



AX Series

High Precision Turning / Turn-Mill Centers



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OVERVIEW

AX Series delivers productivity solutions with flexibility and precision with existing demand of market to fulfil multi-tasking and precision turning / turn-mill center to produce world class products from simple turning and milling to complex multi-axis simultaneous machining in one machine. Off-center machining with the Y-Axis and milling of angled surfaces with the C-Axis increases the range of machining.

RIGID STRUCTURE

- AX Series is designed with single piece slant bed structure in such a way that it requires minimum floor space.
- Construction of machine allows independent perpendicular type Y-Axis, which in turn provides excellent precision, stability & higher rigidity leading to improved productivity.
- High precision AX Series machine is loaded with electro-spindle, roller guideways, linear glass scale and digital tailstock. The series offers variant like live tool turret, Y-Axis, secondary electrospindle and servo steady rest.



3-POINT LEVELING SYSTEM

Due to high rigidity of the base design and 3 point leveling, twisting of bed is eliminated. This feature in AX Series allows machine to be installed or relocated quickly and easily.



HEADSTOCK AND ELECTRO-SPINDLE

Headstock is made from closed grain FG 300 for better torsional stresses, specially designed cooling system ensures the best heat dissipation.

World class **electro-spindle** designed in-house to make AX Series as precision turning machine. High torque availability in spindle for heavy machining & making complete turn-mill center from roughing to finishing operations.

- **Secondary electro-spindle** is also available, which can be synchronised with main spindle to improve the productivity in single setup.
- Hydraulically clamped C-Axis enables heavy duty & precision milling operations.
- Hydraulic Chucking for both spindles.

C-Axis
Hyd. Break



DIGITAL TAILSTOCK

For variety of jobs with different length, tailstock support is required to be adjustable at different places, servo controlled axis in digital tailstock helps to increase the productivity for long shaft. It does not take care only for length variation but also precisely controls tailstock thrust force for better operation control compared to hydraulically operated tailstock.

HIGH SPEED SERVO TURRET

AX Series machines are equipped with high speed and high precision Bi-directional Servo Turret with hydraulic clamping system achieved by 3-piece hirth coupling. Faster tool change reduces idle time and increased productivity.

LIVE TOOL TURRET

For milling and intricate turn-mill, version of 12 station Live Tool Turret is also available



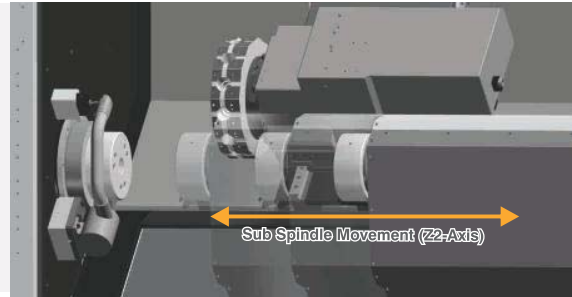
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PRECISION LINEAR AXIS

All three axis consist of **Roller Type L.M.** guideways, which ensures vibration free cutting for heavy depth of cut in dynamic conditions. All three axis are equipped with Linear Glass Scale which make AX Series precision turning/turn-mill centre.

- Sub-Spindle has Z2-Axis movement to pick component from main spindle for second setup.
- Long shaft operation can be performed with higher productivity by clamping on both ends in main and sub-spindle. Sub-spindle can rotate in synchronisation with main spindle to avoid twisting of long shaft machining.



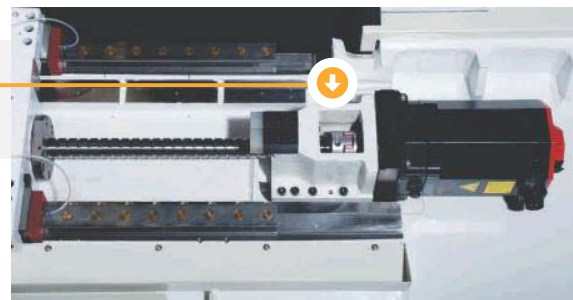
INDEPENDENT Y-AXIS

Most turning machines available in market with Y-Axis has virtual Y-Axis generated by synchronizing two axis. AX Series have **independent Y-Axis** eliminating such errors for milling intricate shapes accurately. Independent Y-Axis makes programming easy and makes following operations more accurate:

- On-centre face groove
- Poly side machining
- Off-centre side grooving
- Y & X - Axis circular interpolation

DIRECT COUPLED BALL SCREW

Recirculating precision class pre-loaded ball screw is directly coupled with axis motor for retaining accuracy for long term.



