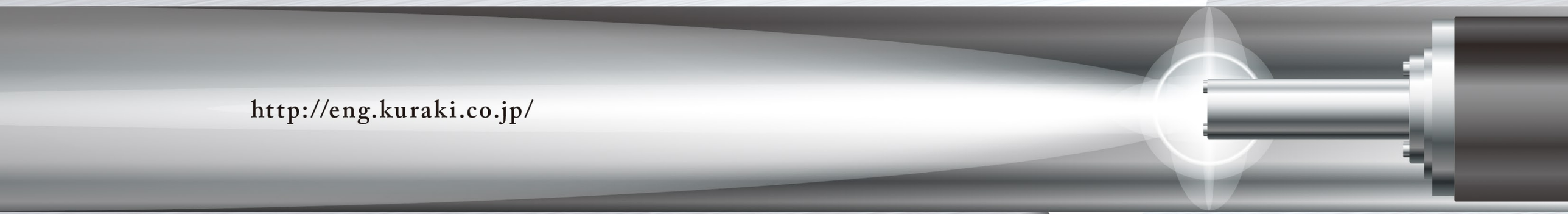
Technology for the World
KURAKI

CNC Horizontal Boring & Milling Machine

KBM Series

11EM / 11SX / 11S Models



http://eng.kuraki.co.jp/

PRODUCT CATALOG

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KBM11EM/11SX/11S 2020 02 EN R01

CNC Horizontal Boring & Milling Machine

KBM Series

11EM Model

Boring spindle: 5000 min^{-1}, highest in industry

Cutting feedrate/rapid traverse rate: Twice as fast as standard machine

Table loading capacity: 4t, corresponding to heavy workpiece

Main specification		KBM-11EM
Table size		950×1050 (1050×1200) [37.40×41.54″ (41.34×47.24″)]
Table maximum loading capacity		4000kg [8800lbs]
Stroke	X axis (table longitudinal)	1500mm [59.06″]
	Y axis (spindle vertical)	1200mm [47.24″]
	Z axis (table cross)	700mm (950mm) [27.56″ (37.4″)]
	W axis (spindle axial)	350mm [13.78″]
Rapid traverse	X, Y, Z axis	24m/min [78.74ft/min]
	W axis	12m/min [39.37ft/min]
Feed rate	X, Y, Z axis	1~12000mm/min[0.04~472.44″/min]
	W axis	1~10000mm/min[0.04~393.70″/min]
Table auto. Indexing B axis		0.001° (0.0001°)
Spindle speed		5~5000min^{-1}
Spindle motor (30min / cont.)		AC26/22kW [AC35/30HP]
Max. spindle torque		1118Nm[825ft･lbs]
Tool storage capacity		30 (60, 90, 120) tools
Scale feedback		X, Y, Z, B axis

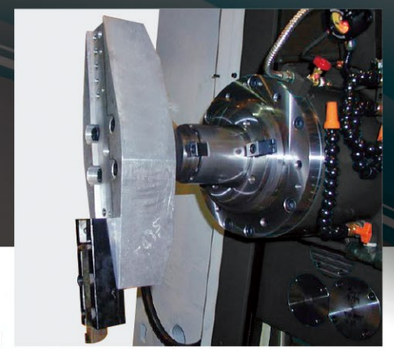
Options are indicated in ( ).

High-spec and compact machine for accelerating manufacturing with excellent rigidity and mobility

Incomparably high torque is achieved by the use of a 110mm (4.33”) diameter boring spindle.

High torque spindle

The spindle has high rigidity and the incomparably high torque, achieving large diameter boring, large diameter threading, and highly efficient machining of difficult-to-cut materials.

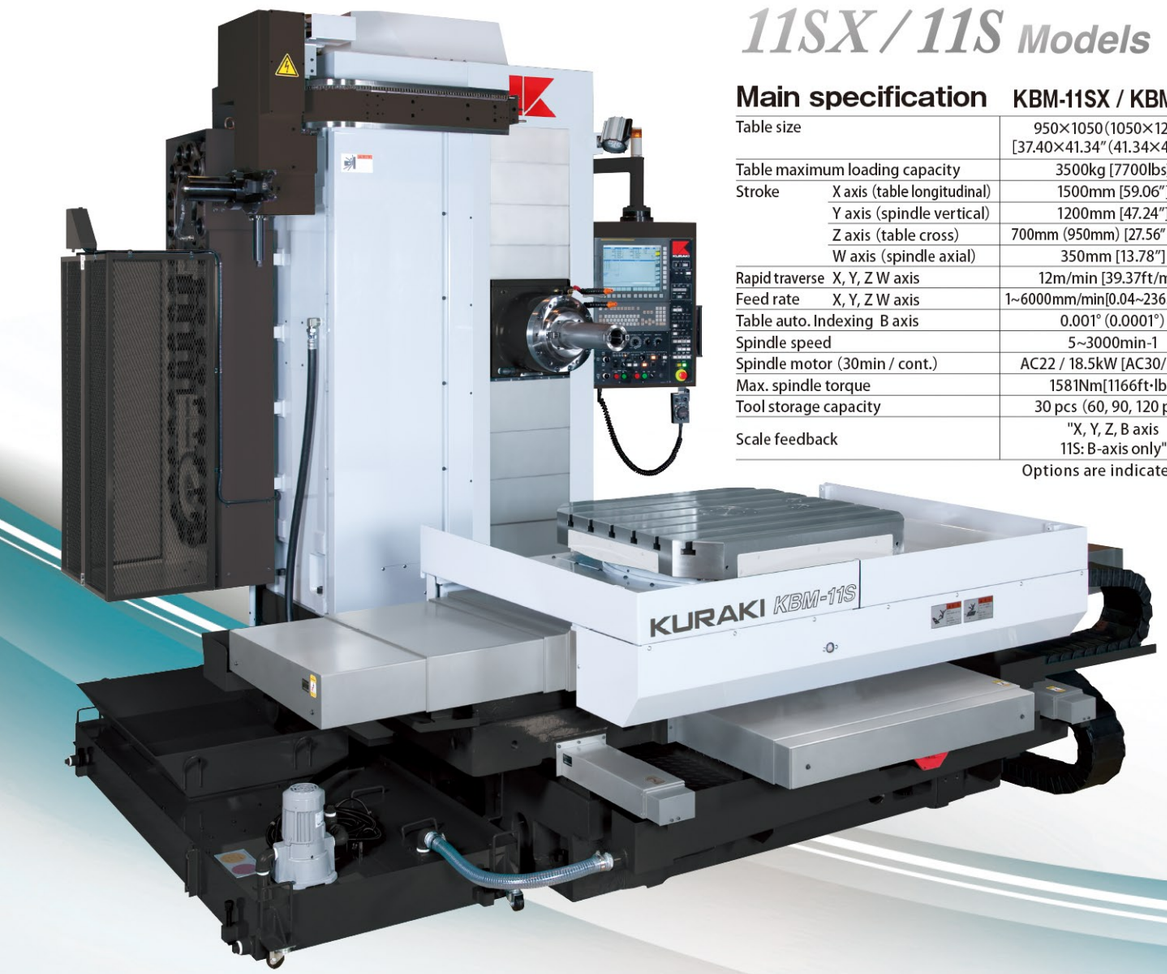


ϕ 650 (25.59”) large diameter boring

CNC Horizontal Boring & Milling Machine

KBM Series

11SX / 11S Models



※Optional accessories are partly equipped in the picture.

