TOYODA

JTEKT Group

Toyoda Machinery Europe

FH-J / FH-S / FH-SX / FA-S SERIES

horizontal machining centres

horizontal machining centres

FH-J Series:
FH400J
FH500J

FH-S Series:
FH450S
FH550S
FH630S

FH-SX Series:
FH550SX
FH630SX
FH800SX

FA-S Series:
FA630S
FA800S
FA1050S

FH1000SX
FH1250SX

In trade fairs and open house shows we present our latest developments and technology to our customers.

Together with the customer, we develop the most suitable economic and technological manufacturing solution.

Our design engineers can make individual modifications to your machine to suit your requirements.

Investments in high-grade machinery are subject to the requirements of upcoming manufacturing jobs.

In most cases, many different criteria have to be taken into consideration. Among other factors, an optimum configuration of machine type, tool supply, workpiece transfer and control components is important.

Our wide range of horizontal and vertical machining centers allows us to offer manufacturing solutions to our customers which completely meet their requirements.

Customer-specific modifications can be integrated into the general machine concept by our design engineers.

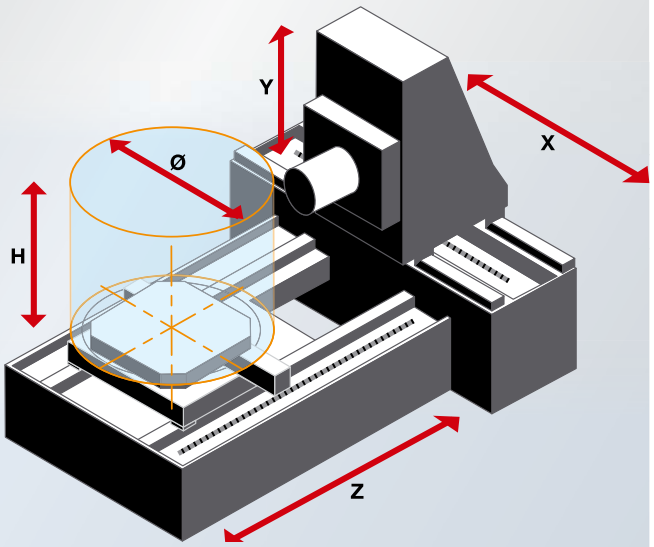
We can perform customer test cutting according to customer's production data
or we can develop production data which can utilise the best performance of a chosen product.

Machining accuracy is verified and recorded on a Zeiss coordinate measuring machine, located in our environmentally controlled QC room.

Toyoda attaches great importance to research and development because we want our customers to invest in future-proof technology. As one of the world's leading machine tool manufacturers we want to be innovative,
not imitative.

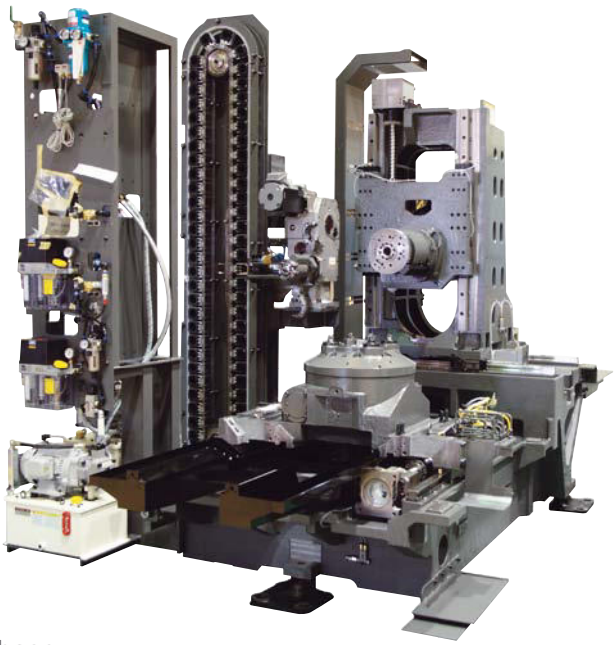
In the Toyoda technology centre, test cuttings can be performed according to the customer's drawings. The machining result is verified and recorded in an environmentally controlled QC room.

horizontal machining centres



Capacity

Model	FH400J	FH500J
Pallet	400 x 400 mm	500 x 500 mm
Axis stroke X/Y/Z	600 x 560 x 630 mm	730 x 730 x 850 mm
Workpiece (swing diameter x height)	Ø 630 x 900 mm	Ø 800 x 1,000 mm
Max. load on table	400 kg	500 kg

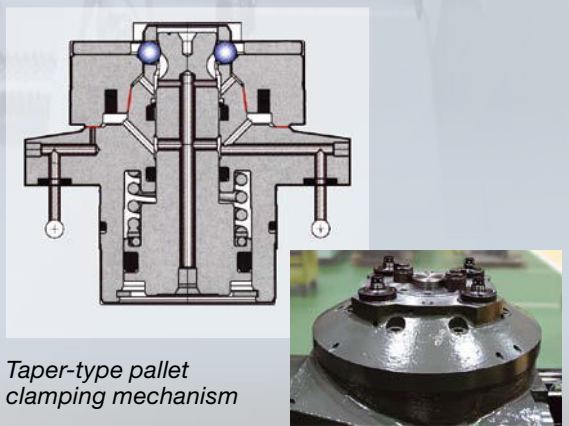


Machine base

All JTEKT cast components are engineered and manufactured in-house. The design is supported by FEM analyses and provide for an optimum of the components maximising stability at keeping moving masses at a minimum.

