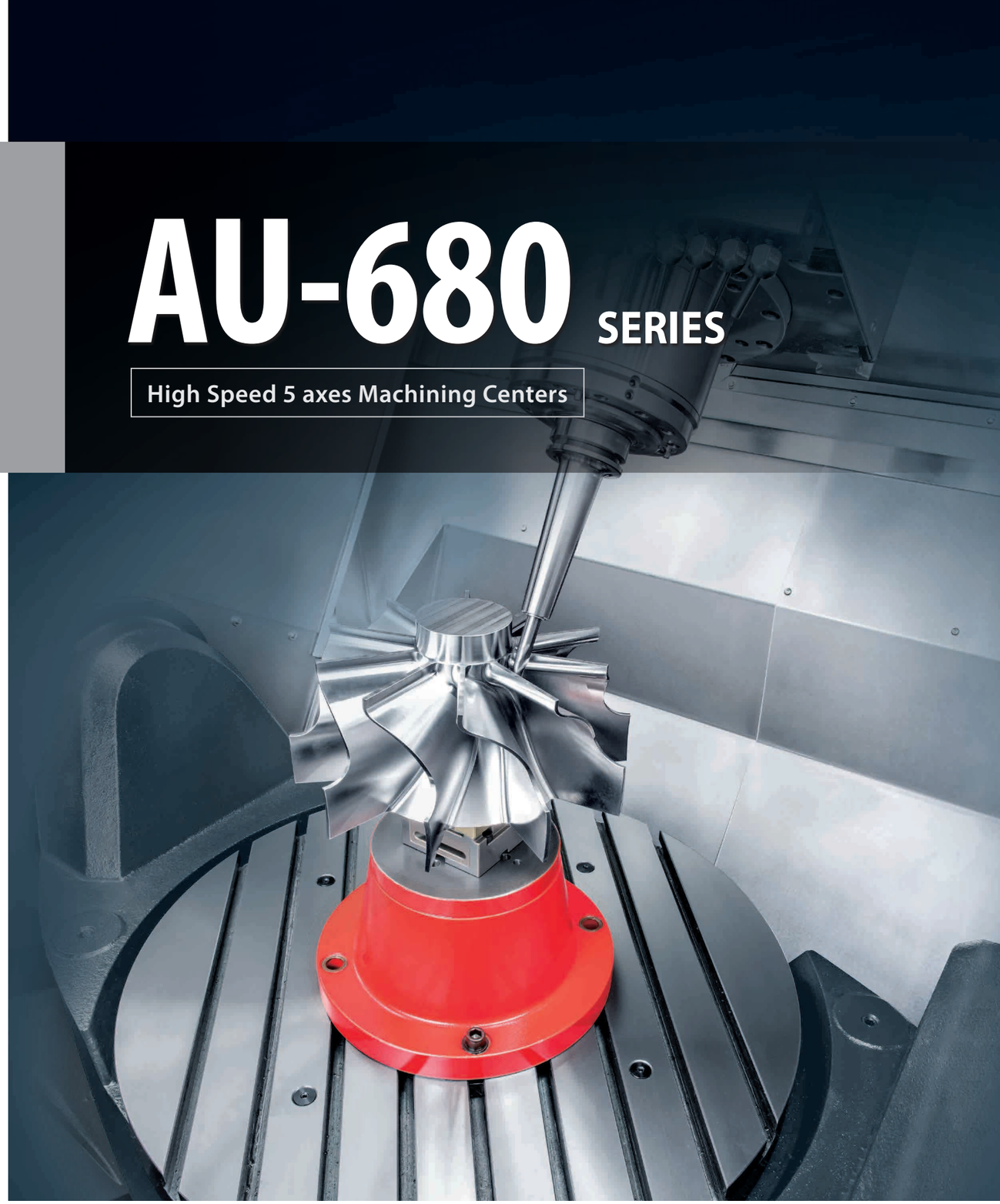
AU-680 series

# AU-680 SERIES

High Speed 5 axes Machining Centers



THE ULTIMATE MACHINING POWER

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ISO 9001 ISO 14001 CE



A-AU-680-EN-202308


THE ULTIMATE MACHINING POWER

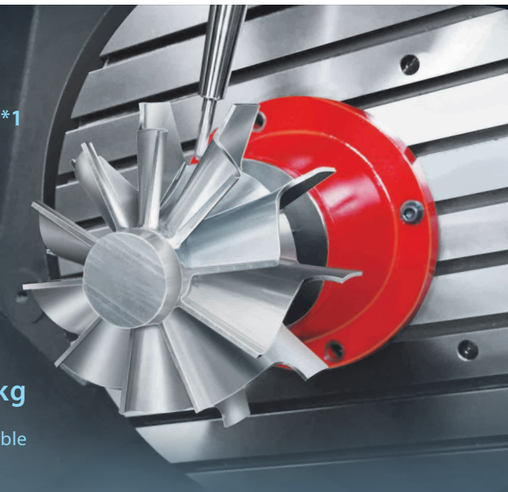
AWEA MECHANTRONIC CO.,LTD.

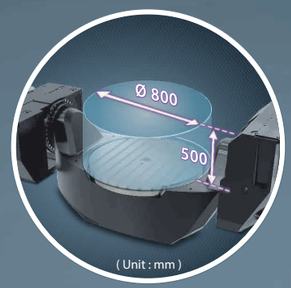
# AU-680 series | High Speed 5 axes Machining Centers

With superior structural rigidity, outstanding dynamic performance of A / C axes trunnion table and the powerful built-in spindle with maximum 191 Nm output, AU-680 can fulfill various demands from five-axis simultaneous, five-face machining to high torque heavy cutting all in one setup on one single machine.
In addition, the thermal expansion countermeasures for key components and comprehensive chip removal design ensure AU-680 achieving high accuracy for long-time machining.

- 1,000 kg load capacity A / C axes trunnion table*1
- 16,000 / 18,000 rpm high speed built-in spindle
- Maximum 120T tool magazine ( Opt. )
