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Tan Jia Precision Technology

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The 8th edition

Redefine "RIGIDITY"

Larger Through Hole → Bigger Bearing
Bigger Bearing → Higher Rigidity

Truly great value for money



Large diameter



Made in Japan

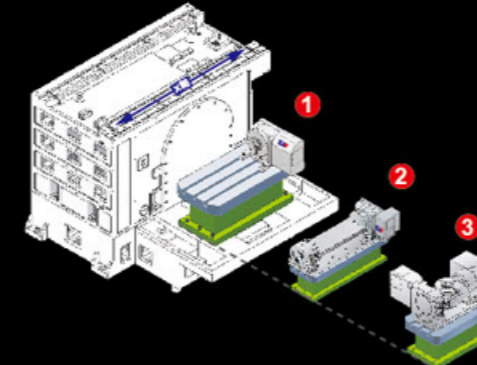
Unique high tensile brass
Wear life is 2.6 times longer than aluminum bronze PBC3.

Devised by German

Specialized for Rotary Table, the Radial & Axial bearing can fully support heavy-duty cutting in both radial and axial directions.

This is the only way to lead the trend.

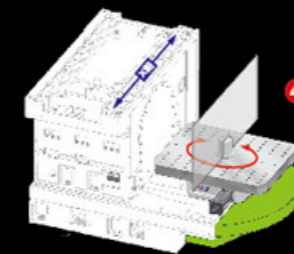
Make your 5-axes milling machine work as a vertical lathe concurrently. (Tilt axis: 1500-2500 rpm)



4th & 5th axis rotary table and Bridge connection plate set are applicable.

Quintuple-purpose machine

One machine is able to be installed with **FIVE** different kinds of rotary tables.



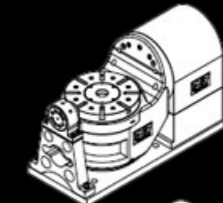
For vertical machining center with auto pallet changer (3-axis moving column type)

- Features:
- Two functional positions (180° to and fro)
 - One position: machining
 - Another position: loading & unloading

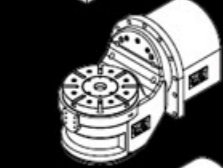
Only TJR large-diameter radial & axial bearing can deliver enough rigidity to well support tilt axis of single-arm type dual axis rotary table.

For 5-axis vertical machining center (3-axis moving column type)

- Features:
- Less interruption
 - Clear at a glance no matter how the table tilts



FAD-300iwj-30D single-arm type (with base plate) for vertical machining center



FAD-300iwj-30D single-arm type (without sub-tailstock) for 3-axis-moving-column vertical machining center



FAD-300iwj-30D single-arm type (with sub-tailstock & support) for 3-axis-moving-column vertical machining center

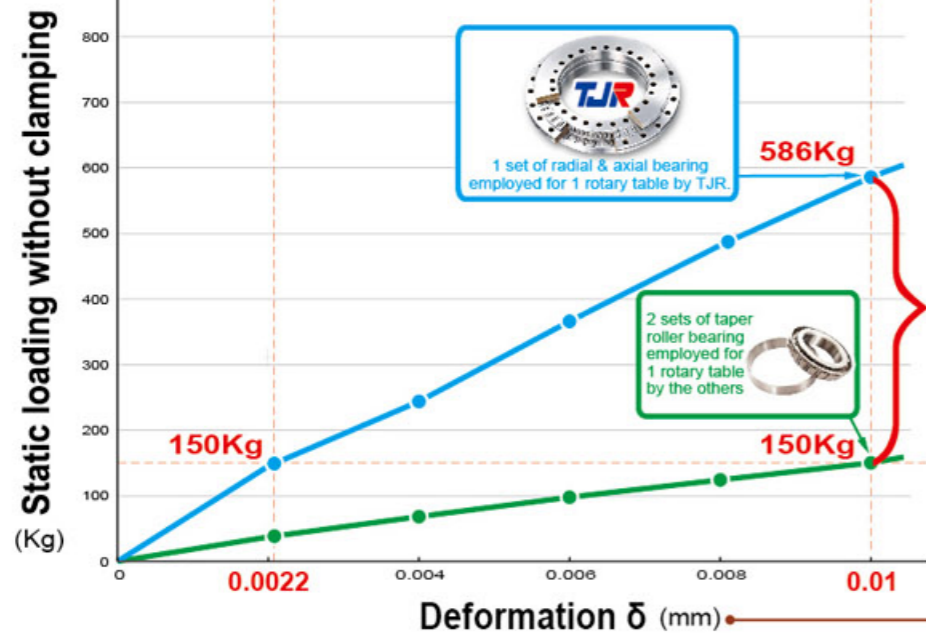


FHR-630SN single-arm type

As below

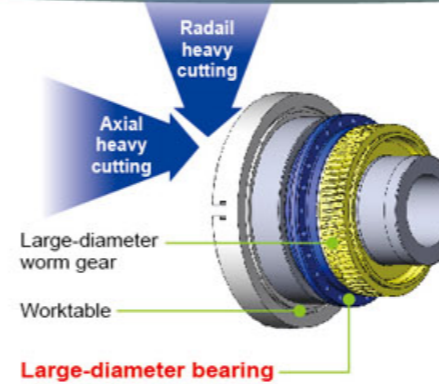
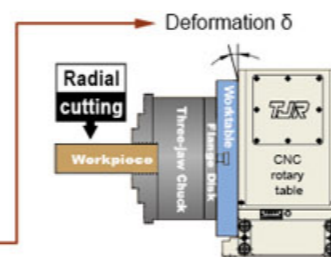
Rigidity comparison between radial & axial bearing and taper roller bearing

Take Ø255mm Rotary Table as an example



3.9 times better

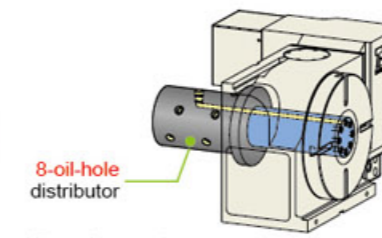
TJR Models	Deformation δ	Static loading without clamping
HR 255	0.01 mm	586 Kg
HR 320	0.01 mm	631 Kg
HR 500	0.01 mm	915 Kg
HR 630	0.01 mm	1,668 Kg



can sustain outer circle periphery of table, and accordingly deliver high rigidity and optimize axial heavy-duty cutting.



It is watertight by all rims sealed with O-ring. (IP65 water-resistant enclosure)



HR series employs the large-through-hole design, as it sizes up to over Ø255mm. The through hole diameter can be adjusted by using the mandrel sleeve. But, it is no way to be enlarged with small-through-hole design.












Endurable finish, shining with pearlescent and silver







High performance braking system

TJR	Others
Encircling brake	Disc brake
<ol style="list-style-type: none"> 1) Clamping range is bigger 2) Encircling brake mechanism is tightly placed on the worktable and thus provides high rigidity 	<ol style="list-style-type: none"> 1) Clamping range is smaller 2) Disc brake mechanism is far from the wordtable; therefore, it causes run-out of table and low rigidity
So it is suitable for heavy duty cutting	Available for light cutting only
<p>Hydraulic Clamping Force</p>	<p>Fully Peripheral Hydraulic Brake</p>
Drawing of encircling clamping mechanism	

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Instruction

How to choose a suitable TJR rotary table

1 Workpiece material :

- A : For materials like aluminum and copper, it is OK to select AR series (Pneumatic brake)
- B : For materials like cast iron and steel, it is OK to select HR series (Hydraulic brake) or HI series (Hirth coupling Hydraulic brake)

2 Workpiece accuracy requirement :

- A : For accuracy within 20 sec, select AR series (as rotary table for any angle)
- B : For accuracy within 15 sec, select HR series (as rotary table for any angle)
- C : For accuracy within 10 sec, the retrofitting of angle encoder can be considered; but the angle encoder costs more. If the processing only occurs at fixed angles, HI series (± 5 sec can be achieved) can be considered; however, the HI series cannot be used for continuous cutting, as it only works at **fixed angles** of multiple of 1° or 5° (see page 17)

3 Workpiece shape and size :

- A : If it is in the shape of round bar, please purchase the 3-jaw chuck and the center tailstock additionally. (as Dia. ① to the right) When choosing the 3-jaw chuck, note that its outer diameter should not exceed the table diameter. Please see page 48 for the grip range of the chuck.
 - B : If of odd shapes and more than two workpieces are processed at once (see page 47), then purchase rotary tailstock additionally. (as Dia. ② to the right) [For L-block, base plate and middle plate (connection plates), please have them manufactured by fixture suppliers].
- ✗ When using middle plate, please note to limit its width to the max. table diameter.

4 Max. load :

Verify if the rotary table can withstand the load of workpiece and then add up the weights of predetermined rotary table, tailstock, L-block, middle plate, base plate, workpiece and fixture to see if the total load which the machine can withstand is exceeded. If overweighed, check the material of workpiece first. If the material is aluminum alloy or other light material but you are forced to select a larger rotary table due to its too long details in shapes which require over-large radius of rotation, please feel reassured to select the rotary table of a next smaller size. Fit raiser blocks to lift the workpiece so as to accommodate the radius of rotation whereby to reduce the total weight and the cost.

5 Y axis interference :

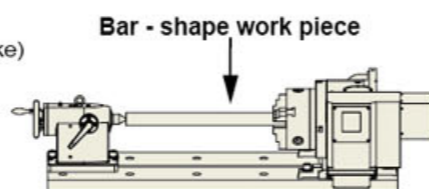
First, verify whether the selected rotary table interferes when it is placed on the work table of the machining center. With the Y axis of the vertical machining center moved to the origin, please measure

- A : the distance between central groove of the worktable and the sheet metal of the machine's slide door [Ex: assuming 450mm remains]
- B : the distance between the centerline of rotary table and the end of motor cover (excluding the wiring box) [Ex: 420mm in HR255-R as Dia ③ to the right]

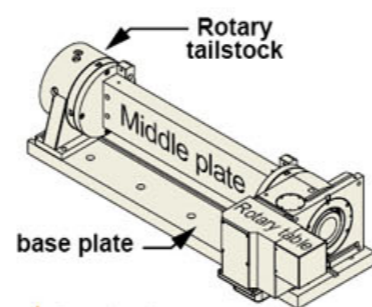
If the "B" distance is less than the "A" distance, it is certain that the rotary table will not collide with the sheet metal of the slide door. [Ex: 420mm < 450mm; thus it's ok to select HR255-R] If not, please change to sheet metal cover reduction version of TJR rotary table. [Ex: only 346mm in HR255-N as Dia ③-1 to the right]

6 Verify the available room for placing the workpiece :

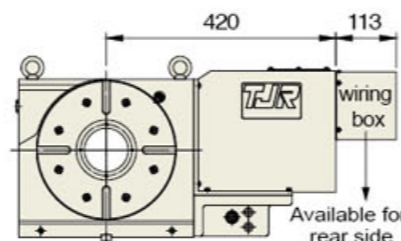
Please measure the length of working table of the machine to verify that it is not 200 mm smaller than base plate. It is the **maximal allowed protrusion** for the base plate of all models to stand out by 100mm on each side of the working table. For example: Assuming the length of working table of the machine is 950mm. (as Dia. ④ to the right) If HR255-N rotary table, RTH-255 rotary tailstock, and middle plate are selected, then it is determined that 700 mm in "E" middle plate is available for workpiece. (see data sheet on page 47) By the same principle, it's 1148mm in "B" base plate. In this case, it's acceptable since it is only 198 mm larger than machine's working-table. As for the space "E", thickness "J" and width "H", they are advised not to exceed the set values in our specification (as data sheet on page 47).



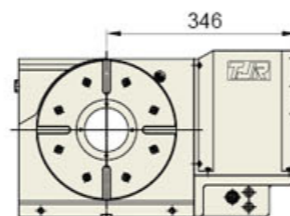
▲ Drawing ①



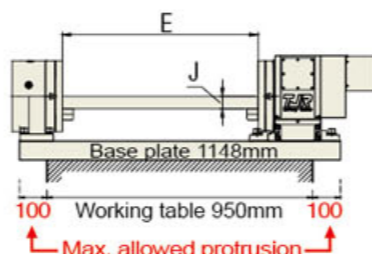
▲ Drawing ②



▲ Drawing ③ : HR-255R



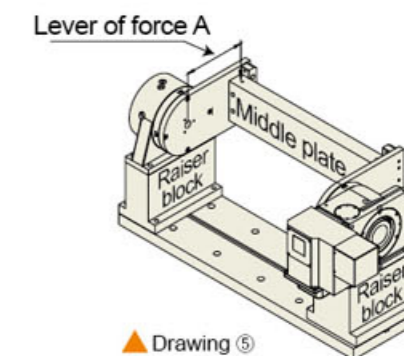
▲ Drawing ③-1 : HR-255N



▲ Drawing ④ : base is bigger than working table

7 Important notices :

When purchasing rotary table, rotary tailstock, and **cradle-type fixture** (as Dia. ⑤ to the right), it is necessary to advise us if the arm (A) has overtaken the table radius and caused off-center process. Otherwise, the worm wheel will be worn out quickly. (The longer the arm (A) is, the more it's against common sense and normal practice) We shall not be responsible if you fail to advise so.



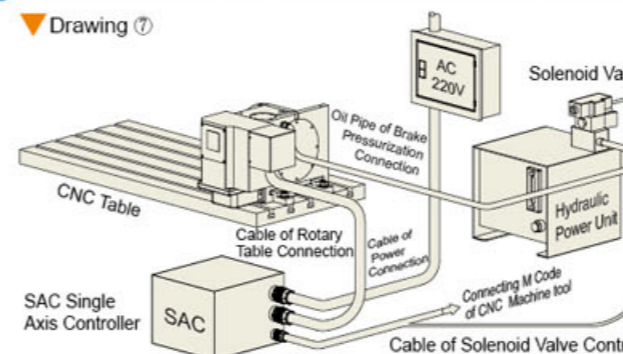
▲ Drawing ⑤

8 "Reserved interface for the forth axis" :

The so-called "reserved interface for the forth axis" refers to all the small hardware or PLC software necessarily reserved for the fourth axis on the machine as well as refers to five main components including ① rotary table ② 4th axis motor ③ shielded power & feedback cables ④ unshielded power & feedback cables, and ⑤ 4th axis amplifier. (as below Dia. ⑥ shows)

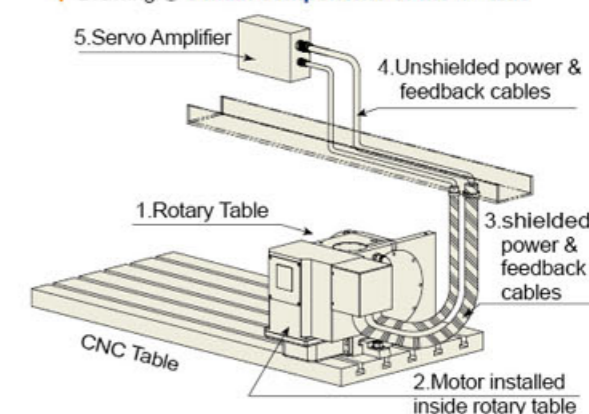
- (A) If the machine comes with those reserved interfaces for the fourth axis, there is no problem at all to retrofit the fourth axis of the same system for **four-axes simultaneous contouring**.
- (B) If the machine does not come with those reserved interfaces for the fourth axis, the **single-axis controller (SAC)** we provide (as below Dia. ⑦ shows) can be used to retrofit the fourth axis. However, such single-axis controller does not interlock with any of X, Y and Z axes in the machine. In other words, the other three axes can not be moved unless the fourth-axis motion is complete.

9 Application for single axis controller (SAC) :



★ With a reserved M Code in the machine center, TJR SAC single axis controller or AIC hydraulic controller can be easily installed, **no matter which brand** of control system is used.

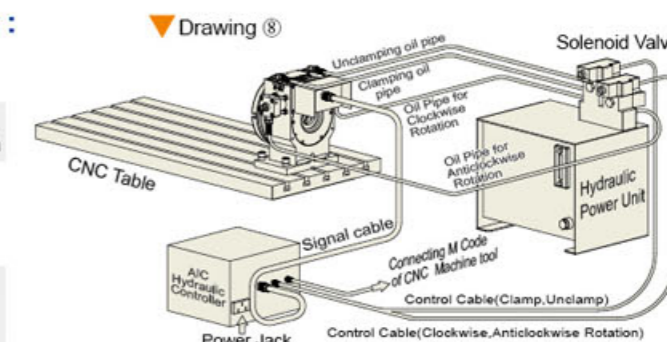
▼ Drawing ⑥ 5 main components of the 4th axis



10 Application of AIC hydraulic controller :

It is not suitable for CNC rotary table, but for HC series (page 31) hydraulic index table only

Strength:	<ul style="list-style-type: none"> • Indexing accuracy ± 5 seconds, • Lower cost due to no numerical control system
Weakness:	<ul style="list-style-type: none"> • It is not available for simultaneous movement with the other 3 axes. • Limited index numbers: 2, 4, 8, 12, 24 index numbers
Note:	Please prepare specialized PLC for HC series by yourself, if you don't buy AIC hydraulic controller.



CNC Rotary Tables
(Min indexing angle – 0.001°)

AR Series

(Powerful Pneumatic Brake)-

Right Side Motor

AR-125R/170R/210R/250R



▲ AR-125R



Use radial & axial bearings



▲ AR-170R



▲ AR-210R



▲ AR-250R



▲ AR-255H

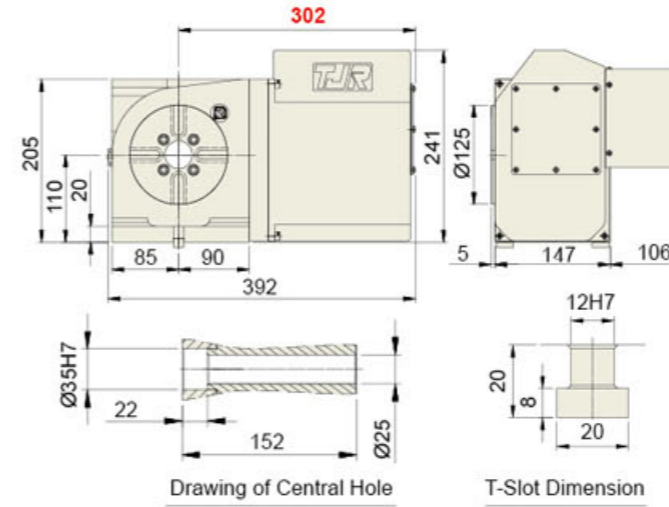
The Standard of Precision Test: Japan JIS

Hydraulic HR-170R/210R/250R are alternatives.

Item / Model	Unit	AR-125R	AR-170R	AR-210R/AR-250R	AR-255H	
Table Diameter	mm	Ø 125	Ø 170	Ø 210 / Ø 250	Ø255	
Diameter of Table Central Hole	mm	Ø 35H7	Ø 67	Ø 67	Ø110	
Inner Diameter of Mandrel Sleeve	mm	-	Ø 40H7	Ø 40H7	Ø80H7	
Diameter of Center Through Hole	mm	Ø 25	Ø 40	Ø 40	Ø80	
Center Height (Vertical)	mm	110	135	160	160	
Table Height (Horizontal)	mm	152	152	152 / 160	200	
Table T-slot Width	mm	12H7	12H7	12H7	12H7	
Guide Block Width	mm	14h7	18h7	18h7	18h7	
Min. Increment	deg.	0.001	0.001	0.001	0.001°	
Indexing Precision	sec.	40	20	20	15	
Repeatability	sec.	4	4	4	4	
Clamping System (Pneumatic)	kg/cm ²	6	6	6	5	
Clamping Torque	kg-m	13	31	31	82.6	
Servo Motor Model	FANUC	Taper shaft	α2i / β4is	α4i / α8i / β8is	α4i / α8i / β8is	α4i / α8i / β8is
	MITSUBISHI	Taper shaft	HF-75 / 105	HF-54 / 104	HF-54 / 104	HF-104 / 154
Speed Reduction Ratio	-	1 : 60	1 : 90	1 : 90	1 : 120	
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)	r.p.m	83.3	44.4	44.4	33.3	
Allowable Inertia Load Capacity (Horizontal)	kg.cm.sec ²	2	5.4	8.3	20.3	
Allowable Workpiece Load	Vertical	kg	50	75	75	100
	with Tailstock	kg	100	150	150	250
	Horizontal	kg	100	150	150	250
Allowable Load (with Rotary Table Clamping)	F	kgf	1000	1450	1450	2000
	FxL	kgf.m	45	100	100	112
	FxL	kgf.m	13	31	31	70
Strength of worm gears	kg.m	9	18	18	55	
Net Weight (servo motor excluded)	kg	34	50	55 / 58	116	

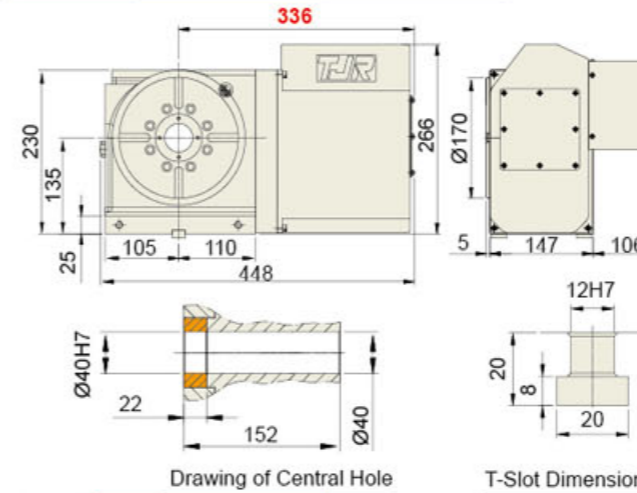
NEW Powerful Brake System

AR-125R (For Both Vertical and Horizontal Applications)



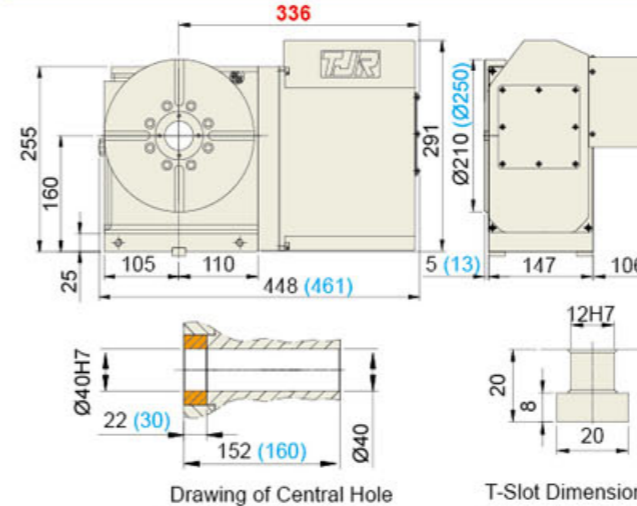
NEW Powerful Brake System

AR-170R (For Both Vertical and Horizontal Applications) HR-170R (Hydraulic Brake)



NEW Powerful Brake System

AR-210R/250R (For Both Vertical and Horizontal Applications) HR-210R/250R (Hydraulic Brake)

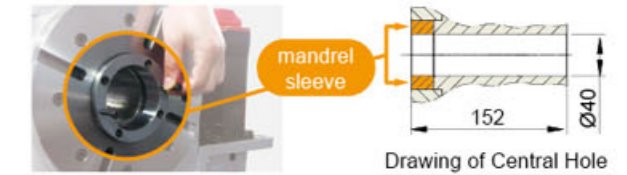


(): the dimension of Model AR-250R

HR-255N-J-A Diagram of Model Encoding Rules

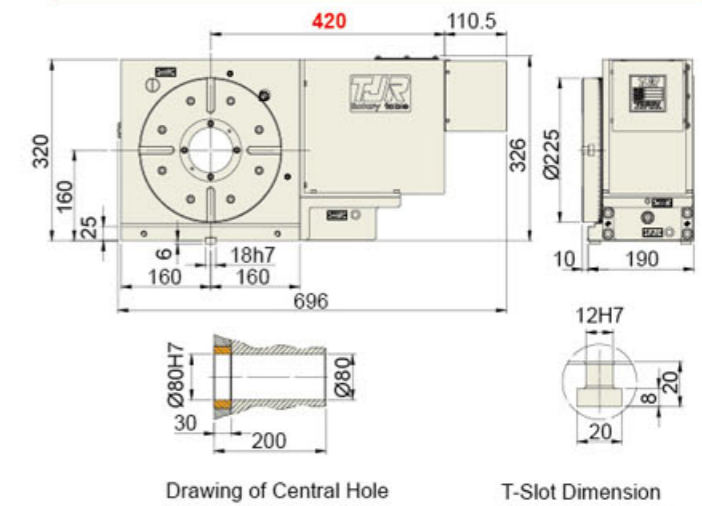
- Special Version (A, B, C...) Specified by Customers
- J: Worm and Worm Gear Made in Japan (Recommend for any table which sizes up to over Ø255mm)
- T: Worm and Worm Gear Made in Taiwan
- R: Right Side Motor (for Both Vertical and Horizontal Applications)
- L: Left side motor, while applying to 4th axis. (for Both Vertical and Horizontal Applications)
- L: Extended type, while applying to 4th & 5th axis
- L: Integrated linear guideway bottom type, while applying to auto pallet changer.
- B: Back Side Motor (Only for Vertical Application ;not able to equip with angle encoder)
- N: Right Side Motor with Sheet Metal Cover Reduction (Only for Vertical Application)
- C: Dual-axis Cradle Type
- S: Dual-axis Single-arm Type
- A: 2nd generation

Model code (page 3~4)



NEW Powerful Brake System

AR-255H (For Both Vertical and Horizontal Applications)



CNC Rotary Tables
(Min indexing angle – 0.001°)

AR Series

(Powerful Pneumatic Brake)-

Left Side Motor

AR-125L/170L/210L/250L



▲ AR-125L



Use radial & axial bearings



▲ AR-170L



▲ AR-210L



▲ AR-250L

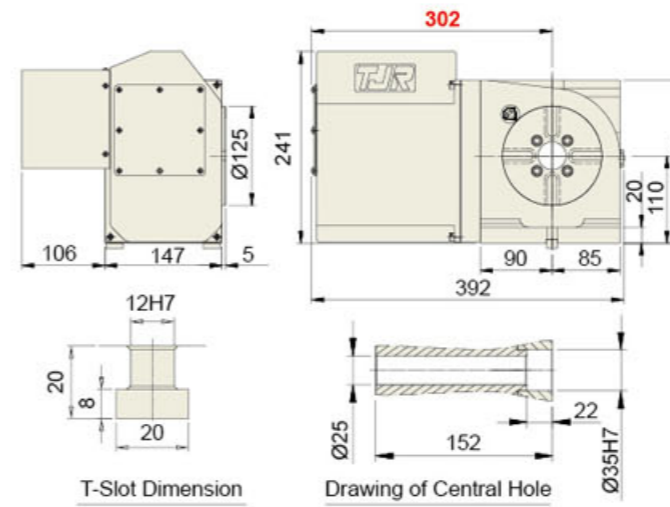
The Standard of Precision Test: Japan JIS

Hydraulic HR-170L/210L/250L are alternatives.

