Technology for the World
KURAKI

CNC Horizontal Boring & Milling Machine

KBT Series

11/11W Models

PRODUCT CATALOG

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

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JAB CM009 ISO 9001 JQA-QM3424 UKAS 091

KBT11/11W 2020 02 EN R02

Evolved boring machine

High performance machine beyond imagination

CNC Horizontal Boring & Milling Machine

KBT Series

11 / 11W Models

Main specification			KBT-11.A	KBT-11W.A
Table work space		mm[inch]	1200x1400 [47.24x55.12]	1400x1600 [55.12x62.99]
Table maximum loading capacity		kg[lbs]	5000 [11000]	6500 [14300]
Stroke	X axis (table longitudinal)	mm[inch]	1700 [66.93]	2000 [78.74]
	Y axis (spindle vertical)	mm[inch]	1500 [59.06]	
	Z axis (table cross)	mm[inch]	1150 [45.28]	1450 [57.09]
	W axis (spindle axial)	mm[inch]	500 [19.69]	
Rapid traverse	X,Y,Z axis	m[inch]/min	12 [472.44]	
	W axis	m[inch]/min	10 [393.70]	
Table auto. Indexing	B axis	deg	0.001°(0.0001°)	
Spindle speed		min^{-1}	5～3000(4500、5000)	
Spindle motor (30min/cont.)		kW[HP]	AC18.5/15[25/20] (22/18.5[30/25]、26/22[35/30])	
Tool storage capacity		pcs	40(60、90、120)	
			Options are indicated in ( ).	

Supporting wide range of machining needs

Incomparably high speed boring spindle in its class

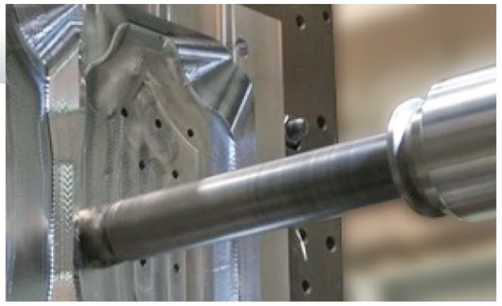
The 4500 min^{-1} and 5000 min^{-1} specifications in addition to the standard 3000 min^{-1} specification are prepared to support various types of machining.

Spindle thermal displacement compensating function (optional accessory)

This function supports high accuracy machining at a high speed by minimizing spindle thermal displacement specific to horizontal boring machines.

Highly efficient machining of difficult-to-machine materials

Highly efficient rough machining of highly tough materials (40HRC)
ϕ63 high feed cutter infeed 1.25 mm/Feed per tooth 1.5 mm



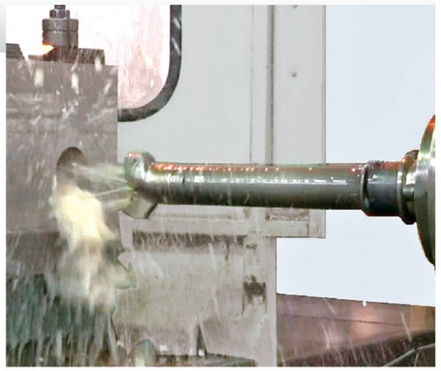
Intermittent cutting of highly tough material (40HRC)
ϕ63 high feed cutter L300 long type 1.25 mm/Feed per tooth 1.5 mm

The dual structure spindle in which the long boring spindle and milling spindle integrally rotate exhibits overwhelming cutting capability.

Through-spindle function (special specification)

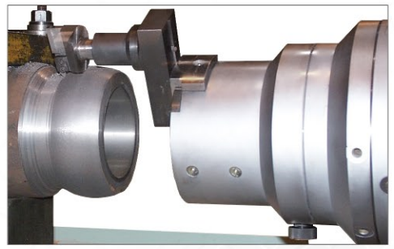
MC gun drilling using high pressure coolant is possible. Air and mist improve various types of machining in efficiency and provide long tooth life.

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

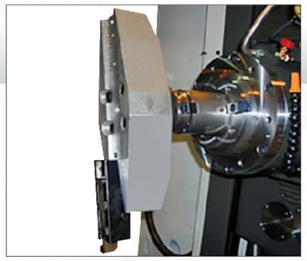


ϕ110 carbide multi-tooth drilling Material: S45C/Machining depth: 640 mm

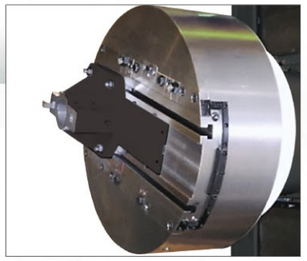
High-speed & high-accuracy W-axis (boring spindle)



NC contouring /External contour machining



ϕ650 (25.59") large diameter boring



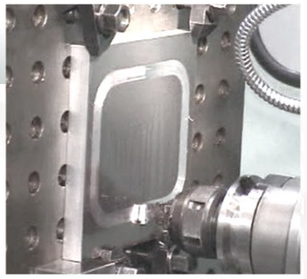
ϕ600 (23.62") universal face plate
Slide stroke=140mm(5.51")

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.

Shape machining by Cs control function (optional accessory)

Cs control facing

Cs control outer groove machining + end face groove machining



Cs control arbitrary shape groove machining

Optimization by multi-face pallet

KBT-11. AP / KBT-11W. AP

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.

KBT-11W.AP
Optional accessory: Splash guard type B (for APC)

Spindle structure

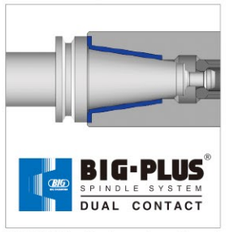
High accessibility of boring spindle

Long nose spindle head

It improves accessibility to the workpiece and allows powerful cutting with its minimum feed amount.

Adoption of dual contact spindle corresponding to BIG-PLUS

In addition to No. 50 standard tools, The BIG-PLUS dual contact spindle design is a Kuraki standard resulting in more rigidity during the machining process.