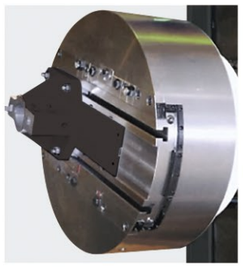
Main specification KBM-11SX / KBM-11S

Table size		950×1050 (1050×1200) [37.40×41.34”(41.34×47.24”)]
Table maximum loading capacity		3500kg [7700lbs]
Stroke	X axis (table longitudinal)	1500mm [59.06”]
	Y axis (spindle vertical)	1200mm [47.24”]
	Z axis (table cross)	700mm (950mm) [27.56” (37.4”)]
	W axis (spindle axial)	350mm [13.78”]
Rapid traverse	X, Y, Z W axis	12m/min [39.37ft/min]
Feed rate	X, Y, Z W axis	1~6000mm/min[0.04~236.22”/min]
Table auto. Indexing	B axis	0.001° (0.0001°)
Spindle speed		5~3000min-1
Spindle motor (30min / cont.)		AC22 / 18.5kW [AC30/25HP]
Max. spindle torque		1581Nm[1166ft·lbs]
Tool storage capacity		30 pcs (60, 90, 120 pcs)
Scale feedback		"X, Y, Z, B axis 11S: B-axis only"

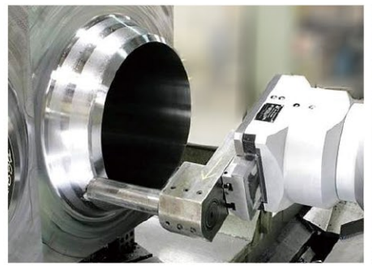
Options are indicated in ( ).

High-speed & high-accuracy W-axis (boring spindle)

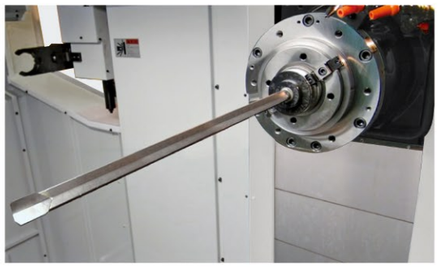
Kuraki's accurate W axis allows for many machining options when drilling, tapping or utilizing other attachments such as U-axis heads for complex part machining.



ϕ600 (23.62”) universal face plate



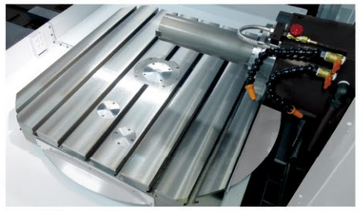
U axis contouring machining with attachment



ϕ29 (1.14”) MC gun drilling Drill length 620 mm (24.41”)

Excellent accessibility

The 110 mm (4.33”) boring spindle with stroke of 350 mm (13.78”) has excellent accessibility and exhibits its power when machining deep inner parts and uneven parts of a large workpiece.



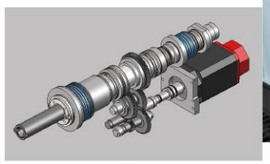
KURAKI's original locator pin system

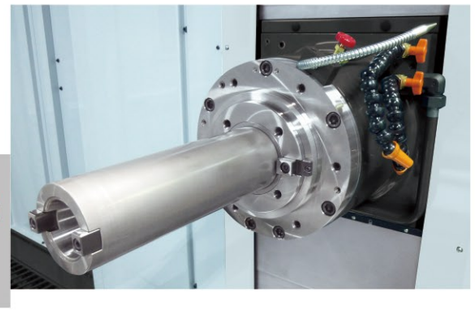
The highly rigid rotary table can perform powerful rotary milling using table rotation (B-axis). In addition to smooth rotation and index operation, the locator pin system is used at every 90°.

Spindle structure / cutting capability

High accessibility of boring spindle

Accessibility to the workpiece is improved by the 110 mm (4.33") boring spindle (W-axis) travel.
Stable machining without vibration can be performed in a wide range for deep inner parts and uneven parts.



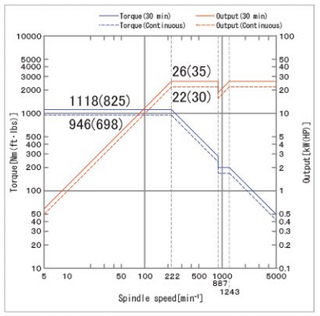


The spindle stroke exceeds the rotary table rotation center {up to 5 mm (0.19")} due to the long nose design.

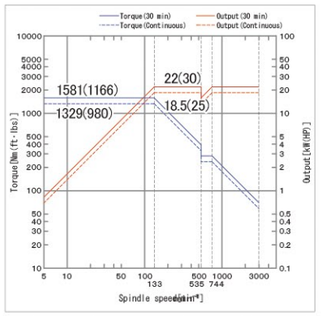
Large-mass spindle structure

The dual structure spindle in which the boring spindle and milling spindle integrally rotate is supported by large diameter bearings at three points. This exhibits high rigidity as the spindle is driven by a multiple stage gear, and a high-power and large-diameter bull gear (on the final output side) generating incomparably high torque of 1581Nm (1166ft.lbs) (KBM-11SX/11S).

Intermittent cutting of highly tough material(40HRC)



KBM-11EM Standard spec. (5000 min^{-1})

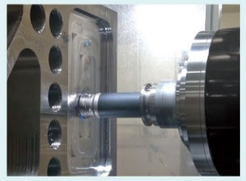


KBM-11SX/11S Standard spec. (3000 min^{-1})

Cutting capability

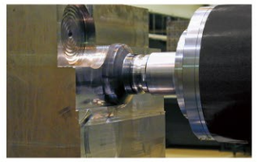
The high power, high torque spindle exhibits incomparable cutting capability in combination with the highly rigid main body structure and table structure.

ϕ63 (2.48") Radius Endmill High feed cutting for highly tough material (40HRC)



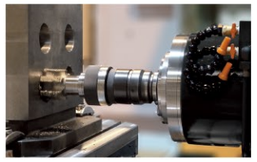
KBM-11EM
Spindle speed = 700min^{-1}
Cutting speed = 139 m/min (456 ft/min)
Feed rate = 8000mm/min (314.96 in/min)
Feed per tooth = 2.286mm/t (0.09 in/t)
Cutting width = 45mm (1.77 in)
Cutting depth = 1.0mm (0.039 in)
Chips volume = 360 cm^3/min (22in^3/min)

ϕ160 (6.30") Face milling, (W=185mm (7.28"))



S55C
Spindle speed = 400min^{-1}
Cutting speed = 200m/min (656 ft/min)
Feed rate = 1200mm/min (47.24 in/min)
Cutting width = 100mm (3.94 in)
Cutting depth = 7.0mm (0.28 in)
Chips volume = 840 cm^3/min (51 in^3/min)

M100 Tapping



S55C
Spindle speed=32 min^{-1}
Cutting speed=10m/min (32.8 ft/min)
Feed rate=192 mm/min (7.56 in/min)

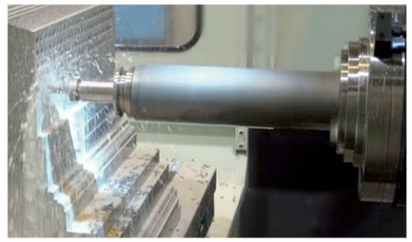
ϕ624 (24.57") Large boring (W=350mm (13.78"))

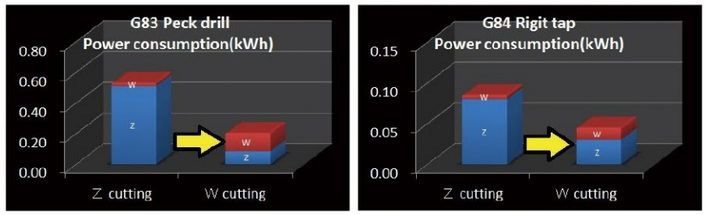
S55C
Spindle speed = 51min^{-1}
Cutting speed = 98m/min (321.5 ft/min)
Feed rate = 15mm/min (0.59 in/min)
Cutting depth = 7.0mm (0.28 in)

W-axis feed machining

Boring spindle (W-axis) feed machining is possible by the original guiding structure consisting of the large diameter ball screw and the square box way sliding surface.

