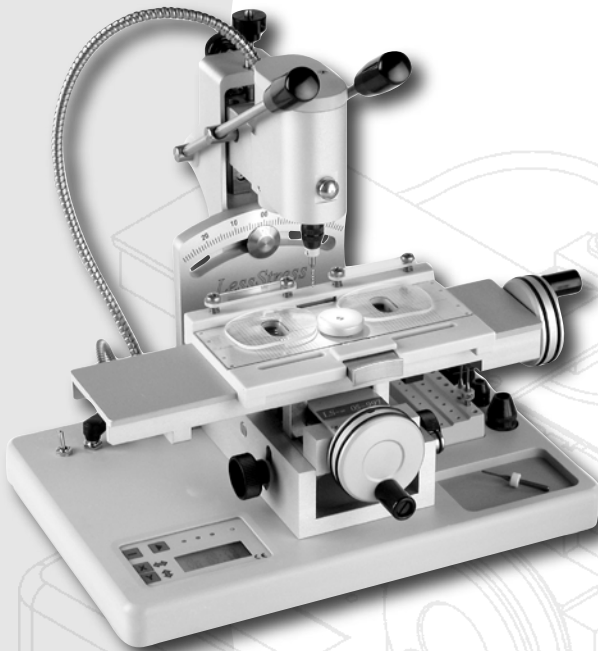
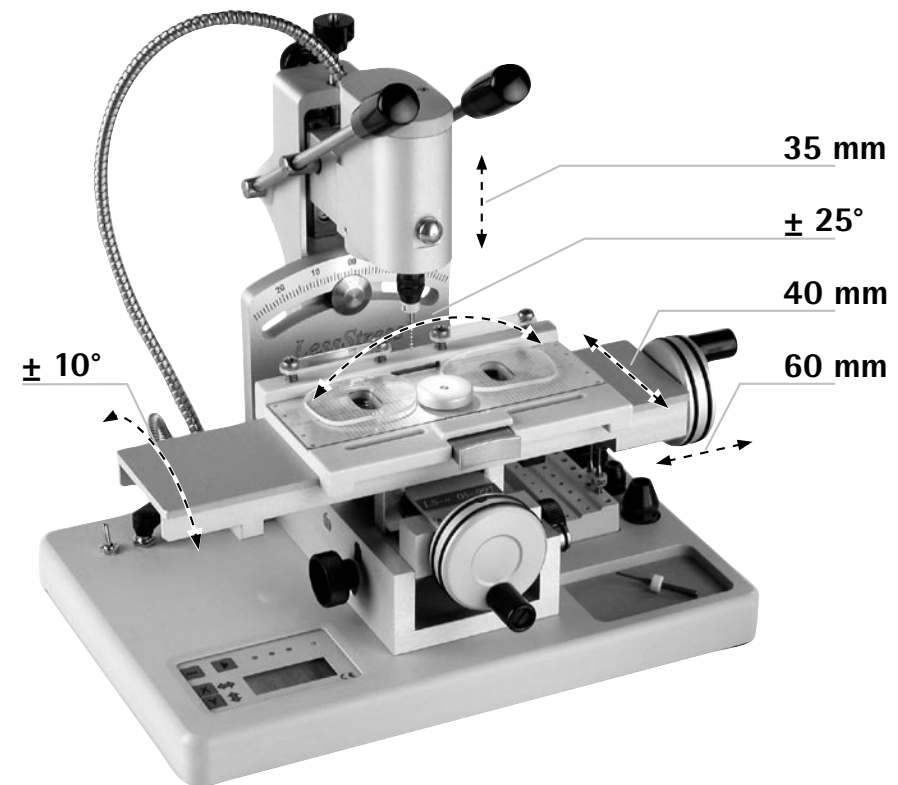
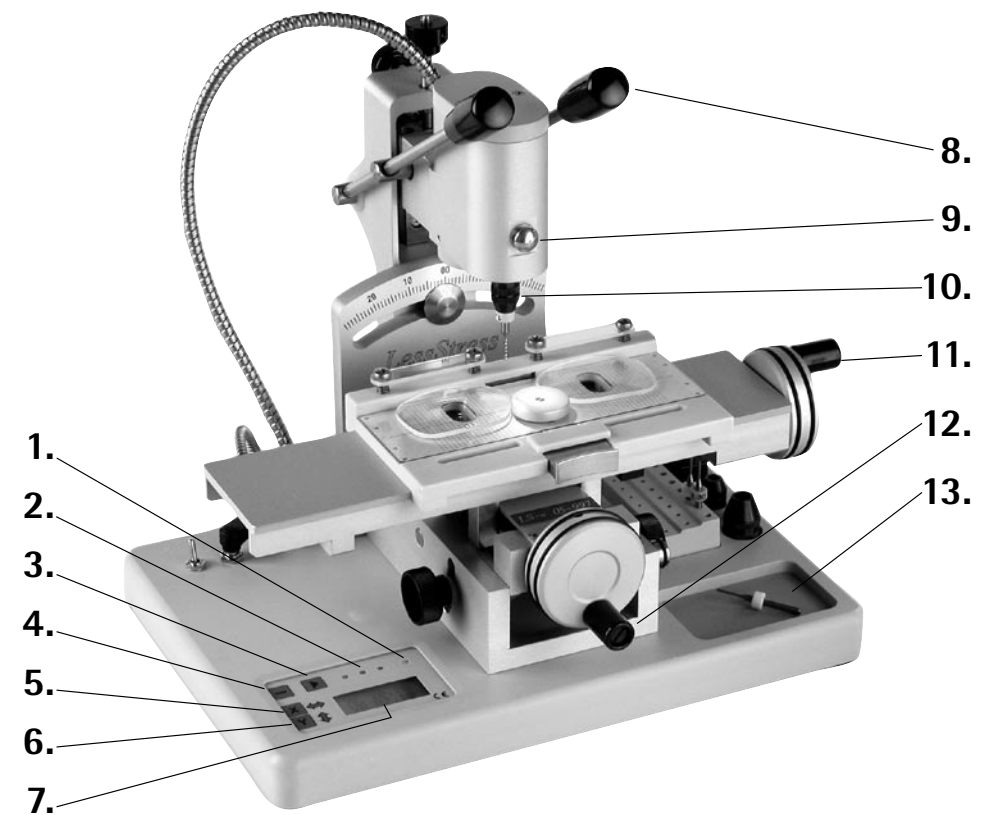


Manual

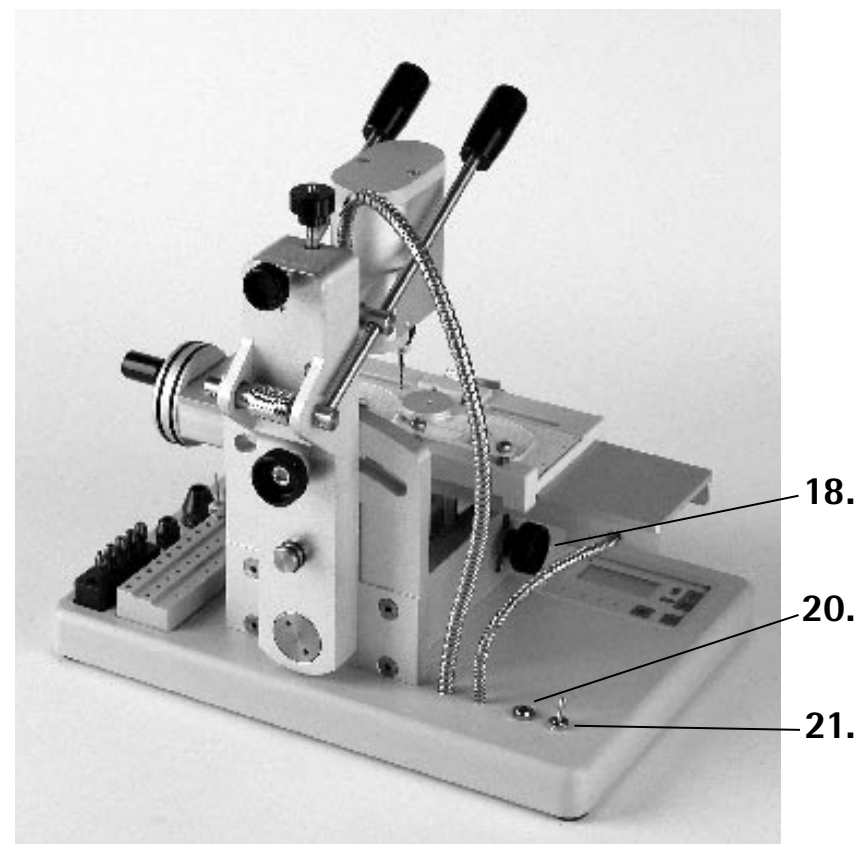
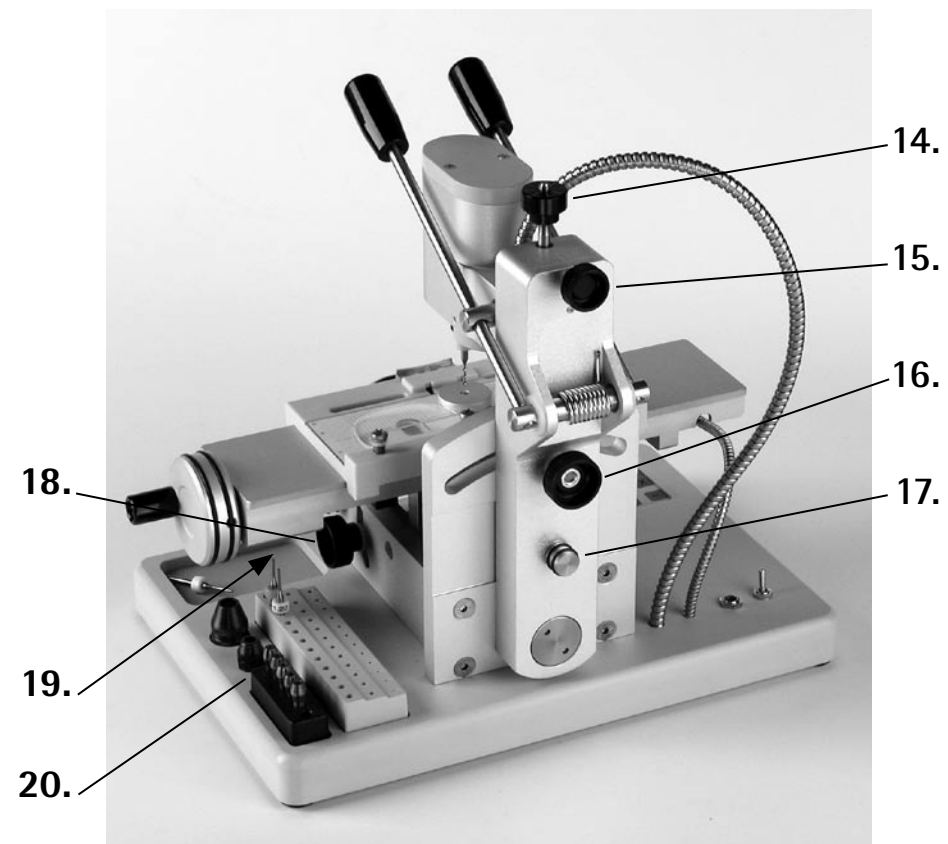


