

sainsmart 3018-PRO

SainSmart Genmitsu CNC 3018-PRO User Manual

GRBL-Controlled 3-Axis Milling/Engraving Machine

1. INTRODUCTION

The SainSmart Genmitsu CNC 3018-PRO is a versatile and robust 3-axis CNC milling and engraving machine designed for hobbyists and professionals. This manual provides essential information for the safe and effective operation of your device, covering assembly, operation, maintenance, and troubleshooting.

The 3018-PRO is an enhanced version of the popular Genmitsu 3018, featuring improved performance and stability thanks to its protective ABS casing and integrated fan. It offers a generous working area of 300mm x 180mm x 45mm, making it suitable for a wide range of projects. The machine is powered by a strong 775 24V motor, capable of up to 10,000 RPM, allowing it to process various materials including soft aluminum, wood, acrylic, and PVC.

2. SAFETY INFORMATION

Always prioritize safety when operating the CNC machine. Failure to follow safety guidelines can result in injury or damage to the equipment.

- **Eye Protection:** Always wear safety glasses to protect your eyes from flying debris.
- **Hand Protection:** Use gloves when handling sharp tools or materials.
- **Work Area:** Ensure your workspace is clean, well-lit, and free of obstructions. Keep children and pets away from the machine during operation.
- **Ventilation:** Work in a well-ventilated area, especially when cutting materials that produce dust or fumes.
- **Emergency Stop:** Familiarize yourself with the location and operation of the emergency stop button.
- **Power Disconnection:** Always disconnect power before performing any maintenance, cleaning, or tool changes.

- **Material Compatibility:** Only use materials suitable for the machine's capabilities. Avoid extremely hard metals or materials that produce hazardous dust.
- **Secure Workpiece:** Ensure the workpiece is securely clamped to prevent movement during operation.

3. PACKAGE CONTENTS

Upon opening your SainSmart Genmitsu CNC 3018-PRO kit, please verify that all components are present and undamaged. The kit includes all necessary parts for assembly and initial operation.



Figure 3.1: Overview of all components included in the Genmitsu 3018-PRO kit before assembly.



Figure 3.2: The assembled Genmitsu 3018-PRO CNC machine, showcasing its compact design and included accessories like clamps and bits.

Typical contents include:

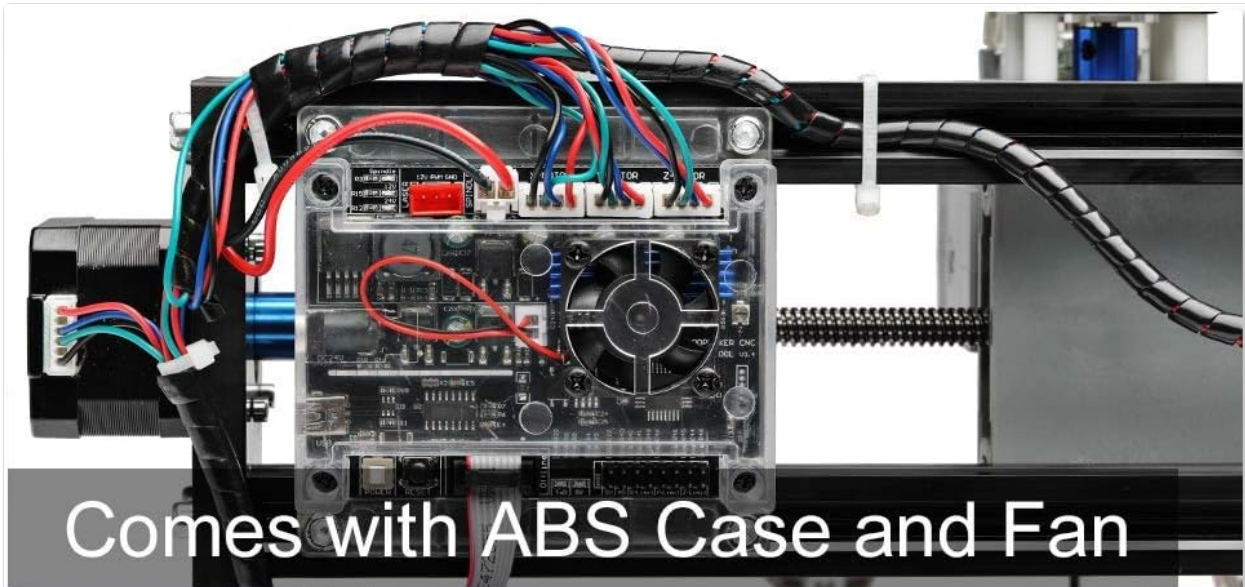
- CNC Machine Frame Components (Aluminum profiles, acrylic plates)
- Spindle Motor (775 24V)
- Control Board with ABS Casing and Fan
- Stepper Motors (NEMA 17 for X, Y, Z axes)
- Power Supply (CE/FCC/UL approved)
- ER11 Collet and Nuts
- Basic Engraving Bits
- USB Cable
- Clamps and Fasteners
- Assembly Tools (wrenches, hex keys)
- User Manual (this document)

