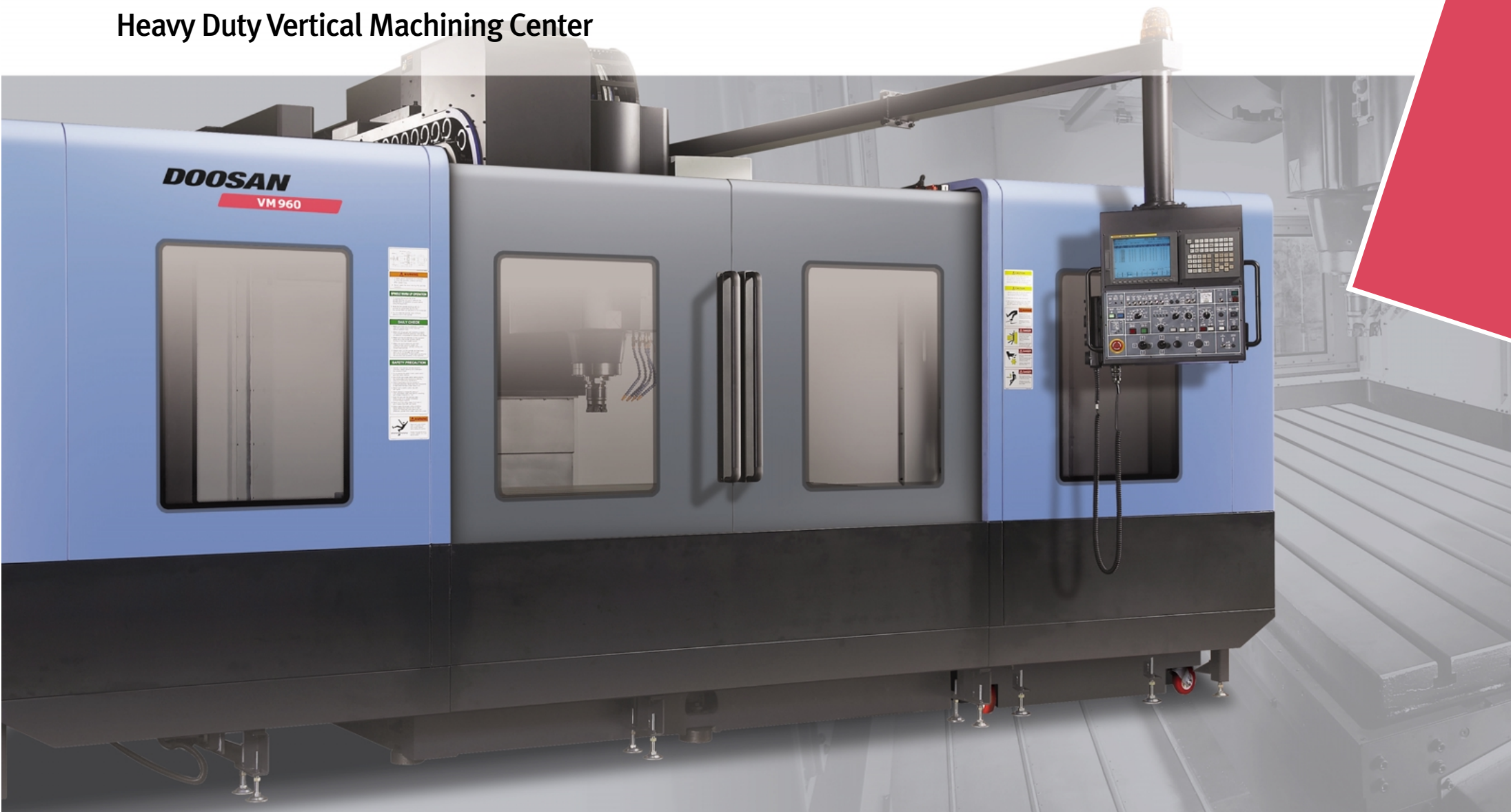
Doosan Infracore
Machine Tools

VM 750/960/1260

Heavy Duty Vertical Machining Center



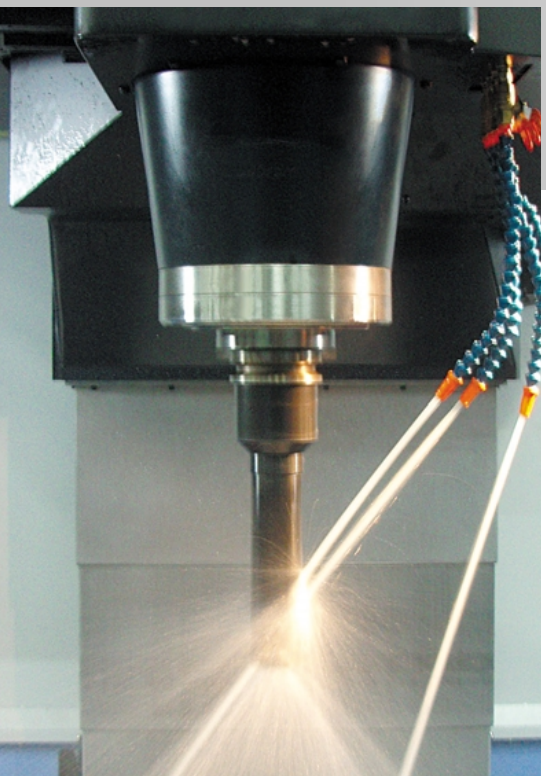
Heavy Duty Vertical Machining Center

New Series of Vertical Machining Center

VM 750/960/1260

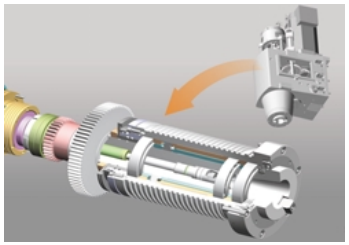
The VM 750/960/1260 series of Vertical Machining Centers are built to world-class standards to ensure world-class results. Its powerful drives, heavy duty construction and unsurpassed rigidly provide exceptional precision and years of trouble free performance.

