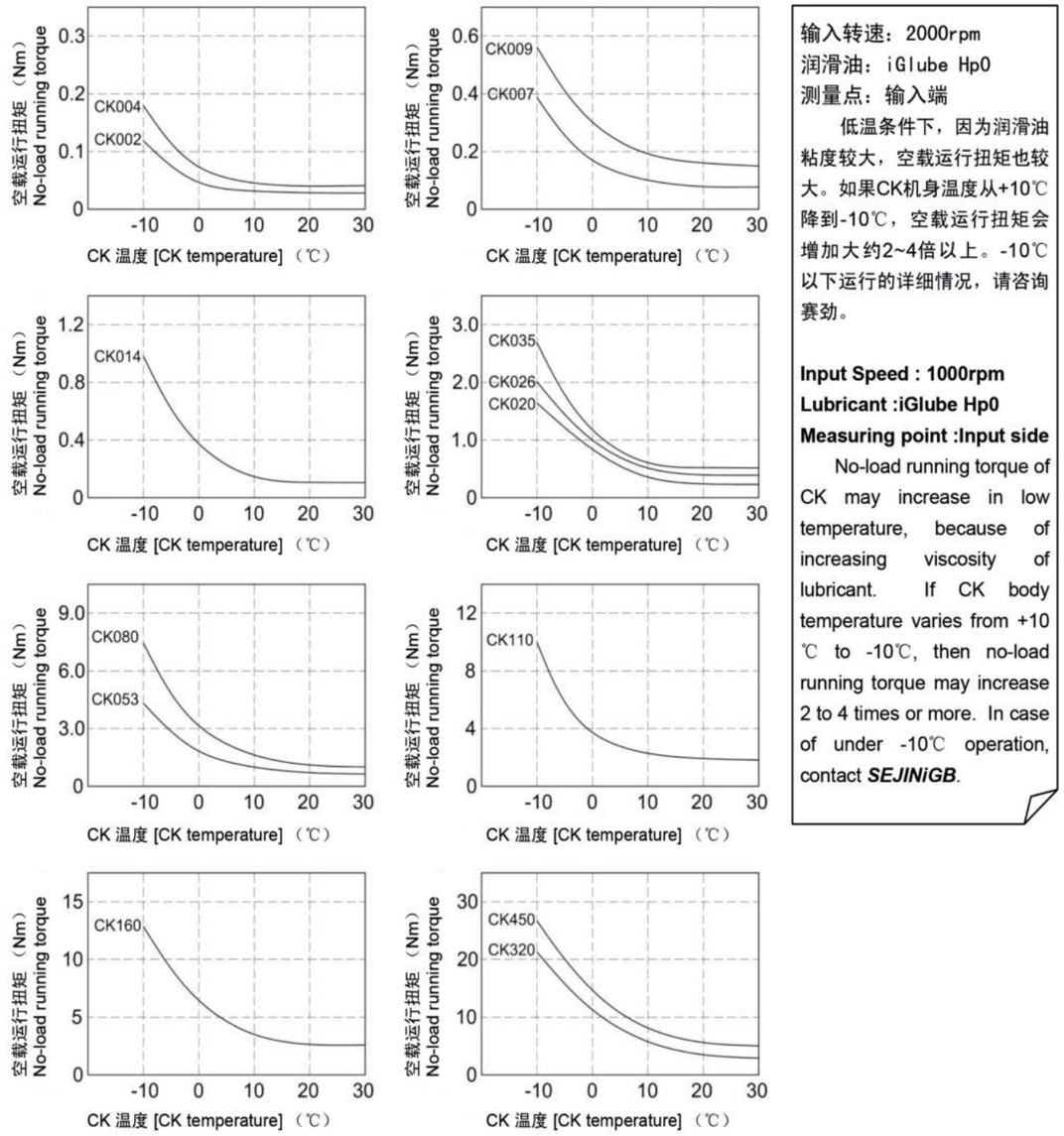
空载启动扭矩 [No-load starting torque]

型号 [Model]	(Nm)	型号 [Model]	(Nm)	型号 [Model]	(Nm)	型号 [Model]	(Nm)
CK002	0.04	***CK014***	0.17	***CK053***	0.9	***CK320***	5.1
CK004	0.07	***CK020***	0.35	***CK080***	1.8	***CK450***	6.5
CK007	0.1	***CK026***	0.48	***CK110***	3.2		
CK009	0.13	***CK035***	0.7	***CK180***	4.2		

- 上表的值是CK在20℃的环境温度下，以额定扭矩间歇运行至少2小时后所测量的平均值。
  The table above shows mean values obtained after minimum 2 hours with rated intermittent periodic duty at 20℃ ambient temperature.
- 空载启动扭矩的值并未考虑因输入端密封和输入结构而产生的摩擦和阻力等因素（可认为大约1.2倍）。
  CK values above do not include agitation resistance or friction of input sealing and input structure. (Approx. 1.2)
- 匹配的电机需满足：空载启动扭矩×2≤电机额定扭矩。
  A combination of motor should satisfy the following equation, i.e. {No-load starting torque×2≤Rated torque of motor}

摆线动力传输 Cycloidal Kinetic Transmission
be precise with SAIZIN®

低温时空载运行扭矩 [No-load running torque at low temperature]

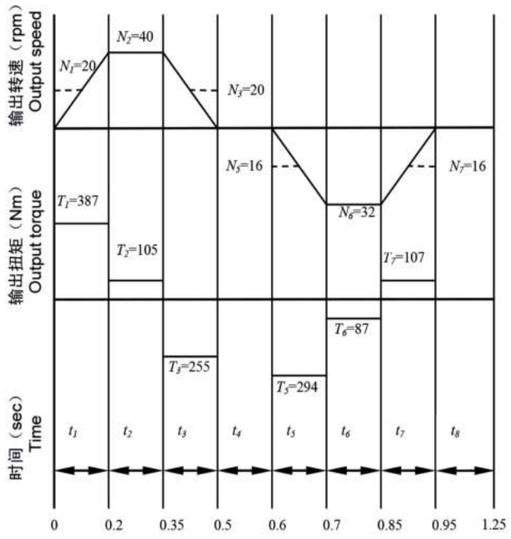


输入转速：2000rpm
润滑油：iGlube Hp0
测量点：输入端
低温条件下，因为润滑油粘度较大，空载运行扭矩也较大。如果CK机身温度从+10℃降到-10℃，空载运行扭矩会增加大约2~4倍以上。-10℃以下运行的详细情况，请咨询赛劲。

Input Speed : 1000rpm
Lubricant :iGlube Hp0
Measuring point :Input side
No-load running torque of CK may increase in low temperature, because of increasing viscosity of lubricant. If CK body temperature varies from +10 ℃ to -10℃, then no-load running torque may increase 2 to 4 times or more. In case of under -10℃ operation, contact ***SEJINiGB***.

- 上图中假设输入端速比为1，当速比增加时，空载运行扭矩仍不变。
  Diagrams above assumed input side ratio 1,when input side ratio increased, no-load running torque reduced.)
- 上图的值并未考虑到因输入端密封和C2, S1, S2输入方式的输入结构而产生的摩擦和阻力等因素。
  Diagrams above do not include agitation resistance, friction of input sealing & input structure of C2, S1, S2 input style.
- C2, S1, S2的输入方式参考值大约为图表中数值的1.2倍。
  It may be approximated by 1.2 times for input style C2, S1, S2 as a reference.

CK 选型 [CK Model Selection]



转速 [Speed] (rpm)	N_1	N_2	N_3	N_4	N_5	N_6	N_7	N_8
	20	40	20	0	16	32	16	0
扭矩 [Torque] (Nm)	T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8
	387	105	255	0	294	87	107	0
时间 [Time] (sec)	t_1	t_2	t_3	t_4	t_5	t_6	t_7	t_8
	0.2	0.15	0.15	0.1	0.1	0.15	0.1	0.3

暂选： **CK053S-57-S-C2-24X24-□□□□□□**

1、验证运行模式

$$CDR(\%)=\frac{(t_1+t_2+t_3+t_5+t_6+t_7)}{\sum_{i=1}^{8}t_i}\times 100$$
$$=\frac{0.2+015+015+0.1+015+0.1}{125}\times 100=68\%$$

68%>60%,所以是连续运行模式（S1）。

2、验证负载条件

转换成输出端：最大输出转速≤允许的最大输出转速

40rpm ≤ 75rpm, (参考额定参数表)

最大输入转速=速比×最大输出转速；最大输入转速≤允许的最大输入转速

57×40=2280rpm＜2920rpm, (参考输入参数表)

最大输出扭矩≤允许的加减速扭矩

387Nm＜1290Nm, (参考额定参数表)

3、验证运行条件

平均输出转速：

$$N_m=\frac{t_1N_1+t_2N_2+\cdots+t_7N_7}{t_1+t_2+t_3+t_5+t_6+t_7}=\frac{21}{0.85}=24.7rpm$$

其中，t_4，t_8是暂停时间。

Temporary selection :

CK053S-57-S-C2-24X24-□□□□□□

1. Verify operating mode

$$CDR(\%)=\frac{(t_1+t_2+t_3+t_5+t_6+t_7)}{\sum_{i=1}^{8}t_i}\times 100$$
$$=\frac{0.2+015+015+0.1+015+0.1}{125}\times 100=68\%$$

68%>60%, therefore, continuous operating duty (S1)

2. Verify load condition

Convert into output side

Max. output speed ≤ Permitted max. output speed

40rpm ≤ 75rpm, (Refer ratings)

Max. input speed = ratio × max. output speed

Max. input speed ≤ Permitted input speed

57X40=2280rpm ＜ 2920rpm,

(Refer 'input side specifications')

Max. output torque ≤ Permitted acc./dec. torque

387 ＜ 1290, (Refer ratings)

3. Verify running condition

Average output speed calculation:

$$N_m=\frac{t_1N_1+t_2N_2+\cdots+t_7N_7}{t_1+t_2+t_3+t_5+t_6+t_7}=\frac{21}{0.85}=24.7rpm$$

※ t_4 , t_8 is pause time.

