

AMS

Automatic Motion System

TCG 齿圈组件

RGU Series



速器可以由客户提供，并且照片和
减速器可能不同。



速器可以由客户提供，并且照片和
减速器可能不同。

高精度 · 高刚性 · 同时实现中空大口径，零背隙减速组件

A non-backlash reduction unit featured by the realization of high precision, high rigidity and large-caliber hollow hole

特性 Features

■ 组件化 Unitization

TCG齿圈和球减速机组件化。省去烦琐的设计和装配，提高客户效率。

Unitization of TCG Cam Ring and Ball Reducer has reduced the man-hours required for designing and assembling.

■ 零背隙·高精度 Non-backlash and high precision

零背隙，可以实现高精度。

Non-backlash has realized high-precision positioning.

■ 中空大口径 Large-caliber hollow hole

中空大口径贯通结构，方便配线，配管，转台组件整体上结构紧凑。

The large-caliber through, hollow hole can pass wiring and piping through there to make the entire unit neat and ordered.

■ 低噪音·低振动 Low noise and low vibration

驱动部分全部为滚动接触，因此没有敲齿音，振动也很小。

All contacts of the drive unit by means of rolling has eliminated gear rattle and reduced vibration.

■ 高负载·高刚性 High load and high rigidity

旋转轴的轴承采用交叉滚子轴承。

可以强有力地支撑作用在转台上的外力。

Cross-roller bearing employed for the slewing shaft can adequately receive external force acting on the table.

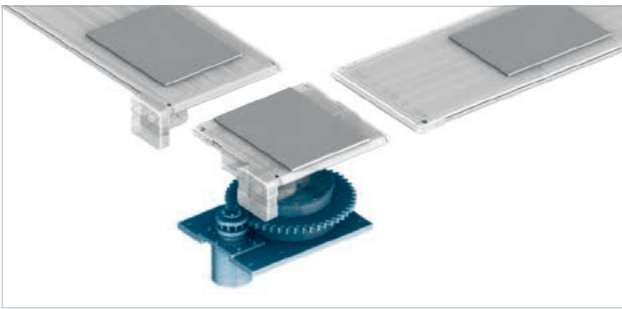
■ 电机安装简单 Easy-to-mount motor

配有各公司标准的伺服电机安装对应表，便于电机安装。

Motor mounting is easy with the availability of various attachments applicable to standard servo motors of various manufacturers.

用途例 Use Examples

● 大型基板反转装置 Large-sized board turnover unit



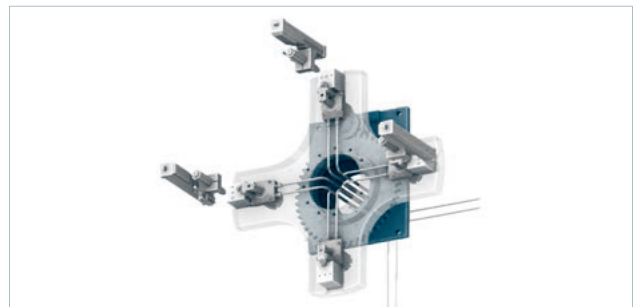
● 机器人周边装置 Peripheral units for robot



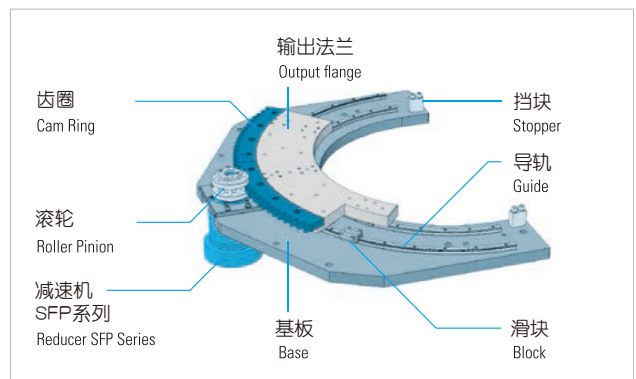
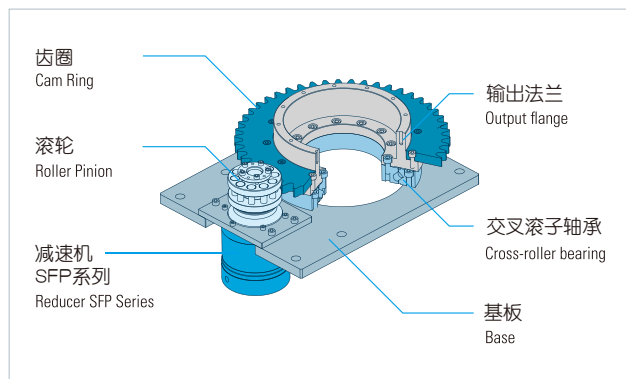
● 检查装置 Inspection unit



● 加工工作台的分度装置 Indexing of processing table



构造图 Structural Drawing



选定产品后相关技术参数请再次咨询亚姆斯 (AMS) 确认，更多新产品请查阅亚姆斯 (AMS) 官方网站

想要了解产品技术信息请登录网站下载

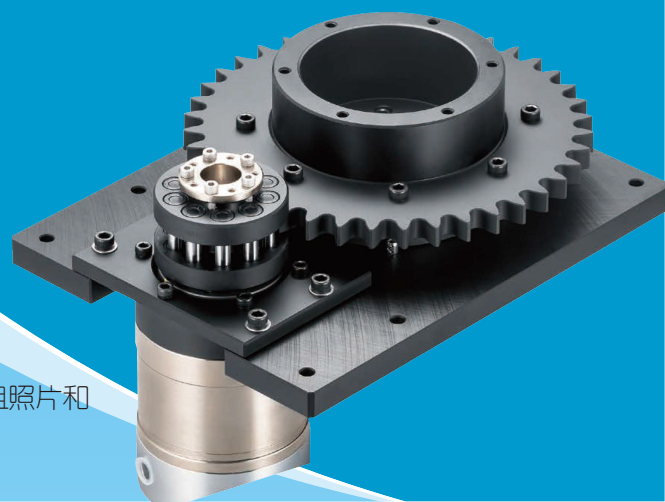
WWW.AMS88.COM
咨询电话:0631-5927833

规格 · 尺寸表

Specification Dimensional Table

TCG齿圈组件

TCG Cam Ring Unit



速器可以由客户提供，并且照片和
减速器可能不同。

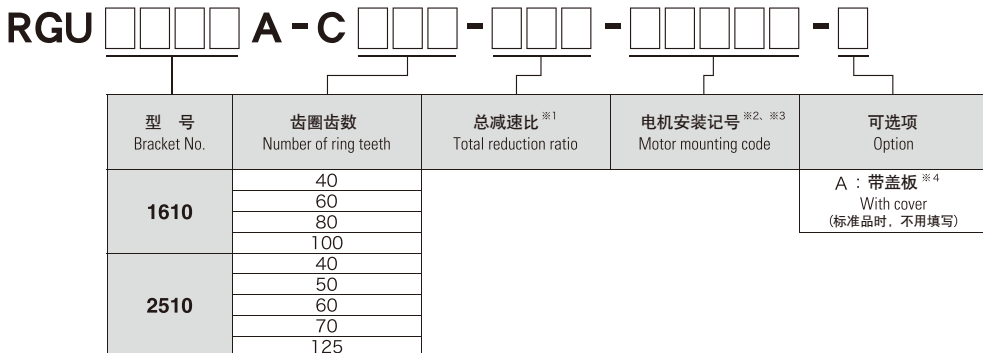
规格 · 型号 · 外形图 Specifications, Models, Outline Drawings

