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UP3D

Shenzhen UP3d Tech Co.,Ltd

UP3D
Smart Milling Machine

User Manual

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User guide

Dear Customers:

We are delighted that you have chosen and purchased our dental milling machine!

Read this user manual carefully before using the machine to develop a good use and maintenance habit, which will play a good role in the product and increase the lifespan.

⚠Warning:

Don't assemble or disassemble the machine without authorization, otherwise UP3D and UP3D's dealers have the right to refuse to guarantee the product failure!

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01 Product Information

1.1 UP3d digital dental CAD/CAM system

Shenzhen UP3D Tech Co., Ltd started digital dentistry research in 2012. We have a group of specialized technology development and digital core technologies.

Now we have a complete set of digital dental CAD/CAM system, including: high-precision dental scanners, dental CAD design software, dental CAM nesting software, dental milling machines, etc., which are all developed independently, with patents of invention.

1.2 Product introduction

Denture (or dental, prosthetic) engraving machine, or dental processing machine, also called dental milling machine, dental processing machine, dental cutting machine and tooth carving machine.

UP3D intelligent dental milling machine is one of the important products of dental CAD/CAM system, which is intelligent for below two aspects:

1. Auto calibration function. It can compensate the deviation of the milling automatically by calibration, ensuring the milling precision.

2. Highly integrated 5 axis motion control system and intelligent, simplified CNC software.

1.3 Features

(1)High reliability and stability

The spindle adopts vertical milling design, which has wider versatility. The key control components are made of internationally renowned original parts, screws and guide rails, etc., which are maintenance-free and reduce equipment maintenance costs.

(2)High precision and high-speed milling

The maximum spindle speed is 40000~60000RPM, and the maximum feed rate is 3000mm/min (the milling precision can be controlled within 0.05mm).

(3)High intelligent host computer

Highly intelligent software, easy workflow operation, one-button milling, one-button automatic calibration process, automatic compensation of milling accuracy.

(4)Highly open and compatible system

Compatible with a variety of open systems and capable of milling various dental materials, including zirconia, wax, PMMA, etc. Improving efficiency of the equipment utilization, saving costs and increasing returns.

(5)Equipped with intelligent nesting software

The intelligent nesting software developed by UP3D is highly integrated with the equipment to easily realize data transmission and sharing.

1.4 Applicable environment of P53

P53 dental milling machine has certain requirements for its environment when it is running. When finishing the installation, turning it on and working, its environment should be as below:

(1) The indoor temperature range is 5~40℃ ,

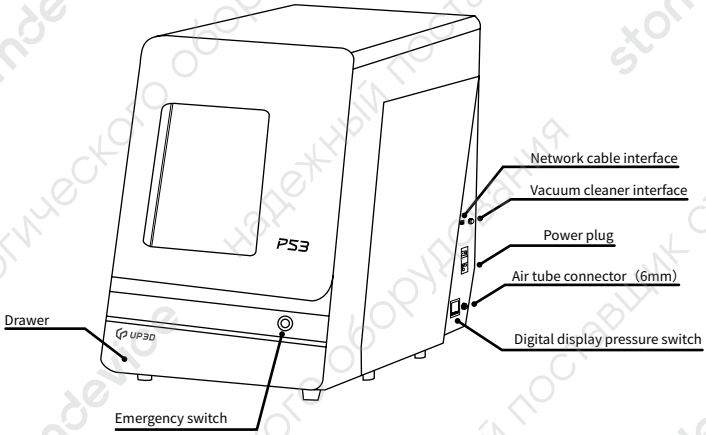
(2) Air humidity: 35-80% (no condensation),

(3) The altitude does not exceed 2,000 meters,

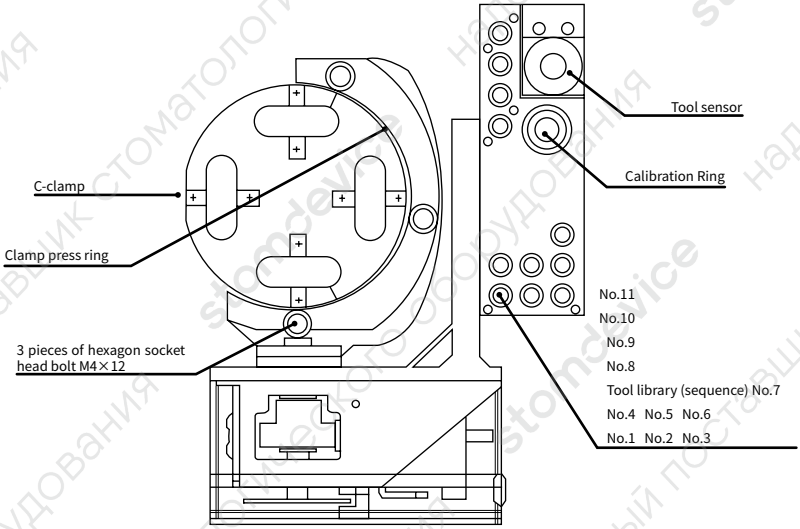
(4) Environmental pollution level: 2 (according to IEC 60664-1)

(5) Instantaneous overvoltage 1,500V.

