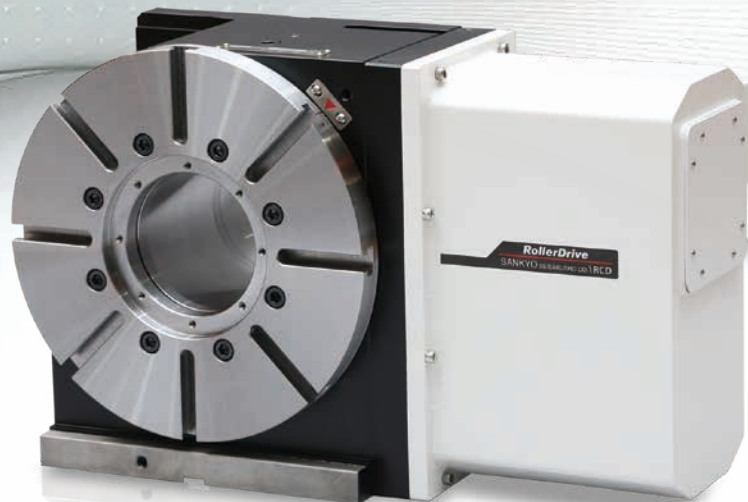


CNC ROTARY TABLE

RollerDrive CNC™

 **RCD series**



The Ultimate CNC Rotary Table



Zero-backlash Technology Delivers Unsurpassed Motion

The RollerDrive CNC is a rotary table designed to meet the requirements of machine tool manufacturers for greater speed and accuracy. The RollerDrive—Sankyo's zero-backlash reducer—delivers accurate output motion that stands up to external disturbances, unlike gearmotors or torque motors. It offers excellent rotary positioning accuracy of 10 seconds or less, and can hold up to heavy cutting forces on hard steel.

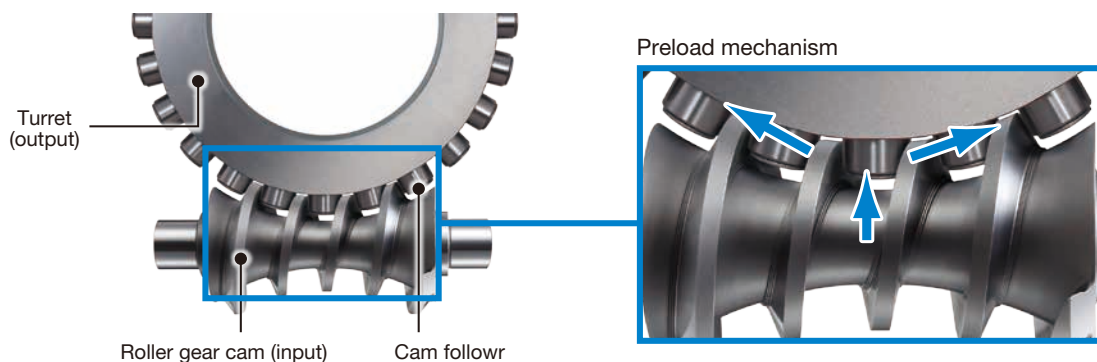
The heavy-duty RollerDrive CNC has no internal part wear and no loss of accuracy over long-term use, thus eliminating the need for regular calibration or adjustments.

Theory of Operation of the RollerDrive

The RollerDrive uses the roller gear mechanism, one of the finest motion control mechanisms available. The unit is constructed from an input shaft (the roller gear cam) and a turret (output shaft) fitted with roller followers. The roller followers are preloaded against a screw-like input shaft to completely eliminate backlash. Our proprietary adjustment mechanism provides optimum preload.

The roller followers planted in the turret use internal roller bearings to transfer torque while rotating. This ensures zero backlash, outstanding precision, and excellent efficiency without causing wear, while providing long-term consistent accuracy.

Exclusive zero-backlash construction



Features

➤➤ **Rolling contact**

➤➤ **Preload**

- ✓ No backlash (play).
- ✓ High accuracy and good efficiency.
- ✓ Preloadable for high rigidity.
- ✓ Clamless machining reduces positioning time.
- ✓ No deterioration of accuracy over time, initial accuracy is maintained for an extended period.

No Maintenance and Excellent Price Performance

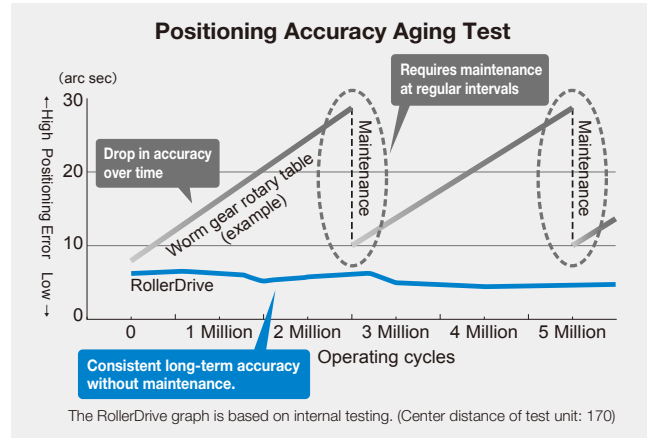
Consistent long-term accuracy without maintenance.

► Worm gear models

Accuracy declines over time. Requires maintenance to achieve initial accuracy.

► RollerDrive

Accuracy is consistent with no maintenance even after 5 million operation cycles.



Cost Comparison with a Worm Gear Rotary Table

Offers Long-term Use without Maintenance

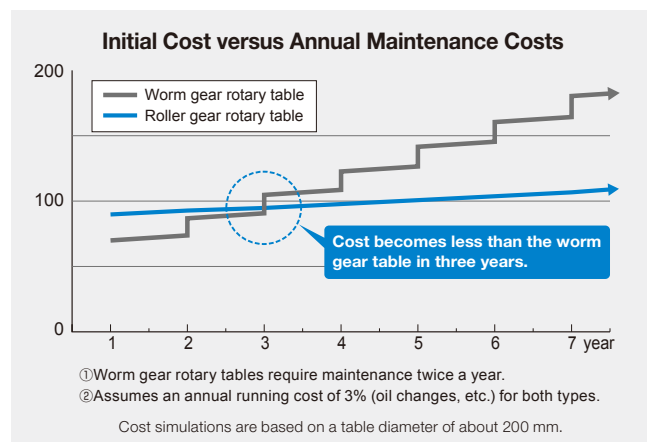
► Worm gear models

Maintenance costs occur once or twice a year to adjust the backlash.

► RollerDrive

Long-term use is possible without any mechanical maintenance. **Beats the cost of a worm gear even after adding annual running costs to the initial investment cost. Price performance continues thereafter.**

(Based on internal calculations.)



Shorter positioning time

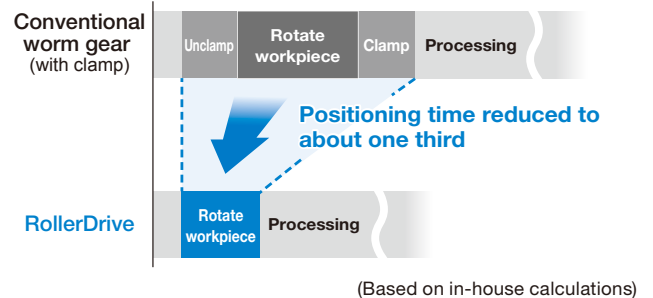
Time comparison for 90° positioning

► Conventional worm gear

Clamping using hydraulic pressure or air pressure is required to suppress backlash.

► RollerDrive

Zero backlash and high rigidity eliminate the need for clamping. Compared to the worm gear type, positioning time is reduced to about one third.



Extended Accuracy

Compared against a worm gear for over 5 million indexes.

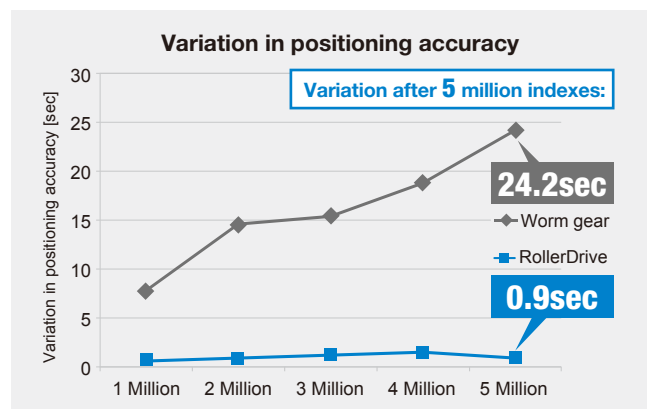
► Test conditions

- Table size: Output table diameter: 170 mm
- Load inertia: 0.5 kgm²
- Index angle: 36° (unidirectional)
- Indexing time: 0.35sec

► Results after 5 million indexes:

Item	Worm gear	RollerDrive
Variation in positioning accuracy	24.2sec	0.9sec
Backlash (measured at R60)	18 μm (15 μm → 33 μm)	-

(Based on internal testing data.)





Product Lineup

RCD Heavy duty & versatile model (Upright / Sideways mount)



φ 105

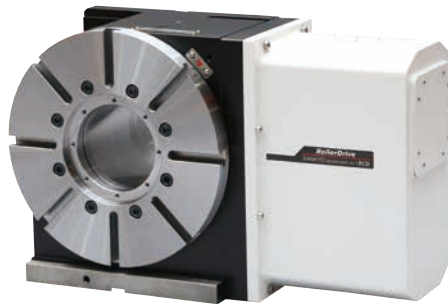
φ 170

φ 200

φ 250

φ 300

φ 400



Motor rear surface mounting type



Motor top surface mounting type

Auxiliary equipment

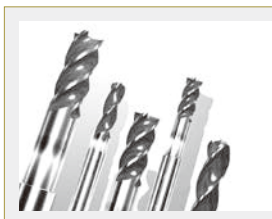
Support table



Tail stock



Applications



▶ Cutting tool grinding

Higher accuracy by Zero-backlash movement



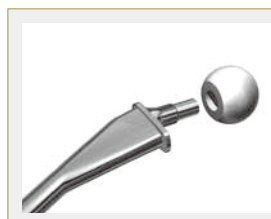
▶ Turbine blade

High acceleration processing



▶ Automotive parts

Improving productivity by speed of 0.4sec / 90 deg.



▶ Medical parts

Compact 5 axis



▶ Molding parts

High speed & accurate continuous cutting

Product Code

Rotary table

1	2		3		4		5		6		7			
RCD105	A		R		B		F		1		H			
1	2		3		4		5		6		7			
Model	Servo motor		Motor mounting side		Connector position		Connector type		Table shape		Posture			
	With brake	Without brake ²												
RCD105	A	A1	FANUC		R	Right	B	Rear	F ⁷	Flexible	1	Tapped holes	H ^{9,10}	Horizontal position
RCD170	B ²	B1 ²	MITSUBISHI		L	Left	S ⁵	Side	R	Receptacle	2 ⁶	T slot	V ¹⁰	Upright position
RCD200	C	C1	— ¹⁵		B ⁴	Rear	T ⁶	Top surface						
RCD250	D ³	D1 ³	Sanyo Brother type		T ⁴	Top surface								
RCD300	E	E1	OKUMA											
RCD400	X	X1	Others (Custom)											

8		9		10		11	
EC		M1		W		X	
8		9		10		11	
Options		Mounting clamps		User-supplied items (Motor, MP scale, A/D converter)		Standard / Custom	
C	Air / Hydraulic clamping	M1	Keys (14 mm width)	W	No user-supplied items (supplied by Sankyo)	Blank	Standard
CH ^{11,13}	Air / Hydraulic clamping External rotary joint	M2	T-slot nuts (14 mm width)	Y	MP scale, A/D converter User supplied	X	Custom
CJ ¹¹	Air / Hydraulic clamping Built-in rotary joint	M3	Mounting clamps (14 mm width)	Z	User-supplied motor		
E ¹¹	With MP scale (MPRZ-536A)	M4	Keys, T-slot nuts (14 mm width)	Blank	Motor, MP scale, A/D converter User supplied		
EC ¹¹	With MP scale (MPRZ-536A) Air / Hydraulic clamping	M5	Keys, Mounting clamps (14 mm width)				
F ¹¹	With MP scale (MPI-536A)	M6	Mounting clamps, T-slot nuts (14 mm width)				
FC ¹¹	With MP scale (MPI-536A) Air / Hydraulic clamping	M7	Keys, Mounting clamps, T-slot nuts (14 mm width)				
H ^{11,13}	External rotary joint	M8 ¹⁴	Mounting clamps (14 mm width) [For option J horizontal placement]				
J ¹¹	Built-in rotary joint	M9 ¹⁴	Keys, Mounting clamps (14 mm width) [For option J horizontal placement]				
G ^{11,12}	With MP scale (MPRZ-536A) Air / Hydraulic clamping Built-in rotary joint	MA ¹⁴	Mounting clamps, T-slot nuts (14 mm width) [For option J horizontal placement]				
K ^{11,12}	With MP scale (MPI-536A) Air / Hydraulic clamping Built-in rotary joint	MB ¹⁴	Keys, Mounting clamps, T-slot nuts (14 mm width) [For option J horizontal placement]				
Blank	No options	MC	Keys (18 mm width)				
		MD	T-slot nuts (18 mm width)				
		ME	Mounting clamps (18 mm width)				
		MF	Keys, T-slot nuts (18 mm width)				
		MG	Keys, Mounting clamps (18 mm width)				
		MH	Mounting clamps, T-slot nuts (18 mm width)				
		MI	Keys, Mounting clamps, T-slot nuts (18 mm width)				
		MJ ¹⁴	Mounting clamps (18 mm width) [For option J horizontal placement]				
		MK ¹⁴	Keys, Mounting clamps (18 mm width) [For option J horizontal placement]				
		ML ¹⁴	Mounting clamps, T-slot nuts (18 mm width) [For option J horizontal placement]				
		MM ¹⁴	Keys, Mounting clamps, T-slot nuts (18 mm width) [For option J horizontal placement]				
		MN	Keys (22 mm width)				
		MO	T-slot nuts (22 mm width)				
		MP	Mounting clamps (22 mm width)				
		MQ	Keys, T-slot nuts (22 mm width)				
		MR	Keys, Mounting clamps (22 mm width)				
		MS	Mounting clamps, T-slot nuts (22 mm width)				
		MT	Keys, Mounting clamps, T-slot nuts (22 mm width)				
		Blank	No mounting clamps				

*1 If motor brake control is not possible, select a servo motor without brake.
 *2 The standard Sankyo-supplied motor for motor code B1 (B) is HF □□□□ (B) S-A48.
 *3 For RCD105, select "Without brake". For RCD170 to RCD300, select "With brake". RCD400 is not available with the Sanyo Brother type motor.
 *4 RCD105 is not available in the motor top surface type or motor rear surface type.
 *5 Models of the motor top surface type are not available with the side connector position.
 *6 Only models of the motor top surface type are available with the top surface connector position.
 *7 If "Flexible" is selected, the flexible cable code must also be selected.
 *8 For RCD105, the T slot table cannot be selected.
 *9 Models of the motor rear surface type and motor top surface type are not available with the horizontal placement posture.
 *10 Models supporting both postures are available (custom).
 *11 There is no hollow bore in the table when the MP scale (high-accuracy model) or rotary joint is installed.
 *12 Options G and K are only available for RCD250 to RCD400 models of the motor top surface type. MP scales (high-accuracy type) and rotary joints can't be used together in models of other types.
 *13 Options CH and H are not available for models of the motor rear surface type and motor top surface type.
 *14 Options M8 to MB and MJ to MM are only available for models RCD105 to 200 of the motor right/left mounting type.
 *15 Contact Sankyo for information about the external controller type.

Motor mounting side		Connector position		Connector type / shape		Table shape																						
R		B		F	 S : Straight A : Angled	1	 <table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> </tr> </thead> <tbody> <tr> <td>RCD105</td> <td>(4)M8 × 1.25, 16DP</td> <td>75</td> </tr> <tr> <td>RCD170</td> <td>(8)M8 × 1.25, 14DP</td> <td>140</td> </tr> <tr> <td>RCD200</td> <td>(8)M8 × 1.25, 14DP</td> <td>170</td> </tr> <tr> <td>RCD250</td> <td>(8)M10 × 1.5, 18DP</td> <td>210</td> </tr> <tr> <td>RCD300</td> <td>(8)M10 × 1.5, 18DP</td> <td>250</td> </tr> <tr> <td>RCD400</td> <td>(8)M12 × 1.75, 24DP</td> <td>355</td> </tr> </tbody> </table>		A	B	RCD105	(4)M8 × 1.25, 16DP	75	RCD170	(8)M8 × 1.25, 14DP	140	RCD200	(8)M8 × 1.25, 14DP	170	RCD250	(8)M10 × 1.5, 18DP	210	RCD300	(8)M10 × 1.5, 18DP	250	RCD400	(8)M12 × 1.75, 24DP	355
	A	B																										
RCD105	(4)M8 × 1.25, 16DP	75																										
RCD170	(8)M8 × 1.25, 14DP	140																										
RCD200	(8)M8 × 1.25, 14DP	170																										
RCD250	(8)M10 × 1.5, 18DP	210																										
RCD300	(8)M10 × 1.5, 18DP	250																										
RCD400	(8)M12 × 1.75, 24DP	355																										
L		S		R		2 ⁸	P7 ~ 8 : Table with RCD dimensions																					
B		T																										
T																												

Product Lineup / Applications
 Product Code
 Specifications / Dimensions
 Options for RCD model tables
 Compatible Servo Motor Models / Precision Ratings
 Auxiliary equipment
 Control methods for air / hydraulic table clamping
 Guidelines for rotary table selection / Check sheet for rotary table specifications
 Technical Information / Precautions

Product Code

Flexible cable

1	2	3	4	5	6	7							
CD-105	A	A	S	3	R	X							
1	2		3		4		5		6		7		
Model	Servo motors for rotary tables		Type of flexible connector at rotary table side		Type of connector at customer side		Length		Flexible material		Standard / Custom		
	With brake	Without brake ²	Manufacturer	S	Straight	S	Straight						
CD-105 For RCD105	A	A1	FANUC	S	Straight	S	Straight	3	3m	R	Resin	Blank	Standard
CD-170 For RCD170	B	B1	mitsubishi	A	Angled	A	Angled	5	5m	M	Metal	X	Custom
CD-200 For RCD200	C	C1	— ⁶										
CD-250 For RCD250 and RCD300	D ²	D1 ²	Sanyo Brother type										
CD-400 For RCD400	E	E1	OKUMA										
	X	X1	Others (Custom)										

¹ If motor brake control is not possible, select a servo motor without brake.

² For RCD105, select "Without brake". For RCD170 to RCD300, select "With brake". RCD400 is not available with the Sanyo Brother type motor.

⁶ Contact Sanyo for information about the external controller type.

