General Catalog

DREAM NAVIGATOR
SINCE 1909

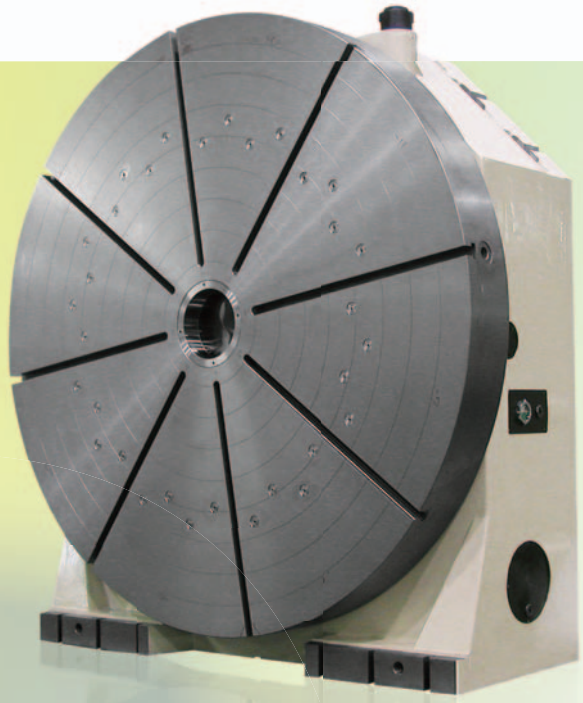
TSUDAKOMA

NC Rotary Tables

TSUDAKOMA Corp.

Productivity Innovation

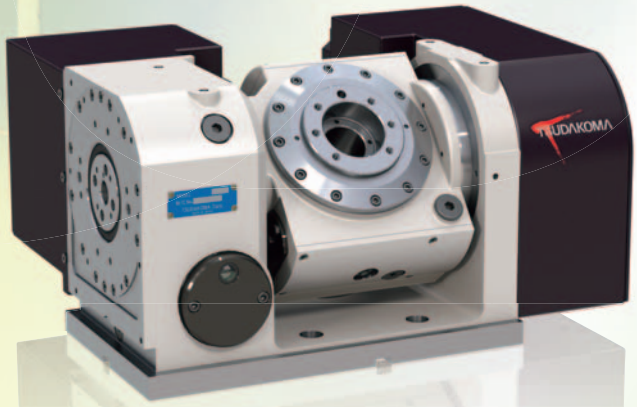
Tsudakoma products are being used all over the world for high-precision machining in the automobile, aerospace, electronics and medical industries.
In pursuit of the ultimate in performance, productivity, and technical advantages, Tsudakoma always strives to develop innovative products.
We are trying to create advantageous NC tables that best suit your needs.



Aerospace/Parts

Energy

Medical



Electronics

General Catalog

NC Rotary Tables

I N D E X

TSUDAKOMA Original Next-Generation Drive mechanism

『BallDrive®』

The perfect drive system 'BallDrive®' realizes the highest accuracy level and no-backlash.

No-clamp machining at a light load with no-backlash, high speed and high rigidity.

Shorten cycle time to improve your productivity by zeroizing of clamp/unclamp time and more than double indexing speed ※

No backlash

High accuracy machining without backlash

High rigidity

Stable positioning using a powerful clamp

Maintenance free

Extremely small aged deterioration
Original precision is maintained

Cycle time reduction

Twice as fast as the current model
Clampless machining

Power saving

High transfer efficiency with a ball rolling system

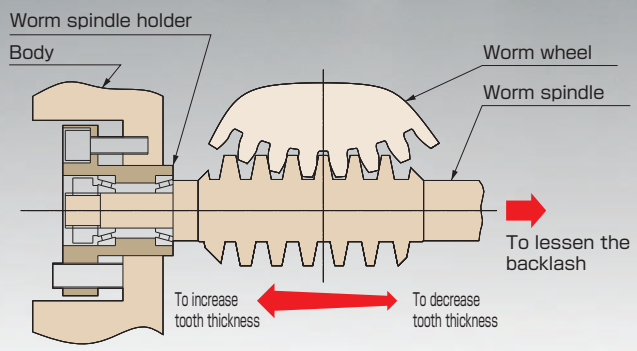
※In-house comparison

EXCELLENT BALANCE OF SMOOTHNESS, POWER AND DURABILITY BY SPECIAL GEAR SYSTEM ASSURES THE ULTIMATE IN PERFORMANCE

TSUDAKOMA specially designed double-lead worm gears with full-depth teeth

The setting of the lead amount on this gear system is different depending on the rotating direction of the worm wheel and the worm spindle. By moving the worm spindle axially, the tooth engagement can be changed successively. As the backlash between the worm wheel and the worm spindle can be adjusted while keeping them in their proper positions, the ideal tooth engagement is maintained.

Gear system



Materials

Worm spindle: Case-hardened alloy steel
Worm wheel: Special high-tensile brass equal in strength to a steel alloy

Torque transfer efficiency

The combination of iron and brass produces less friction. A more effective transfer of the motor torque is achieved compared with other combinations of materials.

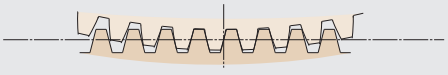
Larger worm wheel

The worm wheel with a large pitch diameter creates a large engagement area and less pressure on the contact surface, resulting in high durability against wear compared with conventional gear system.

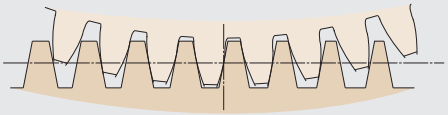
Tooth profile

The adoption of full-depth gear teeth, instead of standard teeth, results in higher strength equal to that of a gear of a size larger in module.

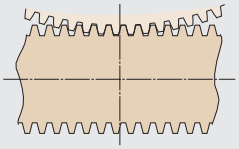
Conventional type



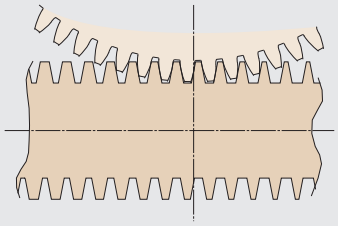
TSUDAKOMA



Conventional type



TSUDAKOMA



HIGH-LEVEL PERFORMANCE PROVEN IN MACHINING FIELDS

BallDrive NC Rotary Tables

Basic model

RBS-series

High-performance model with the drive system uniquely developed

No backlash
Ideally meshing rolling of steel balls with cam shaft achieves no backlash, 'play' at drive parts. It realizes the highest accuracy level for both indexing accuracy and repeatability.

High Speed
It enables smaller speed reduction ratio comparing with other drive system and more than twice as fast as worm gear. ※

High rigidity
High rigidity of BallDrive enables strong clamp and no-clamp machining at a light load.

BallDrive NC Tilting Rotary Tables

Basic model

TBS-series

High-end Next-Generation model pursuing productivity improvement

No backlash
Ideally meshing rolling of steel balls with cam shaft achieves no backlash, 'play' at drive parts. Machining accuracy and wear resistance is excellent in simultaneous 5-axis machining.

High Speed
It enables smaller speed reduction ratio comparing with other drive system and more than twice as fast as worm gear at both rotary and tilt axis. ※

High rigidity
High rigidity of BallDrive enables strong clamp and no-clamp machining at a light load. ※

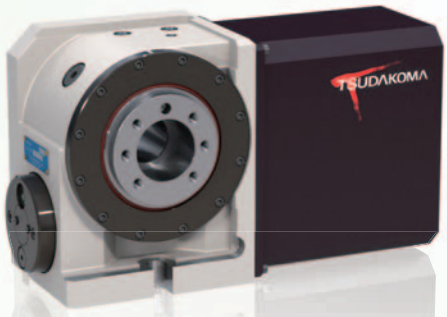
※In-house comparison

NC Rotary Tables

Basic models

RWE/RWA-series

New standard for the ultimate in power and speed



High Speed

The specially designed double-lead worm gear system with full-depth teeth of increased torque transfer efficiency minimizes the speed reduction ratio, improving the indexing speed.
The machining cycle time is reduced.

Strong Clamp Torque(RWA-series)

The newly developed clamp mechanism using pneumatic pressure realizes powerful clamping.
The cutting feed speed is increased.
Responsivity is also increased.

Big bore models

RWB-series

Flagship models of single-axis NC table

Newly developed strong hydraulic clamping system

New clamping system enables 25% stronger clamping torque than previous model. It realizes stable machining at a distance from rotary center.

Strong strength of worm gears

Strength of worm gears improves 70% to 130% higher than previous model. It realizes 1 size stronger strength than previous model, which provides downsizing of the model.

Indexing accuracy 14 sec.(the sum) guaranteed

Our high quality control enable us to take an another step forward to elevate the indexing accuracy.

NC Tilting Rotary Tables

Basic tilting models

TWA/TN-series

Best partner for five-axis machining

High Speed

The specially designed double-lead worm gear system with full-depth teeth of increased torque transfer efficiency minimizes the speed reduction ratio, improving the indexing speed.
The machining cycle time is reduced.

Strong Clamp Torque

The newly developed clamp mechanism using pneumatic pressure realizes powerful clamping.
It is rigid enough for machining even at a position far from the tilting axis.

Variety of Options

In addition to the automatic work mounting and dismounting arrangements by a pull-stud device as well as pneumatic or hydraulic rotary joint, high precision specifications using a scale is also available.

INDEX

NC Tilting Rotary Tables

Machining of aluminum components for automobiles electronic devices and blades for jet engines

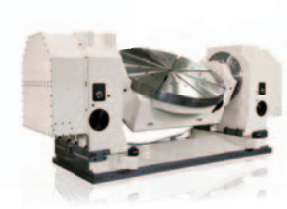
Basic models

High speed indexing and strong clamp torque for 5-axis machining

Standard type
TWA/TN

TWA-130 P.30
TWA-160
TWA-200
TN-101
TN-320
TN-450

Standard type
TTNC



TTNC-631 P.32
TTNC-1001
TTNC-1500

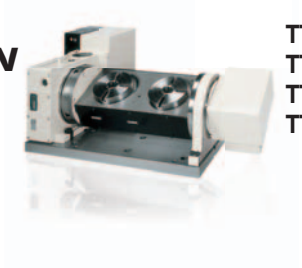
Manual Tilting type
THNC

THNC-251 P.34
THNC-301

Multi-spindle models

Multi-work processing model for high productivity

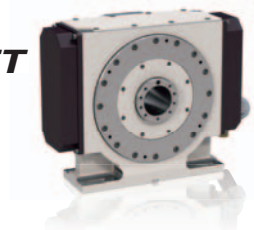
Multi-spindle type
TTNC-N



TTNC-102-2 P.36
TTNC-101-4
TTNC-151-2
TTNC-201-2

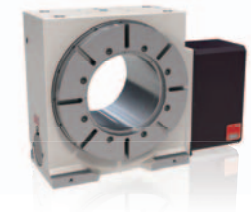
DD Table•Special NC Rotary Tables

DD Table
RDS
RTV・RTT



RDS-200 P.38
RTV-202 P.39
RTT-112

Highly rigid models with a super big bore
RCB



RCB-350 P.40
RCB-450
RCB-550

Accessories P.54

Chuck
Scroll chuck

Power chuck

Tailstock
Manual tailstock

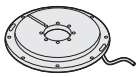
Hydraulic tailstock

Support spindle

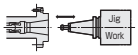
Face plate

Optional Specifications P.61

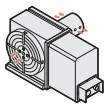
Rotary encoders and MP scales for high precision



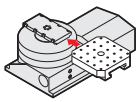
Pull-stud



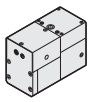
Rotary joint



Pallet clamp



Air-hydraulic Booster



Standard type

RBS RBS-160•250•320

We provide you the top productivity and high-grade machining with no backlash and high indexing speed, two times faster than previous model.

RBS-160

Specifications

Unit: mm

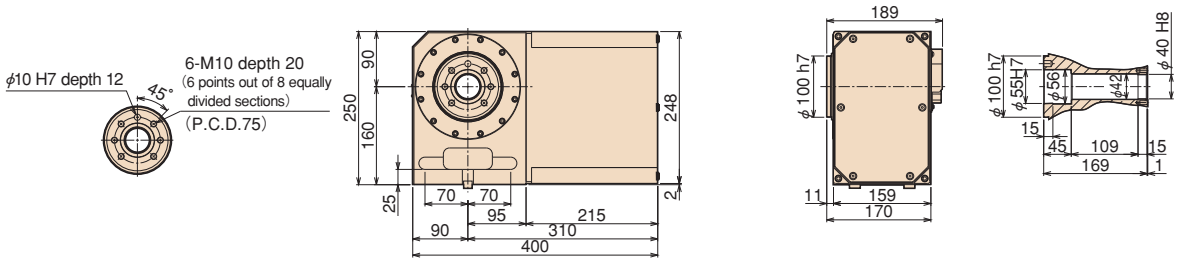
		RBS-160	RBS-250	RBS-320
Handedness	R	○	○	○
	L	○	○	○
Spindle diameter		ϕ100	ϕ140	ϕ180
Table diameter*1		ϕ160 or ϕ200 (Option)	ϕ250 (Option)	ϕ320 (Option)
Center height		160	210	255
Center bore	Nose diameter	ϕ55H7×45	ϕ80H7×45	ϕ115H7×45
	Through-bore	ϕ40	ϕ50	ϕ85
Table T-slot width*1		12H8	12H8	14H8
Guide block width		14 h 7	18 h 7	18 h 7
Servo motors (for FANUC)		αiS4	αiS8	αiS12
Inertia converted into motor shaft	$\times 10^{-3}$kg·m^2	0.19	0.42	2.24
Net weight	kg	60	110	210
Speed reduction ratio		1/36	1/36	1/36
Table max. rpm (Motor rpm: 3,000min^{-1})	min^{-1}	83.3	83.3	83.3
Indexing accuracy (the sum)	sec	15	15	15
Clamp system		Pneumatic	Pneumatic	Pneumatic
Clamp torque ／pneumatic pressure 0.49MPa	N·m	250 (500)*2	600 (1,000)*2	1,000 (1,500)*2
Allowable work weight	Vertical setting ( ):with tailstock  kg	100 (200)	125 (250)	175 (350)
	Horizontal setting  kg	200	250	350
Allowable load (when table is clamped)	F  N	10,800	14,400	24,800
	F×L  N·m	250 (500)*2	600 (1,000)*2	1,000 (1,500)*2
	F×L  N·m	780	1,900	4,700
Allowable work inertia	$J=\frac{W \cdot D^2}{8}$  kg·m^2	0.64	1.95	4.48

☞ Servo motors of other manufacturers P.66
☞ When assembling a faceplate or a fixture with the main spindle (RNA-B-series) P.76
＊1 The tolerance of the table T-slot width is applicable to four standard slots arranged crosswise. ☞ Dimensions P.60
＊2 High Clamp Torque model.

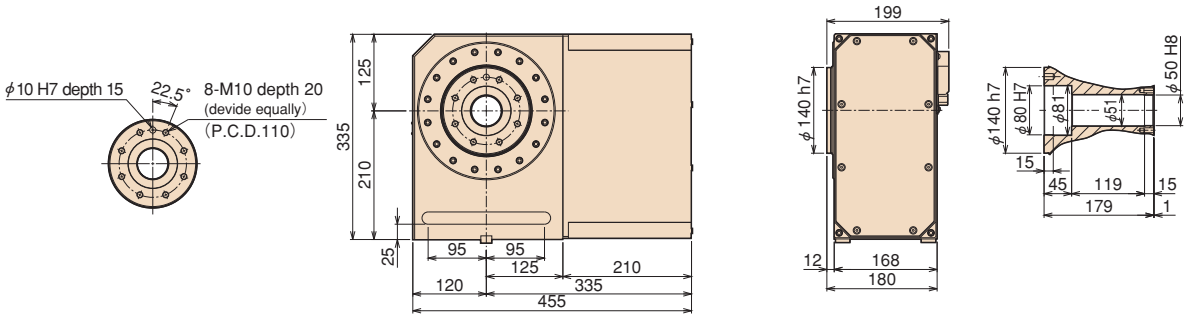
Dimensions

Unit:mm

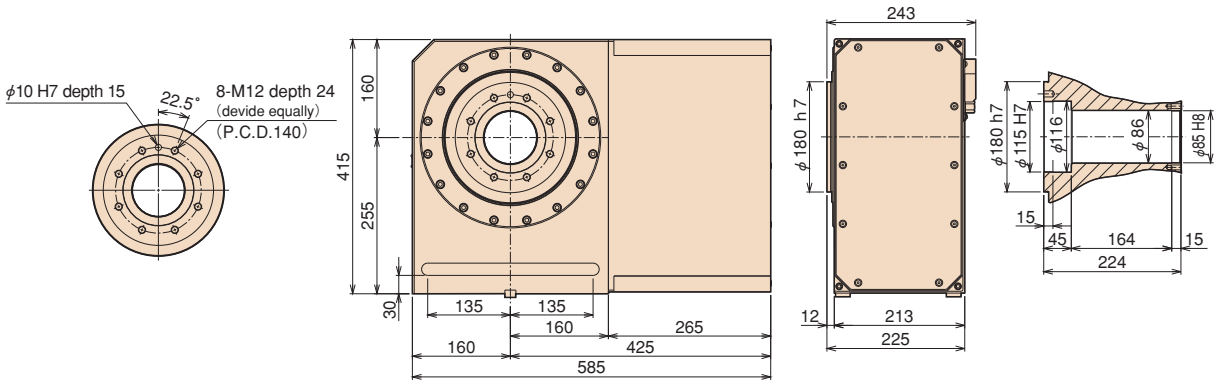
RBS-160



RBS-250



RBS-320



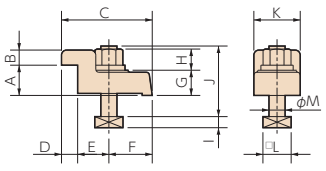
Note: The above dimensions are for FANUC servo motors. The dimensions of servo motors of other manufacturers may be larger.

Clamping block and bolt

Unit: mm

	Q'ty	T-slot pitch	T-slot width	A	B	C	D	E	F	G	H	I	J	K	L	M
RBS-160	2	—	14	—	—	—	—	—	—	—	17	8	60	—	23	12
RBS-250	4	40~120	18	25	12	80	12	33	35	22	21	11	65	40	28	16
RBS-320	4	55~147	18	30	15	90	16	31	43	25	21	11	70	46	28	16

Type I



Note 1: When using a machine with a T-slot pitch other than the above, use suitable clamping blocks and bolts that are available on the market, or order custom-made ones from TSUDAKOMA. (Option)

Standard type

TBS TBS-130•160•250

The latest technology, tilting rotary tables with Tsudakoma BallDrive system are joined in our line-up to provide perfect performance in 5-axis machining and to contribute to improve productivity.

TBS-160

Specifications

Unit: mm

		TBS-130		TBS-160		TBS-250	
Tilt range		−30°～+110°		−30°～+110°		−30°～+110°	
Spindle diameter		φ90 h7		φ100 h7		φ140 h7	
Table diameter *1		φ135		φ160 or 200 (Option)		φ250	
Table height at 0° position		225 (250 W/face plate)		270 (300 W/face plate)		290 (320 W/face plate)	
Center height at 90° position		160		200		235	
Center bore	Nose diameter	φ55H7 (φ40H7 W/face plate)		φ55H7 (φ50H7 W/face plate)		φ80H7 (φ75H7 W/face plate)	
	Through-bore	φ40		φ40		φ50	
Table T-slot width *1		12H8(W/face plate)		12H8 (W/face plate)		12H8(W/face plate)	
Guide block width		14h7		18h7		18h7	
Servo motors (for FANUC)		Rotary axis	Tilt axis	Rotary axis	Tilt axis	Rotary axis	Tilt axis
		αiS2	αiS2	αiS2	αiS4	αiS8	αiS8
Inertia converted into motor shaft	×10^{-3}kg·m^2	0.121	0.140	0.155	0.168	0.586	0.465
Speed reduction ratio		1/48	1/60	1/60	1/60	1/45	1/60
Table max. rpm	min^{-1} (Motor rpm: 3,000min^{-1})	62.5	50	50	50	66.6	50
Clamp system Supplied pressure		Pneumatic	Pneumatic	Pneumatic	Pneumatic	Pneumatic	Pneumatic
Clamp torque ／pneumatic pressure 0.49MPa	N·m	250 (500) *2	250 (500) *2	250 (500) *2	250 (500) *2	600 (1,000) *2	600 (1,000) *2
Indexing accuracy (the sum)	arc sec	20	—	20	—	20	—
Tilting accuracy Tilt 0°～90°	arc sec	—	30	—	30	—	40
Net weight	kg	120		160		280	
Allowable work weight 0° (Horizontal)	kg	35		60		135	
Allowable work weight 0°～90° (Tilting)	kg	20		40		85	
Allowable work moment W×L	N·m	61.1		59.6		186.7	
Allowable load (when table is clamped) F	N	3,920		10,800		14,400	
Allowable load (when table is clamped) F×L	N·m	250 (500) *2		250 (500) *2		600 (1,000) *2	
Allowable load (when table is clamped) F×L	N·m	250 (500) *2		250 (500) *2		600 (1,000) *2	
Allowable work inertia $J=\frac{W \cdot D^2}{8}$	kg·m^2	0.08		0.19		1.05	

☞ Servo motors of other manufacturers P.66

☞ When assembling a faceplate or a fixture with the main spindle P.76

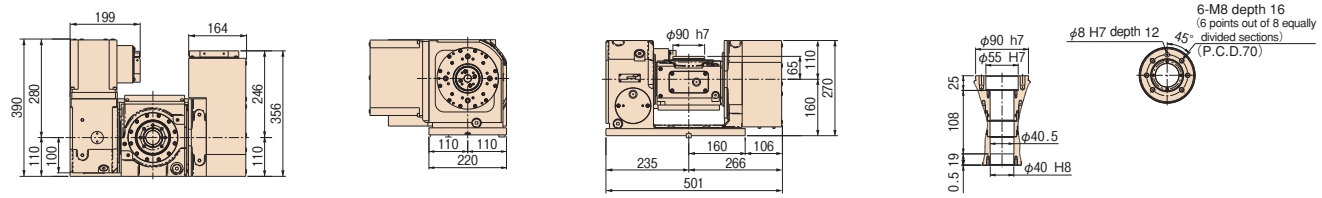
＊1 The tolerance of the table T-slot width is applicable to four standard slots arranged crosswise. ☞ Dimensions P.60

＊2 High Clamp Torque model.

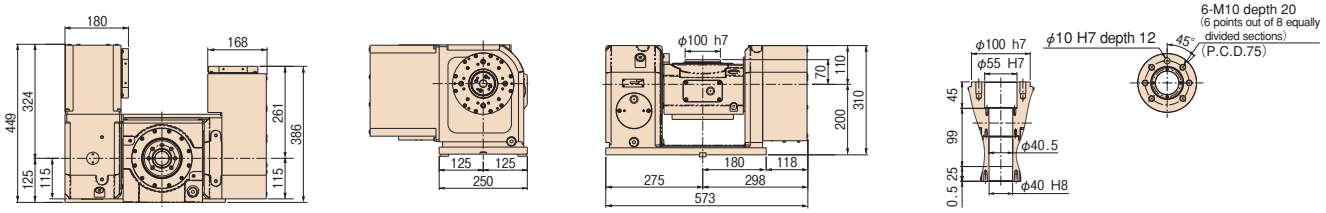
Dimensions

Unit:mm

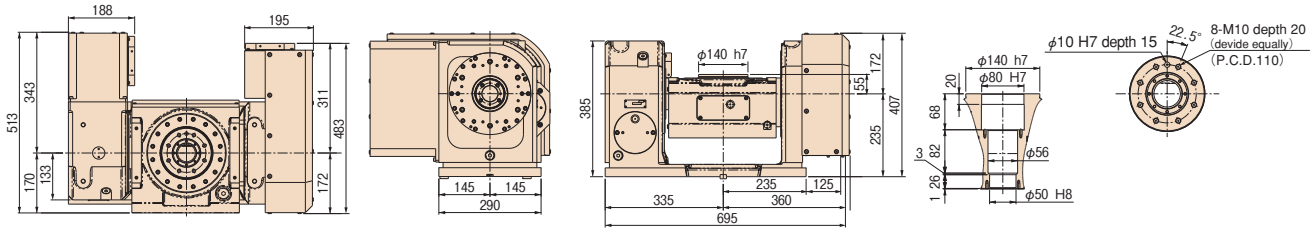
TBS-130



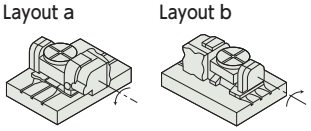
TBS-160



TBS-250



Note: The above dimensions are for FANUC servo motors. The dimensions of servo motors of other manufacturers may be larger.

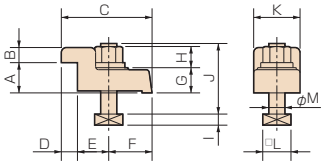


Clamping block and bolt

Unit:mm

	Type	Q'ty	Layout	T-slot pitch	T-slot width	A	B	C	D	E	F	G	H	I	J	K	L	M
TBS-130	I	4	a b	40~134 *	14	20	12	70	10	35	25	20	17	8	55	35	23	12
TBS-160	I	4	a b	78~152 63~107	18	20	12	70	10	35	25	17	15	11	55	35	28	16
TBS-250	I	4	a b	130~215 78~125	18	25	12	80	12	33	35	22	21	11	65	40	28	16

Type I



Note 1: *In the case of layout b, contact us for the details about mounting.
Note 2: When using a machine with a T-slot pitch other than the above, use suitable clamping blocks and bolts that are available on the market, or order custom-made ones from TSUDAKOMA. (Option)

Standard type

RWE/RWA

RWE-160•200
RWA-160•200•250•320

RN RN-100

RWA-160R

The RWE/RWA series, an improvement on the best-selling, has remarkably improved cost efficiency due to its high-speed operation for use in drill and tapping machines.

Specifications

Unit: mm

		RWE/RWA-160	RWE/RWA-200	RWA-250	RWA-320	RN-100
Handedness	R	○	○	○	○	○
	L	○	○	○	○	○
Spindle diameter		φ100	φ120	φ140	φ180	φ80
Table diameter*1		φ160 or 200 (Option)	φ200 or 250 (Option)	φ250 (Option)	φ320 (Option)	φ135 (Option)
Center height		135	160	160	210	110
Center bore	Nose diameter	φ55H7×45	φ65H7×45	φ80H7×45	φ115H7×45	φ50H7×45
	Through-bore	φ40	φ45	φ50	φ85	φ30
Table T-slot width*1		12H8	12H8	12H8	14H8	10H8
Guide block width		14h7	18h7	18h7	18h7	14h7
Servo motors (for FANUC)		αiS2	αiS4	αiS8	αiS8	αiF2
Inertia converted into motor shaft	$\times10^{-3}$kg·m^2	0.09	0.17	0.41	0.52	0.23
Net weight	kg	40	61	80	150	28
Speed reduction ratio		1/72	1/72	1/90 *2	1/120 *2	1/36
Table max. rpm (Motor rpm: 3,000min^{-1})	min^{-1}	41.6	41.6	33.3	25	83.3
Indexing accuracy (the sum)		25	20	20	20	45
Clamp system		Pneumatic	Pneumatic	Pneumatic	Pneumatic	Pneumatic
Clamp torque ／pneumatic pressure 0.49MPa	N·m	250 (RWE) 500 (RWA)	400 (RWE) 800 (RWA)	1,000	1,500	80
Strength of worm gears	N·m	206	288	596	939	176
Allowable work weight — Vertical setting ( ):with tailstock	kg	100 (200)	125 (250)	125 (250)	175 (350)	25 (50)
Allowable work weight — Horizontal setting	kg	200	250	250	350	50
Allowable load (when table is clamped) — F	N	10,800	14,400	14,400	24,800	5,880
Allowable load (when table is clamped) — F×L	N·m	500	800	1,000	1,500	80
Allowable load (when table is clamped) — F×L	N·m	780	1,900	1,900	4,700	156
Allowable work inertia $J=\frac{W\cdot D^2}{8}$	kg·m^2	0.64	1.25	1.95	4.48	0.10

☞ Servo motors of other manufacturers P.66

☞ When assembling a faceplate or a fixture with the main spindle (RNA-B-series) P.76

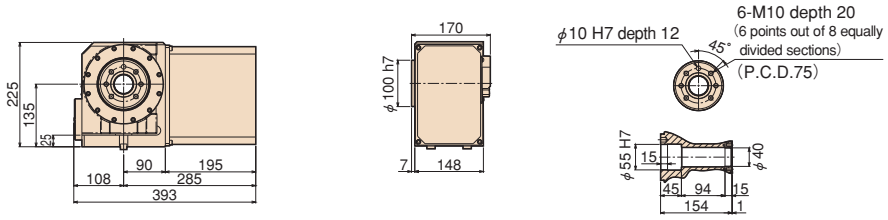
＊1 The tolerance of the table T-slot width is applicable to four standard slots arranged crosswise. ☞ Dimensions P.60

＊2 High speed models are available. Ask us for further information.
RWA-250,320(speed reduction ratio: 1/45) RWA-320: αiS12 or an equivalent motor should be used.

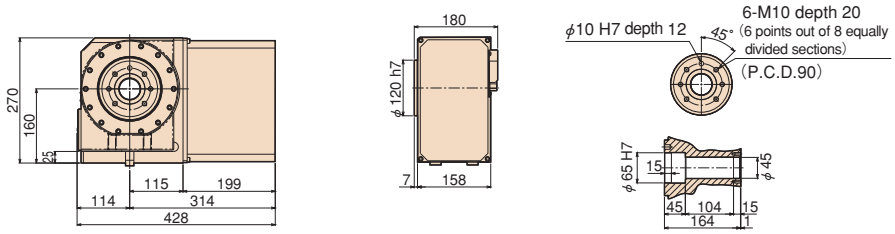
Dimensions

Unit:mm

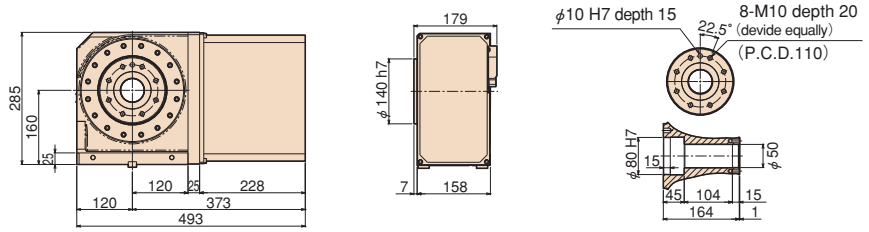
RWE/RWA-160



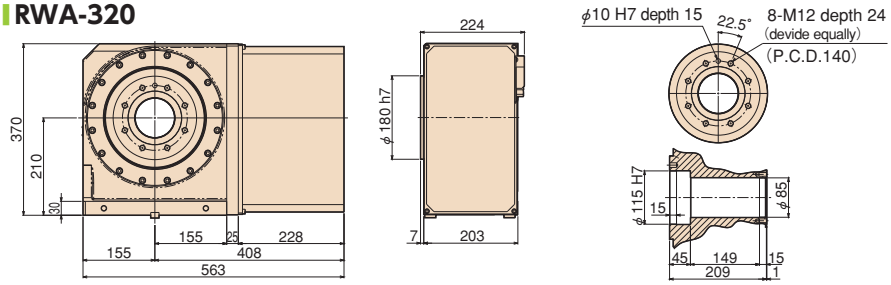
RWE/RWA-200



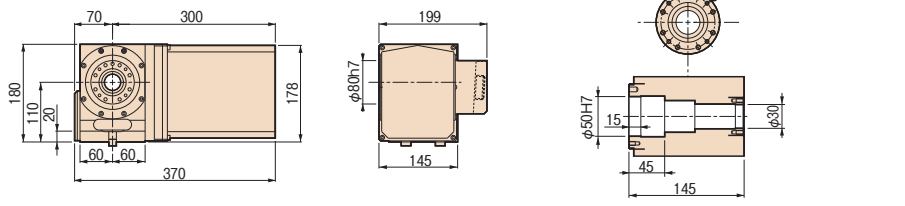
RWA-250



RWA-320



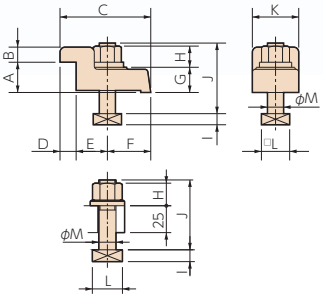
RN-100R



Note: The above dimensions are for FANUC servo motors. The dimensions of servo motors of other manufacturers may be larger.

RN-100R

Type I



Clamping block and bolt

Unit: mm

	Type	Q'ty	T-slot pitch	T-slot width	A	B	C	D	E	F	G	H	I	J	K	L	M
RWE/RWA-160	—	2	–	14	–	–	–	–	–	–	–	17	8	60	–	23	12
RWE/RWA-200	—	2	–	18	–	–	–	–	–	–	–	21	11	65	–	28	16
RWA-250	I	4	50~100	18	25	12	80	12	33	35	22	21	11	65	40	28	16
RWA-320	I	4	50~132	18	30	15	90	16	31	43	25	21	11	70	46	28	16
RN-100	—	2	–	14	–	–	–	–	–	–	–	17	8	55	–	23	12

Note 1: When using a machine with a T-slot pitch other than the above, use suitable clamping blocks and bolts that are available on the market, or order custom-made ones from TSUDAKOMA. (Option)
Note 2: Clamping blocks are not included with the RWE/RWA-160 and RWE/RWA-200 and RN-100.

Rear motor mounting type

RWE/RWA-B

RWE- 160R,B•200R,B
RWA- 160R,B•200R,B•250R,B•320R,B

RNCV-B

RNCV-401R,B

RWE-160R,B

One of the most popular rear motor mounting types. Suitable for mounting on a compact machine tool for space saving.

