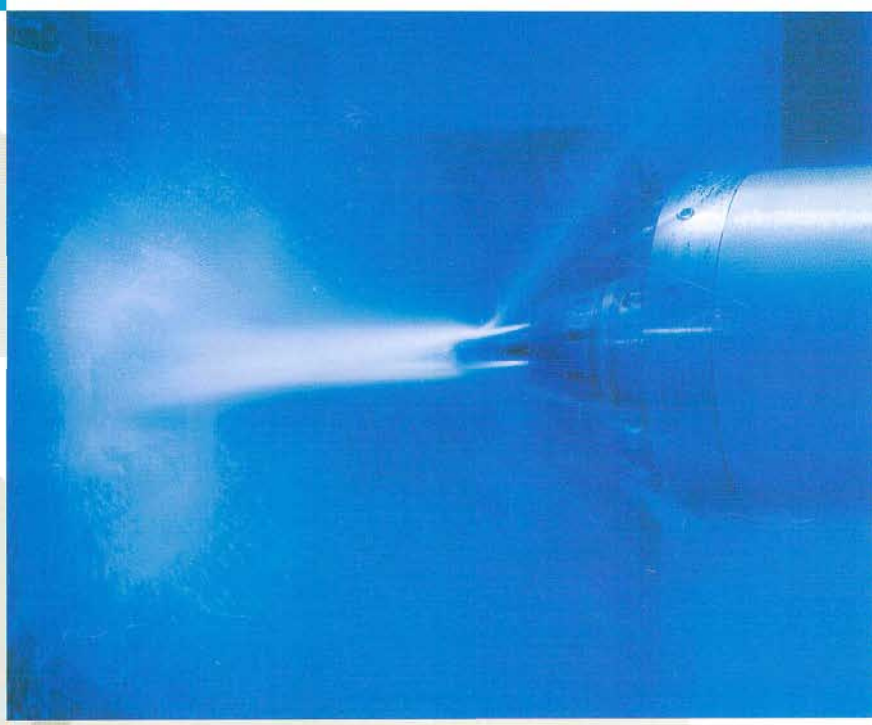
MITSUI SEIKI

HORIZONTAL MACHINING CENTER

HS6A & HS8A



MITSUI SEIKI KOGYO CO.,LTD.

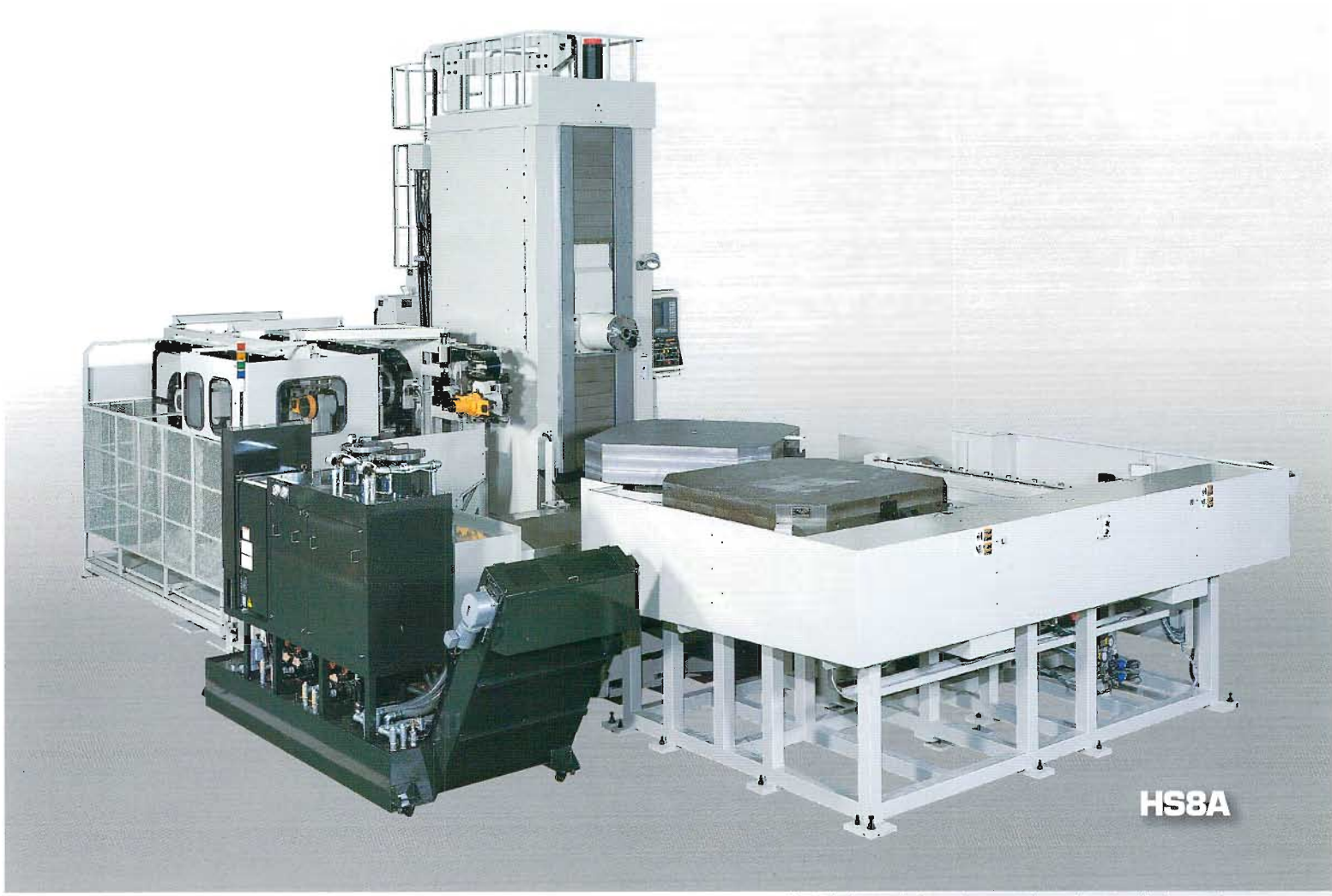
HS6A & HS8A

The HS6A/HS8A is a large machining center which is very user-friendly and responds to demands for high-precision and high-speed machining. A rigid traveling column is employed to facilitate high-precision, heavy duty cutting on large workpieces.

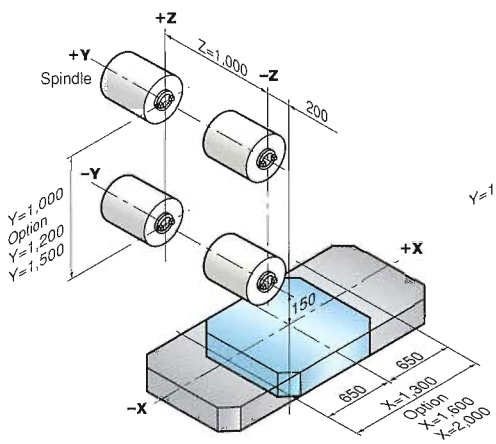
The bed of the HS6A/HS8A is an extremely thick cast monocoque structure, minimizing deflection due to bending and torsional stresses. Geometric alignments are maintained on X, Y and Z Axis, even when each axes moves to the end of its travels.

