TJR®
Rotary Table

Exquisite Products of Taiwan.
Extreme Ingenuity

ROTARY TABLE

TJR®
Rotary table

Japan-made
worm gear

Alloy steel
worm gear

TJR Precision Technology
www.tjr.com.tw

The 10th edition

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

Alloy steel worm gear

(1) **Anti-wear** (2) **High torque**

Example of
alloy-steel-type model name

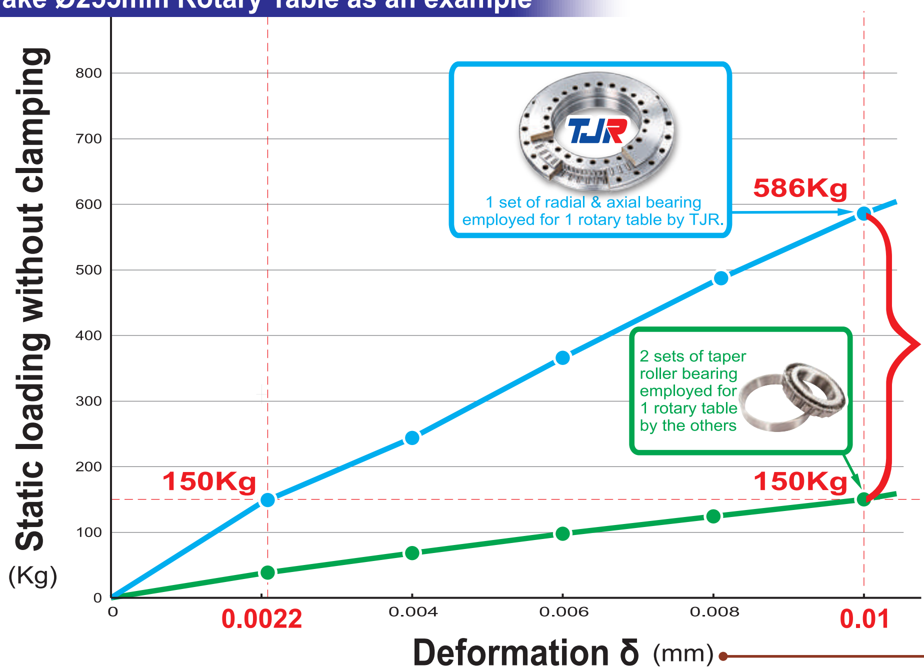
ARs-170 FHRs-320
HRs-255 FHRs-400CF

Japan-made high-tensile-brass worm gear

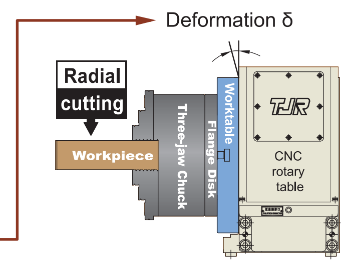
Wear life is 2.6 times longer than aluminum bronze PBC3.

Rigidity comparison between radial & axial bearing and taper roller bearing

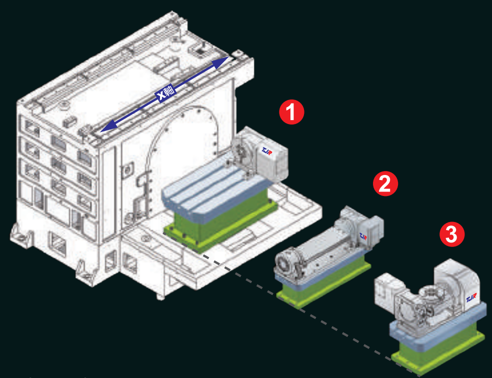
Take Ø255mm Rotary Table as an example



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



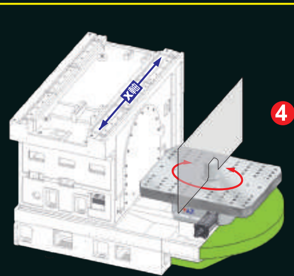
This is the only way to lead the trend.



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

Quintuple-purpose machine

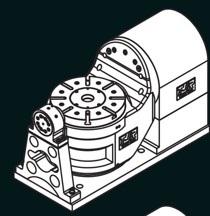
One machine is able to be installed with **FIVE** different kinds of rotary tables.



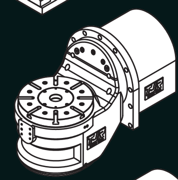
For vertical machining center with auto pallet changer
(3-axis moving column type)

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

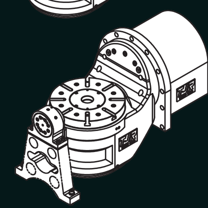
Make your 5-axes milling machine work as a vertical lathe concurrently. (Tilt axis: 1500-2500 rpm)



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

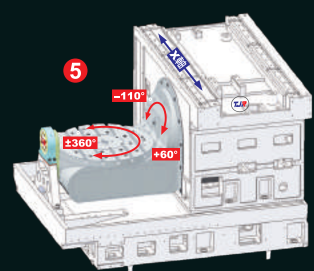


FAD-300iwj-30D single-arm type
(with sub-tailstock & support)
for 3-axis-moving-column vertical machining center

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

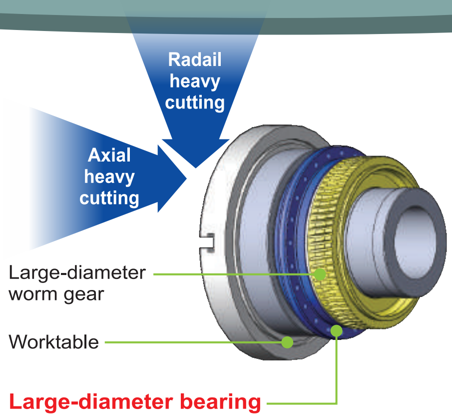
For 5-axis vertical machining center
(3-axis moving column type)

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

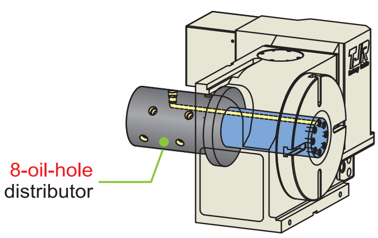


As below

FHR-630SN
single-arm type



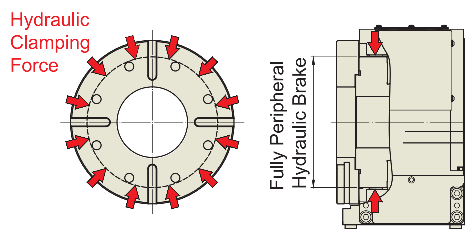
can sustain outer circle periphery of table, and accordingly **deliver high rigidity** and **optimize axial heavy-duty cutting.**



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.

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 wordtable; therefore, it causes run-out of table and low rigidity
So it is suitable for heavy duty cutting	Available for light cutting only



Drawing of encircling clamping mechanism

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

Endurable finish, shining with pearlescent and silver

Page index

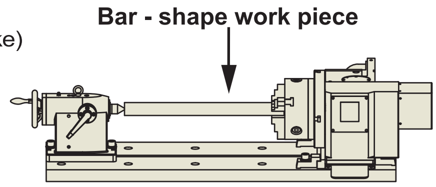
Page index

Instruction

How to choose a suitable TJR rotary table

1 Workpiece material :

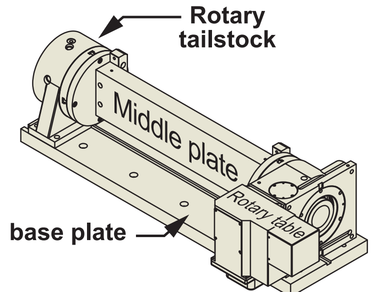
A：For materials like aluminum and copper, it is OK to select AR series (Pneumatic brake)
B：For materials like cast iron and steel, it is OK to select HR series (Hydraulic brake) or HI series (Hirth coupling Hydraulic brake)



Drawing ①

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 19)



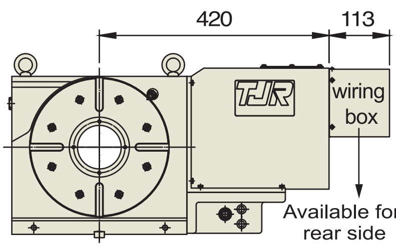
Drawing ②

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 52 for the grip range of the chuck.
B：If of odd shapes and more than two workpieces are processed at once (see page 51), 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.



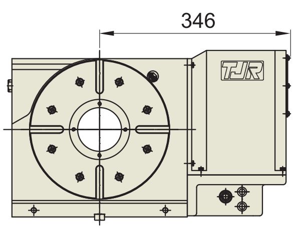
Drawing ③ : HR-255R

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]

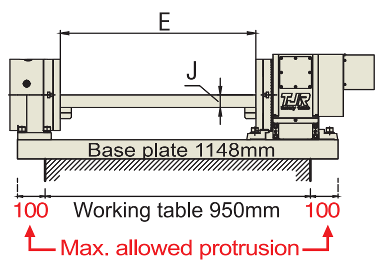
If the “B” distance is less than the “A” distance, it is certain that the rotary table will not collide with the sheet metal of the slide door. [Ex: 420mm < 450mm; thus it's ok to select HR255-R] If not, please change to sheet metal cover reduction version of TJR rotary table. [Ex: only 346mm in HR255-N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



Drawing ③-1 : HR-255N

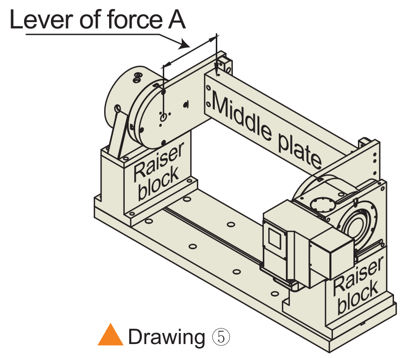
6 Verify the available room for placing the workpiece :

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 51) 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 51).



Drawing ④：
base is bigger than working table

⑦ Important notices :



▲Drawing ⑤

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.

⑧ "Reserved interface for the forth axis" :

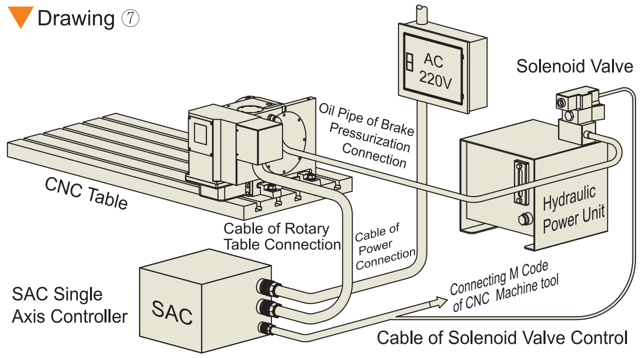
The so-called "reserved interface for the forth axis" refers to all the small hardware or PLC software necessarily reserved for the fourth axis on the machine as well as refers to five main components including ① rotary table ② 4^{th} axis motor ③ shielded power & feedback cables ④ unshielded power &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

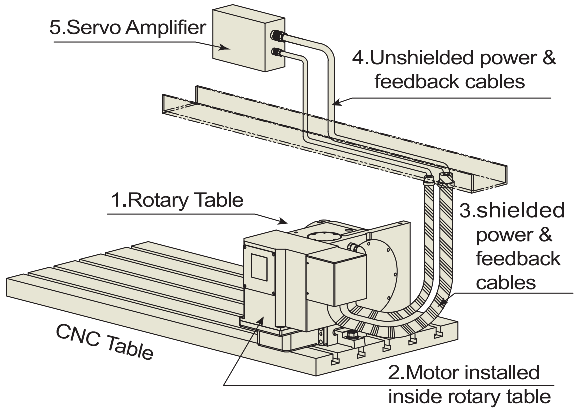
⑨ Application for single axis controller (SAC) :

▼Drawing ⑦



★ 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 4^{th} axis**

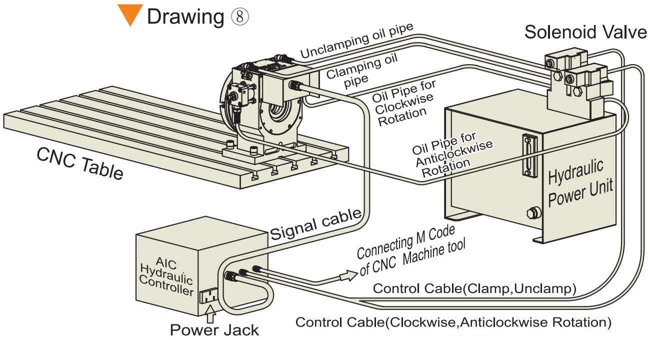


⑩ Application of AIC hydraulic controller :

It is not suitable for CNC rotary table, but for HC series hydraulic index table only(see page 35)

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.

▼Drawing ⑧



CNC Rotary Tables
(Min indexing angle – 0.001˚)

AR Series

(Powerful Pneumatic Brake)-
Right Side Motor

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

▲ AR-125R

FEATURE

Use radial & axial bearings

▲ AR-170R

▲ AR-210R

▲ AR-250R

▲ AR-255H

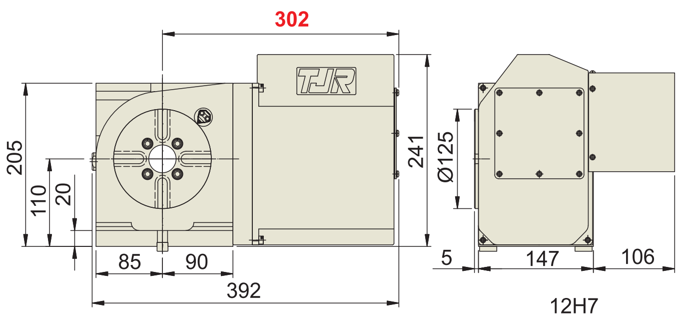
The Standard of Precision Test: Japan JIS

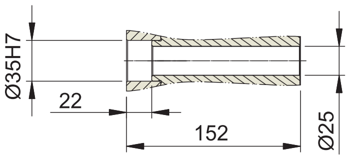
Hydraulic HR-170R/210R/250R are alternatives.

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	α4is / ß4is	α4i / α8i / ß8is	α4i / α8i / ß8is	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

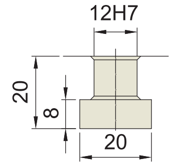
NEW Powerful Brake System

AR-125R





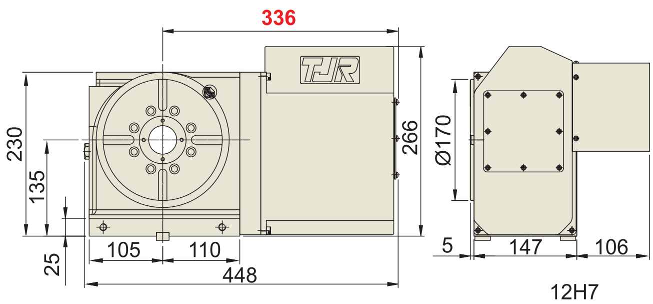
Drawing of Central Hole

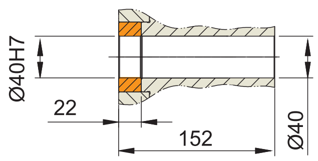


T-Slot Dimension

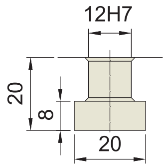
NEW Powerful Brake System

AR-170R HR-170R (Hydraulic Brake)





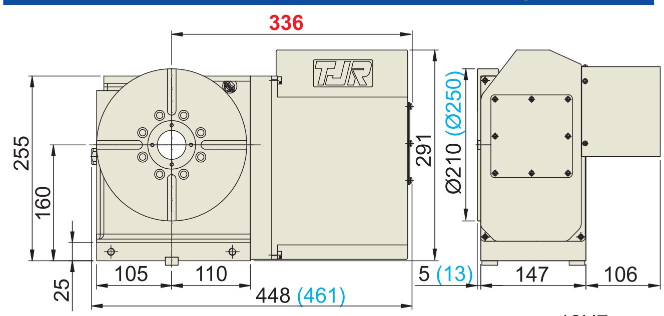
Drawing of Central Hole

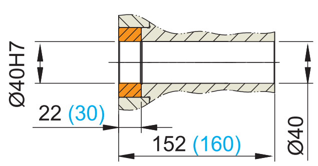


T-Slot Dimension

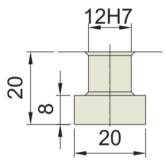
NEW Powerful Brake System

AR-210R/250R HR-210R/250R (Hydraulic Brake)





Drawing of Central Hole



T-Slot Dimension

*( ): the dimension of Model AR-250R

HRs-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

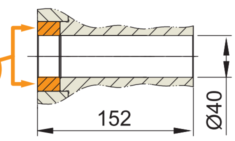
S: Dual-axis Single-arm Type

A: 2nd generation

Table Diameter

Alloy steel worm gear

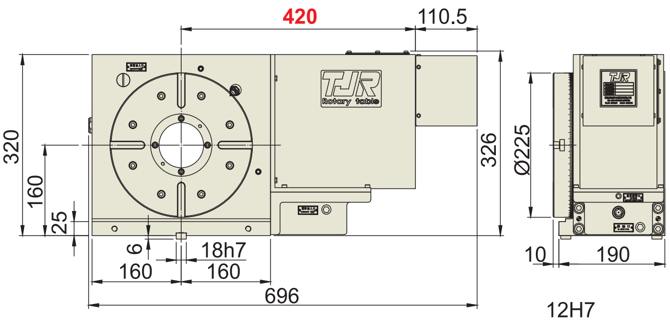
Model code (page 3~4)

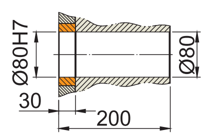


Drawing of Central Hole

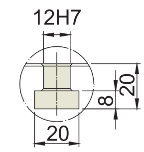
NEW Powerful Brake System

AR-255H





Drawing of Central Hole



T-Slot Dimension

CNC Rotary Tables (Min indexing angle – 0.001˚)

AR Series

(Powerful Pneumatic Brake)-

Left Side Motor

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

▲ AR-125L

FEATURE

Use radial & axial bearings

▲ AR-170L

▲ AR-210L

▲ AR-250L

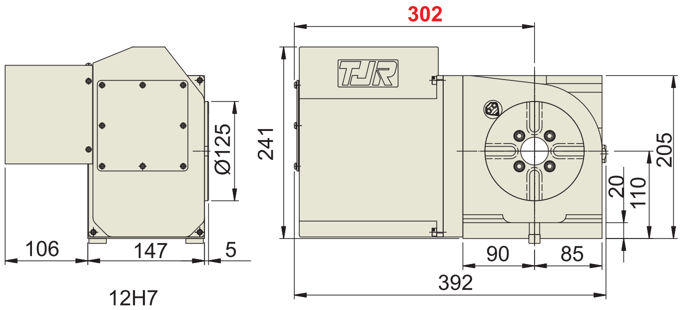
The Standard of Precision Test: Japan JIS

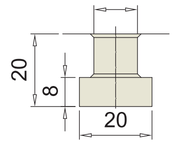
Hydraulic HR-170L/210L/250L are alternatives.

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	α4is / ß4is	α4i / α8i / ß8is	α4i / α8i / ß8is	α4i / α8i / ß8is
	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

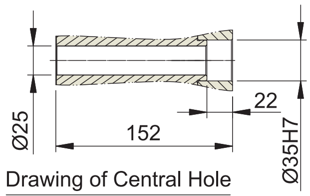
NEW Powerful Brake System

AR-125L





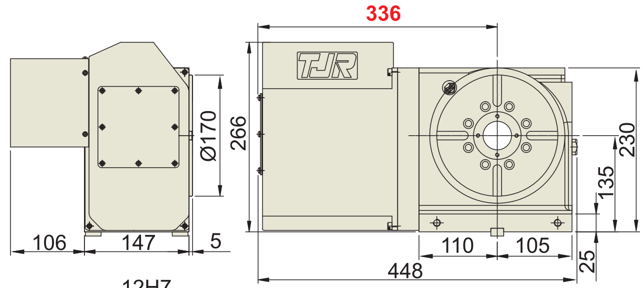
T-Slot Dimension

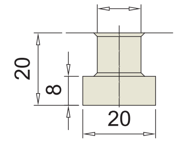


Drawing of Central Hole

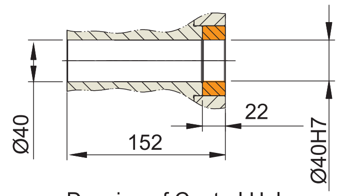
NEW Powerful Brake System

AR-170L HR-170L (Hydraulic Brake)





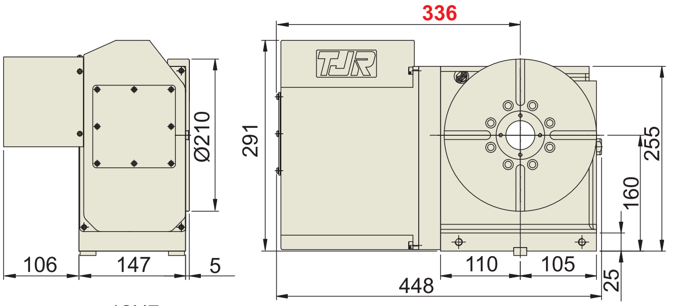
T-Slot Dimension

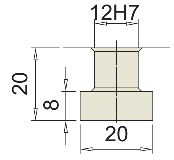


Drawing of Central Hole

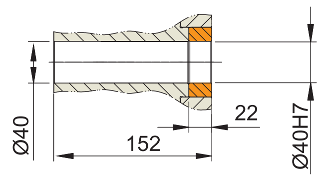
NEW Powerful Brake System

AR-210L HR-210L (Hydraulic Brake)





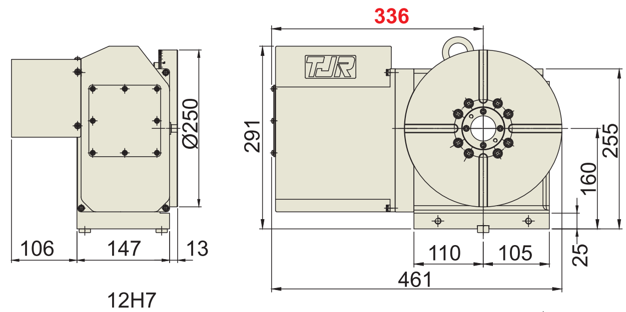
T-Slot Dimension

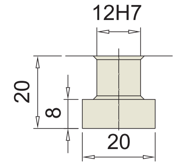


Drawing of Central Hole

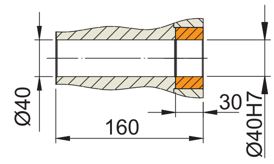
NEW Powerful Brake System

AR-250L HR-250L (Hydraulic Brake)





T-Slot Dimension



Drawing of Central Hole

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

Air pressure required

F.R.L unit
(economic option)

or

Cooling dryer
(luxurious option)

(Self-provided)

Solenoid valve
(inside of rotary table)

scenario 1

or

Solenoid valve
(inside of rotary table)

scenario 2

Simultaneously brake for rotary table and tailstock

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.

