

# NOBILCAM-5X

## Operation Manual



<b>1. NOBILCAM-5X Milling Machine .....</b>	<b>4</b>
1.1 Equipment Introduction.....	4
1.2 Host operation panel .....	6
1.3 Working cabin door .....	6
1.4 Working cabin .....	8
1.5 Suction and blowing system The suction an blowing system includes .....	9
1.6 Technical parameters .....	10
<b>2. Equipment transportation and installation .....</b>	<b>10</b>
2.1 Handling, Packaging and Storage.....	10
2.1.1 Handling Safety Rules .....	11
2.1.2 Packing .....	11
2.1.3 Logo on the outer packaging .....	11
2.2 Parts List.....	11
2.3 Installation requirements .....	12
The selection of the installation site must meet the following conditions .....	12
2.4 Device installation.....	14
2.5 Take out the filling in the working chamber .....	15
● Remove the shipping stuffing from the work compartment.....	15
● Clean up any remaining stuffing debris in the work compartment.....	15
● Place the filling well for later transportation and use.....	15
2.6 Pneumatic unit installation .....	15
2.6.1 Introduction to Pressure Regulating Filters .....	15
2.7 Install a vacuum system.....	16
2.7.1 Vacuum Cleaner Requirements .....	16
2.7.2 Vacuum cleaner installation.....	16
2.8 Connect circuit.....	17
<b>3. Operating the equipment .....</b>	<b>17</b>
3.1 Preparation before operation .....	17
3.2 Power on the Equipment .....	18
3.3 Equipment testing.....	18
3.4 Overview of milling process Note.....	18
3.5 Insert / replace the burs.....	19
3.6 Burs information.....	21

3.7 Install and remove fixture.....	22
3.7.1 Install the material blocks.....	23
3.7.2 Remove the material block.....	24
3.8 Program interruption and stop.....	24
3.8.1 What to do when the program is interrupted.....	25
3.8.2 How to deal with equipment failure.....	25
3.8.3 How to deal with tool damage.....	25
<b>4.Introduction of operating system page .....</b>	<b>26</b>
4.1 Status Display.....	27
4.2 Explanation of Button function.....	28
4.3. Coordinate display area.....	33
4.4 Tool position.....	33
<b>5. Equipment maintenance and cleaning .....</b>	<b>33</b>
5.1 Safety note.....	33
5.2 Accessory replacement.....	34
5.3 Routine cleaning.....	34
5.4 Material fixture cleaning.....	34
5.5 Clean tool library and tool.....	34
5.6 Cleaning of the spindle clamp.....	35
5.7 Check hoses, cables and connections.....	35
5.8 Check the pressure regulator filter.....	36
5.8.1 Check the regulator filter for condensation.....	36
5.9 Maintenance of screw and guide rail.....	36
5.10 Maintenance schedule.....	38
5.11 Equipment calibration.....	38

# 1. NOBILCAM-5X Milling Machine

## 1.1 Equipment Introduction



Figure Schematic diagram of NOBILCAM-5X

1. Cutting machine
2. Cabin door
3. Observation work cabin window
4. Digital display barometer/USB interface
5. Host system
6. Power on
7. Emergency stop
8. Processing alarm display bar

The NOBILCAM-5X five-axis milling machine is designed for the convenient realization of digital processing in the field of dental technology, and can process different types of materials.

## Connection board on the back of the device

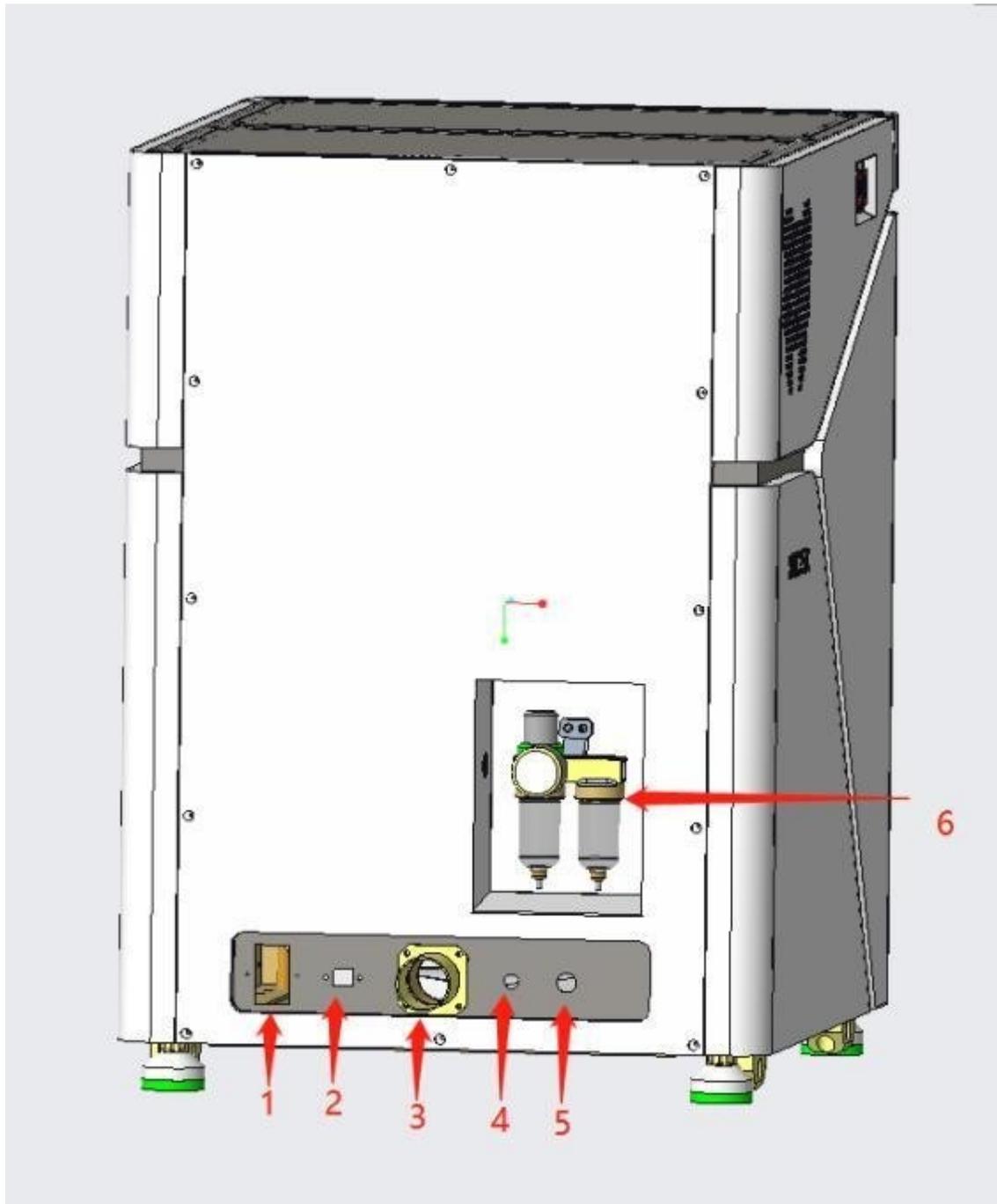


Figure Connection board on the back of the device

1. Power inlet connector
2. Network port
3. Dust suction port
4. Air intake hole
5. Vacuum cleaner external interface
6. Double cup air pressure filter

## 1.2 Host operation panel

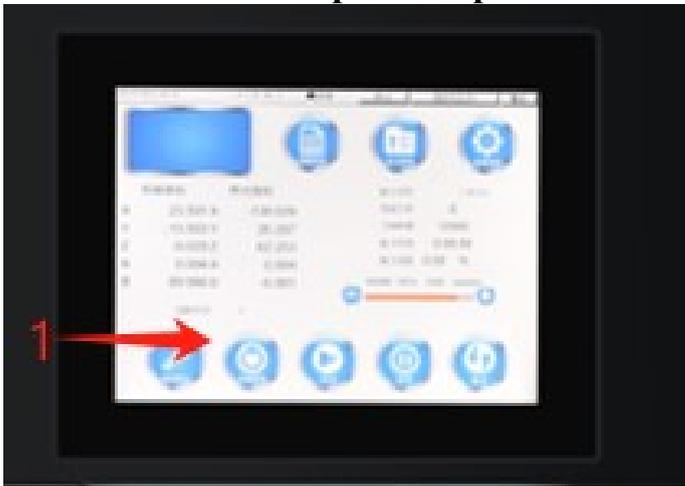


Figure Operation panel

1. System display 2. Power on and off 3. System emergency stop

## 1.3 Working cabin door

The working cabin door must be closed when the machine is working to prevent personal injury.