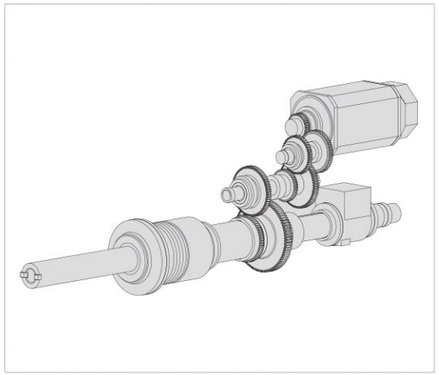


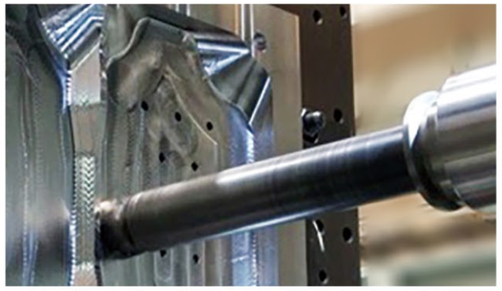
BIG-PLUS is a trademark registered by BIG DAISYOWA SEIKI CO LTD.

Large-mass spindle structure

Lineup of spindles with high torque generated by gear structure

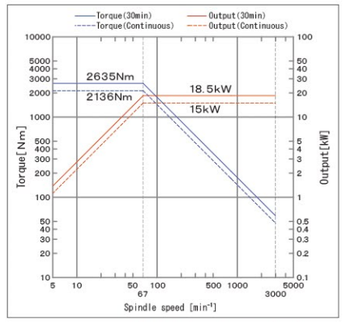
	Standard/ Special spec.	Spindle speed (min^{-1})	Motor power (kw[HP]) (30min/cont.)
KBT-11.A / 11W.A	Standard	5～3000	18.5/15 [25/20]
	Power up	5～3000	22/18.5 [30/25]
		5～3000	26/22 [35/30]
	Hi speed spec.	5～4500	26/22 [35/30]
		5～5000	26/22 [35/30]



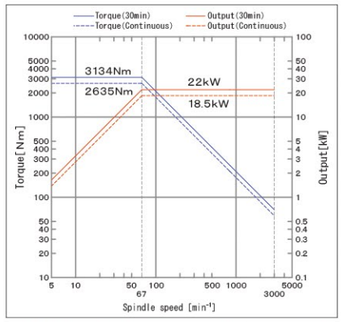


Intermittent cutting of highly hard and highly tough material (40HRC)

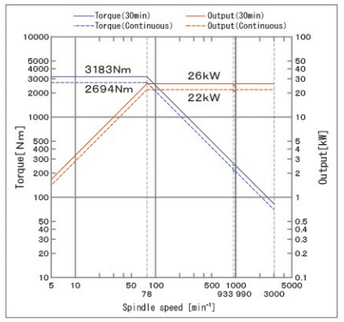
The dual structure spindle in which the boring spindle runs inside a large diameter milling spindle is supported by large diameter bearings at three points providing both side load and axial load rigidity. This combined with a built-in gear box provides extremely high torque not found in common machining centers.



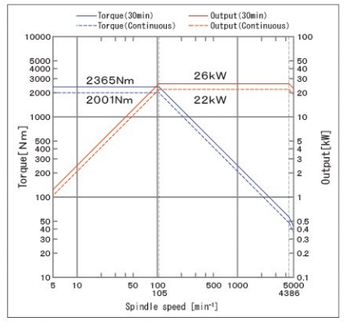
KBT-11.A/11W.A Standard spec.



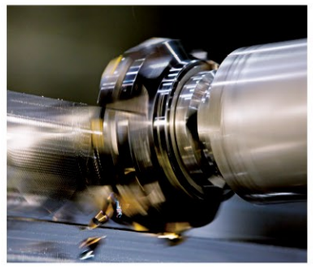
KBT-11.A/11W.A Power up 22/18.5kW[30/25HP]



KBT-11.A/11W.A Power up 26/22kW[35/30HP]



KBT-11.A/11W.A Spindle speed 4500mim^{-1} / 5000min^{-1}

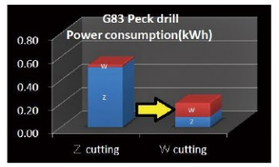


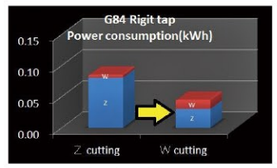
W-axis feed machining

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.

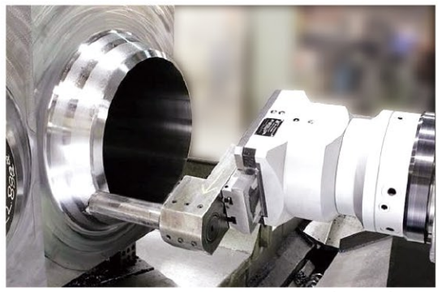
Driving the small mass W-axis puts less load to the machine and is more efficient rather than driving the table (Z-axis) because the table body has a larger mass. For example, the power consumption by the motor is reduced in drilling cycles and tapping cycles involving many acceleration/deceleration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

If an attachment having the U-axis such as NC surface plate is mounted, the U-axis is controlled by the W-axis. The stable and powerful W-axis feed enables not only positioning but also U-axis contouring.

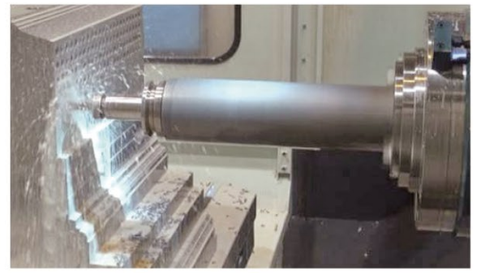




Reducing power consumption in drilling and tapping



U-axis contouring by attachment

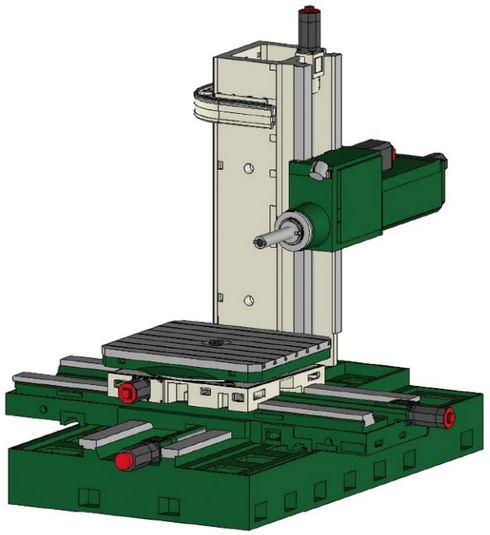


Main body / Table structure

Main body structure with excellent rigidity

The large-diameter, large-mass, and long spindle is built in the robust spindle head housing and stably held by the single column structure. Moreover, the sectional shape of the column approximated to a square exhibits high rigidity to bending/twisting moment.

