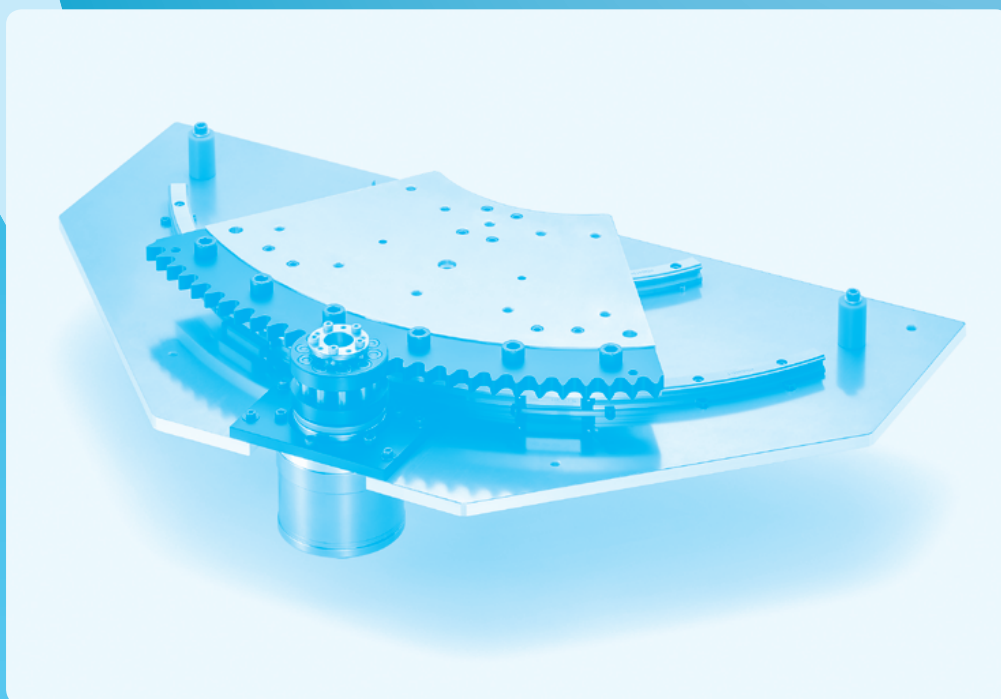


規格・ 尺寸表

Specification Dimensional Table

TCG分割型齒圈模組

TCG Circular Arc Cam Ring Unit



規格・型號・外型圖 Specifications, Models, Outline Drawings

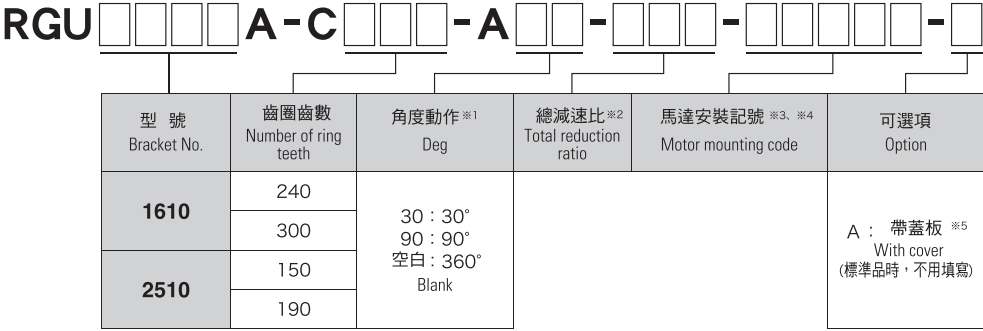
規格圖 Specification Table

型 號 Model	作動角度 Deg	總減速比 Total reduction ratio	基本動額 定轉矩 Basic dynamic rated torque	最大使用 轉矩 Maximum working torque	容許靜額 定轉矩 Allowable static rated torque	驅動部分 轉動慣量 Inertia moment of drive unit	容許平均輸 入迴轉數 Allowable average number of input revolutions	最高輸入 迴轉數 Maximum number of input revolutions	容許平均輸 出迴轉數 Allowable average number of output revolutions	最高輸出 迴轉數 Maximum number of output revolutions	入力軸 轉動慣量 Inertia moment converted to input shaft	推薦馬達 功率 Recommendable motor capacity	入力軸 孔徑 Input shaft hole diameter	重量 Mass
	deg		N · m	N · m	N · m	×10 ⁻⁴ kg·m ²	rpm	rpm	rpm	rpm	×10 ⁻⁴ kg·m ²	W	mm	kg
RGU1610A-C240	30	240	500	945	1160	25961	3000	4500	12.5	18.8	0.974	400	14 · 11 · 8	60
		480							6.3	9.4	0.554	200		
		720							4.2	6.3	0.469	200		
		960							3.1	4.7	0.437	100		
	90	240				12.5			18.8	1.576	400	158		
		480				6.3			9.4	0.705	200			
		720				4.2			6.3	0.535	200			
		960				3.1			4.7	0.474	100			
	360	240				12.5			18.8	5.981	400	270		
		480				6.3			9.4	1.806	200			
		720				4.2			6.3	1.025	200			
		960				3.1			4.7	0.750	100			
RGU1610A-C300	30	300	620	1180	1450	65947	3000	4500	10.0	15.0	1.256	400	14 · 11 · 8	88
		600							5.0	7.5	0.625	200		
		900							3.3	5.0	0.500	200		
		1200							2.5	3.8	0.454	100		
	90	300				10.0			15.0	2.200	400	238		
		600				5.0			7.5	0.861	200			
		900				3.3			5.0	0.605	200			
		1200				2.5			3.8	0.513	100			
	360	300				10.0			15.0	9.998	400	476		
		600				5.0			7.5	2.810	200			
		900				3.3			5.0	1.471	200			
		1200				2.5			3.8	1.001	100			
RGU2510A-C150	30	150	1090	1795	2520	34331	2000	4000	13.3	26.7	5.286	1500	24 · 22 · 19 · 16 · 14	75
		300							6.7	13.3	3.452	750		
		450							4.4	8.9	3.070	750		
		600							3.3	6.7	2.916	400		
	90	750				2.7			5.3	2.852	400	177		
		150				13.3			26.7	7.303	1500			
		300				6.7			13.3	3.956	750			
		450				4.4			8.9	3.294	750			
	360	600				3.3			6.7	3.042	400	293		
		750				2.7			5.3	2.932	400			
		150				13.3			26.7	18.770	1500			
		300				6.7			13.3	6.823	750			
RGU2510A-C190	30	190	1375	2270	3200	89097	2000	4000	10.5	21.1	6.229	1500	24 · 22 · 19 · 16 · 14	105
		380							5.3	10.5	3.688	750		
		570							3.5	7.0	3.175	750		
		760							2.6	5.3	2.975	400		
	90	950				2.1			4.2	2.889	400	262		
		190				10.5			21.1	9.223	1500			
		380				5.3			10.5	4.436	750			
		570				3.5			7.0	3.507	750			
	360	760				2.6			5.3	3.162	400	549		
		950				2.1			4.2	3.009	400			
		190				10.5			21.1	33.480	1500			
		380				5.3			10.5	10.500	750			
	360	570	1072875			3.5	7.0	6.203	750	549				
		760				2.6	5.3	4.678	400					
		950				2.1	4.2	3.979	400					

