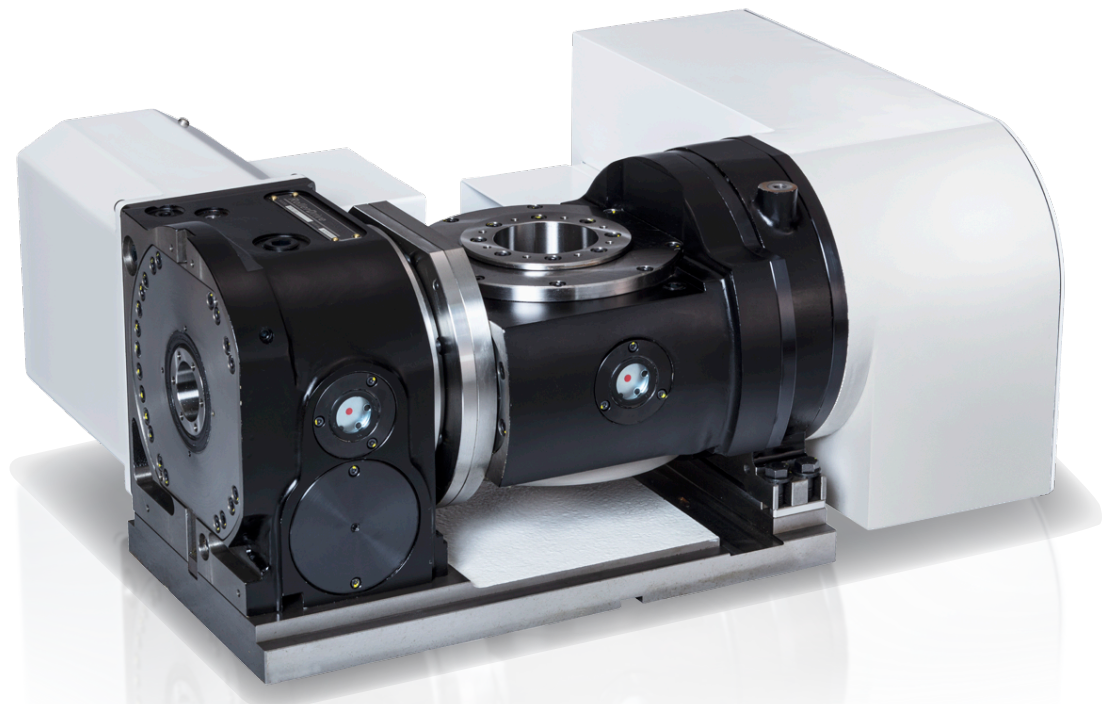


RollerDrive[®] ***RTB series***

Tilting rotary table for small MCs

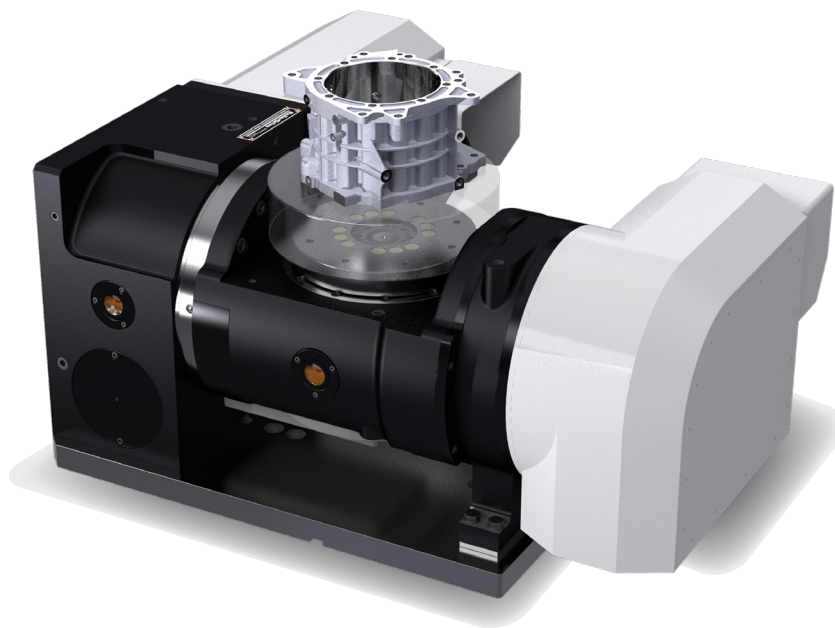


Tilting rotary table for small MCs

RollerDrive® RTB series

The RTB series is a compact, lightweight, tilted rotary table built to respond to the increasing number of machining variations with small MCs, the increasing complexity and size of workpieces. Even for workpieces that require multiple processes, use of the RTB series, equipped with A and C axes, enables process consolidation, efficient machining postures and optimized tool selection.

In addition, in order to meet the needs of unmanned machines and the introduction of robots, we have developed a rotary joint with up to 6 ports that can be used for automatic workpiece loading/unloading and seating confirmation. Further, the use of the RollerDrive mechanism eliminates the need for clamping during machining, so the indexing time can be reduced by approximately one-third, compared with the conventional worm gear mechanism on rotary tables with a clamping operation. Since continuous operation only needs a lubrication oil change from time to time, the RTB RollerDrive eliminates the need for periodic recalibration, unlike a conventional worm gear rotary table. This contributes to an extended operating time for equipment. The RTB is ideal for small MCs, by providing improvements in automation and productivity.