LessStress®



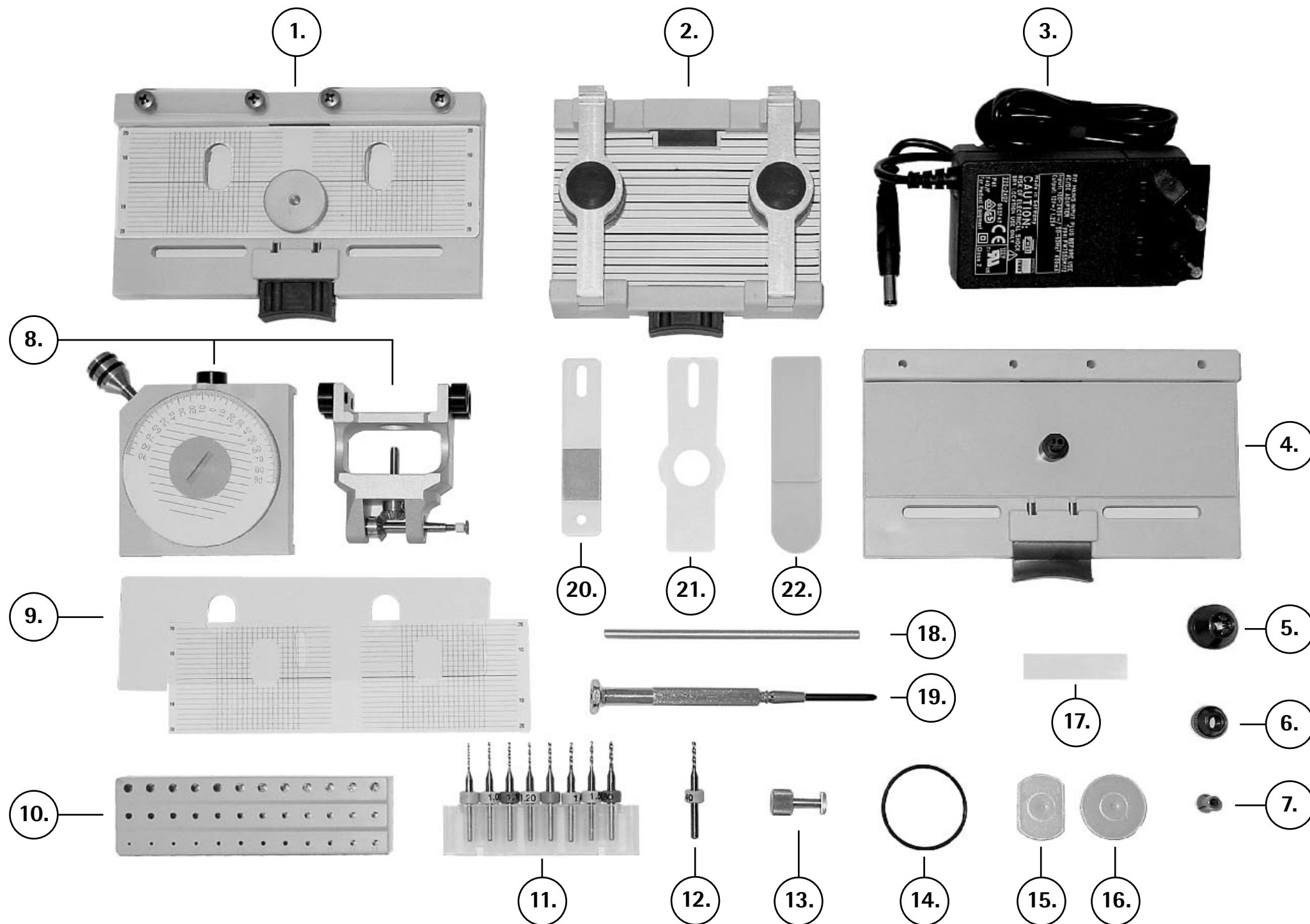
Drill features (front view)

1. Display “On/Off”
2. Display of variable speeds
3. Motor on; variable speeds
4. Motor off
5. X-axis Reset
6. Y-axis Reset
7. Digital display
8. Drilling arm
9. Spindle lock button to secure the drill spindle while changing drill bits
10. Collet chuck
11. X-axis Dial
12. Y-axis Dial
13. Tray for drills etc.



Drill features (rear view)

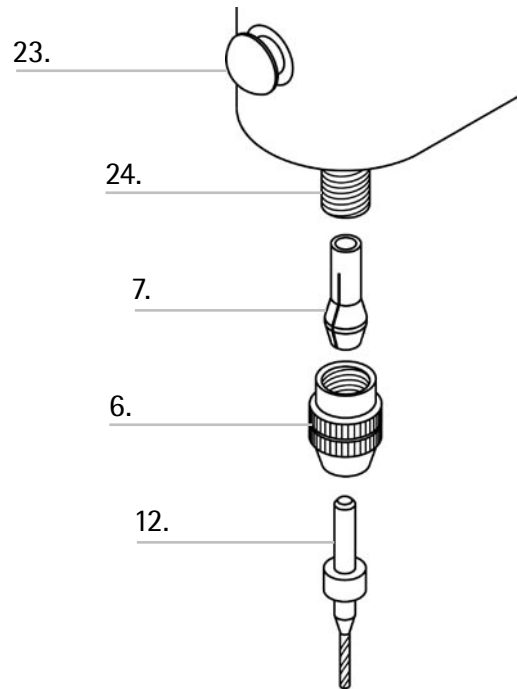
- 14. Adjustable end-stop
- 15. Lock screw for adjustable end-stop
- 16. Lock screw for drill-head tilt
- 17. Lock pin for 90° vertical-position of drill-head
- 18. X-Y table pantoscopic tilt lock
- 19. Lock pin for X-Y table in horizontal position
- 20. Tray for accessories
- 21. "On/Off" switch
- 20. Plug for power supply



Accessories

1. standard lens mounting stage
2. lens mounting stage for blocked lenses*
3. power supply
4. Lens mounting stage for screw extractor*
5. collet 0.5 - 3.5 mm
6. collet chuck
7. collet chuck
8. T-Flair Adapter*
9. PVC-pad with paper backing
10. drill block
11. drill set 0.9 - 1.6 mm*
12. drill
13. knurled knob for lens clamps
14. transmission belt
15. square lens holder
16. round lens holder
17. PVC-strips for adjusting
18. rod for blocked lenses
19. screw driver
20. lens clamp for unblocked lenses
21. lens clamp for blocked lenses
22. „Y“ zero gauge

* = optional accessories



Safety precautions and initial operation

Please read these safety precautions and this manual carefully, so you can use LessStress optimally. Always keep the manual together with the unit. Please only use original accessories which are optimized for the use with LessStress.

Unpack the unit carefully and keep the original box. Take care that the unit is only placed on a clean, dry and flat surface. Check the indication on the power supply with your electric currency. Do not use other power supplies and do not manipulate the unit or the cables.

If the collet chuck (7) is not mounted to your unit already, please mount it accordingly to the drawing on the left side. To use the enclosed drills (5), mount the largest collet chuck. To fix the drill spindle while mounting, press the button (22).

Always wear protection glasses while working with LessStress!

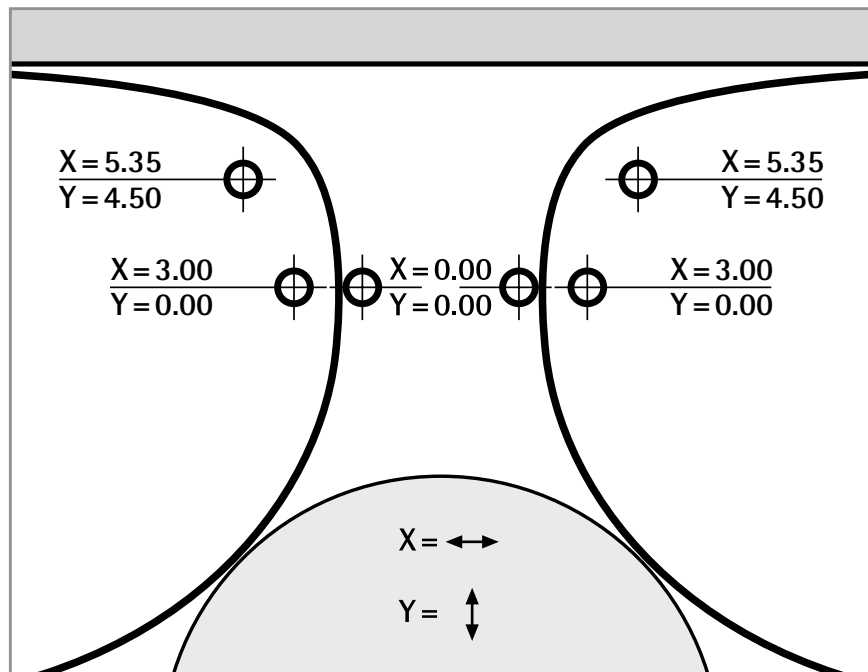
Make sure that hair, clothes and electric cables are kept away from rotating parts of the unit.

When you leave the unit, make sure it is turned off and that all rotating parts have come to a complete stop.

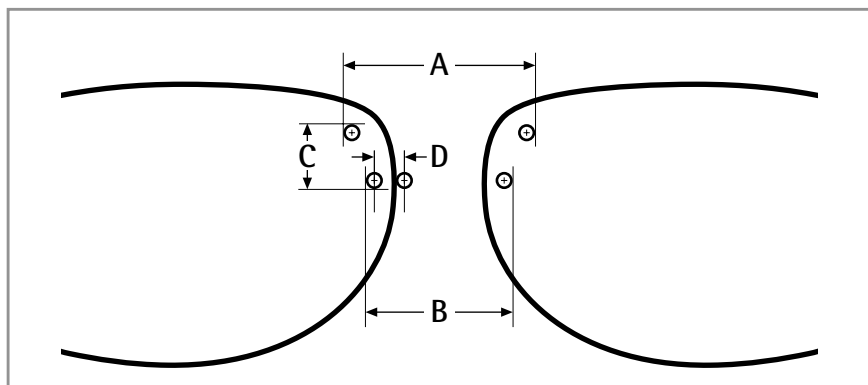
If a tool blocks, immediately turn off the machine.