The HS6A/HS8A machining center assists you in constructing a versatile system and assures you efficient, high-value-added production.

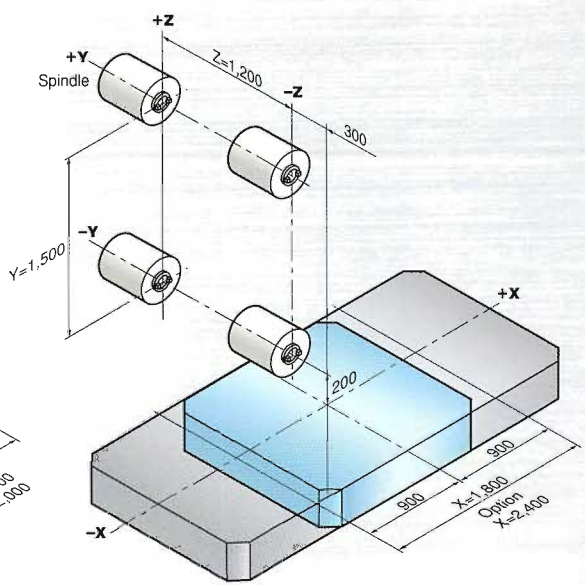
HS6A



Model shown in the photograph equipped with the options:



HS6A



HS8A

X, Y & Z stroke

MACHINE CONFIGURATION

DOUBLE COLUMN STRUCTURE

The spindle head is rigidly supported at the center of the double walled column, distributing cutting forces uniformly to the slideways on the column.

The two massive slideways, receive machining forces symmetrically. The top and bottom members are a one piece casting to form a box shaped structure.

An extensive width between the columns allows for heat, from the spindle drive motor to be easily dissipated.

Unusually large depth to height ratio (2:1) contributes to the columns' Z axis rigidity.

This structure gives the machine high rigidity and reduces thermal displacements to a minimum, thus assuring high machining accuracy.

HARDENED AND GROUND GUIDE WAYS

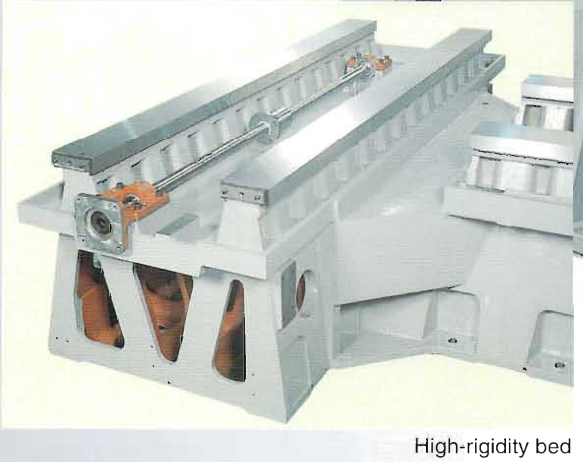
The X, Y and Z axis utilize hardened and ground rectangular steel slideways, mounted to the hand scraped castings.

The moving menbers are equipped with Turcite B® bearing surface which provides a low co-efficient of friction and good vibration absorption during heavy cutting throughout the full range of feed and speed. This contributes to improved surface finishes and overall machining quality.

® : Turcite is a trade name for a material of a low coefficient of friction.

Z-axis scale

Y-axis scale

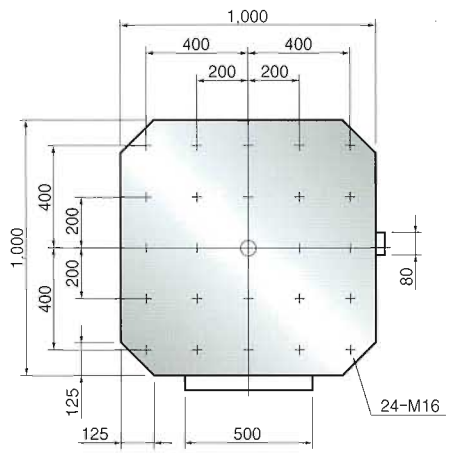


High-rigidity bed

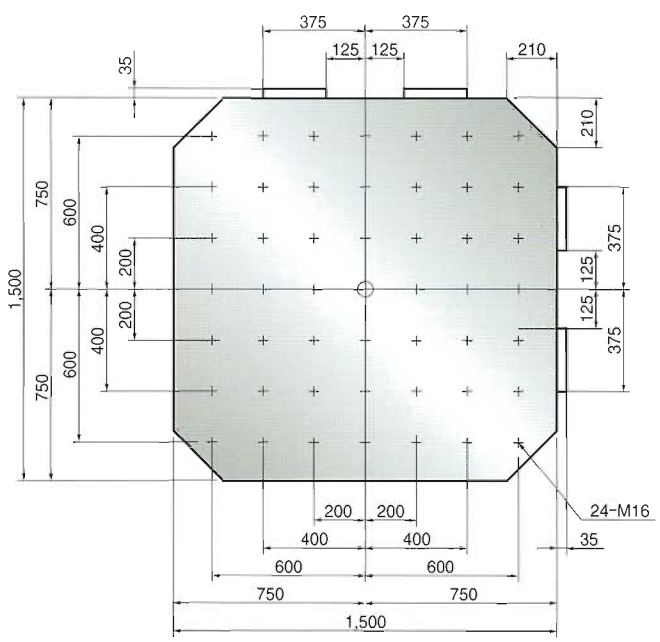
TABLE & SADDLE

The table or pallet is carried by a rigid cast iron saddle along the bed's hardened and ground replaceable steel slideways.
The saddle is directly driven by an AC motor and large ball screw.
The table surface is precision machined, and two edge locators are attached to the two sides of the table for locating and attaching fixtures.

