

SOLUTION OF WORLDWIDE SALES NETWORK



History



- 1976** Established this Metal processing department at MAR.01.
- 1992** Established the Machine Center R&D department.
- 1993** Continually 4th year of Knee-type Milling machine production reached 1800 sets monthly. Established China branch as Twinhorn machinery co.,Ltd.
- 2005** Started constructing China manufacture & production headquarters.
- 2008** Invested in the technical cooperation with Italian 5Ax maker on Movingcolumn and Gantry type
- 2009** 5Ax machining centers.
- 2010** Completed the construction of China manufacture & production
- 2014** Expanded the 4th assembly plant(factory area 4000m²)in Taiwan headquarters.
- 2016** HORNET moving column type 5-axis machining center was launched.
- 2018** Launch first moving gantry type 5-axis machining center TWISTER series to the market.

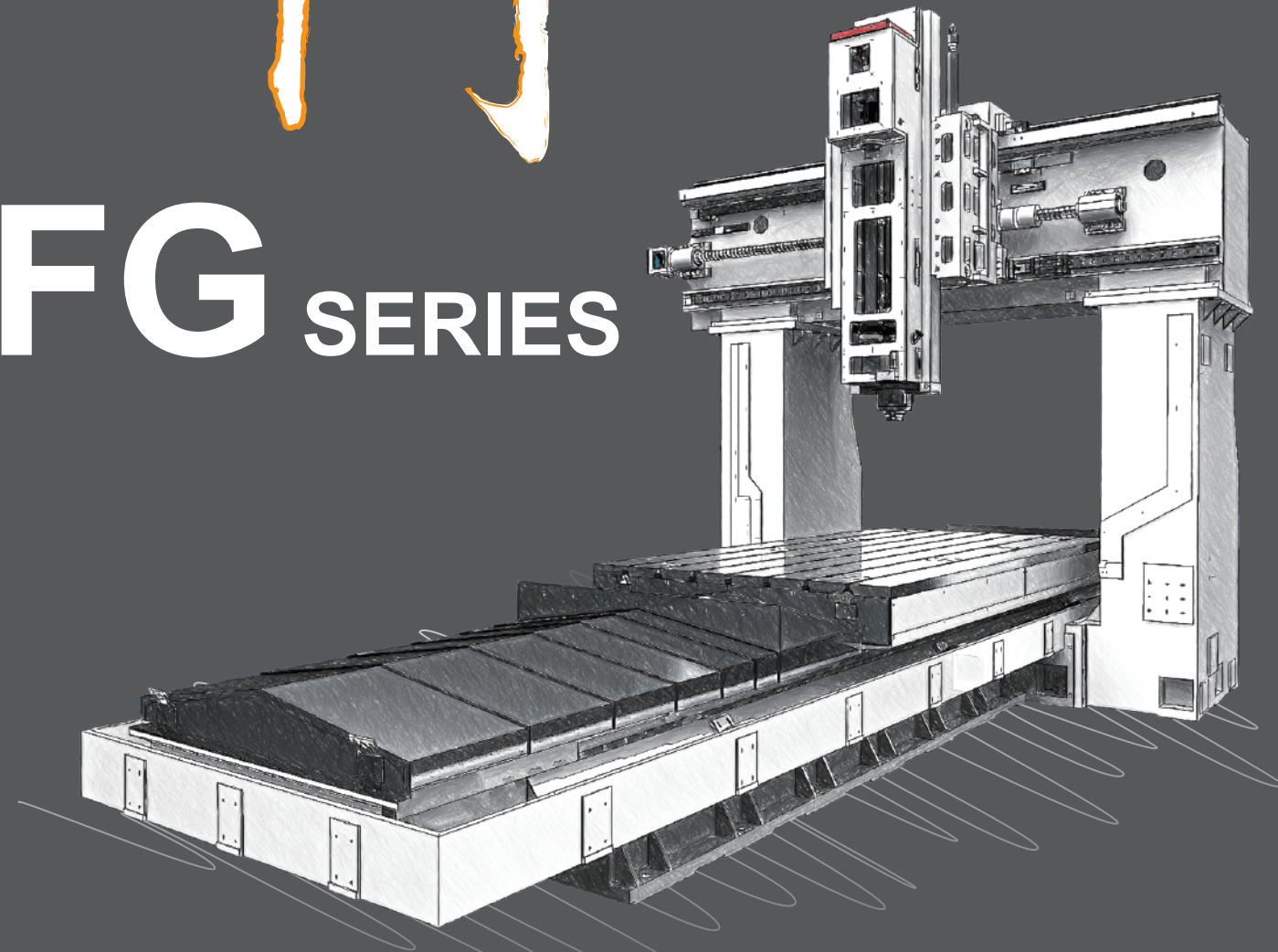
Twinhorn

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龍門

FG SERIES



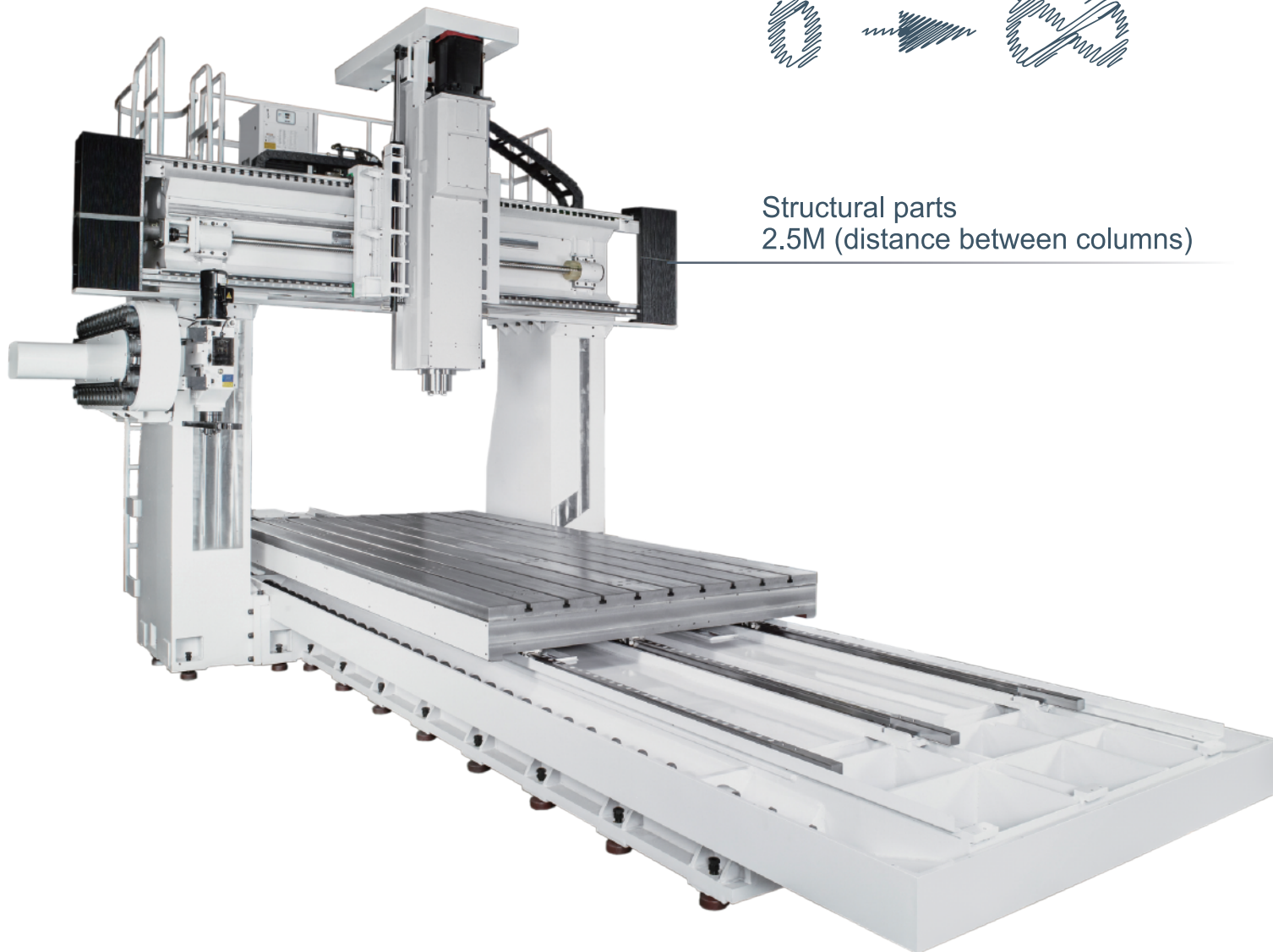
CNC **Double Column** Machining Center

www.twinhorn.com

Twinhorn

The Best Result Begins from Zero

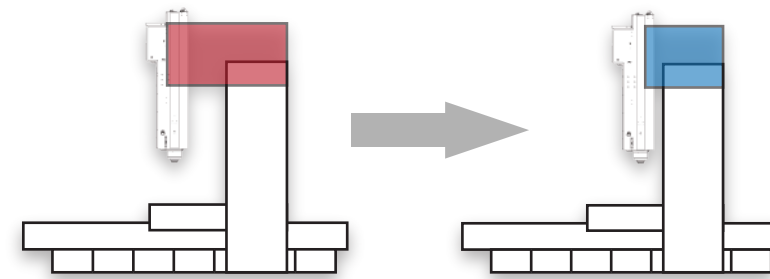
To produce a high rigid machine tool, it needs to start from rigorous requirement of a small screw. With over 30 years of design and manufacturing experience, FG series double column machining center has been developed and manufactured in-house throughout the entire machine. We can fully understand how to optimize combination and running for the thousands of parts on a large machine tool, that also allow us to build the optimum machine structure.