1.5 Main structure



Product left side view (external)



(intracavity schematic diagram)

02 User manual

2.1 Devices connection

(1) Remove the milling machine from the wood box and place it on a stable table. Open the door of the milling machine and take out the foam cotton (save it for subsequent maintenance and transportation).

(2)Open the accessories box and connect the power cable, network cable and router to the milling machine and computer.

(3)Take out the pressure regulating filter and two M6×10 screws, fix it on the right side of the milling machine.

Connect the air compressor and convert the air tube into a 6mm diameter tube from the air compressor and insert it according to the marked position on the pressure regulating filter. At the same time, cut a 6mm tube (about 40cm long), and insert it from the right side of filter to the tube joint on the milling machine.

(4)Connect the dust collector.

(5)Take out the Φ4mm calibration tool, Φ2mm milling tool, Φ1mm milling tool, and Φ0.6mm milling tool, and install them according to the following picture.

(6)Please connect the network cable to the network port of computer and the milling machine directly, or connect the router with the computer, then turn on the machine power switch and button switch (on the shell) in turn, follow the UPCNC instructions to install the software and drivers, and set basic parameter.

2.2 UPCNC operation instruction

Connection and Window Function Area



① Connection and Window Function Area



The picture is connection and window function area.

Devices: It will display current operational device and it will display multiple icons if there are multiple devices



Minimize: the software interface is minimized to the taskbar



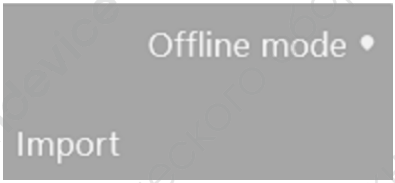
Close: It will close the software after clicking this button

② File loading and start-stop operation area





Import: It is used to load the NC (G-code) file. Click this button and [Open NC File] dialog box will pop up. Then find the file to be loaded.





Start：It will start to mill after you upload the NC file and click this button



Pause：if you want to check the status or meet some issues during milling.

Main function: stop milling and the spindle stops rotating then returns to the machine origin position

③ Milling progress and information display area

It will display the current axis coordinate, spindle speed and the following progress bar shows the current milling progress and percentage



④ Main Function Area



Calibrate：Calibrate automatically, the machine will follow the process settled after you click this button



Reset：The machine will disconnect with PC and then reconnect the PC when you chick this button



Homing：When you click this button, the device will go back to the original coordinate by touching the limit switch of each axis



Dismantling：A-axis will rotate to an angle to facilitate the disassembly and assembly of the material



Loose/Clamp tools：Click this button to open the spindle chuck. If there is a tool, the tool will drop directly. If there is no tool, it will not respond. Click 1 time to loose the tool, then click one more time to clamp the tool, the spindle chuck will lock.

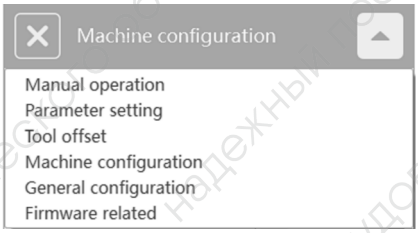


Configuration: Click this button, then input the password to enter the device parameter setting mode. Before entering the advanced mode, the [Password Verification] dialog box will pop up, enter the password, then you can enter.

2.3 Advanced mode settings

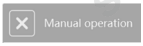
Click the [Configuration] button and enter the password to enter the advanced mode.

Under this mode, there are 6 buttons at the bottom of the interface, which are used to switch, save and return operation, etc.

