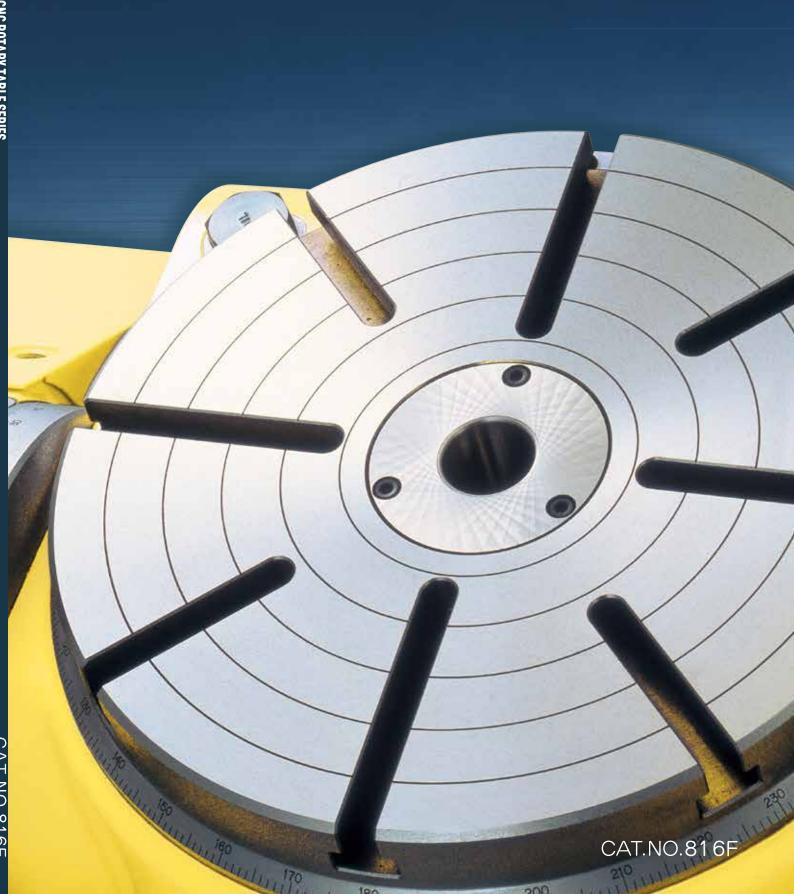


# CNC ROTARY TABLE SERIES



# Made in Japan, Made by

NIKKEN is one of the few manufacturers of machine tools that designs and manufactures in-house the key components of its rotary tables in order to realize the exceptional performance customer requirements.

#### Spirit of Innovation In pursuit of exceptional performance

Our name "NIKKEN" derives from Japanese characters meaning "doing research & study every day," and this expresses the spirit of our company. Today this spirit is alive in each and every component of our innovative NIKKEN CNC rotary table products. To achieve unmatched high precision, high rigidity, and durability, we utilize a variety of key components incorporating our own innovative ideas, rather than relying on off-the-shelf parts. This is exactly what NIKKEN CNC rotary tables makes the superior performance possible.

#### ■Long Life Concept In-house design and manufacturing for secure environment

Although our products are highly durable, it is necessary to replace parts occasionally due to breakdowns or maintenance. Since NIKKEN designs and manufactures key components in-house, our customers avoid the risk of not being able to perform product repairs or maintenance due to being discontinued off-the-shelf parts. You can continue to rely on our high-precision products under secure environment over the long term. This is a key concept behind NIKKEN products.

#### The Heart of NIKKEN CNC Rotary Table

#### Carbide Worm System ●



#### Solid Carbide Worm Screw

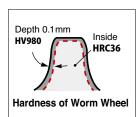
This is NIKKEN s unique design, superior to traditional steel worm screw. olid carbide worm screw is allowed longer life and minimal wear

compared to tradition al worm system to use specially hard material. This alongs with the hand pairing of the custom made steel worm wheel to eliminates backlash.



#### **HV980** Heat Treated Steel Worm Wheel

The material used for the NIKKEN worm wheel is custom made steel, specially hardened and ion nitrided on the teeth. As a consequence, frictions between the gears are eliminated.



#### Unique "Bearing system"

#### Independent Double Thrust and Radial Bearing System •



NIKKEN Bearing system allow for more points of contact versus traditional ball bearings of cross roller bearings, resulting in smooth and accurate rotation.

#### ■Thr t :T b lar Thr t eari

Tubular thrust bearings dampen vibration and protect the internal gears during crash situations.

#### adia I: eedle oller eari

The high accuracy is implemented in "Hand picked and matched" Needle Roller Bearings between rotary table and faceplate assembly assuring the utmost rotation accuracy and elimination of any play or unnecessary movement between the two parts.



# NIKKEN.



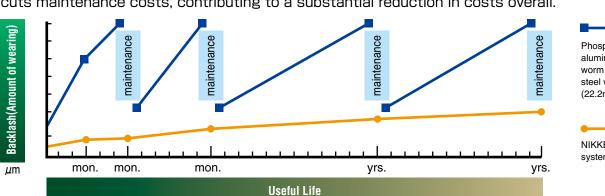


# RIGIDITY

# **ACCURACY**



Our thoroughgoing passion for high rigidity and high precision results in products of excellent durability that retain their precision even after long-term use. This boosts the operating ratio and cuts maintenance costs, contributing to a substantial reduction in costs overall.

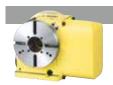


Phosphor bronze, aluminium bronze worm wheel and steel worm screw (22.2min<sup>-1</sup>)

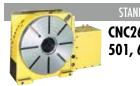
NIKKEN carbide worm system. . min

# NIKKEN CNC rotary table extensive

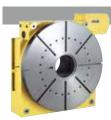




105, 180, 202, **NEW CNC205** 



STANDARD P11 - P14 CNC260, 302, 321, 401 501, 601, 803, 1003



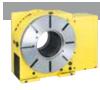
LARGE P15 - P16 CNC1000,1200, 1201, 1600



TOP SIDE MOTOR MOUNTED P17 - P20 CNC202T, 260T, 302T 321T, 401T, 501T, 601T



CK SIDE MOTOR MOUNTED P21 - P22CNC180B, 202B, 260B 302B, 321B, 401B



BIG BORE P23 - P24 CNCB350, B450, B630



CNC100-2W, 3W, 4W, 180-2W, 202-2W, 260-2W





COMPACT P27 - P32 **NEW NCT200, NCT200E** 





NSVZ180, 300 NSVX400, 400T, 500







TEC

## **NIKKEN**

# lineup to match your own applications.





COMPACT P37 - P40

NEW 5AX-100,130
201

LARGE P45 - P46 5AX-800,1200



5AX-230, 250, 350, 550

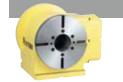


MALTI-SPINDLE P47 - P48

5AX-2MT-105, 4MT-105





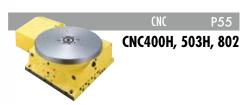


DD P51 DD180, 250, 400



P54







AX P56 **5AX-T400,B450** 

**SERVO MOTOR** 

SERVO MOTOR P57 - P58

Servo Motor List • Relation between Unbalancing load and Servo Motor • Flow Chart of the Additional Axis Control







TECHNICAL INFORMATION P75 - P78

## ACC ACCESSORIES

SUPPORT TABLE	····· P79 – P80
TAILSTOCK····································	·····P81 - P82
SCROLL CHUCK & POWER CHUCK · · · · · · · · ·	····· P83 - P84
CLAMPING DEVICE and T-NUT · · · · · · · · · · · · · · · · · · ·	····· P85 – P86

#### O/P OPTIONAL EQIPMENTS

■ High Precise Indexing · · · · · · · · · · · · · · · · · · ·	···· P87 – P88
ROTARY JOINT · · · · · · · · · · · · · · · · · · ·	···· P89 – P92
AWC SYSTEM · · · · · · · · · · · · · · · · · · ·	···· P93 – P94
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#### TEC TECHNICAL INFORMATION

Accuracy Standard P99 P100
Description of Specifications, Recommended lubricating Oil and Quantity P101—P102
Assessment P103
Load Calculation, Indexing Time, Comparaison, Durability · · P104
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#### NET WORLDWIDE NETWORK

Headguater·····	P106
Overseas Sales & Service Network······	
Worldwide Sales Branch	
Check Sheet for the Technical Specifications of CHC R	(otary lable··P113 - P114

## **How to Select Your Best CNC Rotary Table**



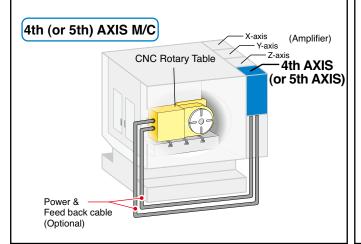
#### 1 How CNC Rotary Table is Controlled

#### **Additional Axis**

You can choose additional axis when the machine has 4th or 5th axis.

CNC rotary table can be controlled by machine in this case.

- 1. 4th or 5th amplifier is required for the machine. It should be used exactly the same one used for X, Y and Z axis. Install same servomotor(s) used for X, Y and Z axis.
- 2. The type of the servomotor or amplifier is defined by the types of rotary table.
- 3. Decide by whom servomotor will be supplied.
- 4. External dimensions and specifications depend on the type of servomotor.
- 5. Parameter configuration, hydraulic connection, wiring and installation of amplifiers should be provided by machine tool

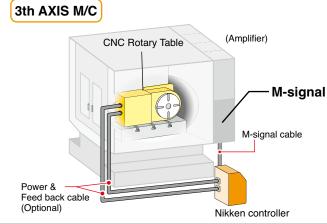


#### **NIKKEN Controller (M-signal)**

You can choose NIKKEN Controller when the machine doesn't have additional axis.

Note: at least one M-signal code is required.

- At least one M-Signal is required on the machine.
   Input M-signal as "index start" command on the machine, high accuracy indexing, equally divided indexing (2-9999), or lead operation is allowed.
- Control unit, servo-motor and all cables will be supplied by NIKKEN.



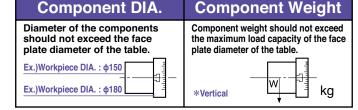
#### 2 Select +1 AXIS or +2 AXIS



#### 5 High Speed or Standard?



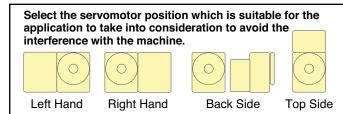
#### 3 Select Face Plate Diameter



#### 6 Select Options



#### 4 Select the Servomotor Position

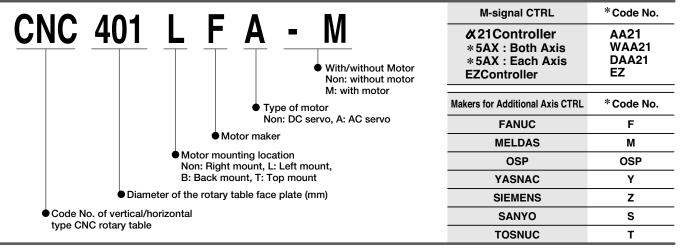


#### 7 Select Accessories



## **How to Read Product Code**

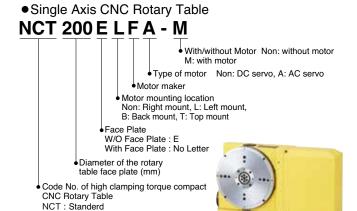




5AX-

Servomotors for Brother **SPEEDIO** is exclusive. EX.)NCT 200 SA-BR2 The last part of the product code must be "SA-BR2".

FA-M



**NCT200** 

With/without Motor
Non: with motor, M: with motor
Type of motor Non: DC servo, A: AC servo
Motor maker
Rotary axis motor mounting location Non: Right mount, L: Left mount
Diameter of the table
face plate (mm)
Tilting axis motor mounting location
Non: Parallel mount
A: Back mount

B: Back of rotary axis
T: Top mount

Code No. of Rotray & Tilting Table

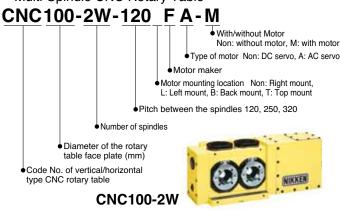
●5AX Rotary & Tilting Table

350

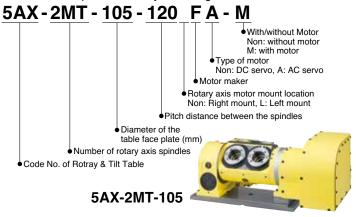
5AX-350

Multi-Spindle CNC Rotary Table

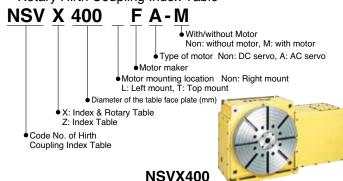
NCTZ : High Speed



● 5AX Multi Spindle Rotary & Tilting Table



• Rotary Hirth Coupling Index Table





## **COMPACT CNC ROTARY TABLE**





**CNC105 and accessories** 

- Wide application can be offered from small drilling press to M/C
- Suitable for indexing/leads cutting of small size work pieces
- Various kinds of the work chucking attachments can be offered from 5C collet fixtures to the air/hyd. chuck





























P.57



#### Specifications

#### ( ):High Speed CNC ROTARY Table Z series

Item	/ Code No.	CNC105 CNCZ105	CNC180 CNCZ180	CNC202 CNCZ202
Diameter of Table ¢mm		105	180	200
Diameter of S	eter of Spindle Hole		Ф60нт Ф40	Ф60нт Ф40
Center Height	mm	105	135	135
Width of T Slo	ot mm	Ф10H7 Pin hole	12 +0.018	12 <sup>+0.018</sup>
Clamping Sys	tem	Pneumatic*4	Pneumatic*4	Pneumatic*4
Clamping Tord	que N·m	205	303	303
Table Inertia at M	lotor Shaft $(\frac{GD^2}{4})$ kg·m <sup>2</sup> ×10 <sup>-3</sup>	0.06	0.08	0.09
Servo Motor	min <sup>-1</sup>	αiF1⋅3000	αiF2•3000	α iF4•3000
MIN. Increme	nt	0.001°	0.001°	0.001°
Rotation Spee	ed min <sup>-1</sup>	33.3(66.6)	33.3(66.6)	33.3(66.6)
Total Reduction	on Ratio	1/90(1/45)	1/90(1/45)	1/90(1/45)
Indexing Accu	iracy sec	±30	±20	±20
Net Weight	kg	32	45	55
MAX. Work Load	Vertical kg	30	100	100
on the Table	Horizontal kg	60	200	200
MAX.	N	8800	18000	18000
Thrust Load applicable on the	*1 F×L N·m	275	542	542
Table	FXL N·m	220	690	690
Guide Line of MAX. Unbalancing Load			30	50
MAX. Work Inertia	0.04(0.02)		0.4(0.2)	1.0(0.5)
Driving Torque	*3 N·m	36(27)	72(54)	144(115)

<sup>\*1</sup> This is the strength of the worm wheel without brake. It is applied against dynamic cutting thrust.

<sup>\*2</sup> The guide line of MAX unbalancing load means the unbalancing load, when the rotary table is used with support table in vertical application. The guide line figure will be different according to the servo motor, please refer to P.57 for more detail.

<sup>\*3</sup> Driving torque means the torque at MAX. rotation speed after acceleration. Driving torque is almost constant and independent from the load except unbalancing load is applied.

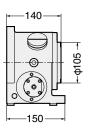
<sup>\*4</sup> Air Intensifying Booster system is available if the supplied air pressure is under 0.5MPa or the brake torque is required to increase. 🖙 P.95

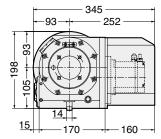


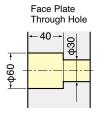
External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

## **CNC105, CNCZ105**

















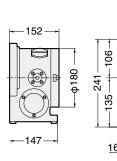


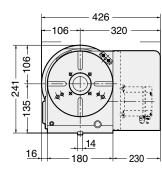


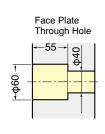
Air purge function is provided inside the motor cover as standard.

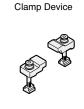
## CNC180, CNCZ180

















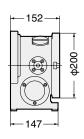


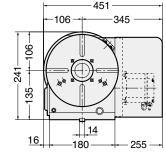


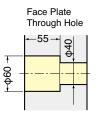
Air purge function is provided inside the motor cover as standard.

## **CNC202, CNCZ202**

















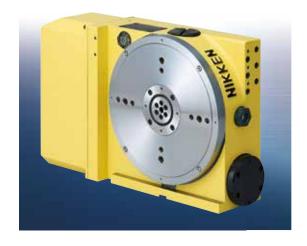




Air purge function is provided inside the motor cover as standard.

## **COMPACT CNC ROTARY TABLE**







#### Ultra Slim Model for Trunnion Application

# **CNC205**

## **98mm**

**Ultrathin Specification to Maximize Machining Space** 

Demonstrates the true worth of a compact machining center with limited machining space.

The body thickness of 98mm is 54mm slimmer than previous models. Allows enlargement of the cradle jig work mounting area on machines with limited machining space, such as the BT30 compact machining center.

## Built-in

**Supports Mounting of Built-in Rotary Joints** 

Automated component mounting/unmounting with minimal increase in size.

The rotary table body is already provided with IN ports, so the rotary joint specification can be changed with minimal increase in the body dimensions.

## 380Nm

Air-hydraulic Unit Provided as Standard Equipment

Astoundingly powerful clamping capability in spite of the slim body

For machines with no hydraulic power source, the air-hydro unit provides powerful hydraulic supply functionality using only an air supply. In spite of its slim body, it delivers an astounding 380 Nm of clamping power, enabling a variety of applications, such as use of a cradle jig.

# **High Speed**

Z Type is also Available

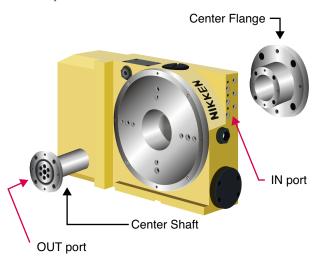
Reducing cycle time enhances productivity

The lineup also includes the highly rotatable Z type that further reduces machining cycle time. By setting the speed reduction ratio to 1/2 that of the standard type, 200% speedup is achieved.

## Ultra-slim

Ultrathin Support Table is also Available.

Contributes to a further expansion of machining area when used with the CNC205.



#### I**LW** Iltrathin Support

Ultrathin Support Table with Clamping System

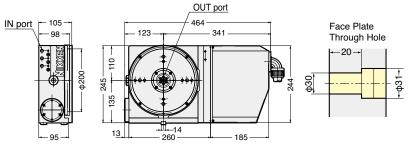
# Ex.) Trunnion Application with CNC205L and a Support Table











Rotary joint is included in the photo.

\*Rotary joint is included in the layout with α21 controller.

#### Specifications

Iter	n / Code No.	Standard	High Speed
Right Hand	t Hand Mounted Moter CNC205		CNCZ205
Left Hand M	ounted Moter	CNC205L	CNCZ205L
Diameter of T	able	200	200
Diameter of S	pindle Hole	Ф30н7	Ф30н7
Center Height	mm m	135	135
Width of T Slo	ot mm	_	_
Clamping Sys	tem	Air Hydraulic Booster Built-in type	Air Hydraulic Booster Built-in type
Clamping Tor	que N·m	380	380
Table Inertia at	Motor Shaft $(\frac{GD^2}{4})$ kg·m <sup>2</sup> ×10 <sup>-3</sup>	0.15	0.15
Servo Motor	min <sup>-1</sup>	α iF2•3000	αiF2•3000
MIN. Increme	nt	0.001°	0.001°
Rotation Spee	ed min <sup>-1</sup>	33.3	66.6
Total Reduction	on Ratio	1/90	1/45
Indexing Accu	iracy sec	±20	±20
Net Weight	kg	45	45
MAX. Work Load	Vertical kg	100 (with suppart)	100 (with suppart)
on the Table	Horizontal	_	_
MAX. Thrust Load	*1 FXL N·m	670	670
applicable on the Table	FXL N·m	690	690
Guide Line of MAX. Unbalancing Load	*2 N·m 30		30
MAX. Work Inertia	Vertical $(\underline{GD^2})$ + $(\underline{GD^2})$ kg·m <sup>2</sup>	0.40	0.20
Driving Torque	N·m 72 54		54

<sup>\*1</sup> This is the strength of the worm wheel without brake. It is applied against dynamic cutting thrust.

<sup>\*2</sup> The guide line of MAX unbalancing load means the unbalancing load, when the rotary table is used with support table in vertical application. The guide line figure will be different according to the servo motor, please refer to P.57 for more detail.

<sup>\*3</sup> Driving torque means the torque at MAX. rotation speed after acceleration. Driving torque is almost constant and independent from the load except unbalancing load is applied.

## STANDARD CNC ROTARY TABLE





- The rotary table can be used vertically or horizontally depending on the application
- Best match for a medium-size machining center
- Standard model with motors mounted on the body side































#### Specifications

#### ):High Speed CNC ROTARY Table Z series

Item / Code No.		CNC260 CNCZ260	CNC302*4 CNCZ302	CNC321*4 CNCZ321	CNC401 CNCZ401
Diameter of Table ¢mm		260	300 320		400
Diameter of S	pindle Hole	ф80н7	ф80н7	ф105н7	ф105н7
Center Height	mm	170	170	230	230
Width of T Slo	t mm	12 +0.018	12 +0.018	12 +0.018	14 +0.018
Clamping Sys	tem	Pneumatic*3/ Hydraulic	Pneumatic*3 / Hydraulic	Hydraulic	Hydraulic
Clamping Tord	·	588 / 1568	588 / 1568	1760	1760
Table Inertia at M	otor Shaft $\left(\frac{GD^2}{4}\right) \text{ kg} \cdot \text{m}^2 \times 10^{-3}$	0.33	0.33	2.8	2.8
Servo Motor	min <sup>-1</sup>	αiF4•3000	αiF4•3000	αiF12∙2000	αiF12•2000
MIN. Incremer	nt	0.001°	0.001°	0.001°	0.001°
Rotation Spee	ed min <sup>-1</sup>	25.0(50.0)	25.0(50.0)	22.2(44.4)	22.2(44.4)
Total Reduction	on Ratio	1/120(1/60)	1/120(1/60)	1/90(1/45)	1/90(1/45)
Indexing Accu	racy sec	20	20	15	15
Net Weight	kg	115	120	200	230
MAX. Work Load	Vertical kg	175	175	250	250
on the Table	Horizontal kg	350	350	500	500
MAX.	, N	42480	42480	53100	53100
Thrust Load applicable on the	*1 FXL N·m	1442	1442	2648	2648
Table	FXL N·m	2320	2320	3840	3840
Guide Line of MAX. Unbalancing Load	*2 N·m	50	50	100	100
MAX. Vertical Work Inertia $0 + \frac{(GD^2)}{4} + ($		3.2(1.6)	3.2(1.6)	6.4(3.2)	6.4(3.2)
Driving Torque	*3 N·m	192(153)	192(153)	432(345)	432(345)

<sup>\*1</sup> This is the strength of the worm wheel without brake. It is applied against dynamic cutting thrust.

<sup>\*2</sup> The guide line of MAX unbalancing load means the unbalancing load, when the rotary table is used with support table in vertical application. The guide line figure will be different according to the servo motor, please refer to \$\one{cond}\$ P.59 for more detail.

<sup>\*3</sup> Air-air Booster system is available if the supplied air pressure is under 0.5MPa or the brake torque is required to increase. 🖙 P.95

<sup>\*4</sup> CNC302,321 is semi-standard model.

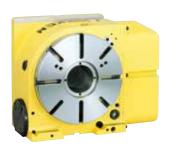
<sup>★</sup>The air-hydraulic booster is available, when the rotary table with hydraulic clamping system is used on the M/C without hydraulic source, please refer to F.95.

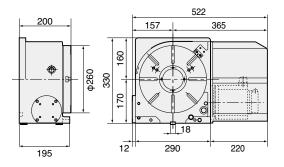
<sup>★</sup> XiF8/4000 motor can be mounted on CNC260, 302.

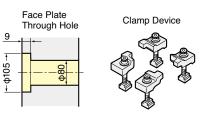
CNC260, 302, 321, 401

External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

## **CNC260, CNCZ260**













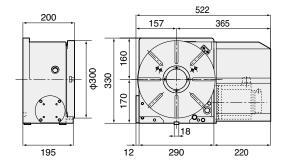


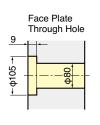


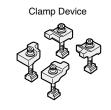
For the rotary table with pneumatic clamping, air purge function is provided inside the motor cover as standard.

## **CNC302, CNCZ302**















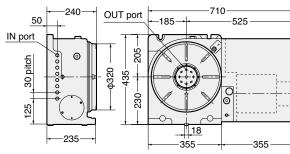


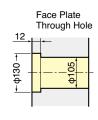


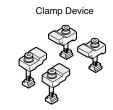
For the rotary table with pneumatic clamping, air purge function is provided inside the motor cover as standard.

## CNC321, CNCZ321













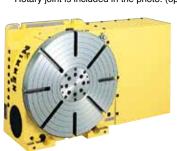


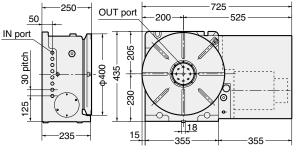


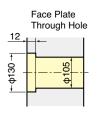
Rotary joint is included in the layout. (optional)

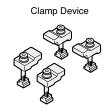
#### CNC401, CNCZ401

Rotary joint is included in the photo. (optional)











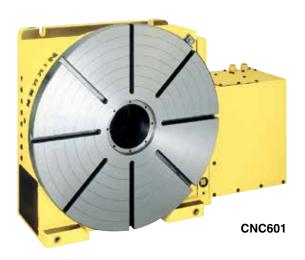






## STANDARD CNC ROTARY TABLE





- Dividing and lead cutting for large size work piece is suitable
- Large through hole and powerful clamping system
- Ideal for deep cutting of highly rigid material

M-SIGNAL METHOD -















WITH FACE PLATE





P.59







#### Specifications

#### ):High Speed CNC ROTARY Table Z series

 Iter	m / Code No.	CNC501 CNCZ501	CNC601 CNCZ601	CNC803	CNC1003
Diameter of T	able	500	600	800	1000
Diameter of S		Ф130н7	Ф130н7	Ф230н7	Ф230н7
Center Height	· · · · · · · · · · · · · · · · · · ·	310	310	550	550
Width of T Slo	ot mm	14 +0.018	14 <sup>+0.018</sup>	22H7*4	22H7*4
Clamping Sys	tem	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Clamping Tor	que N·m	4655	4655	7000	7000
Table Inertia at M	lotor Shaft $(\frac{GD^2}{4})$ kg·m <sup>2</sup> ×10 <sup>-3</sup>	6.8	4.9	6.2	6.3
Servo Motor	min <sup>-1</sup>	αiF12•2000	αiF12•2000	αiF30•2000	αiF30•2000
MIN. Increme	nt	0.001°	0.001°	0.001°	0.001°
Rotation Spee	ed min <sup>-1</sup>	16.6(33.3)	11.1(22.2)	5.5	5.5
Total Reduction		1/120(1/60)	1/180(1/90)	1/360	1/360
Indexing Accu	iracy sec	15	15	15	15
Net Weight	kg	470	500	2070	2210
MAX. Work Load	Vertical kg	400	400	2000	2000
on the Table	Horizontal kg	800	800	4000	4000
MAX.	N	150000	150000	281250	281250
Thrust Load applicable	*1 FXL N·m	5709	5709	20067	20067
on the Table	F×L N·m	16650	16650	42190	42190
Guide Line of MAX. Unbalancing Load  *2  N·m		200	200	300	300
MAX. Work Inertia	Vertical $(\frac{GD^2}{4})$ kg·m²	19.4(9.7)	37(18.5)	234	234
Driving Torque	*3 N·m	576(460)	864(690)	3168	3168

<sup>\*1</sup> This is the strength of the worm wheel without brake. It is applied against dynamic cutting thrust.

<sup>\*2</sup> The guide line of MAX unbalancing load means the unbalancing load, when the rotary table is used with support table in vertical application. The guide line figure will be different according to the servo motor, please refer to \$\sigma\$ P.59 for more detail.

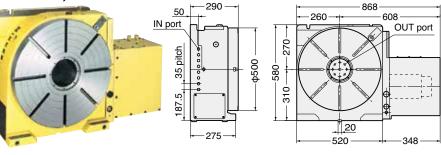
<sup>\*3</sup> Driving torque means the torque at MAX. rotation speed after acceleration. Driving torque is almost constant and independent from the load except unbalancing load is applied.

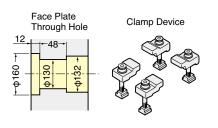
<sup>★</sup>Total reduction ratio of 1/180 is also available for CNC501T. ★ α iF22/4000 motor can be mounted on CNC501, 601.



External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

## CNC501, CNCZ501





**NIKKEN** 



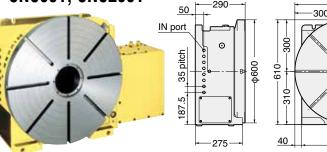


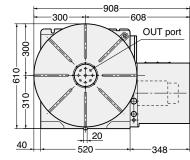


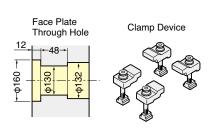


Rotary joint is included in the layout. (optional)

## **CNC601, CNCZ601**









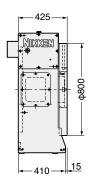


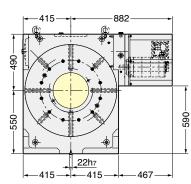


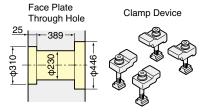
Rotary joint is included in the layout. (optional)

#### **CNC803**









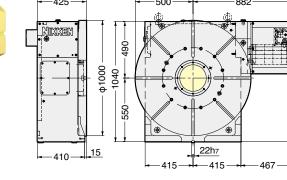






## **CNC1003**

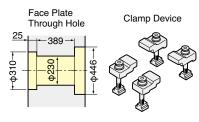






#### **CNC803B**

CNC803: the servomotor is mounted at back side, suitable for the application for pallet on Horizontal machines.



590









## **LARGE CNC ROTARY TABLE**





- Ideal for indexing and lead cutting of large work pieces
- Tooth thickness module 10 and ultrahigh rigidity among best in class.(CNC1600)
- Ideal for aircraft- and energy-related parts

































#### Specifications

#### The specification will be varied according to your application. Please contact us.

Item / Code No.		CNC1000*1	CNC1200*1	CNC1201*1	CNC1600*1
Diameter of Table ¢mm		1000	1200	1200	1600
Diameter of S	pindle Hole *2	300н7	300н7	300н7	400н7
Center Height	mm	Horizontal	Horizontal	650	850
Width of T Slo	ot *3 mm	22H7*3	22H7*3	22H7*3	28H7*3
Clamping Sys	tem	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Clamping Tor	que N·m	18000	18000	18000	35000
Servo Motor	min <sup>-1</sup>	αiF22	2•2000	αiF30•200	00
MIN. Increme	nt	0.001°	0.001°	0.001	0.001
Rotation Spee	ed min <sup>-1</sup>	5.5	5.5	2.7	2.7
Total Reduction	on Ratio* <sup>4</sup>	1/360	1/360	1/720	1/720
Indexing Accu	iracy sec	15	15	15	15
Indexing Accur	acy of Ultra Precision sec	±3	±3	±3	±3
Net Weight	kg	1700	1850	3500 *5	5250 *5
MAX. Work Load	Vertical kg			6500	10000
on the Table	Horizontal kg	7000	7000	13000	30000
MAX.	N N	281250	375000	1333330	2000000
Thrust Load applicable on the Table	*6 FXL N·m	24080	24080	79025	111952
on the rable	F×L N·m	42190	67500	240000	510000
MAX. Work Inertia	Vertical kg·m²	1300	1300	2300	6400
MAX. Allowable Torque	N·m	3168	3168	8640	8640

- CNC1000, 1200, 1600 is semi-standard model.
- The diameter of the spindle hole is restricted for the ultra precision type with Heidenhain rotary encoder. Standard large rotary tables are without T slot. T slot is available as an option, please specify the width of the T slot.
- Total reduction ratio and motor can be changed according to your application, please contact us.
- \*5 Net weight of the rotary table is for horizontal application. The weight of the back support for vertical application is not included.
- \*6 This is the strength of the worm wheel without brake. It is applied against dynamic cutting thrust.

# CNC1000, 1200, 1201, 1600

50

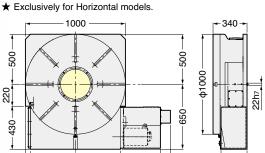


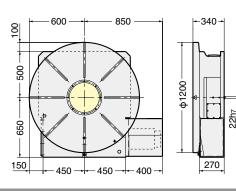
External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

100

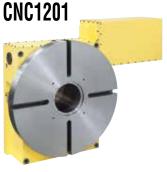
#### CNC1000,1200

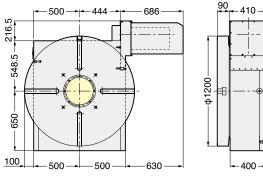






## RIGHT HAND FACE PLATE





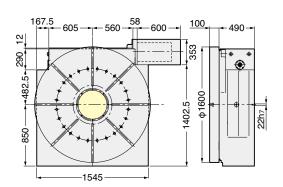




 $\bigstar$  Please contact us about the back support for vertical use.

## **CNC1600**







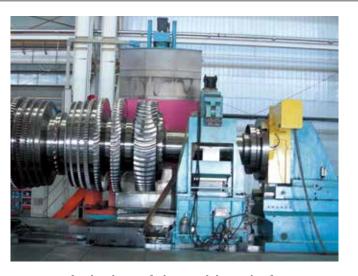


K21 CTRL

 $\bigstar$  Please contact us about the back support for vertical use.



Configuration of the large rotary table on the horizontal M/C to machine a propeller hub of the windmill.



Indexing of the turbine shaft

## TOP SIDE MOTOR MOUNTED CNC ROTARY TABLE

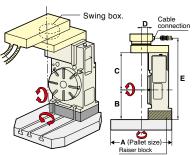




Ideal for automation of small parts by mounting of jig holder

Also ideal for B-axis of generalpurpose horizontal machining center. Figure at right shows example of pallet mounting.

Please specify A, B, C, D and E.





























EZ CTRL

P.69





#### Specifications

):High Speed CNC ROTARY Table Z series

Iter	n / Code No.	CNC202T CNCZ202T	CNC260T CNCZ260T	CNC302T *5 CNCZ302T
Diameter of Ta	able	200	260	300
Diameter of S	pindle Hole	ф60н7 ф40	ф80н7	ф80н7
Center Height	mm	150	170	170
Width of T Slo	ot mm	12 +0.018	12 +0.018	12 +0.018
Clamping Sys	tem	Pneumatic*4	Pneumatic*4 / Hydraulic	Pneumatic*4 / Hydraulic
Clamping Tord	que N·m	303	588 / 1568	588 / 1568
Table Inertia at N	Motor Shaft $\left(\frac{GD^2}{4}\right) \text{ kg} \cdot \text{m}^2 \times 10^{-3}$	1.0	1.5	1.5
Servo Motor	min <sup>-1</sup>	αiF4•3000	αiF4•3000	αiF4•3000
MIN. Increme	nt	0.001°	0.001°	0.001°
Rotation Spee	ed min <sup>-1</sup>	25.0 (50.0)	25.0 (50.0)	25.0 (50.0)
Total Reduction	on Ratio	1/120 (1/60)	1/120 (1/60)	1/120 (1/60)
Indexing Accu	iracy sec	±20	20	20
Net Weight	kg	70	160	165
MAX. Work Load	Vertical kg	100	175	175
on the Table	Horizontal kg			
MAX.	N	18000	42480	42480
Thrust Load applicable on the	*1 FXL N·m	542	1442	1442
Table	FXL N·m	690	2320	2320
Guide Line of MAX. Unbalancing Load	L 1/2/2 50		50	50
MAX. Work Inertia	Vertical $(\frac{GD^2}{4})$ kg·m <sup>2</sup>	1.0(0.5)	3.2(1.6)	3.2(1.6)
Driving Torque	*3 N·m	192(153)	192(153)	192(153)

<sup>\*1</sup> This is the strength of the worm wheel without brake. It is applied against dynamic cutting thrust.