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

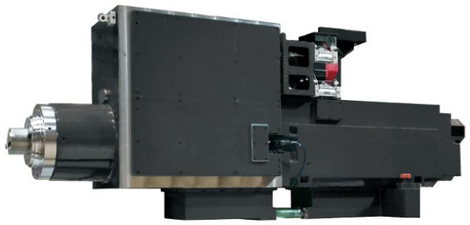


Positioning accuracy

Axis	Positioning accuracy	Repeatability
X, Y, Z	±0.005mm(0.0002")	±0.003mm(0.0001")
W	±0.010mm(0.0004")	±0.005mm(0.0002")

Structure

Spindle head



Saddle /Rotary table

Column

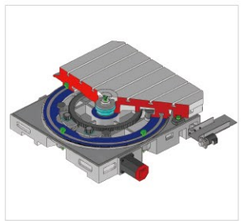
Bed

Original table structure

A high accuracy rotary encoder with the minimum indexing angle of 0.001° is provided on the center shaft. The optional specification enables indexing of 0.0001°.

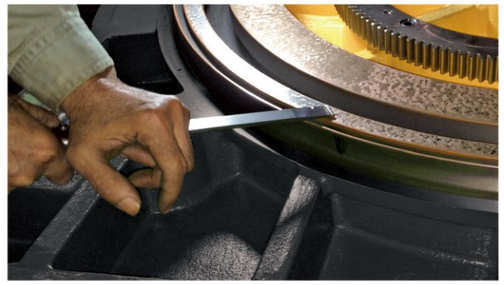
The large ring gear is driven by the double pinion gear not only to ensure a large rotation torque and high rigidity but also to minimize backlash. Also, even if a heavy workpiece is loaded, it rotates smoothly thanks to the oil semi-floating sliding surface. The table is prevented from being lifted 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	±5"	±3"



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.

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.

Sub operation panel (option)

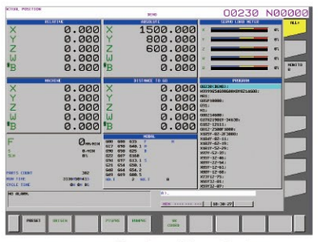
This operation panel allows pulse handle feed from a position close to the workpiece, handle interruption, spindle rotation/stop, and automatic operation start/temporary stop.

Handy machine operation panel (option)

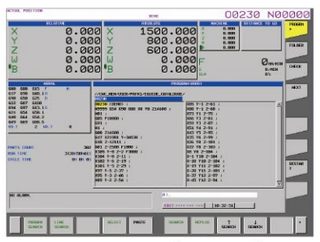
This operation panel allows pulse handle feed while checking current position, centering from a position close to the workpiece, and start/ temporary stop of manual/automatic operations.

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

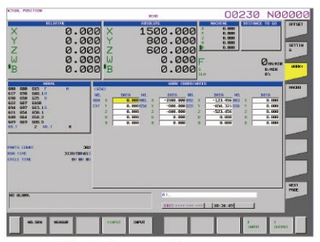
15" LCD is equipped as standard. It can display not only main data largely but also much more information together. In addition, operability is improved and searching on screens is facilitated.



Total position display screen



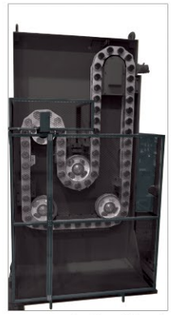
Program edit screen



Workpiece coordinate system screen

ATC (Automatic Tool Changer)

Standard 40pc's



Option 60pc's

Option 120pc's

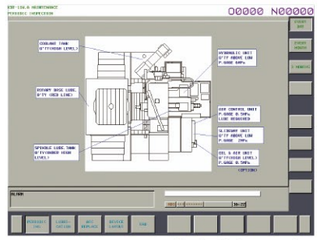
ATC tool spec.	
Tool shank	MAS BT50
Pull stud	MAS P50T-1 (45°)
Tool storage capacity	40pc's
Max. tool diameter [vacant adjustment pots]	125mm (4.92") [240mm(9.45")]
Max. tool length	400mm(15.75") (expandable)
Max. tool weight	25kg (55lbs)

Interruption for magazine rotation

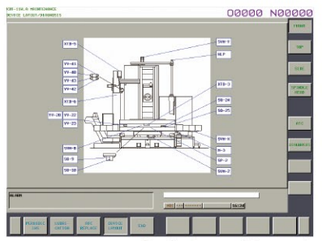
Allows checking and loading/ unloading of tools without stopping machining even during automatic operation.

Maintenance information displayed on screen

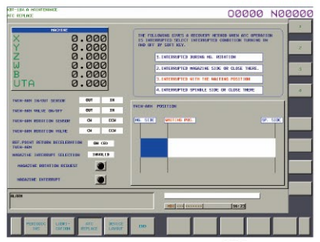
Periodic inspection items (daily, every 1/3/6 months, annually) such as filter cleaning are displayed on the screen automatically and periodically. Slideway lubricant remaining quantity, decrease of spindle head coolant flow, etc. are also displayed in messages. Equipment layout and trouble diagnosis/countermeasure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



Periodic inspection



Device layout/diagnosis



ATC recovery

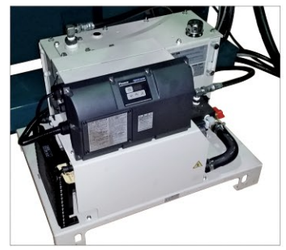
Collectively arranged maintenance devices

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.

Energy-saving inverter type hydraulic unit is equipped.