Speed Spindle VM series



High speed spindle of high quality and rigidity
helps increase the efficiency and performance of the machine.

Gear Type



Max. spindle speed

6000 r/min

Motor (continuous / 30 min)

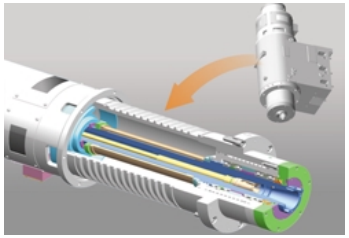
18.5 / 22 kW(25/30 Hp)

Powerful Cutting of Large Objects
Powerful processing capability of large objects with maximum torque of 561.54 N·m is offered with 2 stage gear drive.

Rigidity and Stability
Rigid angular contact bearing is adopted to assure rigidity and stability by maintaining the rigidity even during powerful cutting.

High Speed Tapping (Standard)
Standard adoption of rigid tap allows high speed tapping without the tap holder.

Built in Type opt.



Max. spindle speed

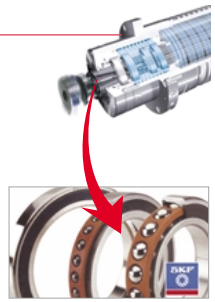
12000 r/min

Motor (continuous / 30 min)

30 kW(40 Hp)

Rigid and Precise Mandrel
Adoption of 100 diameter rigid ceramic bearing and oil supply (oil mist) method assure high precision even during the high speed rotation.

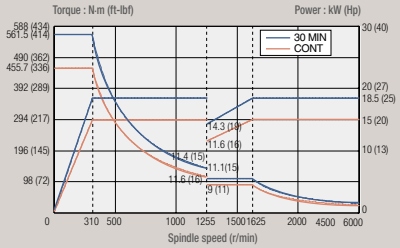
Highest Speed Mandrel in the Class
Adoption of low vibration built-in motor offers optimum molding with highest mandrel speed (12000 r/min) and highest torque of 419.44 N·m in the same class.



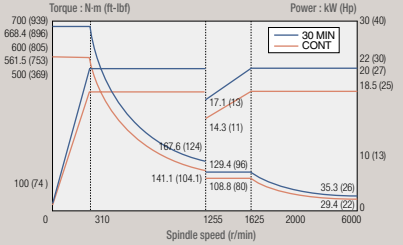
Spindle power-torque diagram

Gear type

VM 750/750L/960/960L - 6000 r/min

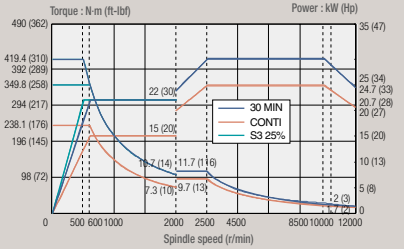


VM 1260 - 6000 r/min
VM 750/750L/960/960L - 6000 r/min opt.



Built in type

VM 750/750L/960/960L/1260 - 12000 r/min opt.



Machine Structure VM series

Stable bed and column assembles are designed for high speed and heavy duty machining.

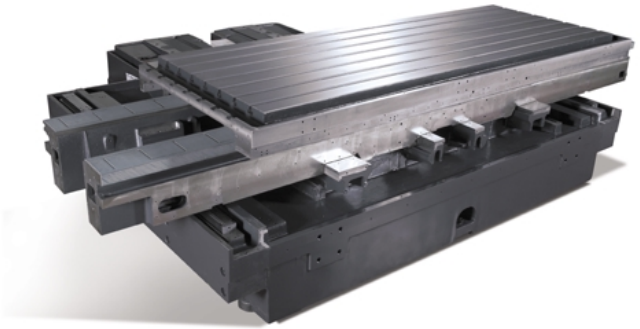
Machine Structure

Rigid Construction for heavy duty applications

- The rigidity is increased by rationally arranging the box type structure of bed, column and saddle.
- Rigidity and stability are assured with the wide box guide structure.
- The mandrel head is supported by the wide guide way for the stable cutting performance.
- Wide z-side slide and wide y-side transport support prevents skewing and makes it suitable for powerful, heavy cutting.

Exceptionally durable all in one single frame construction

The widely spaced bed slides are high frequency deep heat treated providing outstanding performance during heavy duty interrupted cutting operations.



Radial rib structure

The processing quality is improved as the weight is reduced and shaking with processing thrust during intermediate cutting is absorbed.

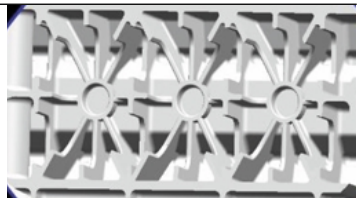
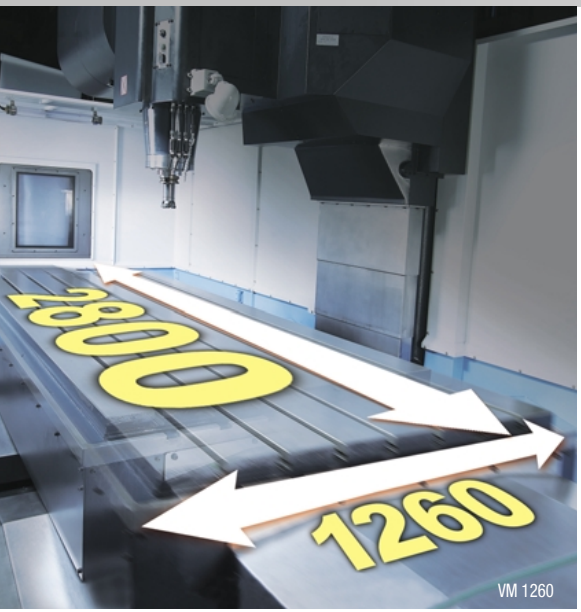
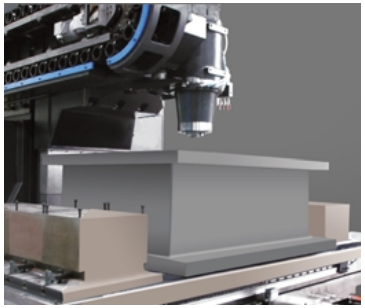


Table & Screw VM series

Stable bed and column assembles are designed for high speed and heavy duty machining.





