



Ø400MM COMPACT 5-AXIS  
MACHINING CENTER

# DVF

4000



**DN SOLUTIONS**

# DVF 4000

Newly added 5-axis model, DVF 4000 has significantly improved reliability and productivity for high speed 5-axis machining. And grease lubrication is applied on X/Y/Z-axis as standard for eco-friendly and cost-saving operation. A stable structure and compact footprint is ideal for the production of small and medium size workpieces with complex shapes.



From small high precision medical parts to small & medium-sized automobile, aerospace and semiconductor parts, it is possible to cover various applications for both AL die-cast high-speed light cutting and titanium, inconel, CoCr difficult-to-cut machining with DVF's high rigidity, high speed spindle and solid column structure table.



## HIGH SPEED, HIGH-PERFORMANCE 5-AXIS

- 12000 / 15000 r/min direct-coupled high speed spindle
- Ø400 mm rotary tilting table (opt : Ø500mm)
- Max. workpiece weight 200kg
- RGC(Roller Gear Cam) driven type B/C-axis

## USER-FRIENDLY MACHINE

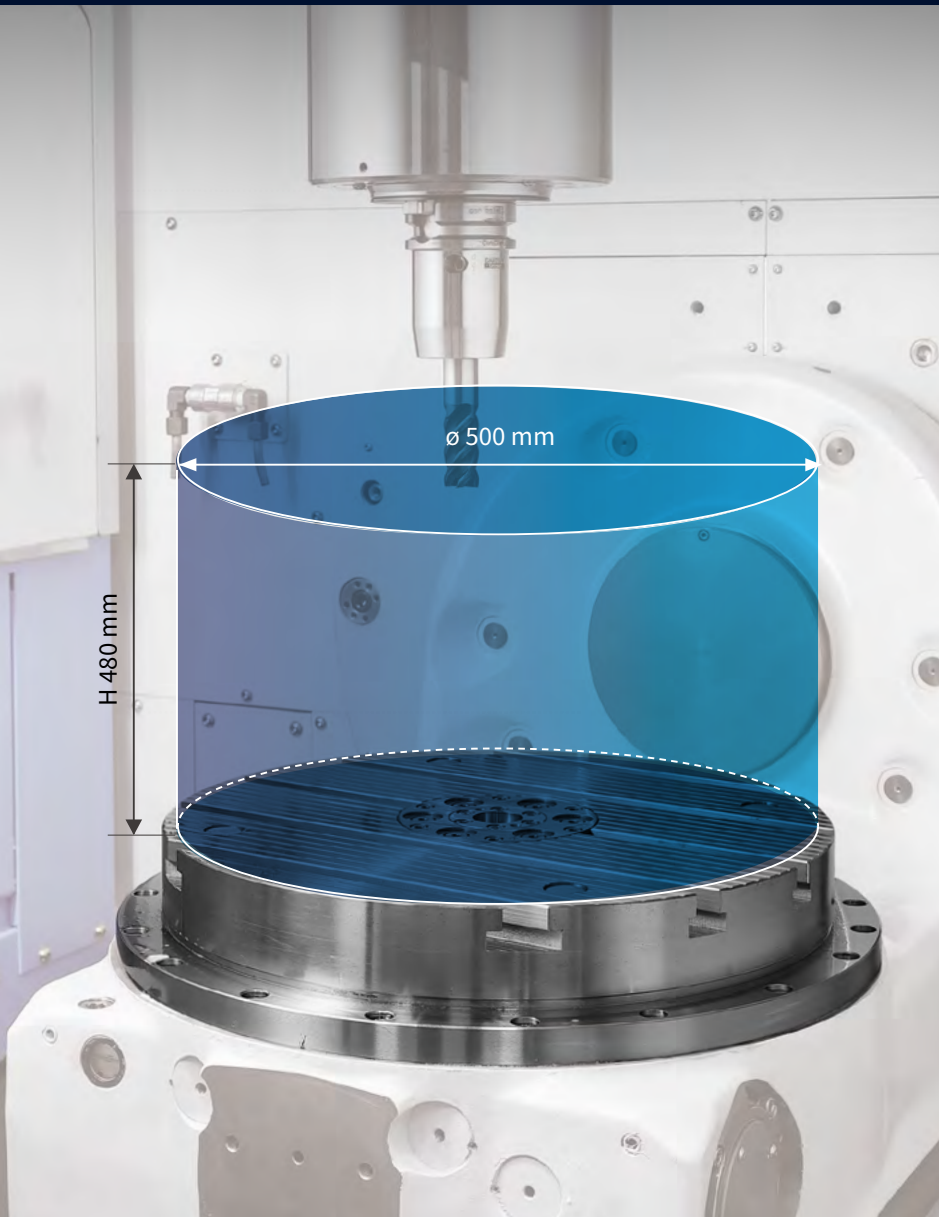
- Compact footprint
- Grease lubrication system
- Easy operator's access to machine
- Compact automation system(AWC)
- Enhanced chip disposal capability(flushing, chip conveyor)

## HIGH PRECISION MACHINING

- Integrated thermal compensation systems for spindle and structure
- Spindle cooling provided as standard
- B/C-axis rotary encoder provided as standard

# BASIC STRUCTURE

High precision roller LM guideways on all X/Y/Z-axes promise higher accuracy and structural stability.



