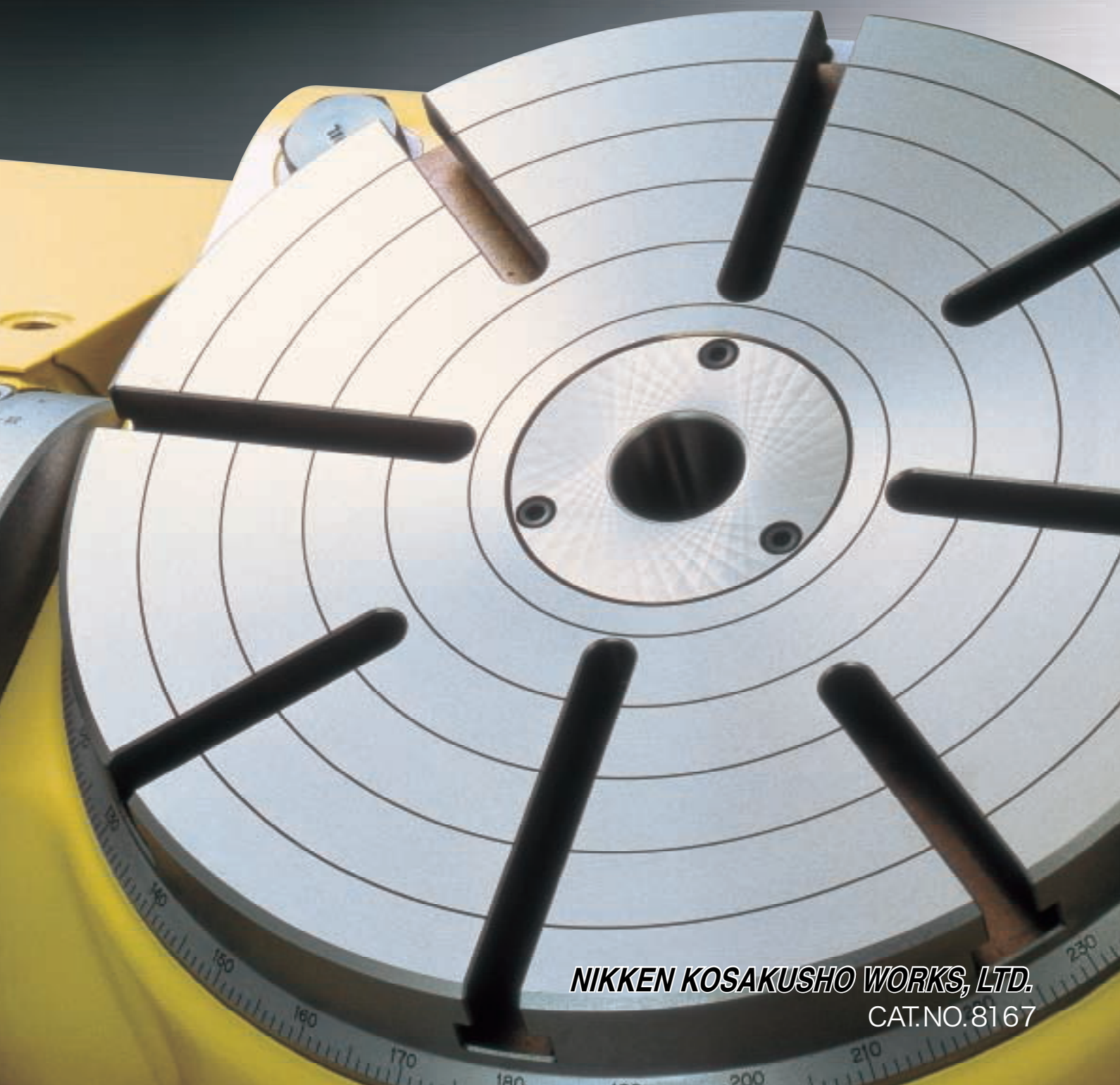


NIKKEN

CNC ROTARY TABLE SERIES



NIKKEN KOSAKUSHO WORKS, LTD.
CAT.NO.8167

CNC ROTARY TABLE for Full Automation

*Worldwide Field-proven NIKKEN CNC Rotary Table.
Consequently and finally, NIKKEN Carbide Worm Screw System.*

Japan (PAT. 1856406)
USA (PAT. 4576058)
Germany (PAT. DE3417860C2)
UK (PAT. 2158546)
France (PAT. 8407554)

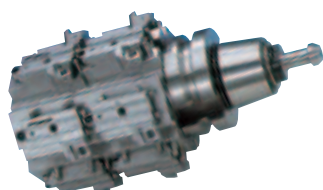
Ion Nitrided
Worm Wheel
HV930

Steel Way
HRC58~60

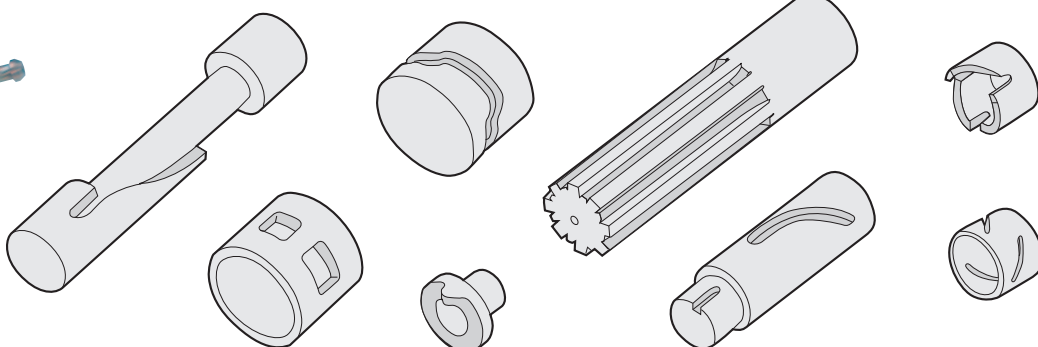
Carbide Worm Screw

Work Sample

Work samples are also shown on [P.34](#)



Multi-setting on multi-planes
[P.32](#)



Anti-Wearing, High Rigidity and High Speed Rotation

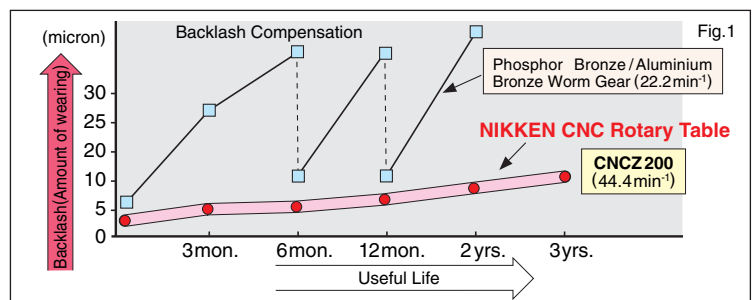
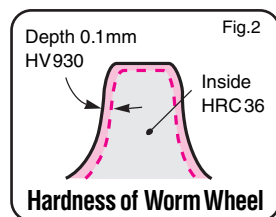
Carbide Worm Screw

Carbide Worm Screw, hard and strong against high speed rotation, is used. (Photo at right hand side) [Material : V grade Carbide: High anti-wearing and tough quality] Ultra heavy duty, maintaining the high accuracy semi-permanently. Comparing with the traditional combination of worm system (phosphor bronze, aluminium bronze worm wheel and steel worm screw), wearing is largely reduced and table is usable for much more years, resulting in great cost-down. For better impact capability, the special very hardened worm screw is used for the worm system of the small tooth module.



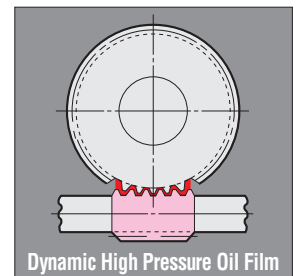
Worm Wheel

Material is special NIKKEN order made steel. Specially hardened and furthermore ion-nitro treated on teeth. Thus, the problem of sliding friction is solved. The hardness of teeth surface and inside is shown at right hand side.



Dynamic High Pressure Oil Film Effect for High Speed CNC Rotary Table Z Series

NIKKEN'S experience in gear cutting and study of the pressure angle of worm screw carry out the table's higher rotation speed (44.4min⁻¹). The rotational speed of the screw creates the pressure to force the oil between the gears preventing any metal-to-metal contact, eliminating gear wear and producing high rigidity and durability.

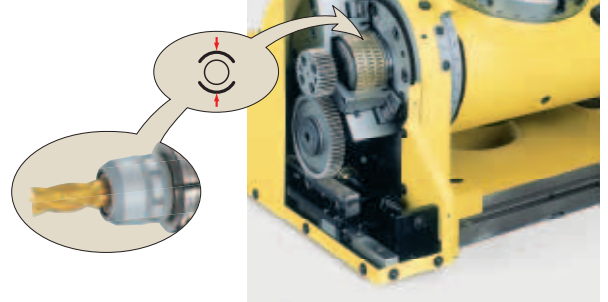


Trouble of Insufficient Brake Torque of Tilting Axis is completely resolved. (5,000Nm)

JAPAN (PAT. 2142343) • U.S.A. (PAT. 5385424, 5507587) • EU (PAT. EP 0553355B1)

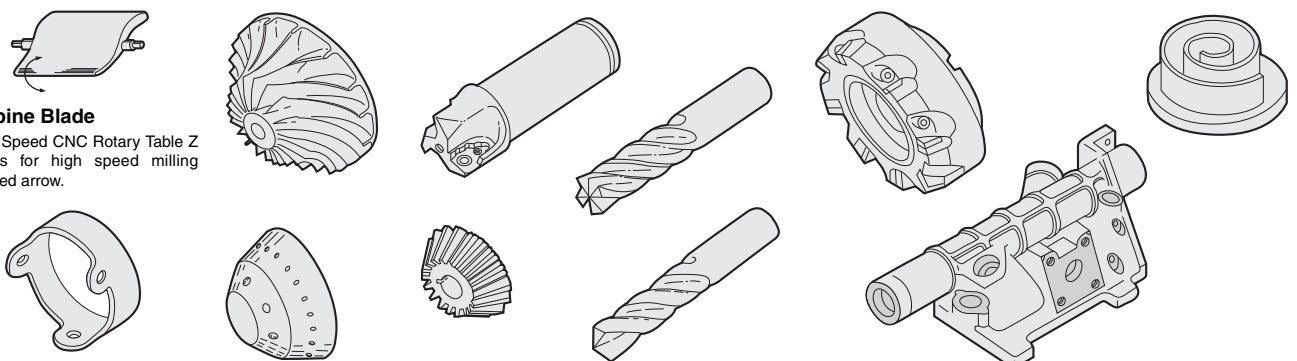
The proven tightening power of NIKKEN milling chuck with 40 years experience is applied to brake of tilting axis of 5AX- tilting rotary table.

- No vibration at any tilting angle.
- Excellent in multi-face machining including heavy drilling and face milling.



Turbine Blade

High Speed CNC Rotary Table Z series for high speed milling marked arrow.



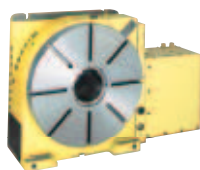


CNC105, 180, 202

Compact CNC Rotary Table P. 5 ~ 6

High Speed Compact CNC Rotary Table **Z series**

NEW Compact CNC Rotary Table with α 21 Controller P. 55



CNC200, 250, 300, 321, 401, 501, 601, 801, 1200

CNC Rotary Table P. 7 ~ 10

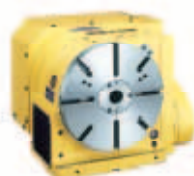
High Speed CNC Rotary Table **Z series**

NEW CNC Rotary Table with α 21PW Controller P. 56



CNC100-2W, 3W, 4W, CNC180-2W, CNC202-2W, CNC250-2W

Multi-Spindle CNC Rotary Table P.15~16



CNC180 B, 202 B, 250 B, 300 B, 321 B, 401 B

Back Side Motor Mounted CNC Rotary Table P.11~12

High Speed Back Side Motor Mounted CNC Rotary Table **Z series**



CNC200 T, 260 T, 321 T, 401 T, 501 T, 601 T

Top Side Motor Mounted CNC Rotary Table P.13~14

High Speed Top Side Motor Mounted CNC Rotary Table **Z series**



5AX-130, -200 II, -220 II, -230, -300, -350 -400, -550

Tilting Rotary Table P.19~24

NEW Compact Tilting Rotary Table with α 21 Controller ... P.57



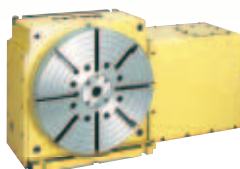
5AX-2MT, -4MT

Multi-Spindle Tilting Rotary Table P.25~26



NST250, 300, 450, 500

Manual Tilting Rotary Table P.17~18

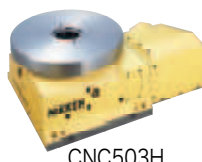


NSVZ180, 300 NSVX400, 500 Indexing Accuracy ($\pm 2''$)

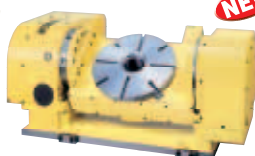
Ultra Precision Rotary Hirth Coupling Index P.27~28

NSVZ: Min. Command Increment = 1°

NSVX: Min. Command Increment = 1° , 0.001 $^\circ$



CNC503H



5AX-350

NEW Built-In Type CNC Rotary Table

CNC401H, CNC503H P.29

5AX-350, -T400 P.30

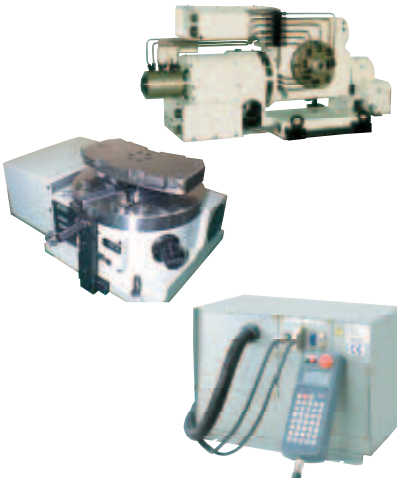
This is a CNC Rotary Table specially designed to be built into the machines.

Optional Specification, Accessories & Technical Information

NIKKEN

Ample Accessories are available for NIKKEN CNC Rotary Table.

For the additional or special specification, please fill in the specification mark sheet, and attach to your order. For the rotary tables marketing in EU, please order specifying "With CE Mark". All rotary tables are available with CE Mark.



■ AWC SystemP.31	■ Rotary JointP.41
Automatic Work Change system	Rotary connection for Air/ Hyd. chuck
■ α Series AttachmentP.36	■ Built-in Pallet Clamp SystemP.41
	Suitable to automatic pallet changer
■ Scroll Chuck	■ Water Proof SpecificationP.42
■ Power ChuckP.37	Available for water proof connector & cable
■ TailstockP.38	■ Various Kinds of ApplicationsP.43
	Recommendation of various kind of examples
■ Air Hydraulic UnitP.42	■ Assessment and
For the machine without hydraulic source.	■ Technical InformationP.45
■ Hydraulic UnitP.36	Assessment, instruction, caution,
	load calculation, indexing time
■ Servo Motor ListP.35	calculation and after service in overseas
■ Accuracy StandardP.39	■ α 21 ControllerP.47
Accuracy and measuring method	■ Technical Information of
■ Ultra PrecisionP.40	■ ControllerP.53
	■ NIKKEN World Wide Sales
	■ & Service BranchP.58

Selection Guide of NIKKEN CNC ROTARY TABLE

NIKKEN

CNC ROTARY Table (M signal series) with NIKKEN Controller

NIKKEN α21controller is set with Machining Centre, NC Mill, Universal Mill etc. Then, with only one M signal from machine side. Precision Dividing, Equal Dividing (2-9999 dividing), Arc Milling, Lead Milling etc, can be performed easily and automatically. ☞ P.47

CNC ROTARY Table for Additional Axis Control

When the controller of Machining Centre has additional axis capability, this series is to be selected. In this case, please let us know Machine/Controller Maker and Servo Motor type. We manufacture CNC ROTARY Table applicable to any makers. For Servo Motor. ☞ P.35

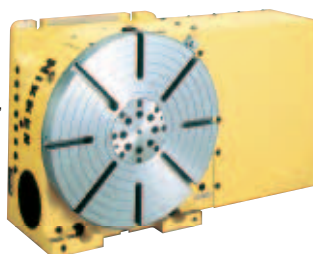
Explanation of the Code No.

1 Axis CNC Rotary Table

From Bench Drill Press to Large Machining Centre.

CNC 401	F A - M
	<ul style="list-style-type: none"> No letter: without motor M: with motor No letter: DC servo motor A: AC servo motor Motor Maker A21: with NIKKEN α21 controller F:FANUC M:MELDAS Y:YASNAC OSP:OSP T:TOSNUC N:NEC S:SANYO Z:SIEMENS I:INDRAMAT H:HEIDENHAIN X:ISOFLX SEM:SEM B:BOSCH No letter: Right hand mounted motor L: Left side motor B: Back side motor T: Top side motor No letter: Horizontal V: Vertical Diameter of Table dia. mm 105, 180, 200, 250, 300, 320, 400, 500, 600, 800, 1200 CNC: Standard CNCZ: High Speed Z series

CNC401FA

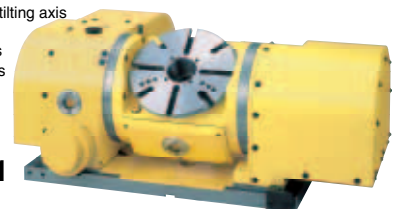


5AX- Tilting Rotary Table

Rationalization series with Tilting and Rotary Control.

5AX- 220	F A - M
	<ul style="list-style-type: none"> No letter: without motor M: with motor No Mark: DC servo motor A: AC servo motor Motor Maker WA21: with NIKKEN α21 controller DA21: with NIKKEN α21 controller for the tilting axis F:FANUC M:MELDAS Y:YASNAC OSP:OSP T:TOSNUC N:NEC S:SANYO Z:SIEMENS I:INDRAMAT H:HEIDENHAIN X:ISOFLX SEM:SEM B:BOSCH No letter: Right hand mounted motor L: Left hand mounted motor Diameter of Table dia. mm 130, 200, 220, 230, 300, 350, 400, 550 Location of the motor for tilting axis No letter: horizontal A: Back side of tilting axis B: Back side of rotary axis T: Top side motor 5AX-: Tilting rotary CNC table NST: Manual tilting table

5AX-220 WA21



COMPACT CNC ROTARY TABLE

NIKKEN



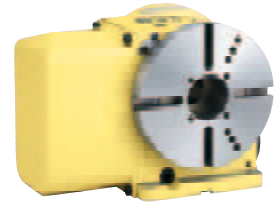
CNC105 A21 and attachments

- 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.36**

● Explanation of the Code No. (Example)

CNC 105 L F A - M

- No Letter: without motor M: with Motor
- No Letter: DC servo motor A: AC servo motor
- Motor Maker **P.35**
- A21: with NIKKEN α 21 controller
- F:FANUC M:MELDAS Y:YASNAC OSP:OSP T:TOSNUC
- N:NEC S:SANYO Z:SIEMENS I:INDRAMAT H:HEIDENHAIN
- X:ISOFLX SEM:SEM B:BOSCH
- No letter: Right hand mounted motor
- L: Left hand mounted motor
- Diameter of Table 105, 180, 200
- CNC: Standard CNCZ: High Speed Z series



CNC202L

■ Specifications

Specification is expressed in SI unit.

For old gravity unit, refer **P.46**

* **CNC(Z)170 & 201** are special.

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

Rotary table with α 21 controller, refer **P.55**

Item / Code No.		CNC105 CNCZ105	CNC180 CNCZ180	CNC202 CNCZ202	CNC170 CNCZ170*	CNC201 CNCZ201*
Diameter of Table	ϕ mm	105	180	200	170	200
Diameter of Spindle Hole	ϕ mm	$\phi 60H7 \times \phi 30$	$\phi 60H7 \times \phi 40$	$\phi 60H7 \times \phi 40$	$\phi 60H7 \times \phi 40$	$\phi 60H7 \times \phi 40$
Centre Height	mm	105	135	135	135	135
Width of T Slot	mm	$\phi 10H7$ Pin hole	$12^{+0.018}_0$	$12^{+0.018}_0$	$12^{+0.018}_0$	$12^{+0.018}_0$
Clamping System		Air	Air	Air	Air	Air
Clamping Torque	N · m	205	303	303	147	147
Table Inertia at Motor Shaft ($\frac{GD^2}{4}$)	$kg \cdot m^2 \times 10^{-3}$	0.06	0.08	0.09	0.24	0.25
Servo Motor	min ⁻¹	$\alpha 1/5000i \cdot 2000$	$\alpha 2/5000i \cdot 2000$	$\alpha 4/4000i \cdot 2000$	$\alpha 2/5000i \cdot 2000$	$\alpha 2/5000i \cdot 2000$
MIN. Increment		0.001°	0.001°	0.001°	0.001°	0.001°
Rotation Speed	min ⁻¹	22.2 (44.4)	22.2 (44.4)	22.2 (44.4)	22.2 (44.4)	22.2 (44.4)
Total Reduction Ratio		1/90 (1/45)	1/90 (1/45)	1/90 (1/45)	1/90 (1/45)	1/90 (1/45)
Indexing Accuracy	sec	±30	±20	±20	±20	±20
Net Weight	kg	30	43	49	42	45
MAX. Work Load on the Table	Vertical	30 kg	100	100	50	50
	Vertical	60 kg	200	200	100	100
MAX. Thrust Load applicable on the Table		8800 N	10780	10780	6860	6860
		$F \times L$ N · m	65	415	637	112
		$F \times L$ N · m	220	980	980	294
MAX. Work Inertia	Vertical	$\frac{GD^2}{4} kg \cdot m^2$	0.04	0.40	1.0 (0.5)	0.14
Driving Torque		N · m	36 (27)	72 (54)	144 (115)	72 (54)

★ L type (left hand mounted motor) is available for all tables.

★ Ultra precision type is available for all tables, $\pm 3''$ or $\pm 5''$, refer **P.40**

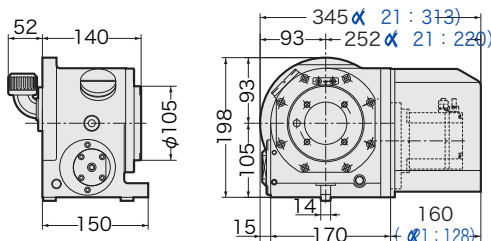
★ $\alpha 4/4000i$ motor can be mounted on **CNC180**.

★ Driving torque means the torque at MAX. rotation speed after acceleration. Driving torque is almost constant and independent from the load except unbalancing weight is applied.

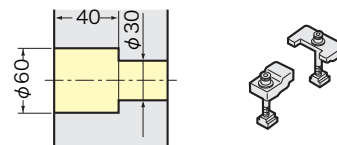
★ **CNC(Z)170 and CNC(Z)201** are available as special option.

NIKKEN

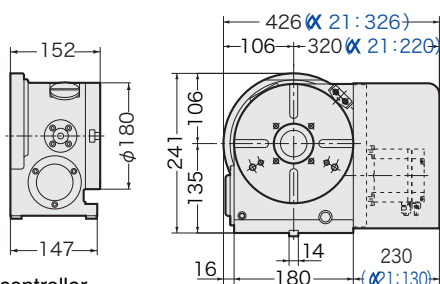
CNC105, CNCZ105 



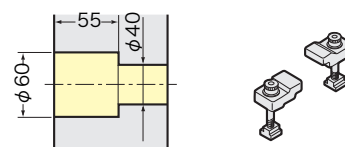
Powerful Brake
Brake Torque : 205Nm



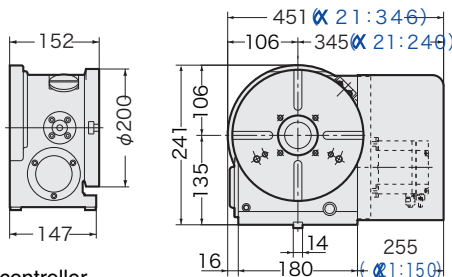
CNC180, CNCZ180 



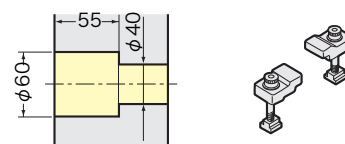
Powerful Brake
Brake Torque : 303Nm



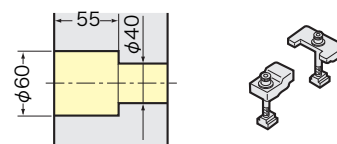
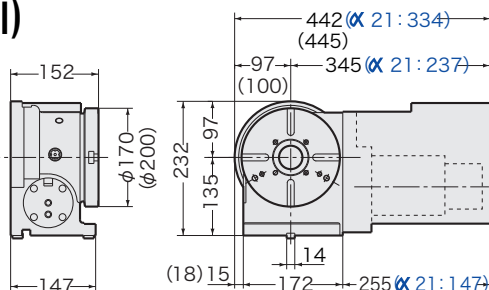
CNC202, CNCZ202 



Powerful Brake
Brake Torque : 303Nm



CNC170, CNCZ170 (Special)
CNC201, CNCZ201



Counter balance cylinder

CNC180A21

100 68 34 432 34 152 10

$\phi 150$

110

830

200 250 376

50

Technical drawing of a crane hook. The drawing shows a side view of the hook with dimensions in millimeters. The total height of the hook is 200 mm. The height of the upper part, which is shaded yellow, is 100 mm. The width of the upper part is 230 mm. The width of the lower part is 100 mm. The drawing is labeled "Un-balancing load" with an arrow pointing to the upper part. The drawing is also labeled "100/100" and "200".

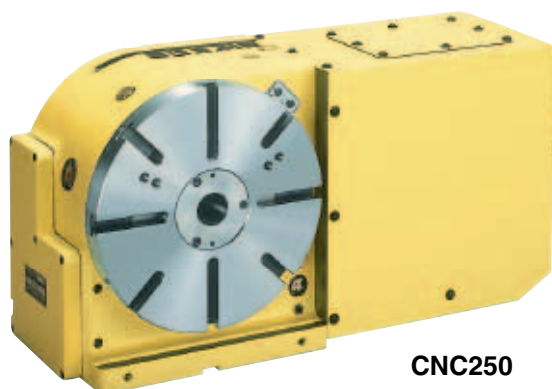
Technical drawing of a sub-plate for a 800mm diameter vessel. The drawing shows a rectangular plate with a central circular opening. Dimensions include an outer diameter of 800mm, a central hole diameter of 1056mm, and various offsets and thicknesses: 150mm offset from the left edge, 500mm offset from the bottom edge, 170mm offset from the top edge, 190mm offset from the right edge, 225mm offset from the bottom edge, and a 20mm thickness. A label "Sub Plate" points to the central area.

changer

Technical drawing showing the front view of a machine component. The drawing includes dimensions and labels for various parts:

- Overall Width:** 500
- Top Section Widths:** 75, 350 (X Stroke), 75
- Top Section Heights:** 25, 140, 260 (Machining Area)
- Sub Plate:** A horizontal plate with a height of 35.
- Distribution Box:** A rectangular box with a height of 225.
- Swing Centre:** A point marked with a circle and a cross, indicating the center of rotation.
- Right Side Dimensions:** 10, 250 (Y Stroke), 270, 10, 90, 90
- Bottom Section:** A rectangular base with a width of 300.

CNC ROTARY TABLE



CNC250

■ Vertical and Horizontal use depending on the application.

● Explanation of the Code No. (Example)

CNC 250 L F A - M

- No Letter: without motor
M: with motor
- No Letter: DC servo motor
A: AC servo motor
- Motor Maker P.35
A21: with NIKKEN α 21 controller
F:FANUC M:MELDAS Y:YASNAC OSP:OSP
T:TOSNUC N:NEC S:SANYO Z:SIEMENS
I:INDRAMAT H:HEIDENHAIN X:ISOFLEX
SEM:SEM B:BOSCH
- No Letter: Right hand mounted motor
L: Left hand mounted motor
- Diameter of Table
200, 250, 300, 320, 400
- CNC: Standard
CNCZ: High Speed Z Series

Specifications

Specification is expressed in SI unit.

For old gravity unit, refer P.46

(): High Speed CNC ROTARY Table Z series

Rotary table with α 21 controller, refer P.55, P.56

Item / Code No.		CNC200 CNCZ200	CNC250 CNCZ250	CNC300 CNCZ300	CNC321 CNCZ321	CNC401 CNCZ401
Diameter of Table	ϕ mm	200	250	300	320	400
Diameter of Spindle Hole	ϕ mm	ϕ 50H7	ϕ 60H7 \times ϕ 52	ϕ 60H7 \times ϕ 52	ϕ 105H7	ϕ 105H7
Centre Height	mm	150	170	170	230	230
Width of T Slot	mm	$12^{+0.018}_0$	$12^{+0.018}_0$	$12^{+0.018}_0$	$12^{+0.018}_0$	$14^{+0.018}_0$
Clamping System		Air	Air	Air	Hyd.	Hyd.
Clamping Torque	N \cdot m	196	343	343	1760	1760
Table Inertia at Motor Shaft	$\left(\frac{GD^2}{4}\right) \text{ kg} \cdot \text{m}^2 \times 10^{-3}$	0.25	0.46	0.5	2.8	2.8
Servo Motor	min ⁻¹	α 4/4000i \cdot 2000	α 4/4000i \cdot 2000	α 4/4000i \cdot 2000	α 12/3000i \cdot 2000	α 12/3000i \cdot 2000
MIN. Increment		0.001°	0.001°	0.001°	0.001°	0.001°
Rotation Speed	min ⁻¹	22.2 (44.4)	16.6 (33.3)	16.6 (33.3)	16.6 (33.3)	16.6 (33.3)
Total Reduction Ratio		1/90 (1/45)	1/120 (1/60)	1/120 (1/60)	1/90 (1/45)	1/90 (1/45)
Indexing Accuracy	sec	20	20	20	15	15
Net Weight	kg	70	90	105	200	225
MAX. Work Load on the Table	Vertical	100	150	150	250	250
	Horizontal	200	300	300	500	500
MAX. Thrust Load applicable on the Table		10780	19600	19600	31360	31360
		637	686	686	1166	1166
		980	2744	2744	3920	3920
MAX. Work Inertia	Vertical	1.0 (0.5)	1.9 (0.95)	1.9 (0.95)	6.4 (3.2)	6.4 (3.2)
Driving Torque		144 (115)	192 (153)	192 (153)	432 (345)	432 (345)

★ L type (left hand mounted motor) is available for all tables.

★ AWC system is available for all tables, refer P.31 ~ 34

★ For rotary joint, refer P.41

★ Ultra precision type is available for all tables, $\pm 3''$ or $\pm 5''$, refer P.40

★ For CNC321 & 401, ultra heavy duty type is available.

The continuous cutting ability is 5 times compared with standard type, P.42

★ α 8/3000i motor can be mounted on CNC200, 250 & 300.

★ α 22/3000i motor can be mounted on CNC321 & 401.

★ The supplied hydraulic pressure is 3.5MPa for hydraulic clamping system.

★ Air hydraulic unit for hydraulic clamping system is available for the machine without hydraulic source, refer P.42

CNC200, 250, 300, 321, 401

NIKKEN

External dimensions will be different according to the type of the servo motors. Dimensions with FANUC motor or with NIKKEN $\alpha 21$ controller ($\alpha 21$:) are shown. Please contact with us for CAD data (DXF format) of each dimension.

CNC200, CNCZ200

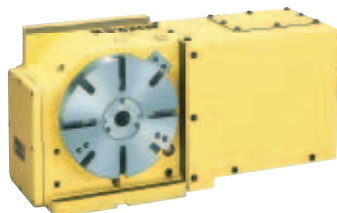
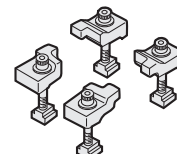
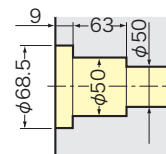
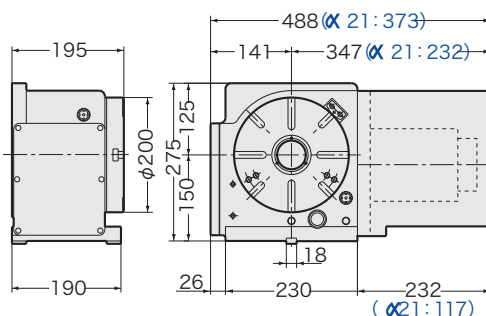


Photo shows with centre socket (option).



