AWEA®

THE ULTIMATE MACHINING POWER

BM SERIES

Maximum Performance Machining Centers

Awea Mechantronic Co., Ltd.

MAXIMUM PERFORMANCE VERTICAL MACHINING CENTERS

Packed with industry leading technology and top quality components, the AWEA BM series machining centers combine incredible power, strength, and speed to bring you The Ultimate Machining Power®. These powerful maximum performance machines will easily accomplish the demanding milling applications of today and tomorrow. Offering a wide range of models and many spindle configurations to suit your applications, the BM series offers BM 850 / 1020 / 1200 / 1460 with 600 mm of Y-axis travel, BM 1400 / 1600 / 1800 have 800 mm of Y-axis travel and BM 2100 / 2500 have 1,000 mm of Y-axis travel. Furthermore, many features are standard that are not available or costly options found on competitor's machines. Features such as extended Y-axis with 4 box ways, 20 drum ATC (BM 850 ~ BM 1460), 16 drum ATC (BM 1400 ~ BM 2500), spindle oil chiller, rigid tapping, and high speed controls are standard plus many more.

(BM 850 model shown)

- Ultra fast rapids of 24 m/min. on X & Y axes*1.
- Extra long Y-axis travel offers greater machining capacity.
- Fully enclosed splashguards keep chips and coolant contained for a safe clean working environment.

Models	BM 850	BM 1020	BM 1200	BM 1460	BM 1400	BM 1600	BM 1800	BM 2100	BM 2500
Spindle taper	BT 40 / BT 50*2							BT 50*2	
X-axis travel	850 mm	1,020 mm	1,200 mm	1,400 mm	1,400 mm	1,600 mm	1,800 mm	2,100 mm	2,500 mm
Y-axis travel	600 mm				800 mm			1,000 mm	
Z-axis travel	600 mm				700 mm	800 mm		1,000 mm	

Specifications are subject to change without notice.
*1 : BM 850 ~ 1460 . *2 : Optional CAT or DIN .

(BM 2100 model shown with optional enlarged windows)

40 - Taper optional 30 - tool ATC shown

50 - Taper optional 30 - tool ATC shown

- 40-Taper machines have optional 24 / 30 / 32 / 40 tool swing-arm ATCs, 50-Taper machines have optional 24 / 30 / 40 tool swing-arm ATCs.

- Optional chip conveyor system automatically discharges chips from machine.

- Standard spindle oil chiller improves machining accuracy and extends spindle life.

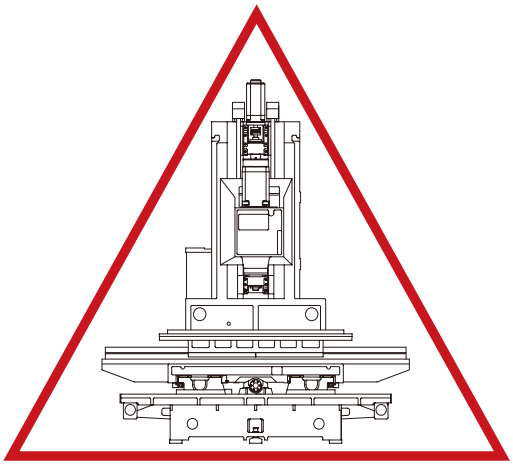
- Copper piping auto lubrication system delivers metered amounts of lubrication to the slide ways, ball screws, and vital components with ensured reliability.

MAXIMUM STRENGTH DESIGN

- By using the Finite Element Method (FEM), optimal reinforce ribbings are directly cast into the one-piece bed structure. Together with the super-wide Y-shape column, mechanical rigidity has been increased by more than 45% when compared to conventional designs. The BM series is capable of performing super heavy-duty machining and maintain long-term super high-precision accuracy. More rigidity also means extended tool life.

