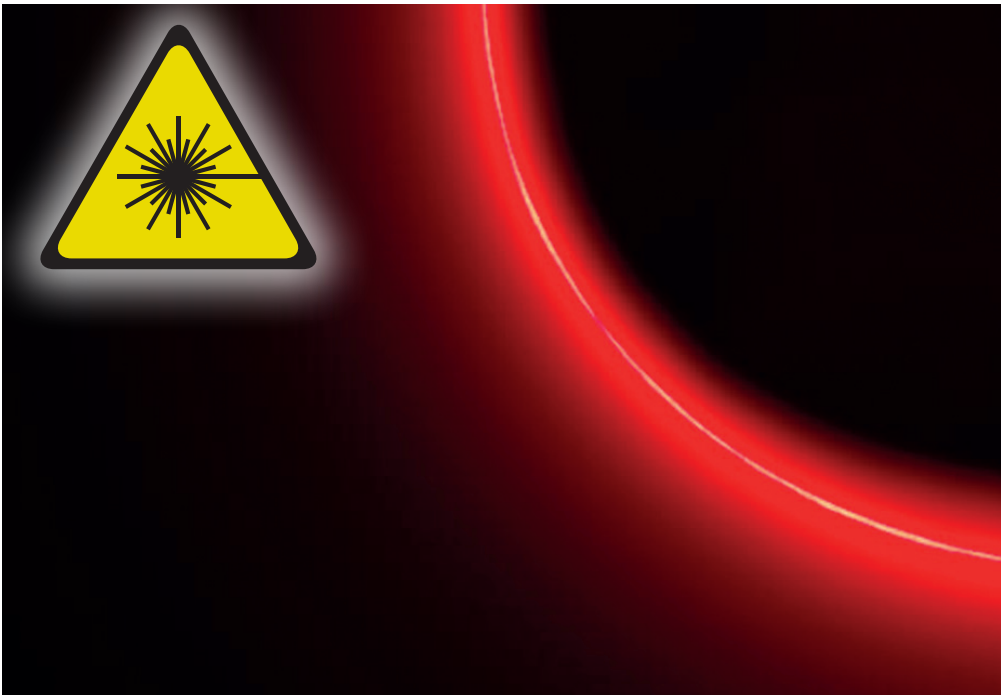
SLT + Nd:YAG Laser

Cobra

Installation & Handling

A.R.C. LASER

April 2019



BASIC LASER SAFETY INSTRUCTIONS

In case of any eye injury due to disregard of the eye protection by safety goggles, an ophthalmologist hast to be consulted.

To avoid any injuries and to use the COBRA laser safely it is important to follow the laser safety guide lines:

1. The laser system should only be used by a trained personnel, undergone training by A.R.C. Laser or A.R.C. Laser approved trainer.
2. The room or area, where the laser system is used must be marked with the included warning signs in clear and visible way, to warn against entering the room/area without adequate protection while the laser is in use.
3. The laser system should never be used, in case of a doubt the device or any of its component are faulty. The fiber delivery system should periodically be tested, by aiming the beam to a flat surface (at approx. 5cm distance) and observing the spot shape.
4. The device indicates when the laser is placed on “Ready“ mode. Any third person present at the area where laser radiation can occur (laser treatment area / laser room) should wear laser safety goggles, to protect the eyes from laser radiation.
5. The laser device must be used only for its defined application; never irradiate other material / or areas not detailed in the application description.

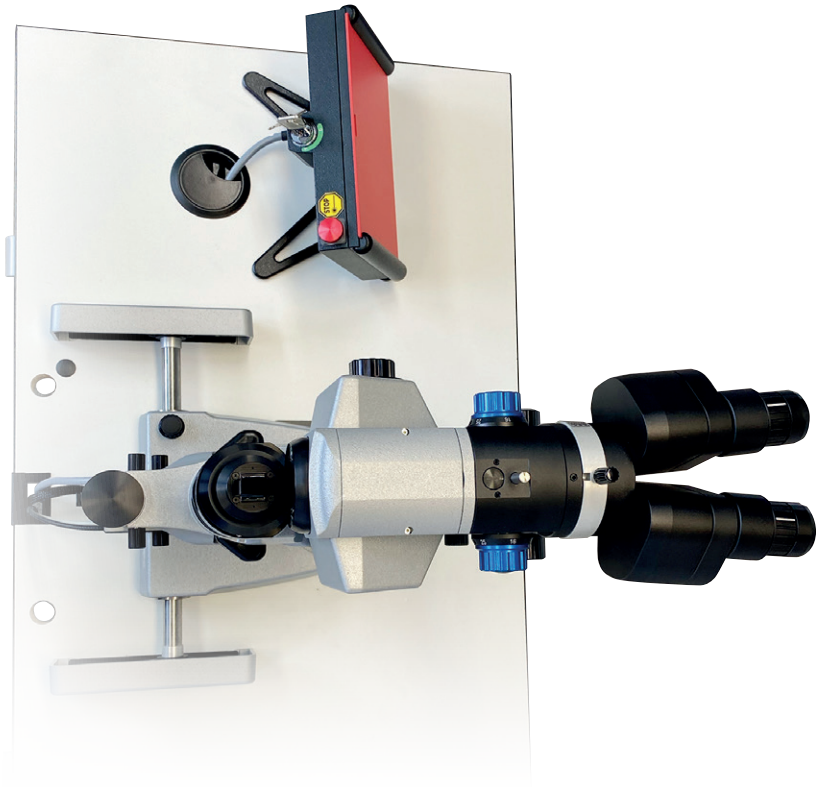
6. Special care should be taken to avoid irradiating reflecting materials, since reflected laser radiation can still cause serious harm.
7. Always switch off the laser from its „Ready“ mode when not in use; e. g. during long pauses or at the end of the procedure.

LASER RADIATION & TEMPERATURE EFFECT	
TEMPERATURE	EFFECT
> 40° C	Enzyme induction, membrane disaggregation, edema
45° – 65° C	Tissue damage, irreversibility depends on irradiation time
> 65° C	Coagulation
> 100° C	Dehydration
> 150° C	Carbonisation

Absorption is mainly derived by the laser radiation physical properties (wavelength). Absorption defines how much of the laser radiation is converted into heat, which causes the desired clinical effects (coagulation / vaporisation).

At low energy densities (large laser beam spot or low laser power), heat gradually built within the tissue. The smaller the beam spot size, or the higher the power, the faster heat will built. Above a certain limit, the tissue can no longer tolerate the amount of absorbed heat, proteins starts to denaturants and coagulation occurs. If continuing to heat up the tissue, the tissue water (intra and extracellular water) will suddenly evaporates (> 300° C). Tissue is fragmented and destroyed - cutting / evaporation is achieved.

BASIC LASER SAFETY INSTRUCTIONS



Always switch off the laser from its „Ready“ mode when not in use; e. g. during long pauses or at the end of the procedure.

READY-Screen

1. The laser packaging

The CITO is shipped in three seperate boxes:

The entire system includes the following parts, which can be ordered separately at any time.

① CITO SLT laser box

② The slit-lamp, additional chin rest plus laser transmission and control unit.

③ Table system with lifting ability for two legs.

Ususally there are no extra safety goggles included due to the fact that there is a built in protection filter for the surgeon.