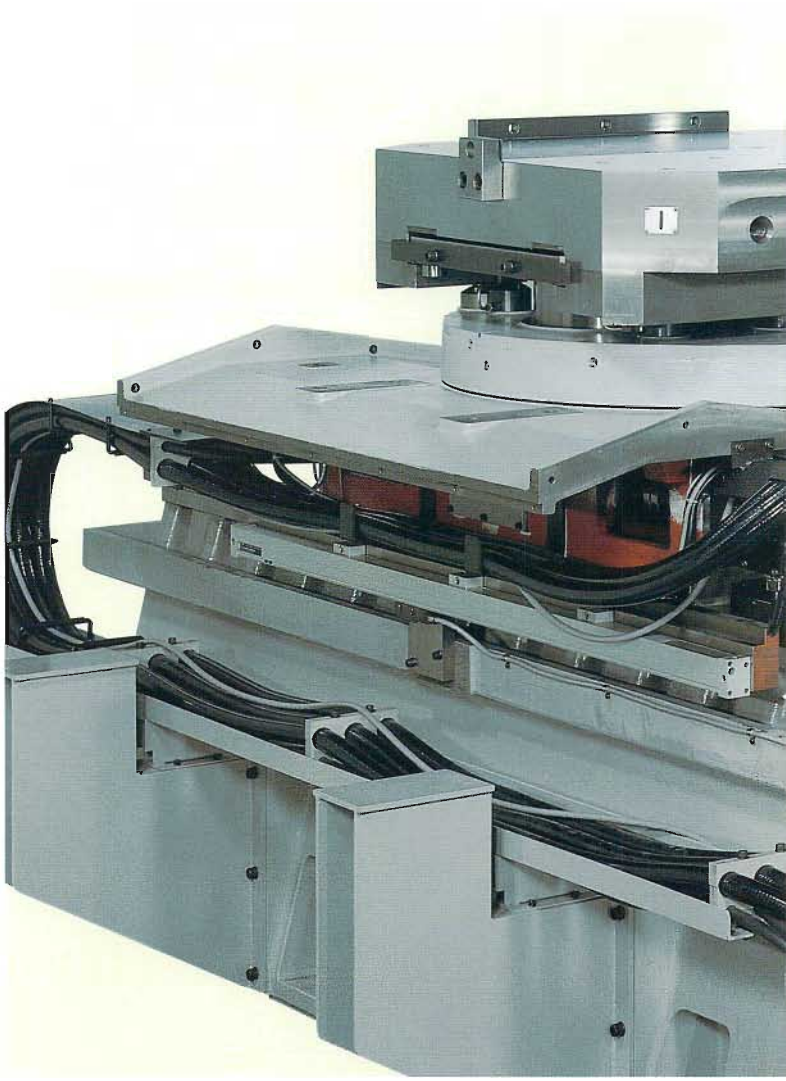
A 1 degree index table is standard and employs a large diameter Hirth coupling.
An infinite rotary table is available as an option which employs rotary Inductosyn scales and provides 360,000 positions (0.001 degree). The infinite rotary table is driven by a large dual lead worm and worm wheel assembly and is hydraulically clamped for high accuracy heavy cutting operation.



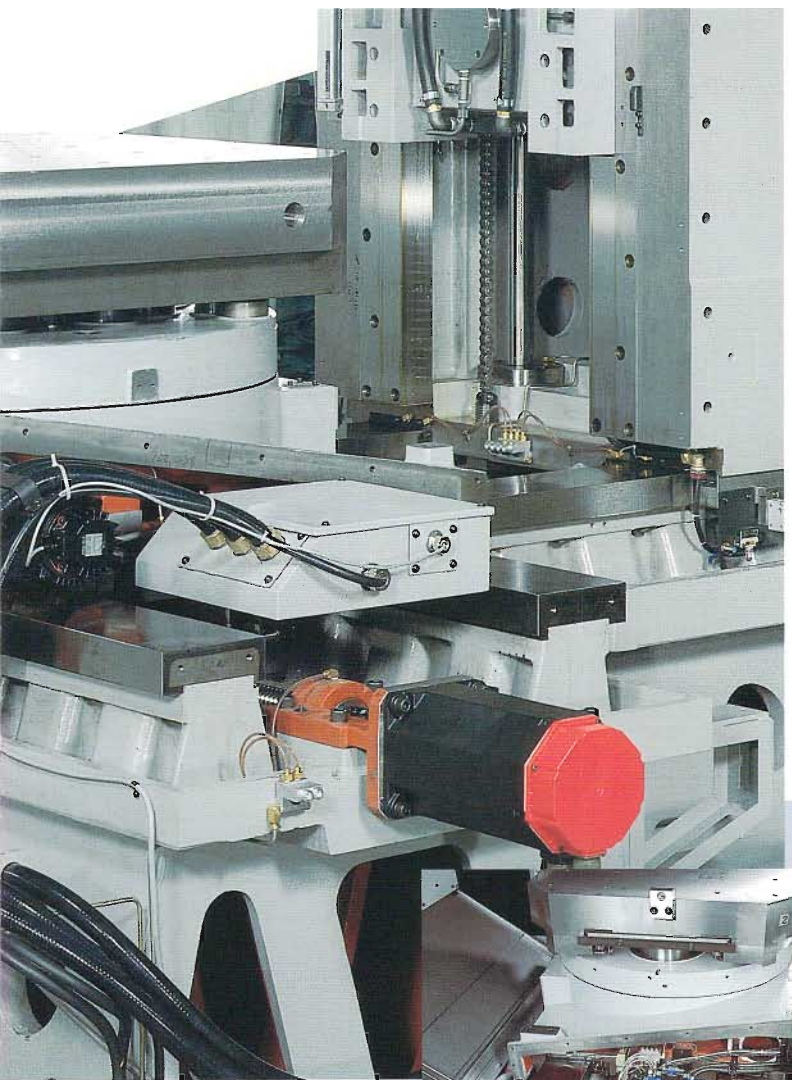
HS6A Pallet size



HS8A Pallet size



1° index table (HS6A standard)