Item / Model	Unit	AR-125L	AR-170L	AR-210L	AR-250L	
Table Diameter	mm	Ø 125	Ø 170	Ø 210	Ø 250	
Diameter of Table Central Hole	mm	Ø 35H7	Ø 67	Ø 67	Ø 67	
Inner Diameter of Mandrel Sleeve	mm	-	Ø 40H7	Ø 40H7	Ø 40H7	
Diameter of Center Through Hole	mm	Ø 25	Ø 40	Ø 40	Ø 40	
Center Height (Vertical)	mm	110	135	160	160	
Table Height (Horizontal)	mm	152	152	152	160	
Table T-slot Width	mm	12H7	12H7	12H7	12H7	
Guide Block Width	mm	14h7	18h7	18h7	18h7	
Min. Increment	deg.	0.001	0.001	0.001	0.001	
Indexing Precision	sec.	40	20	20	20	
Repeatability	sec.	4	4	4	4	
Clamping System (Pneumatic)	kg/cm ²	6	6	6	6	
Clamping Torque	kg-m	13	31	31	31	
Servo Motor Model	FANUC	Taper shaft	α2i / β4is	α4i / α8i / β8is	α4i / α8i / β8is	α4i / α8i / β8is
	MITSUBISHI	Taper shaft	HF-75 / 105	HF-54 / 104	HF-54 / 104	HF-54 / 104
Speed Reduction Ratio	-	1 : 60	1 : 90	1 : 90	1 : 90	
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)	r.p.m	83.3	44.4	44.4	44.4	
Allowable Inertia Load Capacity (Horizontal)	kg.cm.sec ²	2	5.4	8.3	11.7	
Allowable Workpiece Load	Vertical	kg	50	75	75	75
	with Tailstock	kg	100	150	150	150
	Horizontal	kg	100	150	150	150
Allowable Load (with Rotary Table Clamping)	F	kgf	1000	1450	1450	1450
	FxL	kgf.m	45	100	100	100
	FxL	kgf.m	13	31	31	31
Strength of worm gears	kg.m	9	18	18	18	
Net Weight (servo motor excluded)	kg	34	50	55	58	

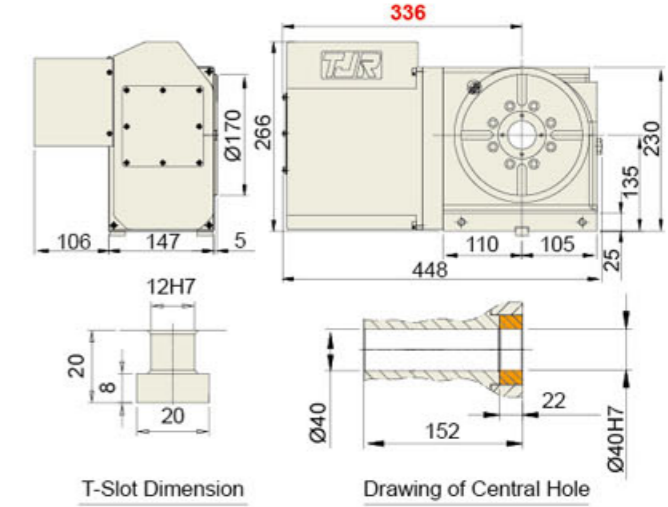
NEW Powerful Brake System

AR-125L (For Both Vertical and Horizontal Applications)



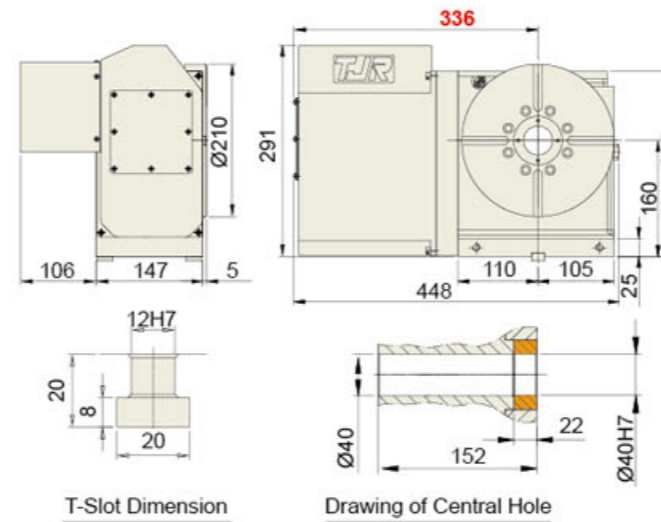
NEW Powerful Brake System

AR-170L (For Both Vertical and Horizontal Applications) HR-170L (Hydraulic Brake)



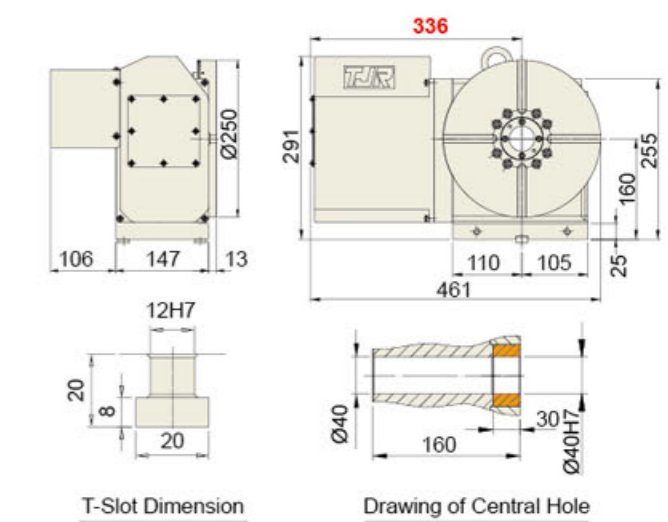
NEW Powerful Brake System

AR-210L (For Both Vertical and Horizontal Applications) HR-210L (Hydraulic Brake)



NEW Powerful Brake System

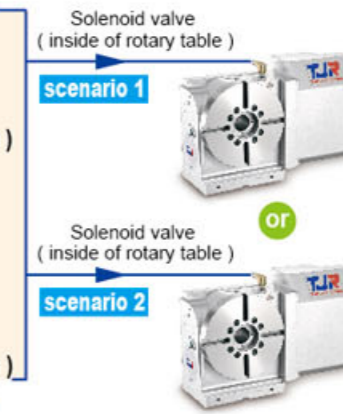
AR-250L (For Both Vertical and Horizontal Applications) HR-250L (Hydraulic Brake)



※ While using AR series rotary table (pneumatic brake), please note the following matters :



Air pressure required



Note: Please mount cooling dryer or F.R.L unit to avoid any rustiness which seizes up the shaft of solenoid valve and damages the coils.

TJR CNC Rotary Table

CNC Rotary Tables
(Min indexing angle – 0.001°)

AR Series (Powerful Pneumatic Brake)- Back Side Motor AR-125B/170B/210B/250B

For tapping center
(short Y axis travel)

FEATURE



Use radial & axial bearings

Picture of Power and Feedback Cable Connectors
(Back Side Motor type can not be equipped with angle encoder)



▲ AR-170B
(Back Side Motor)

▲ AR-210B
(Back Side Motor)

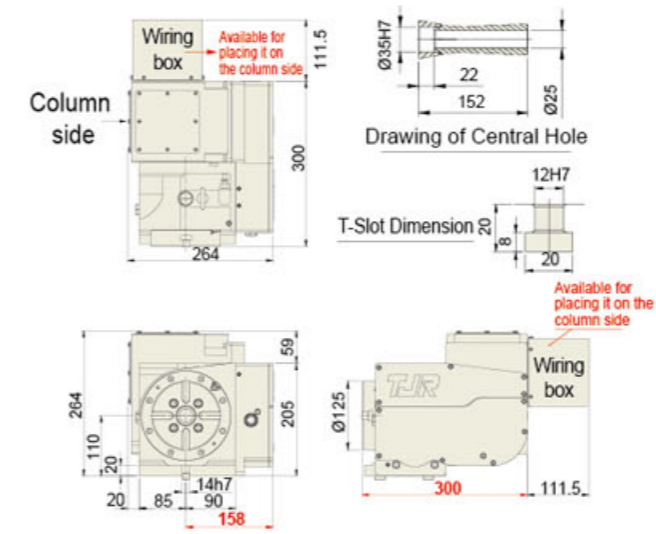
The Standard of Precision Test: Japan JIS

Hydraulic HR-170B/210B/250B are alternatives.

Item / Model	Unit	AR-125B	AR-170B	AR-210B	AR-250B
Table Diameter	mm	Ø 125	Ø 170	Ø 210	Ø 250
Diameter of Table Central Hole	mm	Ø 35H7	Ø 67	Ø 67	Ø 67
Inner Diameter of Mandrel Sleeve	mm	-	Ø 40H7	Ø 40H7	Ø 40H7
Diameter of Center Through Hole	mm	Ø 25	Ø 40	Ø 40	Ø 40
Center Height (Vertical)	mm	110	135	160	160
Table Height (Horizontal)	mm	-	-	-	-
Table T-slot Width	mm	12H7	12H7	12H7	12H7
Guide Block Width	mm	14h7	18h7	18h7	18h7
Min. Increment	deg.	0.001	0.001	0.001	0.001
Indexing Precision	sec.	40	20	20	20
Repeatability	sec.	4	4	4	4
Clamping System (Pneumatic)	kg/cm ²	6	6	6	6
Clamping Torque	kg-m	13	31	31	31
Servo Motor Model	FANUC Taper shaft	α2i / β4is	α4i / α8i / β8is	α4i / α8i / β8is	α4i / α8i / β8is
	MITSUBISHI Taper shaft	HF-75 / 105	HF-54 / 104	HF-54 / 104	HF-54 / 104
Speed Reduction Ratio	-	1 : 60	1 : 90	1 : 90	1 : 90
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)	r.p.m	83.3	44.4	44.4	44.4
Allowable Inertia Load Capacity (Horizontal)	kg.cm.sec ²	2	2.7	4.1	5.9
Allowable Workpiece Load	Vertical	kg	50	75	75
	with Tailstock	kg	100	150	150
Allowable Load (with Rotary Table Clamping)	Horizontal	kg	-	-	-
	F	kgf	1000	1450	1450
Strength of worm gears	FxL	kgf.m	45	100	100
	FxL	kgf.m	13	31	31
Net Weight (servo motor excluded)	kg	-	60	65	72

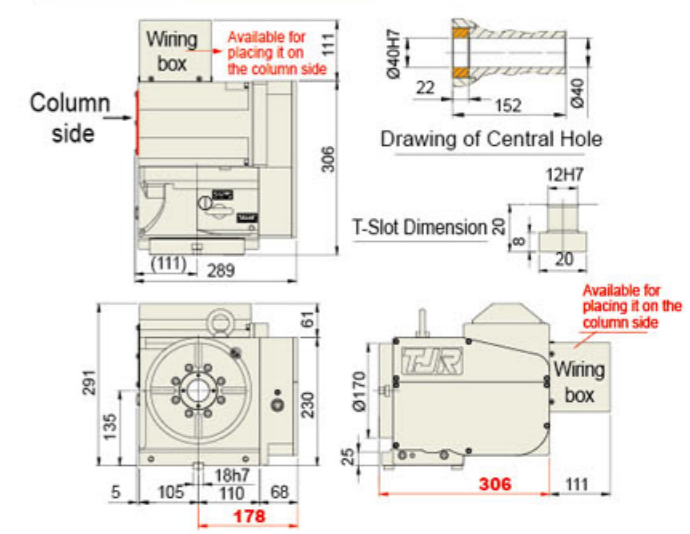
NEW Powerful Brake System

AR-125B (For Vertical Application)



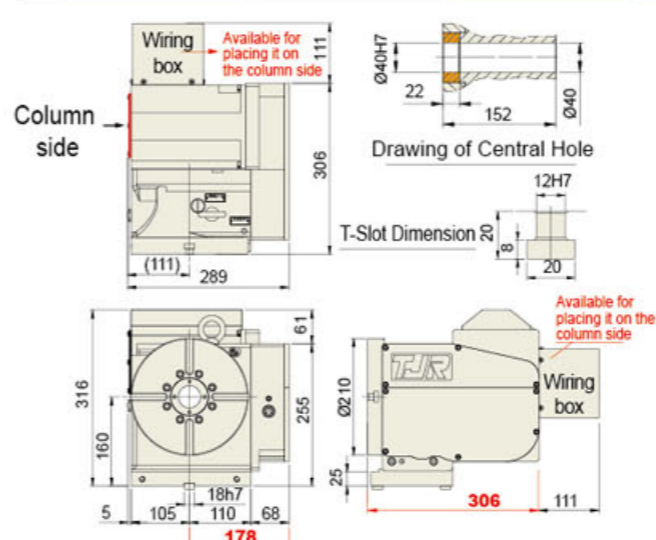
NEW Powerful Brake System

AR-170B (For Both Vertical and Horizontal Applications) HR-170B (Hydraulic Brake)



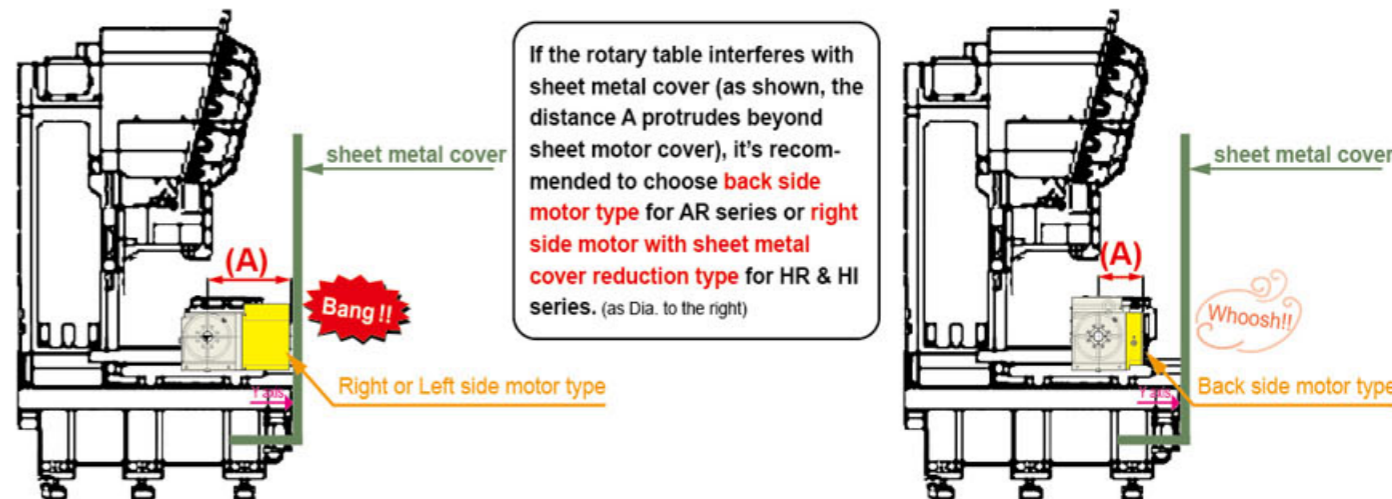
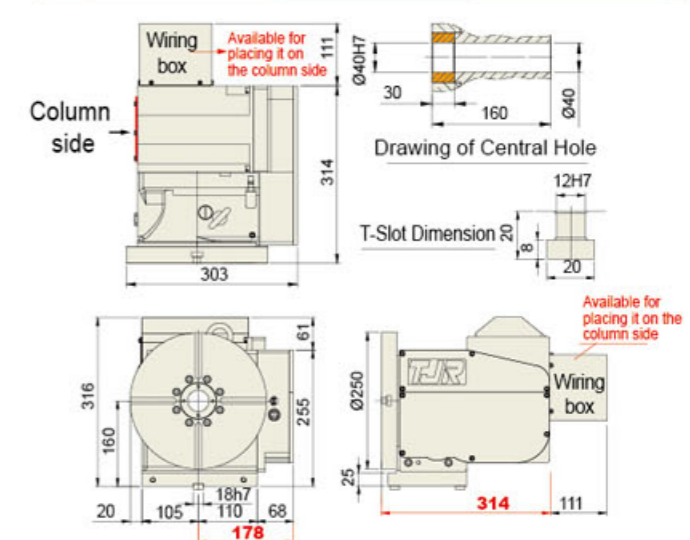
NEW Powerful Brake System

AR-210B (For Both Vertical and Horizontal Applications) HR-210B (Hydraulic Brake)



NEW Powerful Brake System

AR-250B (For Both Vertical and Horizontal Applications) HR-250B (Hydraulic Brake)



CNC Rotary Tables
(Min indexing angle – 0.001°)

HR Series (Hydraulic Brake)

HR-210/255/320/400

Recommend HR Series to use **made-in-Japan** dual-lead worm and worm gear

3
FEATURES



- 1 Use **large-diameter** radial & axial bearings
- 2 Employ a **large-through-hole design** while the table diameter exceeds 250mm. This design delivers high rigidity and provides bigger space for work piece setup with fixtures. (The hole diameter can be adjusted by adding a mandrel sleeve.)
- 3 **High rotation rate design** delivers high efficiency



HR-255N
(Reduced Sheet Metal Cover for Vertical Application)



HR-320N
(Reduced Sheet Metal Cover for Vertical Application)

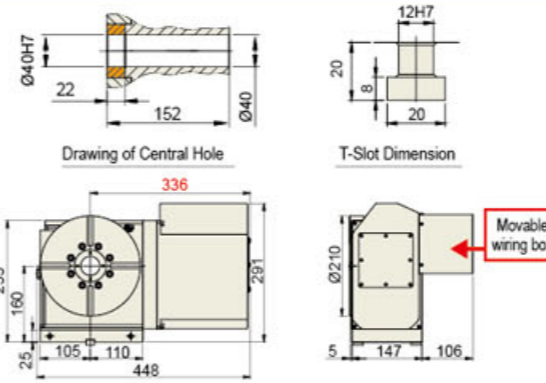


HR-255R
(Sheet Metal Cover for Both Vertical and Horizontal Applications)

The Standard of Precision Test: Japan JIS

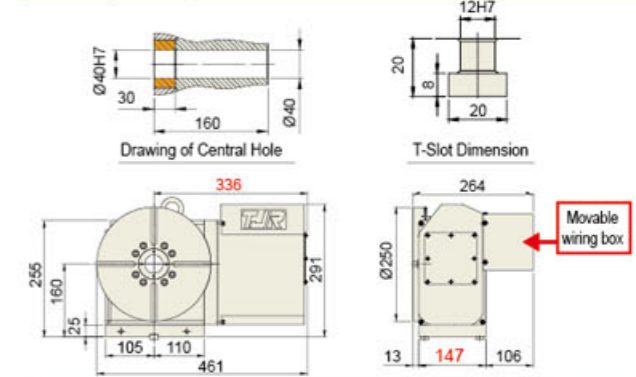
Item / Model	Unit	HR-210	HR-255	HR-320	HR-400	
Table Diameter	mm	Ø 210	Ø 255	Ø 320	Ø 400	
Diameter of Table Central Hole	mm	Ø 67	Ø 110	Ø 150	Ø 150	
Inner Diameter of Mandrel Sleeve	mm	Ø 40H7	Ø 80H7	Ø 120H7	Ø 120H7	
Diameter of Center Through Hole	mm	Ø 40	Ø 80 Big Bore	Ø 120 Big Bore	Ø 120 Big Bore	
Center Height (Vertical)	mm	160	160	210	255	
Table Height (Horizontal)	mm	152	200	235	250	
Table T-slot Width	mm	12H7	12H7	14H7	14H7	
Guide Block Width	mm	18h7	18h7	18h7	18h7	
Min. Increment	deg.	0.001	0.001	0.001	0.001	
Indexing Precision	sec.	20	15	15	15	
Repeatability	sec.	4	4	4	4	
Clamping System (Hydraulic)	kg/cm ²	25	35	35	35	
Clamping Torque	kg-m	35	70	115	200	
Servo Motor Model	FANUC	-	α4i/α8i/β8is(Taper shaft)	α8i/β8is(Taper shaft)	α12i/β22is(Straight shaft)	α12i/β22is(Straight shaft)
	MITSUBISHI	-	HF-54/104 (Taper shaft)	HF-104/154 (Taper shaft)	HF-204 (Straight shaft)	HF-204 (Straight shaft)
Speed Reduction Ratio	-	1 : 90	1 : 120	1 : 120	1 : 120	
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)	r.p.m	44.4	33.3	25	25	
Allowable Inertia Load Capacity (Horizontal)	kg.cm.sec ²	8.3	20.3	44.8	100	
Allowable Workpiece Load	Vertical	kg	75	100	150	200
	with Tailstock	kg	150	250	350	500
	Horizontal	kg	150	250	350	500
Allowable Load (with Rotary Table Clamping)	F	kgf	1450	2000	3000	4000
	FxL	kgf.m	100	112	300	400
	FxL	kgf.m	35	70	115	200
Strength of worm gears	kg.m	18	55	80	170	
Net Weight (servo motor excluded)	kg	55	109	204	315	

HR-210R (For Both Vertical and Horizontal Applications)

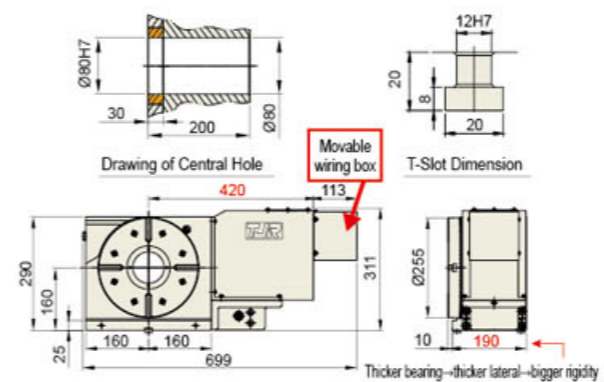


HR-250R (Ultra-thin, for Both Vertical and Horizontal Applications) Hydraulic Brake

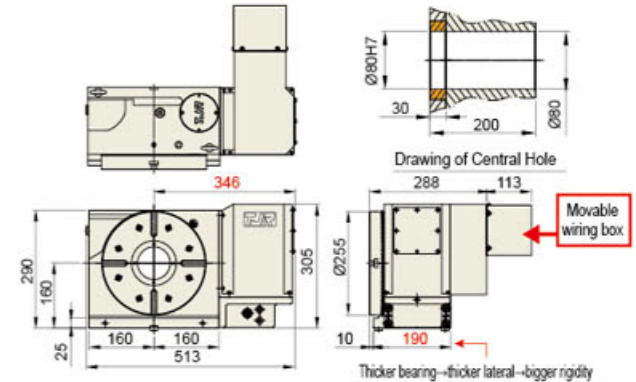
Special specified model used for shorter machine



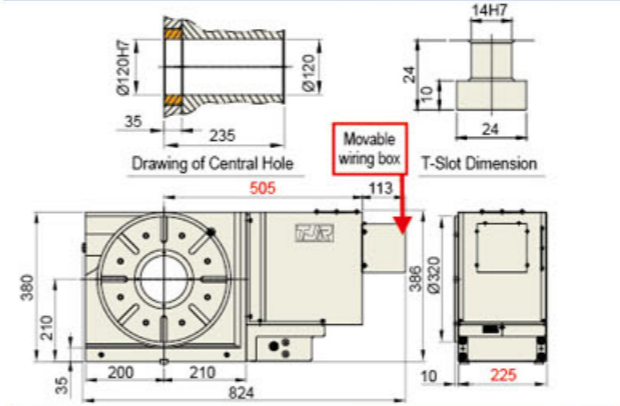
HR-255R (For Both Vertical and Horizontal Applications)



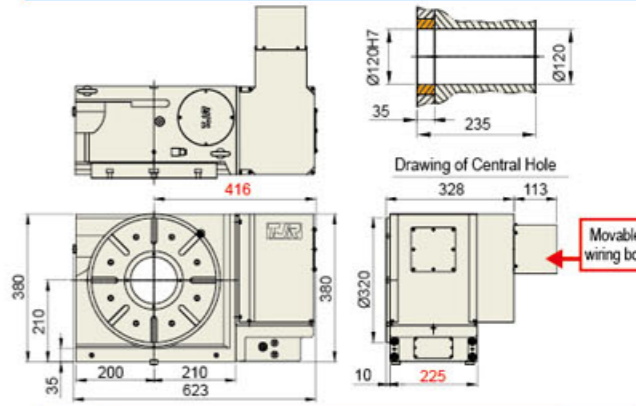
HR-255N (Sheet Metal Cover Reduction)



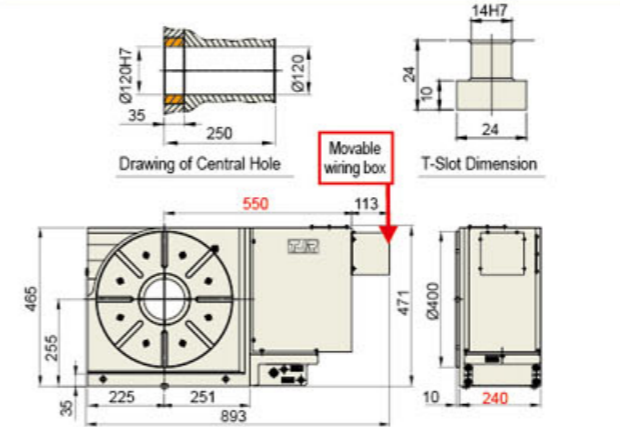
HR-320R (For Both Vertical and Horizontal Applications)



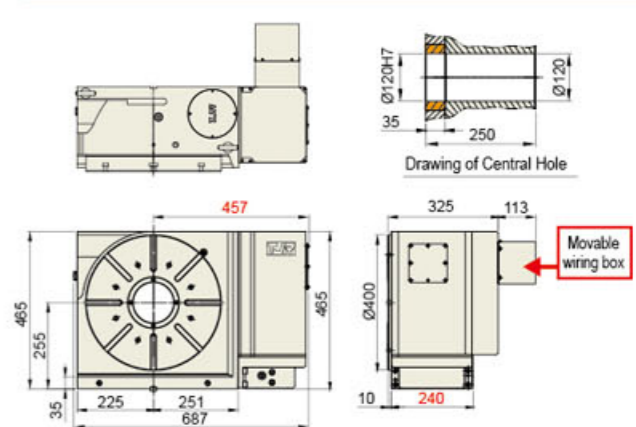
HR-320N (Sheet Metal Cover Reduction)



HR-400R (For Both Vertical and Horizontal Applications)



HR-400N (Sheet Metal Cover Reduction)

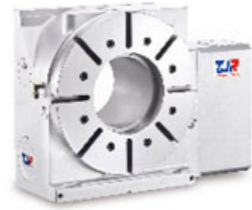
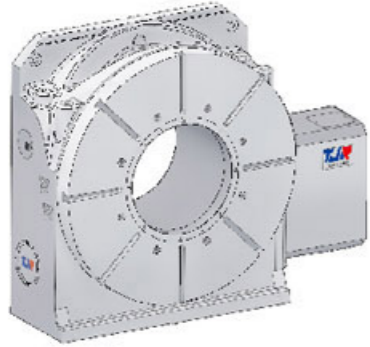


TJR CNC Rotary Table

CNC Rotary Tables
(Min indexing angle – 0.001°)

HR Series (Hydraulic Brake)

HR-500/630R/800



▲ HR-500R
(for Both Vertical and Horizontal Applications)



▲ HR-630R (for Both Vertical and Horizontal Applications)

▲ HR-800 (for Both Vertical and Horizontal Applications)

The Standard of Precision Test: Japan JIS

Item / Model	Unit	HR-500R	HR-630R	HR-800R	
Table Diameter	mm	Ø 500	Ø 630	Ø 800	
Diameter of Table Central Hole	mm	Ø 250	Ø 325	Ø 395	
Inner Diameter of Mandrel Sleeve	mm	Ø 220H7	Ø 280H7	Ø 350H7	
Diameter of Center Through Hole	mm	Ø220 Big Bore	Ø280 Big Bore	Ø350 Big Bore	
Center Height (Vertical)	mm	310	400	470	
Table Height (Horizontal)	mm	290	325	350	
Table T-slot Width	mm	18H7	18H7	18H7	
Guide Block Width	mm	18h7	18h7	18h7	
Min. Increment	deg.	0.001	0.001	0.001	
Indexing Precision	sec.	15	15	15	
Repeatability	sec.	4	4	4	
Clamping System (Hydraulic)	kg/cm ²	35	35	35	
Clamping Torque	kg-m	370	800	800	
Servo Motor Model	FANUC Direct Shaft without Key	α12i / β22is	α12i / β22is	α22i	
	MITSUBISHI Direct Shaft without Key	HF-204	HF-204	HF-204	
Speed Reduction Ratio	-	1 : 180	1 : 180	1 : 180	
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)	r.p.m	16.6	16.6	11.1	
Allowable Inertia Load Capacity (Horizontal)	kg.cm.sec ²	187.5	396.9	1200	
Allowable Workpiece Load	Vertical	kg	250	400	800
	with Tailstock	kg	600	800	1500
Allowable Load (with Rotary Table Clamping)	Horizontal	kg	600	800	1500
	F	kgf	4000	5000	5000
Strength of worm gears (Rotary axis)	FxL	kgf.m	500	850	1000
	FxL	kgf.m	370	800	800
Strength of worm gears	kg.m	250	420	800	
Net Weight (servo motor excluded)	kg	405	692	-	

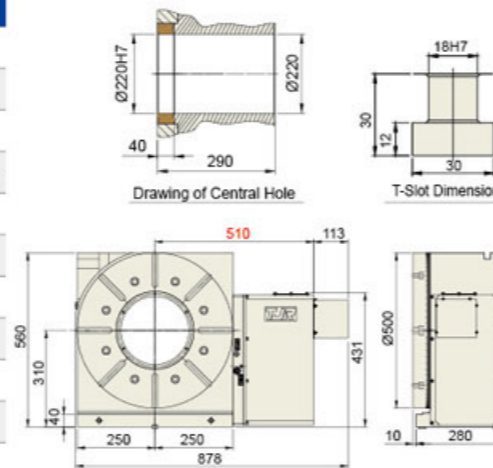


- Use large-diameter radial & axial bearings
- Employ a large-through-hole design while the table diameter exceeds 250mm. This design delivers high rigidity and provides bigger space for work piece setup with fixtures. (The hole diameter can be adjusted by adding a mandrel sleeve.)