Support table

1	2	3	4	5				
ST105A	1	CH	M1	X				
1	2		3		4		5	
Model	Table shape		Options		Mounting clamps		Standard / Custom	
	1	Tapped holes	C	Air / Hydraulic clamping	M1	Keys (14 mm width)	Blank	Standard
ST105A For RCD105	2 ³	T slot	CH ⁴	Air / Hydraulic clamping External rotary joint	M2	T-slot nuts (14 mm width)	X	Custom
ST170A For RCD170, For 200			CJ ⁴	Air / Hydraulic clamping Built-in rotary joint	M4	Keys T-slot nuts (14 mm width)		
ST250A For RCD250 and RCD300			H ⁴	External rotary joint	MC	Keys (18 mm width)		
ST400A For RCD400			J ^{4,5}	Built-in rotary joint	MD	T-slot nuts (18 mm width)		
			Blank	No options	MF	Keys T-slot nuts (18 mm width)		
					MN	Keys (22 mm width)		
					MO	T-slot nuts (22 mm width)		
					MQ	Keys T-slot nuts (22 mm width)		
					Blank	No mounting clamps		

³ For ST105A, the T slot table cannot be selected.

⁴ There is no hollow bore in the table when a rotary joint is mounted.






⁵ Option J is not available (is the same as option H) for ST400A.

Table shape		
1		
	A	B
	ST105A	(4)M8 × 1.25, 16DP 75
	ST170A	(8)M8 × 1.25, 14DP 140
	ST250A	(8)M10 × 1.5, 18DP 210
	ST400A	(8)M12 × 1.75, 24DP 355
2 ³	P21 ~ 22 : Table with ST dimensions	

Tail stock

1	2	3	4	5				
TSS105	M	R	M1	X				
1	2		3		4		5	
Model	Type		Handle side		Mounting clamps		Standard / Custom	
	M	Manual	R	Right	M1	Keys (14 mm width)	Blank	Standard
TSS105 For RCD105			R	Right	M2	T-slot nuts (14 mm width)	X	Custom
TSS135 For RCD170 and RCD200			L	Left	M4	Keys T-slot nuts (14 mm width)		
TSS185 For RCD250 and RCD300					MC	Keys (18 mm width)		
TSS230 For RCD400					MD	T-slot nuts (18 mm width)		
					MF	Keys T-slot nuts (18 mm width)		
					MN	Keys (22 mm width)		
					MO	T-slot nuts (22 mm width)		
					MQ	Keys T-slot nuts (22 mm width)		
					Blank	No mounting clamps		

Specifications (RCD models of motor side surface mounting type)

Specifications		RCD105	RCD170	RCD200	RCD250	RCD300	RCD400	
Table diameter	mm	Φ 105	Φ 170	Φ 200	Φ 250	Φ 300	Φ 400	
Table pilot bore diameter	mm	Φ 60 ^{+0.03} ₀	Φ 60 ^{+0.03} ₀	Φ 60 ^{+0.03} ₀	Φ 110 ^{+0.035} ₀	Φ 110 ^{+0.035} ₀	Φ 150 ^{+0.04} ₀	
Center height	mm	105	135	135	185	185	230	
Table T slot width	mm	—	12 ^{+0.018} ₀	12 ^{+0.018} ₀	12 ^{+0.018} ₀	12 ^{+0.018} ₀	14 ^{+0.018} ₀	
Keyway width	mm	14 ⁰ _{-0.011}	14 ⁰ _{-0.011}	14 ⁰ _{-0.011}	18 ⁰ _{-0.011}	18 ⁰ _{-0.011}	18 ⁰ _{-0.011}	
Clamp type (air 0.5 MPa, hydraulic 3.5 MPa)		Air / Hydraulic	Air / Hydraulic	Air / Hydraulic	Hydraulic	Hydraulic	Hydraulic	
Clamp torque ^{*1}	N·m	210	310	310	1100	1100	1850	
Motor shaft equivalent inertia ^{*2, *3}	× 10 ⁻⁴ kg·m ²	0.56	2.96	3.15	5.70	5.70	25.76	
Motor model (FANUC)		α iS2/5000-B (A06B-2212-B400)	α iS4/5000-B (A06B-2215-B400)	α iS8/4000-B (A06B-2235-B400)	α iS8/4000-B (A06B-2235-B400)	α iS8/4000-B (A06B-2235-B400)	α iS22/4000-B (A06B-2265-B400)	
Minimum setting unit	deg	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	
Maximum table speed	min ⁻¹	100	70	70	60	60	60	
Gear ratio ^{*2}		1/50	1/50	1/50	1/60	1/60	1/60	
Indexing accuracy	arc.sec	± 15	± 15	± 15	± 10	± 10	± 10	
Repeatability	arc.sec	8	8	8	4	4	4	
Net weight	kg	30	51	59	110	115	263	
Allowable payload	Upright position ^{*4} 	kg	50 (100)	70 (140)	70 (140)	255 (510)	255 (510)	295 (590)
	Horizontal position 	kg	100	140	140	510	510	590
Allowable load	F 	N	18200	21000	21000	52000	52000	58500
	F × L with clamping 	N · m	210	310	310	1100	1100	1850
	Continuous holding torque ^{*2, *5}	N · m	122	236	416	512	512	1400
	Maximum output torque ^{*2, *5, *6}	N · m	221	362	544	987	987	2400
	F × L 	N · m	900	1300	1300	5500	5500	7800
Allowable workpiece inertia	kg·m ²	0.5	1.1	1.1	8.3	8.3	15	
External rotary joint (number of ports) ^{*7}		6+1	6+1	6+1	10+1	10+1	12+1	
Internal rotary joint (number of ports) ^{*7}		4	6	6	8	8	10	
MP scale (high-accuracy model) ^{*7}		MPRZ-536A (MHI)						
		MPI-536A (MHI)						

*1 Values for RCD105, RCD170, and RCD200 are clamping torques when using an air hydro booster with a air pressure of 0.5 MPa as the supply source.
 *2 Values for motor shaft equivalent inertia, gear ratio, and continuous / maximum holding torque are given for Fanuc motors. Please contact Sankyo if a different motor is to be used.
 *3 Motor shaft equivalent inertia does not include the inertia of the motor shaft.
 *4 The allowable payload value for upright mounting shown in brackets applies when a tail stock or support table is used.
 *5 The continuous / maximum holding torque is the allowable load torque when a clamp is not used.
 *6 Maximum holding torque should not exceed 10 seconds with 20% duty.
 *7 Simultaneous use of the MP scale (high-accuracy model) and the rotary joint is not supported.

Product Lineup / Applications
Product Code

Specifications / Dimensions

Options for RCD model tables

Compatible Servo Motor Models / Precision Ratings

Auxiliary equipment

Control methods for air / hydraulic table clamping

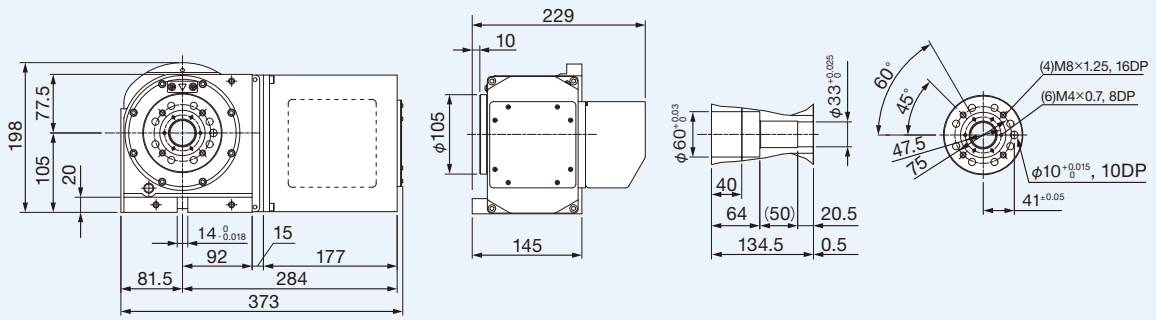
Guidelines for rotary table selection / Check sheet for rotary table specifications

Technical Information / Precautions

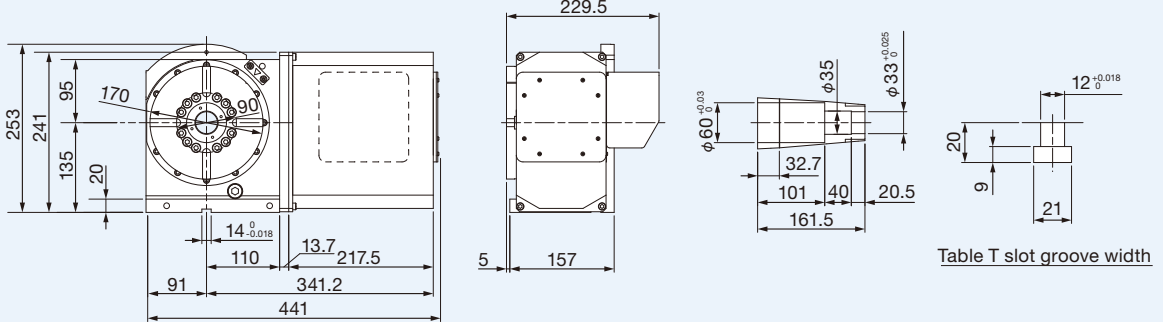


Dimensions (RCD models of motor side surface mounting type)

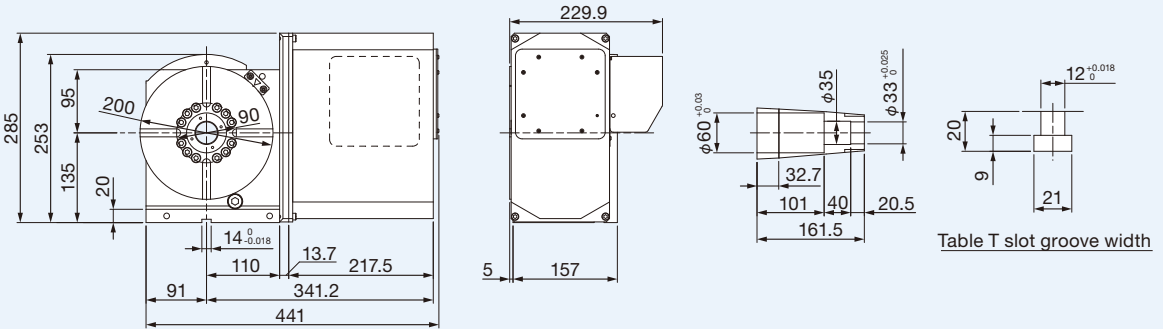
► RCD105



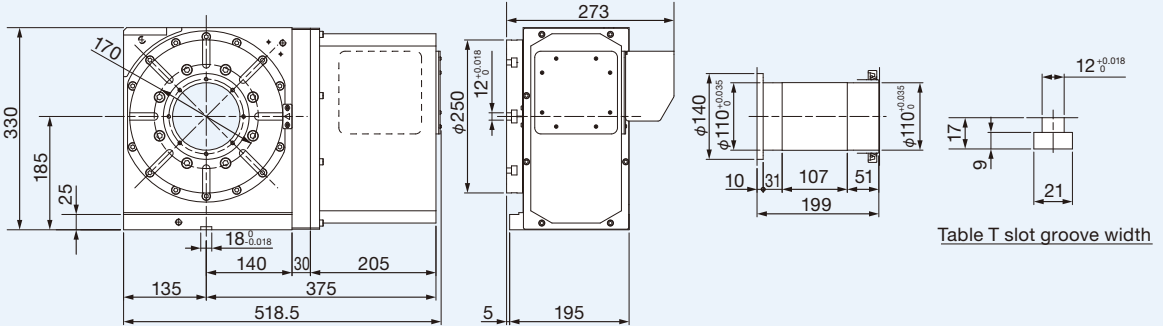
► RCD170



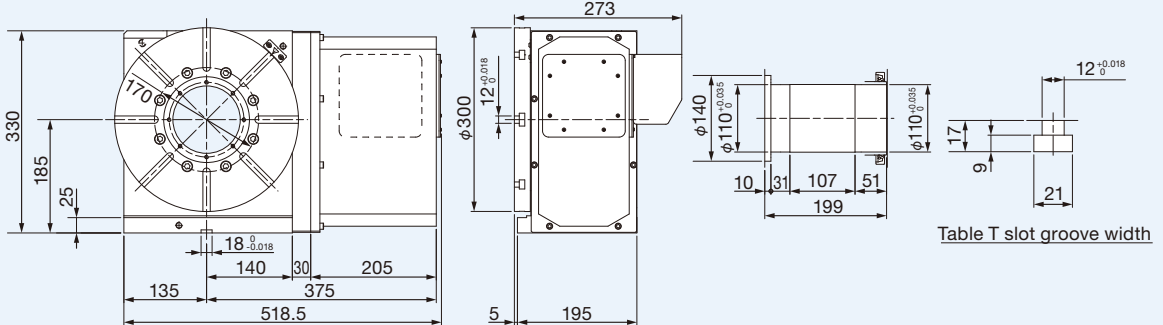
► RCD200



► RCD250

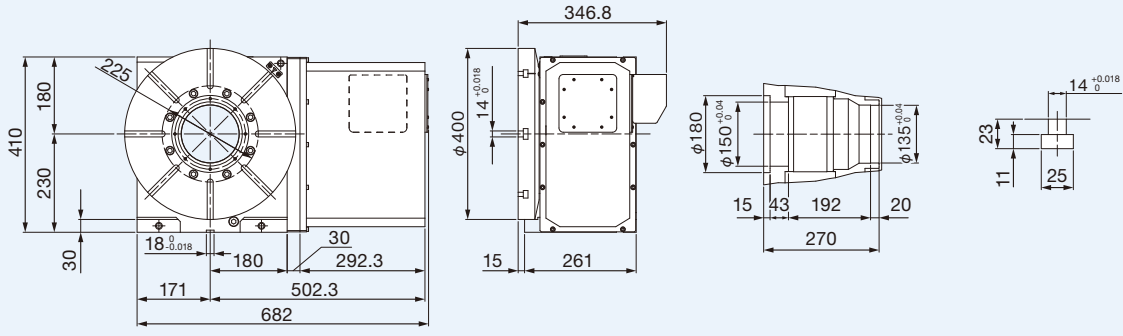


► RCD300



The drawings apply to the following specifications: Fanuc motor, R side mounting, rear connector.

► RCD400



Product Lineup / Applications
Product Code

Specifications /
Dimensions

Options for RCD model tables

Compatible Servo Motor Models
/ Precision Ratings

Auxiliary equipment





Control methods for air /
hydraulic table clamping

Guidelines for rotary table selection /
Check sheet for rotary table specifications

Technical Information /
Precautions



Specifications (RCD models of motor rear surface mounting type)

Specifications		RCD170	RCD200	RCD250	RCD300	RCD400	
Table diameter	mm	Φ 170	Φ 200	Φ 250	Φ 300	Φ 400	
Table pilot bore diameter	mm	Φ 60 ^{+0.03/0}	Φ 60 ^{+0.03/0}	Φ 110 ^{+0.035/0}	Φ 110 ^{+0.035/0}	Φ 150 ^{+0.04/0}	
Center height	mm	185	185	185	185	230	
Table T slot width	mm	12 ^{+0.018/0}	12 ^{+0.018/0}	12 ^{+0.018/0}	12 ^{+0.018/0}	14 ^{+0.018/0}	
Keyway width	mm	14 ^{0/0.011}	14 ^{0/0.011}	18 ^{0/0.011}	18 ^{0/0.011}	18 ^{0/0.011}	
Clamp type (air 0.5 MPa, hydraulic 3.5 MPa)		Air / Hydraulic	Air / Hydraulic	Hydraulic	Hydraulic	Hydraulic	
Clamp torque ^{*1}	N·m	310	310	1100	1100	1850	
Motor shaft equivalent inertia ^{*2,*3}	× 10 ⁻⁴ kg·m ²	6.14	6.33	10.90	11.10	47.76	
Motor model (FANUC)		α iS8/4000-B (A06B-2235-B400)	α iS8/4000-B (A06B-2235-B400)	α iS8/4000-B (A06B-2235-B400)	α iS8/4000-B (A06B-2235-B400)	α iS22/4000-B (A06B-2265-B400)	
Minimum setting unit	deg	0.0001	0.0001	0.0001	0.0001	0.0001	
Maximum table speed	min ⁻¹	70	70	60	60	60	
Gear ratio		1/50	1/50	1/60	1/60	1/60	
Indexing accuracy	arc.sec	± 15	± 15	± 10	± 10	± 10	
Repeatability	arc.sec	8	8	4	4	4	
Net weight	kg	78	80	133	138	305	
Allowable payload	Upright position ^{*4} 	kg	70 (140)	70 (140)	255 (510)	255 (510)	295 (590)
	F 	N	21000	21000	52000	52000	58500
Allowable load	F × L with clamping 	N · m	310	310	1100	1100	1850
	Continuous holding torque ^{*2,*5}	N · m	416	416	512	512	1400
	Maximum output torque ^{*2,*5,*6}	N · m	544	544	987	987	2400
	F × L 	N · m	1300	1300	5500	5500	7800
Allowable workpiece inertia	kg·m ²	1.1	1.1	8.2	8.2	15	
Internal rotary joint (number of ports) ^{*7}		6	6	8	8	10	
MP scale (high-accuracy model) ^{*7}		MPRZ-536A (MHI)					
		MPI-536A (MHI)					

*1 Values for RCD170, RCD200 are clamping torques when using an air hydro booster with a air pressure of 0.5 MPa as the supply source.

*2 The values shown for motor shaft equivalent inertia and continuous/maximum holding torque apply when using a Fanuc motor. Contact Sankyo if using a different motor.

*3 Motor shaft equivalent inertia does not include the inertia of the motor shaft.

*4 The allowable payload value for upright mounting shown in brackets applies when a tail stock or support table is used.

*5 The continuous / maximum holding torque is the allowable load torque when a clamp is not used.

*6 Maximum holding torque should not exceed 10 seconds with 20% duty.

*7 Simultaneous use of the MP scale (high-accuracy model) and the rotary joint is not supported.



Dimensions (RCD models of motor rear surface mounting type)

The drawings apply to the following specifications: Fanuc motor, side connector.