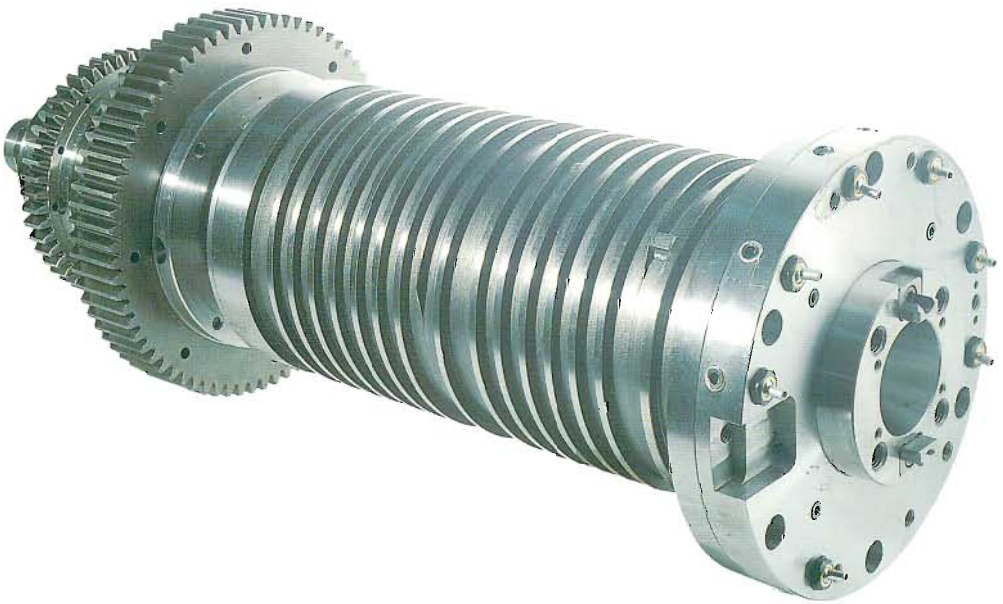


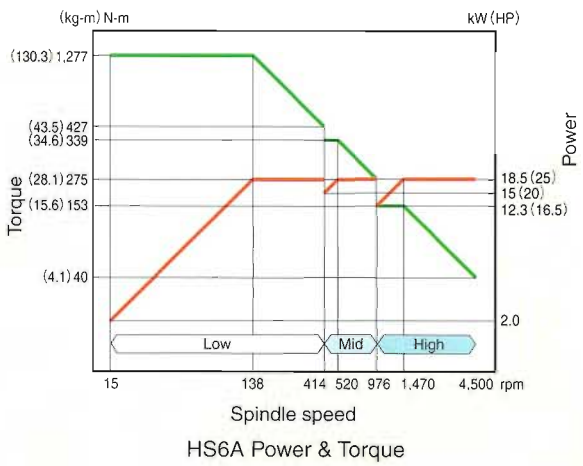
X axis slideway & chip conveyers

The augled telescopic cover

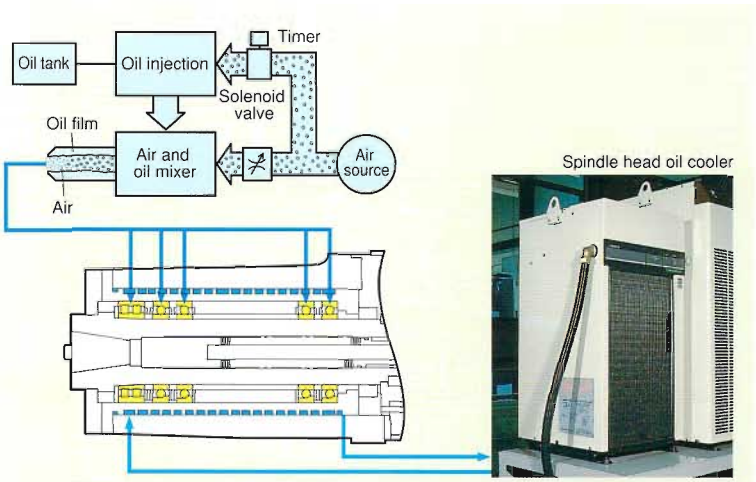
THE SPINDLE

A large diameter spindle, supported by ultra-precision bearings, is adopted to allow for heavy duty cutting. Thermal displace ment is minimized by Mitsui Seiki's own spindle design utilizing circulating chilled oil around the spindle cartridge and throughout the gear box.

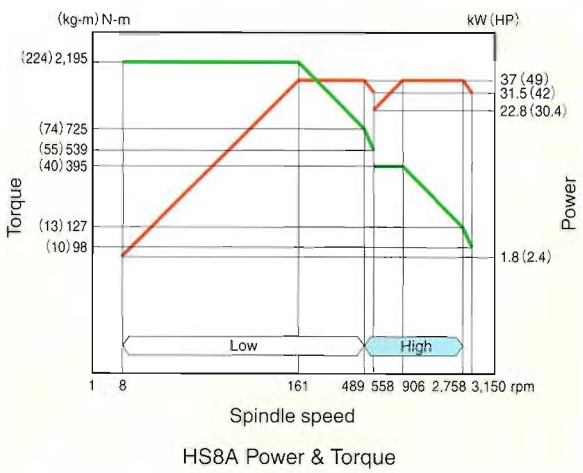




HS6A Power & Torque



Spindle cooling system



HS8A Power & Torque

300 mm Quil spindle (HS8A option)

ATC (Automatic Tool Changer)

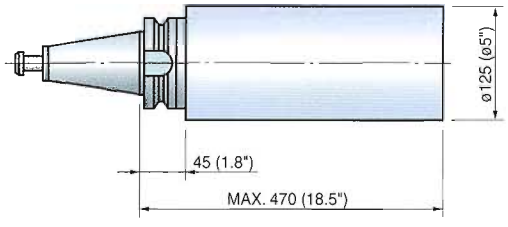
Since the automatic tool changer is installed separately from the machine, its' movement and tool weight variation does not affect machining accuracy.

A 32 tool storage magazine is standard, however to meet the demand for Flexible Manufacturing Systems and unmanned operation, the following tool storage magazines are available as options 60, 90, 120, 180, 240, 270 or 360. The automatic tool changer can handle tools up to a maximum length of 470 mm (18.5") and a maximum weight of 25 kg (55 lbs).

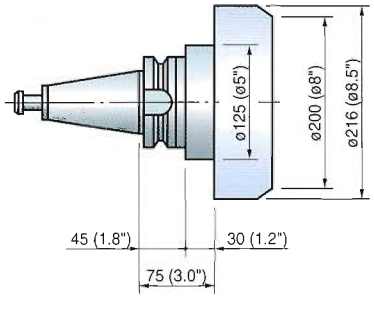
60 tools

Tool capacity stored in ATC magazine

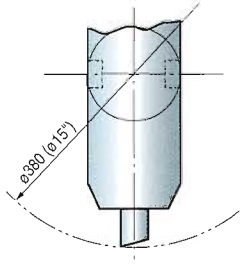
With adjacent tool



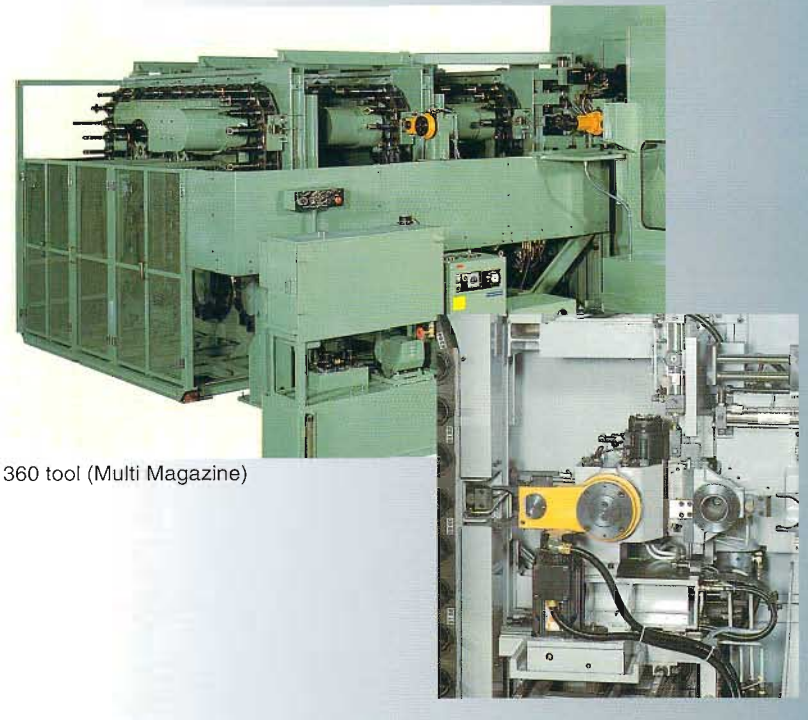
Millig cutter



With T type boring bar



mm (inch)


360 tool (Multi Magazine)

APC (Automatic Pallet Changer)

