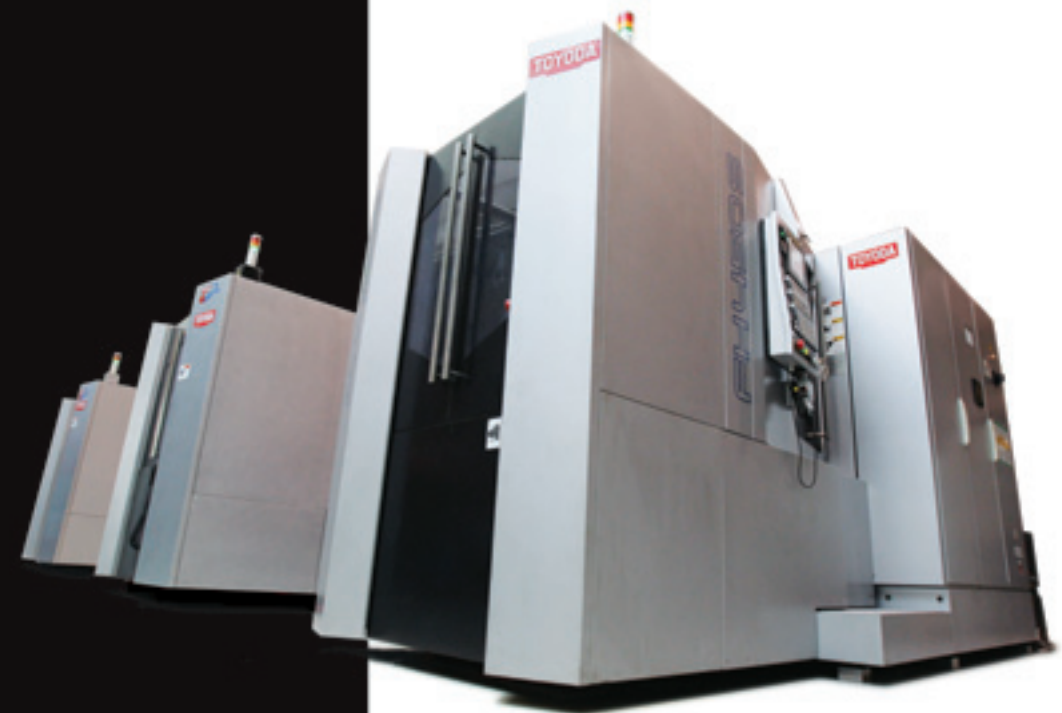


TOYODA®

JTEKT

FH SERIES

FH450S
FH550S
FH630S
FH550SX
FH630SX
FH800SX



<http://www.jtekt.co.jp>

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Available machines or machines shown may vary depending on optional equipment or periodic design changes.
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Always read manuals carefully before using any machinery to ensure safe and proper use.

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JTEKT
JTEKT CORPORATION



Best value for the Customer By focusing on the starting point, we aim for the summit

A solid line-up covering all types of manufacturing.

FH450S

High-cutting performance contributes to the improvement of productivity.



FH450S	
Pallet size	mm □450
Stroke(X×Y×Z)	mm 600×600×600
Max. workpiece size	mm φ630×750
Pallet load	kg 400

FH550S FH630S

Basic model applicable to a wide-range of purposes



FH550S	
Pallet size	mm □550 (□500)
Stroke(X×Y×Z)	mm 750×800×850
Max. workpiece size	mm φ850×1,000
Pallet load	kg 800

FH630S	
Pallet size	mm □630
Stroke(X×Y×Z)	mm 1,000×800×850
Max. workpiece size	mm φ1,000×1,000
Pallet load	kg 800 (1,000)

FH550SX FH630SX

Premium model boasting the best cutting performance in its class



FH550SX	
Pallet size	mm □550 (□500)
Stroke(X×Y×Z)	mm 750×800×850
Max. workpiece size	mm φ850×1,000
Pallet load	kg 800

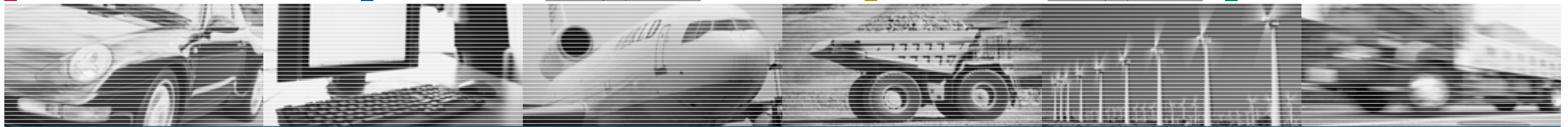
FH630SX	
Pallet size	mm □630
Stroke(X×Y×Z)	mm 1,000×800×850
Max. workpiece size	mm φ1,000×1,000
Pallet load	kg 800 (1,000)

FH800SX

Efficient production of large parts



FH800SX	
Pallet size	mm □800
Stroke(X×Y×Z)	mm 1,250×1,100×1,050
Max. workpiece size	mm φ1,200×1,250
Pallet load	kg 1,300



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Reliably rigid.

The □450 model has a high basic performance which assures use across a diverse range of applications.

FH450S

High cutting performance improves productivity.

X-/Y-/Z-axis rapid feed rate **[50m/min]**

X-/Y-/Z-axis rapid acceleration **[0.7G]**

Tool change time (C-C) **[2.7S]**

Table indexing time **[2.5S]**

Spindle startup time **[1.0S]**
BT No. 40 15,000min⁻¹ spindle (0 to 10,000min⁻¹)

3-point support bed

Z-axis dual ball screw drive

Cylindrical roller slide

Completely open center trough

Field Bus



		FH450S
Pallet size	mm	□450
Stroke (X×Y×Z)	mm	600×600×600
Max. workpiece size	mm	φ630×750
Pallet load	kg	400

Photo features equipment with optional specifications.

Features **FH450S**

3 spindle types selected according to machining operation

- [BT No.40 15,000min⁻¹] Ideal for the mass production of aluminum and castings Standard
- [BT No.40 8,000min⁻¹] Ideal for the efficient production of castings
- [HSK A63 20,000min⁻¹] Ideal for form cutting



Advanced performance with ultimate speed

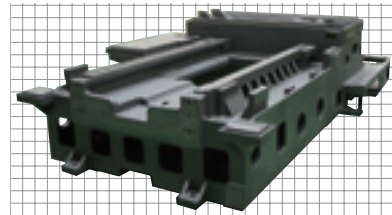
- [Rapid feed rate] 50m/min(X, Y and Z-axes)
- [Table indexing time] 2.5s/90°
- [Rapid acceleration] 6.86m/s² (0.7G) (X, Y and Z-axes)
- [Pallet change time] 5.6s*
- [Tool change time (chip-to-chip)] 2.7s



A rigid platform helping to achieve the best possible performance

High grade cast iron 3-point support bed

Large parts such as the bed and column are cast in our foundry so that quality high grade cast iron can be obtained. In addition, latest structure analysis technologies are added to achieve both rigidity and light-weight objectives, supporting the fastest speed performance and the highest cutting performance in its class.



Rigid cylindrical roller slide

The cylindrical roller slide is an ideal slide method incorporating both the rigidity of the angular slide and the speed offered by the linear guide. Compared with the ball guide, rigidity is double and improved damping capacity reduces vibration to 1/3, thus rigidity is assured. In addition, the preloading feature eliminates the gap factor found in friction slides.



Dual ball screw drive

A dual ball screw drive is adopted to drive the heavy Z-axis table. This structure has the ball screw located outside the machining chamber with an ideal chip-discharging center trough. Furthermore, the driving force is distributed to two shafts while motor size is reduced, thus providing an effective means for heat reduction.



Center trough structure enabling chip disposal beneath the cutting point

Chip disposal plays a critical role in improving machine productivity. By incorporating a large chip disposal port in the center of the bed, chip disposal has become 6 times more effective. On top of this, the significant reduction in coolant consumption has led to another plus – the creation of a more environmentally-friendly machine.



FH450S



Rear view



Side view

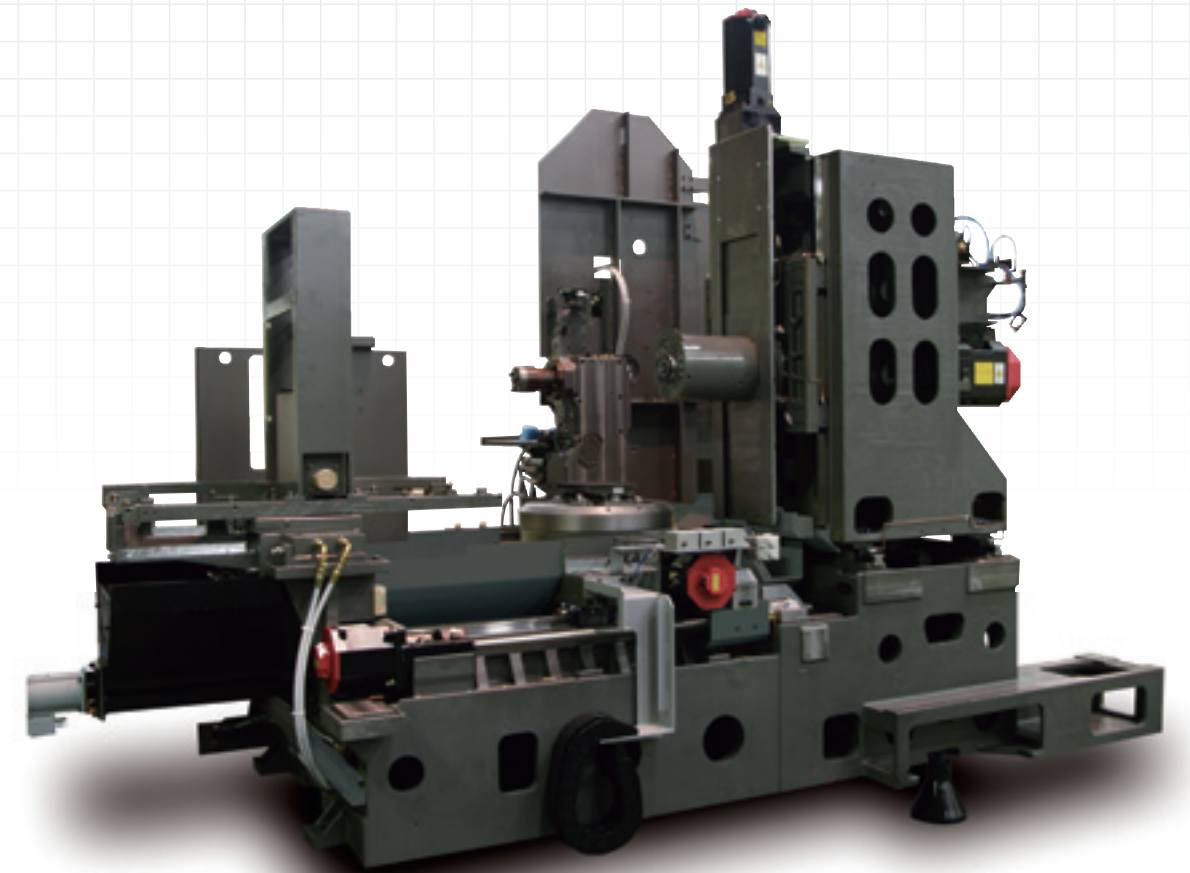


Photo features equipment with optional specifications.

*With 1° indexing table



Performance a step above the rest
A utility machine suitable for all
manufacturing requirements

FH550S FH630S

Basic model applicable to a wide-range of purposes

X-/Y-/Z-axis rapid feed rate **[60m/min]**

X-/Y-/Z-axis rapid acceleration **[1.0G]**

Tool change time (C-C) **[2.7S]**
BT No.40

Table indexing time (90°) **[2.0S]**

Table indexing time (90°) **[0.7S]**
Optional DD table

Spindle startup time **[1.0S]**
BT No. 40 15,000min⁻¹ spindle (0 to 10,000min⁻¹)

3-point support bed

Z-axis dual ball screw drive

Cylindrical roller slide

Completely open center trough

Field Bus



		FH550S
Pallet size	mm	□550 (□500)
Stroke(X×Y×Z)	mm	750×800×850
Max. workpiece size	mm	φ850×1,000
Pallet load	kg	800
		FH630S
Pallet size	mm	□630
Stroke(X×Y×Z)	mm	1,000×800×850
Max. workpiece size	mm	φ1,000×1,000
Pallet load	kg	800 (1,000)

Photo features equipment with optional specifications.

Features FH550S/FH630S

4 spindle types selected according to machining operation

- [BT No.40 15,000min⁻¹] Ideal for the mass production of aluminum and castings Standard
- [BT No.40 8,000min⁻¹] Ideal for the efficient production of castings
- [HSK A63 20,000min⁻¹] Ideal for form cutting
- [BT No.50 15,000min⁻¹] Ideal for the production of various materials ranging from aluminum to iron



Advanced performance with ultimate speed

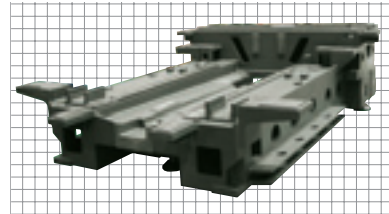
- [Rapid feed rate] 60m/min(X, Y and Z-axes)
- [Rapid acceleration] 9.8m/s² (1G) (X, Y and Z-axes)
- [Tool change time (chip-to-chip)] 2.7s (BT No.40)
- [Table indexing time] 2.0s/90°
- [Table indexing time] 0.7s/90° (Optional DD table)
- [Pallet change time] 9.5s (FH550S), 12s (FH630S)*



A rigid platform helping to achieve the best possible performance

High grade cast iron 3-point support bed

Large parts such as the bed and column are cast in our foundry so that quality high grade cast iron can be obtained. In addition, latest structure analysis technologies are added to achieve both rigidity and light-weight objectives, supporting the fastest speed performance and the highest cutting performance in its class.



Rigid cylindrical roller slide

The cylindrical roller slide is an ideal slide method incorporating both the rigidity of the angular slide and the speed offered by the linear guide. Compared with the ball guide, rigidity is double and improved damping capacity reduces vibration to 1/3, thus rigidity is assured. In addition, the preloading feature eliminates the gap factor found in friction slides.

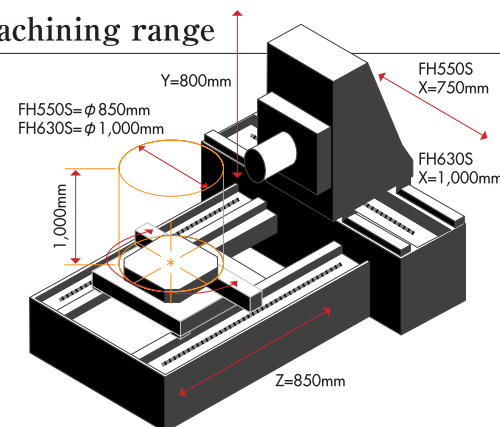


Dual ball screw drive

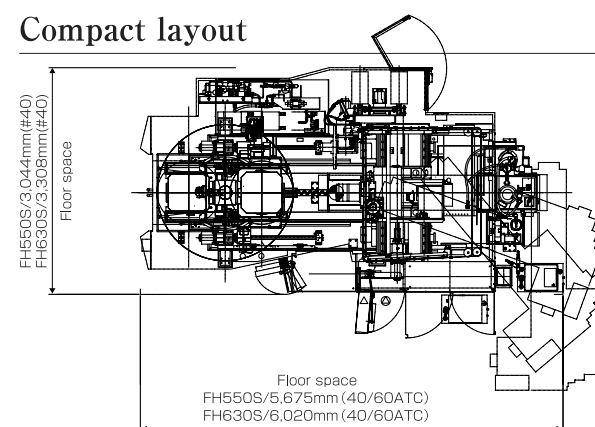
A dual ball screw drive is adopted to drive the heavy Z-axis table. This structure has the ball screw located outside the machining chamber with an ideal chip-discharging center trough. Furthermore, the driving force is distributed to two shafts while motor size is reduced, thus providing an effective means for heat reduction.



Wide machining range



Compact layout



FH550S

FH630S



Front view



Side view

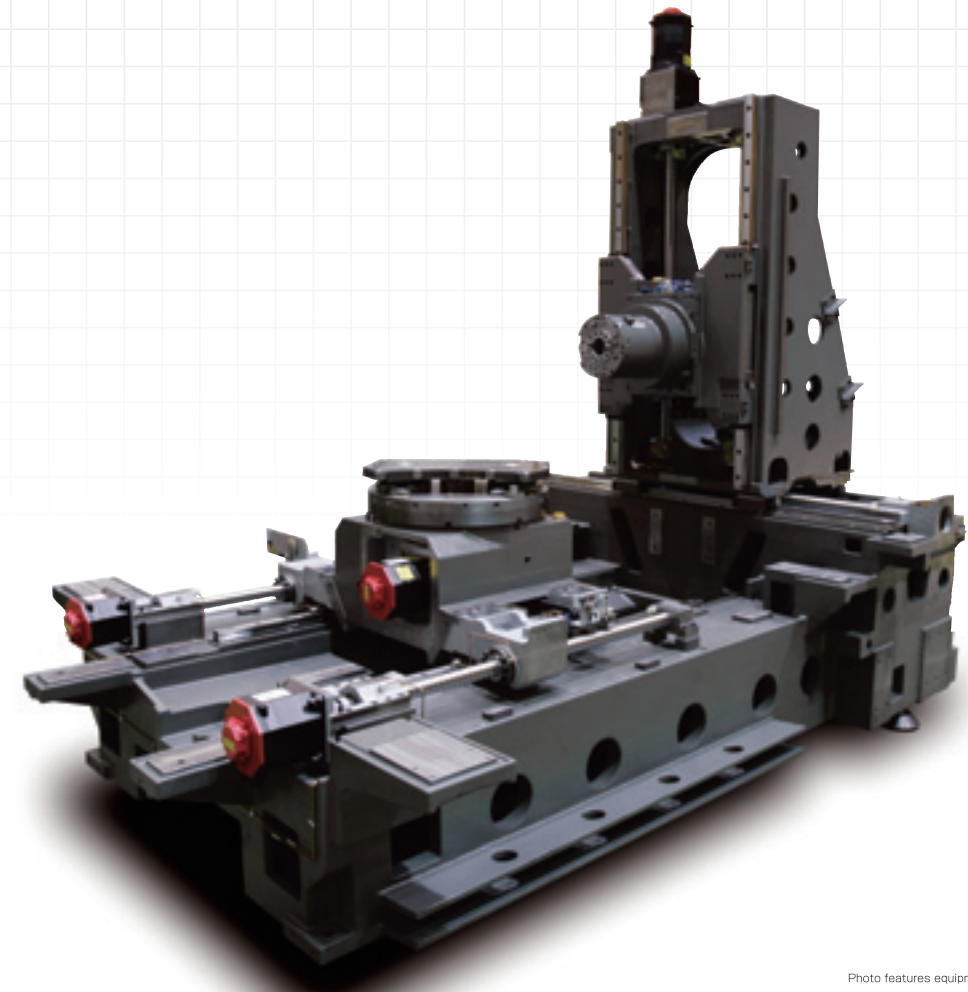


Photo features equipment with optional specifications.

Its rigidity has set a new benchmark
for machining centers.
A premium model with condensed
high performance in a compact body

FH550SX FH630SX

Premium model boasting the best cutting performance in its class

X-/Y-/Z-axis rapid feed rate **[60m/min]**

Rapid acceleration **[XY=0.7G Z=1.0G]**

Tool change time (C-C) **[3.6S]**

Table indexing time (90°) **[2.0S]**

Table indexing time (90°) **[0.7S]**
Optional DD table

6,000min⁻¹ spindle output **[30/22kW]**

6,000min⁻¹ spindle output **[37/30kW]**
Optional large torque spindle

3-point support bed

Y-/Z-axis dual ball screw drive

Cylindrical roller slide

Completely open center trough

Field Bus



		FH550SX
Pallet size	mm	□550 (□500)
Stroke (X×Y×Z)	mm	750×800×850
Max. workpiece size	mm	φ850×1,000
Pallet load	kg	800
		FH630SX
Pallet size	mm	□630
Stroke (X×Y×Z)	mm	1,000×800×850
Max. workpiece size	mm	φ1,000×1,000
Pallet load	kg	800 (1,000)

Photo features equipment with optional specifications.

Features FH550SX/FH630SX

3 spindle types selected according to machining operation

- [BT No.50 6,000min⁻¹] Ideal for the heavy duty cutting of iron parts Standard
- [BT No.50 15,000min⁻¹] Offers high speed and torque, making it ideal for a wide variety of products (262.6N·m high torque)
- [BT No.50 6,000min⁻¹] Ideal for heavy duty cutting at low speeds with large diameter cutters (1,009N·m high torque)



Best cutting performance in its class with a 1,009N·m large torque spindle

Face milling 1,250cc/min¹

- [Workpiece material] S48C
- [Tool] φ160 face mill
- [Spindle speed] 400min⁻¹
- [Feed rate] 1,600mm/min
- [Depth of cut/width] 6/130mm



Side face end milling 740cc/min¹

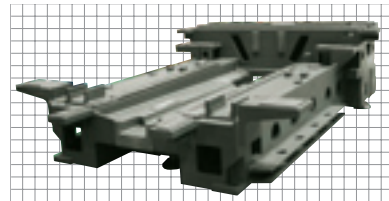
- [Workpiece material] S48C
- [Tool] φ50 roughing end mill
- [Spindle speed] 1,020min⁻¹
- [Feed rate] 1,224mm/min
- [Depth of cut/width] 40/15mm



A rigid platform helping to achieve the best possible performance

High grade cast iron 3-point support bed

Large parts such as the bed and column are cast in our foundry so that quality high grade cast iron can be obtained. In addition, latest structure analysis technologies are added to achieve both rigidity and light-weight objectives, supporting the fastest speed performance and the highest cutting performance in its class.



Rigid cylindrical roller slide

A rigid, long-type cylindrical roller slide is adopted for the Y-axis to meet the requirements of heavy duty cutting. This helps to substantially increase resistance against cutting forces.

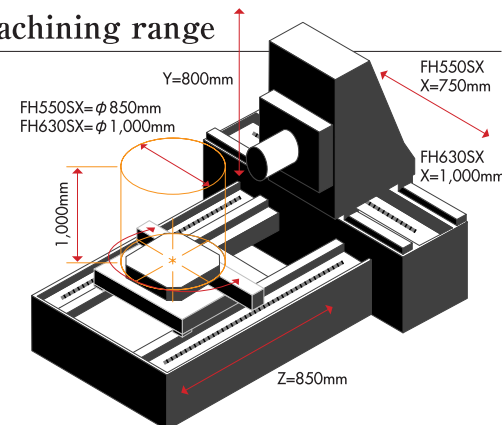


Dual ball screw drive

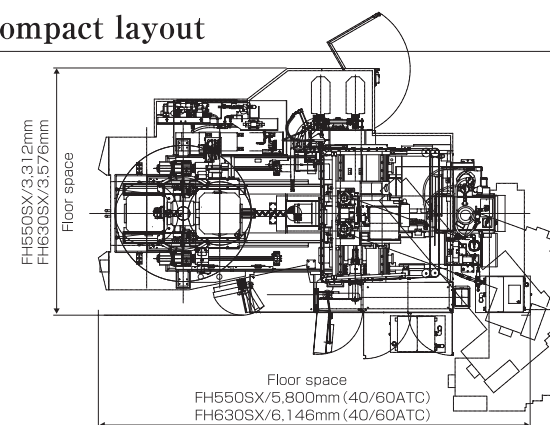
A dual ball screw drive is adopted for the Y-axis to suppress rolling and vibration in heavy duty cutting, thereby substantially improving cutting performance.



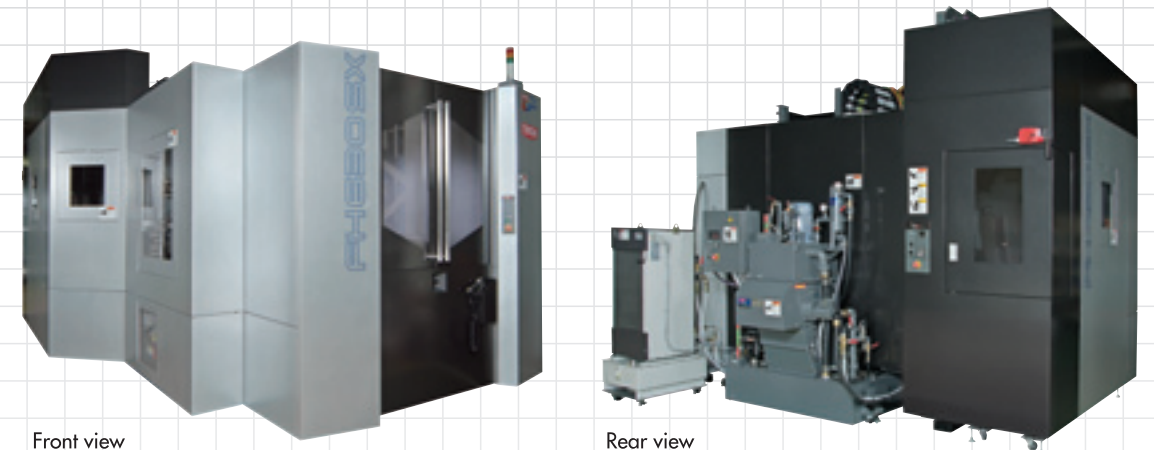
Wide machining range



Compact layout



FH550SX FH630SX



Front view

Rear view

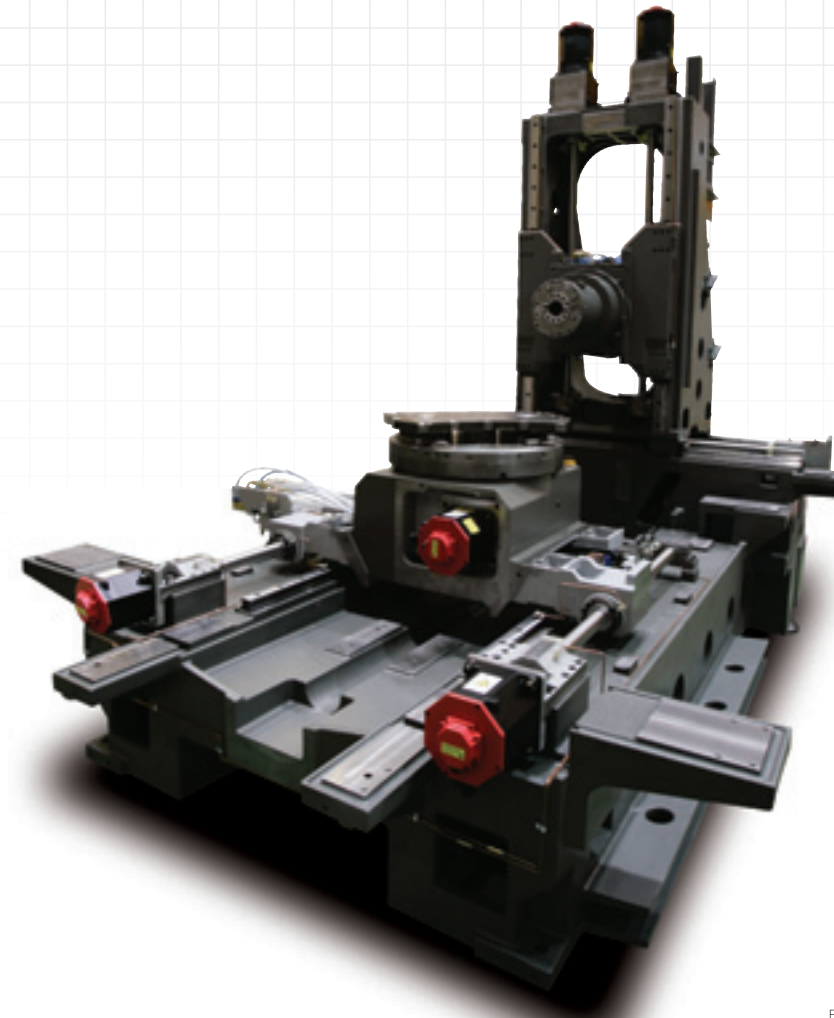


Photo features equipment with optional specifications.



Its rigidity has set a new benchmark for machining centers.

□800 model best for high-efficiency cutting of large parts

FH800SX

Highly efficient production of large parts

X-/Y-/Z-axis rapid feed rate **[48m/min]**

Rapid acceleration **[XY=0.5G Z=0.7G]**

Tool change time(C-C) **[5.5S]**

Table indexing time (90°) **[2.5S]**

6,000min⁻¹ spindle output **[30/22kW]**

3-point support bed

Y-/Z-axis dual ball screw drive

Cylindrical roller slide

Completely open center trough

Field Bus



		FH800SX
Pallet size	mm	□800
Stroke (X×Y×Z)	mm	1,250×1,100×1,050
Max. workpiece size	mm	φ 1,200×1,250
Pallet load	kg	1,300

Photo features equipment with optional specifications.

Features **FH800SX**

3 spindle types selected according to machining operation

- [BT No.50 6,000min⁻¹] Ideal for the heavy duty cutting of iron parts **Standard**
- [BT No.50 15,000min⁻¹] Offers high speed and torque, making it ideal for a wide variety of products (262.6N·m high torque)
- [BT No.50 6,000min⁻¹] Ideal for heavy duty cutting at low speeds with large diameter cutters (1,009N·m high torque)



Advanced performance with ultimate speed

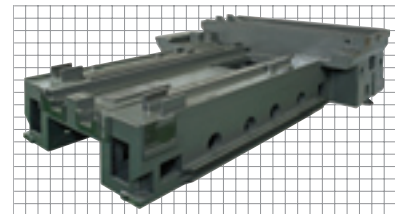
- [Rapid feed rate] 48m/min(X, Y and Z-axes)
- [Rapid acceleration] XY=4.9m/s² (0.5G) Z=6.86m/s² (0.7G)
- [Tool change time (chip-to-chip)] 5.5s
- [Table indexing time] 2.5s/90° [Pallet change time] 18s*



A rigid platform helping to achieve the best possible performance

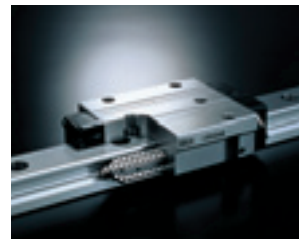
High grade cast iron 3-point support bed

Large parts such as the bed and column are cast in our foundry so that quality high grade cast iron can be obtained. In addition, latest structure analysis technologies are added to achieve both rigidity and light-weight objectives, supporting the fastest speed performance and the highest cutting performance in its class.



Rigid cylindrical roller slide

A rigid, long-type cylindrical roller slide is adopted for the Y-axis to meet the requirements of heavy duty cutting. This helps to substantially increase resistance against cutting forces.



