AUCTECH

INTELLIGENT SYSTEM FOR
MOTION CONTROL INDUSTRY

CNC
CONTROLLER

M618i/M6180i/
M620i/M6200i SERIES
M620e/M621s/M635i SERIES

Brochure · V2.0

AUCTECH Makes Human Life and Manufacturing More Convenient

工业之强，工业之美，个性化、品质化需求，对制造业提出了更苛刻的要求。

助力智能装备、助力新能源推动产业升级，我们以解决行业需求创造价值为荣，广州世华一直在路上。

The strength of industry, the beauty of industry, and the demand for personalization and quality put forward more stringet requirements for the manufacturing industry.

To help intelligent equipment and new energy to promote industrial upgrading, we are proud to solve the needs of the industry and create value. Guangzhou Auctech Automation Technology has always been on the way.

Contents

Intelligent System for Motion Control Industry
Auctech Numeric Control System

M618i/M6180i CNC Engraving and Milling Machine

· Built on the low–power,high–performance ARM A9 architecture.
· Features Nanometer–scale Interpolation Algorithm (NIA)for precise interpolation.
· Implements High–Speed High–Precision Slope Conversion(GSG).
· Application of Dual–Drive Synchronized Gantry System.
· Utilizes servo hardware current loop and secondary feedback closed–loop functionality.
· Open CNC interface supporting MIII/EtherCAT/pulse/analog, adaptable to various servo systems globally.
· Bus I/O,serially connected to servo modules via RJ45 interface for seamless network integration. Unified configuration of servo, 1/O, and external auxiliary units simplifies design and wiring.
· PLC online editing for convenient function improvements and prompts.
· Dual USB ports for expandable storage.
· In–built functions for servo adjustment,circular interpolation, high–speed tapping, and other online optimization adjustments.
· Open macro programming functionality.

M620i/M6200i Five–axis linkage application

· Nanometer Interpolation Five–Axis Linkage, domestically pioneered, breaking through import restrictions.
· Innovative RTCP (Rotated Tool Center Point) function, compatible with any machine tool structure (including non–standard).
· Dual–channel standard configuration.
· Application of Dual–Drive Synchronized Gantry System.
· Servo hardware current loop, and secondary feedback closed–loop functionality.
· Based on the low–power, high–performance ARM A9 and x86 architectures.
· Nanometer–scale Interpolation Algorithm (NIA).
· High–Speed High–Precision Slope Conversion (GSG).
· Open CNC interface supporting MIII/EtherCAT/pulse/analog, adaptable to various servo systems globally.
· Bus I/O, serially connected to servo modules.
· PLC online editing for convenient function improvements and prompts.
· RJ45 interface for seamless integration of servo, I/O, and external auxiliary units. Unified configuration simplifies design and wiring.
· Dual USB ports for expandable storage.
· In–built functions for servo adjustment, circular interpolation, high–speed tapping, and other online optimization adjustments.
· Program pre–reading of up to 5000 segments and various segment fitting, ensuring high–speed, high–precision, and high–luminosity performance.
· Open control interface supporting customer–configurable applications like swinging head, and cradle application.
· Open macro programming functionality.

M620e Special Application

· Based on the low–power, high–performance ARM A9 and X86 architectures.
· Customizable secondary development interface.
· Front and back–end control solutions.
· Reserved expansion key positions for convenient customization of different work pages.
· PLC online editing for enhanced convenience in function improvement and prompts.
· Nanometer–scale Interpolation Algorithm (NIA) for precise interpolation.
· High–Speed High–Precision Slope Conversion (GSG).
· Open CNC interface supporting MIII /EtherCAT/pulse/analog, adaptable to various servo systems globally.
· RJ45 interface for seamless integration of servo, I/O, and external auxiliary units. Unified configuration simplifies design and wiring.
· Dual USB ports for expandable storage.
· In–built functions for servo adjustment, circular interpolation, high–speed tapping, and other online optimization adjustments.
· Shortcut definition of M codes for quick definition without modifying PLC.
· In–built standard CNC G–code functionality.
· Open macro programming functionality.