ERGONOMIC DESIGN

Keeping in mind operator's convenience, reduced approach distance which helps easy loading & unloading of component. Tilting type operating panel helps operator to view machining area completely while machining.



EFFICIENT CHIP FLOW

Design concept of AX Series enables it to give efficient chip disposal, with such design chips will directly fall into chip conveyor enabling easy chip evacuation and thus assures uninterrupted production.

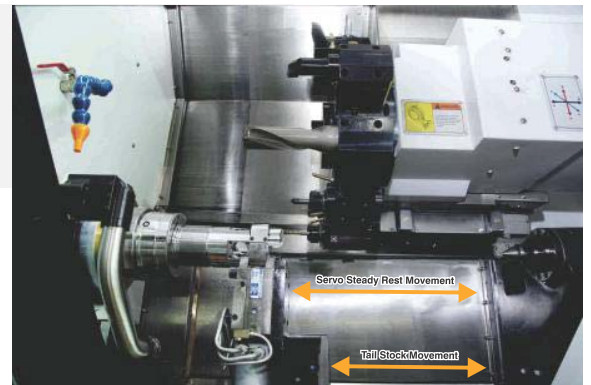
PRODUCTIVITY IMPROVEMENT OPTION

SERVO STEADY REST:

Steady rest is equipped with independent servo drive and ball screw, this follower rest supports long shafts while machining and prevents vibration and ensures process stability.

BAR FEEDER:

For such fully loaded AX Series option of bar feeder, bar puller, part catcher improves great productivity in production shop.



AUTOMATIC TOOL SETTING

Automatic Tool Setting Probes and Job Probe can be incorporated with control feedback to set accurate tool data and even detect in-process tool wear or breakages.

CONTROLLER FEATURES (SIEMENS 828D)

- High Resolution 10.4" Color Screen with Dynamic Graphic Display
- M Dynamics Feed Forward Control
- Integrated QWERTY keyboard & Multi Functional Display
- High Speed Rigid Tapping & Thread Milling
- Linear, Circle, Helical & Universal NURBS Interpolation
- Powerful Servo Axis Motors with Super Precision Absolute Encoder
- Advanced Surface Finishing
- Inch/Metric Conversion
- Tool Management for Monitoring of Tool life
- Tool Display Unit
- MPG Unit for Operator Easiness
- High Speed Fast Ethernet for Data Communication
- Communication & Data Management Via USB, CF Card & RS 232C
- User Friendly Built-in Calculator
- 15" Touch Screen is available as an optional