Structural parts
2.5M (distance between columns)

Features of Double Column Structure

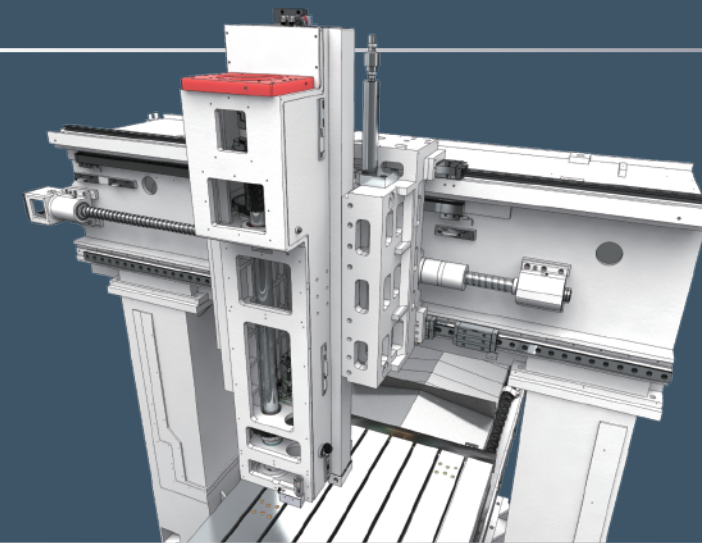
Special design for FG-series



AsTWINHORN attaches great importance to the fundamental and detail in mechanism design, the spindle head structure is simplified allowing Z-axis to close to the center of the column. This not only eliminates the error caused by bending stress, but also achieves the optimal rigidity.



Z-axis is a box way design and sliding surfaces are precisely scraped to ensure the service life of the slide ways. The box ways and the ram are one-piece fabricated to achieve no clearance between the slideways and the saddle, This feature is normally requested by a high end machine.



Class C3 Ball Screws on Three Axes

Ball screws have been pre-tensioned to ensure machining accuracy under heavy loading condition for a long time.

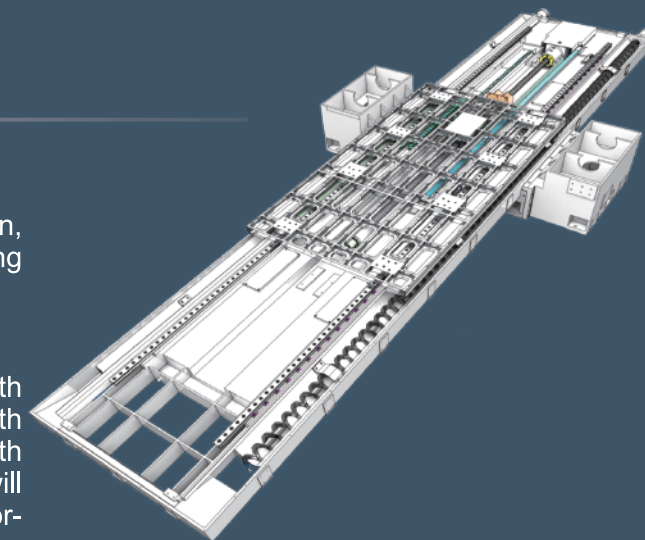


Table, Spindle Head & Saddle

Manufactured from high quality Meehanite cast iron, they feature ultra high rigidity, excellent absorbing capacity and wear-resistance.

Base, Beam & Column

These structural parts are manufactured with multi-walls with internal rib, welded by high strength steel plates with tempered and stress-relieved. With the meticulous design, various structural parts will provide the best possible vibration absorbing performance and rigidity.



Measurement and Inspection



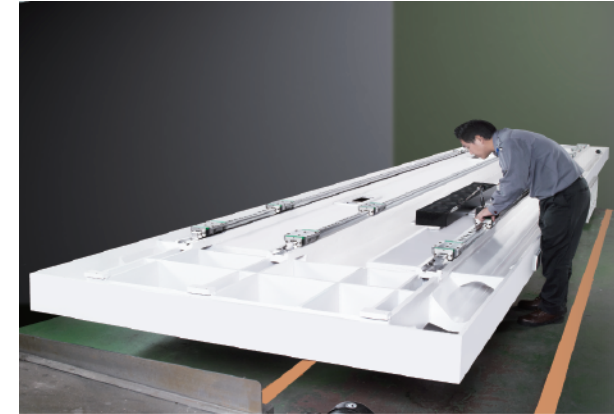
Three-Dimensional Coordinate Measuring Machine

TWINHORN is one of the few domestic manufacturers that have set up a large type three-dimensional coordinate measuring machine. It is especially suitable for parts inspection and calibration for a large machine, and provides true monitoring and improvement in quality.

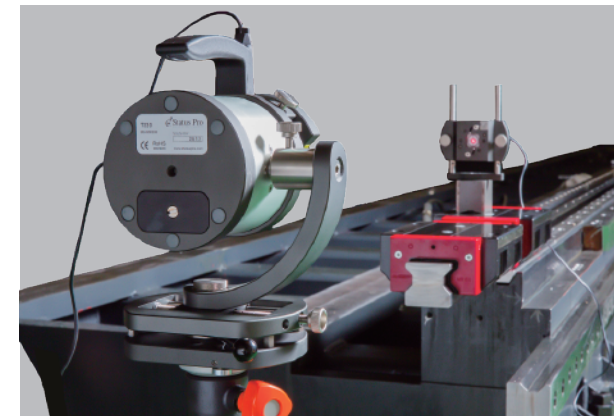
Q-VIDEO ▶



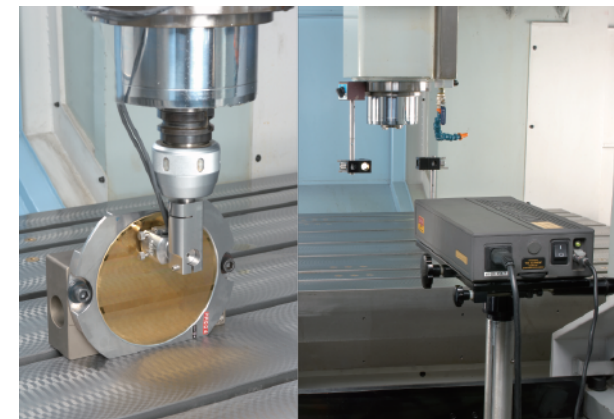
Measurement



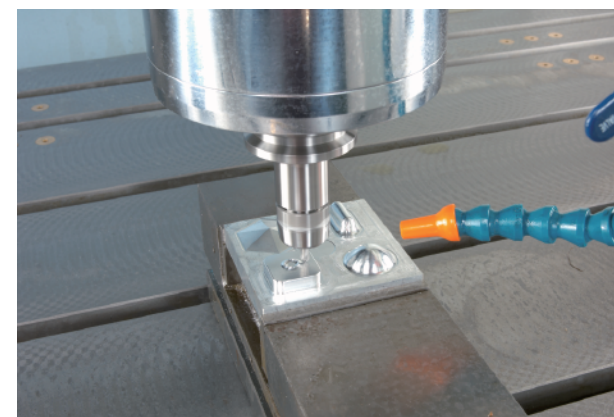
Straightness calibration with a laser unit is a necessity during assembling a large machine, so as to ensure high accuracy movement on each exit. TWINHORN always pays special attention to every detail by employing the highest standard level in the assembly of a double column machine.



During manufacturing process, calibration of each machine must be highly skilled technicians. With rigorous quality control throughout in combination with meticulous attitude, each machine from TWINHORN will be guaranteed in rigorous and satisfactory quality.



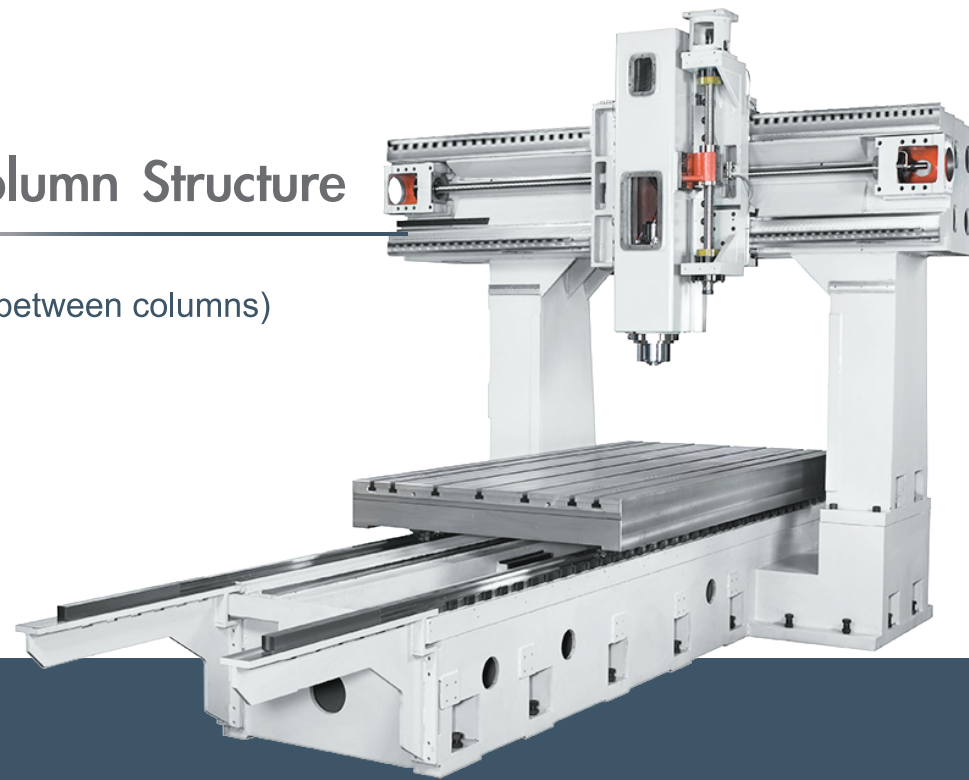
Spindle calibration may prevent a large machine from unnecessary power consumption and machine vibration under a heavy cutting condition. It also avoids parts wear, such as couplings, bearings and seals, etc. Each double column machine from TWINHORN is subject to laser inspection and ball bar test prior to shipment for thorough control of quality.