Always choose the fitting collet chuck for each tool.

1.



2.



General hints

Every drilled job with LessStress follows the same protocol:
the two coordinates of a hole refer to a reference point of the Y-axis at 0.00 and the edge of the lens. You will measure holes and notches starting from this point.

Sometimes the positions of holes and notches in the sample lenses are not symmetrical. Therefore use only one of the sample lenses for taking your measurements. Since both prescription lenses are drilled in a mirror-like fashion to this one sample, the result is always excellent. In case of doubt it is best to verify uncertain measurements by drilling a test lens first. The little extra time is offset by less correction time later.

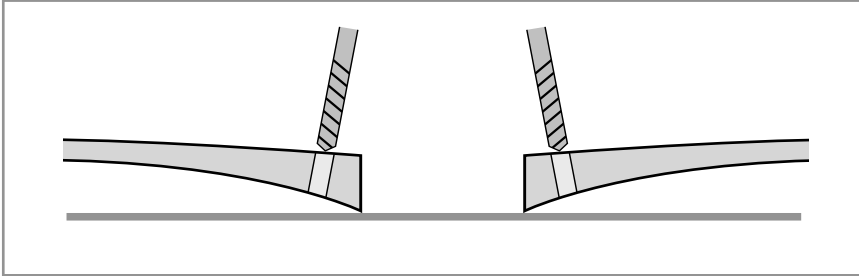
Collect old lenses for test drills.

With frame chassis that have 4 screws welded on, taking the coordinates is very easy.

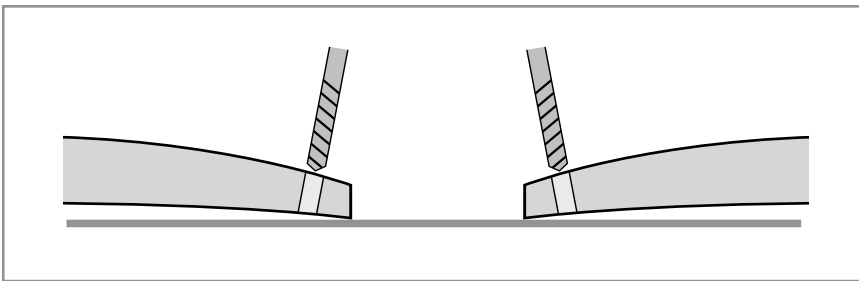
A - B \div 2 = drilling distance on X-axis
C - = drilling distance on Y-axis
D - screw \varnothing

You only need the distance of the first drilling from the edge of the lens (D).

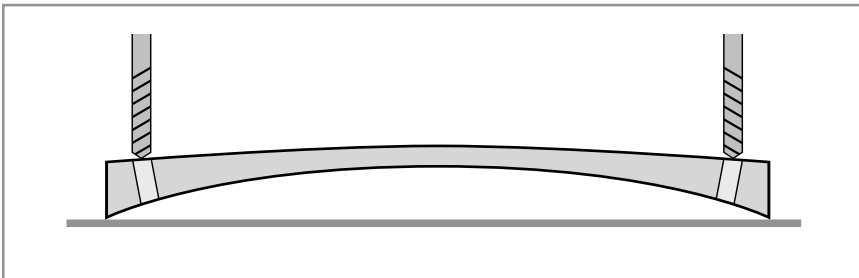
1.



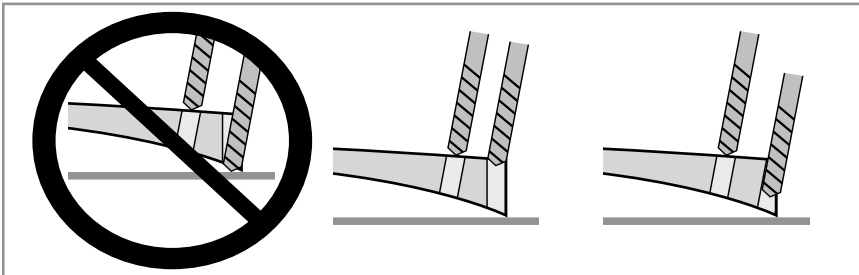
2.



3.



4.



The angle in which the lenses should be drilled are determined by the frame chassis/mounting. If you drill plus or minus lenses - the adjustment of the mounting will be a lot easier if you do not drill vertically but use the angles given by the frame chassis/mounting.

If you are not sure about the angle, using an angle of 8° will be close to the optimal angle (drawing 1 and 2)

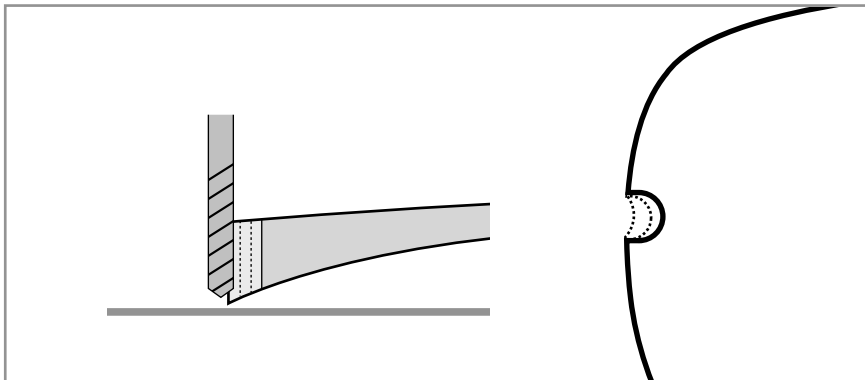
It is important to drill the holes on the nasal side of the lens at the same angle to avoid a later twisting of the lenses.

If holes or notches on one side have different diameters we recommend to drill both holes or notches with the small diameter. It is very easy to ream up the smaller diameter by hand for example from 1,2 mm to 1,4 mm without changing distance or angle.

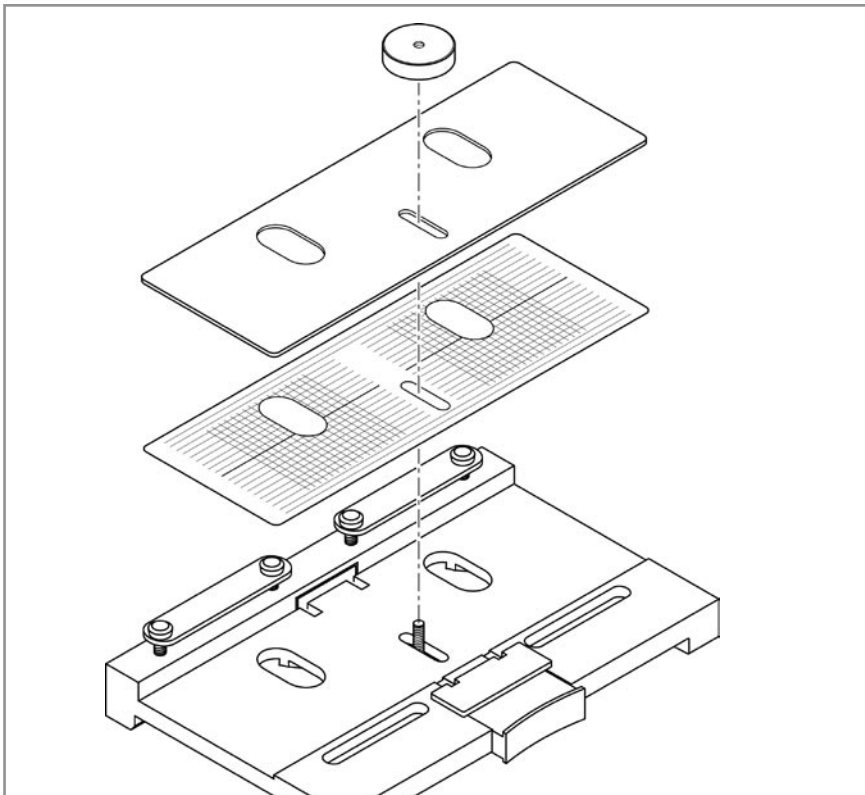
Glasses with supporting rod mostly have different angles at nose side and bow side. It is advisable to take the coordinates with perpendicular position before you drill at the right angles. (drawing 3)

On lenses with hole and notch it is important to measure the distance on the front surface of the lens. By doing so you avoid the tedious frame adjustments necessary afterwards. The length of the notch at the front surface should be approx. one drill diameter.

1.



2.



We suggest using our hard metal drills which have a larger shank and a short spiral bit-end because normal drills tend to bend and wobble, causing faulty results. Furthermore you can notch lenses up to 2,5 – 3 mm thick at the lens edge with our hard metal drills without changing tools. Always turn the X-Y dials staring at the outer diameter to have a more sensible feeling for turning!

Please note that the drills are extremely sharp, but also very brittle and therefore should be handled very carefully.

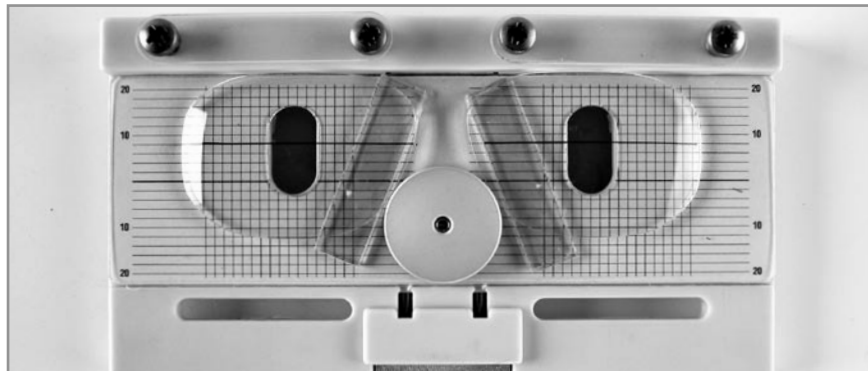
These drills can also be used to prepare a notching in thicker lenses by drilling a sequence of “half” holes(two consecutive holes resembling a figure-eight style hole)and then to even them out later on. Please turn the X-Y dials very carefully while doing this in order to extend drill-bit life. If you should drill into the PVC-pad, this PVC-pad is a consumable part that can be easily replaced.

Polycarbonate lenses should never be drilled with standard/ normal drill-bits. These drills tend to melt the lens rather than drill, which again may cause stress cracks in the lens. Our drills with their spiral cutting ability avoid this risk.

Also, always use the lowest speed while drilling polycarbonate.