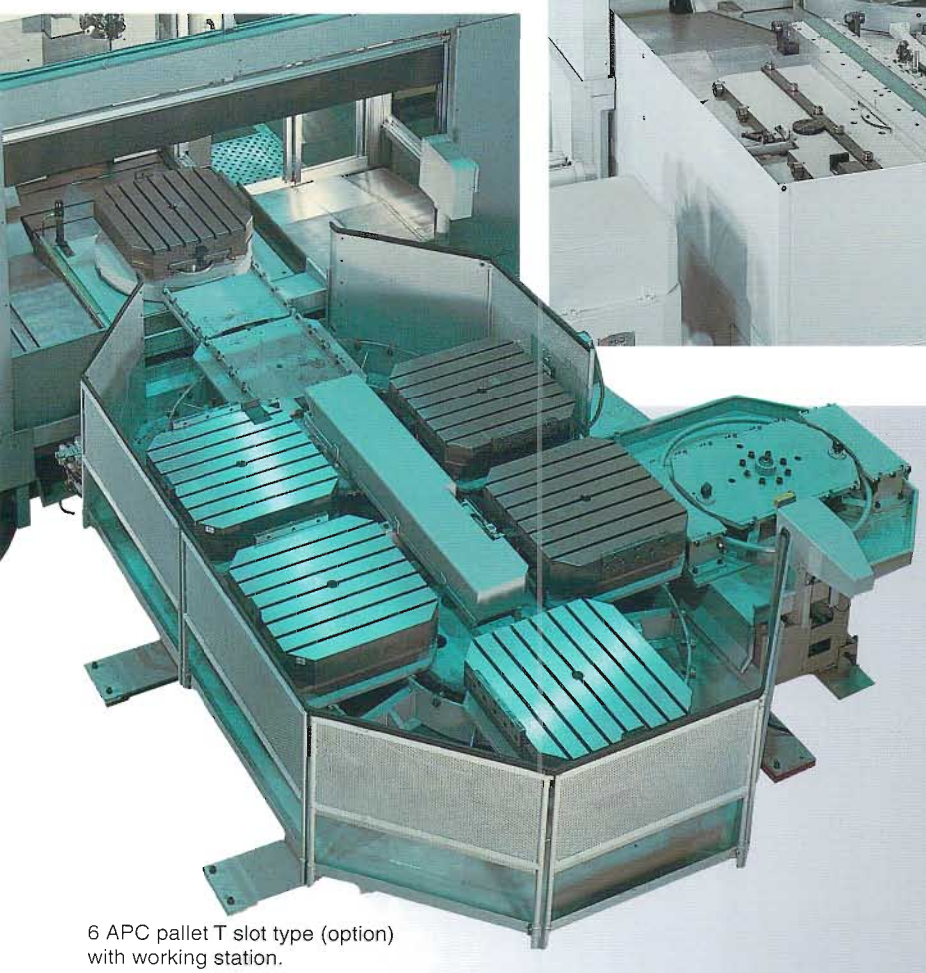
The standard pallet size is 1000mm (39.4") x 1000mm (39.4") and can support heavy work up to 2000 kg. (4400 lbs).

In order to meet the demand for Flexible Manufacturing systems and unmanned operation the following automatic pallet changers are available as options: 2, 6, 8 and 10 pallets.

Standard pallets are furnished with (24) 16 mm tapped holes and (2) edge locators.

Pallets with T slots are optional.

2APC

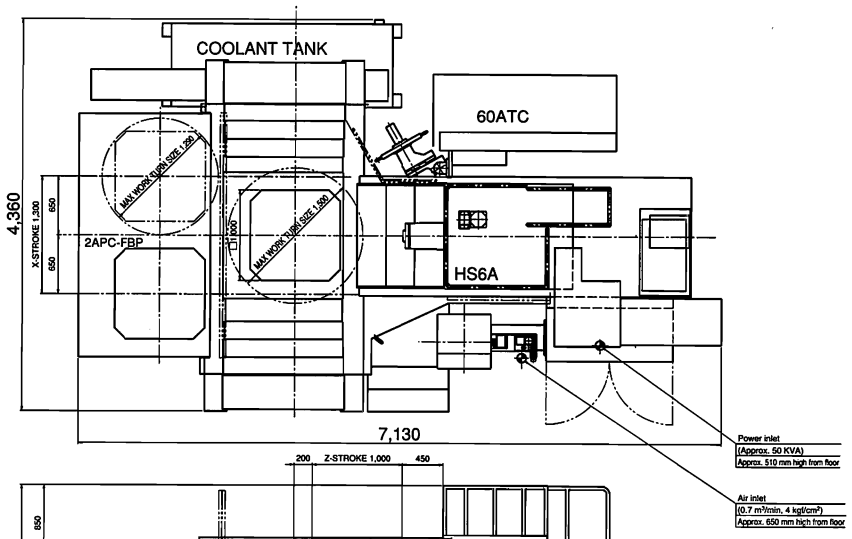


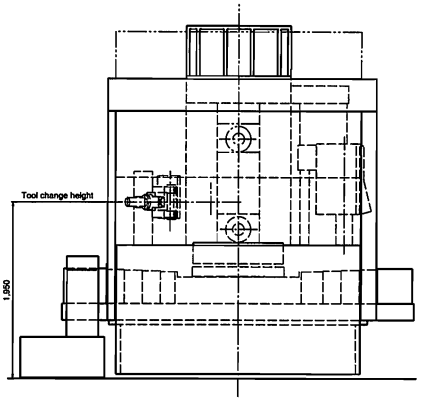
6 APC pallet T slot type (option) with working station.