TECHNICAL SPECIFICATION

Capacity	AX 200	AX 200M	AX 200MY	AX 200MSY	AX 300	AX 300M	AX 300MY	AX 300MSY
Swing Over Bed	550	550	550	550	650	650	650	650
Swing Over Carriage	385	395	325	325	465	465	375	375
Max. Turning Dia.*	370	330	330	330	480	420	420	420
Max. Turning Length*	325 625	325 625	325 625	325 625	600 1200	600 1200	600 1200	600
Chuck Dia.	200	200	200	200	250	250	250	250
Slides								
X-Axis Travel	200	200	200	200	250	250	250	250
Y-Axis Travel	NA	NA	±40	±40	NA	NA	±50	±50
Z-Axis Travel	325 625	325 625	325 625	325 625	625 1225	625 1225	625 1225	625
Rapid Travel (X, Y & Z - Axis)	24 / NA / 35	24 / NA / 35	24 / 24 / 35	24 / 24 / 35	24 / NA / 30	24 / NA / 30	24 / NA / 30	24 / 24 / 30
Main Spindle (Motorized)								
Spindle Motor Power (Cont.) ^{Siemens/Fanuc}	9.15	9.15	9.15	9.15	20	20	20	20
Spindle Nose	A,6	A,6	A,6	A,6	A,8	A,8	A,8	A,8
Max. Bar Capacity	52	52	52	52	65	65	65	65
Spindle Speed Range	4500	4500	4500	4500	4000	4000	4000	4000
Sub-Spindle (Motorized)								
Spindle Motor Power (Cont.) ^{Siemens/Fanuc}	NA	NA	NA	7.5	NA	NA	NA	9.15
Spindle Nose	NA	NA	NA	A,5	NA	NA	NA	A,6
Spindle Speed Range	NA	NA	NA	5000	NA	NA	NA	4500
Spindle Travel	NA	NA	NA	630	NA	NA	NA	620
Turret								
Turret Type	Servo	Live Tool	Live Tool	Live Tool	Servo	Live Tool	Live Tool	Live Tool
No. of Stations	12	12	12	12	12	12	12	12
Max. Boring Bar Capacity	40	40	40	40	50	50	50	50
Tool Size (Cross Sectional)	25 x 25	25 x 25	25 x 25	25 x 25	25 x 25	25 x 25	25 x 25	25 x 25
Live Tool Power (Siemens/Fanuc)	NA	4.8 / 4.5	4.8 / 4.5	4.8 / 4.5	NA	4.8 / 5.5	4.8 / 5.5	4.8 / 5.5
Live Tool Speed (Siemens)	NA	4500	4500	4500	NA	4500	4500	4500
Live Tool Speed (Fanuc)	NA	4500	4500	4500	NA	3000	3000	3000
Live Tool Type	NA	VDI 30 / BMT 45	VDI 30 / BMT 45	VDI 30 / BMT 45	NA	VDI 40 / BMT 55	VDI 40 / BMT 55	VDI 40 / BMT 55
Tail Stock								
Tailstock Type	Digital	Digital	Digital	NA	Digital	Digital	Digital	NA
Tailstock Travel	330 630	330 630	330 630	NA	620 1220	620 1220	620 1220	NA
Live Quill Taper	MT 5	MT 5	MT 5	NA	MT 5	MT 5	MT 5	NA
Quill Dia.	85	85	85	NA	130	130	130	NA
Thrust	350	350	350	NA	500	500	500	NA
Accuracy (As per DGG 3441)								
Positioning Uncertainty (P)	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Repeatability (Ps Medium)	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Other Data								
Machine Weight # (Approx.)	4100 4500	4200 4600	4400 4800	5000	6300 6900	6500 7100	6500 7100	6700
Machine Dimension # (Approx.)								
Length	2610 2910	2610 2910	2610 2910	3220	3490 4090	3490 4090	3490 4090	3490
Width	1735	1735	1735	1735	2000	2000	2000	2000
Height	1960	1960	1960	1960	2205	2205	2205	2205

* Depends upon clamping arrangement, tooling and job. # Refer Machine Detailed Layout for overall machine dimensions & space requirements.

CONTROL SYSTEM

The CNC System offered with the AX Series machine is the latest digital control from FANUC 0i TF or SIEMENS 828D.

STANDARD FEATURES

- AC Spindle Drive
- AC SERVO Digital Drive
- High Torque Electro Spindle
- 12-Station Bi-Directional Servo Turret for Turning Center
- 12 Station Live Tool Turret for Turn-Mill Center
- Digital Tailstock with Live Quill or Electro Sub-Spindle
- Linear Glass Scale
- L. M. Guideways (Roller Type)
- Hyd. Chucking
- Auto & Manual Coolant System
- Electricals with Quality Devices & Panel with A. C.

PRODUCTIVITY IMPROVING OPTIONS

- Chip Conveyor
- Servo Controlled Steady Rest
- Automatic Tool Setting
- Bar Feeder
- Auto Door
- Bar Puller
- Part Catcher
- Automatic Loading Unloading System
- Hydraulic Collet Chuck
- Manual Guide-I (Fanuc)
- 15" Touch Screen Operator Panel (Siemens)
- Shop Turn (Siemens)
- Easy SMS System (Siemens)
- Fully Tool up Solution to Meet Customer Needs