## Table size

**Ø400** mm  
 ø15.7 inch

**Ø500 x 460** mm option  
 ø19.7 inch x 18.1 inch

## Maximum workpiece size

**Ø500 x H480** mm  
 ø19.7 inch x 18.9 inch

## Maximum workpiece weight

**200** kg  
 440.9 lbs

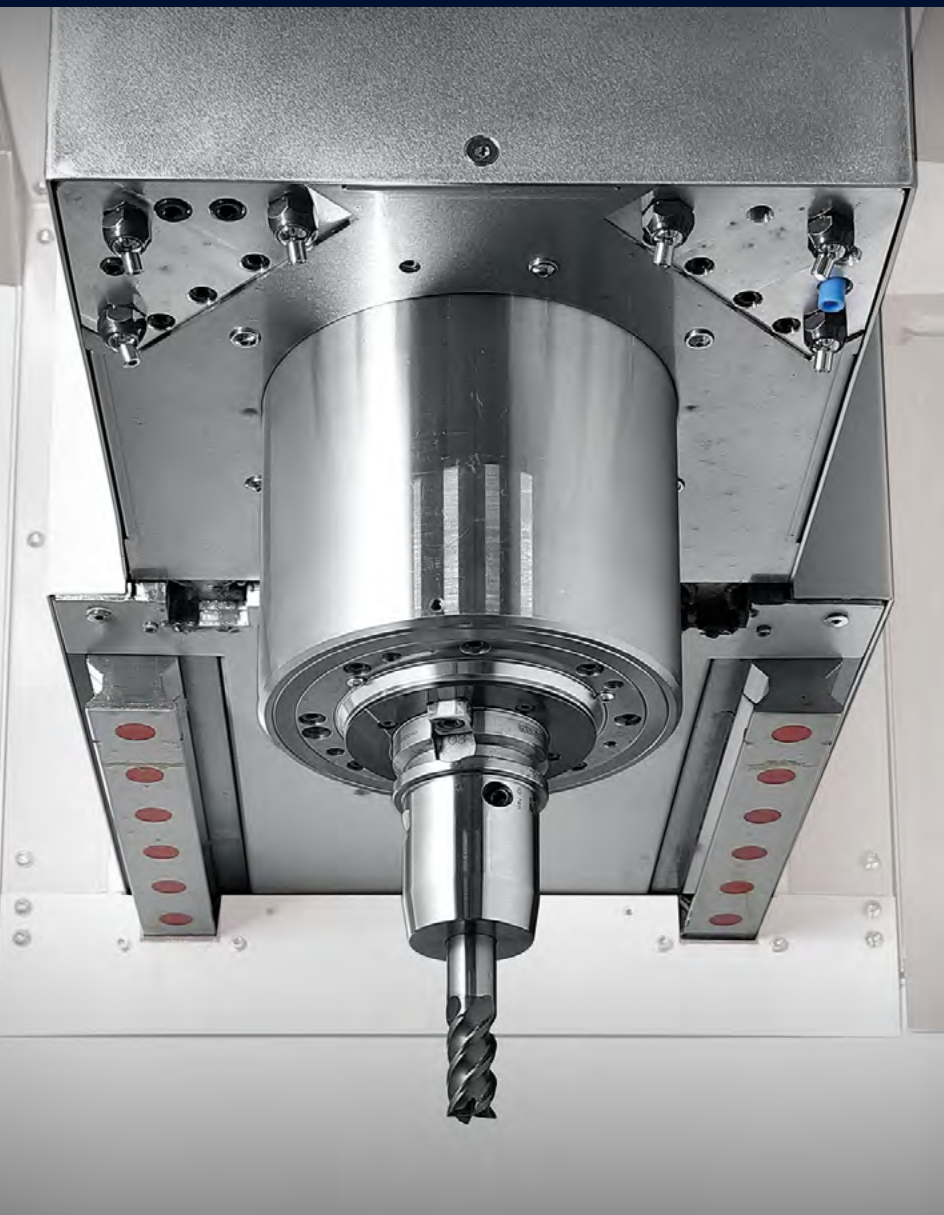
Description		Unit	DVF 4000
Travel distance	X-axis	mm (inch)	620 (24.4)
	Y-axis	mm (inch)	440 (17.3)
	Z-axis	mm (inch)	430 (16.9)
Rapid traverse rate	X-axis	m/min (ipm)	36 (1417.3)
	Y-axis	m/min (ipm)	36 (1417.3)
	Z-axis	m/min (ipm)	36 (1417.3)





# SPINDLE SPECIFICATIONS

Providing stable machining performance with a high-speed, direct-coupled spindle.



## Maximum speed

**12000** r/min  
(Grease type lubrication)

**15000** r/min option  
(Air-oil type lubrication)

## Maximum power / torque

**18.5** kW / **118** N·m  
24.8 hp / 87.1 ft-lbs

- Oil cooling, spindle smart thermal control as standard
- Tool clamp confirmation sensor

## COVER ALL POSSIBILITIES

With cutting-edge technology and an automation-ready framework, this machine elevates your 5-axis capability.



# MAGAZINE SPECIFICATIONS

Servo tool magazine delivers high productivity and reliability.



## Tool type

**ISO #40**

## Tool capacity

DRUM TYPE **30, 40** tools

CHAIN TYPE **60, 120** tools

## Maximum tool diameter

CONTINUOUS **75** mm 3.0 inch

W/O ADJACENT TOOLS

**125** mm 4.9 inch

## Maximum tool length

**300** mm 11.8 inch

## Maximum tool weight

**8** kg 17.6 lb

## Tool-to-tool

T-T-T **1.3** second

C-T-C **4.6** second

# STANDARD | OPTIONAL SPECIFICATIONS


A range of options is available to suit individual requirements.

