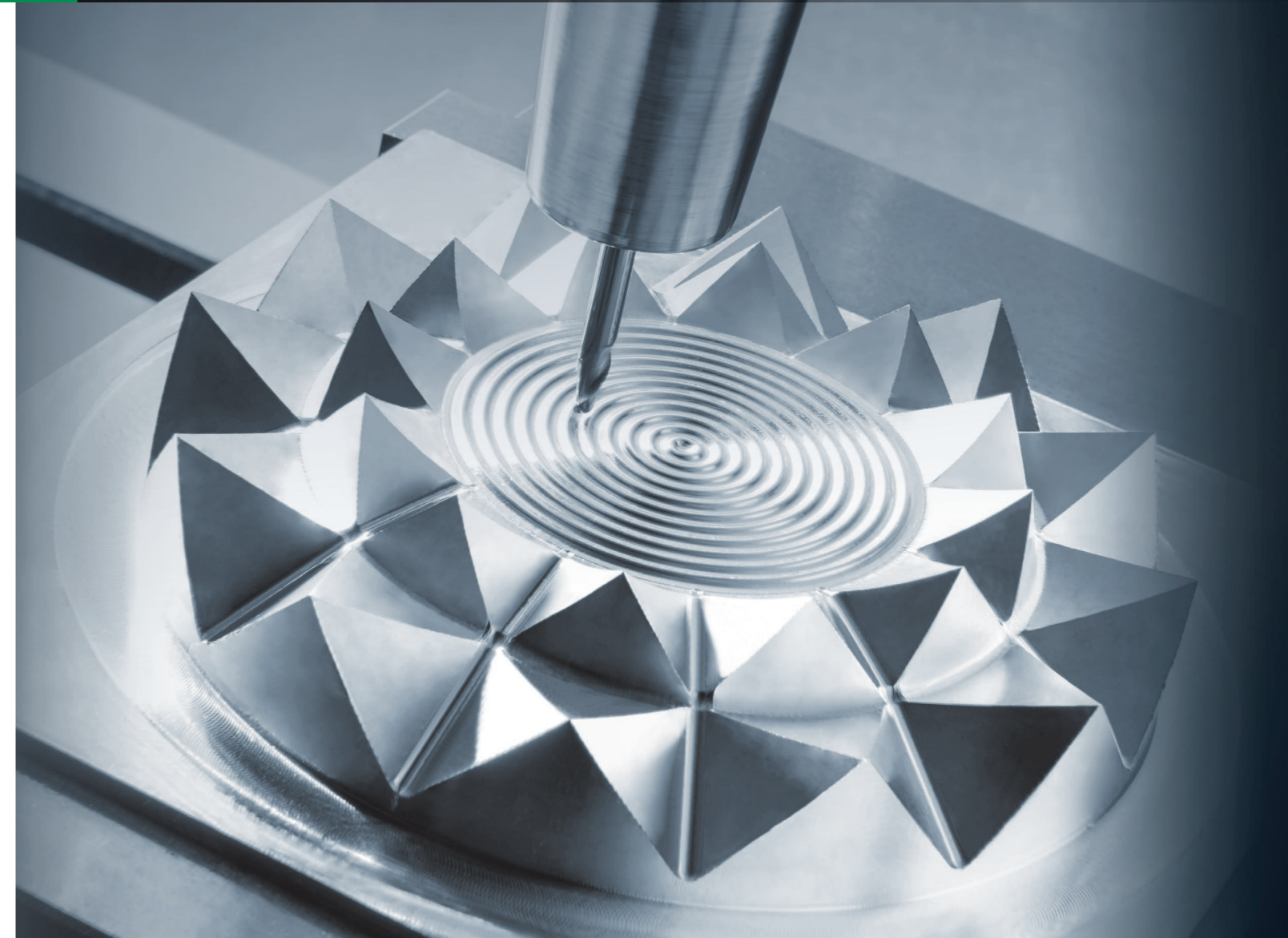


AL-660  
series

# AL-660 SERIES

High Speed Vertical Machining Centers



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### NEW GENERATION Vertical Machining Centers

The AL-660 series features high speed linear guide ways and high speed spindle with rigid casting body and fast ATC system to achieve high efficiency and excellent accuracy. Along with design differentiation and high CP value, the AL-660 series fulfill various machining needs from now and future.