Cast specifications:

- FCD600 (GGG60) cast iron
- 600 N/mm² tensile strength



Taper-type pallet clamping mechanism

Pallet changer and table

The clamping of the pallet is done through a specially designed, space-saving mechanism that ensures the stable and precise hold of the pallet.

In order to reduce non-productive times, the FH-J series is equipped with a high-speed pallet table as standard, which is indexing in 0.001°-steps.

The installation of hydraulic pressure supply for automated clamping solutions is possible.

Technical Data FH-J Series

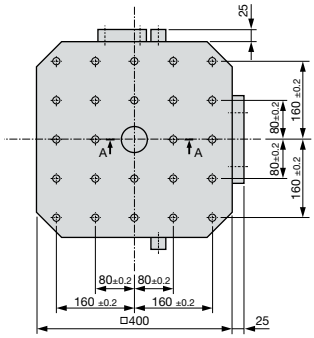
	FH400J	FH500J
Work area		
Axis stroke X (column)	600 mm	730 mm
Axis stroke Y (spindle head)	560 mm	730 mm
Axis stroke Z (table)	630 mm	850 mm
Spindle nose ➔ table center	100 ~ 730 mm	100 ~ 950 mm
Spindle center ➔ pallet surface	50 ~ 610 mm	50 ~ 780 mm
Workpiece (swing diameter x height)	Ø 630 x 900 mm	Ø 800 x 1,000 mm

Spindle		
Spindle speed min^{-1}	50 ~ 15,000	50 ~ 15,000
Spindle taper	No.40 (HSK)	No.40 (HSK)
Front bearing Ø (mm)	80	80
Output (kW) 30 min ED / continuous	22/18.5	22/18.5

Automatic tool changer		
Tool holding capacity	60	60
Tool selection	Absolute address	
Max. tool weight	8 kg	8 kg
Max. tool dimensions (Ø x length) mm	Ø 70 x 400 (Ø 140 x 400)[1]	Ø 70 x 400 (Ø 140 x 400)[1]
Tool changing time, tool to tool	0.9 s	0.9 s
Tool changing time, chip to chip	2.3 s	2.3 s

[1] without adjacent tools

Dimensions		
Machine height mm	2,750	3,020
Floor space W x D mm	2,100 x 3,750	2,230 x 4,225
Weight	10,000 kg	13,500 kg



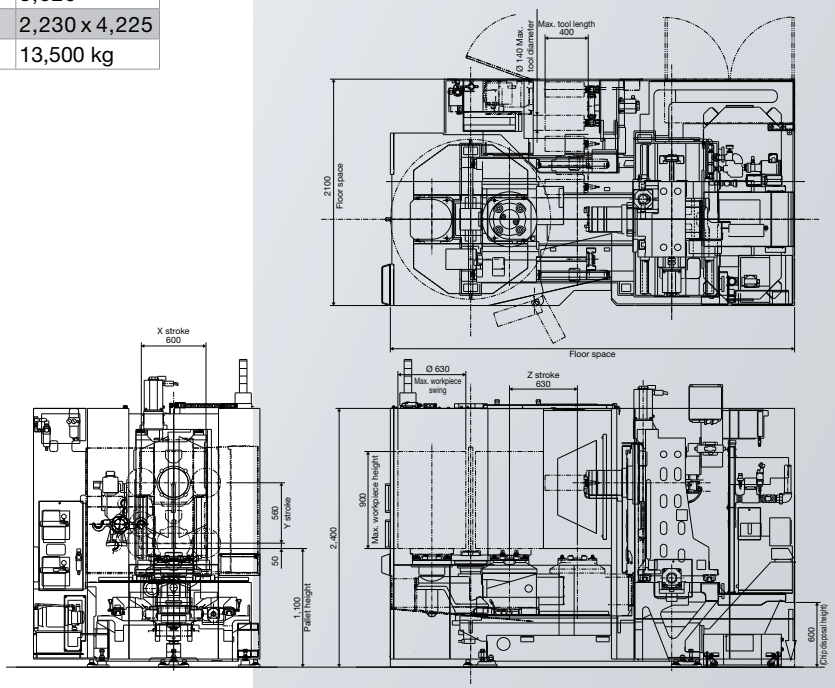
Dimensions 400 mm pallet

	FH400J	FH500J
Pallet changer and table		
Number of pallets	2	2
Dimensions	400 x 400 mm	500 x 500 mm
Indexing angle	0.001°	0.001°
Indexing time, 0–90°	1.6 s	2.0 s
Pallet height from floor	1,100 mm	1,200 mm
Pallet change time	6 s	7 s
Max. load on pallet	400 kg	500 kg

Axis drives		
Rapid traverse rate	60 m/min	60 m/min
Cutting feed rate mm/min	1 ~ 30,000	1 ~ 30,000
Acceleration	X, Z: 1 G, Y: 0.7 G	X, Z: 1 G, Y: 0.7 G
Guides	cylindrical roller slides	cylindrical roller slides
Ballscrew Ø (X, Y, Z)	40 mm	40 mm

Precision		
Positioning accuracy	±0.003 mm	±0.003 mm
Repeatability	±0.0015 mm	±0.0015 mm
Table positioning accuracy	±7 WS	±7 WS
Table repeatability	±3.5 WS	±3 WS

