

# Before Installation

Thanks you for choosing our Digital Drilling Machine 3G.

Before any installations or operations, please read carefully this manual and keep well of it for future reference, and then enjoy the extraordinary functions while making perfect rimless eyeglasses.

The on-screen displays and illustrations in this manual completely come from the field operations so as to help you comprehend and operate in the right way. When you meet the situations, like to press the button finding the instrument not responding or in the other way or to have pressed the button that you don't want, please read the screen where you will be guided.

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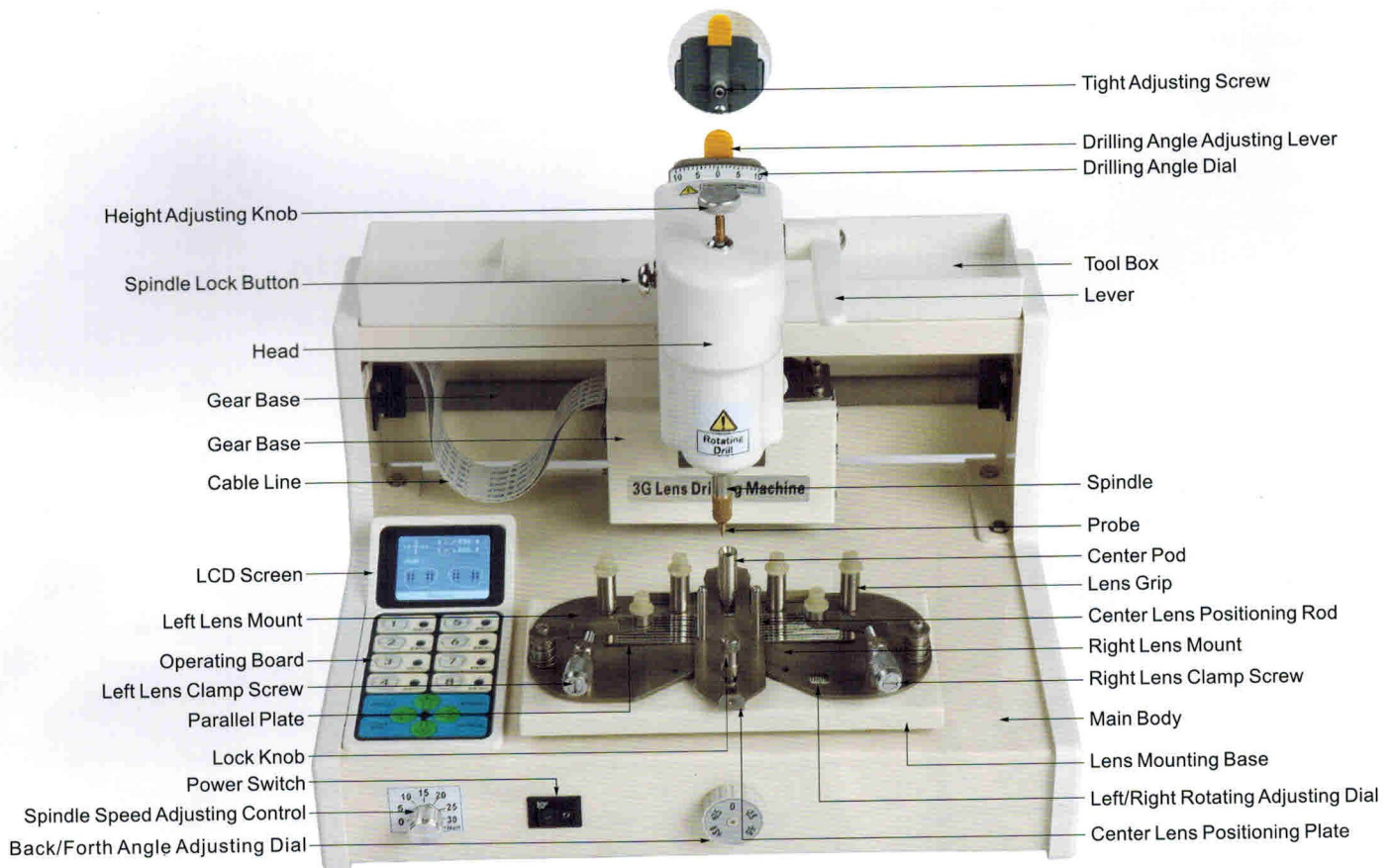
### Main Functions

- \* The operation procedures are highly intelligent and totally digital.
- \* Compared to the hole position of the pattern lenses, it has higher process accuracy whose process deviation is less than 0.075mm in both X-axis and Y-axis.
- \* It has auto-position clamping equipment which allows to remain the same process accuracy after the change of clamps.
- \* The screen shows the drill position and coordinates data, and gives guidance to the operation.
- \* The hole position memory function allows to process the set hole positions continuously.
- \* Original Pattern Measurement Mode.
- \* Mirroring Measurement Mode.
- \* The head can automatically reposition if it's removed from its position accidentally.
- \* The instrument drills automatically in a set order, and can be corrected by pressing the number button if any hole is missed by wrong operations.

### The Safety Instructions

1. Please turn off the instrument immediately if there's any unusual sound. Restart it and set the zero point to continue the procedure. If it happens again, please contact our local service department.
2. Do not open the bottom cover in case of the danger of electric shock.
3. Do not reform or decompose the instrument in case of any effect on the accuracy.
4. Do not pull the head in processing mode in case of any damage to gears or racks.
5. Do not put the instrument on an unstable platform in case of falloff.
6. Do not press the spindle lock button while the drill bit is rotating.
7. Do not use the spare drill provided by other manufactures in case of any effect on the accuracy of concentricity.
8. This instrument can only drill and mill on PC and CR lenses and cannot be used to other process.