Dual ball screw drive

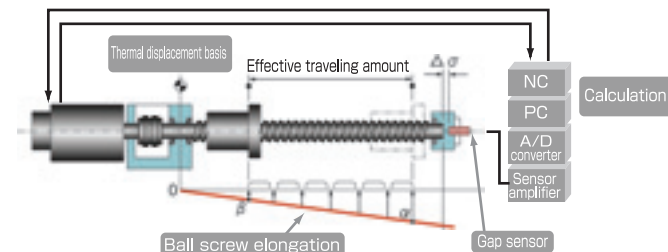
A dual ball screw drive is adopted for the Y-axis to suppress rolling and vibration in heavy duty cutting, thereby substantially improving cutting performance.



JTEKT's original thermo technology provides satisfaction to everybody.

BTS (Ball screw Thermo Stabilizer) function

A new method is developed to directly measure the amount of displacement caused by heat generation of the ball screw. When compared with the method of cooling the ball screw shaft center with coolant, the new method makes for a more environmentally friendly, accurate correction process.



*With 1° indexing table

STS (Spindle Thermo Stabilizer) function **Option**

Spindle elongation is directly measured with a special sensor for correction. When compared with the machine body temperature follow-up method, a more accurate correction can be made.

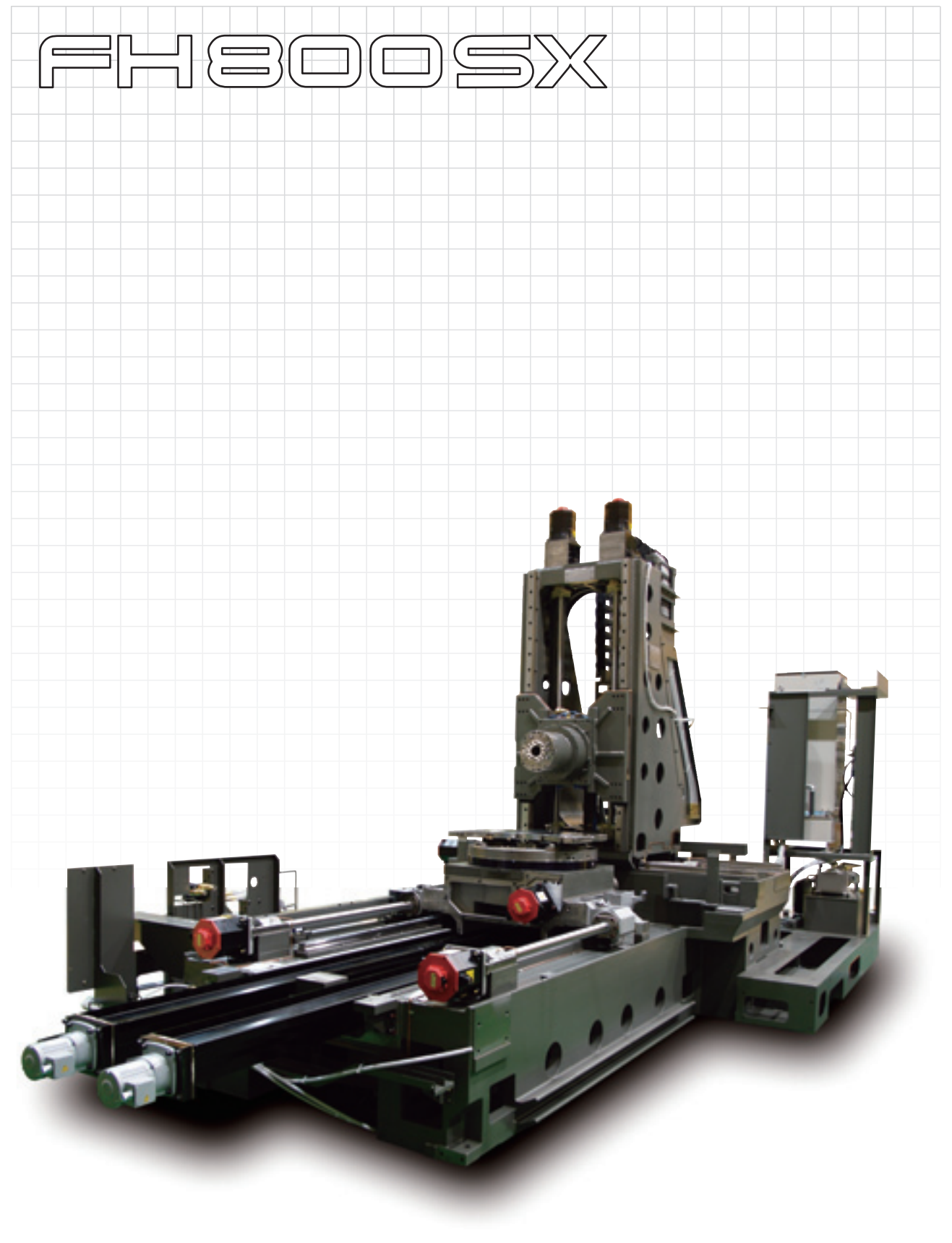
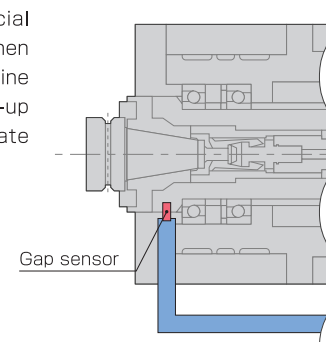
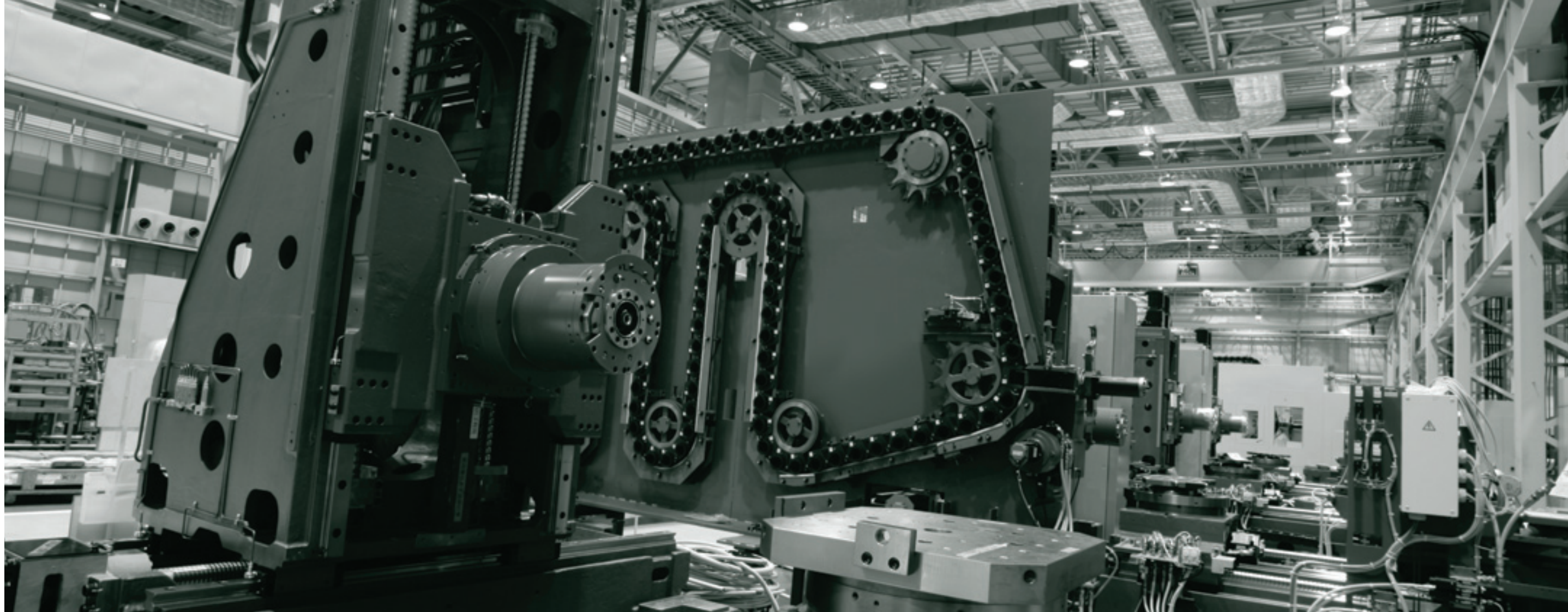


Photo features equipment with optional specifications.



The “Assurance” of **JTEKT** quality

Premium Technology **FH**SERIES

A function most sought after in machine tools.

The capability of stable production
over a long period of time.

JTEKT makes this possible through
its own unique engineering strength.

JTEKT promises a high level of quality which will ensure customer satisfaction in every aspect looked for in a machining center.

Through leading edge technologies and innovative technology development, JTEKT’s machining centers have come to enjoy a status of reliability in various countries across the world. JTEKT’s ability to satisfy customers stems from the combined strengths of our development, production, sales and service departments, combined with the “customer-first” principle and the quality of the production shop floor. We are constantly dedicating ourselves to the creation of products which offer a quality that provides that “feeling of assurance”.

Spindle 21~26

Platform 27~34

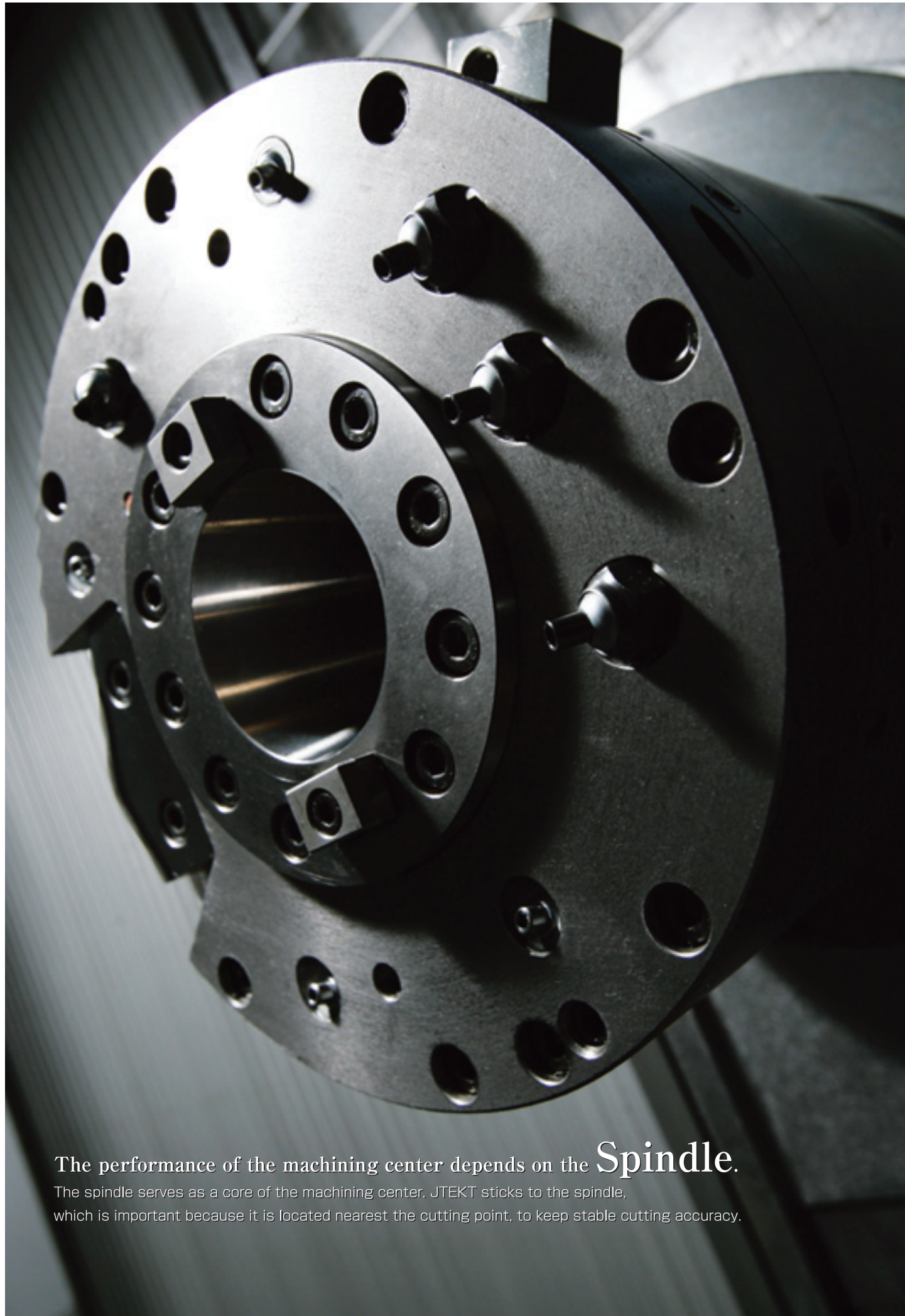
Precision technology 35~36

Reliability 37~44

Workability 45~50

Automation support 51~56

Environmental performance 57~58



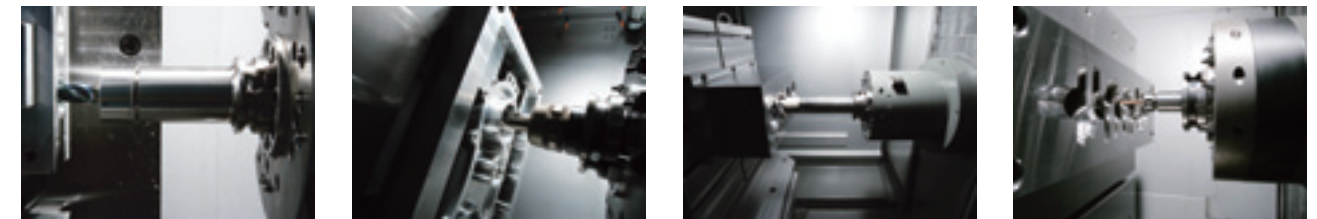
The spindle lineup fits all manufacturing needs ranging from high speed cutting to heavy duty cutting.

JTEKT's machining center realizes fast, rigid and stable cutting operation based on a fine balance between the spindle and the machine. Backed by experience of support of manufacture of the cutting line of mass production parts starting at automotive parts, we also take care of reduction of the spindle maintenance cost. The spindle lineup including seven variations starting at the rigid spindle manufactured under long-period aging tests and rigidity analyses will surely impress you.

Selection from seven spindle variations according to cutting operation

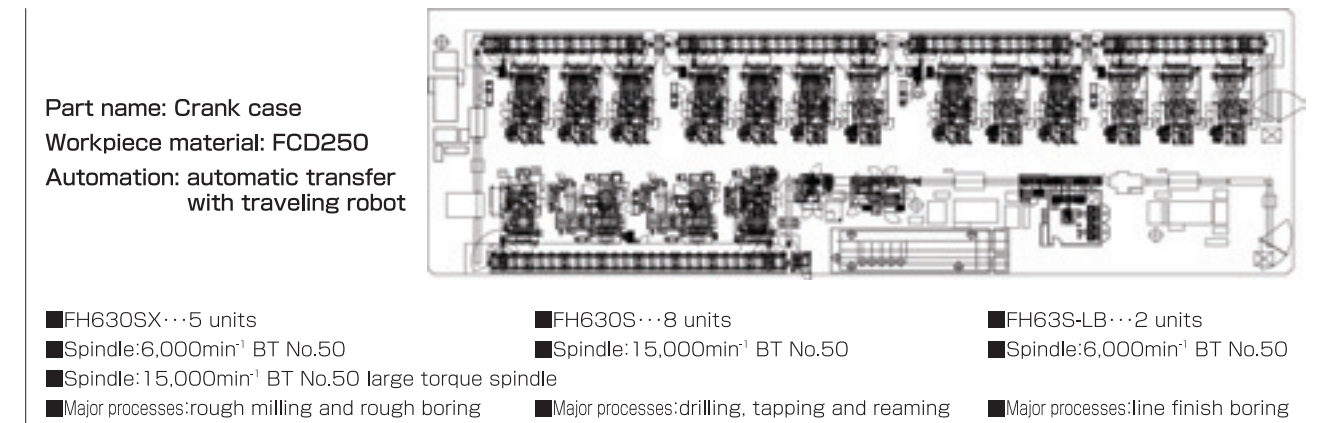
Application	Spindle speed	Spindle nose shape	Spindle motor (short-time/continuous)	Spindle diameter (front bearing bore)	Max. torque	Acceleration time	Deceleration time	Applicable models
Best for form cutting such as shaving	20,000min ⁻¹	HSK A63	22/18.5kW	φ70mm	117.8N·m	2.4sec	3.0sec	FH450S, FH550S, FH630S
Best for mass production of products ranging from aluminum to castings	15,000min ⁻¹	BT No.40 HSK A63	22/18.5kW	φ80mm	166.7N·m	1.0sec ^{*1} 1.9sec	1.7sec ^{*2} 2.3sec	FH450S, FH550S, FH630S
Best for high-efficiency cutting of cast parts	8,000min ⁻¹	BT No.40 HSK A63	17.7/15kW	φ80mm	165.5N·m	1.9sec	2.8sec	FH450S, FH550S, FH630S
Best for a wide variety of products ranging from aluminum to iron	15,000min ⁻¹	BT No.50 HSK A100	22/18.5kW	φ90mm	166.7N·m	1.4sec ^{*1} 2.6sec	1.9sec ^{*2} 3.2sec	FH550S, FH630S
Best for a wide variety of products with high speeds and large torques	15,000min ⁻¹ (large torque)	BT No.50 HSK A100	30/25kW	φ100mm	262.6N·m	2.5sec ^{*1} 5.6sec	3.9sec ^{*2} 7.6sec	FH550SX, FH630SX, FH800SX
Best for heavy duty cutting of iron parts	6,000min ⁻¹	BT No.50 HSK A100	30/22kW	φ110mm	600N·m	1.9sec	2.9sec	FH550SX, FH630SX, FH800SX
Best for heavy duty cutting at low speeds with large diameter cutters	6,000min ⁻¹ (large torque)	BT No.50 HSK A100	37/30kW	φ110mm	1,009N·m	2.0sec	2.9sec	FH550SX, FH630SX, FH800SX

*1: Acceleration time to 10,000min⁻¹ *2: Deceleration time from 10,000min⁻¹



The best production line can be configured with the machine and spindle selected according to the cutting processes.

From rough cutting to finish cutting, realized with three types machining centers and three spindle types.



The performance of the machining center depends on the Spindle.

The spindle serves as a core of the machining center. JTEKT sticks to the spindle, which is important because it is located nearest the cutting point, to keep stable cutting accuracy.

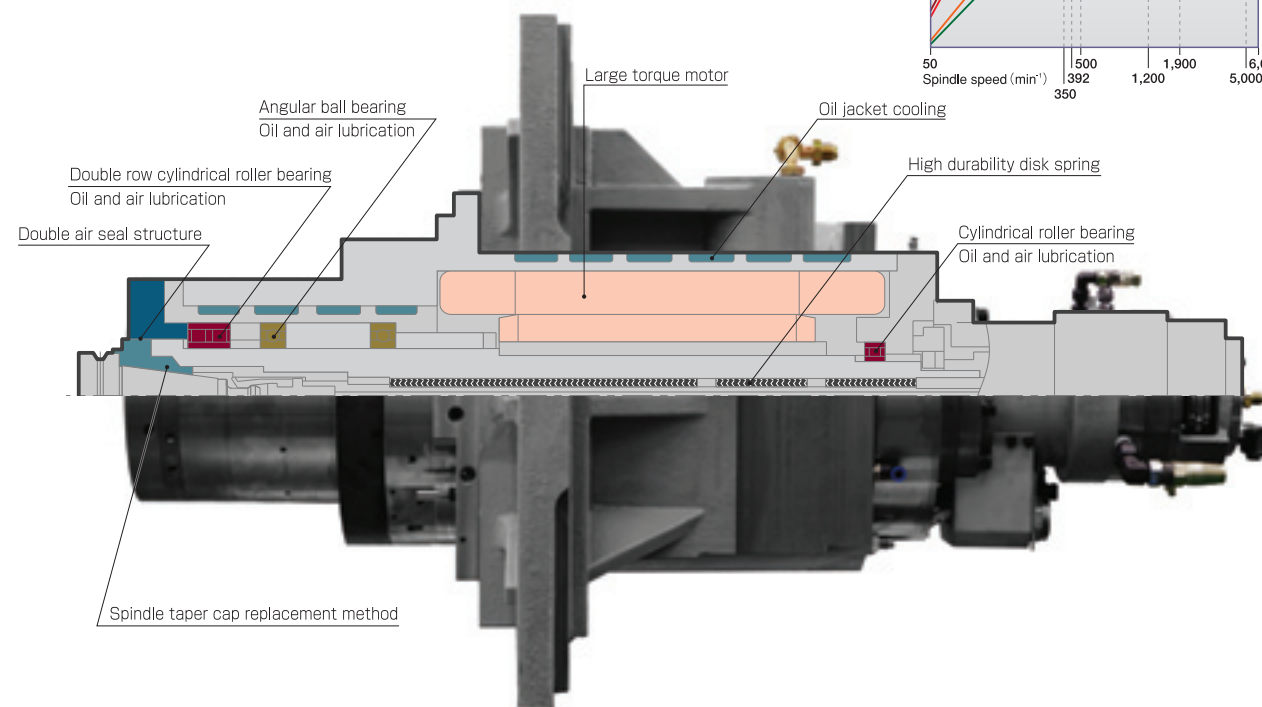
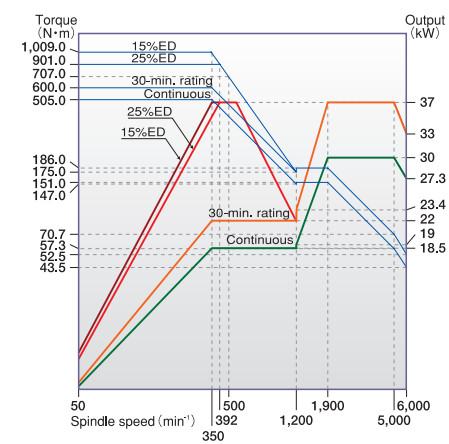
Each and every spindle is backed by its own specific type of outstanding technology.

Large torque spindle achieving the best performance in its class

FH550SX/FH630SX FH800SX

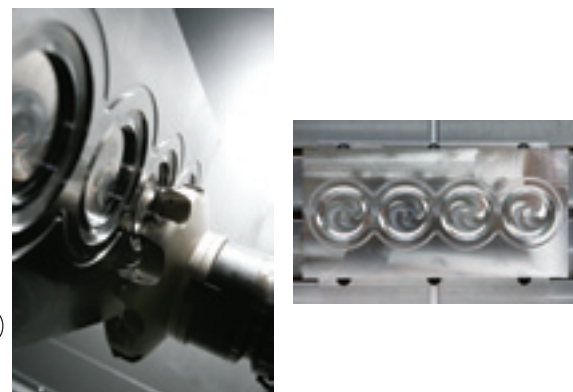
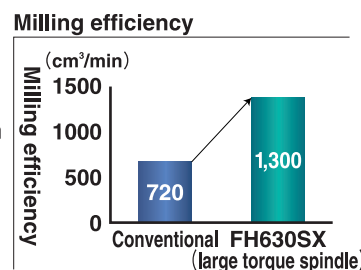
- [Spindle speed] 6,000min⁻¹
- [Spindle nose shape] BT No.50
- [Spindle motor (short-time/continuous)] 37/30kW
- [Max. torque] 1,009N·m
- [Spindle diameter (front bearing bore)] φ110mm

Both axial and radial rigidity is sought after in spindles operating with large cutters. To satisfy both requirements, the 6,000min⁻¹ spindle is equipped with a double row cylindrical roller bearing on its front. This bearing has a large radial load capacity and is therefore able to withstand heavy duty loads and impacting loads.



Best cutting performance in its class with a 1,009N·m large torque spindle

- Cylinder block (model piece)
- [Workpiece material] HPM7
- Milling
- [Tool] φ160 face mill
- [Spindle speed] 350min⁻¹
- [Feed rate] 1,400mm/min
- [Depth of cut/width] 5/128mm
- Boring
- [Tool] φ92 boring
- [Spindle speed] 500min⁻¹
- [Feed rate] 200mm/min
- [Model FH630SX] 6,000min⁻¹ BT No.50 large torque spindle



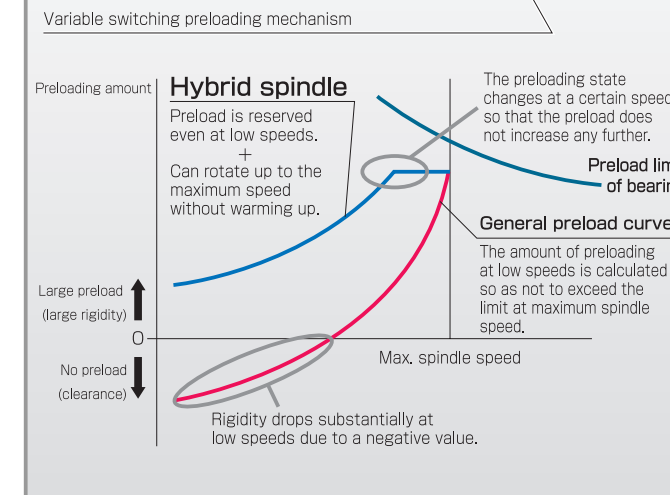
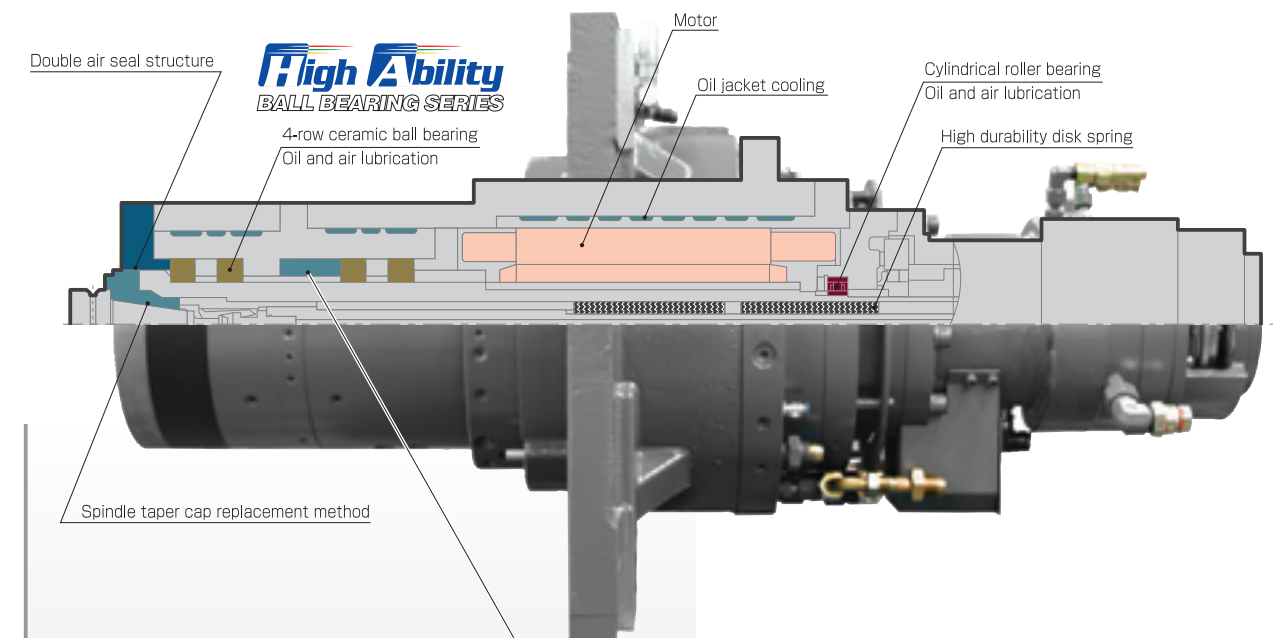
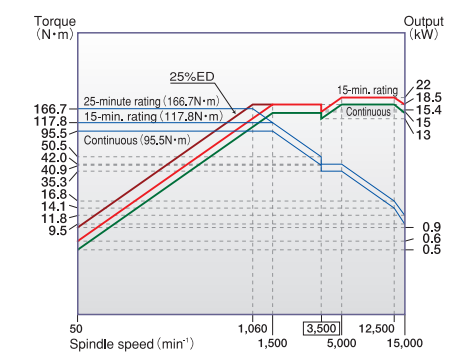
Hybrid spindle

boasting superior rigidity and rotation accuracy in all zones ranging from low to high speeds

FH450S FH550S/FH630S

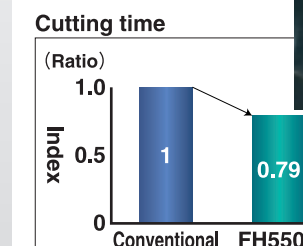
- [Spindle speed] 15,000min⁻¹
- [Spindle nose shape] BT No.40
- [Spindle motor (short-time/continuous)] 22/18.5kW
- [Max. torque] 166.7N·m
- [Spindle diameter (front bearing bore)] φ80mm

A high speed spindle covering all areas from the low speed cutting of cast irons to the high speed precision cutting of aluminum. A JTEKT-manufactured ceramic ball bearing suitable for high speed rotation is used to substantially reduce friction heat generation inside the bearing rotating at a high speed. An original variable changing preloading mechanism which keeps the spindle bearing preload at the optimum level suppresses heat generation and extends the service life.



High-efficiency cutting with hybrid spindle

- Transmission case
- [Workpiece material] ADC12
- [Model FH550S] 15,000min⁻¹ HSK A63 spindle



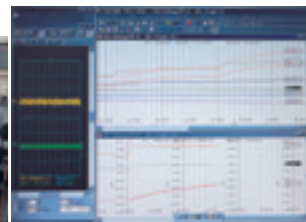
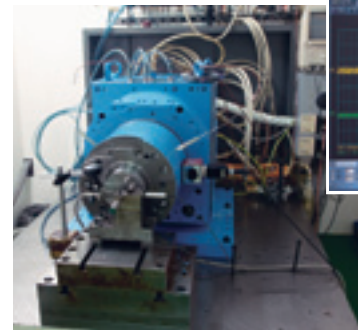
JTEKT's spindle promises assurance over a long period and takes maintenance into consideration.

JTEKT's dedicated spindle manufacturing

The spindle is the heart of the machining center, and as such it is manufactured under strict accuracy control. Confirmation checks look at dynamic balance, vibration, noise, and so forth, and, after ensuring all allowable limits have been maintained, the spindle is installed in the machine.



Dynamic balance measurement



High-speed spindle running test

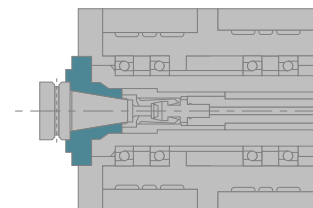
Basic design particularly focusing on low vibration.

A spindle vibration within 2 microns* has been accomplished (measurement with a 15,000min⁻¹ spindle).

