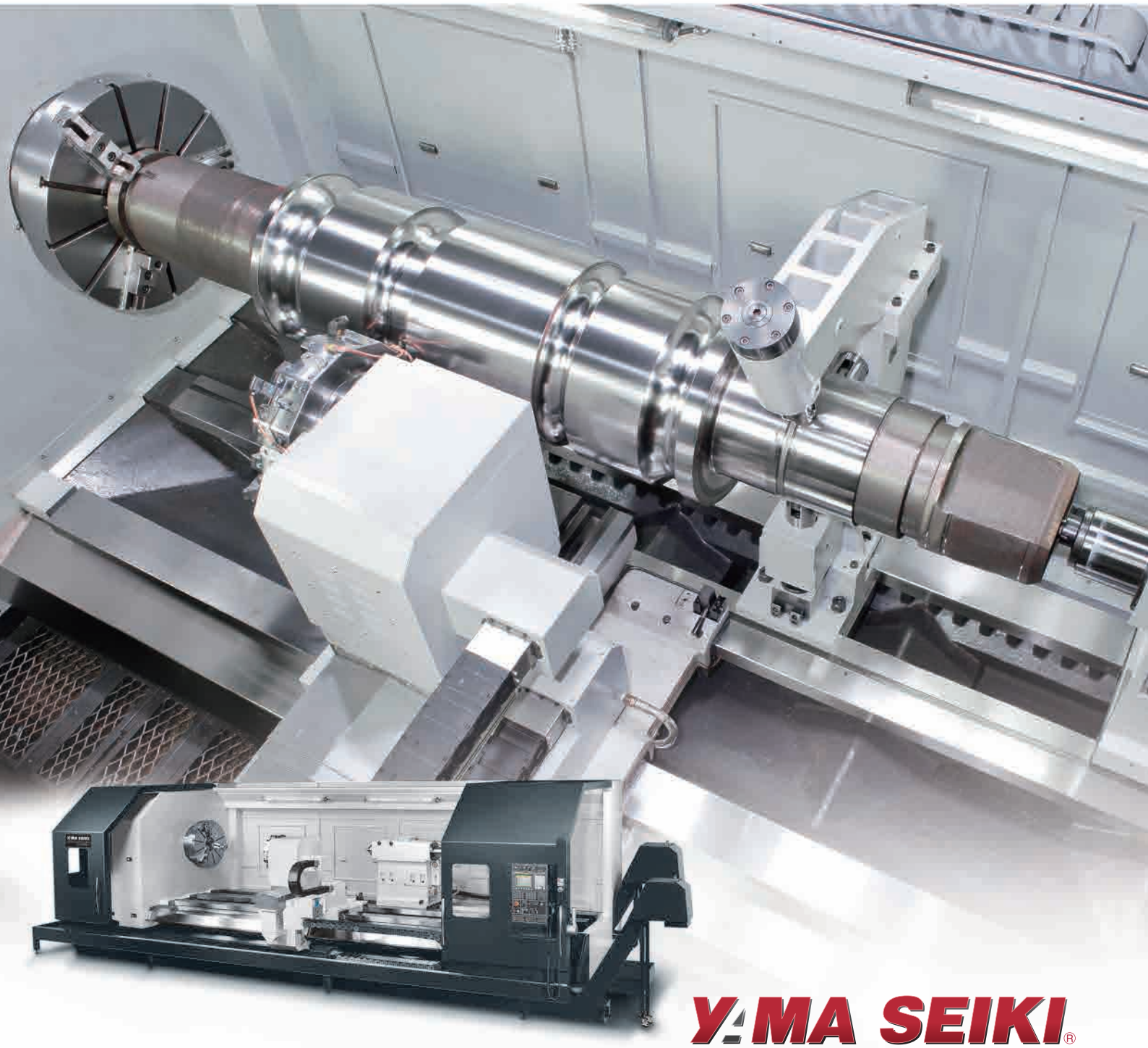
HA SERIES

Flat-Bed CNC Turning Center

www.YAMASEIKI.com



YAMA SEIKI®

TURNING CENTERS by GOODWAY®

FLAT-BED CNC TURNING CENTER

Together with the latest technology and high quality components, the YAMA SEIKI HA series utilizes high rigidity four box way bed with 3-step gear spindle and servo indexing turret to provide heavy-duty cutting capability for super large work-piece applications. It is suitable for energy, aerospace and shipbuilding industry. The optional four-way toolpost, boring bar, and steady rest provide a more efficient turning performance for large work-piece applications. Furthermore, the live tooling turret and C-axis is also available which allows the machine to perform more complicated tasks such as turning, milling, and drilling to fulfill your needs for today and tomorrow.

- One-piece 4 box way and flat bed casting provides a large platform with a heavy-duty structure, suitable for super large work-pieces of any cutting applications.
- 3-step gear spindle provides great torque output under low speed, to fulfill heavy cutting needs.
- Z-axis twin chip conveyor system with separated large coolant tank design provides high efficient chip disposal and stable turning accuracy.

(HA-1600L^5 model shown.)

Max. swing diameter

Ø 2,000 mm (78.74")

Max. turning diamter

Ø 1,700 mm (66.92")

