DOOSAN

DNM series

Global Standard Vertical Machining Center

DNM series

DNM 4500/4500L
DNM 5700/5700L
DNM 6700/6700L/6700XL

MACHINE GREATNESS™

DNM series

Building on the history of the well proven and successful DNM and DNM II series, the new version DNM series boasts even greater reliability and performance. In addition, the new series includes grease lubrication to the roller guideways for more environmental-friendliness. The design concepts of the DNM 4500/5700/6700 series are high speed, high rigidity and suitability for universal applications. Standard features are the largest machining space in its class, direct coupled spindle, roller guideways and thermal error compensation to provide optimum precision.

Contents

A highly versatile vertical machining center offering the largest machining space in its class

- DNM series provides a larger table with increased Y axis travel and maximum table load.
- Doosan machine tools offer X-axis extension version for DNM 4500L, 5700L, 6700L/XL to enhance customer's machine variation.

Standard Direct-Coupled Spindle for Higher Productivity

- The direct coupled spindle reduces vibration and noise, thereby improving the machines performance and environmental-friendliness compared to belt drive type.
- High torque and High speed spindle are available to meet material of workpiece.
- Higher productivity is achieved by reducing tool change time and improving all axes feed system acc/dec times.

An environmental-friendly machine designed for stable and easy operation

- Thermal error compensation function fitted as standard optimizes machine accuracy by reducing the effects of heat build-up during extended periods of operation.
- The EOP function can be checked in the pop-up window on the NC main screen for convenient machine operation.
- Grease lubrication for axis roller guideways is a standard feature and reduces contamination of the operator's environment.

Basic structure

Designed as a highly stable, rigid structure, the new DNM series offers a wide line-up from 400 to 670 mm in the Y axis, enabling the user to handle a wider range of workpieces.

Travel distance (X x Y x Z axis)

DNM 4500/L

800{910} x 450 x 510 mm

(31.5{35.8} x 17.7 x 20.1 inch)

DNM 5700/L

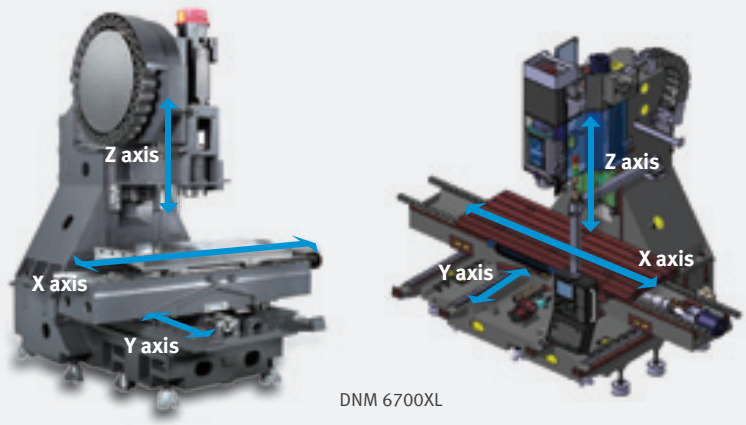
1050{1300} x 570 x 510 mm

(41.3{51.2} x 22.4 x 20.1 inch)

DNM 6700/L/XL

1300{1500/2100} x 670 x 625 mm

(51.2{59.1/82.7} x 26.4 x 24.6 inch)



DNM 6700XL

Axis system

Environmentally friendly grease lubrication is adopted as standard for all the axis feed system, and roller-type LM Guides are provided to enhance the rigidity.

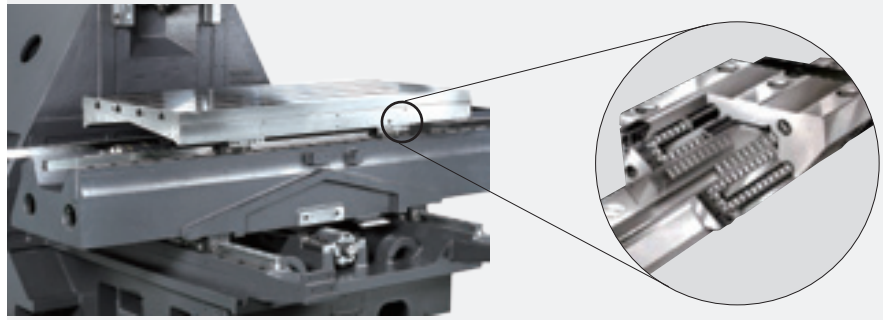
Rapid traverse rate (X / Y / Z axis)

DNM 4500 / 5700 / 6700 / 6700L

36 / 36 / 30 m/min (1417.3 / 1417.3 / 1181.1 ipm)

DNM 6700XL

30 / 30 / 30 m/min (1181.1 / 1181.1 / 1181.1 ipm)



Grease lubrication for all axes is a standard feature.

Roller-type LM Guides are provided as a standard feature.

Table

Increased table size and maximum load capacity are included to offer maximum workpiece capacity even in the same floor space as previous model.

Wide machining area

Table size (A x B)

DNM 4500/L

1000{1050} x 450 mm
(39.4{41.3} x 17.7 inch)

DNM 5700/L

1300{1500} x 570 mm
(51.2{59.1} x 21.3 inch)

DNM 6700/L/XL

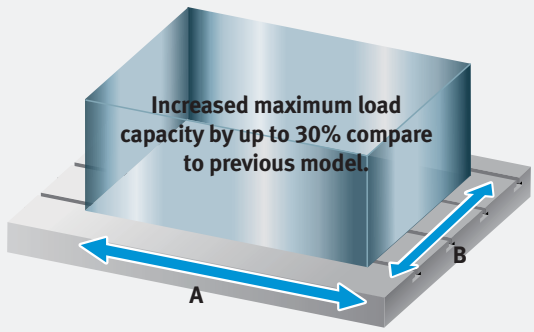
1500{1600/2200} x 670 mm
(59.1{63.0/86.6} x 26.4 inch)

Max weight on Table

DNM 4500/4500L
600 kg
(1322.8 lb)

DNM 5700/5700L
1000 kg
(2204.6 lb)

DNM 6700/6700L/6700XL
1300 kg
(2866.0 lb)



Spindle

Direct-coupled type spindles have been adopted as a standard feature to further reduce vibration and noise while enhancing productivity, work environment and machining accuracy. High torque and High speed spindle are available to meet material of workpiece.

Max. spindle speed

8000 r/min
12000 r/min option
15000 r/min option

Max. spindle motor power

18.5 kW (24.8 Hp)

Max. spindle motor torque

117.8 N·m (86.9 lbf-ft)
(8000 r/min, 12000 r/min, 15000 r/min)

286 N·m (211.1 lbf-ft) option
(8000 r/min high torque version)

Tool change system

Tool change time has been optimized to reduce non cutting time. The highly-reliable tool magazine can accommodate up to 30 tools as standard.

Automatic tool change arm

Tool to Tool time **1.2s**

Chip to Chip* time **3.2s**

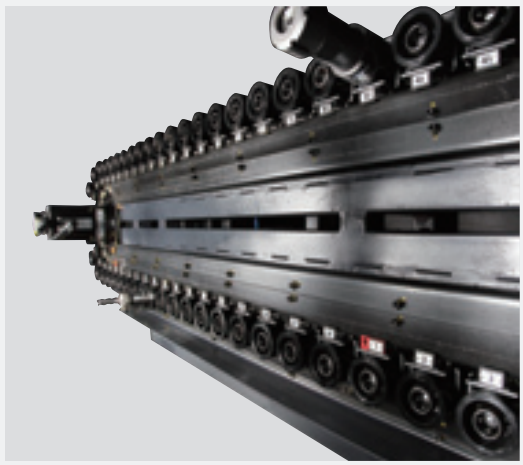
* The Chip-to-Chip time has been tested in accordance with Doosan's strict testing conditions, but may vary depending on the user's operating conditions.

Magazine

Tool storage capacity

30 ea, 40 ea option**, 60 ea** option

* 30, 40ea



* 60ea

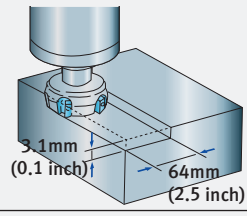
Machining performance

The DNM series delivers the best cutting performance in its class to optimize productivity.

Cutting performance

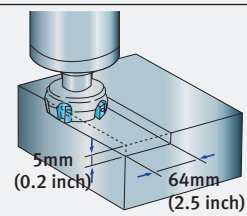
Face mill (ø80mm (3.15 inch)) Carbon steel (SM45C)

Chip removal rate cm³/min (inch³/min)	Spindle speed r/min	Feedrate mm/min (ipm)
527 (32.2)	1500	2700 (106.3)



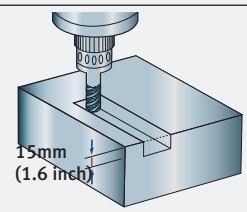
Face mill (ø80mm (3.15 inch)) Aluminium(AL6061)

Chip removal rate cm³/min (inch³/min)	Spindle speed r/min	Feedrate mm/min (ipm)
1901 (116.0)	1500	5940 (233.9)



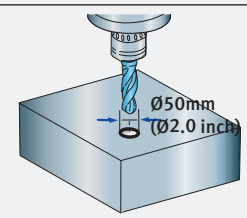
End mill (ø30mm (i.2 inch)) Carbon steel (SM45C)

Chip removal rate cm³/min (inch³/min)	Spindle speed r/min	Feedrate mm/min (ipm)
48 (2.9)	222	107 (4.2)



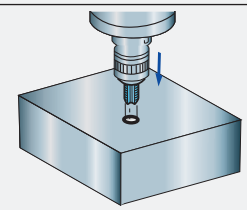
U-Drill (ø50mm (2.0 inch)) Carbon steel (SM45C)

Chip removal rate cm³/min (inch³/min)	Spindle speed r/min	Feedrate mm/min (ipm)
501 (30.6)	1500	255 (10.0)



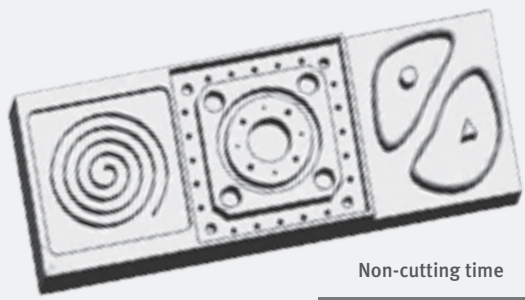
Tap Carbon steel (SM45C)

Tap size mm	Spindle speed r/min	Feedrate mm/min (ipm)
M 36 x P 4.0	221	884 (34.8)



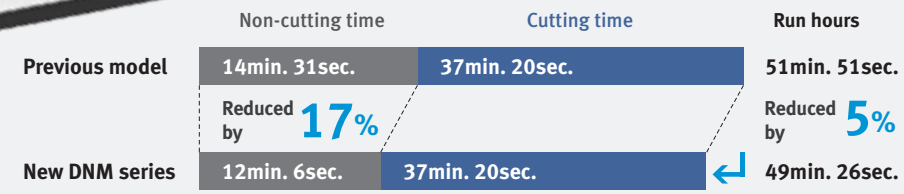
* The results, indicated in this catalogue are provides as example. They may not be obtained due to differences in cutting conditions and environmental conditions during measurement.