<sup>\*2</sup> The guide line of MAX unbalancing load means the unbalancing load, when the rotary table is used with support table in vertical application. The guide line figure will be different according to the servo motor, please refer to \$\infty\$ P.57 for more detail.

<sup>\*3</sup> Driving torque means the torque at MAX. rotation speed after acceleration. Driving torque is almost constant and independent from the load except unbalancing load is applied.

<sup>\*4</sup> Air Intensifying Booster system is available if the supplied air pressure is under 0.5MPa or the brake torque is required to increase. P.95 \*5 CNC302T is semi-standard model. CNCZ series table can not be recommended for the application with large unbalancing load. CNCZ series table is recommended for the application only with light load.





External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

#### CNC202T, CNCZ202T

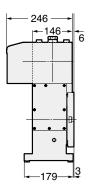


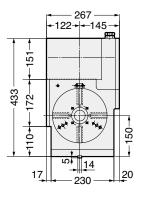


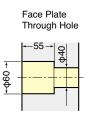














Air purge function is provided inside the motor cover as standard.

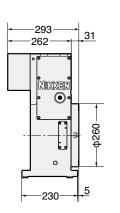
## CNC260T, CNCZ260T

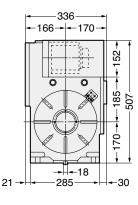


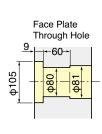


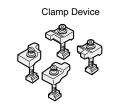








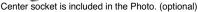


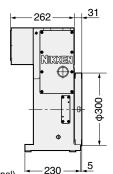


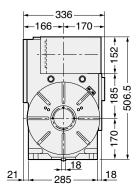
For the rotary table with pneumatic clamping, air purge function is provided inside the motor cover as standard.

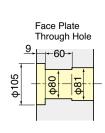
## CNC302T, CNCZ302T

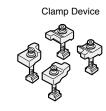


















For the rotary table with pneumatic clamping, air purge function is provided inside the motor cover as standard.

#### Specification of the Top Side Mounted CNC Rotary Table

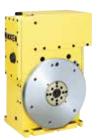


Photo with CNC302T without T slot.



Synchronors movement of 2 off CNC401T

Tubular roller bearing is installed against the thrust load. Therefore, when 2 rotary tables are faced on both side to synchronise movement, the system can be run without affecting the heat expansion of the rotary table.



CNC401T is installed on the pallet of the horizontal



CNC401T is installed on CNC600.



CNC501T is used for the tilting axis table of 5AX-tilting rotary table.

# TOP SIDE MOTOR MOUNTED CNC ROTARY TABLE **NIKKEN**

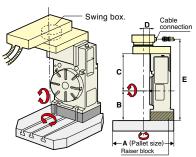




Ideal for automation of small parts by mounting of jig holder

Also ideal for B-axis of generalpurpose horizontal machining center. Figure at right shows example of pallet mounting.

Please specify A, B, C, D and E.

































#### Specifications

Iten	n / Code No.	CNC321T*4	CNC401T	CNC501T	CNC601T
Diameter of Table ¢mm		320	400	500	600
Diameter of S	pindle Hole	ф105н7	ф105н7	ф130н7	ф130н7
Center Height	: mm	240	240	310	310
Width of T Slo	ot mm	12 <sup>+0.018</sup>	14 <sup>+0.018</sup>	14 <sup>+0.018</sup>	14 +0.018
Clamping Sys	tem	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Clamping Tord	que N·m	1760	1760	4655	4655
Table Inertia at I	Motor Shaft $\left(\frac{\text{GD}^2}{4}\right) \text{ kg·m}^2 \times 10^{-3}$	2.0	2.0	9.0	8.8
Servo Motor	min <sup>-1</sup>	αiF12•2000	αiF12•2000	αiF22•2000	αiF22•2000
MIN. Increme	nt	0.001°	0.001°	0.001°	0.001°
Rotation Spee	ed min <sup>-1</sup>	16.6	16.6	16.6	11.1
Total Reduction	on Ratio	1/120	1/120	1/120	1/180
Indexing Accu	iracy sec	15	15	15	15
Net Weight	kg	220	245	495	525
MAX. Work Load	Vertical kg	250	250	400	400
on the Table	Horizontal kg				
MAX.	, N	53100	53100	150000	150000
Thrust Load applicable	*1 FXL N·m	2648	2648	5709	5709
on the Table		3840	3840	16650	16650
Guide Line of MAX.  Unbalancing Load  *2  N·m		100	100	200	200
$\begin{array}{c c} \text{MAX.} & \text{Vertical} \\ \text{Work Inertia} & & & & \\ \end{array}$		8.0	8.0	19	37
Driving Torque	*3 N·m	576	576	576	864

<sup>\*1</sup> This is the strength of the worm wheel without brake. It is applied against dynamic cutting thrust.

<sup>\*2</sup> The guide line of MAX unbalancing load means the unbalancing load, when the rotary table is used with support table in vertical application. The guide line figure will be different according to the servo motor, please refer to F.57 for more detail.

<sup>\*3</sup> Driving torque means the torque at MAX, rotation speed after acceleration, Driving torque is almost constant and independent from the load except unbalancing load is applied. \*4 CNC321T is semi-standard model.

<sup>★</sup> α/F22/4000 motor can be mounted on CNC321T, 401T, 501T, 601T. ★Total reduction ratio of 1/180 is also available for CNC501T.

# CNC321T, 401T, 501T, 601T



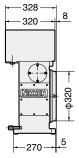
External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

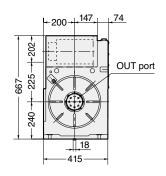
#### CNC321T

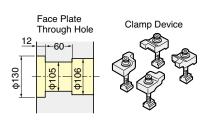










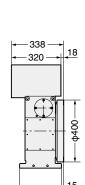


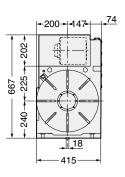
Rotary joint is included in the layout. In ports are located in back side.

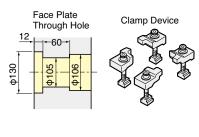
#### **CNC401T**











★ Built-in type rotary joint can be mounted on CNC401 refer \$\opin\$P.89

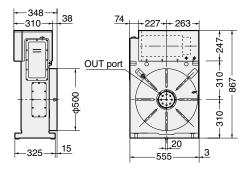
Center socket is included in the Photo. (optional)

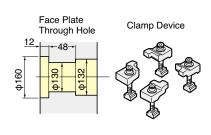
IN ports are located in back side.

#### CNC501T





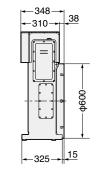


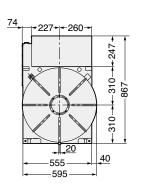


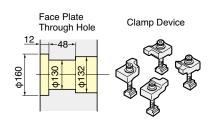
Rotary joint is included in the layout. (optional) In ports are located in back side.

#### CNC601T













## BACK SIDE MOTOR MOUNTED CNC ROTARY TABLE **NIKKEN**





CNC260B

- Suitable for the machine which does not have so wide space for Y axis, such as the gantory type M/C or the M/C with sprash guard
- Also compatible with rotary joints
- Select among pneumatic, hydraulic, and air-hydro clamping systems































#### Specifications

#### ):High Speed CNC ROTARY Table Z series CNC202D\*5 CNC221D\*5 CNC401D

Item	n / Code No	o.	CNC180B CNCZ180B	CNC202B CNCZ202B	CNC260B CNCZ260B	CNC302B*5 CNCZ302B	CNC321B*5 CNCZ321B	CNC401B CNCZ401B
Diameter of Ta	able	фтт	180	200	260	300	320	400
Diameter of S	Diameter of Spindle Hole \$\phi\$mm		ф60н7 ф40	ф60н7 ф40	ф80н7	ф80н7	ф105н7	ф105н7
Center Height		mm	180	180	170	170	230	230
Width of T Slo	t	mm	12 <sup>+0.018</sup>	12+0.018	12+0.018	12+0.018	12+0.018	14 <sup>+0.018</sup>
Clamping Sys	tem		Pneumatic*4	Pneumatic*4	Pneumatic*4 / Hydraulic	Pneumatic*4 / Hydraulic	Hydraulic	Hydraulic
Clamping Tord	que	N·m	303	303	588/1568	588/1568	1760	1760
Table Inertia at N	Motor Shaft $\left(\frac{GD^2}{4}\right)$	kg·m²×10 <sup>-3</sup>	0.4	0.4	1.7	1.8	7.0	7.0
Servo Motor		min <sup>-1</sup>	αiF2•3000	αiF4•3000	αiF4•3000	αiF4•3000	αiF12•2000	αiF12•2000
MIN. Incremen	nt		0.001°	0.001°	0.001°	0.001°	0.001°	0.001°
Rotation Spee	ed	min <sup>-1</sup>	33.3(66.6)	33.3(66.6)	25.0(50.0)	25.0 (50.0)	22.2(44.4)	22.2(44.4)
Total Reduction	on Ratio		1/90(1/45)	1/90(1/45)	1/120 (1/60)	1/120 (1/60)	1/90(1/45)	1/90(1/45)
Indexing Accu	ıracy	sec	±20	±20	20	20	15	15
Net Weight		kg	56	60	145	150	240	270
MAX. Work Load	Vertical -	kg	100	100	175	175	250	250
on the Table	Horizontal	kg						
MAX.	J.	l N	18000	18000	42480	42480	53100	53100
Thrust Load applicable on the	*1	) F×L N·m	542	542	1442	1442	2648	2648
Table		FXL N·m	690	690	2320	2320	3840	3840
Guide Line of MAX. Unbalancing Load	*2	w N·m	30	50	50	50	100	100
MAX. Work Inertia	Vertical	$(\frac{GD^2}{4})$ kg·m <sup>2</sup>	0.4	1.0	3.2(1.6)	3.2(1.6)	6.4(3.2)	6.4(3.2)
Driving Torque	*3	<del>`</del> → N·m	72(54)	144(115)	192(153)	192(153)	432(345)	432(345)

- \*1 This is the strength of the worm wheel without brake. It is applied against dynamic cutting thrust.
- \*2 The guide line of MAX unbalancing load means the unbalancing load, when the rotary table is used with support table.
- The guide line figure will be different according to the servo motor, please refer to \$\opin\$P.57 for more detail.

  \*3 Driving torque means the torque at MAX. rotation speed after acceleration. Driving torque is almost constant and independent from the load except unbalancing load is applied.
- \*4 Air Intensifying Booster system is available if the supplied air pressure is under 0.5MPa or the brake torque is required to increase. F.95
- \*5 CNC302B, CNC321B is semi-standard model. ★αiF4/5000 motor can be mounted on CNC180B. ★αiF8/4000 motor can be mounted on CNC260B, 302B.
- ★The air-hydraulic Booster is available, when the rotary table with hydraulic clamping system is used on the M/C without hydraulic source, please refer 🖙 P.95.

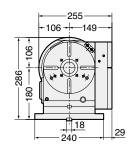
# CNC180B, 202B, 260B, 302B, 321B, 401B

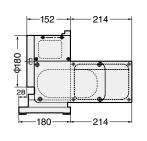


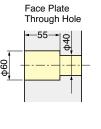
External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

## CNC180B, CNCZ180B













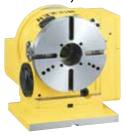


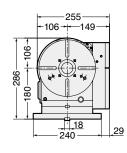


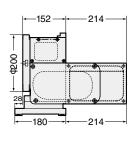


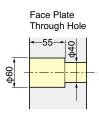
Air purge function is provided.

## CNC202B, CNCZ202B













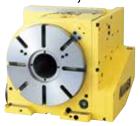


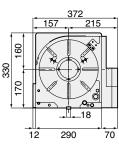


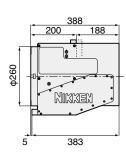


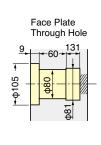
Air purge function is provided.

## CNC260B, CNCZ260B









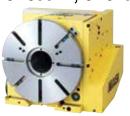


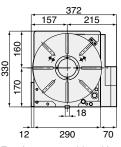


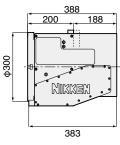


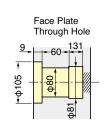
For the rotary table with pneumatic brake, air purge function is provided inside the motor cover as standard.

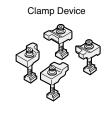
## CNC302B, CNCZ302B













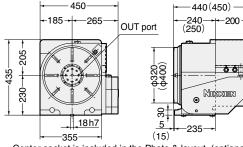


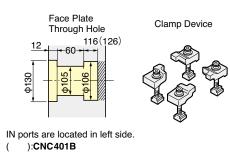


For the rotary table with pneumatic brake, air purge function is provided inside the motor cover as standard.

## CNC321B, CNCZ321B, CNC401B, CNCZ401B





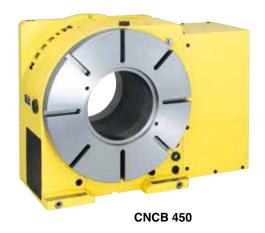




Center socket is included in the Photo & layout. (optional)

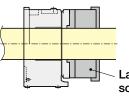
## **BIG BORE CNC ROTARY TABLE**





- Ideal for machining boring pipes for oil or natural gas
- Capable of cutting through-holes in work pieces
- Supports up to 20 + 1P rotary joint ports

**Example for the utilization** for large diameter bar work



Large diameter scroll chuck.

































#### Specifications

Iten	n / Code No.	CNCB 350	CNCB 450	CNCB 630	
Diameter of T	able	350	450	630	
Diameter of S	pindle Hole	ф154н7	ф205н7	ф345н7	
Center Height	t mm	230	280	380	
Width of T Slo	ot mm	14	18	14	
Clamping Sys	stem	Hydraulic	Hydraulic	Hydraulic	
Clamping Tor		3331	3870	6550	
Table Inertia at I	Motor Shaft $\left(\frac{\text{GD}^2}{4}\right) \text{ kg} \cdot \text{m}^2 \times 10^{-3}$	2.9	2.8	4.8	
Servo Motor	min <sup>-1</sup>	αiF12•2000	αiF12•2000	αiF22•2000	
MIN. Increme	nt	0.001°	0.001°	0.001°	
Rotation Spee	ed min <sup>-1</sup>	22.2 (44.4)	25.0 (50.0)	11.1(22.2)	
Total Reduction	on Ratio	1/90(1/45)	1/120 (1/60)	1/180 (1/90)	
Indexing Accu	iracy sec	15	15	15	
Net Weight	kg	245	330	750	
MAX. Work Load	Vertical kg	250	350	400	
on the Table	Horizontal kg	500	700	800	
MAX.	Z	5300	63720	250000	
Thrust Load applicable	*1 FXL N·m	2648	3531	5297	
on the Table	FXL N·m	3840	5990	33000	
Guide Line of MAX. Unbalancing Load	*2 N·m	100	150	300	
MAX. Work Inertia	Vertical $(\frac{GD^2}{4}) \text{ kg} \cdot \text{m}^2$	6.4	17.0	40.0	
Driving Torque	*3 N·m	432	576	1584	

<sup>\*1</sup> This is the strength of the worm wheel without brake. It is applied against dynamic cutting thrust.

<sup>\*2</sup> The guide line of MAX unbalancing load means the unbalancing load, when the rotary table is used with support table in vertical application. The guide line figure will be different according to the servo motor, please refer to P.57 for more detail.

<sup>\*3</sup> Driving torque means the torque at MAX. rotation speed after acceleration. Driving torque is almost constant and independent from the load except unbalancing load is applied.

CNCB350, 450(T), 630

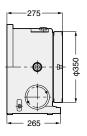


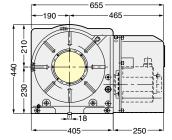
External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

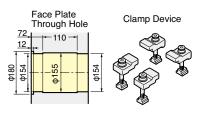
#### **CNCB350**



# Ultra Big Bore ( $\phi$ 154mm) Specification





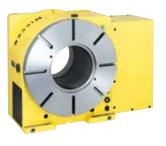




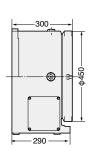


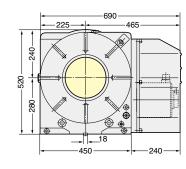


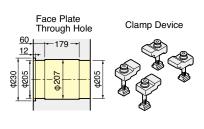
## CNCB450



#### Ultra Big Bore (\$\phi\$205mm) Specification







## RIGHT HAND



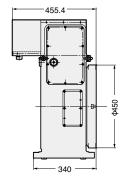


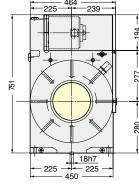


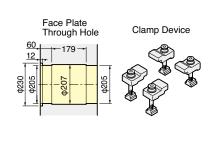
#### CNCB450T



## Ultra Big Bore (ф205mm) Specification

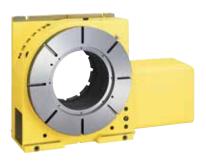




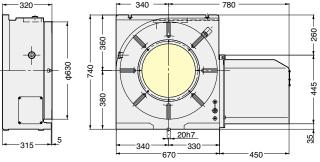


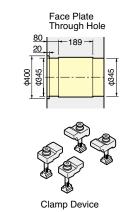


#### CNCB630















## **MULTI-SPINDLE CNC ROTARY TABLE**





CNC100-2W

- Multi-Spindle (2, 3 & 4 spindles) CNC rotary table series for rationalization of machining of small size work pieces (φ3~100mm)
- Max. number of spindles CNC100 : 4 spindles, CNC180 : 4 spindles, CNC202: 4 spindles, CNC260: 2 spindles. Please contact us
- Ideal for small items and mass-produced parts

MOTOR MOUNTED



























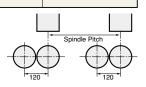




Specifications Multi-Spindle CNC Rotary Tables are all semi-standard models. Please contact us. ( ):High Speed type Please contact us.

Iten	n / Code No.	CNC100-2W,-3W,-4W		CNC180-2W	CNC202-2W	CNC260-2W		
Diameter of T	able $\phi$ mm		105		180	200	260	
Diameter of S	pindle Hole $\phi$ mm	Ф60н7 Ф30		Ф60н7 Ф40	Ф60н7 Ф40	Ф80н7		
Number of sp	indles (Pitch) mm		2,3,4×120		2×250	2×250	2×350	
Center Height	mm		105		175	175	220	
Width of T Slo	ot mm		16 <sup>+0.018</sup>		12 +0.018	12 <sup>+0.018</sup>	12+0.018	
Clamping Sys	tem		Pneumatic*3	B	Pneumatic*3	Pneumatic*3	Pneumatic*3 / Hydraulic	
Clamping Tor	que N·m		147		303	303	588/1568	
Table Inertia at I	Motor Shaft $\left(\frac{\text{GD}^2}{4}\right) \text{ kg} \cdot \text{m}^2 \times 10^{-3}$	0.13	0.16	0.2	0.12	0.13	0.7	
Servo Motor	min <sup>-1</sup>	αiF2	•3000	αiF4•3000	αiF4•3000	αiF8•3000	αiF8•3000	
MIN. Increme	nt		0.001°		0.001°	0.001°	0.001°	
Rotation Spee	ed min <sup>-1</sup>	16.6(66.6)			33.3	33.3	22.2	
Total Reduction	on Ratio	1/180 (1/45)			1/90	1/90	1/120	
Indexing Accu	iracy sec	±30 ±45		±45	±20	±20	20	
Net Weight	kg	70	90	120	115	120	320	
MAX. Work Load	Vertical kg	15			100	100	175	
on the Table	Horizontal kg	30			200	200	350	
MAX.	N N	3920			18000	18000	42480	
Thrust Load applicable	*1 FXL N·m	275			542	542	1442	
on the Table	FXL N·m	98		690 690		2320		
MAX. Work Inertia	Vertical $(\frac{GD^2}{4})$ kg·m <sup>2</sup>	0.019 (0.07Horizontal)		0.5	0.5	1.9		
Driving Torque	*2 N·m	72		72	144	192		

<sup>\*1</sup> This is the strength of the worm wheel without brake. It is applied against dynamic cutting thrust.



<sup>\*2</sup> Driving torque means the torque at MAX. rotation speed after acceleration.

Driving torque is almost constant and independent from the load except unbalancing load is applied. \*3 Air Intensifying Booster system is available if the supplied air pressure is under 0.5MPa or the brake torque is required to increase. ☞ P.95
★ Min. pitch between spindles CNC100 : 120mm, CNC180 : 250mm, CNC202 : 250mm,

CNC260: 320mm. Please contact us when the different pitch is required. ★ 4 spindles table to suit 2 spindles M/C is available.

<sup>★ 5</sup> or 6 spindles CNC rotary table is also available.

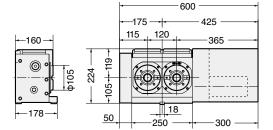
## CNC100-2W, 3W, 4W, CNC180-2W, CNC202-2W, CNC260-2W

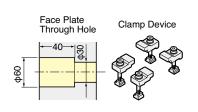


External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

#### CNC100-2W













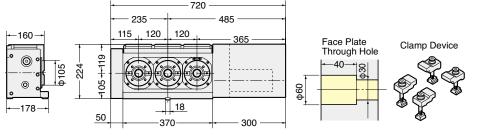




Air purge function is provided inside the motor cover as standard.

#### CNC100-3W









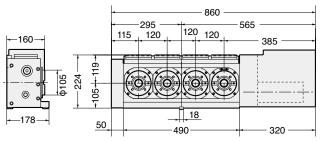


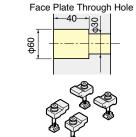


Air purge function is provided inside the motor cover as standard.

#### CNC100-4W













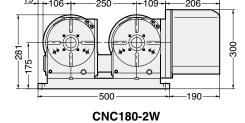


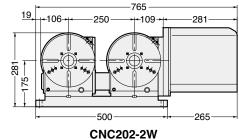
Air purge function is provided inside the motor cover as standard.

Clamp Device

## CNC180-2W, CNC202-2W







CNC202-2W









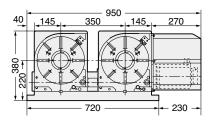


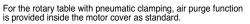


Air purge function is provided inside the motor cover as standard.

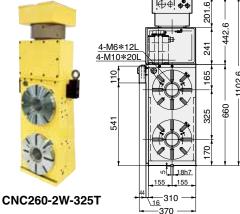
#### CNC260-2W Pneumatic Clamping Torque UP 588Nm







#### CNC260-2W-325T













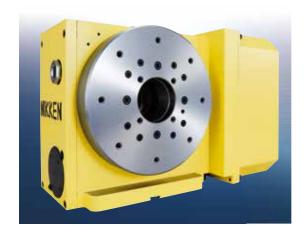


# NCT

# **CNC ROTARY TABLE**

## New

#### HIGH CLAMPING TORQUE COMPACT CNC ROTARY TABLE



# Small but Strong NCT200

## 900Nm

**Super-high Clamping System** 

#### Reliable indexing accuracy enhances profitability

Super-high Clamping torque 900Nm can be generated by air supply only. Strong clamping torque and better indexing accuracy enhance productivity.

#### MOTOR MOUNTED FACE PLATE -— M-SIGNAL METHOD EZ CTRL ADD. ACCURACY **X21 AXIS** SPEC. P.59 P.69 P.57 P.99 ROTARY ULTRA **SCROLI** CLAMP T-NUT JOINT **PRECISION TABLE** STOCK **CHUCK CHUCK** DEVICE

P.83

P.84

P.85

P.86

## 25%UP

P.89

**High Rigidity of New Driving System** 

## Maintain high accuracy over the long term Reduce the total maintenance cost

Redesigning the driving system, the rigidity increases 25%. High durability of the mechanism is allowed to maintain high accuracy and to accomplish high precision machining operation over the long term.

# **High Speed**

P.79

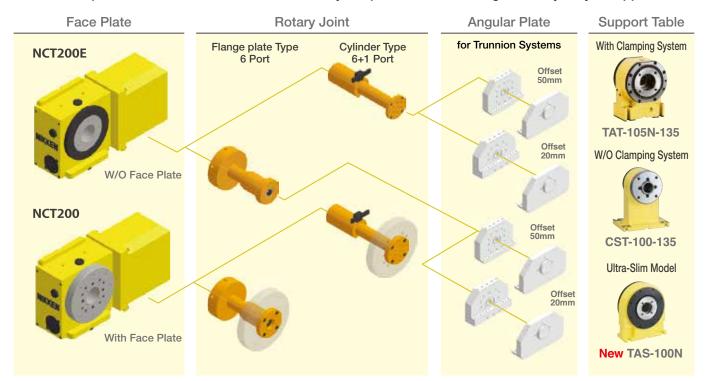
Z Type is also Available

#### Reducing cycle time enhances productivity

High speed Z type is also available. Setting up gear ratio 1/2 is allowed rotation speed to be double.

#### **Great Customization**

Without faceplate models are now available. A variety of options enhance the great utility for your applications.







#### Specifications

Itam / Cada Na		With Fa	ce Plate	W/O Face Plate			
Ite	m / Code No.		Standerd	High Speed	Standerd	High Speed	
Right Hand	Mounted Moter		NCT200	NCTZ200	NCT200E	NCTZ200E	
Left Hand M	ounted Moter		NCT200L	NCTZ200L	NCT200EL	NCTZ200EL	
Diameter of T	able	фmm	200	200	130	130	
Diameter of S	pindle Hole	фmm	ф60Н7 ф40	ф60Н7 ф40	ф60Н7 ф40	ф60Н7 ф40	
Center Height	t	mm	135	135	135	135	
Clamping Sys	stem		PNEMATIC*4	PNEMATIC*4	PNEMATIC*4	PNEMATIC*4	
Clamping Tor	que	N•m	900	900	900	900	
Table Inertia at	Motor Shaft kg	·m <sup>2</sup> X10 <sup>-3</sup>	0.1	0.1	0.1	0.1	
Servo Motor	$\left(\frac{GD^2}{4}\right)$	min <sup>-1</sup>	αiF4·3000	αiF4·3000	αiF4·3000	αiF4•3000	
MIN. Increme	nt		0.001	0.001	0.001	0.001	
Rotation Spec	ed	min <sup>-1</sup>	33.3	66.6	33.3	66.6	
Total Reduction	on Ratio		1/90	1/45	1/90	1/45	
Indexing Accu	ıracy	sec	±20	±20	±20	±20	
Net Weight		kg	65	65	62	62	
MAX. Work Load	Vertical kg		100	100	100	100	
on the Table	Horizontal	kg	200	200	200	200	
MAX.	F	N	18000	18000	18000	18000	
Thrust Load applicable	*1	FXL N·m	677	677	677	677	
Table	on the Table FXL		690	690	690	690	
Guide Line of MAX. Unbalancing Load	<u> </u>		60 30		60	30	
MAX. Work Inertia	Vertical	<u>ı²</u> ) kg∙m²	1.1	0.5	1.1	0.5	
Driving Torque	*3	N∙m	151	121	151	121	

<sup>\*1</sup> This is the strength of the worm wheel without face plate clamping. It is applied against dynamic cutting thrust.

<sup>\*2</sup> The guide line of MAX unbalancing load means the unbalancing load, when the rotary table is used with support table in vertical application.

The guide line figure will be different according to the servo motor, please refer \$\sigma\$P.37 for more detail.

<sup>\*3</sup> Driving torque means the torque at MAX. rotation speed after acceleration. Driving torque is almost constant and independent from the load except unbalancing load is applied.

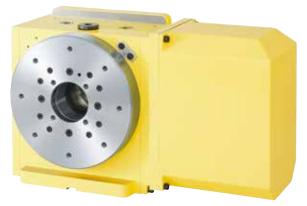
<sup>\*4</sup> Air Intensifying Booster system is available if the supplied air pressure is under 0.5MPa or the brake torque is required to increase. F.95

<sup>★</sup>Standard faceplate is without T slot. T slot is available as an option. Please contact us.

## **DIMENSIONS OF NCT200**

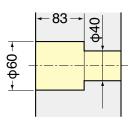


#### **NCT200 (With Face Plate)**

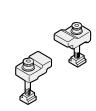


(Photo) NCT200FA

#### Face Plate Through Hole



**Clamp Device** 





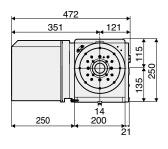


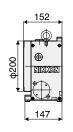




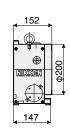


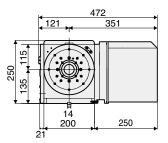
#### Left Hand : NCT200LFA





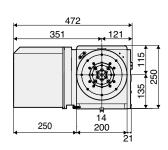
## Right Hand : NCT200FA

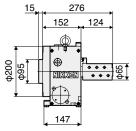




#### Left Hand: With Cylinder type Rotary Joint

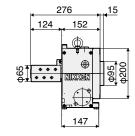
NCT200L+Clinder type Rotary Joint(6+1 Ports)
RT-NC200SD-6+1-L\*1

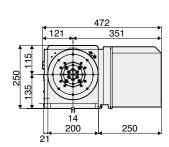




#### Right Hand: With Cylinder type Rotary Joint

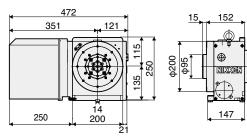
NCT200+Clinder type Rotary Joint(6+1 Ports) RT-NC200SD-6+1-R\*1





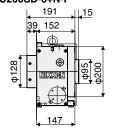
#### Left Hand: With Flange Plate type Rotary Joint

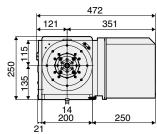
NCT200L+Flange Plate type Rotary Joint(6 Ports) RN-NC200SD-6+N-F\*1



#### Right Hand: With Flange Plate type Rotary Joint

NCT200+Flange Plate type Rotary Joint(6 Ports)
RN-NC200SD-6+N-F\*1





External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

## **DIMENSIONS OF NCT200E**

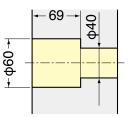


#### **NCT200E (W/O Face Plate)**

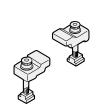


(Photo) NCT200EFA

#### **Face Plate Through Hole**









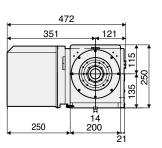


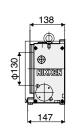






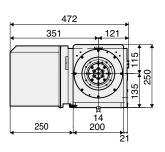
#### Left Hand : NCT200ELFA

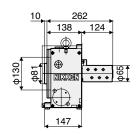




#### Left Hand: With Cylinder type Rotary Joint

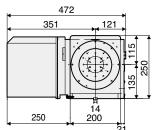
NCT200EL+Clinder type Rotary Joint(6+1 Ports) RT-NC20ESD-6+1-L\*

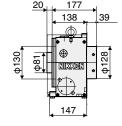




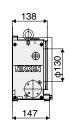
#### Left Hand: With Flange Plate type Rotary Joint

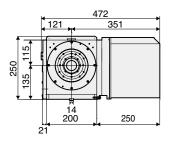
NCT200EL+Flange Plate type Rotary Joint(6 Ports) RN-NC20ESD-6+N-F\*1





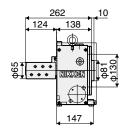
#### Right Hand : NCT200EFA

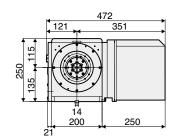




#### Right Hand: With Cylinder type Rotary Joint

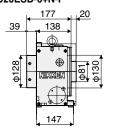
NCT200E+Clinder type Rotary Joint(6+1 Ports) RT-NC20ESD-6+1-R\*1

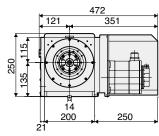




#### Right Hand: With Flange Plate type Rotary Joint

NCT200E+Flange Plate type Rotary Joint(6+1 Ports) RN-NC20ESD-6+N-F\*1

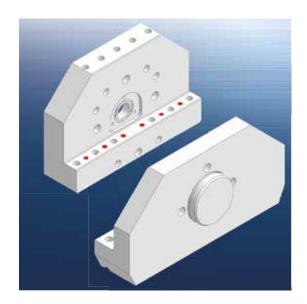




External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

## **ANGULAR PLATE FOR NCT200E**

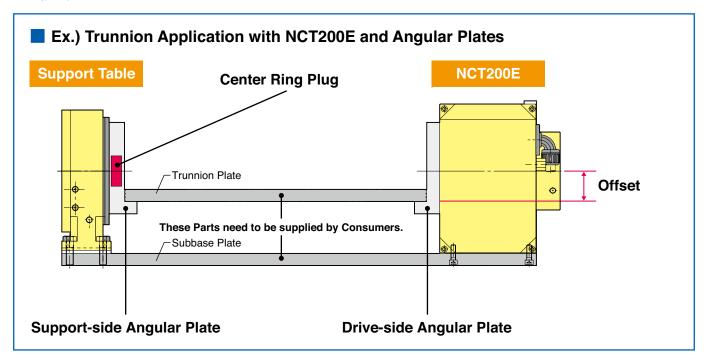




Model without faceplate: Custom Angular plates for use with the NCT200E. When combined with the NCT200E, they enable configuration of compact trunnion applications that maximize space inside the machine.

# Trunnion Applications Utilize the NCT's High Rigidity and Powerful Clamping Capability for More Efficient Utilization of Limited Space.

The NCT200 series, which can reliably drive trunnion applications with its powerful clamping capability and high rigidity exceeding the norm for this product class, is now provided with angle plates as a standard accessory. When combined with the NCT200E without faceplate, they allow application configuration that utilizes space inside the machine to the maximum.



# Lineup Of Two Types for Internal or External Rotary Joints

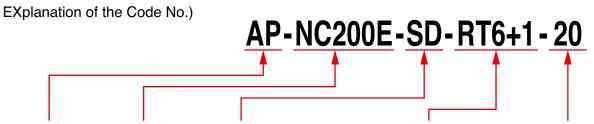
A lineup of two types of drive-side angle plate is available for use in combination with the NCT200E to match the rotary joint specification. Specify the type of angle plate you require according to the componentsor applications.

#### 20 mm / 50 mm Selectable Offset

In addition, a lineup of two offset specifications is available for both the drive-side Angular plate and support-side Angular plate. This allows you to configure the optimal application to match the component size.