Description	Features	DVF 4000	
Spindle	12000r/min	●	
	15000r/min	○	
Tool Magazine	30ea, Drum type	●	
	40ea, Drum type	○	
	60ea, Chain type	○	
	120ea, Chain type	○	
Tool type(shank)	BIG PLUS BT40	●	
	CAT40/DIN40/HSK-A63	○	
Coolant	FLOOD	2.5kW, 0.2MPa, 325L/min	●
	TSC	None	●
		4.0kW, 2.0MPa, Cyclone filter	○
		4.0kW, 2.0MPa, Paper filter	○
		3.7kW, 3.0MPa, Cyclone filter	○
		3.7kW, 3.0MPa, Paper filter	○
		7.5kW, 7.0MPa, Cyclone filter	○
		7.5kW, 7.0MPa, Paper filter	○
	Chiller	5800W(60Hz) / 4800W(50Hz)	○
	OIL SKIMMER	None	●
BELT TYPE		○	
Coolant level switch _Low / High		○	
Chip disposal	Chip conveyor	Chip pan	●
		Left side, Hinged belt type	○
		Left side, Drum type	○
	Chip bucket	Forklift type, 300L	○
		Rotation type, 300L	○
	Air blower		○
	Air gun		○
	Coolant gun		○
Mist collector	Preparation(including internal hose)	○	
	0.75kW(water soluble, none water soluble)	○	
Rotary table	Rotary joint	Hyd. Fixture line thru table center(Max. 6 port)	○
	Air clamping	B-axis/C-axis	○
	Fixture interface	2AB+GAP SENSING(5 PORTS)	○
Accuracy	Spindle Smart Thermal Control		●
	Structure Smart Thermal Control		●
	Linear scale	X/Y/Z axis	○
	Pulse encoder	X/Y/Z axis	○
	Rotary encoder	B/C axis	●
Measurement	IKC(Intelligent Kinematic Compensation)	IKC Ready _S/W only	○
		IKC Ready _S/W +Receiver(RMI-Q)	○
	Auto tool length measurement	TS27R(Renishaw, Touch type)	○
		ZX SPEED(Blum, Touch type)	○
		NC4S(Renishaw, Laser type)	○
	Auto workpiece measurement	RMP60(Renishaw)	○
TC-60(Blum)		○	
Automation	AWC(Automatic Workpiece Changer)	6/8/12 pallets	○
	Multi-AWC	28/32/40 pallets	○
	AUTO DOOR	Front door, with safety edge	○
		Side door, with safety edge	○
		Roof door	○
Others	LED work light		●
	3 color signal tower		●
	EZ Work		●
	EZ Guide i		○
	Automatic power off		●

\* Please contact DN Solutions for detailed specification information. \*Special Quotation.

● Standard ○ Optional x Not applicable

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

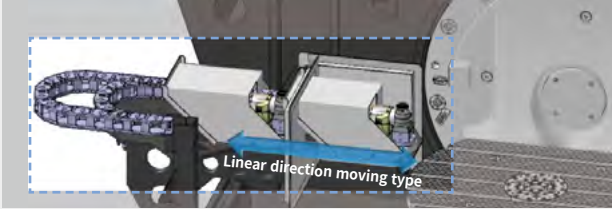
 **Fire Safety Precautions** | There is a high risk of fire when using non-water-soluble cutting fluids, processing flammable materials, neglecting the controlled and careful use of coolants and modifying the machine without the consent of the manufacturer. Always check the SAFETY GUIDELINES carefully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



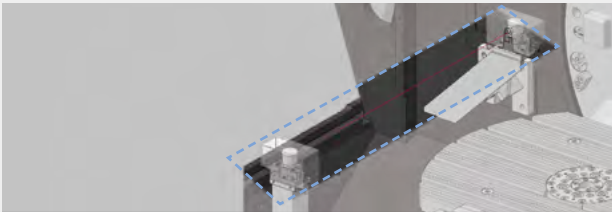
# PERIPHERAL EQUIPMENT

## Automatic Tool Measurement

Touch type : TS27R / RTS(Renishaw), ZX Speed(Blum)



Laser type : NC4S(Renishaw)



## Automatic Workpiece Measurement

Touch probe : RMP60(Renishaw),  
TC-60(Blum)



## Intelligent kinematic compensation for 5-axis machining

For high-accuracy 5-axis machining, the Intelligent Kinematic Compensation function is recommended. This function minimizes errors in complex 5-axis machining applications by maintaining the tool point in the correct position relative to the workpiece.

In order to use this function, the following optional items are required:

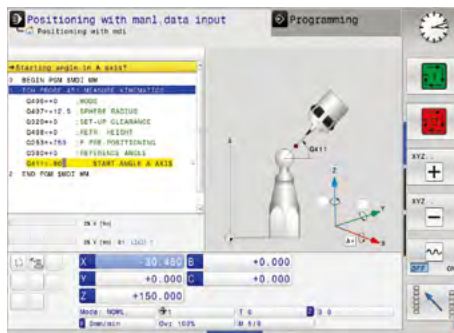
### SOFTWARE

RELATIVE	ABSOLUTE	MACHINE	DISTANCE TO GO
X -500.000	X 150.200	X 100.200	Y 0.000
Y -473.510	Y 14.950	Y 14.950	Z 0.000
Z 614.741	Z 264.541	Z -349.300	C 0.000
C 0.000	C 0.000	C 0.000	A 0.000
A 0.000	A -53.100	A -53.100	

INITIAL VALUE FOR MEASURE	MEASURED MEASUREMENT PERIODS
BALL DIAMETER 25.400 (UNIT:mm)	N1 DATE TIME X-DIR Y-DIR Z-DIR
TOOL OFFSET NO. 60 (RANGE:1~)	1 20.09.11 15:45 0.001 0.002 0.004
C-AXIS POINT 4 (RANGE:4)	2 20.09.11 13:50 0.002 0.001 0.003
A-AXIS POINT 2 (RANGE:2)	3 20.09.11 13:41 0.001 0.005 0.007
	4 20.09.11 11:54 0.001 0.000 0.001
	5 20.09.11 11:26 0.003 0.001 0.005
X-DIRECTION ERROR 0.001 (UNIT:mm)	6 20.09.11 10:03 0.000 0.001 0.000
Y-DIRECTION ERROR -0.002 (UNIT:mm)	7 20.09.11 09:58 0.001 0.002 0.002
Z-DIRECTION ERROR 0.004 (UNIT:mm)	8 20.09.11 09:05 0.002 0.002 0.011
	9 20.09.10 10:31 0.001 0.001 0.000
	10 20.09.10 10:26 0.000 0.007 0.205

