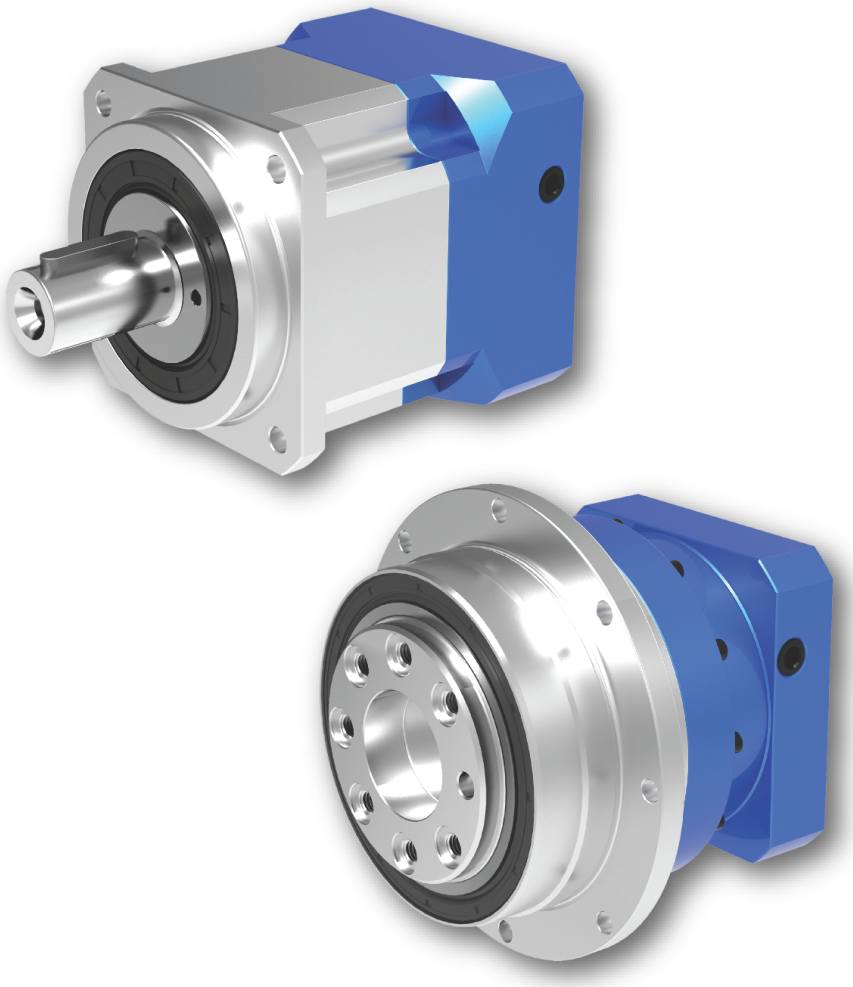
TRANSMISSION SYSTEM
精 密 科 技　传 动 世 界

# TAB / TAD 系列高精密行星减速机

## SERIES HIGH PRECISION PLANETARY GEARBOX



# 企业简介
# COMPANY PROFILE

浙江通宇变速机械股份有限公司位于中国东南沿海浙江省台州市，成立于1992年，是一家集产品研发、制造、销售、售后服务为一体的专业传动设备制造企业。

公司拥有国际领先的科研装备和专家团队，凭借先进的自动化加工和检测设备，制造出高品质的传动产品，经过多年不懈努力，已发展成为传动机械行业的知名企业。

公司旗下生产的JMC品牌减速机，产品多样，品质优异。主要产品有：***TNRV***系列蜗轮蜗杆减速机、***TWM***系列蜗轮蜗杆减速机、***VF***系列蜗轮蜗杆减速机、***UDL***系列无极变速器、***TKM / TKB***系列斜齿-准双曲面齿轮减速机、***WKM***系列斜齿-准双曲面齿轮减速机、***TRC***系列小型斜齿轮减速机、***TR***系列斜齿轮减速机、***TF***系列平行轴斜齿轮减速机、***TK***系列斜齿轮-伞齿轮减速机、***TS***系列斜齿轮-蜗轮蜗杆减速机、***TAB / TAD***系列高精密行星减速机、畜牧机械专用***LA / AB***系列料线减速机、***GF***系列工业风扇减速机等。

产品广泛应用于轻工、化工、建筑建材机械、钢铁冶金、环境保护、煤炭矿业、汽车工业、港口建设、畜牧业等各大工农业领域，以及各种需减速要求的生产自动线、输送线、装配线等领域。产品遍及全国，并远销欧美、中东、大洋洲及东南亚等世界各地。

Established in ***1992***, Zhejiang ***TONGYU*** Variable-speed Machinery Co., Ltd. Located in Taizhou city, Thejiang province, southeast coast of China. Tongyu is a comprehensive enterprise which specializes in product R&D, production, sales, and after-sales service.

The company has the international leading scientific research equipment and the expert team, relies on the advanced automation processing and the inspection equipment, manufactures the high quality transmission product, after many years unremitting efforts, has developed into the transmission machinery profession well-known enterprise.

The ***JMC*** brand reducer produced by ***Tongyu*** has various products and excellent quality. The main products are ***TNRV,TWM VF, UDL, TKM, TKB, WKM, TRC, TR, TF, TK, TS, TAB, TAD, LA, AB , GF*** series at present.

Products are widely used in light industry, chemical industry, building materials machinery, iron and steel metallurgy, environmental protection, coal mining, automobile industry, port construction, animal husbandry and other major industrial and agricultural fields, as well as a variety of need to slow down the requirements of the production of automatic lines, transmission lines, assembly lines and other fields. Products throughout the country, and exported to Europe and America, the Middle East, Oceania and southeast Asia and other parts of the world.

We sincerely welcome you to ***TONGYU***'s world of Reducers.

该样本为最新版本，可替代以往的任何版本及修改。如果你是通过非正式渠道取得，不能保证是最新内容，可在本公司网站上查阅 www.china-tongyu.com。

This section replaces any previous edition and revision. If you obtained this catalogue other than through controlled distrbution channels, the most up-to-date content is not guaranteed. In this case the latestversion is available on our web site www.china-tongyu.com

# 1. 产品特点及应用 / PRODUCTS CHARACTERISTICS AND APPLICATION

## 1.1 产品特点：

为同轴式方形法兰输出，具有精度高、钢性好、承载能力大、 效率高、寿命长、噪音低、体积轻小、外形美观，安装方便、定位精准等特点，适用于交流伺服电机、直流伺服电机、步进电机的减速传动。

## 1.1 Products Characteristics:

Coaxial square flange output. High precision, good rigidity, large carrying capacity, high efficiency, long life, low noise, light in weight, small volume, good appearance, convenient installation, positioning accuracy and so on. Suitable for reducing transmission of ac servo motor, dc servo motor and stepper motor

## 1.2 应用领域：

精密机床、军工设备、半导体设备、印刷包装设备、太阳能、工业机器人、医疗设备、精密测试仪器等高精度场合的应用。

## 1.2 Application

Precision machine tools, military equipment, semiconductor equipment, printing and packaging equipment, solar energy, industrial robots, medical equipment, precision test instruments and other high-precision applications.

# 2. TAB系列型号说明 / TAB SERIES MODEL ILLUMINATE

**TAB 090 - 010 - S1 - P1 / 电机 MOTOR**

① ② ③ ④ ⑤ ⑥

| No | 说 明 | Comments |
|---|---|---|
| 1 | **TAB**：减速器系列代号 | **TAB**：code for gear units series |
| 2 | 减速器规格号：042、060、060A、090、090A、115、142、180、220 | Gearbox Size : 042、060、060A、090、090A、115、142、180、220 |
| 3 | 减速比：<br>单级：3、4、5、6、7、8、9、10<br>双级：15、20、25、30、35、40、45、50、60、70、80、90、100 | Ratio：<br>1 Stage：3、4、5、6、7、8、9、10<br>2 Stage：15、20、25、30、35、40、45、50、60、70、80、90、100 |
| 4 | 输出轴选择：<br>1）S1:光轴输出轴<br>2）S2:带键输出轴<br>3）S3:DIN 5480 花键轴 | Shaft Option：<br>1）S1:Smooth Output Shaft<br>2）S2:Output Shaft With Key<br>3）S3:DIN 5480 |
| 5 | 背隙：<br>1）P0:超精密背隙<br>2）P1:精密背隙<br>3）P2:标准背隙 | **Backlash**：<br>1）P0:Micro Backlash<br>2）P1:Reduced Backlash<br>3）P2:Standard Backlash |
| 6 | 电机型号:<br>电机制造商及型号 | Moto Designation:<br>Manufacturer Type And Model |