CNC Rotary Tables (Min indexing angle – 0.001°)

AR Series

(Powerful Pneumatic Brake)-

Back Side Motor

AR-125B/170B/210B/250B

For tapping center (short Y axis travel)

FEATURE

Use radial & axial bearings

Vertical

AR-170B
(Back Side Motor)

AR-210B
(Back Side Motor)

Picture of Power and Feedback Cable Connectors

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

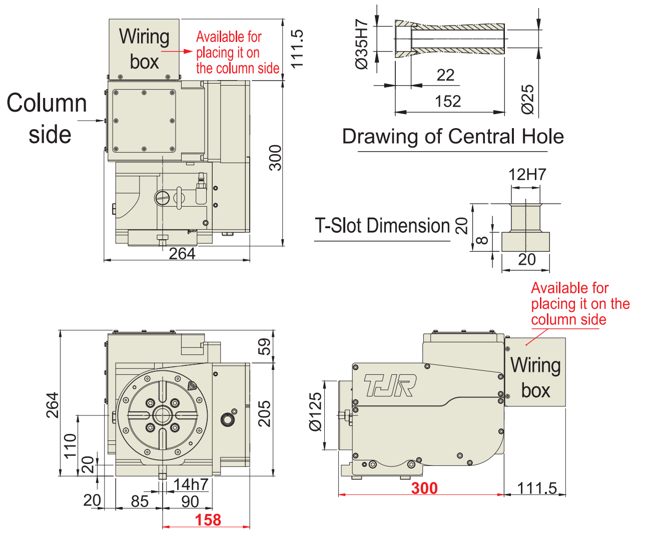
The Standard of Precision Test: Japan JIS

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	α4is / ß4is	α4i / α8i / ß8is	α4i / α8i / ß8is	α4i / α8i / ß8is
	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

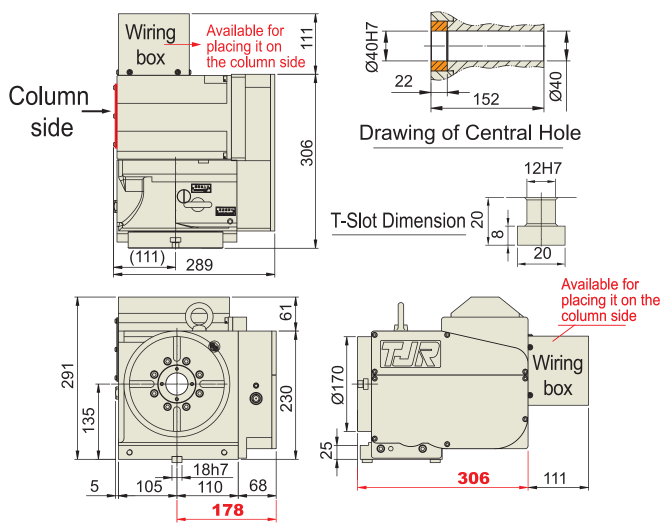
NEW Powerful Brake System

AR-125B



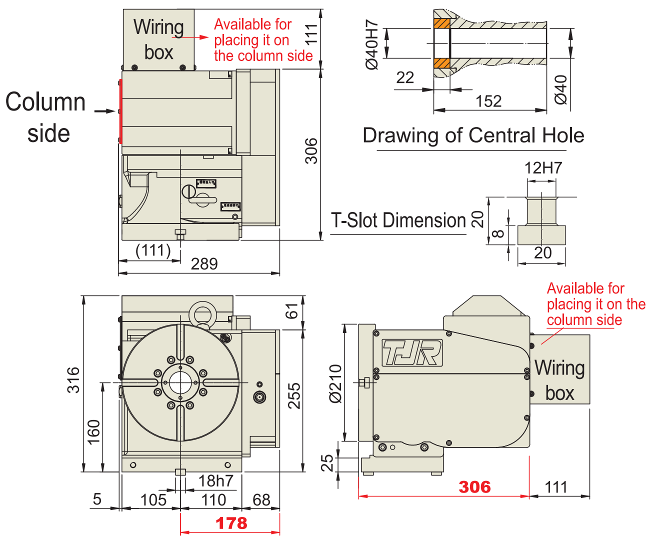
NEW Powerful Brake System

AR-170B HR-170B (Hydraulic Brake)



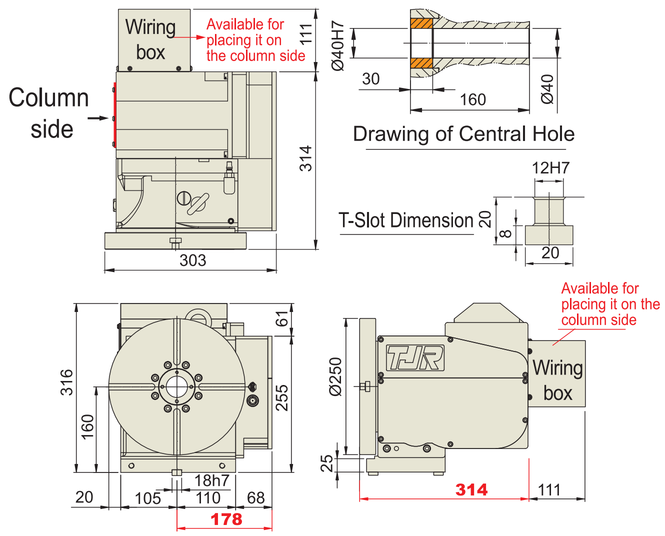
NEW Powerful Brake System

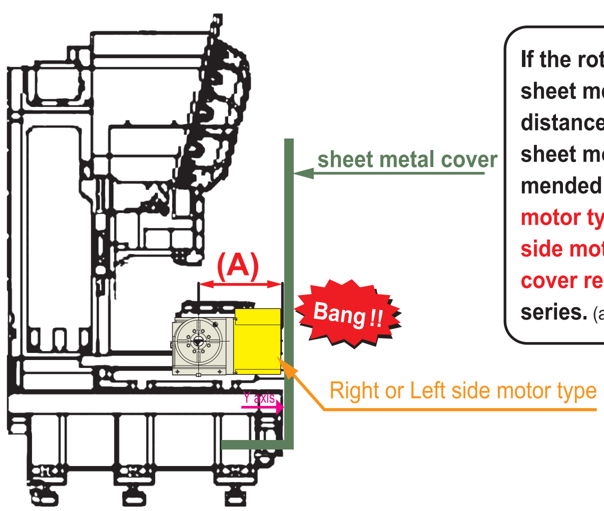
AR-210B HR-210B (Hydraulic Brake)



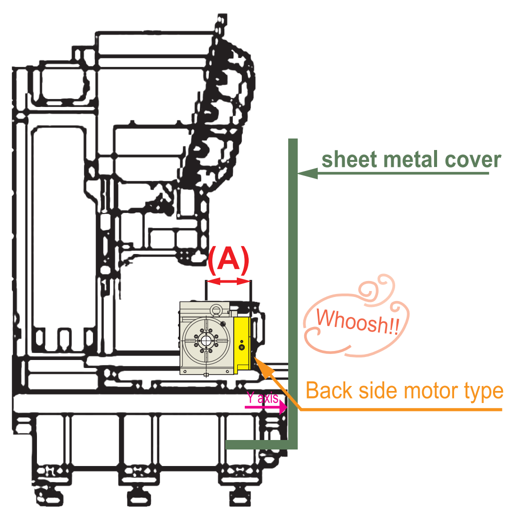
NEW Powerful Brake System

AR-250B HR-250B (Hydraulic Brake)





If the rotary table interferes with sheet metal cover (as shown, the distance A protrudes beyond sheet motor cover), it's recom-mended to choose back side motor type for AR series or right side motor with sheet metal cover reduction type for HR & HI series. (as Dia. to the right)



CNC Rotary Tables (Min indexing angle – 0.001˚)

HR Series (Hydraulic Brake)

HR-210/255/320/400

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

3 FEATURES

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

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

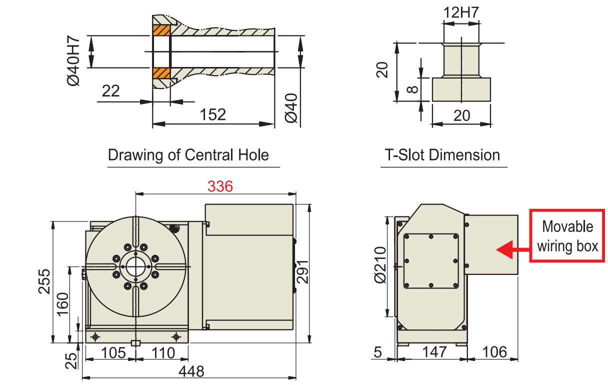
HR-320N
(Reduced Sheet Metal Cover for Vertical Application)

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

The Standard of Precision Test: Japan JIS

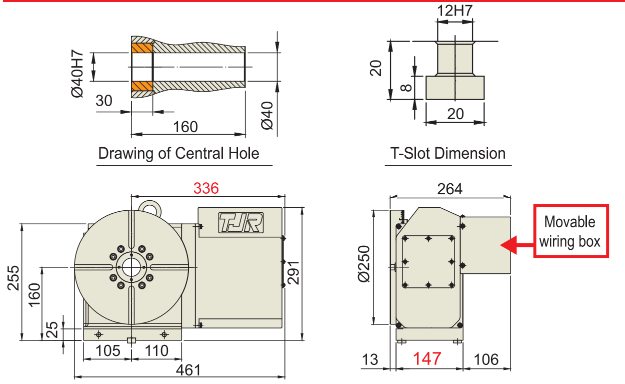
Item / Model		Unit	HR-210	HR-255	HR-320	HR-400
Table Diameter		mm	Ø 210	Ø 255	Ø 320	Ø 400
Diameter of Table Central Hole		mm	Ø 67	Ø 110	Ø 150	Ø 150
Inner Diameter of Mandrel Sleeve		mm	Ø 40H7	Ø 80H7	Ø 120H7	Ø 120H7
Diameter of Center Through Hole		mm	Ø 40	**Ø 80** Big Bore	**Ø 120** Big Bore	**Ø 120** Big Bore
Center Height (Vertical)		mm	160	160	210	255
Table Height (Horizontal)		mm	152	200	235	250
Table T-slot Width		mm	12H7	12H7	14H7	14H7
Guide Block Width		mm	18h7	18h7	18h7	18h7
Min. Increment		deg.	0.001	0.001	0.001	0.001
Indexing Precision		sec.	20	15	15	15
Repeatability		sec.	4	4	4	4
Clamping System (Hydraulic)		kg/cm^2	25	35	35	35
Clamping Torque		kg-m	35	70	115	200
Servo Motor Model	FANUC	-	α4i/α8i/ß8is(Taper shaft)	α8i/ß8is(Taper shaft)	α12i/ß22is(Straight shaft)	α12i/ß22is(Straight shaft)
	MITSUBISHI	-	HF-54/104 (Taper shaft)	HF-104/154 (Taper shaft)	HF-204 (Straight shaft)	HF-204 (Straight shaft)
Speed Reduction Ratio		-	1：90	1：120	1：120	1：120
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	44.4	**33.3**	**25**	**25**
Allowable Inertia Load Capacity (Horizontal)		$kg.cm.sec^2$	8.3	20.3	44.8	100
Allowable Workpiece Load	Vertical	kg	75	100	150	200
	with Tailstock	kg	150	250	350	500
	Horizontal	kg	150	250	350	500
Allowable Load (with Rotary Table Clamping)	F	kgf	1450	2000	3000	4000
	FxL	kgf.m	100	112	300	400
	FxL	kgf.m	35	70	115	200
Strength of worm gears		kg.m	18	55	80	170
Net Weight (servo motor excluded)		kg	55	109	204	286

HR-210R

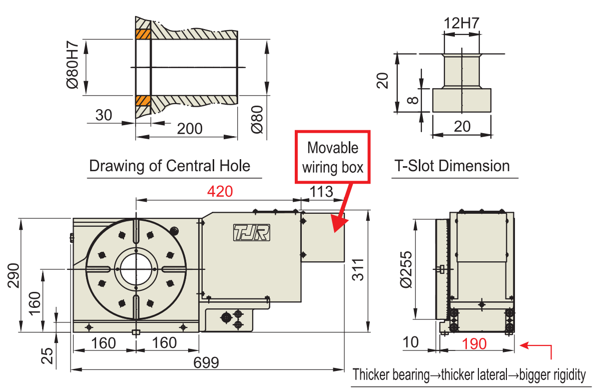


HR-250R

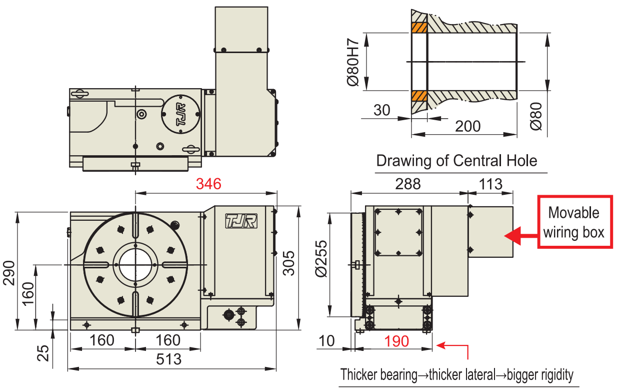
Special specified model used for shorter machine



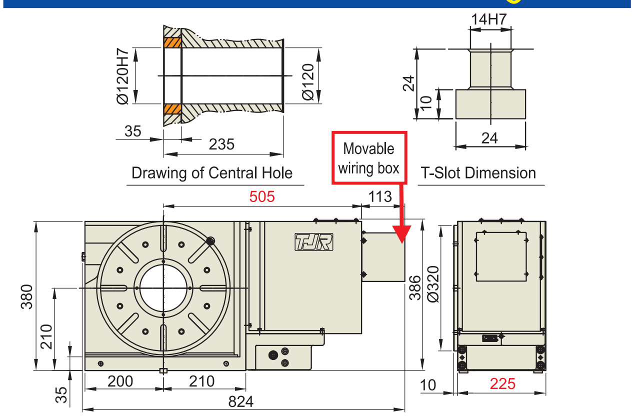
HR-255R



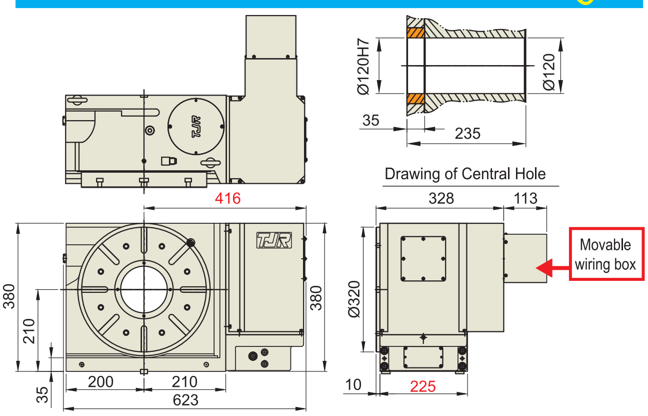
HR-255N (Sheet metal cover reduction)



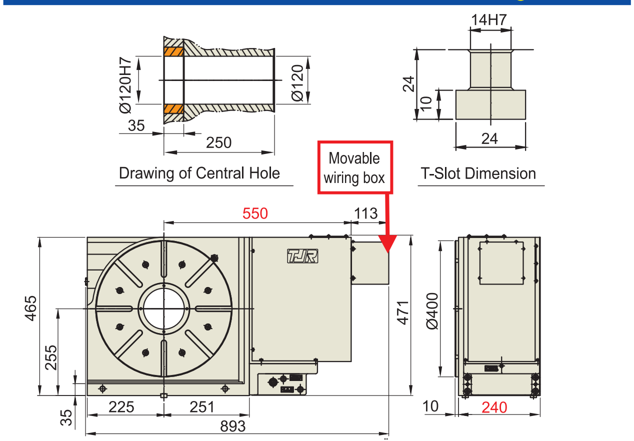
HR-320R



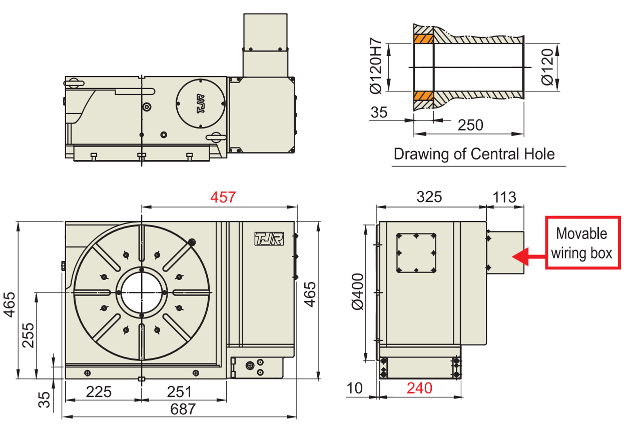
HR-320N (Sheet metal cover reduction)



HR-400R



HR-400N (Sheet metal cover reduction)



TJR CNC Rotary Table

CNC Rotary Tables (Min indexing angle – 0.001˚)

HR Series (Hydraulic Brake)

HR-500R/630R/800R

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

2 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.)

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

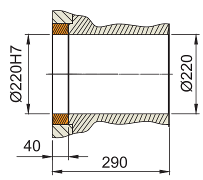
HR-800 (for Both Vertical and Horizontal Applications)

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

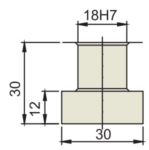
The Standard of Precision Test : Japan JIS

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	**Ø220** Big Bore	**Ø280** Big Bore	**Ø350** Big Bore
Center Height (Vertical)		mm	310	400	470
Table Height (Horizontal)		mm	290	325	350
Table T-slot Width		mm	18H7	18H7	18H7
Guide Block Width		mm	18h7	18h7	18h7
Min. Increment		deg.	0.001	0.001	0.001
Indexing Precision		sec.	15	15	15
Repeatability		sec.	4	4	4
Clamping System (Hydraulic)		kg/cm^2	35	35	35
Clamping Torque		kg-m	370	800	800
Servo Motor Model	FANUC	Direct Shaft without Key	α12i / ß22is	α12i / ß22is	α22i
	MITSUBISHI	Direct Shaft without Key	HF-204	HF-204	HF-204
Speed Reduction Ratio		-	1 : 180	1 : 180	1 : 180
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	16.6	16.6	11.1
Allowable Inertia Load Capacity (Horizontal)		$kg.cm.sec^2$	187.5	396.9	1200
Allowable Workpiece Load	Vertical	kg	250	400	800
	with Tailstock	kg	600	800	1500
	Horizontal	kg	600	800	1500
Allowable Load (with Rotary Table Clamping)	F	kgf	4000	5000	5000
	FxL	kgf.m	500	850	1000
	FxL	kgf.m	370	800	800
Strength of worm gears		kg.m	250	420	800
Net Weight (servo motor excluded)		kg	405	692	991

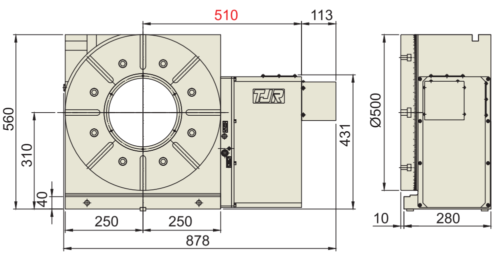
HR-500R



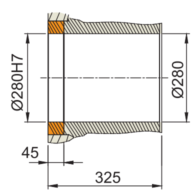
Drawing of Central Hole



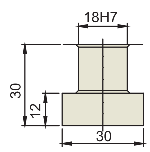
T-Slot Dimension



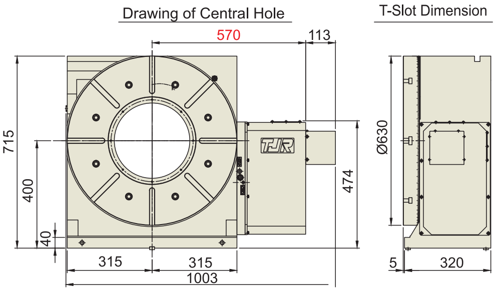
HR-630R



Drawing of Central Hole



T-Slot Dimension



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

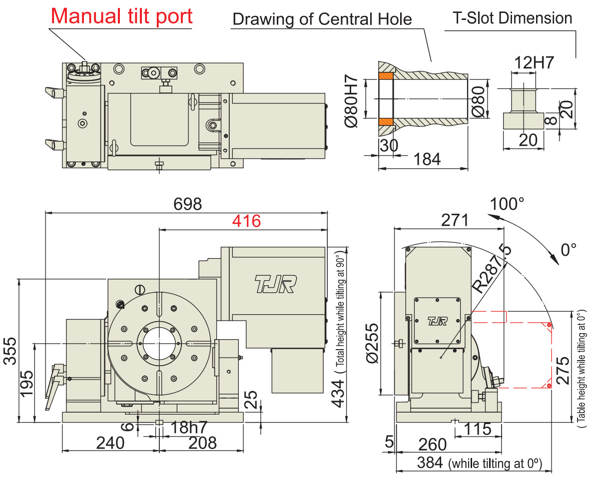
4 FEATURES

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

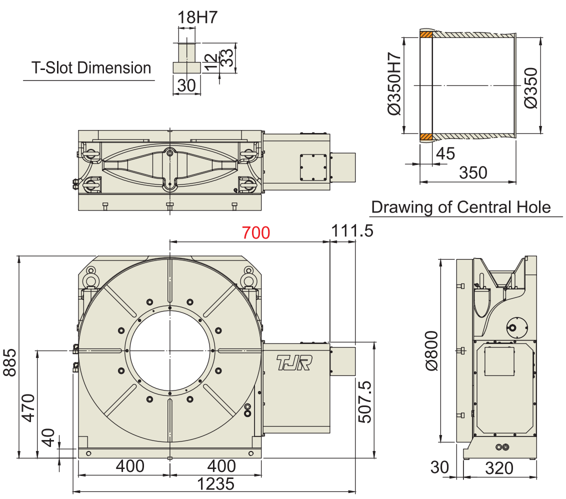
The Standard of Precision Test: Japan JIS

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	-
Repeatability		sec.	4	-
Clamping System (Hydraulic)		kg/cm²	Hyd.35	Manual double disk brakes
Clamping Torque		kg-m	70	-
Servo Motor Model	FANUC	Taper/Straight shaft	α8i / ß8is (Taper)	Manual
	MITSUBISHI	Taper shaft	HF-104 / HF-154	Manual
Speed Reduction Ratio		-	1：120	1：40
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	33.3	-
Allowable Inertia Load Capacity (Horizontal)		kg.cm.sec²	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	

MTHR-255 (Manual tilt)



HR-800R



CNC Rotary Tables
(Min indexing angle – 0.001°)

HR Series (Hydraulic Brake - Back Side Motor)

HR-320B/320B-2W/400B

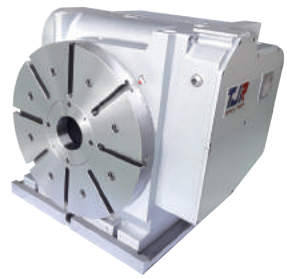
Vertical

FEATURE

Use radial & axial bearings

HR-320B (Back Side Motor)

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



HR-400B (Back Side Motor)

The Standard of Precision Test: Japan JIS

Item / Model		Unit	HR-320B	HR-320B-2W	HR-400B
Table Diameter		mm	Ø 320	Ø 320	Ø400
Diameter of Table Central Hole		mm	Ø 150	Ø 150	Ø150
Inner Diameter of Mandrel Sleeve		mm	Ø 120H7	Ø 120H7	Ø120H7
Diameter of Center Through Hole		mm	Big Bore Ø120x217 Deep	Big Bore Ø120x217 Deep	Big Bore Ø120x220 Deep
Center Height (Vertical)		mm	255	270	255
Table Height (Horizontal)		mm	-	-	-
Minimum distance between table centers		mm	-	400	-
Table T-slot Width		mm	14H7	14H7	14H7
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	115	115	200
Servo Motor Model	FANUC	Direct Shaft without Key	α12i / β22is	α12i / β22is	α12i / β22is
	MITSUBISHI	Direct Shaft without Key	HF- 204	HF- 204	HF-204
Speed Reduction Ratio		-	1 : 150	1 : 150	1 : 120
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	20	20	25
Allowable Inertia Load Capacity (Horizontal)		kg.cm.sec^2	-	-	-
Allowable Workpiece Load	Vertical	kg	150	150	200
	with Tailstock	kg	350	350	500
	Horizontal	kg	-	-	-
Allowable Load (with Rotary Table Clamping)	F	kgf	3000	3000	4000
	FxL	kgf.m	300	300	400
	FxL	kgf.m	115	115	200
Strength of worm gears		kgf.m	80	80	170
Net Weight (servo motor excluded)		kg	-	-	281

CNC Rotary Tables
(Min indexing angle – 0.001˚)

HR Series
(Embedded type)
iHHR-400

Horizontal

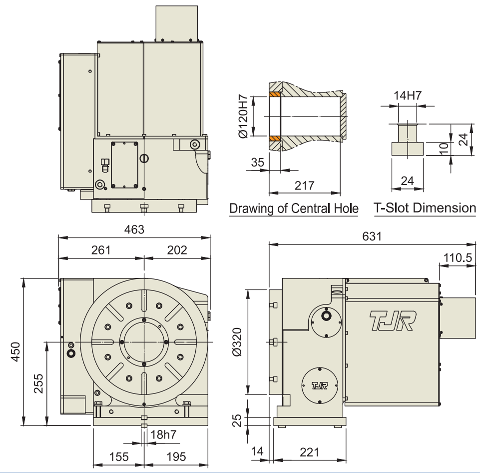
FEATURE

Use radial & axial bearings

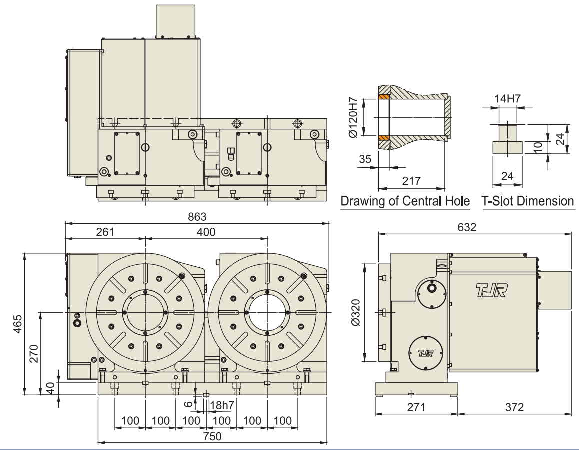
▶ iHHR-400

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.	0.001
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	-

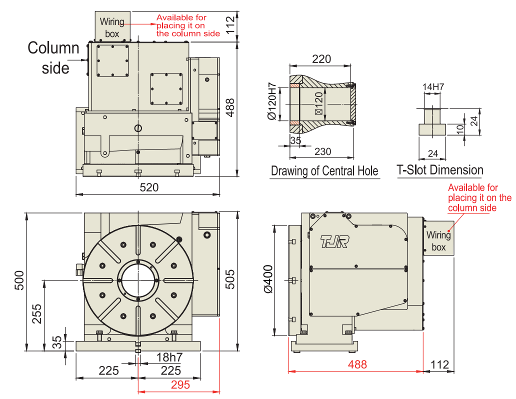
HR-320B (Back Side Motor)



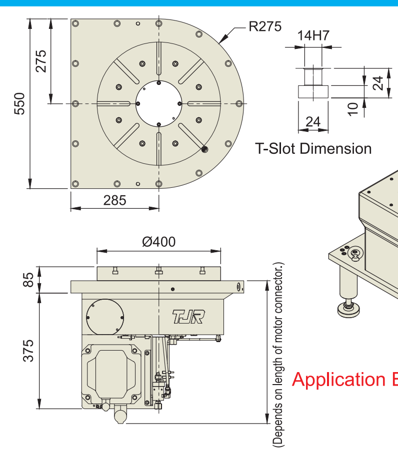
HR-320B-2W (Back side motor / 2-wheel coupled)

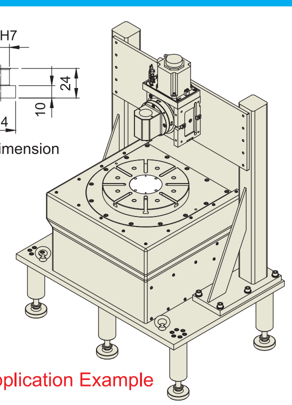


HR - 400B (Back side motor)



iHHR-400 (Embedded type)





