

M-signal CNC ROTARY TABLE with AR21 CONTROLLER

Minimum Command Increment: 0.001° or 1sec.

AR21 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.

USB interface as standard equipment

By connecting to a PC, program data and parameters can be input and output. (However, communication software is required on the PC side.)

Upgrade of Water Proof Characteristic

EMC Assessment P.103

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

Digital Servo System & Absolute Encoder

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

 after Power ON or after releasing the emergency stop condition is not necessary.*

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 30,000 sets working in the field.

This fact ensures the highest reliability.

Product compatible with ROHS2-10 commands

The AR21 controller is now ROHS2-10 compliant and has the product code AR21, which can be shipped to EU member countries.(400W,750W,1.3KW,1.8KW)

* : The operation to establish the coordinate system is required at once, when turning the POWER ON at first time just after connecting the cable. Please refer to  P.62



AR21 controller

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



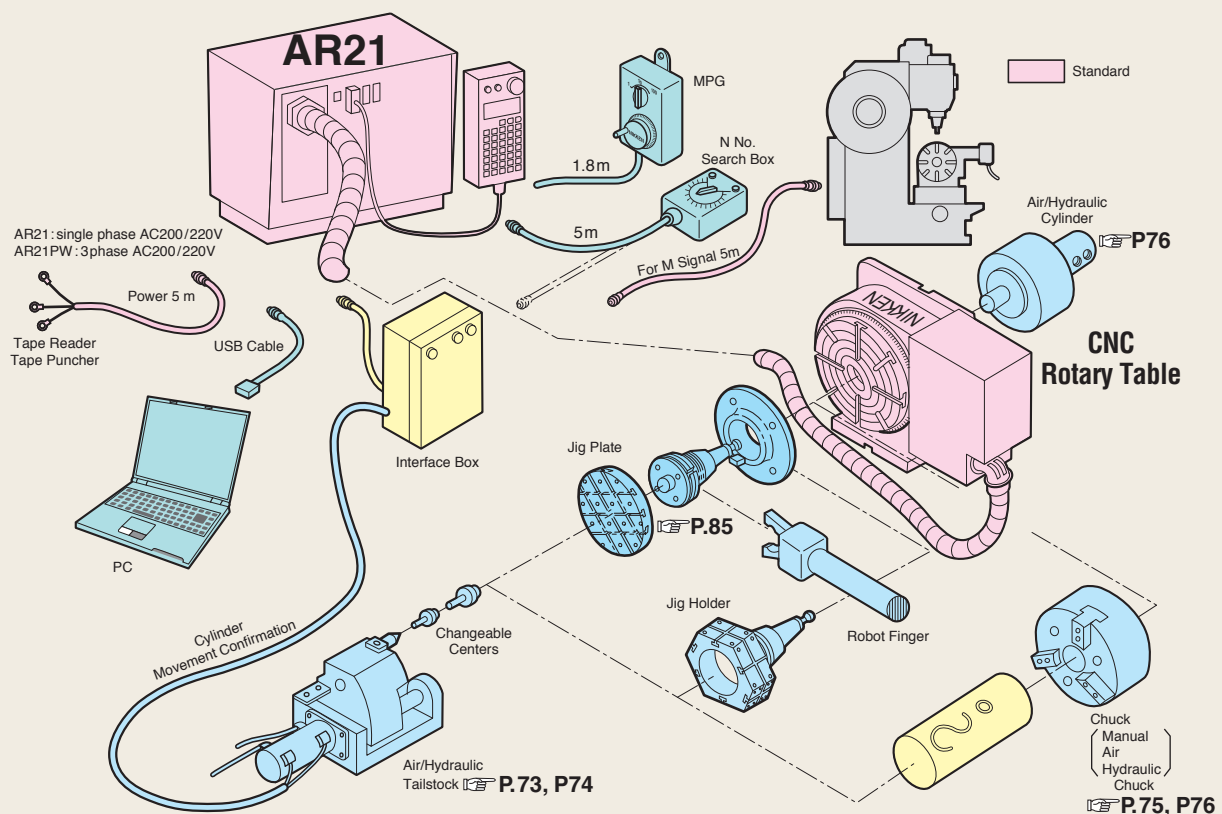
AR21 PW controller

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



AR21 controller for larger capacity

- 4.4KW is available.
- 3 phase AC200/220V



AR21 CONTROLLER Specification



Main Specification of Controller (NIKKEN-AR21 controller)