## SPECIFICATION OF ANGULAR PLATE FOR NCT200E NIKKEN





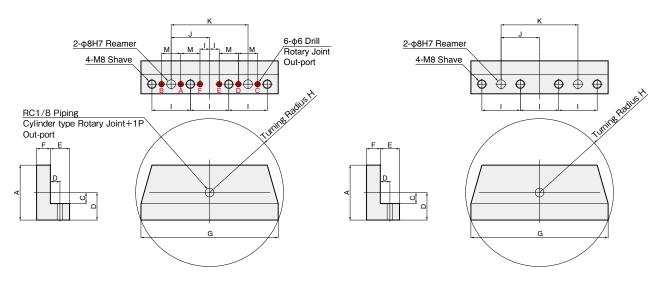
Angular Plate Product SD... Standard Number of Ports of Rotary Joint Offset Code No. SP... Special

RT... Cylinder type ... 20mm RN··· Flange Plate type ... 50mm 50

N ... Non (Support-side Only)

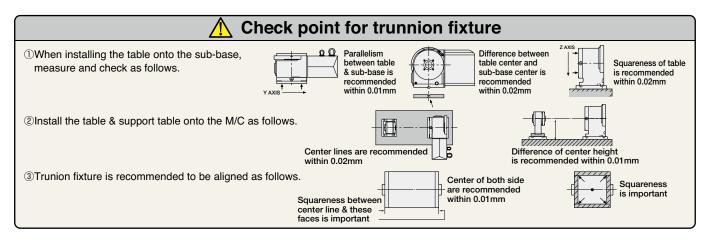
#### Drive-side

#### Support-side



#### **Speciffications**

Subject	Subject Models		Offset	Code No.	Α	В	С	D	Е	F	G	Н	1	J	К
		Cylinder type Rotary Joint Ready  Flange Plate type Rotary Joint Ready	20mm	AP-NC200E-SD-RT6+1-20	133	53	20			25 35	200	107	14 60	60±0.01	120±0.01
Duite state	NCT200E		50mm	AP-NC200E-SD-RT6+1-50	150	70	50	44 00	00			114			
Drive-side	NC 1200E		20mm	AP-NC200E-SD-RN6-20	133	53	20	11 20	20			113			
			50mm	AP-NC200E-SD-RN6-50	150	70	50					114			
	TAS-100N	with Center Ring Plug	20mm	AP-TAS100-SD-N-20	105	53	20	16 25				113	3		
Support-side	Center F		50mm	AP-TAS100-SD-N-50	122	70	50		00	000	114		00 0 01	100 001	
	TAT 405N 405	05N-135 with Center Ring Plug	20mm	AP-TAT105-SD-N-20	105	53	20		25	20	H	113	60	60±0.01	120±0.01
	1A1-103N-133		50mm	AP-TAT105-SD-N-50	122	70	50					114			



# NSV ROTARY HIRTH COUPLING INDEX



- Ideal for deep cutting of highly rigid material
- Indexing Accuracy: ±2"
- No Lifting up of Table at Indexing Time. (Built-in 3 pieces of Hirth Coupling) JAPAN : PAT.























EZ CTRL

P.69





#### Specifications

Iten	n / Code No.		NSVZ180	NSVZ300	NSVX400	NSVX500	NSVX400T
Diameter of	Table	фmm	180	300	400	500	400
Diameter of Spindle Hole ¢mm		Ф60н7 Ф30	Ф60н7 Ф52	Ф80н7	Ф80н7	Ф80н7	
Center Heigl	ht	mm	135	170	240	310	240
Width of T S	lot	mm	12 +0.018	12 +0.018	14 +0.018	14 +0.018	14 <sup>+0.018</sup>
Clamping Sy	/stem		Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Clamping To	orque	N·m	910	2155	5880	5880	5880
Table Inertia a	t Motor Shaft $(\frac{GD^2}{4})$ kg	·m²×10 <sup>-3</sup>	0.11	0.16	2.9	3.9	2.9
Servo Motor		min <sup>-1</sup>	α iF2•2000	α iF4•2000	α iF12·2000	α iF12·2000	α iF12·2000
MIN. Increm	ent		1°	1°	1°*/0.001°	1°*/0.001°	1°*/0.001°
Rotation Spe	eed	min <sup>-1</sup>	11.1	11.1	22.2	16.6	16.6
Total Reduc	tion Ratio		1/180	1/180	1/90	1/120	1/120
Indexing Acc	curacy	sec	±3	±2	±2*	±2*	±2*
Net Weight		kg	60	150	325	410	350
MAX. Work Load	Vertical	kg	50	150	250	250	250
on the Table	Horizontal	v] kg	100	300	500	500	
MAX.	F	N	23520	39200	58800	58800	58800
Thrust Load applicable	*1	F×L N·m	911	2156	5880	5880	5880
on the Table		F×L N·m	569	1421	3920	3920	3920
Guide Line of MAX. Unbalancing Load	*2	N·m	30	30	100	100	-
MAX. Work Inertia	Vertical	<sup>2</sup> -) kg·m <sup>2</sup>	0.14	1.0	6.4	6.4	11.5
Driving Torque		N·m			432	576	576

<sup>\*1</sup> This is the strength of the clamping by the hirth coupling.

<sup>\*2</sup> The guide line of MAX unbalancing load means the unbalancing load, when the rotary table is used with support table in vertical application. The guide line figure will be different according to the servo motor, please refer to F.57 for more detail.

<sup>★</sup> NSVZ series are indexing table which is indexable at each 1°.
★ NSVX series are rotary and indexing table which clamped by hirth coupling (of high precision & high rigidity) at each 1°, also perform min. command incremental at 0.001° and profile milling.

<sup>★</sup> XiF4/5000 motor can be mounted on NSVZ180 and NSVZ300.

★ The air-hydraulic booster is available, when NSVZ180 or NSVZ300 is used on the M/C without hydraulic source.

 <sup>★</sup> Please be careful that the centralizing of work piece or jig fixture should be done after indexing, not rotating.
 ★ The solenoid valve is installed inside the table for the indexing table with NIKKEN controller. The solenoid valve must be installed at the hydraulic tank for the indexing table of the additional axis control.

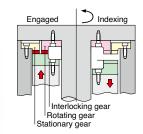
# NSVZ180, 300, NSVX400, 400T, 500



#### No lift (Three pieces of Hirth Coupling)

Three pieces of 360 division precision hirth coupling ensures smooth and fast indexing without table lifting.

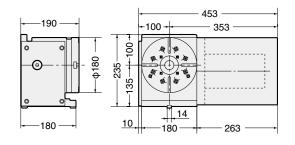
●3-piece Hirth coupling developed in-house by NIKKEN

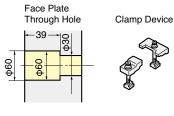


External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

#### NSVZ180

















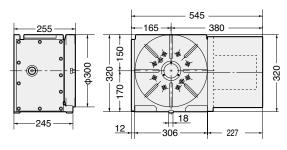


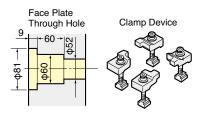


#### NSVZ300

Photo with center socket. (optional)









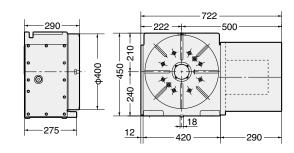


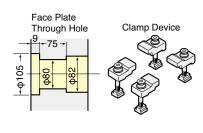




#### NSVX400









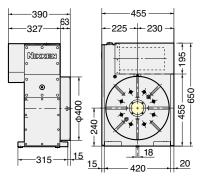






#### NSVX400T





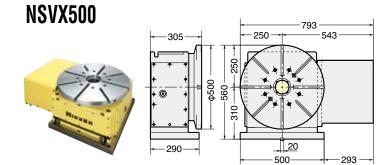




Photo: for horizontal use. Please contact us for external dimension.

# **NST MANUAL TILTING ROTARY TABLE**



- Table can be tilted at  $0^{\circ} \sim 90^{\circ}$  manually
- ndexing is CNC controlled so that it can be adapted to all kinds of machining
- Suitable for wide variety of applications thanks to numerical tilting axis control

M-SIGNAL METHOD -

WITH FACE PLATE X21 CTRL EZ CTRL P.69

P.59 SCROLL **CHUCK** P.83

**POWER CHUCK** P.84

CLAMP DEVICE P.85

ADD. AXIS

P.57

T-NUT P.86

ACCURACY SPEC.

P.99

#### Specifications

Iten	n / Code No.	NST250	NST250 NST300		
Diameter of Ta	able	250	300	500	
Diameter of S	pindle Hole	Ф60нт Ф52	Ф60н7 Ф60	Ф75н7 Ф61.5	
Center Height	mm	155	208	288	
Width of T Slo	ot mm	12 +0.018	12 +0.018	14 +0.018	
Clamping Sys	tem	Pneumatic*2	Pneumatic*2	Pneumatic*2	
Clamping Tord	que N·m	147	196	196	
Table Inertia at I	Motor Shaft $\left(\frac{\text{GD}^2}{4}\right) \text{ kg} \cdot \text{m}^2 \times 10^{-3}$	0.39	0.59	0.69	
Servo Motor	min <sup>-1</sup>	α iF2•2000	α iF4•2000	α iF8•2000	
MIN. Increme	nt	0.001°	0.001°	0.001°	
Rotation Spee	ed min <sup>-1</sup>	16.6	11.1	5.5	
Total Reduction	on Ratio	1/120	1/180	1/360	
Indexing Accu	iracy sec	20	20	20	
Net Weight	kg	75	135	320	
MAX. Work Load	90° kg	50	100	200	
on the Table	Horizontal kg	100	300	500	
MAX.	N N	17500	31860	75000	
Thrust Load applicable	*1 FXL N·m	603	903	2884	
on the Table	FXL N·m	770	2010	8330	
MAX. Work Inertia	90° ( <u>GD²</u> ) + ( <u>GD²</u> ) kg·m²	1.35	3.37	14.70	
Driving Torque	N·m	144	288	1152	

<sup>\*1</sup> This is the strength of the worm wheel without brake. It is applied against dynamic cutting thrust.

<sup>\*2</sup> Air Intensifying Booster system is available if the supplied air pressure is under 0.5MPa or the brake torque is required to increase. ☞ P.95
★ ≪iF8/3000 motor can be mounted on NST300.



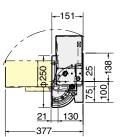
NST250, 300, 500

External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

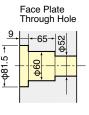
### **NST250**

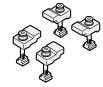


707 206 501



Center height at 90°: 155mm





Clamp Device

Center socket is included in the Photo. (optional)





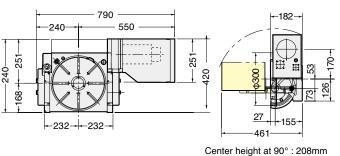


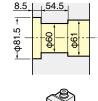
Guide key width: 18mm Table height in horizontal position: 151mm

## **NST300**

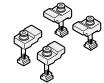


Center socket is included in the Photo. (optional)





Face Plate Through Hole



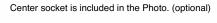
Clamp Device

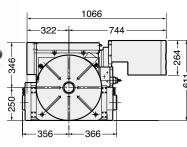
Guide key width: 18mm

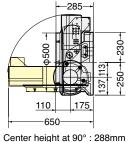
Table height in horizontal position: 182mm

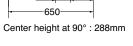
## **NST500**

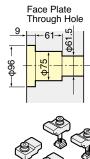












Clamp Device







Guide key width: 18mm Table height in horizontal position: 285mm



## **TILTING ROTARY TABLE**

## New

THE SMALLEST TILTING CNC ROTARY TABLE FOR COMPACT MACHINES























**CHUCK** 

CLAMP DEVICE

T-NUT P.86

Ultra Compact Tilting Rotary Table

## 5AX-100

## Minimum & Lightest Weight

The Smallest and Lightest 5AX

Demonstrates the true worth of a compact machining center with limited machining space.

With a body width of 466mm and product weight of 84 kg, the 5AX series is the smallest and lightest tilting rotary table in NIKKEN's history. It is an ideal counterpart to products such as the BT30 compact machining center. It allows you to secure more machining space than was possible with earlier models.

## Tilting Axis 410Nm

Tilt-axis with Air-hydranlic unit as Standard Equipment.

Astoundingly powerful clamping capability in spite of compact body.

For machines with no hydraulic power source, the tilt-axis is equipped with an air-hydro unit that provides powerful hydraulic clamping using only an air supply. In spite of its compact body, it delivers an astounding 410 Nm of clamping power, enabling high positioning accuracy for highly precise machining.

## **Extensive Lineup of Attachments**

This extensive attachment lineup from NIKKEN allows machining of a wide variety of work pieces.



Jig Plate



Scroll Chuck

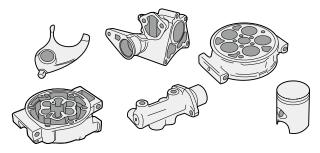


Center Socket

High-precision 5-axis machining of precision electronic devices such as smartphones, automobile parts, etc. can be accomplished using a compact machining center.



Impeller



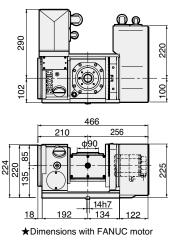
Components of Automotive Parts

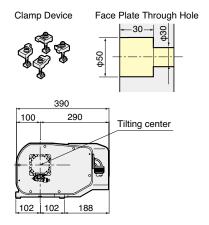




















Specifi	cations			
Iten	n / Code No.	5AX-100		
Diameter of T	able $\phi$ mm	ф90		
Diameter of S	pindle Hole	Ф50н	7 Ф30	
Center Height	t (90°) mm	1.	35	
Table Height in H	Horizonatal Position (0°) mm	1	90	
Width of T Slo	ot mm	Ф8Н7 І	Pin hole	
Axis		Rotary	Tilting (0°∼105°)	
Clamping Sys	stem	Pneumatic*1	Air Hydraulic Booster Built-in type	
Clamping Tor	que N·m	205	410	
Table Inertia at I	Motor Shaft $\left(\frac{\text{GD}^2}{4}\right) \text{ kg·m}^2 \times 10^{-3}$	0.09	0.12	
Servo Motor	min <sup>-1</sup>	α iF1 •2000	α iF2•2000	
MIN. Increme	nt	0.001°	0.001°	
Rotation Spee	ed min <sup>-1</sup>	44.4	22.2	
Total Reduction	on Ratio	1/45	1/90	
Indexing Accu	iracy sec	±30	60	
Net Weight	kg	84		
MAX. Work Load	0° to 30°	40		
on the Table	30° to 90°	2	20	
	Tilting Angle   F   F   F   N	53	300	
MAX. Thrust Load	Tilting Angle	L= 45mm	F=3820N	
applicable on the Table	Tilting Angle F1 F2 = 90° + 10 - 10	L <sub>1</sub> =0mm L <sub>2</sub> =100mm	$F_1 = 2945N$ $F_2 = 1045N$	
	Tilting Angle F FXL N·m	98		
MAX. Work Inertia	+ $\left(\frac{\text{GD}^2}{4}\right) \text{ kg·m}^2$	0.	03	
Driving Torque	N·m	1	8	

<sup>■</sup> The Area of Noninterference in Tilting Position.

Angle	5AX-100
0° \$ 45°	\$170 \$140 \$120 \$120 \$120 \$120 \$120 \$120 \$120 \$12
0° \$ 90°	\$\frac{\phi_{170}}{\phi_{140}} \frac{\phi_{170}}{\phi_{170}} \frac
0° \$ 105°	\$\frac{15^{\chi}}{\phi 150}\$

<sup>\*1</sup> Air Intensifying Booster system is available if the supplied air pressure is under 0.5MPa or the brake torque is required to increase. 3P.95

## **COMPACT TILTING ROTARY TABLE**





- Rotary and tilting axes are controlled by CNC
- Various kinds of attachments













CLAMP

DEVICE

P.85















EZ CTRL

P.69









### Specifications

Item / Code No.		5AX	-130	5AX	-201	
Diameter of Ta	able	фтт	Φ105(with Φ1	30 sub table)	200	
Diameter of S	pindle Hole	фтт	Ф 60н	7 ф30	Ф60н7 Ф50	
Center Height	(90°)	mm	15	50	180	
Table Height in H	Iorizonatal Position (0°)	mm	23	35	20	60
Width of T Slo	t	mm	ф10Н7	Pin hole	12	+0.018 0
Axis			Rotary	Tilting (0°∼105°)	Rotary	Tilting (0°∼105°)
Clamping Sys	tem		Pneumatic*2	Pneumatic*2	Pneumatic*1*2/ Hydraulic	Pneumatic*1*2/ Hydraulic
Clamping Tord	que	N·m	205	303	303*1*2/ 588	303* <sup>1</sup> * <sup>2</sup> / 612
Table Inertia at N	Motor Shaft $(\frac{GD^2}{4})$ kg·r	n <sup>2</sup> ×10 <sup>-3</sup>	0.09	0.12	0.11	0.16
Servo Motor		min <sup>-1</sup>	α iF2•3000	αiF2•3000	α iF2•2000	αiS4•2000
MIN. Increme	nt		0.001°	0.001°	0.001°	0.001°
Rotation Spee	ed	min <sup>-1</sup>	33.3	16.6	22.2	16.6
Total Reduction	on Ratio		1/90	1/180	1/90	1/120
Indexing Accu	racy	sec	±30	60	20	60
Net Weight		kg	115		160	
MAX. Work Load	0° to 30°	w kg	5	0	6	0
on the Table	30° to 90°	-₩] kg	2	0	4	0
	Tilting Angle	N	58	80	98	000
MAX. Thrust Load	Tilting Angle		L=65mm	F=2940N	L=100mm	F=4900N
applicable on the Table	Tilting Angle F1 F2 = 90° +		L <sub>1</sub> =0mm L <sub>2</sub> =100mm	F <sub>1</sub> =3460N F <sub>2</sub> =1590N	L <sub>1</sub> =0mm L <sub>2</sub> =100mm	F <sub>1</sub> =588N F <sub>2</sub> =2940N
. 43.0	Tilting Angle = 90°	F×L N·m	9	8	38	32
MAX. Work Inertia	+ t ( <u>GD</u> <sup>2</sup> / <sub>4</sub> )	kg·m²	0.	12	0	.5
Driving Torque		N·m	7	2	7	2

<sup>\*1</sup> Air brake system is also available for 5AX-201.

<sup>\*2</sup> Air Intensifying Booster system is available if the supplied air pressure is under 0.5MPa or the brake torque is required to increase.



## 5AX-130, 5AX-201

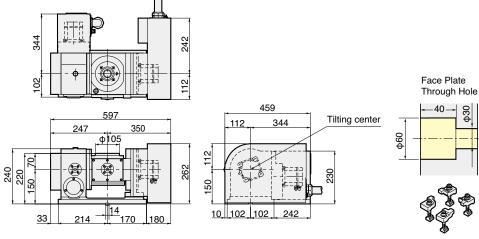


External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

## 5AX-130



Photo with  $\phi$ 130mm plate.









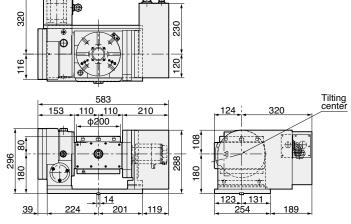


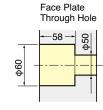
Center height of high column table is 65mm higher than that of standard table.

Clamp Device













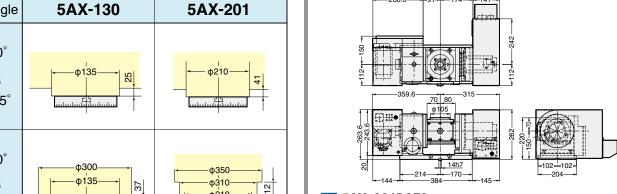




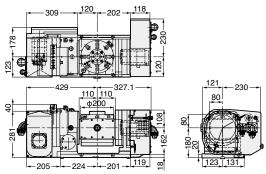


Built-in type 4 ports rotary joint can be attached on standard type as an option. (High column type is not necessary.)

#### 5AX-130BA The tilting axis motor is mounted at back side.



5AX-201BAFA The tilting axis motor is mounted at back side.



### ■ The Area of Noninterference in Tilting Position.

Angle	5AX-130	5AX-201
0° \$ 45°	φ135— 83	φ210 — 4
0° \$ 90°	ф300 ф135 — ф135 — б	\$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
0° \$ 105°	ф235 — ф135 — 02	φ250 φ210 φ210 β

## STANDARD TILTING ROTARY TABLE





- CNC tilting rotary table with powerful clamping system USA, EU: PAT
- A best-selling product suitable for use with mediumsize machining center
- Ideal for lines consisting of horizontal machines only

MOTOR MOUNTED — FACE PLATE — M-SIGNAL METHOD —





























### Specifications

Itei	m / Code No.		5AX-	<b>230</b> *¹	5AX	-250
Diameter of Table ¢mm		230		250		
Diameter of S	Spindle Hole	фтт	Ф60нт Ф40		Ф60нт Ф50	
Center Heigh	t (90°)	mm	24	10	25	50
Table Height in I	Horizonatal Position (0°)	mm	28	35	25	50
Width of T Slo	ot	mm	12 -	⊢0.018 0	12	-0.018 0
Axis			Rotary	Tilting (0°∼105°)	Rotary	Tilting (0°∼105°)
Clamping Sys	stem		Hydraulic	Hydraulic	Hydraulic	Hydraulic
Clamping Tor	que	N·m	490	3430	588	490
Table Inertia at	Motor Shaft (GD <sup>2</sup> /4) kg⋅n	n <sup>2</sup> ×10 <sup>-3</sup>	0.3	0.5	0.11	0.16
Servo Motor		min <sup>-1</sup>	α iF4•2000	αiF8•2000	α iF4•2000	α iF4•2000
MIN. Increme	nt		0.001°	0.001°	0.001°	0.001°
Rotation Spec	ed	min <sup>-1</sup>	11.1	5.5	22.2	11.1
Total Reducti	on Ratio		1/180	1/360	1/90	1/180
Indexing Accu	uracy	sec	20	60	20	60
		kg	220		290	
MAX. Work Load	0° to 30°	w kg	100		80	
on the Table	30° to 90°	₩ kg	10	00	5	0
	Tilting Angle   F   C   C   C   C   C   C   C   C   C	ı N	111	760	98	00
MAX. Thrust Load	Tilting Angle = 0°	]	L=115mm	F=5880N	L=100mm	F=4900N
applicable on the Table	Tilting Angle = 90°	= <sub>2</sub>   <del>]</del>	L <sub>1</sub> =0mm L <sub>2</sub> =100mm	F <sub>1</sub> =5880N F <sub>2</sub> =2940N	L <sub>1</sub> =0mm L <sub>2</sub> =100mm	F <sub>1</sub> =5880N F <sub>2</sub> =2940N
, 43.0	Tilting Angle = 90°	- F F×L N·m	4:	51	38	32
MAX. Work Inertia	+ t ( <u>GD</u> <sup>2</sup>	) kg·m²	0.66		0	.5
Driving Torque		N·m	288		14	14

<sup>\*1 5</sup>AX-230 is semi-standard model

<sup>★</sup>The air-hydraulic booster can not be used for **5AX-230**. The hydraulic tank is always necessary for **5AX-230**.

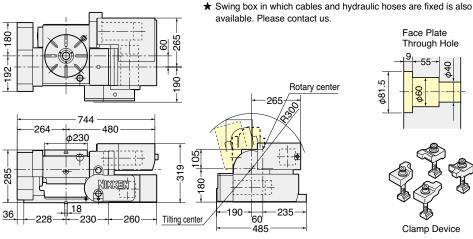
**NIKKEN** 

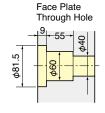
External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

## 5AX-230



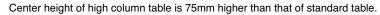
5AX-230, 5AX-250





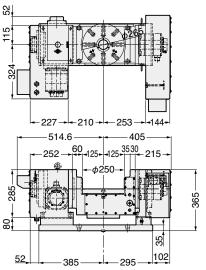


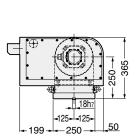


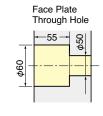


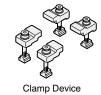
## 5AX-250













Built-in type 3 ports rotary joint can be attached on standard type as an option.

#### ■ The Area of Noninterference in Tilting Position.

Angle	5AX-230	5AX-250
0° \$ 45°	φ350 - ξ	φ315 φ260 φ260 Φ260
0° \$ 90°	φ480 φ320 β	φ425 φ315 φ260 φ260 8
0° \$ 105°	φ370 φ260 β60 β60	30° 30° 44 φ260 80 80 80 80 80 80 80 80 80 80 80 80 80

#### Example when tilting base is supplied from M/C builder.



Tilting Base



## **STANDARD TILTING ROTARY TABLE**





CNC tilting rotary table with powerful clamping system

- A best-selling product suitable for use with medium-size and large machining center
- Ideal for lines consisting of horizontal machines only

- MOTOR MOUNTED -— M-SIGNAL METHOD — FACE PLATE -



P.87

ROTARY JOINT

P.89













P.79









## Specifications

Item / Code No.		5AX-350		5AX-550	
Diameter of Table ¢mm		350		550	
Diameter of Spindle Hole ¢mm		Ф80н7		Ф130н7	
Center Height	t (90°) mm	30	00	380	
Table Height in F	Horizonatal Position (0°) mm	30	00	518	
Width of T Slo	ot mm	12 <sup>-</sup>	⊢0.018 0	14	+0.018 0
Axis		Rotary	Tilting (0°∼105°)	Rotary	Tilting (0°∼105°)
Clamping Sys	stem	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Clamping Tor	que N·m	1568	1568	3430	6272
Table Inertia at I	Motor Shaft $\left(\frac{\text{GD}^2}{4}\right) \text{ kg} \cdot \text{m}^2 \times 10^{-3}$	0.8	1.35	5.5	5.2
Servo Motor	min <sup>-1</sup>	αiF8 •2000	α iF12 •2000	αiF12 ⋅2000	α iF12 ·2000
MIN. Increme	nt	0.001°	0.001°	0.001°	0.001°
Rotation Spec	ed min <sup>-1</sup>	22.2	22.2	11.1	5.5
Total Reduction	on Ratio	1/90	1/90	1/180	1/360
Indexing Accu	uracy sec	20	60	20	60
Net Weight	kg	420 (withou	t Base:355)	1150	
MAX. Work Load	0° to 30°	20	00	5	00
on the Table	30° to 90°	20	00	3	00
	Tilting Angle  F	190	600	31	360
MAX. Thrust Load	Tilting Angle	L=175mm	F=4900N	L=275mm	F=9800N
applicable on the Table	Tilting Angle F1 F2 = 90° +	L₁=0mm L₂=100mm	F <sub>1</sub> =17160N F <sub>2</sub> =8580N	L <sub>1</sub> =0mm L <sub>2</sub> =200mm	F <sub>1</sub> =19600N F <sub>2</sub> =14120N
. 42.0	Tilting Angle F FXL N·m	858		2548	
MAX. Work Inertia	+ $\left(\frac{\text{GD}^2}{4}\right) \text{ kg} \cdot \text{m}^2$	3.2		2	23
Driving Torque	N·m	20	38	8	64

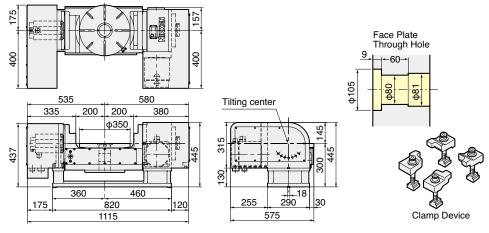




External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

### 5AX-350







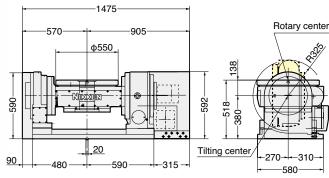


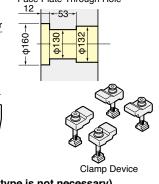
Built-in type 6 ports rotary joint is available on standard type. (optional) (High column type is not necessary)

### 5AX-550

## Powerful double clamping system on both ends of tilting axis









1

Built-in type 4 ports rotary joint is available on standard type. (optional) (High column type is not necessary)

#### ■ The Area of Noninterference in Tilting Position.

Angle	5AX-350	5AX-550
0° \$ 45°	0455 0400 0400 02	φ <sub>660</sub> 95
0° \$ 90°	\$\frac{\phi 540}{\phi 455}\$\$\$\frac{\phi 400}{\phi 400}\$\$\$\$2	φ750 φ640 φ550 φ550 φ750
0° \$ 105°	0 24°	φ550 - 15° - 25,

Built-in type **5AX**- rotary tables are more and more getting popular as a component of M/C, even for the special applications.



Utilization for 4th and 5th axis rotary table of the M/C for die molding

Utilization for 4th and 5th axis rotary table of special grinding center



## **LARGE TILTING ROTARY TABLE**





- CNC tilting rotary table with powerful clamping system at both side
- Counter balance weight can be installed on 5AX-1200A to compensate the unbalancing load as standard
- Ideal for gantry type systems, machining centers, and 5-plane machines

MOTOR MOUNTED — FACE PLATE — M-SIGNAL METHOD —





























### Specifications The specification will be varied according to your application. Please contact us.

Iter	n / Code No.	5AX	-800	5AX	-1200
Diameter of T	able	800:	×500	1200	
Diameter of S	Spindle Hole	Ф130		Ф300н7	
Center Height	t (90°) mm	5	50	7	50
Table Height in I	Horizonatal Position (0°) mm	50	00	9	50
Width of T Slo	ot mm	-(14	<sup>+0.018</sup> ) *1	22	+0.018 *1 0
Axis		Rotary	Tilting	Rotary	Tilting (-20°~105°)
Clamping Sys	stem 3.5MPa	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Clamping Tor	que N·m	4655	6125	14700	19600
Table Inertia at	Motor Shaft $\left(\frac{GD^2}{4}\right) \text{ kg·m}^2 \times 10^{-3}$	6.8	6.0	10.8	3.5
Servo Motor	min <sup>-1</sup>	α iF22•2000	αiF40•2000	α iF22•2000	α iF22•2000
MIN. Increme	nt	0.001°	0.001°	0.001°	0.001°
Rotation Spee	ed min <sup>-1</sup>	25	12.5	5.5	2.7
Total Reduction	on Ratio	1/60	1/120	1/360	1/720
Indexing Accu	uracy sec	20	60	20	60
Indexing Accur	racy of Ultra Precision *2 sec	±5	±10	±5	±10
Net Weight	kg	23	800	73	300
MAX. Work Load	0° to 30°	50	00	25	500
on the Table	30° to 90°	50	00	15	500
	Tilting Angle   F   = 0°   N	31:	360	137	7200
MAX. Thrust Load	Tilting Angle	26	95	54	488
applicable on the Table	Tilting Angle F1 F2 = 90° + B	28	24	96	600
Table	Tilting Angle FXL N·m	25	48	14	700
MAX. Work Inertia	$+$ $\left(\frac{GD^2}{4}\right)$ kg·m <sup>2</sup>	23		2	76
Driving Torque	N·m	4:	22	31	168

<sup>\*1</sup> Standard large rotary tables are without T slot. T slot is available as an option, please specify the width of the T slot.



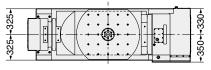


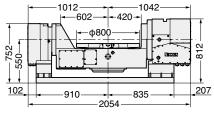
External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

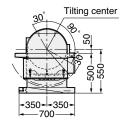
### 5AX-800

### Powerful double clamping system on both ends of tilting axis.







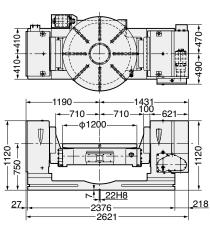


WITH K2
CTR

5AX-1200

### Powerful double clamping system on both ends of tilting axis.









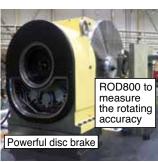
#### ■ The Area of Noninterference in Tilting Position.

Angle	5AX-800	5AX-1200
0° \$ 45°	Ф <u>8</u> 00 0 88	Ф2900 Ф1300 QX
0° \$ 90°	Φ1080	ф1480 ф1280 024
0° \$ 120°	9888	φ1280 φ1280

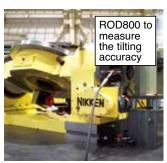
Counter balance weight can be installed on **5AX-1200A** to compensate the unbalancing load as standard.

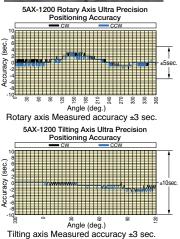
410-410-

820





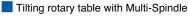




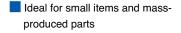
## **MULTI-SPINDLE TILTING ROTARY TABLE**







■ Various attachment for fixing work piece





MOTOR MOUNTED -

WITH W/























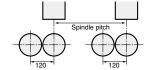




## Specifications Multi-Spindle Tilting Rotary Tables are all semi-standard models. Please contact us.( ):High Speed type Please contact us.

Item / Code No.		5AX-2	MT-105	5AX-4	ит-105
Diameter of Table ¢mm		105		105	
Diameter of S	pindle Hole	Ф60нт Ф30		Ф60нт Ф30	
Number of sp	indles (Pitch) mm	12	20	120	
Center Height	(90°) mm	1	75	23	35
Table Height in H	Horizonatal Position (0°) mm	25	50	30	00
Width of T Slo	t mm	16 <sup>-</sup>	+0.018 0	16 <sup>+</sup>	-0.018 0
Axis		Rotary	Tilting (0°∼105°)	Rotary	Tilting (0°∼105°)
Clamping Sys	tem	Pneumatic*1	Pneumatic*1	Hydraulic	Hydraulic
Clamping Tor	que N·m	147	147	147	343
Table Inertia at I	Motor Shaft $(\frac{GD^2}{4})$ kg·m <sup>2</sup> ×10 <sup>-3</sup>	0.13	0.13	0.2	0.48
Servo Motor	min <sup>-1</sup>	α iF2•3000	αiF2•3000	α iF8•3000	α iF4•3000
MIN. Increme	nt	0.001°	0.001°	0.001°	0.001°
Rotation Spee	ed min <sup>-1</sup>	33.3	16.6	16.6 (44.4)	25.0
Total Reduction Ratio		1/90	1/180	1/180 (1/45)	1/120
Indexing Accu	racy sec	±30	60	±45	±30
Net Weight	kg	150		350	
MAX. Work Load	0° to 30°	1	5	2	5
on the Table	30° to 90°	1	0	1	5
	Tilting Angle   F   P   P   P   P   P   P   P   P   P	39	3920		20
MAX. Thrust Load	Tilting Angle	L=60mm	F <sub>1</sub> =784N	L=60mm	F=2858N
applicable on the Table	Tilting Angle F <sub>1</sub> F <sub>2</sub> = 90° +	L <sub>1</sub> =0mm F <sub>1</sub> =653N L <sub>2</sub> =100mm F <sub>2</sub> =490N		L <sub>1</sub> =0mm L <sub>2</sub> =100mm	F <sub>1</sub> =1380N F <sub>2</sub> =1040N
	Tilting Angle L————————————————————————————————————	49		49	
MAX. Work Inertia	+ $\left(\frac{GD^2}{4}\right) \text{ kg·m}^2$	0.014		0.0	21
Driving Torque	N·m	3	36	14	14

<sup>\*1</sup> Air Intensifying Booster system is available if the supplied air pressure is under 0.5MPa or the brake torque is required to increase. P.95



<sup>★</sup> Min. pitch between spindles 105:120mm. If you need different pitch, please contact us.

<sup>★ 4</sup> spindle rotary table to suit 2 Spindle M/C is also available, please contact with us.

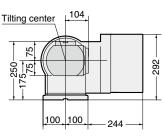
<sup>★</sup> Max numbers of spindles 105:4 spindles.

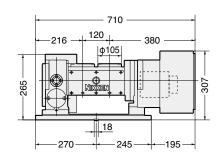
## **5AX-2MT,5AX-4MT**

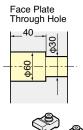
External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

### 5AX-2MT-105













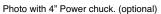


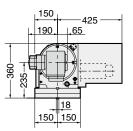


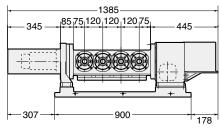
Center height of high column table is 35mm higher than that of standard table. MAX. number of ports in rotary joint Standard: 4 ports, High Column: 6 ports

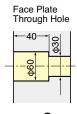
### 5AX-4MT-105



















MAX. 6 port rotary joint can be installed on standard type as an option.

### Multi-Spindle Tilting Rotary Table

For Multi-Spindle Tilting Rotary Table, please contact us to know the required faceplate diameters, fixture attachment (e.g. Power Chuck etc), the required spindle pitch, the M/C model and the type of NC.