High Productivity



Sample work

Material	Aluminium (AL6061)
Material size	561 x 210 x 30 mm (22.1 x 8.3 x 1.2 inch)
Using tools	18 ea



* The results, indicated in this catalogue are provides as example. They may not be obtained due to differences in cutting conditions and environmental conditions during measurement.

Standard / Optional Specifications

Various optional features are available to satisfy customers' specific machining applications.

● Standard ○ Optional X N/A

NO.	Description	Features		DNM 4500/L	DNM 5700/L	DNM 6700/ 6700L/XL
1	Spindle	8000 r/min (Unit: kW(Hp), N·m(lbf-ft)	18.5/11(24.8/14.8), 117.8(86.9)_FANUC	●	●	X
2			18.5/15 (24.8/20.1), 117.8(86.9)_FANUC	X	X	●
3			15/11 (20.1/14.8), 286(211.1)_FANUC	○	○	○
4		12000 r/min (Unit: kW(Hp), N·m(lbf-ft)	18.5/11(24.8/14.8), 117.8(86.9)_FANUC	○	○	○
5			17/10 (22.8/13.4), 108.6(80.1)_HEIDENHAIN	○	○	X
6			32/15 (42.9/20.1), 203.7(150.3)_HEIDENHAIN	X	X	○
7			16.5/11 (22.1/14.8), 141(104.1)_SIEMENS	○	○	X
8			21.8/16.3 (29.2/21.9), 150.1(110.8)_SIEMENS	X	X	○
9		15000 r/min (Unit: kW(Hp), N·m(lbf-ft)	18.5/11(24.8/14.8), 117.8(86.9)_FANUC	○	○	○
10			17/10 (22.8/13.4), 108.2 (79.9)_HEIDENHAIN	○	○	○
11			16.5/11 (22.1/14.8), 141.3 (104.3)_SIEMENS	○	○	○
12	Magazine	Tool storage capacity	30 ea	●	●	●
13			40 ea	○	○	○
14			60 ea	○	○	○
15	Tool shank type	BIG PLUS BT40		●	●	●
16		BIG PLUS CAT40		○	○	○
17		BIG PLUS DIN40		○	○	○
18	Raised column	150 mm (5.9 inch)		○	○	○
19		200 mm (7.9 inch)		○	○	○
20		300 mm (11.8 inch)		○	○	○
21	Coolant	FLOOD	0.15 MPa(21.8 psi), 0.4 kW(0.5 Hp)	●	●	●
22			0.7 MPa(101.5 psi), 1.8 kW(2.4 Hp)	○	○	○
23		TSC	None	●	●	●
24			2 MPa(290.1 psi), 1.5kW(2.0 Hp)	○	○	○
25			2 MPa(290.1 psi), 4 kW(5.4 Hp)	○	○	○
26			7 MPa(1015.3 psi), 5.5 kW(7.4 Hp)	○	○	○
27		FLUSHING		○	○	○
28		SHOWER (200 L/min (52.8 gal/min))		○	○	○
29	Chip disposal	Chip conveyor	Chip pan	●	●	●
30			Hinged type (Left/Right/Rear)	○	○	○
31			Magnetic scraper type (Left/Right/Rear)	○	○	○
32			Screw(AUGER) type (Left/Right)	○	○	○
33		Chip bucket		○	○	○
34		Air blower		○	○	○
35		Air gun		○	○	○
36		Coolant gun		○	○	○
37		Mist collector		○	○	○
38	Precision machining option	Linear scale	X / Y / Z axis	○	○	○
39		AICC I (40 block)		○	○	○
40		AICC II (200 block)		○	○	○
41		SSP (Smooth Surface Package)		○	○	○
42	Measurement & Automation	Automatic tool measurement	TS27R_RENISHAW	○	○	○
43			OTS_RENISHAW	○	○	○
44		Automatic tool breakage detection		○	○	○
45		Automatic workpiece measurement	OMP60_RENISHAW	○	○	○
46		Automatic front door with safety device		○	○	○
47	Others	LED Work light		●	●	●
48		3 Color signal tower		●	●	●
49		4th axis auxiliary device interface		○	○	○
50		Tool load monitoring		●	●	●
51		EZ Guide i		●	●	●
52		Automatic power off		○	○	○
53	Customized Special Option	Coolant level switch	Sensing level - Low / High	○	○	○
54		20K spindle	-	X	X	○
55		HSK-63A	-	○	○	○
56		ATC shutter door	30Tool / 40Tool	○	○	○
57		ATC full cover	30Tool / 40Tool	○	○	○
58		Bellows cover	-	○	○	○
59		Ballscrew cover	-	○	○	○
60		Drum chipconveyor	Hinge type	○	○	○
61			Scraper type	○	○	○
62		Oil lubrication	X, Y, Z axis	○	○	○
63		20 Bar TSC with inverter	50Hz → 60Hz	○	○	○
64		Auto tool length measurement	LTS	○	○	○
65		Auto tool breakage detection	OMRON / D5A	○	○	○
66			MSC/BK9(Needle type on magazine)	○	○	○

* Please contact DOOSAN to select detail specifications.

Peripheral equipments

Grease lubrication system

The standard grease lubrication system eliminates the need for an oil skimmer and reduces lubrication costs by about 60% compared to oil lubrication.

Yearly maintenance cost

Max. 60%

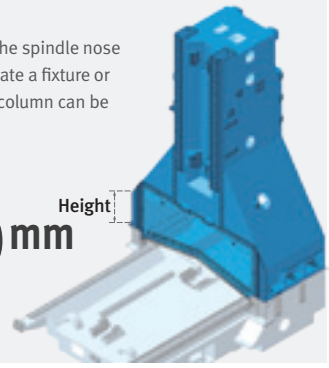
Raised column option 18~20

When the distance between the table top and the spindle nose needs to be extended, for example, accommodate a fixture or rotary axis on the table, solid one-piece raised column can be used to extend the distance.

Height

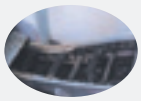
150/200/300 mm

(5.9/7.9/11.8 inch)

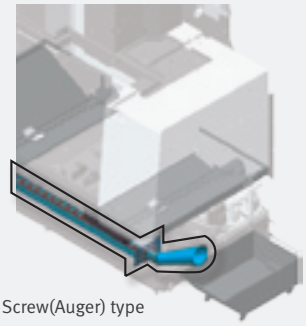


Chip conveyor option 29~32

Hinged belt



Magnetic scraper



Screw(Auger) type

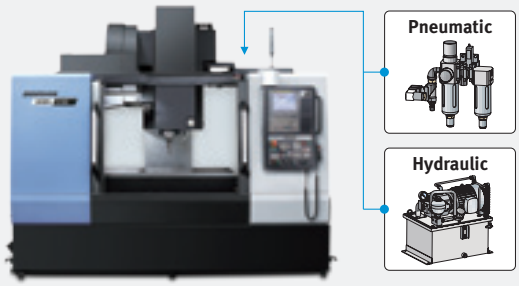
Chip conveyor type	Material	Description
Hinged belt	Steel	Hinged belt chip conveyor, which is most commonly used for steel work [for cleaning chips longer than 30mm(1.2inch)], is available as an option.
Magnetic scraper	Cast Iron	Magnetic scraper type chip conveyor, which is ideal for die-casting work [for cleaning small chips], is available as an option.
Screw(Auger) type	Steel	Screw(Auger) type chip conveyor is suitable for minimizing installation space. About 85% floor space is required to install Screw(Auger) type chip conveyor compare to Hinged belt type.

Chip bucket option 33

Capacity 300 L (79.3 gal)

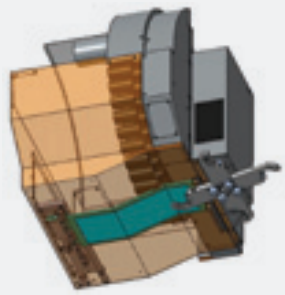
Hydraulic / Pneumatic fixture line option

The user should prepare pipelines for hydraulic/pneumatic fixtures whose detailed specifications should be determined by discussion with Doosan.



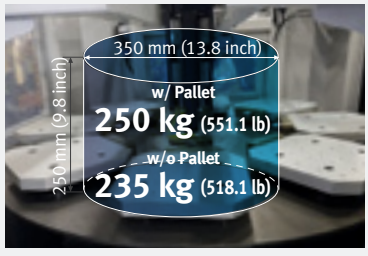
Auto shutter option 50

To prevent chips from getting inside the magazine port during aluminum workpiece cutting with a dual contact tool, an auto shutter is provided.



AWC system option

The optimized solution to realize compact automation system through automatic work-piece change system.



DOOSAN Fanuc i Plus

DOOSAN Fanuc i Plus is optimized for maximizing customer productivity and convenience.