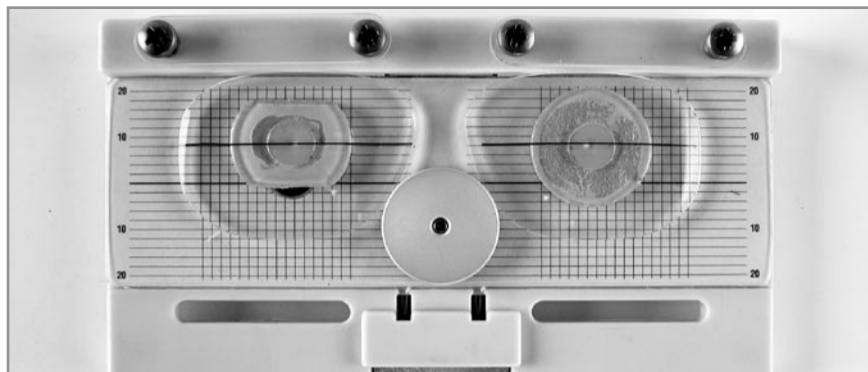
The motor speed is variable and can be adjusted accordingly to lens material and drill size.

1.



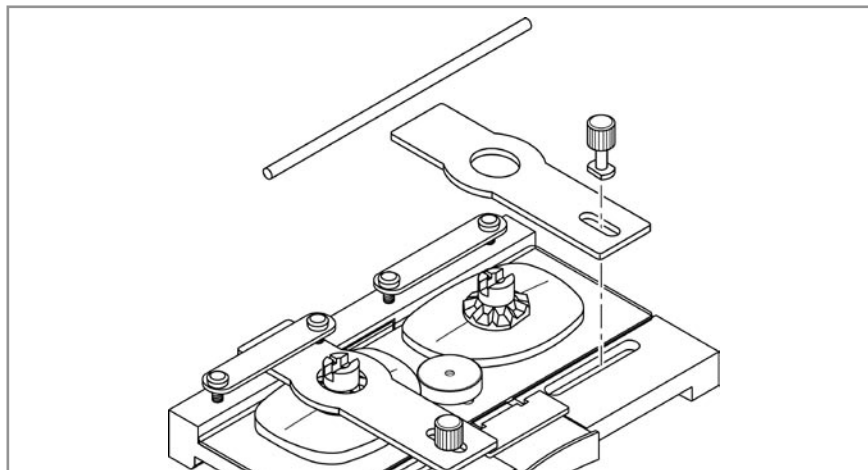
With very thick lenses and/or unusual shapes it may be necessary to support the lenses on the mounting stage by means of the PVC strips. Use the strips to get the front surfaces of the lenses in a horizontal position to make drilling easier and more precise. When notching, lenses can also be supported by these strips to avoid drilling into the PVC pad (photo 1).

2.



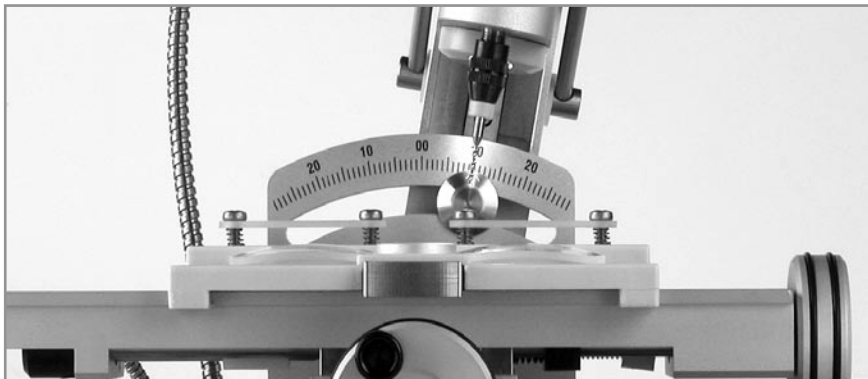
With the supporting disks you can also support the lenses from the center. This is recommended for small lenses which only rest on small rims and might be deformed by putting pressure on them when fastening on the mounting stage. The graduated scale under the PVC pad makes it easy to find the same position for left and right supporting disk (photo 2).

3.



If you prefer to work with blocked lenses, fastening onto the mounting stage can be done with lens holding strips, which go over the blocks. Before you fasten the lenses please check that the lenses are up against the top(rear fence) and the middle lens-stops (bridge-stop). A perfect axis alignment can be achieved with the axis-rod (drawing 3).

1.



Besides the drill-head swivel capacity (photo 1), you can also change the pantoscopic tilt of the X-Y-table (photo 2). Pull out the lock pin of the table, turn loose both screws and swivel the table in the needed direction. At the right side of the table you will find a small scale. An angle of 5° will cause a change in height of approx. 8 mm at the end of the mounting.

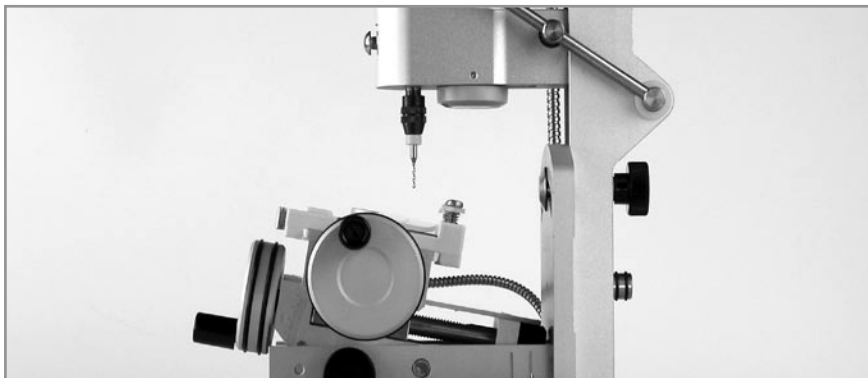
The adjustable end-stop of the drill-head also has a little scale. Turning the knob 1/8th of a turn (photo 3), moves the drilling head 0.1 mm up or down.

NOTE: Important hint while working with LessStress:

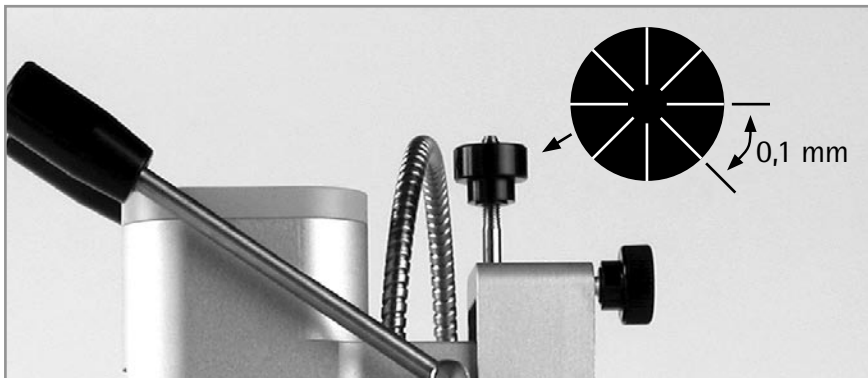
The digital display of the X-Y-table works with a digital encoder that is similar to a radio dial.

Therefore, it is very important, to turn the dials at a rate of only **one revolution/second** to avoid the skipping of any impulses.

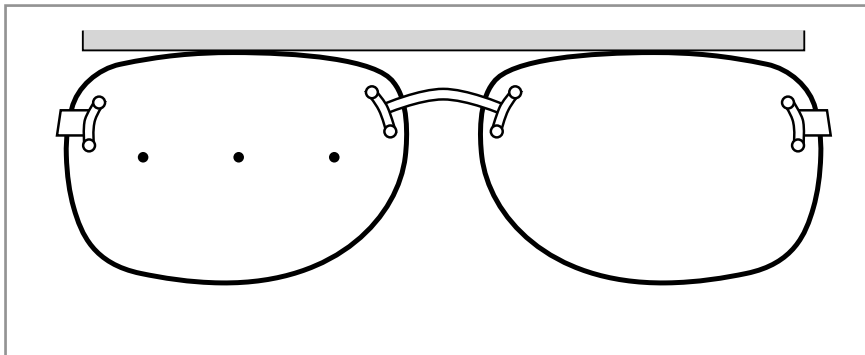
2.



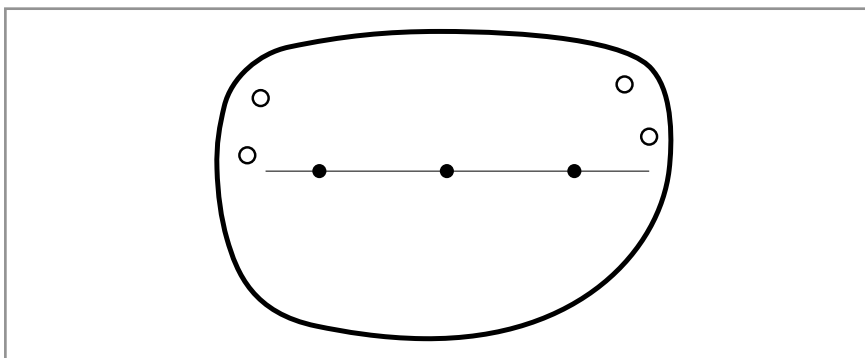
3.



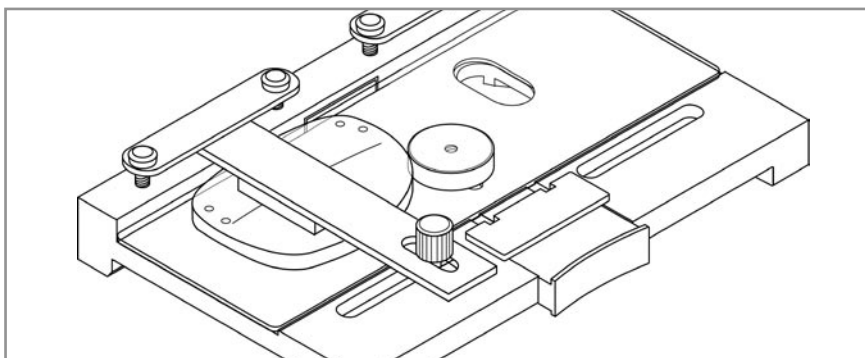
1.



2.



3.



Step by step

Mark the horizontal-axis line on the sample lens (1),
disassemble the sample lenses from the frame chassis and
measure the diameter of the screws or notch pins (2).

Position the sample lens on a mounting stage touching the top
edge of the lens to the top-rear fence of the stage. Also touch
the nasal side of the lens to the middle round stop and align the
axis line with the printed lines on the paper beneath the PVC
pad.

Fasten the lens with one of the lens clamps (3).

1.



Prior to starting a job, please make sure that the X-Y table is approximately located in the middle of the machine by way of using the X-Y dials (use the base of the unit as a reference for centering your X-Y table).

