

6A SERIES



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6A Controller Description

The Syntec 6A Series controllers incorporate embedded system architectures with 8-inch LCD displays and standard keyboard panels. They include integrated servo axes, spindle axes, MPG (manual pulse generator) axes, as well as USB ports on the front panel. This series provides low prices, high stability, easy operation, and high reliability.

- 3-axis servo positioning control
- 2 spindle DA (+/-10V) sets, including 1 encoder set
- 1 set of dedicated MPG (manual pulse generator) axes, including 7 IN points
- The 6TA and 6MA come standard with 32I/32O, while the 6CA comes standard with 16I/16O
- Standard keyboard panel
- Dedicated port on the operation panel for matrix scanning
- 2 sets of USB ports on the front panel, supporting hot plug-and-play
- Adapter (100~240V AC 50/60Hz) included
- Operating environment temperature: 55°C

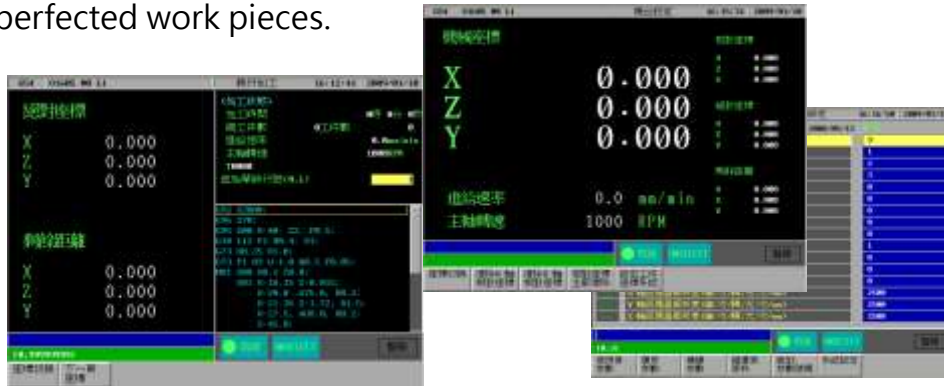
■ The 6A Architecture



Product Features

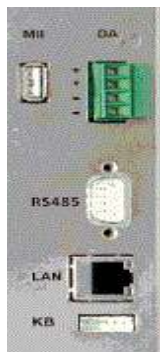
■ Complete System Functionality

The system provides complete lathing and milling functionalities, a simple windows-based operating interface that is easy to learn to use, and precise synchronous movement interpolation, allowing users to easily produce perfected work pieces.



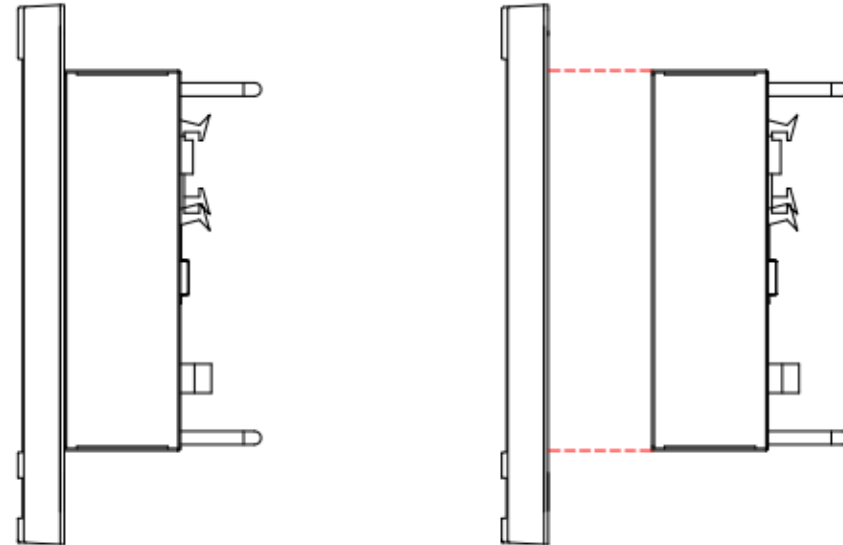
■ Advanced Transmission Mechanism

In addition to the traditional RS-485 interface, the system also has an advanced 10/100 MHz Ethernet port as well as hot-swappable USB ports, which boost software transmission speeds as well as enhance convenience and stability.