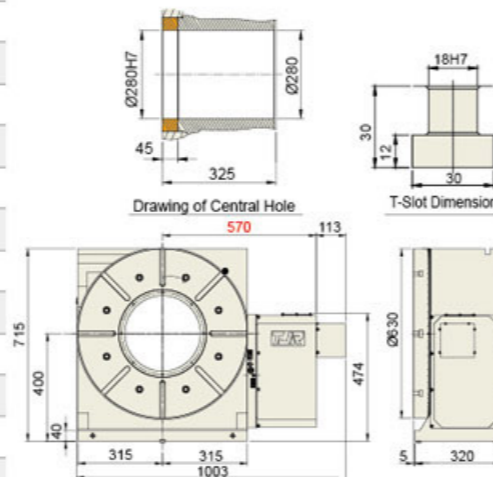


HR-500R and HR-630R specialize in lifting heavy load, and thus suit with double column machining center.

HR-500R (For Both Vertical and Horizontal Applications)



HR-630R (For Both Vertical and Horizontal Applications)



Manual Tilt rotary tables
(Min indexing angle – 0.001°)

MTHR Manual Tilt Series (Manual tilt axis ; CNC rotary axis - 0.001°)

MTHR-255



▲ MTHR-255



▲ MTHR-255
Rear view + Ratchet handle



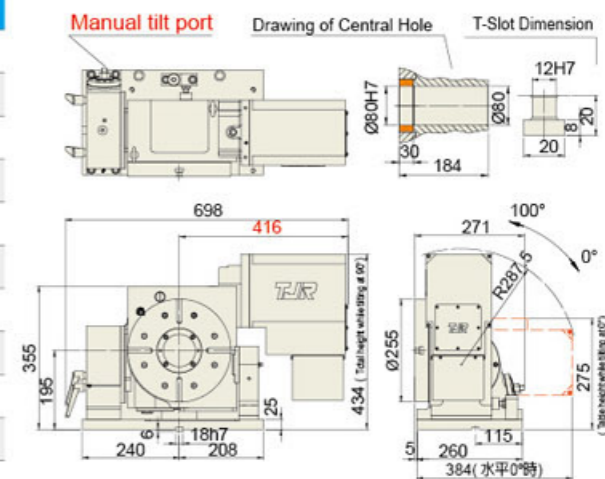
- Use large-diameter radial & axial bearings
- Fully sealed tilt axis
- Powerful manual double disk brakes for tilt axis
- Highly rigid structure of manual tilt axis

The handle of unclamping / clamping tilt axis. Double disk brakes. The table center won't shift while clamping the tilt axis.

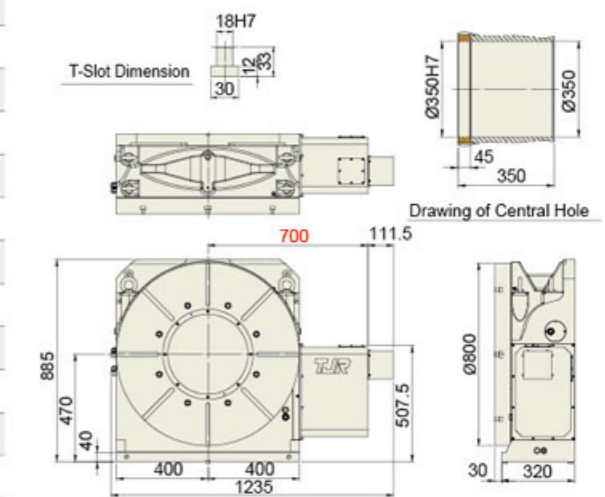
The Standard of Precision Test: Japan JIS

Item / Model	Unit	MTHR-255	
Table Diameter	mm	Ø255	
Diameter of Table Central Hole	mm	Ø110	
Inner Diameter of Mandrel Sleeve	mm	Ø80H7	
Diameter of Center Through Hole	mm	Ø80	
Table Height (Horizontal)	mm	275	
Table T-slot Width	mm	12H7	
Guide Block Width	mm	18h7	
Axis		Rotation	Tilt(0°~100°)
Min. Increment	deg.	0.001	-
Indexing Precision	sec.	15	15
Repeatability	sec.	4	4
Clamping System (Hydraulic)	kg/cm ²	Hyd.35	Manual double disk brakes
Clamping Torque	kg-m	70	-
Servo Motor Model	FANUC Taper/Straight shaft	α8i / β8is (Taper)	Manual
	MITSUBISHI Taper shaft	HF-104 / HF-154	Manual
Speed Reduction Ratio	-	1 : 120	1 : 40
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)	r.p.m	33.3	-
Allowable Inertia Load Capacity (Horizontal)	kg.cm.sec ²	20.3	
Allowable Workpiece Load	0° Horizontal	kg	250
	0°~90° Tilt	kg	100
Allowable Load (with Rotary Table Clamping)	F	kgf	1600
	FxL	kgf.m	85
Strength of worm gears (Rotary axis)	FxL	kgf.m	70
	FxL	kgf.m	55
Net Weight (servo motor excluded)	kg	145	

MTHR-255 (Manual tilt)



HR-800R (For Both Vertical and Horizontal Applications)

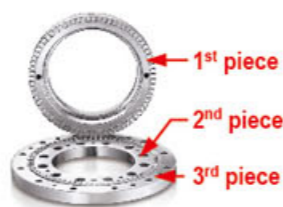


TJR CNC Rotary Table

CNC Index Tables
Min. indexing angle – 1° or 5°

HI Series (Hirth coupling hydraulic brake)

HI-255/320/400/500



HI Series :
Use **three-piece** clutch plate

Function:

- ① Accuracy: ± 5 seconds
(Angle encoder accuracy)
- ② Rotate **without lifting the table** to prevent table from water and particles.



▲ HI-255N



▲ HI-320N

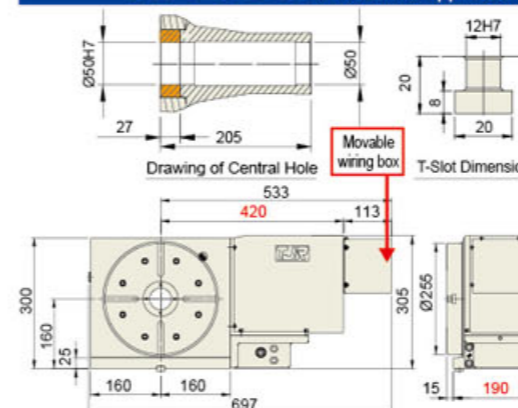


▲ HI-500

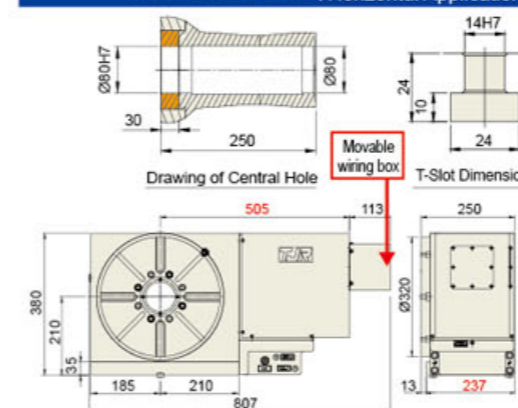
The Standard of Precision Test: Japan JIS

Item / Model	Unit	HI-255	HI-320	HI-400	HI-500	
Table Diameter	mm	Ø 255	Ø 320	Ø 400	Ø 500	
Diameter of Table Central Hole	mm	Ø 50H7	Ø 80H7	Ø 80H7	Ø 120H7	
Diameter of Center Through Hole	mm	Ø 50	Ø 80	Ø 80	Ø 120	
Center Height (Vertical)	mm	160	210	255	310	
Table Height (Horizontal)	mm	205	250	255	290	
Table T-slot Width	mm	12H7	14H7	14H7	18H7	
Guide Block Width	mm	18h7	18h7	18h7	18h7	
Min. Increment	deg.	1° or 5°	1° or 5°	1° or 5°	1° or 5°	
Indexing Precision	sec.	±5	±5	±5	±5	
Repeatability	sec.	±1	±1	±1	±1	
Clamping System (Hydraulic)	kg/cm ²	35	35	35	35	
Clamping Torque	kg-m	300	400	500	1000	
Servo Motor Model	FANUC	-	β8is (Taper shaft)	β22is (Straight shaft)	β22is (Straight shaft)	β22is (Straight shaft)
	MITSUBISHI	Taper shaft	HF- 104 / 154	HF-204	HF-204	HF-204
Speed Reduction Ratio	-	1 : 120	1 : 120	1 : 120	1 : 180	
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)	r.p.m	33.3	25	25	16.6	
Allowable Inertia Load Capacity (Horizontal)	kg.cm.sec ²	24.8	44.8	100	187.5	
Allowable Workpiece Load	Vertical	kg	125	175	250	400
	with Tailstock	kg	300	400	500	600
Allowable Load (with Rotary Table Clamping)	Horizontal	kg	300	350	500	600
	F	kgf	1600	2000	3000	4000
Allowable Load (with Rotary Table Clamping)	FxL	kgf.m	175	250	300	600
	FxL	kgf.m	300	400	500	1000
Net Weight (servo motor excluded)	kg	120	210	320	410	

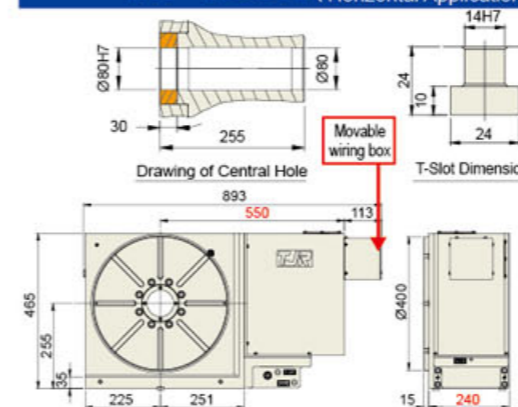
HI-255R (For Both Vertical and Horizontal Applications)



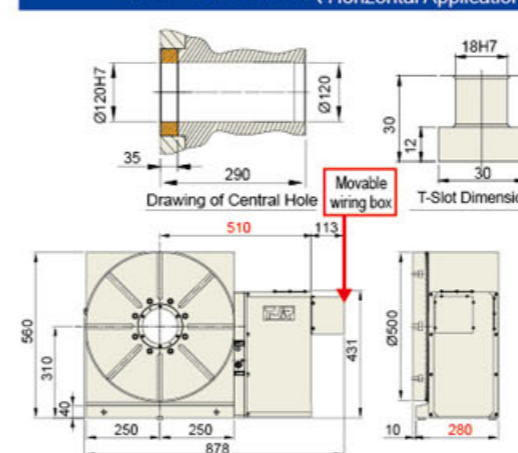
HI-320R (For Both Vertical and Horizontal Applications)



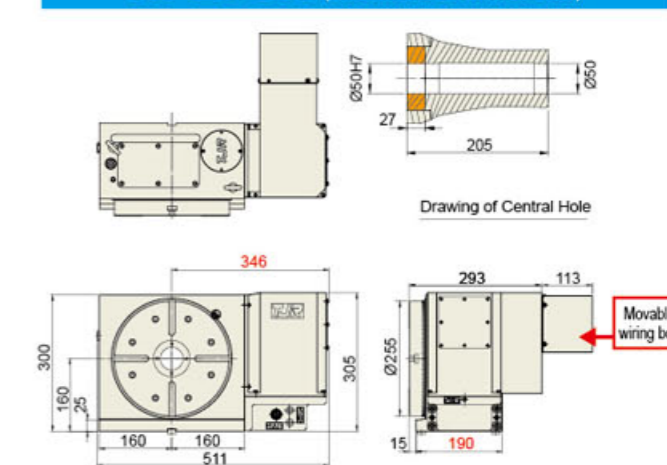
HI-400R (For Both Vertical and Horizontal Applications)



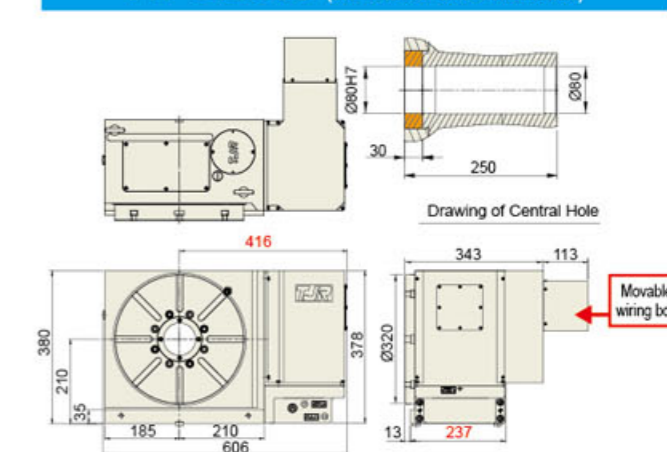
HI-500R (For Both Vertical and Horizontal Applications)



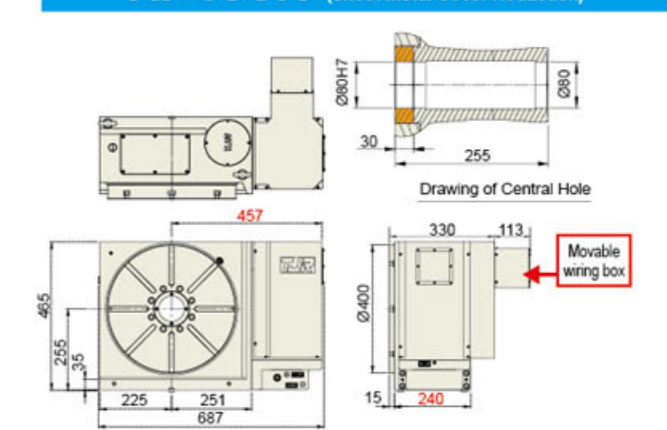
HI-255N (Sheet Metal Cover Reduction)



HI-320N (Sheet Metal Cover Reduction)



HI-400N (Sheet Metal Cover Reduction)



▲ RTH-255

Hydraulic Brake Rotary Tailstock (with Delay Valve)
When HI series is chosen, the corresponding rotary tailstock should have a delay valve.

TJR CNC Rotary Table

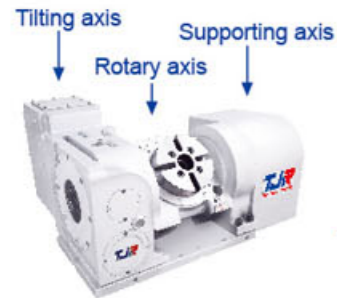
CNC Tilting Rotary Tables
Min. indexing angle -0.001°

FAR Series Dual-axis dual-arm type (Powerful Pneumatic Brake) FAR-125/125B/170A/170/170B

3
FEATURES



- Both the tilting axis and rotary axis use radial & axial bearings.
- Because the tilting axis normally needs to bear heavy load, Japanese-made worm and worm gear are employed to improve wear resistance and precision of tilting axis. **standard component** (It's wear life is 2.6 times longer than aluminum bronze PBC3.)
- A hydraulic brake for tilting axis is optional.



▲ FAR-170A (compact type)



▲ FAR-170

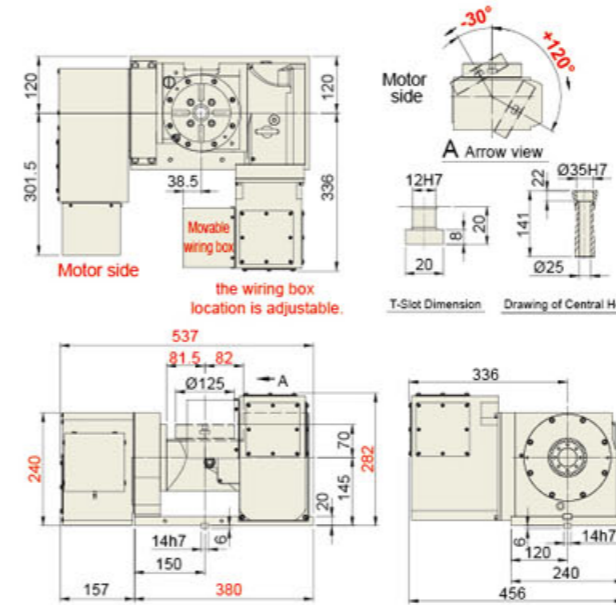


▲ Workpiece sample – 5 axis simultaneous contouring

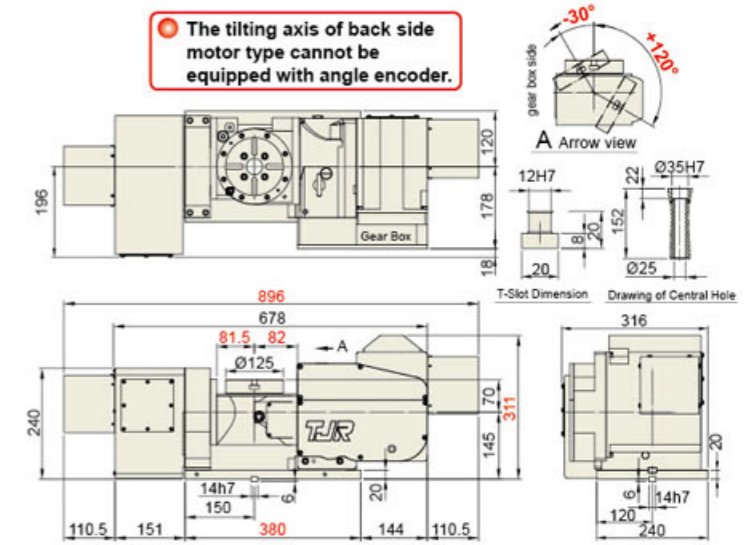
The Standard of Precision Test: Japan JIS

Item / Model		Unit	FAR-125/125B		FAR-170A (compact type)		FAR-170 (Standard type) / FAR-170B (Back side motor type)	
Table Diameter		mm	Ø125		Ø170		Ø170	
Diameter of Table Central Hole		mm	Ø 35H7		Ø67		Ø67	
Inner Diameter of Mandrel Sleeve		mm	-		Ø40H7		Ø40H7	
Diameter of Center Through Hole		mm	Ø25		Ø40		Ø40	
Table Height (Horizontal)		mm	215		245		270	
Table T-slot Width		mm	12H7		12H7		12H7	
Guide Block Width		mm	14h7		18h7		18h7	
Axis			Rotation		Tilt $-30^\circ \sim +120^\circ$		Rotation	
Min. Increment		deg.	0.001		0.001		0.001	
Indexing Precision		sec.	40		50 (30, if ECN-225 angle encoder is employed)		50 (Angle encoder can not be employed)	
Repeatability		sec.	4		8		8	
Clamping System (Pneumatic)		kg/cm ²	5		6		6	
Clamping Torque		kg-m	13		31		31	
Servo Motor Model	FANUC	Taper/Straight shaft	α2i / β4is	α4i / β8is	α2i / α4is / β4is	α4i / β8is	α4i / β8is	α8i / α12is / β12is
	MITSUBISHI	Taper shaft	HF-75 / 105	HF-54/104	HF-75/105	HF-54/104 (Straight shaft is not available)	HF-54/104	HF-104
Speed Reduction Ratio		-	1 : 60		1 : 90		1 : 90	
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	83.3		44.4		44.4	
Allowable Inertia Load Capacity (Horizontal)		kg.cm.sec ²	0.97		2.2		4.13	
Allowable Workpiece Load	0° Horizontal	kg	50		60		75	
	0°~90° Tilt	kg	35		40		50	
Allowable Load (with Rotary Table Clamping)	F	kgf	400		600		750	
	FxL	kgf.m	31		31		31	
	FxL	kgf.m	13		31		31	
Strength of worm gears (Rotary axis)		kg.m	9		18		18	
Net Weight (servo motor excluded)		kg	97		125		160	

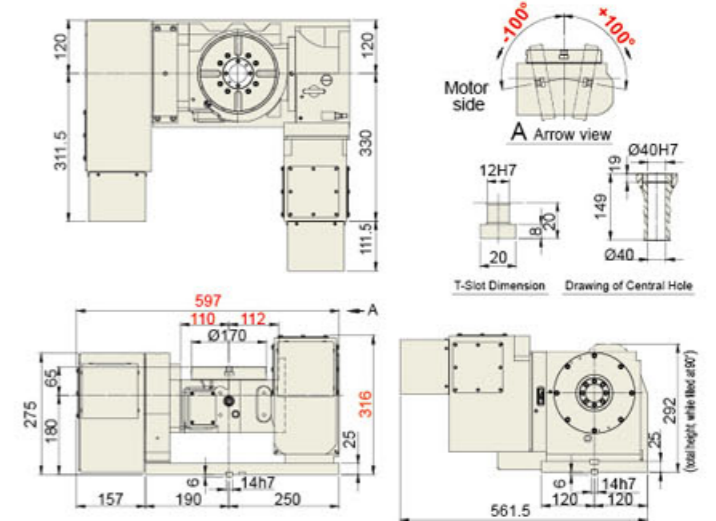
FAR-125 (Standard type)



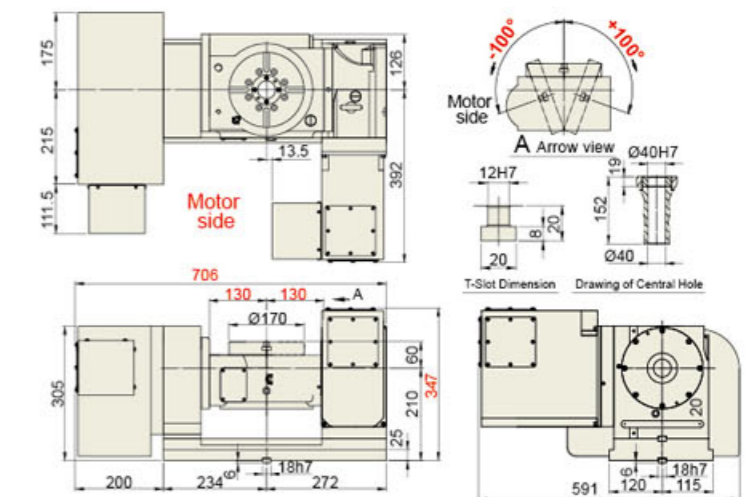
FAR-125B (Back side motor type)



FAR-170A (compact type)



FAR-170 (Standard type)



* In accordance with the foreign trade control ordinance, permission of the ministry of economy, trade and industry is required when exporting dual-axis products overseas.

TJR CNC Rotary Table

CNC Tilting Rotary Tables
Min. indexing angle -0.001°

FAR Series Dual-axis dual-arm type (Powerful Pneumatic Brake) FAR-210/210B/210L

3
FEATURES



- Both the tilting axis and rotary axis use radial & axial bearings.
- Because the tilting axis normally needs to bear heavy load, Japanese-made worm and worm gear are employed to improve wear resistance and precision of tilting axis. **standard component** (It's wear life is 2.6 times longer than aluminum bronze PBC3.)
- A hydraulic brake for tilting axis is optional.

Tilting axis
Supporting axis
Rotary axis



FAR-210B
(Back side motor type)



FAR-210L
(Extended cradle type)



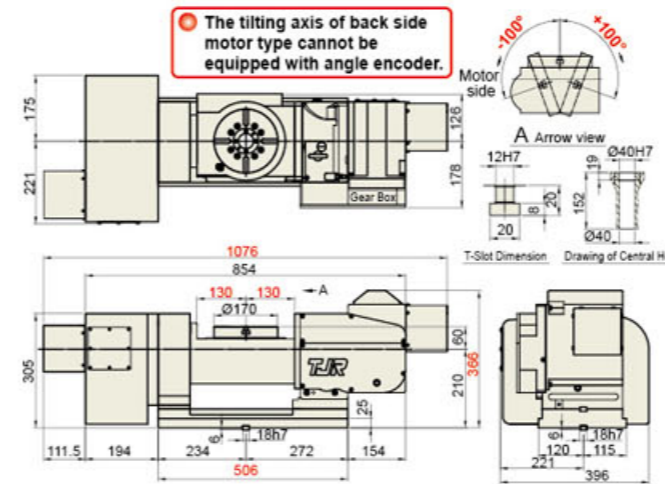
Workpiece sample –
5 axis simultaneous
contouring

The Standard of Precision Test: Japan JIS

Item / Model		Unit	FAR-210 (Standard type)		FAR-210B (Back side motor type)		FAR-210L (Extended cradle type)	
Table Diameter		mm	Ø210		Ø210		Ø210	
Diameter of Table Central Hole		mm	Ø67		Ø67		Ø67	
Inner Diameter of Mandrel Sleeve		mm	Ø40H7		Ø40H7		Ø40H7	
Diameter of Center Through Hole		mm	Ø40		Ø40		Ø40	
Table Height (Horizontal)		mm	270		270		270	
Table T-slot Width		mm	12H7		12H7		12H7	
Guide Block Width		mm	18h7		18h7		18h7	
Axis			Rotation	Tilt $\pm 100^\circ$	Rotation	Tilt $\pm 100^\circ$	Rotation	Tilt $\pm 100^\circ$
Min. Increment		deg.	0.001	0.001	0.001	0.001	0.001	0.001
Indexing Precision		sec.	20	50 (30, if ECN-225 angle encoder is employed)	20	50 (Angle encoder can not be employed)	20	50 (30, if ECN-225 angle encoder is employed)
Repeatability		sec.	4	8	4	8	4	8
Clamping System (Pneumatic)		kg/cm ²	6	6 / Hyd.25 (optional)	6	6 / Hyd.25 (optional)	6	6 / Hyd.25 (optional)
Clamping Torque		kg-m	31	31 / Hyd.35	31	31 / Hyd.35	31	31 / Hyd.35
Servo Motor Model	FANUC	Taper/Straight shaft	$\alpha 4i$ / $\beta 8is$	$\alpha 8i$ / $\alpha 12is$ / $\beta 12is$	$\alpha 4i$ / $\beta 8is$	$\alpha 8i$ / $\alpha 12is$ / $\beta 12is$	$\alpha 4i$ / $\beta 8is$	$\alpha 8i$ / $\alpha 12is$ / $\beta 12is$
	MITSUBISHI	Taper shaft	HF-54/104	HF-104	HF-54/104	HF-104	HF-54/104	HF-104
Speed Reduction Ratio		-	1 : 90	1 : 90	1 : 90	1 : 90	1 : 90	1 : 90
Max. Rotation Rate of Table (Calculate with Fanuc or Motor)		r.p.m	44.4	44.4	44.4	44.4	44.4	44.4
Allowable Inertia Load Capacity (Horizontal)		kg.cm.sec ²	4.13		4.13		4.13	
Allowable Workpiece Load	0° Horizontal	kg	75		75		75	
	0°~90° Tilt	kg	50		50		50	
Allowable Load (with Rotary Table Clamping)	F	kgf	750		750		750	
	FxL	kgf.m	Pne.31 / Hyd.35		Pne.31 / Hyd.35		Pne.31 / Hyd.35	
	FxL	kgf.m	31		31		31	
Strength of worm gears (Rotary axis)		kg.m	18		18		18	
Net Weight (servo motor excluded)		kg	153		163		156	

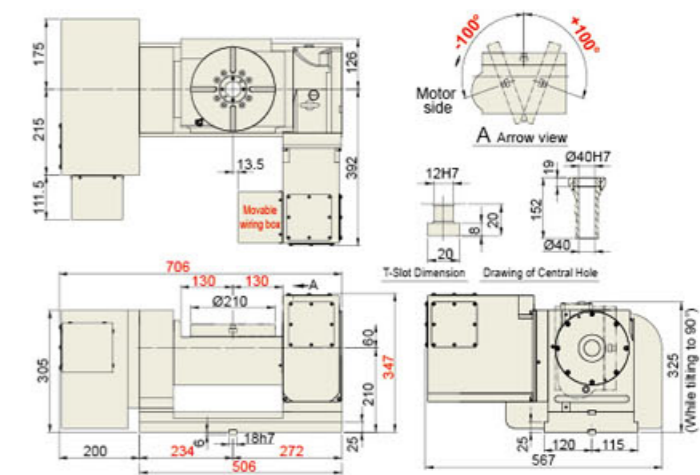
*In accordance with the foreign trade control ordinance, permission of the ministry of economy, trade and industry is required when exporting dual-axis products overseas.