15 inch screen + New OP

DOOSAN Fanuc i Plus' operation panel enhances operating convenience by incorporating common-design buttons and layout, and features the Qwerty keyboard for fast and easy operation.

DOOSAN Fanuc i Plus
- 15 inch color display
  Intuitive and user-friendly design

USB & PCMCIA card QWERTY keyboard
- EZ-guide i standard
- Ergonimic operator panel
- 2MB Memory
- Hot key

iHMI Touch screen option

iHMI provides an intuitive interface that utilizes a touch screen for quick and easy operation and provides a variety of applications that can help machine operation.

- **PLANNING**
  Tool information such as tool offset and tool life can be checked and set, and scheduler function is provided.
- **MACHINING**
  MDI, EDIT, MEM, JOG screen can be changed by using touch function, and it is quick and easy to move to sub menu by using soft key.
- **IMPROVEMENT**
  User can set up to record data for analysis and monitor the specific signals by setting up the maintenance and inspection function. Also user can add items.
- **UTILITY**
  View and search PDF and TEXT files, create notes from text / images / drawings, and link to web pages.
  For users who are familiar with the DDOOSAN Fanuc i Plus screen, the screen can be switched.

Easy Operation Package

The software developed by Doosan's own technology provides numerous functions designed for convenient operation.

EOP Main screen

On the operation panel, press the CUSTOM1 button to make the initial EOP screen show up.

Tool management

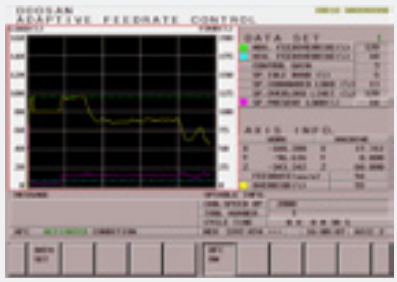
This function controls information on the tools in the tool magazine pots.

ATC recovery

In the event of an error during ATC (automatic tool changer) operation, follow the on-screen instructions for an easy and prompt solution.

Tool load monitoring

During cutting operation, abnormal load caused by wear and tear of the tool is detected and an alarm is triggered to prevent further damage.



Adaptive Feed Control(AFC)

If tool overload is detected during operation, the feed rate is controlled to prevent the tool from being damaged.

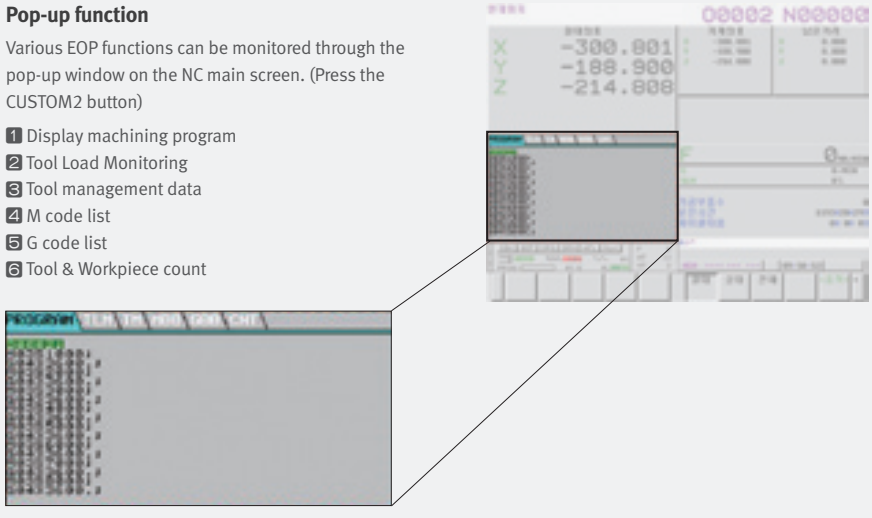
Thermal compensation function

A thermal error compensation function is provided as a standard feature to secure stable cutting safe from potentially harmful environmental factors.

Pop-up function

Various EOP functions can be monitored through the pop-up window on the NC main screen. (Press the CUSTOM2 button)

1 Display machining program
2 Tool Load Monitoring
3 Tool management data
4 M code list
5 G code list
6 Tool & Workpiece count



SIEMENS 828D

SIEMENS CNC optimized for DOOSAN machine tools maximizes users' productivity.

15.6 inch screen + New OP

The newly-designed operation panel enhances operating convenience by incorporating common-design buttons and layout, and features the Qwerty keyboard for fast and easy operation.

15.6-inch display

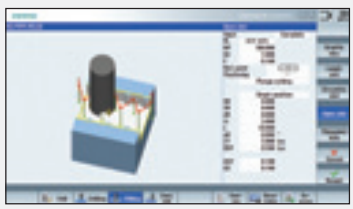
- USB (standard)
- QWERTY Keyboard (standard)

Conversational Convenient function

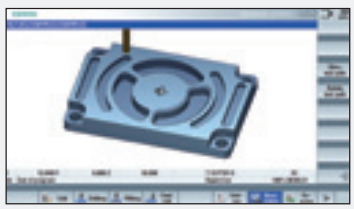
The machining monitoring function developed on the basis of the Shop Mill – an interactive machining support function of SIEMENS – provides users with cutting, servicing and maintenance screens for easy and convenient machine operation.

Smart function
Color highlighting is provided for each processing code function, and the calculator can be used easily by using the pocket calculator on display.

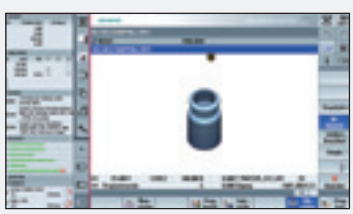
Shop Mill Part Programming
It helps to write the part program and shorten the writing time.



Advanced program language programGUIDE
Increases program flexibility, minimizing cycle time.



Simulation and machining contour monitoring
Simulation results with different views can be checked.



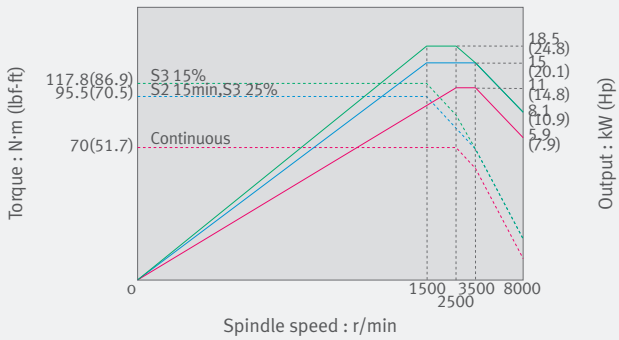
Side screen widget
Through the side widget, operator can easily monitor the current machining status.

Spindle Power – Torque Diagram (FANUC)

DNM 4500/L, DNM5700/L

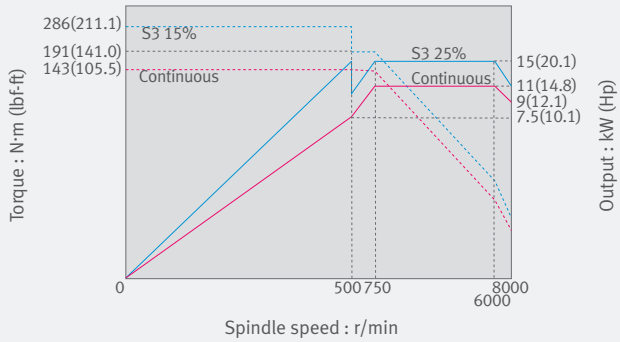
8000 r/min

Max. spindle power: 18.5 kW (24.8 Hp)
Max. spindle torque: 117.8 N·m (86.9 lbf-ft)



8000 r/min High Torque option

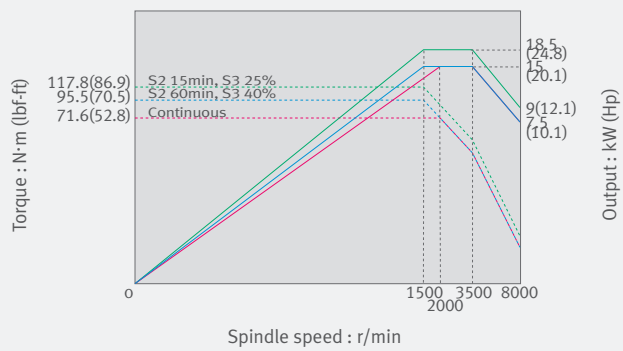
Max. spindle power: 15 kW (20.1 Hp)
Max. spindle torque: 286 N·m (211.1 lbf-ft)



DNM 6700/L/XL

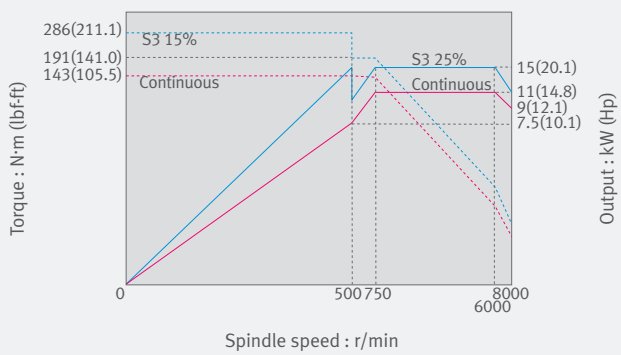
8000 r/min

Max. spindle power: 18.5 kW (24.8 Hp)
Max. spindle torque: 117.8 N·m (86.9 lbf-ft)



8000 r/min High Torque option

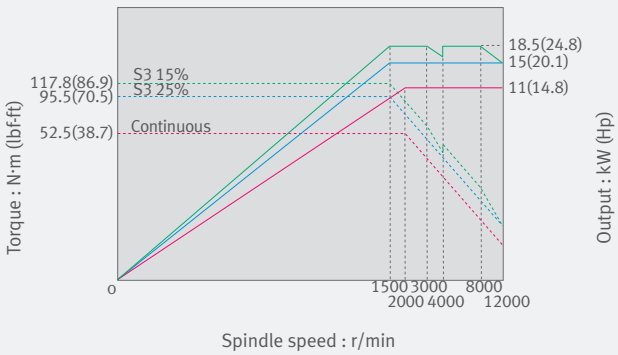
Max. spindle power: 15 kW (20.1 Hp)
Max. spindle torque: 286 N·m (211.1 lbf-ft)