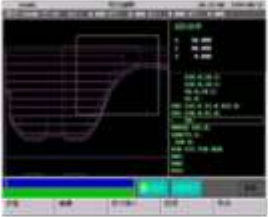
■ Easily Maintainable System Architecture

This next-generation controller is built using high-density integration technologies and incorporates an extremely well-thought-out design. Its compact and modular design allows on-site personnel to easily perform maintenance with just a single screwdriver.



User-Friendly Operation Interface

- Simulation
 - Syntax check
 - 3D simulation and step simulation
 - Magnify at any ratio
 - Integrated environment that can also check trajectory coordinates and program contents



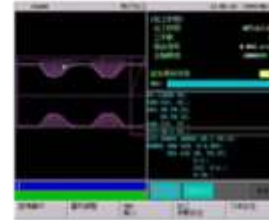
- Multi-pocketed Complex Cutting cycle
 - The user only needs to enter the external appearance of the work piece, and the CNC will automatically figure out the cutting path and cycle
 - Can be used with A, R, and C
 - Can perform multi-pocketed processing with one run of the program



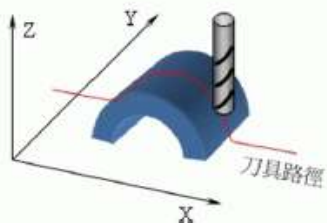
- Graphical Dialogue
 - X/Y axis single/dual-direction surface milling cycles
 - Track-type/square-type/round-type trench processing cycles
 - Round-hole/angled-line hole/curved-hole checkerboard hole drilling cycles



- Processing execution
 - Integrated operation environment
 - Processing parameter configuration
 - Program coordinate and cutting tool configurations are made on the same page



- Hand Wheel Processing Simulation
 - The MPG can be used to control software processing speeds
 - Rotate the MPG forwards/backward to move the cutting tool forwards/backwards along its path
 - Turn the MPG to fast and the cutting tool will move faster along its path
 - Turn the MPG to slow and the cutting tool will move slower along its path
 - Turn the MPG to stop and the machine will stop



Thoughtful Diagnostic and Development Tools

- On line ladder
 - I, O, C, S inspection page
 - Real-time Ladder display
 - Search for components
 - The PLC can issue alert messages in Chinese and English



- Alert records
 - Records 200 alert messages in the alert history, with dates, hours, minutes, seconds, and alert content
 - Capable of further displaying reason for malfunction and methods used for troubleshooting



- Parameter Settings
 - Parameter group configuration
 - Comprehensive descriptions of the meaning of parameters
 - Password protection
 - Supports user-defined parameters



- Production Records
 - Provides complete records for 100 completed processing programs, including the program name, start time, total processing time, as well as number of work pieces
 - Monitors the production rate of programs in execution



■ Complete Software Application Support

□ MACRO Support

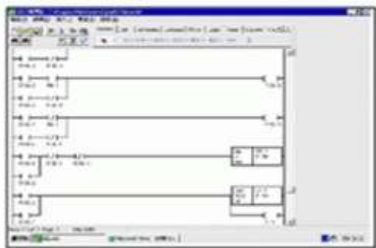
- Windows based Macro development environment
- Can communicate with the PLC via register bits
- Completely compatible with CNC operating environments



- Open and store files
- Step simulation and three-view diagram simulation
- System parameter and variable configuration

□ Ladder Support

- Windows based PLC software development
- Online Ladder display, making troubleshooting easier
- PLC executes servo movement commands



-Editing Function Table

- Open file, save file
- Add Ladder footnote (Chinese and English)
- Cut, copy, paste
- Search,...
- Syntax check

Macro Syntax

Logic Computation Command

- ◆ AND, OR, XOR, ...
- ◆ +, -, ×, /, ...
- ◆ <, =, >, ...