Driving the small mass W-axis puts less load to the machine and is more efficient rather than driving the table (Z-axis) because the table body has a larger mass. For example, the power consumption by the motor is reduced in drilling cycles and tapping cycles involving many acceleration /deceleration operations.





Reducing power consumption in drilling and tapping

Main body / Table structure

Main body structure with excellent rigidity

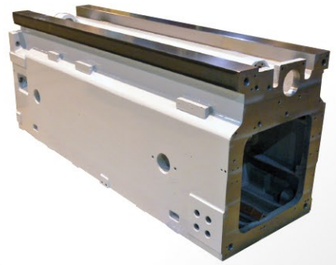
Structure

Spindle head

The robust spindle head housing supports the large-diameter, long spindle.

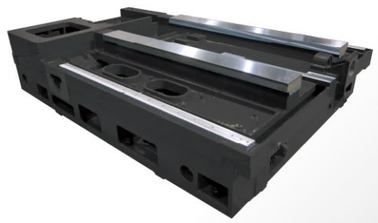
Saddle

The saddle is supported by wide box way sliding surface and the guide rail.



Column

A single column structure is utilized, and the sectional shape of the column approximated to a square exhibits high rigidity against bending/twisting moment.



Bed

The rectangular bed designed for concentrating stress and restricting distortion supports both the structures and cutting power with good balance. Also, the stable high accuracy is maintained for a long time.

Positioning accuracy

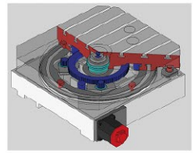
	Axis	KBM-11EM/11SX	KBM-11S
Positioning accuracy	X, Y, Z	±0.003mm (0.0001″)	±0.005mm (0.0002″)
Repeatability	X, Y, Z	±0.002mm (0.00008″)	±0.003mm (0.0001″)
Positioning accuracy	W	±0.005mm (0.0002″)	
Repeatability	W	±0.003mm (0.0001″)	

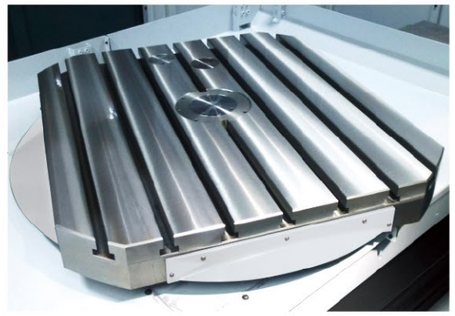
Original table structure

The rotary table (B axis) is capable to carry large parts with rigid and accurate rotation.

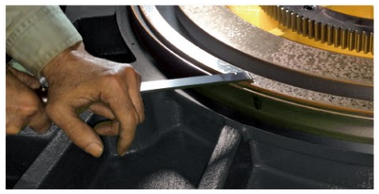
The large ring gear is driven by the double pinion gear not only to ensure a large rotation torque and high rigidity but also to minimize backlash. Also, even if a heavy workpiece is loaded, it rotates smoothly thanks to the oil semi-floating sliding surface. The table is prevented from being lifted due to uneven load and heavy cutting resistance by the integral back plates, and powerful T-bolt hydraulic clamp.

The locator pin system is used for indexing at every 90°. This system is highly accurate and provides for stable indexing with large thrust rigidity.





Indexing accuracy



	Positioning Accuracy	Repeatability
Every 90°	±2″	±1.5″
Optional angle	±3″	±2″

Continuous rotary machining

Rotary milling while rotating the rotary table is a standard feature.

Heavy cutting is also possible in rotary milling due to the large torque and high feed rigidity.

Cam machining is also easy by using the cylindrical interpolation function (option).

Operability / Maintenance

Operation-integrated pendant type operation panel

Switches and keys are situated on the pendant type operation panel to allow the user to perform almost all manual/automatic operations to improve work efficiency.

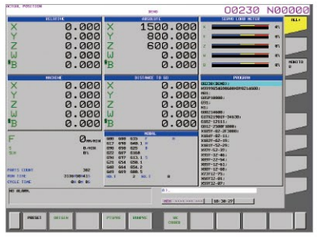
The CNC unit FANUC 31i-Model B5 supports various machining types with its functions.

Data input/output using USB memory is possible in addition to current standard CF cards.

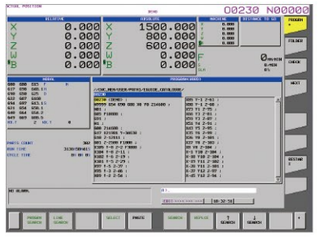
To ensure manual operability, mono levers, table 90° index switch, and spindle speed override switches are provided.

The user-friendly manual pulse generator and manual operation switches enable "general usage", so "single parts with short delivery time" and "parts requiring accuracy" also be machined efficiently without the need for program preparation.

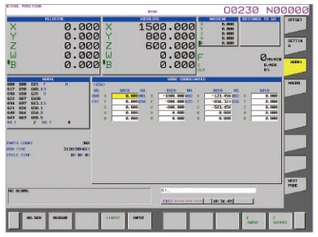
A 15" LCD is equipped as standard. It can display not only main data largely but also much more information together. In addition, operability is improved and searching on screens is facilitated.



Coordinate display screen



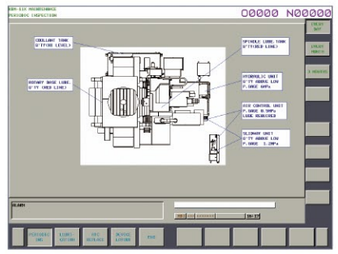
Program screen



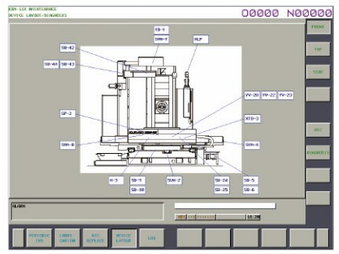
Workpiece coordinate system screen

Maintenance information displayed on screen

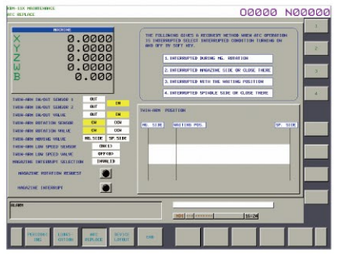
Periodic inspection items (daily, every 1/3/6 months, annually) such as filter cleaning are displayed on the screen automatically and periodically.
Slideway lubricant remaining quantity, decrease of spindle head coolant flow, etc. are also displayed in messages.
Equipment layout and trouble diagnosis/countermeasure are graphically displayed.



Periodic inspection



Device layout/diagnosis



ATC recovery

Collectively arranged maintenance devices

The devices requiring daily maintenance such as the spindle cooling unit, lubricant tank, air cleaning unit, and hydraulic unit are collectively arranged on the rear of the machine.

The maintenance devices are arranged to prevent check omission and improve efficiency of the maintenance work.