基本動額定轉矩
Basic dynamic rated torque
最大使用轉矩
Maximum working torque
容許靜額定轉矩
Allowable static rated torque
驅動部分轉動慣量
Inertia moment of drive unit
輸入軸換算轉動慣量
Inertia moment converted to input shaft

：在一定速度運轉時，滿足額定壽命的基本扭矩。
Basic torque required for satisfying the rated lifetime during a constant-speed, continuous operation.
：正常運轉可以使用的扭矩（包含加減速的峰值）的最大值。
Maximum value of torque for normal operation (including the peak torque during acceleration/ deceleration).
：非常條件下停止或者外部衝擊等，情況下的最大扭矩。
Maximum value of torque for non-normal use, such as emergency stop and external shock.
：輸出側回轉部分的轉動慣量，計算負載扭矩時，負載轉動慣量需要一併算出，
Inertia moment of the output side rotation unit. To calculate load torque, add the load inertia moment.
：齒圈元件全體的換算值。
Converted value of the entirety of Ring Unit.

型號表示 Model Indication



※1：非整圈的時候需要填寫。
Only Circular arc model do state "-A□□",
Round model do state Blank.

※2：規格表參照 Refer to Specification Table.

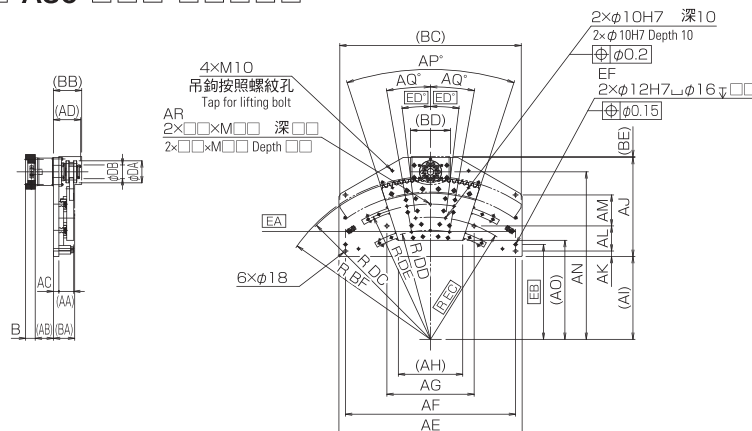
※3：沒有選擇馬達安裝法蘭的情況下
000□□填寫輸入軸軸徑
● 輸入軸軸徑 Input shaft hole diameter
For models with no motor attachment, enter
5-digit figure of "000□□."

※4：馬達對應參照表P12-15頁
Refer to Motor Corresponding Table on pp. 12 – 15.

※5：蓋板是為了安全，並不是用來防塵的，
蓋板的尺寸圖參照P9-11頁
The cover is a safety cover, not a dustproof cover.
For the outline dimensions of models with cover,
refer to Outline Dimensional Drawings on pp. 9 – 11.

外型尺寸圖 Outline dimensional drawings

●RGU□□□□A-C□□□□-A30-□□□□-□□□□□



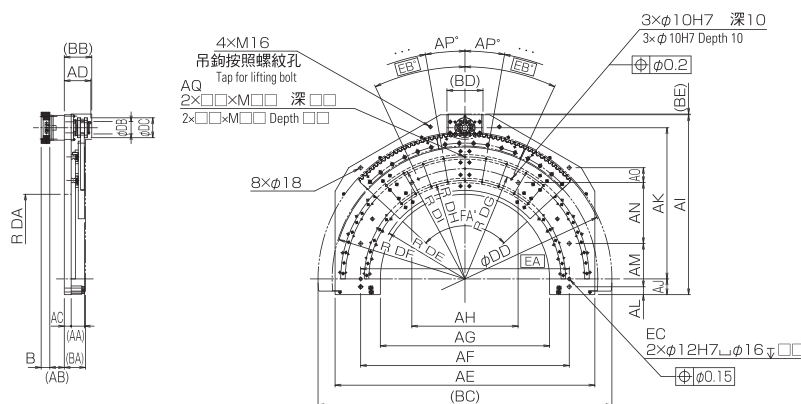
尺寸表 Dimension table

型號 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

型號 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	1189.2	42	67	1176	400	500	525	610	356	450	8
RGU1610A-C300	100.5	116.6	830.8	133.2	3.6	1481.2	42	67	1468	500	620	670	780	435	560	8
RGU2510A-C150	85.5	117.6	653.4	183.2	3.6	1187.2	63	101	1174	400	500	525	610	356	450	8
RGU2510A-C190	97.5	129.6	831.8	183.2	3.6	1493.2	63	101	1480	500	620	670	780	435	560	8

B□ 的尺寸 是選擇選項A(帶蓋板)的尺寸表。 B□ dimensions enable when choose option A (With cover)

●RGU□□□□A-C□□□□-A90-□□□□-□□□□□



尺寸表 Dimension table

型號 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	20	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

