

# ***DN Solutions*** ***Electric Vehicle*** ***Solution*** ***Reference***



ver. EN 220902 SU

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# DN Solutions Application Business

## INTRO

### Battery

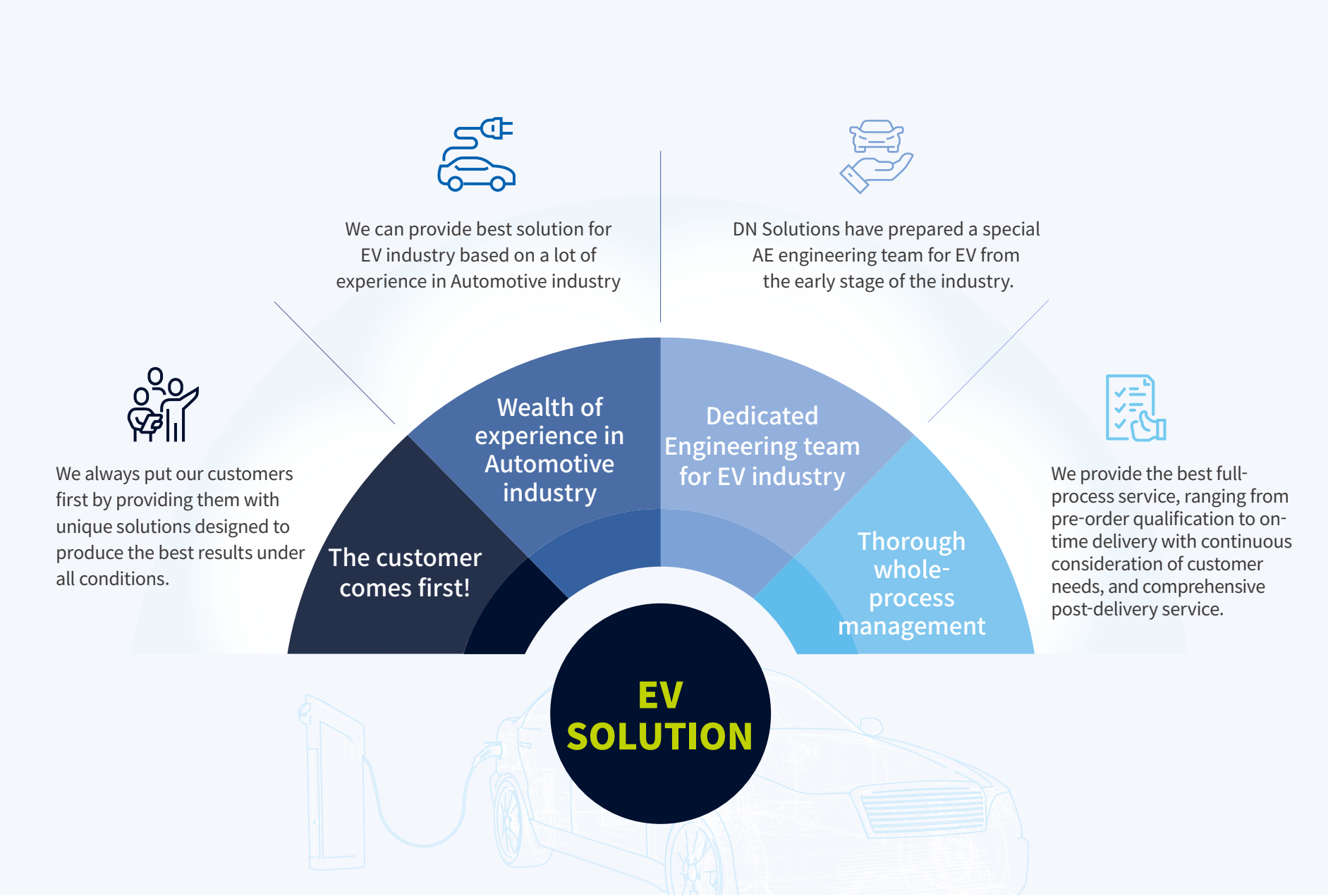
- Module
- Pack case
- Pack Tray
- Electronics
- Extra items

### PE System

- Motor
- Inverter
- Reducer

### Retained Parts

- Body
- Suspension
- Axle&Drive



# Mobility Innovation : Electric car

## INTRO

### Battery

Module  
Pack case  
Pack Tray  
Electronics  
Extra items

### PE System

Motor  
Inverter  
Reducer

### Retained Parts

Body  
Suspension  
Axle&Drive

- As combustion engine vehicles reduce in number, many parts will disappear. However, as EV's increase, new parts will emerge
- There is a high risk that the overall number of parts required will reduce, but nevertheless there will be many new parts required for EV's
- Many new solutions will have to be developed for the new parts required for EV's.

- It is estimated that EV's will take 31% of total global sales in 2030
- Conversion to EV's is inevitable due to global environmental regulation
- Efficiency of EV's will continuously increase due to high R&D investment