示例 Example：TAB090-010-S1-P1/SIEMENS 1FT6 041-4AF71

# 3. 减速机技术参数 / GEARBOX PERFORMANCE

| 规格 Model No. | | 级数Stage | 减速比Ratio[A] | TAB042 | TAB060 | TAB060A | TAB090 | TAB090A | TAB115 | TAB142 | TAB180 | TAB220 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 额定输出扭矩 $T_{2N}$<br>Nominal Output Torque $T_{2N}$ | Nm | 1 | 3 | 20 | 55 | – | 130 | – | 208 | 342 | 588 | 1140 |
| | | | 4 | 19 | 50 | – | 140 | – | 290 | 542 | 1050 | 1700 |
| | | | 5 | 22 | 60 | – | 160 | – | 330 | 650 | 1200 | 2000 |
| | | | 6 | 20 | 55 | – | 150 | – | 310 | 600 | 1100 | 1900 |
| | | | 7 | 19 | 55 | – | 140 | – | 300 | 550 | 1100 | 1800 |
| | | | 8 | 17 | 45 | – | 120 | – | 260 | 500 | 1000 | 1600 |
| | | | 9 | 14 | 40 | – | 100 | – | 230 | 450 | 900 | 1500 |
| | | | 10 | 14 | 40 | – | 100 | – | 230 | 450 | 900 | 1500 |
| | | 2 | 15 | 20 | 55 | 55 | 130 | 130 | 208 | 342 | 588 | 1140 |
| | | | 20 | 19 | 50 | 50 | 140 | 140 | 290 | 542 | 1050 | 1700 |
| | | | 25 | 22 | 60 | 60 | 160 | 160 | 330 | 650 | 1200 | 2000 |
| | | | 30 | 20 | 55 | 55 | 150 | 150 | 310 | 600 | 1100 | 1900 |
| | | | 35 | 19 | 50 | 50 | 140 | 140 | 300 | 550 | 1100 | 1800 |
| | | | 40 | 17 | 45 | 45 | 120 | 120 | 260 | 500 | 1000 | 1600 |
| | | | 45 | 14 | 40 | 40 | 100 | 100 | 230 | 450 | 900 | 1500 |
| | | | 50 | 22 | 60 | 60 | 160 | 160 | 330 | 650 | 1200 | 2000 |
| | | | 60 | 20 | 55 | 55 | 150 | 150 | 310 | 600 | 1100 | 1900 |
| | | | 70 | 19 | 50 | 50 | 140 | 140 | 300 | 550 | 1100 | 1800 |
| | | | 80 | 17 | 45 | 45 | 120 | 120 | 260 | 500 | 1000 | 1600 |
| | | | 90 | 14 | 40 | 40 | 100 | 100 | 230 | 450 | 900 | 1500 |
| | | | 100 | 14 | 40 | 40 | 100 | 100 | 230 | 450 | 900 | 1500 |
| 急停扭矩 $T_{2NOT}$[B]<br>Emergency Stop Torque $T_{2NOT}$[B] | Nm | 1 / 2 | 3~100 | 3倍额定输出扭矩 3 times of Nominal Output Torque | | | | | | | | |
| 额定输入转速 $n_{1N}$<br>Nominal Input Speed $n_{1N}$ | rpm | 1 / 2 | 3~100 | 5000 | 5000 | 5000 | 4000 | 4000 | 4000 | 3000 | 3000 | 2000 |
| 最大输入转速 $n_{1B}$<br>Max. Input Speed $n_{1B}$ | rpm | 1 / 2 | 3~100 | 10000 | 10000 | 10000 | 8000 | 8000 | 8000 | 6000 | 6000 | 4000 |
| 超精密背隙 P0<br>Micro Backlash P0 | arcmin | 1 | 3~10 | – | – | – | ≤1 | – | ≤1 | ≤1 | ≤1 | ≤1 |
| | | 2 | 15~100 | – | – | – | – | – | ≤3 | ≤3 | ≤3 | ≤3 |
| 精密背隙 P1<br>Reduced Backlash P1 | arcmin | 1 | 3~10 | ≤3 | ≤3 | – | ≤3 | – | ≤3 | ≤3 | ≤3 | ≤3 |
| | | 2 | 15~100 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 |
| 标准背隙 P2<br>Standard Backlash P2 | arcmin | 1 | 3~10 | ≤5 | ≤5 | – | ≤5 | – | ≤5 | ≤5 | ≤5 | ≤5 |
| | | 2 | 15~100 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 |
| 扭转刚性<br>Torsional Rigidity | Nm/arcmin | 1 / 2 | 3~100 | 3 | 7 | 7 | 14 | 14 | 25 | 50 | 145 | 225 |
| 允许径向力 $F_{2rB}$[C]<br>Max. Radial Load $F_{2rB}$[C] | N | 1 / 2 | 3~100 | 780 | 1530 | 1530 | 3250 | 3250 | 6700 | 9400 | 14500 | 50000 |
| 允许轴向力 $F_{2TAB}$[C]<br>Max. Axial Load $F_{2aB}$[C] | N | 1 / 2 | 3~100 | 390 | 765 | 765 | 1625 | 1625 | 3350 | 4700 | 7250 | 25000 |
| 重量<br>Weight | kg | 1 | 3~10 | 0.6 | 1.3 | – | 3.7 | – | 7.8 | 14.5 | 29 | 48 |
| | | 2 | 15~100 | 0.8 | 1.5 | 1.9 | 4.1 | 5.3 | 9 | 17.5 | 33 | 60 |
| 噪音值($n_1$=3000rpm,i=10,无负载)[D]<br>Noise ($n_1$=3000rpm, i=10, No load)[D] | dB(A) | 1 / 2 | 3~100 | ≤56 | ≤58 | ≤60 | ≤60 | ≤63 | ≤63 | ≤65 | ≤67 | ≤70 |

# 减速机技术参数 / GEARBOX PERFORMANCE

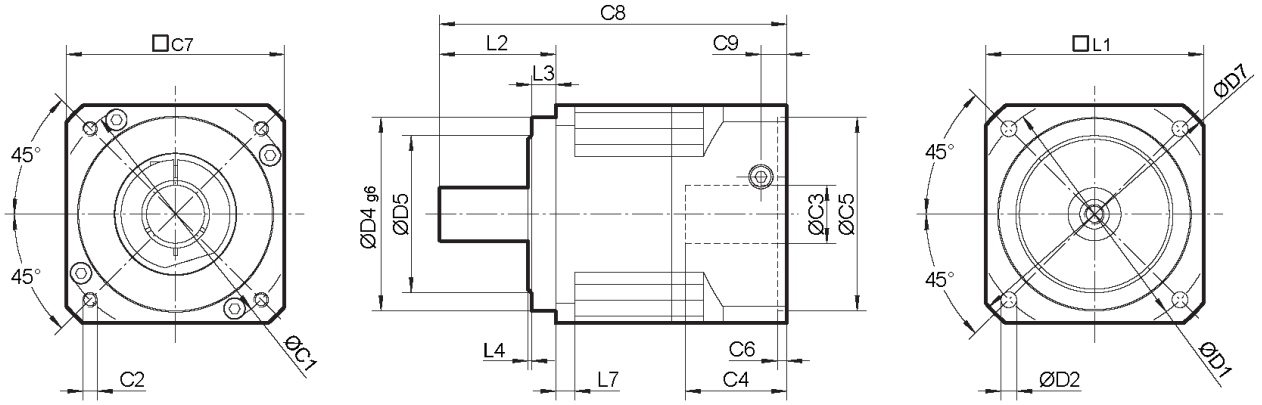
| 规格 Model No. | | 级数Stage | 减速比Ratio[A] | TAB042 | TAB060 | TAB060A | TAB090 | TAB090A | TAB115 | TAB142 | TAB180 | TAB220 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 使用寿命[E] Service Life[E] | hr | 1,2 | 3~100 | 20000 | | | | | | | | |
| 效率 η Efficiency η | % | 1 | 3~10 | ≥97% | | | | | | | | |
| | | 2 | 15~100 | ≥94% | | | | | | | | |
| 使用温度 Operating Temp | ℃ | 1,2 | 3~100 | -10°C~90°C | | | | | | | | |
| 润滑 Lubrication | | | | 合成润滑油脂 Synthetic lubrication oils | | | | | | | | |
| 防护等级 Degree of Gearbox Protection | | 1,2 | 3~100 | IP65 | | | | | | | | |
| 安装方向 Mounting Position | | 1,2 | 3~100 | 任意方向 All directions | | | | | | | | |
| 转动惯量 $J_1$ Mass Moments of Inertia $J_1$ | kg·cm² | 1 | 3 | 0.03 | 0.16 | – | 0.61 | – | 3.25 | 9.21 | 28.98 | 69.61 |
| | | | 4 | 0.03 | 0.14 | – | 0.48 | – | 2.74 | 7.54 | 23.67 | 54.37 |
| | | | 5 | 0.03 | 0.13 | – | 0.47 | – | 2.71 | 7.42 | 23.29 | 53.27 |
| | | | 6 | 0.03 | 0.13 | – | 0.45 | – | 2.65 | 7.25 | 22.75 | 51.72 |
| | | | 7 | 0.03 | 0.13 | – | 0.45 | – | 2.62 | 7.14 | 22.48 | 50.97 |
| | | | 8 | 0.03 | 0.13 | – | 0.44 | – | 2.58 | 7.07 | 22.59 | 50.84 |
| | | | 9 | 0.03 | 0.13 | – | 0.44 | – | 2.57 | 7.04 | 22.53 | 50.63 |
| | | | 10 | 0.03 | 0.13 | – | 0.44 | – | 2.57 | 7.03 | 22.51 | 50.56 |
| | | 2 | 15 | 0.03 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 7.42 | 23.29 |
| | | | 20 | 0.03 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 7.42 | 23.29 |
| | | | 25 | 0.03 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 7.42 | 23.29 |
| | | | 30 | 0.03 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 7.42 | 23.29 |
| | | | 35 | 0.03 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 7.42 | 23.29 |
| | | | 40 | 0.03 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 7.42 | 23.29 |
| | | | 45 | 0.03 | 0.03 | 0.13 | 0.13 | 0.47 | 0.47 | 2.71 | 7.42 | 23.29 |
| | | | 50 | 0.03 | 0.03 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 7.03 | 22.51 |
| | | | 60 | 0.03 | 0.03 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 7.03 | 22.51 |
| | | | 70 | 0.03 | 0.03 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 7.03 | 22.51 |
| | | | 80 | 0.03 | 0.03 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 7.03 | 22.51 |
| | | | 90 | 0.03 | 0.03 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 7.03 | 22.51 |
| | | | 100 | 0.03 | 0.03 | 0.13 | 0.13 | 0.44 | 0.44 | 2.57 | 7.03 | 22.51 |

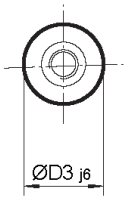
A. 减速比 ( $i=N_{in} / N_{out}$)
B. 最大加速扭矩 $T_{2B}$ = 60% of $T_{2NOT}$
C. 输出转速100 rpm时，作用于输出轴中心位置。
D. 噪音值会随着减速机速比不同而有差异
E. 连续运转，使用寿命为10000 hrs(请咨询本公司)

