



GA SERIES

Ultra Performance CNC Turning Centers

ULTRA PERFORMANCE TURNING CENTERS

Engineered to handle heavy-duty turning applications with superb accuracy, the GA series ultra performance turning centers combine extremely powerful high torque motors, super rigid box way constructions, and large diameter servo indexing turrets to bring you The Ultimate Machining Power®. The GA series will help you be more competitive by achieving faster cycle times with heavier cuts, faster machine movements, and allow cutting of tough material efficiently. You'll also appreciate the reliability and durability that our machines are known for. Plus, with more standard features than any other machine on the market today, many say it's the best investment they have ever made.

- ▶ Extremely powerful high-torque spindles deliver 2.5 ~ 4 times the torque output of standard spindles.
- ▶ Extra large Z-axis servo motors provide the thrust needed to efficiently drill big diameter holes.
- ▶ In order to endure the machine's high outputs with durability, heavy-duty roller bearings are used to support the spindles and axes guide ways are of super-rigid one-piece box ways.



(GA-2000 series model shown.)



(GA-3000 series model shown.)

- ▶ A total of 36 models are available in the GA Series lineup, use the chart below to pinpoint the model that best suits your applications needs.

SERIES		GA-2000 SERIES			GA-3000 SERIES		
Chuck Size		8"	8" / 10"	10"	10"	12"	15"
Bar Capacity		Ø 51 mm (2.0")	Ø 65 mm (2.5")	Ø 75 mm (3.0")	Ø 75 mm (3.0")	Ø 90 mm (3.5")	Ø 105 mm (4.0")
Turning Length	300 mm (12.1") ^{*1}	GA-2000/300 / /300M	GA-2600/300 / /300M	GA-2800/300 / /300M	—	—	—
	600 mm (24.5") ^{*1}	GA-2000 / M	GA-2600 / M	GA-2800 / M	GA-3000 / M	GA-3300 / M	GA-3600 / M
	900 mm (35.4") ^{*1}	—	—	—	GA-3000/900 / /900M	GA-3300/900 / /900M	GA-3600/900 / /900M
	1,200 mm (47.4") ^{*1}	GA-2000L / LM	GA-2600L / LM	GA-2800L / LM	GA-3000L / LM	GA-3300L / LM	GA-3600L / LM

/300 : Compact Bed /900 & L : Long Bed M : Live Tooling & C-axis

^{*1} Turning length listed here are approximate numbers, individual models may vary. Please see Machine Specifications page for details.

- ▶ The modern 30° slant wedge bed design provides smooth chip disposal and easier operator access without sacrificing machine rigidity.
- ▶ Larger machining capacities and available live tooling features provide additional production flexibility.

1
2

(GA-3300L model shown.)

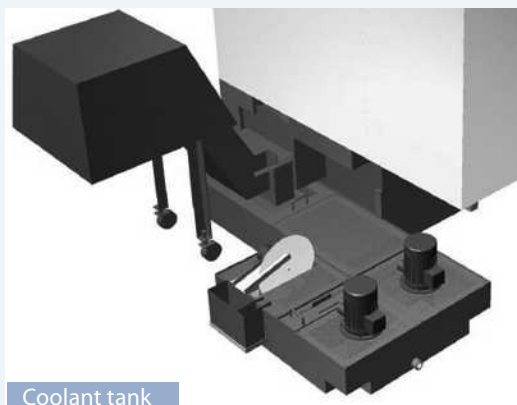
GA Series machines (excluding compact bed GA-2000/300 models) feature a standard programmable base and quill tailstock.

- ▶ Manual mode quill-jog function allows the quill to be inched forward, which makes it easier to insert the center into the center hole.
- ▶ Movement of the base and quill in auto mode are controlled by M-codes and thrust pressure is manually adjustable.
- ▶ Z-axis carriage automatically locks onto the tailstock base and moves it to the desired position with precision accuracy.



Tailstock shown with optional live center

Machine rigidity is increased by eliminating the opening required for under-machine-type coolant tanks.



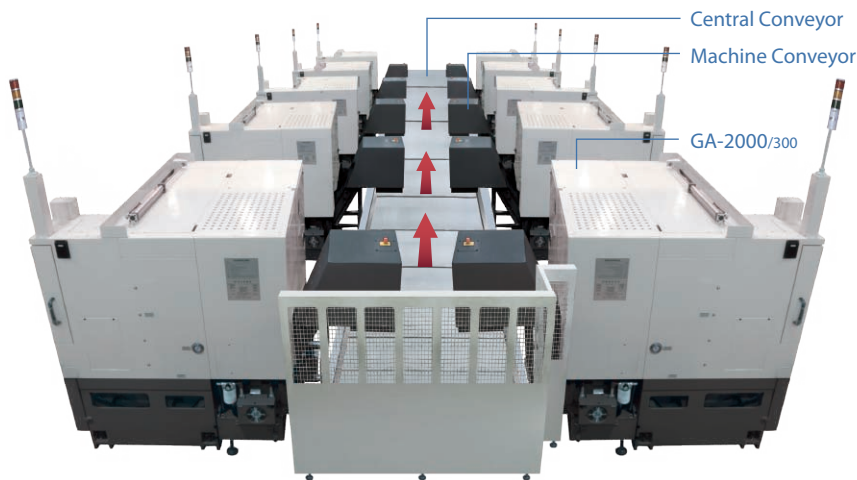
Coolant tank

- ▶ Utilizing unused space, this coolant tank placement allows optimal air circulation for faster heat dispersion and lower coolant temperature, which will help extend coolant life.
- ▶ Heat escapes directly into the air, not trapped inside the machine; this tremendously improves the machine's overall accuracy by lowering thermal expansion effects to a minimum.
- ▶ Coolant tank allows the connection of compressed air to circulate coolant and keep it fresh when machine is not in use.
- ▶ Less space limitations allow larger 145 L coolant tank capacity and easier maintenance access.

Auto industry manufactures require machines with compact footprints and rear discharge conveyor systems to streamline their production lines. We offer the GA-2000/300 models to meet the demand.

- ▶ With the machines placed closer together, operators spend less time walking and are less exhausted, thus, lowering the demand on manpower and increase efficiency.

(GA-2000/300 model shown.)



- ▶ Rear discharge conveyor systems allow machines to be placed closer together, thus, requiring less floor space. Furthermore, all machine conveyors can discharge onto a central conveyor, which carries the chips to one location; this saves man power and streamlines the chip removal process.



Right discharge chip conveyor



Rear discharge chip conveyor

- ▶ The standard chip conveyor features adjustable timers that allow the operator to set operation intervals according to the amount of chips generated by the machine. Thus , reducing coolant loss to a minimum.

Right discharge

- GA-2000 series (excluding GA-2000/300 models)
- GA-3000 series

Rear discharge

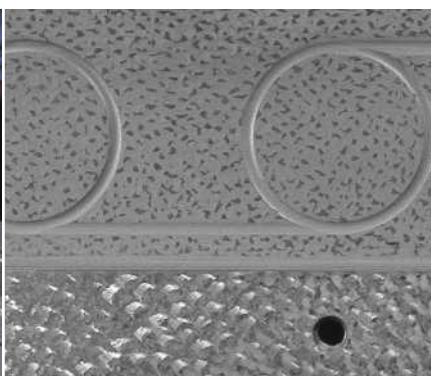
- GA-2000/300 (Std.)
- GA-2000 series (Opt.)
- GA-3000 series (Opt.)

SUPER HEAVY-DUTY CONSTRUCTION

- ▶ The low center of gravity heavy-duty bed and 30° slant wedge saddle design provide a super rigid foundation for the headstock, turret, and tailstock. Creating the rigidity needed to perform super heavy-duty turning and maintaining long-term high precision accuracy. More rigidity also means extended tool life.
- ▶ Built to withstand years and years of rigorous high production turning, the heavily ribbed, one-piece thermally balanced bed and casting components are of " Meehanite " casting.
- ▶ By using Finite Element Methods (FEM), optimal reinforce ribbings are directly cast into the one-piece bed structure. Mechanical rigidity has been increased by more than 30% when compared to conventional designs.

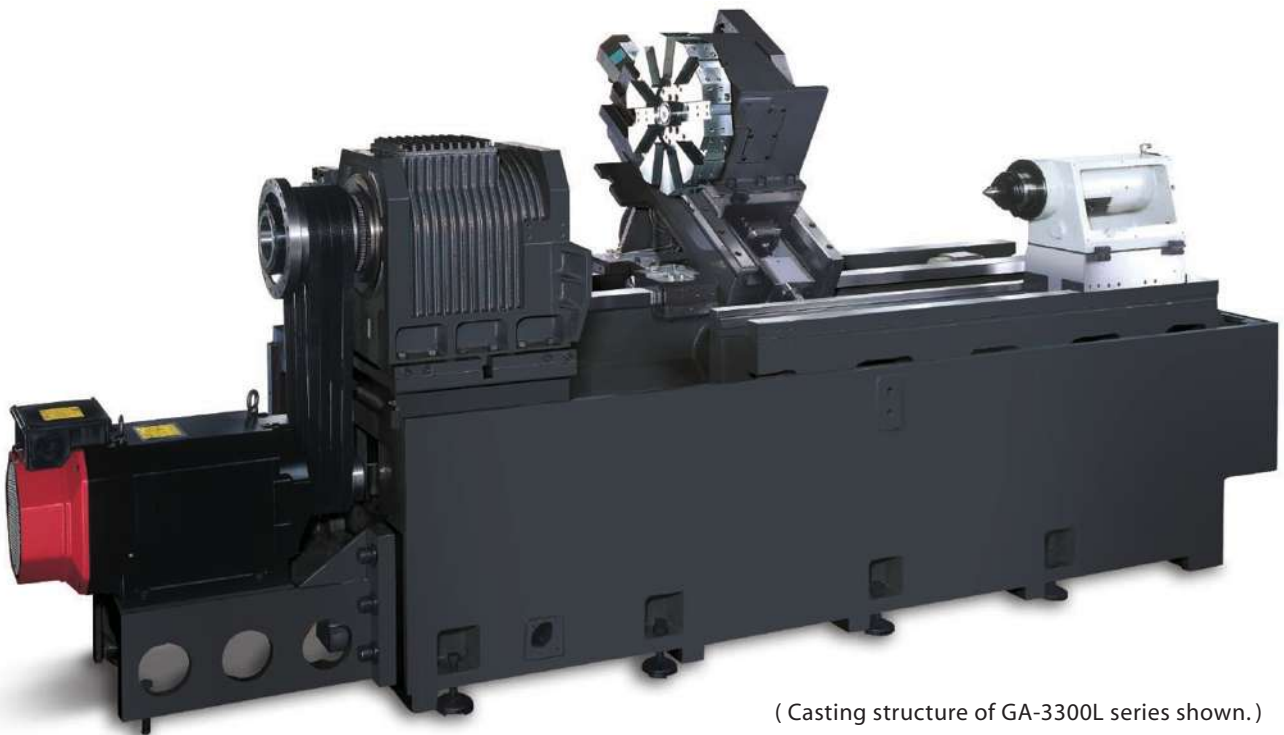


(Casting structure of GA-2000 series shown.)



- ▶ Contact surfaces of all slides, headstock, turret, tailstock, and ball screw bearing housings with the machine bed are hand scraped to provide maximum assembly precision, structural rigidity, and load distribution.