Product Lineup / Applications
Product Code

Specifications /
Dimensions

Options for RCD model tables

Compatible Servo Motor Models
/ Precision Ratings

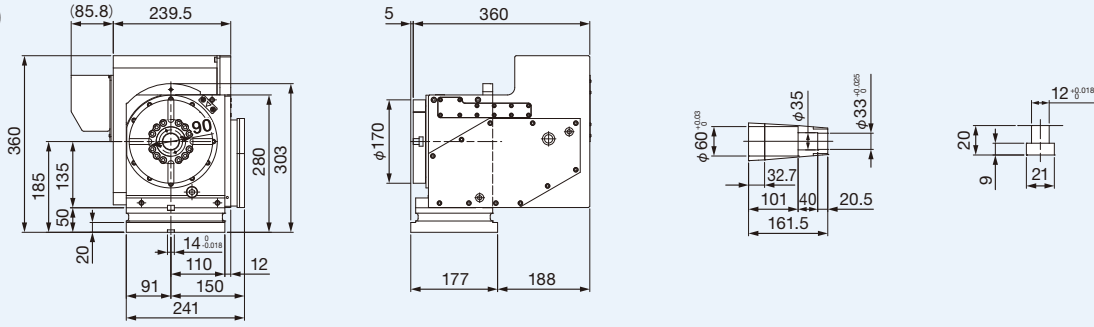
Auxiliary equipment

Control methods for air /
hydraulic table clamping

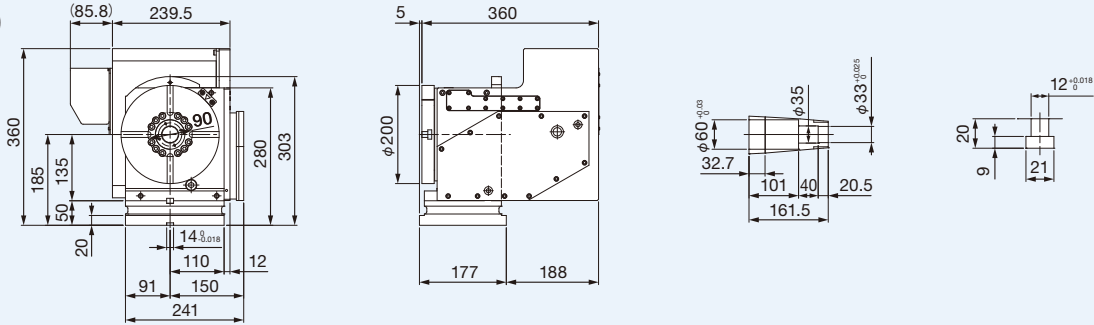
Guidelines for rotary table selection /
Check sheet for rotary table specifications

Technical Information /
Precautions

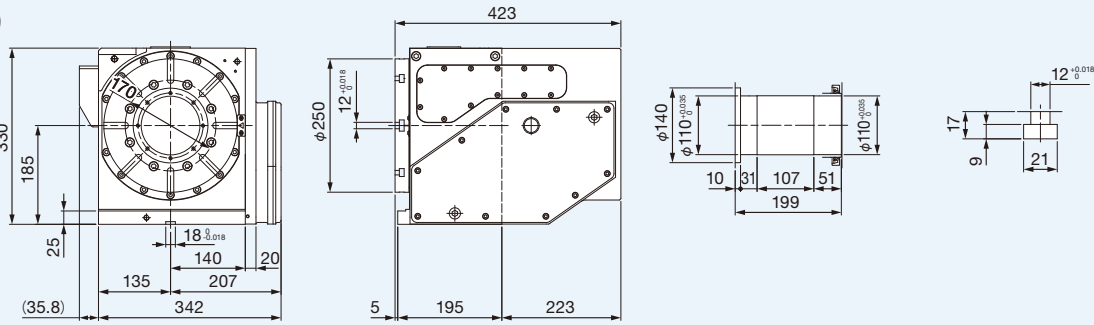
▶ RCD170



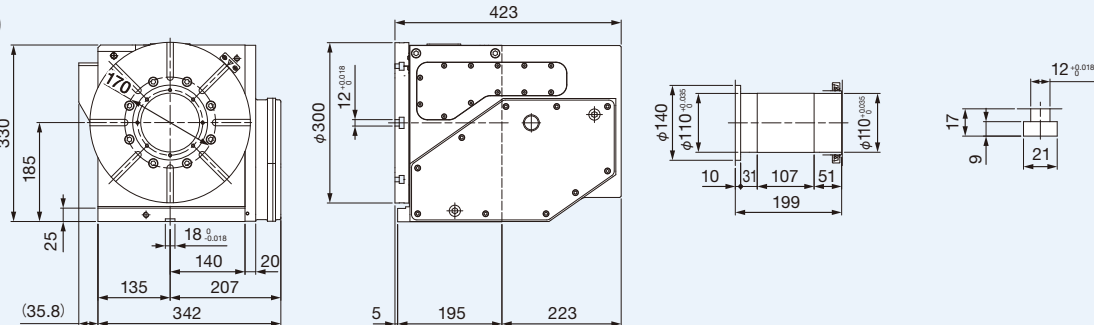
▶ RCD200



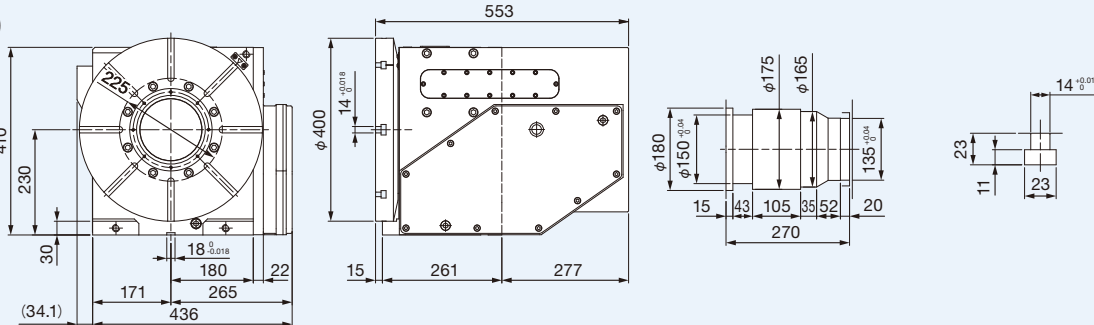
▶ RCD250







▶ RCD300



▶ RCD400



Specifications (RCD models of motor top surface mounting type)

Specifications		RCD170	RCD200	RCD250	RCD300	RCD400	
Table diameter	mm	Φ 170	Φ 200	Φ 250	Φ 300	Φ 400	
Table pilot bore diameter	mm	Φ 60 $^{+0.03}_0$	Φ 60 $^{+0.03}_0$	Φ 110 $^{+0.035}_0$	Φ 110 $^{+0.035}_0$	Φ 150 $^{+0.04}_0$	
Center height	mm	135	135	185	185	230	
Table T slot width	mm	12 $^{+0.018}_0$	12 $^{+0.018}_0$	12 $^{+0.018}_0$	12 $^{+0.018}_0$	14 $^{+0.018}_0$	
Keyway width	mm	14 $^0_{-0.011}$	14 $^0_{-0.011}$	18 $^0_{-0.011}$	18 $^0_{-0.011}$	18 $^0_{-0.011}$	
Clamp type (air 0.5 MPa, hydraulic 3.5 MPa)		Air / Hydraulic	Air / Hydraulic	Hydraulic	Hydraulic	Hydraulic	
Clamp torque ^{*1}	N·m	310	310	1100	1100	1850	
Motor shaft equivalent inertia ^{*2,*3}	$\times 10^{-4}$ kg·m ²	2.96	3.15	5.70	5.70	25.76	
Motor model (FANUC)		α iS4/4000-B (A06B-2215-B400)	α iS8/4000-B (A06B-2235-B400)	α iS8/4000-B (A06B-2235-B400)	α iS8/4000-B (A06B-2235-B400)	α iS22/4000-B (A06B-2265-B400)	
Minimum setting unit	deg	0.0001	0.0001	0.0001	0.0001	0.0001	
Maximum table speed	min ⁻¹	70	70	60	60	60	
Gear ratio		1/50	1/50	1/60	1/60	1/60	
Indexing accuracy	arc.sec	± 15	± 15	± 10	± 10	± 10	
Repeatability	arc.sec	8	8	4	4	4	
Net weight	kg	61	69	120	125	291	
Upright position	Allowable load ^{*4} 	kg	70 (140)	70 (140)	255 (510)	255 (510)	295 (590)
	F 	N	21000	21000	52000	52000	58500
	F × L with clamping 	N · m	310	310	1100	1100	1850
	Continuous holding torque ^{*2,*5}	N · m	236	416	512	512	1400
	Maximum output torque ^{*2,*5,*6}	N · m	362	544	987	987	2400
F × L 	N · m	1300	1300	5500	5500	7800	
Allowable workpiece inertia	kg·m ²	1.1	1.1	8.2	8.2	15	
External rotary joint (number of ports) ^{*7}		6+1	6+1	10+1	10+1	12+1	
Internal rotary joint (number of ports) ^{*7}		6	6	8	8	10	
MP scale (high-accuracy model) ^{*7}		MPRZ-536A (MHI)					
		MPI-536A (MHI)					

*1 Values for RCD170, RCD200 are clamping torques when using an air hydro booster with a air pressure of 0.5 MPa as the supply source.

*2 The values shown for motor shaft equivalent inertia and continuous/maximum holding torque apply when using a Fanuc motor. Contact Sankyo if using a different motor.

*3 Motor shaft equivalent inertia does not include the inertia of the motor shaft.

*4 The allowable payload value for upright mounting shown in brackets applies when a tail stock or support table is used.

*5 The continuous / maximum holding torque is the allowable load torque when a clamp is not used.

*6 Maximum holding torque should not exceed 10 seconds with 20% duty.

*7 Models RCD105, RCD170, and RCD200 do not enable the use of MP scales (high-accuracy type) together with rotary joints.



Dimensions (RCD models of motor top surface mounting type)

The drawings apply to the following specifications: Fanuc motor, rear connector.

Product Lineup / Applications
Product Code

Specifications /
Dimensions

Options for RCD model tables

Compatible Servo Motor Models
/ Precision Ratings

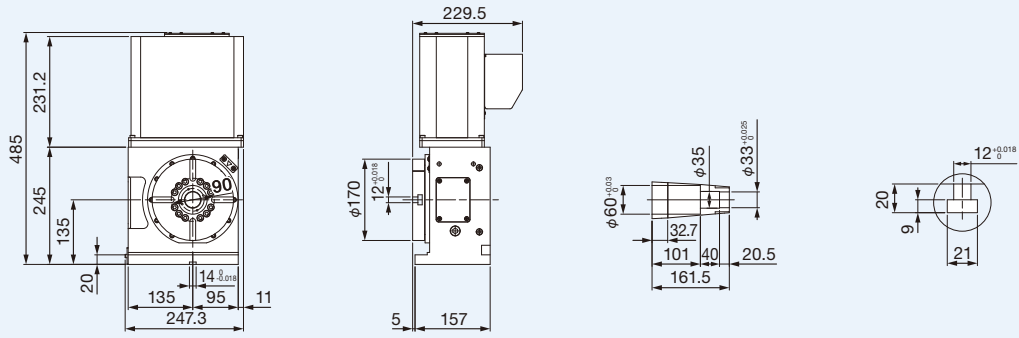
Auxiliary equipment

Control methods for air /
hydraulic table clamping

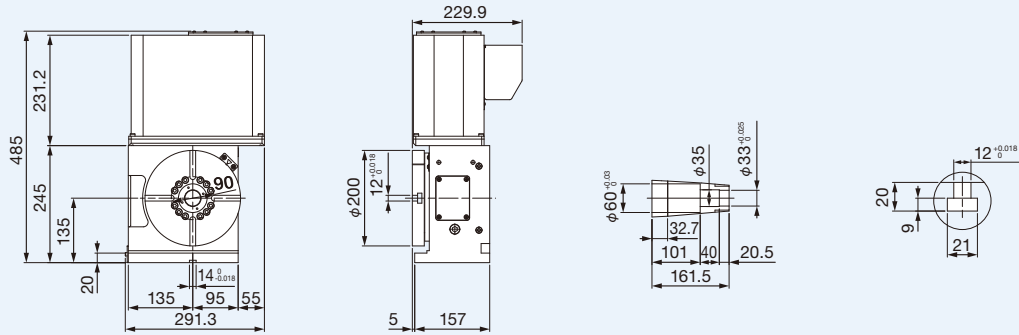
Guidelines for rotary table selection /
Check sheet for rotary table specifications

Technical Information /
Precautions

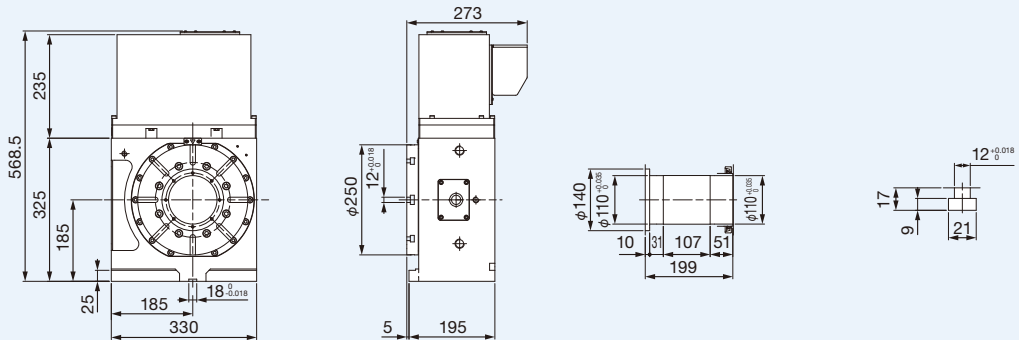
▶ RCD170



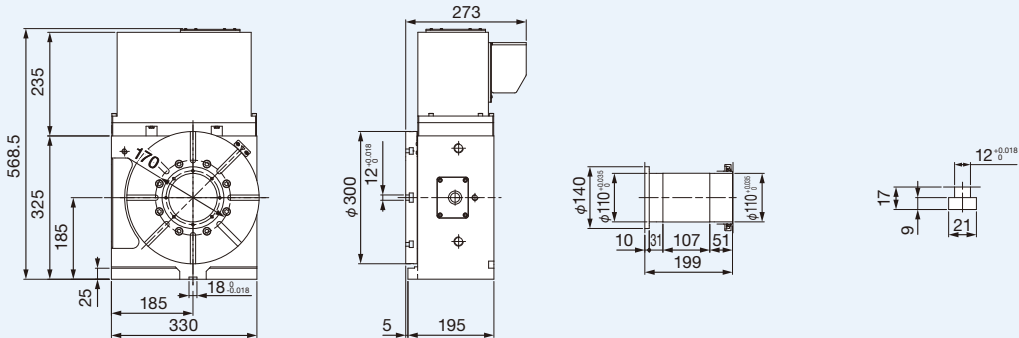
▶ RCD200



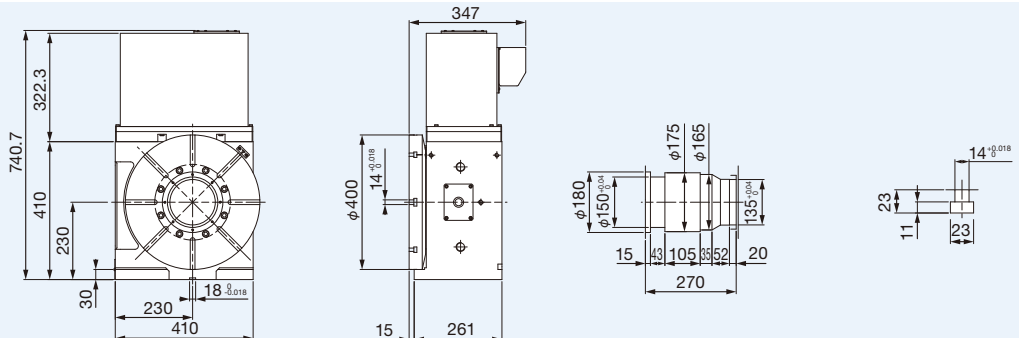
▶ RCD250



▶ RCD300

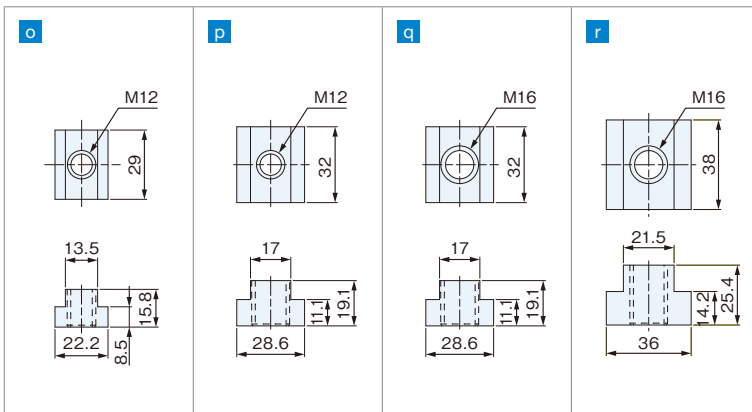
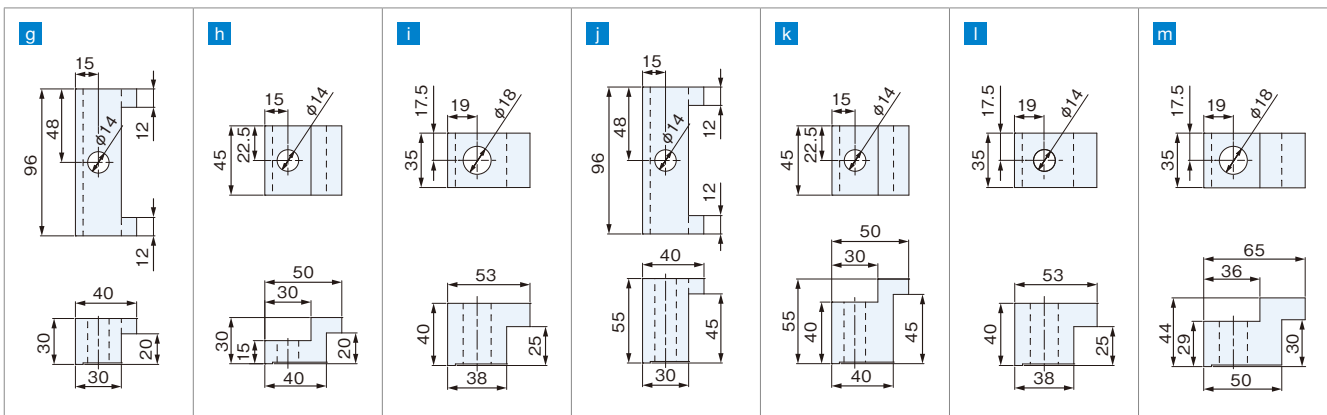
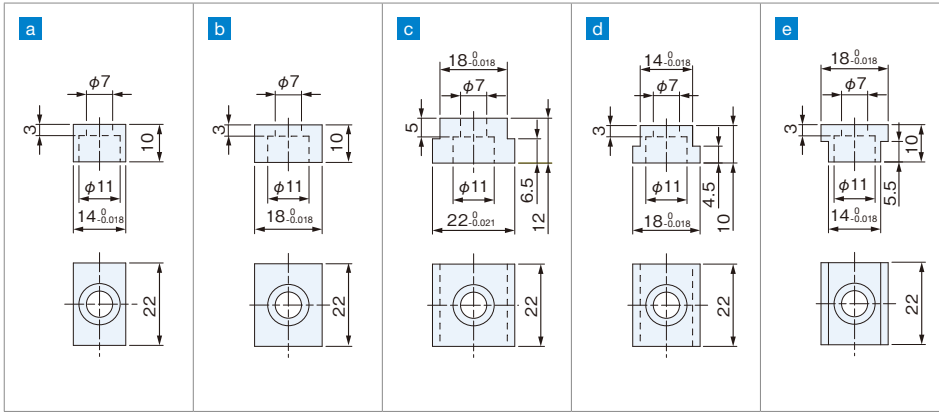


