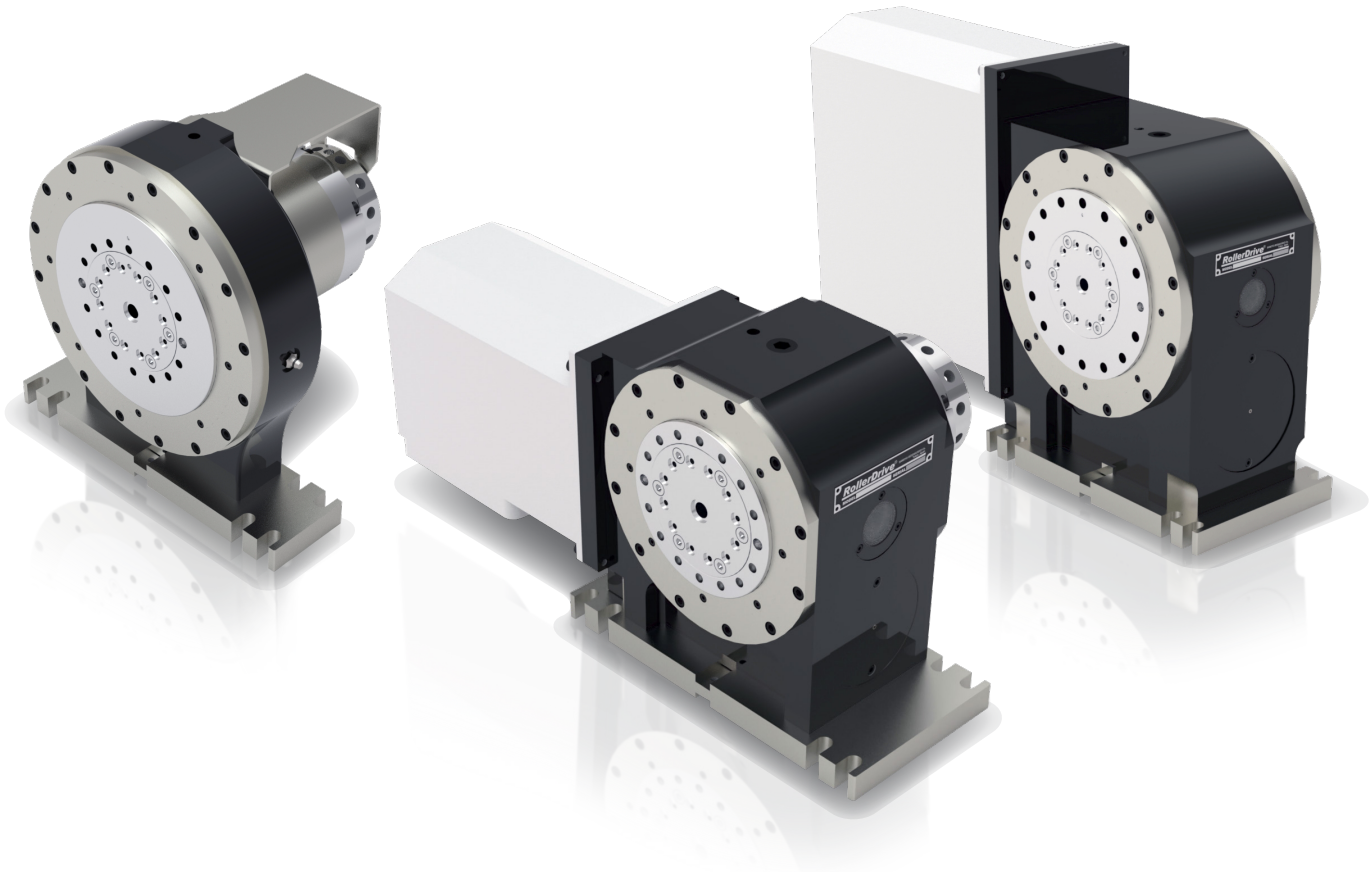
SANKYO SEISAKUSHO CO.

RollerDrive®
RSR series

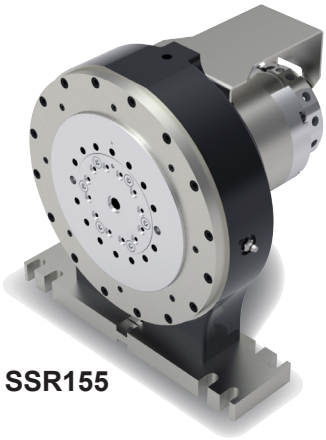
High productivity rotary table for small MCs



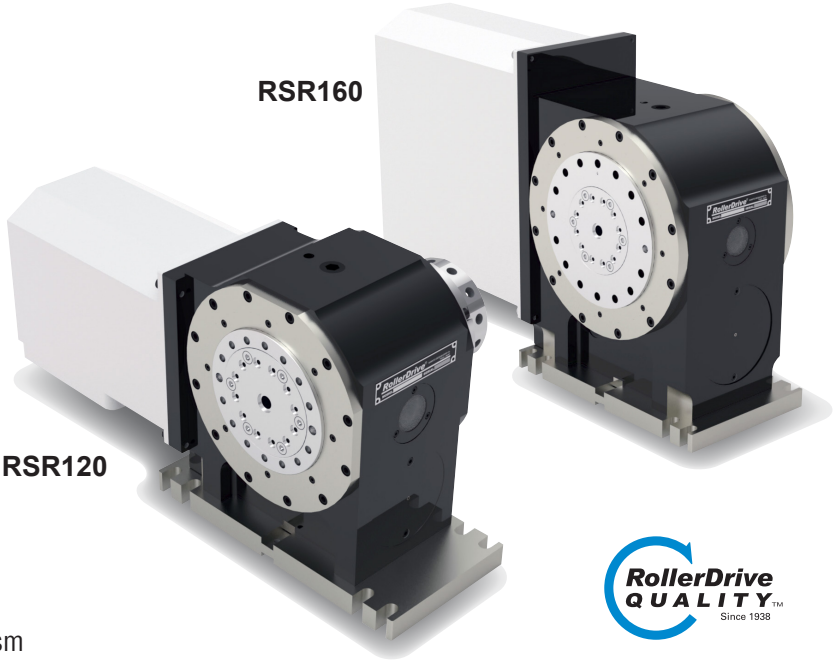
High productivity rotary table for small MCs

RollerDrive® RSR series

The compact and lightweight design and the redesigned support around the mounting area maximizes the available workspace.
By increasing the load capacity of the RollerDrive mechanism, high-speed indexing is possible even with heavy loads, including cradle jigs with a large moment of inertia. In addition, since a clamping mechanism is not required during machining, the indexing time can be reduced by approximately one-third compared with the conventional worm gear mechanism rotary table that has a clamping operation.
Compared with the DD motor rotary table mechanism with a clamping operation, the cycle time can be reduced as much or even more.
Since continuous operation only needs a lubrication oil change from time to time, the RSR RollerDrive improves automation by eliminating the need for periodic recalibration, unlike a conventional worm gear mechanism on a rotary table. Rotary joints with up to 13 ports (12+1) are available for the aveilable, installation and seating confirmation of workpieces, to meet the needs of process consolidation, making unmanned operation and the use of robots a real possibility.
Up to 26 ports for the automated operation, with a support table. The RSR is optimal for small MCs, and permits automation and increased production efficiency.



SSR155



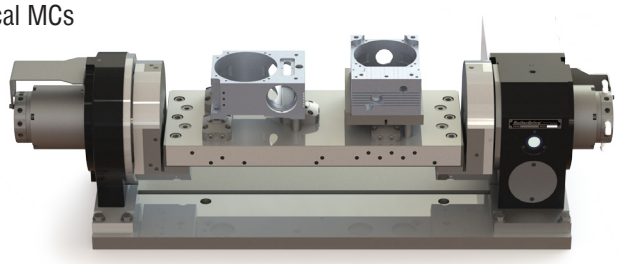
RSR160

RSR120

RollerDrive QUALITY™ Since 1938

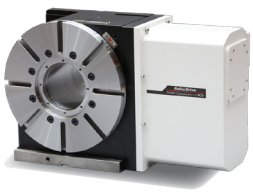
Features

- Built-in, no-backlash RollerDrive mechanism
- No clamp design delivers ultra fast positioning leading higher effciency
- Lightweight and compact, and can be mounted on the #30 vertical MCs
- A rotary joint with up to 12+1 ports is installed.
- Up to 26 ports can be used with a support table.
- Routine maintenance is just an oil change, nothing else.