4. SETUP

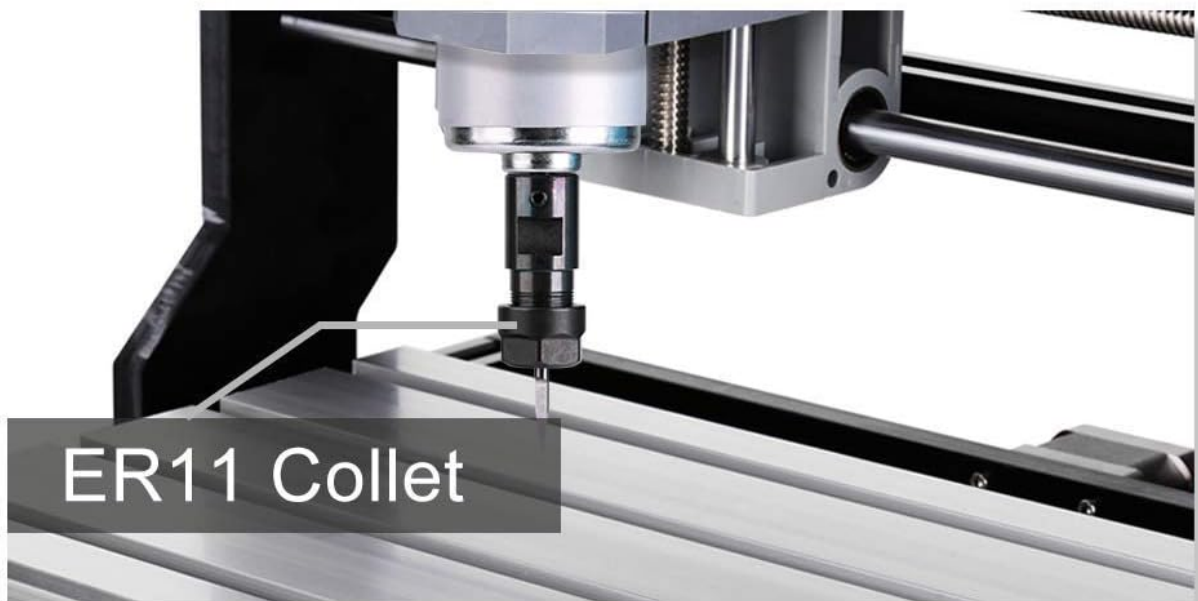
The Genmitsu 3018-PRO is designed for straightforward assembly, typically completed in 8 simple steps. Refer to the detailed assembly instructions provided in the separate assembly guide or online resources for visual assistance.

4.1 Assembly

1. **Unpack Components:** Carefully remove all parts from the packaging and verify against the package contents list.
2. **Assemble Frame:** Connect the aluminum profiles and acrylic plates to form the machine's base and gantry.
3. **Install Lead Screws and Guide Rods:** Mount the lead screws and smooth guide rods for each axis (X, Y, Z).
4. **Attach Stepper Motors:** Secure the stepper motors to their respective axes.
5. **Mount Spindle:** Install the spindle motor onto the Z-axis carriage. Ensure the ER11 collet is properly seated.
6. **Connect Wiring:** Carefully connect the stepper motor cables, spindle motor cable, and limit switch cables (if applicable) to the control board. Pay attention to correct polarity and pin assignments.
7. **Install Control Board:** Mount the control board securely, ensuring proper ventilation. The integrated ABS case and fan provide protection and cooling.
8. **Power Connection:** Connect the power supply to the control board and then to a suitable power outlet.