规格表 Specification Table

型号 Model	总减速比 Total reduction ratio	基本动额定 扭矩	最大使用 扭矩	允许静额定 扭矩	驱动部分 转动惯量	允许平均输入 回转数	最高输入 回转数	允许平均输入 回转数	最高输出 回转数	输入轴 转动惯量	推荐电机 容量	输入轴 孔径	质量
		Basic dynamic rated torque N · m	Maximum working torque N · m	Allowable static rated torque N · m	Inertia moment of drive unit x10 ⁻⁴ · kg · m ²	Allowable average number of input revolutions rpm	Maximum number of input revolutions rpm	Allowable average number of output revolutions rpm	Maximum number of output revolutions rpm	Inertia moment converted to input shaft x10 ⁻⁴ · kg · m ²	Recommendable motor capacity W	Input shaft hole diameter mm	Mass kg
RGU1610A-C40-	40	83	143	143	212	3000	4500	75.0	112.5	0.695	400	14 · 11 · 8	16
	80							37.5	56.3	0.484	200		
	120							25.0	37.5	0.437	200		
	160							18.8	28.1	0.419	100		
RGU1610A-C60-	60	125	237	290	1149			50.0	75.0	0.881	400		30
	120							25.0	37.5	0.531	200		
	180							16.7	25.0	0.458	200		
	240							12.5	18.8	0.430	100		
RGU1610A-C80-	80	165	316	390	4135			37.5	56.3	1.208	400		54
	160							18.8	28.1	0.612	200		
	240							12.5	18.8	0.494	200		
	320							9.4	14.1	0.451	100		
RGU1610A-C100-	100	205	395	480	12007			30.0	45.0	1.763	400		83
	200							15.0	22.5	0.751	200		
	300							10.0	15.0	0.556	200		
	400							7.5	11.3	0.486	100		
RGU2510A-C40-	40	290	479	670	2017	2000	4000	50.0	100.0	5.28	1500	48	
	80							25.0	50.0	3.45	750		
	120							16.7	33.3	3.07	750		
	160							12.5	25.0	2.91	400		
	200							10.0	20.0	2.85	400		
RGU2510A-C50-	50	360	598	840	5443			40.0	80.0	6.19	1500	72	
	100							20.0	40.0	3.68	750		
	150							13.3	26.7	3.17	750		
	200							10.0	20.0	2.97	400		
	250							8.0	16.0	2.89	400		
RGU2510A-C60-	60	430	718	1010	12074			33.3	66.7	7.37	1500	94	
	120							16.7	33.3	3.97	750		
	180							11.1	22.2	3.30	750		
	240							8.3	16.7	3.05	400		
RGU2510A-C70-	70	510	838	1180	22095			6.7	13.3	2.93	400	126	
	140							28.6	57.1	8.52	1500		
	210							14.3	28.6	4.26	750		
	280							9.5	19.0	3.43	750		
	350							7.1	14.3	3.12	400		
RGU2510A-C125-	125	910	1496	2100	249165			5.7	11.4	2.98	400	342	
	250					16.0	32.0	19.96	1500				
	375					8.0	16.0	7.12	750				
	500					5.3	10.7	4.70	750				
	625					4.0	8.0	3.83	400				
						3.2	6.4	3.44	400				

基本动额定扭矩 : 在一定速度运转时, 满足额定寿命的基本扭矩。
 Basic dynamic rated torque : Basic torque required for satisfying the rated lifetime during a constant-speed, continuous operation.
 最大使用扭矩 : 正常运转可以使用的扭矩 (包含加减速的峰值) 的最大值。
 Maximum working torque : Maximum value of torque for normal operation (including the peak torque during acceleration/ deceleration).
 允许静额定扭矩 : 非常条件下停止或者外部冲击等, 情况下的最大扭矩。
 Allowable static rated torque : Maximum value of torque for non-normal use, such as emergency stop and external shock.
 驱动部分转动惯量 : 输出侧回转部分的转动惯量, 计算负载扭矩时, 负载转动惯量需要一并算出。
 Inertia moment of drive unit : Inertia moment of the output side rotation unit. To calculate load torque, add the load inertia moment.
 输入轴换算转动惯量 : 齿圈组件整体的换算值。
 Inertia moment converted to input shaft : Converted value of the entirety of Ring Unit.

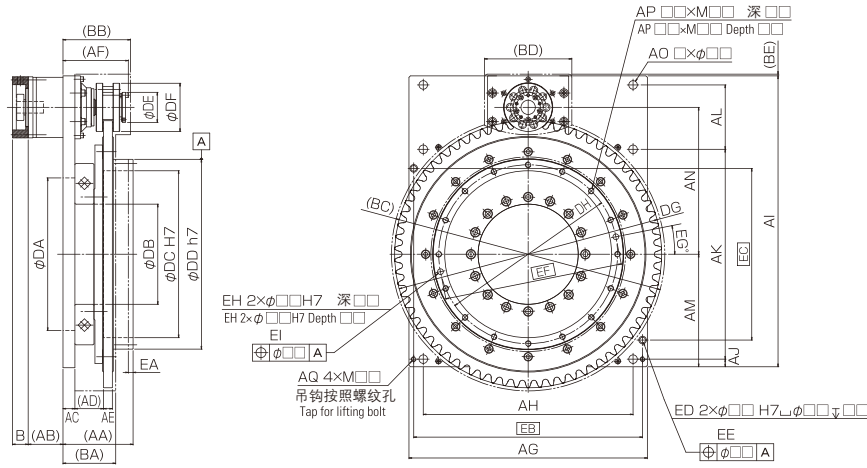
型号表示 Model Indication



- ※1 : 规格表参照
Refer to Specification Table.
- ※2 : 没有选择电机安装法兰的情况下
000□□ 内填写输入轴轴径
● 输入轴轴径 Input shaft hole diameter
For models with no motor attachment, enter
5-digit figure of "000□□."
- ※3 : 电机对应参照表P96-99页。
Refer to Motor Corresponding Table on P.96-99
- ※4 : 盖板是为了安全, 并不是用来防尘的,
盖板的尺寸图参照P89-90页。
The cover is a safety cover, not a dustproof cover.
For the outline dimensions of models with cover,
refer to Outline Dimensional Drawings on P.89-90

外形尺寸图 Outline dimensional drawings

●RGU□□□□A-C□□□-□□□□□□



尺寸图 Dimension table

型号 Model	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ
RGU1610A-C40	90	73	15	26	11.5	80	210	180	270	12	190	55	102	122	6×φ12	6×M6 深12 6×M6 Depth 12	无 None
RGU1610A-C60	101	62	15	37	11.5	91	300	250	355	14	250	75	139	170	6×φ12	12×M8 深16 12×M8 Depth 16	M8
RGU1610A-C80	116	48	20	47	11.5	106	400	330	450	19	330	80	184	220	6×φ18	12×M10 深20 12×M10 Depth 20	M10
RGU1610A-C100	125	38	20	56	11.5	115	460	400	530	16	400	95	216	268	6×φ18	16×M12 深24 16×M12 Depth 24	M10
RGU2510A-C40	122	97	15	45	18.5	112	320	270	405	11	270	110	146	193	6×φ18	12×M8 深16 12×M8 Depth 16	M8
RGU2510A-C50	141	78	20	59	18.5	131	400	330	480	19	330	110	184	230	6×φ12	12×M10 深20 12×M10 Depth 20	M10
RGU2510A-C60	142	78	20	60	18.5	132	440	380	540	16	380	125	206	268	6×φ18	16×M12 深24 16×M12 Depth 24	M10
RGU2510A-C70	147	73	25	60	18.5	137	500	440	610	16	440	135	236	308	6×φ18	16×M12 深24 16×M12 Depth 24	M10
RGU2510A-C125	125	97	30	30	18.5	112	820	750	990	31	750	175	406	518	6×φ22	16×M16 深32 16×M16 Depth 32	M16

