Mazak

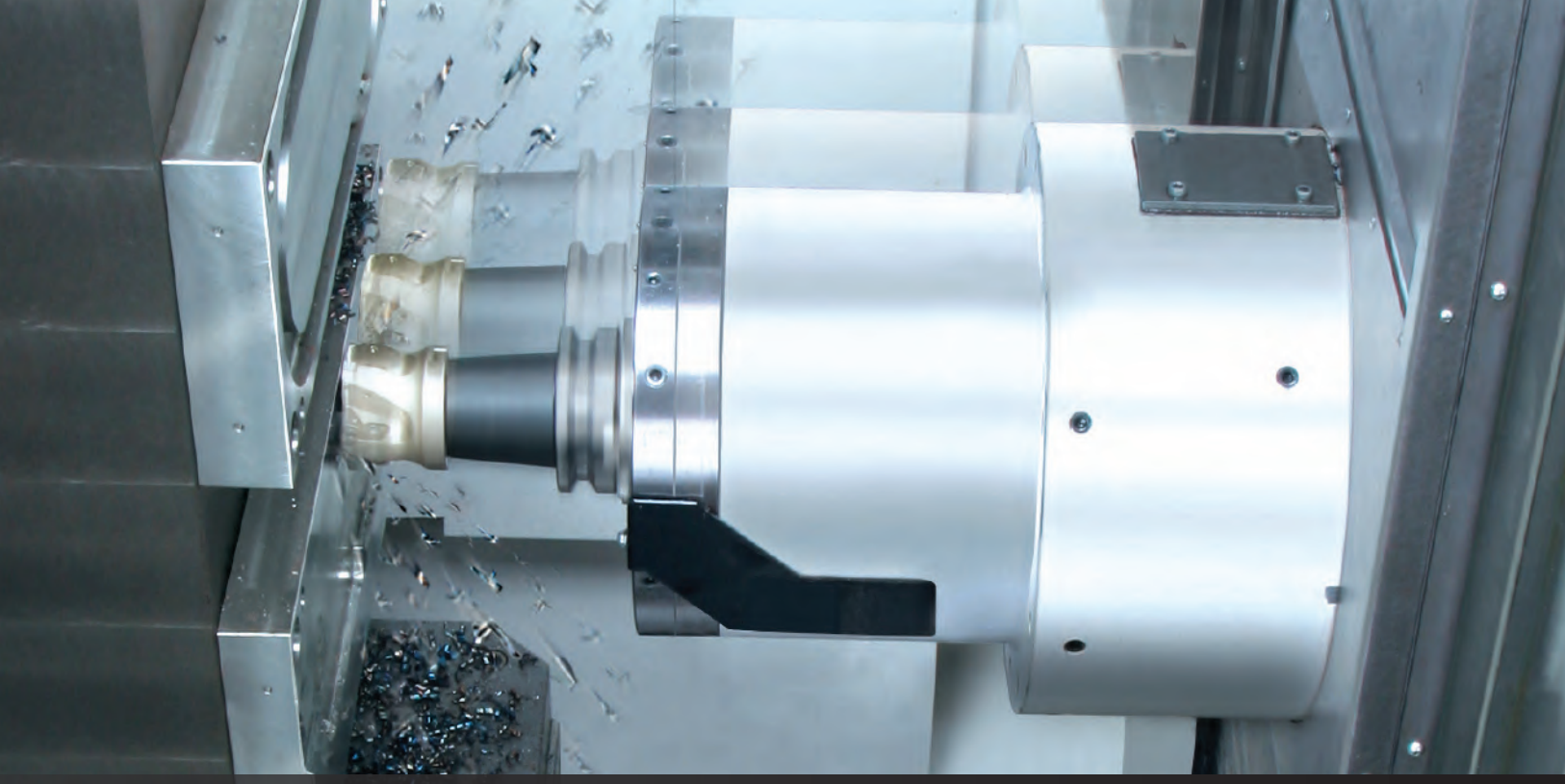
HCN

SERIES

Advanced features of the MAZATROL SmoothG CNC

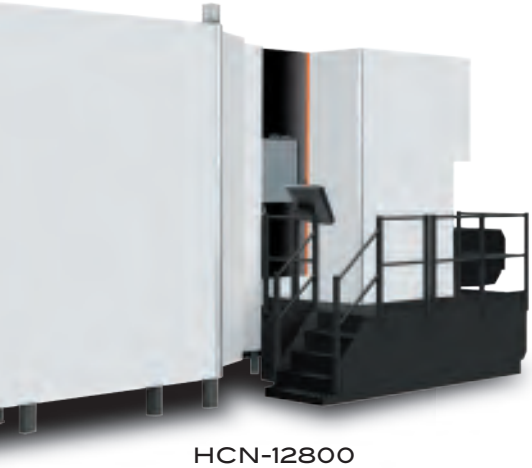
- Touch screen operation — Operates similar to your smart phone / tablet
- PC with Windows® 8 embedded OS
- Fastest CNC in the world — Latest hardware and software for unprecedented speed and precision
- Easy conversational programming of multiple surface machining
- Smooth graphical user interface and support functions for unsurpassed ease of operation
- Fine tuning functions — Easily configure machine parameters for different workpiece materials and application requirements
- MTConnect® ready — Convenient networking

MAZATROL SMOOTH G



Designed for unsurpassed productivity

High-speed, high-accuracy horizontal machining centers



HCN-12800

Shown with optional status light (3 colors)

HCN SERIES

- Pallet sizes: □630 mm, □800 mm, □1000 mm and □1250 mm
- No.50 taper spindle specifications for any production requirement:
  - Standard: 10000 rpm
  - High-speed: 16000 rpm OPTION
  - High-torque: 8000 rpm OPTION
  - Hard metal: 6000 rpm OPTION
- Rigid machine construction for heavy-duty machining
- Unsurpassed ease of operation

Spindle specifications for any workpiece material requirement

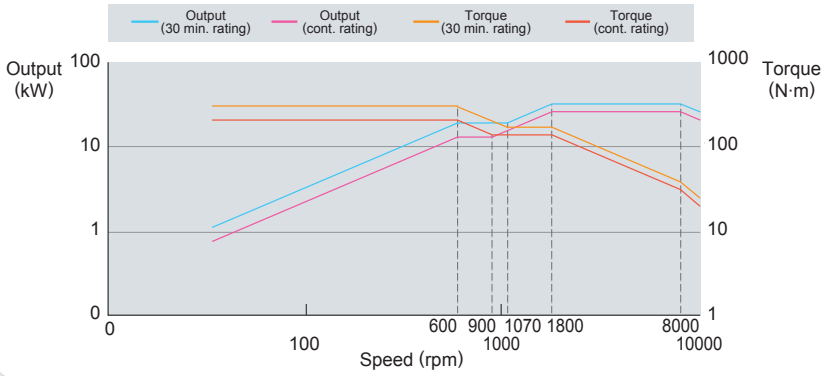
Standard 10000 rpm spindle

Integral spindle / motor | Oil & air lubrication

Speed	10000 rpm
Output	AC 37 kW (50 HP) [30 min. rating]
	AC 30 kW (40 HP) [cont. rating]
Max. torque	350 N·m [30 min. rating]

High performance from low speed to high-speed for a wide variety of materials such as cast iron and aluminum.

10000 rpm spindle output / torque diagram



Mount (stainless)
Construction machinery component

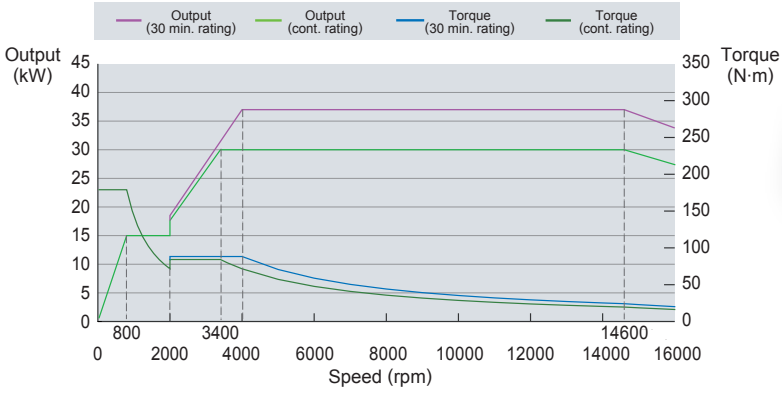
High-speed 16000 rpm spindle OPTION

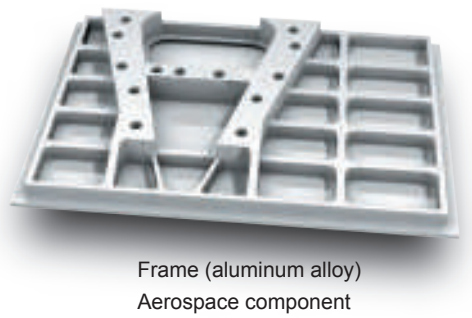
Integral spindle / motor | Oil & air lubrication | Bearing preload change

Speed	16000 rpm
Output	AC 37 kW (50 HP) [30 min. rating]
	AC 30 kW (40 HP) [cont. rating]
Max. torque	179 N·m [30 min. rating]

Thanks to the changeable bearing preload, rigidity is ensured during low speed machining as well as high-speed machining of aluminum.

