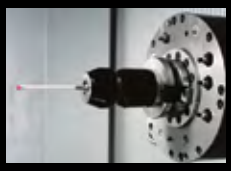
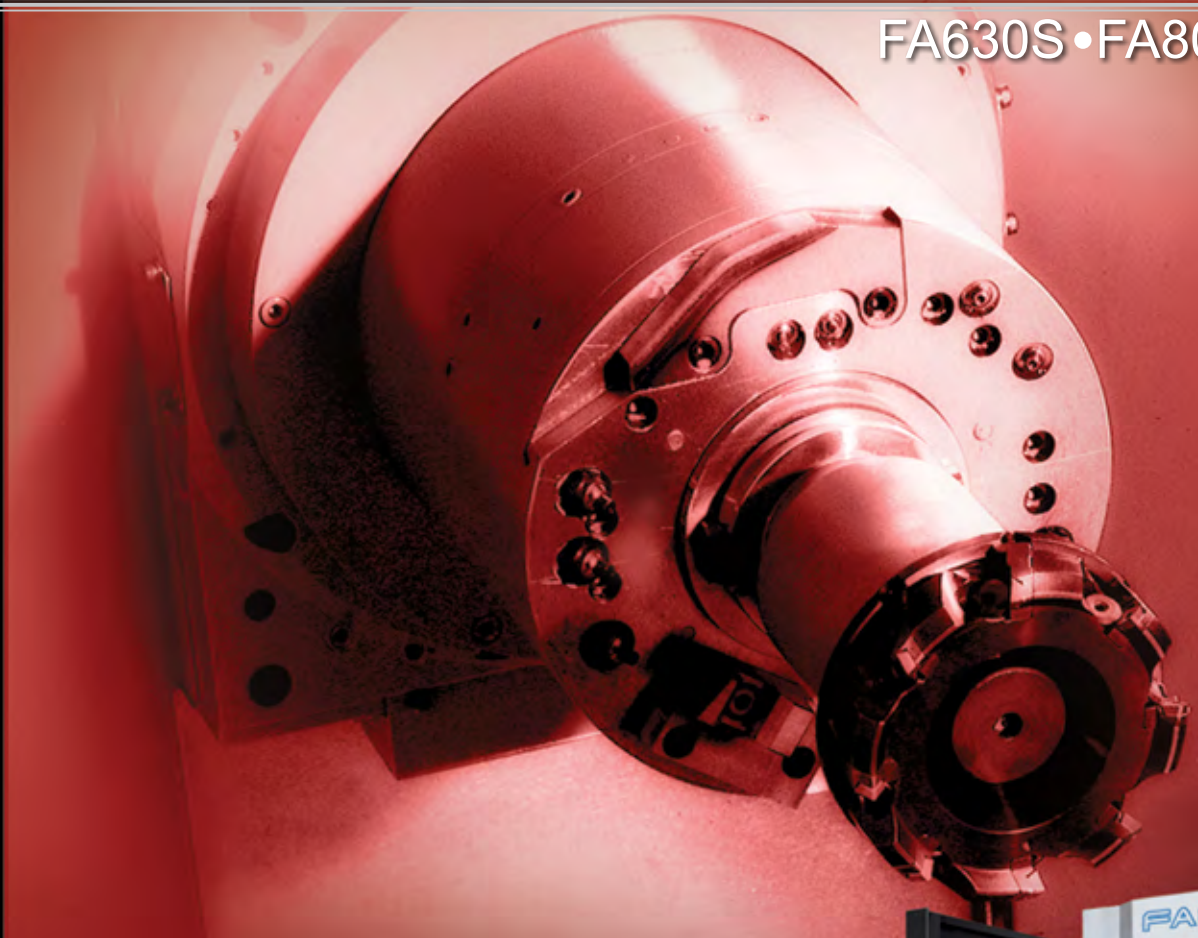
TOYODA





FA SERIES

FA630S • FA800S • FA1050S

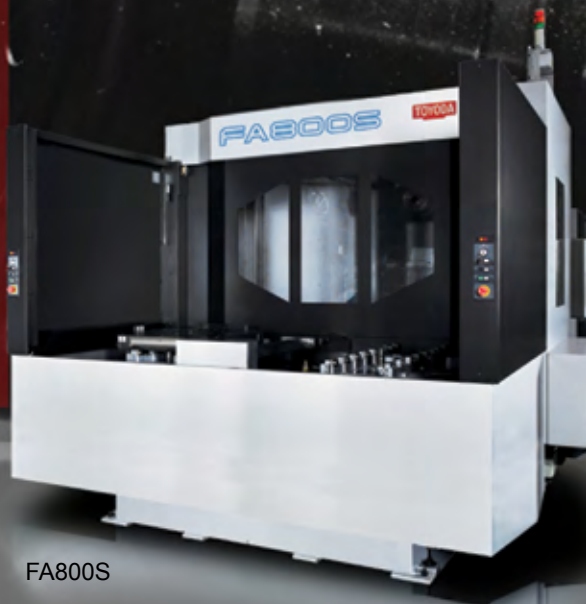



JTEKT
Koyo TOYODA

Toyoda's horizontal machining centers

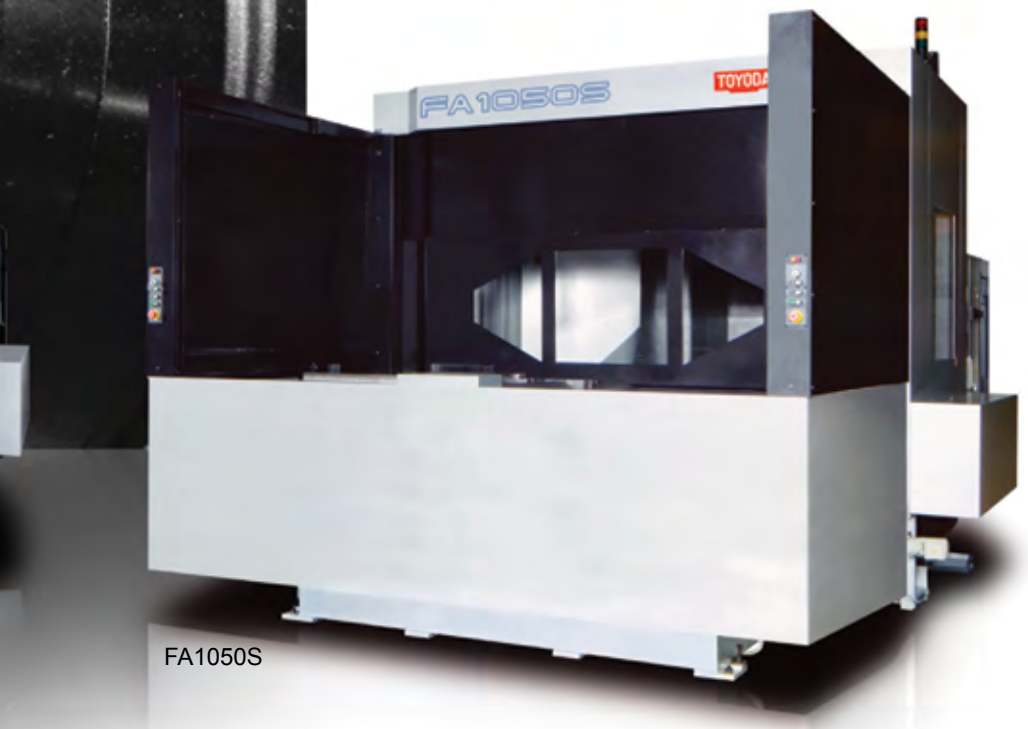
are known throughout the metalcutting industry as the most rigid and dependable machines. The FA Series combines massive machine size, speed, and power to cut large and heavy workpieces. Toyoda Machinery USA offers a better solution to keep you highly productive in today's competitive environment.