DNM 4500/L, 5700/L, 6700/L/XL

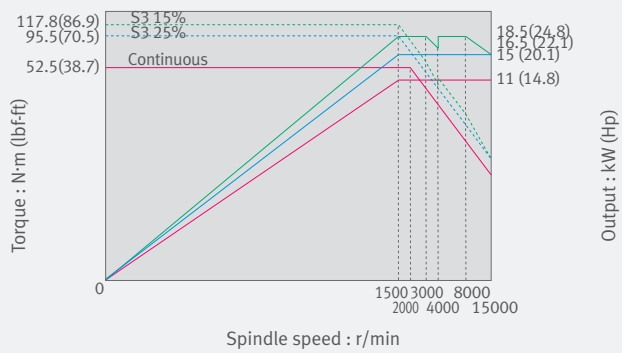
12000 r/min option

Max. spindle power: 18.5 kW (24.8 Hp)
Max. spindle torque: 117.8 N·m (86.9 lbf-ft)



15000 r/min option

Max. spindle power: 18.5 kW (24.8 Hp)
Max. spindle torque: 117.8 N·m (86.9 lbf-ft)

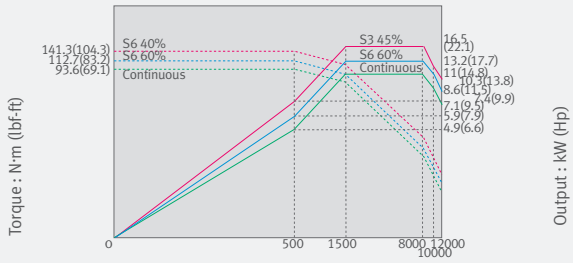


Spindle Power – Torque Diagram (SIEMENS)

DNM 4500/L, 5700/L

12000 r/min

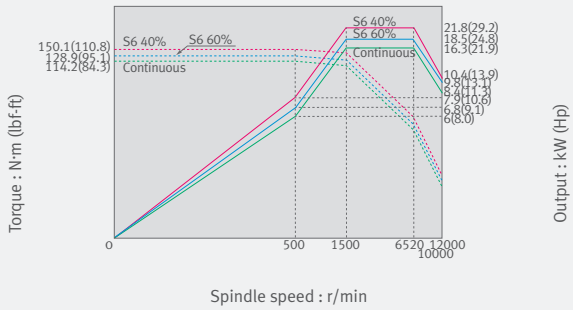
Max. spindle power: 16.5 kW (22.1 Hp)
Max. spindle torque: 141.3 N·m (104.3 lbf-ft)



DNM 6700L/XL

12000 r/min

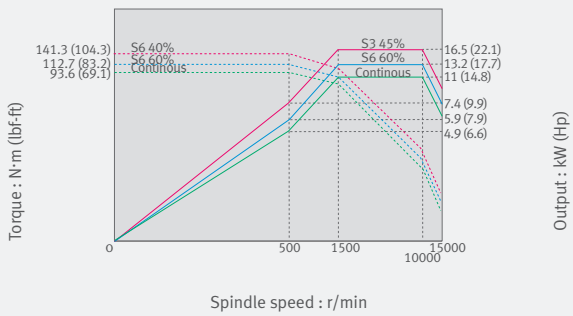
Max. spindle power: 21.8 kW (29.2 Hp)
Max. spindle torque: 150.1 N·m(110.8 lbf-ft)



DNM 4500/L, 5700/L, 6700/L/XL

15000 r/min option

Max. spindle power: 16.5 kW (22.1 Hp)
Max. spindle torque: 141.3 N·m (104.3 lbf-ft)

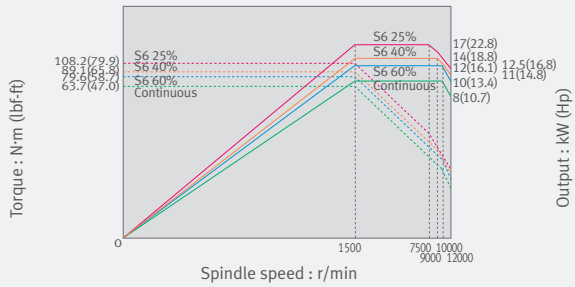


(HEIDENHAIN)

DNM 4500/L, 5700/L

12000 r/min

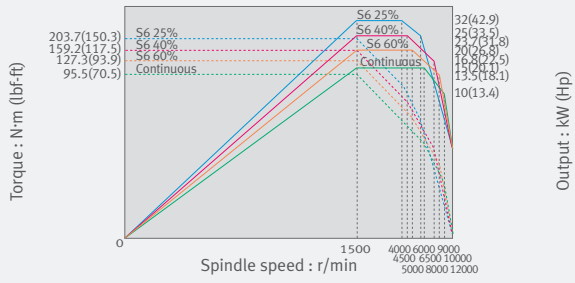
Max. spindle power: 17 kW (22.8 Hp)
Max. spindle torque: 108.2 N·m (79.9 lbf-ft)



DNM 6700L/XL

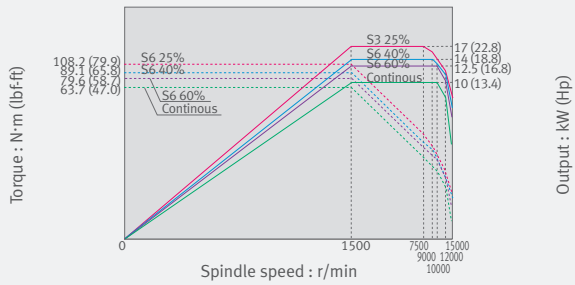
12000 r/min

Max. spindle power: 32 kW (42.9 Hp)
Max. spindle torque: 203.7 N·m (150.2 lbf-ft)



15000 r/min option

Max. spindle power: 17 kW (22.8 Hp)
Max. spindle torque: 108.2 N·m (79.9 lbf-ft)

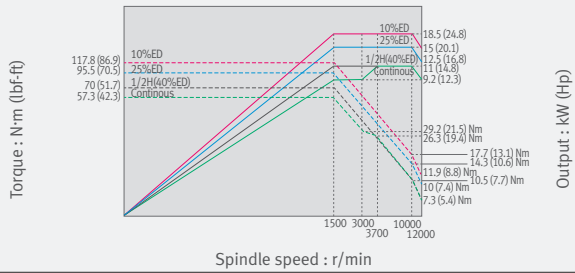


(MITSUBISHI)

DNM 4500/L, 5700/L, 6700/L/XL

12000 r/min

Max. spindle power: 18.5 kW (24.8 Hp)
Max. spindle torque: 117.8 N·m (86.9 lbf-ft)

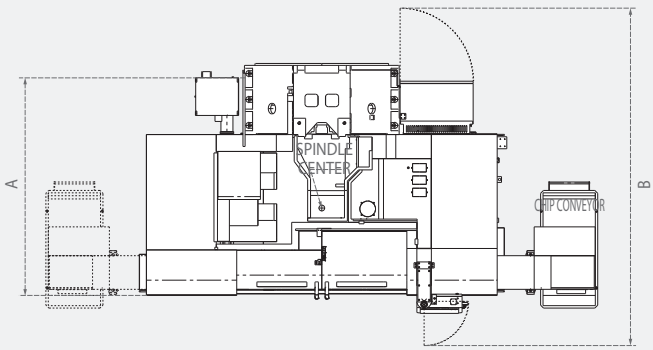


External Dimensions

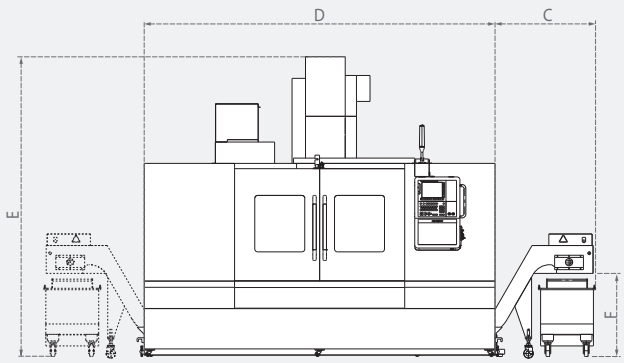
DNM 4500/5700/6700 series

Unit: mm (inch)

Top View



Front View

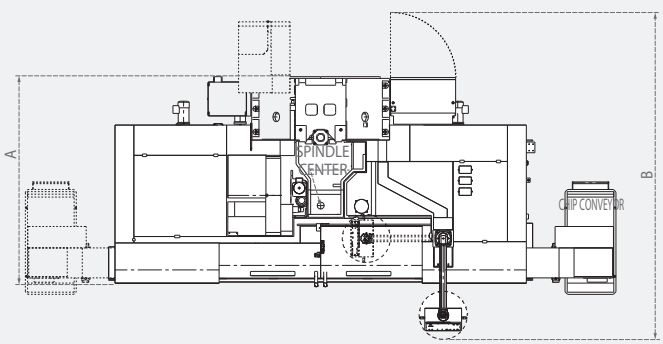


Model	A (Length)	B[1]	C[2]	D (Width)	E (Height)	F		
						SCRAPER	HINGED	SCREW
DNM 4500	1970 (77.6)	3200 (126.0)	1040 (415) [40.9(16.3)]	2465 (97.0)	2985 (117.5)	883 (34.8)	865 (34.1)	440 (17.3)
DNM 4500L	1970 (77.6)	3200 (126.0)	1040 (415) [40.9(16.3)]	2550(100.4)	2985 (117.5)	883 (34.8)	865 (34.1)	440 (17.3)
DNM 5700	2225 (87.6)	3365 (132.5)	1040 (415) [40.9(16.3)]	2960 (116.5)	2985 (117.5)	883 (34.8)	865 (34.1)	440 (17.3)
DNM 5700L	2225 (87.6)	3365 (132.5)	1040 (415) [40.9(16.3)]	3200 (126.0)	2985 (117.5)	883 (34.8)	865 (34.1)	440 (17.3)
DNM 6700	2415 (95.1)	3510 (138.2)	1040 (415) [40.9(16.3)]	3200 (126.0)	3120 (122.8)	883 (34.8)	865 (34.1)	440 (17.3)
DNM 6700L	2415 (95.1)	3510 (138.2)	1040 (415) [40.9(16.3)]	3650 (143.7)	3120 (122.8)	883 (34.8)	865 (34.1)	440 (17.3)

