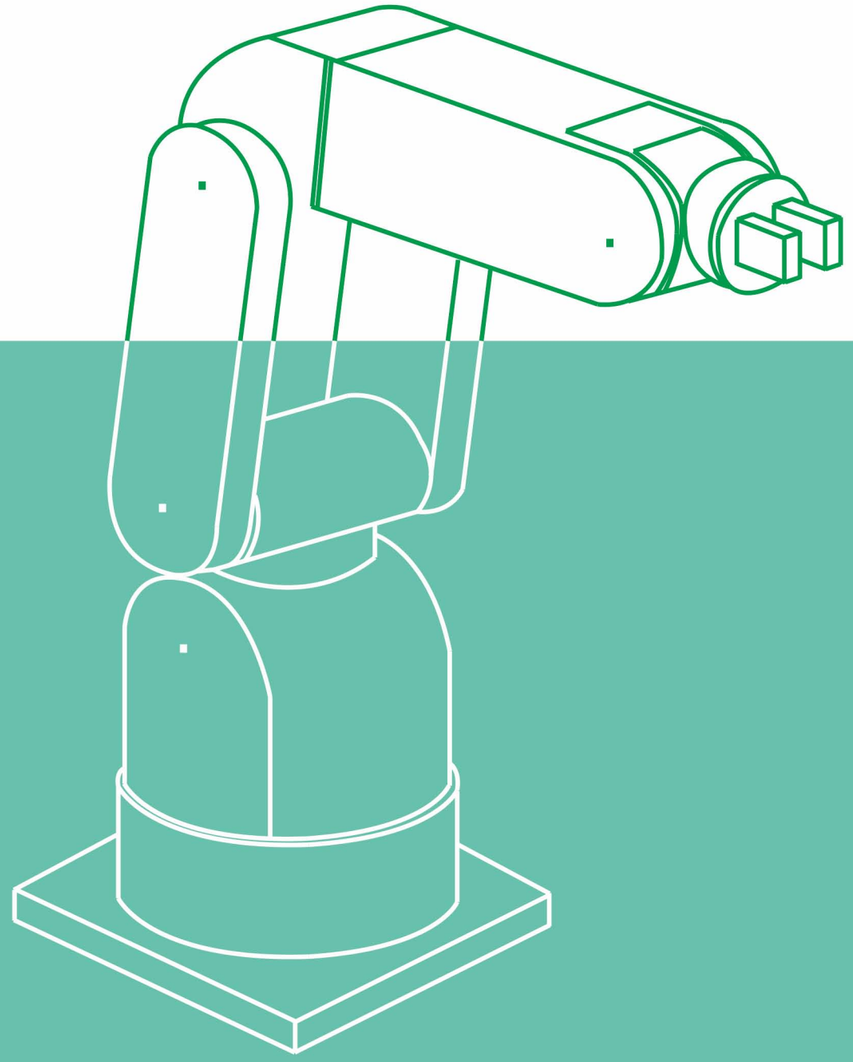
BEGEMA ROBOTS



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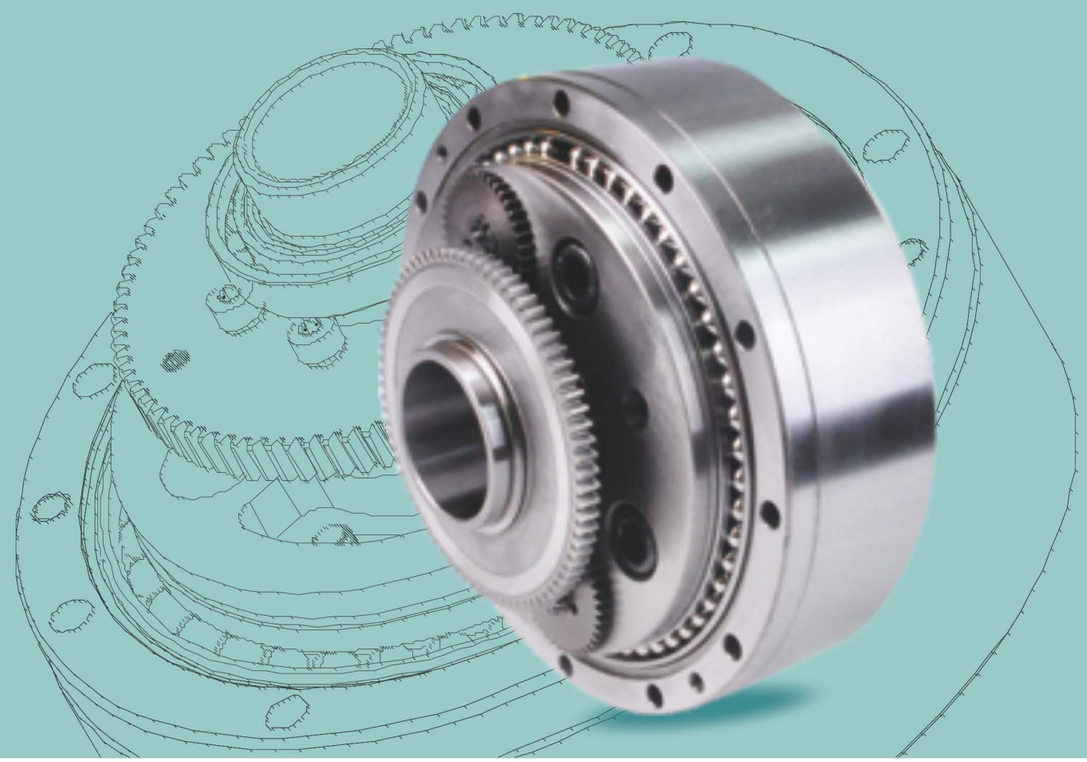
本刊如有勘误,敬请谅解,内容涉及参数若有变动恕不另行通知。

BEGEMA 宝戈玛®

—— 国际知名的动力传动设备专业供应商

摆线针轮RV减速器选型简本



2017版

BEGEMA

INDUSTRIAL EQUIPMENT

Company
公司简介Introduction

BEGEMA宝戈玛工业是一家集科研、生产、销售于一体的动力传动装置专业制造商公司总部位于意大利博洛尼亚市，并在中国苏州、东莞设有大型生产基地和营销中心。公司拥有专业的研发团队、顶尖的加工生产线和严格的质量控制体系，经过不断开拓和发展，宝戈玛逐步成为动力传动和自动化控制领域中的知名品牌。

公司产品主要包括BHS系列谐波减速器、BCS系列谐波减速器、精密行星减速器等精密传动元件，具有可靠性高、扭矩大、寿命长、体积小等特点，广泛应用于机器人、半导体制造设备、数控机床、医疗设施、精密机械自动化控制等领域，尤其在工业机器人机械臂行业，宝戈玛产品超高的精度和结构优点得到广大客户的一致好评与信赖。

征程万里鹏程举，敢立潮头唱大风。紧紧围绕"用户至上"的服务理念和"创新提效"的发展思路，公司产品质量和服务赢得大批用户支持。在未来的进取之路上，我们将永葆诚信、专业、高效、安全的企业精神，继续为广大客户提供整套动力传动系统解决方案确保宝戈玛在国内外市场中的领先地位！

Applications
减速器应用领域

能源
Energy

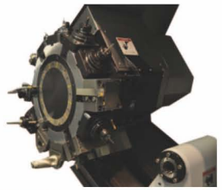
航天
Space

医疗机械
Medical Apparatus and Instruments

机床 ATC 刀库
Machine Tool ATC Knife Library

工业机器人
Industrial Robot

精密定位转台
Precision Positioning Turntable



机床刀塔
Machine Tool Turret

Production & Testing Equipments
生产 & 检测设备

格里森高效滚齿机
Gleason senior hobbing machine

高精度内孔磨床
High prescision I · D Grider

高精度外圆磨床
High prescision O · P Grider

高精度车床
High prescision lathe

KAPP 磨齿机
KAPP grinding machine

成型磨床
Forming grinder

真空炉生产线
Production line of Vacuum furnace

多用炉生产线
Production line of continuous furnace

滚刀磨
Hobbing cutter sharpner

MM350 齿轮检测中心
The MM350 Gear Testing Center

P26/P24 齿轮检测中心
The P26/P24 Gear Testing Center

光谱仪
Spectrometer

轮廓仪检测中心
Taylor gear profile instrument

蔡司三坐标检测中心
ZEISS CMM

高倍显微镜
High power microscope

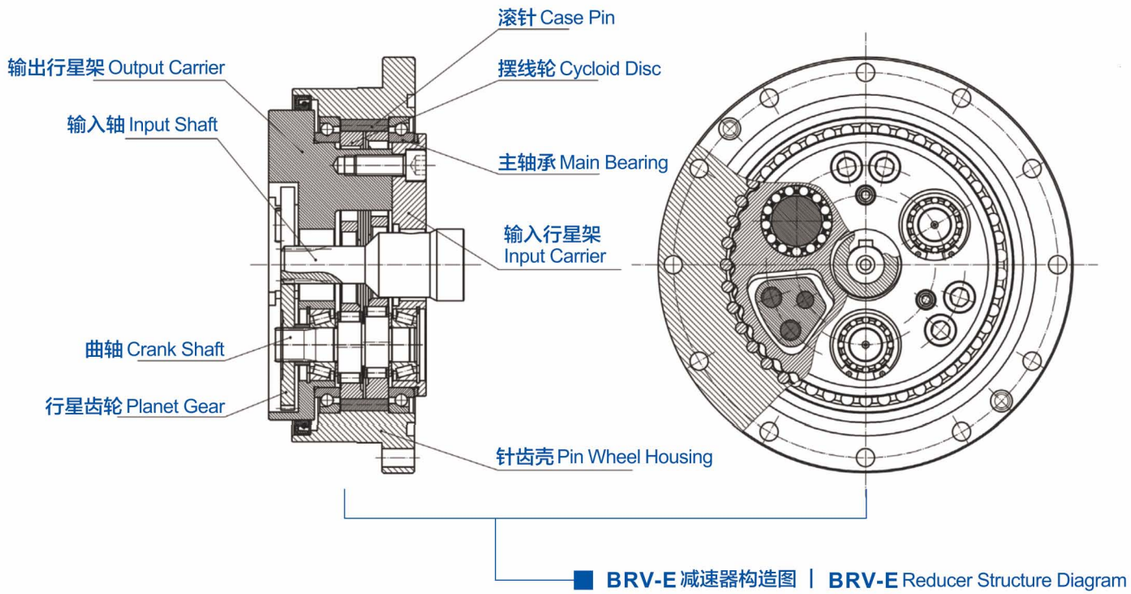
振动噪声实验室
NVH Laboratory

250HF5100 型、250KN 高频疲劳试验机
250KN High frequency pulsator

标准 FZG 试验台
FZG standard test-bed

BRV-E

Operating Principle
工作原理

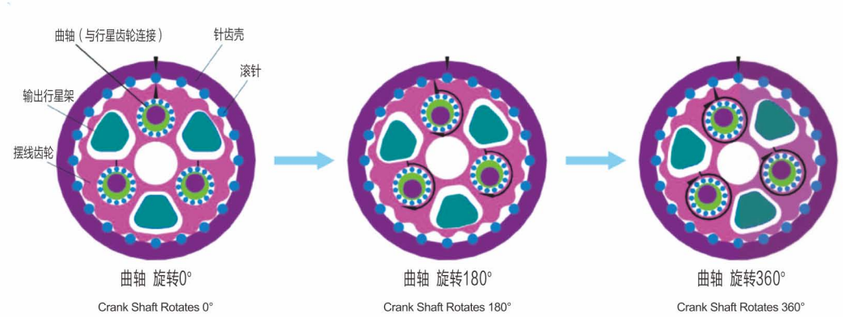


BRV-E 减速器构造图 | **BRV-E** Reducer Structure Diagram

BRV-E 减速器是由一个行星齿轮减速器的前级和一个摆线针轮减速器的后级组成的二级减速器。第一级减速经输入轴的旋转由输入轴上的齿轮传递到行星齿轮，按齿数比进行减速；行星齿轮与曲轴相连接，第二级减速经曲轴的旋转带动摆线轮做偏心运动，曲轴旋转 1 周，摆线轮将沿与曲轴运动相反方向转动 1 个齿。

BRV-E is a two-stage gear reducer which consists of the 1st stage of planetary gear reducer and the 2nd stage of cycloidal pin-wheel reducer. The first speed reduction is achieved by the meshing between the input shaft gear and the planetary gear based on the gear reduction ratio. The planet gear is connected to the crank shaft, and the rotation of crank shaft causes the eccentric rotation of the cycloid disc. This achieves the second speed reduction and thus if the crank shaft rotates 360°, the cycloid disc will rotate one tooth in the opposite direction.

▼ E 系列工作原理图　E Series Working Principle Diagram



输入轴转动时速比：

$$R=1+\frac{Z2}{Z1}\cdot Z3$$

- R：速比值
- Z1: 输入轴齿数
- Z2: 行星齿轮齿数
- Z3: 滚针数

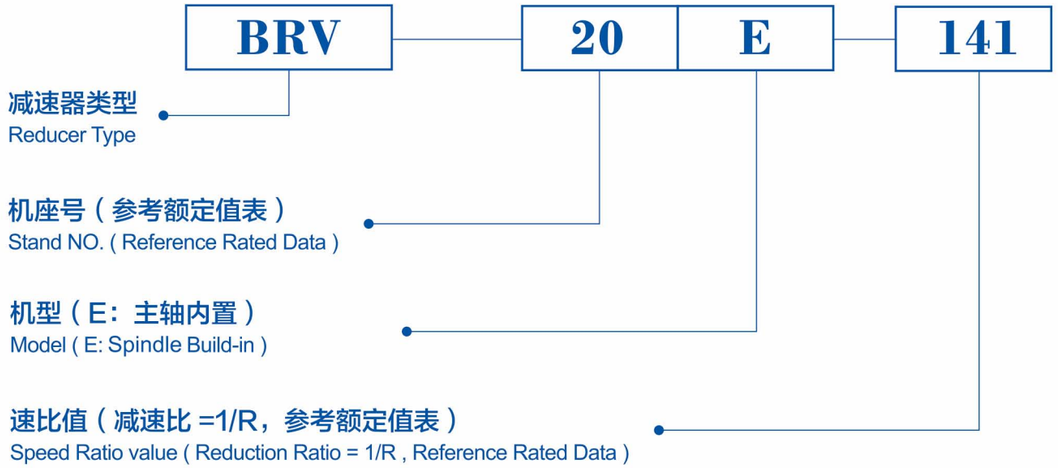
Speed Ratio When Input Shaft Rotation:

$$R=1+\frac{Z2}{Z1}\cdot Z3$$

- R：Speed ratio value
- Z1: Input Shaft Teeth
- Z2: Planet Gear Teeth
- Z3:Case Pin Number

Model Designations
型号表示

订购、咨询时，请按下述型号标记进行指示。
When ordering, consulting, please click the following model markup instructions.