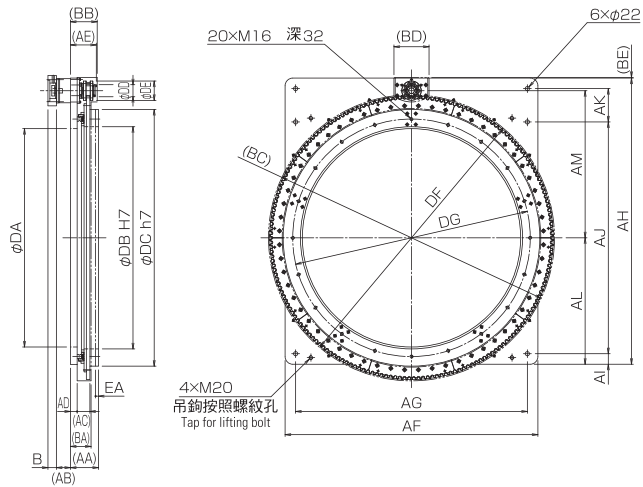
型號 Model	BA	BB	BC	BD	BE	DA	DB	DC	DD	DE	DF	DG	DH	EA	EB	EC
RGU1610A-C240	98.5	114.6	1189.2	133.2	3.6	350	42	67	1176	365	525	400	500	850	450	20
RGU1610A-C300	110.5	126.6	1481.2	133.2	3.6	430	42	67	1468	450	670	500	620	1060	560	25
RGU2510A-C150	95.5	127.6	1187.2	183.2	3.6	350	63	101	1174	365	525	400	500	850	450	20
RGU2510A-C190	107.5	139.6	1493.2	183.2	3.6	430	63	101	1480	450	670	500	620	1060	560	25

B□ 的尺寸 是選擇選項A(帶蓋板)的尺寸表 B□ dimensions enable when choose option A (With cover)

規格・型號・外型圖 Specifications, Models, Outline Drawings

外型尺寸圖 Outline dimensional drawings

●RGU□□□□A-C□□□-A360-□□□-□□□□□



尺寸表 Dimension table

型號 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

型號 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

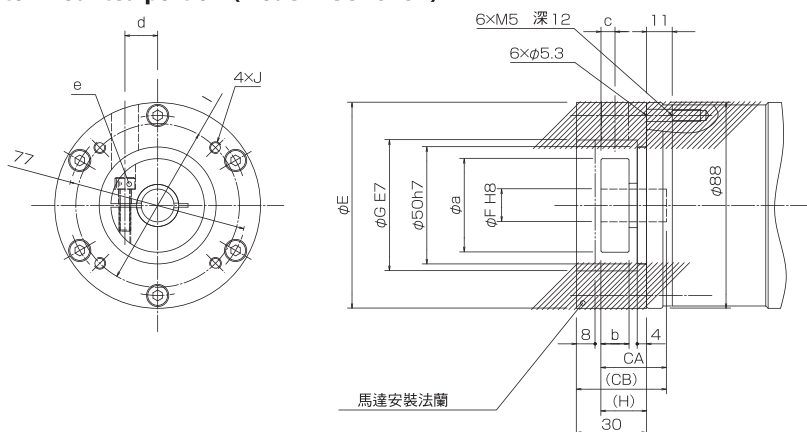
B□ 的尺寸 是選擇選項A(帶蓋板)的尺寸表。

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

外型尺寸圖 Outline dimensional drawings

● 馬達安裝詳細圖(RGU1610A型)

Detailed drawing of motor mounted portion (Model RGU1610A)



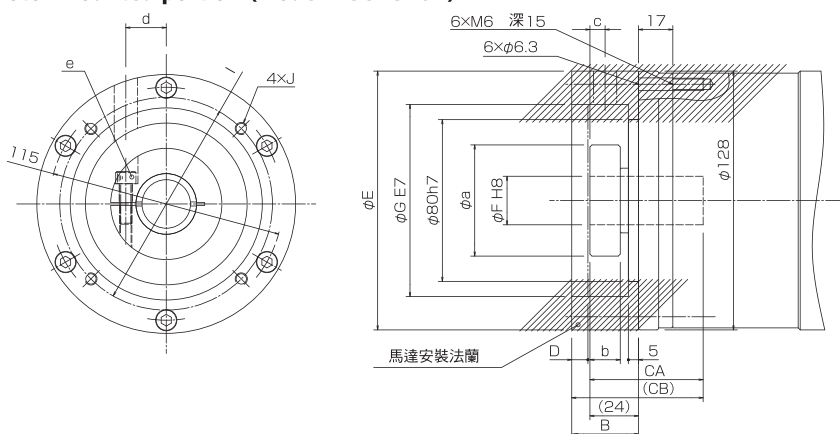
尺寸表 [馬達安裝詳細圖(RGU1610A型)]

Dimension table [Detailed drawing of motor mounted portion (Model RGU1610A)]

型號 Model	CA	CB	E	F	G	H	I	J	a	b	c	d	e
C01	23	33.5	88	8	30	20	45	M3×6	30	10	5	10	M4
C02								46					
C03								M4×8					
C04	28	38.5	88	11・14	50	19.5	70	M5×10	40	12	6	14	M5
	23	33.5		8		20			30	10	5	10	M4
				14									
D01	28	38.5	98	11・14	70	19.5	90	M6×12	40	12	6	14	M5
D02				14									

● 馬達安裝詳細圖(RGU2510A型)

Detailed drawing of motor mounted portion (Model RGU2510A)



尺寸表 [馬達安裝詳細圖(RGU2510A型)]

Dimension table [Detailed drawing of motor mounted portion (Model RGU2510A)]

型 號 Model	B	CA	CB	D	E	F	G	I	J	a	b	c	d	e				
F01	33	38	47	5	128	14	50	70	M4×10	40	12	6	14	M5				
F02																		
F03																		
F04										19	70	90	M5×10	50	15	7.5	18	M6
									14	40				12	6	14	M5	
F05								8		16・19	80	100	M6×12	50	15	7.5	18	M6
										14				40	12	6	14	M5
F06										16・19	95	115	M8×16	50	15	7.5	18	M6
F07						24			55	20								
F08	44	56	65	10	158	16・19	110	145	50	18								
G01		38	47															
G02		56	58			76			22・24				55	20				

馬達簡單對應表。選項時請務必進行計算。馬達的瞬間最大轉矩*減速比的值請不要超過齒圈元件的最大使用轉矩。
關於沒有記載到的馬達型號，請向本公司諮詢。

Motor Corresponding Table is an abridged table. Be sure to make a model selecting calculation. In using the motor, ensure that the product of “(Instantaneous maximum torque) × (Reduction ratio)” of the motor is not more than the maximum working torque of Ring Unit. For models not listed in the table, contact us for inquiry.