Place the mounting stage onto the machine (press the front button on the mounting stage). First, mount the front side of the plate, then tilt down and arrest the back. (1)

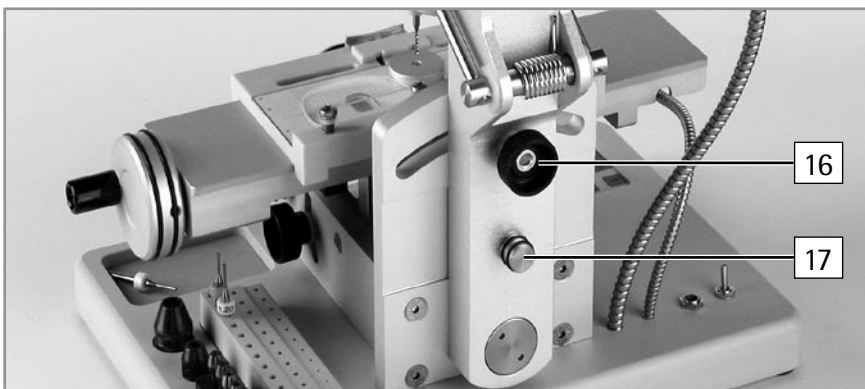
Place a pin or drill of appropriate diameter in the nasal side hole of the lens.

Pull out the lock pin (17), loosen the lock screw (16) and move the drill-head so that the pin in the hole is parallel to the drill (3). Tighten the lock screw (16).

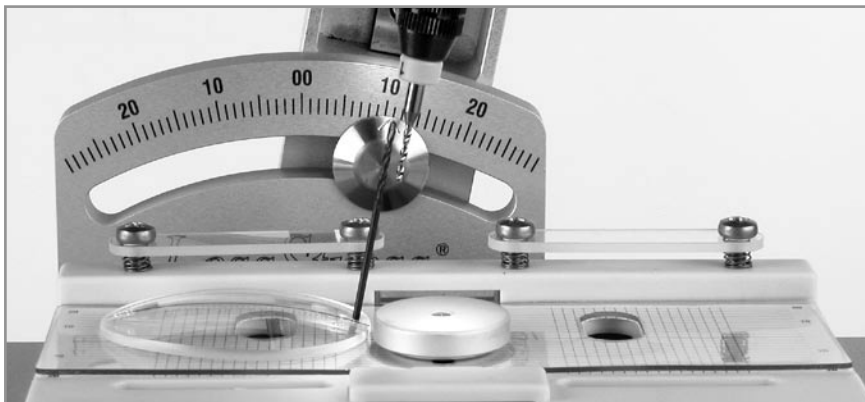
The pin or drill for measuring the angle should fit tightly into the hole of the sample lens.

If the drillings in the sample lens are a lot bigger than the diameter of the screw, you should use a drill or pin with an appropriate diameter. For hole drilling, the diameter of the drill should not be larger than 0.1 mm than that of the screw.

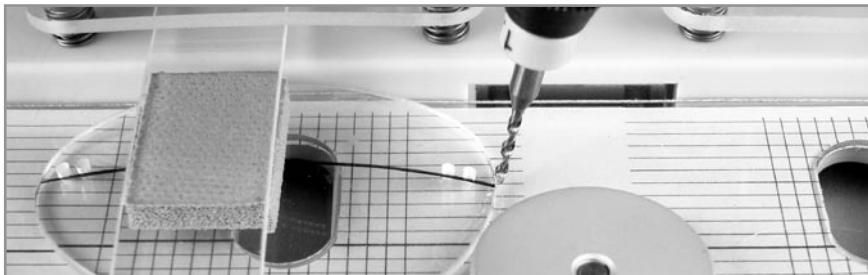
2.



3.



1.

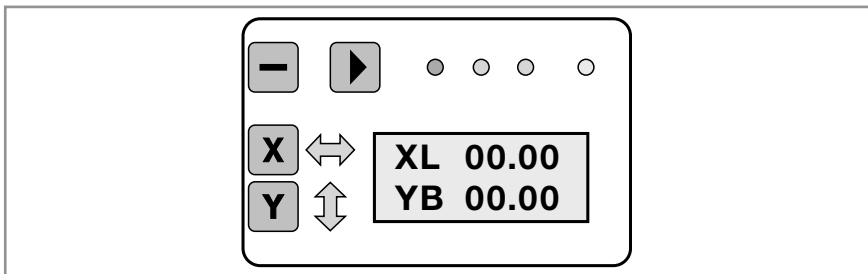


Remove the pin or drill from the sample lens. Press the button in front of the mounting stage and move the mounting stage until the drill bit is near to the first hole.

Then move the table by using the X-Y dials until the drill fits into the hole. Lift the drill bit up and out of the hole.

Then move the table until the drill touches the rim of the lens. Now reset both X and Y axis to 0.00. This is the starting point for measuring (picture 1 & drawing 2).

2.



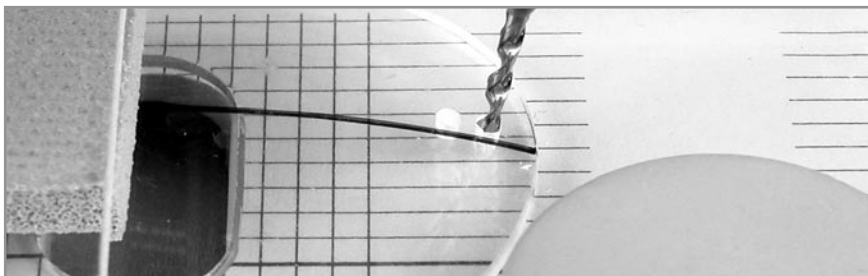
Move the table by using the X-Y dials until the drill fits into the first hole. (picture 3)

Mark the position of holes and notches on a coordinate copy template and note the coordinates for the first hole.

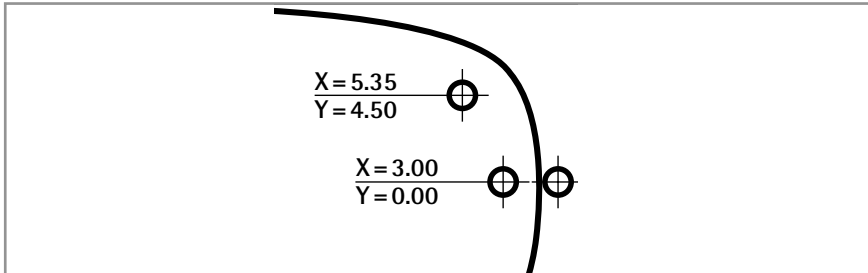
Repeat for the second hole.

Your drawing should then look like this: (drawing 4)

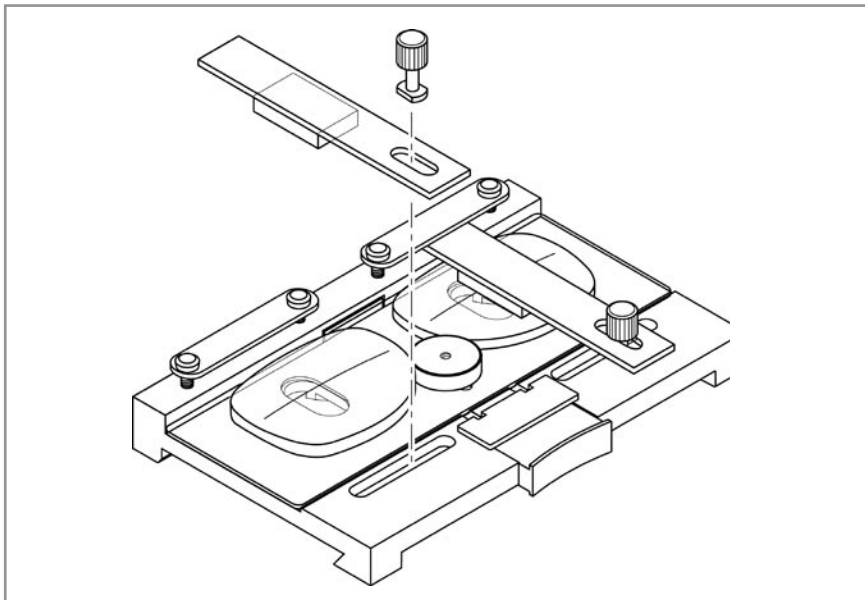
3.



4.



1.

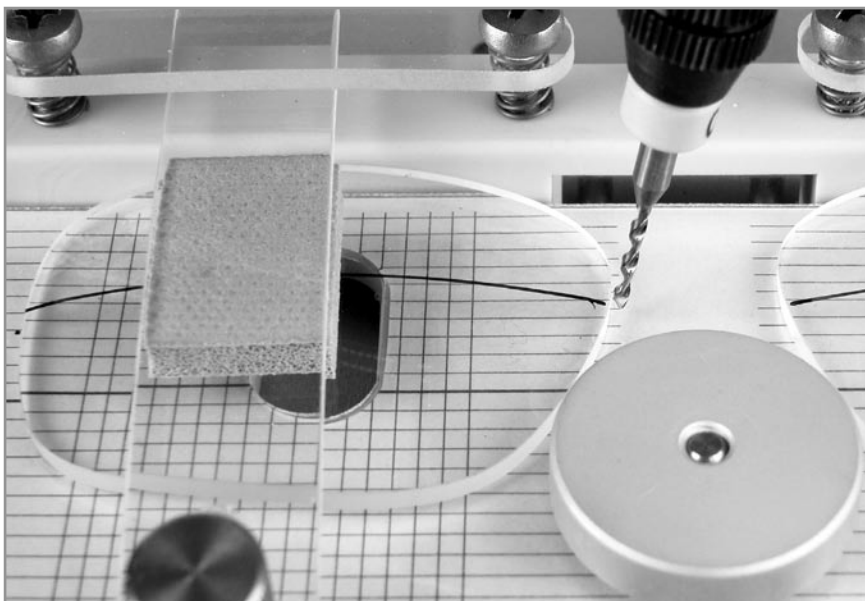


The edged prescription lenses are positioned and fastened on the 2nd mounting stage. The horizontal axis line was drawn before grinding and is now used to find the right position, parallel with lines on the paper beneath the PVC pad. The PD needs not to be considered. This was already done while grinding.

The middle round lens stop can be moved so that measurements can be taken and holes drilled without problems on all lens shapes and sizes. (drawing 1)

Since the lenses are fastened to the mounting stage while off the machine, you can easily check whether the front surface of the lenses are set correctly and well positioned for drilling. After that you secure the lenses on the mounting stage with the appropriate lens clamps (plastic strips with foam backing pads). The tension of fastening can be changed by bringing the back bridges on the mounting stage up or down with the screwdriver supplied. Please secure tightly for notching and frasing.

2.