Comes with ABS Case and Fan



ER11 Collet



Aluminum Profile

Figure 4.1: Key components including the control board with its protective ABS case and fan, the ER11 collet for tool holding, and the robust aluminum profile base.

4.2 Software Installation

The Genmitsu 3018-PRO is controlled by GRBL firmware. You will need a GRBL-compatible control software (e.g., Candle, UGS) on your computer to send G-code commands to the machine. Drivers for the USB connection may also be required.

- Download the recommended software and drivers from the SainSmart official website or the provided USB drive.
- Install the software and drivers following the on-screen instructions.
- Connect the CNC machine to your computer via the USB cable.
- Launch the control software and establish a connection with the machine.
- Perform initial calibration and homing procedures as per the software's instructions.

5. OPERATING INSTRUCTIONS

Operating the Genmitsu 3018-PRO involves preparing your design, generating G-code, setting up the workpiece, and running the milling process.

5.1 Material Compatibility

The machine is capable of milling and engraving a variety of materials within its working area of 300mm x 180mm x 45mm.

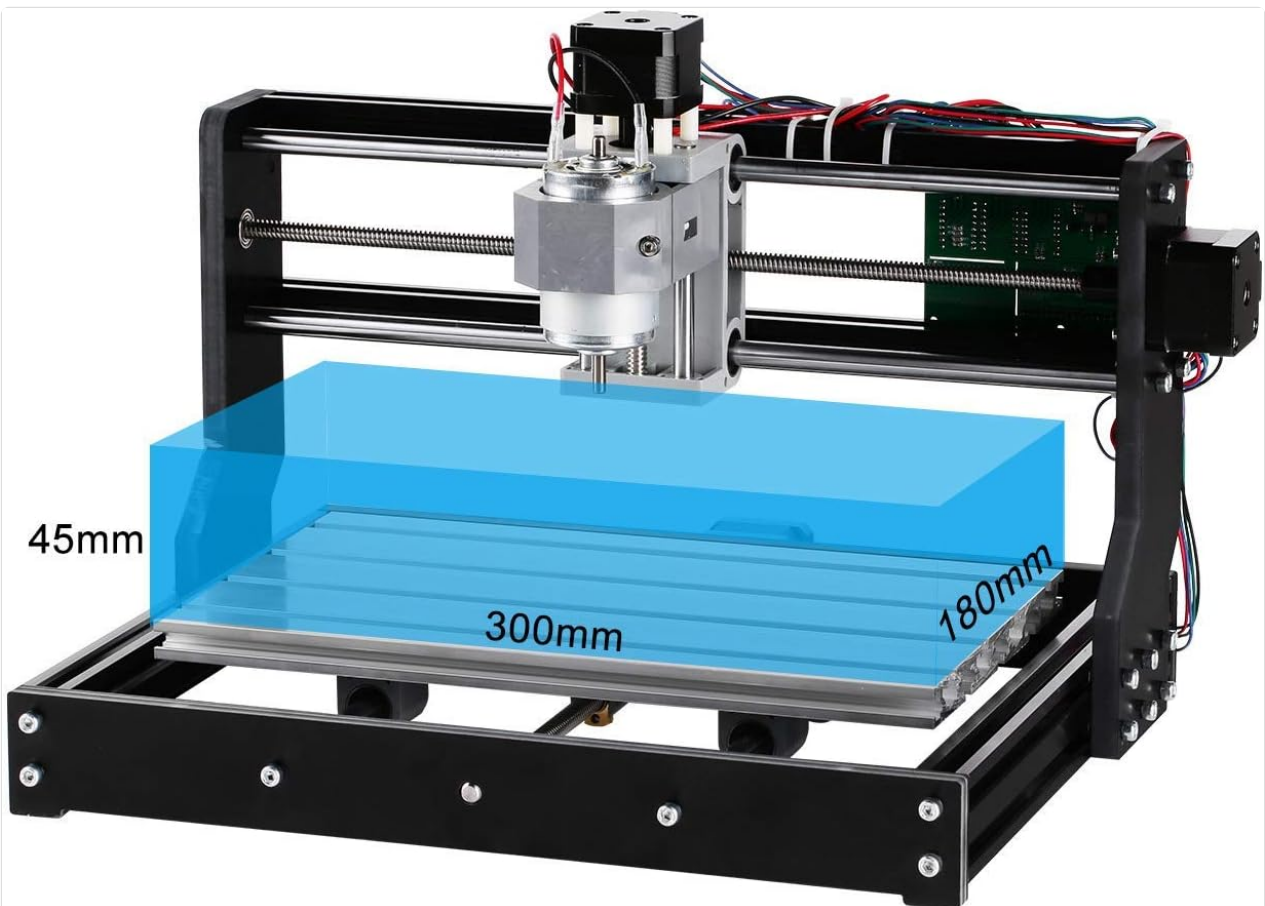


Figure 5.1: The working area of the Genmitsu 3018-PRO, measuring 300mm in X, 180mm in Y, and 45mm in Z.

Supported materials include:

- Soft Aluminum

- Wood (various types)
- Acrylic
- PVC
- PCB (Printed Circuit Board) material
- Other soft materials

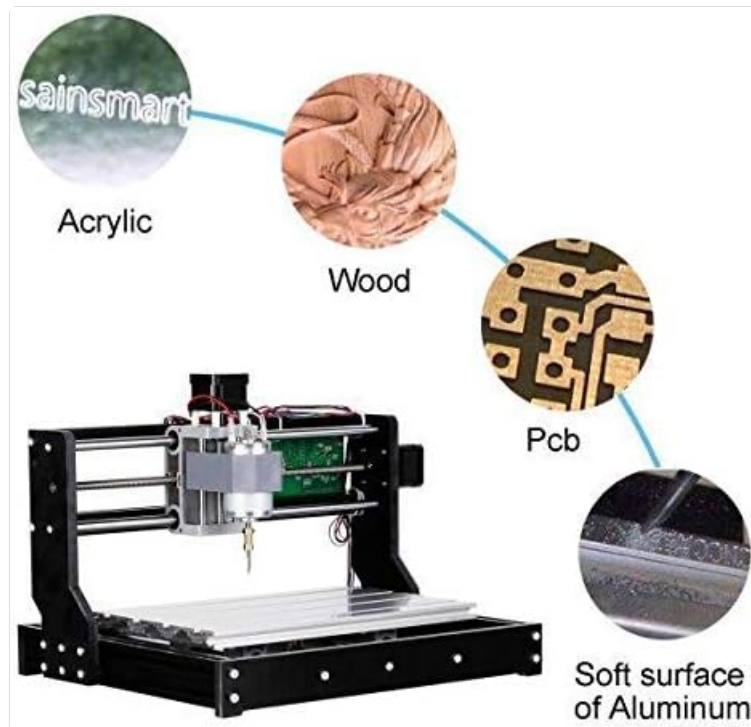


Figure 5.2: Examples of materials suitable for processing with the Genmitsu 3018-PRO, including acrylic, wood, PCBs, and soft aluminum.

5.2 Workflow

1. **Design Creation:** Use CAD/CAM software (e.g., Fusion 360, Easel) to create your design and generate the appropriate G-code.
2. **Tool Selection:** Choose the correct milling bit for your material and desired operation. Insert the bit into the ER11 collet and tighten it securely using the provided wrenches.



Figure 5.3: Proper method for securing a milling bit into the ER11 collet using the provided wrenches.

