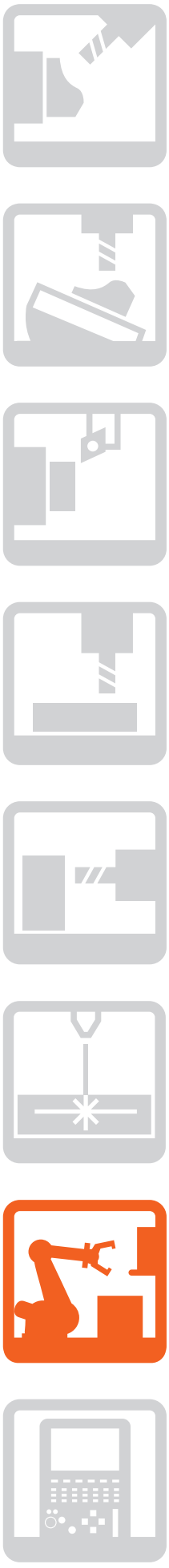


SMOOTH TECHNOLOGY

PALLETECH SYSTEM

Mazak

Manufacturing innovation to meet your requirements today as well as tomorrow

The PALLETECH SYSTEM is designed with the flexibility required for shorter product life cycles, reduced in-process inventory, just-in-time production and other demands of today's manufacturing environment. We offer the PALLETECH MANUFACTURING CELL (1 level) and PALLETECH HIGH RISE SYSTEM (2, 3 levels) according to your volume of production and budget. Furthermore, the PALLETECH SYSTEM is designed for convenient system expansion after the initial installation to easily respond to increased production requirements in the future.

High productivity automation system

PALLETECH SYSTEM

Investment Comparison

The PALLETECH system
reduces costs in three areas

1 Lower investment

System comparison between HCN-6800 with 2-pallet changer, 6-pallet changer and PALLETECH HIGH RISE SYSTEM.
Daily required machine hours : 55 (55 workpieces with 1 hour cycle time)

	Effective machine hours per machine*1	Required number of machines
HCN-6800 (2-pallet changer)	(10 + 2) × 70% = 8.4 hours	55 hours ÷ 8.4 hours = 7 machines
HCN-6800 (6-pallet changer)	(8 + 6) × 81% = 11.3 hours	55 hours ÷ 11.3 hours = 5 machines
HCN-6800 PALLETECH HIGH RISE SYSTEM	(8 + 15) × 85% = 19.6 hours	55 hours ÷ 19.6 hours = 3 machines

*1 (Manned operation + unmanned operation) × utilization rate = effective machine hours

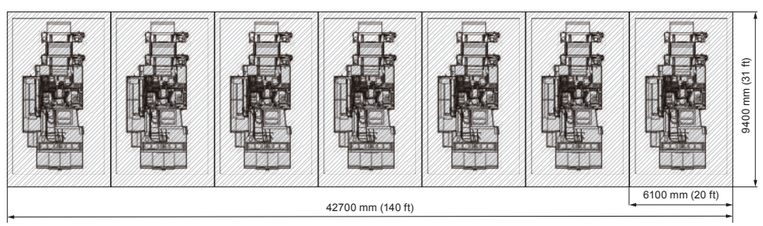
2 Considerable reduction of required number of operators

	Number of required operators	Labor expense
HCN-6800 × 7 machines (2-pallet changer)	4	100%
HCN-6800 × 5 machines (6-pallet changer)	2	50%
HCN-6800 × 3 machines + PALLETECH HIGH RISE SYSTEM	1	25%

3 Reduction of floor space requirements

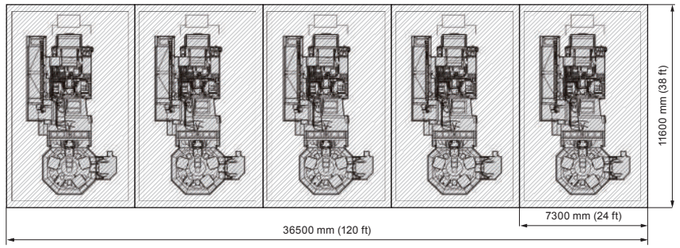
To efficiently use limited factory floor space, the PALLETECH SYSTEM provides the best solution.
A PALLETECH HIGH RISE SYSTEM when compared with the 2-pallet changer and 6-pallet changer HCN-6800 is shown below.