## Description of Components

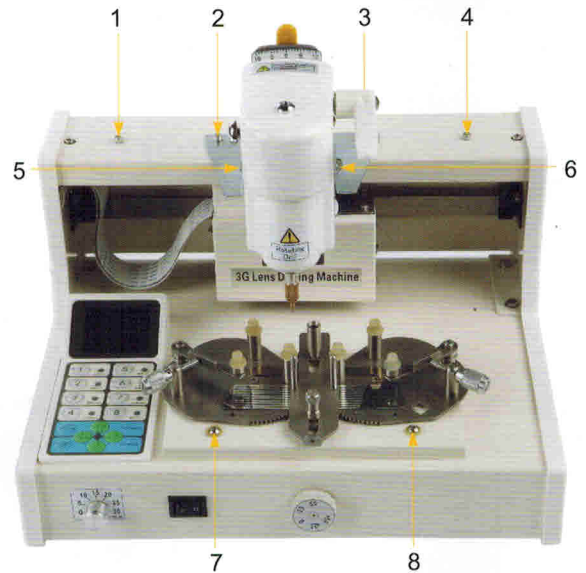




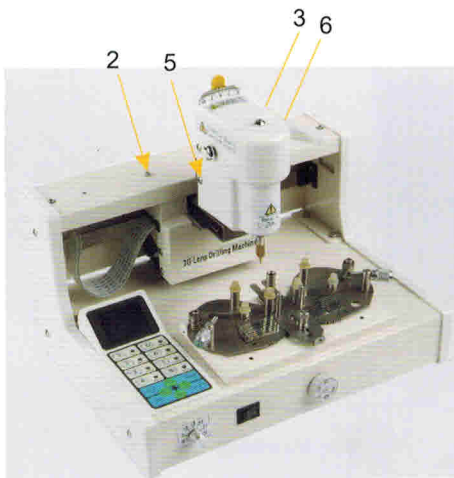
# 3G DIGITAL DRILLING MACHINE

## I Setup for Driller

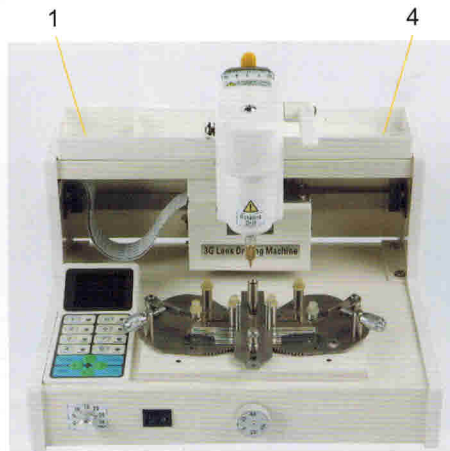
1. Unpack the carton and take out 3G unit carefully.
2. Loosen the four fixing screws (Screw 5, 6, 7 and 8) with the cross-screwdriver and the four screws of the drill (Screw 1, 2, 3 and 4) with the Allen key, and then remove the immobilizing spindle anchor. (P. 1)
3. Return and tighten the four screws (Screw 2, 3, 5 and 6). (P. 2)
4. Lay on the tool box and tighten the screws (Screw 1 and 4) to their original screw-holes. (P. 3)
5. Remove the lens mounting base (Turn upward, side-step to left and hold up with left hand). Return and tighten the two screws (Screw 7 and 8) and the lens mounting base. (P. 4, 5 and 6)
6. Adjust the head to Zero point.  
Adjust the lens mounting base and rotate it to Zero point.  
Adjust the lens mounting base angle adjusting dial to Zero point (P. 7). (Pull it out and rotate it)



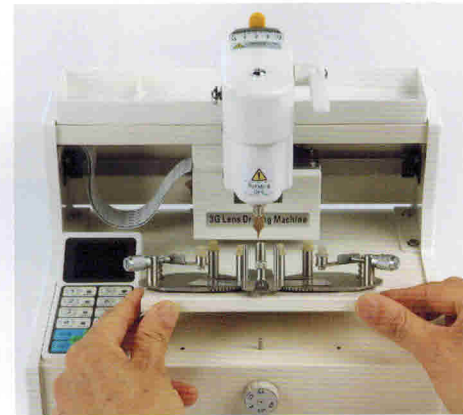
P.1-1



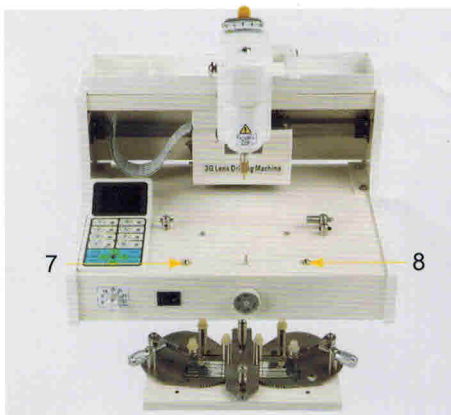
P.1-2



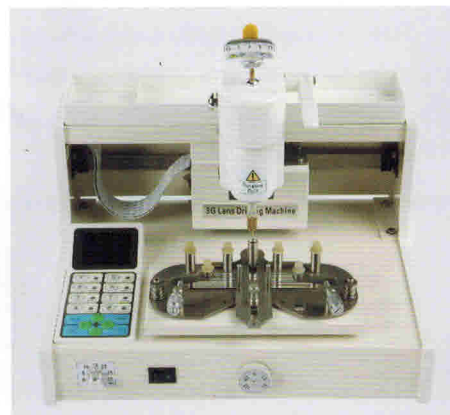
P.1-3



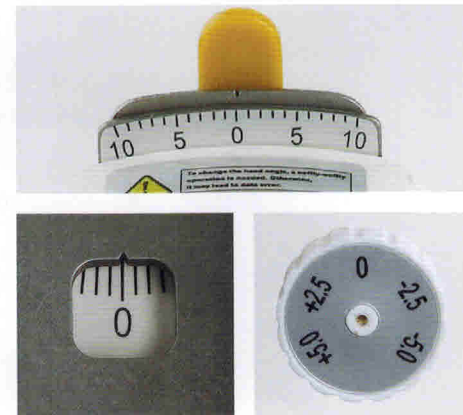
P.1-4



P.1-5



P.1-6



P.1-7



## Setup for Driller

7. Load the scrap box and connect the AC adapter. (P. 8 and 9)



P.1-8



P.1-9

8. Description of Operation Buttons:

- ① Screen: To show the content of operation at the processing mode.
- ② Number buttons: The eight buttons (Num. 1 to 8) are to store the measured hole positions (coordinates) to each memory and recall them for practically drilling lenses with either the eight holes on the left or right.
- ③ Operation button: If there're any errors in operation or measurement and need to access to the measuring mode, press both the Operation button and Measure button together. When the data check mode finished, press the Operation button to resume the drilling process. After the Mirroring Measurement, press the "Operation" button to access the process of drilling.
- ④ Electric Motor button: To start/stop drill motor.
- ⑤ Measurement button: To reset the memories of the numbers and access to the measuring mode.
- ⑥ Confirmation button: To memorize in the micro-computer after one certain operation is set or to move to the next step of operation.

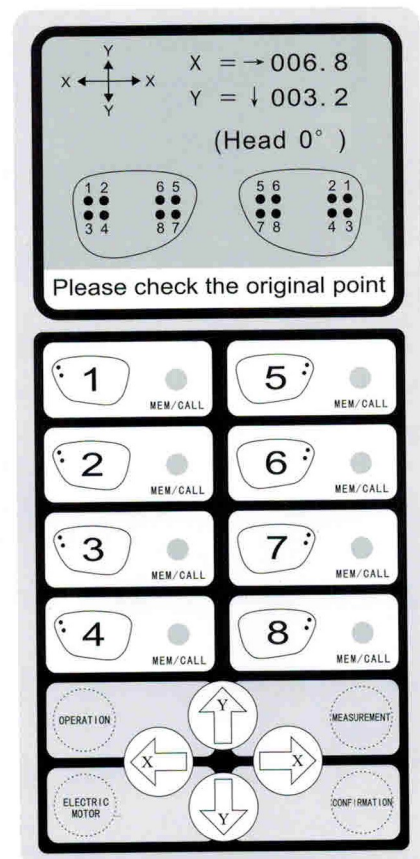
Arrows: Arrow buttons for milling.

In the drilling mode, press "" buttons at the same time to access to the milling mode.

In the measuring mode, press "" button to access to the Mirroring measurement mode.

In the drilling mode, press "" button to re-drill the missed drill hole on the left side, and press "" button to re-drill the missed drill hole on the right side.

Hint: Only pressing a button and responding a "doo" sound mean the operation command is accepted.