CNC250, CNCZ250

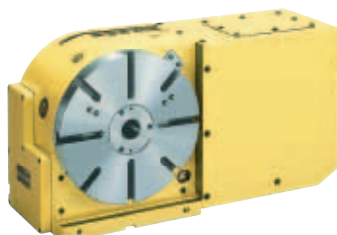
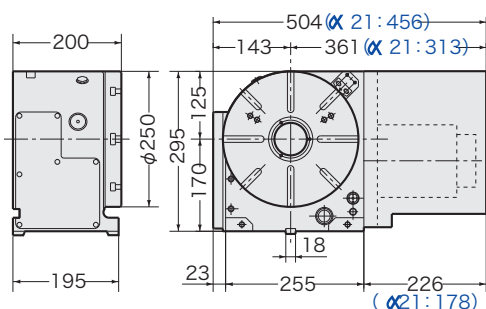
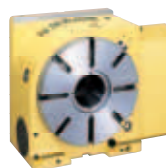


Photo shows with centre socket (option).



NEW

CNC260, CNCZ260



**Compact
Rigidity
Powerful Clamping**

Available from May 2004.

CNC300, CNCZ300

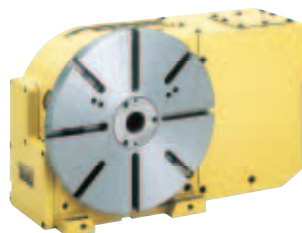
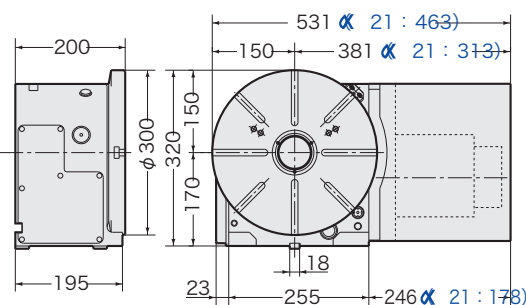
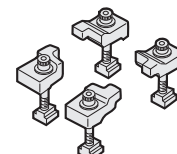
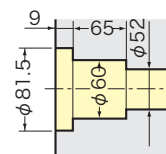


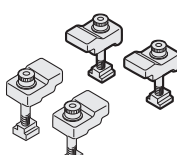
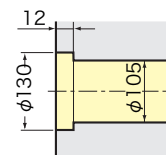
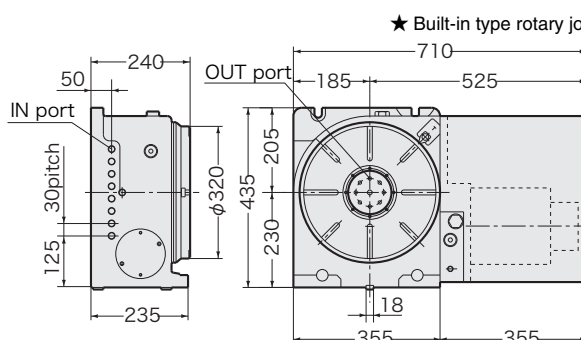
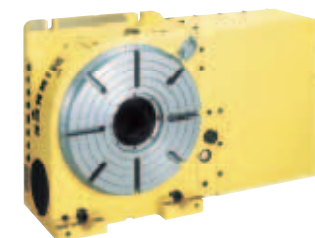
Photo shows with centre socket (option).



CNC250, CNC300



CNC321, CNCZ321



★ Built-in type rotary joint can be mounted on CNC321 & 401, refer P.41

CNC401, CNCZ401

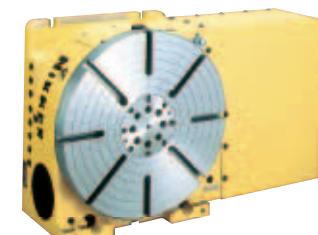
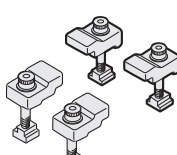
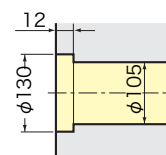
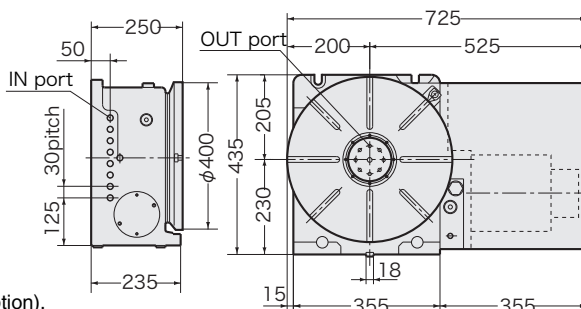


Photo shows with rotary joint(option).

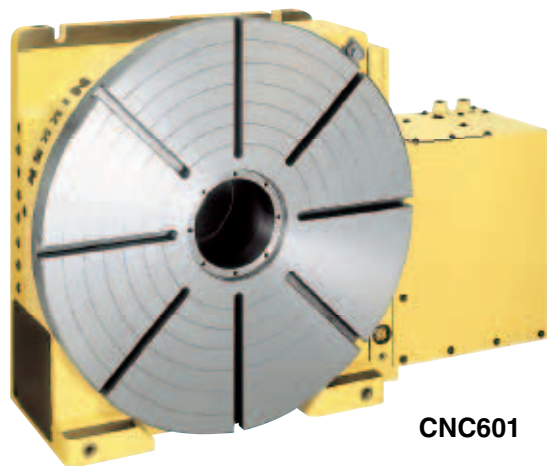


★ Built-in type rotary joint can be mounted on CNC321 & 401, refer P.41

- ★ For ultra high speed rotation, refer P.42
- ★ For accuracy standard, refer P.39
- ★ For fitting metal and stepped guide piece, refer P.18

- ★ For scroll chuck, tailstock and other optional accessories, refer P.37, 38
- ★ For the condition of CNC table which is mounted on CNC special purpose machine, refer P.46

CNC ROTARY TABLE



CNC601

- Dividing and lead cutting for large size work piece is suitable.
- Large through hole and powerful clamping system.

Explanation of the Code No. (Example)

CNC	601	F	A	-	M
● CNC: Standard CNCZ: High Speed Z Series	● Diameter of Table 320, 400, 500, 600, 800, 1200	● Position of motor No Letter: Horizontal V: Vertical	● No Letter: Right hand mounted motor L: Left hand mounted motor	● Motor Maker No Letter: DC servo motor A: AC servo motor F: FANUC M: MELDAS Y: YASNAC OSP: OSP T: TOSNUC N: NEC S: SANYO Z: SIEMENS I: INDRAMAT H: HEIDENHAIN X: ISO FLEX SEM: SEM B: BOSCH	● No Letter: without motor M: with motor

Specifications

Specification is expressed in SI unit.

For old gravity unit, refer P.46

(): High Speed CNC ROTARY Table Z series

Rotary table with α 21PW controller, refer P.56

Item / Code No.		CNC501 CNCZ501	CNC601 CNCZ601	CNC801	CNC1200
Diameter of Table	ϕ mm	500	600	800	1200
Diameter of Spindle Hole	ϕ mm	$\phi 130H7$	$\phi 130H7$	$\phi 130H7$	$\phi 300H7$
Centre Height	mm	310	310	Horizontal only	
Width of T Slot	mm	$14^{+0.018}_0$	$14^{+0.018}_0$	$20^{+0.021}_0$	$22^{+0.021}_0$
Clamping System		Hyd.	Hyd.	Hyd.	Hyd.
Clamping Torque	N·m	4655	4655	4655	9800
Table Inertia at Motor Shaft ($\frac{GD^2}{4}$)	$\text{kg}\cdot\text{m}^2\times 10^{-3}$	6.8	4.9	7.8	10.8
Servo Motor	min^{-1}	$\alpha 12/3000\cdot 2000$	$\alpha 12/3000\cdot 2000$	$\alpha 12/3000\cdot 2000$	$\alpha 22/3000\cdot 1500$
MIN. Increment		0.001	0.001	0.001	0.001
Rotation Speed	min^{-1}	16.6(33.3)	11.1(22.2)	11.1	5.5
Total Reduction Ratio		1/120(1/60)	1/180(1/90)	1/180	1/360
Indexing Accuracy	sec	15	15	15	15
Net Weight	kg	440	470	690	1300
MAX. Work Load on the Table	Vertical 	400	400	—	—
	Horizontal 	800	800	640	5000
MAX. Thrust Load applicable on the Table		39200	39200	39200	360640
		4655	4655	4655	15288
		5880	5880	5880	76440
MAX. Work Inertia	Vertical 	19.4(9.7)	37(18.5)	23	539
Driving Torque		576(460)	864(690)	864	3168

★ L type (left hand mounted motor) is available for CNC501 & 601.

★ For rotary joint, refer P.41

★ AWC system is available for all tables, refer P.31~34

★ Ultra precision type is available for all tables, $\pm 3''$ or $\pm 5''$, refer P.40

★ Ultra heavy duty type is available for all tables. The continuous cutting ability is 5 times compared with standard type, refer P.42

★ $\alpha 22/3000i$ motor can be mounted on CNC501, 601 & 801.

★ The supplied hydraulic pressure is 3.5MPa for hydraulic clamping system.

★ For CNC501, total reduction ratio of 1/180 is also available.

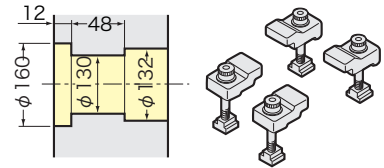
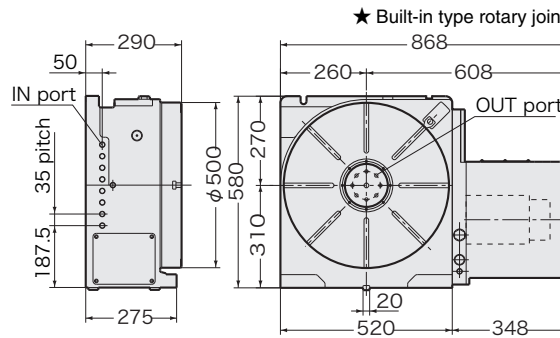
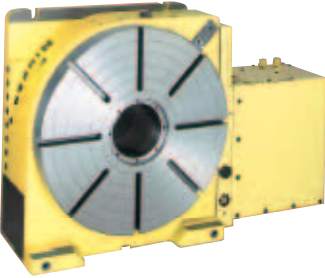
★ Air hydraulic unit for hydraulic clamping system is available for the machine without hydraulic source, refer P.42

CNC501,601,801,1200

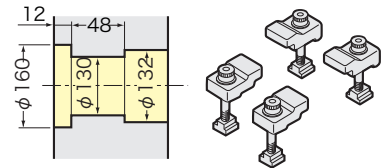
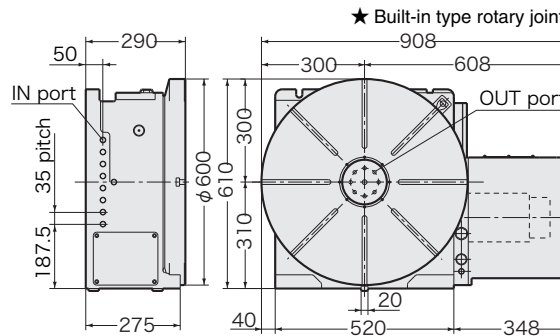
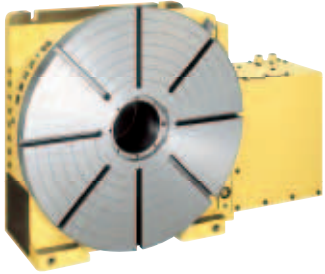
NIKKEN

External dimensions will be different according to the type of the servo motors. Dimensions with FANUC motor are shown. Please contact with us for CAD data (DXF format) of each dimension.

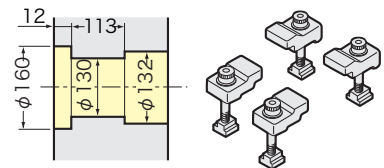
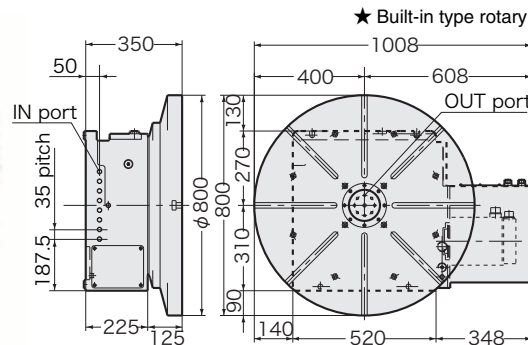
CNC501,CNCZ501



CNC601,CNCZ601



CNC801



CNC1200

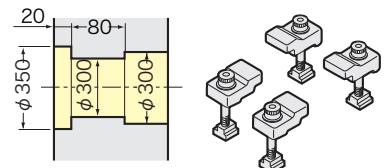
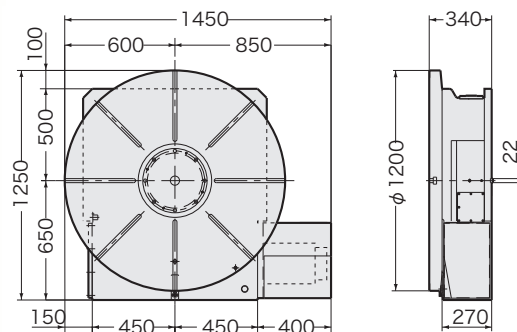
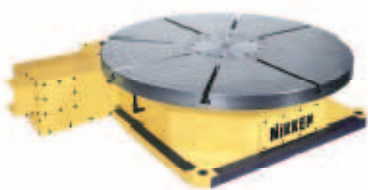
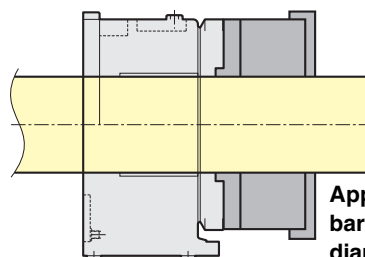


Photo shows with centre socket (option).

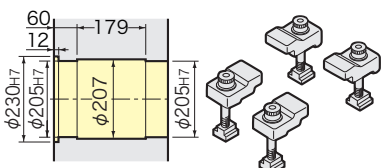
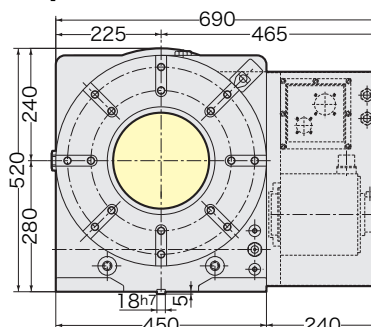
■ CNCB450 Ultra Big Bore (φ205mm) Specification

This is special specification. Please contact with us for the details.

Table Dia. : φ 450mm



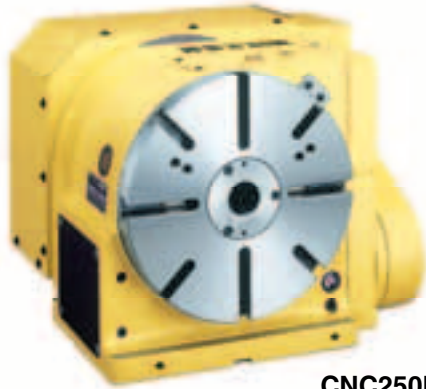
Application for the bar work with large diameter work piece.



- ★ For accuracy standard, refer ⇨ P.39
- ★ For fitting metal and stepped guide piece, refer ⇨ P.18
- ★ For scroll chuck, tailstock and other optional accessories refer ⇨ P.37,38
- ★ For the conditions of CNC table which is mounted on CNC special purpose machine, refer ⇨ P.46

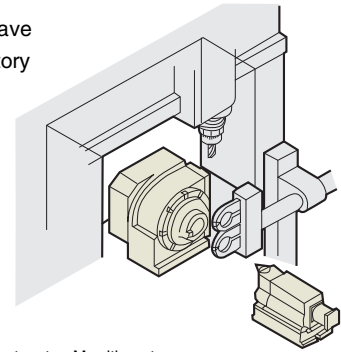
BACK SIDE MOTOR MOUNTED CNC ROTARY TABLE

NIKKEN



CNC250B

- Suitable for the machine which does not have so wide space for Y axis, such as the gantry type M/C or the M/C with splash guard.



- Explanation of the Code No. (Example)

CNC 250 B F A - M








- No Letter: without motor M: with motor
- No Letter: DC servo motor A: AC servo motor
- Motor Maker **P.35**
- A21: with NIKKEN α 21 controller
- F:FANUC M:MELDAS Y:YASNAC OSP:OSP T:TOSNUC N:NEC
- S:SANYO Z:SIEMENS I:INDRAMAT H:HEIDENHAIN X:ISOFLEX
- SEM:SEM B:BOSCH
- Position of motor B: Back side
- Diameter of Table
180, 200, 250, 300, 320, 400
- CNC: Standard
CNCZ: High Speed Z Series

Specifications

Specification is expressed in SI unit.

For old gravity unit, refer **P.46**

() : High Speed CNC ROTARY Table Z series

Item / Code No.		CNC180B CNCZ180B	CNC202B CNCZ202B	CNC250B CNCZ250B	CNC300B CNCZ300B	CNC321B CNCZ321B	CNC401B CNCZ401B	
Diameter of Table	ϕmm	180	200	250	300	320	400	
Diameter of Spindle Hole	ϕmm	ϕ60H7×ϕ40	ϕ60H7×ϕ40	ϕ60H7	ϕ60H7	ϕ105H7	ϕ105H7	
Centre Height	mm	180	180	170	170	230	230	
Width of T Slot	mm	12 ^{+0.018 0}	12 ^{+0.018 0}	12 ^{+0.018 0}	12 ^{+0.018 0}	12 ^{+0.018 0}	14 ^{+0.018 0}	
Clamping System		Air	Air	Air/Hyd.	Air/Hyd.	Hyd.	Hyd.	
Clamping Torque	N·m	303	303	340/735	340/735	1760	1760	
Table Inertia at Motor Shaft (GD ² ₄) kg·m ² ×10 ⁻³		0.4	0.4	1.0	1.5	7.0	7.0	
Servo Motor	min ⁻¹	α2/5000·2000	α2/5000·2000	α4/4000·2000	α4/4000·2000	α12/3000·2000	α12/3000·2000	
MIN. Increment		0.001	0.001	0.001	0.001	0.001	0.001	
Rotation Speed	min ⁻¹	22.2(44.4)	22.2(44.4)	16.6(33.3)	16.6(33.3)	22.2(44.4)	22.2(44.4)	
Total Reduction 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 Accuracy	sec	± 20	± 20	20	20	15	15	
Net Weight	kg	56	60	110	115	260	280	
MAX. Work Load on the Table	Vertical 	kg	100	100	175	175	250	250
	Horizontal 	kg	—	—	—	—	—	—
MAX. Thrust Load applicable on the Table		N	10780	10780	19600	19600	31360	31360
		F×L N·m	415	415	686	686	1166	1166
		F×L N·m	980	980	2744	2744	3920	3920
MAX. Work Inertia	Vertical 	(GD ² ₄) kg·m ²	0.4	0.4	1.9(0.95)	1.9(0.95)	6.4(3.2)	6.4(3.2)
Driving Torque		N·m	72(54)	72(54)	192(153)	192(153)	432(345)	432(345)

★ $\alpha 4/4000i$ motor can be mounted on **CNC180B & 202B**.

★ $\alpha 8/3000i$ motor can be mounted on **CNC250B & 300B**.

★ Please contact with us for ultra precision type and rotary joint type, refer **P.40, 41**

★ The supplied hydraulic pressure is 3.5MPa for hydraulic clamping system.

★ Air hydraulic unit for hydraulic clamping system is available for the machine without hydraulic source, refer **P.42**

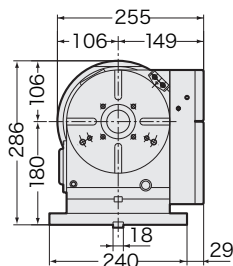
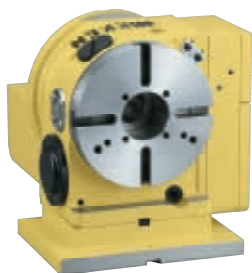
CNC 180B, 202B, 250B, 300B, 321B, 401B

NIKKEN

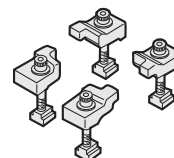
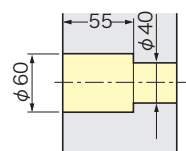
External dimensions will be different according to the type of the servo motors. Dimensions with FANUC motor are shown. Please contact with us for CAD data (DXF format) of each dimension.

CNC180B, CNCZ180B

NEW



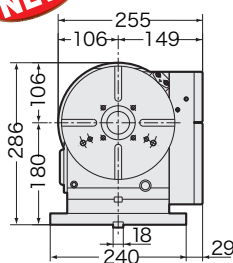
Powerful Brake
Brake Torque : 303Nm



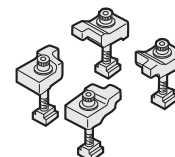
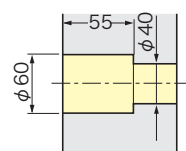
Air purge function is provided.

CNC202B, CNCZ202B

NEW



Powerful Brake
Brake Torque : 303Nm



Air purge function is provided.

CNC200B is unified to CNC202B.

CNC250B, CNCZ250B

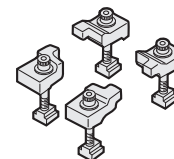
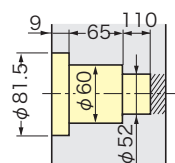
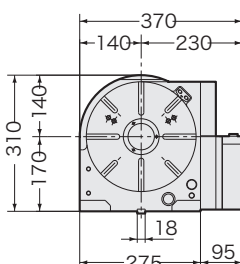
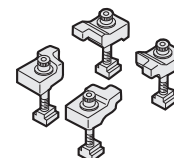
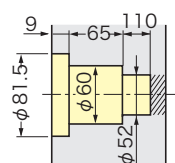
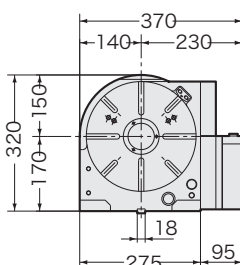


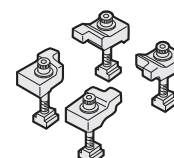
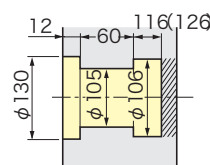
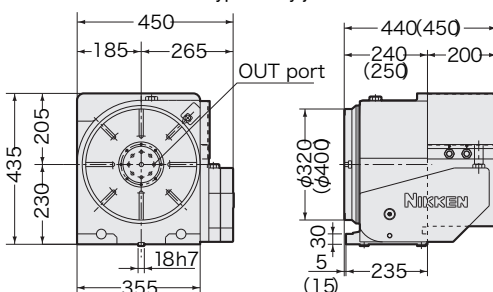
Photo shows with centre socket (option).

CNC300B, CNCZ300B



CNC321B, CNCZ321B CNC401B, CNCZ401B

★ Built-in type rotary joint can be mounted on CNC321B & 401B, refer P.41



IN ports are located in left side.
() : CNC401B

Photo shows with centre socket (option).

★ For accuracy standard, refer P.39
★ For fitting metal and stepped guide piece, refer P.18

★ For scroll chuck, tailstock and other optional accessories, refer P.37,38
★ α series attachment can be attached for all tables, refer P.36

TOP SIDE MOTOR MOUNTED CNC ROTARY TABLE

NIKKEN



CNC501T

■ To avoid interference, the motor is mounted on top side of table for horizontal M/C and special purpose machine. (Fig.1)

The Fig.2 shows an application on the pallet of horizontal M/C.

● Explanation of the Code No. (Example)

CNC 501 T F A - M

- No Letter: without motor
M: with motor
- No Letter: DC servo motor A: AC servo motor
- Motor Maker ☞ **P.35**
A21: with NIKKEN α21 controller
F:FANUC M:MELDAS Y:YASNAC OSP:OSP
T:TOSNUC N:NEC S:SANYO Z:SIEMENS I:INDRAMAT
H:HEIDENHAIN X:ISO FLEX SEM:SEM B:BOSCH
- Position of motor T: Top side
- Diameter of Table
200, 260, 320, 400, 500, 600
- CNC: Standard
CNCZ: High Speed Z Series

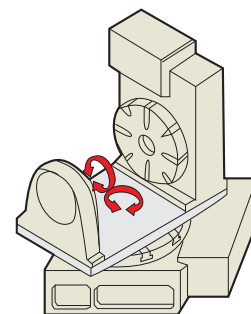


Fig.1

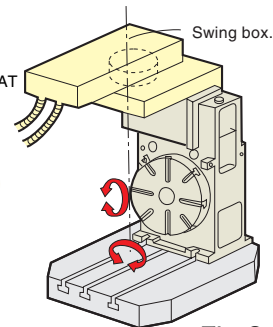









Fig.2

Specifications

Specification is expressed in SI unit.

For old gravity unit, refer ☞ **P.46**

() : High Speed CNC ROTARY Table Z series

Item / Code No.		CNC200T CNCZ200T	CNC260T CNCZ260T	CNC321T CNCZ321T	CNC401T CNCZ401T	CNC501T CNCZ501T	CNC601T CNCZ601T
Diameter of Table	φmm	200	260	320	400	500	600
Diameter of Spindle Hole	φmm	φ50H7	φ80H7	φ105H7	φ105H7	φ130H7	φ130H7
Centre Height	mm	150	170	240	240	310	310
Width of T Slot	mm	12 ^{+0.018 0}	12 ^{+0.018 0}	12 ^{+0.018 0}	14 ^{+0.018 0}	14 ^{+0.018 0}	14 ^{+0.018 0}
Clamping System		Air	Air/Hyd.	Hyd.	Hyd.	Hyd.	Hyd.
Clamping Torque	N·m	196	392/1176	1760	1760	4655	4655
Table Inertia at Motor Shaft ($\frac{GD^2}{4}$)	kg·m ² ×10 ⁻³	1.0	1.5	2.0	2.0	9.0	8.8
Servo Motor	min ⁻¹	α4/4000·2000	α4/4000·2000	α12/3000·2000	α12/3000·2000	α12/3000·2000	α12/3000·2000
MIN. Increment		0.001	0.001	0.001	0.001	0.001	0.001
Rotation Speed	min ⁻¹	22.2(44.4)	16.6(33.3)	16.6(33.3)	16.6(33.3)	16.6(33.3)	11.1(22.2)
Total Reduction Ratio		1/90(1/45)	1/120(1/60)	1/120(1/60)	1/120(1/60)	1/120(1/60)	1/180(1/90)
Indexing Accuracy	sec	20	20	15	15	15	15
Net Weight	kg	95	125	200	245	495	525
MAX. Work Load on the Table	Vertical  kg	100	175	250	250	400	400
	Horizontal  kg	—	—	—	—	—	—
MAX. Thrust Load applicable on the Table	 N	10780	19600	31360	31360	39200	39200
	 F×L N·m	637	858	1166	1166	4655	4655
	 F×L N·m	980	2744	3920	3920	5880	5880
MAX. Work Inertia	Vertical  ($\frac{GD^2}{4}$) kg·m ²	1.0(0.5)	1.9(1.2)	8.0(4.0)	8.0(4.0)	19(9.7)	37(19)
Driving Torque	 N·m	144(115)	192(153)	576(460)	576(460)	576(460)	864(690)

★ α8/3000i motor can be mounted on **CNC200T & 260T**.

★ α22/3000i motor can be mounted on **CNC321T, 401T, 501T & 601T**.

★ AWC system is available for all tables, refer ☞ **P.31~34**

★ Rotary joint is available for all tables, refer ☞ **P.41**

★ Ultra precision type is available for all tables, ±3" or ±5", refer ☞ **P.40**

★ The supplied hydraulic pressure is 3.5MPa for hydraulic clamping system.

★ For **CNC501T**, total reduction ratio of 1/180 is also available.

★ Air hydraulic unit for hydraulic clamping system is available for the machine without hydraulic source, refer ☞ **P.42**

CNC200T, 260T, 321T, 401T, 501T, 601T

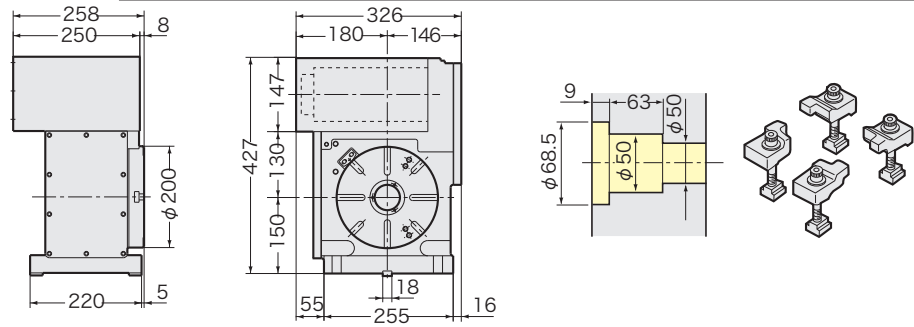
NIKKEN

External dimensions will be different according to the type of the servo motors. Dimensions with FANUC motor are shown. Please contact with us for CAD data (DXF format) of each dimension.

CNC200T, CNCZ200T



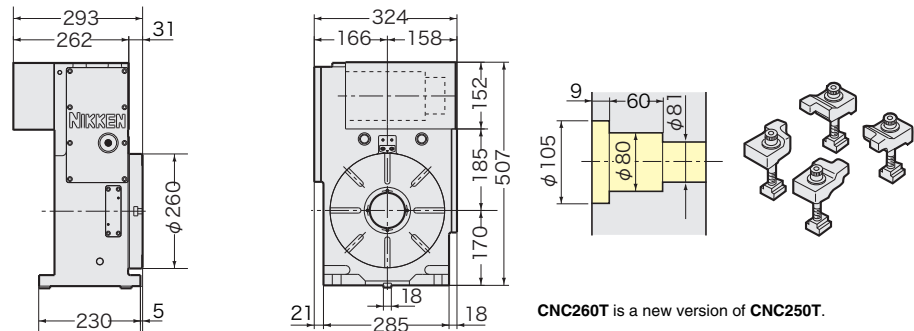
Photo shows with centre socket (option).



CNC260T, CNCZ260T



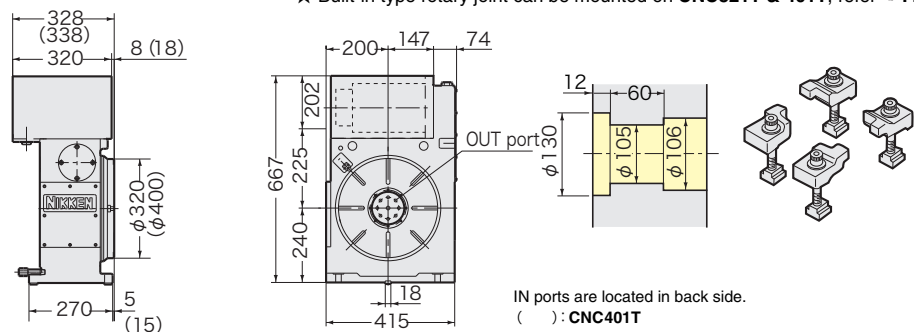
Photo shows with centre socket (option).



CNC321T, 401T CNCZ321T, 401T

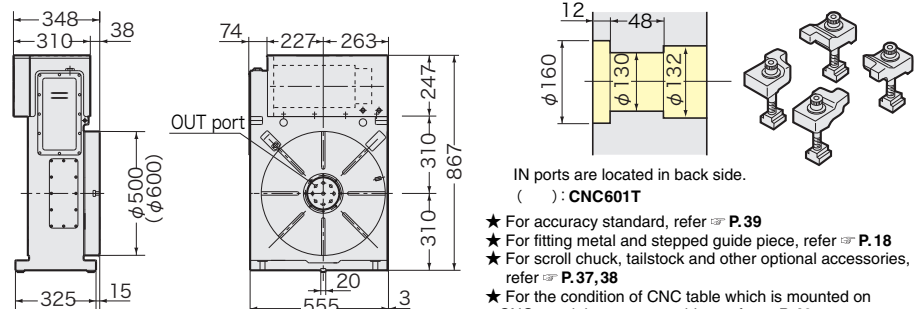


Photo shows with centre socket (option).