HCN-6800 (60 tool magazine, 2-pallet changer) × 7 machines



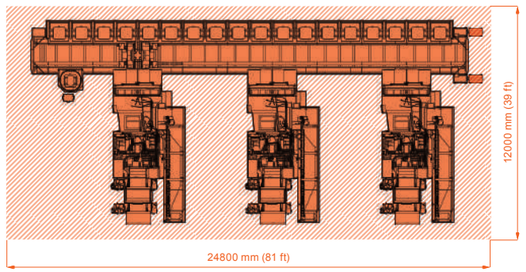
Floor space requirement
402 m² (**4327** ft²)

HCN-6800 (120 tool magazine, 6-pallet changer) × 5 machines



Floor space requirement
424 m² (**4564** ft²)

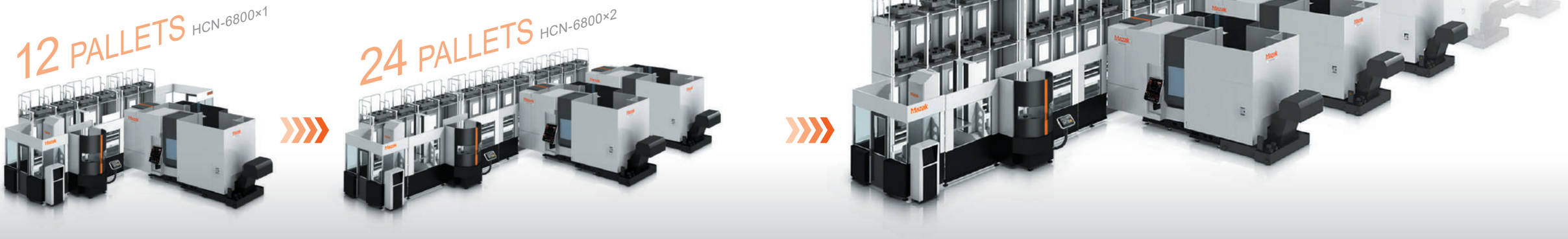
HCN-6800 (160 tool magazine) × 3 machines
+ PALLETECH HIGH RISE SYSTEM (1 loading station, 36 pallets)



Floor space requirement
298 m² (**3208** ft²)

Modular Design

PALLETECH EXPANDABILITY



Flexible extensibility

A single machine system can be expanded - pallet stocker(s), loading station(s) and machines can be added in response to increased production requirements after the initial system installation.

Pallet stocker

The rail for the loader and the chip pan are integrated with the pallet stocker in order to provide convenient system expansion. The PALLETECH HIGH RISE SYSTEM features a 2/3-level pallet stocker for increased storage capacity with a minimum floor space requirement. Either the PALLETECH MANUFACTURING CELL or PALLETECH HIGH RISE SYSTEM can be selected according to current production requirements and budget. Either system can be easily expanded after the initial installation in response to increased production requirements.

Loading station

When a pallet is at the loading station, the pallet can be indexed to 4 positions at every 90 degrees for convenient workpiece loading and unloading. Additionally, the loading station is equipped with a safety door as standard equipment to maintain a safe working environment for the operator. The PALLETECH SYSTEM can be equipped with up to a maximum of 8 loading stations.

Pallet loader

Pallets are automatically transferred from the pallet stocker to the loading station and then to a machining center by the pallet loader. The system controller commands the pallet loader according to the registered production schedule. The pallet loader features high speed acceleration and positioning to eliminate non-productive pallet waiting time. Additionally, the loader utilizes 2 different pallet transferring speeds - one when a workpiece is on a pallet and the other when no workpiece is on a pallet.

Smooth PMC

Data driven manufacturing

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

Designed for ease of operation

The Smooth PMC server controls overall system operation according to the registered production schedule. Operation is intuitive by the touch panel screen. If connected to a network*, utilization can be viewed on office PCs, tablets and smart phones.