A rear guard is provided as standard for safety of the maintenance area.

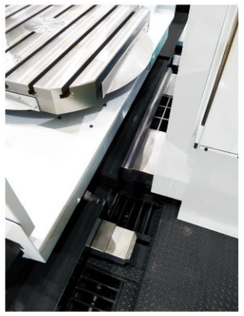
Coolant unit / chip disposal

Coil type chip conveyor

The coil type chip conveyor is provided in the bed in parallel to the X-axis.

Coolant and chips are collected from the chip chute on the saddle side as well as several openings on the chip cover and the step. These are and discharged out of the machine.

Discharged coolant and chips are processed by the coolant unit at the discharge port of the coil type chip conveyor.



Coolant Unit (optional accessory)

The coolant unit consists of the spindle head side nozzle and the X-axis end side coolant tank.
For the coolant unit tank, Type A and Type B are available.

Coolant unit type A
Chip bucket and coolant tank (with/without pit)

Without pit, 270L

Coolant unit type B
Coolant tank with lift-up type chip conveyor (without pit)

Without pit, Discharge in X direction, 270L

Without pit, Discharge in Z direction, 310L

Oil Skimmer system

An oil skimmer system is available for water-soluble coolant. It collects excessive oil (floating oil) mixed in the tank.

Chip bucket

The chip bucket for the coolant unit B type is available.

Magnet roller type chip removal device

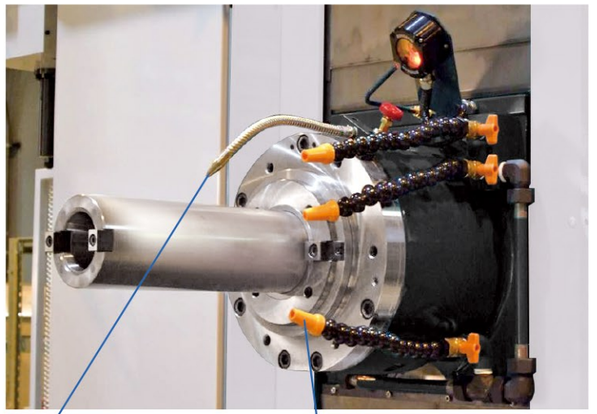
The magnet roller type chip removal device for the coolant unit B type is available. It attracts and collects fine iron powder with magnetic force.

Additional coolant nozzle, Oil mist spray, etc. (optional accessory)

Two coolant nozzles are provided as standard, but can be increased to three.
Nozzles for oil mist can also be attached.

When using a high spindle or an oil hole drill, a positioning block is attached on the spindle nose end face.

Even when standard holders together with BIG plus are used, it is possible to prevent chips and coolant from being caught by blowing them off fit the spindle nose before tool change.



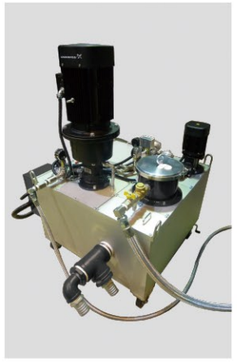
Oil mist spray (Variety of Semi-dry cutting system)

Positioning block
(spindle nose end face)

Through-spindle (special specifications)

Through-spindle coolant, mist, and air are available as optional.
The options can be provided individually, and also provided together as a switching system.

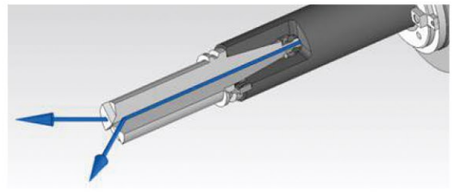
Three types of through-spindle coolant units are available (1/3/5 MPa) according to the maximum use pressure.
A dedicated mist generator is attached for through-spindle mist.



Through coolant unit

Special oil mist generator

Gun drilling (coolant pressure 3Mpa)



Through-spindle coolant / mist / air

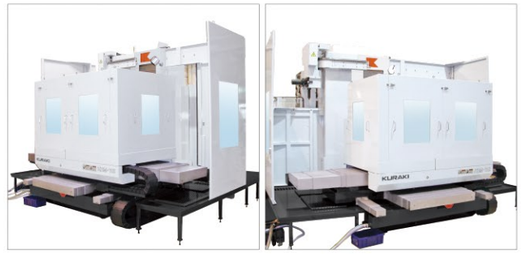
Peripheral equipment

Splash guard (optional accessory)

Splash guard type A

It covers the circumference of the table. The guard is fixed to the table oil pan and moves with the table.
The standard guard is the insert type, but it can be changed to the front cover open/close type.
Workpieces can be loaded/unloaded easily by opening/closing the cover.

Splash guard type A + type B



Splash guard type A (slide door) + type B

Splash guard type B

It covers the circumference of the operator step and the column.The guard is fixed to the step, and a door is provided on the operator side.
The standard operator side door is the slide type, but the simplified folding type without the door frame is also available.

Splash guard type A (double-door type) + type B (simple type)

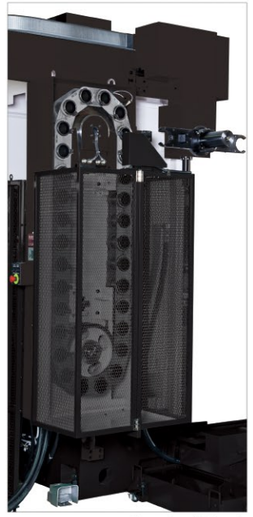
Operator side simplified folding door

Splash guard full cover type

It covers the whole machine movable range. The door on workpiece loading side is the manual slide type.
An automatic shutter is provided for the APC specification.

Splash guard full cover type

ATC (automatic tool changer)



Standard 30pc's

ATC specification	
Tool shank	MAS BT50
Pull stud	MAS P50T-1 (45°)
Tool storage capacity	30pc's
Max. tool diameter [vacant adjustment pots]	125mm (4.92") [240mm (9.45")]
Max. tool length	400mm (15.75") (expandable)
Max. tool weight	25kg (55lbs)

Option 60pc's

Option 90pc's

Interruption for magazine rotation

Allows checking and loading/unloading of tools without stopping machining even during automatic operation.

APC (automatic pallet changer) (optional accessory)

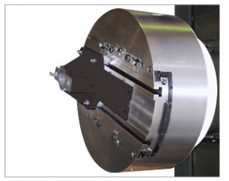
2 pallets shuttle type are available as option.
Also, multiple pallets magazine type (four pallets, etc.) are available.
Steps and fences can be added around the pallet upon request.

APC (2 pallets shuttle type, with Splash guard full cover type)

Attachments (optional accessory)

Various attachments can be provided as option.

Vertical attachment (L=350mm (13.78"))



Facing head (dia. φ600mm (23.62")) (stroke : 140mm (5.51"))

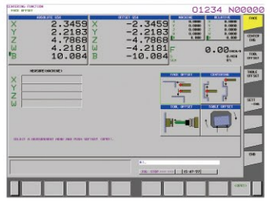
NC contouring head

ZX200 U axis stroke 38mm (1.50")
ZX300 U axis stroke 75mm(2.95")
ZX420 U axis stroke 102mm(4.02")

Measurement system / Programming support function

Centering Function (optional accessory)

The following three functions are available as the centering function.
A touch sensor is provided for the touch centering function and the automatic centering function.
No touch sensor is provided for the simple centering function. Please prepare a commercial centering tool, etc.



Centering guidance screen

Touch censor for touch centering / automatic centering

Simple centering function

Work coordinate system and tool length offset can be set easily by bringing a commercial centering tool into contact with the measurement surface using the manual pulse generator and then pressing the keys in accordance with the guidance on the screen.