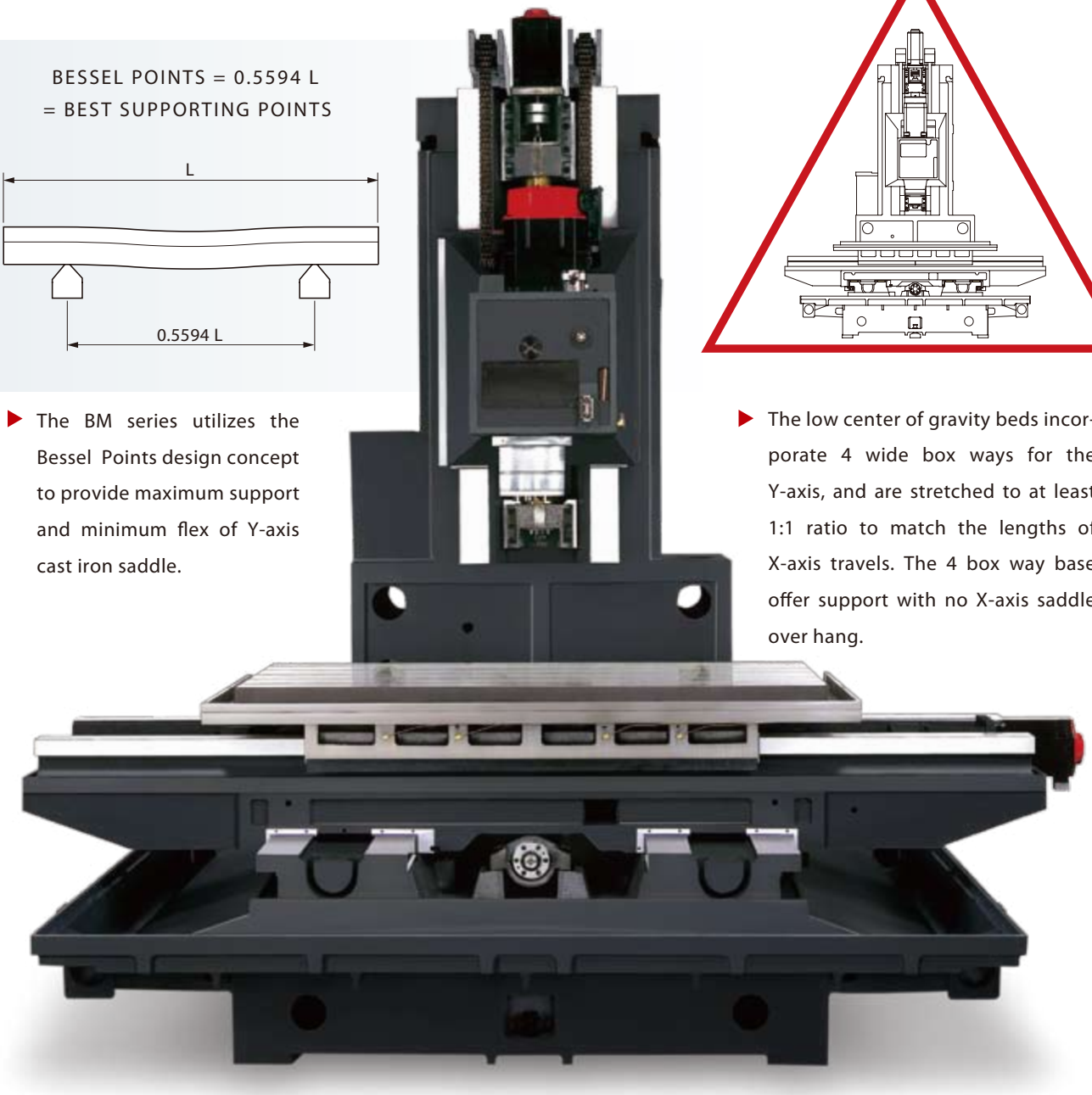
- Built to endure years and years of rigorous high production machining, the thermally balanced bed and casting components are of FC300 - Meehanite casting (industry standard is FC200 ~ 250). FC300 grade cast iron is capable of withstanding much greater stress without deforming and provides maximum vibration dampening, which result in a machine that will outlast and outperform the competition.

BESSEL POINTS = 0.5594 L
= BEST SUPPORTING POINTS



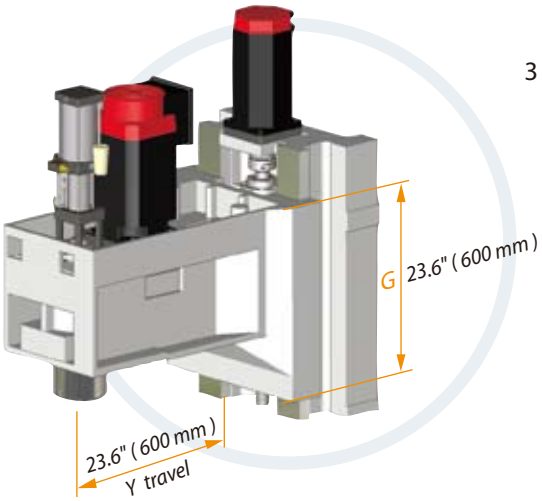
- The BM series utilizes the Bessel Points design concept to provide maximum support and minimum flex of Y-axis cast iron saddle.

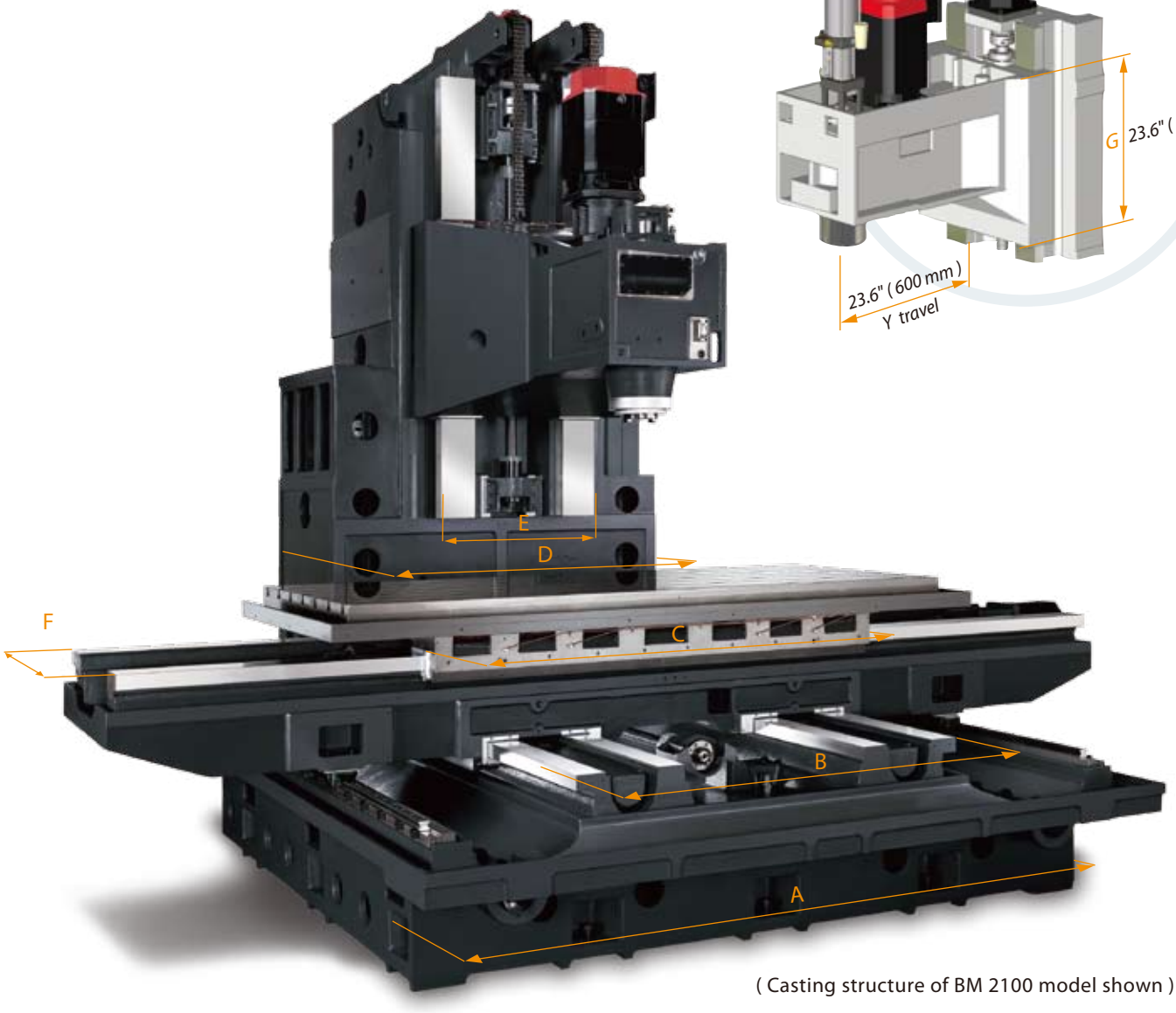
- The low center of gravity beds incorporate 4 wide box ways for the Y-axis, and are stretched to at least 1:1 ratio to match the lengths of X-axis travels. The 4 box way base offer support with no X-axis saddle over hang.



