



Doosan Infracore
Machine Tools

HM 500 / 630 / 800

Heavy Duty Horizontal Machining Center

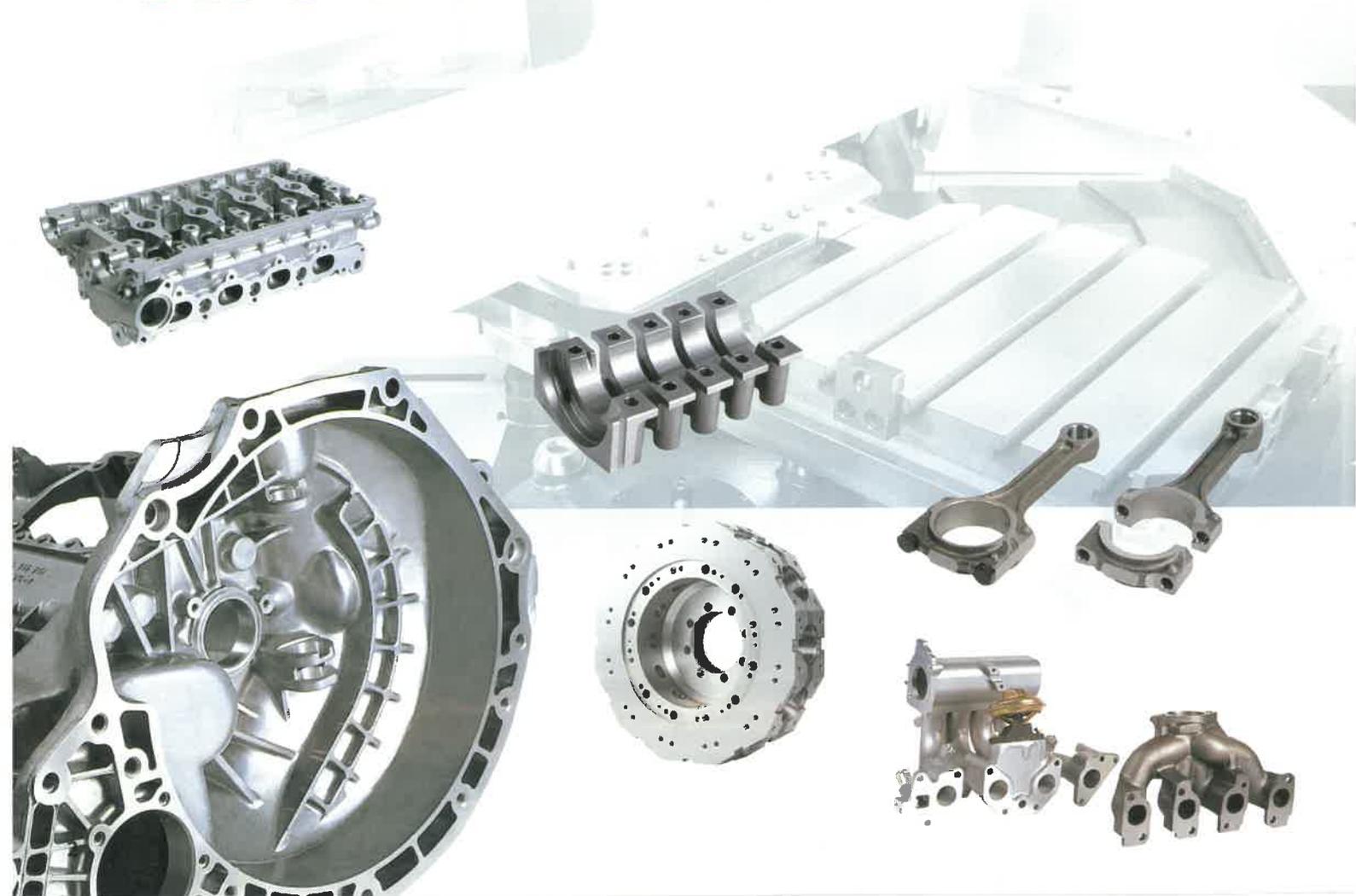


Horizontal Machining Centers designed for heavy duty applications

The HM series combines a high torque spindle drive and powerful axis drives for a large chip removal rate.

The massive meehanite cast structure and wrap around box guideways provide the rigidity required for both heavy cutting and superb surface finishes.

HM 500 / 630 / 800





Spindle Head

The HM's heavy duty, 50 taper spindles are supported by four, permanently lubricated angular-contact spindle bearings, precision class P4. The bearings are assembled using a stepped sleeve system. This permits precise adjustment, and eliminates the possibility of assembly damage typical of lock nut systems. A powerful AC motor delivers power to the three-speed geared head, and provides high speeds and low-end torques for a broad range of applications. An encoder, attached to the spindle, allows rigid tapping in both high and low gear ranges.

HM 500

Max. spindle speed

6,000 rpm

Motor (30min)

25 Hp

HM 630 / 800

Max. spindle speed

6,000 rpm

Motor (30min)

30 Hp

Oil cooler

The temperature of the hydraulic oil is regulated by a refrigerated cooling system. It maintains uniform controlled temperature required for high accuracy.

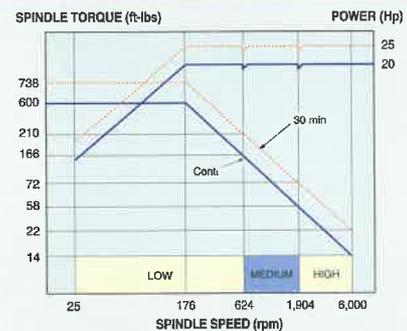


Lubrication

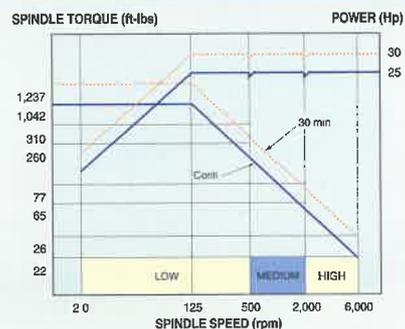
Automatic lubrication is provided to the guideways, ball screws and spindle gearbox. Way lubrication oil is delivered by piston distributors which precisely meter the volume of oil. A low-level alarm prevents the machine from restarting.