▶ RCD400





RCD model table mounting clamps (accessories)



RCD model table mounting clamp combinations

RCD105, 170, 200		Keys	T-slot nuts	Mounting clamps
M1	Keys (14 mm width)	a : 2 pcs.	-	-
M2	T-slot nuts (14 mm width)	-	o : 2 pcs.	-
M3	Mounting clamps (14 mm width)	-	-	g, h : 1 pc. each
M4	Keys, T-slot nuts (14 mm width)	a : 2 pcs.	o : 2 pcs.	-
M5	Keys, Mounting clamps (14 mm width)	a : 2 pcs.	-	g, h : 1 pc. each
M6	Mounting clamps, T-slot nuts (14 mm width)	-	o : 2 pcs.	g, h : 1 pc. each
M7	Keys, Mounting clamps, T-slot nuts (14 mm width)	a : 2 pcs.	o : 2 pcs.	g, h : 1 pc. each
M8 ^{*1}	Mounting clamps (14 mm width) [For option J horizontal placement]	-	-	j, k : 1 pc. each
M9 ^{*1}	Keys, Mounting clamps (14 mm width) [For option J horizontal placement]	a : 2 pcs.	-	j, k : 1 pc. each
MA ^{*1}	Mounting clamps, T-slot nuts (14 mm width) [For option J horizontal placement]	-	o : 2 pcs.	j, k : 1 pc. each
MB ^{*1}	Keys, Mounting clamps, T-slot nuts (14 mm width) [For option J horizontal placement]	a : 2 pcs.	o : 2 pcs.	j, k : 1 pc. each
MC	Keys (18 mm width)	d : 2 pcs.	-	-
MD	T-slot nuts (18 mm width)	-	p : 2 pcs.	-
ME	Mounting clamps (18 mm width)	-	-	g, h : 1 pc. each
MF	Keys, T-slot nuts (18 mm width)	d : 2 pcs.	p : 2 pcs.	-
MG	Keys, Mounting clamps (18 mm width)	d : 2 pcs.	-	g, h : 1 pc. each
MH	Mounting clamps, T-slot nuts (18 mm width)	-	p : 2 pcs.	g, h : 1 pc. each
MI	Keys, Mounting clamps, T-slot nuts (18 mm width)	d : 2 pcs.	p : 2 pcs.	g, h : 1 pc. each
MJ ^{*1}	Mounting clamps (18 mm width) [For option J horizontal placement]	-	-	j, k : 1 pc. each
MK ^{*1}	Keys, Mounting clamps (18 mm width) [For option J horizontal placement]	d : 2 pcs.	-	j, k : 1 pc. each
ML ^{*1}	Mounting clamps, T-slot nuts (18 mm width) [For option J horizontal placement]	-	p : 2 pcs.	j, k : 1 pc. each
MM ^{*1}	Keys, Mounting clamps, T-slot nuts (18 mm width) [For option J horizontal placement]	d : 2 pcs.	p : 2 pcs.	j, k : 1 pc. each

RCD250, 300		Keys	T-slot nuts	Mounting clamps
M1	Keys (14 mm width)	e : 2 pcs.	-	-
M2	T-slot nuts (14 mm width)	-	o : 4 pcs.	-
M3	Mounting clamps (14 mm width)	-	-	l : 4 pcs.
M4	Keys, T-slot nuts (14 mm width)	e : 2 pcs.	o : 4 pcs.	-
M5	Keys, Mounting clamps (14 mm width)	e : 2 pcs.	-	l : 4 pcs.
M6	Mounting clamps, T-slot nuts (14 mm width)	-	o : 4 pcs.	l : 4 pcs.
M7	Keys, Mounting clamps, T-slot nuts (14 mm width)	e : 2 pcs.	o : 4 pcs.	l : 4 pcs.
MC	Keys (18 mm width)	b : 2 pcs.	-	-
MD	T-slot nuts (18 mm width)	-	q : 4 pcs.	-
ME	Mounting clamps (18 mm width)	-	-	i : 4 pcs.
MF	Keys, T-slot nuts (18 mm width)	b : 2 pcs.	q : 4 pcs.	-
MG	Keys, Mounting clamps (18 mm width)	b : 2 pcs.	-	i : 4 pcs.
MH	Mounting clamps, T-slot nuts (18 mm width)	-	q : 4 pcs.	i : 4 pcs.
MI	Keys, Mounting clamps, T-slot nuts (18 mm width)	b : 2 pcs.	q : 4 pcs.	i : 4 pcs.

RCD400		Keys	T-slot nuts	Mounting clamps
MC	Keys (18 mm width)	b : 2 pcs.	-	-
MD	T-slot nuts (18 mm width)	-	q : 4 pcs.	-
ME	Mounting clamps (18 mm width)	-	-	m : 4 pcs.
MF	Keys, T-slot nuts (18 mm width)	b : 2 pcs.	q : 4 pcs.	-
MG	Keys, Mounting clamps (18 mm width)	b : 2 pcs.	-	m : 4 pcs.
MH	Mounting clamps, T-slot nuts (18 mm width)	-	q : 4 pcs.	m : 4 pcs.
MI	Keys, Mounting clamps, T-slot nuts (18 mm width)	b : 2 pcs.	q : 4 pcs.	m : 4 pcs.
MN	Keys (22 mm width)	c : 2 pcs.	-	-
MO	T-slot nuts (22 mm width)	-	r : 4 pcs.	-
MP	Mounting clamps (22 mm width)	-	-	m : 4 pcs.
MQ	Keys, T-slot nuts (22 mm width)	c : 2 pcs.	r : 4 pcs.	-
MR	Keys, Mounting clamps (22 mm width)	c : 2 pcs.	-	m : 4 pcs.
MS	Mounting clamps, T-slot nuts (22 mm width)	-	r : 4 pcs.	m : 4 pcs.
MT	Keys, Mounting clamps, T-slot nuts (22 mm width)	c : 2 pcs.	r : 4 pcs.	m : 4 pcs.

*1 Options M8 to MB and MJ to MM are only available for models RCD105 to RCD200 with right/left-mounted motors.



Compatible Servo Motor Models

With brake

	FANUC	mitsubishi ^{*2}	Sanyo Brother type	OKUMA
RCD105	α iS2/5000-B (A06B-2212-B400)	HF75BS-A48 [HG75BS-D □□]	–	BL-ME24M-50SB/M
RCD170	α iS4/5000-B (A06B-2215-B400)	HF104BS-A48 [HG104BS-D □□]	R2AAB8100FCPGYM	BL-MT40M-40SB/M
RCD200	α iS8/4000-B (A06B-2235-B400)	HF104BS-A48 [HG104BS-D □□]	R2AAB8100FCPGYM	BL-MT40M-40SB/M
RCD250	α iS8/4000-B (A06B-2235-B400)	HF154BS-A48 [HG154BS-D □□]	R2AA13180HCP9CM	BL-MT40M-40SB/M
RCD300	α iS8/4000-B (A06B-2235-B400)	HF154BS-A48 [HG154BS-D □□]	R2AA13180HCP9CM	BL-MT40M-40SB/M
RCD400	α iS22/4000-B (A06B-2265-B400)	HF354BS-A48 [HG354BS-D □□]	–	BL-MT200M-40SB/M

Without brake^{*1}

	FANUC	mitsubishi ^{*2}	Sanyo Brother type	OKUMA
RCD105	α iS2/5000-B (A06B-2212-B100)	HF75S-A48 [HG75S-D □□]	R2AAB8075HXPGYM	BL-ME24M-50SN/M
RCD170	α iS4/5000-B (A06B-2215-B100)	HF104S-A48 [HG104S-D □□]	–	BL-MT40M-40SN/M
RCD200	α iS8/4000-B (A06B-2235-B100)	HF104S-A48 [HG104S-D □□]	–	BL-MT40M-40SN/M
RCD250	α iS8/4000-B (A06B-2235-B100)	HF154S-A48 [HG154S-D □□]	–	BL-MT40M-40SN/M
RCD300	α iS8/4000-B (A06B-2235-B100)	HF154S-A48 [HG154S-D □□]	–	BL-MT40M-40SN/M
RCD400	α iS22/4000-B (A06B-2265-B100)	HF354S-A48 [HG354S-D □□]	–	BL-MT200M-40SN/M

*1 If motor brake control is not possible, select a servo motor without brake.

However, since the mechanism is not self-locking, please note that the table may rotate depending on the position in case of a power failure or similar.

*2 The standard Sanyo-supplied motor for motor code B1 (B) is HF □□□ (B) S-A48.

The □□ characters at the end of each HG series motor model name shown in square brackets [] are machine tool manufacturer-specific codes.

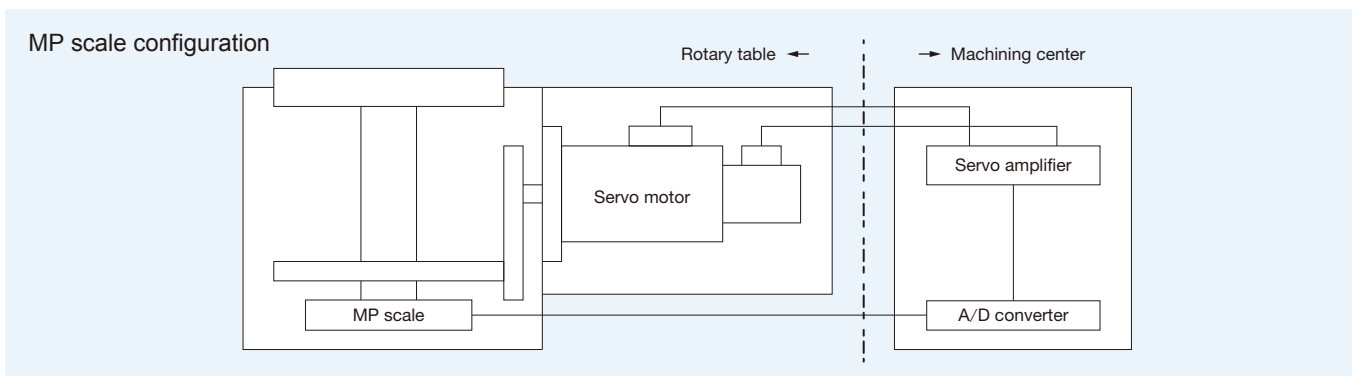
*3 Contact Sanyo for information about the external controller type.

Precision Ratings

NO.	Measurement	Method	RCD105	RCD170	RCD200	RCD250	RCD300	RCD400
1	Parallelism between table top and reference surface for upright mounting		0.015mm	0.015mm	0.015mm	0.02mm	0.02mm	0.02mm
2	Runout of table top		0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	0.01mm
3	Runout of table reference bore		0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	0.01mm
4	Perpendicularity between table top and reference surface for upright mounting		0.02mm (must not lean forward)	0.02mm (must not lean forward)	0.02mm (must not lean forward)	0.02mm (must not lean forward)	0.02mm (must not lean forward)	0.02mm (must not lean forward)
5	Parallelism between rotary axis and guide blocks for reference surface for upright mounting		0.02mm/ 150 mm	0.02mm/ 150 mm	0.02mm/ 150 mm	0.02mm/ 150 mm	0.02mm/ 150 mm	0.02mm/ 150 mm
6	Deviation between rotary axis and guide blocks for reference surface for upright mounting		0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.02mm
7	Parallelism between rotating center and reference surface for upright mounting		0.02mm/ 150 mm	0.02mm/ 150 mm	0.02mm/ 150 mm	0.02mm/ 150 mm	0.02mm/ 150 mm	0.02mm/ 150 mm
8	Indexing accuracy		± 15arc.sec	± 15arc.sec	± 15arc.sec	± 10arc.sec	± 10arc.sec	± 10arc.sec
9	Repeatability		8arc.sec	8arc.sec	8arc.sec	4arc.sec	4arc.sec	4arc.sec

Options for RCD model tables — high-accuracy type

By mounting a commercially available MP scale to the rotary table, fully closed loop control can be realized. Direct detection of the table's rotation angle enables indexing with high accuracy.



MP scale	A/D converter	NC support	
		FANUC	MITSUBISHI
Absolute (MPRZ)	ADB-K70F	○	×
	ADB-K70M	×	○
Incremental (MPI)	ADB-K60F	○	×
	ADB-K60M	×	○

1. With the incremental specification, absolute detection is possible by combination with an absolute type servo motor.
2. Refer to the documentation of the respective manufacturer for operation instructions and information on the connection between the A/D converter and higher-level equipment.
3. "MITSUBISHI" in the "NC support" column refers to Mitsubishi CNC.

Product Lineup / Applications
Product Code

Specifications /
Dimensions

Options for RCD model tables

Compatible Servo Motor Models
/ Precision Ratings

Auxiliary equipment

Control methods for air /
hydraulic table clamping

Guidelines for rotary table selection /
Check sheet for rotary table specifications

Technical Information /
Precautions



Options for RCD model tables – rotary joints

Specifications

Product type	Size	Max. number of ports Maximum actuation		Maximum actuation pressure
		Internal type	External type	
RCD (Motor right/left)	105	4	6 + 1 ^{*1}	Fluid: Air 0.7 MPa / Hydraulic 6 MPa
	170	6	6 + 1 ^{*1}	
	200	6	6 + 1 ^{*1}	
	250	8	10 + 1 ^{*1}	
	300	8	10 + 1 ^{*1}	
	400	10	12 + 1 ^{*1}	
RCD (Motor rear surface)	170	6	-	
	200	6	-	
	250	8	-	
	300	8	-	
	400	10	-	
RCD (Motor top surface)	170	6	-	
	200	6	-	
	250	8	-	
	300	8	-	
	400	10	-	

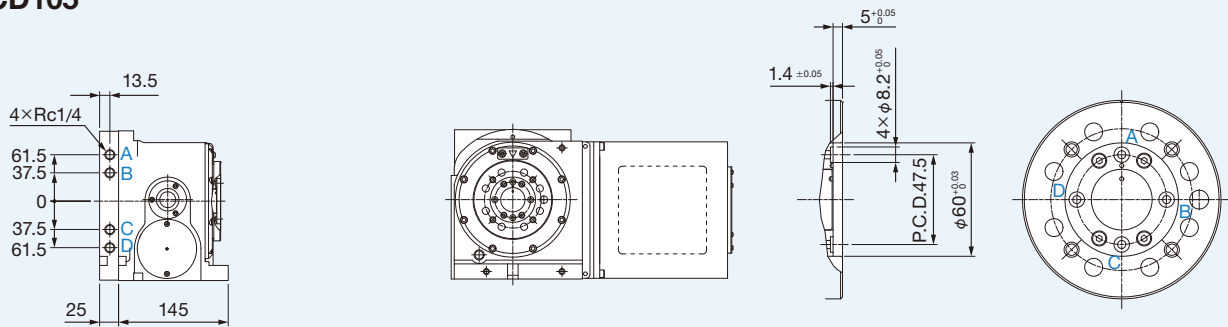
*1 The +1 indicates the port in the center bore.

*2 Make sure to furnish a line filter in the air supply line.

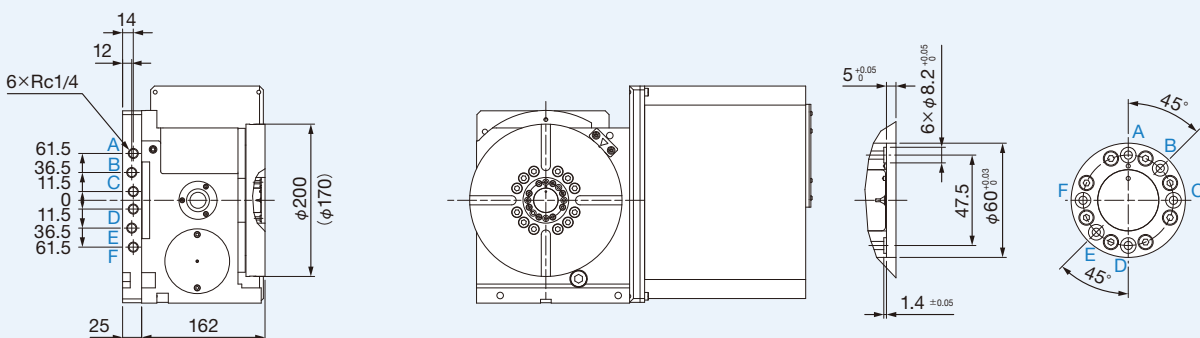
*3 Under prolonged use a small amount of actuation oil may leak from the oil port toward the adjacent air port. If possible, the adjacent ports should be left open for use as drain ports.

