CNC Milling Machine

BSM-400DW

Operating Instructions

V2-20230705 Updated

Content

Preface

Dear Customer:

Thank you for choosing the universal dry and wet milling machine BSM-400DW from Chengdu Besmile Biotechnology Co.,Ltd. (abbreviated as BSM hereafter). BSM is a dedicated manufacturer of dental cad/cam materials, equipment and solutions. All of our BSM products are manufactured in-house.

With our own R&D team to develop the CNC milling machines and many years of experience in milling equipment manufacturing, BSM 400DW integrates advanced 4-axis technology and cutting-edge CAM software within the equipment to ensure its high precision, efficiency and reliability. In order to achieve the best milling results, please **carefully read this operation instruction** before using this machine.

> ***Precautions:**
> - The installation environment should **BE FREE OF** any steam and corrosive or combustible gas.
> - **DO NOT** connect the three-phase 220V or 380V power supply to the machine to avoid damage of the internal components or cause any physical injury.
> - The grounding works must be correctly implemented in accordance with the current national relevant electrical code.

> ***Please pay attention to the following warning symbols:**

 This symbol is indicated to remind that the operation may fail or an instruct may not be performed. Note these instructions on the equipment and take careful operations.

 This symbol indicates a potential risks and danger to life and limb,or to the serious damage of the equipment. Extra precautions need to be taken during operation.

If you have other questions, please contact BSM/BSM local dealers.

*Statement

1) BSM-400DW is recommended to mill the materials indicated in chapter 1.1. Other types of materials are not recommended to be processed on the equipment, otherwise BSM will not bear the responsibility for the equipment damage therefore incurred.

2) Without the consent and permission of BSM, it is strictly forbidden to disassemble the external and internal parts and electrical accessories of the equipment, otherwise BSM will not bear the responsibility for the equipment damage therefore incurred.

3) This machine is assembled with precision electronic components, which requires cleanliness of the air source. The milling machine will be equipped with a triple air filter when it was shipped and installed. In order to increase the stability and lifespan of the equipment, please ensure the cleanliness of the air source and install the air filter as required.

Chapter 1 Introduction/Description of the Equipment

删除[Seline]:

1.1 Introduction of the Equipment

BSM-400DW is a 4-axis universal dental grinding and milling machine, designed for digital dental CAD/CAM solutions. This machine adopts the most advanced 4-axis technology and cutting-edge CAM software with high precision, efficiency, reliability and intelligence. Mastering dry milling and wet grinding, it meets your versatile material milling needs including zirconia blocks, glass ceramics,and titanium premills.

1.1.1Technical Data

Dimension(W*D*H)	665*440*590mm	Weight	60Kg
Fields of application	Dry milling and wet grinding	Number of axes	4
Spindle power	500W	Spindle speed	Up to 80000 RPM
Cooling system	Air cooling	Voltage/Rated power	220V/0.8KW
Milling accuracy	±0.01mm	Milling scope	A axis: the front and the reverse milling
Touch screen control	LCD touch screen	Remote assistance	Positive
Buil-in burs	6	Automatic tool changer	Positive
Millable Materials	Zirconia blocks, glass ceramics,and titanium premills.		
Burs type	Tool kit for glass ceramic 2.5mm 1.0mm 0.6mm Tool kit for metal material 3.0mm 2.0mm 1.0mm Tool kit for zirconia 2.0mm 1.0mm 0.6mm		
Single processing quantity	Glass ceramic 3 units/Titanium premill 2 units/Zirconia block 3 units		
Dimension of material in block	Glass ceramic: 18.5*14.9*12.5mm, 40*15*14mm Zirconia block: 20*19*15.5mm, 39*19*11.5mm		
Environment Temperature	5℃-40℃	Air pressure	0.65MPa

1.1.2Axes Data

X route	145mm	Y route	100mm	Z route	90mm
Repetition accuracy	0.005mm	Positioning accuracy	0.02mm	A-axis rotation range	0°~360°

1.2 Description of the Equipment

1.2.1 Description of the Nameplate

"No." indicates the **Manufacturing Number.**

It is generally composed of :Model of the equipment+Version+Manufacturing Date(Year-Month-Date)+ Manufacturing Serial No.

For example: Manufacturing No:BSM400DW W 180818 0001

Model of the equipment   BSM 400DW

Version W

Manufacturing Date:180818

Manufacturing Serial No. 0001

1.2.2 Description of the Equipment
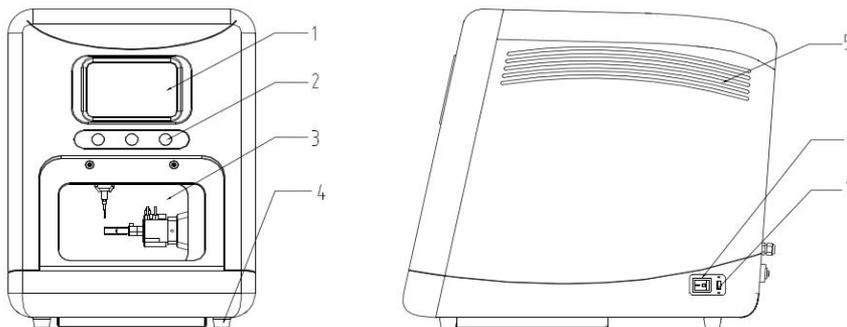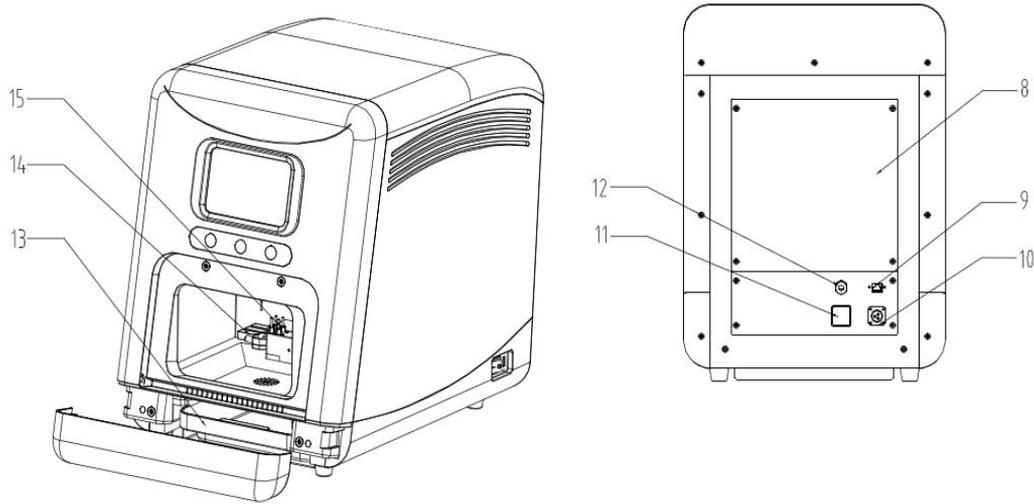
1. LED touch screen : to operate the machine

2. Operation button: to start, reset, pause and operate the machine；

3. Visual window: to observe the running status of the machine；

4. Supporting base: to support the machine and prevent jitter during processing

5. Heat dissipation hole: for electrical heat dissipation

6. Power button: to control the power supply

7. USB port：for program import and export；

8. Back cover

9. Ethernet transmission connector；

10. Power connector

11．Pressure switch: to display barometric number

12. Air source inlet

13. Water tank：to collect and filter milling fluid；

14. Fixture: for workpiece clamping；

15. Tool Library

Chapter 2 Installing

2.1 Checking Before Unpacking

Please **CHECK** if there are any visible damages **ON THE PACKAGE** before unpacking. Please contact BSM/BSM local dealers if any damages spotted.

2.2 Handling And Storage

- **Handling**

Please use a lift truck or forklift to transport. Do not lift the machine packing box directly with both hands to avoid personal injury. When moving the whole machine, please move the bottom plate of the whole machine instead of the casing and movable door. It is strictly forbidden to push and pull the machine casing on the ground to move it.

- **Storage**

Before installation and commissioning of this machine, please put the machine in the packing box. If the machine is not used temporarily, in order to ensure the machine to meet the scope of the company's warranty and is convenient for maintenance, the following items must be paid attention to when storing:

- It must be placed in a dust-free and dry position；
- The storage temperature must be between 0°C and 40°C；
- It must be placed in a non-corrosive gas and liquid environment；
- When stacking machines, strictly follow the instructions on the packing cases

2.3 Installing Environment

- **Selecting the location**

When selecting the appropriate location, please pay attention to following precautions. (Otherwise, the machine may not be covered by our warranty or affect maintenance.)
1)You need to install this machine in the place
- ✓ **Without** a lot of heating equipment
- ✓ **Without** water, droplets, steam, dust and oil dust, flammable gas and liquid
- ✓ **Without** floating dust and metal particles
- ✓ **Without** vibration and electromagnetic noise

2) The temperature and humidity of the machine installation site shall not exceed the range specified in the specification.

- **Basic requirement:**

Please pay attention to the following matters to ensure the product comply with the warranty and future maintenance:
- ✓ **Power**   Single-phase 220V/ 50Hz
- ✓ **Table** The machine must be placed on the table level, stable and able to borne it.
- ✓ **Temperature**   5℃ to 40℃
- ✓ **Relative Humidity** 10% - 80% (without moisture or condensation)
- ✓ **MORE THAN 40CM** space around the machine to ensure heat dissipation
- ✓ **KEEP AWAY** from vibration sources or high frequency transmitters (such as ultrasonic waves).
- ✓ **KEEP AWAY** from combustion source, inflammable and explosive products, corrosive gas or liquid.

- **For long time running**

It is recommended to operate at an ambient temperature below 40 °C for a long time to ensure the reliable performance of machine components. If the temperature exceeds 40 °C, place it in a well-ventilated or air-conditioned place.