Note: Beware of pinching when opening or closing the hatch

- When opening the hatch, hold the hatch handle with your hand and pull it outward
  
- To close the hatch, place your hand on the lower edge of the hatch and push upwards

## 1.4 Working cabin

Compartments for processing materials.

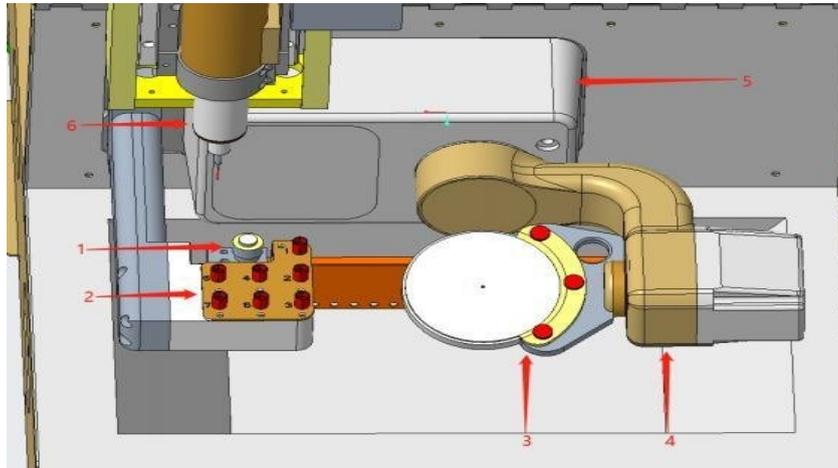


Figure NOBILCAM-5X work cabin

1. Tool setting device 2. Tool magazine 3. Blank fixture 4. Four rotating shafts 5. Five rotating shafts 6. Spindle

## 1.5 Suction and blowing system - The suction and blowing system includes:

- Gas blown from the spindle and blowpipe.
- External extraction system (suction device, suction hose).

During normal operation, there will be continuous gas blown into the working chamber, and the connected dust suction device will suck out the debris and dust in the working chamber through the dust suction hole.

A good extraction and blowing system can prevent damage and wear of sensitive parts of the machine.

Note: The suction and blowing system cannot replace regular machine cleaning. If the machine is not cleaned regularly, the service life of the machine will be significantly reduced.

## 1.6 Technical parameters

Specification	Parameters
Number of axes	Five-axis linkage
Cutting method	Dry milling
Cutting material	Zirconia, PMMA, Wax, Resin, Composite Material
Block size	Straight warp 98mm, thickness 10-30mm Disc
Stroke range	X/Y/Z:200-120-120 A:360° B:+35°,-92°
Spindle	0-60000rpm/500W
Drive	Full servo motor
Tool (Bur)	Quantity:7 Diameter:4mm
Dimension	Left and right: 530, Front and back 650 Up and down 760
Weight	Total mass of cutting machine:145KG
Required air pressure	6.0-6.5bar
Compressed air flow	Approx. 50L/min
Minimum suction volume	Approx. 3000L/min
Power	800W
Power supply	220-230V AC, 50/60Hz

## 2. Equipment transportation and installation

### 2.1 Handling, Packaging and Storage

⚠ Warning: In order to ensure the normal use of the equipment in the future, operators and maintenance personnel are required to be competent in handling the transport packaging, so please read the following precautions carefully

### 2.1.1 Handling Safety Rules

- . Pay attention to the center of gravity of the equipment! Do not shift the center of gravity during transportation, otherwise it may cause the device to tilt or fall.
- . Please pay attention to the weight and direction of the equipment marked on the outer packing box of the equipment, and try to keep the balance during the transportation.
- . When using hoisting machinery to carry, should always keep the part of the mechanical force around the center of gravity, and minimize shaking.
- . When lifting and lowering, please always pay attention to whether the equipment is tilted, and reduce the packaging height as much as possible if conditions permit.
- . Only use the designated stress area during the moving process
- . The outer packaging material can only be removed before the equipment is installed.

### 2.1.2 Packing

The transportation package is designed according to the expected transportation method and transportation conditions. The packaging is specially designed to prevent physical damage and other possible damage during transportation to the greatest extent. Therefore, the transportation package can only be removed before the equipment is installed. When removing the transport package, try to ensure the integrity of the package in case it needs to be returned to the factory for reuse.

### 2.1.3 Logo on the outer packaging

The equipment is a high-precision instrument, and there are many vulnerable parts inside, so handle it with care during transportation.

There are many electronic components and mechanical parts that need to be waterproofed inside the device, so keep them away from moisture

When temporarily placing or storing equipment, place it in the direction of the arrow

Do not let the box tilt or roll over during transportation and handling

## 2.2 Parts List

First check the delivery list to see if it is complete. Unpack the machine and check the following types:

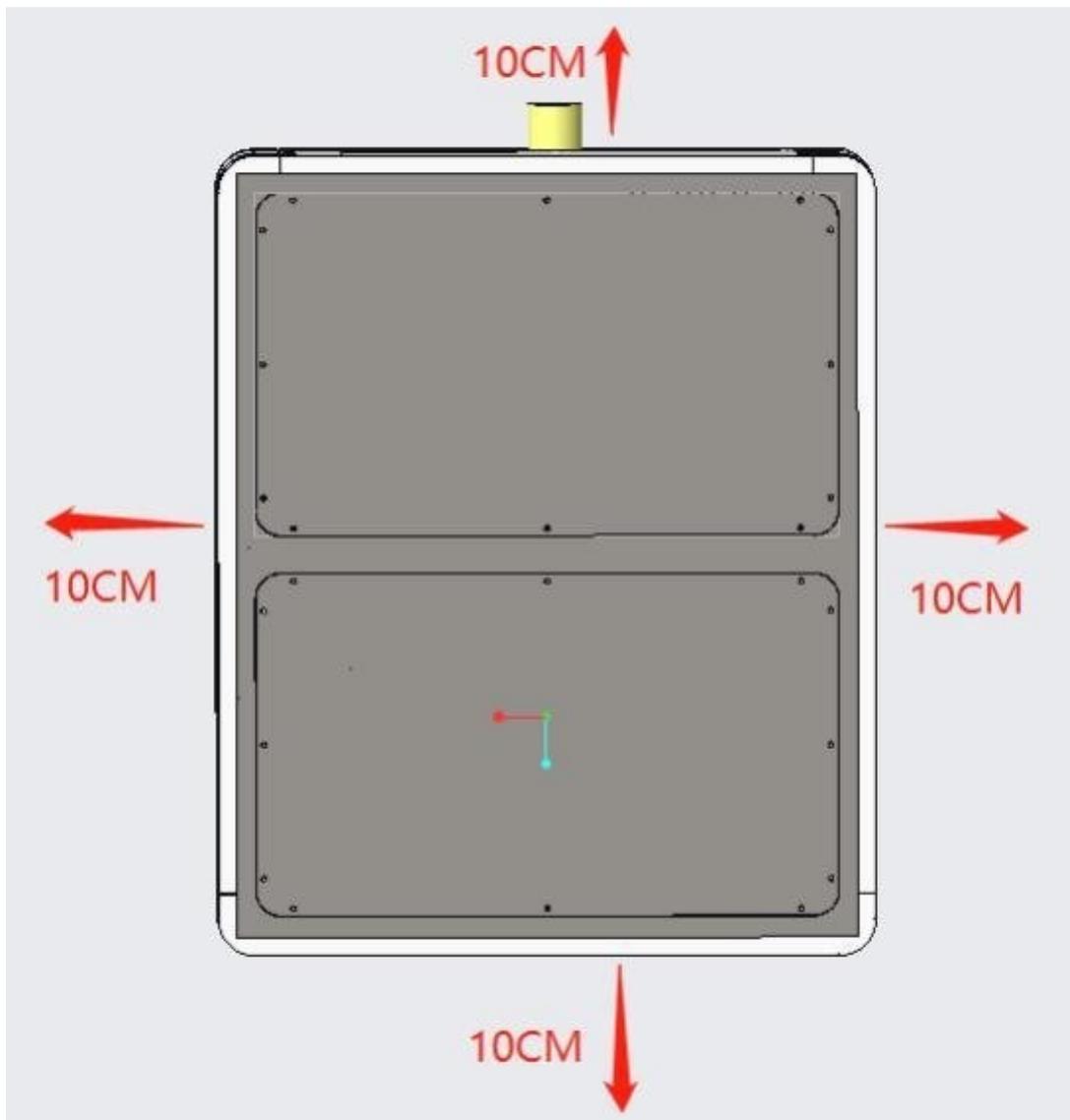
No.	Product name	Specification	Unit	Quantity
1	NOBILCAM-5X	530-650-760	set	1
2	Dust suction air pipe	2m	pc	1
3	8mm air Pipe	5m	pc	1
4	TY tee	8 turn double 8 6 turn double 8	pc	1
5	Hoop	Vacuum pipe hoop	pc	1
6	Power cable	3.5m	pc	1
7	Screwdriver	Phillips screwdriver and flat-blade screwdriver		1
8	Allen wrench	1-10	pc	1
9	Tool Burs	ZIR2.0 ;ZIR1.0 ;ZIR0.6; 1.5R;PMMA2.0;PMMA 1.0;PMMA0.6	pc	7
10	pressure regulator filter	AFR2000(mounted on the machine)	pc	1
11	WAX	98mm	pc	1
12	Lifting handle	20-160	pc	1