HA-2000 Series

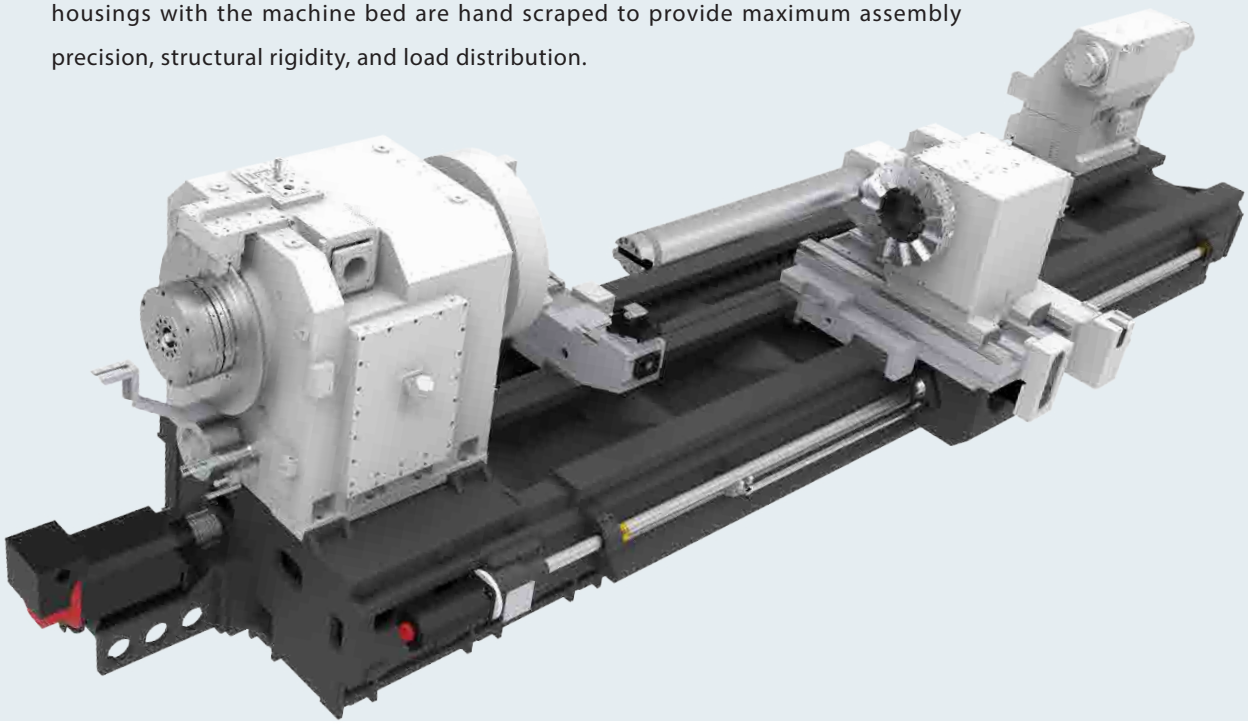
HEAVY-DUTY CONSTRUCTION

- The flat-bed is designed with a low center of gravity, which allows the work-piece weight to be evenly distributed throughout the flat-bed. This can greatly increase machine's overall structure and heavy-duty cutting capability.

- Built to endure years and years of rigorous high production turning, the heavily ribbed, one-piece thermally balanced bed and casting components are of FC35 MEEHANITE casting. FC35 grade cast iron is capable of withstanding much greater stress without deforming and provides maximum vibration damping, which result in a machine that will outlast and outperform the competition.

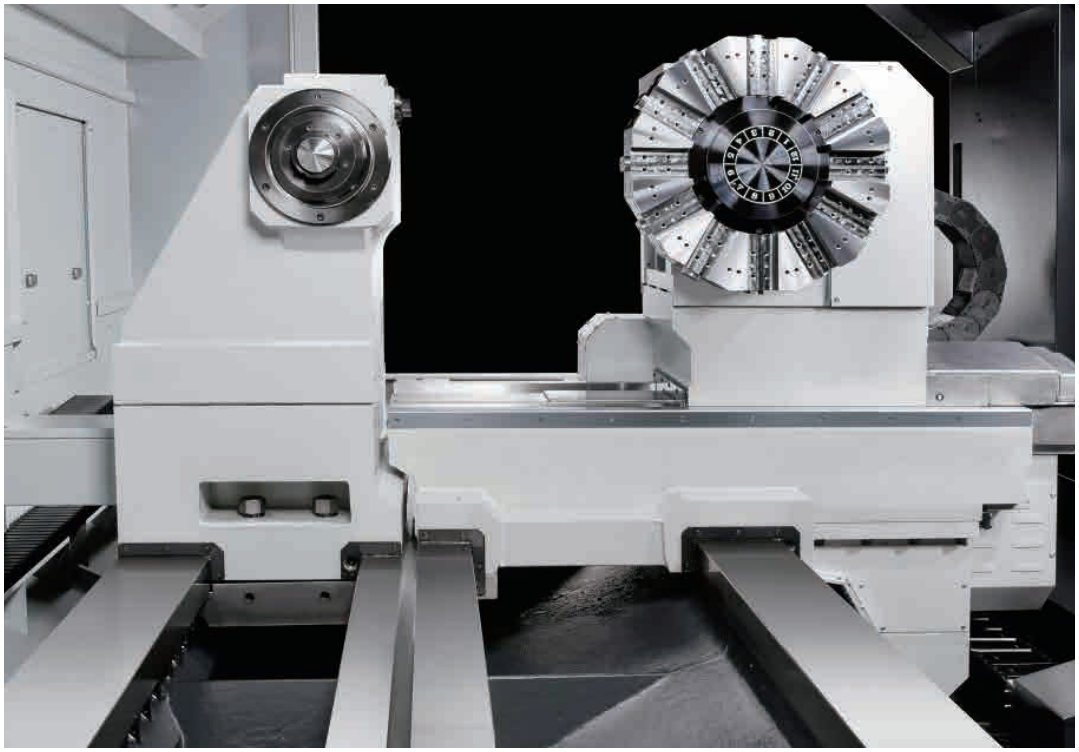
- By using Finite Element Analysis (FEA), optimal reinforce ribbings are directly cast into the one-piece bed structure. Mechanical rigidity has been increased by more than compared to conventional designs.

- 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.



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

- The Z-axis ball screw of the HA-L⁴ series and all other super-long models are equipped with supportive mechanism.



- The one-piece casting components of the box way, bed, and saddle are designed with large span to reach maximum strength and accuracy.
- The X-axis saddle and tailstock travel are designed separately, which allows the tailstock to support the work-piece without crossing the saddle. This prevents the tailstock from overhanging which can influence the rigidity.

- The tailstock is equipped with Ø200 mm (Ø7.87") rotary tailstock spindle, combining the MT#6 dead center quill and sufficient thrust power, to provide stable and accurate support for the work-piece.
- The tailstock spindle control panel is directly integrated in the tailstock base, which allows the operator to easily control the tailstock positioning.
- X-axis carriage locks onto the tailstock base manually and moves it to the desired position with precision accuracy.
- The tailstock is designed with an auxiliary retention which gives a firm support to prevent the tailstock from sliding backwards when working on heavy work-pieces.

(Twin chip conveying system)

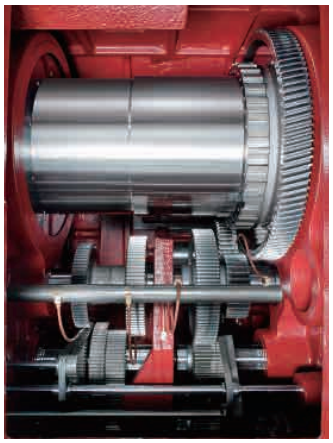
- High performance twin chip conveying system allows the chip to be quickly disposed on both sides of the Z-axis travel through the chip conveyor. This ensures the working area to maintain its temperature while increasing turning stability and accuracy.
- 2,115 ℓ (L^5 Series) super large coolant tank allows optimal air circulation for faster heat dispersion and coolant temperature, which will help extend coolant life.

- The control panel is integrated onto the splash guard. The operator can easily move it to the desired position without safety problems.

- The splash guard and saddle can be synchronized to move together manually during the working progress, which ensures safety for the operator.