Since it is continuous operating duty (S1),

N_m ≤ Permitted maximum output speed × 0.6 (or 0.7)

24.7*rpm* ≤ Permitted max. output speed × 0.6 (or 0.7)

= 75 × 0.6 (or 0.7) = 45 (or 52.5)*rpm*

Average output torque calculation:

$$T_m=\sqrt[\frac{10}{3}]{\frac{t_1N_1T_1^{\frac{10}{3}}+t_2N_2T_2^{\frac{10}{3}}+\cdots+t_7N_7T_7^{\frac{10}{3}}}{t_1N_1+t_2N_2+\cdots+t_7N_7}}=259\,Nm$$

Since it is continuous operating duty (S1),

T_m ≤ Rated output torque × 0.7

259*Nm* ≤ 532 × 0.7 = 372.4*Nm*

其运行模式是连续运行模式（S1），所以：N_m≤允许的最大输出转速×0.6（或0.7），即：

24.7 rpm≤75×0.6（或0.7）= 45（或52.5）rpm

平均输出扭矩：

$$T_m=\sqrt[\frac{10}{3}]{\frac{t_1N_1T_1^{\frac{10}{3}}+t_2N_2T_2^{\frac{10}{3}}+\cdots+t_7N_7T_7^{\frac{10}{3}}}{t_1N_1+t_2N_2+\cdots+t_7N_7}}=259\,Nm$$

其运行模式是连续运行模式（S1），所以：Tm≤额定输出扭矩×0.7，即：

259Nm≤532Nm×0.7 = 372.4Nm

4、寿命计算

预期寿命（L）≤计算寿命（L_h），即：预期寿命（L）＝每小时使用率×每天使用小时数×每年使用天数×使用年数

$$L=0.3\times 18\times 300\times 5=8100hrs$$
$$L_h=6000\times\frac{N_o}{N_m}\times\left(\frac{T_o}{T_m}\right)^{\frac{10}{3}}$$

其中，N_m是平均输出转速（rpm），T_m是平均输出扭矩（Nm），N_o是额定输出转速（rpm），T_o是额定输出扭矩（Nm）（连续运行模式下×0.6或0.7）

$$L_h=6000\times\frac{15}{24.7}\times\left(\frac{372.4}{259}\right)^{\frac{10}{3}}\cong 12225hrs$$

预期寿命（L）=8100≤计算寿命（L_h）=12225

5、验证输出轴承的倾覆刚性

$$l_3>a,\ \theta=\frac{W_1(a/2-b+l_1)+W_2l_2}{M_R\times 10^3}$$

θ是倾覆角（arc.min），M_R是倾覆刚性（Nm/arcmin），W_1是径向负载（N），W_2是轴向负载（N），a，b是输出轴承作用距离（mm），l_1，l_2是个负载作用的距离（mm）

实例：

假设W_1=1200N，l_1=200mm，W_2=1000N，l_2=50mm，CK053S [a=84.71mm,b=6.64mm,M_R=642Nm]

$$\theta=\frac{1200\times\{84.71/2-(-6.64)+200\}+1000\times 50}{642\times 10^3}$$
$$=0.543arc.\min$$

这个计算仅考虑了产品本身，如果倾覆刚性很重要，请正确控制安装结构的刚性。

4. Lifetime calculation

Desired lifetime (L) ≤ Calculated lifetime (L_h)

Desired lifetime (L) =

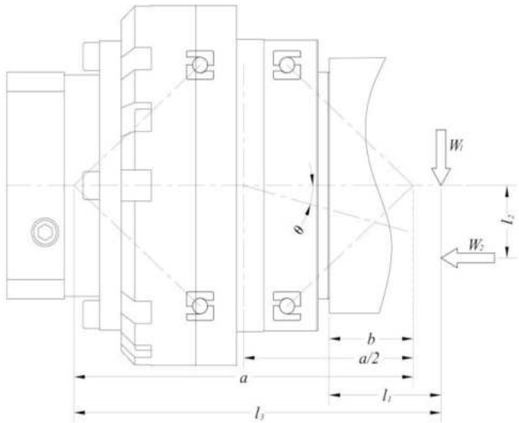
Operating rate/hr × Operating hrs/day × Operating days/year × Operating years

$$L=0.3\times 18\times 300\times 5=8100hrs$$
$$L_h=6000\times\frac{N_o}{N_m}\times\left(\frac{T_o}{T_m}\right)^{\frac{10}{3}}$$

where, N_m = Average output speed (*rpm*),
T_m = Average output torque (*Nm*),
N_o = Rated output speed (*rpm*),
T_o = Rated output torque × 0.6(0.7) (*Nm*),
(Continuous operating duty).

$$L_h=6000\times\frac{15}{24.7}\times\left(\frac{372.4}{259}\right)^{\frac{10}{3}}\cong 12225hrs$$

Desired lifetime (L)=8100 ≤ Cal. lifetime (L_h)=12225



5. Verify tilting rigidity of output bearing

When $l_3>a$, $\theta=\frac{W_1(a/2-b+l_1)+W_2l_2}{M_R\times 10^3}$

where, θ is tilting angle (*arc.min*),
M_R is tilting rigidity (*Nm/arcmin*),
W_1 is radial direction load (*N*),
W_2 is axial direction load (*N*),
a, b : output bearing supporting span (*mm*),
l_1, l_2 is each distance (*mm*).

Example) Let's assume W_1=1200*N*, l_1=200*mm*, W_2=1000*N*, l_2=50*mm*, with CK053S [*a*=84.71*mm*, *b*=-6.64*mm*, M_R=642*Nm*]. Then,

$$\theta=\frac{1200\times\{84.71/2-(-6.64)+200\}+1000\times 50}{642\times 10^3}$$
$$=0.543arc.\min$$

This calculation shows CK alone; please manage the proper rigidity of installation structure, in case tilting rigidity is important.

6、验证输出轴承的倾覆负载力矩

$l_3 > a$， $M_E = (W_1 l_3 + W_2 l_2)/1000$

其中，M_E是外部负载力矩（Nm），W_1是径向负载（N），W_2是抗轴向负载（N），l_2，l_3(=a-b+l_1)是负载作用距离（mm）

根据第5项的计算：

$$M_E = \frac{1200 \times (84.71 - (-6.64) + 200) + 1000 \times 50}{1000}$$

$$\cong 400Nm$$

CK053S在输出转速≤30rpm，轴向负载作用点不位于输出端中心时，其允许的倾覆负载力矩是738Nm。因此，M_E=400＜738

CK 快速选型公式

$$T_{OD} = \left(\frac{L_D}{6000} \times \frac{N_m}{N_O}\right)^{\frac{3}{10}} \times T_m$$

$$T_O \geqslant T_{OD}$$

其中：

N_m=（电机额定转速/速比）或平均输出转速（rpm）

N_o=CK额定输出转速（rpm）

T_m= 电机额定扭矩×速比（rpm）

L_D=期望寿命（Hr）

T_{OD}=期望额定输出扭矩（Nm）

T_o=CK额定输出扭矩（Nm）

注意，如果是连续运行模式（S1），CK额定输出扭矩要乘以60%（最大70%）。

即T_o×0.6（0.7）≥T_{OD}

例如：假设电机功率是750W，转速为3000rpm，减速机速比为70，间歇运行模式，期望寿命为6000hrs。750w，3000rpm的电机额定输出扭矩是2.4Nm。

$$N_m = \frac{3000}{70} \cong 43rpm$$

$$T_m = 2.4 \times 70 = 168Nm$$

应用快速选型公式，

$$T_{OD} = \left(\frac{6000}{6000} \times \frac{43}{15}\right)^{\frac{3}{10}} \times 168 \cong 230Nm$$

查表，额定输出扭矩要超过这个计算值，可以找到CK026的额定输出扭矩（259Nm）和速比范围都符合要求。（参考额定参数表）

接下来确定CK026的速比，与70最接近的标准速比是69，所以可以选定这个速比。（参考CK选型）

6. Verify tilting moment load of output bearing

When $l_3 > a$， $M_E = (W_1 l_3 + W_2 l_2)/1000$

where, M_E is external moment load (*Nm*),
W_1 is radial direction load (*N*),
W_2 is offset axial direction load (*N*),
l_2, l_3(=a-b+l_1) is each distance (*mm*).

Apply the condition of item 5, then

$$M_E = \frac{1200 \times (84.71 - (-6.64) + 200) + 1000 \times 50}{1000}$$

$$\cong 400Nm$$

Tilting moment load of CK053S is given by 738*Nm*, with output speed ⩽30rpm, without axial load result in center of output flange. $M_E = 400 \leqslant 738$

CK Quick Selection Formula

$$T_{OD} = \left(\frac{L_D}{6000} \times \frac{N_m}{N_O}\right)^{\frac{3}{10}} \times T_m$$

$$T_O \geqslant T_{OD}$$

where, N_m = (motor rated speed/ratio) or average output speed (*rpm*)
N_o = *CK* rated output speed (*rpm*)
T_m = motor rated torque × ratio (*Nm*)
L_D = Desired life time (*Hr*)
T_{OD} = Desired rated output torque (*Nm*)
T_o = *CK* rated output torque (*Nm*)

Remark; In case of continuous operation (S1), apply 60% (max 70%) of the *CK* rated output torque and maximum output speed on the specifications or *CK* surface temperature should be settling within 80°C. i.e. $T_O \times 0.6(0.7) \geqslant T_{OD}$.