Each double column machine is also subject rigorous dynamic cutting test prior to shipment so as to ensure its cutting performance meet customer's requirements. TWINHORN always insists on quality, and we have no compromise and no negligence throughout the entire manufacturing process from parts machining to machine assembly.

Double Column Structure

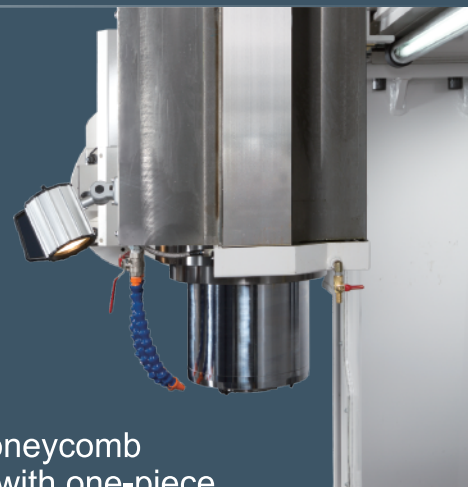
Structural parts
1.5M (distance between columns)



Structural Features of 1.5M Door Width

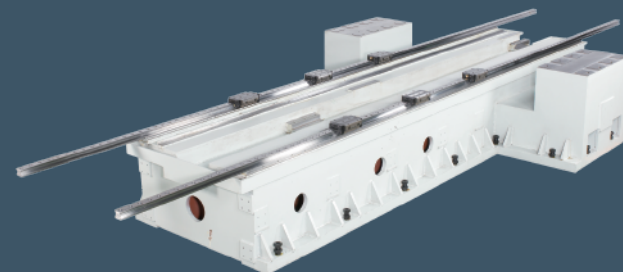
X-axis with fully supported design resulting in a dramatic increase in structural stability and absorbing capacity. Box ways on Z-axis provides a solid support for the spindle head so as to offer great cutting capability.

Z-axis box ways are widened for ultra high rigidity. The box type structure is designed with 3 x 4 layers sectional ribs. Y-axis linear ways are deployed in horizontal and vertical planes with over 30% of strength than the conventional parallel layout. In addition, the axial movement is more stable and accurate



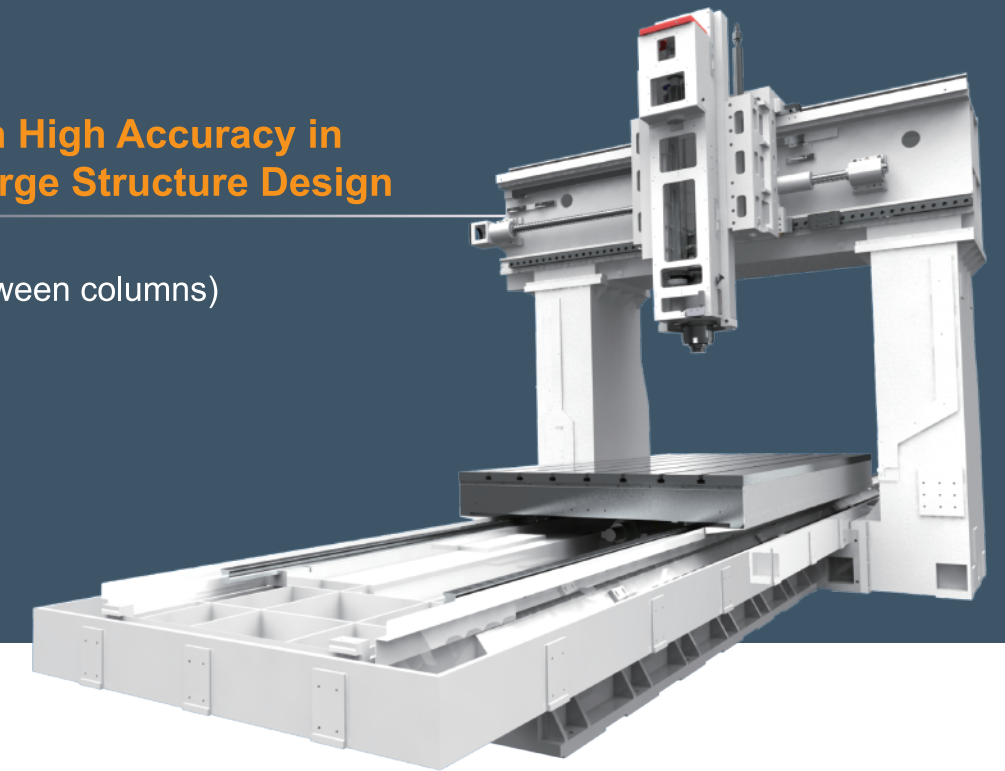
The cross beam is a reinforced honeycomb shaped structure design together with one-piece type door shaped columns for exhibiting outstanding rigidity and vibration absorbing performance. Two roller type precise linear ways on y-axis not only upgrades rigidity, but also reduces bending stress on the spindle head to a minimum.

X-axis are mounted with two rigid, precise linear guide ways with greater span between ways, leading to an increase in table loading capacity, higher axial moving accuracy for large workpiece and improved feeding rigidity.



Designed with High Accuracy in Mind Extra Large Structure Design

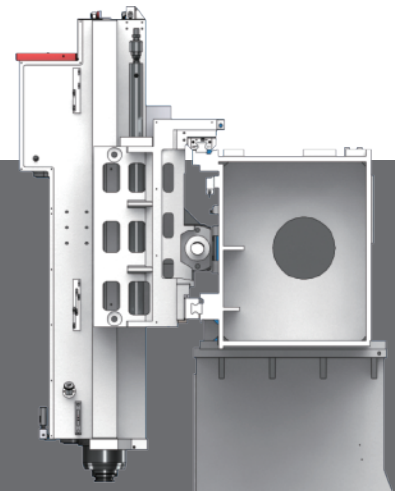
Structural parts
2M (distance between columns)



Structural Features of Door Width Over 2M

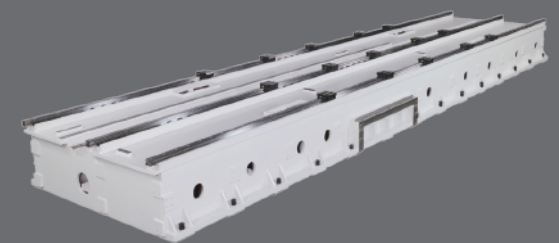
A greater table area requires higher rigidity of column structure and linear ways/blocks to provide more efficient moving response and rigidity.

Y-axis roller guide way with 3 blocks on the horizontal plane couples with 4 blocks on the vertical plane, will fully eliminate head tilting problem, and ensure long time machining accuracy and long service life of linear ways.



Enlarged one-piece fabricated rigid column make machining more stable. Both column bottoms have been widened to boost rigidity, providing excellent rigidity and absorbing performance especially when performing high cutting feedrates in heavy cutting.

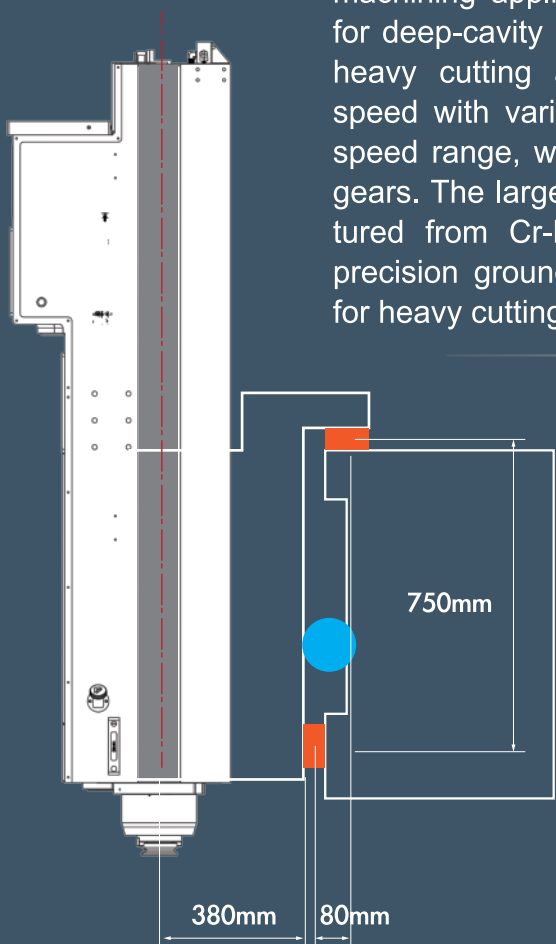
X-axis is mounted with three heavy duty, high precision and low friction roller type linear ways (2 roller type linear ways for 2M models). Each linear guide way is equipped with several blocks with an aim to offer a solid support for the cutting travel, improve moving accuracy while saving energy consumption due to friction.



Extra Powerful Spindle Head

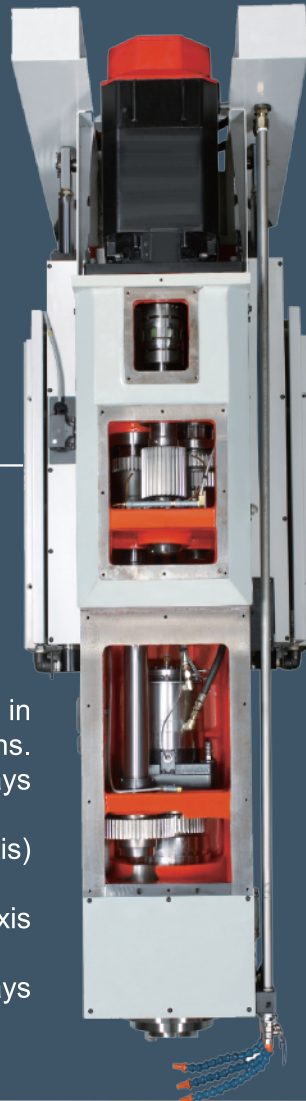
EXTENDED HEADSTOCK

This type of headstock provides a wide range of machining applications, and is especially ideal for deep-cavity machining on a large mold and heavy cutting application. 6000 rpm spindle speed with variable speed change in high/low speed range, which are directly driven by spur gears. The large module of gears are manufactured from Cr-Mo alloy steel, hardened and precision ground making the machine suitable for heavy cutting at the low speed range.

