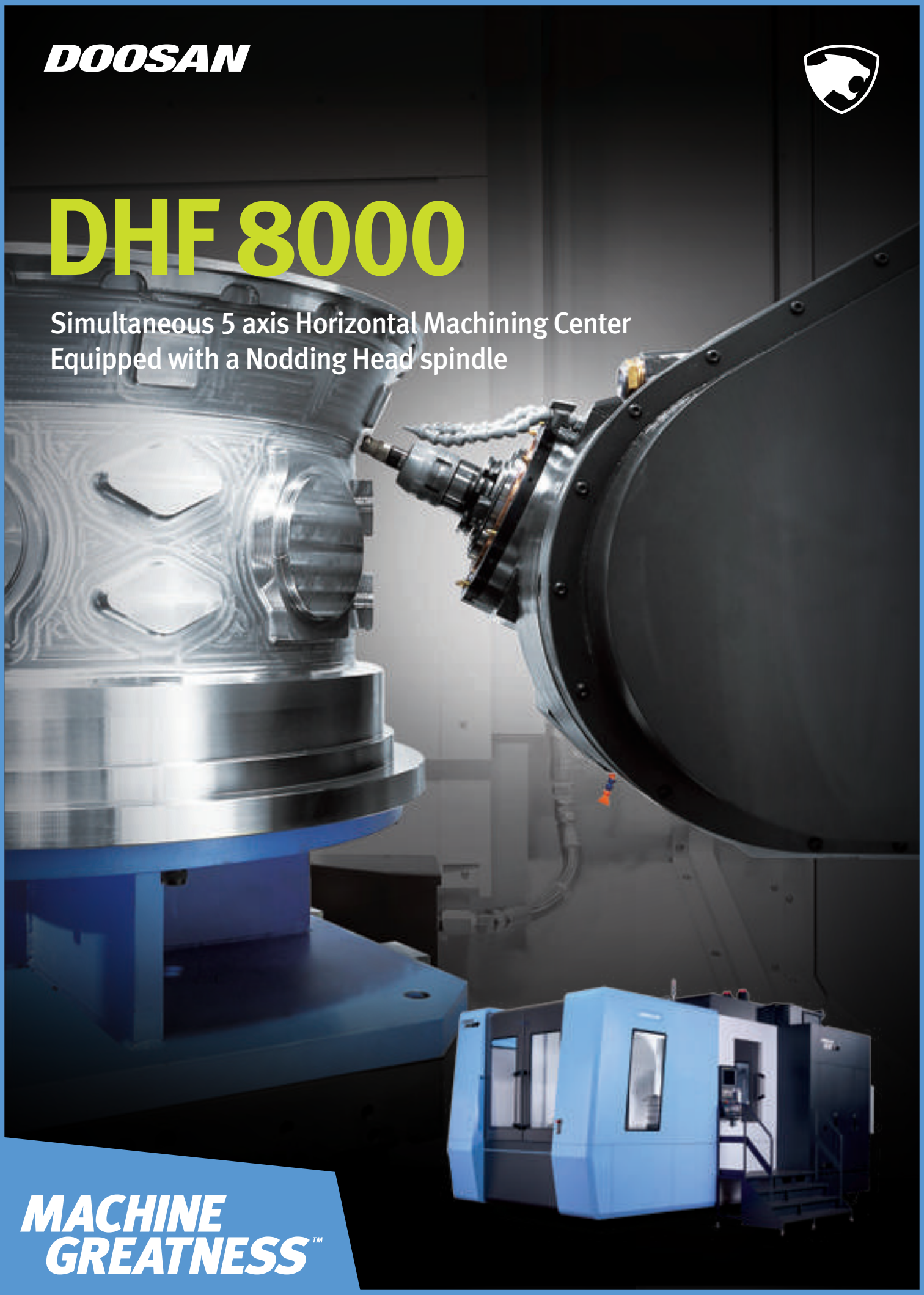
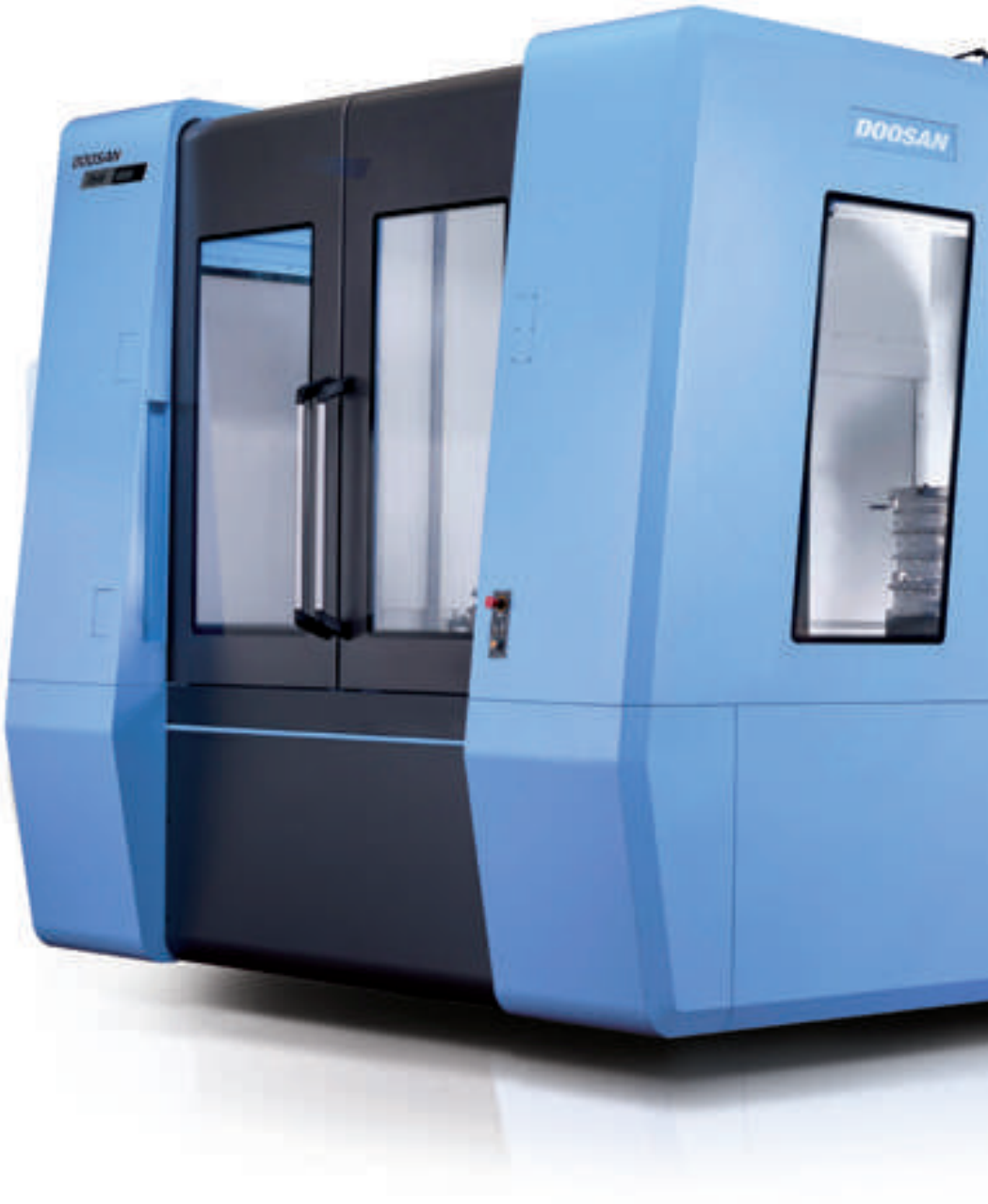
DOOSAN

# DHF 8000

Simultaneous 5 axis Horizontal Machining Center
Equipped with a Nodding Head spindle



MACHINE GREATNESS™




# DHF 8000

**The DHF 8000 with A axis nodding head spindle is a 5 axis simultaneous horizontal machining center with high rigidity structure and dual ballscrews on the X and Y axes. The DHF 8000 meets the machining requirements of customers ranging from hard materials such as Titanium and Inconel through to high speed machining of Aluminium.**

## Contents



### High productivity, single setup with simultaneous 5 axis machining

- A axis nodding head spindle
- Travel (x / y / z) : 1450 / 1200 / 1500 mm (57.1 / 47.2 / 59.1 inch)
- Max. Workpiece size : Ø1400 X H1400 mm (Ø55.1 X H55.1 inch)

### high rigidity & Compact structure

- Y/Z Dual ball screw
- Thermal compensation for Spindle & Structure
- Cooling system
- Linear scale

### User friendly convenience features

- Improved rear exit central through chip disposal
- Power pack, multi-step TSC
- Easy chip-disposal through PSC(Programmable shower coolant)

## Basic structure

To handle various complex shapes, we applied the A axis nodding head spindle to achieve simultaneous 5 axis machining. Dual ballscrews are applied to the X / Y axes for highly stable machining.

**Travel distance (X / Y / Z)**

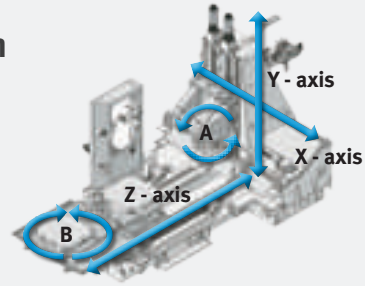
**1450/1200/1500 mm**

**(57.1 / 47.2 / 59.1 inch)**

**Feedrate (X / Y / Z)**

**40/40/50 m/min**

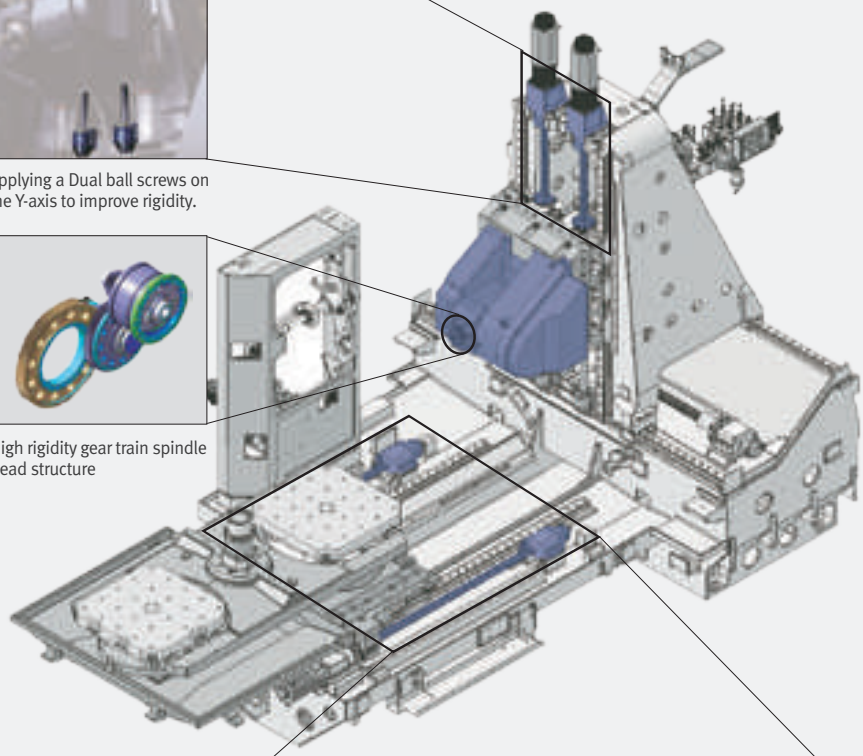
**(1574.8 / 1574.8 / 1968.5 ipm)**




Applying a Dual ball screws on the Y-axis to improve rigidity.