Table

Cutting of wide and diverse work-pieces

The large size x-axis stroke, allows mounting and cutting of wider and more diverse work-pieces.

X x Y axis

1600 x 800 mm (63 x 31.5 inch) (VM 750)

2400 x 950 mm (94.5 x 37.4 inch) (VM 960)

2800 x 1260 mm (110.2 x 49.6 inch) (VM 1260)

Table loading capacity

3000 kg (6613.8 lb) (VM 750)

4000 kg (8818.4 lb) (VM 960)

8000 kg (17636.7 lb) (VM 1260)

Rapid Traverse

All guideways are wide box type for unsurpassed long-term rigidity and accuracy. The guideways are induction hardened and precision ground. Fluroplastic resin, Rulon® 142, is boned to the mating surfaces and then hand scraped to ensure perfect fit and tolerances. The fluroplastic resin with the forced way lubrication combine to provide a low friction surface and virtually eliminates guide wear. All guideways are fully protected from chips and damage.

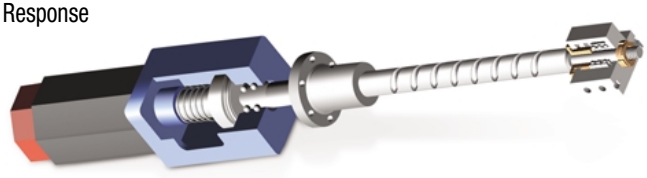
Rapid traverse rate (VM 750/960/1260)

20 / 16 / 12 m/min (787.4 / 629.8 / 472.4 ipm)

Ball Screw & Driver

Large diameter ball screw for powerful cutting

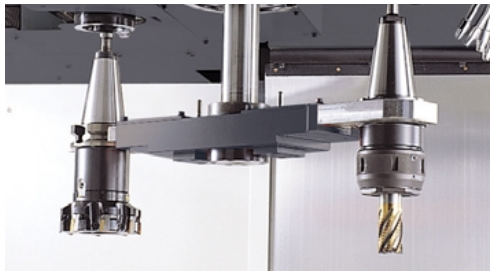
- Double Edge Fixed Type Transport Structure
- Double Anchor Method of High Accuracy Pretension
- Fast Response



Minimized Non Cutting Time

Faster tool change time using cam increases productivity than previous model.

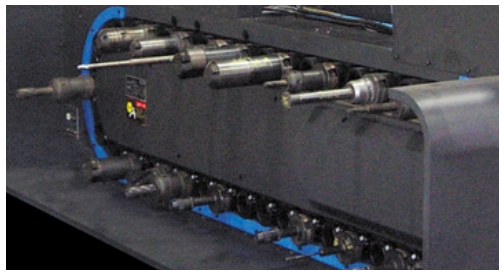
Automatic tool changer



Tool change time (T-T-T)

3.0 s

Tool magazine



Tool storage capacity

30 tools (VM 750/960)

40 tools (VM 1260)

Oil Cooler Unit

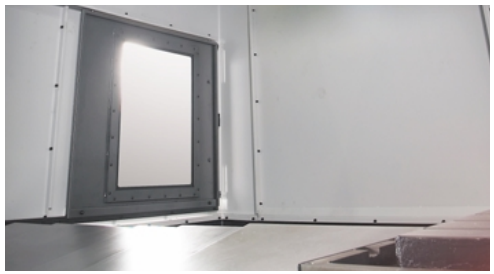
Oil cooler unit to maintain the best spindle.

- Thermal displacement of the mandrel is minimized at the highest rotational speed (after 30 min. pre-heating)
- Since the oil jacket around the mandrel and heat generation parts of all moving units have the forced circulation of cooling lubricant of the oil cooling system, the whole mandrel maintains the uniform temperature to ensure high precision even during the high speed rotation.
- Temperature control within deviation of ±0.1˚ is offered through the method of stopping the cooler using Daikin inverter oil-cooler and temperature control using other flow rate control.

A refrigerated spindle cooling system circulates cooling oil to maintain a constant temperature for high accuracy, regardless of the ambient temperature or cutting condi tions.

Eco Friendly & Ergonomic

Side windows



Total of 6 large windows in the front and side areas ensures the operator to check the work space from anywhere so that the problem generated during the work can be resolved early.

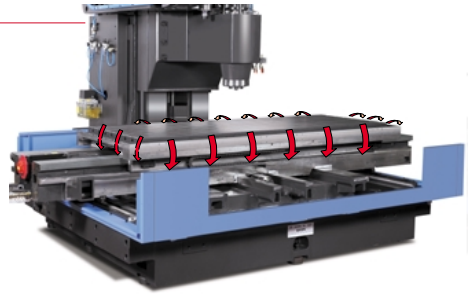
Top windows

Bright work environment is featured using the splash guard roof window provide the clean environment.

• VM 1260 : opt.

Easy Chip Disposal

Proper disposal of cutting chips greatly affects productivity. During machining, the screw type chip conveyors provided as standard equipment, move chips to the chip buckets through the chip con veyor at the side of the machine.



