

CHEVALIER®

FM-2S/2SK/2SKH/4SKH

FM-3VS/3VK/3VKH/4VKH

VERTICAL TURRET MILLING MACHINE



FM-2S / 4S / 3V

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FEATURES

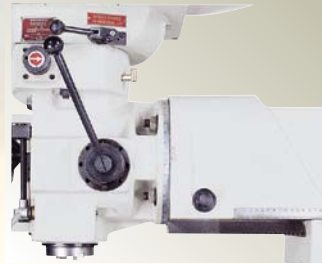
HIGH EFFICIENCY VERTICAL TURRET MILLING MACHINE

FM-2S · 2SK · 2SKH · 4SKH

FM-3VS · 3VK · 3VKH · 4VKH

HIGH EFFICIENCY VERTICAL TURRET MILLING MACHINE

- Dynamically balanced motor and ground pulleys
- Chrome-plated and bearing supported motor shaft provides an extremely smooth, low vibration quiet drive.
- High precision spindles use Class 7 angular contact bearings.
- Spindle runout guaranteed to be within 0.00015"
- The dovetail and square slideways of the table, saddle and column are laminated with Turcite-B, hardened and ground for precise, smooth and wear resistant movement
- The hard chrome quill is ground to a mirror finish to ensure smooth movement
- Double-nut mounting of table and saddle lead screws eliminates backlash
- One-piece pinion gear and shaft; one-piece worm gear & shaft



Spindle Head

- NST40 spindle head is rigidly fixed to the ram for heavy duty milling and is available with tilting head standard and fixed head optional. (FM-4SKH/4VKH)



Saddle

- Extra wide saddle is constructed to handle heavy work loads and to avoid table overhang. (FM-4SKH/4VKH)



FM-2S

Note: Machine shown with optional accessories



FM-3VS

Note: Machine shown with optional accessories

/4V Series

FEATURES

2

VERTICAL MILLING MACHINE



Step Pulley Head

- Spindle speeds are reached by manually switching V belt positions to match with cutting demands or cutter sizes. A braking system is equipped to facilitate operations.



Dovetail Ways

- Hardened and ground dovetail slideways design is available to customers who want accurate locking in the way system.
L: Dovetail column ways
R: Dovetail knee ways



Vari-Speed Head

- The infinitely variable spindle speed is displayed and can be controlled by a handwheel during running, eliminating the need to completely stop machine for speed changes. A braking system is also equipped to facilitate operations.



Square Ways

- Hardened and ground squareways are available to customers who demand stiff load bearing surfaces for heavy duty machine.
L: Square column ways
R: Square knee ways



FM-3VKH

Note: Machine shown with optional accessories

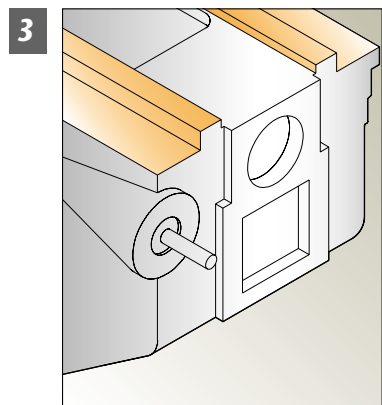
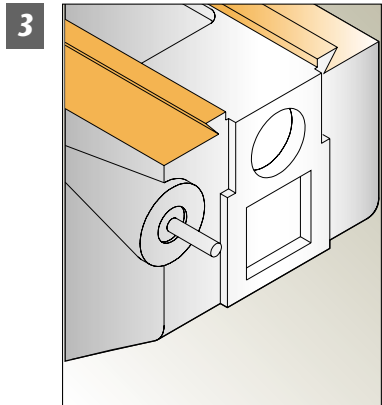
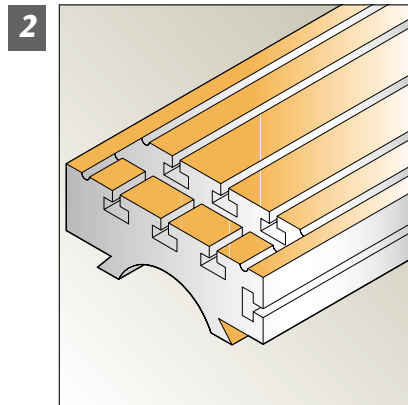
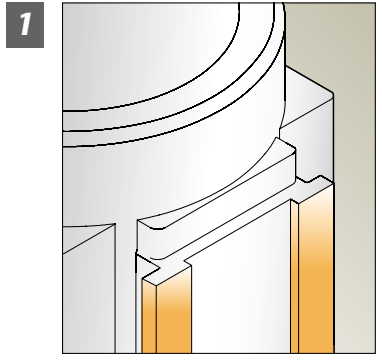
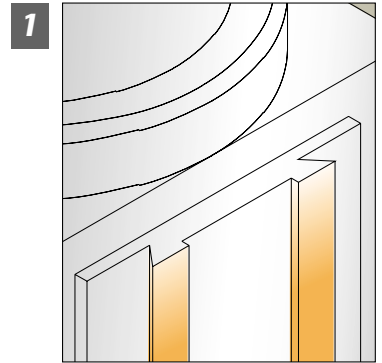