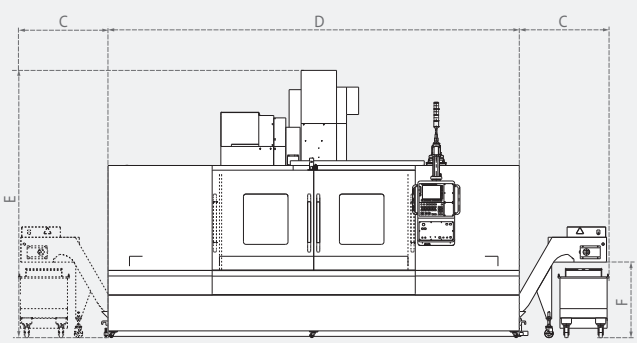
DNM 6700XL

Unit: mm (inch)

Top View



Front View



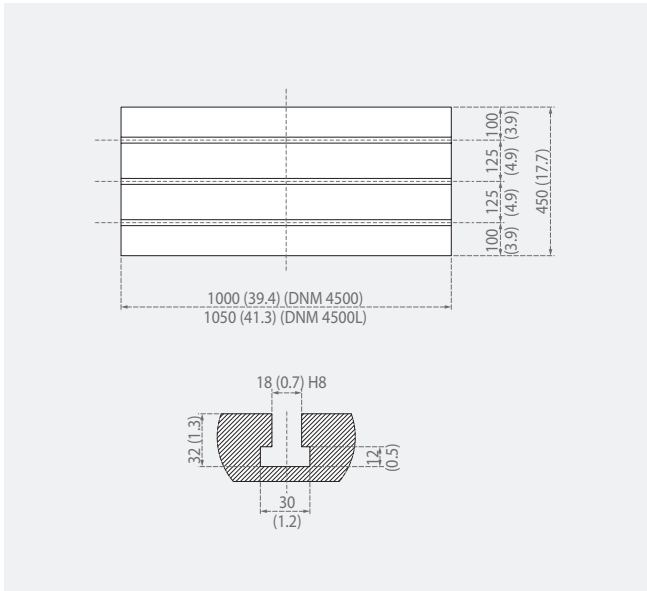
Model	A (Length)	B[1]	C[2]	D (Width)	E (Height)	F		
						SCRAPER	HINGED	SCREW
DNM 6700XL	2415 (95.1)	3820 (150.4)	1045 (41.1)	4800 (189.0)	3120 (122.8)	883 (34.8)	865 (34.1)	440 (17.3)

[1] Max. machine length (including electric cabinet door and operation panel swiveling)
[2] Additional width to accommodate the side chip conveyor. [ ] indicates the additional width required to accommodate a screw(auger)type chip conveyor.
* Some peripheral equipment can be placed in other places *Rear chipconveyor need discuss with sales person

Table

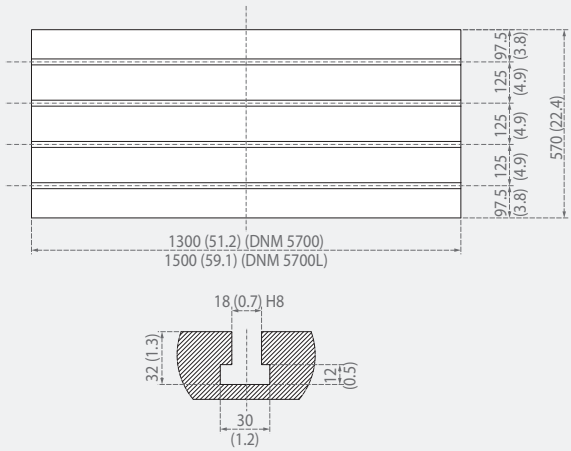
DNM 4500/L

Unit: mm (inch)



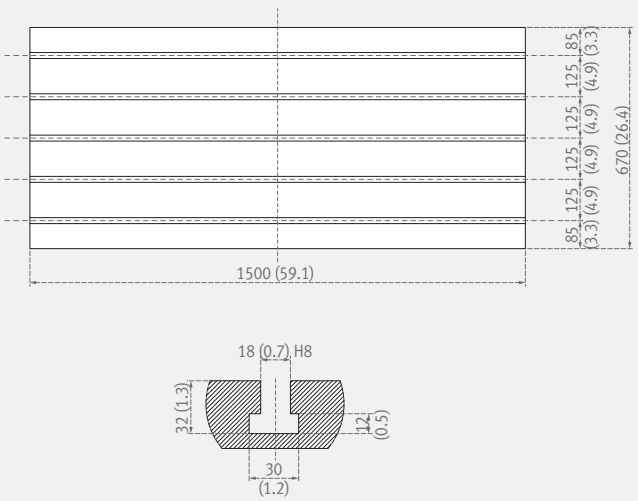
DNM 5700/L

Unit: mm (inch)



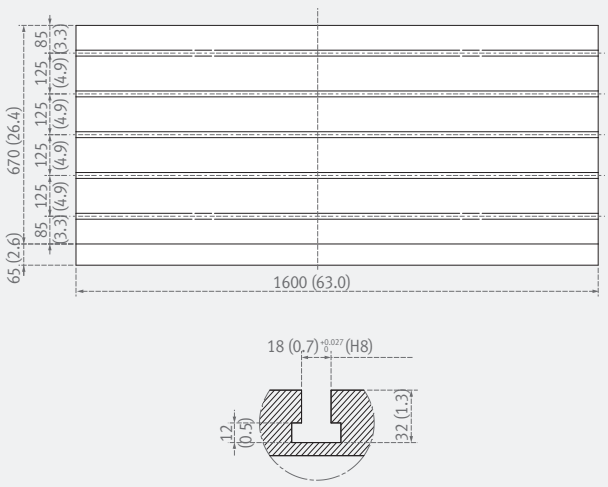
DNM 6700

Unit: mm (inch)



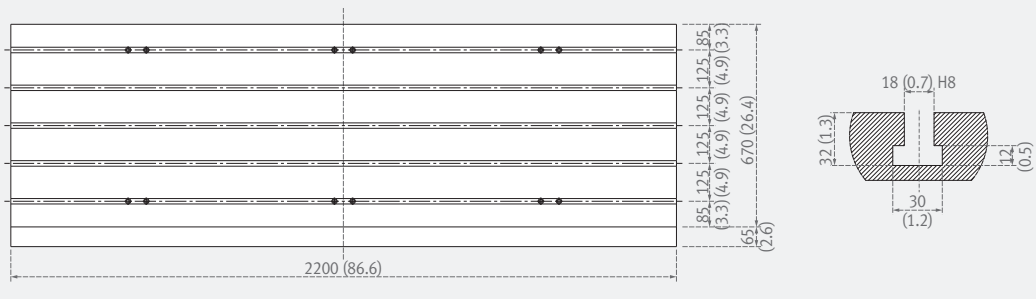
DNM 6700L

Unit: mm (inch)



DNM 6700XL

Unit: mm (inch)