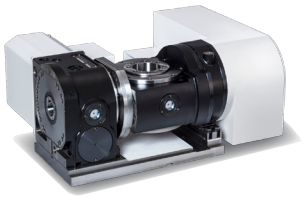
CNC ROTARY TABLE

RCD series



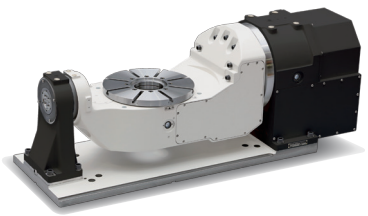
Standard model with improved performance thanks to a re-engineered design

RTB series Two-axis model



A 2-axis tilting rotary table supported on both sides, with a lightweight and compact body that can be installed on #30 processing machines.

RTD series



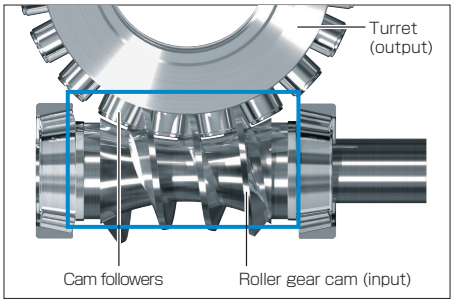
A two-axis tilting rotary table securely held at both ends achieves both a thin, compact body that is highly rigid

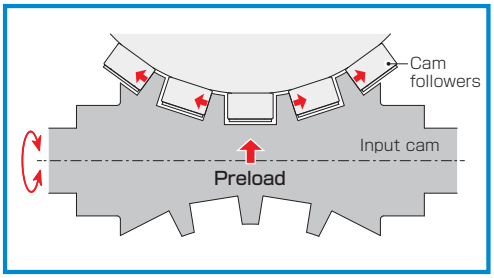
RTA series

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

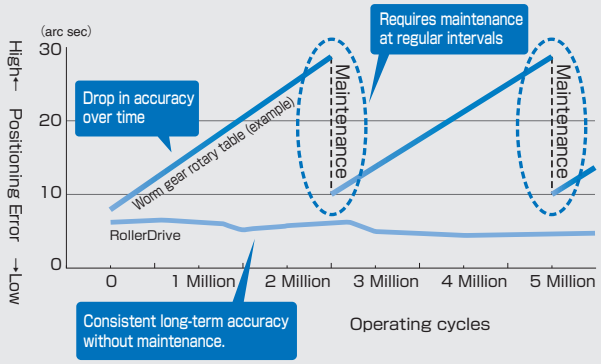
Rolling contact

Preload

- No backlash (play).
- High accuracy and good efficiency.
- Preloadable for high rigidity.
- Clampless 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.

Positioning Accuracy Aging Test



The RollerDrive graph is based on internal testing.
(Center distance of test unit: 170)

■ Worm gear models

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

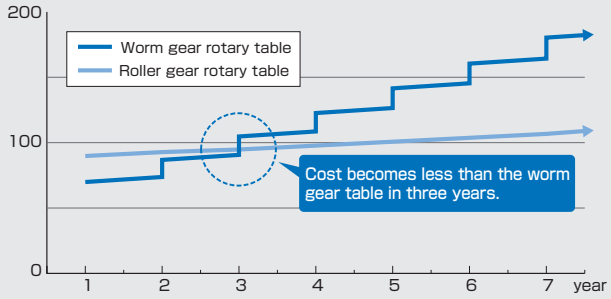
■ RollerDrive

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

Initial Cost versus Annual Maintenance Costs



①Worm gear rotary tables require maintenance twice a year.
②Assumes an annual running cost of 3% (oil changes, etc.) for both types.
Cost simulations are based on a table diameter of about 200 mm.

■ 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.

Extended Accuracy

Compared against a worm gear for over 5 million indexes.

■ Test conditions

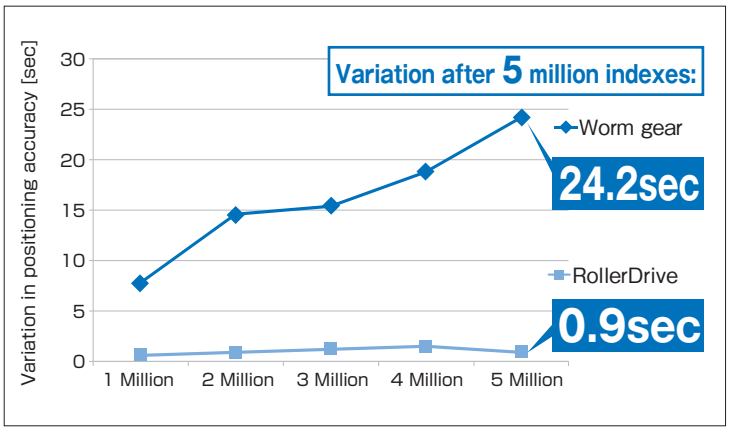
- Table size: Output table diameter: 170 mm
- Load inertia: 0.5 kgm²
- Index period: 36° (unidirectional)
- Indexing time: 0.35sec

■ 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.

■ Variation in positioning accuracy



Product code

Rotary table

1 **RSR120** – 2 **L** 3 **A** – 4 **J**

1
Model
RSR120
RSR160

2	
Motor mounting side	
L	Left
R	Right

3	
Servo Motor	
A	FANUC(With brake)
A1	FANUC(Without brake)
D	BROTHER(With brake)
X	Others

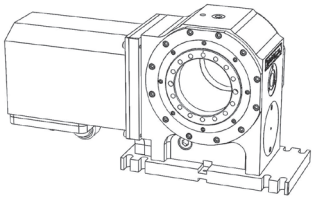
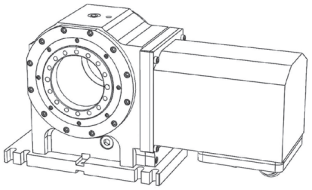
4	
Option	
Rotary joint	
J	Number of ports12+1
Blank	None

– 5 **M1** 6 **W** – 7 **X**

5	
Mounting clamps	
M1	2 guide blocks (14 mm wide) 4 T-slot nuts (14 mm wide) 4 hexagon head bolts (M10) 4 washers (M10)
Blank	Without mounting

6	
W	Motor supplied by Sankyo
Blank	Motor supplied by customer

7	
Standard / custom	
Blank	Standard
X	Custom

Motor mounting side			
L		R	

Support table

1 **SSR155** – 2 **J** – 3 **M1** – 4 **X**

1	
Model	
SSR155	For RSR120
SSR195	For RSR160

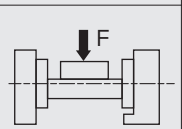
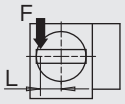
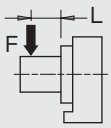
2	
Option	
Rotary joint	
J	Number of ports12+1
Blank	None

3	
Mounting clamps	
M1	2 guide blocks (14 mm wide) 4 T-slot nuts (14 mm wide) 4 hexagon head bolts (M10) 4 washers (M10)
Blank	Without mounting hardware