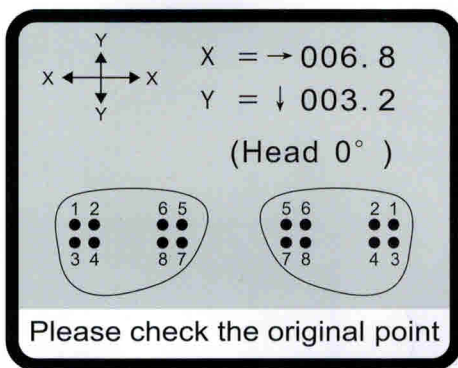
P.1-10

## Setup for Driller

9. Turn on the power and check the original point on the coordinates of the head, which is displayed on the screen. Then load the measuring probe, put it right into the center pod, press the lever with the right hand and the “Confirmation” button with the left one. On the top of the screen displays [X=000.0 Y=000.0] while on the bottom of the screen displays [Drilling Process] where the data of the drill holes stored last time. Press the “Confirmation” button if continue, or press the “Measurement” button if the hole positions data needs to be changed and on the bottom of the screen displays [ Measuring].(P. 11, 12, 13, 14 and 15)

Hint:

- ① If the screen displays that the X-axis or Y-axis is out of range, the original point needs to be reset.
- ② The instrument has to be restarted to reset the original point again.



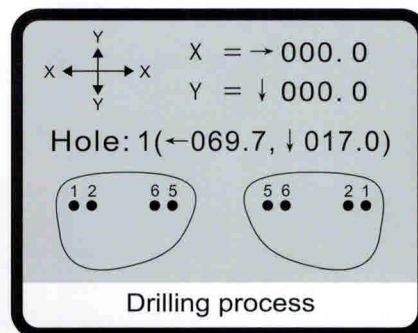
P.1-11



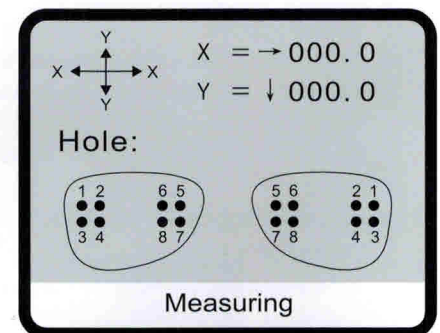
P.1-12



P.1-13



P.1-14

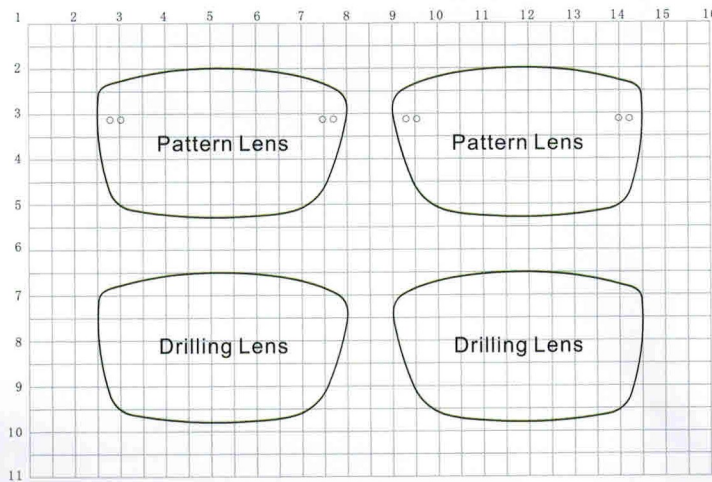


P.1-15



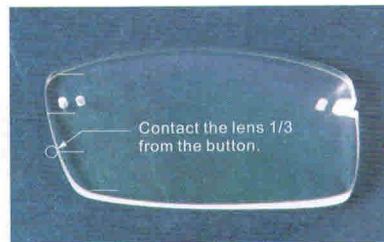
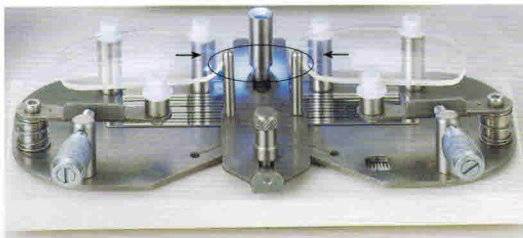
## II Original Pattern Measurement and Drilling Process

The drilling lenses need to be "exactly" the same size as the pattern ones. (P. 2-1)



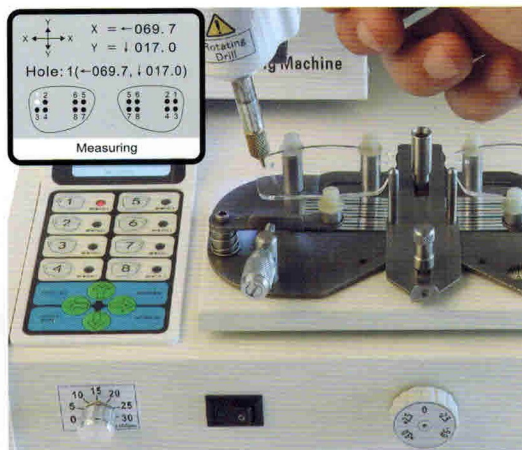
P.2-1

1. Access to the measuring mode, load the measuring probe, mount the pattern lenses, adjust the center lens positioning plate (about 1/3 from the bottom of lenses) (P. 2). Watch carefully if the edges of the lenses have contacted both of the center lens position rods which set the position of the lenses edges, and the hole position will shift if not both of the edges have done. Tilt the head by tilting the angle lever to the left (the angle could be either 5 degrees or 10 degrees, which is decided by the operator, and the angle of 5 degrees is recommended). (Please refer to the 3D images 1, 2 and 3 on the page of 18).

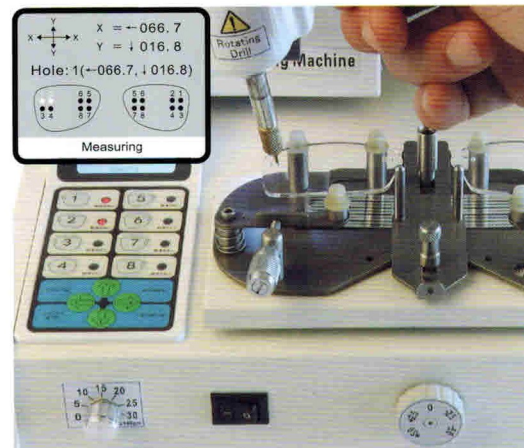


P.2-2

2. Insert the probe into the 1st hole of the left lens and press the "1" button (P. 3). Insert the probe into the 2nd hole of the left lens and press the "2" button (P. 4).