FA630S



FA800S

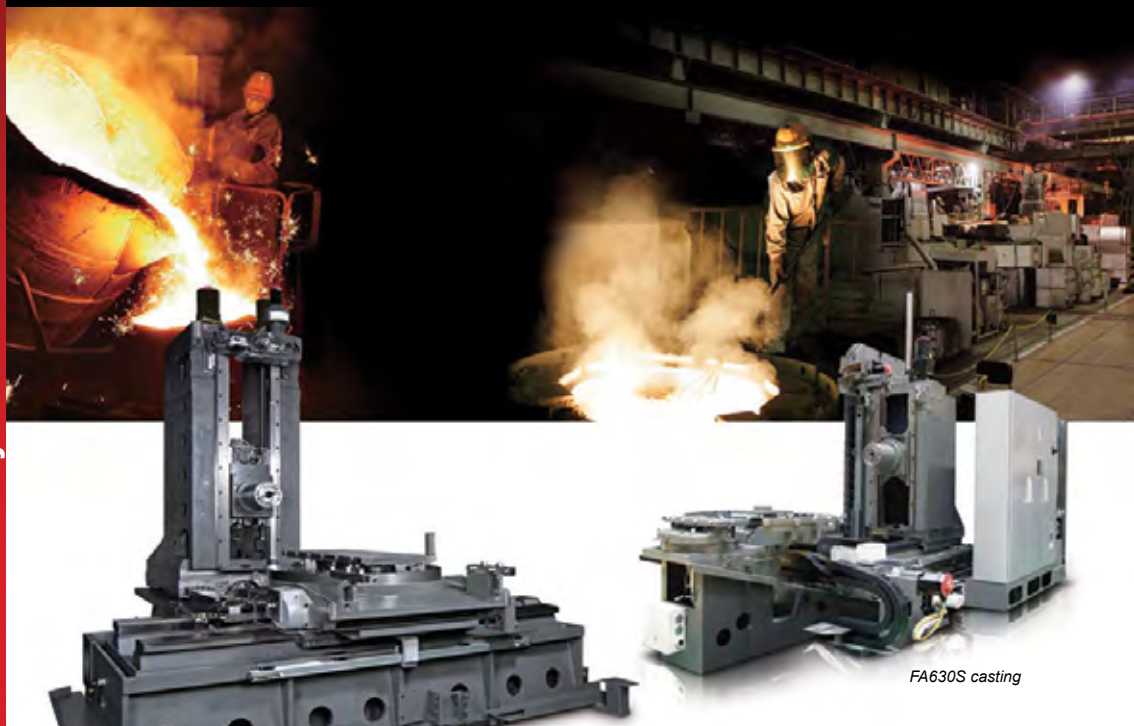
Contents



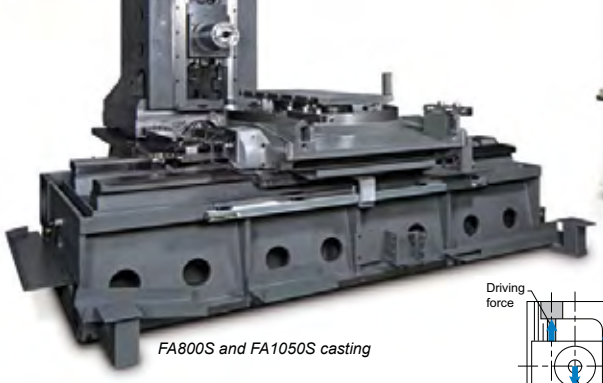
FA1050S

Perfected Casting Technology

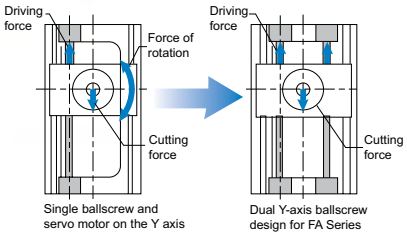
JTEKT's casting division develops solid, high-quality cast iron for maximum machining performance. Enhanced over years, this casting technology offers a higher density than traditional cast iron, giving the bed and column castings of Toyoda machining centers greater tensile strength and maximum dampening capabilities.



FA630S casting



FA800S and FA1050S casting



Dual Y-Axis Ballscrews on FA800 and FA1050

The high-performance spindle is supported on the Y axis by dual ballscrews and servo motors. The tandem control function ensures the ballscrews are driven in perfect synchronization to support rapid acceleration rates and consistency in accuracy without any oscillating force on the Y axis.

Solid Platform Construction

Toyoda machining centers are constructed to minimize displacement caused by external forces that may impact cutting accuracy. The FA Series is designed to withstand large cutting resistance and inertial forces of feed acceleration and deceleration. This incomparable platform assures long-term consistency in production.

A Column Designed for Performance

JTEKT uses proprietary casting technology to design a column with a low center of gravity. This allows for rapid feedrates and quick acceleration while maintaining rigidity during heavy-duty cutting.

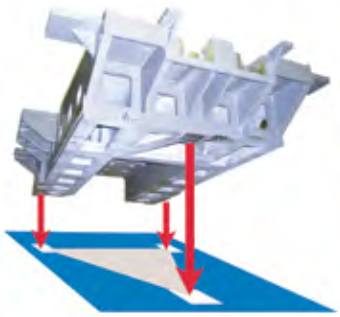
Thermal Control Design

The FA Series' column utilizes a symmetrical box structure to suppresses thermal displacement during heavy machining.

High-Grade Cast Iron Bed

The foundation of the FA Series is engineered with FEM-analysis technology. The bed casting's outstanding rigidity allows for stable axial feed at high speeds and acceleration rates.

The cast iron bed on the FA630S incorporates the three-point support model, providing easy leveling adjustments. The bed is engineered to support rapid axis movements while maintaining consistency in accuracy over time.

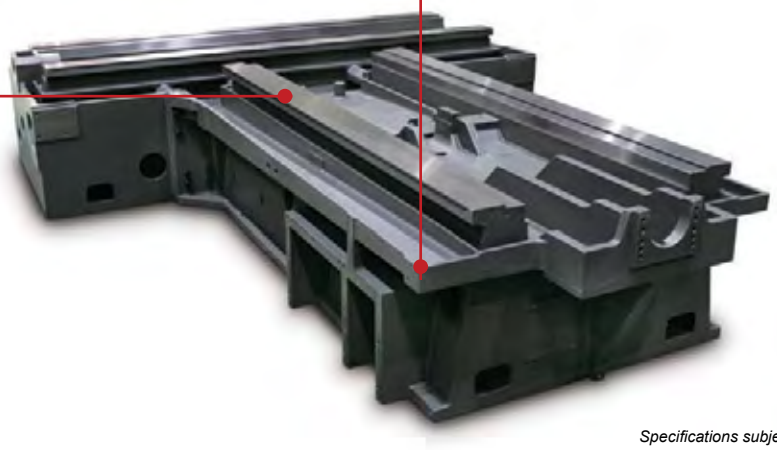


Integrated Bed and Guideways

The box guideways on the FA Series are built into the structure of the bed, providing increased stability and rigidity during machining.

Thick Bed Wall

The cast iron bed features a thick-walled box structure to support heavy workloads.



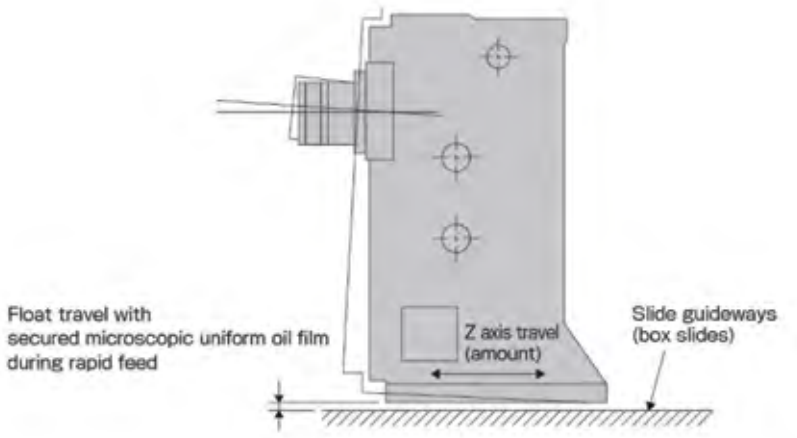
Built for Reliability

Boxway Construction

With rigidity in mind, the FA Series uses box guideways for all three axes: Z axis (column travel), Y axis (spindle housing travel), and the X axis (table travel).