*Network / Wi-Fi needs to be prepared by user

PMC + INTEGREX i-630V/6 SmoothX

Simulation

Machine utilization and production results

Displays next workpiece to be loaded into machines / loading stations to conveniently see the system status. Production results are also displayed for ease of production planning.

Simulation

System resources (tooling) are checked by simulation to confirm that the production schedule can be performed as well as forecast overall system utilization. Simulation results for up to one week are displayed graphically.

Required tools display

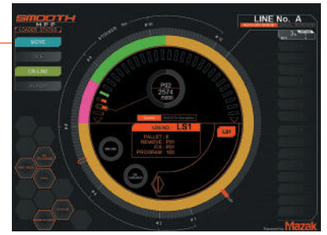
To streamline setup, the list of tools not in a machine magazine and those that do not have sufficient remaining time for the production schedule is displayed.

Tools not required

By showing tools that are not required for the production schedule, tool magazines can be used with increased efficiency.

Monitoring

System and production status are displayed visually. Monitoring of system operation is extremely convenient.

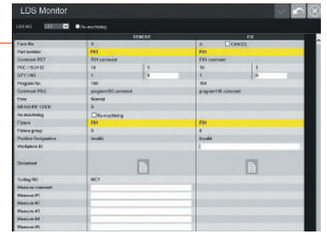


Home screen

System monitoring screen

Instruction display

To assist the operator, displays such as the workpiece loading instructions and the list of missing tools are available.



Workpiece loading instructions

Missing tools display

Production results display

A wide variety of graphs display the production results for convenient system utilization and analysis.

Gant chart screen

(One week operation results data)

Analysis screen

(Analysis of machining time and setup time)

Connection to tablets

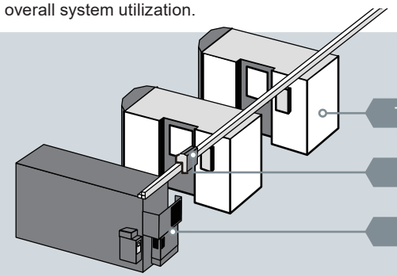
Production results, system utilization and other data can be checked on the MAZATROL SmoothX and SmoothG CNC. If connected to a network (prepared by user), system data are accessible on office PCs and tablets.

Higher Productivity

Overall management of tools in system for higher efficiency

Tool Transport System

The tool loader automatically transfers tools from the tool stocker to each machine's tool magazine in a system. As tools are transferred, tool data are automatically downloaded over the network to eliminate tool data input errors by an operator. Broken tools or those that have used all of the preregistered tool life are automatically returned to the tool stocker and are replaced with new tools. Multiple special tools are not required to be stored in each machines' tool magazine. A single special tool can be shared among machines by being automatically transferred from one tool magazine to another. This convenient tool management improves overall system utilization.



Tool magazine capacity ··· 120 or 160 tools

Tool transport loader ··· Speed : 180 m/min (7087 IPM)

Tool stocker capacity ··· 240 or 330 tools

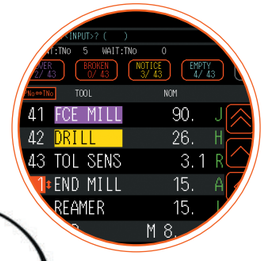
By having one central tool stocker, all the tools in a system are managed at one location.

Smooth Tool Management

This system manages tool data of all the tools in a system. By connecting a tool pre-setter in the tool room over a network, tool length and diameter data can be registered.

Tool ID

Smooth Tool Management utilizes a tool ID chip mounted on each tool to manage the tool data of all the tools in a system.