FAR-170B (Back side motor type)

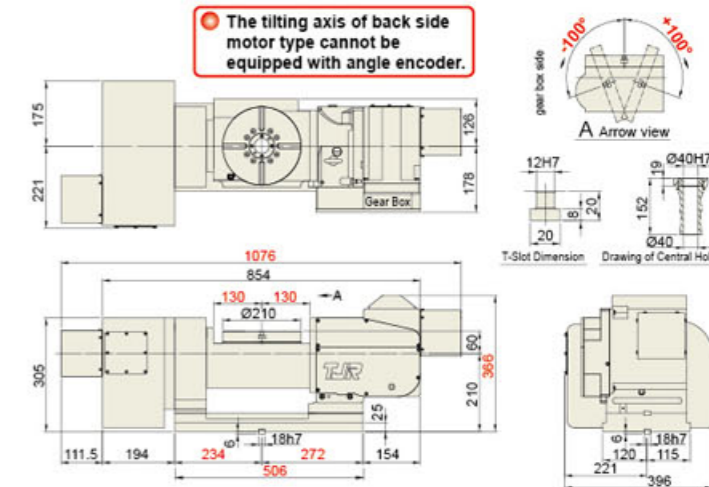


Remark: Please refer to Page 20 for the specification of FAR-170B

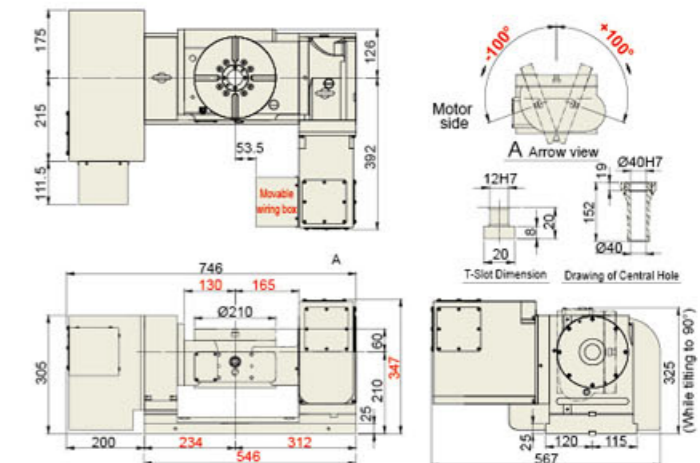
FAR-210 (Standard type)



FAR-210B (Back side motor type)



FAR-210L (Extended type)



TJR CNC Rotary Table

CNC Tilting Rotary Tables
Min. indexing angle -0.001°



- Both the tilting axis and rotary axis use large-diameter radial & axial bearings.
- Because the tilting axis normally needs to bear heavy load, Japanese-made worm and worm gear are employed to improve wear resistance and precision of tilting axis. **standard component** (It's wear life is 2.6 times longer than aluminum bronze PBC3.)
- The tilting, supporting, and rotary axis are all equipped with the hydraulic-brake mechanisms. (Employing **three independent encircling hydraulic systems**)
- Max. tilting angle: $\pm 110^{\circ}$

FHR Series Dual-axis dual-arm type (Hydraulic Brake)

FHR-255C/255CL
FHR-320/320C



FHR-255C (Cradle type)



FHR-255CL (Extended cradle type)



FHR-320C (Cradle type)

FHR-320 (Standard type)

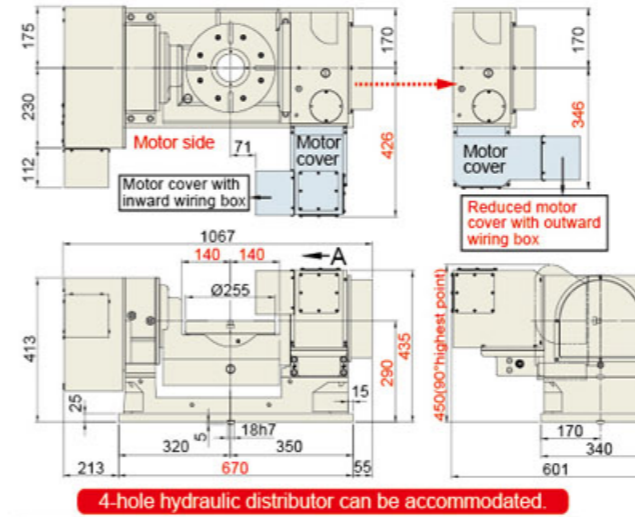
Workpiece sample - 5 axis simultaneous contouring

The Standard of Precision Test: Japan JIS

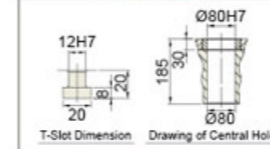
Item / Model	Unit	FHR-255C / 255CL		FHR-320 (Standard type)		FHR-320C (Cradle type)		
Table Diameter	mm	$\varnothing 255$		$\varnothing 320$		$\varnothing 320$		
Diameter of Table Central Hole	mm	$\varnothing 110$		$\varnothing 150$		$\varnothing 150$		
Inner Diameter of Mandrel Sleeve	mm	$\varnothing 80H7$		$\varnothing 120H7$		$\varnothing 120H7 \times 30$ deep		
Diameter of Center Through Hole	mm	$\varnothing 80$		$\varnothing 120$		$\varnothing 80$		
Table Height (Horizontal)	mm	290		355		310		
Table T-slot Width	mm	12H7		14H7		14H7		
Guide Block Width	mm	18h7		18h7		18h7		
Axis		Rotation	Tilt $\pm 110^{\circ}$	Rotation	Tilt $\pm 110^{\circ}$	Rotation	Tilt $\pm 110^{\circ}$	
Min. Increment	deg.	0.001	0.001	0.001	0.001	0.001	0.001	
Indexing Precision	sec.	15	50 (30, if ECN-225 angle encoder is employed)	15	50 (30, if ECN-225 angle encoder is employed)	15	50 (30, if ECN-225 angle encoder is employed)	
Repeatability	sec.	4	8	4	8	4	8	
Clamping System (Hydraulic)	kg/cm ²	35	35	35	35	35	35	
Clamping Torque	kg-m	70	140	115	175	70	175	
Servo Motor Model	FANUC / MITSUBISHI	Taper/Straight shaft	$\alpha 8i / \alpha 12is / \beta 8is$ (Taper)	$\alpha 8i / \alpha 12is / \beta 12is$ (Taper)	$\alpha 8i / \alpha 12is / \beta 12is$ (Taper)	$\alpha 12i / \beta 22is$ (Straight)	$\alpha 8i / \alpha 12is / \beta 12is$ (Taper)	$\alpha 12i / \beta 22is$ (Straight)
Speed Reduction Ratio	-	1 : 120	1 : 120	1 : 120	1 : 120	1 : 120	1 : 120	
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)	r.p.m	33.3	33.3	33.3	25	33.3	25	
Allowable Inertia Load Capacity (Horizontal)	kg.cm.sec ²	8.13		25.6		25.6		
Allowable Workpiece Load	kg	100		200		200		
Allowable Load (with Rotary Table Clamping)	kgf	1500		1800		1800		
Strength of worm gears (Rotary axis)	kgf.m	140		175		175		
Net Weight (servo motor excluded)	kg	70		115		70		
		55		80		55		
		296		312		470		
		312		470		489		

*In accordance with the foreign trade control ordinance, permission of the ministry of economy, trade and industry is required when exporting dual-axis products overseas.

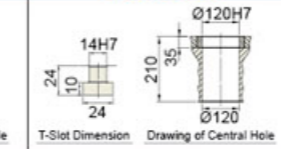
FHR-255C (Cradle type)



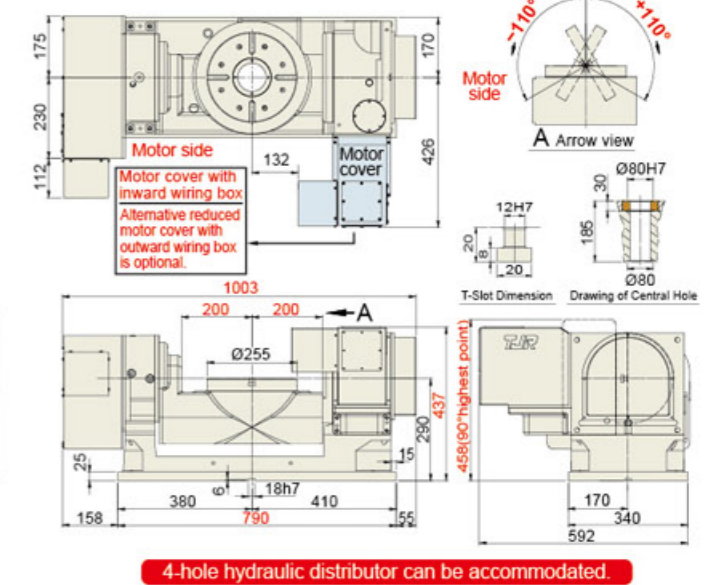
FHR-255C



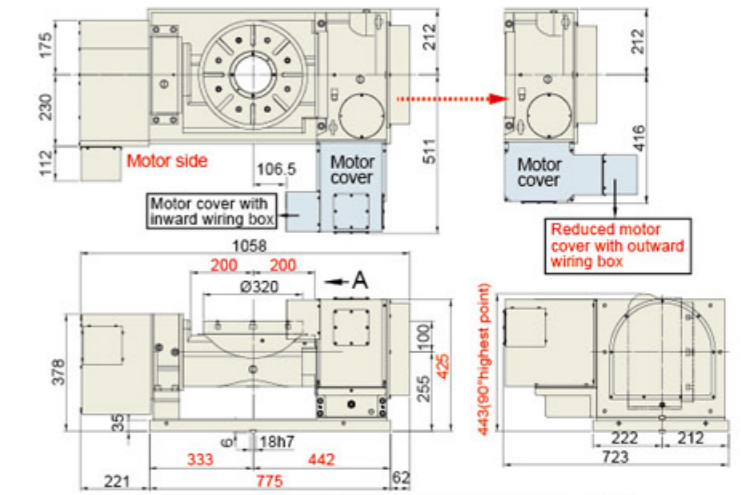
FHR-320



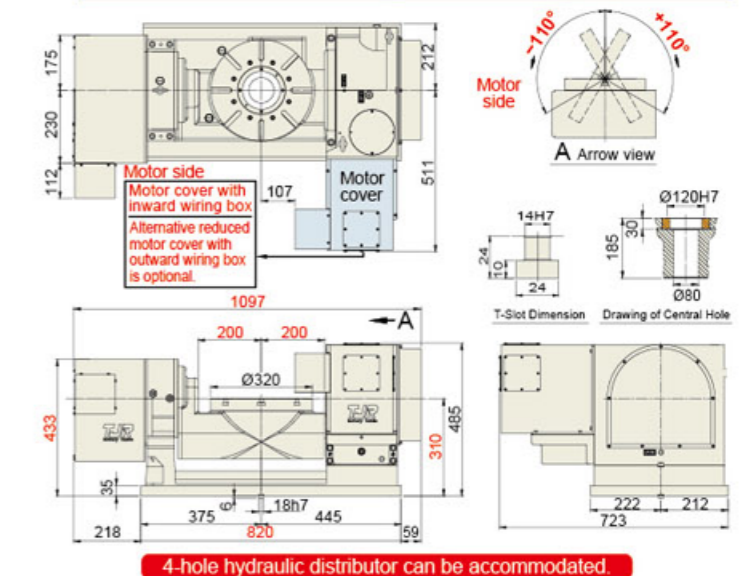
FHR-255CL (Extended cradle type)



FHR-320 (Standard type)



FHR-320C (Cradle type)



TJR CNC Rotary Table

CNC Tilting Rotary Tables
Min. indexing angle -0.001°

FHR Series Dual-axis dual-arm type (Hydraulic Brake)

FHR-350BC/400C/400BC
FHR-350BCF

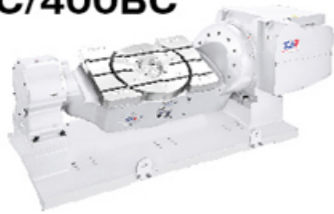
4
FEATURES



- Both the tilting axis and rotary axis use **large-diameter radial & axial bearings**.
- Because the **tilting axis** normally needs to bear heavy load, **Japanese-made worm and worm gear** are employed to improve wear resistance and precision of tilting axis. **standard component** (It's wear life is **2.6 times** longer than aluminum bronze PBC3.) (except for FHR-500C/630C)
- The tilting, supporting, and rotary axis are all equipped with the hydraulic-brake mechanisms. (Employing **three independent encircling hydraulic systems**)
- Max. tilting angle: **$\pm 110^\circ$**



▲ FHR-350BC
(Back side motor type)



Angle encoder on the tilt axis is optional.

▲ FHR-400BC (Back side motor type)

▲ FHR-350BC
(Back side motor type)



▲ FHR-400C (Cradle type)

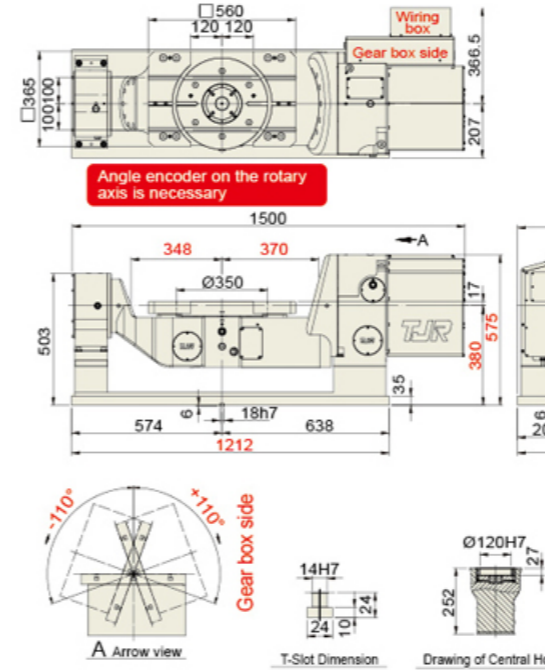
especially for machining aluminum alloy wheels

The Standard of Precision Test: Japan JIS

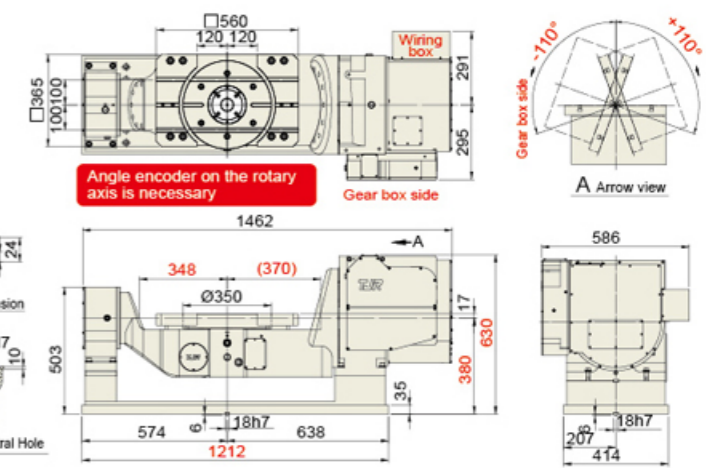
Item / Model	Unit	FHR-350BC/FHR-400BC		FHR-400C		FHR-350BCF		
Table Diameter	mm	round plate $\varnothing 350$, square plate 560×365 / round plate $\varnothing 400$		$\varnothing 400$		round plate $\varnothing 350$, square plate 560×365		
Diameter of Table Central Hole	mm	$\varnothing 150H7 \times 27$ deep / $\varnothing 150H7 \times 10$ deep		$\varnothing 150$		$\varnothing 150H7 \times 27$ deep		
Inner Diameter of Mandrel Sleeve	mm	$\varnothing 150H7 \times 27$ deep / $\varnothing 150H7 \times 10$ deep		$\varnothing 120H7$		$\varnothing 120H7 \times 27$ deep		
Diameter of Center Through Hole	mm	-		$\varnothing 120$		-		
Table Height (Horizontal)	mm	397/380		430		397		
Table T-slot Width	mm	14H7		14H7		14H7		
Guide Block Width	mm	18h7		18h7		18h7		
Axis		Rotation	Tilt $\pm 110^\circ$	Rotation	Tilt $\pm 110^\circ$	Rotation	Tilt $\pm 110^\circ$	
Min. Increment	deg.	0.001	0.001	0.001	0.001	0.001	0.001	
Indexing Precision	sec.	12 (RCN-2390F must be equipped)	50 (35, if RCN-2390F angle encoder is employed)	15	50 (30, if ECN-225 angle encoder is employed)	12 (RCN-2390F must be equipped)	50 (35, if RCN-2390F angle encoder is employed)	
Repeatability	sec.	4	8	4	8	4	8	
Clamping System (Hydraulic)	kg/cm ²	35	35	35	35	35	35	
Clamping Torque	kg-m	115	275	115	175	115	190	
Servo Motor Model	FANUC	Taper/Straight shaft	$\alpha 8i / \alpha 12is / \beta 12is$ (Taper)	$\alpha 22i / \beta 22is$ (Taper)	$\alpha 8i / \alpha 12is / \beta 12is$ (Straight)	$\alpha 12i / \beta 22is$ (Straight)	$\alpha 8i / \alpha 12is / \beta 12is$ (Taper)	$\alpha 22i / \beta 22is$ (Straight)
	MITSUBISHI	Straight shaft without key	HF-154	HF-354	HF-154	HF-354	HF-154	HF-354
	SIEMENS	Straight shaft	1FK7063	1FK7083	1FK7063	1FK7083	1FK7063	1FK7083
	HEIDENHAIN	Straight shaft	QSY-116E	QSY-155B	QSY-116E	QSY-155B	QSY-116E	QSY-155B
Speed Reduction Ratio	-	1 : 120	1 : 120	1 : 120	1 : 120	1 : 120	1 : 120	
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)	r.p.m	25	25	33.3	25	25	25	
Allowable Inertia Load Capacity (Horizontal)	kg.cm.sec ²	33.7 / 44		40		30.6		
Allowable Workpiece Load	0° Horizontal	kg	220	200	100	200	100	
	0°~90° Tilt	kg	120	100	100	100	100	
Allowable Load (with Rotary Table Clamping)	F	kgf	1800	1800	1800	1800	1800	
	FxL	kgf.m	275	175	175	190	190	
Strength of worm gears (Rotary axis)	FxL	kgf.m	115	115	115	115	115	
		kg.m	80	80	80	80	80	
Net Weight (servo motor excluded)	kg	1060 / -		860		950		

*In accordance with the foreign trade control ordinance, permission of the ministry of economy, trade and industry is required when exporting dual-axis products overseas.

FHR-350BCF

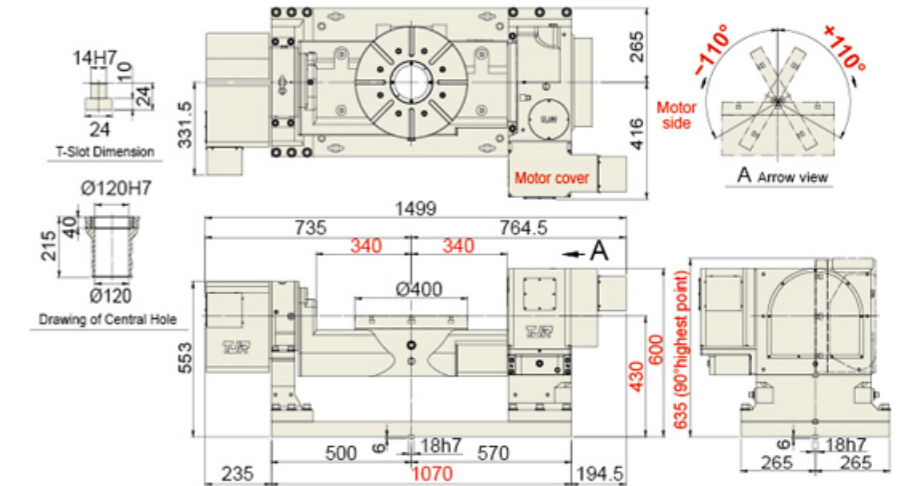


FHR-350BC (Back side motor type)

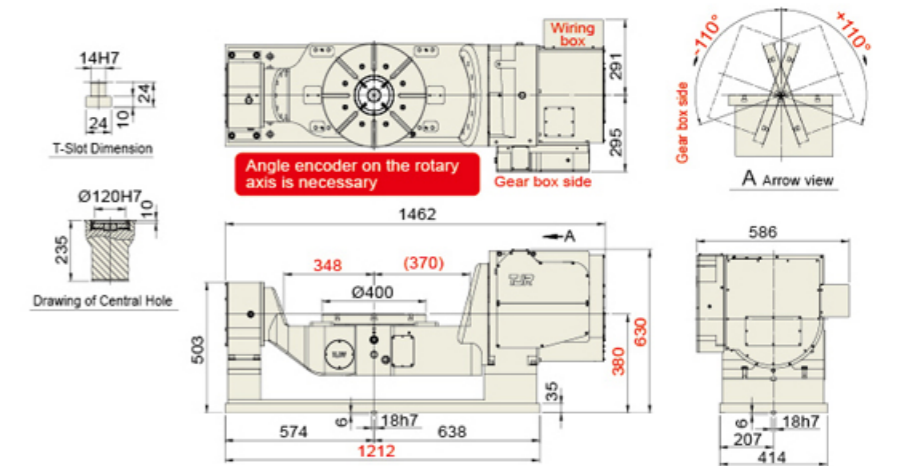


FHR-400C (Cradle type)

The model is recommended for workpiece made of light material such as aluminum or copper.



FHR-400BC (Back side motor type)



CNC Tilting Rotary Tables
Min. indexing angle -0.001°

FHR Series Dual-axis dual-arm type (Hydraulic Brake)

FHR-630S
FHR-630SN
FHR-630SM



▲ FHR-630S



Only TJR large-diameter radial & axial bearing can deliver enough rigidity to support tilting axis of single arm type tilting rotary table

Footnotes:

- Tilting angle is reducible rather than enlargeable.
- Built-in hydraulic distributor (2 oil holes) and supporting base are standard accessories for both FHR-630S and FHR-630SN.
- The rotation axis of FHR-630SN must be equipped with angle encoder. (The table transmitted by pulley can accommodate distributor and angle encoder in chorus.)

▲ FHR-630SN (compact type)

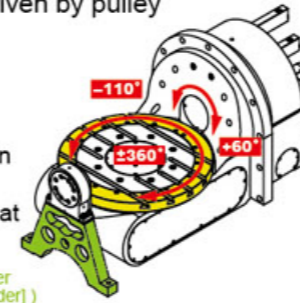
The transmission of tilt axis is driven by pulley



▲ FHR-630SM (compact type)

The transmission of tilt axis is driven by pulley

The illustration of additional supporting seat
Supporting seat
Fixed frame
(Made by the buyer
[machine tool builder])

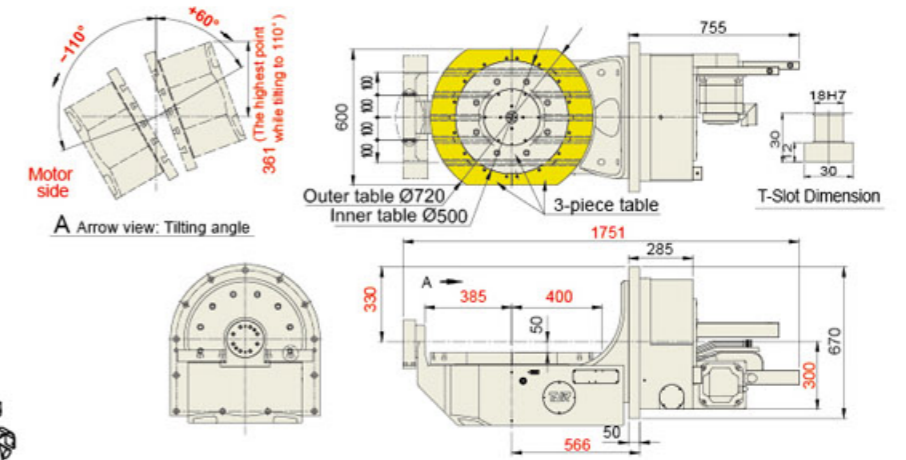


The Standard of Precision Test: Japan JIS

Item / Model	Unit	FHR-630S		FHR-630SN		FHR-630SM	
Table Diameter	mm	Outer table $\varnothing 720 \times 600$ · Inner table $\varnothing 500$		Outer table $\varnothing 650$ · Inner table $\varnothing 500$		Outer table $\varnothing 650$ · Inner table $\varnothing 500$	
Diameter of Table Central Hole	mm	-		-		-	
Inner Diameter of Mandrel Sleeve	mm	-		-		-	
Diameter of Center Through Hole	mm	-		-		-	
Table Height (Horizontal)	mm	-		-		-	
Table T-slot Width	mm	18H7		18H7		18H7	
Guide Block Width	mm	-		-		-	
Axis		Rotation	Tilt ($-110^\circ \sim +60^\circ$)	Rotation	Tilt ($-110^\circ \sim +60^\circ$)	Rotation	Tilt ($-90^\circ \sim +110^\circ$)
Min. Increment	deg.	0.001	0.001	0.001	0.001	0.001	0.001
Indexing Precision	sec.	15	60 (30, if ECN-225 angle encoder is employed.)	20 (when ECN-225 angle encoder is employed.)	60 (30, if ECN-225 angle encoder is employed.)	20 (when ECN-225 angle encoder is employed.)	60 (30, if ECN-225 angle encoder is employed.)
Repeatability	sec.	4	8	4	8	4	8
Clamping System (Hydraulic)	kg/cm ²	35	35	35	35	35	35
Clamping Torque	kg-m	370	500	370	500	215	500
Servo Motor Model	FANUC	$\alpha 12i$	$\alpha 40i$	$\alpha 12is$	$\alpha 40i$	$\alpha 12is$	$\alpha 40is$
	MITSUBISHI	HF-204	HF-703S(49Nm)	HF-224	HF-703S	HF-224	HF-703S
	SIEMENS	1FK7083	1FK7101 / 7103	SIEMENS Designated model	1FK7101 / 7103	SIEMENS Designated model	1FK7101 / 7103
Speed Reduction Ratio	-	1 : 120	1 : 120	1 : 120	1 : 120	1 : 120	1 : 120
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)	r.p.m	25	25	25	25	25	25
Allowable Inertia Load Capacity (Horizontal)	kg.cm.sec ²	135		158.4		158.4	
Allowable Workpiece Load	kg	300 (500, if the sub-tailstock is employed)		300 (500, if the sub-tailstock is employed)		300 (500, if the sub-tailstock is employed)	
Allowable Load (with Rotary Table Clamping)	F	-		-		-	
	FxL	-		-		-	
	FxL	-		-		-	
Strength of worm gears(Rotary axis)	kg.m	250		250		250	
Net Weight (servo motor excluded)	kg	1165		1065		-	

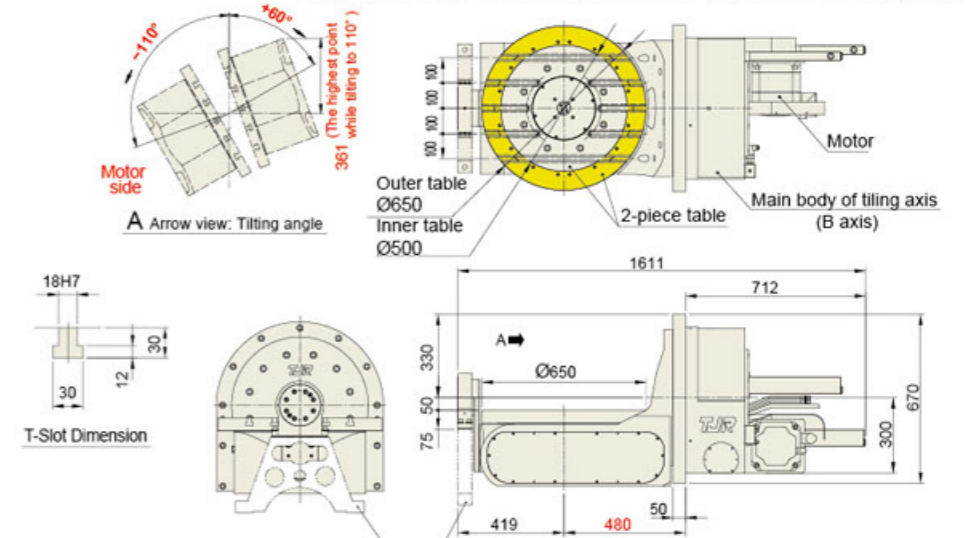
* In accordance with the foreign trade control ordinance, permission of the ministry of economy, trade and industry is required when exporting dual-axis products overseas.