# EV Parts Analysis

## INTRO

### Battery

Module  
Pack case  
Pack Tray  
Electronics  
Extra items

### PE System

Motor  
Inverter  
Reducer

### Retained Parts

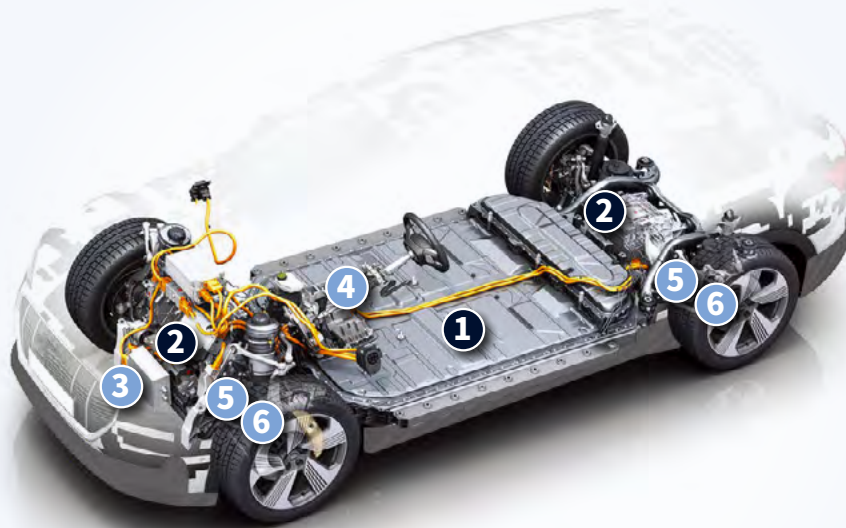
Body  
Suspension  
Axle&Drive

#### New

- 1 Battery
- 2 PE System

#### Retained

- 3 Thermal System
- 4 Steering
- 5 Axle & Drive
- 6 Suspension/Brake



## Retained Equipment

Co-existence equipments in gasoline&diesel car and EV

3 Thermal System

5 Steering

4 Axle & Drive

6 Suspension/Brake

## New Equipment

New equipment not in combustion engine car

### 1 Battery

- New power system that replaces fuel tank
- Machining requirements: various design and production processes from manufacturers



### 2 PE System(Power Electric System)

- New power system that replaces combustion engine
- Machining requirements : design variations by manufacturers/mainly machining of die castings



# Module

## INTRO

### Battery

- Module
- Pack case
- Pack Tray
- Electronics
- Extra items

### PE System

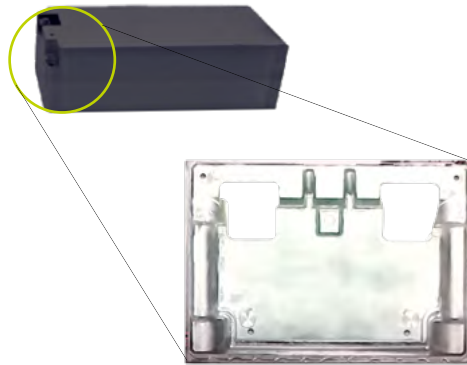
- Motor
- Inverter
- Reducer

### Retained Parts

- Body
- Suspension
- Axle&Drive

## Workpiece

### END PLATE



Material  
**Aluminum**

### Manufacturing Specialty

Small size part

Light cutting

Mass production : Robot automation

Special demand : 4-axis machining

## Solution

### T series

High-Speed, High-Productivity  
Tapping Center



### Operation

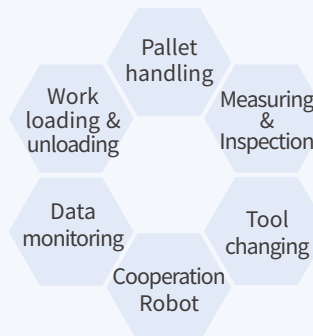
- OP#10 Face milling, Drilling
- OP#20 Chamfering, Face milling, Drilling



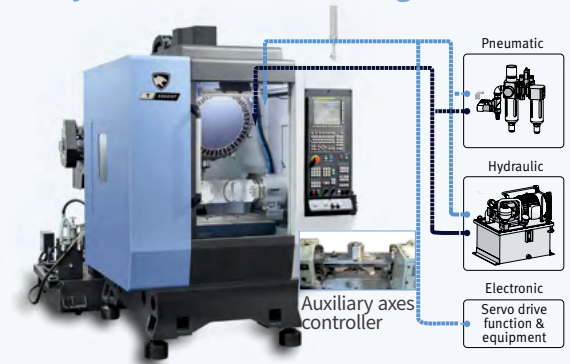
DN Solutions  
MachineTools



Robot System



### 4-axis Auxiliary device Interface/ Hydraulic & Pneumatic Jig Line



• T 4000L recommendation Rotary Table : Ø200(7.9inch)

# Module

## INTRO

### Battery

- Module
- Pack case
- Pack Tray
- Electronics
- Extra items

### PE System

- Motor
- Inverter
- Reducer

### Retained Parts

- Body
- Suspension
- Axle&Drive

## Workpiece

### MODULE CASE



Material  
**Aluminum**

### Manufacturing Specialty

Small size part

Light cutting

Mass production

## Solution

### T series

High-Speed, High-Productivity  
Tapping Center



Compact

High Speed

High Productivity

### New, High-Precision Spindle

The spindle length has been minimized to reduce the time required for acceleration/ deceleration and idle time, resulting in greater productivity and reduced vibration and noise.



### FANUC 31i

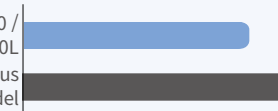
The FANUC 31i is designed to satisfy users' demands for higher machining accuracy and ultra-fine cutting.