A. Ratio ( $i=N_{in} / N_{out}$)
B. Max. acceleration torque $T_{2B}$ = 60% of $T_{2NOT}$
C. Applied to the output shaft center at 100 rpm
D. These values are measured by gearbox with ratio = 10 (1-stage) or ratio = 100 (2-stage) at 3000 rpm without load.
By ratio smaller than 10, the noise value would be 3-5dB higher
E. For continuous operation,the service life time is less than 10000 hrs

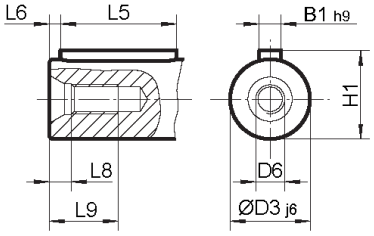
# 4. 外形尺寸图表 / OUTLINE DIMENSION SHEET

## 4.1 单级 1-stage，减速比 Ratio i = 3~10




输出轴形式 **S1**
Shaft Option **S1**




输出轴形式 **S2**
Shaft Option **S2**

（单位unit:mm）

| 尺寸 Dimension | TAB042 | TAB060 | TAB090 | TAB115 | TAB142 | TAB180 | TAB220 |
|---|---|---|---|---|---|---|---|
| D1 | 50 | 70 | 100 | 130 | 165 | 215 | 250 |
| D2 | 3.4 | 5.5 | 6.6 | 9 | 11 | 13 | 17 |
| $D3_{j6}$ | 13 | 16 | 22 | 32 | 40 | 55 | 75 |
| $D4_{g6}$ | 35 | 50 | 80 | 110 | 130 | 160 | 180 |
| D5 | 22 | 45 | 65 | 95 | 75 | 95 | 115 |
| D6 | M4 x 0.7P | M5 x 0.8P | M8 x 1.25P | M12 x 1.75P | M16 x 2P | M20 x 2.5P | M20 x 2.5P |
| D7 | 56 | 80 | 116 | 152 | 185 | 240 | 292 |
| L1 | 42 | 60 | 90 | 115 | 142 | 180 | 220 |
| L2 | 26 | 37 | 48 | 65 | 97 | 105 | 138 |
| L3 | 5.5 | 7 | 10 | 12 | 15 | 20 | 30 |
| L4 | 1 | 1.5 | 1.5 | 2 | 3 | 3 | 3 |
| L5 | 16 | 25 | 32 | 40 | 63 | 70 | 90 |
| L6 | 2 | 2 | 3 | 5 | 5 | 6 | 7 |
| L7 | 4 | 6 | 8 | 10 | 12 | 15 | 20 |
| L8 | 4.5 | 4.8 | 7.2 | 10 | 12 | 15 | 15 |
| L9 | 10 | 12.5 | 19 | 28 | 36 | 42 | 42 |
| C1 [a] | 46 | 70 | 100 | 130 | 165 | 215 | 235 |
| C2 [a] | M4 x 0.7P | M5 x 0.8P | M6 x 1P | M8 x 1.25P | M10 x 1.5P | M12 x 1.75P | M12 x 1.75P |
| C3 [a] | ≤11 / ≤12 [b] | ≤14 / ≤16 [b] | ≤19 / ≤24 | ≤32 | ≤38 | ≤48 | ≤55 |
| C4 [a] | 25 | 34 | 40 | 50 | 60 | 85 | 116 |
| C5 [a] | 30 | 50 | 80 | 110 | 130 | 180 | 200 |
| C6 [a] | 3.5 | 8 | 4 | 5 | 6 | 6 | 6 |
| C7 [a] | 42 | 60 | 90 | 115 | 142 | 190 | 220 |
| C8 [a] | 86.5 | 117 | 143.5 | 186.5 | 239 | 288 | 364.5 |
| C9 [a] | 8.75 | 13.5 | 10.75 | 13 | 15 | 20.75 | 53 |
| $B1_{h9}$ | 5 | 5 | 6 | 10 | 12 | 16 | 20 |
| H1 | 15 | 18 | 24.5 | 35 | 43 | 59 | 79.5 |

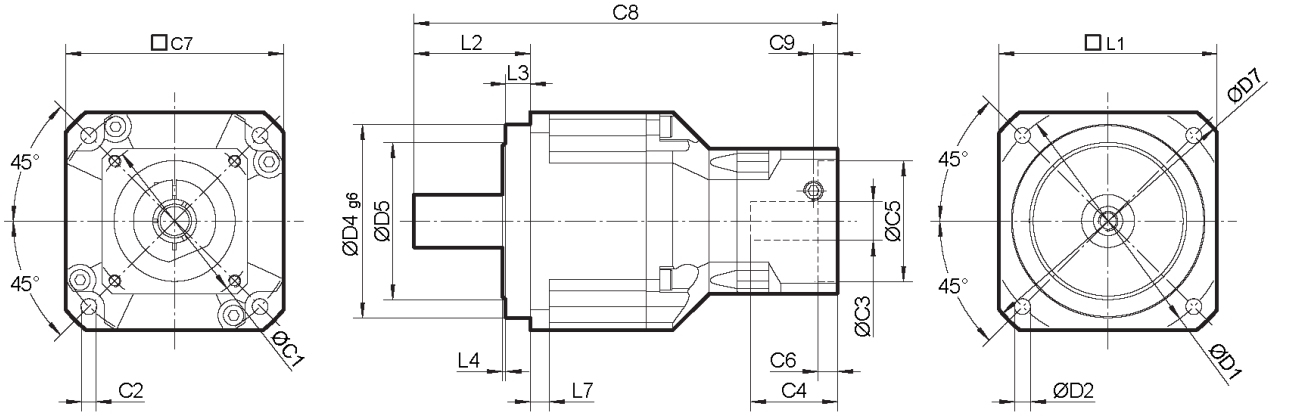
a. C1~C9 为常用公制电机接口尺寸，其他特殊型号请联系本公司。

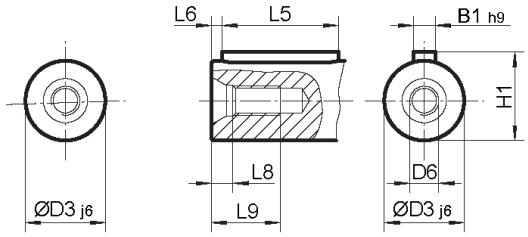
b. **TAB042**： 5,10减速比提供C3 ≤ 12可选；**TAB060**： 5,10减速比提供C3 ≤ 16可选。

a. C1~C9 are motor specific dimensions (metric std shown). Refer to www.china-tongyu.com and Design Tool to view your specific motor mounting system.

b. **TAB040** ratio 5,10 offers C3 ≤ 12 option; **TAB060** ratio 5, 10 offers C3 ≤ 16 option.

## 4.2 双级 2-stage，减速比 Ratio i = 15~100

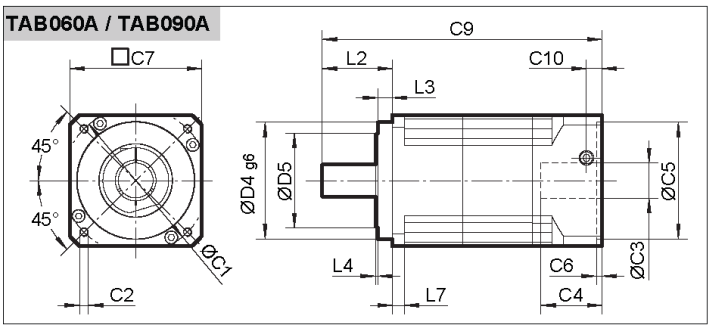



输出轴形式 **S1**
Shaft Option **S1**

输出轴形式 **S2**
Shaft Option **S2**

**TAB060A / TAB090A**




（单位unit：mm）

| 尺寸Dimension | TAB042 | TAB060 | TAB060A | TAB090 | TAB090A | TAB115 | TAB142 | TAB180 | TAB220 |
|---|---|---|---|---|---|---|---|---|---|
| D1 | 50 | 70 | | 100 | | 130 | 165 | 215 | 250 |
| D2 | 3.4 | 5.5 | | 6.6 | | 9 | 11 | 13 | 17 |
| D3 $_{j6}$ | 13 | 16 | | 22 | | 32 | 40 | 55 | 75 |
| D4 $_{g6}$ | 35 | 50 | | 80 | | 110 | 130 | 160 | 180 |
| D5 | 22 | 45 | | 65 | | 95 | 75 | 95 | 115 |
| D6 | M4 x 0.7P | M5 x 0.8P | | M8 x 1.25P | | M12 x 1.75P | M16 x 2P | M20 x 2.5P | M20 x 2.5P |
| D7 | 56 | 80 | | 116 | | 152 | 185 | 240 | 292 |
| L1 | 42 | 60 | | 90 | | 115 | 142 | 180 | 220 |
| L2 | 26 | 37 | | 48 | | 65 | 97 | 105 | 138 |
| L3 | 5.5 | 7 | | 10 | | 12 | 15 | 20 | 30 |
| L4 | 1 | 1.5 | | 1.5 | | 2 | 3 | 3 | 3 |
| L5 | 16 | 25 | | 32 | | 40 | 63 | 70 | 90 |
| L6 | 2 | 2 | | 3 | | 5 | 5 | 6 | 7 |
| L7 | 4 | 6 | | 8 | | 10 | 12 | 15 | 20 |
| L8 | 4.5 | 4.8 | | 7.2 | | 10 | 12 | 15 | 15 |
| L9 | 10 | 12.5 | | 19 | | 28 | 36 | 42 | 42 |
| C1 [a] | 46 | 46 | 70 | 70 | 100 | 100 | 130 | 165 | 215 |
| C2 [a] | M4 x 0.7P | M4 x 0.7P | M5 x 0.8P | M5 x 0.8P | M6 x 1P | M6 x 1P | M8 x 1.25P | M10 x 1.5P | M12 x 1.75P |
| C3 [a] | ≤11 / ≤12 | ≤11 / ≤12 | ≤14 / ≤16 | ≤14 / ≤15.875 / ≤16 | ≤19 / ≤24 | ≤19 / ≤24 | ≤32 | ≤38 | ≤48 |
| C4 [a] | 25 | 25 | 34 | 34 | 40 | 40 | 50 | 60 | 85 |
| C5 [a] | 30 | 30 | 50 | 50 | 80 | 80 | 110 | 130 | 180 |
| C6 [a] | 3.5 | 3.5 | 8 | 8 | 4 | 4 | 5 | 6 | 6 |
| C7 [a] | 42 | 42 | 60 | 60 | 90 | 90 | 115 | 142 | 190 |
| C8 [a] | 114 | 138.5 | 154 | 178.5 | 191.5 | 225.5 | 292.5 | 337 | 415 |
| C9 [a] | 8.75 | 8.75 | 13.5 | 13.5 | 10.75 | 10.75 | 13 | 15 | 20.75 |
| B1 $_{h9}$ | 5 | 5 | | 6 | | 10 | 12 | 16 | 20 |
| H1 | 15 | 18 | | 24.5 | | 35 | 43 | 59 | 79.5 |

a. C1~C9 为常用公制电机接口尺寸，其他特殊型号请联系本公司。

a. C1~C9 are motor specific dimensions (metric std shown). Refer to www.china-tongyu.com and Design Tool to view your specific motor mounting system.