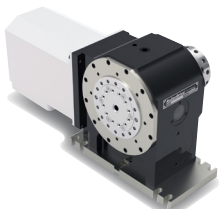


Features

- ⦿ No-backlash RollerDrive mechanism
- ⦿ Clampless processing drastically increases the ratio of cutting to non-cutting time
- ⦿ Lightweight and compact, and can be mounted on the #30 vertical MCs
- ⦿ Rotary joint up to 6 ports
- ⦿ Routine maintenance is just an oil change, nothing else.

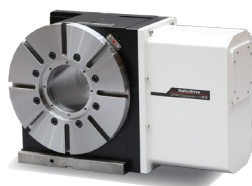
CNC ROTARY TABLE

RSR series



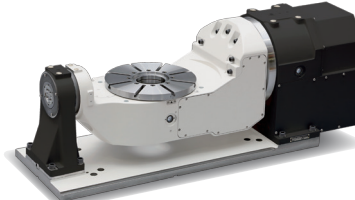
High productivity circular table with an installed rotary joint 12+1p model for compact MCs

RCD series



Standard model with improved performance thanks to a re-engineered design

RTD series



A two-axis tilting rotary table securely held at both ends achieves both a thin, compact body that is highly rigid

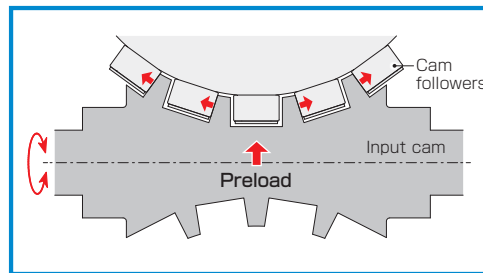
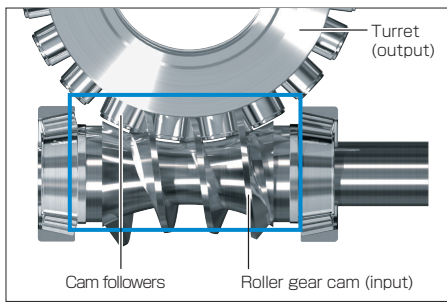
RTA series



Large, high-power tilting rotary table with a dual-axis tilting drive.

No Maintenance and Excellent Price Performance

Exclusive Backlash Zero Structure



Multiple roller followers, come into contact from both sides (in pairs) without gaps to provide efficient rolling transmission without backlash.

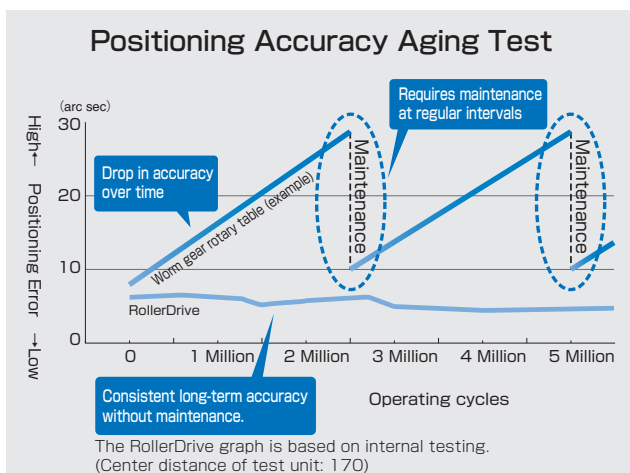
Features

Rolling contact

Preload

- No backlash (play).
- High accuracy and good efficiency.
- Preloadable for high rigidity.
- Clamless processing reduces positioning time.
- Accuracy does not deteriorate over time and maintains initial accuracy for a long period of time.

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.

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 period: 36° (unidirectional)
- Indexing time: 0.35sec

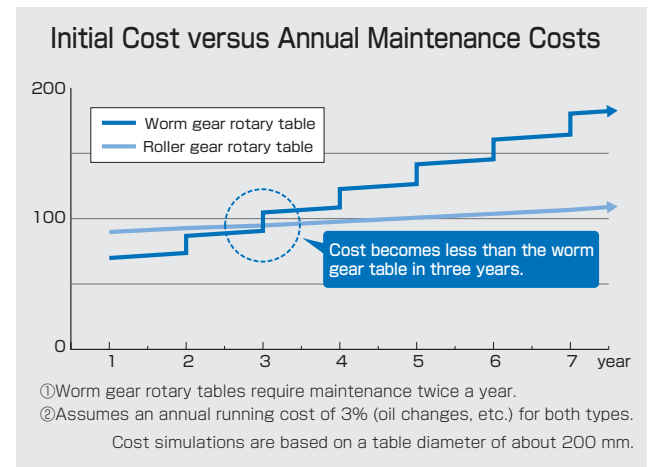
Results after 5 million indexes:

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

Based on internal testing data.

Cost Comparison with a Worm Gear Rotary Table

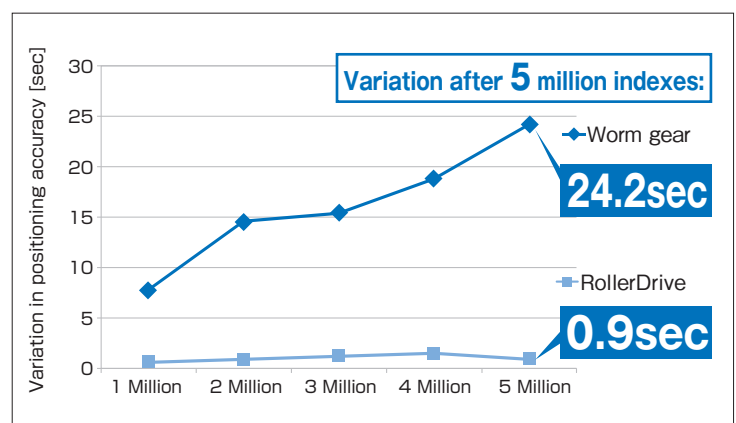
Offers Long-term Use without Maintenance



- **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.