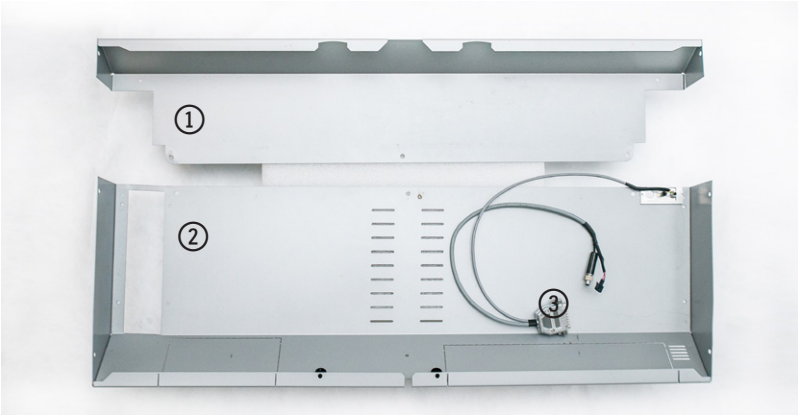
2. Unpacking the table (box #3)

The first layer contains the table legs ① and feet ②.

Layer 2 holds the table plate ③, that has to become joint to the legs.

3. Opening the table plate cover

By removing the cover plates ①② you will receive access to the table‘s plate. Inside shield 2 you have two pre installed cables ③.



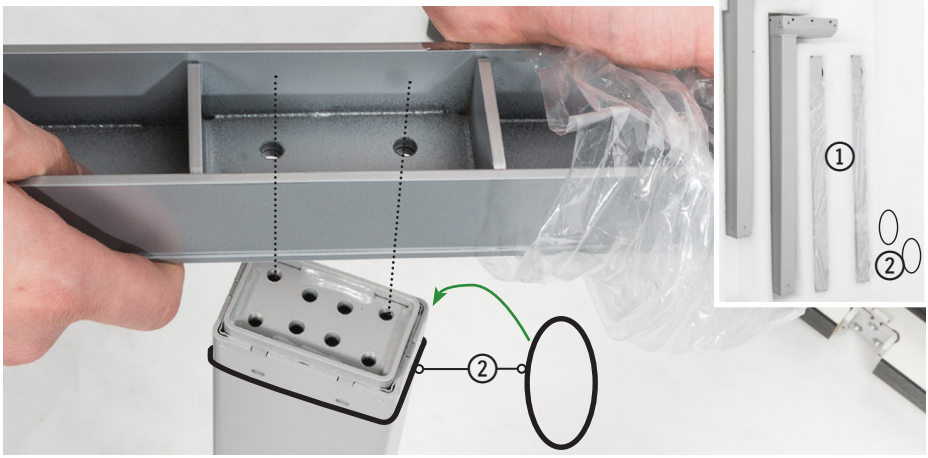
4. Mounting the legs

Both legs will find their place in the described mounting plates. Fix them with the short screws ① and take care that the cables are inserted ② + ③. At the same time make sure, that all the connectoers to power supplies are tightly + inserted ④.

Not inserting those connectors will lead to the loss of lifting ability of the table.

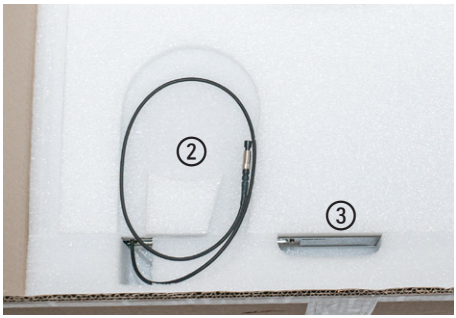
5. Mounting the feet

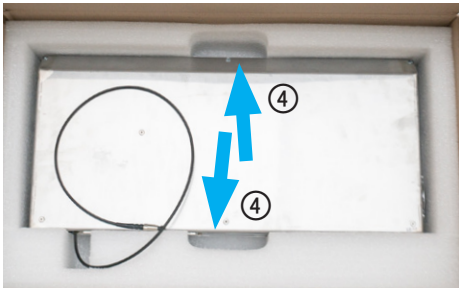
Four screws are necessary to connect each foot to the table.
Use one protector ring ② for each leg. Two rings are included in the package. Place the ring at the lowest end of the leg.
Make sure to have the short side facing the short end of the table. ③

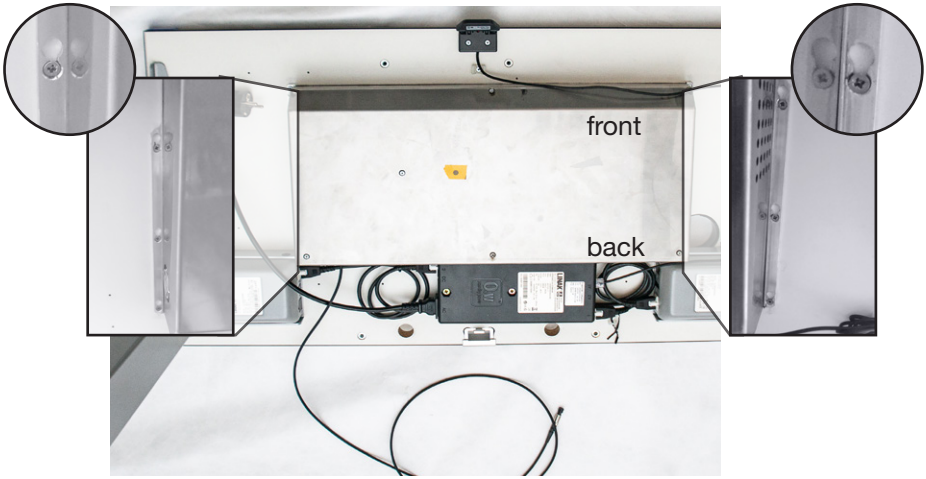


6. Unpack the CITO SLT laser box

Open the carton ① - avoid cutting! Take out the cover matte, and take care for the fiber that is now visible ② inside the package. Take out the protective foam cover ③. Make sure not to bend the fiber. Lift out the laser-box with two hands grasping the box ④. Place the laser box onto the bottom side of the table and fix it with all 6 screws in the displayed manner.







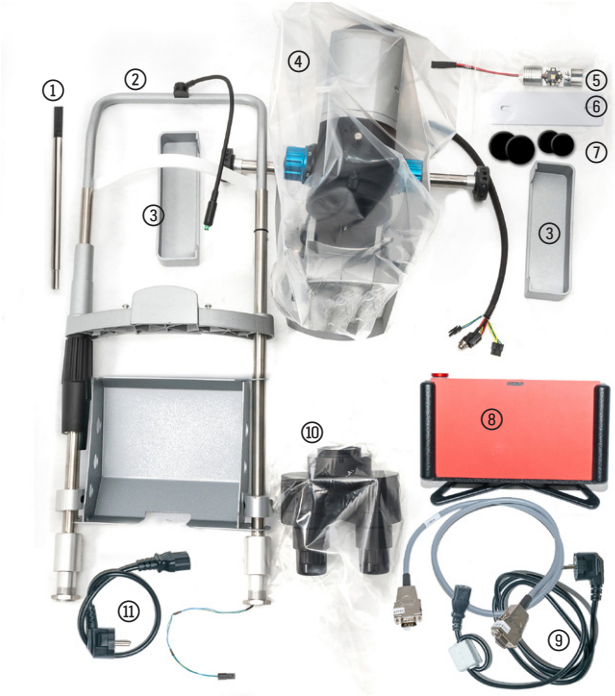
Rotate the table now and put it onto its feet.
Please check the position of the rubbers ●.

Open box number ② with the slit lamp inside.