Machine Specifications

DNM
series

Description			Unit	DNM 4500	DNM 4500L	DNM 5700	DNM 5700L	DNM 6700	DNM 6700L	DNM 6700XL
Travels	Travel distance	X axis	mm (inch)	800 (31.5)	910 (35.8)	1050 (41.3)	1300 (51.2)	1300 (51.2)	1500 (59.1)	2100 (82.7)
		Y axis	mm (inch)	450 (17.7)		570 (22.4)		670 (26.4)		
		Z axis	mm (inch)	510 (20.1)				625 (24.6)		
	Distance from spindle nose to table top		mm (inch)	150~660 (5.9~26.0)				150~775 (5.9~30.5)		
Table	Table size		mm (inch)	1000 x 450 (39.4 x 17.7)	1050 x 450 (41.3 x 17.7)	1300 x 570 (51.2 x 22.4)	1500 x 570 (59.1 x 22.4)	1500 x 670 (59.1 x 26.4)	1600 x 670 (63.0 x 26.4)	2200 x 670 (86.6 x 26.4)
	Table loading capacity		kg (lb)	600 (1322.8)		1000 (2204.6)		1300 (2866.0)		
	Table surface type		mm (inch)	T-SLOT (3-125(4.9) x 18(0.7)H8)		T-SLOT (4-125(4.9) x 18(0.7)H8)		T-SLOT (5-125(4.9) x 18(0.7)H8)		
Spindle	Taper		-	ISO #40						
	Max. spindle speed	Fanuc	r/min	8000 {8000*, 12000, 15000}						
		Siemens	r/min	12000 {15000}						
		Heidenhain	r/min	12000 {15000}						
		Mitsubishi	r/min	12000 {15000}						
	Max. Spindle power	Fanuc	kW (Hp)	18.5/11 (24.8/14.8) {15/11 (20.1/14.8)*, 18.5/11 (24.8/14.8), 18.5/11 (24.8/14.8)}				18.5/15 (24.8/20.1) {15/11 (20.1/14.8)*, 18.5/11 (24.8/14.8), 18.5/11 (24.8/14.8)}		
		Siemens	kW (Hp)	16.5/11 (22.1/14.8) {16.5/11 (22.1/14.8)}				21.8/16.3 (29.2/21.9) {16.5/11 (22.1/14.8)}		
		Heidenhain	kW (Hp)	17/10 (22.8/13.4) {17/10 (22.8/13.4)}				32/15 (42.9/20.1) {17/10 (22.8/13.4)}		
		Mitsubishi	kW (Hp)	18.5/11 (24.8/14.8)						
	Max. spindle torque	Fanuc	N·m (lbf-ft)	117.8 (86.9) {286 (211.1)*, 117.8 (86.9), 117.8 (86.9)}						
		Siemens	N·m (lbf-ft)	141.3 (104.3) {141.3 (104.3)}				150.1 (110.7) {141.3 (104.3)}		
		Heidenhain	N·m (lbf-ft)	108.2 (79.9) {108.2 (79.9)}				203.7 (150.2) {108.2 (79.9)}		
		Mitsubishi	N·m (lbf-ft)	117.8 (86.9)						
Feedrates	Rapid traverse rate	X axis	m/min (ipm)	36 (1417.3)						30 (1181.1)
		Y axis	m/min (ipm)	36 (1417.3)						30 (1181.1)
		Z axis	m/min (ipm)	30 (1181.1)						
Automatic Tool Changer	Type of tool shank	Tool shank	-	BT 40 {CAT 40 / DIN 40}						
		Pull stud	-	PS806 {Modified DIN / DIN 69872 #40}						
	Tool storage capa.		ea	30 {40, 60}						
	Max. tool diameter	Continous	mm (inch)	80 (3.1) {76 (3.0)}						
		Without Adjacent Tools	mm (inch)	125 (4.9)						
	Max. tool length		mm (inch)	300 (11.8)						
	Max. tool weight		kg (lb)	8 (17.6)						
	Max. tool moment		N·m (ft-lbs)	5.88 (4.3)						
	Tool selection			MEMORY RANDOM						
	Tool change time (Tool-to-tool)		sec	1.2						
	Tool change time (Chip-to-chip)		sec	3.2					3.5	
Power source	Electric power supply (rated capacity)		kVA	29.6				38.1 {33.0**}	40 {35}*	
	Compressed air supply		MPa (psi)	0.54 (78.3)						
Tank capacity	Coolant tank capacity		L (gal)	260 (68.7)	285 (75.3)	310 (81.9)	350 (92.5)	325 (85.9)	430 (113.6)	440 (116.2)
Machine Dimensions	Height		mm (inch)	2985 (117.5)				3120 (122.8)		
	Length		mm (inch)	2160 (85.0)		2415 (95.1)		2605 (102.6)		3070 (120.9)
	Width		mm (inch)	2465 (97.0)	2701 (106.3)	2960 (116.5)	3350 (131.9)	3350 (131.9)	3650 (143.7)	4800 (189.0)
	Weight		kg (lb)	4500 (9920.7)	5500 (12125.2)	6450 (14219.6)	7000 (15432.1)	8000 (17636.7)	9000 (19841.3)	10000 (22045.9)
Contrel	NC system		-	DOOSAN Fanuc i Plus / SIEMENS S828D / HEIDENHAIN TNC620 / MITSUBISHI M80A						

* { } : Optional * 8000 r/min High torque version(FANUC only) ** Power capacity of 8000 r/min high torque and 12000 r/min spindle

NC Unit Specifications

FANUC

● Standard ○ Optional X N/A

No.	Item		Spec.	DOOSAN Fanuc i Plus
1	Controlled axis	Controlled axes	3 (X,Y,Z)	X, Y, Z
2		Additional controlled axes	5 axes in total	○
3		Least command increment	0.001 mm / 0.0001"	●
4		Least input increment	0.001 mm / 0.0001"	●
5		Interpolation type pitch error compensation		●
6	Interpolation & Feed Function	2nd reference point return	G30	●
7		3rd / 4th reference return		●
8		Inverse time feed		●
9		Cylinderical interpolation	G07.1	●
10		Bell-type acceleration/deceleration before look ahead interpolation		●
11		Automatic corner override	G62	●
12		Automatic corner deceleration		●
13		Manual handle feed	Max. 3unit	1 unit
14		Handle interruption		●
15		Manual handle retrace		○
16		AICC II	200 BLOCK	●
17			400 BLOCK	○ 1)
18	Spindle & M code Function	M- code function		●
19		Retraction for rigid tapping		●
20		Rigid tapping	G84, G74	●
21	Tool Function	Number of tool offsets	400 ea	400 ea
22		Tool nose radius compensation	G40, G41, G42	●
23		Tool length compensation	G43, G44, G49	●
24		Tool life management		●
25		Tool offset	G45 - G48	●
26	Programming & Editing Function	Custom macro		●
27		Macro executor		●
28		Extended part program editing		●
29		Part program storage	2MB (5120m)	5120m
30		Inch/metric conversion	G20 / G21	●
31		Number of Registered programs	1000 ea	1000 ea
33		Optional block skip	9 BLOCK	●
34		Optional stop	M01	●
35		Program file name	32 characters	●
36		Sequence number	N 8-digit	N8 digit
37		Playback function		●
38	OTHER FUNCTIONS (Operation, setting & Display, etc)	Addition of workpiece coordinate system	G54.1 P1 - 48 (48 pairs)	48 pairs
39		Addition of workpiece coordinate system	G54.1 P1 - 300 (300 pairs)	○
40		Embeded Ethernet		●
41		Graphic display	Tool path drawing	●
42		Loadmeter display		●
43		Memory card interface		●
44		USB memory interface	Only Data Read & Write	●
45		Operation history display		●
46		DNC operation with memory card		●
47		Optional angle chamfering / corner R		●
48		Run hour and part number display		●
49		High speed skip function		●
50		Polar coordinate command	G15 / G16	●
51		Programmable mirror image	G50.1 / G51.1	●
52		Scaling	G50, G51	●
53		Single direction positioning	G60	●
54		Pattern data input		●
55		Jerk control	AI contour control II is required.	●
56		Fast Data server with1GB PCMCIA card		○
57		Fast Ethernet		○
58		3-dimensional coordinate conversion		○
59		Figure copying	G72.1, G72.2	○
60		Machining time stamp function		○
61		EZ Guide i (Conversational Programming Solution)		● 2)

1) AICC2 (400block) of 0iMF must be changed to High Speed Main board. Ask R&D center for information.
2) Only with 15" LCD standard

SIEMENS

● Standard ○ Optional X N/A

No.	Item		Spec.	S828D
1	Controlled axis	Controlled axes	3 axes	X, Y, Z
2		Additional controlled axes	Max. 5 axes in total	○
3		Least command increment	0.001mm (0.0001 inch)	●
4		Least input increment	0.001mm (0.0001 inch)	●
5		Travel to fixed stop with Force Control		○
6	Interpolation & Feed Function	Reference point return	G75 FP=1	●
7		2nd reference point return	G75 FP=2	●
8		3rd / 4th reference return	G75 FP=3, 4	●
9		Inverse time feedrate	G93	●
10		Helical interpolation		●
11		Polynomial interpolation		N/A
12		Spline interpolation (A, B and C splines)		○
13		Separate path feed for corners and chamfers		●
14		Acceleration with Jerklimitation		●
15		Compressor for 3-axis machining		●
16		Temperature compensation		●
17		Look ahead number of block	150 BLOCK	●
18		Cartesian point-to-point (PTP) travel		●
19		TRANSMIT/cylinder surface transformation		○
20	Spindle Function	Tapping with compensating chuck/rigid tapping		●
21		Retraction for rigid tapping		●
22	Tool Function	Tool radius compensations in plane		●
23		Number of tools/cutting edges in tool list	256/512	●
24			600/1500	N/A
25		Tool length compensation		●
26		Operation with tool management		●
27		Tool list		●
28		Replacement tools for tool management		○
29		Monitoring of tool life and workpiece count		●
30		Manual measurement of tool offset		●
31		Magazine list		●
32	Programming & Editing Function	Number of levels for skip blocks 1		●
33		Number of levels for skip blocks 8		○
34		Program/workpiece management	On additional plug-in CF card	●
35			On integral Hard disk PCU50.3	N/A
36			On USB storage medium (e.g. disk drive, USB stick)	●
37			On network drive	○
38		Program editor	Programming support for cycles program(Program Guide)	●
39			CNC editor with editing functions: Marking, copying, deleting	●
40			Programming graphics/free contour input (contour calculator)	●
41			ShopMill Machining step programming	●
42		Technology cycles for drilling/milling		●
43		Pocket milling free contour and islands stock removal cycle		●
44		Residual material detection		●
45		Access protection for cycles		●
46		Programming support can be extended, e.g. customer cycles		●
47		2D simulation		●
48		3D simulation, finished part		●
49	OTHERS FUNCTIONS (Operation, setting & Display, etc)	Switchover: inch/metric		●
50		Manual measurement of zero/work offset		●
51		Automatic tool/workpiece measurement		●
52		Reference point approach, automatic/via CNC program		●
53		Execution from USB or CF card interface on operator panel front		●
54		Execution from network drive		○
55		10.4" color display		●
56		15.0" color display		N/A
57		Alarms and messages		●
58		Remote Control System (RCS) remote diagnostics	RCS Host remote diagnostics function	○
59			RCS Commander (viewer function)	●
60		Automatic measuring cycles		○

