



SMOOTH
TECHNOLOGY

PALLETECH SYSTEM

Mazak

Manufacturing innovation to meet your requirements today and 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) to match your production volume and budget. Furthermore, the PALLETECH SYSTEM is designed for convenient system expansion after initial installation to respond easily to increased future production requirements.



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)	$(10 + 2) \times 70\%$ = 8.4 hours	$55 \text{ hours} \div 8.4 \text{ hours}$ = 7 machines 
HCN-6800 (6-pallet changer)	$(8 + 6) \times 81\%$ = 11.3 hours	$55 \text{ hours} \div 11.3 \text{ hours}$ = 5 machines 
HCN-6800 PALLETECH HIGH RISE SYSTEM	$(8 + 15) \times 85\%$ = 19.6 hours	$55 \text{ hours} \div 19.6 \text{ hours}$ = 3 machines 

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

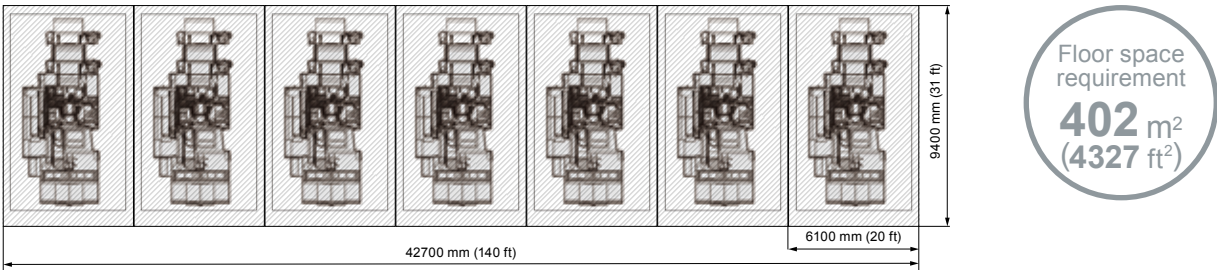
2 Fewer operators required

	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%

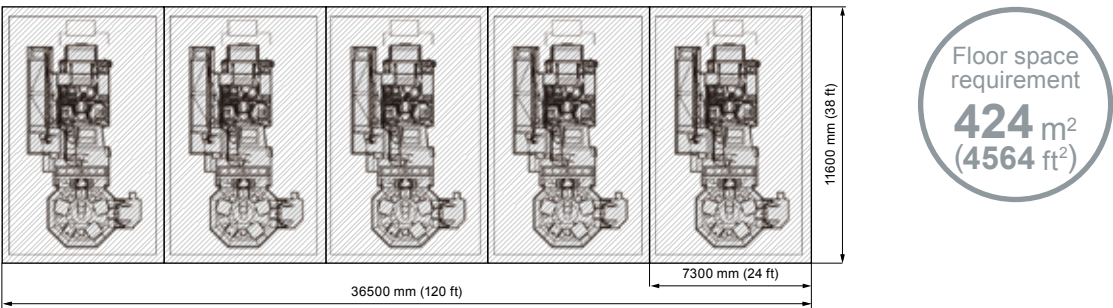
3 Reduction of floor space requirements

To efficiently use limited factory floor space, the PALLETECH SYSTEM provides the best solution.
System comparison between HCN-6800 with 2-pallet changer, 6-pallet changer and PALLETECH HIGH RISE SYSTEM.

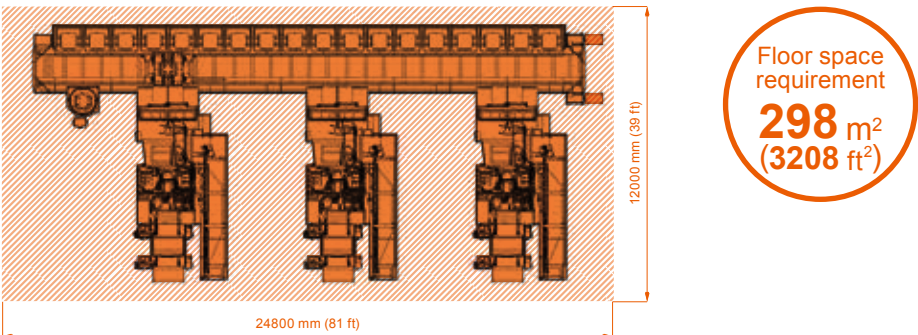
HCN-6800 (60 tool magazine, 2-pallet changer) × 7 machines



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



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



Modular Design

PALLETECH EXPANDABILITY



Flexible extensibility



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

Pallet stocker



The rail for the loader and the chip pan are integrated with the pallet stocker for convenient system expansion. The PALLETECH HIGH RISE SYSTEM features a 2/3-level pallet stocker for increased storage capacity in minimum floor space. Select either the PALLETECH MANUFACTURING CELL or PALLETECH HIGH RISE SYSTEM to match current production requirements and budget. Expand either system after initial installation in response to meet increased production requirements.