7. Opening the laser package

The laser package is easy to open and covered by a protective foam. Anyway, please do not open it with a knife, you might harm the content.

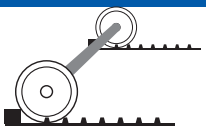
Content of the laser package



1. Focusing rod
2. Chin rest + cable
3. Side cover
4. Slit lamp +laser housing with integrated protection filter
5. Spare light bulb
6. Chin rest paper
7. Cover plugs (4pcs)
8. Screen + cable
9. Power cable, CITO
10. Tubus
11. Cable lifting table
12. Dust cover

8. Unpacking the Slitlamp Laser Housing for the Cobra

In box ① you will find the tubus.
Box ② contains the slit lamp accessories for the like Touch Screen and cables
To lift the Cobra out of the box please use both hands ③ to lift the base and the slit lamp well.



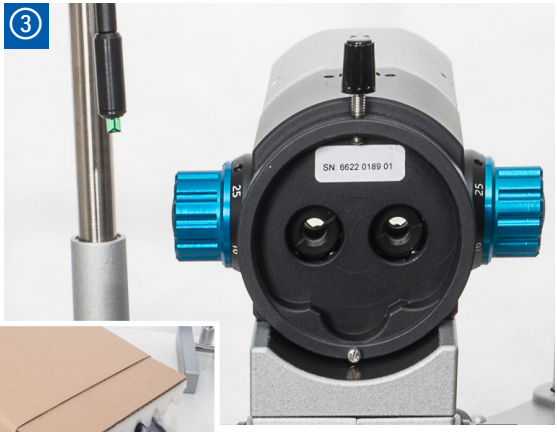
Mounting Slitlamp and Tubus

Place the necessary parts as displayed here on the table. To correctly put the slit lamp onto the table, please check that both rolls are straightly in Line. Mounting the tubus is performed by screwing the „pigeon-tale“ ④ connector manually. Do not overstretch the screw. ⑤

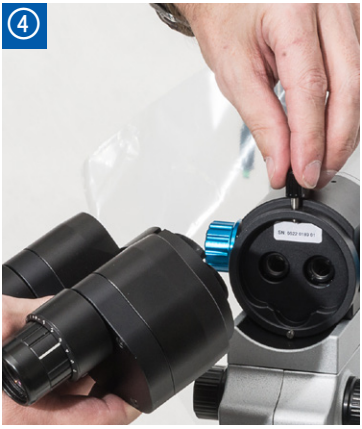
①

②

③



④



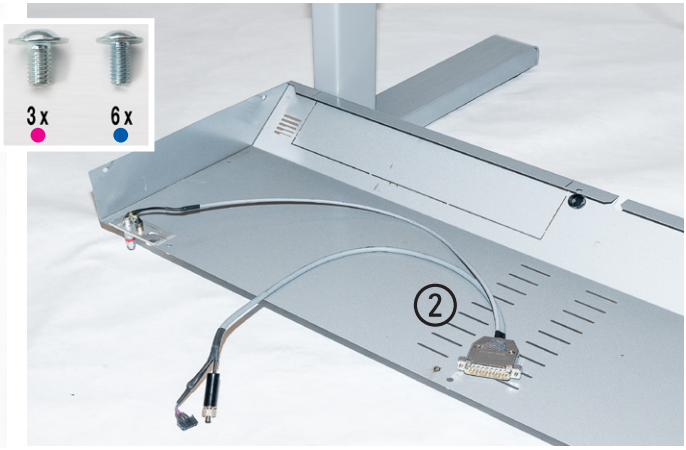
⑤

The slit lamp can be tested now mechanically: moving it left / right or up and down to check its functionallity.

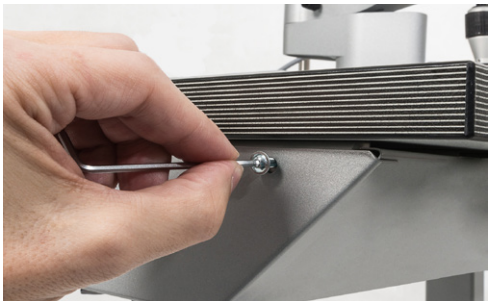
Placing the cable and the housing

The slit lamp cable ① has to go through the table placeholder ②
No need to open the placeholder for that procedure.

② Take the big plate ① hand mount it to the table with 4 screws (●) Please make sure that the cables will find space ②. Do not squeece them anywhere inside.



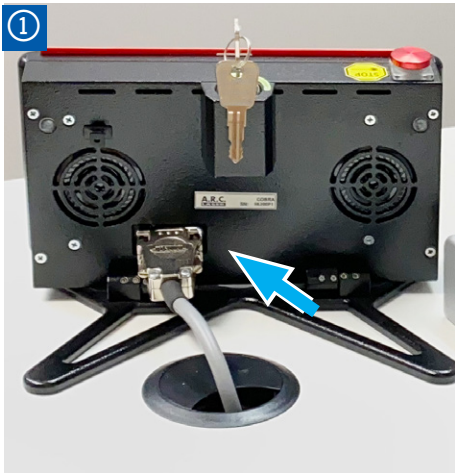
Just take the cable ② out. Do not squeece them anywhere inside.



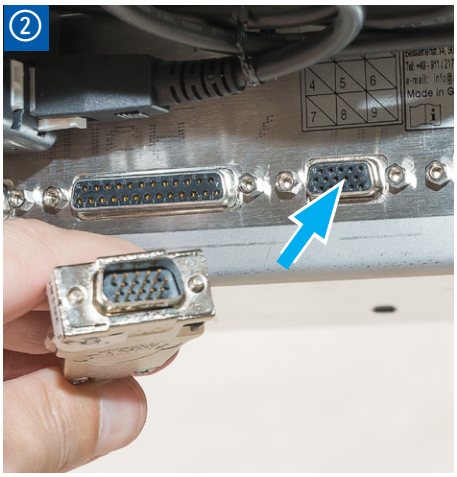
Placing the touch screen

Place the screen onto the table and
mount the monitor cable as displayed. ②

Fixate the cable with the attached screws. Do not overstretch them.



① insert the monitor cable at the back of the screen



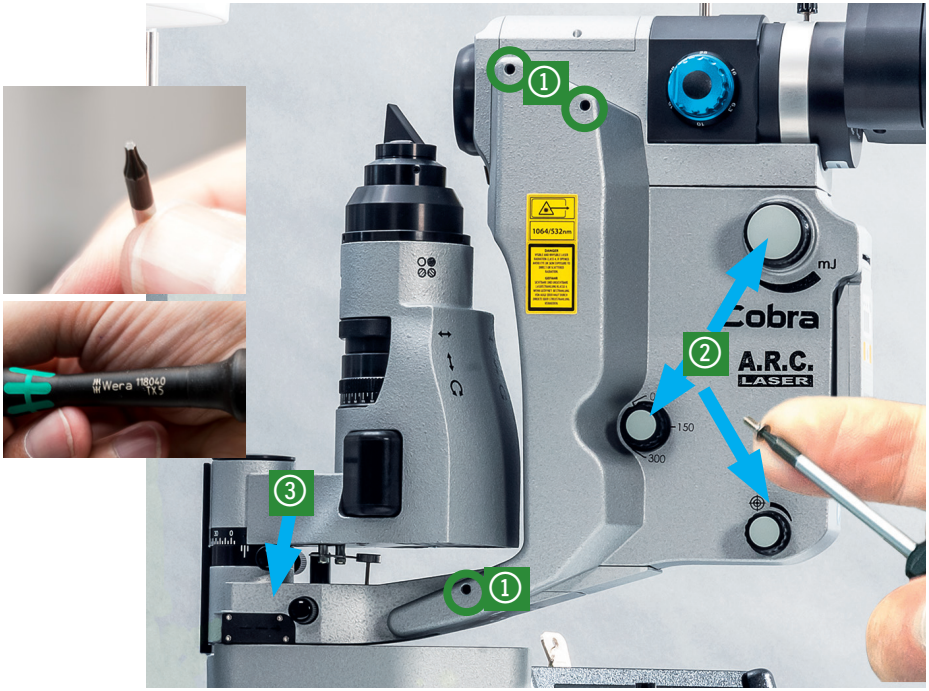
② Location of the monitor cable under the table

Remove left side cover plate

Use a TORX 5 screwdriver to open the cover plate screws.

