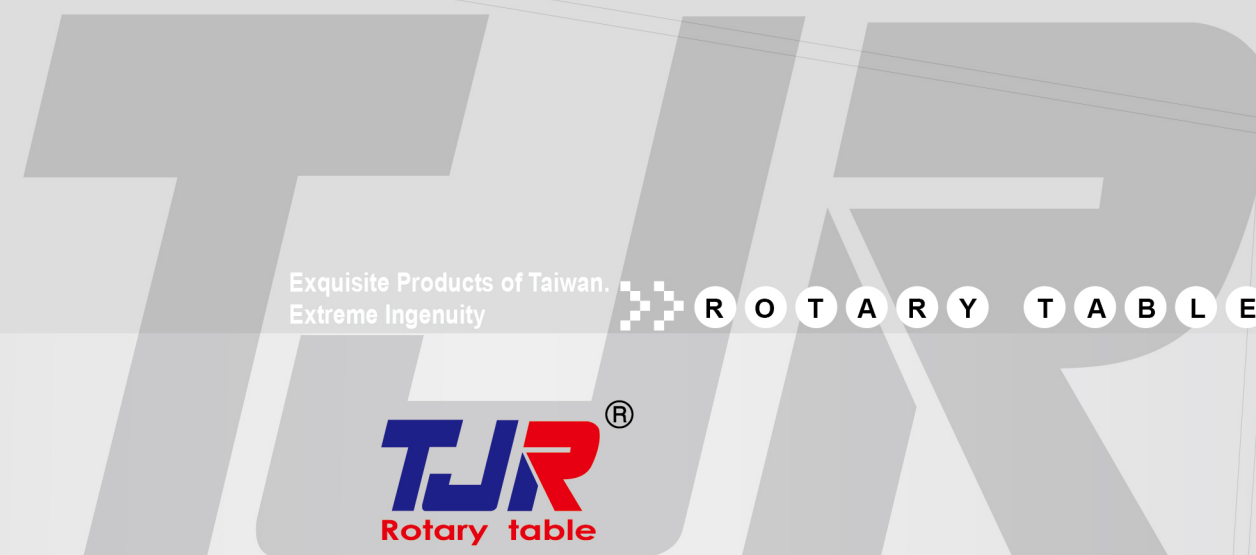
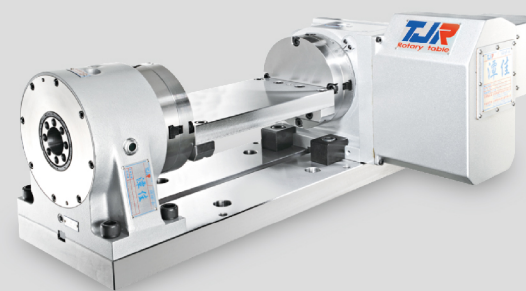
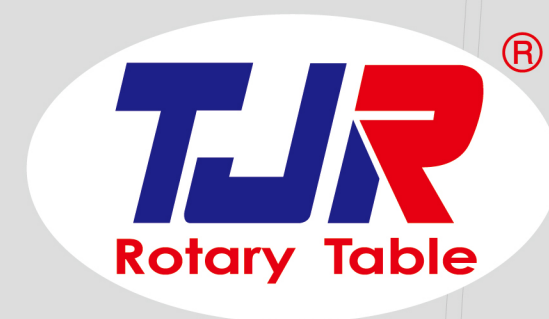




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TJR APP



We Chat



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Redefine "RIGIDITY"

Larger Through Hole → Bigger Bearing
Bigger Bearing → Higher Rigidity

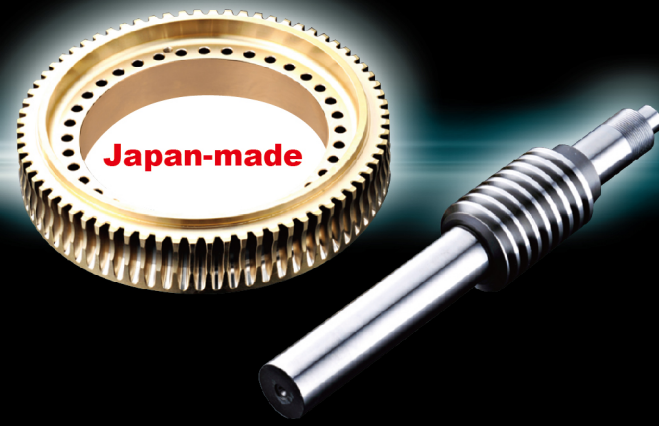


Large diameter

Devised by German

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

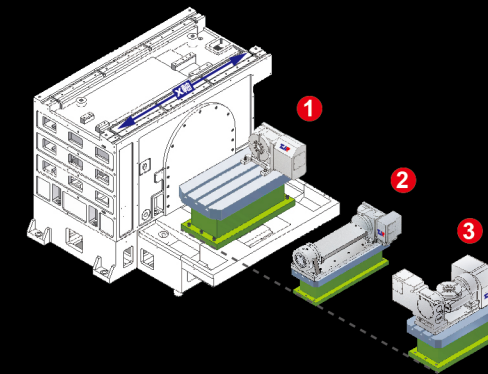
Truly great value for money



Made in Japan

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

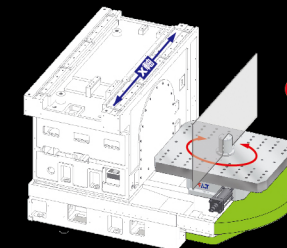
This is the only way to lead the trend.



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

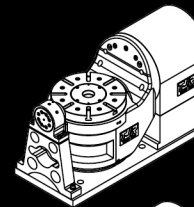
Only TJR large-diameter radial & axial bearing can deliver enough rigidity to well support tilt axis of single-arm type dual axis rotary table.

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

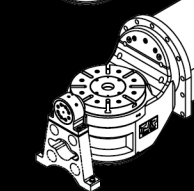
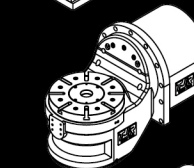
Features :
• Less interruption
• Clear at a glance no matter how the table tilts



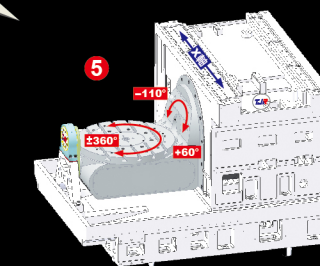
► FAD-300iwj-30D single-arm type (with base plate) for vertical machining center



► 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

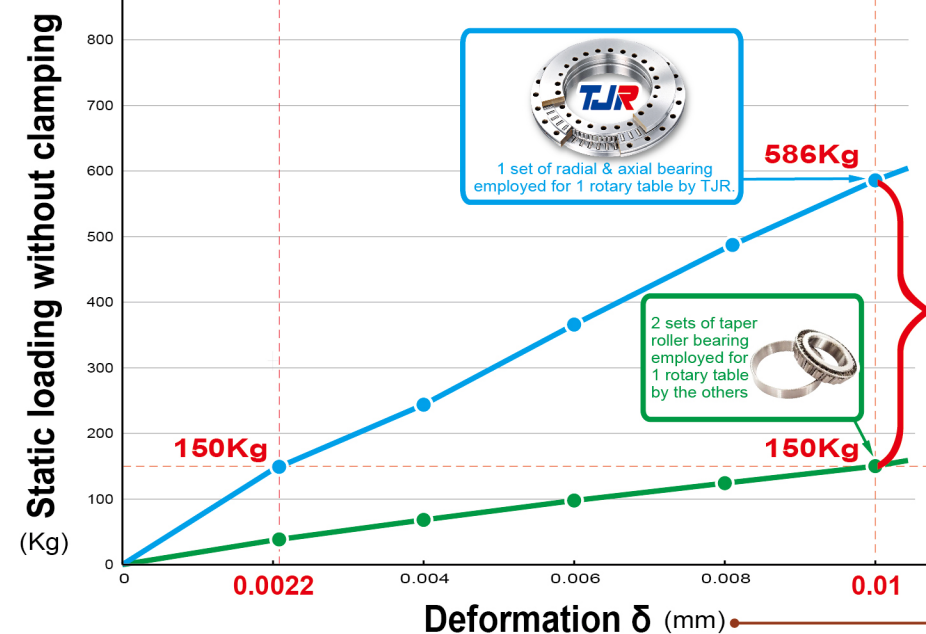


► FHR-630SN single-arm type

As below

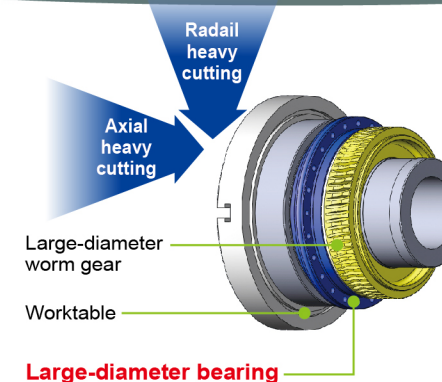
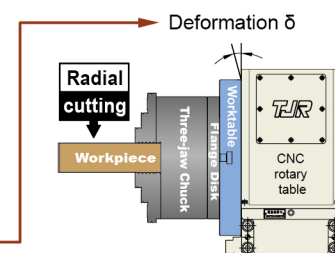
Rigidity comparison between radial & axial bearing and taper roller bearing

Take Ø255mm Rotary Table as an example



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

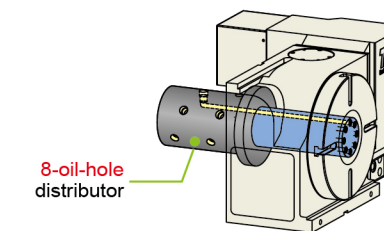
3.9 times better



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.

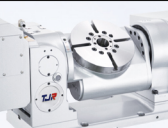


Endurable finish, shining with pearlescent and silver

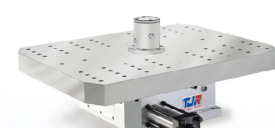
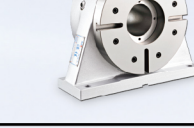
High performance braking system

TJR	Others
Encircling brake	Disc brake
1) Clamping range is bigger	1) Clamping range is smaller
2) Encircling brake mechanism is tightly placed on the worktable and thus provides high rigidity	2) Disc brake mechanism is far from the worktable; therefore, it causes run-out of table and low rigidity
So it is suitable for heavy duty cutting	Available for light cutting only
Hydraulic Clamping Force	Fully Peripheral Hydraulic Brake
Drawing of encircling clamping mechanism	

Page index

Description	Model code	Page
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Instruction	How to choose a suitable TJR rotary table	5~6
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CNC Tilting Rotary Tables (Single-arm type) Min. indexing angle – 0.001°	 FHR series: Hydraulic brake FHR-630S/630SN/630SM FHR-400S FHR-650S-525/650S-550	31~34

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Description	Model code	Page
Non-CNC Hydraulic index tables with hirth coupling	 HC series: Hirth coupling hydraulic brake Fixed angle / Equal-parts HC-255A、HC-320A、HHC-500 (Index numbers: 2, 4, 8, 12, 24 indexes)	35
Flat type APC for 3-axis-moving-column vertical machining center	 CHC series: Flat type auto pallet changer (180° to and fro) CHC-700 x 910 CHC-700 x 1090	36
Single pallet rotary table for horizontal machine	 HHI series: Hirth coupling hydraulic brake(1° or 5°) HHI-320/400/500/630/800 HHR series: Hydraulic brake(0.001°) HHR-400/500	37~38
Hook type APC for vertical machining center	 CTU series: Hook type auto pallet changer (180° to and fro) CTU-400 x 600 CTU-500 x 700	39~40
Tray type APC and dual pallets rotary table for horizontal machining center	 CHI series: Hirth coupling hydraulic brake CHI-400/500/630L (1° or 5°) CHR series: Hydraulic brake CHR-400/500/630L (0.001°) CTH series: Tray type auto pallet changer CTH-400/500/630L (180° to and fro)	41~46
Rotary tailstock	 RTA series: Pneumatic brake RTA-125/170/210/250 RTH series: Hydraulic brake RTH-210/255/320/400A	47
Manual tailstock	 TJ series: Fixed Taper TJ-125~400 TTJ series: Replaceable Taper TTJ-125~400	48
Manual tailstock with Pneumatic / Hydraulic Switching valve	 TJ series: Fixed Taper TJ-125~400 TTJ series: Replaceable Taper TTJ-125~400	
CNC Multi spindle Rotary Tables Min indexing angle – 0.001°	 AR multi spindle series: Pneumatic brake (2W : 2-wheel coupled) AR-125-2W/170-2W/210-2W (3W : 3-wheel coupled) AR-125-3W/170-3W/210-3W (4W : 4-wheel coupled) AR-125-4W	49~50
Rotary table accessories / Accuracy Inspection report: Geometric precision test/ indexing precision test		51~57
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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 :

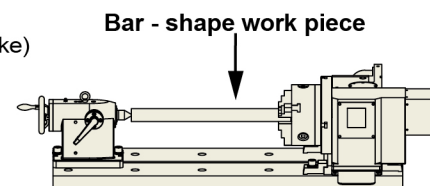
First, verify whether the selected rotary table interferes when it is placed on the work table of the machining center. With the Y axis of the vertical machining center moved to the origin, please measure

- 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]

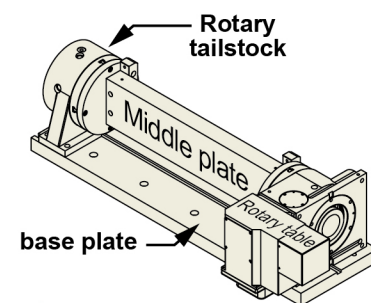
If the "B" distance is less than the "A" distance, it is certain that the rotary table will not collide with the sheet metal of the slide door. [Ex: 420mm < 450mm; thus it's ok to select HR255-R] If not, please change to sheet metal cover reduction version of TJR rotary table. [Ex: only 346mm in HR255-N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

6 Verify the available room for placing the workpiece :

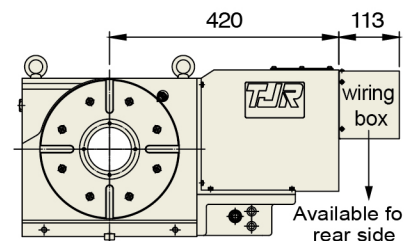
Please measure the length of working table of the machine to verify that it is not 200 mm smaller than base plate. It is the **maximal allowed protrusion** for the base plate of all models to stand out by **100mm** on each side of the working table. For example: Assuming the length of working table of 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).



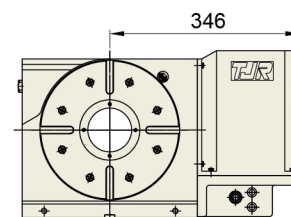
▲ Drawing ①



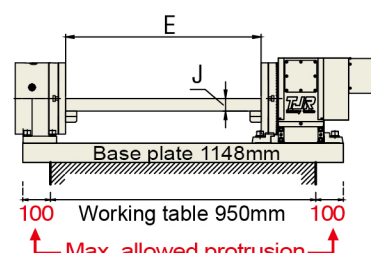
▲ Drawing ②



▲ Drawing ③ : HR-255R



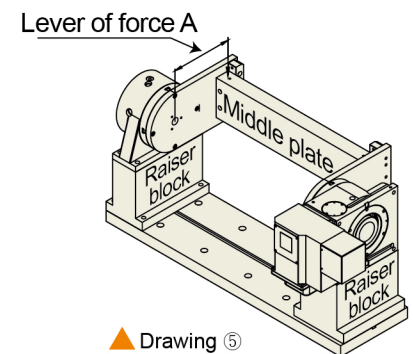
▲ Drawing ③-1 : HR-255N



▲ 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.



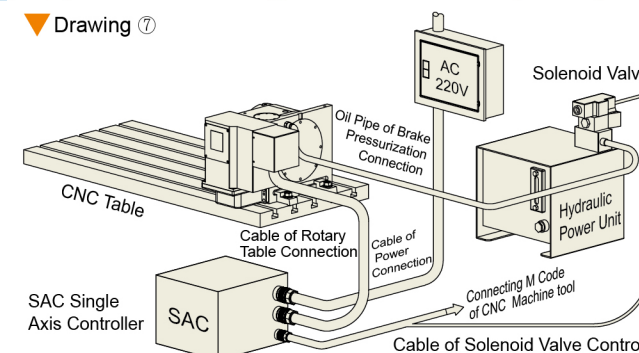
▲ Drawing ⑤

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)

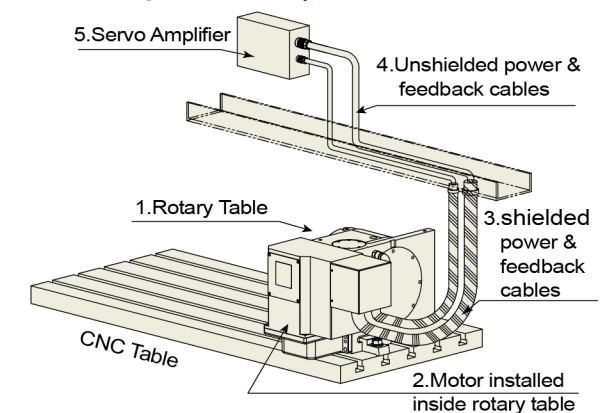
- (A) If the machine comes with those reserved interfaces for the fourth axis, there is no problem at all to retrofit the fourth axis of the same system for **four-axes simultaneous contouring**.
 (B) If the machine does not come with those reserved interfaces for the fourth axis, the **single-axis controller (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.

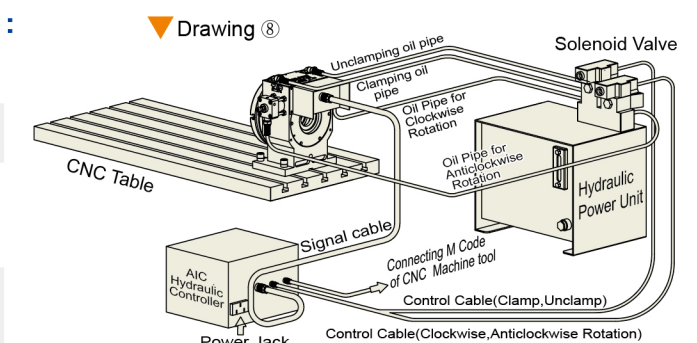
▼ Drawing ⑥ 5 main components of the 4th axis



10 Application of AIC hydraulic controller :

It is not suitable for CNC rotary table, but for HC series hydraulic index table only

Strength:	- Indexing accuracy ± 5 seconds, - Lower cost due to no numerical control system
Weakness:	- 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



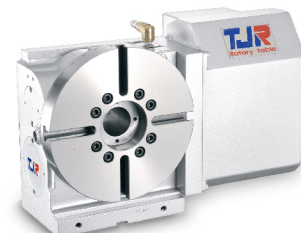
Use radial & axial bearings



▲ AR-170R



▲ AR-210R



▲ AR-250R

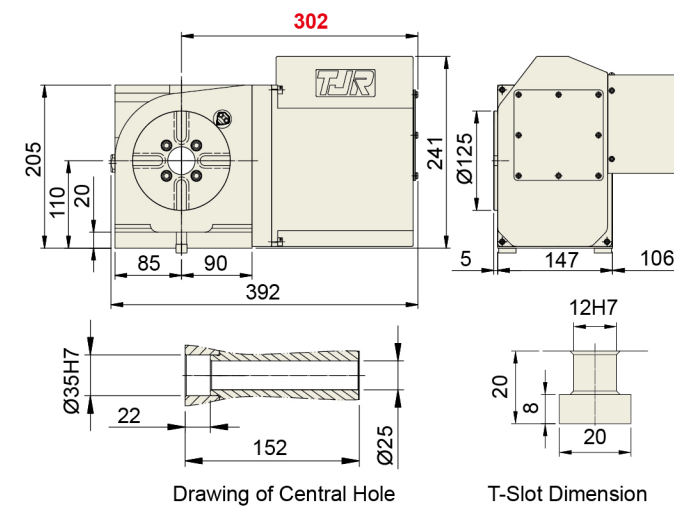


▲ AR-255H

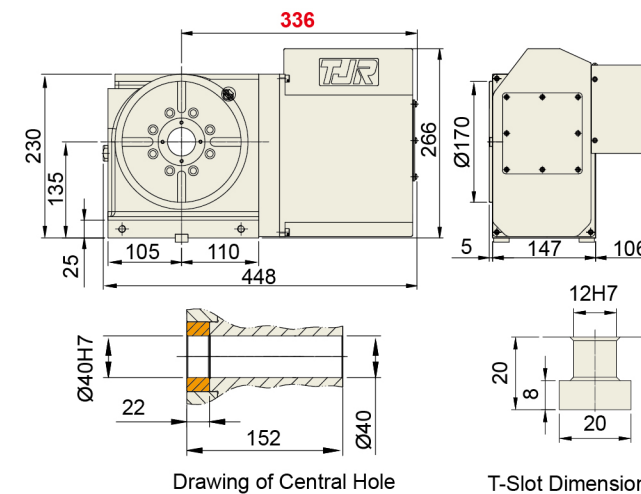
The Standard of Precision Test: Japan JIS

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

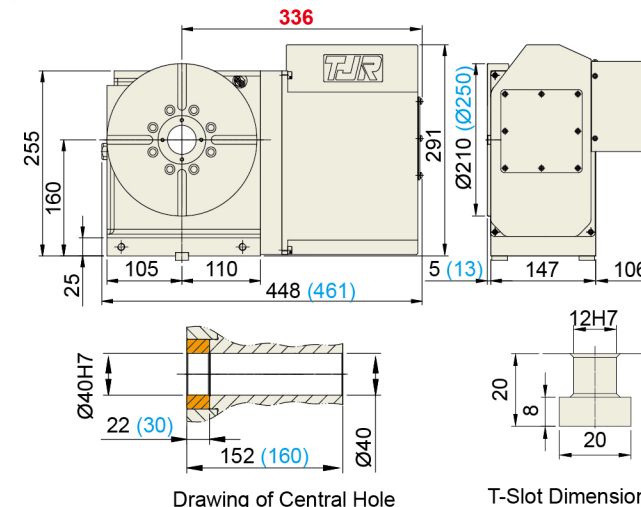
Item / Model		Unit	AR-125R	AR-170R	AR-210R/AR-250R	AR-255H
Table Diameter		mm	Ø 125	Ø 170	Ø 210 / Ø 250	Ø255
Diameter of Table Central Hole		mm	Ø 35H7	Ø 67	Ø 67	Ø110
Inner Diameter of Mandrel Sleeve		mm	-	Ø 40H7	Ø 40H7	Ø80H7
Diameter of Center Through Hole		mm	Ø 25	Ø 40	Ø 40	Ø80
Center Height (Vertical)		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)

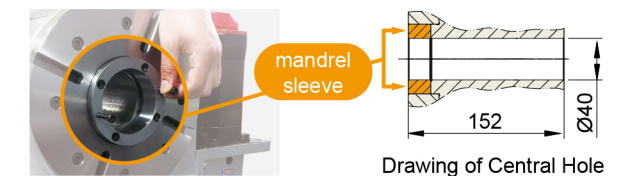
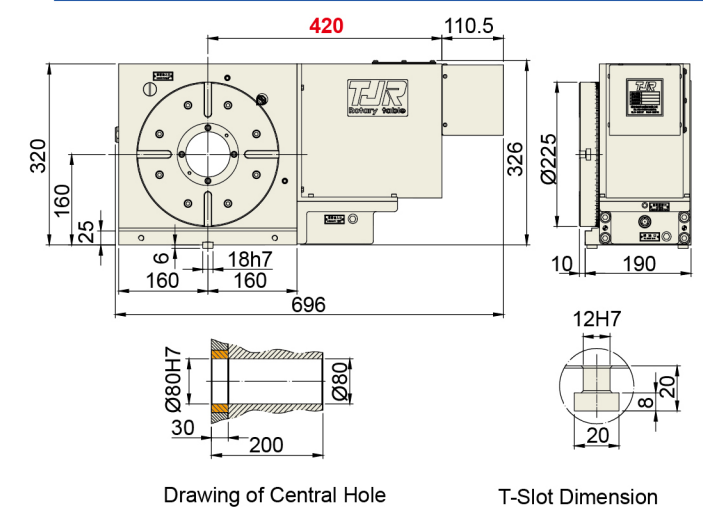
N: Right Side Motor with Sheet Metal Cover Reduction (Only for Vertical Application)