- X / Y / Z / A / C axes simultaneous machining
- High rigidity structure, machine weight 13,500 kg

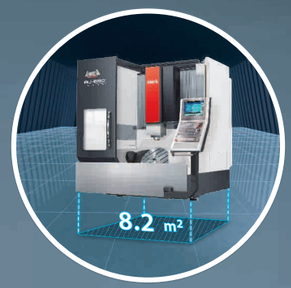
*1 dual-drive trunnion table



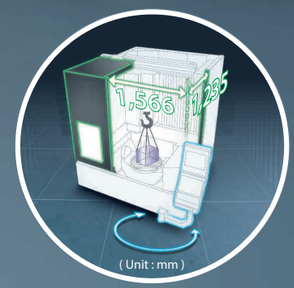

### Abundant working area

Largest workpiece up to Ø 800 mm x 500 ( L ) mm, weights 1,000 kg.




### Compact dimensions

8.2 $m^2$ compact footprint, 15 % less floorspace than other machines of the same level.

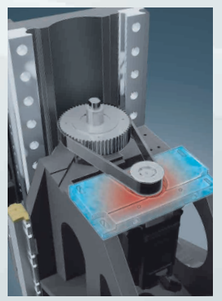


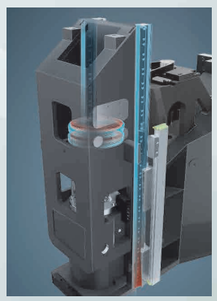

### Easy accessibility

Workpiece loading with crane directly. Optional automatic door for achieving automation integrated with robots.

## Thermal Expansion Countermeasures

- Cooling system on Z-axis linear guideway, bearing seat and the motor flange of X & Z axes .
- Optional hollow ball screws to reduce thermal expansion.
- Equipped as standard feature precise rotary encoders on A & C axes. X / Y / Z axes optional for high resolution linear scales.
- Optional high-efficiency 5 kW chiller for cooling.