NC Unit Specifications

HEIDENHAIN

● Standard ○ Optional X N/A

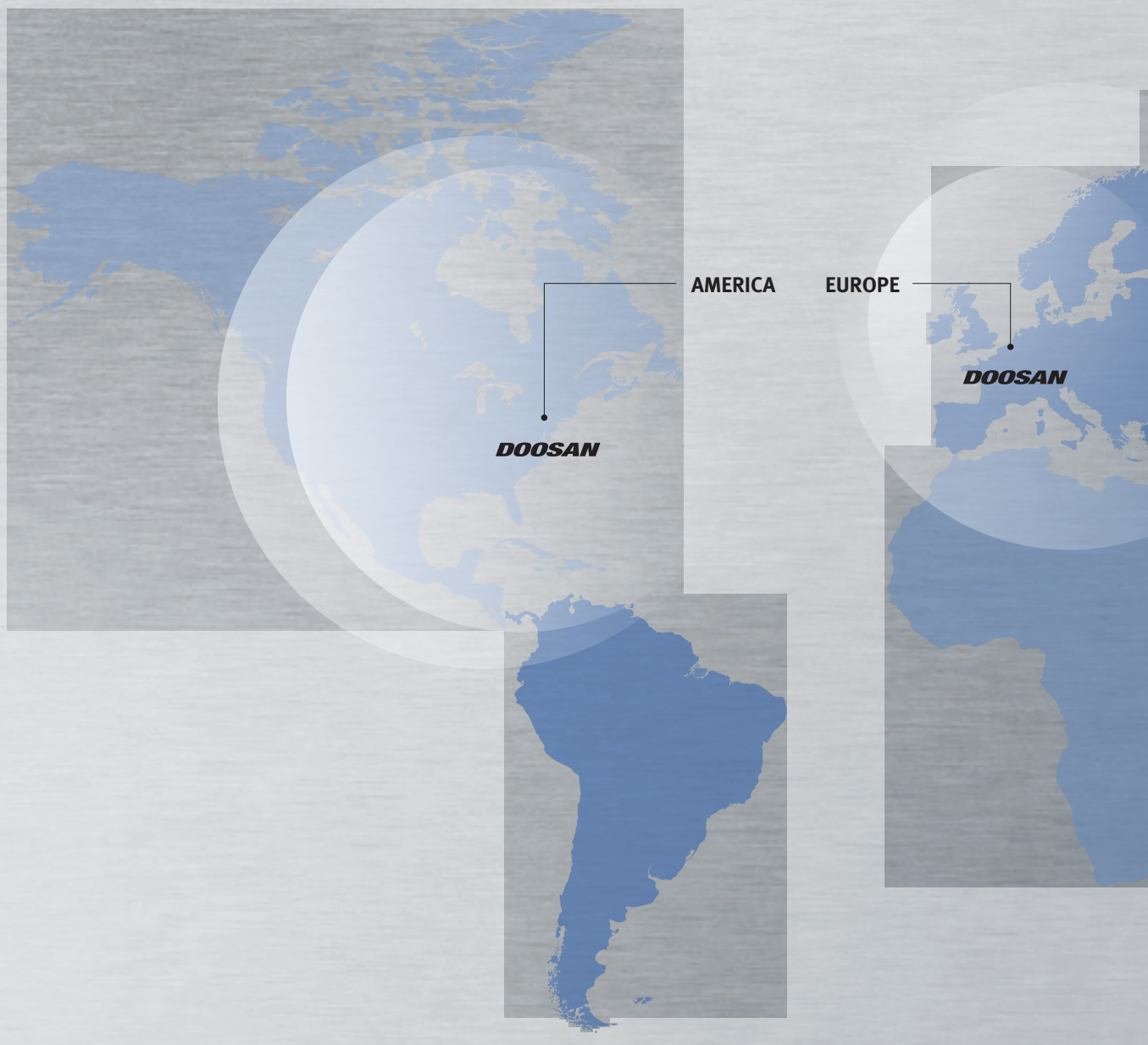
NO.	Item		Spec.	TNC 620
1	Axes	Controlled axes	3 axes	X, Y, Z
2		Additional Controlled axes	Max. 18 axes in total	○ (Max. 6axes)
3		Least command increment	0.0001 mm (0.0001 inch), 0.0001°	●
4		Least input increment	0.0001 mm (0.0001 inch), 0.0001°	●
5		MDI / DISPLAY unit	15.1 inch TFT color flat panel	●
6		Program memory for NC programs	SSDR	8GB
7	Commissioning and diagnostics	Data interfaces	Ethernet interface	●
8			USB interface (USB 2.0)	●
9	Machine functions	Look-ahead (Intelligent path control by calculating the path speed ahead of time)	Max. 1024 blocks.	N/A
10			Max. 5000 blocks.	●
11		HSC filters		●
12		Switching the traverse ranges		N/A
13	User functions	Tool compensation	In the working plane and tool length	●
14			Radius-compensated contour lookahead for up to 99 blocks (M120)	○
15			Three-dimensional tool radius compensation	○
16		Tool table	Central storage of tool data	●
17			Multiple tool tables with any number of tools	●
18		MDI mode		N/A
19		Tilting the working plane with Cycle 19		○
20		Tilting the working plane with the PLANE function		○
21		Manual traverse in tool-axis direction	after interruption of program run	●
22		Function TCPM	Retaining the position of tool tip when positioning tilting axes	○
23		Rotary table machining	Programming of cylindrical contours as if in two axes	○
24			Feed rate in distance per minute	○
25		New 3-D simulation graphics in full detail		●
26		Program verification graphics	Plan view, view in three planes, 3-D view	●
27			3-D line graphics	●
28		Enhanced file management		●
29		Context-sensitive help for error messages		●
30		TNCguide	Browser-based, context-sensitive helpsystem	●
31		Calculator		●
32		"Save As" function		●
33	Fixed cycles	Pecking	Cycle 1	●
34		Tapping	Cycle 2	●
35		Slot milling	Cycle 3	●
36		Pocket milling	Cycle 4	●
37		Circular pocket	Cycle 5	●
38		Datum shift	Cycle 7	●
39		Mirror imaging	Cycle 8	●
40		Dwell time	Cycle 9	●
41		Rotation	Cycle 10	●
42		Scaling factor	Cycle 11	●
43		Program call	Cycle 12	●
44		Oriented spindle stop	Cycle 13	●
45		Rigid tapping (controlled spindle)	Cycle 17	●
46		Working plane	Cycle 19	○
47		Cylinder surface	Cycle 27	○
48		Cylinder surface slot milling	Cycle 28	○
49		Cylinder surface ridge milling	Cycle 29	○
50		Tolerance (HSC mode, TA)	Cycle 32	○
51		Rigid tapping, new	Cycle 207	●
52		Tapping with chip breaking	Cycle 209	●
53		Polar pattern	Cycle 220	●
54		Cartesian pattern	Cycle 221	●
55		Engraving	Cycle 225	●
56		Multipass milling	Cycle 230	●
57		Face milling	Cycle 233 Eenhanced with side walls, milling direction and strategy	●
58		Centering	Cycle 240	●
59		Single-lip deep-hole drilling	Cycle 241	●
60		Datum setting	Cycle 247	●
61		Rectangular pocket, complete	Cycle 251	●
62		Circular pocket, complete	Cycle 252	●
63		Slot, complete	Cycle 253	●
64		Circular slot, complete	Cycle 254	●
65		Rectangular stud, complete	Cycle 256	●
66		Circular stud, complete	Cycle 257	●
67		Thread milling	Cycle 262	●
68		Thread milling/countersinking	Cycle 263	●
69		Thread drilling/milling	Cycle 264	●
70		Helical thread drilling/milling	Cycle 265	●
71		Outside thread milling	Cycle 267	●
72		Trochoidal milling	Cycle 275	●
73	Touch probe cycles	Calibrating the effective radius on a circular stud		●
74		Calibrating the effective radius on a sphere		●
75	Cycles for automatic workpiece inspection	Save kinematics		○
76		Measure kinematics		○
77		Preset compensation		○
78		TS calibration of length		○
79		TS calibration in a ring		○
80		TS calibration on stud		○
81	Options	Software option 1	Rotary table machining, Coordinate transformation, Interpolation	○
82		Software option 2	3-D machining, Interpolation	○

MITSUBISHI

● Standard ○ Optional X N/A

No.	Item		Spec.	M80A
1	Control Axes	Number of Basic Control Axes (NC Axes)	3 (X,Y,Z)	●3
2		Number of Simultaneous Contouring Control Axes		●4
3		Tape (RS-232C Input) Mode		●
4		Front-side SD Card Mode		●
5		Front-side USB Memory Mode		●
6	Input Command	Least control increment 0.01μm(10nm)		●
7		Least control increment 0.001μm(1nm)		●
8		Inch/Metric Changeover	G20/G21	●
9		Absolute/Incremental Command	G90/G91	●
10	Positioning/Interpolation	Linear Interpolation		●
11		Circular Interpolation(Center/Radius Designation)		●
12		Helical Interpolation		●
13		Spiral/Conical Interpolation	G02.1 /G03.1	●
14		Cylindrical Interpolation	G7.1	●
15	Feed	Feed per Minute (Asynchronous Feed)	G94	●
16		Feed per Revolution (Synchronous Feed)	G95	●
17		Override Cancel	M48 / M49	●
18		Automatic Acceleration/Deceleration after Interpolation		●
19		Thread Cutting (Lead/Thread Number Designation)		●
20		Synchronous Tapping Cycle	G84	●
21		Pecking Tapping Cycle		●
22		Deep-hole Tapping Cycle		●
23	Program Memory/Editing	Program Memory 500kB[1280m] (1000 programs)		●
24	Operation and Display	Color Touchscreen Display (10.4-type LCD TFT)		○
25		Absolute/Incremental Setting	G90/G91	●
26		Parameter Guidance		●
27		Alarm Guidance		●
28		Screenshot Capture		●
29		Remote Desktop Connection		●
30		VNC Server		●
31	Input/Output Functions and Devices	Tool Offset Data Input/Output		●
32		Common Variable Input/Output		●
33		Parameter Input/Output		●
34		History Data Output		●
35		RS-232C I/F		●
36		Front-side SD Card I/F [Up to 32GB]		●
37		Ethernet I/F		●
38		Front-side USB Memory I/F [Up to 32GB]		●
39	Tool Compensation	Number of Tool Offset 400 sets		●
40		Tool Shape/Wear Offset Amount		●
41	Coordinate System	Workpiece Coordinate System Selection (6 Sets)		●
42		Extended Workpiece Coordinate System Selection (48 Sets) G54.1P1 to P48		●
43	Operation Support Functions	Optional Block Skip		●
44		Auto-restart		●
45		Manual Interruption		●
46		Automatic Operation Handle Interruption		●
47		Tapping Retract		●
48	Program Support Functions	Variable Command 8000 sets		●
49		Fixed Cycle for Drilling		●
50		Special Fixed Cycle		●
51		Mirror Image by Parameter Setting		●
52		Mirror Image by External Input		●
53		Mirror Image by G Code	G51.1	●
54		Coordinate Rotation by Program	G68/G69	●
55		3-dimensional Coordinate Conversion		●
56		Corner Chamfering/Corner R		●
57		Linear Angle Command		●
58		Polar Coordinate Command		●
59		Chopping		●
60		Exact Stop Check Mode	G09	●
61		Exact Stop Check	G61	●
62		Error Detection		●
63		Programmable In-position Check		●
64		High-speed Machining Mode I (G05P1) Maximum [kBPM]	337 BLOCK	●33.7
65		High-speed Machining Mode II (G05P2) Maximum [kBPM]	675 BLOCK	●67.5
66		High-accuracy Control (G61.1/G08)		●
67		SSS Control		●
68		Tolerance Control		●
69		High-speed High-accuracy Control I (G05.1Q1) Maximum [kBPM]	337 BLOCK	●33.7
70		High-speed High-accuracy Control II (G05P10000) Maximum [kBPM]	675 BLOCK	●67.5
71		High-speed High-accuracy Control III (G05P20000) Maximum [kBPM]	1350 BLOCK	●135
72		Smooth Fairing		●
73		Machining Condition Selection I		●
74		Playback		●
75		Interactive Cycle Insertion		●
76		Simple Programming (NAVI MILL/LATHE)		●
77	Machine Accuracy Compensation	Backlash Compensation		●
78		Memory-type Pitch Error Compensation[sets]	16SET	●16
79		Memory-type Relative Position Error Compensation		●
80		External Machine Coordinate System Compensation		●
81		Circular Radius Error Compensation		●
82		Ball Screw Thermal Expansion Compensation		●
83		Position-dependent Gradually Increasing-type Backlash Compensation		●
84		Bidirectional Pitch Error Compensation		●
85		Smooth High-gain (SHG) Control		●
86		Lost Motion Compensation		●
87	Automation Support Functions	Automatic Tool Length Measurement		●
88		Workpiece Position Measurement		●
89		Tool Life Management I / II / III		●
90		Auto Power OFF		●
91		Load Monitoring I		●
92	Machine Support Functions	Ethernet Connection		●
93		CC-Link Connection		●