# 5. 选型相关参数 / RELEVANT PARAMETER

## 5.1 功率 P

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

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

$P_1$ 输入功率
$P_2$ 输出功率
$P_{1n}$ 电机额定功率
$f_s$ 使用系数
$\eta$ 传动效率

## 5.1 Power P

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

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

$P_1$ Input power
$P_2$ Output power
$P_{1n}$ Rated power driving motor
$f_s$ Service factor
$\eta$ Transmission efficiency

## 5.2 传动比 i

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

$n_1$ 减速器输入转速
$n_2$ 减速器输出转速

## 5.2 Transmission ratio i

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

$n_1$ Gear units input speed
$n_2$ Gear units output speed

## 5.3 扭矩 T

$$T_2 = \frac{9550 \cdot P_1 \cdot \eta}{n_2} \text{ [Nm]}$$

$$T_{2n} \geqslant T_2 \cdot f_s \text{ [Nm]}$$

$T_2$ 输出扭矩
$T_{2n}$ 选用输出扭矩
$P_1$ 输入功率
$\eta$ 传动效率
$f_s$ 使用系数

## 5.3 Torque T

$$T_2 = \frac{9550 \cdot P_1 \cdot \eta}{n_2} \text{ [Nm]}$$

$$T_{2n} \geqslant T_2 \cdot f_s \text{ [Nm]}$$

$T_2$ Output torque
$T_{2n}$ Selected output torque
$P_1$ Input power
$\eta$ Transmission efficiency
$f_s$ Service factor

## 5.4 使用系数 $f_s$

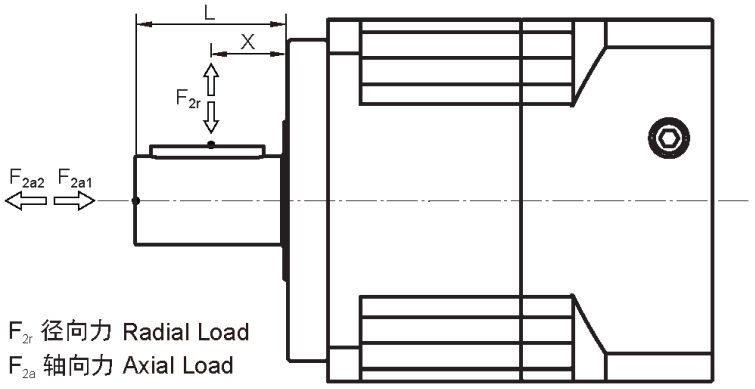
使用减速器时，应考虑一定的使用系数$f_s$，它是根据每天的运转时间和启停频率Z确定的。根据惯性加速系数确定三种负载类型

## 5.4 Service factor $f_s$

The effect of the driven machine on the gear unit is taken into account to a sufficient level of accuracy using the service factor $f_s$. The service factor is determined according to the daily operating time and the starting frequency **Z**.

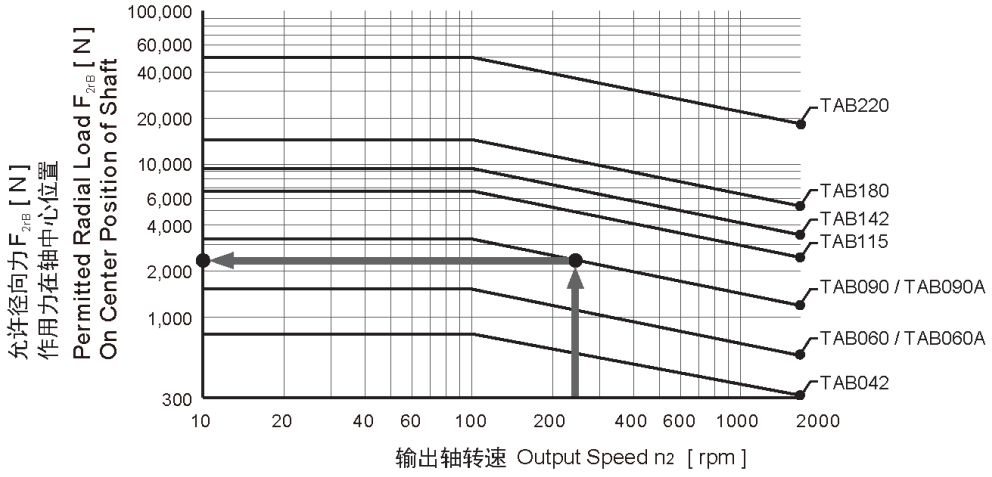
| 负载类型 Load Classifications | 每小时启动次数 Start Up Frequency Z(1/h) | 使用系数 Service Fact ($f_s$) 每日运行时间 Run Time (h) | | | | |
|---|---|---|---|---|---|---|
| | | h ≤ 4 | 4 ≤ h ≤ 8 | 8 ≤ h ≤ 12 | 12 ≤ h ≤ 16 | 16 ≤ h ≤ 24 |
| 均匀平稳负载 Uniform Shoch Load | 1 ≤ 0 | 0.9 | 1.0 | 1.1 | 1.4 | 1.8 |
| | 10 ≤ Z ≤ 30 | 1.0 | 1.2 | 1.3 | 1.6 | 2.0 |
| | 30 ≤ Z ≤ 100 | 1.2 | 1.4 | 1.5 | 1.8 | 2.2 |
| 中等冲击负载 Moderate Shoch Load | Z ≤ 10 | 1.2 | 1.4 | 1.5 | 1.8 | 2.2 |
| | 10 ≤ Z ≤ 30 | 1.4 | 1.6 | 1.7 | 2.0 | 2.5 |
| | 30 ≤ Z ≤ 100 | 1.6 | 1.8 | 2.0 | 2.2 | 2.8 |
| 冲击重载 Heavy Shoch Load | Z ≤ 10 | 1.6 | 1.8 | 2.0 | 2.2 | 2.8 |
| | 10 ≤ Z ≤ 30 | 1.8 | 2.0 | 2.2 | 2.4 | 3.0 |
| | 30 ≤ Z ≤ 100 | 2.0 | 2.3 | 2.5 | 2.7 | 3.3 |

## 5.5 输出轴的允许径向力与轴向力 / Permitted radial and axial loads



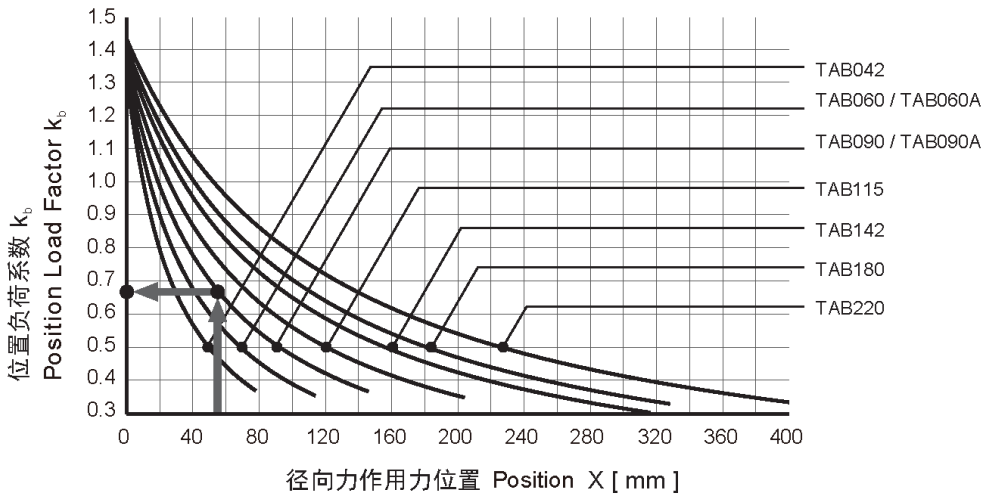

减速机输出轴所能承受的最大径向力及轴向力，端视内部支撑轴承的设计，通宇减速机采用大尺寸的轴承及较大跨距的设计，其能承受更大的径向及轴向负荷。

The permitted radial and axial loads on output shaft of the gearbox depend on the design of the gearbox supporting bearings. Tongyu use the extension straddle oversized ball bearing design. It can take heavy load from both axes.




当径向力$F_{2r}$作用于轴中心位置即X=1/2 x L.时，不同规格的减速机在不同输出转速运用下，使用寿命为20000小时*，所能承受的允许径向力$F_{2rB}$，请参照左图。

If radial force F2r exert on the center of the output shaft X=1/2 x L.
Under various operating condition the lifetime is over 20,000 * hours.
The permitted radial load is given on left diagram.