★ Built-in type rotary joint can be mounted on CNC321T & 401T, refer P.41

CNC501T, 601T CNCZ501T, 601T



★ Built-in type rotary joint can be mounted on CNC501T & 601T, refer P.41

- ★ For accuracy standard, refer P.39
- ★ For fitting metal and stepped guide piece, refer P.18
- ★ For scroll chuck, tailstock and other optional accessories, refer P.37,38
- ★ For the condition of CNC table which is mounted on CNC special purpose machine, refer P.46

SUPPORT TABLE TAT

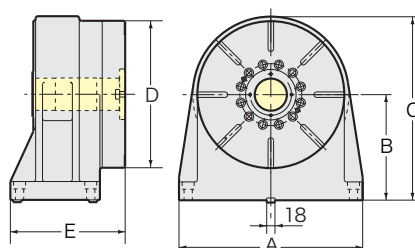
JAPAN PAT.P



TAT105



TAT320



- Hydraulic connections are RC $\frac{3}{8}$ ×2.
- Pneumatic connections are RC $\frac{1}{4}$ ×2.
- Limit switch for clamp, unclamp and solenoid valve are not included.

Code No.	A	B	C	D	E	Clamping System	Brake Torque	Weight
TAT105	155	105	175	105	113	Air	275	16
TAT170	155	135	220	170	138	Air	275	25
TAT200	250	150	250	200	145	Air/Hyd.	112/784	43
TAT250	250	170	295	250	145	Air/Hyd.	112/784	50
TAT320	400	230	390	320	250	Hyd.	1470	120
TAT400	400	230	430	400	250	Hyd.	1470	140
TAT500	480	310	560	500	250	Hyd.	1470	200

- ★ Hydraulic pressure is 3.5MPa.
- ★ Air pressure is 0.5MPa.
- ★ Double intensifying clamping mechanism is installed on TAT105 & 170.
- ★ Rotary Joint is available for all models. refer P.41.

MULTI-SPINDLE CNC ROTARY TABLE



- Multi-Spindle (2, 3 & 4 spindles) CNC rotary table series for rationalization of machining of small size work pieces ($\phi 3 \sim 100\text{mm}$).
- Different pitch between spindles is also available.
- 5 or 6 spindles CNC rotary table is also available.
- Explanation of the Code No. (Example)



CNC100-2W

CNC 100-3W-120-L F A -M








- No Letter: without motor
M: with motor
- No Letter: DC servo motor
A: AC servo motor
- Motor Maker P.35
A21: with NIKKEN α 21 controller
F:FANUC M:MELDAS Y:YASNAC OSP:OSP
T:TOSNUC N:NEC S:SANYO Z:SIEMENS I:INDRAMAT
H:HEIDENHAIN X:ISOFLX SEM:SEM B:BOSCH
- Position of motor
No Letter: Right hand mounted motor
L: Left hand mounted motor
- Pitch (Centre distance)
- Number of spindles
2, 3, 4, 5, 6
- Diameter of Table
100, 180, 200, 250
- CNC table which can be used in vertical/horizontal position.



CNC100-6W

Specifications

Specification is expressed in SI unit.
For old gravity unit, refer P.46

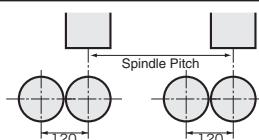
Item / Code No.		CNC100-2W,-3W,-4W			CNC180-2W	CNC202-2W	CNC250-2W
Diameter of Table	ϕmm	105			180	200	250
Diameter of Spindle Hole	ϕmm	$\phi 60\text{H}7 \times \phi 30$			$\phi 60\text{H}7 \times \phi 40$	$\phi 60\text{H}7 \times \phi 40$	$\phi 60\text{H}7 \times \phi 52$
Number of spindles (Pitch)	mm	2,3,4(120)			2(250)	2(250)	2(320)
Centre Height	mm	105			175	175	220
Width of T Slot	mm	$16^{+0.018}_0$			$12^{+0.018}_0$	$12^{+0.018}_0$	$12^{+0.018}_0$
Clamping System		Air			Air	Air	Air
Clamping Torque	N·m	147			303	303	343
Table Inertia at Motor Shaft $(\frac{GD^2}{4}) \text{ kg} \cdot \text{m}^2 \times 10^{-3}$		0.13	0.16	0.2	0.12	0.13	0.6
Servo Motor	min^{-1}	$\alpha 2 / 5000 \cdot 2000$			$\alpha 4 / 4000 \cdot 2000$	$\alpha 8 / 3000 \cdot 2000$	$\alpha 8 / 3000 \cdot 2000$
MIN. Increment		0.001			0.001	0.001	0.001
Rotation Speed	min^{-1}	11.1			22.2	22.2	16.6
Total Reduction Ratio		1/180			1/90	1/90	1/120
Indexing Accuracy	sec	± 30		± 45	± 20	± 20	20
Net Weight	kg	70	90	120	135	140	250
MAX. Work Load on the Table	Vertical 	15			100	100	100
	Horizontal 	30			200	200	200
MAX. Thrust Load applicable on the Table		3920			10780	10780	19600
		49			415	415	686
		98			980	980	2744
MAX. Work Inertia	Vertical  $(\frac{GD^2}{4}) \text{ kg} \cdot \text{m}^2$	0.019(0.07 Horizontal)			0.5	0.5	1.3
Driving Torque		72			72	144	192

★ L type (left hand mounted motor) is available for all tables.

★ Min. pitch between spindles CNC100:120mm, CNC180:250mm, CNC202:250mm, CNC250:320mm. When you need different pitch, please contact with us.

★ 4 spindle table to suit 2 Spindle machine is available.

★ Max. number of spindles CNC100:6 spindles, CNC170:4 spindles, CNC200:3 spindles, CNC250:2 spindles.

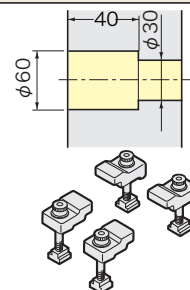
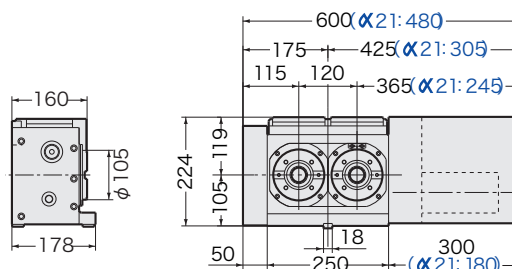


CNC100-2W, 3W, 4W CNC180-2W, CNC202-2W, CNC250-2W

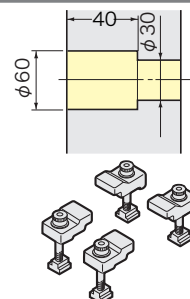
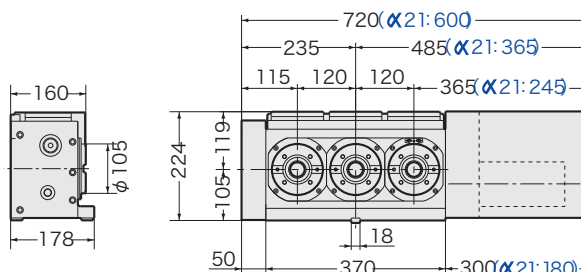
NIKKEN

External dimensions will be different according to the type of the servo motors. Dimensions with FANUC motor or with NIKKEN α 21 controller (α 21:) are shown. Please contact with us for CAD data (DXF format) of each dimension.

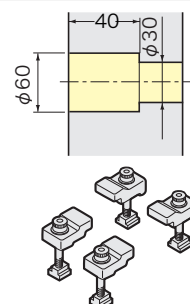
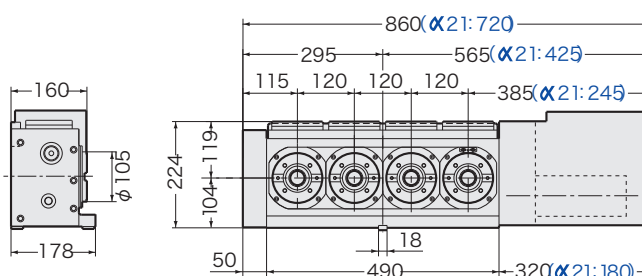
CNC100-2W



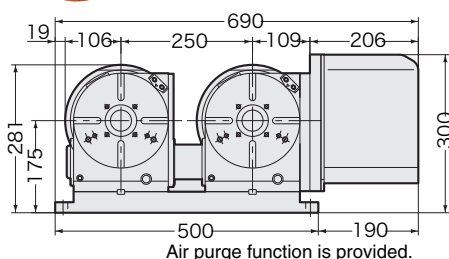
CNC100-3W



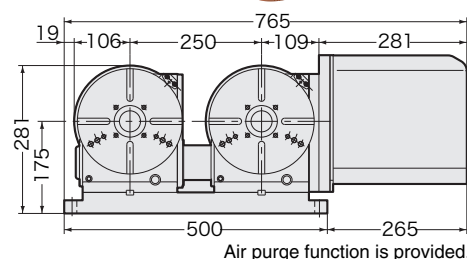
CNC100-4W



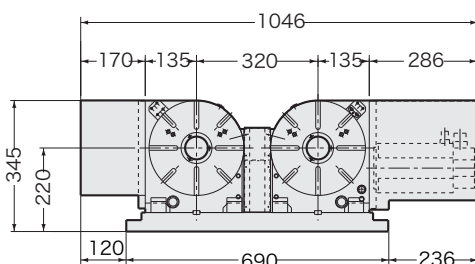
NEW CNC180-2W



NEW CNC202-2W



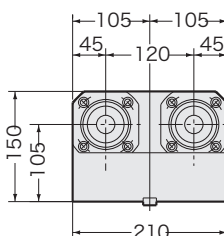
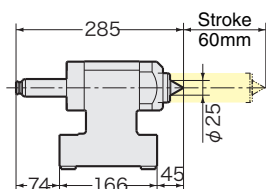
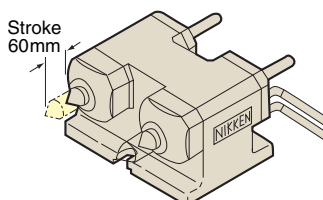
CNC250-2W



Accuracy Standard of Multi-Spindle

No.	Measuring Item	Measuring Method	Accuracy
1	Pitch between Spindles		Within $\pm 0.02\text{mm}$ from nominal pitch
2	Centre Height of Spindle		Within $\pm 0.02\text{mm}$

Pneumatic Tailstock for Multi-Spindle PB-105-2W, -3W, -4W



- ★ For fitting metal and stepped guide piece, refer [P.18](#)
- ★ For scroll chuck, tailstock and other optional accessories, refer [P.37,38](#)
- ★ α series attachment can be attached for CNC100-2W, 3W, 4W, CNC180-2W and CNC202-2W, refer [P.36](#)

★ MT (Morse Taper) type quill is also available. Please contact with us.

MANUAL TILTING ROTARY TABLE



NST300

- Table can be tilted at 0°~90° manually.
- Indexing is CNC controlled so that it can be adapted to all kinds of machining.

● Explanation of the Code No. (Example)

NST 300 L F A - M

- No Letter: without motor
M: with motor
- No Letter: DC servo motor
A: AC servo motor
- Motor Maker P.35
A21: with NIKKEN A21 controller
F:FANUC M:MELDAS Y:YASNAC OSP:OSP
T:TOSNUC N:NEC S:SANYO Z:SIEMENS
I:INDRAMAT H:HEIDENHAIN X:ISOFLEX
SEM:SEM B:BOSCH
- Position of motor
No Letter: Right hand mounted motor
L: Left hand mounted motor (**Only NST300**)
- Diameter of Table
250, 300, 450, 500
- NST: Manual tilting table

■ Specifications

Specification is expressed in SI unit.
For old gravity unit, refer P.46

Item / Code No.		NST250	NST300	NST450	NST500
Diameter of Table	φmm	250	300	450	500
Diameter of Spindle Hole	φmm	φ60H7×φ52	φ60H7×φ60	φ75H7×φ61.5	φ75H7×φ61.5
Centre Height	mm	155	208	288	288
Width of T Slot	mm	12 ^{+0.018} ₀	12 ^{+0.018} ₀	14 ^{+0.018} ₀	14 ^{+0.018} ₀
Clamping System		Air	Air	Air	Air
Clamping Torque	N·m	147	196	196	196
Table Inertia at Motor Shaft $(\frac{GD^2}{4}) \text{ kg} \cdot \text{m}^2 \times 10^{-3}$		0.39	0.59	0.69	0.69
Servo Motor	min ⁻¹	α2 /5000· 2000	α4 /4000· 2000	α8 /3000· 2000	α8 /3000· 2000
MIN. Increment		0.001	0.001	0.001	0.001
Rotation Speed	min ⁻¹	16.6	11.1	5.5	5.5
Total Reduction Ratio		1/120	1/180	1/360	1/360
Indexing Accuracy	sec	20	20	20	20
Net Weight	kg	75	130	300	320
MAX. Work Load on the Table	Vertical 	50	100	200	200
	Horizontal 	100	300	500	500
MAX. Thrust Load applicable on the Table		9800	14700	24500	24500
	 F x L N·m	412	686	1166	1166
	 F x L N·m	706	1176	2450	2450
MAX. Work Inertia	Vertical $(\frac{GD^2}{4}) \text{ kg} \cdot \text{m}^2$	1.35	3.37	12.64	14.70
Driving Torque	 N·m	144	288	1152	1152

★ L type (left hand mounted motor) is available for **NST300**.

★ α8/3000i motor can be mounted on **NST300**.

NST250, 300, 450, 500

NIKKEN

External dimensions will be different according to the type of the servo motors. Dimensions with FANUC motor or with NIKKEN α 21 controller (α 21:) are shown. Please contact with us for CAD data (DXF format) of each dimension.

NST250



Photo shows with centre socket (option).

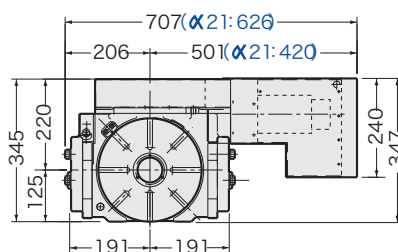
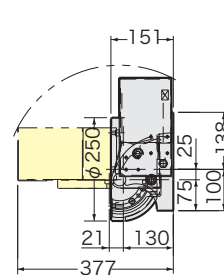
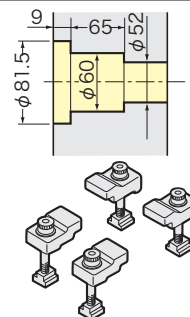


Table height in horizontal position: 151mm



Centre height at 90°: 155mm



NST300



Photo shows with centre socket (option).

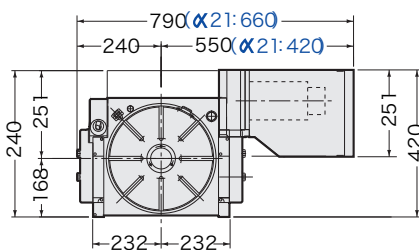
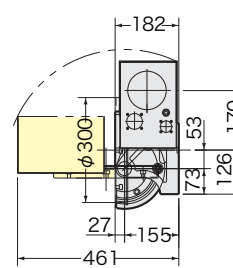
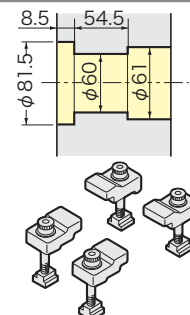


Table height in horizontal position: 182mm



Centre height at 90°: 208mm



NST450, 500



Photo shows with centre socket (option).

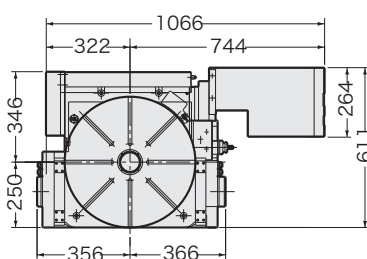
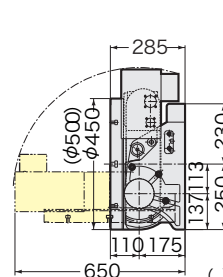
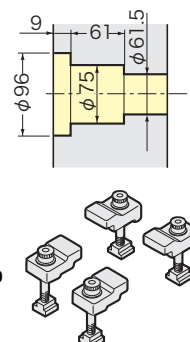


Table height in horizontal position: 285mm



Centre height at 90°: 288mm



★ For accuracy standard, refer P.39

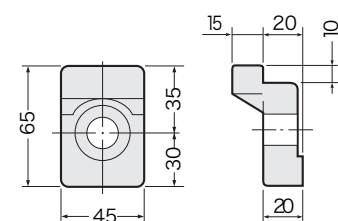
★ For scroll chuck, tailstock and other optional accessories, refer P.37,38

★ α series attachment can be attached for NST250, refer P.36

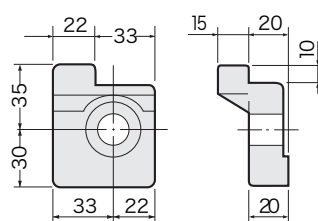
FITTING METAL and STEPPED GUIDE PIECE

NIKKEN

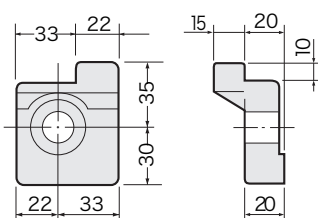
Fitting Metal



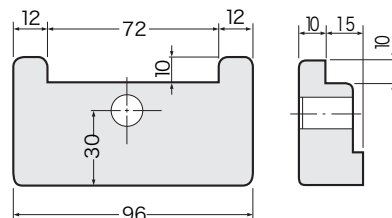
A



B



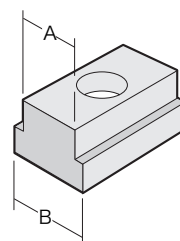
C



E

Stepped Guide Piece

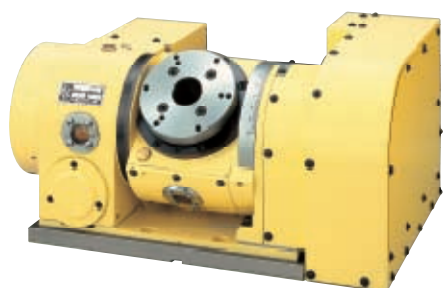
- Be careful that in case of stepped guide piece is being applied, fitting metal should be changed.



★ 2 pcs./set

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

COMPACT TILTING ROTARY TABLE **NIKKEN**



5AX-130FA

- Rotary and tilting axes are controlled by CNC.
- Rotary axis cables and hoses stay during tilting for **5AX-130** and **5AX-200 II** as standard.
- Various kinds of attachments ☞ **P.36**



- Explanation of the Code No. (Example)

5AX - 130FA - M

- No Letter: without motor M: with motor
- No Letter: DC servo motor A: AC servo motor
- Motor Maker ☞ **P.35**
WA21: with NIKKEN α 21 controllers for both axes
DA21: with NIKKEN α 21 controller for tilting axis
F:FANUC M:MELDAS Y:YASNAC OSP:OSP T:TOSNUC N:NEC S:SANYO
Z:SIEMENS I:INDRAMAT H:HEIDENHAIN X:ISOFLUX SEM:SEM B:BOSCH
- Diameter of Table 130, 200, 220
- Location of the motor for tilting axis
No letter: horizontal
A: Back side of tilting axis B: Back side of rotary axis
T: Top side motor
- 5AX-: Tilting rotary CNC table

Rotary table with α 21 controller, refer ☞ **P.57**

Specifications

Specification is expressed in SI unit.

For old gravity unit, refer ☞ **P.46**

Item / Code No.		5AX-130		5AX-200 II 5AX-220 II	
Diameter of Table	ϕ mm	ϕ 105(with ϕ 130 sub table)		200(220)	
Diameter of Spindle Hole	ϕ mm	ϕ 60H7 \times ϕ 30		ϕ 60H7 \times ϕ 50	
Centre Height (90°)	mm	150		180	
Table Height in Horizontal Position (0°)	mm	235		260(265)	
Width of T Slot	mm	ϕ 10H7 Pin hole		12 ^{+0.018} ₀	
Axis		Rotary	Tilting (0°~105°)	Rotary	Tilting (0°~105°)
Clamping System		Air	Air	Hyd.	Hyd.
Clamping Torque	N·m	205	303	588	490
Table Inertia at Motor Shaft ($\frac{GD^2}{4}$)	kg·m ² $\times 10^{-3}$	0.09	0.12	0.11	0.16
Servo Motor	min ⁻¹	α 2 / 5000 \cdot 2000	α 2 / 5000 \cdot 2000	α 4 / 4000 \cdot 2000	α 4 / 4000 \cdot 2000
MIN. Increment		0.001	0.001	0.001	0.001
Rotation Speed	min ⁻¹	22.2	11.1	22.2	11.1
Total Reduction Ratio		1/90	1/180	1/90	1/180
Indexing Accuracy	sec	± 30	60	± 20	60
Net Weight	kg	99.5		160(165)	
MAX. Work Load on the Table	0° to 30° 	50		80	
	30° to 90° 	25		50	
MAX. Thrust Load applicable on the Table	Tilting Angle = 0° 	5880		9800	
	Tilting Angle = 0° 	L=65mm F=2940N		L=100mm F=4900N	
	Tilting Angle = 90° 	L ₁ =0mm F ₁ =3460N L ₂ =100mm F ₂ =1590N		L ₁ =0mm F ₁ =5880N L ₂ =100mm F ₂ =2940N	
	Tilting Angle = 90° 	98		382	
MAX. Work Inertia	 ($\frac{GD^2}{4}$) kg·m ²	0.12		0.5	
Driving Torque	 N·m	72		144	

★ AWC system is available for all tables, refer ☞ **P.31~34**

★ Rotary joint is available for all tables, refer ☞ **P.41**

★ Ultra precision type is available for all tables,
Rotary axis: $\pm 5''$ Tilting axis: $\pm 10''$, refer ☞ **P.40**

★ α 2/5000i motor can be mounted on the rotary axis of **5AX-200 II**. The dimension will be more compact.

★ Location of tilting axis motor can be changed as an option. e.g. **5AX-B130** & **5AX-B200 II** (Motor back side).

5AX-130, 5AX-200II, 5AX-220II **NIKKEN**

External dimensions will be different according to the type of the servo motors. Dimensions with FANUC motor or with NIKKEN $\alpha 21$ controller ($\alpha 21$:) are shown. Please contact with us for CAD data (DXF format) of each dimension.

5AX-130

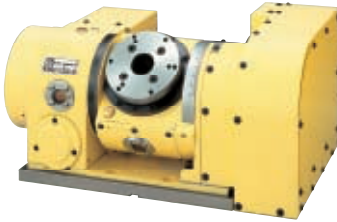
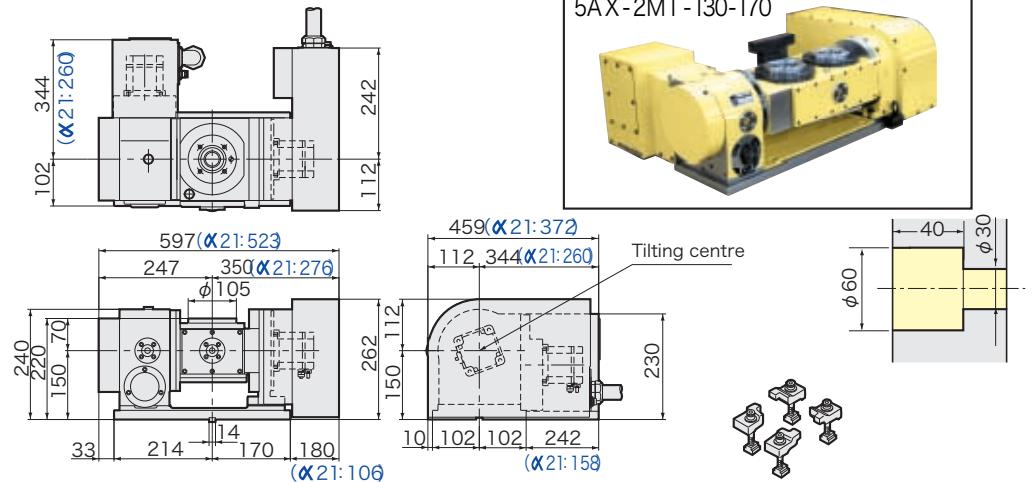
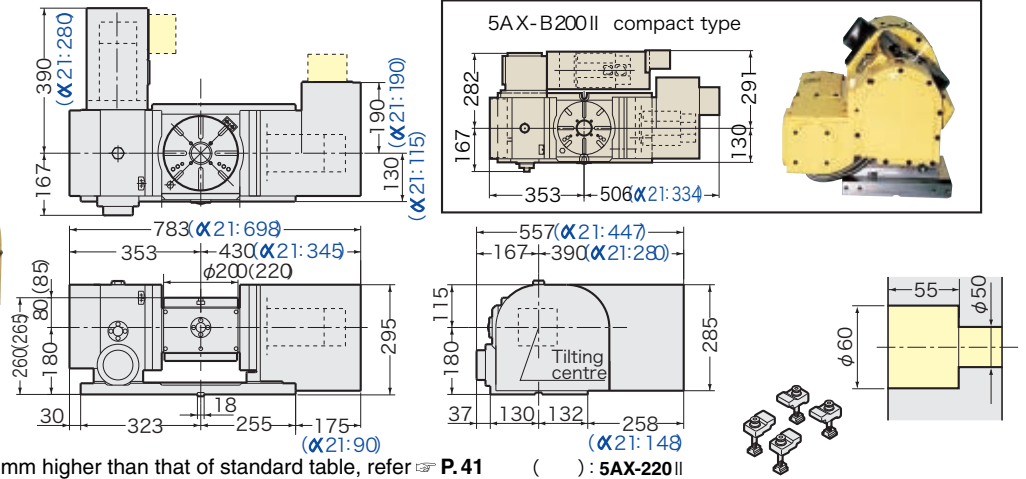


Photo shows with $\phi 130$ mm plate.



Centre height of high column table is 65mm higher than that of standard table, refer P.41

5AX-200II, 5AX-220II

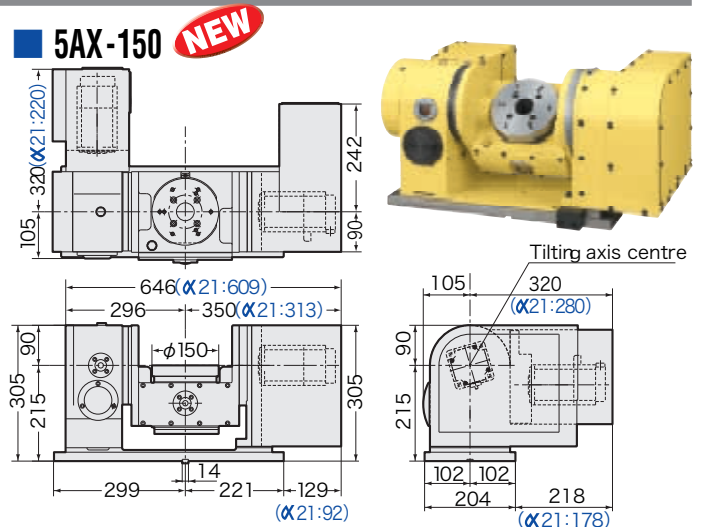


Centre height of high column table is 65mm higher than that of standard table, refer P.41 () : 5AX-220II

- ★For accuracy standard, refer P.39
- ★For fitting metal and stepped guide piece, refer P.18
- ★For scroll chuck, tailstock and other optional accessories, refer P.37, 38

The Area of Noninterference in Tilting Position.

Angle	5AX-130	5AX-200II
0°		
45°		
90°		
105°		



Calculation Method of Drilling Thrust Load

$$T = 9.8 \times (0.711 \times HB \times f^{0.8} \times D^{0.8} + 0.0022 \times HB \times D^2)$$

T: Thrust load (N)

f: Feed per one revolution (mm/rev)

HB: Brinell hardness of the work piece

D: Diameter of drill (mm)

For example, in case of drilling an aluminium

(HB: 100, D: $\phi 9.5$ mm, F: 0.2mm/rev),

the calculation method is as follows.

$$9.8 \times (0.711 \times 100 \times 0.2^{0.8} \times 9.5^{0.8} + 0.0022 \times 100 \times 9.5^2) = 1372N$$

This is the thrust load of new drill. When the drill wore, thrust load will increase. (140~160%)

TILTING ROTARY TABLE

NIKKEN



5AX-230



Powerful Brake System

Specifications

Specification is expressed in SI unit.
For old gravity unit, refer [P.46](#)



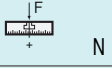
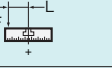




■ CNC tilting rotary table with powerful brake system.

JAPAN, USA, EU : PAT

● Explanation of the Code No. (Example)

5AX-230 L F A - M

- No Letter: without motor
M: with motor
- No Letter: DC servo motor
A: AC servo motor
- Motor Maker [P.35](#)
WA21PW: with NIKKEN α 21 controllers for both axes
DA21PW: with NIKKEN α 21 controller for tilting axis
F:FANUC M:MELDAS Y:YASNAC OSP:OSP
T:TOSNUC N:NEC S:SANYO Z:SIEMENS
I:INDRAMAT H:HEIDENHAIN X:ISOFLEX
SEM:SEM B:BOSCH
- Position of rotary axis motor
No Letter: Right hand mounted motor
L: Left hand mounted motor
- Diameter of Table 230, 300
- 5AX-: Tilting rotary CNC table

Item / Code No.		5AX-230		5AX-300	
Diameter of Table	ϕ mm	230		300	
Diameter of Spindle Hole	ϕ mm	$\phi 60H7 \times \phi 40$		$\phi 60H7 \times \phi 58$	
Centre Height (90°)	mm	240		225	
Table Height in Horizontal Position (0°)	mm	285		285	
Width of T Slot	mm	$12^{+0.018}_0$		$12^{+0.018}_0$	
Axis		Rotary	Tilting ($0^\circ \sim 105^\circ$)	Rotary	Tilting ($0^\circ \sim 105^\circ$)
Clamping System		Hyd.	Hyd.	Hyd.	Hyd.
Clamping Torque	N·m	490	3430	390	3430
Table Inertia at Motor Shaft ($\frac{GD^2}{4}$)	$\text{kg} \cdot \text{m}^2 \times 10^{-3}$	0.3	0.5	0.6	0.6
Servo Motor	min ⁻¹	$\alpha 4 / 4000 \cdot 2000$	$\alpha 8 / 3000 \cdot 2000$	$\alpha 4 / 4000 \cdot 2000$	$\alpha 8 / 3000 \cdot 2000$
MIN. Increment		0.001	0.001	0.001	0.001
Rotation Speed	min ⁻¹	11.1	5.5	8.3	5.5
Total Reduction Ratio		1/180	1/360	1/180	1/360
Indexing Accuracy	sec	20	60	20	60
Net Weight	kg	220		230	
MAX. Work Load on the Table	0° to 30° 	100		200	
	30° to 90° 	100		100	
MAX. Thrust Load applicable on the Table	Tilting Angle = 0° 	11760		14700	
	Tilting Angle = 0° 	L=115mm F=5880N		L=150mm F=4900N	
	Tilting Angle = 90° 	L1=0mm F1=5880N L2=100mm F2=2940N		L1=0mm F1=7840N L2=100mm F2=3430N	
	Tilting Angle = 90° 	451		368	
MAX. Work Inertia	 ($\frac{GD^2}{4}$) $\text{kg} \cdot \text{m}^2$	0.66		1.12	
Driving Torque	 N·m	288		288	

★ L type (Left hand mounted motor) is available for all tables.

★ AWC system is available for all tables, refer [P.31~34](#)

★ Rotary joint is available for all tables, refer [P.41](#)

★ Ultra precision type is available for all tables, Rotary axis: $\pm 5''$ Tilting axis: $\pm 10''$, refer [P.40](#)

★ $\alpha 8/4000$ motor can be mounted on the rotary axis of 5AX-230 & 300.

★ The supplied hydraulic pressure is 3.5MPa.

★ Range of tilting angle ($0^\circ \sim 105^\circ$) can be expanded as an option. Please contact with us.

★ Big bore of $\phi 106\text{mm}$ is available for 5AX-300.

5AX-230, 5AX-300

NIKKEN

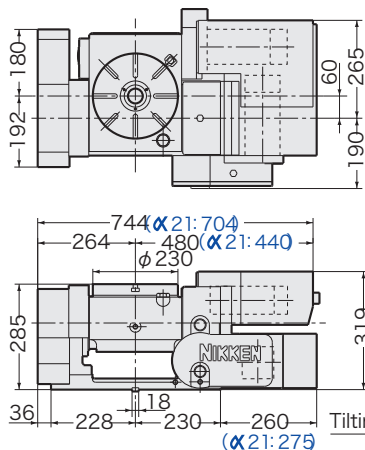
External dimensions will be different according to the type of the servo motors. Dimensions with FANUC motor are shown. Please contact with us for CAD data (DXF format) of each dimension.