FANUC NC : IKC



HEIDENHAIN NC : IKC

### RECEIVER Recommended Option



### TOUCH PROBE Recommended Option



### DATUM BALL Recommended Option



### AUTO TOOL MEASUREMENT Recommended Option



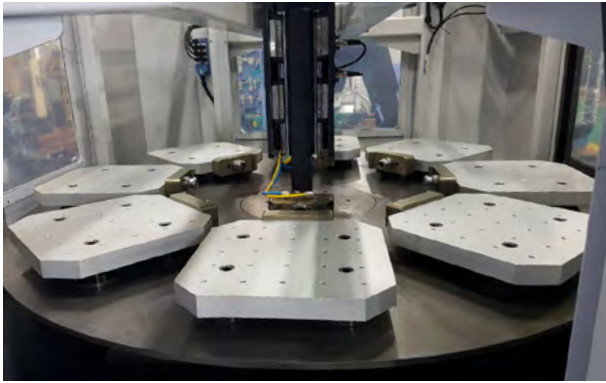
### MASTER TOOL Recommended Option





## AWC, Multi-AWC

A compact loading/unloading automation capable of mounting up to 40 workpieces.



\*Illustrated with DVF5000 & AWC(enable to partially differ from real manufacturing product)

### AWC option

A compact automation system providing fast, reliable and high productivity workpiece change capabilities.

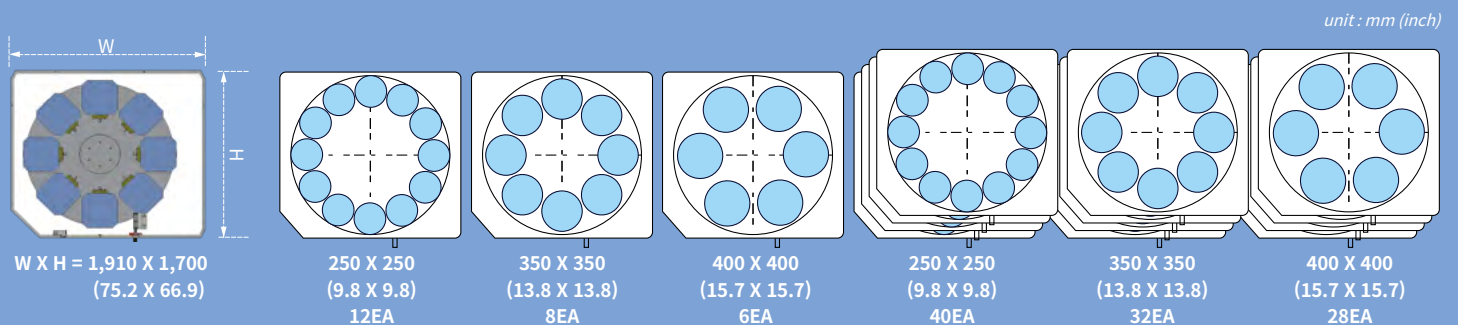


### Multi-AWC option

Automation solution capable of loading up to 40 workpieces.

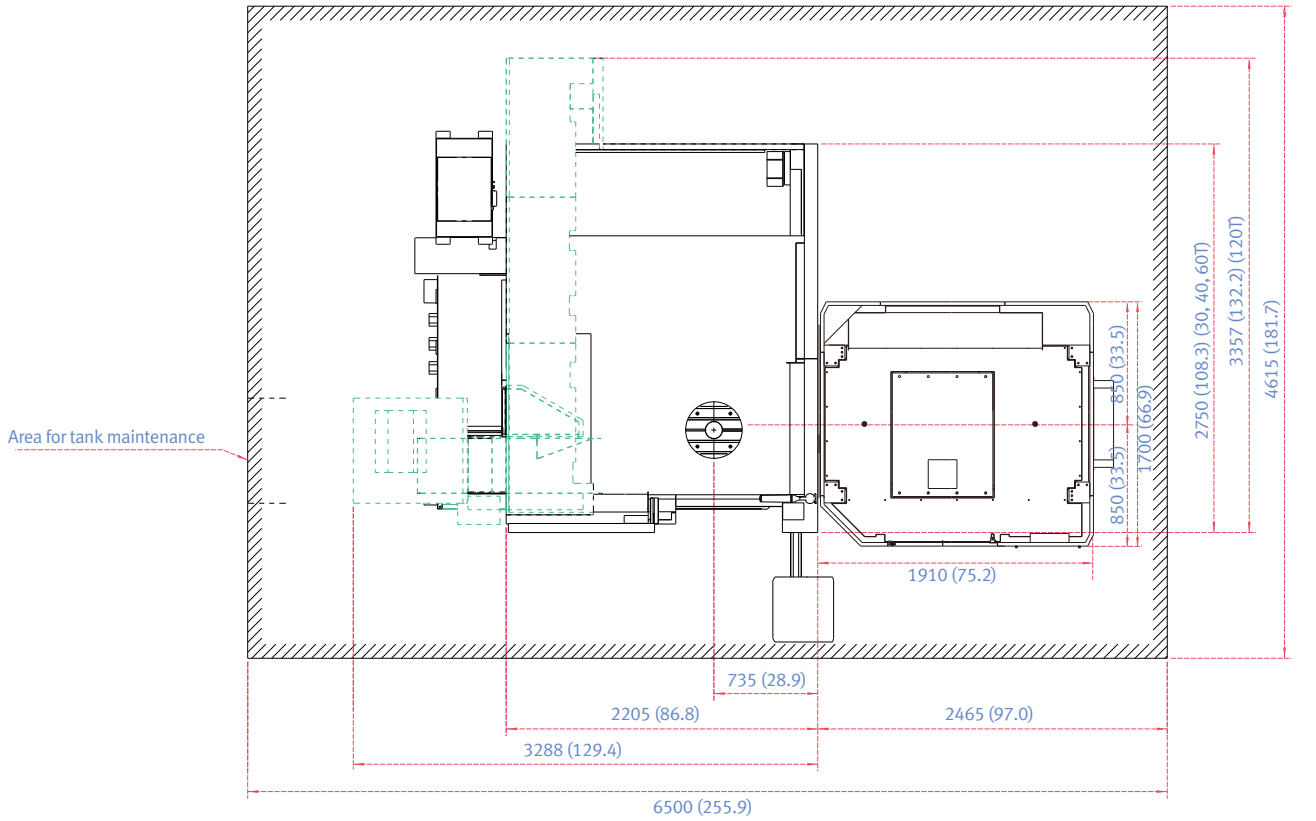
Description	Pallet size	Count	Max. workpiece dimensions	Max. loading
AWC	250 x 250 mm (9.8 x 9.8 inch)	12ea	Φ300 x 350mm (11.8 x 13.8 inch)	130 kg (286.6 lb)
	350 x 350 mm (13.8 x 13.8 inch)	8ea	Φ400 x 350mm (15.7 x 13.8 inch)	250 kg (551.1 lb)
	400 x 400 mm (15.7 x 15.7 inch)	6ea	Φ450 x 350mm (17.7 x 13.8 inch)	250 kg (551.1 lb)
Multi-AWC	250 x 250 mm (9.8 x 9.8 inch)	40ea (10x4 tiers)	Φ300 x 350mm (11.8 x 13.8 inch)	65 kg, 130 kg (143.3, 286.6 lb) <small>option</small>
	350 x 350 mm (13.8 x 13.8 inch)	32ea (8x4 tiers)	Φ400 x 350mm (15.7 x 13.8 inch)	250 kg (551.1 lb)
	400 x 400 mm (15.7 x 15.7 inch)	28ea (7x4 tiers)	Φ450 x 350mm (17.7 x 13.8 inch)	250 kg (551.1 lb)