BRV-E | Rated Data 额定值表

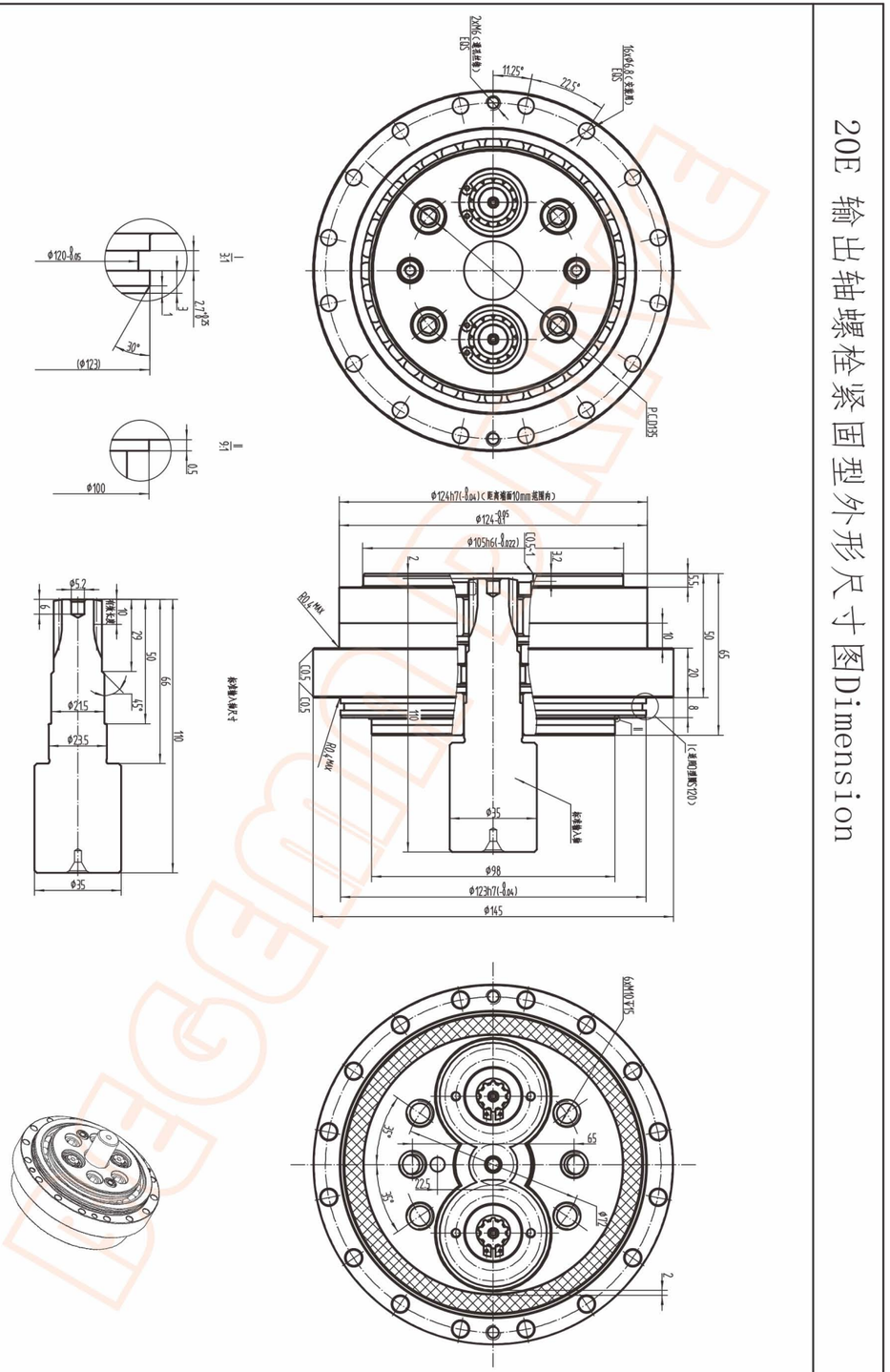
输出转速 Output Speed (r/min)			5		10		15		20		25		25		30		40		50		60		最大工作转矩 Max. Working Torque (Nm)	最大冲击转矩 Max. Impact Torque (Nm)
型号 Model	减速比 Ratio		输出转矩 Output Torque (Nm)	输入功率 Input Power (kW)	输出转矩 Output Torque (Nm)	输入功率 Input Power (kW)	输出转矩 Output Torque (Nm)	输入功率 Input Power (kW)	输出转矩 Output Torque (Nm)	输入功率 Input Power (kW)	输出转矩 Output Torque (Nm)		输入功率 Input Power (kW)	输出转矩 Output Torque (Nm)	输入功率 Input Power (kW)	输出转矩 Output Torque (Nm)	输入功率 Input Power (kW)	输出转矩 Output Torque (Nm)	输入功率 Input Power (kW)	输出转矩 Output Torque (Nm)	输入功率 Input Power (kW)		
	轴旋转 Shaft Rotation	外壳旋转 Wheel Housing																						
20E	57	56	231	0.17	188	0.26	167	0.38	153	0.43	143		0.54	135	0.57	124	0.70	50	0.35	47	0.40		424	848
	81	80																						
	105	104																						
	121	120																						
	141	140																						
	161	160																						
40E	57	56	572	0.40	465	0.65	412	0.86	377	1.05	353		1.23	334	1.40	307	1.71	115	0.81	110	0.92		1015	2030
	81	80																						
	105	104																						
	121	120																						
	153	152																						
80E	57	56	1088	0.76	885	1.24	784	1.64	719	2.01	672		2.35	637	2.67	584	3.26	287	2.00	271	2.27		1950	3900
	81	80																						
	101	100																						
	121	120																						
	153	152																						
110E	81	80	1499	1.05	1215	1.70	1078	2.26	990	2.76	925		3.23	875	3.67	804	4.49	546	3.81	517	4.33		2700	5400
	111	110																						
	161	160																						
	175.28	174.28																						
160E	81	80	2176	1.52	1774	2.48	1568	3.28	1441	4.02	1343		4.69	1274	5.34	—	—	—	—	—	—		3950	7900
	101	100																						
	129	128																						
	145	144																						
	171	170																						
320E	81	80	4361	3.04	3538	4.94	3136	6.57	2881	8.05	2695		9.41	2548	10.7	—	—	—	—	—	—		7900	15800
	101	100																						
	118.5	117.5																						
	129	128																						
	141	140																						
	171	170																						
	185	184																						
450E	81	80	6135	4.28	4978	6.95	4410	9.24	4047	11.3	3783		13.2	—	—	—	—	—	—	—	—		11050	22100
	101	100																						
	118.5	117.5																						
	129	128																						
	154.8	153.8																						
	171	170																						
	192.4	191.4																						

型号 Model	最大工作弯矩 Max. Working Moment (Nm)	最大冲击弯矩 Max. Impact Moment (Nm)	空程回差 Max. Blacklash (arc.min)	倾覆刚度 Tilting Stiffness (Nm/arc.min)	扭转刚度 Torsional Stiffness (Nm/arc.min)	轴向负载 Axial Load (N)	重量 Weight (kg)
20E	880	1760	1′	368	48	5513	4.8
40E	1630	3260	1′	925	108	8052	9.5
80E	2050	4100	1′	1172	195	10348	13
110E	2850	5700	1′	1455	290	11525	17.5
160E	3880	7760	1′	2920	390	13519	26.5
320E	7000	14000	1′	4880	972	20167	44.5
450E	8600	17200	1′	7410	1150	22051	68.8

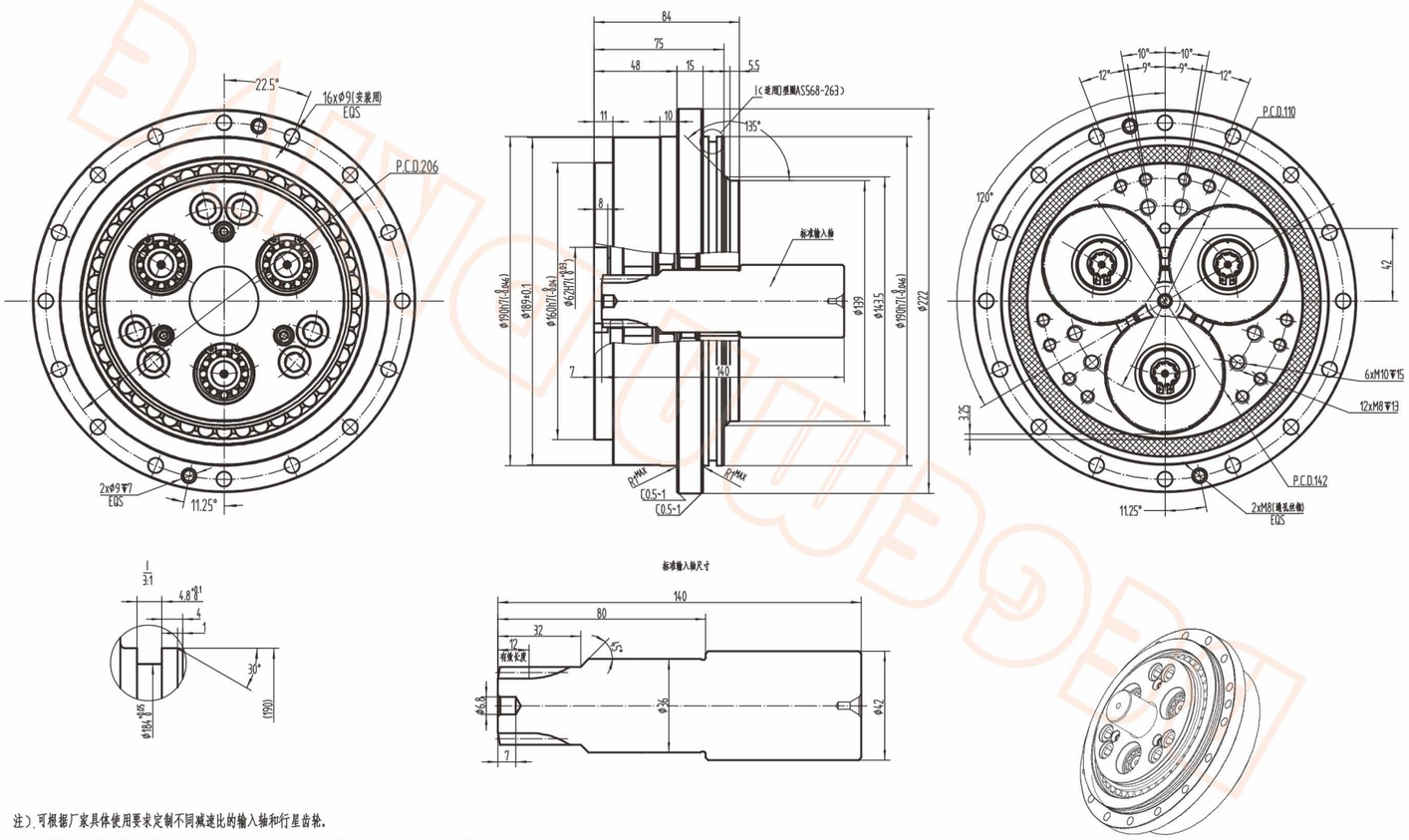
20E 输出轴螺栓紧固型外形尺寸图Dimension

注）可根据厂家具体使用要求定制不同减速比的输入轴和行星齿轮。

Different input shafts and planet gears can be customized according to the using requirements.



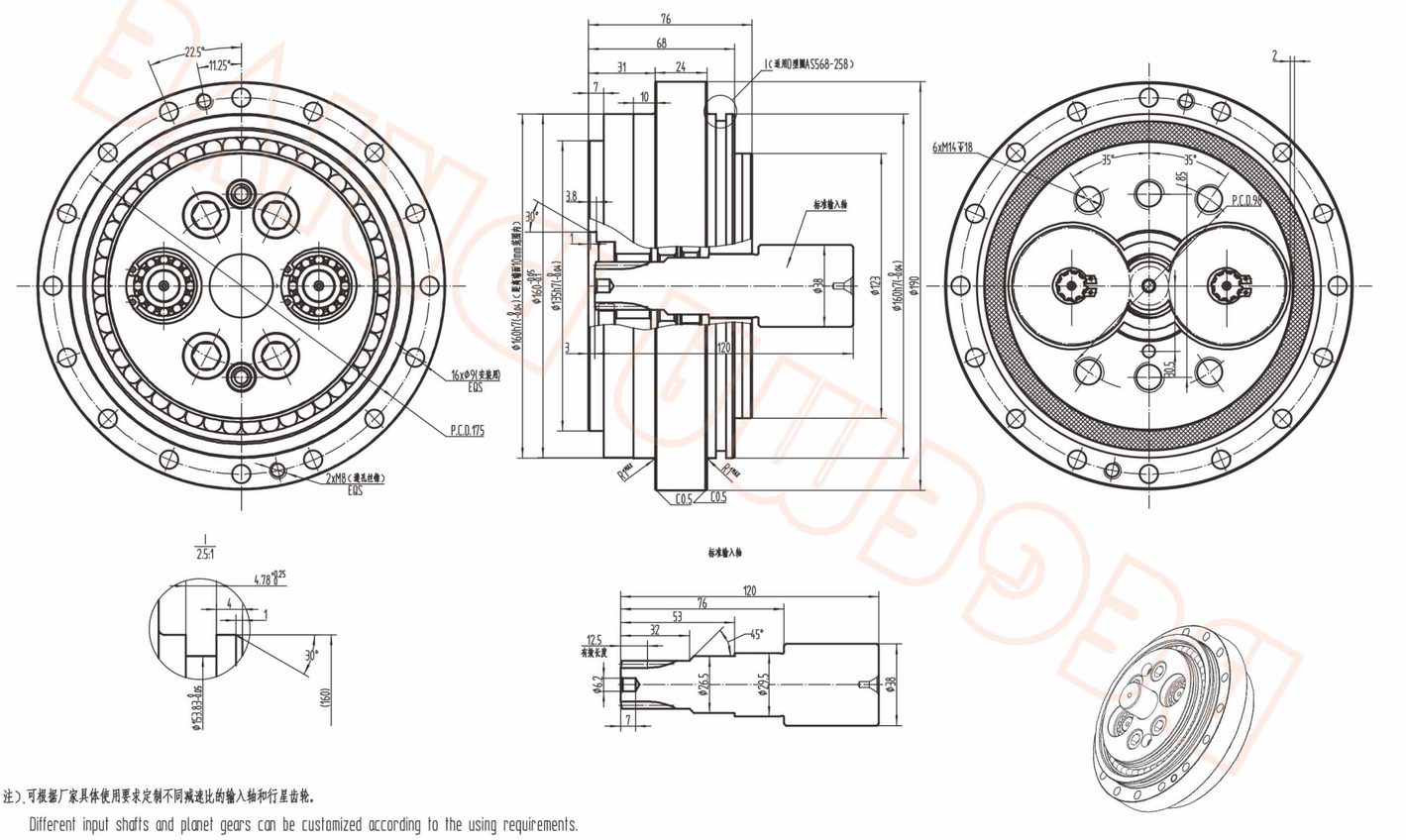
80E 输出轴螺栓紧固型外形尺寸图Dimension



注)、可根据厂家具体使用要求定制不同减速比的输入轴和行星齿轮。

Different input shafts and planet gears can be customized according to the using requirements.

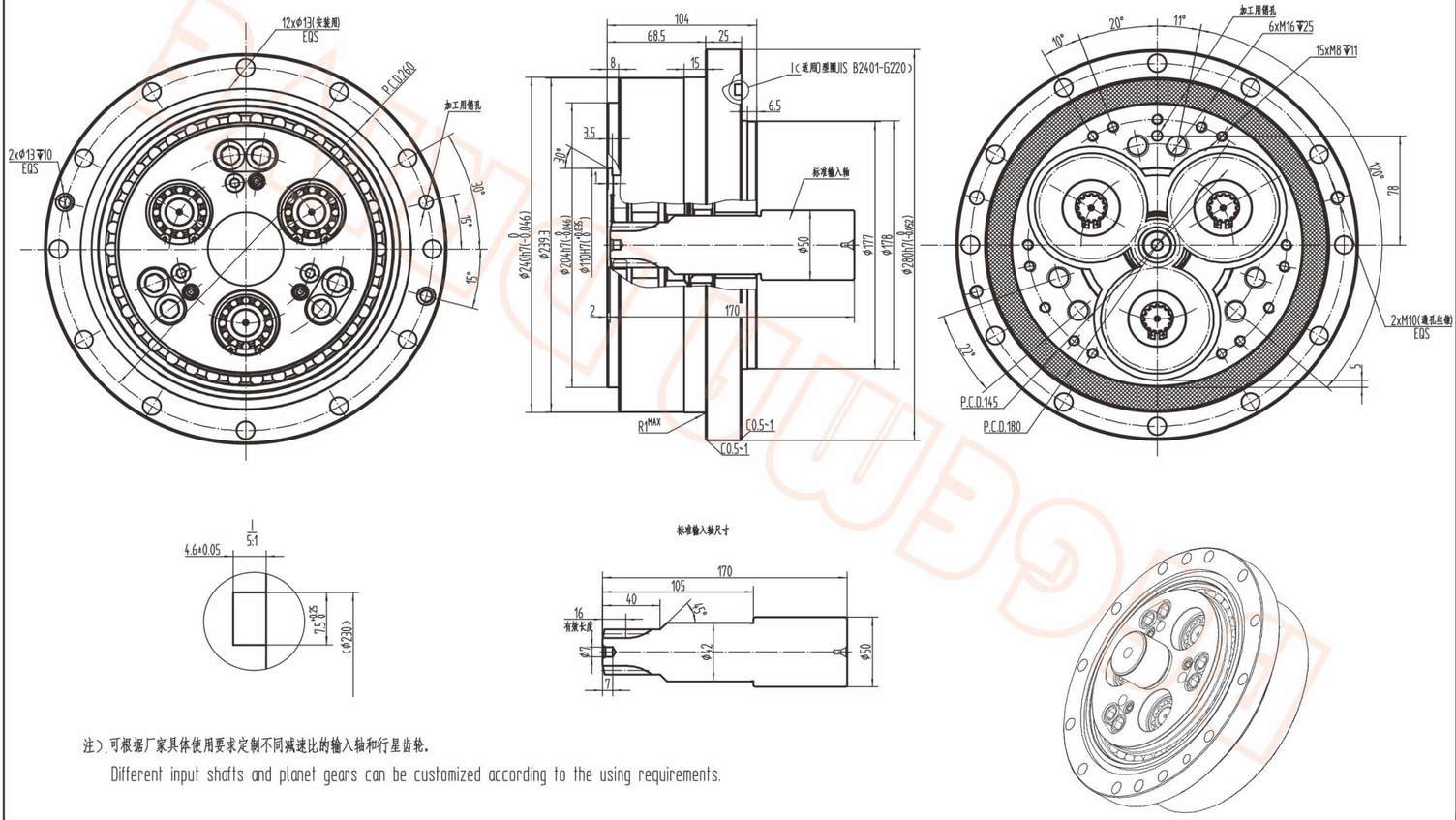
40E 输出轴螺栓紧固型外形尺寸图Dimension



注)、可根据厂家具体使用要求定制不同减速比的输入轴和行星齿轮。

Different input shafts and planet gears can be customized according to the using requirements.

