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› HEXEH F2100B 2-Axis CNC Motion Controller System User Manual

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Model: F2100B

1. INTRODUCTION

This manual provides comprehensive instructions for the installation, operation, and maintenance of the HEXEH F2100B 2-Axis CNC Motion Controller System. Designed for flame and plasma cutting machines, the F2100B offers precise control and a user-friendly interface for various industrial applications. Please read this manual thoroughly before operating the device to ensure safe and efficient use.

2. PRODUCT OVERVIEW

The HEXEH F2100B is a robust 2-axis CNC motion controller system. It features a compact design with an integrated display and keyboard for direct input and control. The system is built with a durable housing suitable for industrial environments.

2.1 Front Panel



Figure 2.1: Front panel of the F2100B controller, showing the display screen, alphanumeric keypad, function keys (F1-F8), and control buttons for ignition, preheat, arc, cut quantity, and height control. A USB port is located on the lower left.

2.2 Rear Panel and Connections



Figure 2.2: Rear panel of the F2100B controller, featuring input, output, motor connections (Motor 1, Motor 2), serial port (RS232), and CAN bus interface. Important warning labels regarding power supply and installation are visible.

- **Input:** Connects to various input signals.
- **Output:** Provides output signals for machine control.
- **Motor 1 & 2:** Interfaces for connecting motor drives.
- **Serial Port (RS232):** For communication with external devices.
- **CAN:** CAN bus interface for network communication.



Figure 2.3: Included connectors for the F2100B system, comprising D-sub 25-pin and 15-pin connectors, along with green terminal blocks for secure wiring.

3. SPECIFICATIONS

The following table outlines the key technical specifications of the HEXEH F2100B CNC Motion Controller System.



Figure 3.1: Detailed technical indicators for the F2100B controller.

Table 3.1: Technical Indicators

Parameter	Value
Control Axis	2 axis linkage
Control Accuracy	+/- 0.001mm
Coordinate Range	+/- 99999.99mm
Max Pulses	200 kHz
Max Speed	15,000 mm/m
Max Lines of Code	80,000 lines
Max Size of Single Code File	4M
Time Resolution	10ms
Working Voltage	DC +24V direct-current power input, power > 80W
Working Temperature	-10°C ~ +60°C
Relative Humidity	0 ~ 95%
Max Power of Drive Arc THC Motor	45W (suitable for models with "T"). Max value 200W if more power is needed.

General Product Specifications:

- **Brand:** HEXEH
- **Material:** Iron
- **Item Weight:** 1500 Grams
- **Color:** One Color

4. CONTROLLER INTERFACE AND HARDWARE CONFIGURATION

The F2100B controller is designed for ease of use and robust connectivity. It features a compact keyboard and various interfaces for seamless integration into your cutting system.

Technical indicator:

- Control Axis: 2 axis linkage
- Control accuracy: $\pm 0.001\text{mm}$
- Coordinate range: $\pm 99999.99\text{mm}$
- Max pulses: 200 kHz.
- Max speed: 15,000 mm/m
- Max lines of code: 80,000lines
- Max size of single code file: 4M
- Time resolution: 10ms
- Working Voltage: DC +24V direct-current power input, power > 80W。
- Working Temperature: $-10^{\circ}\text{C}\sim+60^{\circ}\text{C}$. Relative Humidity, 0~95%.
- Max power of drive arc THC motor: 45W (suitable for models with "T"). if need more power, can select a maximum value: 200W.

Figure 4.1: Overview of controller interfaces and hardware configuration capabilities.

4.1 Controller Interfaces

- **DB15 Pins SMA Male Interface:** For 2 axes of motor drive.
- **DB25 Pins SMA Female Interface:** Provides 16 channels of optoelectronic isolation output ports, with a maximum backflow current of 300mA.
- **DB25 Pins SMA Male Interface:** Provides 16 channels of optoelectronic isolation input ports, with a maximum output current of 300mA.
- **USB Interface (Front Panel):** Convenient for transmitting cutting code and copying files.
- **Extendable I/O Ports:** Supports additional input/output ports, PWM input ports, and analog input ports.
- **Optional Standard DB9 Core Male Serial Port:** RS232 interface for extended connectivity.

4.2 Hardware Configuration Features

- **Compact Keyboard Design:** Facilitates easy input of files and commands.
- **Shape Operations:** Supports functions such as Proportion, Rotate, and Mirror for design flexibility.
- **Matrix Array:** Shapes can be arranged in a matrix, supporting interaction and stacked modes.
- **Adjustable Steel Plate:** The steel plate can be adjusted according to specific steel side requirements.
- **Customizable Coordinate System:** Supports two-dimensional coordinates of all eight kinds.
- **Customizable I/O Ports:** All input and output port types and numbers can be customized (normally open or normally closed).
- **Self-Diagnostic Function:** Diagnoses key status and all I/O status to facilitate inspection and debugging.
- **Lifetime Upgrade Service:** The system can be upgraded via the USB interface, and lifetime upgrade service is provided.
- **Online Upgrades:** All functions and techniques can be upgraded online.

5. SETUP AND INSTALLATION

Proper setup is crucial for the optimal performance and safety of the F2100B controller. Follow these general guidelines for installation.