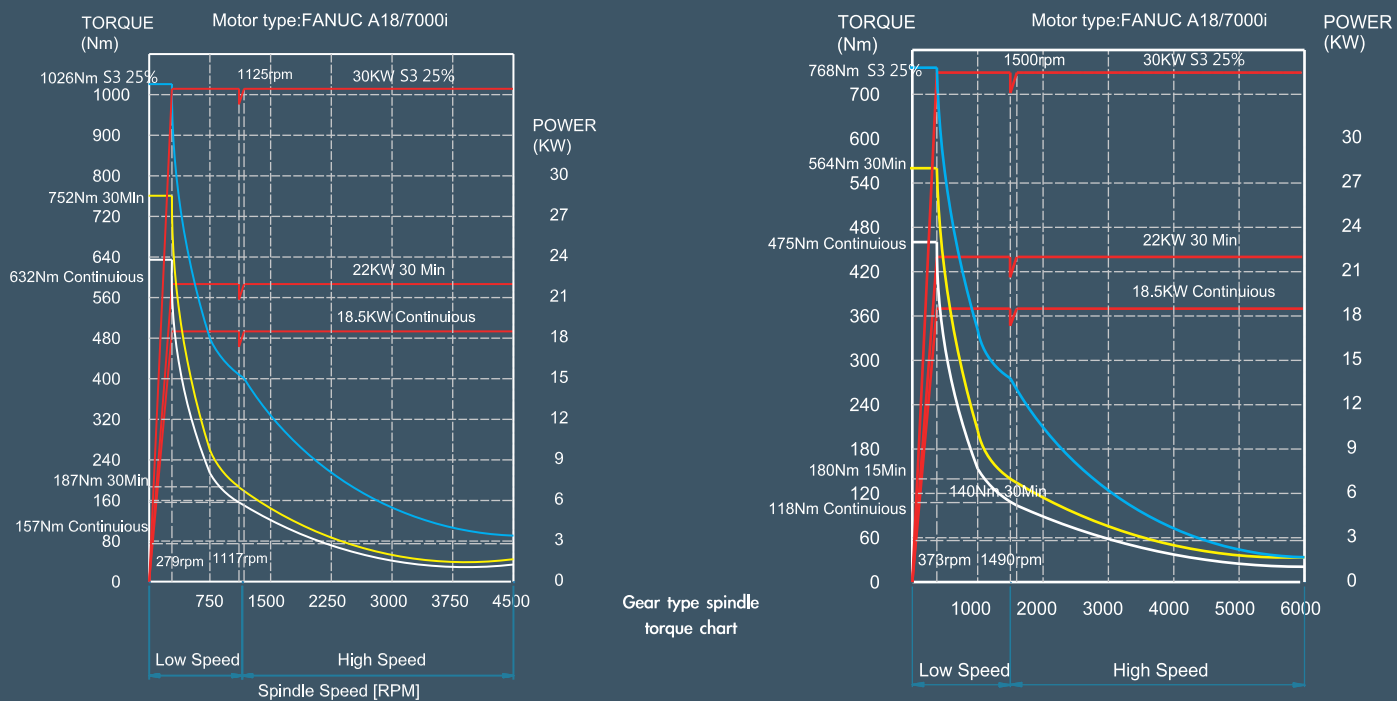


(Door width 2M and over)

- Y-axis linear ways are deployed in horizontal and vertical directions.
- Distance between Y-axis linear ways is 750mm.
- Step type beam construction(Y-axis) with step difference reaches 80mm.
- Distance from spindle center to Y-axis linear way surfaces is only 380mm.
- Spindle center and Z-axis slideways are located at the same center line.

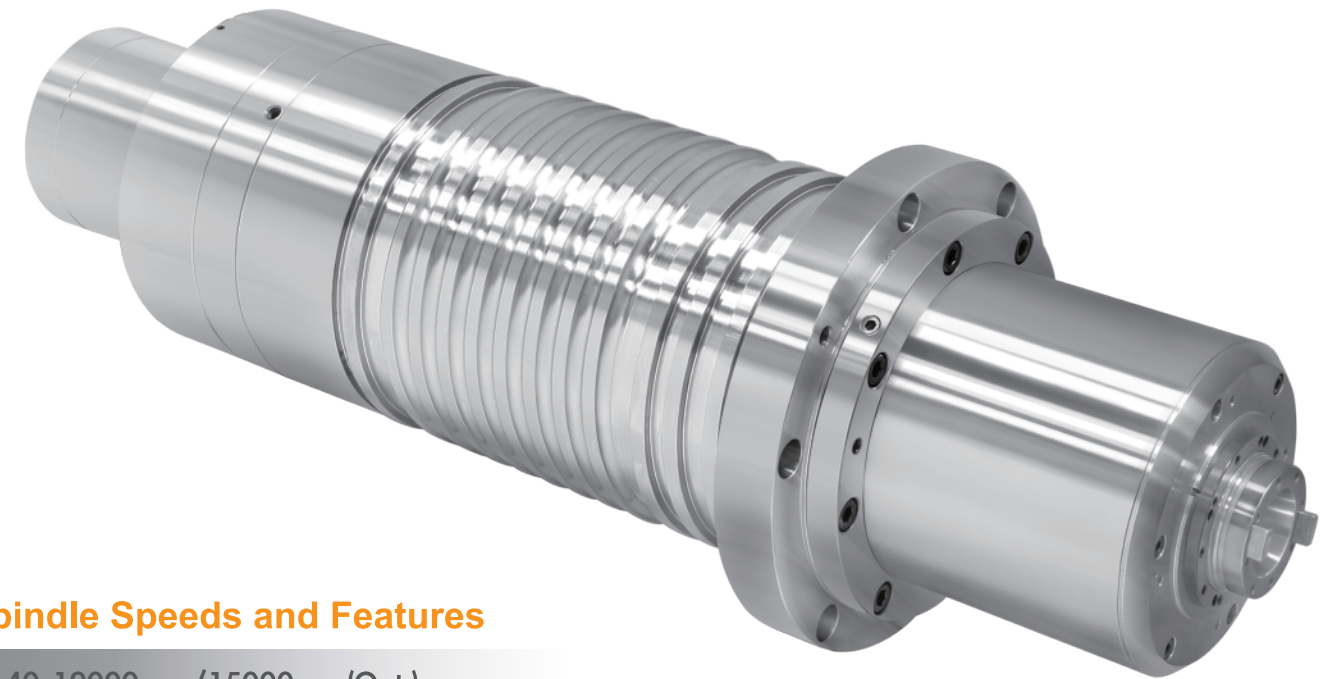


Spindle Motor Torque Chart-LG Series Gear head BT-50



Built-in Type Spindle BT40/50

Applicable for high speed, high accuracy machining



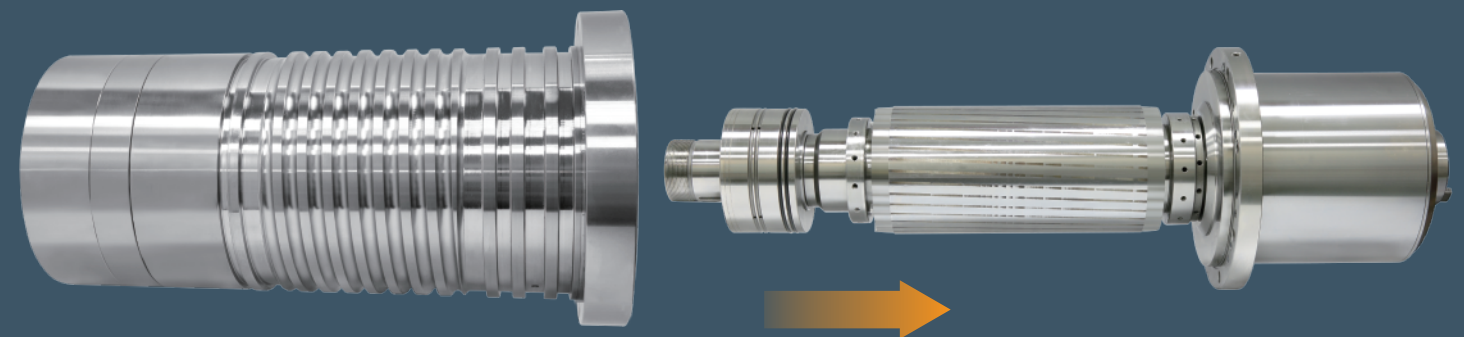
Spindle Speeds and Features

- BT-40 12000rpm/15000rpm(Opt.)
- BT-50 8000rpm/10000rpm(Opt.)

- Using rigid precision bearings.
- Bearings are grease lubricated. (Option: oil mist lubrication)
- The spindle uses external circulated oil cooling system.
- High precision, high rigidity and high power.
- Silent running and minimum vibration.