• VM1260 : Front type chip conveyor

High Productivity VM series

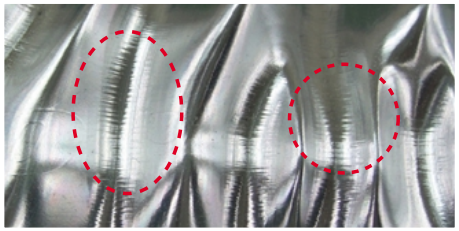
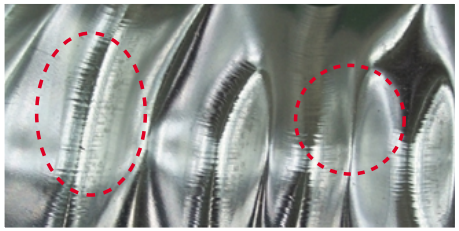
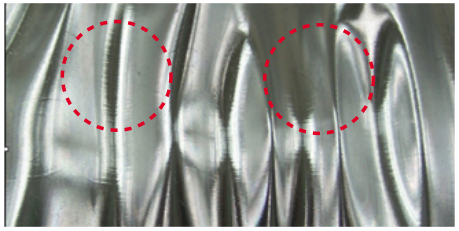
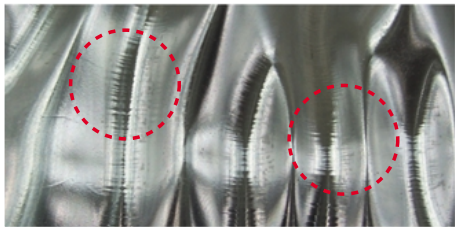
Basic concept structure and operation ensure its capability to get the best results of productivity regardless of any conditions and complexities

Doosan's Exclusive [DSQ] High Speed Precision Processing

DSQ-Xplus improves productivity and molding processing quality by allowing individual tuning customized to the machine, high speed processing of the large capacity program, and enhanced order complying capability on the basis of stable structure of Doosan VM Series.

Machining condition selection

Actual Application

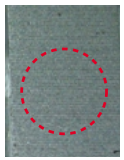
DOOSAN	Other Matters
Roughing [21% time improvement]	Roughing [15% time improvement]
	
Finish Cutting [Better finish cutting quality compared to the competing products]	Finish Cutting [Finish cutting quality difference (insignificant)]
	

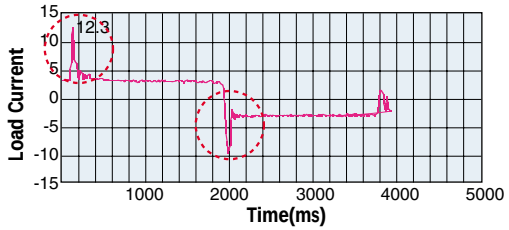
• By allowing the selection of the final processing condition, the processing quality and time are improved.

Weight balancer

Maintenance of Uniform Molding Processing Quality by Automatically Detecting the Part Weight

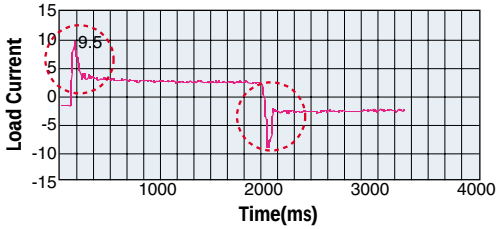
before





Generation of wave pattern on the processing surface with vibration at the processing beginning point / Long lasting servo current change excitation

after



Uniform brightness on the processing surface by applying Weight Balancer function / Reduced servo current change excitation

Screen

ATC guidance std.

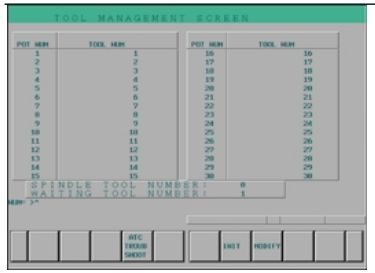
The newly developed software will increase the work efficiency (standard).

ATC guidance screen (ATC trouble shooting guidance)

How to be returned ATC arm to its original position when the tool replacement is terminated without completion during ATC rotation. It was developed to display the work sequence on the screen so that the end users can solve the problem without the help of A/S personnel.

[Features] Guidance screen automatic conversion during the ATC alarm / Alarm cancelation sequence flow the same class.

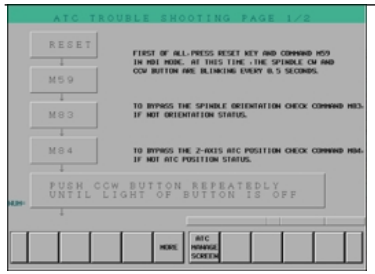
Tool number display (magazine data / tool setting function)



The user can view and change the tool number on the screen port without having to see the tool mounted on the magazine.

[Features] Tool number editing / Tool data one shot initialization

M code guidance screen (M code help)



The function resolves the problem of having to refer to the manual to check the M code during program manufacturing.

Alarm guidance opt.

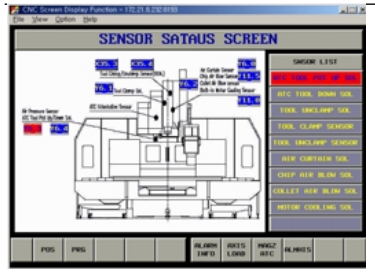
The newly developed software will increase the work efficiency (standard).

ATC guidance screen (ATC trouble shooting guidance)

The function prints the cause of alarm when it is generated, response method, and ladder tracking reference address.

Features] Function implemented by non PC-NC / Maintenance manual embedded

Solenoid / Sensor / Switch operation status display



The solenoid, sensor and switch statuses are monitored in real-time, and the sensor address, location and type are visually displayed when an abnormal situation occurs.

[Features] Function implemented by non PC-NC / SOL location and status in GUI displayed

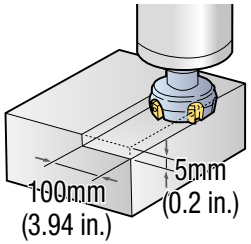
Machine Capacity

Provides high-productivity and high-accuracy in a variety of machining operations

VM 1260 [12000 r/min]

Face mill — Carbon steel (SM45C)

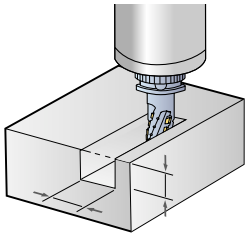
• ø125mm (4.92 in.) Face mill (8Z)



Machining rate
660 cm³/min (40.3 in³/min)
Spindle speed
500 r/min
Feedrate
1660 mm/min (65.4 ipm)

End mill — Carbon steel (SM45C)

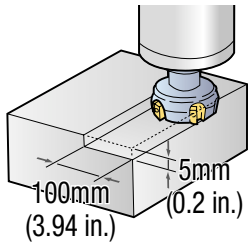
• ø 63mm (2.5 in.) Endmill (4Z)