2.4 Installing

STEP ONE   Unpacking

Please unpack as following steps:
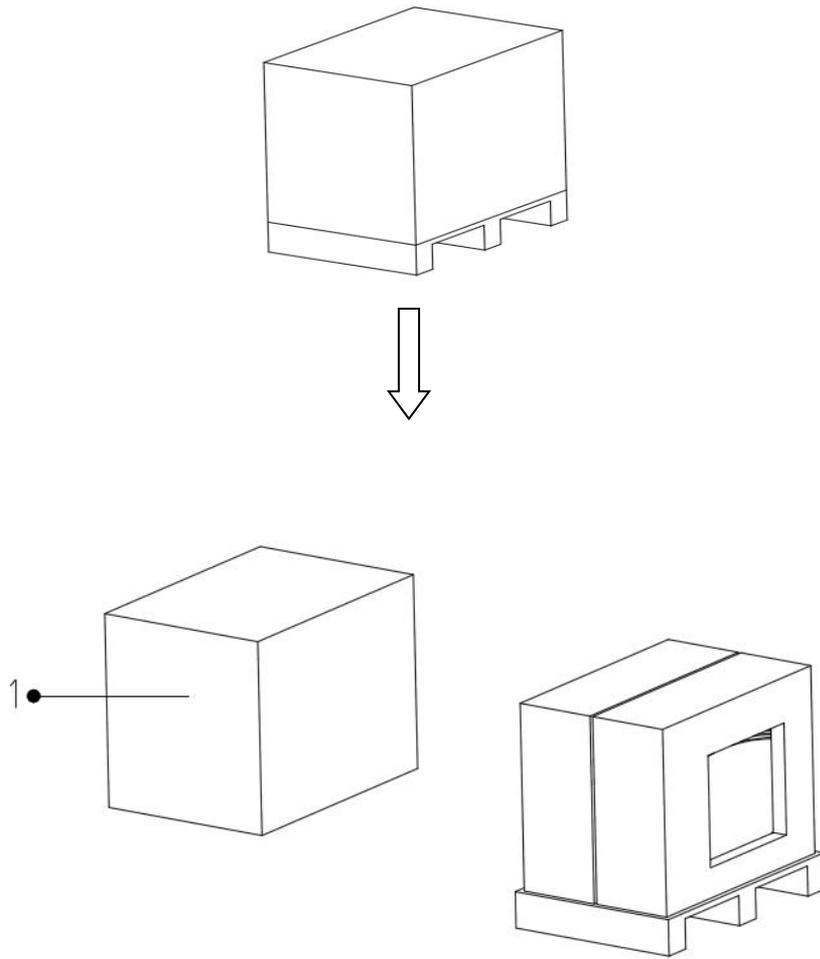
- ✓ Remove the box and pearl cotton EPE.
- ✓ Lift the 400DW from the box and placed it in a level and stable location.
- ✓ Remove the foam covering from the machine.

STEP TWO   Checking before installing

Each BSM-400DW is subject to strict quality control and enhanced anti-collision packaging before leaving the factory. After unpacking, you need to check following items:

- ■ **Appearance Checking**
  - • Check if there are striae or cracks on the LCD touch screen panel;
  - • Check whether the product model on the machine nameplate is the purchased one;
  - • Check if there are scratches or loose screws.
- ■ **Accessories Checking**

Please refer to the following list to check the attached accessories:

Product Name	Specification	Quantity
CNC Milling Machine BSM-400DW	/	1
Cooling water tank	/	1
T hex wrench	M4	1
Power cord	/	1
User Manual	/	1
Air tube	1.5m	1
CAD software	/	1
Milling burs	3mm Diamond ball cutter	1
	2mm Diamond ball cutter	1
	1mm Diamond ball cutter	1
	2.5mm Bistrique	1
	1.0mm Bistrique	1
	0.6mm Bistrique	1
Tool for spindle chuck	/	1
Connector	φ8	2
Reducing joint	φ8 to φ6	2
T-joint	φ8	2
Hex screw	M4×10	12
	M4×16	6
	M4×20	6
Air source processor (Installed on the machine)	/	1
USB disk	/	1
Test Wood (For trial milling)	/	3
Titanium premill (For trial milling)	/	3

STEP THREE   Removing limit accessories

Place the 400DW main body on a level and stable location, take out the transport fixing accessories. In order to prevent collisions during transportation, the X, Y, and Z axes of the machine are fixed at the limit when leaving the factory:

✓ Open the front cover.

✓ Remove the X and axe retainer① and then remove Z axe retainer② in order

✓ Remove all the retainers, and close the front cover.
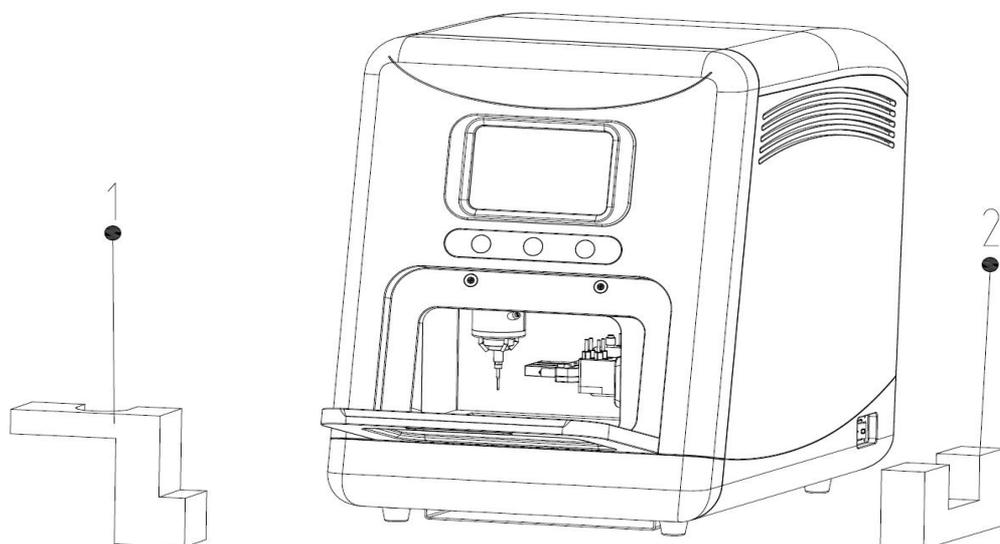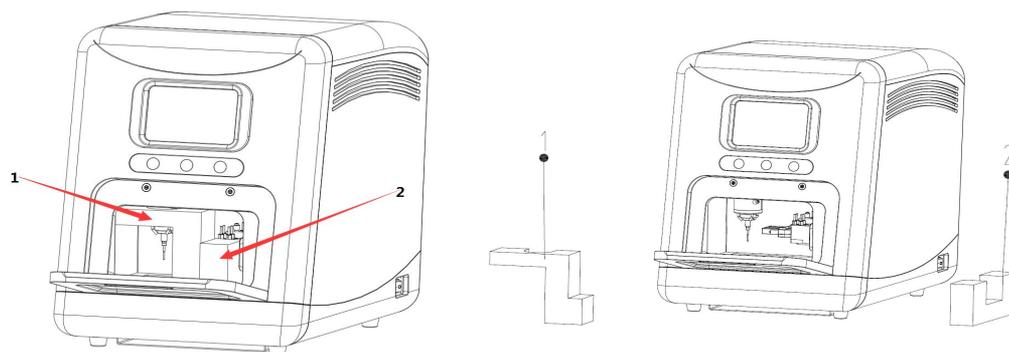
STEP FOUR   Cable and cord connecting

Connect the power cord, air supply system and vacuum system as required.
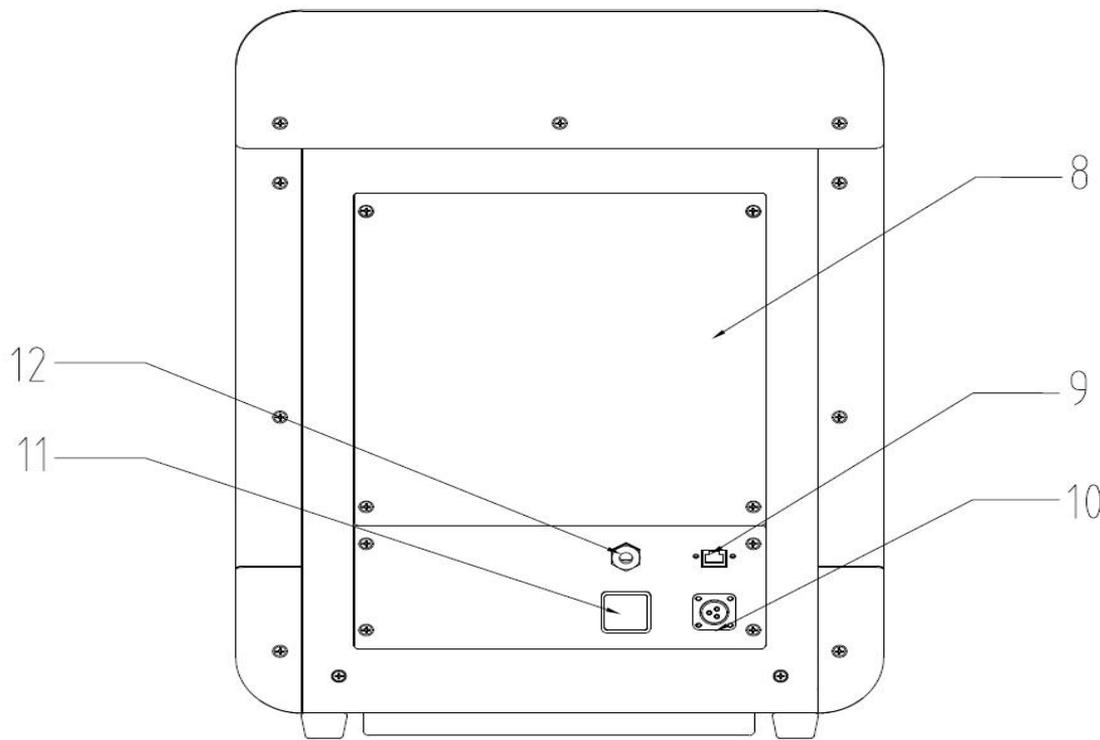
✓ **Power connection**: Connect the single-phase 220v, 50hz power to the No.10 aviation socket through the power cable.

✓ **Tracheal connection**: Connect 0.8 Mpa pressure, dry air to the machine through No.12.