M621s Automation Application

· X86 architecture/Full touchscreen/Flexible configuration of soft keyboard.
· EtherCAT/Pulse digital interface/Analog interface.
· Bus I/O board expandable up to 50 units, supporting a maximum of 3200 I/O points.
· Four–channel functionality activated.
· Up to 50–axis motion control meets the requirements of automation with multiple workstations and actions.
· RJ45 interface "one network to the end," unified bus configuration for servo, I/O, external control units, simplifying design and wiring.
· Abundant reserved expansion key positions for convenient customization of different work pages.
· PLC online editing for enhanced convenience in function improvement and prompts.
· Multiple PLC functions for easy customer switching between work states.
· The quick definition of M codes without modifying the PLC for efficient customization.
· In–built standard CNC G–code functionality.
· Open macro programming functionality

M635i MES IoT Manufacturing
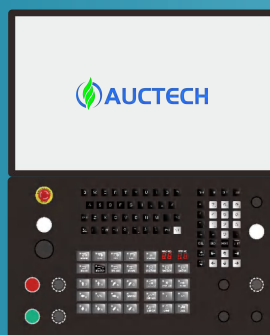
· MES Internet access for cloud–based management.
· Activation of multi–channel functionality.
· The standard configuration of EtherCAT/pulse numerical control interface/analog interface.
· RJ45 interface "one network to the end," allowing configuration of 1000 slave units for servo, I/O, and external control units.
· Flexible manufacturing system with intelligent cloud–based control.
· Support for mainstream domestic and international IoT data exchange, enabling efficient collaboration in production and resource allocation.
· Unmanned factories with remote monitoring and scheduling of production progress, as well as remote maintenance and debugging of machine tools.
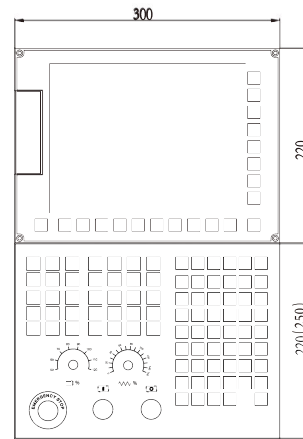
M618i/M6180i

CNC Engraving and Milling Application Controller
Compact/Economic/High–gloss

The Auctech M618i/M6180i is predominantly built on the ARM framework and is meticulously tailored for mainstream standard 3–axis CNC engraving and milling machines. Notably, its exceptional performance in cutter high–gloss machining is attributed to the high–speed, high–precision functions (GSG) and the Nanometer–scale Interpolation Algorithm (NIA).

Supporting both MIII and EtherCAT protocols, the M618i/M6180i goes beyond the bus and principal axis, offering pulse and DA dual spindle control for enhanced flexibility in configuration. Moreover, the inclusion of a built–in tapping debugging interface simplifies the optimization process for users, allowing them to unlock the machine tool's full potential and achieve high–speed, rigid tapping operations.

10.4 inch

EtherCAT	Bus/Pulse/Analog spindle
Dual–drive and synchronous	MECHATROLINK–III
Servo Hardware Current Loop	Full–closed loop control/switch

M6180i–S104AS001
GS3022W001
Resolution: 800 × 600
Color Depth: 16.7M
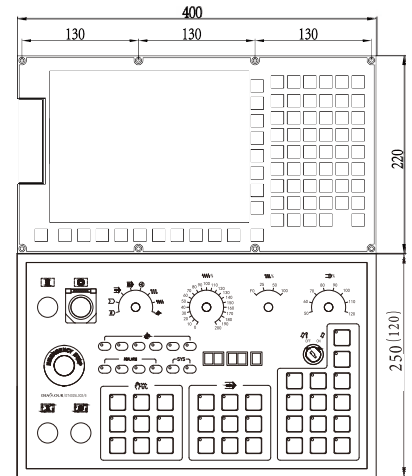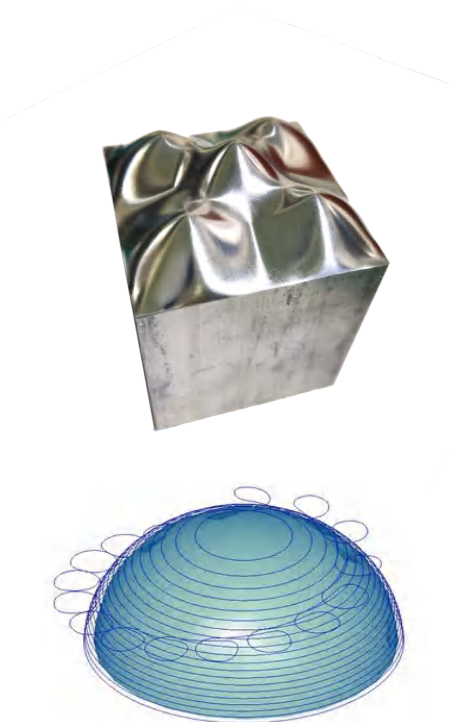
M618i–H104AS001
GH4012W001
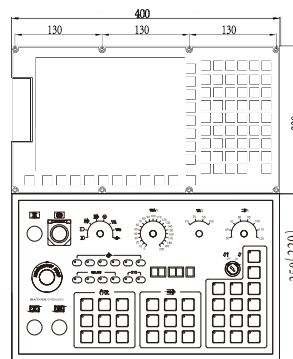Resolution: 800 × 600
Color Depth: 16.7M