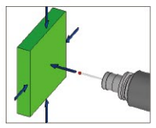
Touch centering function

Automatic measurement is performed by bringing the supplied touch sensor closer to the measurement surface using the manual pulse handle or jog feed and then pressing the keys in accordance with the guidance on the screen.

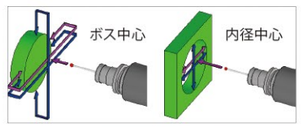
Automatic centering function

Automatic measurement is performed using the supplied touch sensor and the macro program. This function covers the measurement menus of simple centering and touch centering. In addition to work coordinate system automatic setting, output of measurement result to common variables is available. The printer can also be attached(option).

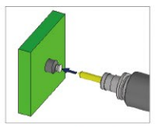
Basically, simple/ touch centering consists of four measurement menus.
(Automatic centering does not include tool offset.)



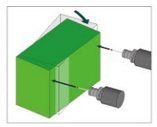
Plane measurement



Measurement between two points



Tool offset



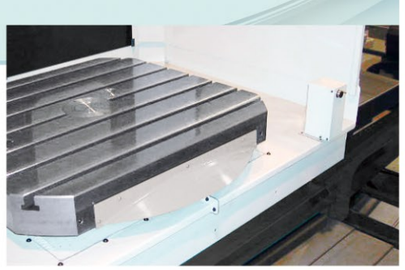
B-axis offset

Auto Tool Length Measurement (optional accessory)

Tool length is automatically measured by the tool length setter (touch sensor type) mounted beside the table and macro programs. The result is automatically set to the tool length offset value.

After machining, wear and damage of a tool can be checked by repeating measurement of the tool. An alarm is displayed if variation of measurement values exceeds the set allowance (tool breakage detector).

The standard tool setter is the touch type, but the laser type can also be attached. The laser type enables automatic measurement of not only tool length but also tool radius.

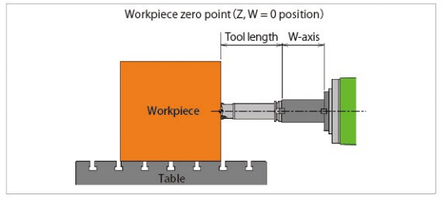


Touch type

Laser type

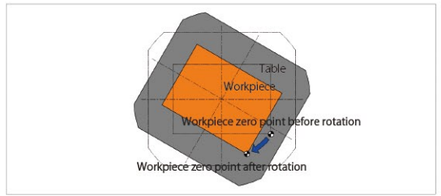
Functions supporting machining by horizontal boring milling machine

Special macro program is provided as standard so that boring spindle feeding (W-axis) and rotary table rotation (B-axis) can be used more effectively.



Z, W axis auto coordinate system setting and tool length compensation function (G143)

In tool length offset mode, Z-/W-axis coordinate systems are automatically set including W-axis feed amount. Tool length offset can be used in the same way as machining center to enable Z-/W-axis machining.

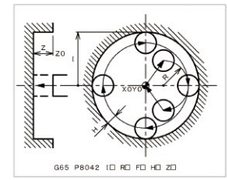


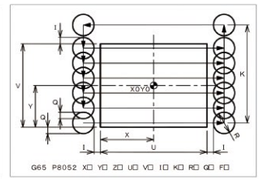
Workpiece zero point automatic calculating function by B-axis rotation (G111)

The shift amount of the work coordinate system after B-axis rotation is calculated and the new work coordinate system is automatically set to save time to measure and input the workpiece zero point each time after rotation.

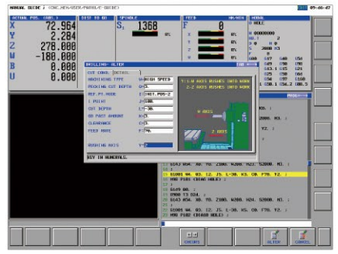
Macro Pattern Cycle

There are 40 patterns of macro programs including hole machining, side facing, planing, and pocketing available as a set.
Complicated calculations using alpha calculator can be omitted in programming.

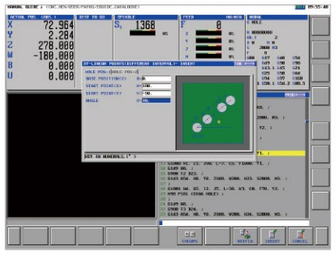




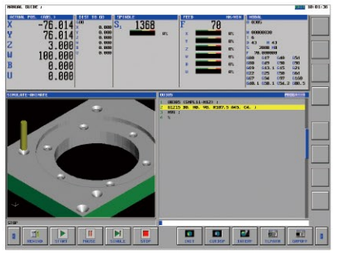
Kuraki E guide (optional accessory)



The Kuraki E guide is integrated programming support software dedicated for Kuraki's horizontal boring machines, and supports boring spindle feed (W axis) and table rotation (B axis).



It is not necessary to input G codes or M codes. Various programs can be created easily just by inputting numerical values to the formats according to guidance on the CNC screen (All macro pattern cycle programs are also included).



Created programs can be drawn using the machining simulation function. The path can be checked to avoid program error beforehand.

*Operation for Background editing is performed on KURAKI E guide screen.

High accuracy machining / Efficiency function

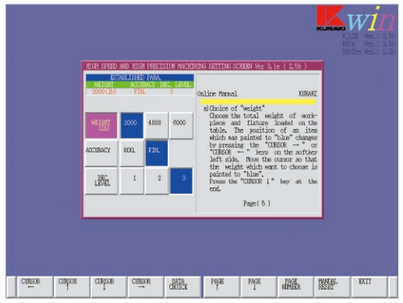
AI Contour Control II Cutting Function (+high speed processing) (optional accessory)

In normal cutting, a shape error occurs at corners and circular interpolation as the feedrate is increased.
These shape errors are eliminated by optimizing acceleration/deceleration by the AI contour control II cutting function.

In shape machining of molds, etc. which consist of consecutive minute blocks, smooth machined surfaces can be obtained.
In addition, the machining time becomes shorter than normal cutting thanks to high speed arithmetic processing (the processing capability is further enhanced by adding high speed processing).

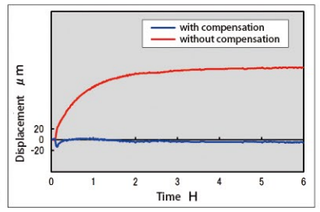
The control parameters of the AI contour control II cutting function can be changed easily by only selecting the loading weight (three levels), machining accuracy (rough/ finish), and deceleration level (three levels) on the provided High-speed high-precision setting screen.

Machining time can be reduced without overloading the machine by selecting each item appropriately according to the workpiece and machining conditions.



High speed and high accuracy machining setting screen

Spindle thermal distortion compensating system (optional accessory)



Measurement Example
(3000min-1 Continuous operation)

Highly accurately corrects spindle thermal expansion generated by rotation using Z-axis motion.

The originally developed algorithm calculates compensation amounts by including not only the data of the temperature sensors in the spindle bearing, etc. but also spindle deformation amount by centrifugal force.

If abnormal heat is detected in the spindle bearing, spindle rotation stops and a message is displayed on the NC screen.

Monitoring / Efficiency function (optional accessory)

Meter relay type over load detection

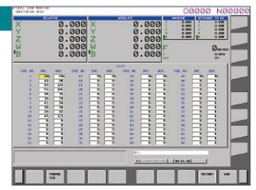
The dynamometer mounted on the operation panel indicates the spindle load rate (%).If the maximum load rate of the tool to be used is set with the friction pointer beforehand, spindle feed and axis feed can be stopped automatically when the load is excessively increased by wear and chipping.