Specifications

Unit: mm

		RWE/RWA-160R,B	RWE/RWA-200R,B	RWA-250R,B	RWA-320R,B	RNCV-401R,B
Handedness	R	○	○	○	○	○
	L	—	—	—	—	—
Spindle diameter		ϕ100	ϕ120	ϕ140	ϕ180	—
Table diameter*1		ϕ160 or 200 (Option)	ϕ200 or 250 (Option)	ϕ250 (Option)	ϕ320 (Option)	ϕ400
Center height		135	160	160	210	255
Center bore	Nose diameter	ϕ55H7×45	ϕ65H7×45	ϕ80H7×45	ϕ115H7×45	ϕ40H7×21
	Through-bore	ϕ40	ϕ45	ϕ50	ϕ85	ϕ40
Table T-slot width*1		12H8	12H8	12H8	14H8	14H8
Guide block width		14h7	18h7	18h7	18h7	18h7
Servo motors (for FANUC)		αiS2	αiS4	αiS8	αiS8	αiF12
Inertia converted into motor shaft	×10^{-3}kg·m^2	0.56	0.64	0.97	0.84	4.01
Net weight	kg	55	77	95	165	330
Speed reduction ratio		1/72	1/72	1/90	1/120	1/180
Table max. rpm (Motor rpm: 3,000min^{-1})	min^{-1}	41.6	41.6	33.3	25	11.1
Indexing accuracy (the sum)	sec	25	20	20	20	15
Clamp system		Pneumatic	Pneumatic	Pneumatic	Pneumatic	Hydraulic or air-hydraulic (Option)
Clamp torque ／pneumatic pressure 0.49MPa	N·m	250 (RWE) / 500 (RWA)	400 (RWE) / 800 (RWA)	1,000	1,500	1,764 (Hydraulic pressure 3.5Mpa)
Strength of worm gears	N·m	206	288	596	939	1,666
Allowable work weight	Vertical setting  ( ):with tailstock	100 (200)	125 (250)	125 (250)	175 (350)	200 (500)
Allowable load (when table is clamped)	F 	10,800	14,400	14,400	24,800	39,200
	F×L 	500	800	1,000	1,500	1,764
	F×L 	780	1,900	1,900	4,700	2,450
Allowable work inertia	$J=\frac{W \cdot D^2}{8}$ 	0.64	1.25	1.95	4.48	9.7

☞ Servo motors of other manufacturers P.66

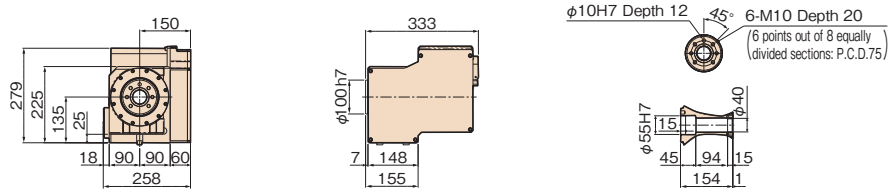
☞ When assembling a faceplate or a fixture with the main spindle (RWE/RWA-B-series) P.76

＊1 The tolerance of the table T-slot width is applicable to four standard slots arranged crosswise. ☞ Dimensions P.60

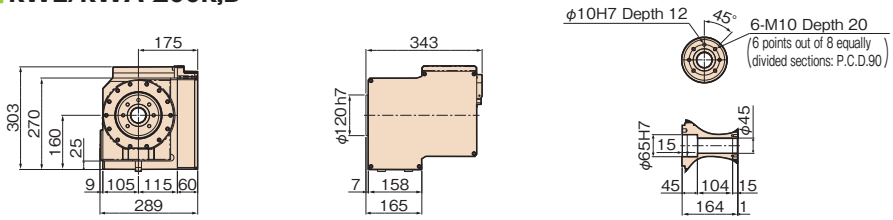
Dimensions

Unit: mm

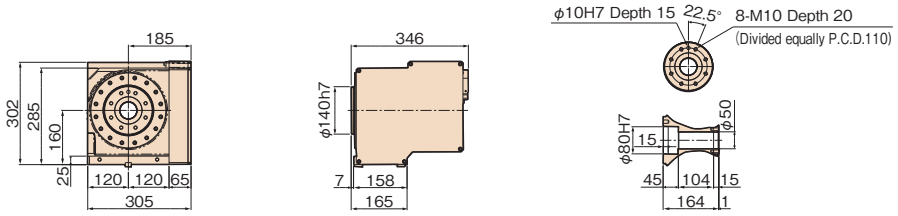
RWE/RWA-160R,B



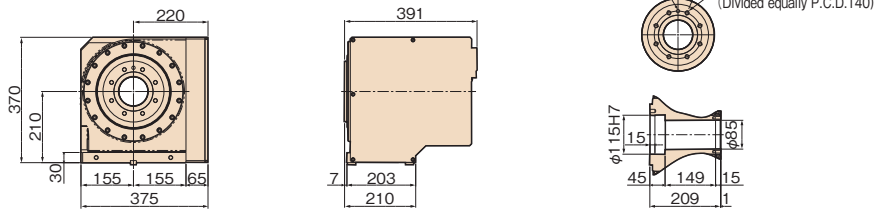
RWE/RWA-200R,B



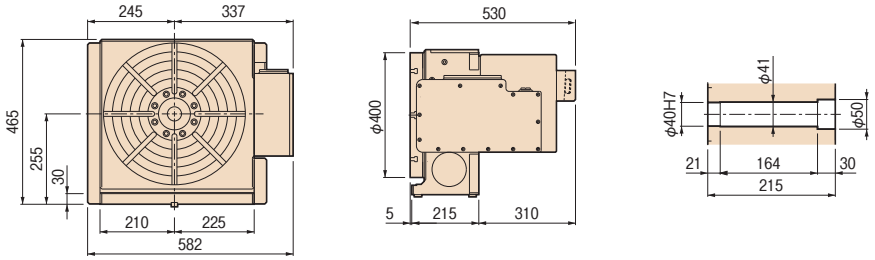
RWA-250R,B



RWA-320R,B



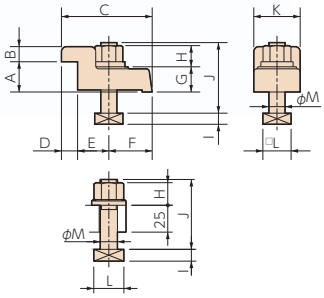
RNCV-401R,B



Note: The above dimensions are for FANUC servo motors. The dimensions of servo motors of other manufacturers may be larger.

RNCV-401R,B

Type I



Clamping block and bolt

Unit: mm

	Type	Q'ty	T-slot pitch	T-slot width	A	B	C	D	E	F	G	H	I	J	K	L	M
RWE/RWA-160R,B	—	2	–	14	–	–	–	–	–	–	–	17	8	60	–	23	12
RWE/RWA-200R,B	—	2	–	18	–	–	–	–	–	–	–	21	11	65	–	28	16
RWA-250R,B	I	4	50~100	18	25	12	80	12	33	35	22	21	11	65	40	28	16
RWA-320R,B	I	4	50~132	18	30	15	90	16	31	43	25	21	11	70	46	28	16
RNCV-401R,B	I	4	55~155	18	30	15	90	16	31	43	25	21	11	70	46	28	16

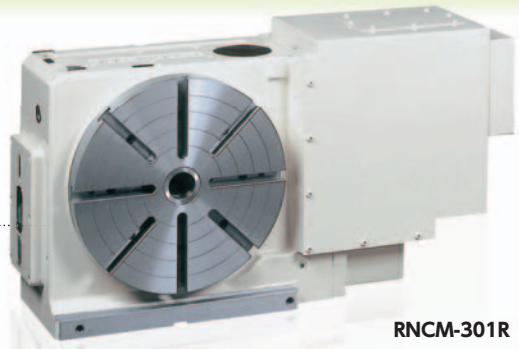
Note 1: When using a machine with a T-slot pitch other than the above, use suitable clamping blocks and bolts that are available on the market, or order custom-made ones from TSUDAKOMA. (Option)
Note 2: Clamping blocks are not included in the RWE/RWA-160R,B and RWE/RWA-200R,B.

Vertical motor mounting type

RNCM

RNCM- 251•301•401•501•631

Basic models with a motor horizontally mounted onto the side of the body.



RNCM-301R

Specifications

Unit: mm

		RNCM-251	RNCM-301	RNCM-401	RNCM-501	RNCM-631
Handedness	R	○	○	○	○	○
	L	○	○	○	○	○
Table diameter		ϕ250	ϕ320	ϕ400	ϕ500	ϕ630
Center height		160	210	255	310	400
Center bore	Nose diameter	ϕ40H7	ϕ40H7	ϕ40H7	ϕ50H7	ϕ60H6*2
	Through-bore	ϕ32	ϕ40	ϕ40	ϕ50	ϕ60
Table T-slot width*1		12H7	14H7	14H7	18H7	18H7
Guide block width		18h7	18h7	18h7	18h7	18h7
Servo motors (for FANUC)		αiF4 or αiF8	αiF8 / αiF12	αiF12	αiF12	αiF12
Inertia converted into motor shaft	$\times10^{-3}$kg·m² [$\times10^{-3}$kgf·cm·sec²]	0.30 [3.01]	0.34 [3.43] / 1.76 [17.9]	2.05 [20.9]	3.09 [31.9]	5.55 [56.6]
Net weight	kg	75	200	300	450	800
Speed reduction ratio		1/180	1/360 / 1/180	1/180	1/180	1/180
Table max. rpm (Motor rpm: 2,000min⁻¹)	min⁻¹	11.1	5.5 / 11.1	11.1	11.1	11.1
Indexing accuracy (the sum)	sec	15	15	15	15	15
Clamp system		Hydraulic or air-hydraulic(Option)	Hydraulic or air-hydraulic (Option)	Hydraulic or air-hydraulic (Option)	Hydraulic or air-hydraulic (Option)	Hydraulic or air-hydraulic(Option)
Clamp torque / Hydraulic pressure 3.5Mpa [35kgf/cm²]	N·m [kgf·m]	490 [50] / Air-hydraulic pressure 274 [28]	833 [85]	1,764 [180]	2,450 [250]	4,410 [450]
Strength of worm gears	N·m [kgf·m]	470 [48]	764 [78]	1,666 [170]	2,450 [250]	4,116 [420]
Allowable work weight	Vertical setting ( ):with tailstock	100 (250) kg	150 (350) kg	200 (500) kg	250 (600) kg	400 (1,000) kg
	Horizontal setting	250 kg	350 kg	500 kg	600 kg	1,000 kg
Allowable load (when table is clamped)	F	19,600 [2,000] N [kgf]	29,400 [3,000]	39,200 [4,000]	49,000 [5,000]	49,000 [5,000]
	F×L	490 [50] N·m [kgf·m]	833 [85]	1,764 [180]	2,450 [250]	4,410 [450]
	F×L	931 [95] N·m [kgf·m]	1,568 [160]	2,450 [250]	3,430 [350]	7,840 [800]
Allowable work inertia	$J=\frac{W\cdot D^2}{8}$	1.2 [12.3] kg·m² [kgf·cm·sec²]	3.7 [38.5]	9.7 [99.8]	18.2 [185.2]	49.6 [506.2]

☞ Servo motors of other manufacturers P.66

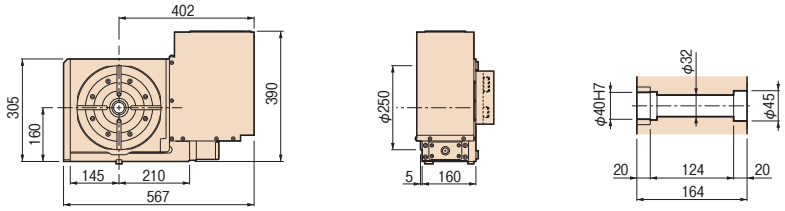
＊1 The tolerance of the table T-slot width is applicable to four standard slots arranged crosswise.

＊2 For model RNCM-631, a big bore type is also available. (center bore: ϕ180H7)

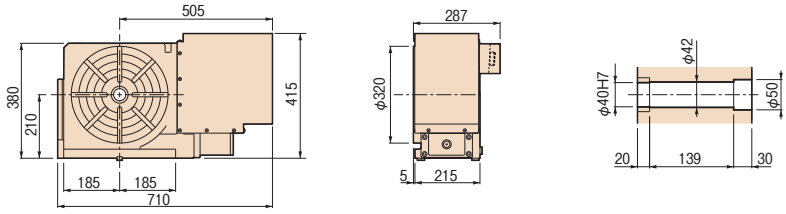
Dimensions

Unit: mm

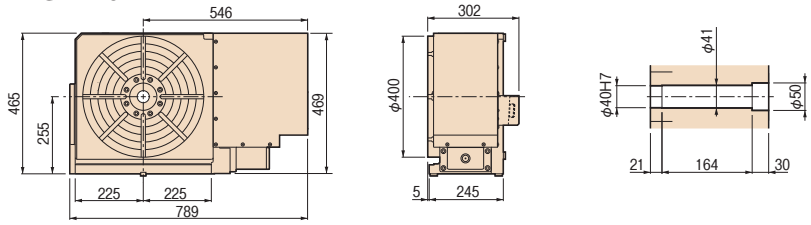
RNCM-251R



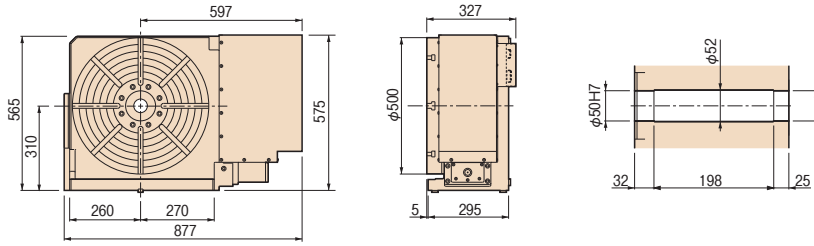
RNCM-301R



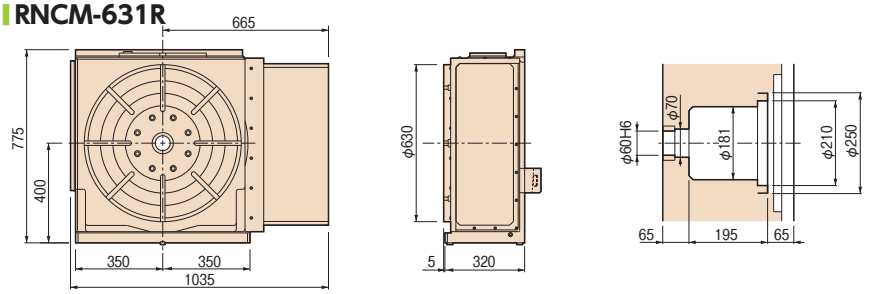
RNCM-401R



RNCM-501R



RNCM-631R



Note: The above dimensions are for FANUC servo motors. The dimensions of servo motors of other manufacturers may be larger.

Clamping block and bolt

Unit: mm

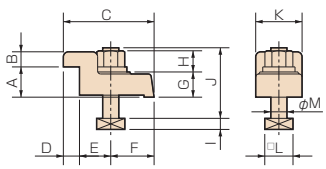
	Type	Q'ty	T-slot pitch	T-slot width	A	B	C	D	E	F	G	H	I	J	K	L	M
RNCM-251	I	4	50~125	18	25	12	80	12	33	35	22	21	11	65	40	28	16
RNCM-301	I	4	55~127	18	30	15	90	16	31	43	25	21	11	70	46	28	16
RNCM-401	I	4	55~155	18	30	15	90	16	31	43	25	21	11	70	46	28	16
RNCM-501	I	4	60~194	18	40	20	110	18	42	50	25	21	11	70	46	28	16
RNCM-631	II	4	90~255	18	40	18	63	18	15	30	58	21	11	105	60	28	16

Note: When using a machine with a T-slot pitch other than the above, use suitable clamping blocks and bolts that are available on the market, or order custom-made ones from TSUDAKOMA. (Option)

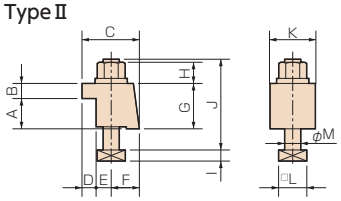
With Hydraulic Power Chuck
P.56

With Support Spindle and Fixture Plate
P.59

Type I



Type II

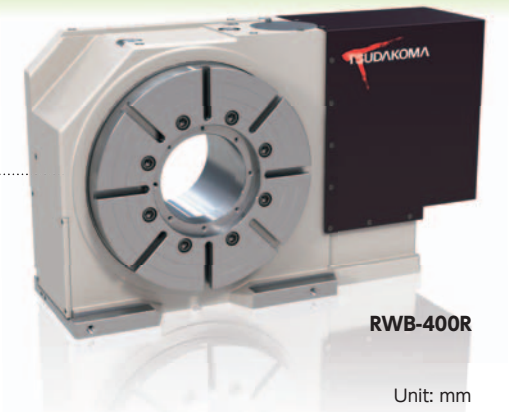


Standard type

RWB

RWB-250•320•400•500

Our flagship models equipped with state-of-the-art TSUDAKOMA technology. It realizes stronger clamping torque and strength of worm gears than previous model. A larger through-bore size enables more ports number of rotary joint.



RWB-400R

Specifications

Unit: mm

		RWB-250	RWB-320	RWB-400	RWB-500
Handedness	R	○	○	○	○
	L	○	○	○	○
Table diameter		ϕ250	ϕ320	ϕ400	ϕ500
Center height		160	210	255	310
Center bore	Nose diameter	ϕ105	ϕ150	ϕ200	ϕ220
	Through-bore	ϕ80	ϕ120	ϕ160	ϕ181
Table T-slot width*1		12H7	14H7	14H7	18H7
Guide block width		18h7	18h7	18h7	18h7
Servo motors (for FANUC)		αiF8	αiF12	αiF12	αiF12
Inertia converted into motor shaft	$\times 10^{-3}$kg·m^2	1.27	3.53	4.63	4.25
Net weight	kg	125	250	360	620
Speed reduction ratio		1/90	1/120	1/120	1/180
Table max. rpm	min^{-1} (Motor rpm: 2,000min^{-1})	22.2	16.6	16.6	11.1
Indexing accuracy (the sum)	sec	14	14	14	14
Clamp system		Hydraulic or air-hydraulic*2	Hydraulic or air-hydraulic*2	Hydraulic or air-hydraulic*2	Hydraulic or air-hydraulic*2
Clamp torque ／Hydraulic pressure 3.5Mpa	N·m	1,300	3,100	5,500	7,600
Strength of worm gears	N·m	1,011	2,127	3,958	5,601
Allowable work weight	Vertical setting  kg	175	250	300	600
	Vertical setting (with tailstock)	350	500	600	1,200
	Vertical setting (with SSB)	900	1,500	1,800	3,600
	Horizontal setting  kg	350	500	600	1,200
Allowable load (when table is clamped)	F  N	35,000	89,000	109,000	240,000
	F×L  N·m	1,300	3,100	5,500	7,600
	F×L  N·m	1,500	5,300	7,800	17,000
Allowable work inertia	$J=\frac{W \cdot D^2}{8}$  kg·m^2	7	19	36	112

☞ Servo motors of other manufacturers P.66

＊1 The tolerance of the table T-slot width is applicable to four standard slots arranged crosswise. ＊2 Option

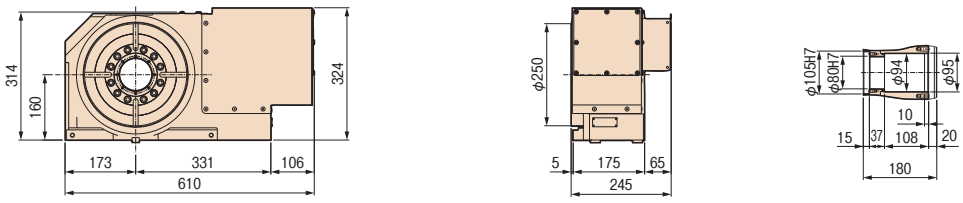
For tables with a diameter of 800 or more, please order a big bore type of the following models:

Tables diameter	Model	Center bore	Specifications
ϕ 800	**RCV-800**	ϕ360	P.26
ϕ1000	**RCV-1000**	ϕ410	P.26
ϕ1250	**RCV-1250**	ϕ500	P.26

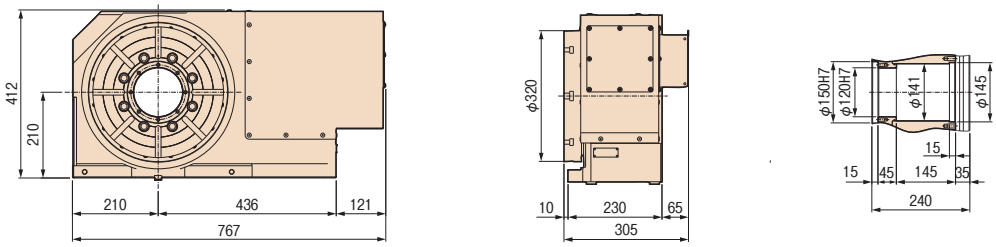
Dimensions

Unit: mm

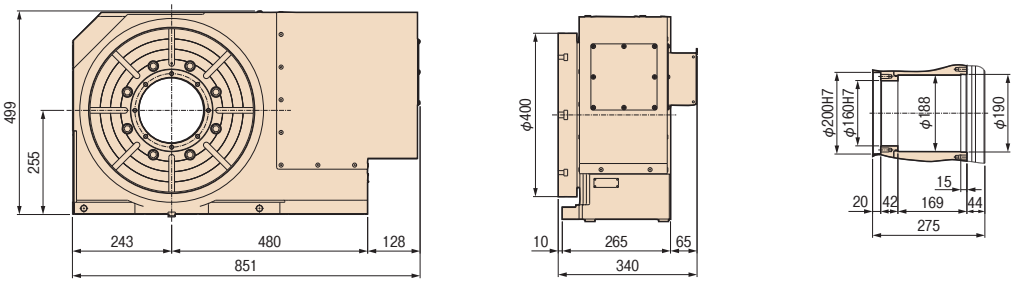
RWB-250R



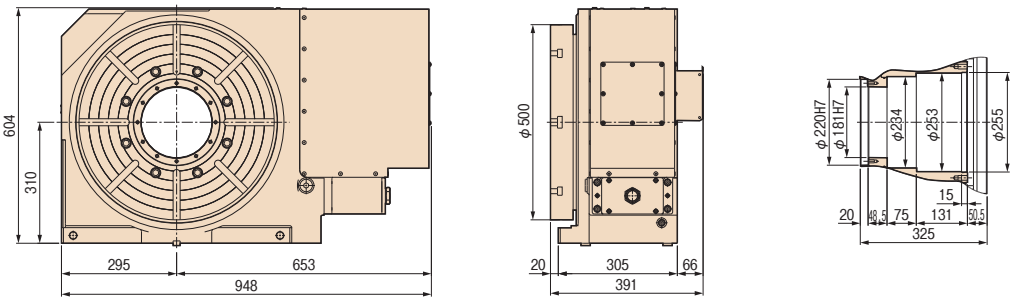
RWB-320R



RWB-400R



RWB-500R



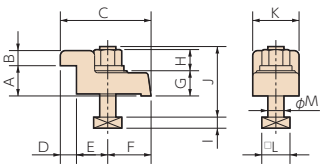
Note: The above dimensions are for FANUC servo motors. The dimensions of servo motors of other manufacturers may be larger.

Clamping block and bolt

Unit: mm

	Type	Q'ty	T-slot pitch	T-slot width	A	B	C	D	E	F	G	H	I	J	K	L	M
RWB-250	I	4	50~125	18	25	12	80	12	33	35	22	21	11	65	40	28	16
RWB-320	I	4	73~162	18	30	15	90	16	31	43	25	21	11	70	46	28	16
RWB-400	I	4	73~193	18	30	15	90	16	31	43	25	21	11	70	46	28	16
RWB-500	I	4	73~233	18	40	20	110	18	42	50	25	21	11	70	46	28	16

Type I



Note: When using a machine with a T-slot pitch other than the above, use suitable clamping blocks and bolts that are available on the market, or order custom-made ones from TSUDAKOMA. (Option)

For horizontal machining centers

RWB-K

RWB-250K•320K•400K•500K

RNCK

RNCK-631

RWB-400K

Flagship model with highest-class specifications exclusively for horizontal machining centers. A popular for the aircraft, automobile and cutting tool industries. A larger through-bore size enables more ports number of rotary joint than previous model.

Specifications

Unit: mm

		RWB-250K	RWB-320K	RWB-400K	RWB-500K	RNCK-631
Table diameter		ϕ250	ϕ320	ϕ400	ϕ500	ϕ630
Center height		160	210	255	310	400
Center bore	Nose diameter	ϕ105	ϕ150	ϕ200	ϕ220	ϕ60H6
	Through-bore	ϕ80	ϕ120	ϕ160	ϕ182	ϕ60
Table T-slot width *1		12H7	14H7	14H7	18H7	18H7
Guide block width		18h7	18h7	18h7	18h7	18h7
Servo motors (for FANUC)		αiF8	αiF12	αiF12	αiF12	αiF12
Inertia converted into motor shaft	$\times 10^{-3}$kg·m^2	1.27	3.53	4.63	4.25	5.55
Net weight	kg	130	250	370	590	800
Speed reduction ratio		1/90	1/120	1/120	1/180	1/180
Table max. rpm	min^{-1} (Motor rpm: 2,000min^{-1})	22.2	16.6	16.1	11.1	11.1
Indexing accuracy (the sum)	sec	14	14	14	14	15
Clamp system		Hydraulic or air-hydraulic*2	Hydraulic or air-hydraulic*2	Hydraulic or air-hydraulic*2	Hydraulic or air-hydraulic*2	Hydraulic or air-hydraulic*2
Clamp torque ／Hydraulic pressure 3.5Mpa	N·m	1,300	3,100	5,500	7,600	4,410
Strength of worm gears	N·m	1,011	2,127	3,958	5,601	4,116
Allowable work weight	Vertical setting  kg	175	250	300	600	400
	Vertical setting (with tailstock)	350	500	600	1,200	800
	Vertical setting (with SSB)	900	1,500	1,800	3,600	—
Allowable load (when table is clamped)	F  N	35,000	89,000	109,000	240,000	49,000
	F×L  N·m	1,300	3,100	5,500	7,600	4,410
	F×L  N·m	1,500	5,300	7,800	17,000	7,840
Allowable work inertia	$J=\frac{W \cdot D^2}{8}$  kg·m^2	7	19	36	112	49.6

☞ Servo motors of other manufacturers P.66

＊1 The tolerance of the table T-slot width is applicable to four standard slots arranged crosswise. ＊2 Option

For tables with a diameter of 800 or more, please order a big bore type of the following models:

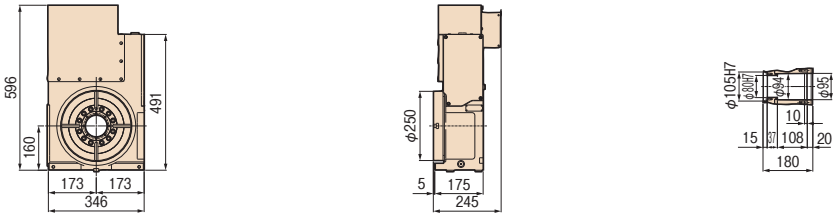
Tables diameter	Model	Center bore	Specifications
ϕ 800	RCV-800 (Upper class motor)	ϕ360	P.26
ϕ1000	RCV-1000 (Upper class motor)	ϕ410	P.26
ϕ1250	RCV-1250 (Upper class motor)	ϕ500	P.26

Note: For the RNCK-631, a basic model (for vertical machining centers) is also available. (for standard bore)

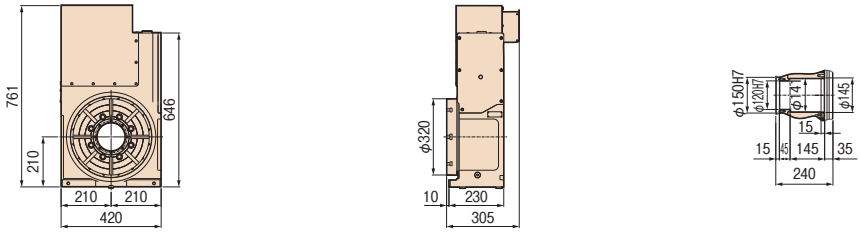
Dimensions

Unit: mm

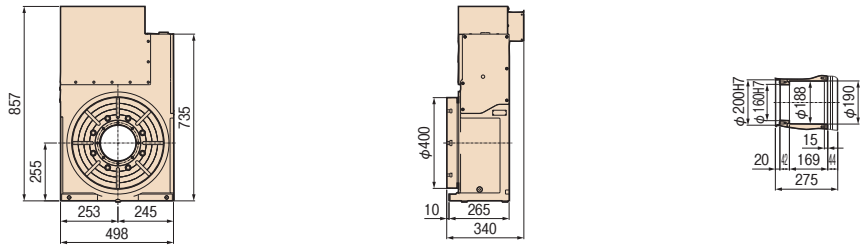
RWB-250K



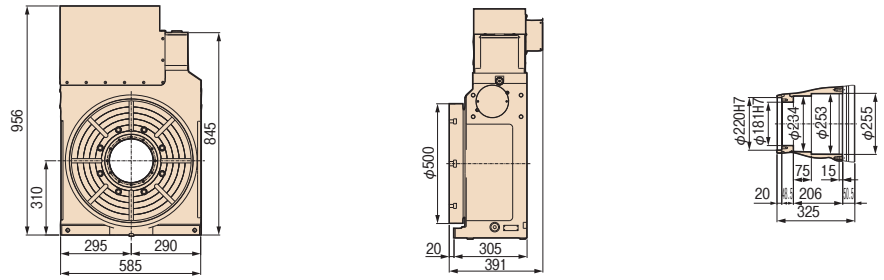
RWB-320K



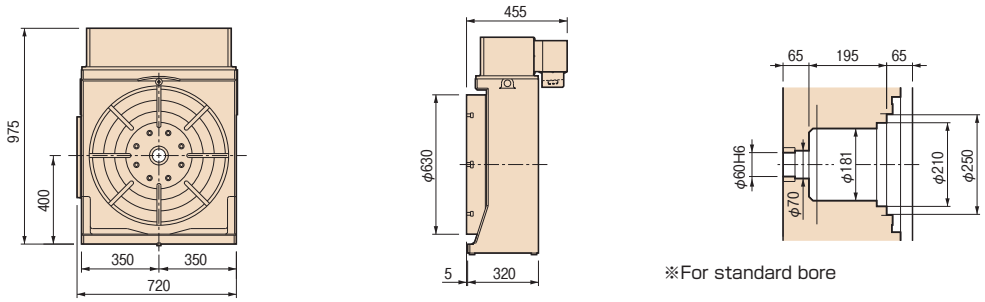
RWB-400K



RWB-500K

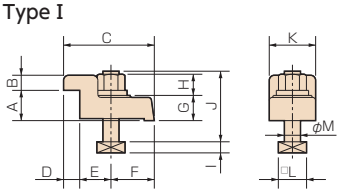


RNCK-631

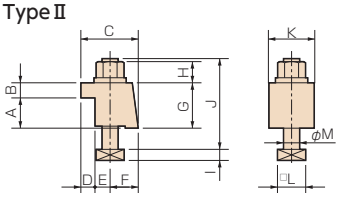


※For standard bore

Type Ⅰ



Type Ⅱ



Clamping block and bolt

Unit: mm

	Type	Q'ty	T-slot pitch	T-slot width	A	B	C	D	E	F	G	H	I	J	K	L	M
RWB-250K	Ⅰ	4	50~125	18	25	12	80	12	33	35	22	21	11	65	40	28	16
RWB-320K	Ⅰ	4	73~162	18	30	15	90	16	31	43	25	21	11	70	46	28	16
RWB-400K	Ⅰ	4	73~160	18	30	15	90	16	31	43	25	21	11	70	46	28	16
RWB-500K	Ⅰ	4	73~200	18	40	20	110	18	42	50	25	21	11	70	46	28	16
RNCK-631	Ⅱ	4	100~255	18	40	18	63	18	15	30	58	21	11	105	60	28	16

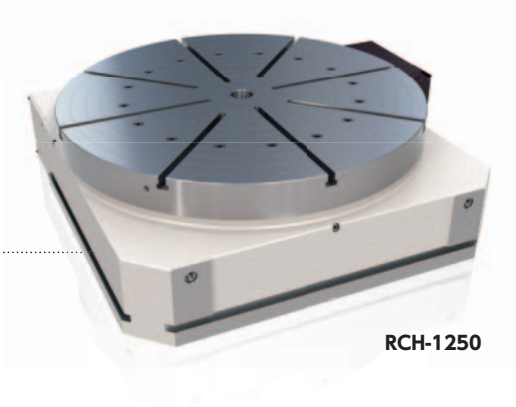
Note: When using a machine with a T-slot pitch other than the above, use suitable clamping blocks and bolts that are available on the market, or order custom-made ones from TSUDAKOMA. (Option)

For horizontal setting

RCH RCH-800•1000•1250

RNC RNC-1501•2001

Horizontal large-capacity model with high rigidity is good for machining heavy workpieces with large size double column and 5-face M/C.



RCH-1250

Specifications

Unit: mm

	RCH-800	RCH-1000	RCH-1250	RNC-1501	RNC-2001
Table diameter ( ):option	φ800(φ1,000)	φ1,000(φ1,200)	φ1,250(φ1,500)	φ1,500	φ2,000
Table height	320	330	410	400	620
Center bore Nose diameter	φ75H7×30	φ75H7×30	φ75H7×30	φ75H7	φ225H7
Table T-slot width*1	18H7	22H7	22H7	28H7	28H7
Guide block width	22h7	22h7	22h7	—	—
Servo motors (for FANUC)	αiF12	αiF22	αiF22	αiF22	αiF30
Inertia converted into motor shaft ×10^{-3}kg·m^2 【×10^{-3}kgf·cm·sec^2】	4.72 【48.2】	8.24 【84.1】	5.04 【51.4】	5.6 【56.6】	17.2 【175.3】
Net weight kg	1,150	1,700	3,100	3,600	8,000
Speed reduction ratio	1/360	1/360	1/720	1/720	1/720
Table max. rpm min^{-1} (Motor rpm: 2,000min^{-1})	5.5	5.5	2.7	2.7	2.7
Indexing accuracy (the sum) sec	15	15	15	15	15
Clamp system	Hydraulic or air-hydraulic*2	Hydraulic	Hydraulic	Hydraulic or air-hydraulic*2	Hydraulic or air-hydraulic*2
Clamp torque ／Hydraulic pressure 3.5Mpa【35kgf/cm^2】 N·m 【kgf·m】	7,000 【714】	20,000 【2,040】	33,000 【3,363】	9,800 【1,000】	19,600 【2,000】
Strength of worm gears N·m【kgf·m】	7,840【800】	13,230【1,350】	25,000【2,548】	21,560【2,200】	49,000【5,000】
Allowable work weight Horizontal setting  kg	4,000	7,000	14,000	8,000	10,000
Allowable load (when table is clamped) F  N 【kgf】	100,000 【10,204】	185,000 【18,878】	383,000 【39,041】	49,000 【5,000】	58,800 【6,000】
F×L  N·m 【kgf·m】	7,000 【714】	20,000 【2,040】	33,000 【3,363】	9.800 【1,000】	19,600 【2,000】
F×L  N·m 【kgf·m】	11,600 【1,184】	22,900 【2,337】	56,700 【5,779】	24.500 【2,500】	34,300 【3,500】
Allowable work inertia $J=\frac{W\cdot D^2}{8}$  kg·m^2 【kgf·cm·sec^2】	320 【3,265】	874 【8,918】	2,734 【27,886】	2,255 【23,000】	4,900 【50,000】

☞ Servo motors of other manufacturers P.66

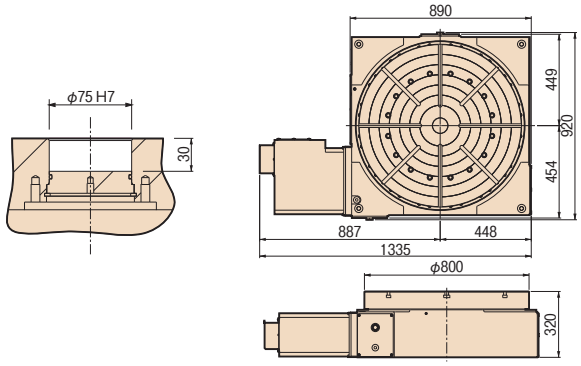
* 1 The tolerance of the table T-slot width is applicable to four standard slots arranged crosswise.