Ex.) Let's assume 750W, 3000rpm, ratio 70, and intermittent periodic duty, expected lifetime 6000hrs. Rated torque of 750W with 3000rpm is 2.4Nm,

therefore, $N_m = \frac{3000}{70} \cong 43rpm$

$$T_m = 2.4 \times 70 = 168Nm$$

Let's apply the quick selection formula, then

$$T_{OD} = \left(\frac{6000}{6000} \times \frac{43}{15}\right)^{\frac{3}{10}} \times 168 \cong 230Nm$$

Select the model, which has bigger rated output torque then calculation result. CK026 (259Nm) is candidates by its rated output torque and reduction range on the specifications. (Ref. Rating table)

Let's search the ratio nearby 70 on the standard ratio of CK026. As a result, CK026 ratio 69 can be selected. (Refer *CK* Model Selection)

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CK 额定参数表 [CK Ratings]

CK 规格参数表I [Specifications at a glance I]

型号 [Model]	额定输出扭矩 Rated output torque	额定输出转速 Rated output speed	允许最大平均输出扭矩 Permitted max.average output torque	允许加/减速扭矩 Permitted Acc./Dec. torque	允许瞬时扭矩（急停） Permitted momentary peak torque (E - stop)	允许最大输出转速 Permitted max. output speed	背隙 Backlash	空回 Lost motion	扭转刚性 Torsional rigidity
	Nm	rpm	Nm	Nm	Nm	rpm	arcmin	arcmin	Nm/arcmin
CK002	19	45	33	40	80	180	<1	<2	2.7
CQ004	40	30	79	113	225	120	<1	<1.5	6.6
CK007	71	30	124	178	355	120	<1	<1.5	9.8
CK009	92	30	161	230	460	120	<1	<1	17
CK014	141	20	247	353	705	100	<1	<1	28
CK020	198	20	347	495	990	100	<1	<1	42
CK026	259	15	453	648	1295	75	<1	<1	56
CK035	353	15	618	883	1765	75	<1	<1	81
CK053	532	15	931	1330	2660	75	<1	<1	120
CK080	784	15	1372	1960	3920	75	<1	<1	203
CK110	1095	15	1916	2738	5475	60	<1	<1	306
CK180	1826	15	3012	4100	8130	45	<1	<1	461
CK320	3136	15	5488	7840	15680	45	<1	<1	1027
CK450	4450	15	7788	11125	22250	45	<1	<1	1611

- CK的设计主要是针对间歇运行模式，如果是连续运行模式，允许的输出扭矩和转速不可超过表中额定输出扭矩和最大输出转速的60%（最大70%），CK表面温度不可超过80°C。
- 额定输出扭矩和额定输出转速是根据使用寿命为6000小时而设定的。（参考CK选型）
- 即使为了满足使用寿命的要求，输出转速较低，输出扭矩增加，也不可超过允许的最大平均输出扭矩。

- CK is designed mainly as intermittent periodic duty. For continuous operation duty application, those series should not exceed 60% (max. 70%) of rated output torque and maximum output speed on the specifications or CK surface temperature should be settling within max. 80°C.
- Rated output torque and rated output speed is set for life time as 6000 hours. (Refer CK model selection.)
- Even though output torque raised by life time calculation, due to the fact, output speed is low, it should not exceed maximum average output torque.

CK 规格参数表II [CK Specifications at a glance II]

S：标准输出轴承 [Standard output bearing]
E：高级输出轴承 [Enhanced output bearing]

型号 [Model]	倾覆刚性 Tilting rigidity		倾覆负载力矩 Tilting Moment load		（冲击负载）最大倾覆负载力矩 (Shock load) Max. tilting moment load		输出轴承受力点标准距离 Output bearing supporting span				轴向负载 Axial load		径向负载（参考值） Radial load (Ref. value)	
	Nm/arcmin		Nm		Nm		mm				N		N	
	S	E	S	E	S	E	S(a)	S(b)	E(a)	E(b)	S	E	S	E
CK002	26	50	52	100	78	150	39.5	-8.3	66.6	5.3	592	1214	929	1786
CQ004	42	90	84	180	126	270	44.3	-11.8	78.3	5.1	911	1822	1235	2647
CK007	76	140	152	270	228	420	45.2	-11.9	85.9	8.4	1646	2455	2203	4058
CK009	89	215	178	421	267	645	49.4	-8.5	96.6	15.1	1853	3407	2677	6466
CK014	172	250	322	500	516	750	57.9	-6.8	105	16.7	1768	4460	4811	6993
CK020	188	265	337	530	564	795	60.8	-9.6	111	15.3	1758	4605	4700	6625
CK026	298	500	596	1000	894	1500	66.4	-7.8	123	20.5	3197	7854	7268	12195
CK035	371	670	715	1340	1113	2010	72.7	-8.2	138	24.3	3123	9241	8337	15056
CK053	642	1000	1197	2000	1926	3000	84.7	-6.6	159	31.1	4485	13989	13102	20619
CK080	980	1500	1777	3000	2940	4500	95.7	-8.9	183	34.6	5898	16770	17269	26432
CK110	1355	2200	2501	4400	4065	6600	108	-11.1	202	35.8	7327	20472	20766	33717
CK180	1660	3000	3320	6000	4980	9000	123	-7.9	230	45.3	9113	21102	23885	43165
CK320	3005	5000	4835	9680	9015	15000	144	-10.2	268	51.9	10694	28198	36646	60976
CK450	4838	7500	7061	13015	14514	22500	165	-7.3	315	67.3	13551	32278	53756	83333

• 倾覆负载力矩和轴向负载是在额定输出转速下测定的，当有外部负载或输出转速不同时，请参考输出轴承的承载力。
• 没有倾覆负载力矩时，最大轴向负载产生于输出端旋转中心。径向负载是通过倾覆刚性除以负载作用距离来计算。如果径向负载作用距离超过输出轴承受力点标准距离，需要用“倾覆刚性除以实际径向负载作用距离”来估算其最大值。请参考各型号的实际径向负载作用距离公式（=a/2-b）。

• Tilting moment and axial load values are at rated output speed, referring output bearing load capacity, when combined load or different output speed applied.
• Axial loads are maximum value at the center of output rotation, without tilting moment load. Radial load reference values are converted value of tilting rigidity divide by radial load distance. If radial load applied out of output bearing support span then ‘tilting moment load’ divide by ‘actual radial load distance’ may use for estimating maximum value. Ref. external drawing of each model for radial load distance basis (=a/2-b).

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CK 标准速比 [CK Standard ratio]

型号【Model】	C2输入方式速比【C2 input style ratios】
CQ004	20 29 39 67.5 95 145
CK009	25 33 49 61 73 103
CK014	45 73 85 100 127
CK026	41 57 81 105 121 141 177
CK053	42 57 81 105 121 141 153
CK080	57 81 106 121 153 171
CK110	61 81 121 161 221
CK180	61 81 101 129 171
CK320	76 109 130 151 211
CK450	81 99 153 189 261

型号【Model】	EP输入方式速比【EP input style ratios】
CQ004	50 72.5 97.5 168.75 237.5 362.5
CK009	62.5 82.5 122.5 152.5 182.5 257.5
CK014	112.5 182.5 212.5 250 317.5
CK026	102.5 142.5 202.5 262.5 302.5 352.5 442.5
CK053	102.5 142.5 202.5 262.5 302.5 352.5 382.5
CK080	142.5 202.5 265 302.5 382.5 427.5
CK110	152.5 202.5 302.5 402.5 552.5
CK180	152.5 202.5 252.5 322.5 427.5
CK320	190 272.5 325 377.5 527.5
CK450	202.5 247.5 382.5 472.5 652.5

CH 额定参数表 [CH Ratings]

CH 规格参数表 I [CH Specifications at a glance I]

型 号 [Model]	额定输出扭矩 Rated output torque	额定输出转速 Rated output speed	允许最大平均输出扭矩 Permitted max. average output torque	允许加/减速扭矩 Permitted Acc./Dec. torque	允许瞬时扭矩（急停） Permitted momentary peak torque (E - stop)	允许最大输出转速 Permitted max. output speed	背隙 Backlash	空回 Lost motion	扭转刚性 Torsional rigidity
	Nm	rpm	Nm	Nm	Nm	rpm	arcmin	arcmin	Nm/arcmin
CH003	31	30	54	77	155	120	<2	<1	5.9
CH005	48	30	84	120	240	120	<1	<1	10
CH007	67	30	117	167	335	120	<1	<1	17
CH009	85	20	148	212	425	100	<1	<1	27
CH012	120	20	210	300	600	100	<1	<1	32
CH014	141	15	246	352	705	75	<1	<1	45
CH020	260	15	450	643	1286	75	<1	<1	81
CH040	410	15	716	1022	2045	75	<1	<1	93
CH065	656	15	1134	1620	3272	75	<1	<1	182
CH080	823	15	1440	2057	4115	60	<1	<1	271
CH115	1196	15	2070	2957	5913	45	<1	<1	326
CH200	1912	15	3308	4725	9450	45	<1	<1	770
CH800	8810	15	15240	20000	46510	36	<1	<1	2903

- **CH**的设计主要是针对间歇运行模式，如果是连续运行模式，允许的输出扭矩和转速不可超过表中额定输出扭矩和最大输出转速的60%（最大70%），CK表面温度不可超过80℃。
- 额定输出扭矩和额定输出转速是根据使用寿命为6000小时而设定的。（参考CH选型）
- 即使为了满足使用寿命的要求，输出转速较低，输出扭矩增加，也不可超过允许的最大平均输出扭矩。

- **CH** is designed mainly as intermittent periodic duty. For continuous operation duty application, those series should not exceed 60% (max. 70%) of rated output torque and maximum output speed on the specifications or **CH** surface temperature should be settling within max. 80°C.
- Rated output torque and rated output speed is set for life time as 6000 hours. (Refer **CH** model selection.)
- Even though output torque raised by life- time calculation, due to the fact, output speed is low, it should not exceed maximum average output torque.