4	
Standard/ custom order	
Blank	Standard
X	Custom order

Specifications

Rotary table housing RSR

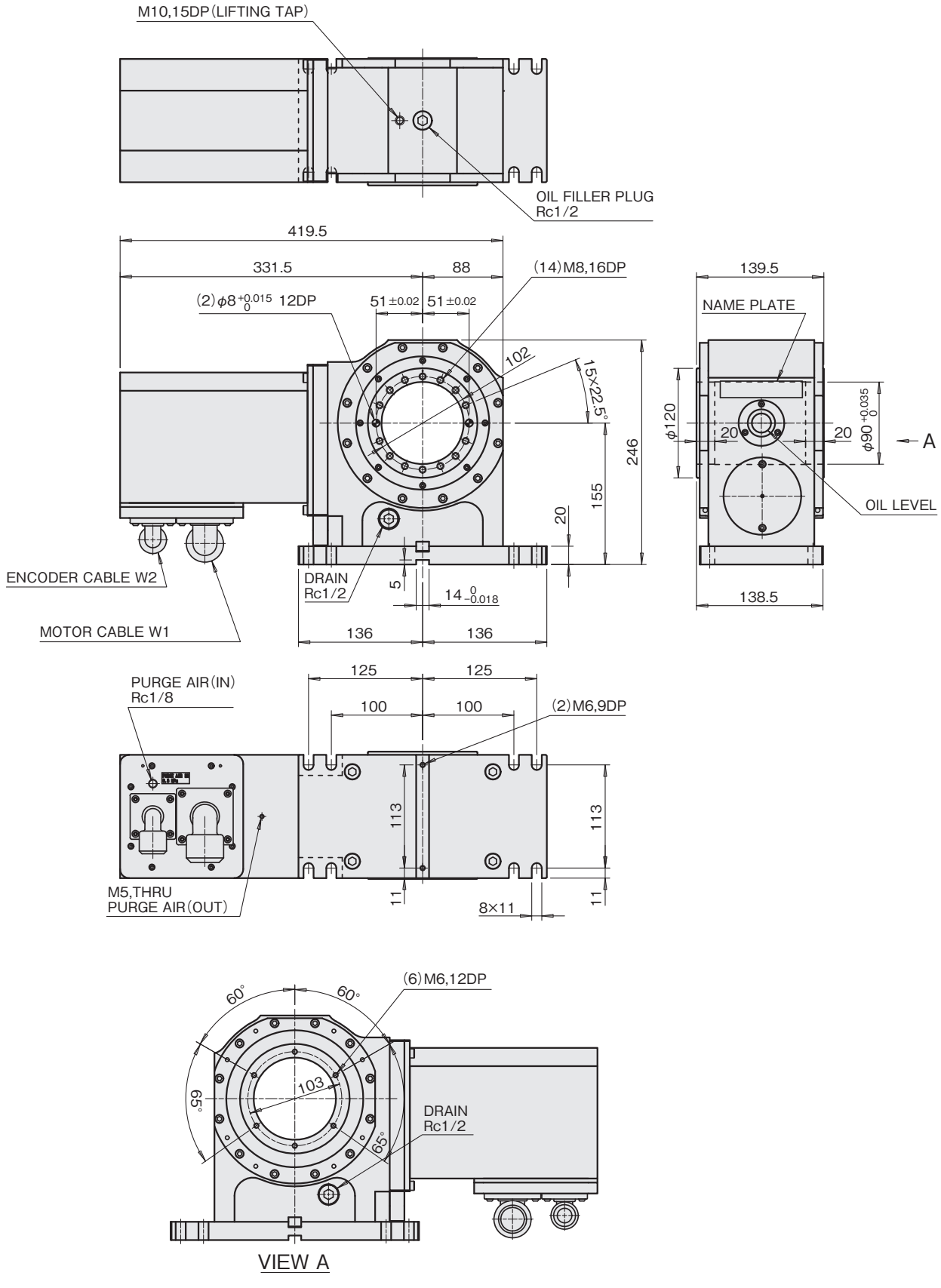
Specifications			RSR120		RSR160	
Table outer diameter		mm	ϕ120		ϕ160	
Table pilot bore diameter		mm	$\phi 90^{+0.035}_{0}$		$\phi 90^{+0.035}_{0}$	
Center height		mm	155		195	
Gear ratio			1/72		1/72	
Motor model			αiS4/5000-B	R2AAB8100F～	αiF8/3000-B	R2AA13180H～
			FANUC	BROTHER	FANUC	BROTHER
Output maximum rotation speed		r/min	65		40	
Indexing accuracy		arc.sec	±15		±15	
Repeatability		arc.sec	8		8	
Net weight		kg	41.5	40.5	81.5	88.5
Net weight(when a rotary joint is installed)		kg	53	52	92.5	99.5
Allowable workpiece inertia		kg·m²	2.7		5.1(26.3)※5	
90° indexing time		sec	0.46		0.45(0.75)※5	
Allowable payload	Without support table	kg	282.5		437.5	
	With support table	kg	565		875	
Permitted radial load※1		N	20600		24000	
Maximum eccentric load torque※2,3		N·m	415	318	835	713
Maximum moment load		N·m	1300		2300	
Minimum setting unit		deg	0.0001		0.0001	
Motor shaft equivalent inertia※4		×10⁻⁴ kg·m²	1.41	1.82	2.51	3.64
Lubrication method			Oil bath		Oil bath	
Oil type/quantity			Mobil SHC629(150cst)/0.7ℓ		Mobil SHC629(150cst)/1.4ℓ	
Rotary joint(number of ports)			12+1		12+1	

*1. The maximum radial load is correct when using a support table.
*2. The maximum load torque is the servo motor holding torque.
*3. The maximum load torque should be for 30 seconds or less with a duty cycle of 40%.
*4. The specified motor shaft equivalent inertia does not include the inertia of the motor shaft.
*5. When used with workload inertia of 26.3 kg·m², a 90° indexing time will be 0.75 sec.