2.5 Precautions before Run-in

If the product is checked correctly, please pay attention to the following items before turning on the power, otherwise it will cause irresistible machine damage

Before switching on the power, please make sure whether the air hose is unobstructed and whether the air pressure is within the fixed air pressure range, Otherwise, the tool cannot be changed during the operation, or the knife collision will occur.

Place the machine in a stable and level location, without doing so may cause injury.

Make sure the air pressure switch and steam separator are functioning properly before turning the power on. Make sure compressed air with

the appropriate pressure: 0.5 MPa to 0.8 MPa to ensure adequate air pressure for switching milling burs and to prevent machine damage lead by milling burs collision.)

DANGER Do not rotate holder and XYZ axis with your hand before the power is off (doing so may cause zero offset, loss of accuracy, and severe cases may cause damage to the machine.)

DANGER Do not open the dust cover when the machine is operating otherwise it might cause injury. Press Emergency Stop button if there is an emergency.

DANGER When an unexpected interruption occurred during process, if not to select a breakpoint to continue processing, must press the reset button to reset the processing program to its initial state. Otherwise, processing errors are prone to occur, and serious situations may cause collisions and damage the machine.

DANGER Reasonable wiring for air inlet and outlet.

WARNING Make sure everything is back to the original position before stating the system, otherwise the machine will not execute tasks.

WARNING After starting the machine, make sure the spindle unit is in a safe position (normally it should stay at the mechanical origin point). If it is not at the mechanical origin point, please enter manual mode and select continuous operation to move it to the mechanical origin point. And then, you can manage it in origin point. (Notes: If this operation is not followed, the spindle unit is likely to collide with the hard limit, it may result in accuracy losing, or mechanical damage.)

WARNING Please check milling burs with the corresponding tool number after switching on power, whether they are placed in the tool changer accurately.

Chapter 3 Operation

3.1 Preparing Jobs

■ **Activating the machine**

You need to activate the machine when it is first used or after the expiration of the machine's usage period:

    1) After powering on the machine, enter the **Registration Code** provided by the manufacturer in the machine registration dialog box that pops up;

    2）Restart the machine to complete activating

■ **Air pressure checking：**

    1) Check the pressure switch.

    2) Check the pressure gauge on the air-water separator to make sure the air pressure is above 0.65 MPA.

    3) If the air pressure is lower than 0.65MPA, please check whether the air compressor is working properly or replace the larger storage tank.

■ **Screen checking：**

You need to check if the screen indicates an alarm message. If there is an alarm prompt, please refer to ***Chapter 5 Troubleshooting*** to deal with it.

■ **Tool magazine checking：**

You need to check whether the tool is placed in the tool magazine, and whether sequence is right. The tool serial number is as follows:
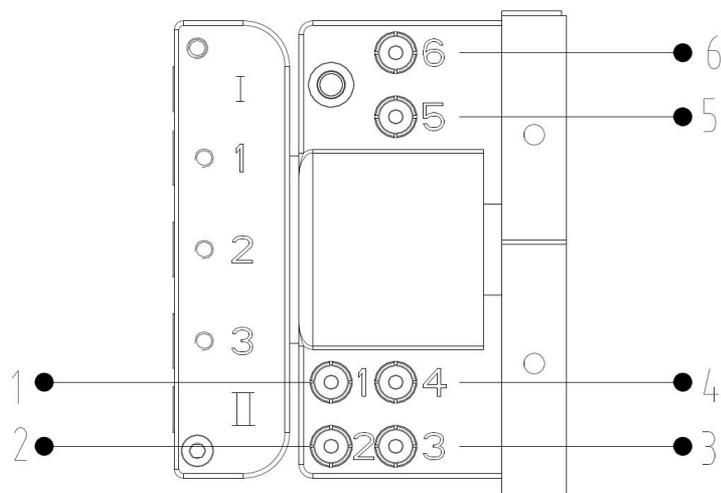
    1：1#: Place 3mm ball milling tool

2: 2#: Place 2mm ball milling tool

3: 3#: Place 1mm ball milling tool

4：4#: Place 2.5mm glass ceramic milling tool

5：5#: Place 1.0mm glass ceramic milling tool

6：6#: Place 0.6mm glass ceramic milling tool

Note: If there is no tool in the magazine, insert the tools in the order shown above.

- **Spindle checking：**

You need to check that the tool on the spindle matches the tool serial number displayed by the system.
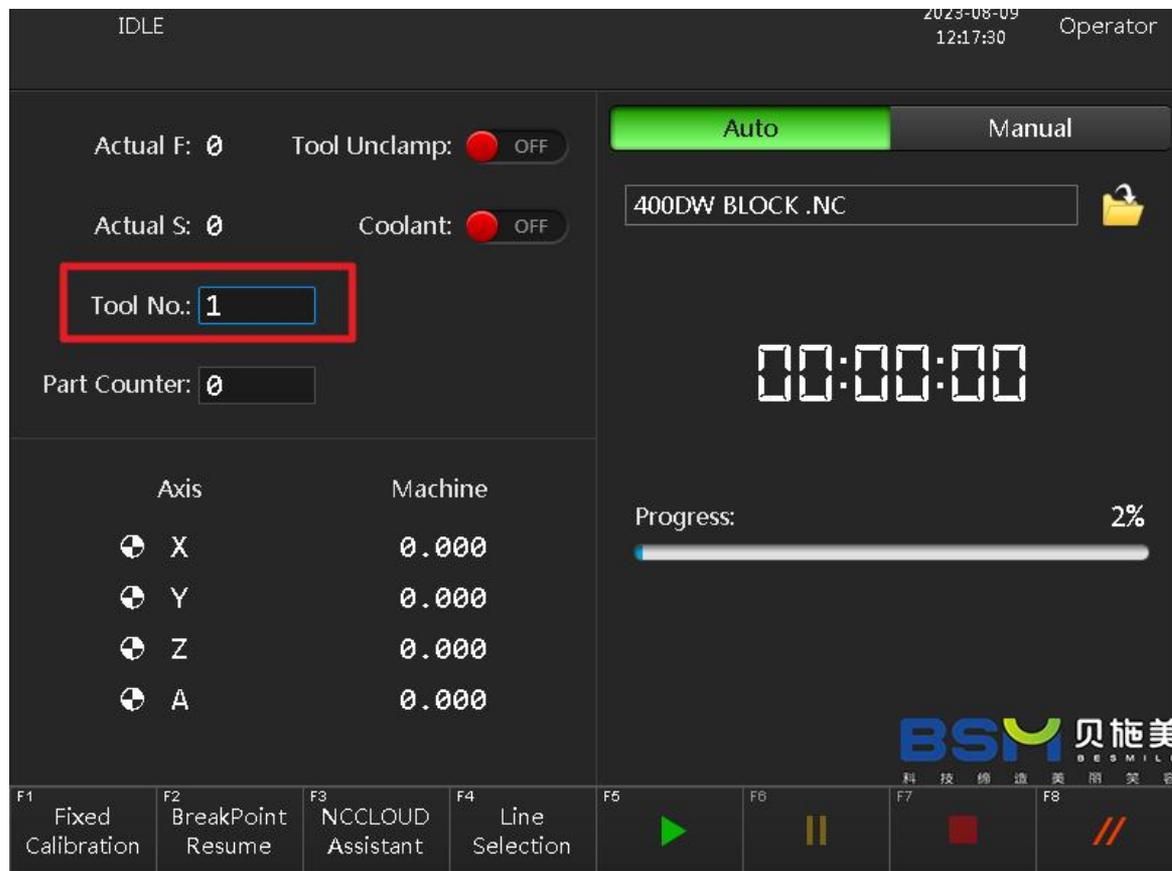
Fig.1
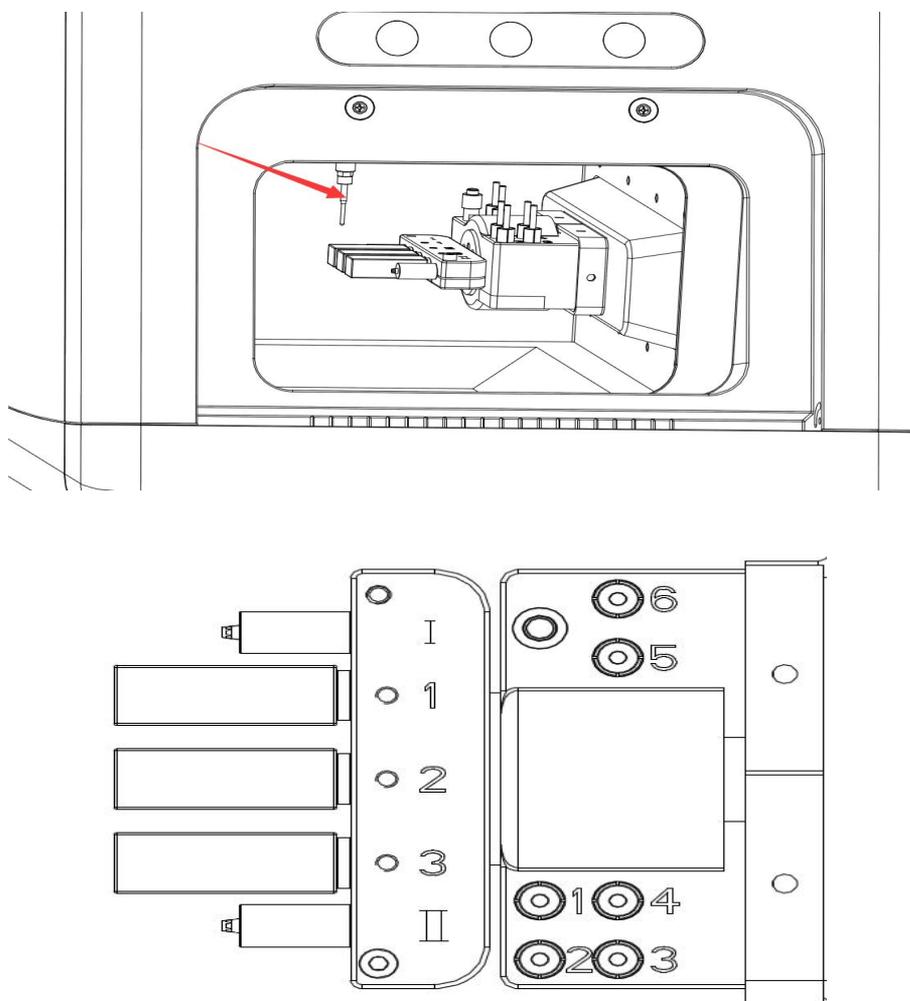
Fig.2