■ Spindle Power-torque diagram

- Max. spindle speed : 6,000rpm (25 Hp)



- Max. spindle speed : 6,000rpm (30 Hp)



Tool Magazine

Automatic tool changer

Tool change time

2.5 sec. (T-T-T)



Tool storage capacity

60 tools

{Opt : 90/120/180/240}

The ATC is composed of tool magazine and change arm. ATC is located separately from the machine in order to prevent adverse effects on accuracy due to vibration or other causes even when the ATC is operated during machining operation. The tools are selected by fixed address method that follows the shorter path. The fixed pocket design automatically returns tools to their original magazine position. This reduces the chance of collision when oversized tooling is used. The bi-directional tool magazine takes the shortest path making loading quick and easy.

Maximum tool size



Max. tool diameter

Ø 5.3 inch (Continuous)

Ø 9.8 inch

(Adjacent empty pockets)

Max. tool length

15.7 inch (HM 500)

21.7 inch (HM 630/800)

Max. tool weight

33 lbs (HM 500)

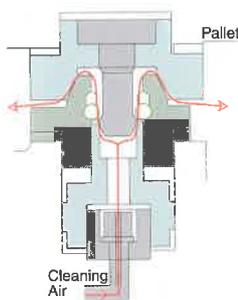
55 lbs (HM 630/800)

Automatic Pallet Changer

HM500/630/800 machining center are equipped with rotary shuttle type APC (Automatic Pallet Changer) as a standard feature. It provides high reliability and wide working area for easy setup. Rotary shuttle APC provides faster changing time and easy adoption for automated system in small sized machine

Pallet change time

14 sec. (HM500) **25 sec.** (HM630) **29 sec.** (HM800)



The possibility that chips might degrade the meshing accuracy of the pallet positioning mechanism increases at higher machining speeds. On all HM machines strong jets of air are discharged from the tapered cones when a pallet is changed to clean any chips from the cones and assure accurate pallet positioning.

Table



Minimum table indexing angle **1°**

Table indexing time (0→90°)

HM 500 **2.2 sec.**
 HM 630 **3.7 sec.**
 HM 800 **3.9 sec.**

Maximum workpiece size



	HM500	HM630	HM800
Pallet size (inch)	19.7×19.7	24.8×24.8	31.5×31.5
Max. workpiece size (inch)	∅ 31.5×H31.5	∅ 39.4×H 39.4	∅ 51.6×H47.2
Max. workpiece weight (lbs)	1,764	2,640	3,520

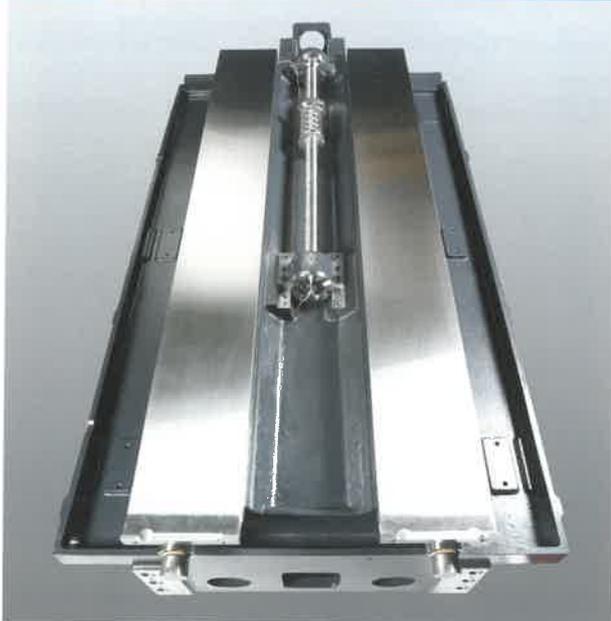
Bed and Column

■ Rigid Cast Iron Construction

The rigid bed and column castings are made of heavily ribbed Fine-grained Meehanite casting iron offering improved vibration dampening properties. The oversized box guideways provide a solid platform and the ability to withstand extreme cutting forces and provide excellent surface finishes in heavy duty applications.



Guideways and Axis Drives



Box guideways provide the ability to withstand extreme cutting forces.

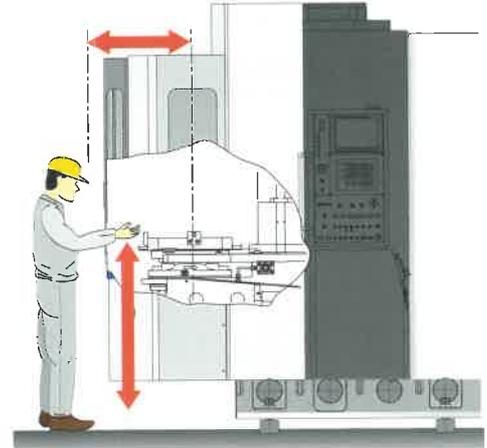


Doosan Infracore HM Series machining centers with oversized AC servo drives power through the toughest cuts in the toughest metal. The high torque servos are coupled directly to the ball screws. With no gears there is no risk of backlash or servo drag. The X and Z axes ball screws are center mounted, pretensioned and supported on both ends by high precision angular contact thrust bearings. This pretension design provides outstanding positioning repeatability with minimize thermal growth. In the event of a sudden impact, a flexible coupling on each axis flexes and absorbs the shock.

X / Y / Z
Rapid traverse 945 ipm

Ergonomic Design

Easy setup



Portable MPG



Swivelling operator's panel



Distance to table

21 inch
(HM500)

22 inch
(HM630)

31 inch
(HM800)

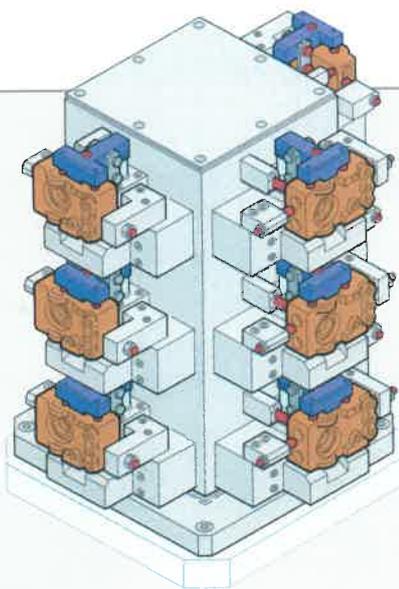
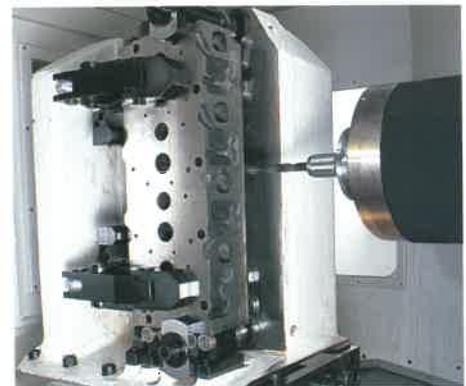
Height to table

48 inch
(HM500)

49 inch
(HM630)

49 inch
(HM800)

Fixture Interface (opt.)



