DN SOLUTIONS

HIGH PRODUCTIVITY COMPACT VERTICAL MACHINING CENTER

DNM 4000





DNM 4000

The DNM 4000 is a compact vertical machining center with a 400mm Y-axis stroke and a directly-coupled 40 taper spindle. By reducing the machine's width, the footprint has been minimized but productivity, owing to the DNM 4000's high acceleration/deceleration rates, has been increased.

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EASY OPERATOR ACCESS AND EXCELLENT CHIP DISPOSAL

- Designed with two doors for easy operator access to the working area.
- Bed flushing occurs on both left and right sides to optimize chip removal. This is especially useful when high chip volume s are produced.

STANDARD DIRECTLY-COUPLED SPINDLE FOR HIGHER PRODUCTIVITY

- The directly-coupled spindle reduces vibration and noise, thereby improving the machine's performance and environmental friendliness
- Higher productivity is achieved by improving and increasing the machine's acceleration/ deceleration rates.

AN ENVIRONMENTALLY-FRIENDLY MACHINE DESIGNED FOR RELIABLE AND EASY OPERATION

- Thermal error compensation function incorporated as standard.
- The Easy Operation function (Ez work) can be viewed in the pop-up window of the main NC screen for convenient machine operation.
- Grease lubrication for the roller guideways is a standard feature and is a cleaner, greener, more efficient and more cost-effective lubrication system.



BASIC STRUCTURE

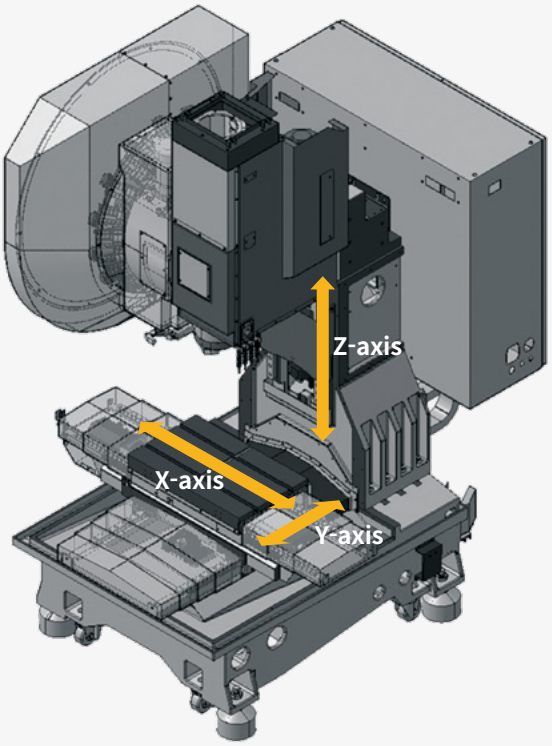
The DNM 4000 is a compact, high-productivity vertical machining center with a #40 spindle delivering outstanding cutting performance.

Travel distance (X / Y / Z axis)

520 / 400 / 480 mm
(20.5 / 15.7 / 18.9 inch)

CNC system

- **DN Solutions FANUC i**
- **SIEMENS**



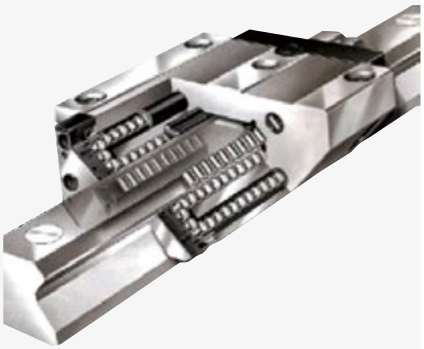
Axis system

Environmentally-friendly oil lubrication is used as standard for the axis feed system, and Roller-type LM Guideways enhance rigidity.

Rapid traverse rate (X / Y / Z axis)

48 / 48 / 48 m/min
(1889.8 / 1889.8 / 1889.8 ipm)

Roller-type LM guides are provided as a standard feature



Grease lubrication for all axes is a standard feature

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** % ↓



SPINDLE

Directly-coupled spindles, with the dual contact tool and spindle interface, are a standard feature and help reduce vibration and noise whilst enhancing productivity, the working environment and machining accuracy.

Max. spindle speed
FANUC / SIEMENS
12000 r/min
** Dual contact tool system support as standard.*

Max. spindle motor power
FANUC / SIEMENS
18.5 / 16.5 kW
(24.8 / 22.1 Hp)

Max. spindle motor torque
FANUC / SIEMENS
117 / 141.3 N·m
(86.3 / 104.2 ft-lbs)

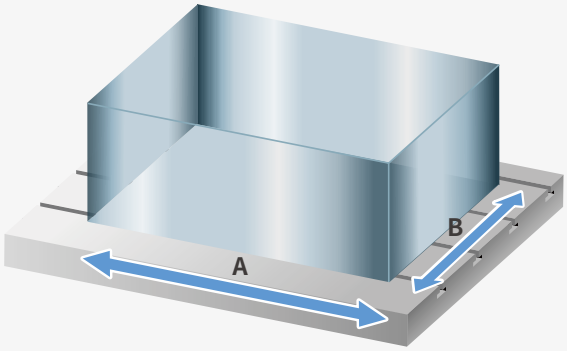


TABLE

An increase in table size and the maximum load capacity, over the previous model, improves the machine's flexibility and application potential.