(Casting structure of BM 1600 model shown)

▶ Perfect 1:1 scale of Z and Y axes strokes on BM 850 ~ BM 1460 models.





(Casting structure of BM 2100 model shown)

▶ All spindle and servo motors, including drives, are Fanuc*1 alpha *i* series components to ensure peak machining performance and accuracy. X, Y, and Z axes are driven by over-sized Fanuc alpha *i* series AC servo motors, providing tremendous thrust outputs with faster acceleration and deceleration.*1

CASTING STRUCTURE DIMENSIONS

(Unit : mm)

Models	A	B	C	D	E	F	G
BM 850	1,000	900	800	1,200	450	450	600
BM 1020			850				
BM 1200	1,280	1,200	1,000				
BM 1460	1,280	1,200	1,100				
BM 1400	1,360	1,300	1,150		550	550	750
BM 1600	1,650	1,500	1,300	1,350		600	800
BM 1800	1,650	1,500	1,600				
BM 2100	2,430	2,400*2	1,700	1,500	700	800	
BM 2500			2,100				

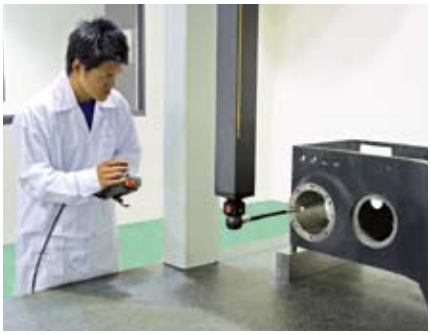
Specifications are subject to change without notice.
*1 : The motors may change according to different controller selections.
*2 : Linear guide way.

ULTIMATE MANUFACTURING PRECISION

All AWEA machining centers are assembled at our brand new, state of the art, 32.5 million US dollars facility. We have over 400 employees, 150 of them are dedicated to this plant to develop, manufacture, and serve on our machining centers.

R & D Dept.

Service Dept.



Application Dept.

Our experienced in-house R&D, Application, and Service departments are always ready to serve and satisfy your needs.

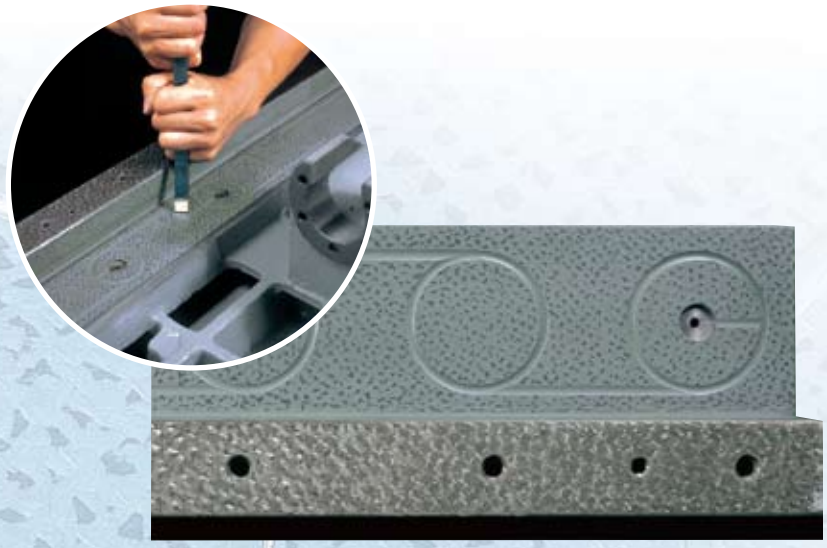
To demonstrate how serious we are about quality, all vital components must pass inspection on the 2 super high precision WENZEL 3D measuring machines (CMM) that we have invested; these CMMs are considered by many, the best in the world.

CTSP Branch

With over 500,000 sq. ft. of floor space, we are capable of producing over 2,400 machining centers a year at this plant. We are also an ISO 9001 & 14001 certified manufacture of machine tools.

- C3 class hardened and precision grinded ball screws ensure the highest accuracy and durability possible. Plus, pretension on all axes minimizes thermal distortion.
- Extra wide hardened and grinded box ways are directly formed onto the machine bed and saddle during the casting process. They are precision machined and widely spaced for maximum strength. Saddles are bonded with " Turcite B " to eliminate stick-slip, minimize wear and maintain long term accuracy. The box way design also provides the rigidity needed for heavy duty machining applications.