Fixture check list (for hydraulic/pneumatic fixtures)

Number of Ports

- 2*¹ × 2*² Line
- 2*¹ × 3*² Line
- 2*¹ × 4*² Line
- 2*¹ × 6*² Line

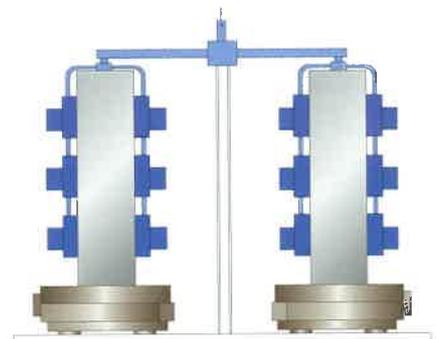
*¹ : Pallet No. 1 and No. 2
(Number of Pallet)

*² : Number of port line

Hydraulic power unit

Special requirement

_____ lpm at _____ Mpa



Contact Doosan for more information

Chip Removal

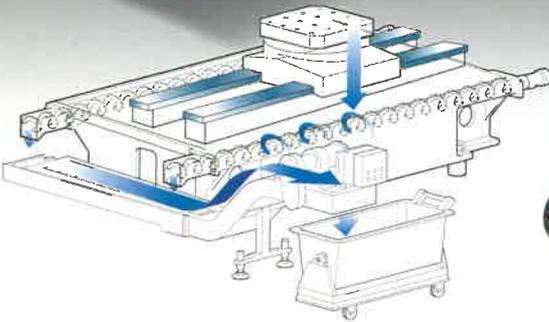


Separate chip conveyor and coolant tank provide easy cleaning and maintenance. The completely enclosed HM series virtually guarantees the confinement of chips and coolant to the inside of the machining area. Screw conveyors clearly remove the chips out of the machine.

Chip Conveyor

	Steel	Cast	Aluminum and nonferrous metals	Compound
Specifications				
Hinge type	○	×	×	×
Scraper type	×	○	△	○
Drum filter type	○	○	○	○

- : Available × : Unavailable △ : Asking for information
- Some types of chips may not be completely removed from the chip conveyor.
- Contact Doosan for more information.



Hinge type (std.)



Scraper type (opt.)



Drum filter type (opt.)



Coolant System

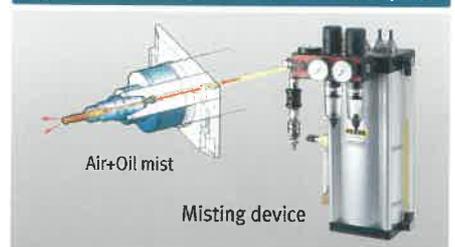
Through the Spindle (std.)



Flood coolant (std.)



Minimum Qty. Lubrication (opt.)



Shower coolant (opt.)



Oil mist collector (opt.)



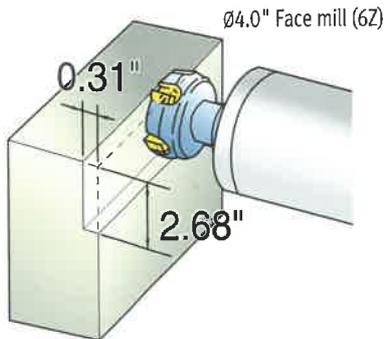
Coolant gun (opt.)



Cutting Performance

HM 500

Face mill Carbon steel (SM45C)



Machining rate

31 in³/min

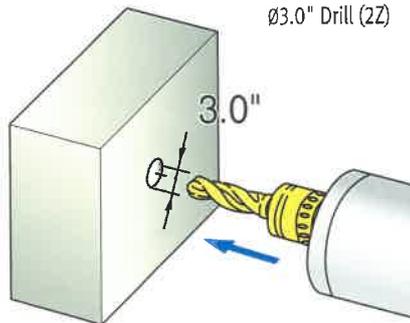
Spindle speed

624 rpm

Feedrate

37 in/min

Drill Gray casting (GC25)



Machining rate

6.5 in³/min

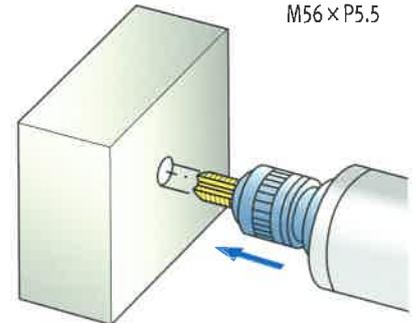
Spindle speed

1,825 rpm

Feedrate

5.4 in/min

Tap Gray casting (GC25)



Tool

M56 x P5.5

Spindle speed

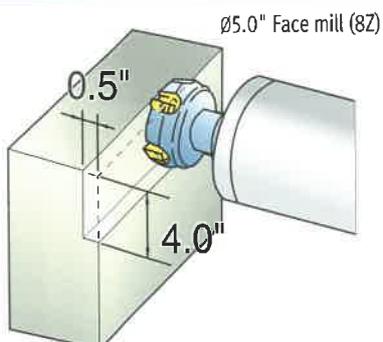
180 rpm

Feedrate

39 in/min

HM 630 / 800

Face mill Carbon steel (SM45C)



Machining rate

80 in³/min

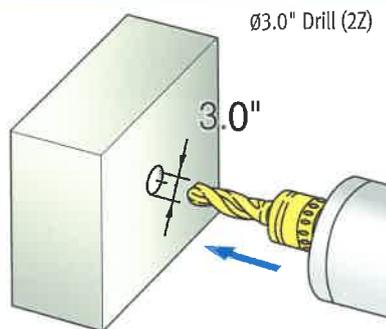
Spindle speed

1,200 rpm

Feedrate

40 in/min

Drill Gray casting (GC25)