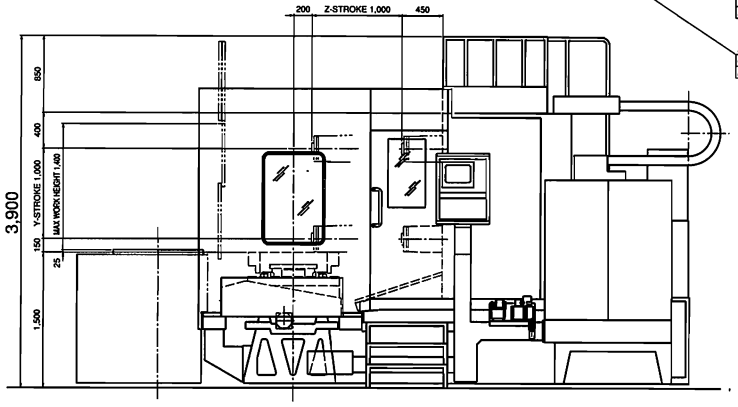
FMS system

MACHINE DIMENSIONS

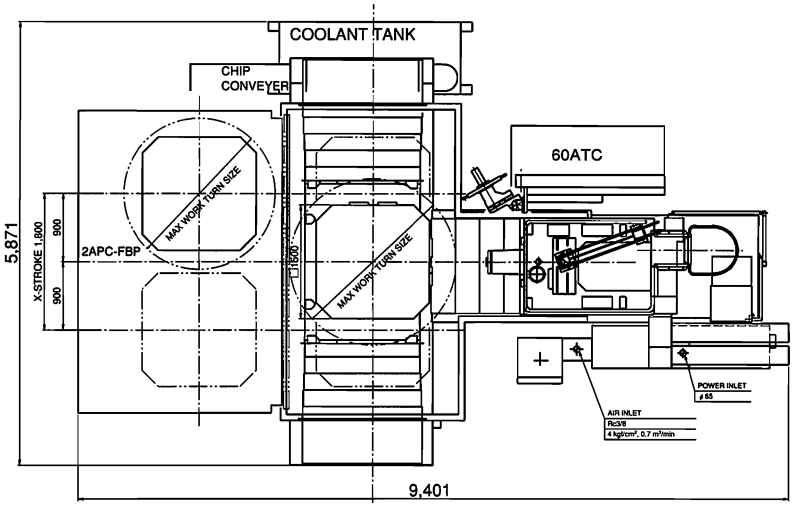
HS6A

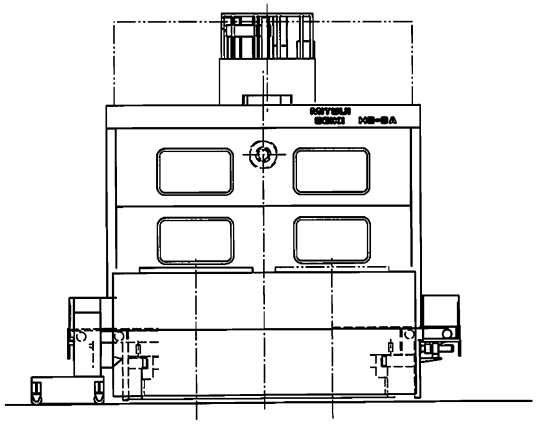


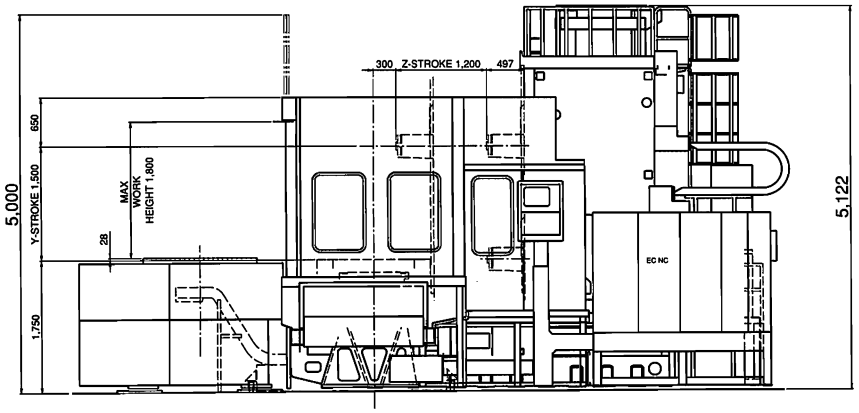




HS8A







MAIN SPECIFICATIONS

STANDARS MACHINE SPECIFICATIONS

	HS6A	HS8A
• Max. working envelope	1,300 x 1,000 x 1,000 mm	1,800 x 1,500 x 1,200 mm
• Storoke		
Table longitudinal stroke (X)	1,300 mm	1,800 mm
Spindle head vertical stroke (Y)	1,000 mm	1,500 mm
Column transversal stroke (Z)	1,000 mm	1,200 mm
Spindle center to table top	150 – 1,150 mm	0 – 1,500 mm
spindle nose to table center	200 – 1,200 mm	300 – 1,500 mm
• Table		
Pallet size	1,000 x 1,000 mm	1,500 x 1,500 mm
Pallet index angle	1°	0.001°
Pallet surface configuration	24–M16 (200 mm space)	49–M16 (200 mm space)
Max. permissible part size	ø1,500 (w/o APC)	ø1,850
Max. permissible load on table	2,000 kg	8,000 kg
• Spindle head		
Spindle taper	ISO 7/24 taper 50	ISO 7/24 taper 50
Spindle diameter	ø110 mm	ø130 mm
Spindle speed	15 – 4,500 min^{-1}	8 – 3,150 min^{-1}
Spindle motor (30/cont.)	18.5/15 kW	37/30 kW
Max. spindle torque	1,277 N-m	2,195 N-m
• Feed rate (X, Y, Z)		
Rapid (X, Y, Z-axis)	15 m/min (X, Y) 12 m/min (Z)	7 m/min (X) 10 m/min (Y, Z)
Cutting feed	1 – 4,000 mm/min	1 – 4,000 mm/min

	HS6A	HS8A
• Minimum input resolution	0.001 mm	0.001 mm
• Position detector (X, Y, Z)		
X, Y, Z-axis	Linear scale	
B-axis	Hirth coupling	Rotary Inductosyn
• Machining capacity		
Z-axis Max. thrust	29.4 kN	29.4 kN
X, Y-axis Max. thrust	19.6 kN	19.6 kN
• ATC		
Tool storage capacity	60 tools	
Tool selection method	Fixed pot No. bi-directional random selection	
Tool shank	50T (JIS6339)	
Max. tool length	470 mm	
Max. tool weight	25 kg	
Max. tool dia.	ø125 mm	
Max. tool dia. (w/o adjacent tool)	ø216 mm	
Tool change time (T to T)	5 sec.	10 sec.
• Machine weight	Approx. 30 ton	Approx. 35 ton
• Power consumption	50 KVA	65 KVA
• Max air consumption	0.4 MPa 700 NL/min	
• CNC unit	FANUC 16 iM	
• Pait color	RAL 7032	

Accuracy

		HS6A	HS8A
• Psitioning accuracy	X, Y, Z-axis (Liner scale)	±0.003 mm/F	±0.004 mm/F
	B-axis (Hirth coupling)	±3 sec	—
	B-axis (Rotary Inductosyn)	±4 sec	±4 sec

		HS6A	HS8A
• Repeatability	X, Y, Z-axis (Liner scale)	±0.001 mm	±0.001 mm
	B-axis (Hirth coupling)	±1 sec	—
	B-axis (Rotary Inductosyn)	±1.5 sec	±1.5 sec

Machine Standard equipment

Spindle chiller	Work lamp	RS232C interface
Chip conveyors (2 on the machine, 1 on the floor)	2-lights beacon light	Manual pulse handle
Flood coolant system 650L tank (HS6A: 7 nozzles/HS8A: 8 nozzles)	Automatic power off system	
100 V 1 A receptacle	Elapse meters (Cycle ON, Spindle ON, Power ON)	

Machine Special specifications

	HS6A	HS8A
• Index type B-axis	0.001°	—
• Infinite rotary B-axis	Rotary Inductosyn	—
• Extended X stroke	1,600/2,000 mm	2,400 mm
• Extended Y stroke	1,200/1,500 mm	—
• Extended Z stroke	1,200 mm	—
• Quill type spindle	—	ø130, stroke 300 mm
• ATC variation	90/120/180/240/360 tools	
• APC	2/4/6/8/10 APC	2/4/6 APC
• Machine color	Need specifications and color sample	

	HS6A	HS8A
• Spindle variation		
15 – 2,250 min^{-1}, 37/30 kW	—	○
15 – 6,000 min^{-1}, 22/18.5 kW	○	—
15 – 6,000 min^{-1}, 26/22 kW	—	○
50 – 12,000 min^{-1} 30/25 kW	○	
50 – 20,000 min^{-1}, 15/11 kW	○	—
• Though tool coolant system		
Through tool coolant	Discharge pressure 1.0/1.5 MPa	
Through spindle coolant	Discharge pressure 1.5/3.0/7.0 MPa	
External nozzle coolant	Discharge pressure 1.5/3.0/7.0 MPa	