We have developed a low vibration, high speed spindle which suppresses vibration and runout across the entire range up to the maximum speed. This feature contributes not only to the improvement of cutting accuracy but also to the extension of tool life.

The spindle taper cap replacement method takes ease of maintenance into consideration.

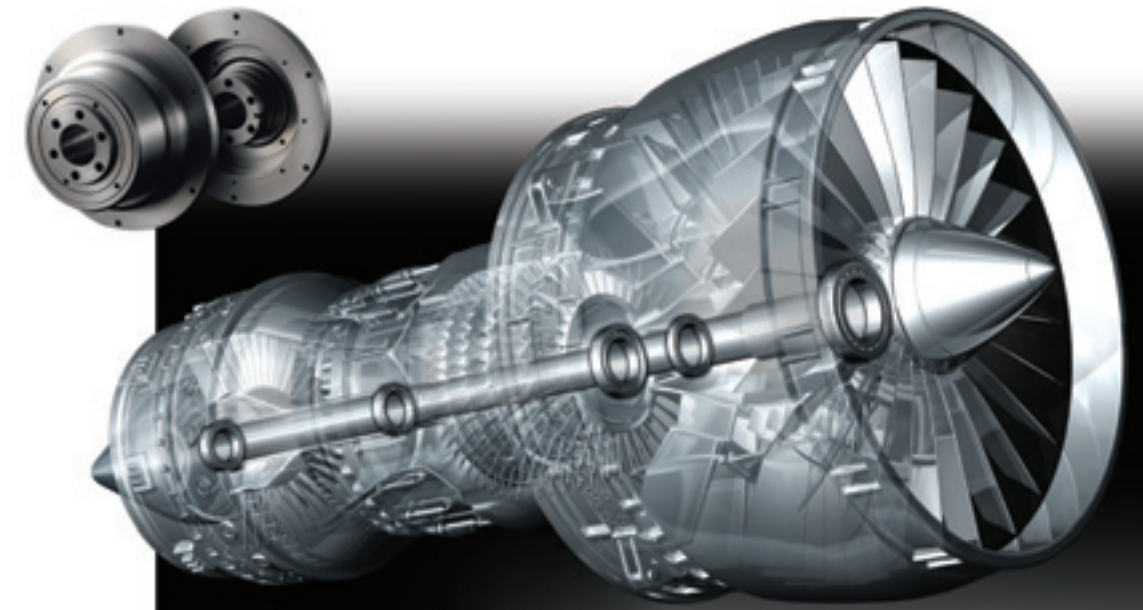
Even in the rare chance that a failure does occur, a replacement spindle cartridge that has been checked at JTEKT for operation and quality can be installed in its place, keeping restoration time down to a minimum. Furthermore, the separate spindle taper makes individual cap replacement possible as it is integrated with the taper, even in the event of taper damage caused by accidental interference.



*Not a guaranteed value

Technologies which have continuously supported the aerospace industry down through time are materialized in our machining center bearings.

We have been supporting the aircraft and aerospace industry for 30 plus years and our bearings are used in many of the jet engines manufactured in Japan. By providing the latest technology, we keep satisfying every rotation technology need from the ground to outer space. The technology cultivated over this period has been materialized in machining center bearings.



High Ability
BALL BEARING SERIES

High speed limit performance - 1.5 fold
Temperature increase - 30% reduction

In 1984, JTEKT were the first in the world to succeed in the practical use of ceramic bearings. Over the years since, we have gradually built up the processes such as design technology, precision and high-efficiency machining technology and mass production needed to use ceramic materials in roller bearings, and consequently now meet those factors such as speed, reliability and price demanded of machining center spindles.

The High Ability bearing is adopted in the 15,000min⁻¹ BT No. 40 spindle.

A rigid Platform incomparable to any others assures stable production over a long period.

JTEKT's basic approach towards machine design is to minimize displacement caused by external forces that may impact on cutting accuracy. The rigid bed of the FH Series provides the answer towards withstanding large cutting resistance as well as inertial forces of feed acceleration and deceleration. --The immobile bed is placed as a solid stationary matter and moving bodies such as the column is light-weight but at the same time rigid-simple, yet requiring high level analysis techniques and material technology.

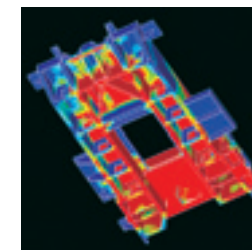


Photo: FH630SX bed

Unrivalled rigid platform allowing the spindle to achieve it's full performance High grade cast iron 3-point support bed keeping machine level stable over a long period

The bed supporting the moving body is designed using FEM analysis technology. While level adjustment is easy due to the 3-point support structure, the bed has sufficient rigidity and substantially improved moving level. This feature makes stable axial feed possible with high speed and high acceleration.

Photo: FH800SX bed

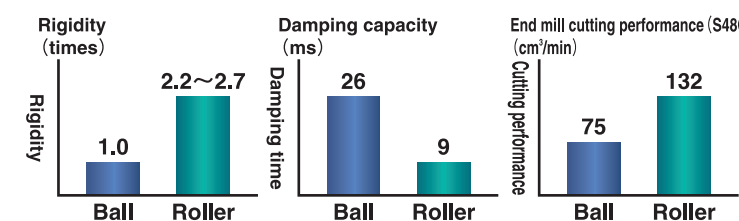


Bed strength is strictly monitored from the design stage. Force transmission and rigidity are simulated in the pursuit of a sturdy bed structure.



A Rigid cylindrical roller slide able to withstand high speed, high acceleration travel while still maintaining rigidity is adopted

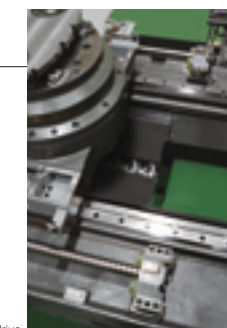
Compared to the ball guide, the cylindrical roller slide features less elastic deformation against loads and smaller displacement caused by load variation, as well as possesses superior vibration damping characteristics. This feature makes it possible to position quickly with smaller orientation changes upon sudden acceleration or stoppages, contributing to a higher level of production efficiency.



Because of JTEKT's assembling technology which allows for strict mounting face accuracies, the rigid cylindrical roller slide offers the best rapid feed rate and acceleration in it's class.

Dual ball screw driving technology boasting a delivery record of 3,000 plus

JTEKT's dual ball screw drive technology is used in fields ranging from mass production parts cutting, which is represented by automotive parts, to high speed profile cutting such as molds. There are more than 3,000 cutting machines using the dual ball screw driving technology operating through-out the world.



Z-axis dual ball screw drive

Y-axis dual ball screw drive, adopted in FH550SX, FH630SX and FH800SX



“Material” as the starting point

Casting technology perfected over time

JTEKT (former Toyoda Machine Works) separated from Toyota Motor Corporation in 1941 and has operating independently since. The casting division was established at the time of company establishment and with the objective of supplying cast irons appropriate for the performance of superior machine tools. Casting technology, nurtured and enriched over the years since company establishment, is materialized in the manufacture of high grade machining centers.



Okazaki plant

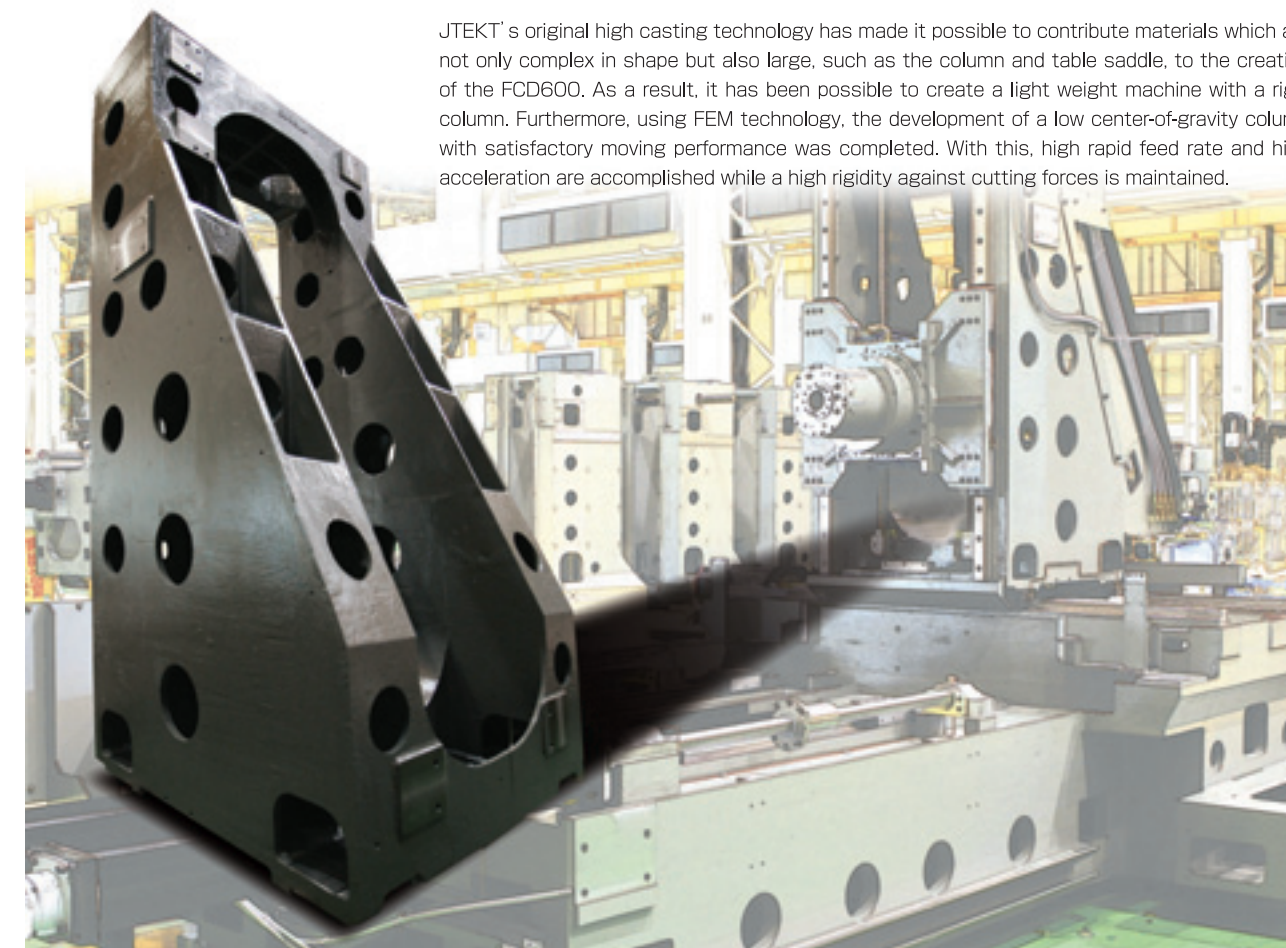


Kariya plant in 1952

Unrivaled rigid platform allowing the spindle to achieve it's full performance

FCD600 column featuring both high speed performance and heavy duty cutting capabilities

FH550S/FH630S
FH600SX

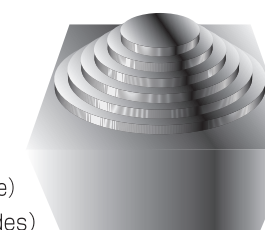


JTEKT's original high casting technology has made it possible to contribute materials which are not only complex in shape but also large, such as the column and table saddle, to the creation of the FCD600. As a result, it has been possible to create a light weight machine with a rigid column. Furthermore, using FEM technology, the development of a low center-of-gravity column with satisfactory moving performance was completed. With this, high rapid feed rate and high acceleration are accomplished while a high rigidity against cutting forces is maintained.

Potential of the light-weight, low center-of-gravity column

●Circular cutting evaluation test [1]

[Workpiece material] Aluminum
 [Cutting diameter] ϕ 40mm, ϕ 50mm
 ϕ 60mm, ϕ 70mm, ϕ 80mm, ϕ 90mm
 [Spindle speed] 15,000min⁻¹
 [[Feed rate] 5,000mm/min (command value)
 [Tool diameter] ϕ 10mm (square EN 4 blades)
 [Model] FH550S 15,000min⁻¹ BT No.40



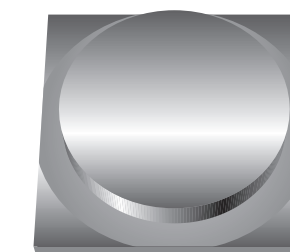
Because the weight of the moving body is reduced while rigidity is maintained, good follow-up performance of CNC commands is made possible. Observe the results of the circular cutting tests with various diameters. You will be convinced.

Cutting diameter [mm]	ϕ 40	ϕ 50	ϕ 60	ϕ 70	ϕ 80	ϕ 90
Circularity [μ m]	5.5	4.3	4.7	3.9	3.7	3.7
Actual feed rate [m/min]	4.77	4.85	4.89	4.95	4.93	4.95

Not guaranteed.

●Circular cutting evaluation test [2]

[Workpiece material] Aluminum [Feed rate] 10,000mm/min
 [Cutting diameter] ϕ 100mm [Tool diameter] ϕ 16mm
 [Spindle speed] 6,700min⁻¹
 [Model] FH550S 15,000min⁻¹ BT No.40



[Circularity] 1.95 μ m

Not guaranteed.

Highest speed potential in class while keeping rigidity

Rapid feed rate

	X-axis	Y-axis	Z-axis
FH450S	50m/min	50m/min	50m/min
FH550S	60m/min	60m/min	60m/min
FH630S	60m/min	60m/min	60m/min
FH550SX	60m/min	60m/min	60m/min
FH630SX	60m/min	60m/min	60m/min
FH800SX	48m/min	48m/min	48m/min



Rapid acceleration

	X-axis	Y-axis	Z-axis	Pallet load
FH450S	0.7G	0.7G	0.7G	400kg
FH550S	1.0G	1.0G	1.0G	800kg
FH630S	1.0G	1.0G	1.0G	800kg
FH550SX	0.7G	0.7G	1.0G	800kg
FH630SX	0.7G	0.7G	1.0G	800kg
FH800SX	0.5G	0.5G	0.7G	1,300kg

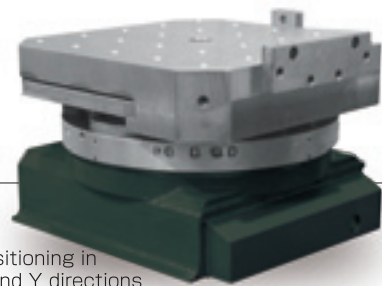
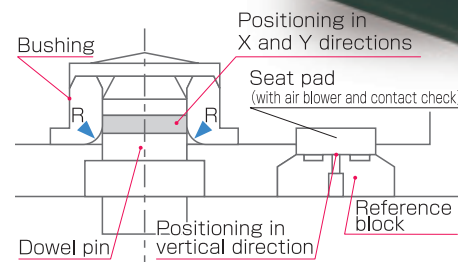


Table indexing time (90° indexing)

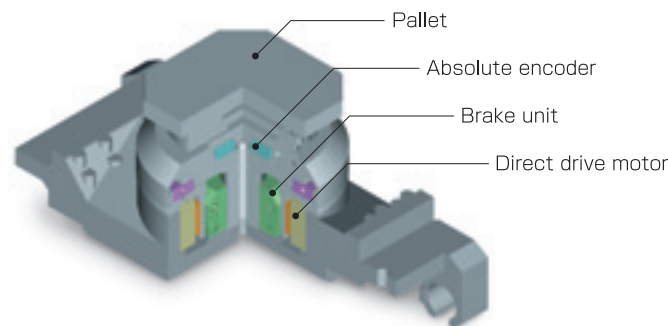
	1°	0.001° Option	DD Option
FH450S	2.5sec	2.5sec	0.43sec
FH550S	2.0sec	2.0sec	0.7sec
FH630S	2.0sec	2.0sec	0.9sec
FH550SX	2.0sec	2.0sec	0.7sec
FH630SX	2.0sec	2.0sec	0.9sec
FH800SX	2.5sec	2.5sec	

The six-face restriction pallet clamp method realized with two positioning pins and four seat pads not only realizes high positioning accuracy and large clamping rigidity but also blocks adherence of chips.



DD table **Option**

The direct drive (DD) table driven with a built-in large torque motor has realized fast indexing operation.



FH450S FH550S/FH630S
FH550SX/FH630SX

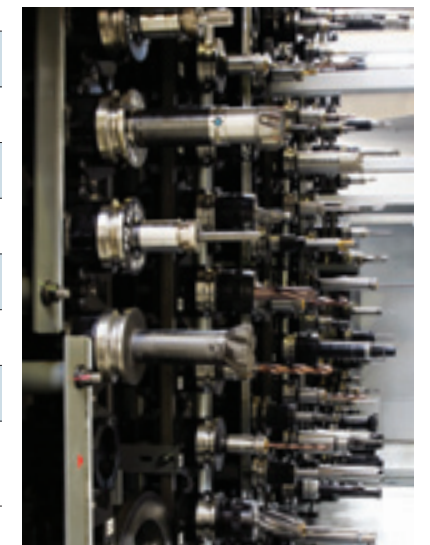
Pallet change time

	Pallet size	Max. workpiece swing	Max. workpiece height	Pallet change time
FH450S	450mm×450mm	φ630mm	750mm	5.6sec
FH550S	550mm×550mm	φ850mm	1,000mm	9.5sec
FH630S	630mm×630mm	φ1,000mm	1,000mm	12.0sec
FH550SX	550mm×550mm	φ850mm	1,000mm	9.5sec
FH630SX	630mm×630mm	φ1,000mm	1,000mm	12.0sec
FH800SX	800mm×800mm	φ1,200mm	1,250mm	18.0sec



Tool change time

	Tool change time (Tool-to-Tool)	Tool change time (Chip-to-Chip)	Max. tool mass
FH450S	1.3sec	2.7sec (~8kg)	8kg
FH550S (BT No.40)	1.6sec (~8kg) 1.9sec (8kg~14kg)	2.7sec (~8kg) 3.0sec (8kg~14kg)	8kg
FH550S (BT No.50)	2.4sec (~15kg) 2.7sec (15kg~27kg)	3.6sec (~15kg) 3.9sec (15kg~27kg)	27kg
FH630S (BT No.40)	1.6sec (~8kg) 1.9sec (8kg~14kg)	2.7sec (~8kg) 3.0sec (8kg~14kg)	8kg
FH630S (BT No.50)	2.4sec (~15kg) 2.7sec (15kg~27kg)	3.6sec (~15kg) 3.9sec (15kg~27kg)	27kg
FH550SX	2.4sec (~15kg) 2.7sec (15kg~27kg)	3.6sec (~15kg) 3.9sec (15kg~27kg)	27kg
FH630SX	2.4sec (~15kg) 2.7sec (15kg~27kg)	3.6sec (~15kg) 3.9sec (15kg~27kg)	27kg
FH800SX	1.9sec (~8kg) 2.2sec (8kg~15kg) 3.2sec (15kg~27kg)	5.5sec (~8kg) 5.8sec (8kg~15kg) 6.8sec (15kg~27kg)	35kg



Tool storage capacity: 121. Model: FH630SX

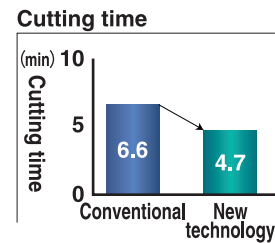


Tool storage capacity: 60. Model: FH630SX

Stable manufacturing made possible by a rigid platform

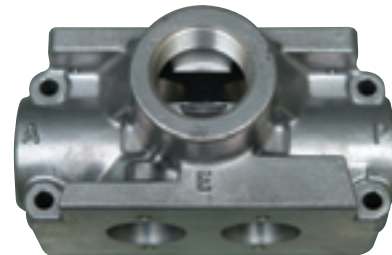
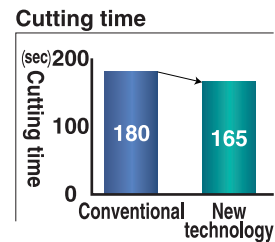
Example of high-efficiency aluminum cutting [1] : Model FH550S/15,000min⁻¹/BT No.40

- Gear box case
- [Workpiece material] Aluminum
- Large diameter rough cutting
- [Tool] φ25 end mill
- [Spindle speed] 13,000min⁻¹
- [Feed rate] 3,000mm/min
- Large diameter rough cutting
- [Tool] φ92 boring
- [Spindle speed] 6,400min⁻¹
- [Feed rate] 2,500mm/min



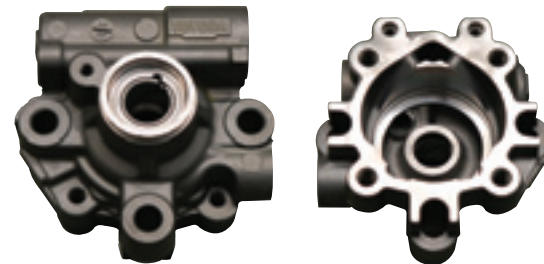
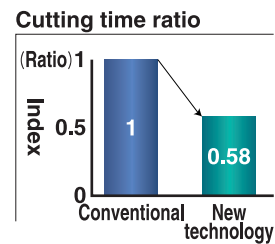
Example of high-efficiency aluminum cutting [2] : Model FH450S/15,000min⁻¹/BT No.40

- Valve body
- [Workpiece material] Aluminum
- 代表加工箇所
- [Tool] φ80 face mill
- [Spindle speed] 10,000min⁻¹
- [Feed rate] 6,000mm/min



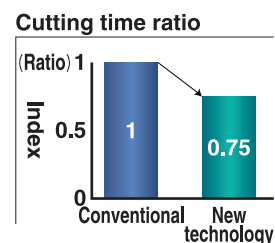
Example of high-efficiency aluminum cutting [3] : Model FH450S/15,000min⁻¹/BT No.40

- Hydraulic power steering pump
- [Workpiece material] Aluminum
- Finish milling
- [Tool] φ50 face mill
- [Spindle speed] 10,000min⁻¹
- [Feed rate] 5,000mm/min
- φ50 contouring
- [Tool] φ22 end mill
- [Spindle speed] 10,000min⁻¹
- [Feed rate] 4,000mm/min



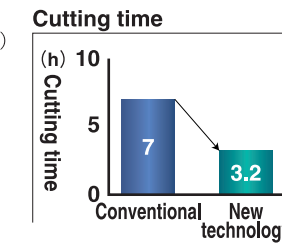
Example of high-efficiency cast-iron cutting : Model FH450S/8,000min⁻¹/HSK A63

- Knuckle
- [Workpiece material] FCD450
- Milling
- [Tool] φ50 face mill
- [Spindle speed] 2,000min⁻¹
- [Feed rate] 800mm/min
- End milling
- [Tool] φ25 end mill
- [Spindle speed] 3,800min⁻¹
- [Feed rate] 2,000mm/min
- Finish boring
- [Tool] φ75 boring
- [Spindle speed] 1,300min⁻¹
- [Feed rate] 260mm/min



Example of high speed crankshaft mold cutting : Model FH630SX/15,000min⁻¹ (large torque) /BT No.50

- Crankshaft mold
- [Workpiece material] SKD61 (45HRC)
- Rough cutting
- [Tool] φ8 ball end mill
- [Spindle speed] 15,000min⁻¹
- [Feed rate] 6,600mm/min
- Finish cutting 1
- [Tool] φ8 ball end mill
- [Spindle speed] 13,000min⁻¹
- [Feed rate] 6,600mm/min
- Finish cutting 2
- [Tool] φ6 ball end mill
- [Spindle speed] 13,200min⁻¹
- [Feed rate] 3,200mm/min



- [Part name] Differential carrier
- [Major process] Boring
- [Cycle time] Within 16 minutes (2 processes)
- [Major point] Position accuracy and perpendicularity of pinion
Dimension tolerance within +/-19μm

Part examples



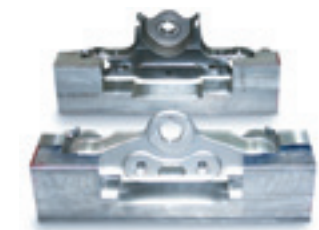
- [Part name] Crank case (for compressor)
- [Major process] Face milling and boring
- [Cycle time] Within 18 minutes (both sides)
- [Major points] Flatness within 30μm
Coaxiality within 50μm
Perpendicularity within 30μm



- [Part name] Carrier cover (aluminum)
- [Major process] Face milling
- [Cycle time] Within 3 minutes
- [Major points] Position accuracy within 25μm
Flatness within 50μm



- [Part name] Carrier case (aluminum)
- [Major process] Boring
- [Cycle time] Within 7 minutes (2 attitudes)
- [Major points] Coaxiality within 30μm



- [Part name] Fork bracket
- [Major process] Boring
- [Cycle time] Within 38 minutes (3 processes/4 workpieces)
Flatness within 50μm

Unique Precision technology only achievable with the inside-out knowledge of the cutting field that JTEKT possess.

Various factors can effect cutting accuracy. The FH Series is packed with a number of precision technologies that only JTEKT have had the opportunity to cultivate down through the years with strong involvement in the mass production of automotive parts.

4 approaches for achieving precision cutting

Suppress heat generation

- [Hybrid spindle] Reduction of spindle temperature rise with a variable switching preloading mechanism ▶ P.24
- [High Ability bearing] 30% reduction of bearing temperature rise ▶ P.26
- [Spindle oil jacket cooling] Reduction of spindle temperature rise
- [Dual ball screw drive] Reduced heat generation through motor size reduction ▶ P.28

Elimination of heat transmission

- [Center trough structure] Suppressing the effects of chips and coolant heat
- [Y-axis motor heat isolation coupling cooling] Suppression of ball screw elongation

Heat effect control

- [Large heat capacity bed] Reducing the effect of thermal displacement
- [Thermally symmetrical structure] Reducing heat-related column twist
- [BTS (Ball screw Thermo Stabilizer) function] Direct measurement and correction of ball screw elongation
- [STS (Spindle Thermo Stabilizer) function] Direct measurement and correction of spindle elongation **Option**
- [Scale feedback] **Option**
- [Touch sensor function] **Option**

Cool

- [Working oil cooling] **Option**
- [Coolant cooling] **Option**

Manufacturing technology for realizing precision cutting



Table reference face sheet scraping

Linear guide mounting face scraping

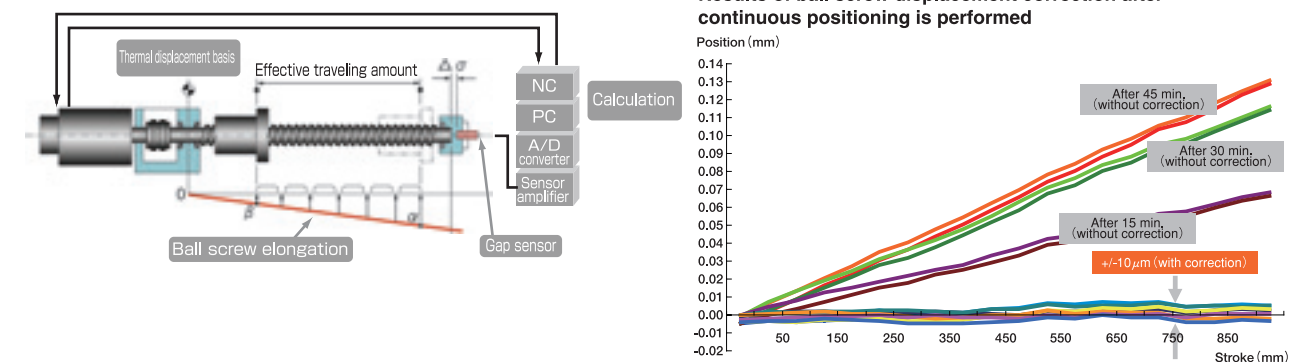
Spindle balancing

Precision assembling work

BTS (Ball screw Thermo Stabilizer) function

Ball screw thermal displacement correction function stabilizing repetitive positioning accuracy

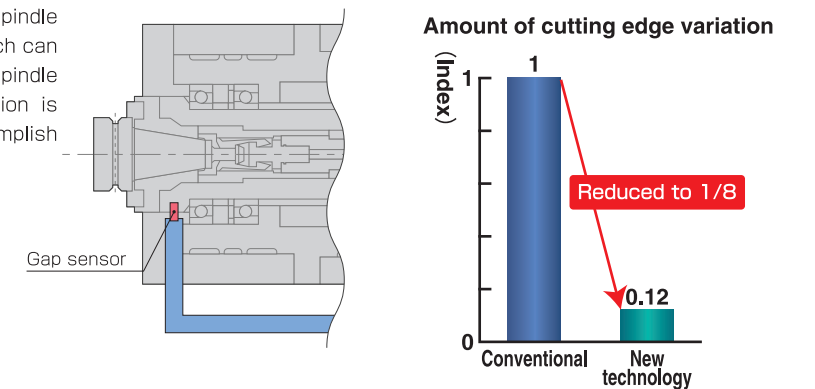
The BTS function is installed as a standard feature to stabilize the repetitive positioning accuracy in parts cutting. With the BTS function, the displacement sensor installed at the end of the ball screw measures the elongation of the entire screw, which is distributed into offsets for each stroke position to correct the positioning accuracy. With this function, accuracy can be stabilized without any costly accessories such as linear scales which require maintenance. Furthermore, continuous cutting operation over a long time becomes possible. In addition, the structure is simpler and the reliability is higher when compared with the ball screw shaft center cooling method, and the function is environmentally friendly.



STS (Spindle Thermo Stabilizer) function **Option**

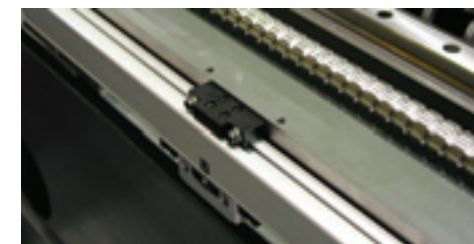
Spindle thermal displacement correction function used to correct spindle elongation formed after an extended period of operation

A displacement sensor installed at the end of the spindle is used to directly detect spindle edge position, which can be easily displaced by heat generated inside the spindle during extended operation. Z-axis direction deviation is suppressed as much as possible in order to accomplish precision cutting.



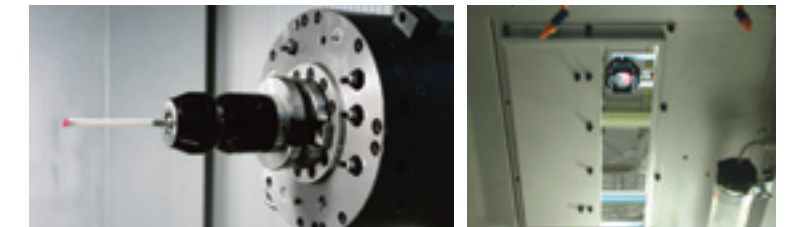
Scale feedback (X, Y and Z axes) **Option**

An optical scale makes lasting precision positioning possible.



Touch sensor function **Option**

The touch sensor is used to align the workpiece. The receiving section will only open its shutter and receive when the touch sensor is used. The effects of chips, mist, etc. are eliminated.