P.2-3

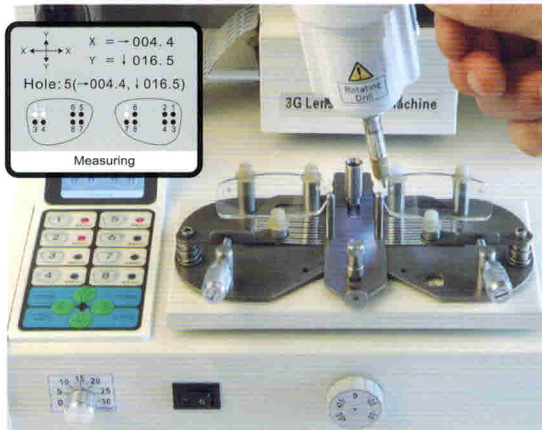


P.2-4

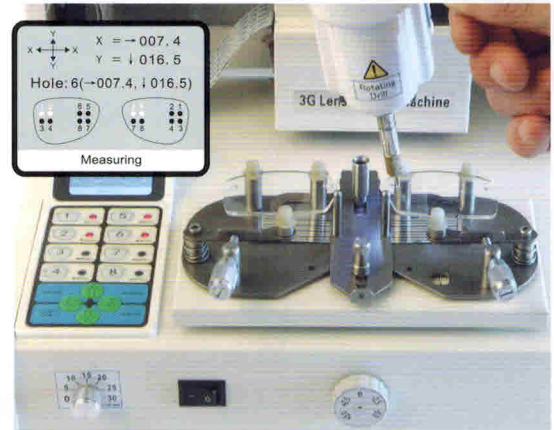


## Original Pattern Measurement and Drilling Process

3. Insert the probe into the 5th hole of the right lens and press the “5” button (P. 5). Insert the probe into the 6th hole of the right lens and press the “6” button (P. 6).

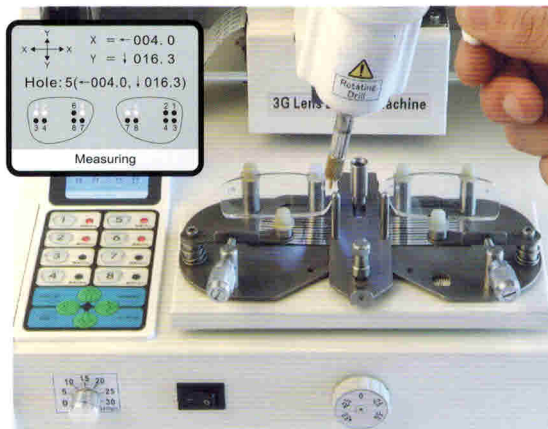


P.2-5

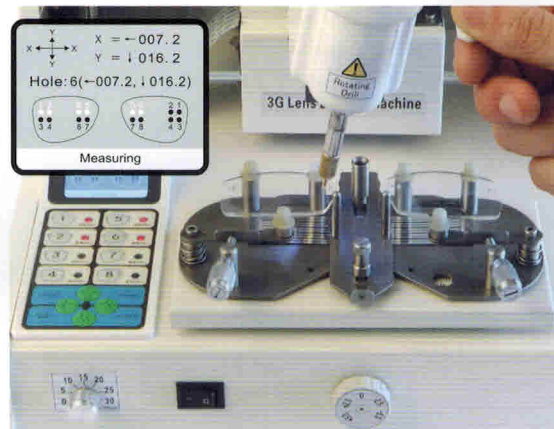


P.2-6

4. Tilt the head to the right and insert the probe into the 5th hole of the left lens and press the “5” button (P. 7). Insert the probe into the 6th hole of the left lens and press the “6” button (P. 8).



P.2-7

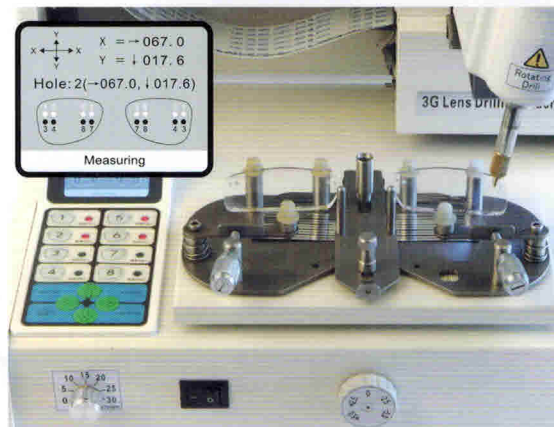


P.2-8

5. Insert the probe into the 1st hole of the right lens and press the “1” button (P. 9). Insert the probe into the 2nd hole of the right lens and press the “2” button (P. 10). After the measurement is done, press the “Confirmation” button to return to the drilling mode.



P.2-9



P.2-10



# Original Pattern Measurement and Drilling Process

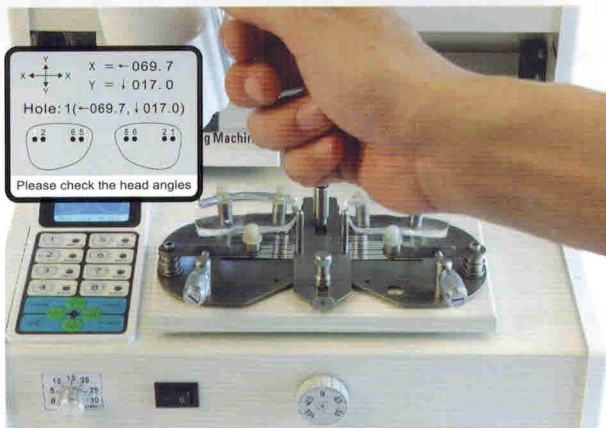
6. Tilt the head to the left (the angle should be the same as the measure one). Remove the measuring probe and load the right type of drill bit. Remove the pattern lenses, load the drilling lenses.(P. 11) Press the “Confirmation” button, the drill automatically moves to the 1st hole position on the left lens. Press the “Electric Motor” button to start the drill engine, rotate the Spindle Speed Adjusting Control to the needed speed, press the lever to make the drill reach out to start drilling and draw back itself when releasing the lever. After the 1st hole on the left lens is drilled, press the “Confirmation” button to make the head moves to the 2nd hole position on the left lens itself, until all the holes that angle to the left are drilled.(P. 11, 12, 13 and 14)

Hint:

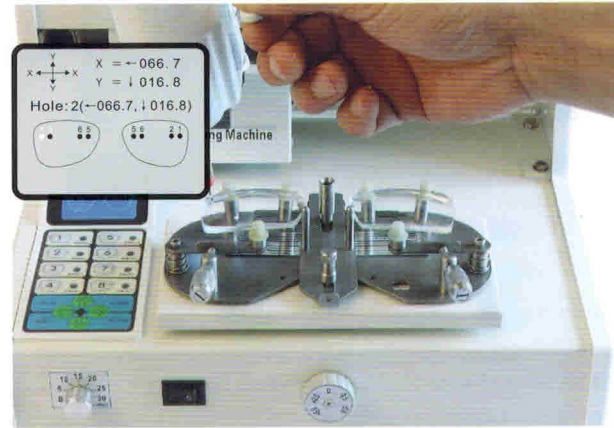
- ① The drill bit must has the same diameter as the pattern hole ones. If it won't match, choose the smaller one and use the reamer to expand the holes later.
- ② The lever should be pressed downward slowly and it will take 5 seconds to finish the drilling. The hole bottom will collapse if the speed is too fast.