Application Example

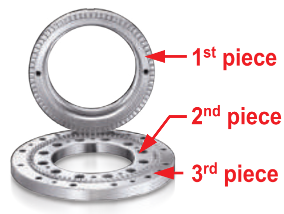
18

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**

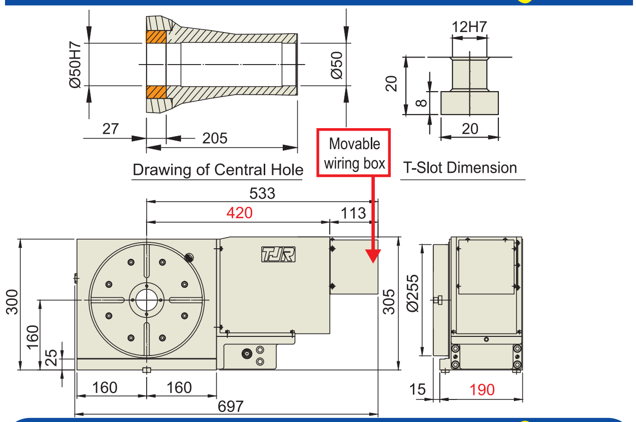
▲ **HI-320N**

▲ **HI-500**

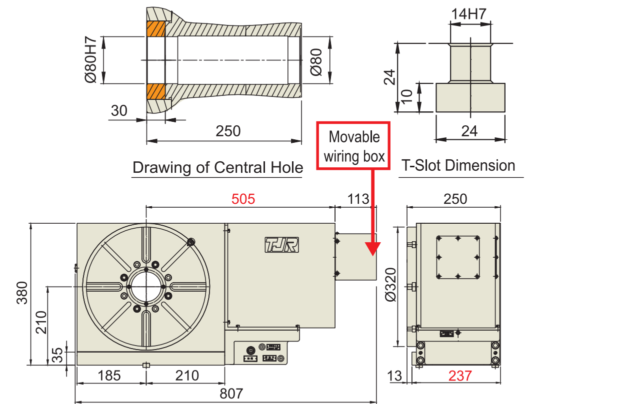
The Standard of Precision Test: Japan JIS

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/cm²	35	35	35	35
Clamping Torque		kg-m	300	400	500	1000
Servo Motor Model	FANUC	-	ß8is (Taper shaft)	ß22is (Straight shaft)	ß22is (Straight shaft)	ß22is (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.sec²	24.8	44.8	100	187.5
Allowable Workpiece Load	Vertical	kg	125	175	250	400
	with Tailstock	kg	300	400	500	600
	Horizontal	kg	300	350	500	600
Allowable Load (with Rotary Table Clamping)	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

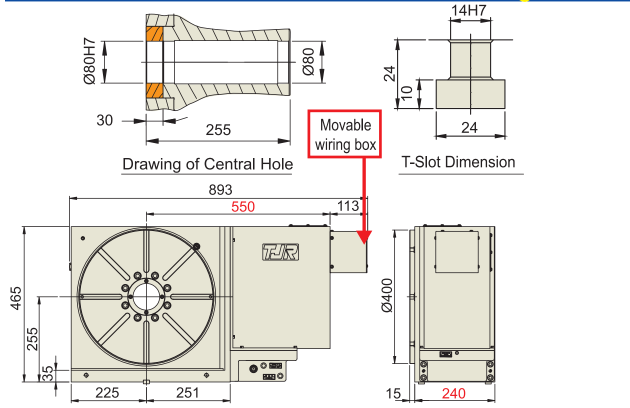
HI-255R



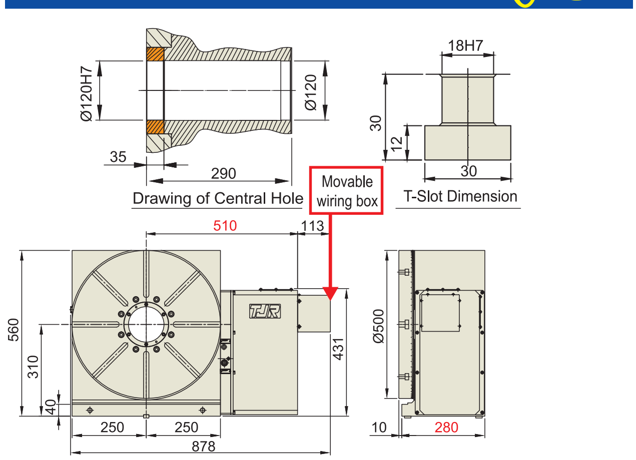
HI-320R



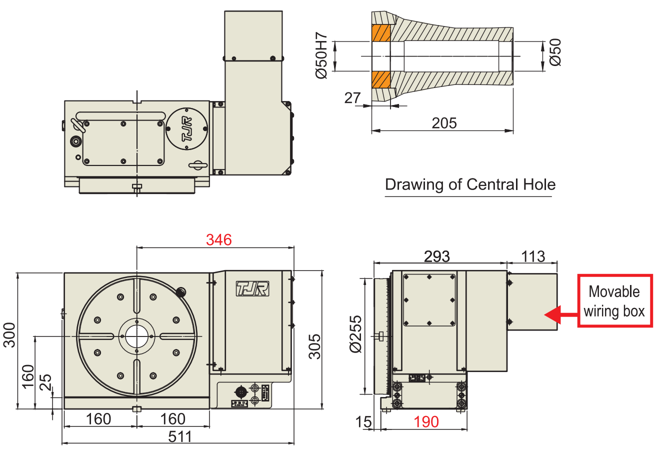
HI-400R



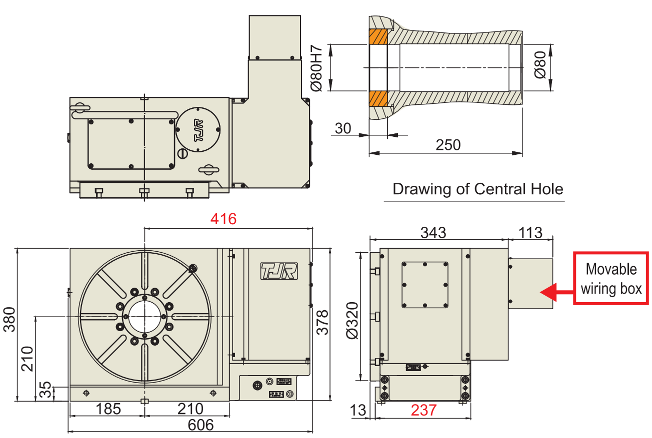
HI-500R



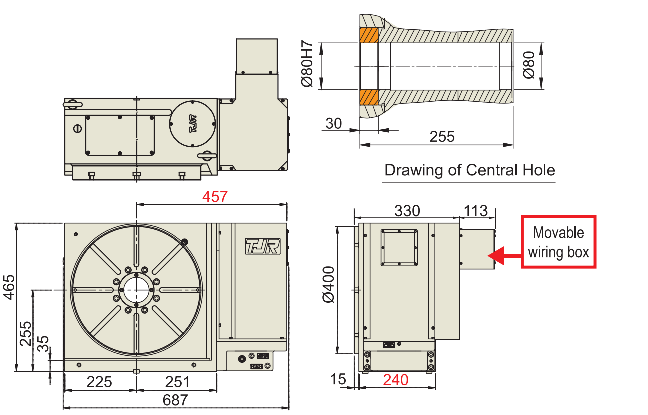
HI-255N (Sheet metal cover reduction)



HI-320N (Sheet metal cover reduction)



HI-400N (Sheet metal cover reduction)



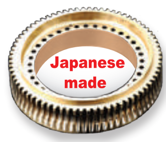
Hydraulic Brake Rotary Tailstock (with Delay Valve)
When HI series is chosen, the corresponding rotary tailstock should have a delay valve.

RTH-255

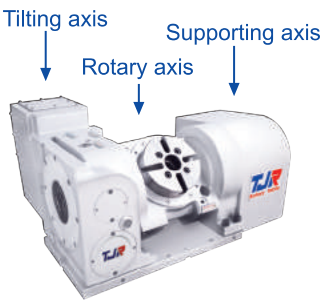
CNC Tilting Rotary Tables
Min. indexing angle –0.001°

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-125**

▲ **FAR-170A** (compact type)

▲ **FAR-170**

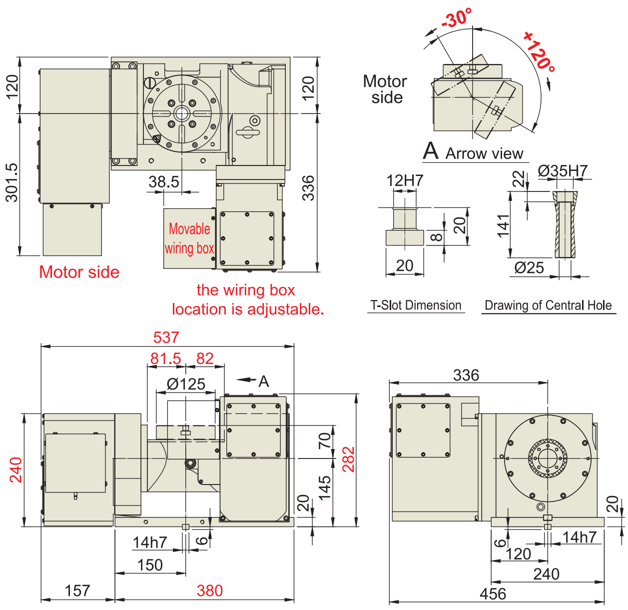
▲ **Workpiece sample – 5 axis simultaneous contouring**

The Standard of Precision Test: Japan JIS

Item / Model		Unit	FAR-125/125B		FAR-170A (Compact type)	
Table Diameter		mm	Ø125		Ø170	
Diameter of Table Central Hole		mm	Ø 35H7		Ø67	
Inner Diameter of Mandrel Sleeve		mm	-		Ø40H7	
Diameter of Center Through Hole		mm	Ø25		Ø40	
Table Height (Horizontal)		mm	215		245	
Table T-slot Width		mm	12H7		12H7	
Guide Block Width		mm	14h7		18h7	
Axis			Rotation	Tilt (-30° ~ +120°)	Rotation	Tilt ±100°
Min. Increment		deg.	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)
Repeatability		sec.	4	8	4	8
Clamping System (Pneumatic)		kg/cm^2	5	6	6	6
Clamping Torque		kg-m	13	31	31	31
Servo Motor Model	FANUC	Taper/Straight shaft	α4is / ß4is	α4i / ß8is	α2i / α4is / ß4is	α4i / ß8is
	MITSUBISHI	Taper shaft	HF-75 / 105	HF-54 / 104	HF-75 / 105	HF-54 / 104 (Straight shaft is not available)
Speed Reduction Ratio		–	1 : 60	1 : 90	1 : 72	1 : 120
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	44.4	44.4	33.3	25
Allowable Inertia Load Capacity (Horizontal)		$kg.cm.sec^2$	0.97		2.2	
Allowable Workpiece Load	0° Horizontal	kg	50		60	
	0°~90° Tilt	kg	35		40	
Allowable Load (with Rotary Table Clamping)	F	kgf	400		600	
	FxL	kgf.m	31		31	
	FxL	kgf.m	13		31	
Strength of worm gears (Rotary axis)		kg.m	9		18	
Net Weight (servo motor excluded)		kg	97	-	125	

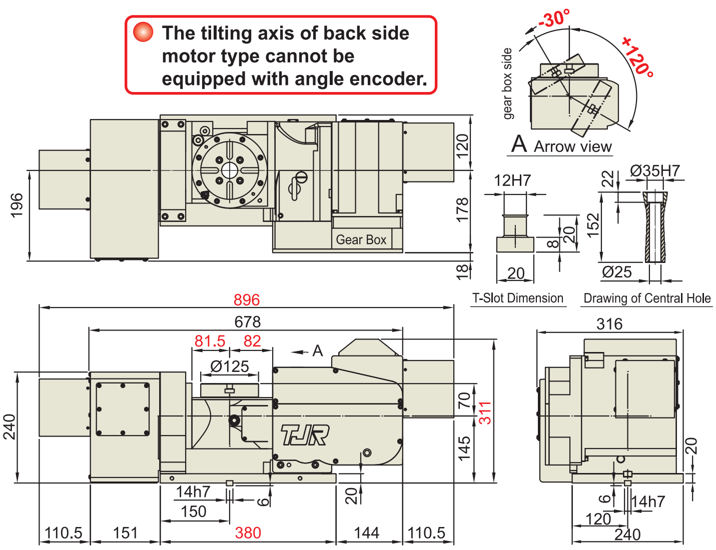
※In accordance with the foreign trade control ordinance, permission of the ministry of economy, trade and industry is required when exporting dual-axis products overseas.

FAR-125 (Standard type)

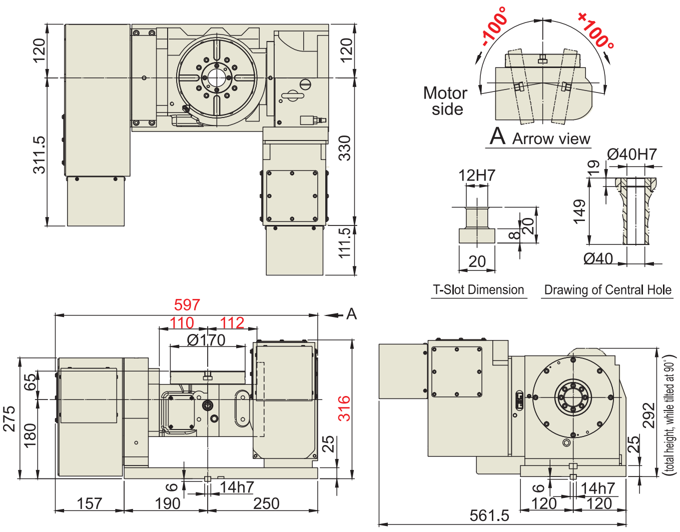


FAR-125B (Back side motor type)

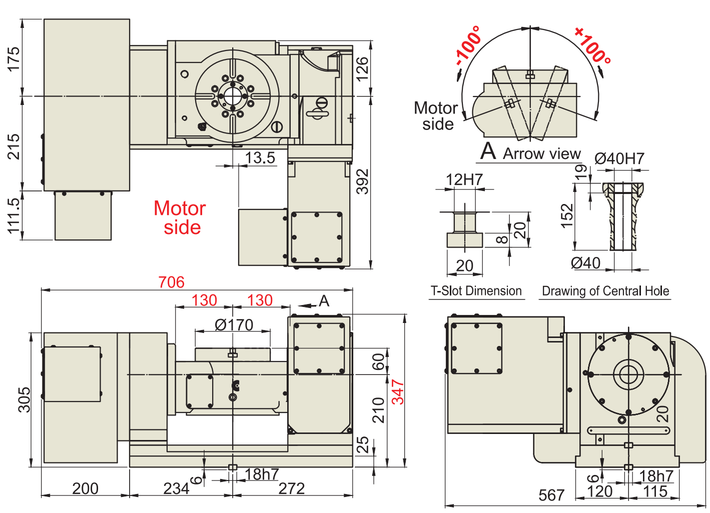
The tilting axis of back side motor type cannot be equipped with angle encoder.



FAR-170A (Compact type)



FAR-170 (Standard type)



FAR-170 (Standard type) / FAR-170B (Back side motor type)	
Ø170	
Ø67	
Ø40H7	
Ø40	
270	
12H7	
18h7	
Rotation	Tilt ±100º
0.001	0.001
20	50 (Angle encoder can not be employed)
4	8
6	6
31	31
α4i / ß8is	α8i / α12is / ß12is
HF-54 / 104	HF-104
1 : 90	1 : 90
33.3	33.3
2.7	
75	
50	
750	
31	
31	
18	
160	

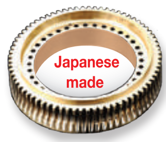
Exquisite Products of Taiwan. Extreme Ingenuity

TJR CNC Rotary Table

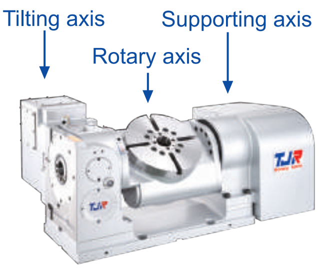
CNC Tilting Rotary Tables
Min. indexing angle –0.001°

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

3 FEATURES

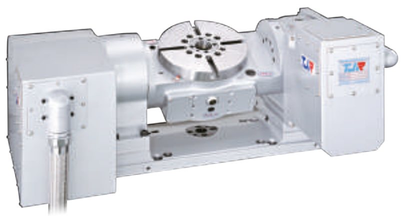


1. **Both the tilting axis and rotary axis use radial & axial bearings.**
2. **Because the tilting axis normally needs to bear heavy load, Japanese-made worm and worm gear are employed to improve wear resistance and precision of tilting axis.** **standard component**
   (It's wear life is 2.6 times longer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



▲ **FAR-210**(Standard type)

▲ **FAR-210B**
(Back side motor type)



▲ **FAR-210L**
(Extended type)

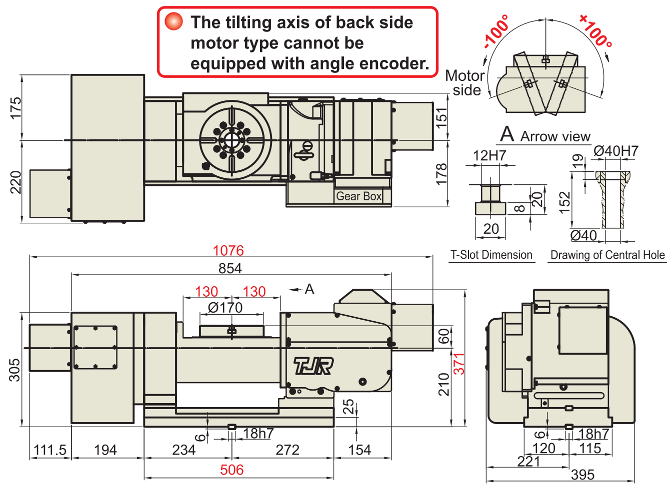
▲ **Workpiece sample – 5 axis simultaneous contouring**

The Standard of Precision Test: Japan JIS

Item / Model		Unit	FAR-210 (Standard type)		FAR-210B (Back side motor type)	
Table Diameter		mm	Ø210		Ø210	
Diameter of Table Central Hole		mm	Ø67		Ø67	
Inner Diameter of Mandrel Sleeve		mm	Ø40H7		Ø40H7	
Diameter of Center Through Hole		mm	Ø40		Ø40	
Table Height (Horizontal)		mm	270		270	
Table T-slot Width		mm	12H7		12H7	
Guide Block Width		mm	18h7		18h7	
Axis			Rotation	Tilt ±100º	Rotation	Tilt ±100º
Min. Increment		deg.	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)
Repeatability		sec.	4	8	4	8
Clamping System (Pneumatic)		kg/cm^2	6	6 / Hyd.25 (optional)	6	6 / Hyd.25 (optional)
Clamping Torque		kg-m	31	31 / Hyd.35	31	31 / Hyd.35
Servo Motor Model	FANUC	Taper/Straight shaft	α4i / ß8is	α8i / α12is / ß12is	α4i / ß8is	α8i / α12is / ß12is
	MITSUBISHI	Taper shaft	HF-54/104	HF-104	HF-54/104	HF-104
Speed Reduction Ratio		–	1 : 90	1 : 90	1 : 90	1 : 90
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	33.3	33.3	33.3	33,3
Allowable Inertia Load Capacity (Horizontal)		$kg.cm.sec^2$	4.13		4.13	
Allowable Workpiece Load	0º Horizontal	kg	75		75	
	0º~90º Tilt	kg	50		50	
Allowable Load (with Rotary Table Clamping)	F	kgf	750		750	
	FxL	kgf.m	Pne.31 / Hyd.35		Pne.31 / Hyd.35	
	FxL	kgf.m	31		31	
Strength of worm gears (Rotary axis)		kg.m	18		18	
Net Weight (servo motor excluded)		kg	153		163	

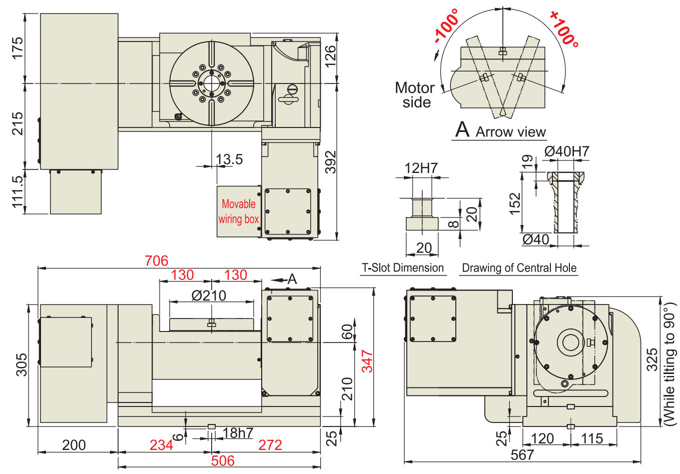
※In accordance with the foreign trade control ordinance, permission of the ministry of economy, trade and industry is required when exporting dual-axis products overseas.

FAR-170B (Back side motor type)

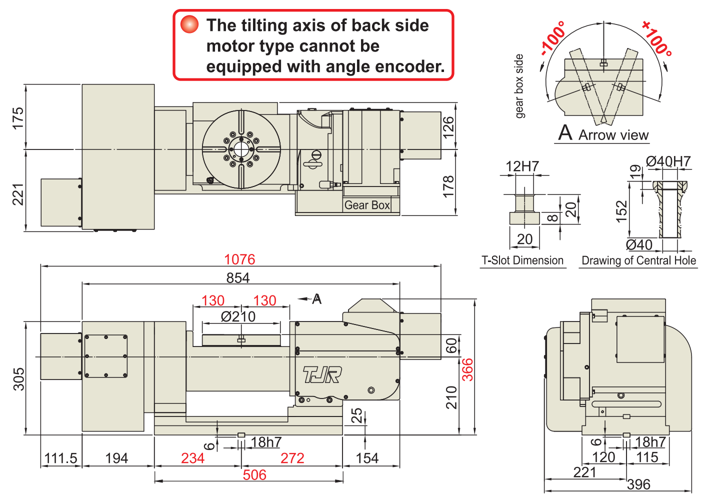


Remark: Please refer to Page 22 for the specification of FAR-170B

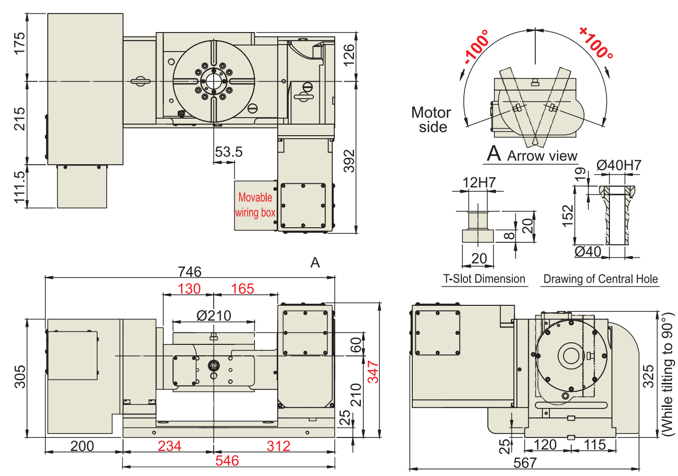
FAR-210 (Standard type)



FAR-210B (Back side motor type)



FAR-210L (Extended type)

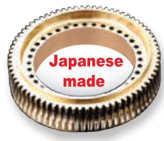


FAR-210L (Extended type)	
Ø210	
Ø67	
Ø40H7	
Ø40	
270	
12H7	
18h7	
Rotation	Tilt ±100º
0.001	0.001
20	50 (30, if ECN-225 angle encoder is employed)
4	8
6	6 / Hyd.25 (optional)
31	31 / Hyd.35
α4i / ß8is	α8i / α12is / ß12is
HF-54/104	HF-104
1 : 90	1 : 90
33.3	25
4.13	
75	
50	
750	
Pne.31 / Hyd.35	
31	
18	
156	

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



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.)
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: **±110°**

▲ FHR-255C(Cradle type)

▲ FHR-320 (Standard type)

▲ FHR-255CL (Extended cradle type)

▲ FHR-320C(Cradle type)

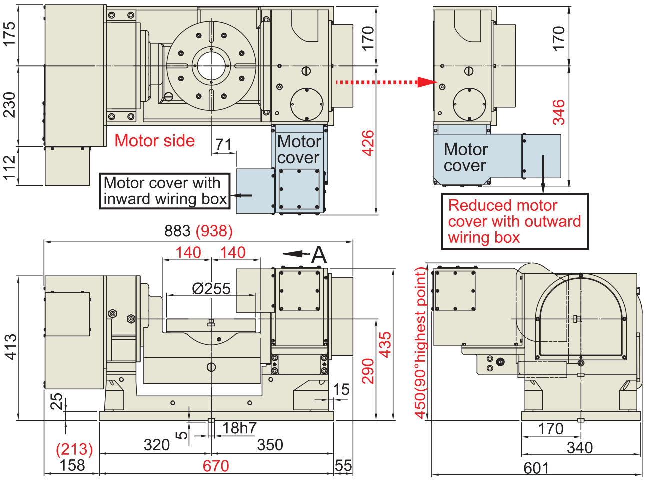
▲ Workpiece sample – 5 axis simultaneous contouring

The Standard of Precision Test: Japan JIS

Item / Model		Unit	FHR-255C / 255CL		FHR-320 (Standard type)	
Table Diameter		mm	Ø 255		Ø 320	
Diameter of Table Central Hole		mm	Ø 110		Ø 150	
Inner Diameter of Mandrel Sleeve		mm	Ø 80H7		Ø 120H7	
Diameter of Center Through Hole		mm	Ø 80		Ø 120	
Table Height (Horizontal)		mm	290		355	
Table T-slot Width		mm	12H7		14H7	
Guide Block Width		mm	18h7		18h7	
Axis			Rotation	Tilt ±110°	Rotation	Tilt ±110°
Min. Increment		deg.	0.001	0.001	0.001	0.001
Indexing Precision		sec.	15	50 (30, if ECN-225 angle encoder is employed)	15	50 (30, if ECN-225 angle encoder is employed)
Repeatability		sec.	4	8	4	8
Clamping System (Hydraulic)		kg/cm²	35	35	35	35
Clamping Torque		kg-m	70	140	115	175
Servo Motor Model	FANUC	Taper/Straight shaft	α4i / α8i / α12is / ß8is (Taper)	α4i / α8i / α12is / ß12is (Taper)	α8i / α12is / ß12is (Taper)	α12i / ß22is (Straight)
	MITSUBISHI	Taper shaft	HF-104	HF-154	HF-104	HF-204
Speed Reduction Ratio		–	1 : 120	1 : 120	1 : 120	1 : 120
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	**25**	**16.6**	**25**	**16.6**
Allowable Inertia Load Capacity (Horizontal)		kg.cm.sec²	8.13		25.6	
Allowable Workpiece Load	0° Horizontal	kg	100		200	
	0°~90° Tilt	kg	75		150	
Allowable Load (with Rotary Table Clamping)	F	kgf	1500		1800	
	FxL	kgf.m	140		175	
	FxL	kgf.m	70		115	
Strength of worm gears (Rotary axis)		kg.m	55		80	
Net Weight (servo motor excluded)		kg	296	312	470	

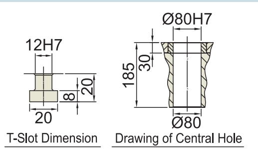
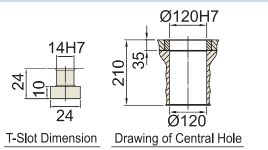
※In accordance with the foreign trade control ordinance, permission of the ministry of economy, trade and industry is required when exporting dual-axis products overseas.