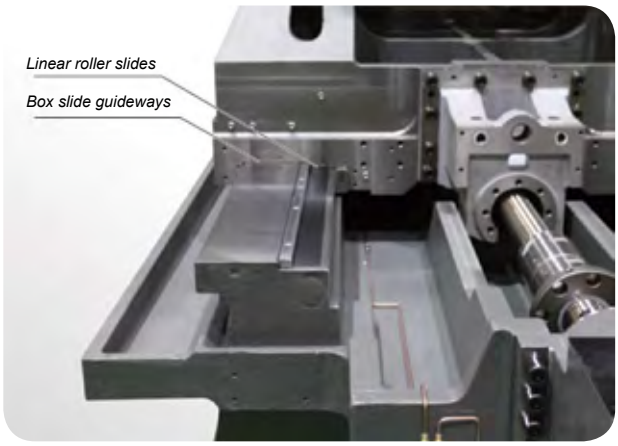
Precision Guideway Technology

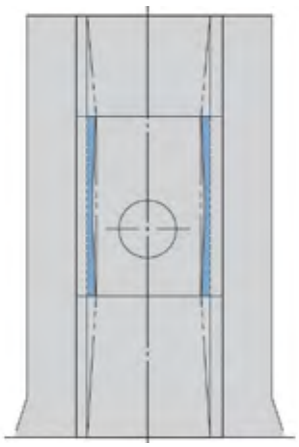
JTEKT's unique static guideway technology minimizes uplift as feedrates increase. This design maintains accuracy and rigidity over long periods of heavy cutting.



Unique Hybrid Guideways

The FA Series is built with hybrid guideways, where the X- and Z-axis box guideways are affixed with rolling slides for the smooth movement of heavy pieces. This design greatly reduces cutting resistance and blade edge vibration during heavy cutting.





Y-Axis Guideway Scraping

Smooth, concave scraping on the Y-axis guideways level face pressure on each stroke and guarantee rigidity during machining.

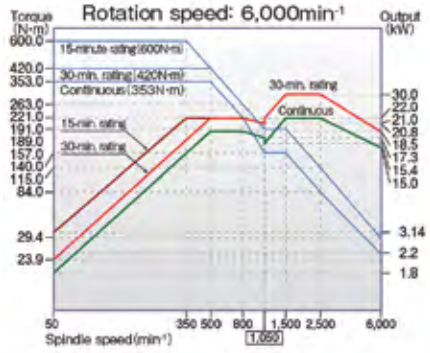
High-Torque Spindle for Heavy-Duty Cutting

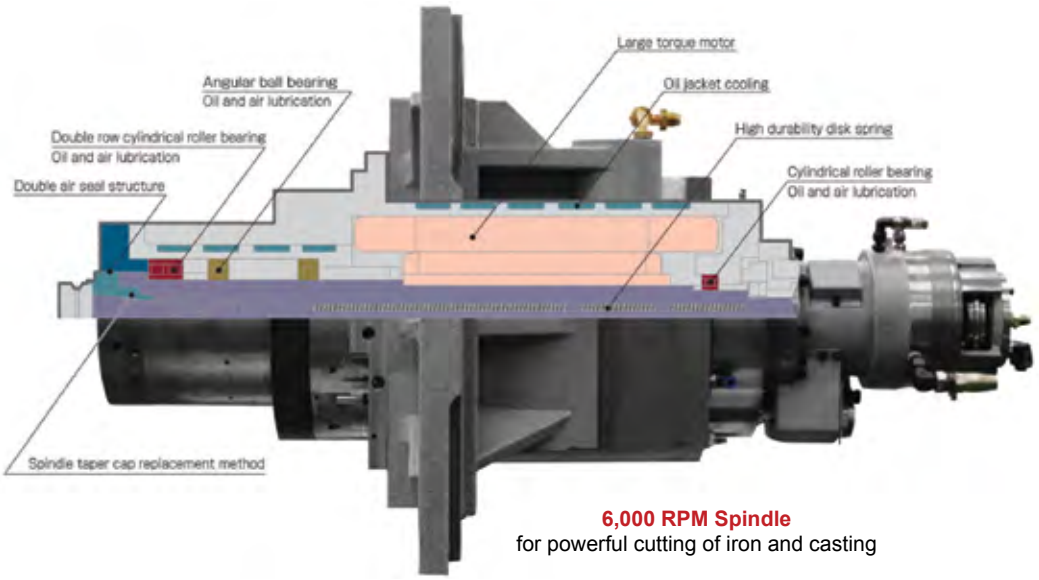
The spindle on the FA Series is designed for hard and heavy cuts. The standard configuration is a 40 horsepower, 6,000 RPM spindle. Other options include a 6,000 RPM geared head, 8,000 RPM high-torque, and 15,000 RPM spindles.

Standard 6,000 RPM Spindle

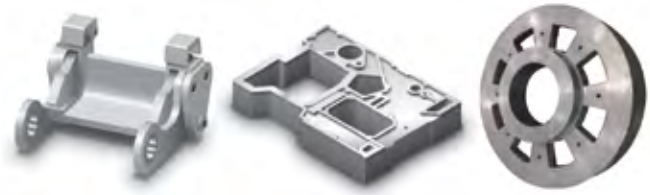
The 6,000 RPM spindle is equipped with a double row of cylindrical roller bearings that are located near the taper. The large radial load capacity of these bearings make it possible to withstand heavy-duty loads and strong impacts.

Spindle Speed	6,000 RPM
Spindle Taper	CAT50 (Optional BT50)
Spindle Drive Motor	30 kW (40 HP) for 30 min. / 22 kW (30 HP) cont.
Max. Spindle Torque	600 Nm (442 ft-lb)
Spindle Diameter (front bearing bore)	Ø 110 mm (4.33 in)





6,000 RPM Spindle
for powerful cutting of iron and casting

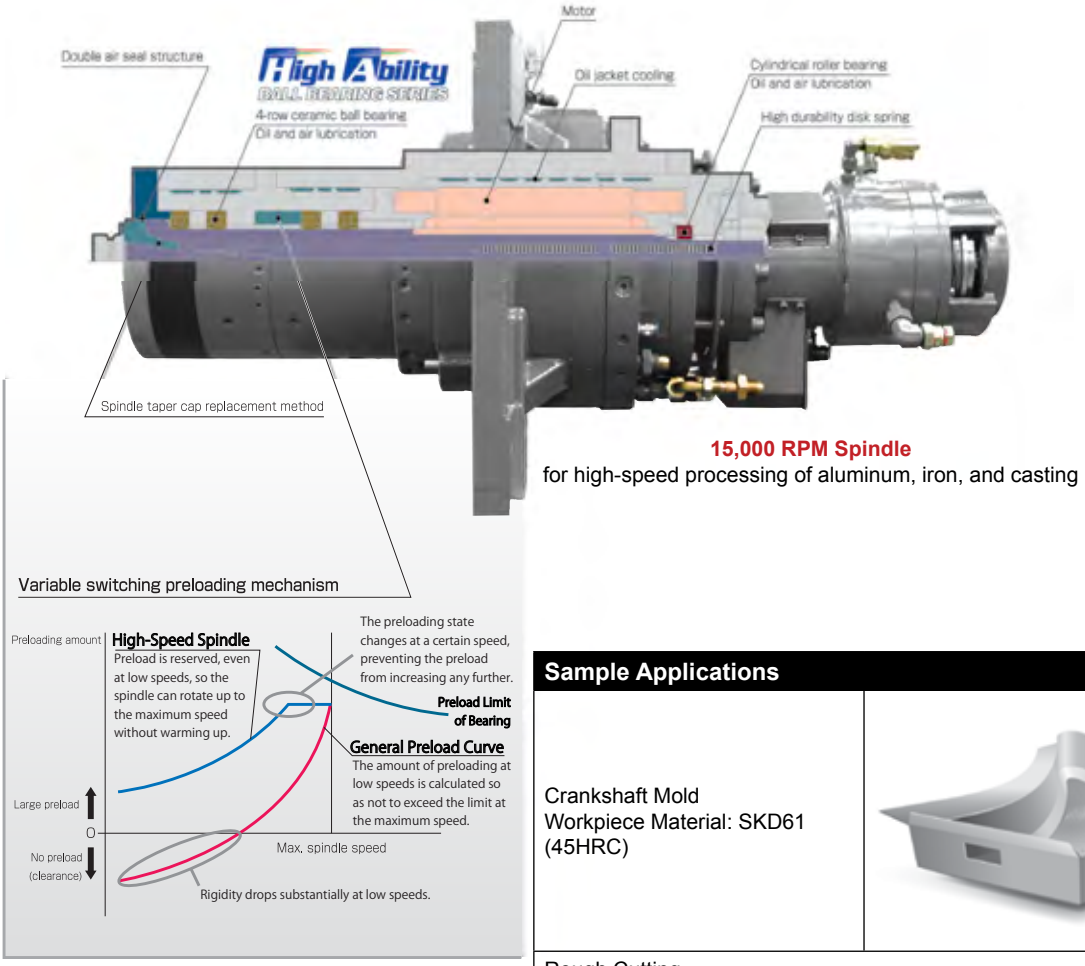
Sample Applications	
Elevator Parts Workpiece Material: FCD450	
Milling Tool: Ø 125 face mill Spindle Speed: 640 RPM Cutting Feedrate: 1,400 mm/min	
Boring Tool: Ø 400 boring Spindle Speed: 80 RPM Cutting Feedrate: 30 mm/min	