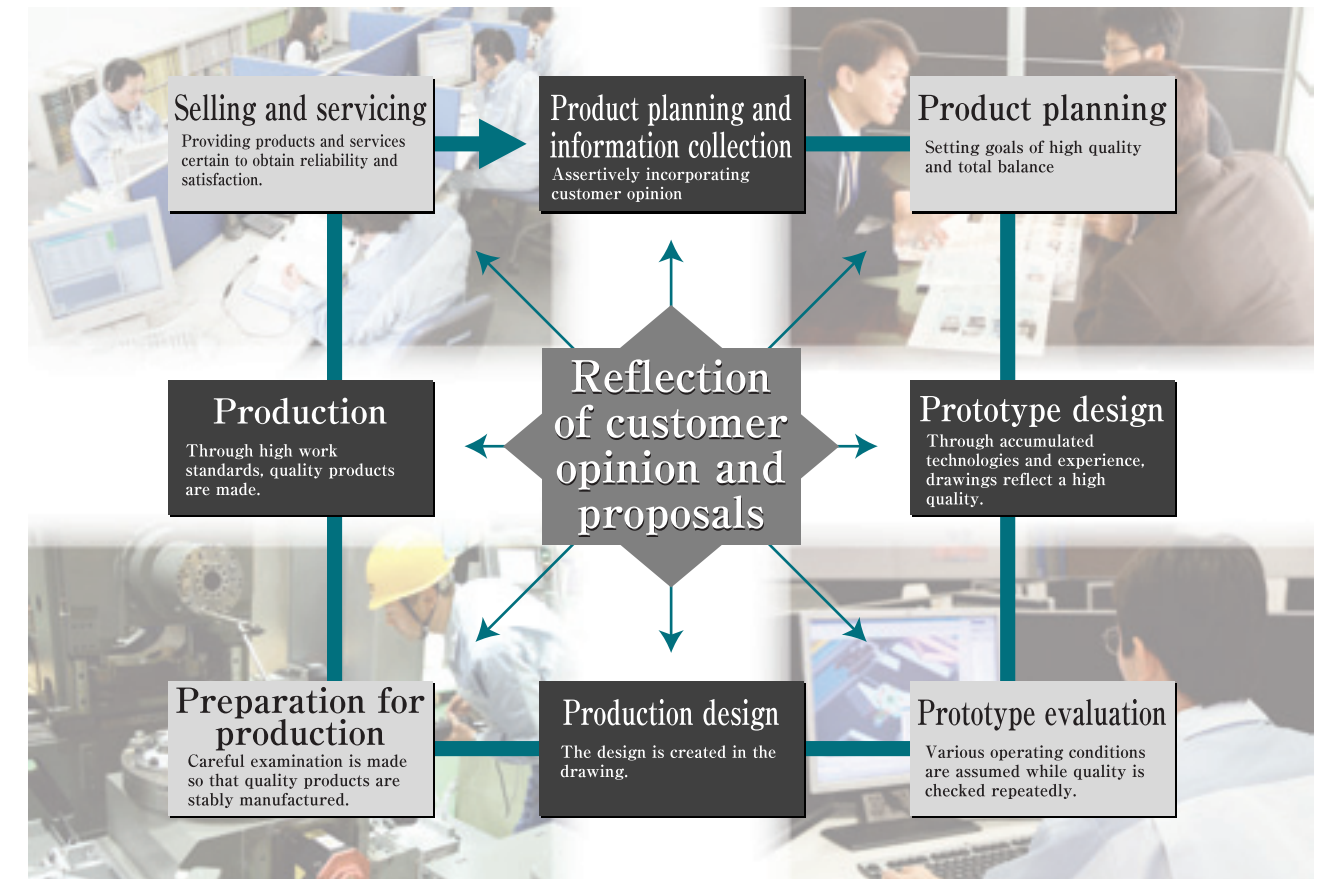
The pursuit of Reliability - one of JTEKT's starting points

Stable accuracy and an improved MTBF (mean time between failures) are both necessary in order for the customer to feel assured with reliability. The design of the FH Series pursues high quality, high performance and long life.



JTEKT don't take quality and performance as a given - we work for it.

When manufacturing a machine, JTEKT begin with understanding various customer needs and establishing a total control system, starting with a product design based on dedicated R&D activities through to a rigid quality control processes that ensure stable production.



JTEKT's leading edge technical development strength. This strength is supported by fundamental technologies ranging across various fields such as tripology, nano technology, material development and cutting technologies, heat treatment, control technology and much more.

Creating a feeling of assurance through the accumulation of material technology: Professionals majoring in material technology use cutting edge equipment to analyze and evaluate.

Research and development center in Kariya, Aichi Pref.



Material Technology Research Div., Research and Development Center



Using X-ray photoelectron spectroscopy to analysis fine matter adhered to a machined surface



Using a transmission electron microscope to survey metal structure

- Machined surface analysis (ultra precision field)
- Machining stress measurement
- Paint evaluation ● Coolant immersion evaluation
- Material mixture evaluation, etc.

“People” are the starting point

Skilled engineer fostering program

JTEKT (former Toyota Machine Works) opened a skilled worker training school in 1941 under the principle of “good machines are created by excellently skilled engineers.” In 1957, a three-year training course for junior high graduates was started, based on the Job Training Law established by the Labor of Ministry at the time. In 1977, courses were integrated to a one-year training course for senior high graduates, which has since produced many superiorly skilled engineers, contributing not only to industry but society also.

1941	Opening of the skilled engineer training school (1 yr program)
1957	Opening of a 3-yr training course for junior high graduates as a skilled engineer training school under the Job Training Law.
1966	Presented with a 'blue-chip training school' award from the Labor Minister
1970	Changed name to "Advanced job training school"
1971	Commencement of 1 and 2 yr long courses for senior high school graduates (2 streams)
1977	Integration of senior high school graduate training (2 streams)
1980	Presented with a 'blue-chip training school' award from the Labor Minister (second time)
1981	Presented with a 'blue-chip skill certification institution' award from the Labor Minister
1983-84	Two-year consecutive victory in the Japan national olympic convention (casting division)
1986	Changed name to "Higher tertiary institution"
2003	Presented with a 'blue-chip training school' award from the Ministry of Health and Labor

To become engineering or skilled professional workers

Knowledge

Acquisition of rich liberal arts and a diverse professional knowledge

Professional knowledge

- Production engineering
- Mechanical engineering
- Mechanical drafting
- Electrical engineering
- Cost control
- Mechanical maintenance
- ISO14001-ISO9001
- Measurement method
- Quality control
- JTEKT production method
- Industrial safety

Engineering method

(Material, Material dynamism, Mechanical engineering method, Electricity and Heat treatment)

General liberal arts

English & interpersonal communication skills

Module certification lesson

Qualification

- Sliding lecture
- Robot handling
- Wheel change
- Arc welding
- Low voltage electricity handling

Skills

Acquisition of a wide-range of fundamental professional skills and the capacity to apply knowledge

Rotational practic

Lathe, Milling machine and Machining center
Manual finishing, Machine assembly, Electrical, PC

General manufacturing practice

Shop floor practical activities

First-hand experience of the quality, speed and material flow on the shop floor

Professional practice (strengthening specialty skills)

Machine assembly course (machine assembly, hydraulic and pneumatic pressure, electrical, machining centers)
Electrical course (switch board assembly, PC, hydraulic and pneumatic pressure, electricity and maintenance)
Casting course (casting)

Group creation lesson

Aichi Prefectural skill award (theory and practice)

National qualification skill examination (theory and practice)

Assistant engineer qualification
(Level 2 national qualification skill exam exempted)



General liberal arts class



Machine assembly practice



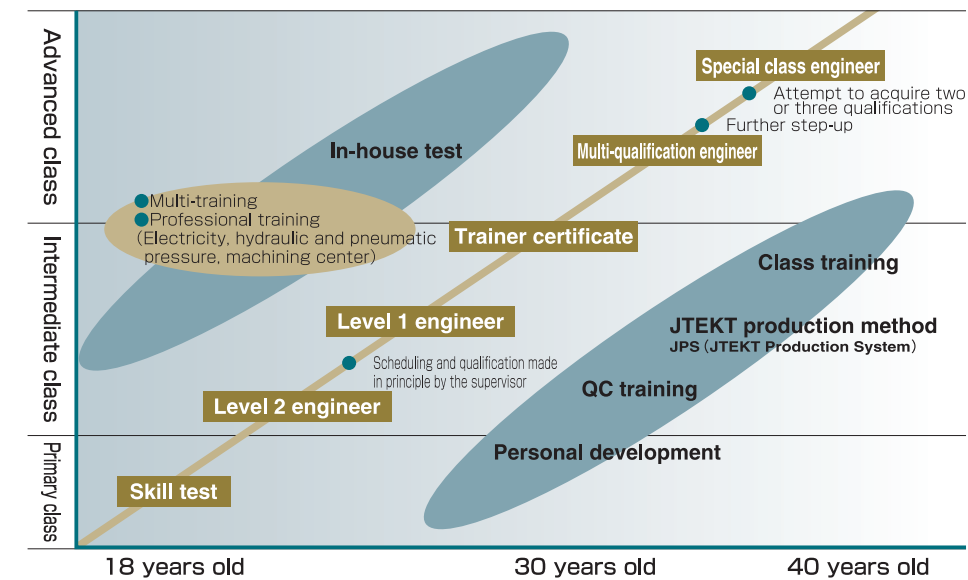
Machining practice (machining center)



Graduation ceremony



Footsteps of skilled engineers after graduation



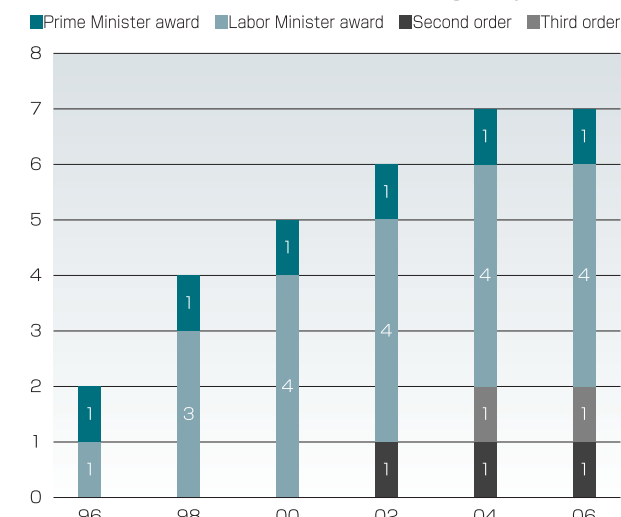
Skilled engineer award record

Yellow ribbon prize
14 awardees

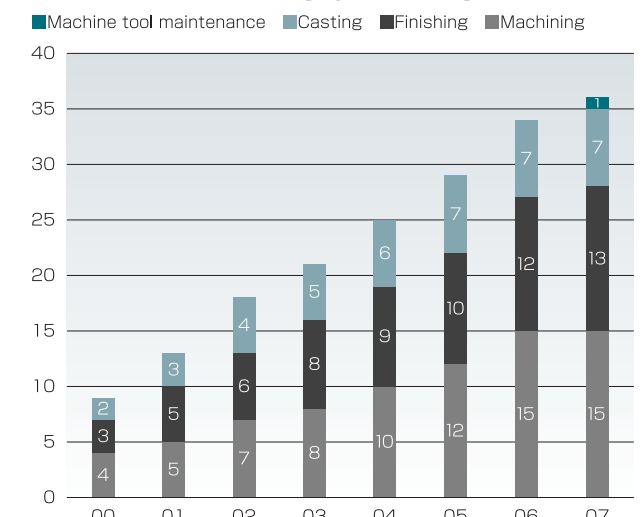
Outstanding engineer
13 awardees



Cumulative number of winners of the skill grand prix award



Cumulative number of highly skilled engineers



Reliability starts with chip disposal. The design of a center trough that makes it possible to deal with chip disposal directly beneath the cutting point.

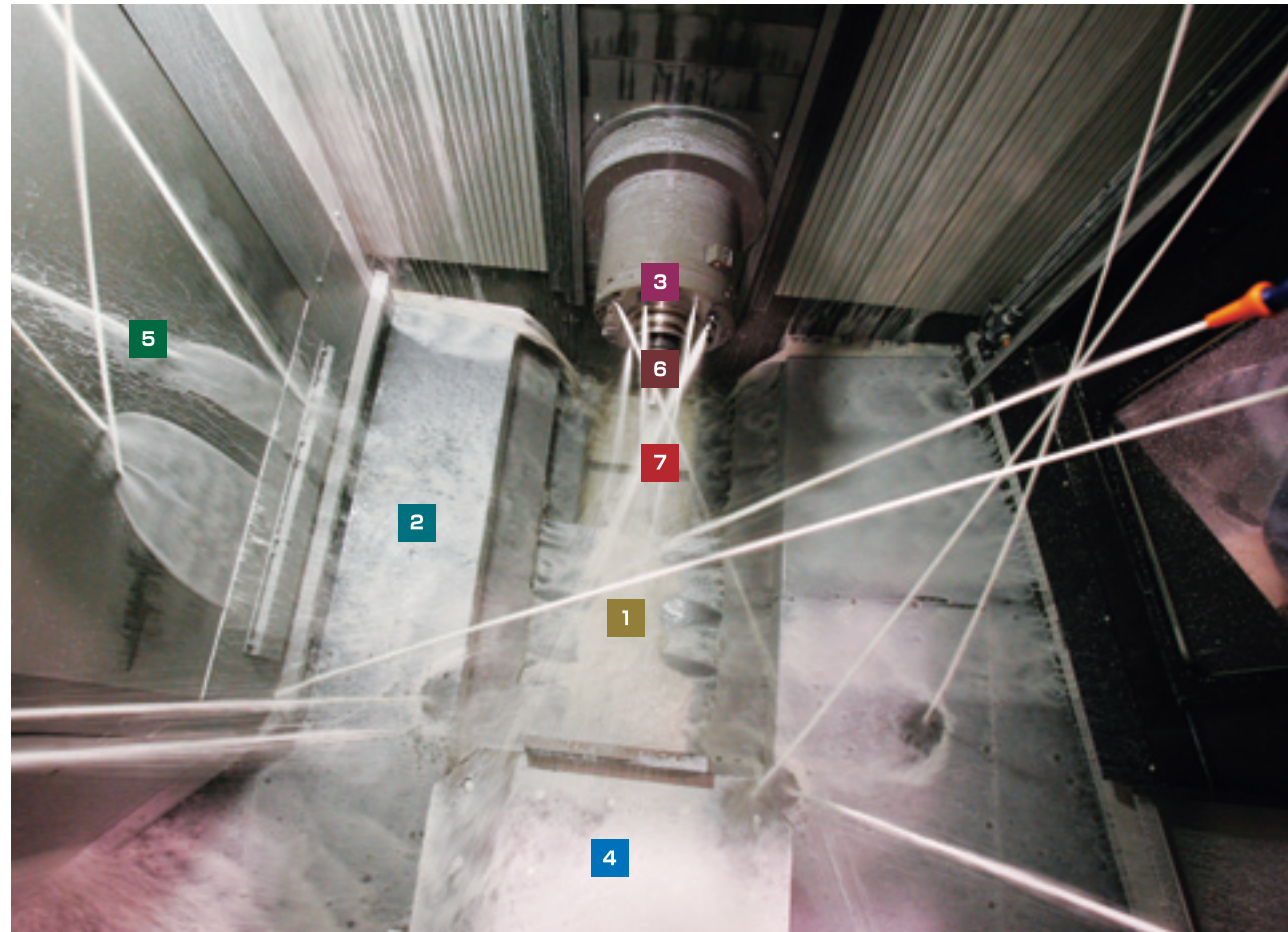
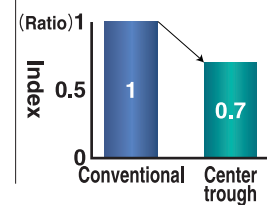


Photo: FH630SX

1 Center trough

Chip disposal plays a critical role in machine operation efficiency. A chip disposal port located in the center of the bed makes for a chip disposal capacity 6 times greater than that of earlier methods. Furthermore, coolant consumption is substantially reduced, helping to make the equipment more environmentally friendly.

Coolant consumption



2 Slant cover

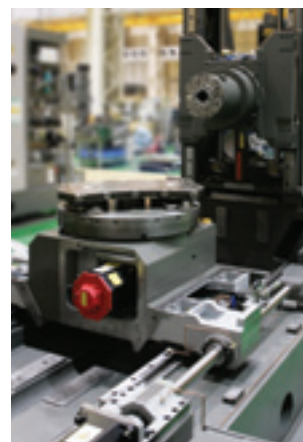
The slant internal cover keeps the accumulation of chips to a minimum.

3 External nozzle coolant

The nozzle installed at the spindle nose supplies coolant to the cutting point.

4 Ultimate table motor positioning

The table motor is installed not beneath the cutting point on the spindle side but on the APC side, avoiding coolant penetration into the table motor and chip accumulation on the motor cover.



The FH630SX motor is located on the APC side.



The FH450S motor is located on the side of the machine.

5 Overhead shower coolant

The coolant nozzle installed in the ceiling discharges coolant, keeping chip accumulation inside the machine down to a minimum.

6 Spindle-through coolant

Option

Coolant is supplied through the spindle center to the cutting edge. It is effective for lubrication and cooling of the cutting point, chip disposal and extension of tool life. (Delivery pressure: 1, 3 or 7 MPa)

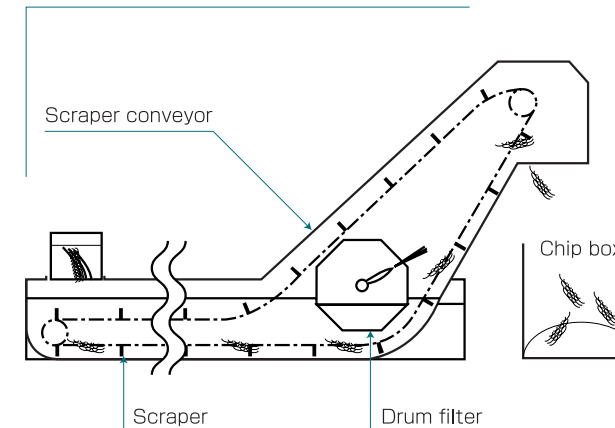


Spindle-through coolant 3MPa

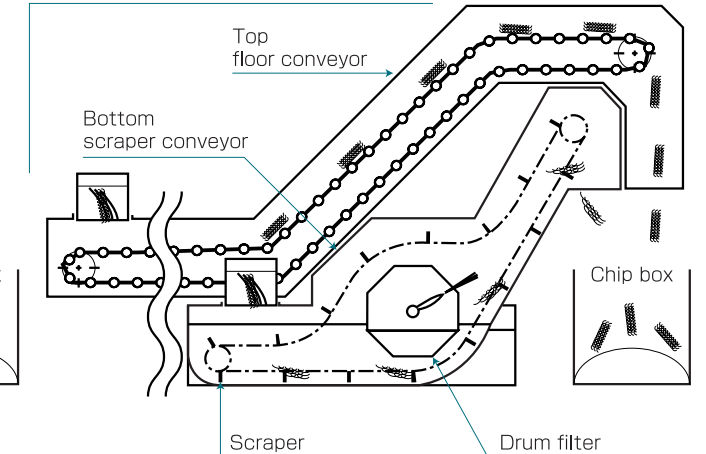
7 Coolant supply unit with take-up chip conveyor

Chips collected in the center trough are transported outside of the machine by the chip conveyor. Two types of chip conveyors are provided to choose from depending on chip shape and material.

Standard scraper type coolant supply unit*



Option Two-tiered coolant supply unit



Option Optional parts

Splash gun, coolant cooling, oil skimmer, chip box, mist collector and other optional accessories can be added.



Splash gun



Coolant cooling



Oil skimmer

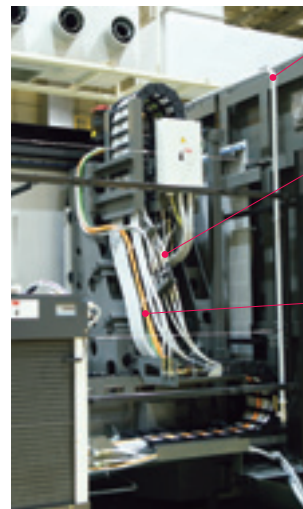
*The coolant supply unit is optional for FH450S.

To provide the customer with assured operation, we work hard to make even the unseen portions of the machine more reliable.

Improved reliability in wiring and piping supporting higher speeds and acceleration

FH550S/FH630S
FH550SX/FH630SX

Axial feed speeds and acceleration rates have increased and consequently the reliability of piping and wiring cable has become very important. Cables rub against each other which may lead to oil leaks or broken wires in axial travel. In addition, the damage on brackets caused by the weight of the cable itself becomes more severe as speed increases.



- Steel pipes are used so that coolant delivery pressure loss is minimal.
- Piping and wiring cables are tied to reduce sagging - a measure in response to higher speeds and acceleration.
- The color of motor power cables and that of communication cables are differentiated to make maintenance work on the wiring routed to the spindle and Y-axis motor more simple. This feature also helps to reduce the time taken in pinpoint the cause of machine trouble.

Wiring to Y-axis motor



An opening/closing pneumatic panel making both daily maintenance activities and X-axis motor maintenance simpler.

FH550S/FH630S
FH550SX/FH630SX

The central lubrication and pneumatic devices are arranged together near the operating position for easier daily inspections. In addition, the X-axis motor is located on the right side of the machine in order to make maintenance work easier, and has an opening/closing panel to assure sufficient working space.



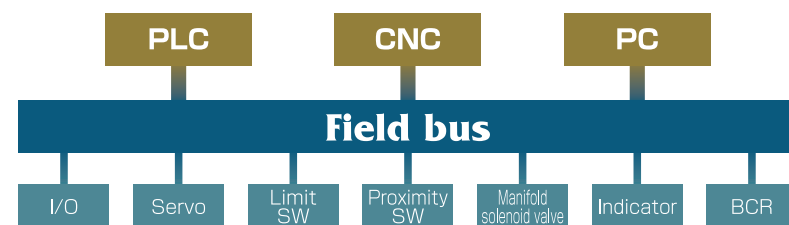
Field bus system improving control system reliability

FH450S
FH550S/FH630S
FH550SX/FH630SX
FH800SX

The field bus is the digital communication signal exchange of communication signals between devices and the controller. Compared with the earlier signal wiring method, it can send multiple signals on a single cable, contributing to the substantial reduction in the number of cables. Using this method, control system reliability is improved. Additional merits of digital communication include sophisticated trouble diagnosis functions.

Field bus features

- [Reduced wiring]
 - Connection of devices with twisted pair cables including power cables
 - Feeder branching connection possible
- [Easy maintenance]
 - Identification of trouble through sophisticated diagnosis functions



Toyota Production System

TPS and high level field potential supporting it

JTEKT's unique high level of quality has been rewarded by ample customer satisfaction. This quality begins on the production floor. As a member of the Toyota group, the Toyota Production System is firmly established in our operations.

Work environment

Working with equipment that is always in order is the starting point of high quality production.

Quality control

Reliable quality control is imposed by professional inspectors.

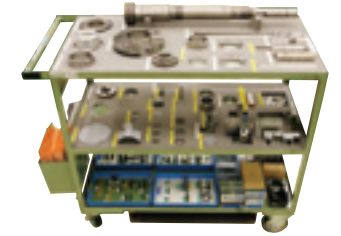
Skilled worker

A skilled engineer training program ensures that high level skills are passed on to the next generation.

Activities to ensure spindles and table reliability

Bolts are tightened to within the rated torque limits with a digital torque wrench, and the date and time, tightening torque, and number of tightened bolts are recorded.

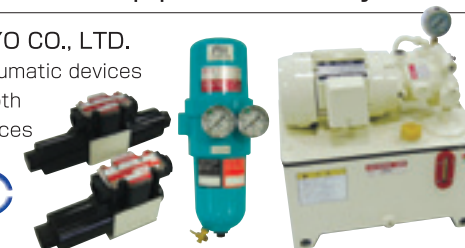
The problem of missing parts is avoided by placing parts on a carrier and making them visible.



The total potential of the JTEKT group combined

JTEKT group companies combine the specialist knowledge they have to improve the reliability of devices and equipment necessary for the manufacturing of machining centers.

■ TOYOOKI KOGYO CO., LTD.
Hydraulic and pneumatic devices helping to save both energy and resources



■ CNK CO., LTD.
Design and manufacture of various automation systems





Workability

Aiming to perfect a production system both environmentally and people-orientated

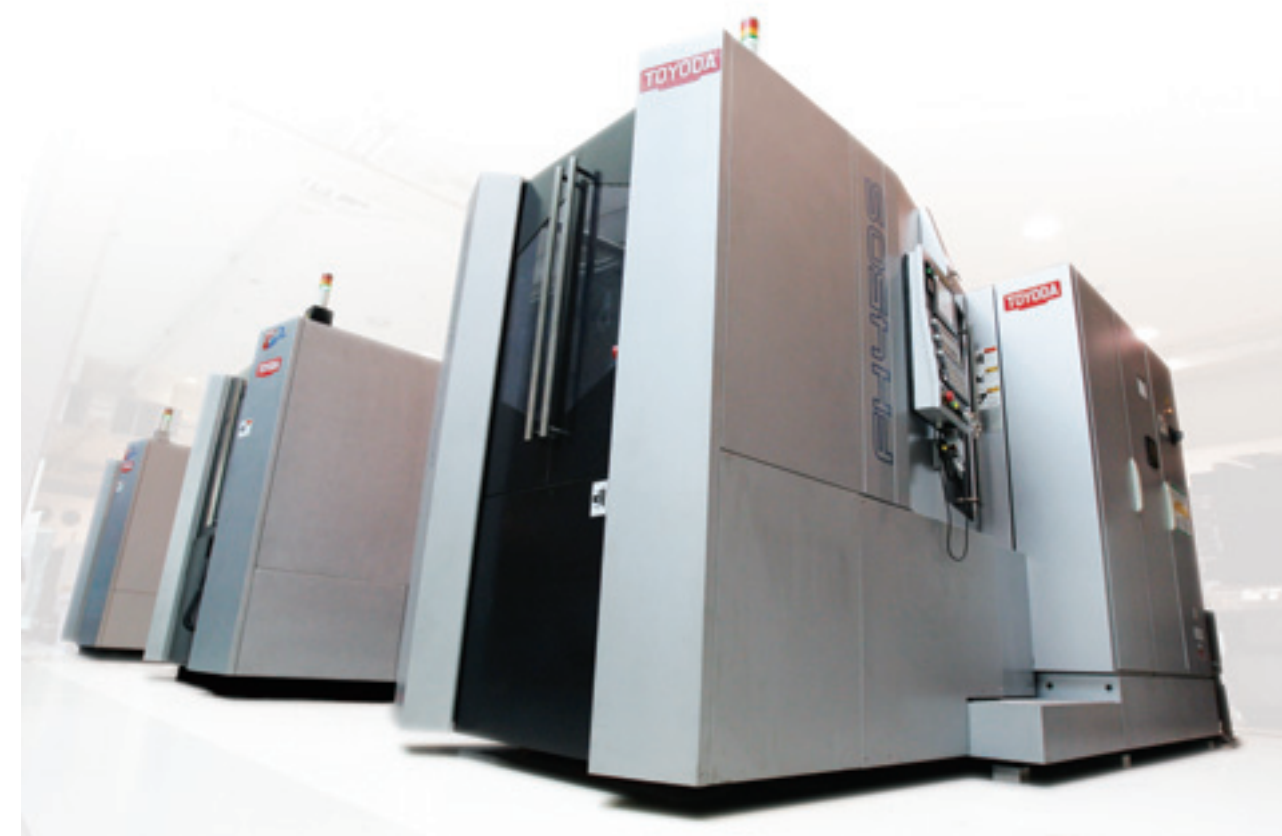
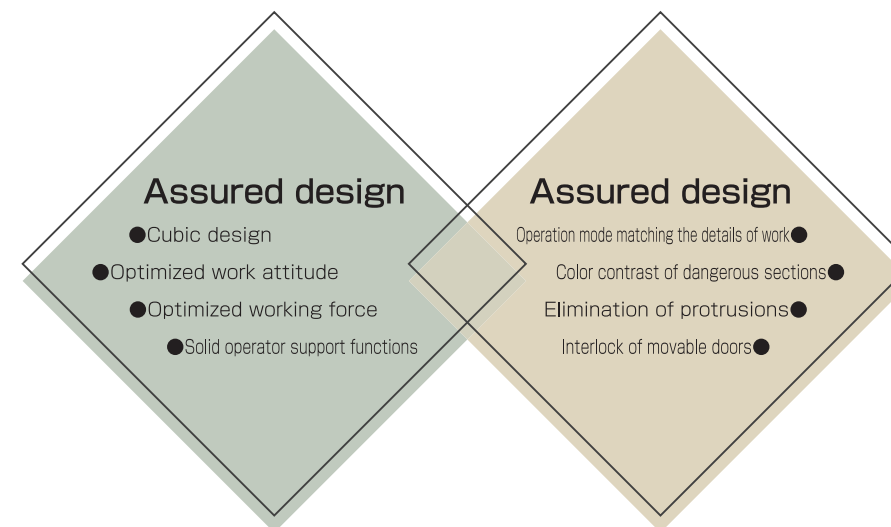
At JTEKT, we never lose sight of our motto 'pursue technological dreams to deliver valuable innovations to you' and are always striving to achieve a style of manufacturing friendly to both people and the planet.

Reliable and user-friendly for all.

JTEKT machines are built based on a universal design.

Designs are conceived with the objective of making machines easier to use for more people

The universal design concept was adopted so that all our customers could use our machines for longer and with peace of mind. At JTEKT, we do not focus all our efforts on basic performance alone, giving equal consideration to the building of a machine that is both safe and reliable.



Securing accessibility and work space

Accessible operation door

By positioning the operation panel on the left-hand side of the machine, we have created a wide opening and reduced the amount of eye travel required. This in turn reduces the physical strain on the operator by not demanding a constrained physical posture.



APC door with good accessibility

The wide door opening makes loading/unloading of the workpiece much easier. The open-out ceiling design ensures the safe loading and unloading of large parts, fixtures and angle steels with the use of the crane.



Photo:FH630SX
 ※The FH800SX operation panel is fixed-type and positioned on the right-hand side of the machine.

Rotary operation panel*



Manual pulse generator (handheld type)



Operator platform



Tool magazine door with good accessibility

A sufficient opening is provided for the tool magazine door so that even heavy tools can be changed in a comfortable posture.



A design concept that aims for safer equipment

A cover design that takes accident prevention and safety into consideration

The cover design is cubic to give a feeling of reliability and stability. Furthermore, a protrusion-free safe design and color identification to identify dangerous sections and maintenance sections are used in the attempt to make equipment that is free from both errors and danger.



The opening/closing force of the APC door is optimized to reduce the physical load.