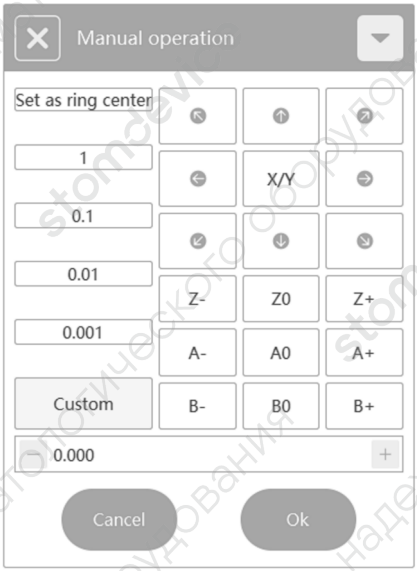




Save all: after clicking this button, set or modify the parameters in the advanced mode, save all the parameters to the control board.



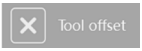
Interface 1: Click the tool control button to enter the fine-tuning interface, as shown below:



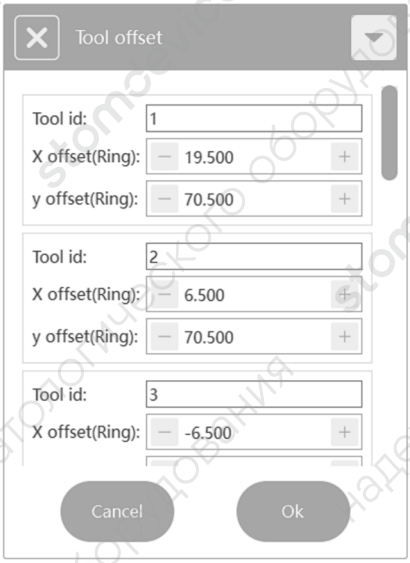


Interface 2: parameter configuration button. The parameters of the current device can be set by clicking the tick button.



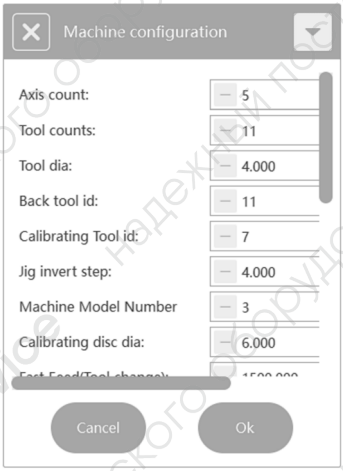


Interface 3: tool configuration button. The tool library information of the current device is shown under this tab. The tool positions of the current tool library can be adjusted or filled in, and saved by clicking the tick button.



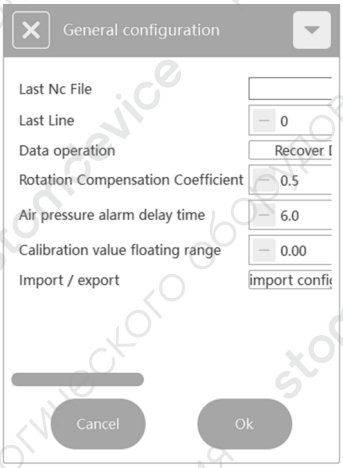


Interface 4: Device configuration. The calibration configuration information, tools changing information、compensation mode and other information are listed under this tab,could be saved by clicking the tick button.





Interface 5: Open general set up.





Return to normal mode: click this button to return to normal mode.

2.4 Automatic calibration operation

After successful connection, automatic calibration is required in the case of first milling, long period milling (more than one month), abnormal milling, long period shutdown (more than two weeks), or large movement of the machine, etc., so as to ensure the milling accuracy.

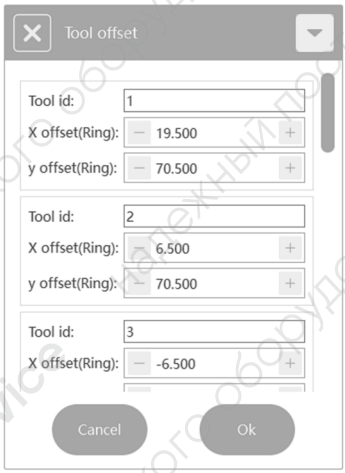
① Check the host computer parameters

Click configuration, enter password, enter advanced mode, and check the key parameters of the three button interfaces respectively:

(1) Calibration configuration interface: check machine axis number, tool number, tool diameter, calibration tool No. and calibration tool diameter