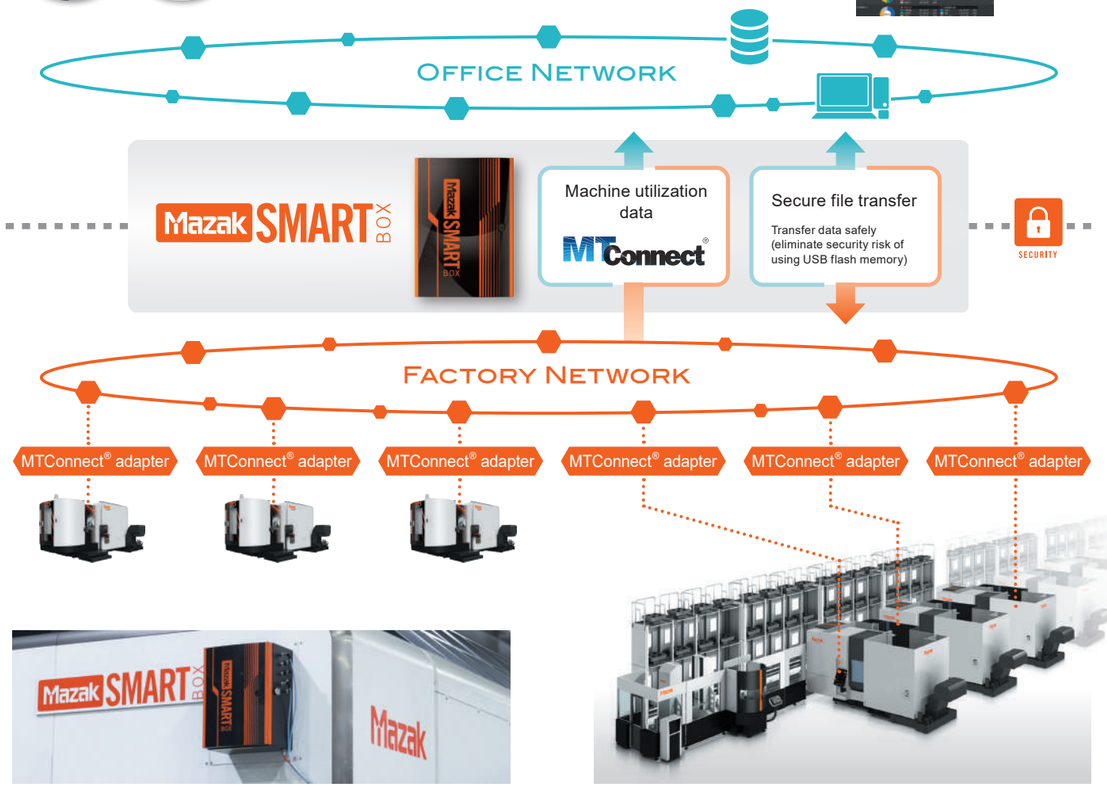
IoT equipment and software for smart factory operation

Integration of all production equipment in a company network. All data are in the MTConnect® format making it possible to integrate older production equipment as well as those of other manufacturers.

Data collection, utilization and analysis

SMOOTH MONITOR AX

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



Mazak SMARTBOX™

The Mazak SMARTBOX™ is a platform for convenient and highly secure network interface. This effectively meets the requirements of digital factory integration for free-flow uniform data sharing of machines with cyber security protection. At the heart of the Mazak SMARTBOX™ is Cisco's networking, security and computer technologies. The Mazak SMARTBOX™ can be connected to up to 6 machines.

MTConnect® adapter (software)

By installing the MTConnect® adapter software in each machine's CNC system, machine data are output in a standard format that allows machine operation to be comprehensively monitored.

Standard Specifications

■HCN series (horizontal machining centers)

		4000*1	5000*1,5000 / 50*1	6000*1
Pallet size		400 mm × 400 mm (15.75" × 15.75")	500 mm × 500 mm (19.69" × 19.69")	
Max. number of machines		15		
Levels		1·2·3		
Max. number of pallets		240		
Max. number of loading stations		8		
Number of pallet loader		1		
Pallet loader speed	Travelling axis	120 m/min (100 m/min*2) (4724 IPM (3937 IMP*2)		80 m/min (3150 IPM)
	Fork axis	80 m/min (3150 IPM)		50 m/min (1969 IPM)
	Vertical axis (1 level)	2.5 m/min (98 IPM)		2.8 m/min (110 IPM)
	Vertical axis (2 levels)	10 m/min (394 IPM)	8 m/min (315 IPM)	
	Vertical axis (3 levels)	14 m/min (551 IPM)		8 m/min (315 IPM)