Table size (A x B)
650 x **400** mm
(25.6 x 15.7 inch)

Max. weight on Table
400 kg
(881.8 lb)



TOOL CHANGE SYSTEM (ATC)

The highly-reliable tool magazine can accommodate up to 20 tools as standard.

Tool storage capacity
20 ea

Tool to Tool
1.3 sec

Chip to Chip*
2.6 sec
** The Chip-to-Chip time has been tested in accordance with DN Solutions's strict testing conditions, but may vary depending on different conditions.*



STANDARD | OPTIONAL SPECIFICATIONS

Various optional features are available to meet customers' specific machining requirements and applications.

Description	Features			DNM 4000
Spindle	12000 r/min	Direct	18.5/11 kW (24.8/14.8 Hp)	●
Spindle cooling system (Oil cooler)	12000 r/min	Direct		○
Magazin	Tool storage capacity	20 ea		●
Tool shank type	ISO #40	BIG PLUS BT40		●
		BIG PLUS CAT40		○
		BIG PLUS DIN40		○
Coolant	Flood coolant	0.16 (0.12) Mpa / 0.4 kW		●
		1.0 (0.75) Mpa / 1.1 kW		○
	TSC	2.0 (1.9) Mpa / 1.5 kW		○
		2.0 (1.3) Mpa / 4.0 kW		○
	Flushing coolant	0.15 (0.1) Mpa / 1.1 kW		●
	Shower flushing coolant	0.2 (0.1) Mpa / 1.8 kW		○
	Coolant gun	0.2 (0.15) Mpa / 0.6 kW		○
Chip disposal	Chip pan			●
	Chip conveyor	Hinged type(Rear)		○
		Magnetic scraper type(Rear)		○
	Chip bucket – CAPACITY	220 L (58.1 galon)		○
		300 L (79.3 galon)		○
		380 L (100.4 galon)		○
	Chip bucket – TYPE	ROTATION		○
		FORKLIFT		○
Precision machining options	AICC II (200block)			●
	SSP (Smooth Surface Package)			○
Measurement & Automation	Automatic tool measurement	TS27R		○
	Automatic tool breakage detection			○
	Automatic workpiece measurement	OMP60		○
	Automatic front door with safety device			○
Accessories	WORK LIGHT	LED LAMP		●
	OPERATOR CALL LAMP	3-COLOR SIGNAL TOWER(LED)		●
	LEVELING BLOCK & BOLT	-		●
	SMART THERMAL CONTROL	SENSORLESS TYPE(ONLY SPINDLE)		●
	ASSEMBLY & OPERATION TOOLS KIT	-		●
	4TH AXIS PREPARATION CABLING FOR SERVO/1-PNEUMATIC PIPING	FACTORY READY MADE		●
	AIR GUN			○
	Air blower			○
	Coolant gun			○
	Mist collector			○
Customized special option	ANCHORING(1)	SLIDE CLAMP & CHEMINCAL ANCHOR BOLT		○
	TSA(2)	0.54		○
	ATC AUTO SHUTTER	20 TOOL		○
	RASING BLOCK	150 mm		○
		200 mm		○
		300 mm		○
	SCALE	SCALE BUILT-IN LM GUIDE		○
	DRUM CHIPCONVEYOR	SCRAPER TYPE		○
	OIL LUBRICATION	X, Y, Z AXIS		○
	20 BAR TSC with INVERTER	50Hz → 60Hz		○
	Water soluble Coolant Chiller**			○
	AUTO TOOL LENGTH MEASUREMEMT	RENISHAW / LTS		○
	AUTO TOOL BREAKAGE DETECTION	MSC/BK9(NEEDLE TYPE ON MAGAZINE)		○

※ *Please contact your DN Solutions representative for detailed machine information.*

● *Standard* ○ *Optional* *X N/A*

(1) Please refer to foundation drawing in relation to anchoring. If more detail information want, consult with DN Solutions service

(2) In case of TSC is not required and only TSA is needed, this option can be selected.

**When using a semi-synthetic type or synthetic type, contact our sales representative or service center in advance.*

*** Technical consultation is mandatory for the chilling of non-water soluble coolant*

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

PERIPHERAL EQUIPMENT

Oil cooler OPTION

An oil cooler correlated to room temperature can be equipped for a long-term operation at high speed. Cooling oil circulates around the spindle bearings to prevent thermal error of the spindle and maintain machining accuracy.

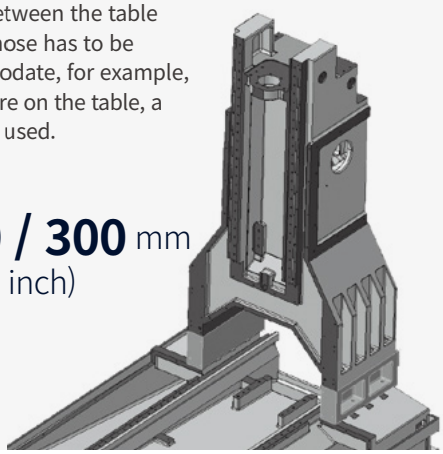


Raised column OPTION

When the distance between the table top and the spindle nose has to be extended to accommodate, for example, a rotary table or fixture on the table, a raised column can be used.