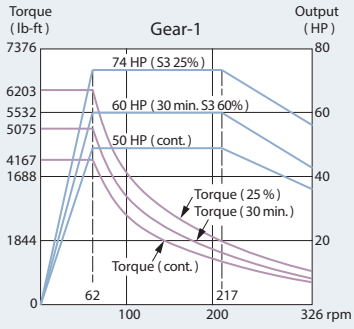
ULTIMATE TURNING POWER

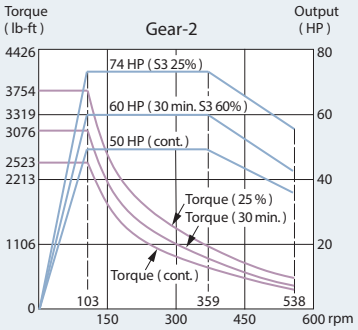
- The one-piece casting headstock has a net weight over 4,000 kg (8,818 lb), which gives outstanding rigidity and also provides an ideal balance for super heavy work-pieces.
- The spindle is support by high rigidity bearings for maximum level of support and precision. Bearing configuration is designed for super heavy-duty cutting with ultra-smooth performance and long term durability with a higher level of accuracy.
- The spindle uses a high performance lubrication system to efficiently and evenly lubricate the spindle bearings. Also, with a special maze protection design, it can prevent the gear box from contamination thus extending the life of the bearings.

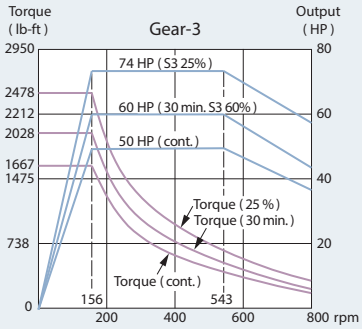


Spindle Output

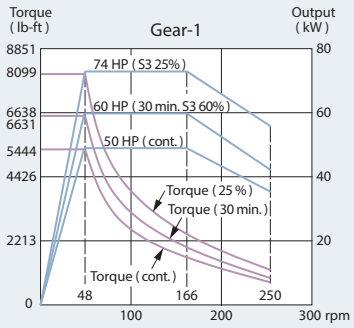
Hole through spindle Ø 205 mm

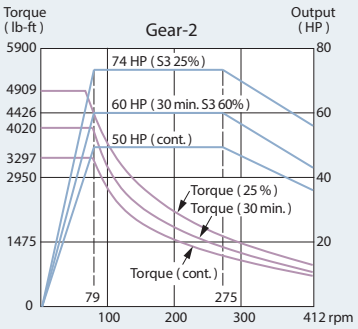


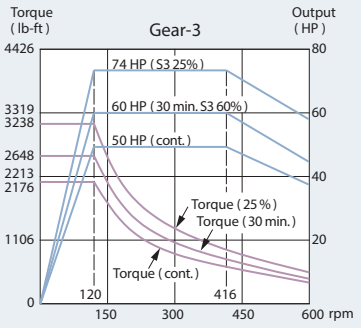




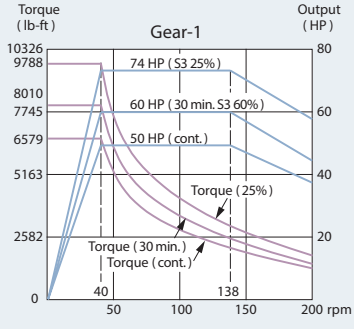
Hole through spindle Ø 260 mm

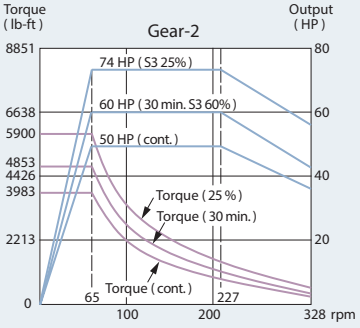


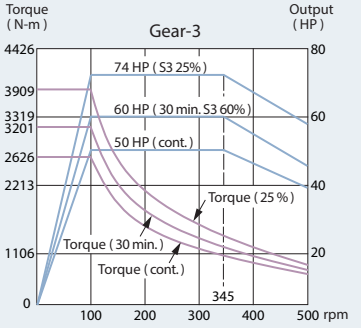




Hole through spindle Ø 320 mm







ADVANCED TURRET TECHNOLOGY

- Ø 320 mm (Ø12.59") diameter 2-piece CURVIC couplings accurately position the turret disk and 10,000 Kg (26,400 lb) of clamping force ensures abundant turret rigidity for all cutting conditions.

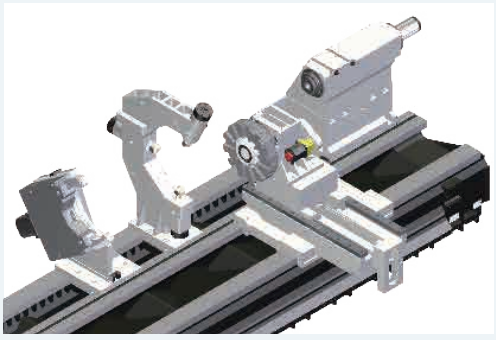
- The 12-station servo indexing turret achieves 0.3 second indexing times for adjacent stations and 0.8 second times for stations at the opposite end of the disk turret.

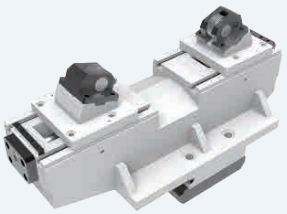
  - Optional 4-way toolpost for super heavy cutting.

HEAVY-DUTY STEADY REST

- The available heavy-duty steady rest can prevent the long work-pieces from deflection during high speed rotation while ensuring precise concentricity of the work-piece.

- When the work-piece diameter is not more than Ø600 mm (Ø23.62"), the saddle and steady rest will not interfere each other during the progress. Thus the operator does not need to stop the machine to remove the steady rest, which greatly increases working efficiency.