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



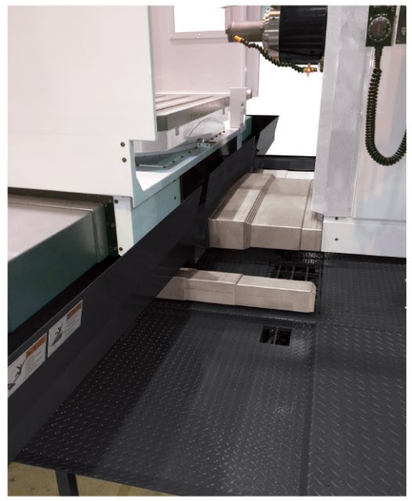
Coolant unit / chip disposal

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.

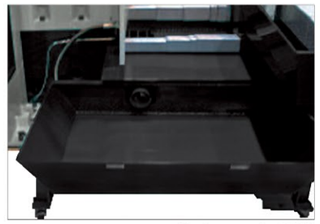


Coolant Unit (optional accessory)

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)



Tank capacity 220L

Coolant unit type B

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

Tank capacity 330L

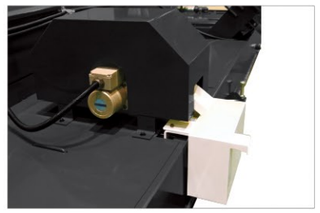
Coolant automatic control unit

The nozzle swiveling to 20 angles is automatically controlled by M code (Manual operation is also supported).

Select switch

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. Chips can be easily disposed of by tilting the bucket.

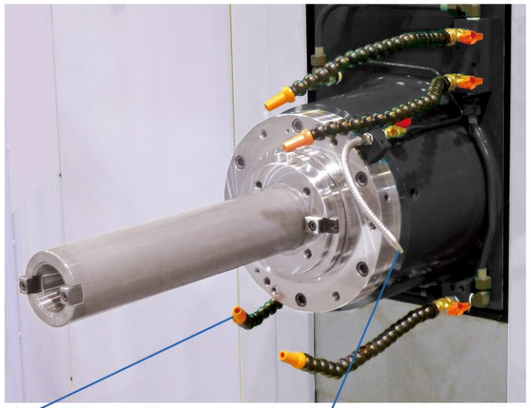
Magnet roller type chip removal device

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.

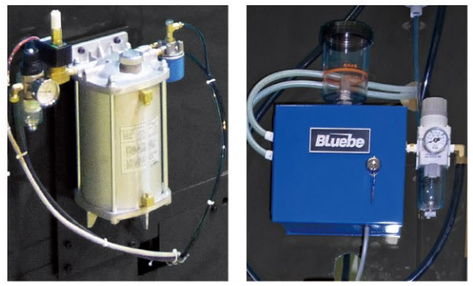
Additional coolant nozzle,Oil mist spray, etc. (optional accessory)

The standard three coolant nozzles can be increased to four.
Nozzles for oil mist can also be attached.

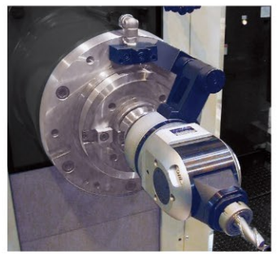
When using a high spindle or an oil hole drill, a positioning block is attached on the spindle nose end face.



Additional coolant nozzle (total 4 pc's)　External air blow system



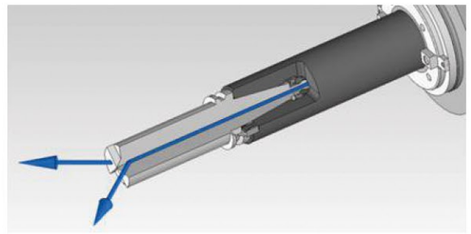
Oil mist spray (Variety of Semi-dry cutting system)



Positioning block
(spindle nose end face)

Through-spindle (special specifications)

Gun drilling (coolant pressure 3Mpa)



Through-spindle coolant / mist / air

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.

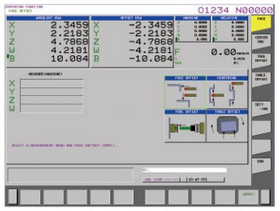
Through coolant unit

Special oil mist generator

Measurement system / Programming support function

Centering Function (optional accessory)

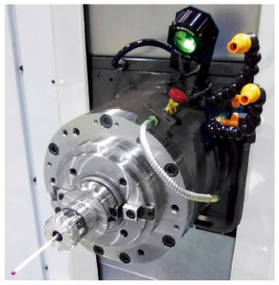
The following three functions are available as the centering function.
A touch sensor is provided for the touch centering function and the automatic centering function.
No touch sensor is provided for the simple centering function. Please prepare a commercial centering tool, etc.



Centering guidance screen

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 censor for touch centering / automatic centering

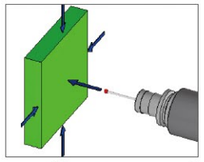
Touch centering function

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.

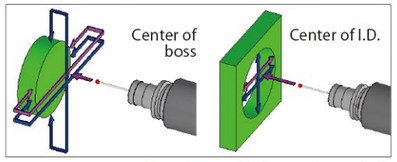
Automatic centering function

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).

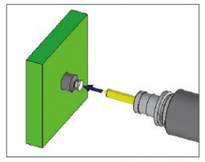
Basically, simple/ touch centering consists of four measurement menus.(Automatic centering does not include tool offset.)



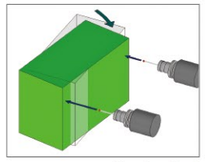
Plane measurement



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

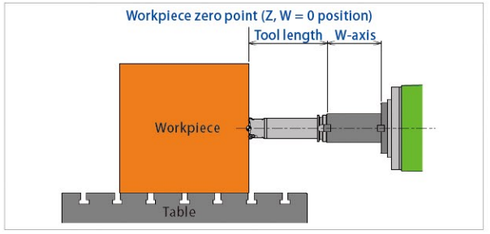
Laser type

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.

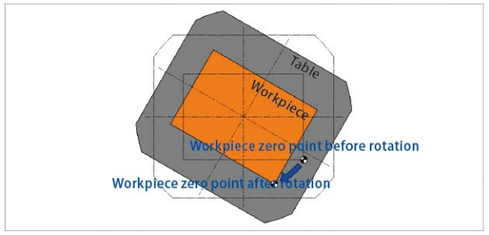
Z, W axis auto coordinate system setting and tool length compensation function (G143)

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.