5AX-2MT-170-200



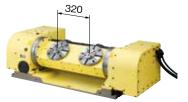
5AX-2MT-201-250FA



5AX-2MT-200-360



5AX-2MT-200-250



5AX-2MT-201-320



5AX-2MT-180-200FA



5AX-2MT-130-170



5AX-2MT-200-250

## **CNC ROTARY TABLE WITH DD MOTOR**

THE SMALLEST TILTING CNC ROTARY TABLE WITH DD MOTOR FOR COMPACT MACHINES





Ultra Compact Tilting Rotary Table with DD Motor

## 5AX-DD100 Only 554mm Wide

The Smallest 5AX with DD Motor

#### Demonstrates the true worth of a compact machining center with limited machining space.

With a body width of 554 mm, 5AX-DD100 is he smallest tilting rotary table with DD motor in NIKKEN's history. It is an ideal counterpart to products such as the BT30 compact machining center. It allows you to secure more machining space than was possible with earlier models.

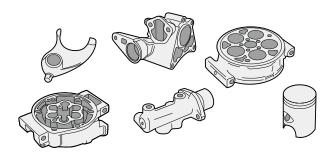
### Opens up New Possibilities for Machining with Compact M/C

#### Suitable for many applications, from IT parts to automotive parts.

High-precision 5-axis machining of precision electronic devices such as smartphones, automobile parts, etc. can be accomplished using a compact machining center.



Impeller



Components of Automotive Parts

# High-acceleration/deceleration.

Compact unit with high-speed rotation

#### Standout performers in 5-axis high-speed machining

This compact unit employs a DD motor for high-speed rotation and high-acceleration/deceleration. Opens up new possibilities for cutting and machining, ranging from IT parts requiring high-speed, high-grade machining to auto parts requiring high-speed machining.

#### NIKKEN's Exclusive "TT Solutions"

#### As an expert in both tables and tooling, NIKKEN offers more.

Allows for even higher precision and efficiency when combined with our Mini-Mini Chuck Advanced Alpha collet chucks, which are standout performers in 5-axis machining.

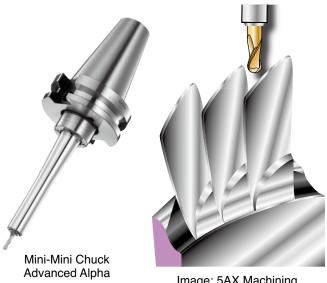
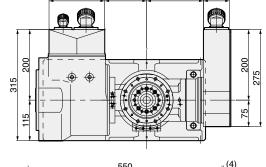


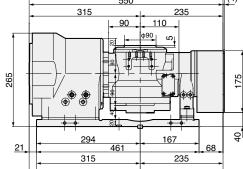
Image: 5AX Machining

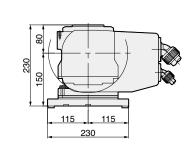




5AX-DD100







## ■ The Area of Noninterference in Tilting Position.

Angle	5AX-DD100
0°	φ200
0° \$ 90°	φ200
0° \$ 110°	\$200 \$\frac{20^{\circ}}{\sqrt{2}}\$

## **Specifications** The external dimension and the specification will be varied according to the DD motor. Please contact us.

Item / Co	ode No.	5AX-DD100AF		
Diameter of Spindle	e Hole	50		
Center Height (90°)	mm	1:	50	
Table Height in Horizonat	al Position (0°) mm	2	30	
Width of T Slot	mm	ф8н7 F	Pin hole	
Axis		Rotary	Tilting (0°∼110°)	
Clamping System		Pneumatic*2 (0.5MPa)	Pneumatic* <sup>2</sup> (0.5MPa)	
Clamping Torqyue	Nm	75	205	
Motor (FANUC)		DiS15/1000	DiS60/400	
Encoder		MPRZ-536A	MPRZ-536A	
Min. Incremental	deg.	0.0	001	
Rotation Speed	min <sup>-1</sup>	200	200	
indexing Accuracy	sec.	±10	±1	
MAX. Torque	Nm	35	130	
Constant Torque	Nm	8.7/16* <sup>1</sup>	24/65 * 1	
Net Weight	kg	120		
MAY Model and	0∼30deg. kg	2	20	
MAX. Work Load	0∼90deg. kg	1	0	

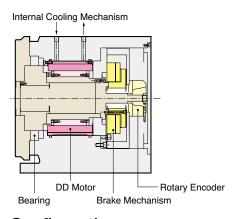
The figures marked  $*\mathbf{1}$  show the figures with cooling system.

<sup>\*2</sup> Air-air Booster system is available if the supplied air pressure is under 0.5MPa or the brake torque is required to increase.



## CNC ROTARY TABLE with DD MOTOR





There is no mechanical reduction mechanism such as worm system in a rotary table with DD motor. DD (Direct Drive) motor is built in the the rotary table to drive directly. High rotation speed and high acceleration/deceleration can be done. However, the driving torque of the rotary table is not strong due to no mechanical reduction mechanism. Therefore, the suitable application of the rotary table with DD motor must be selected.

- High Response : 150min-1 (DD250)
- Indexing of 90°: Within 0.2sec.
- High Response of Micro Spike Clamping System



### Configuration

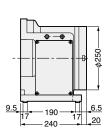
### DD250F-150

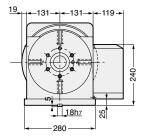




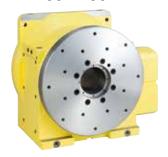






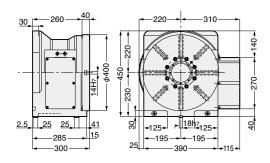


### DD400F-250









#### Specifications The external dimension and the specification will be varied according to the DD motor. Please contact us.

Item / Code No.	DD180F-60	DD250F-150	DD400F-250		
Diameter of Table mm	ф180	ф250	ф400		
Diameter of Spindle Hole mm	ф30н7	ф75н7	ф100н7		
Center Height mm	135	170	230		
Width of T Slot mm	12н7	12н7	14н7		
Clamping System		Pneumatic*2 (0.5MPa)			
Clamping Torqyue Nm	150	500	1000		
Motor (FANUC)	DiS60/400	DiS150/300	DiS250/250		
Encoder	αiCz Sei	αiCz Sensor 512A			
Min. Incremental deg.		0.001			
Rotation Speed min <sup>-1</sup>	200	150	125		
indexing Accuracy sec.		±10			
Net Weight kg	70	105	245		
MAX. Work Load kg	50	100	250		
MAX. Torque Nm	130	380	600		
Constant Torque Nm	24/65 <sup>*1</sup>	73/170 <sup>*1</sup>	120/225 <sup>*1</sup>		
Necessary Cooling Capacity w	1500	1600	1200		

<sup>★</sup>The figures marked \*1 show the figures with cooling system. Please be careful that cooling by the special liquid may not be good for the chiller system. When cooling system is used, please check the cooling system, and stop the DD motor when the unusual condition is found.

<sup>\*2</sup> Air Intensifying Booster system is available if the supplied air pressure is under 0.5MPa or the brake torque is required to increase. 🖙 P.95

## ROTARY TILTING TABLE with DD MOTOR





## **High-Acceleration / High-Speed / Compact Unit**

- Indexing of 90°on Rotary Axis: Within 0.2sec. Tilting Axis: Within 0.3sec.
- Suitable for the machining of the impeller.

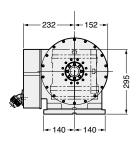


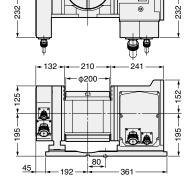
Suitable for the machining of the impeller.

### **5AX-DD200AF2**



★The tilting axis center is located in the same position as the center of the rotary axis body for 5AX-200A.

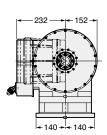


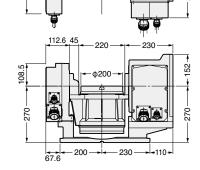


### 5AX-DD200BF2



★The tilting axis center is located in the same position as the center of the rotary axis body for 5AX-200B.





#### Specifications The external dimension and the specification will be varied according to the DD motor. Please contact us.

Item / Co	ode No.	5AX-DD	2200AF2	5AX-DD200BF2		
Diameter of Spindle	Hole ¢mm	53	3H7	53н7		
Center Height (90°)	mm	19	95	2	70	
Table Height in Horizonata	al Position (0°) mm	29	95	2	70	
Width of T Slot	mm	12	!H7	12	!H7	
Axis		Rotary	Tilting (±110°)	Rotary	Tilting (±110°)	
Clamping System		Pneumatic*2 (0.5MPa)	Pneumatic*2 (0.5MPa)	Pneumatic*2 (0.5MPa)	Pneumatic*2 (0.5MPa)	
Clamping Torqyue	Nm	150	500	150	500	
Motor (FANUC)		DiS60/400	DiS150/300	DiS60/400	DiS150/300	
Encoder		α iCz	: 512A	lpha iCz 512A		
Min. Incremental	deg.	0.0	001	0.001		
Rotation Speed	min <sup>-1</sup>	200	150	200	150	
indexing Accuracy	sec.	±10	±15	±10	±15	
MAX. Torque	Nm	130	380	130	380	
Constant Torque	Nm	24	73/170 <sup>*1</sup>	24	73/170 <sup>*1</sup>	
Net Weight	kg	190		185		
MAX. Work Load	0∼30deg. kg	3	0	30		
IVIAA. VVOIK LOAU	0∼90deg. kg	1	5	30		

The figure marked \*1 shows the figure with cooling system.

## **ROTARY TILTING TABLE with DD MOTOR**

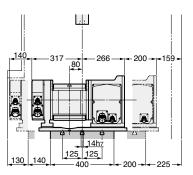


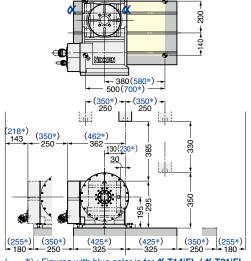
■5AX-DD Table for FANUC ROBO DRILL **5AX-DD200AF2** 





Layout for the ROBO DRILL with 200mm high column





\*) : Figures with blue color is for &-T14iFL / &-T21iFL.

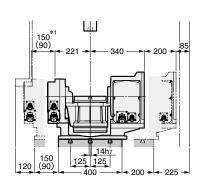
### 5AX-DD200BF2

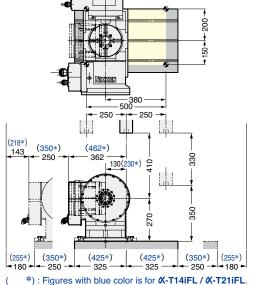




Layout for the ROBO DRILL with 200mm high column

\*1 The stroke restriction of 50mm for the standard cover.
The stroke restriction of 110mm for the metal cover.





The Area of Noninterference in Tilting Position

a	2 3 A	9 0000 0 0000 0 0000
	TIKKEN	

5AX-DD200AF2

The Area of Noninterference in Tilting Position.					
Angle	5AX-DD200AF2	5AX-DD200BF2			
-45° \$ 45°	φ285 φ210 ξ	φ <u>250</u> & & & & & & & & & & & & & & & & & & &			
-90° \$ 90°	φ285 β	φ250 φ220 ω			
-110° \$ 110°	20° 20° 20° 20° 20° 20° 20° 20° 20° 20°	φ290 φ250 φ220 β			

## **Notes on the Use of DD TABLES**



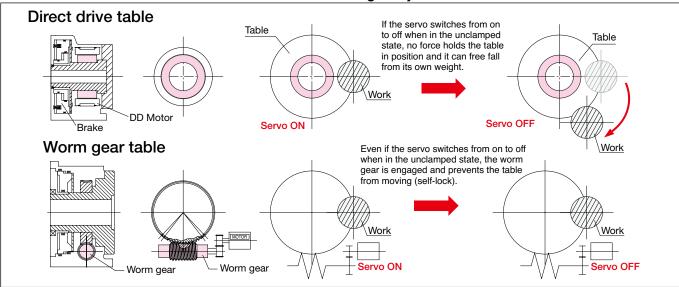
#### DD table characteristics

- The spindle is linked directly to the motor for excellent responsiveness. As a tradeoff for this responsiveness, the system is very sensitive to external force and loads, so it is necessary to set suitable parameters for each application.
- Adjustment is necessary to perform 5-axis simultaneous machining (synchronized machining). The NIKKEN standard parameters can be used for indexing and positioning. After confirming with the machine manufacturer that optional functions\* for synchronized machining are available, it is necessary to make appropriate settings to satisfy the customer's machining time and machining precision requirements. For simultaneous operation, suitable settings must be made to align the 4th (5th) axis with the three basic axes (XYZ).

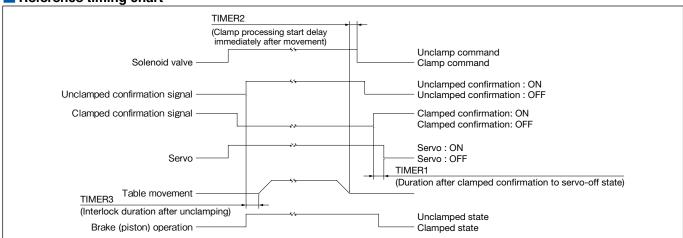
#### Clamping operation

Due to the characteristics of the DD table it can be turned easily by hand if power is not being supplied (free run state). The table will again be in the free run state when the servo turns off after the brake is applied, unless appropriate settings are made, and this can cause positioning inaccuracy. Consult with the machine manufacturer to ensure that the timing is as shown in the timing chart below to prevent a free run state from occurring.

Difference in structure between Direct Drive and Worm gear system



Reference timing chart



#### Preventing emergencies (in case of power interruption)

Configure a pneumatic (hydraulic) circuit (off-clamp) that will provide an effective brake should an emergency stop occur. Unlike normal clamping operation, in an emergency stop the brake is applied at the same time that the servo turns off momentarily, and this can result in positioning inaccuracy on an axis carrying a large load, such as the weight axis. To prevent this, enable the brake control function (FANUC), vertical axis drop prevention function (Mitsubishi), etc.

#### Brake control function

To prevent the fall of the weight axis when an alarm is generated or an emergency stop occurs, instead of stopping excitation of the motor immediately, excitation of the motor continues for the duration specified by a parameter to allow the mechanical brake to engage.

#### Cooling of Direct Drive Servomotor

Except for some types of direct drive servomotor, you can choose no-cooling or liquid cooling. Keep cooling makes it possible to use under continuous rating torque. However, the special care is required because the continuous rating torque may fluctuate depending on the cooling condition.

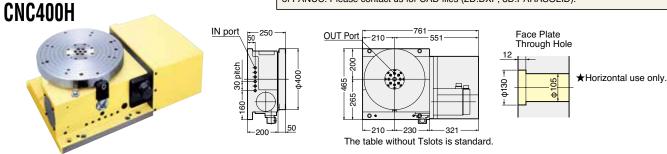
External cooling devices should be prepared for cooling, such as chiller unit which is normally used for high speed spindles. Oil cooling must be used; water cooling is not allowed to prevent the rust. Recommended cooling oil is [ISO VG2] equivalents. (Ex. IDEMITSU "SUPER MULTI 2")

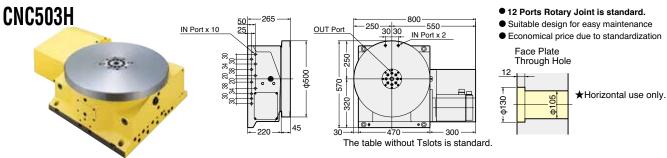
- In the case cooling is needed: ① Long time continuous running under high (close to maximum) speed rotation ② Very long time running under overload (above rated torque-below maximum torque) ③ Using special super-high speed servomotors

  •Examples of cooling needed: ① Always-servo on under high-load condition (continuous turning operation) ② No-brake or the configuration that the servo is not off when clamping (Note: NIKKEN default configuration is servo OFF when clamping)
- ●Examples of cooling NOT needed : ① Indexing only ② Special use considering overload duty characteristics during non-cooling
- Please feel free to contact us if you need any concerns of questions regarding cooling or if you use direct drive rotary table under special conditions.

## **BUILT-IN BUILT-IN type CNC ROTARY TABLE**

External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).

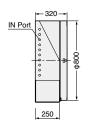


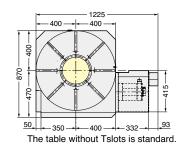


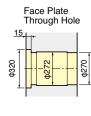
B-type and T-Type are now available. Please contact us for more detail.

## CNC802 Ultra Big Bore (ф270mm) Specification ★ Built-in type rotary joint can be mounted on CNC802 refer to P.89









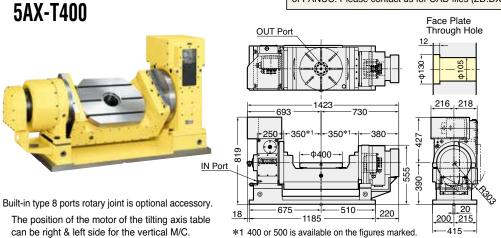
### Specifications Built-type CNC Rotary Tables are all semi-standerd models. Please contact us. ( ):High Speed type Please contact us.

Item / Code No.		CNC400H CNCZ400H	CNC503H CNCZ503H	CNC802
Diameter of Ta	ıble ¢mm	Ф400	Ф500	Ф800
Diameter of Spi	ndle Hole	Ф105	Ф105	Ф270н7
Clamping Syst	em 3.5MPa	Hydraulic	Hydraulic	Hydraulic
Clamping Torq		1470	1890	7000
Table Inertia at Motor	Shaft $\binom{GD^2}{4}$ kg·m <sup>2</sup> ×10 <sup>-3</sup>	2.8	8	5.3
Servo Motor	min <sup>-1</sup>	lpha iF12·2000	α iF12·2000	α iF22·2000
MIN. Incremen	t	0.001°	0.001°	0.001°
Rotation Speed	d min <sup>-1</sup>	22.2(44.4)	16.6 (33.3)	5.5
Total Reductio	n Ratio	1/90 (1/45)	1/120 (1/60)	1/360
Indexing Accur	racy sec	20	20	15
Net Weight	kg	295	400	1100
MAX. Work Load on the Table	Horizontal kg	800	1000	3000
MAX.	N N	53100	63720	247920
Thrust Load applicable on the Table	*1 FXL N·m	2648	3531	8563
on the rable	FXL N·m	3840	5990	36260
MAX. Work Inertia	$\bigoplus_{+}^{\leftarrow} \left(\frac{\text{GD}^2}{4}\right) \text{kg·m}^2$	16.6(8.3)	32.5(16.3)	234
Driving Torque	N⋅m	432 (345)	576 (460)	3168

## **BUILT-IN type TILTING ROTARY TABLE**



External dimensions depend on the type of the servo motor. Indicated dimensions are in case of FANUC. Please contact us for CAD files (2D:DXF, 3D:PARASOLID).





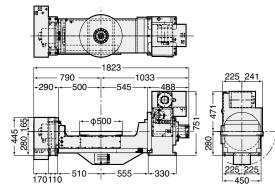
#### Combination of CNC503H & CNC302T

## 5AX-B450



Built-in type 17 ports rotary joint is optional accessory. The position of the motor of the tilting axis table can be right or left side for the vertical M/C.

#### Tilting base will be supplied from M/C builder.





Item / Code No.	5AX-	T400	5AX-B450		
Diameter of Table ¢mm	41	00	50	00	
Diameter of Spindle Hole \$\phi\$mm	Ф10	5H7	Ф155Н	7 ф109	
Center Height (90°) mm	3:	90	280	o*1	
Table Height in Horizontal Position ( 0°) mm	3:	90	280	<sub>0</sub> *1	
Width of T Slot mm	14 0	.018	-	_	
Axis	Rotary	Tilting	Rotary	Tilting	
Clamping System 3.5MPa	Hydraulic	Hydraulic	Hydraulic	Hydraulic	
Clamping Torque N·m	1760	1760	1760	3870	
Table Inertia at Motor Shaft (GD <sup>2</sup> /4) kg·m <sup>2</sup> ×10 <sup>-3</sup>	2.8	2.44	2.8	2.9	
Servo Motor min <sup>-1</sup>	αiF12 •2000	aiF22 •2000	aiF12 •2000	aiF22 •2000	
MIN. Increment	0.001°	0.001°	0.001°	0.001°	
Rotation Speed min <sup>-1</sup>	22.2	16.6	22.2	16.6	
Total Reduction Ratio	1/90	1/120	1/90	1/120	
Indexing Accuracy sec	15	60	20	60	
Net Weight kg	750( <b>w/o base</b> ) 995( <b>with base</b> )		1050( <b>w/o base</b> )		

Item /	Code No.	5AX-T400	5AX-B450
MAX. Work Load	0° to 30° kg	300	300
on the Table	30° to 90°	250	250
	Tilting Angle = 0°	31360	31360
MAX. Thrust Load	Tilting Angle = 0°	L=200mm F=6860N	L=250mm F=5488N
applicable on the Table	Tilting Angle = 90° F1 F2 + G	L=100mm F=11660N	L=100mm F=11660N
	Tilting Angle = 90°  L  F  F  K  N·m	1166	1166
MAX. Work Inertia + C (\frac{GD^2}{4}) kg·m^2		5.1	5.1
Driving Torque	N·m	432	432



## **Servo Motor List**



#### **Maker and Motor Model**

Stall	Torque	)	1 Nm	2 Nm	3 Nm	6 Nm	12 Nm	22 Nm
Rotatio	on Spec	ed	2000min <sup>-1</sup>					
Maker			Model 1	Model 2	Model 3	Model 6	Model 12	Model 22
			<b>X</b> iF1/5000	<b>≪</b> iF1/5000	<b>≪</b> iF4/5000	<b>X</b> iF8/3000	<b>X</b> iF12/4000	<b>∢</b> iF22/3000
FA	NUC		<b>X</b> iS2/5000	<b>α</b> iS4/5000	<b>⋉</b> iS8/4000	<b>X</b> iS12/4000	<b>X</b> iS22/4000	<b>X</b> iS30/4000
			βiS2/4000	βiS4/4000	βiS8/3000	βiS12/3000	βiS22/2000	
			HF75T	HF105T	HF54T	HF104T	HF204S	HF354S
ME	LDAS				HP54T	HP104T	HP204S	HP354S
			HG56T	HG75T	HG104T	HG154T	HG204S	HG354S
			SGMPH-04AAA6S	SGMPH-08AAA6S	SGMGH-05ACA5S	SGMGH-09ACA5S	SGMGH-20ACA2S	SGMGH-30ACA2S
YAS	SNAC		SGMAV-04A3A6S	SGMGV-03A3A6S	SGMGV-05A3A6S	SGMGV-09A3A6S	SGMGV-20A3A2S	SGMGV-30A3A2S
			SGM7A-047A6S	SGM7G-03A7A6S	SGM7G-05A7A6S	SGM7G-09A7A2S	SGM7G-20A7A2S	SGM7A-30A7A2S
	OSP2			BL-MC24J-30S	BL-MC25J-30T	BL-MC50J-30T	BL-MC100J-20S	BL-MC200J-20S
OSP	OSP3			BL-ME24J-50SN	BL-ME40J-40TN	BL-ME80J-40TN	BL-ME100J-30SN	BL-ME200J-20SN
OSP4		OLD		BL-ME24M-50SN	BL-ME40M-40TN	BL-ME80M-40TN	BL-ME100M-30SN	BL-ME200M-20SN
OSP4		NEW		BL-MT24M-50SN	BL-MT40M-40TN	BL-MT80M-40TN	BL-MT100M-30SN	BL-MT200M-20SN
					MFA055MBJNC1	MFA100MBJNC1	MFA180MBJNB	MFA350MBJNB
TO:	SNUC		MDM032R4L	MDM062R4L	MDM052R4L	MDM152R4L	MDM212R4C	MDM402R4C
10	SNUC				MHMA052K2LA	MHME102F2CA	MTMA402F2CA	MTMA552F2CA
			MHMD482S1C	MHMD082S1C	MHME102SCC	MHME152SCC	MHME302SCC	MHME402SCC
Brother	SANY	O*1	Q2AA08050DXP00	Q2AA08075HXP00	Q2AA08100HXP00			
Diotilei	SANY	0*2	R2AD0804FXPGA		R2AAB8100HXPGA			
QIE!	MENS		1FT-6031-4AK71	1FT-6034-4AK71	1FT-6044-1AK71	1FT-6064-1AK71	1FT-6082-1AF71	1FT-6086-1AF71
JIL	WILING			1FK-7042	1FK-7060	1FK-7063	1FK-7083	
INDF	RAMAT		MAC63A	MAC63C	MAC71B	MAC71C	MAC93B	MAC93C
HEIDI	ENHAIN	1		QSY96A	QSY116C	QSY116E	QSY155B	QSY155D
ISO	FLEX				444,2,20	444,3,20	445,2,20	
S	EM			HJ96C6-44	HJ116C6-64	HJ116E6-130	HJ155A8-130	HJT155D8-180
ВС	SCH		SE-B2.010	SE-B2.020	SE-B3.055	SE-B3.075	SE-B4.130	SE-B4.210
GLE	NTEK		GM3340	GM4020	GM4040,GM4050	GM5065		
KOLLI	MORGE	N	6SM37L	6SM47L	6SM57L	6SM57M	6SM77K	

<sup>\*1</sup> The end of the rotary table Code No. is "SA-BR".

<sup>★</sup>Other servo motor can be mounted, please inform us the external dimension, specification of your servo motor.



## Relation between Unbalancing Load and Servo Motor (NIKKEN)

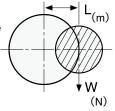


This table shows the guide line. Please make the unbalancing load as small as possible to use the counter balance weight for the precision machining.

Excessive unbalancing load causes the indexing accuracy and the durability to be worse. The relation between the guide line of the unbalancing load and the servo motor shows below. Please do not apply the load exceeding the guide line.

CNCZ series table can not be recommended for the application with large unbalancing load. CNCZ series table is recommended for the application only with light load.

Please inform us the detail of the component, jig fixture, indexing time etc. prior to your order. Then, the calculation of the load is studied and the best suitable rotary table (including the suitable motor) for your application is proposed. The servo parameter is also tuned.



### Guide Line of MAX. Unbalancing Load for Additional Axis Control Please contact us for the other maker.

FANUC motor is described.

MAX. Unbalancing Load (N·m)	CNC180FA	CNC202FA	NCT200FA	CNC302FA	CNC321FA 401FA	CNCB450FA	CNC <sup>501FA</sup>
30	≪iF2						
50	≪iF4	≪iF4					
60			≪iF4	≪iF4			
100				≪iF8	≪iF12		
150						≪iF12	
200					≪iF22		≪iF12
300						≪iF22	
400							≪iF22

#### Guide Line of MAX. Unbalancing Load with NIKKEN Controller

MAX. Unbalancing Load (N·m)	CNC180	CNC202	NCT200	CNC260	CNC302
10	CNC180AA21-04				
20	CNC180AA21-08	CNC202AA21-08	NCT200AA21-08		
30				CNC260AA21-08	CNC302AA21-08
50	CNC180AA21-06	CNC202AA21-06			
60			NCT200AA21-06	CNC260AA21-06	CNC302AA21-06

<sup>\*2</sup> The end of the rotary table Code No. is "SA-BR2".

<sup>★</sup>The characteristics(stall torque, MAX. torque and rotor inertia etc.) of the servo motors differ, therefore the specification of CNC rotary table will be a little different.

## Flow Chart of the Additional Axis Control



Servo enable is basically kept OFF during the mechanical brake clamps. Servo enable is recommended to be kept ON, even when the mechanical brake clamps for the CNC rotary tables listed in the box below. But, the case when a big electric current always flows in the motor due to the heavy unbalancing load, please keep servo enable OFF when the mechanical brake clamps.

- ·CNC321, 401, 501, 601
- ·CNC400H, 503H
- ·5AX-250 (Tilting)
- ·5AX-T400 (Rotary. Tilting)

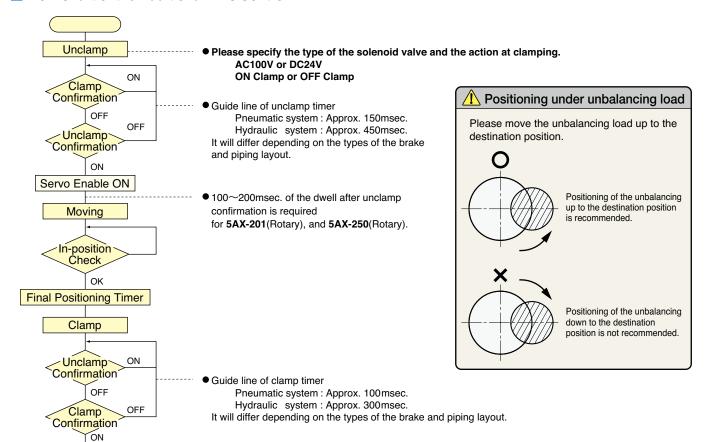


Please specify the brake control when ordering

 200~500msec. of the dwell after clamp confirmation is required for the hydraulic clamping system and the clamping system using the air-hydro booster. The timer value should be specified by the

- ·Type of solenoid valve (AC100V or DC24V)
- ·Motion of solenoid valve for clamp (ON: Clamp, OFF: Clamp)

#### Flow Chart of the Additional Axis Control



## **I**r

200~500msec. dwell

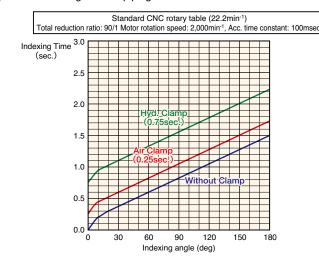
Servo Enable OFF

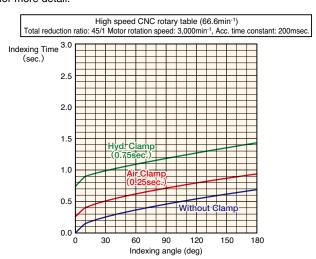
## **Indexing Time**



Guide line of the indexing time is shown. The indexing time will be different according to the total reduction ratio, motor rotation speed, servo parameter setting and the piping of the brake circuit. Please contact us for more detail.

parameter setting.





## M-signal CNC ROTARY TABLE with X21 CONTROLLER

- Single M signal provides Various Automatic Operation. Any unequal dividing, equal dividing, arc cutting, lead cutting etc. can be done very easily.
- RS232C Interface is provided as standard.

  Block data/ parameter data can be up loaded/down loaded through
  RS232C interface. Moreover when the direct angle command interface is used,
  all program and management can be done on M/C side.

  JAPAN PAT.
- Upgrade of Water Proof Characteristic EMC Assessment P.101

The direct out type connection is applied for all models of CNC rotary table, and the EMC assessment is satisfied as the total system.

- Plenty of Optional Functions

  True Closed Loop, Manual Pulse Generator, M Function (Input: 5/ Output: 5),

  External N Number Search, External Position Display, External Power ON/OFF,
- More than 30,000 sets working in the field. This fact ensures the highest reliability.

Pitch Error Compensation

- Product compatible with ROHS2 commands

  Version equipped with a controller that can be shipped to EU member nations.
- \*: The operation to establish the coordinate system is required at once, when turning the POWER ON at first time just after connecting the cable. Please refer to P.62



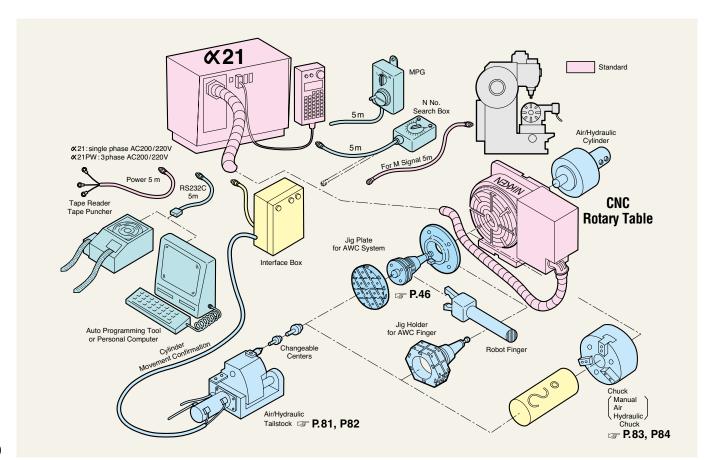
- - Standard (400W, 750W) 300×280×285 10kg
  - · Single Phase AC200/220V



- - Power up (1.3KW, 1.8KW) 540×360×400 28kg
  - · 3 phase AC200/220V



★ 21 controller for larger capacity
 (2.7KW, 4.4KW and 11kW) is available.
 3 phase AC200/220V



# ひロスト

## **\$\times\$21 CONTROLLER Specification**



### ■ Main Specification of Controller (NIKKEN- **☆**21 controller)

Item	Specification	Remarks
MIN. Increment	0.001° or 1"	Free Selection
MAX. Programmable Angle	±9999 rotation, ±999.999° & ±999°59'59"	Free Selection
MAX. Equal Dividing	2~9999 equal dividing	
Program Capacity	1000 Blocks	N000~N999
Input System	put System MDI Key Board, Pendant type	
Programming System Combined use of Incremental/Absolute		Free Selection of G91 / G90
Zero Return	Machine Zero Position/Work Zero Position	can be commanded from outside.
Manual Feed	Rapid Feed/Fine Feed/Step Feed/Continuous Feed	
Uni-directional Positioning	Uni-directional Positioning can be done to eliminate the mechanical backlash.	G14
Emergency Stop	Whole system stops	can be commanded from outside.
Feed Hold	Table rotation temporarily stops.	can be commanded from outside.
Jump Function	Jump to sub program etc.	
Repeating Function	By specifying start No. and final No., multiple sequence are repeated.	
Buffer Function	Reading next block, and execute job without stop.	Useful for lead cutting etc.
Dry Run	Table always rotates in rapid feed for checking.	
Key Lock Function	Even if operation button is pressed by mistake, such command is neglected for safety.	
Preparatory Function	Dwell, Clamping/Unclamping, Lead Cutting	G04~G92
G1 Code, G2 Code	2 kind of G codes can be entered in one block.	
Block Data display	At programming, previous block data or next block data are displayed.	
	Block data/ parameter data can be up loaded/down loaded through RS232C interface.	
	Direct angle command interface enables that the positioning can be commanded	Custom macro is necessary
RS232C Interface	from M/C, and all management of the program can be done on M/C.	on M/C.
	RS232C automatic loading function enables that successive block data can be down	Custom macro is necessary
	loaded from M/C and all management of the program can be done only on M/C.	on M/C.
Software Limit Function	± stroke limit values can be set by parameter.	
Over Travel Detection Function	Over travel detection zone can be set at outside of software limit by using control	, , , , , , , , , , , , , , , , , , , ,
	circuit, and the CNC rotary table can be protected not to exceed safety zone.	axis
Alarm No. Automatic Indication Function	When alarm is detected, controller automatically goes to diagnosis mode	When duplicated, it flickers
Alarm Out	and Alarm No. is displayed.  Alarm condition of <b>X</b> 21 can be sent to M/C	every 2 sec.
Emergency Stop Out	Emergency stop condition of <b>X</b> 21 can be sent to M/C.	
Self Diagnosis Function	Inside situations of controller can be seen.	
Modal G Code Flicker Function	All G codes used in program are indicated in flickering.	Every 2 sec.
Pitch Error Compensation Function	Rotary axis: 15° unit, Tilting axis: 5° unit	Option Option
Feed Rate Override	5~200%,999% (Rapid feed)	±5%
Input Signals	1 kind of Auxiliary Function.(Automatic operation can be done by only one M signal.)	With or without contact signal *1
Output Signal	Block Finish signal, Work Zero Position Signal, Alarm Out Signal *2	Ask Time Chart
Servo Motor	AC servo motor with serial encoder	Tien Timo Onare
	★21: Single phase AC200~220V、50Hz / 60Hz	400W:1.0KVA,750W:1.3KVA
Input Power	<b>★</b> 21.3 Ingle phase AC200 *220V, 30Hz / 60Hz	1,300W:1.4KVA,1,800W:1.8KVA
	V1 211 W . 3 PHASE MOZOU - 220 W 30 MZ / 00 MZ	1,000 VV . 1.41 (VA, 1,000 VV . 1.0 (VA

- \*1: M signal of M/C is valid only the block without DEN (Distribution End).
- \*2: Work Zero Position Signal and Alarm Out Signal are optional signals.