■ Variation in positioning accuracy



Product code

Rotary table

1 RTB170 – **2** A **3** F **4** S **5** F **6** 1

1
Model
RTB100
RTB170

2		3	4		5		6			
Servo Motor		Connector position		Connector type		Table shape				
With brake	Without brake*1	Tilted axis side	Support axis side							
A	A1	FANUC	S	Side	S	Side	F	Flexible	1	Tapped holes
B	B1	MITSUBISHI	B	Back	B	Back	R	Receptacle	2	T slot
C	–	External controller type*1	F	Front						
D	–	SANYO (Brother type)								
X		Others (Custom)								

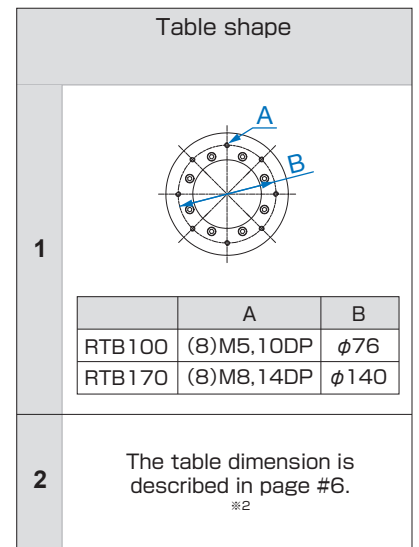
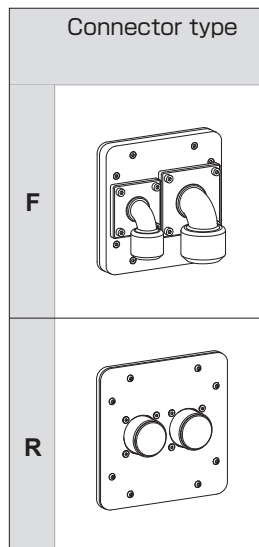
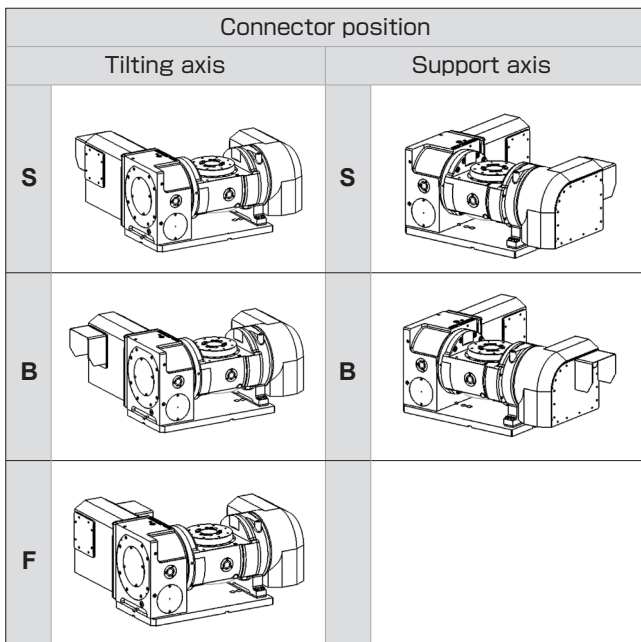
7 J – **M** **8** **9** 01 **10** W – **11** X

7	
Option	
Rotary joint	
J	Number of ports RTB100...3P RTB170...6P
Blank	None

8		9		10	
Mounting clamps				Motor	
Guide blocks		Clamp block			
1	For 14mm T-groove	1	For 14mm T-groove	W	Supplied by Sankyo
2	For 18mm T-groove	2	For 18mm T-groove	Blank	Supplied by customer
0	Not included	0	Not included		

11	
Standard/Custom	
Blank	Standard
X	Custom




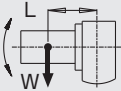
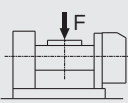
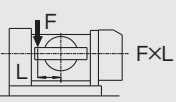
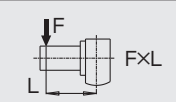
Set of guide blocks	A complete set of hardware	
	RTB100	RTB170
2 guide blocks	4 pcs.	4 pcs.
2 Allen-head bolts (M6)	4 pcs.	6 pcs.
	4 pcs.	4 pcs.
	4 pcs.	4 pcs.
	–	4 pcs.



*1 Please contact us for details about external controller specifications.
*2 RTB100 is not available with a T-groove table.

Specifications

Specification

Specifications			RTB100		RTB170			
			Rotary axis	Tilt axis	Rotary axis	Tilt axis		
Tilting angle		deg	-30 to +120		-30 to +120			
Table diameter		mm	φ100		φ170			
Table pilot bore diameter		mm	φ60 ^{+0.03}		φ60 ^{+0.03}			
Center height at tilted axis +90°		mm	135		185			
Tabletop height at 0° tilted axis		mm	190		265			
Guide block width		mm	14 ^{-0.018}		14 ^{-0.018}			
Gear ratio		—	1/40	1/50	1/50	1/60		
Inertia at motor shaft *1, *2		×10 ⁻⁴ kg·m ²	2.20	1.30	2.96	5.11		
Motor model(FANUC)		—	αiS2/5000 (A06B-2212-B400)	αiS2/5000 (A06B-2212-B400)	αiS4/5000 (A06B-2215-B400)	αiF8/3000 (A06B-2227-B400)		
Maximum table speed		min ⁻¹	100	100	70	50		
Indexing accuracy		arc.sec	±15	±30	±15	±30		
Repeatability		arc.sec	8	8	8	8		
Net weight		kg	90		180			
Allowable payload	When horizontal		kg	35		110		
	When tilted		kg	20		70		
Allowable workpiece inertia			kg·m ²	0.09		0.65		
Maximum eccentric load torque			N·m	59		246		
Allowable load			N	7800		9000		
		Rotary axis	Continuous holding torque *2, *3	N·m	98		236	
			Maximum output torque *2, *3	N·m	177		362	
		Tilt axis	Continuous holding torque *2, *3	N·m	122		512	
		Maximum output torque *2, *3	N·m	221		987		
Built-in rotary joint(number of ports)				3		6		