当径向力$F_{2r}$作用力不在轴中心位置时，越靠近减速机即X<1/2 x L，所能承受的径向力变大，越远离减速机即X>1/2 x L，所能承受的径向力则变小，如左图，按减速机规格及径向力作用位置X, 查出位置负荷系数$K_b$。

If radial force $F_{2r}$ not exert on the center of the output shaft X<1/2 x L or X>1/2 x L.
The permitted radial and axial load can be calculated by the position load factor $K_b$ on the left diagram.

＊连续运转降低使用寿命二分之一。
＊Continuous running reduces service life by 50%

# 1. 产品特点及应用 / PRODUCTS CHARACTERISTICS AND APPLICATION

## 1.1 产品特点：

为同轴式方形法兰输出，具有精度高、钢性好、承载能力大、 效率高、寿命长、噪音低、体积轻小、外形美观，安装方便、定位精准等特点，适用于交流伺服电机、直流伺服电机、步进电机的减速传动。

## 1.1 Products Characteristics:

Coaxial square flange output. High precision, good rigidity, large carrying capacity, high efficiency, long life, low noise, light in weight, small volume, good appearance, convenient installation, positioning accuracy and so on. Suitable for reducing transmission of ac servo motor, dc servo motor and stepper motor

## 1.2 应用领域：

精密机床、军工设备、半导体设备、印刷包装设备、太阳能、工业机器人、医疗设备、精密测试仪器等高精度场合的应用。

## 1.2 Application

Precision machine tools, military equipment, semiconductor equipment, printing and packaging equipment, solar energy, industrial robots, medical equipment, precision test instruments and other high-precision applications.

# 2. TAD系列型号说明 / TAB SERIES MODEL ILLUMINATE

**TAD** ① **090** ② - **010** ③ - **P1** ④ / 电机 **MOTOR** ⑤

| No | 说　　明 | Comments |
|---|---|---|
| 1 | **TAD:** 减速器系列代号 | **TAD:** code for gear units series |
| 2 | 减速器规格号：047、064、090、110、140、200、255 | Gearbox Size : 047、064、090、110、140、200、255 |
| 3 | 减速比：<br>单级：4、5、7、10<br>双级：20、25、35、40、50、70、100 | Ratio：<br>1 Stage：4、5、7、10<br>2 Stage：20、25、35、40、50、70、100 |
| 4 | 背隙：<br>1）P0:超精密背隙<br>2）P1:精密背隙<br>3）P2:标准背隙 | **Backlash**：<br>1）P0:Micro Backlash<br>2）P1:Reduced Backlash<br>3）P2:Standard Backlash |
| 5 | 电机型号:<br>电机制造商及型号 | Moto Designation:<br>Manufacturer Type And Model |

示例 Example：TAD090-010-P1/SIEMENS 1FT6 041-4AF71

# 3. 减速机技术参数 / GEARBOX PERFORMANCE

| 规格 Model No. | | 级数Stage | 减速比Ratio [A] | TAD047 | TAD064 | TAD090 | TAD110 | TAD140 | TAD200 | TAD255 |
|---|---|---|---|---|---|---|---|---|---|---|
| 额定输出扭矩 $T_{2N}$<br>Nominal Output Torque $T_{2N}$ | Nm | 1 | 4 | 19 | 48 | 130 | 270 | 560 | 1100 | 1700 |
| | | | 5 | 22 | 60 | 160 | 330 | 650 | 1200 | 2000 |
| | | | 7 | 19 | 50 | 140 | 300 | 550 | 1100 | 1800 |
| | | | 10 | 14 | 40 | 100 | 230 | 450 | 900 | 1500 |
| | | 2 | 20 | 19 | 48 | 130 | 270 | 560 | 1100 | 1700 |
| | | | 25 | 22 | 60 | 160 | 330 | 650 | 1200 | 2000 |
| | | | 35 | 19 | 50 | 140 | 300 | 550 | 1100 | 1800 |
| | | | 40 | 17 | 48 | 130 | 270 | 560 | 1100 | 1700 |
| | | | 50 | 22 | 60 | 160 | 330 | 650 | 1200 | 2000 |
| | | | 70 | 19 | 50 | 140 | 300 | 550 | 1100 | 1800 |
| | | | 100 | 14 | 40 | 100 | 230 | 450 | 900 | 1500 |
| 急停扭矩 $T_{2NOT}$ [B]<br>Emergency Stop Torque $T_{2NOT}$ [B] | Nm | 1 / 2 | 4~100 | 3倍额定输出扭矩 3 times of Nominal Output Torque | | | | | | |
| 额定输入转速 $n_{1N}$<br>Nominal Input Speed $n_{1N}$ | rpm | 1 / 2 | 4~100 | 5000 | 5000 | 4000 | 4000 | 3000 | 3000 | 2000 |
| 最大输入转速 $n_{1B}$<br>Max. Input Speed $n_{1B}$ | rpm | 1 / 2 | 4~100 | 10000 | 10000 | 8000 | 8000 | 6000 | 6000 | 4000 |
| 超精密背隙 P0<br>Micro Backlash P0 | arcmin | 1 | 4~10 | – | – | ≤1 | ≤1 | ≤1 | ≤1 | ≤1 |
| | | 2 | 20~100 | – | – | – | ≤3 | ≤3 | ≤3 | ≤3 |
| 精密背隙 P1<br>Reduced Backlash P1 | arcmin | 1 | 4~10 | ≤3 | ≤3 | ≤3 | ≤3 | ≤3 | ≤3 | ≤3 |
| | | 2 | 20~100 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 |
| 标准背隙 P2<br>Standard Backlash P2 | arcmin | 1 | 4~10 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 | ≤5 |
| | | 2 | 20~100 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 | ≤7 |
| 扭转刚性<br>Torsional Rigidity | Nm/arcmin | 1 / 2 | 4~100 | 7 | 13 | 31 | 82 | 151 | 440 | 1006 |
| 最大弯曲力矩 $M_{2KB}$ [C]<br>Max. Bending moment $M_{2KB}$ [C] | Nm | 1 / 2 | 4~100 | 42.5 | 125 | 235 | 430 | 1300 | 3064 | 5900 |
| 允许轴向力 $F_{2TAB}$ [C]<br>Max. Axial Load $F_{2aB}$ [C] | N | 1 / 2 | 4~100 | 990 | 1050 | 2850 | 2990 | 10590 | 16660 | 29430 |
| 重量<br>Weight | kg | 1 | 4~10 | 0.7 | 1.2 | 3.0 | 5.6 | 11.9 | 31.6 | 56.1 |
| | | 2 | 20~100 | 1.0 | 1.6 | 3.7 | 7.3 | 15.9 | 36.9 | 70.4 |
| 噪音值($n_1$=3000rpm,i=10,无负载) [D]<br>Noise ($n_1$=3000rpm, i=10, No load) [D] | dB(A) | 1 / 2 | 4~100 | ≤56 | ≤58 | ≤60 | ≤63 | ≤65 | ≤67 | ≤70 |
| 使用寿命 [E]<br>Service Life [E] | hr | 1 / 2 | 4~100 | 30000 | | | | | | |
| 效率η<br>Efficiency η | % | 1 | 4~10 | ≥97% | | | | | | |
| | | 2 | 20~100 | ≥94% | | | | | | |
| 使用温度<br>Operating Temp | ℃ | 1 / 2 | 4~100 | -10°C~90°C | | | | | | |
| 润滑<br>Lubrication | | | | 合成润滑油脂 Synthetic lubrication oils | | | | | | |
| 防护等级<br>Degree of Gearbox Protection | | 1 / 2 | 4~100 | IP65 | | | | | | |
| 安装方向<br>Mounting Position | | 1 / 2 | 4~100 | 任意方向 All directions | | | | | | |

# 减速机技术参数 / GEARBOX PERFORMANCE

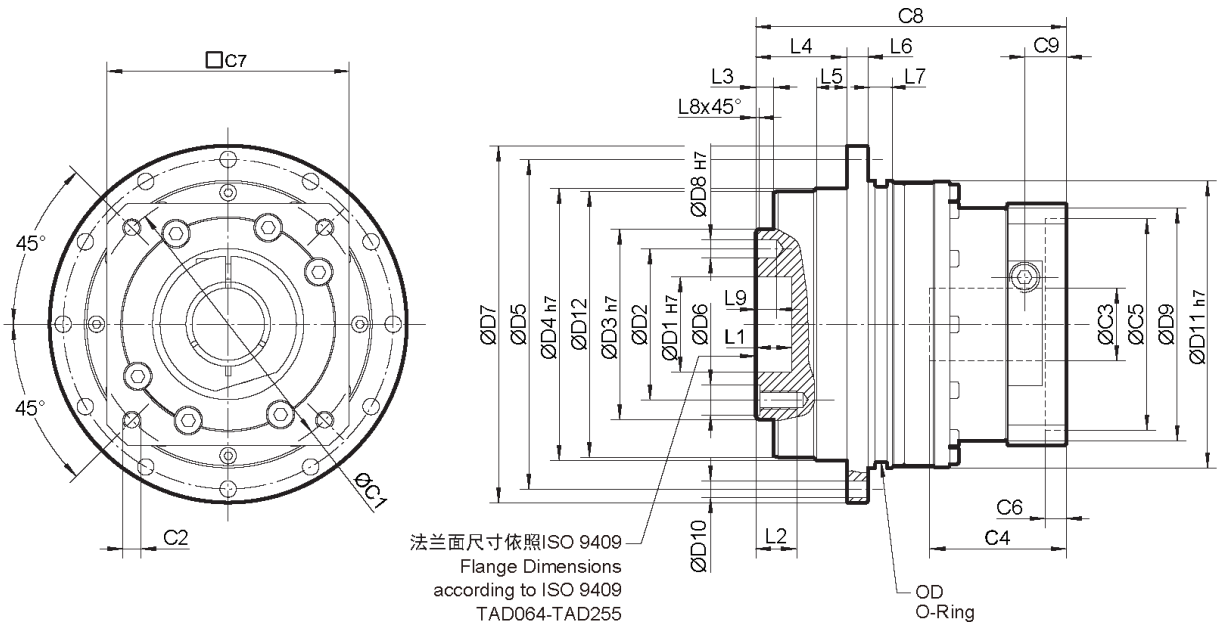
| 规格 Model No. | | 级数Stage | 减速比Ratio[A] | TAD047 | TAD064 | TAD090 | TAD110 | TAD140 | TAD200 | TAD255 |
|---|---|---|---|---|---|---|---|---|---|---|
| 转动惯量 $J_1$ Mass Moments of Inertia $J_1$ | kg·cm² | 1 | 4 | 0.03 | 0.14 | 0.51 | 2.87 | 7.54 | 25.03 | 58.31 |
| | | | 5 | 0.03 | 0.13 | 0.47 | 2.71 | 7.42 | 23.29 | 53.27 |
| | | | 7 | 0.03 | 0.13 | 0.45 | 2.62 | 7.14 | 22.48 | 50.97 |
| | | | 10 | 0.03 | 0.13 | 0.44 | 2.57 | 7.03 | 22.51 | 50.56 |
| | | 2 | 20 | 0.03 | 0.03 | 0.13 | 0.47 | 2.71 | 7.42 | 23.29 |
| | | | 25 | 0.03 | 0.03 | 0.13 | 0.47 | 2.71 | 7.42 | 23.29 |
| | | | 35 | 0.03 | 0.03 | 0.13 | 0.47 | 2.71 | 7.42 | 23.29 |
| | | | 40 | 0.03 | 0.03 | 0.13 | 0.44 | 2.57 | 7.03 | 22.51 |
| | | | 50 | 0.03 | 0.03 | 0.13 | 0.44 | 2.57 | 7.03 | 22.51 |
| | | | 70 | 0.03 | 0.03 | 0.13 | 0.44 | 2.57 | 7.03 | 22.51 |
| | | | 100 | 0.03 | 0.03 | 0.13 | 0.44 | 2.57 | 7.03 | 22.51 |