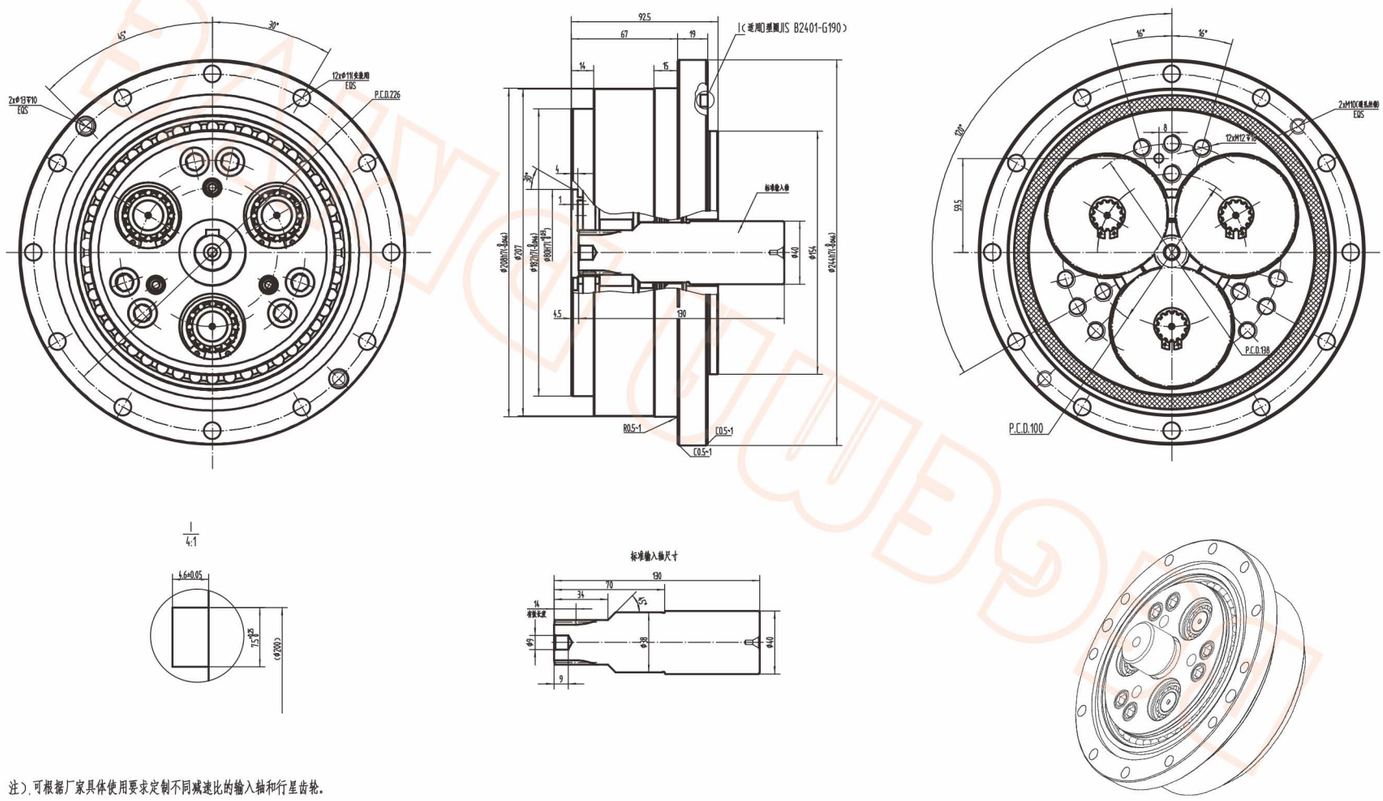
160E 输出轴螺栓紧固型外形尺寸图Dimension



注)、可根据厂家具体使用要求定制不同减速比的输入轴和行星齿轮。

Different input shafts and planet gears can be customized according to the using requirements.

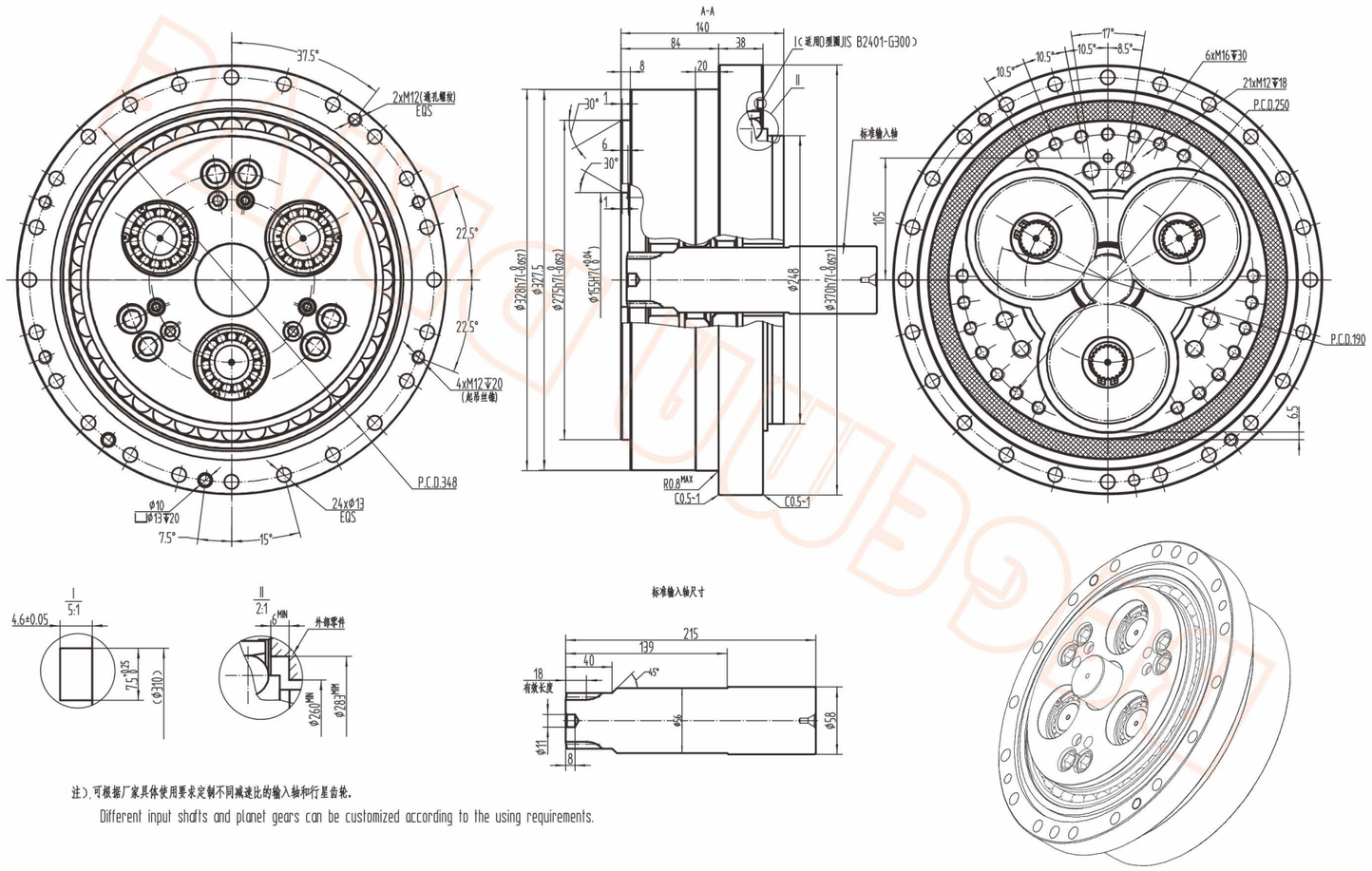
110E 输出轴螺栓紧固型外形尺寸图Dimension



注)、可根据厂家具体使用要求定制不同减速比的输入轴和行星齿轮。

Different input shafts and planet gears can be customized according to the using requirements.

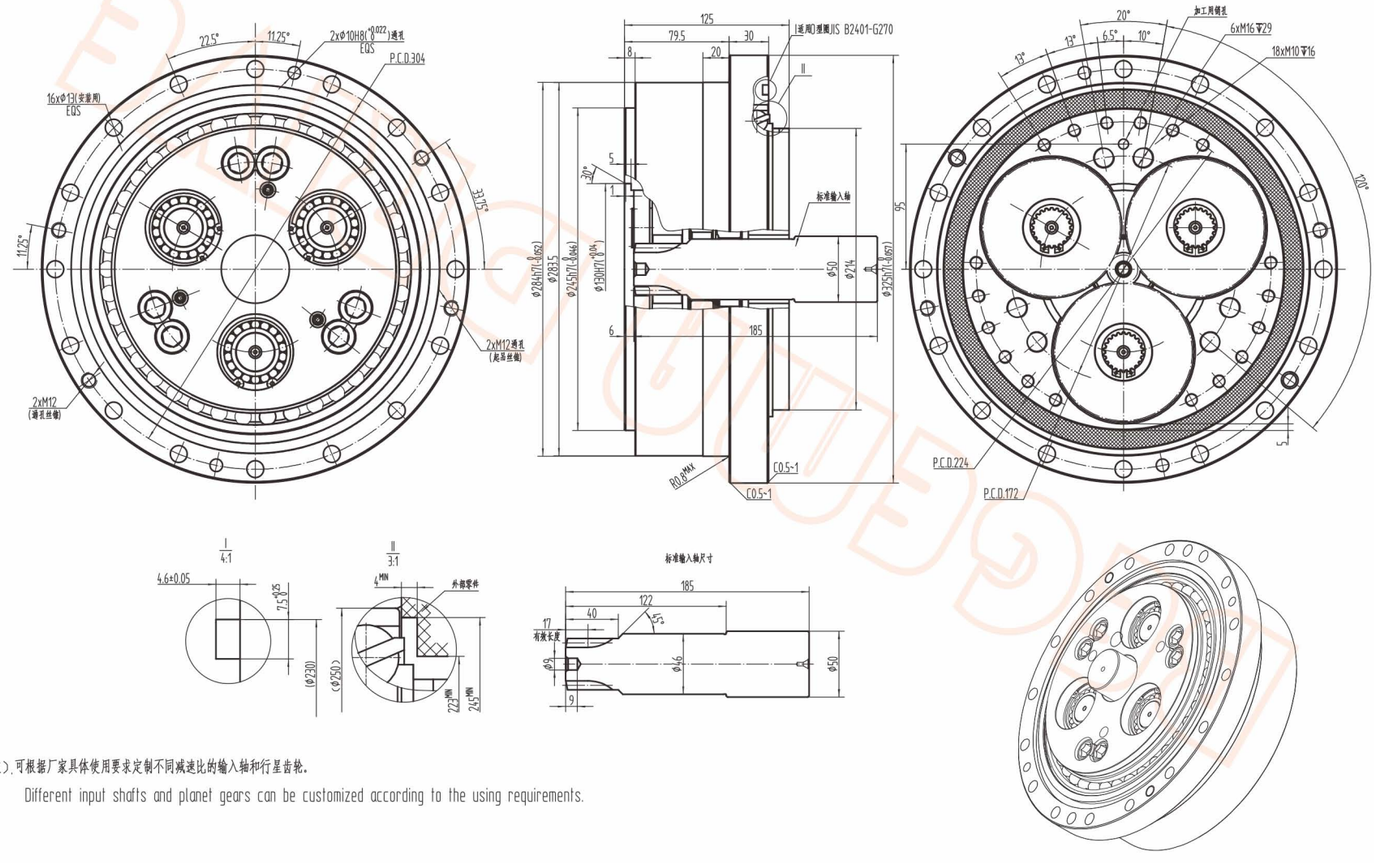
450E 输出轴螺栓紧固型外形尺寸图Dimension



注)、可根据厂家具体使用要求定制不同减速比的输入轴和行星齿轮.

Different input shafts and planet gears can be customized according to the using requirements.

320E 输出轴螺栓紧固型外形尺寸图Dimension

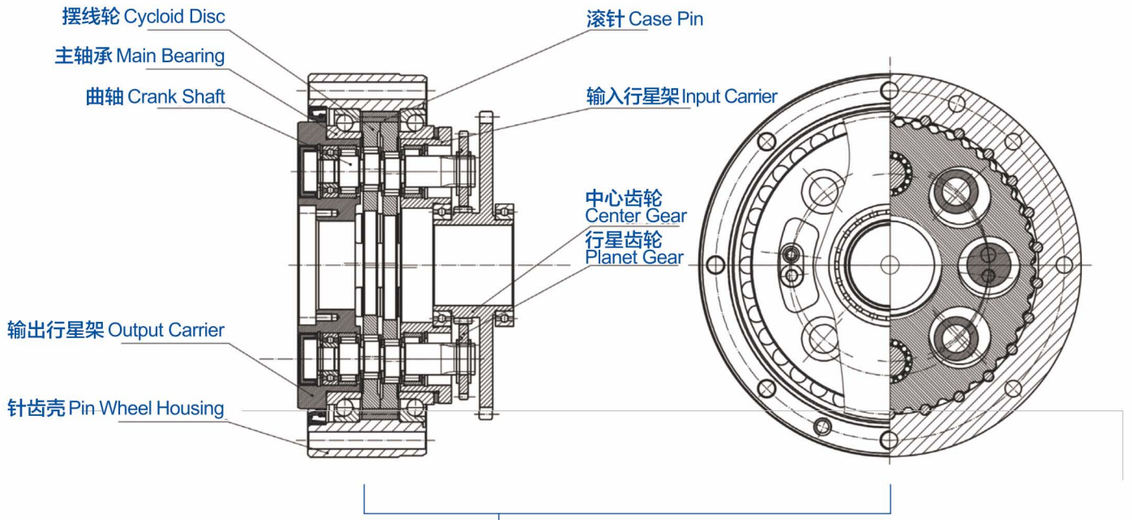


注)、可根据厂家具体使用要求定制不同减速比的输入轴和行星齿轮.

Different input shafts and planet gears can be customized according to the using requirements.

BRV-C

Operating Principle
工作原理

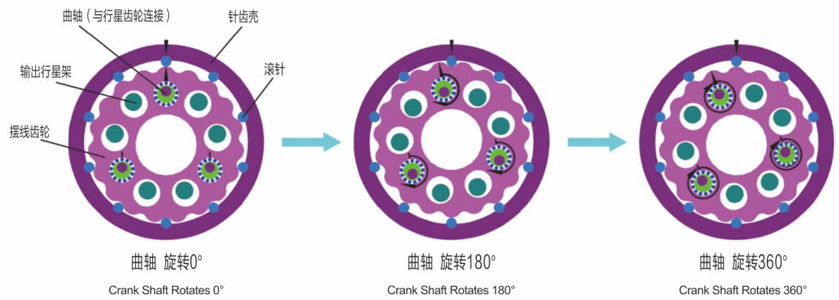


BRV-C 减速器构造图 | **BRV-C** Reducer Structure Diagram

BRV-C 减速器是由一个行星齿轮减速器的前级和一个摆线针轮减速器的后级组成的二级减速器。第一级减速经中心齿轮的旋转由中心齿轮上的大齿轮传递到行星齿轮，按齿数比进行减速；行星齿轮与曲轴相连接，第二级减速经曲轴的旋转带动摆线轮做偏心运动，曲轴旋转 1 周，摆线轮将沿与曲轴运动相反方向转动 1 个齿。

BRV-C is a two-stage gear reducer which consists of the 1st stage of planetary gear reducer and the 2nd stage of cycloidal pin-wheel reducer. The first speed reduction is achieved by the meshing between the big gear of center gear and the planetary gear based on the gear reduction ratio. The planet gear is connected to the crank shaft, and the rotation of crank shaft causes the eccentric rotation of the cycloid disc. This achieves the second speed reduction and thus if the crank shaft rotates 360°, the cycloid disc will rotate one tooth in the opposite direction.