*1. The specified motor shaft equivalent inertia does not include the inertia of the motor shaft.

*2. The converted motor shaft inertia, and the continuous and maximum holding torque are the values when using a FANUC motor.

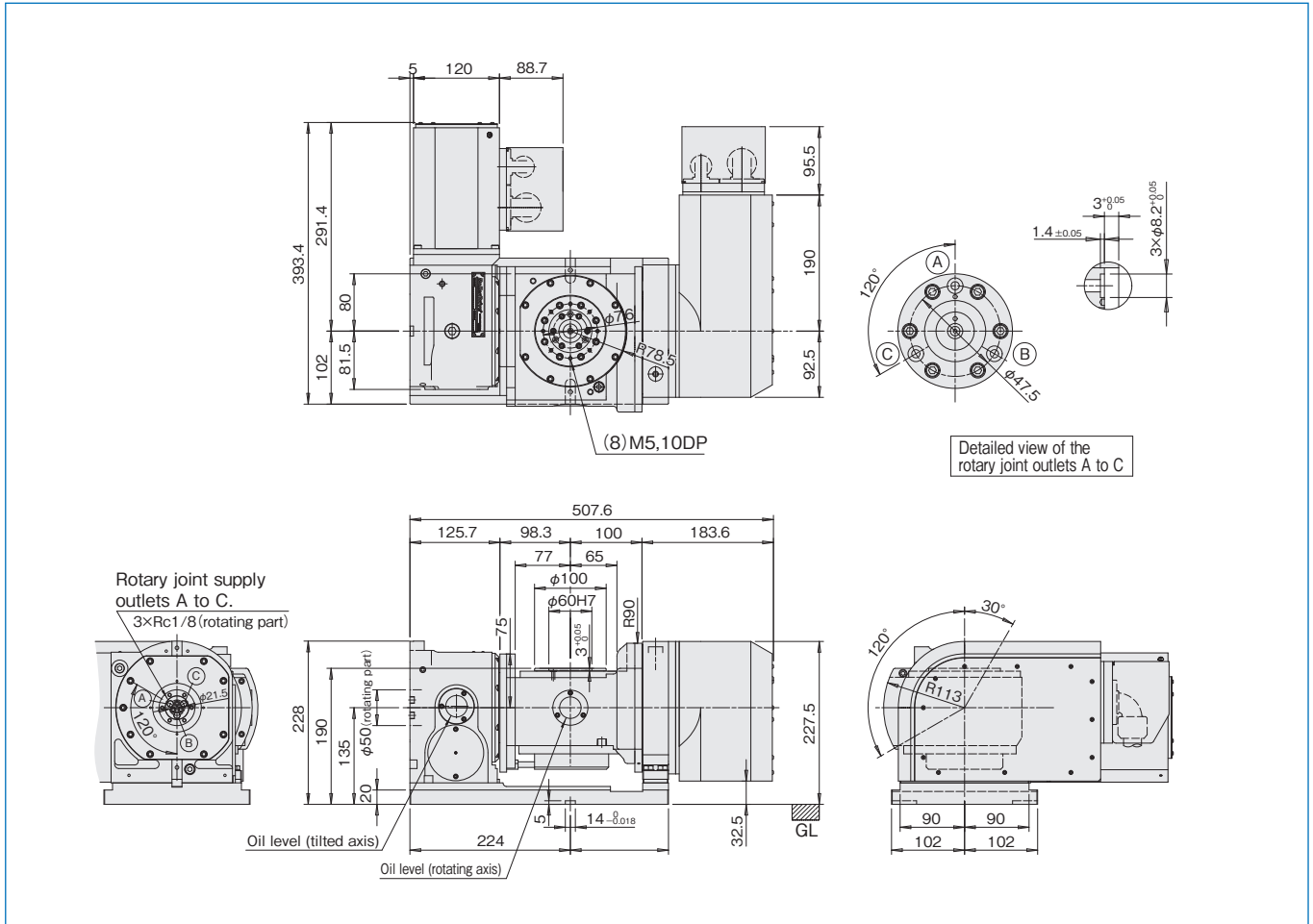
Please contact us if you want to use other motors.

*3. Maximum holding torque shall be a maximum of 10 seconds at a 20% duty cycle.

Dimensions

RTB100-AFSF1-J

Unit : mm



*The above dimensions are for a machine equipped with a FANUC motor.

*Specifications and dimensions are subject to change without notice, so please check again when ordering.