High rigidity gear train spindle head structure



Applying a Dual ball screws on the Z-axis to improve rigidity.

Center through chip disposal

### Main Products

BLISK

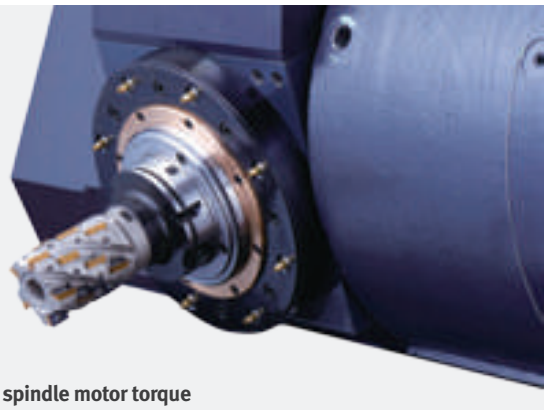
TURBINE CASING

FAN DISK

SPOOL

## Spindle

Provides great cutting performance using 2 step geared spindle head for hard materials, and high speed built in type spindle head for Aluminium.



**Max. spindle speed**

**6000** r/min

**15000** r/min option (HSK only)

**30000** r/min option (HSK only)

PSC(Programmable Shower Coolant ) standard

**Max. spindle motor power**

FANUC

**35** kW (46.9 Hp)

**51, 92** kW option

(68.4, /123.4 Hp)

Siemens

**86, 90** kW option

(115.3, 120.7 Hp)

**Max. spindle motor torque**

FANUC

**960** N·m (708.5 ft-lb)

**147, 53.4** N·m option

(108.5, 39.4 ft-lb)

Siemens

**223, 49.9** N·m option

(164.6, 36.8 ft-lb)

**Tilt angle (A axis)**

**–100 ~ 60** deg

**Tool shank**

**ISO #50**

**HSK A100 / A63** option

## Machining area

Maximizing working area with 800 pallet size.

**Pallet Size**

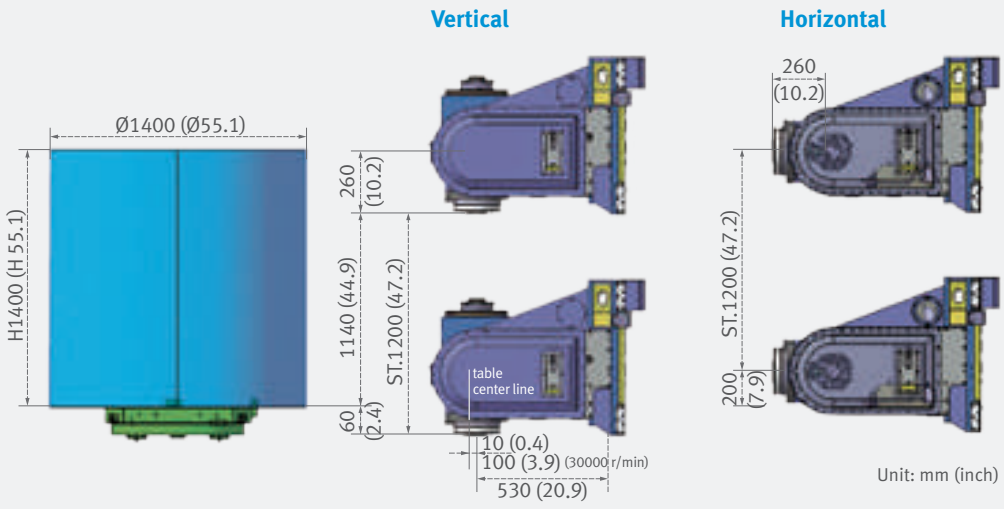
**800 x 800** mm (31.5 x 31.5 inch)

**Max. Work weight**

**2000** kg (4409.2 lb)

**Max. Work size**

**Ø1400 x H1400** mm (Ø55.1 x H55.1 inch)



## Magazine

Applied servo type magazine to improve productivity and reliability.

**Tool to Tool**

**3.5 sec**
**2.4 sec**
**(30000 r/min)**

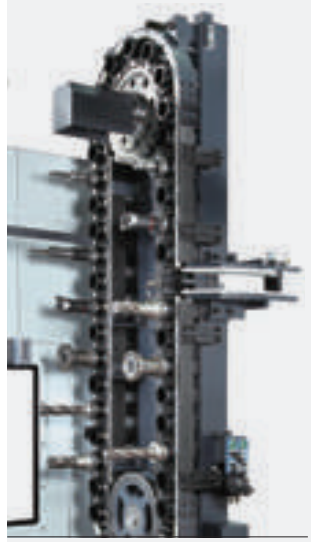
**Max. tool length**

**550 mm**
**(21.7 inch)**

**Max. tool weight**

**30 kg (66.1 lb)**
**12 kg (26.5 lb)**
**(30000 r/min)**

**Pot type magazine**

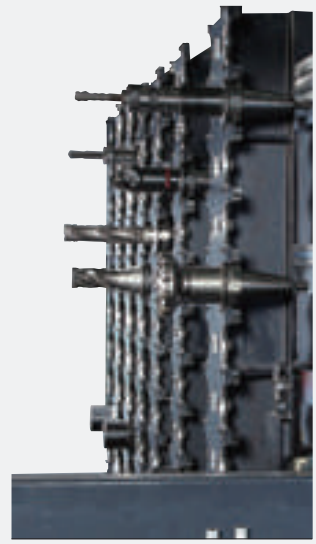


60 tools
80, 120 tools (30000 r/min)

**Chain type magazine** option

90 / 120 / 150 tools

**Matrix type magazine** option



196 / 256 / 316 / 376 tools
171, 275 tools ( 30000 r/min)

## Pallet

An automatic twin pallet changer is provided as standard. Doosan's LPS multi-pallet system is also available.

**Pallet size**

**800 x 800 mm**
**(31.5 x 31.5 inch)**

**Maximum pallet load**

**2000 kg**
**(4409.2 lb)**

**Pallet change time**

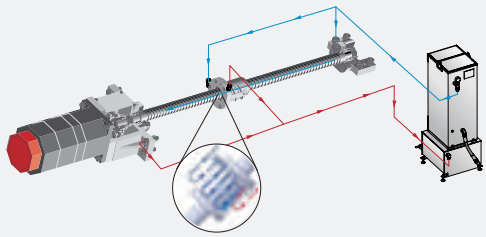
**16 ea**

## High accuracy equipment

High-rigidity machining can be carried out with precision accuracy using a variety of functions.

### Cooling system

Greatly reduced thermal displacement of ballscrews.



### Linear scale

To maintain high precision for long time operation.

## Cutting Performance

Excellent machining capability due to machine structure and spindle performance.

### Higher Cutting Power

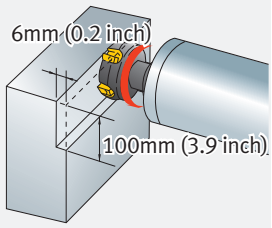
High-rigidity machining can be carried out with precision accuracy and diverse functions.

**Cutting Capacity**

(Motor power : 35/22 kW (46.9/29.5 Hp))

**Face mill_Carbon Steel (SM45C) [ø125mm Face mill (8Z)]**

| | Machining rate | Spindle speed | Feed rate |
|---|---|---|---|
| DHF 8000 | 1020 $cm^3$/min | 348 r/min | 1700 mm/min |




* 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.

### Intelligent Kinematic Compensation for 5-axis Recommended Option

For high accuracy 5-axis machining, Intelligent Kinematic Compensation function is recommended. This function minimizes error in complex 5-axis machining applications by maintaining tip of the tool in correct position in respect to the workpiece. In order to properly utilize this function, the following optional items are required.

**Recommended optional items**

**1. Software**

FANUC NC: DCP-i
(Developed by DOOSAN)

Heidenhain NC:
Kinematic opt

**2. Receiver**

**3. Touch Probe** option

**4. Datum ball** option

**5. Master tool** option

## Standard / Optional Specifications

Various optional features are available for customer-specific work environments.

