DAHLIH

Machines That Create Value

DAH LIH MACHINERY INDUSTRY CO., LTD.
No. 3, Kung-Yeh Lane, Fengcheng Road, Nanshih Village,
Wufeng District, Taichung City, 413001, Taiwan.
TEL:886-4-23334567 FAX:886-4-23307567
E-mail:export.sale@dahlih.com.tw
Http://www.dahlih.com.tw

021-D2-00-038

1000.03, 2024E1

The Latest and Best Quality Machinery.

DAHLIH®

MICRO
MACHINING CENTER

DMC-650

DAHLIH

DAH LIH MACHINERY INDUSTRY CO., LTD.

An Evolution in Structural Rigidity: The Optimal Exhibition of Precision and Stability.

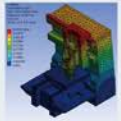
STRUCTURE DESIGN

BOX TYPE GANTRY STRUCTURE
The machine structure of Dah Lih's DMC-650 is designed with the advanced box type gantry structure, which not only reduces the spindle head deflection but also increases machine rigidity to a new level.

MASSIVE BASE AND COLUMN
The massive base combined with the box type column provide a guarantee of outstanding dynamic rigidity and a solid support for the entire machine. The structure provides an outstanding performance in high-speed machining, that dramatically upgrades machining surface quality.

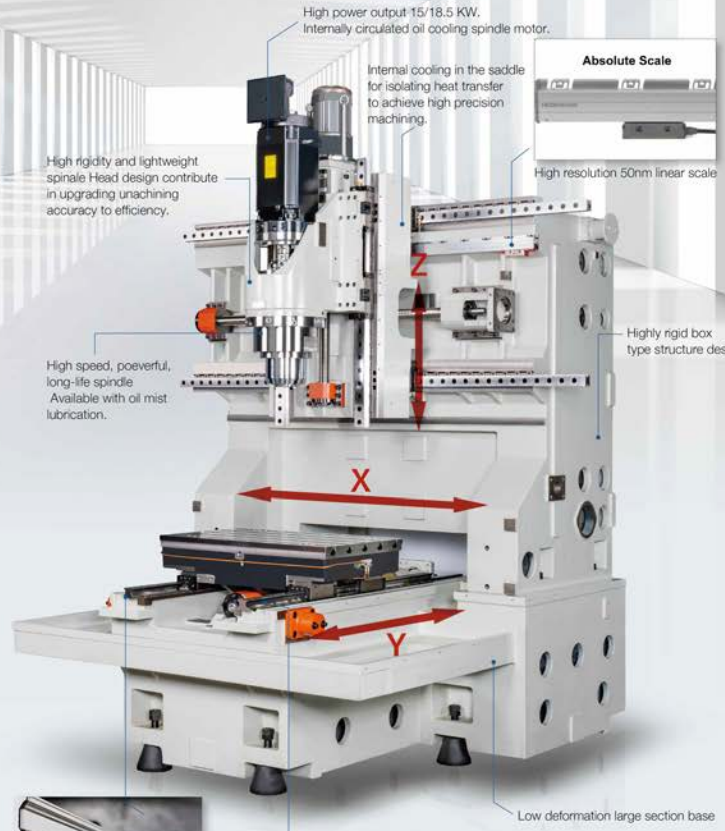
SHORT DISTANCE HEAD EXTENSION
The distance between the spindle and the sliding surface is short that effectively reduces the spindle deflection problem while upgrading machining accuracy.

STATIC AND DYNAMIC ANALYSIS
Upgrading the resonance frequency of the machine is enhanced through static and dynamic analysis. Peak structural dimensions can be achieved with the use of optimization, which effectively eliminates resonance problems during cutting operations. As a result, it reduces vibrating displacement between the cutting tool and the workpiece, and also helps to reduce the dynamic vibrating grains during cutting.


Finite element analysis (FEM)


Large section base design

The machine structure is a symmetrical structure design with box type and without overarm which enhances rigidity and thermal stability. It fully presents dimensional accuracy and machining quality. The structural rigidity of the machine and long-term temperature control accuracy are the key factors that are indispensable for precision machining, especially for high precision machining of small parts. Dah Lih's DMC-650 provides an all-new solution which allows you to complete all jobs peacefully and smoothly.