三菱電機 Mitsubishi Electric				RGU1610型								RGU2510型			
型 號 Model			馬達 功率 Motor capacity	額定 轉矩 Rated torque	馬達 額定轉速 Rated rotational speed of motor	齒圈模組型號 Model of Ring Unit									
						RGU1610A-	C40-40 C60-60 C80-80 C100-100 C240-240 C300-300	C40-80 C60-120 C80-160 C100-200 C240-480 C300-600	C40-120 C60-180 C80-240 C100-300 C240-720 C300-900	C40-160 C60-240 C80-320 C100-400 C240-960 C300-1200					
							RGU2510A-	C40-40 C50-50 C60-60 C70-70 C125-125 C150-150 C190-190	C40-80 C50-100 C60-120 C70-140 C125-250 C150-300 C190-380	C40-120 C50-150 C60-180 C70-210 C125-375 C150-450 C190-570	C40-160 C50-200 C60-240 C70-280 C125-500 C150-600 C190-760	C40-200 C50-250 C60-300 C70-350 C125-625 C150-750 C190-950			
J4	HG-KR	13	100	0.32	3000	齒圈安裝記號 Installation symbol of motor					C0208				
		23	200	0.64							C0414				
		43	400	1.3			C0414					F0214			
		73	750	2.4			F0419								
	HG-MR	13	100	0.32	3000						C0208				
		23	200	0.64							C0414				
		43	400	1.3			C0414					F0214			
		73	750	2.4			F0419								
	HG-SR	51	500	4.8	1000										
		52	500	2.4				2000	G0224						
		102	1000	4.8											
	J3	HF-KP	13	100	0.32		3000					C0208			
23			200	0.64					C0414						
43			400	1.3	C0414							F0214			
73			750	2.4	F0419										
HF-MP		13	100	0.32	3000						C0208				
		23	200	0.64							C0414				
		43	400	1.3			C0414					F0214			
		73	750	2.4			F0419								
HF-SP		51	500	4.77	1000										
		52	500	2.39				2000	G0224						
		102	1000	4.77											
HC-LP		52	500	2.39	2000		G0224								
		102	1000	4.78											
HC-RP		103	1000	3.18	3000		F0724								
		153	1500	4.78											

型 號 Model			馬達 功率 Motor capacity	額定 轉矩 Rated torque	馬達 額定轉速 Rated rotational speed of motor	齒圈模組型號 Model of Ring Unit								
						RGU1610A-	C40-40 C60-60 C80-80 C100-100 C240-240 C300-300	C40-80 C60-120 C80-160 C100-200 C240-480 C300-600	C40-120 C60-180 C80-240 C100-300 C240-720 C300-900	C40-160 C60-240 C80-320 C100-400 C240-960 C300-1200				
							RGU2510A-	C40-40 C50-50 C60-60 C70-70 C125-125 C150-150 C190-190	C40-80 C50-100 C60-120 C70-140 C125-250 C150-300 C190-380	C40-120 C50-150 C60-180 C70-210 C125-375 C150-450 C190-570		C40-160 C50-200 C60-240 C70-280 C125-500 C150-600 C190-760	C40-200 C50-250 C60-300 C70-350 C125-625 C150-750 C190-950	
Σ 7	SGM7J	01A	100	0.318	3000	馬達安裝記號 Installation symbol of motor								
		C2A	150	0.477										
		02A	200	0.637										
		04A	400	1.27										
		06A	600	1.91										
		08A	750	2.39										
	SGM7A	01A	100	0.318	3000									
		C2A	150	0.477										
		02A	200	0.637										
		04A	400	1.27										
		06A	550	1.75										
		08A	750	2.39										
	SGM7P	10A	1000	3.18	3000									
		01A	100	0.318										
		02A	200	0.637										
		04A	400	1.27										
		08A	750	2.39										
	SGM7G	15A	1500	4.77	1500									
		03A	300	1.96										
		05A	450	2.86										
	Σ V	SGMJV	09A	850	5.39		3000							
01A			100	0.318										
C2A			150	0.477										
02A			200	0.637										
04A			400	1.27										
06A			600	1.91										
SGMAV		08A	750	2.39	3000									
		01A	100	0.318										
		C2A	150	0.477										
		02A	200	0.637										
		04A	400	1.27										
		06A	550	1.75										
		08A	750	2.39										
SGMGV		10A	1000	3.18	1500									
		03A	300	1.96										
SGMSV	05A	450	2.86	3000										
	10A	1000	3.18											
	15A	1500	4.9											

馬達對應表

Motor Corresponding Table

松下電機Panasonic

RGU1610型RGU2510型

型 號 Model			馬達 功率 Motor capacity	額定 轉矩 Rated torque	馬達 額定轉速 Rated rotational speed of motor	齒圈模組型號 Model of Ring Unit						
						RGU1610A-	C40-40 C60-60 C80-80 C100-100 C240-240 C300-300	C40-80 C60-120 C80-160 C100-200 C240-480 C300-600	C40-120 C60-180 C80-240 C100-300 C240-720 C300-900	C40-160 C60-240 C80-320 C100-400 C240-960 C300-1200		
							RGU2510A-	C40-40 C50-50 C60-60 C70-70 C125-125 C150-150 C190-190	C40-80 C50-100 C60-120 C70-140 C125-250 C150-300 C190-380	C40-120 C50-150 C60-180 C70-210 C125-375 C150-450 C190-570		C40-160 C50-200 C60-240 C70-280 C125-500 C150-600 C190-760
A6	MSMF	01	100	0.32	3000	馬達安裝記號 Installation symbol of motor					C0108	
		02	200	0.64							C0311	
		04	400	1.27			C0314			F0114		
		08	750	2.39								
		09	1000	3.18			F0319					
	MQMF	01	100	0.32	3000						C0308	
		02	200	0.64			D0111					
		04	400	1.27			D0114			F0314		
	MHMF	01	100	0.32	3000						C0208	
		02	200	0.64							C0311	
		04	400	1.27			C0314			F0114		
		08	750	2.39								
		09	1000	3.18			F0319					
	MDMF	10	1000	4.77	2000							
		10	1000	4.77								
A5	MSME	01	100	0.32	3000						C0108	
		02	200	0.64							C0311	
		04	400	1.3			C0314			F0114		
		08	750	2.4								
	MDME	10	1000	4.77	2000							
	MHME	10	1000	4.77	2000							
A4	MAMA	02	200	0.38	5000						C0311	
		04	400	0.76							C0314	
		08	750	1.43							F0319	
	MSMD	01	100	0.32	3000						C0108	
		02	200	0.64							C0311	
		04	400	1.3			C0314			F0114		
		08	750	2.4							F0319	
	MQMA	01	100	0.32	3000						C0308	
		02	200	0.64			D0111					
		04	400	1.3			D0114			F0314		
	MDMA	10	1000	4.8	2000							
	MFMA	04	400	1.9	2000							
	MHMA	05	500	2.38	2000							
		10	1000	4.8								