### 2.3 Installation requirements

The selection of the installation site must meet the following conditions:

- The installation site must be firm and have a flat surface, and be able to bear the weight of the equipment (approximately 150kg)

- The ideal indoor temperature is 18°C~25°C, with a maximum of 32°C
- The location where the device is installed must be dust-free
- Relative air humidity up to 80%
- AC power supply with 220-240 V and 50/60HZ
- Compressed air supply according to machine requirements, 4.5-7.5bar
- Reserve enough space around the equipment installation, as shown in the figure



NOTE: Plug the unit's power cord into a separate fused circuit, or make sure no other equipment is connected to the same power source, to prevent voltage fluctuations. Strong voltage fluctuations can interfere with control and cause system failure

## 2.4 Device installation

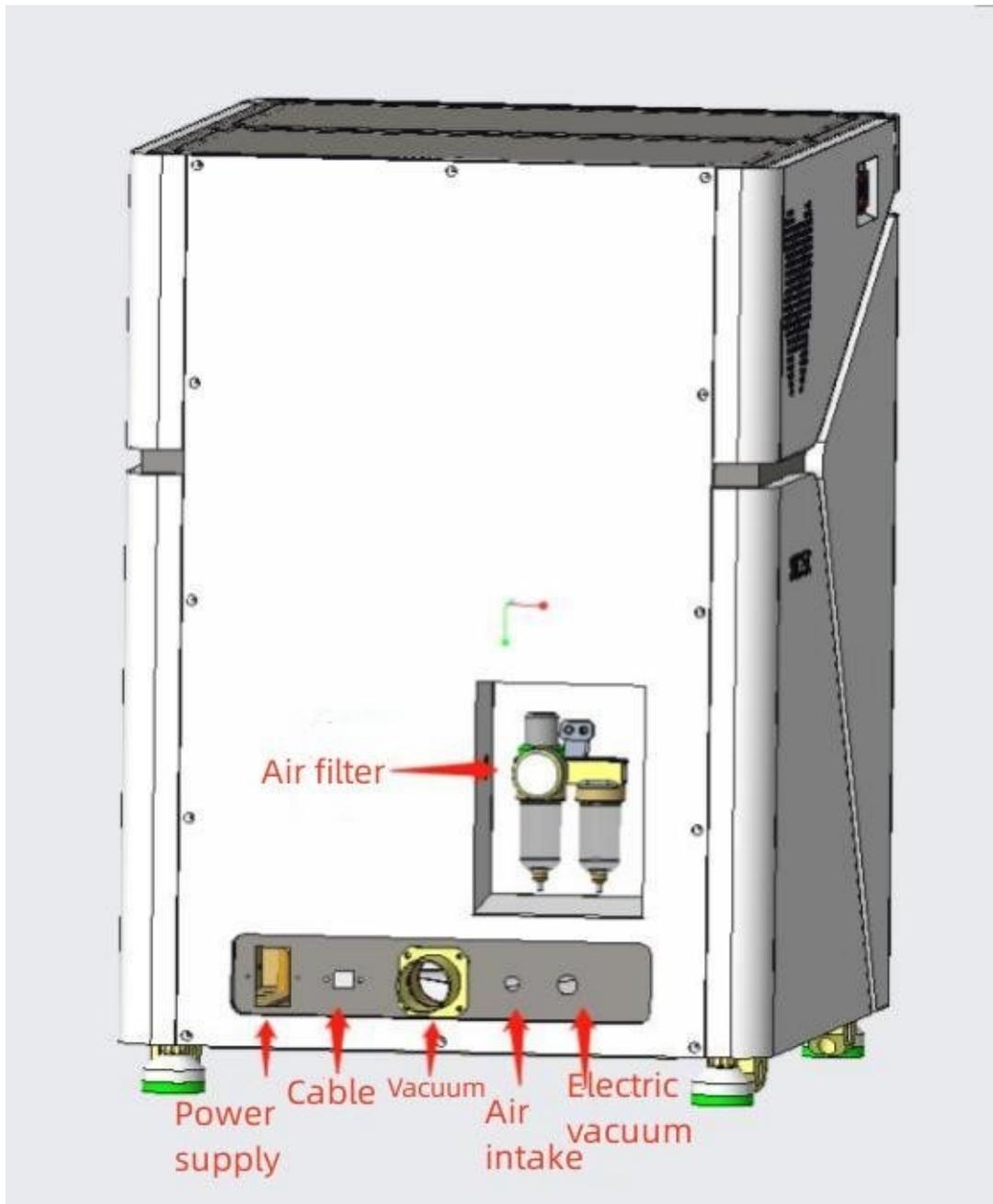


Figure Device Connection Diagram  
The device connection is shown in the figure.

## 2.5 Take out the filling in the working chamber

Before operating the device for the first time, the filling in the working chamber must be removed. The filling protects the spindle and machine structure from damage during transport.

- Remove the shipping stuffing from the work compartment.
- Clean up any remaining stuffing debris in the work compartment.
- Place the filling well for later transportation and use.

## 2.6 Pneumatic unit installation

- During installation and servicing, ensure that no compressed air passes through the regulator filter.
- After installing the pneumatic hose, before venting, check that the hose is securely inserted into the correct connector and is not damaged.

Note: The compressed air input must be oil-free and dry. If the compressed air is polluted (containing water, oil, etc.), it may cause damage to the spindle and electrical components.

- Connect the machine to a compressed air supply only through the supplied pressure regulating filter.

### 2.6.1 Introduction to Pressure Regulating Filters

The compressed air is connected to the machine through a pressure regulating filter, which can be used to adjust the pressure input to the machine and partially separate the moisture in the gas.



Figure Regulator filter

1. Pressure adjustment knob 2. Fixed seat 3. External compressed air interface 4. Pressure gauge 5. Water separator 6. Drainer 7. Machine connection interface

## 2.7 Install a vacuum system

### 2.7.1 Vacuum Cleaner Requirements

Only use vacuum cleaners with the following characteristics:

- specially designed for dentistry
- Equipped with class M filter
- Adapt to the working environment of the machine tool
- With mounting device to prevent operator injury
- Minimum displacement 3000L/min

### 2.7.2 Vacuum cleaner installation

Before installing the vacuum cleaner, please read the installation and operation instructions of the device carefully

✓ Check whether the suction port of the vacuum cleaner matches the bellows (inner diameter 49mm), if not, you need to use an adapter

- ✓ Insert the bellows into the suction port of the vacuum cleaner and make sure the connection is firm
- ✓ Insert the bellows into the suction port of the machine and make sure the connection is firm
- ✓ If you want the machine to automatically switch the vacuum cleaner on and off, you need to connect the device to the vacuum cleaner through a linkage line.

## **2.8 Connect circuit**

- Connect and lock the aviation connector on the cutting machine and the aviation connector on the main engine in sequence and correspondingly through the connecting wire.
- Plug the supplied power cord into the power connector on the console's connection panel.
- Plug the power cord into a grounded and overload protected outlet.

CAUTION: Severe voltage fluctuations can damage the device. Large voltage fluctuations can interrupt the control unit and may cause system failure.

. Plug the device's power cord into a dedicated circuit, or make sure nothing is connected that might cause large voltage fluctuations when powered on.

. If severe voltage fluctuations cannot be avoided, please install a voltage stabilizer to avoid damage to the machine due to severe voltage fluctuations.