Area for mounting workpieces

Tilting axis angle 0° to 90°	0° to 105°	0° to 110°	0° to 120°	-30° to 0°

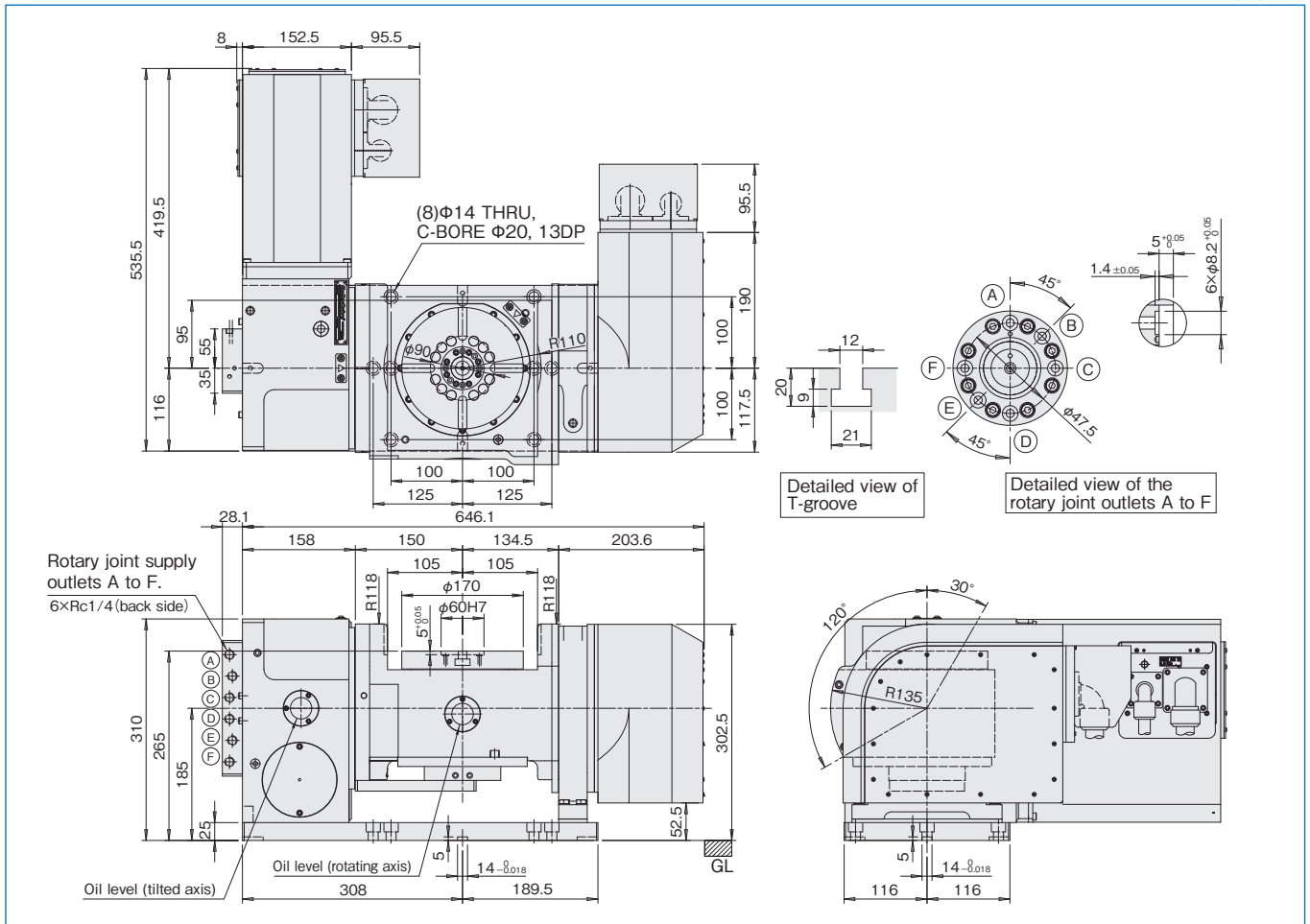
• Set parameter to avoid interference.

Hardware details

Guide key (for 14 mm T-groove)	Guide key (for 18 mm T-groove)	Clamping block	T-slot nut (for 14 mm T-groove)	T-slot nut (for 18 mm T-groove)

RTB170-AFSF2-J

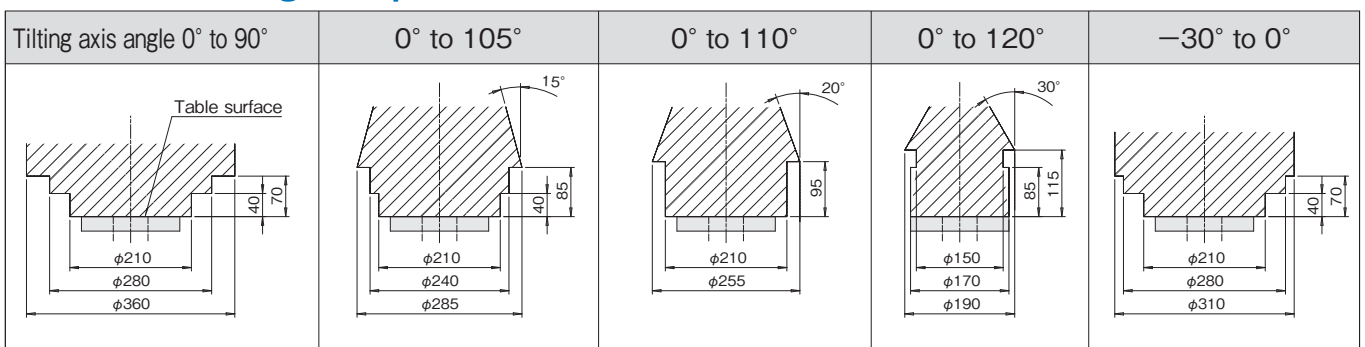
Unit : mm



*The above dimensions are for a machine equipped with a FANUC motor.