Responding to Customers Anytime, Anywhere



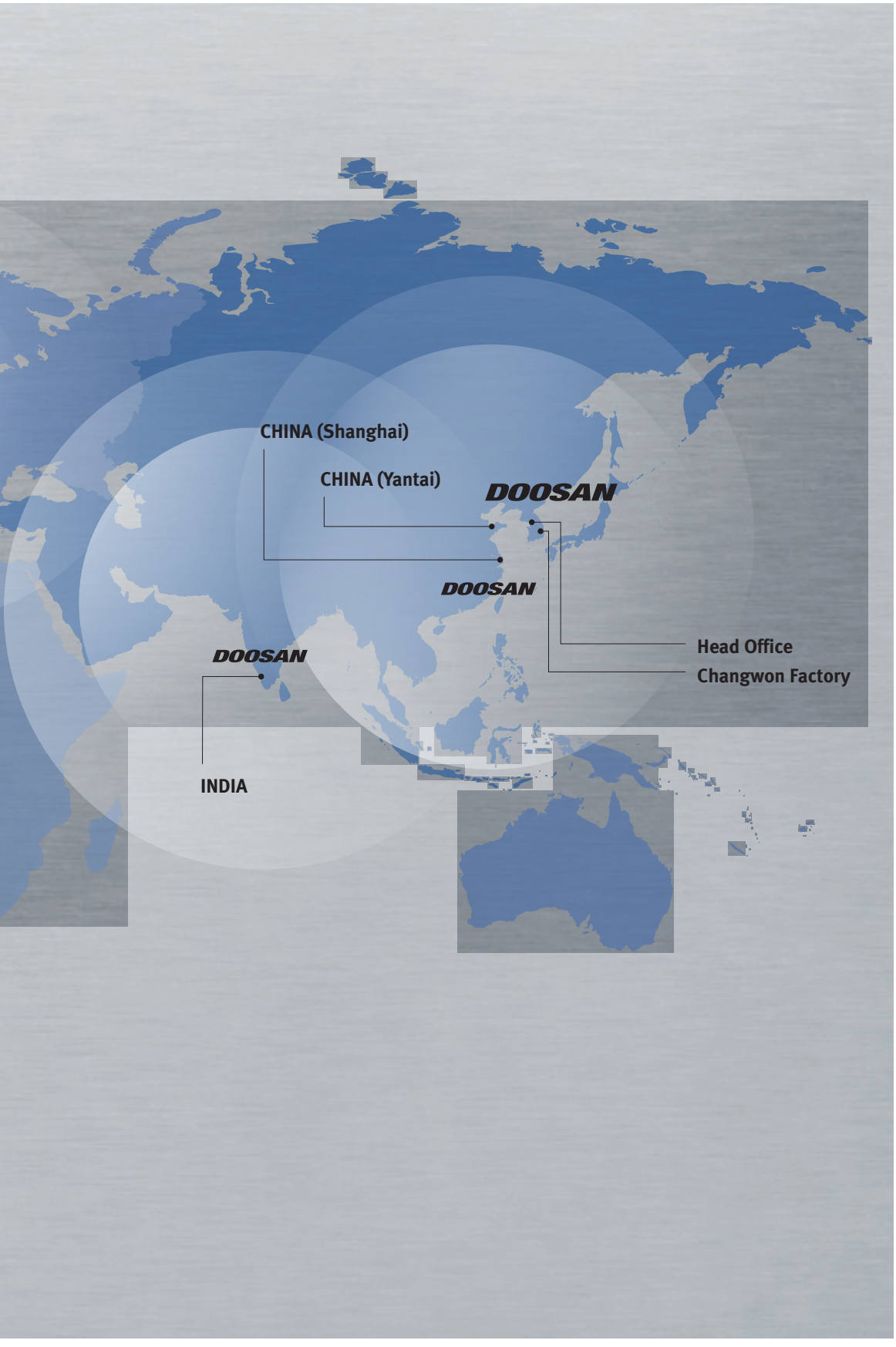
Global Sales and Service Support Network

Corporations	Dealer Networks	Technical Centers	Service Post	Factories
4	164	51	198	3

Technical Center: Sales Support, Service Support, Parts Support

Doosan Machine Tools' Global Network, Responding to Customer's Needs nearby, Anytime, Anywhere

Doosan machine tools provides a system-based professional support service before and after the machine tool sale by responding quickly and efficiently to customers' demands. By supplying spare parts, product training, field service and technical support, we can provide top class support to our customers around the world.



Customer Support Service

We help customers to achieve success by providing a variety of professional services from pre-sales consultancy to post-sales support.

Supplying Parts

- Supplying a wide range of original Doosan spare parts
- Parts repair service

Field Services

- On site service
- Machine installation and testing
- Scheduled preventive maintenance
- Machine repair

Technical Support

- Supports machining methods and technology
- Responds to technical queries
- Provides technical consultancy

Training

- Programming / machine setup and operation
- Electrical and mechanical maintenance
- Applications engineering

Major Specifications

DNM series

Description	Unit	DNM 4500	DNM 4500L	DNM 5700	DNM 5700L	DNM 6700	DNM 6 700L	DNM 6700XL
Max. spindle speed	r/min	8000 {8000*, 12000, 15000}						
Max. spindle power	kW (Hp)	18.5(24.8) {15(20.1)*, 18.5(24.8), 18.5(24.8)}						
Max. spindle torque	N·m (lbf-ft)	117.8 (86.9) {286 (211.1)*, 117.8 (86.9), 117.8 (86.9)}						
Taper	-	ISO #40						
Travel distance (X / Y / Z)	mm (inch)	800 / 450 / 510 (31.5 / 17.7 / 20.1)	910 / 450 / 510 (35.8 / 17.7 / 20.1)	1050 / 570 / 510 (41.3 / 22.4 / 20.1)	1300 / 570 / 510 (51.2 / 22.4 / 20.1)	1300 / 670 / 625 (51.2 / 26.4 / 24.6)	1500 / 670 / 625 (59.1 / 26.4 / 24.6)	2100 / 670 / 625 (82.7 / 26.4 / 24.6)
Tool storage capa.	ea	30 {40, 60}						
Table size	mm (inch)	1000 x 450 (39.4 x 17.7)	1050 x 450 (41.3 x 17.7)	1300 x 570 (51.2 x 22.4)	1500 x 570 (59.1 x 22.4)	1500 x 670 (59.1 x 26.4)	1600 x 670 (63.0 x 26.4)	2200 x 670 (86.6 x 26.4)

{ } * 8000 r/min High torque version

Doosan Machine Tools

www.doosanmachinetools.com

Head Office
22F T Tower, 30, Sowol-ro 2-gil, Jung-gu, Seoul, Korea, 04637
Tel +82-2-6972-0370 / 0350
Fax +82-2-6972-0400

Doosan Machine Tools America
19A Chapin Rd., Pine Brook, NJ 07058, U.S.A.
Tel +1-973-618-2500
Fax +1-973-618-2501

Doosan Machine Tools Europe
Emdener Strasse 24, D-41540 Dormagen, Germany
Tel +49-2133-5067-100
Fax +49-2133-5067-111

Doosan Machine Tools India
No.82, Jakkuar Village, Yelahanka Hobil, Bangalore-560064
Tel + 91-80-2205-6900
E-mail india@doosanmt.com

Doosan Machine Tools China
Room 101,201,301, Building 39 Xinzhuan Highway No.258 Songjiang District,China Shanghai(201612)
Tel +86 21-5445-1155
Fax +86 21-6405-1472

* For more details, please contact Doosan Machine Tools.
* The specifications and information above-mentioned may be changed without prior notice.
* Doosan Machine Tools Co., Ltd. is a subsidiary of MBK Partners. The trademark DOOSAN is used under a licensing agreement with Doosan Corporation, the registered trademark holder.

Fire Safety Precautions | There is a high risk or fire when using non-water-soluble cutting fluids, processing flammable materials, neglecting use coolants and modifying the machine without the consent of the manufacturer. Please check the SAFETY GUIDANCE carefully before using the machine.

ver. EN 200204 SU