If necessary take away the grey covers ② to take off the wheels, which are covering more screws ④. Also take off the black pad ③

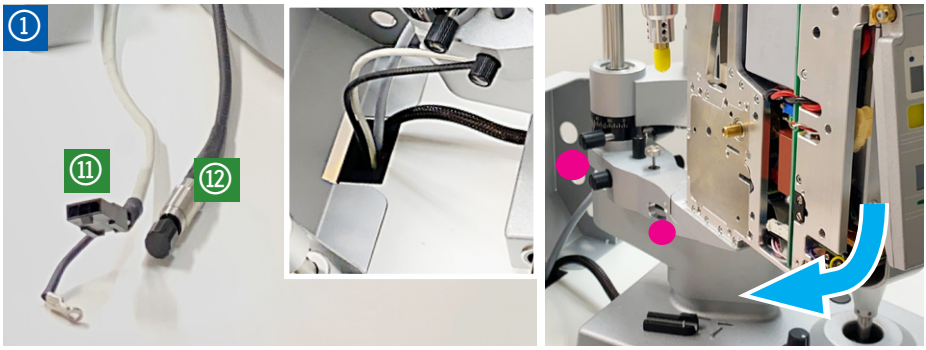
Please NOTE! You only need to take off this one side cover.

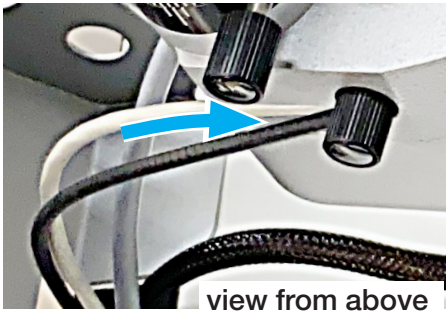


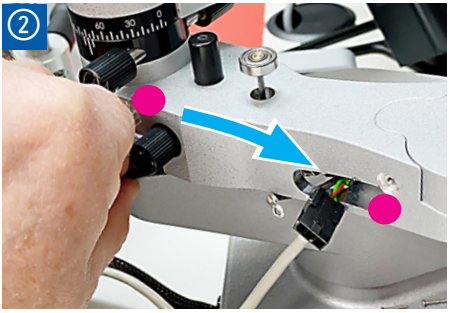
Install fiber and remote cable

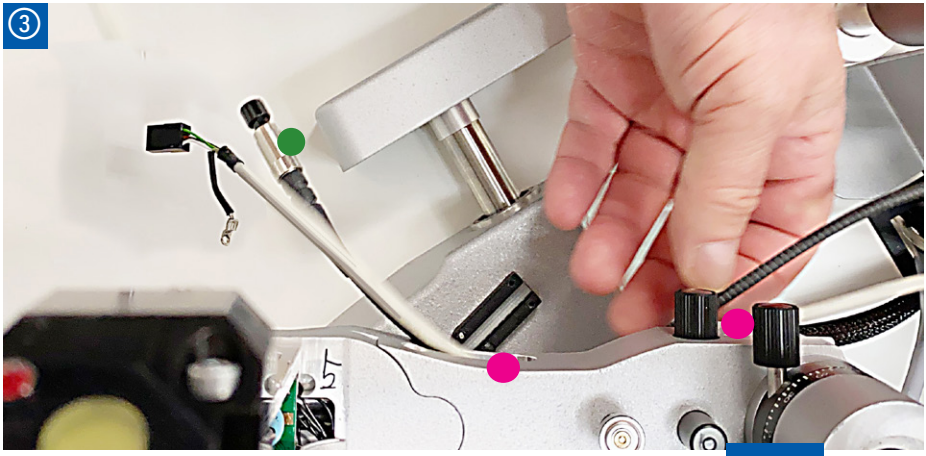
Swing out the COBRA-housing to the left side - full extent. Bring up fiber and cable through the tables placeholder.

Start inserting the cable ⑪ + ⑫ through the rear end ● of the arm of the slit lamp and follow with the fiber ● you will need both hands for a safe installation. ③