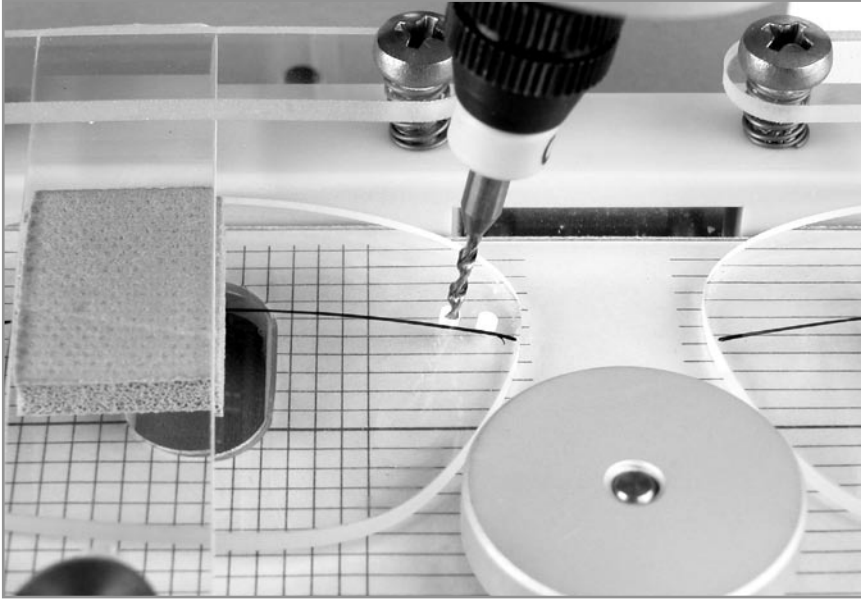


Now attach the mounting stage with the prescription lenses onto the X-Y table and move the Y-axis back to 0.00 **by using the Y Dial.**

Now move the lens mounting stage so that the very tip of the drill is at the very front edge of the rim of the lens. **Reset the X-axis to 0.00 with the reset button.**

The Y-axis is **turned back to 0.00** and the drill therefore has the same distance from the top rear lens stop as the sample lens. (Picture 2)

1.



Move the table by using the X-Y dials to the coordinates you have written down and drill the nasal holes of the first lens (Picture 1).

After drilling the first lens **turn back the Y-axis to 0.00 by using the Y dial, swivel the drill head to the same angle** on the other side and move the mounting stage again until the drill is at the very edge of the rim of the other lens. **Now reset the X-axis to 0.00 with the reset button.**

You now have the same drill position for the second lens (Picture2).

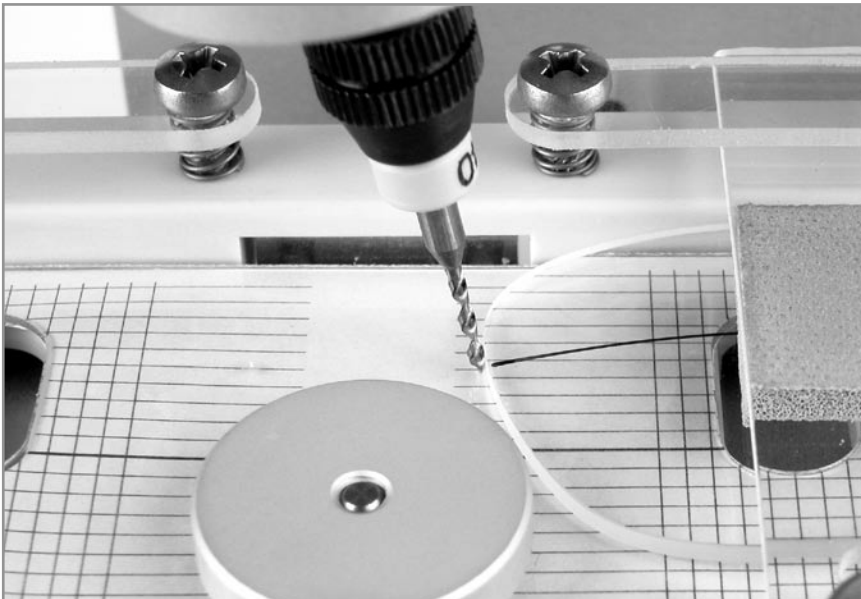
Drill at the same pre-recorded coordinates. Now the nasal holes for right and left lens are drilled absolutely in a mirror-like fashion from the demo lens.

Now change back to the mounting stage with the demo lens, adjust the drilling angle as shown before, take your coordinates of the temporal holes (or notches) and change back to the mounting stage with your prescription lenses.

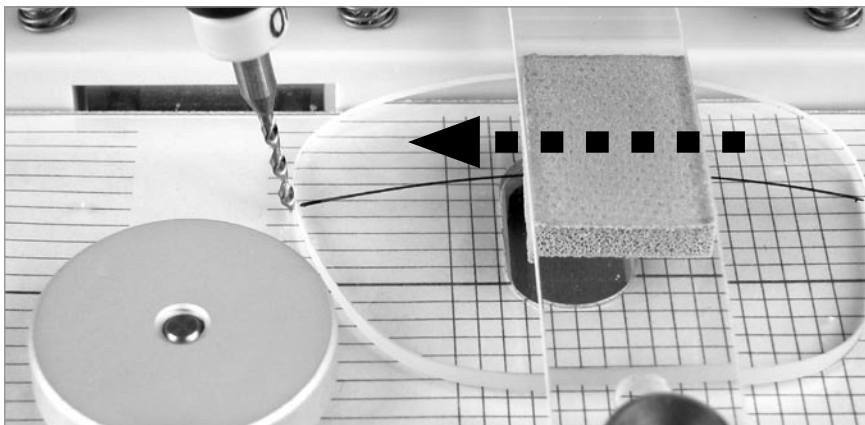
Please always make sure:

In between measuring and drilling the Y-axis may only be set to 0.00 with the Y Dial.

2.



1.



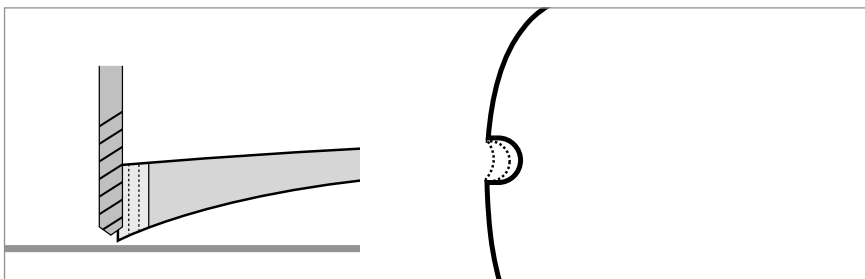
The depth of a notch and the distance to the hole are measured exactly as the coordinates for two holes

(Picture 1).

Lenses with edge thickness of 2.0 – 2.5 mm can be notched by moving the table with the lens on it slowly and carefully against the drill. Do this by **only turning the X dial and not the speed handle on the dial.** By using the X dial, you can feel the cutting ability of the drill and therefore achieve notching with greater accuracy and precision.

Notching in this manner can only be done by using our recommended drill bits, since they have a side-cutting edge.

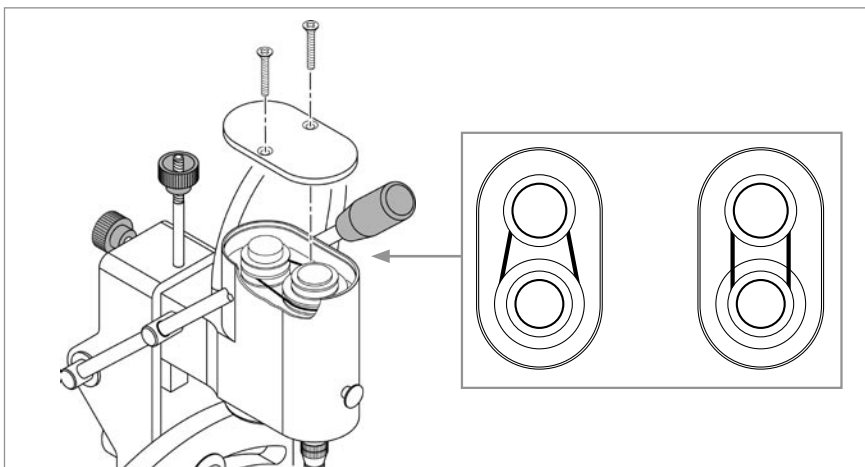
2.

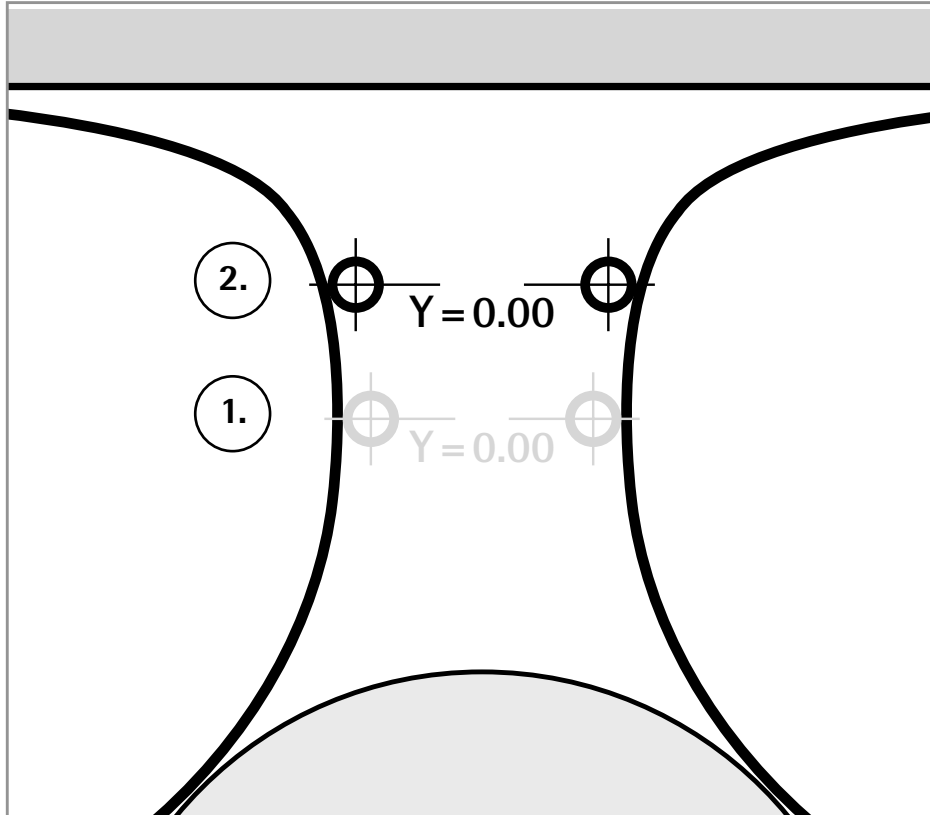


For thicker edged lenses drill in several steps with a movement forward of approx. 0.4 mm, starting at the rim of the lens. After the desired depth of the notch is achieved, slowly go back within the notch, to clean-up and even the notch (Drawing 2).