16000 rpm spindle output / torque diagram





Frame (aluminum alloy)
Aerospace component

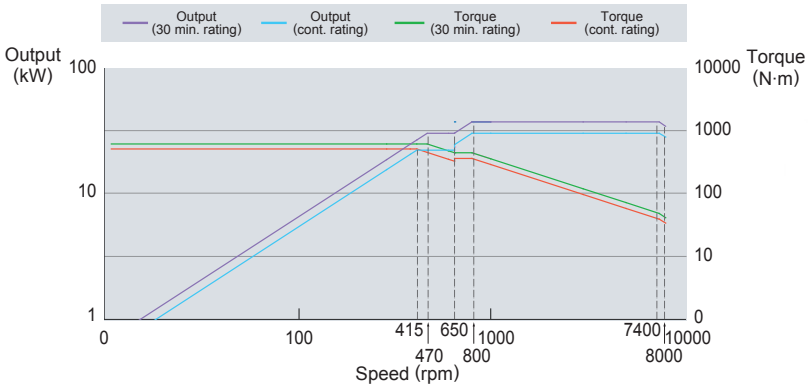
High-torque 8000 rpm spindle OPTION

Integral spindle / motor | Oil & air lubrication

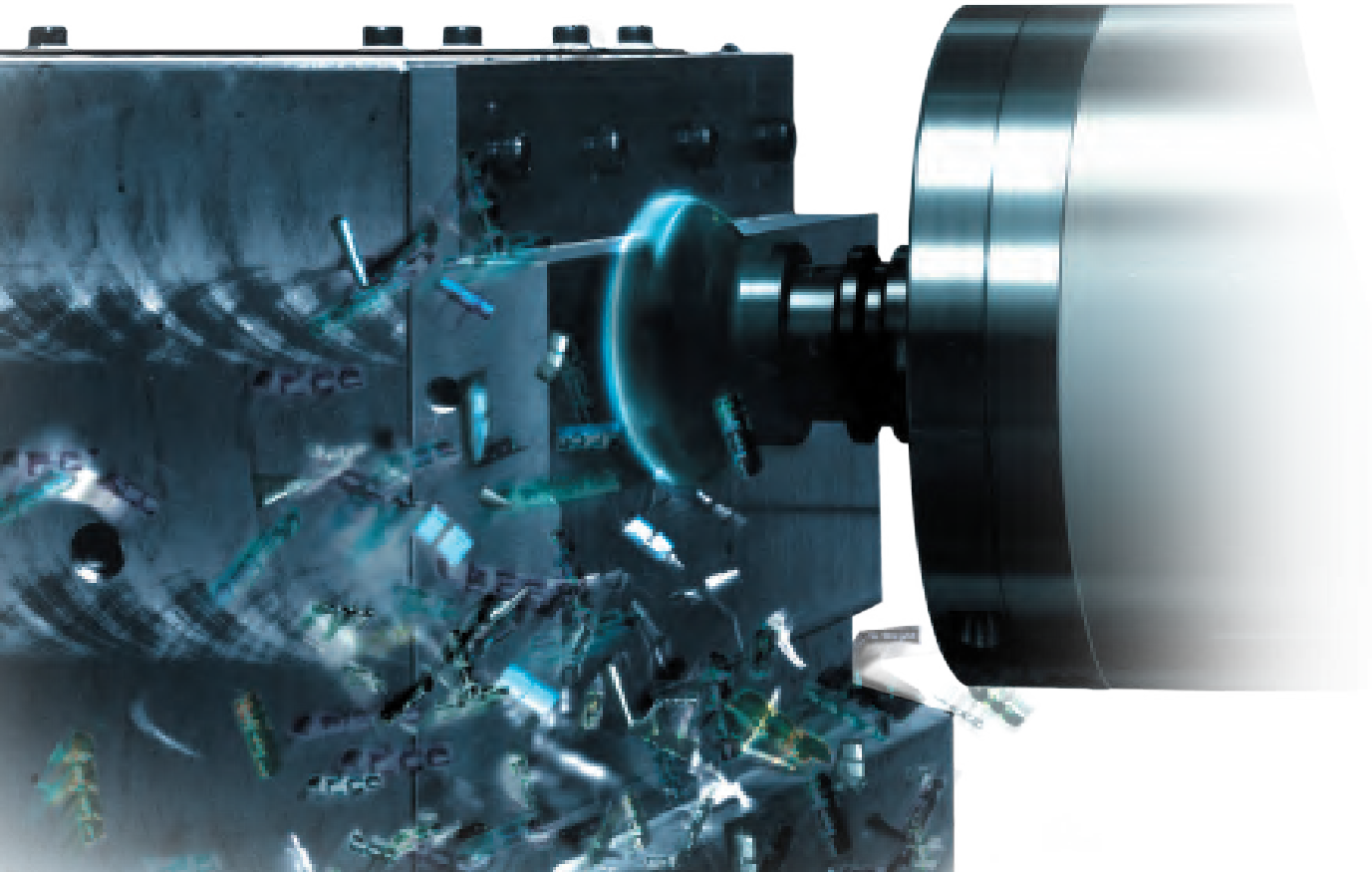
Speed	8000 rpm
Output	AC 37 kW (50 HP) [30 min. rating]
	AC 30 kW (40 HP) [cont. rating]
Max. torque	609 N·m [30 min. rating]

High-torque, No. 50 taper 8000 rpm integral spindle / motor for heavy-duty machining of steel and difficult to machine materials.

8000 rpm spindle output / torque diagram



Cylinder block (cast iron)
Automotive component



Hard metal package OPTION

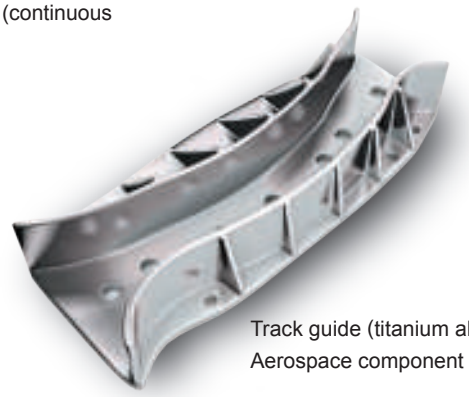
Hard metal package with protective functions is optionally available. High-torque spindle, larger thrust force on feed axes and the high-rigidity base are designed for high productivity machining of difficult to machine materials.

Hard metal 6000 rpm spindle

Integral spindle / motor with a maximum torque of 800 N·m torque (continuous rating) for high-performance, heavy-duty machining.

Integral spindle / motor | Oil & air lubrication

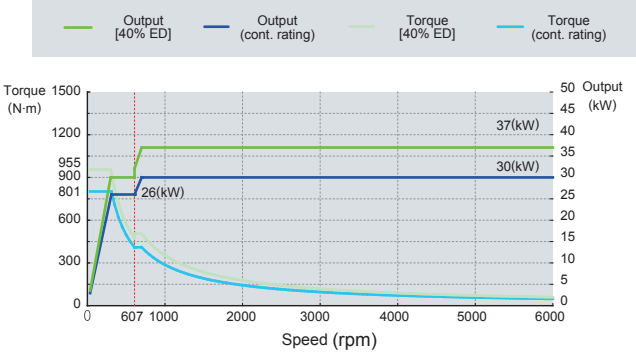
Speed		6000 rpm
Output	HCN-6800 HCN-8800 HCN-10800	AC 37 kW (50 HP) [40% ED]
		AC 30 kW (40 HP) [cont. rating]
	HCN-12800	AC 56 kW (75 HP) [40% ED]
		AC 45 kW (60 HP) [cont. rating]
Torque		955 N·m [40% ED]



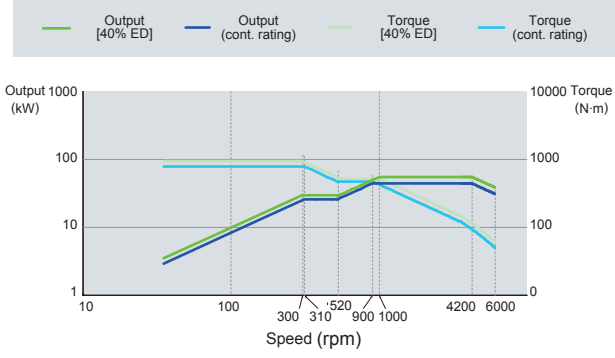
Track guide (titanium alloy)
Aerospace component

6000 rpm spindle output / torque diagram

HCN-6800, HCN-8800, HCN-10800



HCN-12800



X-, Y-, Z-axis thrust

Feed thrust on all axes is 20 kN*1 for heavy-duty machining.*2

*1 HCN-12800 X-axis: 31.53 kN, Y-axis: 19 kN, Z-axis: 42.21 kN.
HCN-6800 acceleration / deceleration: 0.59 G
*2 HCN-6800 has hard metal specification base

Protective functions

Minimized damage to workpiece and machine by detection of abnormal errors.

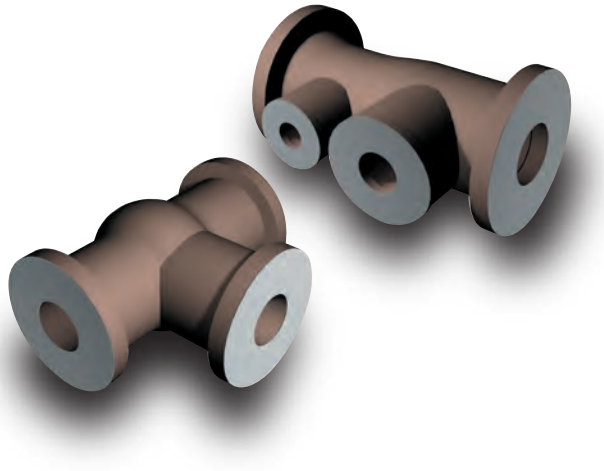
- Crash detection
  Feed is stopped when the registered thrust force is exceeded in order to protect workpiece and machine
- Pallet displacement
  Detects displacement of pallet on pallet seats
- Spindle clamp sensor
  Confirms proper tool clamping

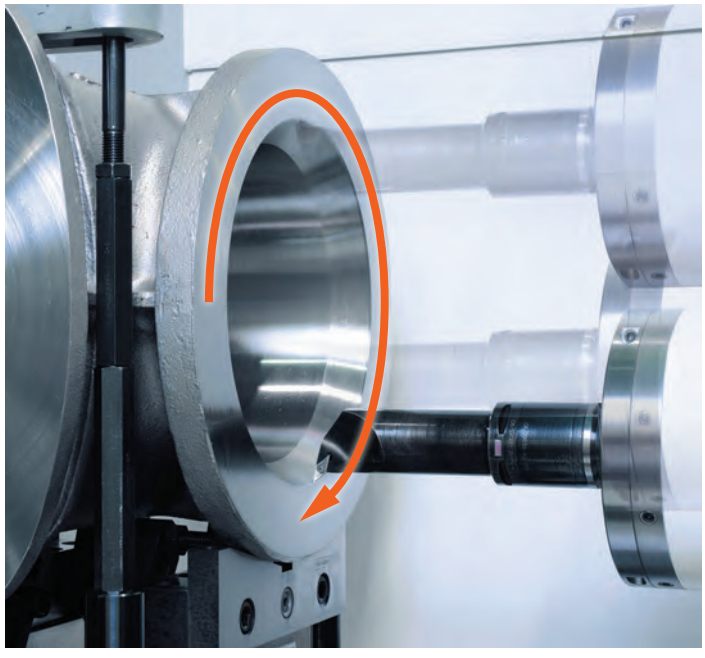
Orbit machining OPTION

Turned workpiece features on a machining center

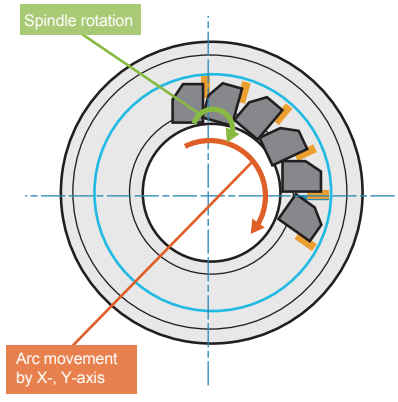
Made possible by the high-speed feed performance of the HCN series and the high-speed, high-accuracy MAZATROL SmoothG CNC.

- Machining of taper bores
- Machining of different bore diameters by a single tool
- A single tool can machine a wide range of bore sizes and outer diameters





The spindle orientation is controlled so that the boring tool tip can machine turning features while it moves in an X-Y axes arc. As a result, turning features can be machined without a U-axis controlled tool.



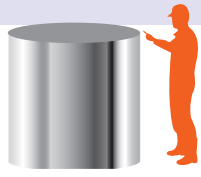
Extensive Series Range

No. 50 spindle horizontal machining centers for large workpieces

HCN-8800
Shown with optional status light (3 colors)

HCN-6800
Shown with optional status light (3 colors)

Machines	HCN-6800	HCN-8800
Max. workpiece diameter X Max. workpiece height	Φ1050 mm X 1300 mm	Φ1450 mm X 1450 mm
Max. load on pallet (evently distributed)	1500 kg	2200 kg, 3000 kg*
Pallet size	☐ 630 mm 630 mm X 800 mm* ☐ 800 mm*	☐ 800 mm 800 mm X 1000 mm* ☐ 1000 mm*
Stroke (X / Y / Z)	1050 mm / 900 mm / 980 mm	1400 mm / 1200 mm / 1325 mm



* Option
*1 Single table (option) specification (not available with FMS)

HCN-12800

Shown with optional status light (3 colors) and chip conveyor

HCN-10800

Shown with optional status light (3 colors) and chip conveyor

HCN-10800	HCN-12800
Φ2050 mm X 1600 mm	Φ2400 mm Φ3000 mm* X 2000 mm
3000 kg, 4000 kg*	6000 kg, 8000 kg*, 10000 kg*[1]
☐ 1000 mm 1000 mm X 1250 mm* ☐ 1250 mm*	☐ 1250 mm 1250 mm X 1600 mm* ☐ 1600 mm*
1700 mm / 1400 mm / 1525 mm	2200 mm, 2800 mm* / 1600 mm / 1850 mm