Dimensions

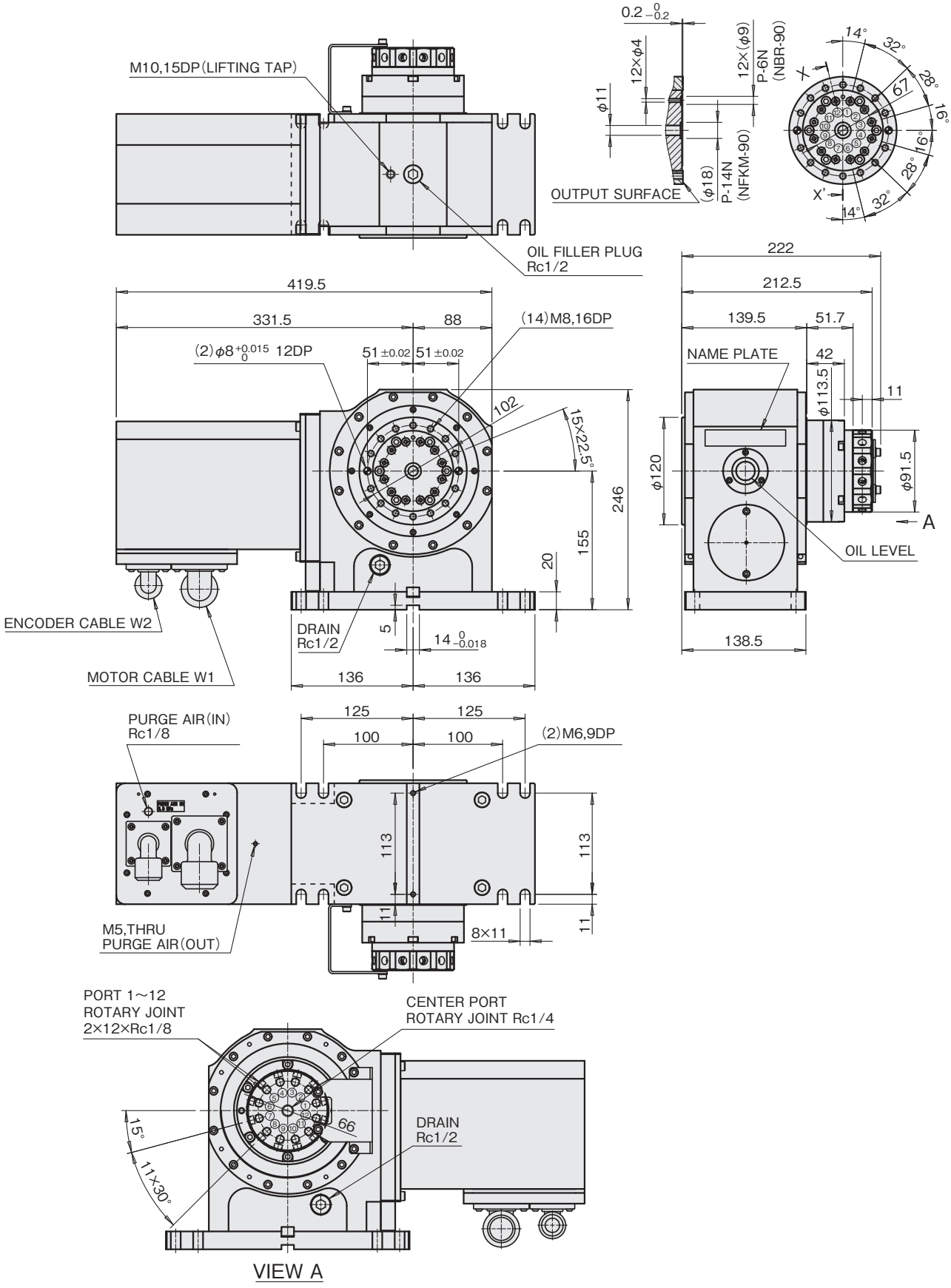
RSR120-L□

Unit : mm



RSR120-L□-J

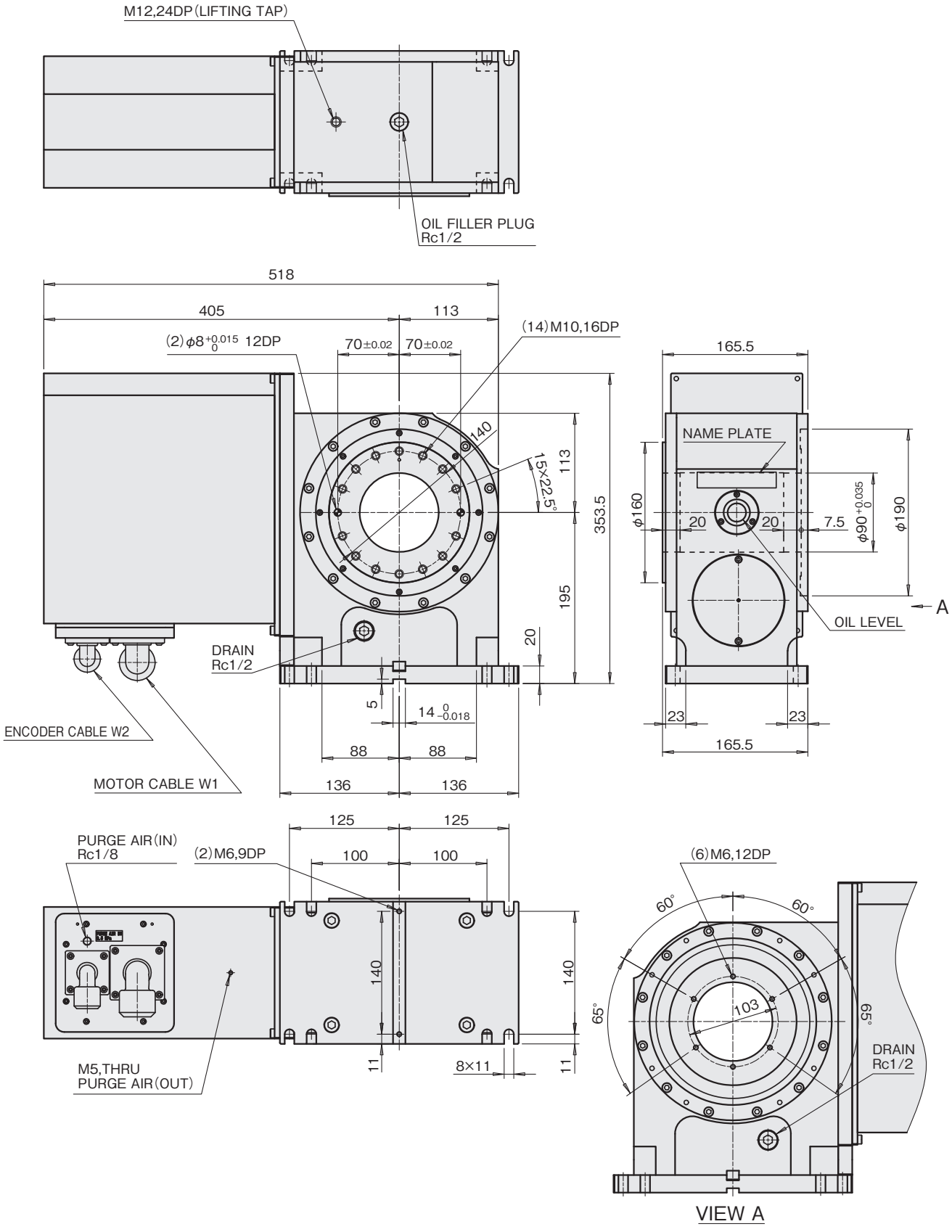
Unit : mm



Dimensions

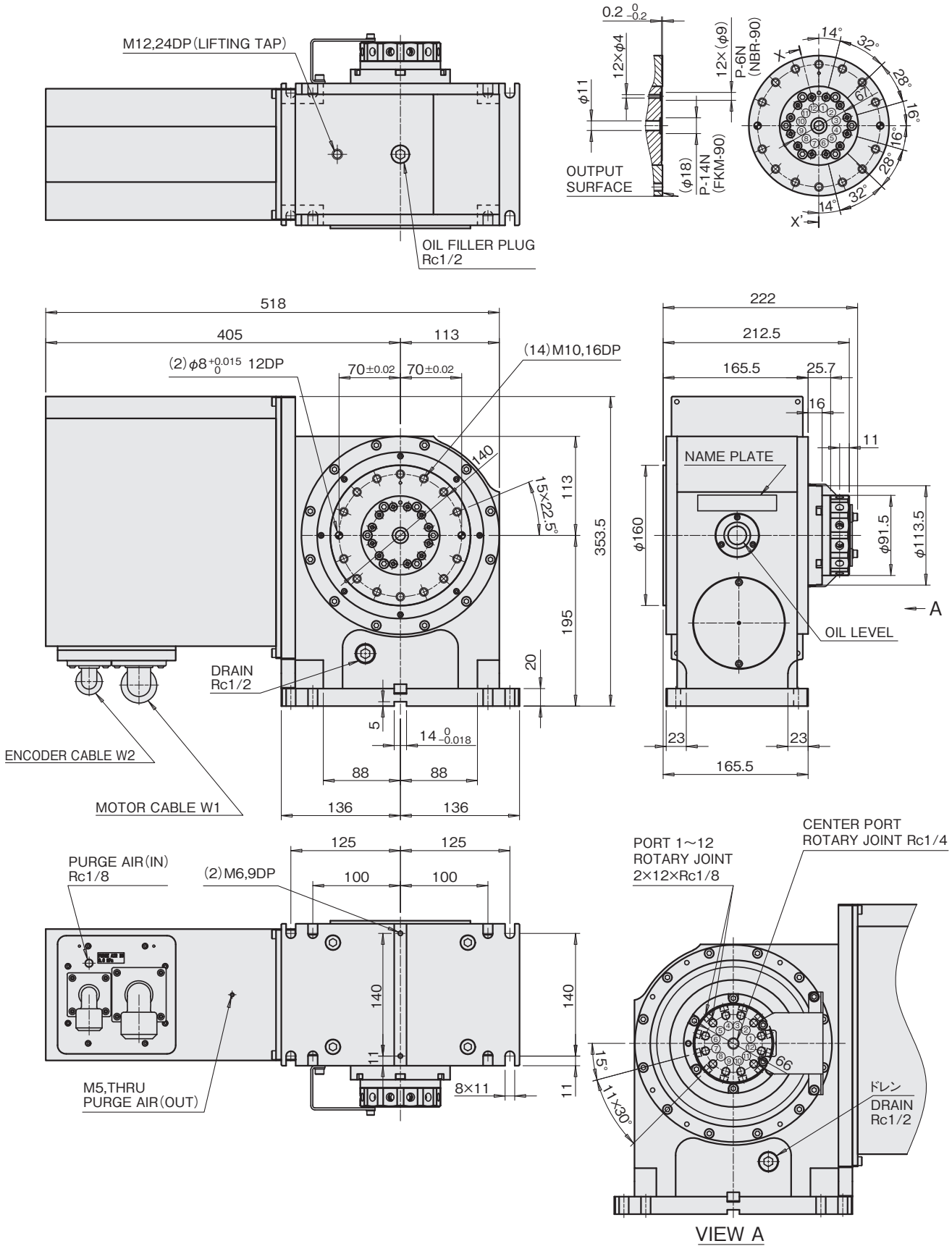
RSR160-L□

Unit : mm



RSR160-L□-J

Unit : mm

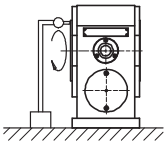
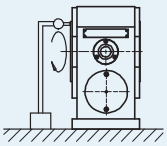
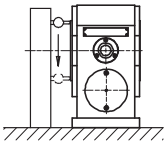
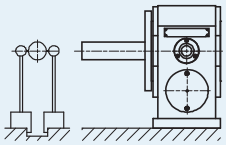
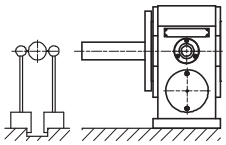
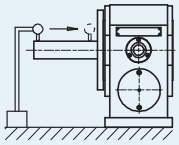