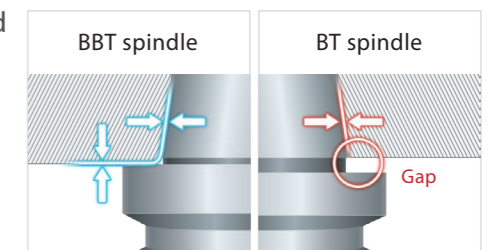


#### Modularized spindle options

- Versatile spindle selections to accommodate customer's requirements, Spindle RPM ranges between 10,000 rpm ~ 15,000 rpm

##### BBT dual contact spindle

Standard BBT dual contact spindle to make the spindle taper and surface contact closely with tool holder which ensure highly cutting rigidity while high speed processing.



#### Faster rapid

- Linear guideways with optimized servo motors setting achieves agile acceleration with maximum rapid at 36 m/min.

**660**

X-axis travel

**460**

Y-axis travel

**510**

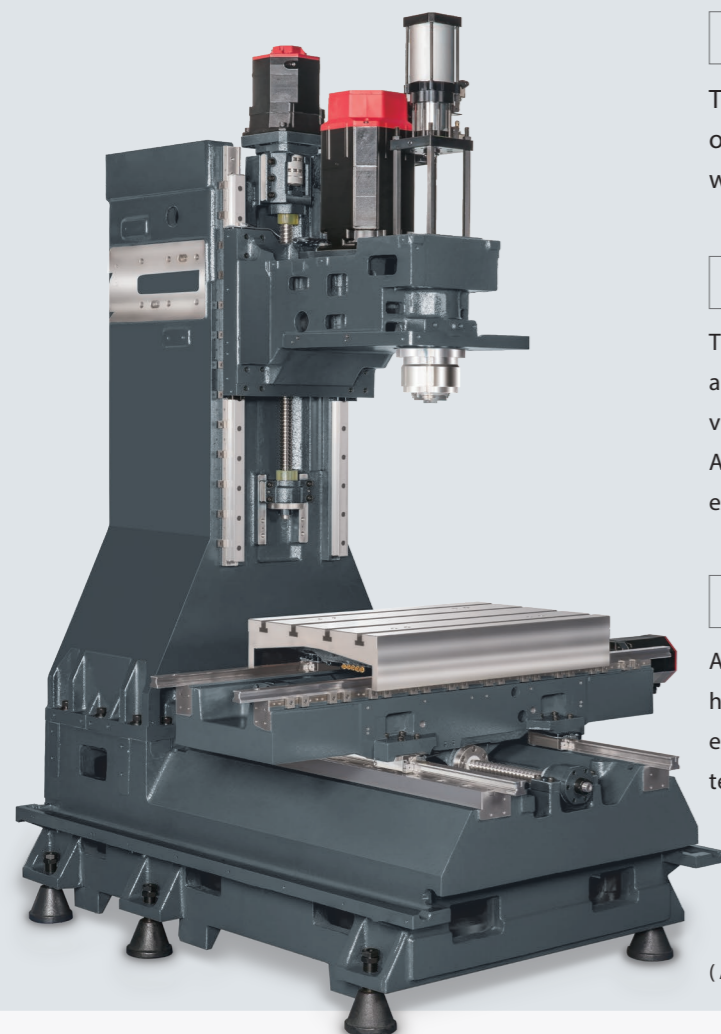
Z-axis travel

Unit : mm

X / Y / Z axes adopt high speed and high precision linear guide ways design to fulfill machining requirements of high speed and high precision which is very suitable for dies & molds, aerospace, automobile and medical industries.