### Maximize productivity

Description	Unit	FANUC 31i
Rapid traverse	m/min	48

### Cycle Time

T 4000 /  
T 4000L  
Previous  
model



Cycle Time reduced by  
**15%**  
than previous  
models

# Pack case

## INTRO

### Battery

- Module
- Pack case
- Pack Tray
- Electronics
- Extra items

### PE System

- Motor
- Inverter
- Reducer

### Retained Parts

- Body
- Suspension
- Axle&Drive

## Workpiece

### BATTERY PACK CASE



Material  
**Aluminum**

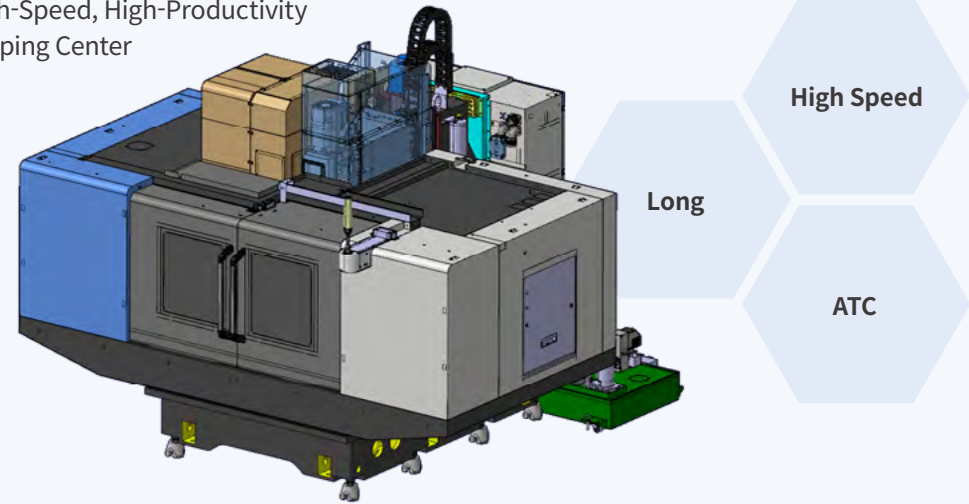
### Manufacturing Specialty

- Light cutting
- Large size parts
- Various type of machining

## Solution

### T7500

High-Speed, High-Productivity  
Tapping Center



30 Tool  
Cam type ATC  
(BT30)

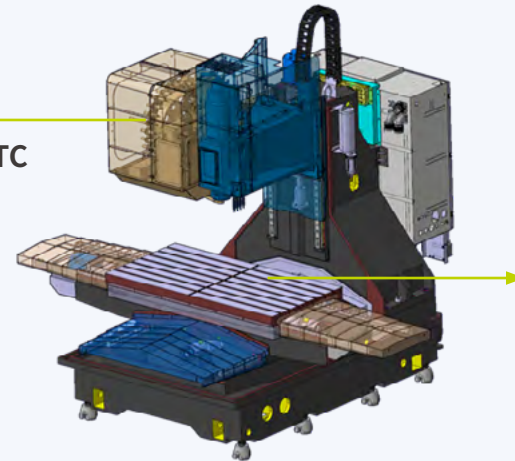


Table size  
T7500

**1600 x 800 mm**  
(51.2 X 23.6 inch)  
**200 kg (440.9 lb)**



# Pack case

## INTRO

### Battery

- Module
- Pack case
- Pack Tray
- Electronics
- Extra items

### PE System

- Motor
- Inverter
- Reducer

### Retained Parts

- Body
- Suspension
- Axle&Drive

## Workpiece

### BATTERY PACK CASE



Material  
**Aluminum**

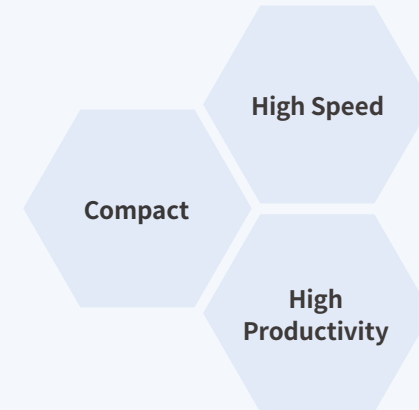
### Manufacturing Specialty

- Large size part
- Various type of machining
- Side machining : Rotary table+Rasing block compensation for high precision

## Solution

### DNM series

Global Standard Vertical Machining Center



### High precision through S/W



#### Tool load monitoring

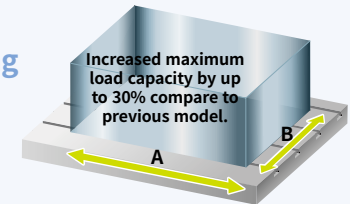
During cutting operation, abnormal load caused by wear and tear of the tool is detected and an alarm is triggered to prevent further damage.



#### Thermal compensation function

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

### Wide machining area



#### Table size (A x B)

DNM 4500/L  
**1000**{1050} **x450**mm  
(39.4{41.3} x 17.7 inch)

Max weight on Table  
DNM 4500/4500L  
**600**kg (1322.8 lb)

DNM 5700/L  
**1300**{1050} **x570**mm  
(51.2{59.1} x 21.3 inch)

DNM 5700/5700L  
**1000**kg (2204.6 lb)

DNM 6700/L/XL  
**1500**{1600/2200} **x 670**mm  
(59.1{63.0/86.6} x 26.4 inch)

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



# Pack tray

## INTRO

### Battery

Module  
Pack case  
Pack Tray  
Electronics  
Extra items

### PE System

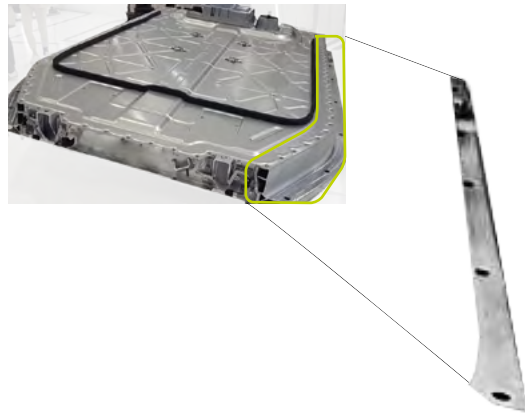
Motor  
Inverter  
Reducer

### Retained Parts

Body  
Suspension  
Axle&Drive

## Workpiece

### PROFILE\_1



Material  
**Aluminum**

### Manufacturing Specialty

Long parts

Twin spindle rotary table needed

Machining a single side of extruded profile

Light cutting

Special demand: optimal solution for easy chip disposal

## Solution

### VCF 5500L

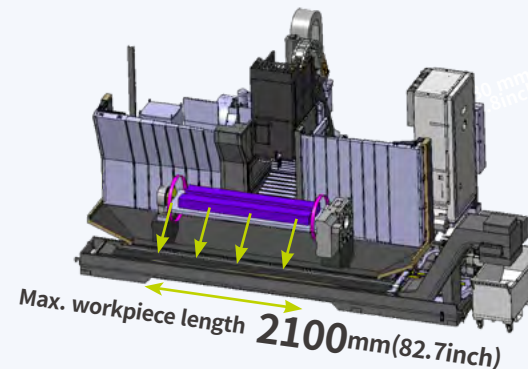
Multi-purpose Vertical Maching Center



### Long parts solution

**Speical bed for easy chip disposal**  
Workpiece to chip conveyor directly

**Twin spindle Rotary table**  
Productivity : Set up two workpieces at the same ime



### Rotary table

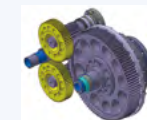
Equipped with dual driving rotary table for powerful cutting and improved accuracy.