Machining rate
635 cm³/min (38.8 in³/min)
Spindle speed
500 r/min
Feedrate
320 mm/min (12.6 ipm)

Face mill — Gray casting (GC25)

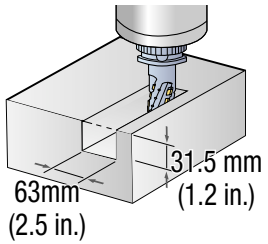
• ø125mm (4.92 in.) Face mill (8Z)



Machining rate
1260 cm³/min (77 in³/min)
Spindle speed
500 r/min
Feedrate
2520 mm/min (99.2 ipm)

End mill — Gray casting (GC25)

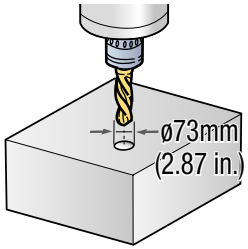
• ø 63mm (2.5 in.) Endmill (4Z)



Machining rate
1012 cm³/min (61.8in³/min)
Spindle speed
500 r/min
Feedrate
320 mm/min (12.6 ipm)

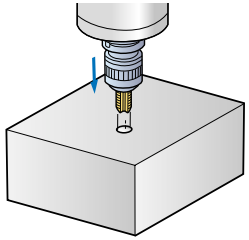
Drill — Carbon steel (SM45C)

• ø73mm (2.87 in.) Drill (2Z)



Spindle speed
500 r/min
Feedrate
140 mm/min (5.5 ipm)

Tap — Carbon steel (SM45C)

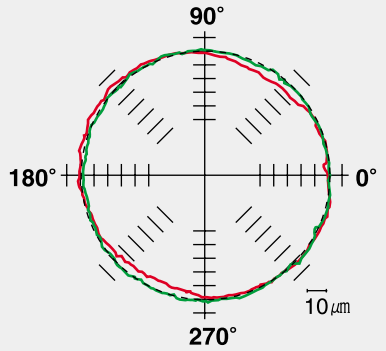


Tool
M42 x P4.5
Spindle speed
400 r/min

A standard rigid tapping function allows synchronized, high-speed tapping. This eliminates the need for special tap holders.

Machining Accuracy

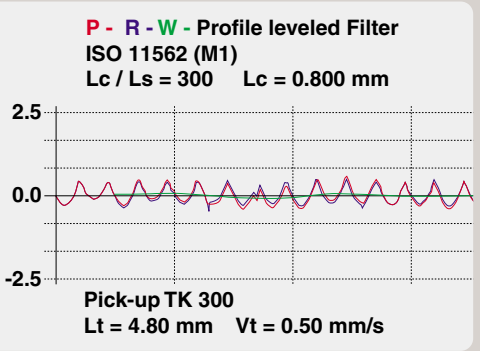
For increased repeatability and reliability



Roundness

8.2 μm

- Model : VM 750 / 900 / 1260
- Material : Al6061
- Tool : ø10mm (ø0.39 inch) (Endmill : 3Z)



Roughness

Ra 0.22 μm

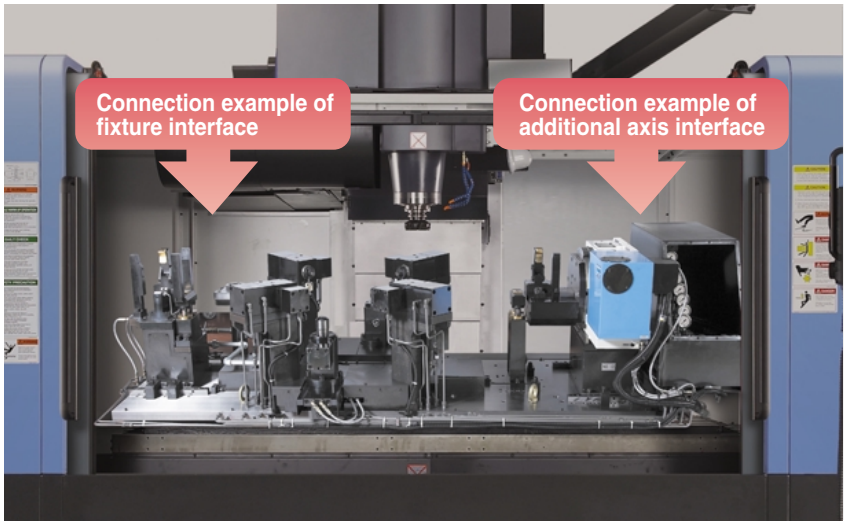
- Spindle speed : 6000 r/min
- Feedrate : 900 mm/min (359.4 ipm)

• The results indicated in this catalog may not be obtained due to differences in environmental conditions during measurement and cutting conditions.

Optional Equipment VM series

Operator's convenience and operability

Interface for Additional Axis



In case of additional axis, Hydraulic unit may be additionally necessary according to rotary table specification. Hydraulic power unit is an optional accessary for rotary table and hydraulic fixture line.

Recommandable rotary table size : VM 750/750L : ø320 mm (12.6 inch)
VM 960/960L : ø500 mm (19.7 inch)
VM 1260 : ø500 mm (19.7 inch)

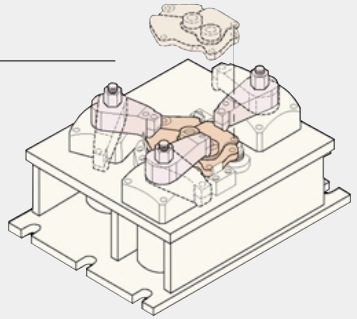
Fixture check list (for hydraulic / pneumatic fixtures)

Pressure source
- Hydraulic ☐P/T ☐A/B
- Pneumatic ☐P/T ☐A/B

Number of ports
- ☐1pair (2-PT 3/8" port)
- ☐2pair (4-PT 3/8" port)