型号 Model	BA	BB	BC	BD	BE	DA	DB	DC	DD	DE	DF	DG	DH
RGU1610A-C40	63.6	84.6	222	133.2	3.6	94	55	90	118	42	67	209	105
RGU1610A-C60	76.6	95.6	318	133.2	3.6	168	90	150	188	42	67	305	170
RGU1610A-C80	91.6	110.6	418	133.2	3.6	246	160	240	278	42	67	405	260
RGU1610A-C100	102.6	119.6	514	133.2	3.6	320	210	310	358	42	67	501	335
RGU2510A-C40	83.6	116.6	344	183.2	3.6	168	90	150	188	63	101	331	170
RGU2510A-C50	102.6	135.6	417	183.2	3.6	246	160	220	258	63	101	404	240
RGU2510A-C60	103.6	136.6	493	183.2	3.6	320	210	280	328	63	101	480	305
RGU2510A-C70	110.6	141.6	573	183.2	3.6	320	210	350	398	63	101	560	375
RGU2510A-C125	83.6	116.6	993	183.2	3.6	560	600	740	860	63	101	980	820

型号 Model	EA	EB	EC	ED	EE	EF	EG	EH	EI
RGU1610A-C40	10	192	144	2×φ8H7 铰孔 φ12 深7 2×φ8H7 φ12 Counter bore Depth 7	φ0.05	105	0	2×φ6H7 深6 2×φ6H7 Depth 6	φ0.03
RGU1610A-C60	10	280	210	2×φ10H7 铰孔 φ14 深5 2×φ10H7 φ14 Counter bore Depth 5	φ0.07	170	15	2×φ8H7 深8 2×φ8H7 Depth 8	φ0.03
RGU1610A-C80	10	368	276	2×φ12H7 铰孔 φ16 深8 2×φ12H7 φ16 Counter bore Depth 8	φ0.07	260	15	2×φ10H7 深10 2×φ10H7 Depth 10	φ0.03
RGU1610A-C100	10	440	330	2×φ12H7 铰孔 φ16 深8 2×φ12H7 φ16 Counter bore Depth 8	φ0.07	335	11.25	2×φ12H7 深12 2×φ12H7 Depth 12	φ0.05
RGU2510A-C40	10	296	222	2×φ10H7 铰孔 φ14 深5 2×φ10H7 φ14 Counter bore Depth 5	φ0.07	170	15	2×φ8H7 深8 2×φ8H7 Depth 8	φ0.03
RGU2510A-C50	10	368	276	2×φ12H7 铰孔 φ16 深8 2×φ12H7 φ16 Counter bore Depth 8	φ0.07	240	15	2×φ10H7 深10 2×φ10H7 Depth 10	φ0.03
RGU2510A-C60	10	416	312	2×φ12H7 铰孔 φ16 深8 2×φ12H7 φ16 Counter bore Depth 8	φ0.07	305	11.25	2×φ12H7 深12 2×φ12H7 Depth 12	φ0.05
RGU2510A-C70	10	480	360	2×φ12H7 铰孔 φ16 深13 2×φ12H7 φ16 Counter bore Depth 13	φ0.07	375	11.25	2×φ12H7 深12 2×φ12H7 Depth 12	φ0.05
RGU2510A-C125	20	800	660	2×φ12H7 铰孔 φ16 深18 2×φ12H7 φ16 Counter bore Depth 18	φ0.1	820	11.25	2×φ16H8 深16 2×φ16H8 Depth 16	φ0.06

B□为可选项A(带盖板)选择时的尺寸表示。

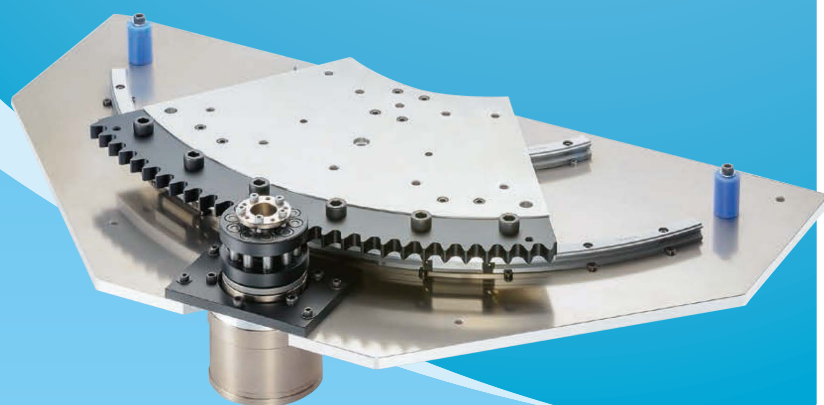
B□ dimensions enable when choose option A (With cover)

规格·尺寸表

Specification Dimensional Table

TCG分割型齿圈组件

TCG Circular Arc Cam Ring Unit



规格·型号·外形图 Specifications, Models, Outline Drawings

规格图 Specification Table

型号 Model	动作角度 Deg deg	总减速比 Total reduction ratio	基本动额定 扭矩 Basic dynamic rated torque N·m	最大使用 扭矩 Maximum working torque N·m	允许静额定 扭矩 Allowable static rated torque N·m	驱动部分 转动惯量 Inertia moment of drive unit ×10 ⁻⁴ kg·m ²	允许平均输入 回转数 Allowable average number of input revolutions rpm	最高输入 回转数 Maximum number of input revolutions rpm	允许平均输出 回转数 Allowable average number of output revolutions rpm	允许最高输出 回转数 Maximum number of output revolutions rpm	输入轴 转动惯量 Inertia moment converted to input shaft ×10 ⁻⁴ kg·m ²	推荐电机 容量 Recommendable motor capacity W	输入轴 孔径 Input shaft hole diameter mm	质量 Mass kg
RGU1610A-C240	30	240	500	945	1160	26998	3000	4500	12.5	18.8	0.992	400	14 · 11 · 8	60
		480							6.3	9.4	0.559	200		
		720							4.2	6.3	0.471	200		
		960							3.1	4.7	0.438	100		
	90	240							12.5	18.8	1.760	400		
		480							6.3	9.4	0.751	200		
		720							4.2	6.3	0.556	200		
		960							3.1	4.7	0.486	100		
	360	240							12.5	18.8	5.964	400		
		480							6.3	9.4	1.802	200		
		720							4.2	6.3	1.023	200		
		960							3.1	4.7	0.749	100		
RGU1610A-C300	30	300	620	1180	1450	70633	3000	4500	10.0	15.0	1.308	400	24 · 22 · 19 · 16 · 14	88
		600							5.0	7.5	0.638	200		
		900							3.3	5.0	0.506	200		
		1200							2.5	3.8	0.458	100		
	90	300							10.0	15.0	2.524	400		
		600							5.0	7.5	0.942	200		
		900							3.3	5.0	0.641	200		
		1200							2.5	3.8	0.534	100		
	360	300							10.0	15.0	9.967	400		
		600							5.0	7.5	2.802	200		
		900							3.3	5.0	1.468	200		
		1200							2.5	3.8	0.999	100		
RGU2510A-C150	30	150	1090	1795	2520	35368	2000	4000	13.3	26.7	5.332	1500	24 · 22 · 19 · 16 · 14	75
		300							6.7	13.3	3.463	750		
		450							4.4	8.9	3.075	750		
		600							3.3	6.7	2.919	400		
	90	150							13.3	26.7	7.955	1500		
		300							6.7	13.3	4.119	750		
		450							4.4	8.9	3.367	750		
		600							3.3	6.7	3.083	400		
	360	150							13.3	26.7	18.633	1500		
		300							6.7	13.3	6.789	750		
		450							4.4	8.9	4.553	750		
		600							3.3	6.7	3.750	400		
RGU2510A-C190	30	190	1375	2270	3200	93783	2000	4000	2.7	5.3	3.385	400	24 · 22 · 19 · 16 · 14	105
		380							10.5	21.1	6.358	1500		
		570							5.3	10.5	3.720	750		
		760							3.5	7.0	3.189	750		
	90	190							10.5	21.1	2.983	400		
		380							2.1	4.2	2.894	400		
		570							10.5	21.1	10.438	1500		
		760							5.3	10.5	4.740	750		
	360	190							3.5	7.0	3.642	750		
		380							2.6	5.3	3.238	400		
		570							2.1	4.2	3.058	400		
		760							10.5	21.1	33.250	1500		
90	190	5.3	10.5	10.443	750									
	380	3.5	7.0	6.177	750									
	570	2.6	5.3	4.664	400									
	760	2.1	4.2	3.970	400									