Higher Accuracy & Higher Productivity

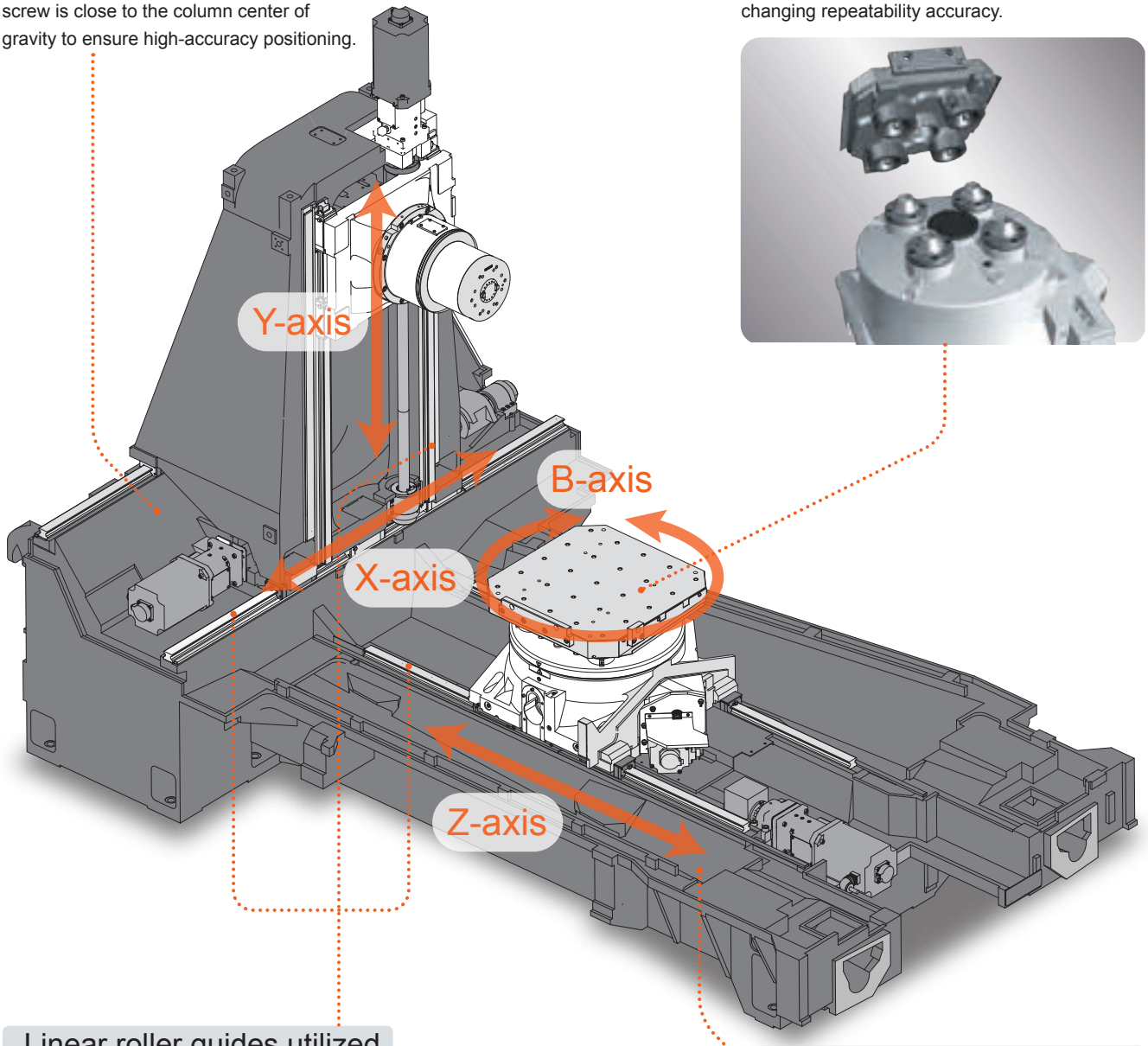
High-rigidity construction for high-accuracy machining

Base X-axis construction

The bottom of the column has a slanted surface for mounting the X-axis linear guides. The ball screw is close to the column center of gravity to ensure high-accuracy positioning.

Table clamping

The table and pallet are clamped on taper cones. This construction ensures high-rigidity and pallet changing repeatability accuracy.



Linear roller guides utilized on the X-, Y-, and Z-axis

Linear roller guides on the X-, Y- and Z-axis are utilized by the HCN series in order to provide high-accuracy and heavy-duty machining.

High-rigidity bed

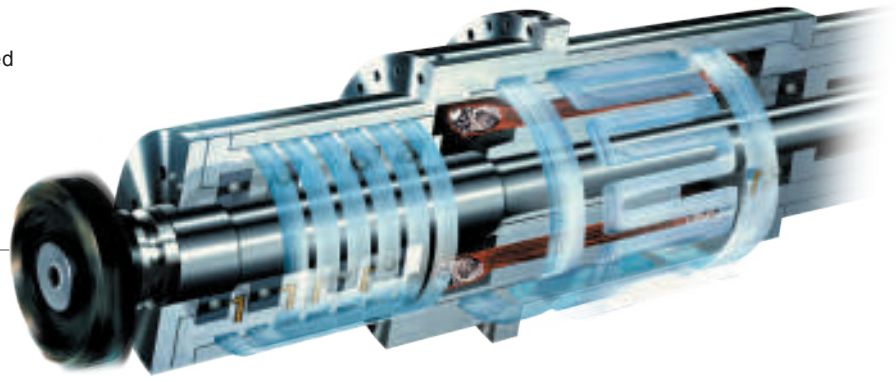
The high-rigidity bed is reinforced with strategically located ribs to ensure stability during heavy-duty machining.

Designed for high-accuracy machining

Spindle

Integral spindle / motor

Thanks to the integral spindle / motor design, vibration is minimized during high-speed operation to ensure exceptional surface finishes and maximum tool life.



Spindle temperature control

For high-accuracy machining, temperature controlled cooling oil is circulated around the spindle bearings and headstock to minimize any thermal change to the spindle.

X-, Y-, Z-axis ball screw core cooling

Ball screw core cooling

Temperature controlled cooling oil circulates through the ball screw cores to ensure stable machining accuracy over extended periods of high-speed operation.

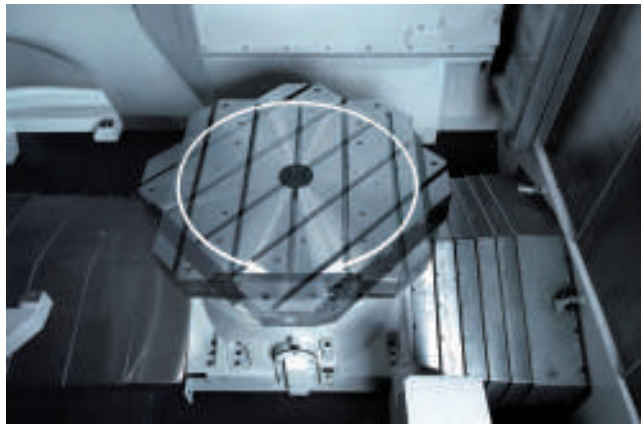
Tables

High index coupling

To realize high-accuracy indexing, the standard 1° indexing table of the HCN-6800 and HCN-8800 uses a 360° high index coupling.

Roller gear cam

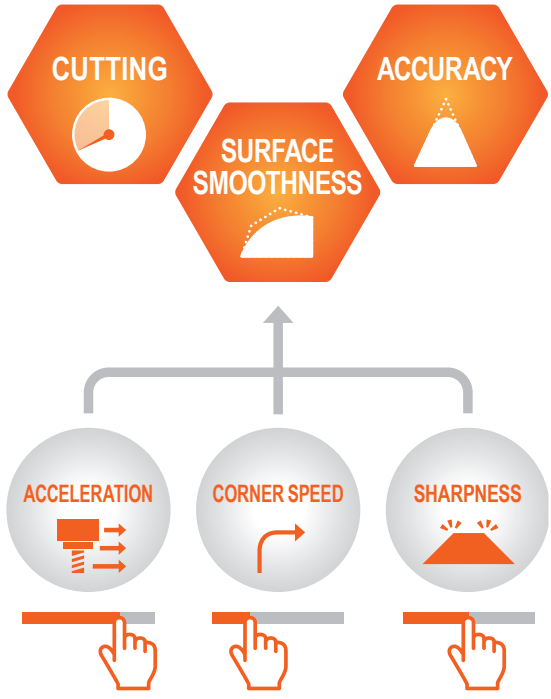
The NC rotary table uses a roller gear cam system for 0.0001°positioning increments and high-accuracy performance (standard on the HCN-10800 and HCN-12800. Optional for the HCN-6800 and HCN-8800).



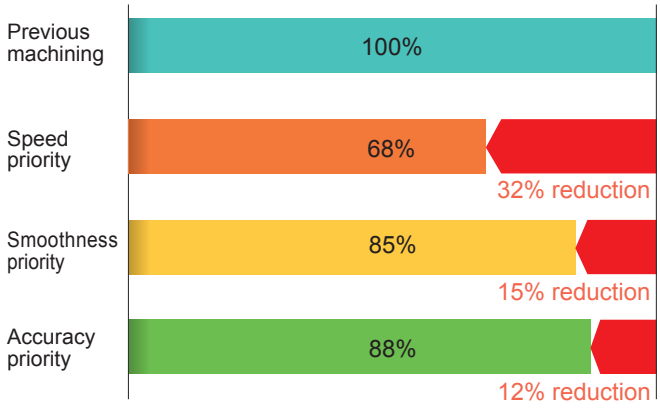
Higher Accuracy & Higher Productivity

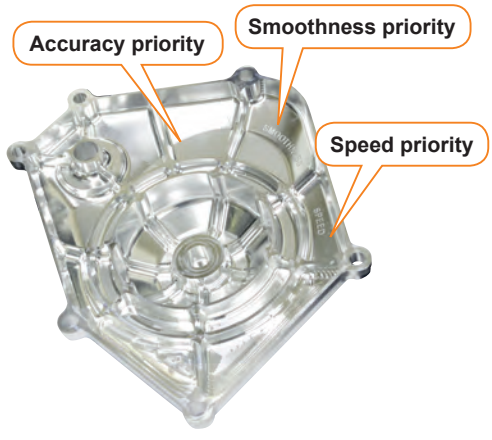
SMOOTH MACHINING CONFIGURATION

NOW – Optimize programs just by using a touchscreen slider



Finishing time comparison





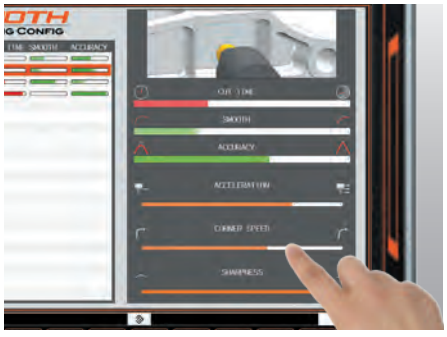
When a machine tool is shipped from the factory where it was manufactured, all of the CNC parameter settings are made for all around general purpose machining. In most cases, these settings are satisfactory for a large percentage of users and will rarely be changed.

However, for aerospace workpieces or workpieces with complex surfaces, such as dies and molds, these machine parameter settings must be manually changed in order to produce workpieces with their required accuracy as well as the minimum cycle time. To optimize these settings, they must be changed according to the type of material, the type of tooling and the type of machining process. This is a complex procedure and a skilled technician is required to perform this efficiently.

As the parameter settings are changed, the default settings for acceleration, electrical gain, tolerances and other items will be modified. As one is changed, it will have a corresponding impact on others which must also change. For instance, if acceleration is increased in order to reduce the cycle time, the accuracy and surface finish may be impacted (corners may not be sharp, gouges may occur in surfaces).

One must know which settings to change, how much to change each setting, and the corresponding effect on other settings for each change in order to tune a machine efficiently. After the workpiece machining is completed, all settings should then be returned to their default settings.