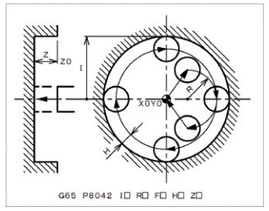
Workpiece zero point automatic calculating function by B-axis rotation (G111)

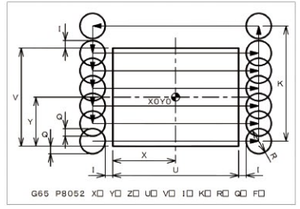
The shift amount of the work coordinate system after B-axis rotation is calculated and the new work coordinate system is automatically set to save time to measure and input the workpiece zero point each time after rotation.



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.



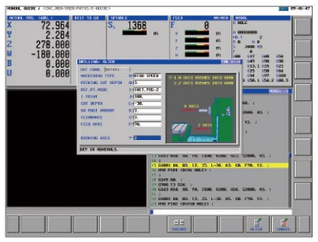


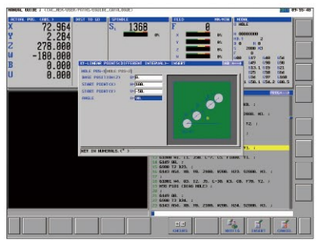
Kuraki E guide (optional accessory)

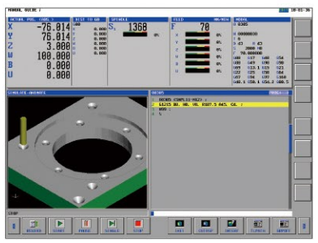
The Kuraki E guide is integrated programming support software dedicated for Kuraki's horizontal boring machines, and supports boring spindle feed (W axis) and table rotation (B axis).

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.





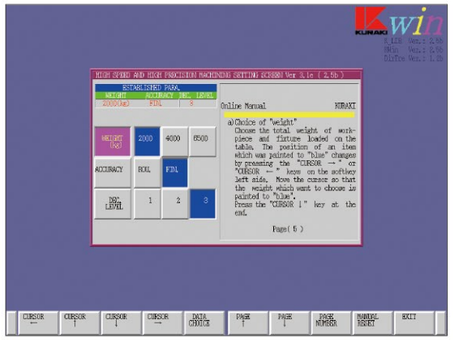


*Operation for Background editing is performed on KURAKI E guide screen.

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.



High speed and high accuracy machining setting screen

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.

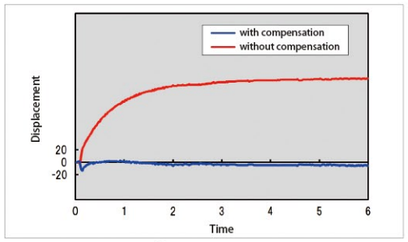
Machining time can be reduced without overloading the machine by selecting each item appropriately according to the workpiece and machining conditions.

Spindle thermal distortion compensating system (optional accessory)

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.



Measurement Example(3000min⁻¹ Continuous operation)

Monitoring/Efficiency function (optional accessory)

Meter Relay Type Spindle Load Monitor

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

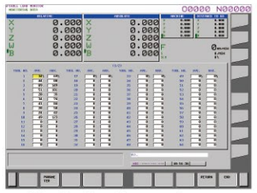
Tool-specific Load Monitor

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



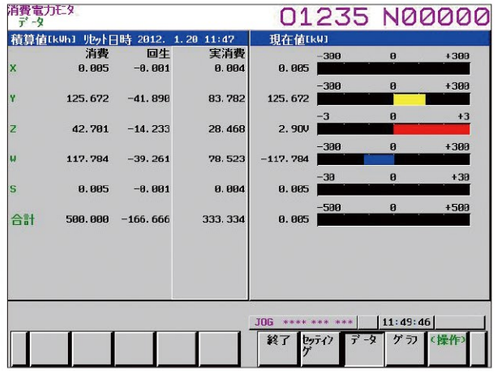
Monitoring data setting screen

Power Consumption Monitor

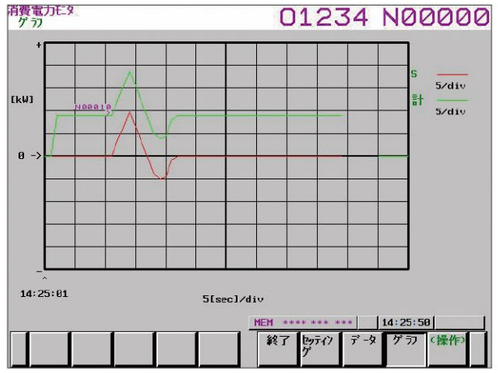
Displays and records the power consumption of not only the spindle and feed axes but also the whole machine including peripheral devices on the screen.

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

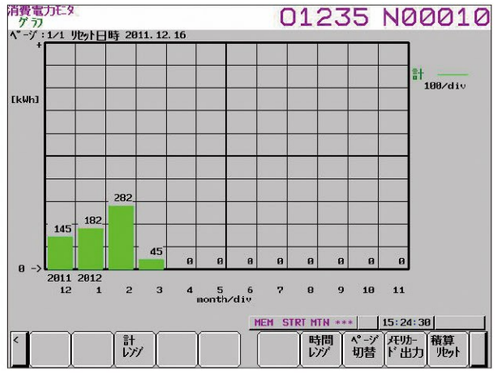
For the integral power of the whole machine (monthly display), data for five years can be saved. Also, the data can be output in the CSV format, which is convenient for preparing reports, etc.



Data screen



Instantaneous power graph screen



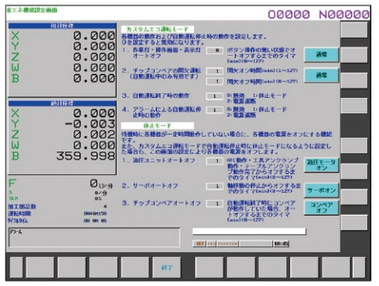
Integral power monthly graph screen

Energy Saving Function

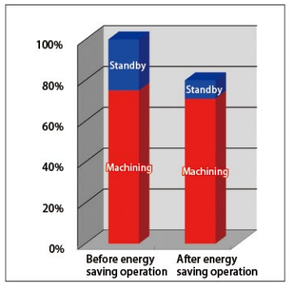
The energy saving function automatically controls waiting axes and operation of peripheral devices in two modes to reduce power consumption. Additional setting is possible if peripheral devices are added.