Internal type (RCD models of motor side surface mounting type)

► RCD105

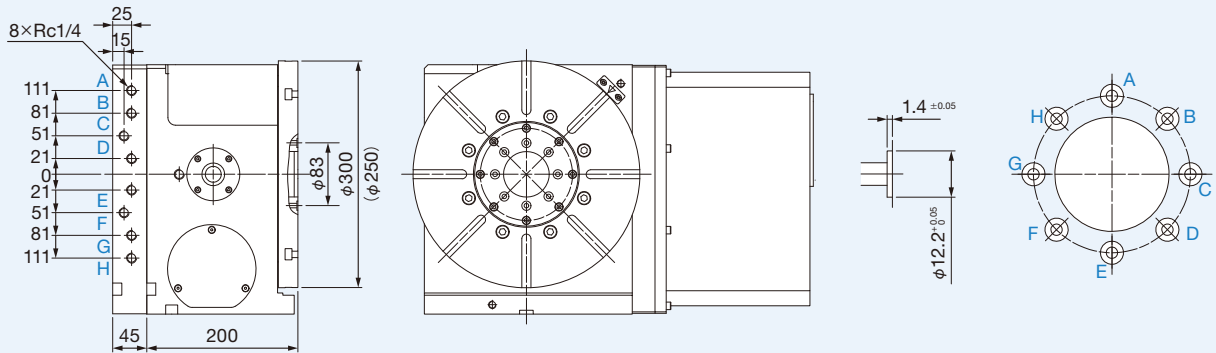


► RCD170, 200

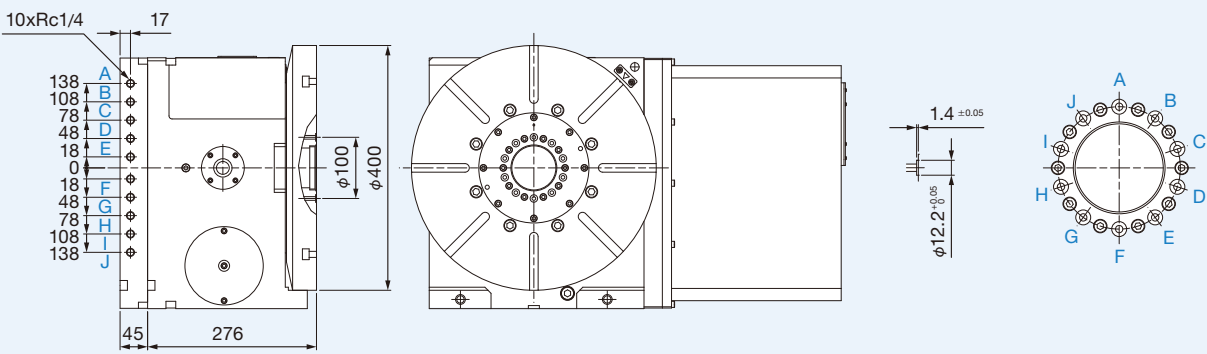


Internal type (RCD models of motor side surface mounting type)

► RCD250, 300

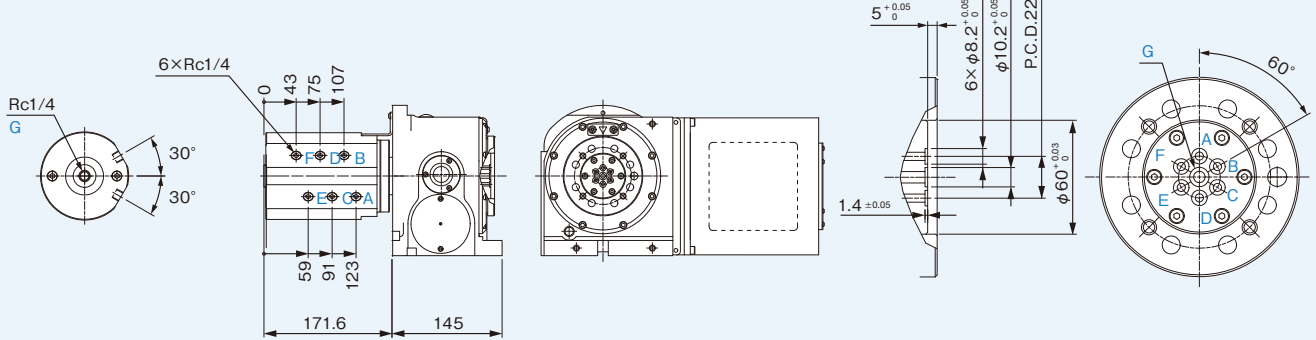


► RCD400

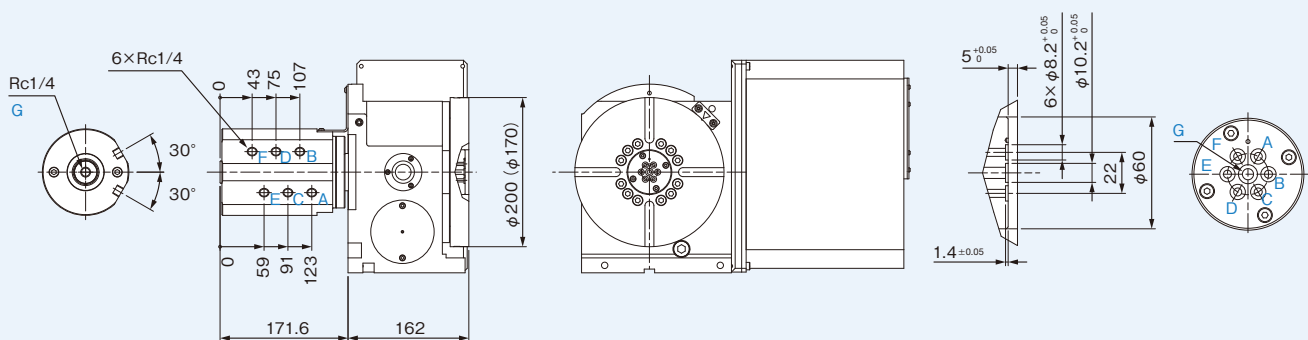


External type (RCD models of motor side surface mounting type)

► RCD105



► RCD170, 200

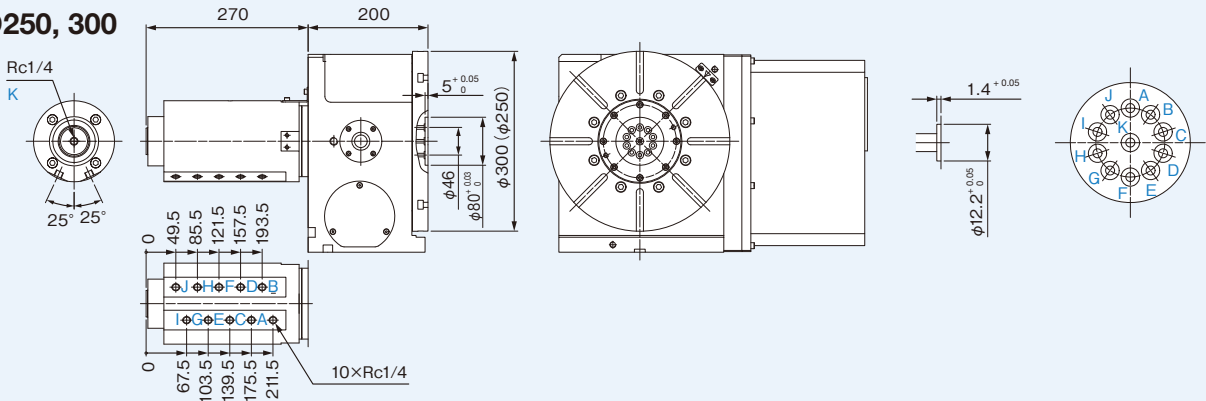




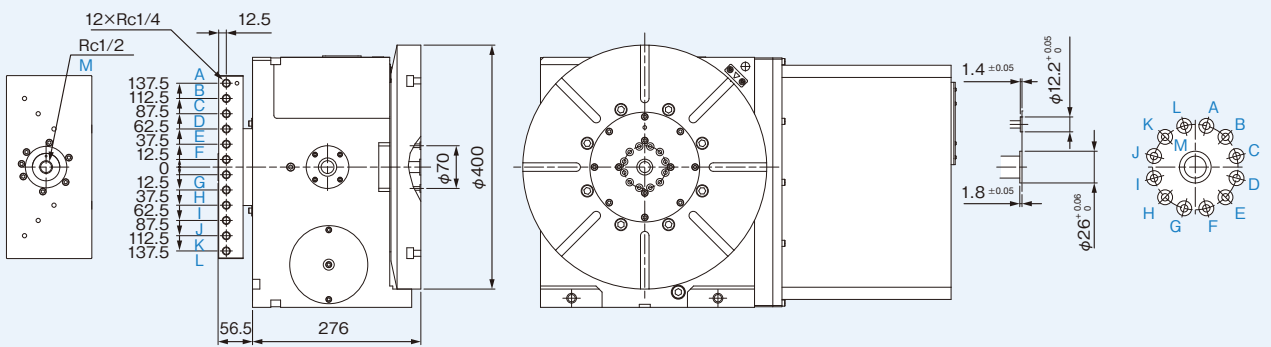
Options for RCD model tables – rotary joints

External type (RCD models of motor side surface mounting type)

► RCD250, 300

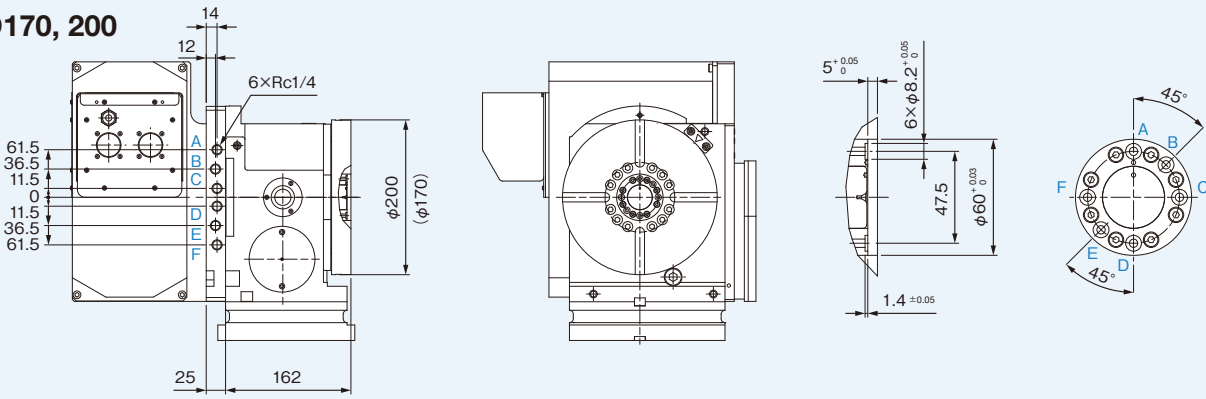


► RCD400

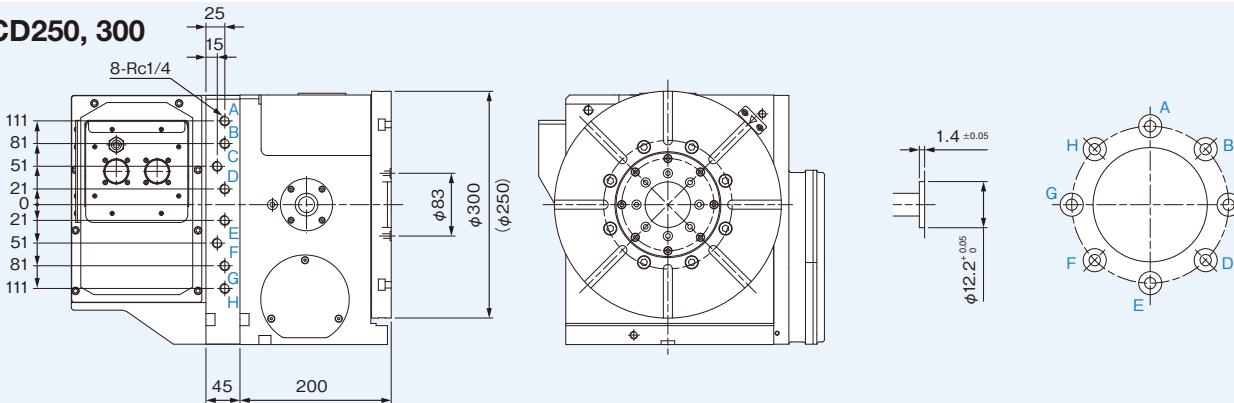


Internal type (RCD models of motor rear surface mounting type)

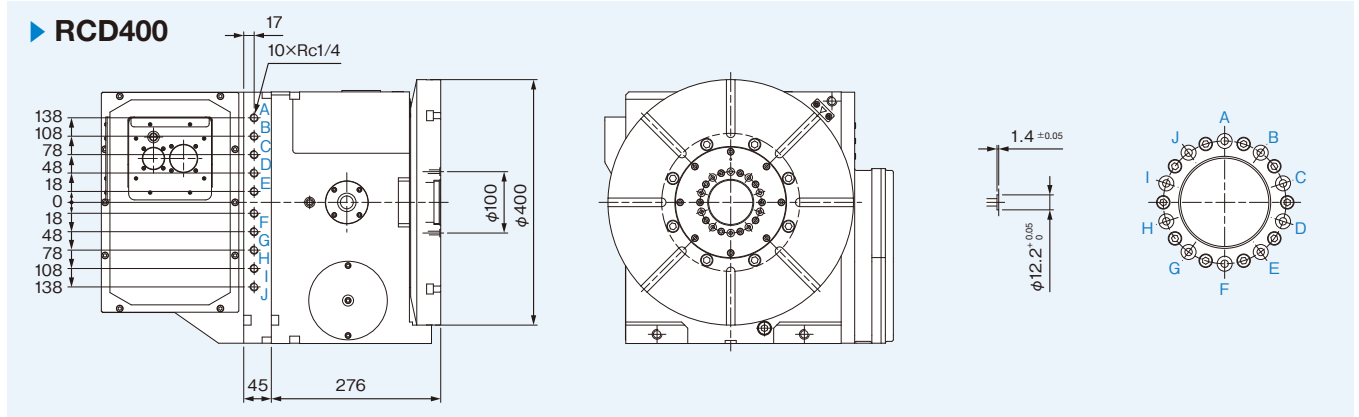
► RCD170, 200



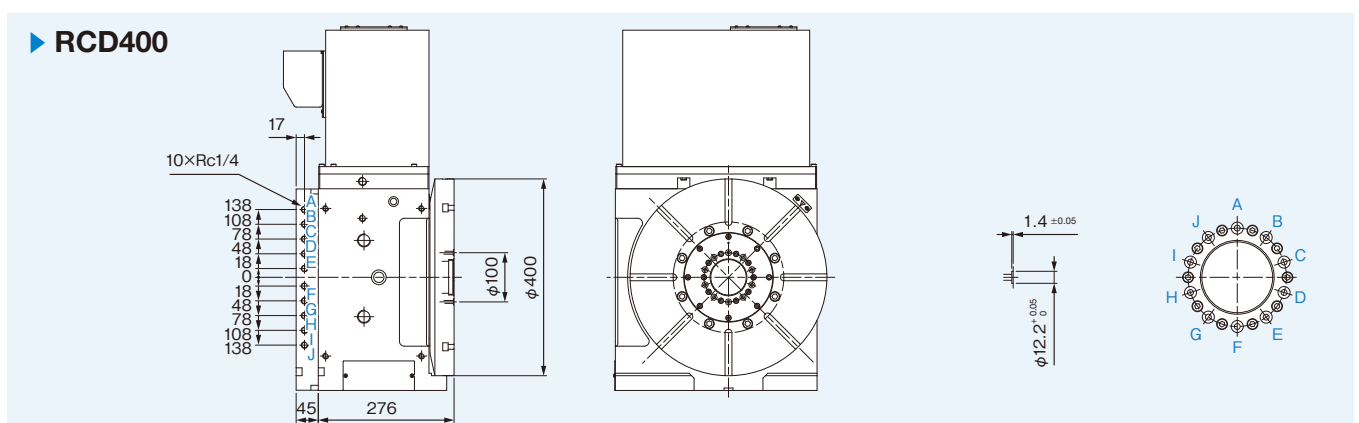
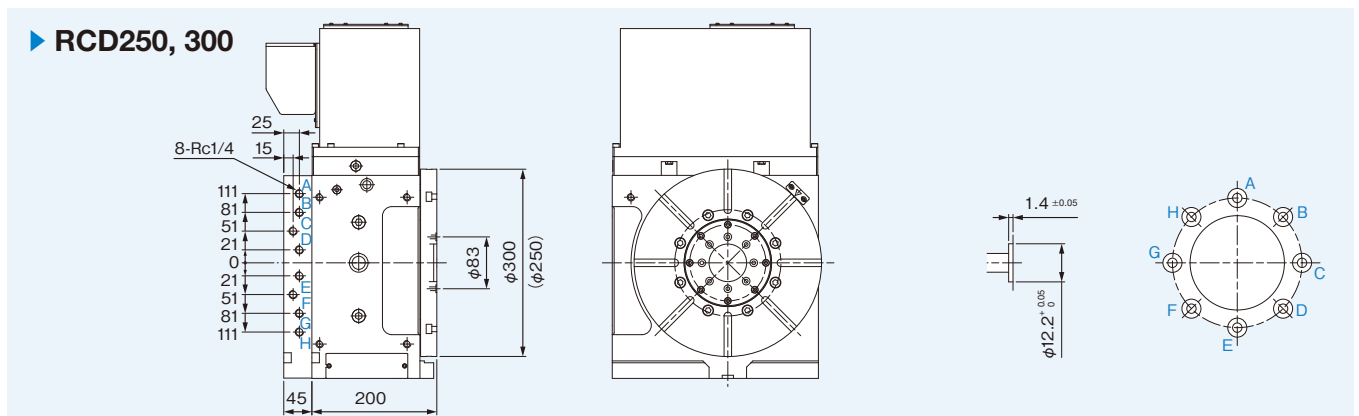
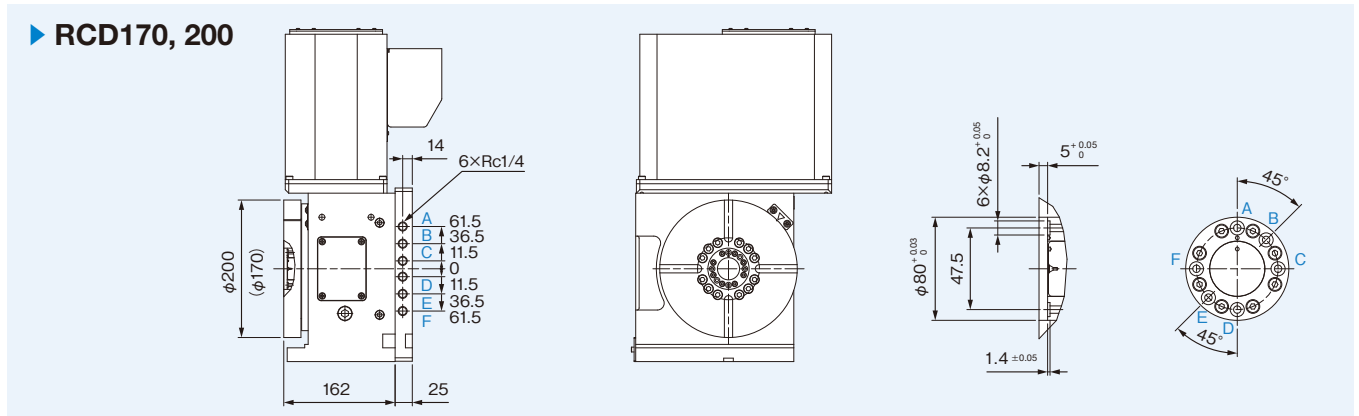
► RCD250, 300



Internal type (RCD models of motor rear surface mounting type)



Internal type (RCD models of motor top surface mounting type)



Product Lineup / Applications
Product Code

Specifications /
Dimensions

Options for RCD model tables

Compatible Servo Motor Models
/ Precision Ratings

Auxiliary equipment

Control methods for air /
hydraulic table clamping

Guidelines for rotary table selection /
Check sheet for rotary table specifications

Technical Information /
Precautions



Auxiliary equipment – Support table specifications

Specifications		ST105A	ST170A		ST250A		ST400A
Rotary table model		RCD105	RCD170	RCD200	RCD250	RCD300	RCD400
Table diameter	mm	Φ 105	Φ 170		Φ 250		Φ 400
Table pilot bore diameter	mm	Φ 60 ^{+0.03} ₀	Φ 60 ^{+0.03} ₀		Φ 110 ^{+0.035} ₀		Φ 150 ^{+0.04} ₀
Center height	mm	105	135		185		230
Table T slot width	mm	—	12 ^{+0.018} ₀		12 ^{+0.018} ₀		14 ^{+0.018} ₀
Keyway width	mm	14 ⁰ _{-0.011}	14 ⁰ _{-0.011}		18 ⁰ _{-0.011}		18 ⁰ _{-0.011}
Clamp type (air 0.5 MPa, hydraulic 3.5 MPa)		Air / Hydraulic	Air / Hydraulic		Hydraulic		Hydraulic
Clamp torque ¹	N·m	210	310		1100		1850
Inertia of rotating output part	× 10 ⁻² kg·m ²	0.54	2.10		20.00		106.40
Maximum table speed	min ⁻¹	100	70		60		60
Net weight	kg	14	24		54		144
Allowable payload ²	kg	100	140		510		590
Allowable load ²	F	N	16400	18900	46300	52600	
	F × L with clamping	N·m	420	620	2200	3700	
	Continuous holding torque ³	N·m	122	236	416	512	1400
	Maximum holding torque ^{3, 4}	N·m	221	362	544	987	2400
External rotary joint (number of ports)		6+1	6+1		10+1		12+1
Internal rotary joint (number of ports)		4	4		6		—

*1 Values for ST105A and ST170A are clamping torques when using an air hydro booster with a air pressure of 0.5 MPa as the supply source.