These complicated procedures are eliminated by the MAZATROL SMOOTH MACHINING CONFIGURATION



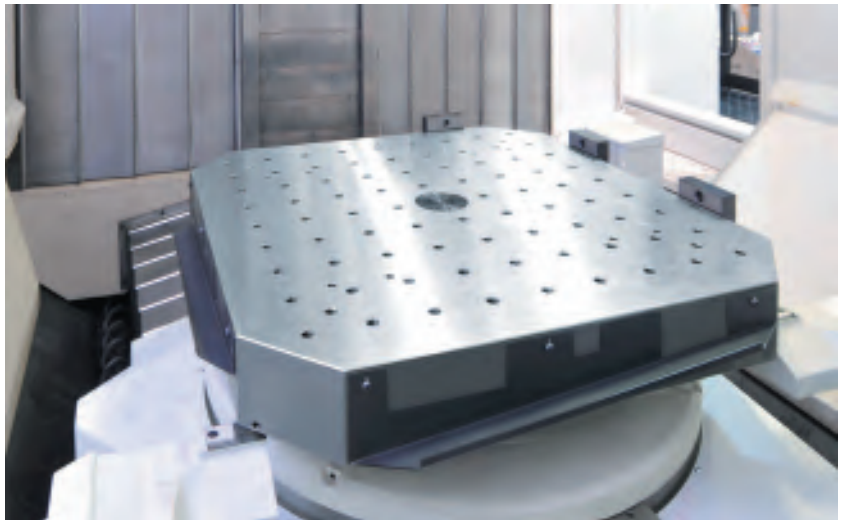
While watching the machining of a complex surface, just use the touchscreen slider switch to change the settings for accuracy, speed or smoothness. As changes in one factor are made, you can see the automatic changes in others. For example, if accuracy is increased, there will be a corresponding decrease in speed.

When the optimum cutting conditions are obtained, these settings can be easily stored in the CNC memory. The next time the same type of material is machined by the same type of tool, these settings can be easily called up by M/G code. Several different settings can be used in a single program. Conventionally, the same parameter settings are used for the entire program.
7 different settings are registered in the CNC memory at the factory (shown to the left). You are able to add your own settings with a maximum storage capacity of 20 settings in total.

Higher Productivity

Wide variety of tables available

For production flexibility, a 0.0001°× 3600000 position NC rotary table is available on all machines (standard on the HCN-10800 and HCN-12800). On the HCN-6800 and HCN-8800, a 1° index table is standard equipment and a 0.001° index table is optionally available.



1° × 360 index table

The 360° high index coupling provides high accuracy indexing in 1°increments.

0.001° × 360000 NC positioning table

The table can be indexed in 0.001°increments (contouring is not available). Hydraulic power supply through the table is optionally available.

0.0001°×3600000 NC rotary table

The backlash-free rotary gear cam utilized by the NC rotary table ensures high accuracy as well as a long service life. Scale feedback system for the rotary axis is optionally available.

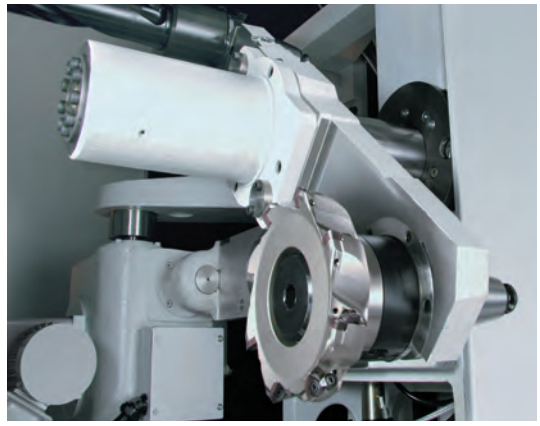
●: Standard ○: Option —: N / A

	1° × 360 index table	0.001° × 360000 NC positioning table	0.0001°×3600000 NC rotary table
HCN-6800	●	○	○
HCN-8800	●	○	○
HCN-10800	—	—	●
HCN-12800	—	—	●

Automation

Tool changing of heavy large diameter tools

Can handle long boring bars and large diameter mills for higher productivity.



ATC Specifications

Machines		HCN-6800	HCN-8800	HCN-10800	HCN-12800
Max. tool diameter	With tools in adjacent pockets	Φ125 mm	Φ125 mm	Φ135 mm	Φ135 mm
	With adjacent pockets empty	Φ250 mm	Φ250 mm	Φ260 mm	Φ260 mm
	When adjacent pockets are empty and pockets next to them have tools less than Φ240 mm	Φ260 mm	Φ260 mm	—	—
	When adjacent pockets are empty and pockets next to them have tools less than Φ200 mm	(Φ300 mm*)	—	(Φ320 mm*)	(Φ320 mm)
	When adjacent pockets are empty and pockets next to them have tools less than Φ180 mm	—	(Φ320 mm*)	—	—
	When adjacent pockets are empty and pockets next to them have tools less than Φ160 mm	—	—	(Φ360 mm*)	Φ360 mm
	With X-axis stroke limitation	(Φ300 mm*)	(Φ320 mm*)	(Φ360 mm*)	—
Max. tool length		630 mm	630 mm (800 mm*)	650 mm (800 mm*)	800 mm
Max. tool weight		30 kg	30 kg	30 kg	30 kg

* Option

Large capacity tool magazine

Large capacity tool magazines make it possible to perform production of a wide variety of workpieces in small size lots as well as store spare tools for unmanned operation.
For tool storage larger than 180 tools, two types of rack type tool magazines are available:
The TOOL HIVE, stores No.50 or HSK-A100 tools horizontally.
The TOOLTECH stores tools (No.50 tools only) vertically with small floor space requirements.

●: Standard ○: Option —: N / A

	Chain type magazine						
	43	60	80	100	120	140	160
HCN-6800	●	○	○	○	○	○	○
HCN-8800	—	●	○	○	○	○	○
HCN-10800	—	—	●	○	○	○	○
HCN-12800	—	—	●	○	○	○	○

	TOOL HIVE (rack type magazine)						TOOLTECH (rack type magazine)		
	180	204	240	288	312	348	206	276	348
HCN-6800	○	○	○	○	○	○	○	○	○
HCN-8800	○	○	○	○	○	○	○	○	○
HCN-10800	○	○	○	○	○	○	○	○	○
HCN-12800	○	○	○	○	○	○	○	○	○

Automation

Automation from single machine to multiple machine system

Pallet changer

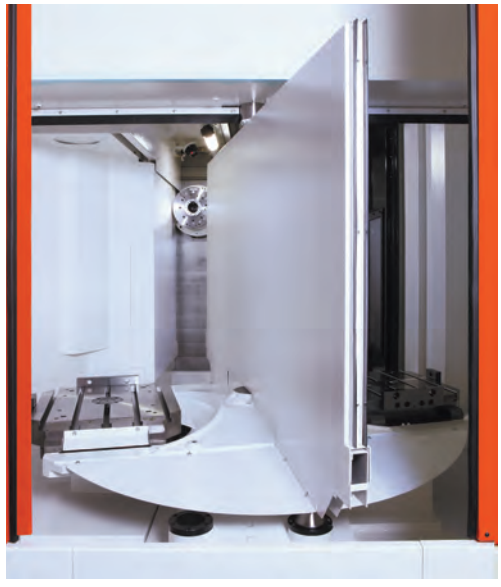
Rotary 2-pallet changer and optional 6-pallet changer

2-pallet changer

Rotary-type pallet changers quickly change pallets with heavy workpieces for higher productivity.

	Pallet change time	Pallet load capacity (evenly distributed)	Max. workpiece diameter
HCN-6800	10.0 sec	1500 kg	Φ1050 mm × 1300 mm
HCN-8800	13.0 sec	2200 kg	Φ1450 mm × 1450 mm
HCN-10800	25.0 sec	3000 kg	Φ2050 mm × 1600 mm
HCN-12800*	48.0 sec	6000 kg	Φ2400 mm × 2000 mm

*Shuttle type pallet changer



6-pallet changer OPTION

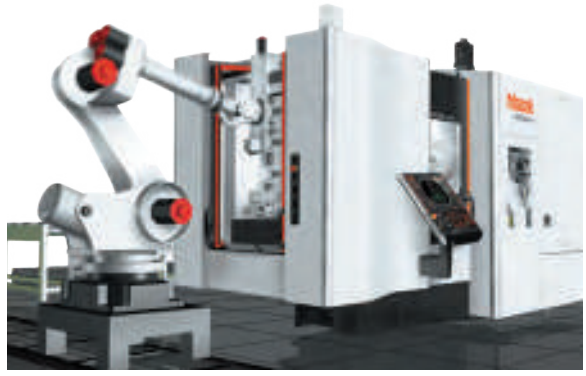
Multiple workpieces can be setup on the 6-pallets making unmanned operation able to be performed over extended periods of time. Available for the HCN-6800 and HCN-8800.

HCN-6800 with 6-pallet changer

Robot system OPTION

Interface for connecting an external robot for workpiece loading / unloading to / from automatic hydraulic fixtures is optionally available.

- Field network available
- Cycle start, door open / close, work loading confirmation, hydraulic fixture operation, table position interface are optionally available.



PALLETECH MANUFACTURING CELL OPTION

The modular design of the PALLETECH conveniently allows more machines and increased pallet storage capacity to be added to the system after the initial installation in response to changing production requirements. The pallet stocker is available with one, two and three levels for large pallet storage capacity with small floor space requirements.

System specifications

		Minimum	Maximum
Machine(s)		1	15
Number of pallets	1 level	6	240
	2 levels	12	240
	3 levels	18	240
Loading station(s)		1	8
Loading robot		1	1

Pallet stocker	HCN-6800	HCN-8800	HCN-10800	HCN-12800
1 level	○	○	○	○
2 levels	○	○	–	–
3 levels	○	–	–	–

○ : Available – : N/A

SMOOTH PMC

FMS control / management software - Unsurpassed ease of system operation to meet sudden changes in schedule.

Automation

Optimum system for the maximum versatility

Integration of multiple machine models in a PALLETECH system

Horizontal machining centers, 5-axis machining centers, multi-tasking machines and turning centers can be integrated to comprise a system with unsurpassed versatility.

PALLETECH with single level 12 pallet stocker
Smooth PMC
Loading station
VORTEX i-630V/6
HCN-6800

PALLETECH system combination applicable machine models

PALLETECH system pallet size	Horizontal machining center	5-axis machining center	Multi-tasking machines	Turning center
630 mm × 630 mm	HCN-6800	VORTEX i-630V/6	INTEGREX i-630V/6	ORBITEC 20
800 mm × 800 mm	HCN-8800	VORTEX i-800V/8	INTEGREX e-1250V/8 INTEGREX i-800V/8	–
1000 mm × 1000 mm	HCN-10800	–	INTEGREX e-1600V/10	–

Tool ID

Tool ID allows automatic input and update of tool data into the CNC for machines in a network. It eliminates mistakes when loading tools into the magazine and tool data input, reducing setup time (requires retention bolt with tool ID and tool presetter).

Hydraulic power supply OPTION

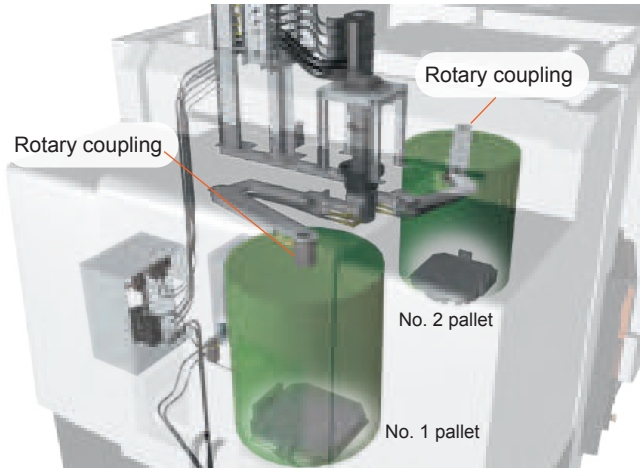
Type A
(supply from machine top, maximum: 8 ports)

By hydraulic hoses, hydraulic power is supplied from the top part of the pallet changer to fixtures mounted on each pallet.

Type B
(supply through pallet, maximum: 3 ports)

By using a leak-free coupling, hydraulic power is supplied to the supply port on the pallet bottom.

Type A (Hydraulic power supply from top)

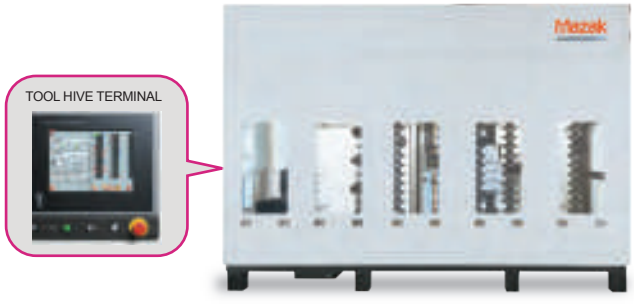


TOOL HIVE OPTION

The TOOL HIVE can store more than 180 tools in a small space. Operation and tool data editing can be performed on the TOOL HIVE TERMINAL control panel to reduce the time required for tool setup. The TOOL HIVE tool storage capacity can be expanded after the initial installation.