# AU-680 series | High Rigidity Structure

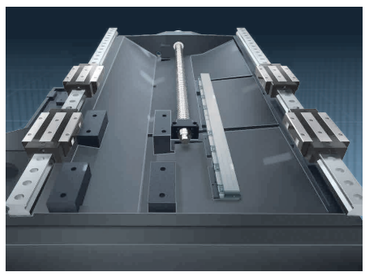
Built of high quality Meehanite cast iron and reinforced ribs design, AU-680 features optimal structural rigidity. The low center of gravity and thick, solid base design offers steady support to all axes during high feed rate machining. AU-680 is superior to other models of the same level both in static and dynamic rigidity.

## Finite Element Method ( FEM )

The Finite Element Analysis ( FEM ) provides optimal machine design and light-weight structure advantage while ensuring high rigidity of machine.

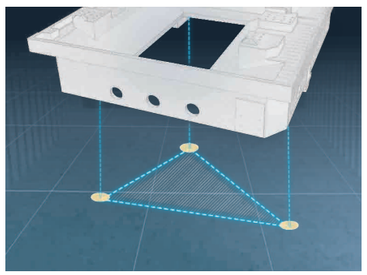
## High Level Casting Structure

Base and saddle all casted in high damping, low deformation one-piece Meehanite cast iron with reinforced ribs design, providing excellent anti-vibration capability and minimized deformation.



Abundant supporting rigidity

Y-axis saddle is supported by 4 roller type big-sized sliding blocks, preventing deformation of overhang due to its own weight and ensuring cutting rigidity.



3-point support design

3-point supported base makes it faster to move and position the machine. ( Lifting point located on the center line of gravity, only one hook needed to lift the machine. )

High performance lubricant system

Grade NLGI 000 lubricant delivered automatically for enhanced lubrication with reduced consumption compared with oil. A more effective and environmentally friendly measure to eliminate unevenly greased lubrication and pollution to coolant tank.

## High Rigidity Linear Guideway

Roller type linear guideways on X / Y / Z axes feature heavy cutting capability of box ways and fast movement, low wear of linear guideways, which significantly increases machine rigidity and maneuverability.

## High Performance Drive System

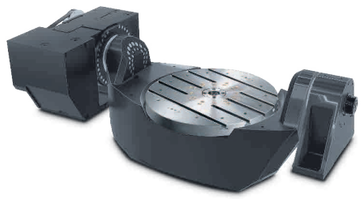
Ball screws of X / Y / Z axes are driven by over-sized servo motors with reducers to provide ample thrust and fast acceleration / deceleration movement, ensuring outstanding dynamic performance.


**40 m/min.**
X / Y / Z axes rapid feed rate

# AU-680 series | High Performance Trunnion Table

With a single setup AU-680 can provide five-axis simultaneous or five-face machining for workpiece weighing up to 1,000 kg, making it easy to process complex workpieces.

- A / C axes are driven by ample servo motors with gear reducers, and the mechanical preload eliminates the backlash to satisfy ultimate accuracy and dynamic performance.
- The full circular clamping system for A-axis provides excellent gripping capacity and therefore heavy cutting capability. ( Max. clamping torque 10,000 Nm for dual servo motor drive. )
- A / C axes are equipped with high-resolution absolute encoders to provide high positioning accuracy.
- Optional hydraulic port allows the trunnion table to install complex fixtures for making the machining process more flexible and productive.