Item	Specification	Remarks
MIN. Increment	0.001° or 1"	Free Selection
MAX. Programmable Angle	±9999 rotation, ±999.999° & ±999°59'59"	Free Selection
MAX. Equal Dividing	2~9999 equal dividing	
Program Capacity	1000 Blocks	N000~N999
Input System	MDI Key Board, Pendant type	
Programming System	Combined use of Incremental/Absolute	Free Selection of G91 / G90
Zero Return	Machine Zero Position/Work Zero Position	can be commanded from outside.
Manual Feed	Rapid Feed/Fine Feed/Step Feed/Continuous Feed	
Uni-directional Positioning	Uni-directional Positioning can be done to eliminate the mechanical backlash.	G14
Emergency Stop	Whole system stops	can be commanded from outside.
Feed Hold	Table rotation temporarily stops.	can be commanded from outside.
Jump Function	Jump to sub program etc.	
Repeating Function	By specifying start No. and final No., multiple sequence are repeated.	
Buffer Function	Reading next block, and execute job without stop.	Useful for lead cutting etc.
Dry Run	Table always rotates in rapid feed for checking.	
Key Lock Function	Even if operation button is pressed by mistake, such command is neglected for safety.	
Preparatory Function	Dwell, Clamping/Unclamping, Lead Cutting...	G04~G92
G1 Code, G2 Code	2 kind of G codes can be entered in one block.	
Block Data display	At programming, previous block data or next block data are displayed.	↑ ↓
USB Interface	Program data and parameters can be input and output.	
Software Limit Function	± stroke limit values can be set by parameter.	
Over Travel Detection Function	Over travel detection zone can be set at outside of software limit by using control circuit, and the CNC rotary table can be protected not to exceed safety zone.	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 AR21 can be sent to M/C	
Emergency Stop Out	Emergency stop condition of AR21 can be sent to M/C.	
Self Diagnosis Function	Inside situations of controller can be seen.	
Modal G Code Flicker Function	All G codes used in program are indicated in flickering.	Every 2 sec.
Pitch Error Compensation Function	Rotary axis: 15° unit, Tilting axis: 5° unit	Option
Feed Rate Override	5~200%, 999% (Rapid feed)	±5%
Input Signals	1 kind of Auxiliary Function. (Automatic operation can be done by only one M signal.)	With or without contact signal *1
Output Signal	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	AR21 : Single phase AC200~220V, 50Hz / 60Hz	400W : 480VA*3, 750W : 760VA*3
	AR21 PW : 3 phase AC200~220V, 50Hz / 60Hz	1.3kW : 960VA*3, 1.8kW : 1.2KVA*3

*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.

*3 Input load capacity at 40% of average load factor.

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 AR21 side. AR21 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 Power ON/OFF**

Interface to perform Power ON/OFF by external circuit is available.
- 6 Pitch Error Compensation**

Rotary Axis:
by 15° unit × 24 points
Tilting Axis:
by 5° unit × 24 points
The optimum correction value is adjusted and shipped with increased indexing accuracy.
- 7 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 AR21 is in alarm condition. These signals can be used for interlocking function.
- 8 Direct Angle Command Interface**

By connecting the machine side RS232C interface to the AR21 controller, it is possible to manage all the programs of the AR21 controller. For details, please refer to [page 76](#).
- 9 Harting Connector Type**

Harting Connector can be corresponded to the CNC Rotary Table side. The AR21PW controller is not compatible.



Explanation of PENDANT 1

NIKKEN



- ① Power Switch
- ② Emergency Stop Button
- ③ ④ 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 AR21 main unit and the pendant are communicating.
- **ALARM** Turned ON when AR21 is in alarm condition.
- **COM. ALARM** Turned ON when communication time out error occurs between AR21 main unit and the pendant.



① Power Switch

② Emergency Stop Button

③ ④ 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, ⑰ are ineffective.

⑦ Edit/Current Position Select Switch

On ⑥ of ⑰, 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.53 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 PENDANT 2

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18 Display

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

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: 0.01~9.99r/min

Rapid feed: 000

G : Preparatory function G01~G92

Two kind of G codes (G₁, G₂)

can be input in one block.

%: Feed rate override

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

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

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

L : Repeating frequency (G27)

INC/ABS: INC (Incremental)

ABS (Absolute)

MODE: EDT (Edit mode)

MAN (Manual mode)

AUT (Auto. mode)

MPG (MPG mode)

DGN (Diagnostic mode)

ZRN-MW:

M Flickering (Returning to M ZERO)

M (Stop at M ZERO)

W Flickering (Returning to W ZERO)

W (Stop at W ZERO)

START/STOP : START (Starting)

STOP (Stop)

19 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 18 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: 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
L

F, L (3digits)

G
NO

F : Cutting feed F001 (0.01 r/min) to F999 (9.99 r/min).