FHR-630S (single-arm \ cradle type)



FHR-630SN (single-arm, shorten cradle type)

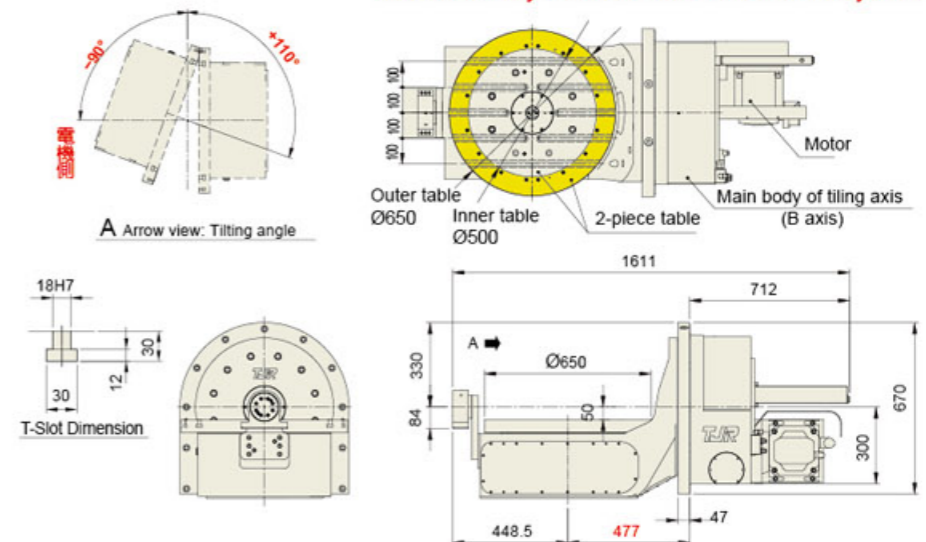
This model only works with SIEMENS or FANUC servo system



The bracket which retains supporting base should be made by the buyer (machine tool builder)

FHR-630SM

This model only works with SIEMENS servo system

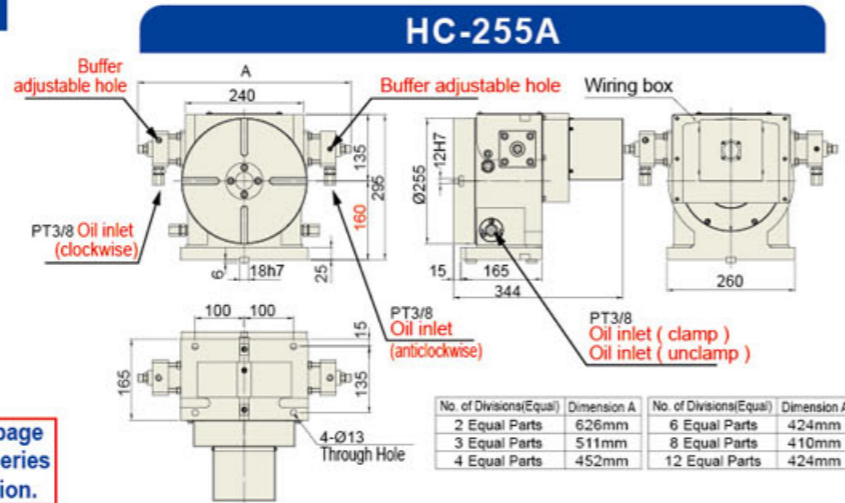


Non-CNC Hydraulic index table

HC Series (Hirth coupling hydraulic brake) HC-255A/320A (Equal Parts)

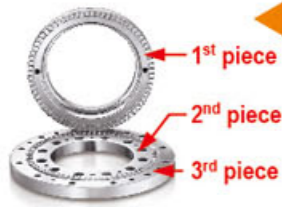


Refer to page 6 for HC series application.



HC-255A

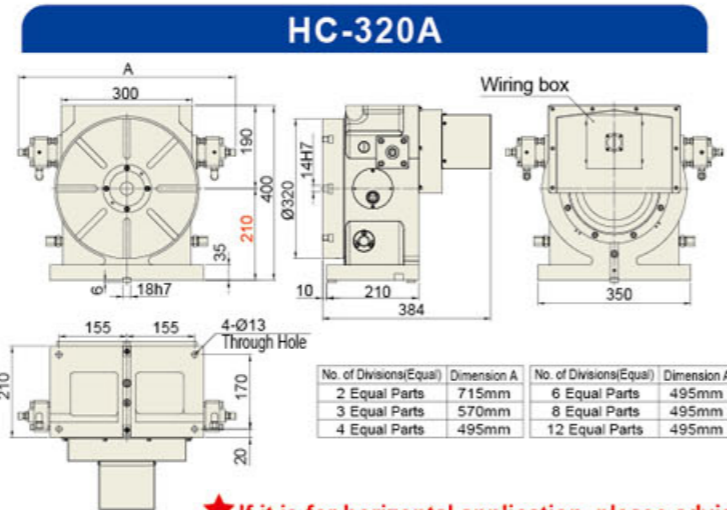
(for Both Vertical and Horizontal Applications)(A additional raiser must be employed whenever horizontal application is needed)



HC Series :
Use **three-piece** clutch plate
Function:
① Accuracy: ± 5 seconds (Angle encoder accuracy)
② Rotate **without lifting the table** to prevent table from water and particles.



Hydraulic Brake Rotary Tailstock (with Delay Valve)
When HC series is chosen, the corresponding rotary tailstock should have a delay valve.



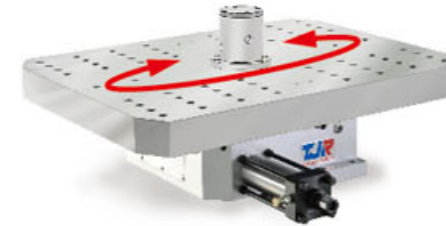
★ If it is for horizontal application, please advise us when placing purchase order.

The Standard of Precision Test: Japan JIS

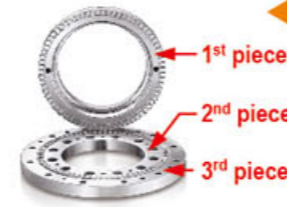
Item / Model	Unit	HC-255A (For Both Vertical and Horizontal Applications)	HC-320A (For Both Vertical and Horizontal Applications)	HHC-500 (For Horizontal Applications)
Table Diameter	mm	Ø 255	Ø 320	Ø 500
Diameter of Table Central Hole	mm	Ø 30H7 x 12 deep	Ø 30H7 x 12 deep	Ø 90H7 x 31deep
Diameter of Center Through Hole	mm	Ø 27	Ø 30	Ø 41
Center Height (Vertical)	mm	160	210	-
Table Height (Horizontal)	mm	180	220	260
Table T-slot Width	mm	12H7	14H7	18H7
Guide Block Width	mm	18h7	18h7	-
No. of Divisions (Equal)	deg.	2、3、4、6、8、12、24		
Indexing Precision	sec.	± 5	± 5	± 5
Repeatability	sec.	± 1	± 1	± 1
Clamping System (Hydraulic)	kg/cm ²	35	35	35
Clamping Torque	kg	1400	1560	4600
Allowable Instant Inertia	kg/m ²	35	85	-
Allowable Workpiece Load	Vertical	kg	200	-
	Horizontal	kg	200	700
Rotating Torque	kg.m	42	60	-
Rotary Table Total Weight	kg	65	98	-

CHC Series (Flat type auto pallet changer)

CHC-500(700x910)
CHC-500(700x1090)
Hirth coupling hydraulic brake (180° to and fro)
For 3-axis-moving-column vertical machining center



CHC-700x910 (tray type APC) (optional hydraulic distributor)



HC Series :
Use **three-piece** clutch plate
Function:
① Accuracy: ± 5 seconds (Angle encoder accuracy)
② Rotate **without lifting the table** to prevent table from water and particles.

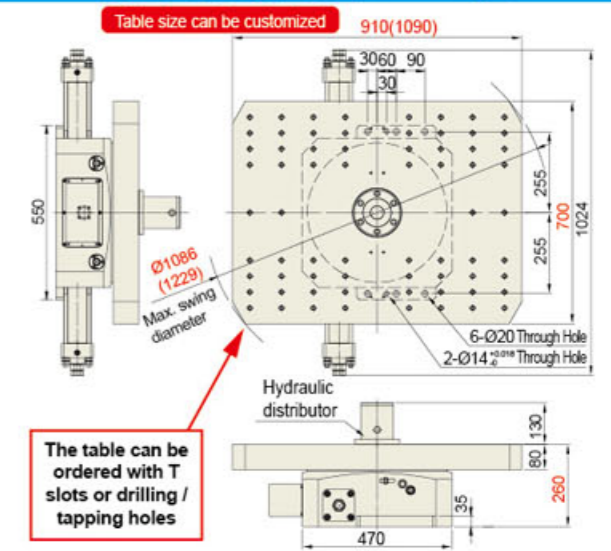


Pallet changing time is 4-5 seconds, which excludes PLC delayed time of machine

The Standard of Precision Test: Japan JIS

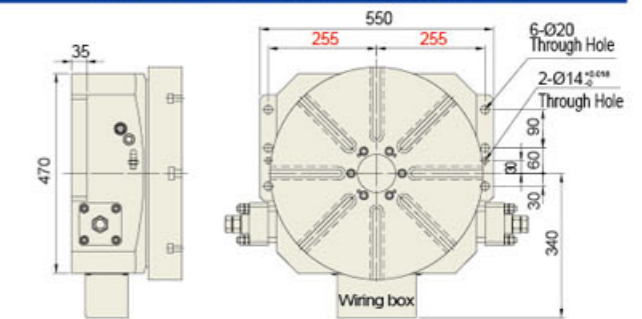
Item / Model	Unit	CHC-500(700x1090)
Table size	mm	□ 700 x 1090
Rotation method	-	Hydraulic hirth coupling
Rotation angle	deg.	180° to and fro
Clamping System	kg/cm ²	Hydraulic 35
Positioning method	-	3-piece clutch plate
Clamping force (35kg/cm ²)	kgf	4600
Operating System (Up & Down)	kg/cm ²	Hydraulic -
Lifting thrust force	kg	-
Up and down travel of the pallet	mm	0
Speed Reduction Ratio	-	-
Allowable Workpiece Load	Horizontal	kg
Inspection accuracy		
Repeatability accuracy on positioning of the same pallet	mm	0.01
Max. positioning tolerance for 2 pallets	mm	0.02
Parallelism of pallet top and base bottom	mm	0.02
Total Weight	kg	525

CHC-700x910 (Pallet changer)

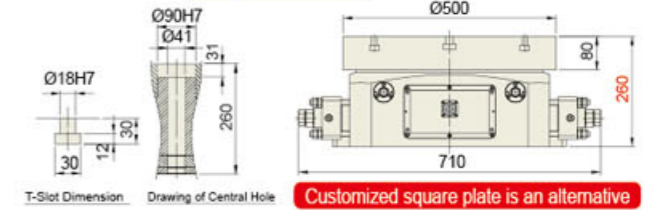


The table can be ordered with T slots or drilling / tapping holes

HHC-500(For Horizontal Application)



Refer to page 31 for the specification table.



Customized square plate is an alternative

Application diagram of auto pallet changer (Available for 4-hole hydraulic distributor)



Application diagram: retrofits 3-axis-moving-column vertical machining center with CHC



CNC index tables
Min. indexing angle - 1° or 5°

HHI Series (Hirth coupling hydraulic brake)

For horizontal machining center
or horizontal drilling & tapping center.

- HH I - 320x320 / 400x400F
- 400x400 / 500x500F
- 500x500 / 630x630F
- 630x630 / 800x800F
- 800x800 / 1000x1000F
- 1200x1200F



▲ **HHI -320x320**
For small Horizontal drilling & tapping center.

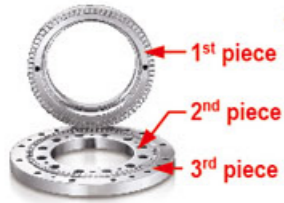
▲ **HHI -500x500**



▲ **HHI -630x630F**

▲ **HHI -800x800**

▲ **HHI -1200x1200F**

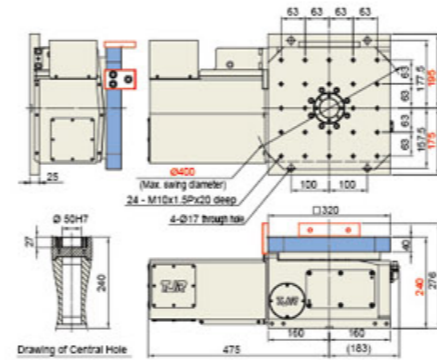


HHI Series :
Use **three-piece** clutch plate
Function:
① Accuracy: ± 5 seconds
(Angle encoder accuracy)
② Rotate **without lifting the table** to prevent table from water and particles.

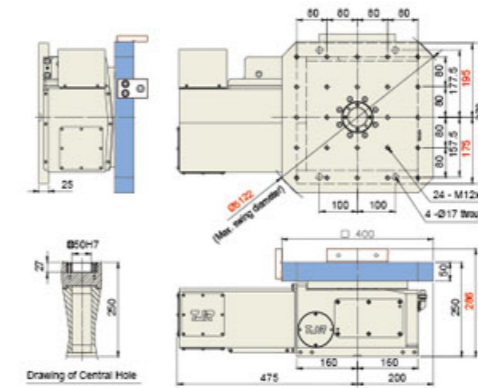
The Standard of Precision Test: Japan JIS

Item / Model	Unit	HHI-320x320	HHI-400x400F	HHI-400x400	HHI-500x500	HHI-630x630F	HHI-800x800	HHR-500x500 (0.001°)	
Table size	mm	□ 320x320	□ 400x400	□ 400x400	□ 500x500	□ 630x630	□ 800x800	□ 500x500	
Diameter of Table Central Hole	mm	∅ 50x27 deep	∅ 50x27 deep	∅ 50x27 deep	∅ 50x27 deep	∅ 50x27 deep	∅ 50x27 deep	∅ 50x27 deep	
Table height	mm	240	250	270	320	320	380	295	
Table T-slot Width	mm	-	-	14H7	18H7	18H7	22H7	18H7	
Guide Block Width	mm	18h7	18h7	18h7	18h7	18h7	18h7	18h7	
Min. Increment	deg.	1° or 5°	1° or 5°	1° or 5°	1° or 5°	1° or 5°	1° or 5°	0.001°	
Indexing Precision	sec.	±5	±5	±5	±5	±5	±5	15	
Repeatability	sec.	±1	±1	±1	±1	±1	±1	4	
Clamping System	kg/cm2	35	35	35	35	35	35	35	
Clamping Torque	kg-m	300	300	500	1000	1000	9000	370	
Servo Motor Model	FANUC MITSUBISHI	Straight shaft without key	β 12is	β 12is	β 22is	β 22is	β 22is	β 22is	α 12i / β 22is
			HF-104/154	HF-104/154	HF-104/154	HF-204	HF-204S	HF-354	HF-204
Speed Reduction Ratio	-	1 : 120	1 : 120	1 : 120	1 : 180	1 : 180	1 : 180	1 : 180	
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)	r.p.m	25	25	25	16.6	16.6	11.1	16.6	
Allowable Workpiece Load	Horizontal	kgf	300	300	500	600	700	4000	600
Strength of worm gears		kg.m	-	-	-	-	-	-	250
Net Weight (servo motor excluded)	kg	149	-	-	518	565	1053	510	

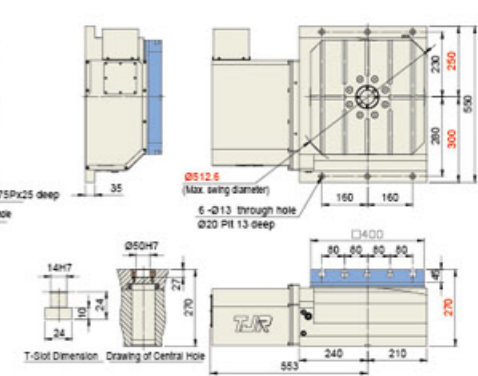
HH I -320x320 (1° or 5°)



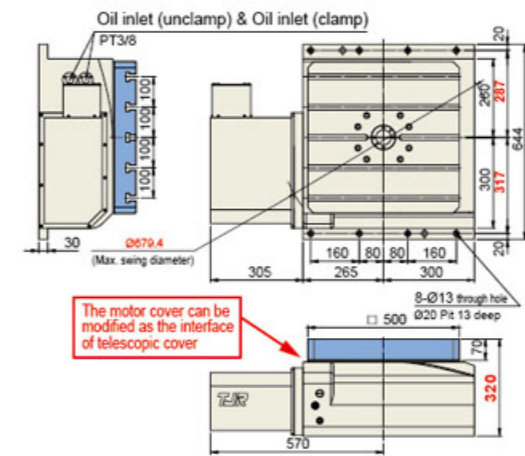
HH I -400x400F (1° or 5°)



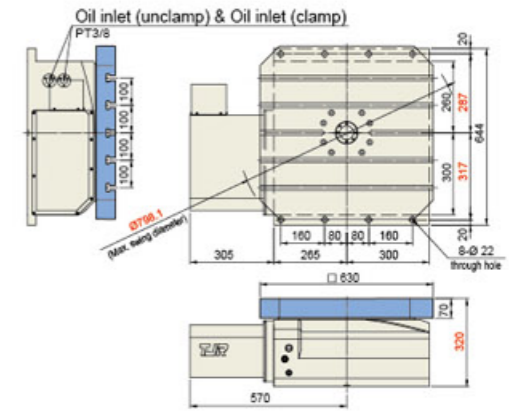
HH I -400x400 (1° or 5°)



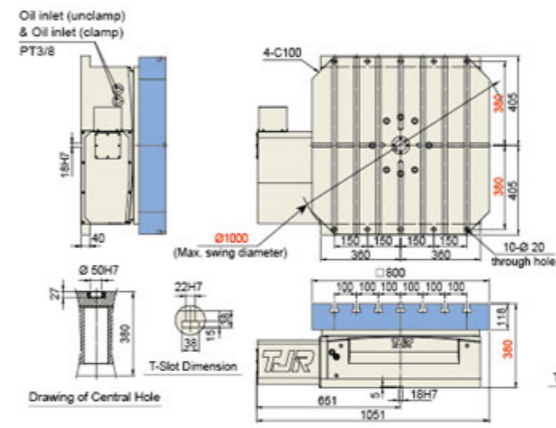
HH I -500x500 (1° or 5°)



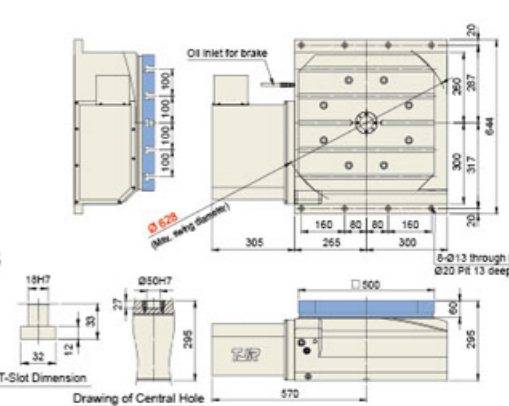
HH I -630x630F (1° or 5°)



HH I -800x800 (1° or 5°)



HHR-500x500 (0.001°)



Auto pallet changer chapter

A living legend
 create a surprising
 exchange mechanism



Beyond the rotational inertia
 Reach unimaginable stability

CTU Series (Hook type auto pallet changer) CTU-400x600 / 500x700

(Table size can be customized)(180° to and fro)

For C type vertical machining center or drilling & tapping center

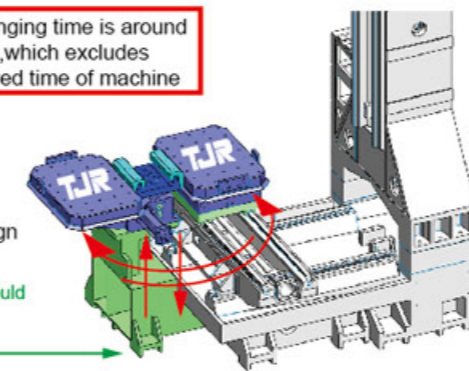


▲ CTU-500x700 (hook type APC)

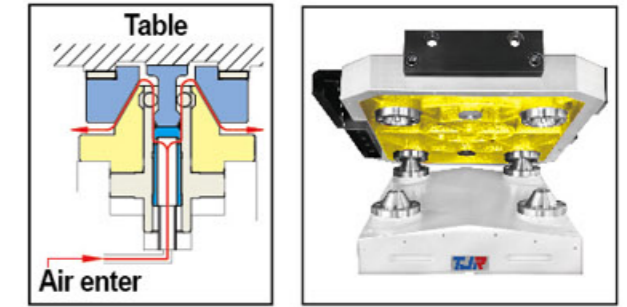
Pallet changing time is around 8 seconds, which excludes PLC delayed time of machine

The location of CTU can vary, depending on the machine design & dimensions.

Green color section should be made by the buyer (machine tool builder)

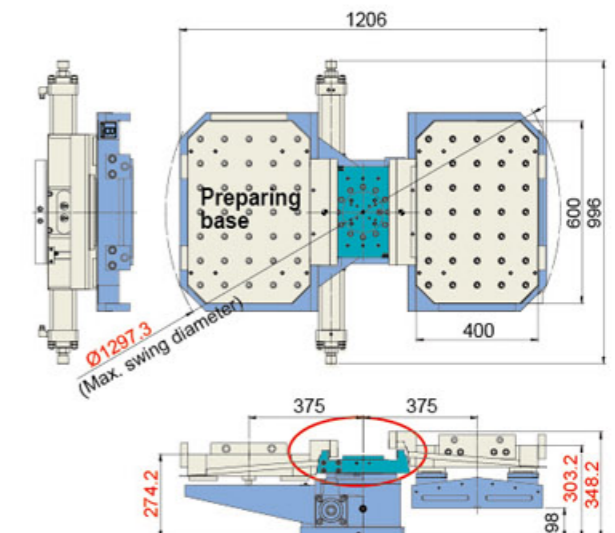


▲ Application diagram: retrofits vertical machining center with CTU

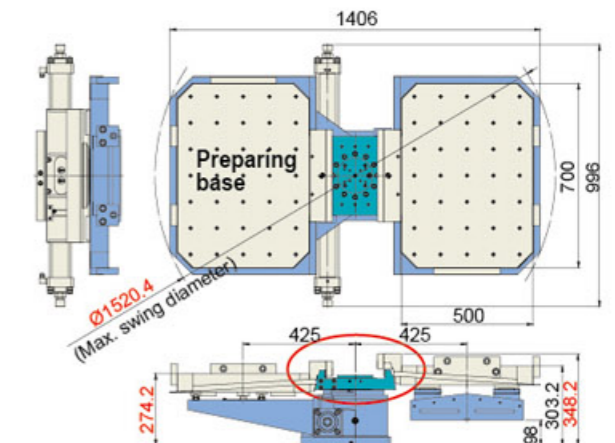


- ▲ The function of cones :
- ① Precise positioning
 - ② Air blast for chip removal
 - ③ Airtight testing
- ▲ Cones: Powerful hydraulic clamping

CTU-400x600 (The type of hook plate fixed on the exchanging mechanism.)

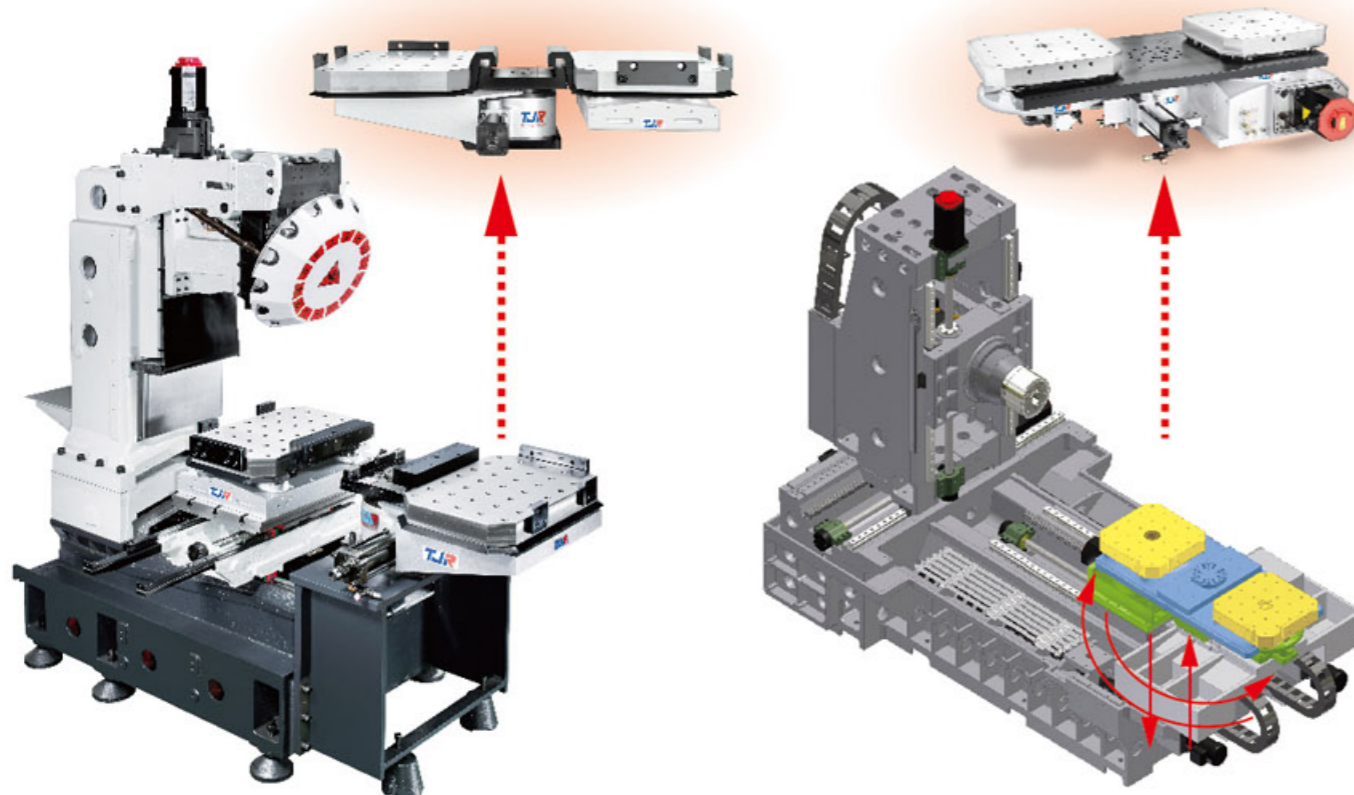


CTU-500x700 (The type of hook plate fixed on the exchanging mechanism.)