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CH 规格参数表 II [CH Specifications at a glance II]

S：标准输出轴承 [Standard output bearing]
E：高级输出轴承 [Enhanced output bearing]

型 号 [Model]	倾覆刚性 Tilting rigidity		倾覆负载力矩 Tilting Moment load		最大倾覆负载力矩 (Shock load) Max. tilting moment load		输出轴承受力点标准距离 Output bearing supporting span				轴向负载 Axial load		径向负载 Radial load (Ref. value)	
	Nm/arcmin		Nm		Nm		mm				N		N	
	S	E	S	E	S	E	S(a)	S(b)	E(a)	E(b)	S	E	S	E
CH003	40	90	80	171	120	270	42.3	-7.8	76.3	9.1	911	1753	1379	3103
CH005	78	140	156	278	234	420	46.2	-6.4	86.9	13.9	1646	2498	2644	4746
CH007	96	215	192	430	288	645	52.9	-5.5	100	18.1	1853	3584	3000	6719
CH009	170	250	319	500	510	750	57.4	-3.3	104	20.2	1768	4434	5313	7812
CH012	173	265	309	530	519	795	55.8	-5.6	106	19.3	1758	4346	5164	7910
CH014	280	500	560	1000	840	1500	62.4	-2.3	119	26	3197	7543	8358	14925
CH020	371	670	715	1340	1113	2010	72.7	-4.2	138	28.3	3123	9241	9460	16543
CH040	597	1000	1112	2000	1791	3000	78.7	-0.1	154	37.1	4485	13429	15114	25316
CH065	950	1500	1721	3000	2850	4500	92.7	0.6	180	44.1	5898	16457	20765	32787
CH080	1305	2200	2408	4400	3915	6600	104	1.9	198	48.8	7327	19971	25970	49781
CH115	1499	3000	2998	5426	4497	9000	111	0.6	218	53.8	9113	19458	27255	54545
CH200	2733	5000	4397	8501	8199	15000	131	-2.2	255	59.9	10694	26026	40489	74074
CH800														

- 倾覆负载力矩和轴向负载是在额定输出转速下测定的，当有外部负载或输出转速不同时，请参考输出轴承的承载力。
- 没有倾覆负载力矩时，最大轴向负载产生于输出端旋转中心。径向负载是通过倾覆刚性除以负载作用距离来计算。如果径向负载作用距离超过输出轴承受力点标准距离，需要用“倾覆刚性除以实际径向负载作用距离”来估算其最大值。请参考各型号的实际径向负载作用距离公式（=a/2-b）。

- Tilting moment and axial load values are at rated output speed, referring output bearing load capacity, when combined load or different output speed applied.
- Axial loads are maximum value at the center of output rotation, without tilting moment load. Radial load reference values are converted value of tilting rigidity divide by radial load distance. If radial load applied out of output bearing support span then ‘tilting moment load’ divide by ‘actual radial load distance’ may use for estimating maximum value. Ref. external drawing of each model for radial load distance basis (=a/2-b).

CH 标准速比 **[CH Standard ratio]**

型号【Model】	C2输入方式速比【C2 input style ratios】
CH005	32.5 48 60.8 80
CH009	42 63 87 105 147
CH020	63 133 90 190
CH040	63 90 147 210
CH065	77 140 110 200
CH080	69 138 105 210 123 246 159 318
CH115	90 105 132 186 210 240
CH200	103 143.5 205 246 287
CH800	88 104 120 152 200 248

型号【Model】	EP输入方式速比【EP input style ratios】
CH005	48 60
CH009	63
CH020	45 63 90
CH040	45 63 90
CH065	66 120
CH080	63 126
CH115	90 168
CH200	63 123 168

CK 安装和装配 [CK Installation and Assembly]

CK-C2输入方式电机安装说明 [CK-C2 input style motor assembly instructions]

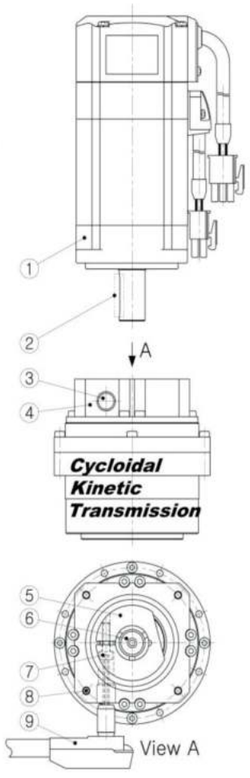
一般说明：

根据下面的安装说明，可以很容易地获得所需的CK扭转刚性以及CK与电机之间无缝连接。请使用有法兰面和运行精度等级为DIN 42955 N或DIN 42955 R的电机。

为了避免CK与电机之间的传动系错位，CK-C2标准输入方式采用了新的“中心开口”式设计。只需将电机轴插入CK空心轴⑥，拧紧夹紧环⑤上的螺栓⑦，使用安装孔将齿轮箱连接到电机。 CK系列是免维护终身润滑的。

电机安装说明：

1. 如果电机轴上有键②，将其去掉。对于电机转速超过3000转的应用情况，建议使用半键装入轴上的键槽，半键安装高度不可超过电机轴径。
2. 先将电机法兰④上的扳手孔螺栓③拧出，把它放在一边，以备后续使用。
3. 转动夹紧环⑤，直到可以通过电机法兰上的扳手孔看到夹紧螺栓⑦的头部。
4. 检查电机法兰④和CK法兰上所有安装接触面。确保安装面干净、无油脂。检查电机轴与轮毂，确保它们无瑕疵（毛刺，划痕等）。
5. 将CK倒过来（输入端朝上），确保不要掉落。装配时确保电机轴的键槽（如果有的话）位于夹紧环夹口相反的方向（180°）。
6. 如果使用轴套，确保轴套的夹口与夹紧环⑤的夹口对齐。
7. 如果CK过重，应使用适合的起重机械。将电机轴插入CK空心轴⑥中，直到电机安装面自然地与CK法兰面完全贴合。 安装时不可撞击CK或使用过大的安装力。
8. 请使用合适的扳手⑨（参见第40页）拧紧夹紧环上的螺栓⑦。
9. 现在可以将螺栓拧入电机①法兰和CK法兰上的安装孔。螺栓必须对角均匀拧紧。
10. 拧紧CK法兰④上的扳手孔螺栓③。CK与电机应垂直对齐，如图所示。



General : A torsionally rigid and backlash free connection between motor and CK can quickly and easily be achieved by using the following assembly instructions. Please only use motors with a flange face and run out accuracy class DIN 42955 N or DIN 42955 R.

To avoid misalignment inside the power train, the standard **CK-C2 input style (i.e. CK)** utilizes our new **“open centering”** design making the laborious task of centering with the flange and pilot obsolete. Simply insert the motor shaft into the CK hollow shaft ⑥, tightens the clamping bolt ⑦ on the compression coupling ⑤, and attaches the gearbox to the motor using the mounting holes. The CK are maintenance free and have lifetime lubrication.

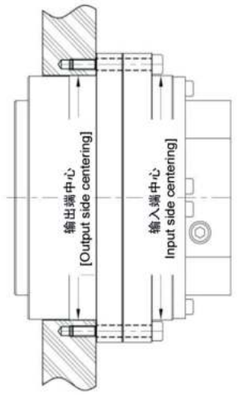
Motor Mounting Instructions:

1. If the motor shaft has a key ②, remove it. For applications with motor speeds over 3000 rpm, we recommend using a half key to completely fill the key way. The key may not stand out above the height of the motor shaft.
2. Remove set screw ③ on the adapter flange ④, put it aside, reserving it for later use.
3. Turn the shrink coupling ⑤ until the head of the clamping bolt ⑦ is visible through the access hole ③.
4. Examine all contact surfaces on the motor flange and the adapter flange ④ to ensure they are clean and grease free. Also inspect the motor shaft and the hub to ensure they are free from damage (burrs, scoring, etc.).
5. Place CK upside down (input side upward) and secure it from falling. Ensure that the key way in the motor shaft (if there is) is positioned opposite the slit (180°) in the compression coupling when assembled.
6. If a reduction bushing is used, ensure the slit in the bushing is aligned with the shrink coupling ⑤ slit.
7. If the CK is too heavy to lift manually, a suitable hoisting machine should be used. Insert the motor shaft into the CK hollow shaft ⑥, until the motor flange naturally mates with the adapter flange over its entire surface. Do not strike the CK or use excessive force to ensure a good fit.
8. Tighten the clamping bolt ⑦ to the prescribed torque (see page 40) using a suitable torque wrench ⑨.
9. Now bolt CK and motor ① together using the mounting holes ⑧ in the adapter flange. The bolts must be diagonally transferred and uniformly tightened.
10. Tightening access hole set screw ③ into adapter flange ④. CK and motor should be aligned vertically as shown in figure.

各输入方式安装实例 [Installation examples with various input style]

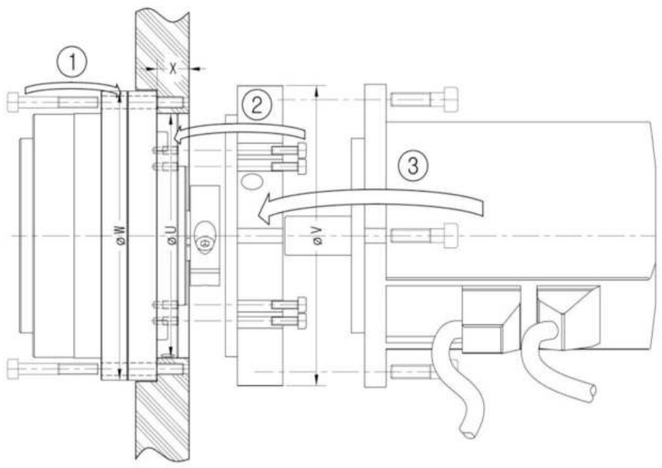
1. CK-C2输入方式安装实例
[CK-C2 input style installation examples]

CK标准安装
[CK Standard installation]



CK反向安装
[CK Reverse installation]

CK匹配大电机反向安装顺序
[CK Reverse installation order for big notor]



CK-C2输入方式包括输入端密封、电机连接胀套等。这种输入方式可以很方便地安装各种轴径和规格的电机。

对于CK-C2输入方式，机身主体有两面安装固定孔位，可以正向标准安装或反向安装。

对于反向安装，如果电机对角直径(ØV)小于输入端定位凸圆直径(ØU)，可以先安装电机后再安装CK主体。但是，一定要确保电机连接件和安装设备(ØU)没有干涉。如果电机对角直径(ØV)大于输入端定位凸圆直径(ØU)。拆解掉CK-C2输入端法兰，先安装CK主体，然后按照图示顺序再安装电机。在设计安装时，需检查安装设备厚度（X）的刚性。同时，“开口中心定位”不能应用，除非CK-C2输出端面垂直朝下安装，详情请联系赛劲。

CK-C2 input style includes input side seal, shrink motor connection, and etc. Due to the fact, it may ready for immediate installation for various diameter and specification of motor shaft.