FHR-255C (Cradle type)



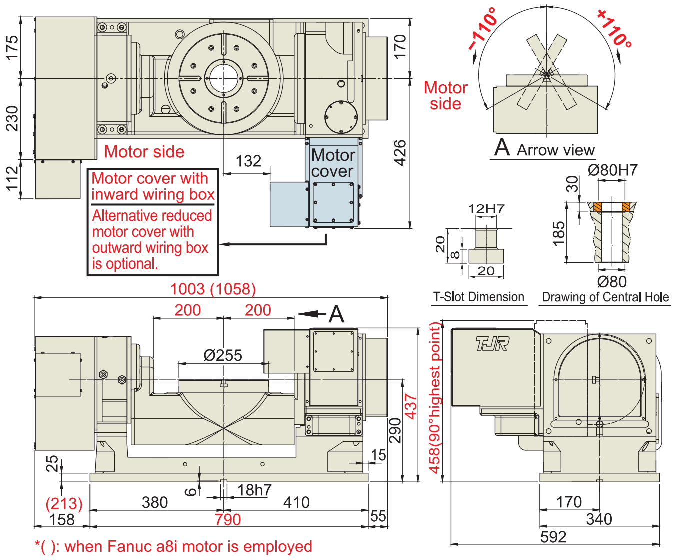
*( ): when Fanuc a8i motor is employed

4-hole rotary joint can be accommodated.

FHR-255C	FHR-320
	

FHR-320C (Cradle type)	
Ø 320	
Ø 150	
Ø 120H7x30 deep	
Ø 80	
310	
14H7	
18h7	
Rotation	Tilt ±110°
0.001	0.001
15	50 (30, if ECN-225 angle encoder is employed)
4	8
35	35
70	175
α8i / α12is / ß12is (Taper)	α12i / ß22is (Straight)
HF-104	HF-204
1 : 120	1 : 120
25	16.6
25.6	
200	
100	
1800	
175	
70	
55	
489	

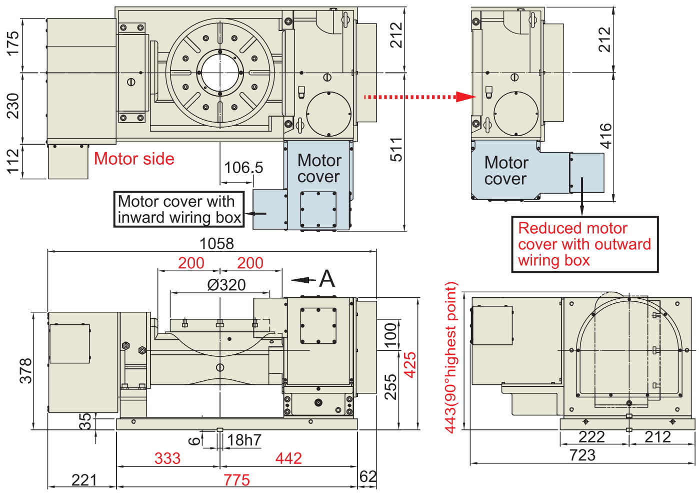
FHR-255CL (Extended cradle type)



*( ): when Fanuc a8i motor is employed

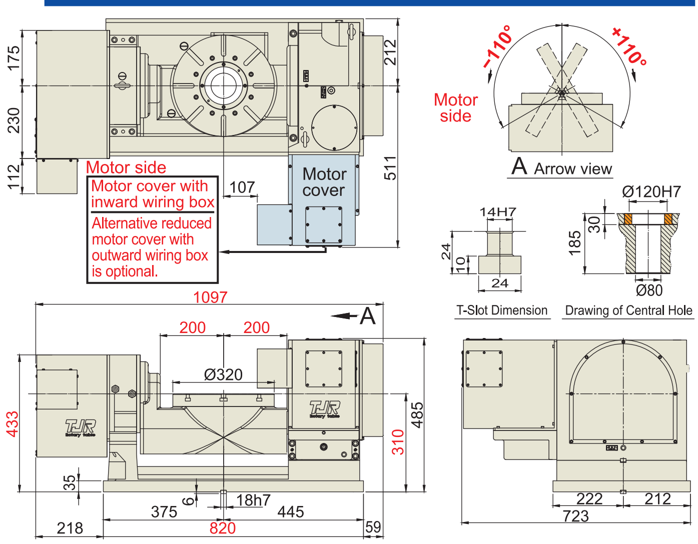
4-hole rotary joint can be accommodated.

FHR-320 (Standard type)



6-hole rotary joint can be accommodated.

FHR-320C (Cradle type)



4-hole rotary joint can be accommodated.

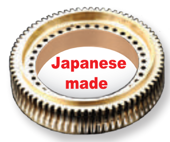
CNC Tilting Rotary Tables
Min. indexing angle –0.001°

FHR Series

Dual-axis dual-arm type (Hydraulic Brake)

FHR-350BC/400BC/400CF
FHR-400BCF

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



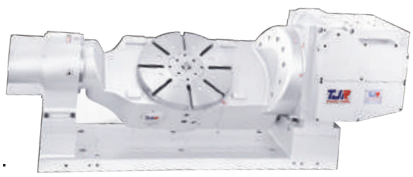
2. Because the **tilting axis** normally needs to bear heavy load, **Japanese-made** worm and worm gear are employed to improve wear resistance and precision of tilting axis. **standard component**
(It's wear life is **2.6** times longer than aluminum bronze PBC3.) 〈except for FHR-500C/630C〉

(Integrated ball-screw-interface type)

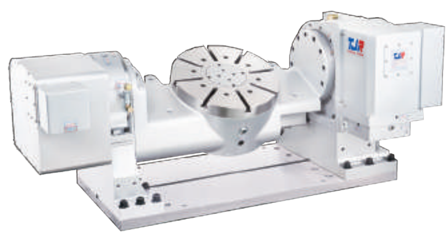
=

FHR-350BC
(Back side motor type)
(Rotation:Belt driven)

Angle encoder on the tilt. axis is optional.



FHR-400BC(Back side motor type)
(Rotation:Belt driven)



FHR-400CF (Cradle type)
especially for machining aluminum ally wheels

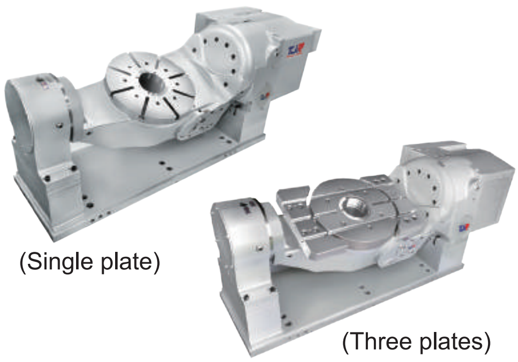
The Standard of Precision Test: Japan JIS

Item / Model		Unit	FHR-350BC/FHR-400BC(Roation : Belt driven)		FHR-400CF(gear driven)	
Table Diameter		mm	round plateØ 350,square plate□560x365/ound plateØ 400		Ø 400	
Diameter of Table Central Hole		mm	Ø120H7x27 deep / Ø120H7x10 deep		Ø150	
Inner Diameter of Mandrel Sleeve		mm	Ø120H7x27 deep / Ø120H7x10 deep		Ø 120H7	
Diameter of Center Through Hole		mm	–		Ø 120	
Table Height (Horizontal)		mm	397/360		430	
Table T-slot Width		mm	14H7		14H7	
Guide Block Width		mm	18h7		18h7	
Axis			Rotation(Belt)	Tilt ±110°	Rotation	Tilt ±110°
Min. Increment		deg.	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)
Repeatability		sec.	4	8	4	8
Clamping System (Hydraulic)		kg/cm^2	35	35	35	35
Clamping Torque		kg-m	115	275	115	175
Servo Motor Model	FANUC	Taper/Straight shaft	α8i/α12is/ß12is(Taper)	α22i / ß22is (Taper)	α8i/α12is/ß12is (Straight)	α12i / ß22is (Straight)
	MITSUBISHI	Straight shaft without key	HF-154	HF-354	HF-154	HF-354
	SIEMENS	Straight shaft	1FK7063	1FK7083	1FK7063	1FK7083
	HEIDENHAIN	Straight shaft	QSY-116E	QSY-155B	QSY-116E	QSY-155B
Speed Reduction Ratio		–	1 : 120	1 : 120	1 : 120	1 : 120
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	25	16.6	25	16.6
Allowable Inertia Load Capacity (Horizontal)		kg.cm.sec^2	33.7 / 44		40	
Allowable Workpiece Load	0° Horizontal	kg	220		200	
	0°~90°Tilt	kg	120		100	
Allowable Load (with Rotary Table Clamping)	F	kgf	1800		1800	
	FxL	kgf.m	275		175	
	FxL	kgf.m	115		115	
Strength of worm gears(Rotary axis)		kg.m	80		80	
Net Weight (servo motor excluded)		kg	740 / 764		818	

※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.

3 Max. tilting angle: **±110°**

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



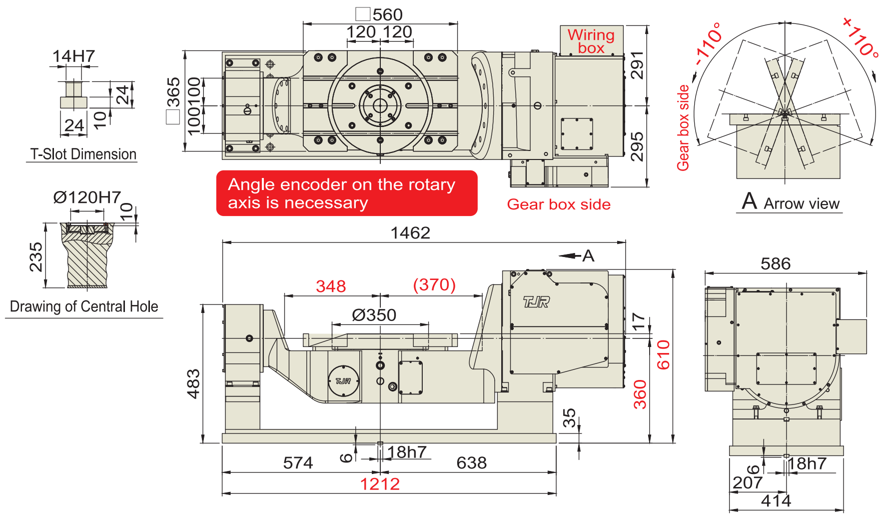
(Single plate)

(Three plates)

▲FHR-400BCF
(Back side motor type)

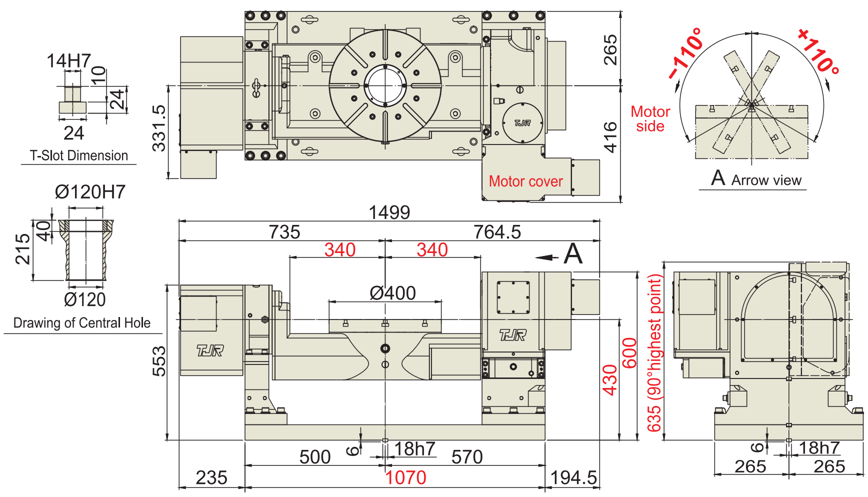
FHR-400BCF(gear driven)	
round plateØ 400	
Ø150H7x27 deep	
Ø 120H7x27 deep	
–	
397	
14H7	
18h7	
Rotation	Tilt ±110º
0.001	0.001
15	50 (35, if RCN-2390F angle encoder is employed)
4	8
35	35
115	190
α8i/α12is/ß12is(Taper)	α22i / ß22is (Straight)
HF-154	HF-354
1FK7063	1FK7083
QSY-130E	QSY-155B
1 : 120	1 : 150
25	16.6
30.6	
220	
120	
1800	
190	
115	
80	
715	

FHR-350BC (Three table plates / Back side motor type)
FHR-400BC (Single table plate / Contact TJR for drawing)

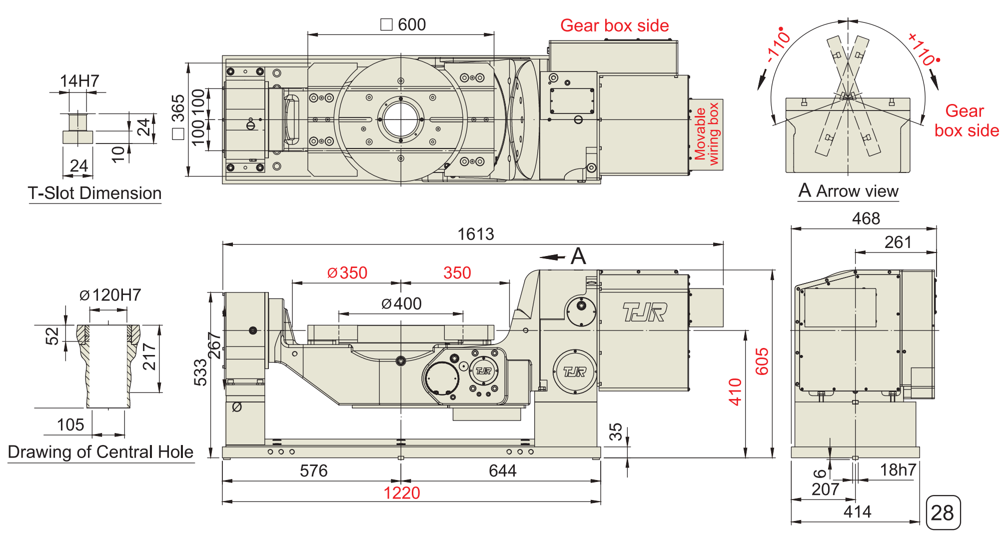


FHR-400CF (Cradle type)

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



FHR-400BCF (Three table plates / Gear driven)

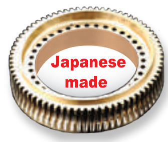


CNC Tilting Rotary Tables
Min. indexing angle –0.001°

FHR Series

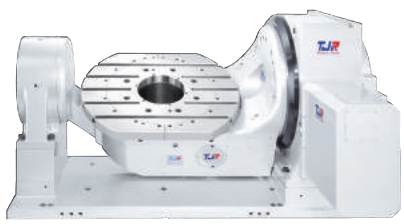
Dual-axis dual-arm type
(Hydraulic Brake)
FHR-500C / FHR-630C

Dual-axis single-arm type
(Pneumatic Brake)
FAR-100SN / FAR-160SN



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: ±110°

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



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

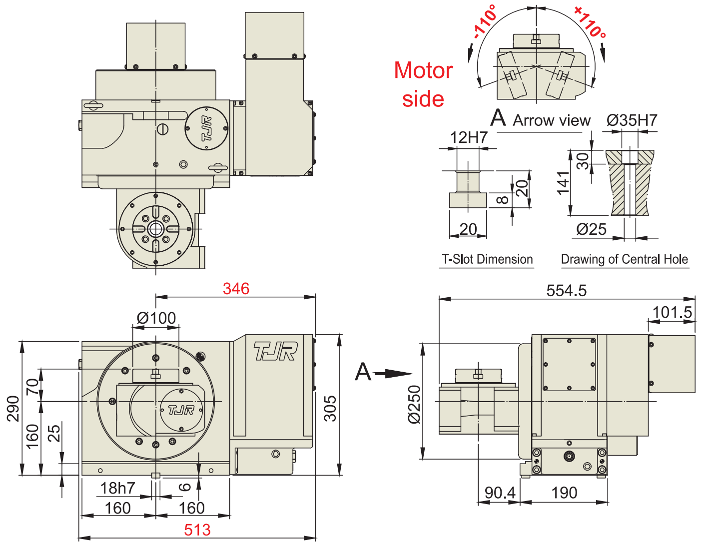
▲ **FAR-160SN** (single-arm type)

The Standard of Precision Test: Japan JIS

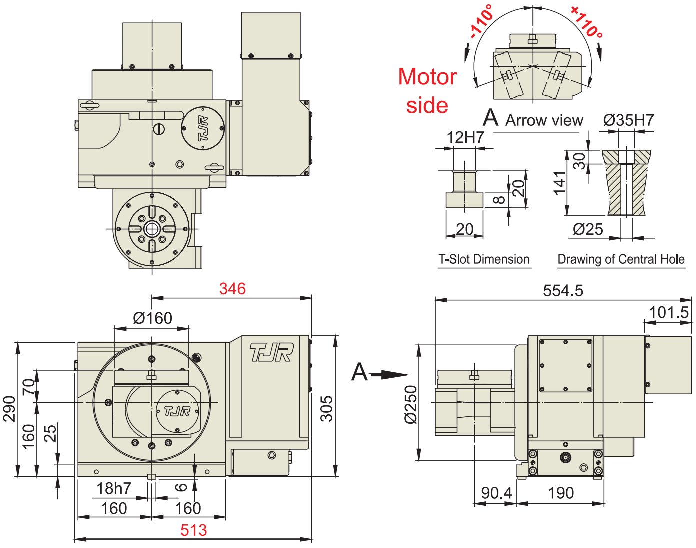
Item / Model		Unit	FHR-500C (dual-arm, cradle type)		FHR-630C (dual-arm, cradle type)	
Table Diameter		mm	Ø500		Outer table Ø720 x 600, Inner table Ø500	
Diameter of Table Central Hole		mm	Ø250		Ø250	
Inner Diameter of Mandrel Sleeve		mm	Ø220H7		Ø220H7	
Diameter of Center Through Hole		mm	Ø220		Ø220	
Table Height (Horizontal)		mm	440		480	
Table T-slot Width		mm	18H7		18H7	
Guide Block Width		mm	18h7		18h7	
Axis			Rotation	Tilt ±110°	Rotation	Tilt ±110°
Min. Increment		deg.	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)
Repeatability		sec.	4	8	4	8
Clamping System (Hydraulic)		kg/cm^2	35	35	35	35
Clamping Torque		kg-m	370	410	370	800
Servo Motor Model	FANUC	Straight shaft	α12i	α22i	α12i	α40i
	MITSUBISHI	Straight shaft	HF-204	HF-354	HF-204	HF-703
	SIEMENS	Straight shaft	1FK7083	1FK7101	1FK7083	1FK7101 / 7103
	DELTA	Straight shaft	-	-	-	-
	YASKAWA	Straight shaft	-	-	-	-
Speed Reduction Ratio		-	1：120	1：180	1：120	1：180
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	25	11.1	25	11.1
Allowable Inertia Load Capacity (Horizontal)		$kg.cm.sec^2$	93.75		180	
Allowable Workpiece Load	0° Horizontal	kg	500		500	
	0°~90°Tilt	kg	300		400	
Allowable Load (with Rotary Table Clamping)	F	kgf	3000		3200	
	FxL	kgf.m	410		800	
	FxL	kgf.m	370		370	
Strength of worm gears(Rotary axis)		kg.m	250		250	
Net Weight (servo motor excluded)		kg	1091		1817	

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

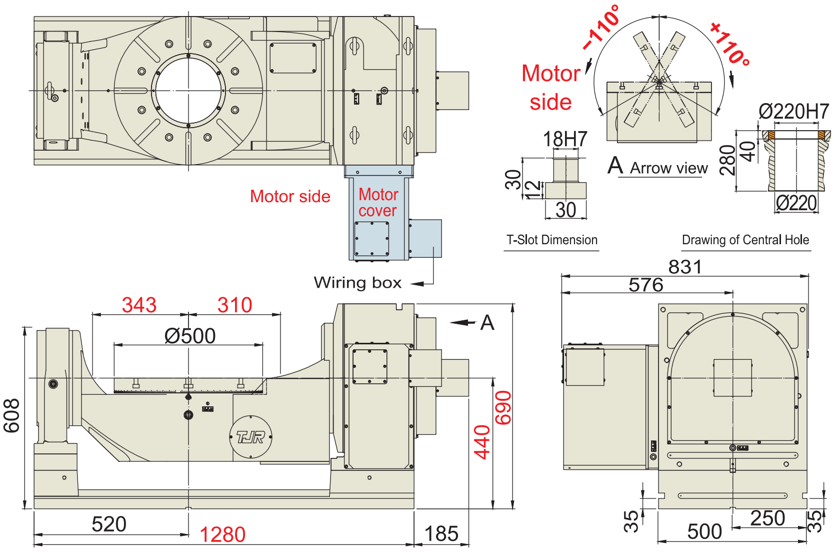
FAR-100SN (Single-arm type)



FAR-160SN (Single-arm type)

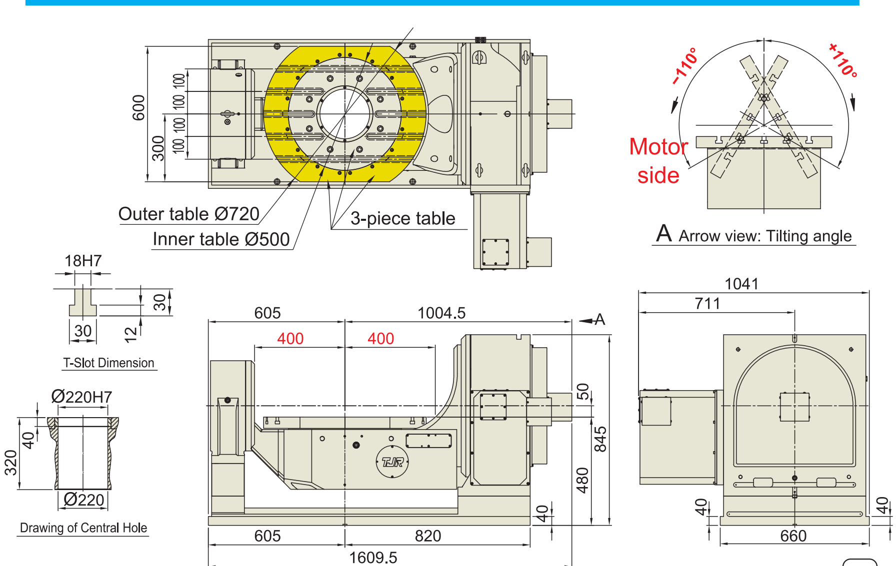


FHR-500C (Dual-arm / Cradle type)



FAR-100SN(single-arm type)	FAR-160SN(single-arm type)
Ø100	Ø160
Ø35H7x30 deep	
-	
Ø25	
230	
12H7	
18h7	
Rotation	Tilt ±110°
0.001	0.001
40	50
4	8
Pne.5	35
13	70
α2i / α2is / ß4is	α8i / ß8is
HF-KP43JW04-S6	HF-154
-	-
ECMA-C20604	ECMA-E21315
SGMJV-04A	SGMGV-13A
1 : 60	1 : 120
44.4	16.6
0.31	0.8
25	
20	
600	
25	
13	
9	
116	

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

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.)