C: Dual-axis Cradle Type

S: Dual-axis Single-arm Type

 A: 2nd generation

Table Diameter

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°)

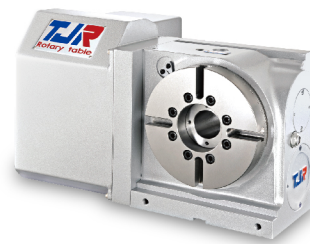
AR Series

 (**Powerful Pneumatic Brake**)-

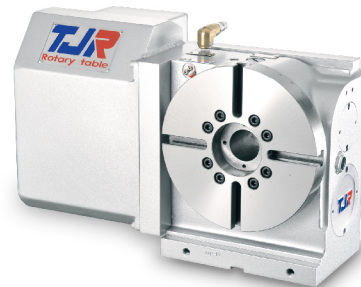
Left Side Motor

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


▲ AR-125L


 Use **radial & axial bearings**


▲ AR-170L



▲ AR-210L

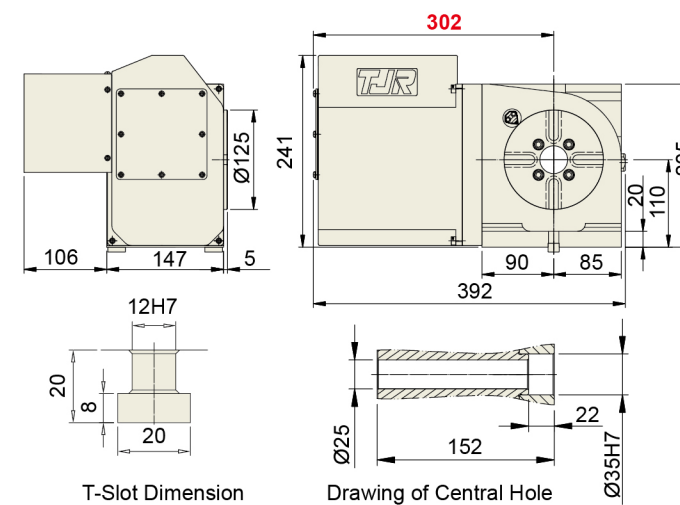
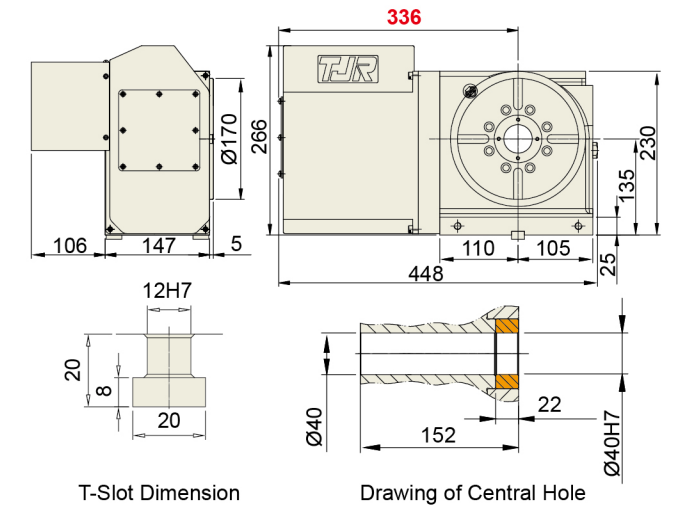
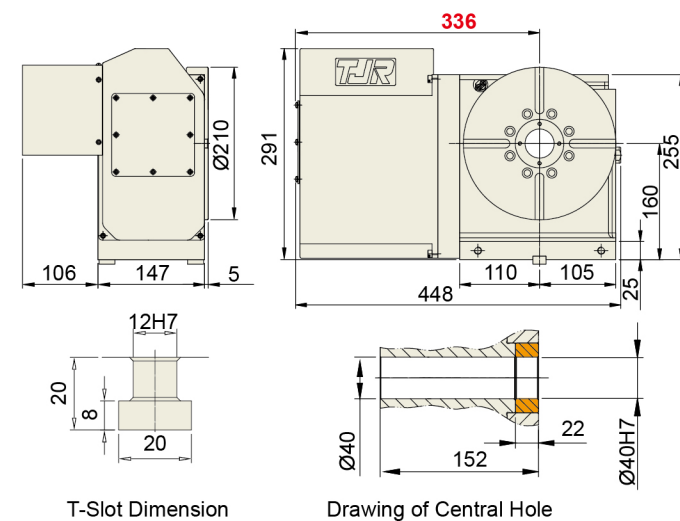
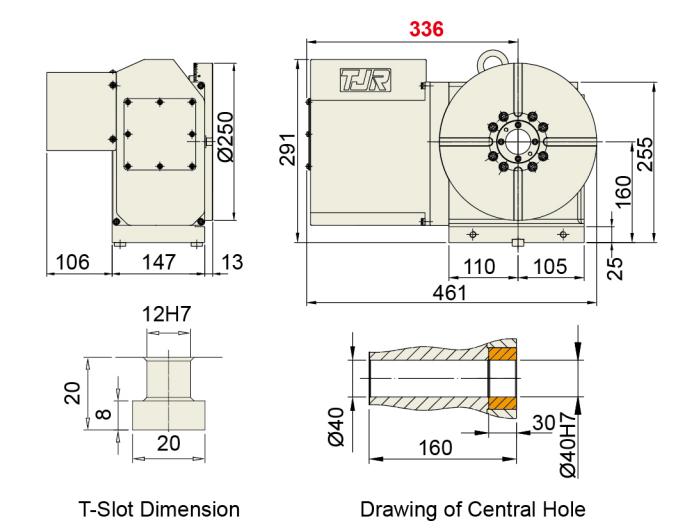


▲ AR-250L

The Standard of Precision Test: Japan JIS

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

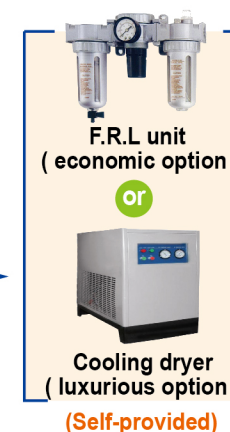
Item / Model		Unit	AR-125L	AR-170L	AR-210L	AR-250L
Table Diameter		mm	Ø 125	Ø 170	Ø 210	Ø 250
Diameter of Table Central Hole		mm	Ø 35H7	Ø 67	Ø 67	Ø 67
Inner Diameter of Mandrel Sleeve		mm	-	Ø 40H7	Ø 40H7	Ø 40H7
Diameter of Center Through Hole		mm	Ø 25	Ø 40	Ø 40	Ø 40
Center Height (Vertical)		mm	110	135	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



Solenoid valve (inside of rotary table)

scenario 1

Solenoid valve (inside of rotary table)

scenario 2

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.

Simultaneously brake for rotary table and tailstock

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)

 Use **radial & axial bearings**

 Picture of Power
 and Feedback
 Cable Connectors

 (Back Side Motor type
 can not be equipped
 with angle encoder)

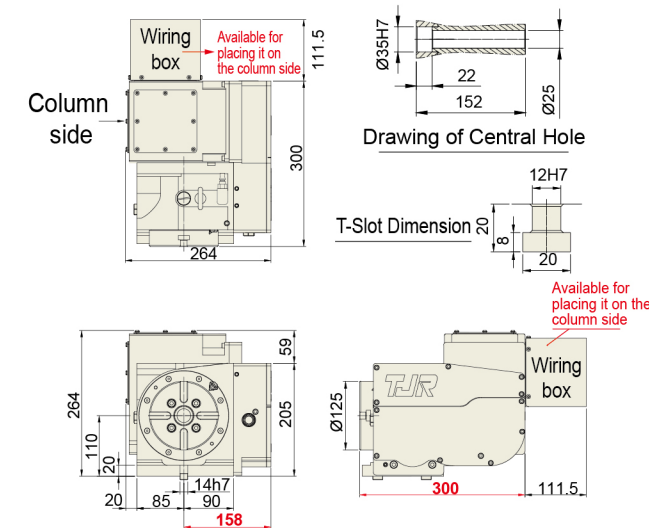
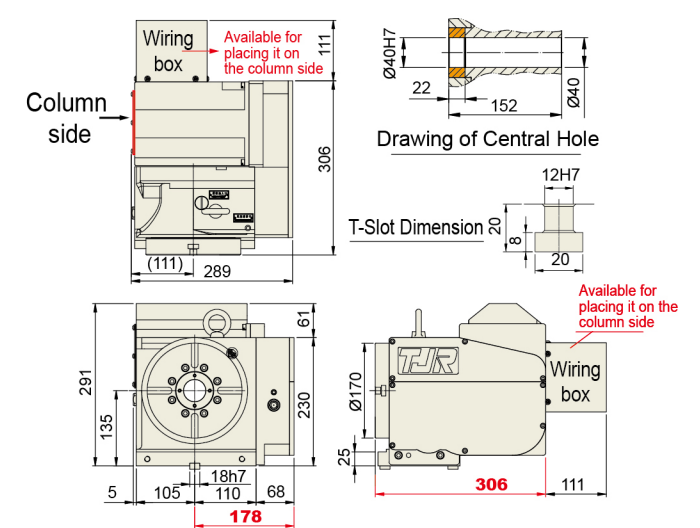
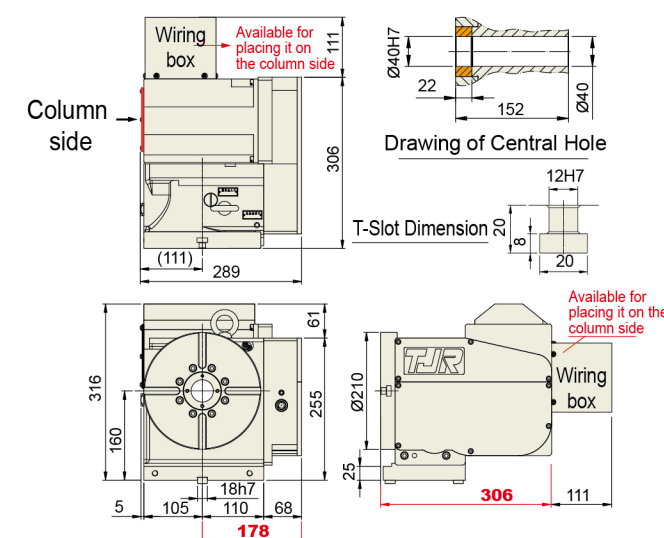
AR-170B
 (Back Side Motor)

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	75
	with Tailstock	kg	100	150	150	150
	Horizontal	kg	-	-	-	-
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	-	60	65	72

NEW Powerful Brake System
AR-125B (For Vertical Application)

NEW Powerful Brake System
AR-170B (For Vertical Application) **HR-170B** (Hydraulic Brake)

NEW Powerful Brake System
AR-210B (For Vertical Application) **HR-210B** (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

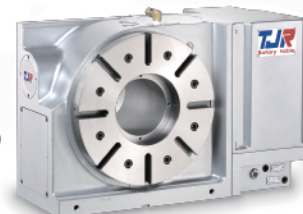
3
FEATURES



- 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

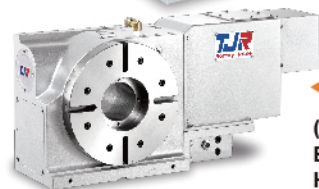
HR-255N

(Reduced Sheet Metal Cover for Vertical Application)



HR-255R

(Sheet Metal Cover for Both Vertical and Horizontal Applications)



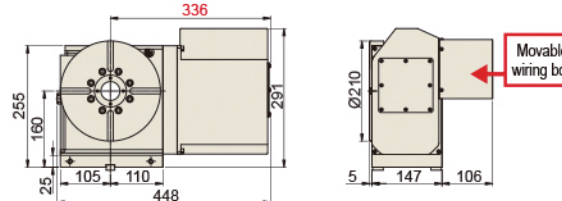
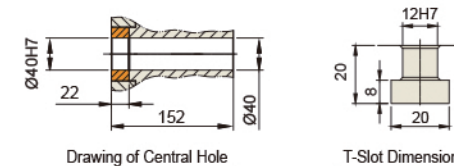
HR-320N

(Reduced Sheet Metal Cover for Vertical Application)

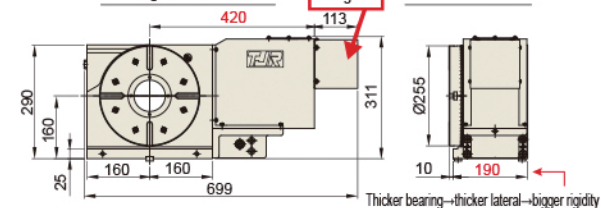
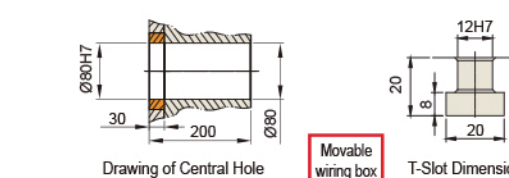
The Standard of Precision Test: Japan JIS

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)
	MITSUBISHI	-	HF-54/104 (Taper shaft)	HF-104/154 (Taper 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
	with Tailstock	kg	150	250	350
	Horizontal	kg	150	250	350
Allowable Load (with Rotary Table Clamping)	F	kgf	1450	2000	3000
	FxL	kgf.m	100	112	300
	FxL	kgf.m	35	70	200
Strength of worm gears	kg.m	18	55	80	170
Net Weight (servo motor excluded)	kg	55	109	204	286

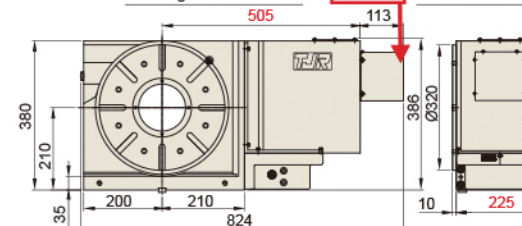
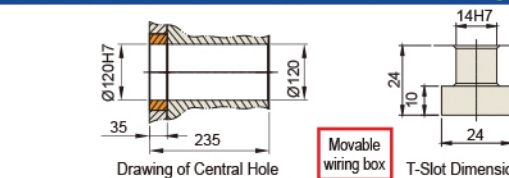
HR-210R



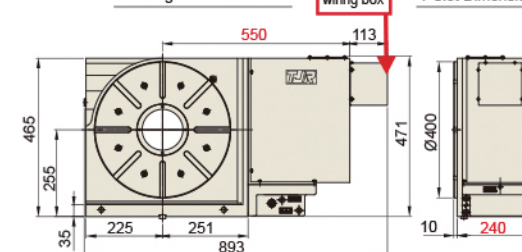
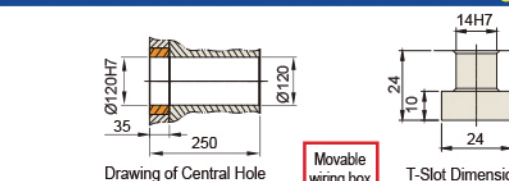
HR-255R



HR-320R

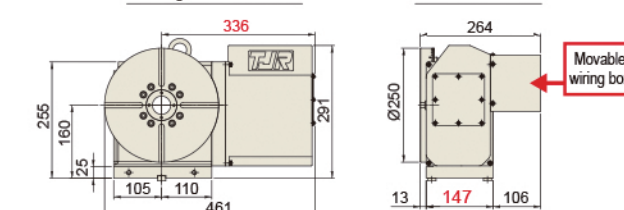
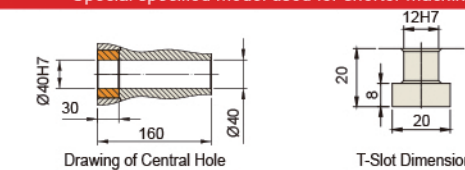


HR-400R

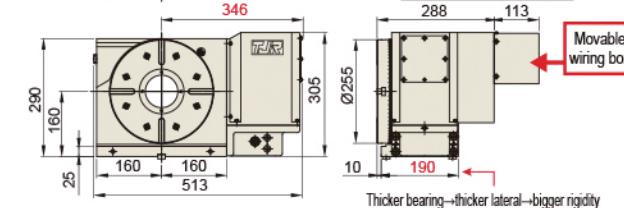
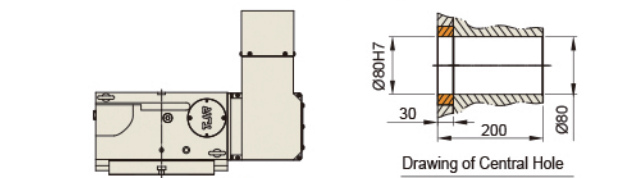


HR-250R

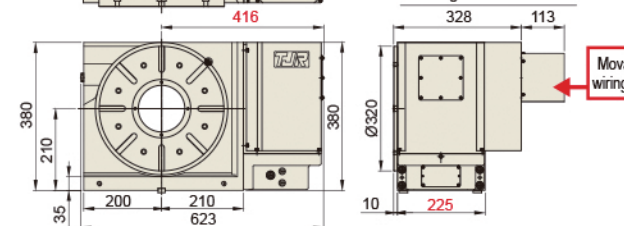
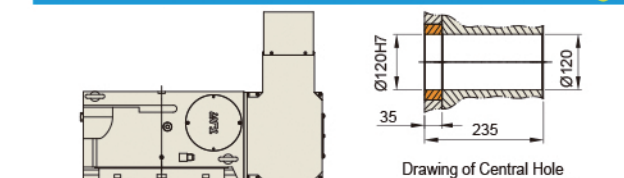
Special specified model used for shorter machine



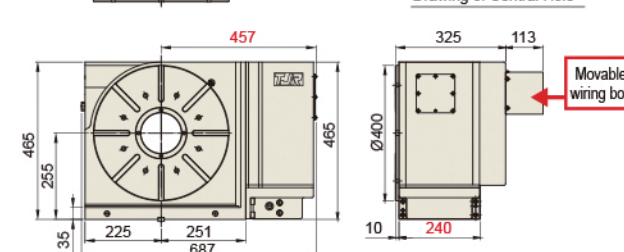
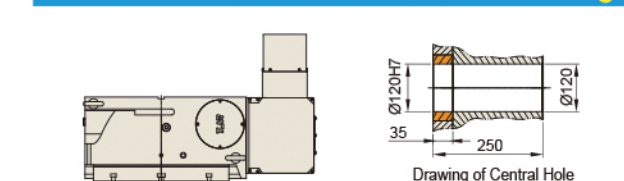
HR-255N (Sheet Metal Cover Reduction)



HR-320N (Sheet Metal Cover Reduction)



HR-400N (Sheet Metal Cover Reduction)

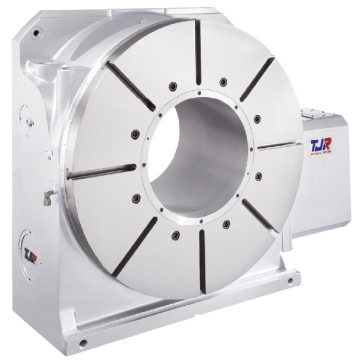


CNC Rotary Tables
 (Min indexing angle – 0.001°)

HR Series

(Hydraulic Brake)

HR-500R/630R/800R


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

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

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

The Standard of Precision Test: Japan JIS

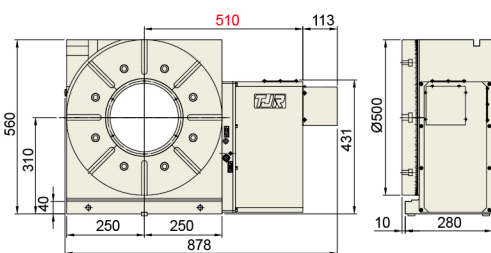
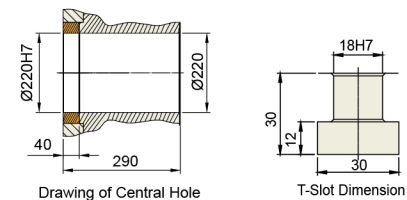
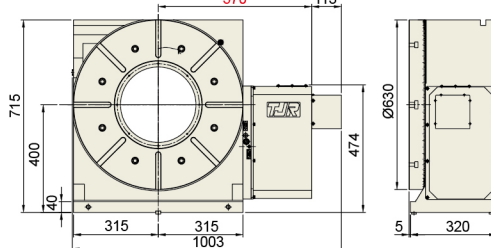
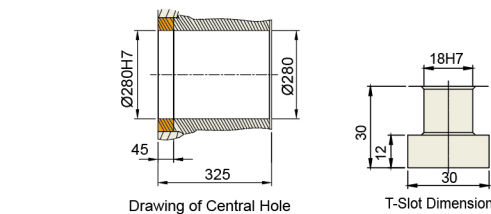
Item / Model	Unit	HR-500R	HR-630R	HR-800R
Table Diameter	mm	Ø 500	Ø 630	Ø 800
Diameter of Table Central Hole	mm	Ø 250	Ø 325	Ø 395
Inner Diameter of Mandrel Sleeve	mm	Ø 220H7	Ø 280H7	Ø 350H7
Diameter of Center Through Hole	mm	Ø 220 Big Bore	Ø 280 Big Bore	Ø 350 Big Bore
Center Height (Vertical)	mm	310	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
	MITSUBISHI	Direct Shaft without Key	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
	with Tailstock 	kg	600	800
Allowable Load (with Rotary Table Clamping)	Horizontal 	kg	600	800
	F 	kgf	4000	5000
	FxL 	kgf.m	500	850
Strength of worm gears	FxL 	kgf.m	370	800
	kg.m	250	420	800
Net Weight (servo motor excluded)	kg	405	692	-



- 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.)



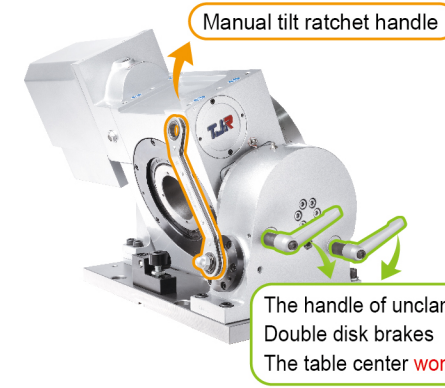
HR-500R and HR-630R specialize in lifting heavy load, and thus suit with double column machining center.

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

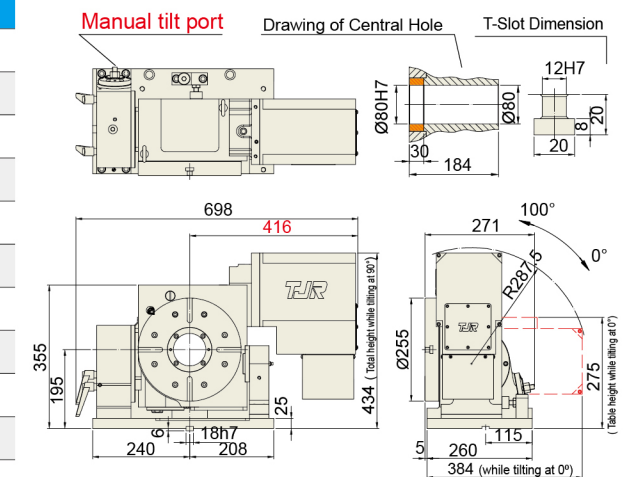
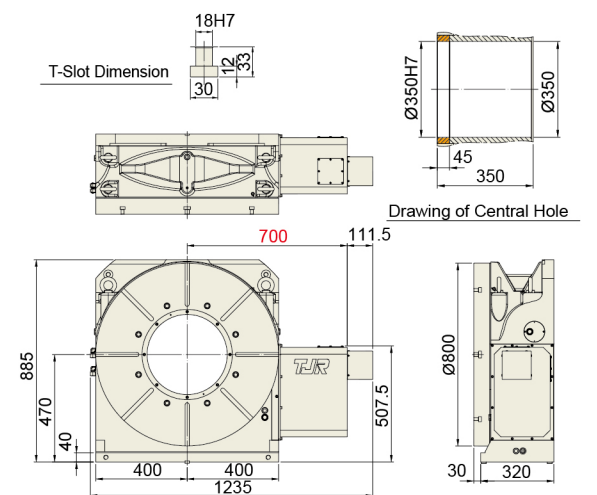
The Standard of Precision Test: Japan JIS

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)
	MITSUBISHI	Taper shaft	HF-104 / HF-154
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
	FxL 	kgf.m	70
Strength of worm gears (Rotary axis)	kg.m	55	
Net Weight (servo motor excluded)	kg	145	



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

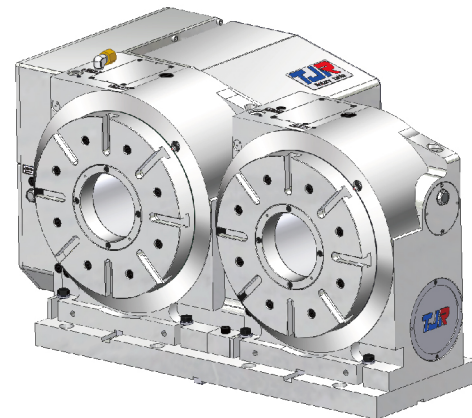
The handle of unclamping / clamping tilt axis.
Double disk brakes
The table center **won't shift** while clamping the tilt axis.