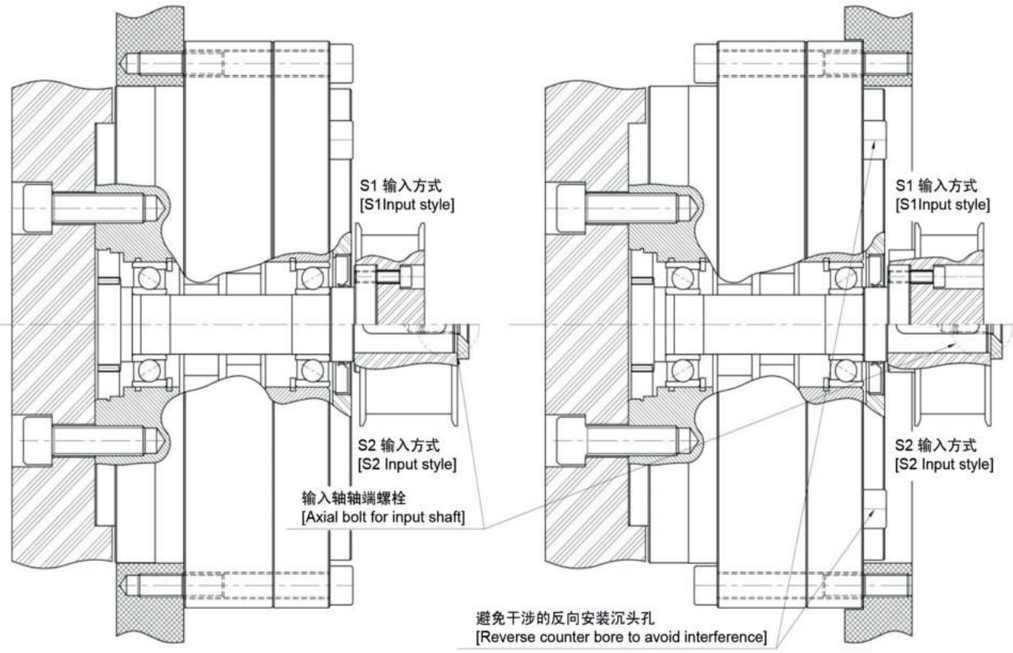
In case of CK-C2, main frame has two centering pilot to have two way mounting configuration so called standard installation and reverse installation.

In case of reverse installation, if diagonal diameter (ØV) of motor is smaller than input side centering diameter (ØU), then CK-C2 may be installed after assembled with motor. However, interference, during CK-C2 installation, between motor connector and mating structure (ØU) has to be check. If diagonal diameter (ØV) of motor is bigger than input side centering diameter (ØU), then disassemble motor adapter of CK-C2, fixing CK-C2 main frame first and then follow assembly sequence as shown in figures. In this case, mating structure thickness (X) need to check a rigidity and etc., while design. Also, ‘open centering’ cannot be applied, unless CK-C2 output flange toward downward vertically. Please contact SEJINiGB for details.

2. CK-S1,S2输入方式安装实例 [CK-S1, S2 input style installation examples]

CK 标准安装
[CK Standard Installation]

CK 反向安装
[CK Reverse Installation]



• CK-S1,S2输入方式包括输入端密封。这种输入方式适合带、联轴器等干燥传输。
• 对于CK-S1,S2输入方式，机身主体有两面安装固定孔位，可以正向标准安装或反向安装。对于反向安装，安装设备需要有足够的刚性。
• 对于CK-S1,S2输入方式，设计输入轴参数时，须考虑到输入轴支撑轴承的轴向负载能力。设计输入传动参数时，如皮带轮，建议使用输入轴轴端螺栓。

• CK-S1, S2 input style includes input side sealing, it may suitable for dry transmission such as belt, coupling, and etc. on input side.
• In case of CK-S1, S2, main frame has two centering bore to have two way mounting configuration so called standard installation and reverse installation. In case of reverse installation, installed structure has to have enough rigidity.
• In case of CK-S1, S2 input style, design the input shaft elements within radial load of input shaft supporting bearing capacity. Input transmission elements, such as belt pulley, using axial bolt on input shaft is recommended.

推荐的螺栓紧固力矩和允许的传动力矩
[Recommended bolt tightening torque and permissible transmission torque]

CK的安装，建议使用六角螺栓(KS B 1003)，紧固力矩如下表所示。建议使用弹簧垫片（KS B 13242）以防止螺栓松动或安装面缝隙。

Use hexa sock head cap bolts to install the CK and tighten to the torque as specified below table. The serrated lock washer is recommended to prevent the bolt from loosening and protect the bolt seat face from flaws.

螺栓大小和螺距(mm) [Bolt size and pitch]	建议的紧固力矩(Nm) [Recommended tightening torque]	紧固力(N) [Tightening force]	螺栓说明 [Bolt Specifications]
M2×0.4	0.175±0.01	451	内六角螺栓 [Hexa sock head cap bolt] KS B 1003 刚度等级[Strength class] ISO 898-1 12.9 螺纹[Thread] Class 2
M2.5×0.45	0.365±0.02	753	
M3×0.5	2±0.1	3436	
M4×0.7	4.6±0.23	5932	
M5×0.8	9.02±0.49	9300	
M6×1	15.3±0.78	13183	
M8×1.25	37.2±1.86	23969	
M10×1.5	75.3±3.43	38830	
M12×1.75	130.2±6.37	55928	
M14×2	204.6±10.2	75722	
M16×2	316.2±15.9	102396	
M18×2.5	437±22	125172	
M20×2.5	613.8±30.7	158196	
M24×3	1060±51.5	227706	

- 上表的数据针对的是钢材或铸铁材质。 如果是较软的材质，如铝材质，建议限制紧固力矩（约表中数值的70~80%）。
- 各系列允许的传动力矩可以通过下面的公式计算或参考外形图。
- 在限制紧固力矩的情况下，利用下面的公式可计算出紧固力矩和允许的传动力矩，同时注意产品各种扭矩的要求。

- The listed values are for steel or cast iron material. If softer material such as aluminum is used, limit the tightening torque. (Approximately 70~80%)
- Permissible transmission torque of each series can be calculated by using equation below, or refer 'External dimensions'.
- In case of limiting tightening torque, refer the equation below to calculate tightening force and permissible transmission torque with limited tightening torque. Also pay attention to the system torque requirements.

紧固力计算 [Calculation of tightening force]

$$F = \frac{T_t \times 1000}{kd}$$

F是紧固力（N），Tt是紧固力矩（Nm），d是螺栓直径（mm），k是扭矩常数(0.19~0.2).
[where, F is tightening force, Tt is tightening torque, d is bolt diameter(mm), k is torque constant (0.19~0.2).]

传动力矩计算 [Calculation of transmission torque]

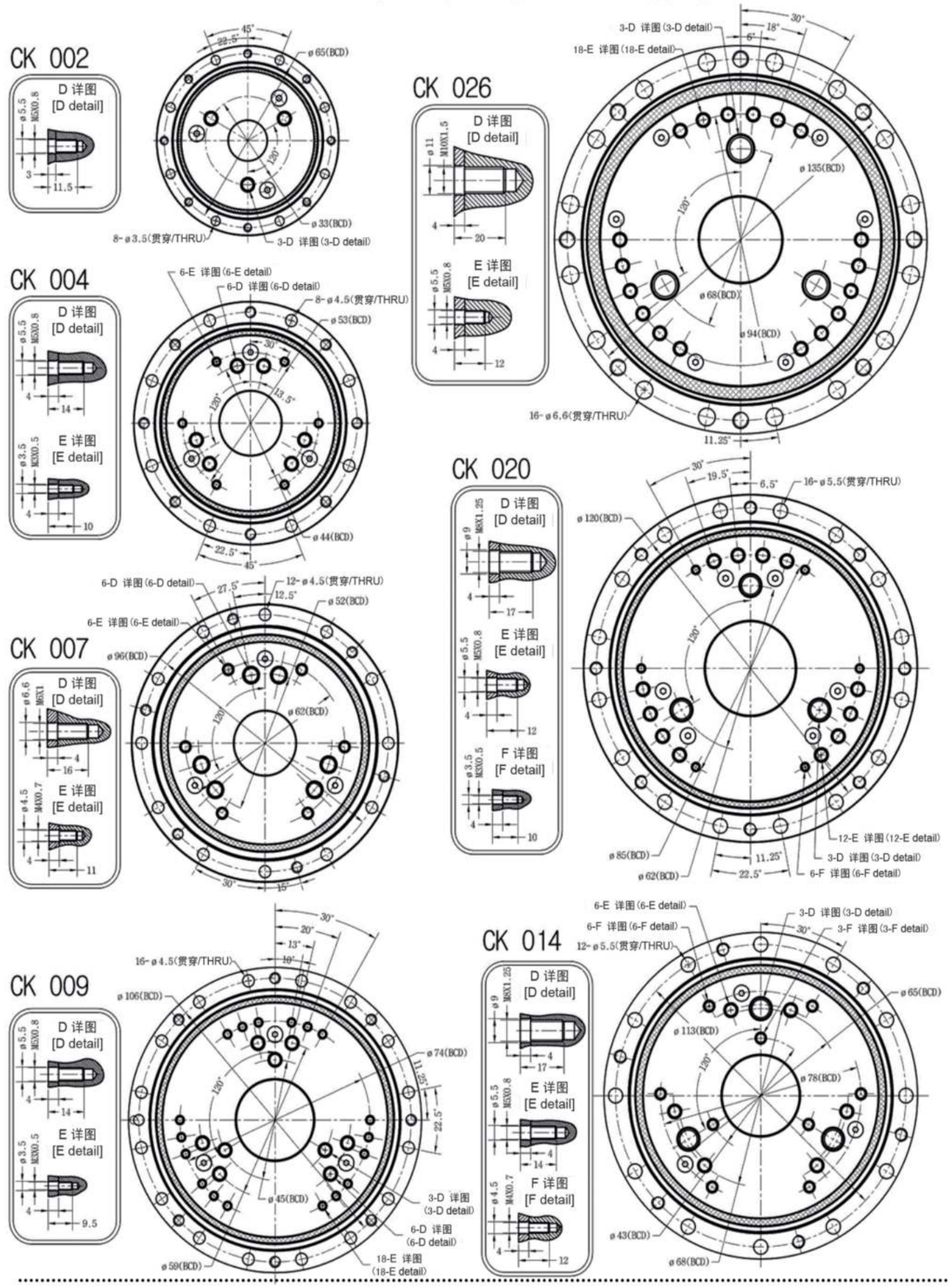
$$T = F \times \frac{D}{2} \times \mu \times n$$