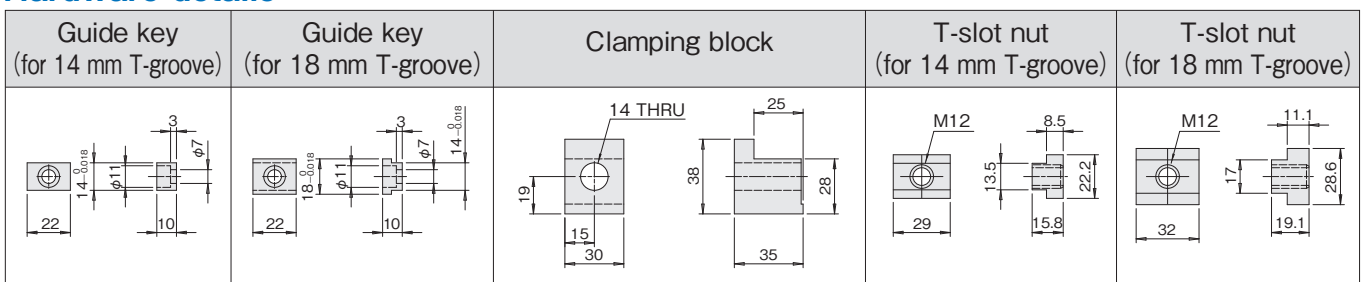
*Specifications and dimensions are subject to change without notice, so please check again when ordering.

Area for mounting workpieces



• Set parameter to avoid interference.

Hardware details



Compatible Servomotor Models

With brake


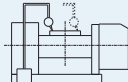




Model		FANUC	MITSUBISHI	SANYO (Brother type)
RTB100	Rotary axis	α iS2/5000 (A06B-2212-B400)	—	R2AA08075FCRGYM6
	Tilt axis	α iS2/5000 (A06B-2212-B400)	—	R2AA08075FCRGYM6
RTB170	Rotary axis	α iS4/5000 (A06B-2215-B400)	HG105BS-S105010	R2AAB8100FCRGYM
	Tilt axis	α iF8/3000 (A06B-2227-B400)	HG104BS	R2AAB8100FCRGYM

Without brake

Model		FANUC	MITSUBISHI	SANYO (Brother type)
RTB100	Rotary axis	α iS2/5000 (A06B-2212-B100)	—	—
	Tilt axis	α iS2/5000 (A06B-2212-B100)	—	—
RTB170	Rotary axis	α iS4/5000 (A06B-2215-B100)	HG105S-S105010	—
	Tilt axis	α iF8/3000 (A06B-2227-B100)	HG104S	—

*1. If a motor brake control is not possible, select the code for a servo motor that doesn't have a brake.
However, please note that this mechanism does not self-lock, so the table may rotate depending on its posture in the event of a power failure.

Precision Rating

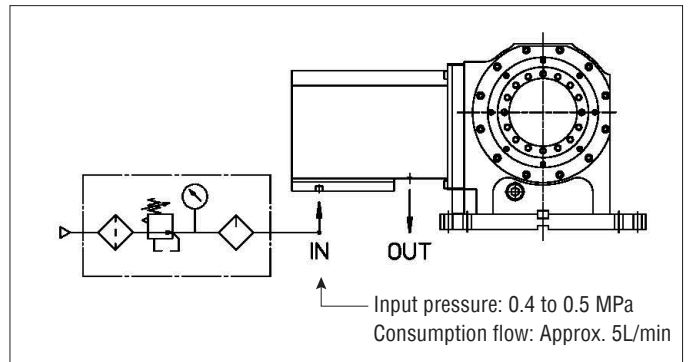
No.	Measurement		Method	RTB100	RTB170
1	Straightness of table top			0.015mm over full length	0.015mm over full length
2	Parallelism between table top and bottom surface of base			0.015mm	0.015mm
3	Runout of table top			0.01mm	0.01mm
4	Runout of table pilot bore			0.01mm	0.01mm
5	Parallelism between tilt axis center line and bottom surface of base			0.02mm over full length	0.02mm over full length
6	Parallelism between table top and guide block			0.02mm	0.02mm
7	Indexing accuracy	Rotary axis		±15arc.sec	±15arc.sec
		Tilt axis		±30arc.sec	±30arc.sec
8	Repeatability	Rotary axis		8arc.sec	8arc.sec
		Tilt axis		8arc.sec	8arc.sec

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.

Rotary joint

Use hoses for plumbing in the stationary sections. If oil film leaks from the pneumatic circuit, it will cause a serious problem. Install a bleed circuit between the two circuits. Avoid continuous rotation as it may cause heat buildup in the internal seals. The gasket port mounting surface (O-ring seal surface) should be a flat with a surface roughness not higher than Rz 6.3. The fluid used and the pressure must be within the following range.

Each RJ port: Hydraulic pressure; up to 6.0 MPa, pneumatic pressure; up to 0.7 MPa