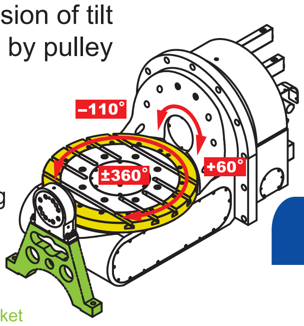
The Standard of Precision Test: Japan JIS

Item / Model		Unit	FHR-630S		FHR-630SN	
Table Diameter		mm	Outer table Ø720 x 600，Inner table Ø500		Outer table Ø650，Inner table Ø500	
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	
Guide Block Width		mm	–		–	
Axis			Rotation	Tilt (−110°~+60°)	Rotation	Tilt (−110°~+60°)
Min. Increment		deg.	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.)
Repeatability		sec.	4	8	4	8
Clamping System (Hydraulic)		kg/cm^2	35	35	35	35
Clamping Torque		kg-m	370	500	370	500
Servo Motor Model	FANUC	–	α12i	α40i	α12is	α40i
	MITSUBISHI		HF-204	HF-703S(49Nm)	HF-224	HF-703S
	SIEMENS		1FK7083	1FK7101 / 7103	SIEMENS Designated model	1FK7101 / 7103
Speed Reduction Ratio		–	1：120	1：150	1：120	1：150
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	25	13.3	25	13.3
Allowable Inertia Load Capacity (Horizontal)		kg.cm.sec^2	135		158.4	
Allowable Workpiece Load	0° Horizontal	kg	300 (500, if the sub-tailstock is employed)		300 (500, if the sub-tailstock is employed)	
	0°~90° Tilt	kg	–		–	
Allowable Load (with Rotary Table Clamping)	F	kgf	–		–	
	FxL	kgf.m	–		–	
	FxL	kgf.m	–		–	
Strength of worm gears(Rotary axis)		kg.m	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-630SM (compact type)

The transmission of tilt axis is driven by pulley

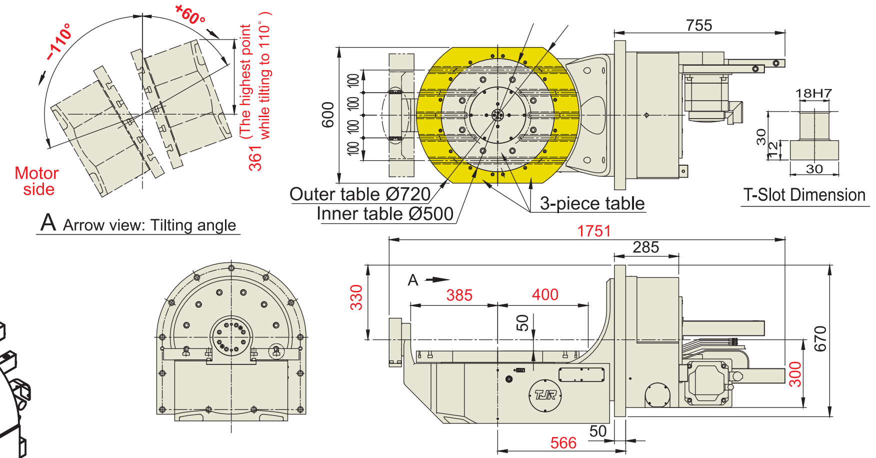


The illustration of additional supporting seat (whose thickness can be tailor-made)

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

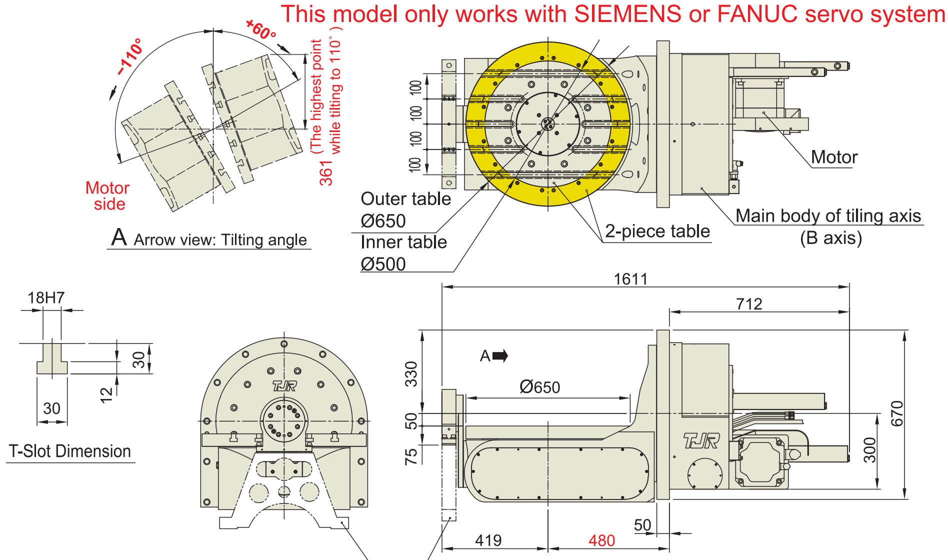
FHR-630SM	
Outer table Ø650，Inner table Ø500	
–	
–	
–	
–	
18H7	
–	
Rotation	Tilt (−90°~+110°)
0.001	0.001
20 (when ECN-225 angle encoder is employed.)	60 (30, if ECN-225 angle encoder is employed.)
4	8
35	35
215	500
-	-
-	-
SIEMENS Designated model	1FK7101 / 7103
1 : 120	1 : 150
25	13.3
158.4	
300 (500, if the sub-tailstock is employed)	
–	
–	
–	
–	
250	
-	

FHR-630S (Single-arm / Cradle type)



FHR-630SN (Single-arm / Shorten cradle type)

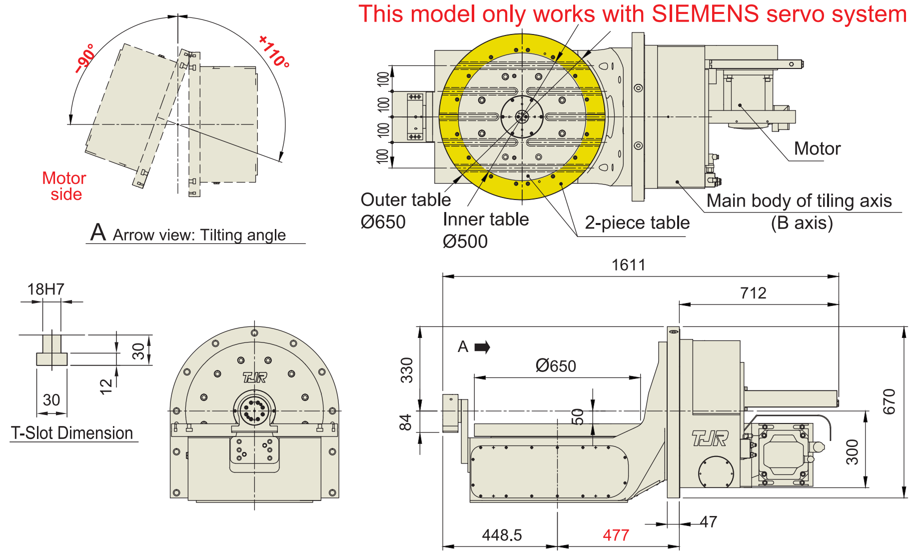
This model only works with SIEMENS or FANUC servo system



The bracket whcih sustains supporting seat should be made by the buyer (machine tool builder)

FHR-630SM

This model only works with SIEMENS servo system



CNC Tilting Rotary Tables
Min. indexing angle –0.001°

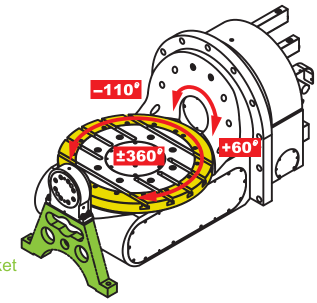
FHR Series
Dual-axis single-arm type
(Hydraulic Brake)

FHR-400S
FHR-650S-525
FHR-650S-550

▲ FHR-650S-525

▶ FHR-400S

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



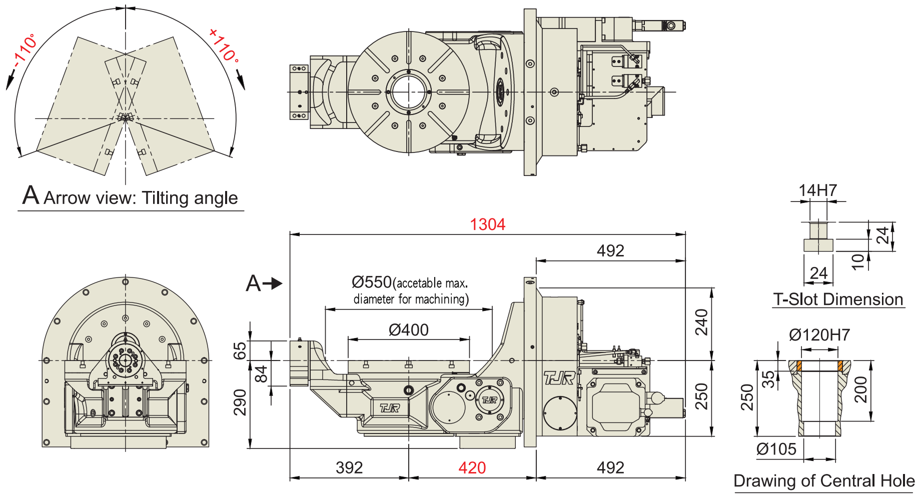
The supporting seat bracket (Made by the buyer [machine tool builder])

The Standard of Precision Test: Japan JIS

Item / Model		Unit	FHR-400S		FHR-650S-525	
Table Diameter		mm	Ø 400		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	
Guide Block Width		mm	-		-	
Axis		-	Rotation	Tilt ±100°	Rotation	Tilt ±110°
Min. Increment		deg.	0.001	0.001	0.001	0.001
Indexing Precision		sec.	15	50	15	60 (30, if ECN-225 angle encoder is employed.)
Repeatability		sec.	4	8	4	8
Clamping System (Hydraulic)		kg/cm^2	35	35	35	35
Clamping Torque		kg-m	115	200	370	500
Servo Motor Model	FANUC	-	α12is	α22i (Straight)	α12 i	α40 i (Straight)
	MITSUBISHI	-	HF-154	HF-354S (Straight)	HF-204	HF-703S (Straight
	SIEMENS	-	1FK7063	1FK7101	1FK7068	1FK7103 / 7105
	HEIDENHAIN	-	QSY-130E	QSY-155B	QSY-155C	QSY-190D
Speed Reduction Ratio		-	1：120	1：150	1：120	1：150
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	25	13.3	25	13.3
Allowable Inertia Load Capacity (Horizontal)		$kg.cm.sec^2$	44		158.4	
Allowable Workpiece Load	0°Horizontal	kg	220		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	
	FxL	kgf.m	115		370	
Net Weight (servo motor excluded)		kg	482		1120	

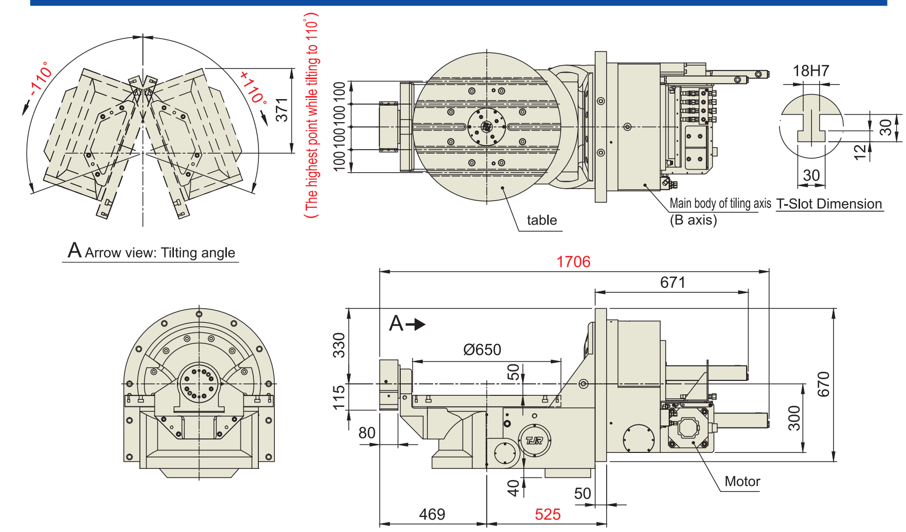
※In accordance with the foreign trade control ordinance, permission of the ministry of economy, trade and industry is required when exporting dual-axis products overseas.

FHR-400S

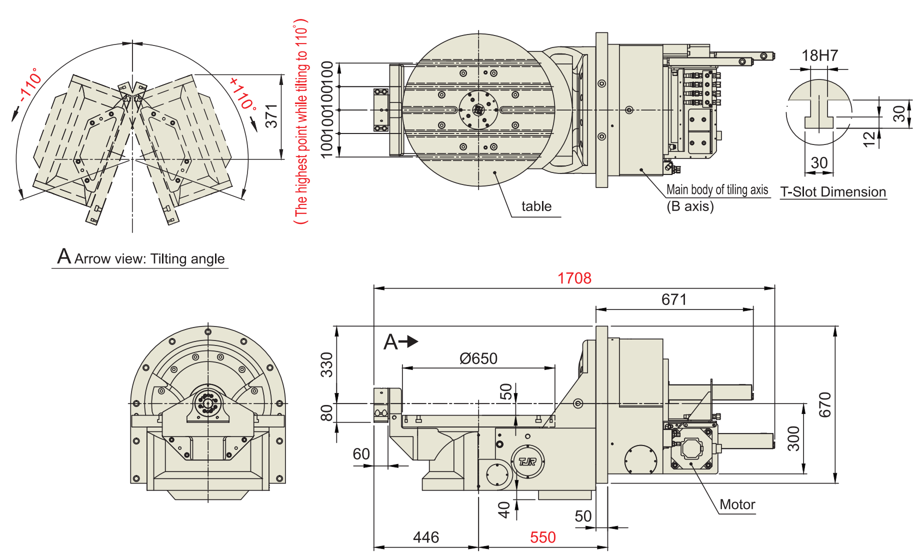


▲ FHR-650S-550

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



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



	FHR-650S-550	
	Ø 650	
	-	
	-	
	-	
	-	
	18H7	
	-	
	Rotation	Tilt ±110º
	0.001	0.001
	15	60 (30, if ECN-225 angle encoder is employed.)
	4	8
	35	35
	370	500
	α12 i	α40 i (Straight)
)	HF-204	HF-703S (Straight)
	1FK7083	1FK7103 / 7105
	QSY-155C	QSY-190D
	1 : 120	1 : 150
	25	13.3
	158.4	
)	300(500, if the sub-tailstock is employed)	
	-	
	-	
	500	
	370	
	-	

Non-CNC Hydraulic index table

HC Series

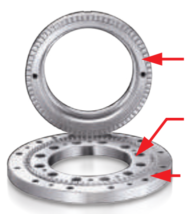
(Hirth coupling hydraulic brake)

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)

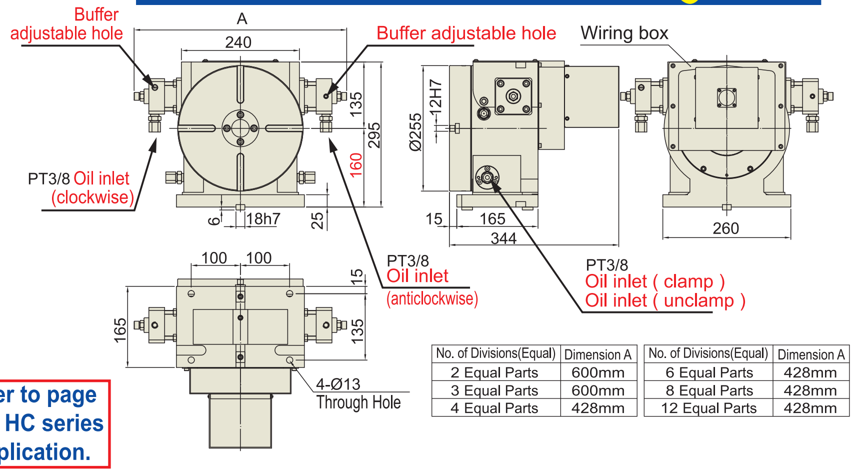


HC Series：
Use three-piece clutch plate

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

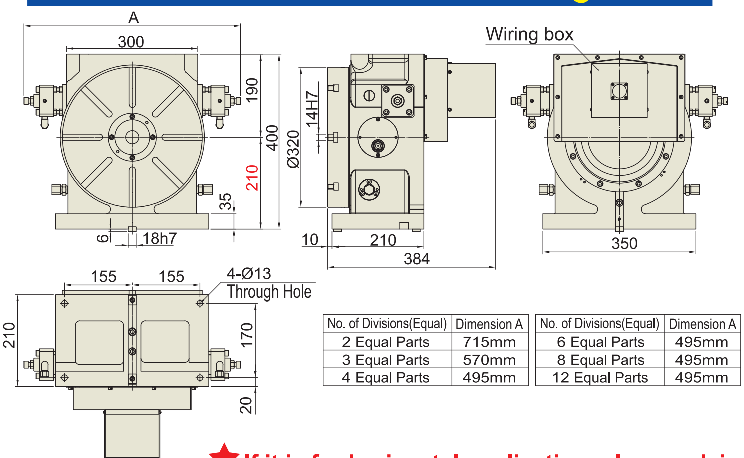
Hydraulic Brake Rotary Tailstock (with Delay Valve)
When HC series is chosen, the corresponding rotary tailstock should have a delay valve.

HC-255A



No. of Divisions(Equal)	Dimension A	No. of Divisions(Equal)	Dimension A
2 Equal Parts	600mm	6 Equal Parts	428mm
3 Equal Parts	600mm	8 Equal Parts	428mm
4 Equal Parts	428mm	12 Equal Parts	428mm

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

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

The Standard of Precision Test: Japan JIS

Item / Model		Unit	HC-255A (For Both Vertical and Horizontal Applications)	HC-320A (For Both Vertical and Horizontal Applications)	HHC-500 (For Horizontal Applications)
Table Diameter		mm	Ø 255	Ø 320	Ø 500
Diameter of Table Central Hole		mm	Ø 30H7 x 12 deep	Ø 30H7 x 12 deep	Ø 90H7 x 31deep
Diameter of Center Through Hole		mm	Ø 27	Ø 30	Ø 41
Center Height (Vertical)		mm	160	210	–
Table Height (Horizontal)		mm	180	220	260
Table T-slot Width		mm	12H7	14H7	18H7
Guide Block Width		mm	18h7	18h7	–
No. of Divisions (Equal)		deg.	2、3、4、6、8、12、24		
Indexing Precision		sec.	±5	±5	±5
Repeatability		sec.	±1	±1	±1
Clamping System (Hydraulic)		kg/cm^2	35	35	35
Clamping Torque		kg	1400	1560	4600
Allowable Instant Inertia		kg/m^2	35	85	–
Allowable Workpiece Load	Vertical	kg	110	200	–
	Horizontal	kg	200	400	700
Rotating Torque		kg.m	42	60	–
Rotary Table Total Weight		kg	65	98	–

Refer to page 36 for the top, front and side views

CHC Series
(Flat type auto pallet changer)

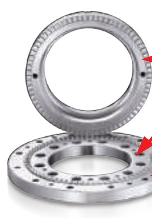
CHC-500(700x910)
CHC-500(700x1090)

Horizontal

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.**

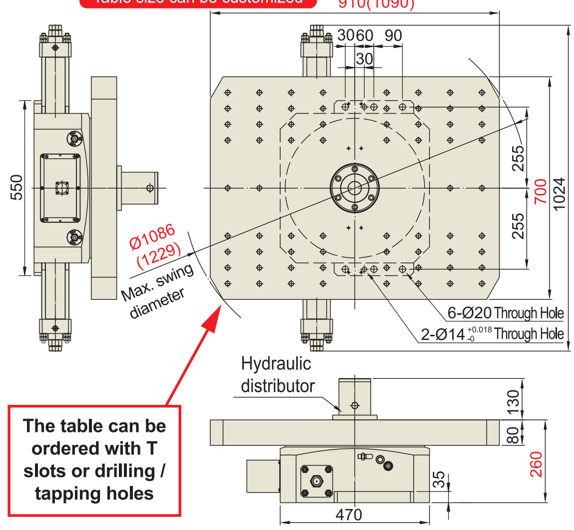
Pallet changing time is 4~5 seconds, which excludes PLC delayed time of machine

The Standard of Precision Test: Japan JIS

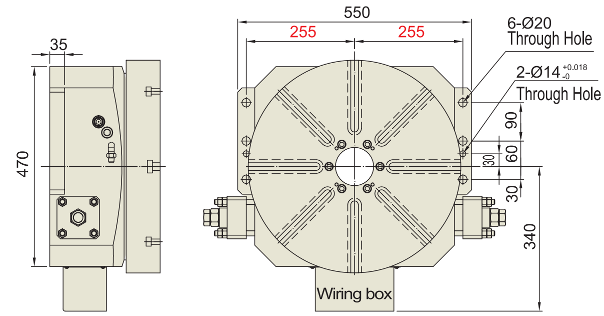
Item / Model		Unit	CHC-500(700x1090)
Table size		mm	□700 x 1090
Rotation method		–	
Rotation angle		deg.	180° to and fro
Clamping System		kg/cm^2	Hydraulic 35
Positioning method		–	3-piece clutch plate
Clamping force (35kg/cm^2)		kgf	4600
Allowable Workpiece Load	Horizontal	kg	700
Inspection accuracy			
Runout of table top during rotation		mm	0.02
Runout of table central hole		mm	0.01
Parallelism of table top to frame bottom		mm	0.02
Flatness of table top (Lower in the center)		mm	0.02
Total Weight		kg	525

CHC-700x910 (Pallet changer)

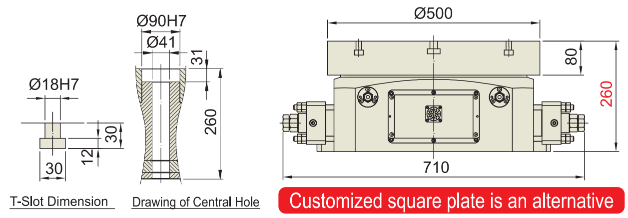
Table size can be customized



HHC-500

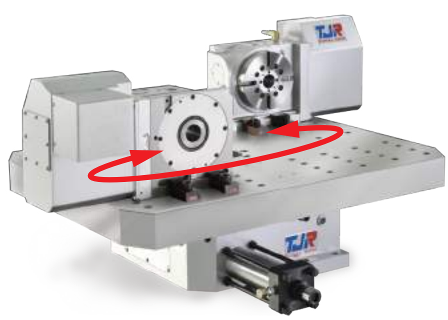


Refer to page 35 for the specification table.

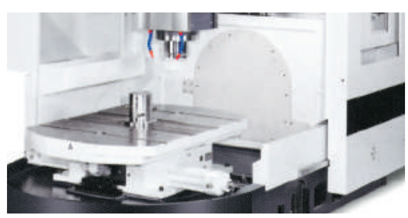


Customized square plate is an alternative

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



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



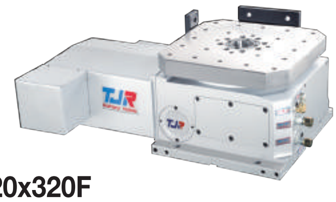
CNC index tables
Min. indexing angle - 1° or 5°

HHI Series

(Hirth coupling hydraulic brake)

For horizontal machining center
or horizontal drilling & tapping center.

HH I - 320x320F / 400x400F
400x400 / 500x500
630x630F / 800x800
1000x1000

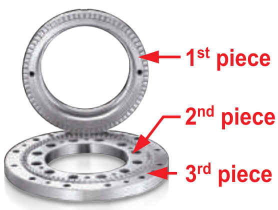


HH I -320x320F
For small Horizontal drilling & tapping center.