Single-drive trunnion table

Dual-drive trunnion table

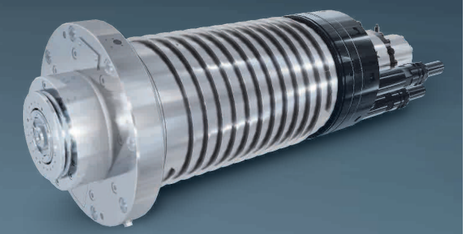
| Work table | Single-drive trunnion table | Dual-drive trunnion table |
|---|---|---|
| Table diameter | Ø 680 mm | |
| Table load capacity | 600 kg | 1,000 kg |
| A / C axes swivel / rotary range | ±120° / 360° | |
| Positioning accuracy ( A / C ) | 8 arc.sec | |
| Repeatability ( A / C ) | 6 arc.sec | |
| Max. A-axis torque | 3,400 Nm | 5,700 Nm |
| Max. A-axis speed | 20 rpm | |
| Max. C-axis torque | 1,800 Nm | 3,600 Nm |
| Max. C-axis speed | 50 rpm*1 | |

*1 HEIDENHAIN controller



# AU-680 series | High Torque Built-in Spindle

- Standard 16,000 rpm high speed built-in spindle delivers a maximum torque output of 191 Nm at 1,050 rpm, ideal for heavy-duty cutting or machining difficult-to-cut materials.
- Optional 18,000 rpm built-in spindle to meet the machining demand of fine-finishing, high-accuracy workpiece surface.
- Built-in spindle effectively reduces vibration during machining which prolongs the lifespan of spindle and improves long-time machining accuracy.

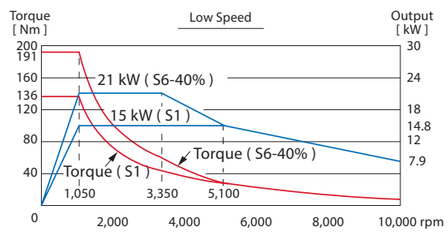


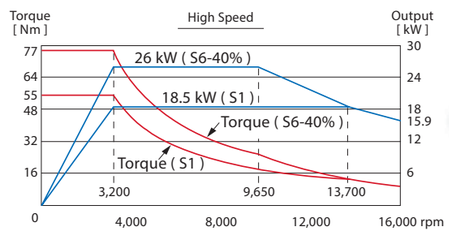
16,000 rpm Built-in Spindle

## Design for High Speed Machining

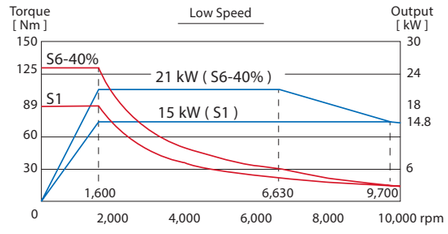
- German-made high-performance rotor and stator.
- High rigidity bearings lubricated with high-grade permanent grease to provide exceptional reliability.
- Well-designed cooling jacket effectively inhibits thermal expansion and ensures the machining accuracy.