M620i/M6200i

Five-axis Interpolation Application Controller
High Quality/Luxury/Great Value

The Auctech M620i/M6200i is expertly outfitted with a 5-axis Interpolation CNC machine tool, featuring standard dual-channel capabilities and the Nanometer-scale Interpolation Algorithm (NIA). As a standard offering, the machine also incorporates the innovative Rotated Tool Center Point (RTCP) function, providing flexibility in switching between structures like swinging heads and cradles, thus surpassing import restrictions.

The M620i/M6200i boasts advanced functionalities, including pre-reading up to 5,000 segments of programs and multiple line segment fitting. These features serve as a guarantee for achieving high gloss and precision in processing composite workpieces.
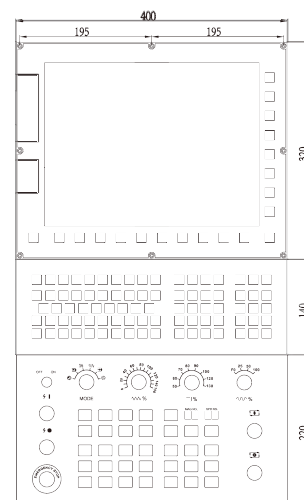
10.4 inch

M620i-H104AS001
GT4022L001
Resolution: 800 × 600
Color Depth: 16.7M

EtherCAT	Bus/Pulse/Analog spindle
Dual channels	MECHATROLINK-III
Dual-drive and synchronous	Five-axis interpolation
RTCP	Dual-drive and synchronous
Servo hardware current loop	
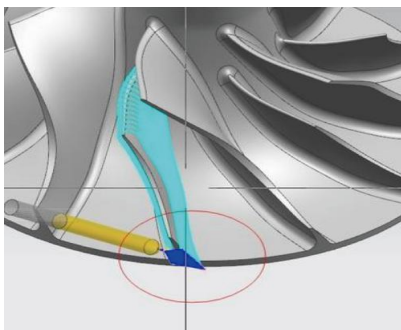
15 inch

M6200i-S150AS001
BS4014W001
GT4022L001
Resolution: 1024 × 768
Color Depth: 16.7M

M620e

Special Application Controller
Personalized Customization

The Auctech M620e boasts a wealth of reserved extension key positions, facilitating the seamless customization of diverse work interfaces. Simultaneously, it supports M3, EtherCAT, pulse, and analog interfaces, providing significant convenience in drive selection. The robust online editing functionality of the PLC enhances the ease of function improvements and prompts. The M620e also features a straightforward M code debugging function, enabling the definition of functions without the need to modify the PLC. With the activation of the four−channel function, it becomes more convenient for applications in complex scenarios.