*1 MAZATROL SmoothG only
*2 2 - 3 levels only

		6800	8800	10800	12800
Pallet size		630 mm × 630 mm (24.80" × 24.80")	800 mm × 800 mm (31.50" × 31.50")	1000 mm × 1000 mm (39.37" × 39.37")	1250 mm × 1250 mm (49.21" × 49.21")
Max. number of machines		15			
Levels		1·2·3	1·2	1	
Max. number of pallets		240			
Max. number of loading stations		8			
Number of pallet loader		1			
Pallet loader speed	Travelling axis	80 m/min (3150 IPM)	60 m/min (2362 IPM)		50 m/min (1969 IPM)
	Fork axis	40 m/min (1575 IPM)			50 m/min (1969 IPM)
	Vertical axis (1 level)	2.8 m/min (110 IPM)	2 m/min (79 IPM)	1.5 m/min (59 IPM)	—
	Vertical axis (2 levels)	8 m/min (315 IPM)		—	
	Vertical axis (3 levels)	8 m/min (315 IPM)	—		

■VARIAXIS i series (simultaneous 5-axis machining centers)

		i-500	i-600	i-700	i-800	i-700T	i-800T
Pallet size		400 mm × 400 mm (15.75" × 15.75")		500 mm × 500 mm (19.69" × 19.69")		Φ610 mm (Φ24.02")	
Max. number of machines		15					
Levels		1·2·3					
Max. number of pallets		240					
Max. number of loading stations		8					
Number of pallet loader		1					
Pallet loader speed	Travelling axis	120 m/min (100 m/min*2) (4724 IPM (3937 IPM*2)			100 m/min (3937 IPM)	120 m/min (100 m/min*2) (4724 IPM (3937 IPM*2)	100 m/min (3937 IPM)
	Fork axis	80 m/min (57 m/min*2) (3150 IPM (2244 IPM*2)	80 m/min (3150 IPM)		57 m/min (2244 IPM)	80 m/min (3150 IPM)	57 m/min (2244 IPM)
	Vertical axis (1 level)	2.9 m/min (114 IPM)	2.5 m/min (98 IPM)		2.9 m/min (114 IPM)	2.5 m/min (98 IPM)	2.9 m/min (114 IPM)
	Vertical axis (2 levels)	10 m/min (394 IPM)		8 m/min (315 IPM)	10 m/min (394 IPM)	8 m/min (315 IPM)	10 m/min (394 IPM)
	Vertical axis (3 levels)	14 m/min (551 IPM)					

■INTEGREX e-V, e-RAMTEC V, i-V, VORTEX e-V, i-V series (multi-tasking machines, simultaneous 5-axis machining centers)

		i-500V/5	i-630V/6	i-800V/8
Pallet size		500 mm × 500 mm (19.69" × 19.69")	630 mm × 630 mm (24.80" × 24.80")	800 mm × 800 mm (31.50" × 31.50")
Max. number of machines		15		
Levels		1·2·3		
Max. number of pallets		240		
Max. number of loading stations		8		
Number of pallet loader		1		
Pallet loader speed	Travelling axis	80 m/min (3150 IPM)		60 m/min (2362 IPM)
	Fork axis	50 m/min (1969 IPM)	40 m/min (1575 IPM)	
	Vertical axis (1 level)	2.8 m/min (110 IPM)		2 m/min (79 IPM)
	Vertical axis (2 levels)	8 m/min (315 IPM)		
	Vertical axis (3 levels)	8 m/min (315 IPM)		—

		e-1250 V/8	e-RAMTEC V/8	e-1600 V/10	e-RAMTEC V/10	e-1850 V/12	e-RAMTEC V/12
Pallet size*3		800 mm × 800 mm (31.50" × 31.50")		1000 mm × 1000 mm (39.37" × 39.37")		1250 mm × 1250 mm (49.21" × 49.21")	
Max. number of machines		15					
Levels		1·2				1	
Max. number of pallets		240					
Max. number of loading stations		8					
Number of pallet loader		1					
Pallet loader speed	Travelling axis	60 m/min (2362 IPM)				50 m/min (1969 IPM)	
	Fork axis	40 m/min (1575 IPM)				50 m/min (1969 IPM)	
	Vertical axis (1 level)	2 m/min (79 IPM)		1.5 m/min (59 IPM)		—	
	Vertical axis (2 levels)	8 m/min (315 IPM)		—			

*3 Other pallet sizes available

Mazak

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