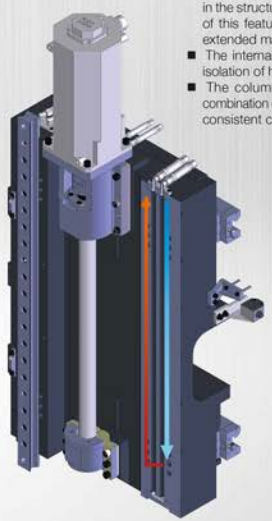

Low chattering roller type linear 4) guide way. High precision, high rigiding linear guideway is lubricated by grease.

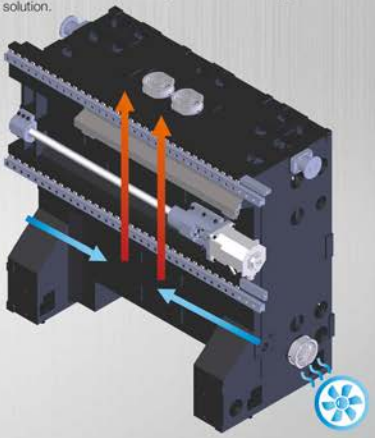

Rigidity up to 145%
Thrust up to 190%
Ø45 ball screw combined with high powered servo motor

Perfectly Designed Structure Cooling to Ensure Lifetime Accuracy

Comprehensive Cooling Effect to Collate Isolate Spindle Heat. Source Teepindle Heat so That Effectively Reduces Thermal Deformation of Casting Parts

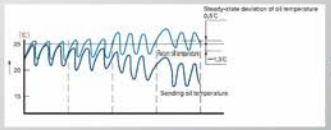
- The thermal balance design of the spindle, motor and internally circulated cooling in the structure provides a comprehensive thermal,. suppression effect. The effect of this feature helps in maintaining a consistent condition over long periods of extended machining time.
- The internaily circulated cooling in the saddle of the spindle head provides an isolation of heat transfer.
- The column and the cross beam Castings are specially designed with the combination of the fan / air tubes this combines to provide an effective high powered consistent cooling solution.





Oil Temperature Control Accuracy ±1°C For Conventional Machines

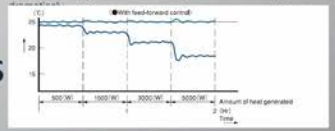
Conventional oil coolers employ ON / OFF control, which cannot accurately control coolant temperature. Due to its restriction of working frequency, temperature consrehe control accuracy variation only range of coolant temperature is ±2°C.



VS

Oil Temperature Control Accuracy Falc FoR DAH LIH DMC-650±0.1°C

The all cooler on DMC-650 employs continuous temperature control continuous in the use of bypass Valve for accurate adjustment of oil. The accuracy concrel temperature. accuracy can reach faic and the temperature variation range of coolant is ±0.2°c. Its accuracy is 10 times that control of ON / OFF con machining accuracy consistency upgraded Sramatically hence can be upgradedd

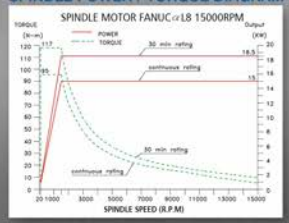


High precision direct-drive spindle

DIRECT-DRIVE SPINDLE

» Spindle Nose Taper:BBT-HSK
» Choice of Spindle Speeds:15,000/18,000rpm

SPINDLE POWER / TORQUE DIAGRAM



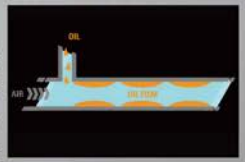
15,000/18,000 RPM DIRECT-DRIVE SPONDLE (OPTIONAL)

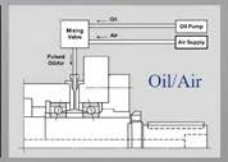
SPINDLE THERMAL BALANCE (STB)

Thermal deformation is affected by various factors such as running speed, cutting load, time, factory environment and other factors. This not only causes thermal expansion and cold contraction, but also affects position machining accuracy. With the use of the spindle thermal balance (STB) function, the spindle temperature growth can be effectively suppressed. Thus, the machine tool can maintain consistent machining accuracy for a long time. In order to effectively control the thermal displacement within a minimum range, the cooling system in the spindle head is also improved. Improvements include spindle oil cooling efficiency, temperature control accuracy and cooling circuit design. With these improvements, the machine is able to maintain the best machining accuracy under the normal variation of environment temperatures. The actual test indicates that the spindle thermal test shows that the spindle thermal balance (STB) can be effectively reduced. 50% of non-symmetrical thermal displacement errors for a vertical machining center.