C 系列工作原理图 C Series Working Principle Diagram



中心齿轮转动时速比：

$$R=1+\frac{Z2}{Z1}\cdot Z3$$

- R：速比值
- Z1: 中心齿轮小齿轮齿数
- Z2: 行星齿轮齿数
- Z3: 滚针数

Speed Ratio When Center Gear Rotation:

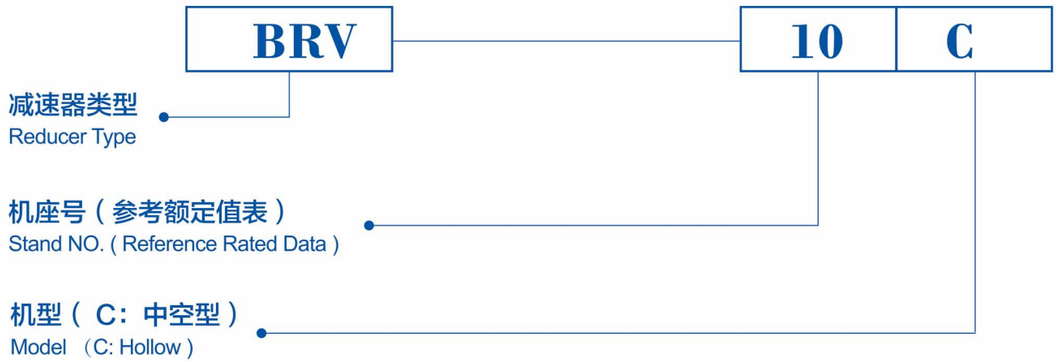
$$R=1+\frac{Z2}{Z1}\cdot Z3$$

- R: Speed ratio value
- Z1: Small Gear Teeth of Center Gear
- Z2: Planet Gear Teeth
- Z3:Case Pin Number

Model Designations
型号表示

订购、咨询时，请按下述型号标记进行指示。

When ordering, consulting, please click the following model markup instructions.

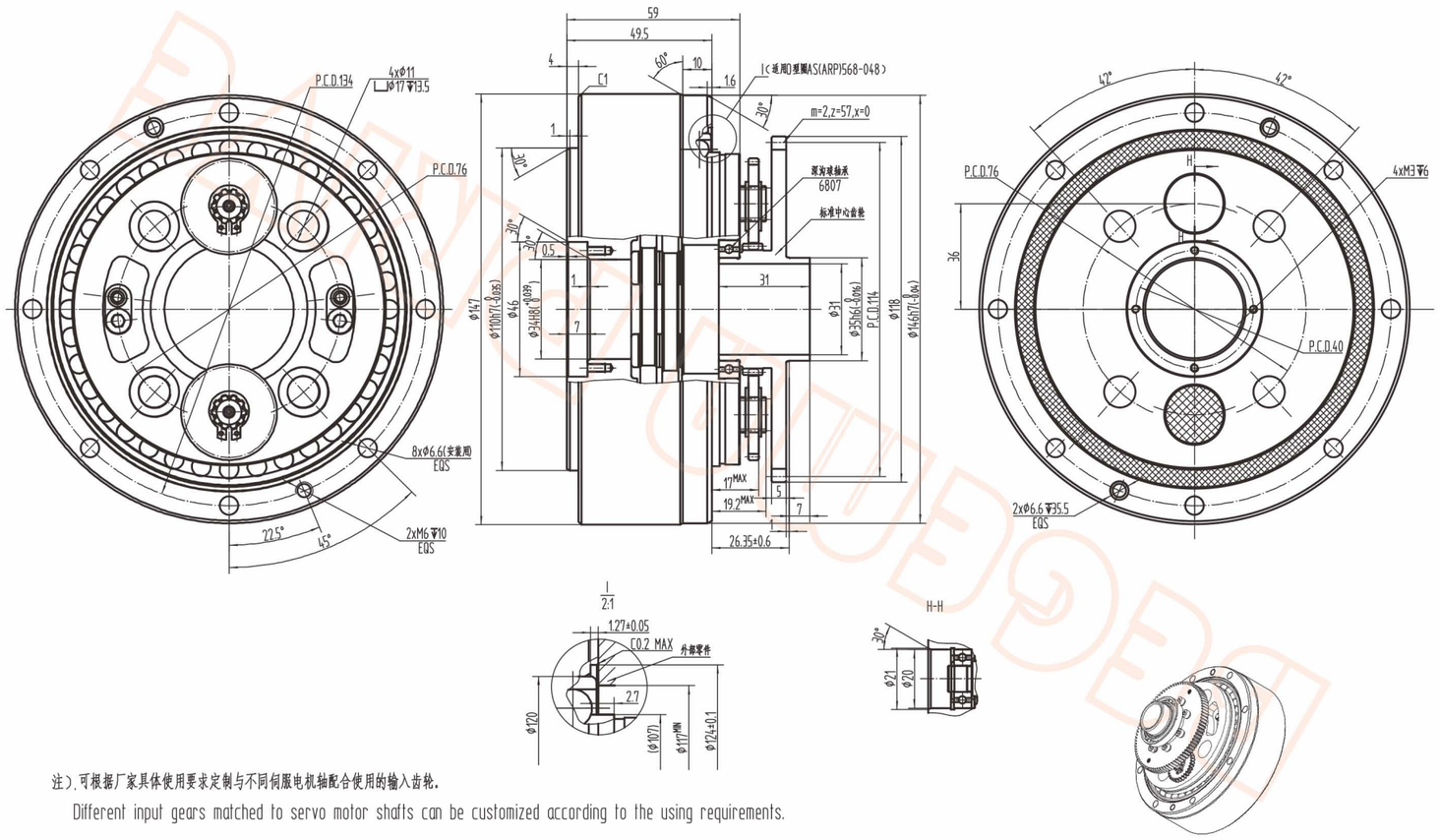


输出转速 Output Speed (r/min)			5		10		15		20		25		25		30		40		50		60		最大工作转矩 Max. Working Torque (Nm)
型号 Model	减速比 Ratio		输出转矩 Output Torque (Nm)	输入功率 Input Power (kW)	输出转矩 Output Torque (Nm)	输入功率 Input Power (kW)	输出转矩 Output Torque (Nm)	输入功率 Input Power (kW)	输出转矩 Output Torque (Nm)	输入功率 Input Power (kW)	输出转矩 Output Torque (Nm)		输入功率 Input Power (kW)	输出转矩 Output Torque (Nm)	输入功率 Input Power (kW)	输出转矩 Output Torque (Nm)	输入功率 Input Power (kW)	输出转矩 Output Torque (Nm)	输入功率 Input Power (kW)	输出转矩 Output Torque (Nm)	输入功率 Input Power (kW)		
	电机在外壳侧 Motor In Wheel Housing	电机在轴侧 Motor In Shaft																					
10C	27	26	136	0.09	111	0.16	98	0.21	90	0.25	84		0.29	80	0.34	73	0.41	68	0.47	65	0.54		243
27C	36.57	35.57	368	0.26	299	0.42	265	0.55	243	0.68	227		0.79	215	0.90	197	1.10	184	1.29	174	1.46		660
50C	32.54	31.54	681	0.48	554	0.77	490	1.03	450	1.26	420		1.47	398	1.67	366	2.04	341	2.38	—	—		1200
100C	36.75	35.75	1362	0.95	1017	1.55	980	2.05	899	2.51	841		2.94	796	3.33	730	4.08	—	—	—	—		2400
120C	36.75	35.75	1422	1.08	1308	1.76	1200	2.22	1085	2.74	907		3.12	823	3.96	765	4.38	—	—	—	—		3000
200C	34.86	33.86	2724	1.90	2215	3.09	1961	4.11	1803	5.04	1686		5.88	1597	6.69	—	—	—	—	—	—		4800
320C	35.61	34.61	4361	3.04	3538	4.94	3136	6.57	2881	8.05	2690		9.41	—	—	—	—	—	—	—	—		7700
500C	37.34	36.34	6811	4.75	5537	7.73	4900	10.26	4498	12.56	—		—	—	—	—	—	—	—	—	—		12000

BRV-C | Rated Data 额定值表

型号 Model	最大冲击转矩 Max. Impact Torque (Nm)	最大工作力矩 Max. Working Moment (Nm)	最大冲击力矩 Max. Impact Moment (Nm)	倾覆刚度 Tilting Stiffness (Nm/arc.min)	扭转刚度 Torsional Stiffness (Nm/arc.min)	空程回差 Max. Blacklash (arc.min)	重量 Weight (kg)
10C	486	682	1364	418	45	1′	4.8
27C	1320	975	1950	1060	145	1′	8.8
50C	2400	1750	3500	1940	252	1′	14.9
100C	4800	2400	4800	2800	505	1′	19.9
120C	6000	2500	5000	2800	550	1′	21.0
200C	9600	8800	17600	9750	960	1′	56.5
320C	15400	20380	40760	12700	1950	1′	81.5
500C	24000	34000	68000	24100	3400	1′	160

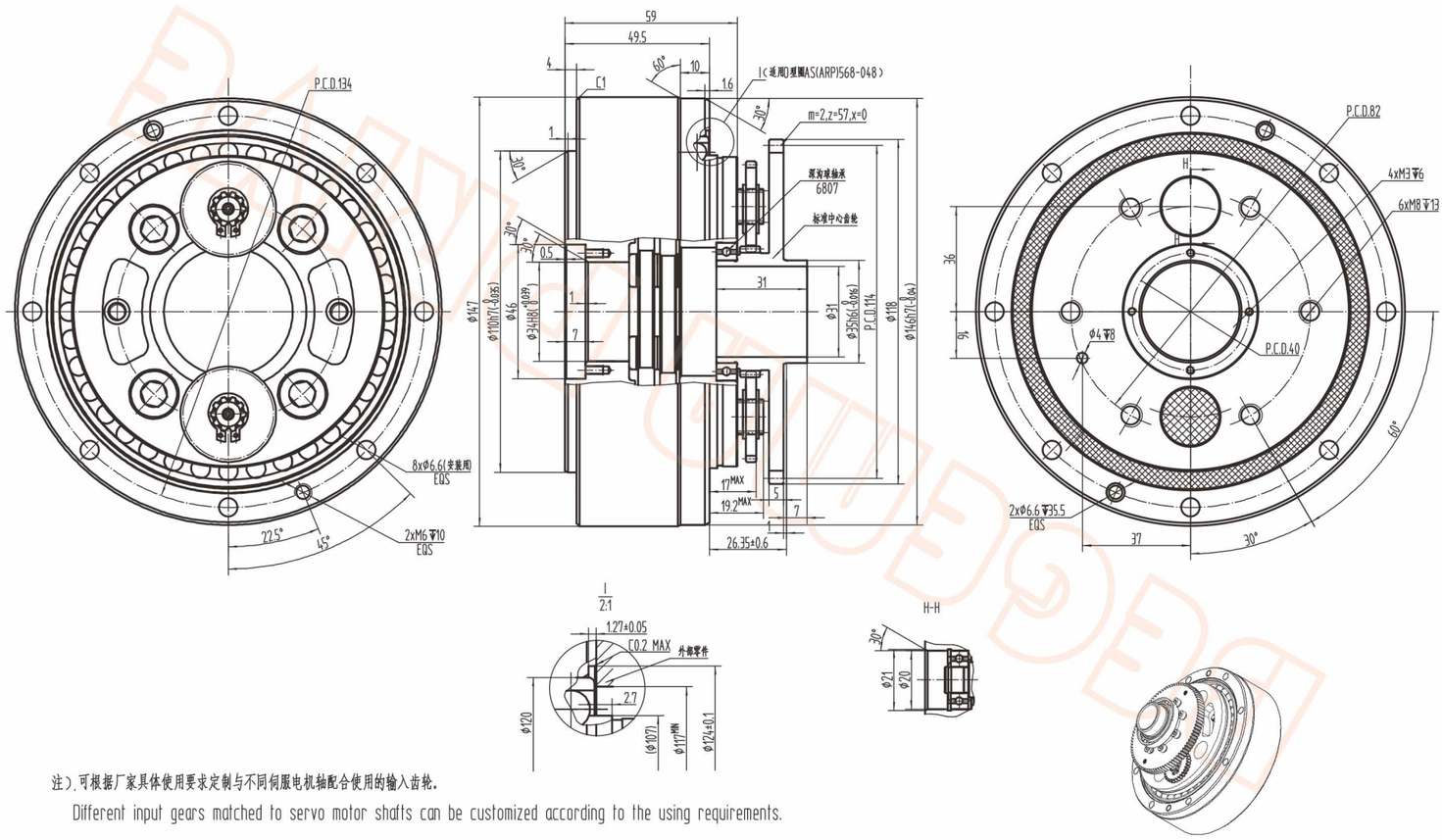
10C-A-T 输出轴通孔螺栓紧固型外形尺寸图Dimension



注)、可根据厂家具体使用要求定制与不同伺服电机轴配合使用的输入齿轮。

Different input gears matched to servo motor shafts can be customized according to the using requirements.

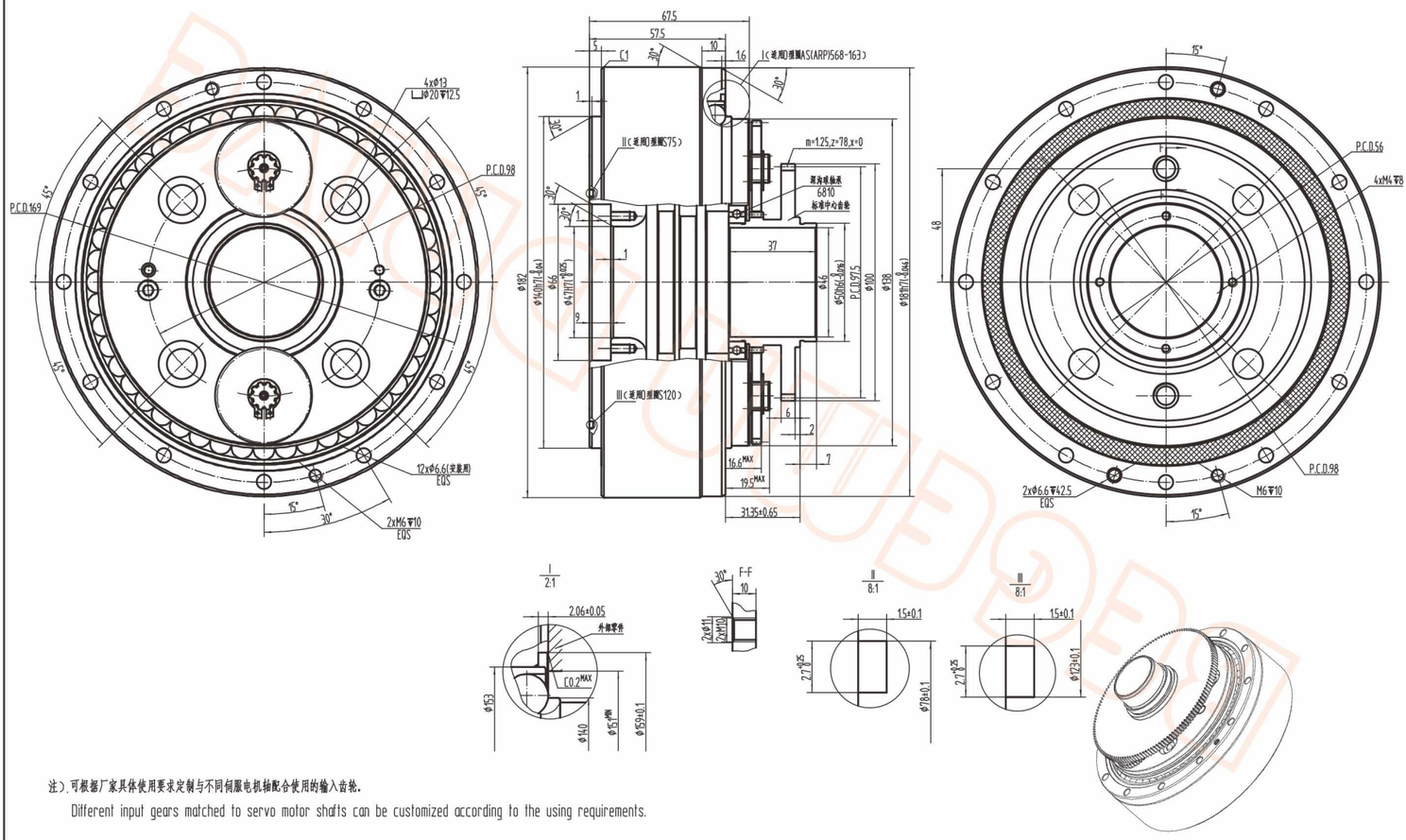
10C-A-B 输出轴螺栓紧固型外形尺寸图Dimension



注)、可根据厂家具体使用要求定制与不同伺服电机轴配合使用的输入齿轮。

Different input gears matched to servo motor shafts can be customized according to the using requirements.