FM-4VKH

Note: Machine shown with optional accessories

Hardened and Ground Slideways & Table Surface

■ The table, knee, column slideways and table surface are all hardened and ground for wear resistance. This helps prolong machine life and ensures consistent machine accuracy even after years of hard use.

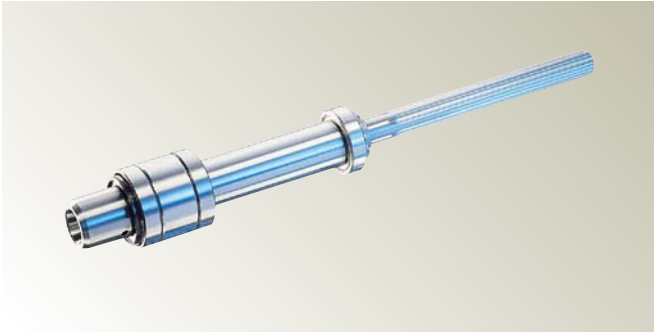


FM-3VK

Note: Machine shown with optional accessories

- 2S / 4S / 3V / 4V Ser

HIGH EFFICIENCY VERTICAL TURRET MILLING MACHINE



High Precision Spindle

- The spindle is supported by super precision ABEC class 7(P4) angular contact ball bearings which have been accurately measured, selected and pre-loaded, then assembled in a temperature controlled room to ensure better accuracy and rigidity throughout the full RPM range.



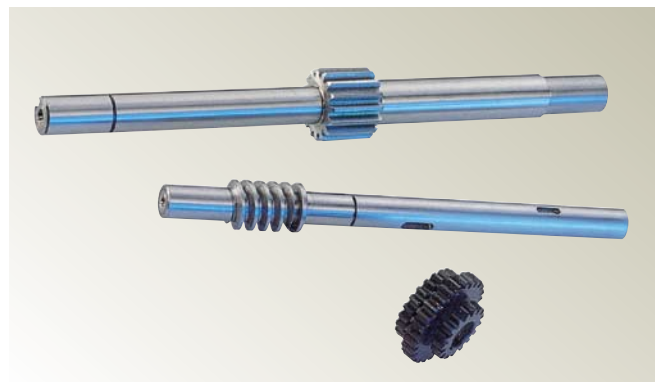
Low Vibration Vari-Speed Spindle Drive

- Spindle motor shaft is chrome plated to ensure smooth speed changes and excellent shaft longevity. The pulleys are ground to lengthen belt life. The motor and pulleys are dynamically balanced to provide an extremely smooth, low vibration and quiet drive.



Accurately Ground Quill and Housing

- The hard chromed quill is ground to a mirror finish and the quill housing is precisely ground to a 0.0004"(0.01mm) oversize to ensure smooth movement and provide excellent rigidity. The sturdiness of the quill provides excellent rigidity during light or heavy cuts.



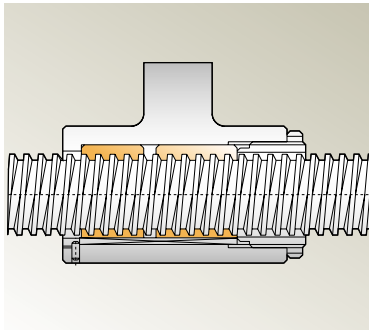
Solid Quill-Feed

- The quill-feed mechanism utilizes a one-piece pinion gear and shaft as well as a one piece worm and worm-shaft both providing strength, rigidity and less maintenance.