SPINDLE OIL-AIR LUBRICATION (OPTIONAL)

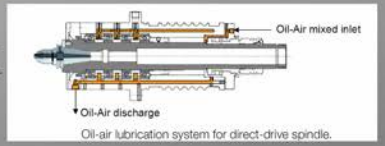
The oil-air lubrication provides superior lubrication and cooling effects which is particularly suitable for high-speed spindles. Lubrication oil is delivered according to the specified interval (circulation time). It uses air to flow into the infeed hose and uniformly distributes to each lubrication point at proper intervals. The oil-air lubrication ensures the lubrication effect and usage efficiency when the spindles run at maximum speed.





FEATURES

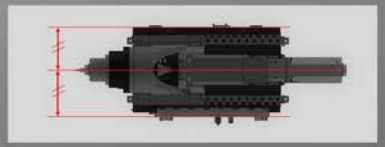
- Minimum friction loss.
- Low heat generation and low thermal growth of spindle.
- Short time of thermal stability.
- Minimum oil consumption and minimum oil mist generation.



Oil-air lubrication system for direct-drive spindle.

SYMMETRICAL DESIGN OF SPINDLE HEAD

The spindle and spindle transmission system are designed with center symmetry. This effectively avoids unbalanced torque during cutting operations. In addition, it can suppress axial displacement that in turn ensures machining accuracy.



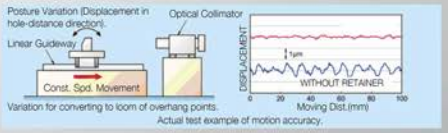
High Precision, High Rigidity, Quiet and Smooth Feed System. The Best Exhibition of Machining Accuracy and Surface Quality.

Feed Axis

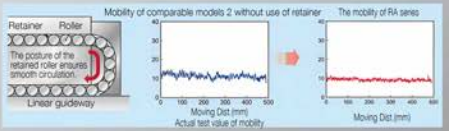
RIGIDITY UPGRADE
Performance comparison for linear guideways and ball screws.

	CONVENTIONAL MACHINE	DMC-650			
Linear Guideway	#35 Roller Type	#45 Roller Type	Rigidity Upgrade	+65	%
Ball Screw	Ø40	Ø45	Rigidity Upgrade	+145	%
			Thrust Upgrade	+190	%

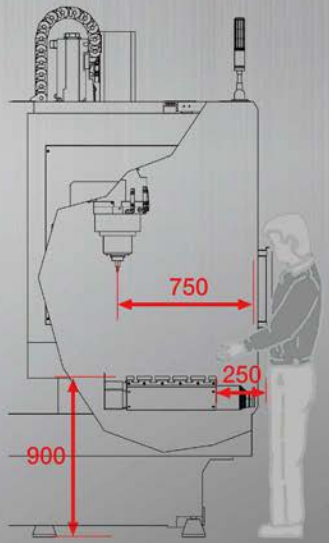
EXTRA HIGH MOTION ACCURACY
The vibration simulation test for the rotating body in combination with the optimal block design for roller vibration suppressing produces a dramatical improvement on the block motion accuracy.



HIGH MOBILITY
As the retainer is equipped between rollers, it suppresses the skew phenomenon caused by thermal push. Thus, smooth motion can be achieved. Because the friction variation is lowered, stable tracing is obtained even on a complicated track.



* NSK linear guideway is optional



The height of the operator shown in the figure is 175cm.

OPERABILTY
The machine is designed from the operator's perspective and also considers workpiece lifting, workpiece installation, fixture adjustment, table height and easy access to the spindle and table.