5AX-230

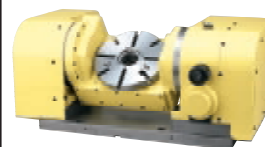


Photo shows with centre socket (option).

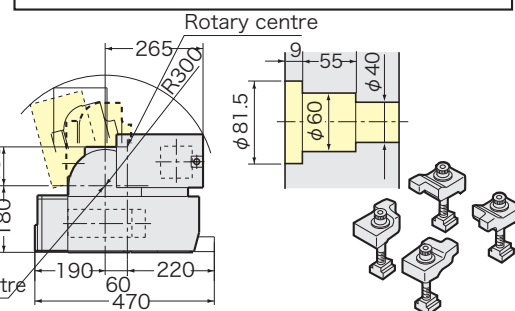
Centre height of high column table is 75mm higher than that of standard table, refer P.41



NEW Power Up type 5AX-250



High Rigidity
High Speed Rotation
• Rotary Axis : 22.2min⁻¹
• Tilting Axis : 11.1min⁻¹

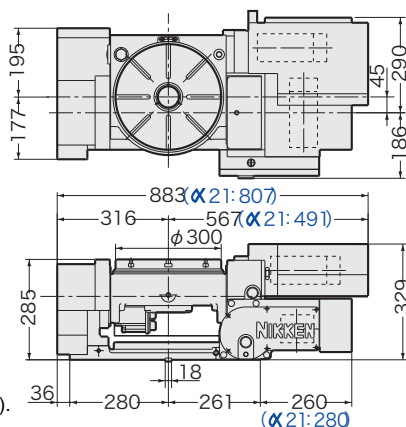


5AX-300



Photo shows with centre socket (option).

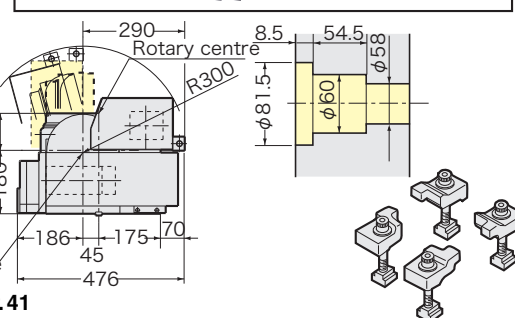
Centre height of high column table is 25mm higher than that of standard table, refer P.41



NEW Power Up type 5AX-350 P.30



High Rigidity
High Speed Rotation
• Rotary Axis : 22.2min⁻¹
• Tilting Axis : 22.2min⁻¹

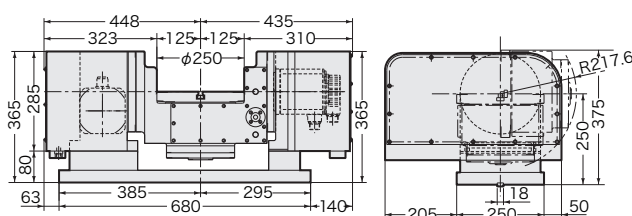


- ★ For accuracy standard, refer P.39
- ★ For fitting metal and stepped guide piece, refer P.18
- ★ For scroll chuck, tailstock and other optional accessories, refer P.37, 38
- ★ Swing box in which cables and hydraulic hoses are fixed is also available. Please contact with us, refer P.34

The Area of Noninterference in Tilting Position.

Angle	5AX-230	5AX-300
0° ↙ 45°		
0° ↙ 90°		
0° ↙ 105°		

5AX-250 NEW



Item / Code No.	5AX-250	
Axis	Rotary	Tilting
Clamping System	3.5MPa Hyd.	Hyd.
Clamping Torque	N·m	588 490
Table Inertia at Motor Shaft ($\frac{90^\circ}{s^2}$)	kg·m ² ×10 ⁻³	0.1 0.16
Servo Motor	min ⁻¹	α4/4000 ·2000 α4/4000 ·2000
MIN. Increment	0.00↑	0.00↑
Rotation Speed	min ⁻¹	22.2 11.1
Total Reduction Ratio	1/90	1/180
Indexing Accuracy	sec	±20 60
Net Weight	kg	210kg (w/o base 163kg)

Item / Code No.	5AX-250	
MAX. Work Load on the Table		80 kg
		50 kg
MAX. Thrust Load Applicable on the Table		9800
		L=125mm F=3920N
		L=100mm F=3820N
		382
MAX. Work Inertia		0.6
Driving Torque		108 N·m

★ Ultra precision type is available. Rotary axis: Tilting axis: ±10°, refer P.40.

TILTING ROTARY TABLE

NIKKEN

■ CNC tilting rotary table with powerful double braking system



5AX-550

● Explanation of the Code No. (Example)

5AX - 550 F A - M

- No Letter: without motor M: with motor
- No Letter: DC servo motor A: AC servo motor
- Motor Maker **P.35**
- WA21PW: with NIKKEN α 21 controllers for both axes
- DA21PW: with NIKKEN α 21 controller for tilting axis
- F:FANUC M:MELDAS Y:YASNAC OSP:OSP T:TOSNUC
- N:NEC S:SANYO Z:SIEMENS I:INDRAMAT H:HEIDENHAIN
- X:ISOFLEX SEM:SEM B:BOSCH
- Diameter of Table 400, 550
- 5AX-: Tilting rotary CNC table

■ Specifications

Specification is expressed in SI unit.

For old gravity unit, refer **P.46**

Item / Code No.		5AX-400		5AX-550	
Diameter of Table	ϕ mm	400		550	
Diameter of Spindle Hole	ϕ mm	$\phi 80H7$		$\phi 130H7$	
Centre Height (90°)	mm	305		380	
Table Height in Horizontal Position (0°)	mm	341		518	
Width of T Slot	mm	$14^{+0.018}_0$		$14^{+0.018}_0$	
Axis		Rotary	Tilting (0°~105°)	Rotary	Tilting (-105°~+105°)
Clamping System		Hyd.	Hyd.	Hyd.	Hyd.
Clamping Torque	N·m	1136	4018	3430	6272
Table Inertia at Motor Shaft ($\frac{GD^2}{4}$)	kg·m ² ×10 ⁻³	0.7	0.4	5.5	5.2
Servo Motor	min ⁻¹	$\alpha 8/3000 \cdot 2000$	$\alpha 8/3000 \cdot 2000$	$\alpha 12/3000 \cdot 2000$	$\alpha 12/3000 \cdot 2000$
MIN. Increment		0.001	0.001	0.001	0.001
Rotation Speed	min ⁻¹	11.1	5.5	11.1	5.5
Total Reduction Ratio		1/180	1/360	1/180	1/360
Indexing Accuracy	sec	20	60	20	60
Net Weight	kg	420		950	
MAX. Work Load on the Table	0° to 30°	300		500	
	30° to 90°	150		300	
MAX. Thrust Load applicable on the Table	Tilting Angle = 0°	24500		31360	
	Tilting Angle = 0°	L=200mm F=6860N		L=275mm F=9800N	
	Tilting Angle = 90°	L ₁ =0mm F ₁ =9800N L ₂ =100mm F ₂ =4900N		L ₁ =0mm F ₁ =19600N L ₂ =200mm F ₂ =14120N	
	Tilting Angle = 90°	588		2548	
MAX. Work Inertia		3.8		23	
Driving Torque		576		864	

★ AWC system is available for all tables, refer **P.31~34**

★ Rotary joint is available for all tables, refer **P.41**

★ Ultra precision type is available for all tables, Rotary axis: $\pm 3''$ or $\pm 5''$ Tilting axis: $\pm 10''$, refer **P.40**

★ The supplied hydraulic pressure is 3.5MPa.

5AX-400, 5AX-550

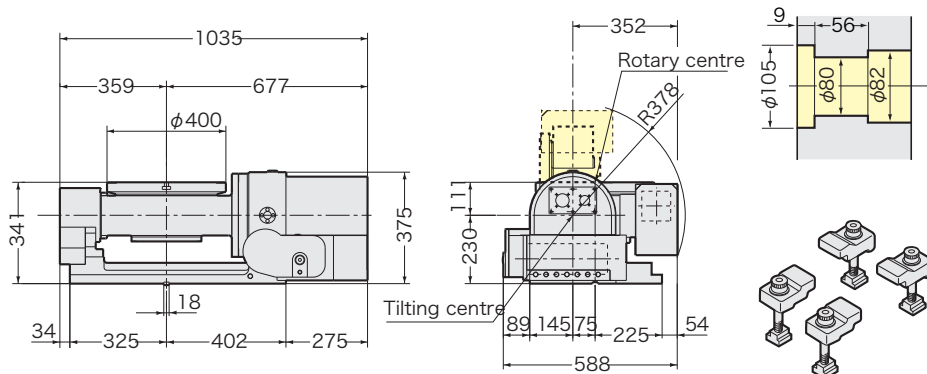
NIKKEN

External dimensions will be different according to the type of the servo motors. Dimensions with FANUC motor are shown. Please contact with us for CAD data (DXF format) of each dimension.

5AX-400



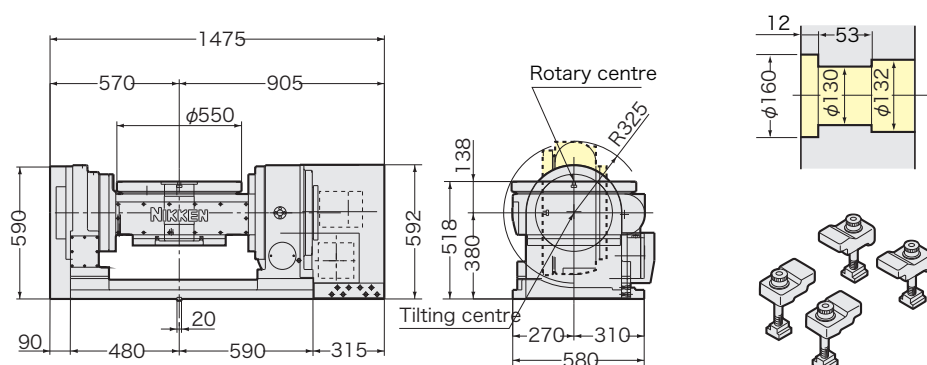
Photo shows with centre socket (option).



5AX-550



Photo shows with centre socket (option).

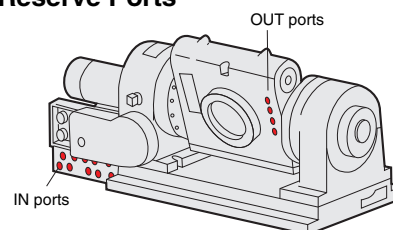


- ★ For accuracy standard refer P.39
- ★ For fitting metal and stepped guide piece, refer P.18
- ★ For scroll chuck, tailstock and other optional accessories, refer P.37,38
- ★ Swing box in which cables and hydraulic hoses are fixed is available on 5AX-400. Please contact with us, refer P.34

The Area of Noninterference in Tilting Position.

Angle	5AX-400	5AX-550
0° ↙ 45°		
0° ↙ 90°		
0° ↙ 105°		

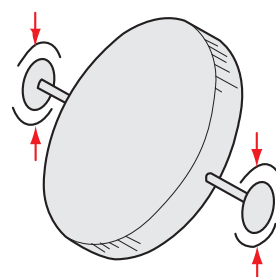
Reserve Ports



5AX-400 : 3 ports
5AX-550 : 4 ports are equipped as standard, and can be used for the rotary joint on rotary axis. P.41

Powerful Double Braking System

5AX-400 & 550 are equipped with powerful brake system on both ends of tilting axis, and free from vibration under heavy cutting.



MULTI-SPINDLE TILTING ROTARY TABLE

NIKKEN



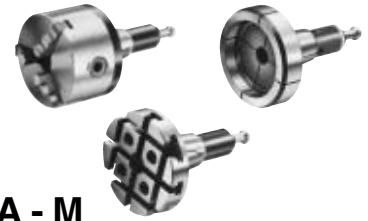
5AX-4MT-120

- Tilting rotary table with Multi-Spindle
- Various attachment for fixing work piece

- Explanation of the Code No. (Example)

5AX - 2MT - 105 - 120 F A - M

- No Letter: without motor M: with motor
- No Letter: DC servo motor A: AC servo motor
- Motor Maker **P.35**
- WA21: with NIKKEN α 21 controllers for both axes
- DA21: with NIKKEN α 21 controller for tilting axis
- F:FANUC M:MELDAS
- Y:YASNAC OSP:OSP T:TOSNUC N:NEC
- S:SANYO Z:SIEMENS I:INDRAMAT
- H:HEIDENHAIN X:ISOFLEX SEM:SEM B:BOSCH
- No Letter: Tilting axis right hand side
- L: Tilting axis left hand side
- Pitch (Centre distance)
- Diameter of Table 105, 120
- Number of spindles 2, 3, 4
- 5AX:- Tilting rotary table

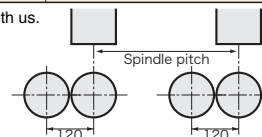


Specifications

Specification is expressed in SI unit.
For old gravity unit, refer **P.46**

Item / Code No.		5AX-2MT-105		5AX-4MT-120	
Diameter of Table	ϕ mm	105		105	
Diameter of Spindle Hole	ϕ mm	$\phi 60H7 \times \phi 30$		$\phi 60 \times \phi 30$	
Number of spindles (Pitch)	mm	120		120	
Centre Height (90°)	mm	175		235	
Table Height in Horizontal Position (0°)	mm	250		300	
Width of T Slot	mm	$16^{+0.018}_0$		$16^{+0.018}_0$	
Axis		Rotary	Tilting ($0^\circ \sim 105^\circ$)	Rotary	Tilting ($-110^\circ \sim +110^\circ$)
Clamping System	Air 0.5MPa Hyd. 3.5MPa	Air	Air	Hyd.	Hyd.
Clamping Torque	N·m	147	147	147	343
Table Inertia at Motor Shaft ($\frac{GD^2}{4}$)	$\text{kg} \cdot \text{m}^2 \times 10^{-3}$	0.13	0.13	0.2	0.48
Servo Motor	min^{-1}	$\alpha 2 / 5000 \cdot 2000$	$\alpha 2 / 5000 \cdot 2000$	$\alpha 8 / 3000 \cdot 2000$	$\alpha 4 / 4000 \cdot 2000$
MIN. Increment		0.001	0.001	0.001	0.001
Rotation Speed	min^{-1}	22.2	11.1	11.1	16.6
Total Reduction Ratio		1/90	1/180	1/180	1/120
Indexing Accuracy	秒	± 30	60	± 45	± 30
Net Weight	kg	115		230	
MAX. Work Load on the Table	0° to 30°	15 kg		25 kg	
	30° to 90°	10 kg		15 kg	
MAX. Thrust Load applicable on the Table	Tilting Angle = 0°	3920 N		3920 N	
	Tilting Angle = 0°	L=60mm $F_1=784\text{N}$		L=60mm $F=2858\text{N}$	
	Tilting Angle = 90°	L ₁ =0mm $F_1=653\text{N}$ L ₂ =100mm $F_2=490\text{N}$		L ₁ =0mm $F_1=1380\text{N}$ L ₂ =100mm $F_2=1040\text{N}$	
	Tilting Angle = 90°	49 $F \times L$ N·m		49	
MAX. Work Inertia		0.014 $\left(\frac{GD^2}{4}\right) \text{kg} \cdot \text{m}^2$		0.021	
Driving Torque		36 N·m		144	

- ★ Min. pitch between spindles 105:120mm, 170:200mm, 200:250mm If you need different pitch, please contact with us.
- ★ 4 spindle rotary table to suit 2 Spindle M/C is also available, please contact with us.
- ★ Max numbers of spindles 105:4 spindles, 170:3 spindles, 200:3 spindles.
- ★ The supplied hydraulic pressure is 3.5MPa for hydraulic clamping system.
- ★ Range of tilting angle ($0^\circ \sim 105^\circ$ or $\pm 110^\circ$) can be expanded as an option. Please contact with us.

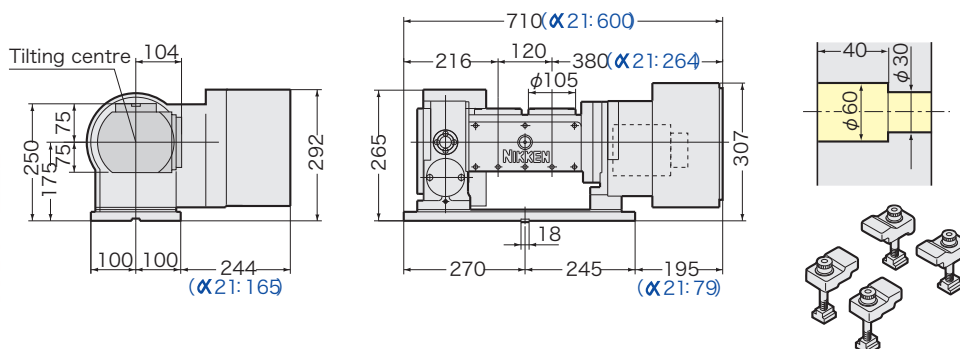


5AX-2MT, 5AX-4MT

NIKKEN

External dimensions will be different according to the type of the servo motors. Dimensions with FANUC motor or with NIKKEN α 21 controller (α 21:) are shown. Please contact with us for CAD data (DXF format) of each dimension.

5AX-2MT-105



Rotary axis cable stay type is available.
Centre 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-120

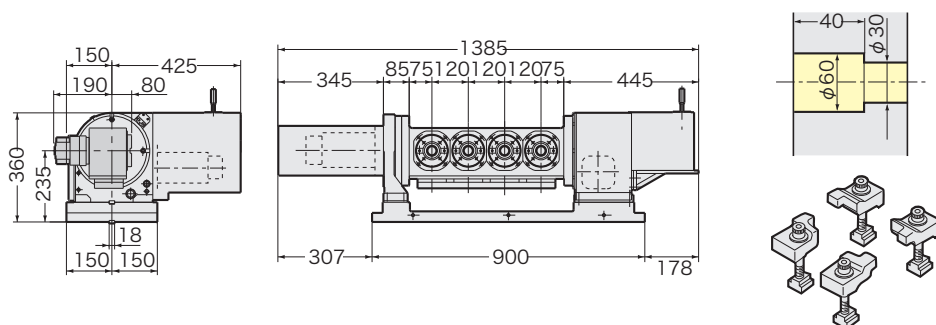


Photo shows with 4" power chuck (option).

MAX. 6 ports can be used in the rotary joint for standard model.

Multi-Spindle Tilting Rotary Table

Special Examples

For Multi-Spindle Tilting Rotary Table, please contact us with 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-200-250



5AX-2MT-170



5AX-2MT-200-360



5AX-2MT-201-250FA



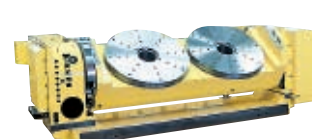
5AX-2MT-200-355.6



5AX-4MT-NC5-85S



5AX-2MT-130-170



5AX-2MT-500-520

Accuracy Standard of Multi-Spindle

No.	Measuring Item	Measuring Method	Accuracy
1	Pitch between Spindles		Within $\pm 0.02\text{mm}$ from nominal pitch
2	Centre Height of Spindle		Within $\pm 0.02\text{mm}$

★ How to mount the above tables on your M/C, please contact with us.

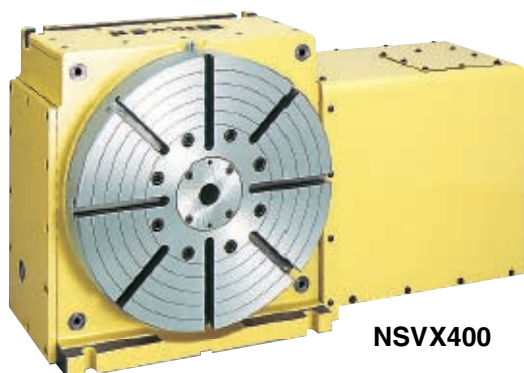
★ For fitting metal of standard accessories, refer [P.18](#)

★ For scroll chuck, tailstock and other optional accessories, refer [P.37, 38](#)
Please contact with us about the chucking or clamp system of your work piece.

★ α series attachment can be used for 5AX-2MT-105 and 5AX-4MT-105, refer [P.36](#)

ROTARY HIRTH COUPLING INDEX

NIKKEN



NSVX400

INDEXING ACCURACY : $\pm 2''$

Specifications

Specification is expressed in SI unit.
For old gravity unit, refer **P.46**

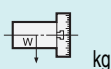
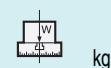



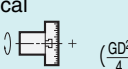

- High Rigidity
 - Indexing Accuracy : $\pm 2''$
 - No Lifting up of Table at Indexing Time. (Built-in 3 pieces of Hirth Coupling)
- JAPAN : PAT.**



● Explanation of the Code No. (Example)

NSV X 400 F A - M

- No Letter: without motor M: with motor
- No Letter: DC servo motor A: AC servo motor
- Motor Maker **P.35**
A21: with NIKKEN α 21 controller
F:FANUC M:MELDAS Y:YASNAC OSP:OSP
T:TOSNUC N:NEC S:SANYO Z:SIEMENS
I:INDRAMAT H:HEIDENHAIN X:ISOFLEX
SEM:SEM B:BOSCH
- No Letter: Right hand mounted motor
L: Left hand mounted motor
T: Top mounted
- Diameter of Table 180, 300, 400, 500
- X: Rotary and indexing table ($1''$ and $0.001''$) Z: Indexing table ($1''$)
- Hirth coupling index table

Item / Code No.		NSVZ180	NSVZ300	NSVX400	NSVX500	NSVX400T
Diameter of Table	ϕ mm	180	300	400	500	400
Diameter of Spindle Hole	ϕ mm	$\phi 60H7 \times \phi 30$	$\phi 60H7 \times \phi 52$	$\phi 80H7$	$\phi 80H7$	$\phi 80H7$
Centre Height	mm	135	170	240	310	240
Width of T Slot	mm	$12^{+0.018}_0$	$12^{+0.018}_0$	$14^{+0.018}_0$	$14^{+0.018}_0$	$14^{+0.018}_0$
Clamping System	3.5MPa	Hyd.	Hyd.	Hyd.	Hyd.	Hyd.
Clamping Torque	N·m	910	2155	5880	5880	5880
Table Inertia at Motor Shaft ($\frac{GD^2}{4}$)	$\text{kg} \cdot \text{m}^2 \times 10^{-3}$	0.11	0.16	2.9	3.9	2.9
Servo Motor	min^{-1}	$\alpha 2/5000 \text{ } \text{ } 2000$	$\alpha 2/5000 \text{ } \text{ } 2000$	$\alpha 12/3000 \text{ } \text{ } 2000$	$\alpha 12/3000 \text{ } \text{ } 2000$	$\alpha 12/3000 \text{ } \text{ } 2000$
MIN. Increment	$1''$	$1''$	$1''$	$1/0.001$	$1/0.001$	$1/0.001$
Rotation Speed	min^{-1}	11.1	11.1	22.2	16.6	16.6
Total Reduction Ratio		1/180	1/180	1/90	1/120	1/120
Indexing Accuracy	sec	± 3	± 2	± 2	± 2	± 2
Net Weight	kg	60	150	270	290	300
MAX. Work Load on the Table	Vertical 	50	150	250	250	250
	Horizontal 	100	300	500	500	—
MAX. Thrust Load applicable on the Table		23520	39200	58800	58800	58800
		911	2156	5880	5880	5880
		569	1421	3920	3920	3920
MAX. Work Inertia	Vertical 	0.14	1.0	6.4	6.4	11.5
Driving Torque		—	—	432	576	576

- ★ NSVZ series are index table which is indexable by $1''$.
- ★ NSVX series are rotary and indexing table which perform indexing by $1''$ with hirth coupling of high precision & high rigidity, and can also perform min. command incremental by $0.001''$ and profile milling.
- ★ The supplied hydraulic pressure is 3.5MPa.

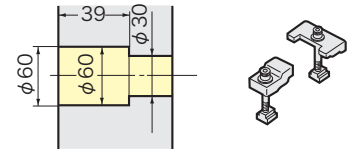
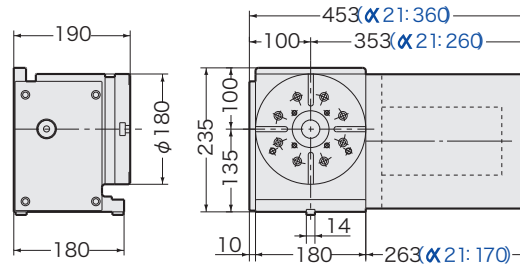
- ★ Be careful that centralizing of work piece or jig fixture should be done after indexing, not rotating.
- ★ With NIKKEN controller, the solenoid valve is installed inside the table.
- ★ For additional axis control, the solenoid valve is not installed inside the table.
- ★ $\alpha 4/4000i$ motor can be mounted on NSVZ180 & 300.

NSVZ180,300 NSVX400,500

NIKKEN

External dimensions will be different according to the type of the servo motors. Dimensions with FANUC motor or with NIKKEN $\alpha 21$ controller ($\alpha 21$:) are shown. Please contact with us for CAD data (DXF format) of each dimension.

NSVZ180



NSVZ300

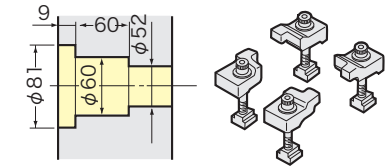
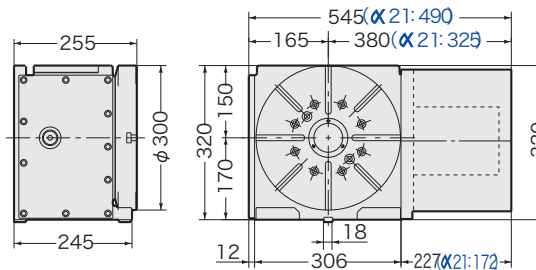
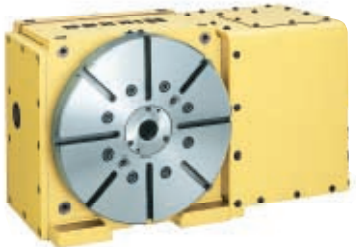


Photo shows with centre socket (option).

NSVX400

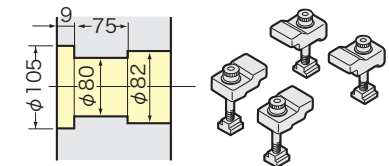
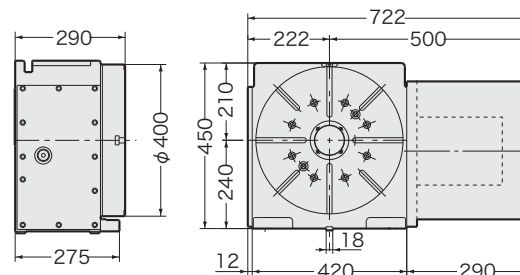
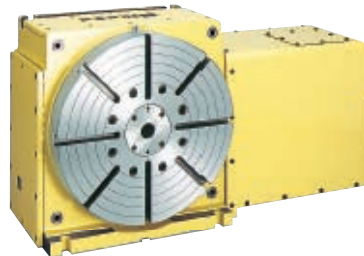
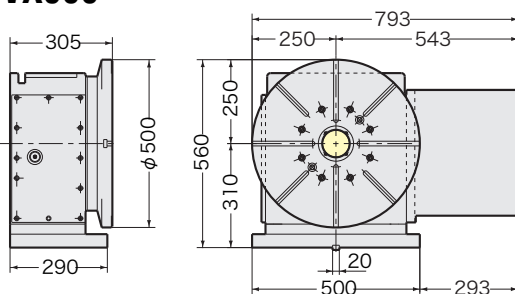
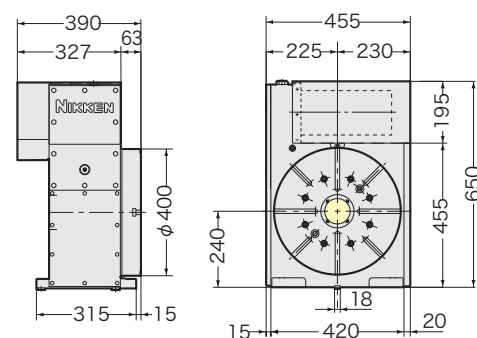


Photo shows with centre socket (option).

NSVX500

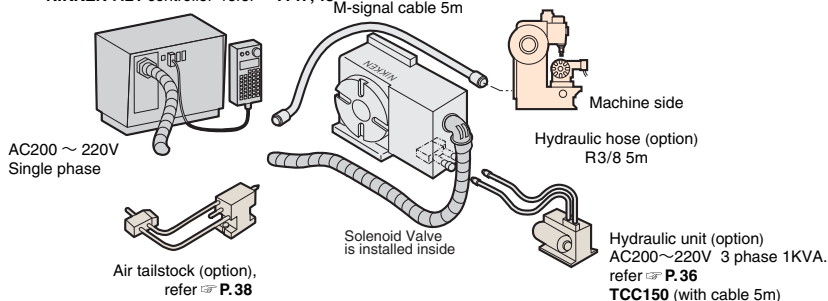


NSVX400T

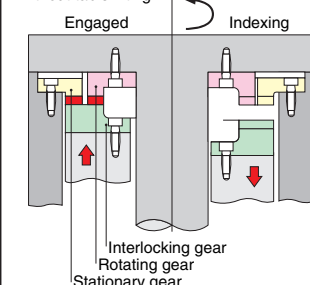


- ★ For fitting metal and stepped guide piece, refer \Rightarrow P.18
- ★ For scroll chuck, tailstock and other optional accessories, refer \Rightarrow P.37,38

NIKKEN $\alpha 21$ controller refer \Rightarrow P.47,48



No lift (Three pieces of Hirth Coupling)
Three pieces of 360 division precision hirth coupling ensures smooth and fast indexing without table lifting.



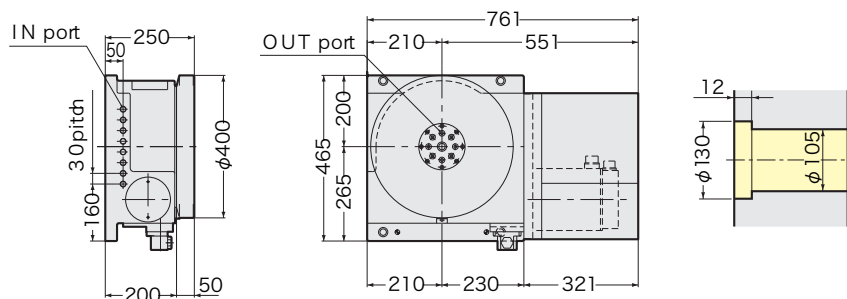
BUILT IN type CNC ROTARY TABLE

NEW

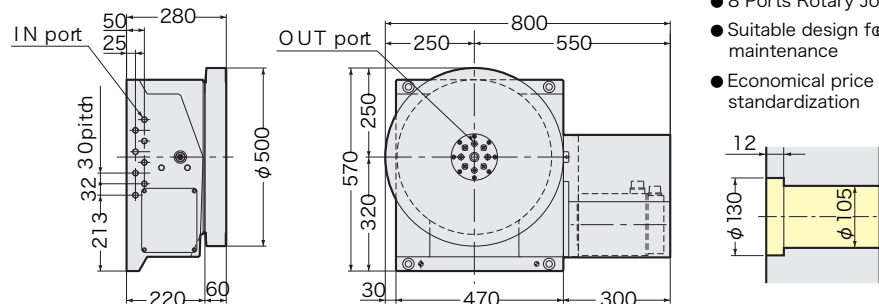
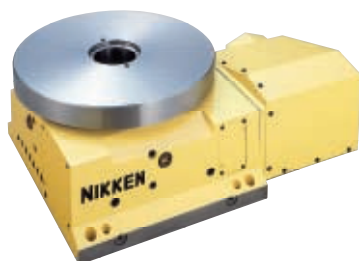
NIKKEN

External dimension will be different according to the type of the servo motors. Dimensions with FANUC motor or with NIKKEN α controller ($\alpha 21$:) are shown. Please contact us for CAD data (DXF format) of each dimension.