TOOL HIVE Specifications

Tool storage	180, 204, 240, 288, 312, 348
Tool shank	No.50, HSK-A100
Magazine	Rack type



240 tool TOOL HIVE magazine

TOOLTECH OPTION

Tools (No.50 tools only) are stored vertically in a magazine with compact floor space requirements.

TOOLTECH Specifications

Tool storage	206, 276, 348
Tool shank	No.50
Magazine	Rack type

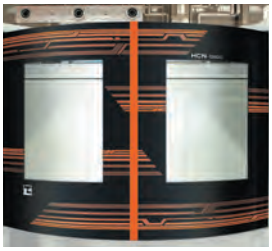
206 tool TOOLTECH magazine

Ergonomics

Design focus on ergonomics provides unsurpassed ease of operation

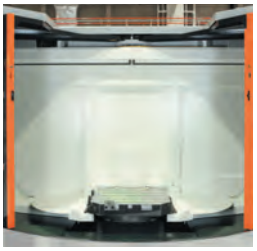
Large window

The large windows on the 2-pallet changer cover door* allow the operator to easily see the status of the workpiece in the setup station.



Convenient workpiece loading / unloading

An over head crane can be easily used for the loading / unloading of heavy workpieces and fixtures.

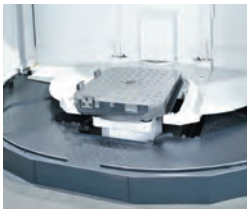


Large window

The large operation window allows the operator to easily monitor workpiece machining.

Convenient setup

The 2-pallet changer on the HCN-10800 and HCN-12800 has a platform inside the setup station for convenient operation.



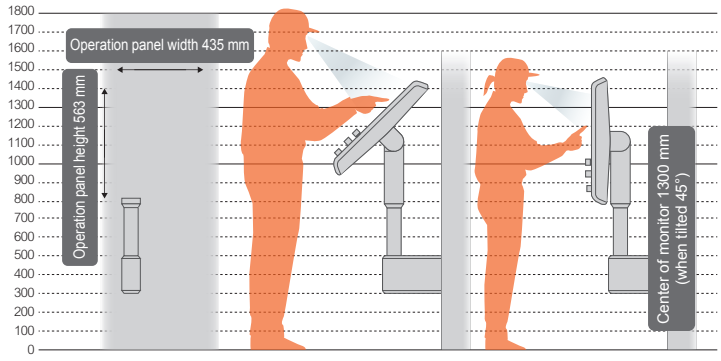
Maintenance area

Hydraulic and air pressure inlets and lubrication reservoirs are conveniently arranged in a central location for convenient maintenance.

*Instead of a 2-pallet safety cover door, the HCN-12800 has an area sensor in the setup station.

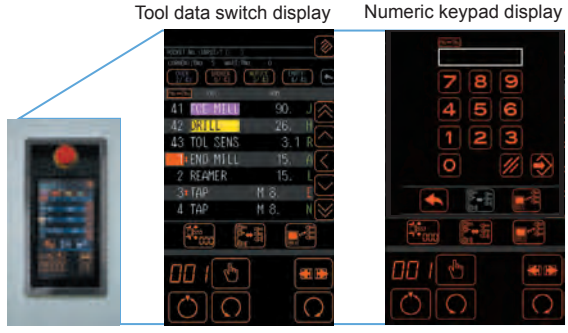
Adjustable CNC operation

Operation touch panel can be tilted to the optimum position for any operator's height to ensure ease of operation.



Tool magazine operation panel / Tool ID

The tool magazine operation panel is designed for increased ease of operation. Instead of having just a forward / reverse button for indexing the tool magazine and manually positioning the desired tool pocket, the pocket number or tool number can be input into the operation panel numeric keyboard and the desired pocket will be automatically brought into position. Additionally, tool data are displayed on this panel eliminating trips back to the machine CNC. By touching the tool data, the tool magazine will be indexed to the selected tool. The sort key quickly shows which tool pockets are empty.



Remote manual pulse generator

The remote manual pulse generator provides convenient operation when the operator is not close to the CNC operation panel. Its display shows the position display and the machine coordinate values.
4 different positions can be registered in memory by the remote manual pulse generator.
A wireless remote manual pulse generator is optionally available.

MAZATROL CNC System

MAZATROL SMOOTH G

4-axes simultaneous CNC

Fastest CNC in the world

— Latest hardware and software for unprecedented speed and precision

Smooth graphical user interface

PC with Windows® 8 embedded OS
MAZATROL Smooth graphical user interface for unsurpassed ease of operation
Touch screen operation — operates similar to your smart phone / tablet

Ease of operation

Designed for unsurpassed ease of operation
with advanced functions

Programming screen links tool path, workpiece shape and programming to reduce programming time.

QUICK MAZATROL

MAZATROL program, unit list and 3D workpiece shape are linked to each other. After defining a machining unit in a MAZATROL program, the 3D shape is immediately displayed to easily and quickly check for any programming error.

Quickly move to the corresponding section in the MAZATROL program by touching a feature in the 3D model.

3D model in the process list is displayed with updated programming in real time.

3D ASSIST

Workpiece and coordinates data can be imported from 3D CAD data to a MAZATROL program. No coordinate value inputs are required. Can reduce input errors and time for program checking.

CAD model importing

Shape selection

Automatically input to MAZATROL program

Process home screens

Five different home process screens – each home screen displays the appropriate data in an easy-to-understand manner. Icons can be touched in each process display for additional screen displays.

Programming

Tool data

Set up

Machining

Maintenance

QUICK EIA

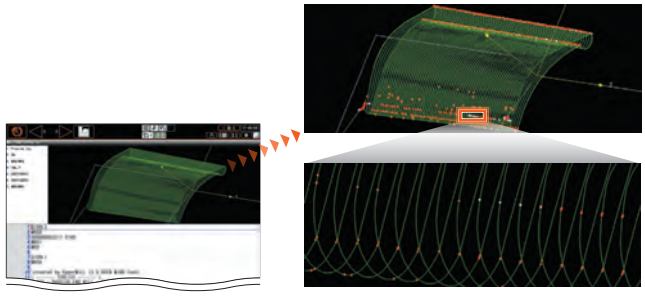
Program, process list and 3D tool path display are linked to each other. Visible search on touch screen can reduce the time for program checking.

Selecting tool path by touching the screen.

Moving to the corresponding EIA program line.

VIEW SURF

By analyzing tool path, any predictable failure on the finished surface can be visualized. Program modification can be done before machining to minimize the time for test cutting.



Optional equipment

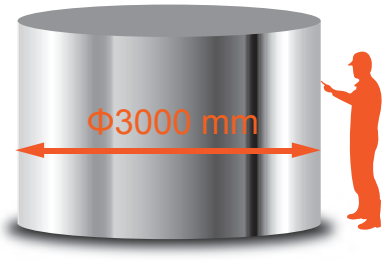
A variety of optional equipment is available for increased versatility in machining large workpieces

Φ3000 mm workpiece diameter

X-axis 2800 mm stroke (HCN-12800)

OPTION

The X-axis stroke is increased by 600 mm. Can be applied with the optional single table specification and heavy workpiece specification (8000 kg and 10000 kg).



Specifications

Max. workpiece diameter	Φ3000 mm
X-axis max. acceleration	2.4 m/s^2
Pallet change time	76 sec

8000 kg workpiece specifications (HCN-12800)

OPTION

Available for 2 pallet changer and single table machine

Specifications

Table load (evenly distributed)	8000 kg
Z-axis rapid traverse rate	34000 mm/min
Z-axis max. acceleration	2.4 m/s^2
Table positioning time	3.8 sec / 90°

4000 kg workpiece specifications (HCN-10800)

OPTION

Specifications

Pallet load	4000 kg
Z-axis max. acceleration	3.43 m/s^2

Considerable reduction in floor space

Single table specification (HCN-12800)

OPTION

By eliminating the 2-pallet changer, floor space is reduced. Available for both single machine and machines integrated into a FMS. Can be applied with the optional 2800 mm X-axis stroke and the 8000 kg, 10000 kg heavy workpiece specification.

Note: When applied with the 10000 kg heavy workpiece specification, cannot be used with a FMS since pallet is directly bolted on the machine table.

10000 kg workpiece specifications (HCN-12800)

OPTION

Available on single table machine only

Specifications

Table load (evenly distributed)	10000 kg
Z-axis rapid traverse rate	24000 mm/min
Z-axis max. acceleration	2.4 m/s^2
Table positioning time	4.2 sec / 90°

3000 kg workpiece specifications (HCN-8800)

OPTION

Specifications

Pallet load	3000 kg
Z-axis rapid traverse rate	52 m/min
Z-axis max. acceleration	3.43 m/s^2
Table rotating time	2.4 sec / 90° (NC rotary table) 4.5 sec / 90° (1° index table)
Pallet change time	25 sec

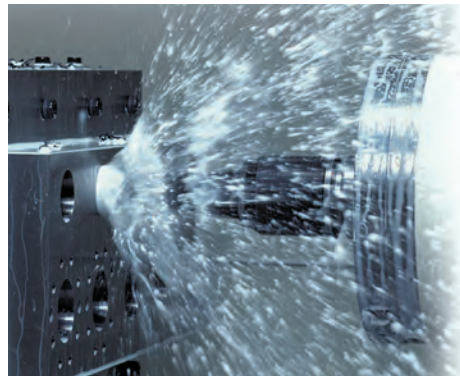
Coolant system for longer tool life and higher productivity

- Reduces tool wear by controlling rise in temperature of tool tip
- Higher quality surface and machining performance thanks to lubrication of tool and workpiece
- Prevents tool damage by removing long chips from tool and workpiece

SUPERFLOW coolant system

OPTION

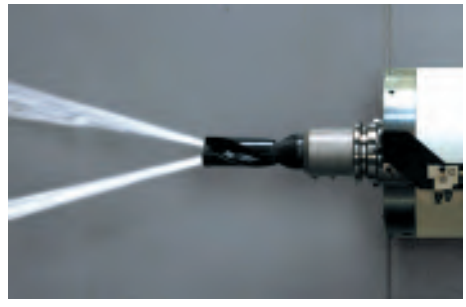
- Max. 7.0MPa(70kgf/cm^2) coolant pressure
- Adjustable coolant pressure
- High performance cyclone filter with minimum maintenance requirements



Coolant through spindle

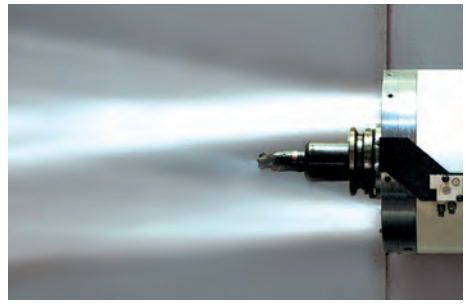
OPTION

Coolant is fed to the tool tip by passages through the tool holder and tool.
3 pump pressure specifications are available: 0.8 MPa(8kgf/cm^2) (Standard),
1.5 MPa(15kgf/cm^2) and 7.0MPa(70kgf/cm^2).



Flood coolant

Coolant is discharged from nozzles on spindle housing to cool workpiece and remove chips.



Niagara coolant

Large volume of coolant is discharged from the nozzles mounted on the machine top cover to flush chips from the workpiece to conveyors on both sides of the table.