#### OPTIONAL SPECIFICATION

#### 1 True Closed Loop

Manual pulse generator (X1, X10, X100)

This is to be used for ultra precision rotary table.

This pulse generator enables the table to be rotate or tilted by manual operation on every 0.001~0.1° unit.

#### 3 Five M functions

Control and confirmation of other actuator (hydraulic tailstock, coolant controller, robot etc.) can be done from **X**21side. **X**21 for AWC, this is included as standard.

#### 4 External N Number Search Function

When plural programs are entered in 1000 blocks. Desired N number can be searched from outside (applicable also to FMS line)

#### 5 External Position Display

When the direct angle command interface is used, this display will be used near M/C MDI panel.

#### 6 External Power ON/OFF

Interface to perform Power ON/OFF by external circuit is available.

#### 7 Pitch Error Compensation

Rotary Axis: by  $15^{\circ}$  unit  $\times$  24 points Tilting Axis:

by 5° unit × 24 points

#### 8 Output Signal \*2

Work Zero position signal is the signal set to ON while the CNC rotary table is in the work zero position. Alarm Out signal is the signal set to ON when

★21 is in alarm condition.

These signals can be used for interlocking function.

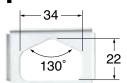
#### 9 Harting Connector Type...Only for ≪21

Harting Connector can be corresponded to the CNC Rotary Table side.



## **Explanation of PENDANT 1**







- 1 Power Switch
  - (2) Emergency Stop Button
- [-∢][▶+] 34 Manual Jog Button
- (5) High Speed Button

  - (6) Auto/Manual Select Switch
  - 7 Edit/Current Position Select Switch
  - (START (8) Start Button
  - 9 Stop Button
  - (10) Continuous Feed Button
  - ORG (11) Original Point Set Button
  - (12) Machine Zero Return Button
  - (3) Work Zero Return Button
  - DGN (14) Diagnosis Button
- 1 | I 15 Increment/ Decrement of Block No.
- (6) Feed Rate Override Button OVR OVR
  - 17 Reset Key RESET
- **READY** ······Turned ON when input power is supplied.
- COM.····Turned ON while X 21 main unit and the pendant are communicating.
- **ALARM**······Turned ON when **≪**21 is in alarm condition.
- COM . ALARM ···· Turned ON when communication time out error occurs between X21 main unit and the pendant.





#### 1 Power Switch



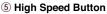
### 2 Emergency Stop Button





#### **34 Manual Jog Button**

▶ + Clockwise, - ◀ Counter clockwise. While this button is being depressed, the table continually rotates slowly. When this button is depressed once, the table steps by 0.001°(1").





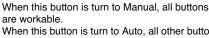
When this button is depressed together with ③ or 4, the table rotates in rapid feed. When jog 11 while depressing 5, table moves

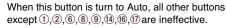
as following;

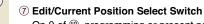
Gear Ratio	Table Movement
1:720	0.5°
1:360	1.0°
1:180	2.0°
1:120	3.0°

Gear Ratio	Table Movement
1:90	4.0°
1:60	6.0°
1:45	8.0°

#### 6 Auto/Manual Select Switch









AUT

MAN

On  $\theta$  of  $\circledR,$  programming or present position is displayed alternatively.

#### (8) Start Button





The table rotates as programmed.

The table slows down and stops. (Feed Hold Function). When ® is depressed again, the table rotates the remaining angle of the







When this button is depressed, the table rotates continually. And, when (9) is depressed, the table stops. The desired feed and direction are to be input in N997 Block. (Refer P.53 ®)

### 11 Original Point Set Button



When this button is depressed at any angle, the position display shows 000.000°, and it is used as the work zero position. When the cumulative angle becomes 360°, work zero position signal is sent, which can be used as interlock.





12 Machine Zero Return Button When this button is depressed, the table returns to the machine zero position (0° of the graduation of the table) clockwise in rapid feed, then low speed for final positioning.



#### **13 Work Zero Return Button**

When this button is depressed, the table returns to the position set by (1) clockwise in rapid feed.



**14** Diagnosis Button



#### (5) Increment/Decrement of Block No.

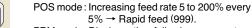
Previous block data and next block data are displayed.

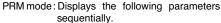


OVR



#### 16 Feed Rate Override Button







POS mode: Decreasing feed rate 200 to 5% every 5%. PRM mode: Displays the proceeding parameters



**17** Reset Key This is for calling N000 and also for resetting

sequentially.

alarm display etc.

## **Explanation of PENDANT 2**



G21: Simultaneous start

G24: Work zero point return

G28: Programmable machine

Pzero position return

G92: Coordinate system setting

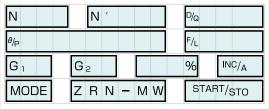
G27: Repeating function

\* G90 : Absolute command

\* G91 : Incremental command

G22: Continuous start G23: Machine zero point return

#### ® Display



N: Sequence No. N000~N999

NRS: Direct angle command interface is selected.

N': Jump & Return J000~J999, RET

 $\theta$ : Rotation angle of table (Decimal, Sexagecimal) 0~±999.999° (Decimal)

0~±999.59'59" (Sexagecimal)

D: Equal division (divided by 2 to 9999)

F: Feed rate

Cutting feed: 0.01~9.99min<sup>-1</sup>

Rapid feed: 000

G: Preparatory function G01~G92 Two kind of G codes (G1, G2) can be input in one block.

%: Feed rate override

(5% to 200%, or 999 for rapid feed rate)

P: Starting block No. of repeating function (G27)

Q: Final block No. of repeating function (G27)

L: Repeating frequency (G27)

INC/ABS: INC (Incremental)

ABS (Absolute)

MODE: EDT (Edit mode)

MAN (Manual mode)

AUT (Auto. mode)

MPG (MPG mode)

**DGN** (Diagnostic mode)

#### ZRN-MW:

M Flickering (Returning to M ZERO)

M (Stop at M ZERO)

W Flickering (Returning to W ZERO)

W (Stop at W ZERO)

**START/STOP: START** (Starting)

STOP (Stop)

#### **Key Encoder**

For calling a certain sequence, input the number after this key so that the program of the block is display, also you can start from the program.

This key is to be used when you want to call sub

program N' or jump to N' after N block is completed.

When sub program is finished, enter R at ® N'

display. And, it returns to the block next to the

one where J' was commanded in the main program.

θ : You can input 0° to ±999.999° in 0.001°

increment, or  $0^{\circ}$  to  $\pm 999^{\circ}59'59"$  in 1"

The selection of decimal or sexagesimal

In case of Dwell Instruction (G04), the waiting

time is inputted. (0.001 to  $\pm 999.999$  sec.).

P: Starting number of repeating function (G27)

system is set up by parameter.

000 to 999.

000 to 999.



Ν

(3digits)

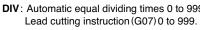
(3digits)





 $\theta$  (±6~7digits)





Q: Final number of repeating function (G27)



F, L(3digits)

G

Rapid feed F000 or F0. L: Repeating frequency 0 to 999. Without G: Positioning

G04: Dwell G06: Constant acceleration G07: Rotation number

\* G08: Buffer commencing \* G09 : Buffer ending \* G10 : Brake unclamped

\* G11: Brake clamped G14: Uni-directional positioning \*G15: Droop check \*G16: Droop cancel

M Function (Option)

G60∼G74 : Activate an actuator

#### How to enter G code:

0 cannot be suppressed for both G1 and G2 codes. For example, when G1=07 and G2=08, enter them

F: Cutting feed F001(0.01 min-1) to F999(9.99

G0708\*

and indication will become as;





When you want to enter 9°, just depress keys as  $\Theta \rightarrow \Theta \rightarrow \bullet$ , and 9.000° or 9°00′00″ is displayed.



This is for command of Counter clockwise rotation.



This is depressed as programming of each block being completed.

(Hereafter shown as \*).



For deletion or alternation of  $\theta$ , DIV, or F individually, just depress  $\theta$ , DIV, or F, then depress. Also when you depress \* with pressing C, complete one block is deleted.

#### Deleting successive blocks

For example, in order to delete blocks from N000 to N999, push keys N0 -999 at Edit mode, and jog while depressing ckey.

means optional function.

Operation of the pendant of X21 controller for tilting axis specification and for NSV index specification differs, please refer instruction manual.



### $^{\prime \uparrow}$ Caution for $\propto$ 21 Controller

- The alarm regarding the absolute encoder will be appeared, when turning the POWER ON at first time just after connecting the cable. This is because the coodinate system is not established yet. Please try as follows;
  - DGN Return to pervious mode.

PRM#110=1 Writting parameter value enable.

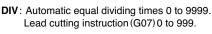
 $\begin{bmatrix} G \\ NO \end{bmatrix}$  7  $\begin{bmatrix} 2 \\ 0 \end{bmatrix}$  2  $\begin{bmatrix} \cdot \\ 0 \end{bmatrix}$  1  $\begin{bmatrix} 1 \\ 0 \end{bmatrix}$  \* PRM#72=1

· Turn the POWER OFF and ON

· For rotary axis (M) Execute machine zero return. For tilting axis First set the temporary machine zero position and (M).

the POWER OFF and ON to establish the coodinate system again.

Please refer instruction manual for more detail. • When the alarms regarding the absolute encoder such as ALARM#1101 or #1102 are appeared, please set PRM#71=1 and turn









## **Operation & Confirmation of PROGRAMS**

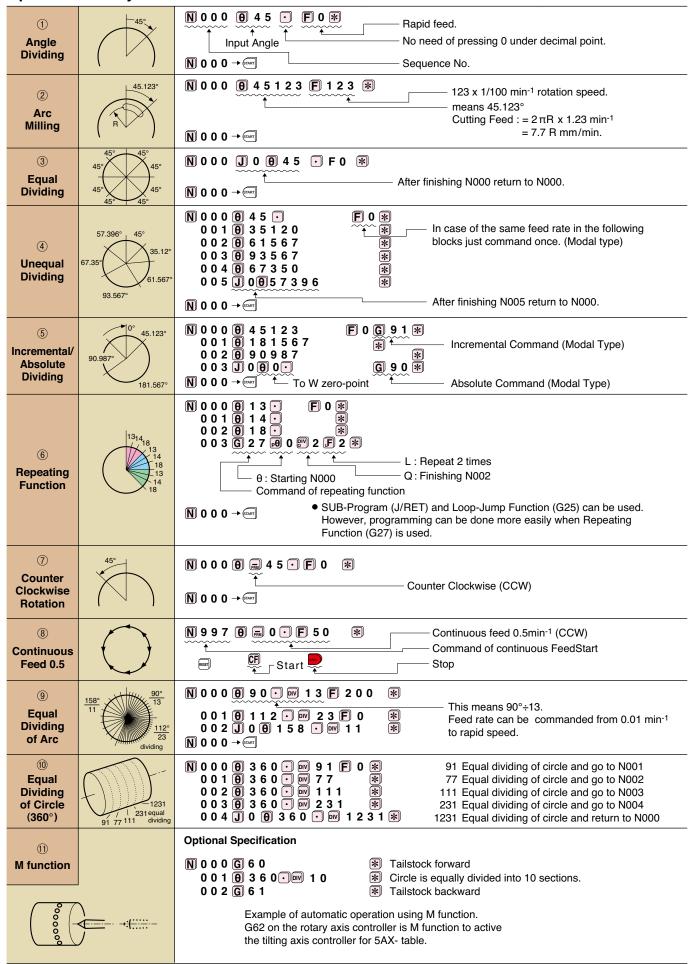


#### Operation of Keys.

Before programing, be sure that mode is EDT.

Before start the programs, push II ..... or II ..... in EDT mode, and confirm input date.

Then start the program in MAN mode to confirm the moving.



## **Example of PROGRAMS**



#### Example for Circle Drilling & Tapping (23 equal division)

#### Program of NC Machine

```
0 0 0 0 0; ··· Main program

M 9 8 P 0 1 0 0 L 2 3; ··· Drilling cycle 23 times

M 9 8 P 0 1 0 1 L 2 3; ··· Tapping cycle 23 times

M 0 2;
```

**0 0 1 0 0** ;···Sub program 1

```
G 0 1 Z — ;···Drilling fixed cycle

M 2 1 ; -----

M 9 9 ;

0 0 1 0 1 ;···Sub Program 2
```

G 0 1 Z — ;···Tapping fixed cycle M 2 1 ; -----

M 9 9 ;

### **2** Example for Arc Milling

Program of NC Machine0 0 0 0 1;

```
:
M 2 1;
G 0 1 Z — ;···Z axis down
M 2 1;
G 0 0 Z — ;···Z axis up
M 2 1;
```

### **③ Example for Lead Cutting**

Program of NC Machine

```
0 0 0 0 3;

M 2 1;

G 0 1 Z — ;··· Z axis down

M 2 1;

M 2 1;

G 0 1 X 4 0 . F 1 0 0; *1 ←

G 0 0 Z — ;··· Z axis up

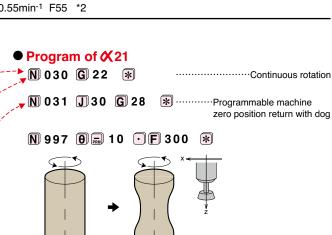
M 2 1;
```

#### Calculations for Feed Rate in Lead Cutting -

- 1. Make a development elevation like **Fig.2** to calculate the vector.
- 2. Give feed in lead cutting (cutting feed from 1 to 2).....e.g. 200 mm/min (depend on work piece materials).
- 3. Cutting speed of X axis: Fx= 200 mm/min x 40 mm  $\div$  80mm =100 mm/min F100  $^{*}1$
- 4. Cutting speed of  $\theta$  axis: f = 200 mm/min x 69.2 mm  $\div$  80mm =173 mm/min 173 mm/min x 1min<sup>-1</sup>  $\div$  314 mm/min =0.55min<sup>-1</sup> F55 \*2

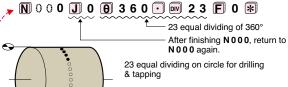
## **4 Example of continuous rotation** as turning operation

Program of NC Machine



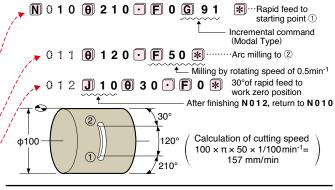
The direction and feed rate of continuous rotation are specified on N997. When higher rotation speed than standard is required, please contact with us.





When NC Machine executes the sub program 23 times, drilling & tapping of 23 holes is completed with 23 equal divisions calculated to 1/23rd of 360° to third decimal places automatically, e.g. 15.652°.

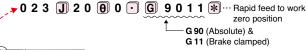


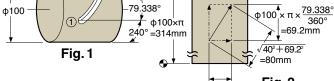


#### ● Program of **≪21**







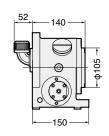


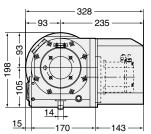
## **CNC ROTARY TABLE with ≪21 CONTROLLER**



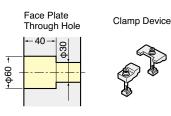
## CNC105AA21-04







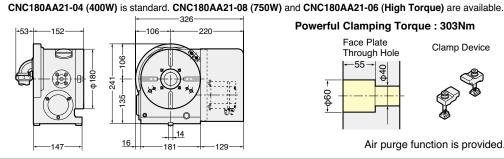
#### Powerful Clamping Torque: 205Nm



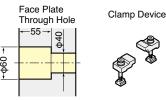
Air purge function is provided.

CNC180AA21-04





Powerful Clamping Torque: 303Nm

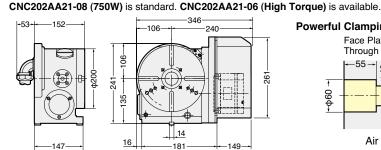


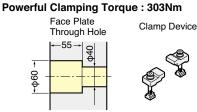


Air purge function is provided.

CNC202AA21-08





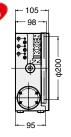


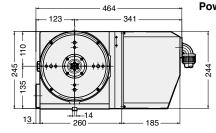
Air purge function is provided.

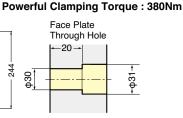
CNC205AA21-05



NC202AA21-05 (450W) is standard. ★Built-in type rotary joint 6+1 can be mounted.



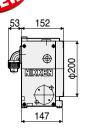


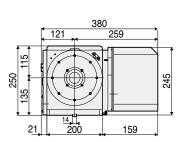


Air purge function is provided.

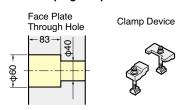
Rotary joint is included in the photo. (optional)







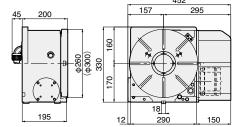
Powerful Clamping Torque: 900Nm



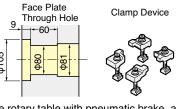
Air purge function is provided.

## CNC260AA21-08, 302AA21-08

**CNC260** 



CNC260, 302AA21-08 (750W) is standard. CNC260, 302AA21-06 (High Torque) is available. **Pneumatic Clamping Torque UP 588Nm** 



For the rotary table with pneumatic brake, air purge function is provided inside the motor cover as standard.

## **CNC ROTARY TABLE with ≪21 CONTROLLER**

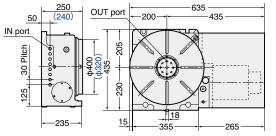


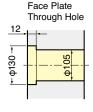
## CNC321, 401AA21-18



Rotary joint is included in the photo. (optional)

#### ★Built-in type rotary joint can be mounted, refer to **P.89**



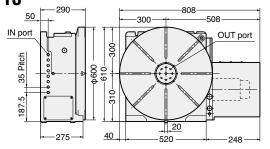


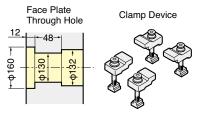


★ Please contact us for the dimension of CNC321A21-18.

## CNC501, 601, 802AA21-18 \*\*Built-in type rotary joint can be mounted, refer to \*\*\* P.89





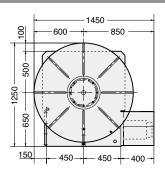


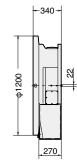
★ Please contact us for the dimension of CNC501, 802A21-18.

## CNC1000, 1200AA21



Center socket is included in the photo. (optional)

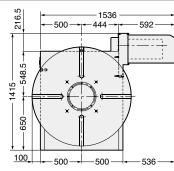


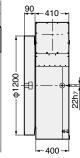


- ★ Ultra precision of ±3sec. is available as an option. There is no through hole on the rotary table due to the rotary encoder for ultra precision option.
- ★ Please contact us for the dimension of CNC1000A21.
- ★ Code No. will be varied according to the servo motor capacity. e.g CNC1000AA21-44 (4.4KW Motor)

## CNC1201AA21



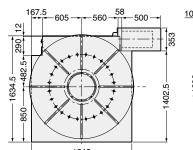


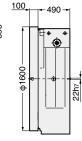


- ★ Ultra precision of ±3sec. is available as an option. There is no through hole on the rotary table due to the rotary encoder for ultra precision option.
- ★ Please contact us for the dimension of CNC1000A21.
- ★ Code No. will be varied according to the servo motor capacity. e.g CNC1201AA21-110 (11KW Motor)

### CNC1600AA21







- ★ Ultra precision of ±3sec. is available as an option.

  There is no through hole on the rotary table due to the rotary encoder for ultra precision option.
- ★ Please contact us for the dimension of CNC2000A21.
- ★ Code No. will be varied according to the servo motor capacity. e.g CNC1600AA21-44 (5KW Motor)

#### The specification of the large rotary table will be varied according to your application.

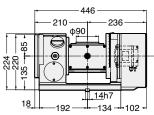
- 1. With/without T slot, Width of T slot
- 2. Spindle hole dimension...Center socket for centering is normally installed.
- 3. Layout of the rotary table...Vertical use, horizontal use, vertical and horizontal use
- 4. Total reduction ratio...Suitable capacity of the servo motor can be selected.

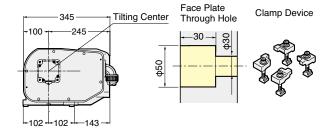
## **Tilting Rotary Table with ≪21 Controller**







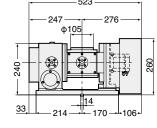




Motor capacity of rotary axis and tilting axis are added at the end of Code No. e.g 5AX-100WAA21-0404

### 5AX-130WAA21





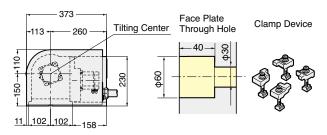
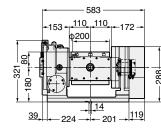


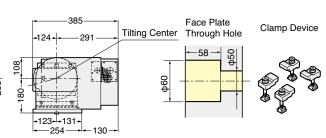
Photo with φ130mm plate. Rotary axis cable stays.

Motor capacity of rotary axis and tilting axis are added at the end of Code No. e.g 5AX-130WAA21-0404

### 5AX-201WAA21



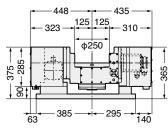


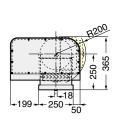


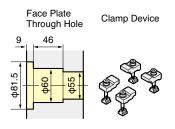
Motor capacity of rotary axis and tilting axis are added at the end of Code No. e.g 5AX-201WA21-0408

### 5AX-250WAA21





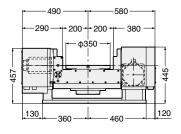


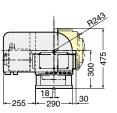


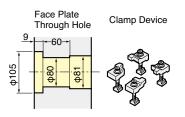
Motor capacity of rotary axis and tilting axis are added at the end of Code No. e.g 5AX-250WA21-1313

## 5AX-350WAA21









Motor capacity of rotary axis and tilting axis are added at the end of Code No. e.g 5AX-350WA21-1318

## Tilting Rotary Table with **≪21** Controller

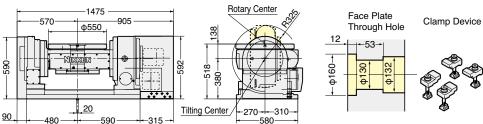


### 5AX-550WAA21



Center socket is included with the Photo. (optional)

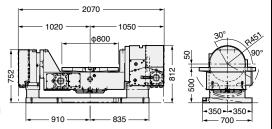
#### The specification of the large rotary table will be varied according to your application.



Motor capacity of rotary axis and tilting axis are added at the end of Code No. e.g 5AX-550WA21-1818

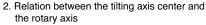
### 5AX-800WAA21





Motor capacity of rotary axis and tilting axis are added at the end of Code No. e.g 5AX-800WA21-1875

1. Moving angle of the tilting axis





5AX-1200A: The tilting axis center is located in the same position as the center of the rotary axis body.

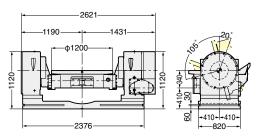


5AX-1200B:The tilting axis center is located in the same position as the top surface of the rotary axis.

- 3. Tilting axis base...It can be supplied to us.
- 4. With/ witout T slot, Width of T slot
- 5. Spindle hole dimension
  - ···Center socket for centering is normally attached.

### 5AX-1200WAA21

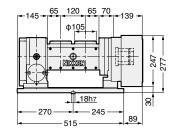


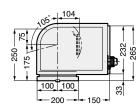


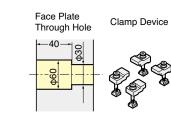
Motor capacity of rotary axis and tilting axis are added at the end of Code No. e.g 5AX-1200WA21-4444

## 5AX-2MT-105WAA21





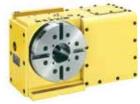




Motor capacity of rotary axis and tilting axis are added at the end of Code No. e.g 5AX-2MT-105WA21-0404



Back side motor mounted **CNC** rotary table



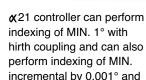
Top side motor mounted **CNC** rotary table

Indexing of MIN. incremental of 1° is done by &21 controller.



Multi-spindle CNC rotary table





**NST** manual tilting

rotary table

hirth coupling and can also perform indexing of MIN. incremental by 0.001° and profile milling.



## M-signal CNC ROTARY TABLE with EZ CONTROLLER

- Compact and lightweight state-of-the-art numerical control unit
- Minimum setting unit of 0.001 or 1 second
- Digital servo and absolute encoder
- Large-capacity, high-torque servo motor (1.0 kw, 3.92 N·m continuous stall torque)
- Ability to back up programs and parameters to USB flash drive
- CE mark certified

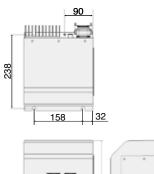


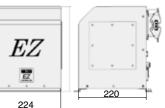




Method of connection to machining center

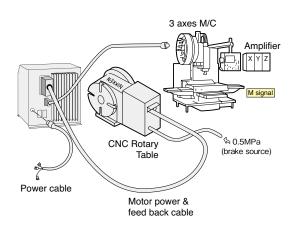
For a CNC rotary table, the interface is the same as that used previously with **&21** controllers. **P.75** For **5AX** rotary tables using EZ controllers for the rotation and tilt-axes, a power supply and M signal cable is required for each EZ controller.



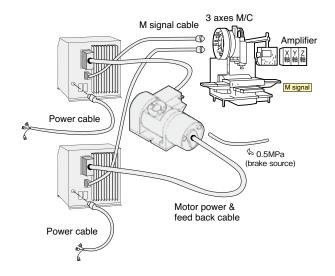




EZ controller connection for CNC rotary table (1-axis)



EZ controller (2 units) connection for 5AX tilting rotary table (2-axis)



## **NIKKEN**

### ■ Main Specification of Controller

**EZ CONTROLLER SPECIFICATION** 

EZ controller is interchangeable for operation and program with existing &21 controller in case of 1 axis control.

Item	Specification	Remarks
MIN. Increment	0.001° or 1″	Free Selection
MAX. Programmable Angle ±999.999° & ±999°59'59"		Free Selection
Program Capacity	1000 Blocks	N000~N999
Input System	MDI Key Board, Pendant type	Maintained by a ten-year battery
Programming System	Combined use of Incremental/Absolute	Free Selection of G91 / G90
Zero Return	Machine Zero Position/Work Zero Position	
Manual Feed	Rapid Feed/Fine Feed/Step Feed/Continuous Feed	
Uni-directional Positioning	Uni-directional Positioning can be done to eliminate the mechanical backlash.	G14
Emergency Stop	Whole system stops	can be commanded from outside.
Jump Function Jump to sub program etc.		
Dry Run Table always rotates in rapid feed for checking.		
Preparatory Function	Dual, brake enable / disable, unidirectional positioning, machining origin return	G04~G92
G1 Code, G2 Code	2 kind of G codes can be entered in one block.	
Block Data display	At programming, previous block data or next block data are displayed. Nine lines are displayed per screen.	
Software Limit Function	± stroke limit values can be set by parameter.	
Over Travel Detection Function	Over travel detection zone can be set at outside of software limit by using control	Standard for 5AX- type tilting
Over Traver Detection 1 unction	circuit, and the CNC rotary table can be protected not to exceed safety zone.	axis
Alarm No. Automatic Indication Function	When alarm is detected, controller automatically goes to diagnosis mode and Alarm No. is displayed.	
Self Diagnosis Function	elf Diagnosis Function Inside situations of controller can be seen.	
Modal G Code Flicker Function	Modal G Code Flicker Function All G codes used in the program are displayed.	
Feed Rate Override	eed Rate Override 1 to 255% (increment determined by parameter setting), 999% (fast feed)	
Input Signals	1 kind of Auxiliary Function.(Automatic operation can be done by only one M signal.)	±5%
Output Signal	1 Block Finish signal, Work Zero Position Signal, Alarm Out Signal	With or without contact signal *1
Servo Motor	AC servo motor with serial encoder R2AAB8100HXPGA (1.0kW)	Ask Time Chart
Input Power	Single phase AC200~220V、50Hz / 60Hz	840VA (Average load factor)

<sup>\$1</sup>: M signal of M/C is valid only the block without DEN (Distribution End).

### Explanation of code numbers of products with EZ controller

Code No. of Rotray & Tilting Table

● 1-axis added axis-1-axis • 1-axis CNC rotary table • 2-axis **5AX** rotary table 5AX rotary table with EZ controller with EZ controller 5AX - 100 DEZ FA - M **CNC 180** EZ **5AX - 100 WEZ** With/without Motor Non: without motor, M: with motor ■ With EZ controller Type of motor Non: DC servo, A: AC servo Motor mounting location Diameter of the rotarytable face plate Motor maker F: Fanuc, M: Meldas, T: Tosnac Y: Yasnac, O: OSP, S: Sanyo, Z: Siemens Diameter of the rotary table face plate Code No. of Rotray & Tilting Table Code No. CNC rotary table With 1 axis EZ controller Diameter of the rotarytable face plate

### Operation & Confirmation of Programs

- ●Before programing, be sure that mode is <u>EDT</u>.

  Before start the programs, push ↓ ↓ ...... or ↑ ↑ ..... in <u>EDT</u> mode, and confirm input date.

  ●Then start the program in <u>MAN</u> mode to confirm the moving.
- I nen start the program in MAN mode to confirm the movii

① Angle Dividing	45	Input Angle No	pid feed. need of pressing 0 under decimal point. quence No.
② Equal Dividing	45° 45° 45° 45° 45° 45° 45° 45° 45° 45°	N 0 0 0 J 0 Ø 4 5	r finishing N000 return to N000.
③ Unequal Dividing	57.396° 45° 67.35° 35.12° 61.567°	N 0 0 0 0 4 5 • F 0 • O 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	- In case of the same feed rate in the following blocks just command once. (Modal type)  - After finishing NOO5 return to NOO9.
		N 0 0 0 → START	<ul> <li>After finishing N005 return to N000.</li> </ul>

## **Explanation of PENDANT 1**





Turned ON when input power is supplied.
Turned ON when EZ is in alarm condition.



#### 1 Power ON/OFF switch



ΗΙ

#### ② Emergency Stop Button



#### **34 Manual Jog Button**

▶ + Clockwise, - ◀ Counter clockwise.
While this button is being depressed, the table continually rotates slowly. When this button is depressed once, the table steps by 0.001°(1").

#### **5 High Speed Button**

When this button is depressed together with ③ or ④, the table rotates in rapid feed.
When jog ① while depressing ⑤, table moves as following:

Gear Ratio	Table Movement	
1:720	0.5°	
1:360	1.0°	
1:180	2.0°	
1:120	3.0°	

Gear Ratio	Table Movement
1:90	4.0°
1:60	6.0°
1:45	8.0°



#### **6 Auto/Manual Select Switch**

When this button is turn to Manual, all buttons are workable.

When this button is turn to Auto, all other buttons except 1, 2, 6, 8, 9, 4, 6, 7 are ineffective.



#### **⑦ Edit/Current Position Select Switch**

On  $\theta$  of  $(\!( \! B \!)\!)$  , programming or present position is displayed alternatively.



#### **® Start Button**

The table rotates as programmed.



#### 9 Stop Button

The table slows down and stops. (Feed Hold Function). When ® is depressed again, the table rotates the remaining angle of the program.



#### (1) Continuous Feed Button

When this button is depressed, the table rotates continually. And, when (§) is depressed, the table stops. The desired feed and direction are to be input in N997 Block. (Refer P.53 (§))



#### 1 Original Point Set Button

When this button is depressed at any angle, the position display shows 000.000°, and it is used as the work zero position. When the cumulative angle becomes 360°, work zero position signal is sent, which can be used as interlock.



#### Machine Zero Return Button

When this button is depressed, the table returns to the machine zero position (0°of the graduation of the table) clockwise in rapid feed, then low speed for final positioning.



#### 13 Work Zero Return Button

When this button is depressed, the table returns to the position set by 1 clockwise in rapid feed.



#### (4) Diagnosis Button



### (5) Increment/Decrement of Block No.

Previous block data and next block data are displayed.

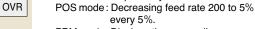


OVR

#### **16 Feed Rate Override Button**

POS mode: Increasing feed rate 5 to 200% every  $5\% \rightarrow \text{Rapid feed (999)}.$ 

PRM mode: Displays the following parameters sequentially.



PRM mode: Displays the proceeding parameters sequentially.



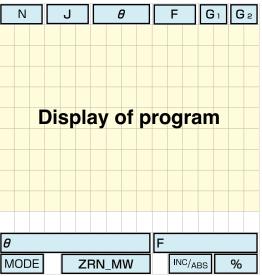
#### **17** Reset Key

This is for calling N000 and also for resetting alarm display etc.

### **Explanation of PENDANT 2**







The program is displayed nine lines at a time.

- N : Sequence No. N000∼N999
- J: Jump target sequence number and return display J000~J999, RET
- θ: Rotation angle of table (Decimal, Sexagecimal) 0~±999.999° (Decimal)
  - 0~±999.59'59" (Sexagecimal)
- F: Feed rate

Cutting feed: 0.01~9.99min-1

Rapid feed: 000

G₁, G₂: Preparatory function G01~G92 Two kind of G codes (G1, G2) can be input in one block.

- θ : Rotation angle of table (Decimal, Sexagecimal)
  - 0~±999.999° (Decimal)
  - 0~±999.59'59" (Sexagecimal)
- F: Feed rate

Cutting feed: 0.01~9.99min<sup>-1</sup>

Rapid feed: 000 MODE: EDT (Edit mode)

MAN (Manual mode) AUT (Auto, mode) **DGN** (Diagnostic mode)

#### ZRN-MW:

M (Stop at M ZERO) W (Stop at W ZERO)

INC/ABS: INC (Incremental)

ABS (Absolute)

%: Feed rate override

(5% to 200%, or 999 for rapid feed rate)

For calling a certain sequence, input the number after this key so that the program of the block is display, also you can start from the program.

This key is to be used when you want to call sub program N' or jump to N' after N block is completed.

When sub program is finished, enter R at ® N' display. And, it returns to the block next to the one where J' was commanded in the main program.

 $\theta$  : You can input 0° to ±999.999° in 0.001° increment, or 0° to  $\pm 999^{\circ}59'59"$  in 1"

The selection of decimal or sexagesimal system is set up by parameter.

In case of Dwell Instruction (G04), the waiting time is inputted. (0.001 to  $\pm 999.999$  sec.).

Not used



F: Cutting feed F001(0.01 min-1) to F999 (9.99

Rapid feed F000 or F0.

Without G: Positioning **G** NO

G04 : Dwell

\* G10: Brake unclamped \* G11 : Brake clamped

G14: Uni-directional positioning

G21 : Simultaneous start

G23: Machine zero point return

G24: Work zero point return

G28: Programmable machine zero position return

\* G90 : Absolute command

\* G91: Incremental command

G92: Coordinate system setting

#### How to enter G code:

0 cannot be suppressed for both G1 and G2 codes. For example, when G1=14 and G2=91, enter them as follows;

1491\*

and indication will become as;

G <sub>1</sub>	G <sub>2</sub>		
14	91		

DATA

When you want to enter 9°, just depress keys as  $\theta \rightarrow 9 \rightarrow \odot$ , and 9.000° or 9°00′00″ is displayed.



This is for command of Counter clockwise rotation.