(2) Tool configuration interface: check the tool coordinates of No. 1-4 tools



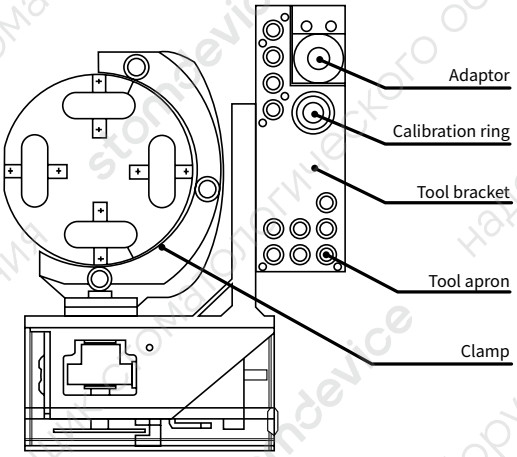
(3) Parameter configuration interface: check the calibration ring coordinates

Note: if you make a change, click confirm, otherwise the change is invalid

② Clean the tool library, calibration ring, tool sensor and fixtures Main cleaning parts:

(1) Upper plane of tool sensor
(2) Upper plane of tool library
(3) Inside and bottom of tool library
(4) inner side of calibration ring
(5) Upper surface of fixture and standard block fixing groove

Cleaning method: use a brush or cloth to wipe the above main parts, if not clean, can add alcohol to wipe.





③ Install calibration plate

(1) Take out the calibration plate in the accessory box and fix it to the specific jig in the following steps for installation.

(2) Position the locating lug of the calibration plate towards you and the flush end of the locating lug on the lower side.

(3) The positioning lug of the calibration plate is aligned with the positioning groove, and gently put into the body of the jig, so that make the lower end of the calibration plate stick to the fixture step surface.

(4) Push the calibration plate so that the positioning lug fits the positioning groove tightly.

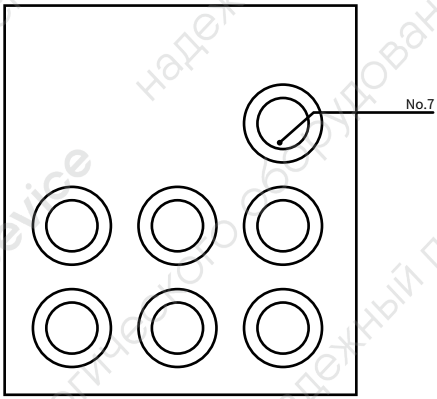
(5) Take out the jig ring and align the 3 corresponding bolt mounting holes to the corresponding threaded holes of the jig, and gently place them on the jig (note: place the jig ring with step downward).

(6) Insert three spare hexagon socket head bolts M4×12 (stainless steel) into the three bolt holes in turn, and during the tightening process, pay attention to coordination to ensure the parallel force of the pressure ring;

Note: Before placing the calibration plate, remove the pressing plate and bolts from the clamp body, remove the debris on the clamp body and the press ring, and ensure that the clamp body and the press ring are clean.

④ Install the calibration tool and place it in the tool library

Before starting the calibration, please note to place the calibration tool at the No. 7 tool position in the tool library. For the installation of the calibration tool, please refer to the tools installation and attention points described above.



⑤ Automatic calibration

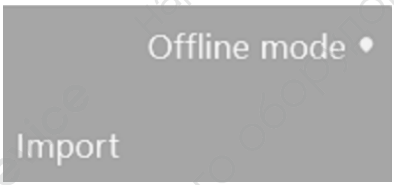
Click Calibration button on the software to auto calibrate th e milling machine after above operations finish, it takes about 16 mins to auto calibrate.



03 Milling operation instructions

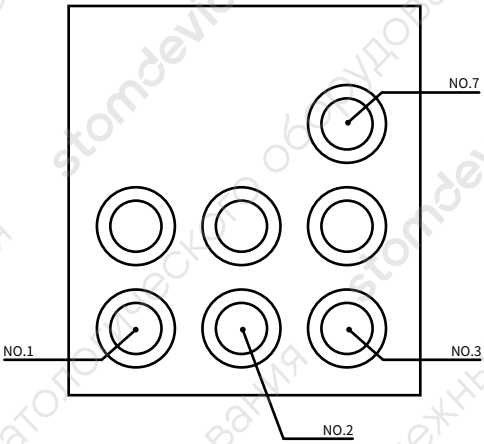
3.1 Loading NC file

Click the [Import] button in the File loading and start stop opera tion area of the software interface, and find the path of the premade file in the opened dialog box. After selecting the file, click the [Open] button to load the NC file of the model to be milled into the software.



3.2 Tools installation

Before milling, the milling tools need to be put on the correc t positions as below:



1st tool position: Φ2mm rough milling tool
2nd tool position: Φ1mm precision milling tool
3rd tool position: Φ0.6mm tooth floss processing tool
7th tool position: Φ4mm calibration tool
Notice: the installation of milling tool and ring please refer t o the articles mentioned above.