MTHR-255(Manual tilt)

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


CNC Rotary Tables
 (Min indexing angle – 0.001°)

HR Series (Hydraulic Brake - Back Side Motor)

HR-320B/320B-2W


 Use **radial & axial bearings**


▲ HR-320B (Back Side Motor)

▲ HR-320B-2W (Back Side Motor / 2-wheel coupled)

The Standard of Precision Test: Japan JIS

Item / Model		Unit	HR-320B	HR-320B-2W
Table Diameter		mm	Ø 320	Ø 320
Diameter of Table Central Hole		mm	Ø 150	Ø 150
Inner Diameter of Mandrel Sleeve		mm	Ø 120H7	Ø 120H7
Diameter of Center Through Hole		mm	Ø 220*217 Big Bore	Ø 120*217 Big Bore
Center Height (Vertical)		mm	255	270
Table Height (Horizontal)		mm	—	—
Minimum distance between table centers		mm	—	400
Table T-slot Width		mm	14H7	14H7
Guide Block Width		mm	18h7	18h7
Min. Increment		deg.	0	0
Indexing Precision		sec.	15	15
Repeatability		sec.	4	4
Clamping System (Hydraulic)		kg/cm ²	35	35
Clamping Torque		kg-m	115	115
Servo Motor Model	FANUC	Direct Shaft without Key	α12i / β22is	α12i / β22is
	MITSUBISHI	Direct Shaft without Key	HF- 204	HF- 204
Speed Reduction Ratio		—	1 : 120	1 : 120
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	25	25
Allowable Inertia Load Capacity (Horizontal)		kg.cm.sec ²	—	—
Allowable Workpiece Load	Vertical 	kg	50	50
	with Tailstock 	kg	100	100
	Horizontal 	kg	—	—
Allowable Load (with Rotary Table Clamping)	F 	kgf	150	150
	FxL 	kgf.m	350	350
	FxL 	kgf.m	3000	3000
Strength of worm gears 		kgf.m	115	115
Net Weight (servo motor excluded)		kg	—	—

CNC Rotary Tables
 (Min indexing angle – 0.001°)

HR Series (Embedded type)

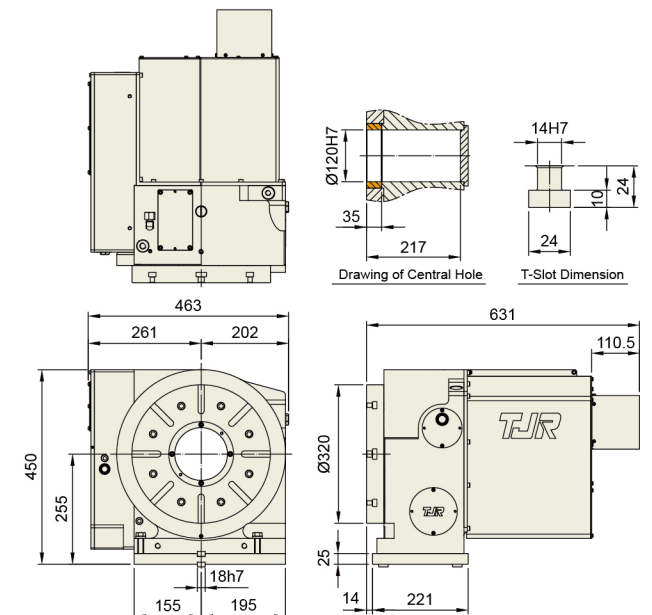
iHHR-400


 Use **radial & axial bearings**

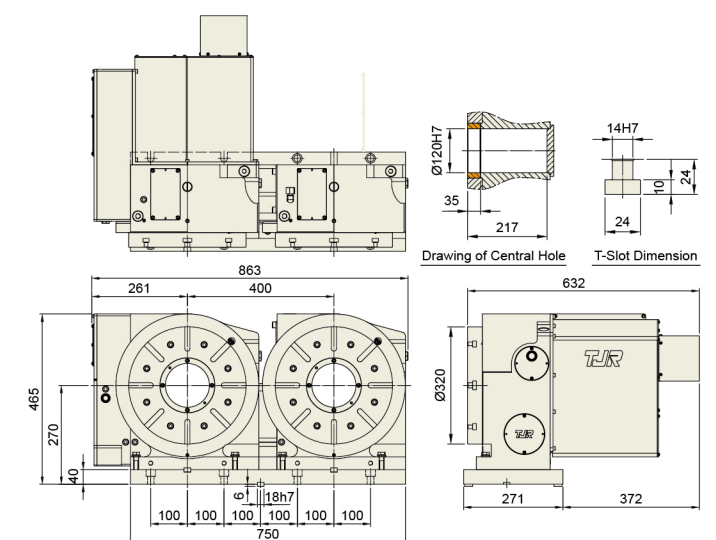

▲ iHHR-400

Item / Model		Unit	iHHR- 400
Table Diameter		mm	Ø 400
Diameter of Table Central Hole		mm	—
Inner Diameter of Mandrel Sleeve		mm	—
Diameter of Center Through Hole		mm	—
Center Height (Vertical)		mm	—
Table Height (Horizontal)		mm	—
Minimum distance between table centers		mm	—
Table T-slot Width		mm	14H7
Guide Block Width		mm	—
Min. Increment		deg.	0
Indexing Precision		sec.	15
Repeatability		sec.	4
Clamping System (Hydraulic)		kg/cm ²	35
Clamping Torque		kg-m	200
Servo Motor Model	FANUC	—	α12i / β22is (Straight)
	MITSUBISHI	Taper shaft	HF-204 (Straight)
Speed Reduction Ratio		—	1 : 150
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	20
Allowable Inertia Load Capacity (Horizontal)		kg.cm.sec ²	100
Allowable Workpiece Load	Vertical 	kg	—
	with Tailstock 	kg	—
	Horizontal 	kg	500
Allowable Load (with Rotary Table Clamping)	F 	kgf	4000
	FxL 	kgf.m	400
	FxL 	kgf.m	200
Strength of worm gears 		kgf.m	170
Net Weight (servo motor excluded)		kg	—

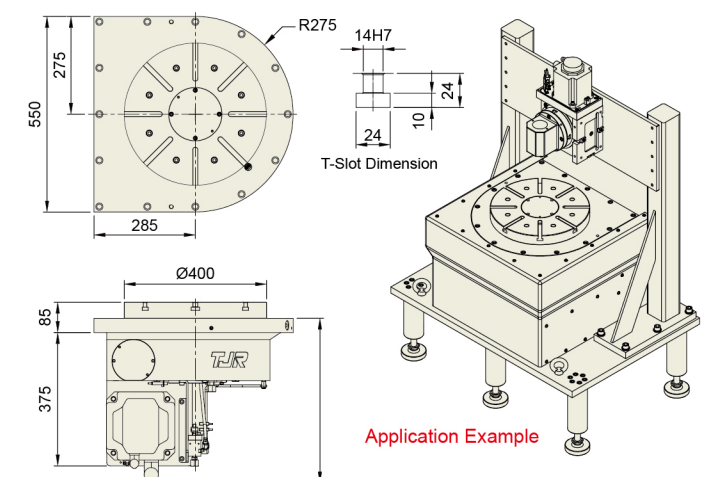
HR-320B(Back Side Motor)



HR-320B-2W(Back side motor / 2-wheel coupled)



iHHR-400(Embedded type)

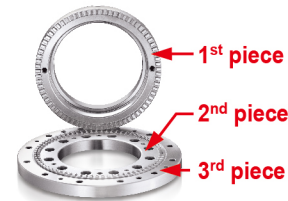


CNC Index Tables
Min. indexing angle – 1° or 5°

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

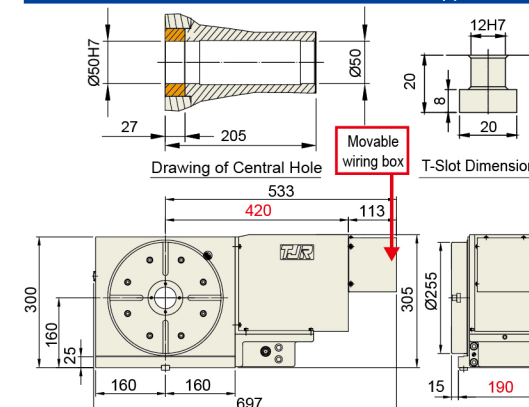


▲ HI-500

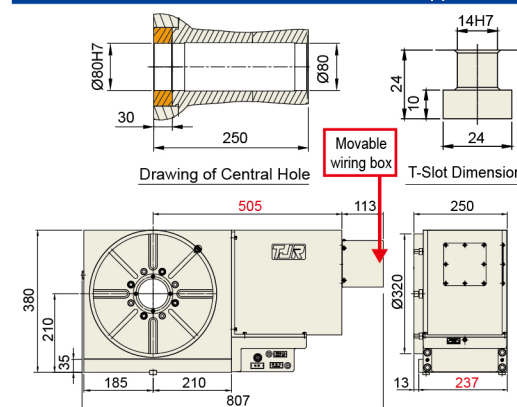
The Standard of Precision Test: Japan JIS

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
	FxL	kgf.m	175	250	300	600
	FxL	kgf.m	300	400	500	1000
Net Weight (servo motor excluded)		kg	120	210	320	410

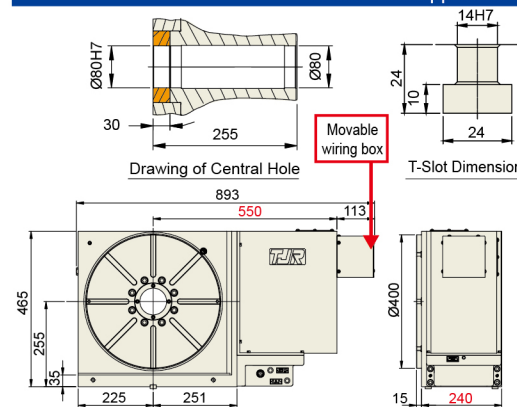
HI-255R (For Both Vertical and Horizontal Applications)



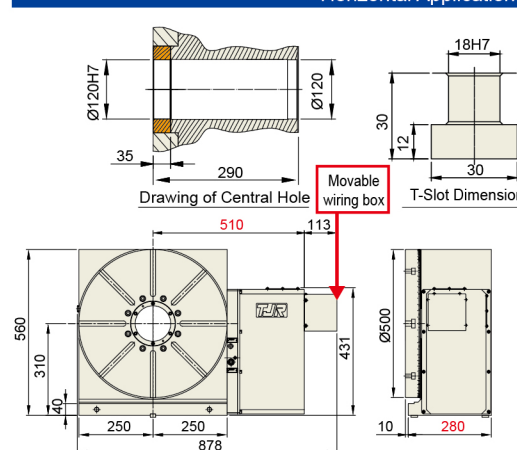
HI-320R (For Both Vertical and Horizontal Applications)



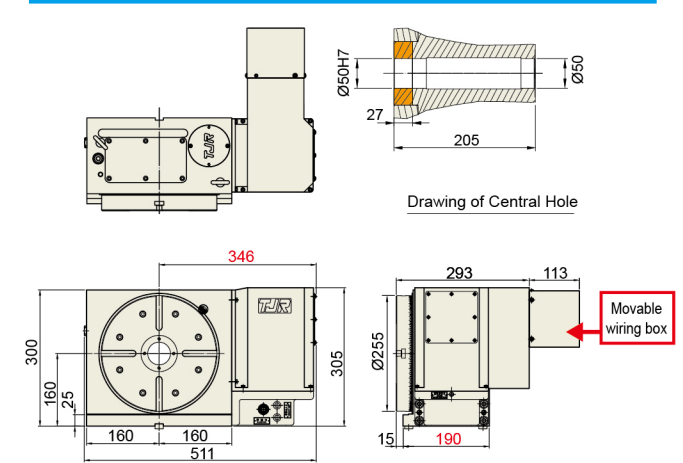
HI-400R (For Both Vertical and Horizontal Applications)



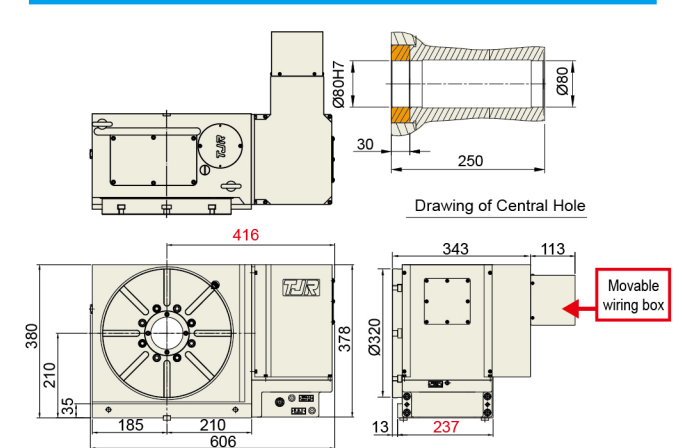
HI-500R (For Both Vertical and Horizontal Applications)



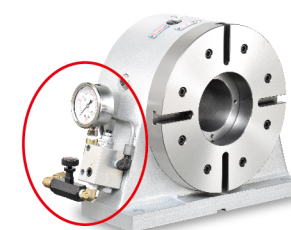
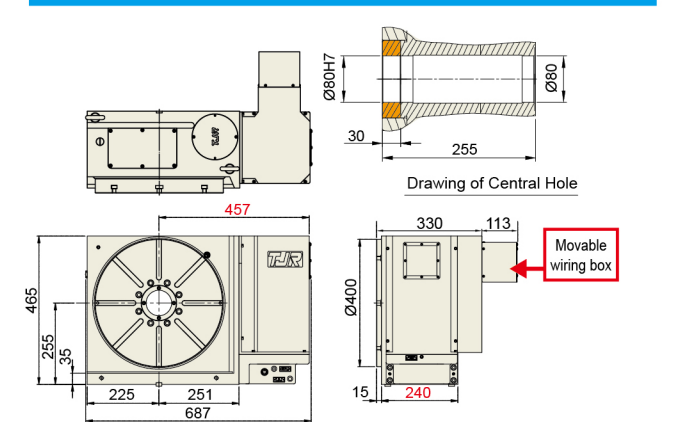
HI-255N (Sheet Metal Cover Reduction)



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.

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

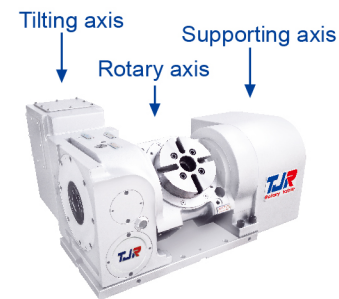
3
FEATURES



1 Both the tilting axis and rotary axis use radial & axial bearings.

2 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.)

3 A hydraulic brake for tilting axis is optional.



▲ FAR-170A (compact type)

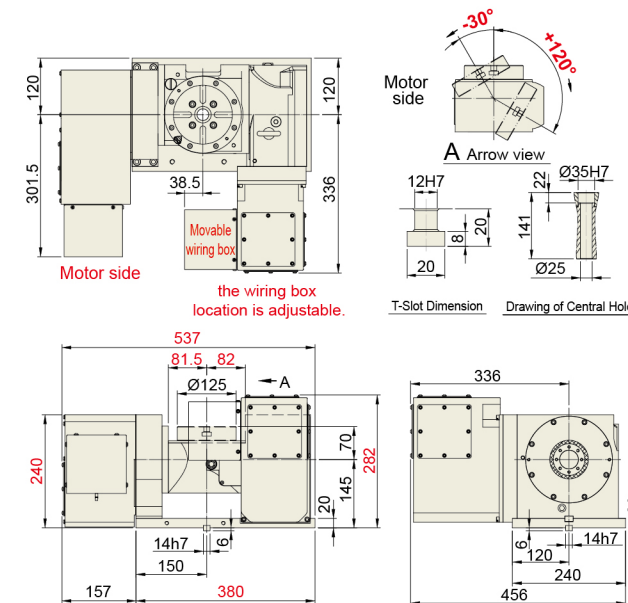


▲ FAR-170

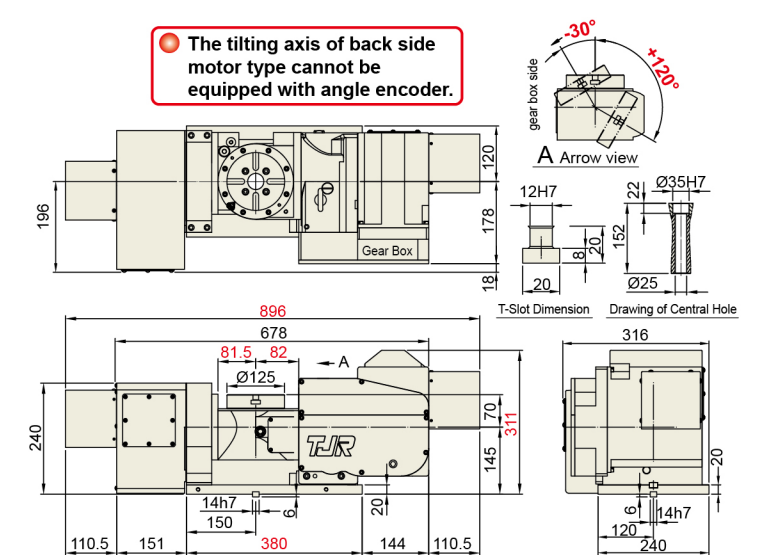


▲ Workpiece sample –
5 axis simultaneous
contouring

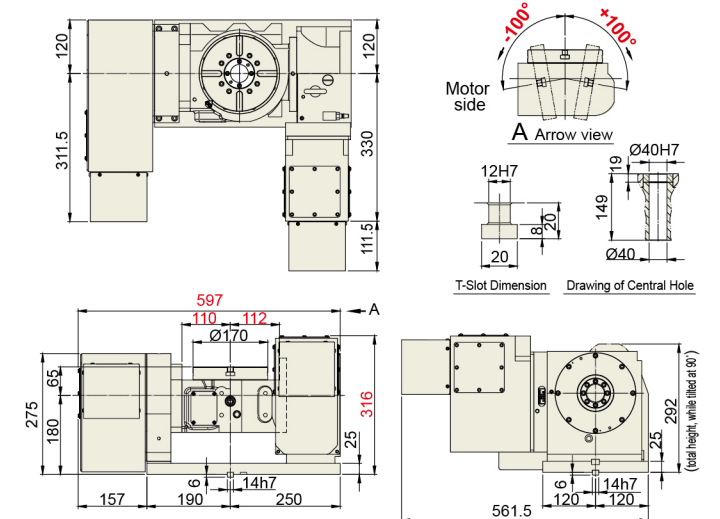
FAR-125 (Standard type)



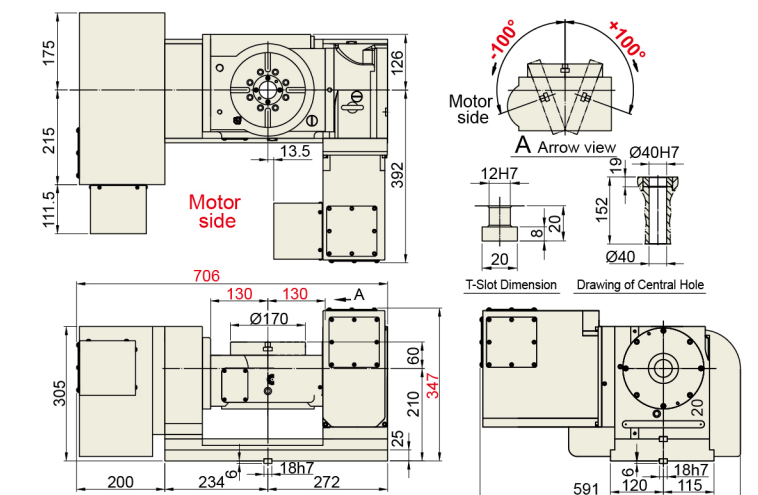
FAR-125B (Back side motor type)



FAR-170A (compact type)



FAR-170 (Standard type)



▲ FAR-125

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	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.	40	50 (30, if ECN-225 angle encoder is employed)	20	50 (30, if ECN-225 angle encoder is employed)	20	50 (Angle encoder can not be employed)
Repeatability		sec.	4	8	4	8	4	8
Clamping System (Pneumatic)		kg/cm ²	5	6	6	6	6	6
Clamping Torque		kg-m	13	31	31	31	31	31
Servo Motor Model	FANUC	Taper/Straight shaft	$\alpha 2i$ / $\beta 4is$	$\alpha 4i$ / $\beta 8is$	$\alpha 2i$ / $\alpha 4is$ / $\beta 4is$	$\alpha 4i$ / $\beta 8is$	$\alpha 4i$ / $\beta 8is$	$\alpha 8i$ / $\alpha 12is$ / $\beta 12is$
	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 : 72	1 : 120	1 : 90	1 : 90
Max. Rotation Rate of Table (Calculate with Fanuc or Motor)		r.p.m	83.3	44.4	41.6	25	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	

※ 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.

CNC Tilting Rotary Tables
Min. indexing angle -0.001°

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

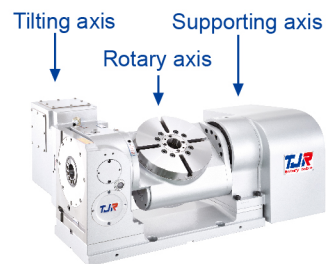
3
FEATURES



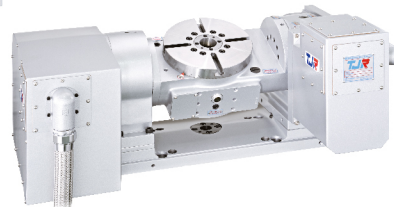
1 Both the tilting axis and rotary axis use radial & axial bearings.

2 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.)