(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.



Setting screen



Example of energy saving

Special specifications / Optional accessories

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

Standard Accessories

- Coil type chipconveyor
- 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
- 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
- Machine manual
- FANUC manual

Special specifications

Spindle	
1	Spindle motor power up 26/22kW (35/30HP)
2	Hi speed spec. 4500 min^{-1} /5000 min^{-1}
3	Milling spindle extension 200mm (7.87")
ATC magazine	
4	60, 90, 120 tools
5	Maximum tool length extension
APC (Automatic pallet changer)	
6	2 pallets shuttle type
Table	
7	0.0001 degree table indexing by NC command
8	Additional table reference groove
Through spindle	
9	Coolant through spindle (1MPa/3MPa/5MPa)
10	Air through spindle
11	Mist through spindle
Stroke	
12	Y axis stroke KBT-11W.A:1800mm (70.87")

＊ 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 4 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
Scale feed back system	
11	Absolute position detection type
Attachment	
12	Facing head ϕ600 *3
13	NC contouring head
14-1	Vertical milling attachment
14-2	Universal milling attachment (Manual indexing)
14-3	Angle attachment (Manual indexing)
14-4	Extension head
14-5	Extension sleeve
14-6	Positioning block (for angle attachment and etc.)
Operation help	
15	Cs control
16	Manual pulse generator 2pc's/3pc's
17-1	Sub operation panel
17-2	Handy machine operation panel
Machine management	
18	Warming up function
19	External run hour display Auto run / Spindle rotation / Cutting feed / Machine power on
Measuring system	
20	Centering system simple type*2
21	Centering system touch type*2
22	Centering system automatic type
23	Auto tool length measurement (tool breakage detector included) *Touch type or Laser type
Monitoring system	
24	Meter relay type over load detection
25	KURAKI monitor (Spindle load monitoring function, Override control function)
26	Power consumption monitoring function
27	Energy saving function
Program help	
28	Kuraki E guide
High precision machining	
29	AI contour control Ⅱ machining function + High speed processing
30	AI contour control Ⅱ machining function
31	Spindle thermal distortion compensating system
Others	
32	Earth leakage circuit breaker
33	EC cabinet door interlock
34	Light inside EC cabinet
35	Plug socket outside EC cabinet AC100V 3A
36	Specified machine color
37	Angle Plate

＊1:The attachments of 12, 13 and 14 cannot be used together with 5 and 6.
＊2:20 and 21 cannot be provided together.
＊3:4 and 12 cannot be provided together.
For details, please contact KURAKI overseas sales department.

Splash guard (optional accessory)

Splash guard type A

It covers the circumference of the table. The insertion type standard guard is fixed to the table oil pan and moves with the table. The front cover open/close type facilitating workpiece loading/unloading is also available.

Splash guard type A

Splashguard A type (double door) + B type

Splashguard B type

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

Splashguard B type

Splashguard A type (slide door) + B type (with roof)

Splash guard full cover type

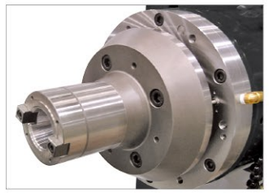
It covers the whole machine movable range. The door on workpiece loading side is the manual slide type.
An automatic shutter is provided for the APC specification.

Splash guard full cover type

Attachments (optional accessory)

Vertical attachment
L=350mm (13.78")

Universal attachment
Manual indexing



Extension head L=220mm (8.66")
It exhibits an effect in long-time powerful heavy-duty cutting. Automatic tool change is allowed even when the extension head is mounted.

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

CNC Specifications / Overall dimensions / Machine specification

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	○	

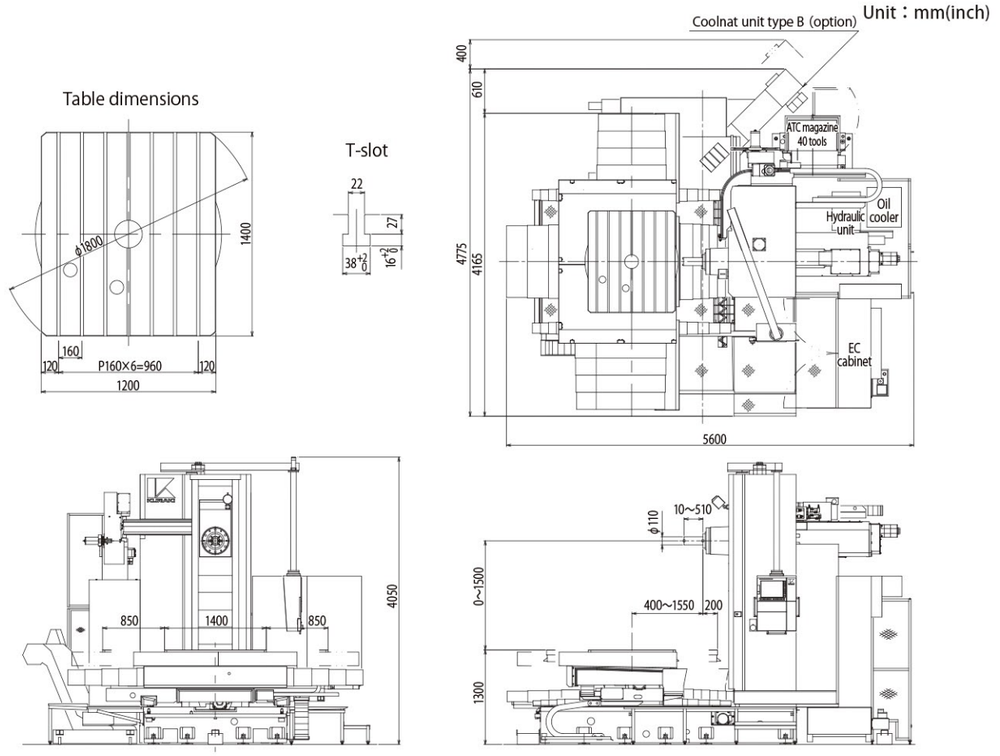
		Standard	Option
Program storage & editing	Program search	○	
	Sequence number N8 digits	○	
	Sequence number search	○	
	Main program / Sub program (Sub program calls can be nested up to ten levels)	○	
Operation display	LCD / MDI panel 15"color LCD	○	
	Clock function	○	
	Run hour & Parts count display	○	
	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 compensation【G43 / G44】	○	
	Tool radius compensation【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 compensation 【G45/G46/G47/G48】		○
	Three dimensional tool compensation 【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		○
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 system 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.