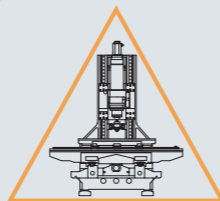


# AL-660 SERIES



## Finite Element Analysis ( FEM )

The Finite Element Analysis provides the optimal machine design to build a light-weight, yet super rigid machine structure.



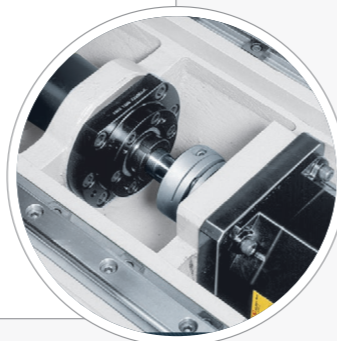
## High-grade MEEHANITE castings

The base, column and head stock are all cast from high-damping and low-deformation FC300 MEEHANITE. It can absorb shocks and vibrations more than 10 times better than steel. Therefore, the AL-660 series not only has ultra-high structural rigidity but also is extremely durable.

## Hand scraped craftsmanship

All the sliding or fix surface of machine bed, column, saddle, headstock, and ball screw holder are hand scraped to provide excellent assembly precision and load distribution, ensuring long term accuracy.

( AL-660 Super Rigid Structure )



## C3 grade ball screw

- The heat-treated and precision-ground C3 grade ball screw offers the highest precision and long term durability. The standard assembly procedure includes adjustments to ensure perfect parallelism between the screw and the guide ways, and the optimal pre-loaded of the nut, which minimizes back lash and greatly improves machining accuracy.

## Direct drive servo motor

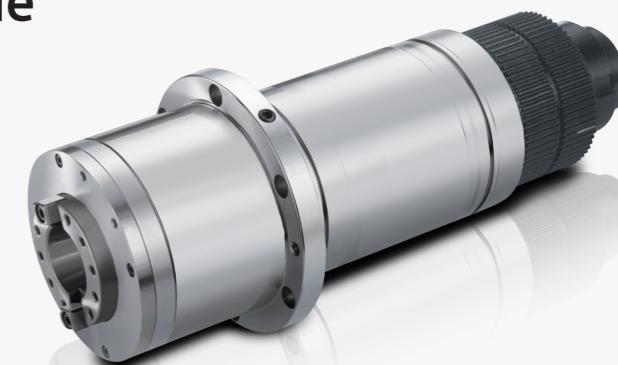
- 3 axes are adopted with direct drive AC servo motors to ensure great heavy load ability, high dynamic precision and fast acceleration / deceleration.

# HIGH SPEED VERTICAL MACHINING CENTERS

## Highly Cost-Effective Spindle

### High efficiency belt-drive spindle

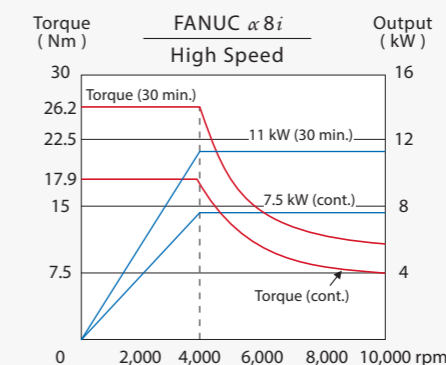
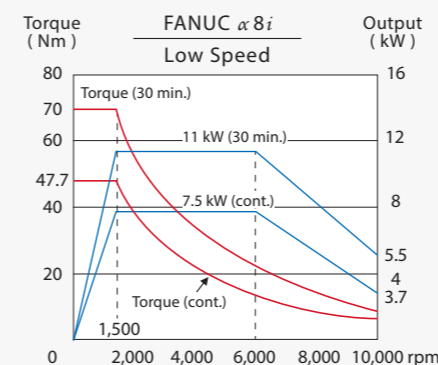
- The spindle combines the capabilities of both precision and heavy-duty cutting. The 10,000 rpm belt-drive spindle delivers a max. torque output of 70 Nm at 1,500 rpm.