Machining rate

29.3 in³/min

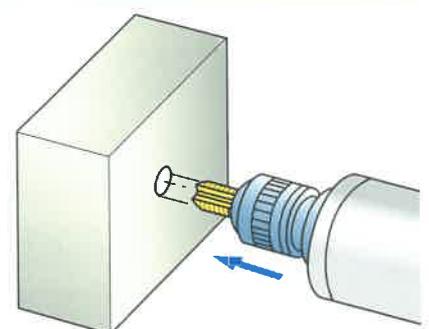
Spindle speed

320 rpm

Feedrate

12 in/min

Tap Carbon steel (SM45C)



Tool

M56 x P5.5

Spindle speed

120 rpm

Feedrate

26 in/min

Flexible Multi Pallet System

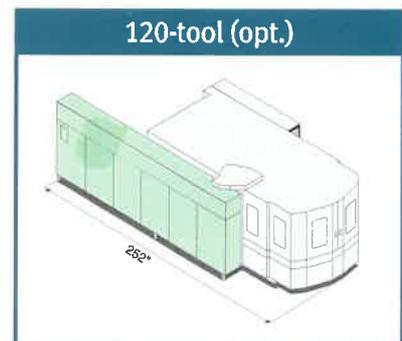
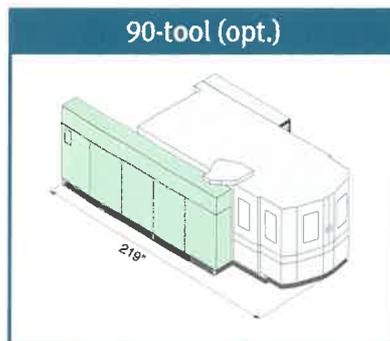
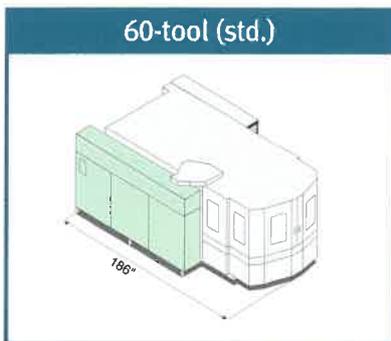
- High Productivity
- Flexible production solutions
- Increased efficiency
- Compact designed
- Easy to extend stations
 - HM500 : 7, 9, 11, 13st.
 - HM630 : 6, 8, 10, 12st.
 - HM800 : 6, 8, 10st.



■ 7-Station Round Type Multi Pallet Magazine

Tool magazine

Numerous Variations to meet production efficiency needs.

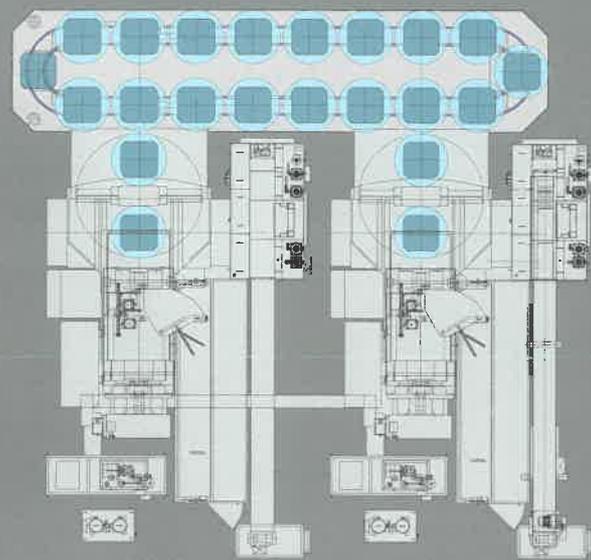


The dimension is HM500

Application of multi pallet system

Name	HM630 (2 sets)
Number of Setup Station	1
Storage Capacity (24.8 × 24.8)	17 station

Application technology of Multi-pallet system is the best solution for the high productivity in the machining shop.



HM630

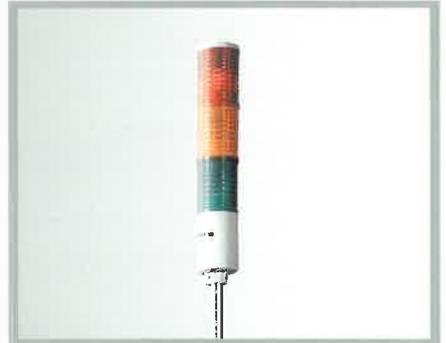
HM630

Standard Features

HM 500 / 630 / 800



Oil cooler & Hyd. unit



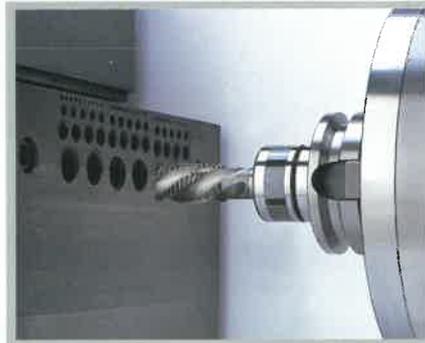
Operator call lamp (red/yellow/green)



FANUC 18i-M controller



Portable MPG



Rigid tapping



Work light



Chip conveyor



T-slot pallet

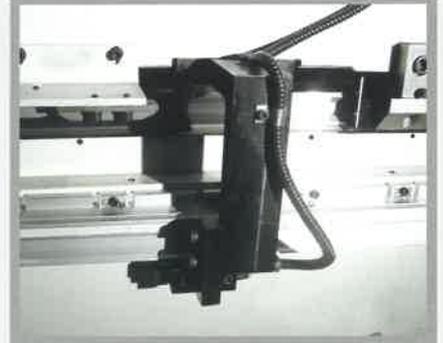
Optional Equipment



Multi pallet system



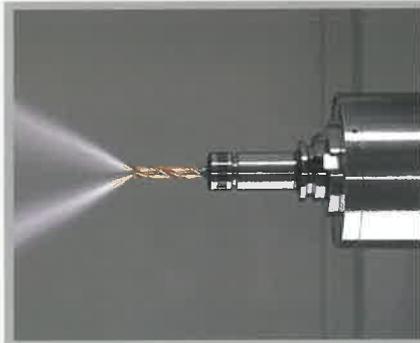
90/120/180/240 Tools



Linear scale feedback system



Shower coolant



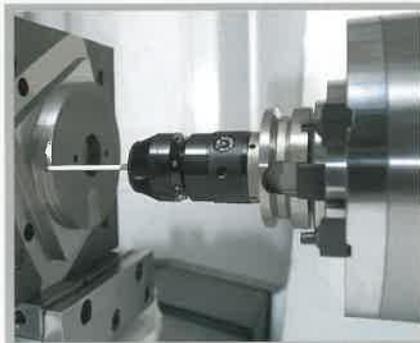
High pressure coolant system



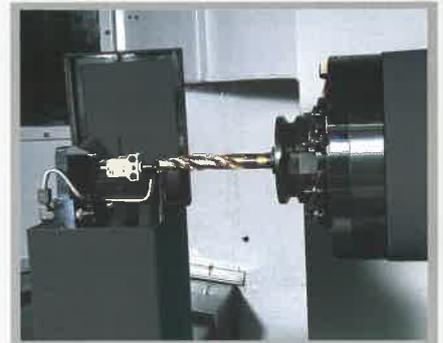
FMS



Built in Rotary Table (0.001°)