Controller		
	Fanuc 32i	Fanuc 32i



Dimensions FH400J

Technical data FH-S Series

	FH450S	FH550S (#40)	FH550S (#50)	FH630S (#40)	FH630S (#50)
Automatic tool changer					
Tool holding capacity	Chain: 60 (opt. 120) FTS #40: 360, 560	Chain: 60 (opt. 121) FTS #40: 360, 560	FTS #50: 210, 330, 450, 570	Chain: 60 (opt. 121) FTS #40: 360, 560	FTS #50: 210, 330, 450, 570
Tool selection	Absolute address	Absolute address	Absolute address	Absolute address	Absolute address
Max. tool weight	8 kg	8 kg	27 kg (#50)	8 kg	27 kg (#50)
Max. tool dimensions (Ø x length) mm	Ø70 x 350	Ø75 x 470	Ø120 x 470	Ø75 x 470	Ø120 x 470
Tool changing time, tool to tool	1.3 s (< 8kg)	1.6 s (< 8 kg) 1.9 s (< 14 kg)	2.4 s (< 15 kg) 2.7 s (< 27 kg)	1.6 s (< 8 kg) 1.9 s (< 14 kg)	2.4 s (< 15 kg) 2.7 s (< 27 kg)
Tool changing time, chip to chip	2.7 s (< 8kg)	2.7 s (< 8 kg) 3.0 s (< 14 kg)	3.6 s (< 15 kg) 3.9 s (< 27 kg)	2.7 s (< 8 kg) 3.0 s (< 14 kg)	3.6 s (< 15 kg) 3.9 s (< 27 kg)
Precision					
Positioning accuracy	±0.003 mm	±0.003 mm		±0.003 mm	
Repeatability	±0.0015 mm	±0.0015 mm		±0.0015 mm	
Table positioning accuracy	±3 WS	±3 WS		±3 WS	
Table repeatability	±3 WS	±3 WS		±3 WS	
Control					
	Fanuc 31i	Fanuc 31i		Fanuc 31i	
Dimensions					
Machine height	2,785 mm	3,108 mm		3,108 mm	
Floor space W x D	2,500 x 5,363 mm	3,044 x 5,675 mm		3,308 x 6,020 mm	
Weight	11,500 kg	16,000 kg		18,000 kg	
Work area					
Axis stroke X (column)	600 mm	750 mm		1,000 mm	
Axis stroke Y (spindle head)	600 mm	800 mm		800 mm	
Axis stroke Z (table)	600 mm	850 mm		850 mm	
Spindle nose → table center	125 ~ 725 mm	150 ~ 1,000 mm		200 ~ 1,050 mm	
Spindle nose → pallet surface	50 ~ 650 mm	100 ~ 900 mm		100 ~ 900 mm	
Workpiece (swing diameter x height)	Ø630 x 750 mm	Ø850 x 1,000 mm		Ø1,000 x 1,000 mm	
Pallet changer and table					
Number of pallets	2	2		2	
Dimensions	450 x 450 mm	550 x 550 mm		630 x 630 mm	
Indexing angle	NC-table: 0.001°	NC-table: 0.001°		NC-table: 0.001°	
Indexing time, 0–90°	2.5 s	2.0 s		2.0 s (800 kg) / 2.4 s (1,000 kg)	
Pallet height from floor	1,100 mm	1,200 mm		1,200 mm	
Pallet change time	5.6 s	9.5 s		12.0 s	
Max. load on pallet	400 kg	800 kg		800 kg / opt. 1,000 kg	
Spindle					
Spindle speed	15,000min^{-1}	15,000min^{-1}		15,000min^{-1}	
Spindle speed (option)	50 ~ 20,000min^{-1}	50 ~ 20,000min^{-1} (HSK-A63 only)		50 ~ 20,000min^{-1} (SK-A63 only)	
Spindle taper	Taper 40 (DIN, BT)	Taper 40 (DIN, BT)	Taper 50 (DIN, BT)	Taper 40 (DIN, BT)	Taper 50 (DIN, BT)
Spindle taper (option)	HSK-A63	HSK-A63	HSK-A100	HSK-A63	HSK-A100
Front bearing Ø (mm)	Ø80 mm	Ø80 mm	Ø90 mm	Ø80 mm	Ø90 mm
Output (kW) 6,000 min^{-1}	22.0 / 18.5 kW	22.0 / 18.5 kW		22.0 / 18.5 kW	
Axis drives					
Rapid traverse rate	50 m/min	60 m/min		60 m/min	
Cutting feed rate	1 ~ 30,000 mm/min	1 ~ 30,000 mm/min		1 ~ 30,000 mm/min	
Acceleration	X, Y, Z: (0.7G)	X, Y, Z: (1G)		X, Y, Z: (1G)	
Guides	Cylindrical roller slides	Cylindrical roller slides		Cylindrical roller slides	
Ballscrew	Ø45 mm, Ø36 (Z)	Ø45 mm		Ø45 mm	

Workspace

The compact machine configuration makes efficient use of the occupied floor space. Yet the work area remains spacious due to the intelligent arrangement of components.