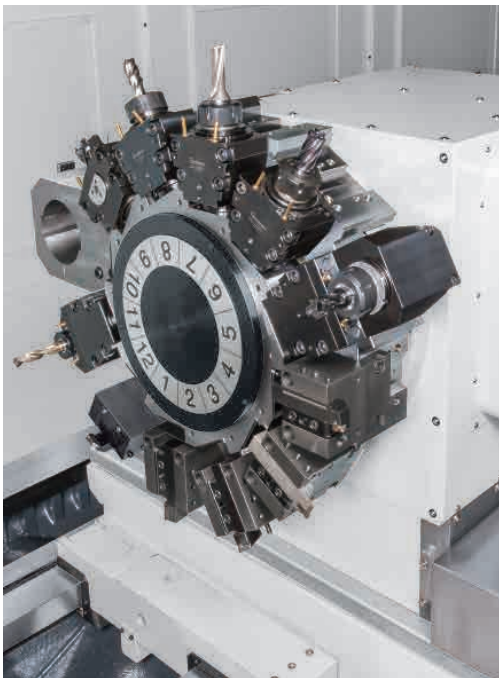
(Hydraulic) Ø125 ~ 460 mm*1 (Ø4.92" ~ 18.11")	(Manual) Ø300 ~ 600 mm*1 (Ø11.81" ~ 23.62")	(Manual) Ø500 ~ 800 mm (Ø19.68" ~ 31.49")	(Manual) Ø800 ~1,000 mm (Ø31.49" ~ 39.37")

*1 The steady rest does not need to be removed during the working progress.

LIVE TOOLING TURRET

- Live tooling and C-axis control capabilities on the HA series allows the machine to perform multiple tasks on a work-piece, such as turning, milling, drilling and tapping. It eliminates manpower and cycle time, while reducing accuracy lost, which will occur if the part is moved from machine to machine.

- The 12-station YAMA SEIKI live tooling turret offers 12 stations available for live tooling, live tools rotate in working position only to reduce power loss and heat.



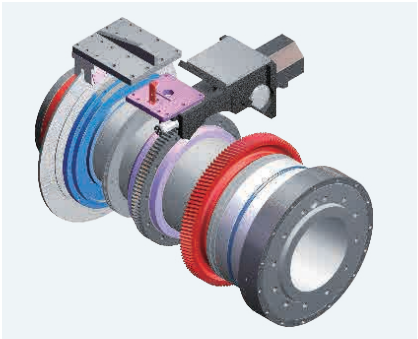
- Optional super rigidity boring bar

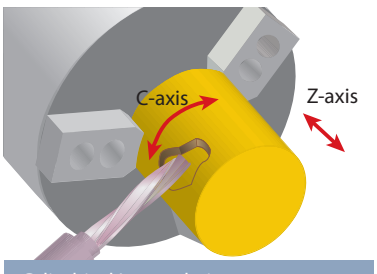
ULTIMATE C-AXIS SPINDLE

- The Cf-axis and disk brake system available on the HA series provide 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 approximately 1 second.

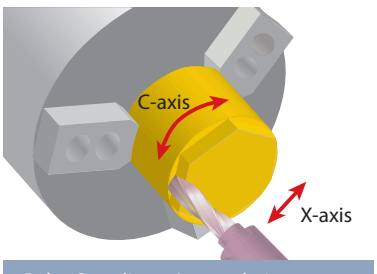
- Working with the live tooling turret, the Cf-axis and disk brake system enables the machine to perform multiple tasks, such as drilling, tapping, and milling operations, including cylindrical and polar coordinate interpolations, resembling a 4th-axis rotary table on a machining center.

- With the FANUC servo motor generating an ultra high resolution of 1,000,000 pulses per spindle rotation and 1,500 N-m (1106 lb-ft) of spindle torque (Cont.). Plus, dynamic accuracy is within ± 0.02° even under heavy cutting loads.

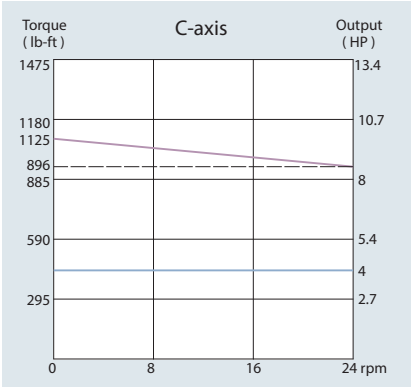




Cylindrical Interpolation.



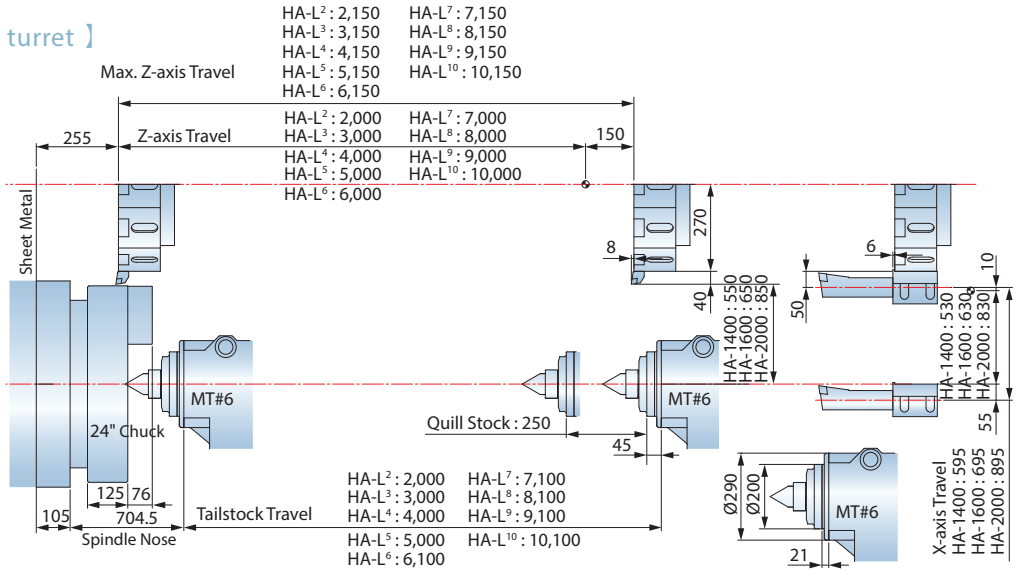
Polar Coordinate Interpolation.