* 2 Option

Dimensions

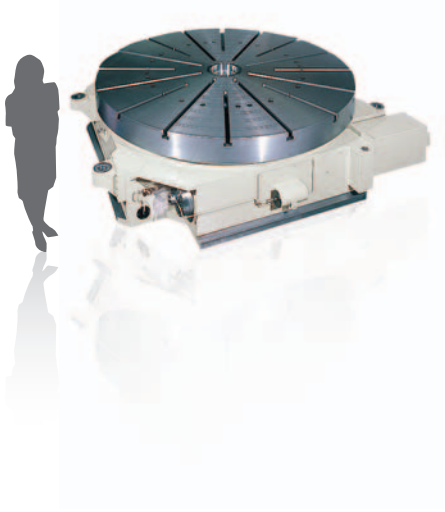
Unit: mm

RCH-800

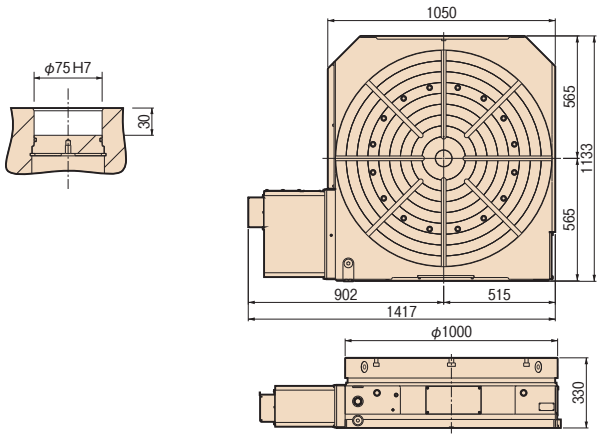


RNC-2001

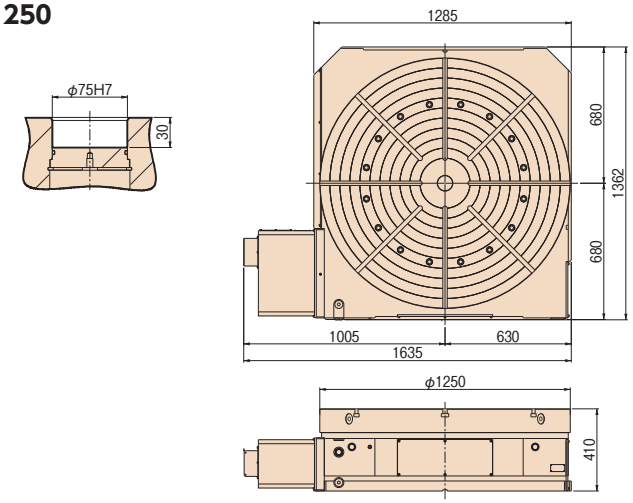
Large NC rotary table with a diameter of 2,000mm.
Used for the position detecting device for controlling the posture of artificial satellites and other devices.
Indexing accuracy: ±3 sec
Minimal angular indication: 0.5 sec



RCH-1000



RCH-1250



Note: The above dimensions are for FANUC servo motors. The dimensions of servo motors of other manufacturers may be larger.

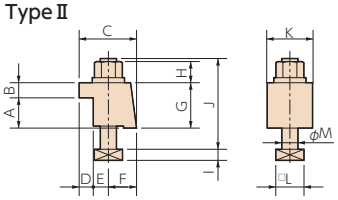
Clamping block and bolt

Unit: mm

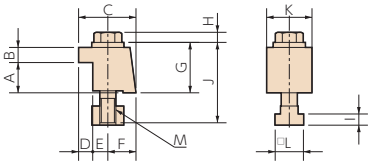
	Type	Q'ty	T-slot pitch	T-slot width	A	B	C	D	E	F	G	H	I	J	K	L	M
RCH-800	Ⅱ	4	80~400	22	40	20	85	24	20	41	60	27	13	115	80	32	20
RCH-1000	Ⅱ	4~8	80~320	22	40	20	85	24	20	41	60	27	13	115	80	32	20
RCH-1250	Ⅱ	4~8	80~450	22	50	20	74	20	18	36	70	27	13	130	70	32	20
RNC-1501	Ⅳ	4~8	80~255	28	50	20	74	20	18	36	77	15	17.5	120	70	41.3	24

Note: When using a machine with a T-slot pitch other than the above, use suitable clamping blocks and bolts that are available on the market, or order custom-made ones from TSUDAKOMA. (Option)

Type Ⅱ



Type Ⅳ



Horizontal motor mounting type

RCV RCV-800•1000•1250
RNCV RNCV-1501

Standard model with the motor mounted horizontally onto the side of the body. A powerful hydraulic clamping mechanism is also equipped with this model.

RCV-1250R

Specifications

Unit: mm

		RCV-800	RCV-1000	RCV-1250	RNCV-1501
Handedness	R	○	○	○	—
	L	—	—	—	○
	K	○	○	○	—
Table diameter ( ):option		φ800(φ1,000)	φ1,000(φ1,200)	φ1,250(φ1,500)	φ1,500
Center height		530	625	775	950
Center bore	Nose diameter	φ360H7×45	φ410H7×75	φ500H7×25	φ75H7
	Through-bore	φ310	φ360	φ450	—
Table T-slot width*1		18H7	22H7	22H7	28H7
Guide block width		22h7	22h7	22h7	28h7
Servo motors (for FANUC)		αiF12	αiF22	αiF22	αiF22
Inertia converted into motor shaft	$\times10^{-3}$kg·m² [$\times10^{-3}$kgf·cm·sec²]	4.89 [49.9]	8.24 [84.1]	5.04 [51.4]	12.8 [130.2]
Net weight	kg	1,350	2,500	4,200	7,000
Speed reduction ratio		1/360	1/360	1/720	1/720
Table max. rpm (Motor rpm: 2,000min^{-1})	min^{-1}	5.5	5.5	2.7	2.7
Indexing accuracy (the sum)	sec	15	15	15	15
Clamp system		Hydraulic or air-hydraulic*2	Hydraulic	Hydraulic	Hydraulic or air-hydraulic*2
Clamp torque ／Hydraulic pressure 3.5Mpa [35kgf/cm²]	N·m [kgf·m]	7,000 [714]	20,000 [2,040]	33,000 [3,363]	17,650 [1,800]
Strength of worm gears	N·m[kgf·m]	7,840[800]	13,230[1,350]	25,000[2,548]	21,560[2,200]
Allowable work weight	Vertical setting  ( ):with tailstock	2,000 (4,000)	3,500 (7,000)	7,000 (14,000)	2,000 (5,000)
	Horizontal setting 	4,000	7,000	14,000	5,000
Allowable load (when table is clamped)	F 	100,000 [10,204]	185,000 [18,878]	383,000 [39,041]	58,800 [6,000]
	F×L 	7,000 [714]	20,000 [2,040]	33,000 [3,363]	17,650 [1,800]
	F×L 	11,600 [1,184]	22,900 [2,337]	56,700 [5,779]	19,600 [2,000]
Allowable work inertia	$J=\frac{W\cdot D^2}{8}$ 	320 [3,265]	874 [8,918]	2,734 [27,886]	2,255 [23,000]

☞ Servo motors of other manufacturers P.66

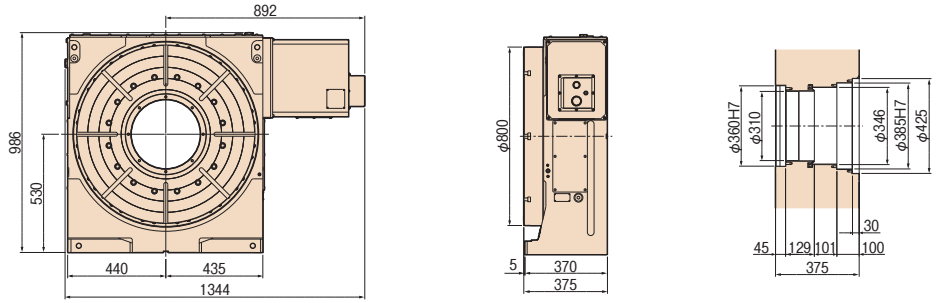
＊1 The tolerance of the table T-slot width is applicable to four standard slots arranged crosswise.

＊2 Option

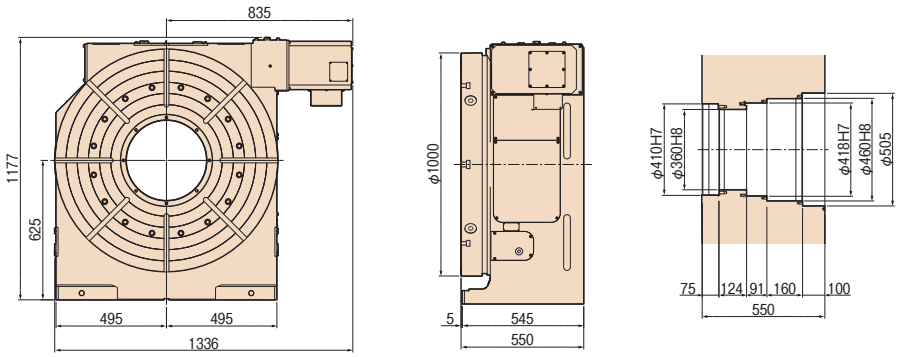
Dimensions

Unit: mm

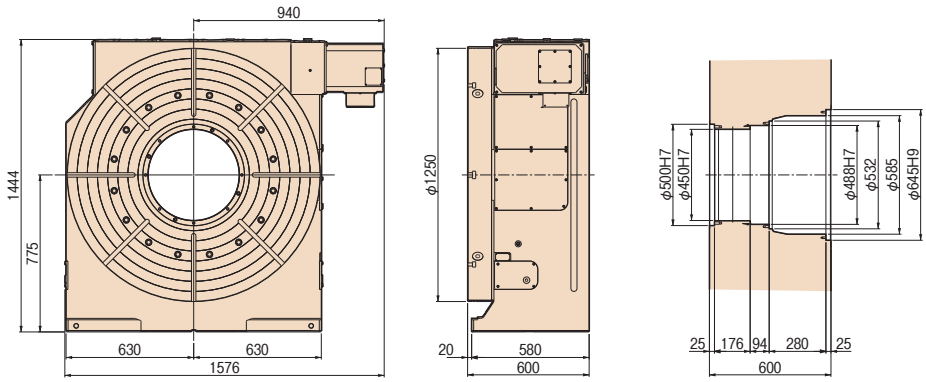
RCV-800R



RCV-1000R



RCV-1250R

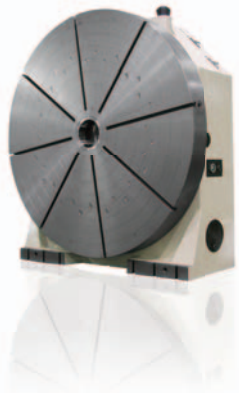


Note: The above dimensions are for FANUC servo motors. The dimensions of servo motors of other manufacturers may be larger.

RTV-902

Largest Vertical NC Rotary Table

Table diameter : φ2,000 mm
Allowable work weight : 30 t
(with support spindle)
Indexing accuracy : 15 sec
Available up to φ 3,000 mm



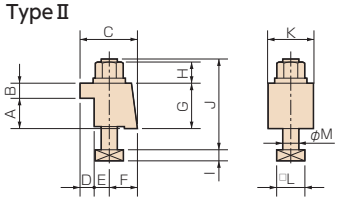
Clamping block and bolt

Unit: mm

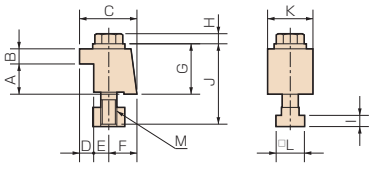
	Type	Q'ty	T-slot pitch	T-slot width	A	B	C	D	E	F	G	H	I	J	K	L	M
RCV-800	Ⅱ	4	100~250	22	60	28	95	29	16	50	88	27	13	145	100	32	20
RCV-1000	Ⅱ	4	80~320	22	60	28	95	29	16	50	88	27	13	145	100	32	20
RCV-1250	Ⅱ	8	80~450	22	60	28	95	29	16	50	88	27	13	145	100	32	20
RNCV-1501	Ⅳ	8	150~600	28	70	35	95	29	16	50	112	15	17.5	160	100	41.3	24

Note: When using a machine with a T-slot pitch other than the above, use suitable clamping blocks and bolts that are available on the market, or order custom-made ones from TSUDAKOMA. (Option)

Type Ⅱ



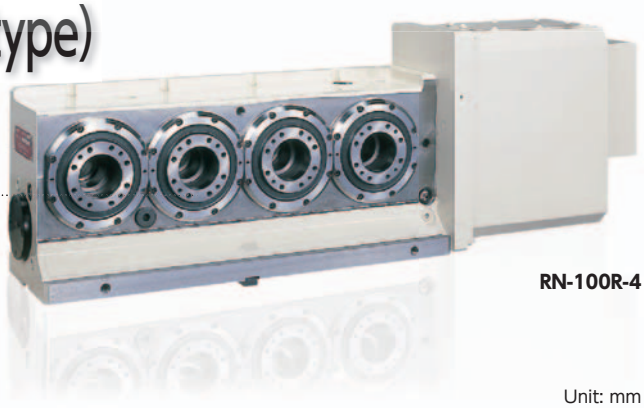
Type Ⅳ



RN-N (multi-spindle type)

RN-100•150•200-2/3/4 (spindles)
RN-250•300-2/3 (spindles)

High-productivity model for multi-piece/multi-face machining. The RN-100, the smallest of the RN-series, assures the fastest operation and meets the requirements for drilling and tapping machines.



RN-100R-4

Specifications

Unit: mm

		RN-100-2/3/4			RN-150-2	RN-200-2	RN-250-2	RN-300-2
Handedness	R	○			○	○	○	○
	L	○			—	—	—	—
Spindle diameter		ϕ80h7			ϕ100h7	ϕ120h7	—	—
Table diameter		ϕ115 (Option)			ϕ160 (Option)	ϕ200 (Option)	ϕ250	ϕ320
Center height		135			135	160	160	210
Center bore	Nose diameter	ϕ50H7 (ϕ50H7 W/face plate)			ϕ55H7 (ϕ50H7 W/face plate)	ϕ65H7 (ϕ50H7 W/face plate)	ϕ75H7	ϕ110H7
	Through-bore	ϕ30			ϕ40	ϕ45	ϕ45	ϕ82
Minimum distance between table centers		120			215	250	300	380
Table T-slot width*1		10H8 (W/face plate)			12H8 (W/face plate)	12H8 (W/face plate)	12H8	14H8
Guide block width		18h7			14h7	18h7	18h7	18h7
Servo motors (for FANUC)		αiF4			αiF4	αiF8	αiF8	αiF12
Number of axis		2-axis	3-axis	4-axis	2-axis	2-axis	2-axis	2-axis
Inertia converted into motor shaft (When spindle pitch is minimum)	$\times10^{-3}$kg·m² 【$\times10^{-3}$kgf·cm·sec²】	0.64 【6.52】	0.92 【9.38】	1.06 【10.8】	0.42 【4.28】	0.55 【5.61】	0.84 【8.56】	2.09 【21.3】
Net weight (When spindle pitch is minimum and with base plate)	kg	70	90	110	120	160	240	480
Speed reduction ratio		1/36	1/36	1/36	1/90	1/90	1/120	1/120
Table max. rpm (Motor rpm: 2,000min⁻¹)	min⁻¹	69.4/2,500	69.4/2,500	55.5/2,000	22.2	22.2	16.6	16.6
Clamp system		Pneumatic			Pneumatic	Pneumatic	Pneumatic	Pneumatic
Clamp torque / pneumatic pressure 0.49MPa【5kgf/cm²】	N·m 【kgf·m】	80 【8】			156 【16】	294 【30】	441 【45】	880 【90】
Indexing accuracy (the sum)	sec	60			30	30	30	30
Strength of worm gears	N·m【kgf·m】	178【18】			147【15】	264【27】	470【48】	764【78】
Allowable work weight — Vertical setting ( ):with tailstock	kg	25 (50)			75 (150)	100 (250)	100 (250)	150 (350)
Allowable work weight — Horizontal setting	kg	50			150	250	250	350
Allowable load (when table is clamped) — F	N 【kgf】	5,880 【600】			7,840 【800】	13,720 【1,400】	13,720 【1,400】	19,600 【2,000】
Allowable load (when table is clamped) — F×L	N·m 【kgf·m】	80*2 【8】			156 【16】	294 【30】	441 【45】	880 【90】
Allowable load (when table is clamped) — F×L	N·m 【kgf·m】	156 【16】			392 【40】	980 【100】	980 【100】	1,960 【200】
Allowable work inertia (per single-axis) $J=\frac{W\cdot D^2}{8}$	kg·m² 【kgf·cm·sec²】	0.10 【1.0】			0.48 【4.9】	1.20 【12.3】	1.95 【20.0】	3.70 【38.5】

☞ Servo motors of other manufacturers P.66

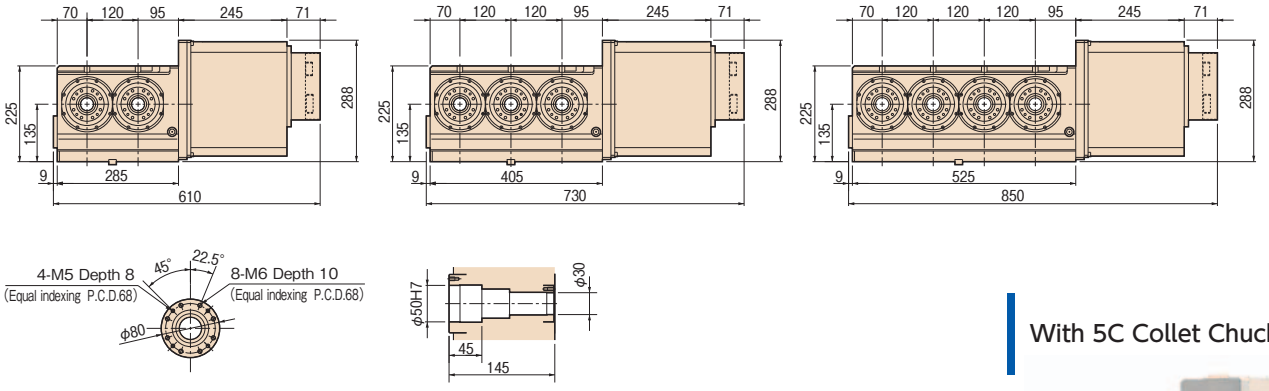
＊1 The tolerance of the table T-slot width is applicable to four standard slots arranged crosswise. ☞ Dimensions P.60

＊2 The clamp torque is optionally increased, subject to applications.

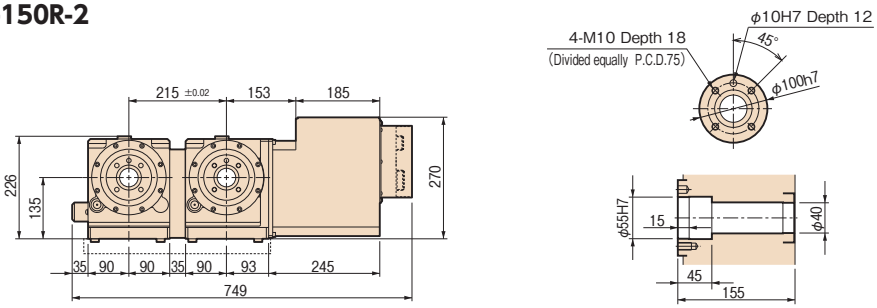
Dimensions

Unit: mm

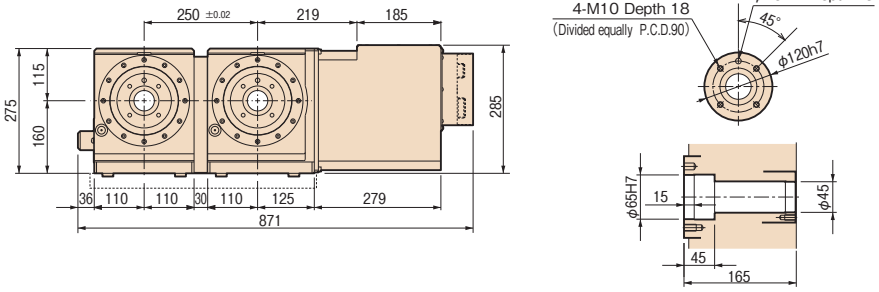
RN-100R-2/3/4



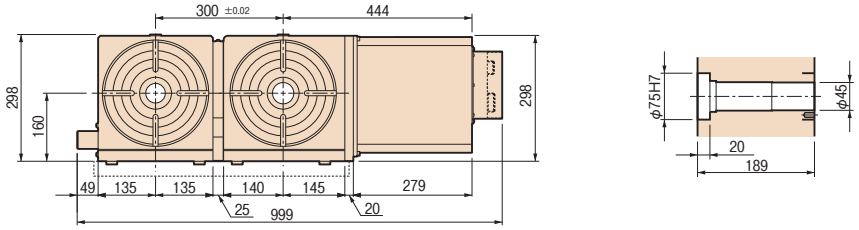
RN-150R-2



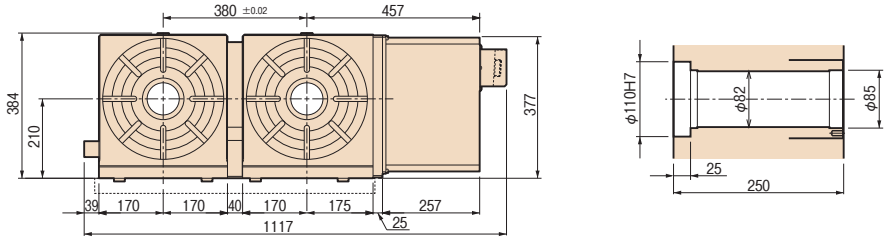
RN-200R-2



RN-250R-2



RN-300R-2



Note: The above dimensions are for FANUC servo motors. The dimensions of servo motors of other manufacturers may be larger.

With 5C Collet Chuck

RN-100R-3

With Rotary Joint

P.63

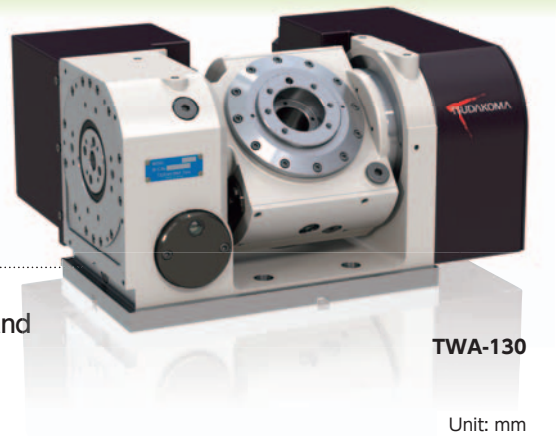
RN-150R-4

Standard type

TWA/TN

TWA-130•160•200
TN-101•320•450

Compact tables for speedy and powerful five-axis machining.
TN-101 and TWA-130 are the most suitable models for drilling and tapping machines.



TWA-130

Specifications

Unit: mm

		TN-101	TWA-130	TWA-160	TWA-200	TN-320	TN-450
Tilt range		−17°～+107°		−30°～+110°			−10°～+95°
Spindle diameter		ϕ86h7	ϕ90h7	ϕ100h7	ϕ120h7	—	—
Table diameter*1		ϕ135 (Option)		ϕ160 or 200 (Option)	ϕ200 or 250 (Option)	ϕ320	ϕ450
Table height at 0° position		180 (205 W/face plate)	210 (235 W/face plate)	235 (260 W/face plate)	270 (300 W/face plate)	355	425
Center height at 90° position		135	150	180	210	255	425
Center bore	Nose diameter	ϕ55H7 (ϕ40H7 W/face plate)		ϕ55H7 (ϕ50H7 W/face plate)	ϕ65H7 (ϕ60H7 W/face plate)	ϕ105H7	ϕ170H7
	Through-bore	ϕ35	ϕ37	ϕ40	ϕ45	ϕ102	ϕ136
Table T-slot width *1		12H8 (W/face plate)				14H7	
Guide block width		14h7		18h7			
Servo motors (for FANUC)		Rotary axis / Tilt axis	Rotary axis / Tilt axis	Rotary axis / Tilt axis	Rotary axis / Tilt axis	Rotary axis / Tilt axis	Rotary axis / Tilt axis
		αiF2 / αiF2	αiS2 / αiS2	αiS2 / αiS2	αiF4 / αiF4	αiF8 / αiF8	αiF22 / αiF22
Inertia converted into motor shaft	×10⁻³kg·m² 【×10⁻³kgf·cm·sec²】	0.072【0.73】 / 0.078【0.79】	0.074【0.75】 / 0.072【0.73】	0.17【1.68】 / 0.18【1.81】	0.38【3.96】 / 0.45【4.61】	0.82【8.34】 / 0.45【4.61】	5.34【54.5】 / 3.00【30.6】
Speed reduction ratio		1/60 / 1/120	1/60 / 1/120	1/72 / 1/120	1/45 / 1/90	1/120 / 1/240	1/90 / 1/180
Table max. rpm	min⁻¹ (Motor rpm: 2,000min⁻¹)	41.6 (Motor rpm: 2,500min⁻¹) / 16.6	41.6 (Motor rpm: 2,500min⁻¹) / 16.6	27.7 / 16.6	44.4 / 22.2	16.6 / 8.3	22.2 / 11.1
Clamp system Supplied pressure		Pneumatic 0.49MPa 【5kgf/㎠】				Hydraulic 3.5MPa 【35kgf/㎠】	
Clamp torque	N·m 【kgf·m】	200【20】 / 300【30】	500【51】 / 500【51】	500【51】 / 800【82】	800【82】 / 1,000【102】	2,200【224】 / 2,200【224】	3,700 / 7,400
Indexing accuracy (the sum)	arc sec	40 / —	40 / —	30 / —	30 / —	20 / —	15 / —
Tilting accuracy	Tilt 0°～90° arc sec	— / 45	— / 45	— / 45	— / 45	— / 45	— / 90
Net weight	kg	69	85	135	195	440	1,200
Strength of worm gears (Rotary axis)	N·m【kgf·m】	152【15.5】	152【15.5】	200【20.4】	450【45.9】	931【95】	1,940【198】
Allowable work weight	0° (Horizontal) kg	35	35	60	120	150	500
	0°～90° (Tilting) kg	20	20	40	70	100	300
Allowable work moment	W×L N·m【kgf·m】	24【2.4】	24【2.4】	39.2【4.0】	53.7【5.5】	163.3【16.6】	288.2【29.4】
Allowable load (when table is clamped)	F N【kgf】	3,920【400】	3,920【400】	7,840【800】	13,720【1,400】	19,600【2,000】	39,200【4,000】
	F×L N·m【kgf·m】	200【20】	500【51】	500【51】	800【82】	2,200【224】	3,700【377.6】
	F×L N·m【kgf·m】	300【30】	500【51】	800【82】	1,000【102】	2,200【224】	7,400【755.1】
Allowable work inertia	$J=\frac{W\cdot D^2}{8}$ kg·m² 【kgf·cm·sec²】	0.08【0.87】	0.08【0.87】	0.19【1.94】	0.59【6.02】	1.53【15.6】	9.38【95.68】

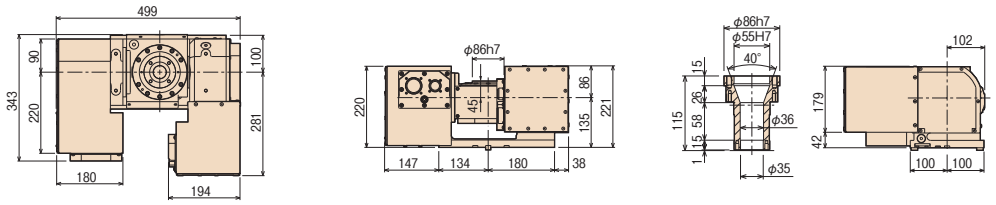
☞ Servo motors of other manufacturers P.66 ☞ When assembling a faceplate or a fixture with the main spindle P.76

＊1 The tolerance of the table T-slot width is applicable to four standard slots arranged crosswise. ☞ Dimensions P.60

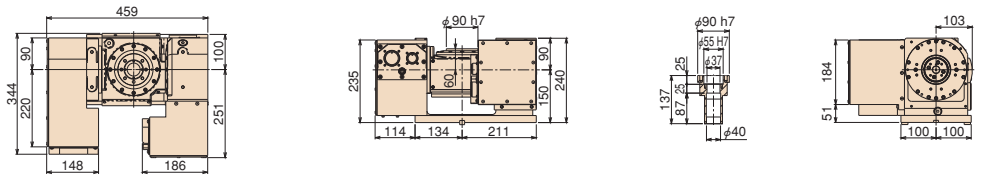
Dimensions

Unit: mm

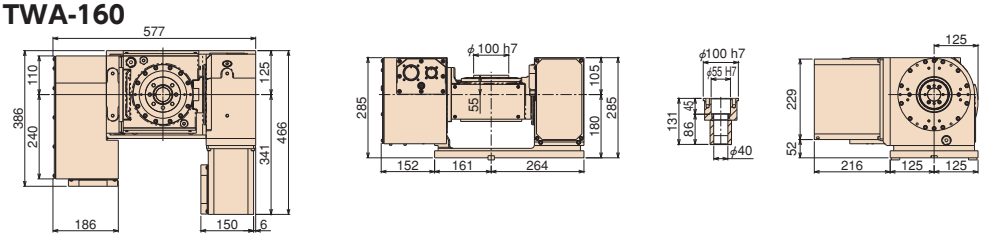
TN-101



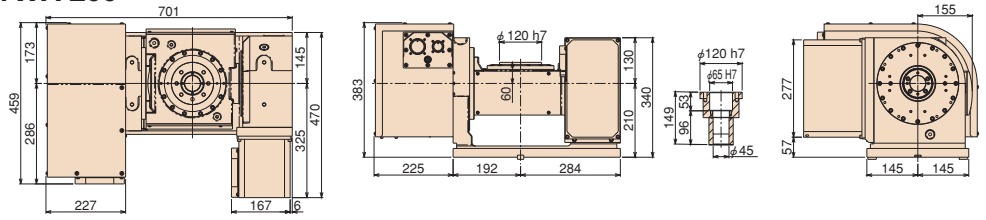
TWA-130



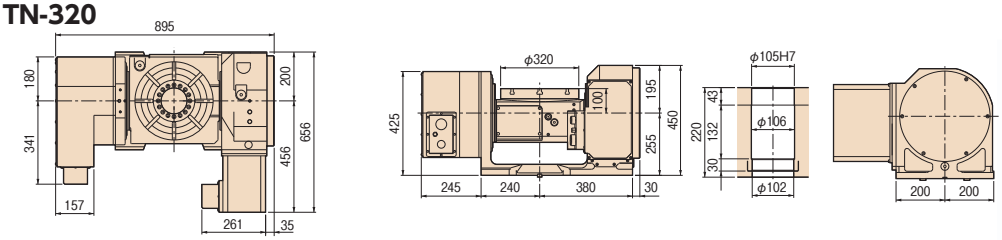
TWA-160



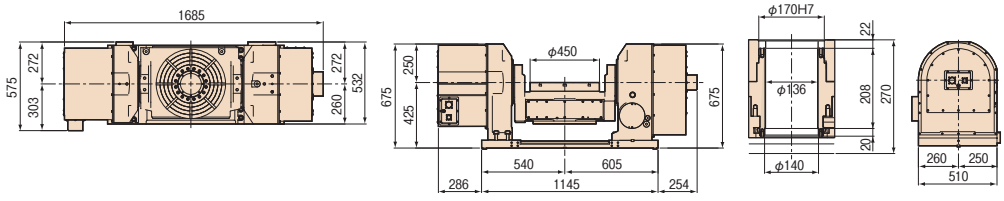
TWA-200



TN-320



TN-450



Note: The above dimensions are for FANUC servo motors. The dimensions of servo motors of other manufacturers may be larger.

Clamping block and bolt

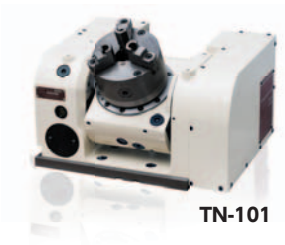
Unit: mm

	Type	Q'ty	Layout	T-slot pitch	T-slot width	A	B	C	D	E	F	G	H	I	J	K	L	M
TN-101	I	4	a b	40~160 *	14	20	12	70	10	35	25	20	12	8	50	35	23	12
TWA-130	I	4	a b	40~190 *	14	20	12	70	10	35	25	20	17	8	55	35	23	12
TWA-160	I	4	a b	78~150 63~117	18	20	12	70	10	35	25	17	15	11	55	35	28	16
TWA-200	I	4	a b	80~180 78~125	18	25	12	80	12	33	35	22	21	11	65	40	28	16
TN-320	I	4	a b	140~190 95~180	18	25	12	80	12	33	35	22	21	11	65	40	28	16
TN-450	Ⅳ	4	a b	80~250 *	18	50	20	74	20	18	36	75	10	11	105	70	28	16

Note 1: ＊In the case of layout b, contact us for the details about mounting.
Note 2: When using a machine with a T-slot pitch other than the above, use suitable clamping blocks and bolts that are available on the market, or order custom-made ones from TSUDAKOMA. (Option)

Example of scroll chuck use

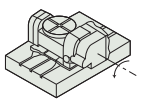
P.55



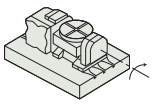
TN-101

TN-450

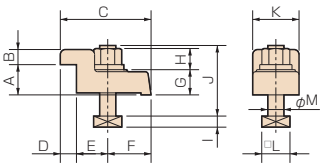
Layout a



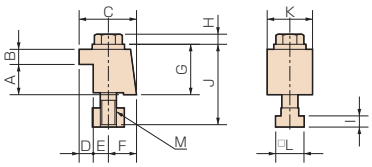
Layout b



Type Ⅰ



TypeⅣ

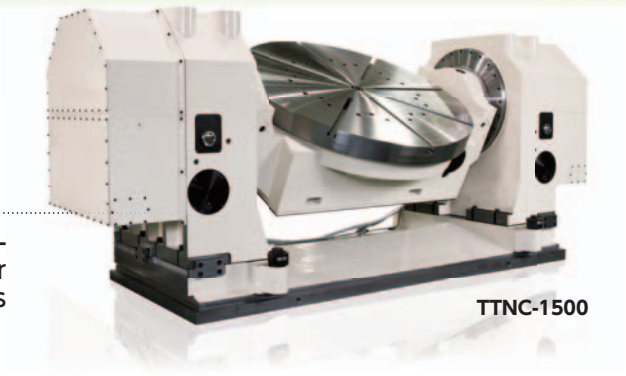


Standard type

TTNC

TTNC-631•1001•1500

Large tilting models that enable 5-face machining and slanted-hole machining with single chucking of workpiece. Suitable for machining of component parts for heavy industries such as aircraft, power generator and construction machine industry.