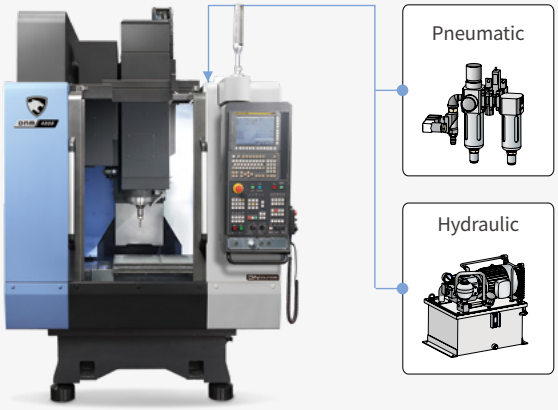
Height

150 / 200 / 300 mm
(5.9 / 7.9 / 11.8 inch)



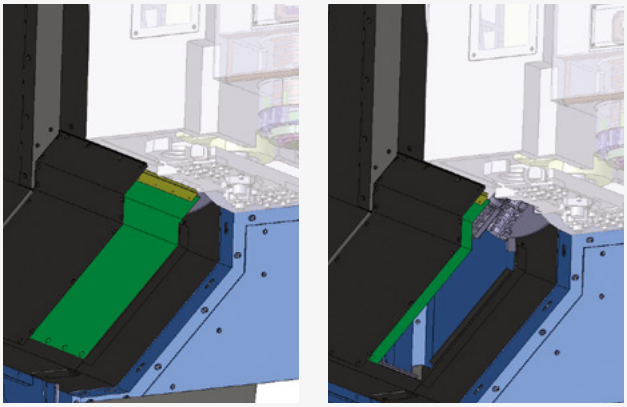
Hydraulic / Pneumatic fixture line OPTION

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

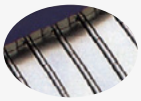


Auto shutter OPTION

An auto shutter is included to prevent chips from entering the tool magazine during high speed machining of Aluminium parts.



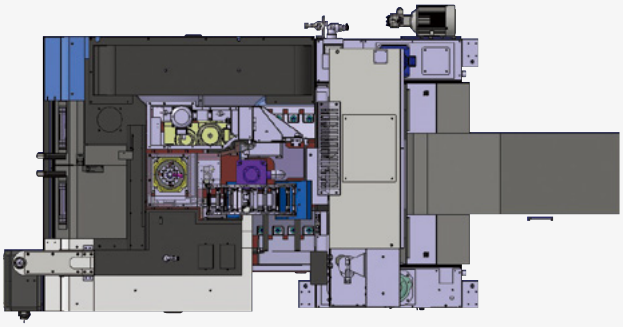
Chip conveyor OPTION



Hinged type

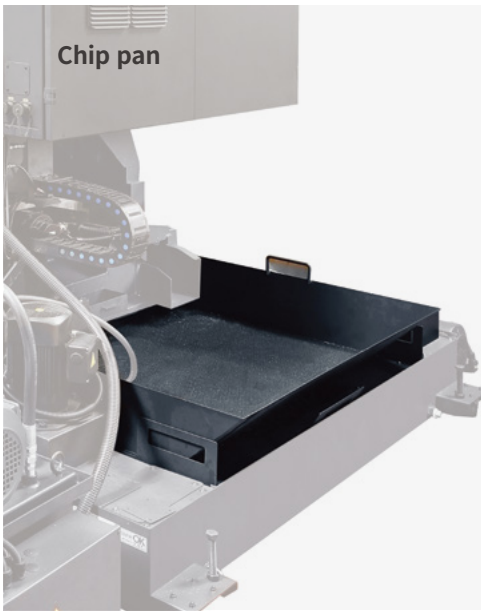


Magnetic scraper



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.

Chip pan



DN SOLUTIONS FANUC i PLUS

DN Solutions Fanuc i Plus maximizes customer productivity and convenience.



15 inch screen + New OP

DN Solutions 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.

DN Solutions Fanuc i Plus

- 15-inch color display
- Intuitive and user-friendly design

USB and PCMCIA card QWERTY keyboard

- EZ-guide i standard
- Ergonimic operator panel
- 2MB Memory
- Hot key

iHMI touchscreen OPTION

iHMI provides an intuitive interface that uses a touchscreen for quick and easy operation.

Range of applications

Providing various applications related to planning, machining, improvement and utility, for customer convenience.



NUMERIC CONTROL SPECIFICATIONS

FANUC

Item		Specifications	DN Solutions Fanuc i (0i Plus) DNM 4digit
Controlled axis	Controlled axes		3 (X,Y,Z)
	Simultaneously controlled axes		4 axes
	Additional controlled Axis	Add 1 Axis (5th Axis)	●
Data input/output	Fast data server		○
	Memory card input/output		●
	USB memory input/output		●
	Large capacity memory(2GB)*2	Available Option only with 15” Touch LCD (iHMI Only) *2)	○
Interface function	Embedded Ethernet		●
	Fast Ethernet		○
	Enhanced Embedded Ethernet function		●
Operation	DNC operation	Included in RS232C interface.	●
	DNC operation with memory card		●
Program input	Workpiece coordinate system	G52 - G59	●
	Addition of workpiece coordinate system	G54.1 P1 X 48 (48 pairs)	●
	Tool number command		T4 digits
	Tilted working plane indexing command	G68.2 TWP	○
Feed function	AI contour control I	G5.1 Q_, 40 Blocks	X
	AI contour control II	G5.1 Q_, 200 Blocks	●
	AI contour control II	G5.1 Q_, 600 Blocks	X
	AI contour control II	G5.1 Q_, 1000 Blocks *1)	X
	High smooth TCP		X
Operation guidance function	EZ Guidei (Conversational Programming Solution)		●
	iHMI with Machining Cycle	Only with 15” Touch LCD standard *2)	X
	EZ Operation package		●
Setting and display	CNC screen dual display function		●
Network	FANUC MTConnect		✪
	FANUC OPC UA		✪
Others	Display unit	10.4" color LCD	X
		15" color LCD	X
		15" color LCD with Touch Panel	●
	Part program storage size & Number of registerable programs	640M(256KB)_500 programs	X
		1280M(512KB)_1000 programs	X
		2560M(1MB)_1000 programs	X
		5120M(2MB)_1000 programs	●
		10240M(4MB)_1000 programs	X
		20480M(8MB)_1000 programs	X
		2560M(1MB)_2000 programs	X
		5120M(2MB)_4000 programs	X
		10240M(4MB)_4000 programs	X
		20480M(8MB)_4000 programs	X