P.2-11



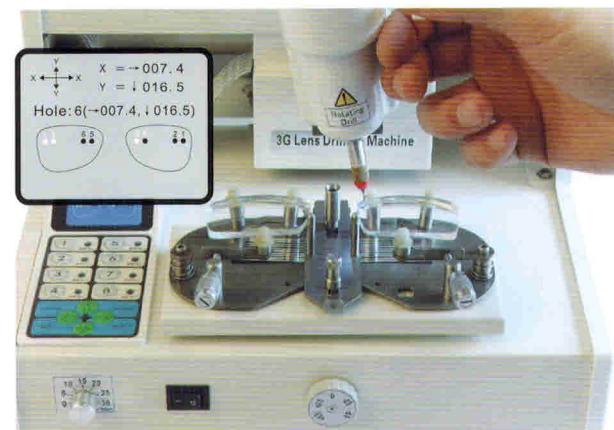
P.2-12



P.2-13



P.2-14



P.2-15

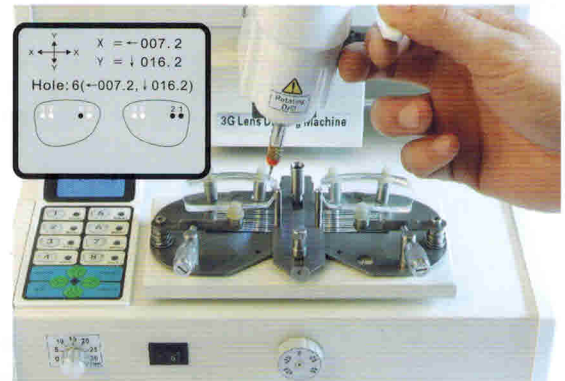


## Original Pattern Measurement and Drilling Process

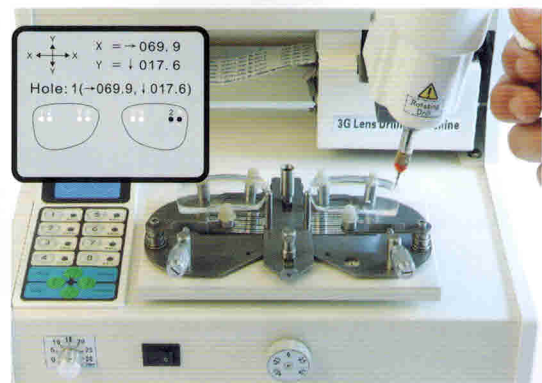
7. Tilt the head to the right (the drill angle must be the same as the measure one), press the “Confirmation” button to move the drill to the 5th hole position on the left lens. Press the “Electric Motor” button to start the engine. Press the lever to begin the drilling. After the 5th holes on the left lens are drilled, press the “Confirmation” button, till all the holes that angle to the right are drilled. Press the “Confirmation” button to set the drill back to original point, and the screen displays [Drilling Process]. (P. 16, 17, 18 and 19)



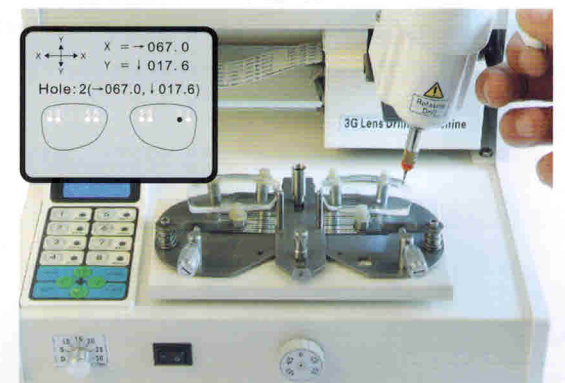
P.2-16



P.2-17



P.2-18



P.2-19

Hint:

- \* To smooth the hole surface, it's recommended to use drill feed bolts while drilling. And when the drill feed bolts is upward screwing, make sure the drill bit is higher than the lens in case of any scrapes of lens surface. (P. 20)
- \* The bill bit can be used to bit the lens hole bottom. (P. 21)
- \* The Cornish bit can be used to expand the hole if the drill hole is too small. (P. 22)



P.2-20



P.2-21



P.2-22

8. Multiple pairs of same size lenses can be made by pressing the “Confirmation” button to proceed and repeat the drilling process above.

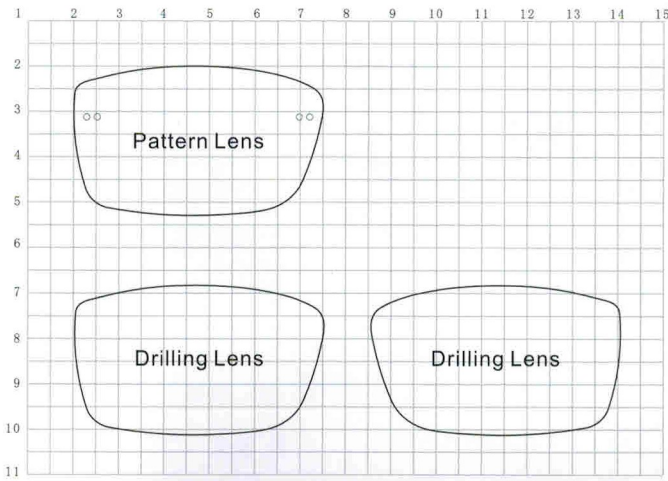
Hint:

The drill stops when moving to the 5th hole on the left lens while the screen displays [Please check the head angles]. Tilt the head angle and press the “Electric Motor” button to proceed.

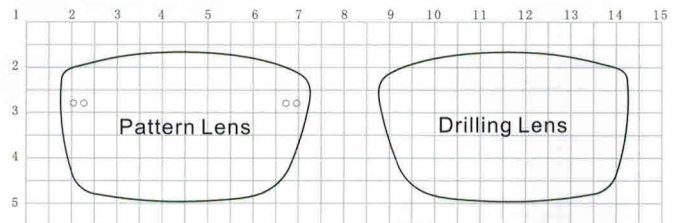


### III Mirroring Measurement and Drilling Process

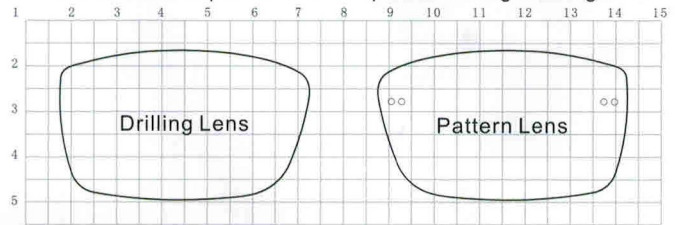
1. After measuring a single pattern lens' drilling holes, this function can provide the drilling process for another single lens or a pair.



Measure one pattern lens can process a pair of lenses.



Measure the left pattern lens can process the right drilling lens.

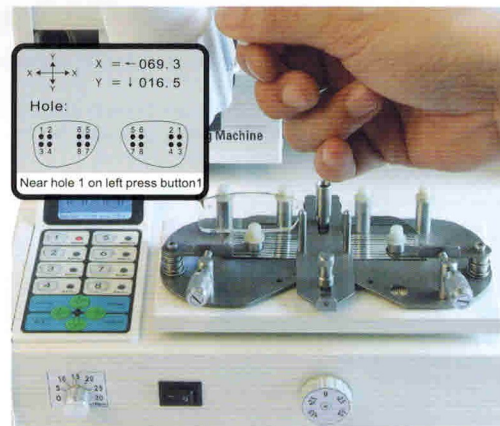


Measure the right pattern lens can process the left drilling lens.

P.3-1

2. Load the measuring probe, mount the pattern lenses (1pc is needed), adjust the center lens positioning plate (about 1/3 from the bottom of lenses) (P. 2-2), press the "Measurement" button to access to the measuring mode. Tilt the head to the left (the angle could be either 5 degrees.)