Friction pointer type dynamometer

KURAKI monitor

No dynamometer is provided and the load rate is displayed on the KURAKI MONITOR screen.
The maximum load rates of several tools can be set and monitored on the abnormal load rate setting screen (up to 240 tools). Automatic override control of the feedrate is also possible so as to make the spindle load closer to the proper value by setting an average load rate (proper value).

KURAKI MONITOR screen



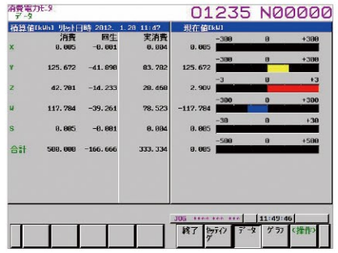
Maximum load rate setting screen

Power Consumption Monitor (optional accessory)

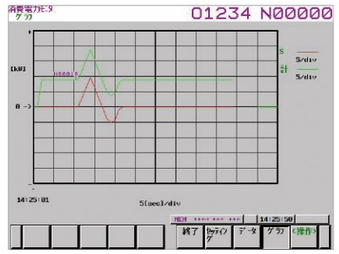
Displays and records the power consumption of not only the spindle and feed axes but also the whole machine including peripheral devices on the screen.

Instantaneous power and integral power of each axis and peripheral devices are graphically displayed.

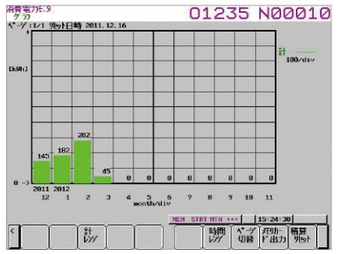
For the integral power of the whole machine (monthly display), data for five years can be saved. Also, the data can be output in the CSV format, which is convenient for preparing reports, etc.



Data screen



Instantaneous power graph screen



Integral power monthly graph screen

Energy Saving Function (optional accessory)

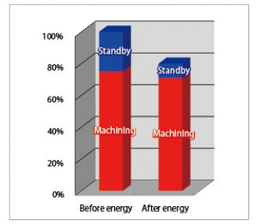
The energy saving function automatically controls waiting axes and operation of peripheral devices in two modes to reduce power consumption. Additional setting is possible if peripheral devices are added.

(1) Custom operation mode

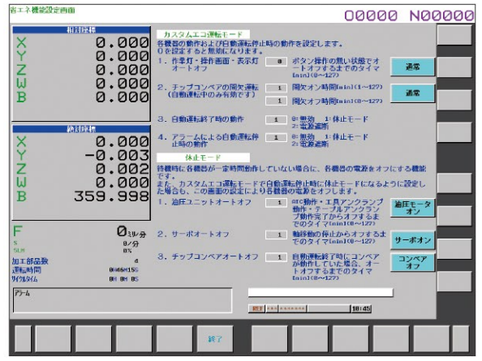
Operates chip conveyor intermittently. Turns OFF LCD if no operation is performed for a certain time. And etc.

(2) Operation stop mode (only during waiting)

Turns OFF hydraulic unit if no hydraulic operation is performed for a certain time. And etc.



Example of energy saving



Setting screen

Special specifications / Optional accessories / CNC specifications

Various options are prepared for accomplishing the customer's "one special machine".

Standard Accessories

- Coil type chip conveyor
- Spindle cooling device
- Chip cover for slide ways
- NC indexing table every 0.001 degree (every 90 degree indexing by locator pin)
- External air blow system
- Manual pulse generator
- Interruption for magazine rotation
- Manual handle interruption
- Work light (waterproof LED lamp)
- 3 colors signal light (Green/Yellow/Red)
  Green: During automatic operation
  Yellow: Normal stop
  Red: Abnormality occurrence
- Power shut off device
- Manual spindle speed setting device
- Monolever type jog feed
- Electric spare parts
- Scale feed back system for X, Y, Z, B axis (11S: B axis only)
- Self-diagnosis function
- Tool & tool box for reassembly
- Leveling block and foundation plate
- Relocation detection unit
- Rigid tap
- Z,W axis auto coordinate system setting and tool length compensating function【G143】
- Workpiece reference point auto calculating function by B axis rotation【G111】
- Macro pattern cycle
- Absolute position detector (X,Y,Z,W axis)
- Machine manual
- FANUC manual

Special specifications

Spindle	
1	Spindle motor power up KBM-11SX/11S 26/22kW (35/30HP)
ATC magazine	
2	60, 90, 120 tools
3	Maximum tool length extension
APC (Automatic pallet changer)	
4	2 pallets shuttle type
Table Table	
5	0.0001 degree table indexing by NC command
6	Table size 1050 × 1200mm (41.33" × 47.24")
7	Additional t able reference groove
Through spindle	
8	Coolant through spindle (1MPa/3MPa/5MPa)
9	Air through spindle
10	Mist through spindle
Stroke	
11	Z axis stroke 950mm (37.40")

＊ Machine specifications may be changed by optional accessories.

Optional accessories

Coolant / Chip disposal	
1	Coolant unit type A (with chip bucket)
2	Coolant unit type B (with lift type chip conveyor)
3	Additional coolant nozzle (total 3 pc's)
4	Programmable coolant device (3 nozzles) *3
5	Oil mist spray (Variety of Semi-dry cutting system) *1
6	Oil hole drill unit (Holder not included) *1
7	Chip bucket (for lift type chip conveyor)
8	Magnet roller type chip removal device
9	Oil skimmer system
Splash guard	
10-1	Splash guard type A (table side)
10-2	Splash guard type B (column side)
10-3	Splash guard full cover type
Attachment	
11	Facing head φ600 *3
12	NC contouring head
13-1	Vertical milling attachment
13-2	Universal milling attachment (manual indexing)
13-3	Positioning block (for angle attachment and etc.)
Operation help	
14	Cs control
15	Manual pulse generator 2pc's/3pc's
Machie management	
16	Warming up function
17	External run hour display Auto run / Spindle rotation/ Cutting feed / Machine power on
Measuring system	
18	Centering system simple type *2
19	Centering system touch type *2
20	Centering system automatic type
21	Auto tool length measurement (tool breakage detector included) ＊Touch typre or Laser type
Monitoring system	
22	Meter relay type over load detection
23	KURAKI monitor (Spindle load monitoring function, Override control function)
24	Power consumption monitoring function
25	Energy saving function
Program help	
26	KURAKI E guide
High precision machining	
27	AI contour control Ⅱ machining function + High speed processing
28	AI contour control Ⅱ machining function
29	Spindle thermal distortion compensating system
Others	
30	Earth leakage circuit breaker
31	EC cabinet door interlock
32	Light inside EC cabinet
33	Plug socket outside EC cabinet AC100V 3A
34	Specified machine color
35	Angle Plate

＊1：The attachments of 11, 12 and 13 cannot be used together with 5 , 6.
＊2：18 and 19 cannot be provided together.
＊3：4 and 11 cannot be provided together.
For details, please contact KURAKI overseas sales department.

The highly reliable FANUC 31i-Model B5 CNC unit is mounted.
It corresponds to various machining types by the various functions.