## AWC pallet storage-table configurations

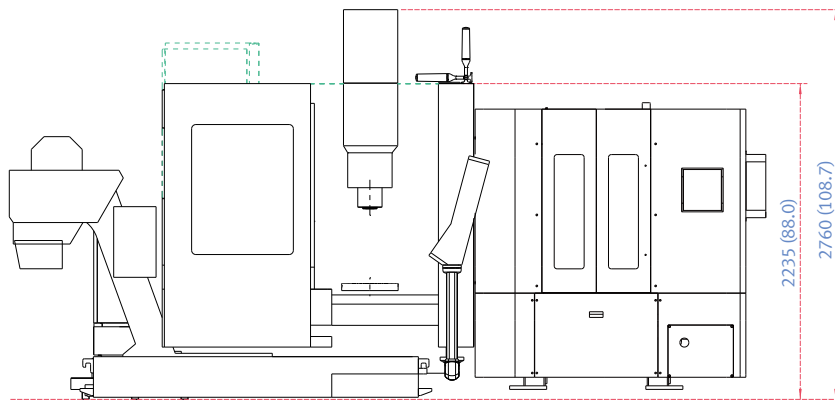


# AWC DIMENSIONS

Units : mm (inch)



TOP



FRONT

# FANUC 31i PLUS

Fanuc 31i Plus maximizes customer productivity and convenience.

## 15" Touch screen + New OP

DN Solutions Fanuc 31iB/B5 Plus' operation panel enhances operating convenience by incorporating common-design buttons and layout. It features a Qwerty keyboard for fast and easy data input and operation.

## Fanuc 31i Plus

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

## USB and PCMCIA card QWERTY keyboard

- EZ-Guide i standard
- Ergonomic operator panel
- 4MB Memory
- Hot keys
- Enhance AICC BLOCK
- Touch pen provided as standard



## iHMI touchscreen

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	F31iB5 Plus	0i PLUS	
		DVF 4000		
Controlled axis	Controlled axes	5 (X,Y,Z,B,C)	5 (X,Y,Z,B,C)	
	Simultaneously controlled axes	5 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	●	●	
Interface function	Large capacity memory(2GB)*2	○	○	
	Embedded Ethernet	●	●	
	Fast Ethernet	○	○	
Operation	Enhanced Embedded Ethernet function	●	●	
	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	T4 digits
Feed function	Tilted working plane indexing command	G68.2 TWP	●	●
	AI contour control II	G5.1 Q_, 200 Blocks	X	●
	AI contour control II	G5.1 Q_, 1000 Blocks	●	X
Operation guidance function	High smooth TCP	●	X	
	EZ Guide i (Conversational Programming Solution)	●	●	
Setting and display	EZ Work	●	●	
	CNC screen dual display function	●	●	
Network	FANUC MTConnect	●	●	
	FANUC OPC UA	●	●	
Others	Display unit	15" color LCD with Touch Panel	●	●
	Part program storage size & Number of registerable programs	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	

Network: FANUC MTConnect and FANUC OPC UA available.

● Standard ○ Optional X Not Available ⊕ Available



# EZ WORK

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

## EZ work

The EZ work package delivers speed and efficiency. This menu-driven innovation not only helps customers reduce setup times, but also simplifies common tasks and procedures, reducing the potential for errors. EZ work reduces operating time, protects machinery, enhances quality and speeds up maintenance interventions.