3 A hydraulic brake for tilting axis is optional.



▲ FAR-210B
(Back side motor type)



▲ FAR-210L
(Extended cradle type)

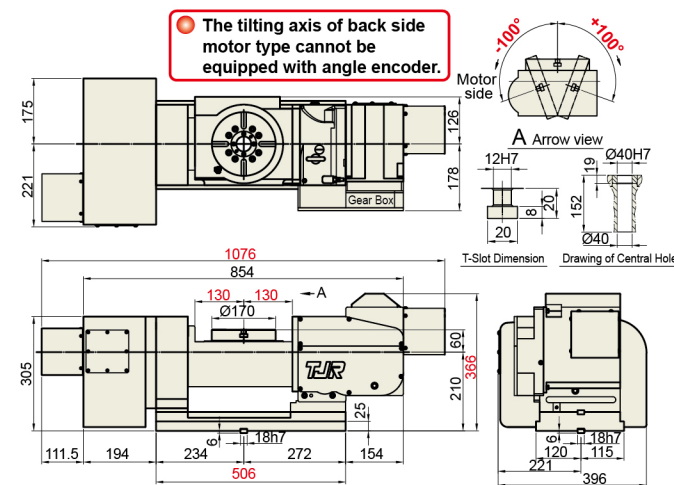


▲ Workpiece sample –
5 axis simultaneous
contouring

The Standard of Precision Test: Japan JIS

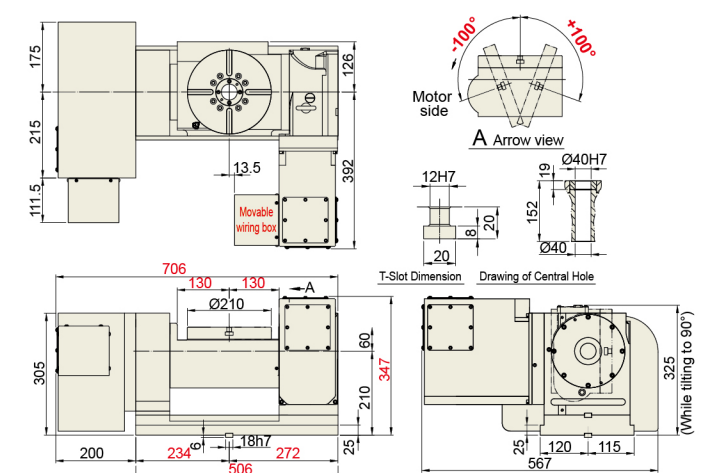
Item / Model		Unit	FAR-210 (Standard type)		FAR-210B (Back side motor type)		FAR-210L (Extended cradle type)	
Table Diameter		mm	Ø210		Ø210		Ø210	
Diameter of Table Central Hole		mm	Ø67		Ø67		Ø67	
Inner Diameter of Mandrel Sleeve		mm	Ø40H7		Ø40H7		Ø40H7	
Diameter of Center Through Hole		mm	Ø40		Ø40		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	

FAR-170B (Back side motor type)

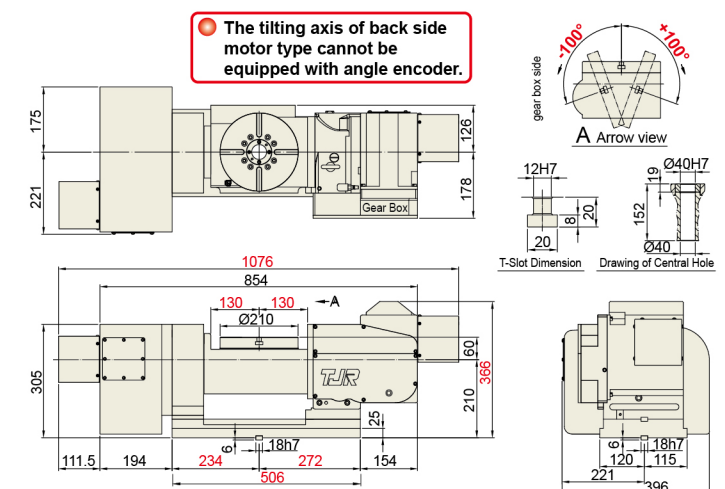


Remark: Please refer to Page 20 for the specification of FAR-170B

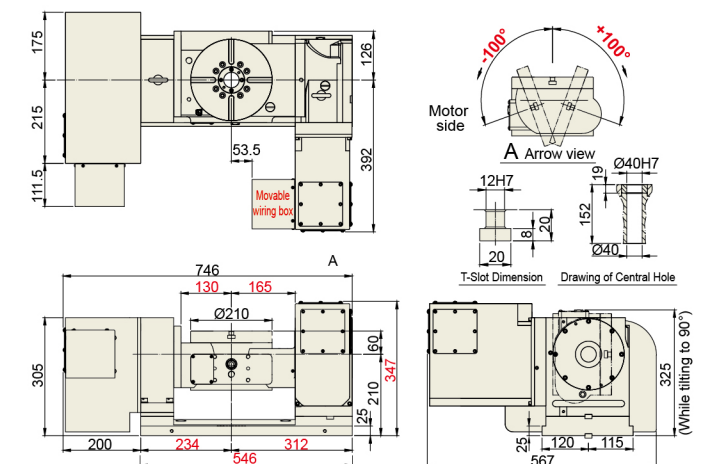
FAR-210 (Standard type)



FAR-210B (Back side motor type)



FAR-210L (Extended type)



CNC Tilting Rotary Tables
Min. indexing angle -0.001°

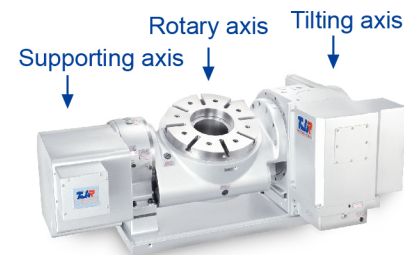
FHR Series Dual-axis dual-arm type (Hydraulic Brake)

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

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.)
- 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-255C(Cradle type)**



▲ **FHR-255CL**

(Extended cradle type)



▲ **FHR-320C(Cradle type)**

▲ **Workpiece sample – 5 axis simultaneous contouring**

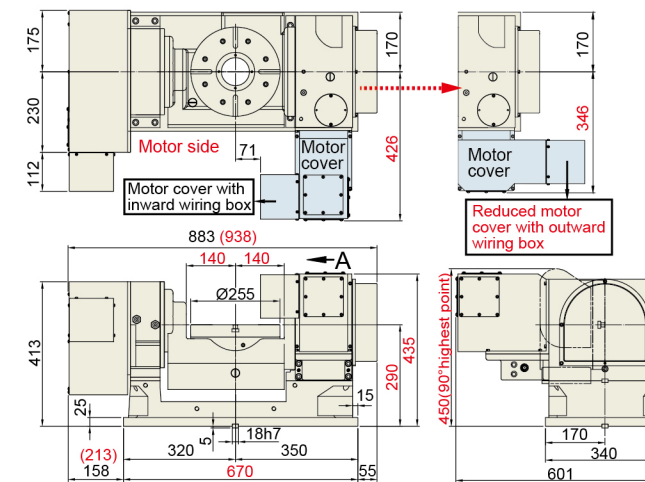
▲ **FHR-320**
(Standard type)

The Standard of Precision Test: Japan JIS

Item / Model		Unit	FHR-255C / 255CL		FHR-320 (Standard type)		FHR-320C (Cradle type)	
Table Diameter		mm	Ø 255		Ø 320		Ø 320	
Diameter of Table Central Hole		mm	Ø 110		Ø 150		Ø 150	
Inner Diameter of Mandrel Sleeve		mm	Ø 80H7		Ø 120H7		Ø 120H7x30 deep	
Diameter of Center Through Hole		mm	Ø 80		Ø 120		Ø 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		Rotation		Rotation	
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	70		115		175	
Servo Motor Model	FANUC	Taper/Straight shaft	α4i / α8i / α12is / β8is (Taper)	α4i / α8i / α12is / β12is (Taper)	α8i / α12is / β12is (Taper)	α12i / β22is (Straight)	α8i / α12is / β12is (Taper)	α12i / β22is (Straight)
	MITSUBISHI	Taper shaft	HF-104	HF-154	HF-104	HF-204	HF-104	HF-204
Speed Reduction Ratio		—	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	
Allowable Inertia Load Capacity (Horizontal)		kg.cm.sec ²	8.13		25.6		25.6	
Allowable Workpiece Load	0° Horizontal	kg	100		200		200	
	0°~90° Tilt	kg	75		150		100	
	F	kgf	1500		1800		1800	
	FxL	kgf.m	140		175		175	
Allowable Load (with Rotary Table Clamping)	FxL	kgf.m	70		115		70	
	Strength of worm gears (Rotary axis)	kg.m	55		80		55	
Net Weight (servo motor excluded)		kg	296		470		489	

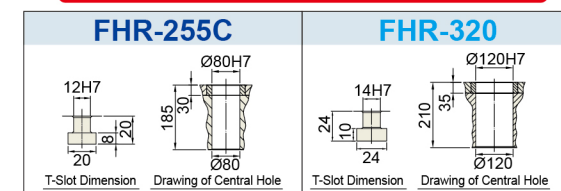
* In accordance with the foreign trade control ordinance, permission of the ministry of economy, trade and industry is required when exporting dual-axis products overseas.

FHR-255C (Cradle type)

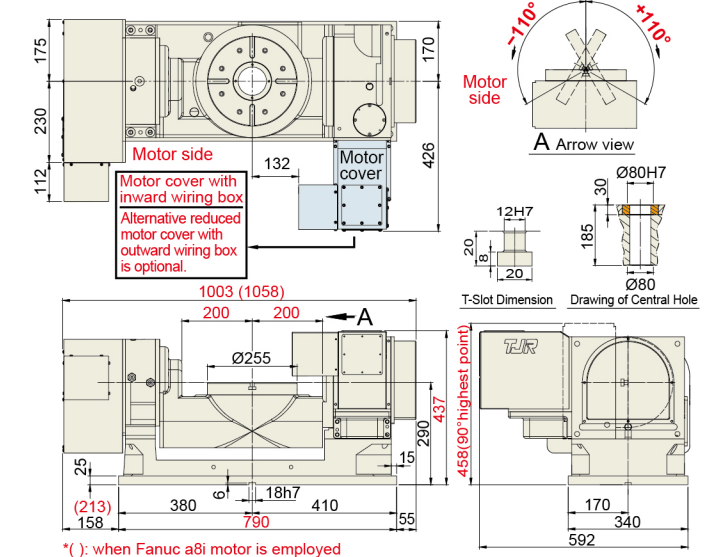


*(): when Fanuc α8i motor is employed

4-hole hydraulic distributor can be accommodated.



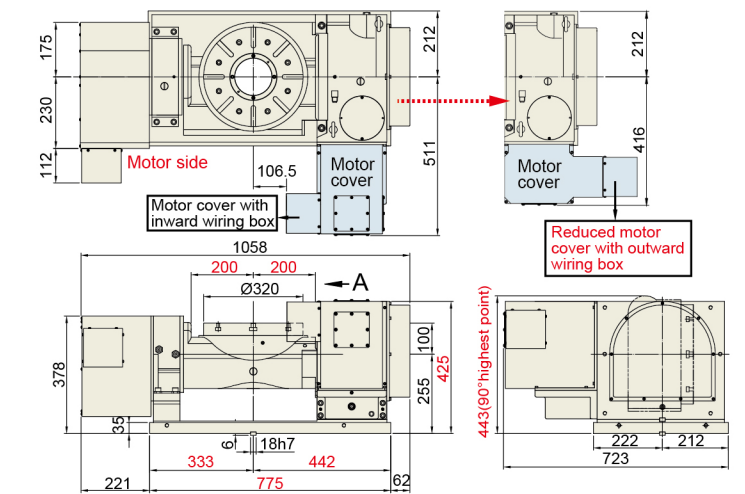
FHR-255CL (Extended cradle type)



*(): when Fanuc α8i motor is employed

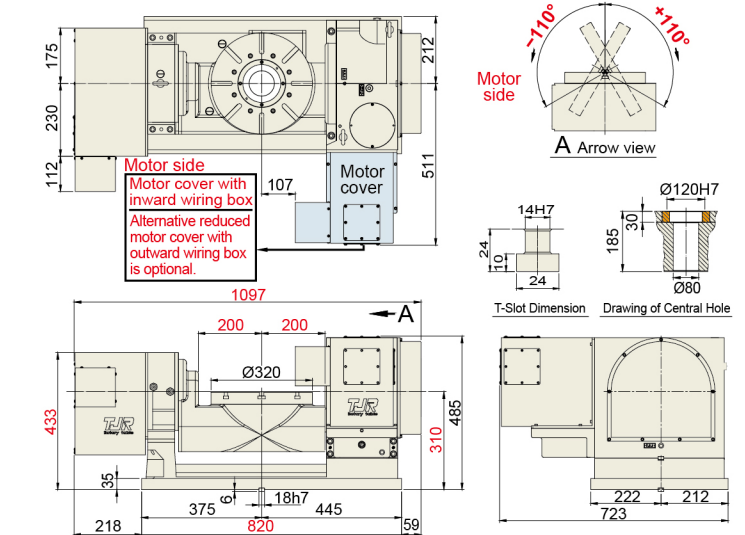
4-hole hydraulic distributor can be accommodated.

FHR-320 (Standard type)



6-hole hydraulic distributor can be accommodated.

FHR-320C (Cradle type)



4-hole hydraulic distributor can be accommodated.

CNC Tilting Rotary Tables
Min. indexing angle -0.001°

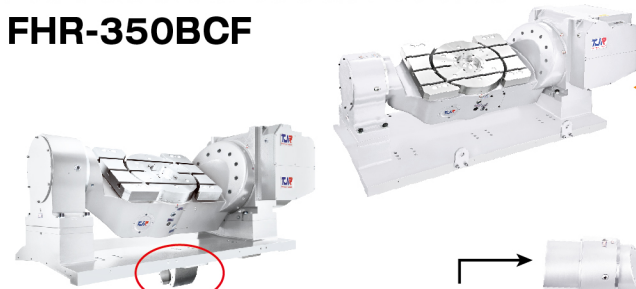
FHR Series Dual-axis dual-arm type (Hydraulic Brake)

FHR-350BC/400CF/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-600C/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)

The lightweight version
FHR-350BCF (850 KGs) is available

▲ **FHR-350BC**
(Back side motor type)

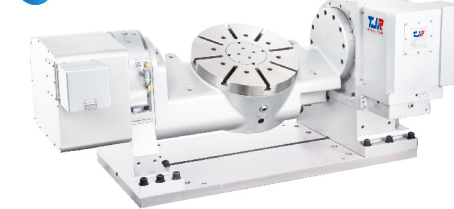
The lightweight version
FHR-350BCF (850 KGs) is available

Angle encoder on the tilt axis is optional.



▲ **FHR-400BC**(Back side motor type)

The lightweight version
FHR-400BCF (960 KGs) is available



▲ **FHR-400CF** (Cradle type)

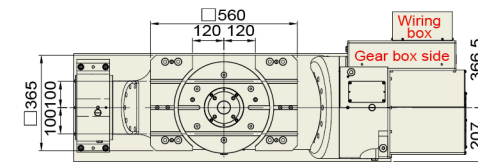
especially for machining aluminum alloy wheels

The Standard of Precision Test: Japan JIS

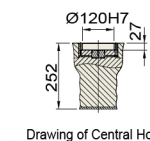
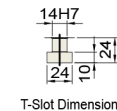
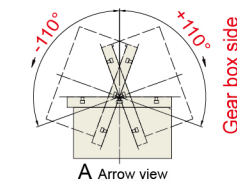
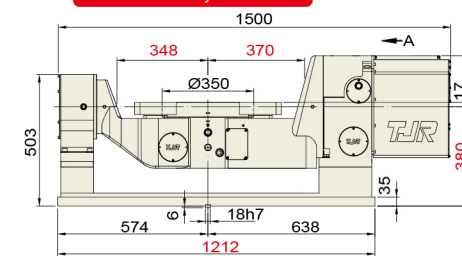
Item / Model		Unit	FHR-350BC/FHR-400BC		FHR-400CF		FHR-350BCF	
Table Diameter		mm	round plate $\varnothing 350$, square plate 560×365 / round plate $\varnothing 400$		$\varnothing 400$		round plate $\varnothing 350$, square plate 560×365	
Diameter of Table Central Hole		mm	$\varnothing 150H7 \times 27$ 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 : 150
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		200	
	0°~90° Tilt	kg	120		100		100	
Allowable Load (with Rotary Table Clamping)	F	kgf	1800		1800		1800	
	FxL	kgf.m	275		175		190	
	FxL	kgf.m	115		115		115	
Strength of worm gears (Rotary axis)		kg.m	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.

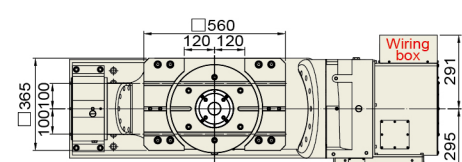
FHR-350BCF



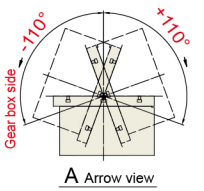
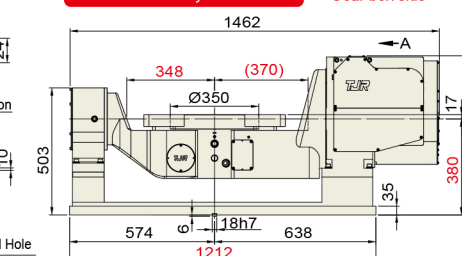
Angle encoder on the rotary axis is necessary



FHR-350BC (Back side motor type)

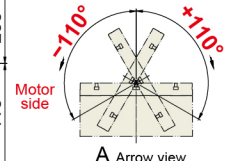
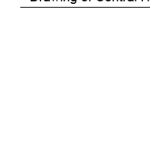
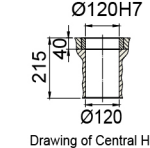
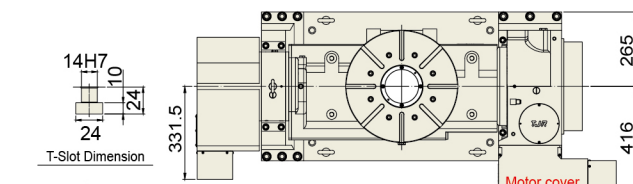


Angle encoder on the rotary axis is necessary

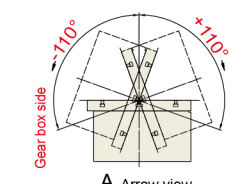
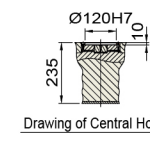
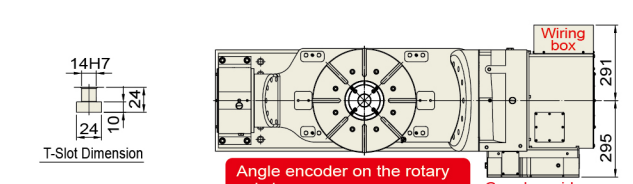


FHR-400CF (Cradle type)

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°

4
FEATURES



1 Both the tilting axis and rotary axis use **large-diameter radial & axial bearings.**

2 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)

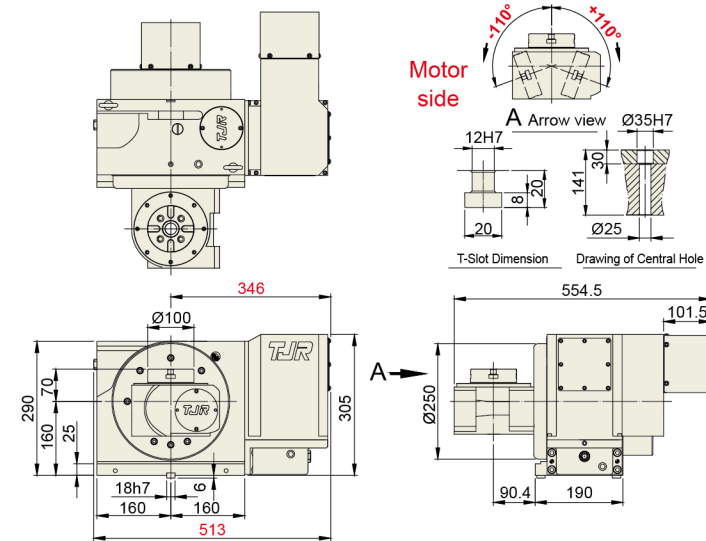
3 The tilting, supporting, and rotary axis are all equipped with the hydraulic-brake mechanisms. (Employing **three independent encircling hydraulic systems**)

4 Max. tilting angle: $\pm 110^\circ$

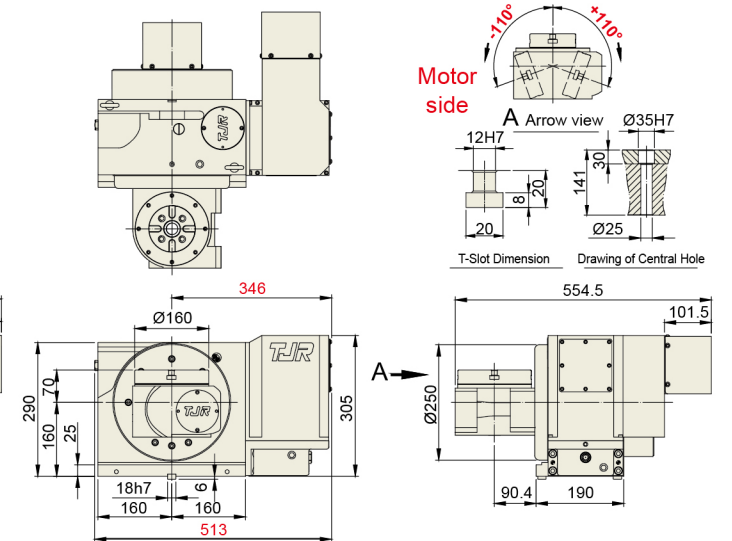


FAR-160SN
(single-arm type)

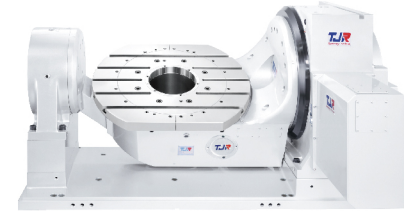
FAR-100SN (single-arm type)



FAR-160SN (single-arm type)



FHR-500C (dual-arm, cradle type)



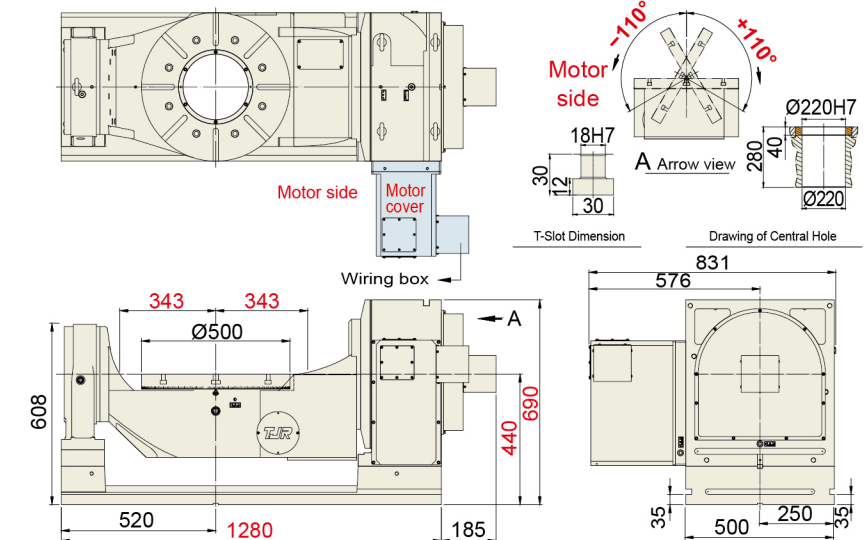
FHR-630C (dual-arm, cradle type)

The Standard of Precision Test: Japan JIS

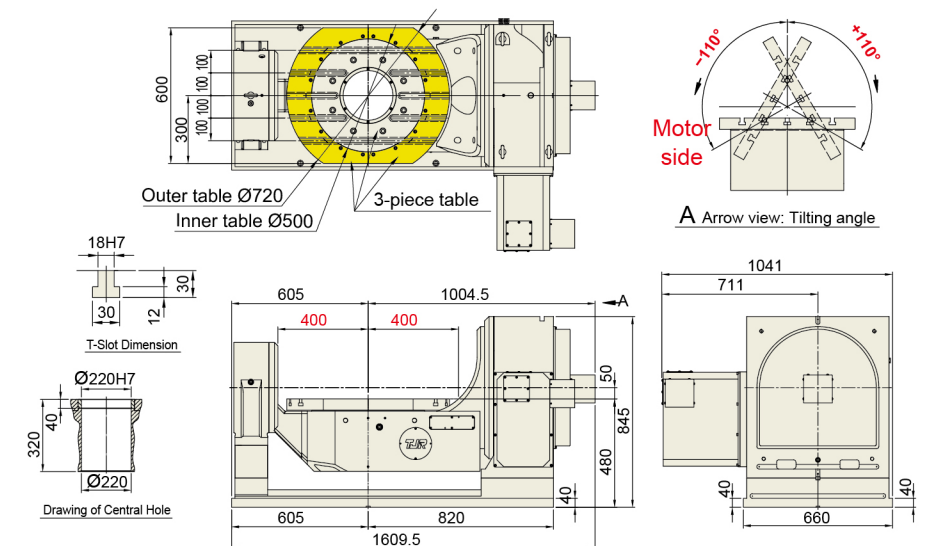
Item / Model		Unit	FHR-500C(dual-arm, cradle type)		FHR-630C(dual-arm, cradle type)		FAR-100SN(single-arm type)	FAR-160SN(single-arm type)
Table Diameter		mm	Ø500		Outer table Ø720 x 600, Inner table Ø500		Ø100	Ø160
Diameter of Table Central Hole		mm	Ø250		Ø250		Ø35H7x30 deep	
Inner Diameter of Mandrel Sleeve		mm	Ø220H7		Ø220H7		-	
Diameter of Center Through Hole		mm	Ø220		Ø220		Ø25	
Table Height (Horizontal)		mm	440		480		230	
Table T-slot Width		mm	18H7		18H7		12H7	
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	60 (30, if ECN-225 angle encoder is employed)	40	50
Repeatability		sec.	4	8	4	8	4	8
Clamping System (Hydraulic)		kg/cm ²	35	35	35	35	Pneumatic 5	Hydraulic 35
Clamping Torque		kg-m	370	410	370	800	13	70
Servo Motor Model	FANUC	Straight shaft	α12i	α22i	α12i	α40i	α2i, whose motor cover is bigger than the standard.	α8i / β8is
	MITSUBISHI	Straight shaft	HF-204	HF-354	HF-204	HF-703S	HF-KP43JW04-S6	HF-154
	SIEMENS	Straight shaft	-	-	1FK7083	1FK7101 / 7103	-	-
	DELTA	Straight shaft	-	-	-	-	ECMA-C20604	ECMA-E21315
	YASKAWA	Straight shaft	-	-	-	-	SGMJV-04A	SGMGV-13A
Speed Reduction Ratio		-	1 : 120	1 : 180	1 : 120	1 : 180	1 : 60	1 : 120
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	25	11.1	25	11.1	83.3	33.3
Allowable Inertia Load Capacity (Horizontal)		kg.cm.sec ²	93.75		180		0.31	0.8
Allowable Workpiece Load	0° Horizontal	kg	500		500		25	
	0°~90°Tilt	kg	300		400		20	
Allowable Load (with Rotary Table Clamping)	F	kgf	3000		3200		600	
	FxL	kgf.m	410		800		25	
	FxL	kgf.m	370		370		13	
Strength of worm gears(Rotary axis)		kg.m	250		250		9	
Net Weight (servo motor excluded)		kg	1091		1817		116	

*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-500C (dual-arm, cradle type)



FHR-630C (dual-arm, cradle type)



CNC Tilting Rotary Tables
Min. indexing angle -0.001°

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

FHR-630S

FHR-630SN

FHR-630SM



▲ FHR-630S

▲ **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



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.)