CNC401H









CNC503H



- 8 Ports Rotary Joint is standard.
- Suitable design for easy maintenance
- Economical price due to standardization

Specifications

(): High Speed CNC ROTARY Table Z series

Item / Code No.		CNC401H CNCZ401H	CNC503H CNCZ503H
Diameter of Table	ϕ mm	$\phi 400$	$\phi 500$
Diameter of Spindle Hole	ϕ mm	$\phi 105$ H7	$\phi 105$ H7
Clamping System	3.5MPa	Hyd.	Hyd.
Clamping Torque	N·m	1470	1890
Table Inertia at Motor Shaft	$(\frac{GD^2}{4}) \text{ kg} \cdot \text{m}^2 \times 10^{-3}$	2.8	8
Servo Motor	min^{-1}	$\alpha 12/3000 \cdot 2000$	$\alpha 12/3000 \cdot 2000$
MIN. Increment		0.001°	0.001°
Rotation Speed	min^{-1}	22.2(44.4)	16.6(33.3)
Total Reduction Ratio		1/90 (1/45)	1/120 (1/60)
Indexing Accuracy	sec	20	20
Net Weight	kg	240	350
MAX. Work Load on the Table	Horizontal  kg	800	1000
MAX. Thrust Load applicable on the Table	 N	31360	37632
	 $F \times L$ N·m	1166	1554
	 $F \times L$ N·m	3920	5644
MAX. Work Inertia	 $(\frac{GD^2}{4}) \text{ kg} \cdot \text{m}^2$	16.6(8.3)	32.5(16.3)
Driving Torque	 N·m	432(345)	576(460)

★ Servo Motor is described as FANUC α series.

★ $\alpha 22/3000$ motor can be mounted on **CNC401H** & **CNC503H**.

★ Conditions of CNC Rotary Table when being used to NC special machines. refer **P.46**

Specification for Special Purpose Machines



Production Line of NC special purpose M/C

Under the severe conditions due to the continuous operation of 24hours.

Specifications will be changed depending on the machine.

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 centre hole
2. Oil Sight Glass, Oil Supply Port and Drain Port can be selected the direction.
3. How to be mounted on the Machine
 - U-groove
 - Additional tapped holes on the backside
 - Shift the guide key position
4. Modification of the Motor Cover
5. Rotary Joint **P.41**
6. Built-In Pallet Clamp System **P.41**
7. Special Color **P.41**
 - Please order with the color sample or Munsell Color No.

In case of 5AX Table....

8. The Travel Range of Tilting
 - How to be mounted **P.44** and the stroke of the NC machine
9. The Relations of the Position between Rotary Centre and Tilting Centre
10. The Base **P.30**
 - In case of the table traverse type machine, the base might be supplied. Please contact with us.

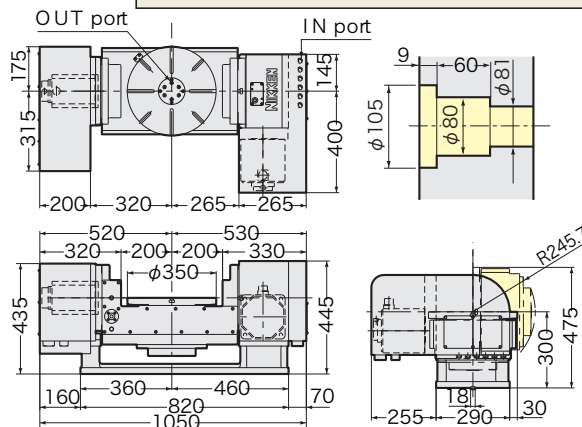
BUILT IN type TILTING ROTARY TABLE

NEW

NIKKEN

External dimension will be different according to the type of the servo motors. Dimensions with FANUC motor are shown. Please contact us for CAD data (DXF format) of each dimension.

5AX-350

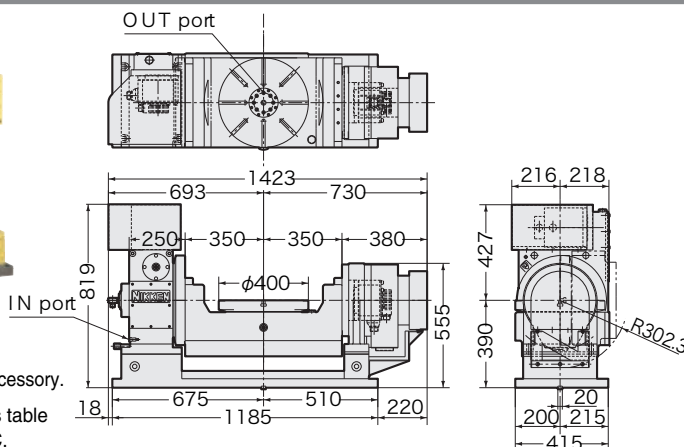
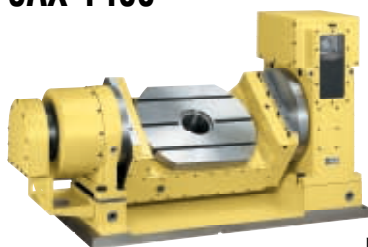


Example when the tilting base is supplied.

Built-in type 6 Ports Rotary Joint is optional accessory.

- The position of the motor of the tilting axis table can be right & left side for the vertical M/C.

5AX-T400



Example when the tilting base is supplied.

Built-in type 8 ports Rotary Joint is optional accessory.

- The position of the motor of the tilting axis table can be right & left side for the vertical M/C.

Item / Code No.	5AX-350		5AX-T400	
Diameter of Table ϕ mm	350		400	
Diameter of Spindle Hole ϕ mm	$\phi 80H7$		$\phi 105H7$	
Centre Height (90°) mm	300		390	
Table Height in Horizontal Position (0°) mm	300		390	
Width of T Slot mm	$12^{+0.018}_0$		$14^{+0.018}_0$	
Axis	Rotary	Tilting	Rotary	Tilting
Clamping System	3.5MPa	Hyd.	Hyd.	Hyd.
Clamping Torque N·m	2000	2000	1760	1760
Table Inertia at Motor Shaft ($\frac{GD^2}{4}$) kg·m ² ×10 ⁻³	0.8	1.35	2.8	2.44
Servo Motor min ⁻¹	$\alpha 8/3000i \cdot 2000$	$\alpha 12/3000i \cdot 2000$	$\alpha 12/3000i \cdot 2000$	$\alpha 22/3000i \cdot 2000$
MIN. Increment	0.001°	0.001°	0.001°	0.001°
Rotation Speed min ⁻¹	22.2	22.2	22.2	16.6
Total Reduction Ratio	1/90	1/90	1/90	1/120
Indexing Accuracy sec	20	60	15	60
Net Weight kg	420kg (W/O base:355kg)		750kg (W/O base:505kg)	

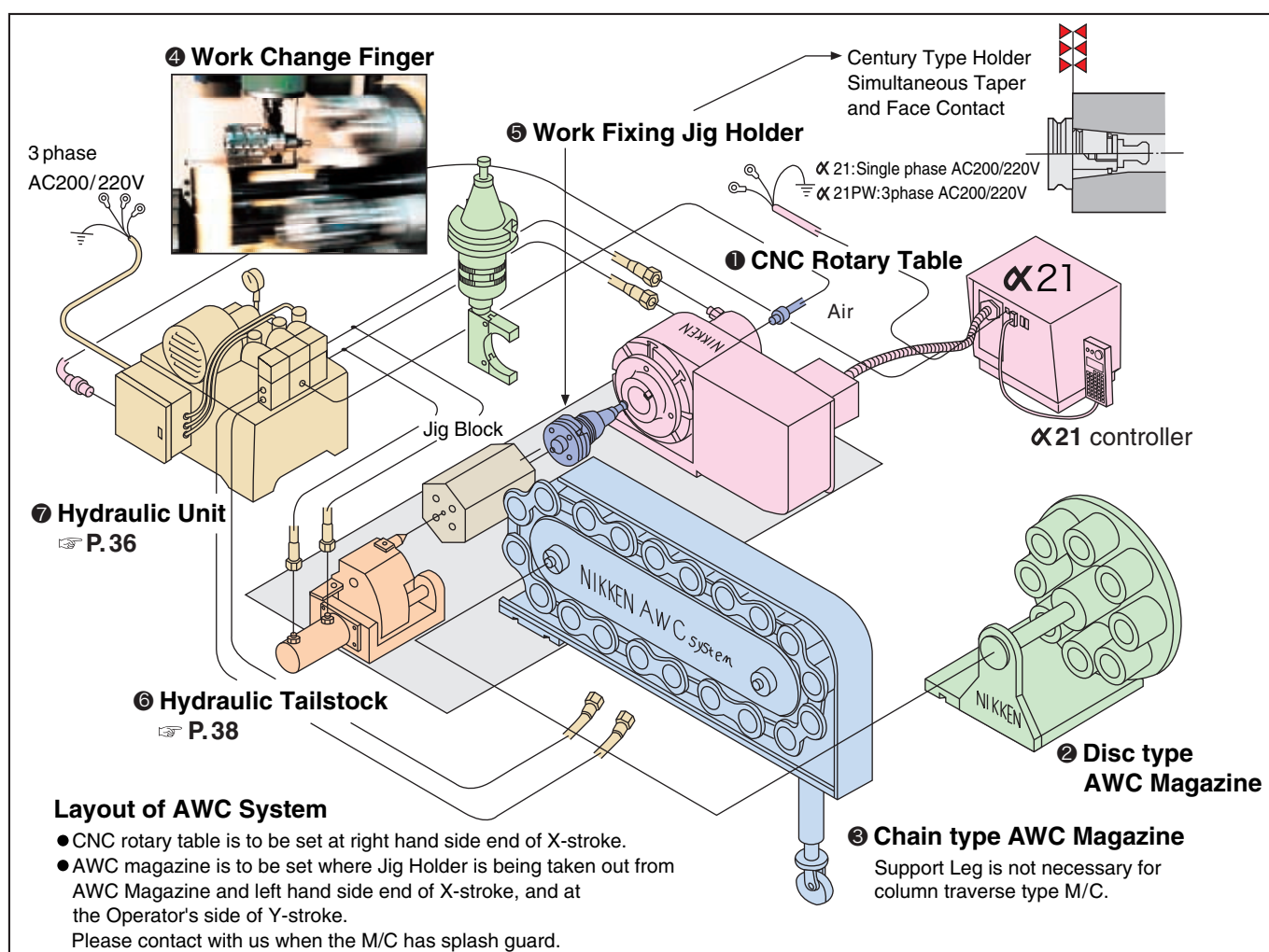
* Servo Motor is described as FANUC α i series.

* Ultra precision type is available. Rotary axis: $\pm 5''$ Tilting axis: $\pm 10''$, refer \square P.40

Item / Code No.	5AX-350	5AX-T400
MAX. Work Load on the Table	0° to 30° kg	200
	30° to 90° kg	200
MAX. Thrust Load applicable on the Table	Tilting Angle=0° F	19600
	Tilting Angle=0° L=175mm F=4900N	L=200mm F=6860N
	Tilting Angle=90° F1 F2 L=100mm F=8580N	L=100mm F=11660N
	Tilting Angle=90° F L F×L N·m	858 1166
MAX. Work Inertia	($\frac{GD^2}{4}$) kg·m ²	3.2 5.1
Driving Torque	N·m	216 432



- Very sure and space saving Work Changer, operated by X,Y and Z axes movements and spindle orientation of Vertical M/C. **JAPAN : PAT.**
- Substitutes expensive robot or pallet changer. Just set on the machine's table, and is automatically operated by only one M-signal.
- Extremely flexible, and can take many kinds of work pieces. Jig Holder is firmly held in the centre 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 (option), and automatic selection of Jig Holder in magazine is possible.
- AWC magazine, Disc type, Chain type, Horizontal type and Bar Work type are available. For details, please contact with us.



The minimum X, Y and Z strokes necessary for setting AWC System; Length : 200mm)

X: 550mm (When longer, the longer Jig Block can be used. e.g. X:560mm Jig Block

Y: 400mm (Even when shorter, AWC System can be mounted by moving the position of key slot of CNC Rotary Table.)

Z: 450mm (The minimum distance from table surface to spindle nose is 600mm.)

AWC SYSTEM 2



AWC System can be utilized to all type of NIKKEN CNC Rotary Tables.

The most popular combination of CNC Rotary Table and Hydraulic Tailstock is shown below;

①	CNC Rotary Table	CNC250 A21-AWC	5AX-230 WA21-AWC
⑥	Hydraulic Tailstock	H-170S	H-230S

In the following items, the most suitable one can be selected irrespective of model of CNC Rotary Tables.

No.	Item	Code No. & Number of Pots	MAX. Dia. (D) × MAX. Length (L)	Weight
②	Disc type AWC Magazine	AWC-F40-8,12,16	φ 63 × 250	36, 38, 40kg
		AWC-F45-6,8,10	φ 85 × 280	38, 40, 43kg
③	Chain type AWC Magazine	AWC-C45-20	φ 85 × 300	145kg
④	Work Change Finger	BT40-RN40, RN45	According to the model of M/C	
		BT50-RN40, RN45	According to the model of M/C	
⑤	Work Fixing Jig Holder	RN40-63 × 25	Most suitable jig block will	
		RN45-85 × 32	be recommended. (Option)	
⑦	Hydraulic Unit	TCC-150AWC	Specification varies depending on the system. P.32	

★Work Fixing Jig Holder: ISO Taper (7/24) or NC5 Taper (1/10 short taper & double contact) is also available.

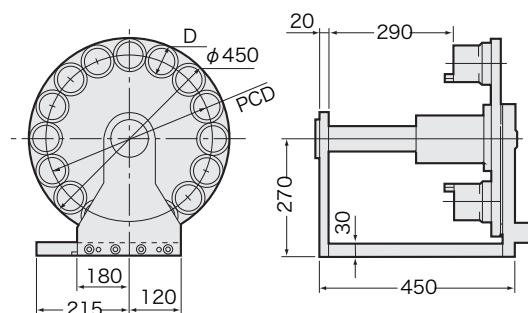
Please refer NC5 TOOLING SYSTEM catalog for NC5 Taper.



② Disk type AWC Magazine

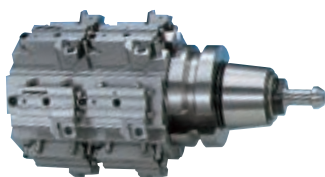
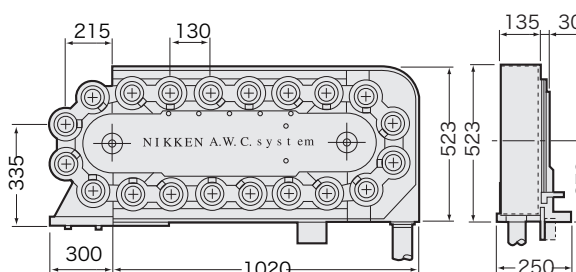
PCD

AWC-F40 : 385
AWC-F45 : 340



③ Chain type AWC Magazine

AWC-C45-20
Pitch between
Pots : 130mm



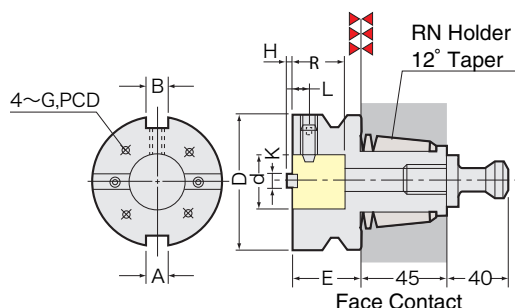
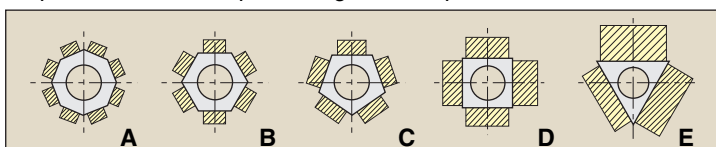
⑤ Work Fixing Jig Holder

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 with us.

Side Lock type Holder

CodeNo.	D ₁	d	K	E	H	R	L	M	G	PCD	A _{0-0.010}	B	Weight
RN40-63×25	63	25H ₆	10h ₇	40	5	30	15	M10	M8	48	16	18	1.5kg
RN45-85×32	85	32H ₆	12h ₇	45	5	35	20	M12	M10	65	18	20	25kg

Representative Examples of Jig Block (Option)



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

Improvement in Productivity with AWC SYSTEM

NIKKEN

When the disc type AWC magazine is operated for one hour during the noon recess and another one hour after the official working hour, three months of the practical machining (not theoretical) can be obtained.

$$\frac{(1 + 1 \text{ hour}) \times 22 \text{ days/month} \times 12 \text{ month}}{8 \text{ hours/day} \times 22 \text{ days/month}} = 3 \text{ months}$$

Further, as shown below, AWC system provides more cost performance per one operator with an increase in the number of AWC system.

Item \ Operating Condition	Operating one M/C with one operator	Operating two M/C with one operator	Operating three M/C with one operator using AWC system
Operation rate of one M/C	100%	80~90%	100%
Operation rate of M/C during noon recess (60min.)	5% (Stopped after completion of the machining work piece)	5%	80~100% (Operated until the finishing of all materials in AWC magazine)
Operating time after official working hour	0 min.	0 min.	50~400min. (Power is cut off by automatic power circuit breaker)
Operator's Cost Performance	100%	160~180%	250~270%

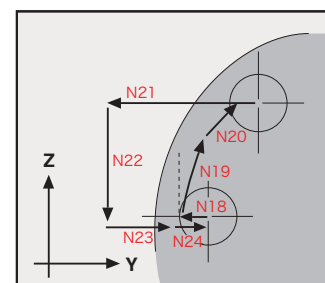
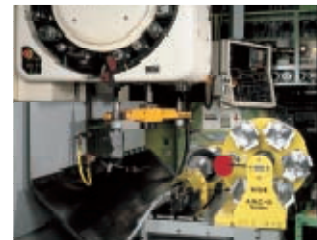
PROGRAM of AWC SYSTEM

NIKKEN

AWC system is the very sure and space saving automatic work changer operated by X, Y and Z axes movements and spindle orientation of Vertical M/C. The following sub program will be called, when the AWC finger is selected in the M/C spindle after all machining. X0. Y0. Z0. is the position where AWC finger is gripped the jig holder on the CNC rotary table.

```

0 1000 ;
N0 MXX ; (Air blow ON)
N1 MXX ; (CNC rotary table 360° rotation)
N2 MXX ; (Air blow OFF)
N3 S100 ; (Spindle low gear change)
N4 G00 G90 X0. M19 ; (Spindle orientation · CNC rotary table X position)
N5 Z0. ; (CNC rotary table Z position)
N6 Y_ ; (Y approach)
N7 G01 Y0. F500 ; (CNC rotary table Y position)
N8 MXX ; (Unclamp jig holder)
N9 MXX ; (Air blow ON)
N10 G01 X-10. ; (Pull jig holder out.)
N11 G04 P2000 ; (Dwell for cleaning)
N12 G00 X_ ; (Completely pull jig holder out.)
N13 Z_ ; (AWC magazine Z position)
N14 X_ ;
N15 Y_ ; (AWC magazine Y position)
N16 X_ ; (X approach)
N17 G01 X_ ; (AWC magazine X position · Insert jig holder)
N18 Y_ ;
N19 Y_ Z_ ; } (Index AWC magazine)
N20 Y_ Z_ ;
N21 G00 Y_ ; (Y relief)
N22 Z_ ; (AWC magazine X position)
N23 Y_ ; (Y approach)
N24 G01 Y_ ; (AWC magazine Y position · Grip jig holder)
N25 G00 X_ ; (Pull jig holder out)
N26 Y0. ; (CNC rotary table Y position)
N27 X_ ;
N28 Z0. ; (CNC rotary table Z position)
N29 X_ ;
N30 G01 X-10. F1000 ; (X approach)
N31 G04 P2000 ; (Dwell for cleaning)
N32 X-3. F500 ; (X final approach)
N33 MXX ; (Air blow OFF)
N34 MXX ; (Clamp jig holder · Jig holder is pulled 3mm in axial direction)
M35 G00 Y_ ;
N36 G28 Y0. Z0. ;
N37 G28 X0. ;
N38 M99 ;
    
```



Indexing of AWC magazine

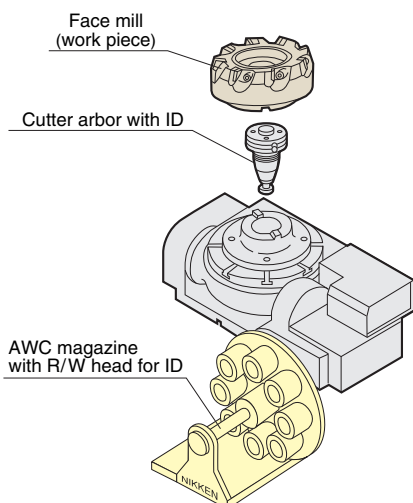
★ This program is made under the condition that there is no interference for the movement of AWC finger between CNC rotary table and AWC magazine.

Application of AWC SYSTEM

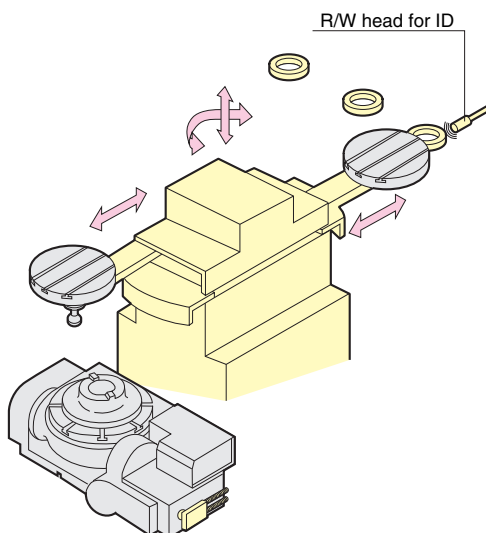


The followings are the drawings of AWC systems and their work samples. Please contact with us about the reduction of your production processes, improvement of precision and flexibility of your plant

■ AWC Disc type Magazine & Example of Face Mill Cutter as Work Piece

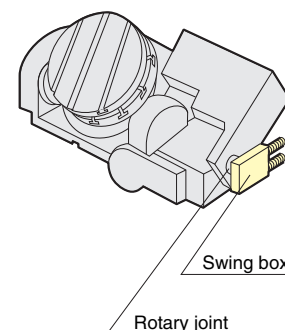


■ Horizontal AWC Magazine with Work Identification Function



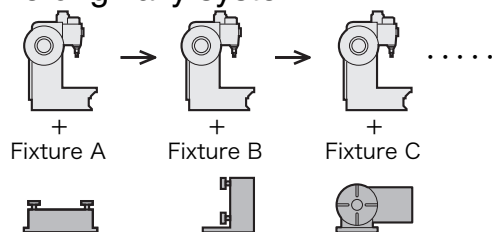
■ Rotary Joint & Swing Box

Cables and hoses are fixed relatively to the tilting movement. Apply to 5AX-230, 5AX-300 & 5AX-400.



■ Advantage of 5AX-Table in Automation Production Line

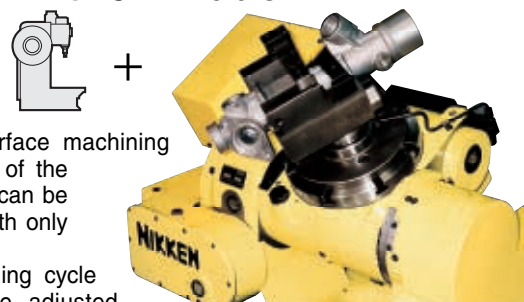
The originally system



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.

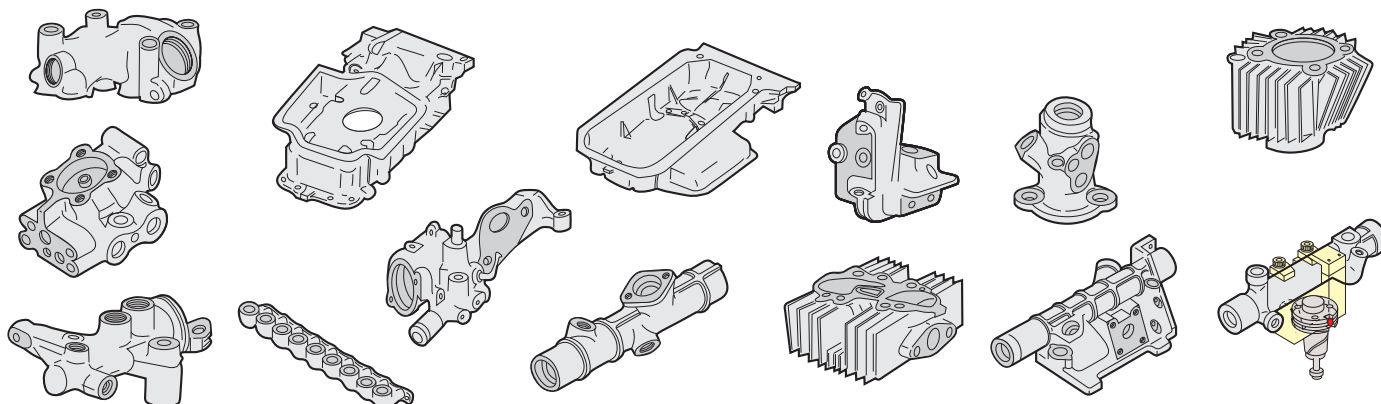
System with 5AX-Table



The full surface machining on top half of the component can be achieved with only one setup. 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 production.
- 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 chip. (That's ideal for the automotive production line as there are many pair parts of right and left.)

■ Work Samples



Servo Motor List



Maker and Motor Model

Stall Torque	1 Nm	2 Nm	3 Nm	6 Nm	12 Nm	22 Nm
Rotation Speed	2000min ⁻¹	2000min ⁻¹	2000min ⁻¹	2000min ⁻¹	1500min ⁻¹	1500min ⁻¹
Maker	Model 1	Model 2	Model 3	Model 6	Model 12	Model 22
FANUC	$\alpha 1/3000$	$\alpha 2/2000$	$\alpha 3/3000$	$\alpha 6/2000$	$\alpha 12/2000$	$\alpha 22/2000$
		$\alpha 2/3000$		$\alpha 6/3000$	$\alpha 12/3000$	$\alpha 22/3000$
	$\alpha 1/5000i$	$\alpha 2/5000i$	$\alpha 4/4000i$	$\alpha 8/3000i$	$\alpha 12/3000i$	$\alpha 22/3000i$
MELDAS	HA23NGTS	HA33NGTS	HA40NGS	HA80NGS	HA100NGS	HA200NGS
			HC52T	HC102T	HC202S	HC352S
			HC53T	HC103T	HC203S	HC353S
YASNUC	USAFED-02CS	USAFED-03CS	USAFED-05CS	USAFED-09CS	USAFED-20CS	
			SGMG-05ASACS	SGMG-09ASACS	SGMG-20ASAAS	SGMG-30ASAAS
	SGMP-04A316S	SGMP-08A316S	SGMG-05ASABS	SGMG-09ASABS		
OSP			BL-MC25E20T	BL-MC50E20T	BL-MC100E20S	BL-MC200E-20S
		BL-MC24J30S	BL-MC25J20T	BL-MC50J20T	BL-MC100J20S	BL-MC200J-20S
TOSNUC			MFA055MBJNC1	MFA100MBJNC1	MFA180MBJNB	MFA350MBJNB
	MDM032X4L	MDM062X4L	MDM0522R4L	MDM1522R4L	MDM2122R4C	MDM4022R4C
NEC	DFSM033Q252A	DFSM042Q252A	DFSM052Q502A	DFSM102Q502A	DFSM202Q502A	
SANYO			20BM040	20BM060	20BM120	
SANYO (Brother)			P50B08050DXS00			
SIEMENS	1FT-6031-4AK71	1FT-60344AK71	1FT-60441AK71	1FT-60641AK71	1FT-60821AF71	1FT-60861AF71
			1FK-6042	1FK-6063	1FK-6083	
			1FK-7042	1FK-7063	1FK-7083	
INDRAMAT	MAC63A	MAC63C	MAC71B	MAC71C	MAC93B	MAC93C
HEIDENHAIN		QSY96A	QSY116C	QSY116E	QSY155B	QSY155D
ISOFLEX			444,2,20	444,3,20	445,2,20	
SEM		HJ96C644	HJ116C664	HJ116E6130	HJ155A8130	HJT155D8180
BOSCH	SE-B2.010	SE-B2.020	SE-B3.055	SE-B3.075	SE-B4.130	SE-B4.210
GLENTEK	GM3340	GM4020	GM4040,GM4050	GM5065		
KOLLMORGEN	6SM37L	6SM47L	6SM57L	6SM57M	6SM77K	

★ 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.

★ FANUC α C series motor does not have enough torque and can not be satisfied with the specification of CNC rotary table.

★ FANUC α i series motor can be rotated much higher than the recommended speed.

$\alpha 1i, \alpha 4i: 3000\text{min}^{-1}$ $\alpha 12i: 2000\text{min}^{-1}$

★ Standard total reduction ratio is applied for the new OSP motor (BL-MC series).

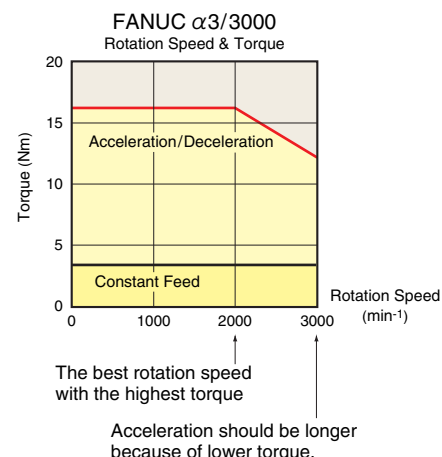
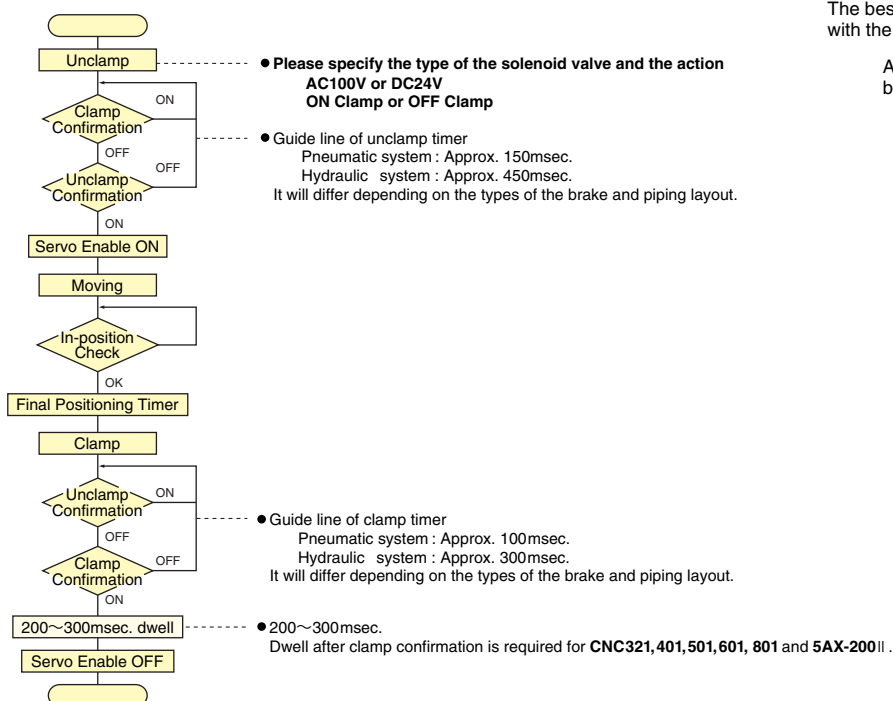
★ Other servo motor can be mounted, please inform us the external dimension, specification of your servo motor.

★ MAX. rotation of the servo motor (CNC rotary table) is decided from the acceleration characteristics of the servo motor and the practical load test.

Rotation Speed of the motor is normally selected to 1500 or 2000min⁻¹. Depending on the application, the rotation speed of CNC rotary table can be increased to increase the rotation speed of the motor.

Flow Chart of the Additional Axis Control

Servo enable is basically kept OFF during the mechanical brake clamps. CNC rotary table is using "Carbide Worm System" and can be used "always servo enable ON and the mechanical brake unclamp" to make the total indexing time shorter.