Built for Speed and Power

Spindle Options

Toyoda's spindle options range from low- to high-speed cutting and support a wide range of functions, from machining of raw materials to ball end mill finishing.

Spindle Speed	15,000 RPM	8,000 RPM	6,000 RPM Geared Head
Spindle Taper	CAT50 (Optional BT50)	CAT50 (Optional BT50)	CAT50 (Optional BT50)
Spindle Drive Motor	30 kW (40 HP) for 30 min. / 25 kW (33 HP) cont.	37 kW (50 HP) for 30 min. / 30 kW (40 HP) cont.	45 kW (60 HP) for 30 min. / 37 kW (50 HP) cont.
Max. Spindle Torque	263 Nm (193 ft lb)	1,009 Nm (744 ft lb)	1,305 Nm (962 ft lb)
Spindle Diameter (front bearing bore)	Ø 110 mm (4.33 in)	Ø 120 mm (4.72 in)	Ø 110 mm (4.33 in)



15,000 RPM Spindle
for high-speed processing of aluminum, iron, and casting

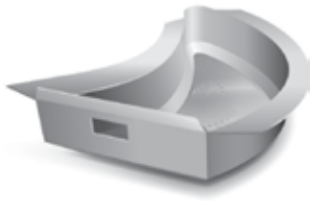
Flexible Variable Preload System*

Ideal Preload Pressure Control System

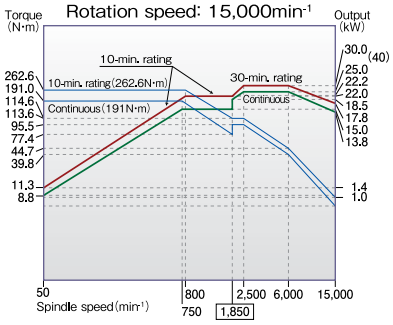
Toyoda's bearing preload allows machines to begin cutting without warming up. This system applies high preload pressure to the spindle bearing at low speeds and slowly decreases pressure as spindle speeds increase. This same technology allows our machines to run 24/7 to meet your production needs.

* Only included with 8,000 RPM high-torque and 15,000 RPM high-speed spindle options.

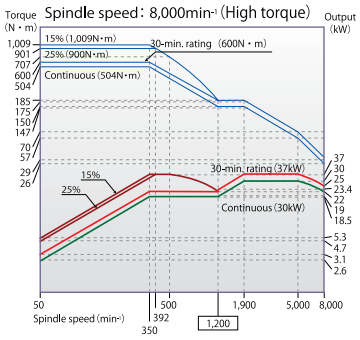
Sample Applications

Crankshaft Mold Workpiece Material: SKD61 (45HRC)	
Rough Cutting	
End Milling Tool: Ø 52 feed mill Spindle Speed: 550 RPM Cutting Feedrate: 1,000 mm/min	End Milling Tool: Ø 8 ball end mill Spindle Speed: 1,600 RPM Cutting Feedrate: 7,000 mm/min
Finish Cutting	
End Milling Tool: Ø 8 ball end mill Spindle Speed: 5,000 RPM Cutting Feedrate: 500 mm/min	

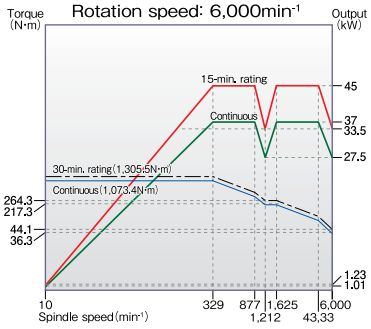
15,000 RPM Optional Spindle (CAT50)

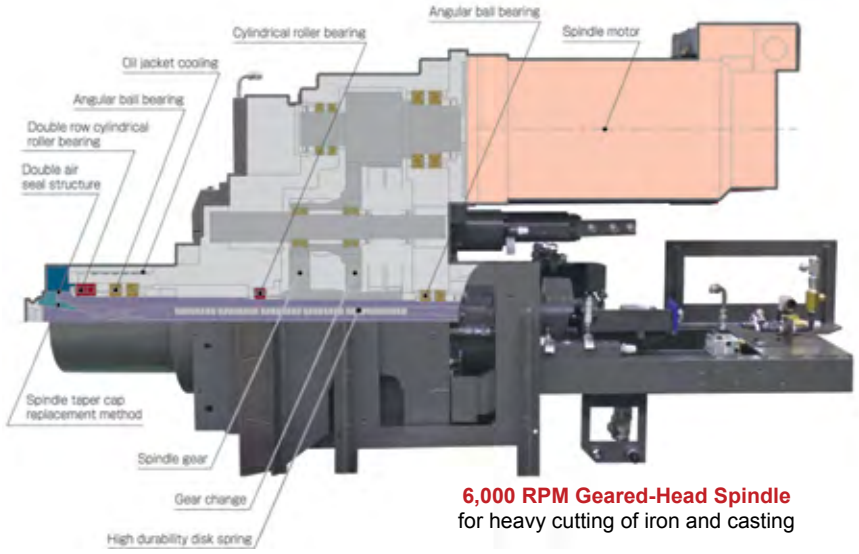


8,000 RPM Optional Spindle (CAT50)



6,000 RPM Geared Head Optional Spindle (CAT50)





6,000 RPM Geared-Head Spindle
for heavy cutting of iron and casting

Sample Applications	
Aircraft Brackets Workpiece Material: Titanium Ti-6Al-4V	
Rough Cutting	
Milling Tool: Ø 40 face mill Spindle Speed: 320 RPM Cutting Feedrate: 1,590 mm/min	End Milling Tool: Ø 10 end mill Spindle Speed: 2,000 RPM Cutting Feedrate: 300 mm/min
Finish Cutting	
End Milling Tool: Ø 25 end mill Spindle Speed: 760 RPM Cutting Feedrate: 150 mm/min	

Dynamic balance measurement

High-speed spindle running rest

Dedicated Spindle Manufacturing

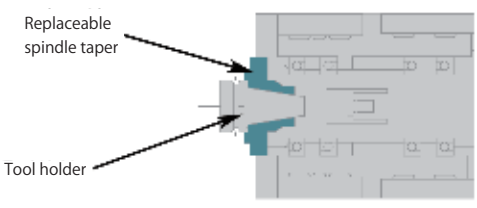
JTEKT spindles are manufactured under strict quality control. Confirmation checks examine dynamic balance, vibration, and noise. The spindle is installed in the machine only after ensuring it has passed all inspections.