KBT-11. A Overall dimensions

Unit：mm(inch)



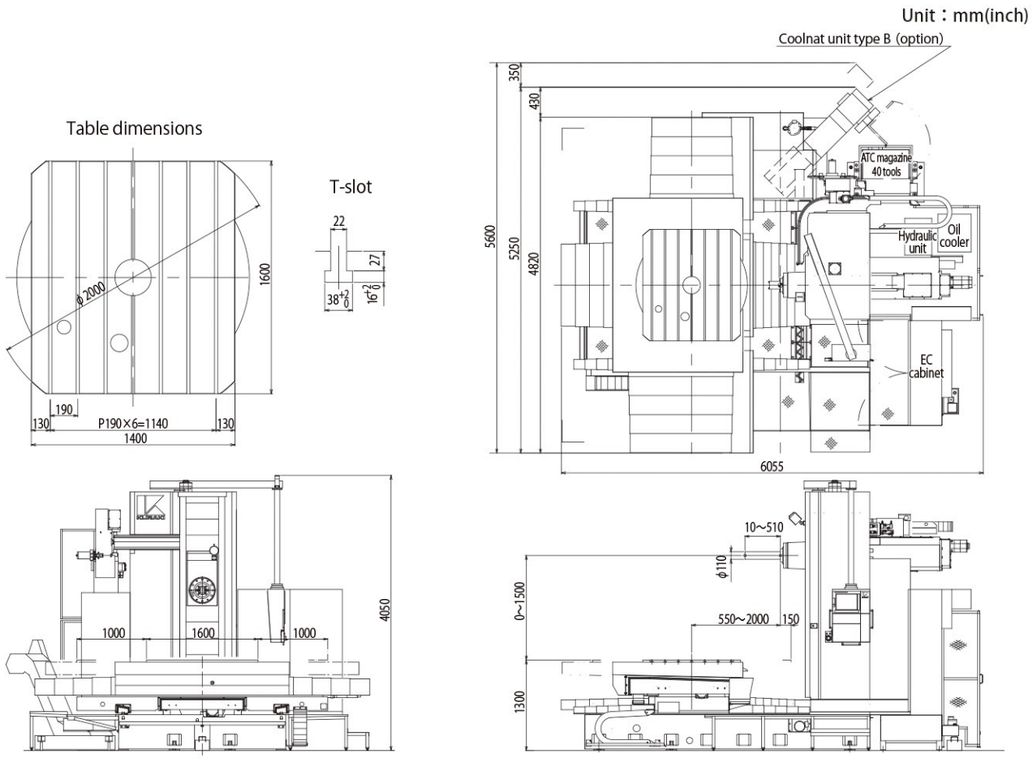
Standard specification

Stroke			**Automatic Tool Changer (ATC)**		
X axis travel (table longitudinal)	mm(inch)	1700 (66.93)	Tool shank		MAS BT50
Y axis travel (spindle vertical)	mm(inch)	1500 (59.06)	Pull stud		MAS P50T -1 (45°)
Z axis travel (table cross)	mm(inch)	1150 (45.28)	Tool storage capacity	pc	40
W axis travel (spindle axial)	mm(inch)	500 (19.69)	Max. tool diameter [vacant adjacent pots]	mm(inch)	125 (4.92) [240 (9.45)]
Distance from table top to spindle center	mm(inch)	0 ～ 1500 (0 ～ 59.06)	Max. tool length	mm(inch)	400 (15.75)
Distance from table center to spindle nose	mm(inch)	400 ～ 1550 (15.75 ～ 61.02)	Max. tool weight	kg(lbs)	25 (55)
Table			Tool selection system		Shortcut rotation at random
Table work space	mm(inch)	1200 X 1400 (47.24 X 55.12)	**Motors**		
Table maximum loading capacity	kg(lbs)	5000 (11000)	Spindle motor (30min / Cont.)	kW(HP)	AC 18.5 (25) / 15 (20)
Table top profile	mm(inch)	22 (0.87) 7T slots	Hydraulic motor	kW(HP)	2.8 (3.7)
T-slot pitch	mm(inch)	160 (6.30)	**Voltage**		
Table auto. Indexing	deg	0.001 (every 90° index. By locator pin)	Electric power supply (Not incl. opt)	kVA	52
Spindle head			Air pressure source pressure	Mpa	0.5
Boring spindle diameter	mm(inch)	110 (4.33)	Air pressure source flow (Not incl. opt)	NL/min	400 (atm)
Spindle speed (for every 1min^{-1})	min^{-1}	5 ～ 3000	**Dimensions**		
Spindle speed range	step	3	Machine height	mm(inch)	4050 (159.45)
Spindle taper		7/24 Taper No.50 (BIG-PLUS spindle system is available)	Floor space (Not incl. opt)	mm(inch)	4775×5600 (187.99×220.47)
Feed			Machine weight (Incl. NC unit)	kg(lbs)	2300 (50600)
Rapid traverse	X,Y,Z axis	m(inch)/min 12 (472.44)			
	W axis	m(inch)/min 10 (393.70)			
Feed rate		mm(inch)/min 1 ～ 6000 (0.04 ～ 236.22)			
Table revolution B axis		min^{-1} 2.0			

Overall dimensions / Machine specification

KBT-11W.A Overall dimensions

Unit : mm(inch)