Smooth Process Support Software

Production support software for optimum factory management

SMOOTH CAM RS OPTION

- Making machining programs
- Machining simulation
- Time studies

SMOOTH SCHEDULER OPTION

- Production scheduling of machines
- Higher equipment utilization
- Visual monitoring of production progress

SMOOTH TOOL MANAGEMENT OPTION

- Centralized tool data management
- Simplified operation and setup thanks to tool ID

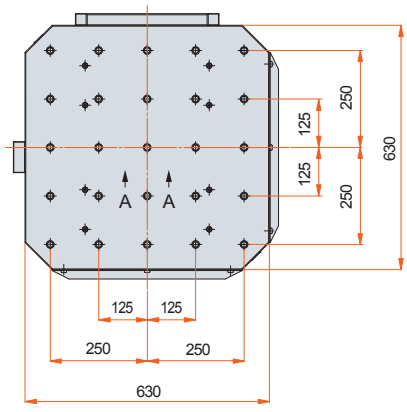
SMOOTH MONITOR AX OPTION

- Timely action by monitoring operation of entire plant
- Improved productivity by analysis of manufacturing data
- Production results database
- Accessible by smart phone / tablet

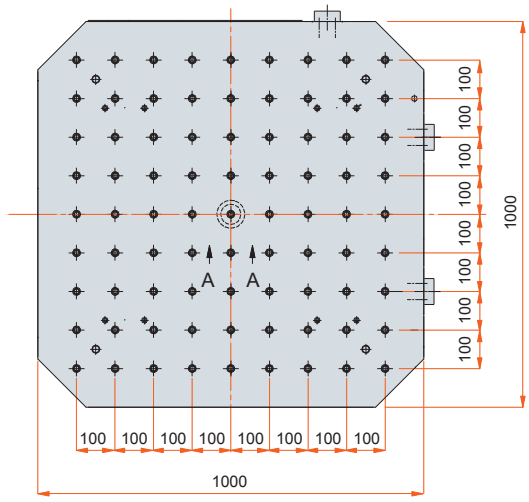
Standard Pallet Dimensions

Unit: mm

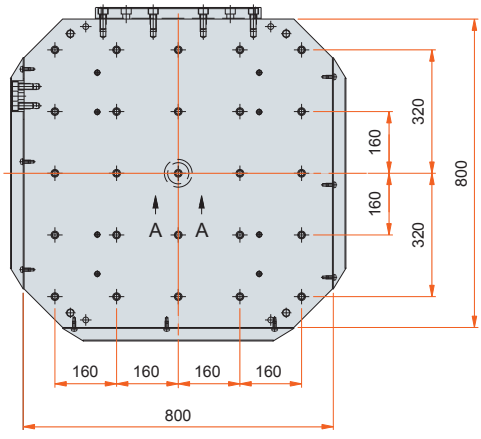
HCN-6800 630 mm × 630 mm tapped pallet



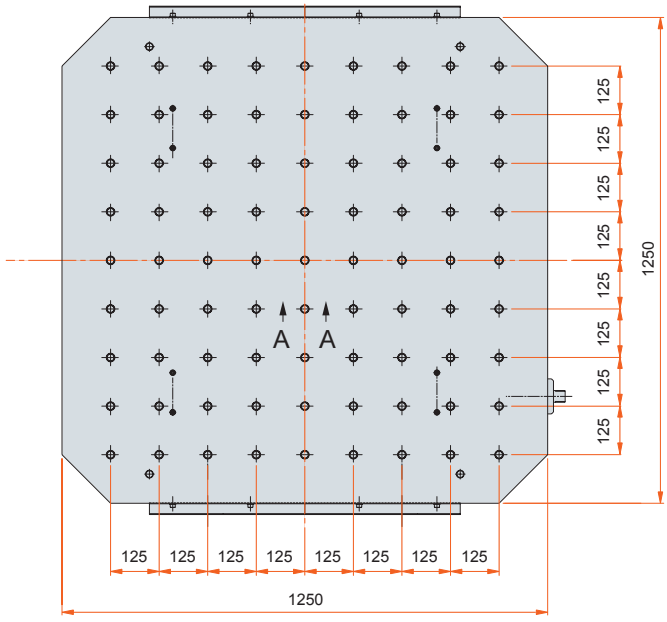
HCN-10800 1000 mm × 1000 mm tapped pallet



HCN-8800 800 mm × 800 mm tapped pallet

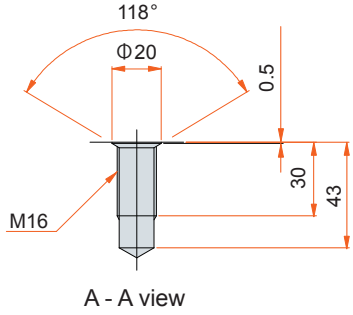


HCN-12800 1250 mm × 1250 mm tapped pallet



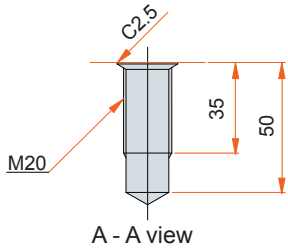
Note : Edge locator is optionally available.