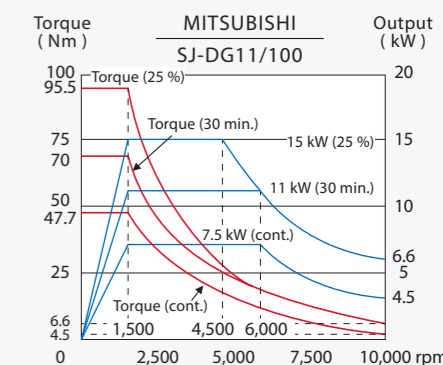
### High speed direct-drive spindle

- Direct-drive design efficiently isolates heat from motor, reduces thermal deformation and maintain long period of machining accuracy.

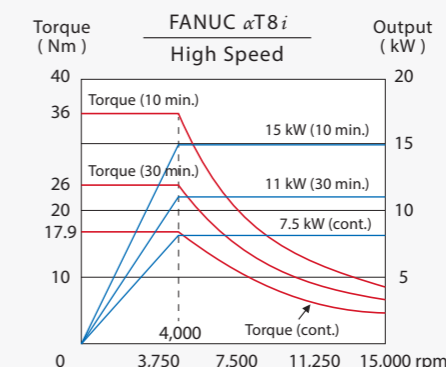
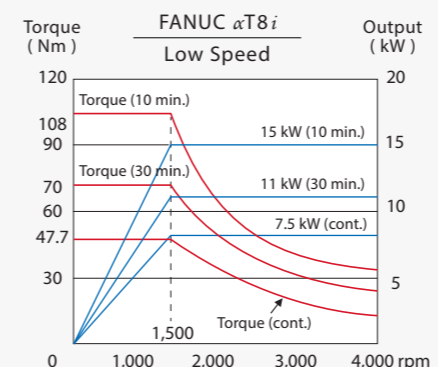
### 10,000 rpm Belt-drive Spindle



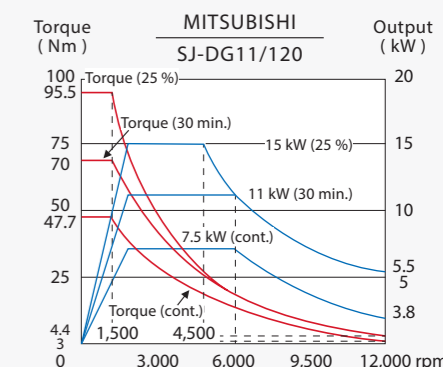
### 10,000 rpm Belt-drive Spindle



### 15,000 rpm Direct-drive Spindle



### 12,000 rpm Direct-drive Spindle



## High Reliable ATC System

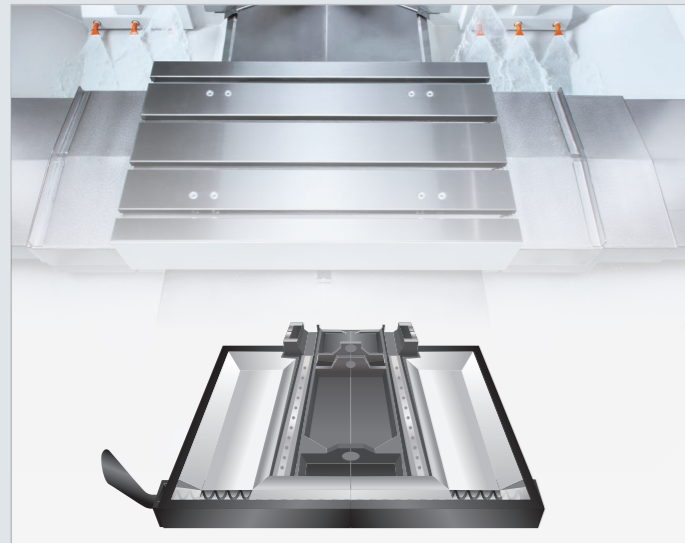


24T Disc Type  
Tool Magazine

20T Drum Type  
Tool Magazine

- All machines must pass the test of long-term tool change reliability before shipment to achieve high efficiency and high stability during tool change.
- Various options of tool magazine configurations are available by machine models to meet different machining needs.