*1) The number of look-ahead blocks may be changed or limited depending on the peripheral device or the configuration of the internal NC system.
*2) Available Option only with Fanuc i plus iHMI

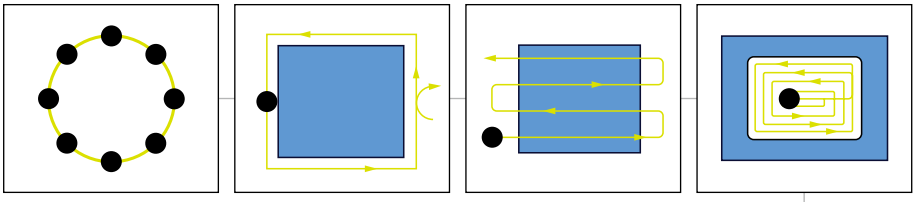
Network: FANUC MTConnect and FANUC OPC UA available.
● Standard ○ Optional X N/A ✪ Available

DN SOLUTIONS FANUC i PLUS

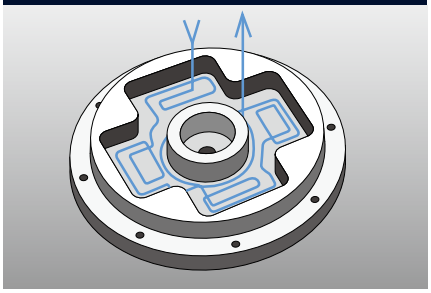
EZ-Guide i

Using the DN Solutions EZ-Guide i, users can create a cutting program for any desired shape, including patterns, by entering the appropriate figures only.

Exemplary Programming : Cutting shape



Collet Chuck

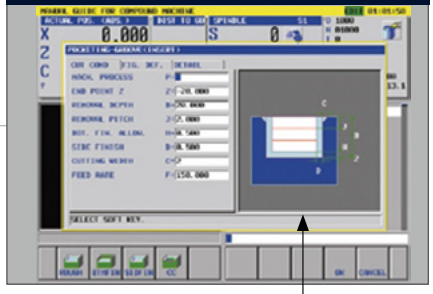


Automatic creation of cutting

```
O7000 (SAMPLE PROGRAM) ;
...
M3 S1500 ;
G0 X50. Y125. ;
G0 Z30. ;
G1040 T0.5 J3. H0.2 K0.5 ... ;
G1020 H120. V50. U37. W68. ... ;
G0 Z80. ;
M5 ;
```

A cutting program is automatically created with the entered values.

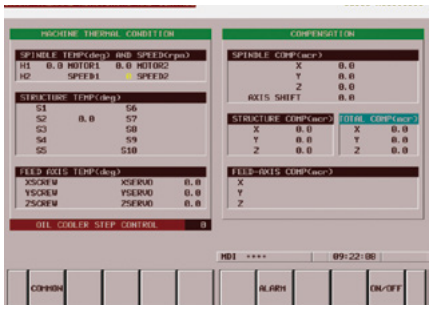
EZ-Guide i Screen



Enter the dimensions of the desired shape.

EZ Work

The software developed by DN Solutions provides a range of different functions designed for fast, efficient and convenient operation.



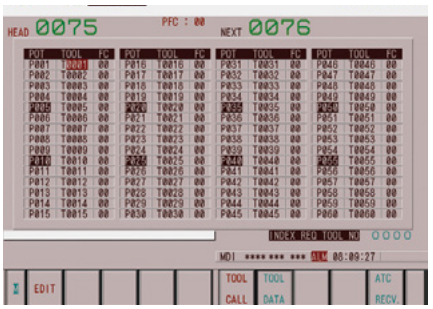
Thermal Compensation

A function to maintain high-precision machining quality by analyzing and correcting the amount of thermal displacement of a structure through a temperature sensor



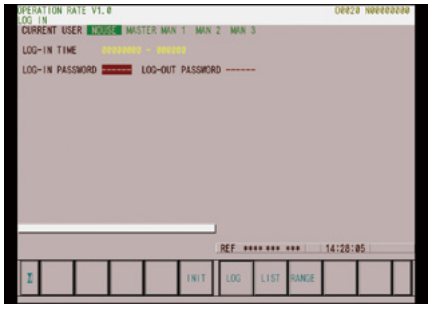
M/G-Code List

Functional description of M code and G code



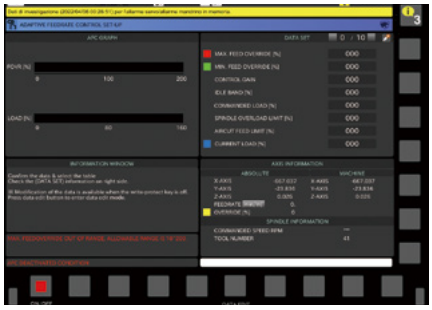
Tool Management

Function to manage tool information [Tool information / Tool No. / Tool condition (normal, large diameter, worn / damaged, used for therst time, manual) / Tool name]