		Standard	Option
Control Axis	Controlled axes 5 axes (X,Y,Z,W,B axis)	○	
	Simultaneously controlled axes 4 axes : Positioning【G00】Linear interoperation【G01】 2 axes : Circular interoperation【G02 / G03】	○	
	Additional axis control (2 axes)		○
Program input	Least input increment 0.001mm/0.00001° (X,Y,Z,W axis) 0.001 deg (B axis)	○	
	Max. programmable dimension ±9 digits	○	
	Absolute / Incremental programming【G90 / G91】	○	
	Decimal point programming / Calculator type decimal point programming	○	
	Inch / Metric conversion【G20 / G21】		○
	Polar coordinate command【G15 / G16】		○
Interpolation functions	Positioning【G00】	○	
	Linear interpolation【G01】	○	
	Circular interpolation【G02 / G03】	○	
	Helical interpolation【G02 / G03】Circular + Linear	○	
	Involute interpolation【G022 / G032】		○
	Cylindrical interpolation【G07.1】		○
	Smooth interpolation【G05.1】** **Requires AICC Ⅱ machining function		○
	Conical / Spiral interpolation		○
	Three dimensional circular interpolation 【G02.4 / G03.4】		○
Feed functions	Feed per minute / Feed per revolution【G94 / G95】	○	
	Dwell【G04】(0～99999.999 seconds)	○	
	Rapid traverse override F0,Low,25,50,100%	○	
	Feed rate override 0～240% (every 10%)	○	
	Exact stop, Exact stop mode【G09/G61】	○	
	Manual pulse generator x 1 X, Y, Z, W axis：0.001/0.01/0.1 mm (Per one graduation) B axis：0.001/0.01° (Per one graduation)	○	
	Thread cutting, Synchronous cutting【G33】		○
Program storage & editing	Program storage capacity, Number of registrable programs / 512KB (=1280m), 1000 pc's	○	
	1MB (=2560m),1000 pc's		○
	2MB (=5120m),1000 pc's		○
	4MB (=10240m),1000 pc's		○
	8MB (=20480m),1000 pc's		○
	Registrable programs expansion 2 Program storage capacity 1 MB：2000 pc's Program storage capacity ≥2 MB：4000 pc's		○
	Program editing：creation, deletion, edit, search, etc.	○	
	Expanded program editing：replacement, copy, transfer, etc.	○	
	Background editing *1	○	
	Program file name 32 characters	○	
	Program number O4-digits	○	

		Standard	Option
Program storage & editing	Program search	○	
	Sequence number N8 digits	○	
	Sequence number search	○	
	Main program / Sub program (Sub program calls can be nested up to ten levels)	○	
Operation display	LCD / MDI panel 15"color LCD	○	
	Clock function	○	
	Run hour & Parts count display	○	
	Load meter display	○	
	Alarm message display	○	
	Alarm history display	○	
	Operation history display	○	
	Periodic maintenance screen	○	
	Maintenance information screen	○	
	Erase LCD screen display	○	
	Graphic display (Tool path drawing during machining)		○
	Dynamic graphic display *2 Tool path drawing and animation drawing Drawing of another program not during machining		○
	Machining time stamp function		○
	Multi-language display		○
Data input / output functions	RS232C interface 1	○	
	Memory card input / output (PC card slot)	○	
	USB memory input / output	○	
	Embedded Ethernet (supporting 100Mbps)	○	
	Fast data server (CF card is required) Programs and files can be transferred at high speed and programs stored in ATA flash card can be modified via LAN connection.		○
	CF card Capacity 128MB / 256MB / 1GB / 4GB Note that 4 GB can be used only for fast data server.		○
Tool compensation	Tool length offset【G43 / G44】	○	
	Tool radius offset【G41 / G42】	○	
	Tool offset pairs 64 pairs	○	
	Additional tool offsets Total 99/200/400/499/999 pairs		○
	Tool offset memory C (Memory for each figure, abrasion, tool length：H code, tool radius：D code)	○	
	Tool length measurement	○	
	Tool position offset 【G45/G46/G47/G48】		○
	Three dimensional tool offset 【G41/G42】		○
Coordinate system	Reference position return manual, automatic【G28】	○	
	Machine coordinate system selection【G53】	○	
	Workpiece coordinate system selection【G54～G59】	○	
	Workpiece coordinate system setting【G92】	○	

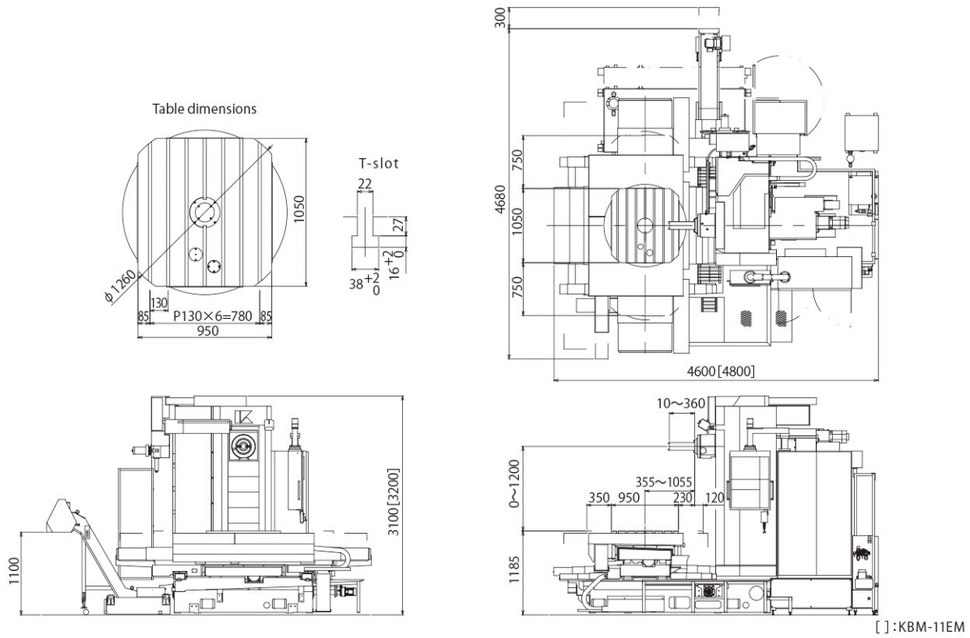
		Standard	Option
Coordinate system	Workpiece coordinate system preset【G92.1】 Workpiece coordinate system shift is cleared.	○	
	Local coordinate system setting【G52】	○	
	Addition of work coordinate system pairs (total 48 / 300 pairs)		○
	Absolute position detection (Except for B-axis)	○	
Operation help functions	Program stop【M00】	○	
	Optional stop【M01】	○	
	Single block	○	
	Optional block skip /1 pc	○	
	Optional block skip /1, /2, /3, /4 (Total 4 pc's)		○
	Dry run	○	
	All axis machine lock	○	
	W, Z axis command cancel	○	
	Auxiliary function lock S,M,T command ignored	○	
	Program restart	○	
	Manual intervention and recovery	○	
	Programmable data / parameter input【G10】	○	
	Help function	○	
	Data protection key / Memory protect		○
	Sequence number comparison and stop		○
Program help functions	Canned cycle 【G73, G74, G76, G80～G89, G98, G99】	○	
	Custom macro common variables 100 pc's	○	
	Custom macro common variables Total 600 / 1100 pc's		○
	FS15 program format		○
	Mirror image (Setting and M command) 【M40, M41, M42】	○	
	Programmable mirror image【G51.1/G50.1】		○
	Coordinate rotation【G68/G69】	○	
	Scaling【G51/G50】		○
	Play back TEACH JOG, TEACH HANDLE		○
Machining help functions	Rigid tap (including return function)	○	
	Auto corner override【G62】	○	
	Optional angle chamfering and corner R	○	
	Tool life management set (Total 256 sets)		○
	Additional tool life management set (Total 1024 sets)		○
Precision compensation	Stored pitch error compensation	○	
	Backlash compensation of rapid traverse / cutting feed	○	
	Single direction positioning【G60】	○	
	Straightness compensation		○
Maintenance & Safety	Over travel	○	
	Stored stroke check 1	○	
	Stored stroke check 2,3【G22/G23】		○
	Stroke limit check before move		○
	Self-diagnosis function	○	
	Dual check safety	○	

＊1：Operation is performed on KURAKI E Guide screen when KURAKI E Guide is provided.
＊2：Dynamic graphic display cannot be provided together with graphic display and KURAKI E Guide.