T是传动力矩（Nm），D是螺栓定位节圆直径（m），n是螺栓数量，μ是摩擦系数(保持润滑，μ=0. 15，无润滑，μ=0. 2)。
[where, T is transmission torque (Nm), D is Bolt Circle Diameter (m), n is number of bolts, μ is friction coefficient (with remained lubricant μ=0.15, without remained lubricant μ=0.2)]

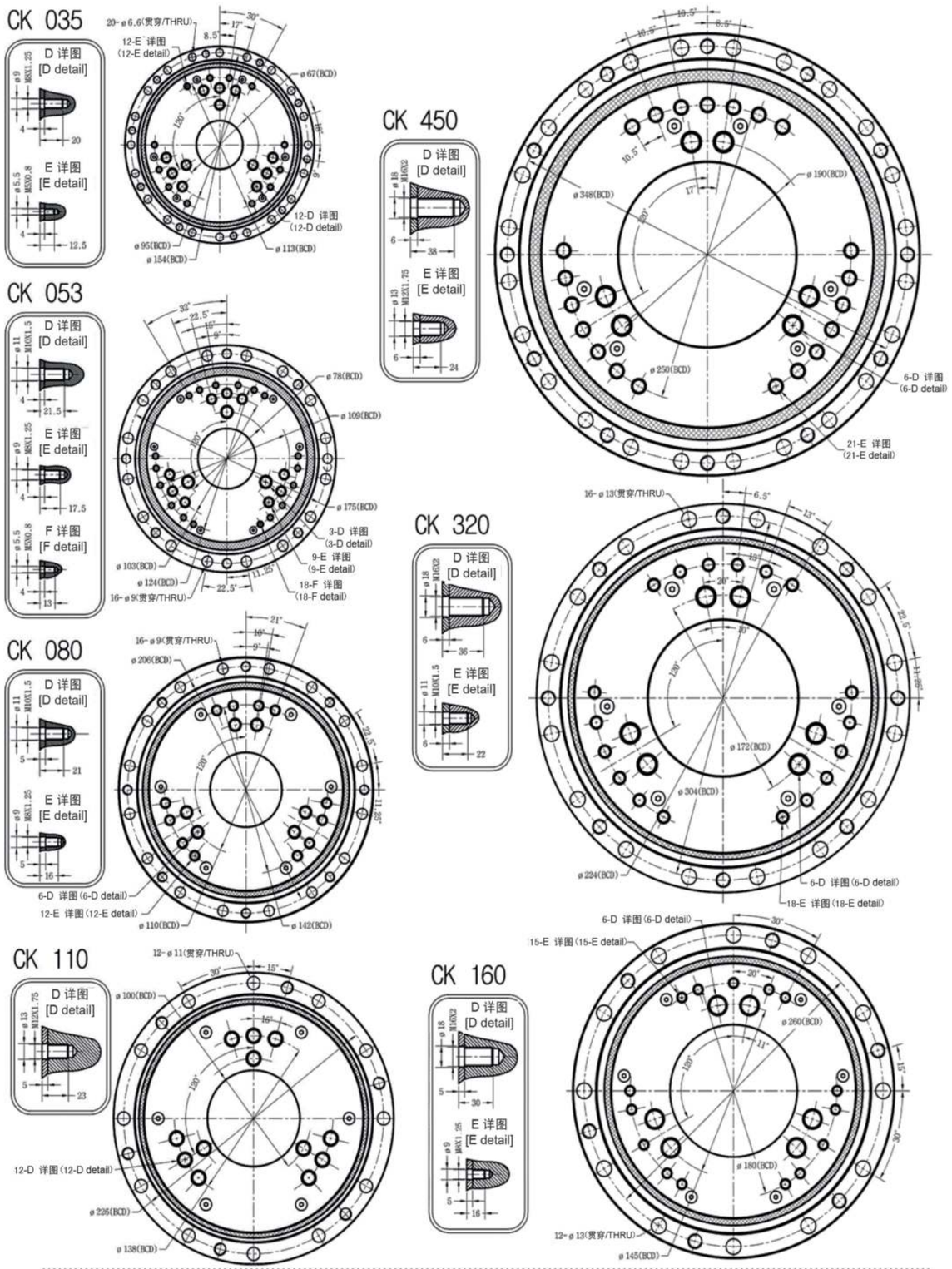
摆线动力传输 Cycloidal Kinetic Transmission
be precise with SAIZIN®

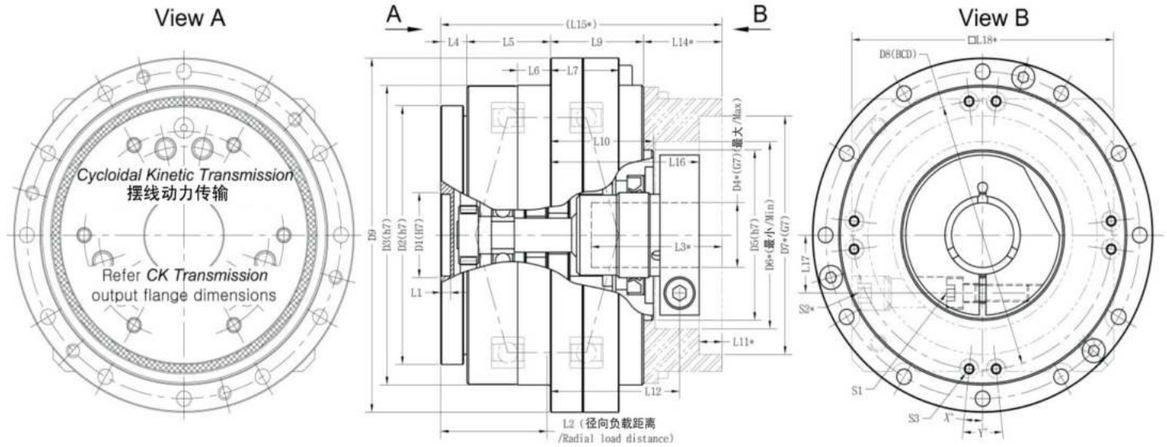
CK外形尺寸表 [CK series External dimensions at a glance]

CK输出端尺寸表I [CK output flange dimensions I] (mm)



CK输出端尺寸表II [CK output flange dimensions II] (mm)

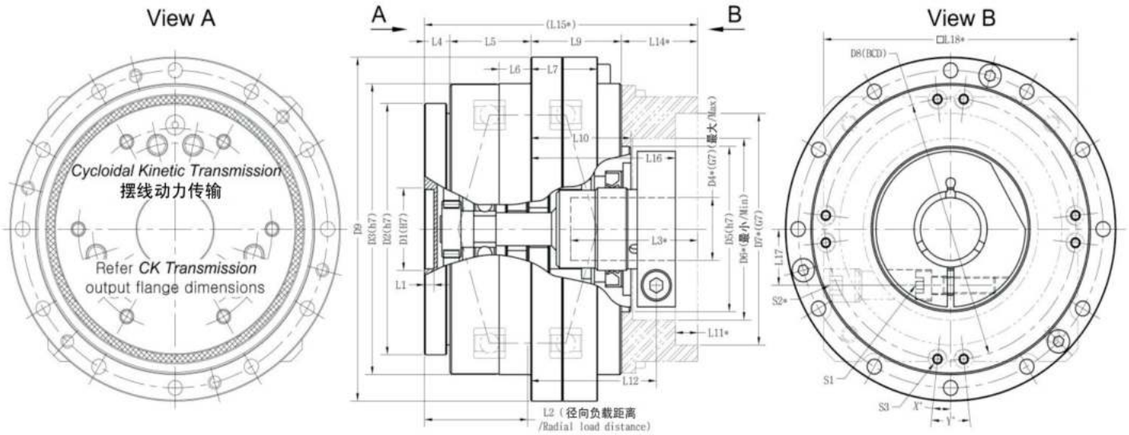




尺寸由匹配的电机而定 [depend on applied motor.]