Meehanite Cast Iron

- All essential castings are made of high grade of Meehanite cast iron which has been stress relieved to provide a rigid machine structure.



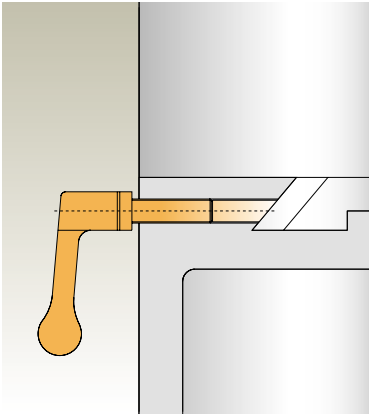
Backlash Adjustment

- The double-nut arrangement utilized on the table and saddle allows backlash to be nearly eliminated and can be adjusted in a matter of minutes.



Meehanite Cast Iron

- All essential castings are made of high grade of Meehanite cast iron which has been stress relieved to provide a rigid machine structure.



Precision Hand Scraping

- The upper and lower surface of the saddle are laminated with Turcite-B and precisely hand scrapped to provide a smooth, accurate and wear resistant slideway surface.

Double Lock

- The knee, ram and table are equipped with a pair of locks that camp each axis to prevent lateral movement.

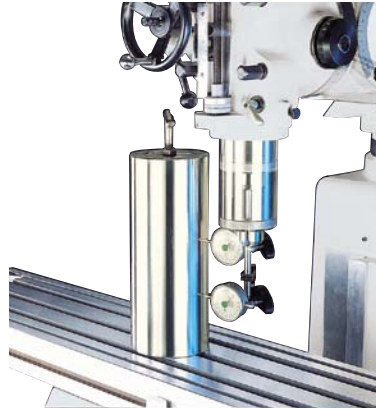


Honeycom Rib Design

- All essential castings are ribbed with honeycomb design for maximum stiffness.

Spindle Bore Runout

- Attach the base of a test indicator to the table surface. Touch the stylus of the indicator to conical bore surface of the spindle. Rotate the spindle and the variation of readings shall be under 0.00015"(0.004mm).



Squareness of Table Surface to Quill Travel

- Attach the base of a test indicator to the spindle. Touch the stylus of the indicator to surface of the cylinder gauge which is placed on the table surface. Move spindle up and down and the indicator variation shall be within 0.0004"/5"(0.01/127mm).

Spindle Running Noise Measuring

- Place noise meter 3.3'(1m) in front of machine and the same height with quill to measure the spindle running noise. The measured noise shall be less than 72 dB.



Stiffness of Head and Quill Combination

- Move quill down to its down limit position. Attach the base of a test indicator to the table surface. Touch the stylus of the indicator to the quill surface. Apply 15lbs(7kgf) by thrust meter to push the lowest edge of quill. The maximum displacement shall be less than 0.0008"(0.02mm).

Parallelism of Table Surface to Table Cross Transverse Movement

- Attach the base of a test indicator to the column. Touch the stylus of the indicator to the table surface. Traverse the table in and out. The indicator variation shall be within 0.0007"/12"(0.018/305mm).

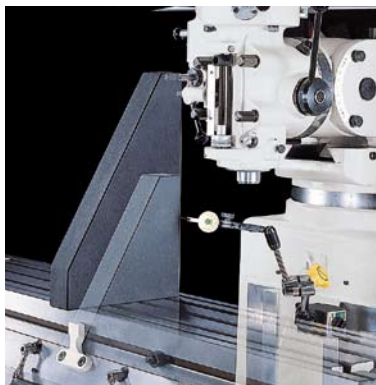


Parallelism of Table Surface to Table Longitudinal Movement

- Attach the base of a test indicator to the column. Touch the stylus of the indicator to the table surface. Move the table left and right. The indicator variation shall be within 0.0006"/20"(0.015/500mm).

Squareness of Table Surface to Knee Travel

- Touch the stylus of the test indicator, which is mounted on fixed part of machine, to the surface of square gauge which is placed on the table surface. Move knee up and down and the indicator variation shall be within 0.0008"/12"(0.02/305mm).



Parallelism of Table Surface to Ram Cross Transverse Movement

- Attach the base of a test indicator to the ram. Touch the stylus of the indicator to the table surface. Traverse the ram in and out. The indicator variation shall be within 0.0008"/12"(0.02/305mm).