HH I -500x500
High loading(HL) version is an alternative

HH I -630x630F

HH I -800x800
High loading(HL) version is an alternative



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.**

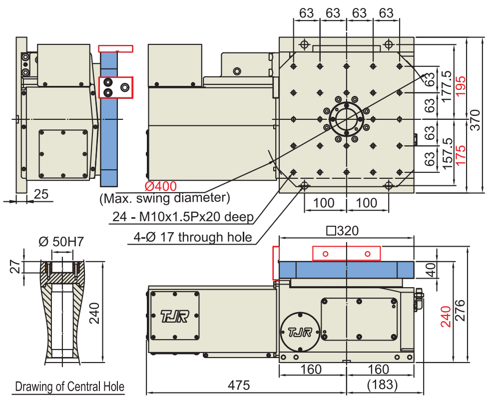
HH I -1000x1000
High loading(HL) version is an alternative

The Standard of Precision Test: Japan JIS

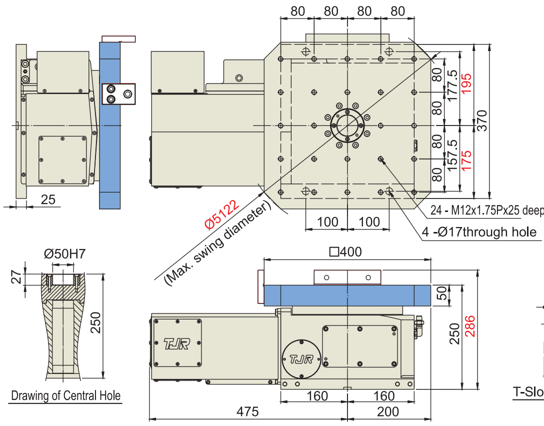
Item / Model		Unit	HHI-320x320F	HHI-400x400F	HHI-400x400	HHI-500x500	HHI-630x630F
Table size		mm	☐ 320x320	☐ 400x400	☐ 400x400	☐ 500x500	☐ 630x630
Diameter of Table Central Hole		mm	Ø 50x27 deep	Ø 50x27 deep	Ø 50x27 deep	Ø 50x27 deep	Ø 50x27 deep
Table height		mm	240	250	270	320	320
Table T-slot Width		mm	-	-	14H7	18H7	18H7
Guide Block Width		mm	18h7	18h7	18h7	18h7	18h7
Min. Increment		deg.	1° or 5°	1° or 5°	1° or 5°	1° or 5°	1° or 5°
Indexing Precision		sec.	±5	±5	±5	±5	±5
Repeatability		sec.	±1	±1	±1	±1	±1
Clamping System (Hydraulic)		kg/cm2	35	35	35	35	35
Clamping Torque		kg-m	300	300	500	1000	1000
Servo Motor Model	FANUC	Straight shaft without key	ß 12is	ß 12is	ß 22is	ß 22is	ß 22is
	MITSUBISHI		HF-104/154	HF-104/154	HF-204	HF-204	HF-204S
Speed Reduction Ratio		-	1：120	1：120	1：120	1：180	1：180
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	25	25	25	16.6	16.6
Allowable Workpiece Load	Horizontal	kgf	300	300	500	600	700
Strength of worm gears		kg.m	-	-	-	-	-
Net Weight (servo motor excluded)		kg	149	171	-	518	565

TJR Rotary Table

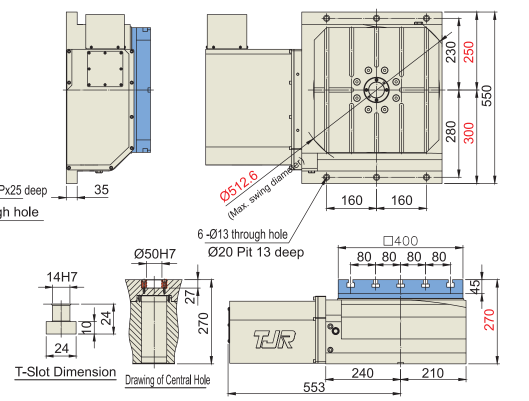
HH I -320x320F (1° or 5°)



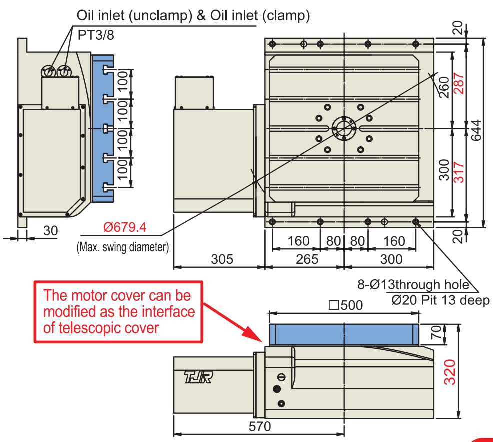
HH I -400x400F (1° or 5°)



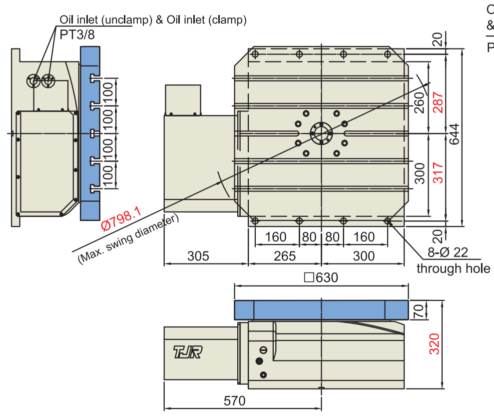
HH I -400x400 (1° or 5°)



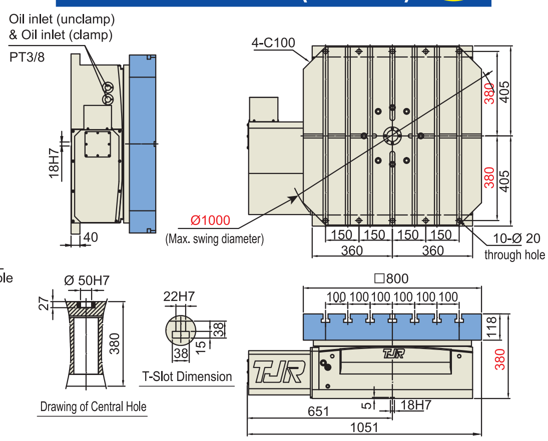
HH I -500x500 (1° or 5°)



HH I -630x630F (1° or 5°)

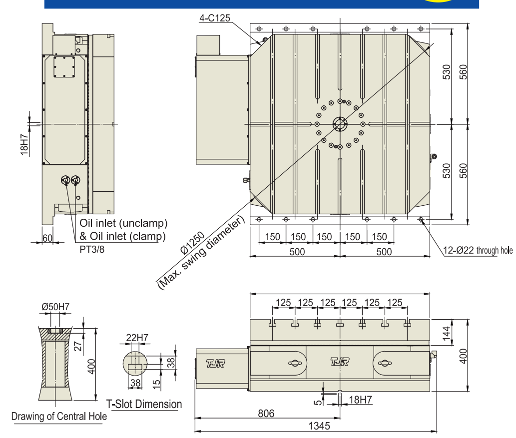


HH I -800x800 (1° or 5°)

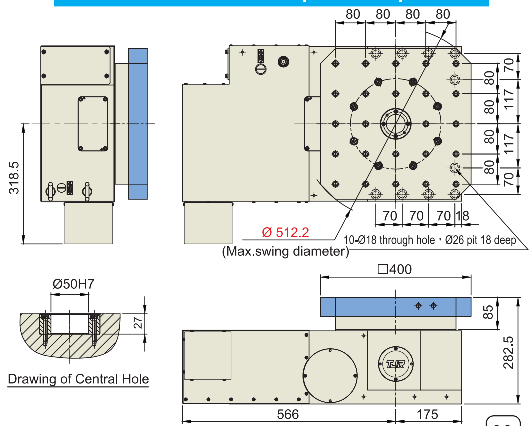


(0.001°)			
HHI-800x800	HHI-1000x1000	HHR-400x400	HHR-500x500
□ 800x800	□1000x1000	□ 400x400	□ 500x500
Ø 50x27 deep	Ø50H7x27 deep	Ø 50x27 deep	Ø 50x27 deep
380	400	282.5	295
22H7	22H7	-	18h7
18h7	22h7	18h7	18h7
1º or 5º	1° or 5°	0.001º	0.001º
±5	±5	20	15
±1	±1	4	4
35	35	45	35
9000	9000	155	370
ß 22is	α22i	α 12i / ß 22is	α 12i / ß 22is
HF-354	HF-354S	HF-204	HF-204
1：180	1：360	1：120	1：180
11.1	8.3	25	16.6
4000	5000	500	600
-	-	170	250
1053	1971	-	510

HH I -1000x1000



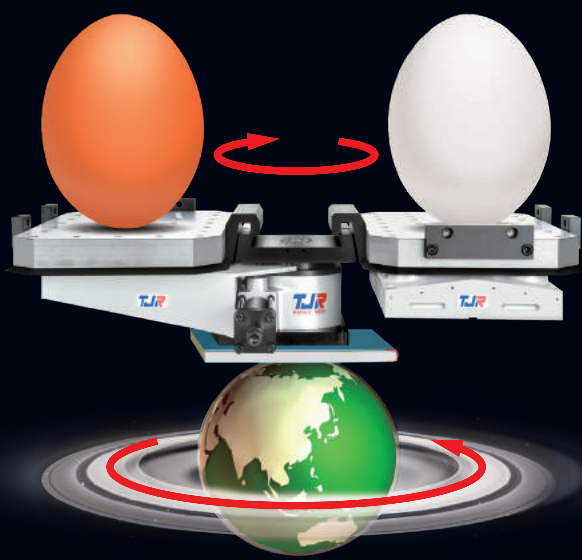
HHR-400x400 (0.001°)



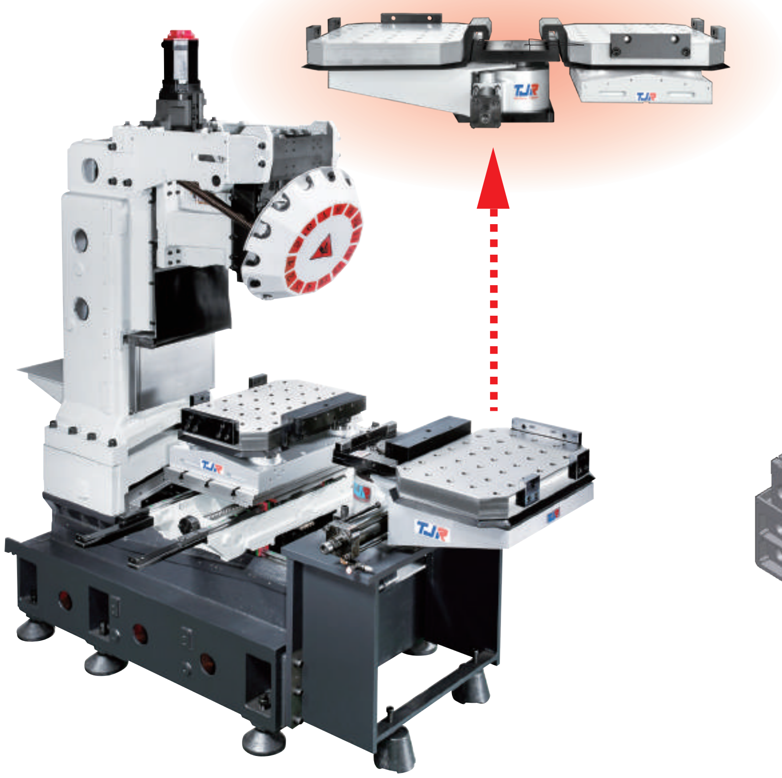
Auto pallet changer chapter

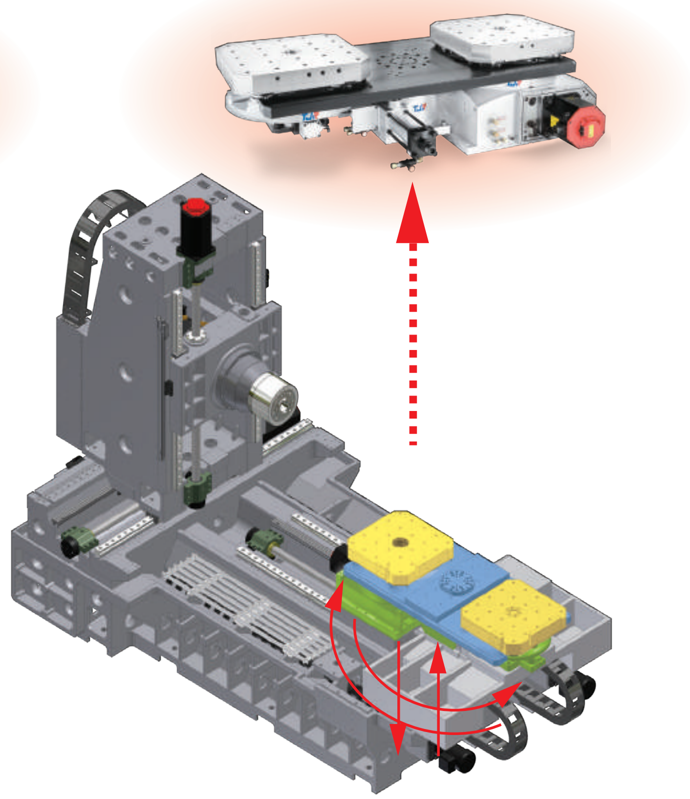
A living legend TJR

create a surprising
exchange mechanism



Beyond the rotational inertia
Reach unimaginable stability





CTU Series

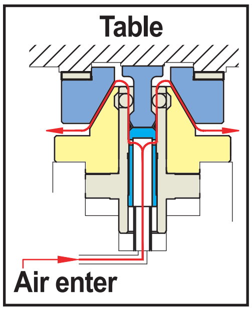
(Hook type auto pallet changer)

CTU-400x600 / 500x700

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

For C type vertical machining center or drilling & tapping center

▲ **CTU-500x700** (hook type APC)



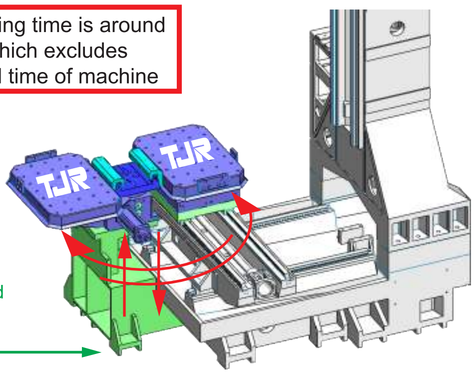
▲ **The function of cones :**
①Precise positioning
②Air blast for chip removal
③Airtight testing

▲ **Cones:** Powerful hydraulic clamping

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.

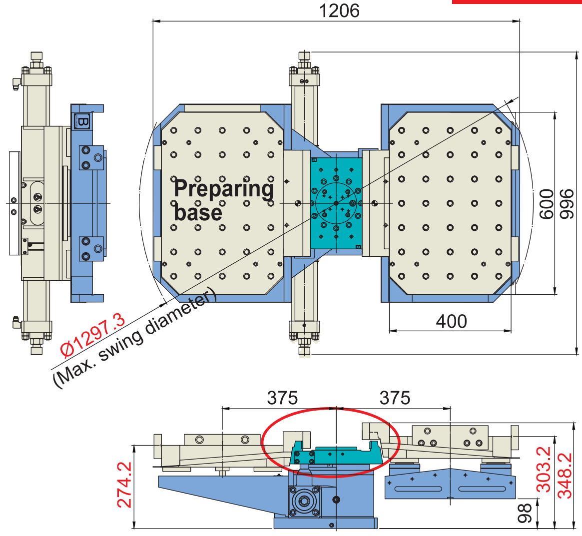
Green color section should be made by the buyer (machine tool builder)



▲ **Application diagram: retrofits vertical machining center with CTU**

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

(Weight:530kg)

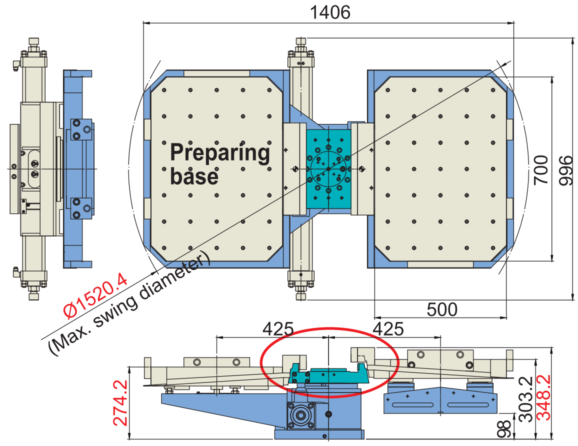


The Standard of Precision Test: Japan JIS

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.	180º to and fro	180º to and fro
Clamping System (Hydraulic)		kg/cm^2	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	Hyd.45	
Lifting thrust force		kg	2860	2860
Up and down travel of the pallet		mm	60	60
Allowable Workpiece Load	Horizontal	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	

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

(Weight:603kg)



CHI/CHR Series

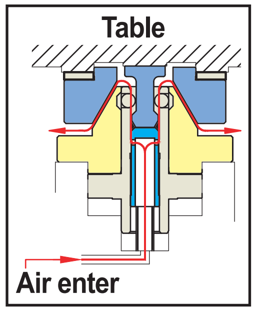
(Dual pallets rotary table)

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

CHR-400 (0.001°) Hydraulic Brake

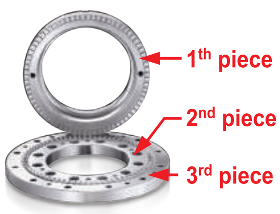
For horizontal machining center

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



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

Cones:
Powerful hydraulic clamping

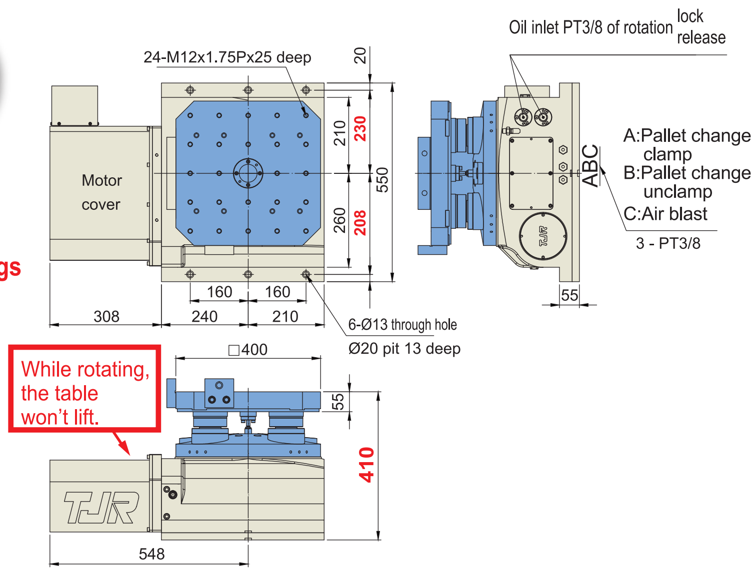


CHI Series：
Use three-piece clutch plate

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

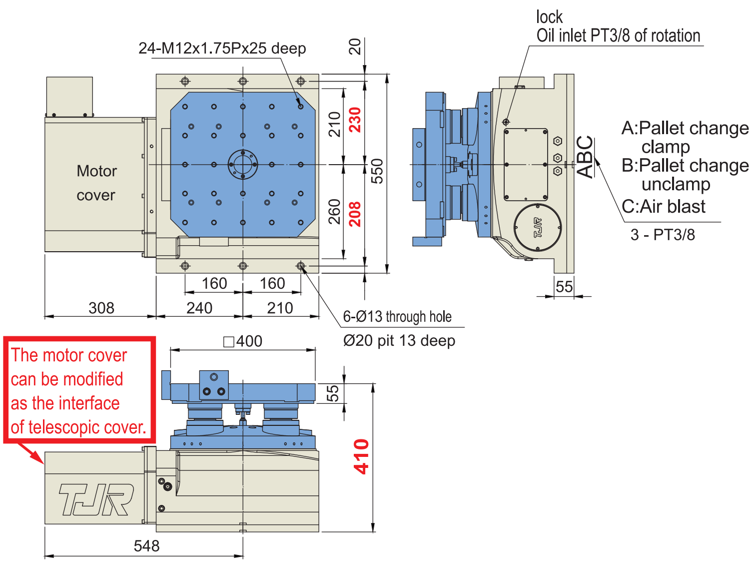
CH I -400 (1° or 5°) (Flat bottom type)



The Standard of Precision Test: Japan JIS

Item / Model		Unit	CH I-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/cm²)		kgf	960x4=3840	960x4=3840
Clamping System		kg/cm²	35	35
Clamping Torque		kg-m	500	200
Servo Motor Model	FANUC	Straight shaft without key	α12i / β22is	α12i / β22is
	MITSUBISHI		HF-204S	HF-204S
Speed Reduction Ratio		-	1：120	1：120
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)		r.p.m	25	25
Allowable Workpiece Load	Horizontal	kgf	400	400
Strength of worm gears		kgf.m	-	170
Net Weight (servo motor excluded)		kg	410	-

CHR-400 (0.001°) (Flat bottom type)



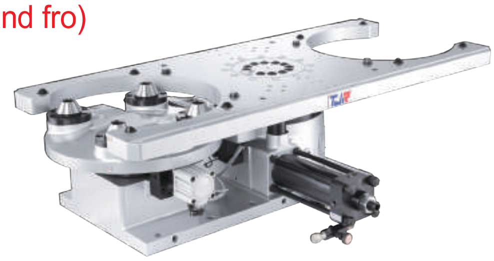
CTH Series

(tray type auto pallet changer)

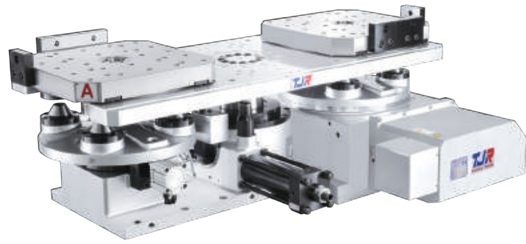
CTH-400 (Can go with CHI/CHR series)

For horizontal machining center

(180° to and fro)



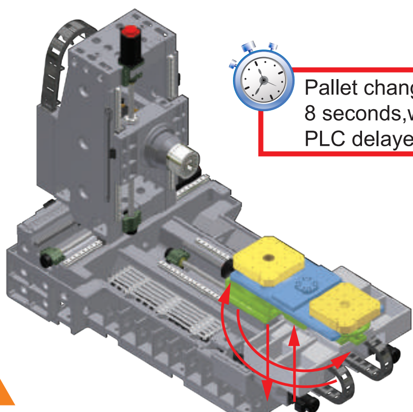
CTH-400 (tray type APC)



CTH-400 + CH I-400

Dual pallets rotary table + Tray type APC

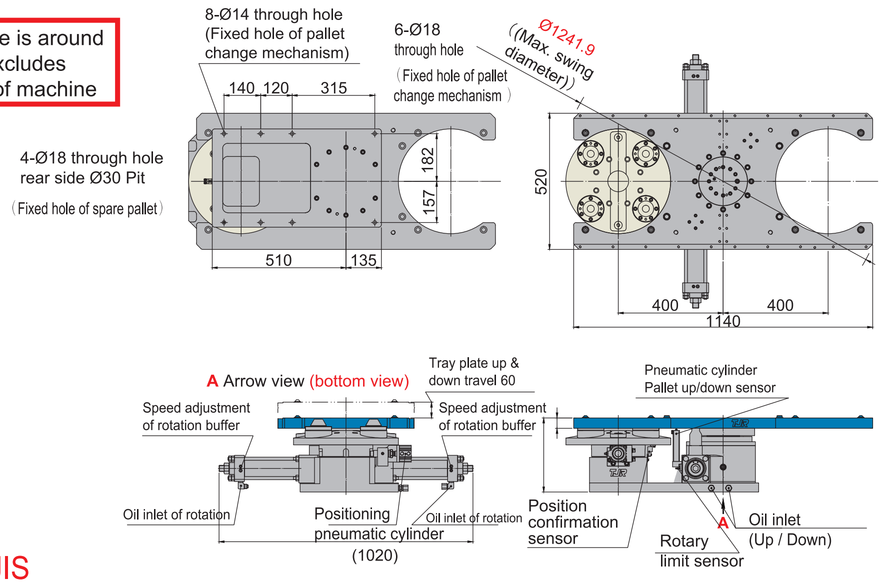
(Flat bottom type)



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

Application diagram: retrofits horizontal machining center with CTH+ CH I

CTH-400 (Pallet changer)

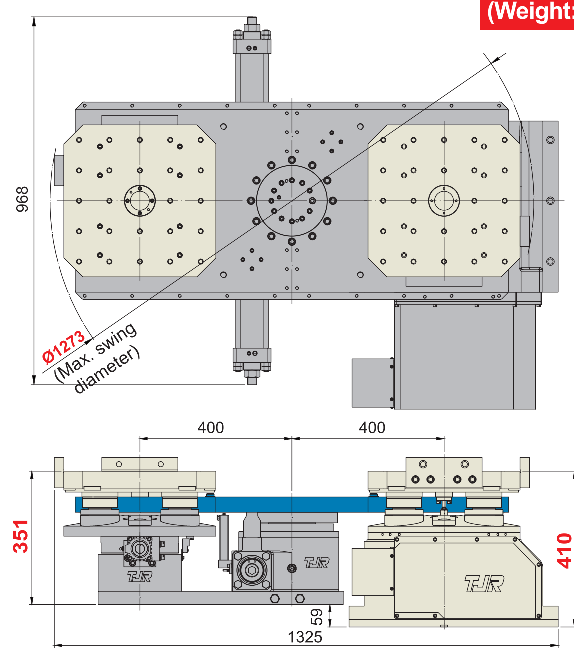


The Standard of Precision Test: Japan JIS

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.	180º to and fro
Clamping System (Hydraulic)		kg/cm^2	35
Positioning method		-	Cone positioning
Clamping force (35kg/cm^2)		kgf	960x4=3840
Operating System(Up & Down & Rotate)		kg/cm^2	Hyd.35
Lifting thrust force		kg	2200
Up and down travel of the pallet		mm	60
Allowable Workpiece Load	Horizontal	kg	400x2=800
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

CTH-400 + CH I-400 (Flat bottom type)

(Weight:335kg)



CHI/CHR Series

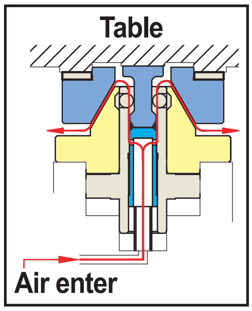
(Dual pallets rotary table)

CH I -500 (1° or 5°) Hirth coupling hydraulic brake

CHR-500 (0.001°) Hydraulic Brake

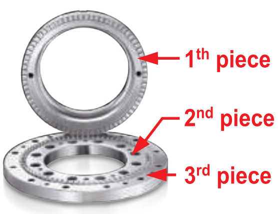
For horizontal machining center

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



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

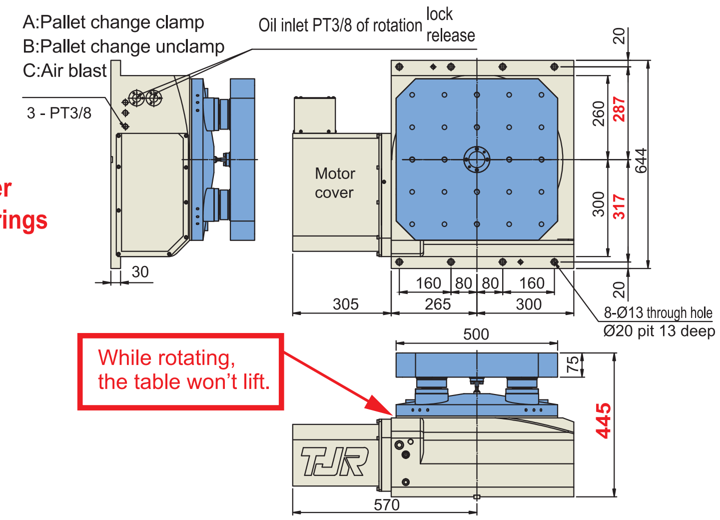
▲ **Cones:** Powerful hydraulic clamping



▲ **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.**

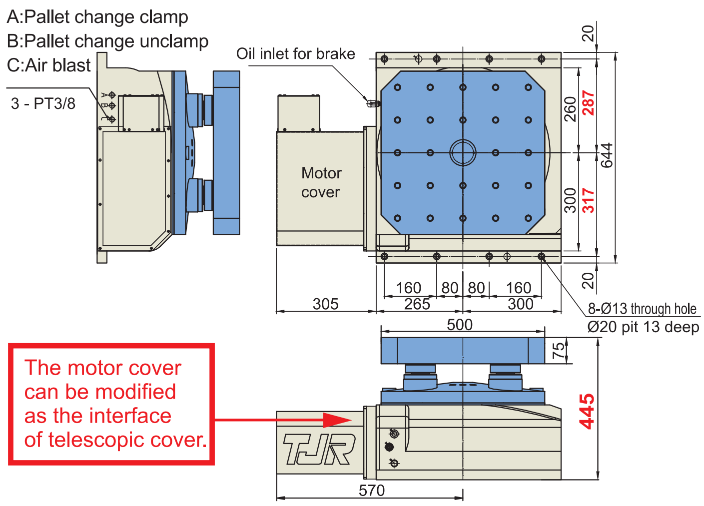
▲ **CHR series :**
Use **large-diameter radial & axial bearings**

CH I -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.