1）For example, the current tool in the system in Figure 1 is tool number 1 and a 3mm tool. Please check whether the tool on the spindle in Figure 2 matches the current tool number in the system in Figure 1. If it does not match, please change the tool number on the system interface to the same serial number as the spindle clamping tool. The specific operation is as follows:

a. Click the current tool number input box, in the pop-up dialog box, enter the modification password "123456" to enter the following tool modification interface, and then enter the same tool number as the spindle in the pop-up dialog box.；
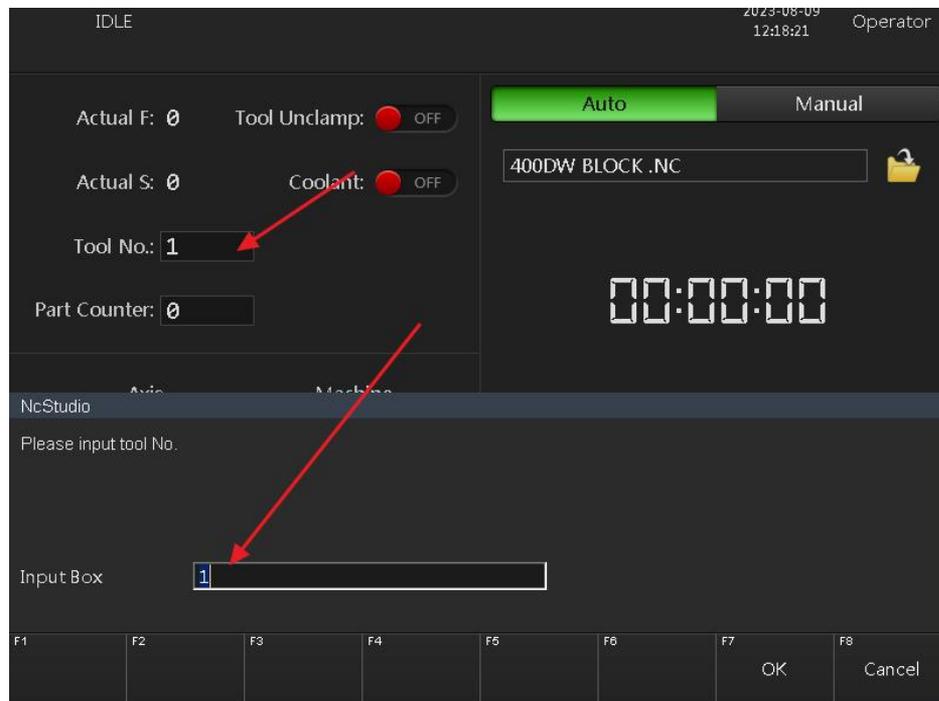
b. Please check milling burs with the corresponding tool number after switching on power, whether they are placed in the tool changer accurately.
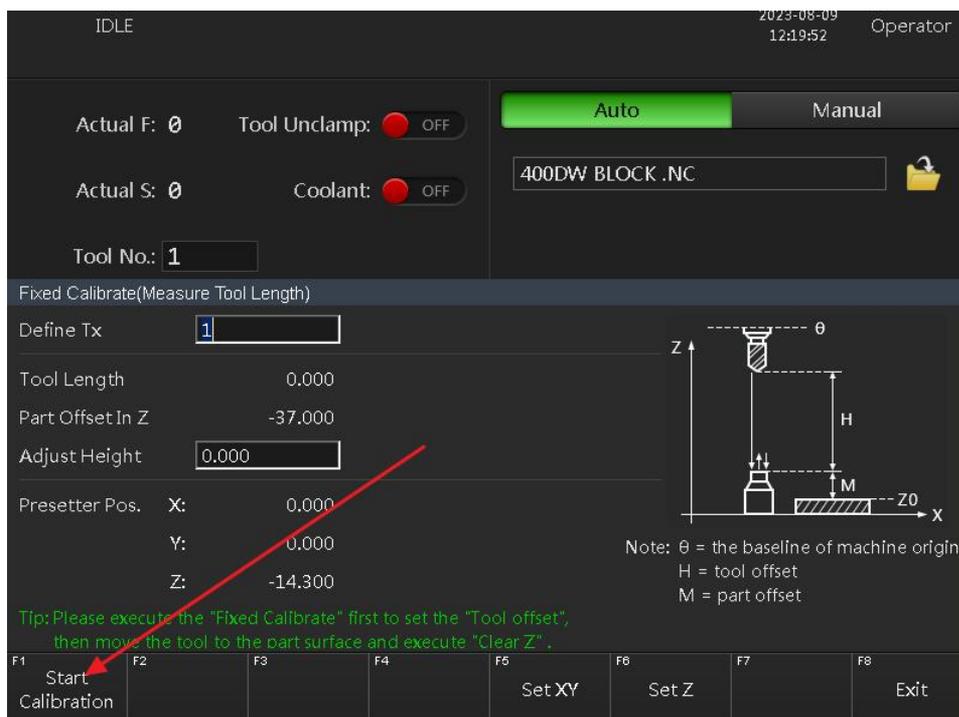
■ **Network checking**
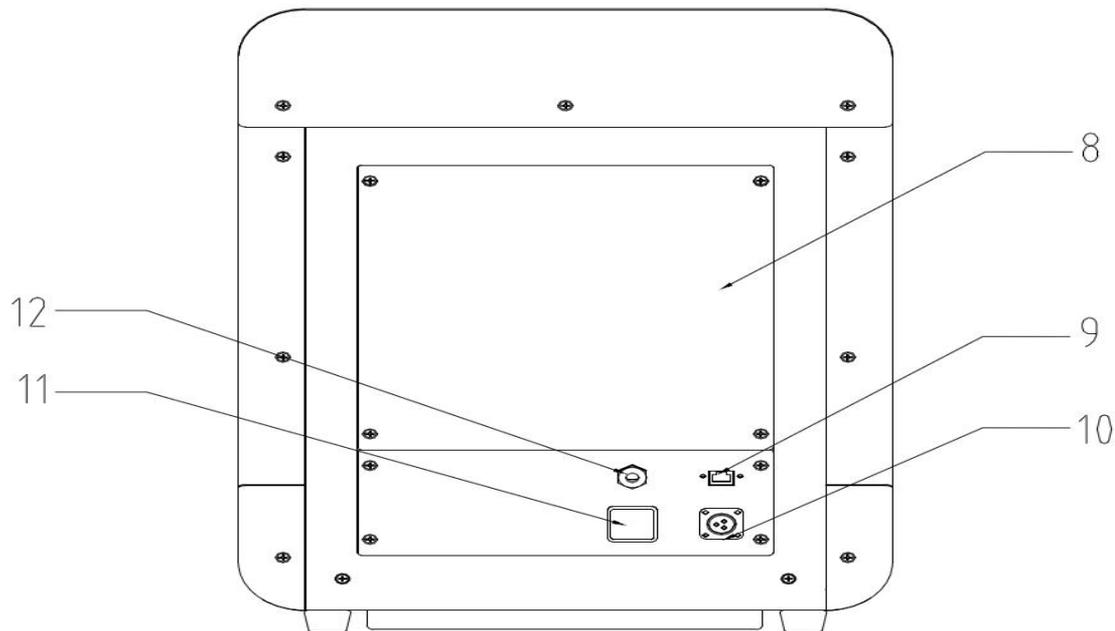
1) Insert the network cable into **No.9 Socket**

2) Click the "Manufacturer mode" on the screen

3) Enter the password "123456" and select "System"

4) Click "Show desktop" to check the network connection status.
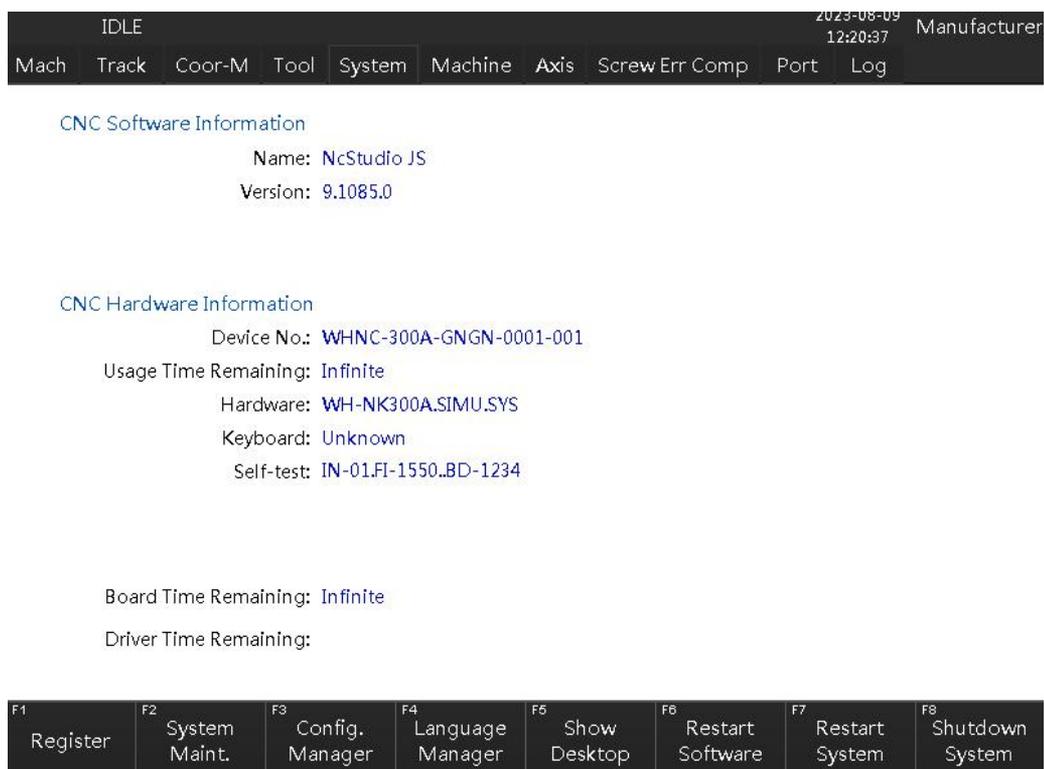
3.2 Control Interface Introduction

This machine provides two modes for convenient operation and maintenance: **Operator Mode** and **Manufacturer mode.** Manufacturer mode can only be used by BSM technicians or with the permission of BSM.