TTNC-1500

Specifications

Unit: mm

		TTNC-631		TTNC-1001		TTNC-1500*2	
Tilt range		−10°～+95°		−20°～+110°		−5°～+95°	
Spindle diameter		—		—		—	
Table diameter		ϕ630		ϕ1,000		ϕ1,500	
Table height at 0° position		585		900		1,155	
Center height at 90° position		450		700		1,055	
Center bore	Nose diameter	ϕ180H6		ϕ75H7		ϕ75H7	
	Through-bore	ϕ180		—		—	
Table T-slot width*1		18H7		22H7		28H7	
Guide block width		18h7		—		—	
Servo motors (for FANUC)		Rotary axis	Tilt axis	Rotary axis	Tilt axis	Rotary axis	Tilt axis
		αiF12	αiF12	αiF22	αiF30	TPC5-SR30	TPC5-SR30
Inertia converted into motor shaft	×10⁻³kg·m² [×10⁻³kgf·cm·sec²]	5.42 [55.3]	3.77 [38.5]	4.37 [44.6]	4.1 [41.8]	5.37 [54.8]	7.46 [76.2]
Speed reduction ratio		1/180	1/360	1/360	1/1,440	1/720	1/1,440
Table max. rpm (Motor rpm: 2,000min⁻¹)	min⁻¹	11.1	4.1 (Motor rpm: 1,500min⁻¹)	5.5	1.3	1.39 (Motor rpm: 1,000min⁻¹)	0.7 (Motor rpm: 1,000min⁻¹)
Clamp system Supplied pressure		Hydraulic 3.5MPa [35kgf/cm²]	Hydraulic 3.5MPa [35kgf/cm²]	Hydraulic 6.9MPa [70kgf/cm²]	Hydraulic 6.9MPa [70kgf/cm²]	Hydraulic 3.5MPa [35kgf/cm²]	Hydraulic 3.5MPa [35kgf/cm²]
Clamp torque	N·m [kgf·m]	4,410 [450]	2,352 [240]	9,800 [1,000]	19,600 [2,000]	12,000 [1,224]	25,000 [2,551]
Indexing accuracy(the sum)	arc sec	15	—	15	—	20	—
Tilting accuracy Tilt 0°～90°	arc sec	—	60	—	60	—	45
Net weight	kg	1,700		4,600		12,000	
Strength of worm gears (Rotary axis)	N·m [kgf·m]	3,284 [335]		13,230 [1,350]		21,560 [2,200]	
Allowable work weight	0° (Horizontal) W kg	600		2,500		2,500	
	0°～90° (Tilting) W kg	300		1,500		1,500	
Allowable work moment	W×L N·m [kgf·m]	980 [100]		7,840 [800]		7,840 [800]	
Allowable load (when table is clamped)	F N [kgf]	24,500 [2,500]		29,400 [3,000]		49,000 [5,000]	
	F×L N·m [kgf·m]	4,410 [450]		9,800 [1,000]		12,000 [1,224]	
	F×L N·m [kgf·m]	2,352 [240]		19,600 [2,000]		25,000 [2,551]	
Allowable work inertia	$J=\frac{W\cdot D^2}{8}$ kg·m² [kgf·cm·sec²]	35.3 [360]		312.6 [3,188.7]		2,255 [23,001]	

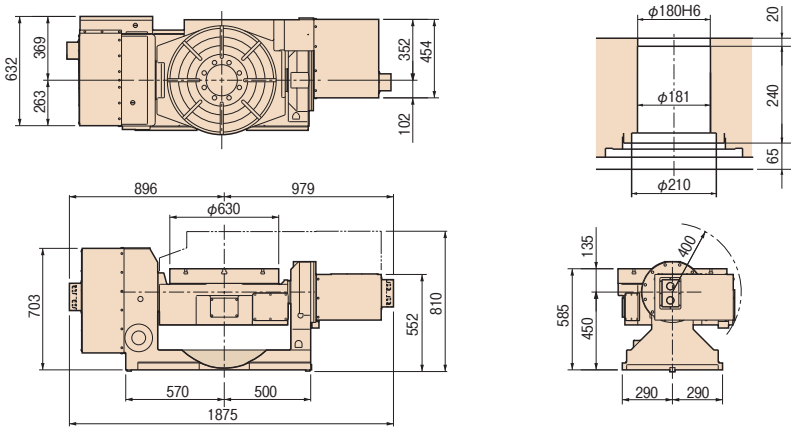
☞ Servo motors of other manufacturers P.66

＊1 The tolerance of the table T-slot width is applicable to four standard slots arranged crosswise.
＊2 Above specifications are for one of experienced production. Those might be changed depending on use conditions.

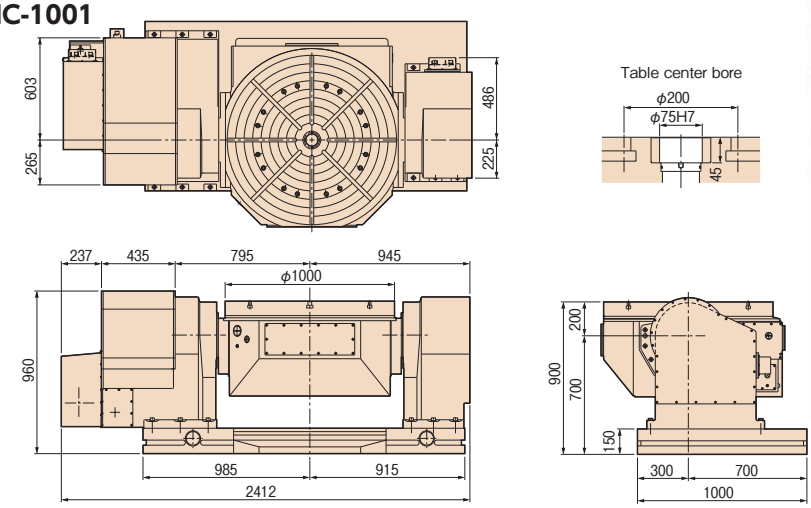
Dimensions

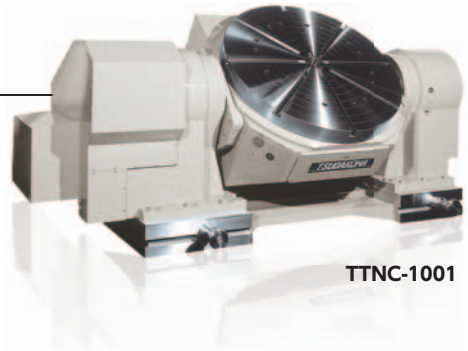
Unit: mm

TTNC-631

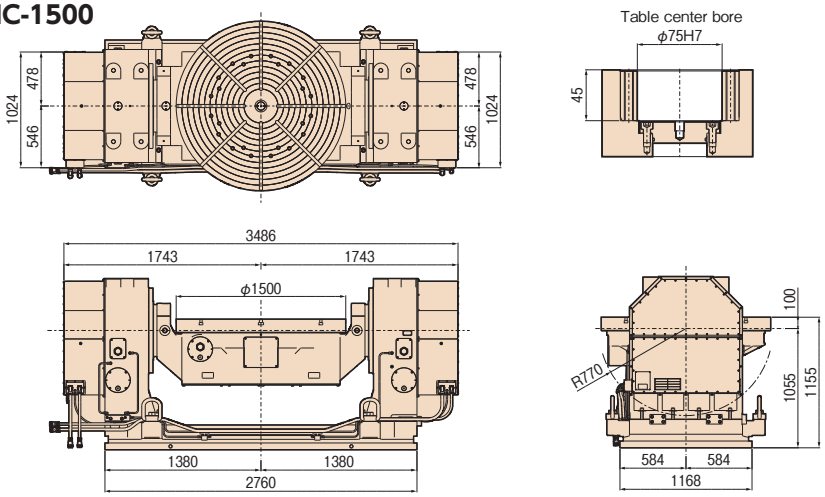


TTNC-1001

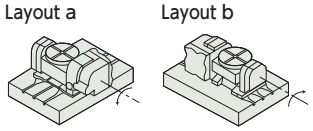


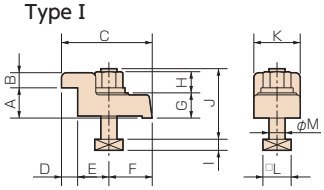


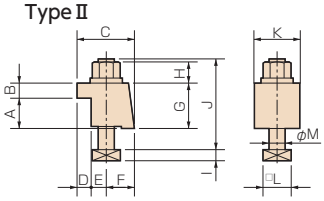
TTNC-1500



Note: The above dimensions are for FANUC servo motors. The dimensions of servo motors of other manufacturers may be larger.







Clamping block and bolt

Unit: mm

	Type	Q'ty	Layout	T-slot pitch	T-slot width	A	B	C	D	E	F	G	H	I	J	K	L	M
TTNC-631	Ⅰ	4	a b	168～450 ＊	18	40	20	110	18	42	50	25	21	11	70	46	28	16
TTNC-1001	Ⅱ	8	—	—	24	50	20	74	20	18	36	70	29	16	130	70	40	22
TTNC-1500	Ⅱ	10	—	—	28	60	28	95	29	16	50	95	22	17.5	146	100	41.3	24

Note 1: ＊In the case of layout b, contact us for the details about mounting.
Note 2: When using a machine with a T-slot pitch other than the above, use suitable clamping blocks and bolts that are available on the market, or order custom-made ones from TSUDAKOMA. (Option)

Manual Tilting type

THNC THNC-251•301

Manual tilt adjustment type with a highly rigid body and a powerful hydraulic clamp system.

THNC-251

Specifications

Unit: mm

		THNC-251		THNC-301	
Tilt range		0°～+93°		0°～+93°	
Table diameter*1		φ250		φ320	
Table height at 0° position		230		265	
Center height at 90° position		210		235	
Center bore	Nose diameter	φ40H7		φ40H7	
	Through-bore	φ32		φ40	
Table T-slot width*1		12H7		14H7	
Guide block width		18h7		18h7	
Servo motors (for FANUC)		Rotary axis	Tilt axis	Rotary axis	Tilt axis
		αiF4	Manual	αiF8	Manual
Inertia converted into motor shaft	$\times10^{-3}$kg·m² [$\times10^{-3}$kgf·cm·sec²]	0.20 [2.0]	—	0.25 [2.6]	—
Speed reduction ratio		1/180	—	1/180	—
Table max. rpm (Motor rpm: 2,000min^{-1})	min^{-1}	11.1	—	11.1	—
Clamp system Supplied pressure		Hydraulic 3.5MPa [35kgf/cm²]	Manual 19.6N·m [2kgf/m]	Hydraulic 3.5MPa [35kgf/cm²]	Manual 35.3N·m [3.6kgf/m]
Clamp torque	N·m [kgf·m]	490 [50]	490 [50]	833 [85]	1,862 [190]
Indexing accuracy(the sum)	sec	15	60	15	60
Net weight	kg	125		180	
Strength of worm gears (Rotary axis)	N·m [kgf·m]	470 [48]		764 [78]	
Allowable work weight	0° (Horizontal) kg	80		200	
	0°～90° (Tilting) kg	40		100	
Allowable load (when table is clamped)	F N [kgf]	6,860 [700]		9,800 [1,000]	
	F×L N·m [kgf·m]	490 [50]		833 [85]	
	F×L N·m [kgf·m]	490 [50]		1,862 [190]	
Allowable work inertia	$J=\frac{W\cdot D^2}{8}$ kg·m² [kgf·cm·sec²]	0.62 [6.3]		2.25 [23]	

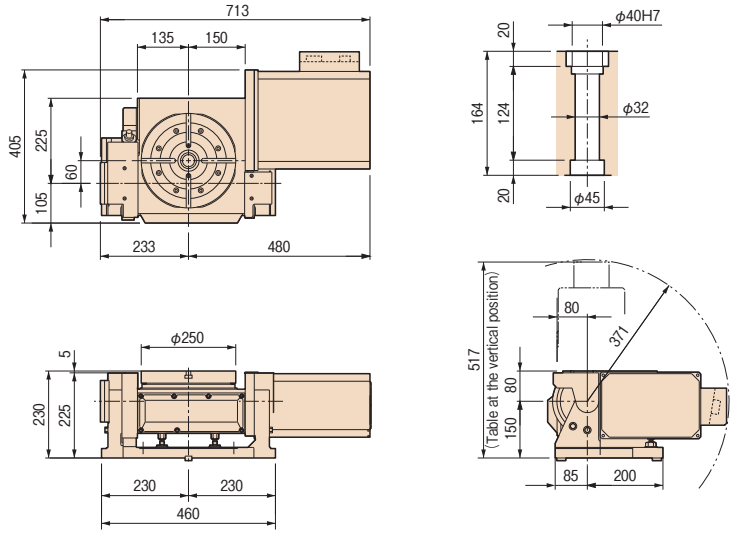
☞ Servo motors of other manufacturers P.66

＊1 The tolerance of the table T-slot width is applicable to four standard slots arranged crosswise. ☞ Dimensions P.60

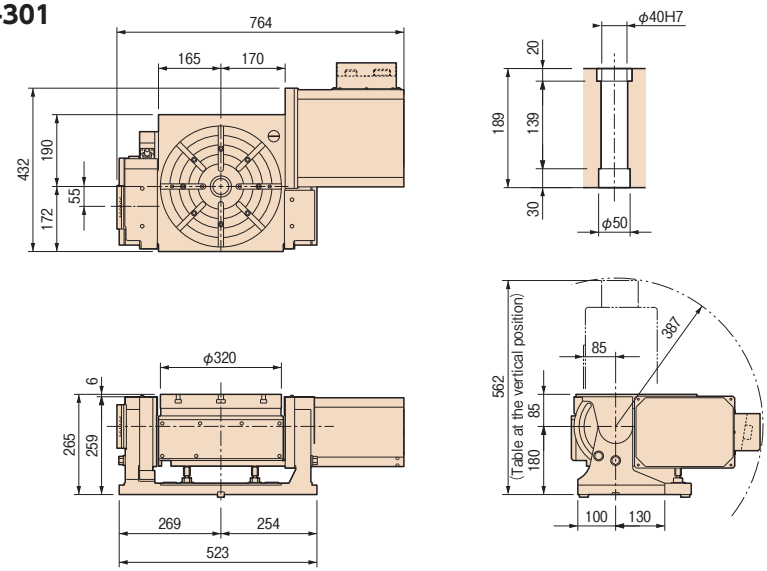
Dimensions

Unit: mm

THNC-251



THNC-301



Note: The above dimensions are for FANUC servo motors. The dimensions of servo motors of other manufacturers may be larger.

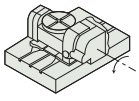
Clamping block and bolt

Unit: mm

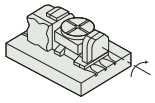
	Type	Q'ty	Layout	T-slot pitch	T-slot width	A	B	C	D	E	F	G	H	I	J	K	L	M
THNC-251	Ⅰ	4	a b	40~100 40~65	18	25	12	80	12	33	35	22	21	11	65	40	28	16
THNC-301	Ⅱ	4	a b	40~130 40~80	18	25	15	52	12	15	25	40	21	11	85	40	28	16

Note: When using a machine with a T-slot pitch other than the above, use suitable clamping blocks and bolts that are available on the market, or order custom-made ones from TSUDAKOMA. (Option)

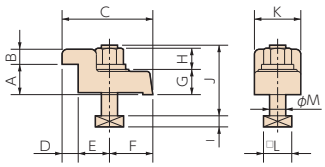
Layout a



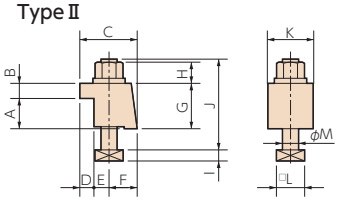
Layout b



Type Ⅰ



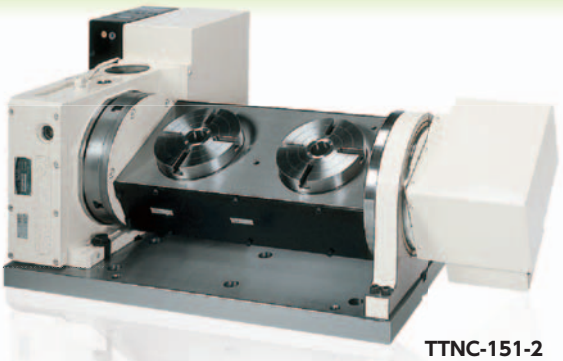
Type Ⅱ



TTNC-N (spindles)

TTNC-102-2 (spindles) • 101-4 (spindles)
TTNC-151-2 (spindles) • 201-2 (spindles)

Tilt type multi-spindle enables highly productive machining. Simultaneous machining of multiple workpieces with complex shapes and 5-face machining is possible.



TTNC-151-2

Specifications

Unit: mm

	TTNC-102-2		TTNC-101-4		TTNC-151-2		TTNC-201-2	
Tilt range	−17°～+107°				−110°～+110°			
Spindle diameter	ϕ90h7		ϕ80h7		—		—	
Table diameter*1	ϕ135 (Option)		ϕ115 (Option)		ϕ160		ϕ225	
Table height at 0° position	230 (255 W/face plate)		275 (300 W/face plate)		270		350	
Center height at 90° position	160		200		200		260	
Center bore — Nose diameter	ϕ55H7 (ϕ40H7 W/face plate)		ϕ50H7 (ϕ50H7 W/face plate)		ϕ35H7		ϕ40H7	
Center bore — Through-bore	ϕ35		ϕ30		ϕ35		ϕ32	
Minimum distance between table centers	140		120		250		304.8	
Table T-slot width *1	12H8 (W/face plate)		10H8 (W/face plate)		12H7		12H7	
Guide block width	14h7		18h7		18h7		18h7	
Servo motors (for FANUC)	Rotary axis	Tilt axis	Rotary axis	Tilt axis	Rotary axis	Tilt axis	Rotary axis	Tilt axis
	αiF2	αiF2	αiF8	αiF8	αiF4	αiF8	αiF8	αiF12
Inertia converted into motor shaft ×10^{-3}kg·m^2 【×10^{-3}kgf·cm·sec^2】	0.16 【1.6】	0.06 【0.6】	0.52 【5.3】	1.08 【11.0】	0.45 【4.6】	1.09 【11.1】	0.48 【4.9】	3.2 【32.8】
Speed reduction ratio	1/90	1/180	1/60	1/90	1/90	1/90	1/90	1/120
Table max. rpm min^{-1} (Motor rpm: 2,000min^{-1})	22.2	11.1	33.3	22.2	22.2	22.2	22.2	16.6
Clamp system Supplied pressure	Pneumatic 0.49MPa 【5kgf/cm²】		Pneumatic*2 0.49MPa 【5kgf/cm²】	Hydraulic 3.5MPa 【35kgf/cm²】	Pneumatic*2 0.49MPa 【5kgf/cm²】	Hydraulic 3.5MPa 【35kgf/cm²】	Hydraulic 3.5MPa 【35kgf/cm²】	
Clamp torque N·m 【kgf·m】	127 【13】	284 【29】	80*2 【8】	980 【100】	78 【8】	1,000 【102】	490 【50】	2,450 【250】
Indexing accuracy(the sum) arc sec	40	—	60	—	30	—	20	—
Tilting accuracy Tilt 0°～90° arc sec	—	45	—	60	—	60	—	60
Net weight kg	100		370		340		550	
Strength of worm gears (Rotary axis) N·m【kgf·m】	93.1【9.5】		176【18】		147【15】		470【48】	
Allowable work weight 0° (Horizontal) kg	35		25		40		50	
Allowable work weight 0°～90° (Tilting) kg	20		25		40		50	
Allowable work moment W×L N·m 【kgf·m】	54.8 【5.6】		176 【26】		156.8 【16】		254.8 【26】	
F N 【kgf】	1,960 【200】		1,960 【200】		6,860 【700】		9,800 【1,000】	
Allowable load (when table is clamped) F×L N·m 【kgf·m】	127 【13】		80*2 【8】		78 【8】		490 【50】	
F×L N·m 【kgf·m】	284 【29】		980 【100】		980 【100】		2,450 【250】	
Allowable work inertia (per single-axis) $J=\frac{W\cdot D^2}{8}$ kg·m^2 【kgf·cm·sec^2】	0.08 【0.86】		0.05 【0.5】		0.19 【2.0】		0.63 【6.4】	

☞ Servo motors of other manufacturers P.66

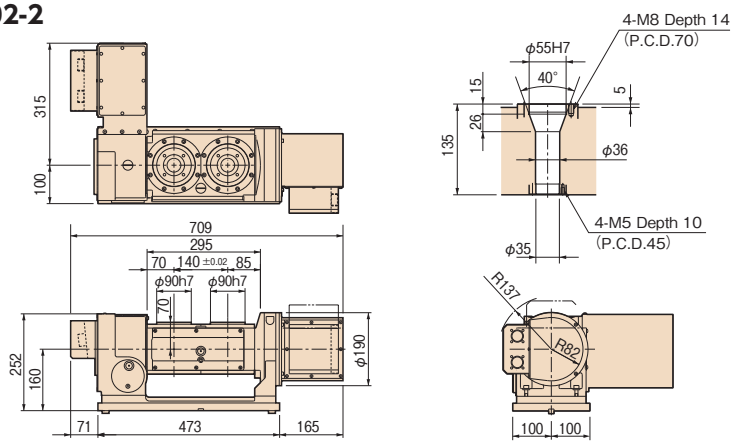
＊1 The tolerance of the table T-slot width is applicable to four standard slots arranged crosswise. ☞ Dimensions P.60

＊2 Tables with increased clamp torque are available according to the applications.

Dimensions

Unit: mm

TTNC-102-2

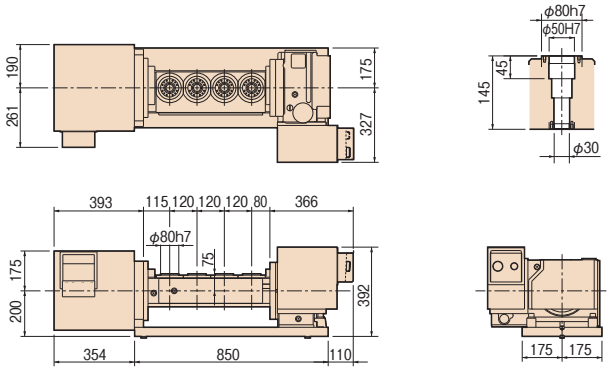


TTNC-102-2

With Power Chuck

P.56

TTNC-101-4



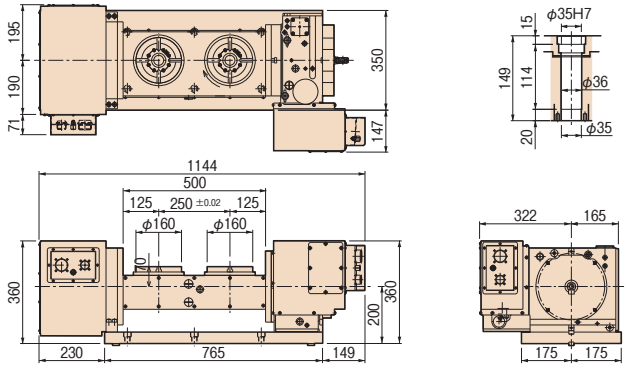
TTNC-101-4

With Rotary Joint

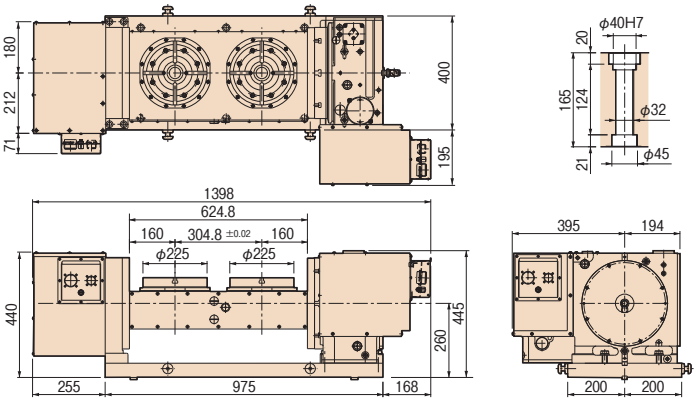
P.63

TTNC-151-2

TTNC-151-2



TTNC-201-2

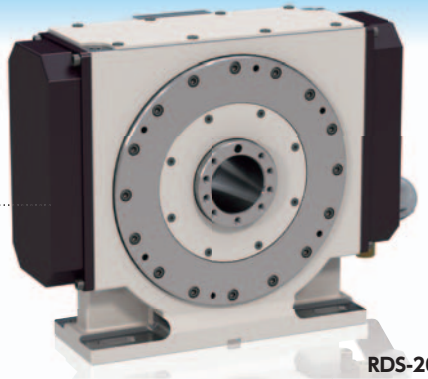


Note: The above dimensions are for FANUC servo motors. The dimensions of servo motors of other manufacturers may be larger.

SmartDD

RDS RDS-200

Smart slim body provides full use of machining area with various features of DD motor including high speed rotation. This is the best model for mass-production of automobile and computer parts at small machining centers.



RDS-200

Specifications

Unit: mm

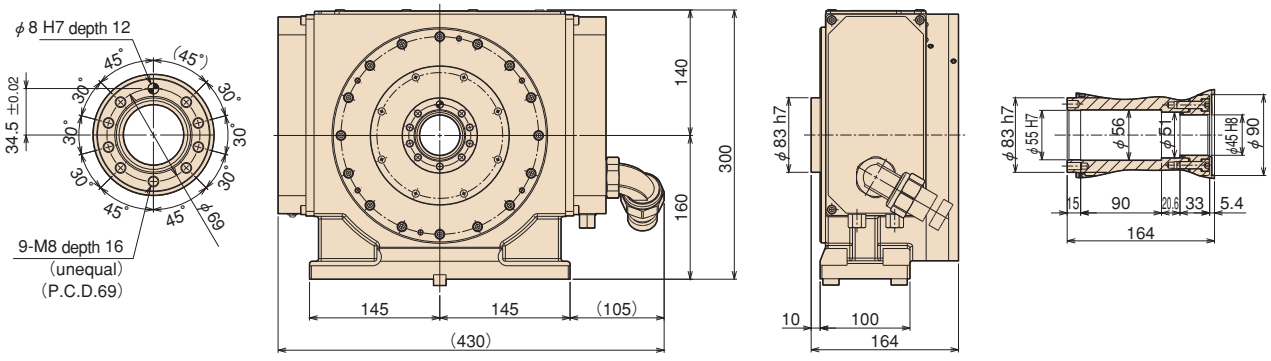
			RDS-200
Spindle diameter		mm	ϕ83
Center height		mm	160
Center bore	Nose diameter		ϕ55
	Through-bore		ϕ45
Motor type			TSUDA-02
Net weight		kg	65
Speed reduction ratio			1/1
Indexing accuracy (the sum)		sec	20※
Clamp system			Pneumatic
Clamp torque ／pneumatic pressure 0.49MPa		N·m	600
Clamp torque ／Pneumatic pressure interception		N·m	40
Table max. rpm	Steady rotation	min^{-1}	100
	Max rotation	min^{-1}	300
Allowable work weight		kg	100
Allowable load (when table is clamped)	F	N	6,860
	F×L	N·m	600
	F×L	N·m	350

※Pitch error corrected

Dimensions

Unit:mm

RDS-200



DD Table

RTV·RTT

RTV-202
RTT-112

RTV-202

DD (Direct Drive) motors realize high speed, high acceleration and no backlash operation.
Most suitable for high speed and high quality machining for various impellers, blades and medical equipment, and for high speed indexing operation for automotive parts.
We provide optimum ideas of products and various applications based on our great experiences.

Specifications

Unit: mm

		RTV-202	RTT-112	
Controll axis		1-axis	2-axis	
		Vertical setting only	Rotary axis	Tilt axis
Table diameter (Spindle diameter)	mm	(ϕ120)	ϕ100	—
Servo motors (for FANUC)		Dis260/300	Dis60/400	Dis150/300
Type of scale		αCZi512S	αCZi512A	αCZi512A
Table max. rpm	min^{-1}	150	150	100
Clamp torque	N·m	300 (Pneumatic pressure 0.49MPa)	—	80 (Pneumatic pressure 0.49MPa)
Center height	mm	190	280	
Rotary joint		—	—	
Allowable work weight	kg	50	30	
Net weight	kg	90	190	

*Contact us for the following models.

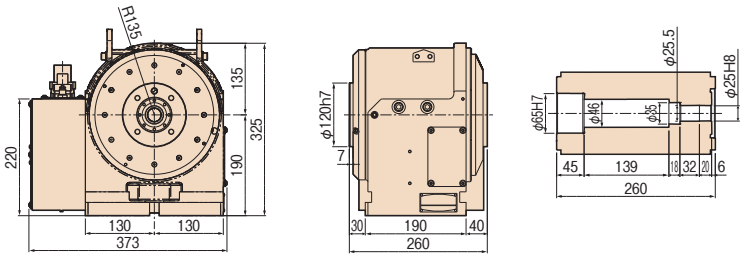
Vertical type DD Table ϕ100～ϕ500
Tilting type DD Table ϕ100～ϕ630

*Applicable for various kinds of DD motors which depend upon the type of controllers. Contact us for details.

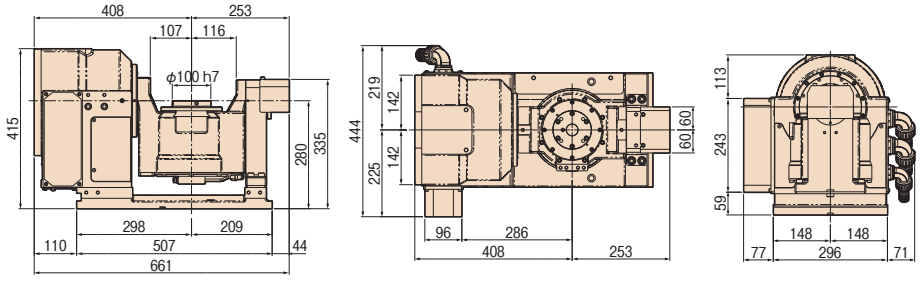
Dimensions

Unit: mm

RTV-202



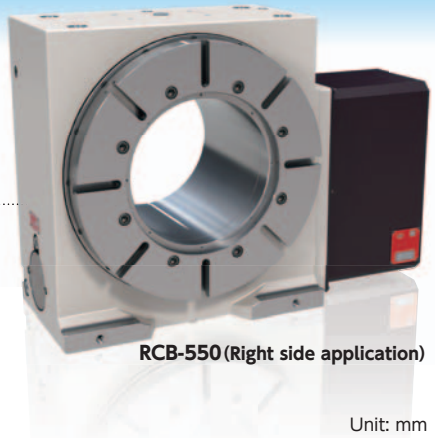
RTT-112



RTT-112

RCB RCB-350•450•550

Main spindle with highly rigid bearings and table with high overall rigidity enable machining of hard materials such as aircraft components. Machining at a position closer to the face plate is made possible by inserting the workpiece through the large bore.



RCB-550 (Right side application)

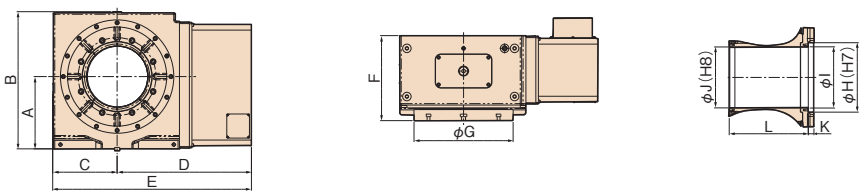
Specifications

Unit: mm

		RCB-350	RCB-450	RCB-550
Handedness	R	○	○	○
	Top	○	○	○
Table diameter		ϕ350	ϕ450	ϕ550
Center height		255	310	350
Center bore	Nose diameter	ϕ245H7	ϕ295H7	ϕ345H7
	Through-bore	ϕ216	ϕ265	ϕ315
Table T-slot width		14H7	14H7	18H7
Guide block width		18h7	18h7	18h7
Servo motors (for FANUC)		αiF12	αiF22	αiF22
Inertia converted into motor shaft	$\times10^{-3}$kg·m² 【$\times10^{-3}$kgf·cm·sec²】	3.48 【35.50】	6.14 【62.63】	5.84 【59.57】
Net weight	kg	330	520	720
Speed reduction ratio		1/90	1/90	1/120
Table max. rpm	min^{-1} (Motor rpm: 2,000min^{-1})	22.2	22.2	16.6
Indexing accuracy (the sum)	sec	15	15	15
Clamp system		Hydraulic	Hydraulic	Hydraulic
Clamp torque ／hydraulic pressure 3.5MPa【35kgf/cm²】	N·m 【kgf·m】	3,300 【337】	4,700 【479】	6,500 【663】
Strength of worm gears	N·m【kgf·m】	1,942【198】	3,276【334】	4,716【481】
Allowable work weight	Vertical setting ( ):with tailstock	400 (800)	700 (1,400)	1,000 (2,000)
Allowable load (when table is clamped)	F	50,000 【5,099】	85,000 【8,668】	150,000 【15,296】
	F×L	3,300 【337】	4,700 【479】	6,500 【663】
	F×L	3,600 【367】	7,300 【744】	15,000 【1,530】
Allowable work inertia	$J=\frac{W\cdot D^2}{8}$	6.1 【62】	17.7 【180】	37.8 【385】

Dimensions

Unit: mm



Unit: mm

	A	B	C	D	E	F	G	H	I	J	K	L
RCB-350R	255	484	227	474	701	300	ϕ350	ϕ245	ϕ216	ϕ215	20	279
RCB-450R	310	579	267	584	851	340	ϕ450	ϕ295	ϕ265	ϕ270	20	319
RCB-550R	350	659	307	624	931	365	ϕ550	ϕ345	ϕ315	ϕ320	20	344

Single axis NC controllers equipped with advanced functions for M-signal

Single axis NC table controllers that operate by means of M-signals from the machining center.
Operation can be programmed by machining center under "Remote mode + M" specification.