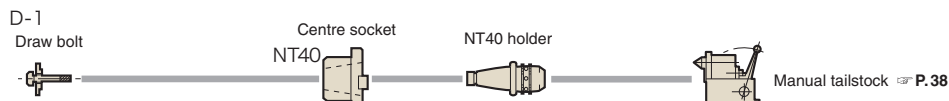


Attachment for α Series CNC ROTARY TABLE

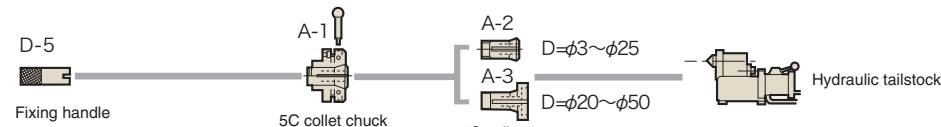
NIKKEN

All of α Series CNC Rotary Tables, as the through holes are standardized $\phi 60$ straight hole, they have same attachment in common. Plentiful attachment can be supplied according to your application.

5C Collet Chuck

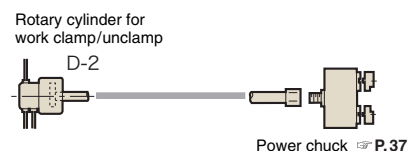
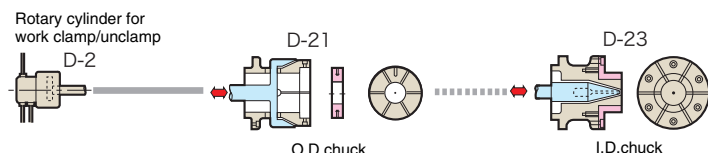
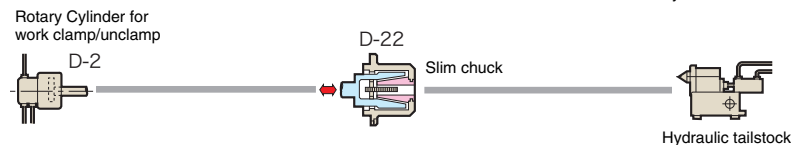
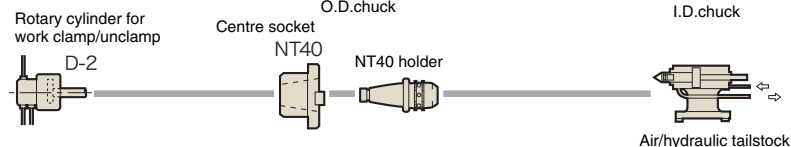
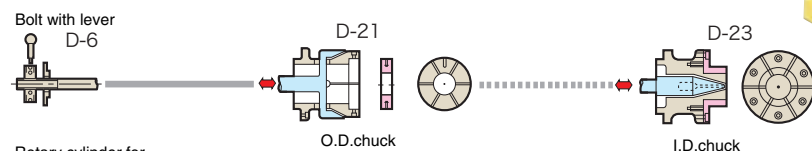
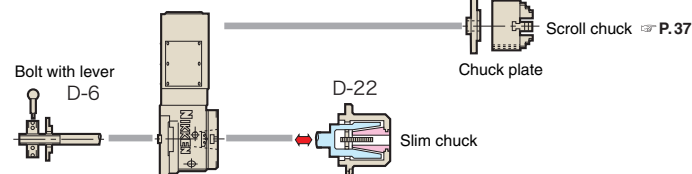


CNC 105A21-5C

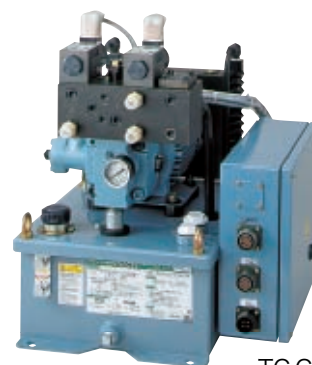


Air/Hydraulic Tailstock

P.38



Hydraulic Unit

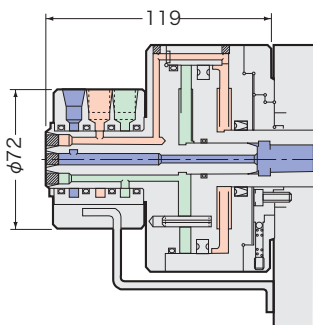


TCC-150

Specifications

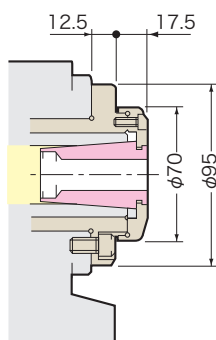
- MAX. 14R /min.
- MAX. 3.5MPa
- AC200~220V, 3 phases, Capacity : 1KVA.
- Solenoid valves and pressure switches depends on your applications.
- Dimension : 400×405×479mm

Rotary Cylinder for Work Clamp / Unclamp



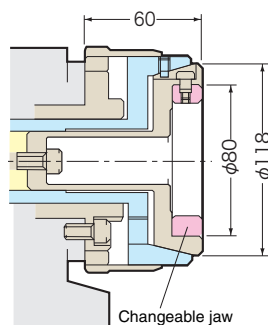
Pulling Force:
3130KN at air 0.5MPa
(Hydraulic cylinder is also available)

Slim Chuck



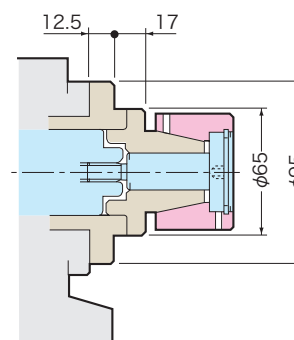
SK Collet
SK10: $\phi 0.75 \sim \phi 10$ mm
SK16: $\phi 2.75 \sim \phi 16$ mm
SK25: $\phi 16 \sim \phi 25.4$ mm

O.D.Chuck



Chucking range: $\phi 25 \sim \phi 80$ mm

I.D.chuck

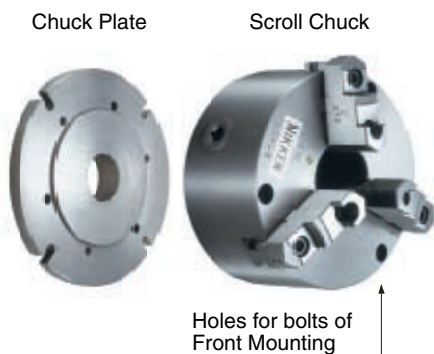


Chucking range:
 $\phi 10 \sim \phi 12$ mm $\phi 30 \sim \phi 40$ mm
 $\phi 13 \sim \phi 16$ mm $\phi 40 \sim \phi 50$ mm
 $\phi 17 \sim \phi 20$ mm $\phi 50 \sim \phi 60$ mm
 $\phi 20 \sim \phi 30$ mm

SCROLL CHUCK & POWER CHUCK

NIKKEN

List of Scroll Chuck & Chuck Plate



- 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.

Scroll Chuck Table Model	4"	5"	6"	7"	9"	10"	12"
CNC105	X-4B						
CNC180		X-5C*	X-6B*				
CNC200			X-6*	X-7C*			
CNC202		X-5C*	X-6B*	X-7A*			
CNC250, 300			X-6B*	X-7A*	X-9E		
CNC321, 401				X-7K	X-9G	X-10D	X-12F, 12G*
CNC501, 601					X-9D	X-10	X-12B
NST250		X-5B	X-6A	X-7B			
NST300			X-6A	X-7B	X-9A	X-10B	
NST450, 500				X-7G	X-9B	X-10C	X-12
5AX-130	X-4B						
5AX-200 II, 220 II		X-5C*	X-6B*	X-7A*			
5AX-230			X-6B*	X-7A*	X-9F		
5AX-300			X-6A	X-7B	X-9A	X-10B	
5AX-350				X-7D	X-9C	X-10A	X-12D
NSVZ180			X-6E				
NSVZ300			X-6A	X-7B	X-9A	X-10B	
NSVX400				X-7D	X-9C	X-10A	X-12C

Chuck plates marked with ★ are used for φ400 tables.

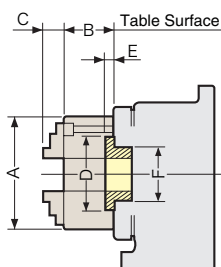


Fig.1

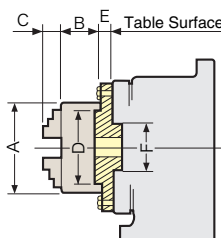
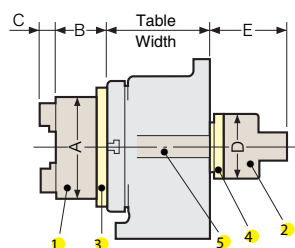


Fig.2

Front End Dimensions with Scroll Chuck & Chuck Plate

Chuck Size	Chuck Plate Code No.	A	B	C	D	E	F	Fig. No.
4"	X-4B	110	60	19	80	13	60	2
5"	X-5B	130	61	23	100	16	60	2
	X-5C*					4	60	1
	X-6*					4	50	1
6"	X-6A	165	68	40	130	16	60	2
	X-6B*					4	60	1
	X-6E					15	60	2
	X-7A*					4	60	1
7"	X-7B	192	77	43	155	16	60	2
	X-7C*					4	50	1
	X-7D					16	80	2
	X-7G					18	75	2
	X-7K					16	105	2
9"	X-9A, 9B, -9C, 9G	233	85	52	190	18	60,75 80,105	2
	X-9D, 9F					20	130,60	2
	X-9E					25	60	2
10"	X-10, 10A -10C, 10D	273	87	55	230	20	130,80 75,105	2
	X-10B					25	60	2
12"	X-12, 12B -12C, 12G	310	92	57	260	20	75,130 80,105	2
	X-12D, 12F					25	80,105	2

★ The dimension from the table surface to the jaw is; [*]: B+C Others: E+B+C



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

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

Power Chuck & Rotary Cylinder

Chuck Size	Power Chuck Code No.	Rotary Cylinder Code No.	A	B	C	D	E	MIN.Table φ
4"	HOIMA-4	HH4C-80	110	70	27	115	215	φ100
		HO5CH-100				130	220	
5"	HOIMA-5	HH4C-80	135	70	27	115	215	φ150
		HO5CH-150				186	235	
6"	HOIMA-6	HH4C-100	165	94	43	135	240	φ170
		HO5CH-175				210	240	
8"	HOIMA-8	HH4C-125	210	110	43	160	250	φ250
		HO5CH-250				290	295	
10"	HOIMA-10	HH4C-125	254	120	43	160	250	φ300
		HO5CH-300				340	310	
12"	HOIMA-12	HH4C-140	304	140	53	180	260	φ320
		HO5CH-300				340	310	

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

★ Above power chucks are not applicable to NST Table. Please contact with us for mounting.

★ Rotary cylinder for 5AX- table is NIKKEN made.

★ NIKKEN air/hydraulic rotary cylinder is also available.

TAILSTOCK (MANUAL, AIR, HYDRAULIC)

NIKKEN



Manual Tailstock



Air/Hyd. Tailstock



Hyd. Tailstock



Support Table TAT P. 14

List of Tailstock and Support Table

Table Model	Centre Height	Manual	Air/Hyd. Tailstock	Hyd. Tailstock	Support Table
		Stroke: 15mm	Stroke: 60mm	Stroke: 100mm	Built-in Brake (Hyd.)
CNC105	105	P-105S	PBA-105		TAT105
CNC180, 202	135	P-125S	PBA-135		TAT170
CNC180B, 202B	180	P-170S	PBA-180	H-170S	
CNC200	150	P-150S	PBA-150	H-150S	TAT200
NST250	155	P-150S		H-150S	
CNC250, 300	170	P-170S	PBA-170	H-170S	TAT250
CNC321, 401	230	P-230S		H-230S	TAT320,400
CNC501, 601	310	P-310S			TAT500,600
NST300	208	P-210S		H-210S	
NST450, 500	288	P-280S			
5AX-130	150	P-150S	PBA-150	H-150S	
5AX-200 II, -220 II	180	P-170S	PBA-180	H-170S	
5AX-230	240	P-230S		H-230S	
5AX-300	225	P-230S		H-230S	
5AX-350	300	P-310S			
CNC100-2, 3, 4W	105		PBA-1052,3,4W		
NSVZ180	135	P-125S	PBA-135		
NSVZ300	170	P-170S	PBA-170	H-170S	TAT250
NSVX400	240	P-230S		H-230S	TAT400

Dimension of Manual Tailstock

Code No.	Centre Height H	A	B	C	D	E	F	G	Weight (Kg)
P-105S	102~110	27	150	76	74	120	195	14	10
P-125S	125~135	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 handed tailstocks are available in all sizes.

★ For P-150S or larger size tailstocks, 5 pcs of changeable centres are included.

Air/Hyd. both usable Small Size Tailstock

Code No.	Centre Height H	H ₁	G	Thrust (N)		Weight (Kg)
				Air 0.5MPa	Hyd. 2MPa	
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

★ Rotary centre is built-in.

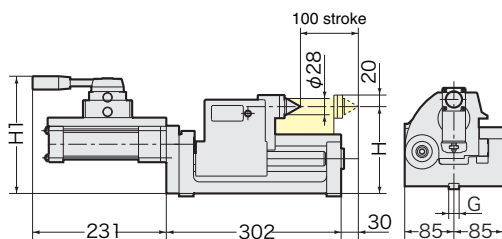
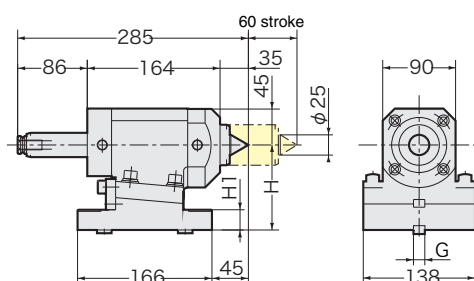
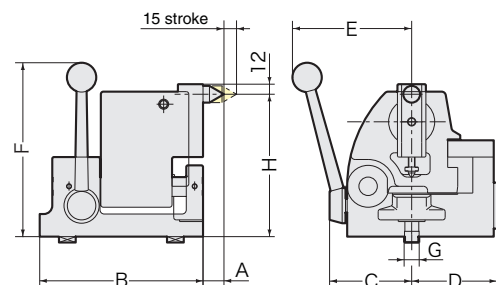
★ MT (Morse Taper) type quill is also available. Please contact with us.

Hydraulic Tailstock

Code No.	Centre Height H	H ₁	G	Thrust (N)	Weight (Kg)
				Hyd. 3.5MPa	
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

★ Rotary centre is built-in.

- For Support Table TAT, refer P. 14
- For details of CNC rotary table for tailstock, please contact with us for more details.
- In case of air/hyd. tailstock, the hydraulic unit, connecting cables and air/hyd. hoses are supplied as an option.



■ CNC Rotary Table

No.	Measuring Item	Measuring Method	CNC105	CNC180 202	CNC200	CNC250 300	CNC321	CNC401	CNC501	CNC601	CNC801	CNC1200
1	Parallelism between table surface and frame bottom (Concave)		0.015mm	0.015mm	0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.04mm
2	Runout of table surface at vertical position		0.01mm	0.01mm	0.015mm	0.015mm	0.015mm	0.015mm	0.02mm	0.02mm	0.02mm	0.03mm
3	Concentricity of centre bore		0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	0.01mm
4	Squareness of table surface at vertical position (Minus deviation at upper part is not permitted.)		0.020mm	0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.03mm	0.03mm	—	—
5	Parallelism between centre line of test bar and key way		At 150mm 0.020mm	At 150mm 0.02mm	At 300mm 0.020mm	0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.02mm
6	Parallelism between side face of frame and table centre line		At 150mm 0.020mm	At 150mm 0.02mm	At 300mm 0.020mm	0.02mm	0.02mm	0.02mm	0.03mm	0.03mm	—	—
7	Indexing accuracy		±30"	±20"	Cumulative 20"	20"	15"	15"	15"	15"	15"	15"
8	Repeatability		4"	4"	4"	4"	4"	4"	4"	4"	4"	4"

★ CNC801 & 1200: At horizontal position

★ For Ultra Precision option: One rank higher accuracies than the above list are inspected.



5AX-230 on 3 Dimensional Measuring Machine

■ NST, 5AX- Tilting Rotary Table

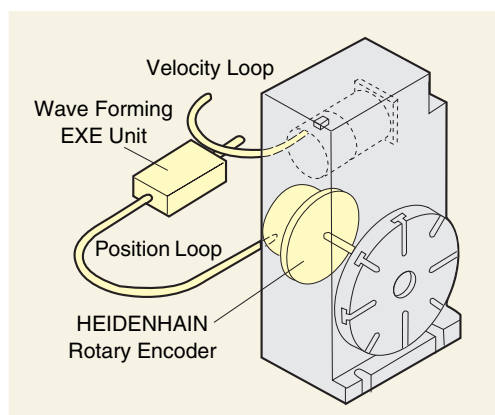
No.		Measuring Method	NST250	NST300	NST-450 500	5AX-130 150	5AX-200II 220II	5AX-230 300	5AX-250 350	5AX-400	5AX-550
1	Parallelism between table surface and frame bottom at tilting angle 0° (Concave)		0.02mm	0.02mm	0.02mm	0.015mm	0.015mm	0.02mm	0.02mm	0.03mm	0.02mm
2	Deviation of table surface at tilting angle 0°		0.02mm	0.02mm	0.02mm	0.01mm	0.01mm	0.02mm	0.02mm	0.02mm	0.02mm
3	Deviation of table centre hole at tilting angle 0°		0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	0.01mm	0.01mm
4	deviation of centre line of rotary axis at tilting angle 90°		0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.02mm	0.03mm
5	Parallelism between table surface and centre line of guide key at tilting angle 90°		0.02mm	0.02mm	0.02mm	0.015mm	0.015mm	0.02mm	0.02mm	0.02mm	0.03mm
6	Squareness of test bar centre line at tilting angle 90°		At 150mm 0.03mm	0.03mm	0.03mm	At 100mm 0.02mm	0.02mm	At 150mm 0.03mm	0.03mm	At 200mm 0.03mm	0.03mm
7	Indexing accuracy of rotary axis		Cumulative 20"	20"	20"	±30"	±20"	Cumulative 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"

★ For Ultra Precision option: One rank higher accuracies than the above list are inspected.

CNC ROTARY TABLE Special Specification 1



■ Ultra Precision (True Closed Loop)



Configuration of Ultra Precision

In ultra precision, 3 grades can be selected for indexing accuracy; $\pm 3''$, $\pm 5''$ and $\pm 10''$ (ISO 230 Accuracy Measuring Method).

High resolution rotary encoder is mounted at the back of Rotary Table for detecting positioning feedback, to realize true closed loop. (Position is detected on the rotating table itself.)

In case indexing unit of 1° or very high rigidity is required, please select Hirth Coupling Index **NSVZ**, **NSVX** series table.

☞ P.27

● Rotary Encoder and Wave Forming Unit for CNC Rotary Table

Table Model	Indexing Accuracy	$\pm 3''$	$\pm 5''$
CNC105, 180, 202		—	RON255, EXE610C
CNC200, 250		RON806, EXE650B	RON255, EXE610C
CNC321, 401, 501, 601		RON806, EXE650B	RON706, EXE610C

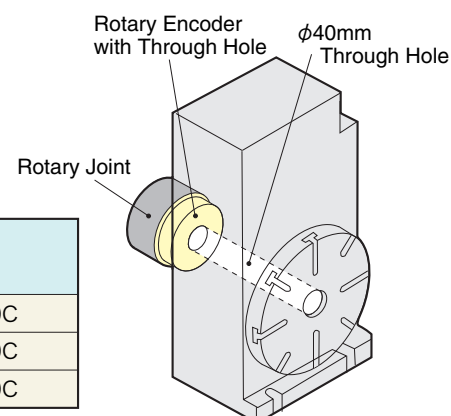
★ The different model rotary encoder can be mounted. e.g. RCN226, RCN723 Please contact with us.

★ EXE unit and cables are not included in ultra precision option. Please order separately.

★ In case of FANUC, the encoder with FANUC serial interface (RCN223, 723) is recommended. In this case, EXE unit is not necessary.

● Rotary Encoder and Wave Forming Unit for 5AX- Tilting Rotary Table

Table Model	Indexing Accuracy	$\pm 5''$	$\pm 10''$
5AX-130, -200II, -220II, -230, 250, 300	Rotary	RON255, EXE610C	—
	Tilting	—	RON255, EXE610C
5AX-350, 400	Rotary	RON255, EXE610C	—
	Tilting	—	RON255, EXE610C
5AX-550	Rotary	RON706, EXE610C	—
	Tilting	—	RON706, EXE610C



The rotary table with RON706 or RON806 has $\phi 40\text{mm}$ through hole, and the rotary joint can be mounted.



Indexing accuracy $\pm 5''$ is available on each tilting axis of **5AX-130**, **5AX-200 II** and **5AX-550**. Please ask for the detail.

■ ISO 230-2 1997 (JIS B 6192-1999)

Accuracy Measuring Method

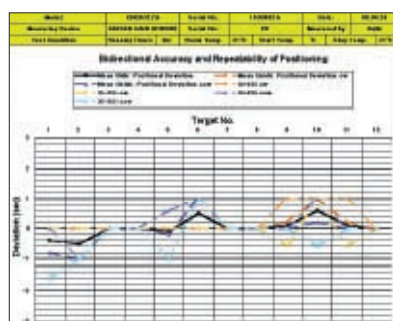
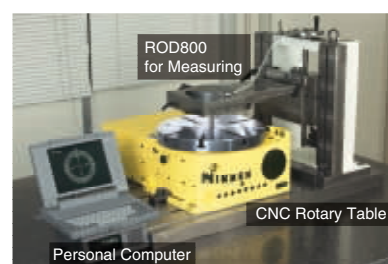
Rotating Axis: $30.2^\circ \times 12$ points

Tilting Axis: $15.2^\circ \times 8$ points

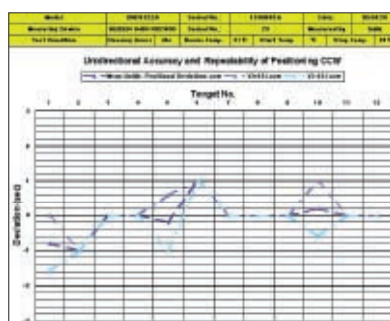
Continually repeating 5 times rotation of CW/CCW, measuring are to be done at above-mentioned points.

And, bidirectional accuracy of positioning, bidirectional repeatability of positioning, unidirectional accuracy of positioning, unidirectional repeatability of positioning etc. are calculated.

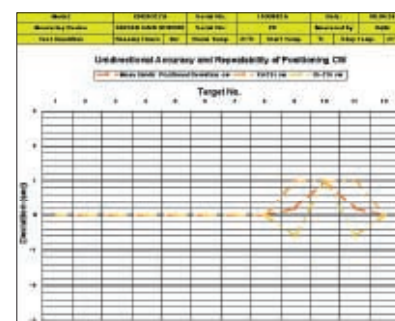
Test data sheet is available in English.



Bidirectional Accuracy and Repeatability of Positioning



Unidirectional Accuracy and Repeatability of Positioning



CNC ROTARY TABLE Special Specification 2

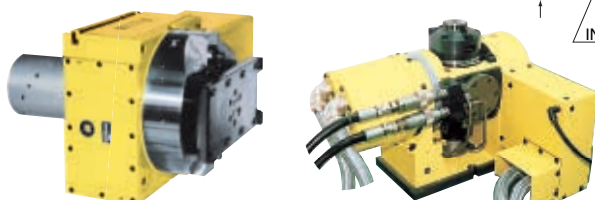
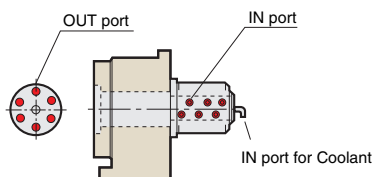
NIKKEN

Rotary Joint

Rotary joint is useful for clamp/unclamp of the work piece, confirmation of proper clamp, cleaning, coolant etc. 3 types of rotary joint are available. The fine cutting swarf may come through the filter into the coolant port, therefore the coolant port is recommended to be separated. (Refer cylinder type rotary joint)

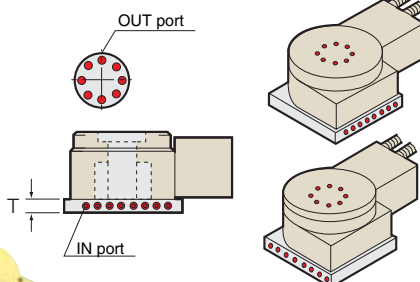
1. Cylinder type Rotary Joint

Retrofitting to standard CNC rotary table is possible.



2. Flange Plate type Rotary Joint

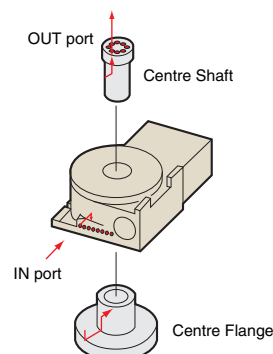
IN ports position can be changed at any angle of 360°. The every position which causes no interference against M/C can be selected.



3. Built-in type Rotary Joint

JAPAN : PAT.

For **CNC321,401,501,601&801**, 8 IN ports are arranged on the table body. Centre flange and centre shaft are as an option.



Code No.	Cylinder type	Flange Plate type	T mm	Built-in type MAX.No. of Ports
	MAX.No. of Ports	MAX.No. of Ports		
CNC 105	4+1*1	4	25	—
180,202	6+1*1	4	25	—
200,250	8+1*1	6	30	—
321,401 401 H, 503H	10+1*1	—	—	8+1*1
501,601	12+1*1	—	—	8+1*1
5AX-130,150	2(4)	—	—	—
200 II, 220 II	3(6)	—	—	—
250	3*2	—	—	—
300	4(6)	—	—	—
350	6*3	—	—	—
400	9*4	—	—	—
550	10*5	—	—	—
NSVZ 180	6+1*1	4	25	—
300	8+1*1	6	30	—
400,500	10+1*1	10+1*1	50	—
TAT 105,170	4+1*1	2	25	—
200,250	8+1*1	4	45	—
320,400,500	10+1*1	6+1*1	35	—

★ () : MAX No. of high column table.

★ *1: +1 port is the port located in the centre hole (for coolant).

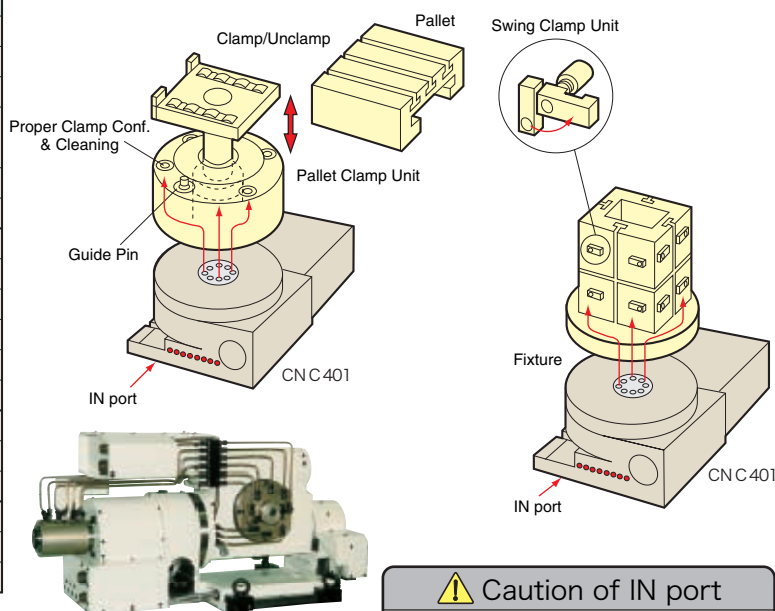
★ *2: 3 reserve ports are provided on **5AX-250**. No additional port is available.

★ *3: 6 reserve ports are provided on **5AX-350**. No additional port is available.

★ *4: 3 reserve ports are provided on **5AX-400** as standard, and the additional 6 ports are available.

★ *5: 4 reserve ports are provided on **5AX-550** as standard, and the additional 6 ports are available.

Application



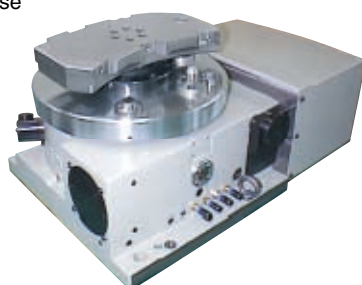
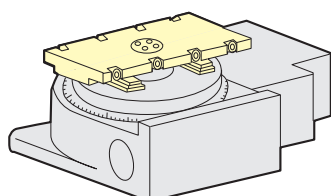
5AX-400 with 9 Ports Rotary Joint

Caution of IN port

- When the air is supplied for all IN ports, please contact with us.
- Please do not supply the different pressure of the air in the next IN port.

Built-in Pallet Clamp System

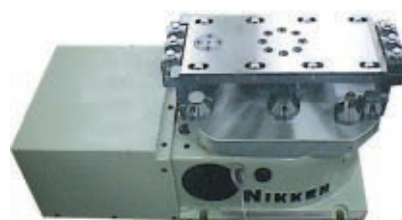
Available to CNC rotary table and 5AX- tilting rotary table. Very suitable to NC special purpose machine and Horizontal M/C as built-in B axis table.



Lifting type Pallet Clamp Unit

Special Color

Please order with the color sample or Munsell Color No.



Pallet Clamp Unit with Automatic Coupler

Water Resistant

Mechanical parts of table are perfectly sealed. For water resistance to electric parts such as motor, switches, and cables, cable directly coming out of CNC rotary table is recommended as an option.

In all of rotary tables with NIKKEN α 21 controller, cable direct out type is used as standard. Harting connector type is also available for the rotary table with α 21 controller as an option.

In all of rotary tables with NIKKEN α 21PW controller, drip proof connectors are used as standard.

For all CNC rotary tables, Δ mark obtained parts or equivalent and CE marked electric parts are used, ensuring high safety.

Δ : Safety approval mark by TÜV RHEINLAND.

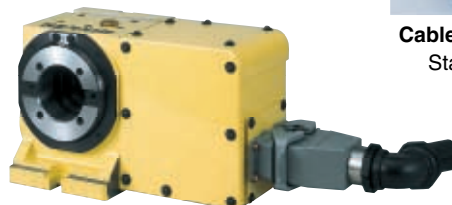
CE : Safety mark required for marketing in Europe from '95.



Cable Direct Out type



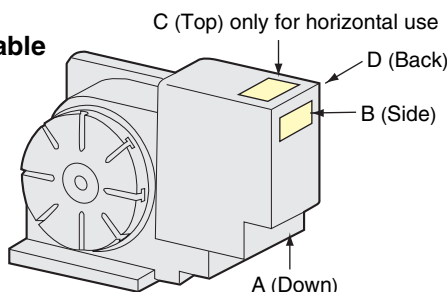
Cable with Blade (Option)
Standard Length: 5m



Harting Connector type

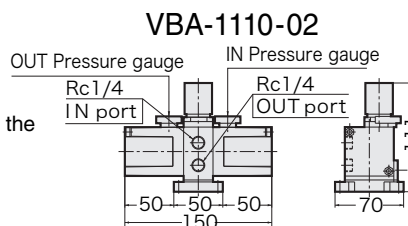
Positions & Directions of Connecting Cable

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



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 Braking System such as the tilting axis of 5AX-130. [P.56](#)



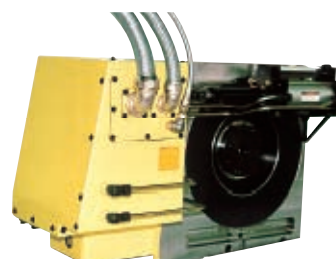
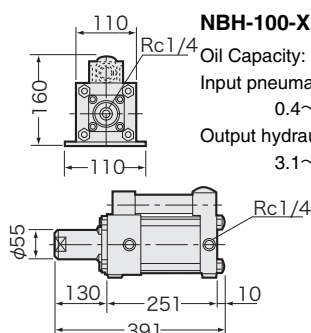
Air Hydraulic Unit

Please order an air hydraulic unit for the machine without hydraulic source.

Applicable for CNC321,401,501,601 & 801.

CNCZ321,401,501,601 & 801.

Please ask for the layout of the unit.



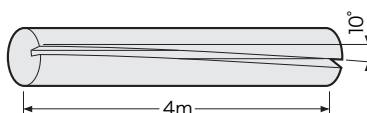
Example of air hydraulic unit located in back side of CNC321

The External Solenoid Valve Unit

This unit is selected for easy maintenance to change the solenoid valves without detaching the motor cover.