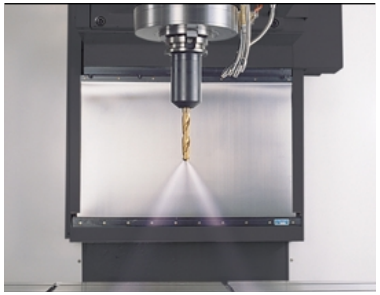
Hydraulic power unit
- Supply scope : ☐ User ☐ Doosan

(Please check the below detail specification, if you want to supply Doosan)
- ☐ Use Doosan standard unit
  24 L/min (45 bar)
- ☐ Special requirement
  _____ L/min (gal/min) at _____MPa (psi)



• Contact Doosan for more information

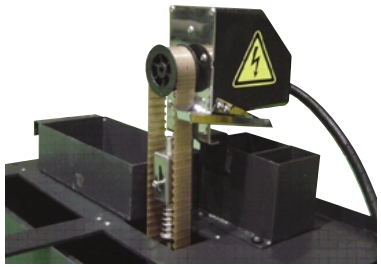
Through the spindle coolant



Minimum quantity lublication

Misting device

Oil skimmer

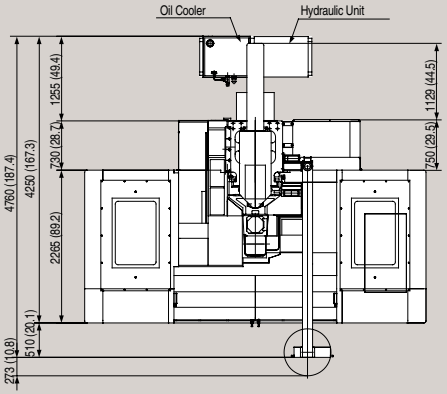


External Dimensions

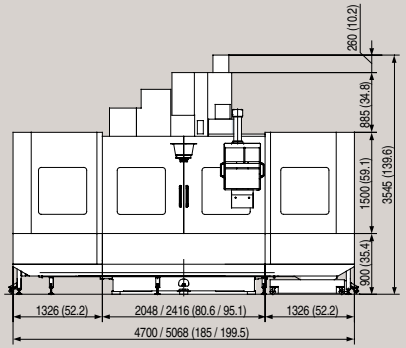
Unit : mm (inch)

VM 750/750L

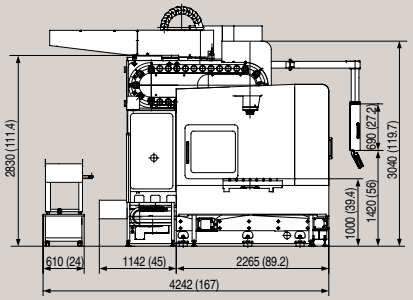
Top View



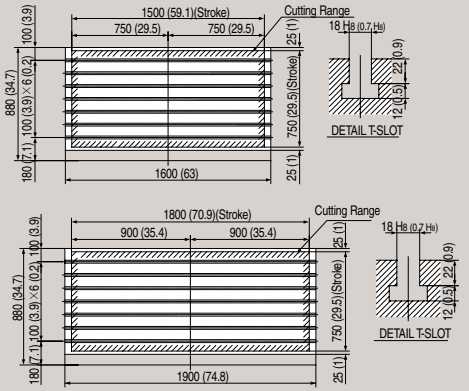
Front View



Side View

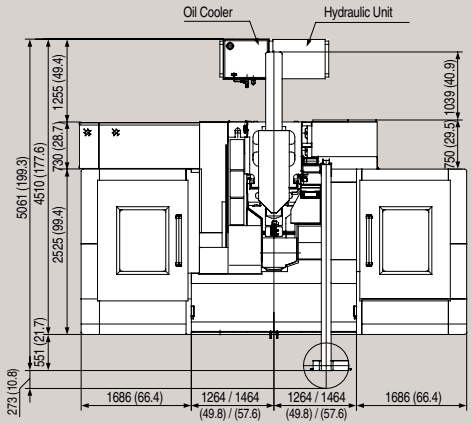


Table

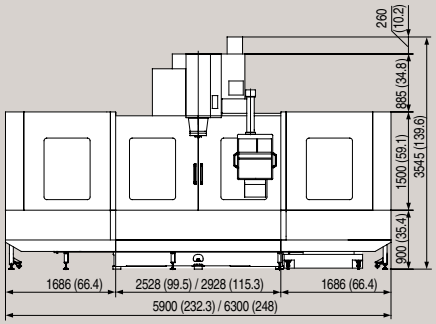


VM 960/960L

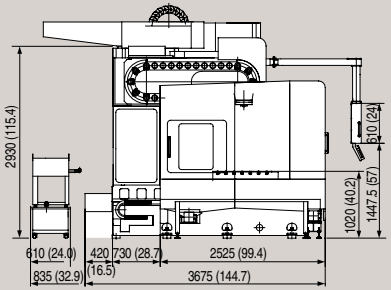
Top View



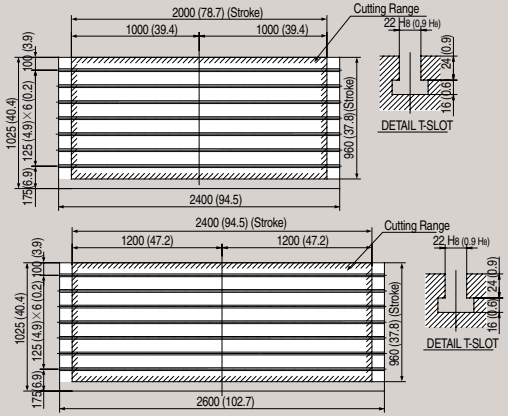
Front View



Side View



Table

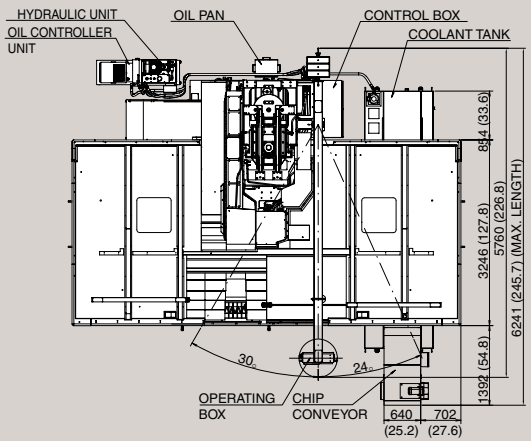


External Dimensions

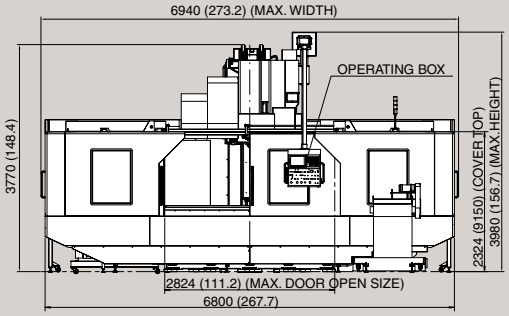
Unit : mm (inch)