GENERAL DIMENSION

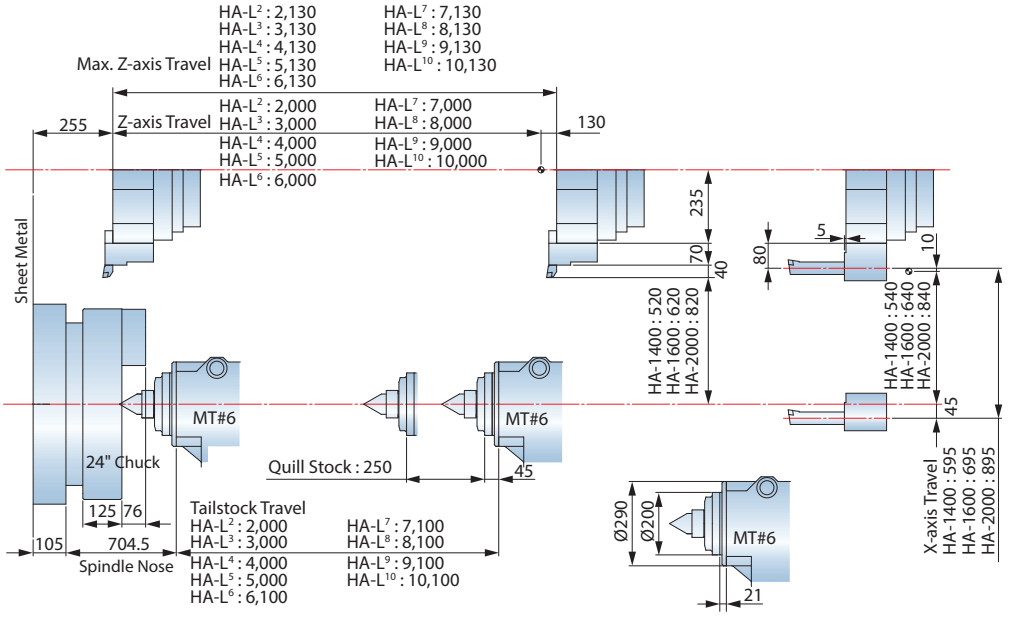
Work Range

【 Standard 12-stations turret 】

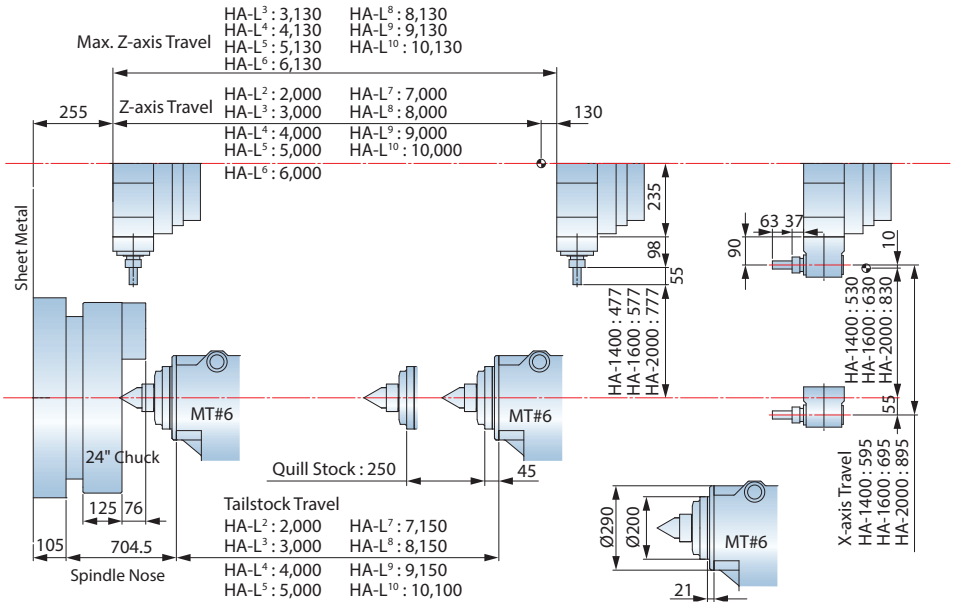


【 Optional 12-stations live tooling turret 】

MT#6
Dead Center
(I.D. / O.D. Tools)



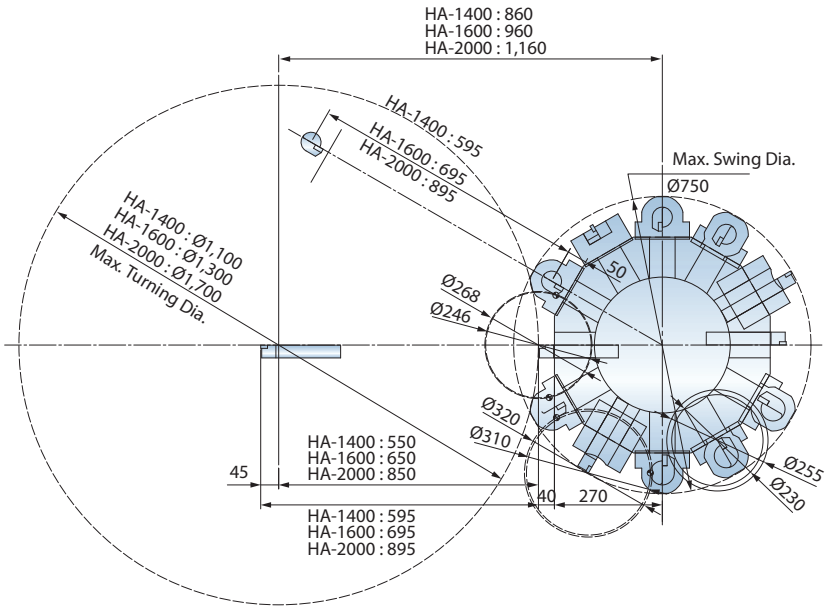
MT#6
Live Center
(Live Tooling)