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

Pzero 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;

G 0 7 0 8 *

and indication will become as ;

G ₁	G ₂
07	08

When you want to enter 9°, just depress keys as **θ** → **9** → **.**, and 9.000° or 9°00'00" is displayed.

This is for command of Counter clockwise rotation.

This is depressed as programming of each block being completed.
(Hereafter shown as *****).

For deletion or alternation of 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 **N 0** **▢** **999** at Edit mode, and jog ***** while depressing **C** key.

***** means optional function.

Operation of the pendant of AR21 controller for tilting axis specification and for NSV index specification differs, please refer instruction manual.

N
(3digits)

J
(3digits)

RET
θ
P

θ (±6~7digits)
P (3digits)

DIV
Q

DIV (4digits)
Q (3digits)



Caution for AR21 Controller

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

- **DGN** Return to pervious mode.

- **PRM** **DGN** **1** **.** **1** ***** PRM#110=1
Writing parameter value enable.

- **G** **7** **2** **.** **1** ***** PRM#72=1

- Turn the POWER OFF and ON

- For rotary axis **M** **ZRN** Execute machine zero return.

- For tilting axis First set the temporary machine zero position and **M** **ZRN**.
Please refer instruction manual for more detail.

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

Operation & Confirmation of PROGRAMS

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

Before start the programs, push **1** **1** or **1** **1** in **EDT** mode, and confirm input date. Then start the program in **MAN** mode to confirm the moving.

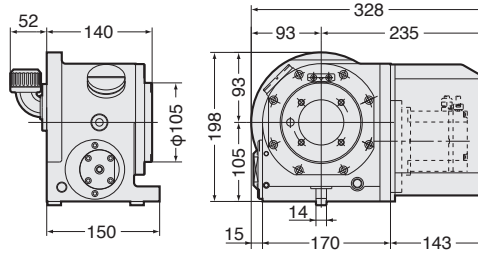
Operation of Keys.

① Angle Dividing		N 0 0 0 θ 4 5 • F 0 * Input Angle Rapid feed. No need of pressing 0 under decimal point. N 0 0 0 → START Sequence No.
② Arc Milling		N 0 0 0 θ 4 5 1 2 3 F 1 2 3 * 123 x 1/100 r/min rotation speed. means 45.123° Cutting Feed : = 2 π R x 1.23 r/min = 7.7 R mm/min. N 0 0 0 → START
③ Equal Dividing		N 0 0 0 J 0 θ 4 5 • F 0 * After finishing N000 return to N000. N 0 0 0 → START
④ Unequal Dividing		N 0 0 0 θ 4 5 • F 0 * 0 0 1 θ 3 5 1 2 0 0 0 2 θ 6 1 5 6 7 0 0 3 θ 9 3 5 6 7 0 0 4 θ 6 7 3 5 0 0 0 5 J 0 θ 5 7 3 9 6 In case of the same feed rate in the following blocks just command once. (Modal type) After finishing N005 return to N000. N 0 0 0 → START
⑤ Incremental/Absolute Dividing		N 0 0 0 θ 4 5 1 2 3 F 0 G 9 1 * 0 0 1 θ 1 8 1 5 6 7 0 0 2 θ 9 0 9 8 7 0 0 3 J 0 θ 0 G 9 0 * Incremental Command (Modal Type) To W zero-point Absolute Command (Modal Type) N 0 0 0 → START
⑥ Repeating Function		N 0 0 0 θ 1 3 • F 0 * 0 0 1 θ 1 4 • F 0 * 0 0 2 θ 1 8 • F 0 * 0 0 3 G 2 7 • 0 DIV 2 F 2 * L : Repeat 2 times Q : Finishing N002 θ : Starting N000 Command of repeating function • 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. N 0 0 0 → START
⑦ Counter Clockwise Rotation		N 0 0 0 θ 4 5 • F 0 * Counter Clockwise (CCW) N 0 0 0 → START
⑧ Continuous Feed 0.5		N 9 9 7 θ 0 • F 5 0 * Continuous feed 0.5r/min (CCW) Command of continuous FeedStart Start Stop N 0 0 0 → START
⑨ Equal Dividing of Arc		N 0 0 0 θ 9 0 • DIV 1 3 F 2 0 0 * This means 90°÷13. Feed rate can be commanded from 0.01 r/min to rapid speed. 0 0 1 θ 1 1 2 • DIV 2 3 F 0 * 0 0 2 J 0 θ 1 5 8 • DIV 1 1 F 0 * N 0 0 0 → START
⑩ Equal Dividing of Circle (360°)		N 0 0 0 θ 3 6 0 • DIV 9 1 F 0 * 91 Equal dividing of circle and go to N001 0 0 1 θ 3 6 0 • DIV 7 7 F 0 * 77 Equal dividing of circle and go to N002 0 0 2 θ 3 6 0 • DIV 1 1 1 F 0 * 111 Equal dividing of circle and go to N003 0 0 3 θ 3 6 0 • DIV 2 3 1 F 0 * 231 Equal dividing of circle and go to N004 0 0 4 J 0 θ 3 6 0 • DIV 1 2 3 1 F 0 * 1231 Equal dividing of circle and return to N000
⑪ M function		Optional Specification N 0 0 0 G 6 0 * Tailstock forward 0 0 1 θ 3 6 0 • DIV 1 0 * Circle is equally divided into 10 sections. 0 0 2 G 6 1 * Tailstock backward 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.