型 號 Model		馬達 功率 Motor capacity	額定 轉矩 Rated torque	馬達 額定轉速 Rated rotational speed of motor	齒圈模組型號 Model of Ring Unit					
					RGU1610A-	C40-40 C60-60 C80-80 C100-100 C240-240 C300-300	C40-80 C60-120 C80-160 C100-200 C240-480 C300-600	C40-120 C60-180 C80-240 C100-300 C240-720 C300-900	C40-160 C60-240 C80-320 C100-400 C240-960 C300-1200	
						RGU2510A-	C40-40 C50-50 C60-60 C70-70 C125-125 C150-150 C190-190	C40-80 C50-100 C60-120 C70-140 C125-250 C150-300 C190-380	C40-120 C50-150 C60-180 C70-210 C125-375 C150-450 C190-570	
GYS	101	100	0.318	3000	馬達安裝記號 Installation symbol of motor				C0208	
	201	200	0.637			C0414				
	401	400	1.27			C0414			F0214	
	751	750	2.39			F0416				
	102	1000	3.18			F0724				
	152	1500	4.78							
GYC	101	100	0.318	3000					C0408	
	201	200	0.637			D0214				
	401	400	1.27					F0414		
	751	750	2.39			F0816				
	102	1000	3.18			G0224				
	152	1500	4.78							
GYG	501	500	2.39	2000	G0119					
	751	750	3.58							
	102	1000	4.77		G0222					

從使用條件來進行選型

Select the model according to the operating conditions.

運轉負載條件

Operating load conditions

負載慣量
Load inertia moment

$I =$ $\text{kg} \cdot \text{m}^2$

最高輸出轉速
Maximum revolution

$NR =$ rpm

加速時間
Acceleration time

$t_1 =$ sec

外力扭轉矩
Outer force torque

$T_c =$ $\text{N} \cdot \text{m}$

驅動部慣量
Inertia moment of drive unit

$I_c =$ $\text{kg} \cdot \text{m}^2$ 參照P.3 Refer to P. 3

負載係數
Coefficient of weight

$fw =$ 參照右表 Refer to the right table.

負載係數 Load coefficient

運轉條件 Operating conditions	fd
沒有衝擊的圓滑運轉 Smooth Operation with no impact.	1.0~1.2
普通運轉 Normal operation without excessive impact	1.2~1.5
有衝擊的運轉 Operation with impact.	1.5~3.0

迴轉數判定

Determination of number of revolutions

RGU最高輸出迴轉速(參照P.3) Maximum number of output revolutions of RGU (Refer to p. 3.)

$NR <$

減速比，迴轉數重新修改
Review of reduction ratio and number of revolutions

負載扭矩計算

Calculation of load torque

角速度
Angular velocity

$\omega = NR \times 2\pi / 60$
 $=$ rad/sec

角加速度
Angular acceleration

$\alpha = \omega / t_1$
 $=$ rad/sec^2

加速轉矩
Accelerative torque

$T_a = (I + I_c) \times \alpha$
 $=$ $\text{N} \cdot \text{m}$

最大負載轉矩
Maximum load torque

$T_{\text{max}} = fw \times (T_a + T_c)$
 $=$ $\text{N} \cdot \text{m}$

RGU最大使用轉矩 (參照P.3) Maximum working torque of RGU (Refer to p. 3.)

$T_{\text{max}} <$

型號提升或者負載降低
Review of model upgrade or load

平均負載轉矩，平均輸出迴轉速計算

Calculation of average load torque and average number of output revolutions

運轉條件 (參考) Operating conditions (Reference)

〈速度曲線〉
Velocity pattern

〈負載曲線〉
Load pattern

平均負載轉矩
Average load torque

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

平均輸出迴轉速
Average number of output revolutions

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

項目
Item

起動時
Starting

穩定時
Steady operation

停止時
Stoppage

負載轉矩
Load torque
 $\text{N} \cdot \text{m}$

T_1

T_2

T_3

輸出迴轉速
Number of output revolutions
 rpm

n_1
($= 0.5 n_2$)

n_2

n_3
($= 0.5 n_2$)

時間
Time
 sec

t_1

t_2

t_3

壽命計算
To life Calculation

壽命計算 Life Calculation

平均負載轉矩 Tm = N · m
Average Load Torque

平均輸出迴轉數 Nm = rpm
Average output revolutions

平均輸入迴轉數 N1 = Nm×Ru
Average Input revolutions = rpm

壽命時間 Life Length Lh

$$Lh = Lh_o \times \frac{N_o}{N_1} \times \left(\frac{T_o}{f_w \times T_m} \right)^{10/3} \quad (H)$$

- Lh_o：額定壽命時間
Rated life length

N_o：容許平均輸入迴轉數
Allowable average number of input revolutions

T_o：基本動額定轉矩
Basic dynamic rated torque

T_m：平均負載轉矩
Average Load Torque

N₁：平均輸入迴轉速
Average Input revolutions

Ru：RGU總速比
Total reduction ratio of RGU

f_w：負載係數
Coefficient of weight
- 參照右表
Refer to right table.

參照右表
Refer to right table.

參照右表
Refer to right table.