Automatic Measuring System

Part measuring and compensation	AMCS-7S	Tool length and radius automatic measuring	AMCS-7T
Calculation multi point results and angle	AMCS-7H	Automatic tool length measuring and comp.	ATLS-3

Automating Functions

Tool life control function	Expired tool resetting function	Schedule function
Broken tool detection function	Tool check function	Load monitoring function
Self recovering function	8-digit tool number function	Floppy disk drive (MF1/MF2)

Machine Special equipment

Oil shot system	Chip bucket (small/large)	Coolant chiller	Edge finder
Oil mist system	Mist collector	Weekly timer	Z-axis origin tool
Part cleaning shower gun	Oil skimmer	3-lights beacon light	Pull stud bolt
Chip air blow	Whole machine cover (with ceiling)	ATC single step control box	
Ceiling shower system	Rotary wiper	Ground fault detector	
2 stage chip conveyor	Hydraulic oil chiller	EC cabinet internal light	

NC Standard functions

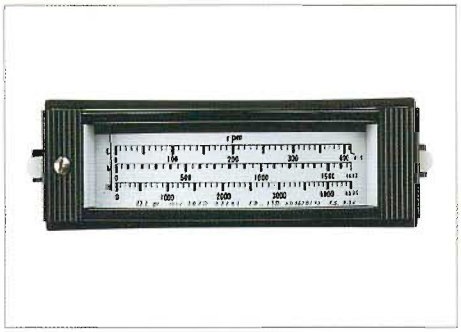
3/4 axes control (X, Y, Z, B)	Dwell	Pitch error compensation	Tool offset memory 64 sets
3 axes simultaneously control	Exact stop mode	Self diagnose	Registerable program 63 sets
Minimum input resolution 0.001 mm	MST function	9.5 monochrome display	Extended editing function
Max. command ±99999.999 mm	Dry run	Program memory 80 m	Background editing
EIA/ISO auto. sensing	Single block	Work coordinate setting	Fixed cycles
Decimal point input	Optional block skip	Circular interpolation	Mirror image
Rapid speed	Aux. function lock	Circular interpolation with R	Follow up
Rapid override 0 – 100%	Machine lock	Tool offset type C	Uni-directional positioning
Feed rate 1 – 4,000 mm/min	Feed hold	Tool length offset	Manual pulse handle
Feed rate override 0 – 200%	Emergency stop	Tool position offset	Memory card interface
Spindle override 50 – 150%	Reset	Reference return	Floppy directory display
Absolute/Incremental input	Manual jog	Exact stop mode	Operation time/parts counter
Coordinate setting	Sequence No. search (5 digits)	Label skip	Japanese/English display
Positioning	Program No. search	Control IN/OUT	Linea accel/decal after/before interpolation
Linear interpolation	Program name	Const. tangential speed control	External part number search
Buffer register	Backlash compensation	Tool offset memory A	

NC Oprional functions

Inch/metric switchable	AI nano contour control		Reader/Puncher interface2		Program restart
Helical interpolation	10.4" color LCD		Remote buffer		Manual pulse handle interruption
Involute Interpolation	Graphic function		High speed serial bus		Arbitary angle chamfering, corner R
Polar coordinate	Dynamic graphic function		Data server		Programmable mirror image
Cylindrical interpolation	Program memory (Standard: 80 m)	160 m	3D tool fooset		Rigid tap
Helical interpolation B		320 m	Tool offset memory (Standard: 64 sets)	99 sets	Coordinate rotation
Spiral/conical interpolation		640 m		200 sets	Custom macro
NURBS interpolation		1,280 m		400 sets	Macro common variable addition
Smoothing interpolation		2,560 m		499 sets	Pattern copy
F-1 digit feed		5,120 m		999 sets	Macro executer
Auto. Corner override	Resisterble program (Standard: 63 sets)	125 sets	Tool posidion offset		F15 format
Feedrate clamp by circular radius		200 sets	Tool offset type (Standard: A)	B	Interruption type custom macro
Auto corner slow down		400 sets		C	Tool life control 128 sets
Inverse time feed		1,000 sets	Work coordianate	48 sets	Tool life control 512 sets
Feed forward	Sequence No. comparison stop			300 sets	External data imput

SPECIAL EQUIPMENT & ACCESSORIES

Spindle RPM Indicator



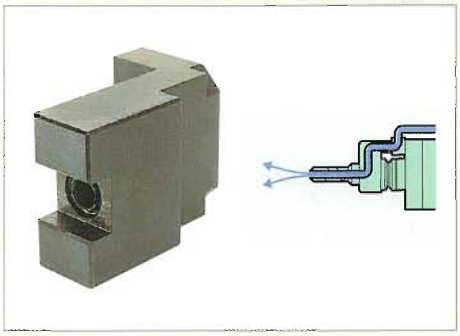
Printer for AMCS (Option)

Spindle Head Cooler

Spindle Power Indicator

Z Axis Original Position Setting Tool (Option)

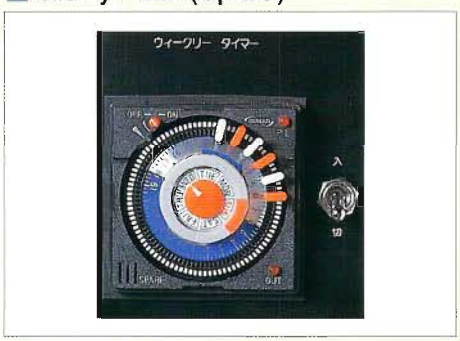
Attachment for Multi Head or Oil Hole Drills (Option)



Operation Hour Meter

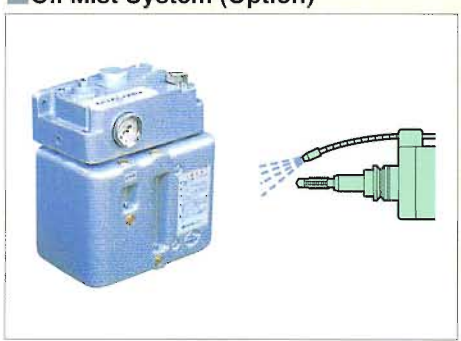
Reference Square (Option)

Weekly Timer (Option)



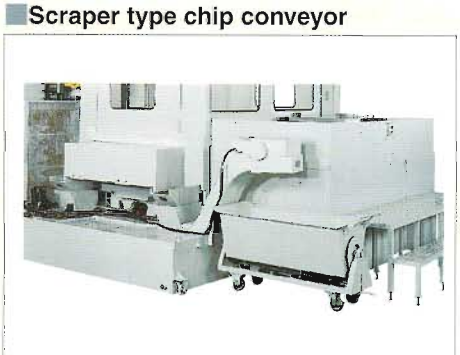
Whole machine cover

Oil Mist System (Option)

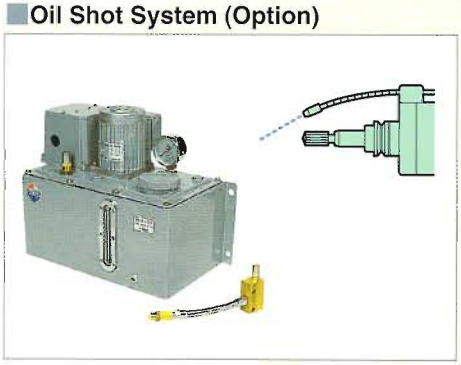


On-machine chip conveyor (coil type)