(Casting structure of BM 1200 model shown with option direct drive spindle)



- Accurate ball-screw housing inspection.

- A total of 56 contact surfaces of all slides, column, and ball screw bearing housings with the machine bed are precisely hand scraped to provide maximum assembly precision, structural rigidity, and load distribution. Furthermore, extensive skilled scraping induces maximum heavy cutting performance and machining accuracy.

ULTIMATE MACHINING POWER

AWEA offers an extensive selection of machining center spindle & motor configurations to suite your needs. From belt drive, to direct drive, to gear head spindles, we have them all. We also offer higher horse power motors to match the strength of our machines for the ultimate cutting performance.

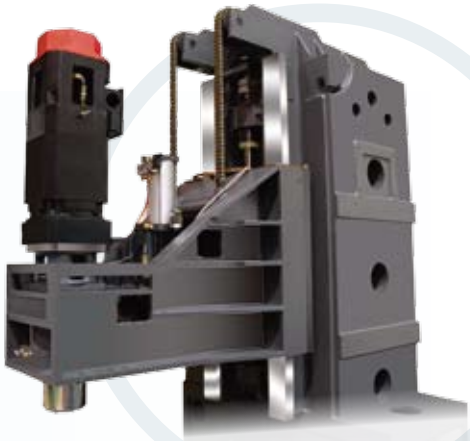
- Spindles are assembled in our own clean room to eliminate contamination problems caused by the surrounding environment.

- Gear spindles are manufactured in-house.

- After assembly, complete head stocks are isolated, broken-in, and tested on test platforms to ensure temperature, vibration, and noise are all within specifications.

HIGH PRECISION DIRECT-DRIVE SPINDLE

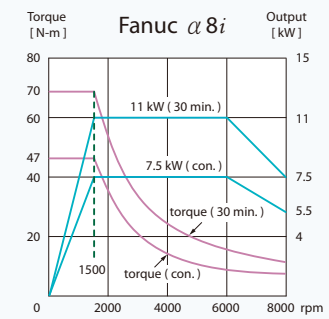
- 40 taper size 10,000 / 12,000 / 15,000 rpm high speed direct drive spindle is available.
- The direct drive spindle provide higher rigidity (16 kgf / μm axial / radial), higher dynamic accuracy (1.2 μm), lower noise (Doors open : 72dB / Doors closed: 63 dB), less vibration (2μm), and lower thermal displacement (Z-axis steady @ 32μm in 30 min).



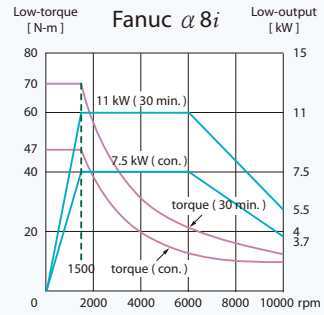
Below are output charts of some popular spindle configurations for different needs. There are also many other configurations available, please contact your sales for details.

40-TAPER SPINDLE OUTPUT

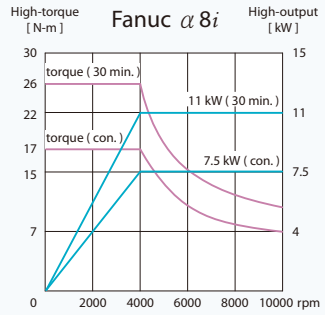
8,000 RPM BELT DRIVE SPD.



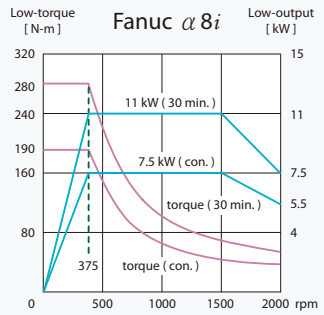
10,000 RPM BELT DRIVE LOW-SPD.



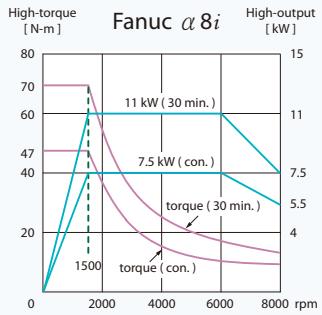
10,000 RPM BELT DRIVE HIGH-SPD.



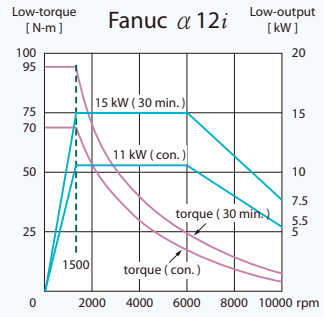
8,000 RPM GEAR HEAD LOW-SPD.



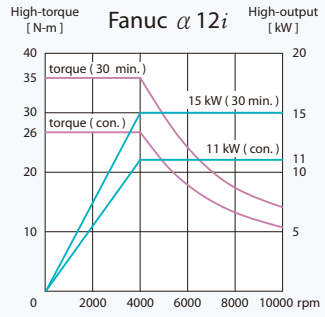
8,000 RPM GEAR HEAD HIGH-SPD.



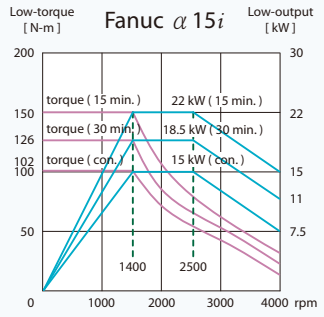
10,000 RPM DIRECT DRIVE LOW-SPD.