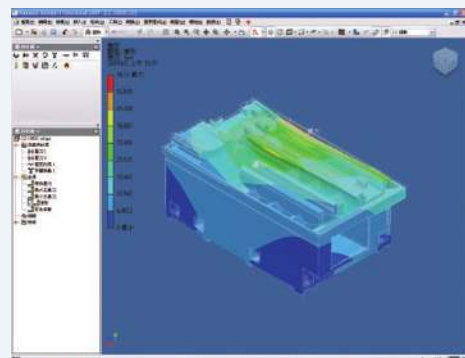
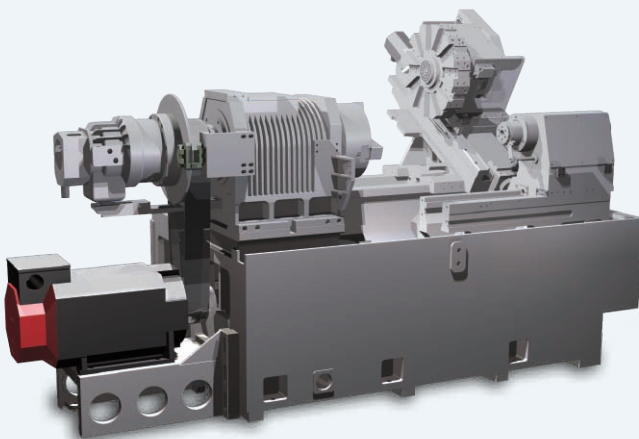
- ▶ All spindle and servo motors, including drives, are Fanuc alpha *i* series components to ensure peak machining performance and accuracy.
- ▶ X and Z axes are driven by over-sized Fanuc AC alpha *i* series absolute servo motors, providing tremendous thrust outputs with faster acceleration and deceleration. Absolute encoder technology eliminates the use of limit switches, thus, eliminating referencing axes to home positions and broken limit switches.



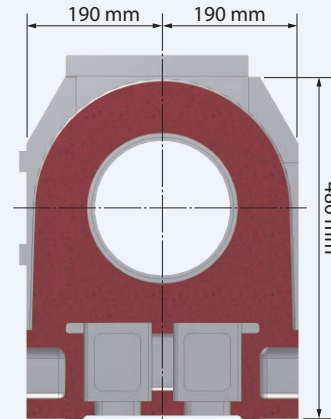
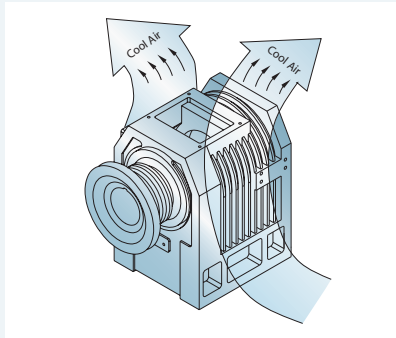
(Casting structure of GA-3300L series shown.)

Mechanical Design

- ▶ Utilizing the latest 3D CAD design software to assist in machine development, and FEM (Finite Element Methods) to provide engineering analysis, we are able to create the best designs possible.



- ▶ GA series head stocks feature even thickness sides, which evenly distribute cutting forces to the machine bed, resulting in exceptional vibration dampening characteristics and forms a stronger structure to handle interrupted and heavy cutting applications. Heat dissipating fins around the headstock evenly disperse heat to reduce deformation, therefore, increasing machining accuracy.

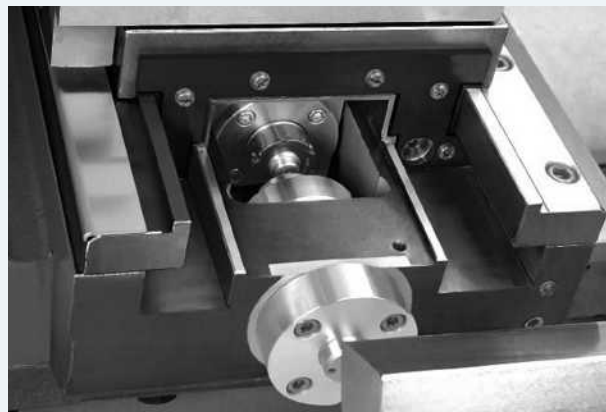


- ▶ Slide ways are bonded with "Turcite B" to eliminate stick-slip, minimize wear and maintain long term accuracy. Rapids are 20 m/min on X-axis & 24 m/min on Z-axis.

- ▶ C3 class hardened and precision ground ball screws ensure the highest accuracy and durability possible. Plus, pretension on all axes minimizes thermal distortion.

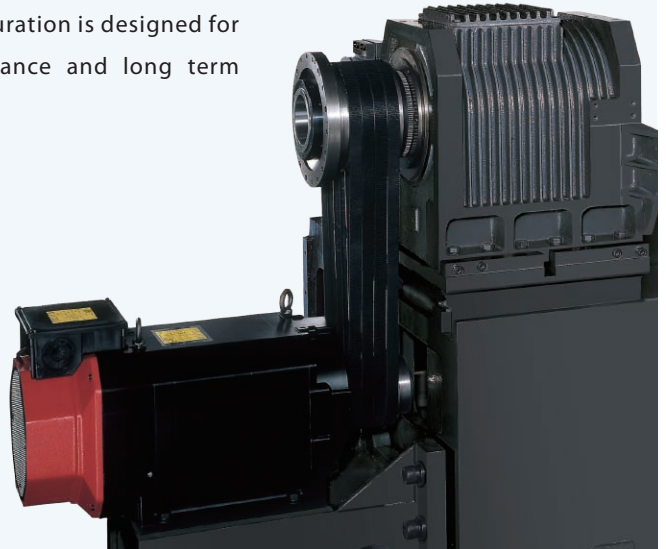
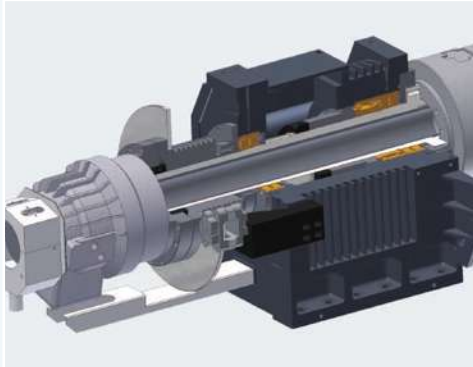


- ▶ Extra wide, hardened and precision ground box ways are widely spaced, and directly cast on to the machine bed and saddle for maximum strength and precision. The box way design also provides the rigidity needed for heavy-duty and interrupted turning applications.



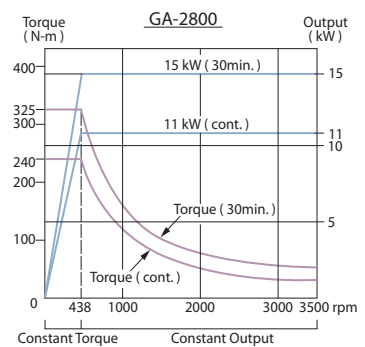
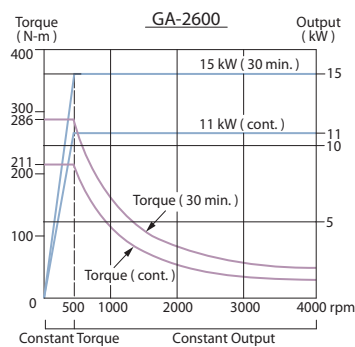
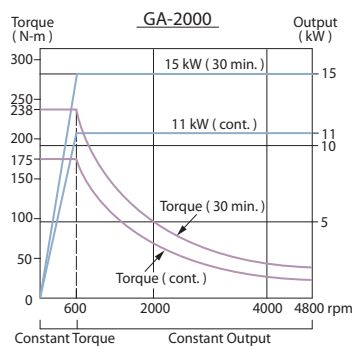
ULTIMATE TURNING POWER

- ▶ The heavy-duty headstock is of one-piece casting reinforced with heat dispending fins.
- ▶ P4 grade (Class 7) super-high precision bearings are directly assembled for maximum level of support and precision. Bearing configuration is designed for super heavy-duty cutting with ultra-smooth performance and long term durability with a higher level of accuracy.

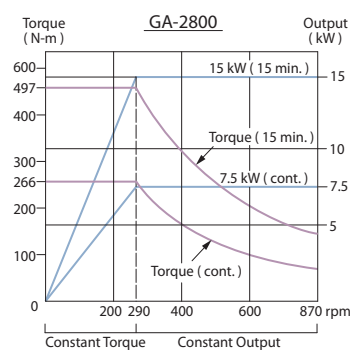
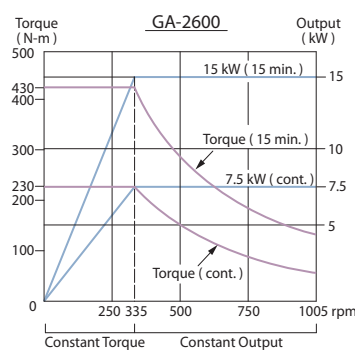
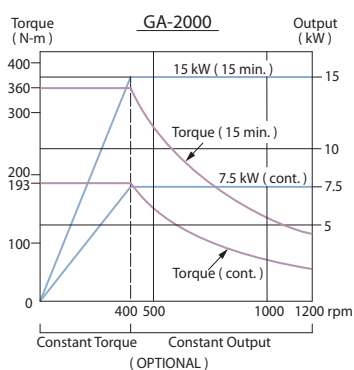


GA-2000 Series Spindle Output

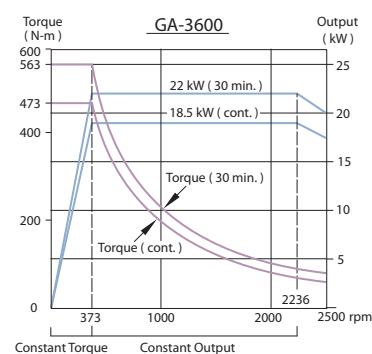
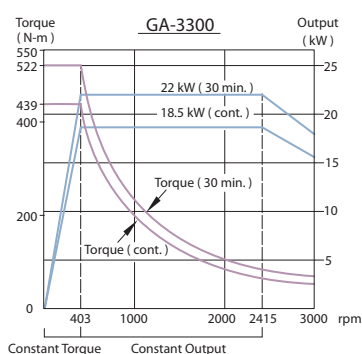
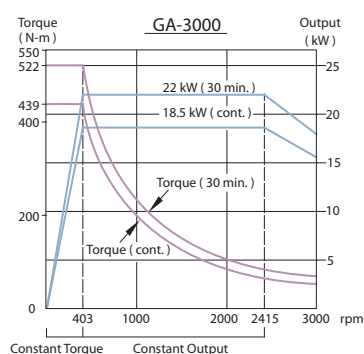
High-Speed (Δ Connection) Spindle Output



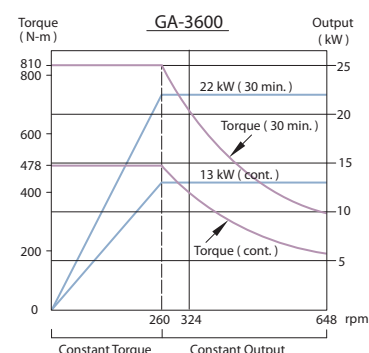
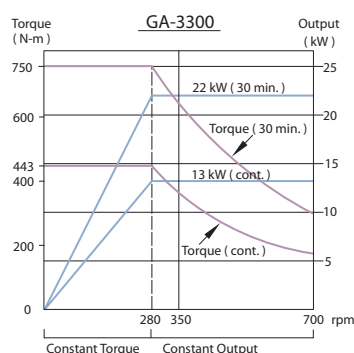
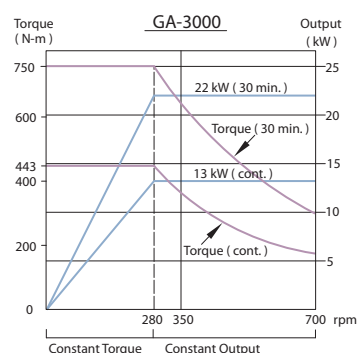
Low-Speed (Y Connection) Spindle Output



GA-3000 Series Standard Spindle Output

High-Speed (Δ connection) Spindle Output

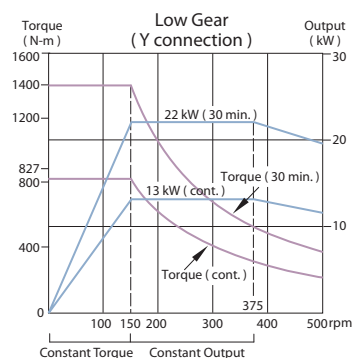
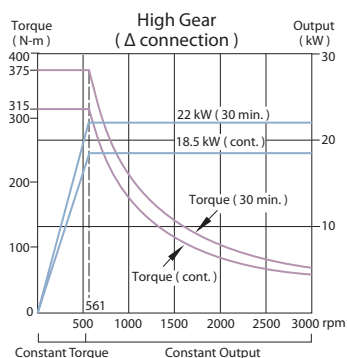
Low-Speed (Y connection) Spindle Output



GA-3000 Series Optional Gear Box Spindle Output

Specification

Models	GA-3000	GA-3300	GA-3600
Spindle Motor	Fanuc α P40 / 6,000i		
Motor Output	18.5 / 22 Kw (Cont. / 30 min.)		
Final Ratio	0.9753 (High Gear) / 0.3751 (Low Gear)		



- The 2-speed super heavy-duty gear box incorporates advance mechanical designs. Mated with a 22 kW (30 min.) high-torque P-type motor to provide tremendous amount of low-end torque to handle heavy material removal on large diameter parts.