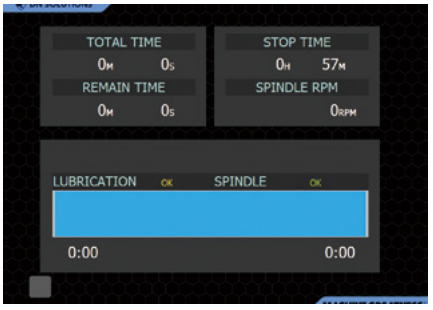
Operation Rate

Machine operation history management function by date based on load



Adaptive Feed Control

Function to control feedrate so that the cutting can be carried out at a constant load (To adapt to the spindle load set up with constant load feedrate control function)



Spindle Warm Up

A function that assists spindle warm-up for spindle life when the spindle has not been used for a certain period of time

CONVENIENT OPERATION

Siemens S828D

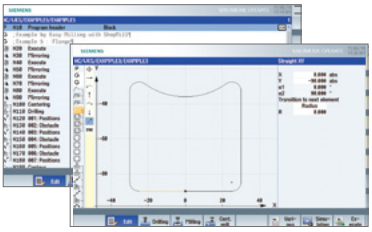


15.6” screen + New OP

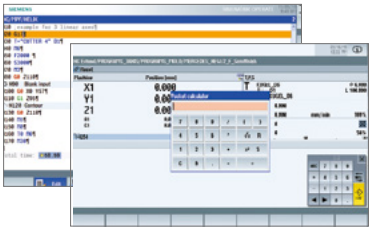
The newly-designed operation panel improves the customer convenience by incorporating and using common-design buttons and layouts, and includes the familiar QWERTY keyboard for fast and easy operation.

- 15.6" display
- 10MB high capacity user memory
- USB & ethernet (standard)
- QWERTY keyboard (standard)
- High-speed calculation and simulation can be fulfilled by improved processor functionality

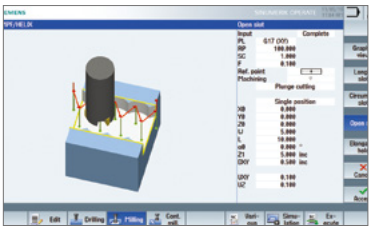
Conversational convenient function



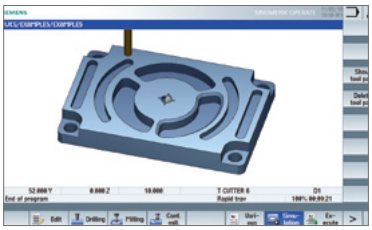
Shop Mill Part Programming



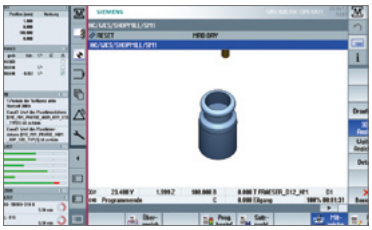
Smart function



Advanced program language programGUID



Simulation and machining contour monitoring



Side screen widget

NUMERIC CONTROL SPECIFICATIONS

SIEMENS

Item		Specifications	S828D DNM
Controlled axis	Controlled axes	-	3-axis
	Simultaneously controlled axes	-	3-axis
Data input/output	Memory card input/output	(Local drive)	X
	USB memory input/output		●
Interface function	Ethernet	(X130)	●
Operation	On network drive	(without EES option, Extcall)	○
	On USB storage medium, e.g. memory stick	(without EES option, Extcall)	●
Program input	Workpiece coordinate system	G54 - G57	●
	Addition of workpiece coordinate system	G505 - G599	●
Interpolation & Feed function	Advanced surface		●
	Top surface		○
	Look ahead number of block	S/W version 4.95	450
Programming & Editing function	3D simulation, finished part		●
	Simultaneous recording		●
	Measure kinematics		X
	DXF Reader for PC integrated in SINUMERIK Operate		○
Operation Guidance Function	ShopMill		●
	EZ Work		●
Setting and display	Operation via a VNC viewer		●
Network	MTConnect		✪
	OPCUA		○
Etc. function	15.6" color display with touch screen		●
	19" color display without touch screen		X
	21.5" color display with touch screen		X
	CNC user memory	10 MB	●
	Expansion by increments	2 ~ 12 MB	○
	Collision avoidance		X
	Collision avoidance ECO (machine, working area)		X