High Speed, Low Vibration Focus

We have developed a high-speed spindle that suppresses vibration and runout from the lowest to highest spindle speeds. This feature contributes not only to the improvement of cutting accuracy, but also to the extension of tool life.

Replaceable Spindle Taper

Should spindle failure occur, Toyoda's patented replaceable spindle taper can be installed without removing the spindle, keeping downtime to a minimum. The separate spindle taper makes individual cap replacement possible, even in the event of taper damage caused by accidental interference.



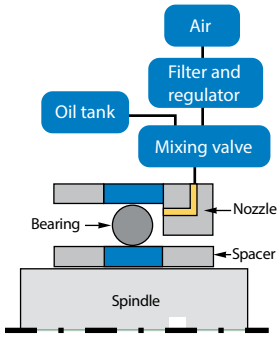
Applying JTEKT's Leading and Innovative Technologies to Machining Center Bearings

JTEKT Corporation has been supporting the aerospace industry for more than 30 years, as seen through the use of JTEKT bearings in many Japanese-manufactured jet engines. The technology cultivated over this extensive period has been applied to the bearings used in Toyoda machining centers.

In 1984, JTEKT was the first bearing manufacturer in the world to succeed in the practical use of ceramic bearings. Since then, we have improved upon the design for better precision and efficiency. Now, those same technologies are applied to the bearings in Toyoda's machining centers to meet the speed and reliability demanded by JTEKT.

Spindle Assembly

The oil and air spindle lubrication system offers a particular advantage in high-speed machining by minimizing friction to keep the bearings cool. This allows the spindle to run at higher speeds for a longer period of time than grease lubrication.

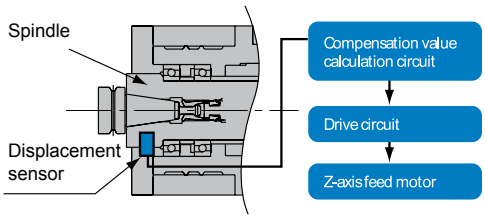


Constant Accuracy

Four front spindle bearings reduce vibration during high-speed spindle rotation. By stabilizing the characteristic frequency of the spindle, machining accuracy and tool life are improved.

Spindle Thermo Stabilizer (Optional)

An optional sensor for heat displacement compensation in the spindle directly measures the Z-axis position of the spindle and stabilizes the positioning accuracy by feeding the measured result to the CNC.



Touch Sensor (Optional)

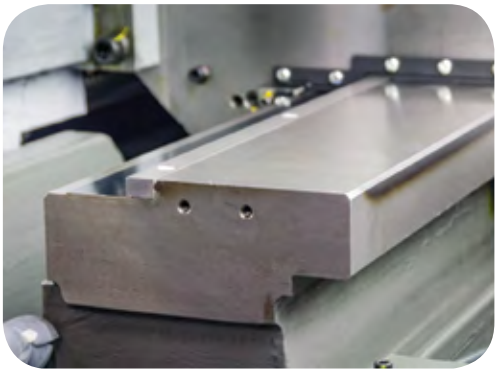
The integrated spindle touch sensor is a time-saving alternative to traditional spindle probes for locating workpiece surfaces. Providing the material is conductive, the optional touch sensor eliminates the need for an extra tool change to call up a probe.

When the tool comes in contact with the material, the gap elimination function drops the feedrate to the programmed speed.

Rapid Feedrate	FA630S	FA800S	FA1050S
Traverse (X, Y, Z axes)	36 m/min	24 m/min	24 m/min
Rapid Acceleration			
X axis	.36 G	.16 G	.15 G
Y axis	.40 G	.15 G	.16 G
Z axis	.31 G	.15 G	.15 G

Fastest Boxway Machine

Specially-designed boxways achieve speeds of 1,417 ipm (36 m/min) for the FA630S and 945 ipm (24 m/min) for the FA800S and FA1050S. A microfilm of pressurized lubricant rides on Rulon®-coated guideways for enhanced wear performance.



Straight Shuttle Pallet Changer

The FA800S and FA1050S have twin pallets that slide smoothly into and out of the work area. This design allows for heavier loads and protects the internal mechanisms from contamination.

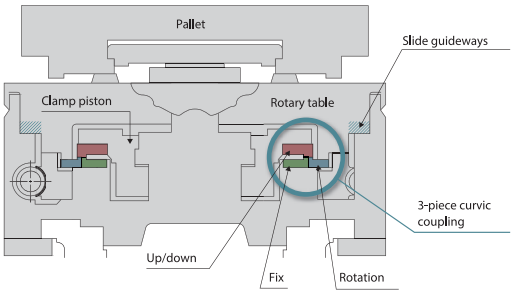


Table Structure

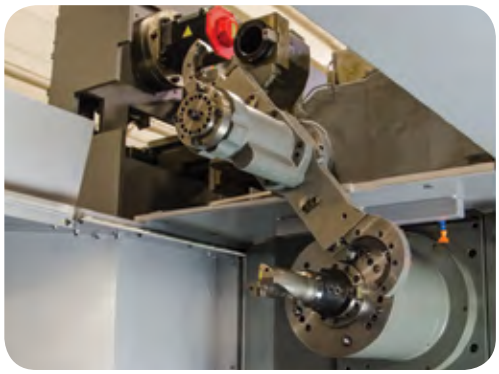
Highly Accurate and Rigid Table

The FA Series features a standard high-speed rotary table with 1 degree indexing, with an optional fully programmable NC table for contour machining. The table is built with a large-diameter slide and a three-piece curvice coupling to prevent uneven workloads on the table.

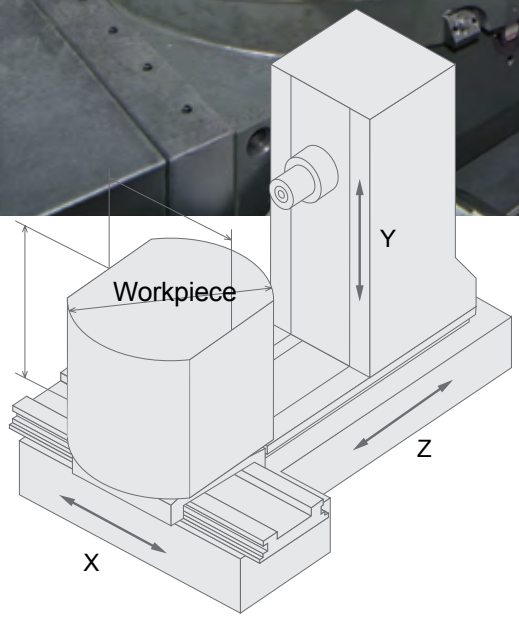
Table Indexing Time	FA630S	FA800S	FA1050S
90° Index	2.7 sec	5 sec	5 sec
Pallet / Pallet Changer			
Pallet Changer Type	Rotary style	Straight shuttle	Straight shuttle
Pallet Size	630 mm x 630 mm (24.80 in x 24.80 in)	800 mm x 800 mm (31.50 in x 31.50 in)	1,050 mm x 1,050 mm (41.33 in x 41.33 in)
Pallet Height from Floor	1,200 mm (47.24 in)	1,320 mm (51.97 in)	1,425 mm (56.10 in)
Pallet Change Time (1° table)	12 sec	40 sec	43 sec
Pallet Load	1,300 kg (2,860 lb)	2,500 kg (5,500 lb)	3,000 kg (6,600 lb)

Automatic Tool Changer

The ATC has three programmable tool change speeds to account for differing tool weights. This allows for the fastest possible tool-to-tool change time, from 2.0 seconds to 3.3 seconds. Faster magazine indexing and spindle orientation work simultaneously with the high-speed tool changer to reduce the chip-to-chip time by 50 percent.