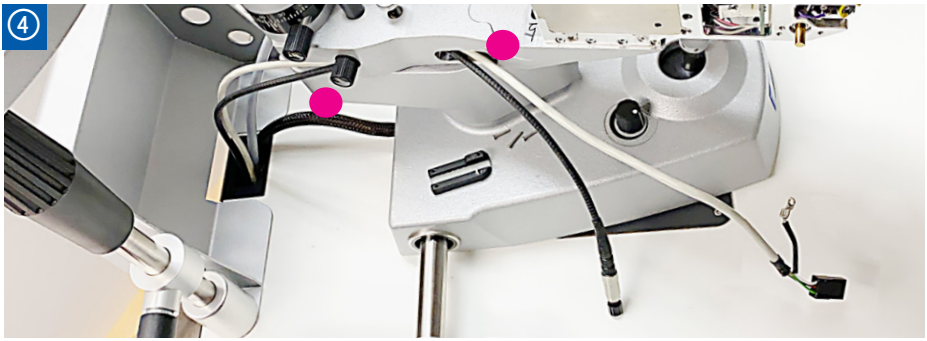




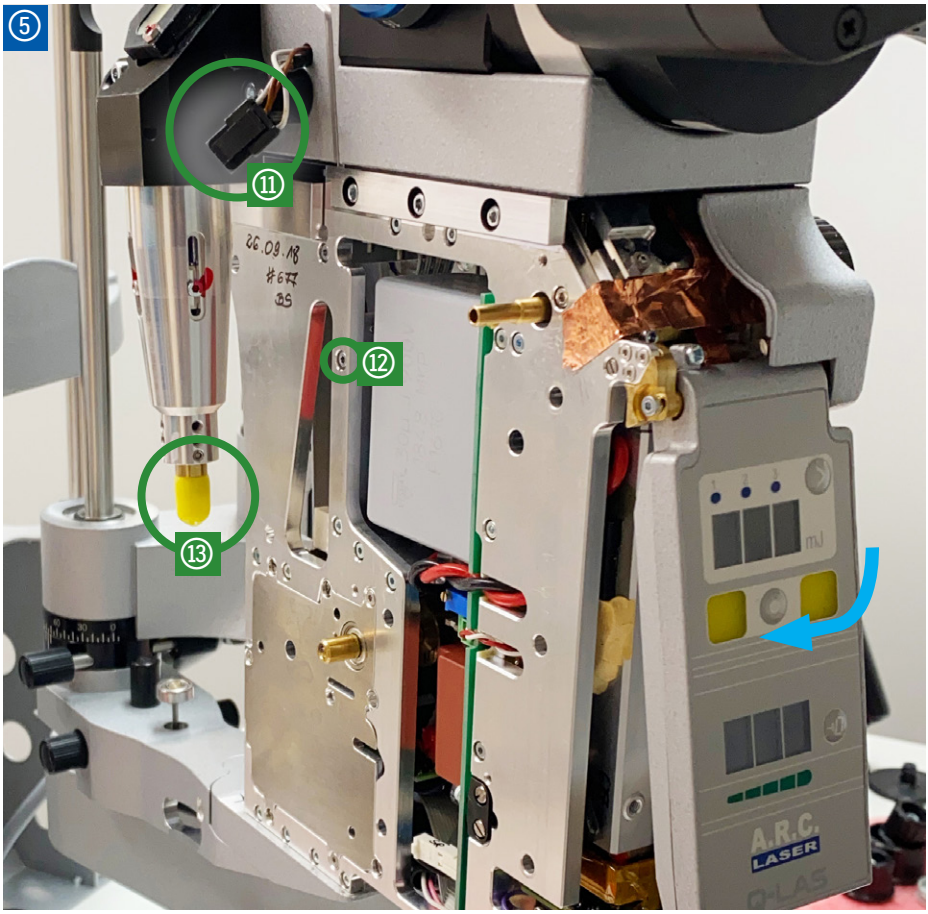


This way fiber and cable ④ should look like after you put them through the fiber duct ●.
The points ⑪, ⑫, ⑬ indicate the next installation steps.

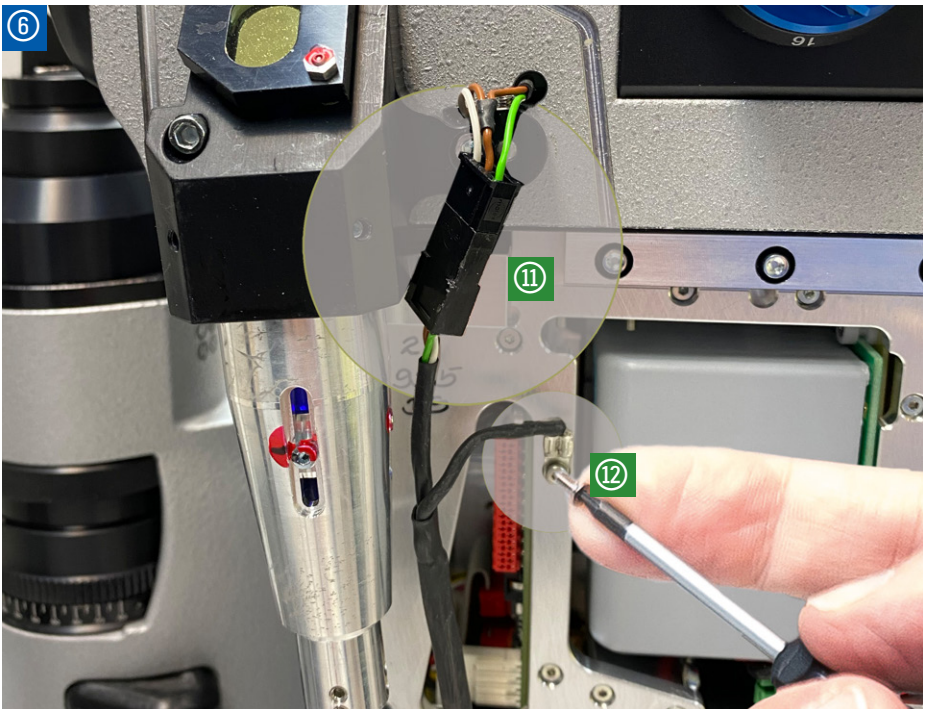
④



⑤

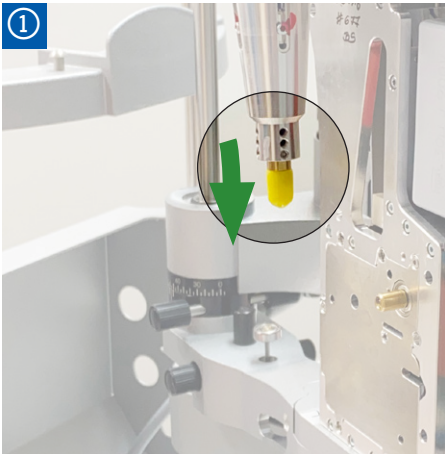


Join the cable ⑪ -and fixate the single cable at its place ⑫



Attach the laser fiber

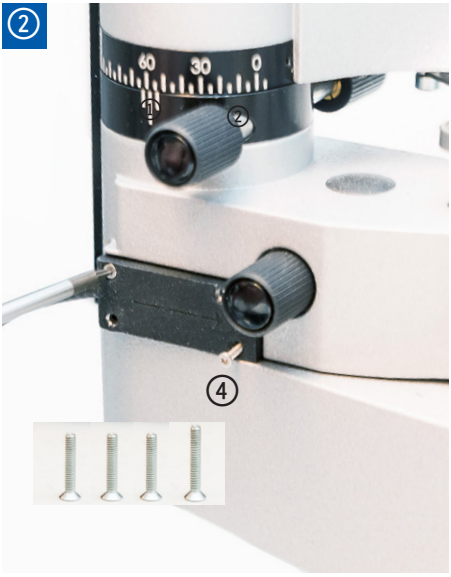
Now you have to take off the yellow cap from the fiber connector ①
and screw the cap off the fiber ②.
Attach the laser fiber to the connector ● Fix it manually by winding it clockwise. ③



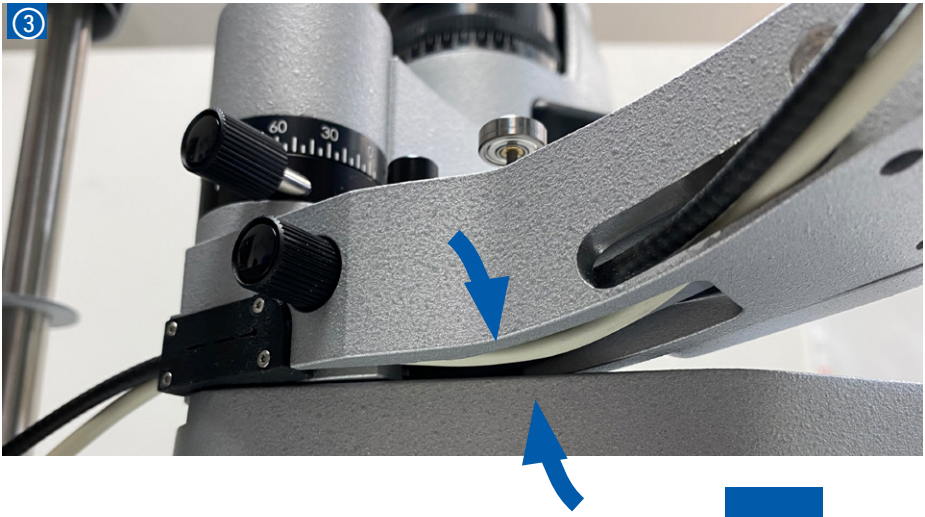
Store both at a safe place as you might need it again for service reasons.

Attention

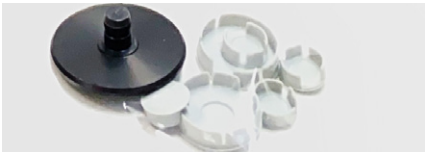
This before mounting the plate you should check the position of the cable.
It is better to have it close to the laser fiber, so that it will not hinder the montage.
Put the pad ② in place and fixate it with 4 screws. Have a close look that neither cable nor fiber are loose - they might scratch under the arm.