VM 1260

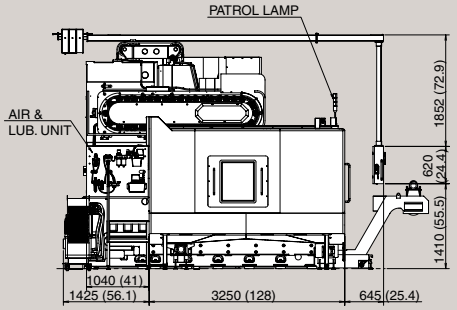
Top View



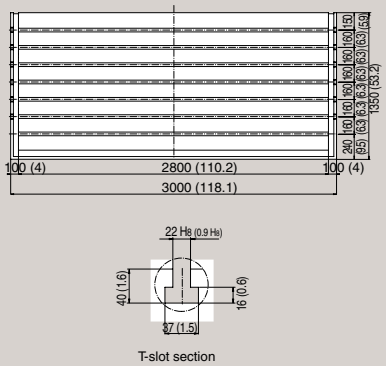
Front View



Side View



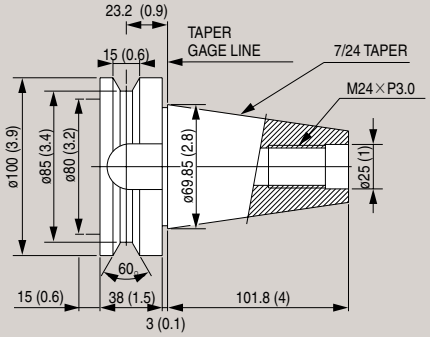
Table

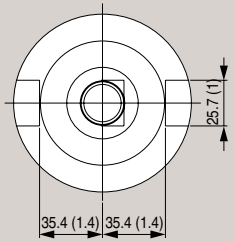


Tool Shank

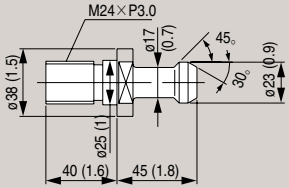
BT50

MAS403P BT 50 _ Standard

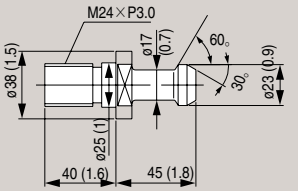




MAS403P50T-I(45) _ Standard



MAS403P50T-II(60) _ Option



Machine Specifications

	Features		VM 750	VM 750L	VM 960	VM 960L	VM 1260
Travel	X-axis	mm (in.)	1500 (59.1)	1800 (70.9)	2000 (78.7)	2400 (94.5)	2500 (98.4)
	Y-axis	mm (in.)	750 (29.5)		960 (37.8)		1260 (49.6)
	Z-axis	mm (in.)	800 (31.5)				900 (35.4)
	Distance from spindle nose to table top	mm (in.)	200 -1000 (7.9-39.4)				200 -1100 (7.9-43.3)
	Distance from spindle center to column guideway	mm (in.)	865 (34.1)		1005 (39.6)		1320 (52)
Table	Table size	mm (in.)	1600 (63) x 800 (31.5)	1900 (74.8) x 800 (31.5)	2400 (94.5) x 950 (37.4)	2600 (102.4) x 950 (37.4)	2800 (110.2) x 1260 (49.6)
	Table loading capacity	kg (lb)	3000 (6613.8)	3500 (7716.1)	4000 (8818.4)	4500 (9920.7)	8000 (17636.7)
	Table surface		7-100 x 18H8		7-125 x 22H8		7-160 x 22H8
Spindle	Max. spindle speed	r/min	6000 {12000}				
	Spindle taper		ISO#50 7/24 Taper				
	Max. spindle torque	N·m (ft-lbs)	561.5 (414.4)				668.4 (493.3)
Feedrate	Rapid traverse rate(X/Y/Z)	m/min (ipm)	20 / 20 / 20 (787.4 / 787.4 / 787.4)		16 / 16 / 16 (629.9 / 629.9 / 629.9)		12 (472.4)
	Cutting feedrate	mm/min (ipm)	10000 (393.7)		8000 (315)		6000 (236.2)
Automatic tool changer	Type of tool shank		MAS403 BT50				
	Tool storage capacity		30		30 {40}		40
	Max. tool diameter	mm (in.)	ø125 (4.9)				
	Max. tool diameter without adjacent tools	mm (in.)	ø230 (9.1)				
	Max. tool length	mm (in.)	350 (13.8)				
	Max. tool weight	kg (lb)	15 (33.1)				
	Method of tool selection		Memory Random				
	Tool change time (tool-to-tool)	s	3				
	Tool change time (chip-to-chip)	s	6		8		
Motor	Spindle motor (30min)	kW (Hp)	18.5 (24.8) {30 (40.2)}		18.5 (24.8) {22/26/30 (29.5/34.9/40.2)}		22 (29.5)
	Feed motor (X/Y/Z)	kW (Hp)	7 / 7 / 7 (9.4 / 9.4 / 9.4)			9 / 9 / 7 (12.1 / 12.1 / 9.4)	
Power source	Electric power supply (Rated Capacity)	kVA	60 {70}				65 {73}
	Compressed air supply	Mpa (psi)	0.54 (78.3)				
Tank capacity	Coolant tank capacity	L (galon)	480 (126.8)				800 (211.4)
	Lubrication tank capacity	L (galon)	3.1 (0.8)				
Machine size	Machine height	mm (in.)	3545 (139.6)				3980 (156.7)
	Machine dimension (L x W)	mm (in.)	5075 x 4830 (199.8 x 190.2)	5075 x 5190 (199.8 x 204.3)	5365 x 6055 (211.2 x 238.4)	5365 x 6455 (211.2 x 254.1)	5760 x 6940 (226.7 x 273.2)
	Machine weight	kg (lb)	15100 (33220)		25000 (55115)	26000 (57320)	30000 (66130)

- Design and specifications are subject to change without notice.
- Doosan is not responsible for difference between the information in the catalogue and the actual machine.