## **3. Operating the equipment**

### **3.1 Preparation before operation**

- Ensure that the equipment placement plane is horizontal and stable, not easy to cause vibration or shaking.
- Ensure that all components are properly installed and connected properly.
- Ensure that all spare parts are firmly fixed.
- Ensure that all control systems are installed and operational.

### 3.2 Power on the Equipment

- Ensure the equipment is fully installed and provide sufficient compressed air and close the work door

Note: The working cabin door must be closed when the equipment is started up and running

- Turn on the power switch on the host backplane
- Press the switch button on the host operation panel to start the equipment.
- Homing the equipment, after the control system is fully started, the equipment will start homing automatically.

Only after the return to original action is completed and the reminder window on the display is closed can the next step be performed

### 3.3 Equipment testing

After the first installation or reinstallation (after transportation), the basic performance of the equipment needs to be tested.

- Put the burs into the machine
- Do not install zirconia blocks or wax discs on the fixture, load any program, run the equipment
- Observe whether the equipment is running normally (Tool changing, Blow, each axis movement, etc.)
- Confirm that the equipment has no problems and can be processed normally. If it cannot operate normally, please contact the manufacturer

### 3.4 Overview of milling process Note:

. Before starting the processing, please read the operation manual and safety instructions carefully

. Check the burs and fixture thoroughly for damage before performing the operation. If the bur or fixture is damaged, and the parts may damage the equipment.

. The processing program is “nc” file and is typesetting via CAM software such as “hyperDENT” ; Computational generation, this file contains all the information required for processing. Copy the program into the operating system via USB, or

via the network. Follow the job with NOBILCAM-5X:

- (1) Select the corresponding block size and material type in the hyperdent software for typesetting.
- (2) Insert the burs into the equipment.
- (3) Put the material block into the equipment and clamp it tightly.
- (4) Click the “Load” button to select the program to be run in the program list.
- (5) Click “Start-up” to start the processing.

### 3.5 Insert / replace the burs

- Incorrect burs will damage the spindle's collet or tool magazine.
- The bur needs a sufficiently large chamfer on the shank, otherwise the collet is easily damaged
- Do not use burs with a blade diameter higher than the shank diameter (Ø4mm).

You can insert 10 burs into the tool changer as shown. The equipment can automatically change the burs during the processing.



You can install the burs in two ways:

- Manually insert the burs into the tool magazine.
  - 1. Make the spindle stop at a safe position, enter the second page of the operating system, pinch the middle part of the bur on the spindle with your hands, and click “Loose/Clamp” to take it out
  - 2. Insert the new bur into the spindle, make sure that the bur fixing copper ring (as shown in the picture) is tightly attached to the spindle chuck, and then click the “Loose/Clamp” button to clamp the bur



- 3. Click the “Auto T” button to detect the length of the current new tool and automatically record it into the system.

Note: After the clamping tool is released every time, regardless of whether the bur is replaced with a new one, the length of the tool must be checked, otherwise it will cause damage to the workpiece or even break the tool.

- Through the main axis.
  - 1. Take out the old burs one by one from the tool holder
  - 2. Put the new bur into the corresponding tool seat correctly according to the serial number, and the positioning copper ring should be completely embedded in the tool seat.
  - 3. Confirm the correct placement order and position of the burs.

Note:

- . Do not hit the bur during placement to prevent damage.

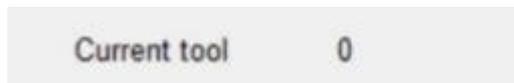
.When the running time exceeds the preset time or the workpiece is damaged, the bur needs to be replaced in time.

.The bur should be replaced in the tool magazine as much as possible, unless the bur on the spindle is damaged and the length cannot be detected.

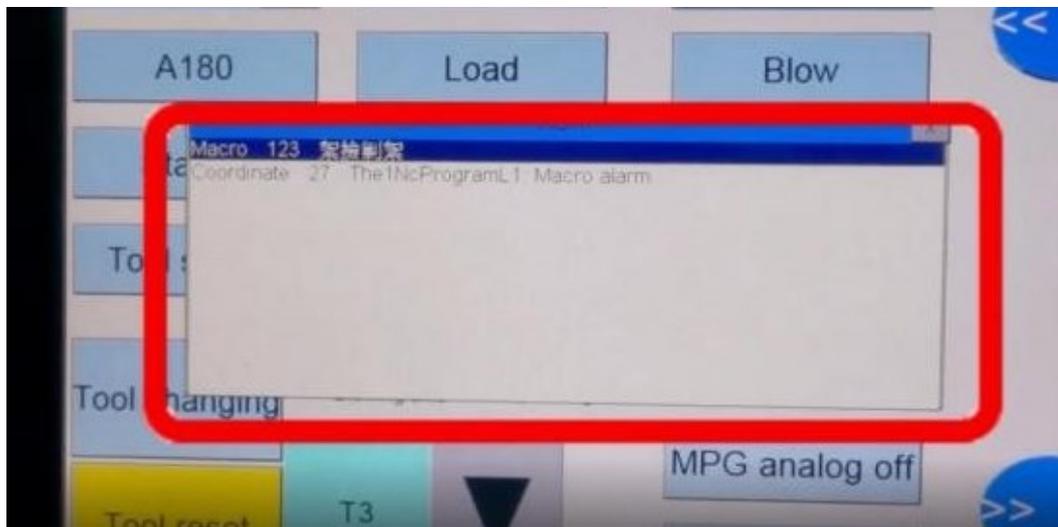
.Burs replacement must be performed by trained personnel who are familiar with the equipment and software.

.The bur must be placed in the corresponding tool holder according to the preset specifications.

.The current system default tool number will be displayed on the operating system. If all burs are put back into the tool magazine normally, the current tool number will be displayed as “0”, as shown in the figure.



.A length check is performed every time the bur is removed or before it is put back in. The length deviation is not can exceed the preset range, if no bur is detected or the length deviation exceeds the range, The system will prompt the following information.



If an error message is encountered by the tool during processing, the program must be restarted after checking the bur or replacing the bur.

### 3.6 Burs information

The table below shows the burs specifications provided by the manufacturer for the NOBILCAM-5X.

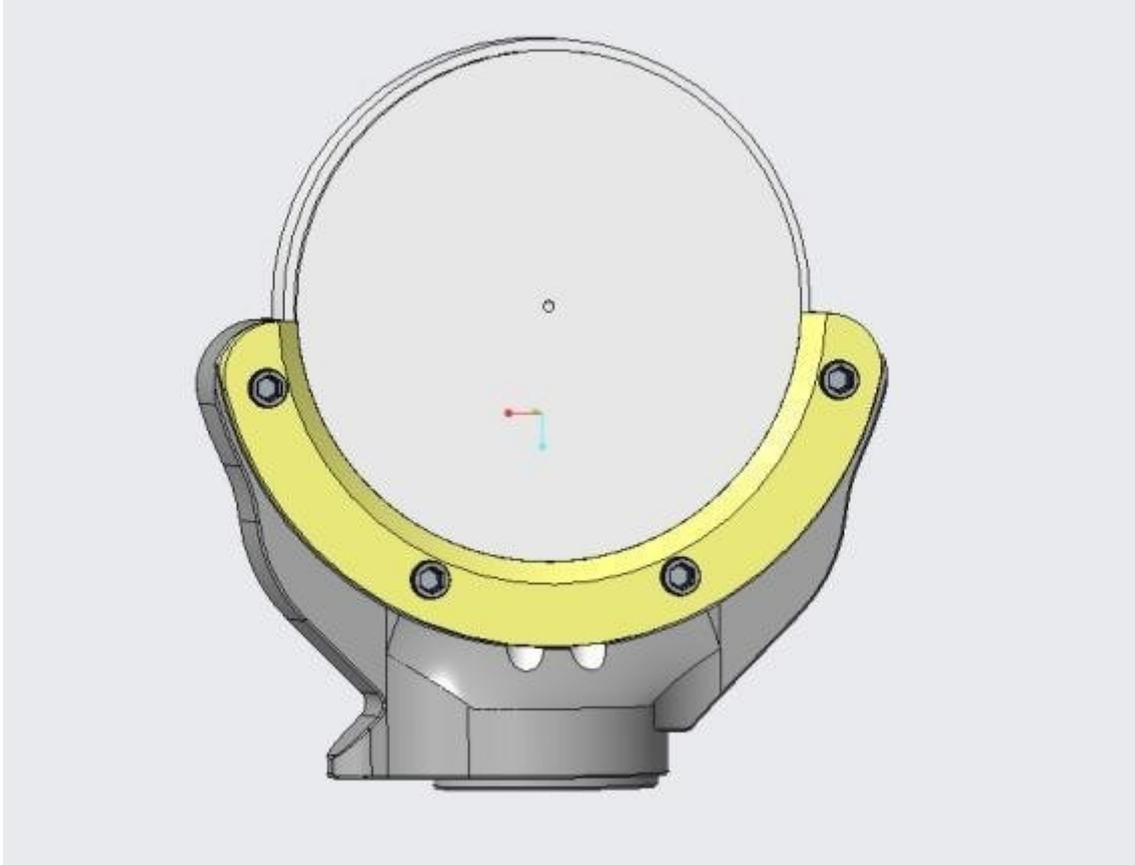
Note: Using non-manufacturer burs for processing may lead to abnormal or even damaged working parts.