OPT. ACCESSORIES

PART NO.	DESCRIPTION	SIZE	MODEL
VICES			
B95-0101	Angle Lock Vise W/Swivel Base	6" (150mm)	
B95-0102	Angle Lock Vise W/Swivel Base	8" (200mm)	
B95-0105	6" Vise W/Swivel Base	6" (150mm)	
BL96-0304	Angle Lock Vise W/Swivel Base	6" (150mm)	
BL96-0305	Kurt Anglock Vise	8" (200mm)	
BL96-0314	Kurt Swivel Base For 6" Vise		
BL96-0315	Kurt Swivel Base For 8" Vise		

OTHERS			
B95-0203	Ground Parallels	18 pcs/set	
B95-0402	Rotary Table (Vert. & Horiz)	12" (300mm)	
BL96-0801	Dorian Right Angle Attachment	R-8	FM-2S.3VS.
BL96-0802	Dorian Arbor Support	R-8	FM-2SK.3VK.
BL96-0803	Dorian 1" Arbor	R-8	FM-3VKH
B95-0429	Right Angle Head	NST-30	FM-2/3 series
B95-0430	Slotting Attachment	G28	FM-2/3/4 series
B95-0432	Right Angle Head	NST-40	FM-4 series
B95-0435	Right angle Head arbor Support Assy.	NST-40	FM-4 series
B95-0502	Clamping Kits.	5/8" (52pcs.)	
BL96-0601	Lyndex R-8 Collet Set	1/8"~7/8" (12pcs./set)	
B95-0201	Riser Block	4" (100mm)	FM-2/3 series
B95-0202	Riser Block	8" (200mm)	FM-2/3 series

DIGITAL READOUTS			
BL45-0302	Acu-Rite 200M 2 axis DRO	12" x 36"	FM-2S, 3VS (48" TABLE)
BL45-0303	Acu-Rite 200M 2 axis DRO	16" x 36"	FM-2SK, 3VK, 3VKH, 4VKH
BL45-0305	Sony Millman 2 axis DRO	12" x 30"	FM-2S, 3VS (48" TABLE)
BL45-0306	Sony Millman 2 axis DRO	18" x 36"	FM-2SK, 3VK, 3VKH, 4VKH
BL45-0307	Acu-Rite 200M 3axis DRO		FM-2S.3VS (48" TABLE)
BL45-0309	Acu-Rite 200M 3axis DRO		FM-2SK, 3VK, 3VKH, 4SKH
• BL45-0311	Sony Millman 3axis DRO	12" x 30"	FM-2S.3VS (48" TABLE)
• BL45-0313	Sony Millman 3axis DRO	18" x 36"	FM-2SK,3VK,3VKH,4SKH,4VKH

SPECIAL MOTOR AND TABLE			
• B95-0403	Table	9" x 48" (230 x 1220mm)	FM-2S, 3VS
• B95-0407	Two Speed Motor(2HP)		FM-2S, 2SK, 2SKH
• B95-0408	3HP Spindle Motor	16 SPEEDS	FM-2S, 2SK, 2SKH

AUTOMATIC FEEDING DEVICE			
• B95-0501	Air Power Drawbar		FM-2/3 series
• B95-0206	Air Power Drawbar		FM-4 series
• B95 0314*	Longitudinal (X) Powerfeed System	110V ONLY	FM-2/3 series
• B95-0315*	Cross (Y) Powerfeed System	110V ONLY	FM-2/3 series
• B95 0316*	Knee (W) Powerfeed System	110V ONLY	FM-2/3 series
• BL96-0201	Servo #140 table feed Powerfeed	110V ONLY	
• BL96-0202	Servo #150 table feed Powerfeed	110V ONLY	

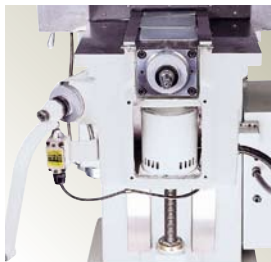
PART NO.	DESCRIPTION	SIZE	MODEL
• BL96-0203	Servo #140 crossfeed Powerfeed	110V ONLY	
• BL96-0204	Servo #150 crossfeed Powerfeed	110V ONLY	
• BL96-0205	Servo #140 kneefeed Powerfeed	110V ONLY	
• B95-0317*	Gear Driven Powerfeed	X AXIS	
• B95-0318*	Gear Driven Powerfeed	Y AXIS	
• B95-0319*	Gear Driven Powerfeed	W AXIS	
• B95-0439*	Rapid Elevating Drive W/Motor at bottom side of knee		FM-2SKH, 3VKH, 4SKH, 4VKH
• BL96-0401	Kurt Power Drawbar (Mechanical)	R8	FM-2/3 series
• BL96-0402	Kurt Power Drawbar (Automatic)	R8	FM-2/3 series