基本动额定扭矩 : 在一定速度运转时, 满足额定寿命的基本扭矩。
Basic dynamic rated torque : Basic torque required for satisfying the rated lifetime during a constant-speed, continuous operation.

最大使用扭矩 : 正常运转可以使用的扭矩 (包含加速减值的峰值) 的最大值。
Maximum working torque : Maximum value of torque for normal operation (including the peak torque during acceleration/ deceleration).

允许静额定扭矩 : 非常条件下停止或者外部冲击等, 情况下的最大扭矩。
Allowable static rated torque : Maximum value of torque for non-normal use, such as emergency stop and external shock.

驱动部分转动惯量 : 输出侧回转部分的转动惯量, 计算负载扭矩时, 负载转动惯量需要一并算出。
Inertia moment of drive unit : Inertia moment of the output side rotation unit. To calculate load torque, add the load inertia moment.

输入轴换算转动惯量 : 齿圈组件整体的换算值。
Inertia moment converted to input shaft : Converted value of the entirety of Ring Unit.

型号表示 Model Indication

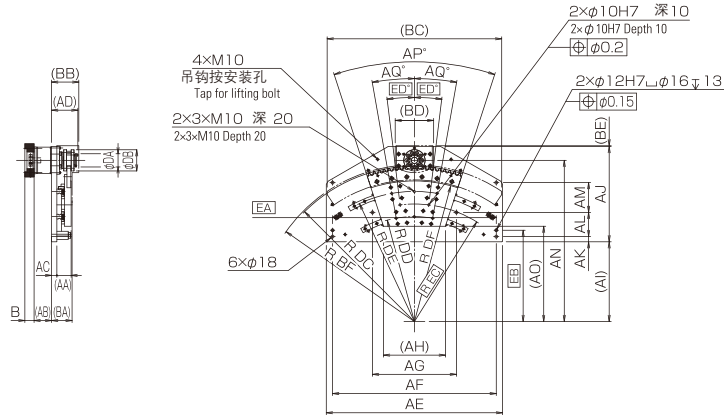
RGU A-C -A - - -

型号 Bracket No.	齿圈齿数 Number of ring teeth	动作角度*1 Deg	总减速比*2 Total reduction ratio	电机安装记号*3,*4 Motor mounting code	可选项 Option
1610	240	30 : 30° 90 : 90° 空白 : 360° Blank			A : 带盖板*5 With cover (标准情况下无记号)
	300				
2510	150				
	190				

- *1 : 仅非整圆的时候需要填写, -A□□
整圆型则为空白。
Only Circular arc model do state "-A□□",
Round model do state Blank.
- *2 : 规格表参照 Refer to Specification Table.
- *3 : 没有选择电机安装法兰的情况下
000□□内填写输入轴轴径
● 输入轴轴径 Input shaft hole diameter
For models with no motor attachment, enter
5-digit figure of "000□□".
- *4 : 电机对应参照表P96-99页
Refer to Motor Corresponding Table on P.96-99
- *5 : 盖板为安全盖板, 并不是用来防尘的,
盖板的尺寸图参照P93-95页
The cover is a safety cover, not a dustproof cover.
For the outline dimensions of models with cover,
refer to Outline Dimensional Drawings on P.93-95

外形尺寸图 Outline dimensional drawings

●RGU□□□□A-C□□□□-A30-□□□□-□□□□□



尺寸表 Dimension table

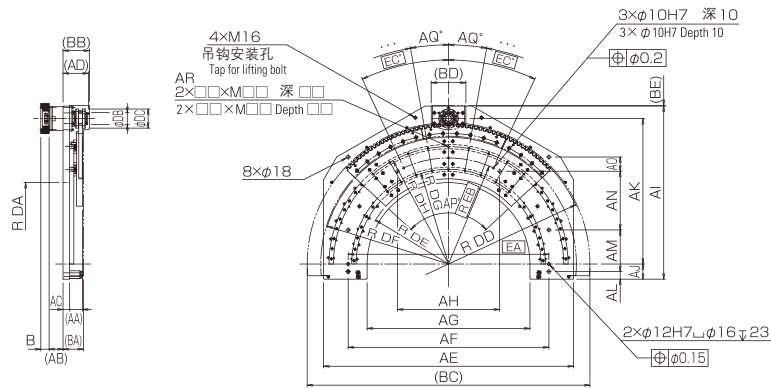
型号 Model	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ
RGU1610A-C240	48	52.5	25	100	660	610	400	233.9	301	351	25	79	136	606	360	36	10
RGU1610A-C300	60	40.5	25	112	840	780	400	295	380	418	25	115	140	752	454	36	10
RGU2510A-C150	56	95.5	25	113	660	610	400	233.9	301	380	25	77	138	615	360	36	10
RGU2510A-C190	68	83.5	25	125	840	780	400	295	380	454	25	115	142	768	454	36	10

型号 Model	BA	BB	BC	BD	BE	BF	DA	DB	DC	DD	DE	DF	EA	EB	EC	ED
RGU1610A-C240	88.5	104.6	657.9	133.2	3.6	594.6	42	67	588	400	500	525	610	356	450	8
RGU1610A-C300	100.5	116.6	830.8	133.2	3.6	740.6	42	67	734	500	620	670	780	435	560	8
RGU2510A-C150	85.5	117.6	653.4	183.2	3.6	593.6	63	101	587	400	500	525	610	356	450	8
RGU2510A-C190	97.5	129.6	831.8	183.2	3.6	746.6	63	101	740	500	620	670	780	435	560	8

B□是可选项A(带盖板)选择时的尺寸表示。

B□ dimensions enable when choose option A (With cover)

●RGU□□□□A-C□□□□-A90-□□□□-□□□□□



尺寸表 Dimension table

型号 Model	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR
RGU1610A-C240	48	42.5	35	110	1057	850	700	420	737	85	606	30	210	245	75	97.5	15	2x7xM10 深 20 2x7xM10 Depth 20
RGU1610A-C300	60	30.5	35	122	1320	1060	860	540	878	80	752	40	220	310	75	94.8	10	2x9xM10 深 20 2x9xM10 Depth 20
RGU2510A-C150	56	85.5	35	123	1057	850	700	420	766	85	615	30	210	245	75	98.4	15	2x7xM10 深 20 2x7xM10 Depth 20
RGU2510A-C190	68	73.5	35	135	1320	1060	860	540	914	80	768	40	220	310	75	94.7	10	2x9xM10 深 20 2x9xM10 Depth 20