10.4 inch

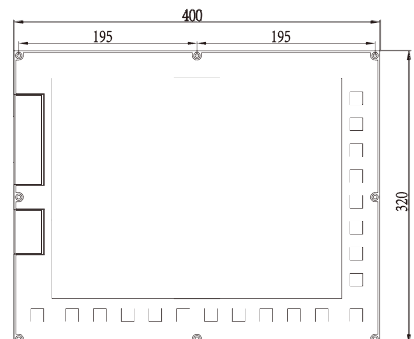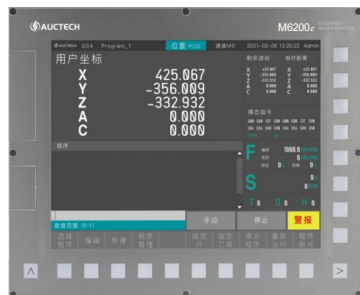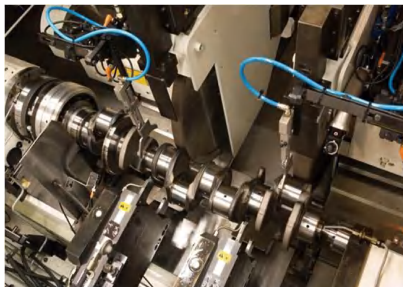| EtherCAT	MECHATROLINK−III
Pulse/Analog Interface	Bus IO extension
Customized key position	Four channels
G code	Multi−PLC control
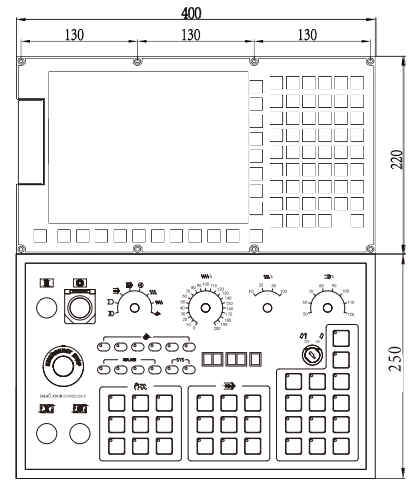
M620e−H104AS001
Resolution: 800 × 600
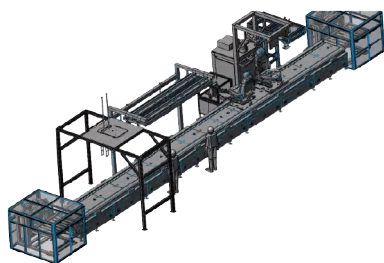Color Depth: 16.7M

15 inch

M6200e−S150AS001
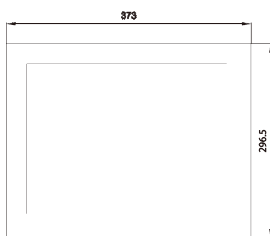Resolution: 1024× 768
Color Depth: 16.7M

M621s

Automation Application Controller Flexible Touch Control/Production Line Connection

The M621s supports external input and output functions with a maximum capacity of 3200 points, catering to various on-site requirements. Simultaneously, it offers support for MIII, EtherCAT, pulse, and analog interfaces, providing significant convenience in drive selection. The M621s is equipped with a four-channel function, supporting motion control for up to 50 axes, meeting the demands of automation in multi-workstation, multi-action scenarios. Its user-friendly multiple PLC functions facilitate easy switching between different operational states to accommodate diverse customer needs.

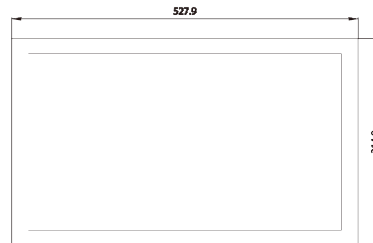| EtherCAT	MECHATROLINK-III
Pulse/Analog Interface	Bus IO Extension
Soft Touch Control	Four Channels
G Code	Multi-PLC Control

15 inch

21.5 inch

M621s-S150XS001
Resolution: 1024 × 768
Color Depth: 16.7M

M621s-S215XS001
Resolution: 1920 × 1080
Color Depth: 16.7M

M635i

MES IoT Manufacturing Platform   Digital Workshop

The M635i is a smart integrated system for digital workshops, featuring high-end hardware and superior software configurations, backed by intelligent cloud support. M635i supports mainstream communication protocols both domestically and internationally, facilitating seamless sharing of work information with other cloud-based systems. With the M635i, remote control via the cloud is achievable, enabling unmanned factories and facilitating remote production scheduling and machine tool maintenance.

| EtherCAT	MECHATROLINK-III
Pulse/Analog Interface	MES
Internet Access	Multiple Channels
Multi-PLC Control	

21.5 inch

Products Highlight

NIA with High Precision Priority

Create micro work pieces through precision manufacturing and high-gloss cutting. Nano or NIA digital commands are transmitted with precision machinery. Calculation precision must cover transmission precision, NIA calculation is a precondition.