- **Operator Mode Introduction**

1) **Operator Manual Mode**
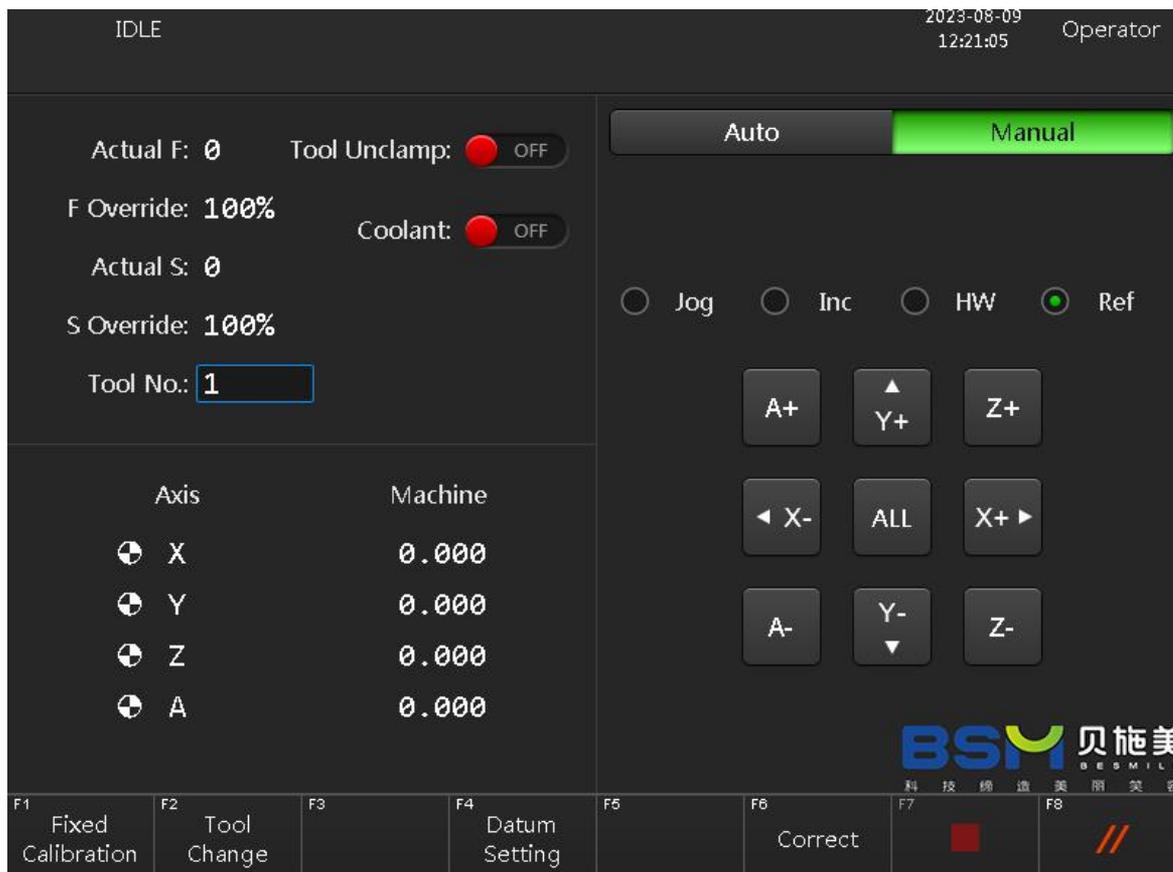
Actual F: the actual speed in the NC program when the system is in cutting mode

Tool Unclamp: tool unclamp/clamp button. This button is only used for manual tool change. Remember that this button cannot be clicked for non-manual tool change or during machine operation, otherwise it will cause tool breakage or personal injuries.

F Override: the current cutting feed rate, which is 100% by default

Actual S: current spindle speed

Coolant: cooling system button for the cooling of cutting tools

S Override: the magnification of current cutting spindle, which is 100% by default.

Tool No.: the tool number on the current spindle

X: Mechanical coordinate of the current X-axis

Y: Mechanical coordinate of the current Y -axis

Z: Mechanical coordinate of the current Z -axis

A: Mechanical coordinate of the current A -axis

Auto: automatic mode in the operator interface

Manual: manual mode in the operator interface

Jog: continuous operation in manual mode

Ref: Home return operation in manual mode

HW: guided by hand wheel in manual mode, generally used for debugging

Inc: step length in manual mod, the default step length is 1mm

A+: Axis A rotates in the positive direction

A-: Axis A rotates in the negative direction

X+: X axis moves in positive direction

X-: X axis moves in the negative direction

Y+: Y axis moves in positive direction

Y-: Y axis moves in the negative direction

Z+: Z axis moves in the positive direction

Z-: Z axis moves in the negative direction

Fixed Calibration: fixed tool setting (7 system automatically measures the actual length of the tool)

Tool change: Tool change

 Terminate

 Reset

2) Operator Automatic Mode

Breakpoint Resume：An interrupted job will be continued automatically while click this icon.

Start

Stop

Terminate

Reset

- **Manufacturer Mode Introduction**

1) **Manufacturer Manual Mode**
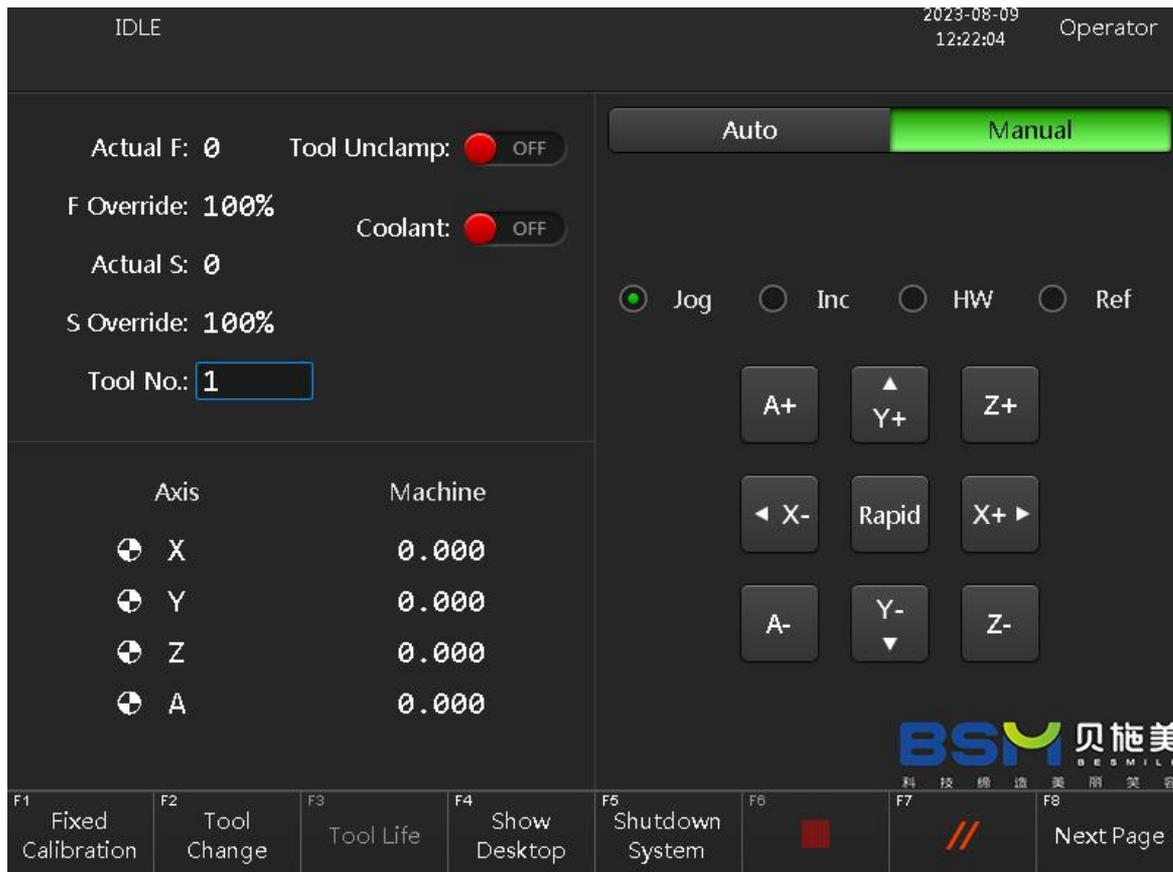
*How to return to the reference point?

If you select Ref, all axes will move back to the original position.

*How to switch to high speed mode?

If you select Jog, Inc or HW, and then select Rapid, you can switch

to the high speed.