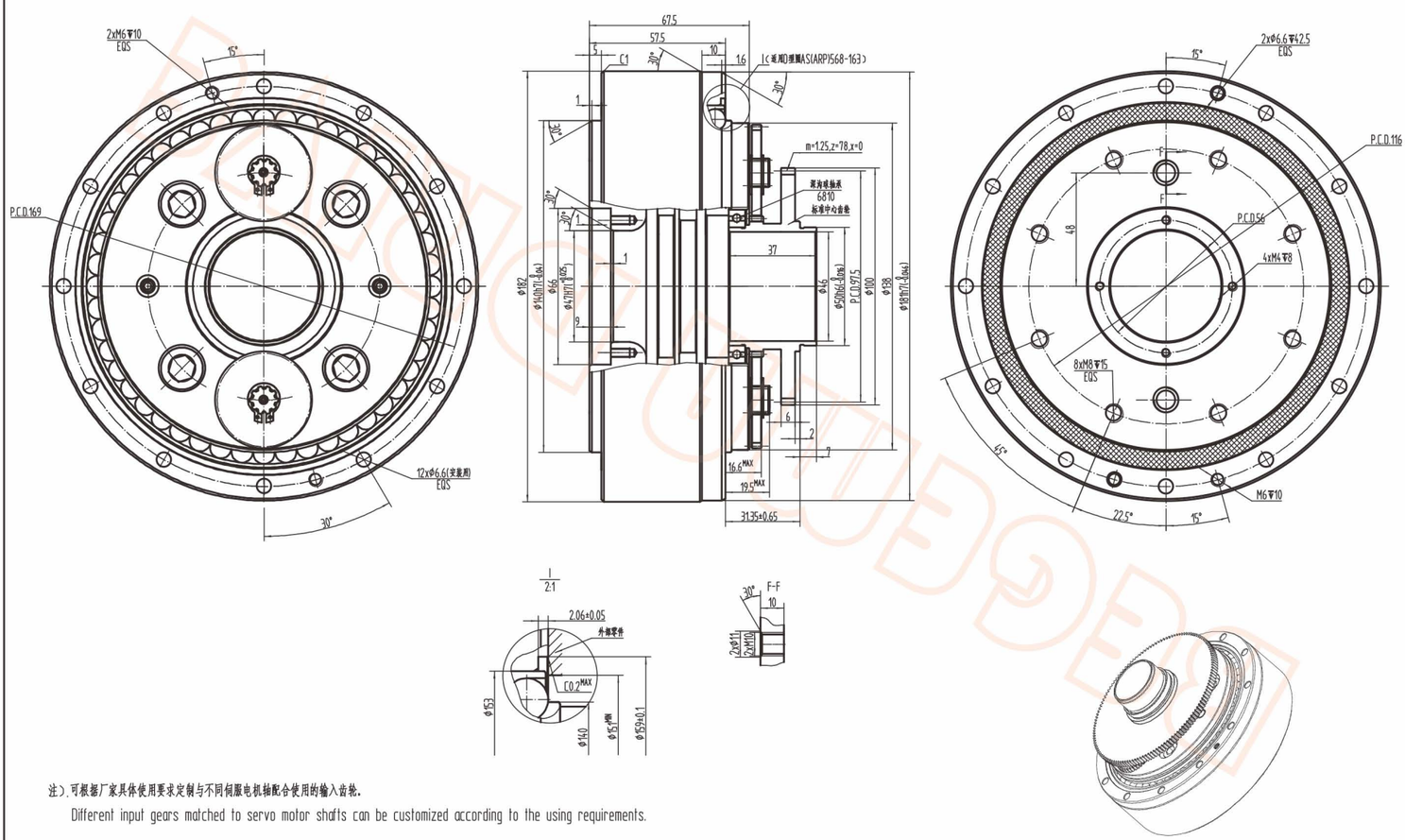
27C-A-T 输出轴通孔螺栓紧固型外形尺寸图Dimension



注）.可根据厂家具体使用要求定制与不同伺服电机轴配合使用的输入齿轮.

Different input gears matched to servo motor shafts can be customized according to the using requirements.

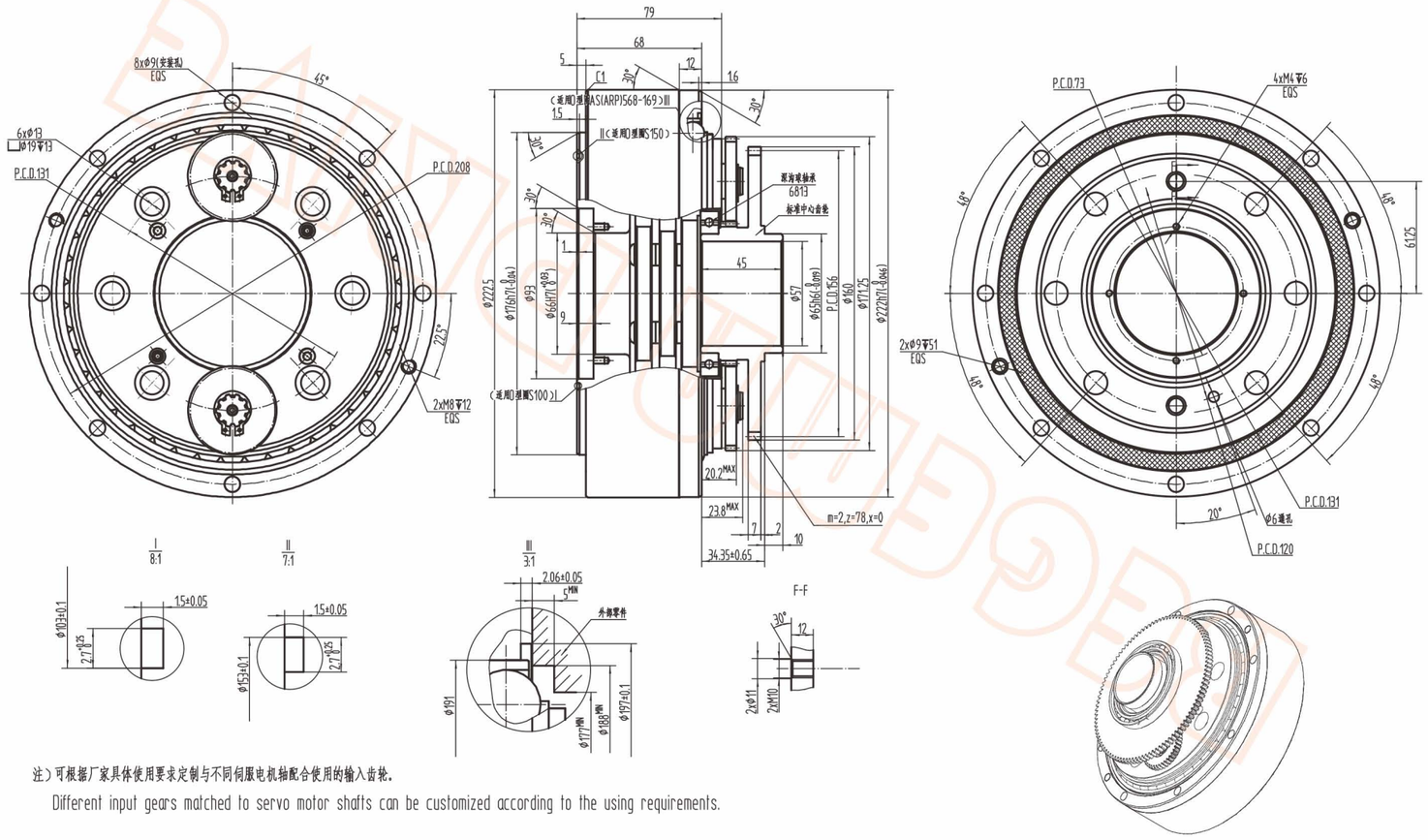
27C-A-B 输出轴螺栓紧固型外形尺寸图Dimension



注）.可根据厂家具体使用要求定制与不同伺服电机轴配合使用的输入齿轮.

Different input gears matched to servo motor shafts can be customized according to the using requirements.

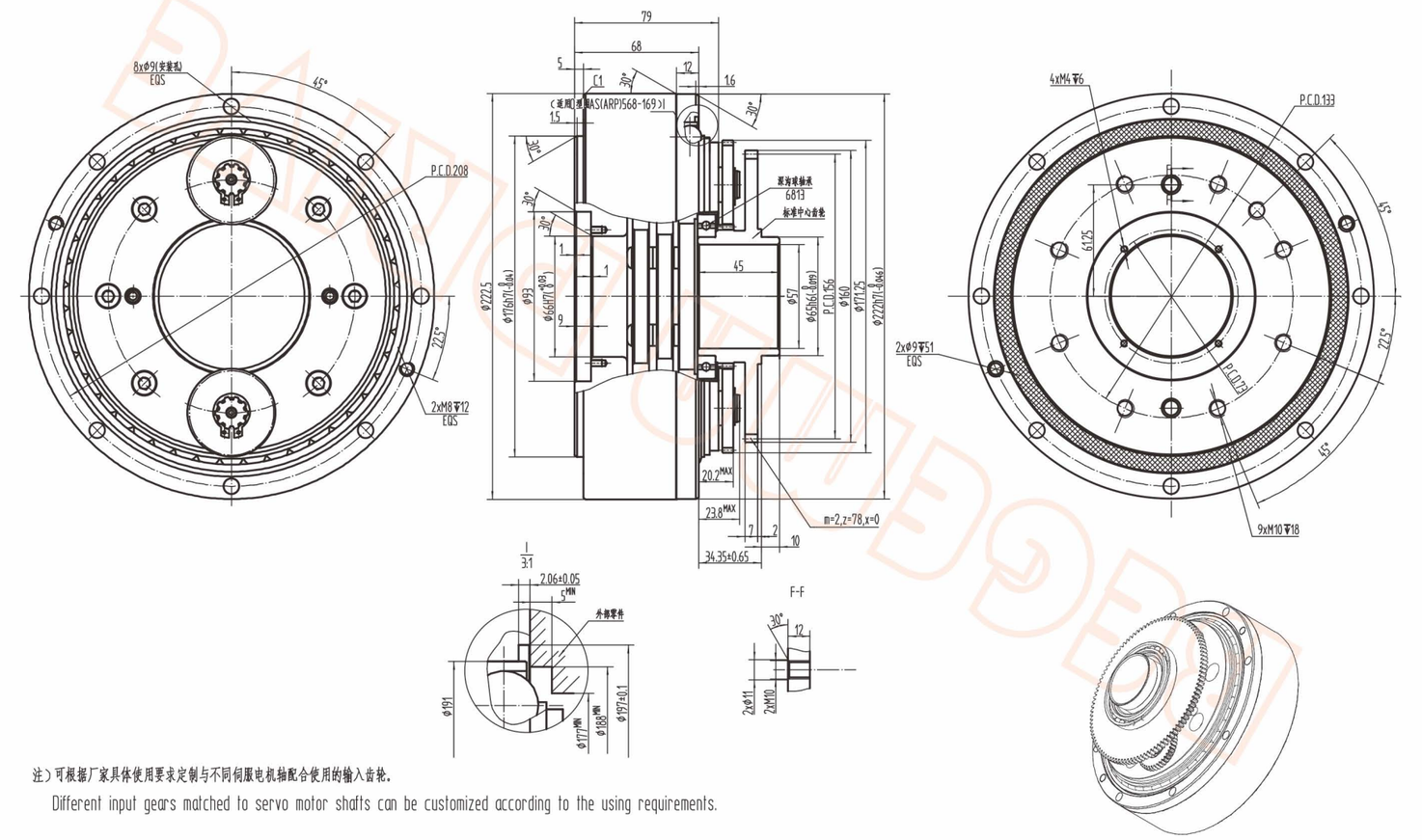
50C-A-T 输出轴通孔螺栓紧固型外形尺寸图Dimension



注）可根据厂家具体使用要求定制与不同伺服电机轴配合使用的输入齿轮。

Different input gears matched to servo motor shafts can be customized according to the using requirements.

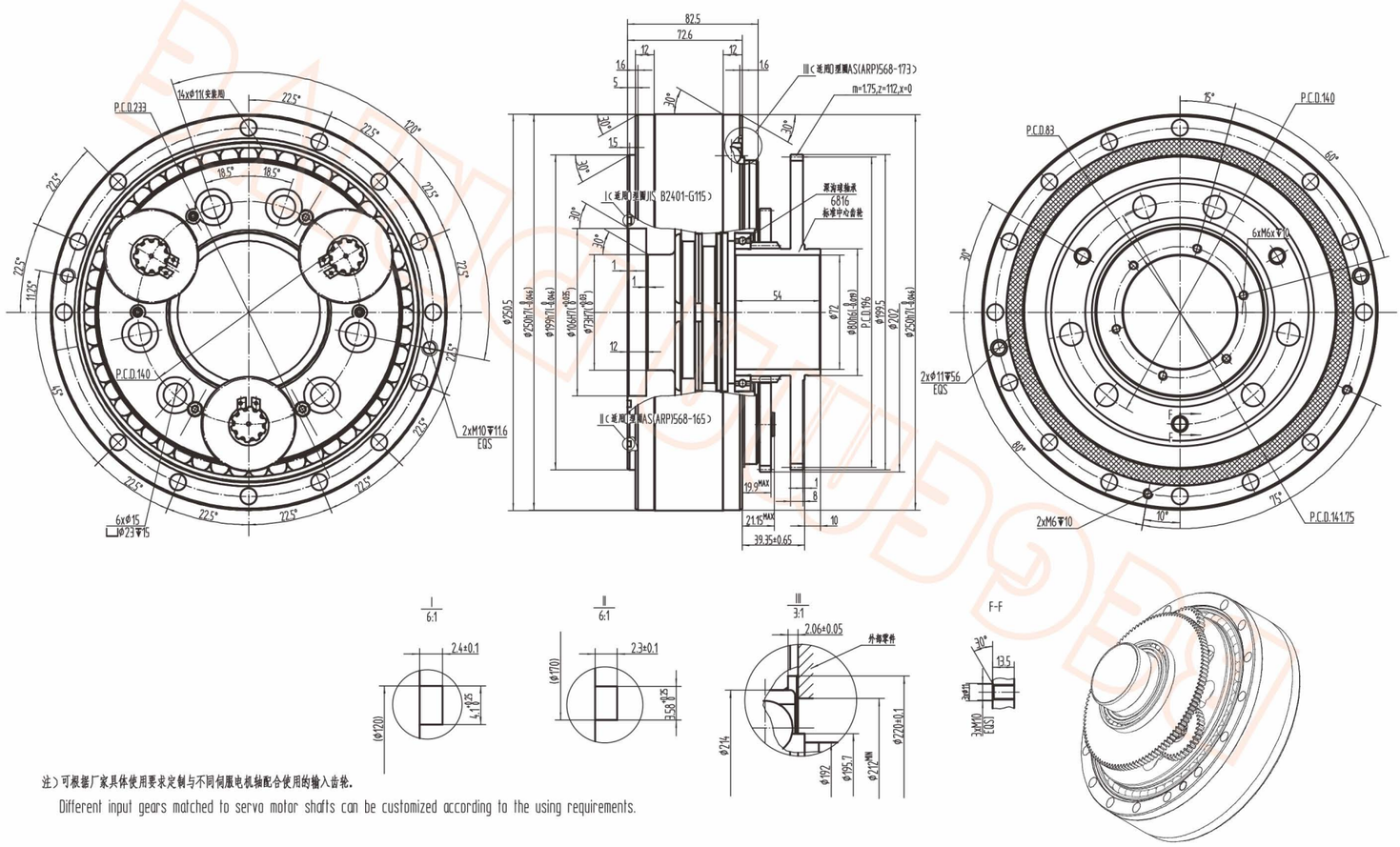
50C-A-B 输出轴螺栓紧固型外形尺寸图Dimension



注）可根据厂家具体使用要求定制与不同伺服电机轴配合使用的输入齿轮。

Different input gears matched to servo motor shafts can be customized according to the using requirements.