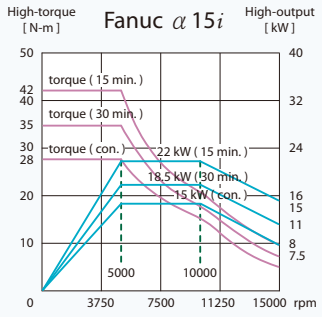
10,000 RPM DIRECT DRIVE HIGH-SPD.



15,000 RPM DIRECT DRIVE LOW-SPD.

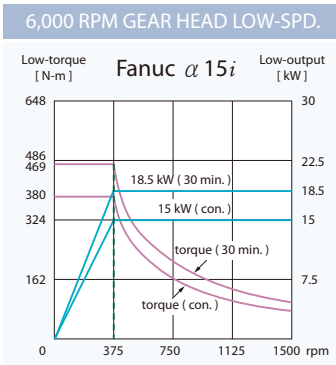


15,000 RPM DIRECT DRIVE HIGH-SPD.

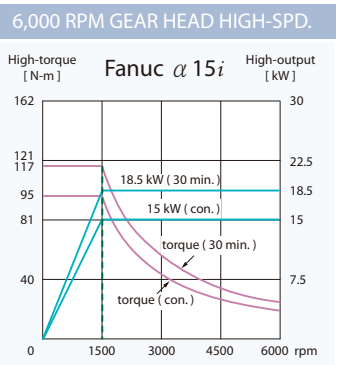


50-TAPER SPINDLE OUTPUT

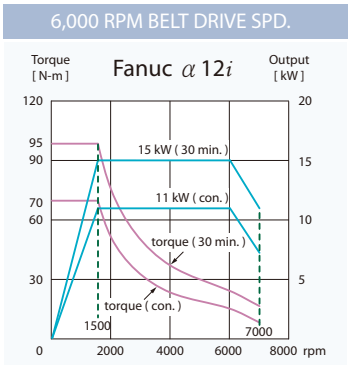
6,000 RPM GEAR HEAD LOW-SPD.



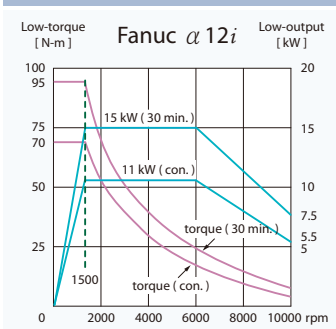
6,000 RPM GEAR HEAD HIGH-SPD.



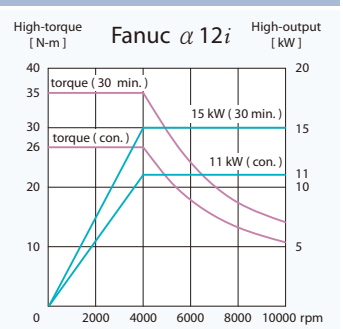
6,000 RPM BELT DRIVE SPD.



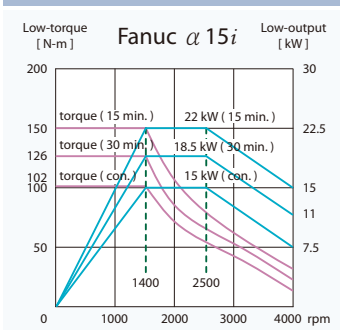
10,000 RPM DIRECT DRIVE LOW-SPD.



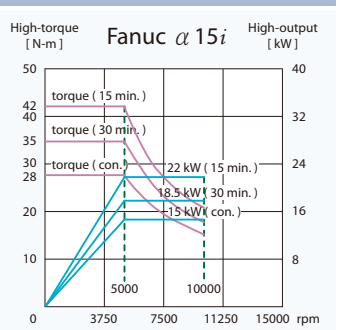
10,000 RPM DIRECT DRIVE HIGH-SPD.



10,000 RPM DIRECT DRIVE LOW-SPD.



10,000 RPM DIRECT DRIVE HIGH-SPD.



STRICT QUALITY ASSURANCE

MACHINE STRUCTURE RIGIDITY INSPECTION

HIGH SPEED SPINDLE DYNAMIC INSPECTION

LASER INSPECTION

- Laser is used to check positioning accuracy, repeatability, backlash test, and offset.
- Strict German VDI 3441 standard (repeating movement of travel 5 times to obtain statistics).

BALL BAR INSPECTION

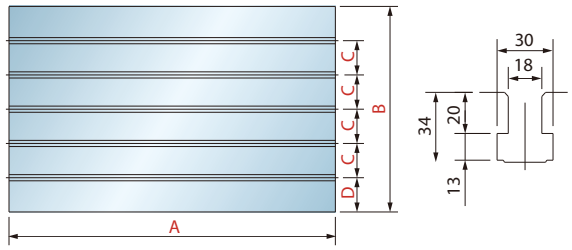
- 3-D ball bar test.

WORKPIECE CUTTING TEST

- Test cutting of work pieces are available for many applications.

DIMENSIONS

TABLE DIMENSION



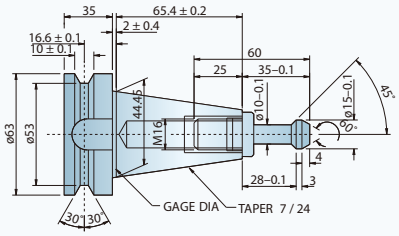
(Unit : mm)

Models	A	B	C	D
BM 850	1,050	600	100	100
BM 1020	1,120			
BM 1200	1,300			
BM 1460	1,500	650		125
BM 1400		800	150	100
BM 1600	1,700			
BM 1800	2,000			
BM 2100	2,300	1,000		50
BM 2500	2,700			

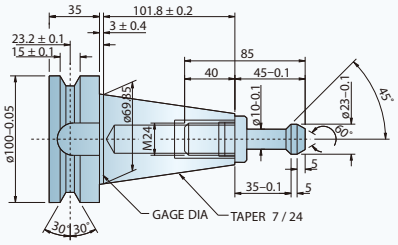
Specifications are subject to change without notice.