This is depressed as programming of each block being completed.

(Hereafter shown as ※).



INPUT

For deletion or alternation of  $\theta$ , DIV, or F individually, just depress  $\theta$ , DIV, or F, then depress. Also when you depress \* with pressing C , complete one block is deleted.

#### **Deleting successive blocks**

For example, in order to delete blocks from N000 to N999. push keys N 0 - 999 at Edit mode, and jog ★ while depressing c key.

Pendant operation is somewhat different on the tilt-axis specification EZ. Refer to the EZ instruction manual for

#### Caution for EZ Controller

- This is an absolute encoder, with alarm #2162 displayed when the cable is initially connected to the rotary table and the power is turned on because the coordinate system is not established. Proceed with the following steps:
  - DGN Return to pervious mode.

PRM#110=1 1 Writting parameter value enable.

2 PRM#72=1

· Turn the POWER OFF and ON

 For rotary axis MRI Execute machine zero return. For tilting axis First set the temporary machine zero position and | M ZRN | Please refer instruction manual for more detail.

• When the alarms regarding the absolute encoder such as ALARM#1101 or #1102 are appeared, please set PRM#71=1 and turn the POWER OFF and ON to establish the coodinate system again.













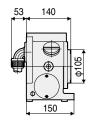
### CNC ROTARY TABLE with EZ CONTROLLER

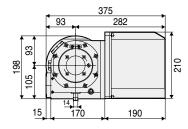




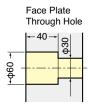
### CNC105EZ







#### Powerful Clamping Torque: 205Nm

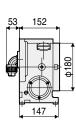


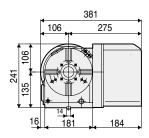


Air purge function is provided.

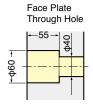
CNC180EZ







Powerful Clamping Torque: 303Nm



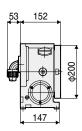


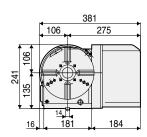
Clamp Device

Air purge function is provided.

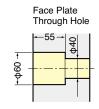
CNC202EZ







Powerful Clamping Torque: 303Nm







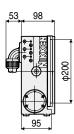
Air purge function is provided.

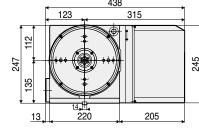
CNC205EZ



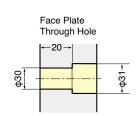
Rotary joint is included in the photo. (optional)

★Built-in type rotary joint 6+1 can be mounted.





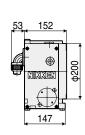
Powerful Clamping Torque: 380Nm

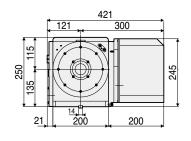


Air purge function is provided.

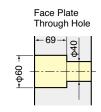
### NCT200EZ







Powerful Clamping Torque: 900Nm

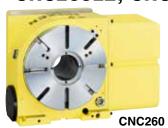


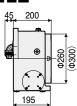


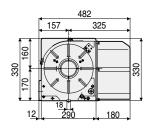


Air purge function is provided.

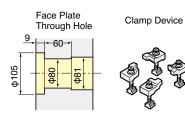
### CNC260EZ, CNC302EZ







#### **Pneumatic Clamping Torque UP 588Nm**



Air purge function is provided.

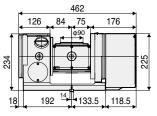
### TILTING ROTARY TABLE with EZ CONTROLLER

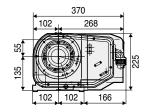


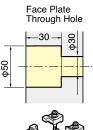








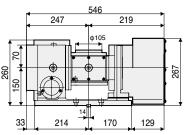


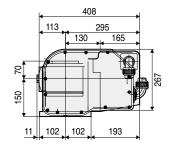


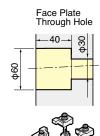


**5AX-130WEZ** 









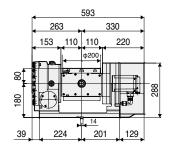


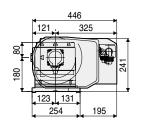
Clamp Device

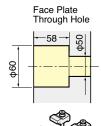
### 5AX-201WEZ

Photo with  $\phi$ 130mm plate.





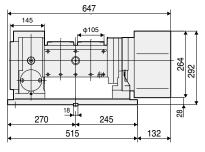


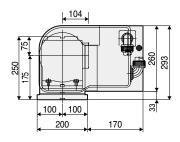


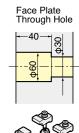
Clamp Device

**5AX-2MT-105WEZ** 











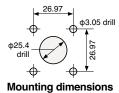
### Technical Information of NIKKEN CONTROLLER 1 NIKKEN



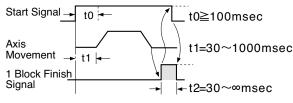
#### X21 and EZ controller connection

Normally the controller will be operated only by connecting M Signal (Start Signal) and 1 Block Fin. Signal. Emergency Stop Input must be set to B contact only for 5AX-Tables. For other Tables, you can choose A/B contact for Emergency Stop Input. When to be connected to machine, receptacle MS3102A18-1P is provided. Arrange the electric circuits of your machine side.

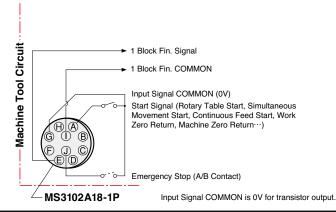




#### Input/Output Time Chart



t1 and t2 can be set by parameter.

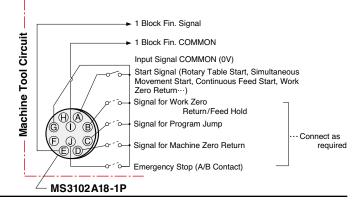


#### Connection for Automatic Operation

Once program is loaded to X21, all operations such as Power ON, Machine Zero Return, Program Section, Start etc. can be done by machine side. 3 sets of M signals are required for CNC rotary table and 6 sets of M signal are required for 5AX- tilting rotary table. e.g.

M21: Start Signal

M22: Program Jump (Selection) Signal M23: Machine Zero Return and Reset



#### RS232C Automatic Loading Interface. · · · Pendant is to be used for manual operation and maintenance only. (≪21only) JAPAN PAT.

Program is loaded from Custom Macro of M/C, and start the program by the ordinary M signal. Total management of programs can be done on only M/C side. The necessary functions of M/C side are;

Custom Macro

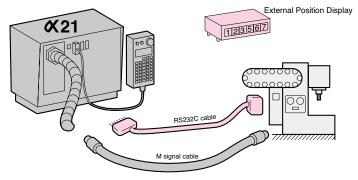
Custom Macro External Output Function

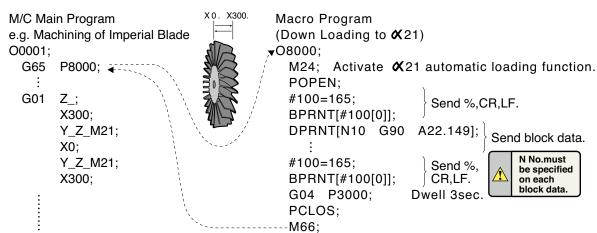
2 sets of M signals

e.g.

M21: Start signal

M24 : Start signal of RS232C Automatic Loading Function (Start signal without 1 Block Fin. signal confirmation and keep this signal ON at least 100msec.)





### Technical Information of NIKKEN CONTROLLER 2 NIKKEN

Special cable



#### ■ RS232C Direct Angle Command Interface (X21 controller only) JAPAN PAT.

This interface can start the block after sending one block data from custom macro of M/C. Equal dividing function (e.g. divided by 7) also can be sent. Therefore, program will be simple and more accurate and the total management of the programs can be done

Required functions at the M/C

- Custom macro
- Custom macro external output function
- 1 M signal (Start signal) M21

5AX-table with 2 off X21 controllers can be connected to use RS232C direct angle command interface. In this case, special RS232c cable is required and 2 off M signals are required.

and maintenance only. X 21 External position display

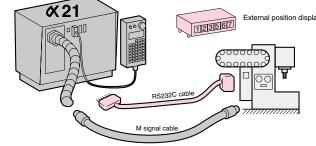
DE-9P-N

DB-25P-N

ER

Shield line

··· Pendant is to be used for manual operation



#### RS232C interface

The cable is available as an option.

Baud rate: 4800, 9600 bps

Code: ISO

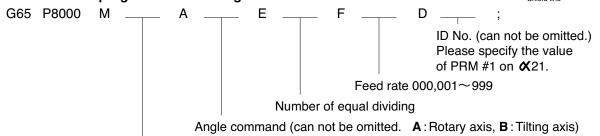
Data bit length: 7 bits Parity bit: Even parity Stop bit length: 2 bits

Parameter setting of M/C must be "LF CR" or "CR LF"

is sent at EOB sending.

#### **X** 21 J15 X21#1 Ŧ (1) X21#2 RD 2 SD RD RS CS-connect to RS DR-connect to ER SG SG CD-connect to ER

#### Call off macro program for direct angle command



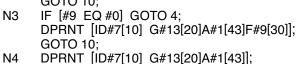
90/91 = Absolute/Incremental

M21(start) will be executed as required times after execution of macro program for direct angle command.

#### Macro program for direct angle command (Example for only rotary axis control)

O 8000: DPRNT [ID#7[10] A#1[43]E#8[40]]; N<sub>6</sub> POPEN: GOTO 10: #100=165: N7 IF [#9 EQ #0] GOTO 8; BPRNT [#100[0]]; DPRNT [ID#7[10] A#1[43]F#9[30]]; IF [#13 EQ #0] GOTO 5; GOTO 10: IF [# 8 EQ #0] GOTO 3; N8 DPRNT [ID#7[10] A#1[43]]; BPRNT [#100[0]]; IF [# 9 EQ #0] GOTO 2; N10 DPRNT [ID#7[10] G#13[20]A#1[43]E#8[40]F#9[30]]; G04 P200; P CLOS: GOTO 10: DPRNT [ID#7[10] G#13[20]A#1[43]E#8[40]]; M99; **GOTO 10:** 

Work zero position signal and alarm out signal can be output as an option. Be careful that these signals are non-contact type output and output common line is 0V. These signals must be recieved on the relay. Please contact with us for more details.



**GOTO 10;** N5

IF [#8 EQ #0] GOTO 7; IF [#9 EQ #0] GOTO 6;

DPRNT [ID#7[10] A#1[43]E#8[40]F#9[30]];

GOTO 10;

N<sub>1</sub>

N2

#### Termination of the maintenance work for NIKKEN controllers

The maintenance work of the NIKKEN controllers is continued as long as the electric parts could be supplied. However, about the following controllers, the maintenance has to be terminated, because the supply of the electric parts became impossible. Please examine reshuffling to the CNC rotary table with &21

Terminated at April 2005 for CNC rotary table ND5000, 8000DC, 8800DC, 9000DC Terminated at April 2005 for NSV index table NSV controller (M signal I / F, B signal I/F) Terminated at April 2013 CNC rotary table 8800DX, 8800AX



# Comparison between & 21 and EZ controller



#### G Codes

	Groups	Function	<b>X21</b>	EZ
W/O G codes	*	Positioning	0	0
G04	*	Dwell command	0	0
G06	*	Constant acceleration command	$\circ$	×
G07	*	Lead-cut command	$\circ$	×
G08	Α	Buffer command	$\circ$	×
G09	(A)	Buffer command cancel	$\circ$	×
G10	В	Brake disused command	0	0
G11	(B)	Brake used command	0	0
G12	С	Running	0	0
G13	(C)	Running cancel	0	0
G14	*	One way positioning command	0	0
G15	D	For Droop check	0	×
G16	(D)	Droop check cancel	0	×
G21	*	Interlock start	$\circ$	0
G22	*	Interlock start command	0	×
G23	*	Machine Zero return	$\circ$	0
G24	*	Program Zero return	0	0
G27	*	Repeat command	0	×
G28	*	Programmable dog machine zero return	$\circ$	0
G60~G74	-	M function	Optional	×
G90	E	Absolute command	0	0
G91	(E)	Incremental command	0	0
G92	*	Configuration of coordinate system	0	0

### Program

	Remarks	Function	<b>%</b> 21	EZ
Frequency change	PRM#15	Base 10 / Base 60	0	0
J	_	Jump command	0	0
RET	_	Return command	0	0
D	_	Dividing command	0	×
Rotating axis specification	PRM#30=0	-	0	0
Tilting axis specification	PRM#30=1	Soft over-travel, Hard over-travel	0	0
NSVZ	PRM#30=2	Indexing specification	0	×
NSVX	PRM#30=3	Rotary Index specification	0	×

# Comparison between & 21 and EZ controller



### Options

	Remarks	Function	<b>X</b> 21	EZ
Magnescale(RU77)	-	Fully closed Loop	Optional	×
PGSL1∼6	-	Program-select function	Optional	×
PRM#213, 216	-	Pitch-error compensation	Optional	×
00A2HEX~00A4HEX	-	Output for external position display device	Optional	×
Manual pulse	-	Manual pulse handle	Optional	×

#### Other functions

	Remarks	Function	<b>X21</b>	EZ
PRM#14	-	Grid-mask amount	0	×
PRM#41	-	Moving angle direct command	0	×

### Input signal

	Remarks	Function	<b>X21</b>	EZ
START	-	Start	0	0
ЕМ	-	Emergency stop	0	0
WZRN/FHOLD	PRM#54=0	Interlock start	0	×
	PRM#54=1	Component Zero return	0	×
	PRM#54=2	Field hold	0	×
JUMP	PRM#51=0	Interlock start	0	×
	PRM#51=1	Voluntary block skip	0	×
MZRN	PRM#50=1	Machine origin return	0	×
	PRM#50=2	External reset signal	0	×
SV OFF	-	Servo off	0	×

### Output signal

	Remarks	Function	<b>X</b> 21	EZ
WPOS	PRM#55=1	Component zero position signal (regular OPEN)	0	×
	PRM#55=2	Component zero position signal (regular CLOSE)	0	×
BOUT1	PRM#90~93	NSV solenoid valve output [both solenoid]	0	×
ALM	-	Alarm out signal	0	×
EMG OUT1 $\sim$ 2	-	Emergency stop signal	0	×

#### SUPPORT TABLE

			With C	01:	
Table Model	Center Height	W/O Clamping	Air (0.5MPa)	<b>Hyd.</b> (3.5MPa)	Slim Sppc With Cla
CNC105	105	CST100-105	TAT-105N		
CNC180, 202,205	135	CST100-135	TAT-170N		TAS-10
NCT200	135	CST100-135	TAT-170N		TAS-10
CNC180B, 202B	180		TAT-170N*1		TAS-10
ONO000 000	170		TAT-250N(Sh	ared use Air/Hyd)	
CNC260, 302	170		TAT-200N(Shared use Air/Hyd)*2		
CNC321	230			TAT-321N	
CNC401	230			TAT-401N	
CNC321T	240			TAT-321N*4	TAT-40
CNC401T	240			TAT-401N*4,403N	TAT-40
CNC501, 601	310			TAT-501N	
NSVZ180	135		TAT-170N		
NOVZOOO	170		TAT-250N(Sh	TAT-250N(Shared use Air/Hyd)	
NSVZ300	170		TAT-200N(Sh	ared use Air/Hyd)*2	
NSVX400	240			TAT-401N*4	TAT-40
DD250	170		TAT-170N*3		

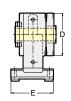
Slim Spport Table With Clamping
TAS-100N
TAS-100N
TAS-100N*1
TAT-403N
TAT-403N
TAT-403N

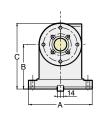
- $\*1$ : A separate sub-base is required to align the center height.
- \*2 : The center height is possible to increase 20mm to use sub-base.
- \*3 : The support tables that can be used are subject to limitations based on the number of rotations.
- \*4: When a sub-base is used to adjust the center height, a +10 mm variation in the specification can be accommodated.

#### Compact Support Table

**CST100-105**, **135** (W/O Clamping System)







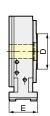


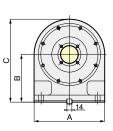
Code No.	Α	В	С	D	E	Weight(kg)
CST100-105	150	105	155	100	100	7
CST100-135	150	135	185	100	100	8

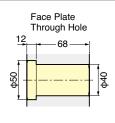
#### Compact & Slim Support Table

**TAS-100N** 







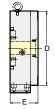


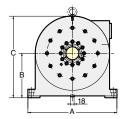
Code No.	Α	В	С	D	Е	Clamping System	Clamping Torque(N·m)	Weight(kg)
TAS-100N	200	135	235	100	80	Pneumatic	217	17

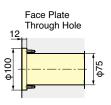
#### Slim Support Table

### **TAT-403N**









The table without T slots "N" is standard.

T slots are available (optional)

<b>\</b> 1	,							
Code No.	Α	В	С	D	E	Clamping System	Clamping Torque(N⋅m)	Weight(kg)
TAT-403N	480	240	440	400	150	Hydraulic	1500	155

- ★ Pneumatic ports: 2 x Rc1/8 Solenoid, Clamp-Unclamp switches are not included.
- ★ Hydraulic connections are RC3/8 X 2 and pneumatic connections are RC1/8 X 2. Confirmation switches for clamp/unclamp and solenoid valve are not included.
- ★ Hydraulic pressure is 3.5MPa. Air pressure is 0.5MPa.
- ★ Rotary joint is available for all models. **P.89** 
  - ★ Please add "— center height" at the end of Code No. for the support table with different center height (B) . e.g. TAT321-240 (For CNC321T)

**NIKKEN** 

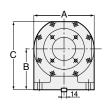


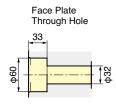
#### Support Table

### **TAT-105N**









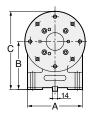
#### TAT-105の場合、T溝なし(TAT-105N)が標準仕様で、T溝付は特別仕様となります。

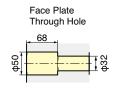
Code No.	A B C		D	E	Clamping System Clamping Torque (N·m		Weight(kg)	
TAT-105N	155	105	175	105	113	Pneumatic	205	16

### **TAT-170N**







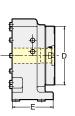


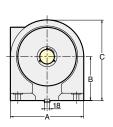
Without T-slots "N" (standard) / With T-slots (optional) in case of TAT-170

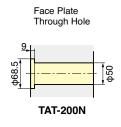
Code No.	Α	В	С	D	E	Clamping System	Clamping Torque(N·m)	Weight(kg)
TAT-170N	155	135	220	170	138	Pneumatic	205	25

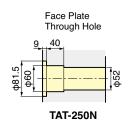
### **TAT-200N, 250N**











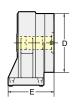
The table without T slots "N" is standard. T slots are available (optional)

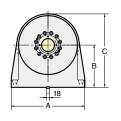
	Code No.	Α	В	С	D E		Clamping System	Clamping Torque (N·m)	Weight(kg)
ſ	TAT-200N	250	150	275	200	145	Pneumatic / Hydraulic	112/784	43
ſ	TAT-250N	250	170	295	250	145	Pneumatic / Hydraulic	112/784	50

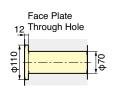
<sup>★</sup>TAT-200N is used in combination with CNC321T or CNC401T to install lifting-block.

### TAT-321N, 401N, 501N









The table without T slots "N" is standard. T slots are available (optional)

Code No.	Α	В	С	D	D E		Clamping Torque(N·m)	Weight(kg)
TAT-321N	400	230	400	320	250	Hydraulic	1470	120
TAT-401N	400	230	430	400	250	Hydraulic	1470	140
TAT-501N	480	310	560	500	250	Hydraulic	1470	220

## TAILSTOCK (MANUAL, PNEMATIC, HYDRAULIC) NIKKEN



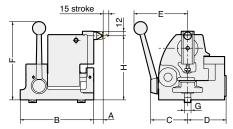
#### Tailstock

	ilstock	Manual	PNEUMATIC / HYDRAULIC	HYDRAULIC
	ilstock illust	Stroke: 15mm	Stroke: 60mm	Stroke: 100mm
CNC105	105	P-105S	PBA-105	
CNC180, 202	135	P-125S	PBA-135	
NCT200	135	P-125S	PBA-135	
CNC180B, 202B	180	P-170S	PBA-180	H-170S
NST250	155	P-150S		H-150S
CNC260, 302	170	P-170S	PBA-170	H-170S
CNC321, 401	230	P-230S		H-230S
CNC501, 601	310	P-310S		
NST300	208	P-210S		H-210S
NST500	288	P-280S		
5AX-100	135	P-125S	PBA-135	
5AX-130	150	P-150S	PBA-150	H-150S
5AX-201	180	P-170S	PBA-180	H-170S
5AX-230	240	P-230S		H-230S
5AX-250*	250			
5AX-350	300	P-310S		
CNC100-2, 3, 4W	105		PB-105-2,3,4W	
NSVZ180	135	P-125S	PBA-135	
NSVZ300	170	P-170S	PBA-170	H-170S
NSVX400	240	P-230S		H-230S

<sup>\*</sup>Please contact us about the Tailstock for 5AX-250.

#### Manual Tailstock





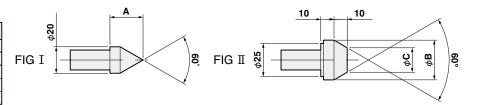
The center height can be adjusted. Please refer to Center Height H on the table.

Code No.	Center Height H	Α	В	С	D	Е	F	G	Weight (Kg)
P-105S	102~110	27	150	76	74	120	195	14	10
P-125S	130~140	27	150	76	74	120	210	14	11.5
P-150S	145~160	25	195	98	102	145	210	18	22
P-170S	160~180	25	195	98	102	145	210	18	22.5
P-210S	200~220	25	195	98	102	145	250	18	26.5
P-230S	220~240	25	195	98	102	145	250	18	27
P-280S	280~300	15	235	103	124	145	330	20	41
P-310S	300~310	15	235	103	124	145	330	20	41.5

★Left hand type is available for all models. ★For P-150S or larger size tailstocks, 5 pcs of changeable centers are included. ★Live center can be applied.

#### Changeable Center

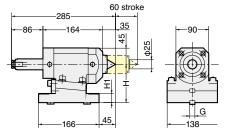
Code No.	FIG	Α	В	С
PC-2	I	25		
PC-3	I	50		
PC-4	II		30	18.45
PC-5	II		40	28.45
PC-6	II		50	38.45



### TAILSTOCK (MANUAL, PNEMATIC, HYDRAULIC) NIKKEN

#### Pneumatic / Hydraulic both usable Small Size Tailstock





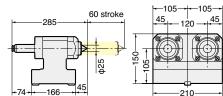
The center height can be adjusted within 0.35mm.

Code No.	Center Height H	ш	G	Thrus	Thrust (N)		
Code No.	Center neight n	H <sub>1</sub>	G	Pneumatic. 0.5MPa	Hydraulic. 2MPa	Weight (Kg)	
PBA-105	105	25	14	1176	4733	15	
PBA-135	135	55	14	1176	4733	20	
PBA-150	150	70	18	1176	4733	22	
PBA-170	170	90	18	1176	4733	24.5	
PBA-175	175	95	18	1176	4733	25	
PBA-180	180	100	18	1176	4733	25.5	

<sup>★</sup>Rotary center is built-in. ★MT (Morse Taper) type quill is also available. Please contact with us.

#### Pneumatic Tailstock for Multi-Spindle



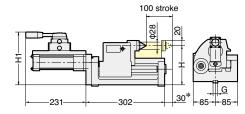


Code No.	Center Height H	H <sub>1</sub>	G	Thrust (N)		Weight (Kg)
Odd No.	Ocinici Height H	•••		Pneumatic. 0.5MPa	Hydraulic. 2MPa	Weight (itg)
PB-105-2W						28
PB-105-3W	105	25	18	1176	4733	42
PB-105-4W						55

- ★For fitting metal and stepped guide piece, refer to P.85
- ★MT (Morse Taper) type quill is also available. Please contact us.
- ★The stroke 60mm can be changed. Please contact us.

#### Hydraulic Tailstock





The center height can be adjusted. Please refer to Center Height H on the table.

Code No.	Center Height H	H <sub>1</sub>	G	Thrust (N)	Weight (Kg)	
Code No.	Center Height H	•••	<u> </u>	Hydraulic. 3.5MPa	Weight (Rg)	
H-150S	145~160	191	18	5370	28	
H-170S	160~180	211	18	5370	35	
H-210S	200~220	251	18	5370	41	
H-230S	220~240	271	18	5370	45	

<sup>★</sup>Rotary center is built-in.

MAX. work piece diameter must be smaller than φ130mm, when the stroke of changing the work piece is more than 30mm marked \*.

<sup>★</sup>The different length of the stroke is available. Please contact us.

### **SCROLL CHUCK**





Scroll Chuck





Holes for bolts of Front Mounting

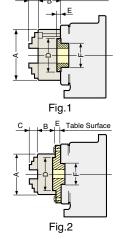
Scroll Chucks with chuck plate marked \* are NIKKEN Scroll Chuck of Front Mounting (Fig.1)

NIKKEN Scroll Chuck is used for X-4B, X-6E & X-9F.

The chuck plates for the scroll chucks without \* can be used for the scroll chuck based on JIS B6151 SC/TC standard.

#### **Scroll Chuck & Chuck Plate**

Chuck	Rai	nge
Size	External	Internal
4"	2~ 89	36~ 78
5″	3~104	42~ 92
6″	3~135	52~119
7″	3~153	56~134
9″	4~190	64~169
10″	10~229	72~208
12″	10~258	82~238



This is the actual gripping range not jow stroke.

#### Front End Dimensions with Scroll Chuck & Chuck Plate

Table Model	Chuck Size	Chuck Plate	Α	В	С	D	E	F	Fig. N
CNC105	R-4	X-4B	112	58	31.25	80	13	60	2
CNC180	R-5	X-5C*	132	60	37.25	100	3.5	60	1
0.10100	R-6	X-6B*	167	66	44.25	130	4	60	1
	R-5	X-5C*	132	60	37.25	100	3.5	60	1
CNC202	R-6	X-6B*	167	66	44.25	130	4	60	1
	R-7	X-7A*	192	75	46.25	155	4	60	1
	R-6	X-6G*	167	66	44.25	130	4	80	1
CNC260	R-7	X-7L*	192	75	46.25	155	4	80	1
	R-9	X-9H	233	82	55.25	190	25	80	2
	R-6	X-6G*	167	66	44.25	130	4	80	1
CNC302	R-7	X-7L*	192	75	46.25	155	4	80	1
	R-9	X-9J	233	82	55.25	190	18	80	2
	R-7	X-7N	192	75	46.25	155	16	105	2
	R-9	X-9K	233	82	55.25	190	18	105	2
CNC321	R-10	X-10G	274	86	53.25	230	20	105	2
		X-10G X-12F-1			59.25	260	25		2
	R-12		310	92			16	105	2
	R-7	X-7K	192	75	46.25	155		105	_
CNC401	R-9	X-9D	233	82	55.25	190	20	130	2
	R-10	X-10D	274	86	53.25	230	20	105	2
	R-12	X-12G	310	92	59.25	260	20	105	2
	R-9	X-9D	233	82	55.25	190	20	130	2
CNC501, 601	R-10	X-10	274	86	53.25	230	20	130	2
	R-12	X-12B	310	92	59.25	260	20	130	2
	R-5	X-5B	132	60	37.25	100	16	60	2
NST250, 300	R-6	X-6A	167	66	44.25	130	16	60	2
	R-7	X-7B	192	75	46.25	155	16	60	2
	R-9	X-9A	233	82	55.25	190	18	60	2
NST300	R-10	X-10B-1	274	86	53.25	230	25	60	2
	R-12	X-12A-1	310	92	59.25	260	25	60	2
	R-7	X-7G	192	75	46.25	155	18	75	2
	R-9	X-9B	233	82	55.25	190	18	75	2
NST500	R-10	X-10C	274	86	53.25	230	20	75	2
	R-12	X-10C X-12	310	92	59.25	260	20	75	2
5AX-100	R-12 R-4	X-12 X-4D*1		58	31.25	80	3	40	1
			112						
5AX-130	R-4	X-4B	112	58	31.25	80	13	60	2
	R-4	X-4B	112	58	31.25	80	13	60	2
5AX-201	R-5	X-5C*	132	60	37.25	100	3.5	60	1
	R-6	X-6B*	167	66	44.25	130	4	60	1
	R-7	X-7A*	192	75	46.25	155	4	60	1
5AX-230	R-6	X-6B*	167	66	44.25	130	4	60	1
5AX-250	R-7	X-7A*	192	75	46.25	155	4	60	1
UAN-EUU	R-9	X-9F	233	82	55.25	190	20	60	2
	R-7	X-7M	192	75	46.25	155	16	80	2
EAV 250	R-9	X-9J	233	82	55.25	190	18	80	2
5AX-350	R-10	X-10E-1	274	86	53.25	230	25	80	2
	R-12	X-12D-1	310	92	59.25	260	25	80	2
NSVZ180	R-6	X-6E	167	66	44.25	130	15	60	2
	R-6	X-6A	167	66	44.25	130	16	60	2
	R-7	X-7B	192	75	46.25	155	16	60	2
NSVZ300	R-9	X-9A	233	82	55.25	190	18	60	2
				86	53.25	230		60	2
	R-10	X-10B-1	274				25		
	R-7	X-7D	192	75	46.25	155	16	80	2
NSVX400	R-9	X-9C	233	82	55.25	190	18	80	2
	R-10	X-10A	274	86	53.25	230	20	80	2
	R-12	X-12C	310	92	59.25	260	20	80	2

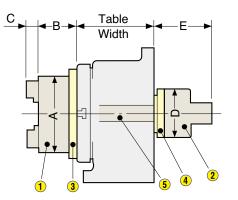
<sup>★</sup>The maker of the scroll chuck was changed. This table shows the chuck plate of the new maker. Please refer to CAT NO.8168 or older for the chuck plate of the old maker.

<sup>★</sup>The dimension from the table surface to the jaw is; \*\*:B+C Others: E+B+C \*1 : Jig-plate with φ120 (AX101R075) is required.

### **POWER CHUCK**



- 1 Power Chuck
- 2 Rotary Cylinder
- 3 Chuck Adapter
- **4** Cylinder Adapter
- **5** Connecting Rod



When power chuck or rotary cylinder is installed on 5AX-table, the 5AX-table must be High Column type.

#### ■Power Chuck & Rotary Cylinder

Table Model	Power Chuck Code No.	Pnev. Rotary Cylinder /Hyd. Rotary Cylinder	A	В	С	D	E	Table Model	Power Chuck Code No.	Pnev. Rotary Cylinder / Hyd. Rotary Cylinder	Α	В	С	D	Е	
0110405		H05CH-100				115	215	5AX-100H		, , ,						
CNC105	HO1MA-4	HH4C-80	110	70	27	130	220	5AX-130H	HO1MA-4		110	70	27	-	-	
	HO1MA-4	H05CH-100	440	70	07	115	215	215 HO1MA-4		440	70	07				
	TIOTIMA-4	HH4C-80	110	70	27	130	220		HOTIVIA-4		110	70	27	-	-	
CNC180	HO1MA-5	H05CH-150	135	70	27	115	215	5AX-201H	HO1MA-5		135	70	27	_	_	
0110100		HH4C-80	133	70	21	186	235	5AX-230H	TIOTIMA 0		133	70				
	HO1MA-6(S)	H05CH-175	165	94	43	135	240		HO1MA-6(S)	165	94	43	-	-		
		HH4C-100	100		10	210	240		(-)	-	100	01	-10	-	-	
	HO1MA-4	H05CH-100	110	70	27	115	215		HO1MA-6(S)		165	94	43		-	
		HH4C-80				130	220	5AX <del>-250H</del>	` ,	-				-	<u> </u>	
CNC202	HO1MA-5	H05CH-150	135	70	27	115	215		HO1MA-8(S)	Please ask for the detail.	210	110	43	_	-	
		HH4C-80				186	235			- Ioi trie detail.						
	HO1MA-6(S)	H05CH-175 HH4C-100	165	94	43	135	240		HO1MA-6(S)		165	94	43	-	-	
		H05CH-100				210	240			-				-	-	
	HO1MA-4	HH4C-80	110	70	27	115	215	5AX-350H	HO1MA-8(S)		210	110	43	-	-	
		H05CH-150				115	215			_						
NCT200	HO1MA-5	HH4C-80	135	70	27	186	235	HO1MA-10(S)				254	120	43	-	-
		H05CH-175				135	240							118	120	
	HO1MA-6(S)	HH4C-100	165	94	43	210	240	5AX-2MT-105H	HO1MA-4	IO1MA-4	110	70	27	98	115	
	1104114 0(0)	H05CH-175				135	240	5 A V 4 M T 4 O 5	HO1MA 4	-			07	118	120	
ONIOGGO	HO1MA-6(S)	HH4C-100	165	94	43	210	240	5AX-4MT-105 HO1MA-4		110	70	27	98	115		
CNC260	HO4MA 0/C)	H05CH-250				160	250	HO1MA-4	H05CH-100		440 70	07	115	215		
	HO1MA-8(S)	HH4C-125	210	110	43	290	295		HUTWA-4	HH4C-80	110 7	70	27	130	220	
	HO1MA-6(S)	H05CH-175	405	0.4	40	135	240	NSVZ180	HO1MA-5	H05CH-150	105	2	27	115	215	
	1101WA-0(3)	HH4C-100	165	94	43	210	240	14342100	HOTIVIA-5	HH4C-80	135	70	21	186	235	
CNC302	HO1MA-8(S)	H05CH-250	210	110	43	160	250		HO1MA-6(S)	H05CH-175	165	94	43	135	240	
0110002	110 1111/4 0(0)	HH4C-125	210	110	43	290	295		TIOTHIA O(O)	HH4C-100	105	94	43	210	240	
	HO1MA-10(S)	H05CH-300	254	120	43	160	250		HO1MA-6(S)	H05CH-175	165	94	43	135	240	
		HH4C-125	254	120	10	340	310			HH4C-100	100	01	-10	210	240	
	HO1MA-8(S)	H05CH-250	210	110	43	160	250	NSVZ300	HO1MA-8(S)	H05CH-250	210	110	43	160	250	
	. ,	HH4C-125				290	295		``,	HH4C-125				290	295	
CNC321, 401	HO1MA-10(S)	H05CH-300	254	120	43	160	250		HO1MA-10(S)	H05CH-300	254	120	43	160	250	
·		HH4C-125				340	310			HH4C-125				340	310	
	HO1MA-12(S)	H05CH-300	304	140	53	180	260		HO1MA-8(S)	H05CH-250	210	110	43	160	250	
		HH4C-140 H05CH-250				340	310			HH4C-125				290	295	
	HO1MA-8(S)	HH4C-125	210	110	43	160	250	NSVX400,	HO1MA-12(S)	H01MA-10(S) H05CH-300 HH4C-125	254 120	120	43	160	250 310	
		H05CH-300				290 160	295 250	500		H05CH-300				340 180	260	
CNC501, 601	HO1MA-10(S)	HH4C-125	254	120	43	340	310			HO1MA-12(S)	HO1MA-12(S)	HH4C-140	304	140	53	340
		H05CH-300				180	260	_	_	-	_	_	_	-	310	
	HO1MA-12(S)	HH4C-140	304	140	53	340	310	_	_	_	_	_	_	_	-	
CNC-100-2		H05CH-100				115	215	_	_	_	_	_	_	_	_	
(3, 4)W	HO1MA-4	HH4C-80	110	70	27	130	220	_	_	_	_	_	_	_	-	
						100	220									

<sup>★</sup>HOWA power chucks and rotary cylinders (Higher:hydraulic, Lower:Air) are listed. Other maker's one can be mounted, please specify the Code No.