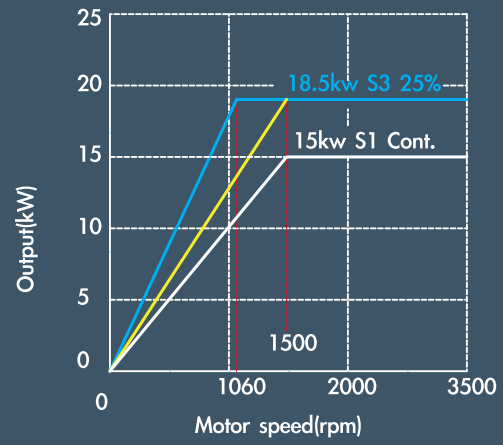
Built-in type

Quick Maintenance System

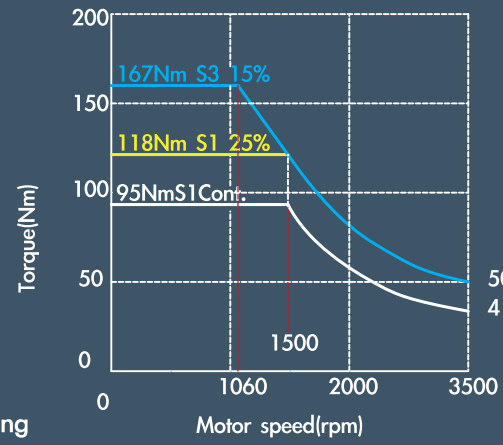


The spindle can be removed quickly allowing maintenance to be accomplished. This reduces the loss of machine down caused by a spindle problem.

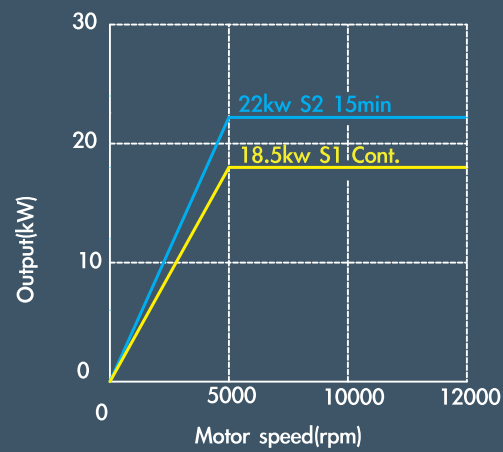
Spindle Motor Torque Built in Series BT-40 12000 rpm



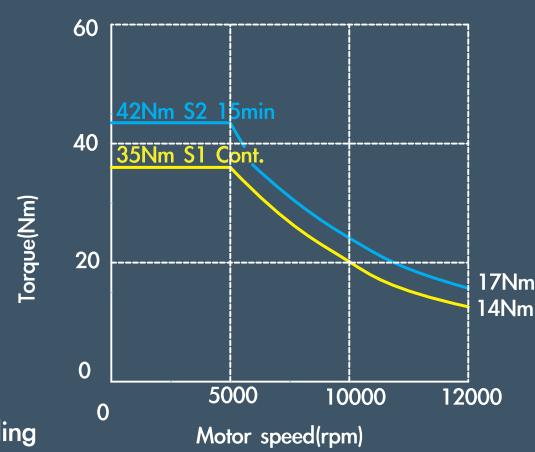
Low winding



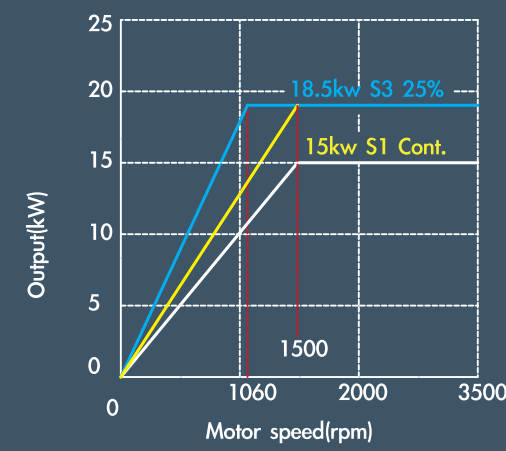
Built-in Type Spindle Torque Diagram



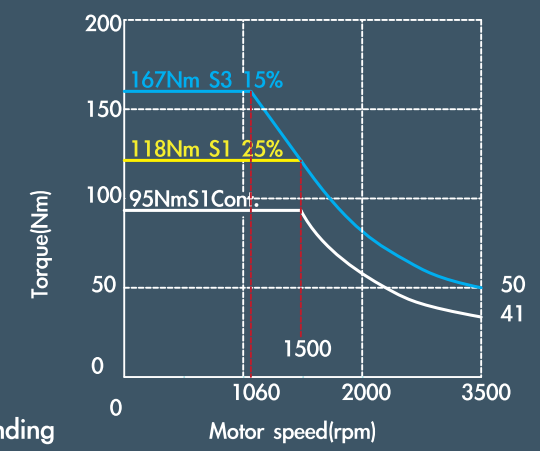
High winding



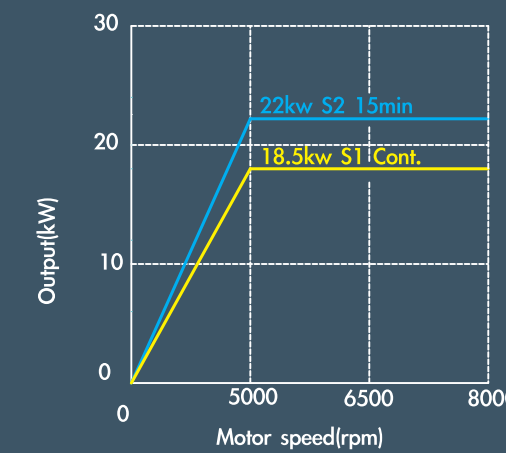
Spindle Motor Torque Built in Series BT-50 8000 rpm



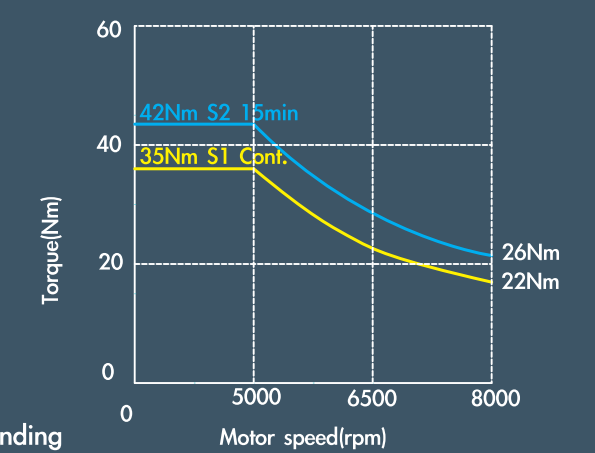
Low winding



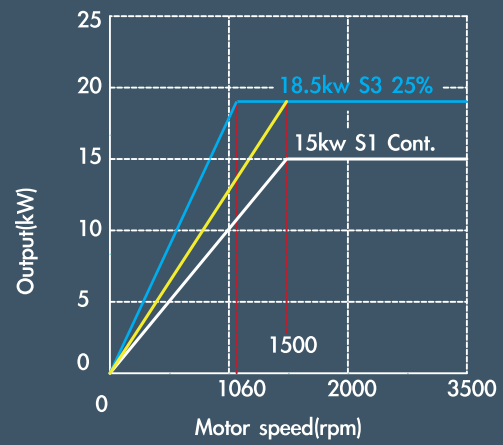
Built-in Type Spindle Torque Diagram



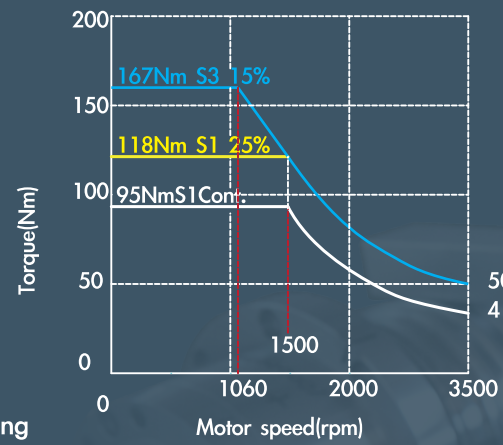
High winding



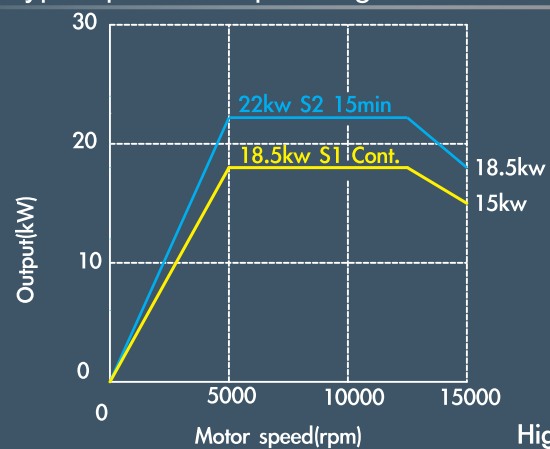
Spindle Motor Torque Built in Series BT-40 15000 rpm