#### Left/ Right A axis

- Synchro mode On : Simultaneous operation of left and right A-axis
- Synchro mode Off : Separated operation of left and right A-axis

**Rapid traverse**      **Travel distance**  
A-axis **60r/min**      **360 deg**



#### Dual pinion

There is no backlash by applying dual pinion structure to increase rigidity.

# Pack tray

## INTRO

### Battery

- Module
- Pack case
- Pack Tray
- Electronics
- Extra items

### PE System

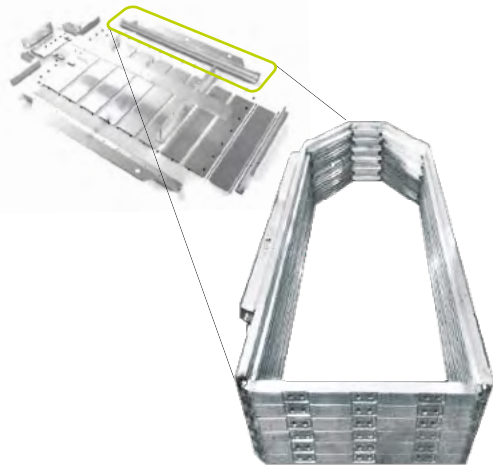
- Motor
- Inverter
- Reducer

### Retained Parts

- Body
- Suspension
- Axle&Drive

## Workpiece

### PROFILE\_2



Material  
**Aluminum**

### Manufacturing Specialty

Assembling machined parts of various lengths

Mass production

Maintain high and stable production

## Solution

### T series

High-Speed, High-Productivity  
Tapping Center



### DNM series

Global Standard Vertical  
Machining Center



### Optimal Design for the User Environment Wide machining area

The machine's compact design delivers greater user convenience and requires minimal floor space.

#### Equipment Layout

Specification	Unit	T 4000	T 4000L
Width	mm (inch)	1600 (63.0)	2050 (80.7)
Length	mm (inch)	2560 (100.8)	2574 (101.3)
Height	mm (inch)	2324 (91.5)	2324 (91.5)
Distance to table	mm (inch)	799 (31.5)	799 (31.5)



#### Table size (A x B)

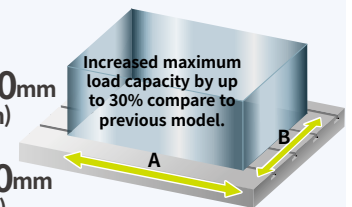
DNM 4500/L  
**1000{1050} x 450mm**  
(39.4{41.3} x 17.7 inch)

DNM 5700/L  
**1300{1050} x 570mm**  
(51.2{59.1} x 21.3 inch)

DNM 6700/L/XL  
**1500 {1600/2200} x 670mm**  
(59.1{63.0/86.6} x 26.4 inch)

#### Rapid traverse rate (X/Y/Z axis)

DNM 4500/5700/6700/6700L	DNM 6700XL
<b>36/36/30m/min</b>	<b>30/30/30m/min</b>
(1417.3/1417.3/1181.1 ipm)	(1181.1/1181.1/1181.1 ipm)
{42/42/36(1653.5/1653.5/1417.3 ipm)}	<b>Option</b>



## INTRO

### Battery

- Module
- Pack case
- Pack Tray
- Electronics
- Extra items

### PE System

- Motor
- Inverter
- Reducer

### Retained Parts

- Body
- Suspension
- Axle&Drive

## Workpiece

### CONTROL BOX



Material  
**Steel, Aluminum**

### Manufacturing Specialty

Light cutting

Mass production

## Solution

### DNM series

Global Standard Vertical  
Machining Center



High Speed

High  
Productivity

Easy  
Operation

### T series

High-Speed, High-  
Productivity  
Tapping Center



Compact

High Speed

High  
Productivity

### 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 DN Solutions's strict testing conditions, but may vary depending on the user's operating conditions.

### FANUC 31i

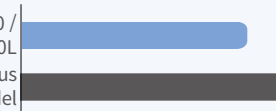
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### Maximize productivity

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### Cycle Time

T 4000 /  
T 4000L  
Previous  
model



Cycle Time reduced by  
**15%**  
than previous  
models

# Extra items

## INTRO

### Battery

- Module
- Pack case
- Pack Tray
- Electronics
- Extra items

### PE System

- Motor
- Inverter
- Reducer

### Retained Parts

- Body
- Suspension
- Axle&Drive

## Workpiece

### ACCUMULATOR



Material  
**Aluminum**

### Manufacturing Specialty

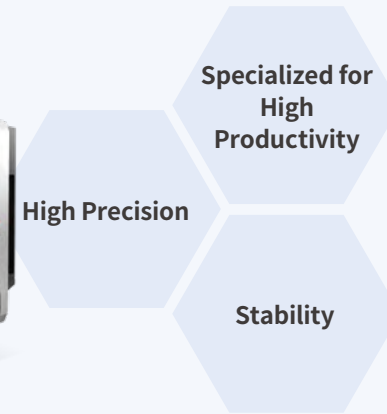
Mass production

Maintain high and stable production

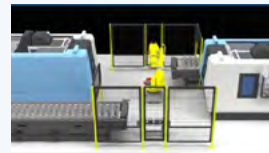
## Solution

### XC series

High productivity 2spindle column moving VMC



### XC Automation Solution



**Robot system**  
(1cell)

**1Cell configuration**

**OP#10**  
XC4000-2SP (1unit)

**OP#20**  
XC4000-2SP (1unit),  
Robot (1unit)



**Gantry loader system**  
(1cell)

**1Line configuration**

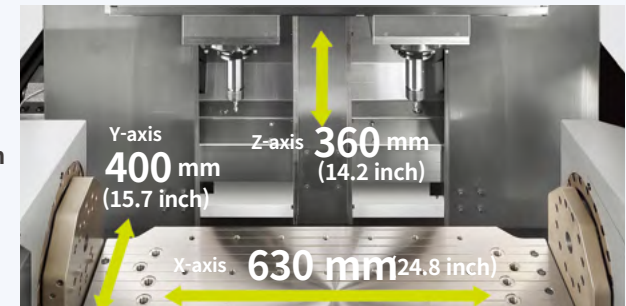
**OP#10**  
XC4000-2SP (1unit)

**OP#20**  
XC4000-2SP (1unit),  
Gantry loader  
(1unit)

### Axis System

To optimize durability and stiffness, dual ballscrews are included. Linear scales on XYZ axes are applied as standard. Productivity is maximized by high speed acc/dec rates on all axes.