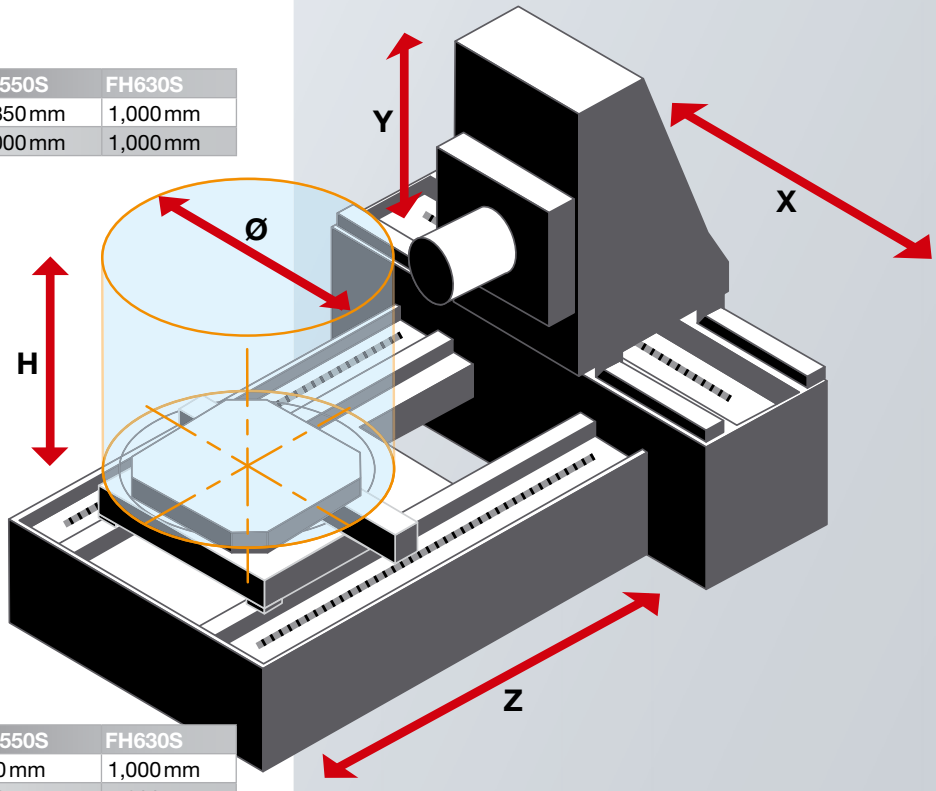
Center Through

The FH-S Series machines feature dual synchronised ballscrews on the Z-axis, positioned at a large distance from each other.

The ballscrews, linear guides and optional linear scales are all located outside the machining area.

Chips do not fall upon the machine components, but directly into the chip conveyor under the spindle. This avoids troublesome disposal of chips accumulated in the machine. Since the coolant is immediately collected into a tank, the Z-axis feed mechanism and machine bed are not affected by the heat from coolant and chips.

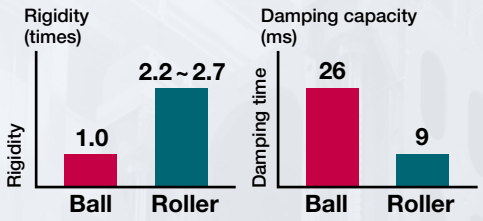
Work piece	FH450S	FH550S	FH630S
Diameter (Ø)	630 mm	850 mm	1,000 mm
Height (H)	750 mm	1,000 mm	1,000 mm



Strokes	FH450S	FH550S	FH630S
X (column)	600 mm	750 mm	1,000 mm
Y (spindle head)	600 mm	800 mm	800 mm
Z (table)	600 mm	850 mm	850 mm

Guides, drives, spindles

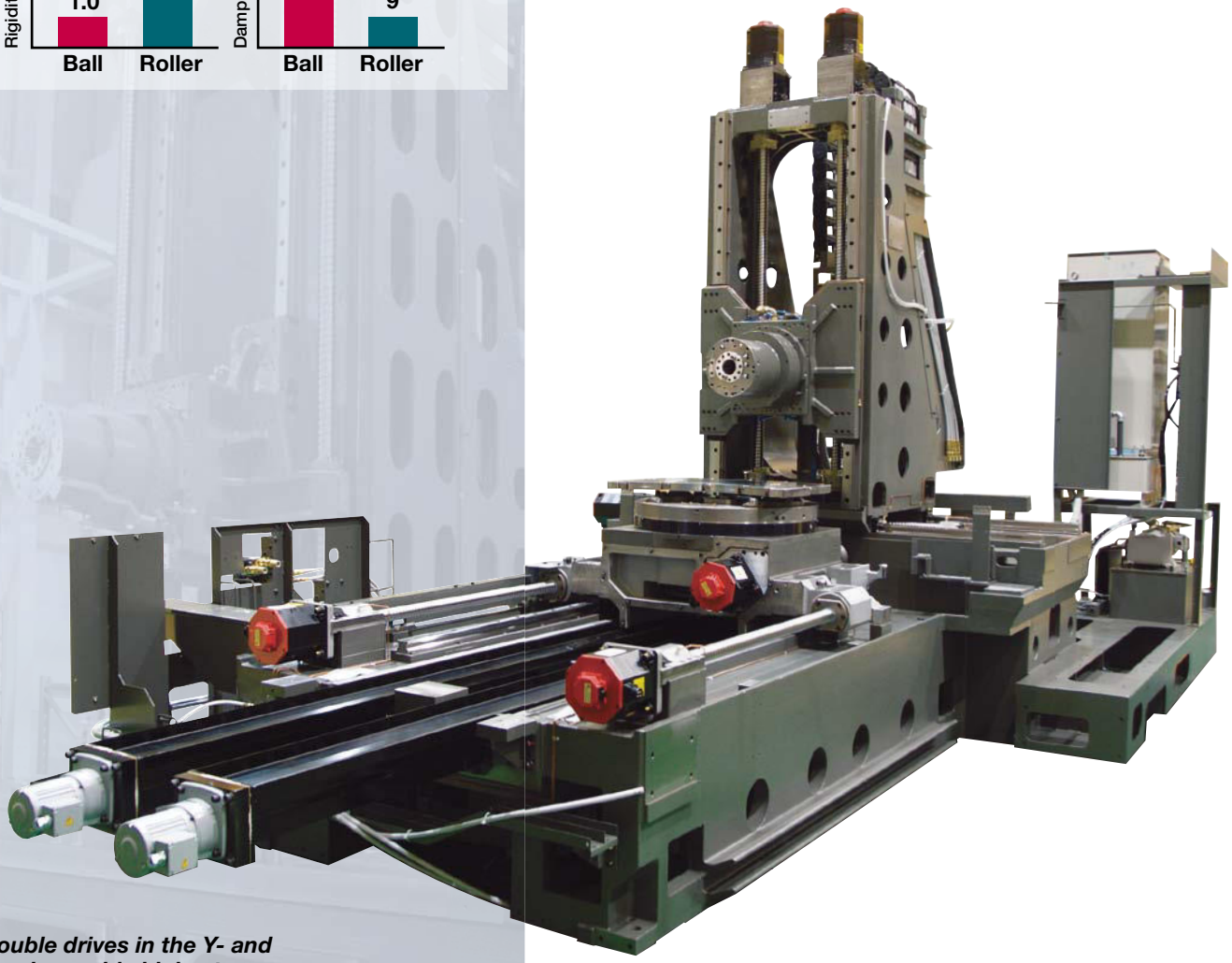
High-dynamic roller bearing guides:
- *Faster damping*
- *More stability*