Note : { } are optional.

Standard Feature

- Assembly & operation tools
- Automatic power off
- Coolant tank & chip conveyor ready
- Fanuc 31i-A controller
- Full enclosure splash guard
- Installation parts
- Oil cooler & spindle head cooling system
- Operator call lamp
- Portable 3MPG
- Screw conveyor
- Work light

Optional Feature

- 4th axis preparation
- Auto door
- Automatic measuring system
- Automatic tool length measurement with sensor
- Chip conveyor
- Chip bucket
- Electric power transformer
- Oil skimmer
- Shower coolant
- Test bar
- Through-the-spindle coolant system
- Top cover (VM 1260)
- Rotary table
  ø320mm (12.6 inch) (VM 750/750L)
  ø500mm (19.7 inch) (VM 960/960L/1260)

NC Unit Specifications (FANUC 31i-A)

AXES CONTROL

- Controlled axes	3 (X,Y,Z)
- 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 :	0.001mm / 0.0001"
- Least input increment :	0.001mm / 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	mm / min
- Feedrate override (10% increments)	0 - 200 %
- Jog override (10% increments)	0 - 200 %
- Linear interpolation	G01
- Manual handle feed 1 unit	
- Manual handle feed 2/3 unit	
- Manual handle feedrate	0.1/0.01/0.001mm
- Override cancel	M48 / M49
- Positioning	G00
- Rapid traverse override	F0 (fine feed), 25 / 50 / 100 %
- Reference point return	G27, G28, G29
- Skip function	G31
- Helical interpolation	
- DSQ1(AICC II + Machine condition selection function)	
	200 block preview
- Thread cutting, synchronous cutting	
- Program restart	
- Automatic corner deceleration (Specify AI Contour control II)	
- Feedrate clamp by circular acceleration	
- Linear ACC/DEC before interpolation (Specify AI Contour control II)	
- Linear ACC/DEC after interpolation	
- Control axis detach	
- Rapid traverse bell-shaped acceleration/deceleration	
- Smooth backlash compensation	

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)	50 - 150 %
- Spindle output switching	
- Retraction for rigid tapping	
- Rigid tapping	G84, G74

TOOL FUNCTION

- Tool nose radius compensation	G40, G41, G42
- Number of tool offsets	64 ea
- Tool length compensation	G43, G44, G49
- Tool number command	T2 digits
- Tool life management	
	Geometry / Wear and Length / Radius offset memory
- Tool offset memory C	
- Tool length measurement	

PROGRAMMING & EDITING FUNCTION

- Absolute / Incremental programming	G90 / G91
- Auto. Coordinate system setting	
- Background editing	
- Canned cycle	G73, G74, G76, G80 - G89, G99
- Circular interpolation by radius programming	
- Custom macro B	
- Custom size 512Kb	
- Decimal point input	
- 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	500 ea
- Optional stop	M01
- Part program storage	640 m
- 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
- Sub program	Up to 4 nesting
- Tape code	ISO / EIA Automatic discrimination
- Work coordinate system	G54 - G59
- Additional work coordinate system(48 Pair)	G54.1 P1 - 48 pairs
- Coordinate system rotation	G68, G69
- Extended part program editing	
- Optional angle chamfering / corner R	
- Macro executor	

OTHERS FUNCTIONS (Operation, Setting & Display, etc)

- 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(Embeded)	
- Graphic display	Tool path drawing
- Help function	
- Loadmeter display	
- MDI / DISPLAY unit	
	10.4" Color TFT 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	
- External data input	
- Multi language display	

OPTIONAL SPECIFICATIONS

- 3-dimensional coordinate conversion	
- 3-dimensional tool compensation	
- 3rd / 4th reference return	
- Addition of tool pairs for tool life management	1024 pairs
- Additional controlled axes	max. 6 axes in total
- Additional work coordinate system	G54.1 P1 - 300 (300 pairs)
- DSQ 2	200 block preview (AICC II + Machine condition
	selection function + Data server + 1GB)
- DSQ 3	600 block preview
(AICC II with High speed processing + Machine condition selection	
function + Data server + 1GB)	
- Automatic corner override	G62
- Chopping function	G81.1
- Cylindrical interpolation	G07.1
- Dynamic graphic displayMachining profile drawing	
- Exponential interpolation	
- Interpolation type pitch error compensation	
- EZ Guide i (Doosan infracore Conversational Programming Solution)	
	with 10.4" Color TFT LCD
- Increment system 1/10	
- Figure copying	G72.1, G72.2
- High speed skip function	
- Involute interpolation	G02.2, G03.2
- Machining time stamp function	
- No. of Registered programs	1000 ea
- Number of tool offsets	99 / 200 / 400 / 499 / 999 / 2000 ea
- Optional block skip addition	9 blocks
- Part program storage	1280 / 2560 m
- Playback function	
- Polar coordinate command	G15 / G16
- Polar coordinate interpolation	G12.1 / G13.1
- Programmable mirror image	G50.1 / G51.1
- Single direction positioning	G60
- Stored stroke check 2 / 3	
- Tool load monitoring function (doosan)	
- Tool position offset	G45 - G48
- Position switch	

VM 750/960/1260

Heavy Duty Vertical Machining Center

Doosan Infracore
Machine Tools

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