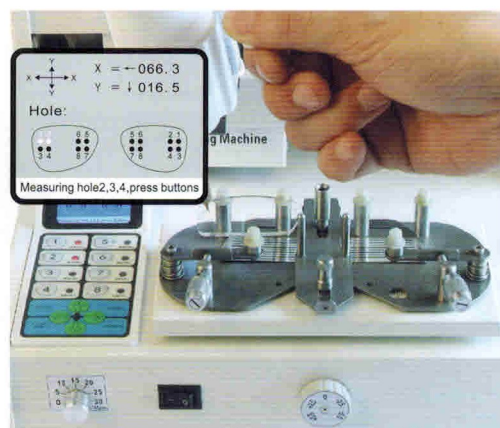
① Insert the probe into the 1<sup>st</sup> hole of the pattern lens, press the "←" button and the indicator LED lamp on "1" button blinks. Contact the taper portion of the probe to the edge of the pattern lens outside the 1<sup>st</sup> hole, press the lever and the "1" button, and the indicator LED lamp on "1" button turns on. Insert the probe into the 2<sup>nd</sup> hole on the pattern lens, press the "2" button, the indicator LED lamp on "2" button turns on. (P. 2,3 and 4)



P.3-2



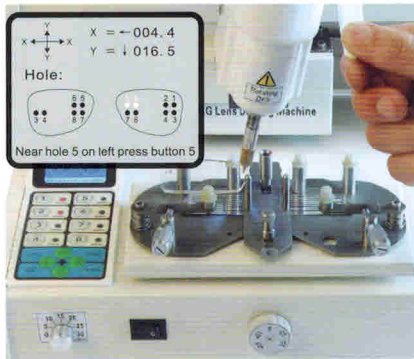
P.3-3



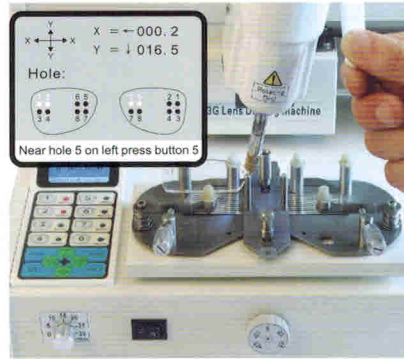
P.3-4

## Mirroring Measurement and Drilling Process

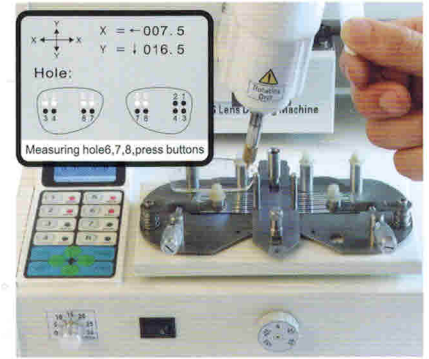
② Tilt the head to the right, insert the probe into the 5<sup>th</sup> hole on the left, press “←” button, the indicator LED lamp on “5” button blinks. Contact the taper portion of the probe to the edge of the left lens outside the 5<sup>th</sup> hole, press the lever and the “5” button, and the indicator LED lamp of “5” button turns on. Insert the probe into the 6<sup>th</sup> hole on the left lens, press the “6” button, the indicator LED lamp of “6” button turns on. (P. 5,6 and 7) After the measurement is finished, press the “Confirmation” button, remove the pattern lens and load the drilling lens.



P. 3-5



P. 3-6



P. 3-7

### 3. Drilling Lenses Measurement

- (1). Tilt the head to the left. Contact the taper portion of the probe to the edge of the left lens outside the 1<sup>st</sup> hole and press the lever and the “Confirmation” button (P.8)
- (2). Tilt the head to the right. Contact the taper portion of the probe to the edge of the left lens outside the 5<sup>th</sup> hole and press the lever and the “Confirmation” button (P.9)
- (3). Contact the taper portion of the probe to the edge of the right lens outside the 1<sup>st</sup> hole and press the lever and the “Confirmation” button (P.10).
- (4). Tilt the head to the left. Contact the taper portion of the probe to the edge of the right lens outside the 5<sup>th</sup> hole and press the lever and the “Confirmation” button to access to the drilling process. (P. 11)



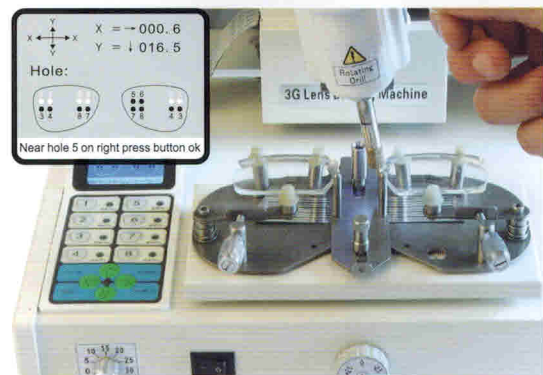
P. 3-8



P. 3-9



P. 3-10



P. 3-11



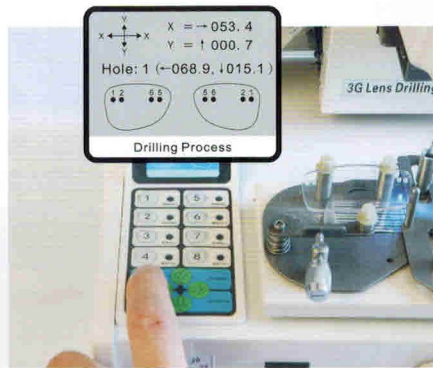
## Mirroring Measurement and Drilling Process

Attention: The order of measurement steps of (P8-11) can be adjusted freely but all steps must be performed, or it will cause missing holes on lens. TheLED will display the drilling holes. If there is no corresponding display on screen means the measurement step of the lens is not performed.

### 4. Drilling Process

Remove the measuring probe and load the right type of drill bit, press" Confirmation" button to access the drilling process which is the same as on the page 8 &9 (important hint: the drilling angle must be the same as the measure one or the lenses will be ruined).

Remark: this new function allows to measure the hole position on only one piece of lens and finish the drilling process of one pair of eyeglasses or, either of lenses of this eyeglasses.