● *Standard* ○ *Optional* *X N/A* ✪ *Available*

POWER | TORQUE

FANUC

Max. spindle speed

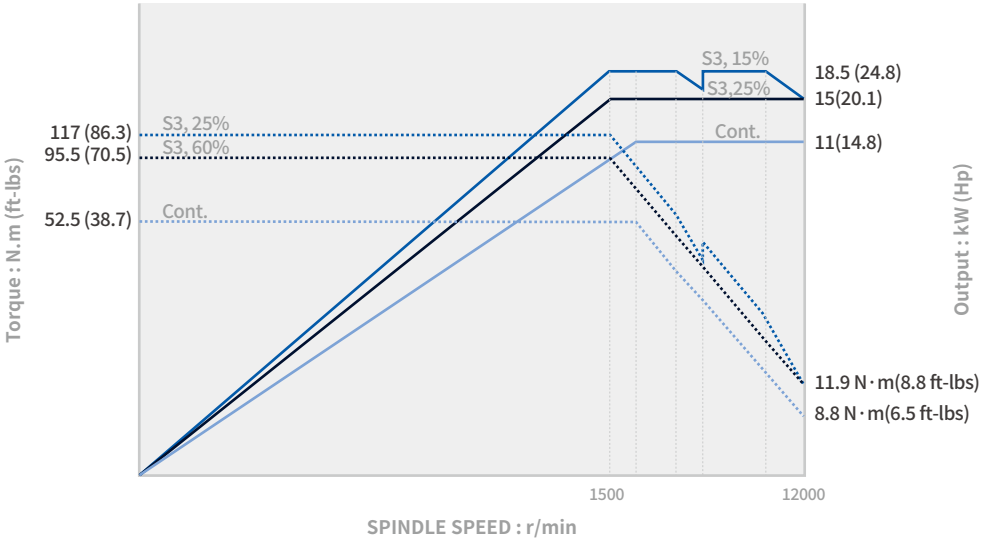
12000 r/min

Max. spindle power

18.5 / 11 kW
(24.8/14.8 Hp)

Max. spindle torque

117 N·m
(86.3 ft-lbs)



SIEMENS

Max. spindle speed

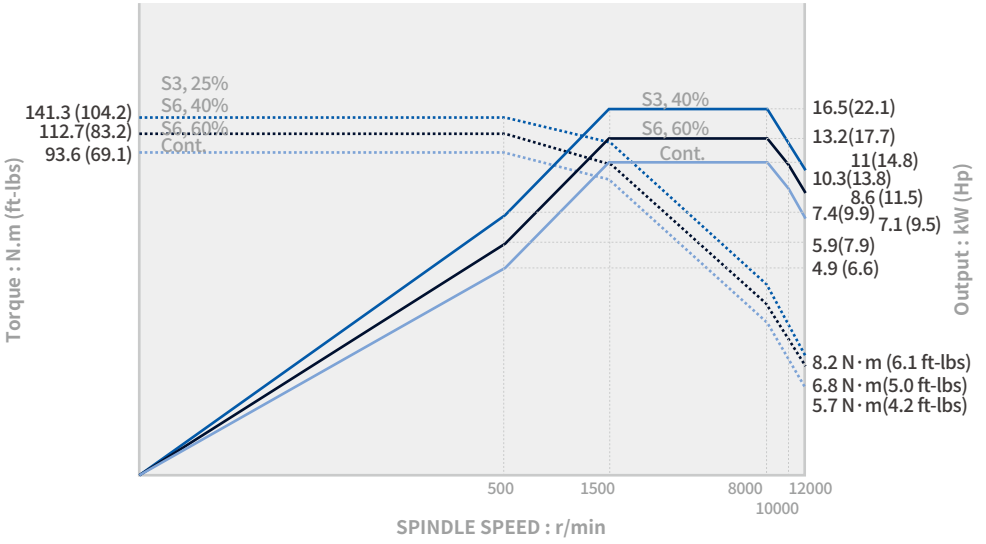
12000 r/min

Max. spindle power

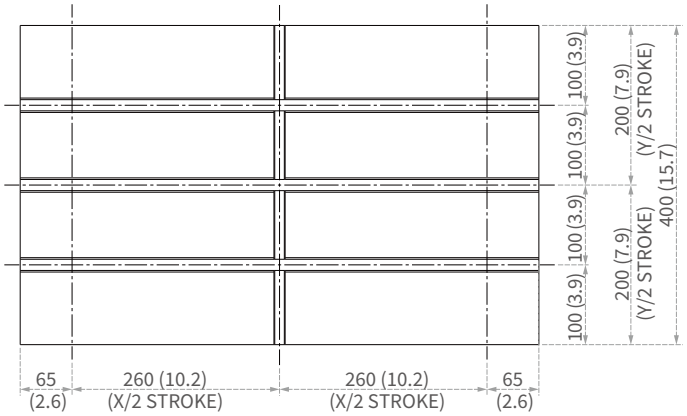
16.5 / 11 kW
(12.2/14.8 Hp)

Max. spindle torque

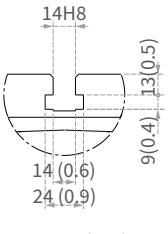
141.3 N·m
(104.2 ft-lbs)



TABLE



Units : mm (inch)