## High Efficiency Chips Removal



### Screw type chip auger

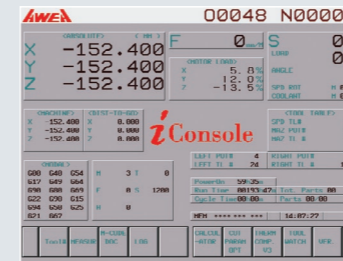
- With high-performance screw chip auger as standard, chips can be quickly removed and reliably separated from the coolant. It successfully reduces both the workload of personnel cleaning and the risk of machining accuracy being affected by chips piling up.

## High Pressure Coolant Systems Opt.

- The high-pressure cooling system enables higher cutting speeds, extends the tool life, and improves the chip removal capacity when deep drilling. It is the most economical processing mode and can vastly improve capacity.



## i Console NC Intelligence Opt.

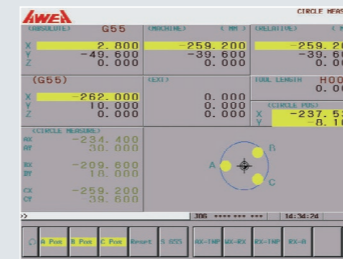


Main screen

- Instant messaging system
- Tool list
- Work piece measurement
- M code
- Calculator

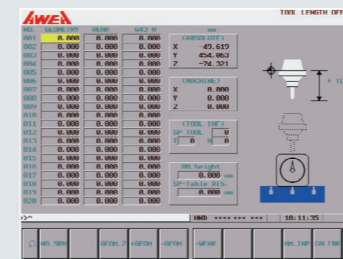
### OPTION :

- CNC parameter optimization
- Spindle thermal compensation
- Adoptive feed control (AFC)



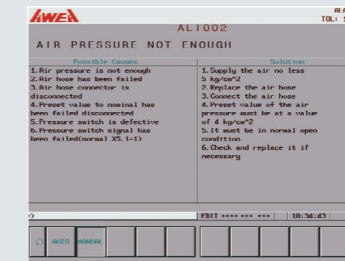
Circular work-piece  
measurement

By measuring the A, B, C three points coordinates the circular work-piece's center point can be correctly calculated.



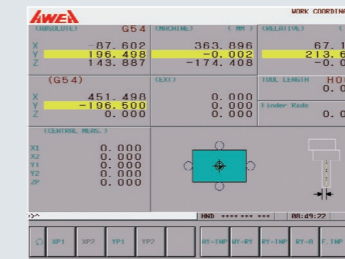
Tool length offset

After manually measuring the tool length, the controller will automatically calculate the tool tip position and enter the data into the tool length offset table.



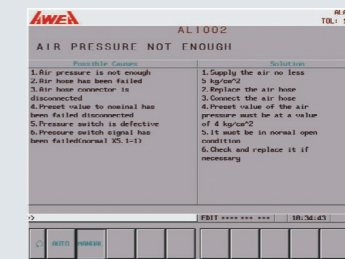
Trouble shooting

When the alarm appears, the screen will display the malfunction message and trouble shooting procedure enabling the operator to solve problems to shorten the shutdown time.



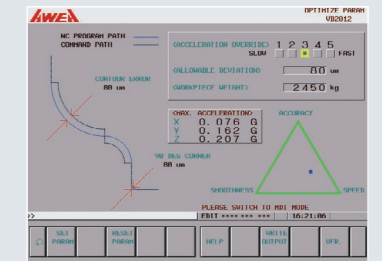
Basic rectangular  
work piece measurement

By measuring the four points X+, X-, Y+, and Y-, the rectangular work piece's center point can be calculated. Then the center point coordinates can be entered in the work piece coordinate system. (G54 - G59)



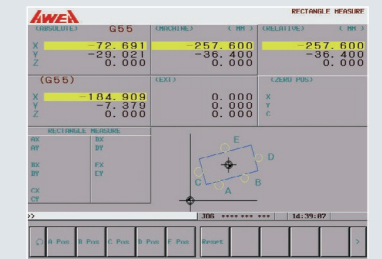
Tools management

Complete tools database, easy to use with intuitive fast tool set-up, lowering the possibility of incorrect entries.