P. 3-12

## IV Description of Measurement Button and Operation Button

In the Mirroring Measurement mode, it can only be operated by following the right procedure and pressing the right button. And restart measuring if there're any wrong operations, press the Operation button and Measurement button at the same time to access to the measuring mode. (This instrument will not accept any wrong instructions like pressing the other buttons.) Those buttons are functional at any mode to access to the measuring mode. (P. 1)



P.4-1



## V Refilling Function

If there's a missed hole on the left lens in the drilling process, press “←” button and the number of the missed hole (The angle of the head being tilted should be the same as the original measurement.), the head automatically moves to the missed position and refills it. (P. 1)

If there's a missed hole on the right lens in the drilling process, press “→” button and the number of the missed hole (The angle of the head being tilted should be the same as the original measurement.), the head automatically moves to the missed position and refills it. (P. 2)



P.5-1



P.5-2

## VI Drilling Data Check

1. After the pattern lenses measurement is finished, the screen displays drilling process. At this mode, the operator cannot make sure if the measuring data which contains the coordinates of the pattern lenses holes is correct. Press the “Operation” button and “Confirmation” button at the same time to access to the drilling data check mode. (P. 1)



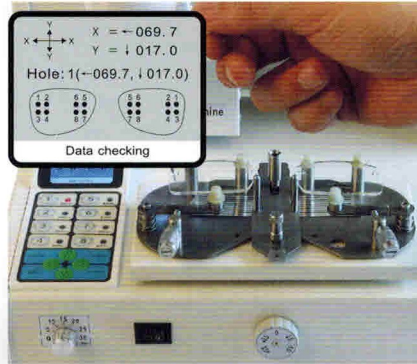
P.6-1

## Drilling Data Check

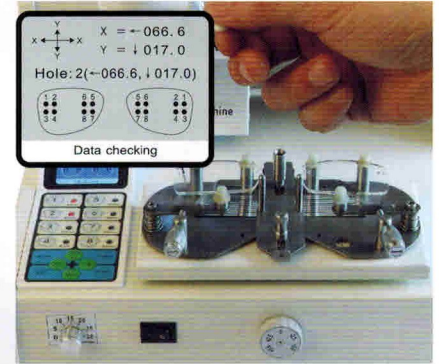
Press “←” button to check the holes on the left lenses. (P. 2, 3, 4 and 5)

Press “→” button to check the holes on the right lenses. (P. 6, 7, 8 and 9)

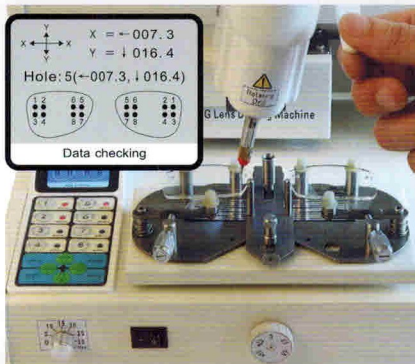
2. Press the number button of the hole position, move the head to the corresponding measuring hole (The drilling angle must be the same as the measuring one). Check the X-axis and Y-axis data on the screen whether it is the same as the measuring one (The deviation should be less than 0.2). If the deviation is more than 0.2, which means the measurement data is incorrect, requiring the re-measurement of the pattern lenses. After the data checked, press the “Operation” button to access to the drilling mode.



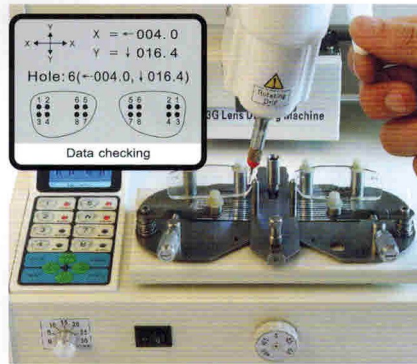
P.6-2



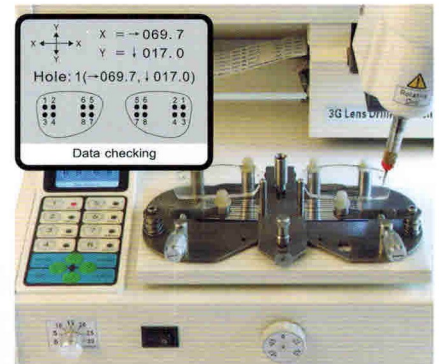
P.6-3



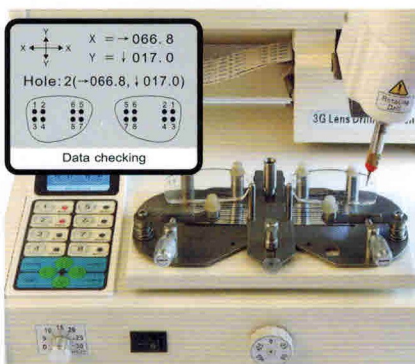
P.6-4



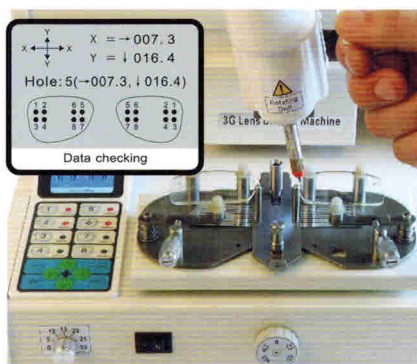
P.6-5



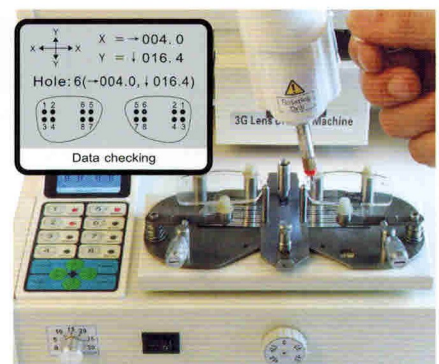
P.6-6



P.6-7



P.6-8

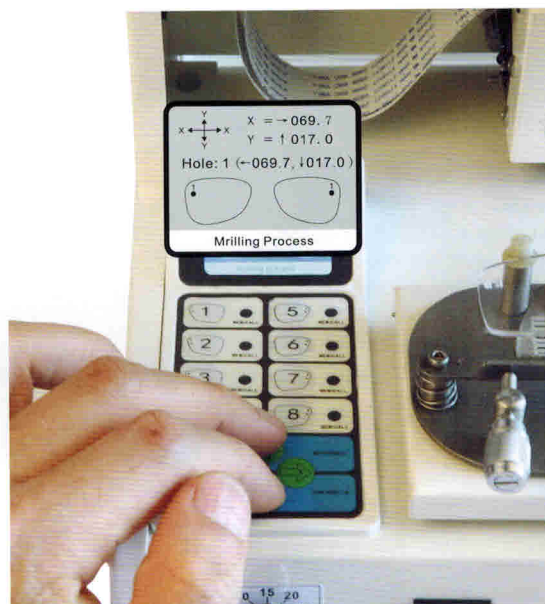


P.6-9

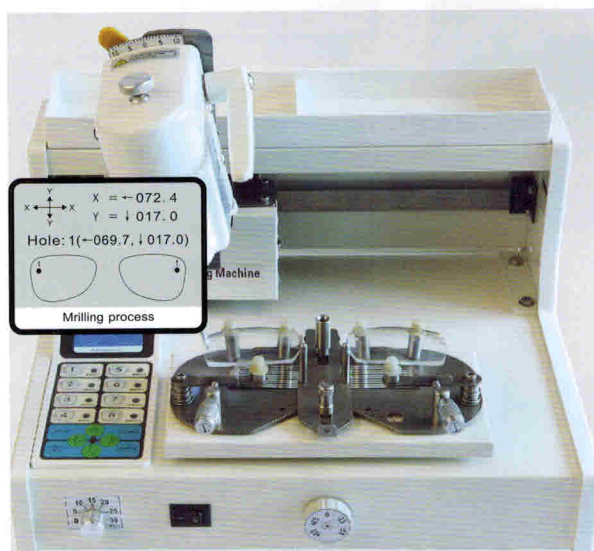


## VII Milling Process

1. After the drilling is finished, load the milling cutter, tilt the head to the angle as same as the drilling one. Press “↑” “↓” button (P. 1) at the same time to access to the milling process. Press the “Confirmation” button, move the head to the hole position that needs to be milled, press the “Electric Motor” button to rotate the milling cutter (at that time, the dial of the spindle speed adjusting control won't work since the milling cutter is rotating at maximum speed driven by the engine to gain the best mill hole smoothness). Adjust the drill height adjusting knob to insert the mid-blade into the lens. Press the direction button where need to be milled. ( “←” “↑” “→” “↓” ). After the milling, press the same arrow button once to stop the cutter moving. Press the arrow button once to continuously milling automatically and press it one more time to stop it moving. (P. 2 and 3)