The stroke ball bearing adopted in the opening/closing mechanism of the APC door reduces the opening/closing force.



Universal design cover

In addition, a universal design cover with increased user-friendliness and of a superior design is also available as an option.

Option

Seamless front panel demonstrating high grade appearance



Long stainless steel handle allowing the user to hold the best force application point

OP Supporter

JTEKT's machining centers feature an automation function which makes the automation of the machine possible and supports the operator's work.

The 3 supporting features of the OP Supporter

Tool control support

- Simple program ... Tool number conversion function
- Detailed control ... Tool life control function
- Direct tool setting capability ... Tool correction function
- Tool counting ... Program tool check function
- Limiting arm speed according to tool weight ... ATC control function
- Faulty tool indexing ... Automatic magazine indexing function
- Manual tool data entry not required ... Tool ID function



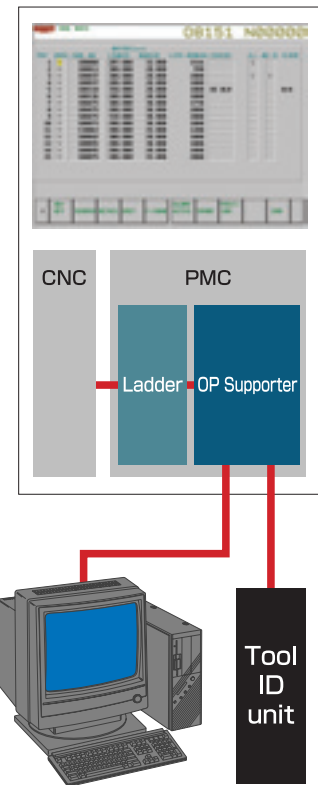
Pallet control support

- Automatic cutting program call ... Program call function
- Omission of unnecessary cutting operations ... Multi-workpiece installation skip function
- Correction between pallets ... Pallet correction function

Maintenance control support

- Notification of control device condition ... Signal condition display function
- Notification of control device position ... Control device layout display function
- Periodic inspection item reminder ... Periodic inspection instruction function
- Equipment fault recording ... Fault history display function

Division	Function name	Model OP**				Remarks
		10 (I)	20IP	20IT	20IA	
① Tool control	Tool number conversion function					
	Tool offset function					
	Tool life control function	×		○	○	a
	ATC speed variation function					
	Offset update function					
	AC function (condition control)	×				*
	Cutting condition setting function	×				*
	Replacement tool automatic indexing function	×			○	*
	Tool data update during installation and removal	×			○	*b
	Storage tool data saving function	×				*
	Tool ID function	×				*"b" is necessary
	2nd/3rd correction function	×		○	○	
	Faulty tool list display					
	Spare tool list display	×		○	○	Set with "a"
Tool position display						
Tool list display	×			○		
② Pallet	APC control	×			○	※C
	Pallet correction					
	Multi-workpiece installation	×			○	※"C" is necessary.
③ Miscellaneous	Function on/off switch	○	○	○	○	
	Start from M code list	○	○	○	○	
	NC data configuration diagram	×			○	
	Measurement result display	×				*
④ Maintenance	Signal status display	×	○		○	
	Fault history	○	○	○	○	
	Fault code-specific frequency	×	○	○	○	
	Periodic inspection display	×	○		○	
	Load maintior	×				
	Cycle time measurement	×	○			
	Counter	×	○			
	Diagnosis data	×	○	○	○	
⑤ DNC support function						
⑥ Report	Fault history					
	Machinig result					
	Operation result					
	Production result					



FA control system

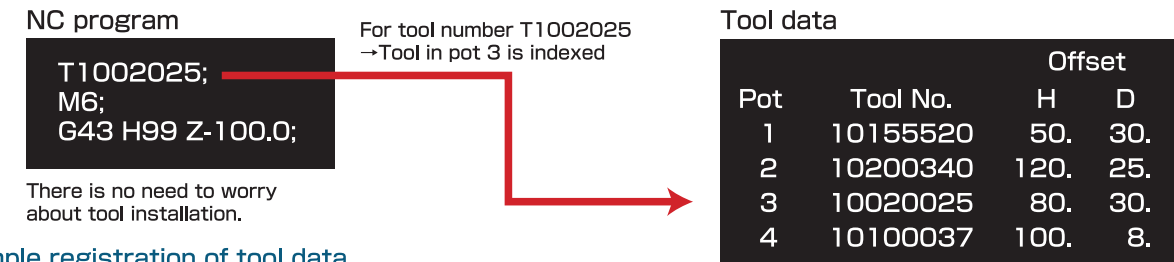
Attached function	○	Attached as a package
	No mark	Can be attached as an option
	×	Cannot attach

- Other functions can be added to the package specification (OP20P/T/A).
- The * mark in the remarks column indicates the items for which devices and other options apart from the software are required. Please contact us for details.
- The ※ mark in the remarks column indicates those items which cannot be included with the FMS or pallet pool-connected machines.

Tool control support

NC program creation is simple.

Tool number conversion function: The tool identification number is automatically converted into the ATC magazine pot number, eliminating command errors.

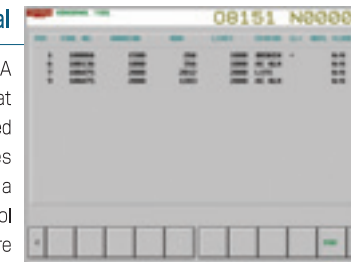


Simple registration of tool data

Tool ID function: The ID chip containing tool data (correction data, tool life, AC data, machining condition, etc.) eliminates the need for manual tool data entry, thus removing the human error factor.

Accurate tool life appraisal

Tool life control function: A counting method giving readings at 0.1 sec accuracy. A double-layered fault warning system provides peace of mind, first generating a warning that the actual error. Tool breakages, AC faults and so on are displayed in addition to tool life.



Preliminary tool check

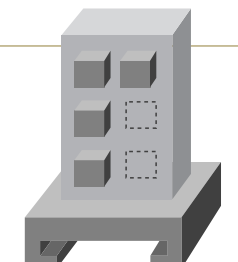
Program tool check function: The tools used in the program are analyzed and any tool shortages are notified.



Pallet control support

Solid pallet control

Multi-workpiece installation function: Only registered mounting faces and/or processes are machined, therefore cycle time is significantly reduced.



Maintenance control support

Visual status display

Signal status display function: Limit switch ON/OFF status is given in real-time.



Straightforward inspection items

Periodic inspection instruction function: Periodic inspection items and completion status are displayed.

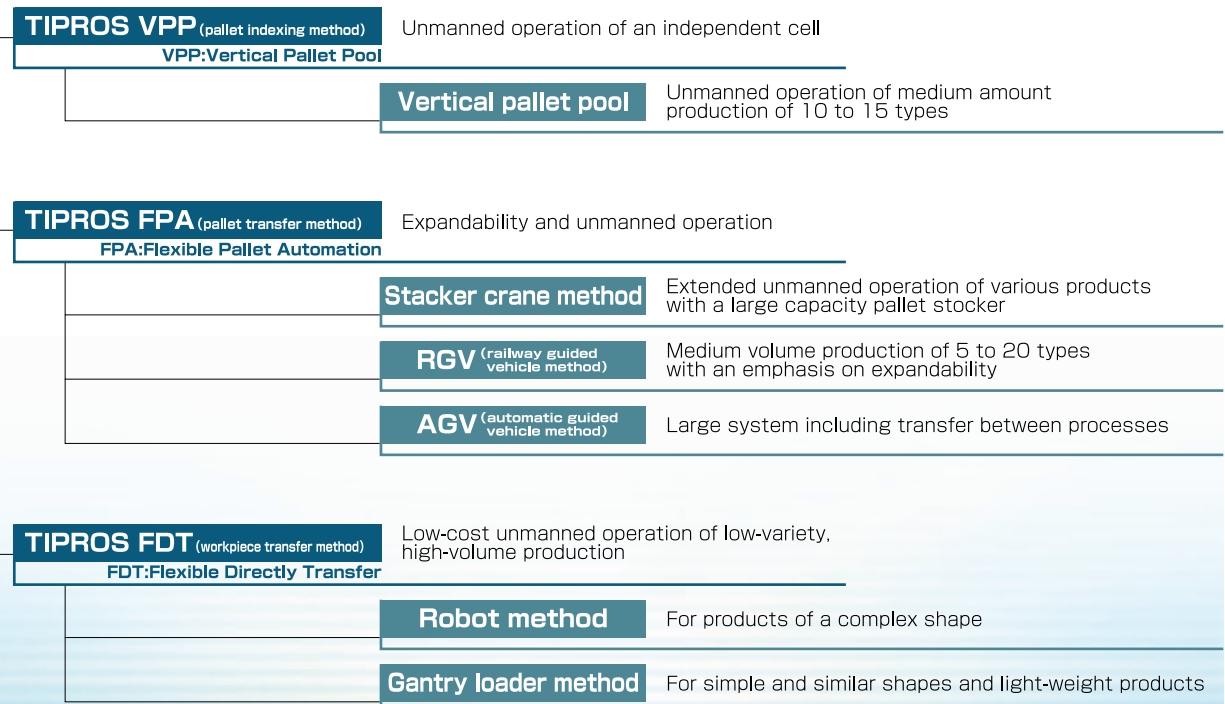


TIPROS

For the people. The **TOYODA**® Integrated Production System continues to evolve.

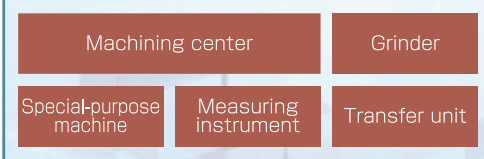
JTEKT has delivered many systems since the first FMS sold in 1972 and have come to be seen by both domestic and overseas customers as a company that offers high reliability and meets expectations, and as such indispensable in the FA era. We manufacture the best FMC/FMS to meet customer requirements, by a combination of our original thorough mechatronics technologies and software modules and numerous delivery records.

FMC/FMS We supply the best system to the customer with a wide selection of modules.



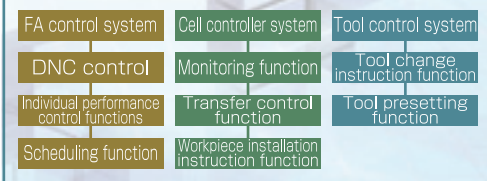
Hardware

- Flexible machine tool giving high speed, high efficiency and high precision
- Intelligent peripheral units



Software

- Flexible control functions
- Enriched unmanned operation support functions
- Superior control functions



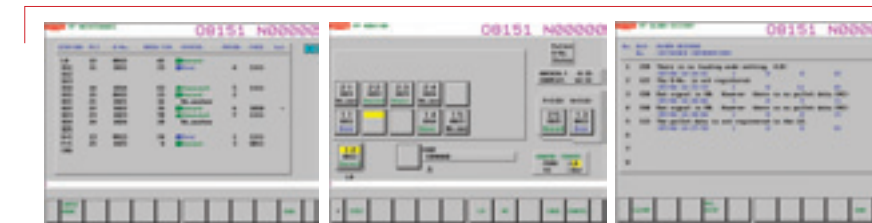
TIPROS VPP

The FMC uses a vertical rack system which reduces the required installation space. Time loss during pallet change is kept at a minimum by combining this with a high speed APC. The pallet storage capacity is increased for unmanned operation at night and on holidays.

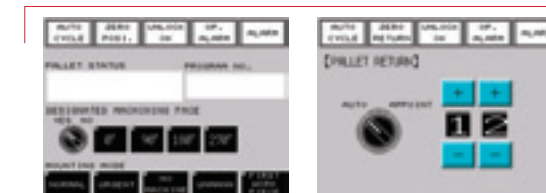


OP Supporter OP40iPP

Our original software is installed in the CNC unit to control VPP with the CPU. Reliability is improved as a PC (hard disk) is not required.



CNC screen

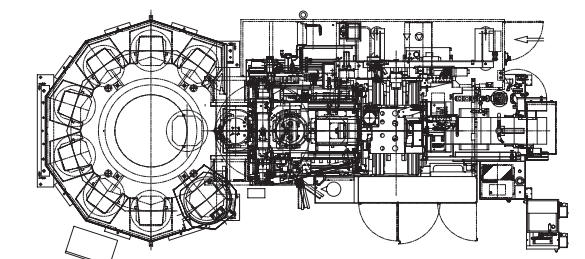


Loading station operation panel



FH450S 7VPP layout

Applicable models	FH450S	FH550S FH550SX	FH630S FH630SX
Pallet storage capacity	7·10·14·21	7·10·14·21	7·10·14
Pallet load	400kg	800kg	800kg
Max. workpiece height on pallet	1 stage type 750mm	1,000mm	1,000mm
	2 stage type 700mm	1,000mm	1,000mm
	3 stage type 700mm	700mm	
Max. workpiece swing on pallet	φ630※	φ850※	φ1,000※
Loading station	1 unit		
FMC software	OP40iPP		



※Subject to limitation in workpiece shape

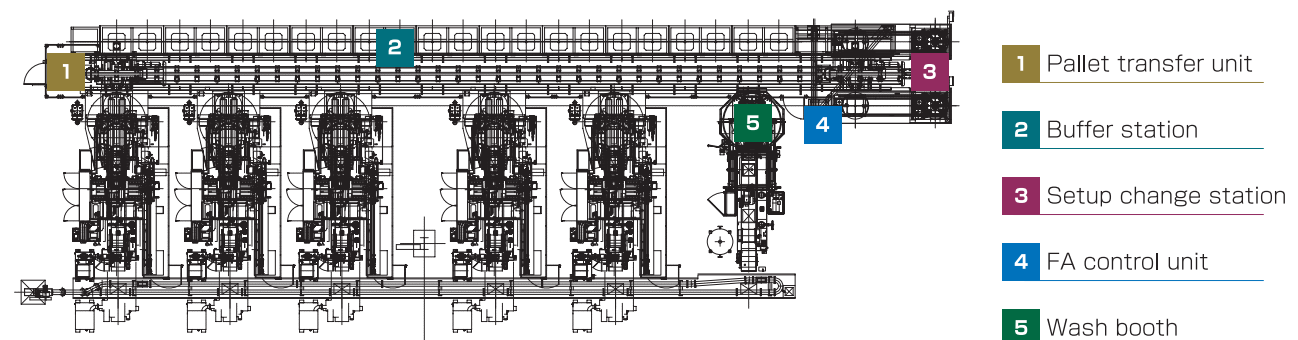
TIPROS

For the people. The **TOYODA**® Integrated Production System continues to evolve.

TIPROS FPA

Unmanned operation, more flexibility in the system and an improved level of control. A state-of-the-art production system that only JTEKT, with our grasp on key points of the FA, are able to provide. The module configuration can be easily expanded, so that any future additions of machines, racks, loading stations or the like can be carried out with ease.

Stacker crane method



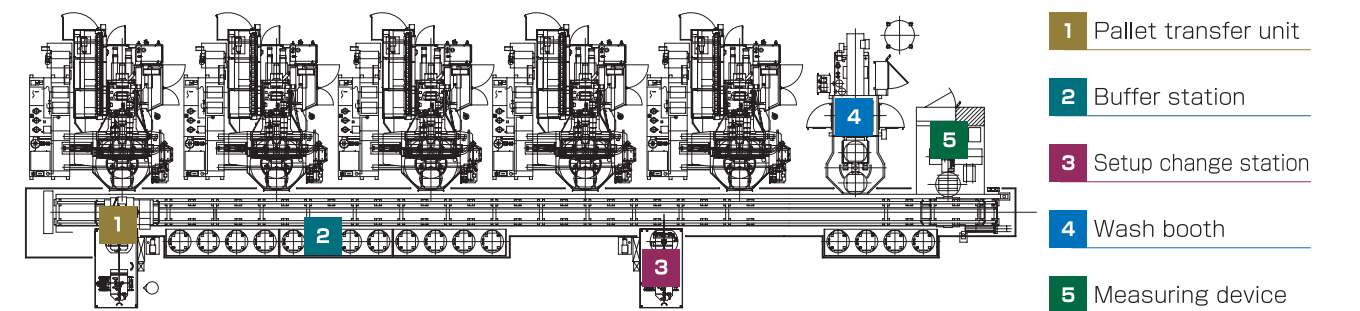
RGV (railway guided vehicle method)



Railway guided vehicle



Setup change station



TIPROS FDT

Robot method



TIPROS

For the people. The **TOYODA**® Integrated Production System continues to evolve.

FMS software for TIPROS FPA (CL30, MG30, TL30)

TIPROS 30 Series is an easy-to-use FMS software that supports a multi-variety style of production system and a high machine operation efficiency rate. The 'instruction-manual' free, intuition-based approach makes operations of the machine much less complicated.



FMS software	PC type	Stacker crane method, carrier method		
		FMS Level1	FMS Level2	FMS Level3
[Transfer control] CL30		●	●	●
[DNC control] MG30			●	●
[Tool control] TL30				●

Option: Scheduling, preventive maintenance, multi-piece installation, ...

The best cutting method for the customer is selected from an abundance of automated jig examples.



A monitor screen that can be understood in a glance
Color indication of equipment status

Detailed data can be viewed with a simple movement of the mouse

Mode icon

Operation starting time and expected completion time are shown.

Merely click to return the pallet.
Merely click the pallet to return it to the loading station.

Simple creation of visual installation instruction drawings
Simply created as if you were creating a home page.

Supporting remote diagnosis of control devices
Our service center delivers accurate problem-solving advice.

Customer's plant | JTEKT | CNC

Cell controller | Carrier controller

Simple data entry for each pallet type

1 piece | Multiple pieces | 4 faces, 1 piece | 4 faces, 2 areas

4 faces, 4 areas | Free | Jig change | Jig base change

Jig change is judged according to the schedule.

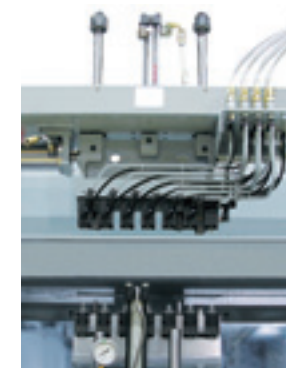
Jig A | Jig B

There is no workpiece requiring jig A in the valid schedule. The next schedule is a workpiece using jig B.

Jig change from jig A to jig B is judged.

Upper coupler supply method

Top-of-machine supply method. The number of ports can be increased to suit the jig clamping method.



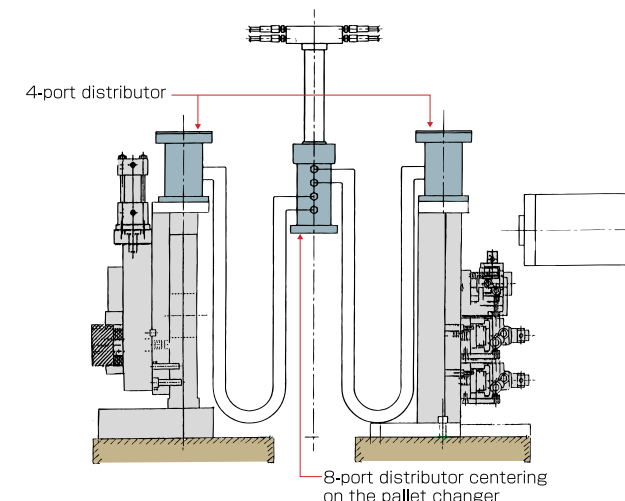
Lower coupler supply method

Bottom-of-machine supply method. There are no restricting factors above the jig.



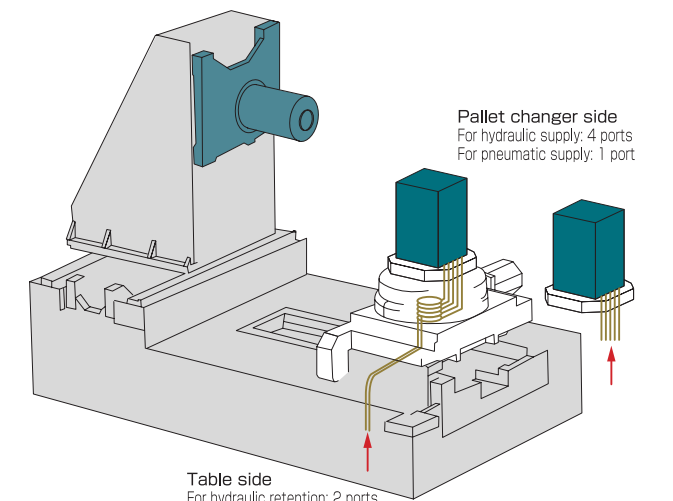
Distributor supply method

An 8-port distributor centering on the pallet changer is arranged.



Pallet-through supply method

The pallet-through supply method makes it possible to supply hydraulically to the internal table.



Taking the global environment, society and our customers into consideration, we at JTEKT promote the production of products which are both people and planet-friendly.

JTEKT undertakes development activities with the belief that by reducing power consumption and conserving resources it is possible to slow down global warming, something essential to the protection of the global environment. The environmental impact of our products from production to disposal is assessed, so that those products which are less of a burden on the environment can be supplied to the customer.

The formation of an environment management system

JTEKT operates an environment management system in consistency with our business concept and environment policy. In this system, a PDCA (Plan > Do > Check > Action) cycle is used to constantly strive for better environmental preservation. Effectiveness of the system, environmental performance and compliance with laws and regulations are checked in periodic internal and external audits, and concise adjustments made to ensure activities are promoted systematically and sustainably.

Environment management system audits

External inspections

We have established an integral company-wide environment management system to promote systematical environmental preservation activities. An external audit was conducted in March 2006, the first time since the company merged, and the evaluation deemed our system to be functioning effectively.

Internal environmental audits

Mutual auditing amongst operating departments ensures quality internal auditing and any improvements made applied across the board. We will keep improving the level of internal auditing whilst promoting understanding of the environment management system among workers and enhancing environmental control. To achieve these goals, internal auditors will continue to be trained at external auditor training courses.

Obtaining ISO14001 certification

Domestic offices

Approval of certification is promoted at major affiliated companies also. As of the end of March, 2006, 13 out of 18 JTEKT group companies environment associations had obtained certification.

Certified companies

- KOYO MACHINE INDUSTRIES CO., LTD.
- KOYO SEALING TECHNO CO., LTD.
- KOYO THERMO SYSTEMS CO., LTD.
- DAIBEA CO., LTD.
- HOUKO CO., LTD.
- KOYO METAL TECH CO., LTD.
- FORMICS INC.
- TOYOOKI KOGYO CO., LTD.
- CNK CO., LTD.
- KOYO ELECTRONICS INDUSTRIES CO., LTD.
- UTSUNOMIYA KIKI CO., LTD.
- TOYODA VAN MOPPE LTD.
- TOYODA-KOKI AUTOMOTIVE TORSION CO.

Overseas offices

As a company taking our business global, it is important for us that the entire group becomes assertively involved in environmental preservation. We request that environmental management systems be established to promote positive environmental preservation activities in the consolidation. 23 out of 34 companies participating in the JTEKT group environmental association have acquired certification.

Windmill power generator
Contains JTEKT bearings in the primary shaft and generator.



Environmental consideration in the product development stage (applicable model: FH630SX)

Reduction in the number of parts

20% reduction

The number of parts is reduced in order to save on resources. A simpler structure not only reduces the burden on the environment but also strengthens reliability because of a reduction in the breakdown ratio.

Reduction of number of bolts

15% reduction

The reduction of the number of bolts caused through optimization of the structure is also effective towards reducing the amount of energy used in parts cutting.

Reduction of coolant consumption

40% reduction

Chip disposal characteristics of the machine body play an important role in the reduction of the amount of fixed energies necessary for the supply of hydraulic pressure, lubricant, coolant, pneumatic pressure, etc. This is due to the fact that a great amount of coolant is needed to discharge chips. To solve the problem, the center trough method is adopted so that a chip disposal space is provided directly beneath the cutting point.

Resource reduction through reduction of number of cables

32% reduction

The field bus method is adopted for easier connection between PLC, sensors, SOL valves and other control devices. With this feature, the number of cables can be substantially reduced.

Reduction of coolant pump power consumption

50% reduction

The center trough method not only reduces the coolant consumption but also reduces the amount of power used by the coolant pump. In addition, optimization of coolant piping has contributed to a 10% reduction in pressure loss.

Recycled magazine socket

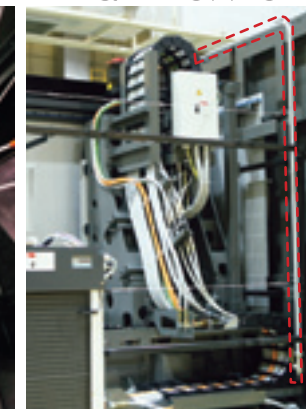
4.8t reduction

The material of the magazine socket used for the machining center was changed from phenol resin to 66 nylon which is able to be recycled, contributing to the annual reduction of waste by 4.8 ton. This is to improve the recycling property of the product in the disposal stage.

Center trough structure



Energy saving piping



A convincing before-after sales system centered on a permanent exhibition site

JTEKT's Customer Center was opened in Kariya, Aichi Pref. in 1999 as one of the largest permanent exhibition sites in Japan. The sales, before-sales and after-sales service and training school divisions accepting direct contact with customers are integrally located in this center so that the best solution to meet customer's requirements can be found.



Customer center outline
 Location: 1-1 Asahimachi, Kariya-shi, Aichi Pref.
 Opened in October 1999
 Exhibition area: 2,110m²
 Permanent exhibition: Various grinders, machining centers, cutting machines, flow forming machines, parallel mechanism type cutting machines, etc.

At the customer center the best solution for the customer's requirements are proposed on a 3 element basis. We hope that you will take the time to visit.

① Observe

Exhibition

- Exhibition of cells/machines most suited to the customer
- Introduction to leading edge technologies
- Exhibition of total engineering potentials including those of group companies



② Touch and confirm

Confirm

- Confirmation of technology by carrying out before-sales service tests
- Operation training at the training school
- Introduction to the service information network



③ Have discussions

Consultation

- Meetings for interchange of technical opinions
- Exchange of the latest information through events
- Machining consultation before the machines



We supply an enriched service to our customer.

① Before-sales service

The customer's product is test cut on an actual machine and a detailed report is given.



② SINOC (Service Information Network Operation Center) Service Information Network Operation Center

Installed in customer center, Kariya Factory



A solid after-sales service has been put in place to ensure we can provide quick solutions to customer inquiries. Experts in machining centers, special purpose machines and grinders are stationed at SINOC, providing 24-hour support to customers and carrying out remote breakdown diagnosis. We refer to the integral information system, covering sales, production, design, parts as well as the service history of the individual machine, in order to give a swift response to the customer's enquiry.

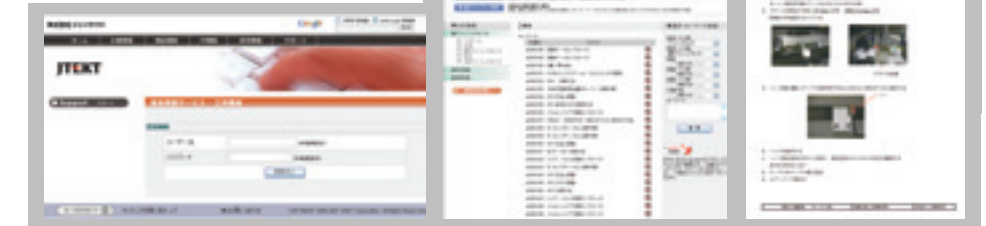
(Time)	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	1	2	3	4	5	6	7	8
Work days	Regular service										SINOC														
Saturday	SINOC																	Phone answering machine							
Sunday	SINOC																	Phone answering machine							

- Upon opening for the day, regional service centers respond swiftly to customer call-outs.
 - SINOC : 17:00 or later on week days, all day Saturday, 8:00 to 17:00 Sunday via the service call window (Within the customer center at the Kariya plant)
 - Answering machine : The customer is able to record their message on the answering machine.
- *Closed over the O-bon and New Year holidays.

③ Service and maintenance information: Service and maintenance information can be downloaded from JTEKT's home page.

Log in on the service and maintenance information screen and enter the model or device, keyword or other data to search maintenance data.

*Accessible only for registered users



④ Visiting service

We visit the customer, inspect the machine and provide consultation.



⑤ Training school

Attend training courses on machine operation, programming, maintenance and so on using actual machines for each training curriculum.