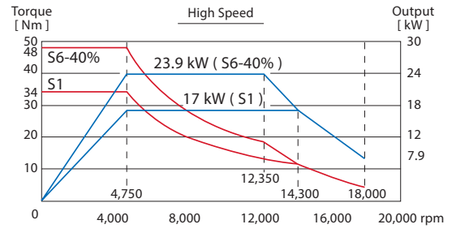
16,000 rpm Built-in Spindle



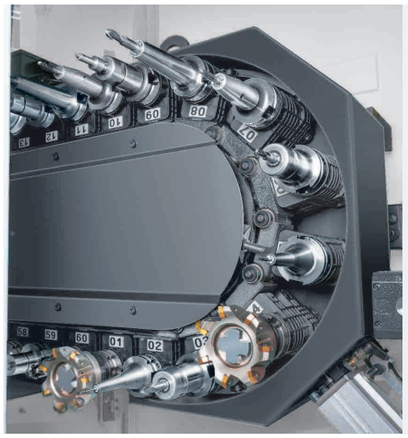




18,000 rpm Built-in Spindle



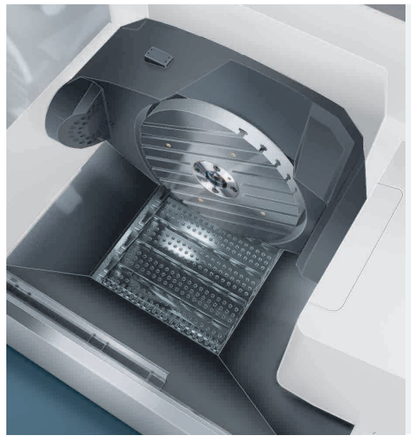

# AU-680 series | High Performance Accessories



## Arm Type ATC System

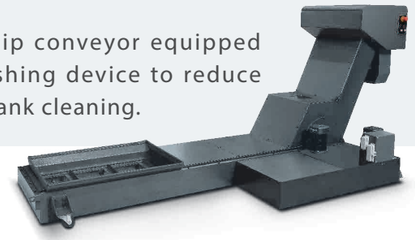
- 40T chain type tool magazine as standard and optional for 60T, 90T, 120T to fulfill various machining demands.
- The ATC arm is driven by roller cam with a special curve design which ensures reliable and speedy tool changing.
- HSK-A63 / BBT40 dual contact spindle efficiently suppresses tool vibration and therefore enhances cutting rigidity.

( Control panel of tool magazine )

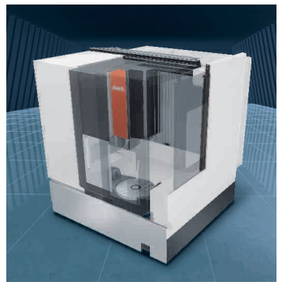


## Complete Chip Removal System

- Rear-exit chip conveyor minimizes footprint requirement, making layout of production line more compact and integration with a centralized chip removal system with ease.
- Chip discharge with a steep angle combined with optimized coolant flushing system effectively flush chips away from the working area.
- Optional roller type chip conveyor equipped with filter and backwashing device to reduce the demand of coolant tank cleaning.



## Standard / Optional Accessories



Automatic door

Both doors can be upgraded to automatic for achieving automated production line.

Accuracy calibration kit

Check and compensate machine accuracy easily with the calibration kit.


High pressure coolant sys.

High pressure coolant through spindle system for deep-hole drilling or heavy-duty cutting. ( Max. 70 bar )

Advanced control system

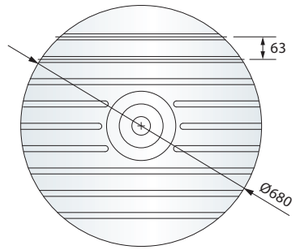
AU-680 supports advanced control systems such as Heidenhain TNC 640, Siemens ONE and Fanuc.



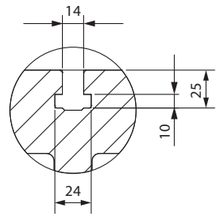
# AU-680 series | Dimensions

( Unit : mm )