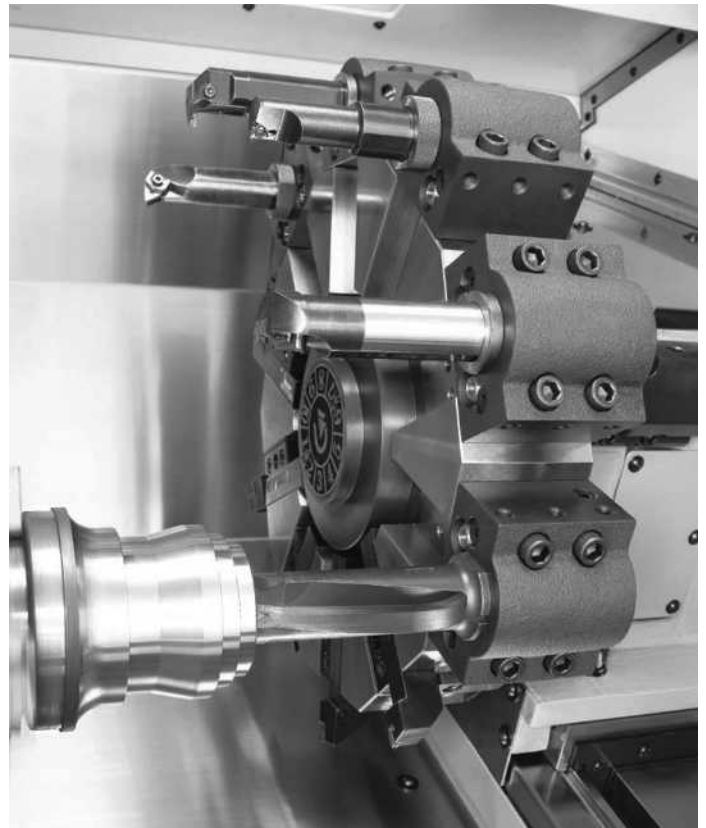
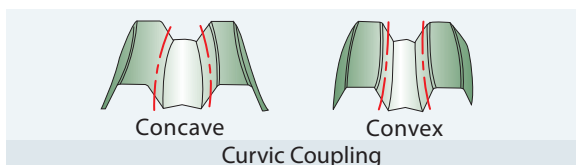
■ GA-3000 series only



ADVANCED TURNING TECHNOLOGY

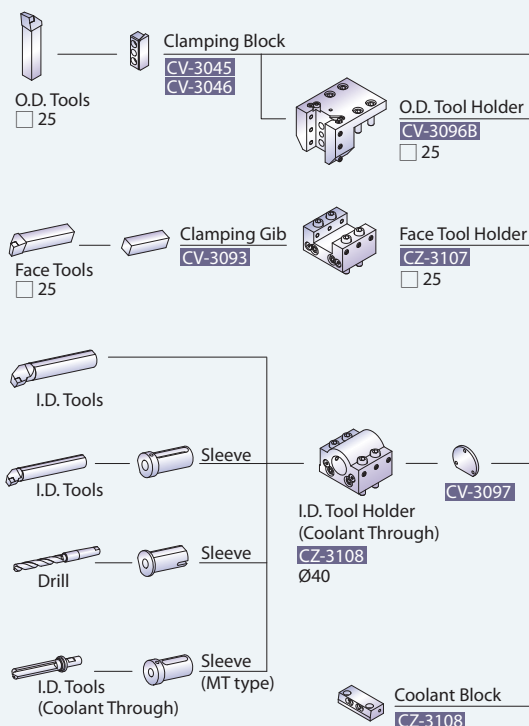
GA-2000 SERIES

- ▶ The heavy-duty servo indexing turret achieves 0.2 second indexing times for adjacent stations and 0.5 second for stations at the opposite end of the disk. Index movements are single step, without pauses, no matter how many stations are skipped.
- ▶ 210 mm (8.26") diameter super high precision curvic couplings accurately position the turret disk and 4,000 Kg (8,800 lbs.) of clamping force ensures abundant turret rigidity for all cutting conditions.
- ▶ The standard 12-station turret clears 8" diameter work holding devices without interference, even when loaded with tooling at maximum shank size. The optional 10-station turret clears 10" diameter work holding devices without interference, even when loaded with tooling at maximum shank size.

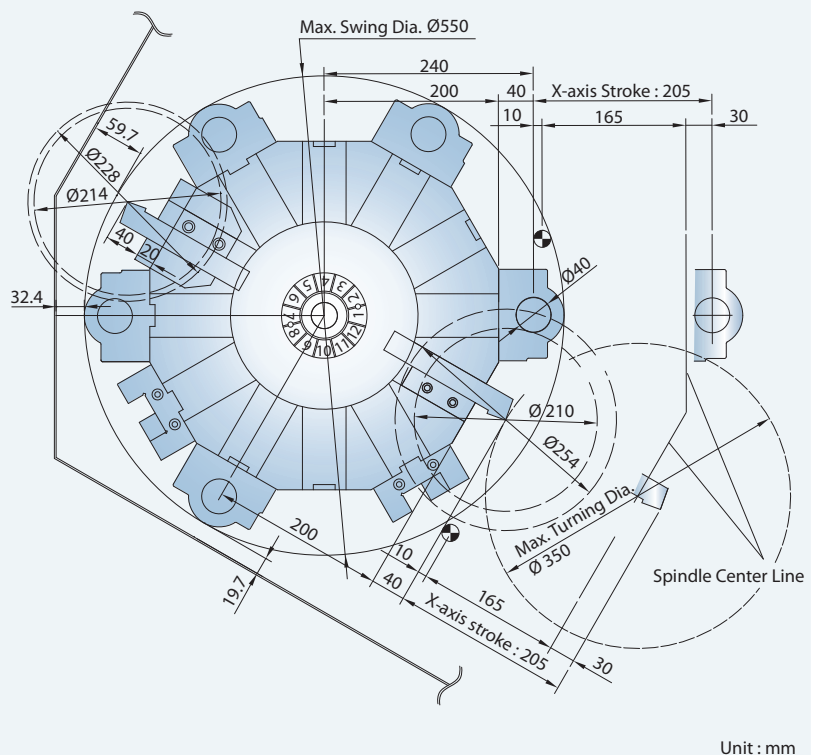


[Standard 12-Stations Turret]

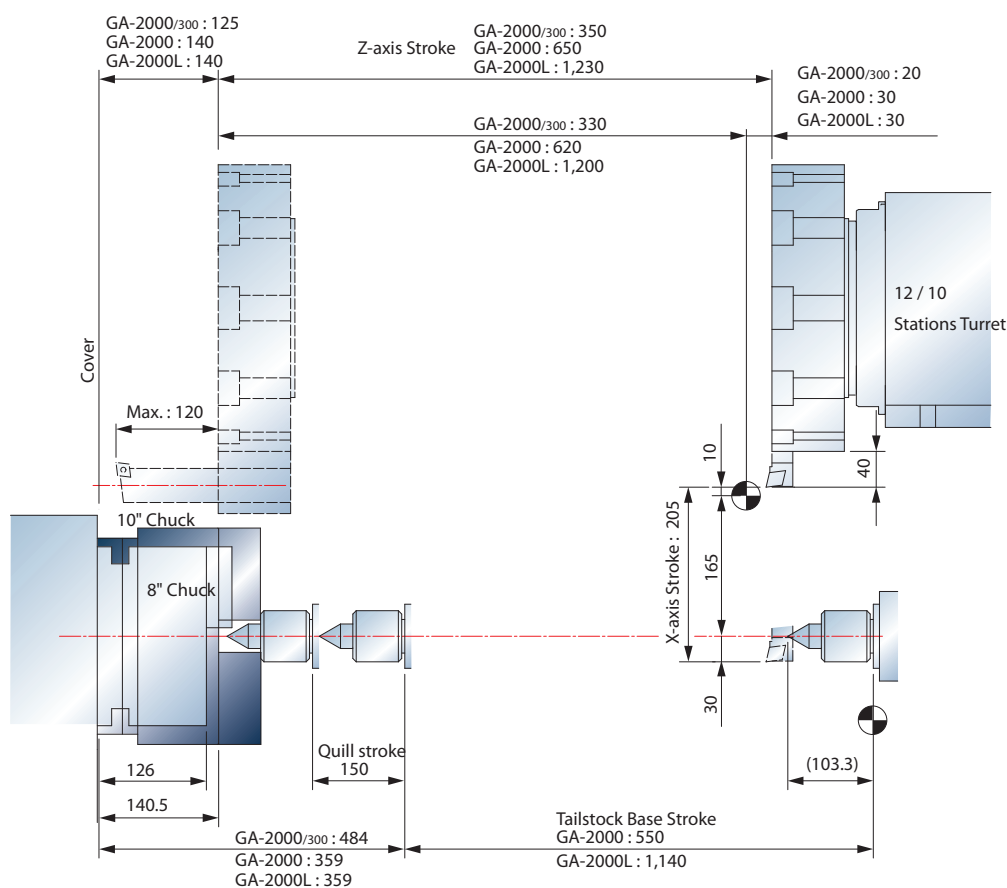
Tooling System



Interference Diagram



Work Range

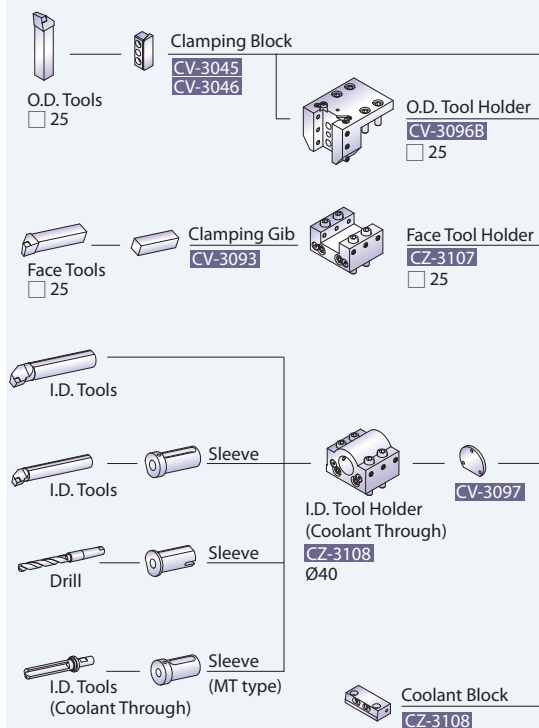


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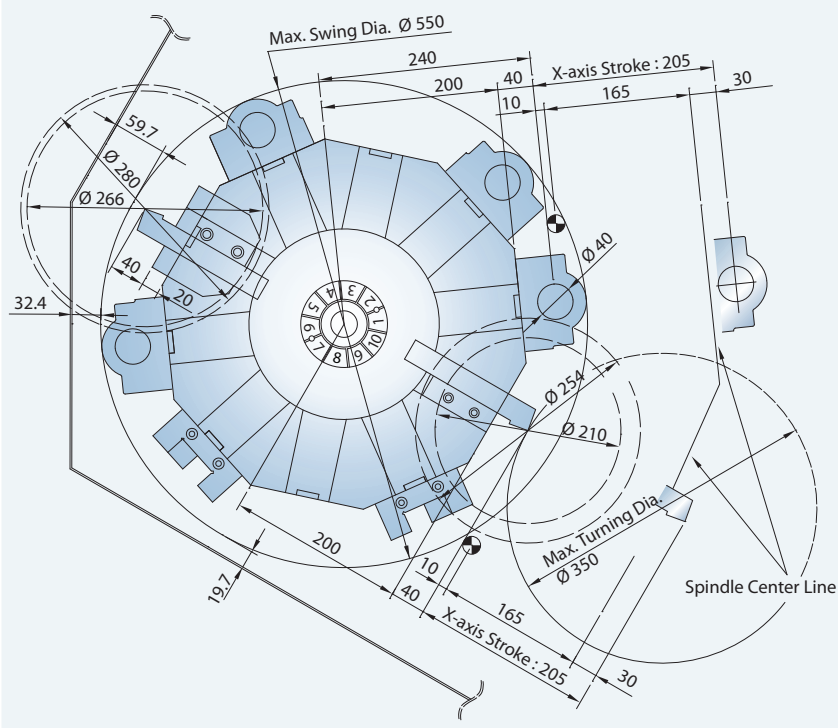
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【 Optional 10-Stations Turret 】