For longer notches special frasers (fish-tail drill bits) should be used. Also, the speed of the spindle should be increased by rearranging the transmission belt (Drawing 3).

3.





Changes in shape and size

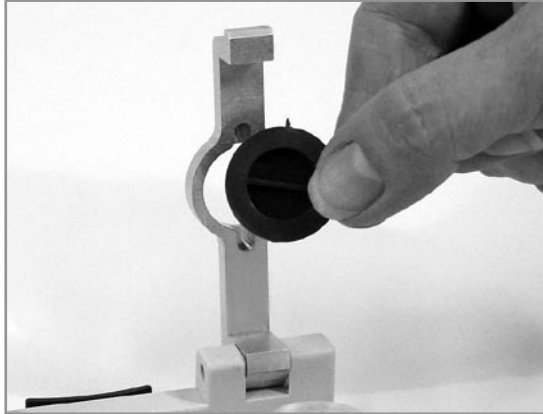
If you change the shape and/or size of the prescription lens, you may also have to realign the 0.00 line of the Y-axis.

Take the coordinates from the demo lens as previously described. Change the lens mounting stage with the prescription lenses. Now you have to decide if and how much you want to realign the 0.00 line of the y-axis up or down. For example, turn the y-axis in a way that the drill meets the lens 2 mm higher. Move the table so that the drill rests on the rim of the lens and reset both digits (X- and Y-axis) to 0.00. The relation of the coordinates to each other do not change. This means that you can now drill with the same coordinates measured before.

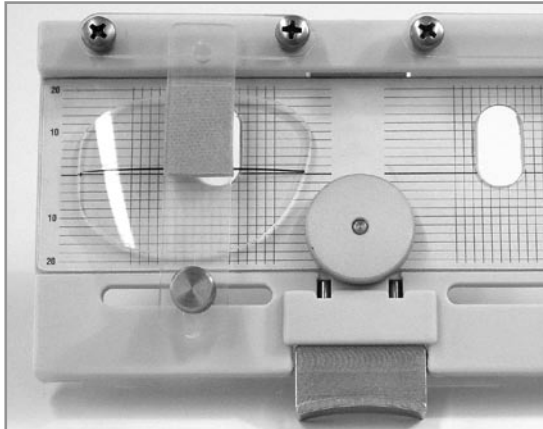
1. original 0.00 line for Y-axis
2. new 0.00 line for Y-axis

Please note that after a change on the nasal side, most times it is necessary to make the same change on the temporal side.

1.



2.



3.



Lens mounting stage for blocked lenses

We recommend the use of this stage if you prefer working with blocked lenses. Please choose the inserts that fit your blocks and press them into the holes in the bridges. Depending on the style of blocks you use, please note the top-orientation of the insert (Picture 1).

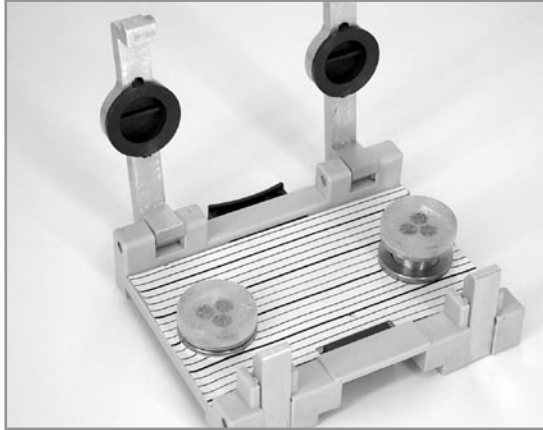
The procedure now depends on how you measure the coordinates and how you block the lenses.

One way is to draw the 180° line(datum line) onto the demo lens and to use this line as the 0.00 line for the Y-axis. Clamp the demo lens on the stage by aligning the 0.00 line to the middle line on the 0.00 line of the graph paper (Picture 2).

Move the drill along this line to the rim of the lens and reset both digits to 0.00. This is the starting point for all measurements and drillings.

When blocking the prescription lenses on the 180° line, you can easily find the corresponding line on the new stage graph paper (Picture 3).

1.



The rest of the procedure is basically the same as that of the standard lens mounting stage. Of course, you can also block the demo lens and take the coordinates with this stage.

To secure the lenses you can tighten the grip by turning the bottom lens holders up or down (Picture 1).

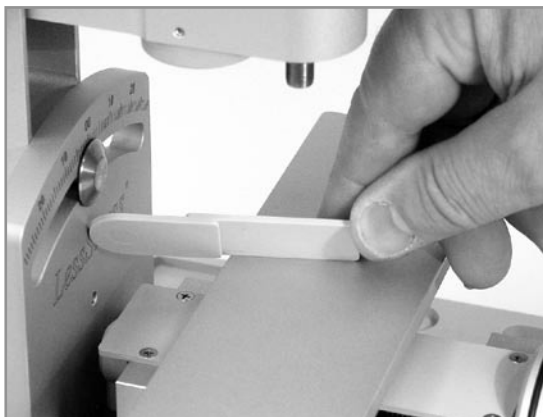
There are 3 ways to find the 0.00 line of the Y-axis.

1. As previously described by aligning the lens according to the grid
2. By aligning the drill bit with the center holes on top of the bridge-ring edge (Picture 2).
3. With the Y-zero gauge which you will find in your accessory box (Picture 3).

2.



3.



1.



Screw extractor stage

LessStress can also be used for general drill works. A standard mounting stage (void of lens clamps) with an even surface can be used for these types of applications (Picture 1).

On this stage you can fasten a hardened steel pin with a 2 mm hole, which is very helpful for drilling out broken-off screws.

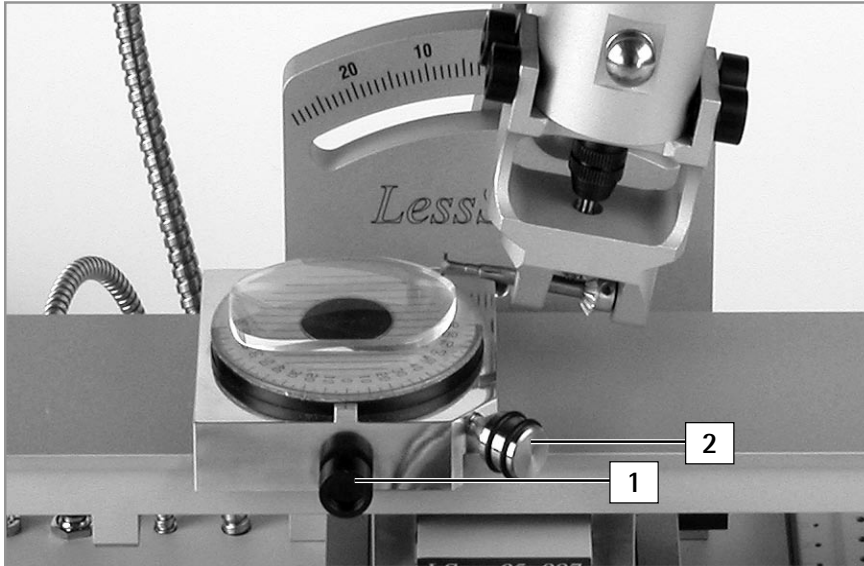
The screw extractor can also be fastened to our standard lens mounting stage, instead of the middle lens holder (Picture 2).

Please always keep drill bits used for drilling lenses and the drill bits used for general drill works separate!
Damaged or dull drill bits can cause damage to prescription lenses!

2.



1.



T-Flair adapter

For use in notching the lens surface (e.g. the T-Flair screws used in some Flair-models), we have developed this special adapter and mounting stage.

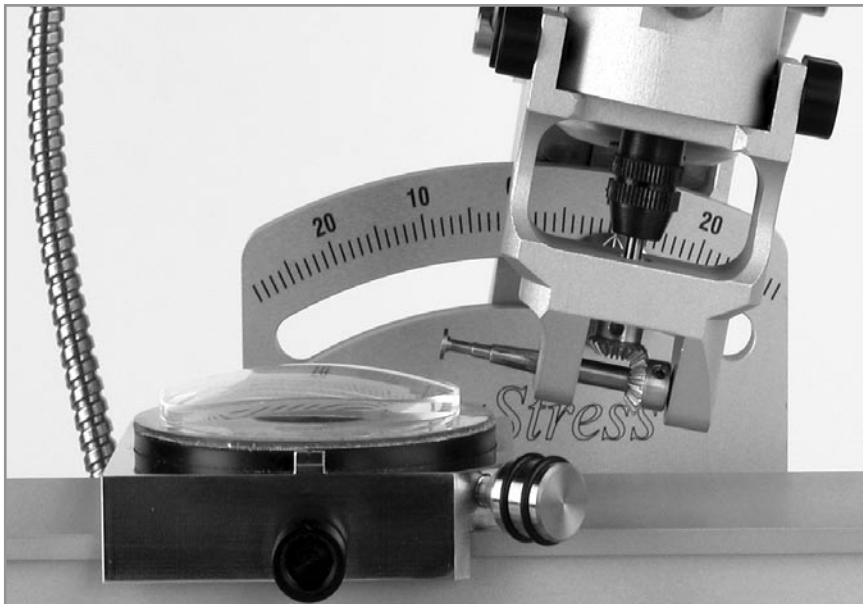
You start by inserting the driving shaft of the adapter into the largest collet chuck (3.0 - 3.2 mm). Then insert the adapter into the drilling head. Screw tight.