Machine specifications

Item	Unit	FH450S		FH550S			FH630S				FH550SX		FH630SX			FH800SX			
		Standard specifications	Special specifications	Standard specifications	Special specifications		Standard specifications	Special specifications			Standard specifications	Special specifications	Standard specifications	Special specifications		Standard specifications	Special specifications		
Table & Pallet	Table dimensions (pallet dimensions)	mm	□450 (Pallet)		□550 (Pallet)	□500 (Pallet)			□630 (Pallet)		□550 (Pallet)	□500 (Pallet)	□630 (Pallet)		□800 (Pallet)				
	Rotary table indexing angle	°	1	0.001	1	0.001			1		0.001		1	0.001	1		0.001		
	Pallet height (from floor)	mm	1,100		1,200				1,200				1,200		1,300				
	Max load on pallet	kg	400		800				800	1,000		800		800	1,000	1,300			
	Table indexing time (90° indexing)	sec	2.5	0.43※1	2	0.7※1			2	0.9※1 2.4※2		2	0.7※1	2	0.9※1 2.4※2	2.5		2.5	
Pallet change time	sec	5.6		9.5				12			9.5		12		18				
Stroke	X-axis	mm	600		750				1,000			750		1,000		1,250			
	Y-axis	mm	600		800				800			800		800		1,100			
	Z-axis	mm	600		850				850			850		850		1,050			
	Distance between spindle nose and table center	mm	125~725		150~1,000				200~1,050			150~1,000		200~1,050		200~1,250			
	Distance between spindle center and top of pallet	mm	50~650		100~900				100~900			100~900		100~900		100~1,200			
	Max. workpiece swing x Max. workpiece height	mm	φ630×750※3		φ850×1,000※3				φ1,000×1,000※3			φ850×1,000※3		φ1,000×1,000※3		φ1,200×1,250※3			
Feeds	Rapid feed rate (X, Y and Z)	m/min	50		60				60			60		60		48			
	Cutting feed rate (X, Y and Z)	m/min	0.001~30		0.001~30				0.001~30			0.001~30		0.001~30		0.001~30			
	Rapid acceleration (X, Y and Z)	m/s ² (G)	6.86 (0.7)		9.8 (1.0)				9.8 (1.0)			XY=6.86 (0.7) Z=9.8 (1)		XY=6.86 (0.7) Z=9.8 (1)		XY=4.9 (0.5) Z=6.86 (0.7)			
	Ball screw diameter (X, Y and Z)	mm	φ45, φ36(Z)		φ45				φ45			φ45		φ45		φ45, φ50(Z)			
Spindle	Spindle speed	min ⁻¹	50~15,000	50~20,000 50~8,000	50~15,000	50~20,000 50~8,000 50~15,000		50~15,000	50~20,000 50~8,000 50~15,000		50~6,000	50~15,000 50~6,000	50~6,000	50~15,000 50~6,000	50~6,000	50~15,000 50~6,000			
	Spindle diameter (front bearing bore)	mm	φ80	φ70 φ80	φ80	φ70 φ80 φ90		φ80	φ70 φ80 φ90		φ110	φ100 φ110	φ110	φ100 φ110	φ110	φ100 φ110			
	Spindle nose shape		BT No.40	HSK	BT No.40	BT No.50, HSK		BT No.40	BT No.50, HSK		BT No.50	HSK	BT No.50	HSK	BT No.50	HSK			
	Spindle motor, short-time/continuous	kW	22/18.5	22/18.5 17.7/15	22/18.5	22/18.5 17.7/15 22/18.5		22/18.5	22/18.5 17.7/15 22/18.5		30/22	30/25 37/30	30/22	30/25 37/30	30/22	30/25 37/30			
ATC	Tool holding capacity	tool	40	60, 120	40	60, 121, or 190 or over		40	60, 121, or 190 or over		40	60, 121, or 190 or over	40	60, 121, or 190 or over	40	60, 121, or 190 or over			
	Tool selection		Absolute address		Absolute address		Absolute address		Absolute address		Absolute address		Absolute address		Absolute address		Absolute address		
	Tool (dia. x length)	mm	φ75×350※4		φ75×470※4	φ120×470※4※5		φ75×470※4	φ120×470※4※5		φ120×545※4		φ120×545※4		φ120×670※4				
	Tool mass	kg	8		8	27.0※5		8	27.0※5		27		27		35				
	Tool change time (Tool-to-Tool)	sec	1.3		1.6 (~8kg) 1.9 (8~14kg)	2.4 (~15kg) 2.7 (15~27kg) ※5		1.6 (~8kg) 1.9 (8~14kg)	2.4 (~15kg) 2.7 (15~27kg) ※5		2.4 (~15kg) 2.7 (15~27kg)		2.4 (~15kg) 2.7 (15~27kg)		1.9 (~8kg) 2.2 (8~15kg) 3.2 (15~35kg)				
	Tool change time (Chip-to-Chip)	sec	2.7 (~8kg)		2.7 (~8kg) 3.0 (8~14kg)	3.6 (~15kg) 3.9 (15~27kg)		2.7 (~8kg) 3.0 (8~14kg)	3.6 (~15kg) 3.9 (15~27kg)		3.6 (~15kg) 3.9 (15~27kg)		3.6 (~15kg) 3.9 (15~27kg)		5.5 (~8kg) 5.8 (8~15kg) 6.8 (15~35kg)				
	Tools Holder		MAS BT40		MAS BT40	MAS BT50		MAS BT40	MAS BT50		MAS BT50		MAS BT50		MAS BT50		MAS BT50		
Pull stud		MAS P40T-1		MAS P40T-1	MAS P50T-1		MAS P40T-1	MAS P50T-1		MAS P50T-1		MAS P50T-1		MAS P50T-1		MAS P50T-1			
Dimensions & Weight	Floor space (width x depth)	mm	2,500×5,363※6		3,044×5,675※6				3,308×6,020※6			3,312×5,800※6		3,576×6,146※6		3,705×7,584※6			
	Machine height	mm	2,785※6		3,108※6				3,108※6			3,200※6		3,200※6		3,646※6			
	Machine weight	kg	11,500		16,000				18,000			16,100		20,100		21,000			
Various Capacities	Working oil	L	53		53				53			53		53		53			
	Slide lubricant	L	2.9		2.9				2.9			2.9		2.9		2.9			
	Spindle oil air	L	2.9		2.9				2.9			2.9		2.9		2.9			
	Table	L	1	4	1.5	3			1.5	3		1.5	3	1.5	3	4	7.5		
	Spindle coolant	L	16		20				20			35		35		35			
	Power supply capacity	kVA	52	57※1	52	35		52	35		54	64	54	64	54	64	54	65	
	Control voltage	V	DC24		DC24				DC24			DC24		DC24		AC100 DC24			
	Air source capacity	NL/min	800		800				800			800		800		900			
	Air source pressure	MPa	0.4~0.5		0.4~0.5				0.4~0.5			0.4~0.5		0.4~0.5		0.4~0.5			
Capability & Performance	Positioning accuracy※7	mm	±0.003	±0.0015	±0.003	±0.002			±0.003	±0.002		±0.003	±0.002	±0.003	±0.002	±0.003	±0.002		
	Repeatability※7	mm	±0.0015	±0.001	±0.0015	±0.001			±0.0015	±0.001		±0.0015	±0.001	±0.0015	±0.001	±0.002	±0.001		
	Table indexing accuracy※7	sec	±3	±7 (NC) ±3.5 (with NC encoder)	±3	±7 (NC) ±3.5 (with NC encoder)		±3	±7 (NC) ±3.5 (with NC encoder)		±3	±7 (NC) ±3.5 (with NC encoder)	±3	±7 (NC) ±3.5 (with NC encoder)	±3	±7 (NC) ±3.5 (with NC encoder)	±3	±7 (NC) ±3.5 (with NC encoder)	
	Table indexing repeatability※7	sec	±3	±3.5 (NC) ±2 (with NC encoder)	±3	±3.5 (NC) ±2 (with NC encoder)		±3	±3.5 (NC) ±2 (with NC encoder)		±3	±3.5 (NC) ±2 (with NC encoder)	±3	±3.5 (NC) ±2 (with NC encoder)	±3	±3.5 (NC) ±2 (with NC encoder)	±3	±3.5 (NC) ±2 (with NC encoder)	

※1 System with DD table ※2 Pallet load 1t spec ※3 The workpiece swing is subject to limitations if used in conjunction with an RG. For details, refer to the tooling data.
 ※4 For detail shape, refer to the tooling data. ※5 In case of BT No. 50 spindle ※6 For details, refer to the layout plan. ※7 According to our inspection method
 ※If pallet load is 1 tonne, the Z-axis rapid acceleration and pallet change time differ from those of the standard model.

CNC unit FANUC 31i. ● Standard / □ Optional

Division	Name	FH450S	FH550S/FH630S	FH550SX/FH630SX	FH800SX	
Axis control	Min. input increment (0.001mm)	●	●	●	●	
	Machine lock	●	●	●	●	
	Absolute position detection	●	●	●	●	
	Inch/metric switch	□	□	□	□	
	Dry run	●	●	●	●	
Operation	Single block	●	●	●	●	
	Manual handle feed 1 unit	●	●	●	●	
	Program restart	□	□	□	□	
	Manual handle interrupt	□	□	□	□	
	Nano interpolation	●	●	●	●	
Interpolation function	Positioning (G00)	●	●	●	●	
	Exact stop mode (G61)	●	●	●	●	
	Tapping mode (G63)	●	●	●	●	
	Cutting mode (G64)	●	●	●	●	
	Exact stop (G09)	●	●	●	●	
	Linear interpolation (G01)	●	●	●	●	
	Arc interpolation (G02, G03)	●	●	●	●	
	Dwell (G04)	●	●	●	●	
	Helical interpolation	●	●	●	●	
	Reference point return (G28, G29)	●	●	●	●	
	Second reference point return (G30)	●	●	●	●	
	Third and fourth reference point return (G30)	●	●	●	●	
	Feed function	AI contour control I (pre-read 30 blocks)	●	●	●	●
		F1-digit feed	□	□	□	□
		AI contour control II (pre-read 200 blocks)	□	□	□	□
Program entry	Local coordinate system (G52)	●	●	●	●	
	Machine coordinate system (G53)	●	●	●	●	
	Workpiece coordinate system (G54 to G59)	●	●	●	●	
	Additional workpiece coordinate systems (48 sets)	□	□	□	□	
	Additional workpiece coordinate systems (300 sets)	□	□	□	□	
	Custom macro	●	●	●	●	
	Additional custom macro common variables (#100 to #199, #500 to #999)	●	●	●	●	
	Fixed drilling cycle (G73, G74, G76, G80 to G89, G98 and G99)	●	●	●	●	
	Additional optional block skip (9 pieces)	□	□	□	□	
	Automatic corner override	□	□	□	□	
Spindle function	Rigid tap	●	●	●	●	
Tool function	Tool corrections (99)	●	●	●	●	
	Tool corrections (200)	□	□	□	□	
Tool correction function	Tool corrections (400)	□	□	□	□	
	Tool corrections (499)	□	□	□	□	
	Tool corrections (999)	□	□	□	□	
	Tool corrections (2000)	□	□	□	□	
	Tool position offset	●	●	●	●	
Editing operation	Tool diameter and cutter radius compensation	●	●	●	●	
	Tool length compensation (G43, G44 and G49)	●	●	●	●	
	Program storage capacity (128K bytes)	●	●	●	●	
	Program storage capacity (256K bytes)	□	□	□	□	
	Program storage capacity (512K bytes)	□	□	□	□	
	Program storage capacity (1M byte)	□	□	□	□	
	Program storage capacity (2M bytes)	□	□	□	□	
	Program storage capacity (4M bytes)	□	□	□	□	
	Program storage capacity (8M bytes)	□	□	□	□	
	Number of registered programs (250)	●	●	●	●	
Number of registered programs (500) ※Storage capacity 256K bytes compulsory	□	□	□	□		
Number of registered programs (1000) ※Storage capacity 512K bytes compulsory	□	□	□	□		
Number of registered programs (2000) ※Storage capacity 1M bytes compulsory	□	□	□	□		
Number of registered programs (4000) ※Storage capacity 2M bytes compulsory	□	□	□	□		
Simultaneous multi-program editing (incl. background editing)	●	●	●	●		
Data entry/display	Touch panel control	●	●	●	●	
Communication function	Built-in Ethernet	●	●	●	●	
Others	10.4" color LCD	●	●	●	●	

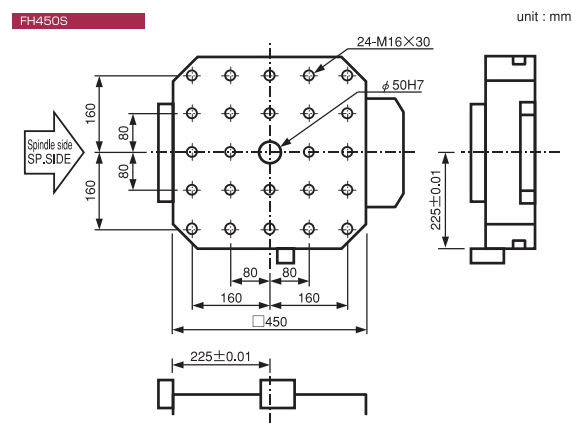
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Accessories ● Standard accessories

Item	Equipment name	FH450S	FH550S/FH630S	FH550SX/FH630SX	FH800SX		
Table and pallet	Indexing table	1 indexing table	●	●	●		
		NC indexing table					
		NC indexing table (with encoder)					
		DD table (with encoder)					
	Pallet	Standard pallet screw hole	●	●	●		
		T-groove pallet					
	Addition of pallet	Single piece screw hole					
		Single piece T-groove					
	Spindle relations	Speed	Optional 1,000Kg pallet load spec (only for FH630S and FH630SX)				
			20,000min-1 HSK A63 (22/18.5kW) spindle (without spindle-through coolant spec)				
15,000min-1 BT No. 40 (22/18.5kW) spindle (without spindle-through coolant spec)			●	●	●		
8,000min-1 BT No. 40 (17.7/15kW) spindle (without spindle-through coolant spec)							
15,000min-1 BT No. 50 (22/18.5kW) spindle (without spindle-through coolant spec)							
15,000min-1 BT No. 50 (30/25kW) large torque spindle (without spindle-through coolant spec)							
6,000min-1 BT No. 50 (30/22kW) spindle (without spindle-through coolant spec)							
6,000min-1 BT No. 50 (37/30kW) large torque spindle (without spindle-through coolant spec)							
20,000min-1 HSK A63 (22/18.5kW) spindle (with spindle-through coolant spec)							
15,000min-1 BT No. 40 (22/18.5kW) spindle (with spindle-through coolant spec)							
8,000min-1 BT No. 40 (17.7/15kW) spindle (with spindle-through coolant spec)							
15,000min-1 BT No. 50 (22/18.5kW) spindle (with spindle-through coolant spec)							
15,000min-1 BT No. 50 (30/25kW) large torque spindle (with spindle-through coolant spec)							
6,000min-1 BT No. 50 (30/22kW) spindle (with spindle-through coolant spec)							
6,000min-1 BT No. 50 (37/30kW) large torque spindle (with spindle-through coolant spec)							
Coolant	Coolant supply unit	Filler block for oil hole holder					
		Positioning block for angle head holder					
		HSK specifications					
		BIG PLUS specifications					
		MAS I	●	●	●		
		JIS					
		MAS II					
		Tool magazine	Tool capacity	40 tools	●	●	●
				60 tools			
				120 tools			
121 tools							
190 or more tools							
Coolant relations	Coolant supply unit	Coolant supply unit (water soluble/with take-up chip conveyor/scrapers type/without spindle-through)		●	●		
		Coolant supply unit (water soluble/with take-up chip conveyor/scrapers type/spindle-through coolant spec/1MPa through pump)					
		Coolant supply unit (water soluble/with take-up chip conveyor/scrapers type/spindle-through coolant spec/3MPa through pump)					
		Coolant supply unit (water soluble/with take-up chip conveyor/scrapers type/spindle-through coolant spec/7MPa through pump)					
		Coolant supply unit (water soluble/with take-up chip conveyor/2-tank type/spindle-through coolant spec/1MPa through pump)					
		Coolant supply unit (water soluble/with take-up chip conveyor/2-tank type/spindle-through coolant spec/3MPa through pump)					
		Coolant supply unit (water soluble/with take-up chip conveyor/2-tank type/spindle-through coolant spec/7MPa through pump)					
		External nozzle coolant	●	●	●		
		Overhead shower coolant	●※	●	●		
		Chip flushing coolant	●※	●	●		
		Internal screw conveyor	●	●	●		
		Coolant cooling					
		Oil skimmer					
		Chip box					
		Splash gun (at APC)					
Mist collector							
Splash guard	Air blower	External nozzle type					
		Enclosure guard	●	●	●		
		Door interlock at operating position	●	●	●		
		APC door interlock	●	●	●		
		Internal lighting	●	●	●		
Operation control function, others	Ground fault interrupter	Electromagnetic lock type					
		Electromagnetic lock type					
Labor saving function	Pallet changer (APC)	Universal design cover					
		TIPROS VPP					
		7 pieces					
		10 pieces					
		14 pieces					
Support for high accuracy	Spindle cooling unit	21 piece (Not provided for FH630S or FH630SX)					
Operator support function	Package	BTS (Ballscrew Thermo Stabilizer) function		●	●		
		Scale feedback (X-, Y- and Z-axes)					
		Touch sensor function					
		Optical type (without energization) ; with alignment and datum face correction functions					
		Optical type (with energization) ; with alignment, datum face correction, gap elimination and tool breakage detection function					
		Automatic tool length measurement function and datum face for measurement (interference area caused)					
		Automatic measurement function					
		Automatic measurement correction function					
		Rotary coordinate system correction function					
		Rotary coordinate axis correction function					
		STS (Spindle Thermo Stabilizer) function					
		OP10i basic model	●	●	●		
		OP20iP maintenance model					
		OP20iT tool control model					
		OP20iA advanced tool control model					
Tool control	AC function (condition control)	Cutting condition setting function					
		Replacement tool automatic indexing function					
		Tool data update during installation and removal					
		Storage tool data saving function					
		Tool ID function					
		Tool list display					
		APC control					
		Multi-workpiece installation					
		Measurement result display					
		Signal status display					
Auxiliary function	Maintenance function	Fault history					
		Fault code-specific frequency					
		Periodic inspection display					
		Load monitor					

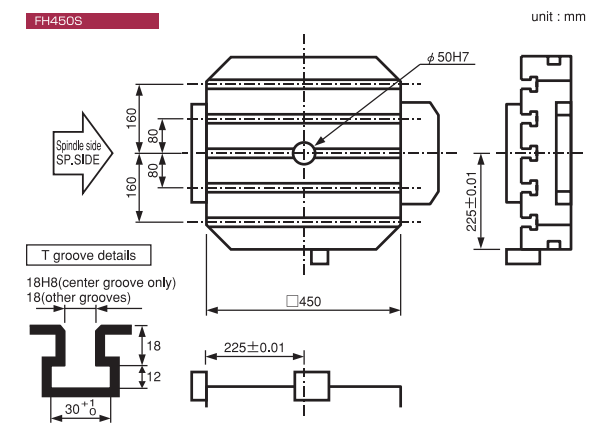
※Piping only

Threaded hole pallet

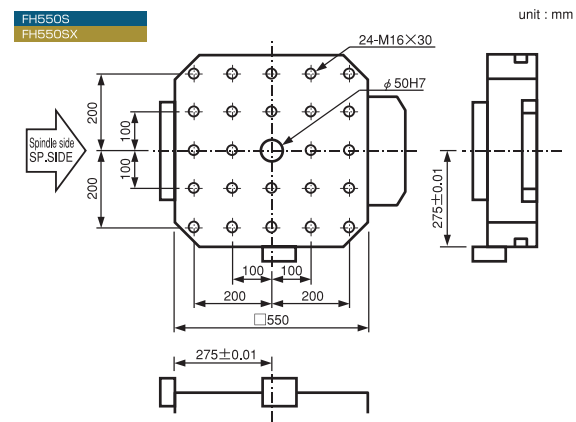


- Pitch tolerance of M16 screw is ± 0.2
- No alignment reference hole is provided for the edge locator.

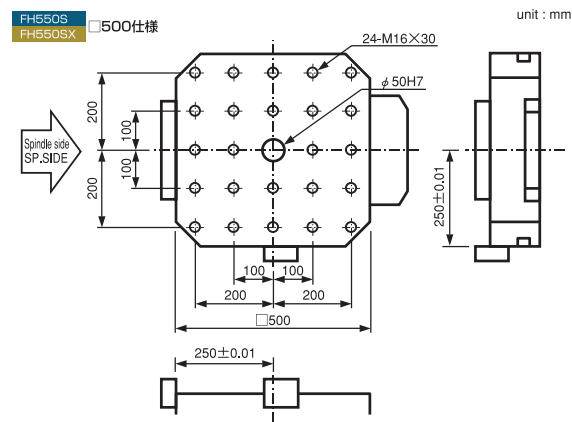
T-groove pallet



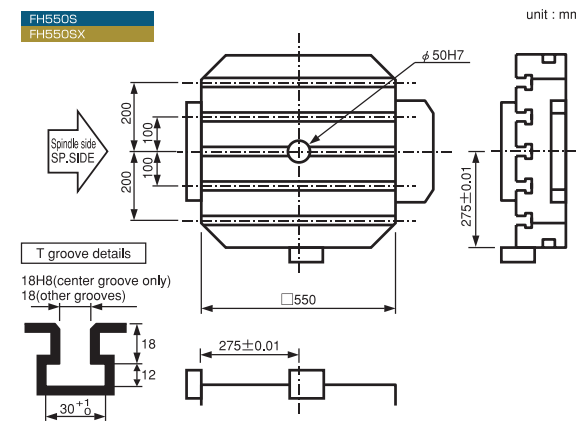
- T-groove pitch tolerance is ± 0.2
- No alignment reference hole is provided for the edge locator.



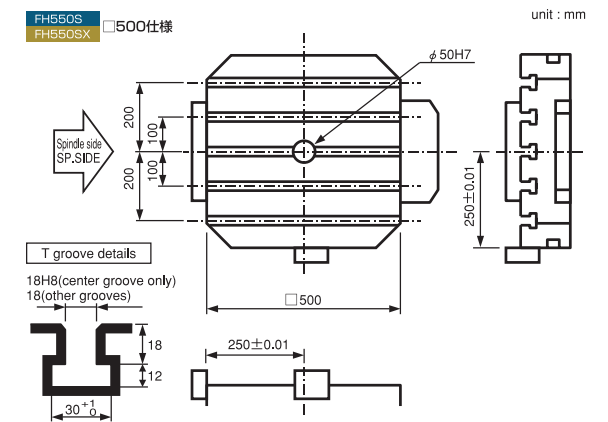
- Pitch tolerance of M16 screw is ± 0.2
- No alignment reference hole is provided for the edge locator.



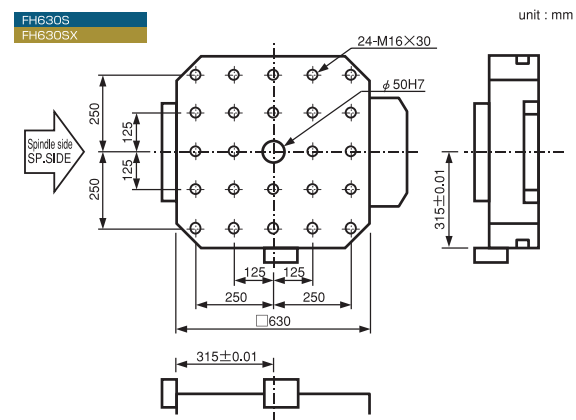
- Pitch tolerance of M16 screw is ± 0.2
- No alignment reference hole is provided for the edge locator.



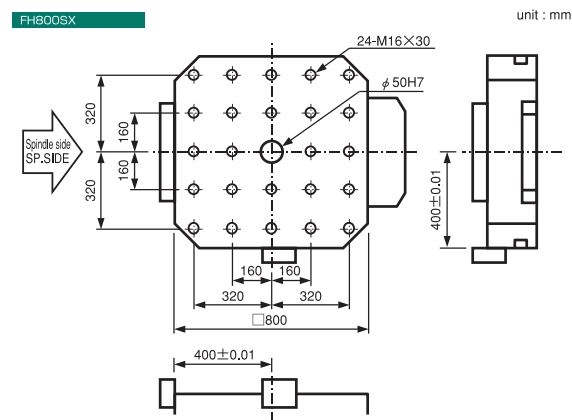
- T-groove pitch tolerance is ± 0.2
- No alignment reference hole is provided for the edge locator.



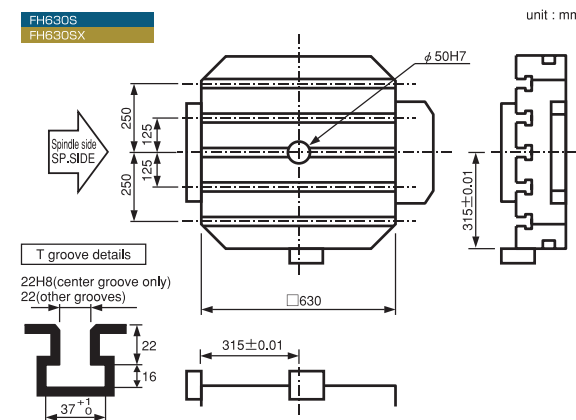
- T-groove pitch tolerance is ± 0.2
- No alignment reference hole is provided for the edge locator.



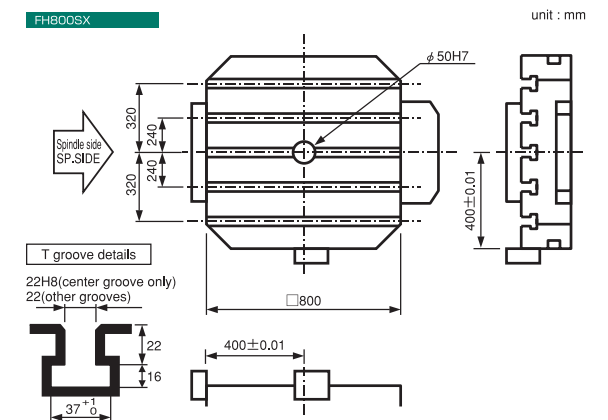
- Pitch tolerance of M16 screw is ± 0.2
- No alignment reference hole is provided for the edge locator.



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

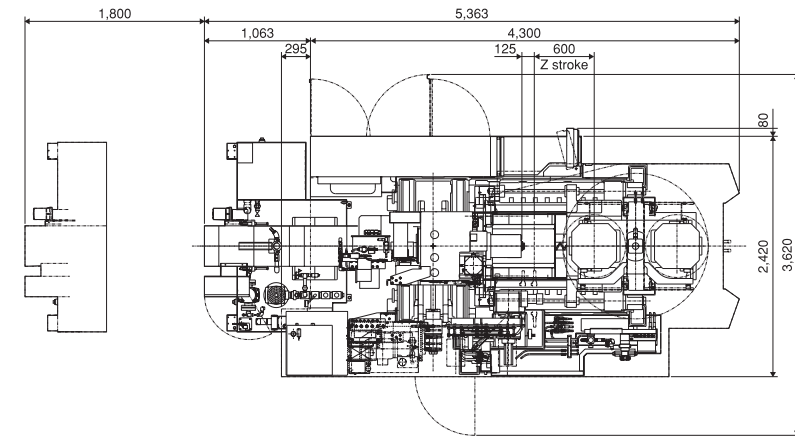


- T-groove pitch tolerance is ± 0.2
- No alignment reference hole is provided for the edge locator.

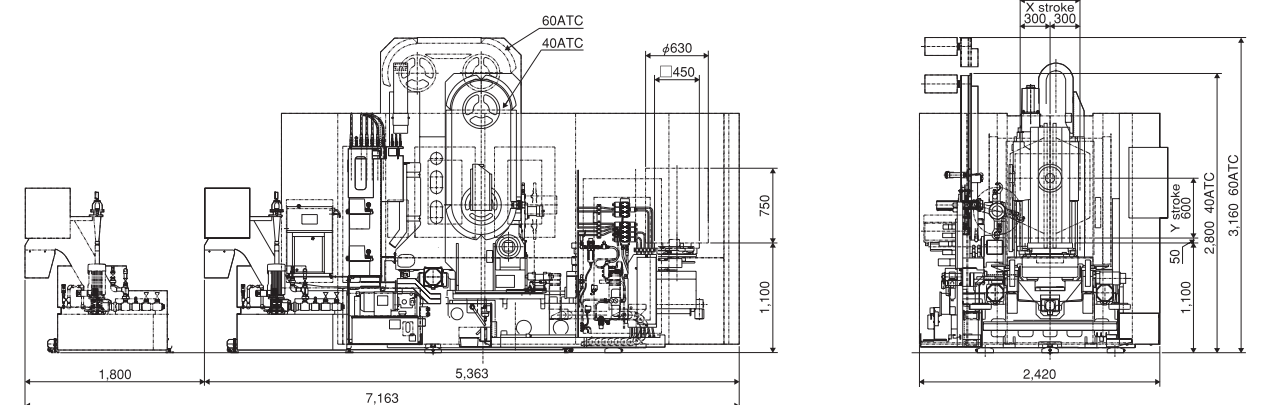


- T-groove pitch tolerance is ± 0.2
- No alignment reference hole is provided for the edge locator.

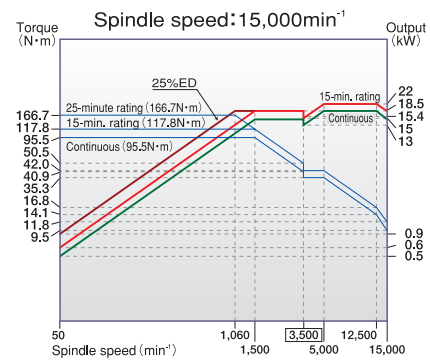
Output and torque diagram of 7 spindles



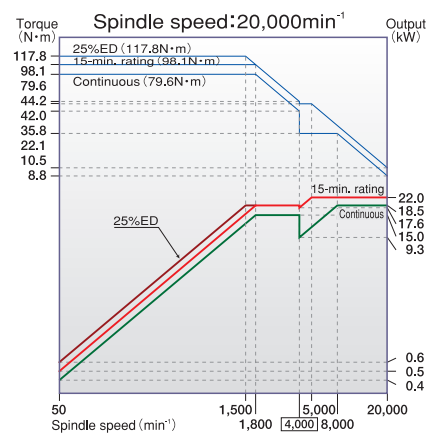
FH450S
Layout plan
unit : mm



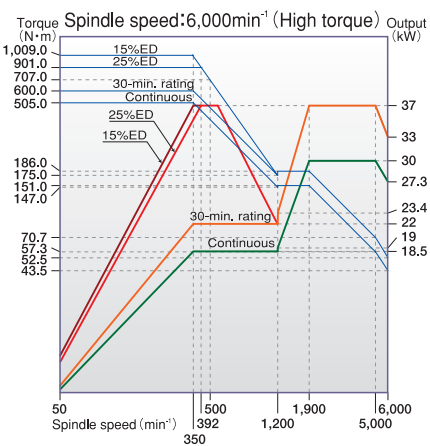
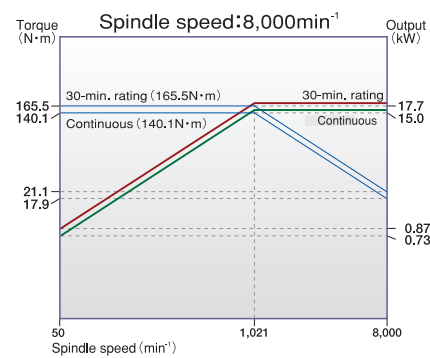
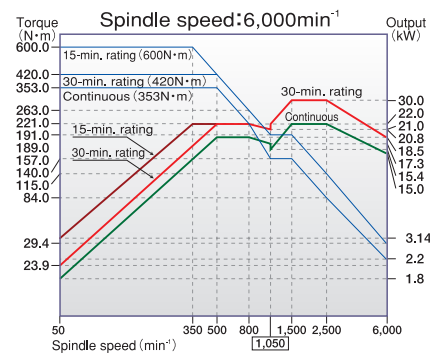
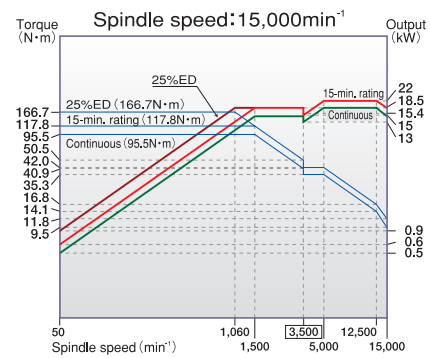
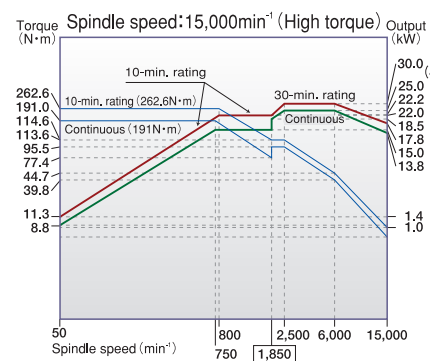
BT No.50 FH550S/FH630S



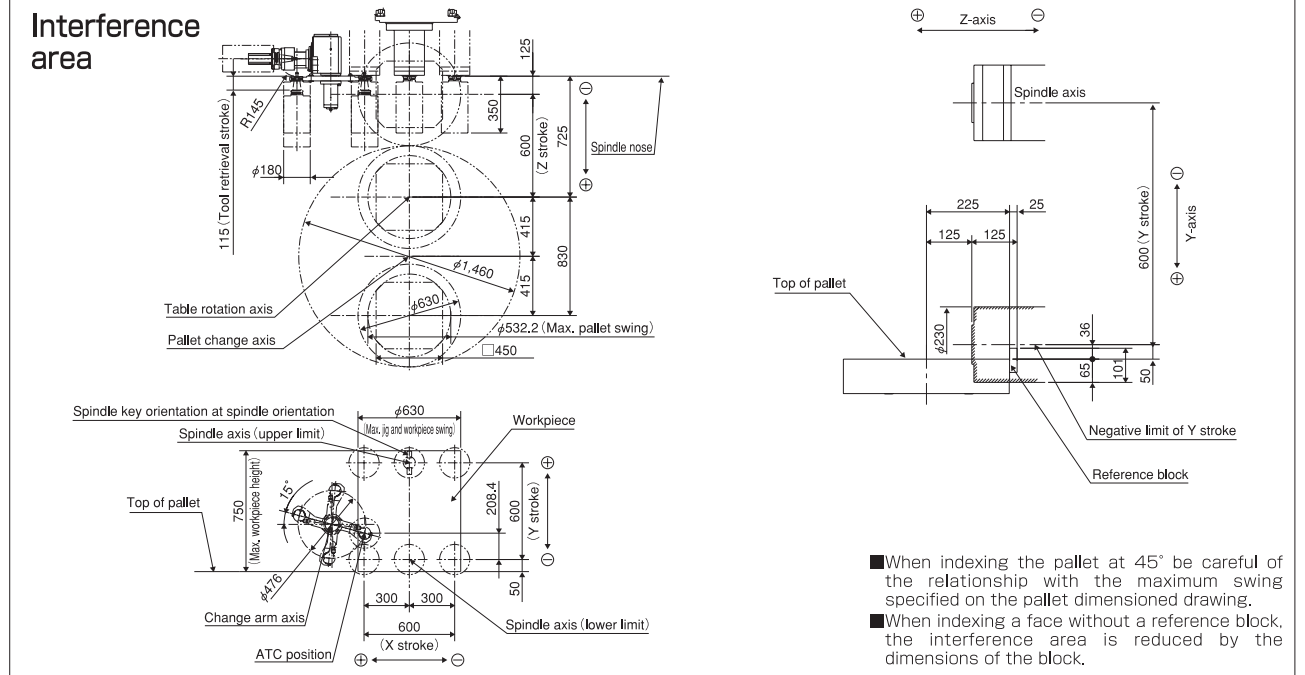
BT No.40 FH450S FH550S/FH630S



BT No.50 FH550SX/FH630SX FH800SX



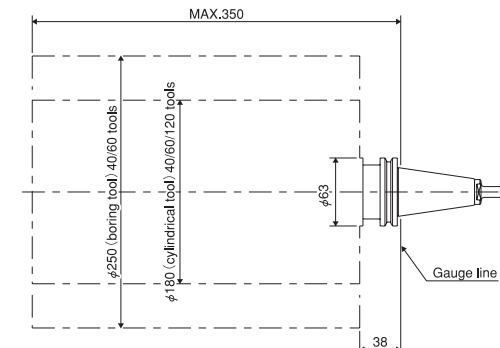
Interference area



Limitations in tool holder shape (JIS·CAT·DIN BT No.40)

The shape of the tool holder is limited due to the ATC (automatic tool change) cycle. The 38mm range from the gauge line must be within $\phi 63$ mm on the outside diameter. The total mass must be within 8kg and the length from the gauge line must be within 350mm.