MACHINE LAMP			
B95-0404	Machine Lamp W/Out Transformer		
B95-0422	Machine Lamp With Transformer		

Control Box System			
• B95-0405A	Economic Electric Control Box With Transformer For Machine With 1 or 2 Axes Powerfeed System (Without Transformer For Machine Lamp)		
• B95-0418	Electric Control Box With Knee Type Control Panel For Machine With 1 or 2 Axes Powerfeed System	FM-2/3/4 series	
• B95-0418A	Electric Control Box With Pendant Control Panel For Machine With 1 or 2 Axes Powerfeed System		
• B95-0421	Electric Control Box With Knee Type Control Panel For Machine With 3 Axes Powerfeed System		
• B95-0421A	Electric Control Box With Pendant Control Panel For Machine With 3 Axes Powerfeed System		
• B95-0345A	Electric Control Box With Pendant Control Panel For Machine With Rapid Drive With Motor And 1 or 2 Axes Powerfeed System		
• B95-0346A	Electric Control Box With Pendant Control Panel For Machine With One Axis Gear Feeder		
• B95-0347A	Electric Control Box With Pendant Control Panel For Machine With 2 Axes Gear Feeder or 1 Axis Gear Feeder And Rapid Elevating Drive		
• B95-0349A	Electric Control Box With Pedant Control Panel For Machine With 3 Axes Gear Feeder or 2 Axes Gear Feeder And Rapid Elevating Drive		

COOLANT SYSTEM			
• B95-0409	Coolant Pump & Fittings	FM-2SK, 3VK, 2SKH, 3VKH, 4SKH, 4VKH	
B95-0410	Chip Pan		FM-2S, 3VS
B95-0411	Chip Pan		FM-2SK, 3VK, 2SKH, 3VKH
B95-0443	Chip Pan		FM-2SKH, 3VKH
• B95-0412	Coolant Pump & Fittings		FM-2S, 3VS
B95-0431	Chip Pan		FM-4SKH, 4VKH.
• BL96-0702	Bijur Fluidflex Coolant System		

• = Recommended to be factory installed.
* = Related control box system must be ordered together.



RAPID KNEE ELEVATION

Rapid knee elevation mechanism, equipped with safety lock.

B95-0469



CONTROL PANEL

Pendant control panel can be adjusted to a comfortable position for easy operation.

B95-0418A, B95-0421A, B95-0345, B95-0346A, B95-0437A, B95-0349A



CROSS (Y) POWERFEED SYSTEM

B95-0315



LONGITUDINAL (X) POWERFEED SYSTEM

B95-0314

Note:
Installation charges are extra when ordering power feed, drawbar, DRO, riser block, coolant system & electric control box.

GENERAL SPECIFICATION

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Description	FM-2S	FM-3VS	FM-2SK	FM-3VK
Table Size	9" x 42" (230 x 1066mm)		10" x 50" (254 x 1270mm)	
Longitudinal Travel	29 1/2" (750mm)		35 1/2" (901mm)	
Cross Travel	12" (305mm)		15 3/4" (400mm)	
Vertical Travel (Knee)	16" (406mm)		14 5/8" (370mm)	
Table T-slots	Quantity	3		
	Size	0.63" (16mm)		
Maximum Workpiece Weight	750lbs (340kg)			
Vertical Spindle Motor	2HP (3HP)			
Spindle Speeds	50Hz	60 ~ 2280rpm (8 steps)	50 ~ 3750rpm	
	60Hz	80 ~ 2760rpm (8 steps)	60 ~ 4200rpm	
Spindle Taper	R8 or NST30			
Spindle Nose to Table	2 3/4" ~ 18 3/4" (70 ~ 476mm)		2 3/4" ~ 117 3/8" (70 ~ 440mm)	
Spindle Centerline to Column Surface	2 3/4" ~ 18 3/4" (71 ~ 476mm)		4" ~ 25 5/8" (102 ~ 652mm)	
Quill Travel	5" (127mm)			
Automatic Vertical Feeds (per revolution of spindle)	0.0015", 0.003", 0.006" (0.04, 0.08, 0.14mm)			
Head Swivel	(R&L)90°, (F&B)45°	(R&L)90°, (F&B)+45°, -38°	(R&L)90°, (F&B)45°	
Overarm Travel	12" (305mm)		21 5/8" (550mm)	
Overarm Swivel	360°			
Floor Space (L x W x H)	86 1/2" x 63" x 78 3/4" (2197 x 1600 x 2000mm)	86 1/2" x 63" x 2 5/8" (2197 x 1600 x 2100mm)	104" x 79" x 80" (2642 x 2000 x 2034mm)	104" x 79" x 84" (2642 x 2000 x 2134mm)
Weights approx.	2380lbs (1080kg)			