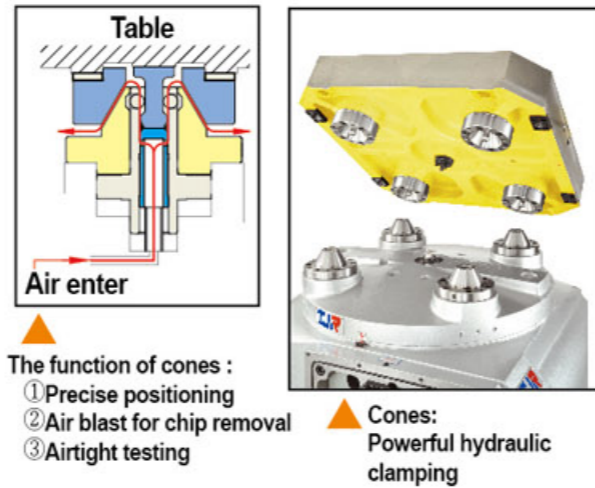
The Standard of Precision Test: Japan JIS

Item / Model	Unit	CTU-400x600	CTU-500x700
Lift-up mechanism	-	Hook type (U type)	Hook type (U type)
Table size	mm	□ 400 x 600	□ 500 x 700
Rotation method	-	Hydraulic hirth coupling	Hydraulic hirth coupling
Rotation angle	deg.	180° to and fro	180° to and fro
Clamping System	kg/cm ²	Hydraulic 35	
Positioning method	-	Cone positioning	Cone positioning
clamping force of positioning cones (35kg/cm ²)	kgf	960x4=3840	960x4=3840
Operating System (Up & Down & Rotate)	kg/cm ²	Hydraulic 45	
Lifting thrust force	kg	2860	2860
Up and down travel of the pallet	mm	60	60
Allowable Workpiece Load	kg	250x2=500	250x2=500
Inspection accuracy			
Repeatability accuracy on positioning of the same pallet	mm	0.01	
Max. positioning tolerance for 2 pallets	mm	0.02	
Parallelism of pallet top and base bottom	mm	0.02	
Net weight of saddle and single swing table	kg	255	
Total weight	kg	530	603



CHI/CHR Series (Dual pallets rotary table)

CHI-400x400 (1° or 5°) Hirth coupling hydraulic brake
CHR-400x400 (0.001°) Hydraulic Brake
 For horizontal machining center



CTH Series (tray type auto pallet changer)

CTH-400 (Can go with CHI/CHR series)
 For horizontal machining center
 (180° to and fro)

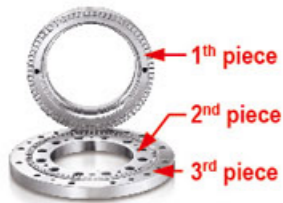


▲ CTH-400 (tray type APC)



▲ CTH-400 + CHI-400
 Dual pallets rotary table + Tray type APC
 (Flat bottom type)

▲ CHI-400x400(1°)- Dual pallets rotary table
 (Flat bottom type)

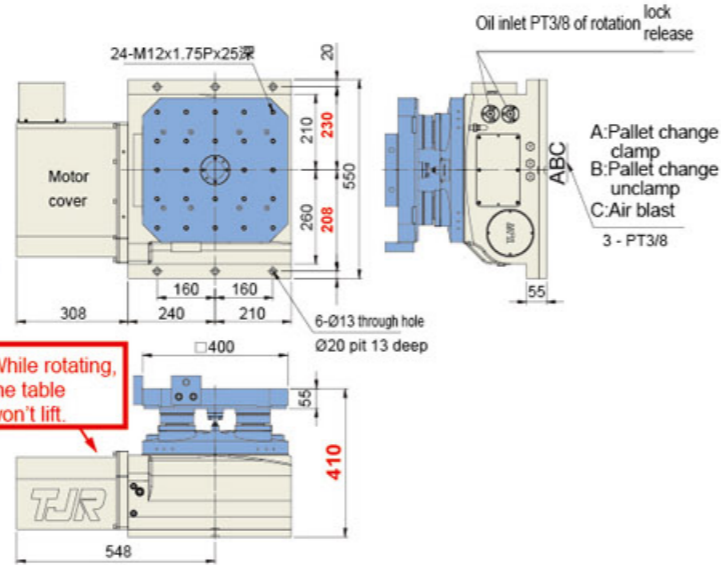


▲ CHI Series :
 Use **three-piece** clutch plate

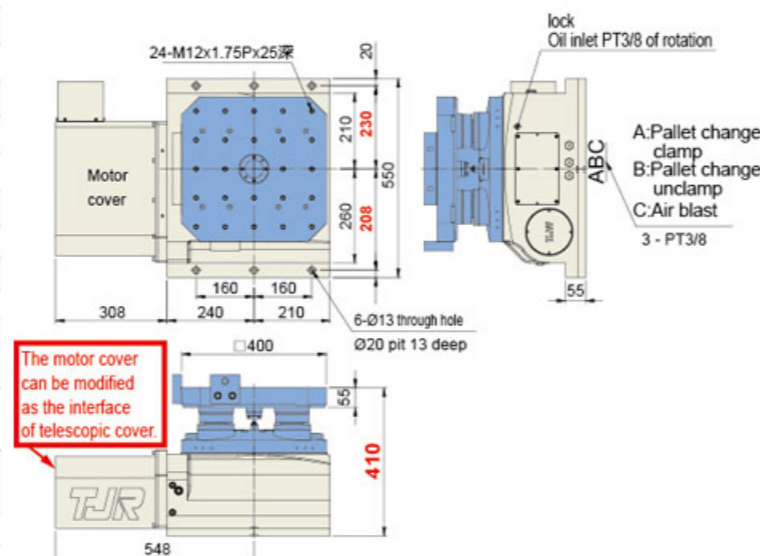
Function: ① Accuracy: ±5 seconds
 (Angle encoder accuracy)
 ② Rotate **without lifting the table** to prevent table from water and particles.

▲ CHR series :
 Use **large-diameter radial & axial bearings**

CHI-400x400 (1° or 5°) (Flat bottom type)

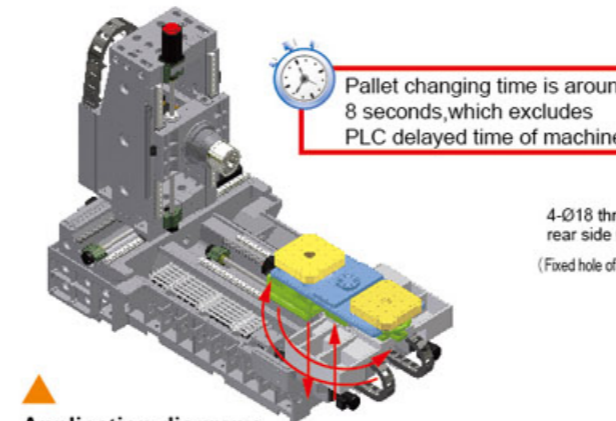


CHR-400x400 (0.001°) (Flat bottom type)



The Standard of Precision Test: Japan JIS

Item / Model	Unit	CHI-400x400	CHR-400x400
Table size	mm	□400x400	□400x400
Diameter of Table Central Hole	mm	Ø50x27 deep	Ø50x27 deep
Table height	mm	410	410
Table T-slot Width	mm	14H7	14H7
Guide Block Width	mm	18h7	18h7
Min. Increment	deg.	1° or 5°	0.001°
Indexing Precision	sec.	±5	15
Repeatability	sec.	±1	4
Clamping force of positioning cones (35kg/cm ²)	kgf	960x4=3840	960x4=3840
Clamping System	kg/cm ²	35	35
Clamping Torque	kg-m	500	200
Servo Motor Model	FANUC Straight shaft without key	α12i / β22is	α12i / β22is
Model	MITSUBISHI	HF-204S	HF-204S
Speed Reduction Ratio	-	1 : 120	1 : 120
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)	r.p.m	25	25
Allowable Workpiece Load	Horizontal	kgf	400
Strength of worm gears	kgf.m	-	170
Net Weight (servo motor excluded)	kg	410	-

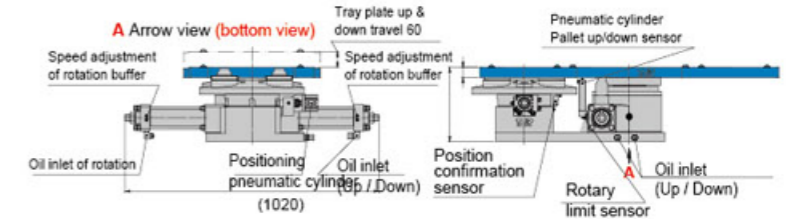
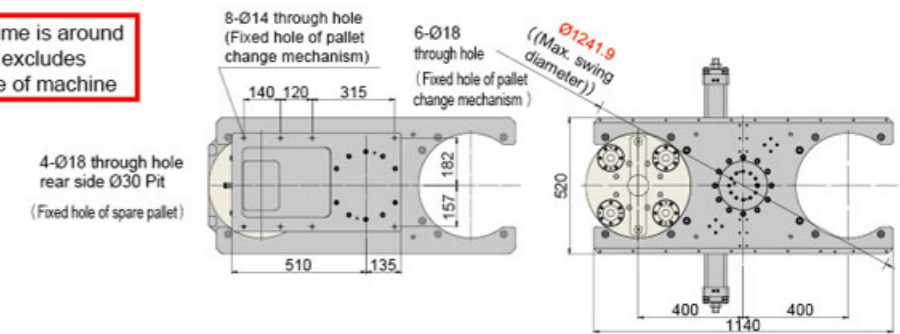


Application diagram:
 retrofits horizontal machining center with CTH+CHI

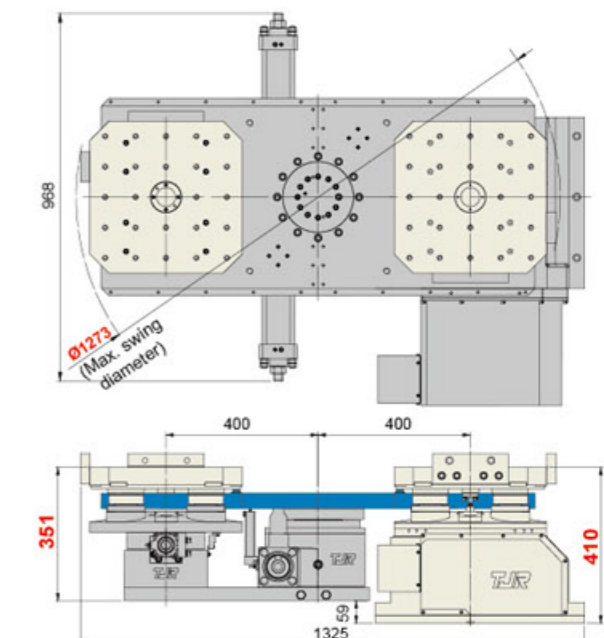
The Standard of Precision Test: Japan JIS

Item / Model	Unit	CTH-400
Lift-up mechanism	-	Tray type (H type)
Table size	mm	520 x 1140
Rotation method	-	Hydraulic hirth coupling
Rotation angle	deg.	180° to and fro
Clamping System	kg/cm ²	Hydraulic 35
Positioning method	-	Cone positioning
Clamping force (35kg/cm ²)	kgf	960x4=3840
Operating System (Up & Down & Rotate)	kg/cm ²	Hydraulic 35
Lifting thrust force	kg	2200
Up and down travel of the pallet	mm	60
Allowable Workpiece Load	Horizontal	kg
Inspection accuracy	-	-
Repeatability accuracy on positioning of the same pallet	mm	
Max. positioning tolerance for 2 pallets	mm	0.01
Parallelism of pallet top and base bottom	mm	0.02
Net weight of saddle and single swing table	kg	0.02
Total weight	kg	335

CTH-400 (Pallet changer)



CTH-400+CHI-400 (Flat bottom type)



CHI/CHR Series (Dual pallets rotary table)

CHI-500 (1° or 5°) Hirth coupling hydraulic brake
CHR-500 (0.001°) Hydraulic Brake
 For horizontal machining center



▲ **CHI-500(1°)- Dual pallets rotary table**
 (Flat bottom type)



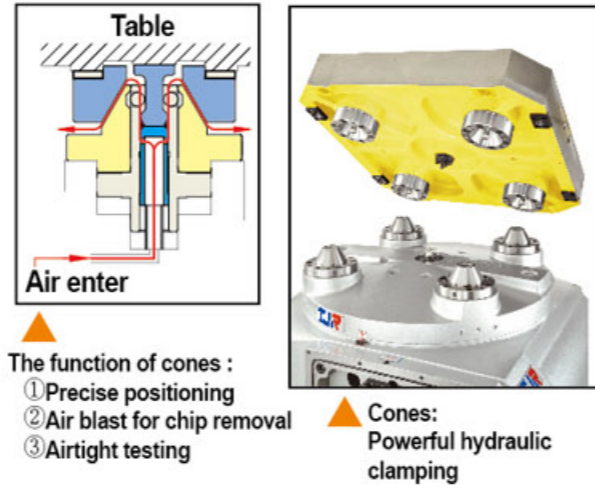
▲ **CHI Series :**
 Use **three-piece** clutch plate

Function: ① Accuracy: ±5 seconds (Angle encoder accuracy)
 ② Rotate **without lifting the table** to prevent table from water and particles.

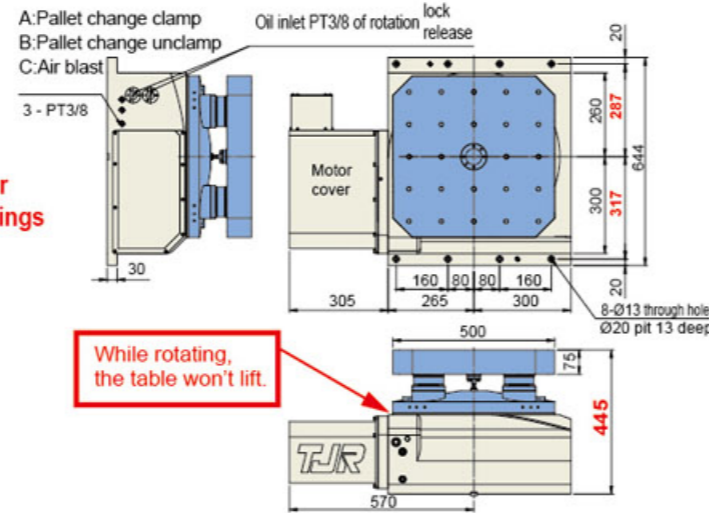
▲ **CHR series :**
 Use **large-diameter radial & axial bearings**

The Standard of Precision Test: Japan JIS

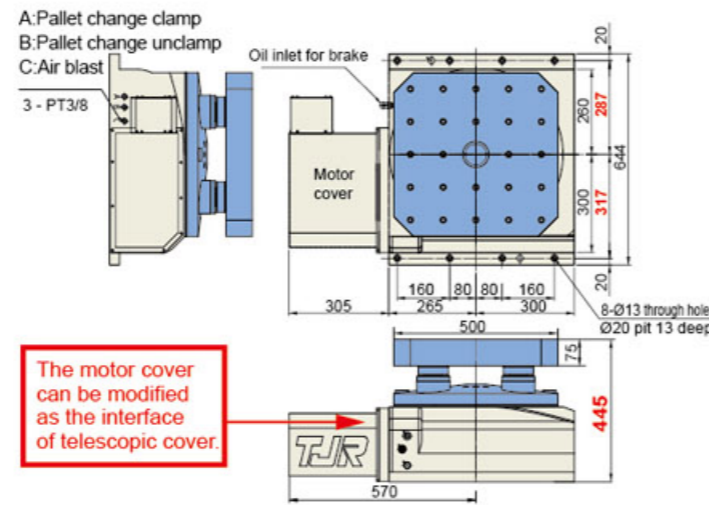
Item / Model	Unit	CHI-500	CHR-500
Table size	mm	□500x500	□500x500
Diameter of Table Central Hole	mm	∅50x27 deep	∅50x27 deep
Table height	mm	445	445
Table T-slot Width	mm	18H7	18H7
Guide Block Width	mm	18h7	18h7
Min. Increment	deg.	1° or 5°	0.001
Indexing Precision	sec.	±5	15
Repeatability	sec.	±1	4
Clamping force of positioning cones (35kg/cm ²)	kgf	960x4=3840	960x4=3840
Clamping System	kg/cm ²	Hydraulic 35	Hydraulic 35
Clamping Torque	kg-m	1000	370
Servo Motor Model	Straight shaft without key	β22is	α12i / β22is
Speed Reduction Ratio	-	1 : 180	1 : 180
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)	r.p.m	16.6	16.6
Allowable Workpiece Load	kgf	600	600
Strength of worm gears	kgf.m	-	250
Net Weight (servo motor excluded)	kg	716(including 2 pallets)	-



CHI-500 (1° or 5°) (Flat bottom type)



CHR-500 (0.001°) (Flat bottom type)

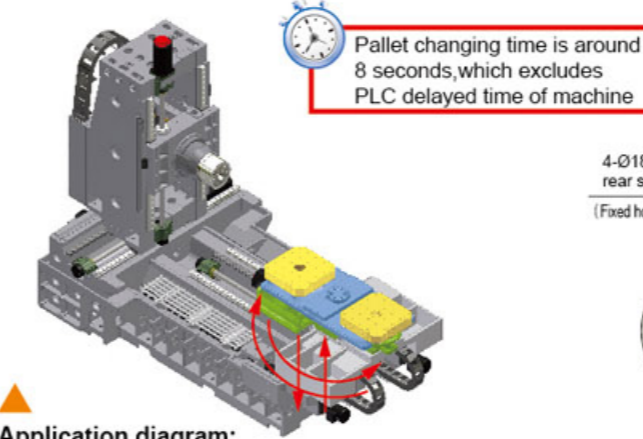


CTH Series (tray type auto pallet changer)

CTH-500 (Can go with CHI/CHR series)
 For horizontal machining center
 (180° to and fro)



▲ **CTH-500** (tray type APC)



▲ **Application diagram:**
 retrofits horizontal machining center with CTH+ CHI

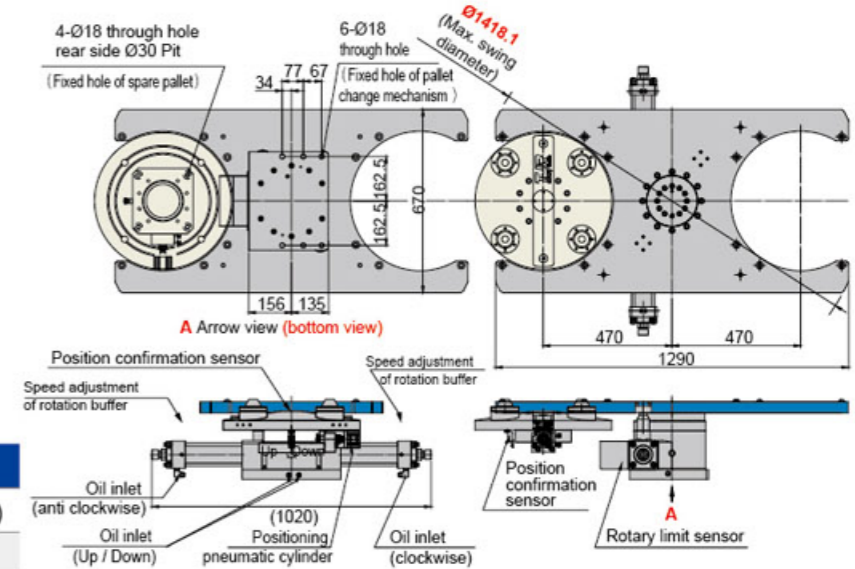
The Standard of Precision Test: Japan JIS

Item / Model	Unit	CTH-500
Lift-up mechanism	-	Tray type (H type)
Table size	mm	670 x 1290
Rotation method	-	Hydraulic hirth coupling
Rotation angle	deg.	180° to and fro
Clamping System	kg/cm ²	Hydraulic 35
Positioning method	-	Cone positioning
Clamping force (35kg/cm ²)	kgf	960x4=3840
Operating System (Up & Down & Rotate)	kg/cm ²	Hydraulic 45
Lifting thrust force	kg	2860
Up and down travel of the pallet	mm	60
Allowable Workpiece Load	kg	500x2=1000
Inspection accuracy		
Repeatability accuracy on positioning of the same pallet	mm	-
Max. positioning tolerance for 2 pallets	mm	0.01
Parallelism of pallet top and base bottom	mm	0.02
Net weight of saddle and single swing table	kg	0.02
Total weight	kg	400

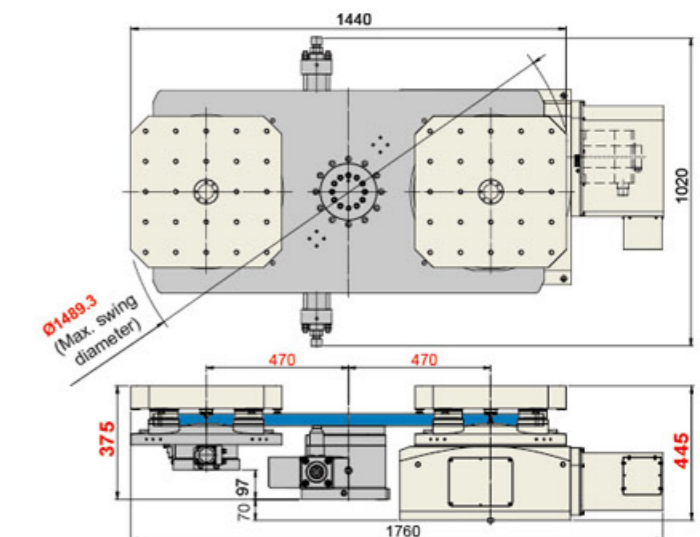


▲ **CTH-500 + CHI-500**
 Dual pallets rotary table + Tray type APC
 (Flat bottom type)

CTH-500 (Pallet changer)

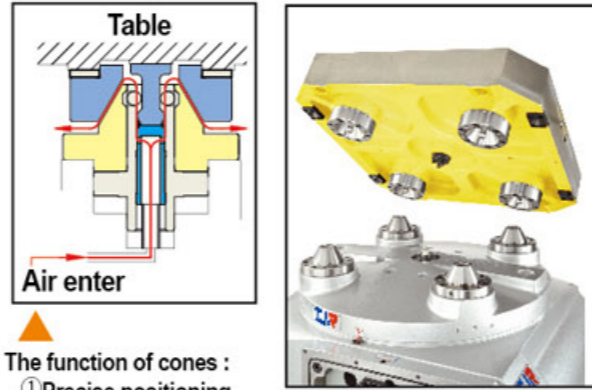


CTH-500+CHI-500 (Flat bottom type)



CHI/CHR Series (Dual pallets rotary table)

CHI-630L (1° or 5°) Hirth coupling hydraulic brake
CHR-630L (0.001°) Hydraulic Brake
 For horizontal machining center



- The function of cones :
- ① Precise positioning
 - ② Air blast for chip removal
 - ③ Airtight testing
- ▲ Cones: Powerful hydraulic clamping

CHI-630L (1° or 5°) (Integrated linear guideway bottom type)

▲ CHI-630L (1°)- Dual pallets rotary table
(Integrated linear guideway bottom type)



▲ CHI Series :
Use **three-piece** clutch plate

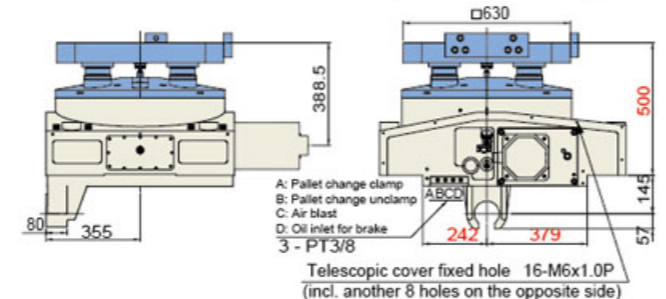
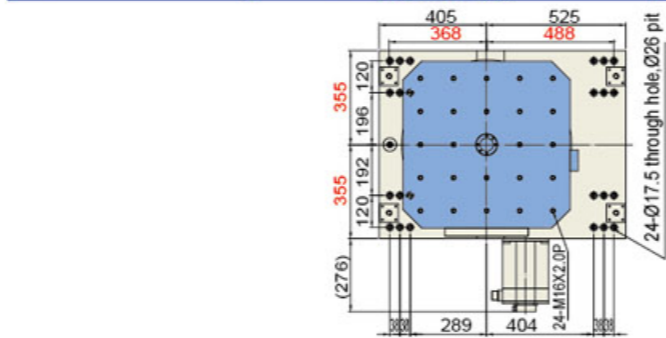
- Function: ① Accuracy: ± 5 seconds (Angle encoder accuracy)
 ② Rotate **without lifting the table** to prevent table from water and particles.

▲ CHR series :
Use **large-diameter radial & axial bearings**

The Standard of Precision Test: Japan JIS

Item / Model	Unit	CHI-630L	CHR-630L
Table size	mm	□630x630	□630x630
Diameter of Table Central Hole	mm	∅50x27 deep	∅50x27 deep
Table height	mm	500	500
Table T-slot Width	mm	-	-
Guide Block Width	mm	-	-
Min. Increment	deg.	1° or 5°	0.001
Indexing Precision	sec.	±5	15
Repeatability	sec.	±1	4
Clamping force of positioning cones (35kg/cm ²)	kgf	940x4=3840	940x4=3840
Clamping System	kg/cm ²	Hydraulic 35	Hydraulic 35
Clamping Torque	kg-m	5000	800
Servo Motor Model	FANUC Straight shaft	β22is	α22i / β22is
Model	MITSUBISHI without key	HF-204	HF-204
Speed Reduction Ratio	-	1 : 180	1 : 180
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)	r.p.m	16.6	16.6
Allowable Workpiece Load	Horizontal	kgf	1200
Strength of worm gears	kgf.m	-	420
Net Weight (servo motor excluded)	kg	1135	-

CHR-630L (0.001°) (Integrated linear guideway bottom type)

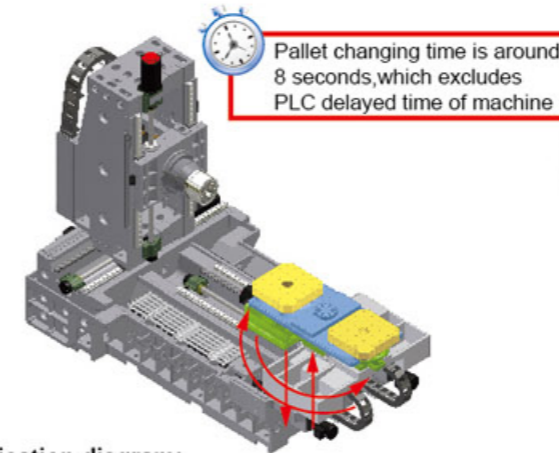


CTH Series (tray type auto pallet changer)

CTH-630 (Can go with CHI/CHR series)
 For horizontal machining center
 (180° to and fro)



▲ CTH-630 (tray type APC)



Application diagram:
retrofits horizontal machining center with CTH+ CHR

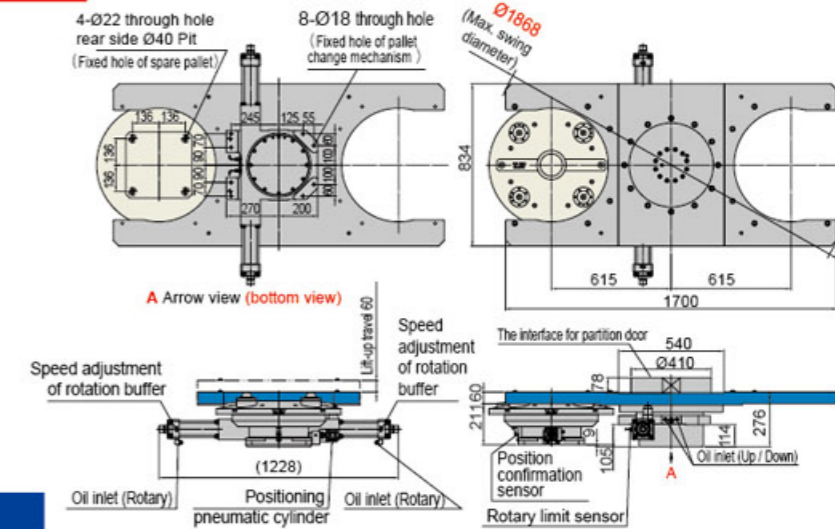
The Standard of Precision Test: Japan JIS

Item / Model	Unit	CTH-630
Lift-up mechanism	-	Tray type (H type)
Table size	mm	834 x 1700
Rotation method	-	Hydraulic hirth coupling
Rotation angle	deg.	180° to and fro
Clamping System	kg/cm ²	Hydraulic 35
Positioning method	-	Cone positioning
Clamping force (35kg/cm ²)	kgf	960x4=3840
Operating System (Up & Down & Rotate)	kg/cm ²	Hydraulic 45
Lifting thrust force	kg	3780
Up and down travel of the pallet	mm	60
Allowable Workpiece Load	Horizontal	kg
Net weight (APC + spare pallet)	kg	-
Inspection accuracy		
Repeatability accuracy on positioning of the same pallet	mm	0.01
Max. positioning tolerance for 2 pallets	mm	0.02
Parallelism of pallet top and base bottom	mm	0.02
Total weight (APC + spare pallet + rotary table)	kg	600