● Standard ○ Optional

| NO. | Description | Features | | DHF 8000 |
|---|---|---|---|---|
| 1 | Spindle | 6000 r/min | 35 kW (46.9 Hp), 960 N·m (708.5 ft-lbs) | ● |
| 2 | | 15000 r/min(SIEMENS) | 86 kW (115.3 Hp), 223 N·m (164.6 ft-lbs) | ○ |
| 3 | | 15000 r/min(FANUC) | 51 kW (68.4 Hp), 147 N·m (108.5 ft-lbs) | ○ |
| 4 | | 30000 r/min(SIEMENS) | 90 kW (120.7 Hp), 49.9 N.m (36.8 ft-lbs) | ○ |
| 5 | | 30000 r/min(FANUC) | 90 kW (120.7 Hp), 53.4N.m (39.4 ft-lbs) | ○ |
| 6 | Magazine | Tool storage capacity | 60 ea | ● |
| 7 | | | 90 / 120 / 150 / 196~376 ea | ○ |
| 8 | | | 80ea (30000 r/min only) | ● |
| 9 | | | 120 / 171 / 275 ea (30000 r/min only) | ○ |
| 10 | Tool shank type | BIG PLUS BT50 | | ● |
| 11 | | BIG PLUS CAT50 | | ○ |
| 12 | | BIG PLUS DIN50 | | ○ |
| 13 | | HSK A100 | | ○ |
| 14 | | HSK A63 | | ○ |
| 15 | Coolant | PSC(Programmable shower coolant) (30000 r/min only) | 0.3MPa (2.5kW) | ● |
| 16 | | FLOOD | 0.7 MPa (1.5 kW) | ● |
| 17 | | FLUSHING | 0.3 MPa (1.5 kW) | ● |
| 18 | | PROGRAMMABLE TSC | 1~7 MPa (7.5kW) | ● |
| 19 | | SHOWER | 0.7 MPa (1.5kW) | ○ |
| 20 | | Coolant level switch : Sensing level - Low / High | | ● |
| 21 | Chip disposal | Chip conveyor | 2-step drum type | ● |
| 22 | | Chip bucket | Folklift type | ○ |
| 23 | | | Rotation type | ○ |
| 24 | | Air blower | | ○ |
| 25 | | Air gun | | ○ |
| 26 | | Coolant gun | | ○ |
| 27 | Precision machining option | Linear scale | X / Y / Z-axis | ● |
| 28 | | DSQ3 (600 Block, High Process CPU, Data Server 1GB) | | ● |
| 29 | | DSQ4 (1000 Block, High Process CPU, Data Server 1GB) | | ○ |
| 31 | | Data Server 2G/4G/16GB | | ○ |
| 32 | Measurement & Automation | Automatic tool measurement | TS27R_RENISHAW | ● |
| 33 | | Automatic workpiece measurement | RMP600_RENISHAW | ○ |
| 34 | Others | LED Work light | | ● |
| 35 | | Signal tower | | ● |
| 36 | | Tool load monitoring | | ● |
| 37 | | EZ Guide i | | ○ |
| 38 | | Automatic power off | | ○ |
| 39 | Customized Special Option | Spin window for main door (Electric type) | | ○ |

* Please contact DOOSAN to select detail specifications.

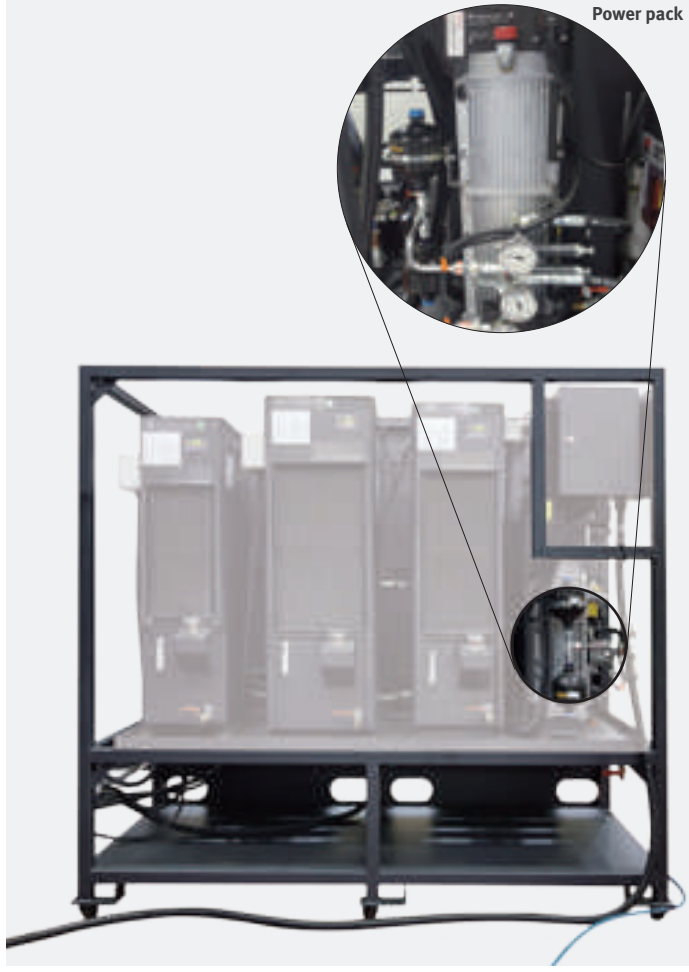
## Various options

### Chip Conveyor

**2-step drum** conveyor

### Movable units

Power pack



### Oil skimmer

### Mist Collector option

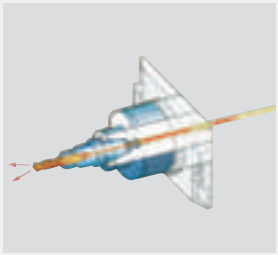
### Chip Disposal System

**Flushing coolant**

**Programmable TSC**

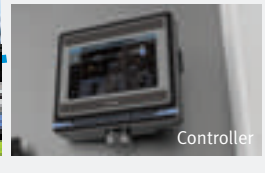
**Shower coolant** option

**Coolant gun** option



**MQL(Minimum Quantity Lublication) system**
(Misting device) option

**Programmable shower coolant**
option 30000 r/min standard

## FANUC F31i5

User convenience has been significantly enhanced with a new operation panel.

### Simple and Convenient Operation Panel

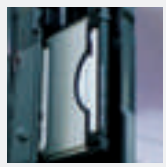
The operator's panel has been redesigned and integrated for better usability. Additional, customized function switches (option) can be provided to maximize the operator's convenience.

Clamping fixture lock/unlock button, counter, timer and other special optional buttons can be provided.

The buttons are separated by partitions in order to prevent erroneous operation of the buttons.

### Swivel/tilt Operating Panel

The operating panel can swivel by 90°, and displays various alarm messages concerning machine and controller error, enhancing the operator's convenience.

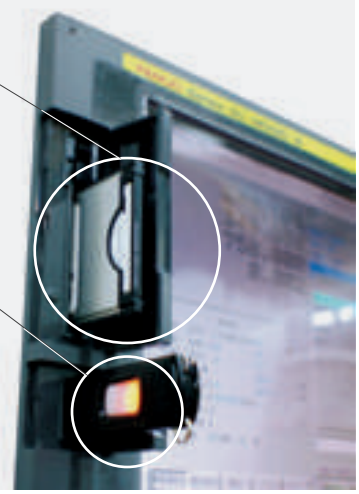



### PCMCIA Card

The PCMCIA card enables uploading and downloading of the NC program, NC parameters, tool information, and ladder programs, and also supports DNC operation.

### USB Port

Upload/download of NC software programs, NC parameters, tool information and ladder program using a USB drive is allowed, but DNC operation is not supported.



## EOP Function

Doosan's Easy Operation Package (EOP) supports the user with tool, help desk, operation, and pallet magazine functions among others.

### EOP (Easy Operation Package)

Doosan's EOP supports the user with tool, help desk, operation, and pallet magazine functions among others to maximize operational efficiency and user convenience.

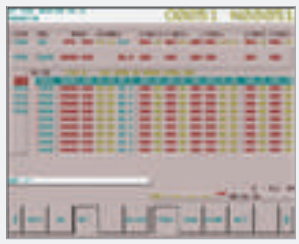
**Tool Support Functions**

**Tool management I**

- Tool magazine control
- Tool state display
- Fastems Tool Add/Remove Function option

**Tool management II** option

- Tool magazine control
- Tool life management
- Tool life prediction
- Tool state control
- Balluff Tool ID function



**Tool load monitor**

- Detection of tool damage
- Detection of abnormalities during operation
- Detection of no-load air cutting

**X MANAGER**

- 8Digits T Call
- Tool Management function
- TOOL ID available
- Tool Pre-setter available
- Toyoda tool ID acceptable

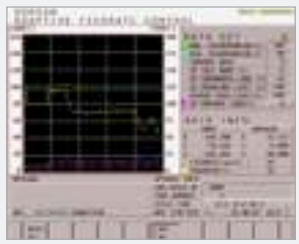
**Operation Support Functions**

**Operation rate**

- Measure various machine operating rate
- Support 3 shift operation
- calculate and save 30 days operating rate
- Show data for a specific period

**PMC switch**

- Operation panel function option
- Substitutes toggle switches
- NC option software



**DAFC**

AFC function adjusts uniform machining load to prevent tool damage and improve machining efficiency.

**Smart Thermal Compensation**

Smart Thermal Compensation function receives data from several sensors and calculates the appropriate compensation data based on the sensor data.

# SIEMENS 840D

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

## 15.6 inch screen + New OP

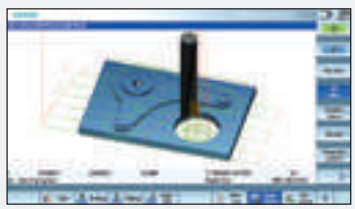
The newly-designed operation panel enhances operating convenience by incorporating common-design buttons and layout, and features the Qwerty keyboard for fast and easy operation.

**15.6-inch display**

- 10MB high capacity user memory
- USB & Ethernet (standard)
- QWERTY Keyboard (standard)
- High speed calculation and simulation can be fulfilled by improved processor skill

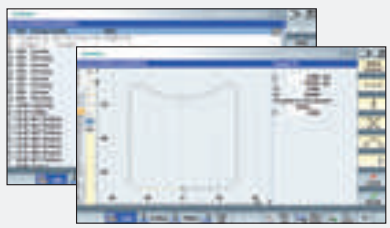
## Conversational Convenient function

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.



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

**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.

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

**5-axis kinematic measuring cycles**
This function automatically measures and corrects the rotation axis center, increasing 5-axis machining accuracy.

**3D Collision Avoidance_Collision Avoidance ECO**
Detect collisions in real time. Detection is possible in all operation modes.