Specifications subject to change



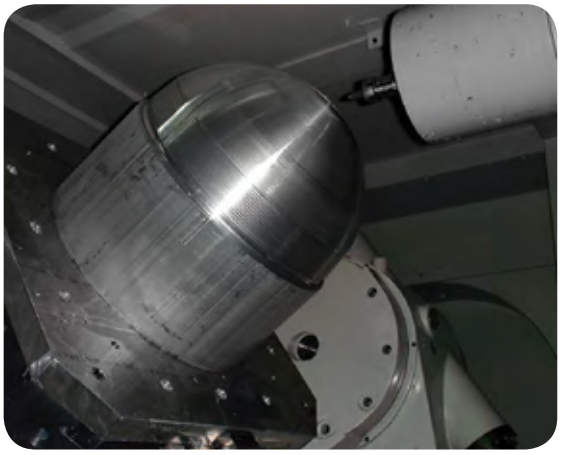
Large Work Envelope

The FA Series comes fully equipped with the largest work envelope in its class. Combined with other Toyoda innovations, this feature ensures that your operation will be able to handle heavy workloads.

Stroke	FA630S	FA800S	FA1050S
X-axis Travel (table)	1,000 mm (39.37 in)	1,350 mm (53.15 in)	1,600 mm (62.99 in)
Y-axis Travel (spindle head)	850 mm (33.46 in)	1,150 mm (45.27 in)	1,400 mm (55.11 in)
Z-axis Travel (column)	750 mm (29.52 in)	1,150 mm (45.27 in)	1,150 mm (45.27 in)
Machine Dimensions			
Width	4,353 mm (172 in)	4,860 mm (192 in)	5,400 mm (213 in)
Length	5,894 mm (232 in)	7,369 mm (291 in)	8,140 mm (321 in)
Height	3,561 mm (142 in)	4,210 mm (166 in)	4,090 mm (161 in)
Weight	16,000 kg (35,200 lb)	27,715 kg (61,100 lb)	34,560 kg (76,200 lb)

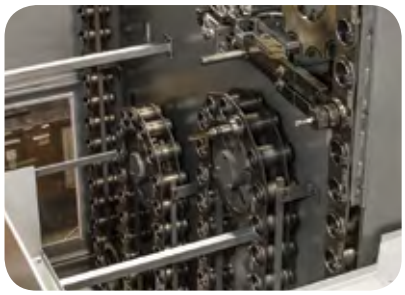
Five-Axis Capabilities (Optional)

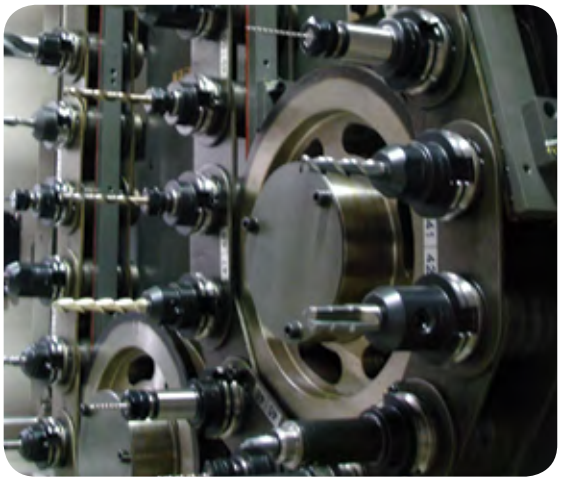
By using a trunnion table or a tombstone-mounted roatary fixture, five-axis machining is achievable with the FA Series. Five-axis machining minimizes the number of machines or setups needed to completely process complex parts, making it an ideal solution for overcoming interference, machining hard-to-reach surfaces, and achieving dimensional accuracy.



Expanded Tool Storage

The standard servo-driven, random access, bi-directional magazine carries 60 tools (optional 120, 190, 240 tools), weighing up to 59.5 lb for the FA630S and up to 77 lb on the FA800S and FA1050S. With adjacent pockets empty, the magazine handles tools up to a 8.27" diameter with a length of 19.69" for the FA630S, and tools up to a 10.6" diameter with a length of 31.5" for the FA800S and FA1050S models.





Automation Systems

The highly reliable FA Series can be integrated into various systems or cells to automate production.

- Multi-level flexible manufacturing system (FMS) with robot-guided vehicle (RGV)
- Single or multi-level automatic pallet pool
- Automatic robot-type loading

Fanuc 31i Controls

The Fanuc 31i CNC delivers high-end features for job shop to production-style environments. Toyoda's advanced software package delivers a high-capacity control memory, extensive operation and maintenance help, and diagnostic screens to support more precise toolpaths, reduced cycle times, and improved surface quality.

Features of the OP Supporter (Optional)

JTEKT machining centers offer the OP Supporter, an automation function that supports the operator's work.

Pallet Control Support

- Automatic cutting program call with the APC control
- Ommission of unnecessary cutting operations with the multi-workpiece installation skip function
- Correction between pallets with the pallet correction function

Solid Pallet Control

Multi-Workpiece Installation Function: Only registered mounting faces and/or processes are machined, significantly reducing cycle time.

Tool Control Support

- Simple program with tool number conversion function
- Detailed control of tool life with tool life control function
- Direct tool setting capability with tool offset function
- Tool teaching with tool list display function
- Limiting arm speed according to tool weight with the ATC speed variation function
- Faulty tool indexing with the replacement tool automatic indexing function
- Manual tool data entry is not required with the tool ID function

Accurate Tool Life Appraisal

Tool Life Control Function: This counting method gives readings at 0.1 sec accuracy and provides a double-layered fault warning system that generates warning of actual error. Tool breakages and AC faults are displayed in addition to tool life.

Simple NC Program Creation

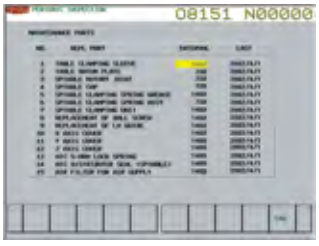
Tool Number Conversion Function: Tool identification number is automatically converted into the ATC magazine pot number to prevent command errors.

Maintenance Control Support

- Notification of control device condition and position with signal status display function
- Periodic inspection item reminder with periodic inspection display function
- Equipment fault recording with fault history function

Straightforward Inspection Items

Periodic Inspection Display Function: Periodic inspection item and completion status are displayed.



Visual Status Display

Signal Status Display Function: Limit switch ON/OFF is given in real time.

 Specifications subject to change

Workability

The FA Series is designed with features that contribute to the productivity, efficiency, safety, and ease of use for the operator.

Accessible Operation Door

The operation panel is positioned on the left-hand side of the machine to provide a wide, accessible door for the operator.

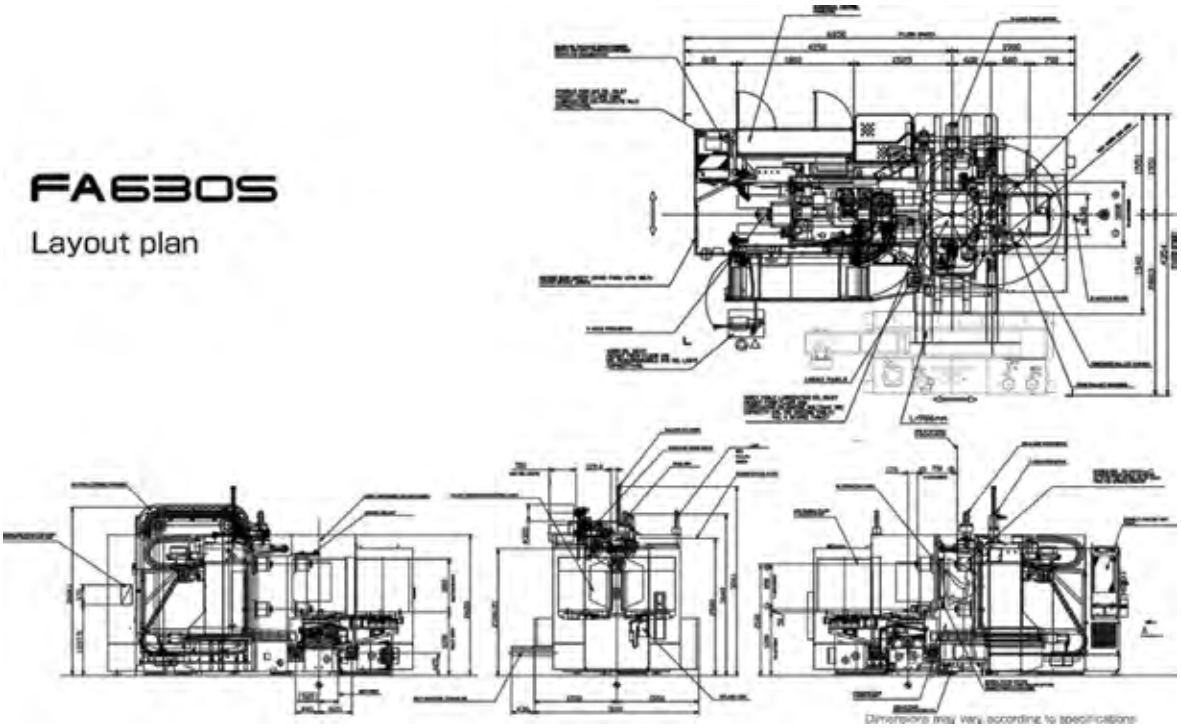
Easy Access to the Spindle

The wide step and large opening enable the operator to stand closer to the spindle while safely operating the machine.