For small-sized rotary tables

TPC-Jr K2／K3

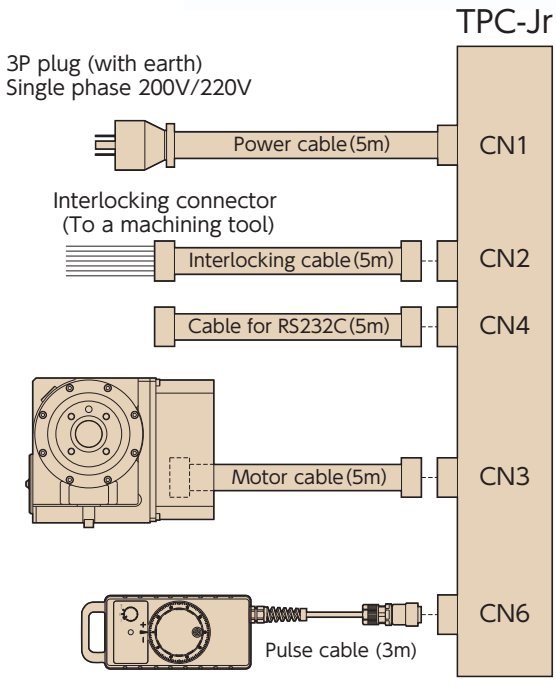
- Single axis NC controllers that operate small-sized TSUDAKOMA NC rotary tables by means of M-signals from machining center.
- TSUDAKOMA rotary tables equipped with super-compact AC servo motors are the most compact among similar models.
- Operation can be programmed by machining center.
  With "Remote mode + M" specification (Parameter change) ☞ P.47
  ※Corresponding to Cable option

Manual Pulse Generator (Option)

Applicable models

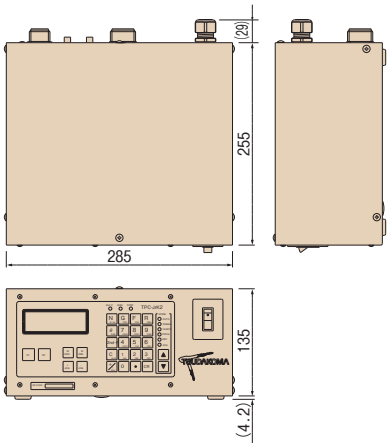
	K2	K3
RN-100	●	
RWE/RWA-160	●	
RWE/RWA-200		●
RWA-250		●
RWA-320		●
RN-100-2 (Axis) /3 (Axis) /4 (Axis)		●
RN-150R-2 (Axis)		●
TN-101	●	
TWA-130	●	
TWA-160	●	
TWA-200		●
TBS-130	●	
TBS-160	● (R)	● (T)

Cables



Note: The cable for RS232C is an optional item.
Note: Manual pulse generator is an optional item.

Dimensions



TPC-Jr FUNCTIONS

Operation panel

OPERATION MODE

AUTO AUTO :
Automatic operation by an M signal from the machining center.

SINGLE SINGLE :
Single operation of TPC-Jr. By pressing ST , positioning is performed once.

CHECK CHECK :
Block number call, program check and self-diagnosis.

PROG Program mode :
For inputting and editing the program.

MDI MDI mode :
For setup operation. Ten blocks of programs can be carried out.

JOG JOG mode :
For manual feed and step feed.

HANDLE Handle mode :
Manual pulse operation.

Program edit keys

2nd·F + N W No. **Workpiece No. (Program No.)**
0000～ 9999
100 programs registerable

N W No. **Block No.**
000～999

G PRO **Operation command**
G0～G4: Movement command
G5 to G9: Assistance function

F POS **Feed rate select command**
F0: Rapid positioning speed
F1～ F9: Cutting feed rate

R REM **Assistance code for codes**

θ DGN **Travel distance command (angle, divided number) Block No./Sub-program No.**

G-code		R-code		θ-code	
No.	Command	No.	Command	Command	Setting
G0	Direct angle command	001～999	Number of Repetition (INC command)	Command angle	±000.001˚～999.999˚
		000	(ABS command)	Command angle	±000.000˚～360.000˚
G1	Direct indexing number command	001～999	Number of repetitions	Number of divisions for 360˚	±1～999999div.
G2	Arc-indexing number command	001～999	Number of divisions, Number of repetitions	Arc-angle indexed	±000.001˚～360.000˚
G3	Lead cutting command	000～100	Number of table rotations	Command angle	±0˚～360.000˚
G4	Zero point return command	000	1st zero point return (mechanical zero point)	Not required	
		001	2nd zero point return		
		002	3rd zero point return		
G5	Sub-program call command	001～999	Number of repetitions	Sub-program No.	0000～9999
G6	Subprogram return command	Not required		Not required	
G7	Program end command	Not required		Target address	000～999
G8	Workpiece coordinate system setting command	Not required		Reference coordinate	±0˚～360.000˚
G9	Declaration command	000	No operation	Not required	
		001/002	Clamp OFF/ON		
		003/004	Dowel OFF/ON	Dwell time	000～999 (×10m sec)
		005/006	Indexing group control OFF/ON	Not required	
		007/008	Directional positioning OFF/ON		
		009/010	Completion signal control command OFF/ON	Completion signal selection	
		011	Program display selection command	Not required	
		012	Current position display selection command		
		013	Remaining angle display selection command		

For large-sized tables

TPC5 SR6／SR12／SR30

Single axis NC controllers automatically start large-sized TSUDAKOMA NC rotary tables by receiving M-signals from machining center.

Easy programming by simple input of the interactive system.
In increments of 0.001° (standard), 0.0001° or 1 sec.

Ready to set optional functions easily.

- With an optional function of B signal, the workpiece number, block number and tilting angle command can be entered from machining center.
- Operation can be programmed by machining center.
  With "remote mode + M" specification
  (Parameter change) ☞ P.47

※Corresponding to Cable option

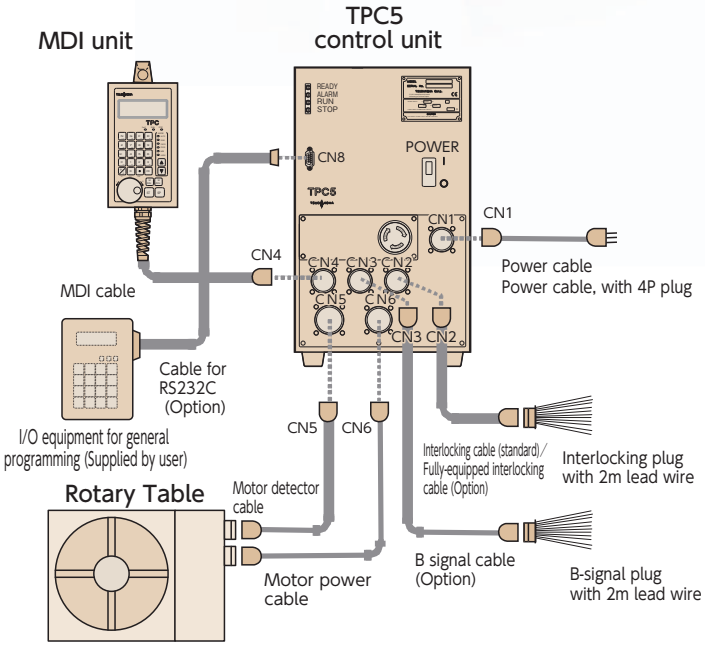

MDI unit

TPC5 control unit

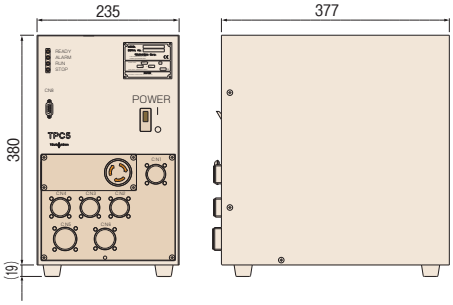
Applicable models

	SR6	SR12	SR30
RNCM-251	●		
RNCM-301～631		●	
RWB-250	●		
RWB-320,400,500		●	
RCH/RCV-800		●	
RCH/RCV-1000,1250			●
RNCV-1501,2001			●
TN-320	●		
TN-450			●
THNC-251	●		
THNC-301	●		
TTNC-631		●	
RBS-160	●		
RBS-250	●		
RBS-320		●	
TBS-250	●		

Cables

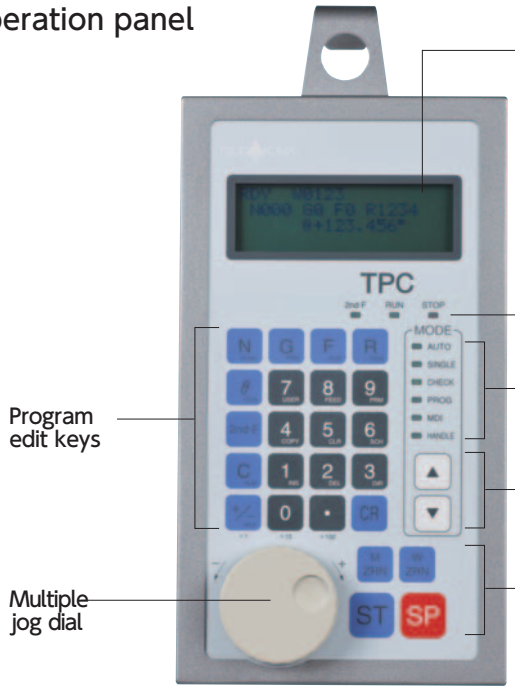


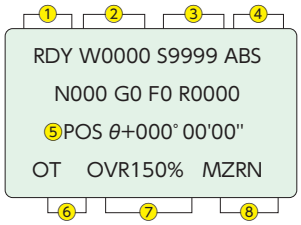
Dimensions



TPC5 FUNCTIONS

Operation panel





Status display line: ①TPC status ②Workpiece number ③Subprogram number ④Command system

Program display line: TPC5 program in 2 lines ⑤Current position/remaining (POS/REM)

Control display line: ⑥Overtravel ⑦Override/machine lock/manual interrupt ⑧Zero point return MZRN/WZRN/TZRN

OPERATION MODE

- **AUTO** AUTO : Automatic operation interlocked with machining center
- **SINGLE** SINGLE : Single operation of TPC5
- **CHECK** CHECK : Program check and self-diagnosis
- **PROG** Program mode : Program entry
- **MDI** MDI mode : Setup operation
- **HANDLE** Handle mode : Manual pulse operation/jog mode

Program edit keys

2nd·F + N W No. **Workpiece No. (Program No.)**
0000～ 9999
100 programs registerable

N W No. **Block No.** 000～999

G PRO **Operation command**
G0～G4 : Movement command
G5 to G9 : Assistance function

F POS **Feed rate select command**
F0 : Rapid positioning speed
F1～ F9 : Cutting feed rate

R REM **Assistance code for codes**

θ DGN **Travel distance command (angle, divided number)**

G-code		R-code		θ-code	
No.	Command	No.	Command	Command	Setting
G0	Direct angle command	0001～9999	Number of Repetition (INC command)	Command angle	±000.001°～999.999°
		0000	(ABS command)	Command angle	±000.000°～360.000°
G1	Direct indexing number command	0001～9999	Number of repetitions	Number of divisions for 360°	±1～999999div.
G2	Arc-indexing number command	0001～9999	Number of divisions, Number of repetitions	Arc-angle indexed	±000.001°～360.000°
G3	Lead cutting command	0000～0100	Number of table rotations	Command angle	±0°～360.000°
G4	Zero point return command	0000	1st zero point return (mechanical zero point)	Not required	
		0001	2nd zero point return		
		0002	3rd zero point return		
G5	Sub-program call command	0000～9999	Number of repetitions	Sub-program No.	0000 (0001)～9999
G6	Subprogram return command		Not required	Not required	
G7	Program end command		Not required	Target address	000～999
G8	Workpiece coordinate system setting command		Not required	Reference coordinate	±0°～360.000°
G9	Declaration command	0000	No operation	Not required	
		0001/0002	Clamp OFF/ON		
		0003/0004	Dowel OFF/ON	Dwell time	001～999 (×10m sec)
		0005/0006	Indexing group control OFF/ON	Not required	
		0007/0008	Directional positioning OFF/ON		
		0009/0010	Completion signal control command OFF/ON	Completion signal selection	
		0011	Program display selection command	Not required	
		0012	Current position display selection command		
		0013	Remaining angle display selection command		

Specifications of TPC

	TPC-Jr	TPC5
Control axis	1 axis	
Servo motor	AC servo: ABS detector	
Command unit	0.001°(Decimal)	1 sec,0.001°,0.0001°(Decimal)
Indexing number Direct indexing	1～999999 even indexing	
Indexing number Arc-indexing	1～999 even indexing	1～9999 even indexing
Max. command angle	±999.999°	±999°59'59",±999.999°,±999.9999°
Command system	INC, ABS, Shortcut ABS, INC/ABS mixed system	
Input system	MDI	
Program control	Workpiece No. (W0000 to 9999)	
Program capacity	1,000 blocks (Total of main and sub programs)	2,000 blocks (Total of main and sub programs)
Positioning speed	Max. motor rotation speed: 3,000rpm	Max. motor rotation speed: 2,000rpm
Operation Mode	AUTO: Operation interlocked with a machining center SINGLE: Single operation of TPC CHECK: Program check and call PROG: Program edit MDI: Setup operation JOG: Manual feed, step feed HANDLE: Manual pulse operation	AUTO: Operation interlocked with a machining center SINGLE: Single operation of TPC CHECK: Program check and call PROG: Program edit MDI: Setup operation HANDLE: Manual pulse operation
Display	OELD 20 figures× 4lines	Liquid crystal display 20 figures×4lines
Direct indexing number command	Move angle is directly commanded	
Repetition	Command of number of move amount repetitions 999(TPC-Jr) 1～9999(TPC5)	
Direct indexing number command	Indexing number of six digits for 360 degrees	
Arc-indexing number command	Command of arbitrary 3-digit angle(TPC-Jr) or 4-digit angle(TPC5)	
Lead cutting command	Interlocked operation with one axis of the machining center in the open loop status	
Zero point return command	Allows return to the first, second or third-zero point	
Feedrate command	F0: positioning speed F1～9: cutting feedrate	
Feedrate setting	1. By radius and surface speed setting 2. By move amount per second	
Sub-program	Up to eight levels of nesting are possible	
Workpiece coordinate system setting	Allows a workpiece coordinate to be set at any point	
Dwell	Allows output of a positioning completion signal to be delayed	
Single directional positioning	Allows positioning in one direction	
Backlash compensation	In increments of 0.001°	Setting by command unit
Soft limit function	Sets a soft limit measured from the 1st zero position	
Automatic setting at power ON	1. Mode selection, AUTO/CHECK 2. Workpiece number setting 3.Block number setting	
Edit function	1. Insert 2. Delete 3. COPY	
Alarm	1. Program format errors 2. Program memory errors 3. Communication errors 4. Soft limit alarms 5. Overtravel 6. Servo motor alarms 7. Overheat in the cabinet(TPC5)	
Override function	×	5～200% 5% steps
JOG/HANDLE feeding	Manual pulse feed, Jog feed, step feed	Manual pulse feed, jog feed
Overtravel	The rotation range of the rotary table can be limited by limit switches. (Standard tilting axis)	
Manual 2nd zero setting	Enables the 2nd zero position to be set and changed at any point in the JOG(HANDLE)mode	
Input/output signal check	○	
Contrast	The concentration on the LCD screen can be adjusted	
Power Earth (less than 100 ohm earth resistance)	1φ200/220V±10% 50/60Hz Model / Power capacity / Fuse rating Jr K2 1.2KVA 10A Jr K3 1.9KVA 15A	3φ200/220V±10% 50/60Hz Model / Power capacity / Fuse rating TPC5-SR6 2.3KVA 10A TPC5-SR12 4.0KVA 15A TPC5-SR30 5.9KVA 20A
Environmental conditions	Ambient temperature: 0-40 degree Relative humidity: 20-80%(no condensation) Vibration: 0.3G or less, No corrosive gas	
Weight	**Jr K2 unit** Weight: 7.0kg 285mm(W)×255mm(D)×135mm(H) **Jr K3 unit** Weight: 7.6kg 285mm(W)×255mm(D)×135mm(H)	**Control unit** Weight: 15kg 235mm(W)×377mm(D)×380mm(H) **MDI unit** Weight: 0.5kg 111mm(W)×30mm(D)×199mm(H)
External output signal	From TPC to machining center Contact ratings: DC24V, 0.1A or less	

	TPC-Jr	TPC5
FIN1	Positioning completion signal during interlocking operation	
	●	●
FIN2	Output of G7 completion or workpiece number setting completion (selectable by parameters)	
	●(AUTO mode)	◇
FIN3	Output of G7 completion or workpiece number setting completion (selectable by parameters)	
	×	◇
FIN4	Output of zero position (selectable by parameters)	
	×	◇
Workpiece number setting completion	Output at workpiece number setting completion (selectable by parameters)	
	●	◇
In AUTO mode	Output in AUTO mode	
	×	◇
LEVEL	Output during positioning (selectable by parameters)	
	●(Rotary table zero position)	◇
ALARM	Output in when alarm detected	
	●	◇
External input signal	From machining center to TPC (External power DC24V is also available.)	
START	Positioning start signal during interlocking operation (M-signal)	
	●	●
STOP	Input to stop rotary table	
	●	●
INTERLOCK	Input to interlock rotary table	
	×	◇
Selection of outer program	Workpiece number can be set externally	
	●	◇
BF (Strobe signal)	Strobe signal for setting workpiece number externally	
	●	◇
M-signal	M signal data fixed input system	
	●(6 points)	◇(16 points)
MDI lock	Input for locking MDI key operation	
	×	◇
Zero point return	1st zero return command	
	●	◇
Manual pulse generator	Manual operation can be performed with a manual pulse generator	
	●(Movement magnification:×1,×10,×100)	
Full-closed feedback control	×	Enable full-closed control (highly precise) with the Inductosyn or rotary encoder
MP scale	Detecting unit 0.0001°(360poles) or 0.00005°(720poles)	
	×	◆
Encoder	Detecting unit 0.0001°or 0.00005°	
	×	◆
Serial channel	TPC program, feed rate and parameters can be stored in an external device	
	Format: ISO	Format: ISO
	◆(RS232C)	◆(RS232C)
Cable supplied (standard)	Between rotary table and TPC-Jr(1 pc) For Motor: 5m	Between rotary table and TPC5(2 pcs.) For motor power supply: 5m For motor detector: 5m
	–	Between TPC5 and MDI unit: 7m
	Power cable: 5m	Power cable: 5m
	Interlocking cable: 5m	Interlocking cable: 5m
Cable supplied (Option)	Cables of different length are available	
	RS232C cable: 5m	Interlocking cable: 5m
	Manual pulse generator (cable) 3m	B signal cable: 5m
	–	RS232C cable: 5m

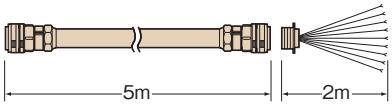
●:Standard
◇:Optional interlocking cables are supplied
◆:Optional units and parts are supplied

TPC Option

TPC5

Full-featured interlocking cable

☞ P.50



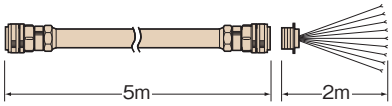
Required for the following functions:

- Stop or interlock input signal
- Positioning completion 2,3,4
- AUTO mode
- Positioning
- Alarm signal

● Full-featured interlocking cable
(Standard length: 5m)

TPC5

B signal cable



Required for the following functions:

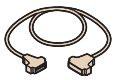
- External input of workpiece numbers
- External input of angles
- Fixed data input through M-signal

※ For using B signal cable,internal harness shall be added.

● Bsignal cable
(Standard length: 5m)

TPC-Jr
TPC5

RS232C cable



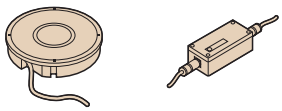
Input and output of program, parameter and feed data for TPC5 and TPC-Jr, and data printout are carried out through external equipment, which is to be prepared by the customer. Also, the cables can be arranged by the customer.

● RS232C cable
(Standard length: 5m)

TPC5

High resolution capability Rotary Encoder type

☞ P.61



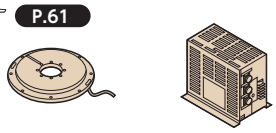
Fully-closed loop control is possible by the feed-back from the rotary encoder.

● Rotary encoders
● IBV unit
(by HEIDENHAIN)
● TPC5 RE

TPC5

High resolution capability MP Scale type

☞ P.61

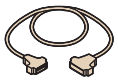


Fully-closed loop control is possible by the feed-back from the MP scale.

● MP scale
● A/D converter
(Mitsubishi Heavy Industries)
● TPC5 RE

TPC-Jr
TPC5

"Remote Mode" specification



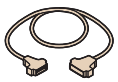
Available for measuring system construction. To be connected with a personal computer using serial channel.

● RS232C cable

TPC-Jr
TPC5

"Remote Mode + M" specification

☞ P.47



To unify the program to start the rotary table by M-signal, by feeding a command for the indexing angle from the RS232C port at the NC controller of the machining center.

Note: This function may not be available for some machining centers. For details, ask the M/C manufacturer.

●RS232C cable

TPC-Jr

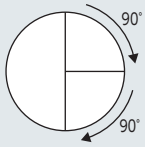
Manual pulse generator

Handle feed is available by turning the dial of a manual pulse generator. A dial rotation can feed 100 pulse and the magnification of step feeding angle can be selected among x1, x10 and x100.

●Manual pulse generator
(Cable length 3m)

TPC Machining Program Examples by TPC Controller

Direct angle command : G0

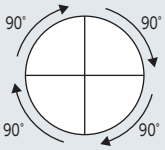



```
N 000  G 0  F 0  R 002  θ 90.000  CR
       Quick  Number of Repetition  Indexing angle/time
N 001  G 7  θ 000  CR
       End of program
```

Positioning at 90° twice

Return to N000 at the program end

Direct indexing number command(even indexing) : G1

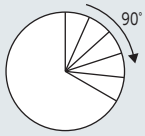



```
N 000  G 1  F 0  R 004  θ 000004d  CR
                        360° is divided into quarters
N 001  G 7  θ 000  CR
```

Dividing 360° by 4, four times

Return to N000 at the program end

Arc-indexing number command(even indexing by an arbitrarily-set angle) : G2

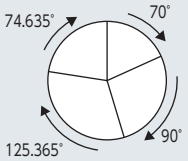



```
N 000  G 2  F 0  R 005  θ 120.000  CR
               Indexing number  Angle for indexing
N 001  G 7  θ 000  CR
```

Dividing 120° by 5, five times

Return to N000 at the program end

Uneven indexing




```
N 000  G 0  F 0  R 001  θ 70.000  CR
N 001  G 0  F 0  R 001  θ 90.000  CR
N 002  G 0  F 0  R 001  θ 125.365  CR
N 003  G 0  F 0  R 001  θ 74.635  CR
N 004  G 7  θ 000  CR
```

Positioning at 70° once

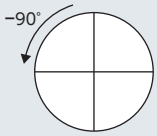
Positioning at 90° once

Positioning at 125.365° once

Positioning at 74.635° once

Return to N000 at the program end

(−) direction indexing

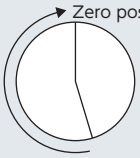



```
N 000  G 0  F 0  R 001  θ −90.000  CR
                         Reverse
N 001  G 7  θ 000  CR
```

Positioning at −90° once

Return to N000 at the program end

Zero point return command : G4



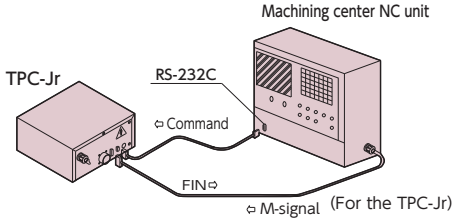

```
N 000  G 4  R 000
       Zero return  To 1st zero position
```

Return to 1st zero position

Remote mode + M specification(Parameter change) ※Corresponding to cable option

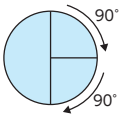
The rotary table is controlled by TPC with M-signal sent from a machining center through RS232C.

Note: This function may not be available for some machining centers. For details, ask the M/C manufacturer.



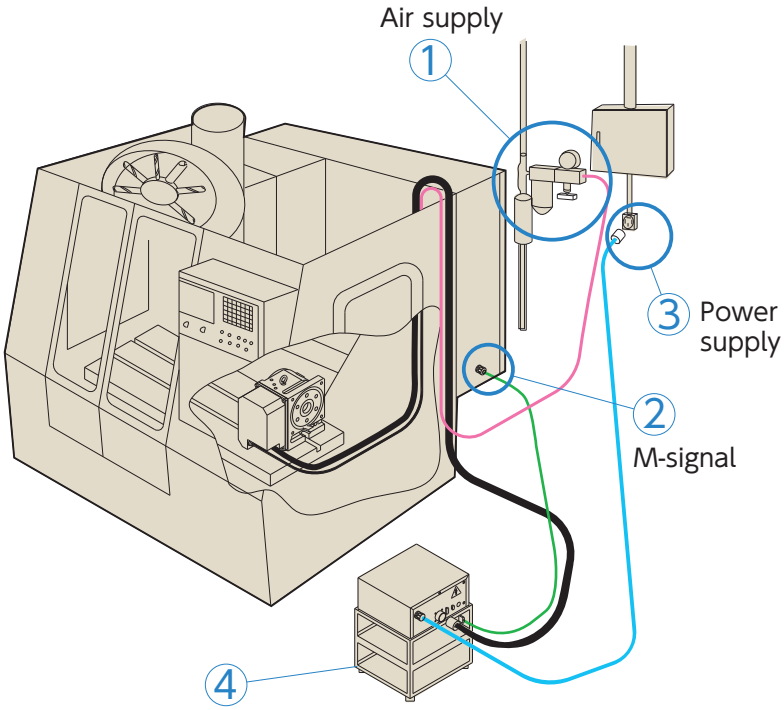
Machining center :

Program using Custom Macro Necessary equipment TPC-Jr : Software for remote mode RS232C/interlock cable, RS232C cross cable
NC unit for a machining tool : RSS232C connector and Custom Macro B (optional) (for FANUC).
For details, ask the machine manufacturer.



POPEN ;	DPRNT[/MOVA180.] ;	RS232C port opens
DPRNT[/MOVA90.] ;	M70 ;	Command of absolute positioning at 90 is transmitted to TPC
M70 ;	GO1Z100.F200 ;	Positioning starts
GO1Z100.F200 ;	PCLOS ;	Machining center in operation
		Command of absolute positioning at 180 is transmitted to TPC
		Positioning starts
		Machining center in operation
		RS232C port closes

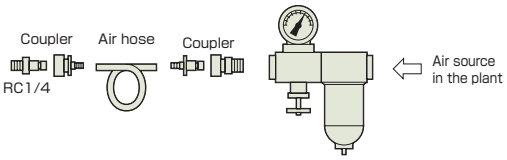
Installation of TPC controller



The figure shows an example for the TPC-Jr controller.

To be provided by customers

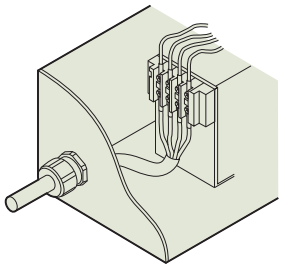
① Air supply



Air supply is necessary the pneumatic or air-hydraulic clamp system of the NC rotary tables with the TPC5 or TPC-Jr controller.

The following are to be provided by customers:
●Air filter and regulator (Air pressure:0.49 MPa)
●Air hose or air tube
●Joint coupler (RC 1/4 for the table)
Some models need a 6mm diameter tube for connection.

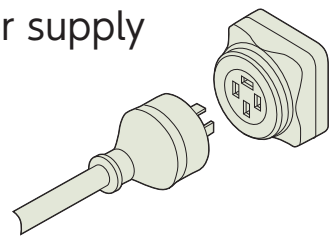
② M-signal



When the machining center controls the rotary table, it uses M-signals. Be sure to confirm with the machine manufacturer that M-signals or M-signal completion signals are transferred to the terminal block of the machine controller. If not, ask the manufacturer to do the required work.

☞ For the connection with an interlocking cable, refer to the examples shown on P.49

③ Power supply



A socket for the TPC controller is necessary. A 3P plug is equipped with the TPC controller, and is recommended. The outlet for the connection is required.
TPC side connector WF4420(Panasonic)
Outer power supply connector WF1420 or the others(Panasonic)
In case of the different type of connector, shall be arranged by the customer.

☞ For the power capacity of each controller, refer to P.45
Conduct grounding (less than 100 ohm earth resistance)

④ Stand

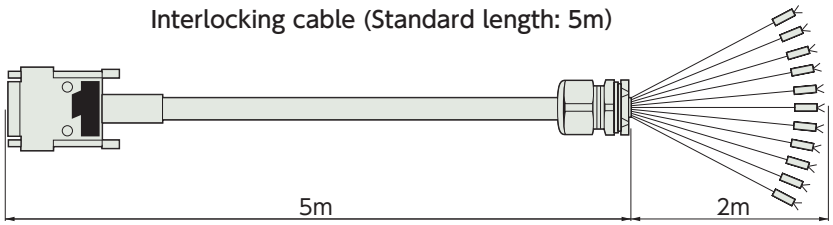
A stand for the TPC controller is to be provided by the customer.

☞ For the dimensions and weight of the controller, refer to P.41~43 P.45

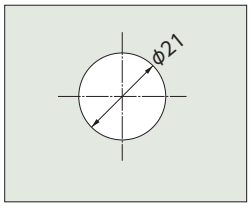
TPC Controllers to Interlock with Machining Tools

TPC-Jr

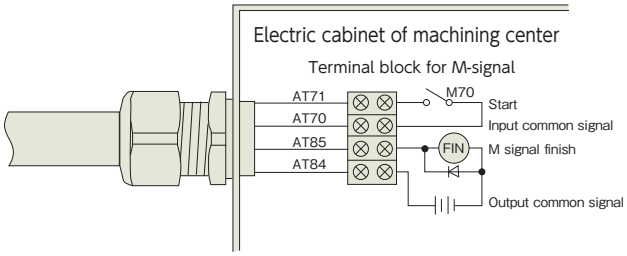
Interlocking cable (Standard length: 5m)



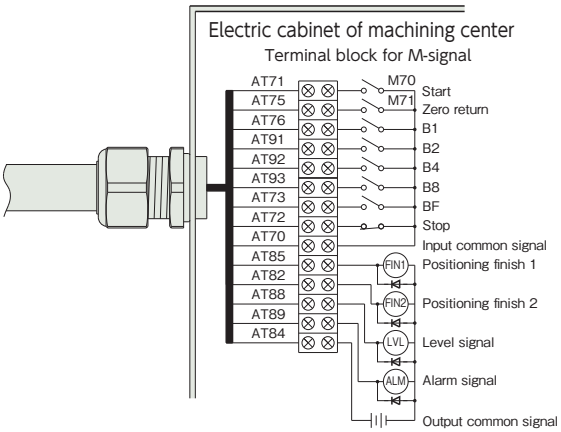
Connector dimension
(on machining center)



a) When a start signal and an indexing completion signal are used:



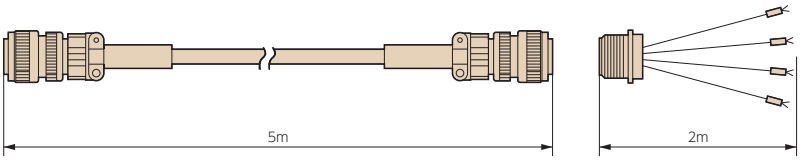
b) When all the signals through interlocking cables are used:



Note 1: When completion signals are received by a relay, the power supply should be 24VDC. Do not apply 100VAC or 200VAC.
Note 2: By changing the switch in the controller, a start signal is also available with the external power supply of 24VDC.
Note 3: Be sure to take countermeasures against electric noise by attaching surge protectors to relays for a machining center.

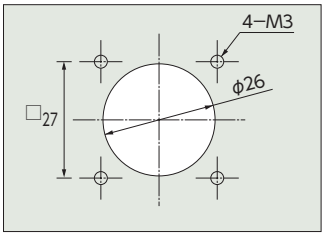
TPC5

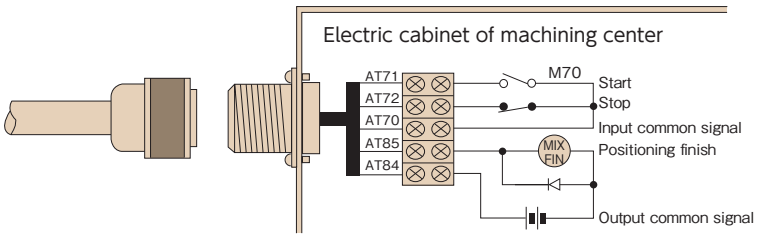
Interlocking cable(Standard length: 5m)



a) Standard interlock cable For interlocking only with M-signal and the completion signal

Connector dimension
(To machining center)



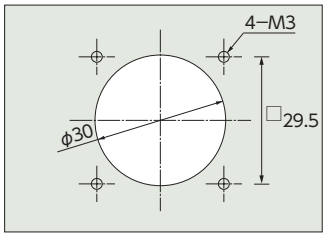


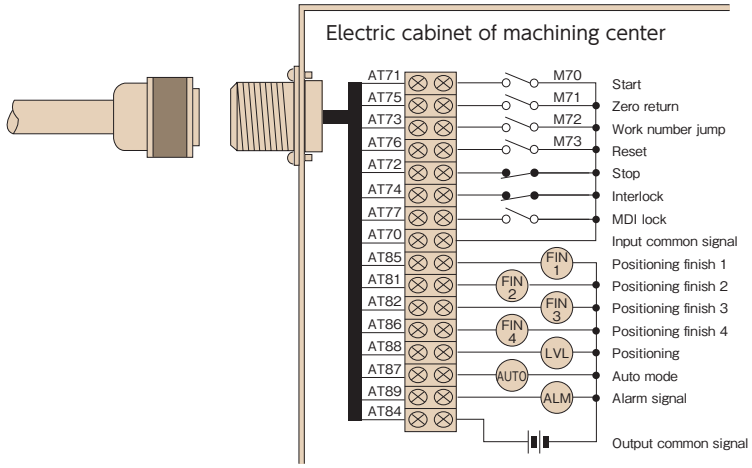
TPC Controllers to Interlock with Machining Tools

b) Fully-equipped interlocking cable (Option)

A variety of signals such as a stop or interlock input signal and a level or alarm output signal are available with this cable.
B signal cable is required when the setting functions for the workpiece number and angle data are used, or when the fixed indexing angle input system by an M-signal is used.
If you want to see some examples of the connections with this cable, please contact Tsudakoma.