1. **Mounting:** Securely mount the controller in a suitable enclosure or panel, ensuring adequate ventilation and protection from environmental factors. Refer to the mounting dimensions provided in the product documentation (not included in this manual).
2. **Power Connection:** Connect the controller to a stable DC +24V power supply. Ensure the power supply can deliver more than 80W. **Warning:** Incorrect voltage or polarity can damage the device. Always verify connections before powering on.
3. **Motor Drive Connections:** Connect your motor drives to the DB15 SMA Male interfaces (Motor 1, Motor 2) on the rear panel. Ensure correct wiring according to your motor drive specifications.
4. **Input/Output Wiring:** Connect all necessary input sensors and output actuators to the DB25 SMA Female (output) and DB25 SMA Male (input) interfaces. Pay close attention to the wiring diagrams for your specific machine configuration.
5. **Grounding:** Ensure the controller and all connected components are properly grounded to prevent electrical interference and ensure safety.
6. **Initial Power-On:** After all connections are verified, power on the system. Observe the display for any error messages or abnormal behavior.

For detailed wiring diagrams and specific installation instructions, please consult the full technical documentation provided with your purchase.

6. OPERATING MODES AND FUNCTIONS

The F2100B controller supports various operating modes and functions to accommodate different cutting processes.

Controller Interface:

- DB15 pins SMA Male interface of 2 axes of the motor drive.
- DB25 pins SMA Female interface of 16 channels optoelectronic isolation output ports max backflow current 300mA.
- DB25 pins SMA Male interface of 16 channels optoelectronic isolation input ports, max output current 300mA.
- USB interface on the front panel, for the convenience of transmitting cutting code.
- Extend IO input/output ports, PWM input ports, analog input ports.
- Optional standard DB9 core male serial port RS232 interface.

Hardware Configuration:

- Compact keyboard design and easy to input files.
- The shape has some operations such as Proportion, Rotate, and Mirror.
- The shape can be arrayed in a matrix, interaction, stacked modes.
- The steel plate can be adjusted according to any steel side.
- The coordinate system can be customized to support the two-dimensional coordinates of all eight kinds.
- All input and output port type and the number can be customized (normally open or normally closed).
- Self-diagnostic function, to diagnose the key status and all the IO status, facilitate inspection and debug.
- Provide a front USB interface for copying files.
- The system can be upgraded by the USB interface easily, and we provide lifetime upgrade service.
- All functions and techniques can upgrade online and don't worry about the after-sale service.

Figure 6.1: Key operating features and supported modes of the F2100B controller.

- **File Management:** Supports importing and exporting files, either individually or in batches.
- **Parameter Management:** Features parameter backup and restoration capabilities for easy configuration management.
- **Supported Modes:** The controller supports four distinct modes:
 - **Flame Mode:** Optimized for flame cutting processes.
 - **Plasma Mode:** Optimized for plasma cutting processes.
 - **Marker Mode:** For marking operations.
 - **Demonstration Mode:** For testing and demonstration purposes.
- **Processing Parameters:** Includes various types of processing parameters to meet the needs of different processes.

- **Flame and Plasma IO Separation:** Flame and Plasma functions are controlled via separate I/O ports for enhanced precision and safety.
- **Torch Height Control (THC):** Supports THC for maintaining optimal cutting distance.
- **Preheat and Pierce (Flame Mode):** Features two-level preheat and three-level pierce functions specifically for flame cutting operations.

7. MAINTENANCE

Regular maintenance ensures the longevity and reliable operation of your HEXEH F2100B controller.

- **Cleaning:** Periodically clean the exterior of the controller with a soft, dry cloth. Avoid using abrasive cleaners or solvents. Ensure the display and keypad are free from dust and debris.
- **Ventilation:** Ensure that the controller's ventilation openings are not obstructed to prevent overheating.
- **Cable Inspection:** Regularly inspect all connecting cables for signs of wear, damage, or loose connections. Replace damaged cables immediately.
- **Software Updates:** Utilize the provided lifetime upgrade service to keep the controller's firmware up-to-date. This ensures access to the latest features and performance improvements. Updates can be performed via the USB interface or online.
- **Environmental Conditions:** Operate the controller within the specified working temperature (-10°C to +60°C) and relative humidity (0-95%) ranges to prevent damage.

8. TROUBLESHOOTING

This section provides general guidance for common issues. For complex problems, contact technical support.

Table 8.1: Common Troubleshooting Guide

Problem	Possible Cause	Solution
Controller does not power on.	No power supply, incorrect voltage, loose power cable.	Check power source, verify +24V DC input, ensure power cable is securely connected.
Motor(s) not responding.	Loose motor cable, incorrect wiring, motor drive fault, parameter misconfiguration.	Inspect motor cables and connections, verify wiring against diagrams, check motor drive status, review motion control parameters.
Display shows error message.	System fault, I/O error, parameter error.	Note the error code/message and consult the detailed error code list in the full technical manual. Use the self-diagnostic function.
Unable to transfer files via USB.	Faulty USB drive, incorrect file format, USB port issue.	Try a different USB drive, ensure files are in a compatible format, check the USB port for damage.

If you encounter issues not covered here or require further assistance, please contact HEXEH customer support.

9. WARRANTY AND SUPPORT

HEXEH is committed to providing reliable products and excellent customer service.

- **Customer Support:** Should you have any questions or require assistance with your HEXEH F2100B controller, please do not hesitate to contact our customer service team. We are dedicated to serving you as soon as possible.
- **Lifetime Upgrade Service:** As mentioned in the hardware configuration, the system benefits from a lifetime upgrade service via the USB interface, ensuring your controller remains current with the latest functionalities.

- **Online Upgrades:** All functions and techniques can be upgraded online, providing continuous improvement without concern for after-sale service.

For specific warranty terms and conditions, please refer to the documentation included with your purchase or contact HEXEH directly.

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