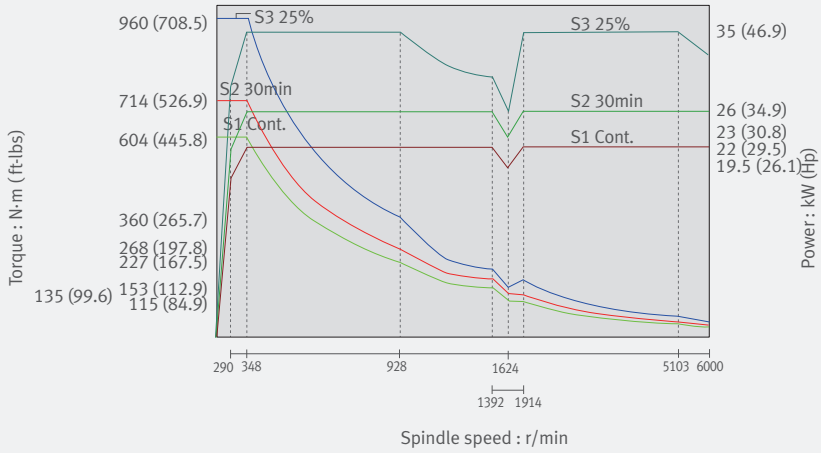
## Spindle Power – Torque Diagram

# DHF8000

### 60000 r/min FANUC

Max. Spindle motor power : 35 kW (46.9 Hp)

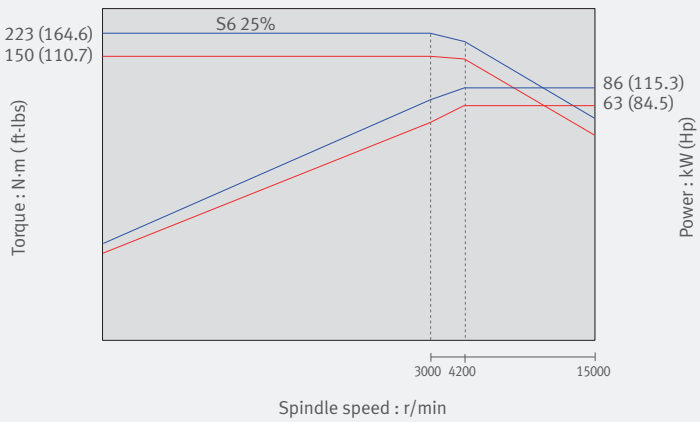
Max. spindle motor torque : 960 N·m (708.5 ft-lbs)




### 15000 r/min SIEMENS option

Max. Spindle motor power : 86 kW (115.3 Hp)

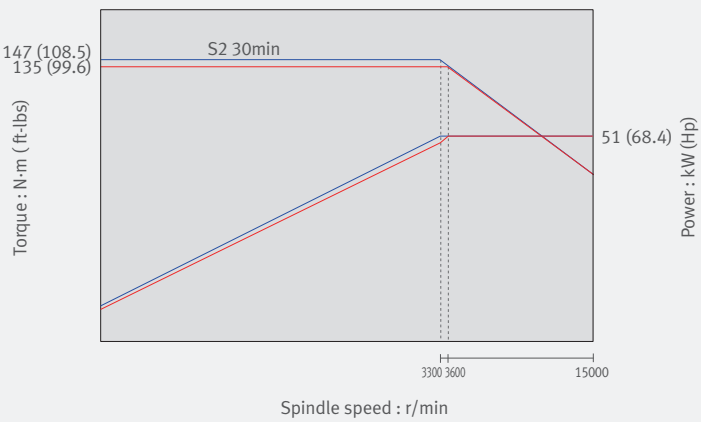
Max. spindle motor torque : 223 N·m (164.6 ft-lbs)




### 15000 r/min FANUC option

Max. Spindle motor power :51 kW (68.4 Hp)

Max. spindle motor torque : 147 N·m (108.5 ft-lbs)

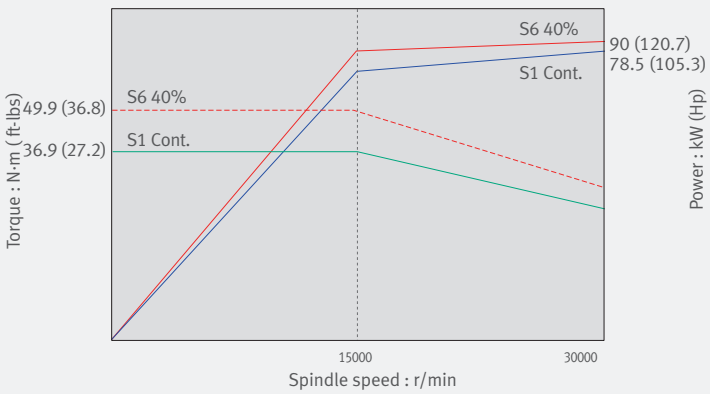



# DHF8000_30K

### 30000 r/min SIEMENS option

Max. Spindle motor power : 90 kW (120.7 Hp)

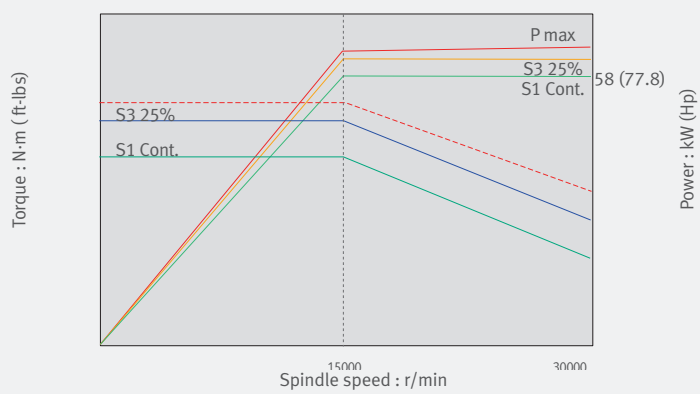
Max. spindle motor torque : 49.9 N·m (36.8 ft-lbs)




### 30000 r/min FANUC option

Max. Spindle motor power : 90 kW (120.7 Hp)

Max. spindle motor torque : 53.4 N·m (39.4 ft-lbs)

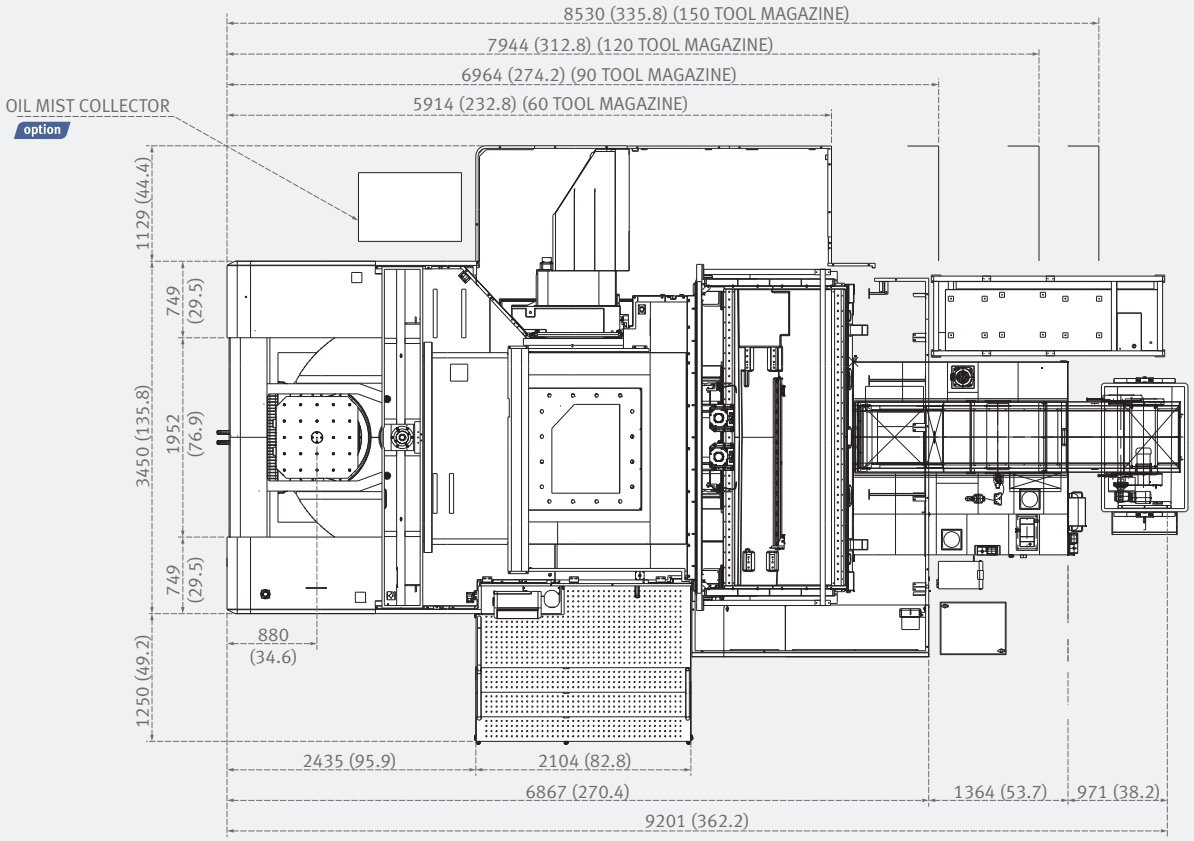


## External Dimensions

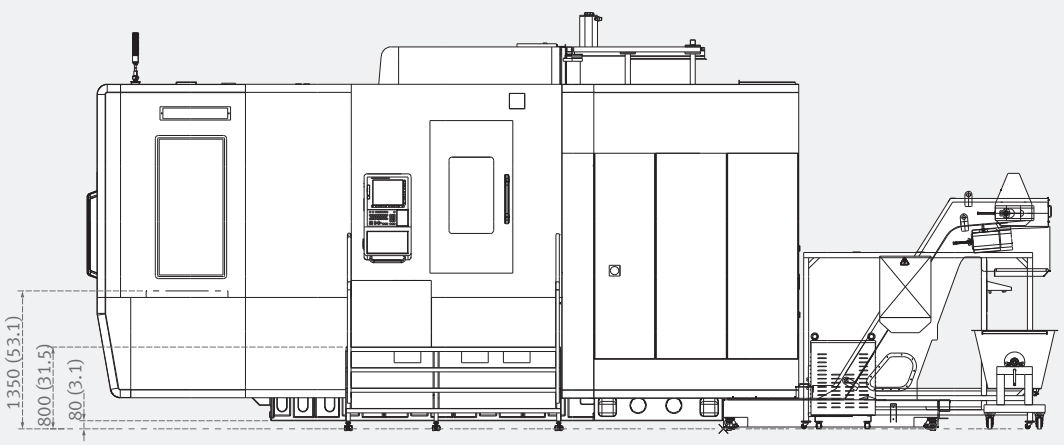
# DHF 8000

Unit: mm (inch)