Work Area	Units	FA630S	FA800S	FA1050S
X-axis Travel (column)	mm (in)	1,000 (39.37)	1,350 (53.15)	1,600 (62.99)
Y-axis Travel (spindle head)	mm (in)	850 (33.46)	1,150 (45.27)	1,400 (55.11)
Z-axis Travel (table)	mm (in)	750 (29.52)	1,150 (45.27)	
Spindle Nose to Table Center	mm (in)	175 - 925 (6.89 - 36.41)	200 - 1,350 (7.87 - 53.15)	250 - 1,400 (9.84 -55.11)
Spindle Center to Top Face of Pallet	mm (in)	50 - 900 (1.97 - 35.4)	50 - 1,200 (1.97 - 47.24)	50 - 1,450 (1.97 - 57.08)
Workpiece Swing	mm (in)	Ø 1,000 (Ø 39.37)	Ø 1,600 (Ø 62.99)	Ø 1,850 (Ø 72.83)
Workpiece Height	mm (in)	1,000 (39.37)	1,300 (51.18)	1,550 (61.02)
Spindle				
Spindle Speed	RPM	6,000 (Opt. 6,000 geared head, 8,000 high torque, 15,000)		
Taper	—	CAT50		
Bearing Diameter	mm (in)	Ø 110 (Ø 4.33)		
Spindle Motor (cont. / 30 min)	kW (hp)	22 / 30 (30 / 40)		
Table and Pallet				
Pallet Type	—	Bolt-hole	T-slot	
Pallet Size	mm (in)	630 x 630 (24.80 x 24.80)	800 x 800 (31.50 x 31.50)	1,050 x 1,050 (41.33 x 41.33)
Rotary Table Index Increments	deg	1° (Opt. NC table)		
Indexing Time	sec	2.7	5	
Pallet Height from the Floor	mm (in)	1,200 (47.24)	1,300 (51.18)	1,400 (55.12)
Pallet Changing Time	sec	12 (Opt. 13.5 with NC table)	40 (Opt. 45 with NC table)	43 (Opt. 48 with NC table)
Max. Pallet Load	kg (lb)	1,300 (2,860)	2,500 (5,500)	3,000 (6,600)
Feeds				
Rapid Traverse (X, Y, Z)	m/min (ipm)	36 (1,417)	24 (945)	
Acceleration (X, Y, Z)	G	0.36, 0.40, 0.31	0.16, 0.15, 0.15	0.15, 0.16, 0.15
Way Design	—	Box way		
Ballscrew Diameter (X, Y, Z)	mm (in)	50 (1.96)	63, 50, 63 (2.48, 1.96, 2.48)	
Accuracy				
Positioning Accuracy (X, Y, Z)	mm (in)	± 0.003 (± 0.00012)		
Repeatability (X, Y, Z)	mm (in)	± 0.002 (± 0.00008)		
Table Indexing Accuracy	arc sec	± 3 (Opt. ± 7 with NC table)		
Table Indexing Repeatability	arc sec	± 1 (Opt. ± 3.5 with NC table)		
Automatic Tool Change				
Magazine Capacity	—	60 (Opt. 120, 190, 240)		
Max. Tool Weight	kg (lb)	27 (59.5)	35 (77)	
Max. Tool Size (diameter x length)	mm (in)	Ø 120 x 500 (Ø 4.72 x 19.69)	Ø 120 x 800 (Ø 4.72 x 31.50)	
Tool Change Time (tool-to-tool)	sec	2.0 (15 kg) - 3.3 (35 kg)	2.0 (15 kg) - 2.9 (35 kg)	
Tool Change Time (chip-to-chip)	sec	5.5 (15 kg) - 6.8 (35 kg)	7.9 (15 kg) - 8.8 (35 kg)	
Dimensions				
Machine Height	mm (in)	3,561 (142)	4,210 (166)	4,090 (161)
Floor Space (width x length)	mm (in)	4,353 x 5,894 (172 x 232)	4,860 x 7,369 (192 x 291)	5,400 x 8,140 (213 x 321)
Weight	kg (lb)	16,000 (35,200)	27,715 (61,100)	34,560 (76,200)
Controls		Fanuc 31i		