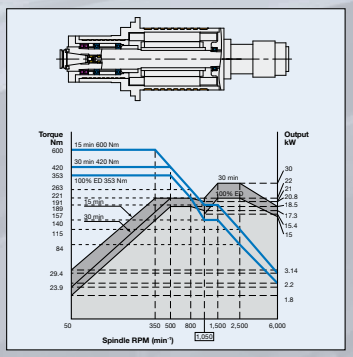
Guides and drives

Equipped with high-dynamic roller bearing guides
- Excellent damping qualities
- Up to three times better damping than ball bearing type

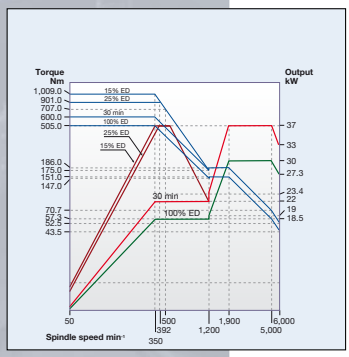
Axis drives with greater ballscrew diameters and optional direct measurement system
- Double drives for Y- and Z-Axis
- Up to 60 m/min rapid traverse rate (FH1000SX: 54 m/min)



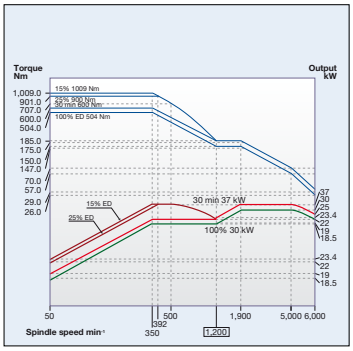
Double drives in the Y- and Z-axis provide highest precision and rigidity
(Picture: Bed FH800SX)



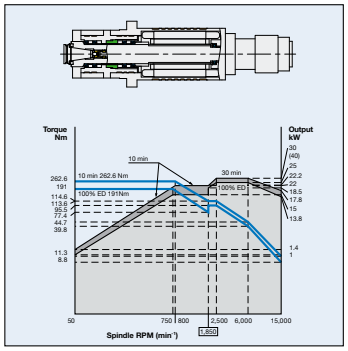
6,000 min⁻¹ spindle (standard)



6,000 min⁻¹ high torque spindle with 1,009 Nm **OPTION**



8,000 min⁻¹ high torque spindle with 1,009 Nm
OPTION (FH1000SX)