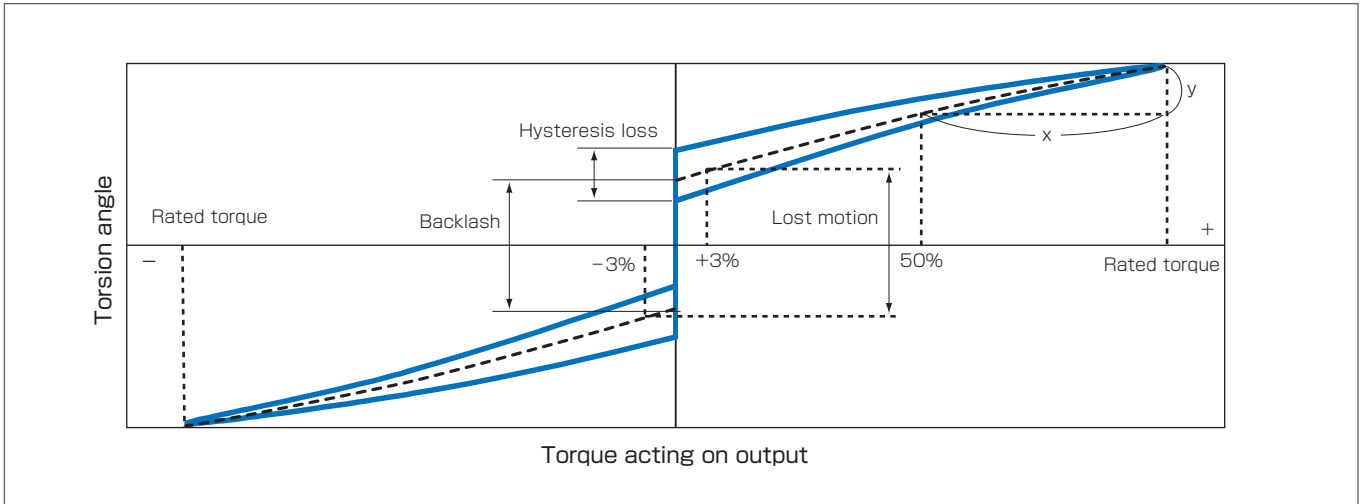
General Precautions

- 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.
- Contents of this catalogue is published in October 2023.
- Whole or part of the contents, mechanisms, logos, drawings belongs to Sankyo-Seisakusho, Japan. No part of the catalogue is allowed to copy or redistributed to the third party without the permission of Sankyo Seisakusho.

Technical information

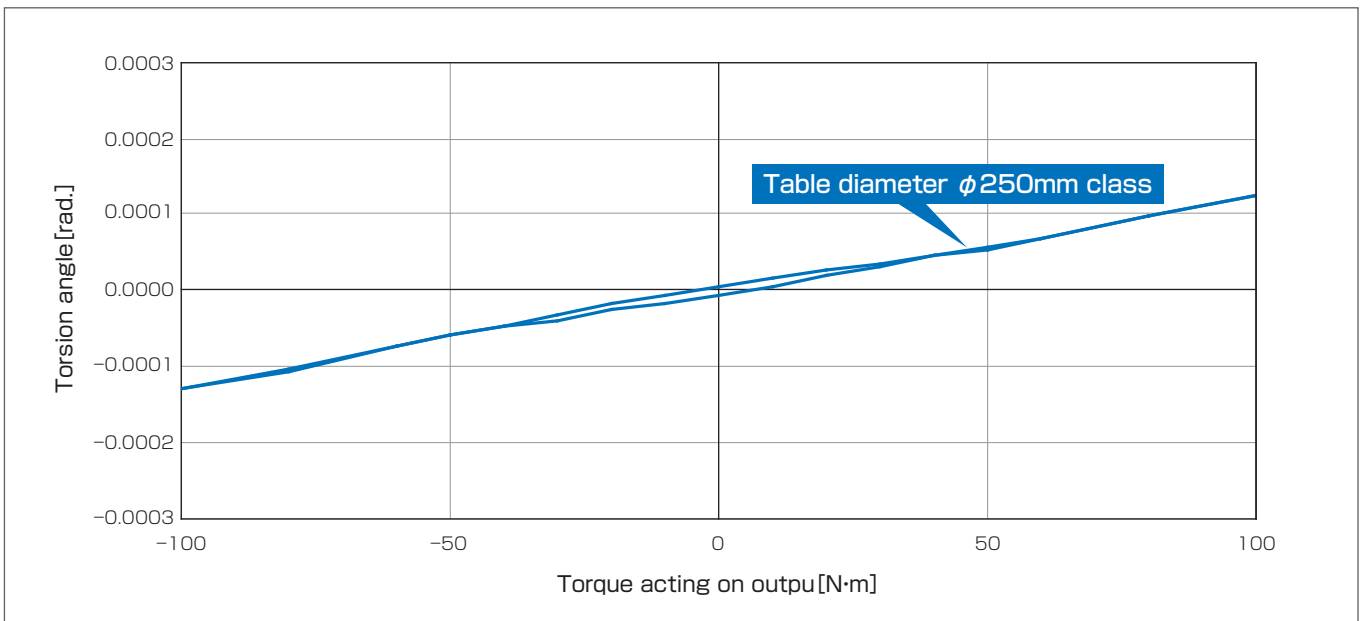
Backlash, lost motion, hysteresis loss

General hysteresis graph



- ※ Backlash Rotation angle which can arise even with zero torque (looseness)
- Lost motion Torsion angle of the midpoint of the hysteresis curve width which arises when applying $\pm 3\%$ rated torque
- Hysteresis loss Torsion angle where there is no complete return, when torque is applied in both forward and reverse directions