## Table Dimensions

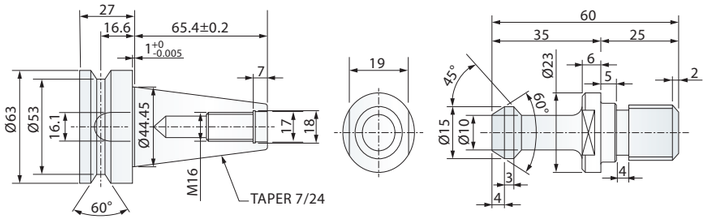



## T-slot Dimensions

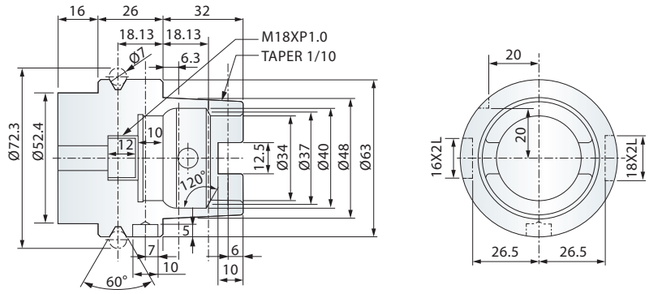



## Tool Shank and Pull Stud Dimensions

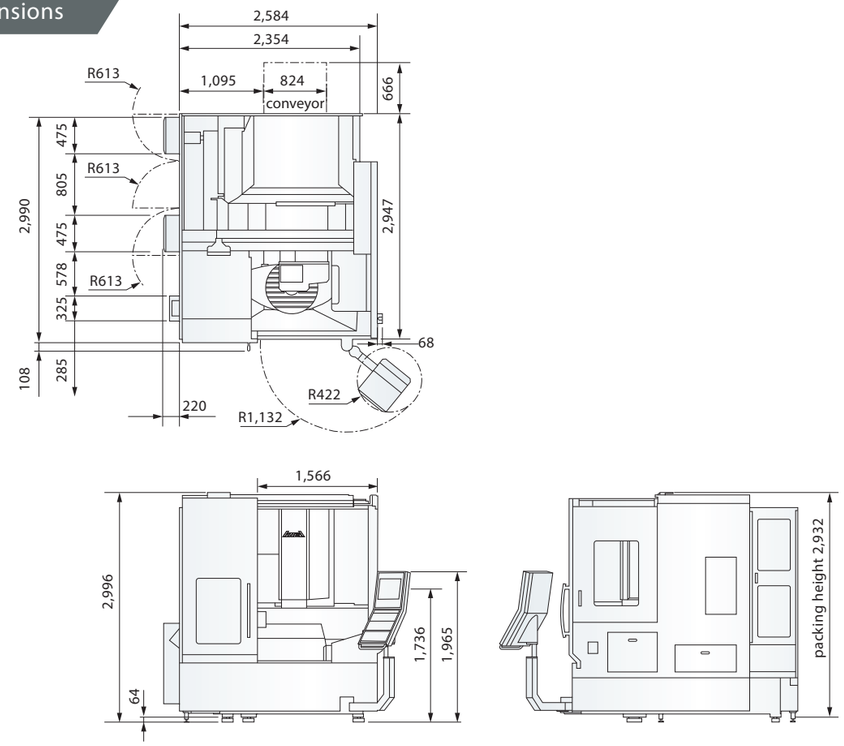
### BBT40




### HSK-A63



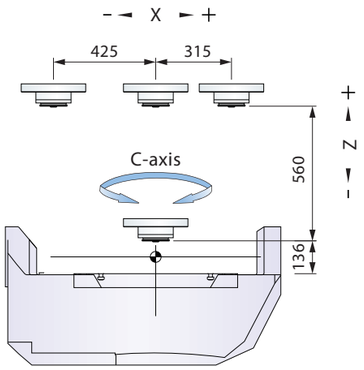

## Machine Dimensions

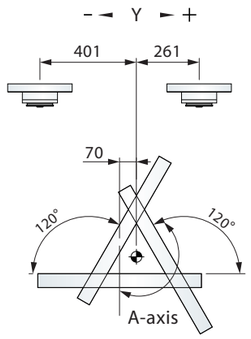


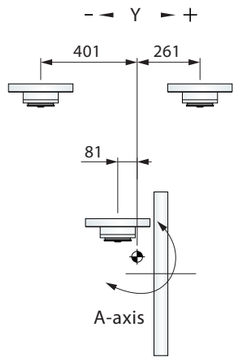
# AU-680 series | Dimensions

( Unit : mm )