Digit Function Command

- ◆ ASIN, ACOS, ATAN, ...
- ◆ SQRT, ...
- ◆ MAX, MIN

Structural Process Control Command

- ◆ GOTO
- ◆ IF < > THEN
 END_IF
- ◆ WHILE < > DO
 END_WHILE
-

Ladder Syntax

- ◆ Contact point: normally open, normally closed
- ◆ Coil: normally open, normally closed, positive edge, negative edge, always return
- ◆ Arithmetic commands:
- ◆ Timer, counter
- ◆ Data movement: MOV
- ◆ Cutting tool commands: ROT
- ◆ Software control commands: JMP, JSR
- ◆ Call subroutine
- ◆ Directly execute PLC shaft movement commandSpecify PLC shaft for executing movement program instruction.....

■ External Appearance of the Product (6A-4012-M)



■ External Appearance of the Product (6A-4018-M2)



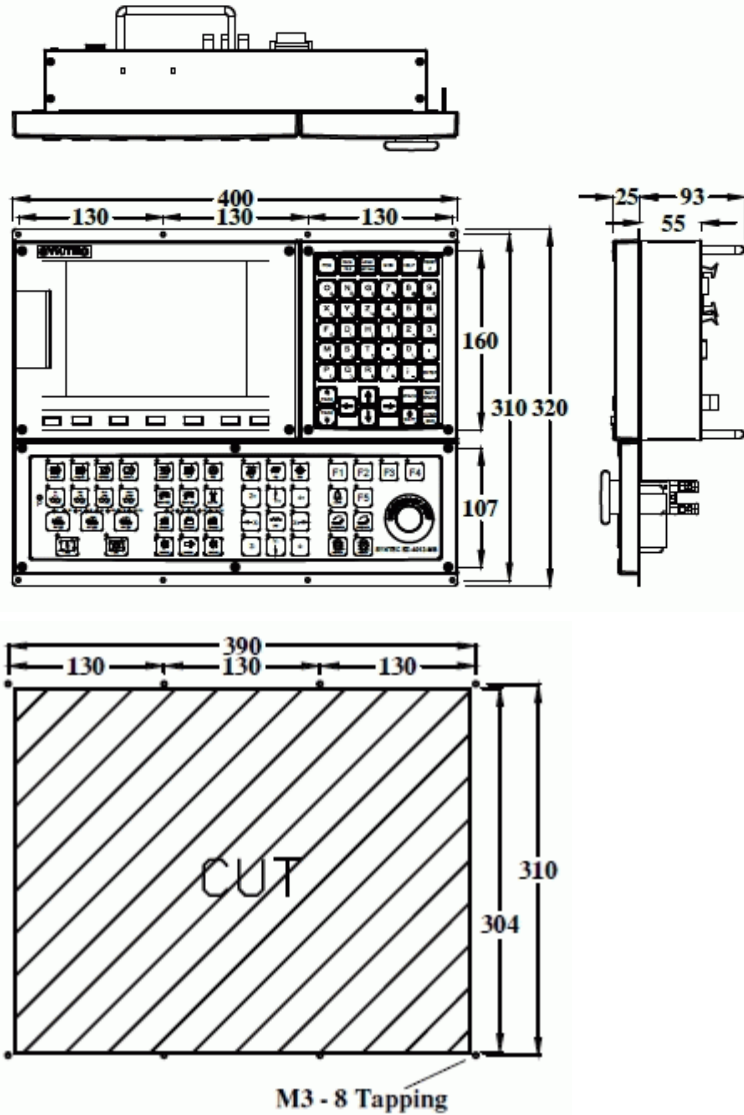
■ External Appearance of the Product (6A-4012-T2)