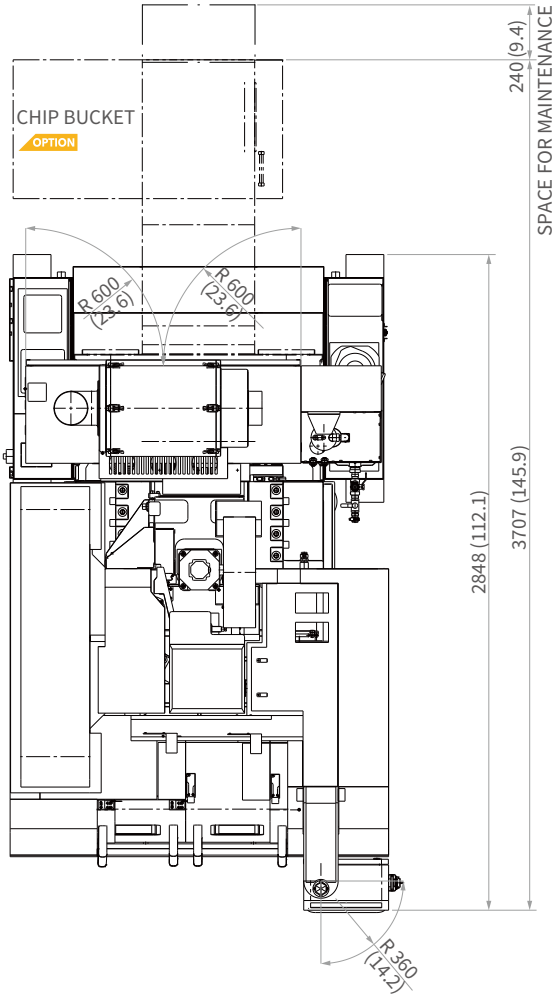


Detail B (1:2)

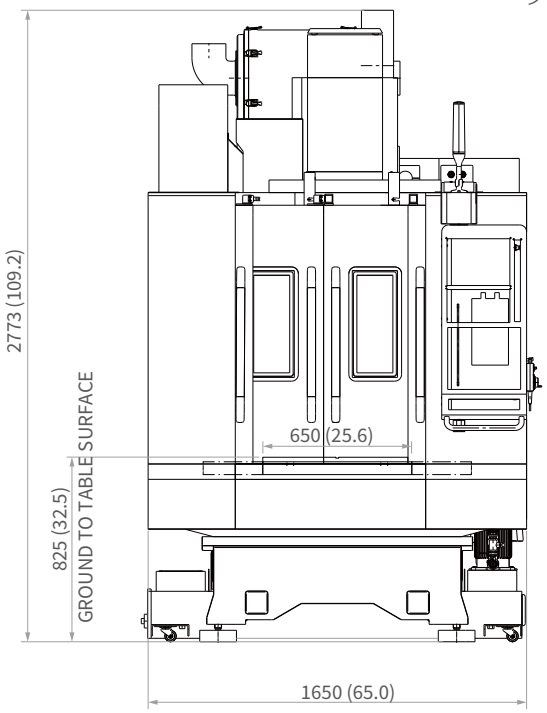
EXTERNAL DIMENSIONS

Units : mm (inch)