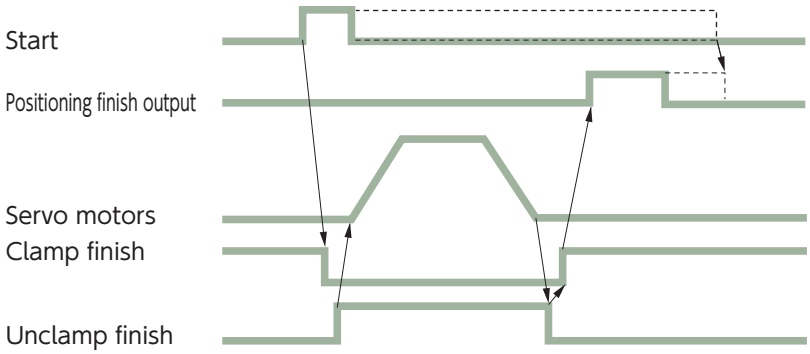
Connector dimension
(To machining center)





Note 1: When completion signals are received by a relay, the power supply should be 24VDC.Do not apply 100VAC or 200VAC.
Note 2: By changing the switch in the controller, a start signal is also available with the external power supply of 24VDC.
Note 3: Be sure to take countermeasures against electric noise by attaching surge protectors to relays for a machining center.

Time Chart



Note 1: A start input signal, in the form of either a pulse signal (of more than 10 msec) or level signal, can be accepted.
Note 2: During the interlocking operation with a machining center carried out through an M-signal, the M-signal should be completed by the positioning completion signal.

TPC Standard Cable Specifications

The tables below shows the maximum outer diameter and the curved radius of standard cables which are supplied with the rotary tables ready for the TPC5 or TPC-Jr controller.

Unit: mm

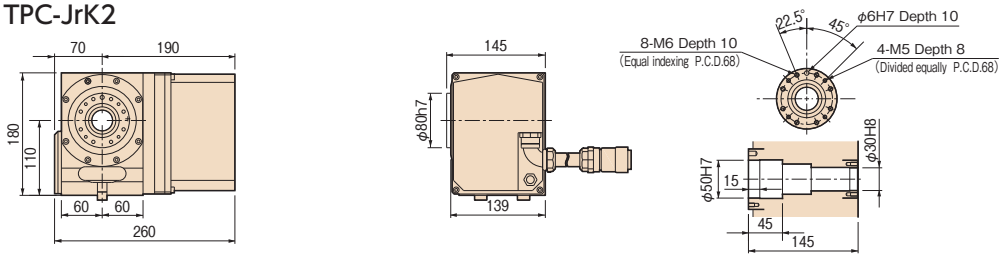
	Cable	Order Code	Max. outer dia	Min. curved radius
TPC5	Motor power cable	NS#20 (SANKEI MANUFACTURING CO.,LTD.)	20	90
	Motor signal cable			
TPC-Jr	Motor cable	NS#25 (SANKEI MANUFACTURING CO.,LTD.)	25	100

Model number, maximum outer diameter and curved radius may differ depending on specifications.

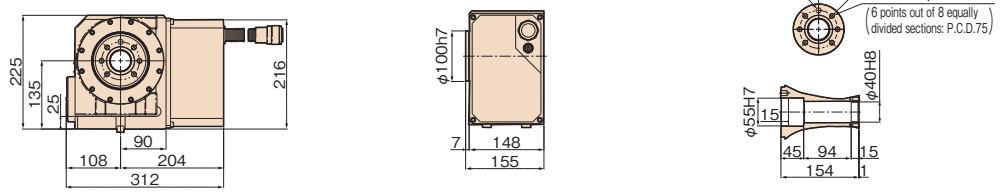
NC Rotary Tables／TPC-Jr

Unit: mm

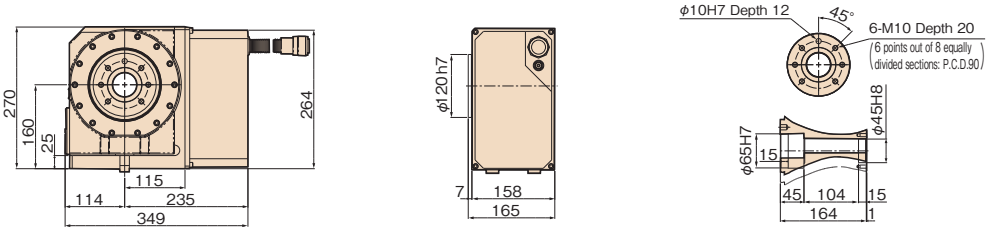
RN-100R ／ TPC-JrK2



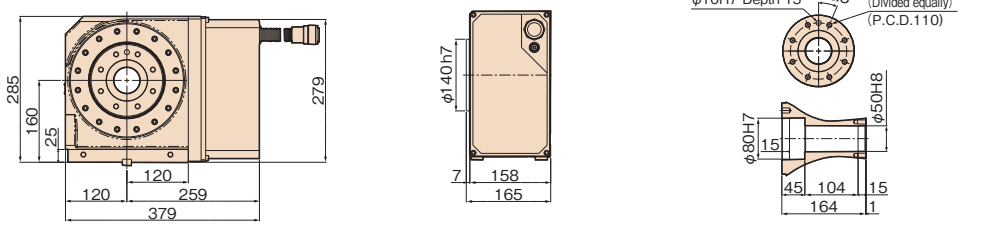
RWE/RWA-160R ／ TPC-JrK2



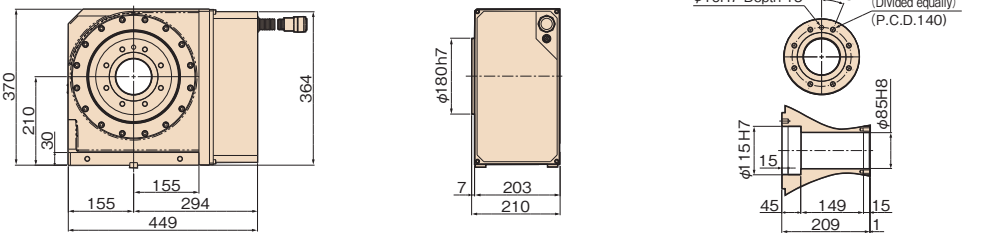
RWE/RWA-200R ／ TPC-JrK3



RWA-250R ／ TPC-JrK3



RWA-320R ／ TPC-JrK3



NC Table Specifications (with TPC－Jr)

	RN-100	RWE/RWA-160	RWE/RWA-200	RWA-250	RWA-320	RN-100-2	RN-100-3	RN-100-4
TPC-Jr	K2	K2	K3	K3	K3	K3	K3	K3
Reduction ratio	1/36	1/72	1/72	1/120	1/180	1/36	1/60	1/60
Max. rpm min^{-1}	66.6/ Motor 2,400	41.6/ Motor 3,000	41.6/ Motor 3,000	25/ Motor 3,000	16.6/ Motor 3,000	55.5/ Motor 2,000	50/ Motor 3,000	50/ Motor 3,000

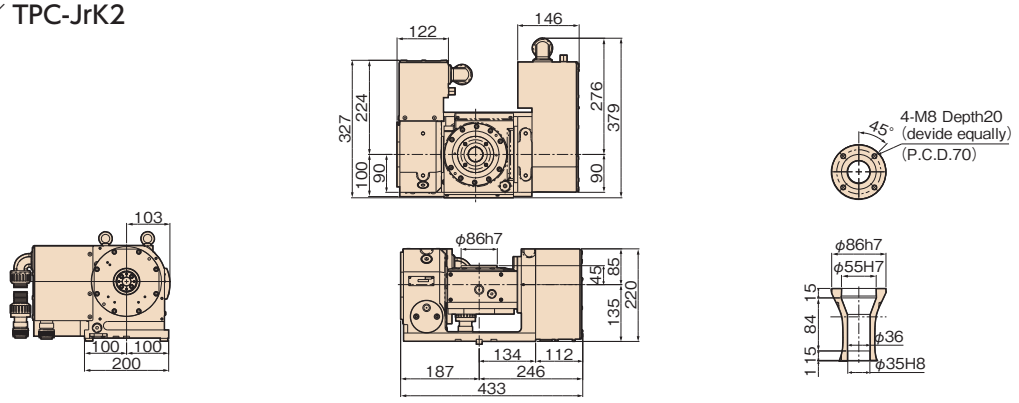
Note 1: Other specifications P.14 P.28
Note 2: Contact us before an eccentric load is applied to the table due to continuous cutting feed or jigs.

NC Rotary Tables／TPC-Jr Dimensions and Specifications

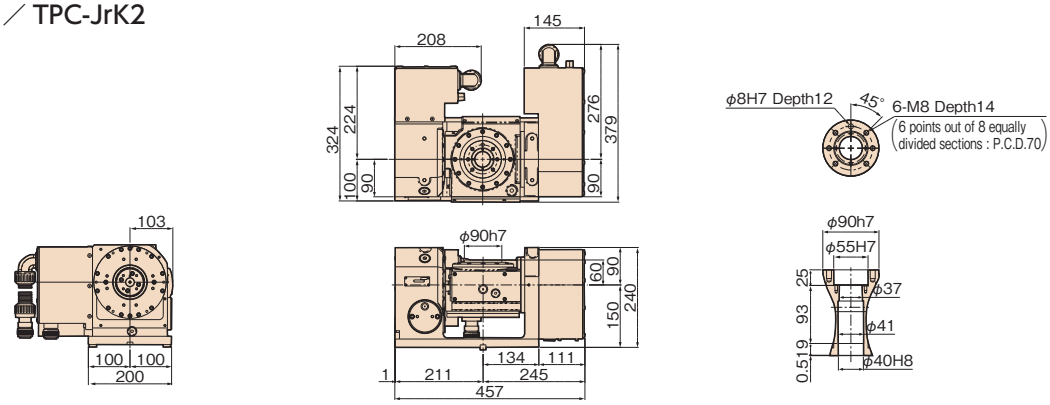
NC Tilting Rotary Tables／TPC-Jr

Unit: mm

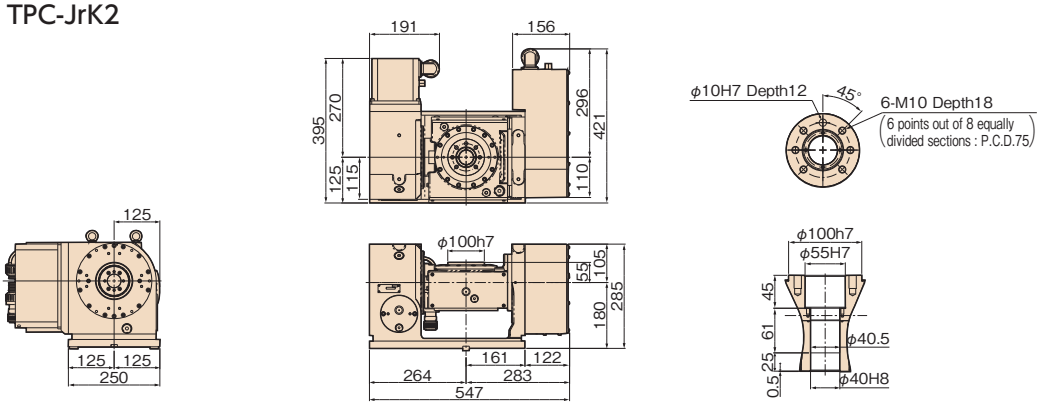
TN-101 ／ TPC-JrK2



TWA-130 ／ TPC-JrK2



TWA-160 ／ TPC-JrK2



NC Tilting Tables Specifications (with TPC－Jr)

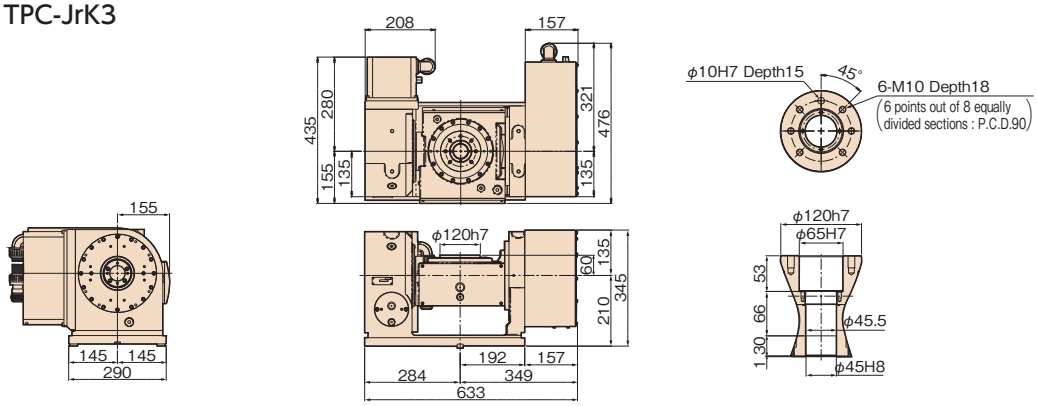
	TN-101		TWA-130		TWA-160		TWA-200	
Control axis	Revolution	Tilt	Revolution	Tilt	Revolution	Tilt	Revolution	Tilt
TPC-Jr	K2		K2		K2		K3	
Reduction ratio	1/60	1/120	1/60	1/120	1/72	1/120	1/45	1/90
Max. rpm min^{-1}	41.6/Motor 2,500	16.6/Motor 2,000	41.6/Motor 2,500	16.6/Motor 2,000	41.6/Motor 3,000	16.6/Motor 2,000	44.4/Motor 2,000	22.2/Motor 2,000

Note 1: Other specifications P.30
Note 2: Contact us before an eccentric load is applied to the table due to continuous cutting feed or jigs.

NC Tilting Rotary Tables／TPC-Jr

Unit: mm

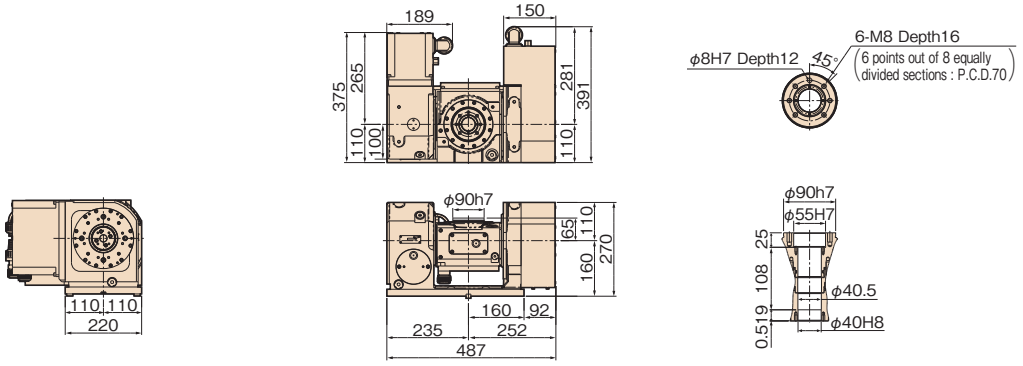
TWA-200 ／ TPC-JrK3



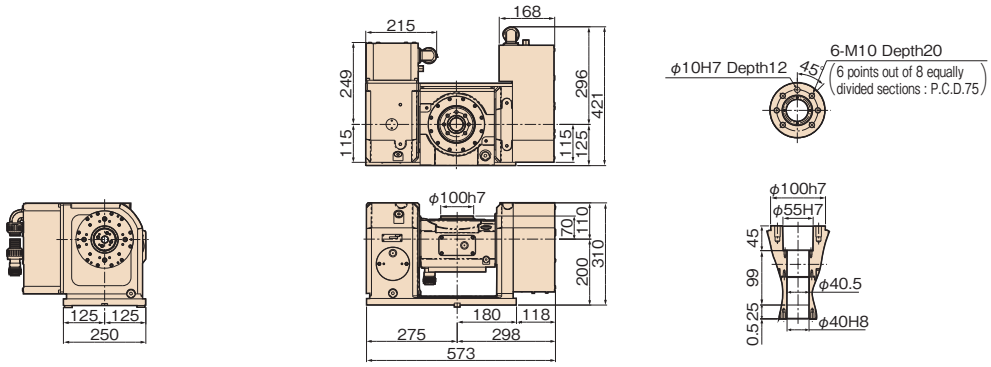
BallDrive NC Tilting Rotary Tables／TPC-Jr

Unit: mm

TBS-130 ／ TPC-JrK2



TBS-160 ／ Rotary axis:TPC-JrK2　Tilt axis:TPC-JrK3



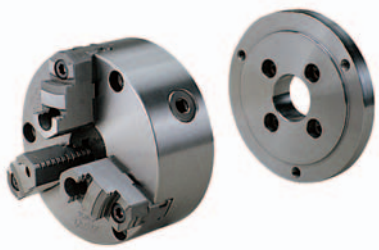
NC Tilting Tables Specifications (with TPC－Jr)

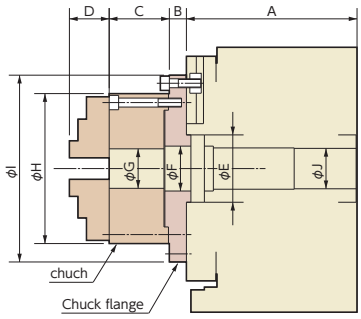
	TBS-130		TBS-160	
Control axis	Revolution	Tilt	Revolution	Tilt
TPC-Jr	K2		K2	K3
Reduction ratio	1/48	1/60	1/60	1/60
Max. rpm min^{-1}	62.5/Motor 3,000	50/Motor 3,000	50/Motor 3,000	50/Motor 3,000

Note 1: Other specifications P.12
Note 2: Contact us before an eccentric load is applied to the table due to continuous cutting feed or jigs.

Chuck

Scroll Chuck





Chuck size (inch)	Chuck type	Outer chucking range(mm)	Inner chucking range(mm)
4	TC110F	2 ~ 106	36 ~ 102
5	TC130F	3 ~ 130	42 ~ 123
6	TC165F	3 ~ 156	52 ~ 148
7	TC190F	3 ~ 184	56 ~ 174
9	TC230F	4 ~ 214	64 ~ 202
10	TC273F	10 ~ 246	72 ~ 230
12	TC310F	10 ~ 275	82 ~ 265
15	TC385F	15 ~ 345	100 ~ 327
18	TC460F	15 ~ 410	152 ~ 436

Note 1: The values in the table above are the dimensions with hardened jaws. (Soft jaws are optional.)
Note 2: Some workpieces, even in the chucking range, may not be chucked due to jaw configuration.

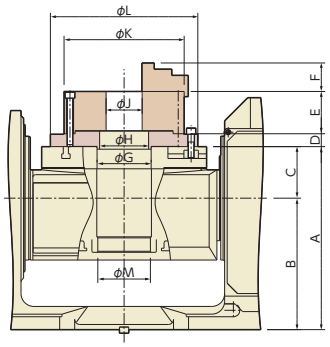
Unit: mm

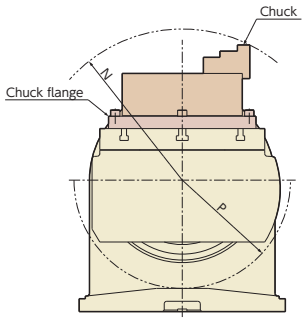
	Chuck size(inch)	A	B	C	D	E	F	G	H	I	J
RBS-160	4	170	18	58	31.3	55	45	24	112	112	40
	5			60	37.3			32	132	132	
	6			66	44.3			44	167	167	
	7		18	75	46.3			54	192	192	
RBS-250	5	180	18	60	37.3	80	65	32	132	132	50
	6		18	66	44.3			44	167	167	
	7		18	75	46.3			54	192	192	
	9		25	82	55.3			70	233	233	
RBS-320	6	225	18	66	44.3	115	100	44	167	167	85
	7		18	75	46.3			54	192	192	
	9		25	82	55.3			70	233	233	
	10		25	86	53.3			100	274	274	
	12		25	92	59.3			110	310	310	
RN-100	4	145	10	58	31.3	50	50	24	112	112	30
	5			60	37.3			32	132	132	
RWE/RWA-160	4	155	18	58	31.3	55	45	24	112	112	40
	5			60	37.3			32	132	132	
	6			66	44.3			44	167	167	
	7			75	46.3			54	192	192	
RWE/RWA-200	5	165	18	60	37.3	65	55	32	132	132	45
	6		18	66	44.3			44	167	167	
	7		18	75	46.3			54	192	192	
	9		25	82	55.3			70	233	233	
RWA-250	5	165	18	60	37.3	80	65	32	132	132	50
	6		18	66	44.3			44	167	167	
	7		18	75	46.3			54	192	192	
	9		25	82	55.3			70	233	233	
RWA-320	6	210	18	66	44.3	115	100	44	167	167	85
	7		18	75	46.3			54	192	192	
	9		25	82	55.3			70	233	233	
	10		25	86	53.3			100	274	274	
	12		25	92	59.3			110	310	310	
RNCM-251	5	165	20	60	37.3	40	30	32	132	168	32
	6		20	66	44.3			44	167	167	
	7		20	75	46.3			54	192	198	
	9		25	82	55.3			70	233	233	
RNCM-301	6	220	20	66	44.3	40	30	44	167	208	40
	7		20	75	46.3			54	192	238	
	9		25	82	55.3			70	233	233	
	10		25	86	53.3			100	274	274	
	12		25	92	59.3			110	310	318	
RNCM-401	7	250	20	75	46.3	40	30	54	192	238	40
	9		25	82	55.3			70	233	233	
	10		25	86	53.3			100	274	274	
	12		25	92	59.3			110	310	318	
RNCM-501	9	300	25	82	55.3	50	40	70	233	288	50
	12			92	59.3			110	310	378	

Unit: mm

	Chuck size(inch)	A	B	C	D	E	F	G	H	I	J
RWB-250	6	180	18	66	44.3	105	65	44	167	208	80
	7		18	75	46.3		65	54	192	236	
	9		25	82	55.3		76	70	233	233	
RWB-320	6	240	18	66	44.3	150	101	44	167	216	120
	7		18	75	46.3			54	192	246	
	9		25	82	55.3			70	233	286	
	10		25	86	53.3			100	274	318	
	12		25	92	59.3			110	310	318	
RWB-400	7	275	20	75	46.3	200	151	54	192	286	160
	9		25	82	55.3			70	233	286	
	10		25	86	53.3			100	274	336	
	12		25	92	59.3			110	310	370	
	15		30	100	70.3			150	385	385	
RWB-500	9	325	25	82	55.3	220	170	70	233	356	182
	12		25	92	59.3		210	110	310	386	
	15		30	100	70.3		210	150	385	460	
	18		35	114	79.8		210	180	460	500	

Note 1: The above dimensions refer to power chucks by KOBAYASHI IRON WORKS CO., LTD.
Note 2: The flange type and the method of attaching the flange fixing bolt differ depending on the rotary table and the chuck size.





Unit: mm

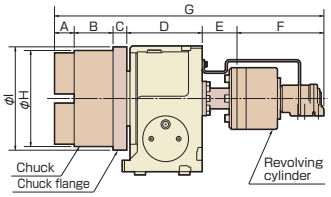
Order Code	Chuck size (inch)	A	B	C	D	E	F	G	H	J	K	L	M	N	P
TBS-130	5	225	160	65	18	60	37.3	55	45	32	132	132	40	R198	R127
TBS-160	4	270	200	70	18	58	31.3	55	45	24	112	112	40	R191	R145
	5					60	37.3			32	132	132		R204	
	6					66	44.3			44	167	167		R223	
	7					75	46.3			54	192	192		R241	
TN-101	4	180	135	45	15	58	31.3	55	45	24	112	112	35	R164	R106
	5					60	37.3			32	132	132		R177	
TWA-130	5	210	150	60	18	60	37.3	55	45	32	132	132	35	R193	R114
TWA-160	4	235	180	55	18	58	31.3	55	45	24	112	112	40	R176	R135
	5					60	37.3			32	132	132		R189	
	6					66	44.3			44	167	167		R208	
	7					75	46.3			54	192	192		R226	
TWA-200	5	270	210	60	18	60	37.3	65	55	32	132	132	45	R200	R148
	6					66	44.3			44	167	167		R219	
	7					75	46.3			54	192	192		R236	
	9				25	82	55.3			70	233	233		R258	
TN-320	6	355	255	100	18	66	44.3	105	95	44	167	256	102	R254	R210
	7					75	46.3			54	192	256		R271	
	9				25	82	55.3			70	233	286		R294	
	10					86	53.3			100	274	318		R303	
	12					92	59.3			110	310	318		R323	
TN-450	9	425	425	0	25	82	55.3	170	150	70	233	316	136	R213	R375
	10					86	53.3			100	274	336		R222	
	12					92	59.3			110	310	370		R244	
	15				30	100	70.3			150	385	445		R288	

Note 1: The above dimensions refer to power chucks by KOBAYASHI IRON WORKS CO., LTD.
Note 2: The flange type and the method of attaching the flange fixing bolt differ depending on the rotary table and the chuck size.
☞ Example P.31

Chuck

Power chuck

Chuck size (inch)	Chuck type	Outer chucking range (mm)	Hydraulic cylinder type	Pneumatic cylinder type
4	H01MA 4	6 ~ 110	HH4C 63	H05CH100
5	H01MA 5	15 ~ 135	HH4C 63	H05CH150
6	H01MA 6	20 ~ 165	HH4C 80	H05CH200
8	H01MA 8	18 ~ 210	HH4C100	H05CH250
10	H01MA10	24 ~ 254	HH4C125	H05CH300



Example of pneumatic power chuck use

Hydraulic cylinder dimensions

Unit: mm

	Chuck size (inch)	A	B	C	D	E	F	G	H	I
RNCM-251	4	27	52	20	165	61	175	500	110	160
	5	27	52	20				500	135	185
	6	43	72	24				540	165	215
RNCM-301	6	43	72	24	220	36	175	570	165	225
	8		85	35		36	190	609	210	270
	10		95	35		39	197	629	254	315
RNCM-401	8	43	85	35	250	36	190	639	210	270
	10		95			39	197	659	254	315

☞ Example P.19

Pneumatic cylinder dimensions

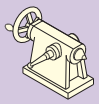
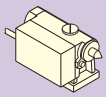
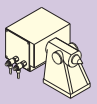
Unit: mm

	Chuck size (inch)	A	B	C	D	E	F	G	H	I
RBS-160	4	27	52	18	170	50	182	484	110	–
	5	27	52			64	190	506	135	
	6	43	72			64	200	552	165	
RBS-250	4	27	52	20	180	67	182	513	110	–
	5	27	52			64	190	518	135	
	6	43	72			64	200	564	165	
RBS-320	6	43	72	24	225	76	200	625	165	–
	8		85	35			243	695	210	
	10		95	35			258	717	254	
RWE/RWA-160	4	27	52	18	155	50	182	484	110	–
	5	27	52			64	190	506	135	
	6	43	72			64	200	552	165	
RWE/RWA-200 RWA-250	4	27	52	20	165	67	182	513	110	–
	5	27	52			64	190	518	135	
	6	43	72			64	200	564	165	
RWA-320	6	43	72	24	210	76	200	625	165	–
	8		85	35			243	692	210	
	10		95	35			258	717	254	
RNCM-251	4	27	52	20	165	67	182	513	110	160
	5	27	52	20		64	190	518	135	185
	6	43	72	24		64	200	568	165	215
RNCM-301	6	43	72	24	220	34	200	593	165	225
	8		85	35		39	243	665	210	270
	10		95	35		44	258	695	254	315
RNCM-401	8	43	85	35	250	39	243	695	210	270
	10		95			44	258	725	254	315

Note: The above dimensions refer to power chucks by HOWA MACHINERY, LTD. A front-mounting pneumatic chuck is also available.

Tailstock

Compatible Rotary Tables

NC Rotary Table \ Tailstock type	Manual	Hydraulic	Pneumatic
			
RN-100	TL-110M	—	—
RWE/RWA-160	TL-135M	TLH-135	TLP-135
RBS-160 RWE/RWA-200, RWA-250 RNCM-251 RWB-250	TL-160M	TLH-160	TLP-160
RBS-250 RWA-320 RNCM-301 RWB-320	TL-210M	TLH-210	—
RBS-320 RNCM-401 RWB-400	TL-255M	TLH-255	—
RNCM-501	TL-310M	—	—
RNCM, RNCK-631	TL-400M	—	—
RCV-800	TL-530M	—	—
THNC-251	TL-210M	TLH-210	—
THNC-301	TL-235M	—	—

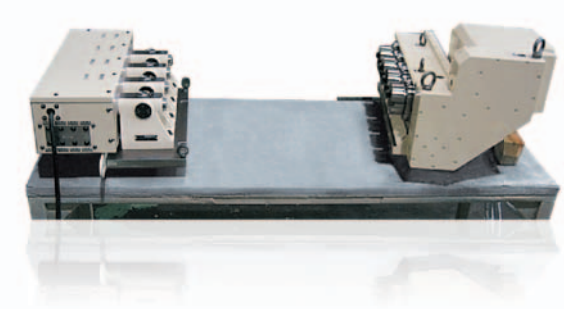
Order Code

T L □ - 1 6 0 M

Center height

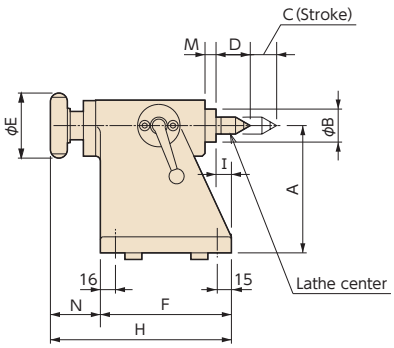
Alphabet	Type
No	Manual
H	Hydraulic
P	Pneumatic

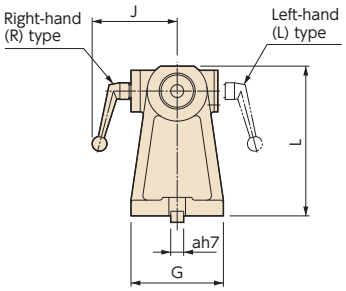
Example



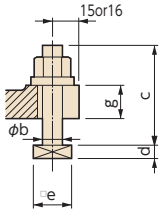
Manual Tailstock

TL-110M,135M

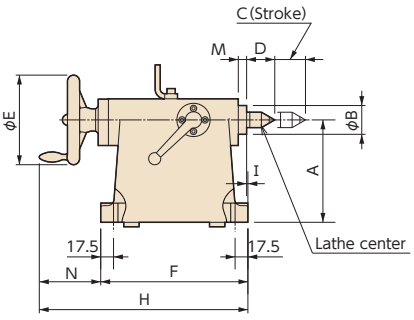


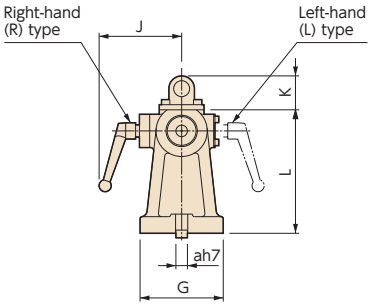


Clamping bolt

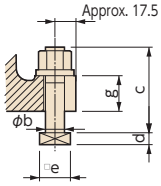


TL-□□□M





Clamping bolt



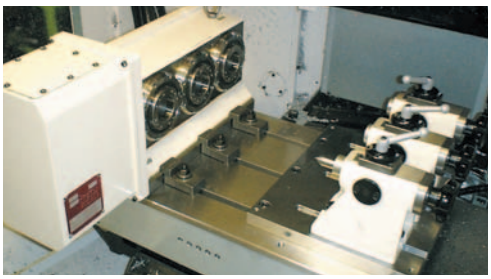
Tailstock

Dimensions

Unit: mm

Order Code	Morse taper	Center height A	Center dia B	Stroke C	Lathe center D	Handle dia E	Base dimensions F×G	H	I	J	K	L	M	N	a	b	c	d	e	g	Weight kg
TL-110M	MT2	110	35	28	36	69	139×100	192	16	92	–	137	12	53	14	12	55	8	23	20	8
TL-135M	MT2	135	35	28	36	69	139×100	192	16	92	–	162	12	53	14	12	55	8	23	20	9
TL-160M	MT3	160	45	48	44	140	230×130	326	2	129	53	193	13	96	18	16	75	11	28	30	22
TL-190M	MT3	190	45	48	44	140	230×140	326	2	129	53	223	13	96	18	16	75	11	28	30	24
TL-210M	MT3	210	45	48	44	140	230×146	326	2	129	53	243	13	96	18	16	75	11	28	30	26
TL-235M	MT4	235	50	53	52.5	160	270×160	383	12	131	53	270	8	113	18	16	80	11	28	35	30
TL-255M	MT4	255	50	53	52.5	160	270×170	383	12	131	53	290	8	113	18	16	80	11	28	35	38
TL-310M	MT4	310	60	53	52.5	180	315×220	417	15	154	65	350	10	102	18	16	85	11	28	40	63
TL-400M	MT4	400	60	53	52.5	180	315×240	417	15	154	65	440	10	102	18	16	85	11	28	40	76
TL-530M	MT4	530	80	68	52.5	225	410×290	532	30	164	65	590	5	122	22	20	95	13	32	40	138

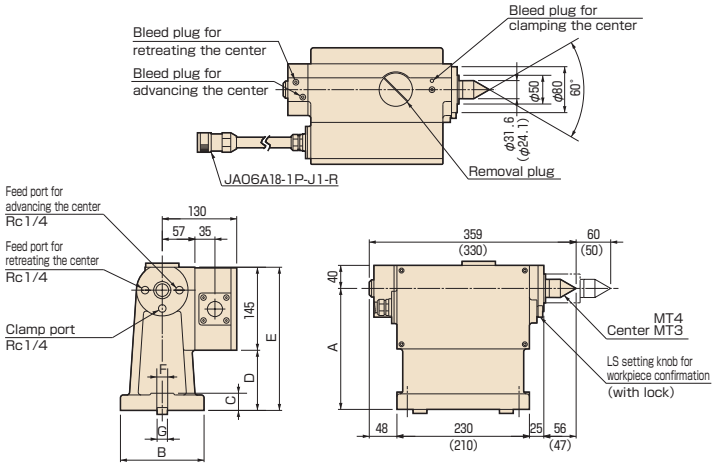
Example



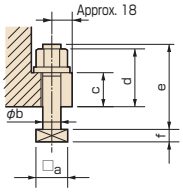
Hydraulic Tailstock

TLH-□□□

TLH-160



Clamping bolt



Note 1: Dimensions in parentheses are for the TLH-135.
Note 2: Specify the cable length when placing an order.