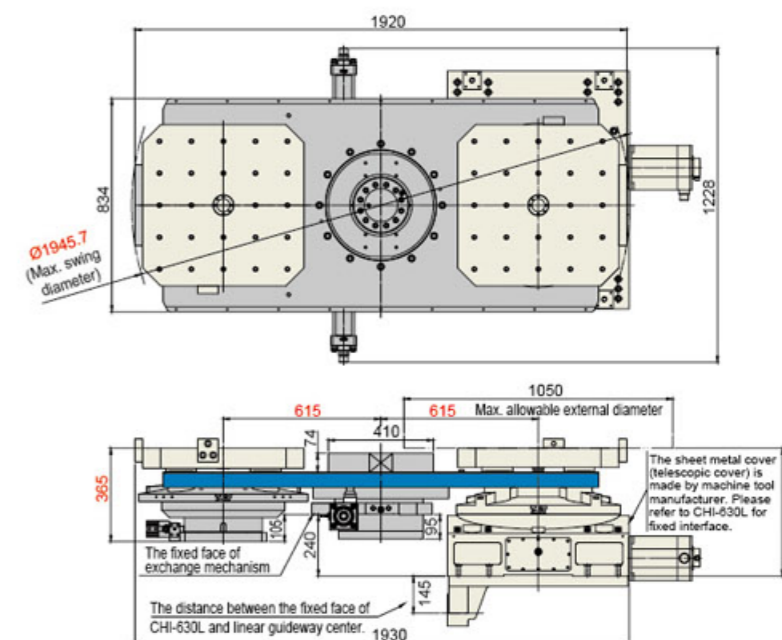


▲ CTH-630 + CHI-630L
 Dual pallets rotary table + Tray type APC
 (Integrated linear guideway bottom type)

CTH-630 (Pallet changer)



CTH-630 + CHI-630L (Integrated linear guideway bottom type)



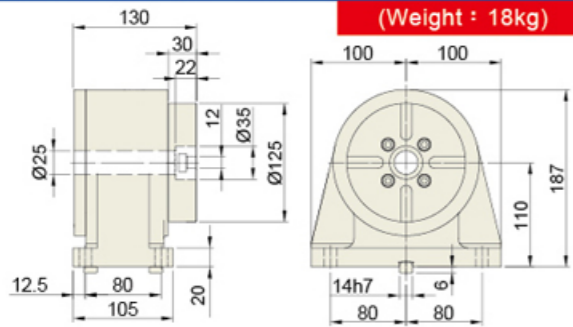
Rotary Tailstock

RTA Series (Pneumatic Brake) RTA-125/170/210/250

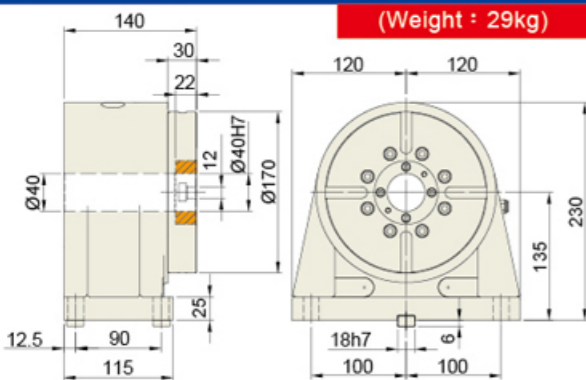
RTH Series (Hydraulic Brake) RTH-210/255/320/400



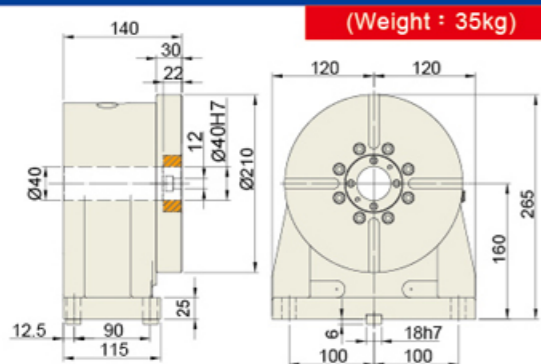
RTA-125 (Pneumatic Brake)



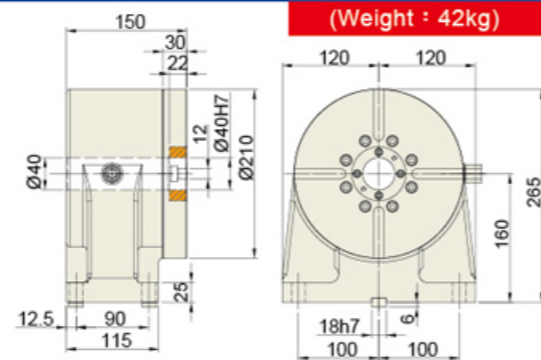
RTA-170 (Pneumatic Brake)



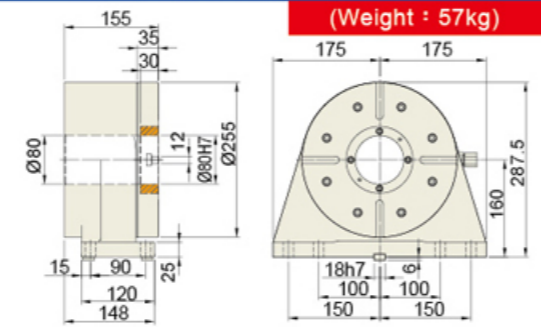
RTA-210 (Pneumatic Brake)



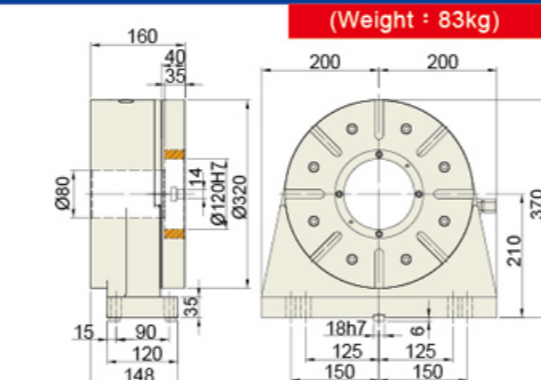
RTH-210 (Hydraulic Brake)



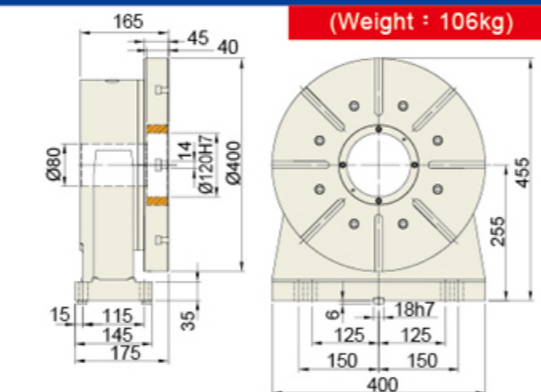
RTH-255 (Hydraulic Brake)



RTH-320 (Hydraulic Brake)



RTH-400A (Hydraulic Brake)



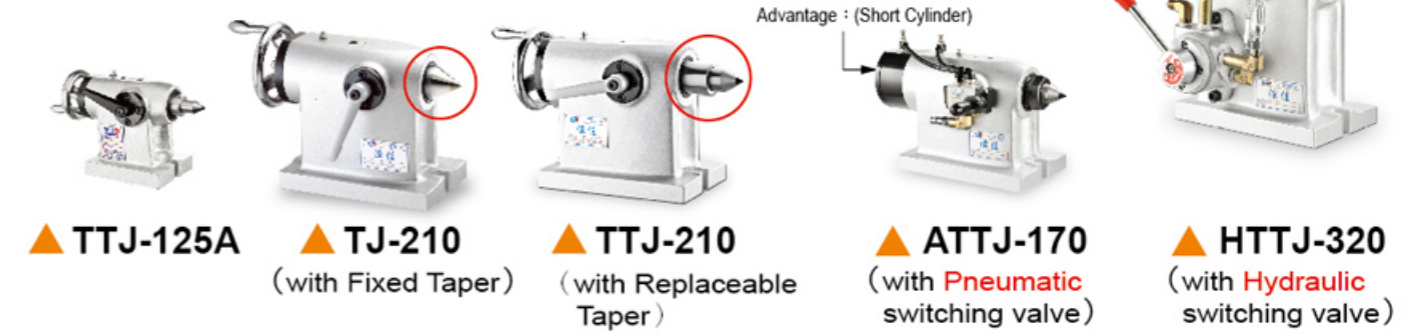
Manual Tailstock (For any model exceeding 170, MT4# is employed to provide higher rigidity)

TTJ Series TTJ-125~400

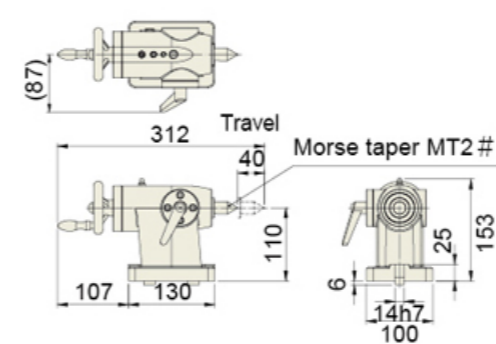
ATTJ Series (Pneumatic) ATTJ-125~210

HTTJ Series (Hydraulic) HTTJ-210~400

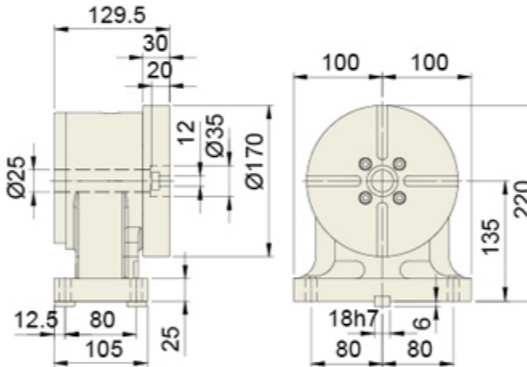
TTJ-125A=MT2



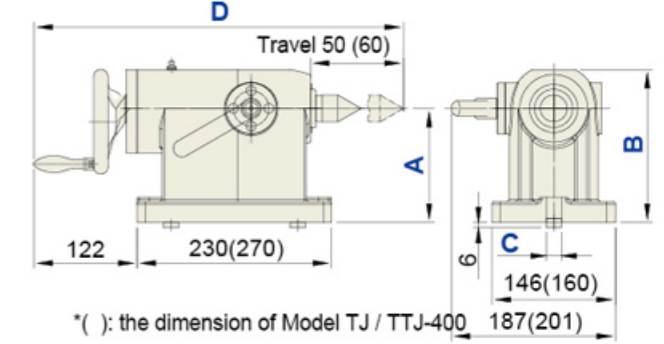
TTJ-125A light manual tailstock



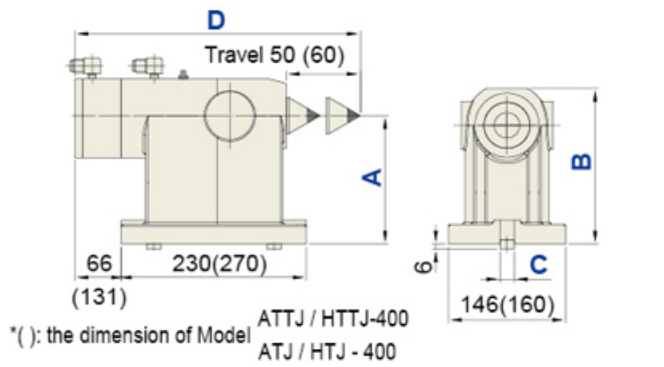
RTA-170A light rotary tailstock



TJ/TTJ



ATJ/ATTJ HTJ/HTTJ



Manual Tailstock Series

(Unit : mm)

Model	A	B	C	D	Weight Kg
TJ / TTJ-125	110	156	14	423/435.5	21.5
TJ / TTJ-170	135	181	18	423/435.5	23
TJ / TTJ-210	160	206	18	423/435.5	25
TJ / TTJ-255	160	206	18	423/435.5	25
TJ / TTJ-320	210	256	18	423/435.5	29
TJ / TTJ-400	255	310	18	487/503.5	48

Manual Tailstock Series with Pneumatic / Hydraulic switching valve

(Unit : mm)

Model	A	B	C	D	Weight Kg
ATJ / ATTJ-125	110	156	14	363/376	21
ATJ / ATTJ-170	135	181	18	363/376	23
ATJ / ATTJ-210	160	206	18	363/376	25
HTJ / HTTJ-210	160	206	18	363/376	25
HTJ / HTTJ-255	160	206	18	363/376	25
HTJ / HTTJ-320	210	256	18	363/376	29
HTJ / HTTJ-400	255	310	18	496/495	50

CNC Multi Spindle Rotary Tables
(Min indexing angle – 0.001°)

AR multi spindle 2W Series
(2-wheel coupled, **Powerful** Pneumatic Brake)

AR-170-2W/210-2W

AR multi spindle 3W Series
(3-wheel coupled, **Powerful** Pneumatic Brake)

AR-170-3W/210-3W

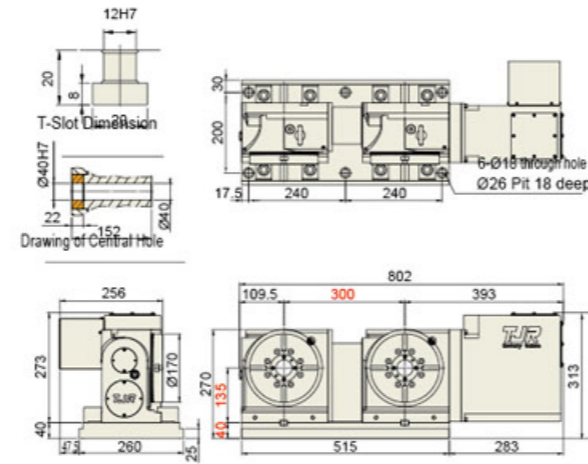


AR-125-4W
4 wheel coupled + manual tailstock + big base plate

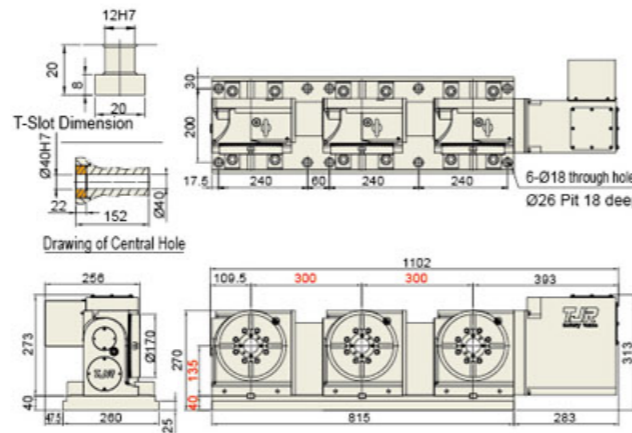
The Standard of Precision Test: Japan JIS

Item / Model	Unit	AR-170-2W/3W	AR-210-2W/3W
Table Diameter	mm	Ø 170	Ø 210
Diameter of Table Central Hole	mm	Ø 67	Ø 67
Inner Diameter of Mandrel Sleeve	mm	Ø 40H7	Ø 40H7
Diameter of Center Through Hole	mm	Ø 40	Ø 40
Center Height(Vertical)	mm	175	200
Minimum distance between table centers	mm	300	300
Table T-slot Width	mm	12H7	12H7
Guide Block Width	mm	18h7	18h7
Min. Increment	deg.	0.001	0.001
Indexing Precision	sec.	20	20
Repeatability	sec.	4	4
Clamping System (Pneumatic)	kg/cm ²	6	6
Clamping Torque	kg-m	31	31
Servo Motor Model	FANUC Taper Shaft with Key	α8i / β12is	α8i / β12is
	MITSUBISHI Direct Shaft without Key	HF-104/154	HF-104/154
Speed Reduction Ratio	-	1 : 90	1 : 90
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)	r.p.m	44.4	44.4
Allowable Inertia Load Capacity (Horizontal)	kg.cm.sec ²	5.4	8.3
Allowable	Vertical (⊙)	kg	75
Workpiece Load	with Tailstock	kg	150
		kg	150
Allowable Load (with Rotary Table Clamping)	F	kgf	1450
	FxL	kgf.m	100
Strength of worm gears	FxL	kgf.m	31
		kg.m	18
Net Weight (servo motor excluded)	kg		

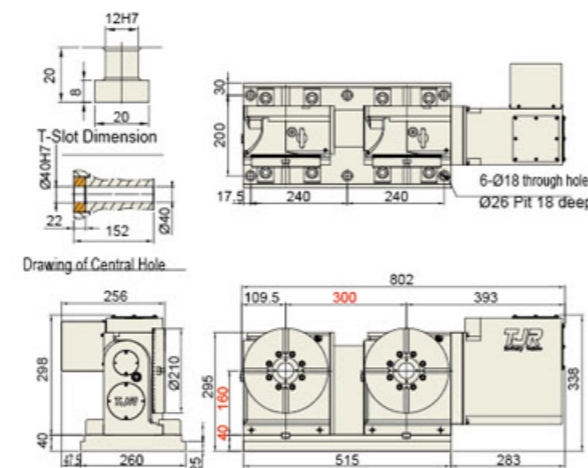
NEW Powerful Brake System
AR-170-2W (Standard type)



NEW Powerful Brake System
AR-170-3W (Standard type)



NEW Powerful Brake System
AR-210-2W (Standard type)



There are **three common transmission mechanisms** of rotary table as bellow:

You can find **all types of mechanism in TJR.**

A

A-1



Driven by **Super-High-Speed** direct drive motor
(super high speed: 1500 - 2500 rpm)

Strength:

- ① If the moving column vertical machining center or drilling & tapping center is equipped with our table, it can make the machine work as a **horizontal** or **vertical lathe** concurrently.
- ② The super high speed of rotary axis: **1500 - 2500 rpm.**
- ③ Truly **zero backlash** during the clockwise / anti-clockwise rotation.
- ④ Truly **zero wear** for the transmission mechanism
- ⑤ Long-lasting high precision
(The actual precision depends on the selected angle encoder)
- ⑥ **Once the rotary table is crashed**, it will cost nothing because there is no transmission mechanism such as worm & gear or roller gear cam which can be damaged.



A-2



Driven by direct drive motor
(speed: 100-200 rpm)

Strength:

- ① Truly **zero backlash** during the clockwise / anti-clockwise rotation.
- ② Truly **zero wear** for the transmission mechanism
- ③ High speed: 100-200 rpm
- ④ Long-lasting high precision
(The actual precision depends on the selected angle encoder)
- ⑤ **Once the rotary table is crashed**, it will cost nothing because there is no transmission mechanism such as worm & gear or roller gear cam which can be damaged.



B



Driven by roller gear cam
(speed: 83-110 rpm)

Strength:

- ① Less backlash during the clockwise / anti-clockwise rotation.
- ② Less wear for the transmission mechanism
- ③ High speed: 83-110 rpm
- ④ Once the rotary table is crashed, it will cost more because it's **more expensive** to renew the roller gear cam.



C



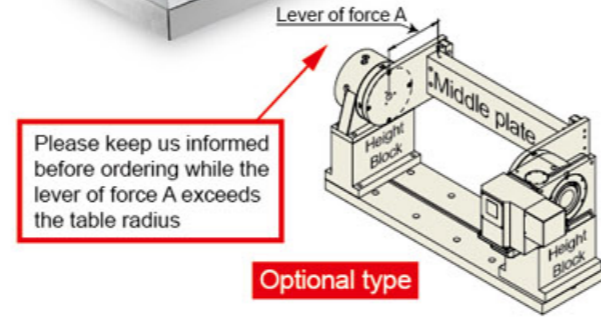
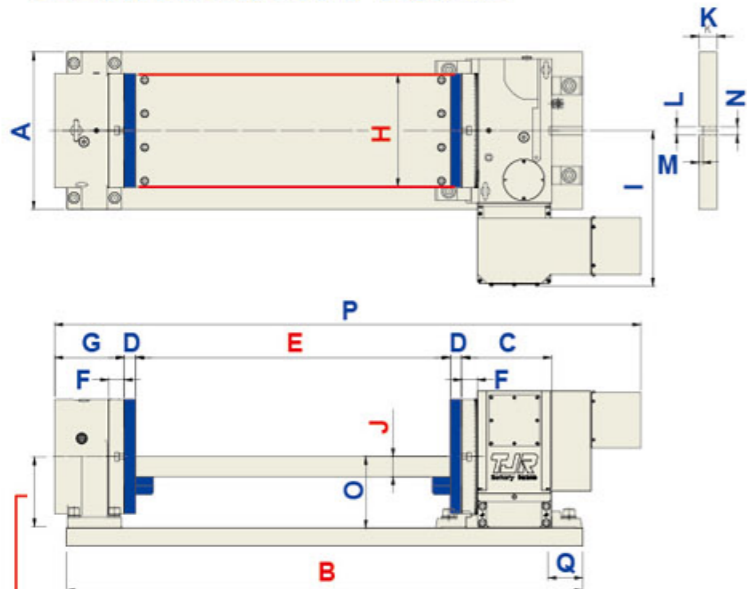
Driven by **Japan-made** worm & worm gear
(speed: 25 - 44 rpm)

Strength:

- ① The price is the lowest
- ② It's easy to adjust backlash after wearing out slowly
- ③ Once the rotary table is crashed, it will cost less.



CNC Rotary Table + Rotary Tailstock + Connection Plates



(Example of workpiece installation)

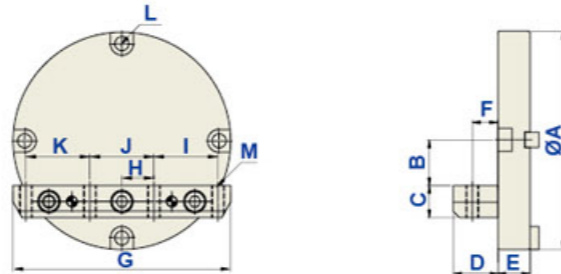
The plane of middle plate is at the same height as the center of rotary table (standard type)
(An exception: the plane of AR-125 / RTA-125 middle plate is 5 mm higher than the center of rotary table)

Specification

Model / Dimension	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
AR-125 / RTA-125	250	725	152	20	400	30	130	125	302	30	35	14	8	14	115	828	0
AR-170 / RTA-170	300	911	152	25	500	30	140	170	336	35	40	18	8	18	135	947	69
AR-210 / RTA-210	300	1011	152	25	600	30	140	200	336	40	40	18	8	18	160	1047	69
HR-210 / RTH-210	300	1022	152	25	600	30	150	200	341	40	40	18	8	18	160	1057	69
AR-250 / RTA-250	300	1019	160	25	600	38	140	250	336	40	40	18	8	18	160	1055	69
HR-255N / RTH-255	350	1148	200	25	700	35	155	250	346	45	40	18	8	18	160	1305	69
HR-320N / RTH-320	400	1297	235	30	800	40	160	300	416	45	40	18	8	18	210	1460	69
HR-400N / RTH-400A	450	1455	250	30	900	45	175	400	457	45	40	18	8	18	255	1572	69

※ J is the thickness of the middle plate, recommended for manufacturing.
If the thickness is not enough, the middle plate will be easy to deform when twisted. (Unit : mm)

Disk L-block



Specification (Unit : mm)

Model / Dimension	ØA	B	C	D	E	F	G	H	I	J	K	L	M
AR-125	Ø125	25	25	25	20	12.5	120	27	25	54	25	M10	4-M8
AR-170	Ø170	35	25	35	25	20	170	25	50	50	50	M10	4-M10
AR-210	Ø210	40	35	40	25	20	200	27.5	55	55	55	M10	4-M10
HR-210	Ø210	40	35	40	25	20	200	27.5	55	55	55	M10	4-M10
HR-255	Ø250	45	40	40	25	20	250	37.5	75	75	75	M10	4-M10
HR-320	Ø320	45	45	45	30	22.5	300	42.5	85	85	85	M12	4-M12
HR-400	Ø400	45	45	45	30	22.5	400	75	80	150	80	M12	4-M12

Accessories Series

- Installation of Manual Three-jaw Chuck
- Three-jaw Chuck
- Flange Disk
- AIC Hydraulic Controller
- Hydraulic cylinder
- Diagram of Chuck Installation
- Single axis controller for Direct Drive Motor (DD SAC)
- Single axis controller (SAC)

Specification Table of Manual Three-jaw Chuck

Suitable rotary table	Model- Dimension	Grip Range of Inner Diameter (Straight)	Grip Range of Outer Diameter (Reverse)	Manual chuck thickness	Through hole of chuck	Max. available diameter of bar-shape workpiece which can go through hole of chuck.	Through hole of chuck adapter.	The thickness of chuck adapter					
								AR-125	AR-170/ 210/250	HR-255 HI-255	HR/HR-320-400	HR-500 HI-500	
AR-125	SK-4	Ø3-Ø95	Ø29-Ø84	59	Ø24	Ø24	Ø28	16					
AR-125	SK-5	Ø3-Ø110	Ø33-Ø100	60	Ø32	Ø28	Ø28	16					
AR-170	SK-6	Ø4-Ø160	Ø55-Ø150	67	Ø45	Ø30	Ø30	16					
AR-170/210/250	SK-7	Ø8-Ø180	Ø62-Ø170	76.5	Ø58	Ø30	Ø30	14	20				
HR-170/210/250	SK-8	Ø8-Ø190	Ø68-Ø180	76.5	Ø58	Ø30	Ø30	14	20	25			
HR-255	SK-9	Ø11-Ø220	Ø70-Ø210	84	Ø70	Ø70	Ø70		20	25			
	SK-10	Ø12-Ø260	Ø80-Ø250	89	Ø89	Ø70	Ø70		20	25			
HR-320	SK-9	Ø11-Ø220	Ø70-Ø210	84	Ø70	Ø70	Ø110		20	25			
	SK-10	Ø12-Ø260	Ø80-Ø250	89	Ø89	Ø89	Ø110		20	25			
HR-400	SK-12	Ø15-Ø300	Ø90-Ø290	96	Ø105	Ø105	Ø110			25			
HR-500	SK-12	Ø15-Ø300	Ø90-Ø290	96	Ø105	Ø105	Ø210						28
	SK-16	Ø30-Ø380	Ø110-Ø350	122	Ø160	Ø160	Ø210						28
HR-500/630	SK-16	Ø30-Ø380	Ø110-Ø350	122	Ø160	Ø160	Ø270						28

Unit : mm

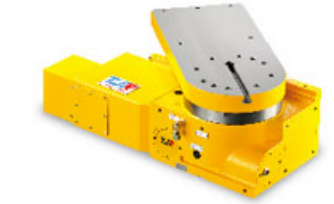
Servo Motor Table (Please use oil-proof motors)

MODEL	AR-125	AR-170	AR-210	AR-250	HR-255	FHR-255C (Rotary axis)	FAR-170 (Tilting axis)	FAR-210 (Tilting axis)	HR-320	FHR-320C (Tilting axis)	HR-800 and above
MOTOR SPECIFICATIONS	FAR-125 (Rotary axis)	FAR-125 (Tilting axis)	FAR-170 (Rotary axis)	FAR-210 (Rotary axis)	FHR-255C (Rotary axis)	FHR-255C (Rotary axis)	FHR-320 (Rotary axis)	FHR-400C (Rotary axis)	HR-400	FHR-400C (Tilting axis)	FHR-500C (Tilting axis)
FANUC	α2i / β4is	α4i / β8is	α8i / β8is / β12is	α8i / β8is	α8i / β12is	α12i / β22is	α12i / β22is	α12i / β22is	α22i		
MELDAS	HF75 HF105	HF54 HF104	HF104 HF154	HF-104	HF-154	HF-204	HF-204/354	HF354			
YASKAWA	08A	09A	13A	13A	13A	30A	30A/44A	30A/44A			
SIEMENS	1FK7042	1FK7060	1FK7063	1FK7063	1FK7063	1FK7083B	1FK7083B	1FK7101B			
FAGOR	FXM13.40A	FXM22.30A	FXM32.30A	FXM32.30A	FXM32.30A	FXM54.30A	FXM54.30A	-----			
HEIDENHAIN	QSY-96A	QSY-116C	QSY-130C QSY-116E	QSY-130C	QSY-116E	QSY-155B	QSY-155D	QSY-155D			

※ Please select high or torque motor while using connection plates and fixtures with rotary tailstock.



Accessories Series



Customized Rotary Table



Cable assembly we provide (Standard)

Separated wiring of adaption and connection for power cable and feedback cable respectively.