Auctech CNC systems uses 64-bit floating-point arithmetic and a composite stack model to realize Nanometer-scale Interpolation Algorithm.
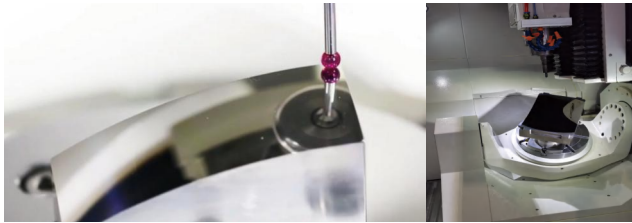
Dual-Mode Fitting(GSG)with High Gloss Priority

E
Programming trajectory
Actual trajectory of cutter
B   C   D
A
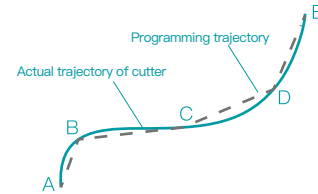
The system supports two high-gloss modes:

1) Mirror priority (small line segment spline fitting and interpolation)

The mode of mirror priority, high speed and high precision uses spline fitting and interpolation algorithm. The small line segments to be programmed are fitted into splines for interpolation, significantly improving surface quality and machining speed.

2) Contour priority

In this high-speed and high-precision mode,the system strictly follows the programmed trajectory. It automatically calculates the maximum transition speed based on the corners of adjacent trajectories. This ensures machining precision and 3D spatial dimensions while optimizing machining efficiency to the fullest extent.

Innovative Five-Axis Linkage Features

1) Innovative RTCP for Five-Axis Linkage:

In addition to retaining the basic tool tip-following tool handle posture adjustment interference function, the system introduces innovative RTCP (Rotated Tool Center Point) control that supports any five-axis machine tool structure, including non-standard configurations.

The system allows the configuration of two sets of RTCP parameters and supports features such as automatic tool change for five-axis heads.

Real-time compensation for the following structural errors is supported while using RTCP:

Three-dimensional real-time compensation for tool length

Compensation for directional errors in the axis of rotation

Compensation for angular errors in the axis of rotation

Compensation for parallelism errors between the axis of rotation and linear axis

Compensation for offset in the axis lines of dual swivel heads

Compensation for offset in the axis lines of dual rotary tables

Compensation for offset in the axis line of the main spindle

2) Tilted Surface Machining:

For machining on tilted surfaces, a characteristic coordinate system (TCS) can be established on the inclined surface, allowing programming within this coordinate system. Programming on the inclined surface is simplified as the characteristic coordinate system aligns with the inclined surface.

Support for fixed cycles such as inclined drilling and tapping.

Characteristic coordinate system
(TCS)

Workpiece coordinate system
(WCS)

Machine coordinate system
(MCS)
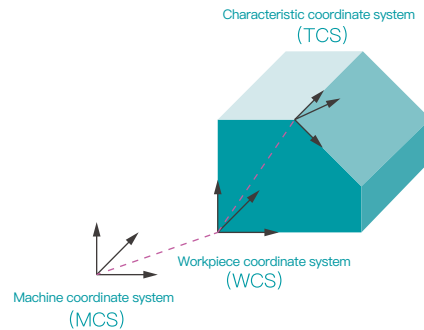
3) Arbitrary Feed-In and Out of the Tool in Any Direction: When the tool is tilted, the system allows instructing the tool to feed in or out along the tool axis direction.

Backward direction (L>0)

Forward distance

Backward distance

Forward direction (L>0)
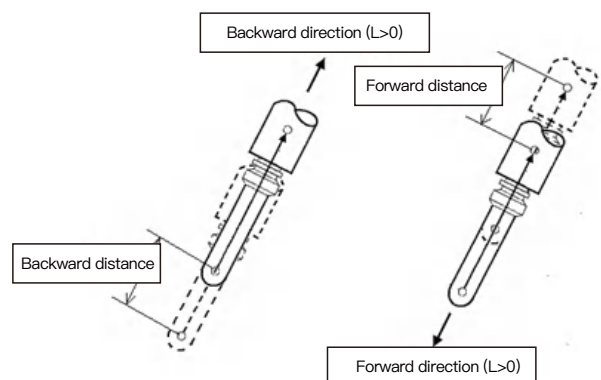
Secondary Development, Customized Interface

Secondary development interface customization, covering drawing and table insertion. Front–end and back–end control connects the engineering software on the Windows platform with the CNC system to achieve fast information interaction.

High–speed program segment preprocessing

5,000 lines of program segment preprocessing

Self–adaptive look–ahead algorithm

Based on look–ahead speed control algorithm of actual machine path, high speed connection of feed speed between micro line segments is realized by establishing a Mathematical model and exporting the constraint conditions for connection and feed speed.

Arc speed limit parameter group

Preset the parameter groups under different working conditions and realize steady arc transition.