*Line Centering

If you select F3 Line Centering, You will enter edge finding mode. This mode allows

you to correct the coordinates in the X/Y direction when the machine has shifted in

the X/Y direction and you need to correct the machine.
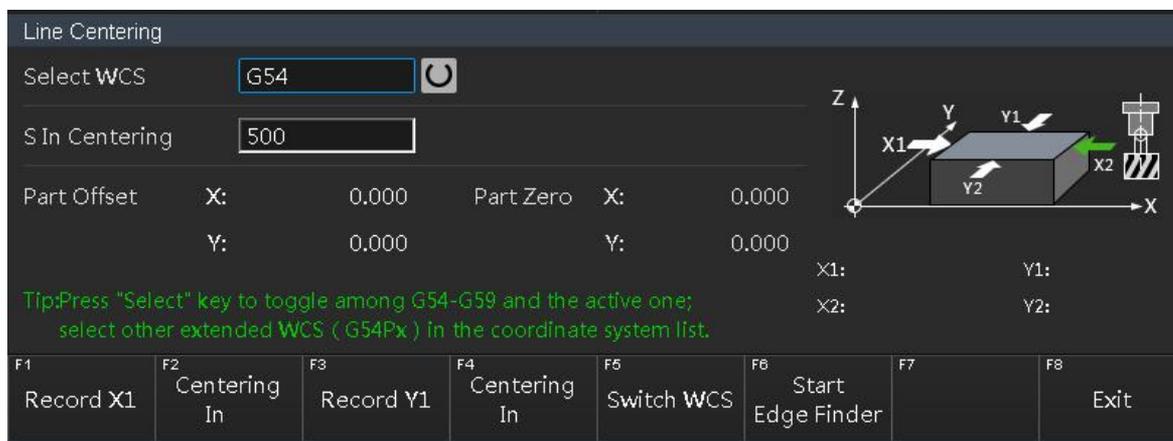
Spindle speed: Spindle speed while finding edge and axis optical

F1 Record X1：Record the X1 coordinate value

F2 Centering In：Record the X2 coordinates and calculate the X-axis G54 coordinates

F3 Record Y: Record Y1 coordinates

F4 Centering In: Record the Y2 coordinate values and calculate the Y-axis G54 coordinates

Position Setting Mode

Travel Range: Upper/lower limit of path of each axis of the machine

Tool position: Tool Coordinate Setting

Decelerate Pos.：Change/calibrate the tool deceleration position

CT Lower Pos.: The Lower limit of path of the axis when changing the tool

✓ **MDI Mode**
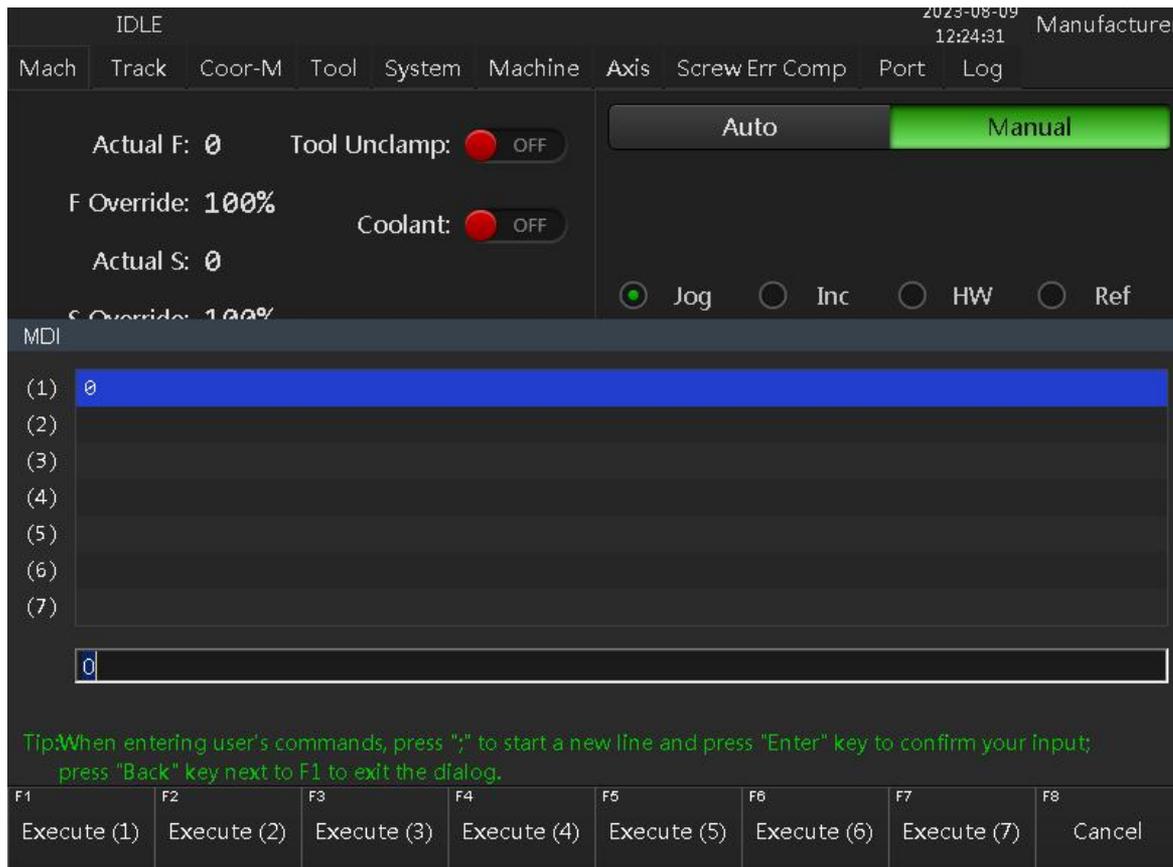
This mode is used for manual testing of some commands

MDI(1)-(8): MDI Command Input Field. You can enter the M code that needs to be executed

Execute(1)-(7)：Executing the corresponding (1)-(7) instructions in MDI

✓ **Tool changing mode**

If you click T1-T7 in tool change mode, the machine will perform the corresponding tool change operation respectively. Before changing a tool, make sure that the tool on the spindle has the same number as the tool in the tool magazine, otherwise it will cause a collision.

2) **Manufacturer Automatic Mode**

- ✓ **BreakPoint Resume:**

  This mode is used when the machine is abnormally powered off during the milling process and need to continuously run the previous milling program. When using this mode, you must ensure the same processing file (STL file) is available in the machine system, or the USB flash disk which loaded the processing file has not been removed before powering on, otherwise, this operation is invalid. The specific operations are as follows:

  Select Operator mode, directly click F2 BreakPoint Resume to execute the operation.

- ✓ **NCCLOUD Assistant**

  Make each axis back to the fixed point coordinates position

- ✓ **Line Selection**

  Guide each axis by hand wheel in auto mode

  Track: Running track interface

  Coor-M: Coordinates management interface

  System: System management interface

  Machine: Machine management interface,

  Axis: Axis management interface,

  Screw Err Comp: Bur compensation interface

  Port: Control ports interface

*Note: The above interfaces must be operated under the guidance of the manufacturer, otherwise, the accidents caused by the careless manual operation would be borne by the operator.

✓ **Log**

Log is used to view records of previous operation of the machine and alarm information to help troubleshooting the machine.

3.4 Reset

If there is a milling abnormality on the machine (e.g. power failure or tool breakage during milling), it is necessary to return to the home position before the system is powered off and on again. Please note that you need to make sure that the X\Y\Z axis mechanical coordinates are positive and the A axis is at 0 degree or 180 degree before resetting, otherwise the system will fail to be resetting or crash.

Resetting step is as follows：

1) Select the Jog operation in manual mode to mechanically seat the X\Y\Z axis.
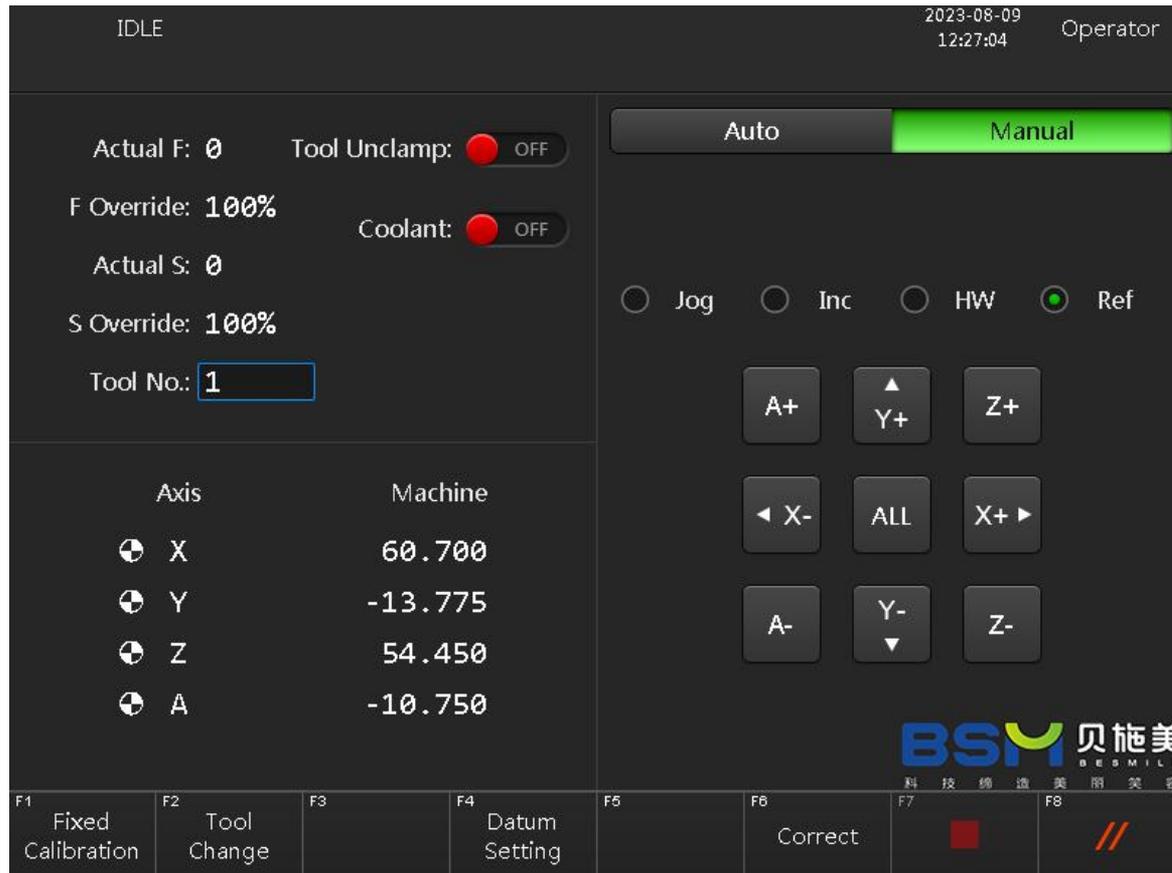
2) Select the "Ref" and click "all" buttons. When the mechanical coordinates of each axis are displayed as 0 and there is a zero completion mark on the front of the axis, it means that the reference point return is complete.
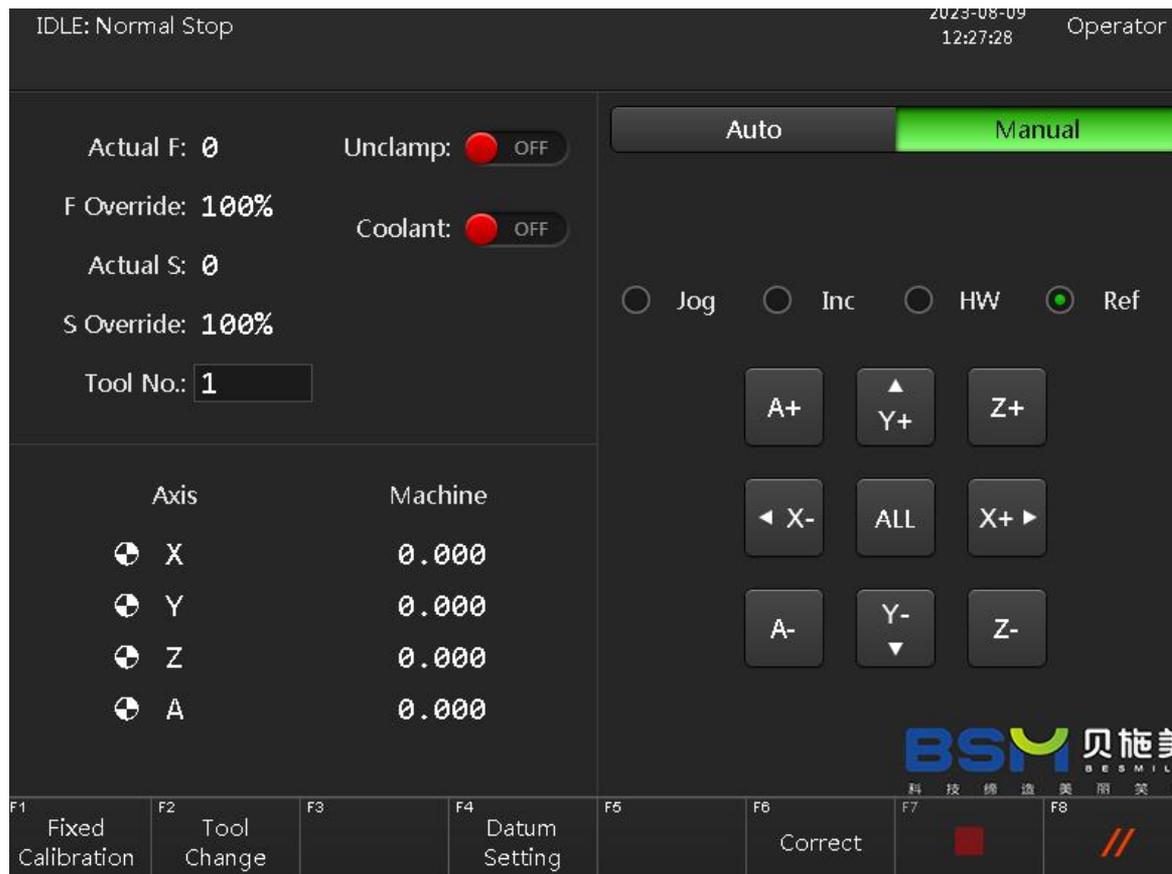
3.4 Program Import and Operation