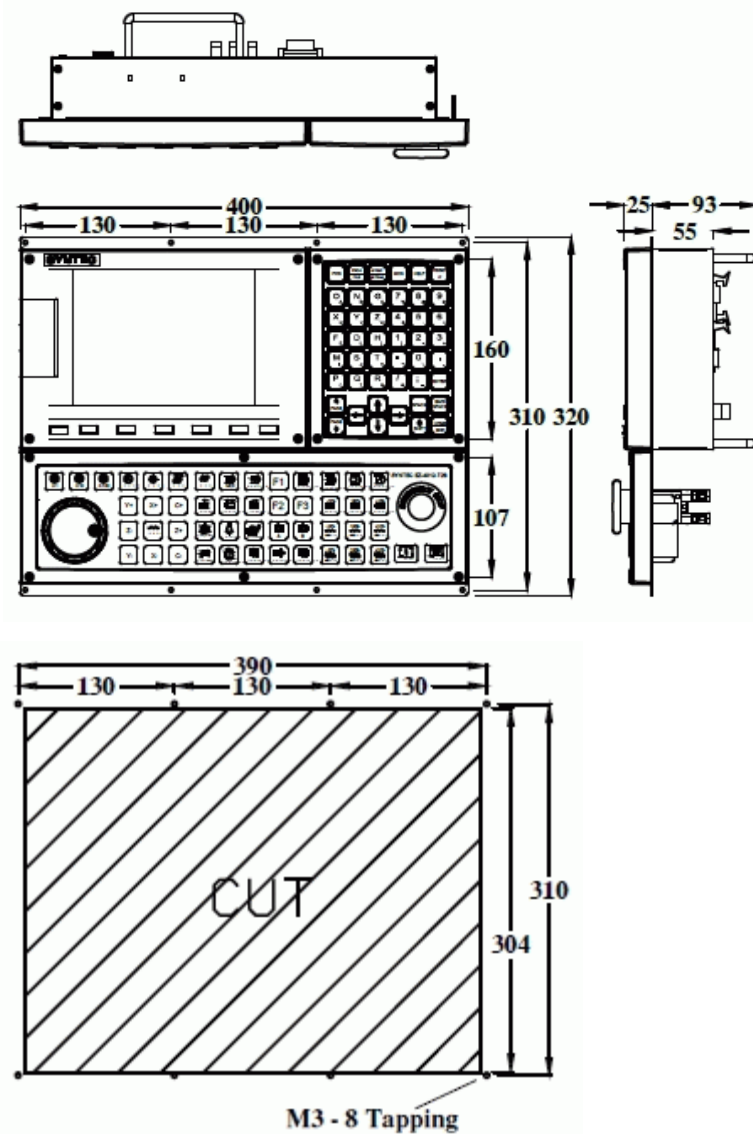
■ External Appearance of the Product (6A-4018-T3)