**Axis acceleration** **7/10/11m/s<sup>2</sup>**  
(X,Y,Z)





# Motor

## INTRO

### Battery

- Module
- Pack case
- Pack Tray
- Electronics
- Extra items

### PE System

- Motor
- Inverter
- Reducer

### Retained Parts

- Body
- Suspension
- Axle&Drive

## Workpiece

### MOTOR HOUSING



Material

**Steel, Aluminum**

### Manufacturing Specialty

High precision

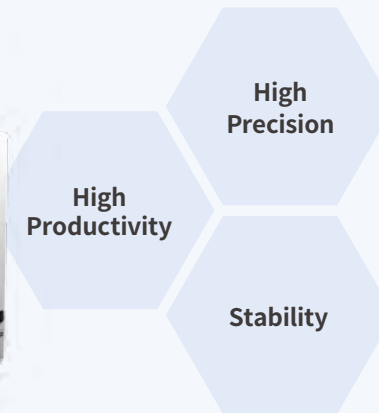
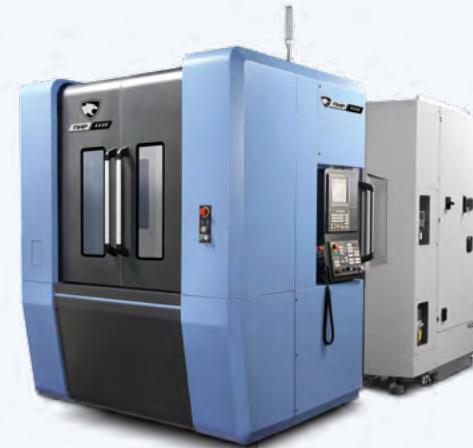
Optimal solution by various size of parts

Cooperation with tooling companies

## Solution

### NHP 4000/5000 series

High productivity Horizontal Machining Center

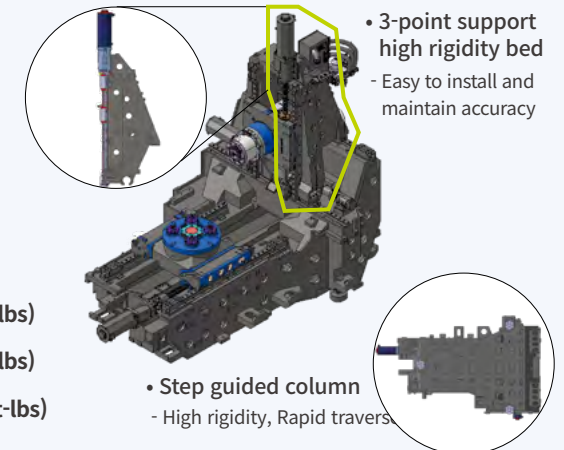


### Spindle



Max. spindle speed	Max. spindle motor power	Max. spindle motor torque
<b>15000</b> r/min	<b>30kW</b> (40.2 Hp)	<b>230</b> N·m(169.7 ft-lbs)
<b>15000</b> r/min	<b>37kW</b> (49.6 Hp)	<b>303</b> N·m(223.6 ft-lbs)
<b>20000</b> r/min	<b>37kW</b> (49.6 Hp)	<b>221</b> N·m(163.1 ft-lbs)

### 3-point support high rigidity bed



- 3-point support high rigidity bed
- Easy to install and maintain accuracy

- Step guided column
- High rigidity, Rapid travers

# Motor

## INTRO

### Battery

- Module
- Pack case
- Pack Tray
- Electronics
- Extra items

### PE System

- Motor
- Inverter
- Reducer

### Retained Parts

- Body
- Suspension
- Axle&Drive

## Workpiece

### MOTOR HOUSING



Material  
**Steel, Aluminum**

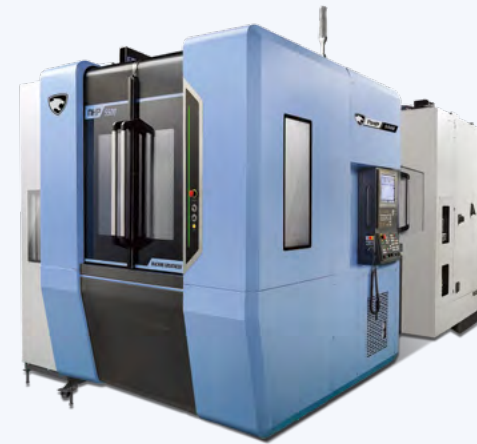
### Manufacturing Specialty

- More high Precision
- Optimal solution by various size of parts
- Cooperation with tooling companies

## Solution

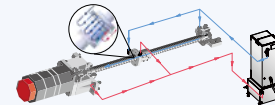
### NHP 5500/ NHP 5500F

New Fine version Horizontal Machining Center



### NHP series High Precision Option

#### Cooling system



#### Linear scale

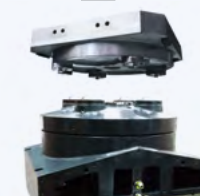
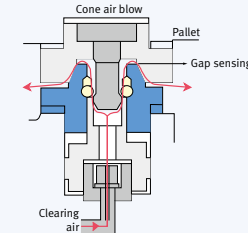