TOP



FRONT



** Some peripheral equipment can be placed in other places.*

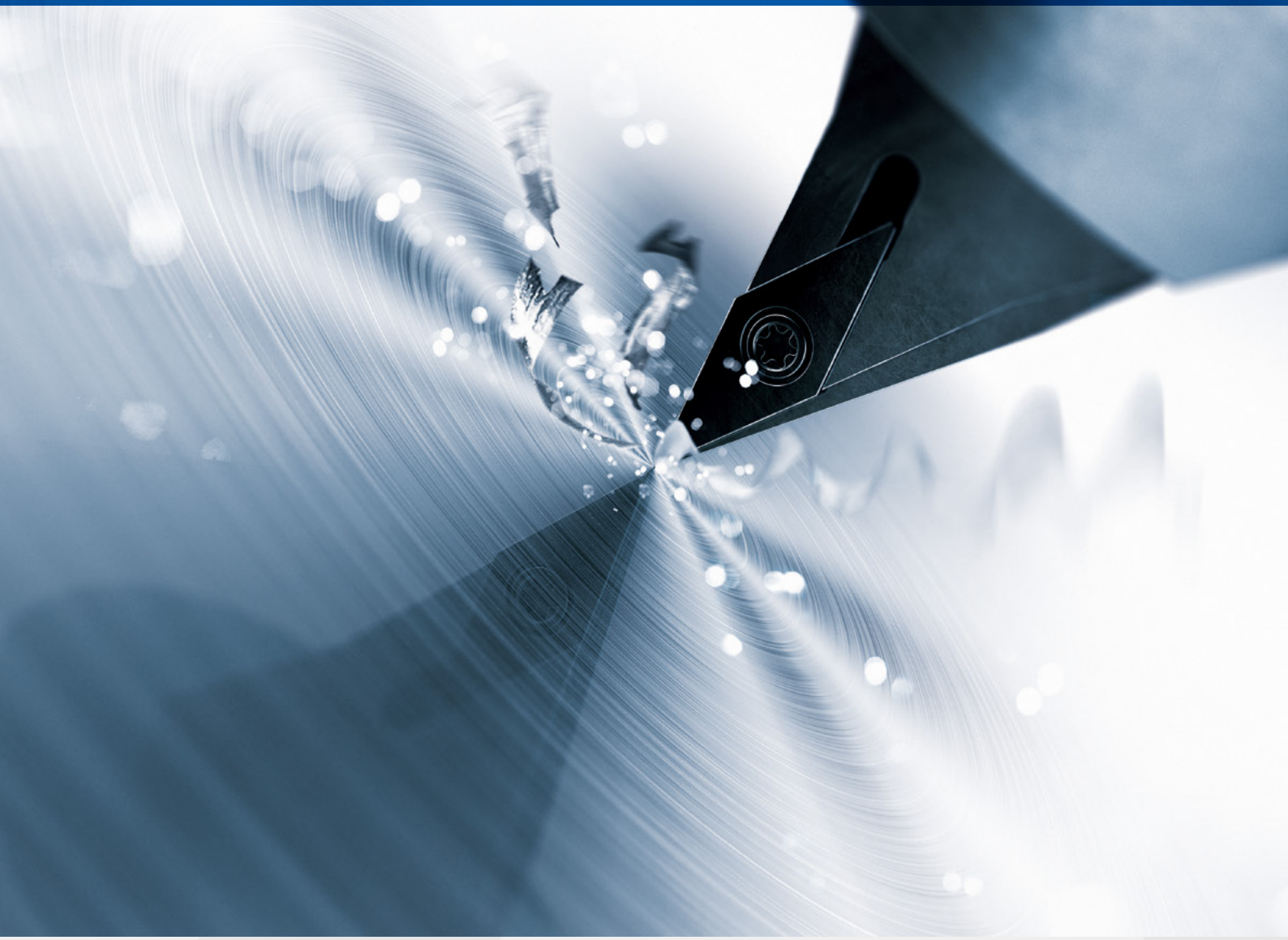
MACHINE SPECIFICATIONS

Description			Unit	DNM 4000
Travels	Travel distance	X axis	mm (inch)	520 (20.5)
		Y axis	mm (inch)	400 (15.7)
		Z axis	mm (inch)	480 (18.9)
	Distance from spindle nose to table top		mm (inch)	150 ~ 630 (5.9~24.8)
Table	Table size		mm (inch)	650 x 400 (25.6 x 15.7)
	Table loading capacity		kg (lb)	400 (881.8)
	Table surface type		mm (inch)	T-SLOT (3-100(3.9) x 14(0.6)H8)
Spindle	Max. spindle speed		r/min	12000
	Taper		-	ISO #40
	Max. spindle power		kW (Hp)	18.5/11 (24.8/14.8)
	Max. spindle torque		N·m (ft-lbs)	117 (86.3)
Feedrates	Rapid traverse rate	X axis	m/min (ipm)	48 (1889.8)
		Y axis	m/min (ipm)	48 (1889.8)
		Z axis	m/min (ipm)	48 (1889.8)
Automatic Tool Changer	Type of tool shank	Tool shank	-	BT 40 {CAT40/DIN40}*
		Pull stud	-	PS806
	Tool storage capa.		ea	20
	Max. tool diameter	Continuous	mm (inch)	90 (3.5)
		Without adjacent tools	mm (inch)	125 (4.9)
	Max. tool length		mm (inch)	270 (10.6)
	Max. tool weight		kg (lb)	5 (11)
	Max. tool moment		N·m (ft-lbs)	9.8 (7.2)
	Tool selection			MEMORY RANDOM
	Tool change (Tool-to-Tool)		sec	1.3
	Tool change (Chip-to-Chip)		sec	2.6
Power source	electric power supply(rated capacity)		kVA	29.5
	Compressed air supply		Mpa (psi)	0.54 (78.3)
Tank capacity	Coolant tank capacity		L (gal)	200 (52.8)
Machine Dimensions	Height		mm (inch)	2753 (108.4)
	Length		mm (inch)	2853 (112.3)
	Width		mm (inch)	1650 (65.0)
	Weight		kg (lb)	3300 (7275.3)
Control	CNC system		-	DN Solutions Fanuc i Plus

*{ } : Option

WHY DN SOLUTIONS

The DN Solutions promise, MACHINE GREATNESS, has two important meanings. The first is simple: DN Solutions makes great machines. The second is a challenge to our end-users. With a product line that is this comprehensive, accurate and reliable, we equip our customers to machine greatness.
The big question: ***Why should you choose DN Solutions over other options?*** Here's why…



UNBEATABLE MACHINES

You won't find a more comprehensive range or a better combination of value, performance and reliability anywhere else.

READILY AVAILABLE - ANYWHERE IN THE WORLD

Machining centres (including 5-axis machines), lathes, multi-tasking turning centres and mill-turn machines, and horizontal borers with best-in-class specifications are all available…ready to install.

ROBUST PRODUCT LINE

We offer an impressive range of machine models and hundreds of configurations. Whatever your machining needs and requirements, there's a DN Solutions for you.

EXPERT SERVICE

Our dedicated, experienced and knowledgeable team is totally committed to improving your productivity, growth and success.

RESPONDING TO CUSTOMERS **ANYTIME, ANYWHERE**

DN SOLUTIONS GLOBAL NETWORK

66 COUNTRIES | **140** + SALES NETWORKS | **3** FACTORIES | **6** REGIONAL HQS



CUSTOMER SUPPORT AND SERVICES

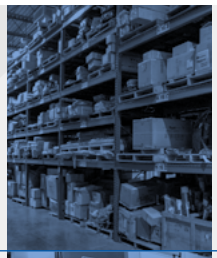
WE'RE THERE FOR YOU WHENEVER YOU NEED US.

We help our customers operate at maximum efficiency by providing them with a range of tried, tested and trusted services - from pre-sales consultancy to post-sales support.



FIELD SERVICES

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



PARTS SUPPLY

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



TRAINING

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



TECHNICAL SUPPORT

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

DN SOLUTIONS

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** Specifications and information contained within this catalogue may be changed without prior notice.*

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