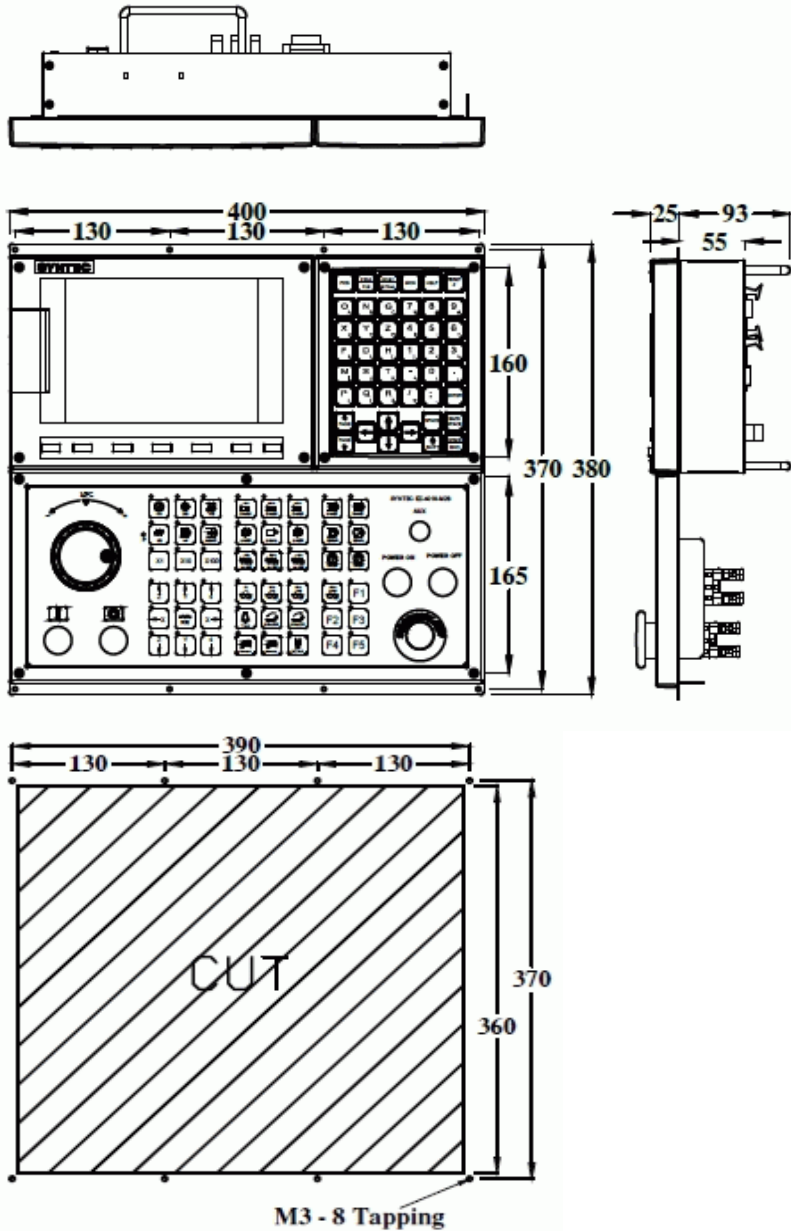
■ Structural Dimensions (6A-4012-M)