Overall dimensions / Standard specification

KBM-11S / 11SX / 11EM Overall dimensions

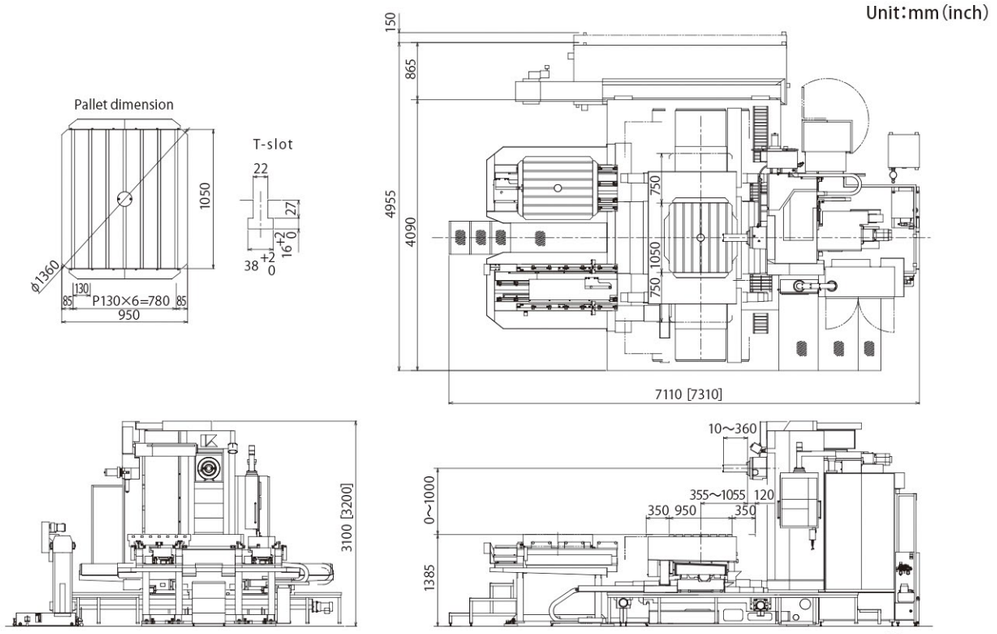
Unit：mm (inch)



[ ]：KBM-11EM

KBM-11S.P / 11SX.P / 11EM.P Overall dimensions

Unit：mm (inch)



[ ]：KBM-11EM.P

Standard specification

Stroke		KBM-11S / 11SX	KBM-11EM	KBM-11S.P / 11SX.P	KBM-11EM.P
X axis travel (table longitudinal)	mm(inch)	1500 (59.06)		1500 (59.06)	
Y axis travel (spindle vrtical)	mm(inch)	1200 (47.24)		1000 (39.37)	
Z axis travel (table cross)	mm(inch)	700 (27.56)		700 (27.56)	
W axis travel (spindle axial)	mm(inch)	350 (13.78)		350 (13.78)	
Distance from table top to spindle center	mm(inch)	0 ～ 1200 (0 ～ 47.24)		0 ～ 1000 (0 ～ 39.37)	
Distance from table center to spindle nose	mm(inch)	355 ～ 1055 (13.98 ～ 41.54)		355 ～ 1055 (13.98 ～ 41.54)	
Table					
Table work space	mm(inch)	950 × 1050 (37.40 × 41.34)		950 × 1050 (37.40 × 41.34)	
Table maximum loading capacity	kg(lbs)	3500 (7700)	4000 (8800)	2700 (5940)	3000 (6600)
Table top profile	mm(inch)	22 (0.87) 7T slots		22 (0.87) 7T slots	
T-slot pitch	mm(inch)	130 (5.12)		130 (5.12)	
Table auto. Indexing	°	0.001 (every 90° index. By locator pin)		0.001 (every 90° index. By locator pin)	
Spindle head					
Boring spindle diameter	mm(inch)	110 (4.33)		110 (4.33)	
Spindle speed (for every 1min^{-1})	min^{-1}	5 ～ 3000	5 ～ 5000	5 ～ 3000	5 ～ 5000
Spindle speed range	step	2		2	
Spindle taper		7/24 Taper No.50 (BIG-PLUS spindle system is available)		7/24 Taper No.50 (BIG-PLUS spindle system is available)	
Feed					
Rapid traverse X,Y,Z axis	m (ft)/min	12 (39.37)	24 (78.74)	12 (39.37)	24 (78.74)
Rapid traverse W axis	m (ft)/min	12 (39.37)		12 (39.37)	
Feed rate X,Y,Z axis	mm(inch)/min	1 ～ 6000 (0.04 ～ 236.22)	1 ～ 12000 (0.04 ～ 472.44)	1 ～ 6000 (0.04 ～ 236.22)	1 ～ 12000 (0.04 ～ 472.44)
Feed rate W axis	mm(inch)/min	1 ～ 6000 (0.04 ～ 236.22)	1 ～ 10000 (0.04 ～ 393.70)	1 ～ 6000 (0.04 ～ 236.22)	1 ～ 10000 (0.04 ～ 393.70)
Table revolution B axis	min^{-1}	2.8	3.0	2.8	3.0
Automatic Tool Changer (ATC)					
Tool shank		MAS BT50		MAS BT50	
Pull stud		MAS P50T-1 (45°)		MAS P50T-1(45°)	
Tool storage capacity	pc	30		30	
Max. tool diameter [vacant adjacent pots]	mm(inch)	125 (4.92)	240 (9.45)	125 (4.92)	[240 (9.45)]
Max. tool length	mm(inch)	400 (15.75)		400 (15.75)	
Max. tool weight	kg(lbs)	25 (55)		25 (55)	
Tool selection system		Shortcut rotation at random		Shortcut rotation at random	
Motors					
Spindle motor (30min / Cont.)	kW(HP)	AC 22 (30) / 18.5 (25)	AC26 (35) /22 (30)	AC 22 (30) / 18.5 (25)	AC26 (35) /22 (30)
Feed motor	kW(HP)	2.2 (3.0)		3.7 (5.0)	
Voltage					
Electric power supply (Not incl. opt)	kVA	43	54	54	56
Air pressure source pressure	Mpa	0.5		0.5	
Air pressure source flow (Not incl. opt)	NL/min	400 (atm)	1000 (atm)	700 (atm)	1300 (atm)
Dimensions					
Machine height	mm(inch)	3100 (122.83)	3200 (125.98)	3100 (122.83)	3200 (125.98)
Floor space (Not incl. opt)	mm(inch)	4980 × 4600 (196.06 × 181.10)	4980 × 4800 (196.06 × 188.98)	5105 × 7110 (200.98 × 279.92)	5105 × 7310 (200.98 × 287.80)
Machine weight (Incl. NC unit)	kg (lbs)	15000 (33000)	15200 (33440)	19100 (42020)	19300 (42460)

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