The knife number	specifications
T01	ZIR 2.0
T02	ZIR 1.0
T03	ZIR 0.6
T04	1.5R (implant hole milling burs)
T05	PMMA 2.0
T06	PMMA 1.0
T07	PMMA 0.6
T8/T9/T10	Alternate

### 3.7 Install and remove fixture

NOBILCAM-5X fixture is an open opening fixture with material block

installation(As shown below) Installation

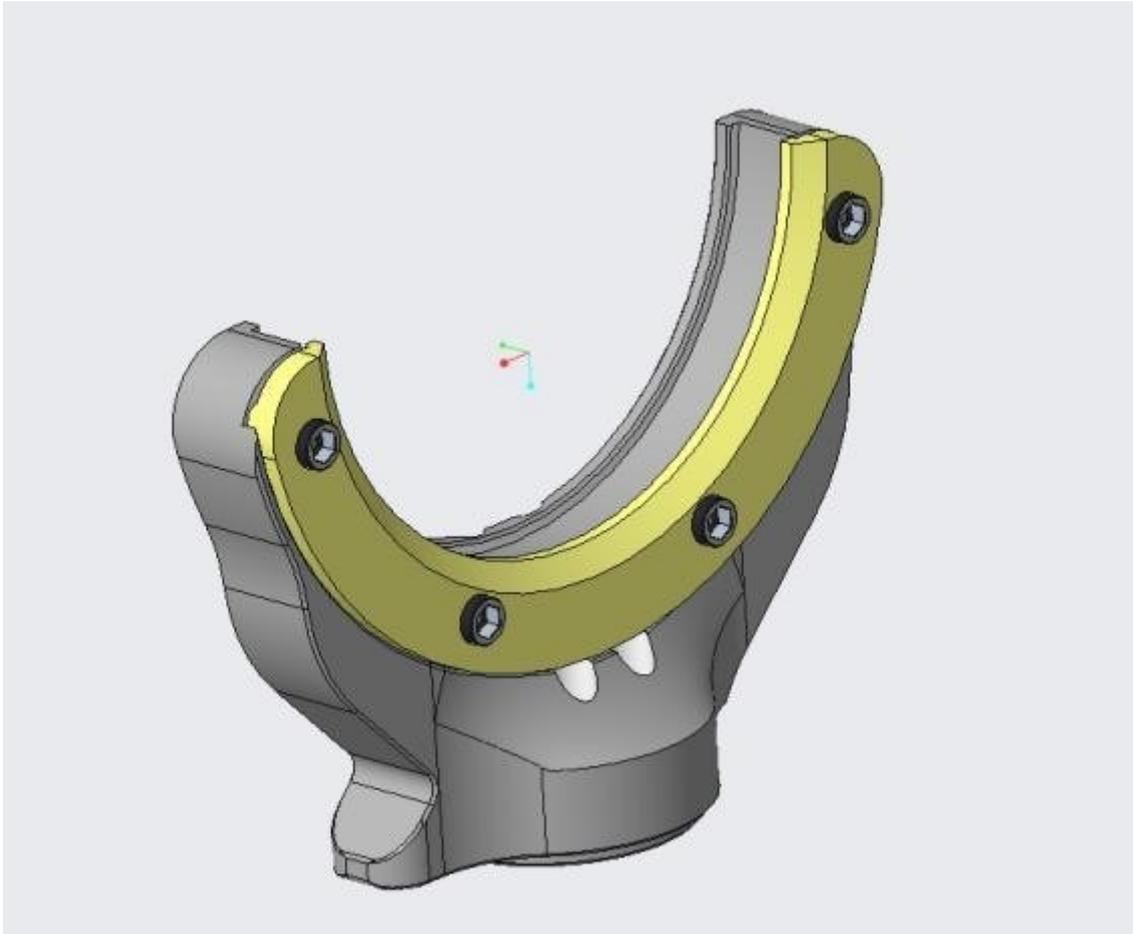


### 3.7.1 Install the material blocks

Section the  $\varnothing 98$  circular block through the fixture as shown in Fixture

- (1) Open the working cabin door and clean up the clamp recess.
- (2) Use a screwdriver to loosen the three screws on the pressure plate.

(3) Put the material block into the fixture and tighten the three fixing screws with a screwdriver, as shown in the figure.



Note: The screws must be tightened. If the material block moves or vibrates during cutting, it may damage the equipment.

### 3.7.2 Remove the material block

To remove the block, simply release the three fixing screws and remove the block

## 3.8 Program interruption and stop

Note: When the program is interrupted or stopped, a corresponding alarm window will pop up on the operating system page.

When the air pressure is insufficient, the program will automatically pause. The program starts automatically when the air pressure is sufficient.

The program must be canceled when:

- When the equipment failure occurs
- When the tool is broken

- During the power failure

If the program is cancelled, it must be restarted in the device

### 3.8.1 What to do when the program is interrupted

If an interruption occurs during program execution, a corresponding message is displayed on the operating system page.

1. Insufficient air pressure is displayed in the device, please check the following:

- . Observe whether the pressure on the pressure regulating filter element and the pressure gauge is within the correct range

- . Whether there is air leakage in the trachea

- . Whether the compressed air pump is normal

### 3.8.2 How to deal with equipment failure

Equipment failures are caused by commands issued by the control unit when an emergency occurs. The operating system page will display error messages and error codes.

If the alarm cannot be eliminated, please record the alarm information in time and contact the after-sales service.

### 3.8.3 How to deal with tool damage

If the tool breaks during processing, the machine cannot recognize it immediately, and the spindle will continue to rotate and cut until the next bur is replaced. Only when measuring the length of the bur, if the measured bur length is wrong, the execution program will report an error, and the error information will be displayed on the operating system page.

Tool breakage can be caused by:

- . The bur is damaged or worn

- . Is the material selected during typesetting consistent with the actual processed material?

- . The bur is misplaced or manually inserted into the spindle at the wrong time, therefore,

This bur is not suitable for further processing in this step, the replacement steps are as follows.

- 1 Open the working chamber

- 2 Take out the damaged bur from the working chamber
- 3 If the spindle is the bur grabbed from the tool magazine, check whether the bur is placed in the correct position. After confirmation is complete, put a new bur in the correct position
- 4 If the bur is manually put into the spindle, check whether the damaged bur is consistent with the bur displayed on the operating system page. Prepare a new correct bur.
- 5 Close the working chamber and restart the procedure.