The Standard of Precision Test: Japan JIS

Item / Model		Unit	CH I-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	Straight shaft without key	β22is	α12i / 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	600	600
Strength of worm gears		kgf.m	-	250
Net Weight (servo motor excluded)		kg	716(including 2 pallets)	-

CTH Series

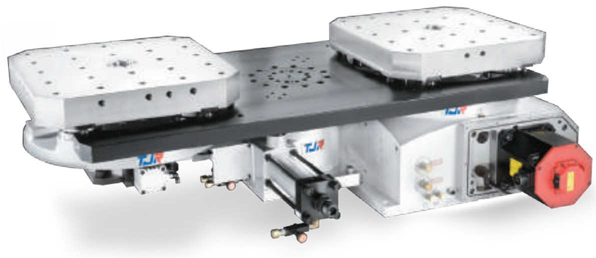
(tray type auto pallet changer)

CTH-500 (Can go with CHI/CHR series)

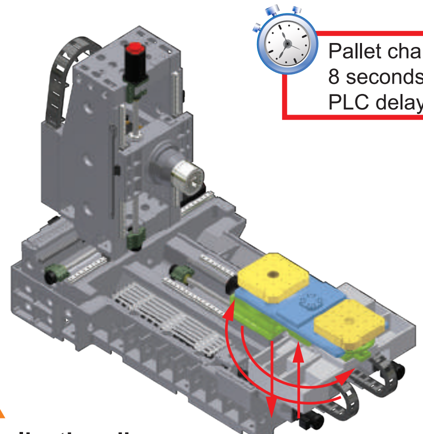
For horizontal machining center

(180° to and fro)

CTH-500 (tray type APC)



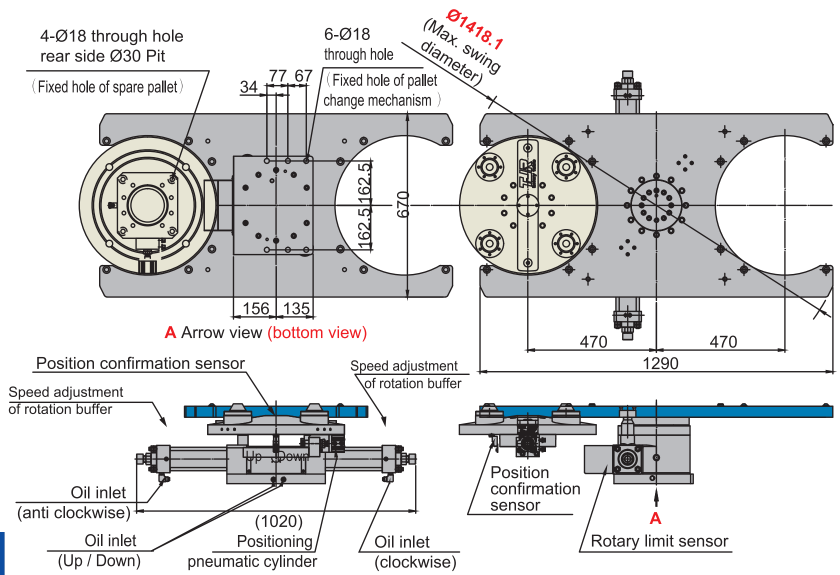
CTH-500 + CH I-500
Dual pallets rotary table + Tray type APC
(Flat bottom type)



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

Application diagram:
retrofits horizontal machining center
with CTH+ CH I

CTH-500 (Pallet changer)

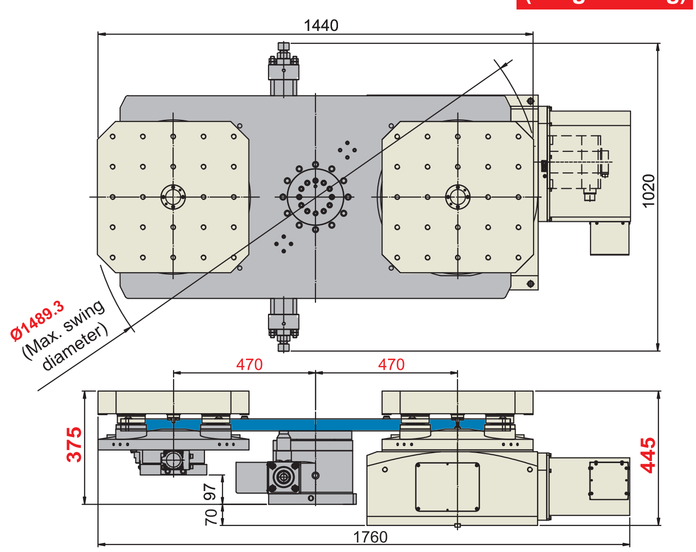


The Standard of Precision Test: Japan JIS

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.	180º to and fro
Clamping System(Hydraulic)		kg/cm^2	35
Positioning method		-	Cone positioning
Clamping force (35kg/cm^2)		kgf	960x4=3840
Operating System(Up & Down & Rotate)		kg/cm^2	Hyd.45
Lifting thrust force		kg	2860
Up and down travel of the pallet		mm	60
Allowable Workpiece Load	Horizontal	kg	500x2=1000
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

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

(Weight:400kg)

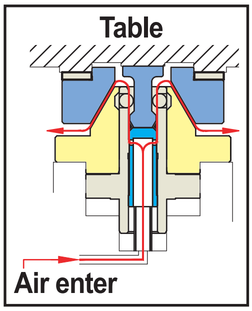


CHI/CHR Series

(Dual pallets rotary table)

CH I-630L(1°or5°) Hirth coupling hydraulic brake
CHR-630L(0.001°) Hydraulic Brake

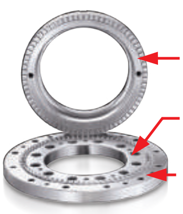
For horizontal machining center



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

Cones:
Powerful hydraulic clamping

CHI-630L (1°)- Dual pallets rotary table
(Integrated ball-screw-interface type)



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

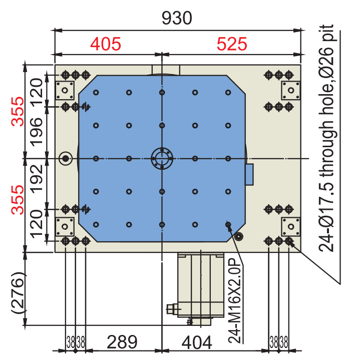
Function: ①**Accuracy: ±5 seconds**
(Angle encoder accuracy)
②**Rotate without lifting the table to prevent table from water and particles.**

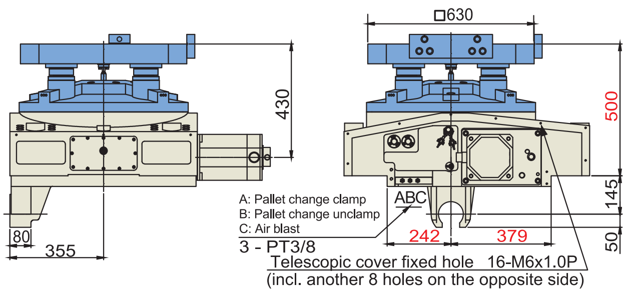
CHR series :
Use **large-diameter radial & axial bearings**

The Standard of Precision Test: Japan JIS

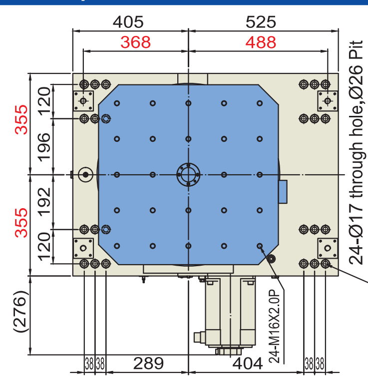
Item / Model	Unit	CH I-630L	CHR-630L
Table size	mm	□630x630	□630x630
Diameter of Table Central Hole	mm	Ø50x27 deep	Ø50x27 deep
Table height	mm	500	500
Table T-slot Width	mm	-	-
Guide Block Width	mm	-	-
Min. Increment	deg.	1° or 5°	0.001
Indexing Precision	sec.	±5	15
Repeatability	sec.	±1	4
Clamping force of positioning cones (35kg/cm²)	kgf	940x4=3840	940x4=3840
Clamping System	kg/cm²	Hydraulic 35	Hydraulic 35
Clamping Torque	kg-m	5000	800
Servo Motor Model FANUC	Straight shaft without key	β22is	α22i / β22is
Servo Motor Model MITSUBISHI	Straight shaft without key	HF-204	HF-204
Speed Reduction Ratio	-	1：180	1：180
Max. Rotation Rate of Table (Calculate with Fanuc α Motor)	r.p.m	16.6	16.6
Allowable Workpiece Load Horizontal	kgf	1200	1200
Strength of worm gears	kgf.m	-	420
Net Weight (servo motor excluded)	kg	1135	-

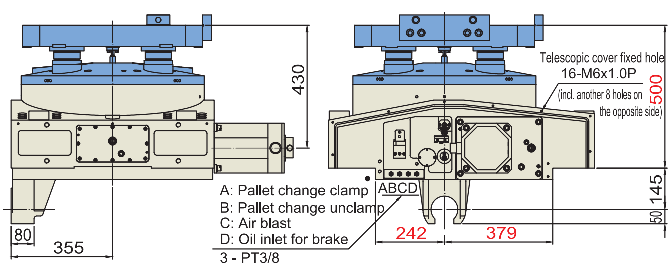
CH I-630L (1° or 5°) Integrated ball-screw-interface type





CHR-630L (0.001°) Integrated ball-screw-interface type





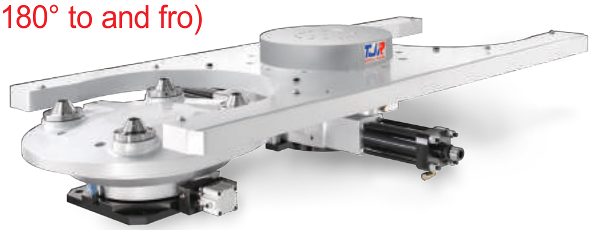
CTH Series

(tray type auto pallet changer)

CTH-630 (Can go with CHI/CHR series)

For horizontal machining center

(180° to and fro)

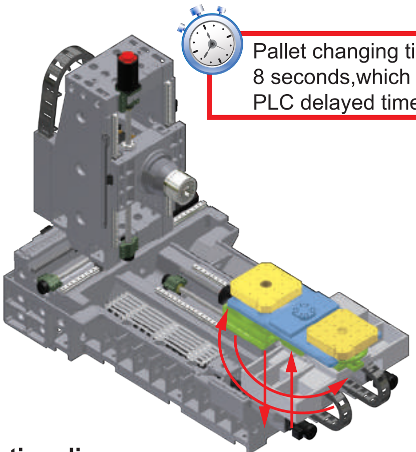


▲ **CTH-630 (tray type APC)**

▲ **CTH-630 + CH I-630L**

Dual pallets rotary table + Tray type APC

(Integrated ball-screw-interface type)

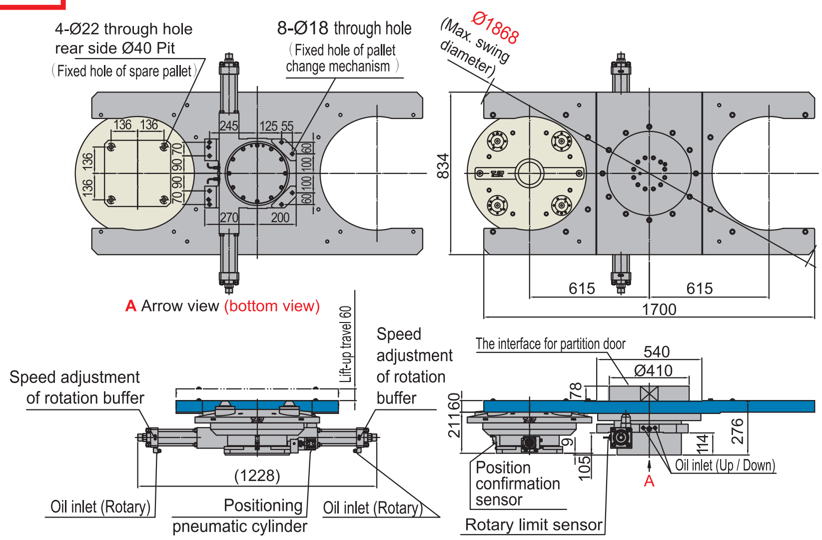


Pallet changing time is around 8 seconds,which excludes PLC delayed time of machine

▲

Application diagram: retrofits horizontal machining center with CTH+ CHR

CTH-630 (Pallet changer)

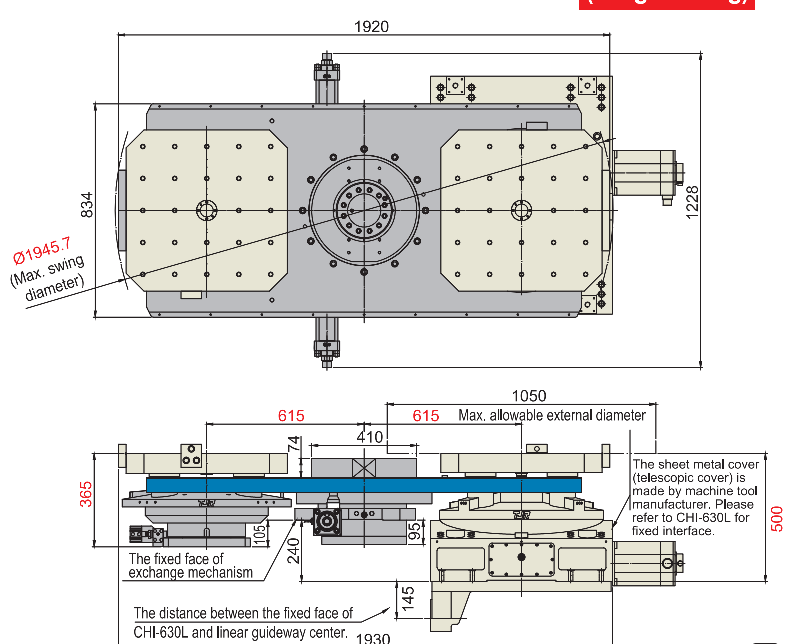


The Standard of Precision Test: Japan JIS

Item / Model		Unit	CTH-630
Lift-up mechanism		-	Tray type (H type)
Table size		mm	834 x 1700
Rotation method		-	Hydraulic hirth coupling
Rotation angle		deg.	180º to and fro
Clamping System (Hydraulic)		kg/cm^2	35
Positioning method		-	Cone positioning
Clamping force ($35kg/cm^2$)		kgf	960x4=3840
Operating System(Up & Down & Rotate)		kg/cm^2	Hyd.45
Lifting thrust force		kg	3780
Up and down travel of the pallet		mm	60
Allowable Workpiece Load	Horizontal	kg	1000x2=2000
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

CTH-630 + CH I-630L Integrated ball-screw-interface type

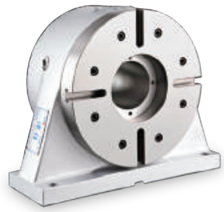
(Weight:600kg)



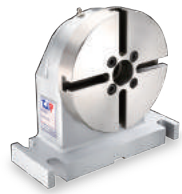
Rotary Tailstock

RTA Series (Pneumatic Brake) RTA-125/170/210/250
RTH Series (Hydraulic Brake) RTH-255/320/400A


▲ RTA-170


▲ RTH-255

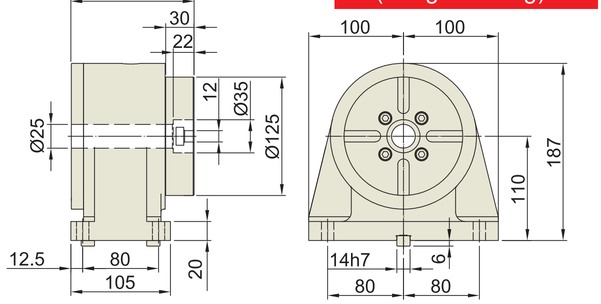

▲ RTH-320


▲ RT-170F


▲ RT-135

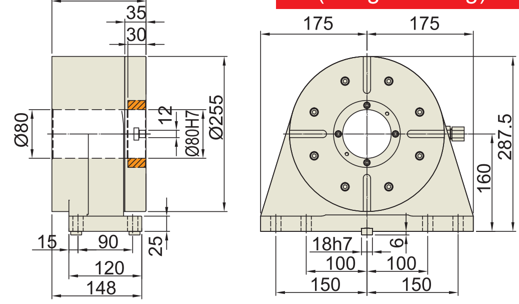
RTA-125 (Pneumatic brake)

(Weight：18kg)



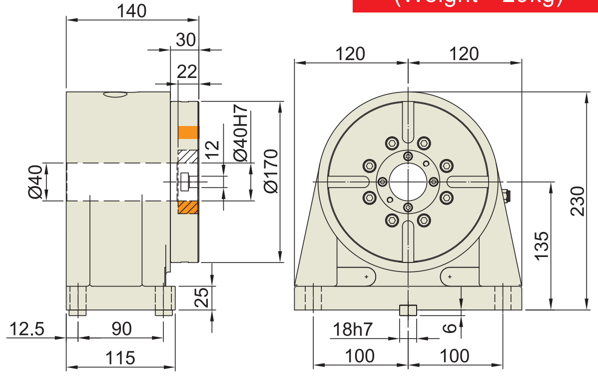
RTH-255 (Hydraulic brake)

(Weight：57kg)



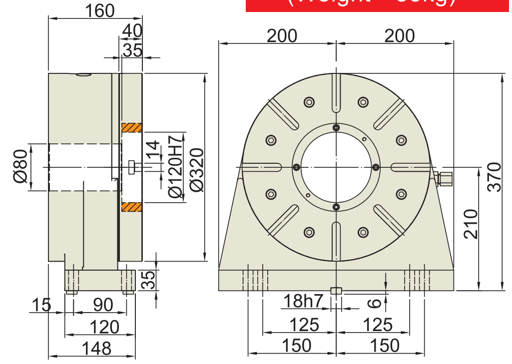
RTA-170 (Pneumatic brake)
RTA-170H (Hydraulic brake)

(Weight：29kg)



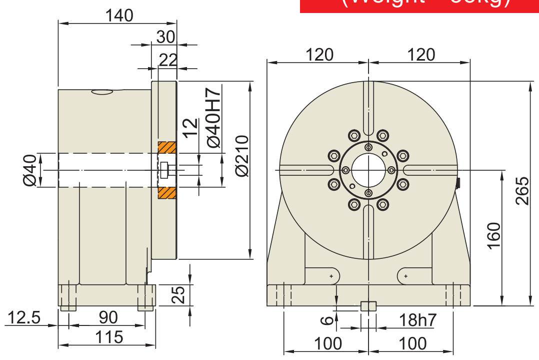
RTH-320 (Hydraulic brake)

(Weight：83kg)



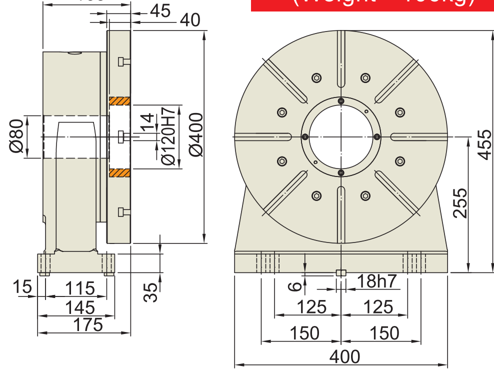
RTA-210 (Pneumatic brake)
RTA-210H (Hydraulic brake)

(Weight：35kg)



RTH-400A (Hydraulic brake)

(Weight：106kg)



Manual Tailstock

TTJ Series
ATTJ Series (Pneumatic)
HTTJ Series (Hydraulic)

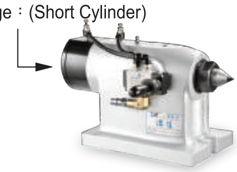
(For any model exceeding 170, **MT4#** is employed to provide **higher rigidity**)

TTJ-125~400
ATTJ-125~210
HTTJ-210~400
TTJ-125A=MT2

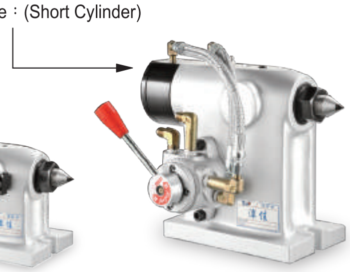
▲ TTJ-125A

▲ TJ-210
(with Fixed Taper)

▲ TTJ-210
(with Replaceable Taper)



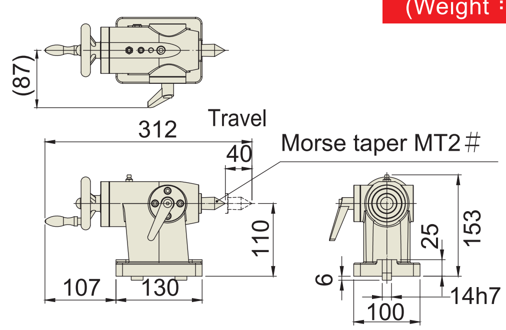
▲ ATTJ-170
(with Pneumatic switching valve)



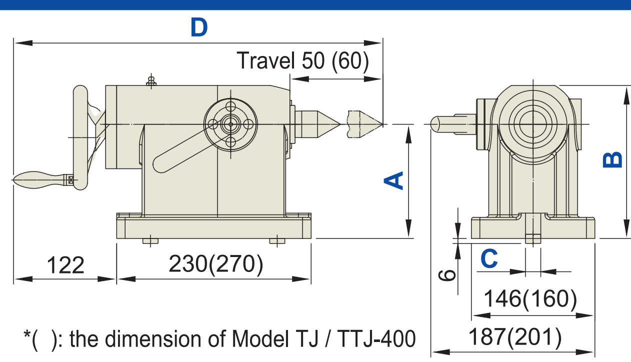
▲ HTTJ-320
(with Hydraulic switching valve)

TTJ-125A (For light cutting)

(Weight：8.5kg)

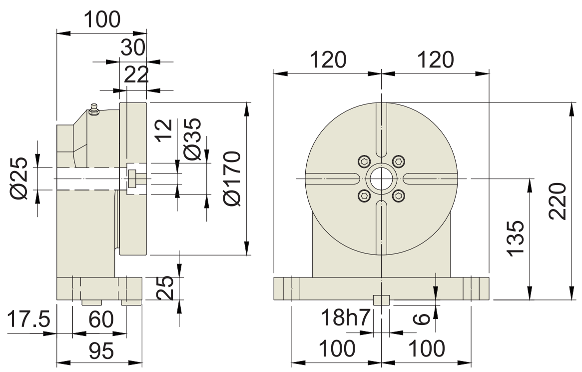


TJ / TTJ

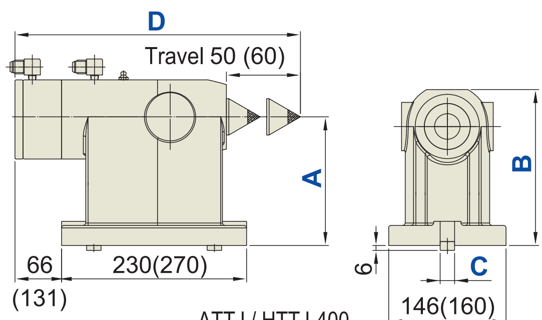


*( ): the dimension of Model TJ / TTJ-400

RT-170F (Without brake)



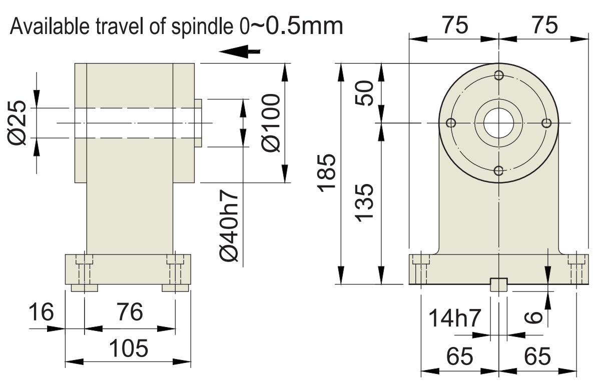
ATJ/ATTJ HTJ/HTTJ



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

RT-135 (Simplified type / Without brake)

Available travel of spindle 0~0.5mm



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

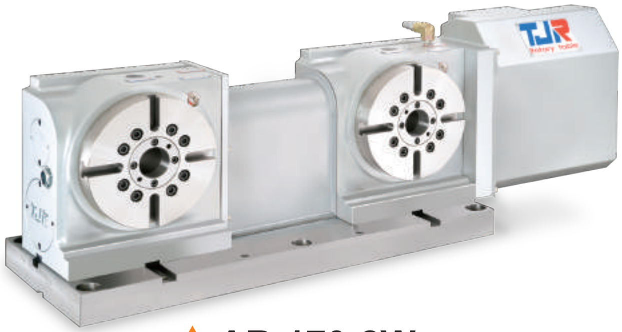
(3-wheel coupled, Powerful Pneumatic Brake)

AR-170-3W/210-3W

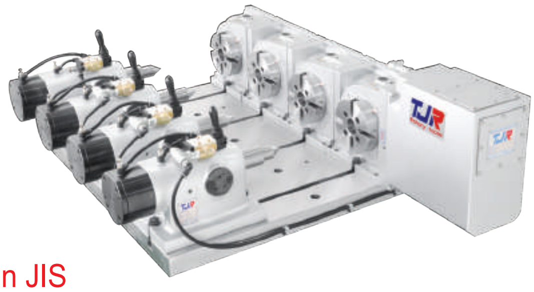
AR multi spindle 4W Series

(4-wheel coupled, Powerful Pneumatic Brake)