<sup>★</sup>Above power chucks are not applicable to **NST** Table. Please contact with us for mounting.

<sup>★</sup>NIKKEN air/hydraulic rotary cylinder is also available.



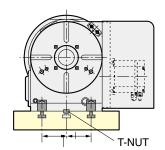
### **CLAMPING DEVICE and T-NUT**



### Clamping device list by CNC rotary table model

	-					
Code No.	Guide-piece width of CNC rotary table(mm)	Clamping device shape1 Code No.	Quantity	Clamping device shape2 Code No.	Set	Thickness of the sim plate(mm)
CNC105	14	CLA114	1	CLE13	1	5
CNC180	4.4	OI 4444	0			
CNC202	14	CLA114	2	_	_	_
NCT200	14	CLA214	2 -		_	_
CNC180B	18	CLB18	2	CLC18	2	
CNC202B	10	CLD16		CLC16		_
CNC202T	14	CLB14	2	CLC14	2	5
CNC260	18	CLB18	2	CLC18	2	5
CNC302	10	OLDIO		OLOTO		3
CNC260B	18	CLB18	2	CLD18	2	5
CNC302B	10	OLDIO		OLDIO		J 3
CNC321(B)	18	CLB18	2	CLC18	2	10
CNC401(B)	10	OLDIO		Z CLC18		10
CNC501	20	CLA118	4	1 _		20
CNC601	20	OLATIO	7		-	20
CNC350	18	CLB18	2	CLC18	2	10
CNC450	18	CLA118	4	-	-	10
CNC100 (Mult spindle)	18	CLA118	4	-	-	5
CNC180 (Mult spindle)	18	CLA218	4	_	_	_
CNC202 (Mult spindle)		OLALIO	'			
NST250	16 W-16B Stepped	CLA218	3	-	_	3
NST300	18	CLA118	3	CLB118	3	
NST500	20	CLA118	4	_	_	_
5AX-100	14	CLA214	4	_	-	_
5AX-130	14	CLB14	2	CLC14	2	_
5AX-150	14	CLB14	2	CLC14	2	_
5AX-201	14	CLA114	4	-	-	-
5AX-230	18	CLB18	2	CLC18	2	-
5AX-250	18	CLA218	4	-	-	15
5AX-550	20	CLA118	4	-	-	20
5AX-2MT-105	18	CLA118	4	-	-	-
NSVZ180	14	CLA114	2	-	-	-
NSVZ300	18	CLB18	2	CLC18	2	5
NSVZ400	18	CLA118	4	-	_	10

 $<sup>\</sup>bigstar \bigstar \text{CLD18}$  is what makes additional processing on CLC18, width: from 55 to 50mm

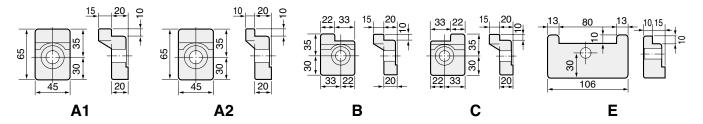


CLAMPING DEVICE is designed for T-slot pitches of 100mm or 125mm on the machine bed table. Please contact with us for the other pitches.

### **CLAMPING DEVICE and T-NUT**



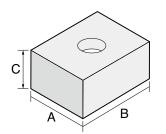
#### ■ Clamping Device



#### ■ Code No. of Clamping Device

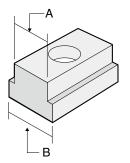
Size of clamping	Clamping Device Type								
device bolt	A1	A2	В	С	E				
M12	CLA114	CLA214	CLB14	CLC14	CLE14				
M16	CLA118	CLA218	CLB18	CLC18	CLE18				
M20	CLA120	CLA220	CLB20	CLC20	CLE20				

#### Standard Guide Piece



Key width dimension	$A \times B \times C$	Code No.
14	14 × 18 × 9	W141809
16	16 × 20 × 10	W162010
18	18 × 25 × 10	W182510
20	20 × 30 × 14	W203014
22	22 × 40 × 14	W224014

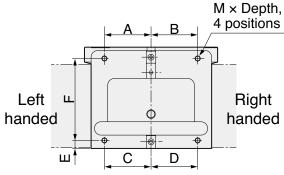
#### Stepped Guide Piece



1	B	10	12	14	16	18	20	22	24	7/16″	11/16″
	14	W-14I	W-14H		W-14A	W-14B	W-14C			W-14F	W-14G
	18		W-18E	W-18A	W-18B		W-18C	W-18D			
	20				W-20A	W-20B		W-20C	W-20D		

- ★ The item is a set of two each.
- Please note that clamping device is altered when using stepped guide-piece.

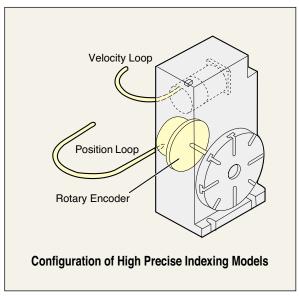
### THREAD HOLES POSITION at the BOTTOM OF ROTARY TABLE



•Please refer to the above dimensions for direct mounting with the bolts from base plane side.

Table Model	Α	В	С	D	Е	F	M × Depth, 4positions	
CNC105, 105L	55	55	55	55	10	125	M10×12L, 4positions	
CNC180, 202 CNC180L, 202L	70	70	70	70	12	123	M 8×10L, 4positions	
CNC205	85	85	85	85	15	60	M10×15L, 4positions	
NCT200	70	70	70	70	12	123	M 8×15L, 4positions	
CNC260, 302	105	120	105	120	12.5	167.5	M12×16L, 4positions	
CNC260L, 302L	120	105	120	105	12.5	167.5	M12×16L, 4positions	
CNC321, 401	145	135	165	135	15	200	M12×20L, 4positions	
CNC321L, 401L	135	145	135	165	15	200	M12×20L, 4positions	
CNC501, 501L	240	240	240	240	20	235	M16×30L, 4positions	

### O/P OPTION High Precise Indexing (Full Closed Loop)



Full closed loop control becomes possible by mounting a rotary encoder at the back of rotary table. And high precise indexing becomes possible by detecting the rotary angle of the table directly.

- 3 grades can be selected for indexing accuracy; ±3", ±5" and ±10".
- Every high Precise Indexing models take a test based on ISO 230-2 to measure the positioning accuracy.
- In case indexing unit of 1" or very high rigidity is required, please select Hirth Coupling Index NSVZ, NSVX series table. 
  P.33
- ★Cables are not included in ultra precision option. Please order separately.
- ★Air purge of the encoder inside is available as an option for water proof. Please contact us.

#### **CNC** High Precise Indexing for CNC Rotary Table

Indexing Accuracy	±3″	±5″
Table Model	Rotary Encoder	Rotary Encoder
CNC105, 180, 202, NCT200	-	RCN2390
CNC260, 302	RCN8590	RCN2390
CNC321~1600	RCN8590	RCN8390

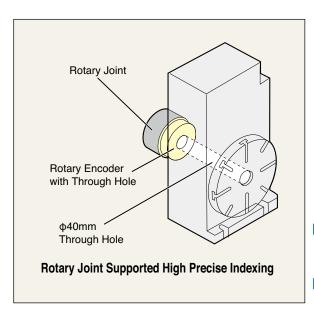
#### 5AX High Precise Indexing for Tilting Rotary Table

Indexir	ng ccuracy	±5″	±10″
Table Model		Rotary Encoder	Rotary Encoder
5AX-130, -201, -230, 250	Rotary	RCN2390	_
5AA-130, -201, -230, 230	Tilting	I	RCN2390
5AX-350	Rotary	RCN2390	_
3AA-330	Tilting	-	RCN2390
5AX-550, 800	Rotary	RCN8390	_
3AA-330, 600	Tilting	_	RCN8390

<sup>★</sup>Higher indexing accuracy (Rotary: ±3 sec., Tilting: ±5sec.) is available. Please contact us.

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# **High Precise Indexing (Full Closed Loop)**



### Rotary Joint Supported High Precise Indexing with Thru-hole

- Even the number of IN ports is limited, rotary joint can be installed for the rotary table with the rotary encoder forhigh precision indexing. Please contact us.
- The rotary table with RCN8390 or RCN8590 has φ40mm through hole, and the rotary joint can be mounted.

#### CNC High Precise Indexing with Thru-hole for CNC Rotary Table

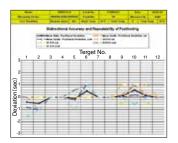
Indexing Accuracy	±3″	±5″
Table Model	Rotary Encoder	Rotary Encoder
CNC260, 302	RCN8590	_
CNC321~1600	RCN8590	RON786

#### 5AX High Precise Indexing with Thru-hole for Tilting Rotary Table

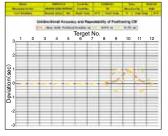
Indexin	ng ccuracy	±5″	±10″
Table Model	oouracy	Rotary Encoder	Rotary Encoder
EAV 550, 900	Rotary	RCN8390	_
5AX-550, 800	Tilting	_	RCN8390

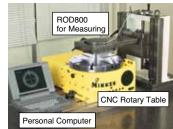
#### ■ ISO230-2 : Accuracy Measurement Based on International Standard

Accuracy Measuring Method Rotating Axis: 30.2°X 12 points Tilting Axis: 15.2°X 8 points
Continually repeating 5 times rotation of CW/CCW, measuring are to be done at above-mentioned points.
And, bidirectional accuracy of positioning, bidirectional repeatability of positioning, unidirectional accuracy of positioning, unidirectional repeatability of positioning etc. are calculated.
Test data sheet is available in English.









### **ROTARY JOINT**





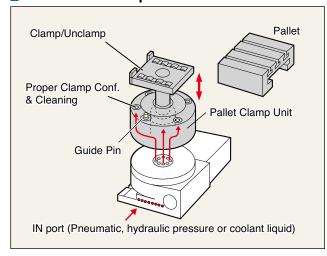
Rotary Joint is a rotating connector to supply air, hydraulic pressure or coolant liquid from outside to a fixture on a CNC rotary table. If liquid is supplied with ordinary hoses, twisting will happen on them by rotation of the table. However, rotary joints can solve this problem as it rotates in accordance with the table.

- Provides Pneumatic, hydraulic pressure or coolant from the rear of the table to a fixture.
- Automation of clamping/unclamping workpieces becomes possible.
- With a choice of 3 types: Cylinder type, Flange Plate type and Built-in type
- ★The coolant port is recommended to be separated because that the fine cutting swarf may come through the filter into the coolant port.
- ★The cylinder type rotary joint is equipped with a port in the center bore exclusively for the coolant liquid.
- ★Even the number of IN ports is limited, rotary joint can be installed for the rotary table with the rotary encoder. Please contact us.

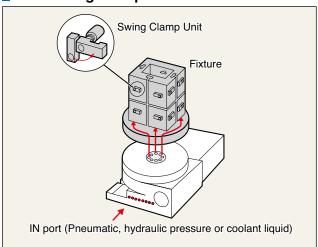
#### The Examples of How Rotary Joint is Used

Rotary joint is used for clamping/unclamping workpieces, confirmation of proper clamp, cleaning, coolant etc.

### Automation Application Examples With Pallet Clamp Unit



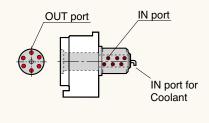
### Automation Application Examples With Swing Clamp Unit



### Type of Rotary Joint

#### 1 Cylinder type Rotary Joint

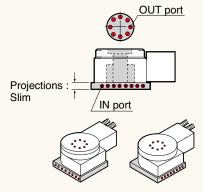
- Cylinder type rotary joint allows many ports.
- Cylinder type rotary joint can be mounted later.



★The cylinder type rotary joint is useful in machining with the coolant liquid, because it's equipped with a port exclusively for the coolant liquid.

#### 2 Flange Plate type Rotary Joint

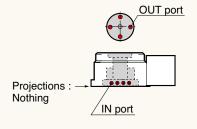
- Flange plate type rotary joint reduces supply block projections
- ●IN ports position can be changed at any side: front, back, left or right side.



- ★The every position which causes no interference against M/C can be selected.
- ★Flange plate type rotary joint is useful in NSV series

#### 3 Built-in type Rotary Joint

- ●The highest space efficiency of all models of rotary joints
- Built-in type rotary joint can be mounted without changing dimension.



PAT.2930889



#### **CNC** Rotary Joints for CNC Rotary Tables

**ROTARY JOINT** 

Code No.	Cylinder type	Flange Plate	e type	Built-in type	
Code No.	MAX. Number of Ports	MAX. Number of Ports T*(mm)		MAX. Number of Ports	
NCT 200	6+1	6	39	_	
CNC 105	4+1	4	25	_	
180, 202	6+1	6	25	_	
205	_	_		6+1	
260, 302	10+1	11	60	_	
(260B, 302B)	_	8+1	_		
321, 401, 401H	12+1	_	8+1		
B350	16+1	_	_		
B450	20+1	_		_	
503H	12+1	_		12+1	
501, 601	14+1	15	_	8+1	
802	16+1	_	_	10+1	
NSVZ 180	6+1	5	25	_	
300	8+1	6	30	_	
400, 500	12+1	13	50	_	

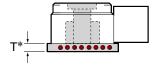
#### **Rotary Joints for Support Tables**

Code No.	Cylinder type	Flange Plate	e type	Built-in type	
Code No.	MAX. Number of Ports	MAX. Number of Ports	T*(mm)	MAX. Number of Ports	
TAT- 105, 170	6+1	2	25	_	
200, 250	9+1	7	30	_	
321, 401, 501	14+1	8+1	35	_	

#### 5AX Rotary Joints for Tilting CNC Rotary Tables

Codo No	MAX. Number of	Cylinder type	Flange Plate	e type	Built-in type
Code No.	Ports on Main Unit	MAX. Number of Ports	MAX. Number of Ports	T*(mm)	MAX. Number of Ports
5AX- 100	_	(4)	3	25	_
130	_	2 (4)			_
201	4	4 (6)	_	_	4*2
250	3	_	_	_	3*3
350	6	_	_	_	6+1*4
550	4	10*5	_	_	_
800	6	_	_	_	6
5AX-DD250	_	_	6	30	_
DD400	_	_	8	30	_
DD200A,B	_	_	4	_	_

- ★ ( ): MAX No. of high column table.
- ★"+1" is the port located in the center hole for coolant.
- \*2 : 4 reserve ports are provided on **5AX-201**.
- \*3:3 reserve ports are provided on **5AX-250** and 2 external ports are available.
- \*4 : 6reserve ports are provided on 5AX-350. No additional port is available.
- \*5 : 4 reserve ports are provided on **5AX-550** as standard, and the additional 6 ports are available.
- \* "T" is dimension of supply block projections after mounting rotary joints.



#### 

- •When the air is supplied for all IN ports, please contact us.
- •Please do not supply the different pressure of the air in the IN ports next each other.
- •Please make sure that the line filter should be provided for pneumatic supply use in order to avoid swarf and water ingress for rust problem.
- •This is not avoidable that the oil of the hydraulic port may be leaked to the next air port for the long time use, due to the characteristic of the seal. Please do not assign the air port next to the hydraulic port as much as possible.
- •The rotary joint must be specially treated to prevent from the rust, when using the glycol solution for the operating fluid. Please inform us when ordering.
- •When the rotary joint is designed at your side, please select the low friction type seal. Then, please check the rotary table movement after installation of your rotary joint, not to over load.

# **How to Read Product Code of ROTARY JOINT**



### RT-CN105 SD-3+1-L

Location of hookup of hoses or Sub-code

R : Right (Cylinder type)
L : Left (Cylinder type)
F : Flange (Flange Plate type)
B : Main Unit (Built-in type)

A : 5AX

Number of Ports 3+1 With a Center Port 3+N W/O a Center Port

SD : Standard

Diameter of Table

RT : Cylinder type Rotary Joint RN : Flange Plate type Rotary Joint

#### Code No. of Rotary Joint

Table Model	No. of port	Туре	Code No.	Remarks
	3+1		RT-CN105SD-3+1-L	3+1RJ Cylinder type
	3+1		RT-CN105SD-3+1-R	3+1RJ Cylinder type
CNC105	4+1	Culindor tuno	RT-CN105SD-4+1-L	4 . 1D I Cylinder type
CNC105	4+1	Cylinder type	RT-CN105SD-4+1-R	4+1RJ Cylinder type
	6+1		RT-CN105SD-6+1-L	6 . 1D I Cylinder type
	6+1		RT-CN105SD-6+1-R	6+1RJ Cylinder type
	3+1	Cylinder type	RT-CN180SD-3+1-L	2 . 1D I Cylinder type
	3+1	Cylinder type	RT-CN180SD-3+1-R	3+1RJ Cylinder type
	4	Flange Plate type	RN-CN180SD-4+N-F	4RJ Flange Plate type
	4+1	Culinday turns	RT-CN180SD-4+1-L	4 . 1D I Cylinder type
ONO100 000	4+1	Cylinder type	RT-CN180SD-4+1-R	4+1RJ Cylinder type
CNC180, 202	4+1	Flange Plate type	RN-CN180SD-4+1-F	4+1RJ Flange Plate type
	5+1	Flange Plate type	RN-CN180SD-5+1-F	5+1RJ Flange Plate type
	6	Flange Plate type	RN-CN180SD-6+N-F	6RJ Flange Plate type
	6+1	Culinday turns	RT-CN180SD-6+1-L	6 . 1D I Cylinder type
	6+1	Cylinder type	RT-CN180SD-6+1-R	6+1RJ Cylinder type
CNC205	6+1	Flange Plate type	RN-CN205SD-6+1-B	6+1RJ Flange Plate type
	6	Flange Plate type	RN-NC200SD-6+N-F	6RJ Flange Plate type
NCT200	6+1	Cylinder type	RT-NC200SD-6+1-L	6+1RJ Cylinder type
	6+1	Cylinder type	RT-NC200SD-6+1-R	- 6+1H3 Cyllrider type
	6	Flange Plate type	RN-NC20ESD-6+N-F	6RJ Flange Plate type
NCT200E	6+1	Cylinder type	RT-NC20ESD-6+1-L	6+1RJ Cylinder type
	6+1	Cylinder type	RT-NC20ESD-6+1-R	0+1H3 Cyllilder type
	4+1	Cylinder type	RT-CN260SD-4+1-L	4+1RJ Cylinder type
	4+1	Cylinder type	RT-CN260SD-4+1-R	4+1h3 Cyllider type
	4+1	Flange Plate type	RN-CN260SD-4+1-F	4+1RJ Flange Plate type
	6+1	Cylinder type	RT-CN260SD-6+1-L	6+1RJ Cylinder type
CNC260, 302	6+1	Cylinder type	RT-CN260SD-6+1-R	- 0+1H3 Cyllider type
	6+1	Flange Plate type	RN-CN260SD-6+1-F	6+1RJ Flange Plate type
	8+1	Cylindor type	RT-CN260SD-8+1-L	8+1RJ Cylinder type
	8+1	Cylinder type	RT-CN260SD-8+1-R	
	8+1	Flange Plate type	RN-CN260SD-8+1-F	8+1RJ Flange Plate type

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4+1RJ Cylinder type

6+1RJ Cylinder type

8+1RJ Cylinder type

3 Cylinder type

4 Cylinder type

4 Flange Plate type

3 Flange Plate type

6 Flange Plate type

6 Flange Plate type

6+1 Cylinder type

#### **Table Model** No. of port **Type** Code No. Remarks **CNC321** 8+1 Flange Plate type RN-CN321SD-8+1-B 8+1RJ Flange Plate type **CNC401** 8+1 Flange Plate type RN-CN401SD-8+1-B 8+1RJ Flange Plate type RN-CN503HSD-8+1-B CNC503H 8+1 8+1RJ Flange Plate type Flange Plate type 12+1RJ Flange Plate type CNC503H 12+1 RN-CN503HSD-12+1-B **CNC501** 8+1 Flange Plate type RN-CN501SD-8+1-B 8+1RJ Flange Plate type CNC601R 8+1 CNC601L 8+1 Flange Plate type RN-CN601SD-8+1-B 8+1RJ Flange Plate type CNC601T 8+1 6+1 Flange Plate type RN-CST101SD-6+1-B 6+1RJ Flange Plate type CST101-135 3+1 RT-TA105SD-3+1-L 3+1RJ Cylinder type 3+1 RT-TA105SD-3+1-R 4+1 RT-TA105SD-4+1-L **TAT-105N** Cylinder type 4+1RJ Cylinder type 4+1 RT-TA105SD-4+1-R 6+1 RT-TA105SD-6+1-L 6+1RJ Cylinder type 6+1 RT-TA105SD-6+1-R RT-TA170SD-3+1-L 3+13+1RJ Cylinder type 3+1RT-TA170SD-3+1-R 4+1 RT-TA170SD-4+1-L **TAT-170N** Cylinder type 4+1RJ Cylinder type 4+1 RT-TA170SD-4+1-R 6+1 RT-TA170SD-6+1-L 6+1RJ Cylinder type 6+1 RT-TA170SD-6+1-R 4+1 RT-TA200SD-4+1-L 4+1RJ Cylinder type 4+1 RT-TA200SD-4+1-R 6+1 RT-TA200SD-6+1-L **TAT-200N** Cylinder type 6+1RJ Cylinder type 6+1 RT-TA200SD-6+1-R 8+1 RT-TA200SD-8+1-L 8+1RJ Cylinder type 8+1 RT-TA200SD-8+1-R

RT-TA250SD-4+1-L

RT-TA250SD-4+1-R

RT-TA250SD-6+1-L

RT-TA250SD-6+1-R

RT-TA250SD-8+1-L

RT-TA250SD-8+1-R

RT-AX130SD-3+N-A

RT-AX130SD-4+N-A

RN-AX201SD-4+N-A

RT-AX201SD-6+1-A

RN-AX250SD-3+N-A

RN-AX350SD-6+N-A

RN-AX550SD-6+N-A

4+1

4+1

6+1

6+1 8+1

8+1

3

4

4

6 + 1

3

6

6

Cylinder type

Cylinder type

Cylinder type

Flange Plate type

Cylinder type

Flange Plate type

Flange Plate type

Flange Plate type

**TAT-250N** 

5AX-130

5AX-201

5AX-250

5AX-350

5AX-550

**How to Read Product Code of ROTARY JOINT** 

HO

### **AWC SYSTEM**



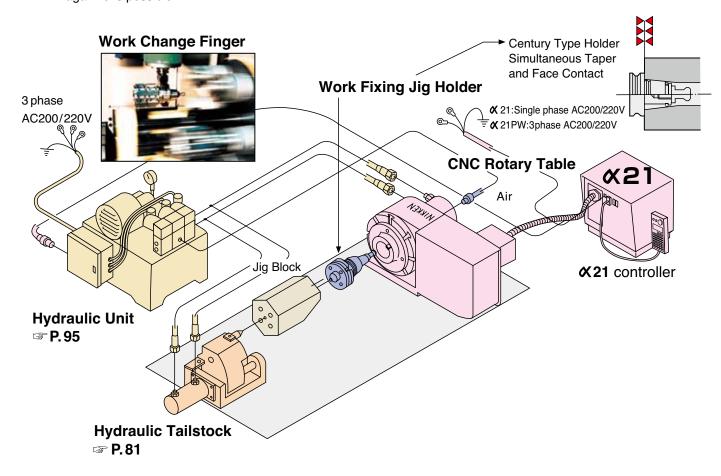


Extremely flexible, and can take many kinds of work pieces. Jig Holder is firmly held in the center hole of CNC Rotary Table as Century Type Holder System. (Simultaneous taper and flange contact) Jig Block can take various work fixtures designed according to each work piece.

Plural number of work pieces can be held. Jig Holder with ID is available (optional), and automatic selection of Jig Holder in magazine is possible.



AWC magazine, Disc type, Chain type, Horizontal type and Bar Work type are available.

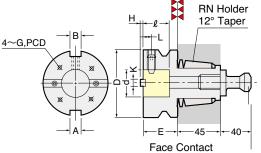




#### Work Fixing Jig Holder

AWC SYSTEM





Standard Pull Stud: PS-3 Holder with ID, Pull Stud with ID are available. (optional)

Whether Work Fixing Jig Holder is suitable to the work or not results in big difference in productivity. We have wide and deep experiences and know-how. Please contact us.

Refer to NC5 tooling system literature for NC5 models

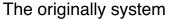
#### Side Lock type Holder

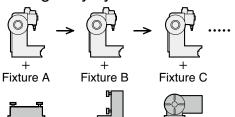
Code No.	D <sub>1</sub>	d	K	Е	Н	R	L	M	G	PCD	<b>A</b> 0 -0.010	В	Weight
RN40-63×25	63	25H <sub>6</sub>	10h7	40	5	30	15	M10	M8	48	16	18	1.5kg
RN45-85×32	85	32H6	12h7	45	5	35	20	M12	M10	65	18	20	2.5kg

Examples of Jig Block (optional)



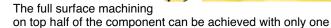
#### Advantage of 5AX-Table in Automation Production Line **System with 5AX-Table**





It's necessary to prepare suitable jig fixtures for each process, then the machining cycle time will be adjusted with increasing the number of processes.

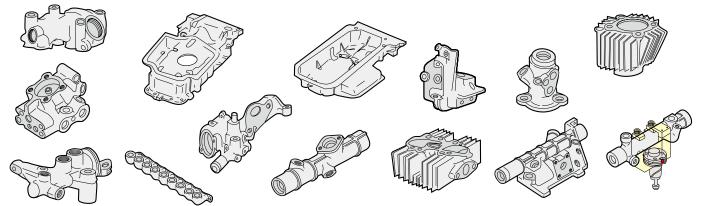
- It's difficult to obtain the exactly same reference location in each operation, therefore it's easy to affect the finish quality.
- If the one machine breaks down, all of the production line will be stopped.
- The cost and the delivery for making a new jig fixture for the new design causes problems.



The machining cycle time will be adjusted with increasing the number of machines.

- As the full surface machining can be done with only one setup, the finish quality will be improved.
- Even if one machine breaks down, the extended operation time on another machine can achieve same quantity of
- It's easy and quick to machine new design component only by changing machining program.
- The random production can be done by the jig holder with ID tip. (That's ideal for the automotive production line as there are many pair parts of right and left.)

#### **Samples**



### **Special Specification 1**

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#### Waterproof Specifications

- ·Mechanical parts of the table are perfectly sealed. For water resistance to electric parts such as cables, the hard-wired type connection on the motor cover is available as an option.
- •For the rotary table with pneumatic clamping, air purge is arranged inside the motor cover as standard.
- In case of the table which with **≪**21 controller, the hard-wired type connection on the rotary table side and harting connector fitting on the controller side, however, the harting connector fitting on the rotary table side is also available as an option.
- •For **<21PW** controller, water resistant connector type cables are supplied as standard.

For all CNC rotary tables,  $\triangle$  mark obtained parts or equivalent and  $\textcircled{\textbf{c}}$  marked electric parts are used, ensuring high safety.

△ : Safety approval mark by TUV RHEINLAND.

( : Safety mark required for marketing in Europe from '95.



Cable Direct Out type



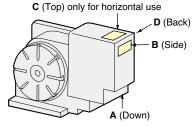
Cable with Blade (Option) Standard Length: 5m



Harting Connector type

#### Position & Direction of Connecting Cable

The standard of the cable connecting direction is **B** or **D**. **A** or **C** is possible on demand.



#### Hydraulic Unit

**Specifications** 

TCC-150

 $MAX.14\ell/min$ 

MAX.3.5MPa

- ●AC 200~220V, 3 phases, Capacity: 1KVA.
- Solenoid valves and pressure switches depends on your applications.
- ●Dimension: 400×405×479mm



#### **VBA10A-02G**

#### Air Intensifying Booster (Max. Output: 0.7MPa)

The air pressure can be double by Air Intensifying Booster. This is suitable for tables with the Double Intensifying Clamping System.

# OUT Pressure gauge Rc1/4 IN Port OUT PO

### Air Hydraulic Booster

Please order an air hydraulic unit for the machine without hydraulic source. Applicable for CNC260, CNC302: AY040030 / CNC321~CNC801: CNC401: AY0420 / CNC501~CNC601: AY0410 Please ask for the layout of the booster.



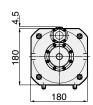
#### AY0400

Oil Capacity: 30cc
Input pneumatic Pressure:
0.4~0.5MPa
Output hydraulic Pressure:
2.0~2.5MPa



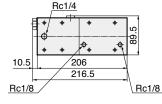
#### AY0420

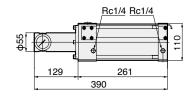
Oil Capacity: 100cc Input pneumatic Pressure: 0.35~0.4MPa Output hydraulic Pressure: 3.5~4MPa

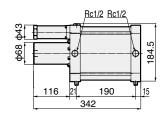


#### AY0410

Oil Capacity: 200cc Input pneumatic Pressure: 0.35~0.4MPa Output hydraulic Pressure: 3.5~4MPa







**NIKKEN** 

### **Special Specification 2**

#### Air Craft-related Parts Apprication.



Synchronous Rotation by CNC401 X 2units



**5AX-150** for 4th and 5th axes tilting rotary table on special grinding center

### Automobile Parts Apprication.



CNC180 + TAT-105N





CNC601, 3m Jig Block & TAT-501N





3 sets of power chucks are used for work clamping.

### ■ Energy-related Parts Apprication.



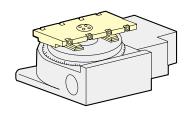
CNC1800 & Support Branch Indexing/ clamping of the turbine disk



**CNC1201** Indexing of the turbine shaft. Turbine shaft is supported and clamped by the roller support.

#### Built-in Pallet Clamp System

Available to CNC rotary table and 5AX- tilting rotary table. Very suitable to NC special purpose machine and Horizontal M/C as built-in B axis table.





Special Color
Please order with t

Please order with the color sample or Munsell Color No.



Pallet Clamp Unit with Automatic Coupler



### **Special Specification 3**



NIKKEN CNC rotary tables are used in various kinds of world wide applications. Please contact with us with the dimension of your work piece and construction of the jig fixture etc. We will recommend you the best application.

#### Combination with Pallet Changer





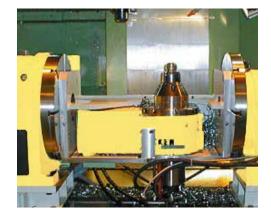


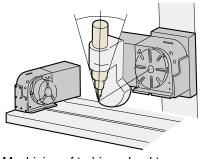


2 units of CNC rotary tables are used on the TAPPING CENTER with swing type pallet changer.

#### Combination of CNC Rotary Tables







Machining of turbine wheel to use 2 units of CNC rotary tables, one for the swing axis of the HF motor and the other for the rotary axis of the work piece



5AX-400FA-RJ8-800/150



5AX-500MA-RJ10-900/100



5AX-321FA



CNC180+TAT-105N+CNCZ503



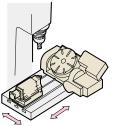
**CNC180+Special Support Table** 

# **NIKKEN**

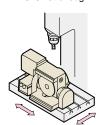
### **Special Specification 4** ■ Example of 5AX Rotary Table location on M/C

There are various ways of arrangement.

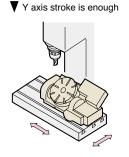
Y axis stroke of the

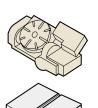


▼ Tail Stock is used together.

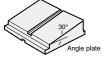


M/C is not enough





▼ Tilting range is 30-135

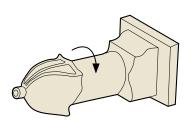




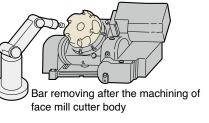
5AX-300 Example on the angle base (60°)

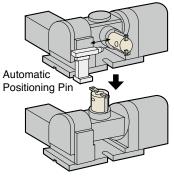
#### Application of 5AX-Table

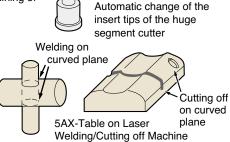


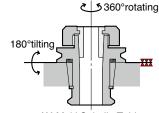


Simultaneous 3 axes control of X, Z & A axis instead of turning.









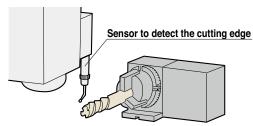
5AX-Multi Spindle Table + Jig Holder with Through Hole

1. The work piece is exchanged by ROBOT, the positioning pin goes forward, then the work piece is clamped at the tilting axis = 90°.

2. The positioning pin goes backward, the tilting axis moves to 0°, then the machining starts.

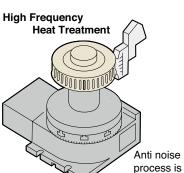
The tilting movement is used only for automatic work piece exchange

#### Other Application

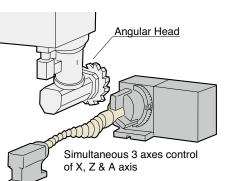


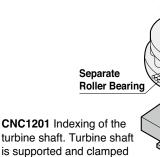
Work piece (Cutter) is exchanged by ROBOT, and the cutting edge will be detected automatically.

required.



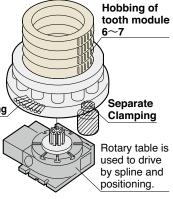








CNC1800 & Support Branch Indexing/ clamping of the turbine disk



# TEC TECHNICAL DATA Accuracy Standard

#### ■ CNC Rotary Table only for Vertical Use···Back side motor mounted type F.21,22、Top side motor mounted type F.17~P.20

No.	Measuring Item	Measuring Method	CNC180•202 NCT200	CNC205	CNC302	CNC321	CNCB <sub>450</sub>	CNC <sup>501</sup>
2	Runout of table surface		0.01mm	0.01mm	0.015mm	0.015mm	0.015mm	0.02mm
3	Concentricity of center bore		0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	0.01mm
4	Squareness of table surface (Minus deviation at upper part is not permitted.)		0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.03mm
5	Parallelism between center line of test bar and key way		At 150mm 0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.02mm
6	Parallelism between frame bottom surface and table center line		At 150mm 0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.03mm
7	Indexing accuracy		±20"	±20"	20"	15″	15"	15″
8	Repeatability		4"	4"	4"	4"	4"	4"

<sup>★</sup> For ultra precision option: One rank higher accuracies than the above figures are inspected.

#### ■ CNC Rotary Table only for Horizontal Use…Built-in type **P.55**

No	. Measuring Item	Measuring Method	CNC 180 NCT 200	CNC360	CNC 321 401 401H	CNC 503H 601	CNC <sub>1000</sub>	CNC1200	CNC1600
1	Parallelism between table surface and frame bottom surface (Concave)		0.015mm	0.02mm	0.02mm	0.02mm	0.03mm	0.04mm	0.05mm
2	Runout of table surface at horizontal position		0.01mm	0.015mm	0.015mm	0.015mm	0.03mm	0.03mm	0.04mm
3	Concentricity of center bore		0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	0.01mm <sup>*1</sup>	0.01mm <sup>*1</sup>
6	Squareness between frame bottom surface and table center line		At 150mm 0.02mm	0.02mm	0.02mm	0.03mm			_
7	Indexing accuracy		±20"	20"	15"	15"	15"	15"	15"
8	Repeatability		4"	4"	4"	4"	4"	4"	4"

<sup>★</sup> For ultra precision option: One rank higher accuracies than the above figures are inspected.