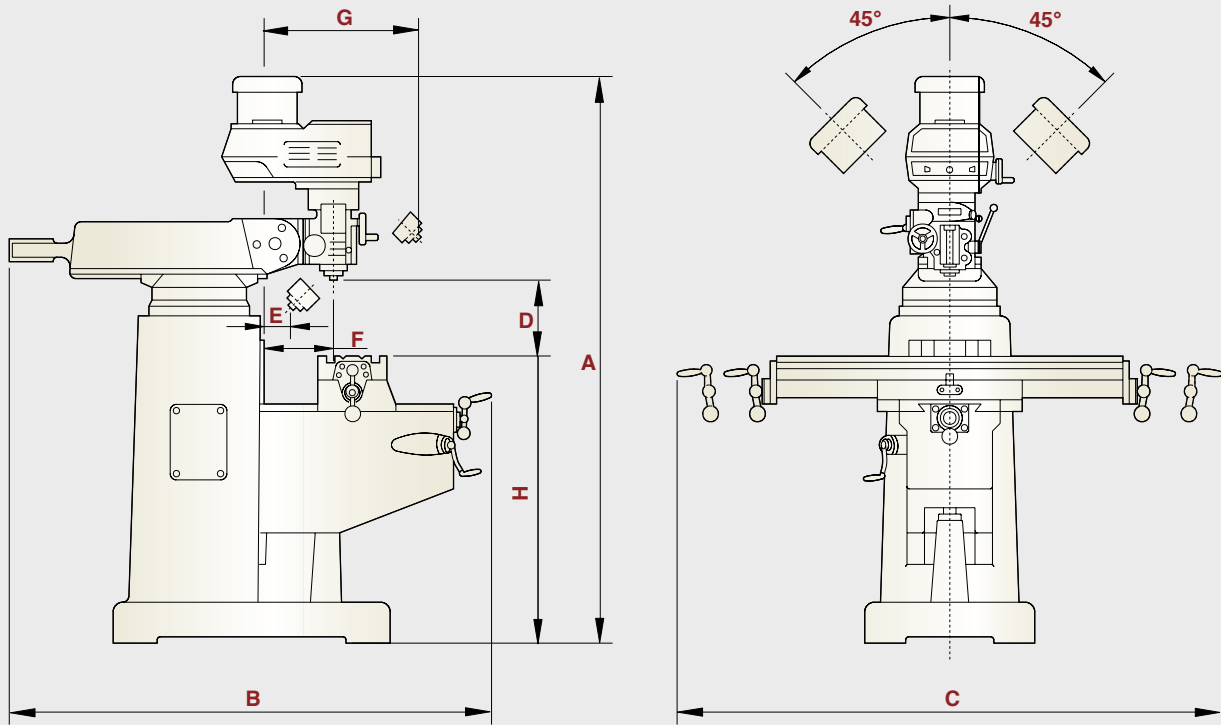
Description	FM-2SKH	FM-3VKH	FM-4SKH	FM-4VKH
Table Size	10" x 50" (254 x 1270mm)		10" x 50" (254 x 1270mm)	
Longitudinal Travel	30" (760mm)		30" (760mm)	
Cross Travel	15 3/8" (390mm)		15 3/4" (400mm)	
Vertical Travel (Knee)	15" (380mm)		14 5/8" (370mm)	
Table T-slots	Quantity	3		
	Size	0.63" (16mm)		
Maximum Workpiece Weight	946lbs (430kg)		990lbs (450kg)	
Vertical Spindle Motor	2HP (3HP)	3HP	3HP	5HP
Spindle Speeds	50Hz	60 ~ 2280rpm (8 steps)50 ~ 3750rpm	60 ~ 2280rpm (8 steps)50 ~ 3335rpm	
	60Hz	80 ~ 2760rpm (8 steps)60 ~ 4200rpm	80 ~ 2760rpm (8 steps)60 ~ 4000rpm	
Spindle Taper	R8 or NST30		NST40	
Spindle Nose to Table	1 5/8" ~ 16 1/2" (40 ~ 420mm)		2 3/8" x 20 7/8" (60 ~ 530)	
Spindle Centerline to Column Surface	4" ~ 255/8" (102 ~ 652mm)		5 7/8" ~ 27 1/2" (150 ~ 700mm)	
Quill Travel	5" (127mm)			
Automatic Vertical Feeds (per revolution of spindle)	0.0015", 0.003", 0.006" (0.04, 0.08, 0.14mm)			
Elevating Rapid Travel approx	50Hz	43 ipm (1100mm/min) (Optional)		
	60Hz	51 ipm (1300mm/min) (Optional)		
Head Swivel	(R&L)90°, (F&B)45°		(R&L)90°, (F&B)0° or 45°	
Overarm Travel	21 5/8" (550mm)			
Overarm Swivel	360°			
Floor Space (L x W x H)	101 1/4" x 79" x 80 5/8" (2572 x 2000 x 2050mm)	101 1/4" x 79" x 84 5/8" (2572 x 2000 x 2150mm)	101 1/4" x 90 1/2" x 88 1/2" (2572 x 2300 x 2275mm)	101 1/4" x 90 1/2" x 931/2" (2572 x 2300 x 2375mm)
Weights approx.	3350lbs (1520kg)		3400lbs(1550kg)	