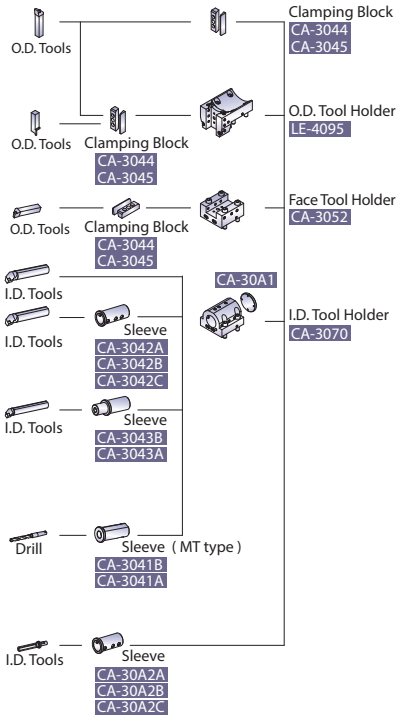
Unit : mm

Interference Diagram

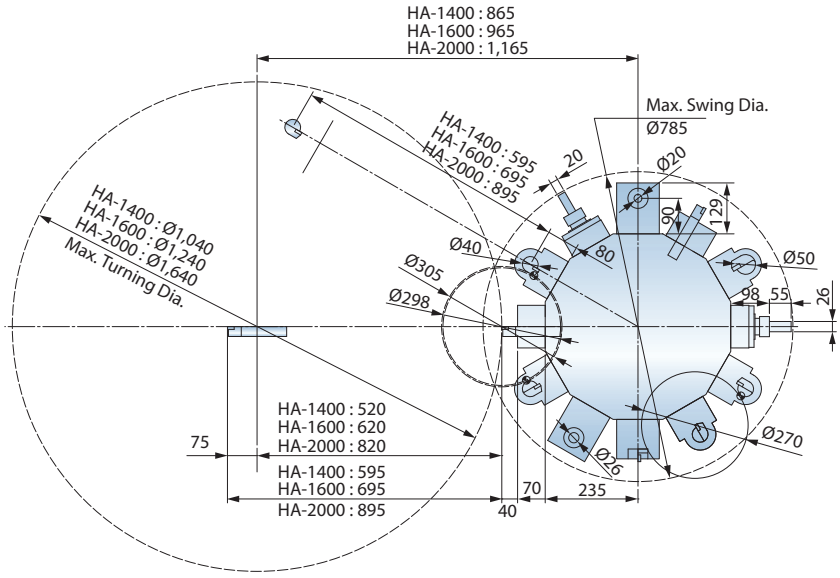
【 Standard 12-stations turret 】



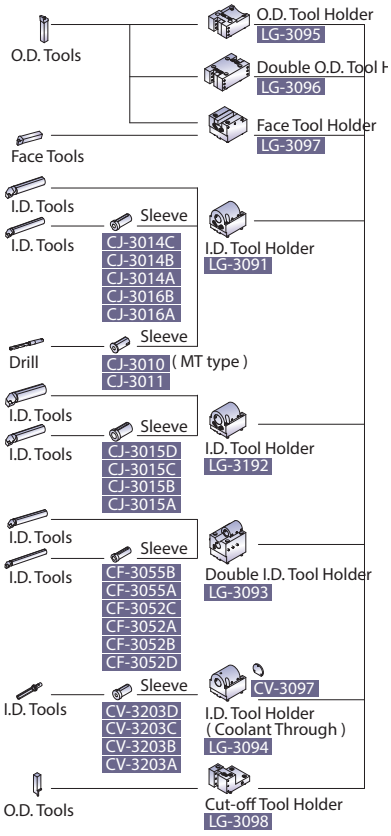
Tooling System



【 Optional 12-stations live tooling turret 】



Unit : mm

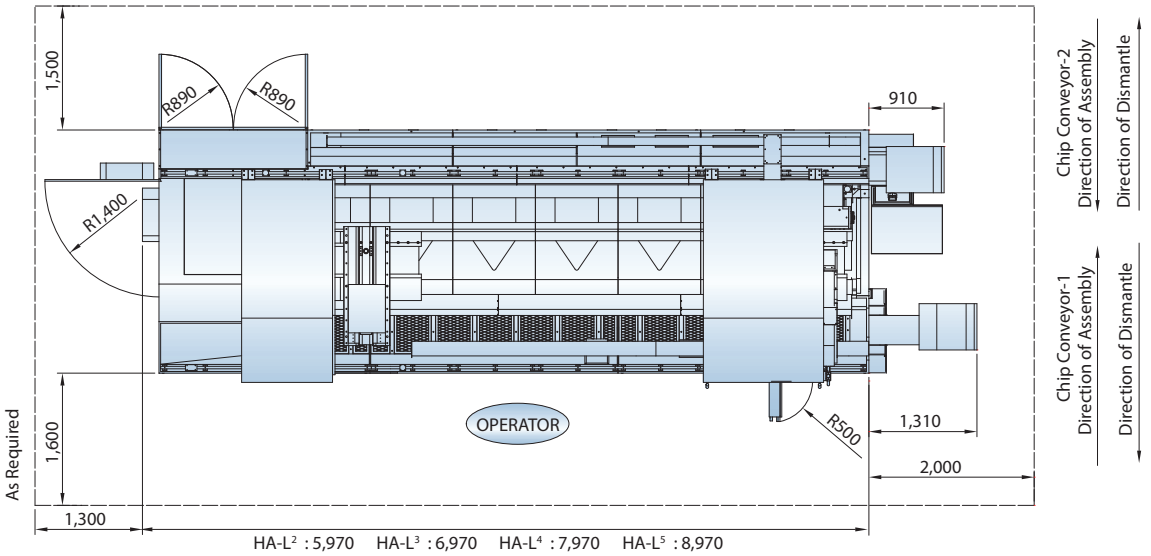


Please contact sales representative for 8-stations turret

GENERAL DIMENSION

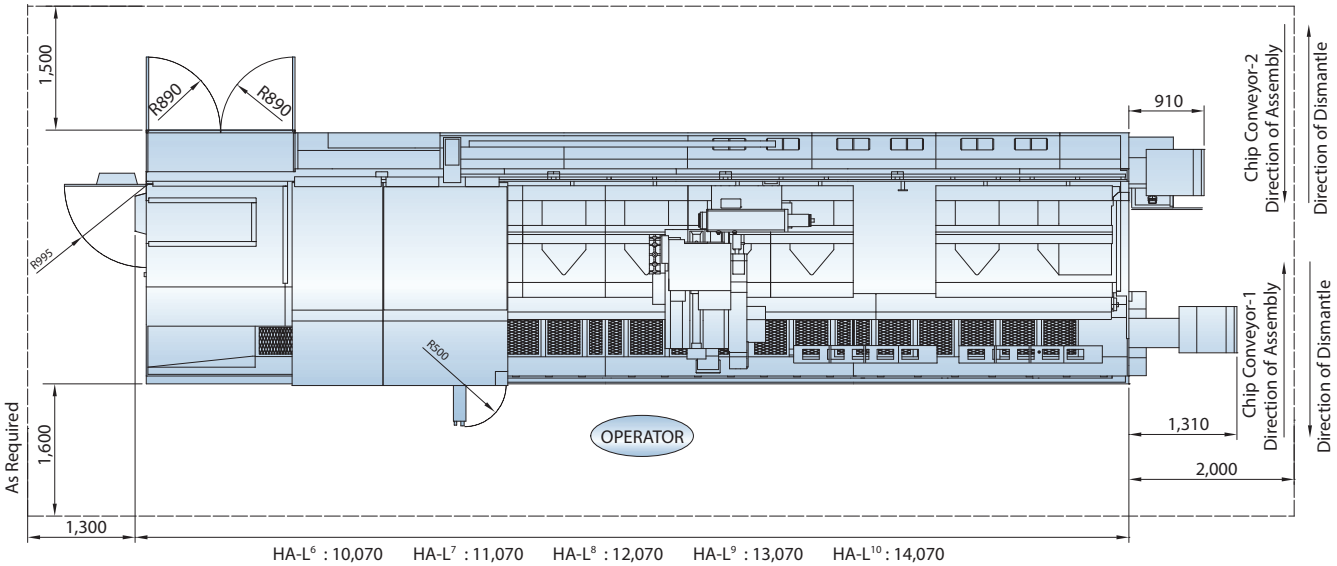
Foot - Print

HA series L² ~ L⁵



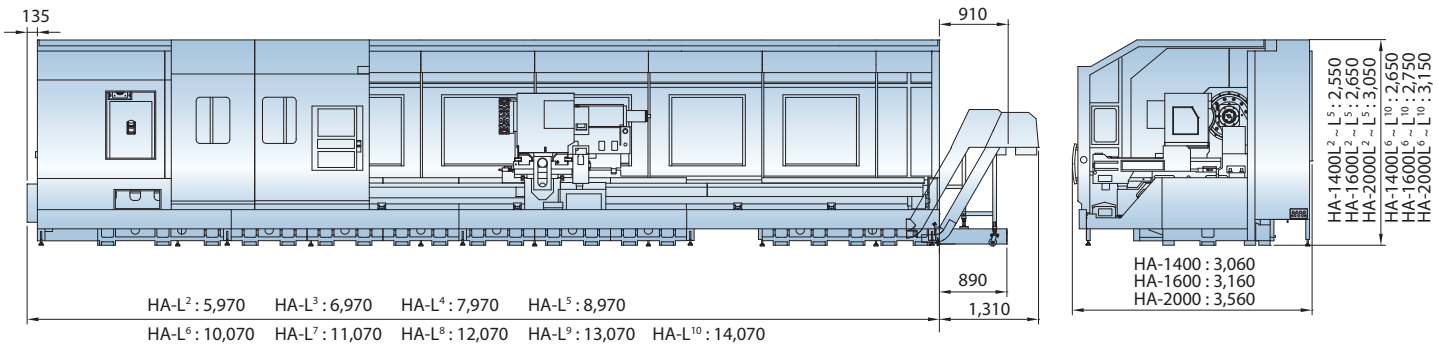
HA-L² : 5,970 HA-L³ : 6,970 HA-L⁴ : 7,970 HA-L⁵ : 8,970

HA series L⁶ ~ L¹⁰



HA-L⁶ : 10,070 HA-L⁷ : 11,070 HA-L⁸ : 12,070 HA-L⁹ : 13,070 HA-L¹⁰ : 14,070

Machine Layout



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HA-L⁶ : 10,070 HA-L⁷ : 11,070 HA-L⁸ : 12,070 HA-L⁹ : 13,070 HA-L¹⁰ : 14,070

Unit : mm

STANDARD & OPTIONAL FEATURES

S : Standard O : Option
– : Not available C : Contact YAMA SEIKI

		HA-1400	HA-1600	HA-2000
SPINDLE				
Main spindle configuration	3-Speed Gear	S	S	S
Rigid tapping & spindle orientation		S	S	S
Main spindle disk brake		O	O	O
WORK HOLDING				
Hollow 3-jaws chuck & 1 set soft jaws	24"	O	O	O
	32"	O	O	O
	40"	O	O	O
	50"	–	O	O
	63"	–	–	O
Foot switch for chuck operation		S	S	S
Quill hydraulic tailstock		S	S	S
MT#6 dead center quill		S	S	S
Manual steady rest		O	O	O
Self-centering hydraulic steady rest		O	O	O
Foot switch for steady rest operation		O	O	O
TURRET				
12-station turret		S	S	S
12-station live tooling turret		O	O	O
Hydraulic 4-way Toolpost		O	O	O
Tool holder & sleeve package		S	S	S
Live tooling tool holders (0˚ x 2 , 90˚ x 2)		O	O	O
COOLANT				
Coolant pump	3 Kg/cm²	S	S	S
	5 Kg/cm²	O	O	O
High-pressure coolant system	20 Kg/cm²	C	C	C
Roll-out coolant tank		S	S	S
Oil skimmer		O	O	O
Coolant flow switch		O	O	O
Coolant level switch		O	O	O
Coolant intercooler system		O	O	O
CHIP DISPOSAL				
Twin chip conveyor	Right discharge	S	S	S
Chip cart with coolant drain		O	O	O
SAFETY				
Fully enclosed guarding		O	O	O
Impact resistant viewing window		S	S	S
Tailstock stroke out-end check		S	S	S
Chuck cylinder stroke out-end check		S	S	S