ATTENTION
You accidentally might break the fiber by swinging the arm back into the right side / middle.

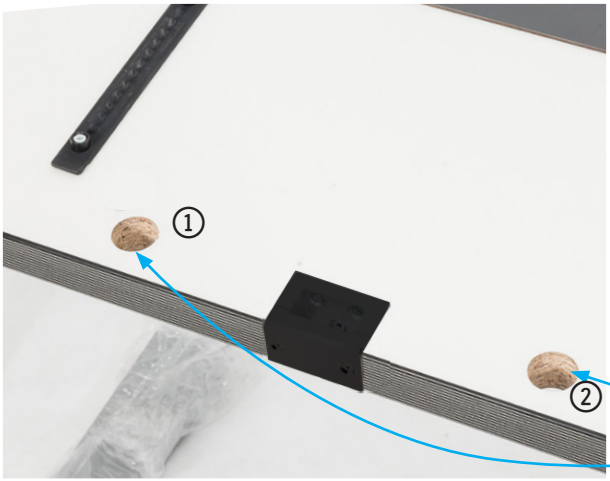


7. Close the housing and check all cables.
Use the TORX screwdriver to close the large grey cover.
Put back the grey cover plate to close the housing again.

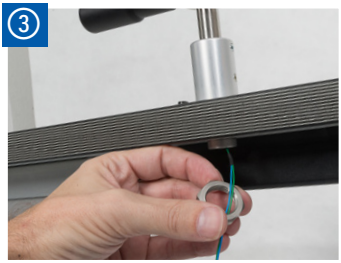


9. Mounting the chin rest on the table

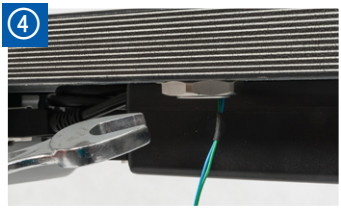
The table contains to mounting holes for the chin rest. As displayed the left side receives the leg with the power cable for the fixation light. Close the screw as tight as possible without using too much of force. Adjust the arm handles ④ for the patient. Our advice is an angled position.



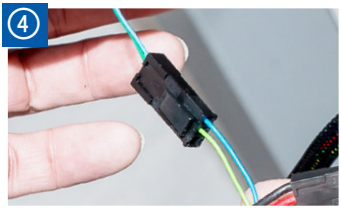
③



④

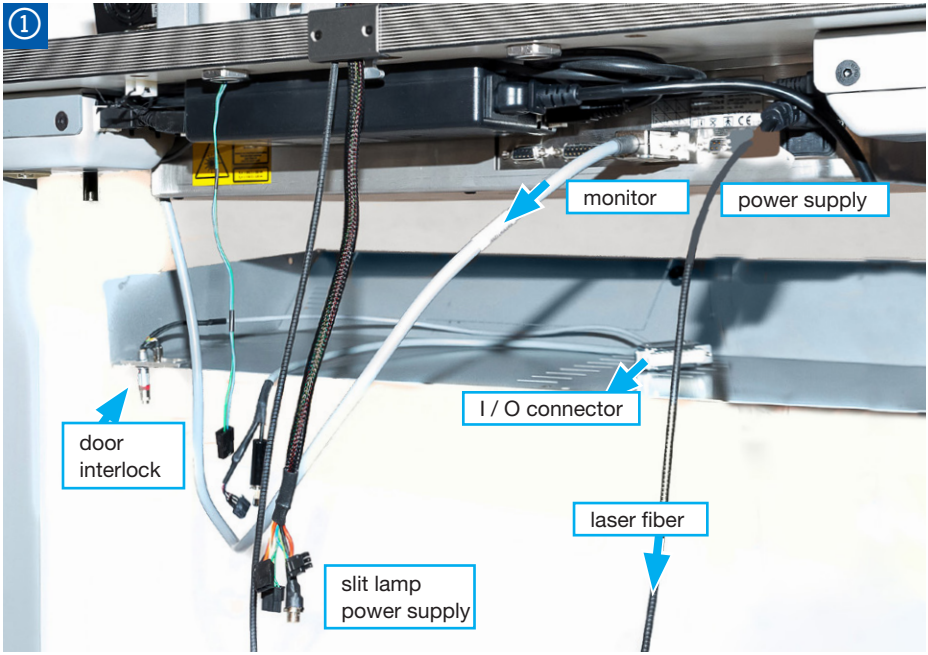


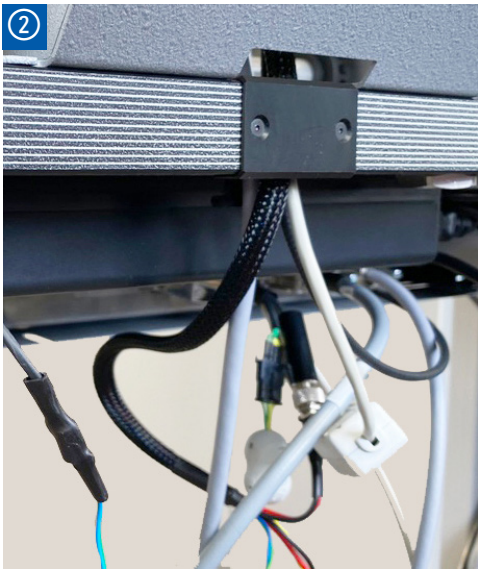
④

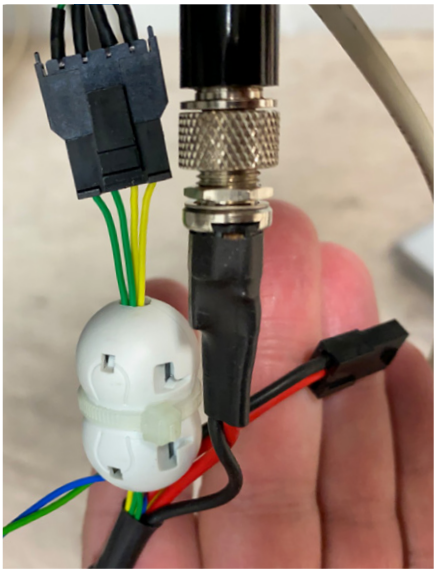


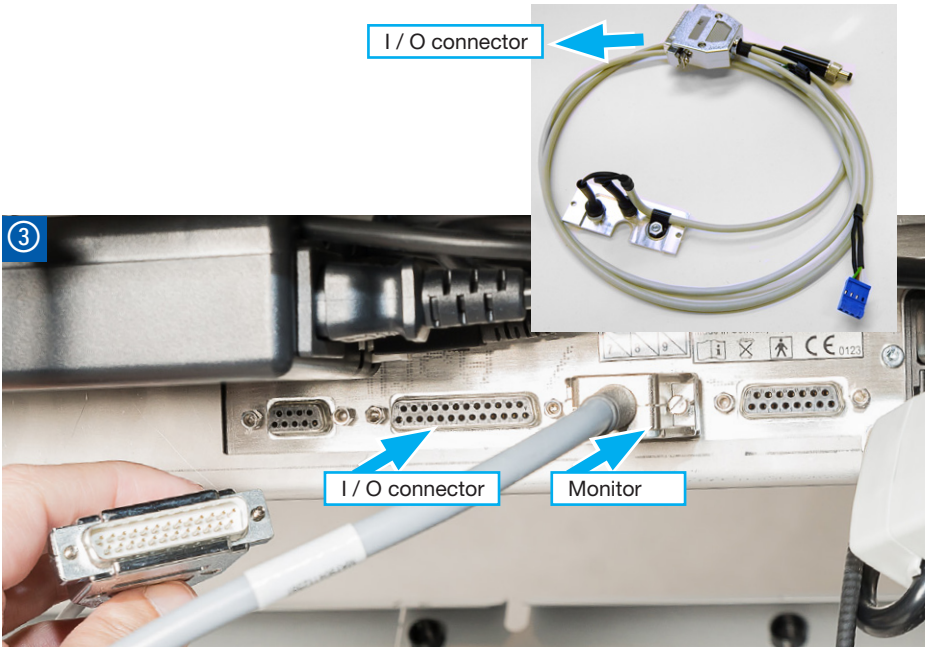
10. Cables for slitlamp and laser

Make sure that the device is definitely without power. You will find all the necessary cables at the patient side of the system. Make sure you give them space for manouvering.
The next step will be to join all the cables to supply the slit lamp and fixation light with power ② - ④.