The illustration of additional supporting seat (whose thickness can be tailor-made)

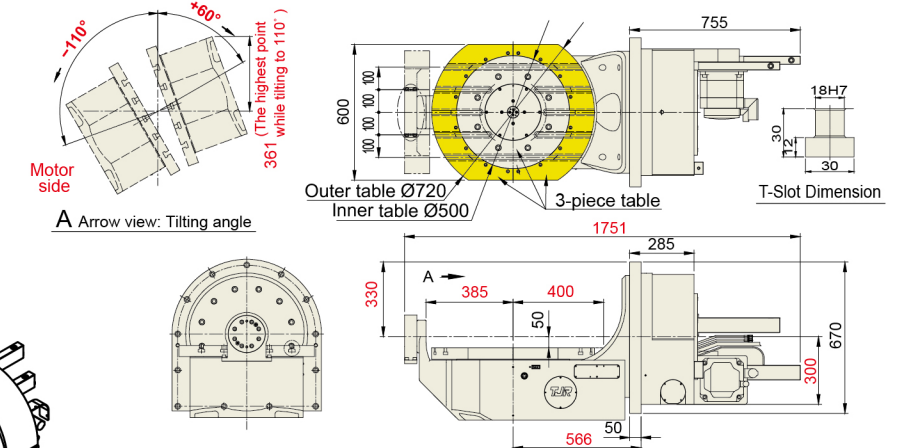
The supporting seat bracket (Made by the buyer [machine tool builder])

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	0° Horizontal	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)	
	0°~90° Tilt	kg	—		—		—	
	F	kgf	—		—		—	
Allowable Load (with Rotary Table Clamping)	FxL	kgf.m	—		—		—	
	FxL	kgf.m	—		—		—	
Strength of worm gears(Rotary axis)		kg.m	250		250		250	
Net Weight (servo motor excluded)		kg	1165		1065		—	

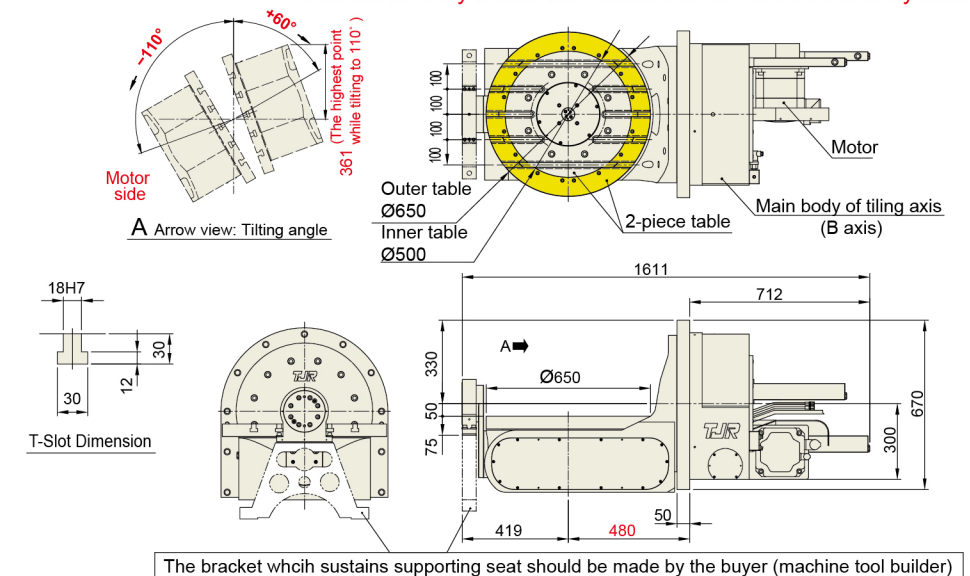
※ In accordance with the foreign trade control ordinance, permission of the ministry of economy, trade and industry is required when exporting dual-axis products overseas.

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



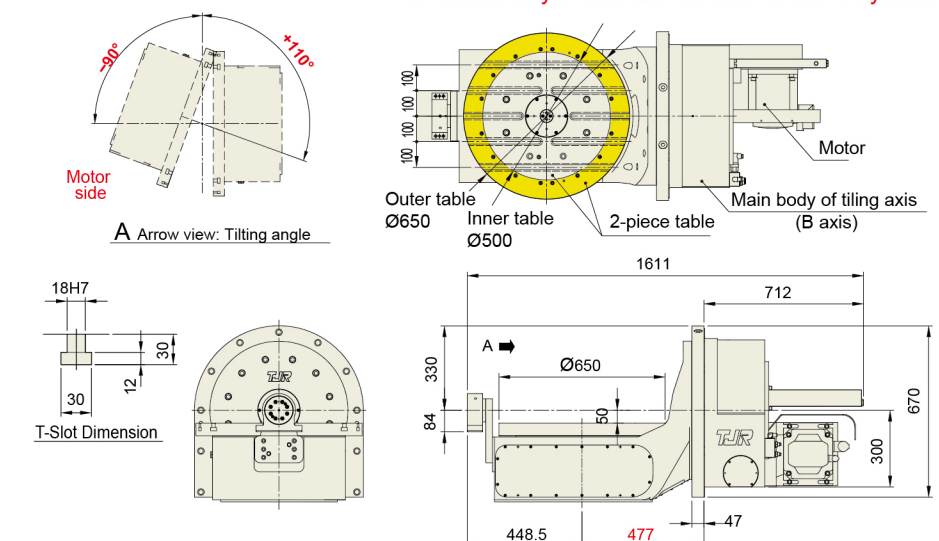
FHR-630SN (single-arm, shorten cradle type)

This model only works with SIEMENS or FANUC servo system



FHR-630SM

This model only works with SIEMENS servo system



CNC Tilting Rotary Tables
Min. indexing angle -0.001°

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

FHR-400S

FHR-650S-525

FHR-650S-550

► **FHR-400S**

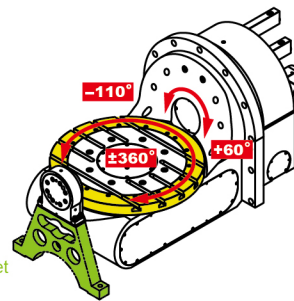


▲ **FHR-650S-525**



The illustration of
additional supporting
seat
(whose thickness
can be tailor-made)

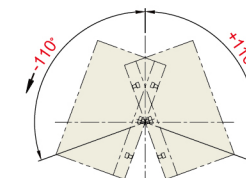
The supporting seat bracket
(Made by the buyer
[machine tool builder])



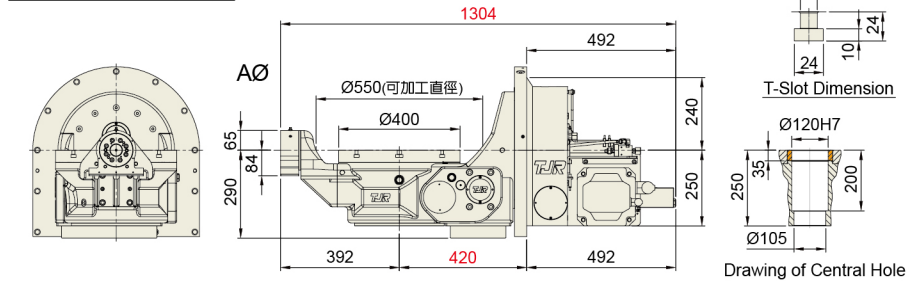
▲ **FHR-650S-550**



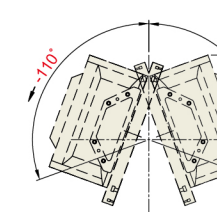
FHR-400S



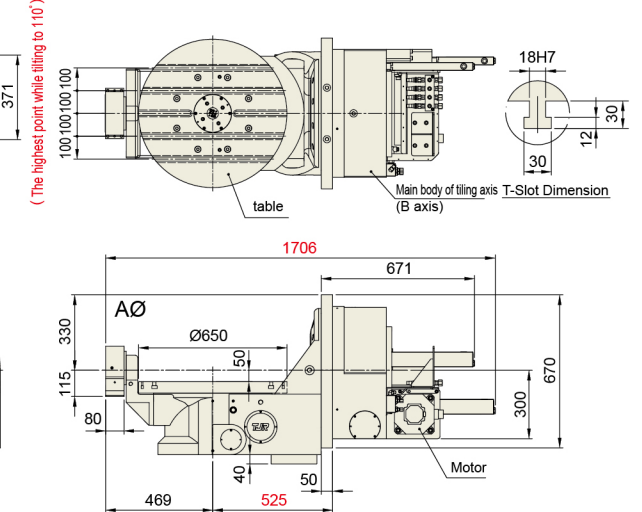
A Arrow view: Tilting angle



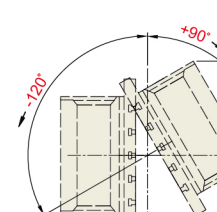
FHR-650S-525(Dual-axis single-arm type(Hydraulic Brake))



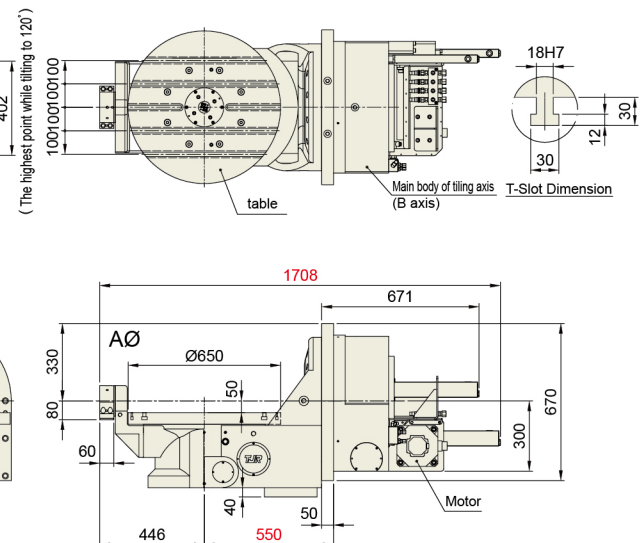
A Arrow view: Tilting angle



FHR-650S-550(Dual-axis single-arm type(Hydraulic Brake))



A Arrow view: Tilting angle



The Standard of Precision Test: Japan JIS

Item / Model		Unit	FHR-400S		FHR-650S-525		FHR-650S-550	
Table Diameter		mm	Ø 400		Ø 650		Ø 650	
Diameter of Table Central Hole		mm	Ø 150		—		—	
Inner Diameter of Mandrel Sleeve		mm	Ø 120H7x200 deep		—		—	
Diameter of Center Through Hole		mm	Ø 150		—		—	
Table Height (Horizontal)		mm	—		—		—	
Table T-slot Width		mm	14H7		18H7		18H7	
Guide Block Width		mm	—		—		—	
Axis		—	Rotation	Tilt ($\pm 100^{\circ}$)	Rotation	Tilt ($\pm 110^{\circ}$)	Rotation	Tilt ($\pm 110^{\circ}$)
Min. Increment		deg.	0	0	0	0	0	0
Indexing Precision		sec.	15	50	15	60 (30, if ECN-225 angle encoder is employed.)	15	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	115	200	370	500	370	500
Servo Motor Model	FANUC	—	$\alpha 12is$	$\alpha 22i$ (Straight)	$\alpha 12 i$	$\alpha 40 i$ (Straight)	$\alpha 12 i$	$\alpha 40 i$ (Straight)
	MITSUBISHI	—	HF-154	HF-354S (Straight)	HF-204	HF-703S (Straight)	HF-204	HF-703S (Straight)
	SIEMENS	—	1FK7063	1FK7101	1FK7068	1FK7103	1FK7083	1FK7103
	HEIDENHAIN	—	—	—	QSY-155C	QSY-190D	QSY-155C	QSY-190D
Speed Reduction Ratio		—	1 : 120	1 : 150	1 : 120	1 : 120	1 : 120	1 : 120
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	33.3	20	25	25	25	25
Allowable Inertia Load Capacity (Horizontal)		kg.cm.sec ²	44		158.4		158.4	
Allowable Workpiece Load	0°Horizontal	kg	220		300(500, if the sub-tailstock is employed)		300(500, if the sub-tailstock is employed)	
	0°~90°Tilt	kg	120		—		—	
Allowable Load (with Rotary Table Clamping)	F	kgf	1800		—		—	
	FxL	kgf.m	200		500		500	
	FxL	kgf.m	115		370		370	
Net Weight (servo motor excluded)		kg	—		—		—	

※ 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.

Non-CNC Hydraulic index table

HC Series

(Hirth coupling hydraulic brake)

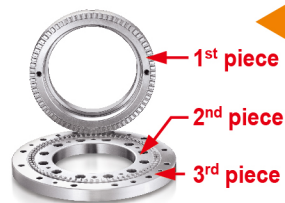
HC-255A/320A (Equal Parts)



Refer to page 6 for HC series application.

HC-255A

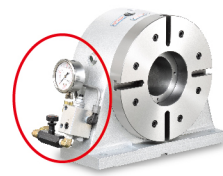
(for Both Vertical and Horizontal Applications)(A additional raiser must be employed whenever horizontal application is needed)



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.

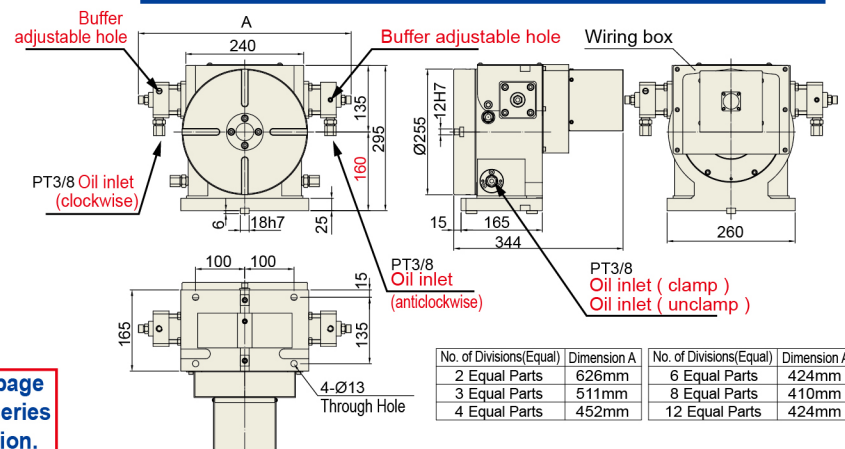
★ If it is for horizontal application, please advise us when placing purchase order.

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	kg	110	200	—
Rotating Torque	kg.m	42	60	700
Rotary Table Total Weight	kg	65	98	—

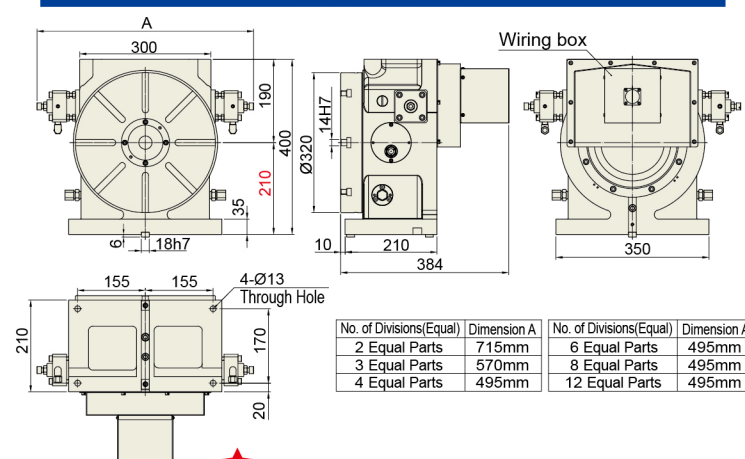
Refer to page 32 for the top, front and side views

HC-255A



No. of Divisions(Equal)	Dimension A	No. of Divisions(Equal)	Dimension A
2 Equal Parts	626mm	6 Equal Parts	424mm
3 Equal Parts	511mm	8 Equal Parts	410mm
4 Equal Parts	452mm	12 Equal Parts	424mm

HC-320A



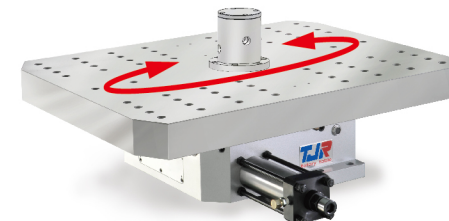
No. of Divisions(Equal)	Dimension A	No. of Divisions(Equal)	Dimension A
2 Equal Parts	715mm	6 Equal Parts	495mm
3 Equal Parts	570mm	8 Equal Parts	495mm
4 Equal Parts	495mm	12 Equal Parts	495mm

CHC Series

(Flat type auto pallet changer)

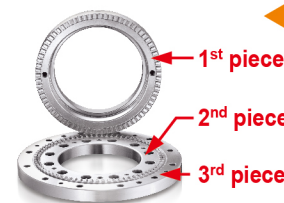
CHC-500(700x910)
CHC-500(700x1090)

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.



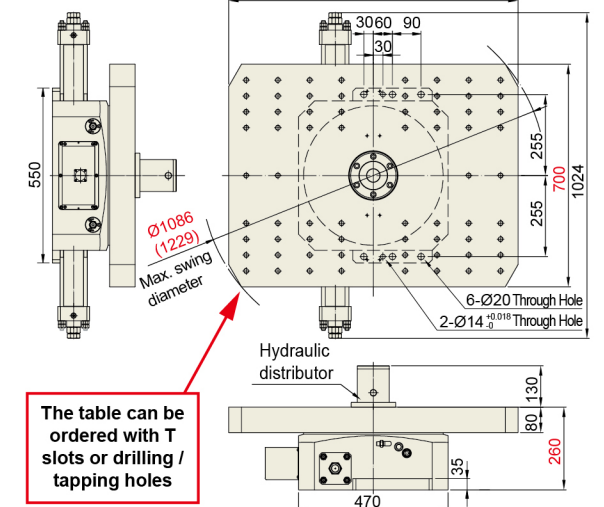
Pallet changing time is 4~5 seconds, which excludes PLC delayed time of machine

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	kg	700
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

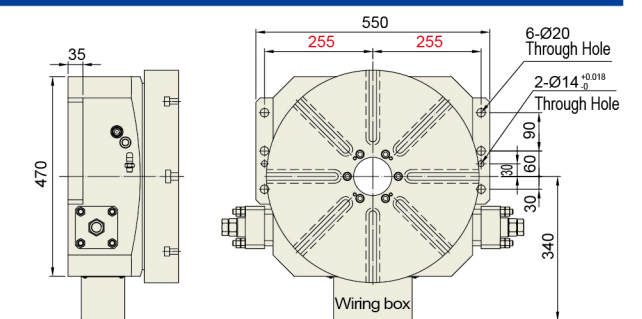
CHC-700x910 (Pallet changer)

Table size can be customized 910(1090)

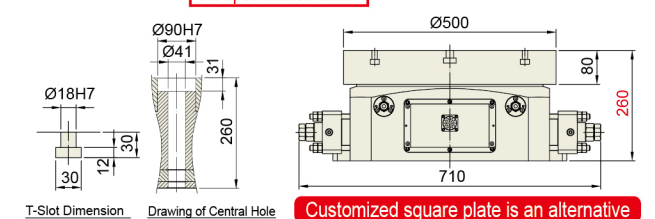


The table can be ordered with T slots or drilling / tapping holes

HHC-500 (For Horizontal Application)

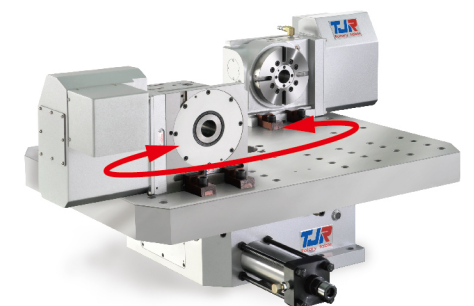


Refer to page 31 for the specification table.

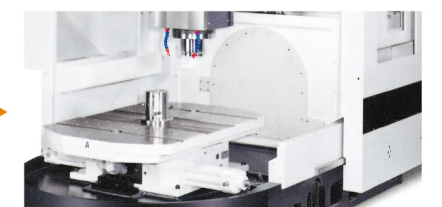


Customized square plate is an alternative

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



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



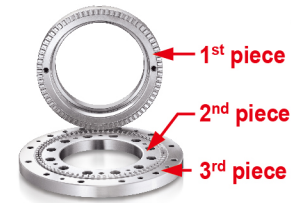
CNC index tables
Min. indexing angle - 1° or 5°

HHI Series

(Hirth coupling hydraulic brake)

For horizontal machining center
or horizontal drilling & tapping center.