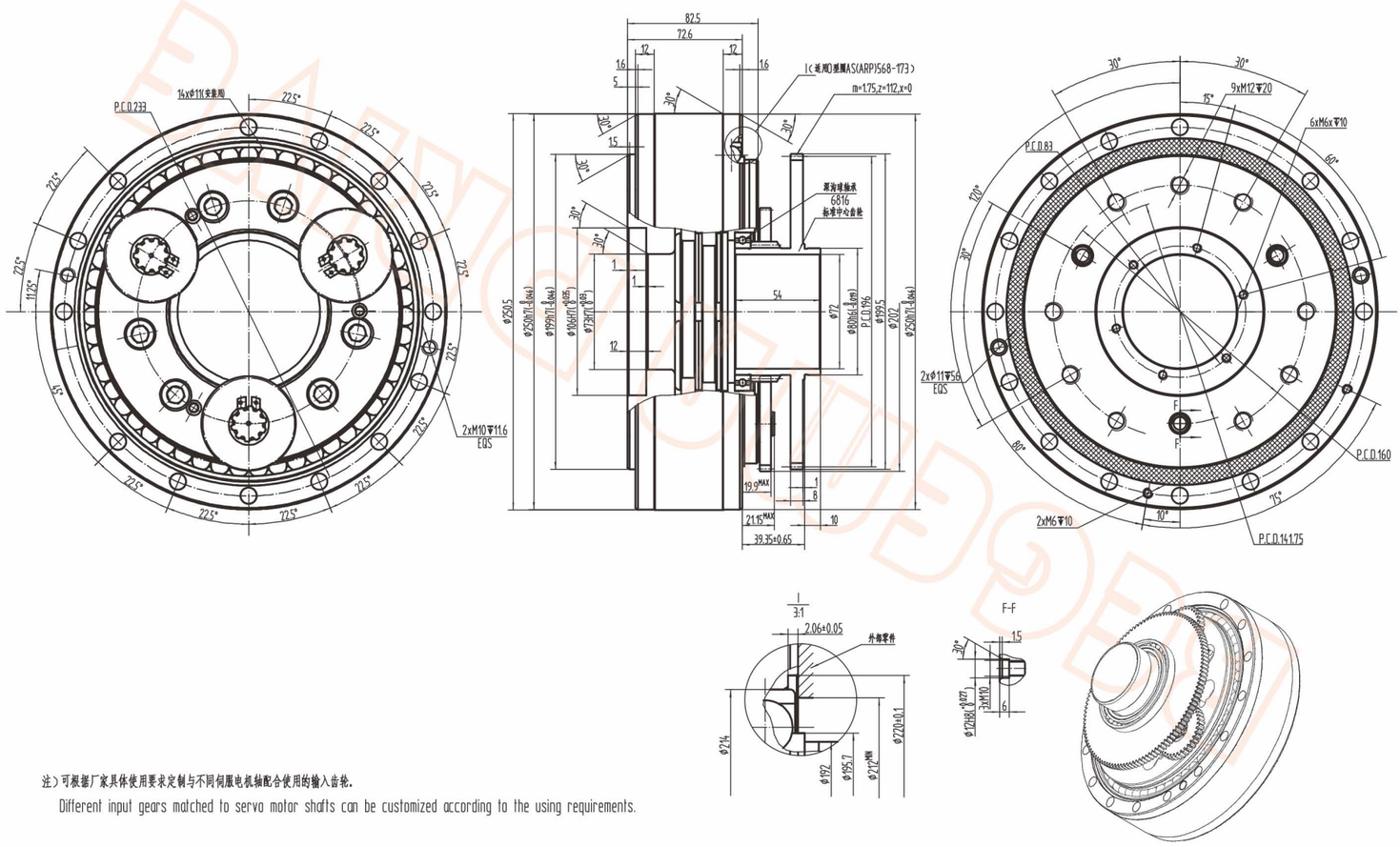
100C-A-T 输出轴通孔螺栓紧固型外形尺寸图Dimension



注）可根据厂家具体使用要求定制与不同伺服电机轴配合使用的输入齿轮。

Different input gears matched to servo motor shafts can be customized according to the using requirements.

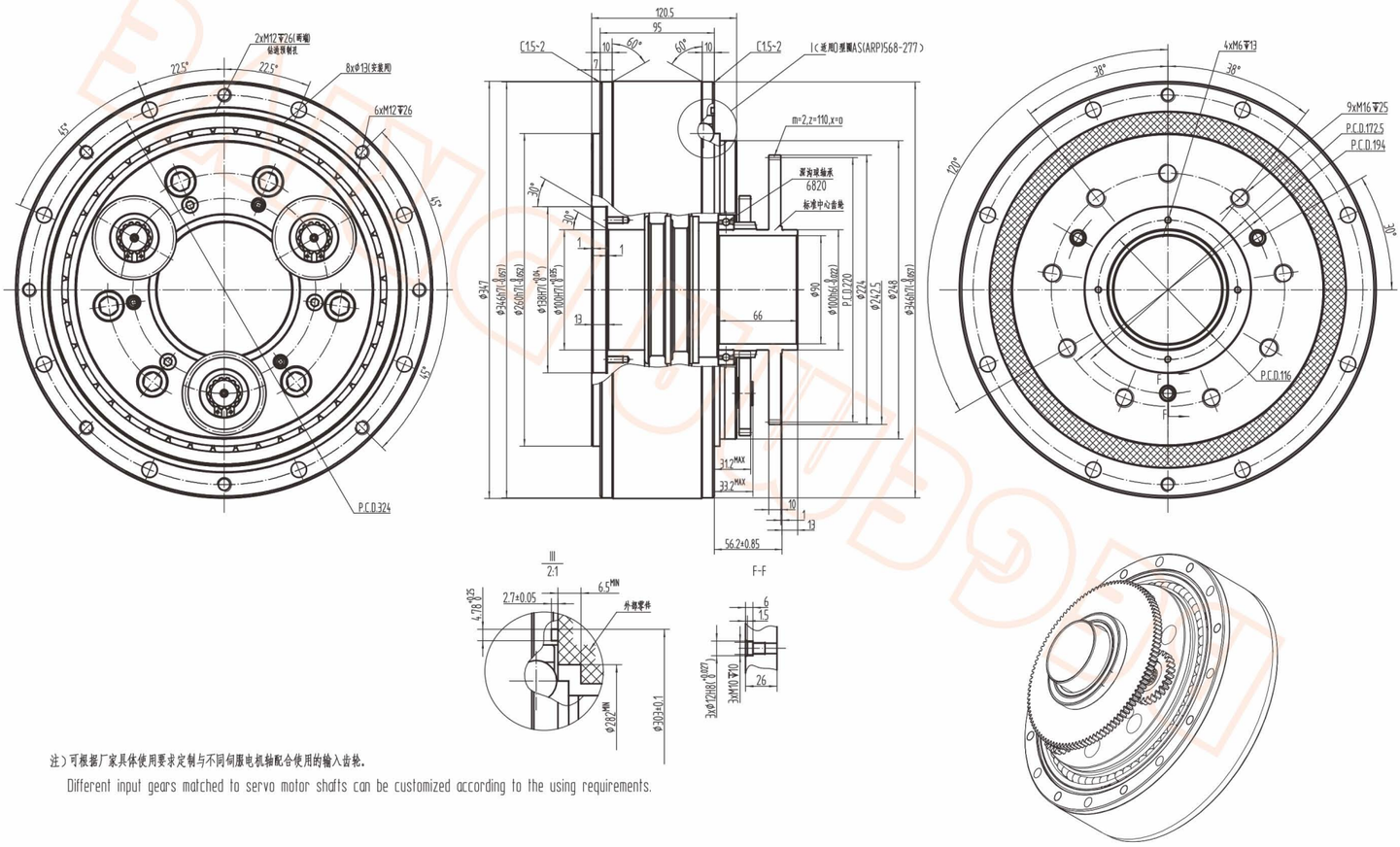
100C-A-B 输出轴螺栓紧固型外形尺寸图Dimension



注）可根据厂家具体使用要求定制与不同伺服电机轴配合使用的输入齿轮。

Different input gears matched to servo motor shafts can be customized according to the using requirements.

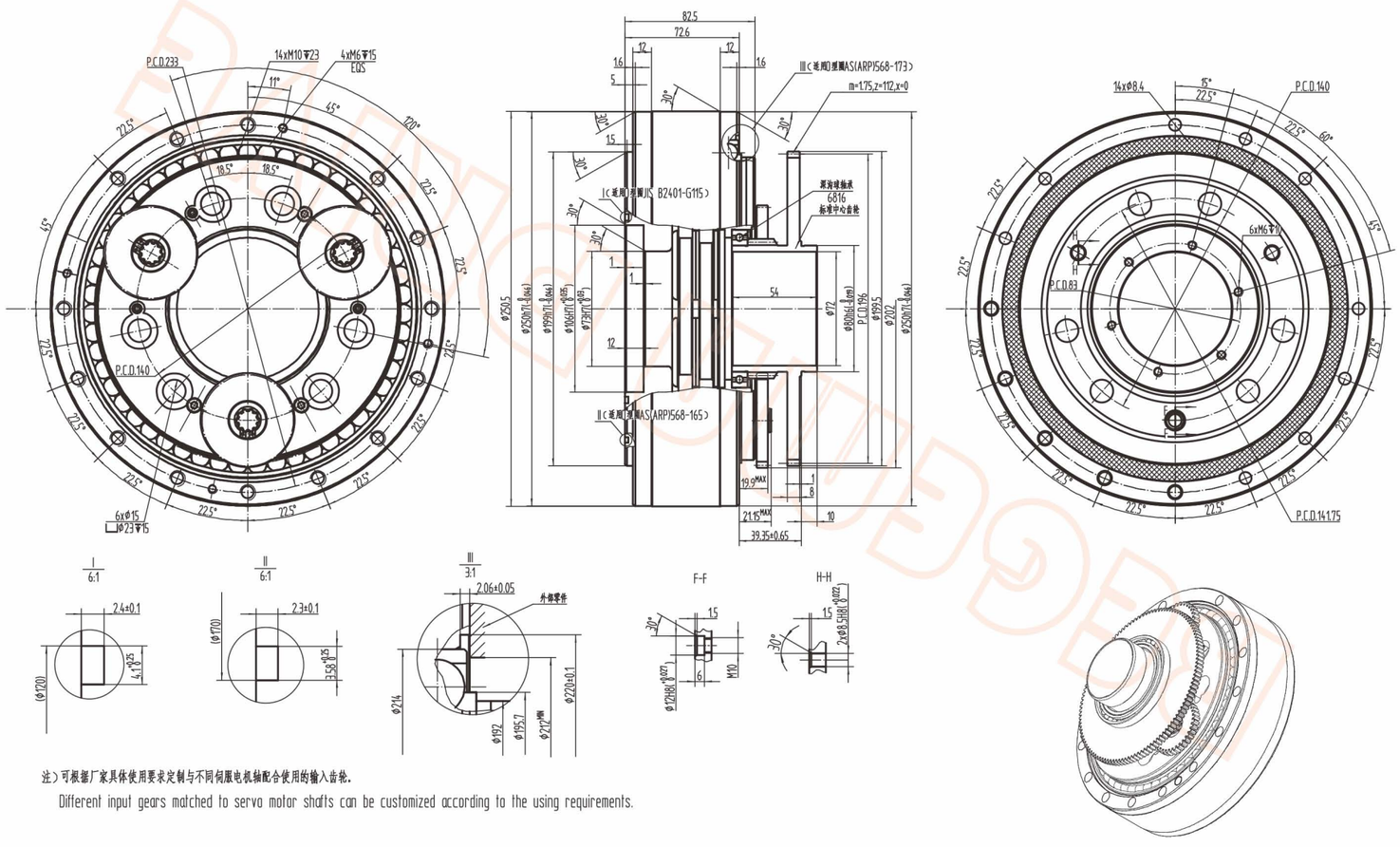
200C-A-B 输出轴螺栓紧固型外形尺寸图Dimension



注）可根据厂家具体使用要求定制与不同伺服电机轴配合使用的输入齿轮。

Different input gears matched to servo motor shafts can be customized according to the using requirements.

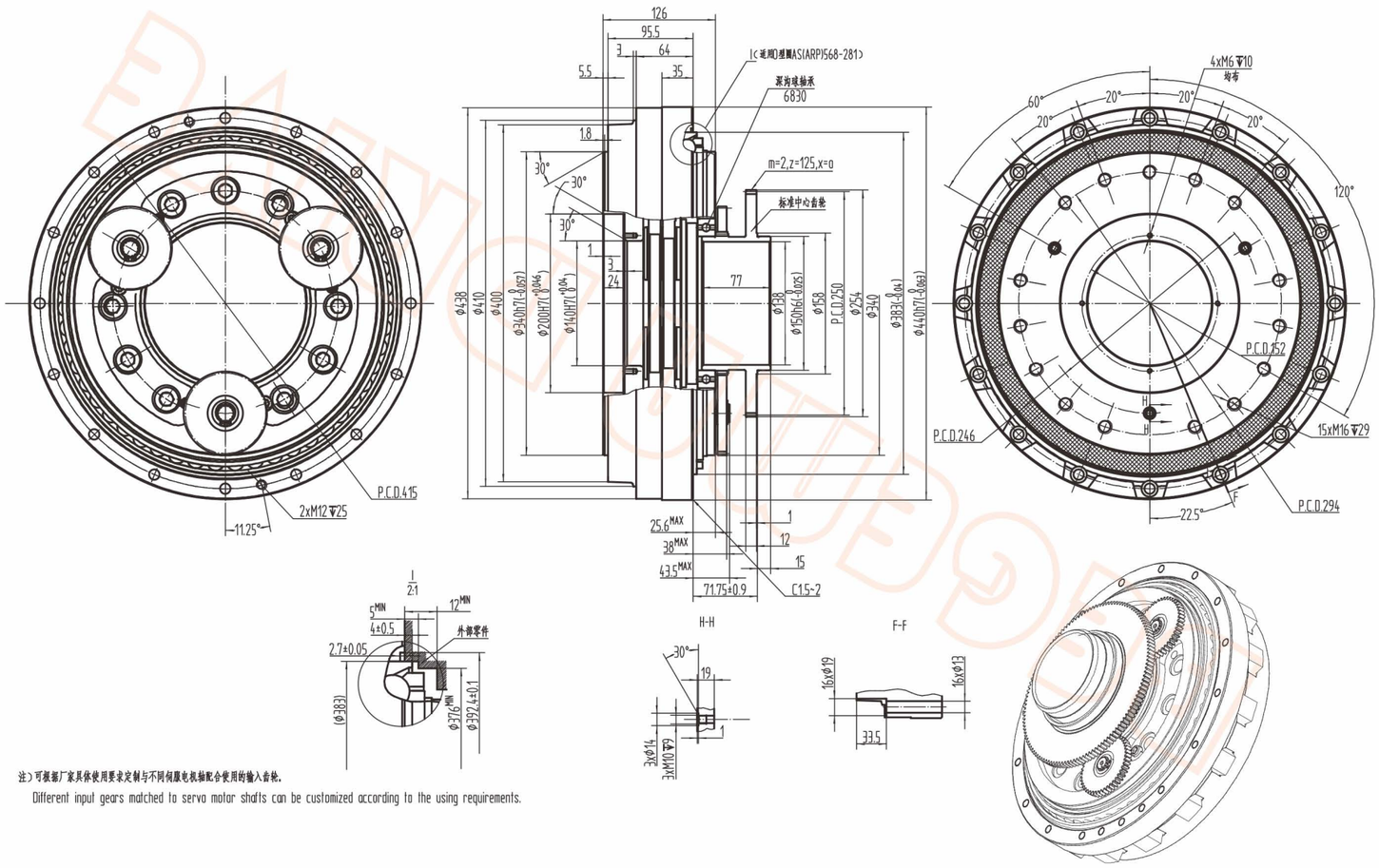
120C-A-T 输出轴通孔螺栓紧固型外形尺寸图Dimension



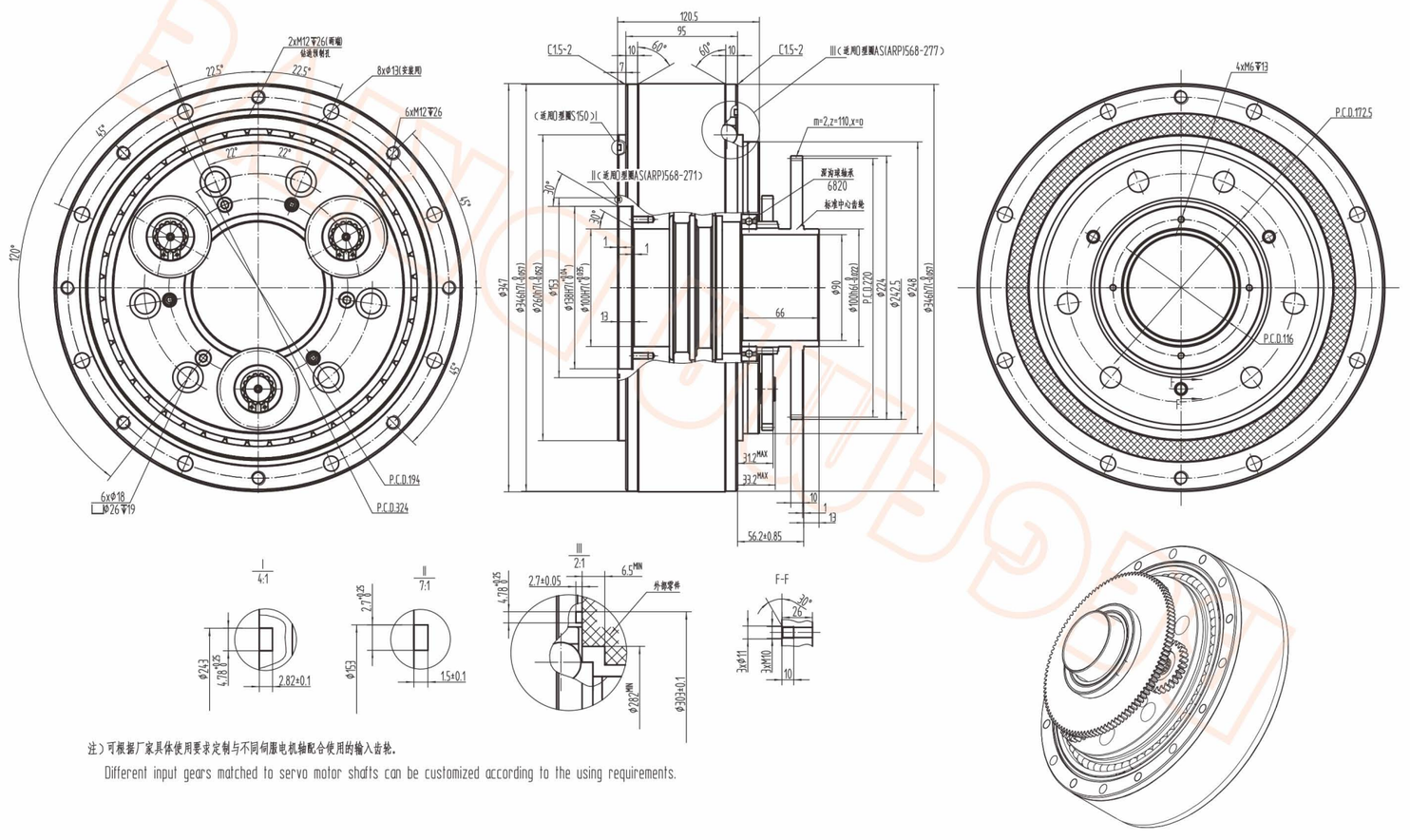
注）可根据厂家具体使用要求定制与不同伺服电机轴配合使用的输入齿轮。

Different input gears matched to servo motor shafts can be customized according to the using requirements.