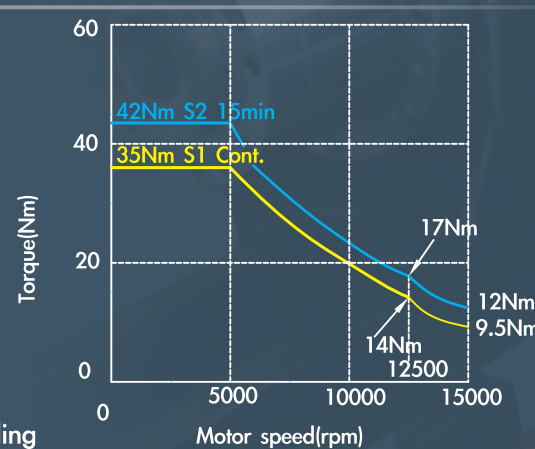
Low winding



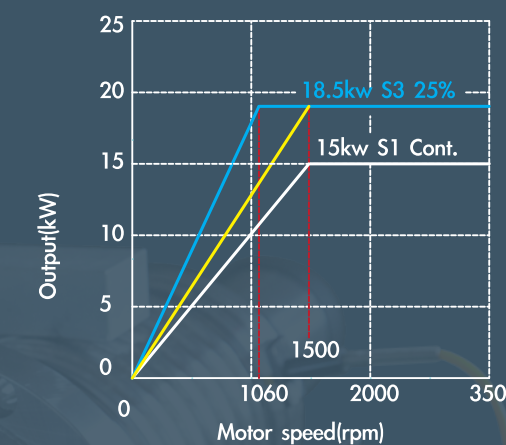
Built-in Type Spindle Torque Diagram



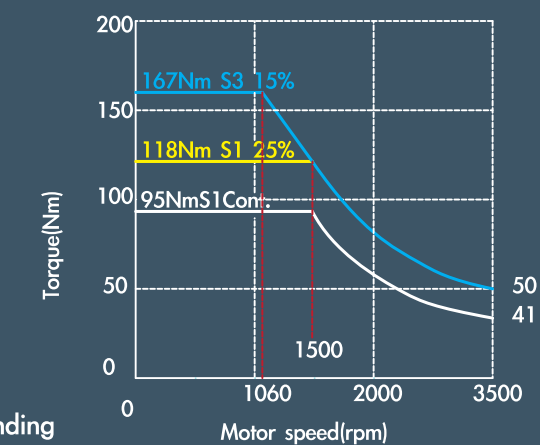
High winding



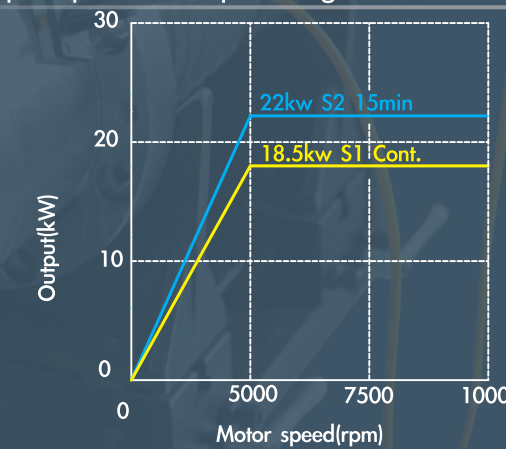
Spindle Motor Torque Built in Series BT-50 10000 rpm



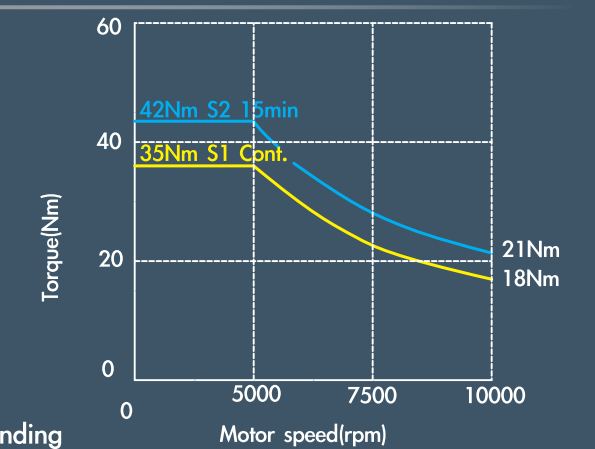
Low winding



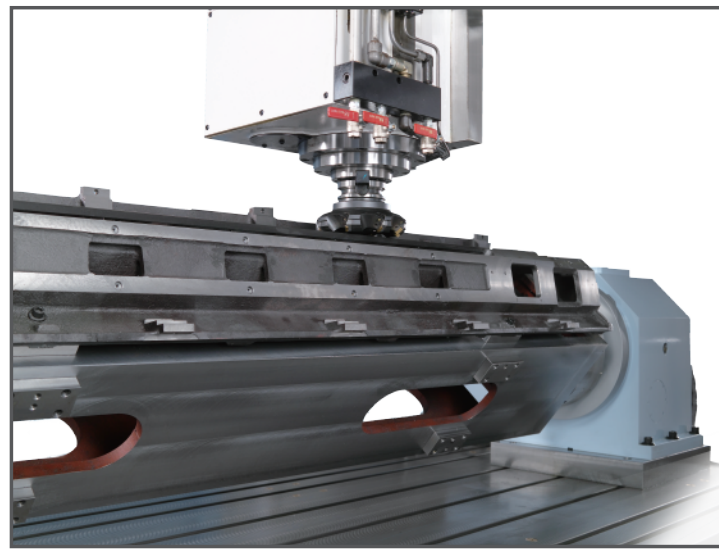
Built-in Type Spindle Torque Diagram



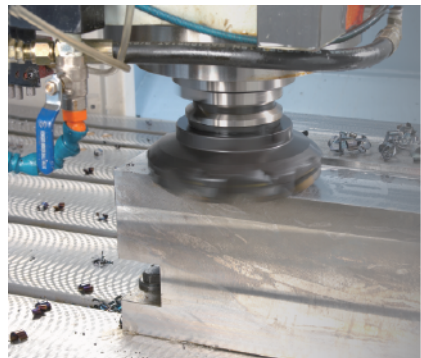
High winding



Super Spindle



Cutting Ability (Gear type spindle)



Face Milling

Workpiece material	S50C
Spindle speed	420 RPM
Feed rate	1,000 mm/min
Cutting width	120 mm
Cutting depth	6 mm
Material removal rate	720 cm ³ /min



End Milling

Workpiece material	S50C
Spindle speed	1500 RPM
Feed rate	1,000 mm/min
Cutting width	25mm
Cutting depth	15 mm
Material removal rate	375 cm ³ /min



Drilling

Workpiece material	S50C
Spindle speed	1300 RPM
Feed rate	182 mm/min
Drill hole dia.	50 mm
Material removal rate	375 cm ³ /min



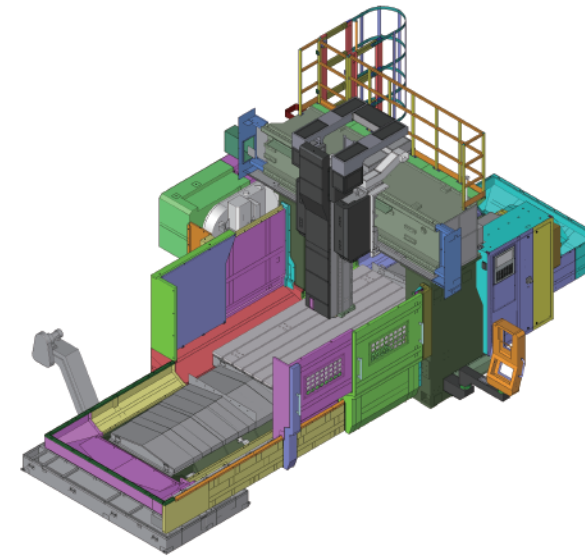
Tapping

Workpiece material	S50C
Spindle speed	70RPM
Feed rate	315 mm/min
Tap	M45x4.5P

Sheet Metal Design

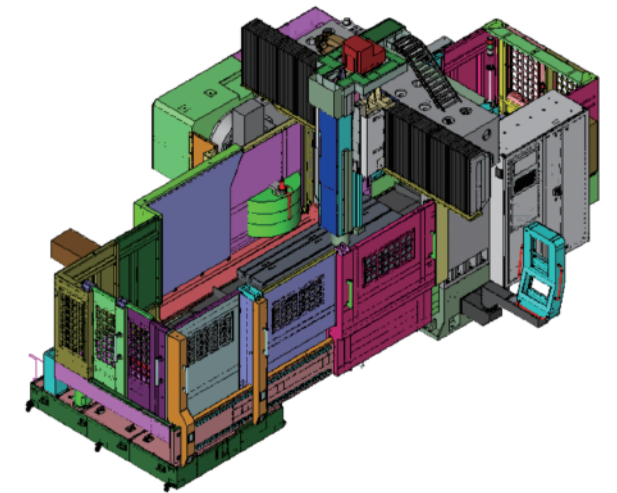
Semi-type splash guard (Std.)

Model: FG-3220



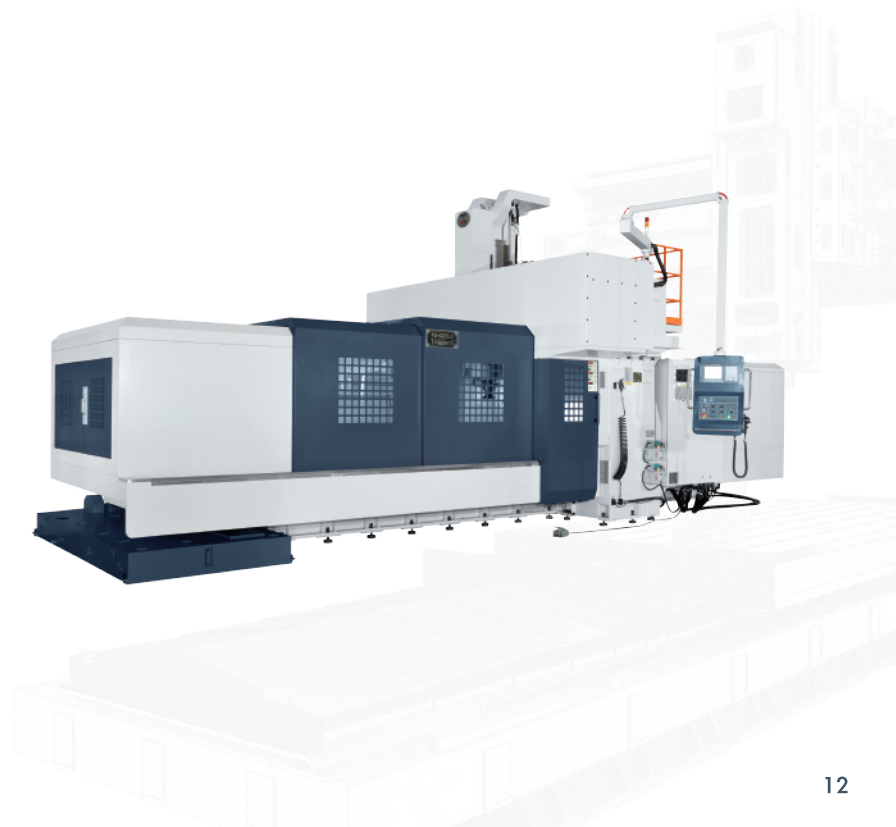
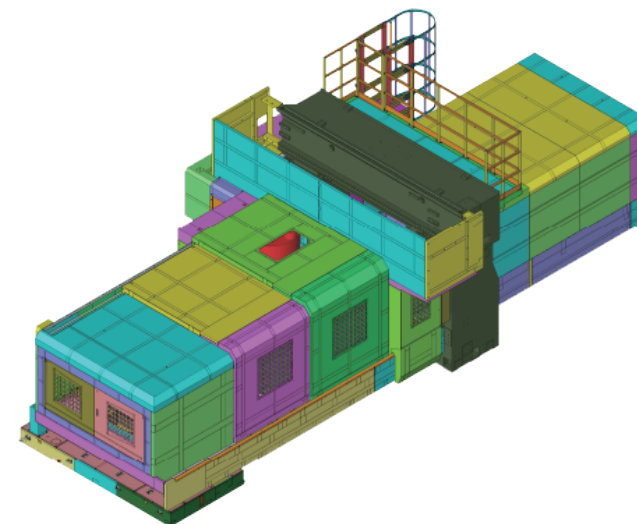
Fully surrounded splash guard (Opt.)