RollerDrive® hysteresis graph

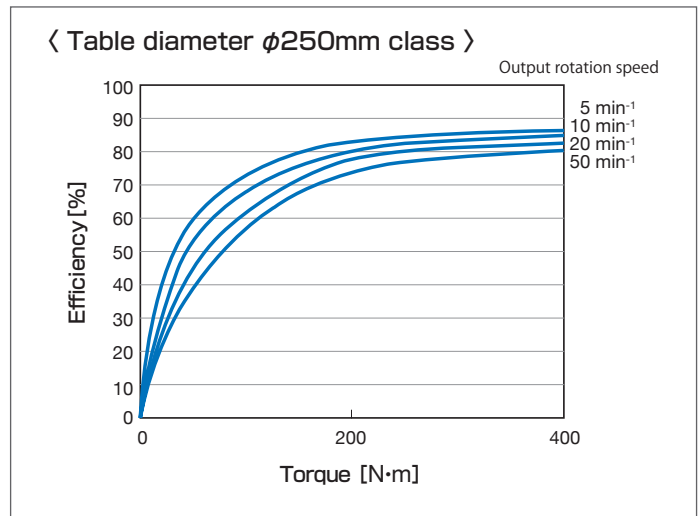


For a general positioner, the hysteresis graph can be obtained by applying torque to the output shaft, and plotting the generated torsion angle. Backlash, lost motion and hysteresis loss can each be defined from the hysteresis graph, as indicated above. Lost motion and hysteresis loss depend on the material 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 **RollerDrive**®, backlash is completely eliminated using our unique preload structure, and lost motion and hysteresis loss are controlled to extremely small values due to the results of research on optimizing materials and structures.

Efficiency

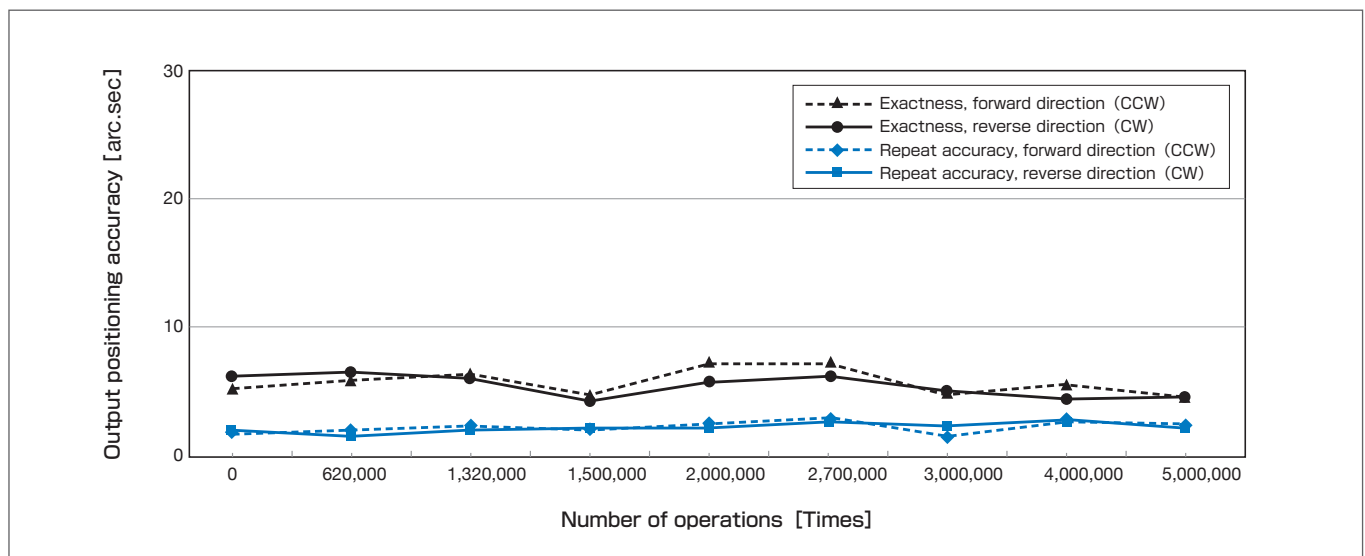
This indicates the percent of input power which is transmitted to the output.

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.



Durability

〈 Test of changes in **RollerDrive**® positioning accuracy over time 〉

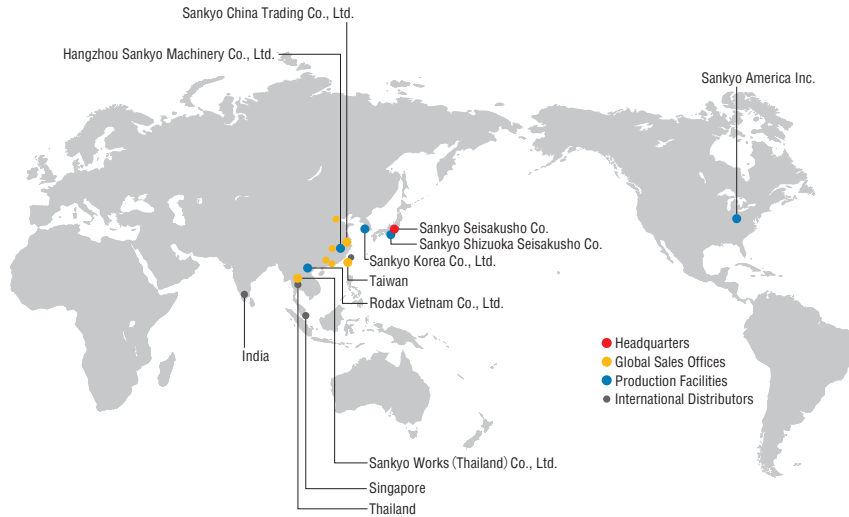


Test conditions	
RollerDrive size	RA125 class test machine
Output load weight	152 kg($\phi 500\text{mm}$)
Output load moment of inertia	4.69kg·m ²
Output rotation angle	0-345degree(Reciprocating)
Output maximum rotation speed	100min ⁻¹
Acceleration time	0.100sec
Uniform speed time	0.475sec
Deceleration time	0.100sec

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, and this shows that the outstanding accuracy of the **RollerDrive**® can be maintained over the long term.

Global network



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