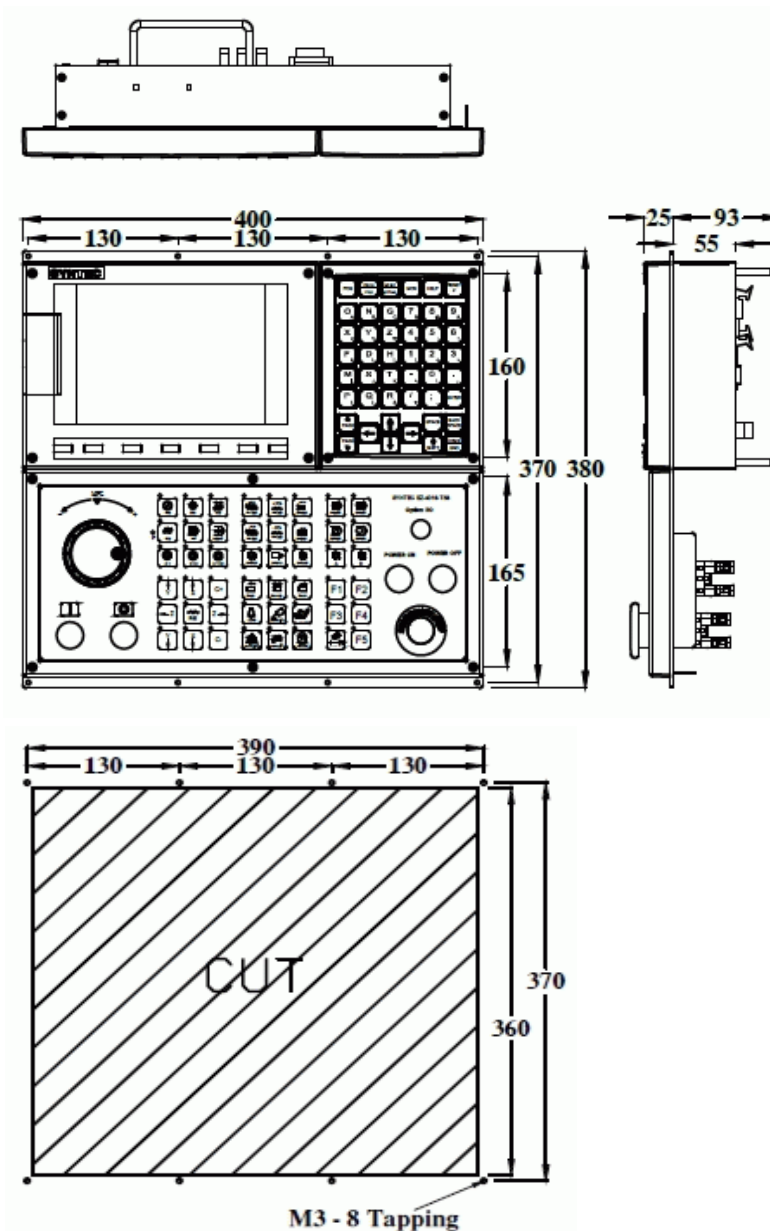
■ Structural Dimensions (6A-4012-T2)



■ Structural Dimensions (6A-4018-M2)



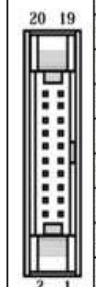
■ Structural Dimensions (6A-4018-T3)



Connector Interface Definitions

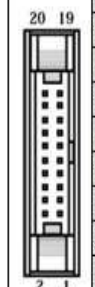
Please mind the voltage values as well as positive and negative polarities

X1 Connector Definitions



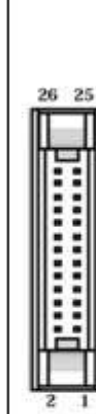
X1	PIN	SIGNAL	PIN	SIGNAL
	20	INPUT8	19	INPUT0
	18	INPUT9	17	INPUT1
	16	INPUT10	15	INPUT2
	14	INPUT11	13	INPUT3
	12	INPUT12	11	INPUT4
	10	INPUT13	09	INPUT5
	08	INPUT14	07	INPUT6
	06	INPUT15	05	INPUT7
	04	GND	03	GND
	02	---	01	---

Y1 Connector Definitions



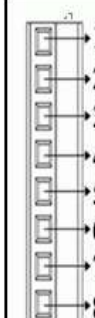
Y1	PIN	SIGNAL	PIN	SIGNAL
	20	OUTPUT8	19	OUTPUT0
	18	OUTPUT9	17	OUTPUT1
	16	OUTPUT10	15	OUTPUT2
	14	OUTPUT11	13	OUTPUT3
	12	OUTPUT12	11	OUTPUT4
	10	OUTPUT13	09	OUTPUT5
	08	OUTPUT14	07	OUTPUT6
	06	OUTPUT15	05	OUTPUT7
	04	GND	03	GND
	02	24V	01	24V

HK Connector Definitions



HK	PIN	SIGNAL	PIN	SIGNAL
	26	---	25	XDI55
	24	XDI54	23	XDI53
	22	XDI52	21	XDI51
	20	XDI50	19	XDI49
	18	XDI48	17	5V
	16	GND	15	XDO62
	14	XDO61	13	XDO60
	12	XDO59	11	XDO58
	10	XDO57	09	XDO56
	08	XDO55	07	XDO57
	06	XDO53	05	XDO52
	04	XDO51	03	XDO50
	02	XDO49	01	XDO48