Loading station



At the loading station, a 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 8 loading stations.

Pallet loader



Pallets are transferred automatically 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 present.

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 from the touch panel screen. If connected to a network*, utilization can be viewed on office PCs, tablets and smart phones.

* User must prepare network/Wi-Fi



SMOOTH PMC

PMC + INTEGREX i-630V/6 SmoothX

Simulation



Simulation

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

Required tools display

To streamline setup, the display lists tools either not present in the magazine or lacking sufficient remaining time to meet the production schedule.

Tools not required

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

Machine utilization and production results

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

SMOOTH
PMC

Monitoring

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



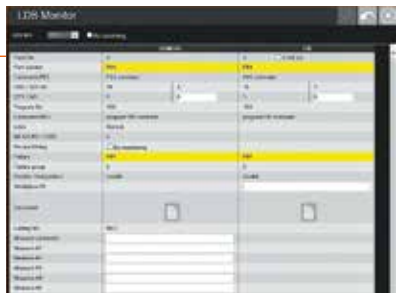
Home screen



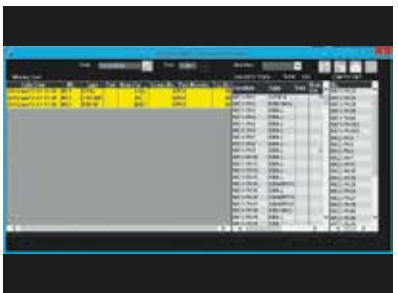
System monitoring screen

Instruction display

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



Workpiece loading instructions



Missing tools display

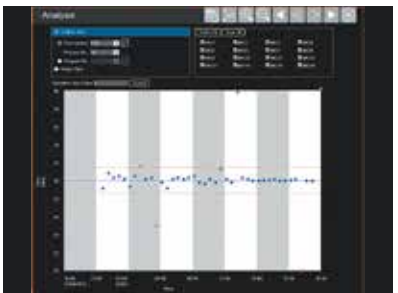
Production results display

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



Gantt chart screen

One week of operating 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.

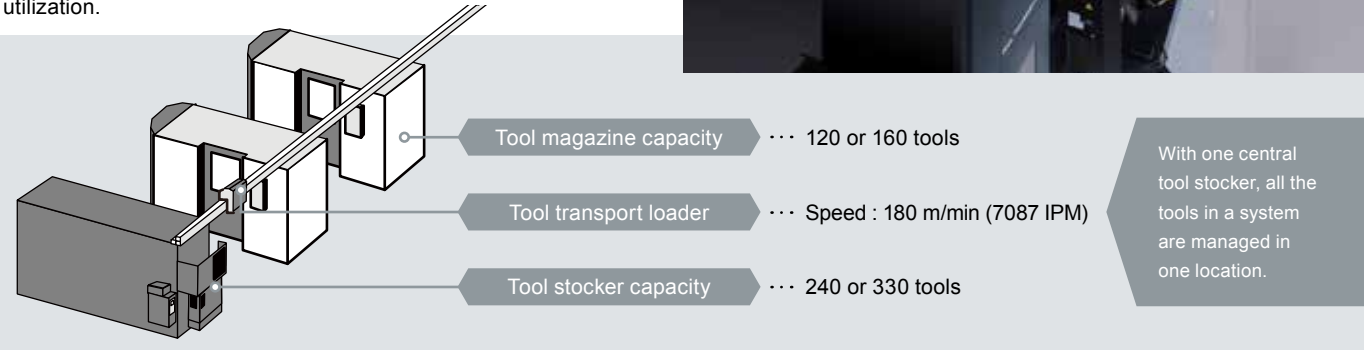


Higher Productivity

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 operator input errors. Broken tools or those that have used all of the preregistered tool life automatically return to the tool stocker and are replaced with new tools. Multiple special tools are not required to be stored in each machine's 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.



SMOOTH Tool Management

This system manages data for 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.