Tooling System



Interference Diagram

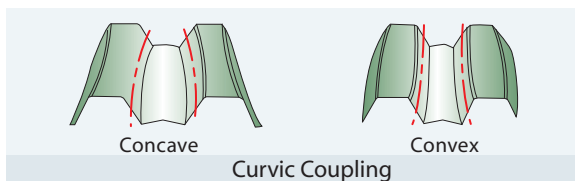


Unit : mm

ADVANCED TURNING TECHNOLOGY

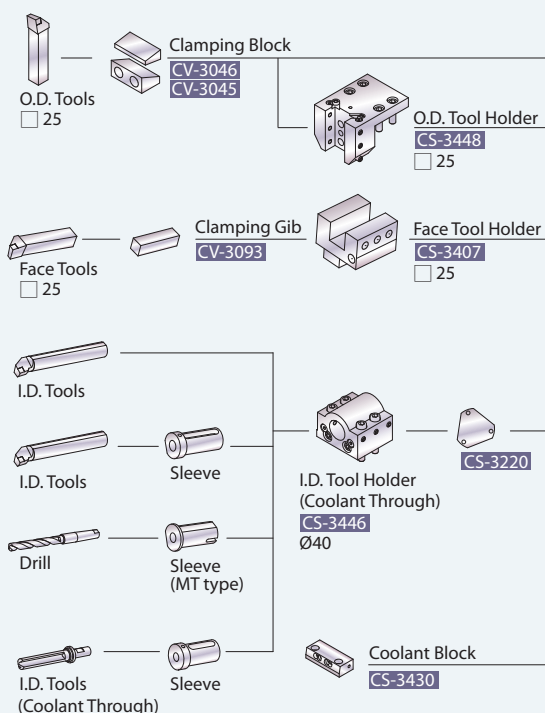
GA-3000 SERIES

- ▶ The heavy-duty servo indexing turret achieves 0.2 second indexing times for adjacent stations and 0.5 second for stations at the opposite end of the disk. Index movements are single step, without pauses, no matter how many stations are skipped.
- ▶ 250 mm (9.84") diameter super high precision curvic couplings accurately position the turret disk and 4,400 Kg (9,600 lbs.) of clamping force ensures abundant turret rigidity for all cutting conditions.
- ▶ The standard 12-station turret clears 8" diameter work pieces without interference, even when loaded with tooling at maximum shank size. The optional 10-station turret clears 10" diameter work pieces without interference, even when loaded with tooling at maximum shank size.

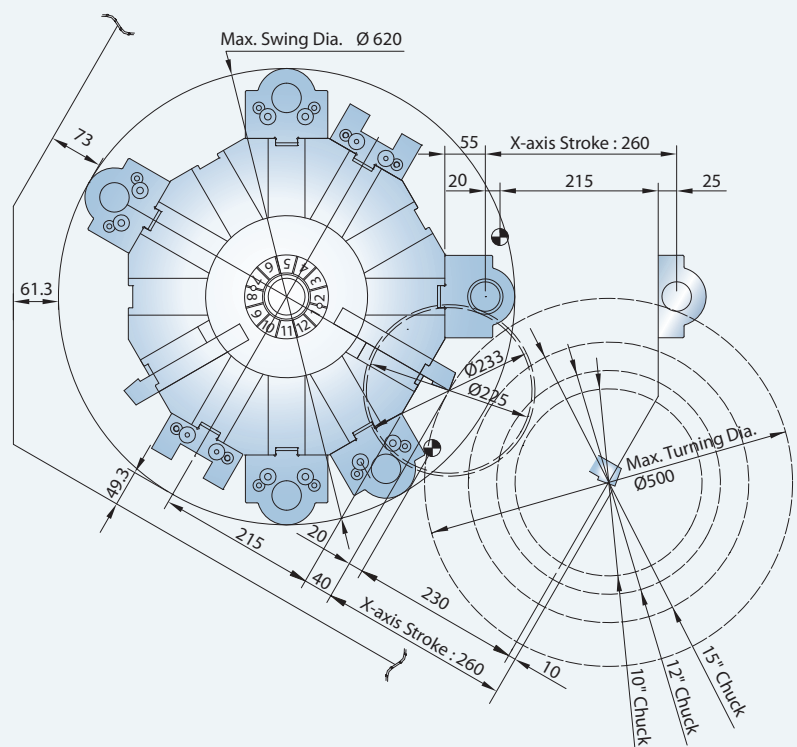


[Standard 12-Stations Turret]

Tooling System

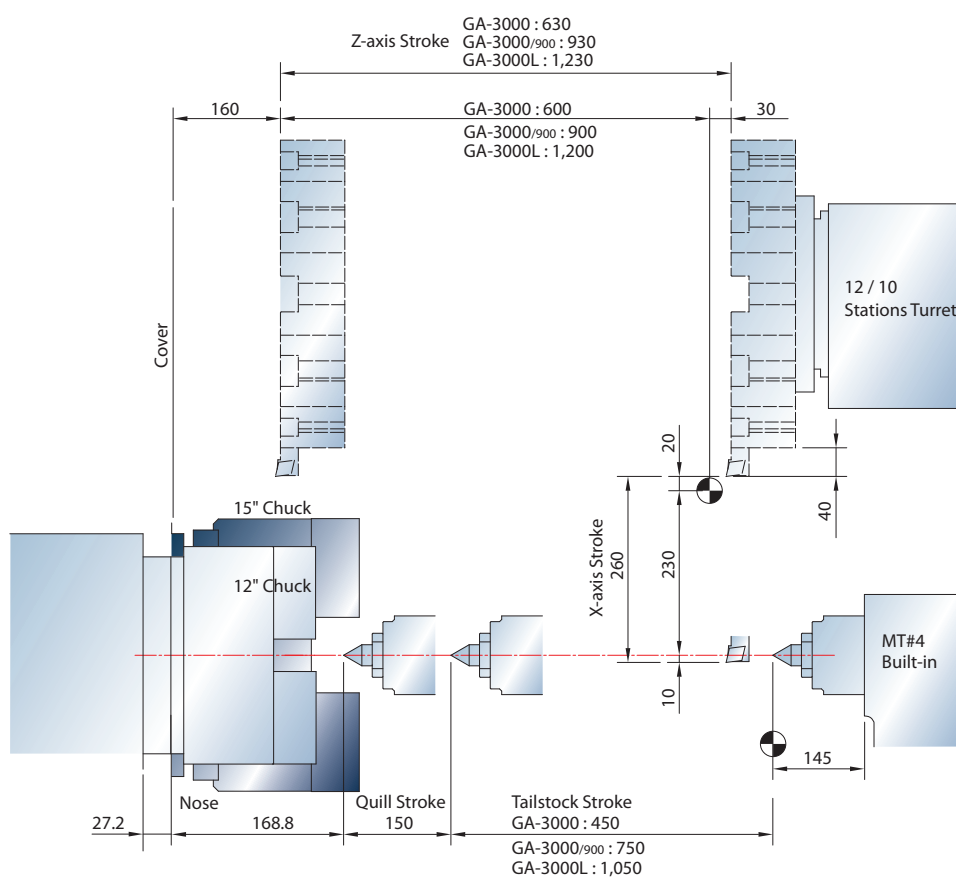


Interference Diagram



Unit : mm

Work Range

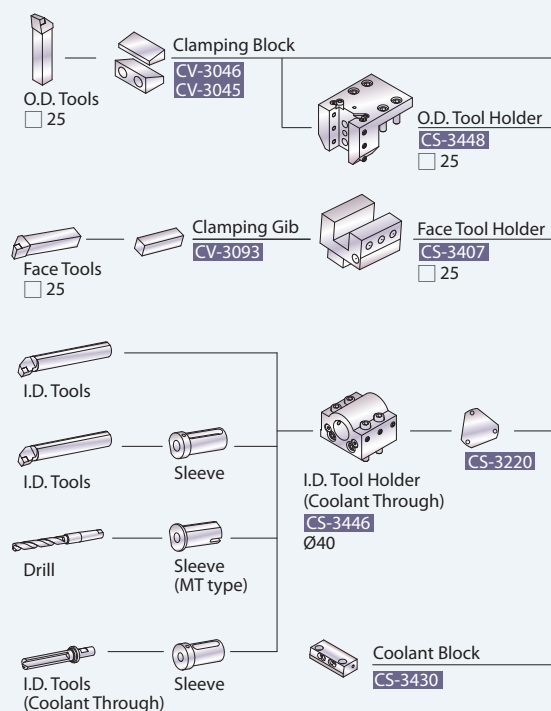


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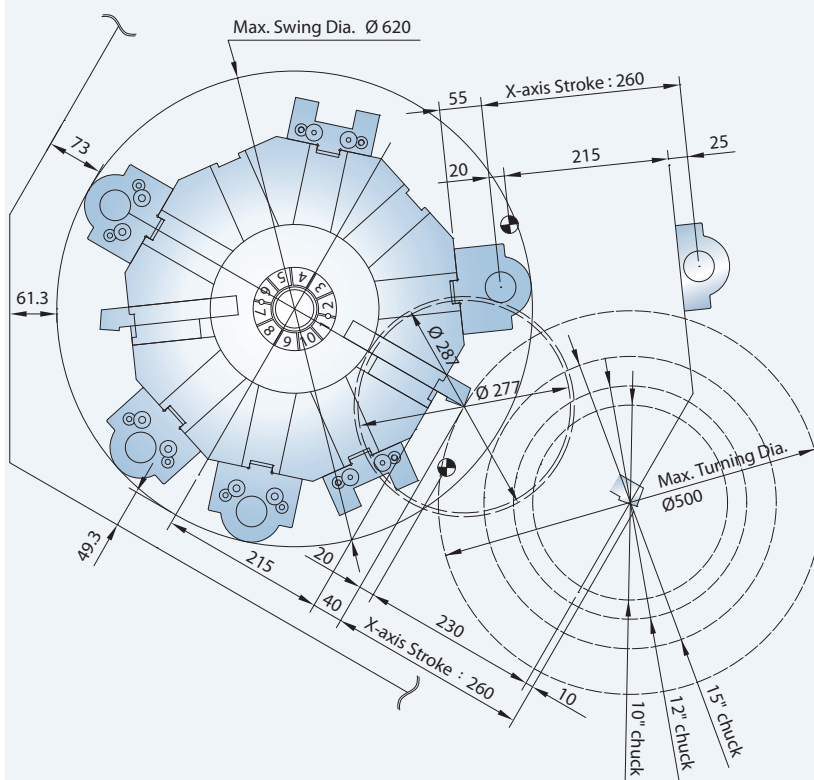
12

【 Optional 10-Stations Turret 】

Tooling System



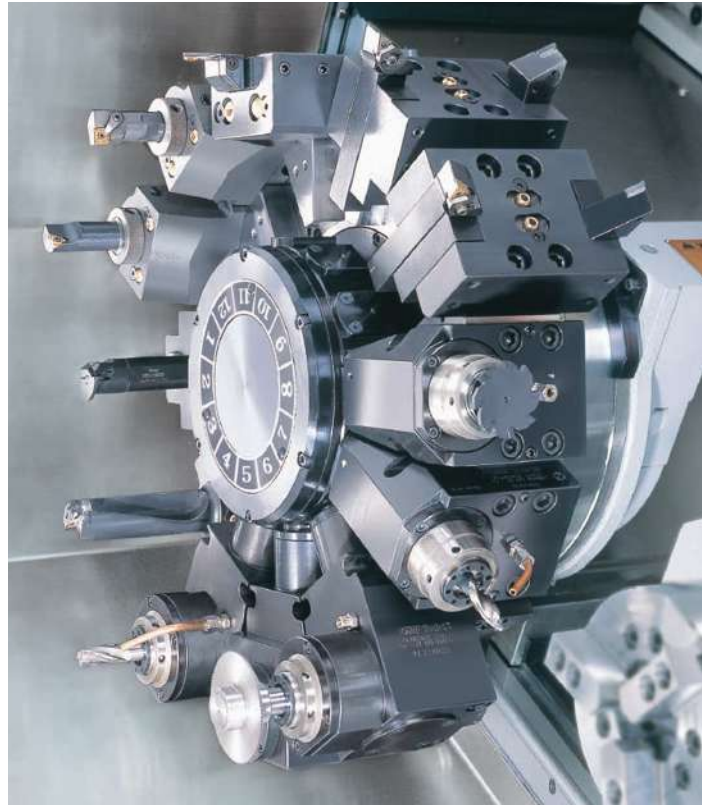
Interference Diagram



Unit : mm

LIVE TOOLING TURRETS

- ▶ Live tooling capabilities on the GA series allows a work piece to be turned, milled, drilled and tapped without moving it to another machine.
- ▶ The 12-station GOODWAY live tooling turret offers 12 stations available for live tooling (live tooling tools rotate in working position only) and features a non-lifting turret disk.
- ▶ GOODWAY's live tooling turret utilizes the latest servo indexing technology to achieve 0.2 second indexing times for adjacent stations and 0.5 second for stations at the opposite end of the disk.
- ▶ With the latest technology, live tooling is driven by an AC servo motor to provide ample power, in the form of torque. Now, even the toughest of jobs may be tackled without a sweat.