FA630S

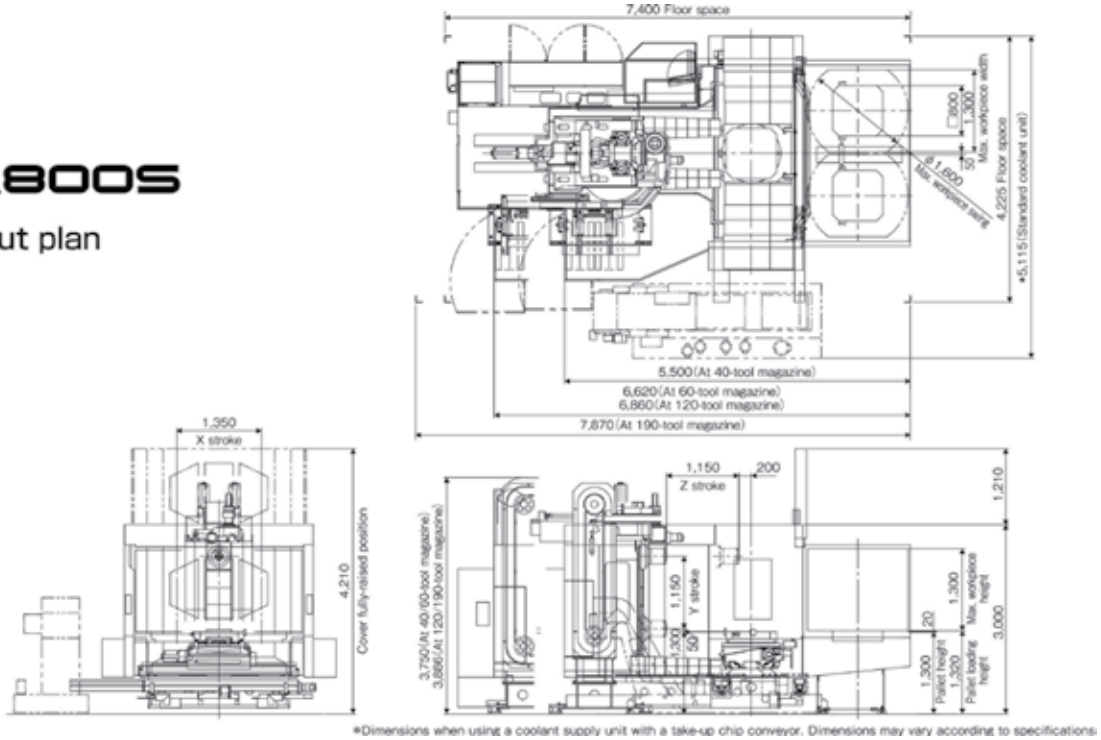
Layout plan



Dimensions may vary according to specifications

FA800S

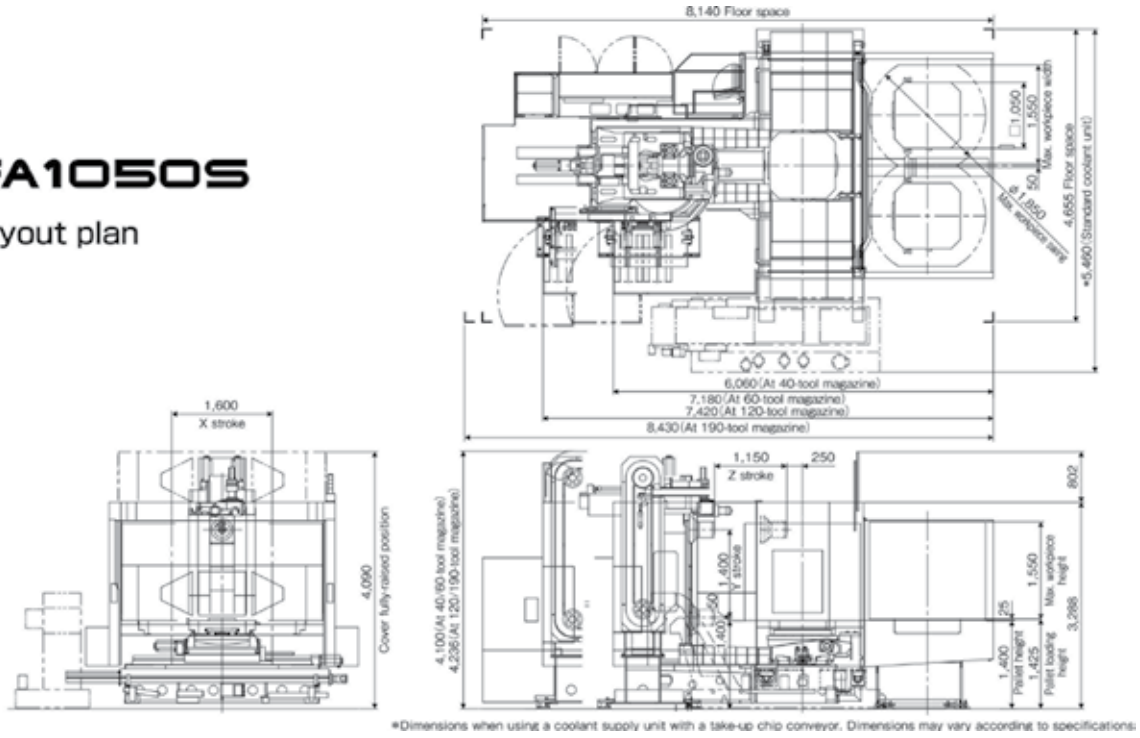
Layout plan



*Dimensions when using a coolant supply unit with a take-up chip conveyor. Dimensions may vary according to specifications

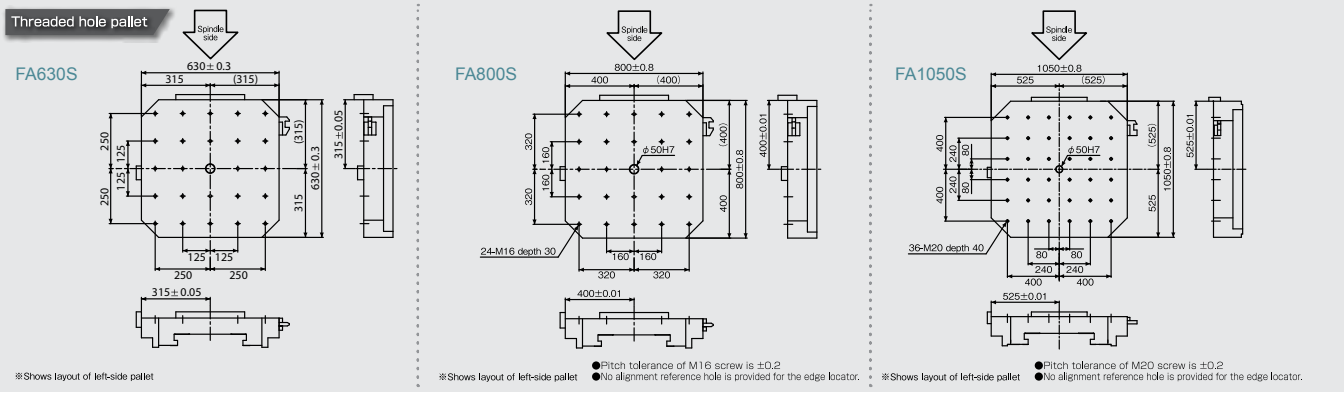
FA1050S

Layout plan



*Dimensions when using a coolant supply unit with a take-up chip conveyor. Dimensions may vary according to specifications.

Threaded hole pallet



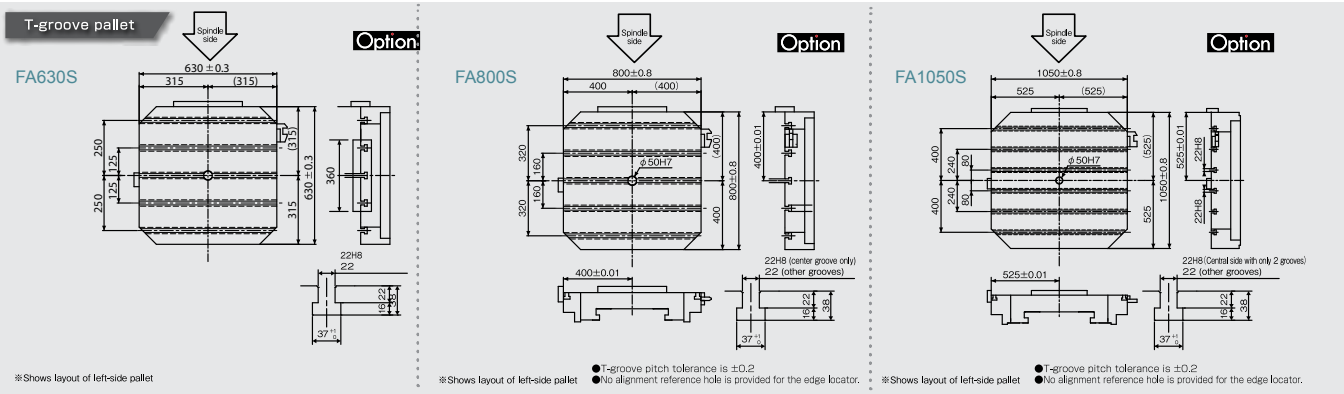
※Shows layout of left-side pallet

FA800S: ●Pitch tolerance of M16 screw is ±0.2 ●No alignment reference hole is provided for the edge locator.

FA1050S: ●Pitch tolerance of M20 screw is ±0.2 ●No alignment reference hole is provided for the edge locator.

T-groove pallet

Option



※Shows layout of left-side pallet

FA800S: ●T-groove pitch tolerance is ±0.2 ●No alignment reference hole is provided for the edge locator.

FA1050S: ●T-groove pitch tolerance is ±0.2 ●No alignment reference hole is provided for the edge locator.

Production Experience

Toyoda is one of the world's largest machine tool builders, but we also have a successful production side to our business. Every year, Toyoda manufactures and sells more than $1.5 billion in steering and driveline systems to automotive OEMs around the world. This gives our company unique insight into the shop floor challenges our customers face every day.

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THE TOYODA DIFFERENCE

Toyoda Machinery USA

Toyoda Machinery USA is headquartered just northwest of Chicago in Arlington Heights, Illinois. Our office in Monterrey, Mexico proudly serves Toyoda's Latin American market, while our Minnesota- and Massachusetts-based tech centers cater to their respective regions.

Toyoda's Remanufactured Products Division, located just outside Detroit in Wixom, Michigan, provides rebuild, remanufacturing, and service support for the machine tool industry.

FA SERIES FA630S•FA800S•FA1050S

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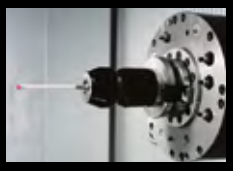

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