

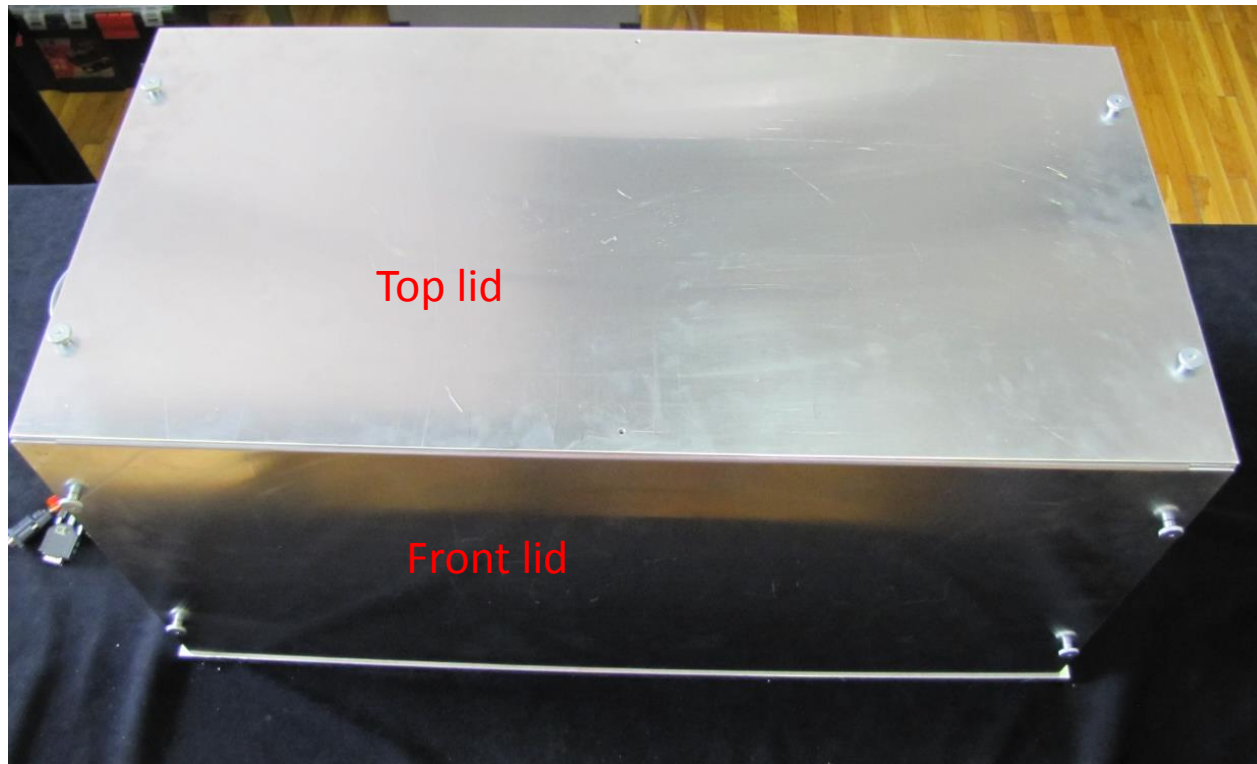
Installation instructions for Scanning Transient Current Setup

Particulars, Advanced Measurement System Ltd.



Unpacking

- ❑ Put the Al box on the stable and flat surface and remove the front and top lid (unscrew the screws and lift/pull).
- ❑ Unload all the packaging boxes from it.





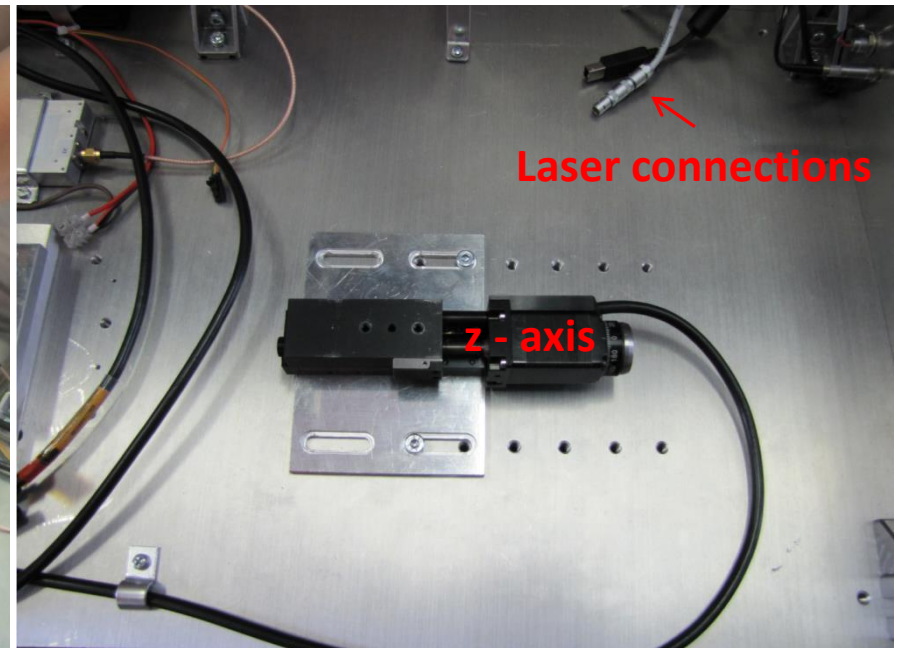
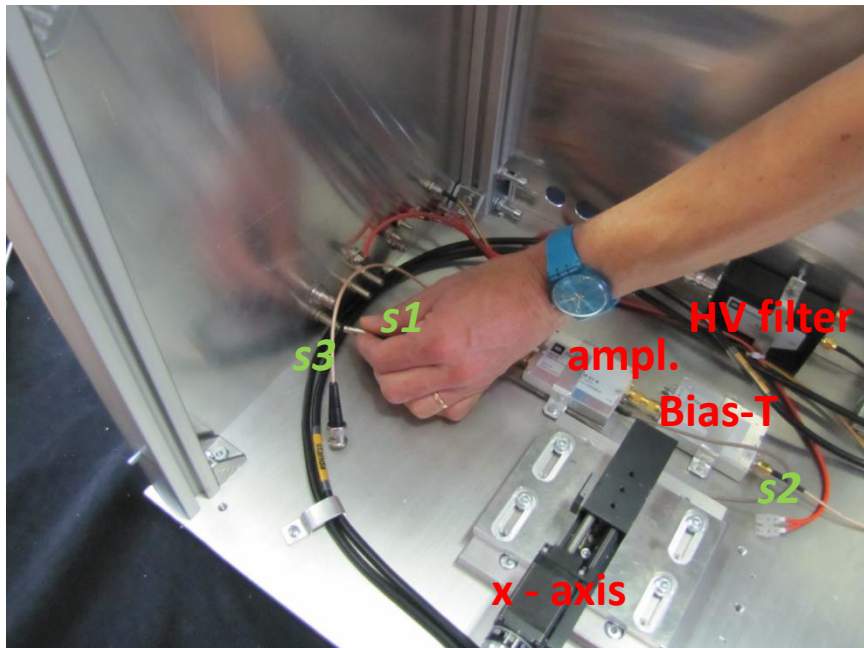
Connections (I)