15,000 min⁻¹ high speed spindle **OPTION**

Technical data FH-SX Series

	FH550SX	FH630SX	FH800SX	FH1000SX	FH1250SX
Automatic tool changer					
Tool holding capacity (chain)	60 (optional 121)	60 (optional 121)	60 (optional 121)	60 (optional 121)	60 (optional 121)
~ (magazine)	210, 330, 450, 570	210, 330, 450, 570	210, 330, 450, 570	210, 330, 450, 570	210, 330, 450, 570
Tool selection	Absolute address	Absolute address	Absolute address	Absolute address	number setting
Max. tool weight	27 kg	27 kg	35 kg	35 kg	35 kg
Max. tool dimensions (Ø x length) mm	Ø120 x 545	Ø120 x 545	Ø120 x 670	Ø120 x 800	Ø120 x 800 (Ø350 x 800)[2]
Tool changing time, tool to tool	2.4–2.7 s	2.4–2.7 s	1.9–2.2–3.2 s	2.7–3.2 s	2.7 s (< 15 kg)
Tool changing time, chip to chip	3.6–3.9 s	3.6–3.9 s	5.5–5.8–6.8 s	4.4–5.0 s	4.0 s (< 15 kg)
					[2] without adjacent tools
Precision					
Positioning accuracy	±0.003 mm	±0.003 mm	±0.003 mm	± 0.003 mm	±0.002 mm
Repeatability	±0.002 mm	±0.002 mm	±0.002 mm	± 0.0015 mm	±0.001 mm
Table positioning accuracy	±3 WS	±3 WS	±3 WS	± 3.5 WS	±7 (±3.5 with NC-encoder)
Table repeatability	±3 WS	±3 WS	±3 WS	± 2 WS	±3.5 (±2 with NC-encoder)
Controller					
	Fanuc 31i	Fanuc 31i	Fanuc 31i	Fanuc 310i	Fanuc 310i
Dimensions					
Machine height	3,200 mm	3,200 mm	3,646 mm	4,051 mm	4,520 mm
Floor space W x D	3,312 x 5,800 mm	3,567 x 6,146 mm	3,704 x 7,584 mm	5,900 x 9,350 mm	6,200 x 9,900 mm
Weight	16,100 kg	20,600 kg	21,000 kg	31,000 kg	48,000 kg
Work area					
Axis stroke X (column)	750 mm	1,000 mm	1,250 mm	1,600 mm	2,200 mm
Axis stroke Y (spindle head)	800 mm	800 mm	1,100 mm	1,400 mm	1,600 mm
Axis stroke Z (table)	850 mm	850 mm	1,050 mm	1,850 mm	1,850 mm
Spindle nose → table center	150 ~ 1,000 mm	200 ~ 1,050 mm	200 ~ 1,250 mm	50 ~ 1,900 mm	200 ~ 2,050 mm
Spindle nose → pallet surface	100 ~ 900 mm	100 ~ 900 mm	100 ~ 1,200	100 ~ 1,500 mm	100 ~ 1,700 mm
Workpiece (swing diameter x height)	Ø 850 x 1,000 mm	Ø 1,000 x 1,000 mm	Ø 1,200 x 1,250 mm	Ø 1,800 x 1,600 mm	Ø 2,400 x 1,800 mm
Pallet changer and table					
Number of pallets	2	2	2	2	2
Dimensions	550 x 550 mm	630 x 630 mm	800 x 800 mm	1,000 x 800 mm	1,250 x 1,250 mm
Indexing angle	1° (NC-table: 0.001°)	1° (NC-Table: 0.001°)	1° (NC-Table: 0.001°)	0.001°	0.001°
Indexing time, 0–90°	2.0 s	2.0 s	2.5 s	4.0 s	5.6 s
Pallet height from floor	1,200 mm	1,200 mm	1,300 mm	1,300 mm	1,500 mm
Pallet change time	9.5 s	12.0 s	18.0 s	70.0 s	85 s
Max. load on pallet	800 kg	800 kg	1,300 kg (NC: 1,000 kg)	3,000 kg	5,000 kg
Spindle					
Spindle speed	6,000 min^{-1}	6,000 min^{-1}	6,000 min^{-1}	6,000 min^{-1}	50 ~ 6,000 min^{-1}
Spindle speed (option)	50 ~ 15,000 min^{-1}	50 ~ 15,000 min^{-1}	50 ~ 15,000 min^{-1}	50 ~ 8,000 min^{-1} 50 ~ 15,000 min^{-1}	50 ~ 15,000 min^{-1} 50 ~ 8,000 min^{-1}
Spindle taper	Taper 50 (DIN, BT)	Taper 50 (DIN, BT)	Taper 50 (DIN, BT)	Taper 50 (DIN, BT)	Taper 50 / HSK-A100
Spindle taper (option)	HSK	HSK	HSK	HSK	
Front bearing Ø (mm)	Ø 110	Ø 110	Ø 110	Ø 110 (Ø 120, Ø 100)	**6K:** 110 **15K:** 100 **8K:** 120
Output (kW) 30 min ED / continuous	30.0 / 22.0 (6,000 min^{-1})	30.0 / 22.0 (6,000 min^{-1})	30.0 / 22.0 (6,000 min^{-1})	30.0 / 22.0 (6,000 min^{-1})	**6K:** 30 / 22 **15K:** 30 / 25 **8K:** 37 / 30 (high torque)
Axis drives					
Rapid traverse rate	60 m/min	60 m/min	48 m/min	54 m/min	42 m/min
Cutting feed rate	1 ~ 60,000 mm/min	1 ~ 60,000 mm/min	1 ~ 30,000 mm/min	1 ~ 30,000 mm/min	1 ~ 30,000 mm/min
Acceleration	X, Y: 6.86 m/s^2 Z: 9.8 m/s^2	X, Y: 6.86 m/s^2 Z: 9.8 m/s^2	X, Y: 4.9 m/s^2 (0.5 G) Z: 6.86 m/s^2 (0.7 G)	X, Y, Z: 4.9 m/s^2 (0.5 G)	0.3 G
Guides	Cylindrical roller slides	Cylindrical roller slides	Cylindrical roller slides	Cylindrical roller slides	cylindrical roller slides
Ballscrew	Ø 45 mm	Ø 45 mm	Ø 45 / Ø 50 mm (Z)	Ø 50 mm	X: 63 mm Y, Z: 50 mm