TOOL SHANK AND PULL STUD

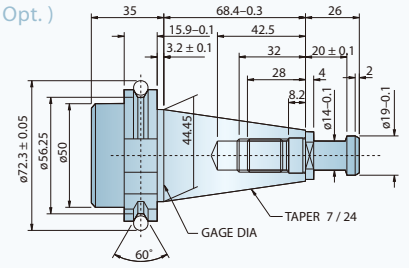
BT40



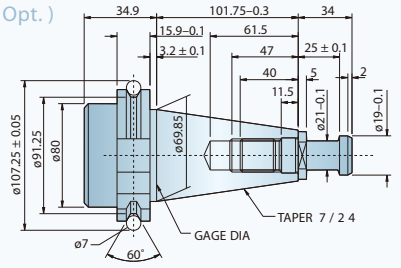
BT50



DIN40 (Opt.)



DIN50 (Opt.)

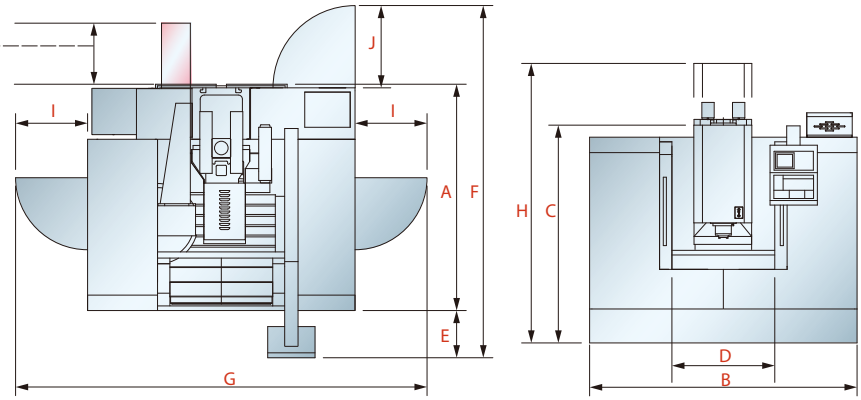


*Please contact AWEA for optional pull stud type.

Unit : mm

MACHINE SPACE REQUIREMENT

BM 850 ~ 1460	40 Taper 40 Tool ATC : 170 mm 50 Taper 30 Tool ATC : 510 mm 50 Taper 40 Tool ATC : 1,140 mm
BM 1400	50 Taper 30 Tool ATC : 265 mm 50 Taper 40 Tool ATC : 900 mm
BM 1600	50 Taper 30 Tool ATC : 245 mm 50 Taper 40 Tool ATC : 880 mm
BM 1800	50 Taper 30 Tool ATC : 245 mm 50 Taper 40 Tool ATC : 880 mm
BM 2100	50 Taper 40 Tool ATC : 520 mm
BM 2500	50 Taper 40 Tool ATC : 520 mm



SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

(Unit : mm)

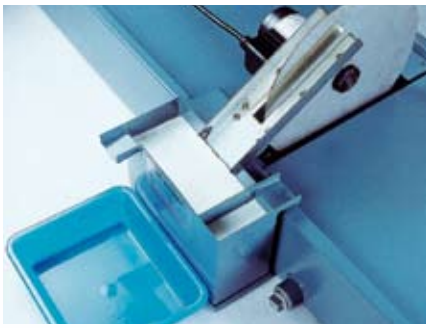
Models	A	B	C	D	E	F	G	H	I	J
BM 850	2,200	2,600	2,130	1,000	580	3,705	3,900	2,730	650	925
BM 1020		3,000				3,905	4,300			1,125
BM 1200	2,185	3,400		1,300		3,890	4,700			
BM 1460		3,850		1,470			5,150			
BM 1400	2,935	3,950	2,320	1,500	655	4,125	5,750	3,120		
BM 1600	2,995	4,400	2,585	1,800	605	4,070	6,200	3,385	900	600
BM 1800	2,965	4,880		2,070	720	4,220	6,680			
BM 2100	3,550	5,200	2,765	2,340	700	4,080	5,460	3,765	0	
BM 2500	3,550	6,500		2,950			6,500			

STANDARD & OPTIONAL FEATURES

Tri-color Status Light

Spindle Coolant

Oil Skimmer (Opt.)



Chip Wash Down (Opt.)

Chip Conveyor (Opt.)

i Console Interface (Opt.)

4Th Axis Rotary Table (Opt.)

Coolant Through Spindle System (Opt.)

ATLM (Opt.)

Linear Scale On X / Y / Z (Opt.)

- Optional coolant through spindle system offers 20 bar pressure with big coolant reservoir tank and top of the line dual filter system.
- HEIDENHAIN linear scales are available on X , Z , and Y axes to deliver accuracy up to ± 3 µm (± 0.0001") with 0.1 µm (0.000004") resolution.