Top View




Side View

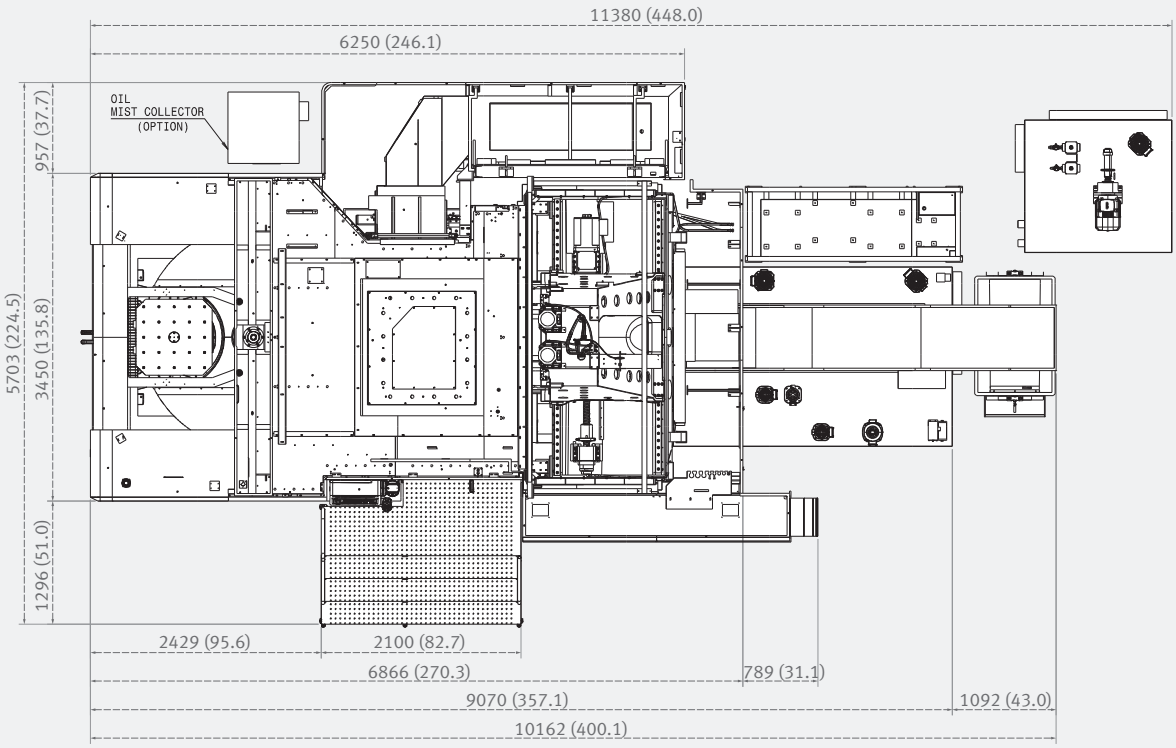



* Some peripheral equipment can be placed in other places

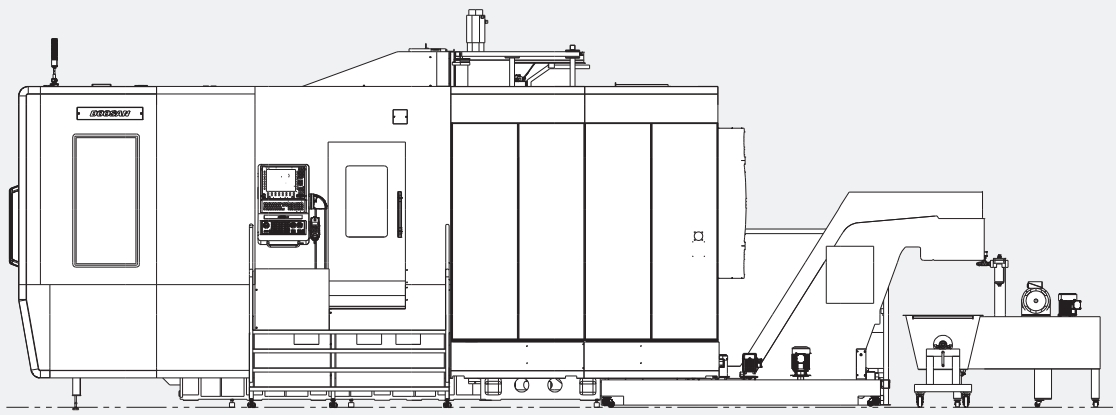
## DHF 8000 30000r/min / PSC

Unit: mm (inch)

Top View




Side View



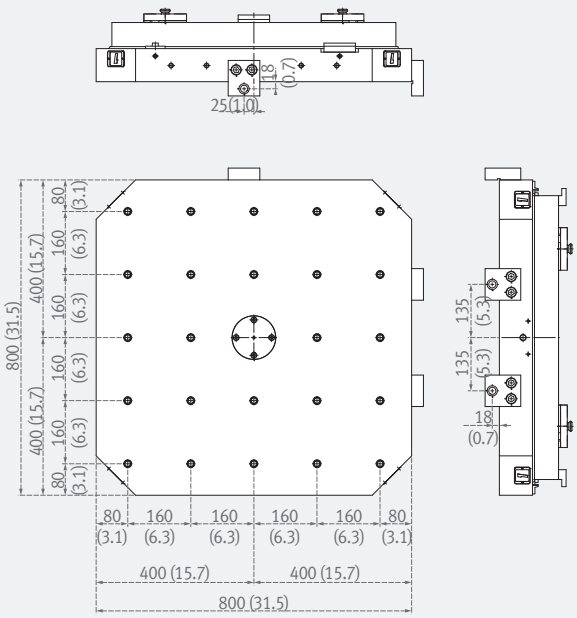
* Some peripheral equipment can be placed in other places

# Pallet / Woring area

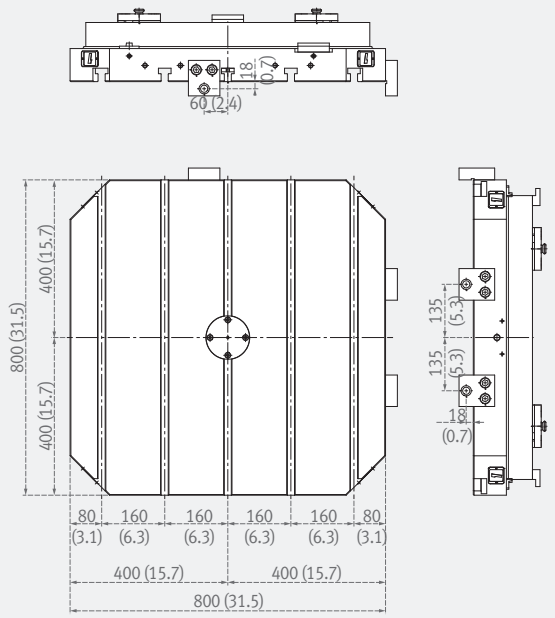
## Pallet

Unit: mm (inch)

TAP

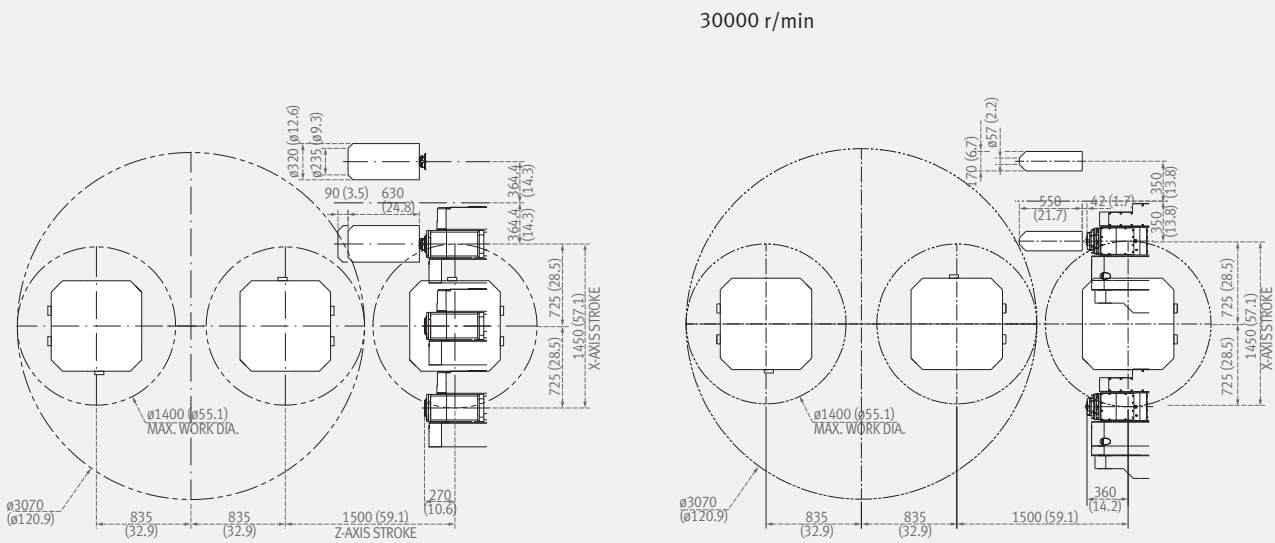



T-SLOT




## Woring area

Unit: mm (inch)



## Machine Specifications


| Description | | | Unit | DHF 8000 | DHF 8000 30000r/min / PSC |
|---|---|---|---|---|---|
| Travel | Travel distance | X-axis | mm (inch) | 1450 (57.1) | |
| | | Y-axis | mm (inch) | 1200 (47.2) | |
| | | Z-axis | mm (inch) | 1500 (59.1) | |
| | Spindle nose to table center | | mm (inch) | -270 ~ 1230 (-10.6 ~ 48.4) | |
| | Distance from spindle nose to table top | | mm (inch) | 200 ~ 1400 (7.9 ~ 55.1) | |
| Table | Pallet size | | mm (inch) | 800 x 800 (31.5 x 31.5) | |
| | Workpiece size | | mm (inch) | Ø1400 x H1400 (Ø55.1 x H55.1) | |
| | Maximum workpiece weight | | kg (lb) | 2000 (4409.2) | |
| Spindle | Max. spindle speed | | r/min | 6000 {15000, 30000}* | |
| | Taper | | - | ISO #50, HSK A100 | HSK A63 |
| | Max. Spindle motor power | | kW (Hp) | 35 {86, 51}* (46.9 {115.3, 68.4})* | 90 (120.7) |
| | Max. spindle torque | | N·m (ft-lbs) | 960 {223, 147} (708.5 {164.6, 108.5})* | 49.9, 53.4 ( 36.8, 39.4) |
| | A-axis tiling angle | | deg | -100 ~ 60 | |
| Feedrate | Rapid traverse rate | X-axis | m/min (ipm) | 40 (1574.8) | |
| | | Y-axis | m/min (ipm) | 40 (1574.8) | |
| | | Z-axis | m/min (ipm) | 50 (1968.5) | |
| Automatic Tool Changer (ATC) | Tool storage capacity | | ea | 60 {90, 120, 150, 196 ~ 376}* | 80 {120, 171, 275}* |
| | Max. tool diameter | Continous | mm (inch) | 125 (4.9) | 75 (3.0) |
| | | Without Adjacent Tools | mm (inch) | 320 (12.6) | 170 (6.7) |
| | Max. tool length | | mm (inch) | 550 (21.7) | |
| | Max. tool weight | | kg (lb) | 30 (66.1) | 12 (26.5) |
| | Max. tool moment | | N·m (ft-lbs) | 34.3 (25.3) | 11.8 (8.7) |
| | Tool change time (Tool-to-tool) | | sec | 3.5 | 2.4 |
| Machine Dimensions | Height | | mm (inch) | 4075 (160.4) | |
| | Length | | mm (inch) | 11835 (465.9) | |
| | Width | | mm (inch) | 5830 (229.5) | |
| | Weight | | kg (lb) | 31000 (68342.3) | |
| Control | CNC system | | - | DOOSAN FANUC 31iB5 {SIEMENS 840D}* | |