Dimensions and specifications

Unit: mm

Order Code	A	B	C	D	E	F	Carbide center	Hydraulic MPa[kgf/cm²]	Center thrust force N[kgf]	Center clamp torque [kgf]	Weight kg
TLH-135	135	110	25	30	175	19	MT3	1.5~6.8 [15~70]	1,670[170]	2,450 [250]	28
TLH-160	160	130	30	55	200	19	MT4		2,352[240]		33
TLH-210	210	146	30	105	250	19	MT4		2,352[240]		36
TLH-255	255	170	35	150	295	19	MT4		2,352[240]		40

*The table above shows the center thrust force and clamp torque when the hydraulic pressure is 3.5MPa (35kgf/cm²).

Clamping bolt dimensions

Unit: mm

Order Code	G	a	b	d	e	f
TLH-135	14	23	12	42	60	8
	16	26	16	46	70	10
	18	28	16	46	70	11
TLH-160 TLH-210	14	23	12	47	65	8
	16	26	16	51	75	10
	18	28	16	51	75	11
TLH-255	16	26	16	56	75	10
	18	28	16	56	80	11
	20	32	18	60	90	11

Support Spindle

Compatible Rotary Tables

Support spindle type / NC Rotary Table	No clamp	Pneumatic clamp	Hydraulic clamp	Strong hydraulic
RWE/RWA-160	TS-135	TS-135P	—	—
RBS-160 RWE/RWA-200 RWA-250 RNCM-251 RWB-250	TS-160	TS-160P	TSH-160	SSB-160
RBS-250 RWA-320 RNCM-301 RWB-320	TS-210	TS-210P	TSH-210	SSB-210
RWB-400	—	—	—	SSB-255
RWB-500	—	—	—	SSB-310

Order Code

T S H - 1 6 0 P

Center height

Alphabet	Clamp
No	No clamp, Pneumatic pressure
H	Hydraulic

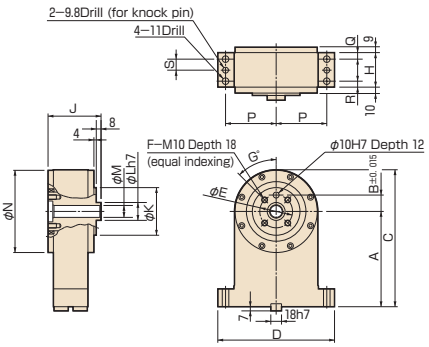
Alphabet	Clamp
No	No
P	Pneumatic

S S B - 1 6 0

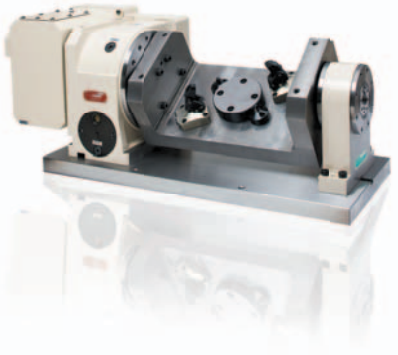
Center height

TS-□□□ (No clamp)

TS-135



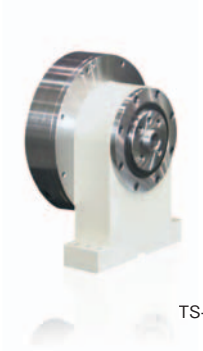
Example



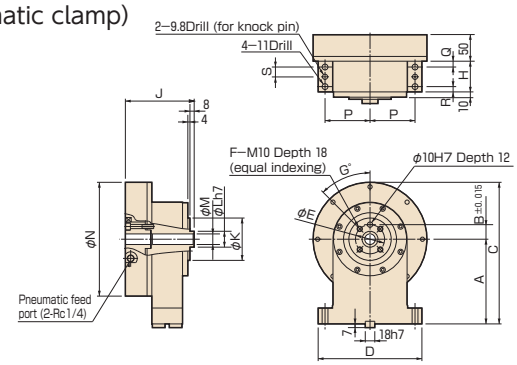
Unit: mm

Order Code	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	Weight kg
TS-135	135	27.5	205	196	55	4	45	58	89	80	30	20	138	85	11	10	18.5	13
TS-160	160	27.5	230	196	55	4	45	58	89	80	30	20	138	85	11	10	18.5	15
TS-210	210	37.5	295	226	75	6	30	67	101	100	50	40	168	100	11	11	22.5	29

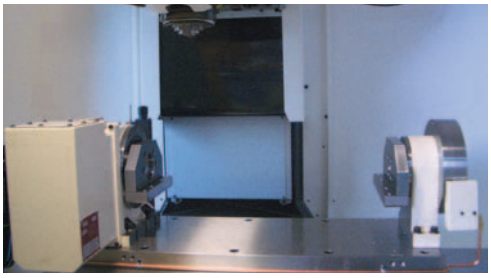
TS-□□□P (Pneumatic clamp)



TS-160P



Example



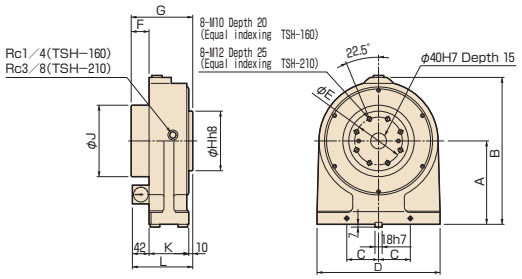
Unit: mm

Order Code	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	Clamping Torque (N·m) (0.49MPa)	Weight kg
TS-135P	135	27.5	218.5	196	55	4	45	58	130	80	30	20	167	85	11	10	18.5	156.9	20
TS-160P	160	27.5	267.5	196	55	4	45	58	130	80	30	20	215	85	11	10	18.5	383.7	27
TS-210P	210	37.5	337.5	226	75	6	30	67	141	100	50	40	255	100	11	11	22.5	779.1	45

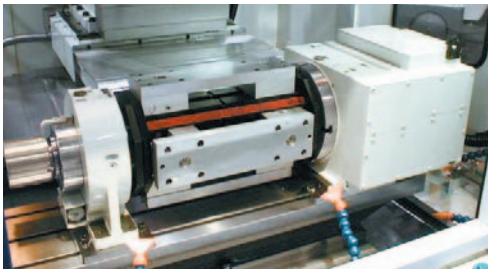
Support Spindle

TSH-□□□ (Hydraulic clamp)

TSH-160



Example

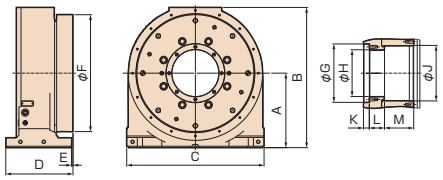


Unit: mm

Order Code	A	B	C	D	E	F	G	H	J	K	L	Clamping Torque (N·m) (3.5MPa)	Weight kg
TSH-160	160	290	70	260	110	42	142	130	150	90	142	490	45
TSH-210	210	370	77	310	120	45	155	150	180	100	152	833	75

SSB-□□□

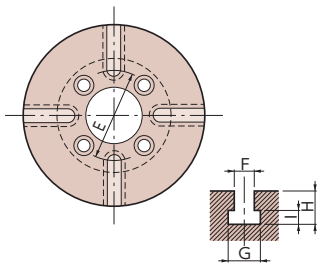
SSB-255

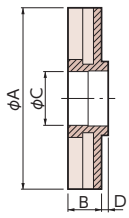


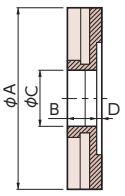
Unit: mm

Order Code	A	B	C	D	E	F	G	H	J	K	L	M	Clamping Torque (N·m)		Weight kg
													3.5MPa	4.9MPa	
SSB-160	160	303	290	175	5	250	105H7	80H7	95H8	15	42	66	1,300	2,000	60
SSB-210	210	396	380	210	5	320	150H7	120H7	145H8	15	50	90	3,100	4,700	120
SSB-255	255	480	470	230	5	400	200H7	160H7	190H8	20	52	100	5,500	8,000	185
SSB-310	310	560	470	230	5	500	200H7	160H7	190H8	20	52	100	5,500	8,000	230

Face Plate







For RN-100
TBS-160
TWA-160, TWA-200

Unit: mm

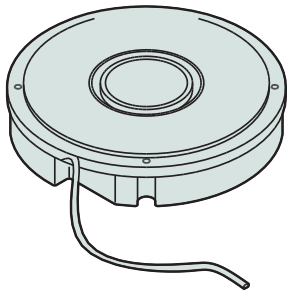
	A Face plate diamete	B	C	D	E	F	G	H	I
RN-100	135	25	φ50H7	5	φ68	10H8	16^{+2}_{0}	17	7^{+1}_{0}
RBS-160 RWE/RWA-160	160	30	φ50H7	3	φ75	12H8	19^{+2}_{0}	19	8^{+1}_{0}
	200								
RWE/RWA-200	200	30	φ60H7	3	φ90	12H8	19^{+2}_{0}	19	8^{+1}_{0}
	250								
RBS-250 RWA-250	250	30	φ75H7	5	φ110	12H8	19^{+2}_{0}	19	8^{+1}_{0}
RBS-320 RWA-320	320	40	φ110H7	5	φ140	14H8	23^{+2}_{0}	23	9^{+1}_{0}
TBS-130	135	25	φ40H7	5	φ70	12H8	19^{+2}_{0}	19	8^{+1}_{0}
TBS-160	160	25	φ50H7	5	φ75	12H8	19^{+2}_{0}	19	8^{+1}_{0}
	200								
TBS-250	250	30	φ75H7	5	φ110	12H8	19^{+2}_{0}	19	8^{+1}_{0}
TN-101	135	25	φ40H7	5	φ70	12H8	19^{+2}_{0}	19	8^{+1}_{0}
TWA-130	135	25	φ40H7	5	φ70	12H8	19^{+2}_{0}	19	8^{+1}_{0}
TWA-160	160	25	φ50H7	5	φ75	12H8	19^{+2}_{0}	19	8^{+1}_{0}
	200								
TWA-200	200	30	φ60H7	5	φ90	12H8	19^{+2}_{0}	19	8^{+1}_{0}
	250								

Example

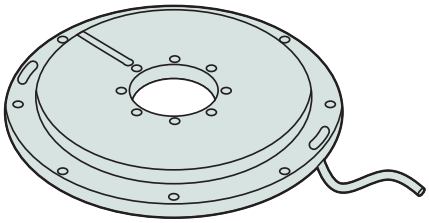
High-precision Specification by Rotary Encoders or MP Scales

Indexing accuracy can be upgraded by attaching a rotary encoder or MP scale to the spindle of the rotary table. The sum of the cumulative indexing accuracy of the rotary encoder or the MP scale and electrically divided errors of the pre-amplifier or the waveform shaping unit is referred to as the indexing accuracy of the rotary tables with scales. The indexing accuracy is guaranteed by TSUDAKOMA.

Rotary encoder



MP scale

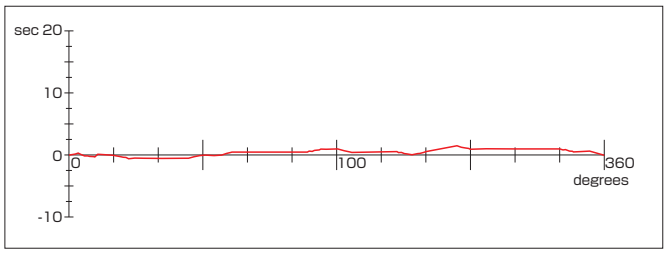


Model Description

"RNCM-□□□R,□□"

- **RE** (Rotary encoders)
- **RI** (MP scales)

Example of measurement indexing accuracy with scale



Indexing accuracy with scale

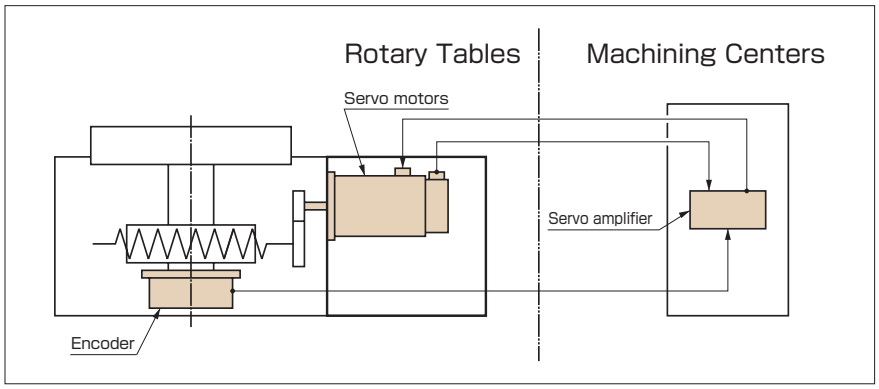
		Rotary encoders		MP scales	
		Order Code	Accuracy with scale	Order Code	Accuracy with scale
RBS-160 RWE/RWA-160 RWE/RWA-200	Rotary axis	RCN23*0 or RU77-4096A	15sec	MPI 536A	15sec
RBS-250, 320 RWA-250 RWA-320	Rotary axis	RCN83*0, RCN85*0 or RS97-1024	10sec/RCN83*0, RS97-1024 6sec/RCN85*0	MPI 736B	10sec
RNCM-251, 301 RWB-250, RWB-250K	Rotary axis	RCN83*0, RCN85*0 or RS97-1024	10sec/RCN83*0, RS97-1024 6sec/RCN85*0	MPI 736B	10sec
RWB-320, RWB-320K	Rotary axis			MPI 1072B	8sec
RWB-400, RWB-400K RWB-500, RWB-500K RWB-630 RNCM-401～631 RNCK-631 RNCV-1501	Rotary axis			MPI 1272B	8sec
TWA-130	Rotary axis* Tilt axis	RCN23*0 or RU77-4096A	15sec	MPI 536A	15sec
TWA-160	Rotary axis Tilt axis				
TWA-200	Rotary axis Tilt axis				
TBS-130	Rotary axis* Tilt axis				
TBS-160	Rotary axis Tilt axis				
TBS-250	Rotary axis			MPI 736B	10sec
	Tilt axis	RCN23*0 RCN83*0, RCN85*0 or RU77-4096A RS97-1024	15sec/RCN23*0, RU77-4096A 10sec/RCN83*0, RS97-1024 6sec/RCN85*0		
TN-320	Rotary axis Tilt axis	RCN83*0, RCN85*0 or RS97-1024	10sec/RCN83*0, RS97-1024 6sec/RCN85*0	MPI 736B MPI 1072B	10sec 10sec
TN-450	Rotary axis Tilt axis			MPI 1272B	8sec
TTNC-631	Rotary axis Tilt axis	RCN83*0, RCN85*0 or RS97-1024	10sec/RCN83*0, RS97-1024 6sec/RCN85*0	MPI 736B MPI 736B	10sec 15sec
TTNC-1001	Rotary axis Tilt axis			MPI 1272B MPI 1272B	8sec 15sec

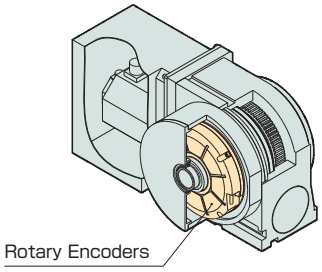
☞For other accuracy standard. P.71～

Accuracy differs depending on the specifications of the tables. Ask us for further information.
Note: With rotary encoder or MP scale, TWA/TN series change their center height.
*Rotary encoders are unavailable.

High-precision Specification by Rotary Encoders or MP Scales

Specifications of rotary encoders





HEIDENHAIN

Rotary Encoders	RON886	RCN23*0	RCN83*0	RCN85*0
Interface unit	IBV102	Not required	Not required	Not required
Recommended resolution	0.0005°	26bit ABS	29bit ABS	29bit ABS

Model RCN and corresponding Interface

RCN 23 △ 0 □

Interface	△	□
FANUC	9	F
MITSUBISHI ELECTRIC	9	M
EnDat 2.2	1	—

Magnescale

Rotary Encoders	RU77-4096A	RS97-1024
Recommended resolution	23bit ABS	23bit ABS

Model RU77 and corresponding Interface

RU77-4096A ☆ G

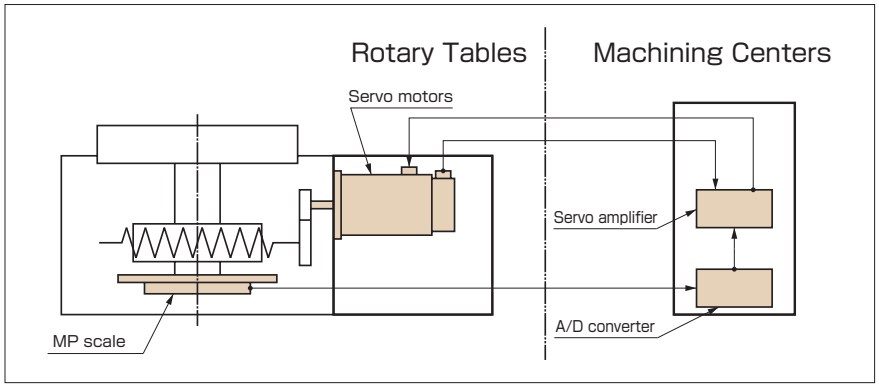
Interface	☆
FANUC	A
MITSUBISHI ELECTRIC	D
YASKAWA ELECTRIC	F

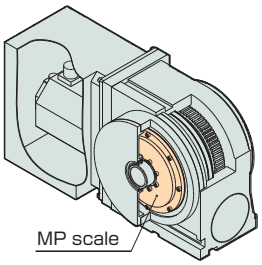
Model RS97 and corresponding Interface

RS97-1024EG ★

Interface	★
FANUC	A
MITSUBISHI ELECTRIC	D

Specifications of MP scales (by Mitsubishi Heavy Industries)



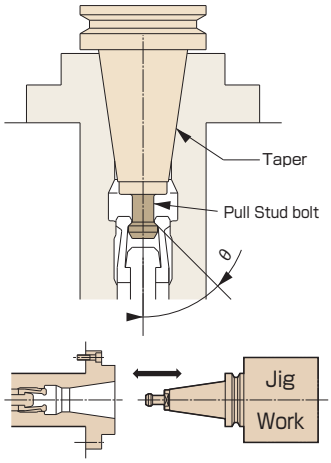


MP scale	MPI 536A	MPI 736B	MPI 1072B	MPI 1272B
Recommended resolution	0.0001°	0.0001°	0.00005°	0.00005°
A/D converter	ADB-20J10			

Note 1:AD converter (corresponding to the serial output interface) is necessary in the MPRZ series.
Note 2:Preamplifiers are necessary for MPR-series.
Note 3:When using preamplifiers for MPR-series other than those of MHI Machine Tool Engineering, consult us.

Pull Stud

A unit to position and fix a fixture and a workpiece on the rotary table by using the taper shank with a pull stud. This unit can be combined with a robot or a work loader to create an unmanned machining system.



＊With clamp/unclamp confirmation switch

Applicable models and specifications

Unit: mm

Order Code	Taper shank	Pull stud clamp force N【kgf】	Hydraulic pressure MPa【kgf/cm²】	Pneumatic pressure for air blow MPa【kgf/cm²】
RWB-250	BT-50	11,000 【1,122】	3.5 【35】	0.2~0.4 【2~4】
RWB-250K				
TWA-200				
TN-320				
RWB-320	BT-50	15,000 【1,530】	3.5 【35】	0.2~0.4 【2~4】
RWB-320K				
RWB-400				
RWB-400K				
RWB-500				
RWB-500K				

Specify the pull stud type.

Taper	Pull stud type	
	θ	
BT-50	45°	Ⅰ
	60°	Ⅱ
	90°	Others

Rotary Joint

A rotary joint unit to supply hydraulic or pneumatic pressure to workpieces or actuators mounted on the rotary tables. Automatic loading and unloading of workpieces are possible.

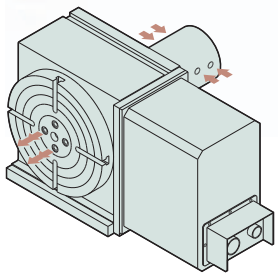
Applicable models and specifications

Unit: mm

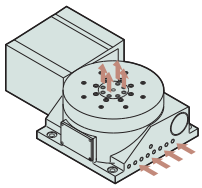
Order Code	Size	Max. number of ports	Rated supplied pressure MPa【kgf/cm²】
RBS RWE/RWA	160	6	3.5 【35】
	200	6	
	250	6	
	320	8	
RNCM	251	6	
	301	6	
	401	6	
	501	8	
RWB	250	10	
	320	12	
	400	16	
	500	16	
	630	16	
RNCK	631	12	
TBS	130	6	
	160	6	
	250	6	
TWA	130	6	
	160	6	
	200	6	

External mount type

RNCM-251R

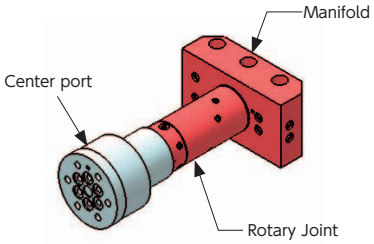


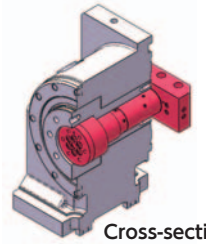
Internal mount type



Example of use

Compact Rotary Joint





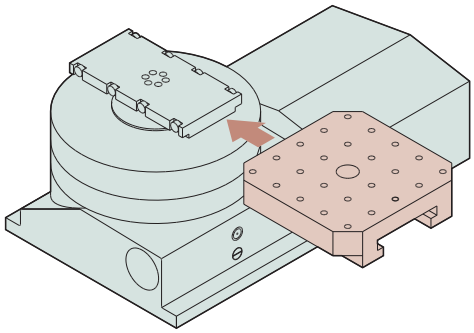
Cross-section

【Specifications】
Max. number of ports：6 port
Rated supplied pressure：21.0MPa〔210kgf/cm²〕

【Applicable models】
Correspond to the models which have more than φ40 center through hole.
RBS, RWE/RWA, TBS, TWA Series.

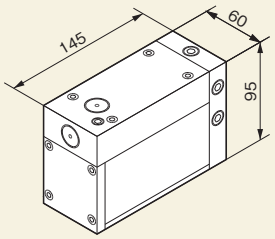
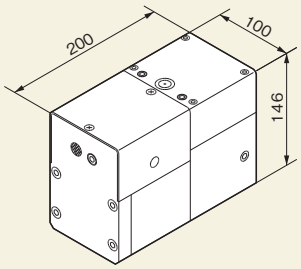
Pallet Clamp

An NC rotary table with a built-in pallet clamp is available. This type of rotary table enables fast and highly accurate positioning of workpieces at any angle. Attachment of an auto-coupler makes it possible to apply hydraulic or pneumatic pressure to the top surface of pallets. By combining with a pallet-changer, setup, transfer and exchange can be carried out automatically.



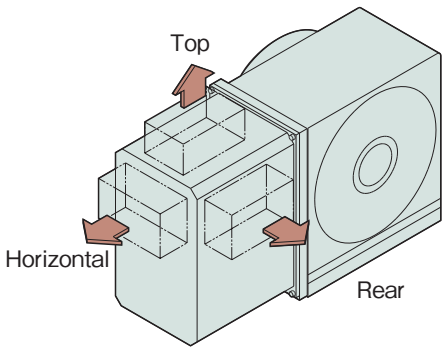
Air-hydraulic Booster

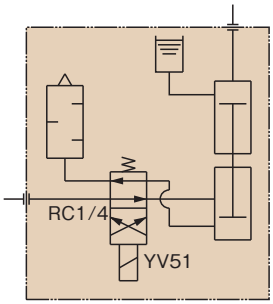
Tsudakoma' s NC rotary tables are equipped with a high-power hydraulic clamp system (excluding RWE-series models, etc.). Air-hydraulic boosters are available for machines without a hydraulic source, which convert pneumatic pressure into hydraulic pressure for clamping.

Type	Applicable model	Dimensions
A (Small type)	RNCM-251	
B (Large type)	300 or more sizes	

Note: Different types of pneumatic-hydraulic boosters are used for the RBA series. ☞ P.7

Mounting position





Please specify the following items:

1. Mounting position of the Air-hydraulic booster
2. Control voltage for the solenoid of the Air-hydraulic unit: AC100V or DC24V
   (This voltage depends on the machine to be attached)

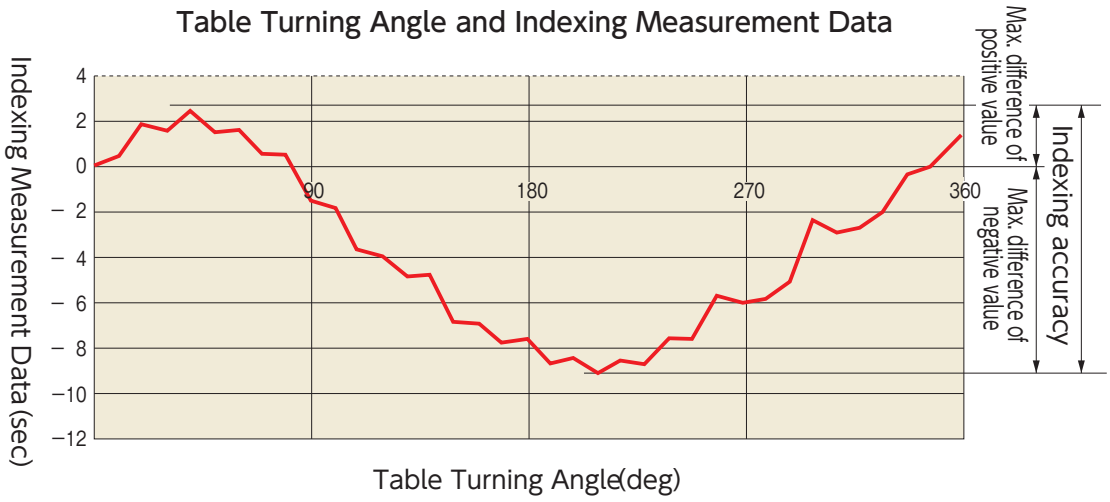
Explanation of Technical Terms

In order to help you understand Tsudakoma's products, here are some explanations about the main specifications.

Indexing Accuracy

After indexing one rotation of the table equally according to the tooth number of the worm gear, obtain the difference between the theoretical turning angle and the measured angle. The indexing accuracy is the sum of the maximum difference in positive values and that in negative values (absolute values).

Table Turning Angle and Indexing Measurement Data



Repeatability

Indexing at four specified angles (0, 90, 180 and 270 degrees) is carried out five times for clockwise rotation to measure the indexing angle. Then, the difference between the minimum and maximum values measured at each angular position is obtained. Carry out indexing for counterclockwise rotation in the same manner as the above, and obtain the difference between the minimum and maximum values measured at each angular position. The maximum value of the difference obtained through both measurements is the repeatability of the table.

Clamp Torque

Clamp torque is only the force of the clamping mechanism, which does not include force caused by self-locking of a worm gear. The clamp torque shown in the catalog is the figure obtained when the rated pressure (3.5 MPa for hydraulic pressure, and 0.49 MPa for pneumatic pressure) is supplied to the working fluid. When a larger clamp torque is required, increase the pressure gradually up to the maximum allowable pressure (4.9 MPa for hydraulic pressure, 0.69 MPa for pneumatic pressure) to increase the clamp torque.

Worm Gear Strength

Worm gear strength is the allowable wheel torque when table rpm is 1 min-1. The allowable torque for the worm wheel is calculated according to the standards stipulated by the Japan Gear Manufactures Association.

Applicable Servo Motors

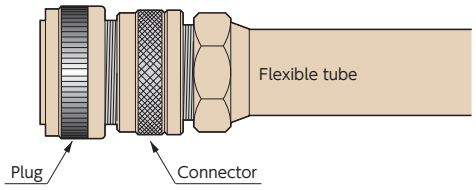
FANUC αi type servo motors are specified for each NC table model in the specifications table. The table below shows other servo motors, which have equivalent capacity to those of FANUC αi motors.

FANUC	αiF2／5000	αiF4／5000	αiF8／3000	αiF12／4000	αiF22／3000
	(αiS2／5000)	(αiS4／5000)	(αiS8／4000)	(αiS12／4000)	(αiS22／4000)
MITSUBISHI	HF75T	HF54T	HF104T	HF204S	HF354S
YASKAWA	SGMPS-04	SGMGV-05	SGMGV-09	SGMGV-20	SGMGV-30
OKUMA	BL-ME24MJ BL-ME24M	BL-ME40MJ BL-ME40M	BL-ME80MJ BL-ME80M	BL-ME150MJ BL-ME150M	BL-ME200MJ BL-ME200M
SIEMENS	1FK7042	1FK7060	1FK7063	1FK7083	1FK7101
HEIDENHAIN	QSY96A	QSY116C	QSY116E	QSY155B	QSY155D

Note 1: Some motors have speed reduction ratio (max rpm) or outline dimensions different from those of FANUC motors.
Note 2: The motors shown above are classified according to motor torque capacity. The motor which is suitable for your machines depends on the specifications of your machine NC controllers. Contact the machine manufacturer about motor selection.

Applicable Cable Connectors

All cable plugs and connectors for Tsudakoma's NC rotary tables should be waterproof. Refer to the table below.



Example of cable plug connectors

	Rotary table receptacle	Cable plug	Connector	Flexible tube
For signal cable	N／MS3102A20-29PW (Japan Aviation Electronics Industry, Ltd.)	JA06A20-29SW-J1-R (Japan Aviation Electronics Industry, Ltd.)	KMKD22-20 (SANKEI MANUFACTURING CO.,LTD.) MSA22-20 (DAIWA DENGYO CO.,LTD.)	KPF-22 (SANKEI MANUFACTURING CO.,LTD.) FCV-22 (DAIWA DENGYO CO.,LTD.)
	N／MS3102A22-14 (Japan Aviation Electronics Industry, Ltd.)	JA06A22-14S-J1-R (Japan Aviation Electronics Industry, Ltd.)	KMKD22-22 (SANKEI MANUFACTURING CO.,LTD.) MSA22-22 (DAIWA DENGYO CO.,LTD.)	
For power cable	N／MS3102A28-11P (Japan Aviation Electronics Industry, Ltd.)	JA06A28-11S-J1-R (Japan Aviation Electronics Industry, Ltd.)	KMKD28-28 (SANKEI MANUFACTURING CO.,LTD.) MSA28-28 (DAIWA DENGYO CO.,LTD.)	FCV-28 (DAIWA DENGYO CO.,LTD.)

CE Example of cable plug connectors (with a FANUC αiF motor) P.76

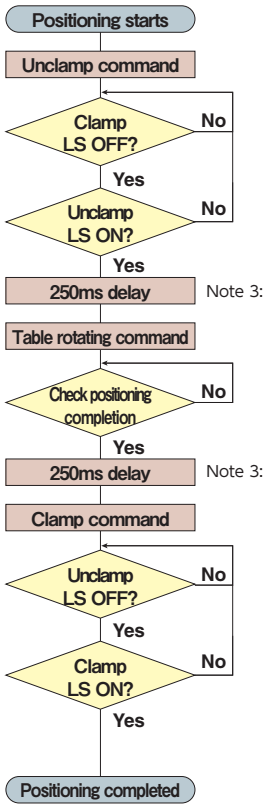
	Rotary table receptacle	Cable plug	Connector	Flexible tube
For signal cable	N／MS3102A20-29PW (Japan Aviation Electronics Industry, Ltd.)	JA06A20-29SW-J1-R (Japan Aviation Electronics Industry, Ltd.)	NBKD-20-20 (SANKEI MANUFACTURING CO.,LTD.)	NSBS＃20 (SANKEI MANUFACTURING CO.,LTD.)
For power cable	JL04V-2A28-11PE-R (Japan Aviation Electronics Industry, Ltd.)	JL04V-6A28-11SE-R (Japan Aviation Electronics Industry, Ltd.)	NBKD-32-28 (SANKEI MANUFACTURING CO.,LTD.)	NSBS＃32 (SANKEI MANUFACTURING CO.,LTD.)

Note: JA06A□□ plug is waterproof when the plug is inserted.

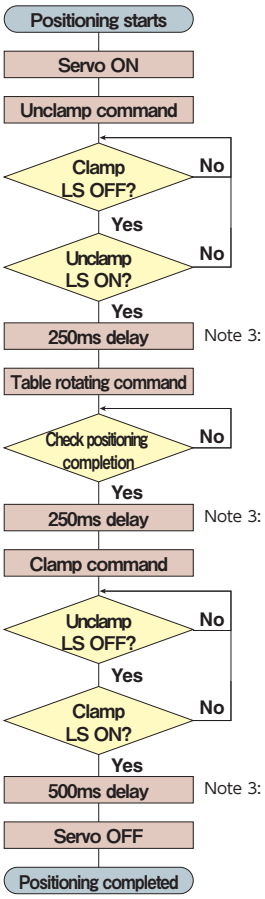
Flow Chart of Control System

It is recommended to control Tsudakoma's NC rotary tables with the servo motor ON. The following are recommended flow charts.

a) Semi-closed loop control



b) Fully-closed loop control



Note 1: In a semi-closed loop control operation, do not turn the Servo motor OFF even when the rotary table is clamped.

Note 2: In a semi-closed operation, when the eccentric load increases in size, and a large current (70% or more of the rated current) is being applied, turn the Servo motor OFF and follow the steps for the full-closed loop control.

Note 3: Delay time is our recommended time. Parameters may differ depending on the specifications. Ask us for further information.

Indexing Cycle Time

The graphs below show the required indexing time which includes the time for the control command for the machine tools. This information helps you examine the cycle time of your process with the rotary table. Table rotation speed and acceleration and deceleration constants may differ depending on the model of the rotary table. If any data other than that shown below is required, please ask us.