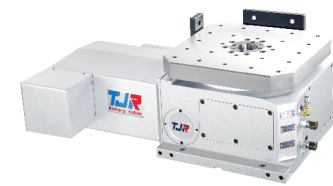
HH I - 320x320 / 400x400F
400x400 / 500x500F
500x500 / 630x630F
630x630 / 800x800F
800x800 / 1000x1000F
1200x1200F



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

Function:

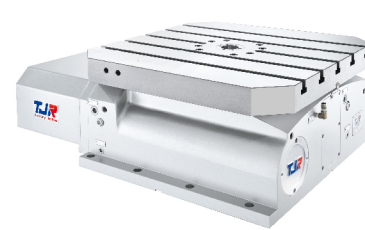
- ① Accuracy: ± 5 seconds
(Angle encoder accuracy)
- ② Rotate **without lifting the table** to prevent table from water and particles.



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



▲ HHI - 500x500



▲ HHI - 630x630F



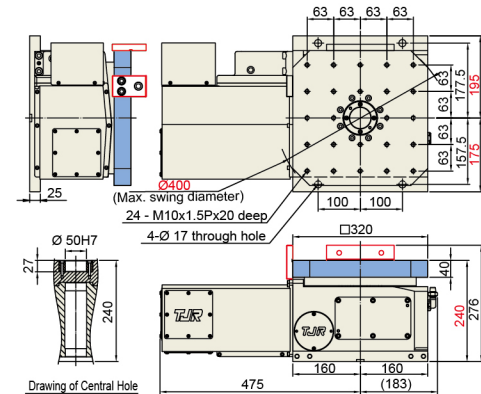
▲ HHI - 800x800

▲ HHI - 1200x1200F

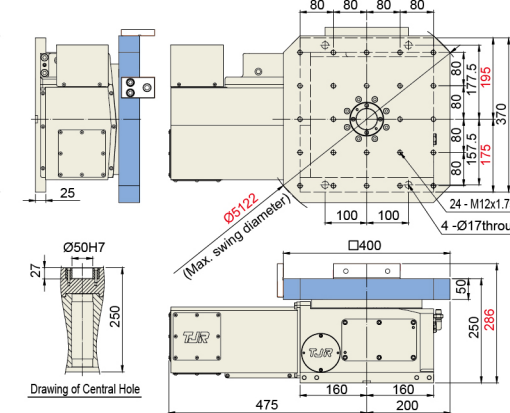
The Standard of Precision Test: Japan JIS

Item / Model		Unit	HHI-320x320	HHI-400x400F	HHI-400x400	HHI-500x500	HHI-630x630F	HHI-800x800	(0.001°)	
Table size		mm	□ 320x320	□ 400x400	□ 400x400	□ 500x500	□ 630x630	□ 800x800	HHR-400x400	HHR-500x500
Diameter of Table Central Hole		mm	Ø 50x27 deep	Ø 50x27 deep	Ø 50x27 deep	Ø 50x27 deep	Ø 50x27 deep	Ø 50x27 deep	Ø 50x27 deep	Ø 50x27 deep
Table height		mm	240	250	270	320	320	380	282.5	295
Table T-slot Width		mm	-	-	14H7	18H7	18H7	22H7	-	18H7
Guide Block Width		mm	18h7	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°	0.001°
Indexing Precision		sec.	± 5	± 5	± 5	± 5	± 5	± 5	20	15
Repeatability		sec.	± 1	± 1	± 1	± 1	± 1	± 1	4	4
Clamping System		kg/cm ²	35	35	35	35	35	35	45	35
Clamping Torque		kg-m	300	300	500	1000	1000	9000	155	370
Servo Motor Model	FANUC	Straight shaft without key	β 12is	β 12is	β 22is	β 22is	β 22is	β 22is	α 12i / β 22is	α 12i / β 22is
	MITSUBISHI		HF-104/154	HF-104/154	HF-104/154	HF-204	HF-204S	HF-354	HF-204	HF-204
Speed Reduction Ratio		-	1 : 120	1 : 120	1 : 120	1 : 180	1 : 180	1 : 180	1 : 120	1 : 180
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	25	25	25	16.6	16.6	11.1	25	16.6
Allowable Workpiece Load	Horizontal	kgf	300	300	500	600	700	4000	500	600
Strength of worm gears		kg.m	-	-	-	-	-	-	170	250
Net Weight (servo motor excluded)		kg	149	-	-	518	565	1053	-	510

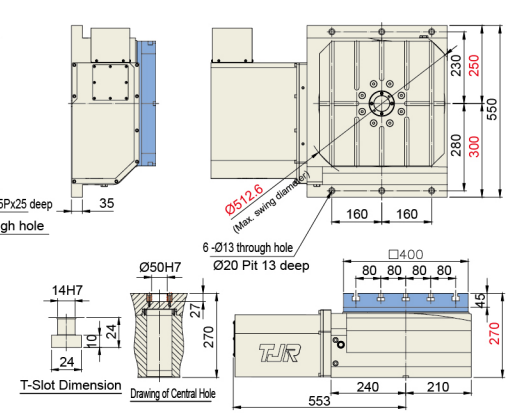
HH I - 320x320 (1° or 5°)



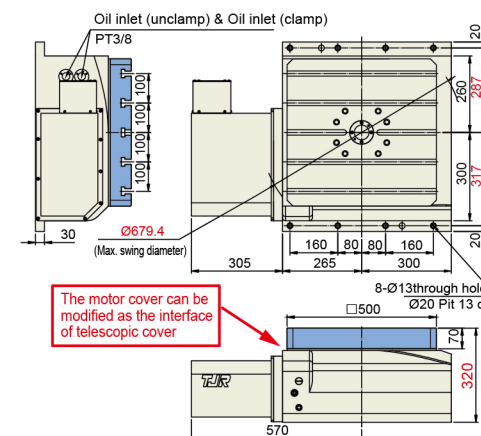
HH I - 400x400F (1° or 5°)



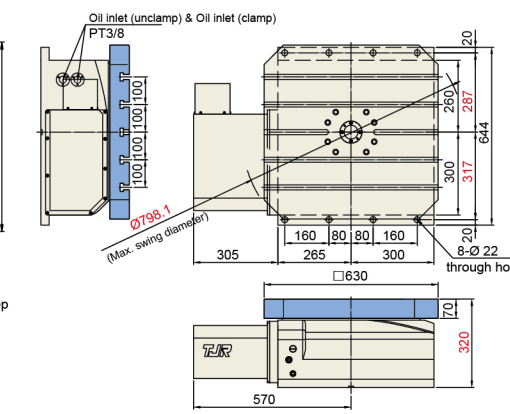
HH I - 400x400 (1° or 5°)



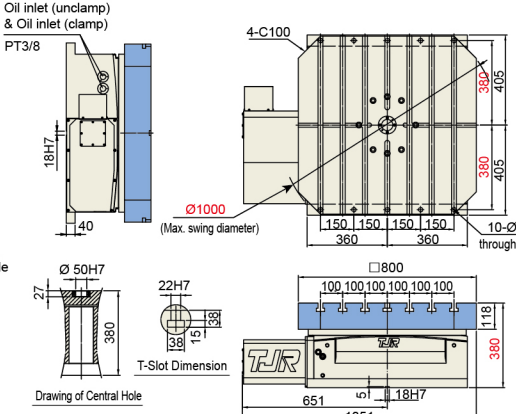
HH I - 500x500 (1° or 5°)



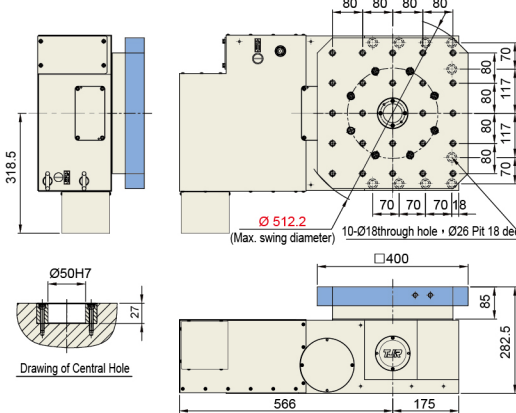
HH I - 630x630F (1° or 5°)



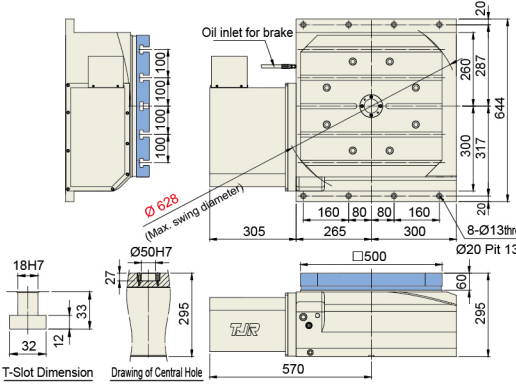
HH I - 800x800 (1° or 5°)



HHR-400x400 (0.001°)



HHR-500x500 (0.001°)



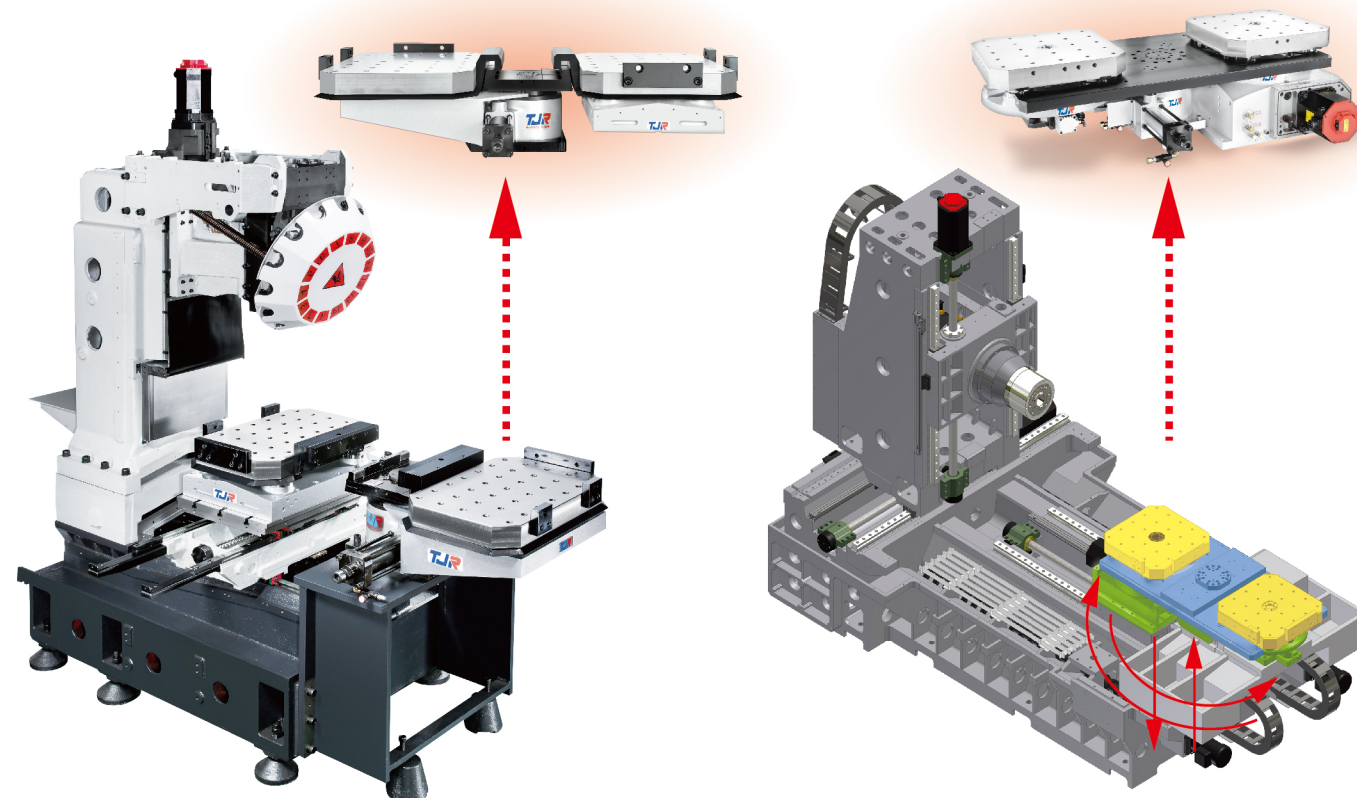
A living legend

create a surprising
exchange mechanism

Auto pallet changer chapter



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



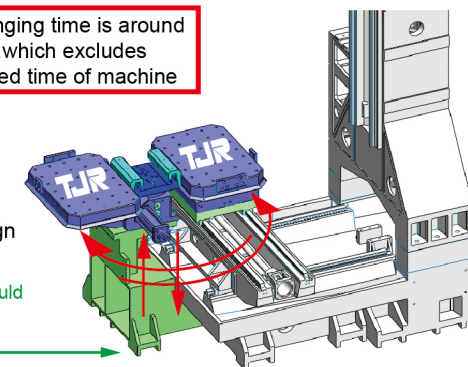
▲ CTU-500x700 (hook type APC)



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.

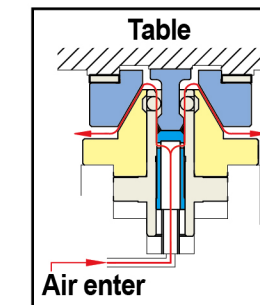
Green color section should
be made by the buyer
(machine tool builder)



▲ Application diagram: retrofits
vertical machining center with CTU

The 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

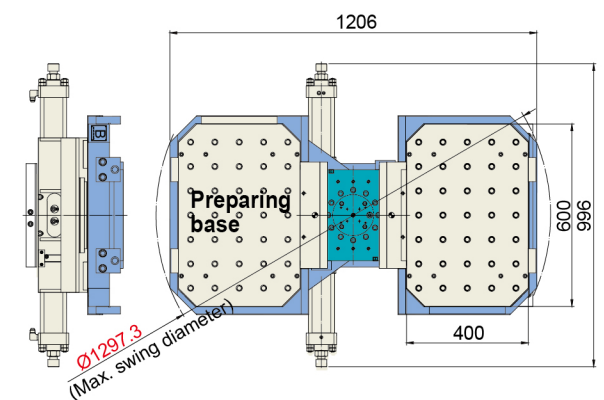


▲ The function of cones :
① Precise positioning
② Air blast for chip removal
③ Airtight testing

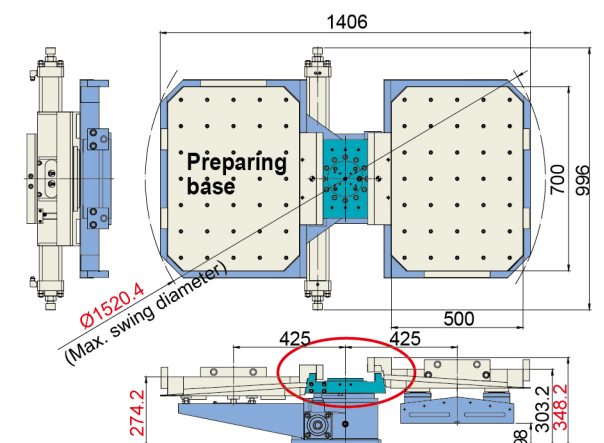


▲ Cones:
Powerful hydraulic
clamping

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



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



CHI/CHR Series

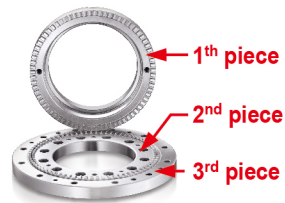
(Dual pallets rotary table)

CHI-400 (1° or 5°) Hirth coupling hydraulic brake

CHR-400 (0.001°) Hydraulic Brake
For horizontal machining center



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



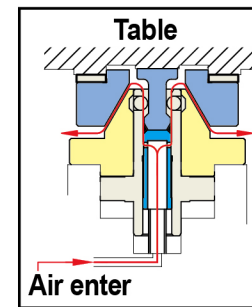
▲ **CHI Series :**
Use **three-piece** clutch plate

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

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

The Standard of Precision Test: Japan JIS

Item / Model	Unit	CHI-400	CHR-400
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	α12i / β22is
	MITSUBISHI	without key	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	kgf	400	400
Strength of worm gears	kgf.m	-	170
Net Weight (servo motor excluded)	kg	410	-

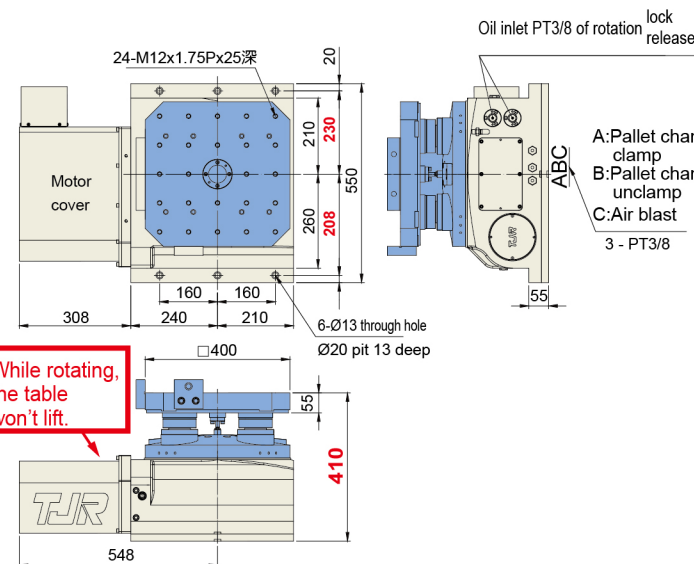


The function of cones :
① Precise positioning
② Air blast for chip removal
③ Airtight testing



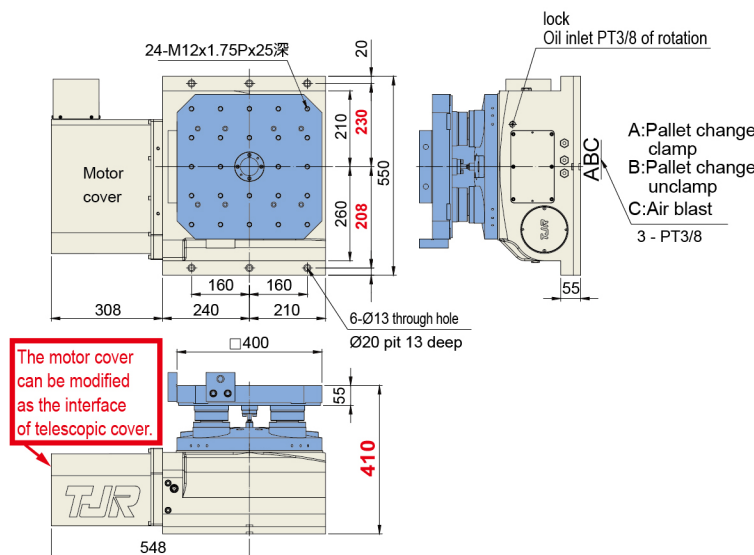
▲ **Cones:**
Powerful hydraulic clamping

CHI-400 (1° or 5°) (Flat bottom type)



While rotating, the table won't lift.

CHR-400 (0.001°) (Flat bottom type)



The motor cover can be modified as the interface of telescopic cover.

CTH Series

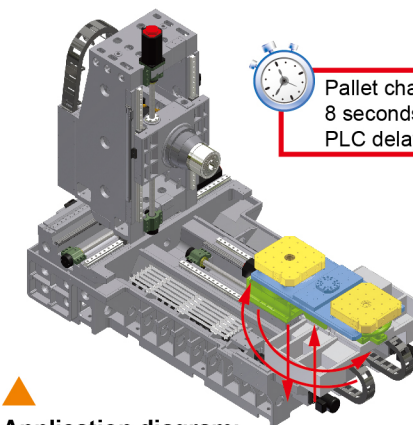
(tray type auto pallet changer)

CTH-400 (Can go with CHI/CHR series)

For horizontal machining center
(180° to and fro)



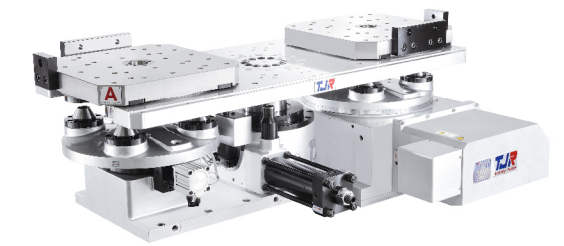
▲ **CTH-400 (tray type APC)**



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

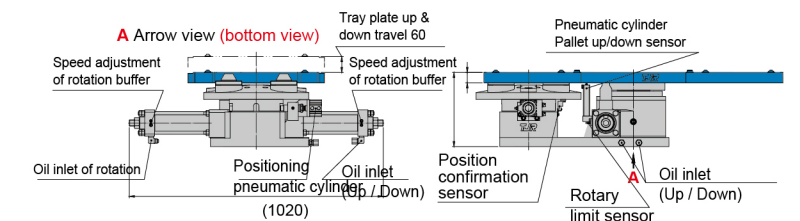
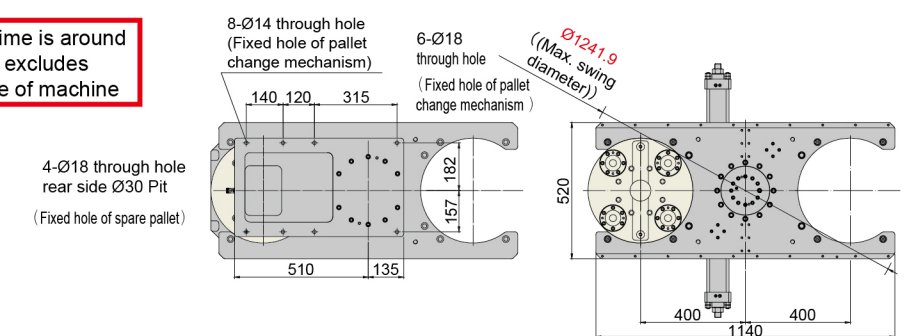
The Standard of Precision Test: Japan JIS

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	kg	400x2=800
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

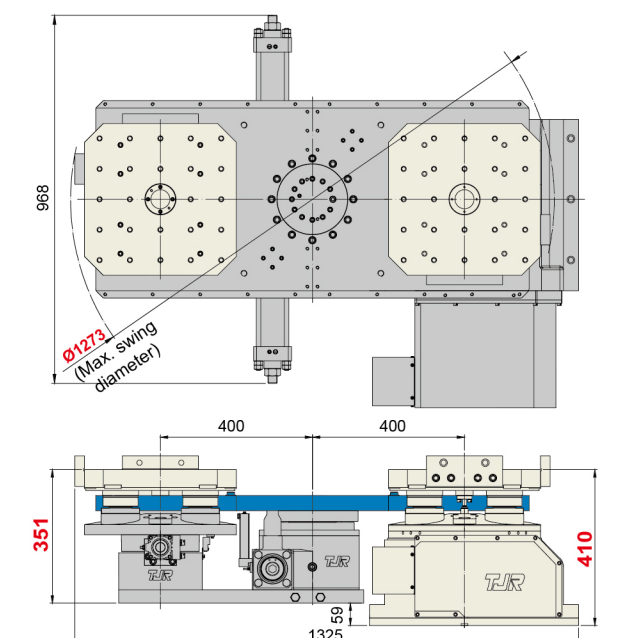


▲ **CTH-400 + CHI-400**
Dual pallets rotary table + Tray type APC
(Flat bottom type)

CTH-400 (Pallet changer)



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



CHI/CHR Series

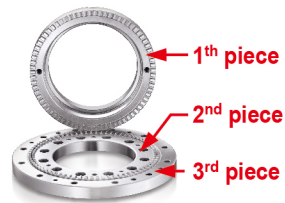
(Dual pallets rotary table)

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

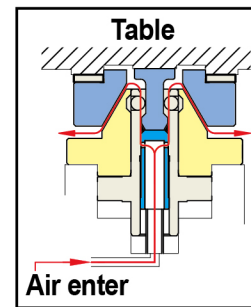
Function: ① Accuracy: ± 5 seconds
(Angle encoder accuracy)
② Rotate **without lifting the table** to prevent table from water and particles.