CK-C2输入方式尺寸表I [CK-C2 input style dimensions I] (mm)

Model / Symbol	CK002		CK004		CK007		CK009		CK014		CK020		CK026		
D1 (H7)	15		24		24		30		30		35		32		
D2 (h7)	52		66		76		88		92		100		110		
D3 (h7)	59		75		88		98		103		110		124		
D4 * (G7) (最大/Max)	8	14	8	14	14	19	14	19	14	19	14	19	14	19	24
D5 (h7)	-	40	40		-	50	-	50	-	50	-	50	-	55	
D6 * (最小 /Min)	29.5	41	29.5	42	42	55	42	55	42	55	42	55	38	56	58
D7 * (G7)	30	50	30	50	50	70	50	70	50	70	50	70	50	70	110
D8 (BCD)	-	51	67		-	79	-	89	-	93	-	93	-	113	
D9	71		91		104		114		122		130		145		
L1	2		3		3		3		3		3		3		
L2	28		34		34.5		33.25		35.75		40		41		
L3 *	25	30	27	30	30	40	30	40	30		30	40	32	43	59
L4	6		8		8		8		8		8		9.5		
L5	20		25		28		21.5		25.5		31		24.5		
L6	8		10		10		10		8		12		10		
L7	21.5		23.5		22.5		28		28		27.5		37		
L9	-	30	30.5		-	30	-	35	-	35	-	34.5	-	46	
L10	-	33	33		-	33	-	38	-	38	-	37	-	49	
L11 *	5	7	5	7	7	10	6	7.5	6	7.5	6	7.5	6	5	10
L12	36	42	39	39.5	34.5	41	37.5	45.5	37.5	45.5	37	45	45.5	57	63
L14 *	-	24.5	18.5	21.5	-	27	-	24	-	24	-	24	-	22	38
L15 *	72	80.5	82	85	83	93	78.5	88.5	82.5	92.5	87.5	97.5	91	102	118
L16	41	47.5	44	45	40	47	43	51.5	43	51.5	42.5	51	51	63	70
L17	9.5	12.5	9.5	12.5	12.5	17	12.5	17	12.5	17	12.5	17	12.5	17	20
L18 *	40	60	45	60	62	80	62	80	62	80	62	80	60	80	130
S1	M3	M4	M3	M4	M4	M5	M4	M5	M4	M5	M4	M5	M4	M5	M6
S2	M6	M8	M6	M8	M6	M10	M8	M10	M8	M10	M8	M10	M8	M10	M10
S3 (深度 / Depth)	-	4XM3 (5)	8XM3(5)		-	8XM3 (5.5)	-	8XM4 (5.5)	-	8XM4 (5.5)	-	16XM4 (5.5)	-	16XM4(7)	
X°	-	0	6		-	6	-	6	-	5	-	5	-	7.5	
Y°	-	0	12		-	12	-	12	-	10	-	10	-	15	



尺寸由匹配的电机而定 [depend on applied motor.]

CK-C2输入方式尺寸表II [CK-C2 input style dimensions II] (mm)

Model / Symbol	CK035				CK053				CK080			
D1 (H7)	40				50				62			
D2 (h7)	130				140				170			
D3 (h7)	143				160				190			
D4 * (G7) (最大/Max)	19	22	24	28	19	24	28	35	22	24	28	35
D5 (h7)	-	60			-	76			-	95		
D6 * (最小 /Min)	52	58	60	74	52	60	76	94	56	58	76	94
D7 * (G7)	70	95	110	130	70	110	130	114.3	70	95	130	114.3
D8 (BCD)	-	132			-	146			-	176		
D9	165				190				222			
L1	3				3				3.5			
L2	44.5				48.5				56.75			
L3 *	41	55	58	67	40	58	65	80	41	59	66	81
L4	11				11				16			
L5	27.5				24				37			
L6	10				10				10			
L7	38				51				46.5			
L9	-	49			-	51			-	55.5		
L10	-	52.5			-	65			-	59		
L11 *	11	12	15.5	13	6.5	11	9	24	6.5	11.5	16.5	23.5
L12	49	62.5	62	66.5	62.5	75	78	81	56.5	69.5	69.5	75.5
L14 *	-	32.5	35.5	43	-	33	40	55	-	32.5	39.5	54.5
L15 *	105.5	120	123	130.5	110	128	135	150	123	141	148	163
L16	55	69.5	69	75.5	68.5	82	87	91	63.5	76.5	78.5	85.5
L17	17	18.5	20	26	17	20	26	32	18.5	20	26	32
L18 *	80	100	130	150	80	130	150	180	80	100	150	180
S1	M5	M6	M6	M8	M5	M6	M8	M10	M6	M6	M8	M10
S2	M10	M10	M10	M14	M10	M10	M14	M16	M10	M10	M14	M16
S3 (深度 / Depth)	-	16XM5(9)			-	16XM5(9)			-	16XM6(9)		
X°	-	7.5			-	7.5			-	7.5		
Y°	-	15			-	15			-	15		

摆线动力传输 Cycloidal Kinetic Transmission
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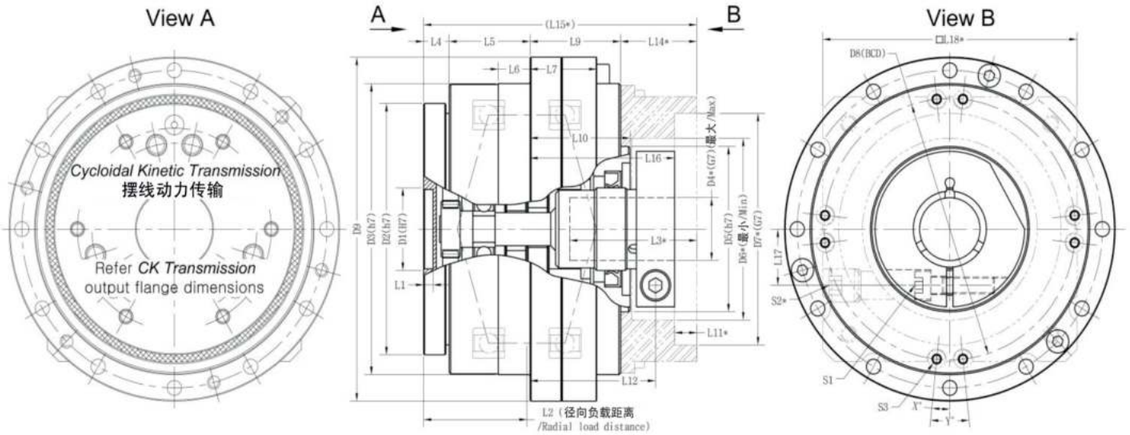
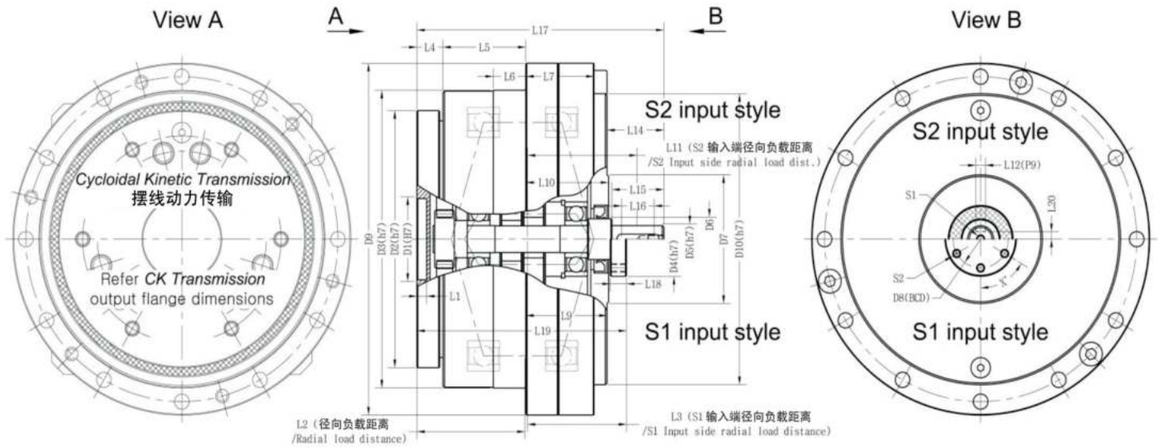


尺寸由匹配的电机而定 [depend on applied motor.]

CK-C2输入方式尺寸表III [CK-C2 input style dimensions III] (mm)

Model / Symbol	CK110				CK160			CK320		CK450		
D1 (H7)	80				110			130		154		
D2 (h7)	192				214			260		290		
D3 (h7)	208				240			284		328		
D4 * (G7) (最大/Max)	24	28	35	42	28	35	42	35	42	35	42	55
D5 (h7)	-	140			110			110		140		
D6 * (最小 /Min)	60	76	94	112	76	94	112	110	112	95	115	150
D7 * (G7)	70	95	114.3	200	95	114.3	200	114.3	200	114.3	200	230
D8 (BCD)	-	190			192			260		288		
D9	244				280			325		370		
L1	3.5				3.5			4		4		
L2	65.25				69.5			82		90		
L3 *	42.5	58	80	95	58	80	95	80	95	81	96	111
L4	19				13			14		14		
L5	53				60.5			71.5		76		
L6	15				15			25.5		20		
L7	42.5				55			60		71		
L9	-	48.5			58.5			75		82		
L10	-	52			62			79		86		
L11 *	6.5	6.5	21	12.5	6.5	23	21.5	11.5	16.5	12	24	24
L12	51.5	65.5	70.5	83.5	71	75.5	90	91	99	98	100	111
L14 *	-	28	54.5	69.5	27.5	49.5	64.5	37	52.5	39	54	69
L15 *	137	153	175	190	160	182	197	198	213	211	226	241
L16	58.5	74.5	80.5	95.5	80	85.5	102	101	111	108	112	127
L17	20	26	32	39	26	32	39	32	39	32	39	50.5
L18 *	80	100	180	220	100	180	220	180	220	180	220	250
S1	M6	M8	M10	M12	M8	M10	M12	M10	M12	M10	M12	M16
S2	M10	M12	M16	M20	M12	M16	M20	M16	M20	M16	M20	M24
S3 (深度 / Depth)	-	20XM5(8)			28XM6(9)			12XM8(12)		12XM8(14)		
X°	-	7.5			7.5			0		0		
Y°	-	15			15			30		30		



CK-S1,S2输入方式尺寸表I [CK-S1,S2 input style dimensions I] (mm)

Model / Symbol	CK002	CK004	CK007	CK009	CK014	CK020		CK026		CK035	
	S1	S1	S1	S1	S1	S1	S2	S1	S2	S1	S2
D1 (H7)	15	24	24	30	30	35		32		40	
D2 (h7)	52	66	76	88	92	100		110		130	
D3 (h7)	59	75	88	98	103	110		124		143	
D4 (h7)	20	23	23	26	26	26		31		34	
D5 (h7)							12		14		14
D6							15		20		20
D7	-	-	38	39	40	39		-		-	
D8 (BCD)	15	17	17	20	20	20		25		26	
D9	71	91	104	114	122	130		145		165	
D10 (h7)	57	73	86	96	101	104		122		141	
L1	2	3	3	3	3	3		3		3	
L2	28	34	34.5	33.25	35.75	40		41		44.5	
L3	29.7	33.75	32.5	34.5	37.5	39.5		42		47	
L4	6	8	8	8	8	8		9.5		11	
L5	20	25	28	21.5	25.5	31		24.5		27.5	
L6	8	10	10	10	8	12		10		10	
L7	21.5	23.5	22.5	28	28	27.5		37		38	
L9	26.5	29.5	26.5	31.5	33	32		43.5		44	
L10	-	-	27	32.5	34.5	33		-		-	
L11							46		48.5		51.5
L12 (P9)							5		5		5
L14							27		26		26
L15							25		25		25
L16							15		15		15
L17							98		103.5		108.5
L18	5	5	5	6	6	6		6		8	
L19	58	68	68.5	69	75	79		84.5		91.5	
L20							3		4		4
S1 (深度 / Depth)							M4(8)		M5(10)		M5(10)
S2	6XM2.5	6XM3	6XM3	6XM3	6XM3	8XM3		8XM3		6XM4	
X°	60	60	60	60	60	45		45		60	