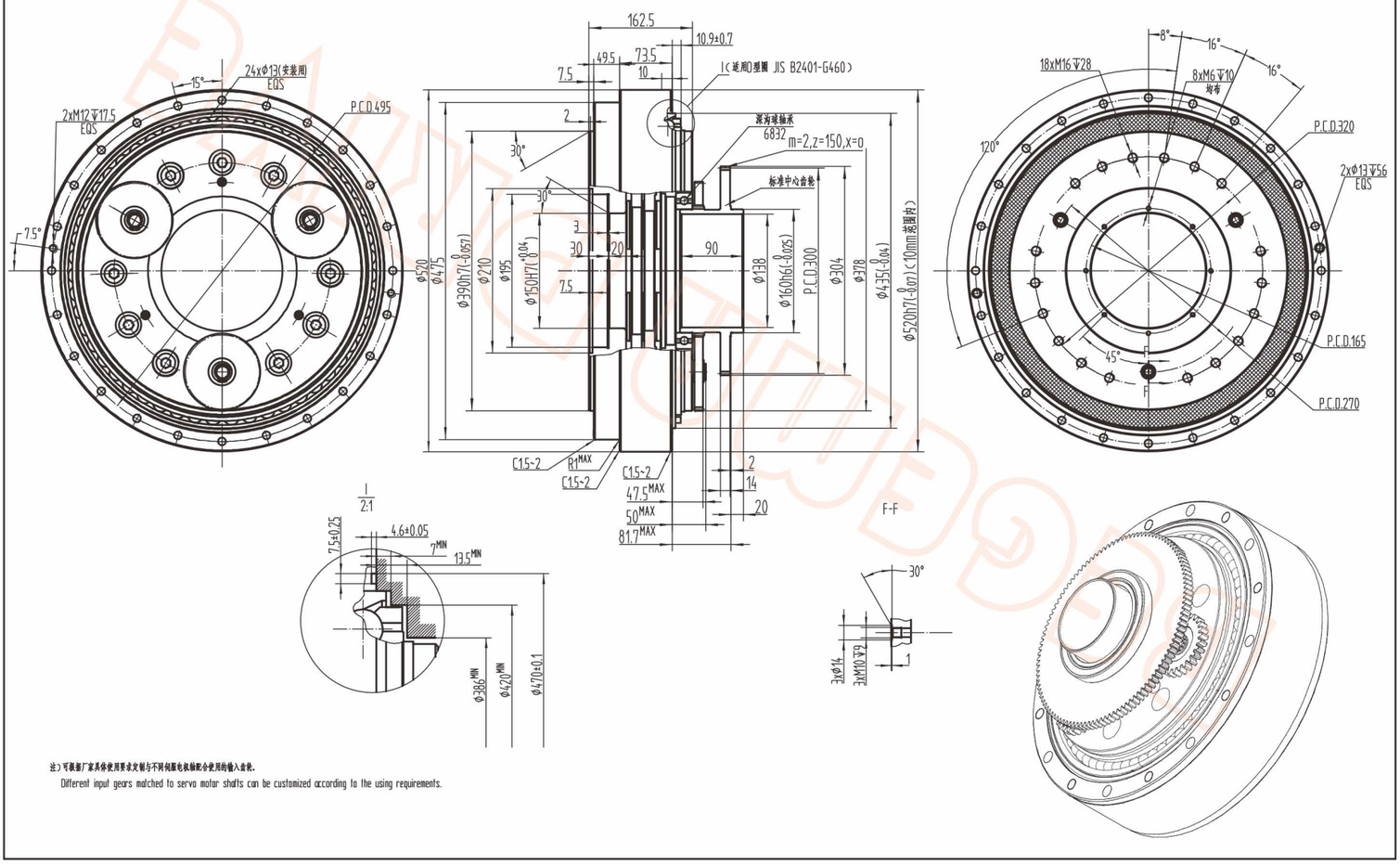
320C-A-B输出轴螺栓紧固型外形尺寸图Dimension



200C-A-T 输出轴通孔螺栓紧固型外形尺寸图Dimension



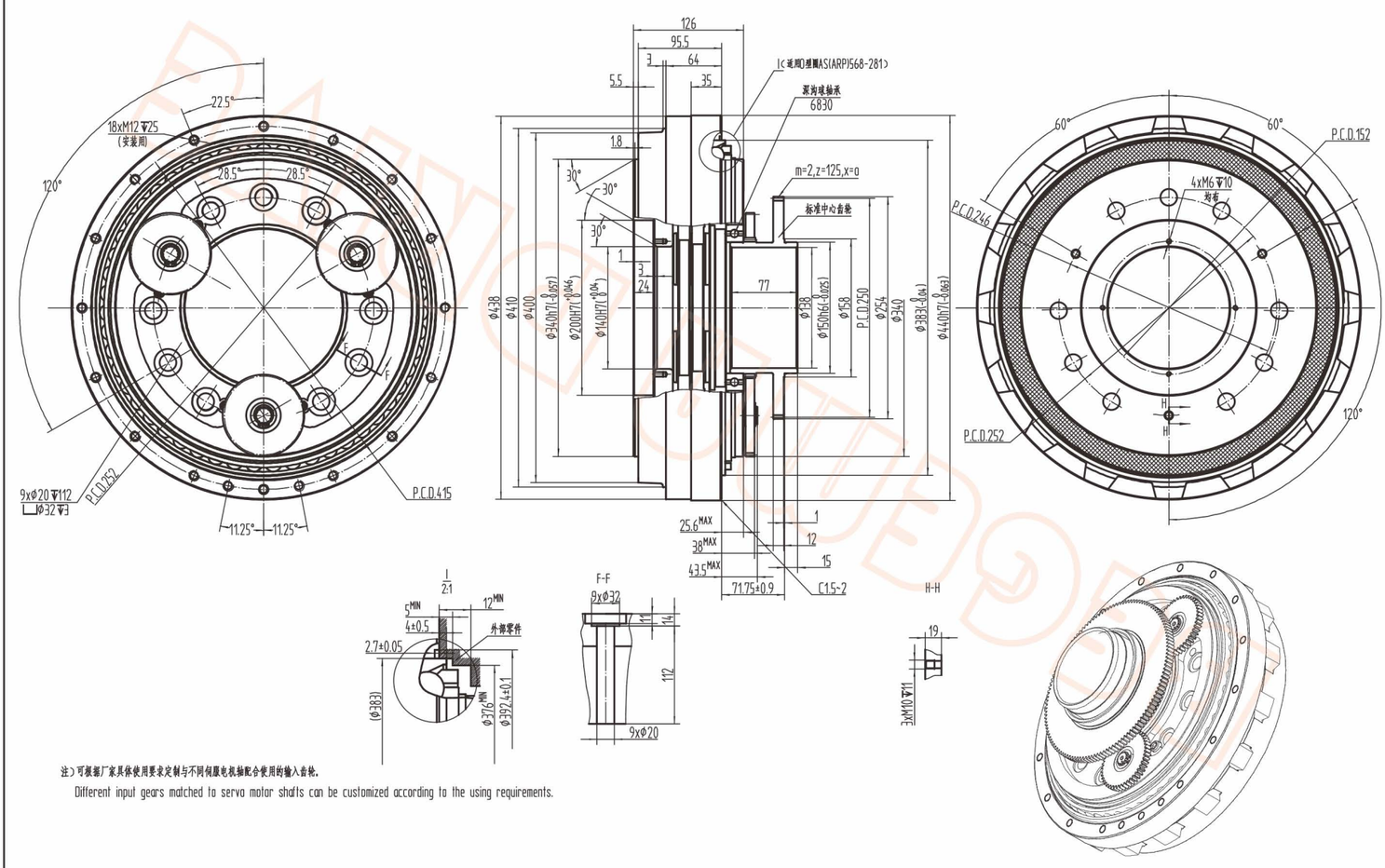
500C-A-B 输出轴螺栓紧固型外形尺寸图Dimension



注）可根据厂家具体使用要求定制与不同伺服电机轴配合使用的输入齿轮。

Different input gears matched to servo motor shafts can be customized according to the using requirements.

320C-A-T 输出轴通孔螺栓紧固型外形尺寸图Dimension



注）可根据厂家具体使用要求定制与不同伺服电机轴配合使用的输入齿轮。

Different input gears matched to servo motor shafts can be customized according to the using requirements.

Performance characteristics
性能参数

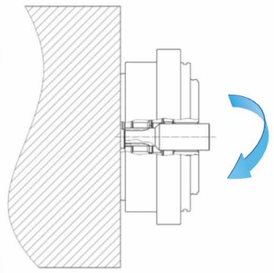
转矩 Torque

最大工作转矩：减速机在启动和停止时，由于载荷的惯性转矩作用，会施加一个大于额定数值的负载转矩，称为最大工作转矩。通常，最大工作转矩约为额定转矩的 250%。

Max. Working Torque: When the reducer at the start and stop, due to the effect of inertia torque, it will exert a greater than the rated load torque, the torque called the Max. working torque. The Max. working torque is the 2.5 times of the rated torque.

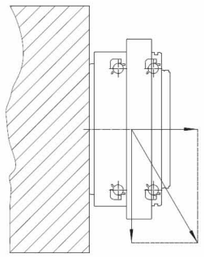
最大冲击转矩：由于紧急停止或者外部载荷的冲击，减速机会承受比额定转矩更大的转矩，称为最大冲击转矩。最大冲击转矩约为额定转矩的 500%。在使用时 ,最大冲击转矩不能超过规定值，并且不能超过限制次数。SHPR-E 和 SHPR-C 系列减速机的冲击允许次数可以按照下面公式计算。

Max. Impact Torque: Because of an emergency stop or the impact of the external load, the reducer will exert a greater than the rated load torque.,the torque called the Max. impact torque. The Max. impact torque is the 5 times of the rated torque, and it can't beyond the limited cycle. The number of allowable operation cycles of SHPR reducer can be calculated as follows:



$$C_{em} = \frac{775 \times \left(\frac{5 \times T_0}{T_{em}}\right)^{\frac{10}{3}}}{Z_4 \times \frac{N_{em}}{60} \times t_{em}}$$

Z_4：滚针数the number of case pins
C_{em}：允许作用次数the number of allowable operation cycles
T_0：额定转矩rated torque(Nm)
T_{em}：急停转矩emergency torque(Nm)
N_{em}：急停转速Scram speed (rpm)
T_{em}：急停时间emergency time(sec.)



力矩 Moment

最大工作力矩：指减速机在日常运转时发生的负载力矩（启动、停止时的力矩等）的允许值。请在最大工作力矩线图范围内使用。

Max. Working Moment: The load torque value in daily operation of reducer. Please use it in the max. working moment.

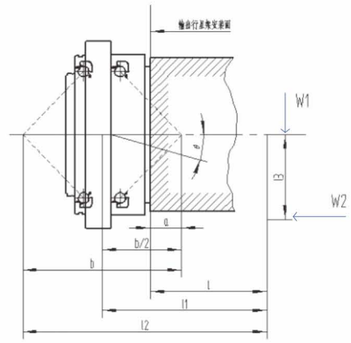
最大冲击力矩：指遭受外部冲击或紧急停止时，减速机所能承受的最大力矩。注意，应尽量避免冲击力矩，否则减速机的性能会下降。最大冲击力矩为最大工作力矩的 200%。

Max. Impact Moment: A large torque and moment due to emergency stop or external impact may be applied to the reduction gear. To be avoided the impact moment, or the performance of reducer will decline. The Max. impact moment is the 2 times of the max. working moment.

倾覆刚性 Overturning rigidity

当减速机受到外部负荷并产生负载力矩时，输出行星架与负载力矩成正比倾斜。倾覆刚性表示的是主轴承的刚性，用倾斜单位角度（1arc.min.）所需的负载力矩值表示。

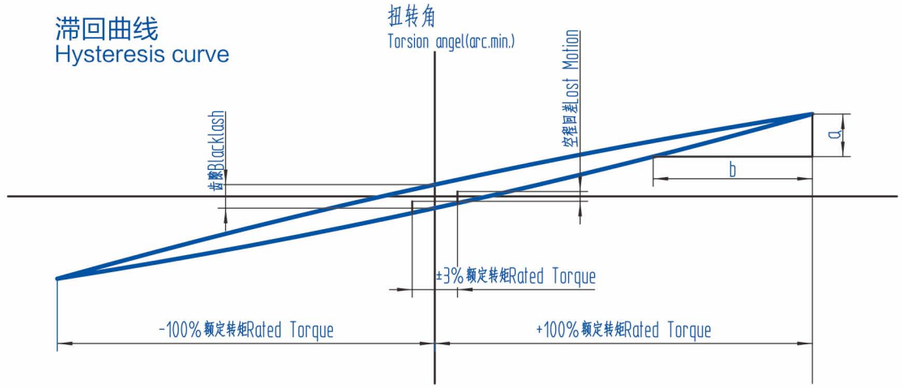
When an external load is applied to the output shaft, its deflection angle is proportional to the external moment. The Overturning rigidity is the capacity of main bearing, and it is expressed as an external moment value, which is required to deflect the output shaft 1arc.min.



$$\theta = \frac{W_1 l_1 + W_2 l_3}{M_t \times 10^3}$$

θ：输出行星架的倾斜角度（arc.min.）deflected angle of output shaft(arc.min.)
M_t：倾覆刚性（Nm/arc.min.）Overturning rigidity(Nm/arc.min.)
W_1、W_2：负荷（N）weight(N)
l_1、l_3：到负荷作用点的距离（mm）arm length(mm)
l_1：l+−a
l：输出行星架安装面到负荷点的距离（mm）the distance between the output shaft mounting surface and the loading point(mm)

扭转刚性（扭转刚度、空程回差）与齿隙 Torsional rigidity(torsional rigidity and lost motion) and backlash



输入轴固定，然后向输出行星架施加转矩，则会产生于转矩响应的扭曲，得到的转矩与扭转角的关系线图叫做滞回曲线。从该曲线获取的扭转刚度、空程回差表示减速机的扭转刚性。

When a torque is applied to the output shaft while the input shaft is fixed, torsion is generated according to the torque value and a hysteresis curve is obtained. The Torsional rigidity of the reduction gear is expressed by the torsional rigidity and the lost motion in this curve.

扭转刚度= $\frac{b}{a}$
Torsional rigidity= $\frac{b}{a}$
空程回差：±3%额定转矩处的滞回曲线宽度中间的扭转角。
Lost motion: The torsional angle at the mid point of the hysteresis curve width at ±3% of rated torque .
齿隙：滞回曲线上，转矩“零”处的扭转角。
Backlash: The torsion angles when the torque indicated by the hysteresis curve is zero.

Installation and assembly
设计方面注意事项

装配精度 Assembly accuracy

各型号减速机装配时，其安装侧部件请按以下精度进行设计。如果安装精度不良，则易产生振动、噪音、齿隙。

Design motor flange within tolerance as follows. Poor assembly accuracy causes vibration, noise and so on.