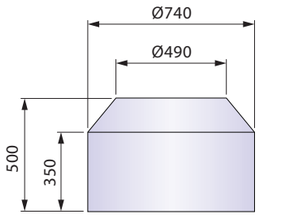
## Interference Diagram



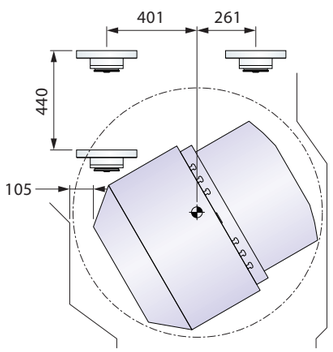



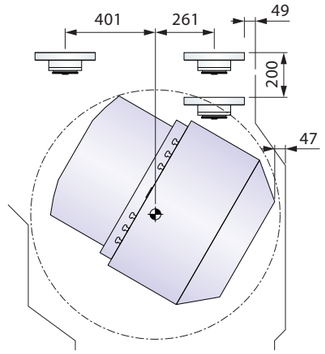




## Work Range




Standard Workpiece Size






# AU-680 series | Specifications

| | | AU-680 |
|---|---|---|
| **SPECIFICATIONS** | | |
| X / Y / Z axes travel | mm | 740 / 662 / 560 |
| A / C axes swivel / rotary range | | -120°~ +120° / 360° |
| A / C axes swivel / rotary speed | rpm | 20 / 50 ( HEIDENHAIN ) , 20 / 40 ( FANUC ) |
| Distance from spindle nose to table center | mm | 120 ~ 680 |
| **WORK TABLE** | | |
| Table diameter | mm | Ø 680 |
| Table load capacity | kg | 600 ( Single-drive ) / 1,000 ( Dual-drive ) |
| T-slot ( width x no. x space ) | | 14 mm x 9 x 63 mm |
| **SPINDLE** | | |
| Spindle taper | | HSK-A63 / BBT40 |
| Spindle speed | rpm | Built-in spindle 16,000 ( 18,000 ) |
| Spindle motor ( S1 / S6 40% ) | kW | 18 / 26 |
| **FEED RATE** | | |
| X / Y / Z axes rapid feed rate | m/min. | 40 |
| Cutting feed rate | m/min. | 20 |
| **TOOL MAGAZINE** | | |
| Tool magazine capacity | T | 40 / 60 |
| Max. tool length | mm | 250 |
| Max. tool weight | kg | 7 |
| Max. tool diameter / adj. pocket empty | mm | Ø 75 / Ø 125 |
| **ACCURACY** | | |
| Positioning accuracy ( ISO230-2 ) | mm | 0.008 |
| Repeatability ( ISO230-2 ) | mm | 0.005 |
| A / C axes positioning accuracy ( ISO230-2 ) | arc.sec | 8 |
| A / C axes repeatability ( ISO230-2 ) | arc.sec | 6 |
| **GENERAL** | | |
| Control system | | HEIDENHAIN TNC 640 / SIEMENS ONE / FANUC O*i*-MF Plus |
| Pneumatic pressure requirement | kg/cm² | 6 |
| Power requirement | kVA | 60*1 ( HEIDENHAIN / SIEMENS ) |
| Machine weight | kg | 13,500 |

*1 Single-drive trunnion table

Specications are subject to change without notice.

## Standard Accessories

- A / C axes absolute encoder
- Spindle cooling system
- Spindle air curtain
- Coolant nozzle around spindle
- Chips flush coolant system
- Anti-drop system for sudden power outage
- Centralized automatic lubricating system
- Chain type 40T magazine
- Coolant system with pump and tank
- Caterpillar type chip conveyor
- Roof enclosure splash guard
- Air conditioner for electric cabinet
- Air gun and water gun
- Oil skimmer
- RJ-45 Ethernet interface
- Tool box and foundation bolts
- Operation and maintenance manual

## Optional Accessories

- Trunnion table with dual drives
- Coolant through spindle ( CTS )
- Compensation system for spindle thermal extension
- X / Y / Z axes optical linear scale
- Chain type 60T / 90T / 120T magazine
- Oil mist collector
- Roller type chip conveyor
- Automatic tool length measurement
- Automatic work piece measurement
- Auto door
- Transformer