#### 4.Introduction of operating system page

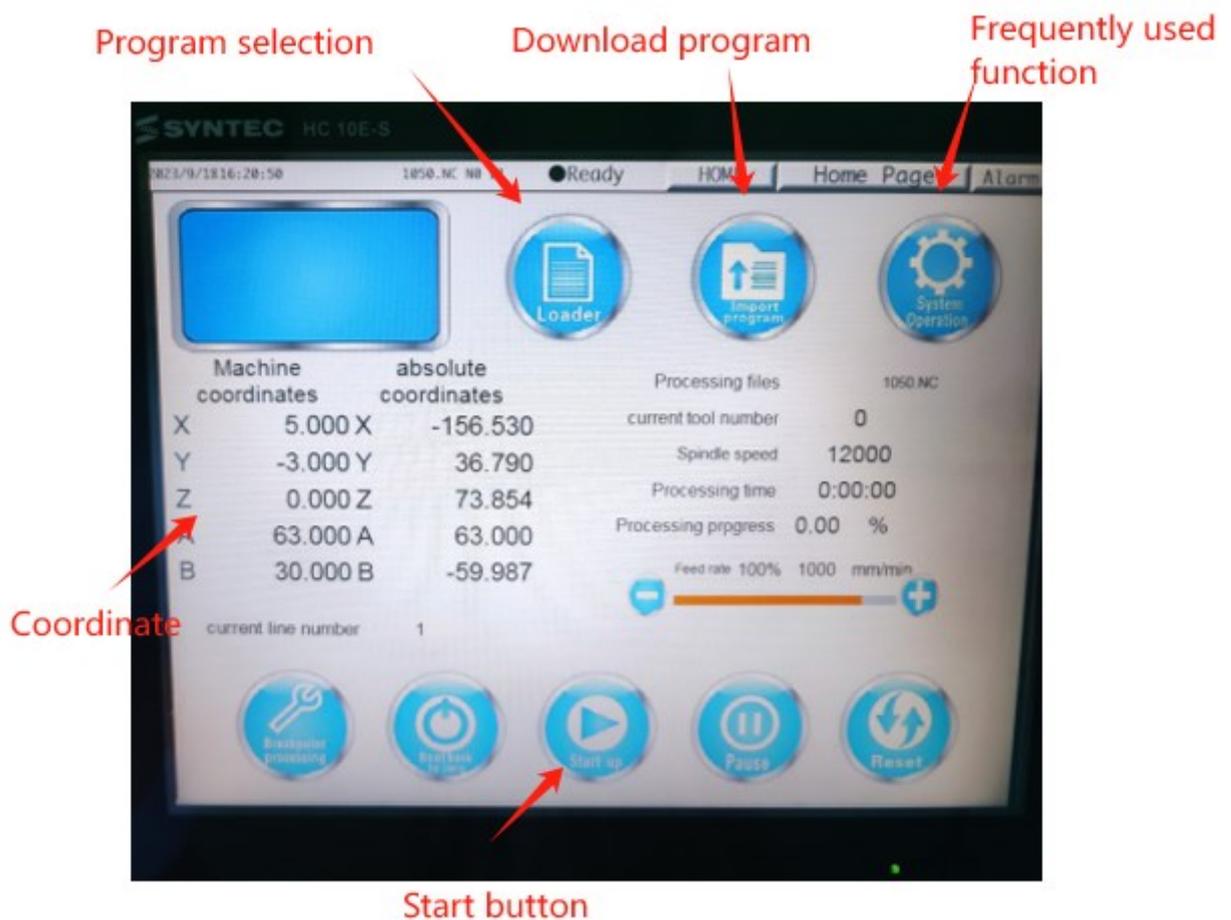


Figure 1 Operating System Page-First page (main page)

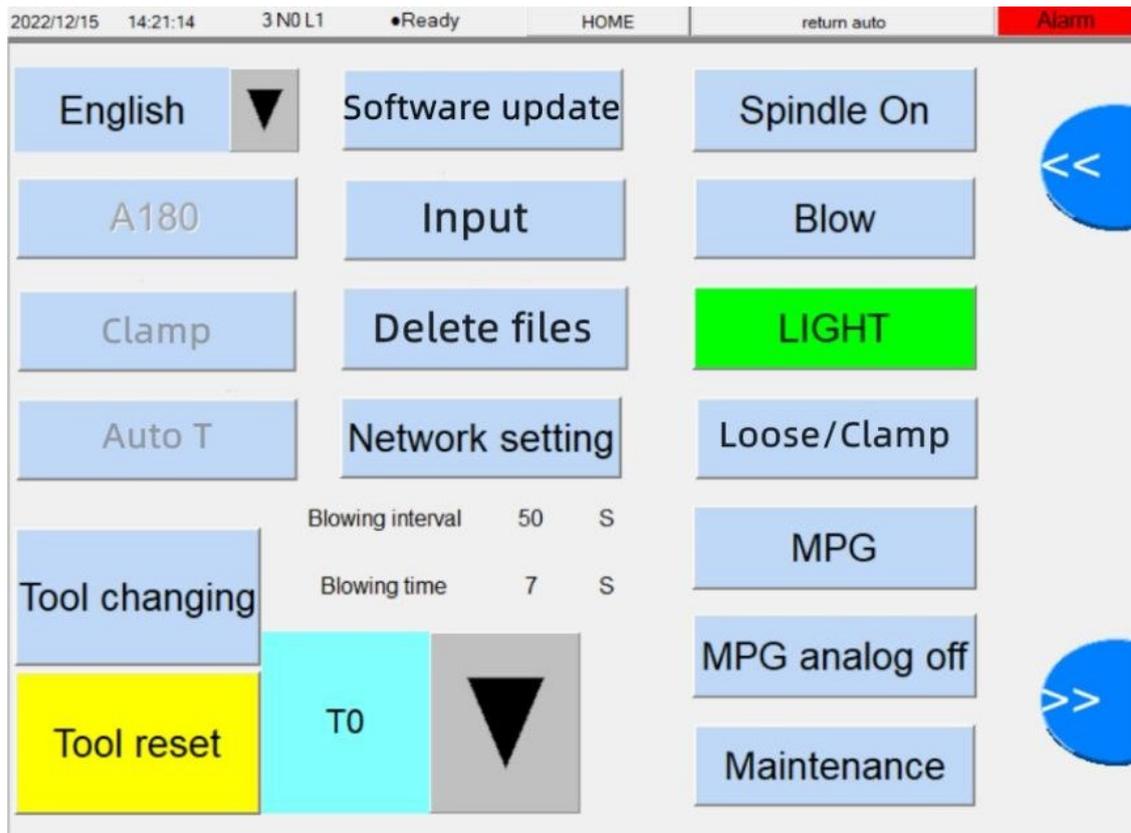
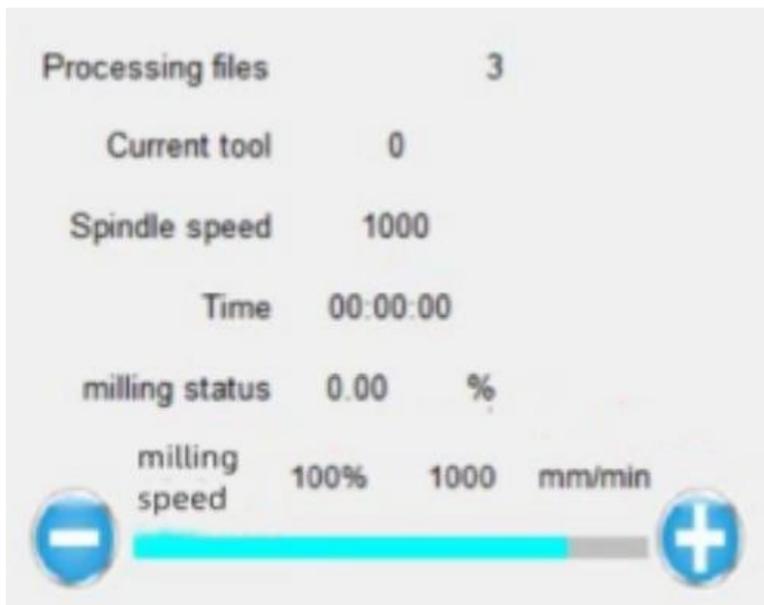


Figure 2 Operating System Page-Second page2(auxiliary page)