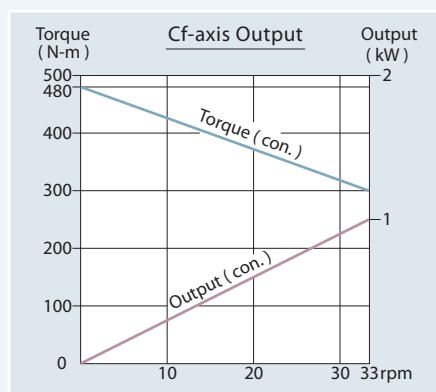
(Sub-spindle not available on GA series)

ULTIMATE C-AXIS SPINDLE



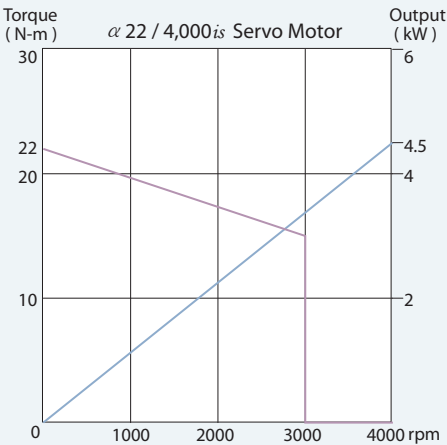
- ▶ With the Fanuc servo motor generating an ultra high resolution of 33,000,000 pulses per spindle rotation and 480 N-m of torque, surface finishes are much superior than Cs-axis (driven by spindle motor) equipped machines. Plus, dynamic accuracy is within $\pm 0.02^\circ$ even under heavy cutting loads.

- ▶ The Cf-axis and disk brake system available on the GA series provides the most rigid and powerful type of C-axis on the market today. In Cf-axis mode, a servo motor is engaged and drives the rotation of the spindle, engagement time is less than 2 seconds.
- ▶ Working with the live tooling turret, the Cf-axis and disk brake system enables the machine to perform drilling, tapping, and milling operations, including cylindrical and polar coordinate interpolations (resembling a 4th-axis rotary table on a machining center).





GA-2000 & GA-3000 Series
Live Tooling Turret Output



Machining Capability

	Models	Tools (mm)	Spindle Speed (rpm)	Feedrate (mm/min)	Cutting Speed (m/min)	Cutting Depth (mm)
Drill	GA-2000	Ø 20	600	60	38	N/A
End Mill		Ø 20	1,000	200	63	12.7
Tapping	GA-3000	M16 * P2.0	200	400	10	N/A

Raw Material : S45C

Live Tooling Turret Specification

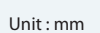
Drive Motor Power (con.)	Drive Motor	Max. Tapping Capacity	Max. Milling Capacity	Gear Ratio
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4.5 kW (6 HP) FANUC α 22 / 4,000is 16 mm (0.63") Ø 20 mm 4 : 3

Sample Work Pieces



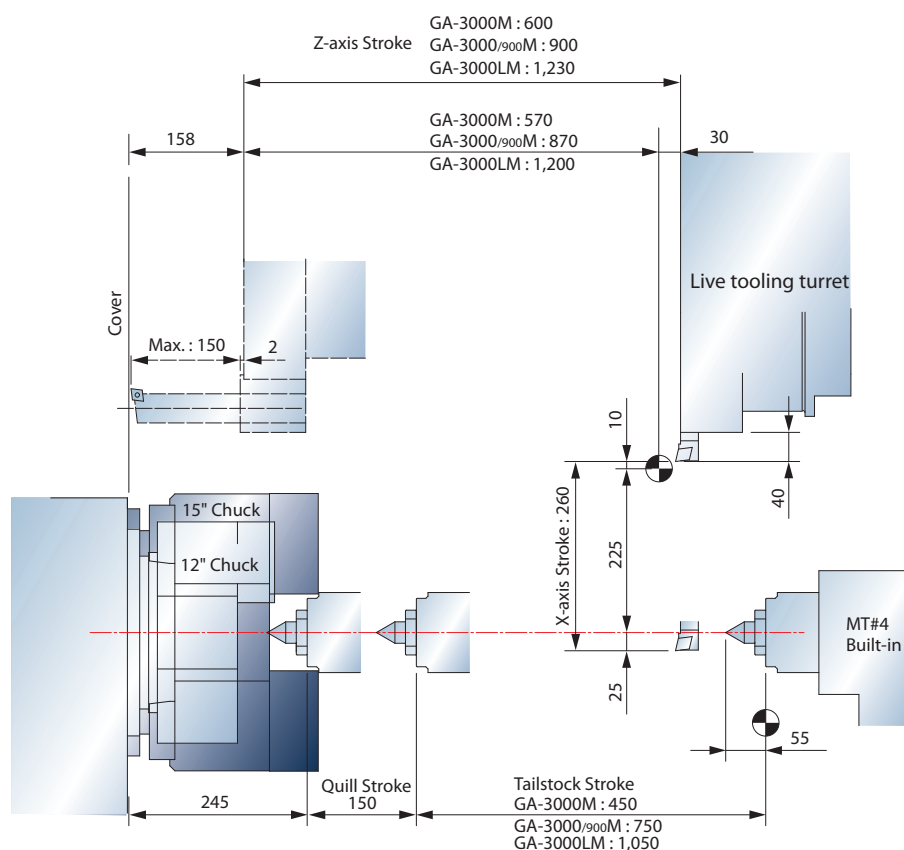
Work Range



【 Optional 12-Stations Live Tooling Turret 】

GA-3000 SERIES

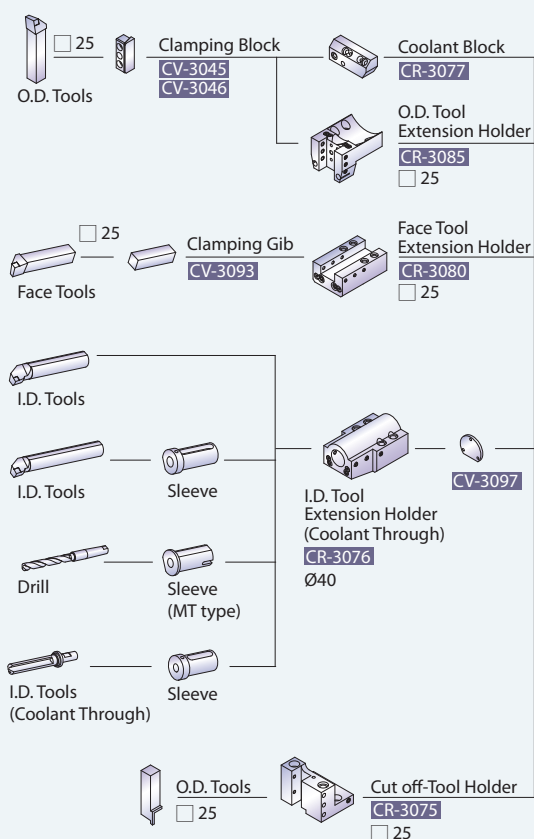
Work Range



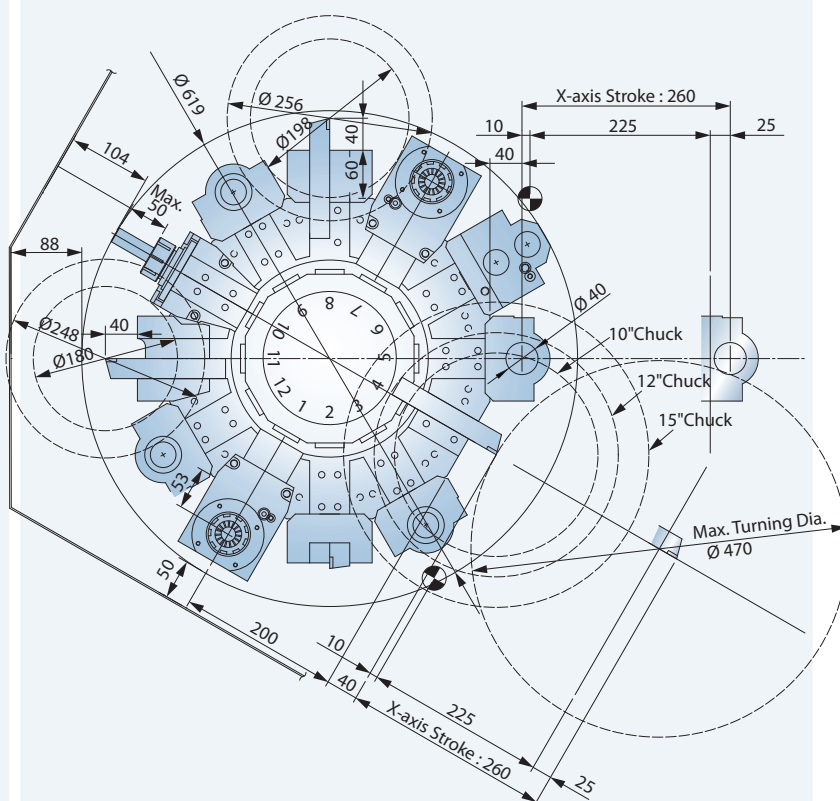
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Tooling System



Interference Diagram



Unit : mm

LIVE TOOLING & SPECIAL TOOL HOLDERS

0° Live Tool Holder

O.D. drill & mill holder
(ER 32 collet)



O.D. mill holder with
combination mill arbor
similar to DIN 6358



High speed O.D. drill &
mill holder
(ER 20 collet, Max. 8,000 rpm,
ratio $i = 1 : 2$)



90° Live Tool Holder

Face drill & mill holder
(ER 32 collet)



Dual-side face drill &
mill holder
(ER 32 collet)

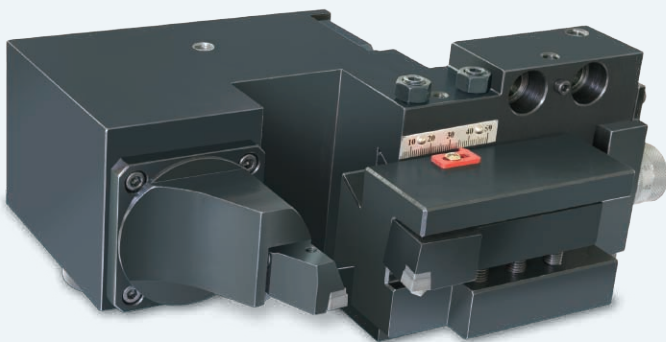


High speed face drill &
mill holder
(ER 20 collet, Max. 8,000 rpm,
ratio $i = 1 : 2$)



Dual-Face Turning Holder

GOODWAY dual-face turning holder allow both sides of a disk-type work piece to be machined at the same time. Tool holder automatically spreads open for retracting tooling to avoid damage to the turned surfaces.