A. 减速比 ( $i=N_{in} / N_{out}$)
B. 最大加速扭矩 $T_{2B}$ = 60% of $T_{2NOT}$
C. 输出转速100 rpm时，作用于输出轴中心位置。
D. 噪音值会随着减速机速比不同而有差异
E. 连续运转，使用寿命为10000 hrs（请咨询本公司）

A. Ratio ( $i=N_{in} / N_{out}$)
B. Max. acceleration torque $T_{2B}$ = 60% of $T_{2NOT}$
C. Applied to the output shaft center at 100 rpm
D. These values are measured by gearbox with ratio = 10 (1-stage) or ratio = 100 (2-stage) at 3000 rpm without load.
By ratio smaller than 10, the noise value would be 3-5dB higher
E. For continuous operation,the service life time is less than 10000 hrs

# 4. 外形尺寸图表 / OUTLINE DIMENSION SHEET

## 4.1 单级 1-stage，减速比 Ratio i = 3~10




[单位unit: mm]

| 尺寸Dimension | TAD047 | TAD064 | TAD090 | TAD110 | TAD140 | TAD200 | TAD255 |
|---|---|---|---|---|---|---|---|
| D1 H7 | 12 | 20 | 31.5 | 40 | 50 | 80 | 100 |
| D2 | 20 | 31.5 | 50 | 63 | 80 | 125 | 140 |
| D3 h7 | 28 | 40 | 63 | 80 | 100 | 160 | 180 |
| D4 h7 | 47 | 64 | 90 | 110 | 140 | 200 | 255 |
| D5 | 67 | 79 | 109 | 135 | 168 | 233 | 280 |
| D6 | 4 x M3 x 0.5P | 7 x M5 x 0.8P | 7 x M6 x 1P | 11 x M6 x 1P | 11 x M8 x 1.25P | 11 x M10 x 1.5P | 12 x M16 x 2P |
| D7 | 72 | 86 | 118 | 145 | 179 | 247 | 300 |
| D8 H7 | 3 | 5 | 6 | 6 | 8 | 10 | 12 |
| D9 | 45.5 | 55 | 77 | 90 | 113 | 138 | 175 |
| D10 | 8 x 3.4 | 8 x 4.5 | 8 x 5.5 | 8 x 5.5 | 12 x 6.6 | 12 x 9 | 16 x 13.5 |
| D11 h7 | 60 | 70 | 95 | 120 | 152 | 212 | 255 |
| D12 | 46.2 | 63.2 | 89.2 | 109.2 | 139.2 | 199.2 | 254.2 |
| L1 | 4 | 8 | 12 | 12 | 12 | 16 | 20 |
| L2 | 6.5 | 8 | 13.5 | 13.5 | 17 | 22.5 | 30.5 |
| L3 | 3 | 3 | 6 | 6 | 6 | 8 | 12 |
| L4 | 19.5 | 19.5 | 30 | 29 | 38 | 50 | 66 |
| L5 | 7 | 7 | 10 | 10 | 14.6 | 15 | 20 |
| L6 | 4 | 4 | 7 | 8 | 10 | 12 | 18 |
| L7 | 5 | 7.7 | 8 | 10 | 12 | 15 | 20 |
| L8 | 0.5 | 0.5 | 1 | 1 | 1 | 1 | 1 |
| L9 | 4 | 6 | 7 | 7 | 7 | 10 | 10 |
| C1 [a] | 46 | 70 | 100 | 130 | 165 | 215 | 235 |
| C2 [a] | M4 x 0.7P | M5 x 0.8P | M6 x 1P | M8 x 1.25P | M10 x 1.5P | M12 x 1.75P | M12 x 1.75P |
| C3 [a] | ≤11 / ≤12 [b] | ≤14 / ≤16 [b] | ≤19 / ≤24 | ≤32 | ≤38 | ≤48 | ≤55 |
| C4 [a] | 30 | 34 | 40 | 50 | 60 | 85 | 116 |
| C5 [a] | 30 | 50 | 80 | 110 | 130 | 180 | 200 |
| C6 [a] | 3.5 | 8 | 4 | 5 | 6 | 6 | 6 |
| C7 [a] | 48 | 60 | 90 | 115 | 142 | 190 | 220 |
| C8 [a] | 70 | 82.5 | 99.5 | 121.5 | 151 | 199.5 | 256.5 |
| C9 [a] | 13.25 | 13.5 | 10.75 | 13 | 15 | 20.75 | 53.5 |
| OD | 56 x 2 | 66 x 2 | 90 x 3 | 110 x 3 | 145 x 3 | 200 x 5 | 238 x 5 |

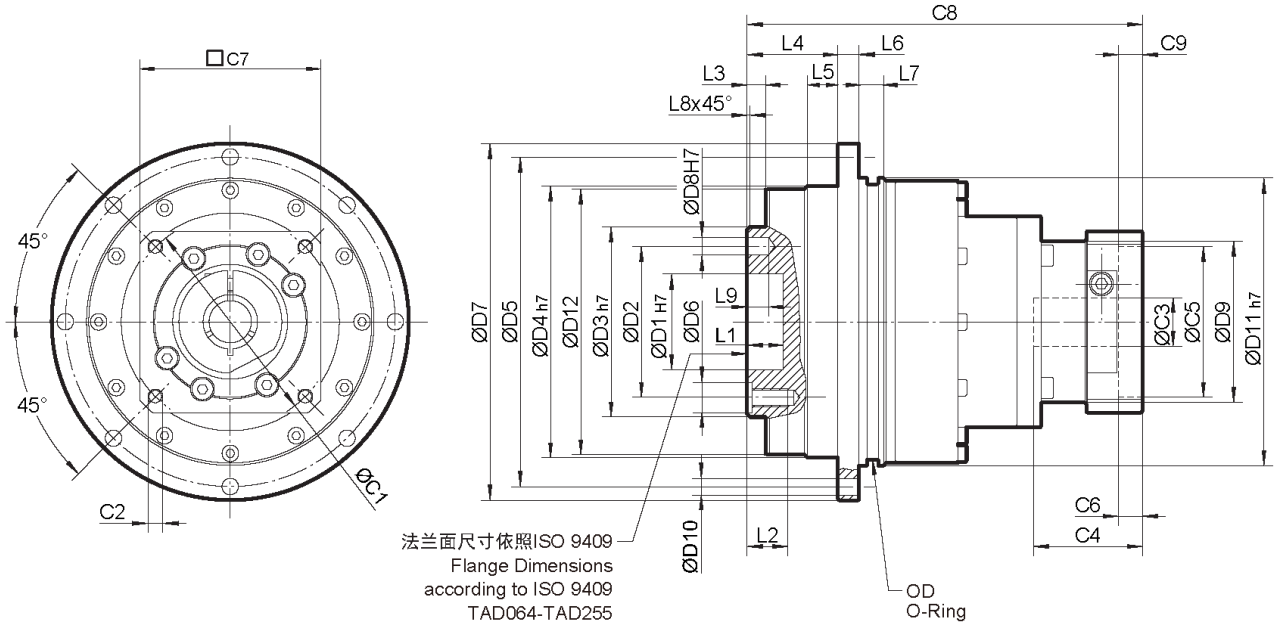
a. C1~C9 为常用公制电机接口尺寸，其他特殊型号请联系本公司。

b. **TAD047**： 5,10减速比提供C3 ≤ 12可选；**TAD064**： 5,10减速比提供C3 ≤ 16可选。

a. C1~C9 are motor specific dimensions (metric std shown). Refer to www.china-tongyu.com and Design Tool to view your specific motor mounting system.

b. **TAD047** ratio 5,10 offers C3 ≤ 12 option; **TAD064** ratio 5, 10 offers C3 ≤ 16 option.