3. **Workpiece Setup:** Place your material on the workbed and secure it firmly using the clamps. Ensure it is stable and will not shift during operation.
4. **Zeroing Axes:** In your control software, manually or automatically set the X, Y, and Z zero points for your workpiece. This defines the starting point for the milling operation.
5. **Run G-code:** Load your G-code file into the control software and initiate the milling process. Monitor the machine closely during operation.
6. **Post-Processing:** Once the milling is complete, carefully remove the workpiece and clean any debris from the machine.



Figure 5.4: Clearing debris from the workpiece and machine bed after a milling operation.

6. MAINTENANCE

Regular maintenance ensures the longevity and optimal performance of your Genmitsu 3018-PRO.

- **Cleaning:** After each use, clean the machine thoroughly to remove dust, chips, and debris. Use a brush or vacuum cleaner. Avoid using compressed air directly on sensitive electronic components.
- **Lubrication:** Periodically apply a small amount of lubricant to the lead screws and guide rods to ensure smooth movement of the axes.
- **Check Connections:** Regularly inspect all electrical connections and mechanical fasteners. Tighten any loose screws or connections.
- **Spindle Maintenance:** Keep the spindle motor clean and free of dust. Ensure the collet is clean and free of debris before inserting bits.
- **Bit Condition:** Inspect your milling bits regularly for wear or damage. Dull or damaged bits can lead to poor results and put strain on the machine.

7. TROUBLESHOOTING

This section addresses common issues you might encounter with your Genmitsu 3018-PRO.

7.1 Common Issues and Solutions

- **Machine Disconnects from PC:**

Possible Causes: Loose USB cable, driver issues, electromagnetic interference, faulty control board.

Solutions: Try a different USB port or cable. Reinstall USB drivers. Ensure the machine is not near strong electromagnetic sources. If the issue persists, contact SainSmart support; a replacement control board may be necessary.

- **Poor Engraving/Milling Quality (e.g., inconsistent depth, rough edges):**

Possible Causes: Loose bits, unsecured workpiece, incorrect feed rates/spindle speed, worn bits, insufficient machine rigidity.

Solutions: Ensure bits are tightly secured in the collet. Verify the workpiece is firmly clamped. Adjust feed rates and spindle speed in your software. Replace dull bits. Check for any loose components in the machine's frame or gantry.

- **Motors Not Moving or Moving Erratically:**

Possible Causes: Loose motor connections, incorrect wiring, driver issues, power supply problems.

Solutions: Check all motor cable connections to the control board. Verify wiring against the assembly guide. Ensure the power supply is providing adequate voltage.

- **Machine Not Powering On:**

Possible Causes: Power cable not connected, faulty power supply, issue with control board.

Solutions: Ensure the power cable is fully inserted into the machine and the outlet. Test the power supply if possible.

If you encounter issues not covered here or require further assistance, do not hesitate to contact SainSmart customer support directly. They are known for their responsive and helpful service.

8. SPECIFICATIONS

Key technical specifications for the SainSmart Genmitsu CNC 3018-PRO:

Feature	Specification
Model Number	3018-PRO
Manufacturer	SainSmart
Product Dimensions (L x W x H)	40 x 40 x 24 cm
Item Weight	7.1 Kilograms
Working Area (X x Y x Z)	300mm x 180mm x 45mm

Feature	Specification
Spindle Motor	775 24V DC Motor
Max Spindle Speed	10,000 RPM
Control Software	GRBL-compatible (e.g., Candle)
Power Source	AC (24 Volts, 4.75 A)
Material	Acrylonitrile Butadiene Styrene (ABS), Aluminum
Included Components	Milling/Engraving Machine

9. WARRANTY AND SUPPORT

SainSmart is committed to providing excellent customer service and support for their products.

Warranty: Your Genmitsu 3018-PRO comes with a standard manufacturer's warranty. Please refer to the warranty card included in your package or visit the SainSmart official website for detailed terms and conditions regarding warranty coverage and duration.

Customer Support: If you have any questions, require technical assistance, or encounter issues with your machine, please contact SainSmart customer support. They are available to help with assembly, operation, troubleshooting, and parts replacement.

You can typically find contact information for support on the SainSmart website or within the product packaging. When contacting support, please have your product model number (3018-PRO) and purchase details ready to facilitate a quicker resolution.