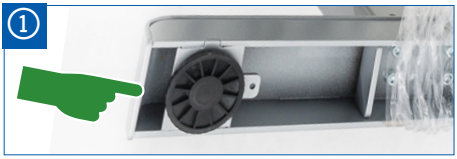


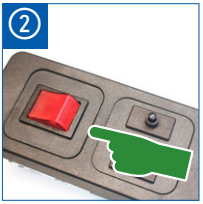
④ The control cable is joint to the cover plate.
Please insert it to the highlighted socket at the rear of the laser box.

In the end, connect the laser box power supply as highlighted.
Check all the cables for tightness.

1. Starting the laser

For a stable stand, the table has to be put on a flat surface to avoid instability.

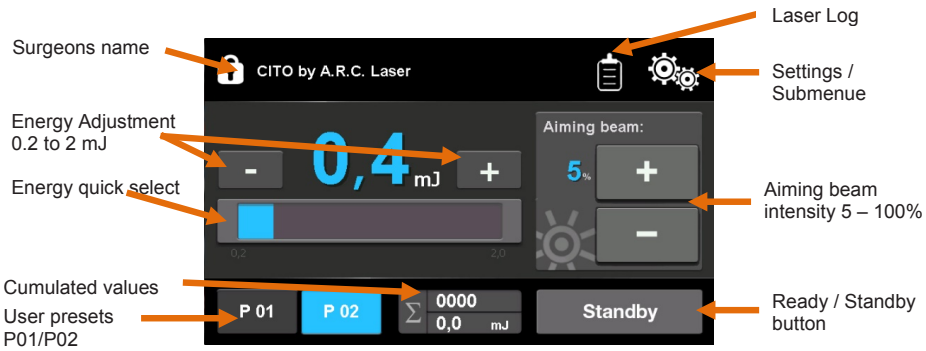




1. The height adjustment at the feet will help you setting up the table propperly.
2. Connect the cables to the socket, connect the mains to your wall mount.
   Switch on the main power supply
3. Adjust the lifting table according to your desired height level
4. Make sure the Emergency-STOP button has been withdrawn.
5. Switch on the system with the KEY-SWITCH
6. Wait until the initializing process is done.
   The laser executes its system check automatically upon startup.

2. Display front

The control panel interface is joining all the necessary buttons and display modules in the front of the device.



For more information, please refer to the user manual.

3. Handling of slitlamp and laser

Plese refer to the description below:

Head rest

Fixation LED

Chin rest

Hight adjustment

Handle

Tubus: parallel or convergent

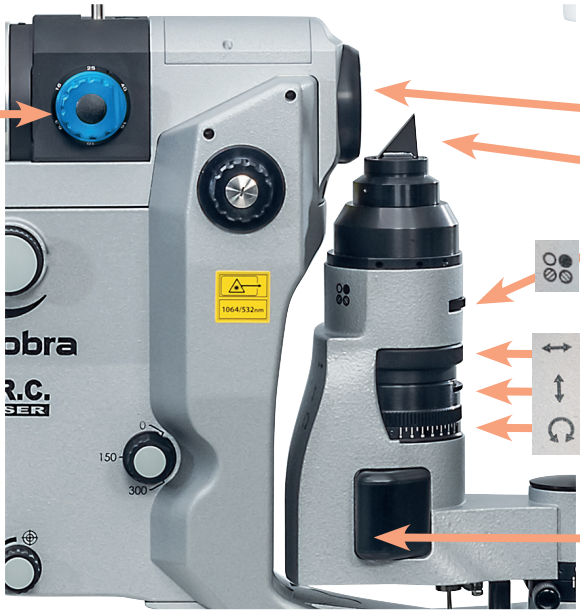
Q-Las Interface

Aiming beam brightness

Display/ Interface

Hight level adjustment + release button

Slit lamp brightness



Drum Rotator 5 x

Optical lens

Prisma

Slit color: white /

Slit width

Slit height

Slit rotation angle

Light source

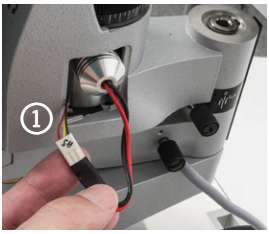
5. Braking / Stopping Spots

To losen or to fixate the slit lamp you can close (brake) or open (loosen) those three knobs by means of a small rotation. Turn clockwise to close.

6. Changing the LED light

Best is to open both of the light boxes. To replace the LED light only use A.R.C. Laser supplied light „bulbs“. Ask your A.R.C. representative for the proper spare parts.
Unwire ① the LED and replace the light source as shown. Have a close look at the alignment - a flat side ② at the bulb will guide you.

ATTENTION
It is very much recommended to disconnect the laser from the power supply. Switch it off before you start changing the light.



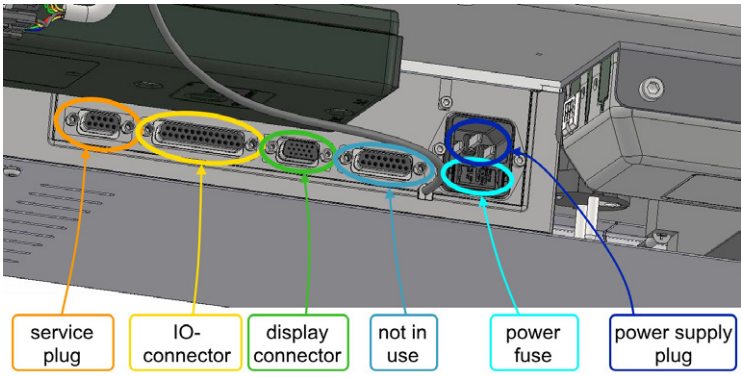
Please check the opposite side, the alternative power cable could have dropped out!
Put it into the holder and close the lamp again.