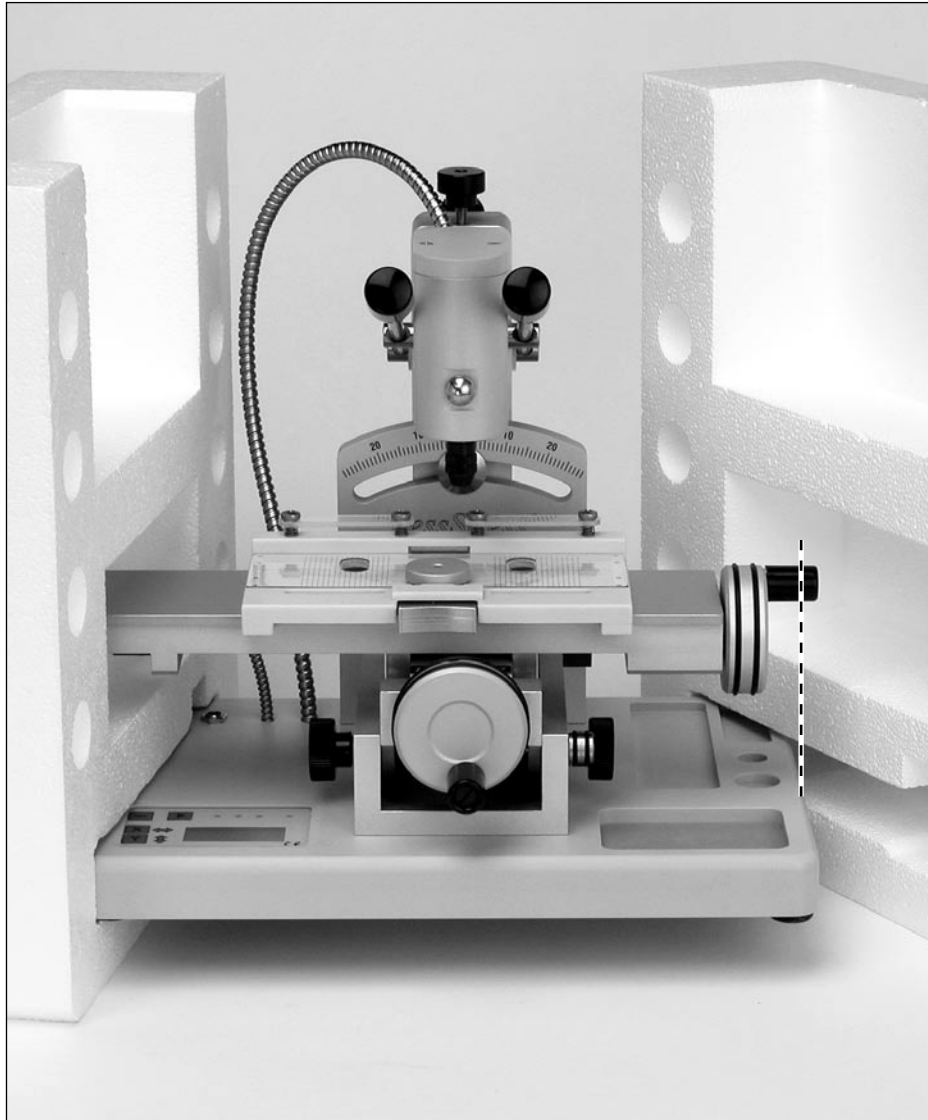
The plastic screws on the left and right side are only for adjustments of tolerances, not for tightening the adapter. Tighten these screws very carefully!

The mounting stage is fixed to the X-Y-table with screw 1, the turning table can be fixed with screw 2 (Picture 1).

The scale and a grid on the turning table helps to adjust the correction lenses and to notch in a mirror-like fashion. The lenses have to be held by hand.

2.





Warranty conditions and repacking instructions

In each country where LessStress is being sold, the warranty conditions of our distributors are valid.

Manufacturing defects will be repaired free of charge within the warranty period.

In case of warranty repairs are needed, please contact your local distributor.

We are not liable for damages caused by wrong handling and/or mis-use of the unit or failure to refer to the manual for proper operational procedures and precautions.

The unit should only be shipped in the original carton. Please take care that the X-axis dial does not stand more than 5 mm over the base plate (see picture on left).

Damages caused by incorrect packing and shipping are not covered by the warranty.

We kindly suggest that you keep the original box.

Maintenance

All surfaces are made of anodized aluminium, stainless steel or ABS plastics.

Clean using only a soft, damp cloth.

Acetone, solvents or strong detergents can damage the surface and are not to be used.

All ball bearings are sealed and have a long-term lubrication.

The collets will work better if a thin film of light oil is applied.

The spindle, drill-arm guide-shafts as well as the linear bushings should always have a thin film of light oil.

A vacuum cleaner should be used to remove lens debris. Never use a blower.

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D CE KONFORMITÄTSERKLÄRUNG

Wir erklären in alleiniger Verantwortung, dass dieses Produkt mit den folgenden Normen oder normativen Dokumenten übereinstimmt: EN 50 144, EN 55 014, EN 60 555, HD 400 gemäß den Bestimmungen der Richtlinien 73/23/EWG, 89/336/EWG (ab 1/1/1996), 89/392/EWG.

F CE DÉCLARATION DE CONFORMITÉ

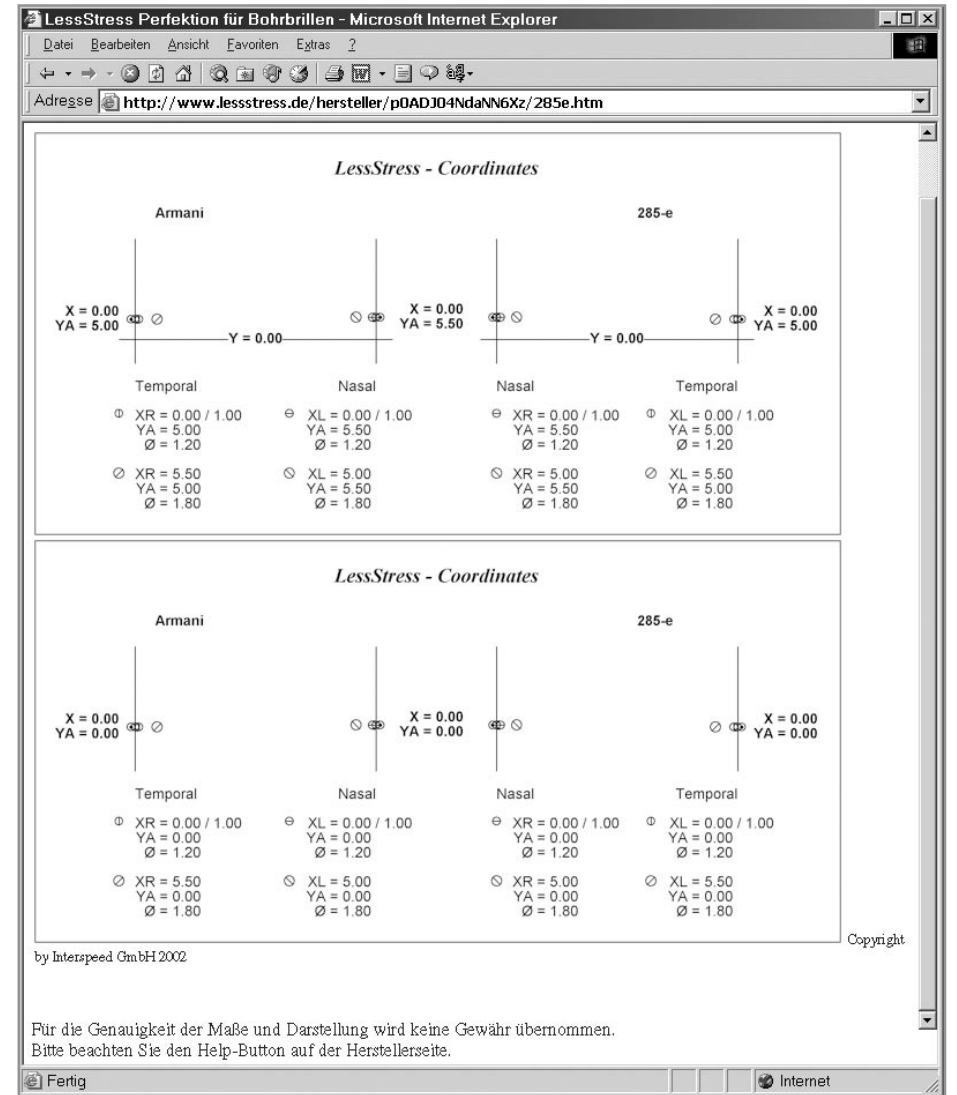
Nous déclarons sous notre propre responsabilité que ce produit est en conformité avec les normes ou documents normalisés suivants: EN 50 144, EN 55 014, EN 60 555, HD 400 conforme aux réglementations 73/23/EEC, 89/336/EEC (à partir du 1/1/1996), 89/392/EEC.

GB CE DECLARATION OF CONFORMITY

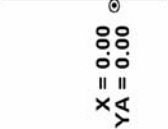
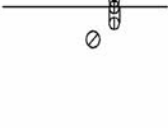
We declare under our sole responsibility, that this product is in conformity with the following standards or standardized documents: EN 50 144, EN 55 014, EN 60 555, HD 400 in accordance with the regulations 73/23/EEC, 89/336/EEC (as of 1/1/1996), 89/392/EEC.

I CE DICHIARAZIONE DI CONFORMITÀ

Dichiariamo, assumendo la piena responsabilità di tale dichiarazione, che il prodotto è conforme alle seguenti normative e ai relativi documenti: EN 50 144, EN 55 014, EN 60 555, HD 400 in base alle prescrizioni delle direttive CEE 73/23, CEE 89/336 (dall' 1/1/1996), CEE 89/392.



LessStress - Coordinates

LessStress	Sample		01
 $X = 0.00$ $YA = 0.00$	Temporal	 $X = 0.00$ $YA = 0.00$	Temporal
$XR = 4.00$ $YA = 0.00$ $\varnothing = 1.30$	Nasal	$XR = 0.00 / 2.50$ $YA = 0.00$ $\varnothing = 1.30$	$XR = 0.00 / 2.50$ $YA = 0.00$ $\varnothing = 1.30$
$XR = 4.00$ $YB = 7.00$ $\varnothing = 1.60$	Nasal	$XR = 5.00$ $YA = 4.00$ $\varnothing = 1.60$	$XR = 5.00$ $YA = 4.00$ $\varnothing = 1.60$
			$XL = 4.00$ $YA = 0.00$ $\varnothing = 1.30$
			$XL = 4.00$ $YB = 7.00$ $\varnothing = 1.60$

The X-zero point for the temporal side of the right lens is the rim of the lens at $YA = 4.00$ mm

From this point you move to the first drilling at $XR = 4.00$ mm. The coordinates $XR = 4.00$ mm and $YB = 3.00$ mm stand for the second drilling.

Accordingly, the coordinate for the temporal side of the left lens is $YA = 4.00$ mm, XL for the first drilling = 4.00 mm, XL for the second drilling and $YB = 3.00$ mm.

In the drawing a slot is shown for the left lens, nasal side with $YA = 4.00$ mm; the slot starts at $X = 0.00$ mm and goes to $XL = 2.50$ mm. The second drilling is at $YA = 8.00$ mm and $XL = 5.00$ mm.

Our lens mounting stage for blocked lenses is especially good for taking these coordinates. The correction lenses have to be blocked on the horizontal line and shape and size are as the original.

The second drawing on our website shows the coordinates without the horizontal line (180° line).

Here, you have to determine the Y zero point yourself. The relations of the coordinates to each other do not change, only the Y coordinates are changed.

This way is used if you have changed size and shape of the lens.

These drawings can be printed directly out of the Internet. The frame of the drawing should have a width of 19,5 cm; then the coordinates are shown almost in the right scale. The lens can be placed over the print-out to check the coordinates and their relation to each other on nasal and temporal side.

Slots are indicated with the coordinates of the beginning and the end of the slot. If the drillings have different diameters, the circles in the drawing have different diameters as well.

LessStress - Coordinates