S : Standard O : Option
– : Not Available C : Contact AWEA

		BM 850	BM 1460	BM 1400	BM 1800	BM 2100	BM 2500
SPINDLE							
Spindle taper	CAT 40 / ISO 40		O	O	–		
	BT 40		S	O	–		
	CAT 50 / ISO 50		O	O	O		
	BT 50		O	S	S		
40 taper spindle configuration	8,000 rpm belt driven		S	–	–		
	10,000 rpm belt driven		O	–	–		
	10,000 rpm direct drive		O	O	–		
	12,000 rpm direct drive		O	O	–		
	15,000 rpm direct driven		O	O	–		
	8,000 rpm 2-speed gear head		O	O	–		
50 taper spindle configuration	6,000 rpm belt driven		–	S	–		
	6,000 rpm 2-speed gear head		O	O	S		
Rigid tapping			S	S	S		
Spindle orientation			S	S	S		
Spindle oil chiller			S	S	S		
AUTOMATIC TOOL CHANGER							
16 drum type ATC	50-taper		–	S	S		
20 drum type ATC	40-taper		S	–	–		
24 - tool swing arm ATC	40-taper		O	O	–		
	50-taper		O	O	O		
30 - tool swing arm ATC	40-taper		O	O	–		
	50-taper		O	O	O		
40 - tool swing arm ATC	40-taper		O	O	–		
	50-taper		O	O	O		
COOLANT AND AIR							
Coolant pump			S	S	S		
Coolant through spindle preparation w/ rotary joint			O	O	O		
20 bar coolant through spindle (form A) w/ reservoir tank and twin filter system			O	O	O		
Roll-out coolant tank			S	S	S		
Chip wash down system			O	O	O		
Handheld coolant wash gun			S	S	S		
Oil skimmer			O	O	O		
Air blast system			S	S	S		
Handheld air gun			S	S	S		
CHIP DISPOSAL							
Chip auger	Single auger		S	O	–		
	triple augers		–	S	–		
	Quintuple augers		–	–	S		
Chip conveyor			O	O	O		
Chip cart with coolant drain			S	S	S		
SAFETY AND OTHERS							
Z-axis power outage anti-drop function			O	O	O		
Roof enclosed splash guarding			O	O	O		
Fully enclosed guarding			S	S	S		
Low air pressure detection switch			S	S	S		
Work light	Single		S	S	S		
Electrical cabinet	Heat exchanger		S	S	S		
	A/C cooling system		O	O	O		
Auto lubrication system			S	S	S		
Foundation leveling & maintenance tool kit			S	S	S		
Operation & maintenance manuals			S	S	S		
External M-code output	2 set (4)		O	O	O		
	4 set (8)		O	O	O		
4TH AXIS							
4th axis interface (Preparation) w/ wiring, pipe, & external cables			O	O	O		
4th axis interface w/ amplifier			O	O	O		
4th axis + 5th indexing axis interface			O	O	O		
4th axis rotary tables and accessories			O	O	O		
MEASUREMENT							
Auto tool length measurement system (Renishaw , Blum , Metrol)			O	O	O		
Workpiece measurement (Renishaw , Blum)			O	O	O		
Heidenhain linear scales on X , Z , and Y axes			O	O	O		

Control functions*1		0*i*-MD	18*i*-MB
HARDWARE			
SB7 PMC system: 0.033 m sec / step		S	S
Display	8.4" color LCD	S	–
	10.4" color LCD	O	S
Keypad	Small - 44 keys	S	–
	Large - 56 keys	–	S
Servo Control	HRV3	S	S
PROGRAMMING			
Linear interpolation		S	S
Circulart interpolation		S	S
Inch / metric conversion		S	S
Unexpected disturbance torque detection function		S	O
Programmable mirror image		S	S
Coordinate system rotation		S	S
Absolute / incremental programming		S	S
Rigid tapping		S	S
Auto power off funtion		S	S
Addition of workpiece coordinate system	48 pairs	S	S
Part program storage length	640 m (256 KB)	–	–
	1280 m (512MB)	S	S
Registerable programs	200	–	–
	400	S	S
Extended part program editing		S	S
Custom macro B		S	S
Background editing		S	S
Conversational programming	Manual Guide O*i*	S	–
	Manual Guide	O	S
	Manual Guide *i*	O	O
i console (10.4" color LCD only)		–	O
DATA INPUT / OUTPUT			
Memory card input / output		S	–
RS-232 port		S	S
ATA Flash Card slot		S	S
Ethernet		S	S
INTERPOLATION			
Threading, synchronous cutting		S	S
Tangential speed constant control		S	S
Cutting feedrate clamp		S	S
Automatic corner deceleration		S	S
Polar coordinate interpolation		–	S
Involute interpolation		–	S
Cylindrical interpolation		S	S
Helical interpolation		S	S
JERK control		S	S
AI nano contour control*2		–	S
AI contour control		S	–
TOOL FUNCTION / COMPENSATION			
Tool offset	200 pairs	–	S
	400 pairs	S	–
Tool offset memory C		S	S
Tool life management		S	S
DISPLAY			
Dynamic graphic display		S	S
Graphic display function*3		S	S
Alarm & Operator message history display		S	S
Run hour and parts count display		S	S
OPERATION			
DNC Operation		S	S
DNC Operation with Memory Card		S	S
Remote MPG (handle feed unit)		S	S

Specifications are subject to change without notice.

*1 : Please contact AWEA for complete control specification list.

*2 : Optional with 18*i*-MB .

*3 : Standard with color LCD option.