額定壽命 Rated lifetime

型 號 Model	總減速比 Total reduction ratio Ru	Lh _o H	T _o N · m	N _o 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		
	200	16000		
RGU2510A-C50	50	8300	360	
	100	16000		
	150	16000		
	200	16000		
	250	16000		
RGU2510A-C60	60	8500	430	
	120	16000		
	180	16000		
	240	16000		
	300	16000		
RGU2510A-C70	70	8000	510	
	140	15000		
	210	15000		
	280	15000		
	350	15000		
RGU2510A-C125	125	8000	910	
	250	15000		
	375	15000		
	500	15000		
	625	15000		

型 號 Model	總減速比 Total reduction ratio Ru	Lh _o H	T _o N · m	N _o 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		
	750	15000		
RGU2510A-C190	190	8200	1375	
	380	16000		
	570	16000		
	760	16000		
	950	16000		

交叉滾子軸承的計算

Calculation of Cross-Roller Bearing

最大負載力矩載荷的計算(Mmax)

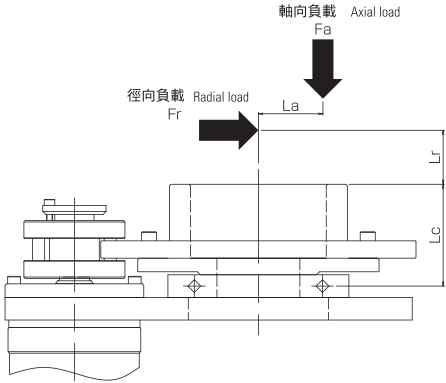
Calculation of maximum load moment load (Mmax)

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

Fr max：最大徑向負載 Maximum radial load (N)
Fa max：最大軸向負載 Maximum axial load (N)
Lr：徑向負載位置 Radial load position (m)
La：軸向負載位置 Axial load position (m)

確認最大使用負載慣量是否在以下允許慣量負載範圍內
Check whether the maximum load moment load is equal to or less than the allowable moment load.

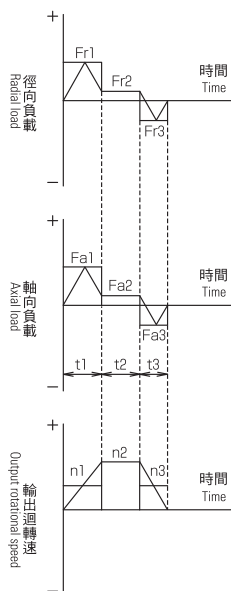
$$M_{max} \leq Mc$$
 (允許的負載請參照下表)
(For the allowable moment load, refer to the following table.)



型 號 Model		容許力矩負載 Allowable moment load Mc (N · m)	容許徑向負載 Allowable radial load (N)	容許軸向負載 Allowable axial load (N)	Lc (mm)
RGU1610A-C40-	40	140	3300	4900	68.5
	80	140	3400	5000	
	120	140	3400	5000	
	160	150	3700	5500	
RGU1610A-C60-	60	610	8200	12200	73.5
	120	620	8400	12500	
	180	610	8300	12300	
	240	660	9000	13400	
RGU1610A-C80-	80	1950	17100	25500	78.5
	160	1980	17400	25900	
	240	1960	17300	25800	
	320	2140	18800	28000	
RGU1610A-C100-	100	3870	26000	38800	85
	200	3890	26200	39100	
	300	3930	26400	39400	
	400	4200	28300	42200	
RGU2510A-C40-	40	610	8300	12300	94.5
	80	610	8300	12300	
	120	690	9400	14000	
	160	750	10200	15200	
	200	800	10900	16200	
RGU2510A-C50-	50	1980	17400	25900	103.5
	100	2000	17600	26200	
	150	2260	19900	29700	
	200	2460	21700	32300	
	250	2630	23200	34600	
RGU2510A-C60-	60	3860	25900	38600	102
	120	3930	26400	39400	
	180	4430	29800	44400	
	240	4830	32500	48500	
	300	5170	34800	51900	
RGU2510A-C70-	70	3930	26400	39400	102
	140	4000	26900	40100	
	210	4520	30400	45300	
	280	4930	33100	49400	
	350	5270	35400	52800	
RGU2510A-C125-	125	14390	38900	58000	56
	250	14670	39700	59200	
	375	16570	44800	66800	
	500	18060	48900	72900	
	625	19310	52300	78000	

容許徑向負載，容許軸向負載對於交叉滾子軸承來說只是單純的徑向負載或者軸向負載。
是負擔在任何一個負載的情況下，而滿足齒圈元件的壽命的值。（徑向負載：Lr + Lc = 0 軸向負載：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).

平均負載的計算公式 Calculation formulas of average load



平均徑向負載 Fra (N)
Average radial load

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

平均軸向負載 Faa (N)
Average axial load

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

平均輸出迴轉速 Nm (rpm)
Average output revolutions

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

平均力矩負載 Ma (N · m)
Average moment load

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

徑向係數 (X) 軸向係數 (Y) 的計算公式 Calculation formulas of radial coefficient and axial coefficient

分類 Classification	徑向係數 (X) Radial coefficient	軸向係數 (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

型號 Model	基本動額定荷重 Basic dynamic rated load C (N)	滾銷的節圓直徑 Roller pitch circle diameter Dpw (m)
RGU1610A-C40	20300	0.085
RGU1610A-C60	49100	0.1475
RGU2510A-C40	104000	0.2275
RGU1610A-C80	156000	0.2973
RGU2510A-C50	230000	0.73823
RGU1610A-C100		
RGU2510A-C60		
RGU2510A-C70		
RGU2510A-C125		

負載係數 Load coefficient (fw)

負載狀態 Load state	fw
無衝擊的圓滑運轉時 In smooth operation with no impacts	1.0~1.2
正常運轉 In normal operation	1.2~1.5
劇烈衝擊或振動的運轉時 In operation with impacts and vibrations	1.5~3.0

壽命計算 Life Calculation (Lh)

對於交叉滾子軸承，使用以下公式計算壽命
For the cross roller bearing, calculate the life hours by using the following formula

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

動態等效徑向負載 Kinetic Equivalent Radial Load (Pc)

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

滑塊的計算 Calculation of Guide Blocks

動作角度 30度 90度 Deg for 30deg, 90deg

運轉條件 Operating conditions

負載重量 Total load mass : m (kg)
輸出法蘭回轉數 RPM of output flange : NR (rpm)
重力加速度 Gravitational acceleration : g (m/sec²)
負載係數 Load factor : fw、fs

● 負載力的計算 Calculation of applied load

滑塊速度 Block speed (m/sec)

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

加速度 Acceleration (m/sec²)

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

加速時負載 Load in acceleration (N)

$$Pa1 = \frac{mg}{n} - \frac{m \times a1 \times L2}{2 \times L0}$$
$$Pb1 = \frac{mg}{n} + \frac{m \times a1 \times L2}{2 \times L0}$$