Spindle Connector Definitions



SPINDLE	PIN	SIGNAL
	1	DA-
	2	DA+
	3	ALM-
	4	ALM+
	5	--
	6	SP_COM
	7	SP_REV(O47)
	8	SP_FWD(O46)

P1~P3 Connector Definitions



P1~P3	PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL
	1	A+	6	Z+	11	CW+
	2	A-	7	ALM+(+24V)	12	CW-
	3	B+	8	ALM-(GND)	13	CCW+
	4	B-	9	SERVO-ON	14	CCW-
	5	Z+	10	SERVO-CLR	15	OUT_COM

SP Connector Definitions

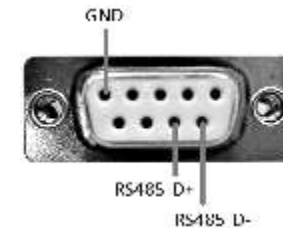


SP	PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL
	1	A+	6	Z-	11	SP_FWD(O46)
	2	A-	7	ALM+ (+24V)	12	SP_REV(O47)
	3	B+	8	ALM- (GND)	13	SP_COM
	4	B-	9	DA+	14	GND
	5	Z+	10	DA-	15	+5V

RS485 Connector Definitions



RS485	PIN	SIGNAL	PIN	SIGNAL
	1		6	TXD485-
	2		7	TXD485+
	3		8	NC
	4		9	5V
	5	GND		



Wiring-Side RS485 Front Schematic Diagram

MPG Connector Definitions



MPG	PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL
	1	MPG_A+	6		11	XDI 60
	2	MPG_A-	7	XDI56	12	XDI 61
	3	MPG_B+	8	XDI 57	13	XDI 62
	4	MPG_B-	9	XDI 58	14	GND
	5		10	XDI 59	15	+5V

■ **6A Series Product Specifications**

○ Standard – Not supported △ Optional

Product Specifications			
Model	6TA	6CA	6MA
Control command format	Generic		
Largest main system axis group	2	1	2
Largest PLC axis group number	1	–	1
Standard control axis number	3		
Maximum control axis number (optional)	3		
Maximum spindle number	2	1	1
Maximum synchronous control axis number (single axis group)	3	2	3
Smallest unit of control - mm	0.0001		
Maximum number of work piece coordinate sets	32		
Maximum number of tool compensation sets	96		
Number of pre-read single-sections	64	100	100
Single-section processing time – number of single sections / seconds	300	350	350
Hardware Specifications			
I/O (standard)	32/32	16/16	32/32
I/O (optional)	–		
DA	2		
Display	8		
RJ-45	1		
VGA output	–		

PS/2	–		
RS232/RS422/RS485	–/–/1		
CF card	–		
USB	2		
Compensation			
Model	6TA	6CA	6MA
Backlash compensation	○		
Pitch error compensation	○		
Angle compensation	○		
Temperature-rise compensation	○		
Two-dimensional compensation	–		
Operation			
MPG simulation	○		
Program idle	○		
Selective stop	○		
Single-section execution	○		
Virtual MPG	○		
Pause point activation	○		
Break point activation	○		
External offset settings	○		
MPG offset function	–	○	○
Program Input			
Selective jump	○		
B-stop / end of program	○		
Interrupt-type MACRO (M96/M97)	–		
M198 subroutine call	–		
G code expansion	○		