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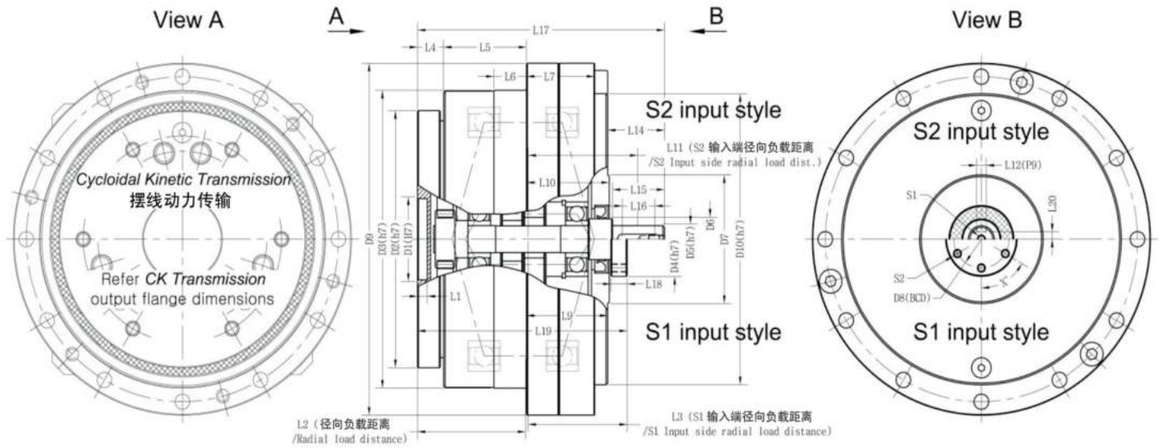

CK-S1,S2输入方式尺寸表II [CK-S1,S2 input style dimensions II] (mm)

Model / Symbol	CK053		CK080		CK110		CK160		CK320		CK450	
	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2	S1	S2
D1 (H7)	50		62		80		110		130		154	
D2 (h7)	140		170		192		214		260		290	
D3 (h7)	160		190		208		240		284		328	
D4 (h7)	40		52		57		62		71		80	
D5 (h7)		19		22		25		28		30		32
D6		25		35		40		42		45		50
D7	-		-		-		-		-		-	
D8 (BCD)	32		42		47		50		55		64	
D9	190		222		244		280		325		370	
D10 (h7)	158		189		206		236		280		326	
L1	3		3.5		3.5		3.5		4		4	
L2	48.5		56.75		65.25		69.5		82		90	
L3	51		59.25		64.75		72.75		86.75		96	
L4	11		16		19		13		14		14	
L5	24		37		53		60.5		71.5		76	
L6	10		10		15		15		25.5		20	
L7	51		46.5		42.5		55		60		71	
L9	58.5		52.5		48.5		59		70		82	
L10	-		-		-		-		-		-	
L11		60.5		71.75		79.75		85.25		98.25		112.5
L12 (P9)		6		8		8		8		10		10
L14		36		46.5		51.5		51.5		56.5		67
L15		35		45		50		50		55		65
L16		23		29		34		34		35		45
L17		129.5		152		172		184		212		239
L18	8		10		10		12		16		16	
L19	102.5		117		132		146		173		190	
L20		6		6		8.5		10		10		11
S1 (深度 / Depth)		M6(12)		M8(16)		M10(20)		M10(20)		M12(24)		M12(24)
S2	8XM4		6XM5		8XM5		8XM6		8XM8		8XM8	
X°	45		60		45		45		45		45	

实际应用

折叠式抗风天线

车载型抗风天线

全自动武装防卫系统

坦克装弹系统

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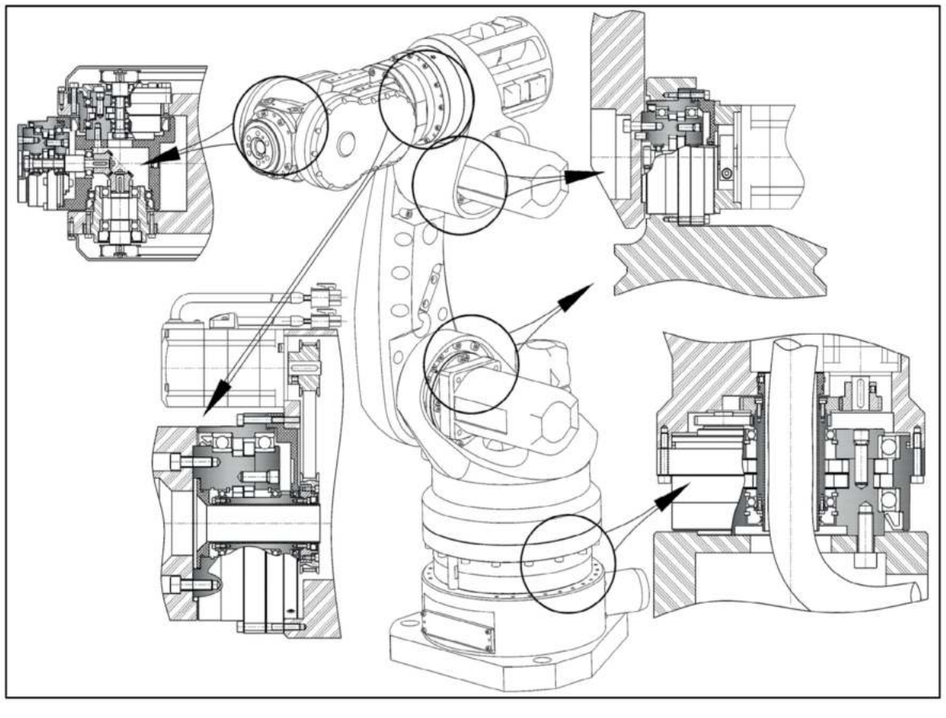
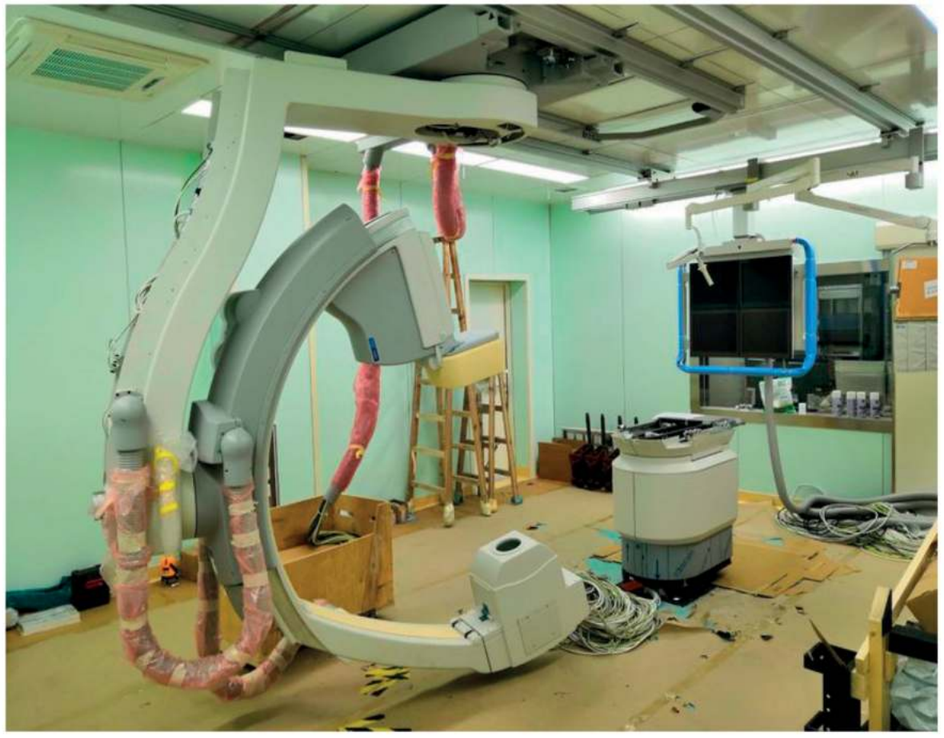
CK 实际应用 *CK* Applications

六轴机械手臂



实际应用

医疗设备

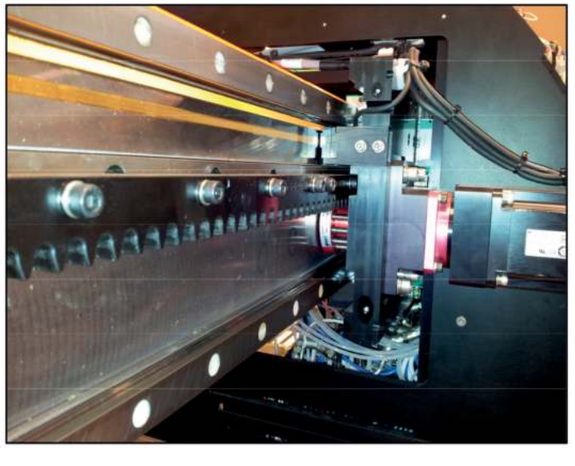


面板检测

CK 实际应用 *CK* Applications

机翼铆钉地位装置

二轴搬运手



海报印刷设备

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赛劲

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所有人孜孜以求，但至今无人企及……
Everybody strives for,nobody has achieved yet ……

Note