#### Coolant Chiller

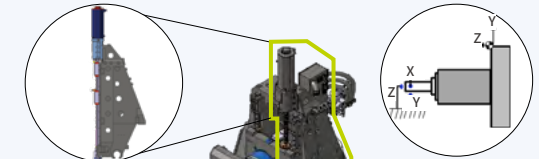


#### Dust collector

#### Cone air blow



### Basic structure for high precision



- 3-point support high rigidity bed
- Easy to install and maintain accuracy

Sensor integrated thermal compensation function for structure

- Step guided column
- High rigidity, Rapid traverse

# Motor

## INTRO

### Battery

- Module
- Pack case
- Pack Tray
- Electronics
- Extra items

### PE System

- Motor
- Inverter
- Reducer

### Retained Parts

- Body
- Suspension
- Axle&Drive

## Workpiece

### MOTOR HOUSING COVER



Material  
**Steel, Aluminum**

### Manufacturing Specialty

Mass production

Keep the high productivity stably

## Solution

### T series

High-Speed, High-Productivity  
Tapping Center



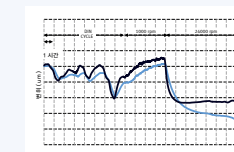
### New, High-Precision Spindle

Max. spindle speed **12000/24000 r/min**



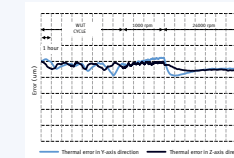
### Spindle Thermal Error Compensation System (standard)

Thermal error of the spindle is calculated with the spindle temperature feedback and automatically compensated to maintain the highest level of work accuracy.



Before thermal error compensation

\* T 4000, 18000 r/min, In-house measurement



After thermal error compensation\*

## INTRO

### Battery

- Module
- Pack case
- Pack Tray
- Electronics
- Extra items

### PE System

- Motor
- Inverter
- Reducer

### Retained Parts

- Body
- Suspension
- Axle&Drive

## Workpiece

### SUPPORT RING



Material  
**Steel**

### Manufacturing Specialty

Light cutting

Mass production

## Solution

### DNM series

Global Standard Vertical  
Machining Center



High Speed

High  
Productivity

Easy  
Operation

### PUMA V400 series

High Performance Vertical  
Turning Center



Compact

High Speed

High  
Productivity

### Wide machining area

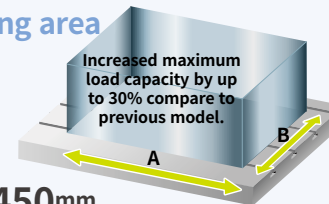


Table size (A x B)

DNM 4500/L  
**1000**{1050} **x450**mm  
(39.4{41.3} x 17.7 inch)

DNM 5700/L  
**1300**{1050} **x570**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

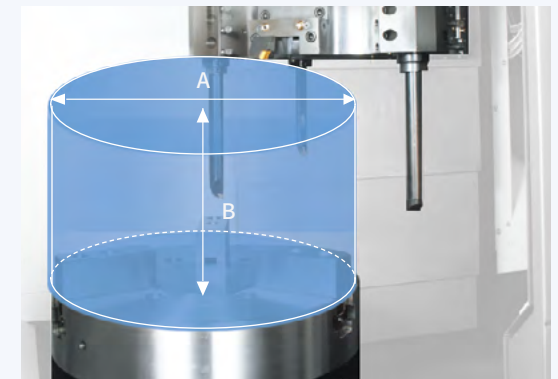
DNM 4500/4500L  
**600**kg (1322.8 lb)

DNM 5700/5700L  
**1000**kg (2204.6 lb)

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

Max. turning diameter (A)  
PUMA V400/ V400M  
**Ø496/420** mm  
(19.53/16.54 inch)

Max. turning length (B)  
PUMA V400/ V400M  
**461/400** mm  
(18.15/15.75 inch)





# Inverter

## INTRO

### Battery

- Module
- Pack case
- Pack Tray
- Electronics
- Extra items

### PE System

- Motor
- Inverter
- Reducer

### Retained Parts

- Body
- Suspension
- Axle&Drive

## Workpiece

### INVERTER CASE



Material  
**Steel, Aluminum**

### Manufacturing Specialty

Small size part

Light cutting

Optimal solution by various size of parts

## Solution

### T series

High-Speed, High-Productivity  
Tapping Center



### DNM series

Global Standard Vertical  
Machining Center



### Optimal Design for the User Environment

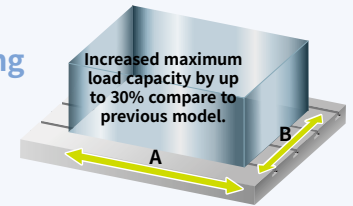
The machine's compact design delivers greater user convenience and requires minimal floor space.

#### Equipment Layout

Specification	Unit	T 4000	T 4000L
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Length	mm (inch)	2560 (100.8)	2574 (101.3)
Height	mm (inch)	2324 (91.5)	2324 (91.5)
Distance to table	mm (inch)	799 (31.5)	799 (31.5)



### Wide machining area



#### Table size (A x B)

DNM 4500/L  
**1000{1050} x 450mm**  
(39.4{41.3} x 17.7 inch)

Max weight on Table  
DNM 4500/4500L  
**600kg (1322.8 lb)**

DNM 5700/L  
**1300{1050} x 570mm**  
(51.2{59.1} x 21.3 inch)

DNM 5700/5700L  
**1000kg (2204.6 lb)**

DNM 6700/L/XL  
**1500{1600/2200} x 670mm**  
(59.1{63.0/86.6} x 26.4 inch)

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

# Reducer

## INTRO

### Battery

- Module
- Pack case
- Pack Tray
- Electronics
- Extra items

### PE System

- Motor
- Inverter
- Reducer

### Retained Parts

- Body
- Suspension
- Axle&Drive

## Workpiece

### MOTOR REDUCER HOUSING



Material  
**Steel, Aluminum**

### Manufacturing Specialty

- HSK recommended
- Mass production
- High productivity & precision

## Solution

### DNM series

Global Standard Vertical Machining Center



### Wide machining area

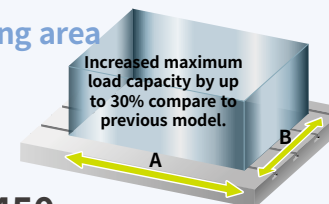


Table size (A x B)