HCN-6800, HCN-8800 tapped pallet



A - A view

HCN-10800, HCN-12800 tapped pallet

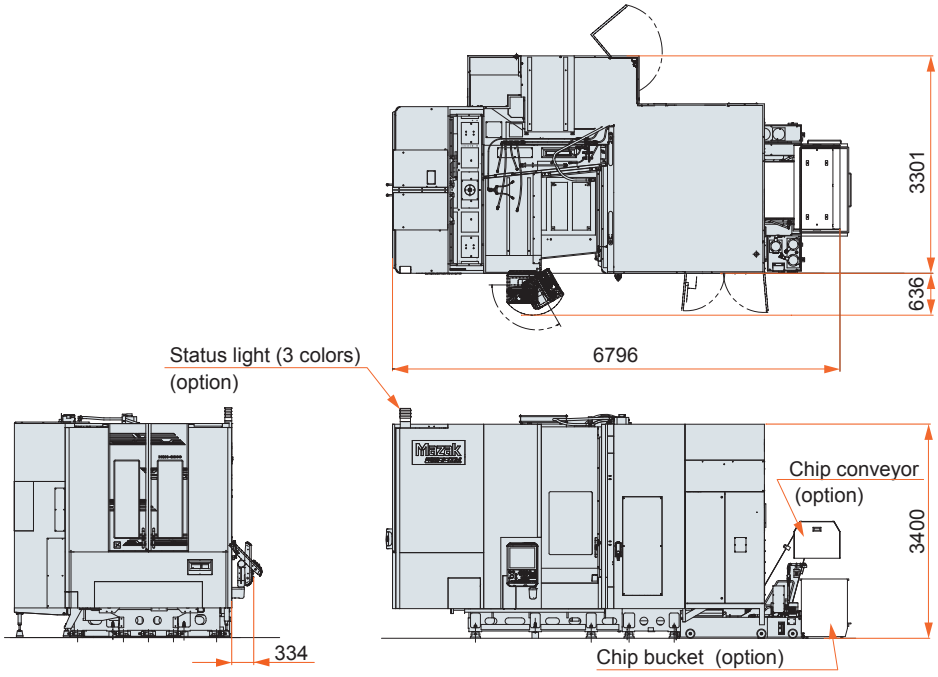


A - A view

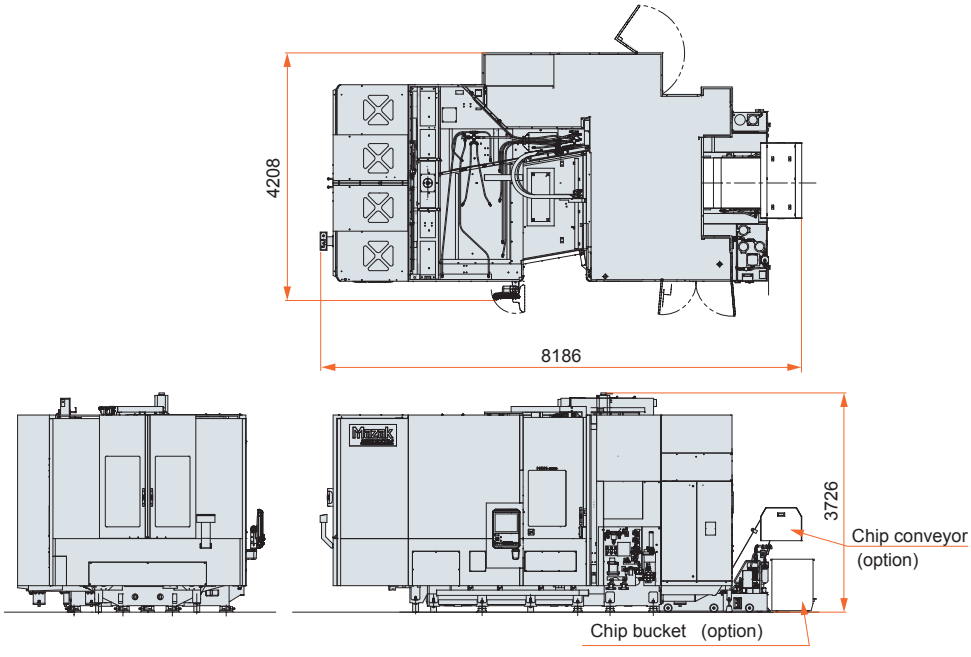
Machine Dimensions

Unit: mm

HCN-6800

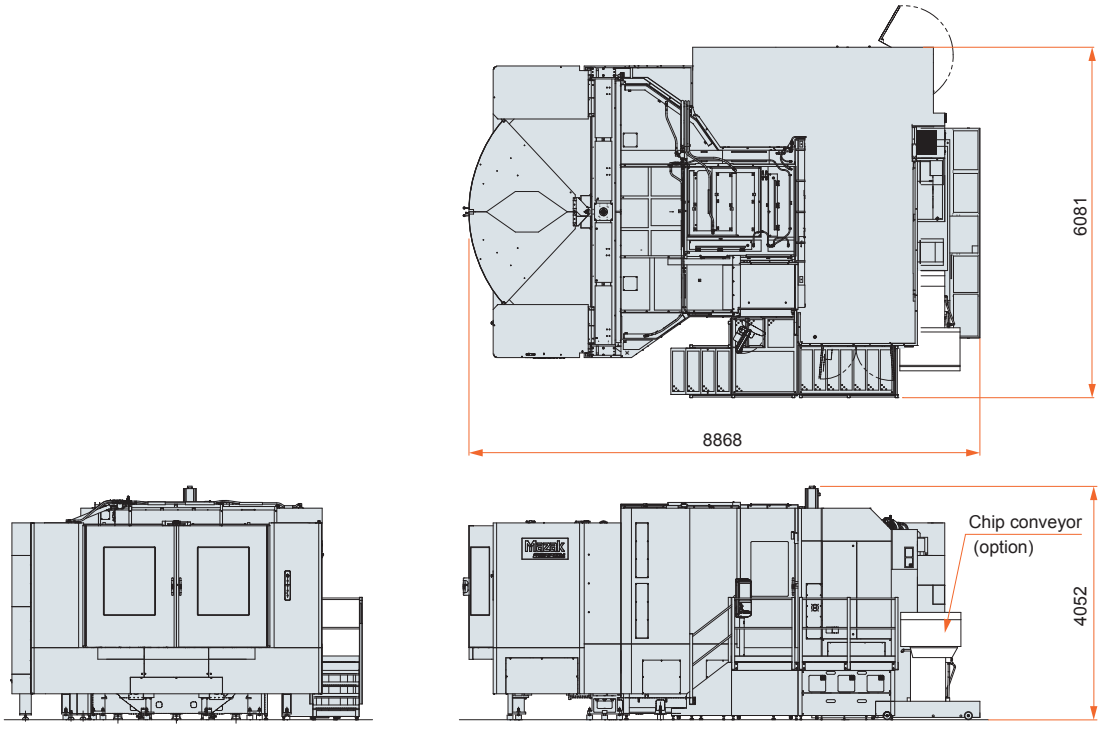


HCN-8800

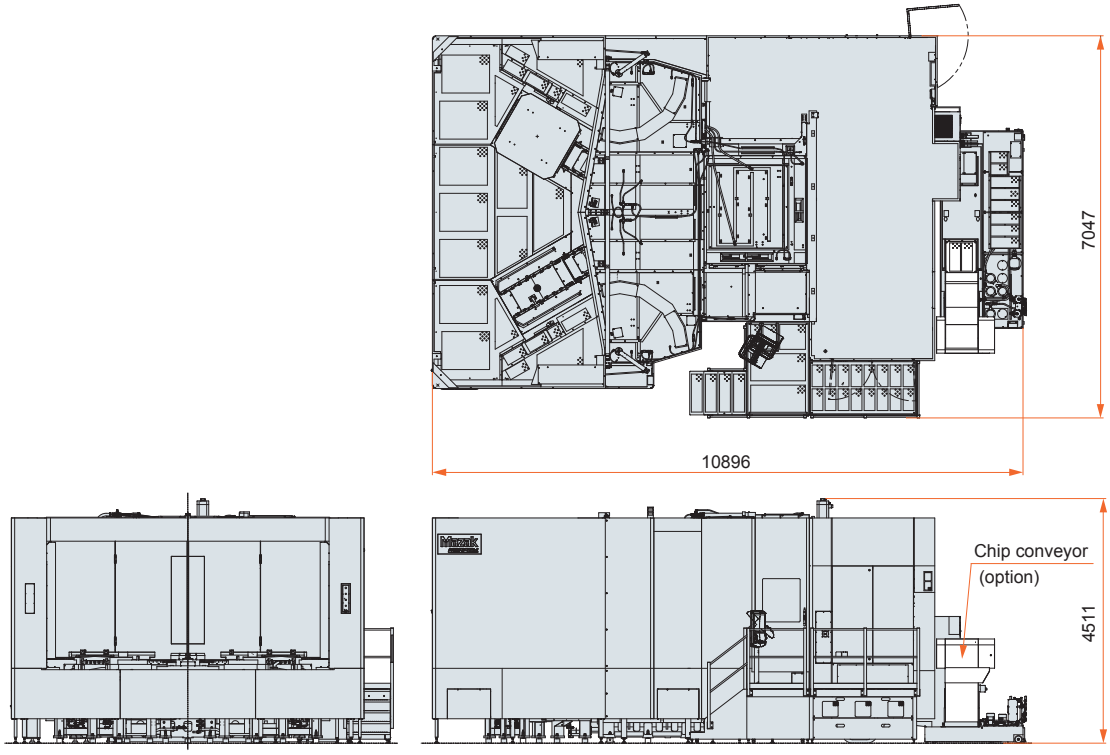


Unit: mm

HCN-10800



HCN-12800



Standard Machine Specifications

		HCN-6800		HCN-8800	
		Standard	Hard metal package	Standard	Hard metal package
Stroke	X-axis (column right / left)	1050 mm		1400 mm	
	Y-axis (spindle up / down)	900 mm		1200 mm	
	Z-axis (table back / forth)	980 mm		1325 mm	
	Distance between table center to spindle nose	100 mm ~ 1080 mm		100 mm ~ 1425 mm	
	Distance between pallet top to spindle center	100 mm ~ 1000 mm		100 mm ~ 1300 mm	
Table	Pallet size	630 mm × 630 mm		800 mm × 800 mm	
	Max. workpiece dimensions	Φ1050 mm × 1300 mm		Φ1450 mm × 1450 mm	
	Pallet load capacity (evenly distributed)	1500 kg		2200 kg	
	Pallet top surface	M16 × P2, tapped 25 places, pitch 125 mm		M16 × P2 , tapped 25 places, pitch 160 mm	
	Minimum indexing angle increment	1°		1°	
	Indexing time	1.9 sec / 90°		3.2 sec / 90°	
Spindle	Max. spindle speed	10000 rpm	6000 rpm	10000 rpm	6000 rpm
	Spindle gear range	2 (electric)	2 (electric)	2 (electric)	2 (electric)
	Spindle taper	No.50	HSK-A100	No.50	HSK-A100
	Spindle bearing ID	Φ100 mm	Φ120 mm	Φ100 mm	Φ120 mm
	Spindle acceleration	3.0 sec (0 → 10000 rpm)	3.5 sec (0 → 6000 rpm)	3.0 sec (0 → 10000 rpm)	3.5 sec (0 → 6000 rpm)
Feedrate	Rapid traverse rate (X-, Y-, Z-axis)*1	60 m/min		60 m/min	
	Cutting feedrate (X-, Y-, Z-axis)*1	1 ~ 60000 mm/min		1 ~ 60000 mm/min	
	Axis acceleration / deceleration	0.8 G	0.6 G	0.5 G	
Automatic tool changer	Tool shank	No.50	HSK-A100	No.50	HSK-A100
	Tool magazine capacity	43		60	
	Max. tool dia. / length (from gauge line) / weight	Φ125 mm / 630 mm / 30 kg		Φ125 mm / 630 mm / 30 kg	
	Max. tool diameter (when adjacent pockets empty)	Φ250 mm*2		Φ250 mm*2	
	Tool selection method	Random selection / shortest path		Random selection / shortest path	
	Tool change time (chip-to-chip)	4.2 sec		5.0 sec	
Automatic pallet changer	Number of pallets	2		2	
	Change system	Rotary type		Rotary type	
	Pallet change time	10.0 sec		13.0 sec	
Motors	Spindle motor (30 min. rating / cont. rating)	37 kW / 30 kW (50 HP / 40 HP)	—	37 kW / 30 kW (50 HP / 40 HP)	—
	Spindle motor (40% ED / cont. rating)	—	37 kW / 30 kW (50 HP / 40 HP)	—	37 kW / 30 kW (50 HP / 40 HP)
Power requirement	60 Hz Motor (30 min. rating / cont. rating)	92.44 kVA / 82.51 kVA	—	98.68 kVA / 88.75 kVA	—
	60 Hz Motor (40% ED / cont. rating)	—	105.08 kVA / 95.10 kVA	—	107.35 kVA / 97.36 kVA
	50 Hz Motor (30 min. rating / cont. rating)	90.55 kVA / 80.61 kVA	—	96.79 kVA / 86.86 kVA	—
	50 Hz Motor (40% ED / cont. rating)	—	103.19 kVA / 93.21 kVA	—	105.46 kVA / 95.47 kVA
	Air supply (pressure / volume)	0.5MPa~0.9MPa (5~9 kgf/cm^2) / 350 L/min		0.5MPa~0.9MPa (5~9 kgf/cm^2) / 350 L/min	
Machine size	Machine height	3400 mm		3726 mm	
	Floor space requirement	3635 mm × 6796 mm		4208 mm × 8186 mm	
	Machine weight	19000 kg	21000 kg	30000 kg	
Sounds	Equivalent continuous sound pressure level at operator position (depend on equipment options)	Less than 80 dB (A)			

*1 Limited feedrate with continuous axis movement
*2 When adjacent pockets are empty and pockets next to them have tools less than Φ240 mm, maximum tool diameter is Φ260 mm

		HCN-10800		HCN-12800	
		Standard	Hard metal package	Standard	Hard metal package
Stroke	X-axis (column right / left)	1700 mm		2200 mm	
	Y-axis (spindle up / down)	1400 mm		1600 mm	
	Z-axis (table back / forth)	1525 mm		1850 mm	
	Distance between table center to spindle nose	150 mm ~ 1675 mm		250 mm ~ 2100 mm	
	Distance between pallet top to spindle center	100 mm ~ 1500 mm		100 mm ~ 1700 mm	
Table	Pallet size	1000 mm × 1000 mm		1250 mm × 1250 mm	
	Max. workpiece dimensions	Φ2050 × 1600 mm		Φ2400 mm × 2000 mm	
	Pallet load capacity (evenly distributed)	3000 kg		6000 kg	
	Pallet top surface	M20, tapped 81 places, pitch 100 mm		M20, tapped 81 places, pitch 125 mm	
	Minimum indexing angle increment	0.0001°		0.0001°	
	Indexing time	2.4 sec / 90°		3.6 sec / 90°	
Spindle	Max. spindle speed	10000 rpm	6000 rpm	10000 rpm	6000 rpm
	Spindle gear range	2 (electric)	2 (electric)	2 (electric)	2 (electric)
	Spindle taper	No.50	HSK-A100	No.50	HSK-A100
	Spindle bearing size ID	Φ100 mm	Φ120 mm	Φ100 mm	Φ120 mm
	Spindle acceleration	3.0 sec (0 → 10000 rpm)	3.5 sec (0 → 6000 rpm)	3.0 sec (0 → 10000 rpm)	2.3 sec (0 → 6000 rpm)
Feedrate	Rapid traverse rate (X-, Y-, Z-axis)*1	52 m/min		43 m/min	
	Cutting feedrate (X-, Y-, Z-axis)*1	1 ~ 52000 mm/min		1 ~ 43000 mm/min	
	Axis acceleration / deceleration	0.4 G		X, Y-axis: 0.35 G Z-axis: 0.3 G	
Automatic tool changer	Tool shank	No.50	HSK-A100	No.50	HSK-A100
	Tool magazine capacity	80		80	
	Maximum tool dia. / length (from gauge line) / weight	Φ135 mm / 650 mm / 30 kg		Φ135 mm / 800 mm / 30 kg	
	Maximum tool diameter (when adjacent pockets empty)	Φ260 mm*2		Φ260 mm*2	
	Tool selection method	Random selection / shortest path		Random selection / shortest path	
	Tool change time (chip-to-chip)	5.7 sec		6.8 sec	
Automatic pallet changer	Number of pallets	2		2	
	Change system	Rotary type		Shuttle type	
	Pallet change time	25 sec		48 sec	
Motors	Spindle motor (30 min. rating / cont. rating)	37 kW / 30 kW (50 HP / 40 HP)	—	37 kW / 30 kW (50 HP / 40 HP)	—
	Spindle motor (40% ED / cont. rating)	—	37 kW / 30 kW (50 HP / 40 HP)	—	56 kW / 45 kW (75 HP / 60 HP)
Power requirement	60 Hz Motor (30 min. rating / cont. rating)	107.84 kVA / 97.86 kVA	—	117.68 kVA / 107.75 kVA	—
	60 Hz Motor (40% ED / cont. rating)	—	116.04 kVA / 106.06 kVA	—	153.69 kVA / 135.08 kVA
	50 Hz Motor (30 min. rating / cont. rating)	105.95 kVA / 95.97 kVA	—	115.36 kVA / 105.43 kVA	—
	50 Hz Motor (40% ED / cont. rating)	—	114.15 kVA / 104.17 kVA	—	151.37 kVA / 132.76 kVA
	Air supply (pressure / volume)	0.5MPa~0.9MPa (5~9 kgf/cm^2) / 600 L/min		0.5MPa~0.9MPa (5~9 kgf/cm^2) / 700 L/min	
Machine size	Machine height	4052 mm		4511 mm	
	Floor space requirement	6081 mm × 8868 mm		7047 mm × 10896 mm	
	Machine weight	45000 kg		57500 kg	
Sounds	Equivalent continuous sound pressure level at operator position (depend on equipment options)	Less than 80 dB (A)			

*1 Limited feedrate with continuous axis movement
*2 When adjacent pockets are empty and pockets next to them have tools less than Φ160 mm, maximum tool diameter is Φ360 mm