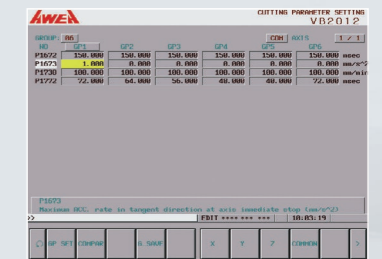
CNC optimized parameter

From rough cutting to fine machining, users can select different work modes, define the allowable tolerances and enter the weight of the work-piece. Based on this input the i Console program will modify machining parameters to reduce machining time.



Advanced rectangular  
work piece measurement

By measuring the five points A, B, C, D, and E, the rectangular work piece's center point and slant angle can be calculated. Then the center point coordinate can be entered in the work piece coordinate system. (G54 - G59)



Machining parameter GP

This function is different from CNC parameter optimization, as it allows the operator to set parameters manually to achieve optimal machining efficiency. (Opt.)

## Standard / Optional Accessories



Std. Tool storage support



Opt. Automatic tool length  
measurement

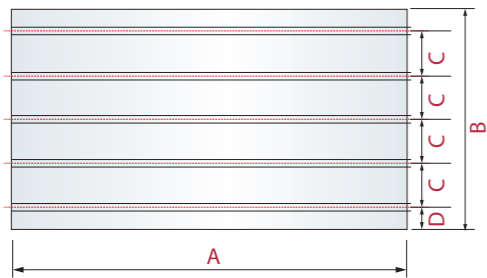


Opt. Automatic work piece  
measurement

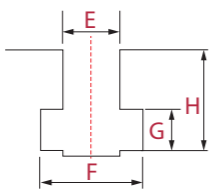
Dimensions

( Unit : mm )