### 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



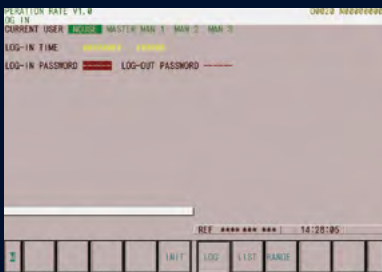
### M/G-Code List

Functional description of M code and G code



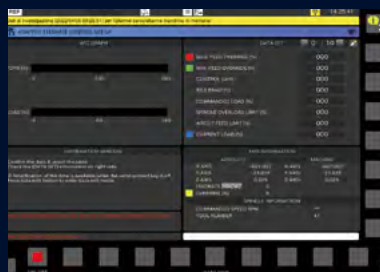
### Tool Management

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



### Operation Rate

Machine operation history management function by date based on load



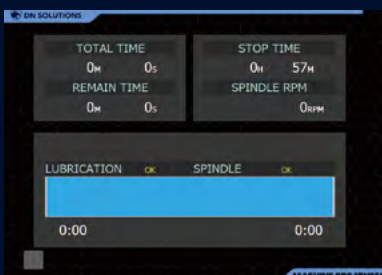
### Adaptive Feed Control

Function to control feedrate so that the cutting can be carried out at a constant load



### IKC (DCP-I)

The function to compensate the position of the workpiece and the tool tip to be constant regardless of the rotation of the rotating shaft error



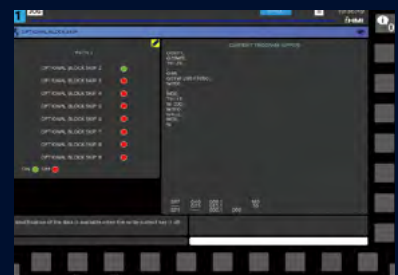
### Spindle Warm Up

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



### ATC Recovery

Function to view detailed info with recommended actions and to perform step-by-step operation manually (when an alarm is triggered during an ATC operation)



### Addition of Optional Block Skip

In addition to the OPTIONAL BLOCK SKIP of the operation panel, the function to skip a specific block selected in the machining program