#### ■ DD Motor ··· 🖙 P.49~P.54

No.	Measuring Item	Measuring Method	DD180F-60	DD250F-150	DD400F-250
2	Runout of table surface		0.01mm	0.01mm	0.015mm
3	Concentricity of center bore		0.01mm	0.01mm	0.01mm
4	Squareness of table surface (Minus deviation at upper part is not permitted.)		0.01mm	0.01mm	0.02mm
5	Parallelism between frame bottom surface and table center line		At 150mm 0.02mm	0.02mm	0.02mm
6	Parallelism between frame bottom surface and table center line		At 150mm 0.02mm	0.02mm	0.02mm
7	Indexing accuracy		±10"	±10"	±10"
8	Repeatability		4"	4"	4"

No.	Measuring Item	Measuring Method	5AX-DD100AF	5AX-DD200AF2	5AX-DD200BF2
1	Parallelism between table surface andframe bottom at tilting angle 0° (Concave)		0.01mm	0.01mm	0.01mm
2	Deviation of table surface at tilting angle 0°		0.01mm	0.01mm	0.01mm
3	Deviation of table center hole at tilting angle 0°		0.01mm	0.01mm	0.01mm
4	Displacement of center when moving from 0° to 90° at tilting angle 90°		0.015mm	0.015mm	0.015mm
5	Parallelism between table surface and center line of guide key at tilting angle 90°		0.01mm	0.01mm	0.01mm
6	Repeatability of rotary axis		±5"	±10"	±10"
7	Indexing accuracy of rotary axis		2″	4"	4"
8	Indexing accuracy of tilting axis	Cumulative	±10"	±15″	±15"
9	Repeatability of tilting axis		±3″	6″	6"

<sup>★</sup> Please contact us for the accuracy of the rotary table larger equal to CNC802 for vertical use.

<sup>★</sup> Center socket is provided at the center bore for the table marked \*1. Concentricity of the internal center socket is shown.

### **Accuracy Standard**



#### ■ CNC Rotary Table for both of Vertival and Horizontal Use

No.	Measuring Item	Measuring Method	CNC105	CNC180•202 NCT200	$CNC_{302}^{260}$	CNC <sub>401</sub>	СNСВ <sup>350</sup>	CNC <sup>501</sup>	CNC <sub>1003</sub>
1	Parallelism between table surface and frame bottom surface (Concave)		0.015mm	0.015mm	0.02mm	0.02mm	0.02mm	0.02mm	0.03mm
2	Runout of table surface		0.01mm	0.01mm	0.015mm	0.015mm	0.015mm	0.02mm	0.03mm
3	Concentricity of center bore		0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	0.01mm
4	Squareness of table surface (Minus deviation at upper part is not permitted.)		0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.03mm	0.04mm
5	Parallelism between center line of test bar and key way		At 150mm 0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.02mm
6	Parallelism between frame bottom surface and table center line		At 150mm 0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.03mm	0.03mm
7	Indexing accuracy		±30"	±20"	20"	15"	15"	15"	15"
8	Repeatability		4"	4"	4"	4"	4"	4"	4"

- ★ For ultra precision option: One rank higher accuracies than the above figures are inspected.
- ★ Please contact us for the accuracy of the rotary table larger equal to CNC802 for both of vertical and horizontal use.

#### NST, 5AX- Tilting Rotary Table

	rtor, or other manigrationary ra										
No.	Measuring Item	Measuring Method	NST <sup>250</sup>	NST500	5AX <sub>130</sub>	5AX-201	5AX-250	5AX- <sup>230</sup> 350	5AX-500	5AX-800	5AX-1200
1	Parallelism between table surface and frame bottom at tilting angle 0° (Concave)		0.02mm	0.02mm	0.015mm	0.015mm	0.02mm	0.02mm	0.03mm	0.04mm	0.05mm
2	Deviation of table surface at tilting angle 0°		0.02mm	0.02mm	0.01mm	0.01mm	0.02mm	0.02mm	0.02mm	0.03mm	0.04mm
3	Deviation of table center hole at tilting angle 0°		0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	*1 0.01mm
4	Deviation of center line of rotary axis at tilting angle 90°		0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.03mm	0.04mm	0.05mm
5	Parallelism between table surface and center line of guide key at tilting angle 90°		0.02mm	0.02mm	0.015mm	0.015mm	0.02mm	0.02mm			
6	Displacement of center when moving from 0° to 90° at tilting angle 90°		0.02mm	0.02mm	0.01mm	0.015mm	0.015mm	0.015mm			
7	Indexing accuracy of rotary axis		Cumulative 20"	20"	±30"	Cumulative 20"	20"	20"	20"	20"	20"
8	Repeatability of rotary axis		4"	4"	4"	4"	4"	4"	4"	4"	4"
9	Indexing accuracy of tilting axis	Cumulative	60″	60"	60"	60"	60"	60"	60"	60″	60"
10	Repeatability of tilting axis				±6"	±6"	±6"	±6"	±6"	±6"	±6"

- ★ For ultra precision option: One rank higher accuracies than the above figures are inspected.
   ★ Center socket is provided at the center bore for the table marked \*1. Concentricity of the internal center socket is shown.

#### ■ Mulit-Spindle CNC Rotary Table … P.25

No.	Measuring Item	Measuring Method	Accuracy
1	Pitch between Spindles		Within ±0.02mm from nominal pitch
2	Center Hight of Spindle	<b>PIPIPI</b>	Within ±0.02mm

#### Mulit-Spindle Tilting Rotary Table ... F.47

No.	Measuring Item	Measuring Method	Accuracy
1	Pitch between Spindles		Within ±0.02mm from nominal pitch
2	Center Hight of Spindle	<b></b>	Within ±0.02mm

### **Description of Specifications**



#### Specification

CNC260 CNCZ260 Item / Code No. Diameter of Table 260  $\phi$ mm Diameter of Spindle Hole  $\phi$ mm φ80 Centre Height mm 170 12+0.018 Width of T Slot mm Air 0.5MPa Hyd. 3.5MPa Clamping System Air/Hyd. 588/1568 Clamping Torque  $N \cdot m$  $\left(\frac{\text{GD}^2}{4}\right) \text{ kg·m}^2 \times 10^{-3}$ Table Inertia at motor Shaft 0.33 Servo Motor  $\alpha$  iF4/5000·2000 min-1 MIN. Increment 0.001 **Rotation Speed** 16.6(33.3) min-1 **Total Reduction Ratio** 1/120(1/60) Indexing Accuracy sec Net Weight 115 kg Vertical MAX. 175 Work Load Horizontal on the Table 350 kg 42480 N MAX. Thrust Load 1442 **FXL** applicable N·m on the Table 2320 FXL N⋅m Guide Line of MAX 5.0 Unbalancing Load kg·m Vertical MAX. 3.2(1.6) Work Inertia  $(\frac{GD^2}{4})$  kg·m<sup>2</sup> Driving 192(153) Torque  $N \cdot m$ 

#### Code No.

CNC:Standard CNCZ:High Speed Z Series

The worm wheels and worm screws on CNC and **CNCZ** models are different and not interchangeable.

#### **Table Diameter**

Please make sure that the work inertia should be within the specified tolerance when the fixture or the work piece is larger than the rotary table diameter.

#### **Through Hole Diameter**

All model have MAX. through hole.

#### Clamping System

For the changing from the hydraulic brake system to the air brake system, please refer to 6-5) Supplying pneumatic or hydraulic pressure for brake and venting air.

The values are according to pneumatic 0.5 MPa / hydraulic 3.5 MPa

Nikken determine the MAX. table rotation speed with the best motor rotation from the motor acceleration characteristics and the practical load test. Normally, we select the motor rotation speed of 1,500min<sup>-1</sup> or 2,000min<sup>-1</sup>. It is possible to increase the rotary table rotation speed to increase the motor rotation speed dependant of each application. Please contact with us for the details. FÄNUC  $\alpha$ i series motor can be rotated faster speed than the recommended speed.

 $\alpha$ iF1,  $\alpha$ iF4: 3,000min<sup>-1</sup>  $\alpha$ iF12: 2,000min<sup>-1</sup>

#### MAX. Work Load

The figure becomes double when the rotary table is used with tail stock or support table.

#### MAX. Applicable Thrust Load

This is a applicable figure for the (dynamic) cutting thrust force with cutting tools, e.g. drill, at the rotary table horizontal use.

#### Worm Wheel Strength

This is the strength of the worm wheel without brake. It is applied against dynamic cutting thrust.

The figure shows the strength of the bearings on the rotary table spindle and the applicable (dynamic) cutting thrust with center support.

#### MAX. Unbalancing Load

The guide line of MAX unbalancing load means the unbalancing load, which the rotary table is used with support table in vertical application. The guide line figure will be different according to the servo motor, please refer P.57 for more detail.

#### **Driving Torque**

This figure shows the rotation torque at the MAX. rotation speed after acceleration.

SI Unit & Gravity Unit SI is the abbreviation of "Systeme International d'Unites".

Item	SI Unit	Gravity Unit	Conversion
Clamping torque	N∙m	kgf∙m	1kgf·m=9.8N·m
Table Inertia at Motor Shaft *1	$\left(\frac{\text{GD}^2}{4}\right)$ kg·m <sup>2</sup> ×10 <sup>-3</sup>	kg cm sec <sup>2</sup>	1kg cm sec <sup>2</sup> =10.2×( $\frac{GD^2}{4}$ )kg·m <sup>2</sup>
MAX. Motor Rotation Speed	min <sup>-1</sup>	rnm	1rpm=1min <sup>-1</sup>
MAX. Table Rotation Speed	111111 '	rpm	πριπ= πιιιι ·
MAX. Thrust Load	N	kgf	1kgf=9.8N
applicable on the Table	N∙m	kgf∙m	1kgf·m=9.8N·m
MAX. Work Inertia*	$(\frac{GD^2}{4})$ kg·m²	kg cm sec <sup>2</sup>	1kg cm sec <sup>2</sup> =10.2×( $\frac{GD^2}{4}$ )kg·m <sup>2</sup>
Driving Torque	N∙m	kgf∙m	1kgf⋅m=9.8N⋅m
Air/Hydraulic Pressure	MPa	kgf/cm <sup>2</sup>	1kgf/cm <sup>2</sup> =0.098MPa

<sup>★ \*1</sup> The unit of inertia is expressed in GD<sup>2</sup>.

# **Recommended Iubricating Oil and Quantity**



■ Recommended oil

Oil Maker	Code No.		
Idemistu Kosan	Super Multi Oil 100		
JX Nippon Oil & Energy	SUPER MULPUS DX 100		
Cosmo Oil Lubricants	Cosmo New Mighty Super 100		
Showa Shell Sekiyu	Shell Morlina S2 BA100		
EMG Marketing	Mobil DTE Heavy		

Table Model	Main Body(cc)	Gear Box (cc)		
CNC(Z)105	110	Grease		
CNC(Z)180, 202	500	Grease		
CNC205	200	Grease		
CNC(Z)260, 302	700	300		
CNC(Z)321, 401	2,000	700		
CNC(Z)401H	2,000	_		
CNCB450	2,000	500		
CNC(Z)501, 601, CNC801	7,000	1,500		
CNC(Z)503	5,000	<del>-</del>		
CNCB630	6,000	1,500		
CNC802	14,500	2,500		
CNC803	15,000	2,000		
CNC1200	18,0	000		
CNC1201	26,0	000		
CNC1600	60,0	000		
CNC(Z)180B, 202B	500	Grease		
CNC(Z)260B, 302B	700	1,200		
CNC(Z)321B, 401B	2,000 1,000			
CNC180T, 202T	1,5	500		
CNC(Z)200T	80	00		
CNC(Z)260T, 302T	1,5	500		
CNC(Z)321T, 401T	4,0	000		
CNCB450T	5,5	500		
CNC(Z)501T, 601T	8,0	000		
CNC100-2W	540	Grease		
CNC100-3W	720	Grease		
CNC100-4W	900	Grease		
NST250	1,300	Grease		
NST300	1,800	Grease		
NST450, 500	10,000	Grease		
NSVZ180	500	Grease		
NSVZ300	1,500	Grease		
NSVX400	3,000			
NSVX500	3,000			
NSVX400T	5,000			
TAT105	60			
TAT200,250	Grease			
TAT321,401	Grease			

Table Model	Axis	Main Body(cc)	Gear Box(cc)	
5AX-100	Rotary	300	Grease	
5AX-100	Tilting	300	Grease	
5AX-130	Rotary	350	Grease	
5AX-130	Tilting	400	Grease	
5AX-150	Rotary	450	Grease	
5AX-150	Tilting	500	Grease	
54V 000 II	Rotary	500	Grease	
5AX-200 II	Tilting	600	Grease	
5AX-201	Rotary	400	Grease	
5AX-201	Tilting	300	Grease	
FAV 050	Rotary	8	800	
5AX-250	Tilting	600	Grease	
54V 000	Rotary	700	Grease	
5AX-230	Tilting	800	400	
FAV 250	Rotary	2,000		
5AX-350	Tilting	800	300	
FAY T(N) 400	Rotary	14	4,000	
5AX-T(N)400	Tilting	4,000		
5AX-B450(T)	Rotary	7,000(9,000)*1		
5AA-6450(T)	Tilting	3,000(5,500)*2	1,000( - )*2	
5AX-550	Rotary	2,000	Grease	
5AX-550	Tilting	2,000	800	
5AX-800	Rotary	8,000		
5AX-800	Tilting	4,000	2,000	
5AX-2MT-105	Rotary	700	Grease	
5AX-2WIT-105	Tilting	400	Grease	
FAY OMT 170	Rotary	2	,000	
5AX-2MT-170	Tilting	700	300	
EAV OMT OOC	Rotary	2	,000	
5AX-2MT-200	Tilting	2,000	1,000	
EAV 4MT 100	Rotary	2,000	Grease	
5AX-4MT-120	Tilting	700	300	

### **Assessment**

### **NIKKEN**

#### Accessment for Reliability & Quality.

#### Over Load Test

The wearing of the worm wheel is very small under very severe testing condition.





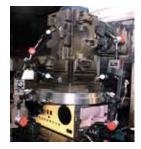


#### ■ Brake Torque Test









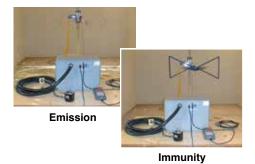
#### Cutting Stability Test

The micro vibration during machining or the surface finish are measured.



EMC Test

Electromagnetic Compatibility Test



■ Water Proof Test



Declaration of Conformity

sizes essential to the conformity

sizes essential to the conformity of the

© Declaration of Conformity

#### Accuracy Measurement



Indexing Accuracy Measurement by Laser



5AX-230 on 3 Dimensional Measuring Machine



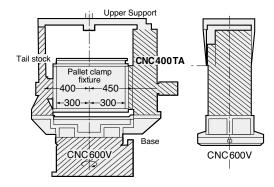
5AX Tilting Rotary Table on 3 Dimensional Measuring Machine

### Load Calculation / Indexing Time Comparison / Duraility **NIKKEN**

#### Conditions of CNC Rotary Table when being used to CNC Special Purpose Machine

Not only indexing accuracy, the following conditions must be also filled for continuous operation of 24 hours. Namely, Load calculation, Indexing time, Durability etc.
And the overseas service branches and after service ability are also important.





#### 1 Load Calculation

In case using conditions are beyond the specification of CNC rotary table, please inform us the work piece, jig fixtures, required indexing time etc. Then, we will calculate the load of your application, and select the suitable CNC rotary table. When such jig fixture and work as right hand are to be rotated on CNC rotary table, we analyze into 1~5 elements, and calculate as per the list shown at right hand side.

No.	Shape		Approx. Weight (Kg)	Approx. GD <sup>2</sup> (GD <sup>2</sup> /4)Kgm <sup>2</sup>
1	CNC400T Eccentricity: 450mm	1	260	59
2	Tailstock Eccentricity: 120mm	1	80	14
3	Base	1	11	10
4	Upper Support Parts	1	30	2
5 Pallet Clamp Fixture Eccentricity: 120 mm		1	80	6
Total			560	91

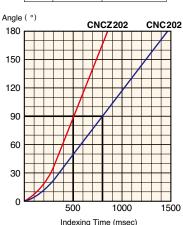
#### 2 Indexing Time Comparison

Indexing Time = Acceleration Time + Rapid Positioning Time + Deceleration Time.

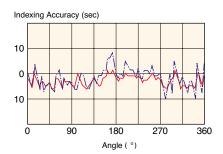
MAX. moving angle is 180°. Therefore, not only rapid positioning time, but also acceleration/deceleration characteristics is very important. The graph at right hand side shows that CNCZ202 (high speed), with it's excellent acceleration/deceleration capability, gives a very substantial time saving of approximately 300 msec. on this 90° movement comparing with CNC202 (standard).

CNCZ202: 500 msec. CNC 202: 800 msec.

Item Rapid Positioning Spe		Acceleration/Deceleration Time Constant
—	44.4 min <sup>-1</sup>	150msec
_	22.2 min <sup>-1</sup>	100msec



Item	Using Years	Indexing accuracy	
	At installation	Cumulated 10sec	
After 7 years		Cumulated 17sec	



#### **3** Durability

In 24 hours continuous operation, durability is one of the most important conditions.

Thanks to Carbide Worm System, NIKKEN CNC rotary table ensures highest anti wearing nature even at the severest load conditions with high speed indexing. The graph at right hand side shows the worm wheel & worm screw and accuracy inspection of the table having been used for 7 years on CNC special purpose machine in production line of automobile parts plant.



Worm System after 7 years used.

### **Technical Information**



#### Specification of the rotary table to be used on the special purpose machines.

- 1. Custom made on the Table Face Plate
- · Drilled hole, tapped hole, or dwell pin hole etc.
- · Without T-slot or with T-slot
- · Additional process at center hole
- 2. The location of the Oil Sight Grass, Oil Supply Port and Drain Port can be changed.
- 3. How to be mounted on the Machine
  - U-aroove
- · Additional tapped holes on the backside
- · Shift the guide key position
- 4. Modification of the Motor Cover
- 5. Rotary Joint r P.89
- 6. Built-In Pallet Clamping System 🖙 P.96
- 7. Special Color P.96
  - ·Please order with the color sample or Munsell Color No.

table body to be clamped for vertical use

When rotary table is

used for horizontal use,

there is no portion of the





CNC302T without T slot



CNC202L without T slot

#### Selection of the CNC rotary table

- The support table is basically used in case of vertical application.
- The machining operation is generally light cut on aluminium materials, however, if the fixture or the component is large size, please make sure that the fixture inertia is within the MAX. work inertia.
- If the unbalance load is too big, it will affect on not only the indexing accuracy but also the durability. Please make sure the unbalance load will be within the following figures.

CNC105: 10Nm, CNC180, 202: 20Nm, CNC260, 302: 30Nm

- In case of the unbalance load is large,
  - -The high speed Z series rotary table is not suitable, please use standard rotary table.
- -Please installing the balance cylinder or counter balance.
- -Please advise us the details of the component, fig fixture, indexing time etc. prior to your order, and we will make a calculation of the load and select the best suitable rotary table for your application.
- If the huge amount of coolant has to be applied, we could prepare air purge (with pneumatic pressure of 0.03MPa) on the CNC rotary table body as an option. Please contact us the details





#### **Check point for trunnion fixture**

When installing the table onto the sub-base, measure and check as follows.



Parallelism between table & sub-base is recommended within 0.01mm



table center and sub-base center is recommended within 0.02mm



within 0.02mm

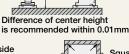
2 Install the table & support table onto the M/C as follows.

3 Trunion fixture is recommended to be aligned as follows.

Center lines are recommended within 0.02mm

Squareness between center line & these faces is important

Center of both side are recommended within 0.01mm



is important



#### Caution

- Always be careful not to inflict personal injury on any shop objects when unpacking this equipment.
- Caution should always be used when lifting this product. Especially when using lifting equipment. Manual lifting of this product may cause serious back injury. Always use safe lifting techniques.
- Install the rotary table on a well ventilated place hidden from direct sunlight, on a place not exposed to corrosive gas such as sulfuric acid and hydrochloric acid. Do not install the rotary table on a place with excessive high/low temperature. (Normal operating temperature:  $5^{\circ}\text{C}{\sim}40^{\circ}\text{C}$ )
- Under the lower temperature condition, please warm the rotary table up just after power on. Or, please use lighter lubrication oil as another solution.
  Only the specified power voltage should be used. Incorrect power
- supply may result in fire.
- Always power off the machine before attempting any installation and wiring work. Failure to do this may result in serious personal injury or electric shock.
- The machine on which CNC rotary table is installed should have a complete cover or splash guard.
- When installing this product onto a machine tool, always pay special attention to the location of cables, hoses and hydraulic tanks (if used), to check for interference.
- Please make sure that all cables and hoses are sufficiently long to allow full axis travel.
- Always ensure that there is no interference with the CNC rotary table or tailstock unit of the ATC (Automatic Tool Change) position. • Always ensure safe cable runs according to the instruction manual in
- order not to interfere with the machine operation. It is dangerous if the cables become entangled with the machine table or spindle unit.
- Always check the parallelism and squareness of the table to the machine axes and fix to the machine table using the fixings provided.

- Please follow the instruction manual for installation, wiring of cables and hoses. Failure to connect wiring correctly may cause fire or a
- This table has been given a waterproof treatment, however if ingress of coolant should occur, stop using the table immediately. Failure to do so may result in the unit catching fire or causing serious electric malfunction
- Always ensure that pneumatic or hydraulic hoses are connected correctly.
- Always keep the air filter clean to prevent water and dirt ingress from the air supply.
- Please ensure that the hydraulic pressure flows constantly on the pump line at brake clamp in the save energy type hydraulic circuit.
- Please use CNC rotary table within the specification. Exceeding the specification may cause defective components and irreparable damage. Please contact us in case of the beyond the specification before ordering. P.105
- Never modify the table by yourself without previous agreement of NIKKEN
- Never to touch any moving parts. Failure to follow this instruction may result in serious personal injury
- For the rotary table with the NIKKEN controller, firstly turn the power of NIKKEN controller off, then turn the power of main M/C off at the end of operation.
- Always remove swarf from the table after use. Long term operation without cleaning may cause damage to the internal mechanism.

  • Always change the lubrication oil annually to prevent the gear wear.
- If a collision occurs with the table, power off the machine controller immediately and contact your distributor for repair.
- Always stop using the table if unusual noises are heard or the slackness or defection of work piece and jig fixture are found. Irrepanable damage may be happened. Please contact with your distributor for repair.

## Headquarter







NIKKEN is the only tooling product manufacturer which performs sub-zero treatment for tooling. This refers to a technique where -90 deg. ultra-low-temperature processing is performed after carbonizing and quenching in order to eliminate the residual austenite and to form 100% martensite compositions to prevent deterioration over time. This technique has been applied for block gauges and for bearings of the highest grade in the past. It is an example of how NIKKEN pays attention to those aspects which are often hidden from view and how we put our hearts and souls into each and every tooling product.

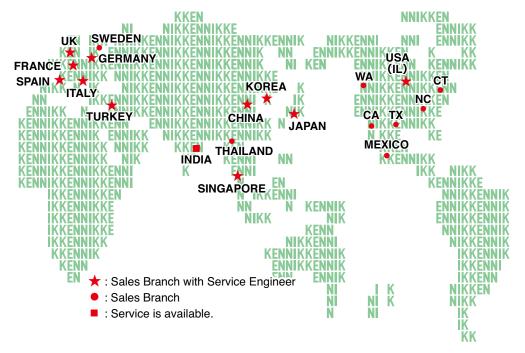


#### Ion Nitriding

Ion nitriding refers to a nitriding process where glow discharges are generated in a vacuum of a nitrogen-mixed gas atmosphere to heat the workpieces at a low temperature of 450 deg. while at the same time nitriding them by a sputtering action. This processing improves both the wear resistance and sliding performance. (It reduces the surface friction coefficient.) The experience and know-how of ion nitriding have been utilized in a large number of **NIKKEN**'s products, including worm wheels for CNC Rotary Tables and Tough-Cut Skill Reamers.

### SERV SERVICE NET WORK

There are overseas Sales Branches in 12 countries. Each sales branch has stocks for toolings and CNC Rotary Tables, and service engineers look after the maintenance and service operation of our products. In the other region, e.g. East-South Asia, Ozaena, South America, Africa, etc., there are some distributors. At the production line in abroad, as there are many requirements for special tools and CNC Rotary Table to suit the special specifications, please ask us or distributors for spare tools and maintenance parts in advance.





LYNDEX-NIKKEN (U.S.A.)



HERRAMIENTAS LYNDEX-NIKKEN (MEXICO)



NIKKEN DEUTSCHLAND (F.R.GERMANY)





PROCOMO-NIKKEN (FRANCE) KOREA NIKKEN (KOREA)









OLASA (SPAIN) **CUTTING TOOL (SPAIN)** 











**NIKKEN ASIA (SINGAPOLE)** 

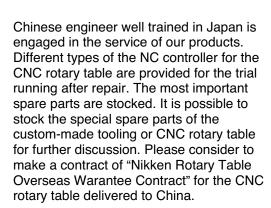
New Nikken China facility was moved to Qinzhou Road, Shanghai on 2014. JAN due to the business expansion in China. The standard items of NC tooling & CNC rotary table and each important spare parts are stocked for quick delivery.

**NIKKEN CHINA** 

You can access to Nikken China with Chinese, Japanese or English. Not only Chinese catalogue but also Chinese instruction manual are provided for Chinese domestic market. Our office has the show room to see and touch our products, and our presentation will be done more practically. Technical seminar of Nikken is also opened at user factory side.







The sales of nikken products through Internet is not started in China. For after service and the further maintenance, please purchase Nikken products through authorized distributors.







### LYNDEX-NIKKEN (NIKKEN USA)



As North America's leading supplier of machine tool accessories, LYNDEX-NIKKEN is a wholly-owned subsidiary of NIKKEN Kosakusho Works., Ltd. - Japan. Backed by over a half century of experience, LYNDEX-NIKKEN sets the standard for high quality and high technology with a complete line of superior toolholders and machine tool accessories. From one source you can expect the best of both worlds: Extreme Quality and Advanced Technology.

LYNDEX-NIKKEN has a team of dedicated application and engineering staff available to advise you on your machining applications and to support our entire product line throughout the U.S., Canada, Mexico and South America. Our regional managers in Chicago, Los Angeles, Boston, Charlotte, Dallas and Seattle support our 1,000 plus distributors with machine tool accessories expertise.

LYNDEX-NIKKEN provides expert process and product consultation for even the most demanding applications with full on-demand field support and ongoing training.



The LYNDEX-NIKKEN North America headquarters is centrally located near Chicago, Illinois. Our 50,000 sq ft. facility houses an inventory of over 12,000 machine tool accessories stocked for fast delivery. Over 95% of orders are shipped out same day. Our extensive inventory of products includes:







#### **Products**

- Rotary Tables NIKKEN's complete line of CNC Rotary Tables are known worldwide for their wear-resistance, rigidity and high-speed rotation. NIKKEN rotary tables are built to provide high accuracy, increased production and a trouble-free long life.
- Advanced Toolholders Maximize the potential of your machine tools with LYNDEX-NIKKEN's advanced toolholders.
- **Standard Toolholders** LYNDEX-NIKKEN's complete range of quality-driven toolholding solutions are designed to meet your strictest requirements.



#### **Service & Support**

- Dedicated application and engineering support staff
- Support for entire product line covering the U.S., Canada, Mexico and South America
- On-demand field support and ongoing training
- Customer service and technical support staff
- Expert process and product consultation for even the most demanding applications
- Cutting trials and testing
- Service, repair and custom configuration completed on-site
- Attention to high-tech application demands, including high-speed and balanced toolholding solutions

**NIKKEN** 

### **NIKKEN EUROPE (NIKKEN UK)**

The NIKKEN Euro Centre based in the UK was opened in 1999; from here we sell, distribute and support all products to our subsidiaries and dealers in over 20 countries around Europe.

In addition to carrying out the functions of NIKKEN UK in the United Kingdom (UK), we employ forty staff members and engineers. At the end of 2015, NICE (NIKKEN Innovation Centre Europe) opened in the AMRC manufacturing technology park, where it provides support to customers working with difficult-to-machine materials, particularly in the aviation and energy industries.





#### **Product Inventory**

NIKKEN Euro Centre facilities has a warehouse space of 13,000m<sup>2</sup>. which holds over 50,000 individual items covering a range of some 4,000 product lines, including the latest generation of Single & Multi Axis CNC Rotary tables, thus making it the largest stock of NIKKEN products in Europe.

# Our Technical Support and Training Section provides our existing customers and potential customers access to:

- A Multimedia based training facility that ensures our customers, through comprehensive training, will realize the full productivity potential of their application.
- A wealth of engineering expertise covering all aspects of application set-up, optimization and implementation that is available for the full life of the NIKKEN product.





### Our machining centre equipped with Testing Facilities enables us to:

- Research, develop and optimize all of our tooling systems.
- Demonstrate to our potential customers the advantages of using both NIKKEN Tooling and CNC Rotary Tables in their applications.

#### Our Service Department specializes in:

- Providing on-site inspections prior to rotary table repairs and refurbishment by our own NIKKEN trained service engineers.
- Providing tooling and rotary tables optimized to seamlessly integrate into any application.



### **NIKKEN DEUTSCHLAND (NIKKEN GERMANY)**



Nikken Deutschland GmbH, a wholly owned subsidiary in Germany of NIKKEN Kosakusho Works, was established in 2003 to take over the sales activities of the previous distributor. Based in Russelsheim, which is a town made famous by the manufacturing complex of Opel, the company is located about 15 minutes away by car from Frankfurt airport. Germany has ranked at the top of the machine tool industry for many years, and is also the supply source of machine tools that are fuelling the significant expansion now taking place in Eastern Europe. Nikken Deutschland GmbH has its base at the centre of the huge market of Germany and Eastern Europe, and continues to broaden the range of the company's sales operations.

NIKKEN has achieved some impressive successes in Germany with its CNC rotary tables and tool holders thanks to a long sales history of the company's sales activities. A sales force consisting mainly of German personnel stands on the front line of this activity to address the sales and servicing needs of the entire country. More specifically, the company provides technical advice, repairs, aftersales support and other services to end users, distributors and machine dealers.



To enable speedy delivery of standard items in the German market and of popular products compliant with European standards, Nikken Deutschland GmbH works closely Nikken Euro Centre to keep a full stock at its disposal. The company uses the most appropriate type of delivery in each case, including parcel post, DHL, door-to-door service and flash shipment, to meet the demands of customers.

The sales territory of Nikken Deutschland GmbH spans the vast area of eastern Europe and covers such countries as the Czech Republic, Slovakia, Austria, Russia, Poland, Hungary, Romania and Bulgaria, all countries in which Japanese companies are rapidly expanding their business. The service is not limited to sales, but engineers make on-site adjustments, repairs and service calls as well.



Nikken Deutschland GmbH has participated in and contributed to many trade shows and exhibitions held in Germany, including the EMO show, METAF, AMB and EURO MOULD. The company's fully furnished showroom is a Mecca of information to the constant stream of visitors who can inspect products and examples of machining, as well as receive application advice and technical training. They can handle NIKKEN's products for themselves, learn about the construction and capability of the CNC rotary tables, and learn about the accuracy and other features of NIKKEN's products.

A complete support organisation is in place to ensure that advice is relayed promptly by telephone and other rapid communication media, that repairs or delivery of tool holders and CNC rotary tables are carried out promptly with all due diligence, and that emergency service calls are responded to rapidly.

To make it possible to support all types of motors and controllers for NIKKEN's CNC rotary tables, the company has set up trial run equipment that accommodates many different motors, and offers a full range of accessories including tailstocks, support tables, scroll chucks and collet chucks adapted to the CNC rotary tables. The fact that NIKKEN's CNC rotary tables are endowed with outstanding durability and that a complete support service is provided instil confidence in users that the equipment will give outstanding service in the years ahead.

### PROCOMO-NIKKEN (NIKKEN FRANCE)



Procomo France S.A.S was established 30 years ago with the avowed intent to deliver the high-accuracy and high-quality tool holders and CNC rotary tables as well as related services, applications and after-sales servicing, into the hands of engineers in France. A major milestone in the company's history was marked in 2006 with the change of the company name to PROCOMO-NIKKEN, and the company took on a new lease of life as NIKKEN's wholly owned subsidiary in France.





In 2005, PROCOMO-NIKKEN embarked on a complete renovation of its buildings and facilities in order to make it possible for users to gain hands-on experience of NIKKEN's products in a bright and comfortable environment.



In the meeting room, which is fitted out with all the latest multimedia technology, technical seminars are regularly held so that attendees will come away with a clear understanding of NIKKEN's products and technology. The showroom is where videos of cutting operations are screened, and visitors can actually handle some of NIKKEN's products in this room as well. The machining center, which is used for cutting trials, enables visitors to

identify what makes NIKKEN's products different from those of other companies and to judge how impressive are the machining accuracy and advanced cutting capabilities of NIKKEN's products. As the top tool holder manufacturer, NIKKEN believes is that once customers have their own personal experience of the low machining noise, attractive-looking cut surfaces and uniform discharge of chips, they will be convinced that they can completely trust in and depend on the expertise and capabilities of the company.







The stocks of a large number of standard products are always on hand, enabling the products that customers need to be delivered in the shortest possible time. The NIKKEN Euro Centre and PROCOMO-NIKKEN retain constant and close contact; together they take on the challenge of how to machine products in a more rationalized manner, in a shorter time and to a higher accuracy so that France's engineers can meet every need of the French marketplace.

NIKKEN has already earned an enviable reputation in the global marketplace for the high accuracy and outstanding wear resistance of the company's CNC rotary tables. PROCOMO-NIKKEN has a team of five engineers dedicated full-time to providing users with application support prior to placing orders for tool holders and CNC rotary tables and to carrying out the preparation for shipment, education and training programs, maintenance and repairs, and servicing. This support network delivers a wide range of services, while willingly taking up the challenge of coming to grips with new applications.





# Check Sheet for the Technical Specifications of CNC ROTARY TABLE **NIKKEN**

1.	Machine tool builder (
2.	Machine model ( )
3.	T-slot width ( ) / pitch ( ) / number of slots ( )
4.	How to install the rotary table  Uertical and Horizontal  Uertical only  Horizontal only
5.	Control method Additional axis
	A21 or EZ controller (use M-signal)
	Rotary axis ( W)
	Tilting axis ( W)(5AX only)
6.	
	Numerical Control (Manufacturer: ) (Model: )
7.	
	Servomotor
8.	
	Servomotor model : ( )
9.	
	Clamping System ☐ Pneumatic( MPa) ☐ Hydraulic( MPa) ☐ Booster
10.	
	Voltage of the solenoid AC100V DC24V Unidentified (confirmed with the drawing for approval)
11.	
	Clamping circuit of the solenoid  OFF:Clamp  ON:Clamp  Unidentified (confirmed with the drawing for approval)
12.	
	Direction of the cable comes out Side Back Top Other (
13.	
	Cable connection method
14.	
	External wiring cable    Necessary    Not necessary
15.	
	Specified color
16.	
	T-slots of table plate  Necessary  Not necessary
17.	
	Language of instruction Manual □Japanese □English

# Check Sheet for the Technical Specifications of CNC ROTARY TABLE **NIKKEN**

18.	Coolant	not use  Oil-based	☐Water-soluble	Coolant pressure	☐Standard ☐H	ligh Pressure
4.0			<b></b>	> .w. :		
19.	Component	-	) Material (	) Weig		:
		Dimension Height	( ) × Ext	ernal Diameter (	)× Width	)
		Internal Diameter (	) × Exter	nal Diameter (	)× Length	( )
20.		/ Please indicate dimens o be attached (if possible)	sions according to the	components from the	center, top of the CN	NC rotary tables

#### 21. Cutting conditions

Cutting position	Type of cutting tools / Number of the cutter	Cutting speed (V)	Cutting feed (mm/min)	Cutting depth mm/time	Application detail (if possible)





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IJК

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http://www.nikken-kosakusho.co.jp/en e-mail: export@nikken-kosakusho.co.jp

■Please give your order to the following agent