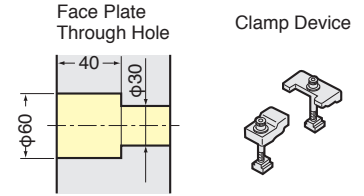
CNC ROTARY TABLE with AR21 CONTROLLER



CNC105AR21-04



Powerful Clamping Torque : 205Nm

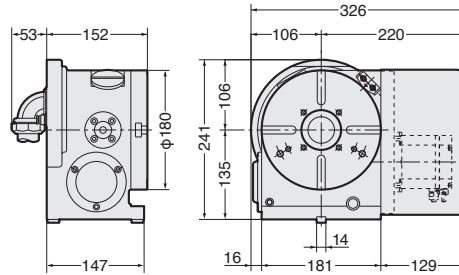


Air purge function is provided.

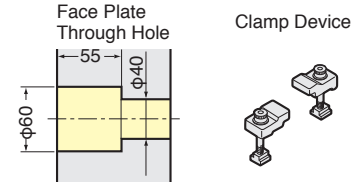
CNC180AR21-04



CNC180AR21-04 (400W) is standard. CNC180AR21-08 (750W) and CNC180AR21-06 (High Torque) are available.



Powerful Clamping Torque : 303Nm

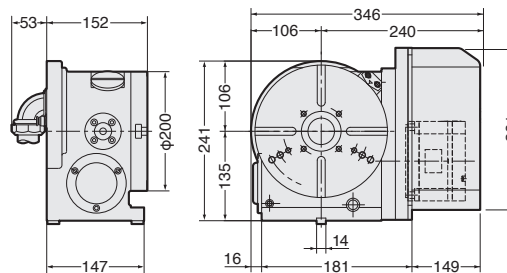


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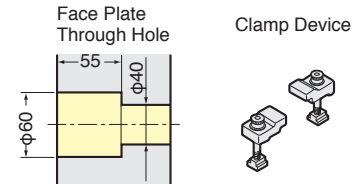
CNC202AR21-08



CNC202AR21-08 (750W) is standard. CNC202AR21-06 (High Torque) is available.



Powerful Clamping Torque : 303Nm

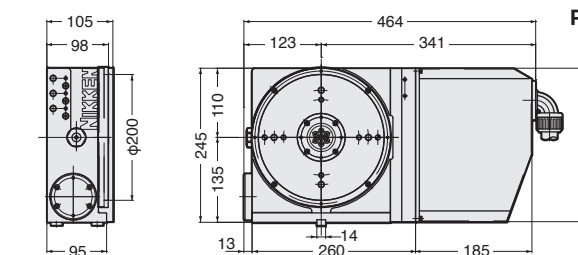


Air purge function is provided.

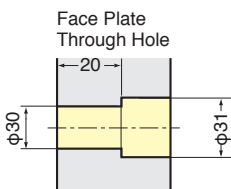
CNC205AR21-05



CNC205AR21-05 (450W) is standard. ★Built-in type rotary joint 6+1 can be mounted.



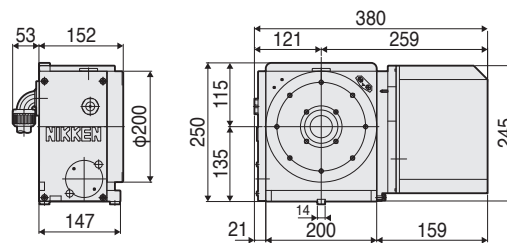
Powerful Clamping Torque : 380Nm



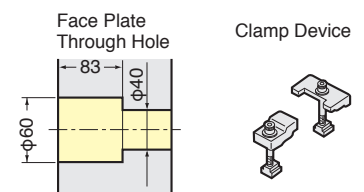
Air purge function is provided.

Rotary joint shown in photo is optional.