#### 4.1 Status Display



Status Display Window - Main Display

- The current program

A program that is currently being copied into the operating system and is being

executed

● situation display

State	Pigment
In the processing	Green
alarm	Red
Processing completed	Green&Red

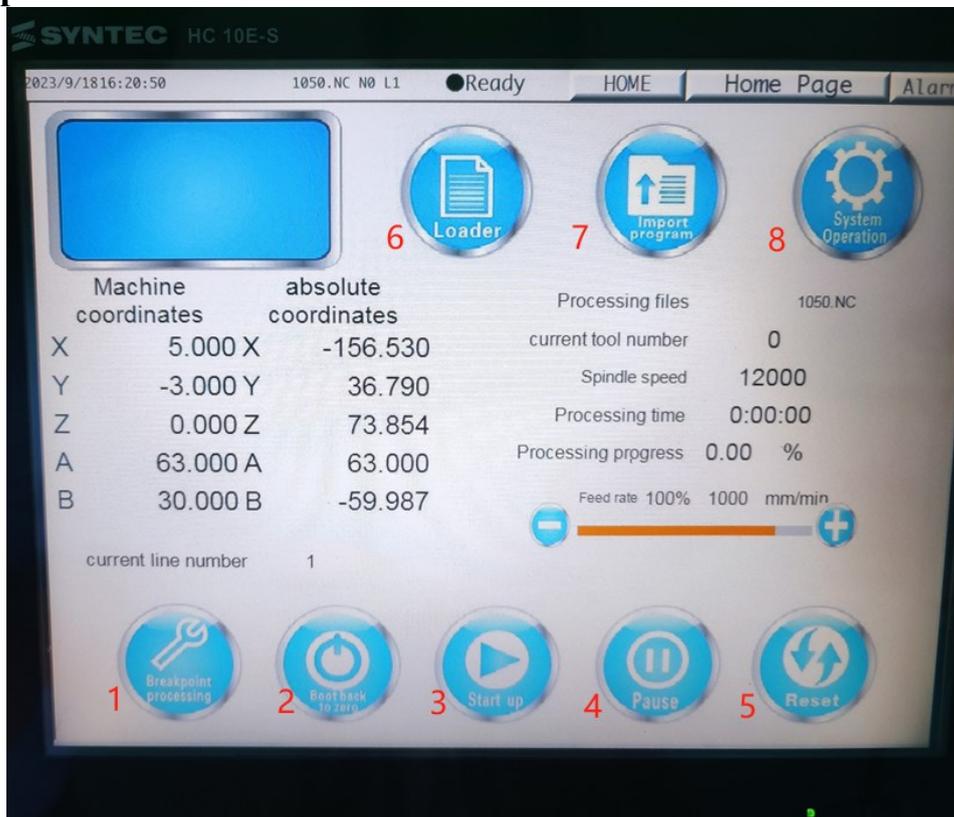
● process time

The processing program has been run for some time

● Current Tool number

The tool number held by the current spindle clamp (not clamped appears as “0”)

**4.2 Explanation of Button function**



(Page 1)

1. The Breakpoint Process.

Use this function to continue processing after normal stop during processing.

2. Turn on the power and return to the original position.

3. After the loading is complete, click the “Start-up” button for the device to start running the machining program automatically.

4. Pause a running program. If you need to stop, click the “Pause” button. After completing the operation, click “Start-up” to run the program again.

Note: The “pause” button can only temporarily stop the movement of the motion axis, can not stop the spindle rotation move!

5. Reset all current alarm conditions and restore the device to its original state. During the program running, click “Reset” to completely stop the program running.

Note: After clicking the “Reset” button, the spindle rotation stops slowly, so be sure to stop before opening the door for the next operation.

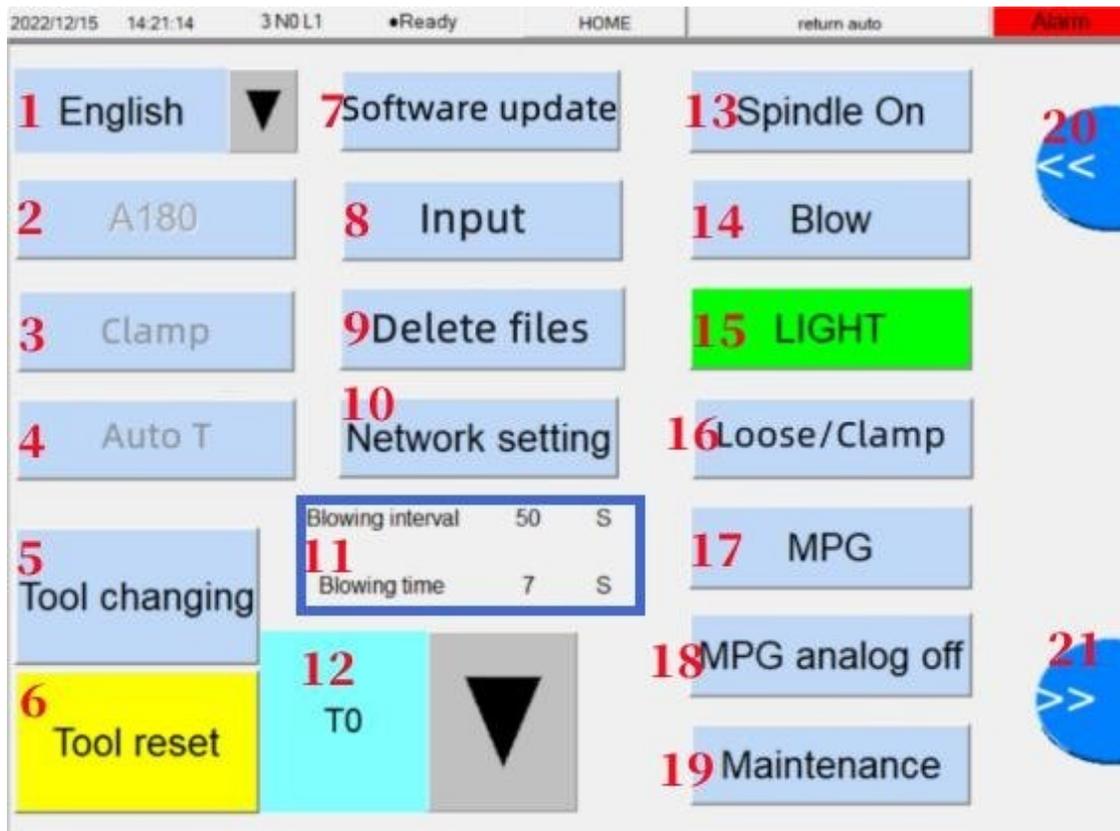
If the condition is serious to terminate the equipment immediately, use the Emergency Stop switch.

6. Load

Click the “Load” button on the screen to select the pending program. All programs in the system can be displayed in the open list, and the default format is the NC file.

7. “Input” :When using USB to copy the program, click the “Input” button and select the program to be copied from the list on the left side of the pop-up window; Enter the program.

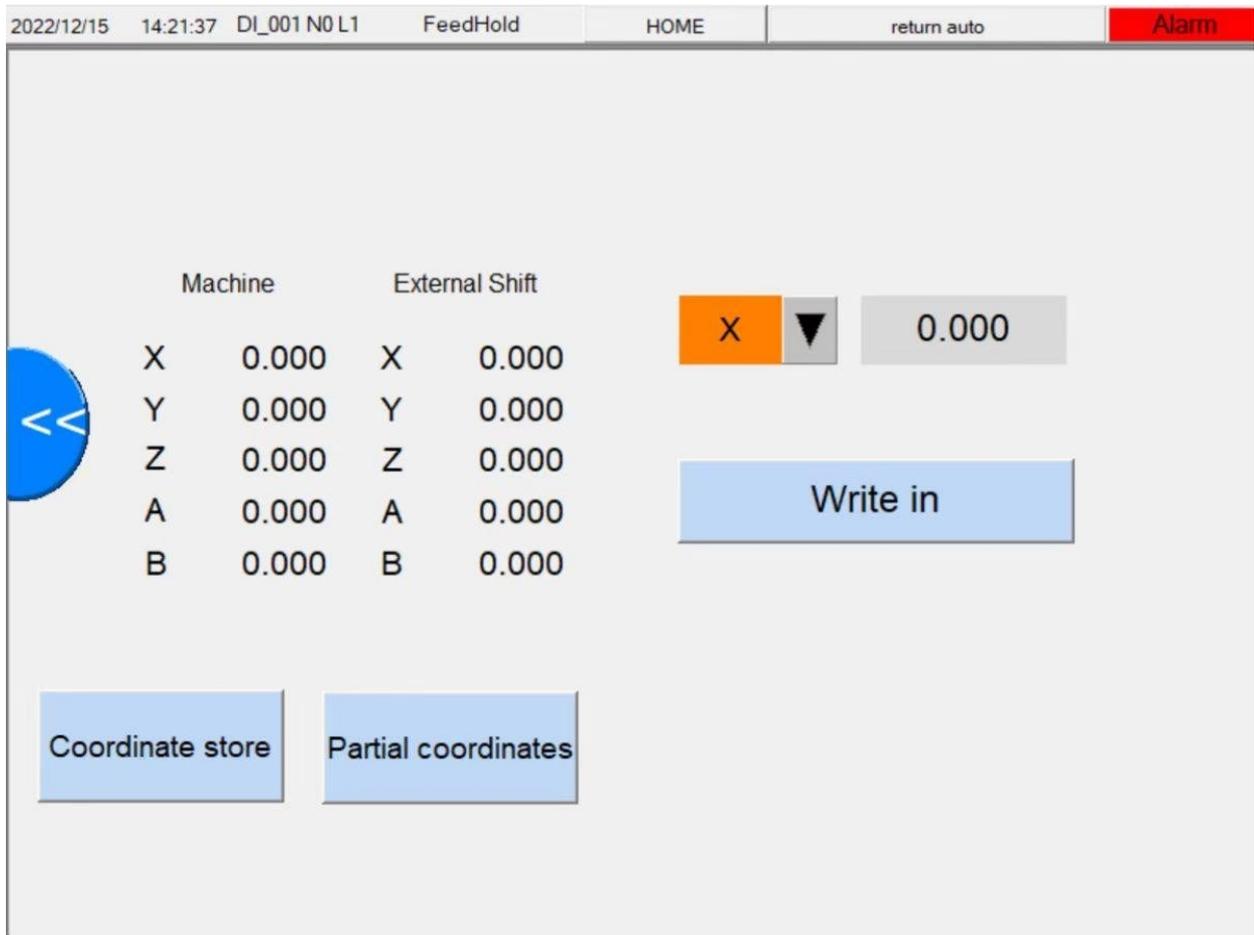
8. “System operation”:Page turning function button