A : Without clamp command

B : For hydraulic clamp (0.4Sec)

C : For pneumatic clamp (0.6Sec)

D : For air-hydraulic clamp (1.0Sec)

※ ( ) shows Clamp & Un-clamp reguired time

Table rpm 8000deg/min (22.2min^{-1})

Acceleration/deceleration constant : 150ms

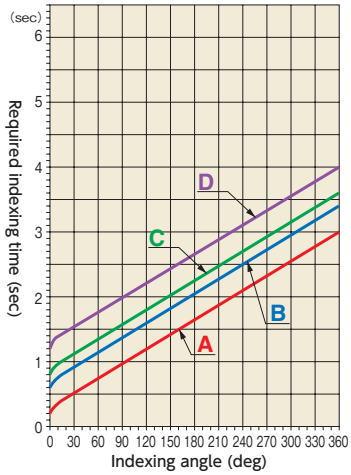
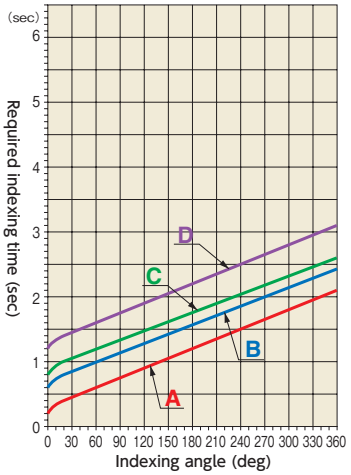


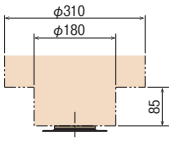
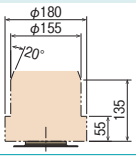
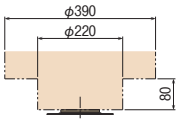
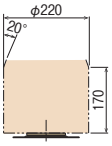
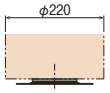
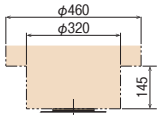
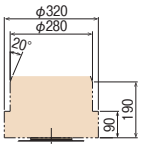
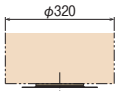
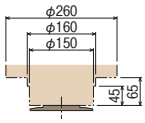
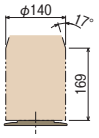
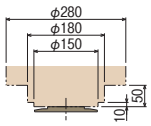
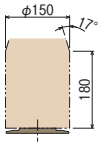
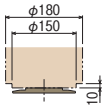
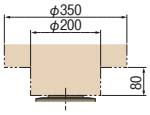
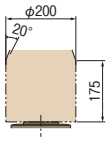
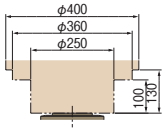
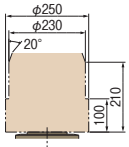
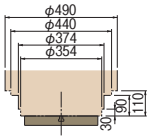
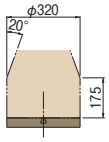
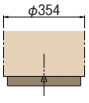
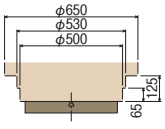
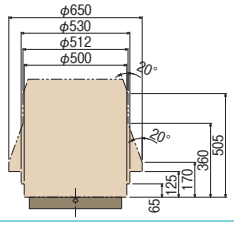
Table rpm 12000deg/min (33.3min^{-1})

Acceleration/deceleration constant : 150ms



Note: For the above B and C cases, the indexing time includes the time to respond to the clamp and unclamp confirmation signals.

Workpiece mounting space for tilting rotary tables

	0～+90°	0～+110°	−30°～0
TBS-130			
TBS-160			
TBS-250			
TN-101			
TWA-130			
TWA-160			
TWA-200			
TN-320			
TN-450	−10°～+95° 	−15°～+100° 	※Emergency stop angle Loading area is set taking the inertia of 10° from the emergency stop position into consideration.

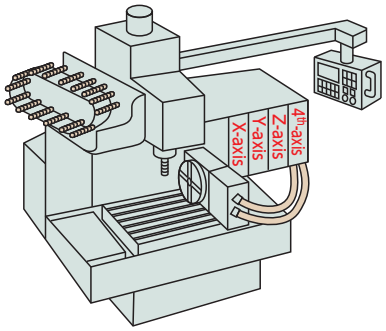
Note 1: If the tilting angle is over the above range or the table stops by emergency stop, check the unit.
Note 2: Be sure to remove the eye bolts used for lifting before using the rotary table.

To make the best use of TSUDAKOMA NC rotary tables

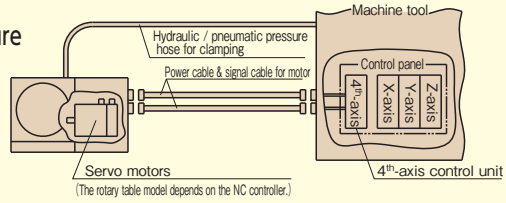
1 First of all, determine the NC controller system that best controls the NC rotary tables.

NC control system 1

A control unit for the 4th axis (or 5th axis) should be installed in the NC controller of the machine tool.



Structure

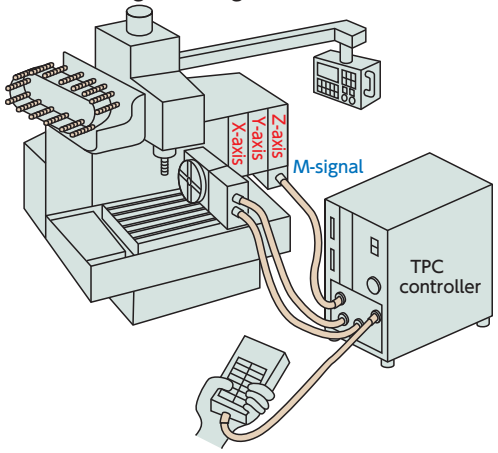


Features

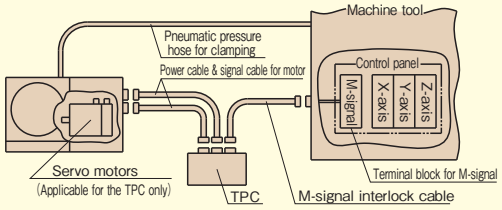
- Simultaneous and continuous circular cutting on the X, Y, and Z-axes is possible depending on the specifications of the machine tool.
- The program of the rotary table should be input at the machine tool.

NC control system 2

The TPC single axis NC controller of TSUDAKOMA is applied, receiving an M-signal from the machine tool.



Structure

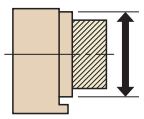


Features

- Even if the 4th (or 5th) axis cannot be installed on a machine tool, the TPC controller can be used with an M-signal.
- Basically, this control system is only for indexing.
- Program for a rotary table should be input directly to the TPC. At the machine tool, an M-signal is input as a start command.

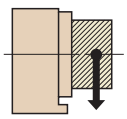
2 Please select the most suitable model of NC rotary tables, depending on the workpiece and cutting conditions.

● Workpiece diameter



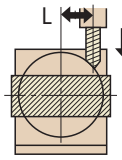
Within the rotary table diameter

● Workpiece weight



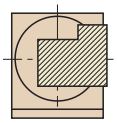
Should not be bigger than allowable as specified.

● Workpiece positioning



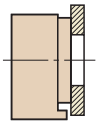
The value of (F×L) should be within the clamp force.

● When an eccentric load is applied:



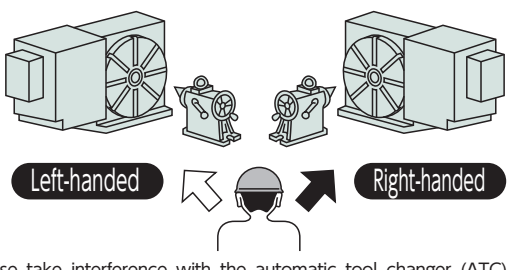
- The workpiece inertia should be within the allowable value.
- Pay attention to any interference with the machine tool.

● Workpiece of larger diameter, but lighter weight



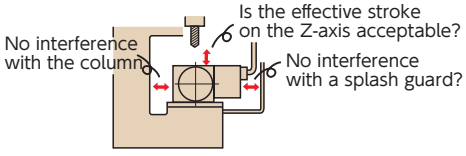
- The workpiece inertia should be within the allowable value.
- Pay attention to any interference with the machine tool.

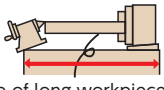
3 Please select the handedness of the NC rotary tables.



Please take interference with the automatic tool changer (ATC) and easy operation into consideration when you make your selection.

4 Please take interference with a machining center into consideration when selecting a table.





- No interference with the ATC? (Select L-type or R-type.)
- Are workpieces within the allowable load of the table?

In the case of long workpieces, check that the workpiece length is within the table length.

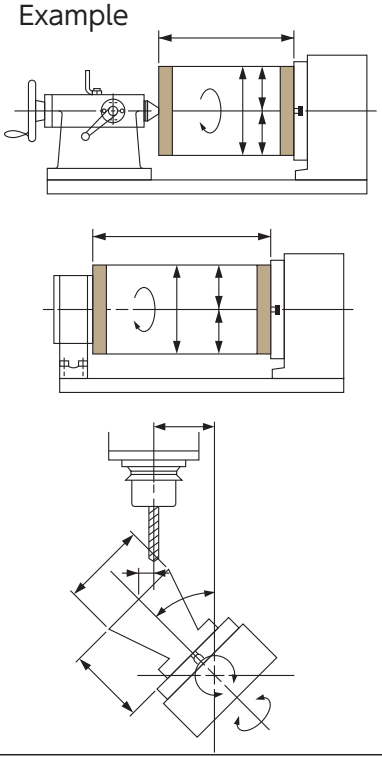
If you need our help to select the best model for you:

Inform TSUDAKOMA of the information below, and TSUDAKOMA will suggest the best model for you.

Fill in this page and send it to a local distributor or TSUDAKOMA. Fax : +81-76-294-5157

1. Customer _____ Tel _____
2. Model considering _____ Unit _____
3. Machine Manufacturer _____
   Model _____ (New ・ Installed)
   NC controller _____
4. Coolant oil Not used Used (Oil ・ Water) (Normal ・ High Pressure)
5. Workpiece Kind _____ Material _____ Weight _____
   Dimensions Height (_____) × Length (_____) × Width (_____) mm
   Inner dia (_____) × Outer dia (_____) × Length (_____) mm
6. Layout of workpiece and fixture (Write the detailed dimensions from the top surface or the center of the face plate)

Example

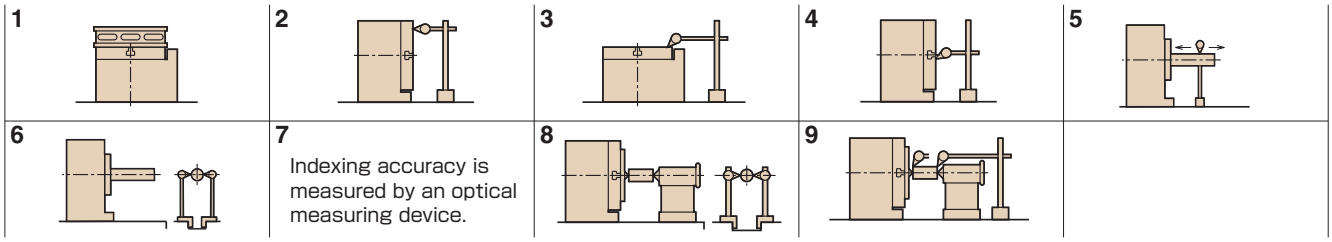


7. Cutting conditions

Cutting point	Cutter ／ teeth number	Cutting speed (V)	Cutting feed rate mm／min	Cutting depth mm／time	Cutting process (Indexing or continuous cutting)
a					
b					
c					
d					

Inspection Standard

NC Rotary Tables



RBS

Unit: mm

No.	Inspection items			Tolerance RBS-160 Standard	RBS-160 With a scale	RBS-250 Standard	RBS-250 With a scale	RBS-320 Standard	RBS-320 With a scale
2	Spindle top runout	—	—	0.01		0.01		0.01	
3	Parallelism top to frame bottom	Per 200mm	Horizontal	0.02		0.02		0.02	
4	Center bore runout	Spindle nose	—	0.01		0.01		0.01	
5	Parallelism of rotary axis center line to frame bottom	Per 200mm	Vertical	0.02		0.02		0.02	
6	Parallelism of rotary axis center line to guide blocks	Per overall length	Vertical	0.02		0.02		0.02	
7	Indexing accuracy (arc sec.)	Cumulative	—	15	15	15	10	15	10
8	Parallelism of center line between rotary table and tailstock to frame bottom guide blocks	Per 300mm	Vertical	0.02		0.02		0.02	
9	Height difference of both center lines of rotary table and tailstock	—	Vertical	0.02		0.02		0.02	

Note: The indexing accuracy above is for tables with MP scales. See P.61 for indexing accuracy of HEIDENHAIN rotary encoders.

RWE/RWA

Unit: mm

No.	Inspection items			Tolerance RWE/RWA-160 Standard	RWE/RWA-160 With a scale	RWE/RWA-200 Standard	RWE/RWA-200 With a scale	RWA-250 Standard	RWA-250 With a scale	RWA-320 Standard	RWA-320 With a scale
2	Spindle top runout	—	—	0.01		0.01		0.01		0.01	
3	Parallelism top to frame bottom	Per 200mm	Horizontal	0.02		0.02		0.02		0.02	
4	Center bore runout	Spindle nose	—	0.01		0.01		0.01		0.01	
5	Parallelism of rotary axis center line to frame bottom	Per 200mm	Vertical	0.02		0.02		0.02		0.02	
6	Parallelism of rotary axis center line to guide blocks	Per overall length	Vertical	0.02		0.02		0.02		0.02	
7	Indexing accuracy (arc sec.)	Cumulative	—	25	15	20	15	20	10	20	10
8	Parallelism of center line between rotary table and tailstock to frame bottom guide blocks	Per 300mm	Vertical	0.02		0.02		0.02		0.02	
9	Height difference of both center lines of rotary table and tailstock	—	Vertical	0.03		0.03		0.03		0.03	

Note: The indexing accuracy above is for tables with MP scales. See P.61 for indexing accuracy of HEIDENHAIN rotary encoders.

RWB

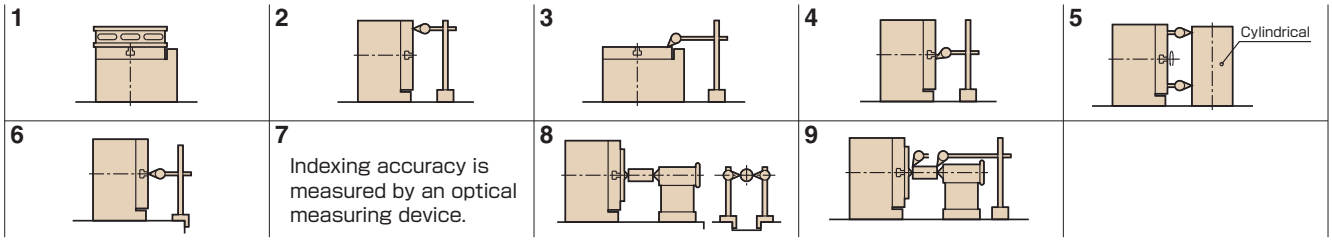
Unit: mm

No.	Inspection items			Tolerance RWB-250,320 Standard	RWB-250,320 With a scale	RWB-400,500 Standard	RWB-400,500 With a scale	RWB-630 Standard	RWB-630 With a scale
1	Table top flatness (concave)	Per overall length	—	0.01	0.01	0.02	0.01	0.03	0.01
2	Table top runout	—	—	0.015	0.01	0.015	0.01	0.02	0.01
3	Parallelism of table top to frame bottom	Per overall length	Horizontal	0.02	0.01	0.02	0.01	0.03	0.02
4	Center bore runout	Spindle nose	—	0.01	0.005	0.01	0.005	0.01	0.01
5	Parallelism of rotary axis center line to frame bottom	Per 300mm	Vertical	0.02	0.01	0.015	0.01	0.015	0.01
6	Parallelism of rotary axis center line to guide blocks	Per 300mm	Vertical	0.02	0.01	0.015	0.01	0.015	0.015
7	Indexing accuracy (arc sec.)	Cumulative	—	14	8	14	8	14	8
8	Parallelism of center line between rotary table and tailstock to frame bottom guide blocks	Per 300mm	Vertical	0.02	0.01	0.02	0.01	0.02	0.01
9	Height difference of both center lines of rotary table and tailstock (tailstock center line should be higher)	—	Vertical	0.02	0.01	0.02	0.01	0.02	0.01

Note1: The indexing accuracy above is for tables with MP scales. See P.61 for indexing accuracy of HEIDENHAIN rotary encoders.
Note2: For RWB-K,No.3 is not required.

Inspection Standard

NC Rotary Tables



RN

Unit: mm

No.	Inspection items			Tolerance RN-100
2	Spindle top runout	—	—	0.01
3	Parallelism top to frame bottom	Per overall length	Horizontal	0.015
4	Center bore runout	Spindle nose	—	0.01
5	Perpendicularity of spindle top to frame bottom	Per overall length	Vertical	0.02
6	Perpendicularity of spindle to frame bottom guide blocks	Per overall length	Vertical	0.02
7	Indexing accuracy (arc sec.)	Cumulative	—	45
9	Height difference of both center lines of rotary table and tailstock	—	Vertical	0.03

RCV/RNCV

Unit: mm

No.	Inspection items			Tolerance					
				RCV-800		RCV-1000		RNCV-1201	RNCV-1501
				Standard	With a scale	Standard	With a scale	Standard	Standard
1	Table top flatness (concaye)	Per overall length	—	0.03	0.02	0.04	0.02	0.04	0.04
2	Table top runout	—	—	0.02	0.01	0.03	0.02	0.03	0.03
3	Parallelism of table top to frame bottom	Per overall length	Horizontal	0.03	0.02	0.04	0.02	0.04	0.04
4	Center bore runout	Spindle nose	—	0.01	0.01	0.01	0.01	0.01	0.01
5	Perpendicularity of spindle top to frame bottom	Per overall length	Vertical	0.03	0.02	0.04	0.03	0.04	0.04
6	Perpendicularity of table top to frame bottom guide blocks	Per overall length	Vertical	0.03	0.03	0.04	0.03	0.04	0.04
7	Indexing accuracy (arc sec.)	Cumulative	—	15	8	15	8	15	15
8	Parallelism of center line between rotary table and tailstock to frame bottom guide blocks	Per 300mm	Vertical	0.02	0.02	0.02	0.02	0.03	0.03
9	Height difference of both center lines of rotary table and tailstock (tailstock center line should be higher)	—	Vertical	0.02	0.02	0.02	0.02	0.04	0.04

Note: The indexing accuracy above is for tables with MP scales. See P.61 for indexing accuracy of HEIDENHAIN rotary encoders.

RNCM

Unit: mm

No.	Inspection items			Tolerance					
				RNCM-251,301		RNCM-401,501		RNCM-631	
				Standard	With a scale	Standard	With a scale	Standard	With a scale
1	Table top flatness (concaye)	Per overall length	—	0.01	0.01	0.02	0.01	0.03	0.01
2	Table top runout	—	—	0.015	0.01	0.015	0.01	0.02	0.01
3	Parallelism of table top to frame bottom	Per overall length	Horizontal	0.02	0.01	0.02	0.01	0.03	0.02
4	Center bore runout	Spindle nose		0.01	0.005	0.01	0.005	0.01	0.01
5	Perpendicularity of spindle top to frame bottom	Per overall length	Vertical	0.02	0.01	0.02	0.01	0.03	0.02
6	Perpendicularity of table top to frame bottom guide blocks	Per overall length	Vertical	0.02	0.01	0.02	0.01	0.03	0.03
7	Indexing accuracy (arc sec.)	Cumulative	—	15	10	15	8	15	8
8	Parallelism of center line between rotary table and tailstock to frame bottom guide blocks	Per 300mm	Vertical	0.02	0.01	0.02	0.01	0.02	0.02
9	Height difference of both center lines of rotary table and tailstock (tailstock center line should be higher)	—	Vertical	0.02	0.01	0.02	0.01	0.02	0.02

Note: The indexing accuracy above is for tables with MP scales. See P.61 for indexing accuracy of HEIDENHAIN rotary encoders.

RNCK

Unit: mm

No.	Inspection items		Tolerance RNCK-631	
			Standard	With a scale
1	Table top flatness (concaye)	Per overall length	0.03	0.02
2	Table top runout	—	0.02	0.01
4	Center bore runout	Spindle nose	0.01	0.005
5	Perpendicularity of table top and frame bottom	Per overall length	0.03	0.02
6	Perpendicularity of table top to frame bottom guide blocks	Per overall length	0.03	0.03
7	Indexing accuracy (arc sec.)	Cumulative	15	8
8	Parallelism of center line between rotary table and tailstock to frame bottom guide blocks	Per 300mm	0.02	0.02
9	Height difference of both center lines of rotary table and tailstock (tailstock center line should be higher)	—	0.02	0.02

Note: The indexing accuracy above is for tables with MP scales. See P.61 for indexing accuracy of HEIDENHAIN rotary encoders.

RCH/RNC

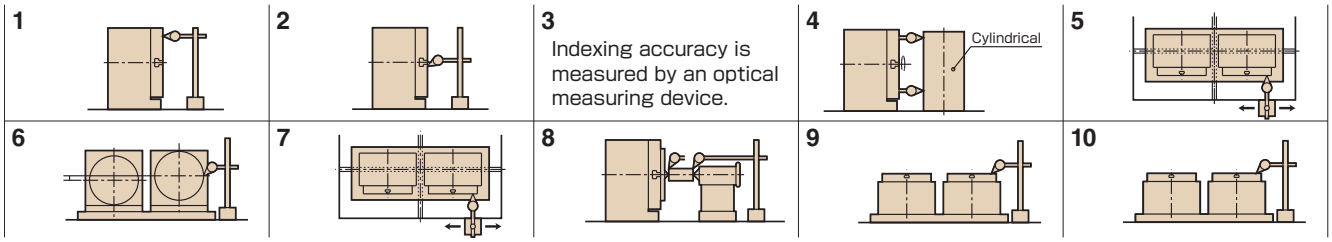
Unit: mm

No.	Inspection items		Tolerance RCH-800		RCH-1000,1250 RNC-1501		RNC-2001	
			Standard	With a scale	Standard	With a scale	Standard	With a scale
1	Table top flatness (concaye)	Per overall length	0.03	0.02	0.04	0.02	0.04	0.03
2	Table top runout	—	0.02	0.01	0.03	0.02	0.03	0.02
3	Parallelism of table top to frame bottom	Per overall length	0.03	0.02	0.04	0.02	0.04	0.03
4	Center bore runout	Spindle nose	0.01	0.01	0.01	0.01	0.01	0.01
7	Indexing accuracy (arc sec.)	Cumulative	15	8	15	8	15	8

Note: The indexing accuracy above is for tables with MP scales.

Inspection Standard

NC Rotary Tables / Multi-Spindle



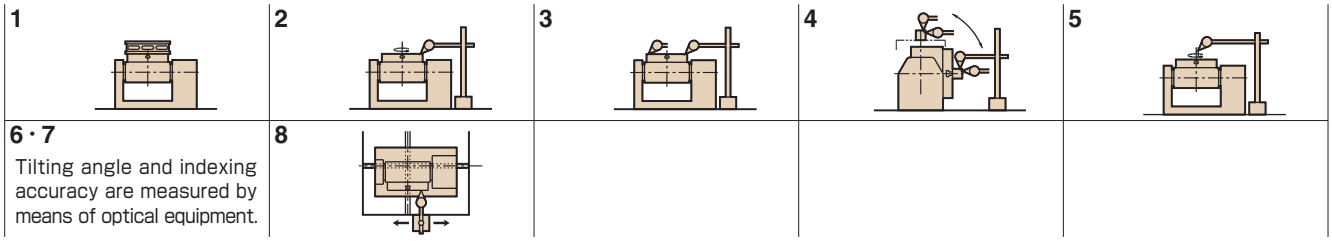
RN-N

Unit: mm

No.	Inspection items			Tolerance			
				RN-100-N	RN-150-N	RN-200-N	RN-250-N 300-N
1	Table top runout	—	—	0.015	0.015	0.015	0.02
2	Center bore runout	Spindle nose	—	0.01	0.015	0.02	0.02
3	Indexing accuracy (arc sec.)	Cumulative	—	60	30	30	30
4	Squareness between table top and base plate	Per overall length	Vertical	0.02	0.02	0.02	0.02
5	Parallelism and perpendicularity of the table top to base bottom guide blocks	Per overall length	Vertical	0.02	0.02	0.02	0.03
6	Difference between both center heights	—	Vertical	0.02	0.02	0.02	0.02
7	Difference of the distance between base bottom guide block and table top	—	Vertical	0.02	0.02	0.02	0.02
8	Height difference of both center lines of rotary table and tailstock	—	Vertical	0.03	0.02	0.02	0.02
9	Parallelism of the table top to base bottom	Per overall length	Horizontal	0.015	0.02	0.02	0.03
10	Difference among the average heights between base bottom and table top	—	Horizontal	0.02	0.02	0.02	0.02

Note 1: For the RN-100-N,RN-150-N and RN-200-N, all the descriptions of "table top" seen in the inspection items should be "spindle end surface".
Note 2: If the base has no guide block, "base bottom guide block" in the above instructions (Nos. 5 and 7) should be construed as "base bottom".

NC Tilting Rotary Tables



TBS

Unit: mm

No.	Inspection items		Tolerance		
			TBS-130	TBS-160	TBS-250
			Standard	Standard	Standard
2	Spindle (Table) top runout	—	0.01	0.01	0.01
3	Parallelism of spindle (table) top to frame bottom	Per overall length	0.015	0.015	0.015
4	Parallelism of tilt axis cenrer to frame bottom	Per overall length	0.02	0.02	0.02
5	Center bore runout	Spindle nose	0.01	0.01	0.01
6	Tilting accuracy (arc sec.)	Cumulative (0°～+90°)	30	30	40
		Cumulative (−30°～+90°)	40	40	50
7	Indexing accuracy (arc sec.)	Cumulative	20	20	20
8	Parallelism (Perpendicularity) of rotary axis center line to guide blocks	Per overall length (90 degree)	0.015	0.015	0.015

NC Tilting Rotary Tables

TWA/TN

Unit: mm

No.	Inspection items		Tolerance					
			TN-101	TWA-130	TWA-160	TWA-200	TN-320	TN-450
			Standard	Standard	Standard	Standard	Standard	Standard
1	Table top flatness (concaye)	Per overall length	—	—	—	—	0.01	0.02
2	Spincle (Table) top runout	—	0.01	0.01	0.01	0.01	0.015	0.015
3	Parallelism of spindle (table) top to frame bottom	Per overall length	0.015	0.015	0.015	0.015	0.02	0.02
4	Parallelism of tilt axis center to frame bottom	Per overall length	0.02	0.02	0.02	0.02	0.02	0.02
5	Center bore runout	Spindle nose	0.015	0.01	0.01	0.01	0.01	0.01
6	Tilting accuracy (arc sec.)	Cumulative (0°～+90°)	45	45 (15)	45	45	45	90
		Cumulative (−30°～+90°)	—	—	60	60	60	—
7	Indexing accuracy (arc sec.)	Cumulative	40	40 (15)	30	30	20	15
8	Parallelism (Perpendicularity) of rotary axis center line to guide blocks	Per overall length (90 degree)	0.015	0.015	0.015	0.015	0.02	0.02

Note 1: For item 8, values differ depending on the mounting direction of the guide block. Note 2: The table tops of TN-101 and TWA-130, are the ends of the spindles.
Note 3: Values in ( ) for TWA-130 are accuracy for tables with rotary encoders and MP scales for high precision. (Please see P.61)

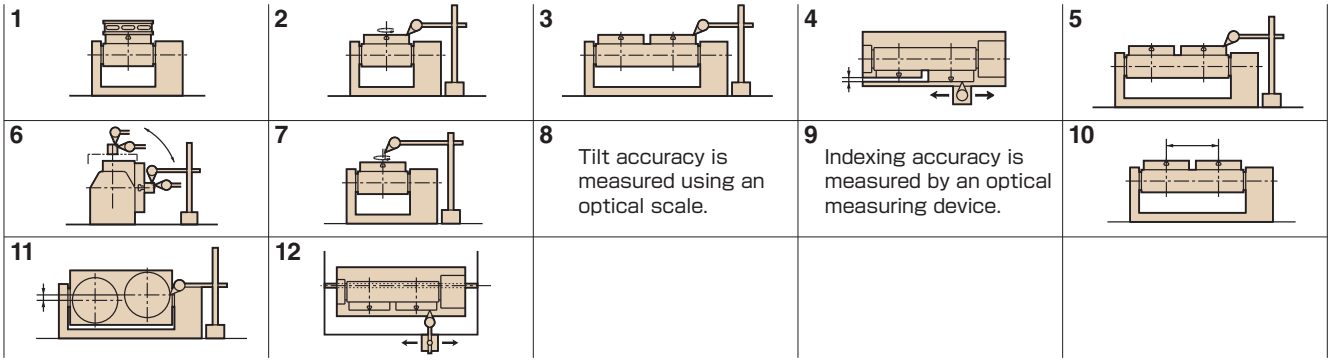
TTNC/THNC

Unit: mm

No.	Inspection items		Tolerance					
			TTNC-631		TTNC-1001		THNC-251,301	
			Standard	With a scale	Standard	With a scale	Standard	With a scale
1	Table top flatness (concaye)	Per overall length	0.03	0.03	0.04	0.04	0.01	0.01
2	Table top runout	—	0.02	0.02	0.03	0.03	0.015	0.015
3	Parallelism of table top to frame bottom	Per overall length	0.03	0.03	0.04	0.04	0.02	0.02
4	Parallelism of tilt axis center to frame bottom	Per overall length	0.03	0.03	0.04	0.04	0.02	0.02
5	Center bore runout	Spindle nose	0.01	0.01	0.01	0.01	0.01	0.01
6	Tilting accuracy (arc sec.)	0°～+90°	60	15	60	15	60	60
7	Indexing accuracy (arc sec.)	Cumulative	15	8	15	8	15	10
8	Perpendicularity of table top to frame bottom guide blocks (Parallelism)	Per overall length (90 degree)	0.02	0.02	0.02	0.02	0.02	0.02

Note 1: The indexing accuracy above is for tables with MP scales. See P.61 for indexing accuracy of HEIDENHAIN rotary encoders.
Note 2: For item 8, values differ depending on the mounting direction of the guide block.

NC Tilting Rotary Tables / Multi-Spindle



TTNC-N (Axis)

Unit: mm

No.	Inspection items		Tolerance			
			TTNC-102-2	TTNC-101-4	TTNC-151-2	TTNC-201-2
1	Table top flatness (concaye)	Per overall length	—	—	0.02	0.01
2	Table top runout	—	0.015	0.015	0.015	0.015
3	Difference between average heights of both tables	0 degree	0.02	0.02	0.02	0.02
4	Difference between distances between frame standard face and both table tops	90 degree	0.02	0.02	0.02	0.02
5	Parallelism of table top to frame bottom	Per overall length	0.015	0.015	0.02	0.02
6	Parallelism of tilt axis center to frame bottom	Per overall length	0.02	0.02	0.02	0.02
7	Center bore runout	Spindle nose	0.015	0.01	0.01	0.01
8	Tilting accuracy (arc sec.)	0°～+90°	45	60	60	60
9	Indexing Accuracy (arc sec.)	Cumulative	40	60	30	20
10	Table center distance	—	±0.02	±0.02	±0.02	±0.02
11	Difference between both center heights	90 degree	0.02	0.02	0.02	0.02
12	Perpendicularity of table top to frame bottom guide blocks (Parallelism)	Per overall length (90 degree)	0.015	0.015	0.02	0.02

Note 1: For the TTNC-102-2 and TTNC-101-4, all the descriptions of "table top" seen in the inspection items above should be "spindle end surface".
Note 2: For item 12, values differ depending on the mounting direction of the guide block.

NOTES

OPERATION ENVIRONMENT AND MAINTENANCE RECOMMENDED TO KEEP PERFORMANCE AND FUNCTION

- **Do not use any coolant of chlorine or strong alkaline.**
- Do not use any corrosive gas, water, steam or chemicals damaging sealing parts.
- **Lubricant is indispensable** in order to operate a rotary table smoothly and to maintain its functions for a long time. **Supply a recommended lubricant (in the operation manual) to the rotary table before operation. Change all the lubricant periodically.**
- If a lot of cutting chips, (generated by machining,) accumulate on some sections of rotary table, install adequate covers for protection.
- Operate a rotary table within the specified range of temperature.
- Depending upon the operation environment, there is a possibility of dew condensation which may cause a malfunction or a rust problem of electrical components, so provide air-purging inside the motor cover. (Do not close the outlet of exhaust air.) **See Fig. 1.**
- When assembling a faceplate or a fixture with the main spindle, make the inner diameter section as the reference for fitting as shown in **Fig. 2.**
- Keep the clearance with 3mm or more between a Faceplate or a fixture and a Rotary table. Otherwise, cutting chips may impede the rotation of the main spindle or the waterproof capability of the seals. **See Fig. 2.**

Fig. 1

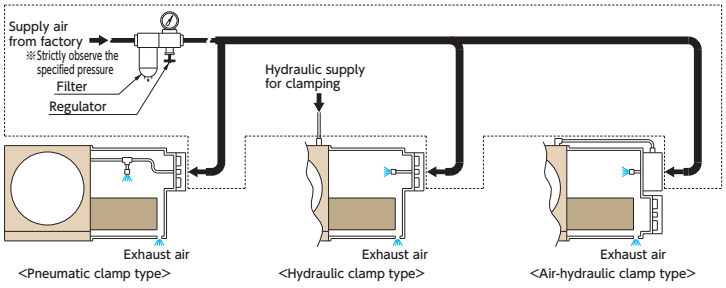
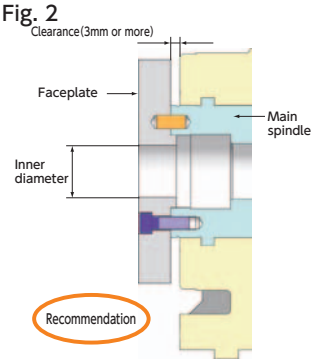


Fig. 2



SETTING ON MACHINE TOOL AND PREPARATION BEFORE USE

- When moving a rotary table by a hanging method, observe the specified method in the operation manual.
- To fix a rotary table on a machine tool, use the specified fixing parts and follow the specified method.
- Connect each interface cable in accordance with the instructions on the electrical drawing.
- Provide protective measures to avoid adding extraordinary force to any piping or any joint for each interface cable and each connector, to induce any damage, during the operation of a machine tool with a rotary table.
- Each piping is to be connected to the specified input port (connecting port) stated in the outlook drawing.
- Regarding each fluid to be supplied to a rotary table, make sure that **maximum pressure does not exceed the specified pressure** even if there is a pressure variation due to the pressure source or other factors.
- Refer to the recommendable flow chart on Page 67 for the NC control at the time of table clamping.

DAILY OPERATION, PERIODICAL CHECK AND OTHERS

- Make sure that the weight and size of the workpiece does not exceed the specified value of the workable force during machining.
- In case any abnormality is realized during operation, stop machining immediately.
- When any human work is carried out within the operational area of machine tool, be sure to turn off the power for the machine tool as well as the Tsudakoma controller.
- When restarting from a long stoppage, perform a warm-up operation of the rotary table.
- Do not make any conversion of a rotary table without Tsudakoma's consent.

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