NCT200AR21-08



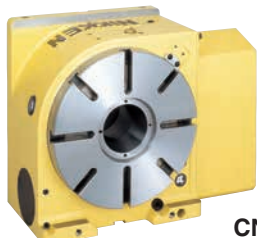
Powerful Clamping Torque : 900Nm



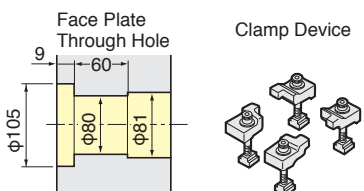
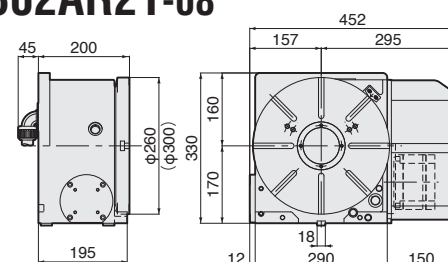
Air purge function is provided.

CNC260AR21-08, 302AR21-08

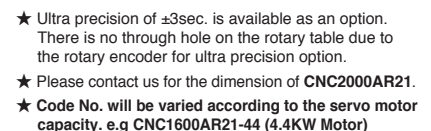
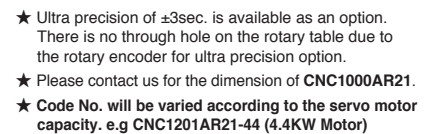
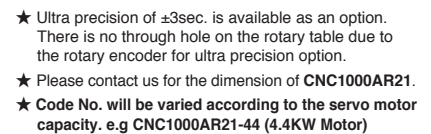
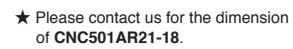
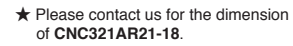
CNC260, 302AR21-08 (750W) is standard. CNC260, 302AR21-06 (High Torque) is available.



CNC260



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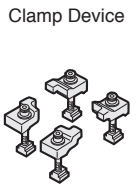
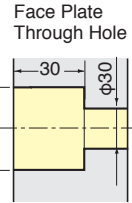
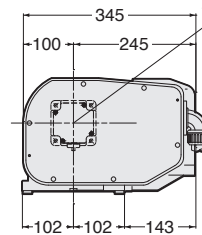
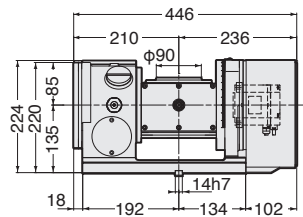


- The specification of the large rotary table will be varied according to your application.**

Tilting Rotary Table with AR21 Controller

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5AX-100WAR21



Motor capacity of rotary axis and tilting axis are added at the end of Code No. e.g 5AX-100WAR21-0404

5AX-130WAR21

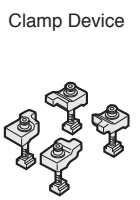
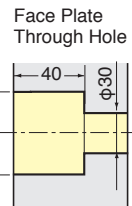
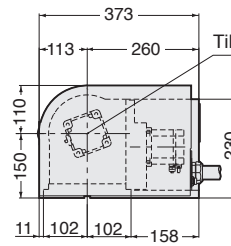
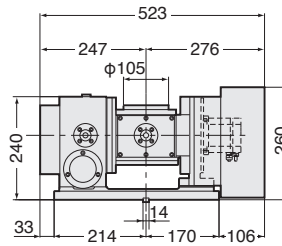
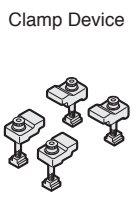
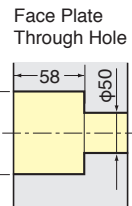
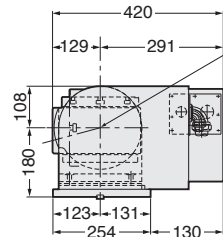
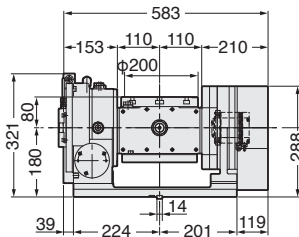
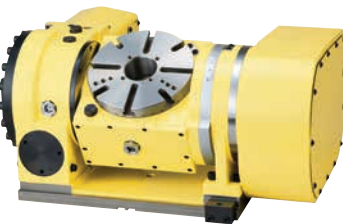


Photo with $\phi 130$ mm plate.
Rotary axis cable stays.