Low hydraulic pressure detection switch		S	S	S
Load monitoring function		O	O	O
OTHERS				
Tri-color machine status light tower		S	S	S
External work light		S	S	S
Electrical cabinet	Heat exchanger	S	S	S
	A / C cooling system	O	O	O
Complete hydraulic system		S	S	S
Advanced auto lubrication system		S	S	S
Tailstock manual lubrication system		S	S	S
Foundation leveling & maintenance tool kit		S	S	S
Emergency maintenance electrical part package		S	S	S
Operation & maintenance manuals		S	S	S

Specications are subject to change without notice .

		0i-TF	31i
FANUC CONTROL FUNCTIONS			
Display	8.4" color LCD	S	O
	10.4" color LCD	–	S
Graphic function	Standard	S	S
	Dynamic	O	O
Part program storage size	512K bytes	S	–
	1M bytes	–	S
	2M bytes	O	O
	4M bytes	–	O
	8M bytes	–	O
Registerable programs	400	S	–
	1,000	O	S
	4,000	–	O
Tool offset pairs	99	–	S
	128	S	–
	200	O	O
	400	–	O
	499	–	O
	999	–	O
	2000	–	O
Servo HRV control	HRV 3	S	S
Automatic data backup		S	S
Synchronous / Composite control		O	O
Inch / metric conversion		S	S
Polar coordinate interpolation		S	S
Cylindrical interpolation		S	S
Multiple repetitive cycle		S	S
Rigid tapping		S	S
Unexpected disturbance torque detection function		S	S
Spindle orientation		S	S
Constant surface speed control		S	S
Spindle speed fluctuation detection		S	S
Embedded macro		O	O
Spindle synchronous control		S	S
Background editing		S	S
Tool radius / Tool nose radius compensation		S	S
Multi-language display		S	S
Cs contouring control		S	S
Polygon turning		S	S
Helical interpolation		O	O
Direct drawing dimension programming		S	S
Thread cutting retract		S	S
Variable lead threading		S	S
Multiple repetitive cycle Ⅱ		S	S
Canned cycles for drilling		S	S
Tool nose radius compensation		S	S
Chamfering / Corner R		S	S
AI contour control Ⅰ		O	S
Multi part program editing[*1]		S	S
Manual handle retrace		O	O
Manual intervention and return		S	O
External data input		S	S
Addition of custom macro		S	S
Increment system C		S	S
Run hour & parts counter		S	S
Auto power-off function		S	S
RS-232 port		S	S
Memory card input / output (CF + USB)		S	S
Ethernet		S	S