Compatible Servomotor Models

	Code : A (FANUC With brake)	Code : A1 (FANUC Without brake)※1	Code : D (BROTHER)
RSR120	αiS4/5000-B (A06B-2215-B300)	αiS4/5000-B (A06B-2215-B000)	R2AAB8100FCRGYM
RSR160	αiF8/3000-B (A06B-2227-B300)	αiF8/3000-B (A06B-2227-B000)	R2AA13180HCR9CM

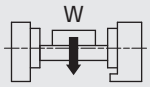
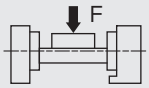
∗1. If a motor brake control is not possible, select the code for a servo motor that doesn't have a brake.
However, please note that this mechanism does not self-lock, so the table may rotate depending on its posture in the event of a power failure.

Precision Rating

No.	Measurement	Method	**RSR120**	**RSR160**
1	Runout of the table top		0.01 mm	0.01 mm
2	Run out of the table pilot bore		0.01 mm	0.01 mm
3	Perpendicularity between table topand the mounting reference surface		0.02 mm (must not lean forward)	0.02 mm (must not lean forward)
4	The parallelism between the rotary axis and the mounting reference surface guide block		0.02 mm /150 mm	0.02 mm /150 mm
5	Degree of tilt between the rotation axis and the mounting reference surface guide block		0.02 mm	0.02 mm
6	The parallelism between the rotation center and the mounting reference surface		0.02 mm /150 mm	0.02 mm /150 mm
7	Indexing accuracy		±15 arc.sec	±15 arc.sec
8	Repeatability		8 arc.sec	8 arc.sec

Specifications

Support table SSR

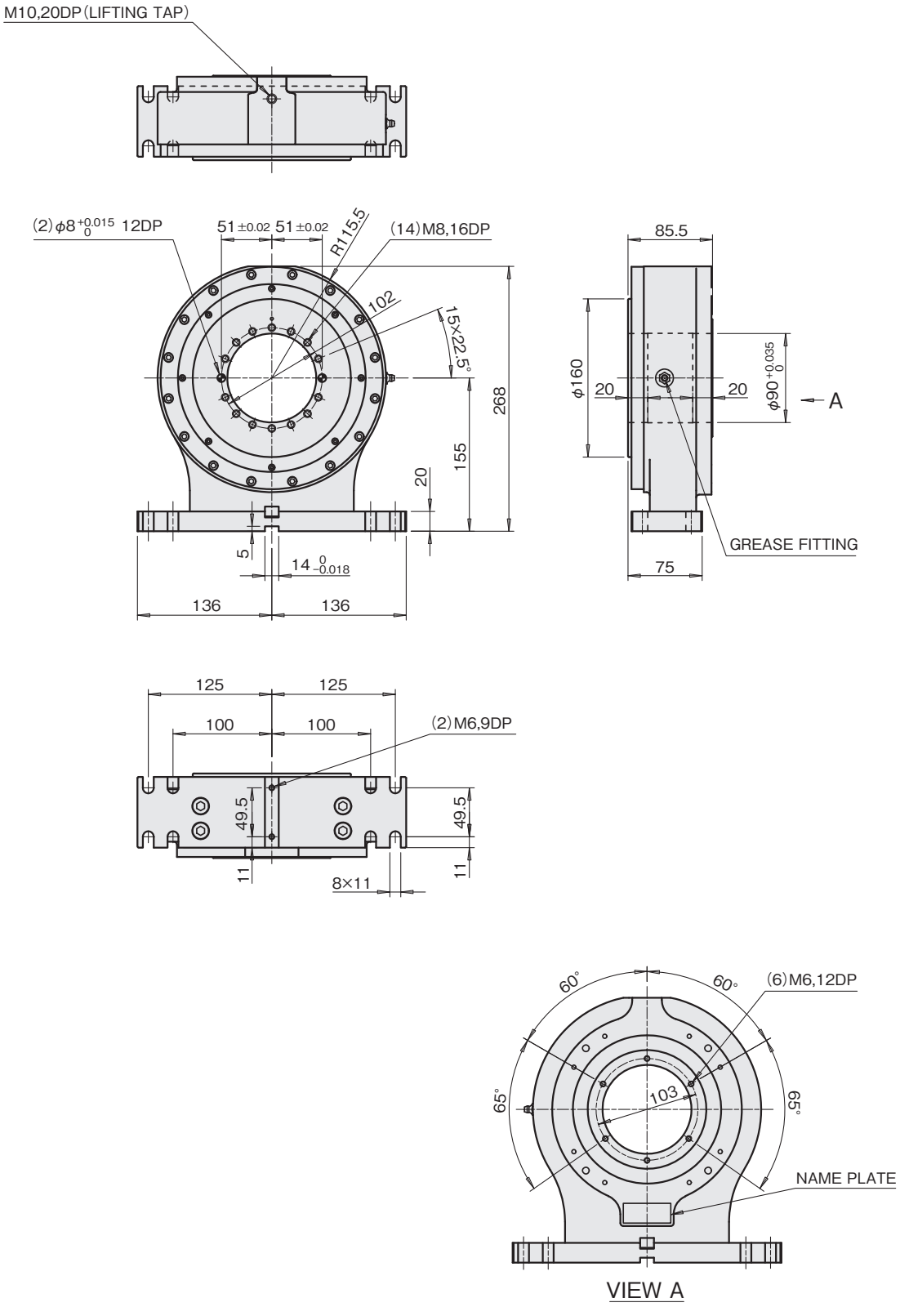
Specifications			SSR155	SSR195
Applicable table models			RSR120	RSR160
Table diameter		mm	ϕ160	ϕ160
Table pilot bore diameter		mm	$\phi 90^{+0.035}_{0}$	$\phi 90^{+0.035}_{0}$
Center height		mm	155	195
Output rotating section inertia		kg·m²	0.22	0.22
Net weight		kg	24	29
Net weight(when a rotary joint is installed)		kg	37	42
Allowable payload※1		kg	565	875
Allowable load※1		N	20600	24000
Lubrication method			Grease lubrication	Grease lubrication
Oil type			AP(N)2	AP(N)2
Rotary joint (number of ports)			12+1	12+1

＊1.The maximum load mass and the maximum load are the values when used as a set with an applicable table.