*{ } : Option

# CNC Specifications

● Standard ○ Optional X Not applicable

## FANUC

| NO. | Division | Item | Spec. | FANUC F31i5 |
|---|---|---|---|---|
| 1 | Controlled axis | Controlled axes | 5 (X, Y, Z, A, B) | X, Y, Z, A, B |
| 2 | | Additional controlled axes | ADD 1 AXIS (6TH AXIS) | ○ |
| 3 | | Simultaneously controlled axes | Positioning(G00)/Linear interpolation(G01) : 5 axes<br>Circular interpolation(G02, G03) : 2 axes | ● |
| 4 | | Backlash compensation | 0~±9999 pulses | ● |
| 5 | | HRV3 control | | ● |
| 6 | | Increment system C | IS-C | ○ |
| 7 | | Machine lock | all axes / Z axis | ● |
| 8 | | Mirror image | Reverse axis movement (setting screen and M - function) | ○ |
| 9 | | Stored pitch error compensation | Pitch error offset compensation for each axis | ● |
| 10 | | Interpolation type pitch error compensation | | ○ |
| 11 | | Stored stroke check1 | Overtraval controlled by software | ● |
| 12 | Spindle & M code Function | 2nd reference point return | G30 | ● |
| 13 | | 3rd / 4th reference return | | ● |
| 14 | | Circular interpolation | G02, G03 | ● |
| 15 | | Nano interpolation | | ● |
| 16 | | Inverse time feed | | ○ |
| 17 | | Cylindrical interpolation | G07.1 | ○ |
| 18 | | Linear interpolation | G01 | ● |
| 19 | | Helical interpolation | | ● |
| 20 | | NURBS interpolation | | ○ |
| 21 | | Bell-type acceleration/deceleration before look ahead interpolation | Included in AI contour control I or II (0i-MF, 31/32i) | ● |
| 22 | | Rigid tapping bell-shaped acceleration/ deceleration | Rigid tapping is required. | ● |
| 23 | | Exponential interpolation | | ○ |
| 24 | | Involute interpolation | | ○ |
| 25 | | Handle interruption | | ○ |
| 26 | | Manual handle retrace | | ○ |
| 27 | | Manual handle feed 2/3 unit | | ○ |
| 28 | | Nano smoothing | | ● |
| 29 | | Nano smoothing II | | ○ |
| 30 | | High-speed processing | 600 BLOCK | ● |
| 31 | | Look-ahead blocks expansion | 1000 BLOCK | ○ |
| 32 | | DSQ III | AICC II with high speed processing (600block) + Machining condition selection function + Data server(1GB) | ● |
| 33 | | HIGH-SPEED SmoothTCP | | ● |
| 34 | | 3-dimensional cutter compensation | | ● |
| 35 | | 3-dimensional manual feed | | ● |
| 36 | Tool Function | Number of tool offsets | 200-pairs | ● |
| 37 | | Number of tool offsets | 400-pairs | ○ |
| 38 | | Number of tool offsets | 499 / 999 / 2000 -pairs | ○ |
| 39 | | Tool nose radius compensation | G40, G41, G42 | ● |
| 40 | | Tool length compensation | G43, G44, G49 | ● |
| 41 | | Tool life management | | ● |
| 42 | | Addition of tool pairs for tool life management | | ○ |
| 43 | | Tool number command | T3 digits | ● |
| 44 | | Tool offset memory C | Geometry / Wear and Length / Radius offset memory | ● |
| 45 | | Tool length measurement | | ● |
| 46 | | Tool length offset | | ● |
| 47 | | 3-dimensional tool compensation | | ● |
| 48 | | Tool offset | G45 - G48 | ○ |
| 49 | | Rotary table dynamic fixture offset | | ● |
| 50 | | Work setting error compensation | | ● |
| 51 | Programming & Editing Function | Absolute / Incremental programming | G90 / G91 | ● |
| 52 | | Canned cycle | G73, G74, G76, G80 - G89, G99 | ● |
| 53 | | Circular interpolation by radius programming | | ● |

● Standard ○ Optional X Not applicable

| NO. | Division | Item | Spec. | FANUC F31i5 |
|---|---|---|---|---|
| 54 | Programming & Editing Function | Addition of custom macro common variables | #100 - #199, #500 - #999 | ● |
| 55 | | Macro executor | | ● |
| 56 | | Custom software | 8MB | ● |
| 57 | | Custom software | 12MB, 16MB | ○ |
| 58 | | Decimal point input | | ● |
| 59 | | Extended P-code variables 512Kbyte | | ● |
| 60 | | Extended part program editing | | ● |
| 61 | | Part program storage | 256KB(640m) | ● |
| 62 | | Part program storage | 512KB(1280m) | ○ |
| 62 | | Part program storage | 1MB(2560m) | ○ |
| 64 | | Part program storage | 2MB(5120m) | ○ |
| 65 | | Part program storage | 4MB(10240m) | ○ |
| 66 | | Part program storage | 8MB(20480m) | ○ |
| 67 | | Inch / metric conversion | G20 / G21 | ● |
| 68 | | Label skip | | ● |
| 69 | | Maximum commandable value | ±99999.999mm(±9999.9999 inch) | ● |
| 70 | | Number of Registered programs | 500 ea | ● |
| 71 | | Optional block skip | 1 BLOCK | ● |
| 72 | | Optional block skip | 9 BLOCK | ○ |
| 73 | | Optional stop | M01 | ● |
| 74 | | Program file name | 32 characters | ● |
| 75 | | Sequence number | N 8-digit | ○ |
| 76 | | Playback function | | ○ |
| 77 | | Program protect | | ● |
| 78 | | Program stop / end | M00 / M02,M30 | ● |
| 79 | | Programmable data input | Tool offset and work offset are entered by G10, G11 | ● |
| 80 | | Sub program | Up to 10 nesting | ● |
| 81 | | Tape code | ISO / EIA Automatic discrimination | ● |
| 82 | | Program restart | | ● |
| 83 | | Workpiece coordinate system | G52 - G59 | ● |
| 84 | | Addition of workpiece coordinate system | G54.1 P1 - 48 (48 pairs) | ● |
| 85 | | Addition of workpiece coordinate system | G54.1 P1 - 300 (300 pairs) | ○ |
| 86 | | Tilted working plane indexing command | G68.2 | ● |
| 87 | OTHERS FUNCTIONS (Operation, setting & Display, etc) | Machining condition selection function | | ● |
| 88 | | Actual cutting speed display | | ● |
| 89 | | Coordinate system rotation | G68,G69 | ● |
| 90 | | Cycle start / Feed hold | | ● |
| 91 | | Display of PMC alarm message | Message display when PMC alarm occurred | ● |
| 92 | | Graphic display | Tool path drawing | ● |
| 93 | | Help function | | ● |
| 94 | | Loadmeter display | | ● |
| 95 | | MDI / DISPLAY unit | 15" Color LCD, Keyboard for data input, soft-keys | ● |
| 96 | | External data input | | ● |
| 97 | | Stored stroke check 2 | | ○ |
| 98 | | Cs contouring control | | ○ |
| 99 | | Extended Spindle orientation(Spindle Multi Orientation) | | ● |
| 100 | | Chopping function | G81.1 | ○ |
| 101 | | High speed skip function | | ○ |
| 102 | | Polar coordinate command | G15 / G16 | ○ |
| 103 | | Polar coordinate interpolation | G12.1 / G13.1 | ○ |
| 104 | | Programmable mirror image | G50.1 / G51.1 | ○ |
| 105 | | Scaling | G50, G51 | ○ |
| 106 | | Single direction positioning | G60 | ○ |
| 107 | | Pattern data input | | ○ |
| 108 | | Jerk control | AI contour control II is required. | ○ |
| 109 | | Tape format for FS15 | | ○ |
| 110 | | Figure copying | G72.1, G72.2 | ○ |
| 111 | | Machining time stamp function | | ○ |
| 112 | | Machining quality level adjustment | | ○ |
| 113 | | EZ Guide I with 15" Color TFT | - Doosan infracore Conversational Programming Solution<br>- When the EZ Guide i is used, the Dynamic graphic display cannot application | ○ |
| 114 | | Dynamic graphic display (with 15" Color TFT LCD) | - Machining profile drawing.<br>- When the EZ Guide i is used, the Dynamic graphic display cannot application | ○ |