※ As shown in the right diagram, internal cables include:

- No. ① - ② power cable
- No. ⑦ - ⑧ feedback cable
- 7 I/O signals for rotary table

※ TJR can also provide ③ - ⑥ and ⑨ - ⑫ cables



Air Hydraulic Booster Unit :
Examples for applications

1. Use hydraulic brake rotary table
2. Use hydraulic brake rotary table + manual tailstock



Hydraulic Power Unit :
Examples for applications

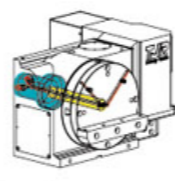
1. Use hydraulic brake rotary table + rotary tailstock
2. Use hydraulic brake rotary table + rotary tailstock + hydraulic fixtures

Pneumatic / Hydraulic distributor :
(can be equipped with 2, 4, 6, 8 holes)

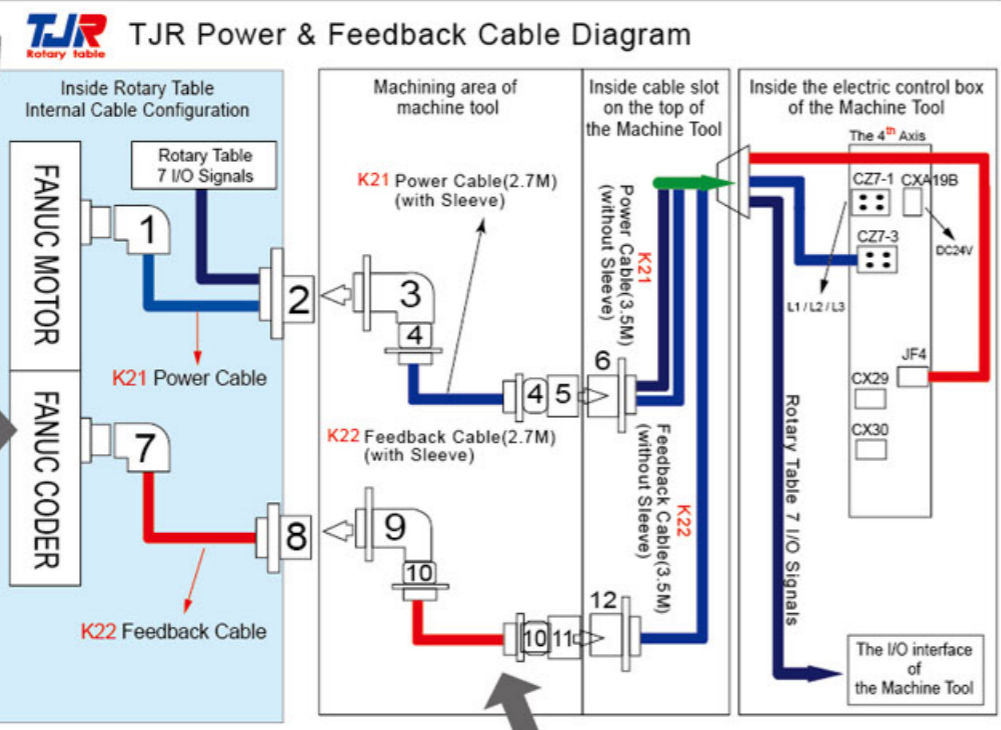


2 holes :
1 input ; 1 output

8 holes :
4 input ; 4 output



Application diagram – pneumatic / hydraulic distributor
When mounting pneumatic / hydraulic fixtures, please use distributors and disk L-blocks equipped with oil holes so that the fluid pipe can go through the center through hole to avoid intertwining while the rotary table spins.



Cable assembly the customer provide (Optional)

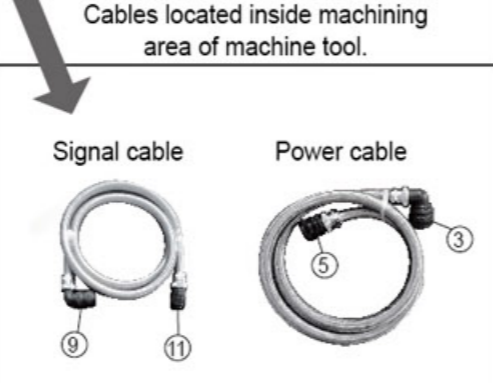
(A) No hole and cable

(B) Direct wiring of power cable and feedback cable combined in one

(C) Direct wiring of power cable and feedback cable combined in one

(D) Wiring of adaption and connection for combined power cable and feedback cable

If you prefer any one of the above-mentioned types of cable assembly, we will provide only the rotary table [7 (air brake) / 5 (oil brake)] I/O signal connector. You need to prepare the rest.



Accuracy comparison sheet while using angle encoder

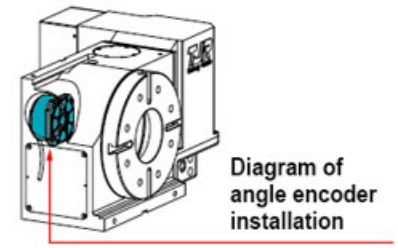
Model of angle encoder	Angle encoder accuracy	Rotary table accuracy
ECN-225	± 10"	Within 30" (for tilt axis)
RCN-2390F (FANUC)	± 5"	Within 12"
RCN-2390M (MITSUBISHI)		
RCN-2310 (HEIDENHAIN)	± 5"	Within 12"
RCN-2380 (SIEMENS)		
RCN-228 (SIEMENS)	± 2.5"	Within 8"
RCN-5590F (FANUC)	± 2.5"	Within 8"
RCN-5590M (MITSUBISHI)		

Note: Absolute vs Incremental

Model of angle encoder	Angle encoder accuracy	Rotary table accuracy
RON-270 (SIEMENS)	± 5"	Within 12"
RON-275 (SIEMENS)		
RON-280 (SIEMENS)		
RON-285 (SIEMENS)		
RON-287C (SIEMENS)	± 2.5"	Within 8"
RON-786-18000	± 2"	Within 6"
RON-786-36000		
ROD-880 (for Japanese controller)	± 1"	Within 5"
RON-886 (for Japanese controller)		

1 Spindle bearings strength

TJR	Others	Others
Radial & axial preloading bearing	Taper roller bearing	Cross roller bearing
Large diameter	Small diameter	Small diameter
Suitable for heavy-duty cutting in the horizontal and vertical directions.	Only suitable for light cutting	Only suitable for light cutting



2 Advanced inspection facilities

	TJR	Others
2D measuring equipment	YES	YES
3D measuring equipment	YES	NO
Geometry precision testing	YES	NO
Laser measuring equipment	YES	NO
Indexing precision testing	YES	NO

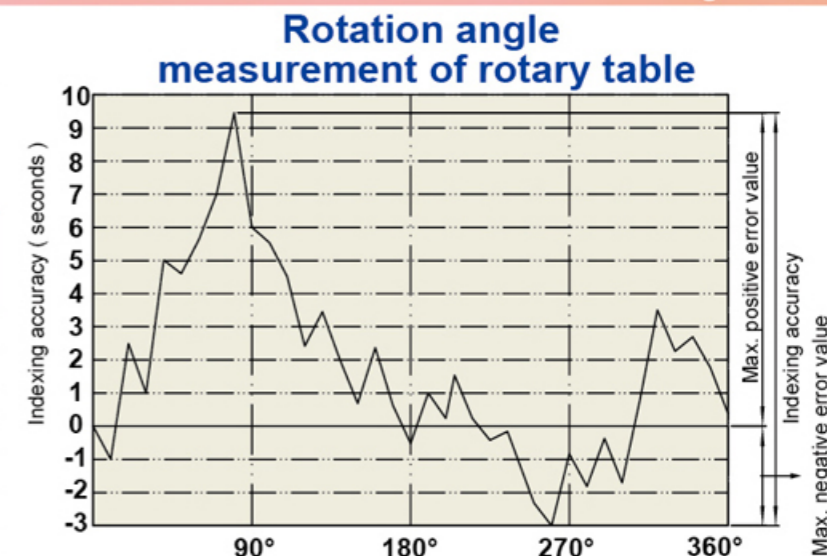
Alternative methods

1. Use the old-type measuring equipment
2. Use cheaper encoder or angle encoder
3. Use the fixture with height gauge to measure 4 squareness



Geometry Precision Test Standard of Rotary Table (Unit : mm)

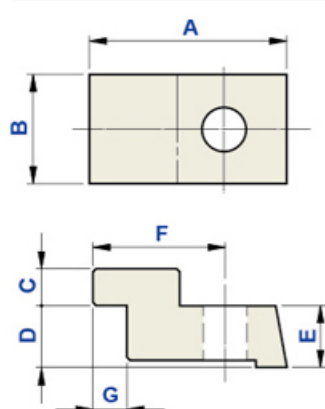
AR/HR (single axis)							The Standard of Precision Test : Japan JIS			
	Flatness of table top (Lower in the center) Total Length	Runout of table top during rotation Per 300mm	Parallelism of table top to frame bottom Total Length	Runout of table central hole Front	Perpendicularity of table top to frame bottom Total Length	Perpendicularity of table top to frame bottom guide blocks Total Length	Indexing Precision (Measured by optical instrument) Accumulative tolerance	Parallelism of centerline between rotary table and tailstock to frame bottom guide blocks Per 300mm	Height Difference between Center Line of Rotary Table and that of Tailstock (tailstock center line should be higher)	
AR-125	0.01	0.015	0.02	0.01	0.01	0.02	40"	0.02	0.02	
AR-170/210/250	0.01	0.015	0.02	0.01	0.01	0.02	20"	0.02	0.02	
AR-170B/210B/250B	0.01	0.015	-	0.01	0.01	0.02	20"	0.02	0.02	
HR-210	0.015	0.015	0.02	0.01	0.01	0.02	20"	0.02	0.02	
HR-255/320/400	0.015	0.015	0.02	0.01	0.01	0.02	15"	0.02	0.02	
HR-500	0.02	0.015	0.02	0.01	0.02	0.02	15"	0.02	0.02	
HR-630	0.03	0.02	0.03	0.01	0.03	0.03	15"	0.02	0.02	



FHR (dual axis)							The Standard of Precision Test : Japan JIS		
	Flatness of table top (Lower in the center) Total Length	Runout of table top during rotation Per 300mm	Parallelism of table top to frame bottom Total Length	Runout of table central hole Front	Parallelism between center line of tilting axis and bottom Total Length	Tilt axis - indexing precision (seconds)	Rotary axis - indexing precision (seconds) Accumulative tolerance	Parallelism between rotary table and positioning block of bottom	
FAR-125	0.015	0.015	0.02	0.01	0.02	50"	40"	0.02	
FAR-170 / 210	0.015	0.015	0.02	0.01	0.02	50"	20"	0.02	
FHR-255	0.015	0.015	0.02	0.01	0.02	50"	15"	0.02	
FHR-320 / 400	0.015	0.015	0.02	0.01	0.02	50"	15"	0.02	
FHR-500	0.02	0.015	0.02	0.01	0.02	50"	15"	0.02	
FHR-630	0.02	0.015	0.02	0.01	0.02	60"	15"	0.02	

Specification – Clamping block

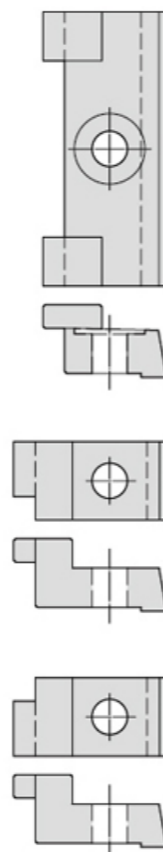
Standard Clamping Block



Model	Standard Clamping Block						
	A	B	C	D	E	F	G
AR-125	63	35	12	20	20	43	11
AR-170	78	40	12	25	22	49	11
AR-210	78	40	12	25	22	49	11
AR-255	78	40	12	25	22	49	11
HR-210	78	40	12	25	22	49	11
HR-255	78	40	12	25	22	49	11
HR-320	78	40	15	35	25	49	11
HR-400	78	40	15	35	25	49	11
HR-500	63	60	18	40	58	33	18
HR-630	63	60	18	40	58	33	18
HI-255	78	40	12	25	22	49	11
HI-320	78	40	15	35	25	49	11
HI-500	63	60	18	40	58	33	18

※ When using clamping blocks other than the above, please use suitable ones that are available on the market or order tailor-made ones from TJR. (Unit : mm)

Examples of special clamping block



▲ Worm Manufacturing
(Offered by Japanese partner)

▲ Precision Test of Worm and Worm Gear
(Offered by Japanese partner)

▲ Worm Gear Manufacturing
(Offered by Japanese partner)

▲ Trade fair exhibition

▲ Mazak Horizontal Machining Center
(Machining the main body)

▲ Appearance of Taiwan Plant

▲ Assembly Line

Program Setting

TJR SAC can accommodate 50 program sets;
Each program set can accommodate 99 steps.

Set the program No:

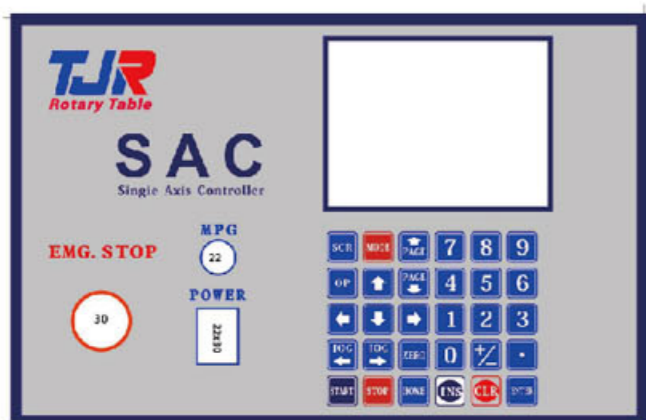
As diagram 1, move the cursor to the upper-left corner at the 1st column [O P] and 1st row (ex: END), and push down the **END** button for 3 seconds. Then, the cursor will be moved to the "PROG NO" as diagram 2 (ex: PROG NO: 1). When the cursor stays at that position "PROG NO", the program No. can be chosen by pressing number buttons.



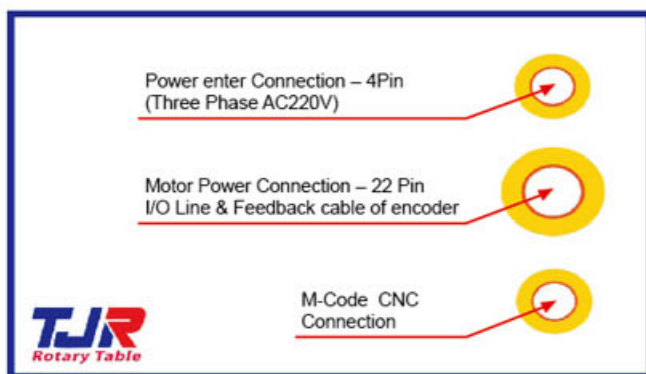
Delete the entire program set:

As diagram 1, move the cursor to the upper-left corner at the 1st column and 1st row (ex: END), and push down the **CLR** button for 3 seconds. Then, the program set will be completely deleted.

Control Panel Illustration



▲ Front View



▲ Rear View



▲ MPG (option)

Panel Button Function

Button	Function
0 ~ 9	Numeral Button for program or parameter input
.	The Button has two functions as follows: 1. Taken as a decimal point collocating with numeral buttons. 2. When the cursor stays at the first column of the first line under the "PROGRAM EDITION" page, hold the button down for 2 seconds to switch into the "PROGRAM GROUPS LIST" page.
+/-	Under the "PROGRAM EDITION" or "PARAMETER SETTING" page, it can be taken as positive/negative sign collocating with numeral buttons and decimal point.
INS	While writing a program, press the button to insert a line of code
CLR	While writing a program, press the button to delete a line of code
↑	Cursor goes up
↓	Cursor goes down
→	Cursor goes right
←	Cursor goes left
PAGE ↑	Page up in the "PROGRAM EDITION" page
PAGE ↓	Page down in the "PROGRAM EDITION" page
SCR	Page selection
OP	Operation code selection only for operation code 10, 11, 12
MODE	Under any page, press the button to return to the Main Page (,showing the current angle) immediately
JOG ←	Jog direction (Anticlockwise)
JOG →	Jog direction (Clockwise)
START	If the program execution had been interrupted, press the button to re-activate the program. If the program execution had not been interrupted, press the button to activate the program, starting from the 1st step of program
STOP	· If the rotary table is rotating, press the button to stop the execution of program and the rotation of the rotary table. · After releasing emergent EMG.STOP button, push the button to terminate the state of emergency lifted.
ZERO	Go toward the relative zero position
HOME	Go toward the machine zero position
ENTER	Press the button to confirm and save if there is any input value

Parameter Setting – Summary

1. Parameter Setting – Page 1

PARAMETER 1: +/- Prog.

Acceleration and deceleration rate of PROGRAM

Definition: Time spent for accelerating/decelerating to the required speed (RPM)

Setting range: From fast to slow
0.1 sec ~ 25 sec. (Min. Increment = 0.1 sec.)

PARAMETER 2: +/- JOG

Acceleration and Deceleration rate of JOG

Definition: Time spent for accelerating/decelerating to the required speed (RPM)

Setting range: From fast to slow
0.1 sec ~ 25 sec. (Min. Increment = 0.1 sec.)

PARAMETER 3: JOG Speed

The JOG speed

Definition: Percentage of motor speed (RPM)

Setting range: From slow to fast
1 (%) ~ 100 (%) (Min. Increment = 1)

PARAMETER 4: RTZ rate

Speed of manually returning to the machine or relative zero position

Definition: Percentage of motor speed (RPM)

Setting range: From slow to fast
1 (%) ~ 100 (%) (Min. Increment = 1)

PARAMETER 5: Final RTZs

The speed of final positioning after detecting zero position sensor

Definition: Percentage of motor speed (RPM)

Setting range: From slow to fast • Under 2 (%) is recommended
1 (%) ~ 10 (%) (Min. Increment = 1)

PARAMETER 6: RTZ path

Direction of returning to zero position

Setting range: 0: clockwise
1: anti clockwise

PARAMETER 7: RTZ Def.

Definition of returning to zero position

Setting range: 1 Take relative zero position as machine zero position
2 Detect the Z-phase signal of encoder
3 Detect the switch of machine zero position
4 First, detect the switch of machine zero position; second, detect the Z-phase signal of encoder.

PARAMETER 8: Zero Adju.

Compensation value of returning to Machine zero position

Definition: The additional compensation angle which the table will further rotates after detecting the signal of machine zero position.

Setting range: $\pm 0.000^\circ \sim \pm 360.000^\circ$
(Min. Increment = 0.001°)

PARAMETER 9: Max. Speed

The Maximum speed

Based on the allowable speed range of servo motor

Setting range: MITSUBISHI motor: 2000 rpm
YASKAWA motor: 1500 rpm

PARAMETER 10: MPG Speed

The hand wheel (MPG) speed

Definition: The amount of pulse wave is inputted within 1/1000 sec.

Setting range: From slow to fast • With no MPG, the parameter will be set as 0.
1 ~ 50 Faster as more pulse waves are input

Parameter Setting – Page 2

PARAMETER 1: Gap offset

Backlash compensation

Definition: the additional degrees which the motor will further rotates in order to compensate the backlash occurred when the table change rotation directions.

Setting range: $0.000^\circ \sim 0.254^\circ$ (Min. Increment = 0.001°)

PARAMETER 2: Auto. Run

Automatic execution

Definition: Time spent for accelerating/decelerating to the required speed (RPM)

Setting range: 0 Execute one step each time by pressing **START** button.
1 Continuously execute all steps unless **STOP** is pressed

PARAMETER 3: Start Way

Activate method

Definition: Set the internal and external activation either valid or invalid.

Setting range: 0 Internal activation is allowed
1 Both internal and external activation are allowed.

PARAMETER 4: Prog. Lock

Program lock

Setting range: 0 Unlocked, it's allowed to modify the program
1 Locked, it's not allowed to modify the program

PARAMETER 5: JOG way

JOG method

Setting range: 0 Rotate based on the set JOG speed; stop as long as the **STOP** button is released.
1 Continuously rotate based on the set JOG speed; stop unless the **STOP** button is pressed.
• Press **↑** button to increase the rotation speed;
• Press **↓** button to decrease the rotation speed.

PARAMETER 6: Rotate Way

Motor rotation direction

Setting range: 0 Clockwise
1 Anti-clockwise

PARAMETER 7: Del. Start

Activation delay after turning on servo motor

Definition: The delay time after turning on servo motor in order to wait for the brake to be completely unclamped. The parameter only functions when parameter "Uncla. Sig." is set as 0.

Setting range: 0.1 sec ~ 99.9 sec. (Min. Increment = 0.1 sec.)

PARAMETER 8: Del. Pos

The delay after finishing motor-positioning

Definition: The delay time after finishing positioning by servo motor. The parameter only functions when parameter "Uncla. Sig." is set as 0.

Setting range: 0.1 sec ~ 99.9 sec. (Min. Increment = 0.1 sec.)

PARAMETER 9: Del. Work

The delay after work-done

Setting range: 0.0 sec ~ 99.9 sec. (Min. Increment = 0.1 sec.)

PARAMETER 10: Ang. Limit

The brake function is limited to certain angles

Definition: Set the angle where the table can be braked. The parameter only functions when the table is driven by hirth coupling hydraulic brake.

Setting range: 0 The brake can function at any angle
1 The brake can function only every 1 degree
5 The brake can function only every 5 degree

Parameter Setting – Page 3

PARAMETER 1: Uncla. Sig

Detect the brake signal after stopping the servo motor

Setting range: 0 Clamp without detecting the brake signal after stopping motor
1 Clamp by detecting the brake signal after stopping motor

PARAMETER 2: OutoutSig.

Output Signal Function

Setting range: 1 Output signal is controlled by Operation code 6 or 7.
• While controlled by code 6, the output signal could be pulse ON or OFF
• While controlled by code 7, the output signal is pulse ON.
2 Output 0.2 sec pulse when motor stops operation.
3 Output pulse ON when motor stops operation
Output pulse OFF when motor starts operation.
4 Output 0.2 sec pulse only under "END" or "HALT" (under Operation code 9 or B)
5 Output pulse OFF when motor stops operation
Output pulse ON when motor starts operation
The setting is opposite to the setting 3
6 Output signal is always OFF

PARAMETER 3: +Ang.Limit

Angular limit when clockwise rotation (the limit set by software)

Definition: Set the angular limit of clockwise rotation
Example: If the parameter is set as 95° , the table can be only rotated clockwise at most 90° degrees.

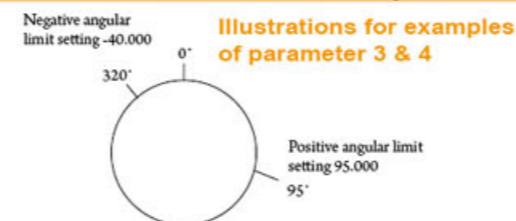
Setting range: $0.000^\circ \sim 359.999^\circ$ Allowable clockwise rotation
(Min. Increment = 0.001°) area within angular limit
 360.000° Set no angular limit clockwise

PARAMETER 4: -Ang.Limit

Angular limit when anticlockwise rotation (the limit set by software)

Definition: Set the angular limit of anticlockwise rotation
Example: If the parameter is set as 40° , the table can be only rotated anticlockwise at most 40° degrees.

Setting range: $0.000^\circ \sim 359.999^\circ$ Allowable clockwise rotation
(Min. Increment = 0.001°) area within angular limit
 360.000° Set no angular limit clockwise



PARAMETER 5: ABS Pos.

Rotation method when absolute positioning

Definition: Set up the rotation direction while going toward absolute position. The parameter only functions under operation code 0.

Setting range: 1 Always rotate clockwise
2 Always rotate anticlockwise
3 + Rotate clockwise
- Rotate anticlockwise
Example:
If 100.000 is input, it will be rotated to 100° clockwise;
If -100.000 is input, it will be rotated to 100° anticlockwise.
4 Rotate via shortest path.
(clockwise or anticlockwise)

PARAMETER 6: Language

Language selection

Setting range: 0 Chinese
1 English

A/B Access Point Selection

A access point = Normal Open = 1

B access point = Normal Close = 0

1: Zero Point

Setting range: 0 Normal Close
1 Normal Open

2: Unclamping

Setting range: 0 Normal Close
1 Normal Open

3: Clamping

Setting range: 0 Normal Close
1 Normal Open

4: Servo

Setting range: 0 Normal Close
1 Normal Open

5: Left limit

Setting range: 0 Normal Close
1 Normal Open

6: Right limit

Setting range: 0 Normal Close
1 Normal Open

7: Braking

Setting range: 0 Normal Close : Power ON → Clamping
1 Normal Open : Power ON → Unclamping

ABNORMAL SIGNAL & TROUBLESHOOT.

When motor cannot rotate

1. Check if the connection between motor and controller is loosened.
2. Check if any parameter is set inappropriately.
3. Check if pneumatic/hydraulic pressure source works normally.
4. Check if the Solenoid Valve works normally.
5. Check if the emergent **EMG.STOP** button is released. After releasing the emergent **EMG.STOP** button, push the **STOP** button to terminate the state of emergency lifted.
6. Shut down for at least 10 seconds, and then reboot.

When error codes occur in the main page

1. [EMG. STOP]:
 - Check if the **EMG.STOP** button is released
 - Check the connection wires of external emergent stop:
 Example: check if the wire connection of CNC or PCL control is loosened.
2. [SERVO ER]:
 - Check if the connection wires are loosened.
 - The main page shows [SERVO ER] only when the servo driver installed inside SAC has error alert. Therefore, please open SAC to check the alert codes displayed on the screen of servo driver. By reading the alert code, the error can be identified, and the solution can be found accordingly.

Operation Code

TJR Single Axis Controller provides 13 operation codes as follows:

No.	Command	Display in the field of control panel
0	Absolute command	ABS
1	Incremental command	ADD
2	Equal division	CUT
3	Return to the machine zero position	HOE
4	Call sub program	CAL
5	Return from sub program	RET
6	Set/reset output signal	OUT
7	Pulse output signal	OUT
8	Waiting Time	HOD
9	The main program ends	END
10	Jump between programs	JUP
11	Under the automatic execution, the code can stop execution and make it wait for next command	HALT
12	Set the relative zero position	OOO-SET

PS: Under the "PROGRAM EDITION" page, choose operation code 10, 11, or 12 in the operation code column by repeatedly pressing the **OP** button.

(0) Operation code 0 – Absolute command

OP:	ABS
ANGLE:	Absolute angle Range: 0.000° ~ 999.999°
SPEED:	Rotation rate Range: 0.1 ~ XXX.X degree/sec (Set according to PARAMETER 19)
LOOP:	NA

(1) Operation code 1 – Incremental command

OP:	ADD
ANGLE:	Forward or Backward angle Range: 0.000° ~ ±999.999° ("+" : clockwise; "-" : anti clockwise)
SPEED:	Rotation rate Range: 1% ~ 100%
LOOP:	Repeating frequency Range: 1 ~ 999 Times

(2) Operation code 2 – Equal division

OP:	CUT
ANGLE:	The degree supposed to be equally divided Range: 0.000° ~ ±999.999° ("+" : clockwise; "-" : anti clockwise)
SPEED:	Rotation rate Range: 1% ~ 100%
LOOP:	Equal dividing times Range: 1 ~ 999 Times

(3) Operation code 3 – Return to the Machine zero position

OP:	HOE
ANGLE:	NA
SPEED:	Rotation rate Range: 1% ~ 100%
LOOP:	NA

(4) Operation code 4 – Call sub program

OP:	CALL
ANGLE:	NA
SPEED:	The step which we would like to call Range: 1 st ~ 99
LOOP:	Repeating frequency Range: 1 st ~ 999 Times

(5) Operation code 5 – Return from sub program

OP:	RET
ANGLE:	NA
SPEED:	NA
LOOP:	NA

(6) Operation code 6 - Set/reset output signal

OP:	OUT
ANGLE:	NA
SPEED:	NA
LOOP:	Set 1 or 0 to decide output signal is ON or OFF (The code is effective only if the PARAMETER 18 is set to be 1.)

(7) Operation code 7 – Pulse output signal

OP:	OUT
ANGLE:	NA
SPEED:	NA
LOOP:	Time interval to set output Range: 1 ~ 999 Times Once the operation code is set, the output signal will be switched from "ON" to "OFF" after the set seconds. (The code is effective only if the PARAMETER 18 is set to be 1.)

(8) Operation code 8 – Waiting time

OP:	HOD
ANGLE:	NA
SPEED:	NA
LOOP:	Waiting time Range: 0.1 ~ 99.9 sec.

(9) Operation code 9 – Finish the main program

OP:	END
ANGLE:	NA
SPEED:	NA
LOOP:	NA

(When the operation code is executed, the program will go back to the 1st step)

(10) Operation code 10 – Jump between programs

OP:	JUP
ANGLE:	NA
SPEED:	The program No. which you are going to jump to Range: 1 st ~ 50th
LOOP:	the step No. of the program No. which you are going to jump to Range: 1 st ~ 90th

(After finish the program/step which we jump to, it will go back to the 1st step of the main program)

(11) Operation code 11 – Under the automatic execution, the code can stop execution and make it wait for next command

OP:	HALT
ANGLE:	NA
SPEED:	NA
LOOP:	NA

(Under the automatic execution, you can use the code to stop the program at a certain step.)

(12) Operation code 12 – Set the relative zero position

OP:	SET
ANGLE:	NA
SPEED:	NA
LOOP:	NA

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