勻速時負載 Load in constant speed (N)

$$Pa2 = \frac{mg}{n}$$
$$Pb2 = \frac{mg}{n}$$

減速時負載 Load in deceleration (N)

$$Pa3 = \frac{mg}{n} + \frac{m \times a1 \times L2}{2 \times L0}$$
$$Pb3 = \frac{mg}{n} - \frac{m \times a1 \times L2}{2 \times L0}$$

負載合成 Load synthesis (N)

$$Pae1 = | Pa1 | + | Pat1 |$$
$$Pbe1 = | Pb1 | + | Pbt1 |$$

Maximum load (N)

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

靜安全係數 Static safety factor (N)

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

負載係數 Load factor fs

負載條件 Load conditions	fs
無衝擊振動的運轉時 No vibration, shock	1.0~3.5
伴隨衝擊振動的運轉時 Applied vibration, shock	2.0~5.0

● 額定壽命的計算 Calculation of rated life time

平均負載力 Average load (N)

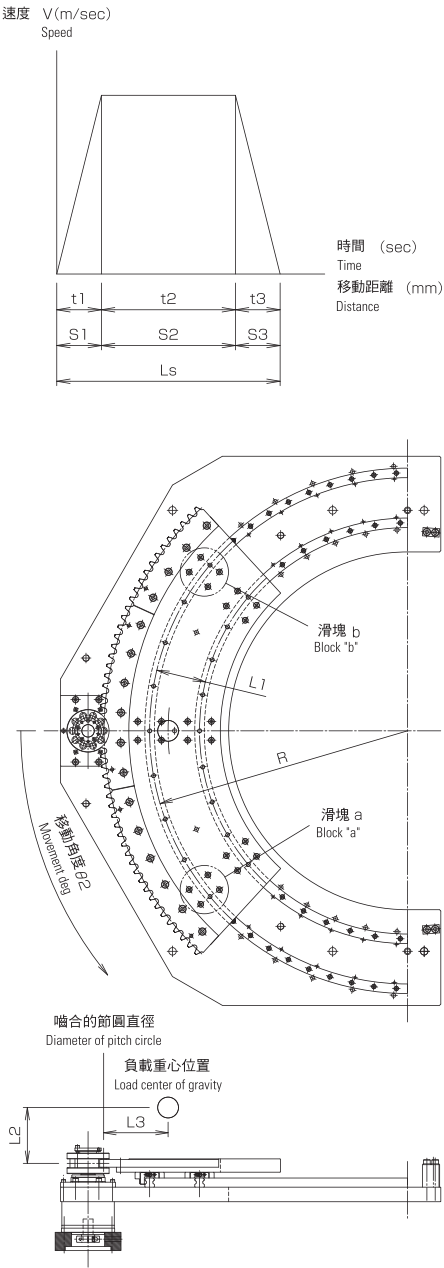
$$Pam = \sqrt[3]{\frac{Pae1^3 \times S1 + Pa2^3 \times S2 + Pae3^3 \times S3}{LS}}$$

額定壽命 Rated life time (km)

$$Lkm = \left(\frac{C}{fw \times Pc} \right)^3 \times 50$$
$$Pc = \text{MAX}(Pam, Pbm)$$

負載係數 Load factor fw

振動・衝擊 Vibration, shock	速度V(m/sec) (參考) 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



動作角度360度 Deg for 360deg

運轉條件 **Operating conditions**

負載重量 Total load mass : m (kg)

輸出法蘭回轉數 RPM of output flange : NR (rpm)

重力加速度 Gravitational acceleration : g (m/sec²)

負載係數 Load factor : fw、fs

● 負載力的計算 **Calculation of applied load**

滑塊速度 Block speed (m/sec)

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

加速度 Acceleration (m/sec²)

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

加速時負載 勻速時負載 減速時負載 (N)

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

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

最大載重 Maximum load (N)

$$Pr = P1$$

靜載安全係數 Static safety factor (N)

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

● 額定壽命計算 **Calculation of rated life time**

平均負載力 Average load (N)

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

額定壽命 Rated life time (km)

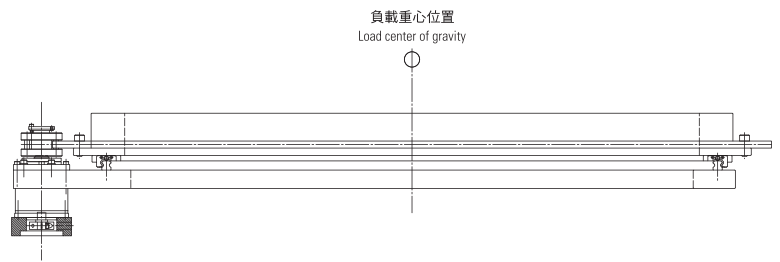
$$L_{km} = \left(\frac{C}{f_w \times P_c} \right)^3 \times 50$$

$$P_c = \text{MAX}(P_{am}, P_{bm})$$

● 設計上的注意 **Notes on consideration**

請注意承重台的重心位置，
動作角度30度・90度需要在內外側導軌
間設定。
動作角度360度需要在回轉中心設定。
超過上述的使用範圍請與我們聯繫。

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.