AR-125-4W



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



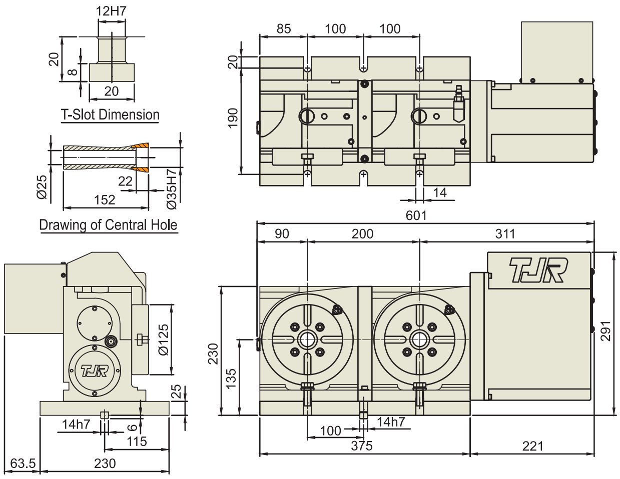
▲ **AR-125-4W**
4 wheel coupled + manual tailstock + big base plate

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
Minimurn 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.	0.001	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 / ß12is	α8i / ß12is
	MITSUBISHI	Direct Shaft without Key	HF-154	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
Allowable Load (with Rotary Table Clamping)	F	kgf	1000	1450	1450
	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 / -	- / -	- / -

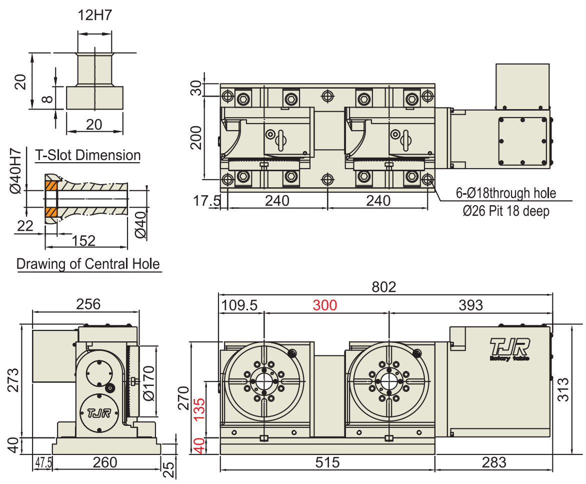
NEW Powerful Brake System

AR-125-2W



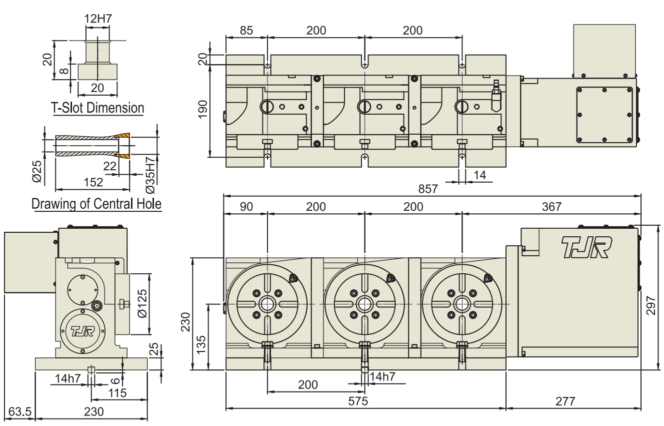
NEW Powerful Brake System

AR-170-2W (Standard type)



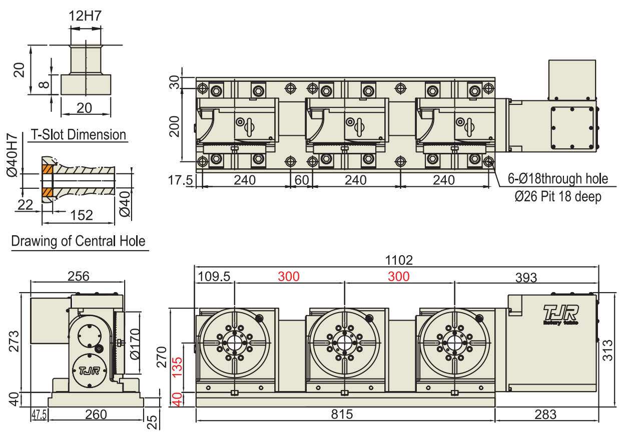
NEW Powerful Brake System

AR-125-3W (Standard type)



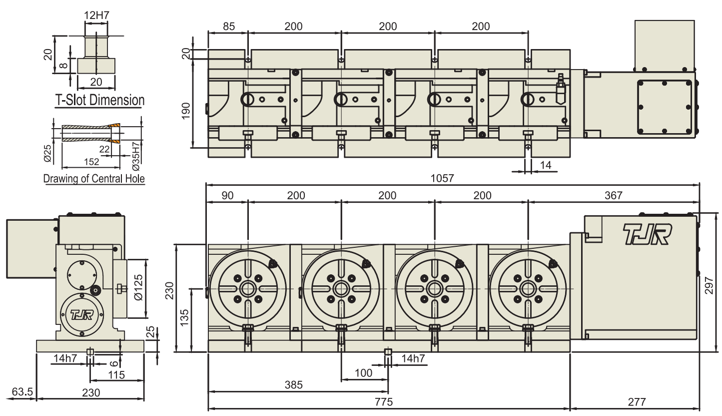
NEW Powerful Brake System

AR-170-3W (Standard type)



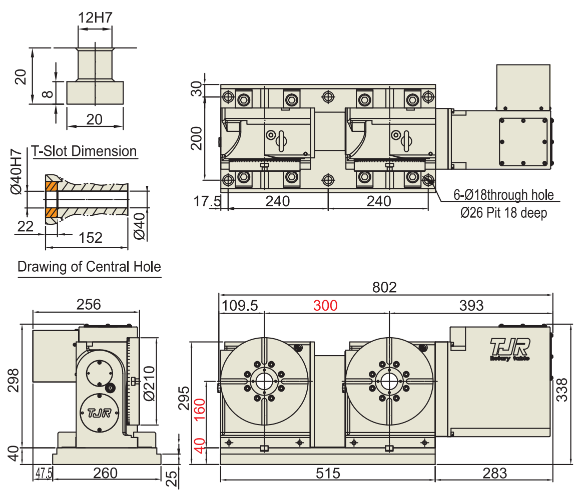
NEW Powerful Brake System

AR-125-4W (Standard type)

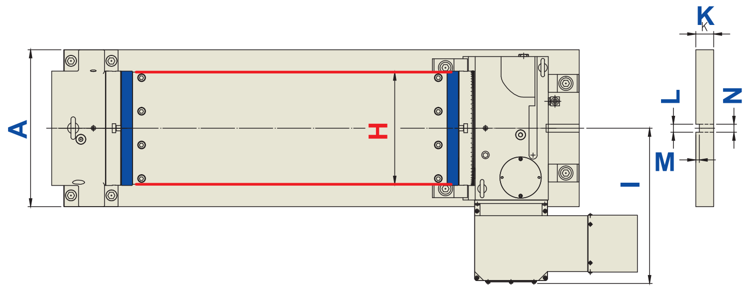


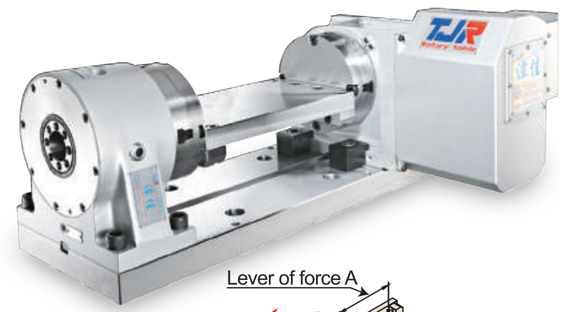
NEW Powerful Brake System

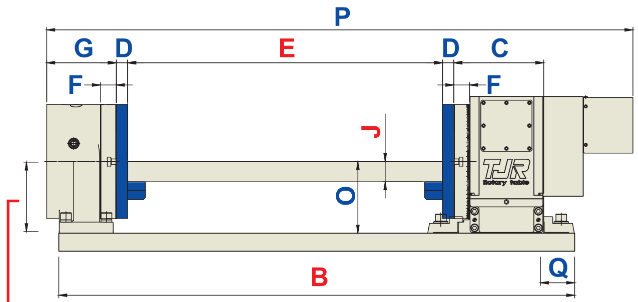
AR-210-2W (Standard type)



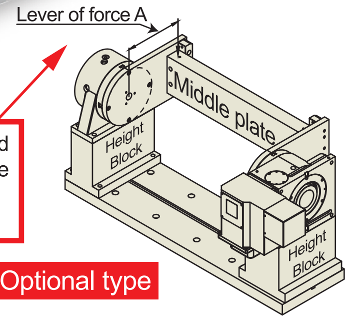
CNC Rotary Table + Rotary Tailstock + Connection Plates





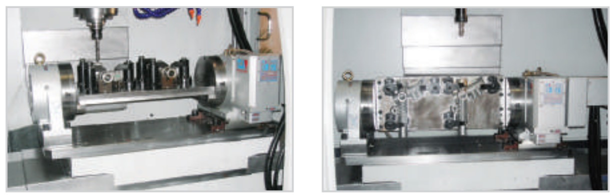


The plane of middle plate is at the same height as the center of rotary table (standard type)
(An exception: the plane of AR-125 / RTA-125 middle plate is 5 mm higher than the center of rotary table)



Please keep us informed before ordering while the lever of force A exceeds the table radius

Optional type



(Example of workpiece installation)

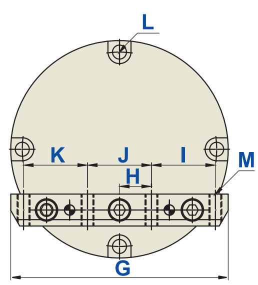
Specification

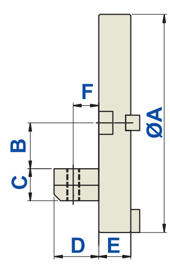
Model /Dimension	A	B	C	D	E ※	F	G	H ※	I	J ※	K	L	M	N	O	P	Q
AR-125 / RTA-125	250	725	152	20	400	30	130	125	302	30	35	14	8	14	115	828	0
AR-170 / RTA-170	300	911	152	25	500	30	140	170	336	35	40	18	8	18	135	947	69
AR-210 / RTA-210	300	1011	152	25	600	30	140	200	336	40	40	18	8	18	160	1047	69
HR-210 / RTA-210H	300	1022	152	25	600	30	150	200	341	40	40	18	8	18	160	1057	69
AR-250 / RTA-250	300	1020	160	25	600	38	140	250	336	40	40	18	8	18	160	1055	69
HR-255N / RTH-255	350	1148	200	25	700	35	155	250	346	45	40	18	8	18	160	1305	69
HR-320N / RTH-320	400	1297	235	30	800	40	160	300	416	45	40	18	8	18	210	1460	69
HR-400N / RTH-400A	450	1455	250	30	900	45	175	400	457	45	40	18	8	18	255	1572	69

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

(Unit：mm)

Disk L-block





Specification (Unit：mm)

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

Accessories Series

Installation of Manual Three-jaw Chuck

Three-jaw Chuck

Flange Disk

AIC Hydraulic Controller

Hydraulic cylinder

Installation of Hydraulic Three-jaw Chuck

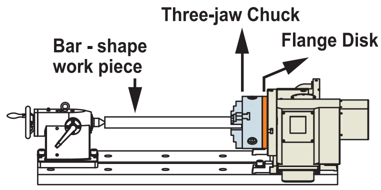


Diagram of Chuck Installation

Single axis controller for Direct Drive Motor (DD SAC)

Single axis controller (SAC) / Dual axis controller (DAC)

Specification Table of Manual Three-jaw Chuck

Specification Table of Manual Three-jaw Chuck						Max. available diameter of bar-shape workpiece which can go through hole of chuck.	Through hole of chuck adapter.	The thickness of chuck adapter				
Suitable rotary table	Model-Dimension	Grip Range of Inner Diameter (Straight)	Grip Range of Outer Diameter (Reverse)	Manual chuck thickness	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				25	
	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

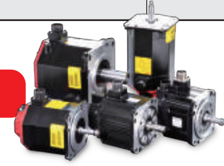
Unit：mm

Servo Motor Table（Please use oil-proof motors）

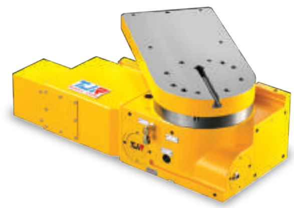
MODEL / MOTOR SPECIFICATIONS	AR-125 FAR-125 (Rotary axis) FAR-170A (Rotary axis)	AR-170 AR-210 AR-250 HR-250 FAR-125 (Tilting axis) FAR-170 (Rotary axis) FAR-210 (Rotary axis)	HR-255	FHR-255C (Rotary axis) FHR-255C (Rotary axis)	FAR-170 (Tilting axis) FAR-210 (Tilting axis) FHR-255C (Tilting axis) FHR-320 (Rotary axis) FHR-400CF (Rotary axis) FHR-400BC (Rotary axis)	HR-320 HR-400 HR-500 HR-630	FHR-320C (Tilting axis) FHR-320 (Tilting axis) FHR-400CF (Tilting axis) FHR-500C (Rotary axis)	HR-800 and above FHR-500C (Tilting axis) FHR-400BC (Tilting axis)
FANUC	α2i / ß4is	α4i / ß8is	α8i / ß8is / ß12is	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

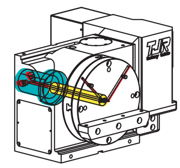
Air Hydraulic Booster Unit :
Examples for applications
1. Use hydraulic brake rotary table
2. Use hydraulic brake rotary table
   + manual tailstock

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

2 holes :
1 input ; 1 output

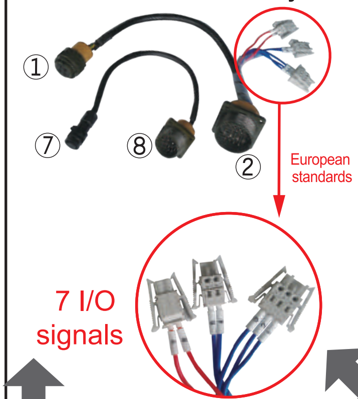
8 holes :
4 input ; 4 output

Hydraulic Power Unit :
Examples for applications
1. Use hydraulic brake rotary table
   + rotary tailstock
2. Use hydraulic brake rotary table
   + rotary tailstock
   + hydraulic fixtures



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.

Internal Cable inside rotary table



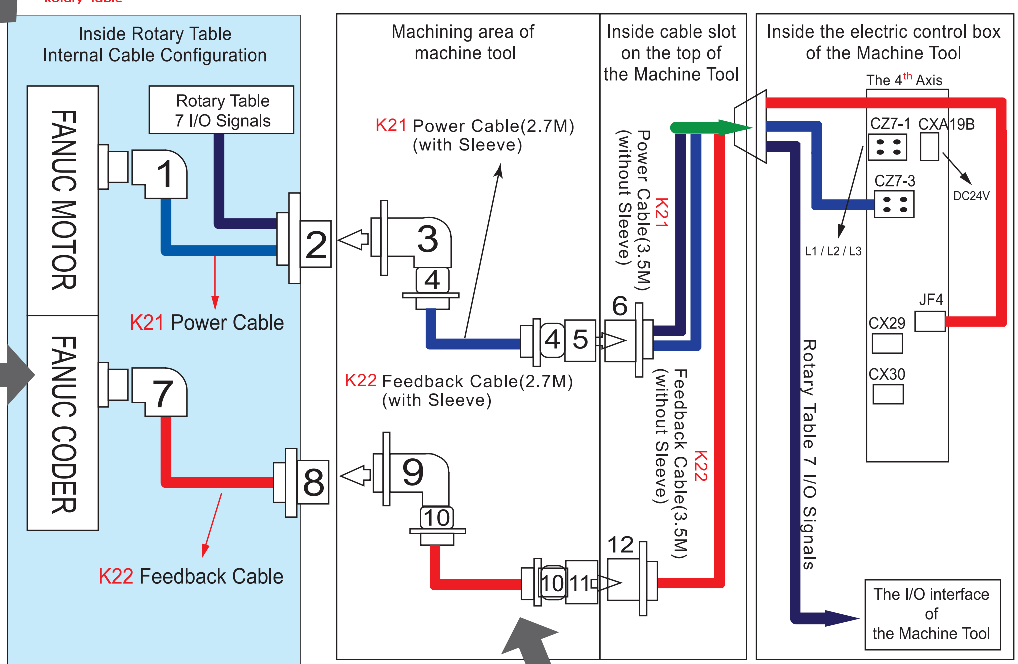
Cable assembly we provide (Standard)

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

TJR Power & Feedback Cable Diagram



Cable assembly the customer provide (Optional)

(A) No hole and cable

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

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

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

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

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
Absolute	ECN-223F (FANUC) ECN-223M (MITSUBISHI) ECN-225 (SIEMENS(HEIDENHAIN))		± 10”	Within 30” (for tilt axis)
	RCN-2390F (FANUC) RCN-2390M (MITSUBISHI)	Original 223F	± 5”	Within 12”
	RCN-2310 (HEIDENHAIN) RCN-2380 (SIEMENS)	Original 226		
	RCN-228 (SIEMENS)		± 2.5”	Within 8”
	RCN-5590F (FANUC) RCN-5590M (MITSUBISHI)	Original 227F	± 2.5”	Within 8”

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

1 Spindle bearings strength

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

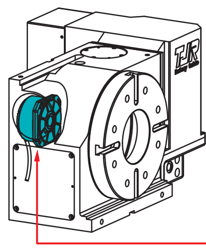


Diagram of angle encoder installation

Angle encoder

2 Advanced inspection facilities

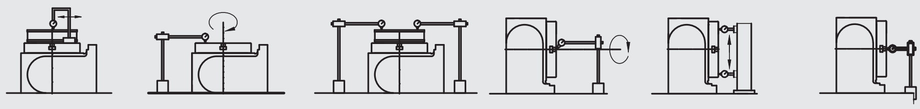
	TJR	Others
2D measuring equipment	YES 	YES
3D measuring equipment [Geometry precision testing]	YES Fully utilized to test all kind of precision and runout. 	NO
Laser measuring equipment [Indexing precision testing]	YES Every rotary table needs to pass laser angular test before shipment 	NO

Alternative methods

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

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

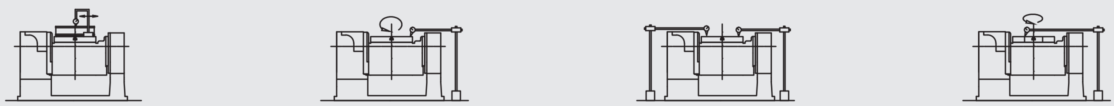
AR/HR (single axis)



The Standard of Precision Test : Japan JIS

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
AR-125	0.01	0.015	0.02	0.01	0.01	0.02	40”
AR-170/210/250	0.01	0.015	0.02	0.01	0.01	0.02	20”
AR-170B/210B/250B	0.01	0.015	-	0.01	0.01	0.02	20”
HR-210	0.015	0.015	0.02	0.01	0.01	0.02	20”
HR-255/320/400	0.015	0.015	0.02	0.01	0.01	0.02	15”
HR-500	0.02	0.015	0.02	0.01	0.02	0.02	15”
HR-630 / HR-800	0.03	0.02	0.03	0.01	0.03	0.03	15”

FHR (dual axis)

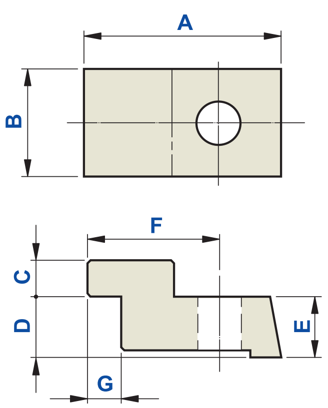


Inspection Items	Flatness of table top (Lower in the center) Total Length	Runout of table top during rotation Per 300mm	Parallelism of table top to frame bottom Total Length	Runout of table central hole Front
FAR-125	0.015	0.015	0.02	0.01
FAR-170 / 210	0.015	0.015	0.02	0.01
FHR-255	0.015	0.015	0.02	0.01
FHR-320 / 400	0.015	0.015	0.02	0.01
FHR-500	0.02	0.015	0.02	0.01
FHR-630	0.02	0.015	0.02	0.01
MTHR-255	0.02	0.02	0.02	0.01

Specification – Clamping block

Examples of special clamping block

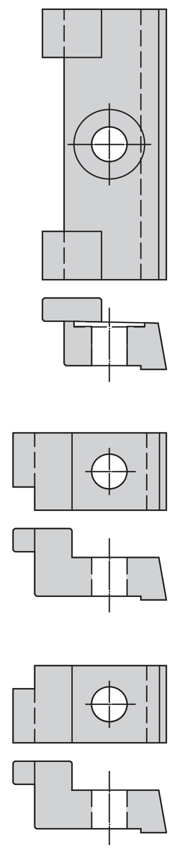
Standard Clamping Block



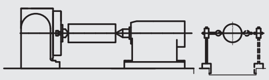
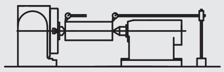
Model	Standard Clamping Block						
	A	B	C	D	E	F	G
AR-125	63	35	12	20	20	43	11
AR-170	78	40	12	25	22	49	11
AR-210	78	40	12	25	22	49	11
AR-255	78	40	12	25	22	49	11
HR-210	78	40	12	25	22	49	11
HR-255	78	40	12	25	22	49	11
HR-320	78	40	15	35	25	49	11
HR-400	78	40	15	35	25	49	11
HR-500	63	60	18	40	58	33	18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

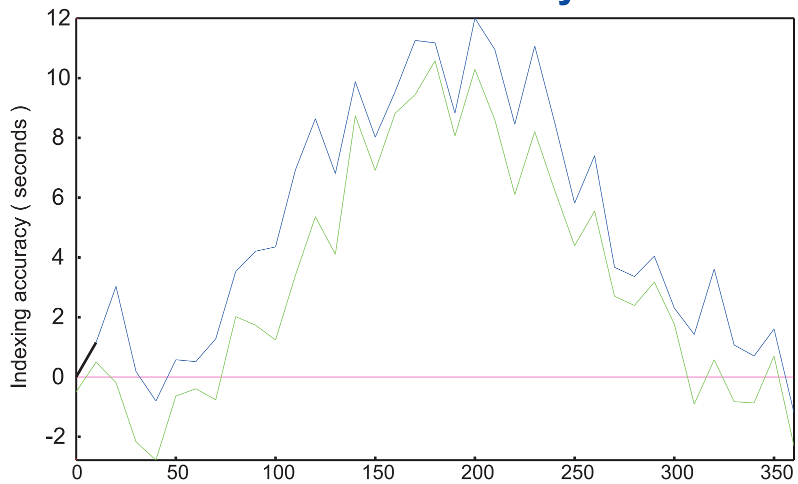
(Unit：mm)

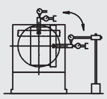


Rotation angle measurement of rotary table

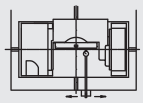



Parallelism of centerline between rotary table and tailstock to frame bottom guide blocks Per 300mm	Height Difference between Center Line of Rotary Table and that of Tailstock (tailstock center line should be higher)
0.02	0.02
0.02	0.02
0.02	0.02
0.02	0.02
0.02	0.02
0.02	0.02
0.02	0.02





The Standard of Precision Test : Japan JIS



Parallelism between center line of tilting axis and bottom Total Length	Tilt axis - indexing precison (seconds)	Rotary axis - indexing precision (seconds) Accumulative tolerance	Parallelism between rotary table and positioning block of bottom
0.02	50”	40”	0.02
0.02	50”	20”	0.02
0.02	50”	15”	0.02
0.02	50”	15”	0.02
0.02	50”	15”	0.02
0.02	60”	15”	0.02
0.02	-	15”	0.02

Mazak Horizontal Machining Center (Machining the main body)

Trade fair exhibition

Assembly Line

Appearance of Taiwan Plant

There are four common transmission mechanisms of rotary table as bellow:

You can find all types of mechanism in TJR.

Transmission Mechanism

A

Driven by alloy steel worm gear

Strength:

① Much more anti-wear than brazed worm gear
② High torque
③ Because the tilting axis needs to bear heavy load, alloy steel worm gear can significantly enhance wear resistance.

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-1

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

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

①If 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.
②The super high speed of rotary axis: 2000 rpm.
③Truly zero backlash during the clockwise / anti-clockwise rotation.
④Truly zero wear for the transmission mechanism.
⑤Long-lasting high precision
(The actual precision depends on the selected angle encoder)

C-2

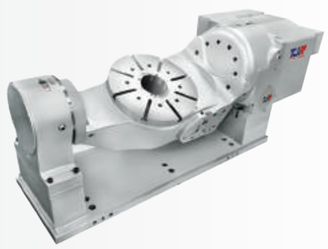
Driven by direct drive motor
(speed: 200 rpm)

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)

D

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



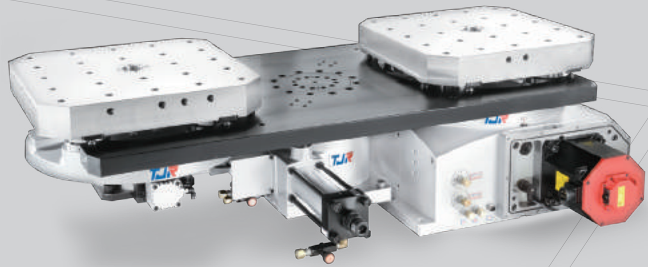
Strength:

① The price is the lowest
② It's very easy to adjust backlash after some abrasions

※ Alloy steel worm gear and roller gear cam are options to drive tilt axis of dual-axis rotary table.

TJR Global Sales

Innovative Product　**Integrity Business**　**Responsible Service**



TJR®

Rotary Table

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TJR APP

LV TJR®

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