Small line segment machining mode

Spline fitting and interpolation algorithm significantly improves surface quality and machining speed.

S–shape acceleration/ deceleration control

Optimize motion curve, reduce mechanical impact and improve machining efficiency.

Multi–axis and multi–channel

The system supports up to four channels. Each channel can be equipped with 20 axes and realize linkage of 20 axes maximally.
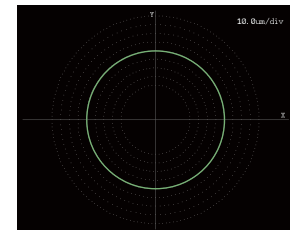
Servo diagnosis oscilloscope

·Online diagnosis of roundness, rigid tapping synchronism, performance of servo speed ring and position ring, etc.
·Adjust the system and servo parameters and optimize the control performance according to online diagnosis results.

Roundness diagnosis result:
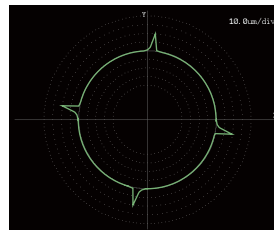

After adjusting serve parameters:

Workpieces can be placed randomly without alignment

·The system supports space coordinate system, which means the axes of workpiece coordinate system can be not parallel to machine coordinate system.
·Workpieces can be placed randomly on the workbench. The system can determine the coordinate system direction of workpieces through simple measurement without alignment.

Workpiece coordinate system direction

方向（I）	方向（J）	方向（K）
1.0	0.0	0.0
0.0	1.0	0.0
0.0	0.0	1.0

"7–box" customization

Personalized and high–quality demands have high requirements for manufacturing. "7–box" customization is a channel specially designed for customers. 7 customization keys have functions of function definition, shortcut key definition, advertisement placement, special interface, etc.
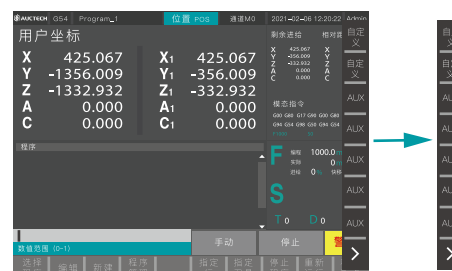
Program check function

When the machine axes don't move, you can quickly simulate and display the program working curve and verify the correctness of programming.

Manual interruption and automatic return

In process of machining, after feed is kept, you can move the axes manually. When a cycle is restarted, the system will automatically return to the interruption position and continue machining.

Probe protection function

In non–measurement mode (non–G31), when collision probe is triggered, the system will automatically stop the program to avoid damage to the probe.

Handwheel debugging function

When the program is working, you can control the working speed using the handwheel and ensure the safety of first machining.

One–key skip (interrupt service routine)

Specified keys are associated with macro program (interrupt service routine). In process of machining, you can press the key at any time, and the system will automatically skip to the associated macro program.This function can realize withdrawal of axes in emergency or other customized motions.

CAD aided machining

CAD DXF graphic files can be imported to system with USB to automatically generate G code.

Functional panel adapter card

Support the third–party function panel and eliminate the trouble of communication protocol and hardware design for convenience of factory customization.
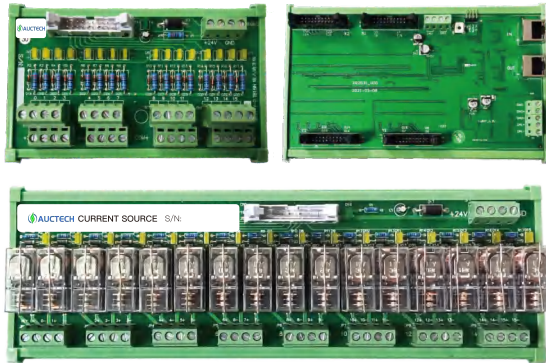
Axis synchronization function

Programming axes are set as the same axis name and will be synchronized automatically when executing G code.

Program Z–axis red display

It's risky to move the machine Z–axis. All Z–axis commanders are displayed in red for you to clearly observe which rows have Z–axis commanders in program for convenience of risk elimination.

Bus I/O module

Support EtherCAT bus interface I/O module. 32–point input, 24–point output (16–point relay output), 2–point analog quantity output and 1–point hand input for each I/O module.

Quick definition of M code

The method of filling a form can be used to quickly define M code function.