Automatic measuring system



Automatic tool length measurement with sensor

- Air gun
- Automatic door for APC guard
- Automatic power off
- CE certification
- Hydraulic line for fixture
- Oil skimmer
- Test bar
- Tool monitoring system

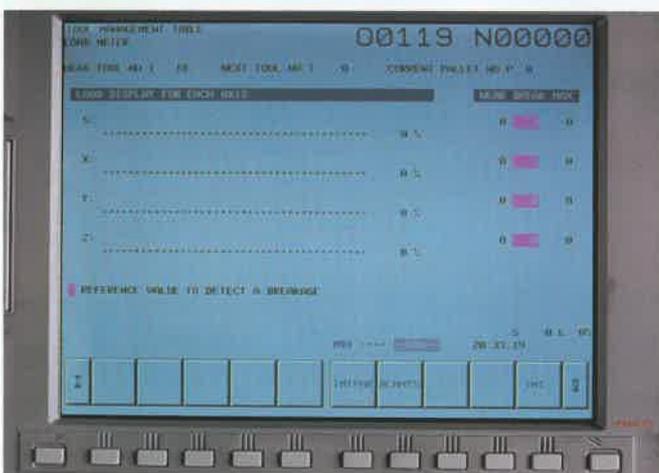
Optional Control Features



Tool Monitoring System (opt.)

Tool Monitoring System is one of safety functions to protect Tool and Spindle against a possible damage of abnormal load caused by tool wear and breakage or others. This system monitors the tool status during machine operation by detecting the abnormal load of each axis and spindle.

Tool load monitoring system



Tool management function



- The screen shows a tool and pallet No., load meter of each axis and spindle limit load.

- This functions consisted of tool pre-check function, substitutive tool selection with tool life management and different tool & port number command function.

EZ Guide i (opt.)

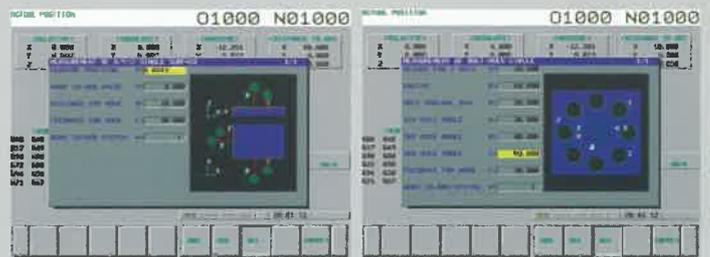


Standard Features

- High compact CNC is realized through LCD display with integrated CNC and a flash memory card interface is standard features.
- Provides many support functions for set-ups, such as tool measurement, workpiece measurement at the original point, and workpiece measurement inside the machine.
- Uses one display screen to perform all operations including programming, checking by animation, and real machining.
- User-Friendly Operation : Soft key Selection of Comprehensive Cycle Library

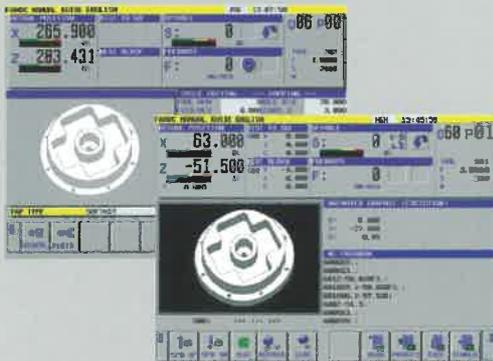
Machining preparation guide

In preparation for machining, simple instructions on a selected screen allow to measure the setting error of workpiece and tool offset value for automated adjustment.



Easy operation

One single screen provides handy operation guidance for programming through machine operation.



- For machining center, turning center and compound machine with milling and turning.
- Solid modeling provides high speed animation. (TFT-LCD Color Only)
- Icon menu soft-keys provide convenient programming for sophisticated milling and turning.
- Measurement cycles provide automatic offset measurement of workpiece (Available for machining center and for compound machine).

Machining condition selection

One single screen provides convenient operation & parameter setting for high speed and high precision machining instructions.



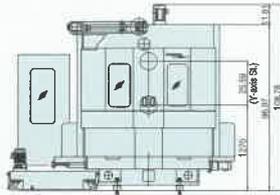
- Registration of parameter sets for high speed machining and/or for high precision machining with machine configurations.
- Instruction of precision level for desired machining selects appropriate parameters automatically.
- Precision level can be instructed through NC program.