型号 Model	BA	BB	BC	BD	BE	DA	DB	DC	DD	DE	DF	DG	DH	EA	EB	EC
RGU1610A-C240	98.5	114.6	1189.2	133.2	3.6	350	42	67	588	365	525	400	500	850	450	20
RGU1610A-C300	110.5	126.6	1481.2	133.2	3.6	430	42	67	734	450	670	500	620	1060	560	25
RGU2510A-C150	95.5	127.6	1187.2	183.2	3.6	350	63	101	587	365	525	400	500	850	450	20
RGU2510A-C190	107.5	139.6	1493.2	183.2	3.6	430	63	101	740	450	670	500	620	1060	560	25

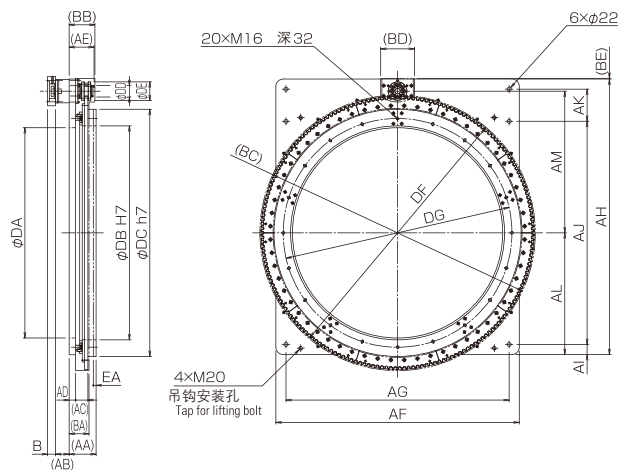
B□是可选项A(带盖板)选择时的尺寸表示。

B□ dimensions enable when choose option A (With cover)

规格 · 型号 · 外形图 Specifications, Models, Outline Drawings

外形尺寸图 Outline dimensional drawings

● RGU□□□□A-C□□□-A360-□□□-□□□□□



尺寸表 Dimension table

型号 Model	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK	AL	AM
RGU1610A-C240	123	47.5	47.5	30	105	1057	940	1181	59	940	123	529	606
RGU1610A-C300	133	30.5	59.5	35	122	1320	1210	1458	55	1210	138	660	752
RGU2510A-C150	127	90.5	54.5	30	118	1057	940	1210	59	940	152	529	615
RGU2510A-C190	146	73.5	66.5	35	135	1320	1210	1494	55	1210	174	660	768

型号 Model	BA	BB	BC	BD	BE	DA	DB	DC	DD	DE	DF	DG	EA
RGU1610A-C240	93.5	109.6	1189.2	133.2	3.6	920	940	1050	42	67	1176	1000	15
RGU1610A-C300	110.5	126.6	1481.2	133.2	3.6	1140	1160	1340	42	67	1468	1240	15
RGU2510A-C150	90.5	122.6	1187.2	183.2	3.6	920	940	1050	63	101	1174	1000	15
RGU2510A-C190	107.5	139.6	1493.2	183.2	3.6	1140	1160	1340	63	101	1480	1240	15

B□是可选项A(带盖板)选择时的尺寸表示。

B□ dimensions enable when choose option A (With cover)

从使用条件来进行选型

Select the model according to the operating conditions.

运转负载条件 Operating load conditions

负载惯量 Load inertia moment $I = \text{[]} \text{ kg} \cdot \text{m}^2$

最高输出转速 Maximum revolution $NR = \text{[]} \text{ rpm}$

加速时间 Acceleration time $t1 = \text{[]} \text{ sec}$

外力扭矩 Outer force torque $Tc = \text{[]} \text{ N} \cdot \text{m}$

驱动部惯量 Inertia moment of drive unit $Ic = \text{[]} \text{ kg} \cdot \text{m}^2$ 参照P.3 Refer to P.3

负载系数 Coefficient of weight $fw = \text{[]}$ 参照右表 Refer to the right table.

负载系数 Load coefficient

运转条件 Operating conditions	fw
没有冲击的圆滑运转时 In smooth operation with no impacts	1.0~1.2
普通运转时 In normal operation	1.2~1.5
伴随冲击和振动运转时 In operation with impacts and vibrations	1.5~3.0

回转数判定 Determination of number of revolutions

RGU最高输出回转数(参照P.3) Maximum number of output revolutions of RGU (Refer to p.3)

$NR < \text{[]}$

NO → 减速比, 回转数重新修改
Review of reduction ratio and number of revolutions

YES →

负载扭矩计算 Calculation of load torque

角速度 Angular velocity $\omega = NR \times 2\pi / 60 = \text{[]} \text{ rad/sec}$

角加速度 Angular acceleration $\alpha = \omega / t1 = \text{[]} \text{ rad/sec}^2$

加速扭矩 Accelerative torque $Ta = (I+Ic) \times \alpha = \text{[]} \text{ N} \cdot \text{m}$

最大负载扭矩 Maximum load torque $Tmax = fw \times (Ta+Tc) = \text{[]} \text{ N} \cdot \text{m}$

RGU最大使用扭矩 (参照P.3) Maximum working torque of RGU (Refer to p.3)

$Tmax < \text{[]}$

NO → 型号提升或者负载降低
Review of model upgrade or load

YES →

平均负载扭矩, 平均输出回转数计算 Calculation of average load torque and average number of output revolutions

运转条件 (参考) Operating conditions (Reference)

速度曲线
Velocity pattern

负载曲线
Load pattern

平均负载扭矩 Average load torque

$$Tm = \sqrt[10/3]{\frac{n_1 t_1 T_1^{10/3} + n_2 t_2 T_2^{10/3} + n_3 t_3 T_3^{10/3}}{n_1 t_1 + n_2 t_2 + n_3 t_3}}$$

平均输出回转数 Average number of output revolutions

$$Nm = \frac{t_1 n_1 + t_2 n_2 + t_3 n_3}{t_1 + t_2 + t_3}$$

项目 Item	起动时 Starting	稳定时 Steady operation	停止时 Stoppage
负载扭矩 Load torque N · m	T ₁	T ₂	T ₃
输出回转数 Number of output revolutions rpm	n ₁ (=0.5 n ₂)	n ₂	n ₃ (=0.5 n ₂)
时间 Time sec	t ₁	t ₂	t ₃

寿命计算
To life Calculation

寿命计算 Life Calculation

平均负载扭矩 Average Load Torque $T_m = \text{[]} \text{ N} \cdot \text{m}$

平均输出回转速数 Average output revolutions $N_m = \text{[]} \text{ rpm}$

平均输入回转速数 Average Input revolutions $N_1 = N_m \times R_u = \text{[]} \text{ rpm}$

寿命时间 Life Length L_h

$$L_h = L_{h_0} \times \frac{N_0}{N_1} \times \left(\frac{T_0}{f_w \times T_m} \right)^{10.3} \quad (\text{H})$$

L_{h_0} : 额定寿命时间 Rated life length	参照右表 Refer to right table.
N_0 : 允许平均输入回转速数 Allowable average number of input revolutions	参照右表 Refer to right table.
T_0 : 基本动额定扭矩 Basic dynamic rated torque	参照右表 Refer to right table.
T_m : 平均负载扭矩 Average Load Torque	
N_1 : 平均输入回转速 Average Input revolutions	
R_u : RGU总速比 Total reduction ratio of RGU	
f_w : 负载系数 Coefficient of weight	