Before the import and operation of the machine programs, it is necessary to ensure that the machine has completed the zeroing operation as Article 3.3 and the machine has not given an alarm. The specific operations are as follows:

1) Insert the USB flash drive into the USB interface of the device, copy the file to the local device in Auto mode, and click the Load button

2) Choose your desired processing program within the USB and load it into the machine

3) When a sentence "Processing program loading succeeded" shows on the machine operation interface, it means that the program you chosen is imported successfully and the file name of the imported program is displayed at 1

4）Click the operation button "F5" on the machine operation interface to process the current program

It is necessary to verify the machine accuracy before the machine is used to avoid the loss of machine accuracy due to vibration during transportation. The specific operation methods are as follows:

a) Import the following verifying programs

   Pr_ 1#_ Titanium rectangle 6X6.nc

   GS_ 2#_ Substitute wood block 10x10 center.nc

b) Measure the sizes of the milled block and check the deviation : If the deviation between the sizes of the milled block and those in STL document is not more than 0.02mm, the machine accuracy is normal. If the deviation between the measured sizes and those in STL document is more than 0.02mm, the machine accuracy needs to be calibrated. Refer to Chapter 6 "machine Calibration" for specific calibration methods.

c) The machine could be performed only after the accuracy of the machine is completely confirmed correct.

Program copy and deletion

This machine supports file copying, uninstalling and deleting

Local: indicating where the local programs store

USB: indicating where the imported USB programs store

Load: loading the programs from Local or USB disk programs

Unload: uninstall the programs from Local or USB disk programs

Delete: choose the program to delete in the corresponding Local or USB disk programs

Copy to local: copy the selected program from the USB disk programs to the local programs

3.5 Tool operation

Tool is another decisive factor of processing quality. The quality of tool directly determines the efficiency of processing and the quality of products. Therefore, when the tool is used for a period of time or affects the processing quality (the edge of the processed product cracks, falls off, or flying-like cutting objects appear during the processing), the following tool update operations should be carried out:

1) First, click "Ref" to ensure that the system has returned to the system reference point;

2) Set the system mode to "Manual" for tool change operation;Replace the old tools in the tool station with new tools and place them in the order of # 1 # 2 # 3 # 4 # 5 # 6 #；

3) Please set the system as "manual" operation

4) Take out the damaged milling bur and update the new milling bur

5) Please kind check the milling bur situation when a certain amount of restoration were fabricated by milling bur. The coating,cutting edge, and sharpness situation of milling bur can be checked in 20X microscope. Please make sure the milling bur in qualified for high requirement and complex restoration fabrication.

6) As No.3/Ø1mm&No.6/Ø0.6mm are small diameter tools with itself high hardness and low toughness character, it is easier to be broken leading to bad influence for normal operation of milling machine. So please pay your attention to avoid the broken of milling bur tips when the operator are changing these two milling burs.

3.6 Raw Material Holding

Notes for raw material holding

1) Please make sure that the holder and the milling working cabin are clean without any dust when change the raw material

2) If the holder was deformed, please stop to using and contact BSM/BSM local dealers .

3) Please tighten each screw of holder uniformly. It is not advised to tighten screw one by one to avoid edge breakage of raw material. Which will influence the results of machine milling.

Chapter 4 Maintenance

4.1 Before power on

Please check the "compressed air pressure" and make sure the pressure switch ＞ 0.65MPa before turn on milling machine.

1) If the air pressure is not enough, the milling machine can't be started.

2) If the air pressure is not enough during operation, the milling machine will stop working. When the air pressure meet the requirement, the milling machine can restart after press down the "starting" buttons.

3) If the air pressure is not enough, the milling bur changing operation may be failure. Even it can cause crash between of milling bur and milling machine. When the crash happen, please deal it as the milling bur changing is interrupted unexpectedly.

4.2 Before processing

1. Keep the clean of tool setting surface and copper ring

If there is dust on tool setting or copper ring, it will affect the tool setting data and result in inaccuracy milling; if the dust is too thick, it will cause tool setting failure.

1) Before processing every day, it is necessary to clean the dust of holder, tool magazines, and visible windows, so that to ensure the clean of the processing area

2) After processing every day, it is advised to clean up the processing area, tool magazine, and tool setting instrument flour dust in time

2. Check the following tasks before processing every day

1) Whether is it normal when the spindle chuck is clamping tool?

2) Whether there is dust attached to the chuck surface? If there is dust attached, please clean it gently with a small brush

3) Clean the dust in the spindle chuck (three-petal mouth) frequently.。

Note: Don't let the bristles of the brush get stuck in the gap of the chuck! Use a special removal tool to remove the three-leaf spring for cleaning, and blow off the dust inside with compressed air. Pay attention to the tightness when installing the three-lobed spring back to the spindle after cleaning. It should not be too loose or too tight. It is best if the spindle can be easily inserted into the handle of milling bur without jamming when the

spindle is loose.

The cleaning of working compartment

After processing every day, use a high-power vacuum cleaner to clean the dust in the cracks around the dust cover. Prevent the dust cover from jamming during the operation of the machine, resulting in loss of machine accuracy or collision.

4.3 During processing

Check following tasks during processing

1) Turn on the cooling system
2) The machine is normal
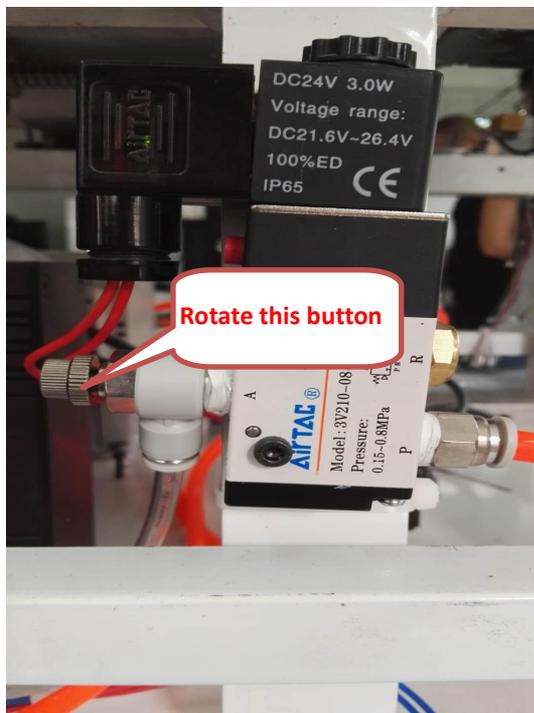
3）To adjust the spindle cooling air pressure by turning this button

4.3 Check every month

1) Whether the screw drive parts and belt drive parts are jammed or slipped
2) Whether the temperature of the electric spindle has obvious temperature rise, whether the sound of the spindle is obviously abnormal

Chapter 5   Trouble Shooting

5.1 Alarm List

Trouble	Cause Analysis	Solution
No display on the panel when power on	The internal power supply of the machine may be disconnected	Turn off the power and check whether the power line of machine is normal
Panel display air pressure alarm	Compressed air pressure may be lower than 0.65MPa	Check whether the air compressor is operating normally
No response to touch on the display screen	system crash or Poor contact of touch screen USB interface	Restart the system or Re-plug the USB
Milling bur broken during machining	1. Tool life has expired 2. The nesting is unreasonable (the undercut is too large, the connecting rod is unreasonable) 3. Incomplete milling strategy	1. Change new milling bur 2. Redesign nesting 3. View milling strategy
Chipping/dropping of glass ceramics	1、The material is not held securely 2、Tool life has expired 3、Improper margin design 4、the connecting rod is unreasonable 5、The veneer is too thin and the cooling pressure is too large	1. Fix well the material 2. Change new milling bur 3. Redesign nesting 4. Adjust design data, adjust cooling pressure
The restoration is too tight fixing on the abutment	Unreasonable adhesion coefficient	Redesign
The restoration is too loose fixing on the abutment	1、Unreasonable adhesion coefficient 2、Large spindle run-out 3、Controller parameter mismatch	1. Redesign nesting 2. Check/change spindle 3. Reset controller parameters

Abnormal friction sound during processing	Abnormal operation of screw rod, guide rail and pulley	Put oil on the screw guide rail and adjust the pulley tightness
Abnormal tools change	1、Ring position offset 2、The milling bur is severely worn	Change the new milling burs

Note: For other faults other than the above faults, please contact BSM/BSM local dealers as soon as possible

*The machine must not be used for functions other than those functions indicated by the manufacturer, otherwise the warranty will be void.