Ultra Heavy Duty CNC Rotary Table

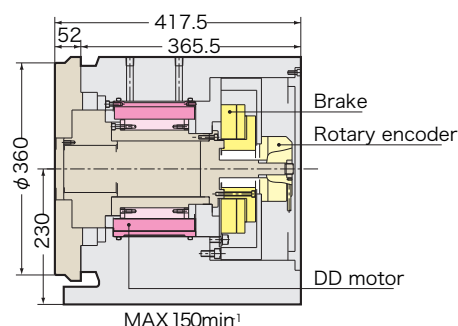
In such lead milling as right hand, the movement of rotating axis is very small in relation to the movement of X axis, servo control will be very difficult. If the cutting conditions and surface finish etc. can not be satisfied with standard CNC rotary table, Ultra Heavy Duty CNC Rotary Table is recommended. (Cutting capability is 5 times of the standard type.)



Ultra High Speed CNC Rotary Table with DD Motor

This table is driven by the Direct Drive motor with high torque, which is perfect for high precision profiling on the M/C driven by the linear motor.

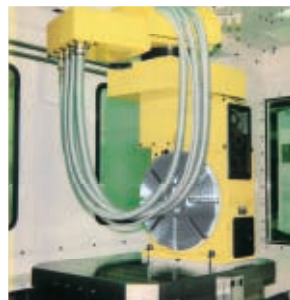
Please ask for the details.



CNC ROTARY TABLE Special Specification 4 **NIKKEN**

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.

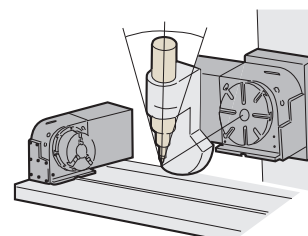
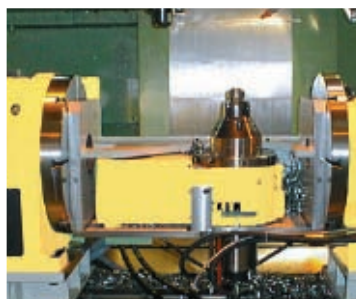
■ Combination with Pallet Changer



2 CNC rotary tables and the distribution box are mounted on the small tapping centre with swing type pallet changer.



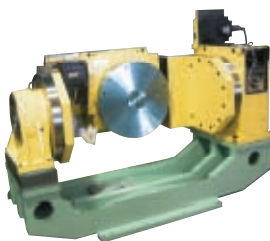
■ Combination of CNC Rotary Tables



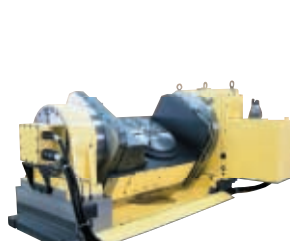
Machining of turbine wheel to use 2 set of CNC rotary tables, one for the swing axis of the HF motor and the other for the rotary axis of the work piece



5AX-400FA-RJ8-800/150



5AX-500MA-RJ10-900/100



5AX-321FA



CNC180 + TAT105 + CNCZ503

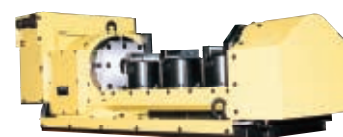
■ Application of CNC Rotary Table with Support Table



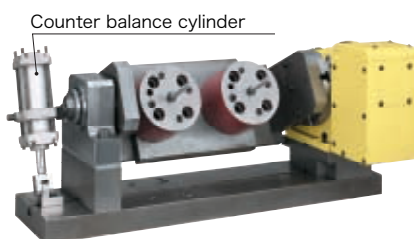
CNC170 + TAT105



CNC601 , 3m Jig Block & TAT500

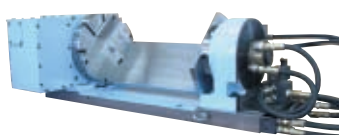


3 sets of power chucks are used for work clamping.

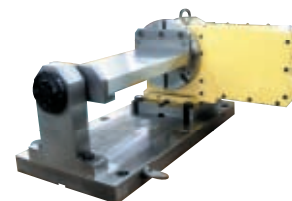


Counter balance cylinder

In case of the application with the support table, un-balancing torque used to be large. The counter balance cylinder is highly recommended. ☞ P. 6



NSVZ300 + TAT200



CNC170 + Special Support Table

CNC ROTARY TABLE Special Specification 5

NIKKEN

Example of 5AX Rotary Table location on M/C

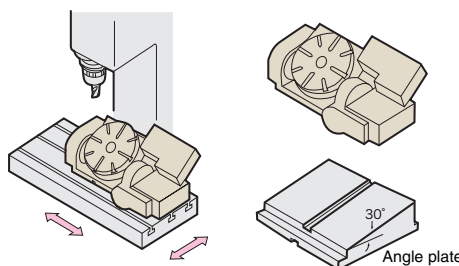
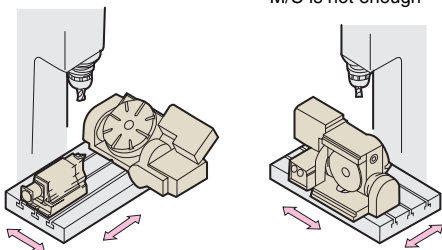
There are various ways of arrangement.

▼ Tail Stock is used together.

▼ Y axis stroke of the M/C is not enough

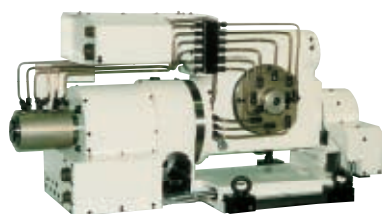
▼ Y axis stroke is enough

▼ Tilting range is 30-135

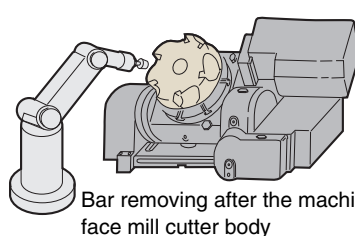


5AX-300 Example on the angle base (60)

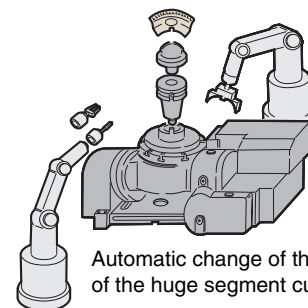
Application of 5AX-Table



5AX-400 with 9 ports rotary joints



Bar removing after the machining of face mill cutter body

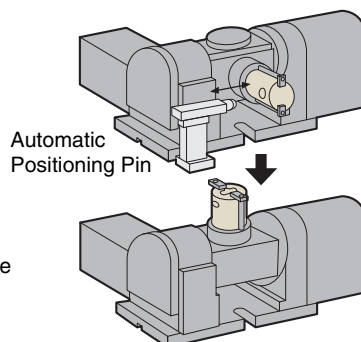
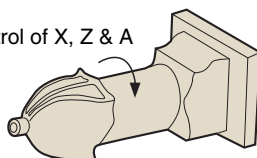


Automatic change of the insert tips of the huge segment cutter

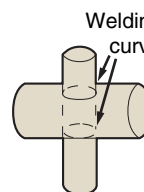


Built-in 5AX-Table for the die moulding machine

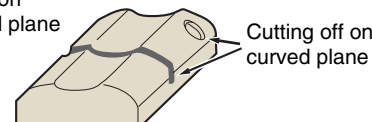
Simultaneous 3 axes control of X, Z & A axis instead of turning.



Automatic Positioning Pin



Welding on curved plane

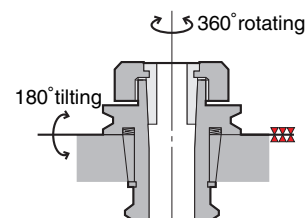


Cutting off on curved plane

5AX-Table on Laser Welding/Cutting off Machine

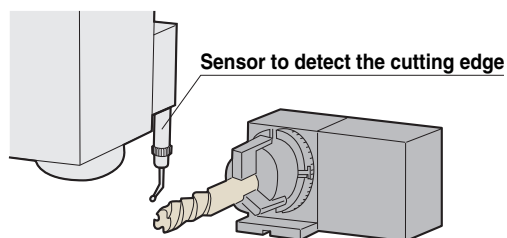
1. The work piece is exchanged by ROBOT, the positioning pin goes forward, then the work piece is clamped at the tilting axis = 90°.
2. The positioning pin goes backward, the tilting axis moves to 0°, then the machining starts.

The tilting movement is used only for automatic work piece exchange

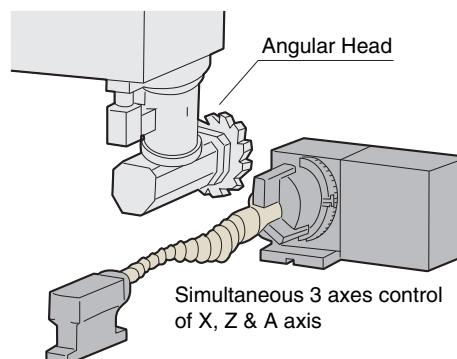


5AX-Multi Spindle Table + Jig Holder with Through Hole

Other Application

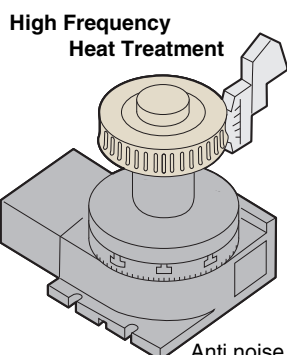


Work piece (Cutter) is exchanged by ROBOT, and the cutting edge will be detected automatically.



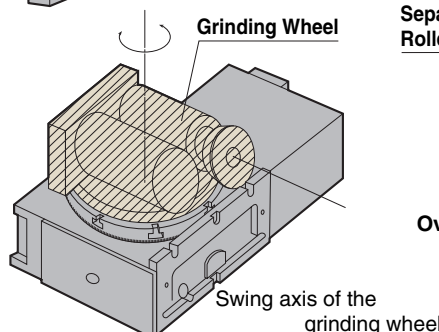
Angular Head

Simultaneous 3 axes control of X, Z & A axis



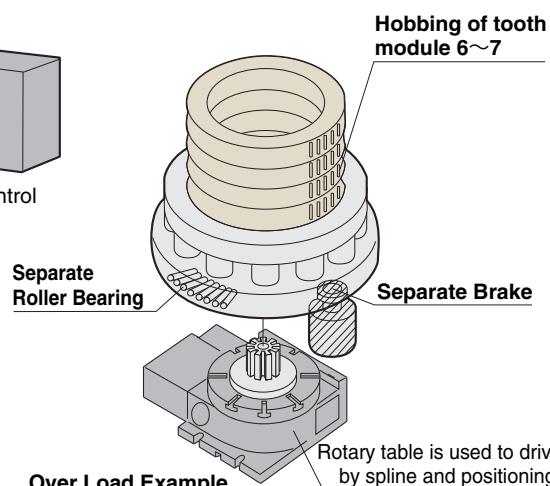
High Frequency Heat Treatment

Anti noise process is required.



Grinding Wheel

Swing axis of the grinding wheel



Hobbing of tooth module 6~7

Separate Roller Bearing

Separate Brake

Over Load Example P. 46

Rotary table is used to drive by spline and positioning.

Assessment of CNC ROTARY TABLE

NIKKEN

Assessment for Reliability & Quality.

Over Load Test

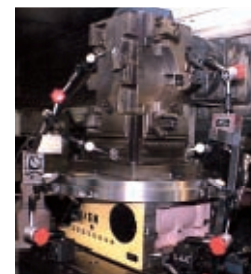
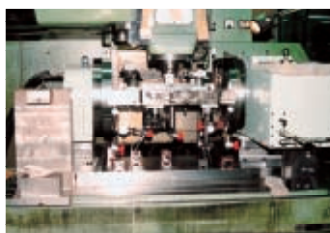
The wearing of the worm wheel is very small under very severe testing condition.



Brake Torque Test



Rigidity Test



Cutting Stability Test

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



EMC Test

Electromagnetic Compatibility Test



Emission



Immunity

Water Proof Test



Declaration of Conformity



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°C~40°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

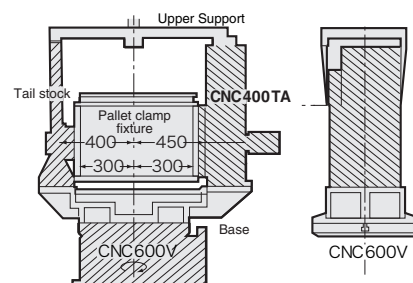
- fix to the machine table using the fixings provided.
- Please follow the instruction manual for installation, wiring of cables and hoses.
- Failure to connect wiring correctly may cause fire or a serious accident.
- This table has been given a waterproof treatment, however if ingress of coolant should 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 with us in case of the beyond the specification before ordering. **P.46**
- 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 deflection of work piece and jig fixture are found. Irreparable damage may be happened. Please contact with your distributor for repair.

Technical Information of CNC ROTARY TABLE **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	Quantity	Approx. Weight (Kg)	Approx. GD ² (GD ² /4) Kgm ²
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: 120mm	1	80	6
Total			560	91

2 Indexing Time Comparison

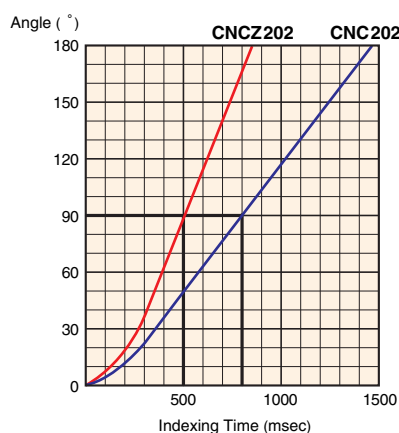
Indexing Time = Acceleration Time + Rapid Positioning Time + Deceleration Time.

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 its excellent acceleration / deceleration capability, gives a very substantial time saving of approximately 300 msec. on this 90° movement comparing with **CNC202** (standard).

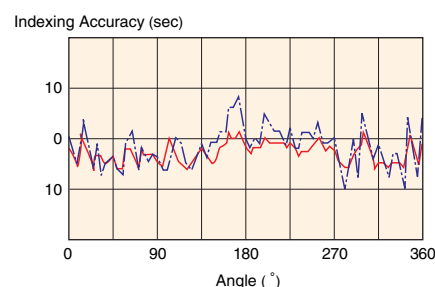
CNCZ202 : 500 msec.

CNC 202 : 800 msec.

Item	Rapid Positioning Speed	Acceleration/Deceleration Time Constant
—	44.4min ⁻¹	150msec
—	22.2min ⁻¹	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.

4 Overseas After Service...Refer back side of this catalogue P. 58

NIKKEN overseas service branches are located in 12 countries. The spare parts of standard tables are stocked in our branches. And, you can take our service by our service engineers trained in Japan.

SI Unit & Gravity Unit SI is the abbreviation of "Système International d'Unités".

Item	SI Unit	Gravity Unit	Conversion
Clamping torque	N·m	kgf·m	1kgf·m=9.8N·m
Table Inertia at Motor Shaft *	$(\frac{GD^2}{4}) \text{ kg} \cdot \text{m}^2 \times 10^{-3}$	kg cm sec ²	1kg cm sec ² =102 × $(\frac{GD^2}{4}) \text{ kg} \cdot \text{m}^2 \times 10^{-3}$
MAX. Motor Rotation Speed	min ⁻¹	rpm	1rpm=1min ⁻¹
MAX. Table Rotation Speed			
MAX. Thrust Load applicable on the Table	N	kgf	1kgf=9.8N
	N·m	kgf·m	1kgf·m=9.8N·m
MAX. Work Inertia *	$(\frac{GD^2}{4}) \text{ kg} \cdot \text{m}^2$	kg cm sec ²	1kg cm sec ² =0.102 × $(\frac{GD^2}{4}) \text{ kg} \cdot \text{m}^2$
Driving Torque	N·m	kgf·m	1kgf·m=9.8N·m
Air/Hydraulic Pressure	MPa	kgf/cm ²	1kgf/cm ² =0.098MPa

* The unit of inertia is expressed in GD².

NIKKEN CONTROLLER Specification1

NEW

NIKKEN

■ Minimum Command Increment: 0.001° or 1sec.

α 21 controller can drive all models of NIKKEN CNC rotary table.

■ 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. **NEW**

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. P

■ Up Grade of Water Proof Characteristic **P.56**

EMC Assessment **P.45**

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

■ The Latest Designed Digital Servo System

The dimension of the servo motor became more compact and the torque is powered up.

Very excellent acceleration/deceleration characteristics, the powered up torque and the best suited servo parameter realize the high quality and long life.

■ 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, Pitch Error Compensation

■ More than 15,000 sets working in the field.

This fact ensures the highest reliability.



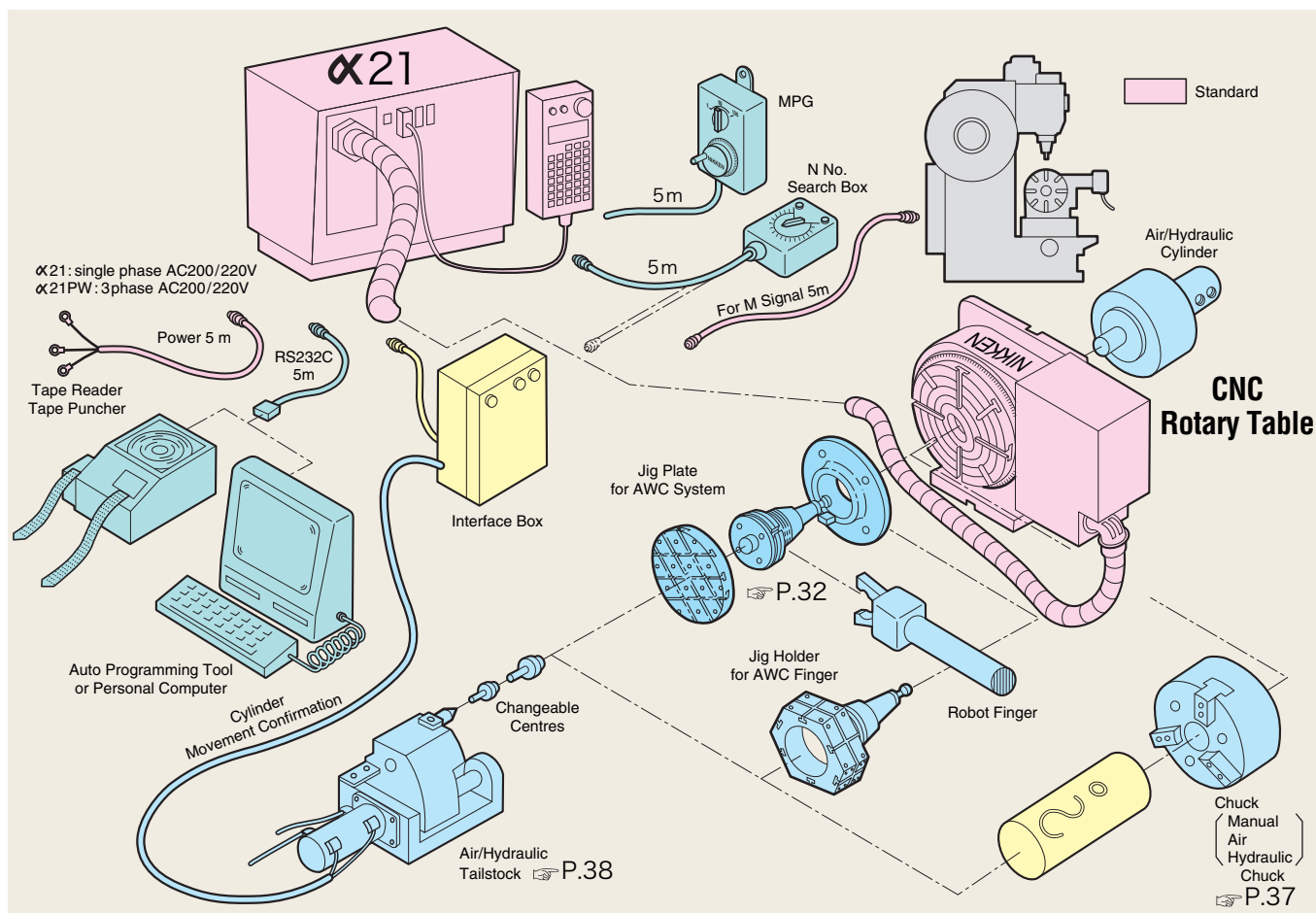
α 21 controller

- Standard (400W, 750W)
480×280×340 25kg
- Single Phase AC200/220V



α 21 PW controller

- Power up (1,300W, 1,800W)
540×360×400 28kg
- 3 phase AC200/220V



NIKKEN CONTROLLER Specification 2

NEW

NIKKEN

Main Specification of Controller (NIKKEN- α 21 controller)

The operation, programming and the interface to M/C are interchangeable with the old NIKKEN controllers (α , 8800AX).

Item	Specification	Remarks
MIN. Increment	0.001° or 1"	Free Selection
MAX. Programmable Angle	± 9999 rotation, $\pm 999.999^\circ$ & $\pm 999^\circ 59'59''$	Free Selection
MAX. Equal Dividing	2~9999 equal dividing	
Program Capacity	1000 Blocks	N000~N999
Input System	MDI Key Board, Pendant type	5 years memory
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...	G01~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.	↑ ↓
RS232C Interface	Block data/ parameter data can be up loaded/down loaded through RS232C interface.	
	Direct angle command interface enables that the positioning can be commanded from M/C, and all management of the program can be done on M/C.	Custom macro is necessary on M/C.
	RS232C automatic loading function enables that successive block data can be down loaded from M/C and all management of the program can be done only on M/C.	Custom macro is necessary on M/C.
Software Limit Function	\pm stroke limit values can be set by parameter, and table does not move beyond this range.	
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.	Standard for 5AX- type tilting axis
Alarm No. Automatic Indication Function	When alarm is detected, controller automatically goes to diagnosis mode and Alarm No. is displayed.	When duplicated, it flickers every 2 sec.
Alarm Out	Alarm condition of α 21 can be sent to M/C	Option
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
Feed Rate Override	5~200%,999% (Rapid feed)	$\pm 5\%$
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	1 Block Finish signal, Work Zero Position Signal, Alarm Out Signal *2	Ask Time Chart
Servo Motor	AC servo motor with serial encoder	
Input Power	α 21: Single phase AC200~220V, 50Hz/60Hz	400W: 0.7KVA, 750W: 1.3KVA
	α 21 PW: 3 phase AC200~220V, 50Hz/60Hz	1,300W: 1.4KVA, 1,800W: 1.8KVA

※ 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

This is to be used for ultra precision rotary table.

2 Manual pulse generator (X1, X10, X100)

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 α 21 side. α 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° unit \times 24 points
Tilting Axis:
by 5° unit \times 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 α 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 the PENDANT 1

NIKKEN



- 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
- ⑧ Start Button
- ⑨ Stop Button
- ⑩ Continuous Feed Button
- ⑪ Original Point Set Button
- ⑫ Machine Zero Return Button
- ⑬ Work Zero Return Button
- ⑭ Diagnosis Button
- ⑮ Increment/Decrement of Block No.
- ⑯ Feed Rate Override Button
- ⑰ Reset Key

- **READY** Turned ON when input power is supplied.
- **COM.** Turned ON while α 21 main unit and the pendant are communicating.
- **ALARM** Turned ON when α 21 is in alarm condition.
- **COM. ALARM** Turned ON when communication time out error occurs between α 21 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").

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	Gear Ratio	Table Movement
1 : 720	0.5°	1 : 90	4.0°
1 : 360	1.0°	1 : 60	6.0°
1 : 180	2.0°	1 : 45	8.0°
1 : 120	3.0°		

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, ⑭, ⑮, ⑰ are ineffective.

⑦ Edit/Current Position Select Switch

On θ of ⑮, programming or present position is displayed alternatively.

⑧ Start Button

The table rotates as programmed.

⑨ Stop Button

The table slows down and stops. (Feed Hold Function). When ⑧ is depressed again, the table rotates the remaining angle of the program.

⑩ Continuous Feed Button

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.51 ⑧)

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 ⑪ clockwise in rapid feed.

⑭ Diagnosis Button

⑮ Increment/Decrement of Block No.

Previous block data and next block data are displayed.

⑯ Feed Rate Override Button

POS mode: Increasing feed rate 5 to 200% every 5% → Rapid feed (999).

PRM mode: Displays the following parameters sequentially.

POS mode: Decreasing feed rate 200 to 5% every 5%.

PRM mode: Displays the proceeding parameters sequentially.

⑰ Reset Key

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

Explanation of the PENDANT 2

NIKKEN

⑮ Display

N		N'		D/Q			
θ /P				F/L			
G ₁		G ₂		%		INC/ABS	
MODE		Z R N - M W		START/STOP			

N : Sequence No.

N000~N999

N RS: Direct angle command interface is selected.

N': Jump & Return

J000~J999, RET

θ : Rotation angle of table (Decimal, Sexagesimal)

0~±999.999° (Decimal)

0~±999.59'59" (Sexagesimal)

D : Equal division (divided by 2 to 9999)

F : Feed rate

Cutting feed: 0.01~9.99min⁻¹

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 Flicking (Returning to M ZERO)

M (Stop at M ZERO)

W Flicking (Returning to W ZERO)

W (Stop at W ZERO)

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

STOP (Stop)

⑯ 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 ⑮ 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° to ±999° 59'59" in 1" increment.

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 ±999.999 sec.).

P : Starting number of repeating function (G27)

000 to 999.

DIV

DIV(4 digits)
Q(3 digits)

F

F, L(3digits)

G
NO

DIV: Automatic equal dividing times 0 to 9999.

Lead cutting instruction (G07) 0 to 999.

Q : Final number of repeating function (G27)
000 to 999.

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

G21 : Simultaneous start

G22 : Continuous start

G23 : Machine zero point return

G24 : Work zero point return

G27 : Repeating function

G28 : Programmable machine

zero position return

*G90 : Absolute command

*G91 : Incremental command

G92 : Coordinate system setting

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 as follows;

G0708

and indication will become as ;

G1	G2
07	08

When you want to enter 9°, just depress keys as $\theta \rightarrow 9 \rightarrow \square$, and 9.000° or 9°00'00" is displayed.

DATA

PRM

INPUT

C

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 θ , DIV, or F individually, just depress θ , DIV, or F, then depress. Also when you depress * with pressing C, complete one block is deleted.

Deleting successive blocks

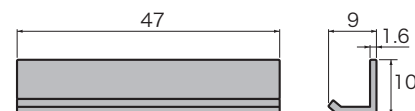
For example, in order to delete blocks from N000 to N999, push keys $\square 0 \square 999$ at Edit mode, and jog * while depressing C key.

means optional function.

Operation of the pendant of $\alpha 21$ controller for tilting axis specification differs, please refer instruction manual.

Operation of the pendant of $\alpha 21$ controller for NSVZ index specification differs, please refer instruction manual.

★ The hole to hang the pendant panel on is located back side of the pendant.
Please make the hook by yourself.



N
(3digits)

J
(3digits)

RET

θ
P

θ (±6~7digits)
P (3digits)

Operation & Confirmation of PROGRAMS

NIKKEN

Before programming, be sure that mode is **EDT**.

Before start the programs, push **ⓧⓧ** or **ⓧⓧ** in **EDT** mode, and confirm input date. Then start the program in **MAN** mode to confirm the moving.

Operation of Keys.

① Angle Dividing		<p>N 000 ⓪ 45 ⓧ F 0 ⓧ ———— Rapid feed.</p> <p>Input Angle ———— No need of pressing 0 under decimal point.</p> <p>N 000 → ST ———— Sequence No.</p>
② Arc Milling		<p>N 000 ⓪ 45 1 23 F 1 23 ⓧ ———— 123 x 1/100 min⁻¹ rotation speed.</p> <p>means 45.123°</p> <p>Cutting Feed : = 2 π R x 1.23 min⁻¹</p> <p>= 7.7 R mm/min.</p> <p>N 000 → ST</p>
③ Equal Dividing		<p>N 000 J 0 ⓪ 45 ⓧ F 0 ⓧ</p> <p>After finishing N000 return to N000.</p> <p>N 000 → ST</p>
④ Unequal Dividing		<p>N 000 ⓪ 45 ⓧ F 0 ⓧ</p> <p>001 ⓪ 3 5 1 20 ⓧ</p> <p>002 ⓪ 6 1 5 67 ⓧ</p> <p>003 ⓪ 9 3 5 67 ⓧ</p> <p>004 ⓪ 6 7 3 50 ⓧ</p> <p>005 J 0 ⓪ 5 7 3 96 ⓧ</p> <p>In case of the same feed rate in the following blocks just command once. (Modal type)</p> <p>After finishing N005 return to N000.</p> <p>N 000 → ST</p>
⑤ Incremental/ Absolute Dividing		<p>N 000 ⓪ 4 5 1 2 3 F 0 G 9 1 ⓧ</p> <p>001 ⓪ 1 8 1 5 6 7 ⓧ ———— Incremental Command (Modal Type)</p> <p>002 ⓪ 9 0 9 8 7 ⓧ</p> <p>003 J 0 ⓪ 0 ⓧ ———— To W zero-point</p> <p>N 000 → ST ———— Absolute Command (Modal Type)</p>
⑥ Repeating Function		<p>N 000 ⓪ 1 3 ⓧ F 0 ⓧ</p> <p>001 ⓪ 1 4 ⓧ ⓧ</p> <p>002 ⓪ 1 8 ⓧ ⓧ</p> <p>003 G 2 7 ⓪ 0 ⓧ L 2 F 2 ⓧ</p> <p>Command of repeating function</p> <p>θ : Starting N000</p> <p>Q : Finishing N002</p> <p>L : Repeat 2 times</p> <p>• SUB-Program (J/RET) and Loop-Jump Function (G25) can be used. However, programming can be done more easily when Repeating Function (G27) is used.</p> <p>N 000 → ST</p>
⑦ Counter Clockwise Rotation		<p>N 000 ⓪ 4 5 ⓧ F 0 ⓧ</p> <p>Counter Clockwise (CCW)</p> <p>N 000 → ST</p>
⑧ Continuous Feed 0.5		<p>N 997 ⓪ 0 ⓧ F 5 0 ⓧ ———— Continuous feed 0.5min⁻¹ (CCW)</p> <p>Command of continuous FeedStart</p> <p>CF ———— Start</p> <p>SP ———— Stop</p>
⑨ Equal Dividing of Arc		<p>N 000 ⓪ 9 0 ⓧ DIV 1 3 F 2 0 0 ⓧ</p> <p>001 ⓪ 1 1 2 ⓧ DIV 2 3 F 0 ⓧ ———— This means 90° ÷ 13.</p> <p>002 J 0 ⓪ 1 5 8 ⓧ DIV 1 1 ⓧ ———— Feed rate can be commanded from 0.01 min⁻¹ to rapid speed.</p> <p>N 000 → ST</p>
⑩ Equal Dividing of Circle (360°)		<p>N 000 ⓪ 3 6 0 ⓧ DIV 9 1 F 0 ⓧ ———— 91 Equal dividing of circle and go to N001</p> <p>001 ⓪ 3 6 0 ⓧ DIV 7 7 ⓧ ⓧ ———— 77 Equal dividing of circle and go to N002</p> <p>002 ⓪ 3 6 0 ⓧ DIV 1 1 1 ⓧ ⓧ ———— 111 Equal dividing of circle and go to N003</p> <p>003 ⓪ 3 6 0 ⓧ DIV 2 3 1 ⓧ ⓧ ———— 231 Equal dividing of circle and go to N004</p> <p>004 J 0 ⓪ 3 6 0 ⓧ DIV 1 2 3 1 ⓧ ⓧ ———— 1231 Equal dividing of circle and return to N000</p>
⑪ M function		<p>Optional Specification</p> <p>N 000 G 6 0 ⓧ ———— Tailstock forward</p> <p>001 ⓪ 3 6 0 ⓧ DIV 1 0 ⓧ ⓧ ———— Circle is equally divided into 10 sections.</p> <p>002 G 6 1 ⓧ ⓧ ———— Tailstock backward</p> <p>Example of automatic operation using M function. G62 on the rotary axis controller is M function to active the tilting axis controller for 5AX- table.</p>

Example of PROGRAMS

NIKKEN

1 Example for Circle Drilling & Tapping (23 equal dividing)

● Program of NC Machine

```

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 ;
    
```

● Program of ♂ 21

```

N 0 0 0 J 0 0 3 6 0 0 2 3 F 0 *
    
```

23 equal dividing of 360°
After finishing N000, return to N000 again.