定格寿命 Rated lifetime

型号 Model	总减速比 Total reduction ratio R_u	L_{h_0} H	T_0 N · m	N_0 rpm
RGU1610A-C40	40	5600	83	3000
	80	11000		
	120	16000		
	160	16000		
RGU1610A-C60	60	5400	125	
	120	10000		
	180	16000		
	240	16000		
RGU1610A-C80	80	5800	165	
	160	11000		
	240	17000		
	320	17000		
RGU1610A-C100	100	5600	205	
	200	11000		
	300	16000		
	400	17000		
RGU2510A-C40	40	8000	290	2000
	80	16000		
	120	16000		
	160	16000		
RGU2510A-C50	50	8300	360	
	100	16000		
	150	16000		
	200	16000		
RGU2510A-C60	60	8500	430	
	120	16000		
	180	16000		
	240	16000		
RGU2510A-C70	70	8000	510	
	140	15000		
	210	15000		
	280	15000		
RGU2510A-C125	125	8000	910	
	250	15000		
	375	15000		
	500	15000		
RGU1610A-C240	240	5400	500	3000
	480	10000		
	720	11000		
	960	11000		
RGU1610A-C300	300	5600	620	
	600	11000		
	900	11000		
	1200	11000		
RGU2510A-C150	150	8100	1090	2000
	300	15000		
	450	15000		
	600	15000		
RGU2510A-C190	750	15000	1375	
	190	8200		
	380	16000		
	570	16000		
	760	16000		
950	16000			

型号 Model	总减速比 Total reduction ratio R_u	L_{h_0} H	T_0 N · m	N_0 rpm
RGU1610A-C240	240	5400	500	3000
	480	10000		
	720	11000		
	960	11000		
RGU1610A-C300	300	5600	620	
	600	11000		
	900	11000		
	1200	11000		
RGU2510A-C150	150	8100	1090	2000
	300	15000		
	450	15000		
	600	15000		
RGU2510A-C190	750	15000	1375	
	190	8200		
	380	16000		
	570	16000		
	760	16000		
950	16000			

交叉滚子轴承的计算

Calculation of Cross-Roller Bearing

最大负载力矩载荷的计算 (Mmax)

Calculation of maximum load moment load (Mmax)

$$M_{max} = Fr_{max} (L_r + L_c / 1000) + Fa_{max} \cdot L_a$$

Fr max : 最大径向负载 Maximum radial load (N)

Fa max : 最大轴向负载 Maximum axial load (N)

Lr : 径向负载位置 Radial load position (m)

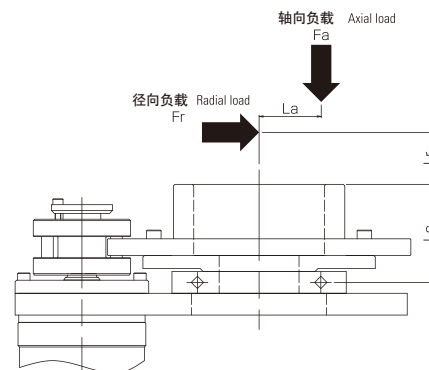
La : 轴向负载位置 Axial load position (m)

确认最大使用负载惯量是否在以下允许惯量负载范围内

Check whether the maximum load moment load is equal to or less than the allowable moment load.

$$M_{max} \leq Mc \quad (\text{允许的负载请参照下表})$$

(For the allowable moment load, refer to the following table.)

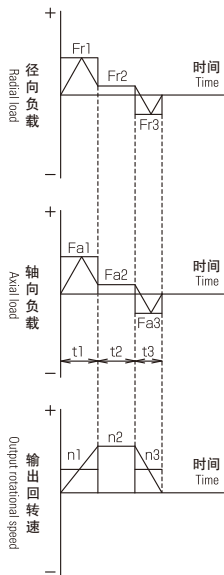


型号 Model	允许力矩负载 Allowable moment load Mc (N · m)	允许径向负载 Allowable radial load (N)	允许轴向负载 Allowable axial load (N)	Lc (mm)
RGU1610A-C40-	40	140	3300	68.5
	80	140	3400	
	120	140	3400	
	160	150	3700	
RGU1610A-C60-	60	610	8200	73.5
	120	620	8400	
	180	610	8300	
	240	660	9000	
RGU1610A-C80-	80	1950	17100	78.5
	160	1980	17400	
	240	1960	17300	
	320	2140	18800	
RGU1610A-C100-	100	3870	26000	85
	200	3890	26200	
	300	3930	26400	
	400	4200	28300	
RGU2510A-C40-	40	610	8300	94.5
	80	610	8300	
	120	690	9400	
	160	750	10200	
RGU2510A-C50-	50	1980	17400	103.5
	100	2000	17600	
	150	2260	19900	
	200	2460	21700	
	250	2630	23200	
RGU2510A-C60-	60	3860	25900	102
	120	3930	26400	
	180	4430	29800	
	240	4830	32500	
	300	5170	34800	
RGU2510A-C70-	70	3930	26400	102
	140	4000	26900	
	210	4520	30400	
	280	4930	33100	
	350	5270	35400	
RGU2510A-C125-	125	14390	38900	56
	250	14670	39700	
	375	16570	44800	
	500	18060	48900	
	625	19310	52300	

允许径向负载，允许轴向负载对于交叉滚子轴承来说只是单纯的径向负载或者轴向负载。是负担在任何一个负载的情况下，而满足齿圈组件的寿命的值。(径向负载：Lr + Lc = 0 轴向负载：La = 0)

The allowable radial load and the allowable axial load are the values that satisfy the lifetime of Ring Unit when either the net radial load or the net axial load is imposed on Cross-Roller Bearing. (Radial load: Lr + Lc = 0, Axial load: La = 0).

平均负载的计算公式 Calculation formulas of average load



平均径向负载 Fra (N)

Average radial load

$$Fra = \sqrt[10/3]{\frac{n1t1(|Fr1|)^{10/3} + n2t2(|Fr2|)^{10/3} + \dots + nntn(|Frn|)^{10/3}}{n1t1 + n2t2 + \dots + nntn}}$$

平均轴向负载 Faa (N)

Average axial load

$$Faa = \sqrt[10/3]{\frac{n1t1(|Fa1|)^{10/3} + n2t2(|Fa2|)^{10/3} + \dots + nntn(|Fan|)^{10/3}}{n1t1 + n2t2 + \dots + nntn}}$$

平均输出回转转速 Nm (rpm)

Average output revolutions

$$Nm = \frac{n1t1 + n2t2 + \dots + nntn}{t1 + t2 + \dots + tn}$$

平均力矩负载 Ma (N·m)

Average moment load

$$Ma = Fra(Lr + Lc) + Faa \cdot La$$

径向系数 (X) 轴向系数 (Y) 的计算公式

Calculation formulas of radial coefficient and axial coefficient

区分 Classification	径向系数 (X) Radial coefficient	轴向系数 (Y) Axial coefficient
$\frac{Fa}{Fr + 2M/Dpw} \leq 1.5$	1	0.45
$\frac{Fa}{Fr + 2M/Dpw} > 1.5$	0.67	0.67

型号 Model	基本动额定负载 Basic dynamic rated load C (N)	滚销的节圆直径 Roller pitch circle diameter Dpw (m)
RGU1610A-C40	20300	0.085
RGU1610A-C60	49100	0.1475
RGU2510A-C40		
RGU1610A-C80	104000	0.2275
RGU2510A-C50		
RGU1610A-C100	156000	0.2973
RGU2510A-C60		
RGU2510A-C70		
RGU2510A-C125	230000	0.73823

负载系数 Load coefficient (fw)

负载状态 Load state	fw
没有冲击的圆滑运转时 In smooth operation with no impacts	1.0~1.2
正常运转 In normal operation	1.2~1.5
伴随冲击·振动的运转时 In operation with impacts and vibrations	1.5~3.0

寿命计算 Life Calculation (Lh)

对于交叉滚子轴承，使用以下公式计算寿命

For the cross roller bearing, calculate the life hours by using the following formula

$$Lh = \left(\frac{10^6}{60 \cdot Nm}\right) \cdot \left(\frac{C}{fw \cdot Pc}\right)^{10/3} \quad (H)$$