## 4.2 双级 2-stage，减速比 Ratio i = 20~100




（单位unit：mm）

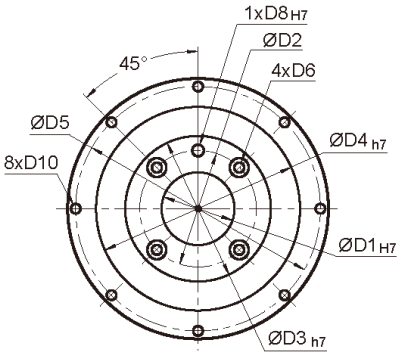
| 尺寸Dimension | TAD047 | TAD064 | TAD090 | TAD110 | TAD140 | TAD200 | TAD255 |
|---|---|---|---|---|---|---|---|
| D1 H7 | 12 | 20 | 31.5 | 40 | 50 | 80 | 100 |
| D2 | 20 | 31.5 | 50 | 63 | 80 | 125 | 140 |
| D3 h7 | 28 | 40 | 63 | 80 | 100 | 160 | 180 |
| D4 h7 | 47 | 64 | 90 | 110 | 140 | 200 | 255 |
| D5 | 67 | 79 | 109 | 135 | 168 | 233 | 280 |
| D6 | 4 x M3 x 0.5P | 7 x M5 x 0.8P | 7 x M6 x 1P | 11 x M6 x 1P | 11 x M8 x 1.25P | 11 x M10 x 1.5P | 12 x M16 x 2P |
| D7 | 72 | 86 | 118 | 145 | 179 | 247 | 300 |
| D8 H7 | 3 | 5 | 6 | 6 | 8 | 10 | 12 |
| D9 | 45.5 | 45.5 | 53.4 | 77 | 102 | 125 | 160 |
| D10 | 8 x 3.4 | 8 x 4.5 | 8 x 5.5 | 8 x 5.5 | 12 x 6.6 | 12 x 9 | 16 x 13.5 |
| D11 h7 | 60 | 70 | 95 | 120 | 152 | 212 | 255 |
| D12 | 46.2 | 63.2 | 89.2 | 109.2 | 139.2 | 199.2 | 254.2 |
| L1 | 4 | 8 | 12 | 12 | 12 | 16 | 20 |
| L2 | 6.5 | 8 | 13.5 | 13.5 | 17 | 22.5 | 30.5 |
| L3 | 3 | 3 | 6 | 6 | 6 | 8 | 12 |
| L4 | 19.5 | 19.5 | 30 | 29 | 38 | 50 | 66 |
| L5 | 7 | 7 | 10 | 10 | 14.6 | 15 | 20 |
| L6 | 4 | 4 | 7 | 8 | 10 | 12 | 18 |
| L7 | 5 | 7.7 | 8 | 10 | 12 | 15 | 20 |
| L8 | 0.5 | 0.5 | 1 | 1 | 1 | 1 | 1 |
| L9 | 4 | 6 | 7 | 7 | 7 | 10 | 10 |
| C1 [a] | 46 | 46 | 70 | 100 | 130 | 165 | 215 |
| C2 [a] | M4 x 0.7P | M4 x 0.7P | M5 x 0.8P | M6 x 1P | M8 x 1.25P | M10 x 1.5P | M12 x 1.75P |
| C3 [a] | ≤11 / ≤12 | ≤11 / ≤12 | ≤14 / ≤15.875 / ≤16 | ≤19 / ≤24 | ≤32 | ≤38 | ≤48 |
| C4 [a] | 30 | 30 | 34 | 40 | 50 | 60 | 85 |
| C5 [a] | 30 | 30 | 50 | 80 | 110 | 130 | 180 |
| C6 [a] | 3.5 | 3.5 | 8 | 4 | 5 | 6 | 6 |
| C7 [a] | 48 | 48 | 60 | 90 | 115 | 142 | 190 |
| C8 [a] | 97.5 | 108 | 134 | 160 | 204 | 248 | 311.5 |
| C9 [a] | 13.25 | 13.25 | 13.5 | 10.75 | 13 | 15 | 20.75 |
| OD | 56 x 2 | 66 x 2 | 90 x 3 | 110 x 3 | 145 x 3 | 200 x 5 | 238 x 5 |

a. C1~C9 为常用公制电机接口尺寸，其他特殊型号请联系本公司。

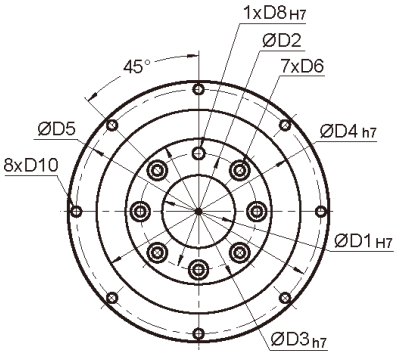
a. C1~C9 are motor specific dimensions (metric std shown). Refer to www.china-tongyu.com and Design Tool to view your specific motor mounting system.

## 输出轴尺寸 Output Dimensions

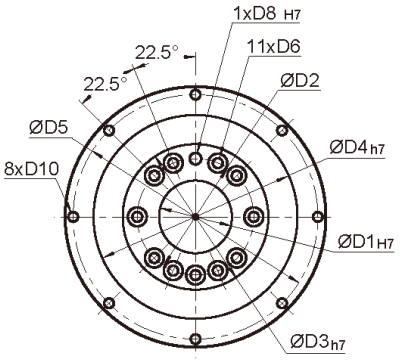
### TAD 047



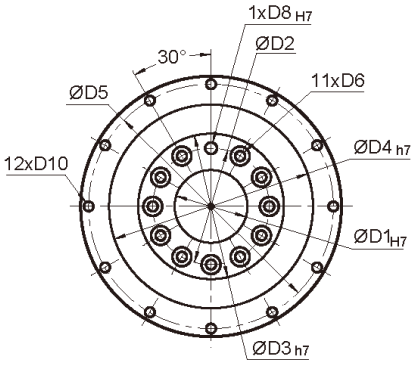

### TAD 064 / TAD 090



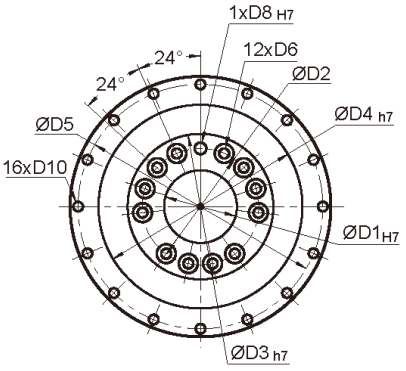

### TAD 110




### TAD 140 / TAD 200




### TAD 255




(单位unit：mm)

| 尺寸Dimension | TAD047 | TAD064 | TAD090 | TAD110 | TAD140 | TAD200 | TAD255 |
|---|---|---|---|---|---|---|---|
| **D1** $_{H7}$ | 12 | 20 | 31.5 | 40 | 50 | 80 | 100 |
| **D2** | 20 | 31.5 | 50 | 63 | 80 | 125 | 140 |
| **D3** $_{h7}$ | 28 | 40 | 63 | 80 | 100 | 160 | 180 |
| **D4** $_{h7}$ | 47 | 64 | 90 | 110 | 140 | 200 | 255 |
| **D5** | 67 | 79 | 109 | 135 | 168 | 233 | 280 |
| **D6** | M3 x 0.5P | M5 x 0.8P | M6 x 1P | M6 x 1P | M8 x 1.25P | M10 x 1.5P | M16 x 2P |
| **D8** $_{H7}$ | 3 | 5 | 6 | 6 | 8 | 10 | 12 |
| **D10** | 3.4 | 4.5 | 5.5 | 5.5 | 6.6 | 9 | 13.5 |

# 5. 选型相关参数 / RELEVANT PARAMETER

## 5.1 功率 P

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

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

$P_1$ 输入功率
$P_2$ 输出功率
$P_{1n}$ 电机额定功率
$f_s$ 使用系数
$\eta$ 传动效率

## 5.2 传动比 i

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

$n_1$ 减速器输入转速
$n_2$ 减速器输出转速

## 5.3 扭矩 T

$$T_2 = \frac{9550 \cdot P_1 \cdot \eta}{n_2} \text{ [Nm]}$$

$$T_{2n} \geqslant T_2 \cdot f_s \text{ [Nm]}$$

$T_2$ 输出扭矩
$T_{2n}$ 选用输出扭矩
$P_1$ 输入功率
$\eta$ 传动效率
$f_s$ 使用系数

## 5.4 使用系数 $f_s$

使用减速器时，应考虑一定的使用系数$f_s$，它是根据每天的运转时间和启停频率Z确定的。根据惯性加速系数确定三种负载类型

## 5.1 Power P

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

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

$P_1$ Input power
$P_2$ Output power
$P_{1n}$ Rated power driving motor
$f_s$ Service factor
$\eta$ Transmission efficiency

## 5.2 Transmission ratio i

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

$n_1$ Gear units input speed
$n_2$ Gear units output speed

## 5.3 Torque T

$$T_2 = \frac{9550 \cdot P_1 \cdot \eta}{n_2} \text{ [Nm]}$$

$$T_{2n} \geqslant T_2 \cdot f_s \text{ [Nm]}$$

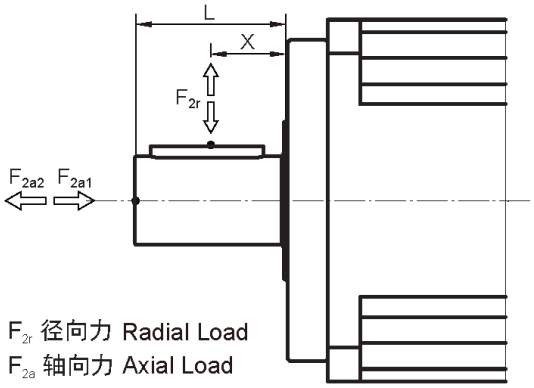
$T_2$ Output torque
$T_{2n}$ Selected output torque
$P_1$ Input power
$\eta$ Transmission efficiency
$f_s$ Service factor

## 5.4 Service factor $f_s$

The effect of the driven machine on the gear unit is taken into account to a sufficient level of accuracy using the service factor $f_s$. The service factor is determined according to the daily operating time and the starting frequency **Z**.