External Dimensions

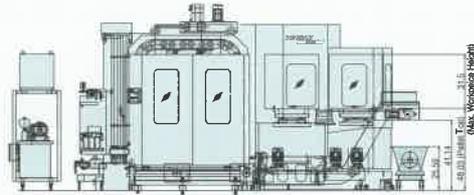
unit : inch

HM 500

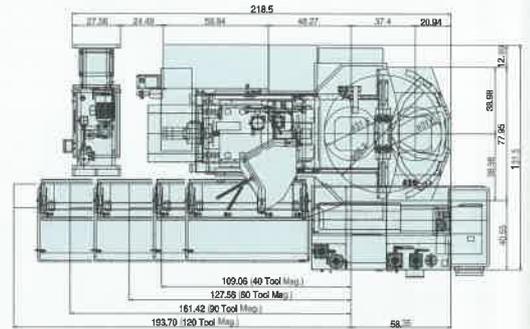
Front View



Side View

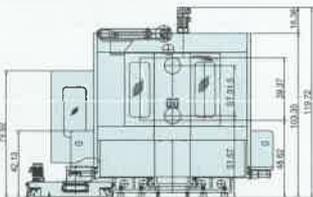


Top View

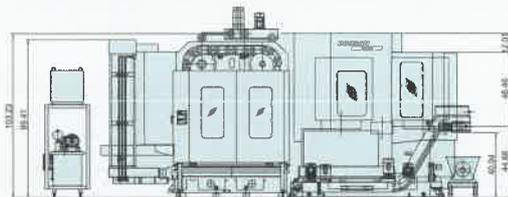


HM 630

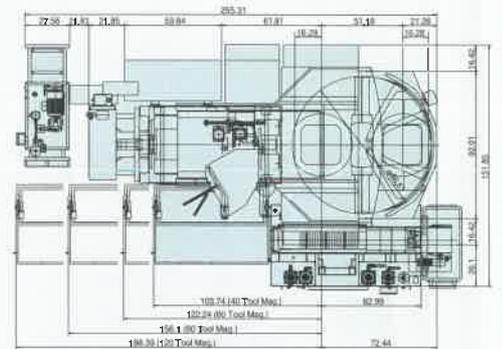
Front View



Side View

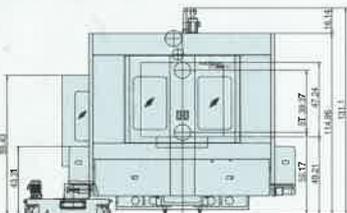


Top View

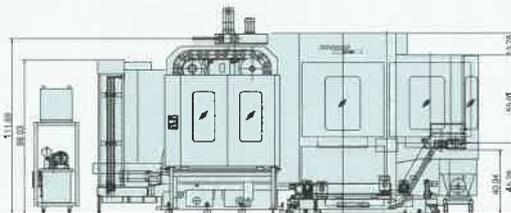


HM 800

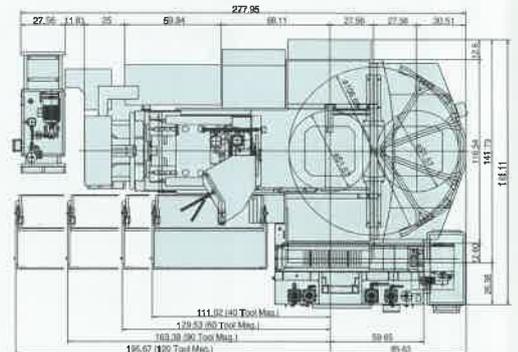
Front View



Side View



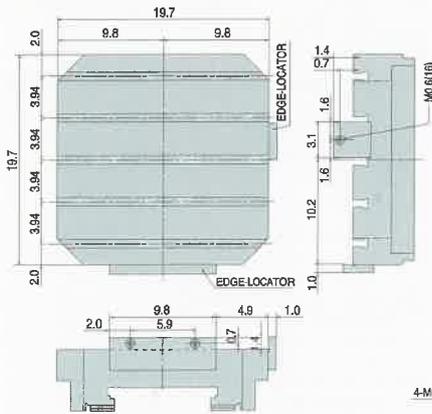
Top View



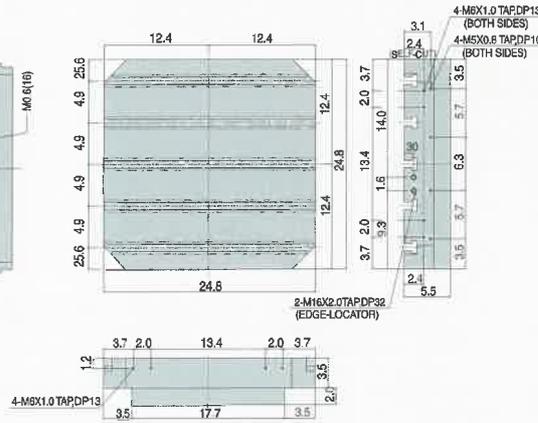
Pallet Dimensions

unit : inch

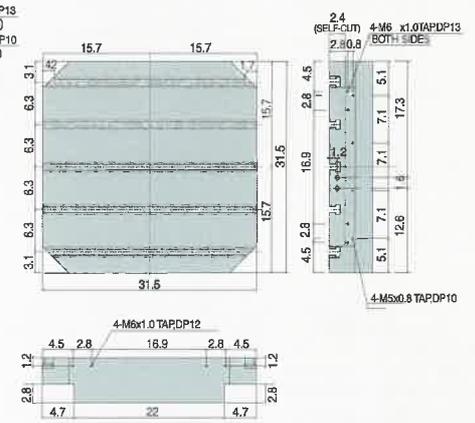
HM 500



HM 630



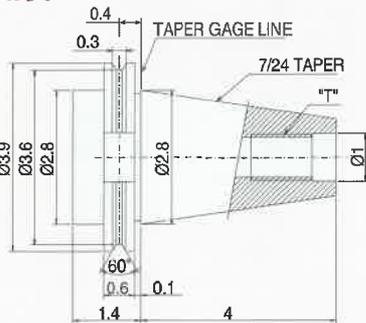
HM 800



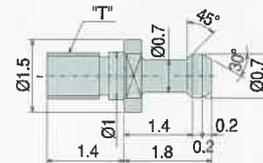
Tool Shank

unit : inch

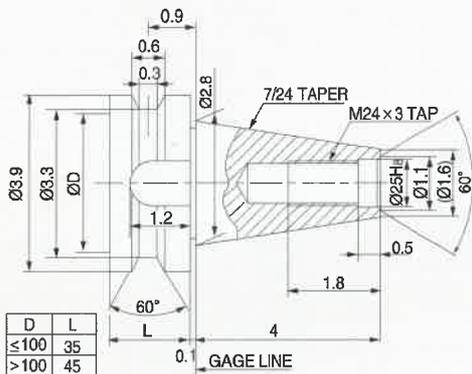
CAT50



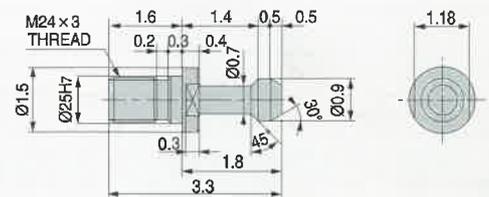
Modified CAT



BT50 (opt.)