Adjustment Laser Power SLT-Laser of the COBRA

You will need those tools:

- laser power meter
- PC with HyperTerminal and service cables
  (KB01005 Service cable serial, EL01368 USB Adapter)

Step 1.
Connect the PC with help of the service cable and USB Adapter with the laser.
See picture service plug 2. Adjust terminal software (configuration) to the following settings:
9600 Baud



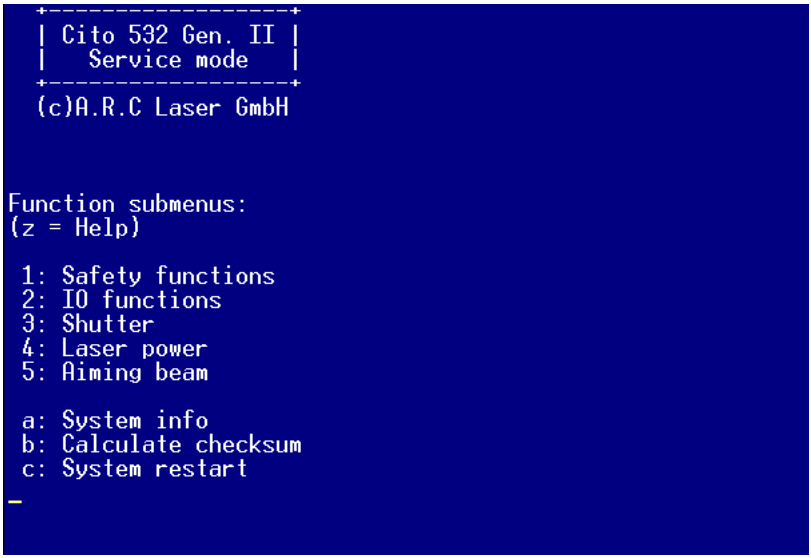
service plug

Step 2.
Adjust terminal software (configuration) to the following settings:

- 9600 Baud
- no parity
- 8 bit
- 1 stop bitno
- no flow control

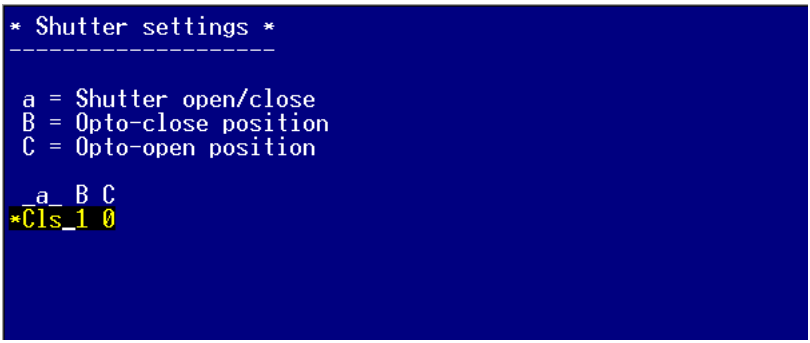
Step 3.
Switch the Laser on
then type Shift-S + ENTER to start service software
(<S> is not displayed – can not be seen on the monitor)

The screen appears



Step 4.
Enter menu 3 by pressing „3“ and open the shutter
by pressing „a“ and after this key „+“.

This screen appears



Step 5.
Enter menu 4 Laser power by pressing „4“

The screen shows:

```
* Laser power *
---------------

 a = Output enable (On/Off)

Diode Settings:
 b = Diode current DA-Value (0..4095)          c = Frequency (0..10Hz)
 d = Pulse Width (250..400us)

Q-Switch Settings:
 e = Delay (230..Pulse width(Diode))

Servo settings:
f = Position servo (0..1360)

Temperature control settings:
 g = Target temperature cavity (°C)            H = Temperature cavity (°C)
 i = Target temperature diode (°C)             J = Temperature diode (°C)
 k = Target temperature KTP (°C)               M = temperature KTP (°C)

Advanced settings:
 l = Servo settings menu                 x = Save settings
  _a_   _b__   __c__   __d__   __e__   _f__   _g__   _H__   _i__   _J__   _k__   _M__
*Off  1840  _ 1Hz  365us  360us   211  30.0  30.1  32.5  32.5  44.0  43.8
```

Enter menu servo setting by pressing „l“

```
* Servo settings *
------------------

 a = Output enable (On/Off)
 b = Frequency [Hz]
 c = Laser power [mJ]
 d = Servo position [0..1360]
 E = Current feedback [mV]
 F = Difference current [%]
 G = Light feedback [mV]
 H = Difference light [%]
 I = Comparator signal: too little energy
 J = Comparator signal: too much energy

 e = Copy prior values
 k = Measure pulser feedback
 l = Measure light feedback
 m = Plot table
 n = Laser stability test
 x = Save value


__a__   __b__   _c_   __d__   __E__   ___F___   __G__   ___H___   I  J
*Off    1Hz   0.2     82      0   ---.-%     0   ---.-%  0  0
```

- Put a laser powermeter in front of the slit lamp at the position of the laser aperture
- set „c“ to 0.2mJ
- set „a“ on
- adjust with „d“ and „+-“ the servo position, so that the output energy is 0,2 mJ
  Note: When you adjust the servo motor, there is a reversal at a value of about 440. That means, although you press +, the power gets smaller step by step. The adjustment range therefore is between 0 and 440.
- save the value by pressing „x“
- adjust the value at „c“ respectively one step higher and adjust the values until the maximum power is reached.
- At H you see the difference of the internal measuring cells, after the adjustment this value should be 100%. Please check this value, because if the difference is bigger than 20% or rather H is lower than 81%, the error F01 will occur.
- After adjustment of the output power you must calibrate the internal measuring cells in the next step.

Step 6.
Press „l“ measure light feedback und confirm the notice: „Do you really want to run light measurement“ with „Y“. An automatic adjustment of the measuring cells will be proceeded.
Following screen appears:

```
Attention! Laser radiation!

Energy table measurement
------------------------

Energy: 0.2mJ
  1/ 277   2/ 276   3/ 279   4/ 282   5/ 280
  6/ 279   7/ 278   8/ 278   9/ 278  10/ 277
 11/ 281  12/ 277  13/ 277  14/ 279  15/ 279
 16/ 279  17/ 282  18/ 282  19/ 278  20/ 281
 21/ 280  22/ 276  23/ 279  24/ 282  25/ 283
 26/ 276  27/ 279  28/ 281  29/ 281  30/ 279
 31/ 280  32/ 279  33/ 277  34/ 280  35/ 280
 36/ 280  37/ 278  38/ 281  39/ 277  40/ 281

Target value: 279, Lower limit: 223, Upper limit: 334
-----------------------------------------------

Energy: 0.3mJ
  1/ 395   2/ 396   3/ 396   4/ 398   5/ 393
_
```

Step 7.
Go back to the main menu and press „b“ for calculate checksum

Step 8.
Quit the program, check the laser in normal mode and check the power values again with an external laser power meter

Close the table-housing

Attach the small housing plate ①. Put all the available cables and the laser fiber into it. Take care not to bend any of them. Mount the plate with its corresponding screws ②. Insert the plug and switch on the laser.

Contact, packaging and disposal information

A.R.C. Laser GmbH
Bessemerstr. 14
90411 Nuremberg
G e r m a n y

+49 911 217 79-0
+49 911 217 79 99
service@arclaser.de

Disposal of old Electrical and Electronic Equipment

(Applicable in the European Union and other European Countries with separate Collection Systems).

This Symbol on the Product or on its Packaging and instructions indicates that it was put on the market place after August 2005 and that this product shall not be treated as Household Waste.

To Reduce the Environmental impact of WEEE (Waste Electrical Electronic Equipment) and minimise the volume of WEEE entering landfills we encourage at Product end of life that this Equipment is recycled and reused.

NOTES

SLT + Nd:YAG Laser

Cobra

Distributor:

A.R.C. Laser GmbH
Bessemerstraße 14
D-90411 Nürnberg
Germany

+49 (0) 911 217 79-0
+49 (0) 911 217 79 99
info@arclaser.de
www.arclaser.de

A.R.C. LASER
enlighten your surgery.

06.05.21