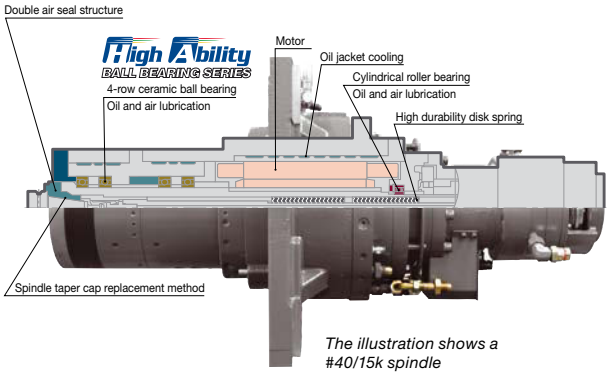
Guides, drives, spindles

Spindles

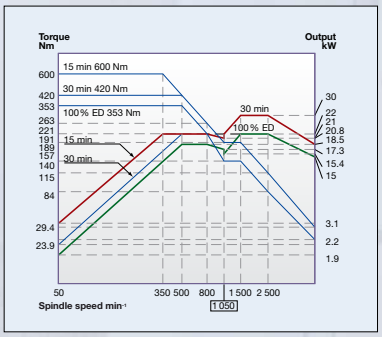
In order to maximise productivity, Toyoda found the perfect balance between speed and stability. The main components have been carefully developed and designed to provide optimum cutting times. Non-productive times have been reduced to a minimum as well.

Powerful spindle specifications, suitable for all applications, with spindle speeds of 5,000, 6,000 and 15,000 min^{-1} are available.

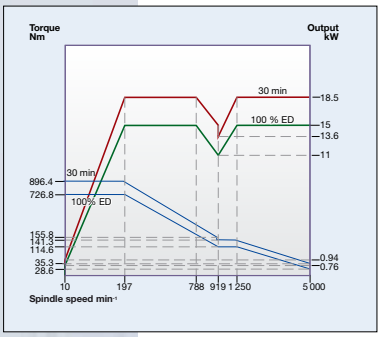
- Taper size #50 (DIN, BT, HSK)
- 6,000 min^{-1}, 30/22 kW, 600 Nm



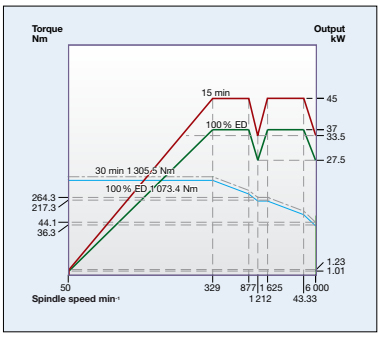
The illustration shows a #40/15k spindle



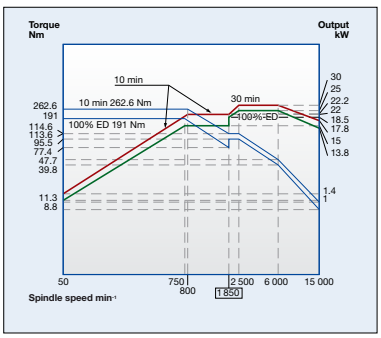
6,000 min^{-1} spindle (standard)