Dimensions

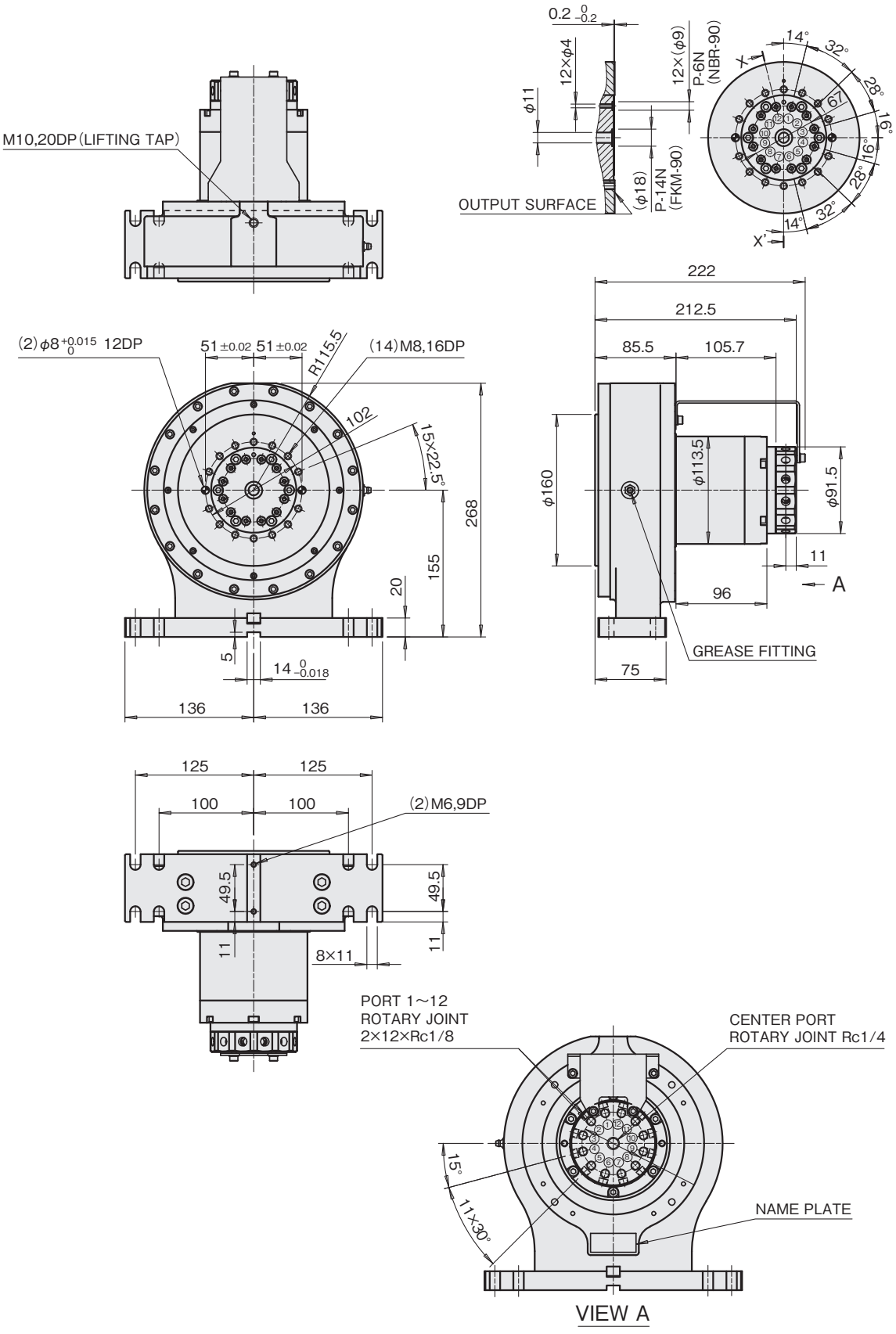
SSR155

Unit : mm



SSR155-J

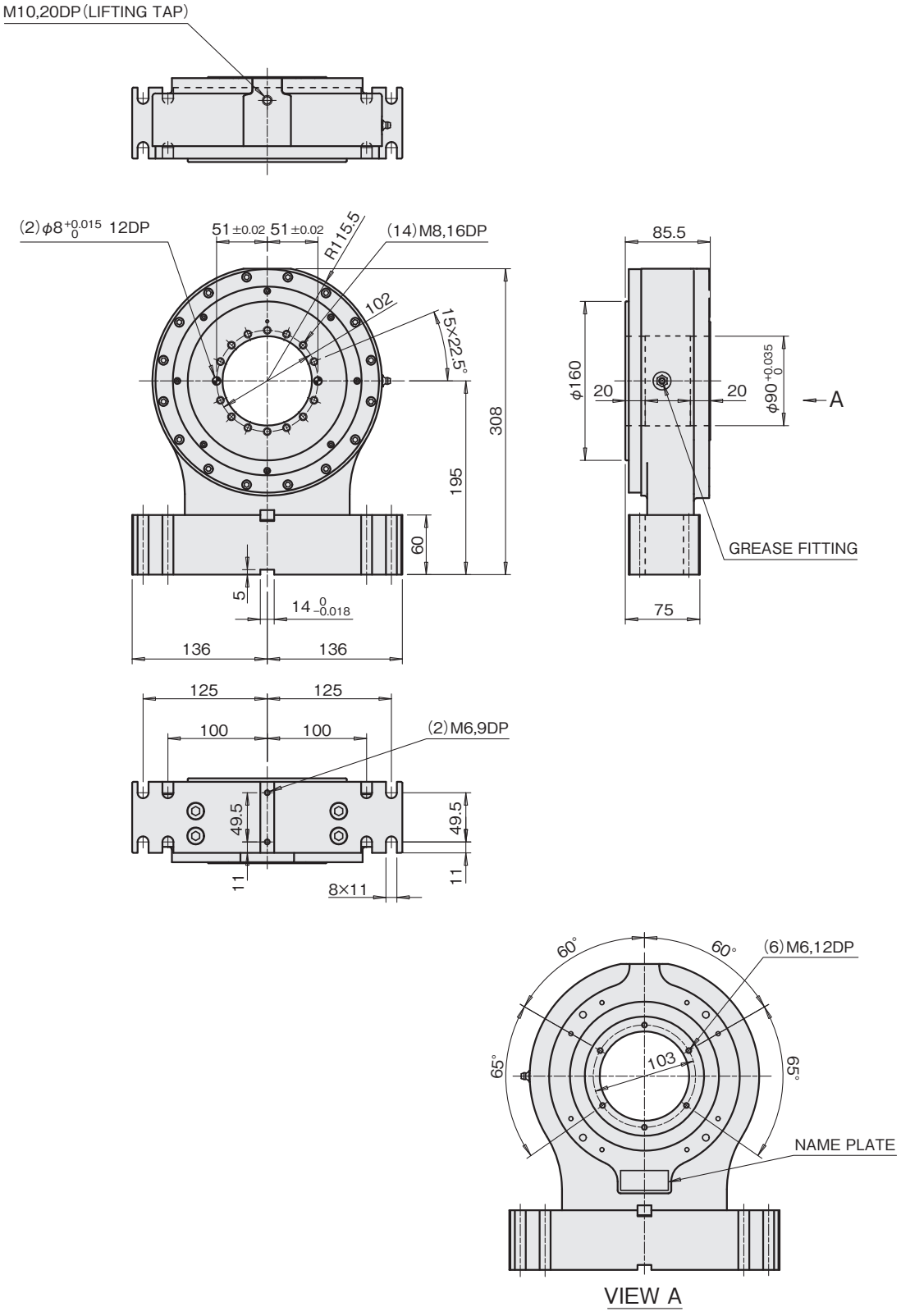
Unit : mm



Dimensions

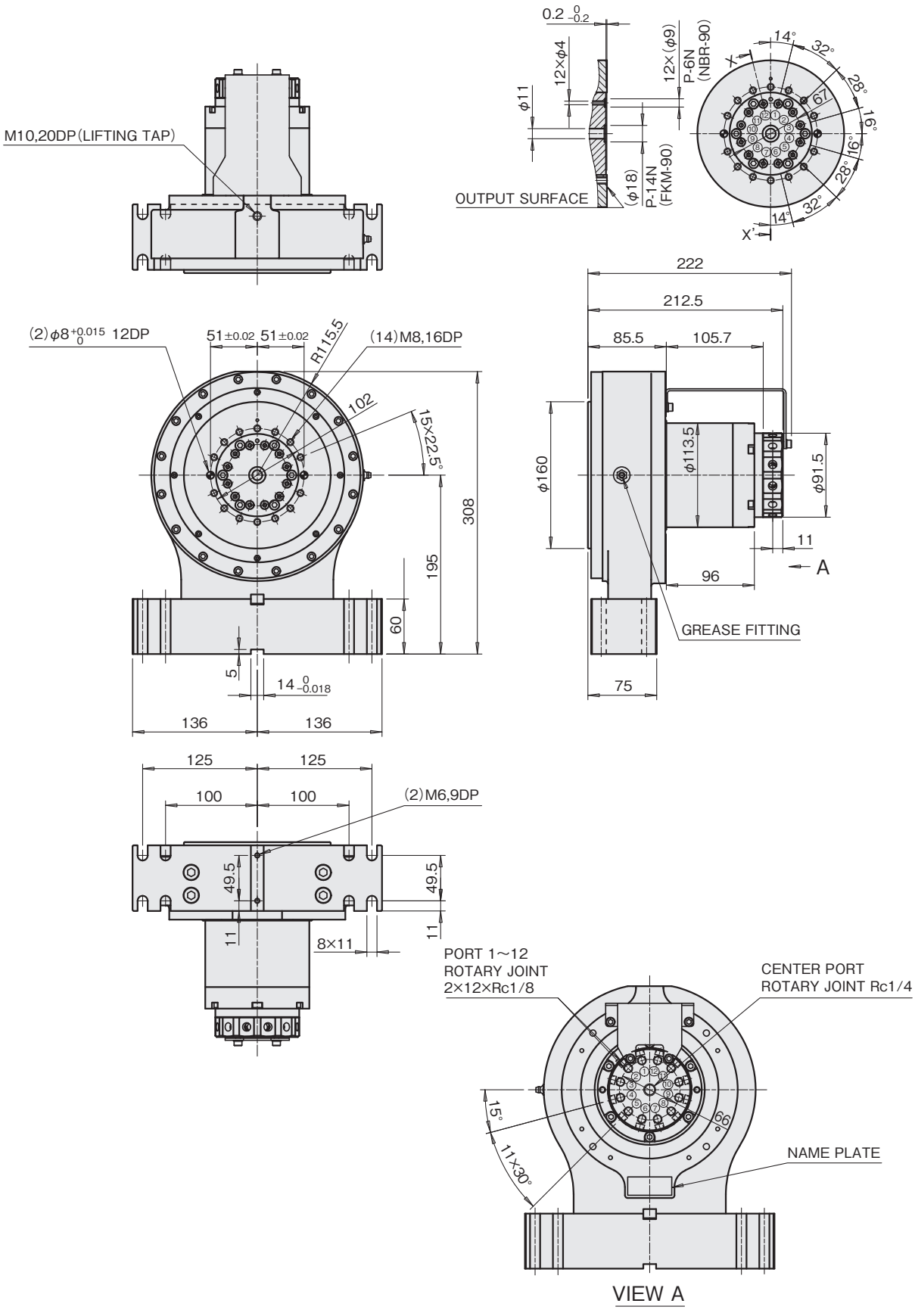
SSR195

Unit : mm



SSR195-J

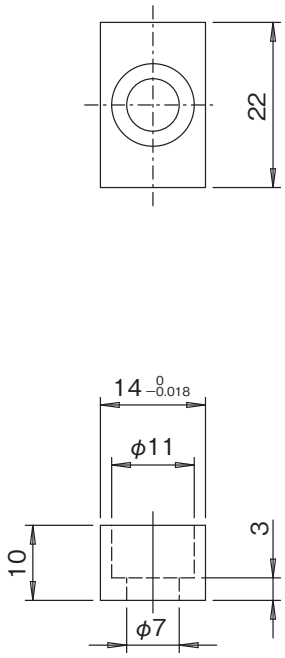
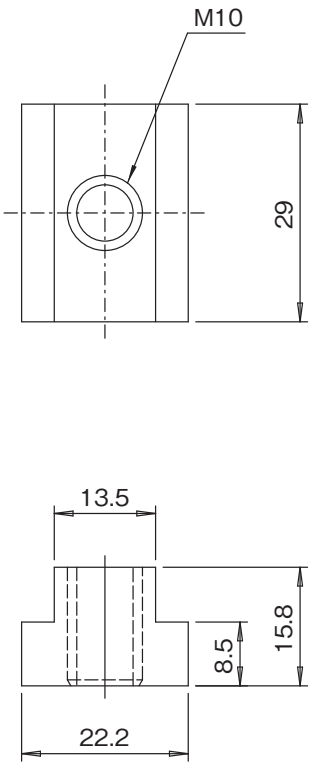
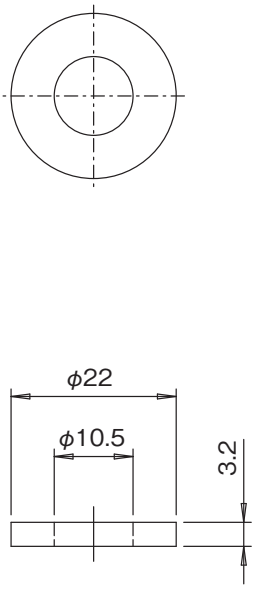
Unit : mm



Mounting clamps

Code : M1

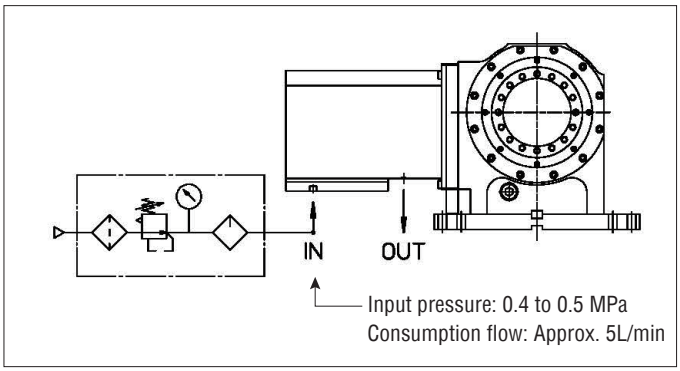
Model	Guide block	The guide block securing bolts	T-slot nuts	Washers	Hex bolt for installation
RSR120	SGB1414 2 pcs.	M6*10 2 pcs.	TNM1410 4 pcs.	W-10-H 4 pcs.	M10*45HX-10.9 4 pcs.
RSR160	SGB1414 2 pcs.	M6*10 2 pcs.	TNM1410 4 pcs.	W-10-H 4 pcs.	M10*45HX-10.9 4 pcs.