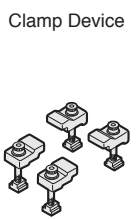
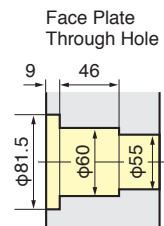
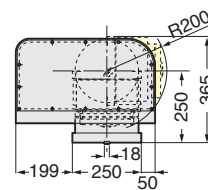
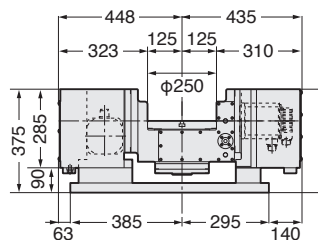
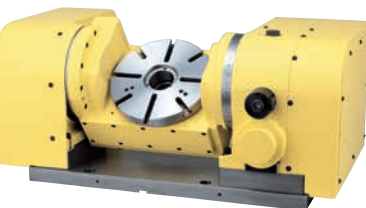
Motor capacity of rotary axis and tilting axis are added at the end of Code No. e.g 5AX-130WAR21-0404

5AX-201WAR21



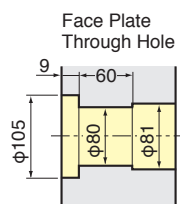
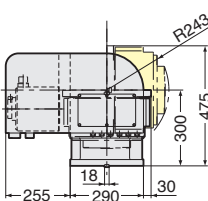
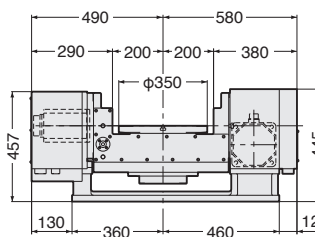
Motor capacity of rotary axis and tilting axis are added at the end of Code No. e.g 5AX-201WAR21-0408

5AX-250WAR21



Motor capacity of rotary axis and tilting axis are added at the end of Code No. e.g 5AX-250WAR21-1313

5AX-350WAR21



Motor capacity of rotary axis and tilting axis are added at the end of Code No. e.g 5AX-350WAR21-1318

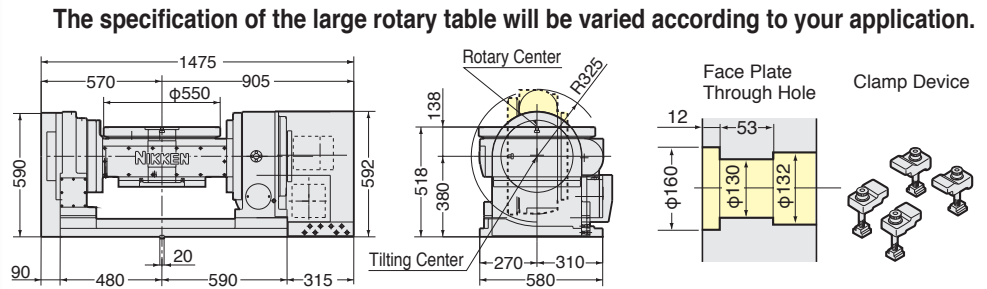
Tilting Rotary Table with AR21 Controller

NIKKEN

5AX-550WAR21

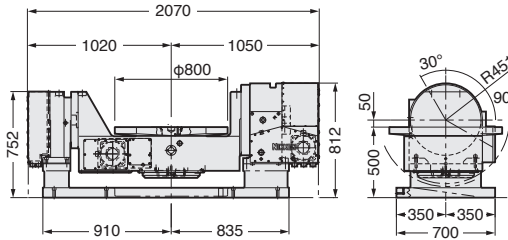


Center socket shown in photo is optional.



Motor capacity of rotary axis and tilting axis are added at the end of Code No. e.g 5AX-550WAR21-1818

5AX-800WAR21



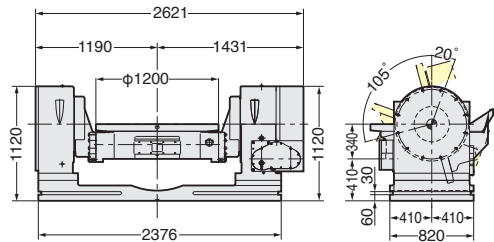
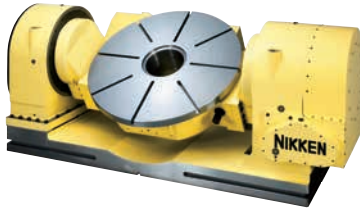
Motor capacity of rotary axis and tilting axis are added at the end of Code No. e.g 5AX-800WAR21-1844