Model: FG-2215



Fully enclosed splash guard (Opt.)

Model: FG-4225





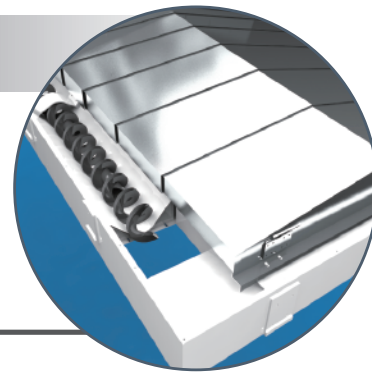
3 axis linear scales (Opt.)

32 Tools Magazine (Opt.)



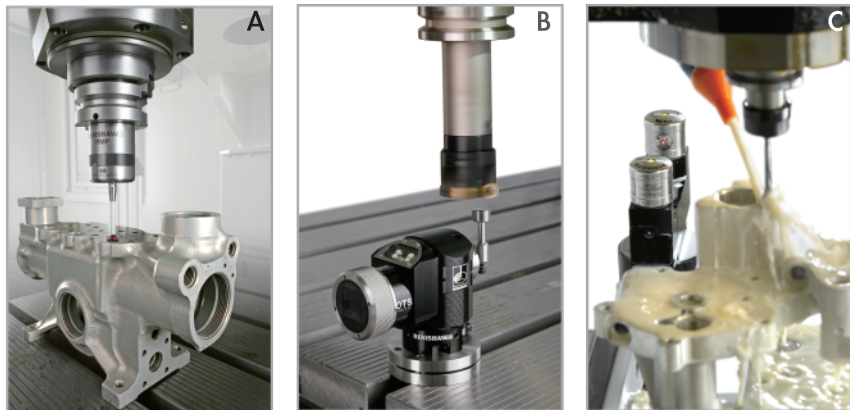
Chain Type Chip Conveyor (Std.)

Great chip delivery rate and easy to clean (Std.)

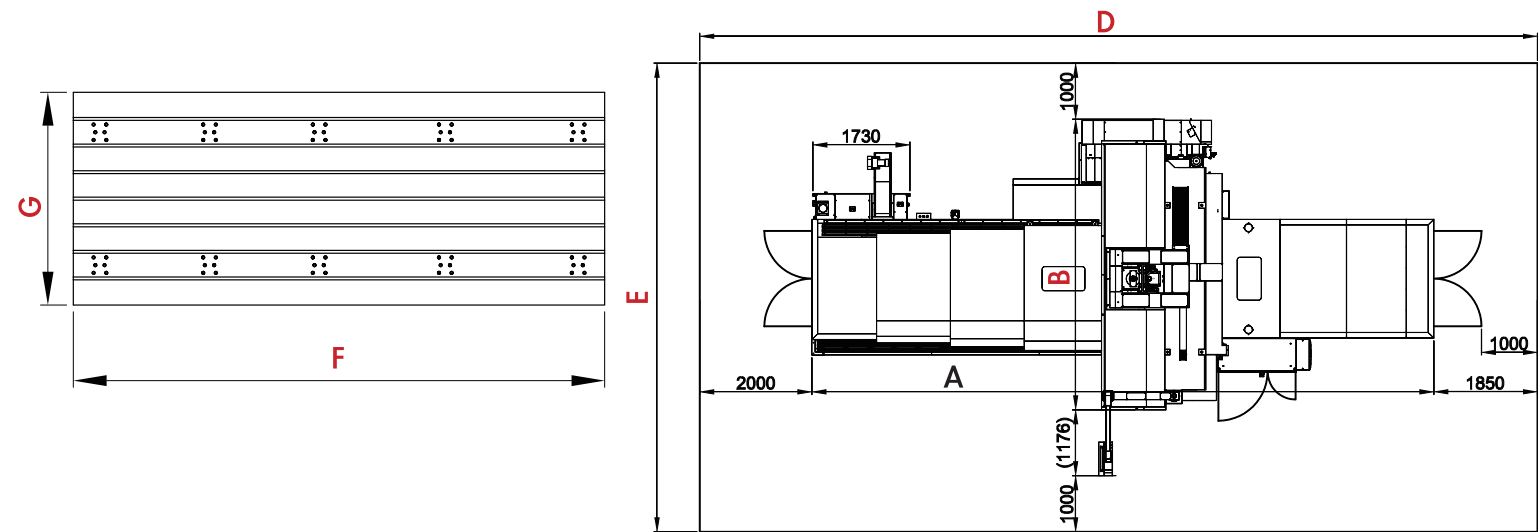


Model	Exterior Dimension Chart					Table Size			
	A	B	C MAX	D	E	F	G	T-slot	Table load(kg)
FG-2215	6831	3550	4030	10681	6726	2000	1200	7	4000
FG-2715	7918			11768		2500	1200		5000
FG-3215	8988			12838		3200	1200		6000
FG-4215	11088			14938		4200	1200		8000
FG-2220	6831	4503	5600	10681	7679	2000	1600	9	8000
FG-2720	7918			11768		2500	1600		9000
FG-3220	8988			12838		3000	1600		10000
FG-4220	11088			14938		4000	1600		12000
FG-3225	8988	5085	5600	12834	8261	3000	2000	9	12000
FG-4225	11088			14893		4000	2000		15000
FG-5225	13255			17105		5000	2000		18000
FG-6225	16000	5570	5600	19850	8746	6000	2000	9	20000
FG-4230	11099			14893		4000	2500		18000
FG-5230	13255			17105		5000	2500		22000
FG-6230	16000			19850		6000	2500		25000

Measuring System (Opt.)



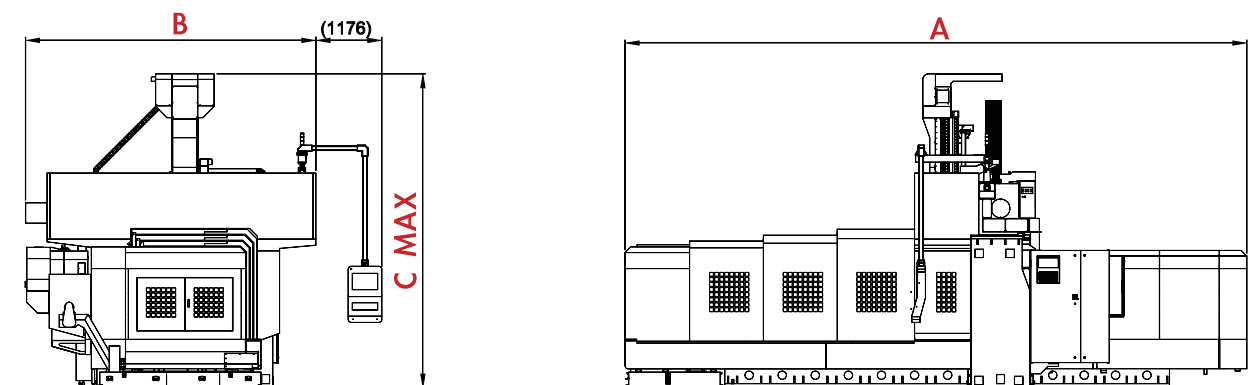
- A. In-time Workpiece Measurement System**
Allows for reducing product defect rate and increasing production efficiency.
- B. Tool Measurement System**
Capable of accurate feedback of tool consumed information and providing error compensation for dramatically upgrading machining accuracy and quality.
- C. Available to use together with a contact or non-contact type laser inspection system for completely solving the problem of machining accuracy.**



Five face head Application (optional)



90° milling head Manual universal milling head Extension milling head 90° auto indexing milling head



Specification

FG - XX XX L/LG A : X-axis travel B : Door width L : Built-in type Spindle LG : Gear head
A B