MACHINE SPECIFICATIONS

Models	BM 850	BM 1020	BM 1200	BM 1460
X/Y/Z AXES				
X-axis travel	850 mm	1,020 mm	1,200 mm	1,400 mm
Y-axis travel	600 mm			
Z-axis travel	600 mm			
X & Y axes rapids	24 m/min.			
Z-axis rapids	20 m/min.			
Cutting feederate	1 ~ 10,000 mm/min.			
Slide way type	Hardened & Ground Box Ways (4 box ways on Y-axis)			
TABLE				
Table size	1,050 X 600 mm	1,120 X 600 mm	1,300 X 600 mm	1,500 X 650 mm
Max. table load	850 Kg	1,000 Kg	1,200 Kg	1,400 Kg
T slot (Width X No.)	18 mm X 5			
Table top to floor	900 mm			
SPINDLE				
Spindle taper	40-Taper : BT 40*1		50-Taper : BT 50 / DIN 50 / CAT 50*2	
Spindle configuration	40-Taper : Belt-driven		50-Taper : 2-speed gear head	
Spindle speed ranges	40-Taper : 65 ~ 8,000 rpm		50-Taper : L : 65 ~ 1,500 rpm H : 1,500 ~ 6,000 rpm	
Spindle motor	40-Taper : 7.5 / 11 Kw (con. / 30 min.) *11		50-Taper : 11 / 15 Kw (con. / 30 min.) *11	
Spindle nose ~ table	40-Taper : 125 ~ 725 mm		50-Taper : 125 ~ 725 mm	
Spindle Center ~ column	680 mm			
ATC				
ATC type	40-Taper : 20-tools drum ATC*3		50-Taper : 24 / 30 tools swing arm ATC*2	
Max. tool diameter	40-Taper : 90 / 150 mm, (adj pockets empty)		50-Taper : 110 / 200 mm, (adj pockets empty)*4	
Max. tool length	40-Taper : 250 mm		50-Taper : 300 mm	
Max. tool weight	40-Taper : 8 Kg		50-Taper : 15 Kg	
Tool change time	40-Taper : 4.5 sec.		50-Taper : 7 sec.	
GENERAL				
Positioning Accuracy	P=0.012，VDI/DGQ3441			
Repeatability	Ps=0.008，VDI/DGQ3441			
CNC control	Fanuc O*i*- MD (opt. 31*i*- MB) *5			
Voltage / Power requirement	AC 200/220 + 10 % to –15 % 3 phase, 25 KVA			
Air requirement	6 Kg/cm^2			
Coolant tank capacity	265 L	305 L	315 L	340 L
Machine weight	6,500 Kg	6,800 Kg	7,300 Kg	7,500 Kg

Specifications are subject to change without notice.

*1 : Optional CAT , DIN.

*2 : 50 Taper with model BM 850 ~ BM 1460 are all optional.

*3 : Optional 24 / 30 / 32 / 40 tools swing arm ATC.

*4 : 24-tool swing arm ATC

*5 : Optional Mitsubishi / Heidenhain / Siemens

Models	BM 1400	BM 1600	BM 1800	BM 2100	BM 2500
X/Y/Z AXES					
X-axis travel	1,400 mm	1,600 mm	1,800 mm	2,100 mm	2,500 mm
Y-axis travel	800 mm			1,000 mm	
Z-axis travel	700 mm	800 mm		1,000 mm	
X & Y axes rapids	20 m/min			15 m/min	
Z-axis rapids	18 m/min.			12 m/min.	
Cutting feederate	1 ~ 8,000 mm/min.				
Slide way type	Hardened & Grinded Box Ways (4 box ways on Y-axis)			Hardened & Grinded Box Ways (4 box ways & 2 linear guide ways on Y-axis)	
TABLE					
Table size	1,500 X 800 mm	1,700 X 800 mm	2,000 X 800 mm	2,300 X 1,000 mm	2,700 X 1,000 mm
Max. table load	1,800 Kg	2,000 Kg	2,200 Kg	3,000 Kg	4,000 Kg
T slot (Width X No.)	18 mm X 5			18 mm X 7	
Table top to floor	990 mm	1,050 mm		1,100 mm	
SPINDLE					
Spindle taper	40-Taper : BT / DIN / CAT 40*6	50-Taper : BT 50*7		50-Taper : BT 50*7	
Spindle configuration	40-Taper : 10,000 / 12,000 rpm direct drive	50-Taper : 6,000 rpm belt-driven*8		50-Taper : 6,000 rpm Gear*8	
Spindle speed ranges	40-Taper : please see page 8	50-Taper : 65 ~ 6,000 rpm		50-Taper : L : 65 ~ 1,500 rpm H : 1,500 ~ 6,000 rpm	
Spindle motor	40-Taper : please see page 8	50-Taper : 11 / 15 Kw (con. / 30 min.) *11		50-Taper : 15 / 18 Kw (con. / 30 min.) *11	
Spindle nose ~ table	40 / 50 : 200 ~ 900 mm	40-Taper : 160 ~ 960 mm	50-Taper : 200 ~ 1000 mm	50 -Taper : 200 ~ 1,200 mm	
Spindle Center ~ column	900 mm			1,100 mm	
ATC					
ATC type	40-Taper*9	50-Taper : 16-tool drum ATC*9		50-Taper : 16-tool drum ATC*9	
Max tool diameter	40-Taper*10	50-Taper : 130 / 200 mm (adj. pockets empty)*10		50-Taper : 130 / 200 mm (adj. pockets empty)	
Max. tool length	40-Taper : 250 mm	50-Taper : 300 mm		50-Taper : 300 mm	
Max. tool weight	40-Taper : 8 Kg	50-Taper : 15 Kg		50-Taper : 15 Kg	
Tool change time	40-Taper : 4.5 sec.*6	50-Taper : 7 sec.		50-Taper : 7 sec.	
GENERAL					
Positioning Accuracy	P=0.02，VDI/DGQ3441				
Repeatability	Ps=0.008，VDI/DGQ3441				
CNC control	Fanuc O*i* - MD (opt. 31*i* - MB)*5				
Voltage/Power requirement	AC 200 / 220 + 10 % to –15 % 3 phase, 40 KVA				
Air requirement	6 Kg/cm^2				
Coolant tank capacity	600 L		630 L	1000 L	
Machine weight	13,000 Kg	15,000 Kg	17,000 Kg	20,000 Kg	22,000 Kg

*6 : 40 Taper with model BM 1400 ~ BM 1800 are all optional.

*7 : Optional CAT , DIN.

*8 : BT40 10,000 or 12,000 rpm direct drive as an option.

*9 : Optional 24 / 30 / 40 tools swing arm ATC.

*10 : Individual models may vary, please contact awea.

*11 : Different spindle motor may be optional available, please consult with your sales representative.

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