*1 10.4" LCD option needed

MACHINE SPECIFICATIONS

CAPACITY	HA-1400L² ~ L¹⁰	HA-1600L² ~ L¹⁰	HA-2000L² ~ L¹⁰
Max. swing diameter	Ø 1,400 mm (55.11")	Ø 1,600 mm (62.99")	Ø 2,000 mm (78.74")
Swing over saddle	Ø 1,000 mm (39.37")	Ø 1,100 mm (43.3")	Ø 1,500 mm (59.05")
Max. turning diameter	Ø 1,100 mm (43.3")	Ø 1,300 mm (51.18")	Ø 1,700 mm (66.92")
Max. turning length	2,000 / 3,000 / 4.000 / 5,000 / 6,000 / 7,000 / 8,000 / 9,000 / 10,000*1 mm (78.74" / 118.1" / 157.4" / 196.8" / 236.2" / 275.5" / 314.9" / 354.3" / 393.7")		
Max. table load	10,000 ~ 15,000 Kg (22,046 ~ 33,069 lbs) (Need to be supported by steady rest)		
Spindle center height (from ground)	1,525 mm (60.03")	1,625 mm (63.97")	1,825 mm (71.85")
FLAT BED			
Flat bed width	1,350 mm (53.14")		
Flat bed height	815 mm (32.08")		
Slide way type	Four Box Ways		
SPINDLE			
Spindle drive system	3-Step Gear box		
Spindle nose	A A2-15 B A2-15 C A2-20 D A2-28*2 E A2-28*2		
Hole through spindle	A 205 (8") B 260 (10.2") C 320 (12.5") D 420*2 (16.5") E 520*1 *2 (20.4") mm		
Spindle bearing diameter	A 260 (10.2") B 340 (13.3") C 400 (15.7") D 500*2 (19.6") E 600*2 (23.6") mm		
Spindle motor type	α 40 / 6000i		
Motor output (Cont. / 30 min.)	37 / 45 kW (50 / 60 HP)		
Spindle speed range	A 800 B 600 C 500 D 300*2 E 250*2 rpm		
Cf-AXIS SPINDLE (OPTIONAL)			
Cf-axis drive motor	AC 3.0 kW (4 HP)		
Cf-axis rapid	24 rpm		
Cf-axis torque output (Cont.)	1,524 N-m (1,124 lb-ft)		
X & Z AXES			
Max. X-axis travel	595 mm (23.42")	695 mm (27.36")	895 mm (32.23")
Max. Z-axis travel	2,150 / 3,150 / 4,150 / 5,150 / 6,150 / 7,150 / 8,150 / 9,150 / 10,150 mm (84.64" / 124" / 163.3" / 202.7" / 242.1" / 281.4" / 320.8" / 360.2" / 399.6")		
X / Z axes rapids	10 / 8 m/min. (394 / 315 IPM)		
Slide way type	Box Way		
Feed rates	1 ~ 2,000 mm/min (0.04 ~ 78.7 IPM)		
X-axis servo motor	4 kW (5.4 HP)		
Z-axis servo motor	9 kW (12 HP)		
X-axis ball screw Ø / pitch	Ø 50 / pitch 10 mm (Ø 1.96" / pitch 0.3")		
Z-axis ball screw Ø / pitch	Ø 80 / pitch 10 mm (Ø 3.14" / pitch 0.3")		
X / Z axes thrust (Cont.)	1,407 / 3,400 Kgf		

Specifications are subject to change without notice.

*1 Please contact YAMA SEIKI for larger size requirements.

*2 Please contact YAMA SEIKI for further details.

TURRET	HA-1400L² ~ L¹⁰	HA-1600L² ~ L¹⁰	HA-2000L² ~ L¹⁰
Stations	12 (8 / 4 Opt.)		
Indexing drive	FANUC AC Servo motor		
Indexing speed	0.3 sec. (Adjacent) / 0.8 sec. (180˚ Single step)		
O.D. tool shank size	□ 32 mm (□ 40 / 50 mm Opt.) □ 1-1/4" (□ 1-1/2" / 2" Opt.)		
I.D. tool shank size	Ø 60 mm (2-1/2")		
LIVE TOOLING TURRET (OPTIONAL)			
Live tooling stations	12 (8 Opt.)		
Indexing drive type	Spindle motor		
Index speed	0.3 sec. (Adjacent) / 0.8 sec. (180˚ Single step)		
O.D. tool shank size	□ 25 mm (1")		
I.D. tool shank size	Ø 50 mm (2")		
Live tooling shank size	ER 40 collets (ER 50 collets Opt.)		
Live tooling RPM range	4,000 rpm		
TAILSTOCK (OPTIONAL)			
Quill center taper	MT#6 Dead center		
Quill diameter	Ø 200 mm Rotary type (Ø 250 mm Opt.) Ø 7.87" Rotary type (Ø 9.84" Opt.)		
Quill travel	250 mm (9.84")		
Tail stock base travel	2,000 / 3,000 / 4,000 / 5,000 / 6,100 / 7,100 / 8,100 / 9,100 / 10,100*[1] mm (78.74" / 118.1" / 157.4" / 196.8" / 240.1" / 279.5" / 318.8" / 358.2" / 397.6")		
Programmable quill	Yes		
GENERAL			
CNC control	FANUC O*i*-TF		
Voltage / Power requirement	AC 220 V / 65 kVA		
Hydraulic tank capacity	60 L (13 gal)		
Coolant tank capacity	2,115 L (L⁵) (465 gal)		
Coolant pump	0.7 kW rated at 3 bar (40 PSI)		

Specifications are subject to change without notice.

MACHINE WEIGHT

	L²	L³	L⁴	L⁵	L⁶	L⁷	L⁸	L⁹	L¹⁰
HA-1400	26,200 (57,761)	28,600 (57,761)	31,000 (68,343)	33,400 (73,634)	40,500 (89,287)	43,400 (95,680)	46,300 (102,073)	49,200 (108,467)	52,100 (114,860)
HA-1600	26,800 (59,083)	29,200 (64,374)	31,600 (69,666)	34,000 (74,957)	41,100 (906,10)	44,000 (97,003)	46,900 (103,396)	49,800 (109,790)	52,700 (116,183)
HA-2000	28,100 (61,950)	30,500 (67,241)	32,900 (72,532)	35,300 (77,823)	42,300 (93,255)	45,200 (99,649)	48,100 (106,042)	51,000 (112,435)	53,900 (118,829)

Specifications are subject to change without notice.

Unit : kg (lbs)

YAMA SEIKI®

TURNING CENTERS by GOODWAY®

YAMASEIKI.com

YAMA SEIKI USA, INC.

5788 Schaefer Ave., Chino, CA 91710

TEL : (888) 976-6789

(909) 628-5568

FAX : (909) 993-5378

E-mail : sales@yamaseiki.com

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