MODEL	UNIT	FG-2215L/LG	FG-2715L/LG	FG-3215L/LG	FG-4215L/LG	FG-2220L/LG	FG-2720L/LG	FG-3220L/LG	FG-4220L/LG	
Table										
Table dimension	mm	2000X1200	2500X1200	3200X1200	4200X1200	2000X1600	2500X1600	3000X1600	4000X1600	
T-slot(no. x width x pitch)		9X22mmX200mm				7X22mmX200mm				
Max. table load	kg	4000	5000	6000	8000	8000	9000	10000	12000	
TRAVEL										
X-axis	mm	2200	2700	3200	4200	2200	2700	3200	4200	
Y-axis	mm	1500				2000				
Z-axis	mm	760				1000				
Distance from spindle nose to table	(L Series) mm	BT40 : 130~890(TH-230),BT50 : 115~875			(TH-230)	BT40 : 190~1190(TH-230),BT50 : 175~1175(TH-230),125~1125(TH-310)				
	(LG Series) mm	295~1055			285~1045	250~1250				
Distance between columns	mm	1500				2000				
SPINDLE										
Spindle taper	(L Series)	BT40,BT50/DIN69871A(Option)				BT40,BT50/DIN69871A(Option)				
	(LG Series)	BT50/DIN69871A(Option)				BT50/DIN69871A(Option)				
Spindle speed	(L Series) rpm	Build-in type BT40 : 12000,15000, BT50 : 8000,10000				Build-in type BT40 : 12000,15000/BT50 : 8000,10000				
	(LG Series) rpm	Two-step variable speed gear : 10~6000 rpm(Std.)			(10~4500 rpm Opt.)	Two-step variable speed gear : 10~6000 rpm(Std.) (10~4500 rpm Opt.)				
Spindle diameter	(L Series) mm	BT40 : 70,BT50 : 100				BT40 : 70,BT50 : 100				
	(LG Series) mm	100				100				
FEED										
Rapid feed rates(X)	m/min	20	15			12	12	15		
Rapid feed rates(Y/Z)	m/min	20/15				20/10				
Cutting feed rates (X/Y)	mm/min	1-10000				1-7500				
Ball screw dia. & pitch (X/Y/Z)	mm	Ø50/45/45,P16/10/10		Ø63/45/45,P25/10/10	Ø80/45/45,P25/16/10	Ø63/63/63,P25/16/10			Ø80/63/63,P25/16/10	
Ball screw transmission (X/Y/Z)		Direct /Direct /Belt deiven		Gear/Direct	/Belt deiven	Gear/Direct/Gear deiven				
ATC										
Tool capacity	pcs	32(Opt 40/60)				32(Opt 40/60)				
Max. tool diameter(with/withou adjacent tool)	mm	BT40 : 75/125,BT50 : 125/215				BT40 : 75/125,BT50 : 125/215				
Max. tool length	mm	BT40 : 250,BT50 : 350				BT40 : 250,BT50 : 350				
Max. tool weight	kg	BT40 : 7,BT50 : 20				BT40 : 7,BT50 : 20				
Pull stud		BT40 : MAS403 P40T-1,BT50 : MAS403			P50T-1	BT40 : MAS403 P40T-1,BT50 : MAS403 P50T-1				
MOTOR										
Spindle motor (cont./30min rating)	(L Series) kW	TH230(αB112L) : 15/18.5			(Cont./15min)	TH230(αB112L) : 15/18.5(Cont./15min) TH310(αB60LL) : 15/22kW(Cont./10min)				
	(LG Series) kW	FANUC ail 18/7000 : 18.5/30			(Cont./S3 25%)	FANUC ail 18/7000 : 18.5/30(Cont./S3 25%)				
Max. spindle torque	(L Series) Nm	αB112L : 167(S3 15%)				αB112L : 167(S3 15%) αB160LL : 420(S3 25%)				
	(LG Series) Nm	6000rpm : 769(S3 25%),(Opt. 4500rpm			(S3 25%)	6000rpm : 769(S3 25%), (Opt. 4500rpm(S3 25%))				
ACCURACY										
Positioning (JIS6338)	mm	±0.005/300mm,±0.015			total length	±0.005/300mm,±0.015 total length				
Positioning (VD13441)	mm	Ps0.020	Ps0.025	Ps0.030	Ps0.020	Ps0.025	Ps0.030	Ps0.020	Ps0.030	
Repeatability (JIS6338)	mm	±0.003				±0.003				
Repeatability (VD13441)	mm	Ps0.015	Ps0.020	Ps0.025	Ps0.015	Ps0.020	Ps0.025	Ps0.015	Ps0.025	
OTHERS										
Power required		50kVA,220V,3phase 50/60				65kVA,220V,3phase 50/60				
Air pressure required	kg/cm ²	6				6				
Coolant tank capacity	liter	500				750				
Linear ways (X/Y/Z)		X:2 roller type linear ways Y:2 roller type linear ways		Z: box ways	X:2 roller type linear ways Y:2 roller type linear ways		Z: box ways			
Machine weight	kg	13000	19000	22000	26000	23000	25000	28000	33000	

Standard Accessories

- Spindle oil cooler
- Semi-type splash guard
- Centralized automatic lubrication system
- Coolant system
- Chip auger and chain type chip conveyor with cart
- Arm type 32 tools magazine
- Rigid tapping
- Working lamp
- Operation indication lamp
- Automatic tool unclamp foot switch
- RS-232 interface
- Leveling bolts and pads
- Remote MPG
- Heat exchanger for electrical cabinet
- Automatic power off(M30)
- Tool box with adjustment tools
- Operation manual

Optional Accessories

- Fully surrounded splash guard
- Fully enclosed splash guard
- 3 axes linear scales
- NC rotary table
- Auto tool length measurement device
- Auto workpiece measurement device
- Coolant through tool holder device (LG series)
- Manual 90° milling head (LG series)
- Manual universal milling head (LG series)
- Extension milling head (LG series)
- 90° auto indexing milling head (LG series)
- 4500 rpm two-step variable speed gear head (LG series)
- Transformer
- Oil skimmer
- Arm type 40 tools magazine
- Coolant through spindle device

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Specification

FG - XX XX L/LG A : X-axis travel B : Door width L : Built-in type Spindle LG : Gear head
A B

MODEL	UNIT	FG-3225L/LG	FG-4225L/LG	FG-5225L/LG	FG-6225L/LG	FG-4230L/LG	FG-5230L/LG	FG-6230L/LG
Table								
Table dimension	mm	3000X2000	4000X2000	5000X2000	6000X2000	4000X2500	5000X2500	6000X2500
T-slot(no. x width x pitch)		9X22mmX200mm			9X28mmX250mm+2X28mmX150mm			
Max. table load	kg	12000	15000	18000	20000	18000	22000	25000
TRAVEL								
X-axis	mm	3200	42000	52000	62000	4200	5200	6200
Y-axis	mm		2500				3000	
Z-axis	mm		1000				1000	
Distance from spindle nose to table	(L Series) mm (LG Series) mm	BT40 : 190~1190(TH-230),BT50 : 175~1175			(TH-230),125~1125(TH310)		BT50 : 175~1175(TH-230),125~1125(TH-310)	
Distance between columns	mm	2500			3000			
SPINDLE								
Spindle taper	(L Series) (LG Series)	BT40,BT50/DIN69871A			(Option)		BT50/DIN69871A(Option)	
Spindle speed	(L Series) rpm (LG Series) rpm	Build-in type BT40 : 12000,15000, BT50 : 8000,10000			(Option)		Build-in type BT50 : 8000,10000	
Spindle diameter	(L Series) mm (LG Series) mm	Two-step variable speed gear : 10~6000 rpm(Std.)			(10~4500 rpm Opt.)		Two-step variable speed gear : 10~6000 rpm(Std.) (10~4500 rpm Opt.)	
		100					100	
		100					100	
FEED								
Rapid feed rates(X)	m/min	15			12		15	
Rapid feed rates(Y/Z)	m/min	15/10					15/10	
Cutting feed rates (X/Y)	mm/min	1~7500					1~7500	
Ball screw dia. & pitch (X/Y/Z)	mm	Ø63/63/63,P25/16/10	Ø80/63/63,P25/16/10	Ø80/63/63,P40/16/10		Ø80/63/63,P25/20/10	Ø80/63/63,P40/20/10	
Ball screw transmission (X/Y/Z)		Gear/Direct /Gear driven					Gear driven	
ATC								
Tool capacity	pcs	32(Opt 40)					32(Opt 40)	
Max. tool diameter(with/withou adjacent tool)	mm	BT40 : 75/125,BT50 : 125/215					BT50 : 125/215	
Max. tool length	mm	BT40 : 250, BT50 : 350					BT50 : 350	
Max. tool weight	kg	BT40 : 7,BT50 : 20					BT50 : 20	
Pull stud		BT40 : MAS403 P40T-1, BT50 : MAS403 P50T-1					BT50 : MAS403 P50T-1	
MOTOR								
Spindle motor (cont./30min rating)	(L Series) kW (LG Series) kW	TH230(αB112L) : 15/18.5 (Cont./15min) TH310(αB160LL) : 15/22kW (Cont./10min)					TH230(αB112L) : 15/18.5(Cont./15min) TH310(αB160LL) : 15/22kW(Cont./10min)	
Max. spindle torque	(L Series) Nm (LG Series) Nm	FANUC ail 18/7000 : 18.5/30 (Cont./S3 25%) αB112L : 167(S3 15%) αB160LL : 420(S3 25%) 6000rpm : 769(S3 25%),(Opt. 4500rpm :1026(S3 25%))					FANUC ail 18/7000 : 18.5/30(Cont./S3 25%) αB112L : 167(S3 15%) αB160LL : 420(S3 25%) 6000rpm : 769(S3 25%),(Opt. 4500rpm:1026(S3 25%))	
ACCURACY								
Positioning (JIS6338)	mm	±0.005/300mm, ±0.015 total length					±0.005/300mm,±0.015 total length	
Positioning (VD13441)	mm	P0.025	P0.030	P0.040	P0.050	Ps0.025	Ps0.030	Ps0.040
Repeatability (JIS6338)	mm	±0.003					±0.003	
Repeatability (VD13441)	mm	Ps 0.020	Ps 0.025	Ps 0.030	Ps 0.035	Ps0.020	Ps0.025	Ps0.030
OTHERS								
Power required		65kVA,220V,3phase			50/60		65kVA,220V,3phase 50/60	
Air pressure required	kg/cm ²	6					6	
Coolant tank capacity	liter	660					750	
Linear ways (X/Y/Z)		X:3 roller type linear ways Y:2 roller type linear ways			Z: box ways		X:3 roller type linear ways Y:2 roller type linear ways Z: box ways	
Machine weight	kg	33000	38000	45000	52000	43000	50000	57000

Standard Accessories

- Spindle oil cooler
- Semi-type splash guard
- Centralized automatic lubrication system
- Coolant system
- Chip auger and chain type chip conveyor with cart
- Arm type 32 tools magazine
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