Chapter 6 Calibration the Axes

*Note: Only for when the axis occurs disorientation and deviation.

At factory, this machine has been calibrated to achieve the precision of dental milling. Only if the accuracy of the machine is lost will you need to re-calibrate it. Two calibration methods for Y-axis accuracy loss as follows:

Example workpiece coordinates are offset as shown in the figure

6.1 Glass ceramic，GS_2#Location Center location

*Calibration method for cube blocks（10mm*10mm*10mm）： In Auto mode, load the program "GS_2#_wood cube 10x10 center.NC" for milling, and then measure it as shown in the picture.

1) The Y-axis is offset as shown in the figure: the A-axis line is calibrated
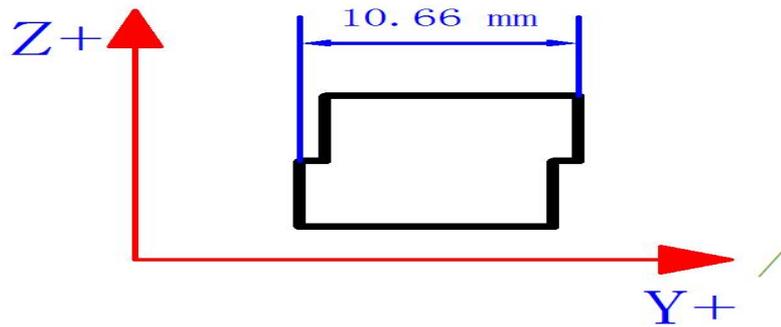
Y axis measured 10.66mm, the upper part of the positive direction to Y offset 0.66mm, take half of the error value 0.66mm/2 = 0.33mm, the error direction is -0.33mm, the workpiece origin position is -43.00, at this time, only the Y axis workpiece origin position set to -43.00-0.33mm = -43.33mm can be, the upper part of the negative direction, the opposite of the same reason Calculation.

2) The Z-axis is shifted as shown in the figure：
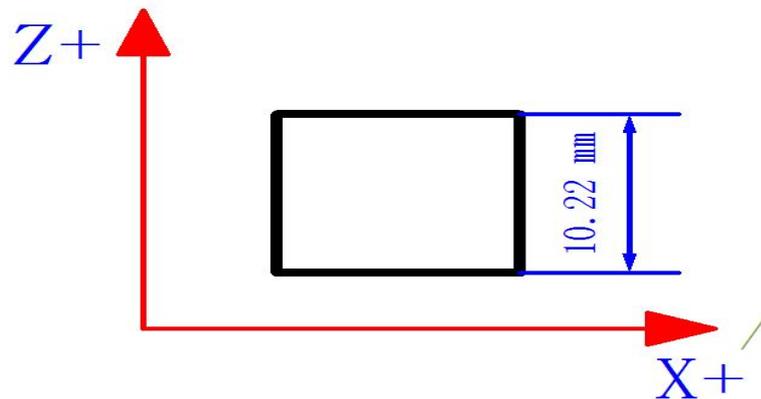
Z measured 10.22mm, to Z positive direction offset 0.22mm, take half of the error value 0.22mm/2 = 0.11mm, the error direction is -0.11mm, the workpiece origin position is -39.34, at this time, only the Z axis workpiece origin position set to -39.34mm - 0.11mm =

-39.45mm can be, Z value is less than the standard value, the same as the opposite Calculation

6.2 Titanium block: titanium rod Pr#1 position

*Cuboid block calibration method(6mm*6mm*18mm): In Auto mode, load the program "Pr_1#_Titanium rectangular 6X6.nc" for normal cutting, and after cutting, measure as shown in the picture.

Part Offset

	G54
X	85.590
Y	-43.000
Z	-39.340
A	0.000

Public Offset

X	0.000
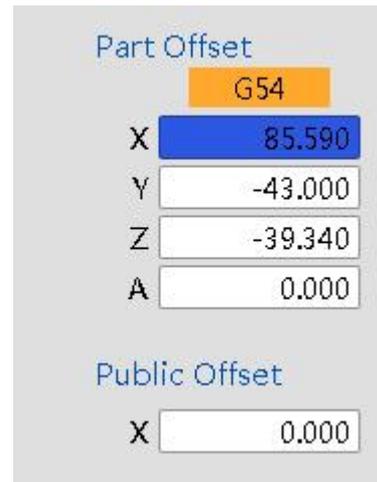
Example workpiece coordinates are offset as shown in the figure

1) The Y-axis is offset as shown in the figure: A-axis center line calibration
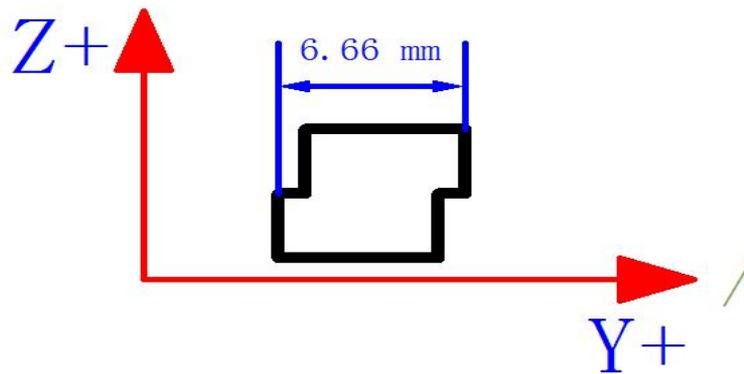
Y axis measured 6.66mm, the upper part of the positive direction to Y offset 0.66mm, take half of the error value 0.66mm/2 = 0.33mm, the error direction is -0.33mm, the workpiece origin position is -43.00, at this time, only the Y axis workpiece origin position set to -43.00-0.33mm = -43.33mm can be, the upper

part of the negative direction, the same reason for the opposite calculation The upper part is in the negative direction, and the calculation is the opposite.

2) The Z-axis is shifted as shown:
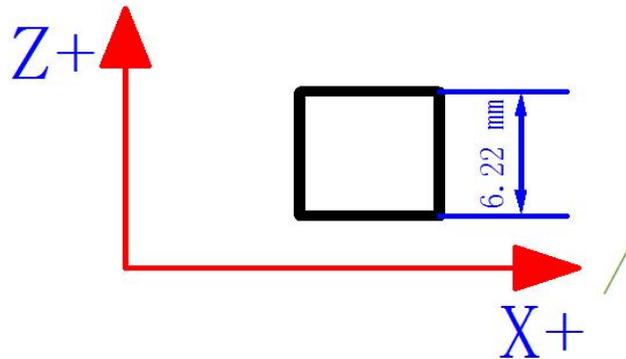
Z measured 6.22mm, offset 0.22mm to Z positive direction, take half of the error value 0.22mm/2=0.11mm, the error direction is -0.11mm, the workpiece origin position is -39.34, at this time only need to set the Z-axis workpiece origin position -39.34mm-0.11mm=-39.45mm can be set, the value of Z is less than the standard value, and the same reasoning on the contrary calculation. The Z value is less than the standard value, and the same reason is calculated in reverse.

3) The x-axis is shifted as shown：
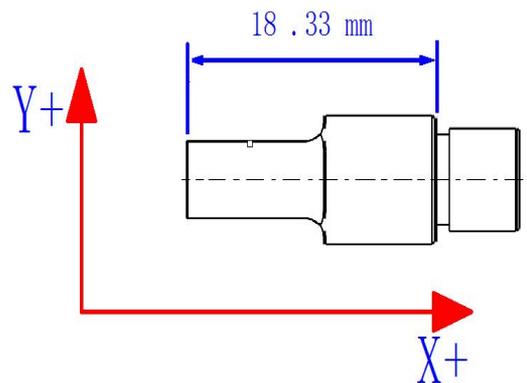
X measured 18.33mm, to the X negative direction offset 0.33mm, take the error value of 0.33mm, the error direction of +0.33mm, the workpiece origin position of 85.590, at this time only need to set the X-axis workpiece origin position of 85.590mm + 0.33mm = 85.92mm can be, the X-value is less than the standard value, the same reason the opposite calculation.

Contact Information

Thank you for choosing the universal dry and wet milling machine BSM-400DW from Chengdu Besmile Biotechnology Co., Ltd again. For any questions or additional support, please contact BSM/BSM local dealers and we are looking forward to assisting you.

Chengdu Besmile Biotechnology Co., Ltd

Website: www.bsmdental.com   **Email**: info@cdbesmile.com

Add: No.9,Sec.2, Shengwucheng North Rd., Chengdu Tianfu International Bio-Town, Shuangliu District, Chengdu, Sichuan, P.R.China.

Tel: : +86-28-8531-7108

Besmile Dental America Inc.

Add: 20311 Valley Blvd, Suite I ,Walnut, CA 91789

Email: admin@bsmdentalus.com

Tel: +1 626-921-579