# CNC Unit Specifications

SIEMENS

● Standard ○ Optional X N/A

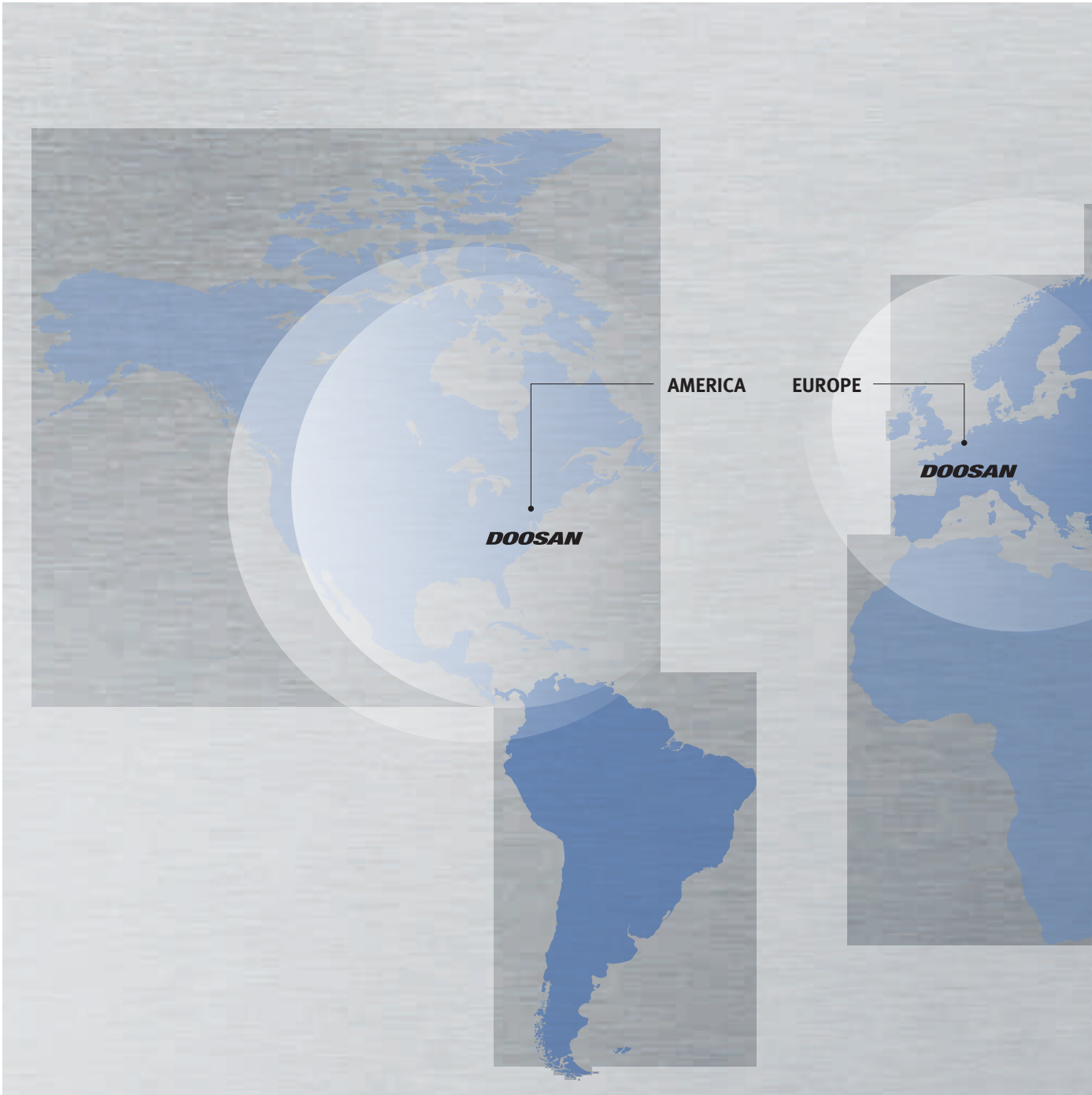
| No. | Item | | Spec. | S840D |
|---|---|---|---|---|
| 1 | Axes control | Controlled axes | 3 axes | - |
| 2 | | | 4 axes | X |
| 3 | | | 5 axes | X, Y, Z, A, B |
| 4 | | Additional controlled axes | Max. 31 axes in total(S840Dsl) /Max. 5 axes in total(S828D) | ○ |
| 5 | | Simultaneously controlled axes | Positioning(G00)/Linear interpolation(G01) : 3 axes Circular interpolation(G02, G03) : 2 axes | X |
| 6 | | | Positioning(G00)/Linear interpolation(G01) : 4 axes Circular interpolation(G02, G03) : 2 axes | X |
| 7 | | | Positioning(G00)/Linear interpolation(G01) : 5 axes Circular interpolation(G02, G03) : 2 axes | ● |
| 8 | | Backlash compensation | | ● |
| 9 | | Leadscrew error compensation | | ● |
| 10 | | Measuring system error compensation | | ● |
| 11 | | Feedforward control | velocity-dependent | ● |
| 12 | | Follow up mode | | ● |
| 13 | | Programmable acceleration | | ● |
| 14 | | Emergency stop / overtravel | | ● |
| 15 | | Least command increment | 0.001mm (0.0001 inch) | ● |
| 16 | | Least input increment | 0.001mm (0.0001 inch) | ● |
| 17 | | | 0.0001mm (0.0001 inch) | X |
| 18 | | Maximum commandable value | ±99999.999mm (±3937 inch) | ● |
| 19 | | Machine lock (PRT) | All axes | ● |
| 20 | | Position switching signals/cam controller | | ● |
| 21 | | Absolute encoder | | ● |
| 22 | | Travel to fixed stop with Force Control | | ○ |
| 23 | Interpolation & Feed function | Dry run | | ● |
| 24 | | Feedrate/Rapid override | 0 - 120 % | ● |
| 25 | | Reference point return | G75 FP=1 | ● |
| 26 | | 2nd reference point return | G75 FP=2 | ● |
| 27 | | 3rd / 4th reference return | G75 FP=3, 4 | ● |
| 28 | | Advanced surface | | ● |
| 29 | | Top surface | | ○ |
| 30 | | Linear interpolation | Max. 4 | ● |
| 31 | | Circular interpolation | G02, G03 | ● |
| 32 | | Inverse time feedrate | G93 | ● |
| 33 | | Helical interpolation | | ● |
| 34 | | Universal interpolator NURBS | | ● |
| 35 | | Polynomial interpolation | | ○ |
| 36 | | Spline interpolation (A, B and C splines) | | ● |
| 37 | | Involute interpolation | | ○ |
| 38 | | Dwell | G04 | ● |
| 39 | | Separate path feed for corners and chamfers | | ● |
| 40 | | Reposition | | ● |
| 41 | | Acceleration with Jerk limitation | | ● |
| 42 | | Compressor for 3-axis machining | | ● |
| 43 | | Compressor for 5-axis machining | | ● |
| 44 | | Temperature compensation | | ● |
| 45 | | Positioning | G00 | ● |
| 46 | | Look ahead number of block | S/W version 4.5 | 150 |
| 47 | | | S/W version 4.7 | 1000 |
| 48 | | Cartesian point-to-point (PTP) travel | | ● |
| 49 | | TRANSMIT/cylinder surface transformation | | ● |
| 50 | | Inclined axis | | X |
| 51 | | Inclined axis TRAANG after TRANSMIT/ TRACYL | | ● |
| 52 | Spindle & M code function | Spindle speed, digital setpoint | | ● |
| 53 | | Spindle speed, max. programmable value range | 106 ... 0.0001 (display: ± 999999999.9999) | ● |
| 54 | | Spindle override | 50 - 120 % | ● |
| 55 | | Automatic gear state selection | | ● |
| 56 | | Oriented spindle stop | | ● |
| 57 | | Spindle speed limitation min./max. | | ● |
| 58 | | Constant cutting rate | | ● |
| 59 | | Spindle control via PLC (Positioning, oscillation) | | ● |
| 60 | | Changeover to axis mode | | ● |
| 61 | | Tapping with compensating chuck/rigid tapping | | ● |
| 62 | Tool function | Tool radius compensations in plane | With approach and retract strategies | ● |
| 63 | | | With transition circle/ellipse on outer edges | ● |
| 64 | | 3D Tool radius compensation | | ● |
| 65 | | Number of tools/cutting edges in tool list | 256/512 | ● |
| 66 | | | 600/1500 | X |
| 66 | | Tool length compensation | | ● |
| 67 | | Operation with tool management | | ● |
| 68 | | Tool list | | ● |
| 69 | | Tool offset selection via T and D numbers | | ● |
| 70 | | Replacement tools for tool management | | ● |
| 71 | | Monitoring of tool life and workpiece count | | ● |
| 72 | | Manual measurement of tool offset | | ● |
| 73 | | Magazine list | | ● |
| 74 | | Loading and unloading of tools | | ● |

● Standard ○ Optional X N/A

| No. | Item | | Spec. | S840D |
|---|---|---|---|---|
| 75 | Programming & Editing function | Programming language (DIN 66025 and high-level language expansion) | | ● |
| 76 | | Main program call from main program and subprogram | | ● |
| 77 | | Subprogram levels and interrupt routines, max. | | 16/2 |
| 78 | | Number of subprogram passes <= 9999 | | ● |
| 73 | | Number of levels for skip blocks | | 8 |
| 74 | | Number of levels for skip blocks, maximum 10 | | X |
| 75 | | Polar coordinates | | ● |
| 76 | | 1/2/3-point contours | | ● |
| 77 | | Dimensions metric/inch, changeover manually or via program | | ● |
| 78 | | Auxiliary function output | | |
| 79 | | • Via M word, max. programmable value range: INT $2^{31}$-1 | | ● |
| 80 | | • Via H word, max. range: REAL ± 3.4028 ex 38, INT -$2^{31}$ ... $2^{31}$-1 | | ● |
| 81 | | CNC High-level language with | | |
| 82 | | • User variables, configurable | | ● |
| 83 | | • Read/write system variables | | ● |
| 84 | | • Indirect programming | | ● |
| 85 | | • Program jumps and branches | | ● |
| 86 | | • Program coordination with WAIT, START, INIT | | ● |
| 87 | | • Arithmetic and trigonometric functions | | ● |
| 88 | | • Compare operations and logic combinations | | ● |
| 89 | | • Macro techniques | | ● |
| 90 | | • Control structures IF-ELSE-ENDIF | | ● |
| 91 | | • Control structures WHILE, FOR, REPEAT, LOOP | | ● |
| 92 | | • STRING functions | | ● |
| 93 | | Program functions | | |
| 94 | | • Dynamic preprocessing memory FIFO | | ● |
| 95 | | • Frame concept | | ● |
| 96 | | • Inclined-surface machining with swivel cycle | | ● |
| 97 | | • Axis/spindle replacement | | ● |
| 98 | | • Geometry axes, switchable online in the CNC program | | ● |
| 99 | | • Program preprocessing | | ● |
| 100 | | Online ISO dialect interpreter | | ● |
| 101 | | Program/workpiece management | | |
| 102 | | • Parts programs on (PPU or NCU), max. number | | 1000 |
| 103 | | • Workpieces on (PPU or NCU), max. number | | 250 |
| 104 | | • Workpieces on Hard disk, max. number | | ○ |
| 105 | | • In additional HMI user memory on CF card | | ● |
| 106 | | • On additional plug-in CF card | | ○ (with PCU) |
| 107 | | • On integral Hard disk PCU50.5 | | ○ |
| 108 | | • On USB storage medium (e.g. disk drive, USB stick) | | ● |
| 109 | | • On network drive | | ● |
| 110 | | • Templates for workpieces, programs and INI files | | ● |
| 111 | | • Job lists | | ● |
| 112 | | Basic frames, max. number | | 16 |
| 113 | | Settable offsets, max. number | G54, G55, G56 ... | 100 |
| 114 | | Zero/work offsets, programmable (frames) | | ● |
| 115 | | Scratching, determining zero/work offset | | ● |
| 116 | | Work offsets, external via PLC | | ● |
| 117 | | Global and local user data | | ● |
| 118 | | Global program user data | | ● |
| 119 | | Display system variables | | ○ |
| 120 | | Program editor | | |
| 121 | | • Programming support for cycles program (Program Guide) | | ● |
| 122 | | • Dual editor | | ● |
| 123 | | • CNC editor with editing functions: Marking, copying, deleting | | ● |
| 124 | | • Programming graphics/free contour input (contour calculator) | | ● |
| 125 | | • Screens for 1/2/3-point contours (contour definition programming) | | ● |
| 126 | | • Support for parameter input Animated Elements | | ● |
| 127 | | • Shopturn/ShopMill Machining step programming | | ● |
| 128 | | Technology cycles for drilling/milling | | ● |
| 129 | | Pocket milling free contour and islands stock removal cycle | | ● |
| 130 | | Residual material detection | | ● |
| 131 | | Access protection for cycles | | ○ |
| 132 | | Programming support can be extended, e.g. customer cycles | | ● |
| 133 | | Quck view for mold making program | | ● |
| 134 | | 2D simulation | | ● |
| 135 | | 3D simulation, finished part | | ● |
| 136 | | Simultaneous recording | | ● |
| 137 | | Measure kinematics | | ● |
| 138 | | DXF Reader for PC integrated in SINUMERIK Operate | | ○ |