Simultaneous dual-face
turning of disk brake

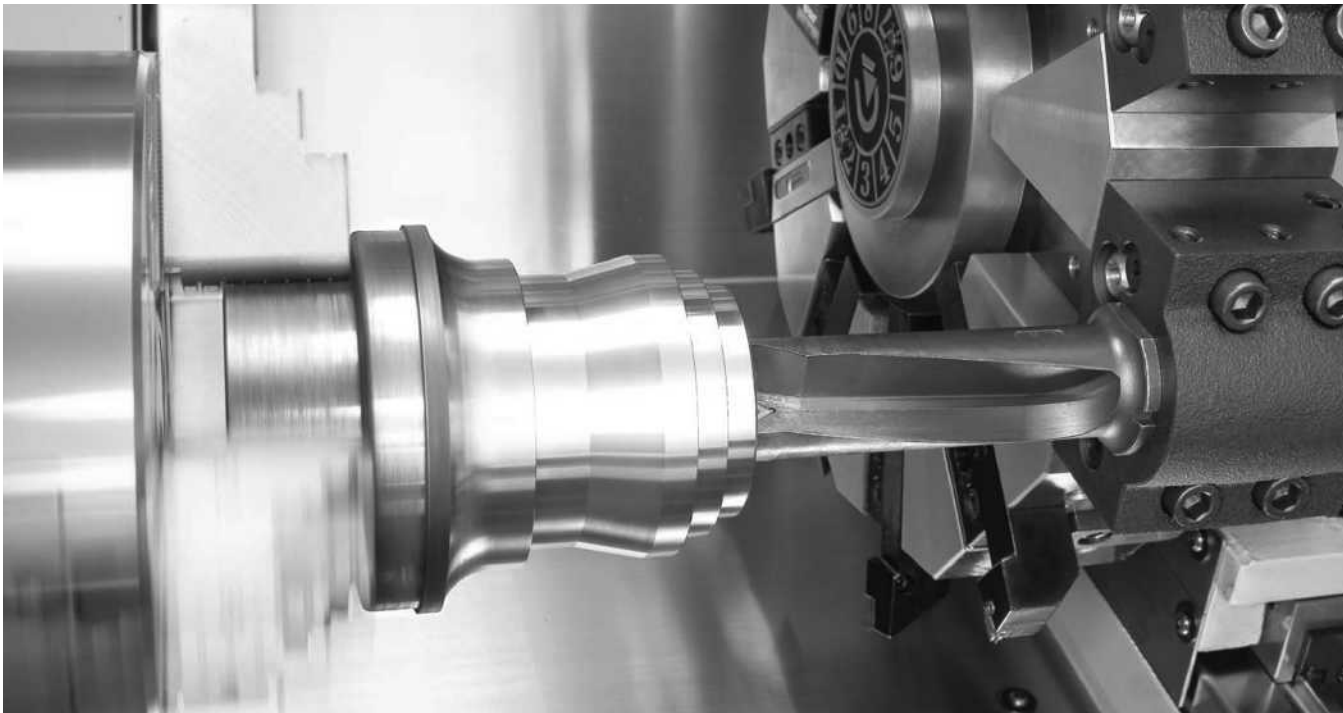


Fine adjustment of
turning thickness

- ▶ Machining time is reduced by over 50%.
- ▶ No unwanted turning marks.
- ▶ Excellent surface quality by using a viper geometry ground insert.
- ▶ Reduced vibration & increase parallelism accuracy utilizing symmetrical cutting pressure.

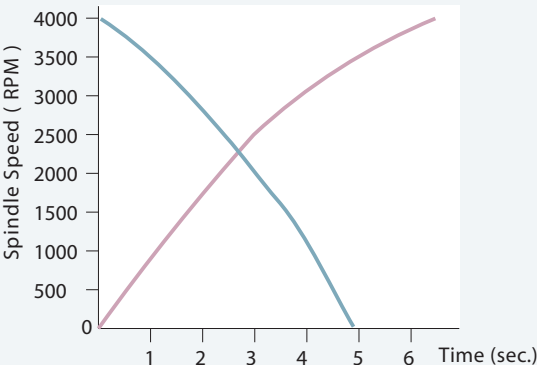
- ▶ Hydraulic movement with adjustable block.
- ▶ Setups are easy with the integration of both hydraulic and spring activation.

MACHINING PERFORMANCE

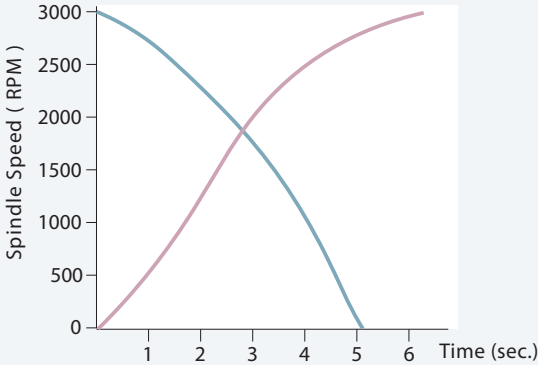


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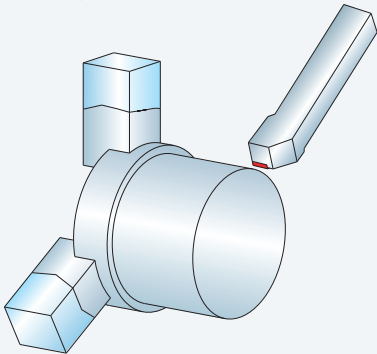
GA-2600 Spindle Acc. / Dec. Times
Chuck : 10" + Hard Jaws



GA-3000 Spindle Acc. / Dec. Times
Chuck : 12" + Hard Jaws



OD Heavy Cutting Example



GA-2000

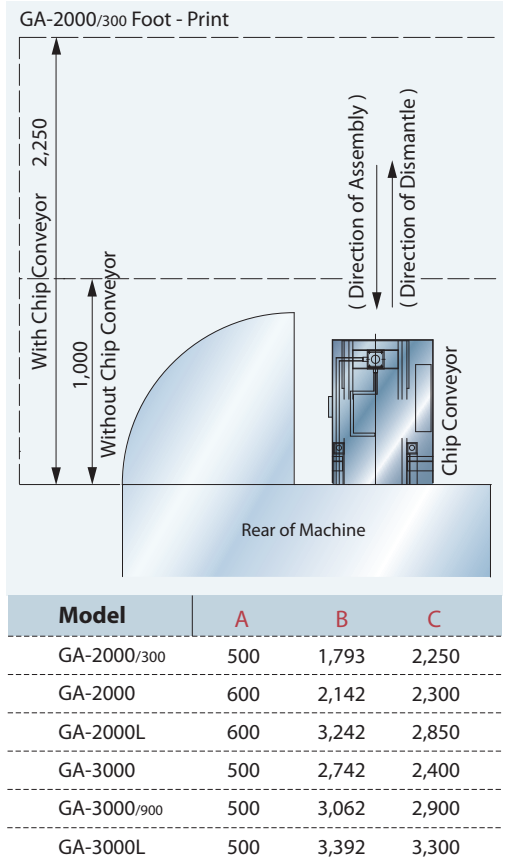
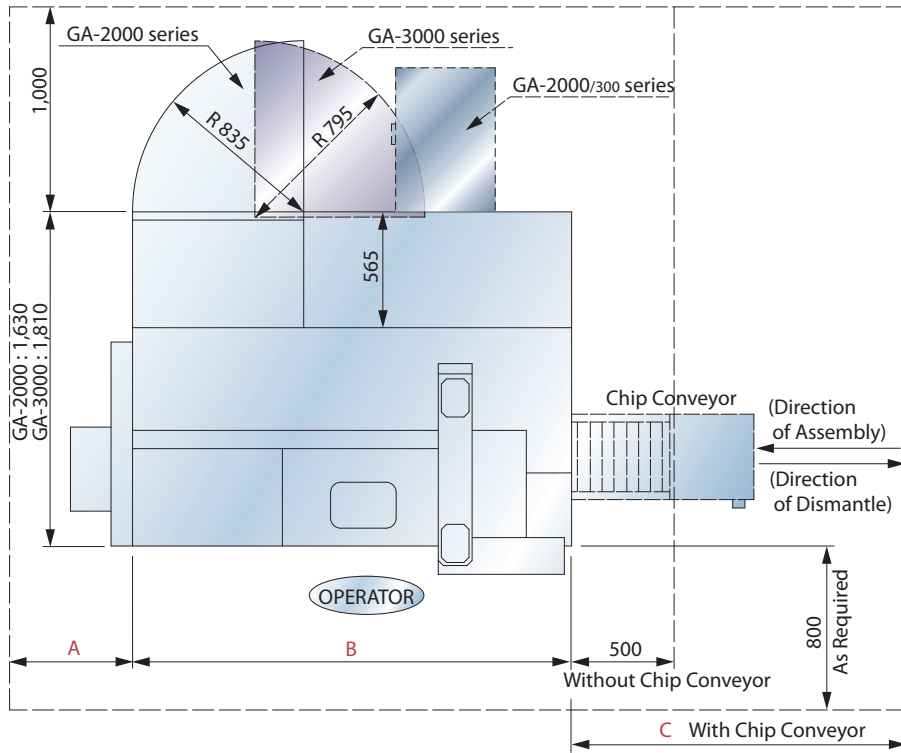
	OD Before Cut	OD After Cut	Spindle Speed	F / Rev.	Depth of Cut	Spindle Load
1	108 mm (4.25")	96 mm (3.77")	500 RPM	0.30 mm (0.0118")	6 mm / side (0.2362" / side)	97%
2	96 mm (3.77")	82 mm (3.22")	550 RPM	0.32 mm (0.0125")	7 mm / side (0.2755" / side)	112%

GA-3000

	OD Before Cut	OD After Cut	Spindle Speed	F / Rev.	Depth of Cut	Spindle Load
	144 mm (5.67")	120 mm (4.72")	729 RPM	0.40 mm (0.016")	12 mm / side (0.4724" / side)	65%

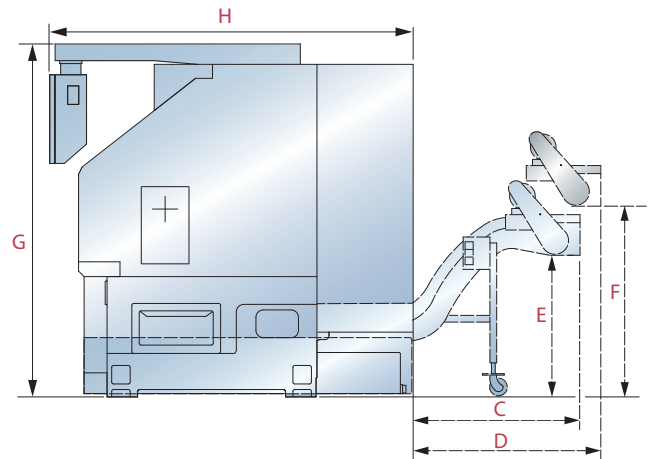
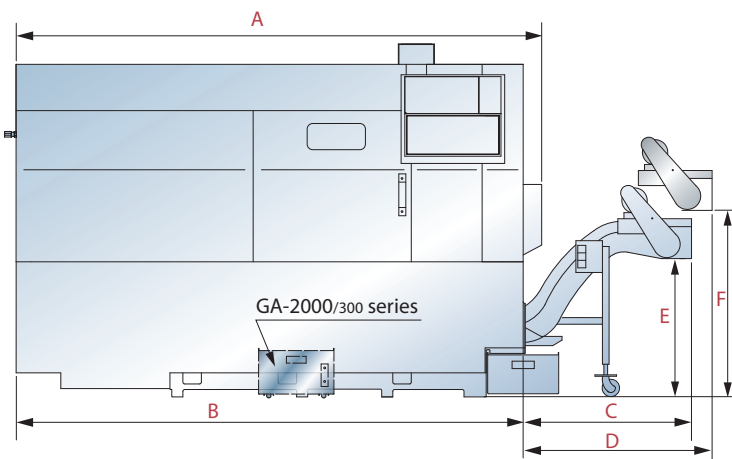
GENERAL DIMENSION

Space Requirement



Machine Layout

Unit : mm



Model	A	B	C	D	E	F	G	H
GA-2000/300	1,995	1,793	890	1,000	800	1,000	1,725	1,630
GA-2000	2,445	2,142	890	1,000	800	1,000	1,890	1,630
GA-2000L	3,345	3,242	890	1,000	800	1,000	1,890	1,630
GA-3000	2,845	2,740	810	1,060	803	1,200	1,910	1,965
GA-3000/900	3,165	3,060	810	1,060	803	1,200	1,910	1,980
GA-3000L	3,495	3,390	810	1,060	803	1,200	1,910	2,020

Specifications are subject to change without notice.