MAS403 P50T-I(45°)



Machine Specifications

	Descriptions		HM 500	HM 630	HM 800
Travel	X-axis (longitudinal movement of table)	in.	31.5	39.4	49.2
	Y-axis (head vertical)	in.	25.6	31.5	39.4
	Z-axis (column cross)	in.	25.6	33.5	39.4
	Distance from table center to spindle gage line	in.	5.9 ~ 31.5	5.9 ~ 39.4	7.9 ~ 47.2
	Distance from table surface to spindle center	in.	2 ~ 27.6	3 ~ 34.4	3 ~ 42.3
Table	Pallet type		T-slot		
	Indexing degree		1° {0.001°}		
	Table loading capacity	lbs	1,764	2,640	3,520
	Pallet size	in.	19.7 × 19.7	24.8 × 24.8	31.5 × 31.5
Spindle	Max. spindle speed	rpm	6,000		
	Spindle taper		ISO#50, 7/24 Taper		
	Max.spindle torque	ft-lbs	738	1,237	
Feedrate	Rapid traverse rate (X / Y / Z)	ipm	945 / 945 / 945		
	Cutting feedrate	ipm	472		
Automatic tool changer	Type of tool shank		CAT50		
	Tool storage capacity		60 {90 / 120 / 180 / 240}		
	Max. tool diameter	in.	5.3		
	Max. tool diameter without adjacent tools	in.	9.8		
	Max. tool length	in.	15.7	21.7	
	Max. tool weight	lbs	33	55	
	Method of tool selection		Fixed addressed		
	Tool changing time (tool-to-tool)	sec	2.5		
	Tool changing time (chip-to-chip)	sec	8	8.5	9
Automatic pallet changer	Type		Rotary shuttle		
	Pallet change time	sec	14	25	29
	Pallet rotation in loading station		90° index		
	Number of pallets	EA	2		
Motor	Spindle drive motor (30 min.)	Hp	25	30	
	Feed motor (X / Y / Z / B)	Hp	2.8 / 5 / 5 / 1.9	5.1 / 6 / 2.8	5.1 / 6.7 / 6.7 / 2.8
Power source	Electrical power supply	kVA	50	65	
	Compressed air supply	psi	80		
Tank capacity	Coolant tank capacity	gallons	145		
	Lubrication tank capacity	gallons	1.5		
Machine size	Machine height	in.	109	120	131.1
	Floor space	in.	132 × 218	152 × 255	162 × 278
	Machine weight	lbs	29,700	39,600	44,000
Accuracy	Positioning accuracy	in.	±0.0002 / full stroke		
	Repeatability	in.	±0.00008		

Note : Dimensions in { } are optional.

• Design and specifications are subject to change without notice.

NC Unit Specifications (Fanuc 18i-M)

AXES CONTROL

- Controlled axes	4 (X,Y,Z,B)
- Simultaneously controllable axes	
- Positioning (G00) / Linear interpolation (G01) :	3 axes
- Circular interpolation (G02, G03) :	2 axes
- Backlash compensation	
- Emergency stop / overtravel	
- Follow up	
- Least command increment :	0.0001"
- Least input increment :	0.0001"
- Machine lock	all axes / Z axis
- Mirror image	Reverse axis movement (setting screen and M - function)
- Stored pitch error compensation	Pitch error offset compensation for each axis
- Stored stroke check 1	Overtravel controlled by software

INTERPOLATION & FEED FUNCTION

- 2nd reference point return	G30
- Circular interpolation	G02, G03
- Dwell	G04
- Exact stop check	G09, G61(mode)
- Feed per minute	in / min
- Feedrate override (10% increments)	0 - 200%
- Jog override (10% increments)	0 - 200%
- Linear interpolation	G01
- Manual handle feed(1 unit)	
- Manual handle feedrate	0.01/0.001/0.0001"
- Override cancel	M48 / M49
- Positioning	G00
- Rapid traverse override	F0 (fine feed), 25 / 50 / 100%
- Reference point return	G27, G28, G29
- Skip function	G31

SPINDLE & M-CODE FUNCTION

- M - code function	M 3 digits
- Spindle orientation	
- Spindle serial output	
- Spindle speed command	S5 digits
- Spindle speed override (10% increments)	10 - 150%

TOOL FUNCTION

- Cutter compensation C	G40, G41, G42
- Number of tool offsets	99 EA
- Tool length compensation	G43, G44, G49
- Tool number command	T3 digits
- Tool offset memory C	Geometry / Wear and Length / Radius offset memory

PROGRAMMING & EDITING FUNCTION

- Absolute / Incremental programming	G90 / G 91
- Auto. Coordinate system setting	
- Background editing	
- Canned cycle	G73, G74, G76, G80 - G89, G99
- Circular interpolation by radius programming	
- Custom macro B	
- Decimal point input	
- Extended part program editing	
- Helical interpolation	
- I / O interface	RS - 232C
- Inch / metric conversion	G20 / G21
- Label skip	
- Local / Machine coordinate system	G52 / G53
- Maximum commandable value	±99999.999mm (±9999.9999 inch)
- No. of Registered programs	125 EA
- Optional block skip	
- Optional stop	M01
- Part program storage	2,100 ft.
- Program number	O4-digits
- Program protect	
- Program stop / end	M00 / M02,M30
- Programmable data input	Tool offset and work offset are entered by G10, G11
- Rigid tapping	G84, G74
- Sub program	Up to 4 nesting

- Tape code	ISO / EIA Automatic discrimination
- Thread cutting	
- Work coordinate system	G54 - G59

OTHERS FUNCTIONS (Operation, Setting & Display, etc)