3.3 Material loading

Put the material to be milled on the jig and fix it with the jig r ing with 3 pieces M4x12 stainless steel hexagon socket head cap s crews (the operation can refer to the calibration plate loading as mentioned above)

3.4 Milling operation

After above operations finish, click [Start] button on the soft ware to mill.

04 Errors and solutions

4.1 Air pressure error



When this fault occurs, the software interface pops up the above prompt box, which indicates that when the system detects the air pressure does not meet the minimum value of the digital display pressure switch. When this error pops up, the current operation will be discontinued.

Solution: Click OK and check the reasons below:

1. Check whether the air pressure supply is enough and the air compressor is on
2. Check if there is air leak of the air tube
3. Check if the pressure regulating filter is damaged or not

4.2 Tool changing error



When this fault occurs, the software interface pops up the prompt box above, indicating that the tool changing failed in the process of tool changing

Reasons:

1, Working mode

The tool is damaged during the milling process or the tool clipping fails during tool changing, this error will pop up and discontinue the milling. The milling needs to be started from the beginning after fix the error.

2, Non-working mode

Tool detection fails during the tool clipping and returning process, including tool changing failures of tool damage, tool not put on the tool library and chuck not open due to insufficient air pressure.

Solution:

Click [Loose/Clamp] button to see if the chuck of the spindle opens or not, if it does not open, the air pressure needs to be checked. If it opens, the tool in the spindle will fall down, you need to catch the tool to avoid breaking down. Put the tool back to the tool library and click start to mill again.

4.3 Limits error



When this error occurs, the prompt box above pops up on th e software interface, indicating that the device touches the limit or the motion exceeds the travel. There are 2 kinds of limit proble m, the mechanical limit and motion limit.

Mechanical limit

If the hard limit occurs in the direction of X, Y or Z axis, it bel ongs to the mechanical limit. The reason is that the moving axis i mpinges on the limit switch in an abnormal state, resulting in ma chine error.

Solution: click OK to close this prompt box, then click Reset button in the software interface and wait for 10 seconds, or restar t the machine.

Motion limit

When this prompt appears, it may indicate that the next mov ement travel of the processing program exceeds the limited trave l, resulting in the machine limit. This limit is the movement limit, and the prompt is the warning prompt.

Solution: click OK to close the prompt box, and then click St op button to revise the NC file or regenerate the NC and proceed t o the next step.

4.4 Other Problems

If any other problems, pls feel free to contact us, thank you!

05 Product Parts List

This product is equipped with a proprietary accessory box, which mainly includes accessories:

No.	Name	Specification	Unit	Qty
1	Pressure regulating filter	with quick connector and mounting bracket	set	1
2	Power cable	According to national standards	set	1
3	Milling tools	ϕ2	pc	2
		ϕ1	pc	2
		ϕ0.6	pc	2
		ϕ4	pc	1
4	Tool ring	ϕ4	pcs	6
5	Allen wrench		Set	1
6	Wax block	98×12mm	pcs	3
7	Calibration plate	dedicated	pc	1
8	Jack screw	Hexagon socket set screws M3×3	pc	12
9	Fixture screw	Hexagon socket head screw M4×12 stainless steel	pc	9
10	Fixing screw	Hexagon socket flat head screws M6×10 stainless steel	pc	4
11	Dongle		pc	1
12	Network cable		pc	1

06 Product Specifications

The basic parameters of P53 dental milling machines of UP3D are as follows:

Model	P53
Dimension	443.5×718×628.5 (mm)
Weight	87Kg
Input voltage	AC 200~240V 50~60Hz
Max power	1.1KW
Spindle power	0.35KW （max）
Axis	5-axis simultaneous motion
Milling range	X/Y/Z:167/206/104mm A :±30° B:±360°
Milling mode	Dry milling
Max rotate speed	30,000rpm
Max feed rate	3000mm/min
Tools library	11
Tools changing	Automatic (Air pressure >0.5MPa)
Spindle cooling	Air compression (Air pressure 0.25~0.35MPa)
Milling materials	Zirconia,Wax,PMMA,PEEK and soft materials
Milling time	Coping : Zirconia-10min Wax-4.5min Crown : Zirconia-13min Wax-5.5min
Tools diameter	2 + 1 + 0.6 (Φ4)

User information

User name: _____

User address: _____

Contacts : _____

Tel: _____

Series number: _____

Purchasing date: _____

Installation date: _____

Mark:

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