40/60/120 tools



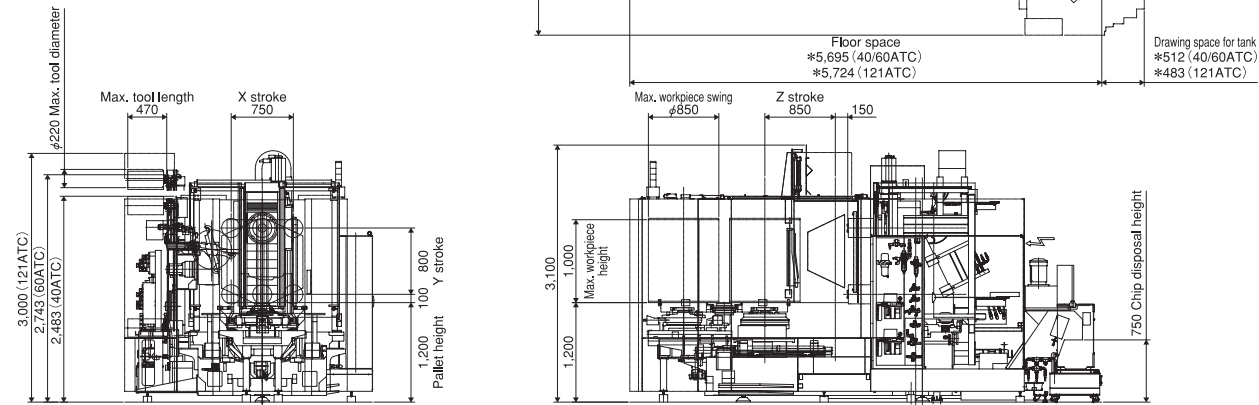
Item	Max. spec
Tool length	350mm
Tool diameter	With 40 tools magazine: $\phi 75$ mm (without limitations of adjacent tools) With 60 tools magazine: $\phi 70$ mm (without limitations of adjacent tools) With 120 tools magazine: $\phi 95$ mm (without limitations of adjacent tools)
Tool weight	8kg: The moment at the spindle nose is supposed to be within 12N·m.
Tool imbalance	Within 30×10^{-5} N·m (tools of 6,000min ⁻¹ or lower speeds) Within 10×10^{-5} N·m (tools of speeds > 6,000min ⁻¹ , $\leq 8,000$ min ⁻¹) Within 3×10^{-5} N·m (tools of speeds > 8,000min ⁻¹ , $\leq 15,000$ min ⁻¹) Within 2×10^{-5} N·m (tools of speeds > 15,000min ⁻¹ , $\leq 20,000$ min ⁻¹)

Tools with diameters exceeding $\phi 70$ are subject to limitations in the diameter of adjacent tools in the magazine, key groove position of the tool holder, etc.

FH550S BT No.40

Layout plan

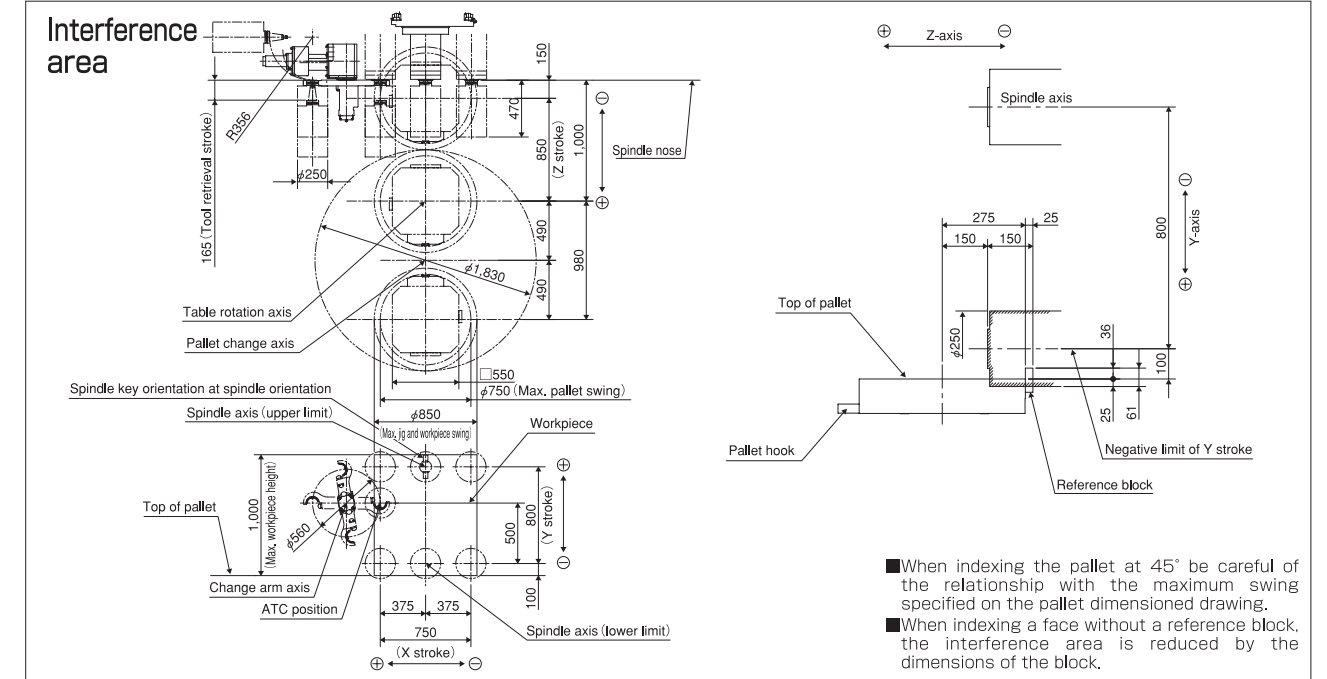
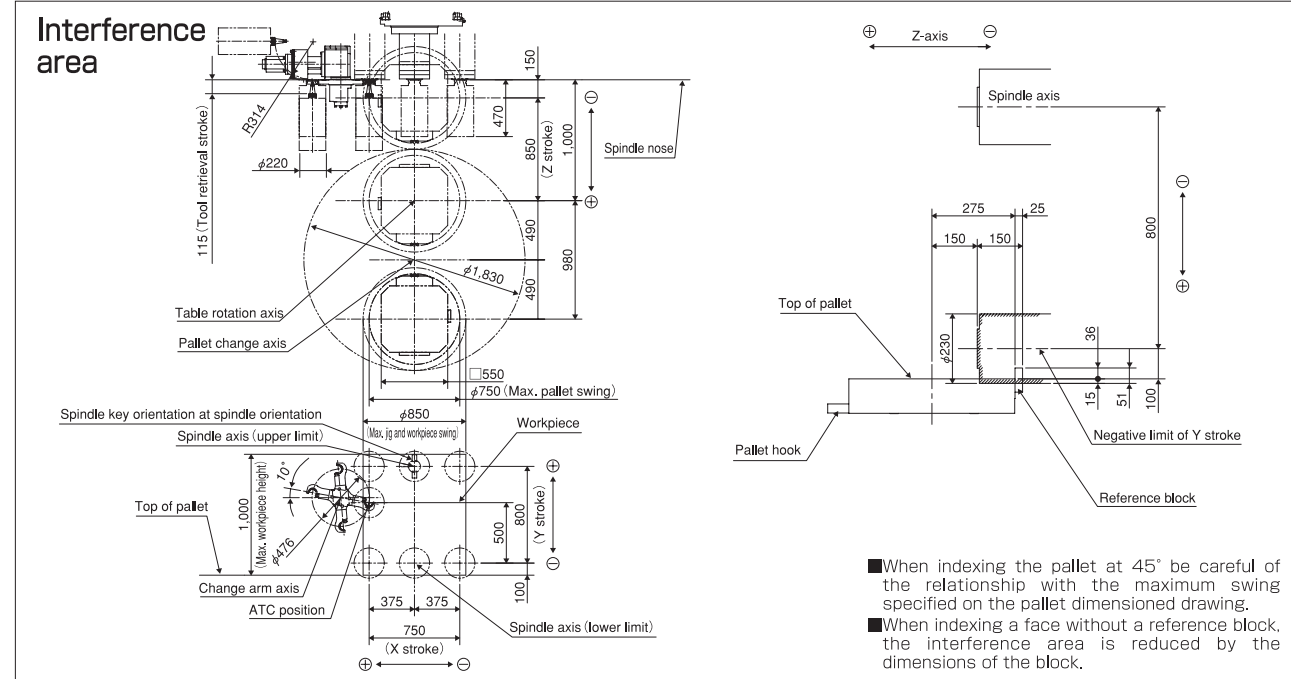
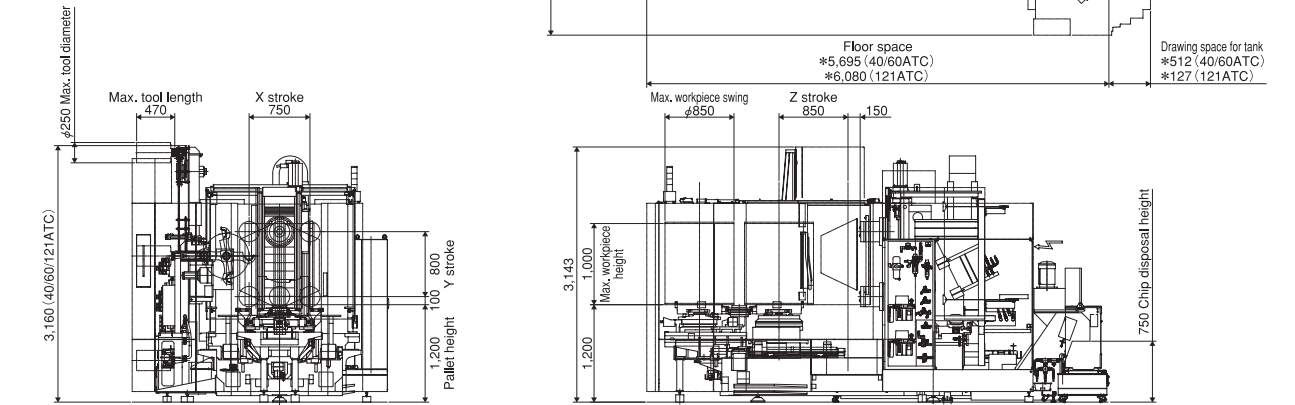
unit : mm
 * indicates dimensions with the standard coolant supply unit.
 Dimension * may change according to specifications.



FH550S BT No.50

Layout plan

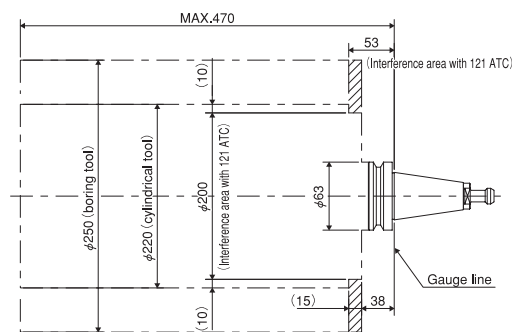
unit : mm
 * indicates dimensions with the standard coolant supply unit.
 Dimension * may change according to specifications.



Limitations in tool holder shape (JIS-CAT-DIN BT No.40)

The shape of the tool holder is limited when ATC (automatic tool change) is carried out. If the maximum tool diameter exceeds $\phi 63$, the 38mm range from the gauge line must be within $\phi 63$ mm of the outside diameter. The total mass must be within 8kg and the length from the gauge line must be within 470mm. With the 121-tool magazine, the tool diameter within 53mm from the gauge line must be within $\phi 200$.

40/60/121 tools



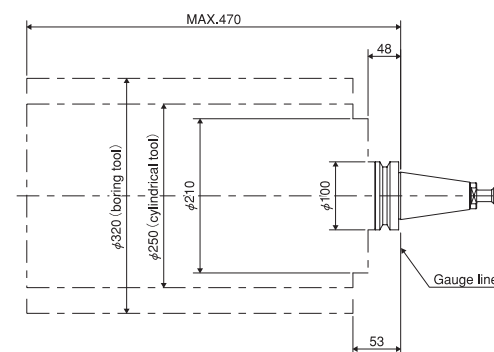
Item	Max. spec
Tool length	470mm
Tool diameter	With 40 and 60 tools magazines: $\phi 75$ mm (without limitations of adjacent tools) With 121 tools magazine: $\phi 110$ mm (without limitations of adjacent tools)
Tool weight	8kg: The moment at the spindle nose is supposed to be within 12N·m.
Tool imbalance	Within 30×10^{-5} N·m (tools of 6,000min ⁻¹ or lower speeds) Within 10×10^{-5} N·m (tools of speeds > 6,000min ⁻¹ , $\leq 8,000$ min ⁻¹) Within 3×10^{-5} N·m (tools exceeding 8,000min ⁻¹)

Tools with diameters exceeding those described above are subject to limitations in the diameter of adjacent tools in the magazine, key good position of the tool holder and so on.

Limitations in tool holder shape (JIS-CAT-DIN BT No.50)

The tool holder is subject to limitations in the shape due to the ATC (automatic tool change) cycle. Tools having $\phi 100$ or larger diameters must be within $\phi 100$ mm in the outside diameter within the 48mm range from the gauge line. The area within 53mm from the gauge line must be within $\phi 210$ in the outside diameter. The total mass must be within 27kg and the length from the gauge line must be within 470mm.

40/60/121 tools



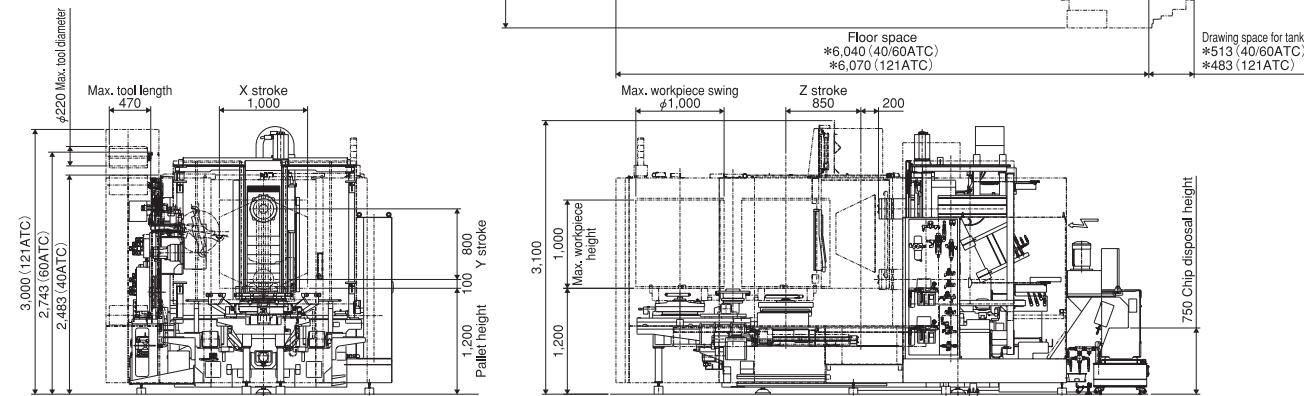
Item	Max. spec
Tool length	470mm
Tool diameter	With 40 and 60 tools magazines: $\phi 120$ mm (without limitations of adjacent tools) With 121 tools magazine: $\phi 130$ mm (without limitations of adjacent tools)
Tool weight	27kg: Spindle nose moment must be within 29N·m.
Tool imbalance	Within 30×10^{-5} N·m (tools of 6,000min ⁻¹ or lower speeds) Within 10×10^{-5} N·m (tools of speeds > 6,000min ⁻¹ , $\leq 8,000$ min ⁻¹) Within 3×10^{-5} N·m (tools exceeding 8,000min ⁻¹)

Tools with diameters exceeding those described above are subject to limitations in the diameter of adjacent tools in the magazine, key good position of the tool holder and so on.

FH630S BT No.40

Layout plan

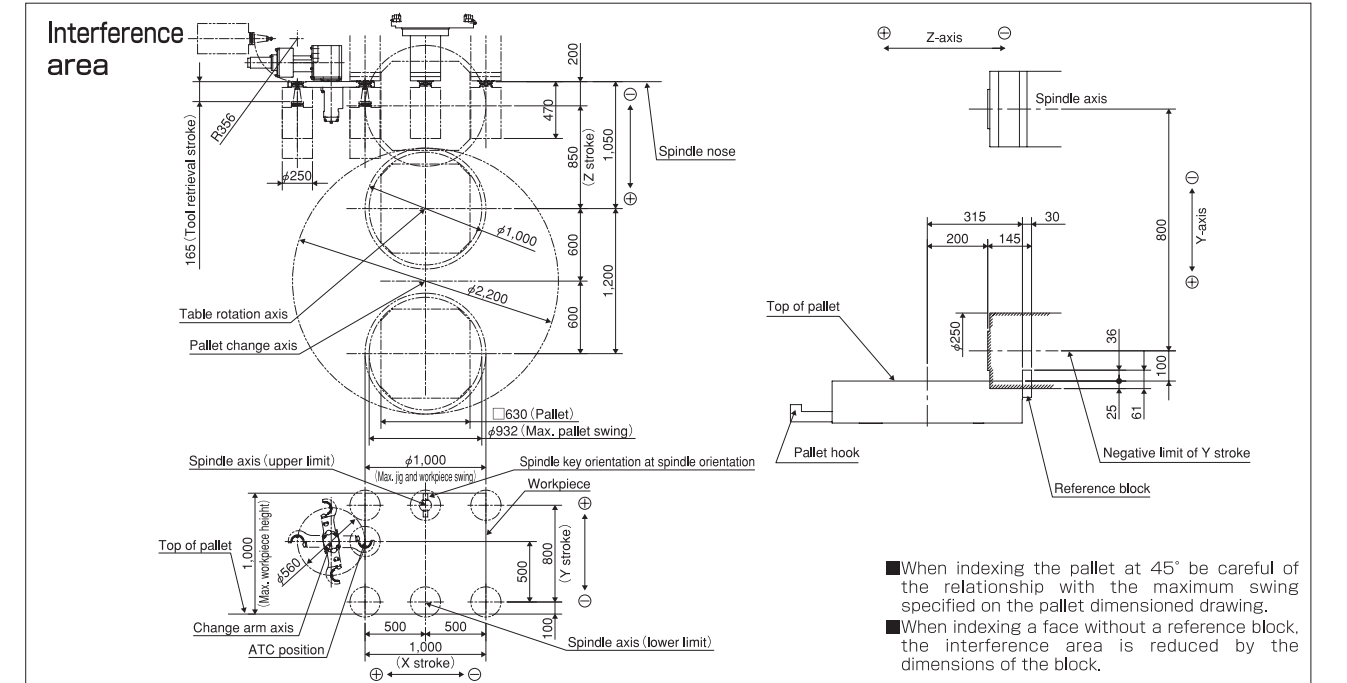
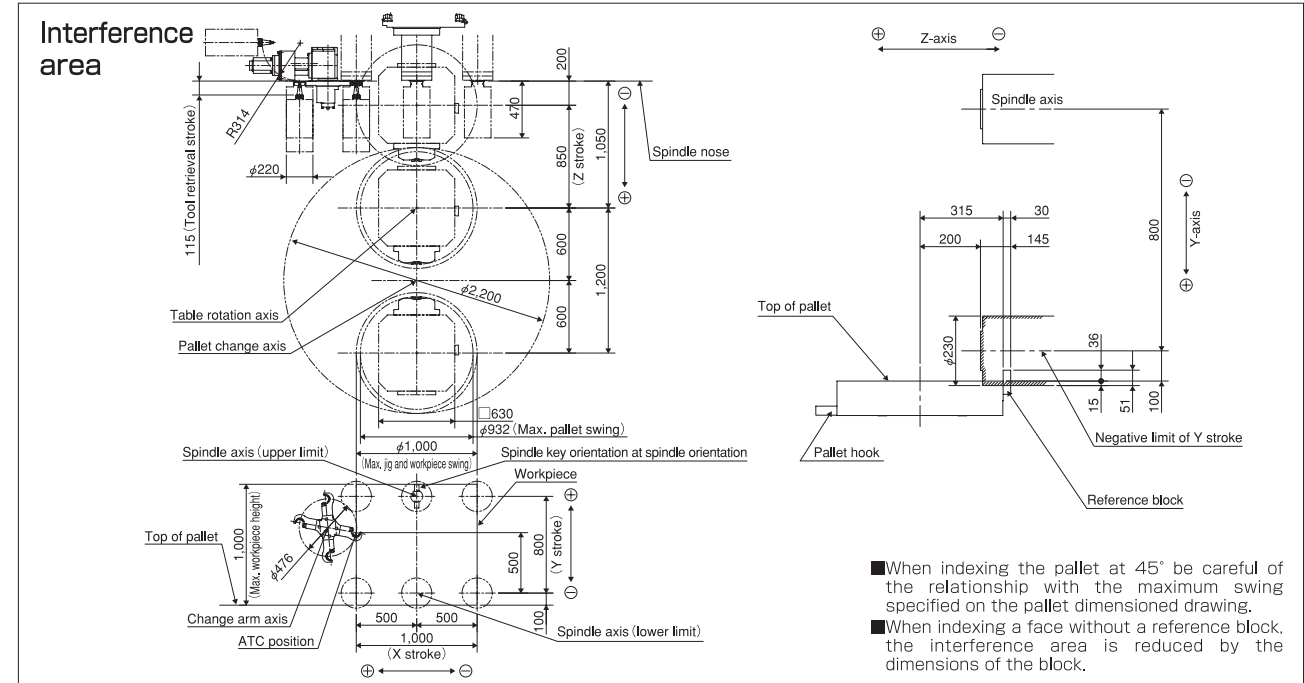
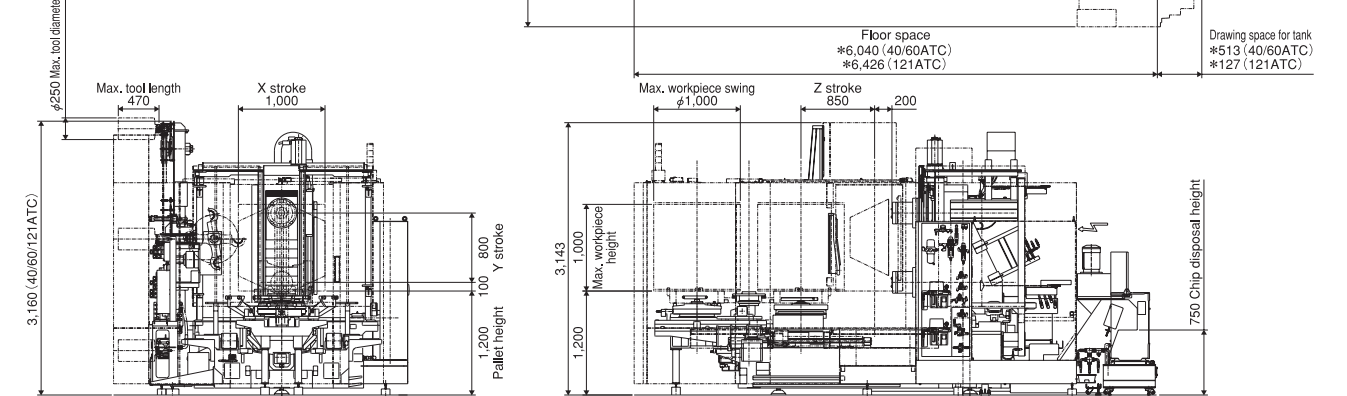
unit : mm
* indicates dimensions with the standard coolant supply unit.
Dimension * may change according to specifications.



FH630S BT No.50

Layout plan

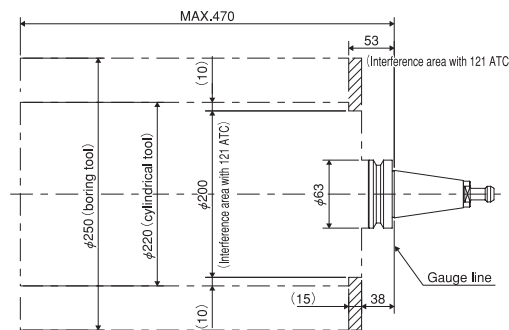
unit : mm
* indicates dimensions with the standard coolant supply unit.
Dimension * may change according to specifications.



Limitations in tool holder shape (JIS·CAT·DIN BT No.40)

The shape of the tool holder is limited when ATC(automatic tool change)is carried out. If the maximum tool diameter exceeds φ63, the 38mm range from the gauge line must be within φ63mm of the outside diameter. The total mass must be within 8kg and the length from the gauge line must be within 470mm. With the 121-tool magazine, the tool diameter within 53mm from the gauge line must be within φ200.

40/60/121 tools



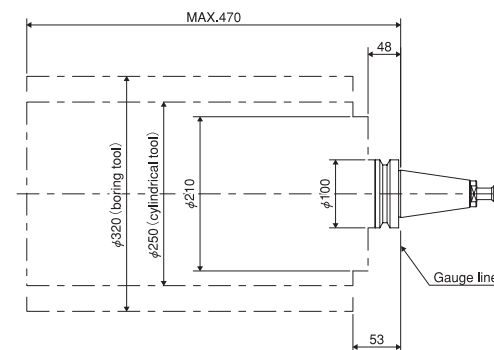
Item	Max. spec
Tool length	470mm
Tool diameter	With 40 and 60 tools magazines: φ75mm (without limitations of adjacent tools) With 121 tools magazine: φ110mm (without limitations of adjacent tools)
Tool weight	8kg: The moment at the spindle nose is supposed to be within 12N·m.
Tool imbalance	Within 30x10 ⁻⁵ N·m (tools of 6,000min ⁻¹ or lower speeds) Within 10x10 ⁻⁵ N·m (tools of speeds > 6,000min ⁻¹ , ≤ 8,000min ⁻¹) Within 3x10 ⁻⁵ N·m (tools exceeding 8,000min ⁻¹)

Tools with diameters exceeding those described above are subject to limitations in the diameter of adjacent tools in the magazine, key good position of the tool holder and so on.

Limitations in tool holder shape (JIS·CAT·DIN BT No.50)

The tool holder is subject to limitations in the shape due to the ATC(automatic tool change) cycle. Tools having φ100 or larger diameters must be within φ100mm in the outside diameter within the 48mm range from the gauge line. The area within 53mm from the gauge line must be within φ210 in the outside diameter. The total mass must be within 27kg and the length from the gauge line must be within 470mm.