23 equal dividing on circle for drilling & tapping

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°.

2 Example for Arc Milling

● Program of NC Machine

```

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 ;
    
```

● Program of ♂ 21

```

N 0 1 0 0 2 1 0 0 F 0 G 9 1 * ...Rapid feed to starting point ①
Incremental command (Modal Type)
0 1 1 0 1 2 0 0 F 5 0 * ...Arc milling to ②
Milling by rotating speed of 0.5min-1
0 1 2 J 1 0 0 3 0 0 F 0 * ...30° of rapid feed to work zero position
After finishing N012, return to N010
    
```

Calculation of cutting speed
 $100 \times \pi \times 50 \times 1/100 \text{ min}^{-1} = 157 \text{ mm/min}$

3 Example for Lead Cutting

● Program of NC Machine

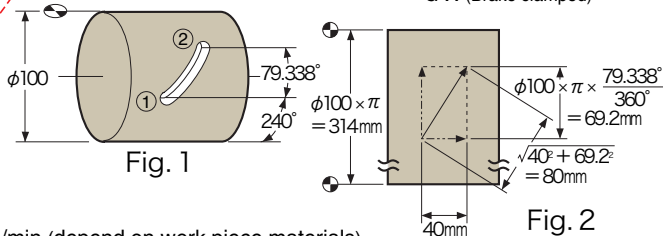
```

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 ;
    
```

● Program of ♂ 21

```

N 0 2 0 0 2 4 0 0 F 0 G 9 1 * ...Rapid feed to starting point ①
0 2 1 0 1 0 * ...Brake unclamped
0 2 2 0 7 9 3 3 8 F 5 5 G 2 1 * ...Cutting feed to ②
*2 Simultaneous start
0 2 3 J 2 0 0 0 0 G 9 0 1 1 * ...Rapid feed to work zero position
G 9 0 (Absolute) & G 1 1 (Brake clamped)
    
```



— 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: $F_x = 200 \text{ mm/min} \times 40 \text{ mm} \div 80 \text{ mm} = 100 \text{ mm/min}$ F100 *1
4. Cutting speed of θ axis: $f = 200 \text{ mm/min} \times 69.2 \text{ mm} \div 80 \text{ mm} = 173 \text{ mm/min}$
 $173 \text{ mm/min} \times 1 \text{ min}^{-1} \div 314 \text{ mm/min} = 0.55 \text{ min}^{-1}$ F55 *2

4 Example of continuous rotation as turning operation

● Program of NC Machine

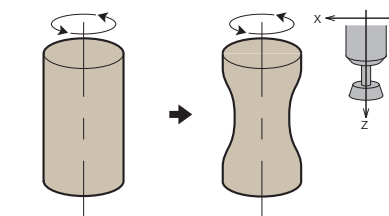
```

0 0 0 4 ;
M 2 1 ; Start continuous rotation
X & Z Contouring
M 2 1 ; Stop continuous rotation
M 2 1 ; Machine zero position return with dog
    
```

● Program of ♂ 21

```

N 0 3 0 G 2 2 * ...Continuous rotation
N 0 3 1 J 3 0 G 2 8 * ...Programmable machine zero position return with dog
N 9 9 7 0 1 0 0 F 3 0 0 *
    
```

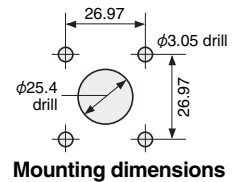


The direction and feed rate of continuous rotation are specified on N997. When higher rotation speed than standard is required, please contact with us.

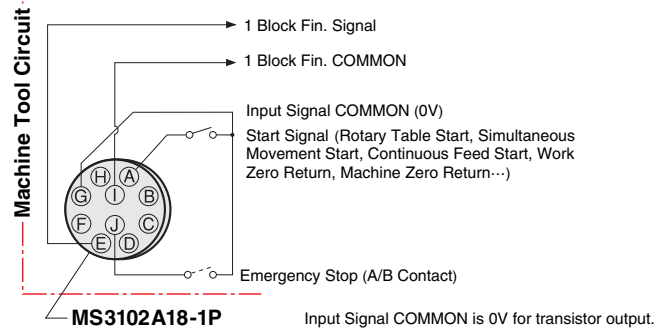
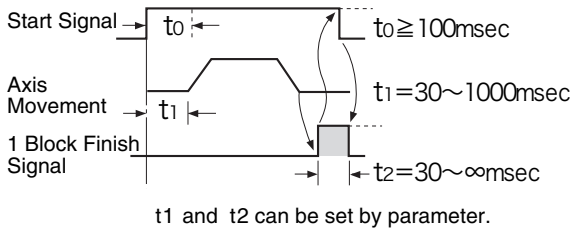
The Connection of $\alpha 21$

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.



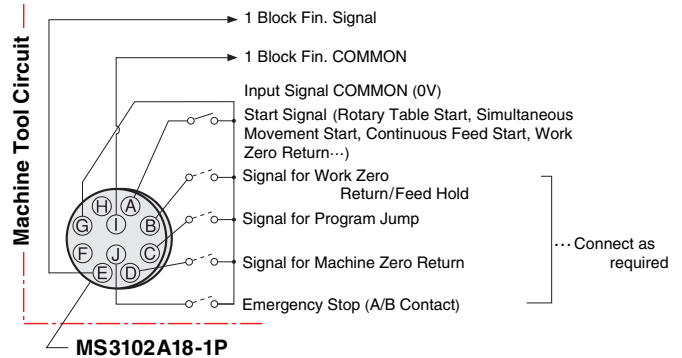
Input/Output Time Chart



Connection for Automatic Operation

Once program is loaded to $\alpha 21$, 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



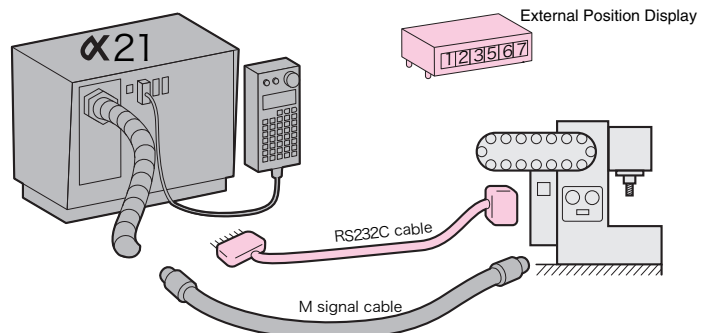
RS232C Automatic Loading Interface. ... Pendant is to be used for manual operation and maintenance only.

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.)



M/C Main Program
e.g. Machining of Imperial Blade

```
O 0001 ;
G65 P8000 ;
...
G01 Z_ ;
X300 ;
Y_Z_M21 ;
X0 ;
Y_Z_M21 ;
X300 ;
...
```

X0 X300.



Macro Program
(Down Loading to $\alpha 21$)

```
O 8000 ;
M24 ; Activate alpha 21 automatic loading function.
POPE N ;
#100=165 ; } Send %,CR,LF.
BPRNT [#100[0]] ;
DPRNT [N10 G90 A22.149] ; } Send block data.
...
#100=165 ; } Send %,CR,LF.
BPRNT [#100[0]] ;
G04 P3000 ; Dwell 3sec.
PCLOS ;
M99 ;
```

N No. must be specified on each block data.

■ RS232C Direct Angle Command Interface **JAPAN PAT.P**

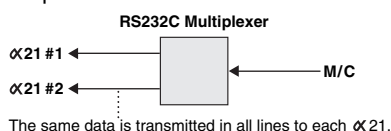
NEW

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 only on M/C.

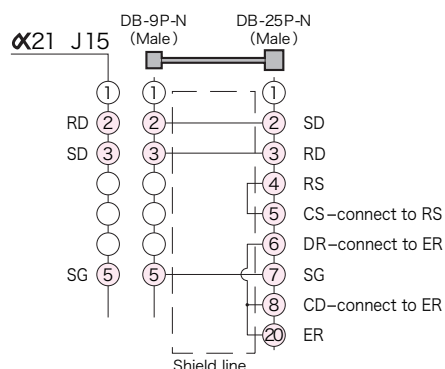
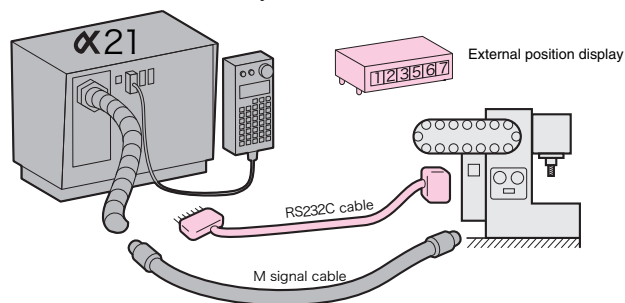
Required functions at the M/C

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

5AX-table with 2 off $\alpha 21$ controllers or 2 or more $\alpha 21$ controllers can be connected to use RS232C direct angle command interface. In this case, RS232C multiplexer is required and the same number of M signals as the number of $\alpha 21$ controllers are required.



... Pendant is to be used for manual operation and maintenance only.



● 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.

● Call off macro program for direct angle command

G65 P8000 M _____ A _____ E _____ F _____ D _____ ;

ID No. (can not be omitted.)

Please specify the value of PRM #1 on $\alpha 21$.

Feed rate 000,001~999

Number of equal dividing

Angle command (can not be omitted. **A**: Rotary axis, **B**: Tilting axis)

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;
POPEN;
#100=165;
BPRNT [#100[0]];
IF [#13 EQ #0] GOTO 5;
IF [# 8 EQ #0] GOTO 3;
IF [# 9 EQ #0] GOTO 2;
N1 DPRNT [ID#7[10] G#13[20]A#1[43]E#8[40]F#9[30]];
GOTO 10;
N2 DPRNT [ID#7[10] G#13[20]A#1[43]E#8[40]];
GOTO 10;
N3 IF [#9 EQ #0] GOTO 4;
DPRNT [ID#7[10] G#13[20]A#1[43]F#9[30]];
GOTO 10;
N4 DPRNT [ID#7[10] G#13[20]A#1[43]];
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;
    
```

```

N6 DPRNT [ID#7[10] A#1[43]E#8[40]];
GOTO 10;
N7 IF [#9 EQ #0] GOTO 8;
DPRNT [ID#7[10] A#1[43]F#9[30]];
GOTO 10;
N8 DPRNT [ID#7[10] A#1[43]];
N10 BPRNT [#100[0]];
G04 P200;
P CLOS;
M99;
    
```

Caution

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. Please contact with us for more details.

Compact CNC ROTARY TABLE with $\alpha 21$

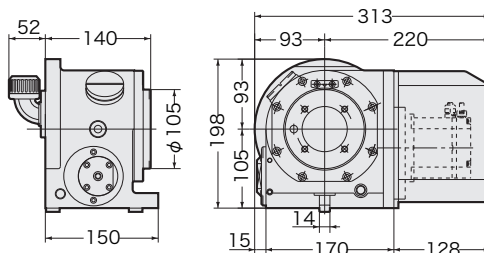
NEW

NIKKEN

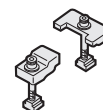
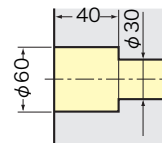
Dimensions with NIKKEN $\alpha 21$ controller are shown. Please contact with us for CAD(DXF format).

CNC105A21

NEW



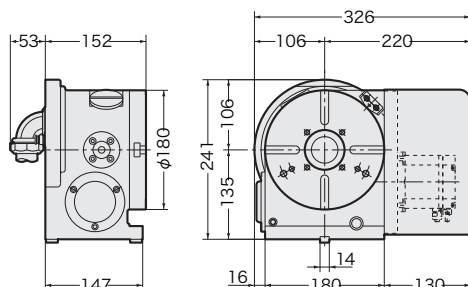
Powerful Brake
Brake Torque : 205Nm



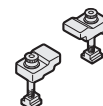
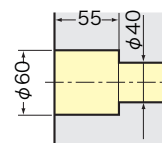
Air purge function is provided.

CNC180A21

NEW



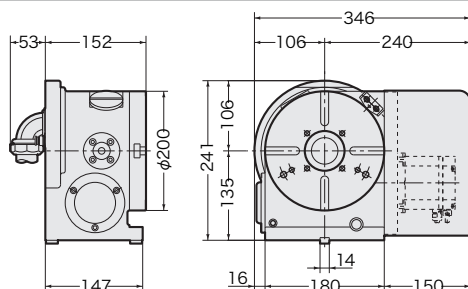
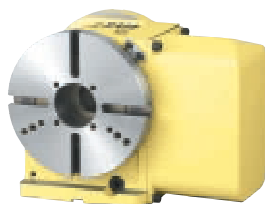
Powerful Brake
Brake Torque : 303Nm



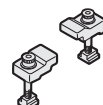
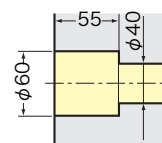
Air purge function is provided.

CNC202A21

NEW

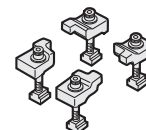
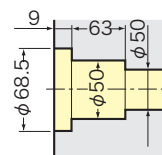
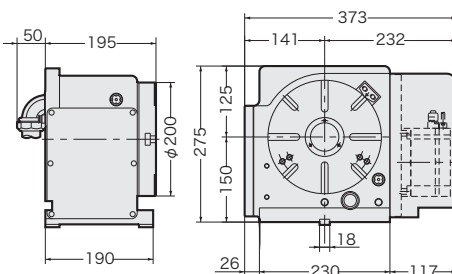


Powerful Brake
Brake Torque : 303Nm

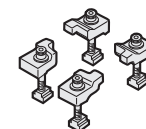
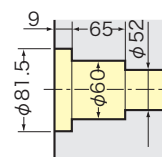
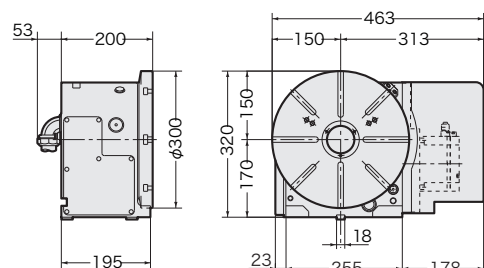
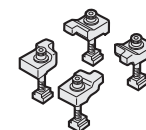
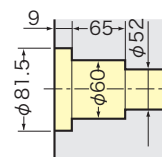
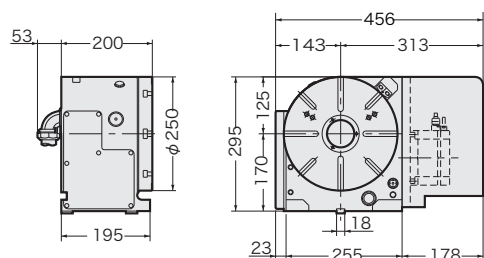
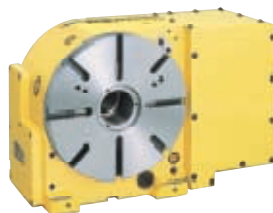


Air purge function is provided.

CNC200A21



CNC250A21, 300A21



High speed rotation Z series is available for all models of CNC rotary table.

ROTARY TABLE with $\alpha 21$

NEW

NIKKEN

External dimensions will be different according to the type of the servo motor. Dimensions with **NIKKEN $\alpha 21$ PW controller** are shown. Additional axis specification is also available, please contact with us.

CNC321 A21PW, CNC401 A21PW

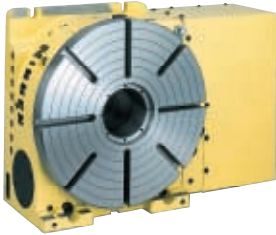
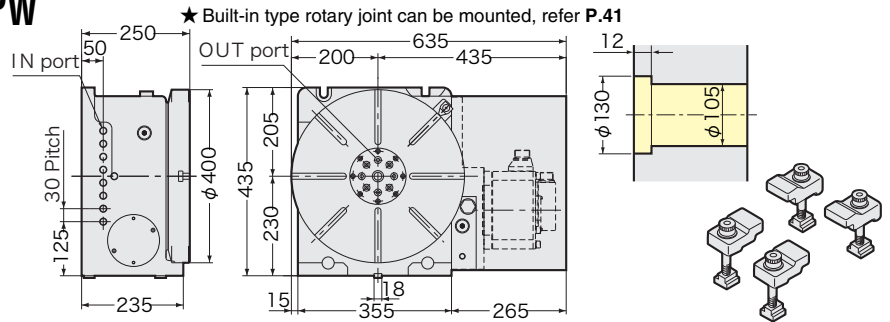


Photo. shows **CNC401A21PW**.



CNC501 A21PW, CNC601 A21PW

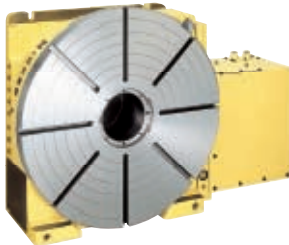
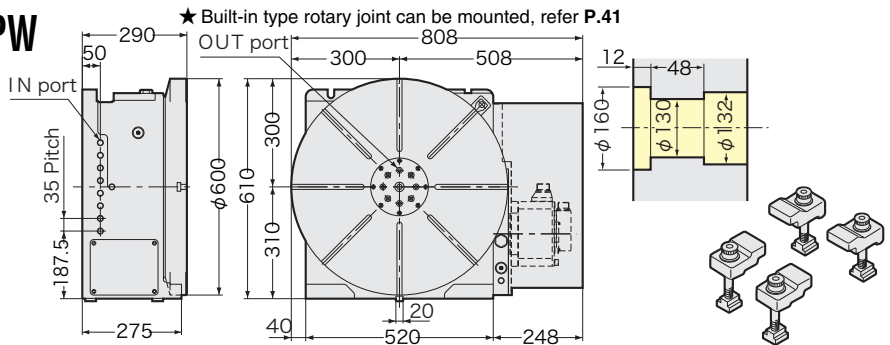


Photo. shows **CNC601A21PW**.



CNC801 A21PW, CNC1200 A21PW

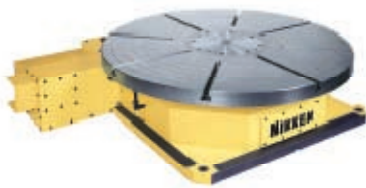
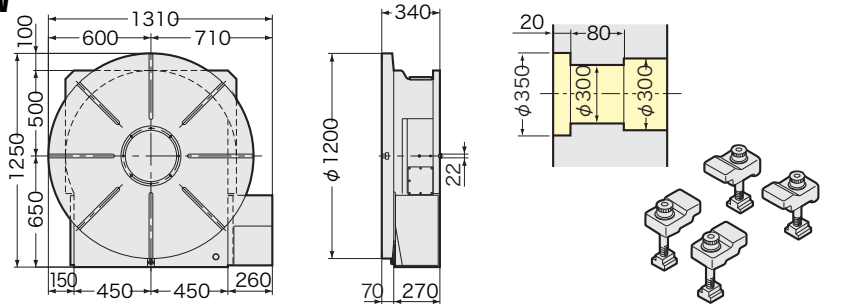


Photo. shows **CNC1200A21PW**.

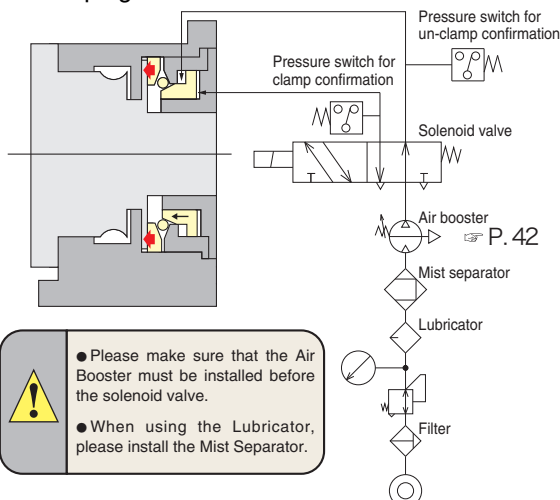


Powerful Clamping

NEW

JAPAN PAT.P

Double intensifying clamping mechanism is applied for **CNC180**, **CNC202**, both axes of **5AX-130**, **TAT105** and **TAT170**. Powerful clamping can be achieved by the gentle taper wedge piston and double intensifying mechanism. Besides, the air intensifying booster is recommended for high power clamping.



Improved Water Proof Capability and Reliability

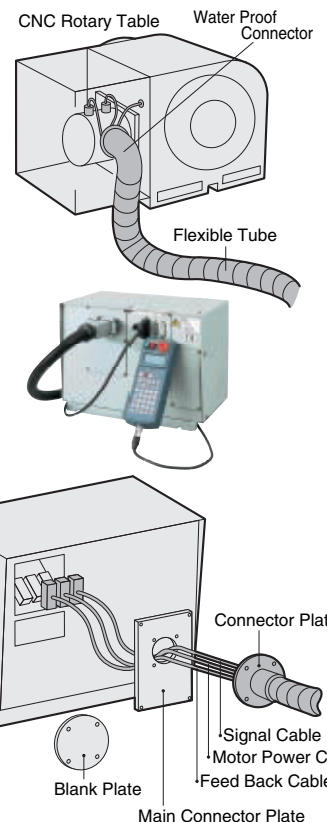
Direct out type cable is used for all of the CNC rotary tables with the $\alpha 21$ controller.

There are 3 cables (the motor power cable, feed back cable and signal cable) in the flexible tube and how to connect is as follows;

Harting Connector is provided on the latest version of the Alpha 21 Controller to improve the easiness of attaching and reattaching of the cable.

1. Remove the main connector plate and the blank plate.
2. Let the motor power cable, feed back cable and signal cable pass through the hole for the blank plate and fix the connectors(J13,J12 and J19) on the $\alpha 21$ controller.
3. Attach the main connector plate on the $\alpha 21$ controller.
4. Attach the connector plate connected with the flexible tube onto the main connector plate.

When CNC Rotary Table is installed and uninstalled on the M/C frequently, Harting Connector type is recommended. P. 48



Main Connector Plate

Tilting Rotary Table with $\times 21$ Controller

NIKKEN

External dimension will be different according to the type of the servo motors. Dimensions with $\times 21$ controller are shown. Additional axis specification is also available, please contact with us.

5AX-130WA21 **NEW**

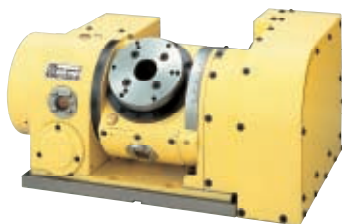
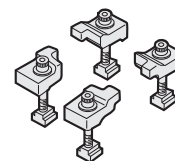
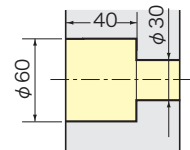
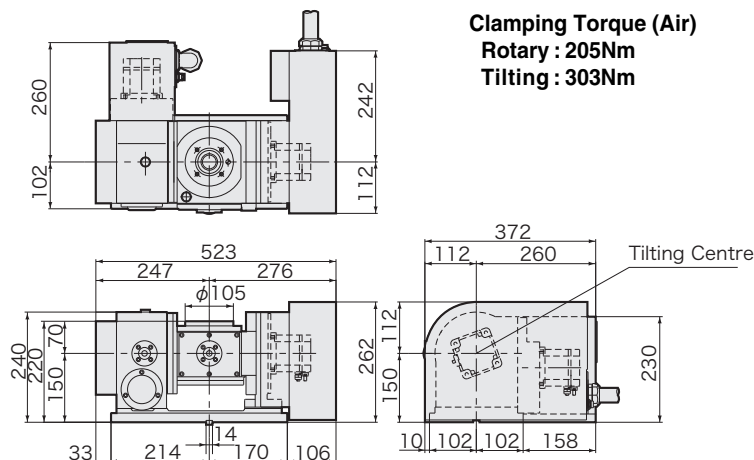


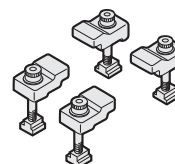
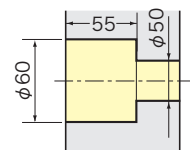
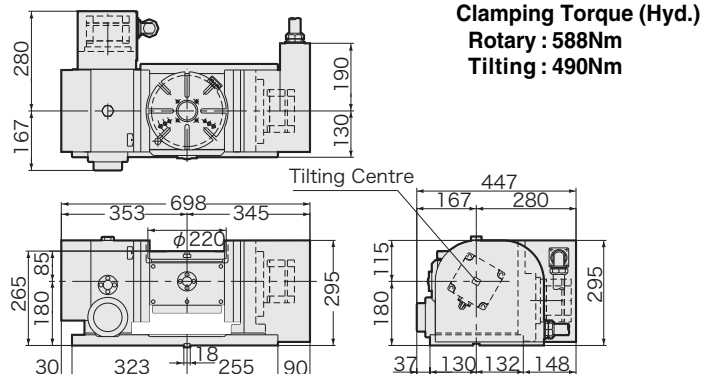
Photo shows with $\phi 130$ mm plate.
Rotary axis cable stays.



5AX-220 II WA21 **NEW**



Rotary axis cable stays.

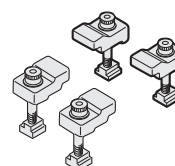
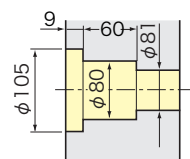
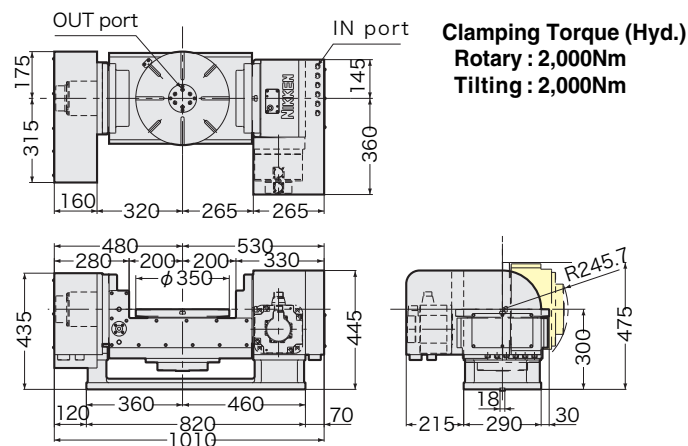


5AX-350WA21PW **NEW**



Rotary axis cable stays.

Built-in type 6 ports Rotary Joint is optional accessory.

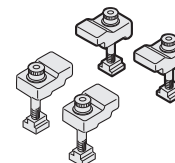
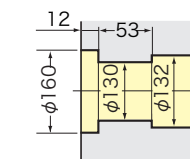
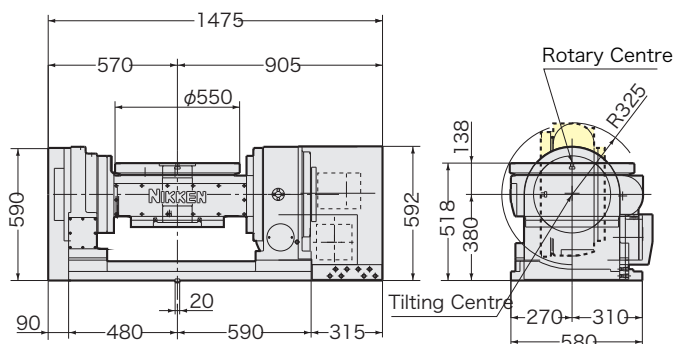


5AX-550WA21PW

Built-in type 4 ports Rotary Joint is optional accessory.



Photo shows with centre socket(option).
Rotary axis cable stays.



NIKKEN World Wide Sales & Service Branch



NIKKEN builds the most Rigid, Precise, and Durable CNC Rotary Tables for the worldwide manufacturing market.



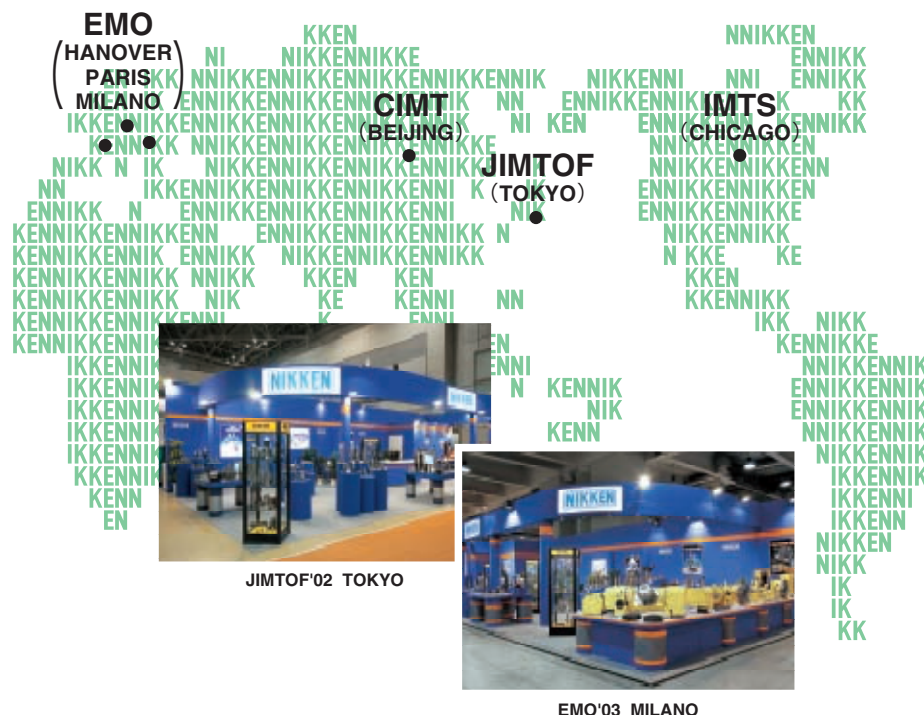
CNC ROTARY TABLE ASSEMBLY DEPARTMENT



ACCURACY INSPECTION



HEADQUARTERS (JAPAN)



JIMTOF'02 TOKYO



EMO'03 MILANO



LYNDEX-NIKKEN (U.S.A.)



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6, avenue du 1er Mai-Z. A. E. Les Glaises 91127
Palaiseau Cedex
Tel. 01.69.19.17.35 Fax. 01.69.30.64.68

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NIKKEN KOSAKUSHO UK LTD.
Precision House, Barbot Hall Industrial Estate,
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Tel. (01709) 366306 Fax. (01709) 376683

F.R.GERMANY

NIKKEN DEUTSCHLAND GmbH
Eisenstrasse 9b, 65428 Rüsselsheim
Tel. + 0049(0)6142/55060-0 Fax. + 0049(0)6142/55060-60

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VEGA INTERNATIONAL TOOLS S.P.A
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SWITZERLAND

NIKKEN SWITZERLAND AG
Sumpfstrasse 32 CH-6300 Zug
Tel. (041) 748-5000 Fax. (041) 748-5001

SCANDINAVIA SWEDEN

NIKKEN SCANDINAVIA AB
Säterigatan 27 41764 Göteborg
Tel. (031) 519855 Fax. (031) 519955

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(GIPUZKOA) APARTADO 1421-20080 SAN SEBASTIAN.
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TURKEY

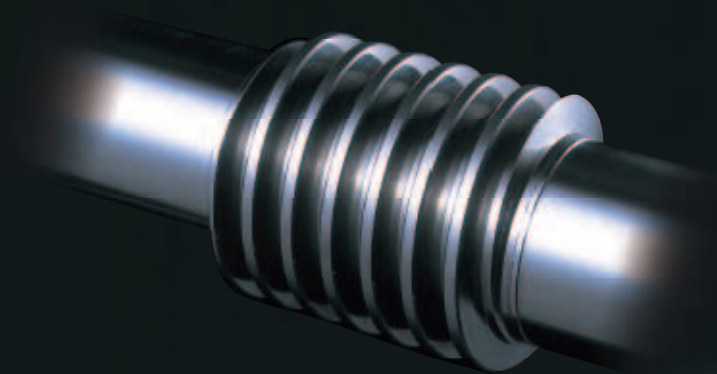
NIKKEN KESICI TAKIMLAR SAN. VE ULUSLARARASI TIC. A. S
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Tel. (021) 6210-2506 Fax. (021) 6210-2083



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5-1, 1-chome, Minamishinden, Daito-shi, Osaka-fu, Japan. Telephone : 072-869-5820 Telefax : 072-869-6220

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ITALY	VEGA INTERNATIONAL TOOLS S.P.A Via Asti N°9 10026-Santena (TORINO) Tel. (011)9456330/40/50~70 Fax. (011)9456380	<div> <div>■ Please give your order to the following agent.</div> <div>S.YC 20</div> </div>	
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SPAIN		<div> <div>● Specifications are subject to change without notice.</div> </div>	