DNM 4500/L  
**1000**{1050} **x450**mm  
(39.4{41.3} x 17.7 inch)

DNM 5700/L  
**1300**{1050} **x570**mm  
(51.2{59.1} x 21.3 inch)

DNM 6700/L/XL  
**1500**{1600/2200} **x670**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)

### Various Spindle



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)  
(8000 r/min high torque version)

**Option**

# Body

## INTRO

### Battery

Module  
Pack case  
Pack Tray  
Electronics  
Extra items

### PE System

Motor  
Inverter  
Reducer

### Retained Parts

Body  
Suspension  
Axle&Drive

## Workpiece

### MEMBER



Material  
**Aluminum**

### Manufacturing Specialty

Symmetrical designed parts

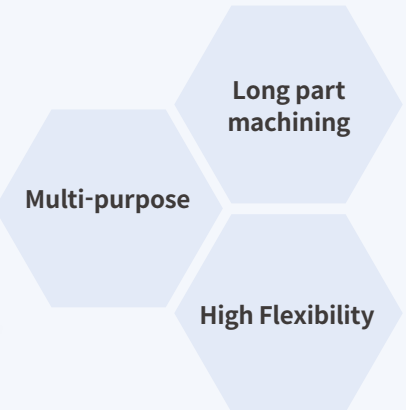
Middle and Large size parts

Light cutting

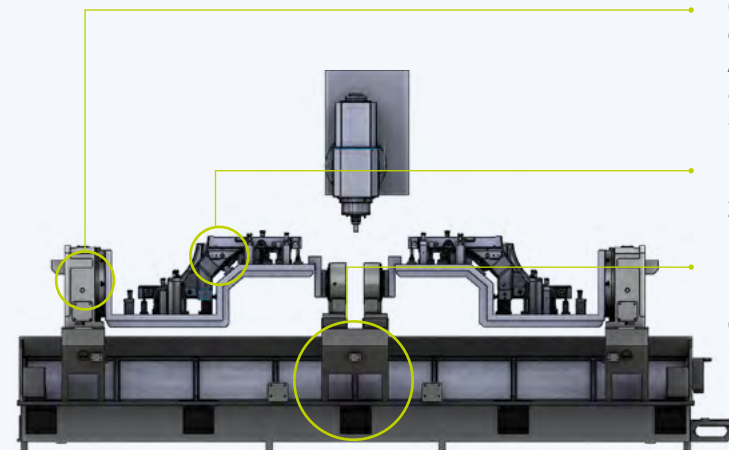
## Solution

### VCF 850LSR II

Multi-purpose Vertical Machining Center



### Dual Rotary Table Solution



#### Operational flexibility

Capable of controlling the two A axes either simultaneously or individually

Additional 6th Axis (Addition of an additional axis to the 5 axes : Control Otp.)  
Synchro control (For sync control : Control Otp.)

#### Reduced investment cost

2 machines → a single machine

#### Improved operating stability

Improved jig rigidity and smooth chip discharge by applying a special bed

# Suspension

## INTRO

### Battery

- Module
- Pack case
- Pack Tray
- Electronics
- Extra items

### PE System

- Motor
- Inverter
- Reducer

### Retained Parts

- Body
- Suspension
- Axle&Drive

## Workpiece

### SHOCK TOWER



Material  
**Aluminum**

### Manufacturing Specialty

Complex shaped workpiece

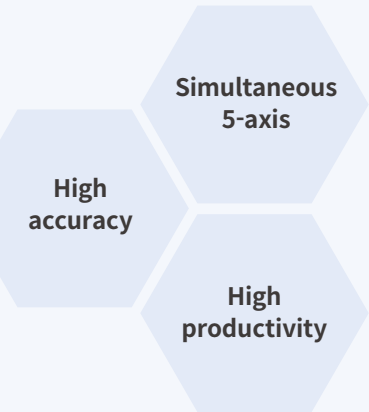
Light cutting

High productivity

## Solution

### VC 630/5AX

Simultaneous 5-axis Vertical  
Machining Center



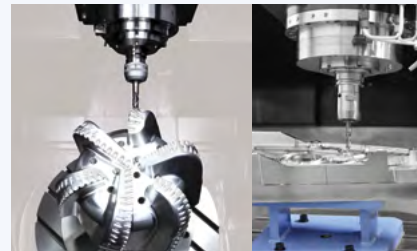
### Spindle

Built-in motor minimizes vibration and noise generated.

Max. spindle speed

**12000** {20000 Option} r/min

**30000** Option r/min



### Rotary Table

Large workpiece capacity allows a variety of parts to be machined in one set up.

Max. Workpiece Size

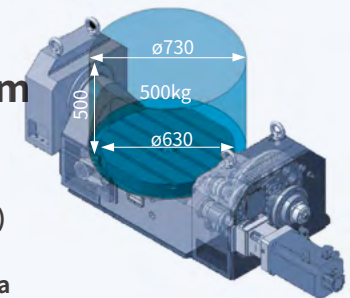
**ø730 x 500mm**  
(ø28.7 x 19.7 inch)

Max. weight

**500kg** (1102.3 lb)

### Wider Machining Area

A wide machining area allows access to machine many features of large workpieces.