P.7-1



P.7-2



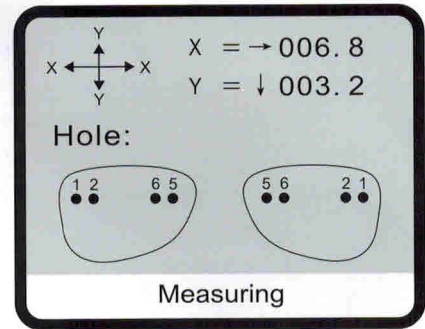
P.7-3

2. After the milling cutter stops moving, raise the drill height adjusting knob and make sure the milling cutter is above the lens in case of any scrapes of the lenses or the broken of the milling cutter. Press the “Confirmation” button, move the head to the next hole position to continue the milling process till all of the holes are milled.

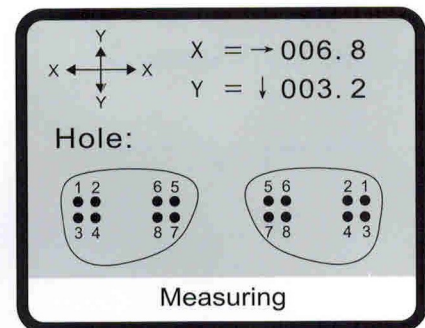


## VIII Instructions of Hole Position

1. This instrument can measure/drill 16 holes at maximum (8 holes of each left and right lens) to meet the needs of all kinds of the lens drilling. The rules of the serial numbers on the screen are like these. The serial numbers of each left and right lenses are the same and symmetric. The serial numbers on the temple side are 1 to 4 (start from 1) and the ones on the nasal side are 5 to 8 (start from 5). At practical work situation, the number of the drill hole may less than 16 when the rules are like these.
2. The serial numbers of 8 holes: The serial numbers on the temple side of the left lens are 1 to 2 and those on the nasal side are 5 to 6. So is the right lens. (P. 1)
3. The serial numbers of 16 holes: The serial numbers on the temple side of the left lens are 1, 2, 3 and 4, and those on the nasal side are 5, 6, 7 and 8. So is the right lens. (P. 2)
4. Following the rules of the serial numbers will make sure the instrument measures and processes properly, and automatically ignores the extra drilling hole numbers.



P.8-1



P.8-2

## IX Specified Mounting of Lenses

The operator can mount the pattern lenses or the drill ones by the following specified installation procedures.

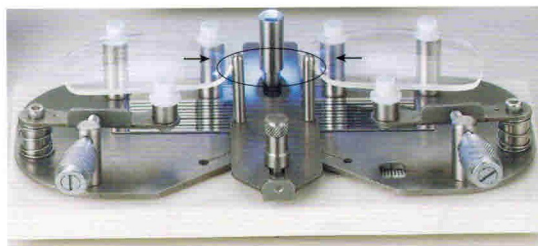
Remove the lens mounting base. (P. 1)

Mount the pattern lenses or the drilling ones, and watch carefully if the edges of the lenses have contacted both of the center lens position rods which set the position of the lenses edges, and the hole positions will shift if not both of the edges have done. (P. 2)

Draw the lines on the pattern lenses or the drilling ones with two hole positions and watch carefully if the lines are in parallel with the ones of the Parallel Plate. The installation procedures make the process of lenses holes more accurate.



P.9-1



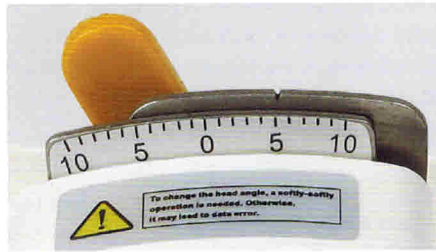
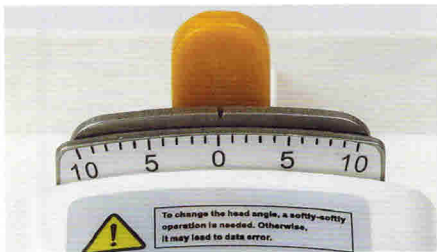
P.9-2



P.9-3

# X 3D Images

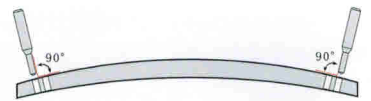
Hint: these 3D images are only for reference.



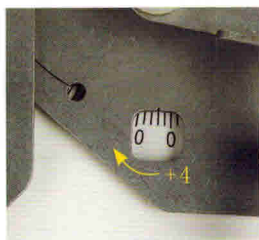
P.10-1



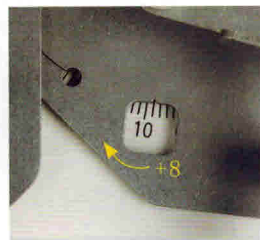
P.10-2



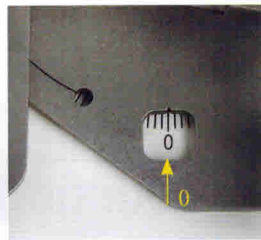
P.10-3



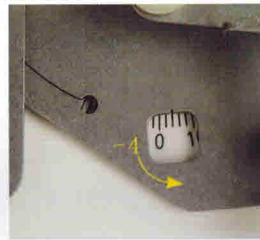
P.10-4



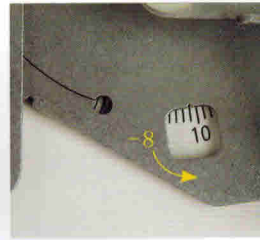
P.10-5



P.10-6



P.10-7



P.10-8



P.10-9



P.10-10



P.10-11



P.10-12



P.10-13



## XI Standby Mode

After the drilling is finished, press the Confirmation button to return the head to the original point if the head does not itself, and access to the standby mode when the head can be moved with hands at both horizontal or vertical. In the standby mode, the instrument working components are in low power consumption mode to save the energy and protect the instrument. If the instrument has been at non-standby mode (the head is locked and cannot be moved with hand) and not operated for long time, it can be damaged for long-time heat generation and mechanical lock.



## XII Specifications

Power Requirement: AC100V-240V DC24V

Power: 50W

Drilling Speed: 0~5000 RPM

The Drilling Bits' eccentricity tolerance: 0.03mm

X-axis moving range (Max. ): 155 mm.

X-axis moving rated Load:50Kg

Y-axis moving range (Max. ): 38 mm.

Y-axis moving rated Load: 30Kg.

Clutch suction force (Max. ): 1.5kg.

Resolution of the Encoder: Less than 0.07mm.

Clamping Capacity of the Clamp:  $\geq 0.7$ kg.

Dimensions: 302×228×270mm

Weight: 5Kg