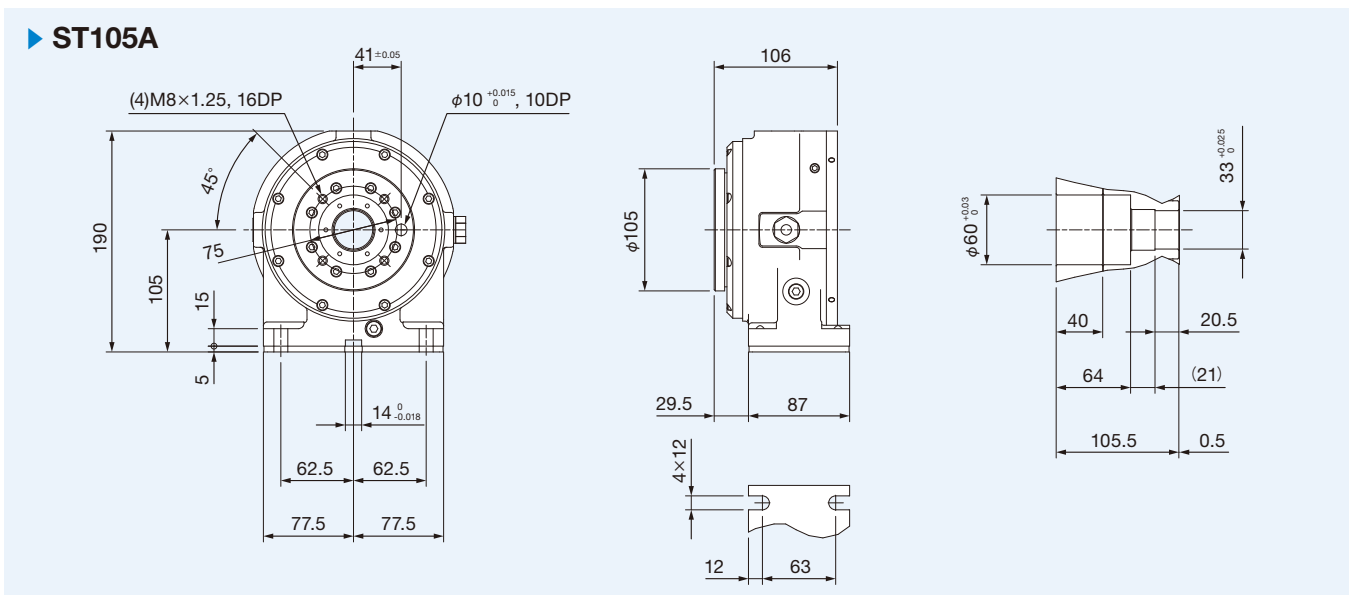
*2 The allowable payload and allowable load values apply to the entire set including the rotary table.

*3 The continuous / maximum holding torque is the allowable load torque when a clamp is not used.

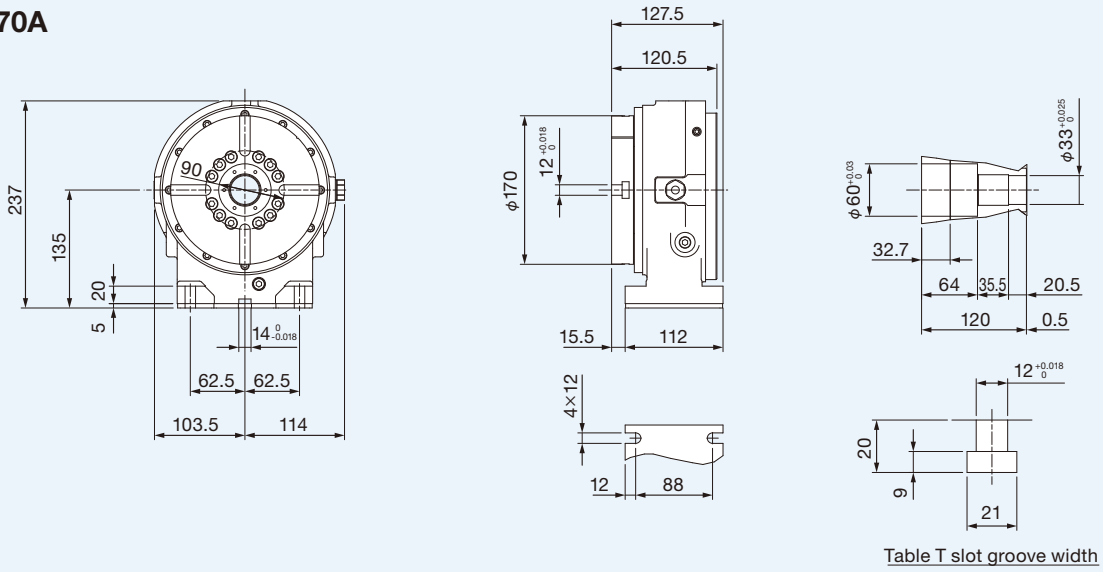
*4 Maximum holding torque should not exceed 10 seconds with 20% duty.



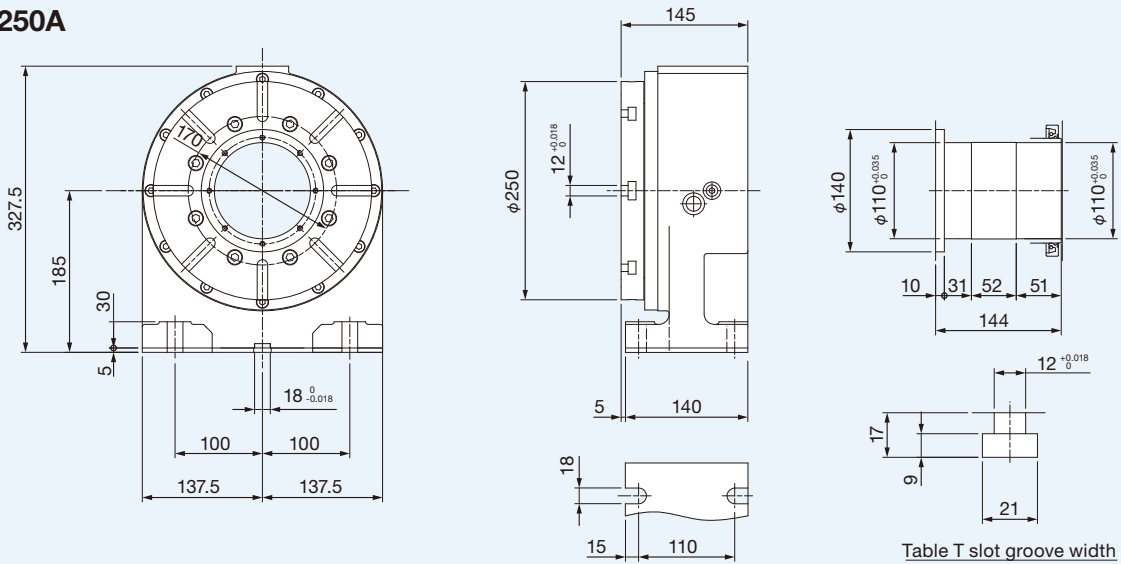
Auxiliary equipment – Support table dimensions



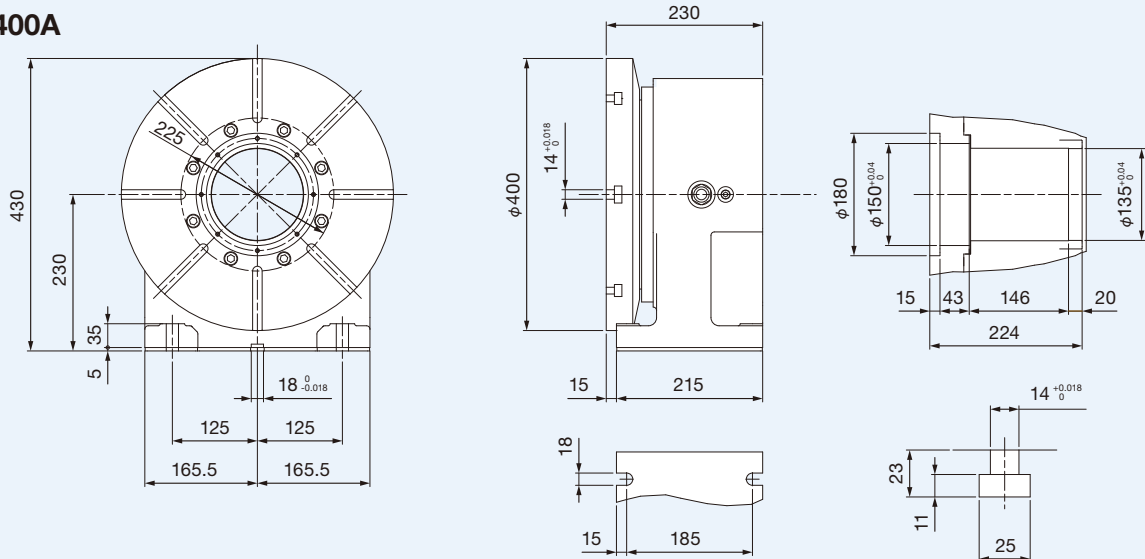
▶ ST170A



▶ ST250A

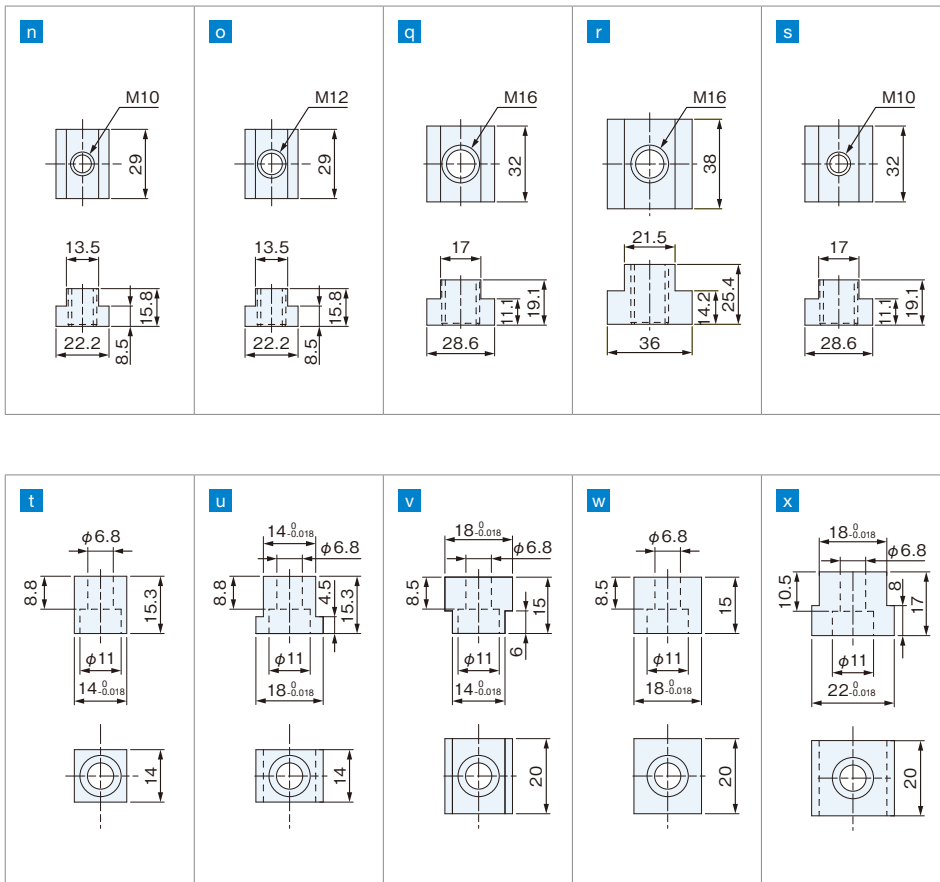


▶ ST400A





Auxiliary equipment – Support table mounting clamps (accessories)



Support table mounting clamp combinations

ST105A, 170A		Keys	T-slot nuts	Washers
M1	Keys (14 mm width)	t : 2 pcs.	-	-
M2	T-slot nuts (14 mm width)	-	n : 4 pcs.	M10 : 4 pcs.
M4	Keys, T-slot nuts (14 mm width)	t : 2 pcs.	n : 4 pcs.	M10 : 4 pcs.
MC	Keys (18 mm width)	u : 2 pcs.	-	-
MD	T-slot nuts (18 mm width)	-	s : 4 pcs.	M10 : 4 pcs.
MF	Keys, T-slot nuts (18 mm width)	u : 2 pcs.	s : 4 pcs.	M10 : 4 pcs.

ST250A		Keys	T-slot nuts	Washers
M1	Keys (14 mm width)	v : 2 pcs.	-	-
M2	T-slot nuts (14 mm width)	-	o : 4 pcs.	M12, 16 : 4 pcs. each
M4	Keys, T-slot nuts (14 mm width)	v : 2 pcs.	o : 4 pcs.	M12, 16 : 4 pcs. each
MC	Keys (18 mm width)	w : 2 pcs.	-	-
MD	T-slot nuts (18 mm width)	-	q : 4 pcs.	M16 : 4 pcs.
MF	Keys, T-slot nuts (18 mm width)	w : 2 pcs.	q : 4 pcs.	M16 : 4 pcs.

ST400A		Keys	T-slot nuts	Washers
MC	Keys (18 mm width)	w : 2 pcs.	-	-
MD	T-slot nuts (18 mm width)	-	q : 4 pcs.	M16 : 4 pcs.
MF	Keys, T-slot nuts (18 mm width)	w : 2 pcs.	q : 4 pcs.	M16 : 4 pcs.
MN	Keys (22 mm width)	x : 2 pcs.	-	-
MO	T-slot nuts (22 mm width)	-	r : 4 pcs.	M16 : 4 pcs.
MQ	Keys, T-slot nuts (22 mm width)	x : 2 pcs.	r : 4 pcs.	M16 : 4 pcs.

Support table options – Rotary joint

Specifications

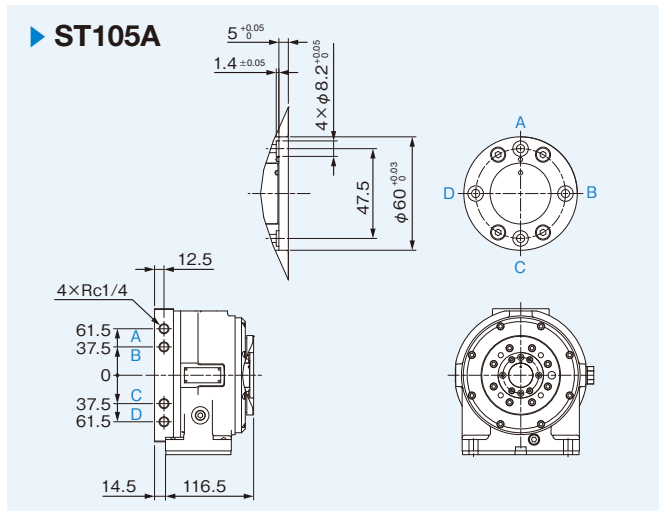
Product type	Size	Max. number of ports		Maximum actuation pressure
		Internal type	External type	
ST	105A	4	6 + 1 ¹	Fluid: Air 0.7 MPa / Hydraulic 6 MPa
	170A	4	6 + 1 ¹	
	250A	6	10 + 1 ¹	
	400A	-	12 + 1 ¹	

¹ The "+1" indicates a port using the center bore.