1. Moving angle of the tilting axis
2. Relation between the tilting axis center and the rotary axis



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

5AX-1200BWAR21



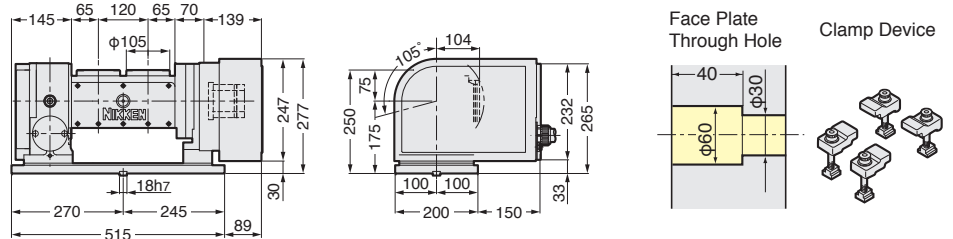
Motor capacity of rotary axis and tilting axis are added at the end of Code No. e.g 5AX-1200BWAR21-4444



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

3. Tilting axis base...It can be supplied to us.
 4. With/ without T slot, Width of T slot
 5. Spindle hole dimension
- ...Center socket for centering is normally attached.

5AX-2MT-105WAR21



Motor capacity of rotary axis and tilting axis are added at the end of Code No. e.g 5AX-2MT-105WAR21-0404

If you need a knock hole for positioning or a key way on the table surface, please contact us.

AR21 controller can drive the all models of NIKKEN rotary tables. Please contact us for the external dimension.



Back side motor mounted
CNC rotary table



Top side motor mounted
CNC rotary table



Multi-spindle
CNC rotary table



NST manual tilting
rotary table



NSVZ index
3980 Webster Avenue

Indexing of MIN.
incremental of 1° is done
by AR21 controller.



NSVX rotary index table

AR21 controller can perform
indexing of MIN. 1° with
hirth coupling and can also
perform indexing of MIN.
incremental by 0.001° and
profile milling.

Cincinnati, OH 45212

Phone: 513.531.2926

info@technitron.com

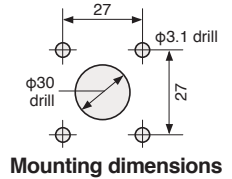
Technical Information of NIKKEN CONTROLLER 1



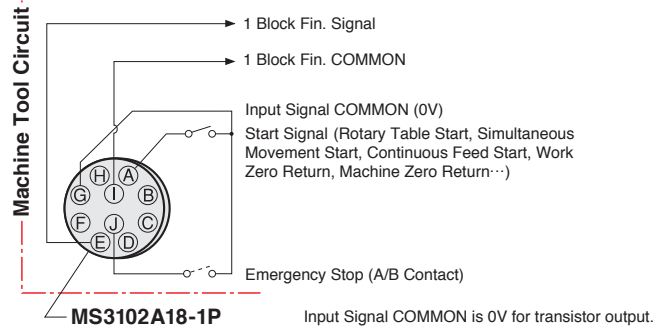
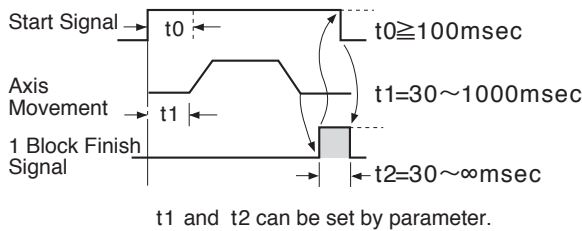
AR21 controller connection

Normally the controller will be operated only by connecting M Signal (Start Signal) and 1 Block Fin. Signal. Emergency Stop Input must be set to B contact only for 5AX-Tables. For other Tables, you can choose A/B contact for Emergency Stop Input.

When to be connected to machine, receptacle MS3102A18-1P is provided. Arrange the electric circuits of your machine side.



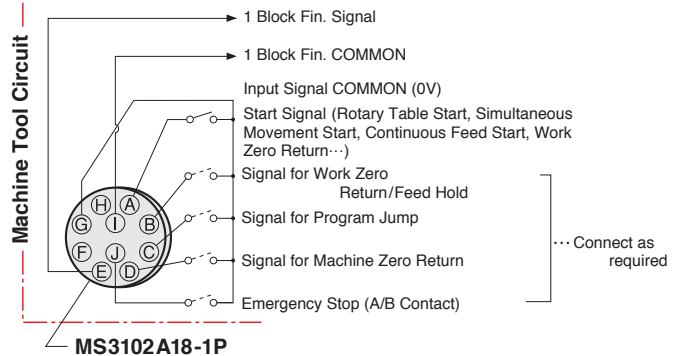
Input/Output Time Chart



Connection for Automatic Operation

Once program is loaded to AR21, 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