▲ 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	Ø50x27 deep	Ø50x27 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		FANUC MITSUBISHI	
Speed Reduction Ratio		Straight shaft without key	β22is α12i / β22is
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)	r.p.m	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	kgf	600	600
Strength of worm gears	kgf.m	-	250
Net Weight (servo motor excluded)	kg	716 (including 2 pallets)	-

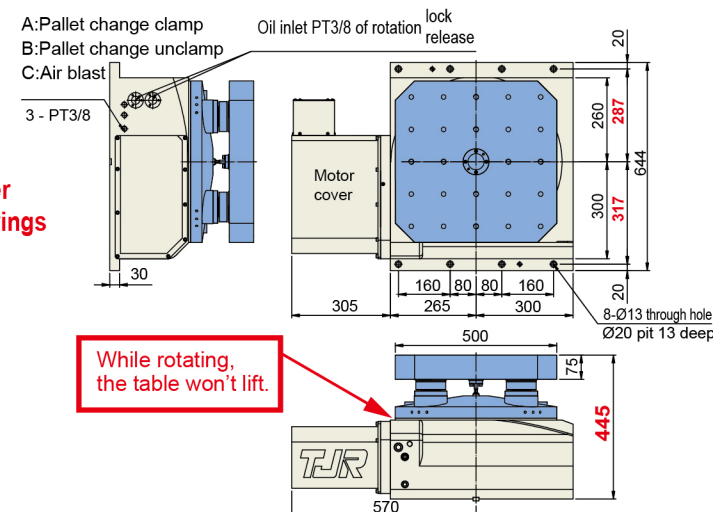


The function of cones :
① Precise positioning
② Air blast for chip removal
③ Airtight testing



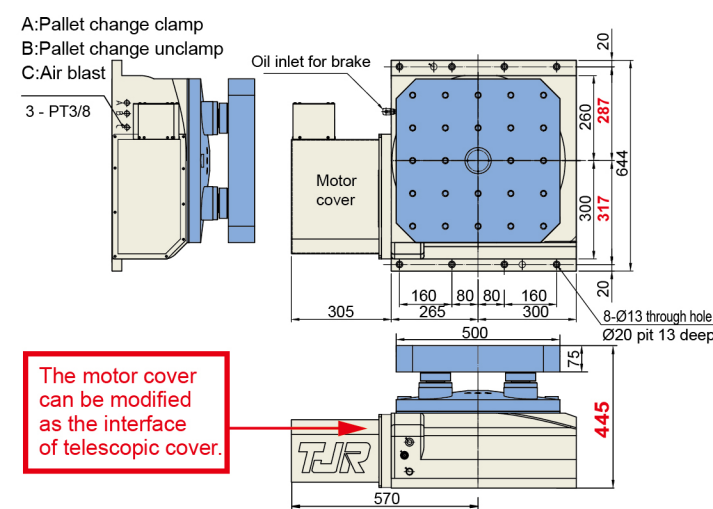
▲ Cones:
Powerful hydraulic clamping

CHI-500 (1° or 5°) (Flat bottom type)



While rotating, the table won't lift.

CHR-500 (0.001°) (Flat bottom type)



The motor cover can be modified as the interface of telescopic cover.

CTH Series

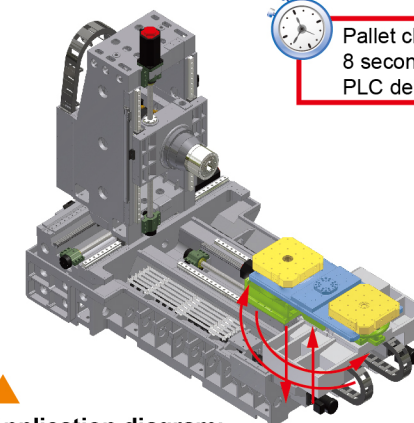
(tray type auto pallet changer)

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+ CH I

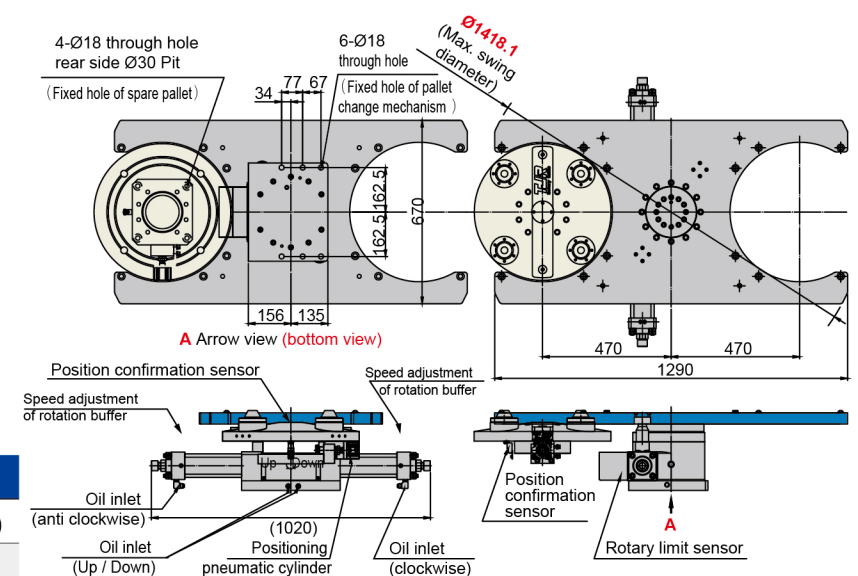
The Standard of Precision Test: Japan JIS

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

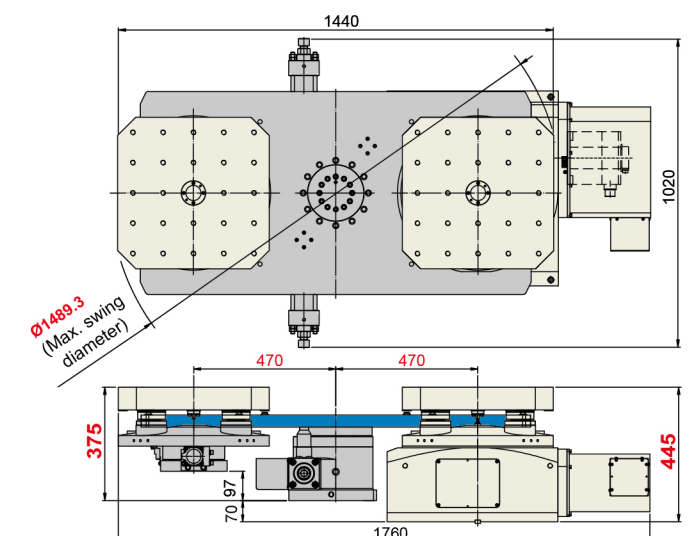


▲ CTH-500 + CH I-500
Dual pallets rotary table + Tray type APC
(Flat bottom type)

CTH-500 (Pallet changer)

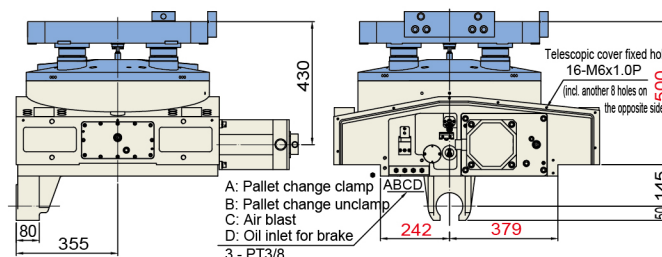
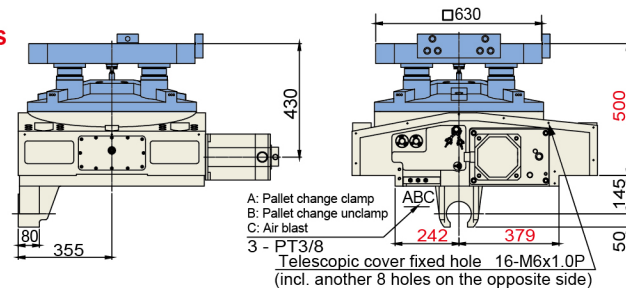


CTH-500+CH I-500 (Flat bottom type)





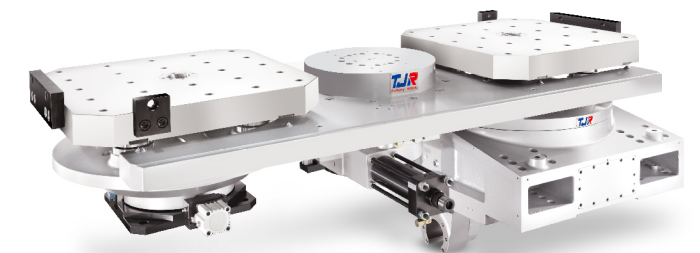
Technical drawing of the front view of the 24-M16X2.0P connector. The drawing shows a blue rectangular component with a central circular feature and a small tab on the right side. Dimensions are provided in millimeters: overall width 930, overall height 355, and various internal dimensions including 405, 525, 120, 192, 196, 120, 289, and 404. A note indicates a 24-Ø17.5 through hole Ø25.0.



(180° to and fro)



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	1000x2=2000
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

[illegible]

Technical drawing of the CHI-630L machine tool, showing top and side views with dimensions.

Top View Dimensions:

- Overall width: 1920
- Overall height: 1228
- Distance between fixed faces of exchange mechanism: 1945.7 (Max. swing diameter)
- Distance between fixed face of CHI-630L and linear guideway center: 1930

Side View Dimensions:

- Overall height: 500
- Overall width: 1050
- Max. allowable external diameter: 615
- Distance between fixed face of exchange mechanism and linear guideway center: 1930
- Distance between fixed face of exchange mechanism and linear guideway center: 145
- Distance between fixed face of exchange mechanism and linear guideway center: 240
- Distance between fixed face of exchange mechanism and linear guideway center: 105
- Distance between fixed face of exchange mechanism and linear guideway center: 74
- Distance between fixed face of exchange mechanism and linear guideway center: 410
- Distance between fixed face of exchange mechanism and linear guideway center: 195

Notes:

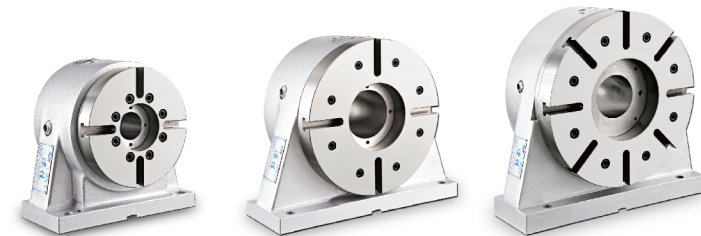
- The sheet metal cover (telescopic cover) is made by machine tool manufacturer. Please refer to CHI-630L for fixed interface.
- The fixed face of exchange mechanism
- The distance between the fixed face of CHI-630L and linear guideway center.

Item / Model		Unit	CH I-630L	CHR-630L
Table size		mm	□630x630	□630x630
Diameter of Table Central Hole		mm	Ø50x27 deep	Ø50x27 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 without key	β22is	α22i / β22is
	MITSUBISHI		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	1200
Strength of worm gears		kgf.m	-	420
Net Weight (servo motor excluded)		kg	1135	-

Rotary Tailstock

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

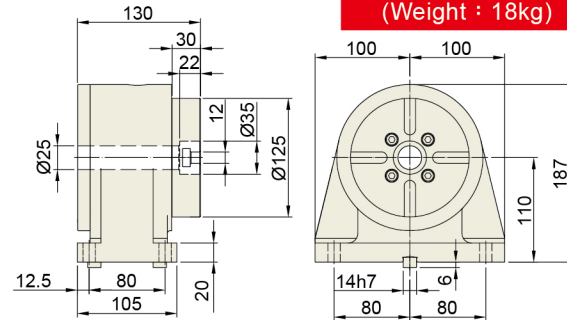
RTH Series (Hydraulic Brake) RTH-210/255/320/400A



▲ RTA-170 ▲ RTH-255 ▲ RTH-320

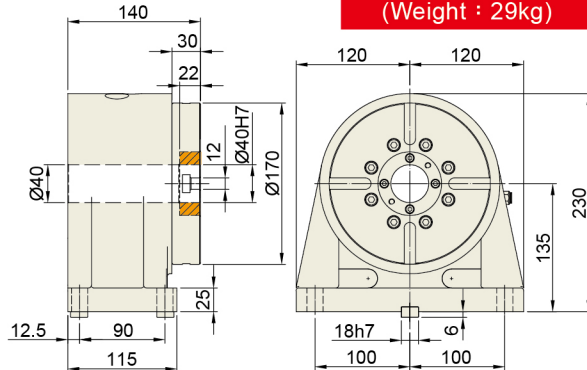
RTA-125 (Pneumatic Brake)

(Weight : 18kg)



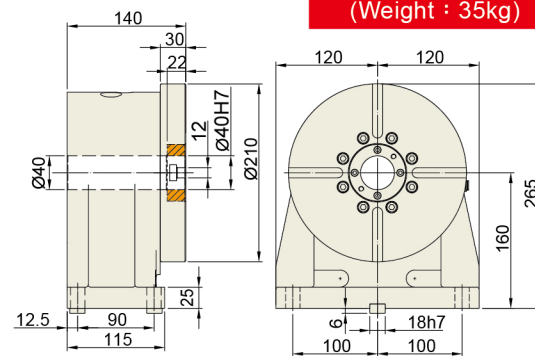
RTA-170 (Pneumatic Brake)

(Weight : 29kg)



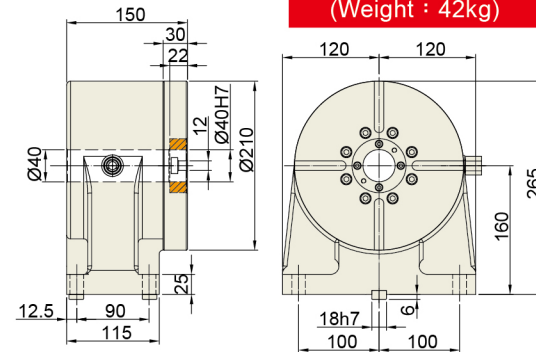
RTA-210 (Pneumatic Brake)

(Weight : 35kg)



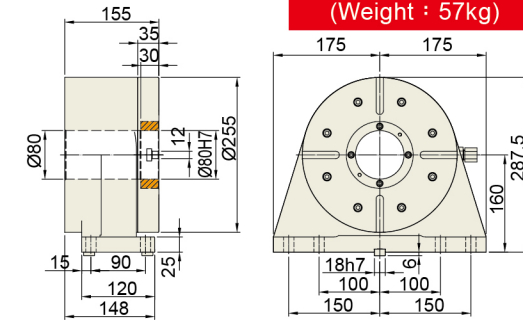
RTH-210 (Hydraulic Brake)

(Weight : 42kg)



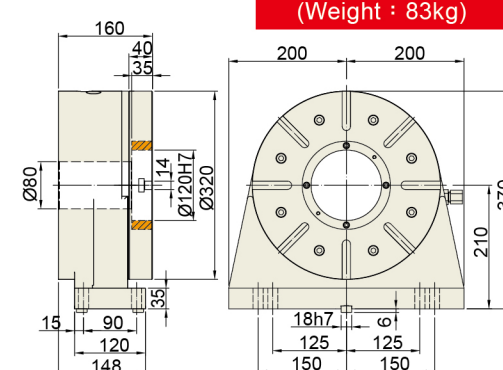
RTH-255 (Hydraulic Brake)

(Weight : 57kg)



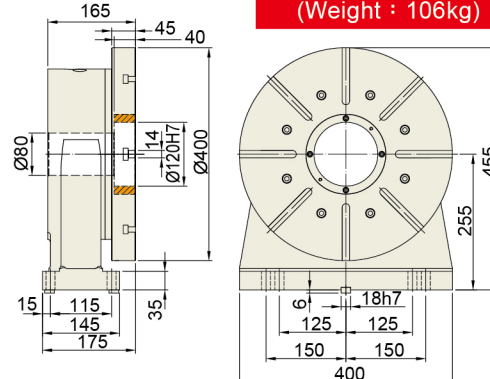
RTH-320 (Hydraulic Brake)

(Weight : 83kg)



RTH-400A (Hydraulic Brake)

(Weight : 106kg)



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

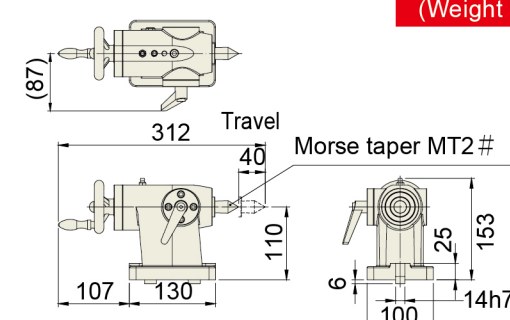
TTJ-125A=MT2



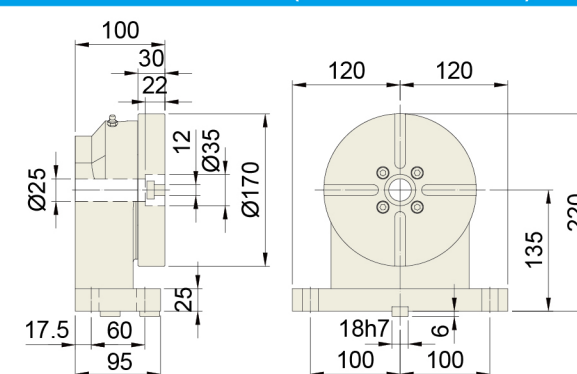
▲ RT-170F ▲ TTJ-125A ▲ TJ-210 (with Fixed Taper) ▲ TTJ-210 (with Replaceable Taper) ▲ ATTJ-170 (with Pneumatic switching valve) ▲ HTTJ-320 (with Hydraulic switching valve)

TTJ-125A light manual tailstock

(Weight : 8.5kg)

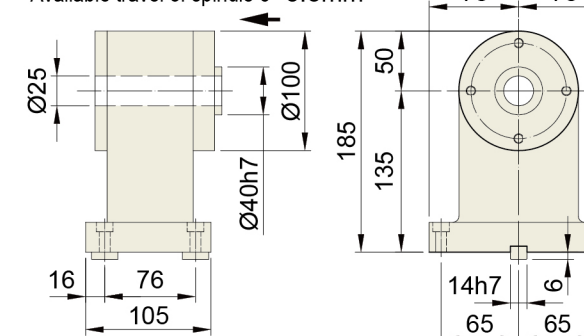


RT-170F (without brake)



RT-135 simplified rotary tailstock(without brake)

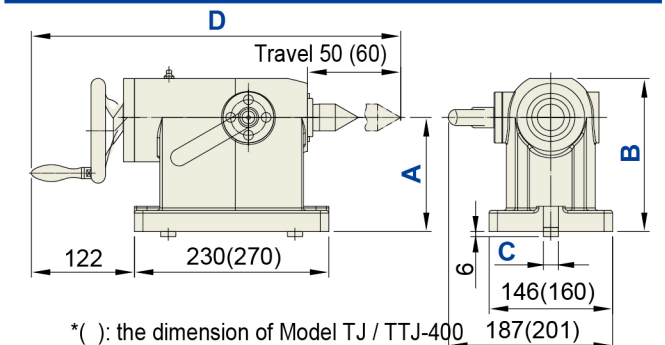
Available travel of spindle 0~0.5mm



Advantage : (Short Cylinder)

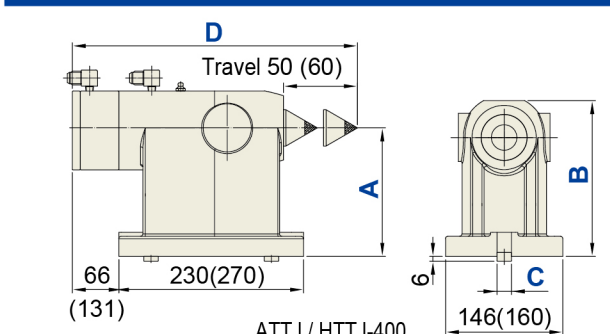
Advantage : (Short Cylinder)

TJ/TTJ



*() : the dimension of Model TJ / TTJ-400

ATJ/ATTJ HTJ/HTTJ



*() : the dimension of Model ATTJ / HTTJ-400
ATJ / HTJ - 400

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

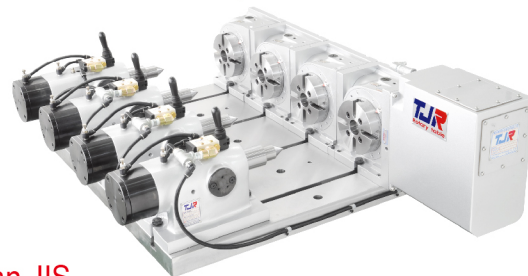
Manual Tailstock Series with Pneumatic / Hydraulic switching valve

(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 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 multi spindle 4W Series**(4-wheel coupled, **Powerful** Pneumatic Brake)**AR-125-4W**

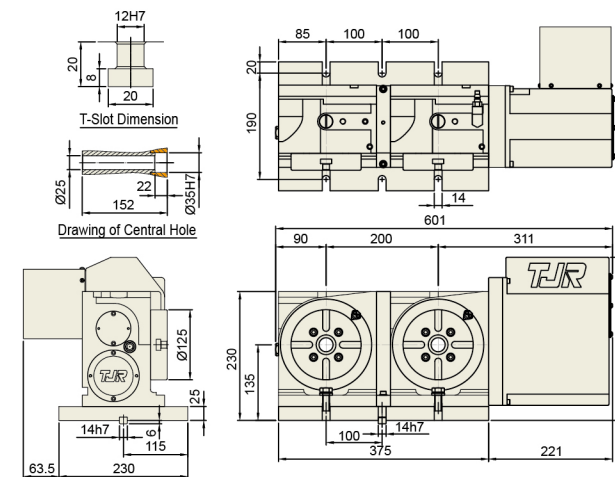
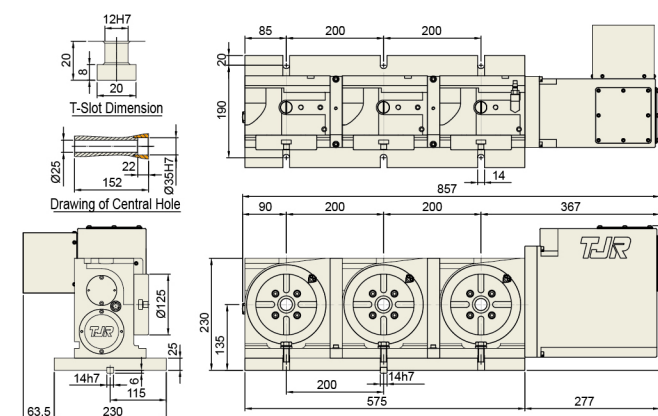
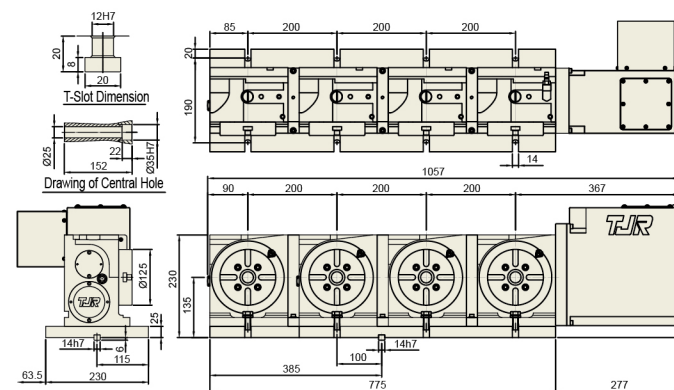
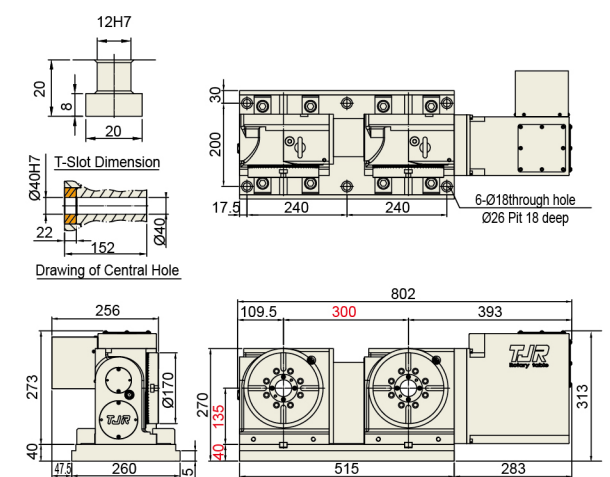
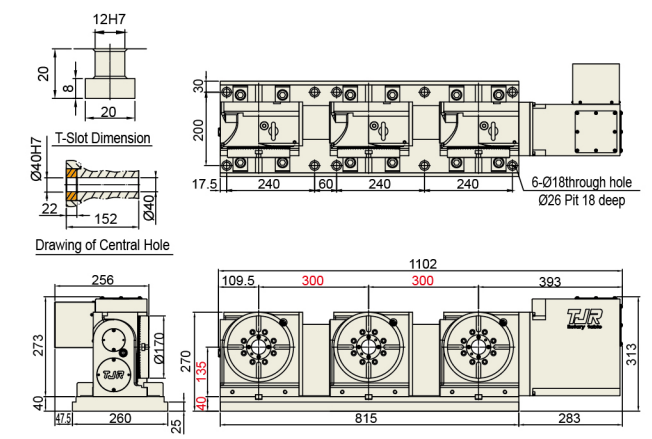
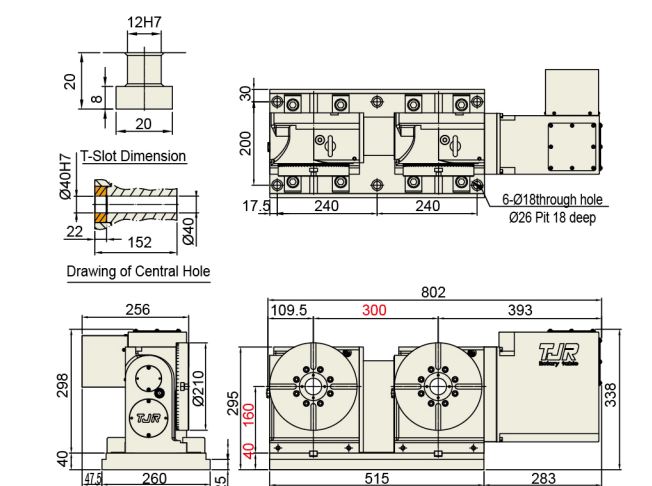
▲ **AR-170-2W**
2 wheel coupled (pitch extended type)