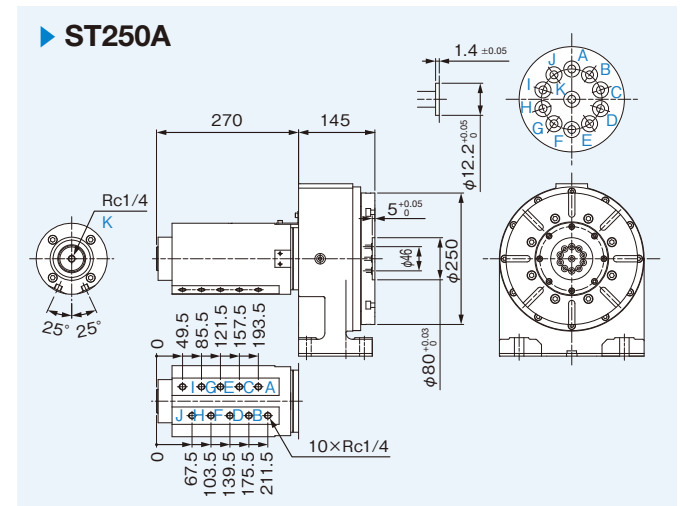
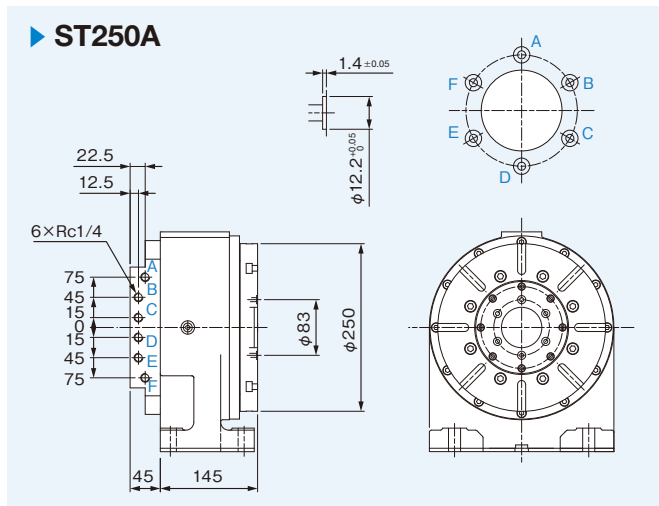
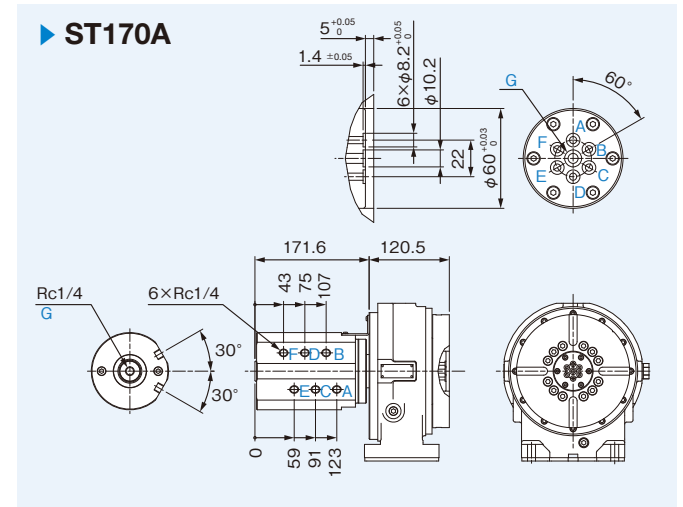
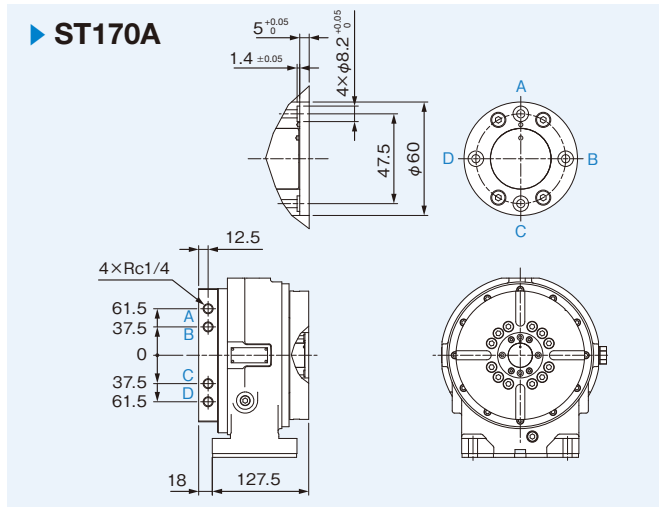
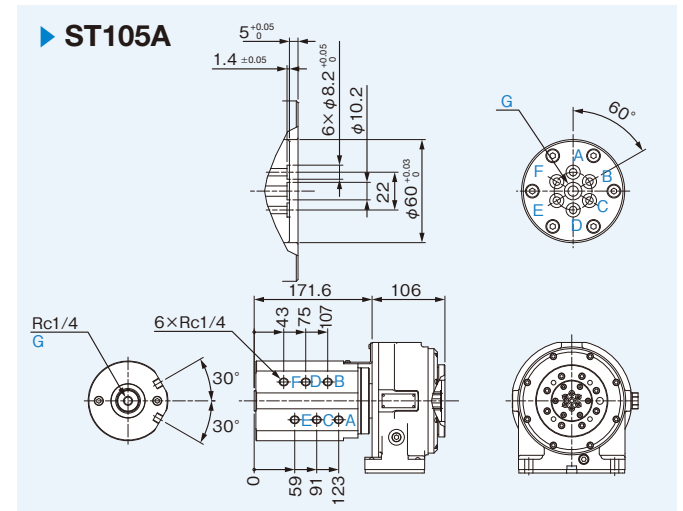
² Be sure to use a line filter in the air supply.

³ During prolonged use, a small amount of actuation oil may leak from an oil port to an adjacent air port. If possible, the adjacent port should be left open as a drain port.

Internal type

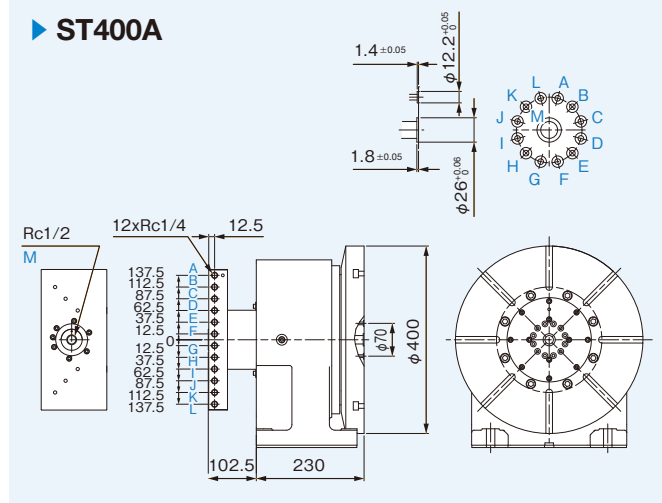


External type



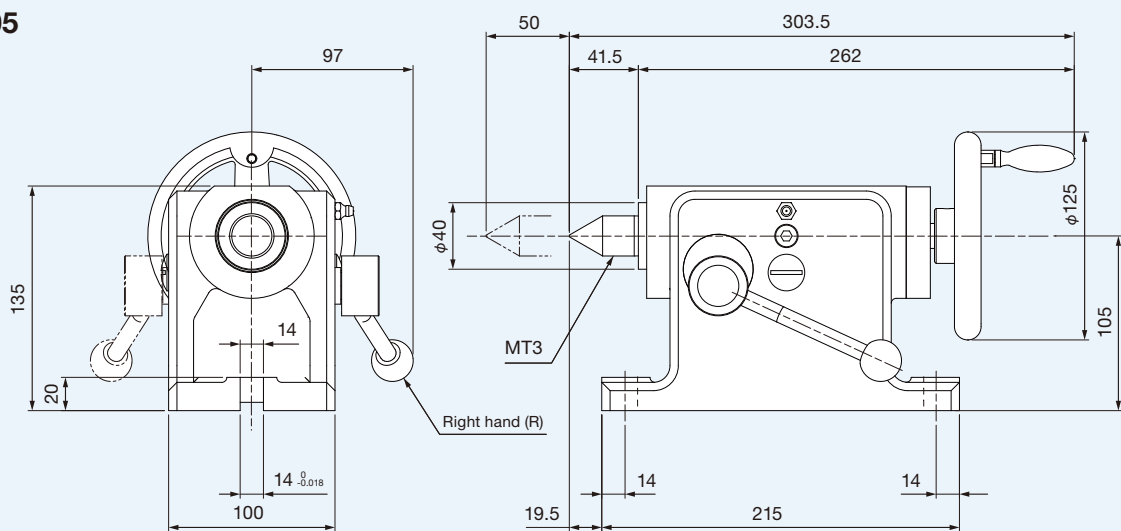
External type

▶ ST400A

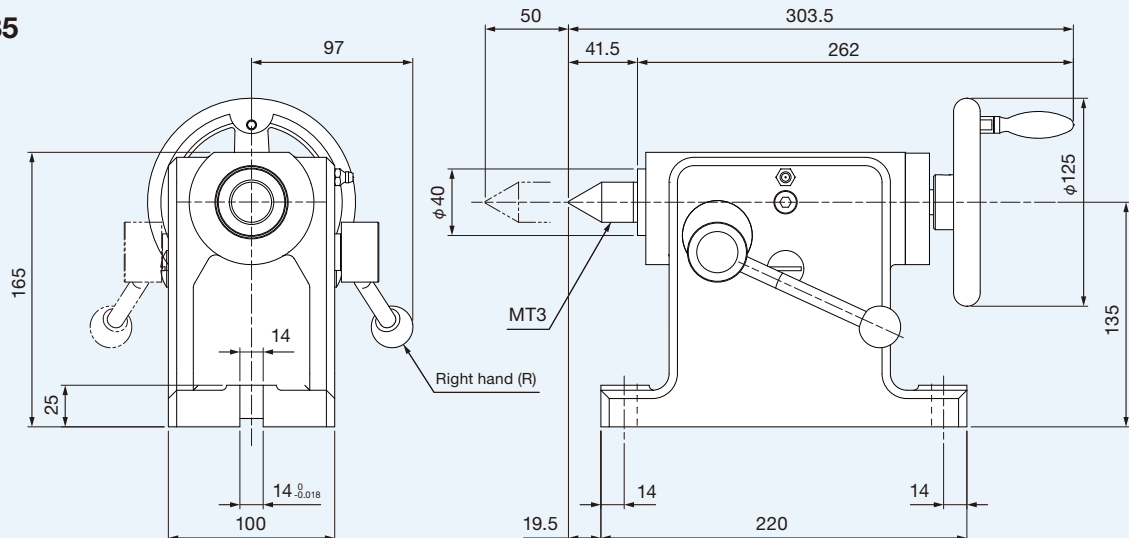


Auxiliary equipment – Tail stock dimensions

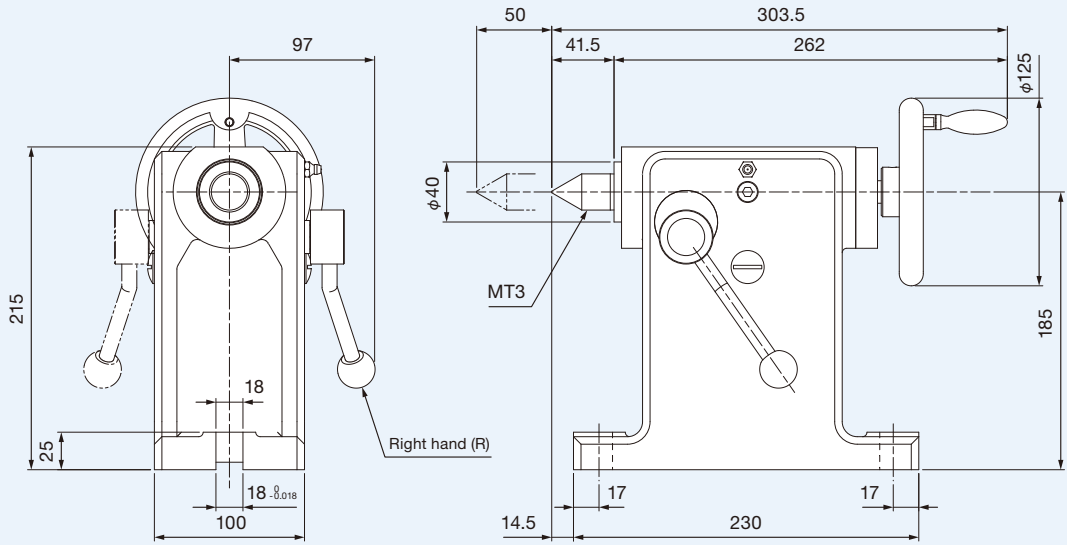
▶ TSS105



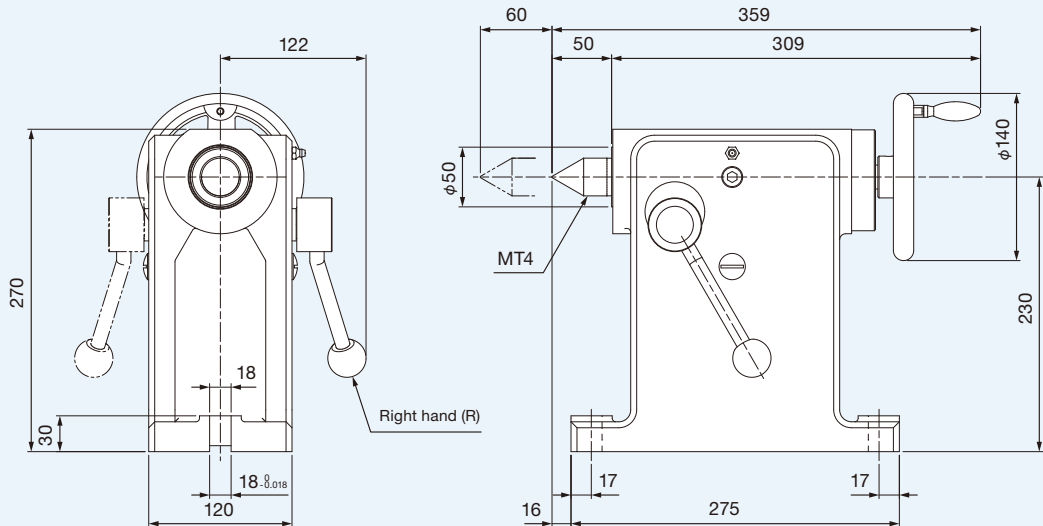
▶ TSS135



▶ TSS185

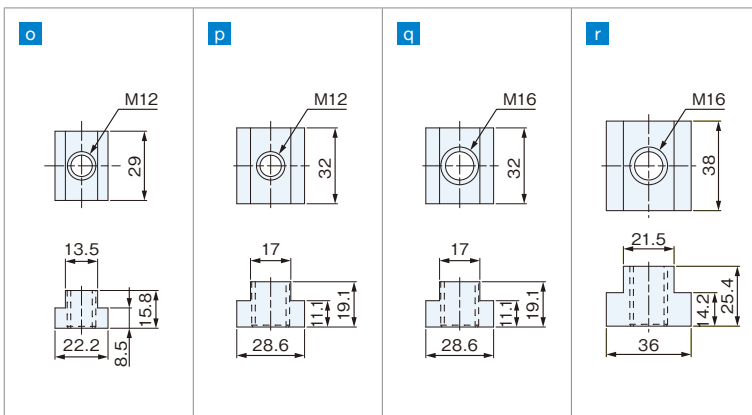
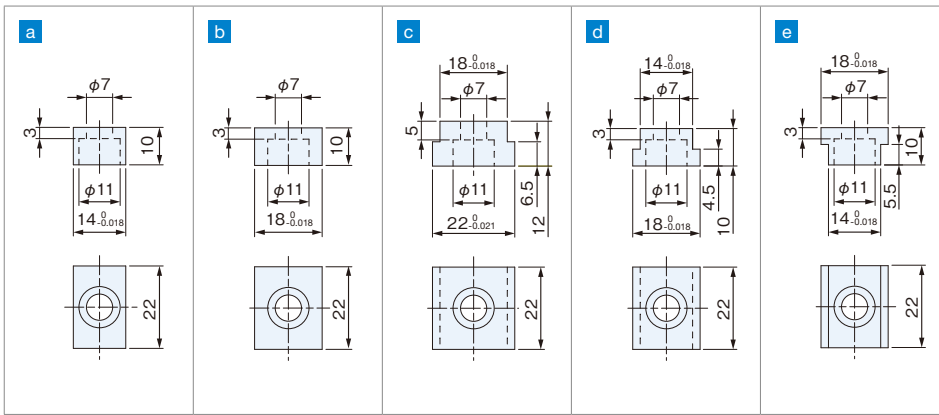


▶ TSS230





Auxiliary equipment – Tail stock mounting clamps (accessories)



Tail stock mounting clamp combinations

TSS105, 135		Keys	T-slot nuts	Washers
M1	Keys (14 mm width)	a : 2 pcs.	-	-
M2	T-slot nuts (14 mm width)	-	o : 2 pcs.	M12 : 2 pcs.
M4	Keys, T-slot nuts (14 mm width)	a : 2 pcs.	o : 2 pcs.	M12 : 2 pcs.
MC	Keys (18 mm width)	d : 2 pcs.	-	-
MD	T-slot nuts (18 mm width)	-	p : 2 pcs.	M12 : 2 pcs.
MF	Keys, T-slot nuts (18 mm width)	d : 2 pcs.	p : 2 pcs.	M12 : 2 pcs.

TSS185, 230		Keys	T-slot nuts	Washers
M1	Keys (14 mm width)	e : 2 pcs.	-	-
M2	T-slot nuts (14 mm width)	-	o : 2 pcs.	M12, 16 : 2 pcs. each
M4	Keys, T-slot nuts (14 mm width)	e : 2 pcs.	o : 2 pcs.	M12, 16 : 2 pcs. each
MC	Keys (18 mm width)	b : 2 pcs.	-	-
MD	T-slot nuts (18 mm width)	-	q : 2 pcs.	M16 : 2 pcs.
MF	Keys, T-slot nuts (18 mm width)	b : 2 pcs.	q : 2 pcs.	M16 : 2 pcs.
MN	Keys (22 mm width)	c : 2 pcs.	-	-
MO	T-slot nuts (22 mm width)	-	r : 2 pcs.	M16 : 2 pcs.
MQ	Keys, T-slot nuts (22 mm width)	c : 2 pcs.	r : 2 pcs.	M16 : 2 pcs.

CNC rotary table

Control methods for air / hydraulic table clamping

▶ Introduction

This section provides information as well as precautions about generally recommended control methods that can be used with Sankyo CNC rotary tables that support air or hydraulic table clamping or motor braking. Because the RollerDrive type CNC rotary tables do not have any structural backlash, clamping is not necessary within certain conditions. This approach eliminates the time required for clamping and unclamping. It allows positioning at maximum speed, while also consuming no energy for a air or hydraulic system. However, if a very high holding torque to maintain the table at the stop position is required, table clamping can be selected as an optional specification.

* In actual use, the characteristics of the equipment installed by the customer and the functions that are targeted are also relevant. Please use the information provided here as a reference in setting up the appropriate control sequence for the specific application.