动等价径向负载 Kinetic Equivalent Radial Load (Pc)

$$Pc = X \cdot \left(Fra + \frac{2Ma}{Dpw}\right) + Y \cdot Fa \quad (N)$$

滑块的计算 Calculation of Guide Blocks

动作角度 30度 90度 Deg for 30deg, 90deg

运转条件 Operating conditions

- 负载质量 Total load mass : m (kg)
- 输出法兰回转数 RPM of output flange : NR (rpm)
- 重力加速度 Gravitational acceleration : g (m/sec²)
- 负载系数 Load factor : fw、fs

● 负载力的计算 Calculation of applied load

滑块速度 Block speed (m/sec)

$$V = \frac{R \times NR \times \pi}{30000}$$

加速度 Acceleration (m/sec²)

$$a_n = \frac{V}{t_n}$$

加速时负载 Load in acceleration (N)

$$Pa1 = \frac{mg}{n} - \frac{m \times a1 \times L2}{2 \times L0}$$

$$Pb1 = \frac{mg}{n} + \frac{m \times a1 \times L2}{2 \times L0}$$

匀速时负载 Load in constant speed (N)

$$Pa2 = \frac{mg}{n}$$

$$Pb2 = \frac{mg}{n}$$

减速时负载 Load in deceleration (N)

$$Pa3 = \frac{mg}{n} + \frac{m \times a1 \times L2}{2 \times L0}$$

$$Pb3 = \frac{mg}{n} - \frac{m \times a1 \times L2}{2 \times L0}$$

负载合成 Load synthesis (N)

$$Pae1 = | Pa1 | + | Pat1 |$$

$$Pbe1 = | Pb1 | + | Pbt1 |$$

Maximum load (N)

$$Pr = \text{MAX}(Pae1, Pbe1, Pa2, Pb2, Pae3, Pbe3)$$

静安全系数 Static safety factor (N)

$$\frac{Co}{Pr} \geq fs$$

负载系数 Load factor fs

负载条件 Load conditions	fs
无冲击振动的运转时 No vibration, shock	1.0~3.5
伴随冲击振动的运转时 Applied vibration, shock	2.0~5.0

● 额定寿命的计算 Calculation of rated life time

平均负载力 Average load (N)

$$Pam = \sqrt[3]{\frac{Pae1^3 \times S1 + Pa2^3 \times S2 + Pae3^3 \times S3}{LS}}$$

$$Pbm = \sqrt[3]{\frac{Pbe1^3 \times S1 + Pb2^3 \times S2 + Pbe3^3 \times S3}{LS}}$$

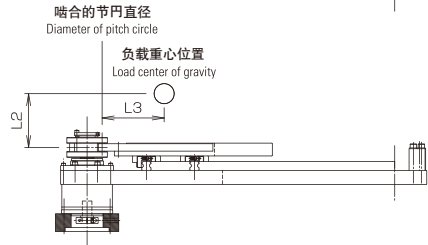
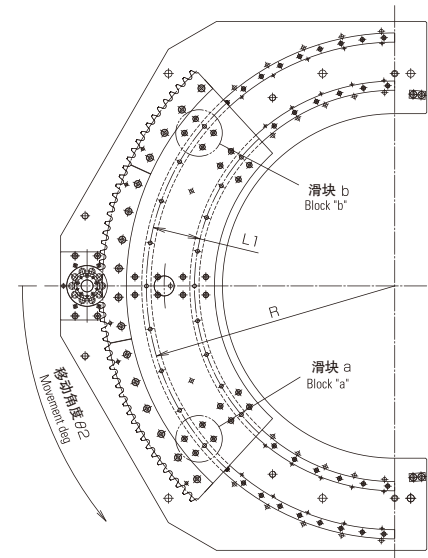
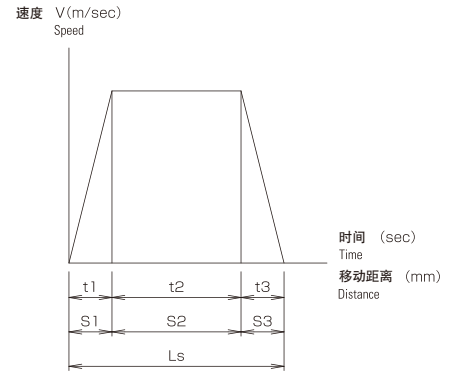
额定寿命 Rated life time (km)

$$Lkm = \left(\frac{C}{fw \times Pc} \right)^3 \times 50$$

$$Pc = \text{MAX}(Pam, Pbm)$$

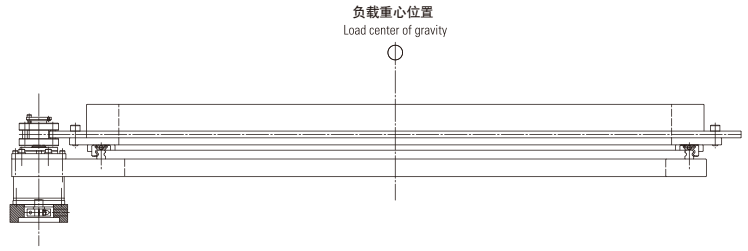
负载系数 Load factor fw

振动, 冲击 Vibration, shock	速度V(m/sec) (参考) speed V(m/sec) (reference)	fw
微 Minute	V ≤ 0.25	1.0~1.2
小 Small	0.25 < V ≤ 1.0	1.2~1.5
中 Medium	1.0 < V ≤ 2.0	1.5~2.0
大 Large	2.0 < V	2.0~3.5



运转条件 Operating conditions

负载质量 Total load mass : m (kg)
 输出法兰回转数 RPM of output flange : NR (rpm)
 重力加速度 Gravitational acceleration : g (m/sec²)
 负载系数 Load factor : fw、fs



● 负载力的计算 Calculation of applied load

滑块速度 Block speed (m/sec)

$$V = \frac{R \times NR \times \pi}{30000}$$

加速度 Acceleration (m/sec²)

$$a_n = \frac{V}{t_n}$$

加速时负载 匀速时负载 减速时负载 (N)

Load in acceleration, Load in constant speed, Load in deceleration

$$P1 = P2 = P3 = \frac{mg}{n}$$

最大载重 Maximum load (N)

$$Pr = P1$$

静载安全系数 Static safety factor (N)

$$\frac{Co}{Pr} \geq fs$$

● 额定寿命计算 Calculation of rated life time

平均负载力 Average load (N)

$$Pm = \sqrt[3]{\frac{P1^3 \times S1 + P2^3 \times S2 + P3^3 \times S3}{LS}}$$

额定寿命 Rated life time (km)

$$Lkm = \left(\frac{C}{fw \times Pc}\right)^3 \times 50$$

$$Pc = \text{MAX}(Pam, Pbm)$$

● 设计上的注意 Notes on consideration

请注意承重台的重心位置，
 动作角度30度·90度需要在内外侧导轨间设定。
 动作角度360度需要在回转中心设定。
 超过上述的使用范围请与我们联系。

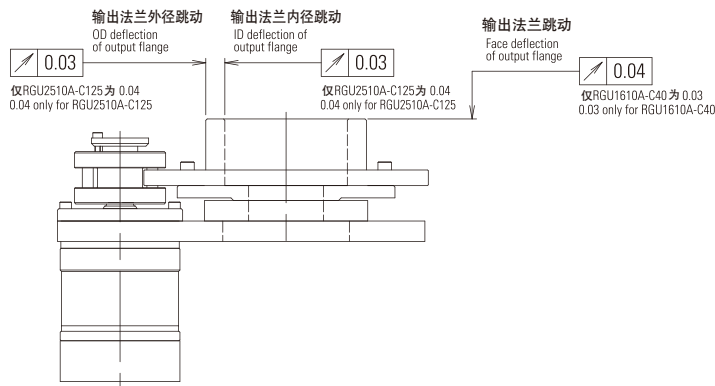
Pay attention to load center of gravity. It set Deg for 30deg and 90deg between the inner guide and the outer guide, and set Deg for 360deg to the center of rotation. If you use beyond the above range, please contact to us.