40/60/121 tools



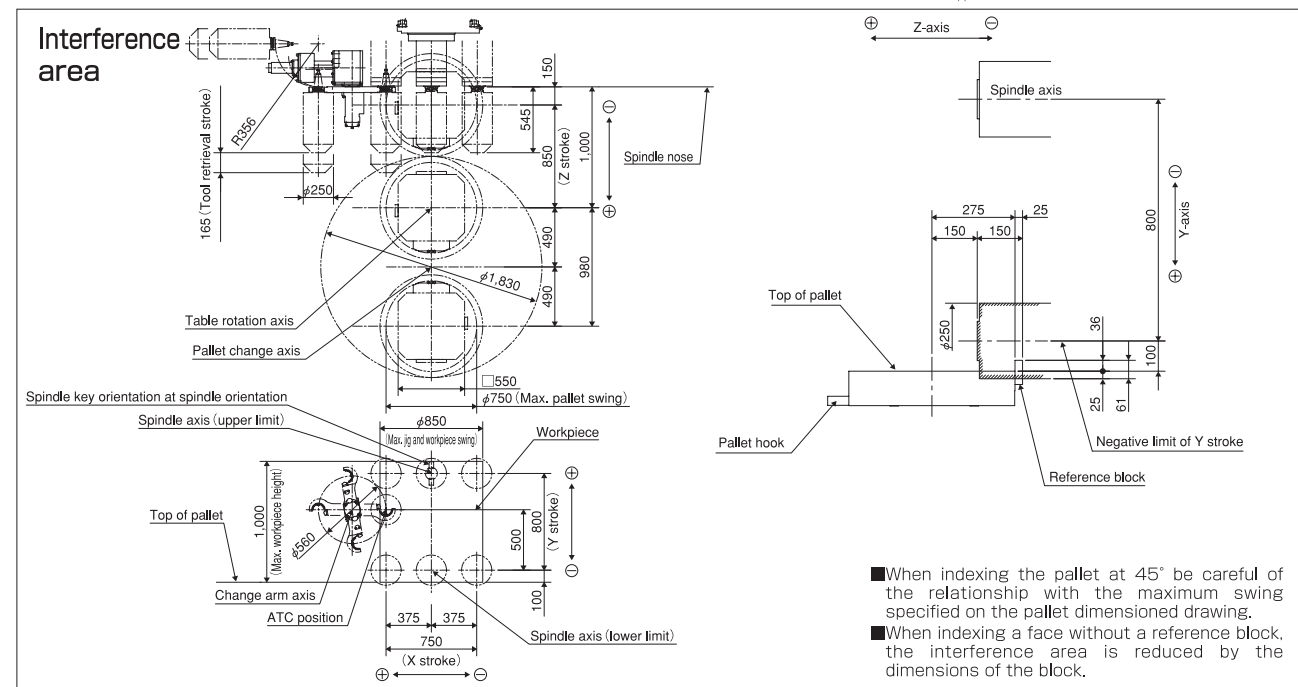
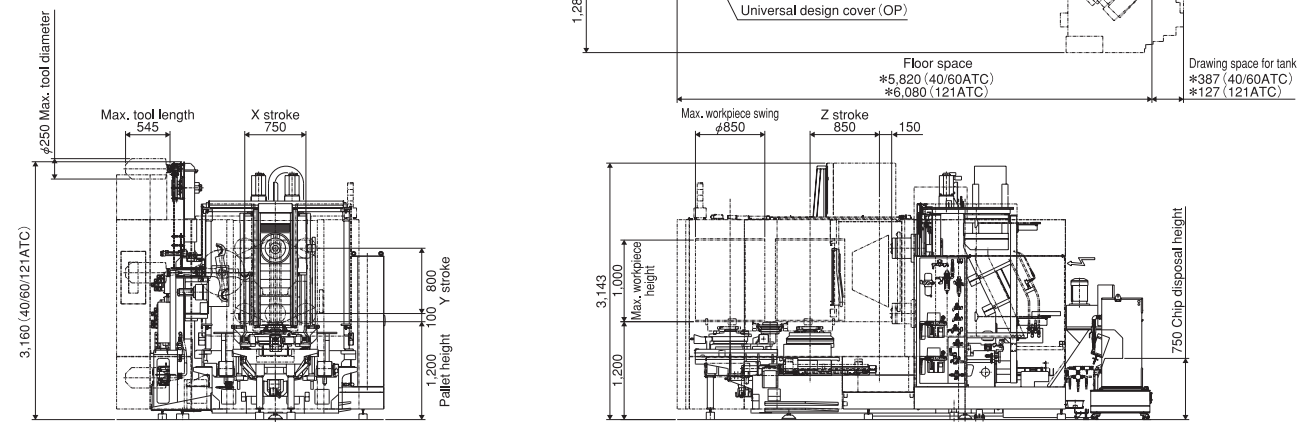
Item	Max. spec
Tool length	470mm
Tool diameter	With 40 and 60 tools magazines: φ120mm (without limitations of adjacent tools) With 121 tools magazine: φ130mm (without limitations of adjacent tools)
Tool weight	27kg: Spindle nose moment must be within 29N·m.
Tool imbalance	Within 30x10 ⁻⁵ N·m (tools of 6,000min ⁻¹ or lower speeds) Within 10x10 ⁻⁵ N·m (tools of speeds > 6,000min ⁻¹ , ≤ 8,000min ⁻¹) Within 3x10 ⁻⁵ N·m (tools exceeding 8,000min ⁻¹)

Tools with diameters exceeding those described above are subject to limitations in the diameter of adjacent tools in the magazine, key good position of the tool holder and so on.

FH550SX

Layout plan

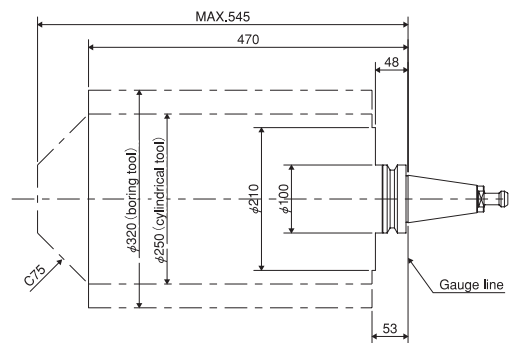
unit : mm
 * * Indicates dimensions with the standard coolant supply unit.
 Dimension * may change according to specifications.



Limitations in tool holder shape (JIS·CAT·DIN BT No.50)

The tool holder is subject to limitations in the shape due to the ATC (automatic tool change) cycle. Tools having ϕ 100 or larger diameters must be within ϕ 100mm in the outside diameter within the 48mm range from the gauge line. The area within 53mm from the gauge line must be within ϕ 210 in the outside diameter. The total mass must be within 27kg and the length from the gauge line must be within 545mm.

40/60/121 tools



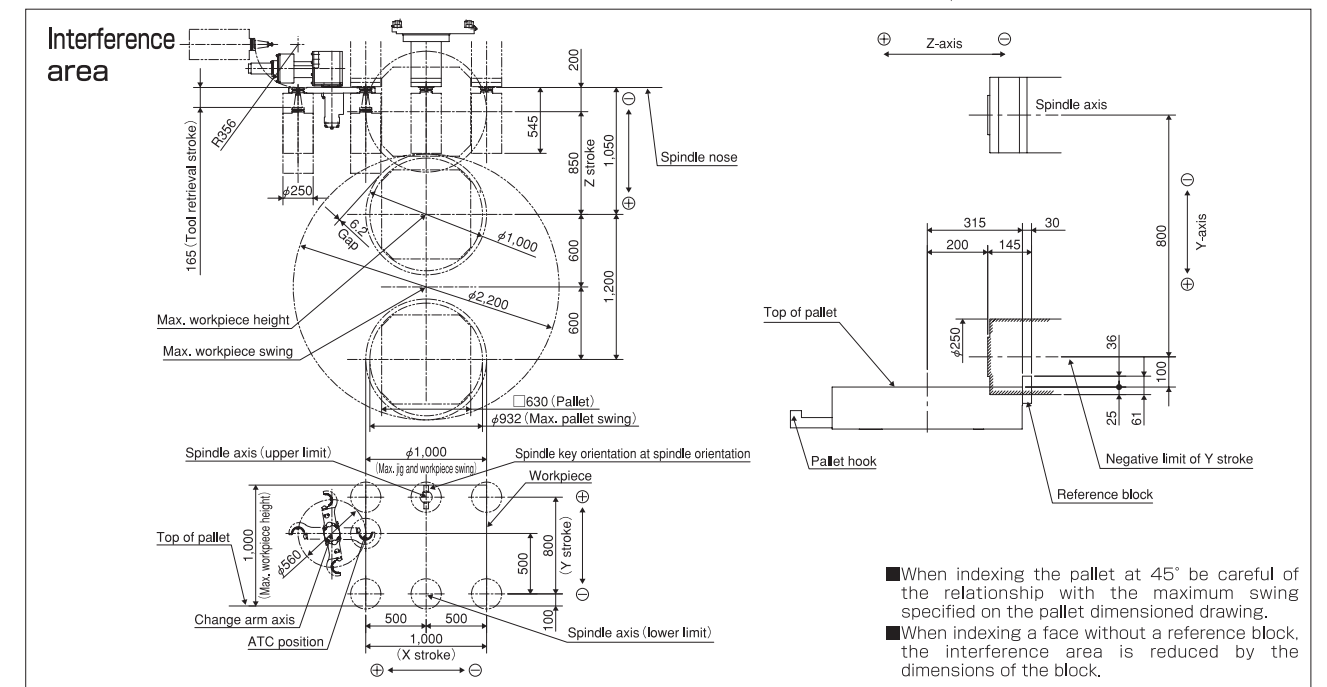
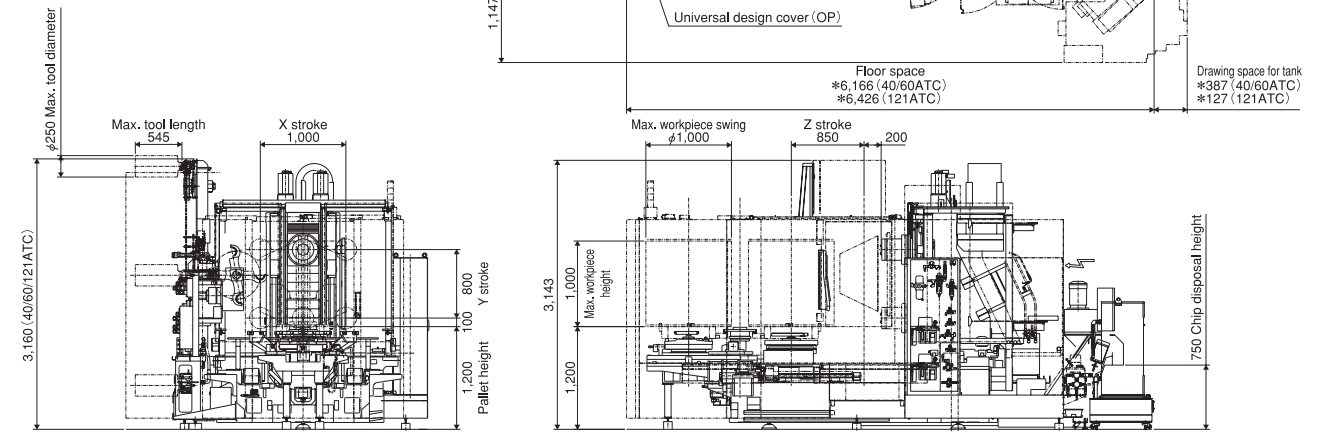
Item	Max. spec
Tool length	545mm
Tool diameter	With 40 and 60 tools magazines: ϕ 120mm (without limitations of adjacent tools) With 121 tools magazine: ϕ 130mm (without limitations of adjacent tools)
Tool weight	27kg: Spindle nose moment must be within 29N·m.
Tool imbalance	Within 30×10^{-6} N·m (tools of 6,000min ⁻¹ or lower speeds) Within 10×10^{-6} N·m (tools of speeds > 6,000min ⁻¹ , \leq 8,000min ⁻¹) Within 3×10^{-6} N·m (tools exceeding 8,000min ⁻¹)

Tools with diameters exceeding those described above are subject to limitations in the diameter of adjacent tools in the magazine, key good position of the tool holder and so on.

FH630SX

Layout plan

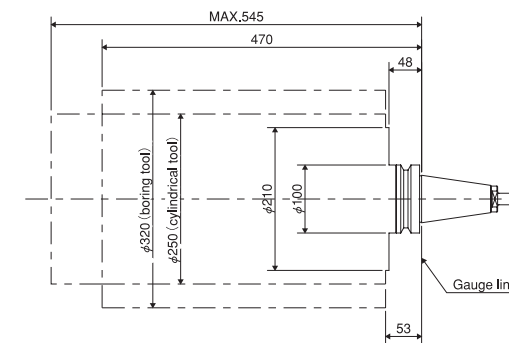
unit : mm
 * * Indicates dimensions with the standard coolant supply unit.
 Dimension * may change according to specifications.



Limitations in tool holder shape (JIS·CAT·DIN BT No.50)

The tool holder is subject to limitations in the shape due to the ATC (automatic tool change) cycle. Tools having ϕ 100 or larger diameters must be within ϕ 100mm in the outside diameter within the 48mm range from the gauge line. The area within 53mm from the gauge line must be within ϕ 210 in the outside diameter. The total mass must be within 27kg and the length from the gauge line must be within 545mm.

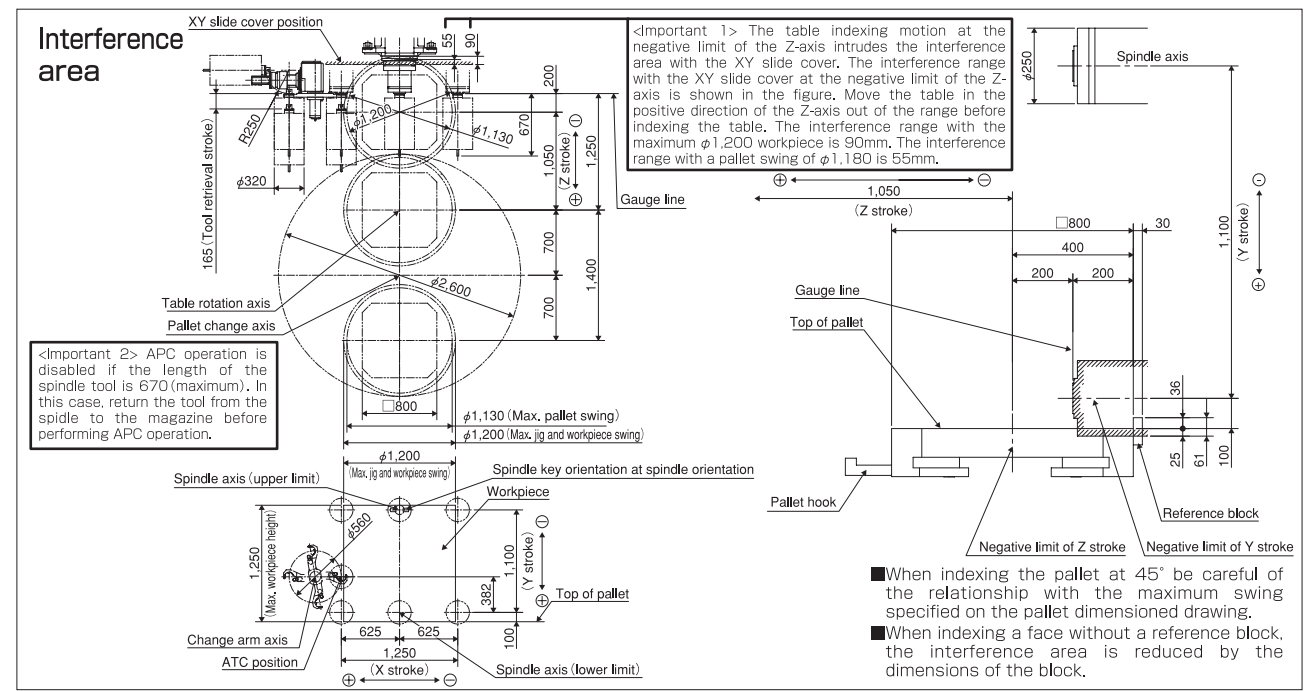
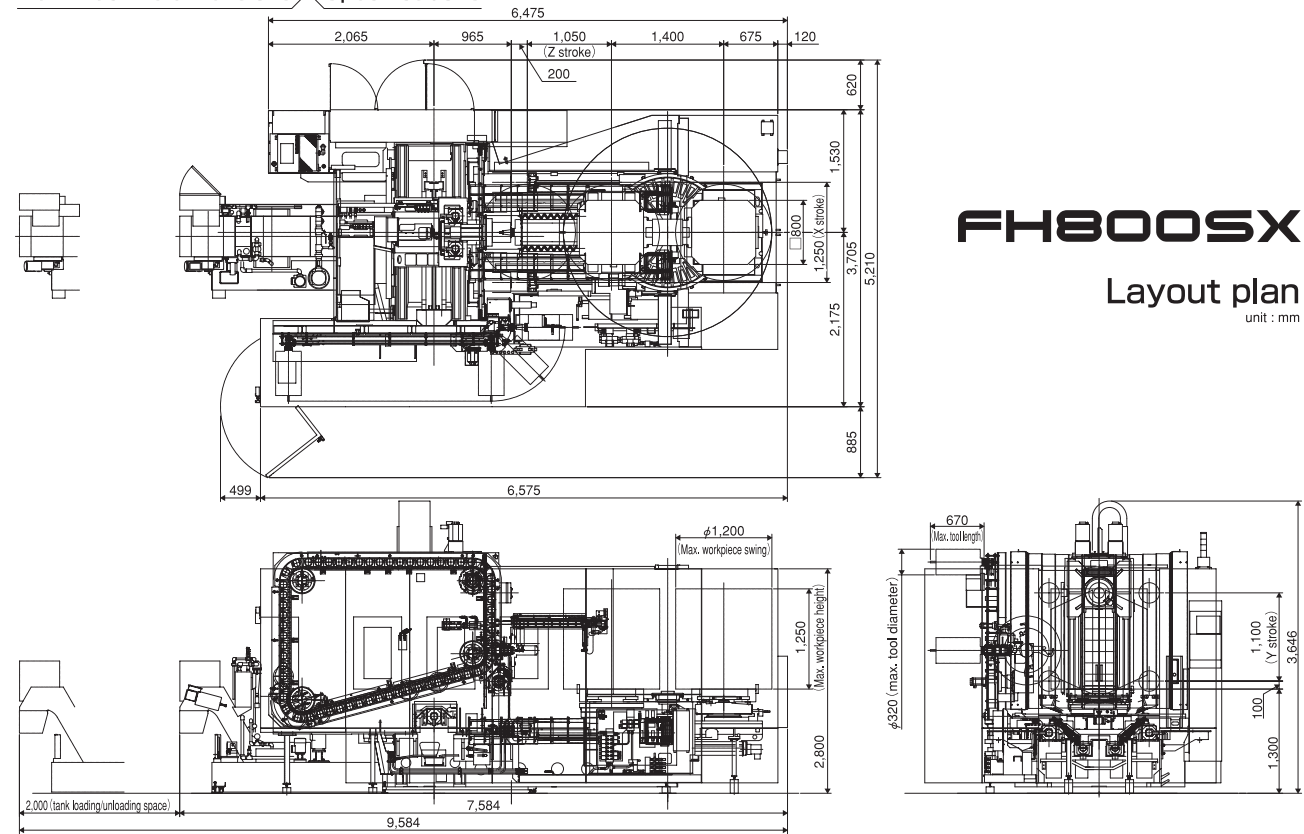
40/60/121 tools



Item	Max. spec
Tool length	545mm
Tool diameter	With 40 and 60 tools magazines: ϕ 120mm (without limitations of adjacent tools) With 121 tools magazine: ϕ 130mm (without limitations of adjacent tools)
Tool weight	27kg: Spindle nose moment must be within 29N·m.
Tool imbalance	Within 30×10^{-6} N·m (tools of 6,000min ⁻¹ or lower speeds) Within 10×10^{-6} N·m (tools of speeds > 6,000min ⁻¹ , \leq 8,000min ⁻¹) Within 3×10^{-6} N·m (tools exceeding 8,000min ⁻¹)

Tools with diameters exceeding those described above are subject to limitations in the diameter of adjacent tools in the magazine, key good position of the tool holder and so on.

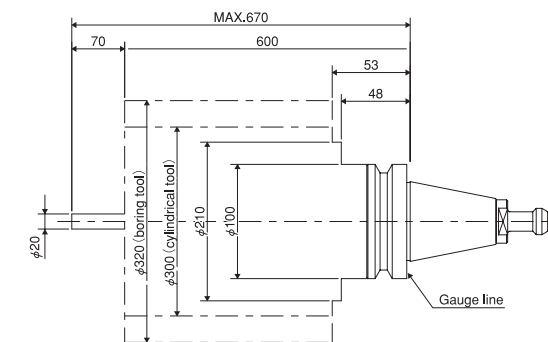
Main machine dimensions Specifications



Limitations in tool holder shape (JIS·CAT·DIN BT No.50)

The tool holder is subject to limitations in the shape during ATC(automatic tool change). If the maximum tool diameter exceeds $\phi 100$, the 48mm range from the gauge line must be $\phi 100$ in the outside diameter. The 53mm range from the gauge line must be within $\phi 210$ in the outside diameter. The total mass must be within 35kg and the length from the gauge line must be within 670mm.

40/60/121 tools



Item	Max. spec
Tool length	670mm
Tool diameter	With 40 and 60 tools magazines: $\phi 120$ mm (without limitations of adjacent tools) With 121 tools magazine: $\phi 130$ mm (without limitations of adjacent tools)
Tool weight	35kg: The moment at the spindle nose must be within 29N·m.
Tool imbalance	Within 30×10^{-3} N·m (tools of 6.000min ⁻¹ or lower speeds)

Tools with diameters exceeding those described above are subject to limitations in the diameter of adjacent tools in the magazine, key good position of the tool holder and so on.

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A group of people that pay particular attention to the basic starting points of manufacturing, striving to perfect a 'people-friendly' production system. That's us, the JTEKT group. We take on the task of improving quality with a "customer first" approach and aim to manufacture products that are both advanced and reliable. Group-wide activities have gained firm reliability all over the world. We promise to continue to adhere to the motto of "pursue technological dreams to deliver valuable innovations to you" in our daily operations, and aim towards a future of people and planet-friendly manufacturing.



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TOYOOKI KOGYO CO.,LTD.

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*JTEKT Corporation and Mitsui Seiki Kogyo Co., Ltd. went into comprehensive business together.

GLOBAL MAP

JAPAN

Head office

- Nagoya head office
- Osaka head office



Research & development centers

- Nara pref.
- Osaka
- Aichi pref.



Technical centers

- Chubu technical center
- Tohoku technical center
- Driveline technical center



Manufacturing facility

- Kokubu plant
- Kariya plant
- Tokushima plant
- Okazaki plant
- Tokyo plant
- Kagawa plant
- Nara plant
- Higashi Kariya plant
- Toyohashi plant
- Tadamisaki plant
- Hanazono plant
- Kameyama plant



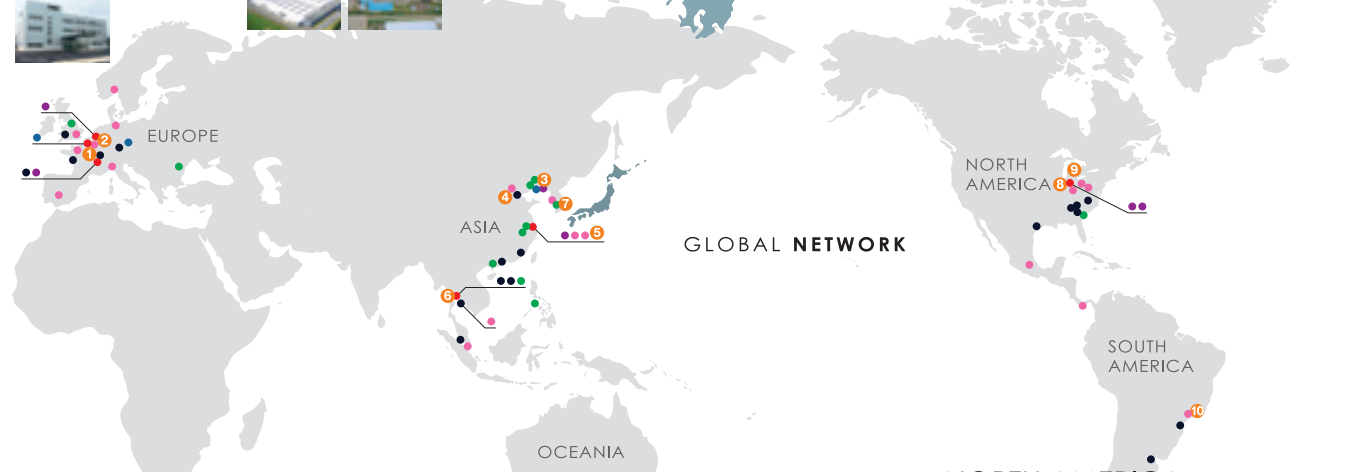
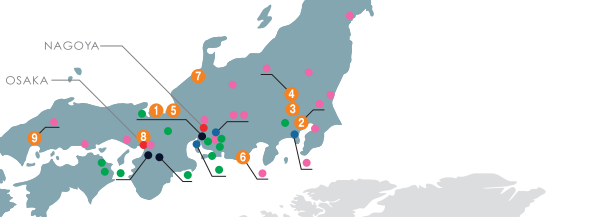
Machine tool & Mechatronics Headquarters

1. Customer center
2. Tokyo sales office
3. Saitama sales office
4. Gunma sales office
5. Sales sect. for middle Japan
6. Hamamatsu sales office
7. Hokuriku sales office
8. Osaka sales office
9. Hiroshima sales office
10. Fukuoka sales office

Branch offices, business offices

- Tokyo branch office
- Higashinoh branch office
- Kitakanto branch office
- Hamamatsu branch office
- Toyota branch office I
- Toyota branch office II
- Nagoya branch office
- Kansai branch office
- Nishinoh branch office
- Tohoku business office
- Utsunomiya business office
- Mito business office
- Chiba business office
- Nagano business office
- Okazaki business office
- Kobe business office
- Okayama business office
- Kyushu business office

DOMESTIC NETWORK



EUROPE

Machine tool

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2. TOYODA MITSUI EUROPE GMBH (Germany)

Regional headquarters

- JTEKT EUROPE S.A.S. (France)
- JTEKT CORPORATION EUROPEAN BEARING CENTRAL OFFICE (Netherlands)
- JTEKT TORSSEN HOLDINGS S.A. (Belgium)

Steering

- JTEKT HPI S.A.S. (France)
- JTEKT AUTOMOTIVE LYON S.A.S. (France)
- JTEKT AUTOMOTIVE DIJON SAINT-ETIENNE S.A.S. (France)
- JTEKT AUTOMOTIVE CZECH PLZEN, S.R.O. (Czech Republic)
- JTEKT AUTOMOTIVE UK, LTD. (U.K.)

Driveline component

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- JTEKT AUTOMOTIVE CZECH PARDUBICE, S.R.O. (Czech Republic)

Bearing

- KOYO BEARINGS (EUROPE) LTD. (U.K.)
- KOYO ROMANIA S.A. (Romania)

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- JTEKT CORPORATION EUROPEAN BEARING TECHNICAL CENTRE (Netherlands)

Sales

- KOYO FRANCE S.A. (France)
- EUROPA-KOYO B.V. (Netherlands)
- KOYO (U.K.) LTD. (U.K.)
- KOYO DEUTSCHLAND GMBH (Germany)
- KOYO KULLAGER SCANDINAVIA A.B. (Sweden)
- KOYO ITALIA S.R.L. (Italy)
- KOYO IBERICA, S.L. (Spain)

ASIA / OCEANIA

Machine tool

3. TOYODA MACHINERY (DALIAN) CO., LTD. (Dalian, China)
4. TOYODA MACHINERY (DALIAN) CO., LTD. (Beijing, China)
5. TOYODA MACHINERY (DALIAN) CO., LTD. (Shanghai, China)
6. TOYODA MACHINERY S.E. ASIA CO., LTD. (Thailand)
7. TPA ENGINEERING CORP. (Korea)

Regional headquarters

- JTEKT (CHINA) CO., LTD. (China)
- JTEKT (THAILAND) CO., LTD. (Thailand)

Steering

- TOYODA-KOKI AUTOMOTIVE (TIANJIN) CO., LTD. (China)
- TOYODA-KOKI AUTOMOTIVE (FOSHAN) CO., LTD. (China)
- JTEKT STEERING SYSTEMS (XIAMEN) CO., LTD. (China)
- KOYO STEERING (THAILAND) CO., LTD. (Thailand)
- TOYODA MACHINE WORKS (THAILAND) CO., LTD. (Thailand)
- KOYO JOINT (THAILAND) CO., LTD. (Thailand)
- JTEKT AUTOMOTIVE (MALAYSIA) SDN. BHD. (Malaysia)

Driveline component

- TOYODA-KOKI DALIAN INNOVATION AUTOMOTIVE CO., LTD. (China)

Bearing

- WUXI KOYO BEARING CO., LTD. (China)
- DALIAN KOYO WAZHOU AUTOMOBILE BEARING CO., LTD. (China)
- KOYO BEARING DALIAN CO., LTD. (China)
- KOYO LIHO (FOSHAN) AUTOMOTIVE PARTS CO., LTD. (China)
- KOYO AUTOMOTIVE PARTS (WUXI) CO., LTD. (China)
- KOYO MANUFACTURING (THAILAND) CO., LTD. (Thailand)
- KOYO JICO KOREA CO., LTD. (Korea)
- KOYO MANUFACTURING (PHILIPPINES) CORP. (Philippines)

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- TOYODA-KOKI AUTOMOTIVE SCIENCE AND TECHNOLOGY CENTER CO., LTD. (China)
- JTEKT CORPORATION (CHINA) TECHNICAL CENTER (China)

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- JTEKT CORPORATION BEIJING LIAISON OFFICE (China)
- JTEKT CORPORATION SHANGHAI LIAISON OFFICE (China)
- KOYO (SHANGHAI) CO., LTD. (China)
- GKN TOYODA (THAILAND) LTD. (Thailand)
- JTEKT KOREA CO., LTD. (Korea)
- KOYO SINGAPORE BEARING (PTE.) LTD. (Singapore)
- KOYO AUSTRALIA PTY. LTD. (Australia)

NORTH AMERICA & SOUTH AMERICA

Machine tool

8. TOYODA MACHINERY USA CORP. Headquarters (IL, USA)
9. TOYODA MACHINERY USA CORP. Automotive product & Special Machine Division (MI, USA)
10. TOYODA KOKI DO BRASIL INDUSTRIA E COMERCIO DE MAQUINAS, LTDA. (Brazil)

Regional headquarters

- JTEKT NORTH AMERICA, INC. (USA)

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- JTEKT AUTOMOTIVE TENNESSEE-MORRISTOWN, INC. (USA)
- JTEKT AUTOMOTIVE VIRGINIA, INC. (USA)
- JTEKT AUTOMOTIVE TEXAS, L.P. (USA)
- JTEKT AUTOMOTIVA BRASIL LTDA. (Brazil)
- JTEKT AUTOMOTIVE ARGENTINA S.A. (Argentina)

Driveline component

- JTEKT AUTOMOTIVE SOUTH CAROLINA, INC. (USA)

Bearing

- KOYO CORPORATION OF U.S.A. [MANUFACTURING DIV.] (USA)

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- JTEKT NORTH AMERICA, INC. TECHNICAL CENTER (USA)

Sales

- KOYO CORPORATION OF U.S.A. [SALES DIV.] (USA)
- JTEKT TORSSEN NORTH AMERICA, INC. (USA)
- KOYO ROLAMENTOS DO BRASIL LTDA. (Brazil)
- KOYO CANADA INC. (Canada)
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