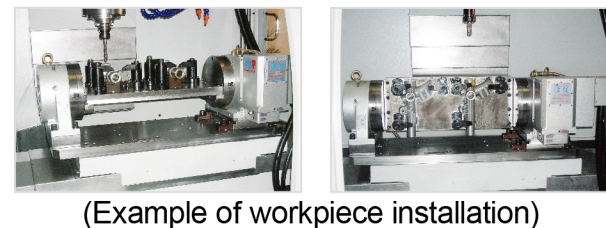
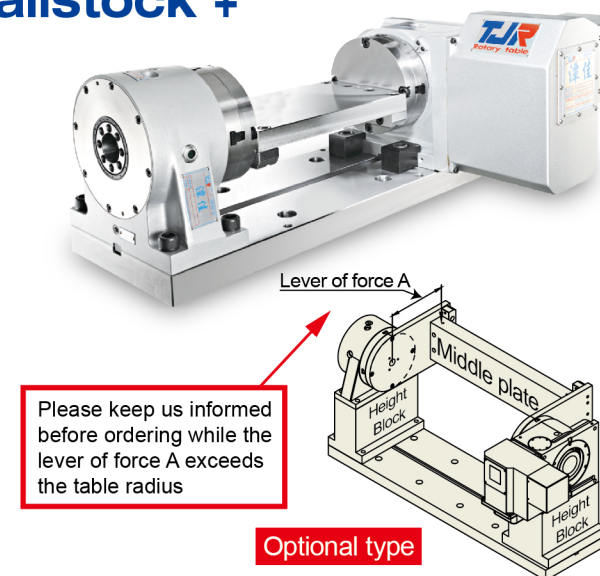
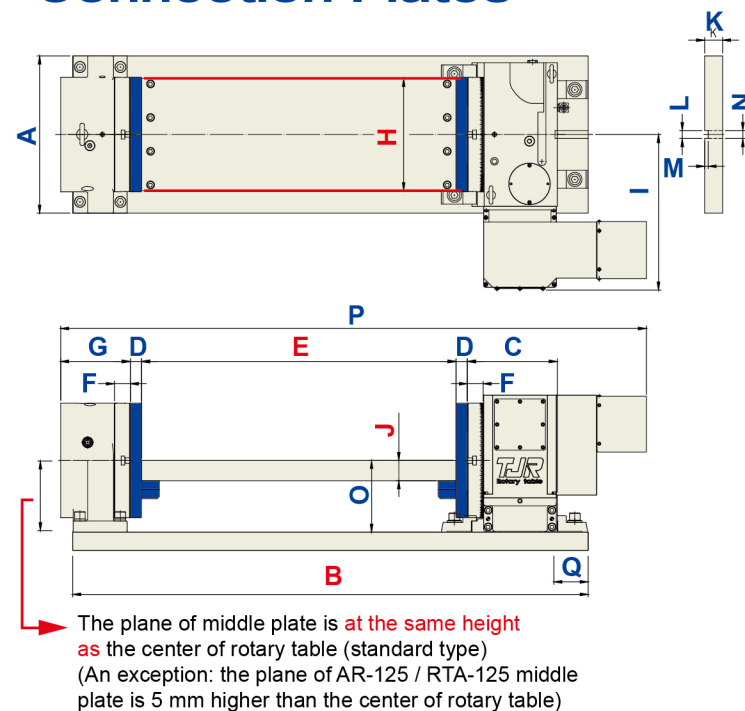
▲ **AR-125-4W**
4 wheel coupled + manual
tailstock + big base plate

The Standard of Precision Test: Japan JIS

Item / Model		Unit	AR-125 - 2W / 3W / 4W	AR-170-2W/3W	AR-210-2W/3W
Table Diameter		mm	Ø 125	Ø 170	Ø 210
Diameter of Table Central Hole		mm	Ø 35H7	Ø 67	Ø 67
Inner Diameter of Mandrel Sleeve		mm	-	Ø 40H7	Ø 40H7
Diameter of Center Through Hole		mm	Ø 25	Ø 40	Ø 40
Center Height(Vertical)		mm	135	175	200
Minimum distance between table centers		mm	200	300	300
Table T-slot Width		mm	12H7	12H7	12H7
Guide Block Width		mm	14h7	18h7	18h7
Min. Increment		deg.	0	0.001	0.001
Indexing Precision		sec.	40	20	20
Repeatability		sec.	4	4	4
Clamping System (Pneumatic)		kg/cm ²	6	6	6
Clamping Torque		kg-m	13	31	31
Servo Motor Model	FANUC	Taper Shaft with Key	【2W/3W】 α4i / β8is 【4W】 α8i / β12is	α8i / β12is	α8i / β12is
	MITSUBISHI	Direct Shaft without Key	HF-104	HF-104/154	HF-104/154
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	-	5.4	8.3
Allowable Workpiece Load	Vertical	kg	50	75	75
	with Tailstock	kg	100	150	150
	F	kgf	1000	1450	1450
Allowable Load (with Rotary Table Clamping)	FxL	kgf.m	45	100	100
	FxL	kgf.m	13	31	31
Strength of worm gears		kg.m	9	18	18
Net Weight (servo motor excluded)		kg	82 / 120 / -		

NEW Powerful Brake System**AR-125-2W****NEW Powerful Brake System****AR-125-3W (Standard type)****NEW Powerful Brake System****AR-125-4W (Standard type)****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)**

CNC Rotary Table + Rotary Tailstock + Connection Plates



Specification

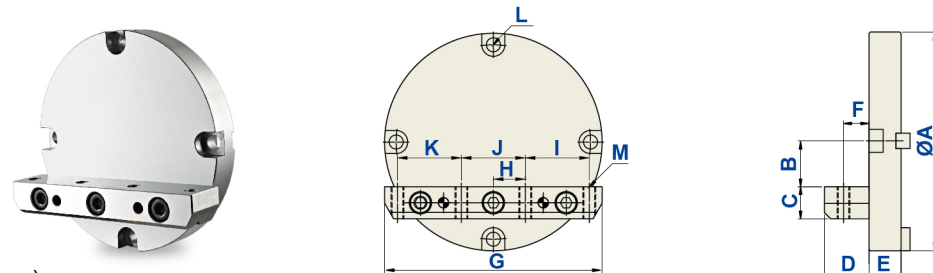
Model /Dimension	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
AR-125 / RTA-125	250	725	152	20	400	30	130	125	302	30	35	14	8	14	115	828	0
AR-170 / RTA-170	300	911	152	25	500	30	140	170	336	35	40	18	8	18	135	947	69
AR-210 / RTA-210	300	1011	152	25	600	30	140	200	336	40	40	18	8	18	160	1047	69
HR-210 / RTH-210	300	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)

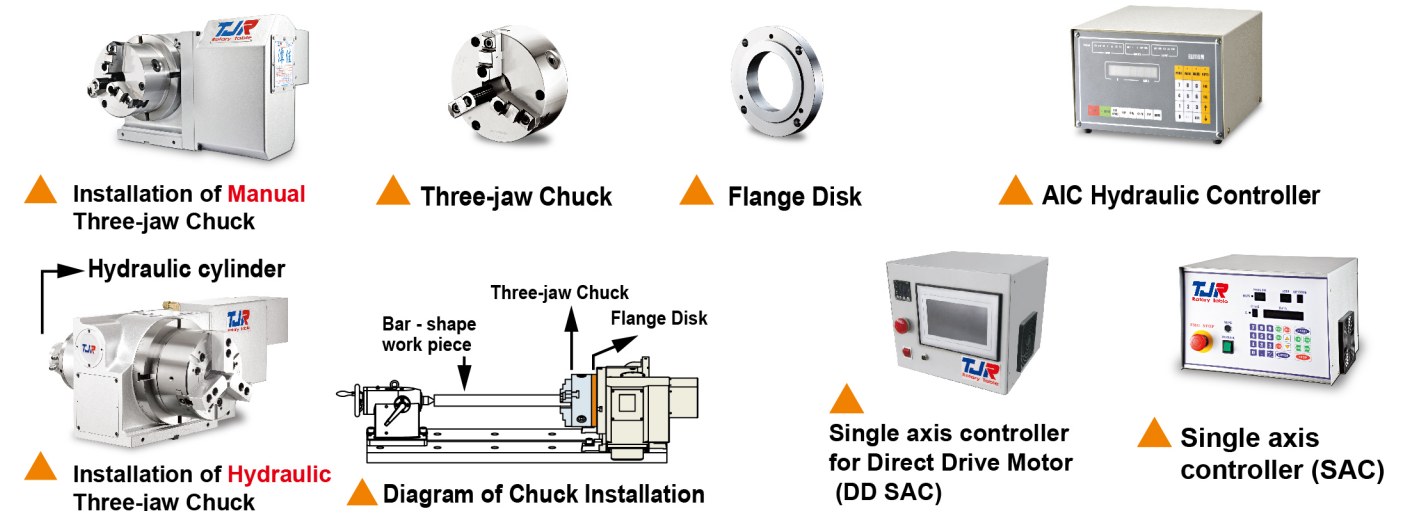
Disk L-block



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



Specification Table of Manual Three-jaw Chuck

Specification Table of Manual Three-jaw Chuck							Through hole of chuck adapter.	The thickness of chuck adapter				
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.		AR-125	AR-170/210/250	HR-255 HI-255	HR/HI-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

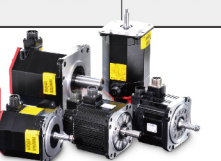
Unit : mm

Servo Motor Table (Please use oil-proof motors)

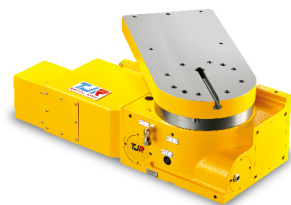
MODEL	AR-125	AR-170		FHR-255C	FAR-170	HR-320	FHR-320C	HR-800
MOTOR SPECIFICATIONS	FAR-125 (Rotary axis)	AR-210 AR-250 HR-250 FAR-125 (Tilting axis) FAR-170 (Rotary axis) FAR-210 (Rotary axis)	HR-255	(Rotary axis) FHR-255C (Rotary axis)	(Tilting axis) FAR-210 (Tilting axis) FHR-255C (Tilting axis) FHR-320 (Rotary axis) FHR-400C (Rotary axis) FHR-400BC (Rotary axis)	HR-400 HR-500 HR-630	(Tilting axis) FHR-320 (Tilting axis) FHR-400C (Tilting axis) FHR-400BC (Tilting axis) FHR-500C (Rotary axis)	and above FHR-500C (Tilting axis)
FANUC	α2i / β4is	α4i / β8is	α8i / β8is / β12is	α8i / β8is	α8i / β12is	α12i / β22is	α12i / β22is	α22i / β30is
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	1FK7083	1FK7083	1FK7101
FAGOR	FXM13.40A	FXM22.30A	FXM32.30A	FXM32.30A	FXM32.30A	FKM 64.30A	FKM 64.30A	FKM 82.30A
HEIDENHAIN	QSY-96A	QSY-116C	QSY-130C QSY-116E	QSY-130C	QSY-116E	QSY-155B	QSY-155D	QSY-155D

※ If other servo motors are going to be employed for rotary tables, please consult TJR in advance.

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

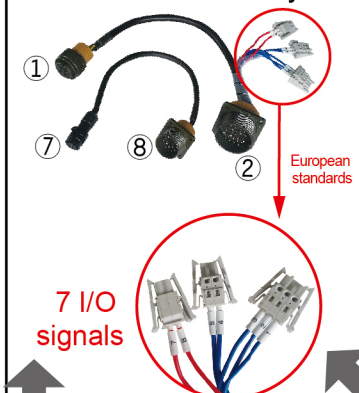


Accessories Series

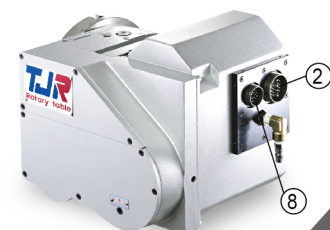


Customized Rotary Table

Internal Cable inside 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

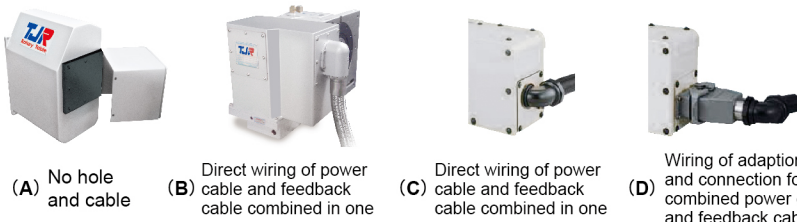
No. ⑦ - ⑧ feedback cable

7 I/O signals for rotary table

※ TJR can also provide

③ - ⑥ and ⑨ - ⑫ cables

Cable assembly the customer provide (Optional)



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.

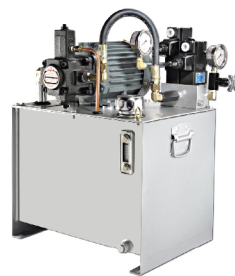


Air Hydraulic Booster Unit :

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

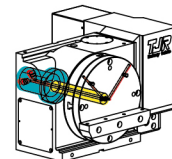
Pneumatic / Hydraulic distributor : (can be equipped with 2, 4, 6, 8 holes)



2 holes :
1 input ; 1 output



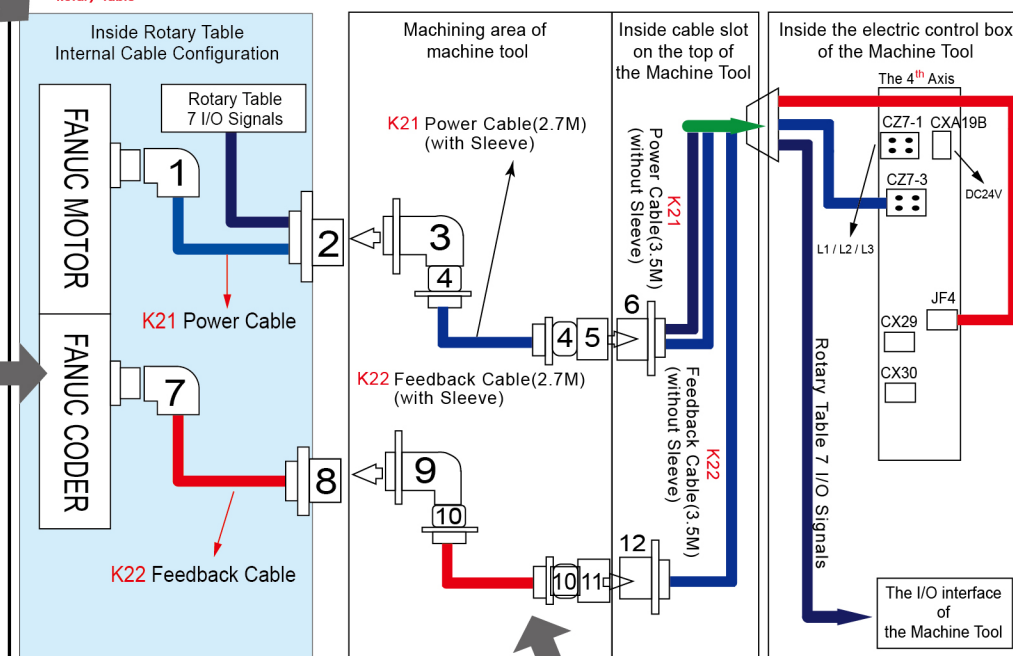
8 holes :
4 input ; 4 output



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.

TJR Power & Feedback Cable Diagram

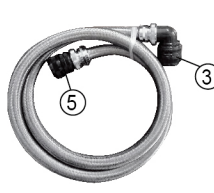


Cables located inside machining area of machine tool.

Signal cable



Power cable



Accuracy comparison sheet while using angle encoder

Model of angle encoder	Angle encoder accuracy	Rotary table accuracy
ECN-223F (FANUC)	± 10"	Within 30" (for tilt axis)
ECN-223M (MITSUBISHI)		
ECN-225 (SIEMENS(HEIDENHAIN))		
RCN-2390F (FANUC)	± 5"	Within 12"
RCN-2390M (MITSUBISHI)		
RCN-2310 (HEIDENHAIN)		
RCN-2380 (SIEMENS)	± 2.5"	Within 8"
RCN-228 (SIEMENS)		
RCN-5590F (FANUC)	± 2.5"	Within 8"
RCN-5590M (MITSUBISHI)		

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
Suitable for heavy-duty cutting in the horizontal and vertical directions.	Only suitable for light cutting	Only suitable for light cutting

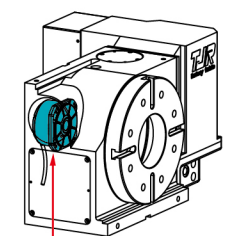


Diagram of angle encoder installation



Angle encoder

2 Advanced inspection facilities

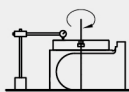
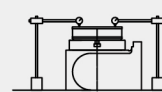
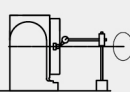
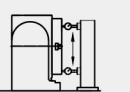
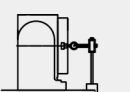
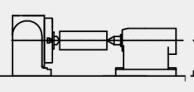
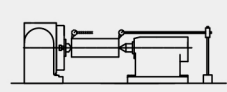
	TJR	Others
2D measuring equipment	YES	YES
3D measuring equipment	YES	NO
Geometry precision testing	Fully utilized to test all kind of precision and runout.	
Laser measuring equipment	YES	NO
Indexing precision testing	Every rotary table needs to pass laser angular test before shipment	

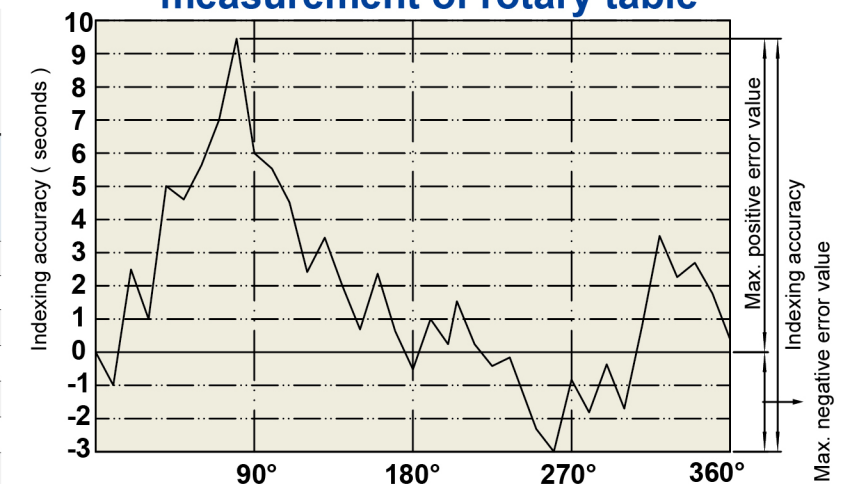


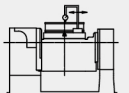
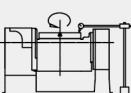
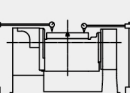
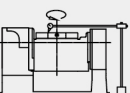
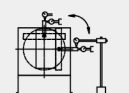
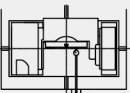
Alternative methods

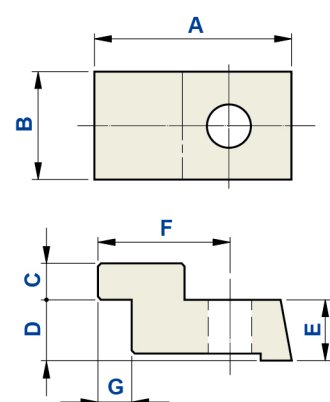
1. Use the old-type measuring equipment
2. Use cheaper encoder or angle encoder
3. Use the fixture with height gauge to measure 4 squareness

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

AR/HR (single axis)								The Standard of Precision Test : Japan JIS			
Inspection Items		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 / HR-800		0.03	0.02	0.03	0.01	0.03	0.03	15"		0.02	0.02

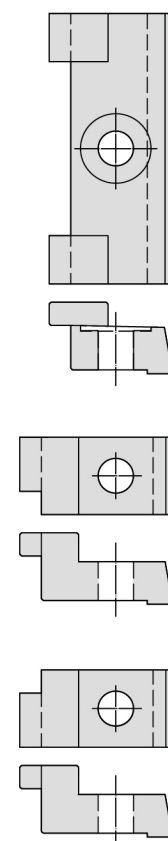
Rotation angle measurement of rotary table

FHR (dual axis)							The Standard of Precision Test : Japan JIS		
Inspection Items		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
MTHR-255		0.02	0.02	0.02	0.01	0.02	-	15"	0.02

Specification – Clamping block**Examples of special 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)



▲ Trade fair exhibition

▲ Mazak Horizontal Machining Center
(Machining the main body)

▲ Assembly Line

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

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

A-1



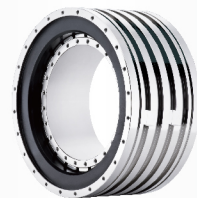
Driven by **super high speed**
direct drive motor
(super high speed: **2000** rpm)



Strength: **can work as a lathe concurrently**

- 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: **2000** 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)

A-2



Driven by direct drive motor
(speed: **200** rpm)



Strength:

- ① Truly **zero backlash** during the clockwise / anti-clockwise rotation.
- ② Truly **zero wear** for the transmission mechanism.
(No abrasion at all)
- ③ High speed: **200** rpm
- ④ Long-lasting high precision
(The actual precision depends on the selected angle encoder)

B



Driven by **roller gear cam**
(speed: **80** rpm)

**Made by Japanese
roller gear cam master**



Strength:

- ① Almost no backlash during the clockwise / anti-clockwise rotation
- ② **Almost no abrasion** for the transmission mechanism
- ③ High speed: **80** rpm

C



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



Strength:

- ① The price is the lowest
 - ② It's very easy to adjust backlash after some abrasions
- ※ Roller gear cam is an option to drive tilt axis of dual-axis rotary table.

TJR Global Sales

Innovative Product

Integrity Business

Responsible Service