5,000 min^{-1} high torque gear spindle 18.5/15 kW **OPTION** *FA630S*

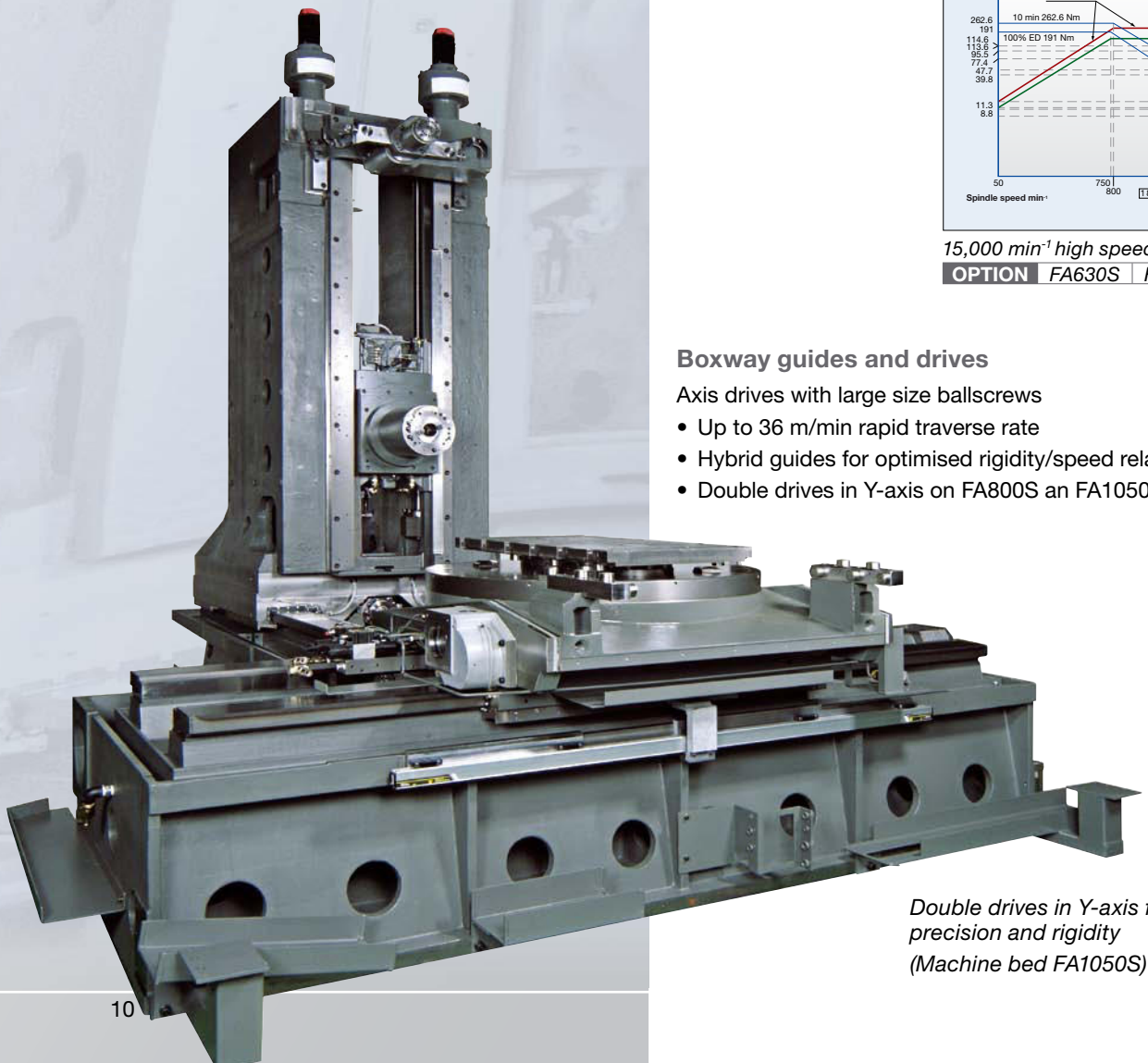


6,000 min^{-1} high torque gear spindle 45/37 kW **OPTION** *FA800S* | *FA1050S*



15,000 min^{-1} high speed spindle 30/25 kW

OPTION *FA630S* | *FA800S* | *FA1050S*



Double drives in Y-axis for highest precision and rigidity

(Machine bed FA1050S)

Boxway guides and drives

Axis drives with large size ballscrews

- Up to 36 m/min rapid traverse rate
- Hybrid guides for optimised rigidity/speed relation
- Double drives in Y-axis on FA800S an FA1050S

Technical data FA-S Series

	FA630S	FA800S	FA1050S
Automatic tool changer			
Tool holding capacity	Chain: 60 (optional 121) FTS: 210, 330, 450, 570	Chain: 60 (optional 121) FTS: 210, 330, 450, 570	Chain: 60 (optional 121) FTS: 210, 330, 450, 570
Tool selection	Absolute address	Absolute address	Absolute address
Max. tool weight	27 kg	35 kg	35 kg
Max. tool dimensions (Ø x length) mm	Ø 120 x 500	Ø 120 x 800	Ø 120 x 800
Tool changing time, tool to tool	2.0 s	2.0 s	2.0 s
Tool changing time, chip to chip	5.5 s	7.9 s	7.9 s
Precision			
Positioning accuracy	±0.003 mm	±0.003 mm	±0.003 mm
Repeatability	±0.0015 mm	±0.0015 mm	±0.0015 mm
Table positioning accuracy	±2 WS	±2 WS	±2 WS
Table repeatability	-	-	-
Control			
	Fanuc 31i	Fanuc 31i	Fanuc 31i
Dimensions			
Machine height	3,561 mm	3,750 mm	4,100 mm
Floor space W x D	3,550 x 6,050 mm	4,225 x 7,400 mm	4,665 x 8,140 mm
Weight	16,000 kg	21,000 kg	30,000 kg
Work area			
Axis stroke X (table)	1,000 mm	1,350 mm	1,600 mm
Axis stroke Y (spindle head)	850 mm	1,150 mm	1,400 mm
Axis stroke Z (column)	750 mm	1,150 mm	1,150 mm
Spindle nose → table center	175 ~ 925 mm	200 ~ 1,350 mm	250 ~ 1,400 mm
Spindle nose → pallet surface	50 ~ 900 mm	50 ~ 1,200 mm	50 ~ 1,400 mm
Workpiece (swing diameter x height)	Ø 1,000 x 1,000 mm	Ø 1,600 x 1,300 mm	Ø 1,850 x 1,550 mm
Pallet changer and table			
Number of pallets	2	2	2
Dimensions	630 x 630 mm	800 x 800 mm	1.050 x 1.050 mm
Indexing angle	NC-table: 0.001°	NC-table: 0.001°	NC-table: 0.001°
Indexing time, 0–90°	2.7 s	5.0 s	5.0 s
Pallet height from floor	1,200 mm	1,300 mm	1,400 mm
Pallet change time	12.0 s	40.0 s	43.0 s
Max. load on pallet	1,300 kg	2,500 kg	3,000 kg
Spindle			
Spindle speed	6,000 min^{-1}	6,000 min^{-1}	6,000 min^{-1}
Spindle speed (option)	50 ~ 15,000 min^{-1}	50 ~ 15,000 min^{-1}	50 ~ 15,000 min^{-1}
Spindle taper	Kegel 50 (DIN, BT)	Kegel 50 (DIN, BT)	Kegel 50 (DIN, BT)
Spindle taper (option)	HSK	HSK	HSK
Front bearing Ø (mm)	Ø 110 mm	Ø 110 mm	Ø 110 mm
Output 15,000 min^{-1}	30/22 kW	30/22 kW	30/22 kW
Axis drives			
Rapid traverse rate	36 m/min	24 m/min	24 m/min
Cutting feed rate	1 ~ 36,000 mm/min	1 ~ 24,000 mm/min	1 ~ 24,000 mm/min
Guides	Boxway guides	Boxway guides	Boxway guides
Ballscrew diameter (Ø/mm) (X, Y, Z)	50 (X,Y,Z)	63 (X), 50 (Y), 63 (Z)	63 (X), 50 (Y), 63 (Z)

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