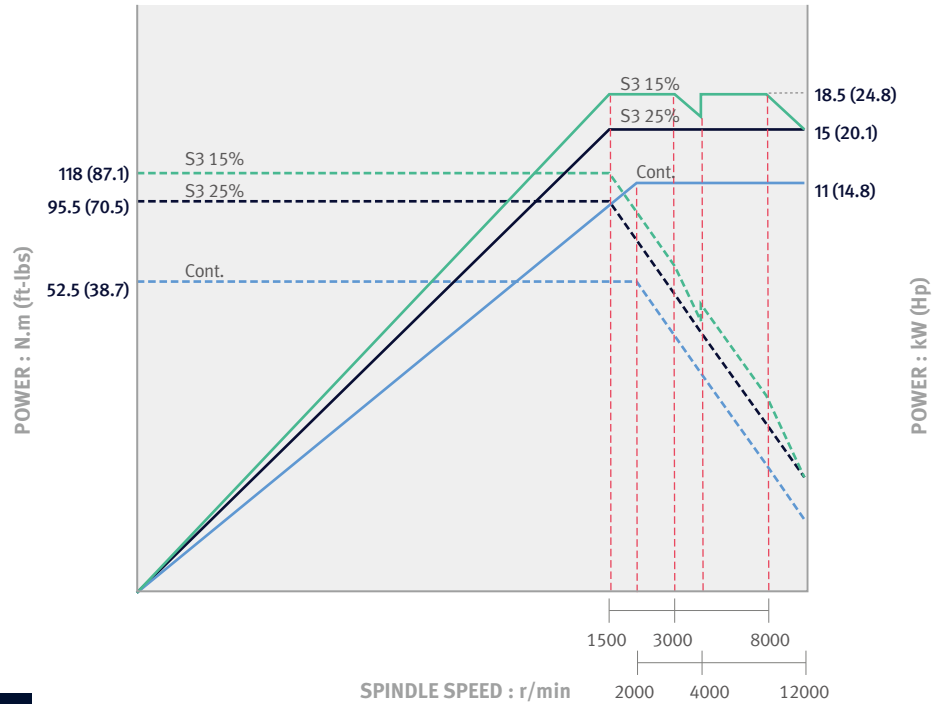
# POWER | TORQUE

## 12000 r/min Direct

Speed: **12000** r/min

Power: **18.5/11** kW  
24.8/14.8 Hp

Torque: **118** N·m  
87.1 ft-lbs

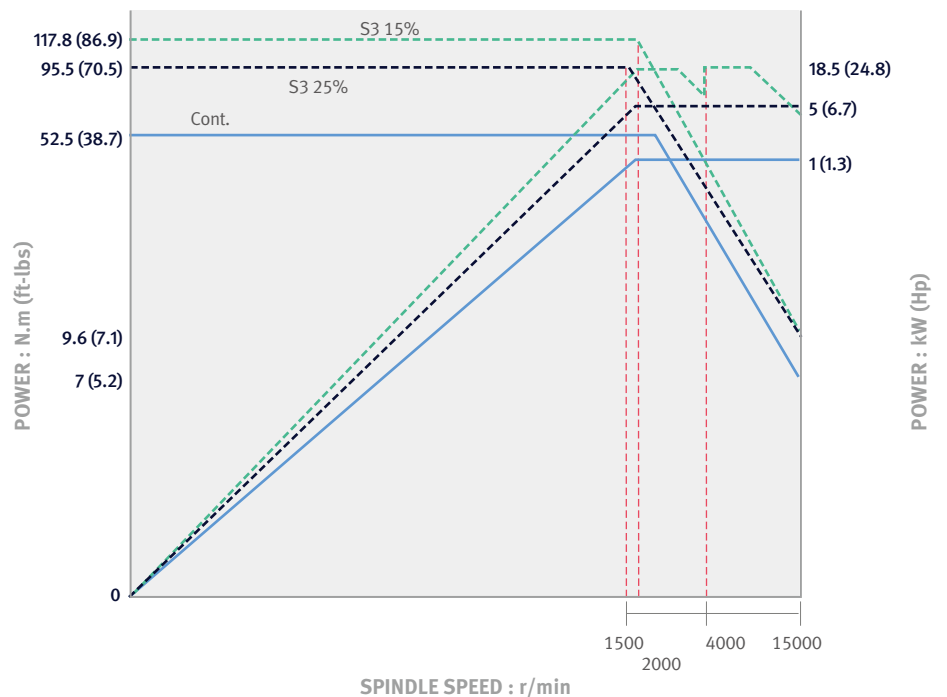


## 15000 r/min Direct option

Speed: **15000** r/min

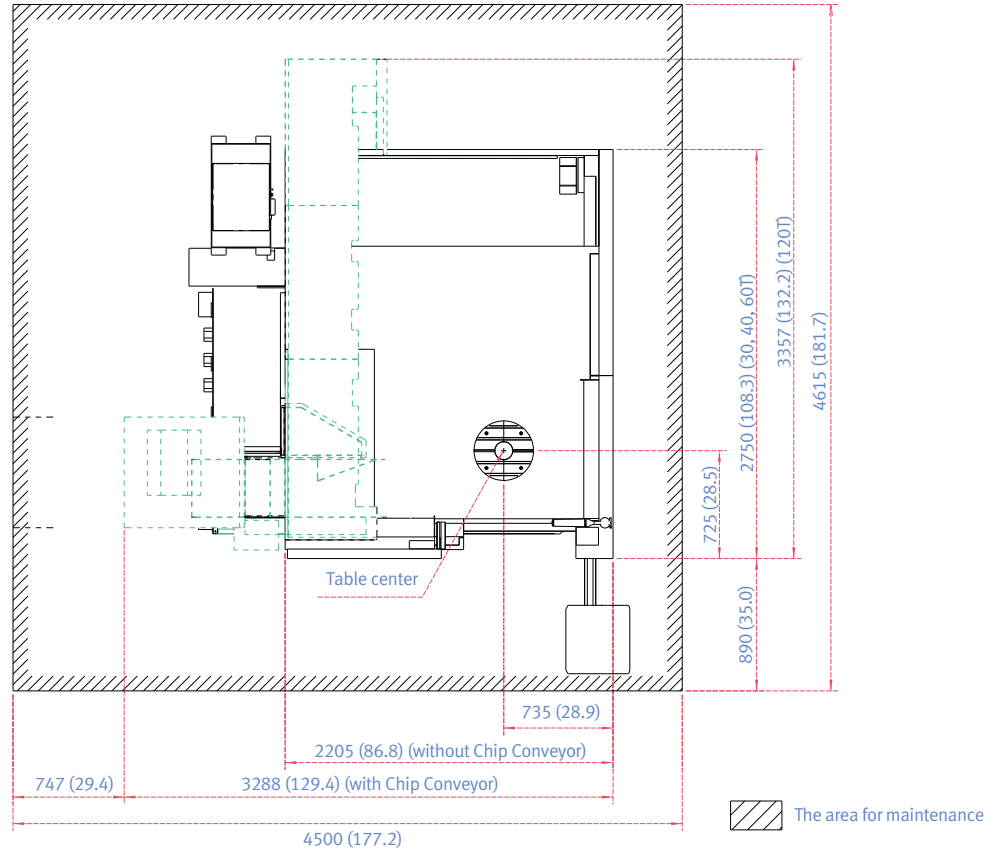
Power: **18.5** kW  
24.8 Hp

Torque: **117.8** N·m  
86.9 ft-lbs

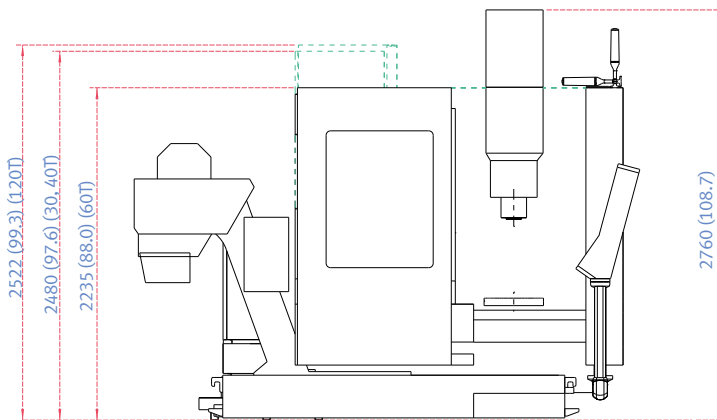


# DIMENSIONS

Units : mm (inch)