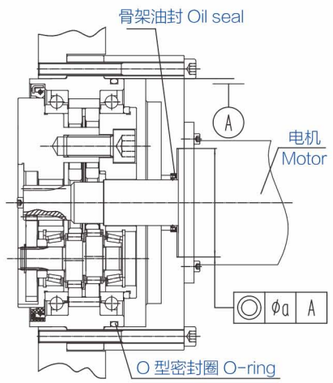
型号 Model	同心度公差 Concentricity tolerance a（mm）	型号 Model	同心度公差 Concentricity tolerance a（mm）
20E	MAX0.03	160E	MAX0.05
40E	MAX0.03	320E	MAX0.05
80E	MAX0.03	450E	MAX0.05
110E	MAX0.03		

型号 Model	中心间距离公差 Tolerance of center-to-center distance X	同心度公差 Concentricity tolerance a	平行度公差 Tolerance of parallelism b
10C	±0.03	MAX0.03	MAX0.03
27C			
50C			
100C			
120C			
200C			
320C			
500C			

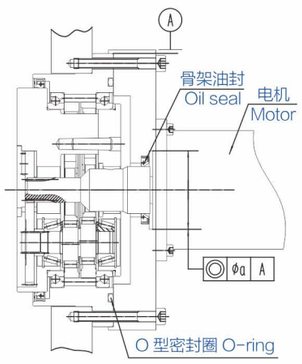
O 型圈的安装 Installation example of O-ring

下图表示了两种系列的“O”型圈密封位置，请在参照表 1 的基础上在安装侧进行密封设计，若结构上无法使用“O”型圈，请使用表 2 中的液体填料等密封剂。

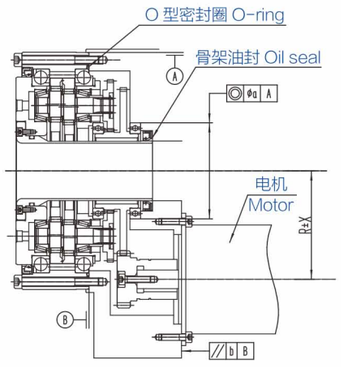
Be sure that seals are used between mating parts on the input side in below picture, refer to the O-ring seal installation illustrated in table 1.If use of an O-ring seal is impossible because of the design, use Gasket sealant shown in table 2.



80E 及以下型号装配精度及密封示意图
The assembly accuracy and seal diagram of 80E and the other types as below



110E 及以上型号装配精度及密封示意图
The assembly accuracy and seal diagram of 110E and the other types as below



C 系列减速机装配精度及密封示意图
The assembly accuracy and seal diagram of C

表1 “O”型圈选型
Table 1 Applicable O-ring seal

型号 Model	适用“O”型圈（II） Applicable O-ring seal(II)	型号 Model	适用“O”型圈（III） Applicable O-ring seal(III)	适用“O”型圈（I） Applicable O-ring seal(I)
20E	S120	10C	AS(ARP)568-048	CO 0625
40E	AS(ARP)568-258	27C	AS(ARP)568-163	CO 0634
80E	AS(ARP)568-263	50C	AS(ARP)568-169	CO 0634
110E	JIS B2401-G190	100C	AS(ARP)568-173	S70
160E	JIS B2401-G220	120C	AS(ARP)568-173	S70
320E	JIS B2401-G270	200C	AS(ARP)568-277	JIS B2401 G95
450E	JIS B2401-G330	320C	AS(ARP)568-281	JIS B2401 G135
		500C	JIS B2401-G460	JIS B2401 G145

表2 标准推荐液状密封剂
Table 2 Recommended Gasket sealant

名称（制造商） Manufacturer	性质、用途 Character & Name
Three Bond 1211 (Three Bond)	● 硅系无溶剂型 Silicon is not solvent ● 半干性填密片 Half dry packing piece
HERME SEAL SS-60F (Nihon-Hermetics)	● 无溶剂弹性密封剂 Solvent-free elastic sealant ● 金属接触面（法兰面）的密封 Contact surface of metal seal ● 与 three bond 1211 为同类产品 The same as three bond 1211

螺栓紧固转矩、允许传递转矩 Bolt tightening torque, allowing transfer torque

关于减速机的紧固请使用 推荐 内六角螺栓，并按以下紧固扭矩进行紧固。另外，为了防止内六角螺栓的松动以及螺栓表座的擦伤，建议使用内六角螺栓用碟簧垫圈。

Use hexagonal socket bolts to assemble the named reduction gear and tighten to the torque as specified below. The serrated lock washer is recommended to prevent the bolt from loosening and protect the bolt seat face from flaws.

内六角螺栓 公称 × 节距 Hexagonal socket bolt nominal size×pitch (mm)	紧固转矩 Tightening torque (Nm)	紧固力 (R) Tightening force（N）	使用螺栓各个部件 Bolt specification
M5×0.8	9.01±0.49	9310	● 内六角螺栓 GB/T 70.1-2008 ● 强度划分 GB/T 3098.1 ● 螺丝Thread GB/T 197 6g
M6×1.0	15.6±0.78	13180	
M8×1.25	37.2±1.86	23960	
M10×1.5	73.5±3.43	38080	
M12×1.75	128.4±6.37	55100	
M14×2.0	204.8±10.2	75860	
M16×2.0	318.5±15.9	103410	
M18×2.5	441.0±22.1	126720	

螺栓的允许传递转矩计算公式
Calculation of allowable transmission torque of bolts:

$$T_1 = F \times \frac{D_1}{2} \times \mu \times n_1$$

T1: 螺栓允许传递转矩 bolt allowable transmission torque(Nmm)
F：螺栓紧固力 bolt tightening force（N）
D1：螺栓安装 P.C.D. bolt P.C.D.（mm）
μ：摩擦系数 Friction，μ=0.15（吻合面附着润滑脂的情况 where lubricants remained），μ=0.2（吻合面脱脂的情况 where left dried with no lubricant）
n1：螺栓根数 number of bolts

安装输入轴（齿轮）Installation of input(center) gear

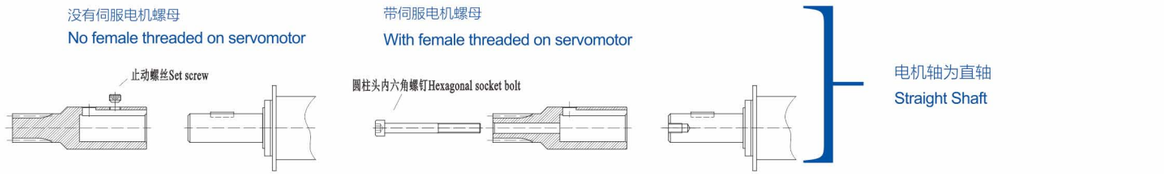
标准输入轴(齿轮)是指未进行伺服电机安装孔加工的产品。减速机的输入轴(齿轮)与不同形状的电机轴安装示例如下，请参考下图进行设计(止动螺丝、牵引螺丝、圆柱头内六角螺钉由贵公司准备 ）。

The standard-sized input(center) gear comes from the factory without holes drilled for motor shafts. The following are reference drawings for installation of input shafts. Customers must provide set screw, hexagonal socket bolt, or hexagonal nut and draw bolt.

BRV-E

没有伺服电机螺母
No female threaded on servomotor

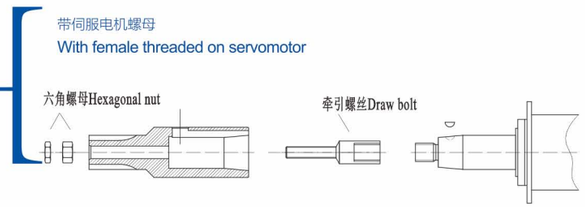
带伺服电机螺母
With female threaded on servomotor



电机轴为直轴
Straight Shaft

电机轴为锥形轴Taper Shaft

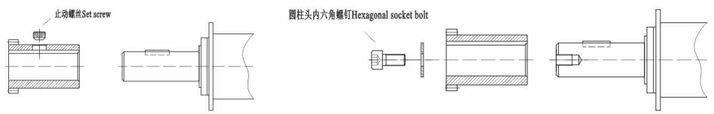
带伺服电机螺母
With female threaded on servomotor



BRV-C

没有伺服电机螺母
No female threaded on servomotor

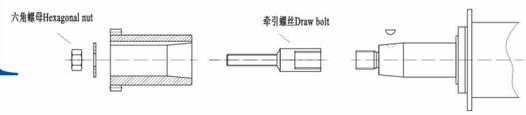
带伺服电机螺母
With female threaded on servomotor



电机轴为直轴
Straight Shaft

电机轴为锥形轴Taper Shaft

带伺服电机螺母
With female threaded on servomotor



润滑 Lubrication

为了充分发挥减速机的性能，请使用 Nebtesco 公司制造的润滑脂 MolyWhiteRE00，请勿与其他润滑脂混合使用。使用周围温度范围：-10℃ ~40℃。

To maximize the performance of the reducer, the use of Molywhite RE00 manufactured by Nebtesco is recommended. Working temperature range: -10℃~40℃.

润滑脂封入量 The quantity of grease required

减速机在出厂时未填充润滑脂，在安装时，请按左表中的注入量填充。

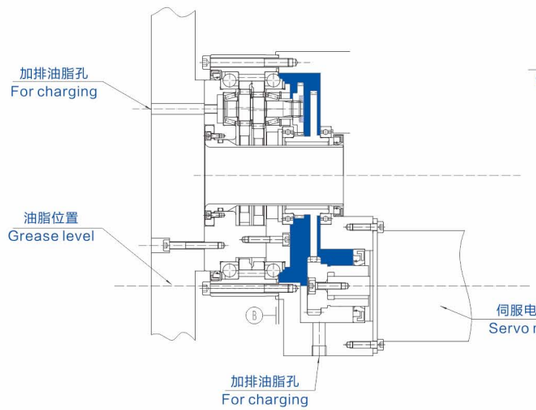
The RV reducer is not greased when it is shipped from the plant, the user must ensure that necessary amount of recommended grease is charged when installing the reducer.

	型号 Model	注入量（g） Quantity(g)	型号 Model	注入量（g） Quantity(g)
安装水平轴 Horizontal installation	20E	76	10C	128
	40E	170	27C	231
	80E	333	50C	433
	110E	376	100C	658
	160E	548	120C	686
	320E	905	200C	1593
	450E	1389	320C	3076
			500C	5163
安装垂直轴 Vertical installation	20E	87	10C	145
	40E	178	27C	265
	80E	382	50C	497
	110E	431	100C	746
	160E	604	120C	786
	320E	1038	200C	1593
	450E	1593	320C	3521
			500C	6003

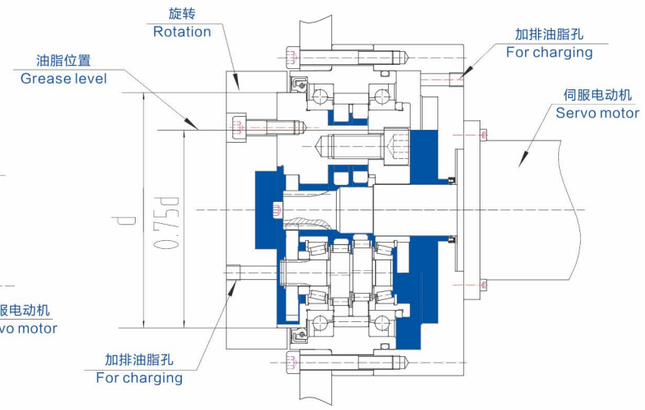
润滑脂注入位置 Grease level in reducer

（蓝色区域为润滑脂填充部分）

安装水平轴
Horizontal installation

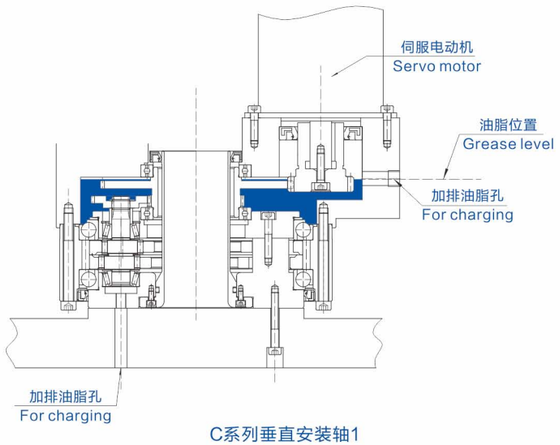


C系列水平安装轴

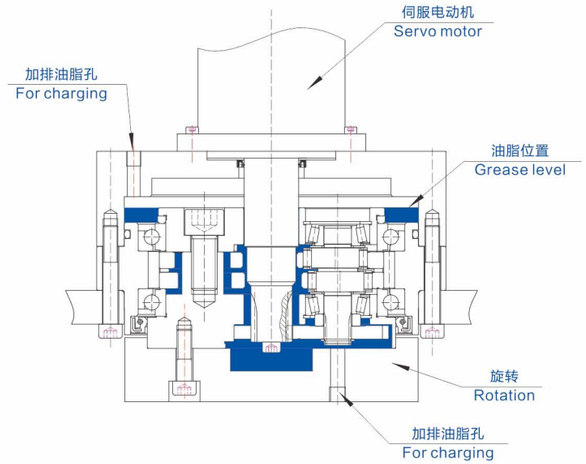


E系列水平安装轴

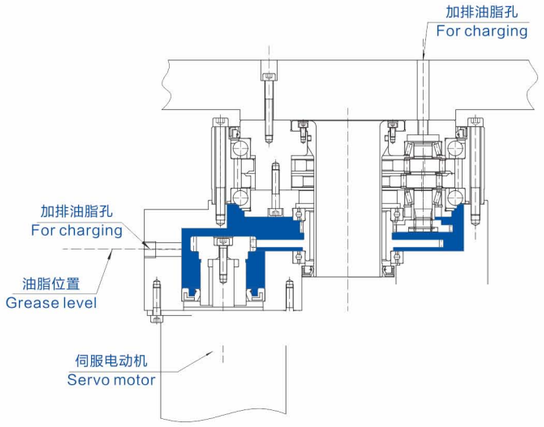
安装垂直轴
Vertical installation



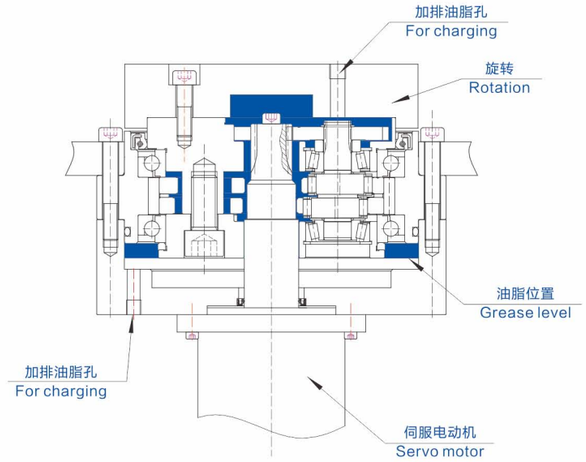
C系列垂直安装轴1



E系列垂直安装轴1



C系列垂直安装轴2



E系列垂直安装轴2

☐ 润滑脂更换时间
Interval between grease changes

润滑脂更换的标准时间为 20000 小时。若润滑脂污损或在周围温度条件（40℃以上）恶劣的环境下使用时，请及时检查润滑脂老化、污损情况并更换。

Change grease at a standard interval of 20000 hours. If grease is contaminated for any reason or used at an ambient temperature of 40℃ or more, check the grease for contamination and deterioration, to determine the proper maintenance interval.

Ordering parameters confirm

订购减速机的相关技术参数确认表

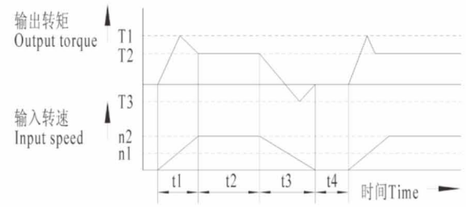
1. 使用行业 Application area：☐ Robot ☐机床 Machine tools ☐机械设备 Mechanical equipment ☐ AGV ☐ RGV ☐液压与气动 Fluid drive ☐工程机械 Project machine ☐其他 others _____

设备名称 Device name：_____

应用场合 Applications：_____

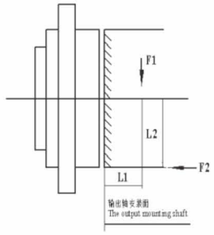
2. 选用型号 Choose model：_____

3. 负载条件 Conditions of load：_____



	启动 Start	稳定 Stable	停止 Stop	间歇时 interval
负载转矩 (Nm) Load torque(Nm)	T1: ____	T2: ____	T3: ____	
转速 (r/min) Speed(r/min)	n1: ____	n2: ____	n3: ____	
时间 (sec) Time(sec)	t1: ____	t2: ____	t3: ____	t4: ____

4. 外部负载 External load conditions：



F1：_____

F2：_____

L1：_____

L2：_____

5. 使用环境 Temperature：环境温度 Env Environment temperature _____ ℃

6. 安装方式 Installation：☐水平安装 Horizontal ☐垂直安装（电机在上）Vertical（upper motor）☐垂直安装（电机在下）Vertical（lower motor）

安装图
Illustration for installation：

7. 输入轴 Input gear：☐ 标准 Standard；
☐ 非标 Non-standard
（长度 length：___；直径 diameter：___ ）

输入轴要求尺寸图
Required dimension of input gear：

8. 驱动参数 Driving portion：功率 Capacity：___kw；
额定转矩 Rated torque：___ Nm；
转速 Speed：___ r/min；
☐伺服电机 Servo motor
☐直流伺服电机 DC Servo motor

电机轴尺寸图
The motor shaft：