SSR155	SGB1414 2 pcs.	M6*10 2 pcs.	TNM1410 4 pcs.	W-10-H 4 pcs.	M10*45HX-10.9 4 pcs.
SSR195	SGB1414 2 pcs.	M6*10 2 pcs.	TNM1410 4 pcs.	W-10-H 4 pcs.	M10*80HX-10.9 4 pcs.

Guide block : SGB1414	T-slot nuts : TNM1410	Washers : W-10-H
		

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

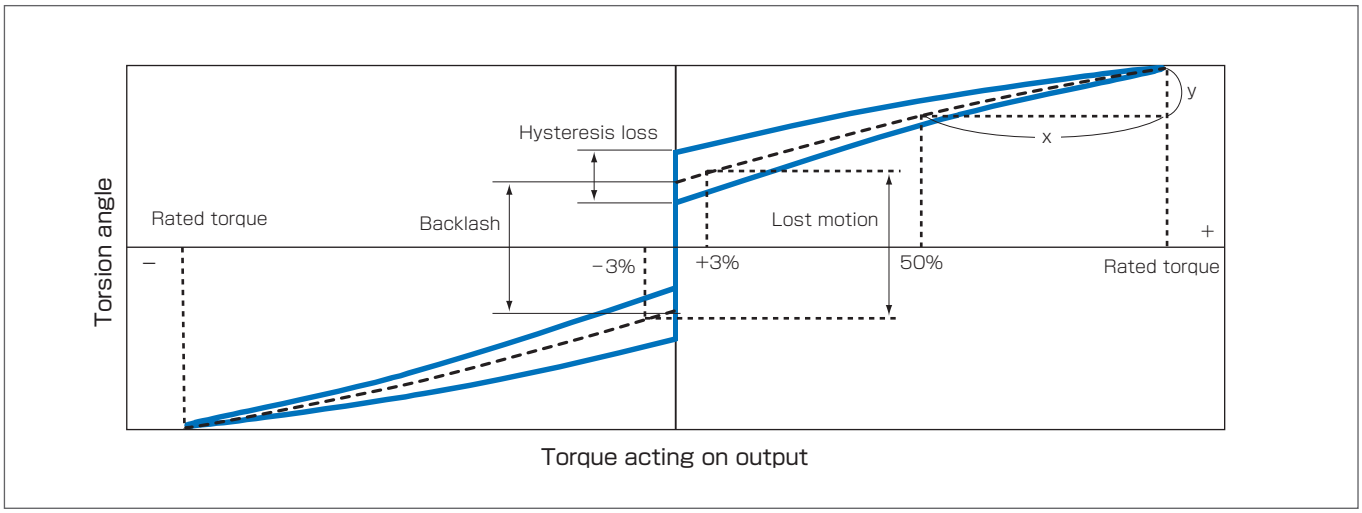
Use hoses for plumbing in the stationary sections. If oil film leaks from the pneumatic circuit, it will cause a serious problem. Install a bleed circuit between the two circuits. Avoid continuous rotation as it may cause heat buildup in the internal seals. The gasket port mounting surface (O-ring seal 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 December 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.