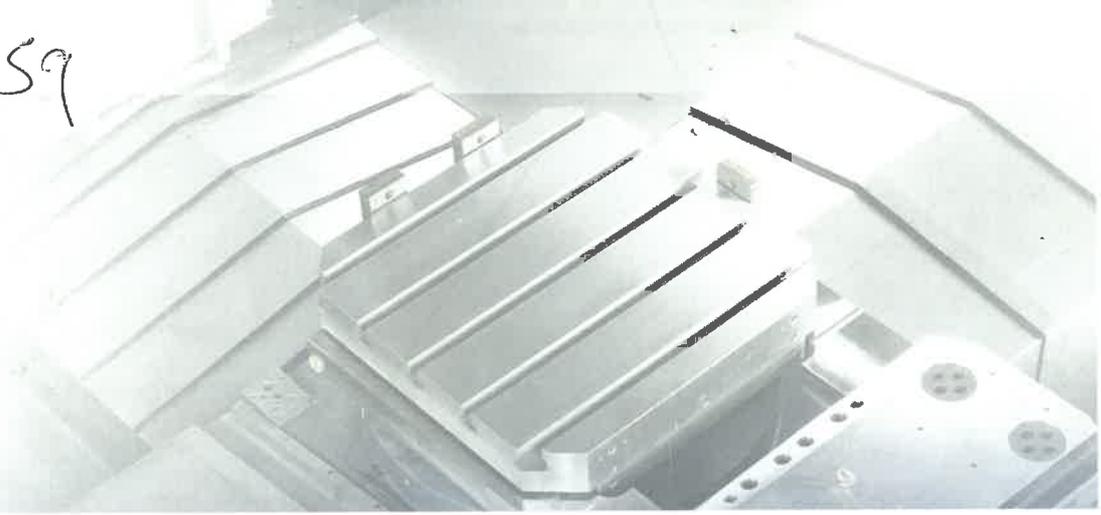
- Additional work coordinate system	G54.1 P1 - 48 (48 pairs)
- Alarm display	
- Alarm history display	
- Clock function	
- Cycle start / Feed hold	
- Display of PMC alarm message	Message display when PMC alarm occurred
- Dry run	
- Ethernet function(Embedded)	
- Graphic display	Tool path drawing
- Help function	
- Loadmeter display	
- MDI / DISPLAY unit	10.4" color LCD, Keyboard for data input, soft-keys
- Memory card interface	
- Operation functions	Tape / Memory / MDI / Manual
- Operation history display	
- Program restart	
- Run hour and part number display	
- Search function	Sequence NO. / Program NO.
- Self - diagnostic function	
- Servo setting screen	
- Single block	

OPTIONAL SPECIFICATIONS

- 3-dimensional coordinate conversion	
- 3-dimensional tool compensation	
- 3rd / 4th reference return	
- Addition of tool pairs for tool life management	128 / 512 pairs
- Additional controlled axes	max. 6 axes in total
- Additional work coordinate system	G54.1 P1 - 300 (300 pairs)
- AI HPCC* (High Precision Contour Control) with 64 bit Risc600 block preview	
- Automatic corner override	G62
- Chopping function	
- Coordinate rotation	G68, G69
- Cylindrical interpolation	G07.1
- Tool monitoring system	
- Data server	
- Dynamic graphic display	Machining profile drawing
- Exponential interpolation	
- EZ Guide i (Conversational Programming Solution)	
- F15 tape format	
- Figure copying	G72.1, G72.2
- Handle interruption	
- High speed skip function	
- Involute interpolation	G02.2, G03.2
- Look ahead control	G08
- Machining time stamp function	
- NANO AICC (AI Contour Control)	80 block preview
- No. of Registered programs	200 / 400 / 1,000 EA
- Number of tool offsets	200 / 400 / 499 / 999 EA
- Optional angle chamfering / corner R	
- Optional block skip addition	9 blocks
- Part program storage	4,200 ft.
- Playback function	
- Polar coordinate command	G15 / G16
- Polar coordinate interpolation	G12.1 / G13.1
- Programmable mirror image	G50.1 / G51.1
- Remote buffer	
- Scaling	G50, G51
- Single direction positioning	G60
- Stored stroke check 2 / 3	
- Tool life management	
- Tool position offset	G45 - G48

HM 500 / 630 / 800

HM 500/630/800



<http://infracore.com>

Sales & Support Network

ARGENTINA/Rosario **AUSTRALIA**/Melbourne/Sydney **AUSTRIA**/Vienna **BELGIUM**/Gullegem **BRAZIL**/Sao paulo **BULGARIA**/Sofia **CANADA**/Edmonton/Montreal/Toronto
/Vancouver **CHILE**/Santiago **CHINA**/Beijing/Chongqing/Guangzhou/Shanghai **COLOMBIA**/Bogota **CZECH**/Brno **DENMARK**/Randers **EGYPT**/Cairo **EL SALVADOR**/San Salvador
FINLAND/Tampere **FRANCE**/Annecy/Paris **GERMANY**/Dusseldorf **GREECE**/Athens **HONG KONG**/Kowloon **HUNGARY**/Budapest **INDIA**/Bangalore/Gurgaon/Pune
INDONESIA/Jakarta **ISRAEL**/Herzlia **ITALY**/Parma **MALAYSIA**/Puchong **MEXICO**/Guadalajara/Mexico City/Monterrey/Vera Cruz **NETHERLANDS**/Goorn
NEW ZEALAND/Auckland **NORWAY**/Oslo **PAKISTAN** /Islamabad **POLAND**/Krakow **PORTUGAL**/Lisbon **ROMANIA**/Bucharest **RUSSIA**/Moscow **SINGAPORE**/Singapore
SLOVENIA/Ljubljana **SOUTH AFRICA**/Kempton Park **SPAIN**/Barcelona **SWEDEN**/Stockholm **SWITZERLAND**/Zürich **TURKEY**/Istanbul **TAIWAN**/Taichung
THAILAND/Bangkok/Chonburi **U.A.E**/Sharjah **U. K.**/Leamington **U.S.A.**/Atlanta/Birmingham /Charlotte/Chicago/Cincinnati/Cleveland/Dallas/Denver/Detroit/Houston/Indianapolis
/Kansas City/Little Rock/Los Angeles/Milwaukee/Minneapolis/New Orleans/Norfolk/Philadelphia/Phoenix/Pittsburgh/Portland/Rochester/Salt Lake City/San Diego/San Francisco/Seattle
/Springfield/St. Louis/Tampa/Trenton/Tulsa **VENEZUELA**/Valencia **VIETNAM**/Ho Chi Minh City



Doosan Infracore
Machine Tools

Corporate Office & Technical Center : 8 York Avenue, West Caldwell, NJ 07006, U.S.A.
Tel : 973-618-2500 Fax : 973-618-2501

Midwest Technical Center : 1701 F Howard Street, Elk Grove Village, IL 60007
Tel : 847-437-1010 Fax : 847-437-1299

Western Technical Center : 488 W. Meats Ave. Orange, CA 92865
Tel : 714-974-1330 Fax : 714-974-5296

DIA Engineering Center : 14900 Galleon Drive, Plymouth, MI 48170
Tel : 734-416-8990 Fax : 734-416-8992

Design and specifications are subject to change without prior notice.

 DAI0711SP