# Differential Gear

## INTRO

### Battery

- Module
- Pack case
- Pack Tray
- Electronics
- Extra items

### PE System

- Motor
- Inverter
- Reducer

### Retained Parts

- Body
- Suspension
- Axle&Drive

## Workpiece

### DIFF GEAR HOUSING



Material  
**Aluminum**

### Manufacturing Specialty

Minimizing Cycle time by optimization of various machining process

Stable mass production

4-axis rotary table installed on VMC

## Solution

### PUMA V series

High Performance Vertical Turning Center



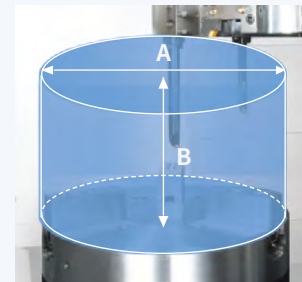
### PUMA GT series

Global standard Horizontal Turning Center



### DNM series

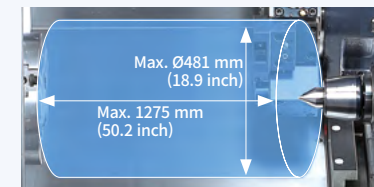
Global Standard Vertical Machining Center



Max. turning diameter (A)  
PUMA V400(P) / M  
**Ø496/420 mm**  
(19.53/16.54 inch)

Max. turning length (B)  
PUMA V400(P) / M  
**461/400 mm**  
(18.15/15.75 inch)

### Machining area



Model group (unit : mm (inch))	Max. turning dia. (2axis/M)	Bar working dia.
PUMA GT2100	390 / 300 (15.4 / 11.8)	65 (2.6)
PUMA GT2100B		
PUMA GT2600		81 (3.2)
PUMA GT2600L	460 / 410 (18.1 / 16.1)	
PUMA GT2600XL		102 (4.0)
PUMA GT2600XLB		
PUMA GT3100A		81 (3.2)
PUMA GT3100LA	481 / 376 (18.9 / 14.8)	
PUMA GT3100		102 (4.0)
PUMA GT3100L		
Model group (unit : mm (inch))	Max. turning length (2axis/M)	
PUMA GT2100	562 / 513 (22.1 / 20.2)	
PUMA GT2100B	550 / 501 (21.7 / 19.7)	
PUMA GT2600	658 / 610 (25.9 / 24.0)	
PUMA GT2600L	1078 / 1030 (42.4 / 40.6)	
PUMA GT2600XL	1603 / 1555 (63.1 / 61.2)	
PUMA GT2600XLB	1573 / 1525 (61.9 / 60.0)	
PUMA GT3100A	790/760 (31.1 / 29.9)	
PUMA GT3100LA	1310/1280 (51.6 / 50.4)	
PUMA GT3100	755 / 725 (29.7 / 28.5)	
PUMA GT3100L	1275 / 1245 (50.2 / 49.0)	

### 4th-axis rotary table

The compact high-precision, highlyrigid designed system enables vertical and horizontal use, and delivers a strong clamping force.



# Differential Parts

## INTRO

### Battery

- Module
- Pack case
- Pack Tray
- Electronics
- Extra items

### PE System

- Motor
- Inverter
- Reducer

### Retained Parts

- Body
- Suspension
- Axle&Drive

## Workpiece

### BEARING SUPPORT



Material  
**Aluminum**

### Manufacturing Specialty

Stable mass production

Separated Gantry Loader

Various types of machining process

## Solution

### PUMA 2100M

High performance horizontal turning center



### Cutting Performance

	Unit	PUMA 2100 BMT55P	PUMA 2600 BMT65P
<b>End mill</b>	Carbon steel (SM45C)		
Chip removal rate	cm <sup>3</sup> /min (inch <sup>3</sup> /min)	90 (35.43)	105 (41.34)
Tool Dia.	mm (inch)	18 (0.71)	20 (0.79)
Cutting Depth	mm (inch)	20 (0.79)	21 (0.83)
Feedrate	mm/min	250 (9.8)	250 (9.8)
<b>Tapping</b>	Carbon steel (SM45C)		
Rotary tool spindle speed	r/min	240	240
Tap Size	mm (inch)	M20 x P2.5	M24 x P3
Feedrate	mm/min (ipm)	600 (23.6)	600 (23.6)
<b>Face mill</b>	Carbon steel (SM45C)		
Chip removal rate	cm <sup>3</sup> /min (inch <sup>3</sup> /min)	41.9 (16.5)	53.9 (21.2)
Tool Dia.	mm (inch)	63 (2.5)	63 (2.5)
Cutting Depth	mm (inch)	3.5 (0.1)	4.5 (0.2)
Feedrate	mm/min (ipm)	190 (7.5)	190 (7.5)



	Unit	PUMA 2100 BMT55P	PUMA 2600 BMT65P
<b>O.D turning</b>	Carbon steel (SM45C)		
Chip removal rate	cm <sup>3</sup> /min (inch <sup>3</sup> /min)	528 (207.9)	616 (242.5)
Cutting Depth	mm (inch)	4.3 (0.2)	5.0 (0.2)
Feedrate	mm/min (ipm)	0.55 (0.022)	0.55 (0.022)
	Unit	PUMA 2100	PUMA 2600
<b>U-Drill dia. (ø63 mm (2.5 inch))</b>	Carbon steel (SM45C)		
Chip removal rate	cm <sup>3</sup> /min (inch <sup>3</sup> /min)	472 (185.8)	630 (248.0)
Feedrate	mm/min (ipm)	0.15 (0.006)	0.2 (0.008)
<b>Grooving</b>	Carbon steel (SM45C)		
Chip removal rate	cm <sup>3</sup> /min (inch <sup>3</sup> /min)	169 (66.54)	241 (94.9)
Cutting Depth	mm (inch)	8 (0.3)	8 (0.3)
Feedrate	mm/rev (ipr)	0.14 (0.006)	0.2 (0.008)



# DN Solutions in the World

In an effort to provide solutions that fit each partners' unique needs, we constantly innovate our thinking, processes, and the way we do business. These optimal solutions lay the foundation for the success of our partners, which adds value to our partners' businesses.

## Global Sales and Service Support Network

**4** Corporations

**155** Dealer Networks

**51** Technical Centers

**200** Service Post

**3** Factories

Technical Center: Sales Support, Service Support, Parts Support



## Supplying Parts

- Supplying parts without charges
- Supplying parts with charges
- Parts repair



## Field Services

- On-site services
- Installation and trials
- Scheduled maintenance/ Preventive maintenance
- Repairs with/without charges



## Technical Support

- Supporting machining technology
- Responding to technical inquiries
- Providing technical materials



## Training

- Programming / Machine operation
- Maintenance
- Application engineering

**DN SOLUTIONS**

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### Fire Safety

Precautions

There is a high risk of 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.

\* For more details, please contact DN Solutions.

\* The specifications and information above-mentioned may be changed without prior notice.