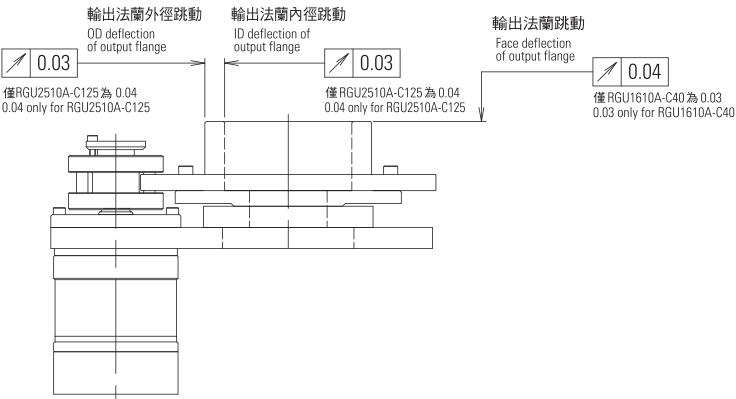


型 號 Model	動作角度 Deg	總減速比 Total reduction ratio	基本動 額定荷重 Basic dynamic rated load	基本靜 額定荷重 Basic static rated load	滑塊數 Number of Blocks	滑軌 Block interval	滑軌半徑 Guide radius	滑軌長 Guide interval	嚙合圓直徑 Diameter of pitch circle
	deg		C (N)	Co (N)	n (個/pieces)	L0 (mm)	R (mm)	L1 (mm)	Dp (mm)
RGU1610A-C240	30	240	7300	11593	4	174.5			
		480							
		720							
		960							
	90	240	7284	11577	6	698.1	500	100	1163.52
		480							
		720							
		960							
	360	240	7092	11385	5	—			
		480							
		720							
		960							
RGU1610A-C300	30	300	18853	32462	4	173.1			
		600							
		900							
		1200							
	90	300	18826	32435	6	822.4	620	120	1455.48
		600							
		900							
		1200							
	360	300	18490	32099	5	—			
		600							
		900							
		1200							
RGU2510A-C150	30	150	6090	9859	4	174.5			
		300							
		450							
		600							
	90	150	6069	9838	6	698.1	500	100	1153.13
		300							
		450							
		600							
	360	150	5876	9645	5	—			
		300							
		450							
		600							
RGU2510A-C190	30	190	18838	30718	4	173.1			
		380							
		570							
		760							
	90	190	18803	30683	6	822.4	620	120	1459.2
		380							
		570							
		760							
	360	190	18388	30268	5	—			
		380							
		570							
		760							
		950							

精度規格 Precision Standard

型 號 Model	角度傳動精度 Angular transmission accuracy arcmin	雙方向重複 定位精度 Bidirectional repetitive positioning accuracy arcsec	輸出法蘭面跳動 Face deflection of output flange mm	輸出法蘭內外徑跳動 ID-OD deflection of output flange mm
RGU1610A-C40	6	90	0.03	0.03
RGU1610A-C60	4	60	0.04	
RGU1610A-C80	3	45		
RGU1610A-C100	3	35		
RGU2510A-C40	4	75	0.04	0.03
RGU2510A-C50	3	60		
RGU2510A-C60	3	50		
RGU2510A-C70	3	45		
RGU2510A-C125	2	25		0.04

型 號 Model	動作角度 Deg deg	角度傳遞精度 Angular transmission accuracy arcmin	雙方向重複定位精度 Bidirectional repetitive positioning accuracy arcsec	輸出法蘭面跳動 Face deflection of output flange mm	輸出法蘭內外徑跳動 ID-OD deflection of output flange mm
RGU1610A-C240	30	1	15	0.04	—
	90			0.08	
	360	2		0.12	0.10
RGU1610A-C300	30	1	12	0.04	—
	90			0.08	
	360	2		0.12	0.12
RGU2510A-C150	30	1	20	0.04	—
	90			0.08	
	360	2		0.12	0.10
RGU2510A-C190	30	1	16	0.04	—
	90			0.08	
	360	2		0.12	0.12

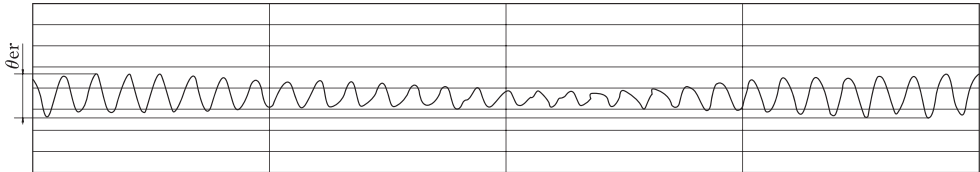


● 角度傳動精度 Angular transmission accuracy

角傳動精度為給輸入軸任意的回轉角（ θ_1 ）時，輸出軸的理論回轉角（ θ_2 ）和實際回轉角（ θ'_2 ）之間的差，輸出軸1回轉產生的最大差（ θ_{er} ）稱之為角度傳動精度。

The angular transmission accuracy generally refers to the difference between the angle of theoretical rotation (θ_2) of the output shaft when any angle of rotation (θ_1) 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}).

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



● 正反位置傳動精度 Bidirectional repetitive positioning accuracy

朝著目標位置正方向定位停止時的位置，和反方向定位停止時的位置的最大差。

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.

使用上的注意 Precautions for Use

關於潤滑 Lubrication

第一次使用時，請在齒面塗潤滑油脂。防止漏塗造成的磨損等原因。

First of all, apply grease to the tooth surface. Otherwise, friction and other troubles could be caused.

防塵對策 Dust preventive measures

齒面和齒底部位等如有灰塵或者異物附著可能會造成運轉不良。

If dust, dirt and foreign matter contaminate the tooth surface, the tooth bottom, etc., malfunction could be caused.

馬達安裝要點 Motor mounting procedure

馬達安裝時，請按照以下的順序：

Mount the motor by using the following procedure:

1. 將減速機輸入軸內徑和電機軸上附著的髒物，油漬等清理乾淨。
Completely remove dust, dirt, oil, etc. from the inside diameter of the input shaft of the reducer and the motor shaft.
2. 將調節襯套插入減速機的輸入軸中，將夾緊環的螺栓對準中間法蘭盤作業孔的位置。
Match the set-collar clamp bolt of the input shaft of the reducer to the work hole of the motor attachment.
3. 保持減速機和馬達不發生傾斜，將馬達軸慢慢地插入到減速機孔底部，然後擰緊螺栓固定馬達。
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. 將夾緊環用規定的扭矩擰緊。
Tighten the set-collar clamp bolt with the specified tightening torque.

固定螺栓 Clamp bolt	鎖緊扭力 Tightening torque N · m
M5	9.0
M6	15.3

請務必按照以上擰緊扭矩進行扭緊。

如果沒有滿足擰緊扭矩的情況，可能會導致滑動等，請注意。

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.

減速機的輸入軸上有切口，外面套有環形夾緊軸套，軸套上的螺栓擰緊後，讓輸入軸產生變形，從而把馬達軸鎖緊。軸套擰緊的時候，輸入軸以及軸套上的切口請按照右圖指示相互對準，然後再擰緊螺栓。

軸套和輸入軸的切口沒有對齊，就鎖緊的情況下，可能會引起輸入軸的破損以及鎖緊力的下降。

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.