Standard and Optional Equipment

●: Standard ○: Option —: N / A

		6800	8800	10800	12800
Spindle	10000 rpm (No.50) spindle	●	●	●	●
	10000 rpm (BBT-50, HSK-A100) spindle	○	○	○	○
	6000 rpm, 37 kW (BBT-50, HSK-A100) hard metal specification	○	○	○	—
	6000 rpm, 56 kW (BBT-50, HSK-A100) hard metal specification	—	—	—	○
	8000 rpm (No.50, BBT-50, HSK-A100) high torque spindle	○	○	○	○
	16000 rpm (HSK-A 100) high speed spindle	○	○	○	○
Tool magazine	43 tool chain type magazine	●	—	—	—
	60 tool chain type magazine	○	●	—	—
	80 tool chain type magazine	○	○	●	●
	100, 120, 140, 160 tool chain type magazine	○	○	○	○
	180, 204, 240, 288, 312, 348 tool TOOL HIVE	○	○	○	○
	206, 276, 348 tool (No.50 tools only) TOOLTECH	○	○	○	○
Table	1° indexing table	●	●	—	—
	NC positioning table (contouring not available)	○	○	—	—
	NC rotary table	○	○	●	●
	NC rotary table with scale	○	○	○	○
	Pallet load 3t for □800 mm pallet	—	○	—	—
	Pallet load 4t for □1000 mm pallet	—	—	○	—
	Table load 8t for □1250 mm pallet	—	—	—	○
	Table load 10t for single table machine	—	—	—	○
Pallet	□630 mm tapped pallet	●	—	—	—
	□630 mm tapped pallet with location bore	○	—	—	—
	□630 mm T-slot pallet with location bore	○	—	—	—
	630 mm × 800 mm tapped pallet	○	—	—	—
	630 mm × 800 mm tapped pallet with location bore	○	—	—	—
	630 mm × 800 mm T-slot pallet with location bore	○	—	—	—
	□800 mm tapped pallet	○	●	—	—
	□800 mm tapped pallet with location bore	○	○	—	—
	□800 mm T-slot pallet with location bore	○	○	—	—
	800 mm × 1000 mm tapped pallet	—	○	—	—
	800 mm × 1000 mm tapped pallet with location bore	—	○	—	—
	800 mm × 1000 mm T-slot pallet with location bore	—	○	—	—
	□1000 mm tapped pallet	—	○	●	—
	□1000 mm tapped pallet with location bore	—	○	○	—
	□1000 mm T-slot pallet with location bore	—	○	○	—
	1000 mm × 1250 mm tapped pallet	—	—	○	—
	1000 mm × 1250 mm tapped pallet with location bore	—	—	○	—
	1000 mm × 1250 mm T-slot pallet with location bore	—	—	○	—
	□1250 mm tapped pallet without edge locator	—	—	○	●
	□1250 mm tapped pallet with edge locator	—	—	○	○
	□1250 mm tapped pallet with location bore	—	—	○	○
	□1250 mm T-slot pallet with location bore	—	—	○	○
	1250 mm × 1600 mm tapped pallet	—	—	—	○
	1250 mm × 1600 mm tapped pallet with location bore	—	—	—	○
	1250 mm × 1600 mm T-slot pallet with location bore	—	—	—	○
	□1600 mm tapped pallet	—	—	—	○
	□1600 mm tapped pallet with location bore	—	—	—	○
	□1600 mm T-slot pallet with location bore	—	—	—	○

●: Standard ○: Option —: N / A

		6800	8800	10800	12800
Automation	2-pallet changer	●	●	●	●
	6-pallet changer	○	○	—	—
	Hydraulic power supply through pallet (N/A 1°indexing table and NC rotary table)	○	○	—	—
	Tapped pallet for hydraulic power supply through pallet	○	○	—	—
	Tapped pallet with location bore for hydraulic power supply through pallet	○	○	—	—
	T-slot pallet for hydraulic power supply through pallet	○	○	—	—
	T-slot pallet for with location bore for hydraulic power supply through palle	○	○	—	—
	Hydraulic power supply from top of pallet changer 2 ports × 2-pallets	○	○	—	—
	Workpiece seating detection, ON / OFF switch	○	○	○	—
	Preparation for PALLETECH	○	○	○	○
	Automatic power ON / OFF + warm-up operation	●	●	●	●
Setup	Remote manual pulse generator (wired)	●	●	●	●
	Remote manual pulse generator (wireless)	○	○	○	○
	Tool ID magazine operation panel	●	●	●	●
	Mazak monitoring system B (optical) OMP60	○	○	○	—
	Mazak monitoring system B (electrical) RMP60	—	—	—	○
	Automatic tool length measurement & tool breakage detection	●	●	●	●
Safety equipment	Operator door interlock	●	●	●	●
High accuracy	Hydraulic unit temperature control	○	○	○	○
	Scale feedback (X-,Y-,Z-axis)	○	○	○	—
	Scale feedback (Y-axis)	—	—	—	●
	Scale feedback (X-,Z-axis)	—	—	—	○
	Chiller unit	●	●	●	●
	Coolant temperature control	○	○	○	○
	Ball screw core cooling	●	●	●	●
Coolant / chip disposal	Flood coolant	●	●	●	●
	Niagara coolant	●	●	●	●
	Oil mist coolant	○	○	○	○
	Coolant through spindle 0.8MPa (8kgf/cm^2)	●	●	●	●
	High pressure coolant through spindle 1.5MPa (15kgf/cm^2)	○	○	○	○
	High pressure coolant through spindle 3.5MPa (35kgf/cm^2)	○	○	○	○
	SUPERFLOW coolant system 7.0MPa (70kgf/cm^2)	○	○	○	○
	Air through spindle	○	○	○	○
	Work air blast	○	○	○	○
	Hand held coolant nozzle	○	○	○	○
	Secondary coolant filter for aluminum	○	○	○	○
	Oil skimmer (RB-200)	○	○	○	○
	Magnetic plate	○	○	○	○
	Magnetic separator for cast iron	○	○	○	○
	Mist collector	○	○	○	○
	Chip conveyor (side disposal, hinge) not available with 6PC	○	○	—	—
	Chip conveyor (side disposal, ConSep) not available with 6PC	○	○	—	—
	Chip conveyor (rear disposal, hinge)	○	○	—	—
	Chip conveyor (rear disposal, ConSep)	○	○	—	—
	Chip conveyor (rear right disposal, hinge)	—	—	○	○
	Chip conveyor (rear right disposal ConSep)	—	—	○	—
	Chip conveyor (rear right disposal, ConSep 2 WS)	—	—	—	○
	Inverter system for hinge chip conveyor	○	○	○	○

MAZATROL SmoothG Specifications

	MAZATROL	EIA
Number of controlled axes	Simultaneous 2 ~ 4 axes	
Least input increment	0.0001 mm, 0.00001", 0.0001 deg	
High speed, high precision control	Shape compensation, Smooth corner control, Rapid traverse overlap, Rotary axis shape compensation	Shape compensation, Smooth corner control, Rapid traverse overlap, Rotary axis shape compensation, High-speed machining mode, High-speed smoothing control
Interpolation	PosPositioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation,Cylindrical interpolation, Polar coordinate interpolation, Synchronous tapping*	Positioning (interpolation), Positioning (non-interpolation), Linear interpolation, Circular interpolation, Spiral interpolation, Helical interpolation, Cylindrical interpolation*, Fine spline interpolation*, NURBS interpolation*, Polar coordinate interpolation*, Synchronous tapping*
Feedrate	Rapid traverse, Cutting feed, Cutting feed (per minute), Cutting feed (per revolution), Dwell (time / rotation), Rapid traverse override, Cutting feed override, G0 speed variable control , Feedrate limitation, Variable acceleration control, G0 slope constant*	Rapid traverse, Cutting feed, Cutting feed (per minute), Cutting feed (per revolution), Inverse time feed, Dwell (time / rotation), Rapid traverse override, Cutting feed override, G0 speed variable control, Feedrate limitation, Time constant changing for G1,Variable acceleration control, G0 slope constant*
Program registration	Number of programs: 256 (Standard) / 960 (Max.), Program memory: 2 MB, Program memory expansion: 8 MB*, Program memory expansion: 32 MB*	
Control display	Display: 19" touch panel / Display: 10.4" touch panel, Resolution: SXGA / Resolution: VGA	
Spindle functions	S code output , Spindle speed limitation, Spindle speed override, Spindle speed reaching detection , Multiple position orient, Constant surface speed, Spindle speed command with decimal digits, Synchronized spindle control , Spindle speed range setting	
Tool functions	Number of tool offset: 4000, T code output for tool number, Tool life monitoring (time), Tool life monitoring (number of machined workpieces)	Number of tool offset: 4000, T code output for tool number, T code output for group number, Tool life monitoring (time), Tool life monitoring (number of machined workpieces)
Miscellaneous functions	M code output, Simultaneous output of multiple M codes	
Tool offset functions	Tool position offset, Tool length offset, Tool diameter / tool nose R offset, Tool wear offset	
Coordinate system	Machine coordinate system, Work coordinate system, Local coordinate system, Additional work coordinates (300 set)	
Machine functions	–	Shaping function*, Dynamic compensation Ⅱ*
Machine compensation	Backlash compensation, Pitch error compensation, Volumetric compensation*	
Protection functions	Emergency stop, Interlock, Pre-move stroke check, SAFETY SHIELD (manual mode), SAFETY SHIELD (automatic mode)*, VOICE ADVISER	
Automatic operation mode	Memory operation	Memory operation, Tape operation, MDI operation, EtherNet operation*
Automatic operation control	Optional stop, Dry run, Manual handle interruption, MDI interruption, TPS, Restart, Machine lock	Optional block skip, Optional stop, Dry run, Manual handle interruption, MDI interruption, TPS, Restart, Restart 2, Collation stop, Machine lock
Manual measuring functions	Tool length teach, Touch sensor coordinates measurement, Workpiece offset measurement, WPC coordinate measurement, Measurement on machine	Tool length teach, Tool offset teach, Touch sensor coordinates measurement, Workpiece offset measurement, WPC coordinate measurement, Measurement on machine
Automatic measuring functions	WPC coordinate measurement, Automatic tool length measurement, Sensor calibration, Tool breakage detection, External tool breakage detection*	Automatic tool length measurement, Sensor calibration, Tool breakage detection, External tool breakage detection*
MDI measurement	Partial auto tool length measurement, Auto tool length measurement, Coordinate measurement	
Peripheral network	PROFIBUS-DP*, EtherNet/IP*, CC-Link*	
Interface	SD card interface, USB	
EtherNet	10 M / 100 M / 1 Gbps	

* Option

Environmentally friendly

Designed with environmental considerations

The environment and our impact on natural surroundings have always been important concerns of Yamazaki Mazak. This is shown by the fact that all factories in Japan where Mazak machine tools are produced are ISO 14001 certified, an international standard confirming that the operation of our production facilities does not adversely affect air, water or land.

Reduction of electrical power consumption

Automatic-off LED worklight and CNC screen are standard equipment. The chip conveyor automatically stops operation after cycle completion for reduced electrical power consumption.

Reduction of lubricant consumption

High efficiency lubrication system delivers the optimum amount of grease to the linear roller guides and ball screw with lower lubricant consumption.

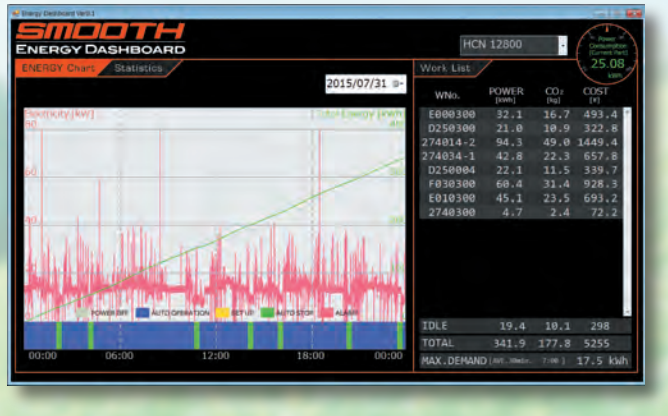
Extended coolant service life

The grease lubrication system eliminates tramp oil for extended service life of coolant.

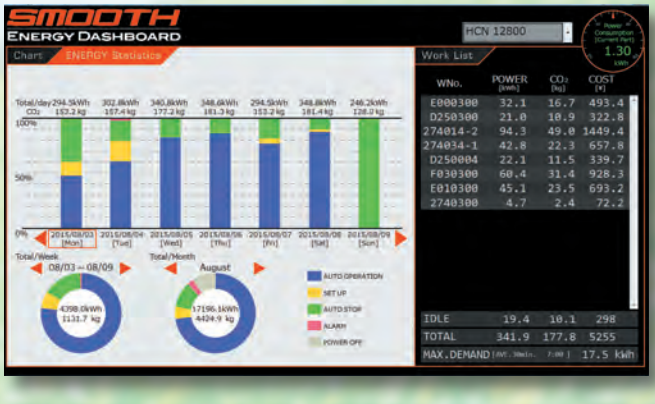
Energy Dashboard OPTION

Process screen displays total energy consumption

Electrical consumption display



Electrical consumption statistics / analysis display



HCN SERIES

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