FEATURES

【Optional Features】

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Tool Setter

- ▶ The optional Renishaw HPMA tool setter utilizes a motorized arm to lower the tool probe into position. An auto tool check function further increases tool touch off efficiency. (HPRA removeable-arm type tool setter on GA-3600 / L series)

Load Monitoring

- ▶ The load monitoring function is used to detect abnormal load of tools by monitoring the variation in spindle motor and servo motor loads during the cutting process. When abnormal loads are detected, the machine will stop at program end (M30) or immediately (feed hold status) according to tool life value or tool break value respectively.

LOAD MONITOR SETTING 1/4 UNIT: %					
code	AXIS	INITIAL	CURRENT	LIFE	BREAK
1 0000	SP	0	0	0	0
	Z	0	0	0	0
2 0000	SP	0	0	0	0
	Z	0	0	0	0
3 0000	SP	0	0	0	0
	Z	0	0	0	0

NUM=

(TECH) (MONI) (CAN) () () ()



Parts Catcher

- ▶ Optional hydraulic parts catchers can be programmed to catch finished parts after cut-off.



Bar Feeder

- ▶ Optional bar feeding systems feed bars up to Ø 65 mm diameter.



Built-in Robot Arm

- ▶ Integrated robot arm saves manpower and floor space.



STANDARD & OPTIONAL FEATURES

S: Standard

O: Option

-: Not Available

C: Contact Goodway

3-Jaw Chuck
w/ Soft Jaws x 1 set (Std.)



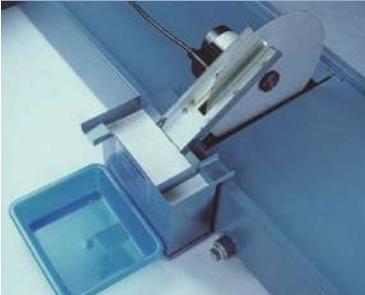
Tri-color Status Light (Std.)



Lubrication Unit (Std.)



Oil Skimmer (Opt.)



External Work Light (Opt.)



SPINDLE

		GA-2000	GA-2600	GA-2800	GA-3000	GA-3300	GA-3600
Main spindle motor configuration	Single-speed	S	S	S	S	S	S
	Two-speed	O	O	O	O	O	O
Rigid tapping & spindle orientation		S	S	S	S	S	S
Spindle disk brake		O	O	O	O	O	O
Cf-axis & spindle disk brake*1		O	O	O	O	O	O
Sub-spindle		-	-	-	-	-	-

WORK HOLDING

	8"	S	-	-	-	-	-
	8" Big-Bore	-	O	-	-	-	-
	10"	-	S	-	S	-	-
Hydraulic hollow 3-jaw chuck	10" Big-Bore	-	-	S	-	-	-
	12"	-	-	-	-	S	-
	15"	-	-	-	-	-	S
Hard jaws	1 set	O	O	O	O	O	O
Soft jaws	1 set	S	S	S	S	S	S
Collet chuck		O	O	O	O	O	O
Special work holding chuck		C	C	C	C	C	C
In spindle work stopper		O	O	O	O	O	O
Spindle liner (guide bushing)		O	O	O	O	O	O
Foot switch for chuck operation	Single	S	S	S	S	S	S
	Double	O	O	O	O	O	O
Programmable base & quill hydraulic tailstock		S	S	S	S	S	S
MT#4 live center		O	O	O	-	-	-
MT#5 live center		-	-	-	O	O	O
Foot switch for tailstock operation	Single	O	O	O	O	O	O
	Double	O	O	O	O	O	O
Self-centering hydraulic steady rest		O	O	O	O	O	O
Foot switch for steady rest operation	Single	O	O	O	O	O	O
	Double	O	O	O	O	O	O
Two-stage programmable pressure	Chuck clamping	O	O	O	O	O	O
	Tailstock thrust	O	O	O	O	O	O

TURRET

10-station turret		O	O	O	O	O	O
12-station turret		S	S	S	S	S	S
12-station live tooling turret w/ no-lift tooling disk*1		O	O	O	O	O	O
Tool holder & sleeve package		S	S	S	S	S	S
Live tooling tool holders		O	O	O	O	O	O

MEASUREMENT

Renishaw HPMA tool presetter	Motorized arm	O	O	O	O	O	-
Renishaw HPRA tool presetter		-	-	-	-	-	O

COOLANT

Coolant pump	3 Kg/cm ²	S	S	S	S	S	S
	5 Kg/cm ²	O	O	O	O	O	O
High-pressure coolant system	20 Kg/cm ²	O	O	O	O	O	O
Roll-out coolant tank		S	S	S	S	S	S
Oil skimmer		O	O	O	O	O	O
Coolant flow switch		O	O	O	O	O	O
Coolant level switch		O	O	O	O	O	O
Coolant intercooler system		O	O	O	O	O	O

CHIP DISPOSAL

Chip conveyor with auto timer	Right discharge	S	S	S	S	S	S
	Rear discharge*2	O	O	O	O	O	O
Chip cart with coolant drain		O	O	O	O	O	O
Chuck air blow		O	O	O	O	O	O
Tailstock air blow		O	O	O	O	O	O
Coolant gun		O	O	O	O	O	O
Oil mist collector		O	O	O	O	O	O

AUTOMATIC OPERATION SUPPORT

Parts catcher		O	O	O	O	O	O
Work piece transport conveyor		O	O	O	O	O	O
Bar feeder		O	O	O	O	O	O
Bar feeder interface		O	O	O	O	O	O
Gantry-type loader / unloader		O	O	O	O	O	O
Auto door		O	O	O	O	O	O
Extra M-code output	4 sets (8)	O	O	O	O	O	O
	8 sets (16)	O	O	O	O	O	O

*1 Standard on M models.

*2 GA-2000/300 models & GA-3000 series models only.

S: Standard O: Option
 -: Not Available C: Contact Goodway

	GA-2000	GA-2600	GA-2800	GA-3000	GA-3300	GA-3600
SAFETY						
Fully enclosed guarding	S	S	S	S	S	S
Door interlock (incl. Mechanical lock)	S	S	S	S	S	S
Impact resistant viewing window	S	S	S	S	S	S
Tailstock stroke out - end check	S	S	S	S	S	S
Chuck cylinder stroke out - end check	S	S	S	S	S	S
Chuck cylinder check valve	S	S	S	S	S	S
Low hydraulic pressure detection switch	S	S	S	S	S	S
Over travel (soft limit)	S	S	S	S	S	S
Load monitoring function	O	O	O	O	O	O
OTHERS						
Tri-color operation status light tower	S	S	S	S	S	S
Florescent work light	S	S	S	S	S	S
Electrical cabinet	Heat exchanger		S	S	S	S
	A/C cooling system		O	O	O	O
Complete hydraulic system	S	S	S	S	S	S
Hydraulic oil intercooler system	S	S	S	S	S	S
Advanced auto lubrication system	S	S	S	S	S	S
Foundation leveling & maintenance tool kit	S	S	S	S	S	S
Emergency maintenance electrical part package	S	S	S	S	S	S
Operation & maintenance manuals	S	S	S	S	S	S

FANUC CONTROL FUNCTIONS**		Oi-TD	31i
PMC system	Oi TD PMC 25 nsec/step	S	-
	31i PMC 25 nsec/step	-	S
Display	8.4" color LCD	S	-
	10.4" color LCD	O	S
Graphic function	Standard	S	-
	Dynamic	O	S
Full keypad	Small - 44 keys	S	-
	Large - 56 keys	O*6	S
Part program storage length	512K bytes	S	-
	1M bytes	-	S
	2M bytes	-	O
	4M bytes	-	O
	8Mbytes	-	O
Registerable programs	400	S	-
	1,000	-	S
	4,000	-	O
	64	S	-
Tool offset pairs	99	O	S
	400	-	O
	499	-	O
	999	-	O
	2000	-	O
Servo control	HRV2 (3)	S	S
Conversational programming	Manual Guide Oi	S	-
	Manual Guide i	O*6	S
Servo motors	α i	S	S
Spindle motors	α i	S	S
Tool Life Management		S	S
Tool Nose Radius Compensation		S	S
Background editing		S	O
Variable Lead Thread Cutting		S	S
Polygon Turning		S	S*7
Unexpected disturbance torque detection function		S	S
Polar coordinate & cylindrical interpolation		-	O
Multiple Threading		S	S
Run hour & parts counter		S	S
Auto power off function		S	S
Custom macro B		S	S
RS-232 port		S	S
Memory card input /output		S	S
Ethernet		S	S
Fast ethernet		O	O

4-Jaw Chuck (Opt.)



Air Chuck (Opt.)



Automatic Steady Rest (Opt.)



Electrical Cabinet A/C (Opt.)



Parts Conveyor (Opt.)



MACHINE SPECIFICATIONS

CAPACITY	GA-2000		GA-2600	GA-2800
Max. swing diameter			Ø 580 mm (22.83")	
Swing over saddle			Ø 400 mm (15.74")	
Max. turning diameter			Ø 350 mm (13.77")	
Std. turning diameter			Ø 210 mm (8.26")	
Max. turning length*1	309 mm 624 mm 1,204 mm (12.16") (24.56") (47.4")	291 mm 606 mm 1,186 mm (11.45") (23.85") (46.69")	260 mm 575 mm 1,155 mm (10.23") (22.63") (45.47")	
Max. work piece weight *2	170 Kg (374 lbs.)		230 Kg (506 lbs.)	250 Kg (550 lbs.)
Chuck size	Ø 8"		Ø 10"	Ø 10" (Big-Bore)
Bar capacity	Ø 51 mm (2.00")		Ø 65 mm (2.55")	Ø 75 mm (2.95")
SPINDLE				
Hole through draw tube	Ø 52 mm (2.05")		Ø 66 mm (2.59")	Ø 76 mm (2.99")
Hole through spindle	Ø 66 mm (2.59")		Ø 76 mm (2.99")	Ø 90 mm (3.54")
Spindle bearing diameter	Ø 100 mm (3.93")		Ø 120 mm (4.72")	Ø 130 mm (5.11")
Hydraulic cylinder	8"		10"	10" (Big-Bore)
Spindle nose	A2-6		A2-8	A2-8
Spindle motor type	Fanuc α P22 / 6,000 <i>i</i> (AC / Wide-Range / Cont. Ouput)			
Motor output (Cont.)	11 kW (15 HP)			
Motor output (30 min.)	15 kW (20 HP)			
Motor full output speed	750 RPM			
Spindle drive system	Direct Belt Drive			
Spindle drive ratio	4 : 5		2 : 3	7 : 12
Spindle speed range	48 ~ 4,800 RPM		40 ~ 4,000 RPM	35 ~ 3,500 RPM
Spindle full output speed	600 RPM		500 RPM	440 RPM
Spindle torque (30 min.)	238 N-m (176 ft-lbs)		286 N-m (211 ft-lbs)	325 N-m (240 ft-lbs)
Spindle torque (Cont.)	175 N-m (129 ft-lbs)		211 N-m (156 ft-lbs)	240 N-m (177 ft-lbs)
2-SPEED SPINDLE (OPTIONAL)				
Spindle speed ranges	L	20 ~1,200 RPM	20 ~1,000 RPM	20 ~875 RPM
	H	1,201 ~ 4,800 RPM	1,001 ~ 4,000 RPM	876 ~ 3,500 RPM
Spindle full output speed	L	400 RPM	333 RPM	291 RPM
	H	600 RPM	500 RPM	440 RPM
Spindle torque (15 min.)	L	360 N-m (266 ft-lbs)	430 N-m (317 ft-lbs)	497 N-m (367 ft-lbs)
Spindle torque (30 min.)	H	238 N-m (176 ft-lbs)	286 N-m (211 ft-lbs)	325 N-m (240 ft-lbs)
Cf-AXIS SPINDLE (OPTIONAL)				
Drive type	AC Servo Motor 0.7 kW (Fanuc α 2 / 5,000 <i>i</i> , Absolute Encoder, 1,000,000/rev.)			
Toruqe output / max. speed	240 N-m (177 ft-lbs) / 33 RPM			
X & Z AXES				
Max. X-axis travel*3	205 mm (8.07")			
Max. Z-axis travel*1	350 mm (13.77") 650 mm (25.59") 1,230 mm (48.42")			
X / Z axes rapids	20 m/min. (788 IPM) / 24 m/min. (945 IPM)			
Slide way type	Hardened & Ground Box Ways			
Feed rates	1~ 4,800 mm/min. (1~189 IPM)			
X-axis servo motor	AC 1.6 kW (2.1 HP , Fanuc α 8B / 3,000 <i>i</i> , Absolute encoder, 1,000,000/rev.)			
Z-axis servo motor	AC 3.0 kW (4 HP , Fanuc α 12 / 3,000 <i>i</i> , Absolute encoder, 1,000,000/rev.)			
X-axis ball screw Ø / pitch	Ø 32 mm (1.26") / Pitch 6			
Z-axis ball screw Ø / pitch	Ø 36 mm (1.41") / Pitch 10			
X / Z axes thrust (Cont.)	850 Kg (1,870 lbs.) / 760 Kg (1,672 lbs)			

Specifications are subject to change without notice.