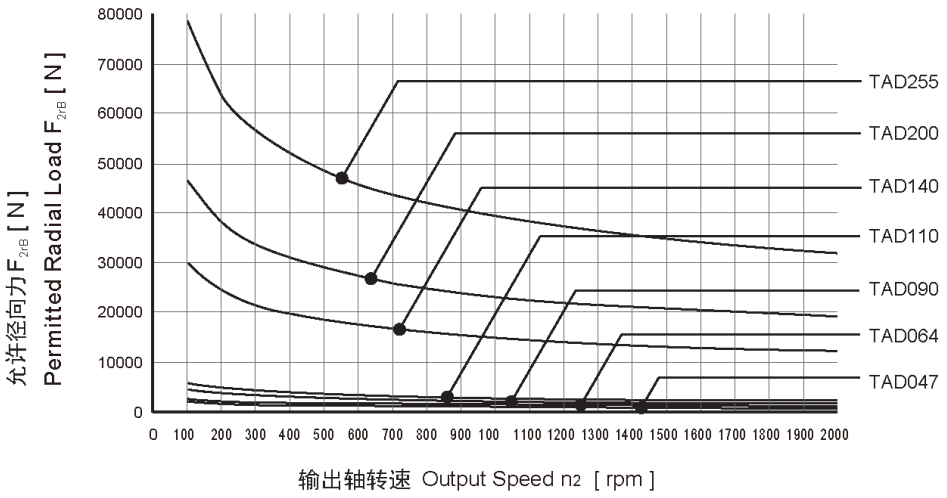
| 负载类型 Load Classifications | 每小时启动次数 Start Up Frequency Z(1/h) | 使用系数 Service Fact ($f_s$) 每日运行时间 Run Time (h) | | | | |
|---|---|---|---|---|---|---|
| | | h ≤ 4 | 4 ≤ h ≤ 8 | 8 ≤ h ≤ 12 | 12 ≤ h ≤ 16 | 16 ≤ h ≤ 24 |
| 均匀平稳负载 Uniform Shoch Load | 1 ≤ 0 | 0.9 | 1.0 | 1.1 | 1.4 | 1.8 |
| | 10 ≤ Z ≤ 30 | 1.0 | 1.2 | 1.3 | 1.6 | 2.0 |
| | 30 ≤ Z ≤ 100 | 1.2 | 1.4 | 1.5 | 1.8 | 2.2 |
| 中等冲击负载 Moderate Shoch Load | Z ≤ 10 | 1.2 | 1.4 | 1.5 | 1.8 | 2.2 |
| | 10 ≤ Z ≤ 30 | 1.4 | 1.6 | 1.7 | 2.0 | 2.5 |
| | 30 ≤ Z ≤ 100 | 1.6 | 1.8 | 2.0 | 2.2 | 2.8 |
| 冲击重载 Heavy Shoch Load | Z ≤ 10 | 1.6 | 1.8 | 2.0 | 2.2 | 2.8 |
| | 10 ≤ Z ≤ 30 | 1.8 | 2.0 | 2.2 | 2.4 | 3.0 |
| | 30 ≤ Z ≤ 100 | 2.0 | 2.3 | 2.5 | 2.7 | 3.3 |

## 5.5 输出轴的允许径向力与轴向力 / Permitted radial and axial loads



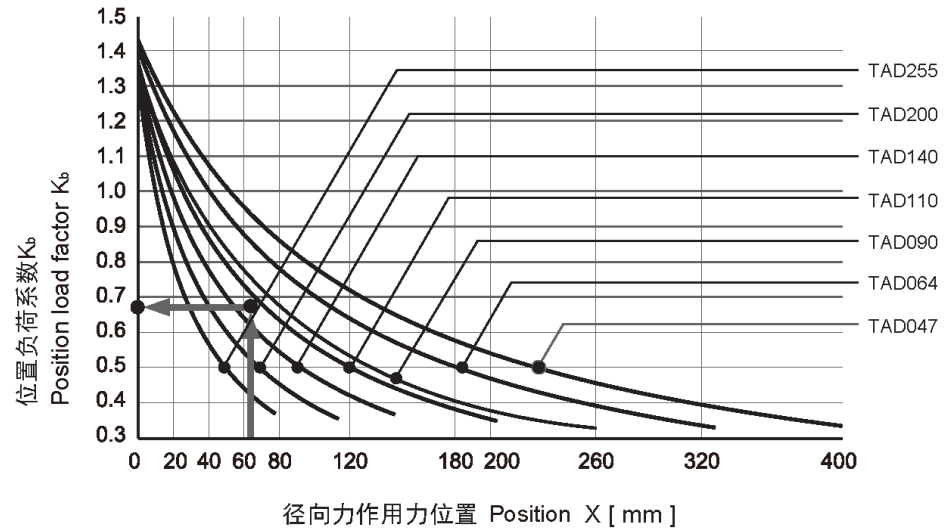

减速机输出轴所能承受的最大径向力及轴向力，端视内部支撑轴承的设计，通宇减速机采用大尺寸的轴承及较大跨距的设计，其能承受更大的径向及轴向负荷。

The permitted radial and axial loads on output shaft of the gearbox depend on the design of the gearbox supporting bearings. Tongyu use the extension straddle oversized ball bearing design. It can take heavy load from both axes.




当径向力$F_{2r}$作用于轴中心位置即X=1/2 x L.时，不同规格的减速机在不同输出转速运用下，使用寿命为20000小时*，所能承受的允许径向力$F_{2rB}$，请参照左图。

If radial force F2r exert on the center of the output shaft X=1/2 x L.
Under various operating condition the lifetime is over 20,000 * hours.
The permitted radial load is given on left diagram.



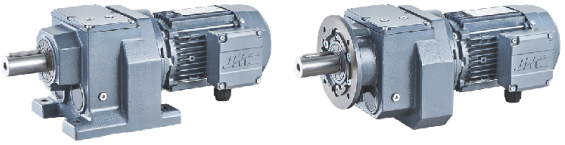

当径向力$F_{2r}$作用力不在轴中心位置时，越靠近减速机即X<1/2 x L，所能承受的径向力变大，越远离减速机即X>1/2 x L，所能承受的径向力则变小，如左图，按减速机规格及径向力作用位置X, 查出位置负荷系数$K_b$。

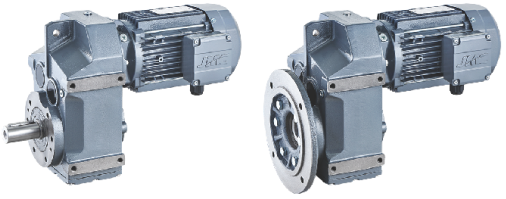
If radial force $F_{2r}$ not exert on the center of the output shaft X<1/2 x L or X>1/2 x L.
The permitted radial and axial load can be calculated by the position load factor $K_b$ on the left diagram.

＊连续运转降低使用寿命二分之一。
＊ Continuous running reduces service life by 50%

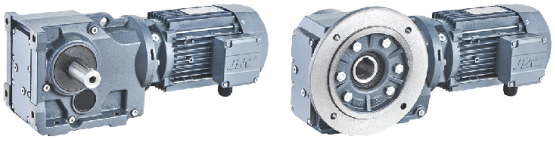
# 系列产品展示
# SHOW THE SERIES PRODUCTS

**TR** 系列斜齿轮减速电机
**TR** Series helical geared motors

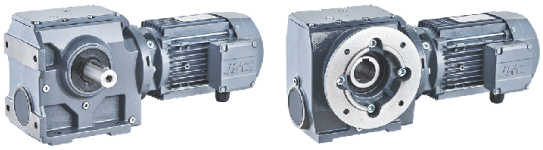




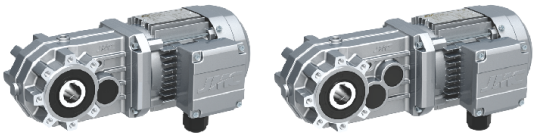
**TF** 系列平行轴斜齿轮减速电机
**TF** Series parallel shaft helical geared motors



**TK** 系列斜齿轮-伞齿轮减速电机
**TK** Series helical-bevel geared motors



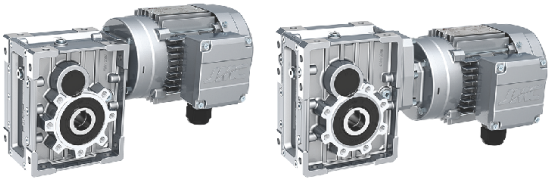
**TS** 系列斜齿轮-蜗轮蜗杆减速电机
**TS** Series helical-worm geared motors



**WKM** 系列斜齿-准双曲面齿轮减速电机
**WKM** Series helical-hypoid geared motors



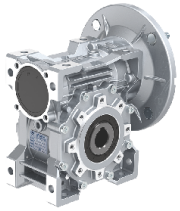
**TRC** 系列小型斜齿轮减速电机
**TRC** Series mini helical geared motors



**TKM / TKB** 系列斜齿-准双曲面轮减电机
**TKM / TKB** series helical-hypoid gear motors



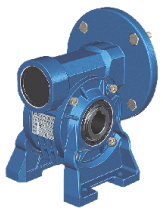
**TAB / TAD** 系列高精密行星减速机
**TAB / TAD** Series high precision planetary gearbox



**TWM** 系列蜗轮蜗杆减速器
**TWM** Series worm gear units



**TNRV** 系列蜗轮蜗杆减速器
**TNRV** Series worm gear units



**VF** 系列蜗轮蜗杆减速器
**VF** Series worm gear units



**UDL** 系列无级变速器
**UDL** Series stepless speed variator

因技术更新，产品与样本有不同之处，请以产品为准，恕不另行通知。
Data of product and catalogue could be different due to the technology update, please refer to the actual product . Without prior notice!

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