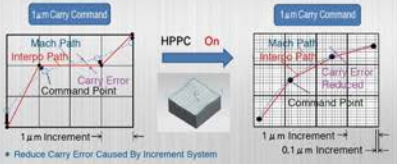
CENTRALIZED DEPLOYMENT OF PNEUMATIC PARTS AND LUBRICATOR
The pneumatic parts and automatic lubricator feature centralized deployment, making machine maintenance and inspection more convenient. In addition, it also contributes to the neat and tidy appearance of the machine.

+ The distance to table: 250mm (9.84 in.)
+ Height of table: 900mm (35.4 in.)
+ Height of guard front: 890mm (35.04 in.)
+ Door open width: 820mm (32.28 in.)
+ Distance from guard front to spindle center: 750mm (29.53 in.)

Fine Surface Control (FSS) A Combination of Speed, Accuracy, and Quality

HIGH PRECISION PROGRAM COMMAND (HPPC)

The increase of program accuracy may reduce patch errors, which in turn upgrades the smoothness of curve connection, reduces level difference on machining surface, while keeping the same machining time.

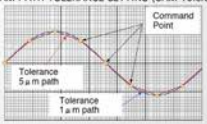


* Reduce Carry Error Caused By Increment System

SMOOTH TOLERANCE CONTROL (STC)

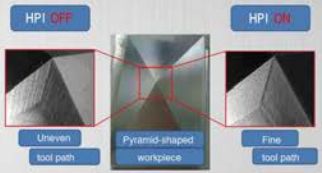
The poor machining surface caused by tool path usually consists of many short lines. Now with the use of the Smooth Tolerance Control function of the CNC, smoother surface effects can be achieved. The STC function not only smoothens the tool path, but also can shorten machining time.

PROGRAM PATH TOLERANCE SETTING (CAM Tolerance)



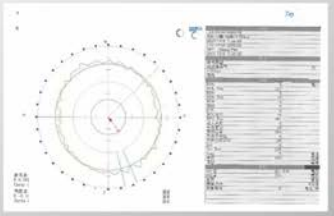
HIGH PRECISION INTERPOLATION (HPI) (An Optional Function for Mold Machining Equipment):

The submicron command control technology in combination with high resolution program path planning can reach the optimal tool path grain on surfaces, which aids in dramatically upgrading the machining surface quality.



CIRCULARITY

The Taylor Hobson circularity system measures the actual test values in internal and external diameter machining, where ultra-high accuracy under 1μm is required.



TOOL MEASURING

Automatic tool measuring system

- Tool length setting
- Tool breakage detection
- Thermal error compensation

Outstanding Machining Capacity

* The spindle motor power required for above-mentioned machining examples is 15/18.5KW.

Examples Of Parts Machining

AEROSPACE PART

Material: Aluminum 7075-T6
Sizes: 430 x 430 x 80mm
Machining time: **8** hours

PNEUMATIC PART

Material: Stainless steel
Sizes: 150 x 150 x 25mm
Machining time: **20** hours

BLADE

Material: Aluminum 7075-T6
Sizes: Ø100 x 55mm
Machining time: **6** hours

PRECISION MOLD

Material: P20 (HRC30)
Sizes: 420 x 360 x 60mm
Machining time: **7** hours

FORGING MOLD

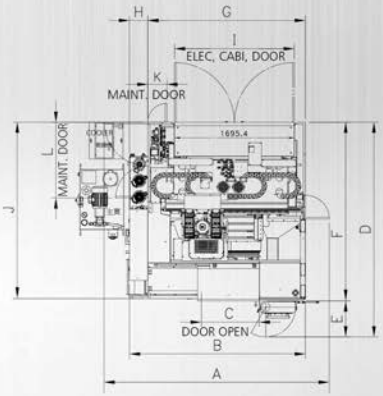
Material: SKD61 (HRC43)
Sizes Ø140 x 70mm
Machining time: **4** hours