**(Page 2)**

1. Language selection (English, Chinese, Russian, Spanish)
2. A180 : ( Displays the main axis angle )
3. “Clamp” :Click Run to move the fixture spindle to given coordinates to facilitate the clamping operation  
Note:Enter Clamp,Click “P1” to move the spindle to a safe position, rotate axis B to 0° position, and select axis A to 0° position
4. Click the “Auto T” button to detect the tool length of the bur on the current spindle and record it into the system
5. “Tool changing” :Manually change the tool, and automatically complete the function of changing the tool.Replace burs (7 burs T1/T2/T3/T4/T5/T6/T7 can be selected)
6. Preset function, all tools are placed in the magazine tools and each working axis returns to a safe position.
7. Installing the program
8. import procedure

9. When the system stores too many files to be deleted, click the “Delete files” button and select the files to be deleted in the pop-up window
10. When the device is connected to the network, you need to enter the “Network Settings” interface and manually match the correct IP address and gateway so that you can transfer nc files over the network.
11. Click the “Blow” button to manually open the spindle blow valve and click again
12. Shop of milling tools
13. Turn on the spindle rotation manually.
14. The spindle blows up the manual switch
15. Operating display indicator light (\*red indicates failure alarm states \*green indicates normal processing state \*yellow and green flashing indicates the completion of the processing program)
16. “Loose/Clamp” :Spindle three-valve spring pine clip switch
17. This function is only valid for manufacturers
18. This function is only valid for manufacturers
19. Device authority management
20. Previous page
21. Next page



## 1. Coordinate

Store the coordinates set by the current equipment, or recall the previously archived coordinates through this function when the equipment deviates.

## 2. Outer Coordinate Modification Ribbon.

Select the axis to be modified, enter the coordinate value, and click Execute Write to overwrite the original coordinate



### 4.3. Coordinate display area.

Displays the current mechanical coordinates and the set external deviation coordinates.

### 4.4 Tool position.

Click to open the cutter base coordinate setting interface.

## 5. Equipment maintenance and cleaning

### 5.1 Safety note

Notice!

Regular maintenance can ensure the processing quality of the equipment and prolong the service life of the machine.

Make sure each axis is in a safe position, turn off the power, and unplug the power cord before servicing and maintenance.

Warn!

For a short time after the power is turned off, the electronic

components will still be partially charged, so wait a few minutes after turning off the power to ensure full discharge.

Notice!

Clean the device with a damp cloth and, if necessary, a suitable cleaning agent. Do not use with abrasive detergents or those containing corrosive ingredients to rubber.

All operations must be professionally trained and qualified to carry out. Before working on the pneumatic system, make sure that it is turned off and that the air pressure in the entire passage has been reduced to normal.

## **5.2 Accessory replacement**

Warning!

The use of non-manufactured or unsuitable accessories can put operators at risk and may result in equipment damage or even complete inoperability.

Therefore, only use original accessories provided by the manufacturer or accessories authorized by the manufacturer.

If you have any questions, please contact the manufacturer's customer service

## **5.3 Routine cleaning**

1. Routine cleaning extends the life of individual parts and avoids failures caused by debris

2. Regular cleaning extends the service life of the equipment.

3. Clean the plastic parts with a suitable liquid cleaner. It is not recommended to use an air gun to clean the interior to prevent dust and other debris from entering the mechanical parts and causing damage.

## **5.4 Material fixture cleaning**

When placing the materials, make sure the clamps and screws are clean to achieve the best grip state.

## **5.5 Clean tool library and tool**

The tool library and the tool shall be free of chips and other debris to ensure accurate length detection and replacement of the tool.

In case of damage , contact the manufacturer immediately.

## 5.6 Cleaning of the spindle clamp

1. Do not spray oil spray and compressed air directly on the spindle head, which may penetrate these substances into the spindle bearing, affect the spindle rotation or cause bearing damage

2. The spindle chuck and the inserted bur must be clean, otherwise impurities entering the spindle will increase the rotation resistance of the spindle and affect the concentricity of the rotation.

3. Normal cleaning cycle of the spindle clamp is weekly. The spindle clip should also be cleaned when the pin is damaged due to impact.

Note: Be sure to use special tools to take up and put the spindle clip, as shown.



Figure :Spindle chuck hexagon wrench Warn!

Do not close the spindle chuck when the chuck is not in the spindle. Spinning the spindle without a collet can damage the spindle. Also keep a bur on the collet at all times.

4. Cleaning of spindle clip:

- a. Equipment returns to safe position
- b. Ensures that the spindle is not rotating.
- c. Uses a special tool to remove the spindle clip.
- d. Clean the clip head mounting hole
- e. Cleans the clip with small brushes to ensure that the clip head is free of impurities.
- d. Position the clean clip back on the spindle to ensure tightening in place.

## 5.7 Check hoses, cables and connections

1. Power off the equipment and cut off the compressed air supply
2. Check the hose and cable to ensure that the connection is normal
3. If there is damage, please do not restart the device. Replace damaged cables and hoses immediately with spare parts.
4. Make sure that the connections on the connection board are firm and not loose
5. Reinsert loose cables and hoses into the appropriate connections. If the connection is damaged, stop using the device immediately. Contact after-sales service immediately.

## **5.8 Check the pressure regulator filter**

Caution: Contamination of the regulator filter may result in equipment damage.

- ① Check the pressure regulator filter for contamination weekly.
- ② If there is moisture, oil or other solid particles inside, please stop using the device.

### **5.8.1 Check the regulator filter for condensation**

Condensation in the pressure regulating filter usually indicates that the compressed air is not dry enough.

1. Check whether water, oil or solid particles have accumulated in the water separator. If it contains the above substances, please stop using the machine immediately and proceed to the next step.
2. Check whether the compressed air supply end meets the equipment operation. Stop using the machine until the requirements are met.
3. Pull down the pressure regulating filter drainer to discharge impurities.

## **5.9 Maintenance of screw and guide rail**

Regular maintenance of the screw and guide rail helps to maintain the machining accuracy of the equipment and prolong the service life of the equipment

- ① Turn off the power of the device.
- ② Remove the fixing screw of the pressure regulating filter and take

off the pressure regulating filter, as shown in the figure.

③ Remove the screws of the side cover and rear cover of the device, and remove the two covers, as shown in the figure.



Figure: Remove of equipment cover plate

④ Use a vacuum cleaner to clean up the dust inside the equipment; use a clean paper towel to wipe off the stains on the screw rod and guide rail.

⑤ Apply grease evenly to the surface of the wiped lead screw and guide rail.

⑥ Install the removed cover plate and pressure regulating filter back to the device.

If there is any problem during the maintenance process, please contact the after-sales service in time.

## 5.10 Maintenance schedule

Maintenance Items	Cycle Periods
Clean work cabin, knife instrument, knife library, and burs	Everyday
Clean up the spindle clip	Weekly
Pressure regulating filter	Weekly
Clean rods and guide rails	Every six months
Machine tool calibration	If necessary

## 5.11 Equipment calibration

The device is calibrated at the factory. As long as the machining result is

flawless, no calibration is required. Calibration takes time and, if done incorrectly, can lead to worst case damage to the device.

If the processing result is not satisfactory, please adjust the working conditions first: check the fixation of the work piece, the state of the bur or the processing material;

Please contact the supplier before calibrating the equipment; During calibration, great care must be taken when measuring and entering data.

When in doubt, stop calibration.

## NOBILCAM-5X Milling Machine