High-Speed, High-Precision			
Model	6TA	6CA	6MA
Constant Jerk control		O	
Cross-section S-curve acceleration and deceleration		–	
Automatic corner deceleration		O	
Circular radius speed limit		O	
Multiple sets of high-speed high-precision parameters		–	
Fast user parameters		–	
SPA function		–	
Virtual circular radius function		–	
High-speed high-precision control mode I (G05.1Q1)		–	
High-speed high-precision control mode II (G05P10000)		–	
NURBS interpolation		–	
Tool and Blade Management			
Automatic blade calibration	–	O	O
Tool and blade usage life management		O	
Supportive Functions			
Mechanical lock (R-bit)		O	
Software cycle limit		O	
Spindle rotation speed detection		O	
Axial coupling function	–	O	O
Dynamic axial coupling function		–	
Feedback coupling function		–	
Fast tapping retraction		O	
Virtual axis function		–	
Axis swapping function		–	
Serial machine swapping function		–	
Fast controller-based spindle positioning (C61)	–	O	O
Frond and back Dipole architecture		–	
Data backup and restoration (MB)		O	
Boot screen customization		O	
Favorites		–	
Project protection function		–	
Access privilege management		–	
RemoteAP monitoring		O	
Programming			
Background editing		O	
Editing protection		O	
Data Transfer Function			
NETWORK/FTP		O/O	
DNC(Network)		O	
DNC(USB)		–	
Information Display			
Graphical simulation		O	
Optical scale missing pulse self-diagnostics		–	
Five-Axis Function			
Five-axis blade tip control (RTCP)		–	
Smooth blade tip function (Smooth TCP)		–	
Tilted-Surface			
Characteristic coordinate system (tilted-surface processing) (G68.2)		–	
Characteristic coordinate system training		–	

■ G Code Commands

Model	6TA	Model	6CA	6MA
Elliptical cutting (clockwise) (G02.1)	○	High-speed high-precision mode (G05)	—	
Parabolic cutting (clockwise) (G02.2)	○	Path smoothing mode (G05.1)	○	
Cylindrical interpolation (G07.1)	○	NURBS curve interpolation (G06.2)	—	
Activate polar coordinate interpolation (G12.1)	○	Thread cutting (G33)	○	
External radius / internal radius lathing and cutting cycle (G20)	○	Automatic blade measurement command (G37)	—	
Threaded lathing and cutting cycle (G21)	○	Blade offset (G45~G48)	—	
Threaded lathing and cutting mid-phase blade entry cycle (G21.2)	○	Tilted surface processing (G68.2)	—	
Edge and surface lathing and cutting cycle (G24)	○	High-speed pecking-type drilling cycle (G73)	○	
Jumping function (G31)	○	Left-handed tapping cycle (G74)	○	
Thread cutting (G33)	○	Fine boring cycle (G76)	○	
Variable-pitch thread cutting (G34)	○	Drilling cycle (G81)	○	
Blade tip control (G43.4)	—	Suspended hole-bottom drilling cycle (G82)	○	
Polygonal cutting (G51.2)	○	Pecking-type drilling cycle (G83)	○	
Blade calibration for tilted surface processing (G53.1)	—	Tapping cycle (G84)	○	
Operating coordinate system configuration (G54~G59.9)	○	Drilling cycle (G85)	○	
Mirroring function (lathe) (G68)	○	High-speed drilling cycle (G86)	○	
Tilted surface processing (G68.2)	—	Backside fine boring cycle (G87)	○	
Duplex cutting cycles (G72~G78)	○	Semi-automatic fine boring cycle (G88)	○	
Fixed drilling cycles (G80,G83~G89)	○	Suspended hole-bottom boring cycle (G89)	○	
Default absolute zero coordinated system (G92.1)	○			
Inversed time feed (G93)	○			
Equal surface cutting speeds (G96)	○			
Spindle synchronization function (G114.1)	○			
Spindle bearing function (G114.3)	○			

■ 6A Series Operating Environment

Model	6A
Operating environment	-10 ~ 55°C
Storage environment	-40 ~ 70°C
Cooling method	Natural cooling
Safety certification	CE
Operating voltage	100V~240V, 60Hz
Power consumption	Approximately 5W