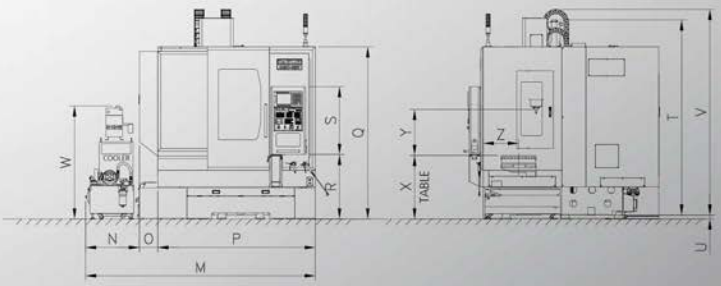
INJECTION MOLD

Material: NAK80 (HRC40)
Sizes: 160 x 120 x 40mm
Machining time: **10** hours

Machine Dimensions

DMC-650





EXTERNAL DIMENSIONS

Model	DMC-650	
Unit	mm	inch
A	3187.5	125.49
B	2489	97.99
C	820	32.28
D	3029	119.25
E	508	20
F	2521	99.25
G	2229	87.76
H	260	10.24
I	1695	66.73
J	2488	97.95
K	270	10.63
L	1073	42.24
M	3252	128.03
N	763	30.04
O	260	10.24
P	2229	87.76
Q	2437.5	95.96
R	913.5	35.96
S	960	37.8
T	2763	108.78
U	55	2.17
V	2911	114.61
W	1600	63
X	900	35.43
Y	200~650	7.87~25.59
Z	500~1000	19.69~39.37

Specifications, Accessories and Dimensions

SPECIFICATIONS

MODEL	DMC-650
TABLE	
Table surface area	800×500 mm
T-slots (w x no. x pitch)	18H8×5
Max. table load	800 kg
Max. workpiece sizes	650×500×350 mm
TRAVEL	
X, Y, Z-axis travel	650 / 500 / 450 mm
Distance from spindle nose to table surface	200-650 mm
Slideway type	Roller type linear way
Feed rates	Rapid trav. 20m/min. Cutting 20m/min.
Acceleration	Rapid trav. 0.5G. Cutting 0.1G
FEED	
Spindle type and nose taper	Direct drive grease lube, BBT40 (std.)
Spindle motor (30 min/cont.)	18.5 kW (25 HP) / 15 kW (20 HP)
Spindle torque (30 min/cont.)	117.7Nm (1201 kg.cm) / 95.5Nm (975 kg.cm)
Max. spindle speed	15,000 rpm direct drive (std.)
Spindle cooling	Oil cooling
ATC system	
Tool storage capacity	24 T
Max. tool weight	7 kg
Max. tool length	250 mm
Max. tool dia. (without adjacent tool)	Ø75 (Ø120) mm
Tool selection	Random
Operation	Dist. From spindle center to guard front: 750mm Min. dist. from table to guard front: 225mm. Height of guard front: 890mm Height of table from floor: 900mm Door open width: 820mm
OTHER	
Power required.	36 KVA
Air pressure required (supply)	6 kg/cm^2
Coolant tank capacity (total/actual)	200 L
Machine weight	8000 kg
Space required	3030×2490×3000 mm (Machine) 3030×3260×3000 mm (Incl. acce)

■ Specifications are subject to change without prior notice.

» STANDARD

1. Heat exchanger
2. Removable manual pulse generator
3. Fully enclosed splash guard
4. RS-232 interface
5. Automatic power off
6. Call light
7. Automatic lubrication equipment
8. Work light
9. Toolbox and tool kits
10. Swing type control panel
11. Spindle oil cooler
12. 24-tool cam type ATC system
13. Rigid tapping
14. Roller type linear ways on 3 axes
15. USB port and embedded ethernet

» OPTIONS

1. Flat type chip conveyor & chip bin
2. 4th axis control
3. Coolant through spindle device with filter
4. Automatic tool length measuring device.
5. Automatic workpiece measuring device.
6. Linear scale
7. 15,000/18,000 rpm direct drive oil mist lubricated spindle
8. 24,000 rpm built-in type spindle with oil mist lubrication
9. Oil mist collector
10. Oil fluid separator
11. Air conditioner for electrical cabinet
12. NSK linear guideway


FANUC


Mitsubishi


Heidenhain


SINUMERIK