型号 Model	动作角度 Deg	总减速比 Total reduction ratio	基本动 额定负载 Basic dynamic rated load C (N)	基本静 额定负载 Basic static rated load Co (N)	滑块数 Number of Blocks n (个pieces)	滑轨 Block interval L0 (mm)	滑轨 半径 Guide radius R (mm)	滑轨 长 Guide interval L1 (mm)	啮合圆 直径 Diameter of pitch circle Dp (mm)
	deg		C (N)	Co (N)	n (个pieces)	L0 (mm)	R (mm)	L1 (mm)	Dp (mm)
RGU1610A-C240	30	240	7300	11593	4	174.5	500	100	1163.52
		480							
		720							
		960							
	90	240	7284	11577	6	698.1	500	100	1163.52
		480							
		720							
		960							
	360	240	7092	11385	5	-	500	100	1163.52
480									
720									
960									
RGU1610A-C300	30	300	18853	32462	4	173.1	620	120	1455.48
		600							
		900							
		1200							
	90	300	18826	32435	6	822.4	620	120	1455.48
		600							
		900							
		1200							
	360	300	18490	32099	5	-	620	120	1455.48
600									
900									
1200									
RGU2510A-C150	30	150	6090	9859	4	174.5	500	100	1153.13
		300							
		450							
		600							
		750							
	90	150	6069	9838	6	698.1	500	100	1153.13
		300							
		450							
		600							
360	150	5876	9645	5	-	500	100	1153.13	
	300								
	450								
	600								
RGU2510A-C190	30	190	18838	30718	4	173.1	620	120	1459.2
		380							
		570							
		760							
		950							
	90	190	18803	30683	6	822.4	620	120	1459.2
		380							
		570							
		760							
360	190	18388	30268	5	-	620	120	1459.2	
	380								
	570								
	760								

精度规格 Precision Standard

型号 Model	角度传动精度 Angular transmission accuracy arcmin	双向重复定位精度 Bidirectional repetitive positioning accuracy arcsec	输出法兰面跳动 Face deflection of output flange mm	输出法兰内外径跳动 ID-OD deflection of output flange mm
RGU1610A-C40	5	90	0.03	0.03
RGU1610A-C60	3	60	0.04	
RGU1610A-C80	3	45		
RGU1610A-C100	2	35		
RGU2510A-C40	3	75	0.04	0.03
RGU2510A-C50	3	60		
RGU2510A-C60	2	50		
RGU2510A-C70	2	45		
RGU2510A-C125	2	25		

型号 Model	动作角度 Deg	角度传递精度 Angular transmission accuracy arcmin	双向重复定位精度 Bidirectional repetitive positioning accuracy arcsec	输出法兰面跳动 Face deflection of output flange mm	输出法兰内外径跳动 ID-OD deflection of output flange mm
	deg				
RGU1610A-C240	30	0.8	25	0.04	-
	90	0.9		0.08	
	360	1.5		0.12	
RGU1610A-C300	30	0.6	12	0.04	-
	90	0.8		0.08	
	360	1.6		0.12	
RGU2510A-C150	30	0.8	20	0.04	-
	90	1		0.08	
	360	1.6		0.12	
RGU2510A-C190	30	0.7	16	0.04	-
	90	0.9		0.08	
	360	1.6		0.12	

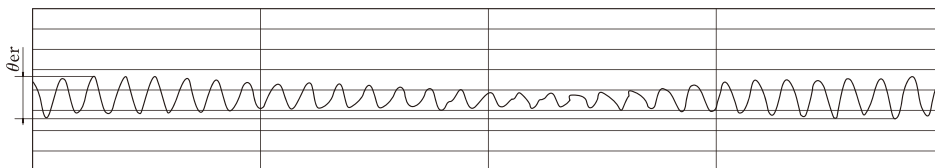


● 角度传动精度 Angular transmission accuracy

角传动精度为给输入轴任意的回转角 (θ₁) 时, 输出轴的理论回转角 (θ₂) 和实际回转角 (θ',₂) 之间的差, 输出轴1回转产生的最大差 (θ_{er}) 称之为角度传动精度。

The angular transmission accuracy generally refers to the difference between the angle of theoretical rotation (θ₂) of the output shaft when any angle of rotation (θ₁) is applied to the input shaft side and the angle of the actual rotation (θ'₂), and particularly refers to the maximum difference caused when the output shaft makes a 360-degree roll (θ_{er}).

$$\theta_{er} = \theta'_2 - \theta_2 = \theta'_2 - \theta_1 / R \quad (R : \text{减速比 Reduction ratio})$$



● 双向重复定位精度 Bidirectional repetitive positioning accuracy

朝着目标位置正方向定位停止时的位置, 和反方向定位停止时的位置的最大差。

This precision refers to the maximum difference between the stop position when positioning is made in a positive direction toward the target position and the stop position when positioning is made in a negative direction toward the target position.

使用注意 Precautions for Use

关于润滑 Lubrication

第一次使用时，请在齿面涂润滑脂。漏涂可能会造成磨损等状况出现。
First of all, apply grease to the tooth surface. Otherwise, friction and other troubles could be caused.

防尘对策 Dust preventive measures

齿面和齿底等部位如有灰尘或者异物附着可能会造成运转不良。
If dust, dirt and foreign matter contaminate the tooth surface, the tooth bottom, etc., malfunction could be caused.

电机安装要点 Motor mounting procedure

电机安装时，请按照以下的顺序：
Mount the motor by using the following procedure:

1. 将减速机输入孔和电机输出轴上附着的脏物，油渍等清理干净。
Completely remove dust, dirt, oil, etc. from the inside diameter of the input shaft of the reducer and the motor shaft.
2. 将衬套的夹紧螺栓对准中间法兰盘作业孔位置。
Match the set-collar clamp bolt of the input shaft of the reducer to the work hole of the motor attachment.
3. 保持减速机和电机不发生倾斜，将电机轴缓慢插入减速机孔底部，然后拧紧螺栓固定电机。
Carefully insert the clamp bolt into the working hole all the way seated in such a manner that the reducer and the motor do not tilt, and fix the motor by tightening the bolt.
4. 将螺栓用规定的扭矩拧紧。
Tighten the set-collar clamp bolt with the specified tightening torque.

夹紧螺栓 Clamp bolt	拧紧扭矩 Tightening torque N · m
M5	9.0
M6	15.3

请务必按照以上拧紧扭矩进行拧紧。
如果没有满足拧紧扭矩，可能会导致滑动等情况出现。
Be sure to tighten the clamp bolt with the above-specified tightening torque.
If the tightening torque is deficient, slip or other trouble could be caused.

减速机的输入孔上有切口，外面套有环形夹紧衬套，衬套上的螺栓拧紧后，会使输入孔产生变形，从而把电机轴抱紧。衬套拧紧的时候，输入孔以及衬套上的切口请按照右图指示相互对准，然后再拧紧螺栓。
衬套和输入孔的切口没有对齐就抱紧的情况下，可能会引起输入轴的破损以及抱紧力的下降。

The input shaft of the reducer is slit up. Because of this, when the set-collar clamp bolt is tightened, the input shaft is deformed to clamp the input shaft.
When the set collar is fastened, match the slit of the input shaft to the slit of the set collar as shown on the right figure, and tighten the clamp bolt.
If the shaft is clamped with the slit of the set collar and the slit of the input shaft in the mismatched condition, the input shaft could be broken or the clamp force could be lowered.