Program breakpoint saving/recovery

In process of machining, in need of interrupting machining, the program breakpoint saving function can be used. The system will automatically save current machining position, spindle speed, cutter compensation and other information.

In need continuing machining from the interruption position, you can use breakpoint recovery function.

Electronic gearbox/axis coupling

Electronic gearbox commander for gear machining can significantly simplify gear machining programming. The axis coupling relationship can be customized for convenience of application extension.

Compatible with EtherCAT/M III bus interface

The system will automatically identify the type of bus interface. The interface can be switched without changing system parameters.

Support multiple languages

The system supports simplified Chinese, traditional Chinese, English and other languages.

Products Model Selection

	M618i/ M6180i	M620i/ M6200i	M620e	M621s	M635i
Screen size*	10.4	10.4/15	10.4/15	15/21.5	21.5
MIII bus	●	●	○	○	○
EtherCAT	●	●	●	●	●
Bus/Pulse/Analog spindle	●	●	○	○	●
Basic controlled axes	4	6	6	6	6+
Max controlled axes	50	50	50	50	50+
Max interpolated axes	3	5	5	5	5+
Max spindle	2	4	Unlimited	Unlimited	Unlimited
Channels	2	2	4	4	4+
Basic I/O points	32+24	32+24	64+48	64+48	128+96
Max I/O points	128+96	256+192	1600+1600	1600+1600	1600+1600
Multi–PLC program selection	○	●	●	●	●
Dual–drive synchronous control	●	●	○	○	○
Hardware current loop servo control	●	●	●	●	●
RTCP control	○	●	○	○	●
GSG	●	●	○	○	●
NIA	●	●	○	○	●
Full closed–loop control	●	●	○	○	●
Programming error function	●	●	●	●	●
INTERNET MES access**	○	○	○	○	●
Remote debugging**	○	○	○	○	●
Standard panel**	GS3022W001 GH4012W001 GH4025L001	BS3012W001 GS3030L001 GT4022L001 GH4025L001 BS4014W001	○	○	○

Graph ● Standard configuration ○ Non–standard configuration

*The unit of screen size: inch
**The function is under development and will become a standard configuration when the products is launched
***The panel will be delivered according to model. Please see product introduction

4

Selection

Servo Drive

HSD–C8 Series Servo ––Digital hardware current loop AC servo driver has been intensively cultivated in the CNC machine tool industry for more than ten years and currently serves more than 500 machine tool manufacturers. Its high–precision and high–response characteristics have deep accumulation in the field of high–gloss processing.

HSD–C8 Series Precision Cutting Application Servo

Product Features

- 25–bit resolution

- Motor socket plastic sealing waterproof, grade IP67

- Hardware current loop

- Multiple automatic tuning chain

- Strong anti–interference, long–distance transmission

- Real–time communication to improve response

Applications

- High–speed feed application for Milling Center

- High smooth feed application for Turning center

- Transmission applications such as Laser/Plasma Cutting

- Woodworking machine application

About Auctech

As the world's leading expert in next–generation intelligent robots, CNC control and motion control, AUCTECH has been focusing on the R&D and innovation of flexible collaborative robots, industrial robots, CNC control, motion control and intelligent manufacturing technologies.

Relying on the company's long–term R&D investment in the field of robotics, CNC control and motion control, we have developed high–performance robot universal control system, CNC control system, Codesys–based motion control system, and a high–performance servo control system.

AUCTECH has a complete and top–of–the–line product range, including mid–to–high–end industrial robot series which is covering payloads from 4 to 220 kilograms, mid–to–high–end collaborative robots that meet various commercial and industrial applications within 20 kilograms, mid–to–high–end CNC controllers that has NIA five–axis interpolation function and innovative RTCP function, mid–to–high–end motion controllers, which efficiently meet the requirements of multi–axis, multi–point, high–response equipment and production lines. Additionally, AUCTECH continuously provide high–rigidity, high–response, a full range of servo motors and drives to meet the needs of industrial automation production.

AUCTECH has been committed to the field of intelligent manufacturing for a long time, helping our customers to continuously improve the level of manufacturing automation. We offer automation and intelligent manufacturing solutions in industries such as auto parts, 3C electronics, hardware tooling, automatic sewing, medical treatment, packaging and printing, metal processing, woodworking, glass and other industries, driving industrial upgrading, AUCTECH is the best choice for industrial automation!!

AUCTECH

AUCTECH Automation