| No. | Item | | Spec. | S840D |
|---|---|---|---|---|
| 139 | Others functions (Operation, setting & Display, etc) | JOG | | |
| 140 | | • Handwheel selection | | ● |
| 141 | | • Switchover: inch/metric | | ● |
| 142 | | • Manual measurement of zero/work offset | | ● |
| 143 | | • Manual measurement of tool offset | | ● |
| 144 | | • Automatic tool/workpiece measurement | | ● |
| 145 | | • Reference point approach, automatic/via CNC program | | ● |
| 146 | | MDA | | |
| 147 | | • Input in text editor | | ● |
| 148 | | • Save MDA program | | ● |
| 149 | | • Input screen forms for technology and positioning, cycle support | | ● |
| 150 | | Teach-in | | ● |
| 151 | | Automatic | | |
| 152 | | • Execution from USB interface on operator panel front | | ● |
| 153 | | • Execution from HMI memory on NCU CF card | | ● |
| 154 | | • Execution from network drive | | ● |
| 155 | | • Execution from Hard disk (PCU50.5) | | ○ |
| 156 | | • Program control | | ● |
| 157 | | • Program editing | | ● |
| 158 | | • Overstoring | | X |
| 159 | | • DRF offset | | ● |
| 160 | | • Block search with/without calculation | | ● |
| 161 | | CNC user memory expanded for programs | ‹ 100MB | ○ |
| 162 | | Execution from external storage EES | | ○ |
| 163 | | Repos (repositioning on the contour) | | |
| 164 | | • With operator command/semi-automatically | | ● |
| 165 | | • Program-controlled | | ● |
| 166 | | Preset | | |
| 167 | | • Set actual value | | ● |
| 168 | | 10.4" color display | | X |
| 169 | | 15.0" color display | | X |
| 170 | | 19.0" color display | | X |
| 171 | | 15.6" color display with touch screen | | ● |
| 172 | | 18.5" color display with touch screen | | ○ |
| 173 | | Plain text display of user variables | | ● |
| 174 | | Multi-channel display | | ○ |
| 175 | | 2D representation of 3D protection areas/work areas | | ● |
| 176 | | Actual-value system for workpiece | | ● |
| 177 | | CNC program messages | | ● |
| 178 | | Screen blanking | | ● |
| 179 | | Access protection, 7 levels | | ● |
| 180 | | Operating software languages | | |
| 181 | | • Ch_S, En, Fr, Gr, It, Sp | | ● |
| 182 | | • Ch_T, Kr, Pt | | ○ |
| 183 | | • Additional languages, use of language extensions | | ○ |
| 184 | | Working area limitation | | ● |
| 185 | | Limit switch monitoring (Software and hardware limit switches) | | ● |
| 186 | | Position monitoring | | ● |
| 187 | | Standstill (zero-speed) monitoring | | ● |
| 188 | | Clamping monitoring | | ● |
| 189 | | 2D/3D protection areas | | ● |
| 190 | | Contour monitoring | | ● |
| 191 | | Axis limitation from the PLC | | ● |
| 192 | | Alarms and messages | | ● |
| 193 | | Action log can be activated for diagnostic purposes | | ● |
| 194 | | PLC status | | ● |
| 195 | | Remote Control System (RCS) remote diagnostics | | |
| 196 | | • RCS Host remote diagnostics function | | ○ |
| 197 | | • RCS Commander (viewer function) | | ● |
| 198 | | Integrated service planner for the monitoring of service intervals | | ● |
| 199 | | Automatic measuring cycles | | ● |
| 200 | | Easy Extend | | X |
| 201 | | Contour handwheel | | ○ |
| 202 | | Integrate screens in SINUMERIK Operate with SINUMERIK Integrate Run MyScreens | | ● |
| 203 | | Cross-mode actions (ASUPs and synchronized actions in all operating modes) | | ● |
| 204 | | Axis collision protection PROT | | ○ |
| 205 | | Collision avoidance (machine, working area) | | ○ |
| 206 | | MDynamics 3-axis | | X |
| 207 | | MDynamics 5-axis | | ● |

# Responding to Customers Anytime, Anywhere



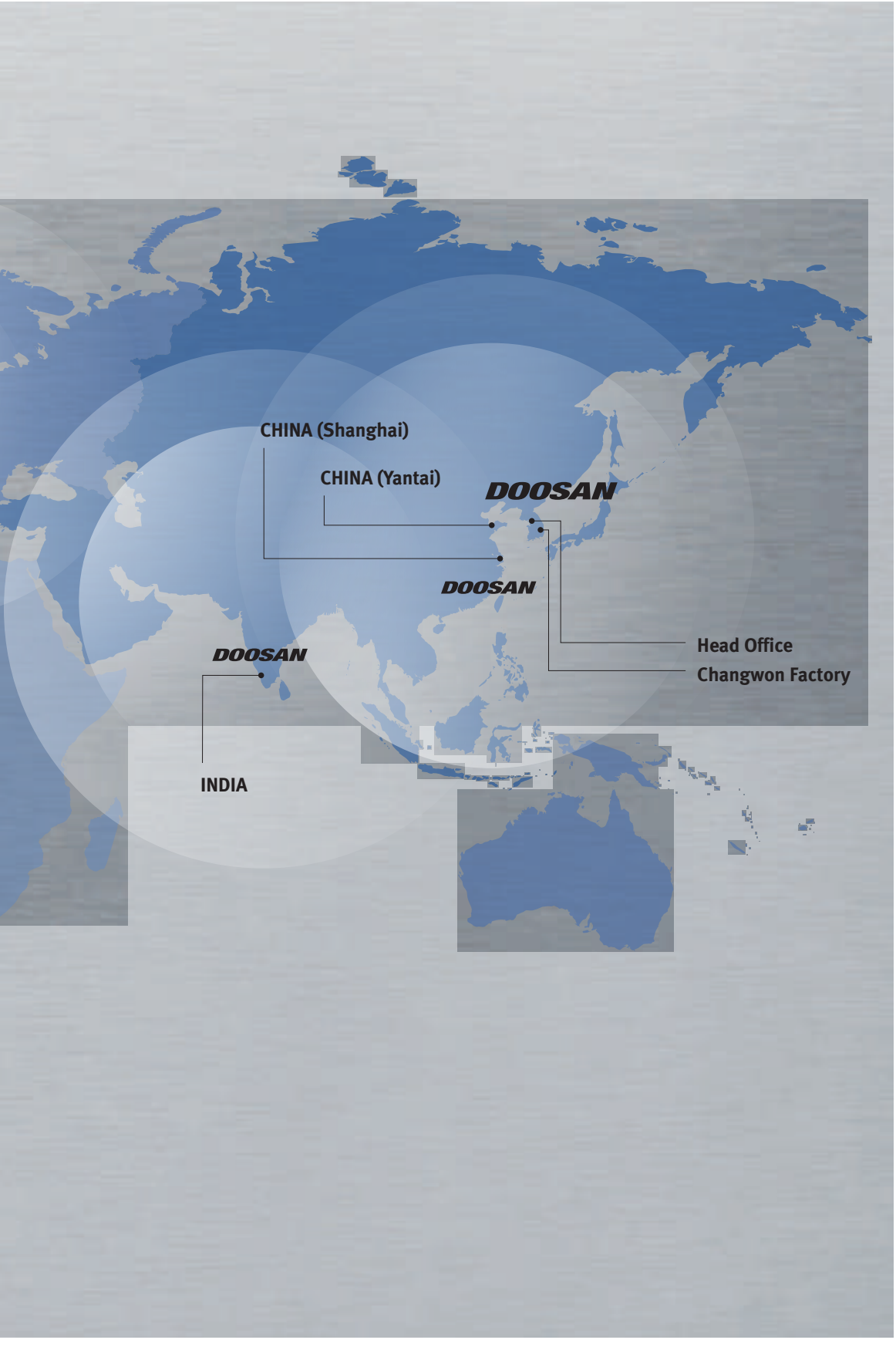

## Global Sales and Service Support Network

| 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

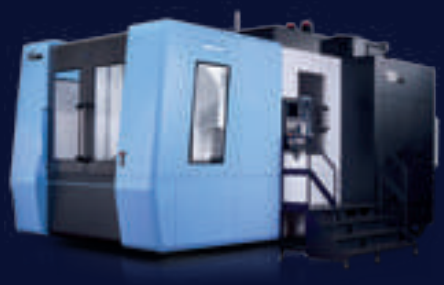
- Supports machining methods and technology
- Responds to technical queries
- Provides technical consultancy

### Training

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

## Major Specifications

### DHF 8000



| Description | Unit | DHF 8000 |
|---|---|---|
| Max. spindle speed | r/min | 6000 {15000, 30000}* |
| Max. Spindle motor power | kW (Hp) | 35 {86, 51, 90} (46.9 {115.3, 68.4, 120.7})* |
| Max. Spindle motor torque | N·m (ft-lbs) | 960 {223, 147, 49.9}<br>(708.5 {164.6, 108.5, 36.8})* |
| Taper | - | ISO #50, HSK A100, HSK A63 (30000 r/min) |
| Travel distance (X / Y / Z) | mm (inch) | 1450 / 1200 / 1500 (57.1 / 47.2 / 59.1) |
| A-axis tiling angle | deg | -100 ~ 60 |
| Pallet Size | mm (inch) | 800 x 800 (31.5 x 31.5) |
| Max. work size | mm (inch) | Ø1400 x H1400 (Ø55.1 x H55.1) |
| Max. work weight | kg (lb) | 2000 (4409.2) |
| Tool storage capacity | ea | 60 {90, 120, 150, 196 ~ 376}*<br>80 {120, 171, 275}* (30000 r/min) |

*{} : Option


## Doosan Machine Tools

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* For more details, please contact Doosan Machine Tools.
* The specifications and information above-mentioned may be changed without prior notice.
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**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 191220 SU