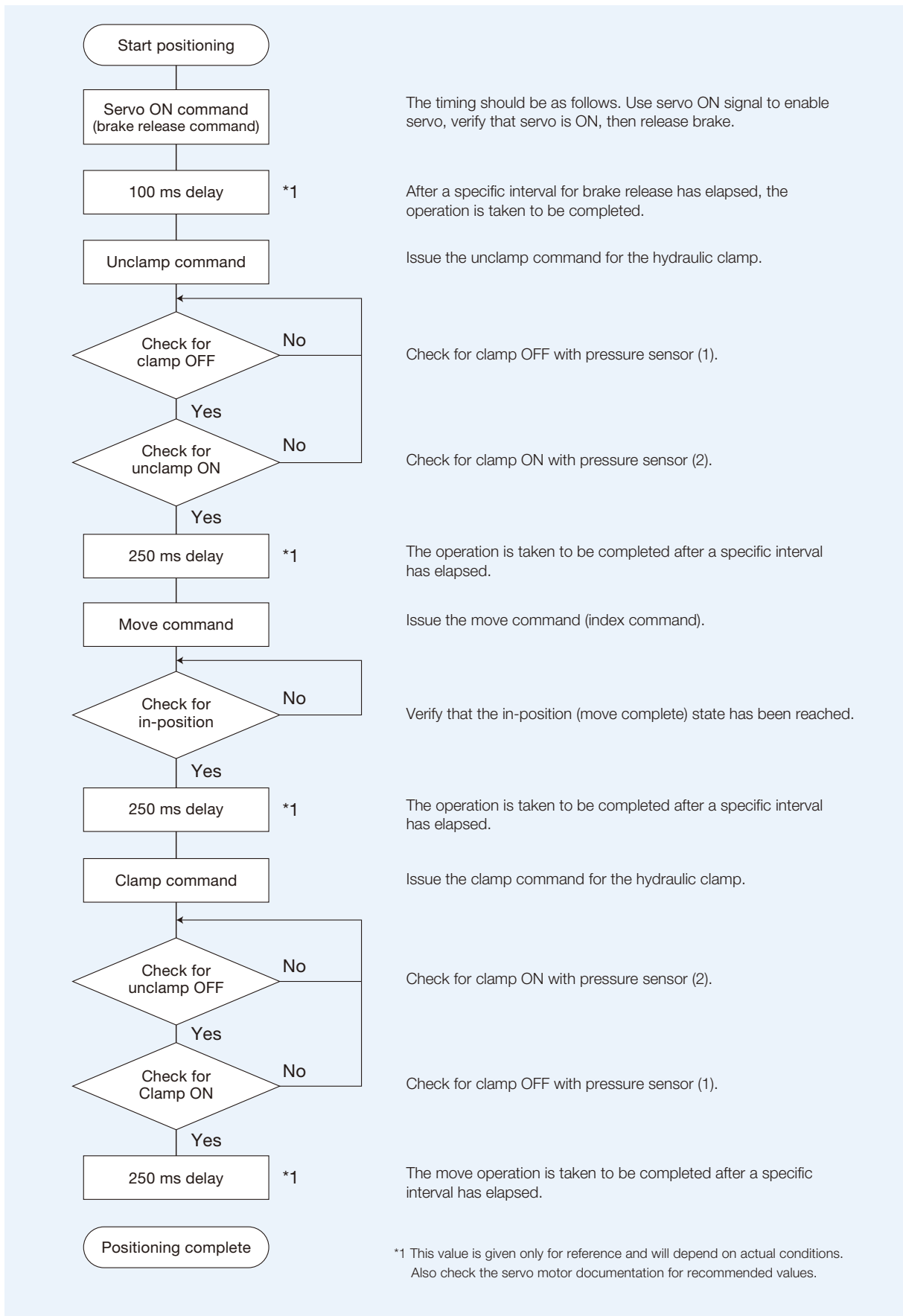
▶ Table clamping

Application	Serves for holding the table at the stop position during machining.
Recommended application	After checking the in-position signal of the drive motor, output the clamp command for the table clamp and check pressure with the pressure sensor. After a specific interval, establish the clamp complete (positioning complete) state.
Using a machine tool servo motor	In principle, servo should be ON, but it is recommended to make provision for servo to be switched OFF if the table clamp was activated while unbalanced torque is generated and the motor current exceeds 70% of the rated value. (The servo motor should be designed for absolute movement and the operation commands must also be issued as absolute values.)
Using a general type servo motor	The following two types of servo motor control are recommended. (1) If servo ON is to be maintained, change proportional integral control to proportional control. This will prevent overload problems. (2) If servo is to be set to OFF, the servo motor's coordinates would be lost if the servo motor is designed for relative movement. To prevent this, an absolute movement type servo motor must be used, and commands must be issued as absolute values.
Points to note	The system is designed for the following operation sequence: Air/Hydraulic pressure ON → Clamp, Air/Hydraulic pressure OFF → Unclamp. Clamping can therefore not be performed when power or the air pressure source will go OFF.

▶ Motor braking

Application	Serves for holding the table at the stop position during power off or servo off.
Recommended application	Use a servo amplifier or a servo ON/OFF signal from higher-level equipment to turn the motor brake on or off. Braking operation is taken to be completed after a specific interval has elapsed.
Using a machine tool servo motor	The ON timing should be as follows. First use the servo ON signal to enable servo, verify that servo is ON, then release the brake. After a specific interval for brake release has elapsed, the operation is taken to be completed. The OFF timing should be as follows.
Using a general type servo motor	Use the servo OFF signal to set the brake to ON, and take servo OFF to be completed after a specific interval has elapsed.
Points to note	Due to the characteristics of the motor brake function, it cannot be used for holding the table in the stop position during machining or for table control. Otherwise machining accuracy may be affected.

► **Control flowchart** (for type with table clamp, motor brake, and machine tool servo motor)





Guidelines for rotary table selection

< Check workpiece and tool dimensions >

• The diameter of the workpiece and tools should not exceed the diameter of the rotary table.

< Check workpiece and tool weight >

• The workpiece and tool weight should not exceed the allowable payload of the rotary table.

< Check machining load >

(Please note that the payload rating is different depending on whether the rotary table has an output clamp or not.)

• Ensure that the machining load when the table is stopped does not exceed the allowable load.

• Ensure that the machining load when the table is rotating does not exceed the allowable load. (The machining load torque during rotation must not exceed the continuous holding torque of the rotary table.)

< Check workpiece and tool inertia >

• The workpiece and tool inertia should not exceed the allowable workpiece inertia of the rotary table.

< Check for machining center interference >

• Ensure that the rotary table does not interfere with the cover, column, ATC etc. when moving.
• Check the motor mounting position.

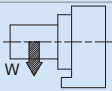

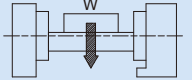

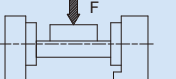
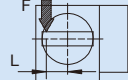
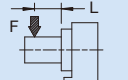
< Check machining center table maximum payload >

• The combined weight of the workpiece, tools, and rotary table (support table weight) must not exceed the maximum payload of the machining center table.

< Check performance of high indexing frequency model >

• Check the performance aspects of the rotary table and motor with regard to the following items:
Workpiece and tool inertia
Unbalanced load
Drive motor model
Table rotation speed, acceleration and deceleration time during positioning, or positioning rotation angle and positioning time
Stop (machining) time after positioning
Required service life (number of positioning operations per day) x (operation days per year) x (operation years)

▶ Rotary table specifications (Motor side surface mounting type)

		RCD105	RCD170	RCD200	RCD250	RCD300	RCD400	
Table diameter	mm	Φ 105	Φ 170	Φ 200	Φ 250	Φ 300	Φ 400	
Center height	mm	105	135	135	185	185	230	
Allowable payload	Mounted upright 	kg	50	70	70	255	255	295
	Mounted sideways 	kg	100	140	140	510	510	590
		kg	100	140	140	510	510	590
Allowable load	F 	N	18200	21000	21000	52000	52000	58500
	F 	N	16400	18900	18900	46300	46300	52600
	F × L with clamping 	N · m	210	310	310	1100	1100	1850
	Continuous holding torque ^{*1, *2}	N · m	122	236	416	512	512	1400
	Maximum holding torque ^{*1, *2, *3}	N · m	221	362	544	987	987	2400
F × L 	N · m	900	1300	1300	5500	5500	7800	
Allowable workpiece inertia	kg · m ²	0.5	1.1	1.1	8.3	8.3	15	
Net weight	kg	30	51	59	110	115	263	

*1 The continuous / maximum holding torque values are given for Fanuc motors. Please contact Sankyo if a different motor is to be used.

*2 The continuous / maximum holding torque is the allowable load torque when a clamp is not used.

*3 Maximum holding torque should not exceed 10 seconds with 20% duty.

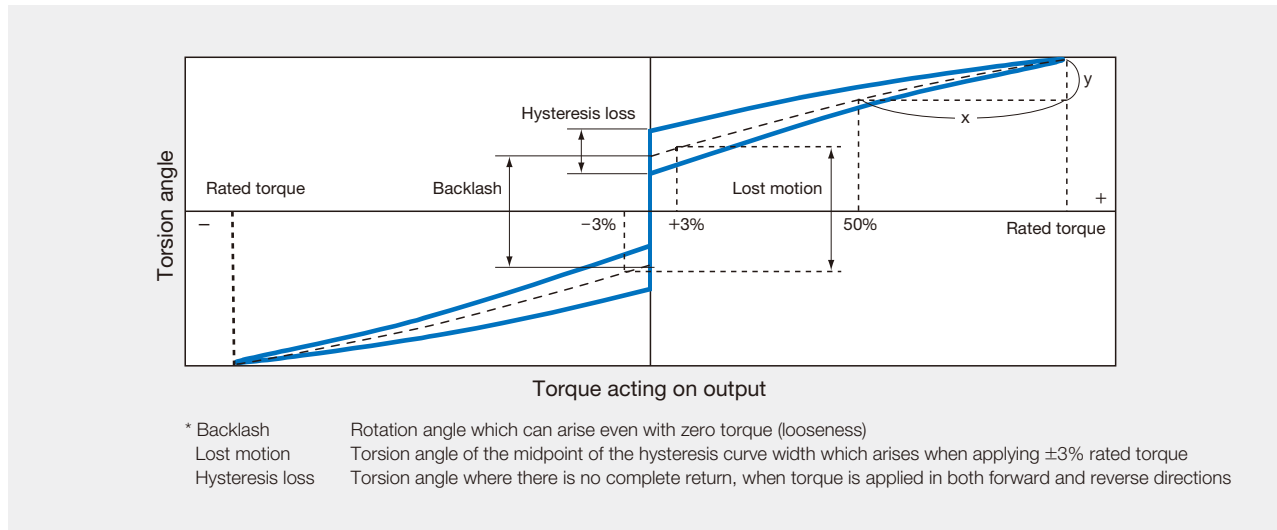
▶ Support table

		ST105A	ST170A	ST250A	ST400
Table diameter	mm	Φ 105	Φ 170	Φ 250	Φ 400
Net weight	kg	14	24	54	144

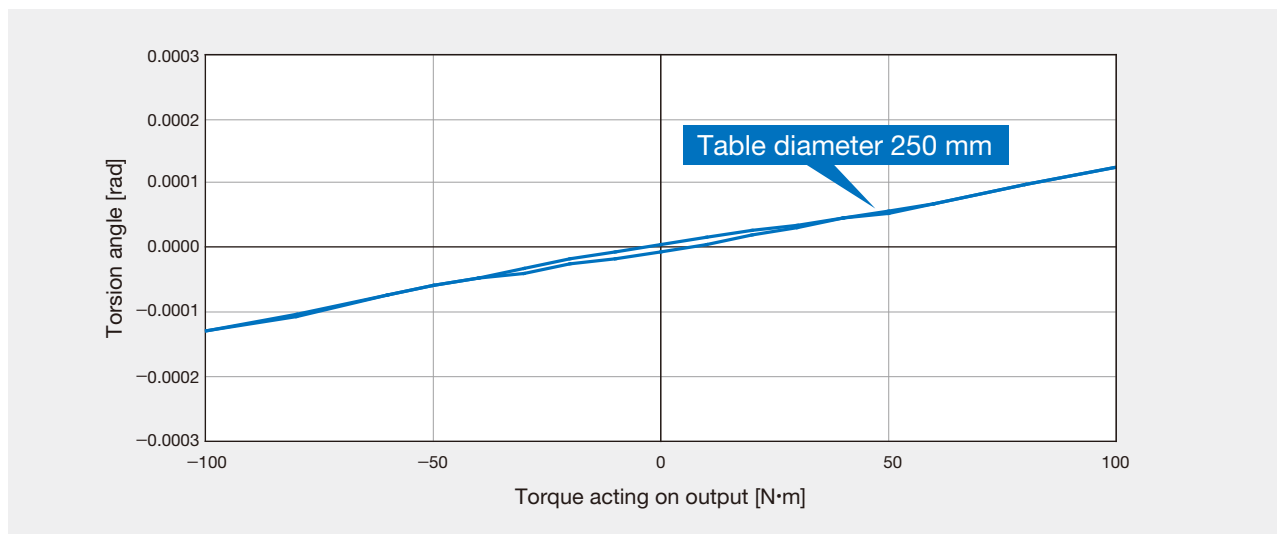
Technical Information

► Backlash, lost motion, hysteresis loss

< General hysteresis graph >



< RollerDrive® hysteresis graph >



For a general reducer, the hysteresis graph can be obtained by applying torque to the output shaft, and plotting the generated torsion angle. Backlash, lost motion and hysteresis loss can each be defined from the hysteresis graph, as indicated above. Lost motion and hysteresis loss depend on the material characteristics, and occur in all types of structures. Backlash on the other hand occurs only when there are gaps or looseness in the structure. Backlash has a major effect on accuracy, servo gain and similar factors, and must be minimized. With the **RollerDrive®** using Sankyo's exclusive preload construction, backlash is completely eliminated and lost motion and hysteresis loss are controlled to extremely small values, based on the results of research on optimizing materials and structures.

Product Lineup / Applications
Product Code

Specifications /
Dimensions

Options for RCD model tables

Compatible Servo Motor Models
/ Precision Ratings

Auxiliary equipment

Control methods for air /
hydraulic table clamping

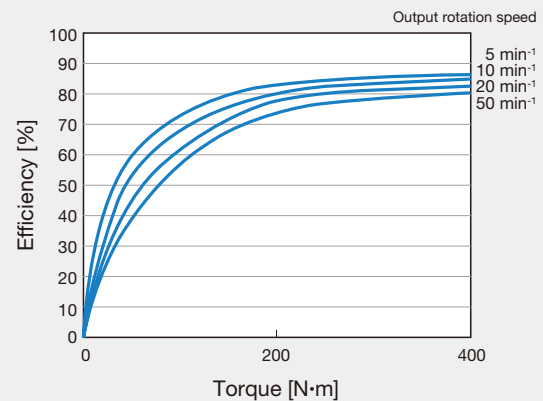
Guidelines for rotary table selection /
Check sheet for rotary table specifications

Technical Information /
Precautions

► Efficiency

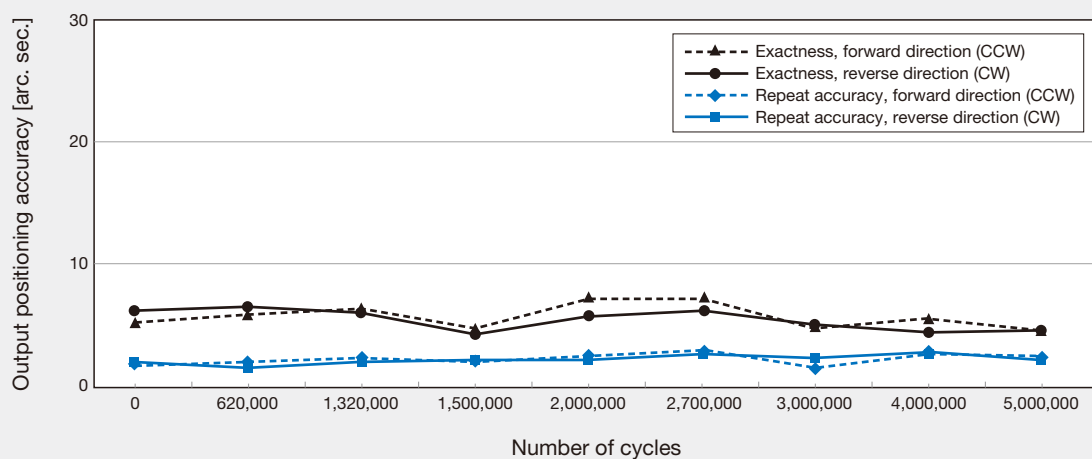
This indicates the percent of input power which is transmitted to the output. The **RollerDrive**® motion mechanism has high efficiency because it employs rolling contact. Efficiency varies depending on conditions such as load torque, rotation speed and temperature.

< Table diameter 250 mm >



► Durability

< Test of changes in **RollerDrive**® positioning accuracy over time >



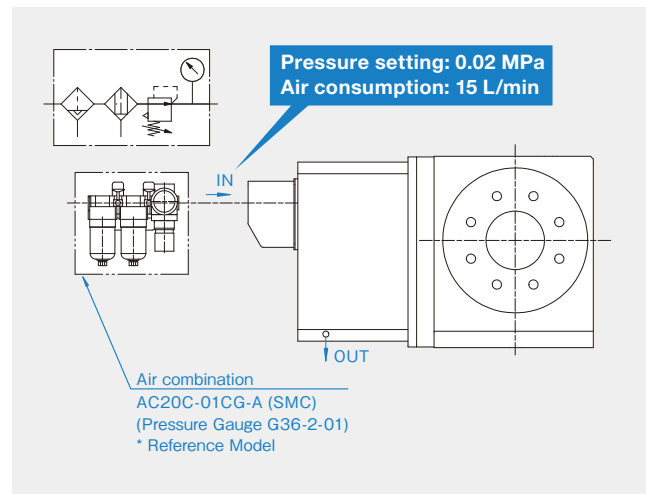
Test conditions	
RollerDrive size	Test machine with table diameter 250 mm
Output load weight	152 kg (Φ 500mm)
Output load moment of inertia	4.69 kg·m ²
Output rotation angle	0 - 345 degrees (reciprocating)
Output maximum rotation speed	100 min ⁻¹
Acceleration time	0.100 sec
Uniform speed time	0.475 sec
Deceleration speed time	0.100 sec

In the **RollerDrive**®, all rotating elements operate in a state of rolling contact, and thus there is almost no wear, or degradation in accuracy over time. There is almost no change in positioning accuracy after testing operation 5 million times. This shows that the outstanding accuracy of the **RollerDrive**® can be maintained over the long term.

Precautions

▶ Air supply

Sankyo's CNC rotary tables come standard equipped with an air purge outlet. (Use it to blow out condensation and coolant to prolong the life of electrical parts and prevent rust in the motor housing.) Supply clean air for the air purge by referring to the drawing shown. (Do NOT block the exhaust outlet.)



▶ Lubrication

Sankyo's CNC rotary tables use high-performance lubrication oil. Although the lubricant is chemically and thermally stable, it should be changed every 3,000 hours of operation in order to ensure longer product life. Even if operated less than 3,000 hours, the oil should be changed once per year. The condition of the oil can be checked with the oil level gauge while the unit is in the stop condition. Check the oil level and color. If the level is low or the color has changed, change the oil regardless of the number of operation hours. Some air bubbles may form in the oil during operation. This is normal and does not affect quality.

* Be sure to use only the lubricant specified below. Otherwise service life may be reduced and parts may deteriorate.

Specified lubricant: Mobil SHC629 (VG150)

▶ Use in grinding machines

When used in grinding machines, the seal device on the outer periphery of the table may become damaged. The warranty does not cover such damage.

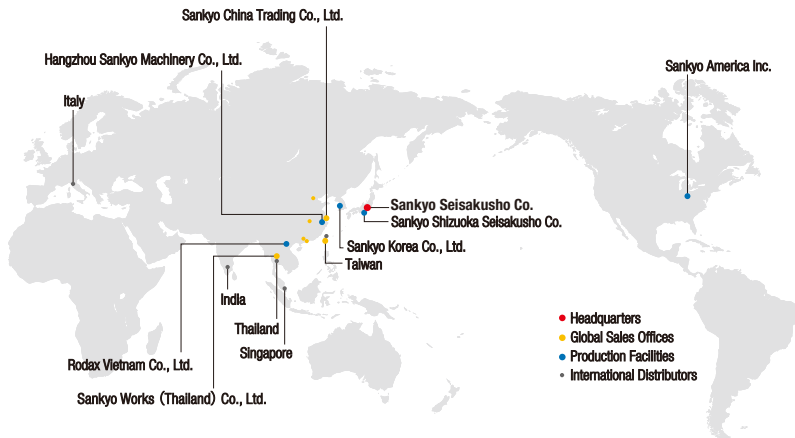
▶ Maximum rotation speed

The maximum rotation speed for the table given in the specifications refers to the indexing speed. Consult with Sankyo if the table is to be rotated continuously. Otherwise, the table will heat up and lose accuracy, causing overload alarms with the servo motor.

▶ General Precautions

- Under the Japanese trade regulation, RollerDrive CNC can be restricted to supply or export to a country which may produce weapons or related products.
- Dimensions and specifications are subjected to be modified without notice.
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