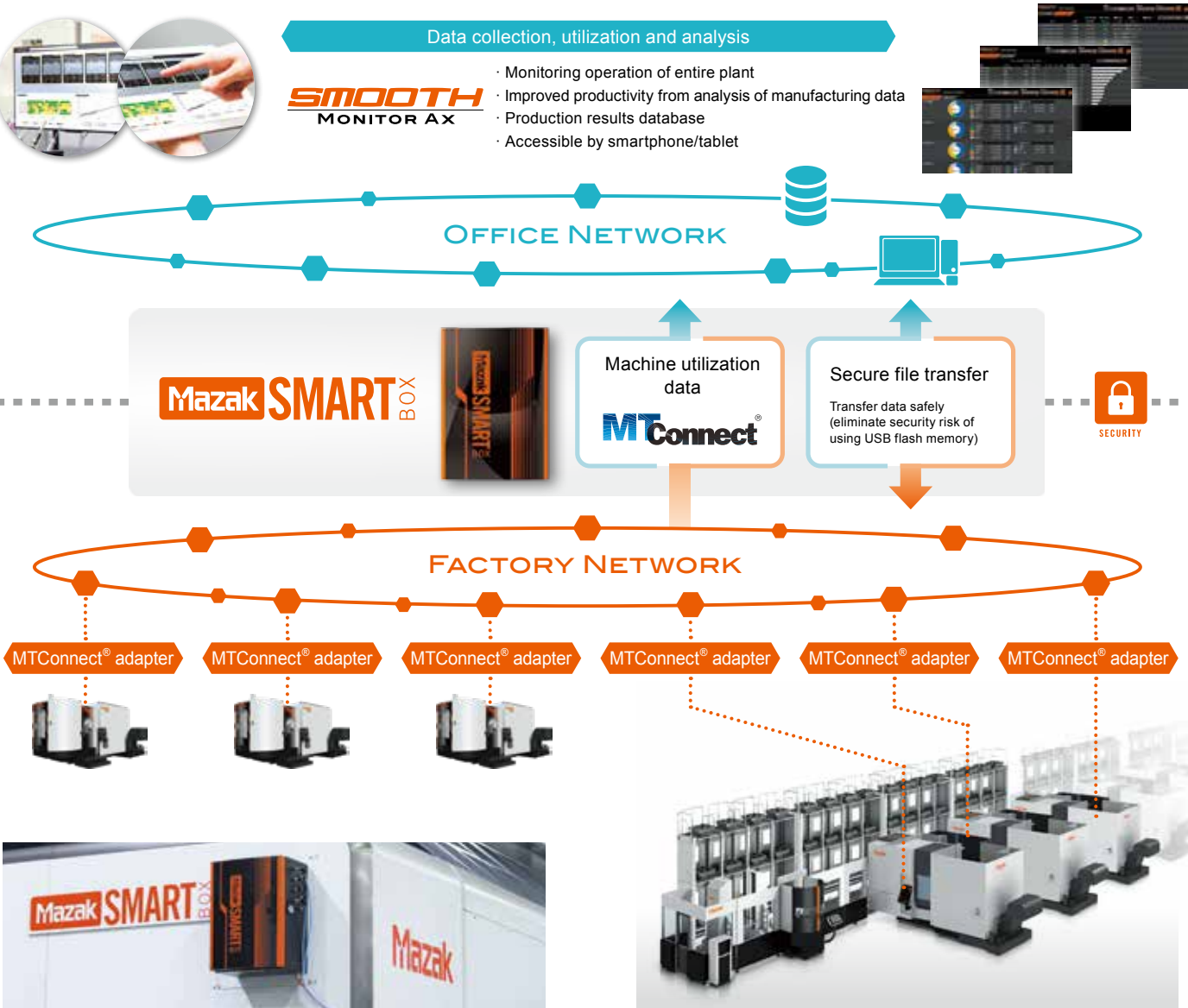
Tool ID

SMOOTH Tool Management utilizes an ID chip mounted on each tool to manage data for all the tools in a system.



IoT equipment and software for smart factory operation

Integrate 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 machines from other manufacturers.



Mazak SmartBox™

The Mazak SmartBox™ is a platform for convenient and highly secure network interfacing. 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 connect 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 monitored comprehensively.

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 loaders	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)		*1 MAZATROL SmoothG only
Vertical axis (3 levels)	14 m/min (551 IPM)	8 m/min (315 IPM)		*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")		ø610 mm (ø24.02")	
Max. number of machines		15					
Levels		1-2-3					
Max. number of pallets		240					
Max. number of loading stations		8					
Number of pallet loaders		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 loaders	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 loaders	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

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