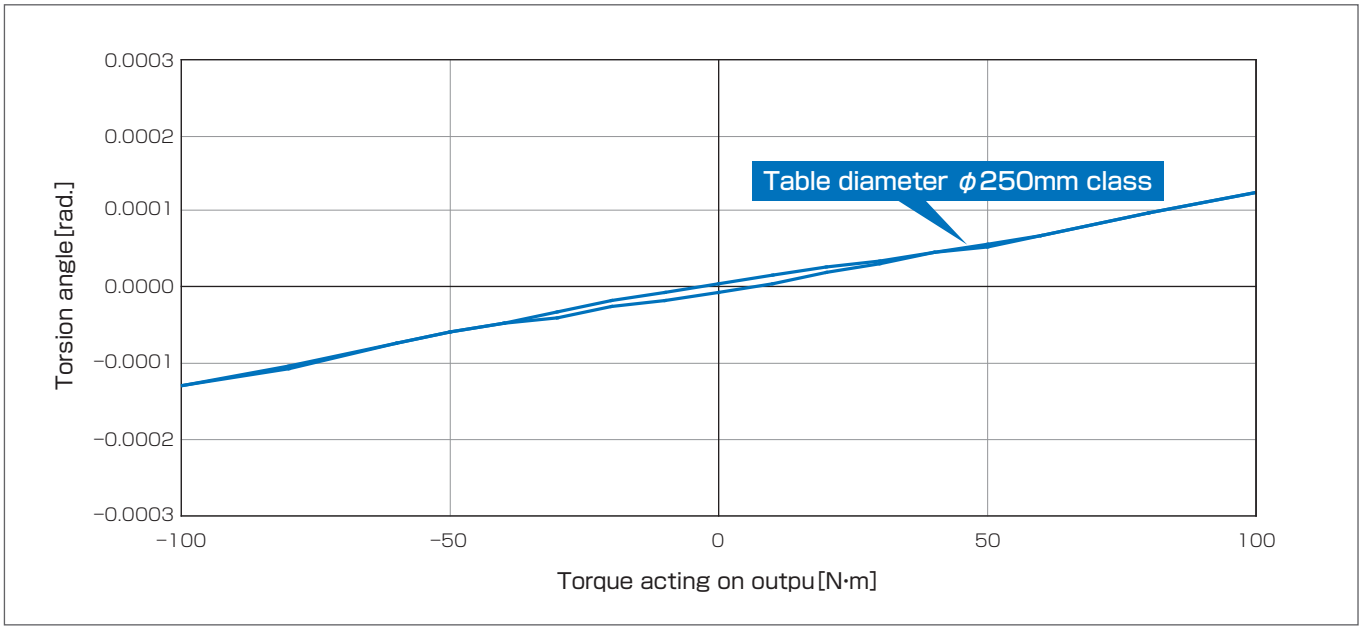
Backlash, lost motion, hysteresis loss

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 ±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**

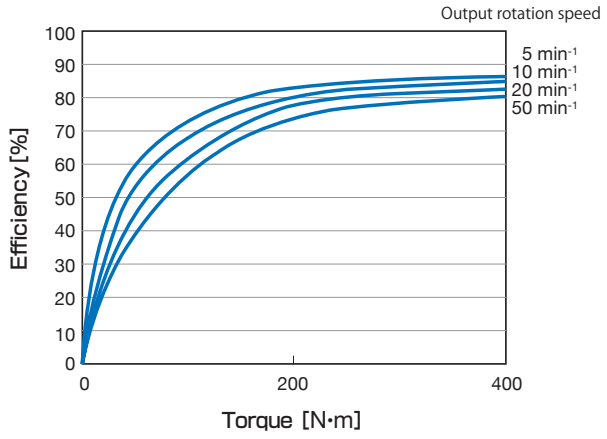


For a general positioner, the hysteresis graph can be obtained by applying torque to the output shaft, and plotting the generated torsion angle. Backlash, lost motion and hysteresis loss can each be defined from the hysteresis graph, as indicated above. Lost motion and hysteresis loss depend on the material 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

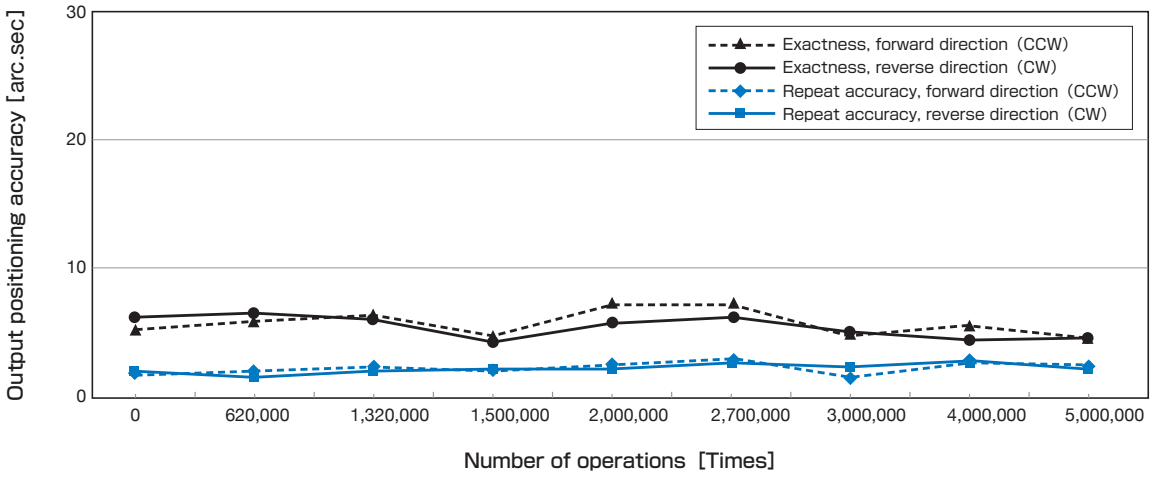
This indicates the percent of input power which is transmitted to the output.
The ***RollerDrive***® motion mechanism has high efficiency because it employs rolling contact. Efficiency varies depending on conditions such as load torque, rotation speed and temperature.

〈 Table diameter ϕ250mm class 〉



Durability

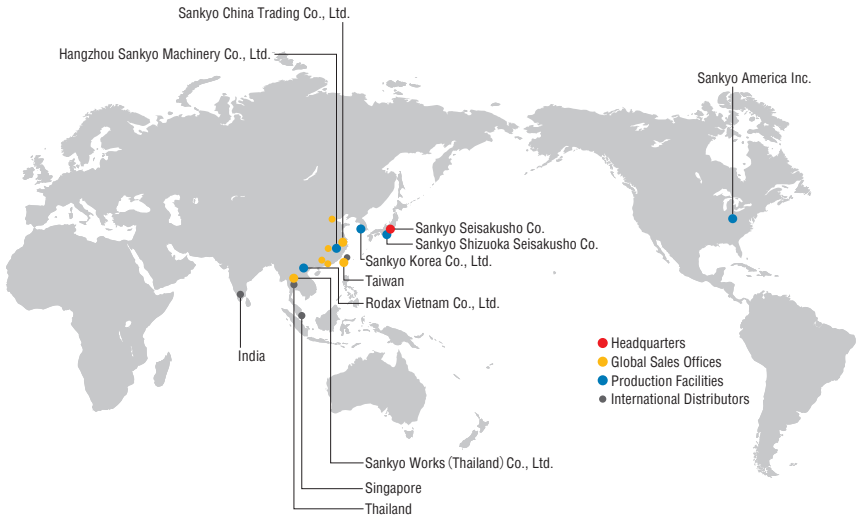
〈 Test of changes in ***RollerDrive***® positioning accuracy over time 〉



Test conditions	
RollerDrive size	RA125 class test machine
Output load weight	152 kg(ϕ500㎜)
Output load moment of inertia	4.69kg·㎡
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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