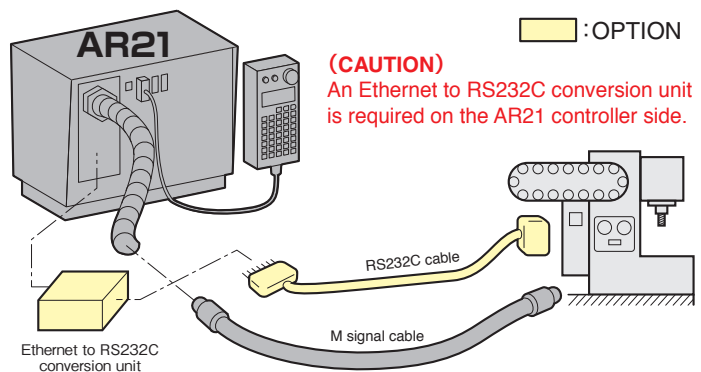


RS232C Automatic Loading Interface. ... Pendant is to be used for manual operation and maintenance only. (OPTION)

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.)

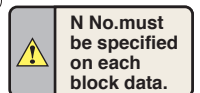


M/C Main Program
e.g. Machining of Imperial Blade
O0001;
G65 P8000;
...
G01 Z;
X300;
Y_Z_M21;
X0;
Y_Z_M21;
X300;
...

X0. X300.



Macro Program
(Down Loading to AR21)
O8000;
M24; Activate AR21 automatic loading function.
POPEN;
#100=165;
BPRNT[#100[0]]; } Send %,CR,LF.
DPRNT[N10 G90 A22.149]; } Send block data.
...
#100=165;
BPRNT[#100[0]]; } Send %, CR,LF.
G04 P3000; Dwell 3sec.
PCLOS;
M66;



Technical Information of NIKKEN CONTROLLER 2

NIKKEN

■ RS232C Direct Angle Command Interface (OPTION)

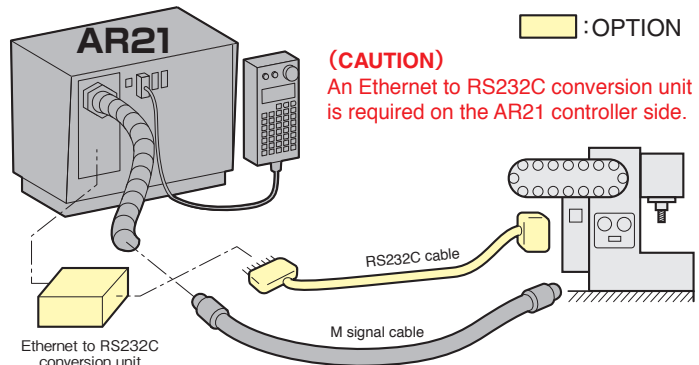
JAPAN PAT.

This interface can start the block after sending one block data from custom macro of M/C. Equal dividing function (e.g. divided by 7) also can be sent. Therefore, program will be simple and more accurate and the total management of the programs can be done 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 AR21 controllers can be connected to use RS232C direct angle command interface. In this case, special RS232C cable is required and 2 off M signals are required.

**(CAUTION)**

An Ethernet to RS232C conversion unit is required on the AR21 controller side.

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

● RS232C interface

The cable is available as an option.

Baud rate : 9600 bps

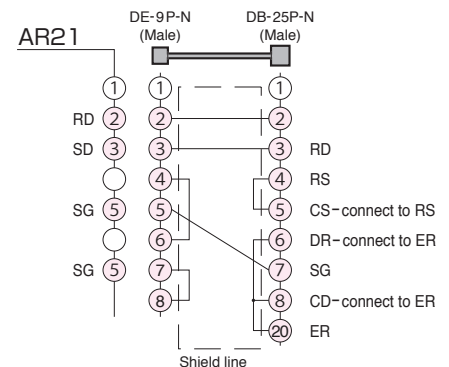
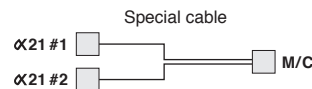
Code : ISO

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 AR21.

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;

```



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

Termination of the maintenance work for NIKKEN controllers

The maintenance work of the NIKKEN controllers is continued as long as the electric parts could be supplied. However, about the following controllers, the maintenance has to be terminated, because the supply of the electric parts became impossible. Please examine reshuffling to the CNC rotary table with AR21 controller by all means.

Terminated at April 2005 : ND5000, 8000DC, 8800DC, 9000DC
 Terminated at April 2005 : NSV controller (M signal I/F, B signal I/F)
 Terminated at April 2013 : 8800DX, 8800AX, 8AC
 Terminated at April 2021 : NEC α controller