*2 Work piece supported by chuck & tailstock.

*1 GA-2000/300 || GA-2000 || GA-2000L

*3 Individual models may vary, please see interference drawings.

Performance	Dimensions	Features	Specifications
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CAPACITY		GA-3000	GA-3300	GA-3600
Max. swing diameter		Ø 600 mm (23.62")		
Swing over saddle		Ø 500 mm (19.69")		
Max. turning diameter		Ø 500 mm (19.69")		
Std. turning diameter		Ø 225 mm (8.86")		
Max. turning length*1		629 mm 929 mm 1,229 mm (24.76") (36.57") (48.39")	624 mm 924 mm 1,224 mm (24.55") (36.37") (48.18")	596 mm 896 mm 1,196 mm (23.46") (35.27") (47.08")
Max. work piece weight *2²		340 Kg (748 lbs.)	340 Kg (748 lbs.)	340 Kg (748 lbs.)
Chuck size		Ø 10" (12")	Ø 12" (15")	Ø 15"
Bar capacity		Ø 75 mm (2.95")	Ø 90 mm (3.54")	Ø 105 mm (4.13")
SPINDLE				
Hole through draw tube		Ø 75 mm (2.95")	Ø 90 mm (3.54")	Ø 105 mm (4.13")
Hole through spindle		Ø 90 mm (3.54")	Ø 101 mm (3.98")	Ø 121 mm (4.76")
Spindle bearing diameter		Ø 130 mm (5.12")	Ø 140 mm (5.51")	Ø 160 mm (6.30")
Hydraulic cylinder		10"	12"	15"
Spindle nose		A2-8	A2-8	A2-11
Spindle motor type		Fanuc α P40 / 6,000 <i>i</i> (AC / Wide-Range)		
Motor output (Cont.)		18.5 Kw (25 HP)		
Motor output (30 min.)		22 Kw (29.5 HP)		
Motor full output speed		400 / 575 RPM		
Spindle drive system		Direct Belt Drive		
Spindle drive ratio		7 : 10	7 : 10	35 : 54
Spindle speed range		30 ~ 3,000 RPM	30 ~ 3,000 RPM	25 ~ 2,500 RPM
Spindle full output speed		403 RPM	403 RPM	373 RPM
Spindle torque (30 min.)		522 N-m (385 ft-lbs)	522 N-m (385 ft-lbs)	563 N-m (415 ft-lbs)
Spindle torque (Cont.)		439 N-m (324 ft-lbs)	439 N-m (324 ft-lbs)	473 N-m (349 ft-lbs)
2-SPEED SPINDLE (OPTIONAL)				
Spindle speed ranges	L	30 ~ 700 RPM	30 ~ 700 RPM	25 ~ 648 RPM
	H	701 ~ 3,000 RPM	701 ~ 3,000 RPM	649 ~ 2,500 RPM
Spindle full output speed	L	280 RPM	280 RPM	260 RPM
	H	403 RPM	403 RPM	373 RPM
Spindle torque (15 min.)	L	750 N-m (553 ft-lbs)	750 N-m (553 ft-lbs)	810 N-m (597 ft-lbs)
Spindle torque (30 min.)	H	439 N-m (324 ft-lbs)	439 N-m (324 ft-lbs)	473 N-m (439 ft-lbs)
Cf-AXIS SPINDLE (OPTIONAL)				
Drive type		Fanuc α 4 / 5,000 <i>is</i>		
Toruqe output / max. speed		480 N-m (354 ft-lbs) / 33 RPM		
X & Z AXES				
Max. X-axis travel*3		260 mm (10.23")		
Max. Z-axis travel*4		630 mm (24.80") 930 mm (36.61") 1,230 mm (48.42")		
X / Z axes rapids		20 m/min. (788 IPM) / 24m/min. (945 IPM)		
Slide way type		Box Ways		
Feed rates		1~ 4,800 mm/min. (1~189 IPM)		
X-axis servo motor		AC 2.7 Kw (4 HP, Fanuc α 12B / 4,000 <i>is</i> , Absolute encoder, 1,000,000/rev.)		
Z-axis servo motor		AC 4.5 Kw (6 HP, Fanuc α 22 / 4,000 <i>is</i> , Absolute encoder, 1,000,000/rev.)		
X-axis ball screw Ø / pitch		Ø 36 mm (1.41") / Pitch 8		
Z-axis ball screw Ø / pitch		Ø 45 mm (1.77") / Pitch 10		
X / Z axes thrust (Cont.)		962 Kg (2,116 lbs.) / 1,411 Kg (3,104 lbs)		

Specifications are subject to change without notice.

*4 GA-3000 || GA-3000/900 || GA-3000L

MACHINE SPECIFICATIONS

TURRET	GA-2000	GA-2600	GA-2800
Stations	12 Std. / 10 Opt.		
Indexing drive	AC Servo motor		
Indexing speed	0.2 sec. Adjacent / 0.5 sec. 180 degrees (Single step)		
Accuracy	Positioning: ± 0.00069°, Repeatability: ± 0.00027°		
OD tool shank size	□ 25 mm (1")		
ID tool shank size	Ø 40 mm (1-1/2")		
LIVE TOOLING TURRET (OPTIONAL)			
Stations	12		
Live tooling stations	12		
Live tooling drive type	4.5 Kw , 22 N-m (Intermittent) AC Servo motor		
Indexing drive type	AC Servo motor		
Index speed	0.2 sec. Adjacent / 0.5 sec. 180 degrees (Single step)		
OD tool shank size	□ 25 mm (1")		
ID tool shank size	Ø 40 mm (1-1/2")		
Live tooling shank size	ER 32 collets		
Live tooling RPM range	40~ 4,000 RPM		
TAILSTOCK			
Quill center taper	MT #4 (Live Center)		
Quill diameter / travel	Ø 70 mm (2.75") / 150 mm (5.90")		
Tail stock base travel*1	Fixed 550 mm (21.65") 1,140 mm (44.88")		
Programmable quill / base	Yes / Yes (Not available on GA-2000/300 series)		
Programmable base type	Positioned by Z-axis carriage		
PARTS CATCHER (OPTIONAL)			
Maximum part diameter	Ø 77 mm (3.03")		
Maximum part length	150 mm (5.9")		
GENERAL			
Positioning accuracy	± 0.005 mm (0.0002")		
Repeatability	± 0.003 mm (0.0001")		
Standard CNC control	Fanuc Oi-TD		
Voltage / Power requirement	AC 200 / 220 +10% to -15% 3 phase / 26 kVA		
Hydraulic tank capacity	30 L (8 gal.) 40 L (10 gal.) 40 L (10 gal.)		
Coolant tank capacity	145 L (38 gal.) [GA-2000/300 series : 100 L (26 gal.)]		
Coolant pump	0.6 Kw rated at 60 PSI		
Machine weight*1	3,500 Kg (7,700 lbs.) 4,000 Kg (8,800 lbs.) 4,600 Kg (10,120 lbs.)		
Dimensions L × W × H	Machine: 1,995 x 1,630 x 1,725 2,445 x 1,630 x 1890 3,345 x 1,630 x 1,890 mm (78.5" x 64.2" x 67.9" 96.3" x 64.2" x 74.4" 131.7" x 64.2" x 74.4")		
	Machine w/ chip conveyor : GA-2000/300 : 1,995 x 2,235 x 1,725 mm (78.5" x 87.9" x 67.9")		
	GA-2000 : 3,335 x 1,630 x 1,890 mm (131.3" x 64.2" x 74.4")		
	GA-2000L : 4,235 x 1,630 x 1,890 mm (166.7" x 64.2" x 74.4")		

Specifications are subject to change without notice.

*1 GA-2000/300 || GA-2000 || GA-2000L

TURRET	GA-3000	GA-3300	GA-3600
Stations	12 Std. / 10 Opt.		
Indexing drive	AC Servo motor		
Indexing speed	0.3 sec. Adjacent / 0.5 sec. 180 degrees (Single step)		
Accuracy	Positioning: ± 0.00069°, Repeatability: ± 0.00027°		
OD tool shank size	□ 25 mm (1")		
ID tool shank size	Ø 40 mm (1-1/2") [Ø 50 mm (2")]		
LIVE TOOLING TURRET (OPTIONAL)			
Stations	12		
Live tooling stations	12		
Live tooling drive type	4.5 Kw , 22 N-m (Intermittent) AC Servo motor		
Indexing drive type	AC Servo motor		
Index speed	0.2 sec. Adjacent / 0.5 sec. 180 degrees (Single step)		
OD tool shank size	□ 25 mm (1")		
ID tool shank size	Ø 40 mm (1-1/2")		
Live tooling shank size	ER 32 collets		
Live tooling RPM range	4,000 RPM		
TAILSTOCK			
Quill center taper	MT #5 (Live center)[Opt. MT #4 (Dead center)]		
Quill diameter / travel	Ø 110 mm (4.33") / 150 mm (5.90")		
Tail stock base travel*1	450 mm (17.71") 750 mm (29.52") 1,050 mm (41.33")		
Programmable quill / base	Yes / Yes		
Programmable base type	Positioned by Z-axis carriage		
PARTS CATCHER (OPTIONAL)			
Maximum part diameter	Ø 105 mm (4.13")		
Maximum part length	180 mm (7.08")		
GENERAL			
Positioning accuracy	± 0.005 mm (0.0002")		
Repeatability	± 0.003 mm (0.0001")		
Standard CNC control	Fanuc Oi-TD		
Voltage / Power requirement	AC 200 / 220 +10% to -15% 3 phase / 38 kVA		
Hydraulic tank capacity	40 L (10 gal.)		
Coolant tank capacity	145 L (38 gal.)		
Coolant pump	0.6 Kw rated at 60 PSI		
Machine weight*1	5,800 Kg (12,760 lbs.) 6,500 Kg (14,300 lbs.) 7,000 Kg (15,400 lbs.)		
Dimensions L × W × H	Machine : 2,845 x 1,965 x 1,910 3,165 x 1,980 x 1,910 3,495 x 2,020 x 1,910 mm (112.0" x 77.4" x 75.1" 124.6" x 77.9" x 75.1" 137.5" x 79.5" x 75.1")		
	Machine w/ chip conveyor : 3,655 x 1,965 x 1,910 3,975 x 1,980 x 1,910 4,305 x 2,020 x 1,910 mm (143.9" x 77.4" x 75.1" 156.5" x 77.9" x 75.1" 169.5" x 79.5" x 75.1")		

Specifications are subject to change without notice.

*1 GA-3000 || GA-3000/900 || GA-3000L



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