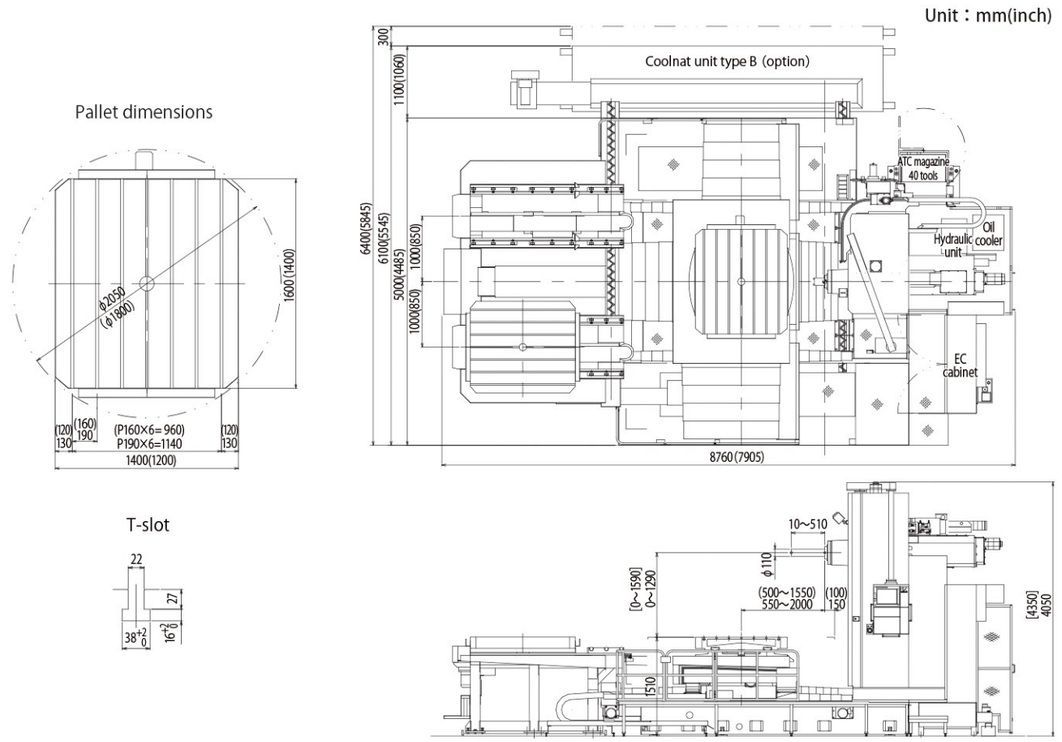


Standard specification

Stroke			Automatic Tool Changer (ATC)		
X axis travel (table longitudinal)	mm(inch)	2000 (78.74)	Tool shank		MAS BT50
Y axis travel (spindle vertical)	mm(inch)	1500 (59.06)	Pull stud		MAS P50T -1 (45°)
Z axis travel (table cross)	mm(inch)	1450 (57.09)	Tool storage capacity	pc	40
W axis travel (spindle axial)	mm(inch)	500 (19.69)	Max. tool diameter [vacant adjacent pots]	mm(inch)	125 (4.92) [240 (9.45)]
Distance from table top to spindle center	mm(inch)	0 ~ 1500 (0 ~ 59.06)	Max. tool length	mm(inch)	400 (15.75)
Distance from table center to spindle nose	mm(inch)	550 ~ 2000 (21.65 ~ 78.74)	Max. tool weight	kg(lbs)	25 (55)
Table			Tool selection system		Shortcut rotation at random
Table work space	mm(inch)	1400 X 1600 (55.12 X 62.99)	**Motors**		
Table maximum loading capacity	kg(lbs)	6500 (14300)	Spindle motor (30min / Cont.)	kW(HP)	AC 18.5 (25) / 15 (20)
Table top profile	mm(inch)	22 (0.87) 7T slots	Hydraulic motor	kW(HP)	2.8 (3.7)
T-slot pitch	mm(inch)	190 (7.48)	**Voltage**		
Table auto. Indexing	deg	0.001 (every 90° index. By locator pin)	Electric power supply (Not incl. opt)	kVA	52
Spindle head			Air pressure source pressure	Mpa	0.5
Boring spindle diameter	mm(inch)	110 (4.33)	Air pressure source flow (Not incl. opt)	NL/min	400 (atm)
Spindle speed (for every 1min^{-1})	min^{-1}	5 ~ 3000	**Dimensions**		
Spindle speed range	step	3	Machine height	mm(inch)	4050 (159.45)
Spindle taper		7/24 Taper No.50 (BIG-PLUS spindle system is available)	Floor space (Not incl. opt)	mm(inch)	5250 X 6055 (206.69 X 238.39)
Feed			Machine weight (Incl. NC unit)	kg(lbs)	26000 (57200)
Rapid traverse X,Y,Z axis	m(inch)/min	12 (472.44)			
Rapid traverse W axis	m(inch)/min	10 (393.70)			
Feed rate	mm(inch)/min	1 ~ 6000 (0.04 ~ 236.22)			
Table revolution B axis	min^{-1}	2.0			

KBT-11.AP / 11W.AP Overall dimensions

Unit : mm(inch)



() : KBT-11.AP [ ] : Y axis stroke extension (special spec.)

Standard specification

	unit	KBT-11.AP	KBT-11W.AP
X axis travel (table longitudinal)	mm(inch)	1700 (66.93)	2000 (78.74)
Y axis travel (spindle vertical)	mm(inch)	1290 (59.78) [1590 (62.60)]	
Z axis travel (table cross)	mm(inch)	1150 (45.28)	1450 (57.09)
W axis travel (spindle axial)	mm(inch)	500 (19.69)	
Distance from table top to spindle center	mm(inch)	0 ~ 1290 (0 ~ 59.78) [0 ~ 1590 (0 ~ 62.60)]	
Table work space	mm(inch)	1200 X 1400 (47.24 X 55.12)	1400 X 1600 (55.12 X 62.99)
Table maximum loading capacity	kg(lbs)	3500 (7700)	4500 (9900)
Table auto. Indexing	deg	0.001 (every 90° index. By locator pin)	
Boring spindle diameter	mm(inch)	110 (4.33)	
Spindle Max. speed	min^{-1}	5 ~ 3000	
Table revolution B axis	min^{-1}	2	
Machine weight (Incl. NC unit)	kg(lbs)	30000 (66000)	34000 (748000)