※ Note: The manufacturer reserves the right to modify the design, specifications, mechanisms... etc. of the machine without prior notice.
All the specifications shown above are just for reference.

STD. ACCESSORIES

1. Tool and Tool Box
2. Rubber way covers (front and rear)
3. One-shot lubrication system

DIMENSIONAL DRAWINGS



ITEM	FM-2S	FM-3VS	FM2SK	FM-3VK	FM-2SKH	FM3VKH	FM-4SKH	FM-4VKH
A	78 3/4"(2000mm)	82 5/8"(2100mm)	80"(2034mm)	84"(2134mm)	80 5/8" (2050mm)	84 5/8" (2150mm)	90" (2300mm)	94" (2400mm)
B	63"(1600mm)		78 3/4" (2000mm)		78 3/4" (2000mm)		90 1/2" (2300mm)	
C	56 1/2"(1435mm)		99 1/4" (2522mm)		99 1/4" (2522mm)		99 1/4" (2522mm)	
D	2 3/4"~18 3/4"(70 ~ 476mm)		2 3/4" ~ 17 1/4" (70 ~ 446mm)		1 5/8" ~ 16 1/2" (40 ~ 420mm)		2 3/8" ~ 20 7/8" (60 ~ 530mm)	
E	0~12"(0~305mm)		0 ~ 21 5/8" (0 ~ 550mm)		0 ~ 21 5/8" (0 ~ 550mm)		0 ~ 21 5/8" (0 ~ 550mm)	
F	6 3/4"~ 18 3/4"(171 ~ 476mm)		4" ~ 25 5/8" (102 ~ 652mm)				5 7/8" ~ 27 1/2" (150 ~ 700mm)	
G	8 3/4"~ 20 3/4"(222 ~ 527mm)		9 1/2" ~ 31 1/8" (241 ~ 791mm)		9 1/2" ~ 31 1/8" (241 ~ 791mm)		9 1/2" ~ 31 1/8" (241 ~ 791mm)	
H	32 3/4"~ 48 3/4"(825 ~ 1231mm)		33 7/8"~ 48 1/2" (860 ~ 1230mm)		33 7/8"~ 48 3/4" (860 ~ 1240mm)		34 1/2" ~ 53" (876 ~ 1346mm)	

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Manual Grinders

CNC Profile Grinders

Linear Motor CNC Profile Grinder

VMC (Various Sizes)

VMC w/ turntable

CNC VTL w/ Double Turret

CNC VTL

Slant Bed CNC Lathes

Teach-in Lathes

Grinder

VMC

Vertical Lathe

Lathe

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