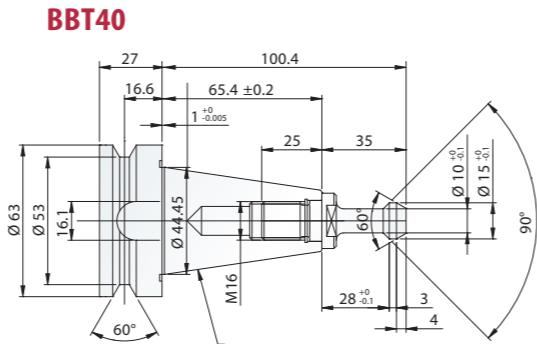
Table Dimensions



T-slot Dimensions



Tool Shank Dimensions

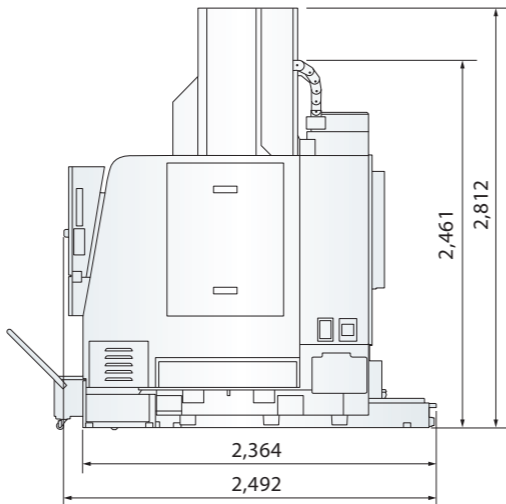
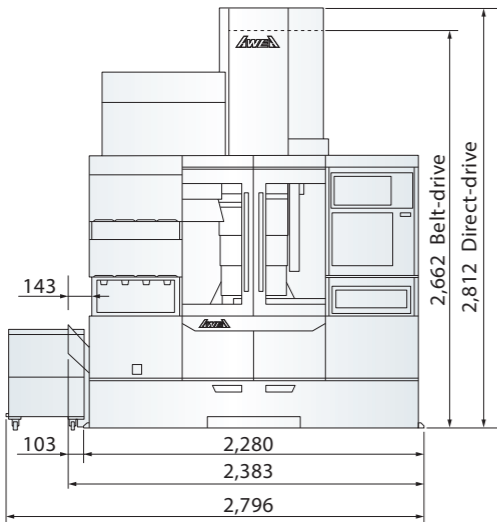
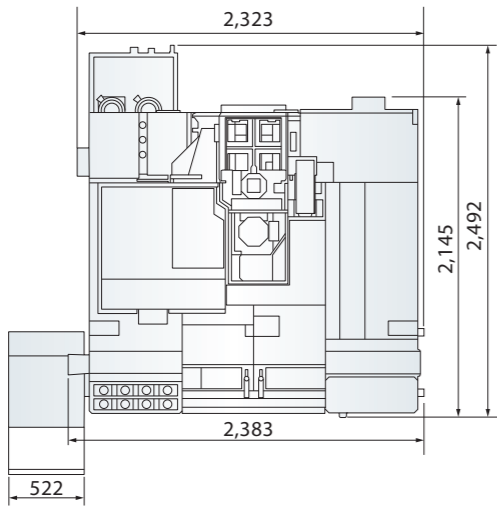


Models	A	B	C	D	E	F	G	H	NO*1
AL-660	760	456	110	58	18H9	32	12	29	4

\* 1 : No. = Number of T-slots

Machine Dimensions

( Unit : mm )



Specifications

		AL-660
SPECIFICATIONS		
X-axis travel	mm	660
Y-axis travel	mm	460
Z-axis travel	mm	510
Dist. from spindle nose to table center	mm	150 ~ 660
WORK TABLE		
Table size (X direction)	mm	760
Table size (Y direction)	mm	456
Table load capacity	kg	500
T-slot ( Width x Pitch x No. )	18 mm x 110 mm x 4	
SPINDLE		
Spindle taper	BBT40	
Spindle motor ( cont. / 30 min. )	kW	7.5 / 11
Spindle speed	rpm	10,000 Belt-drive / 12,000 Direct-drive / 15,000 Direct-drive
FEED RATE		
X / Y axes rapid feed rate	m/min.	36
Z-axis rapids feed rate	m/min.	30
Cutting feed rate	m/min.	1 ~ 10
TOOL MAGAZINE		
Tool magazine capacity	20 T	
Max. tool length	mm	300
Max. tool weight	kg	7
Max. tool dia. / adj. pocket empty	mm	Ø78 / Ø150
ACCURACY		
Positioning accuracy ( ISO230-2 )	mm	+/- 0.003
Repeatability ( ISO230-2 )	mm	+/- 0.0025
GENERAL		
Control system	FANUC O <i>i</i> -MF PLUS / MITSUBISHI M80A	
Pneumatic pressure requirement	kg/cm²	5 ~ 8
Power requirement	kVA	19
Machine weight	kg	4,500

Specications are subject to change without notice.

Standard Accessories

- Spindle air curtain
- Coolant nozzle around spindle
- Spindle cooling system
- Centralized automatic lubricating system
- Fully enclosed splash guard w/ roof
- Chips flush coolant system
- Screw type chip auger ( coolant tank )
- Coolant system with pump and tank
- Disk type oil skimmer
- Automatic power-off system

Optional Accessories

- Air gun system
- Heat exchanger for electric cabinet
- Tool storage support
- Status signal lamp
- Foundation bolt kit
- Tool box
- Water gun
- CE
- 24T ARM Type Tool Magazine
- Automatic work piece measurement
- Automatic tool length measurement
- Coolant through spindle
- Gravity axis anti-drop function
- Caterpillar type chip conveyor and bucket