TOP

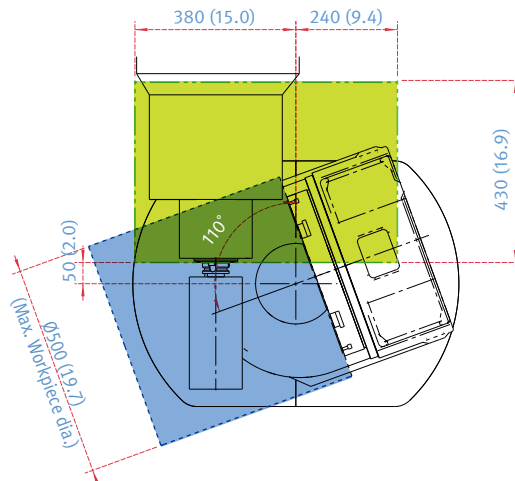
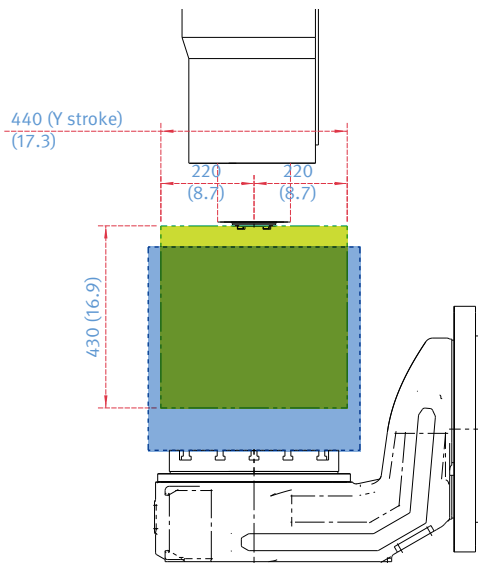
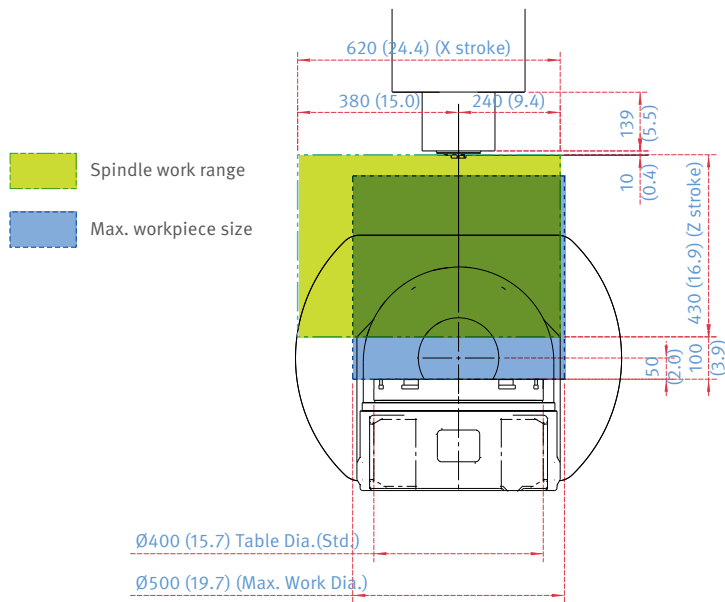


FRONT



# INTERFERENCE

Units : mm (inch)



\*Some peripheral equipment can be placed in other areas

# MACHINE SPECIFICATIONS

Description		Unit	DVF 4000	
Travels	Travel distance	X axis	mm (inch)	620 (24.4)
		Y axis	mm (inch)	440 (17.3)
		Z axis	mm (inch)	430 (16.9)
		B axis	deg	140 (-30~+110)
		C axis	deg	360
Table	Table size		mm (inch)	Ø400 {Ø500 x 460} (Ø15.7 {Ø19.7 x 18.1})
	Max. workpiece size		mm (inch)	Ø500 X H480 (Ø19.7 X H18.9)
	Table loading capacity		kg (lb)	200 (440.9)
Spindle	Max. spindle speed		r/min	12000 {15000}
	Max. spindle power		kW (Hp)	18.5/11 (S3 15%/Cont) (24.8/14.8)
	Max. spindle torque		N · m	117.8
Feedrate	Rapid traverse rate	X axis	m/min (ipm)	36 (1417.3)
		Y axis	m/min (ipm)	36 (1417.3)
		Z axis	m/min (ipm)	36 (1417.3)
		B axis	r/min	20
		C axis	r/min	20
Automatic tool changer	Type of tool shank		-	ISO #40
	Tool storage capa.		ea	30 {40, 60, 120}
	Max. tool diameter	Continuous	mm (inch)	75 (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)
	Tool change (T-T-T)		sec	1.3 (60Hz)
	Tool change time (C-T-C)		sec	4.6 (60Hz)
Tank capacity	Coolant tank capacity		L (gal)	485 (128.1)
Machine dimensions	Height		mm (inch)	2760 (108.7)
	Length x Width		mm (inch)	2750 x 2205 (108.3 x 86.8)
	Width		kg (lb)	7500 (16534.4)
Control	NC system		-	DN Solutions Fanuc i Plus / Fanuc 31iB5 Plus

{ } : option

# WHY 5-AXIS MACHINING?

## Single setup efficiency

5-axis machining allows you to approach the workpiece from all angles, with complete access to five sides of the part in a single setup. This reduces the overall number of part setups compared to traditional machining, which minimizes machine downtime and maximizes chip making time.



## Improved part accuracy

When making parts with multi-sided features using traditional 3-axis machining, multiple part setups are required. This means new inaccuracies can arise each time the workpiece is repositioned. 5-axis machining eliminates stacked tolerances and improves overall part dimensional accuracy.

## Extended machine shop capability

DN Solutions 5-axis machines open up new doors for your machine shop. The increased efficiency will make you instantly more competitive, and full 5-axis machining capabilities give you the opportunity to quote on jobs that previously weren't possible. So, what are you going to make today?



“Compared with similar machines from Japan or Europe, DN Solutions has the same level of precision and quality at a better value for money.”

– *OMGM Group, Italy*

“Our DN Solutions 5-axis is making complex, high precision parts for aerospace and defense. Cycle times have been reduced dramatically.”

– *Aerotech Precision Manufacturing, Great Britain*



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...



**MACHINE  
GREATNESS™**



WHAT YOU MAKE AND HOW YOU MAKE IT MATTERS—SO MAKE IT  
GREAT WITH DN SOLUTIONS.

### UNBEATABLE MACHINES

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

### 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.

### 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.

### 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

DN Solutions provides systems-based professional support services, before and after the machine tool sale, by responding quickly and efficiently to customers. By supplying spare parts, product training, field service and technical support, we provide the expert care, attention and assistance our customers expect from a market leader.

Global sales and service support network		<b>51</b>	<b>Technical centers</b> Technical center, Sales support, Service support, Parts support
<b>4</b>	Corporations	<b>200</b>	<b>Service posts</b>
<b>155</b>	Dealer networks	<b>3</b>	<b>Factories</b>



## 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.com](http://dn-solutions.com)

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