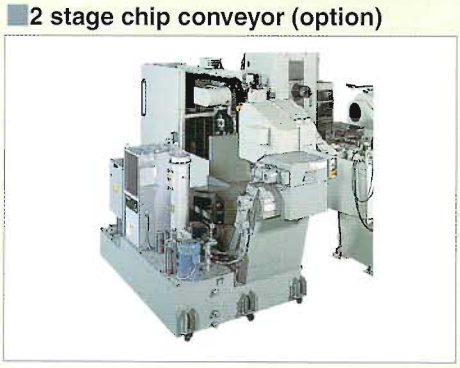
Scraper type chip conveyor



Oil Shot System (Option)



2 stage chip conveyor (option)



AUTOMATING FUNCTIONS

Automatic Measuring and Compensation System (AMCS) [Photo-1]
Spindle touch probing system utilizing Renishaw touch probe.
It measures part location or size and take appropriate action based on the measured results.
It compensates the deviation of coordinate or tool size automatically or rejects the part.

- AMCS-7S
  Spindle touch probing system with standard software.
- AMCS-7H
  Spindle touch probing system with higher grade software.
- AMCS-7T [Photo-2]
  Table touch probe with tool measuring software.
- Ring gage
- Printer
- Stylus (50mm/100mm)
- Renishaw touch probe (for 50T)

Tool breakage detecting system [Photo-3]
Touch switch type tool breakage detecting system.
It is useful to detect breakage of small tools such as small drills and end mills that are difficult to detect breakage by monitoring load meter.

Automatic Tool Length measuring System (ATLS) [Photo-3]
Automatic tool length measuring system utilizing touch switch.
Prior to machining, the tool to be used for the process can be measured its length and tool length offset is automatically registered or updated. No manual intervention is required to measure tool length.

Tool life control function [Photo-4]
Two different types of tool life control function are available.
One is: Tool life control by tool group. This function is based on NC optional function.
The other one is: Tool life control by each individual tool. This function is not based on NC optional function.

Automatic restoring function
When an undesirable condition is detected on a part under process through a monitoring function such as AMCS, ATLS or Tool breakage detecting function etc., this function calls up recovery program and shuttles out the pallet that the bad part is on and brings in a new pallet and starts machining.

Expired tool resetting function
This function is effective when the tool life control function by group is selected.
When all tools in a group have been expired or broken, this function can reset the expired tool data from the control without interrupting machine operation.

Tool check function
Check existence of usable tool on the machine before start machining.
There are 2 types of checking method.
One is List type Tool Check function, that is, the control reads the list of necessary tools and check availability of usable tools on the machine.
The other one is Spindle Tool Check function, that is, the control checks whether the tool in the spindle is usable tool or not after tool change cycle.

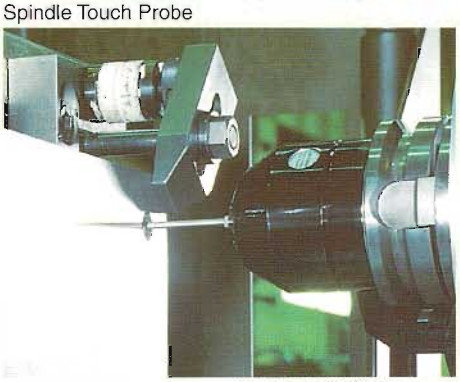
8 digits tool number function
8 digits tool number can be used on part programs.
This function can not be selected together with the following 2 functions:
*Tool life control by tool group. Based on NC optional function.
*Tool offset function by tool number.

Schedule function [Photo-5]
Schedule for machining order can be set for up to 30 pallets.
Up to 4 different work pieces can be loaded on one pallet.

MF-1/MF-2 Floppy disk unit [Photo-6]
3.5" floppy disk unit that can transfer in or out NC data such as NC program, tool data etc.
Also it can perform DNC operation.

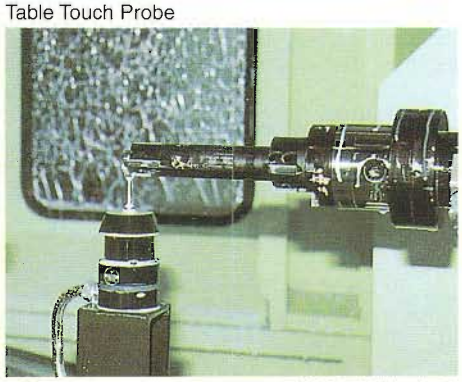
Load monitor function
Spindle load or feed motor load on each axis can be monitored.
If the load exceeds the set level, the control issues alarm or stops the machine motion.

AMCS: Automatic Measuring and Compensation System
Spindle Touch Probe



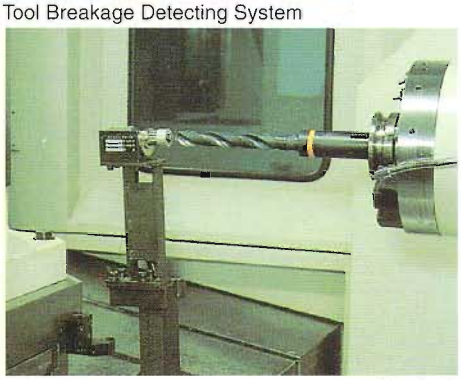
AMCS-7S (H) [Photo-1]

Table Touch Probe



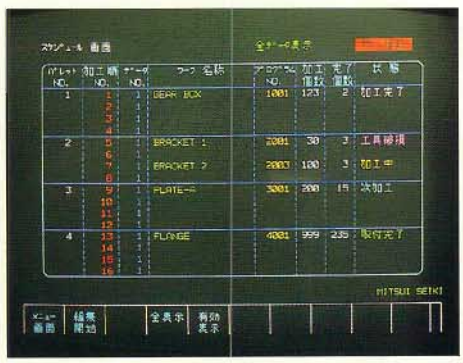
AMCS-7T [Photo-2]

ATLS: Automatic Tool Length Measuring System,
Tool Breakage Detecting System



[Photo-3]

Tool Life Control Function [Photo-4]



Scheduling function [Photo-5]

MF-1 (3.5" Floppy disk unit) [Photo-6]

All the specifications indicated in the brochure are subject to change without prior notice.

ISO 9001 JQA-0904 ISO 14001 JQA-EM2883

MITSUI SEIKI KOGYO CO.,LTD.

SPHERE TOWER TENNOZ
2-2-8, HIGASHI-SHINAGAWA, SHINAGAWA-KU, TOKYO, 140-0002 JAPAN
PHONE: +81-3-5715-4022 FAX: +81-3-5715-3919
URL: http://www.mitsuiseiki.co.jp

ДЖАПАН ТУЛ СЕРВИС,ЛТД
представительство в москве

JTS JAPAN TOOL SERVICE

Россия, 119049 Москва
Коровий вал д7, под 6. кв 168
Тел./факс: (495) 970-15-73
http://www.jtools.biz
e-mail: info@jtools.biz
http://www.japantool.ru

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