❑ After unpacking you should find the following items:

- z-axis stage
- y-axis stage
- amplifier
- Bias-T
- HV filter

❑ Connections:

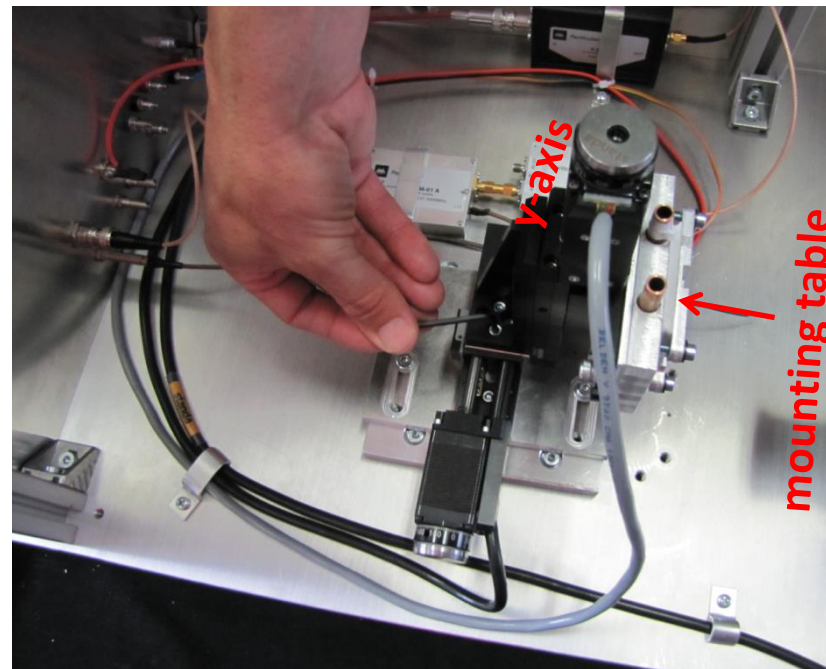
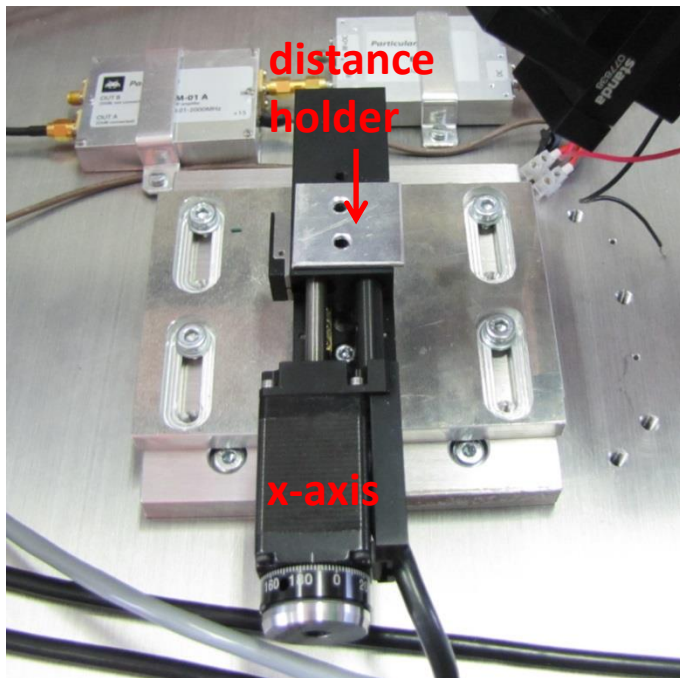
- amplifier power to the AI housing (Lemo cable)(s1)
- Connect output from HV filter to the input of the Bias-T, labeled DC (short SMA-SMA cable) (s2)
- Connect amplifier output to the housing (short BNC – SMA cable) (s3)
- HV to HV filter (HV BNC soldered to housing connector)





Moving stages (I)

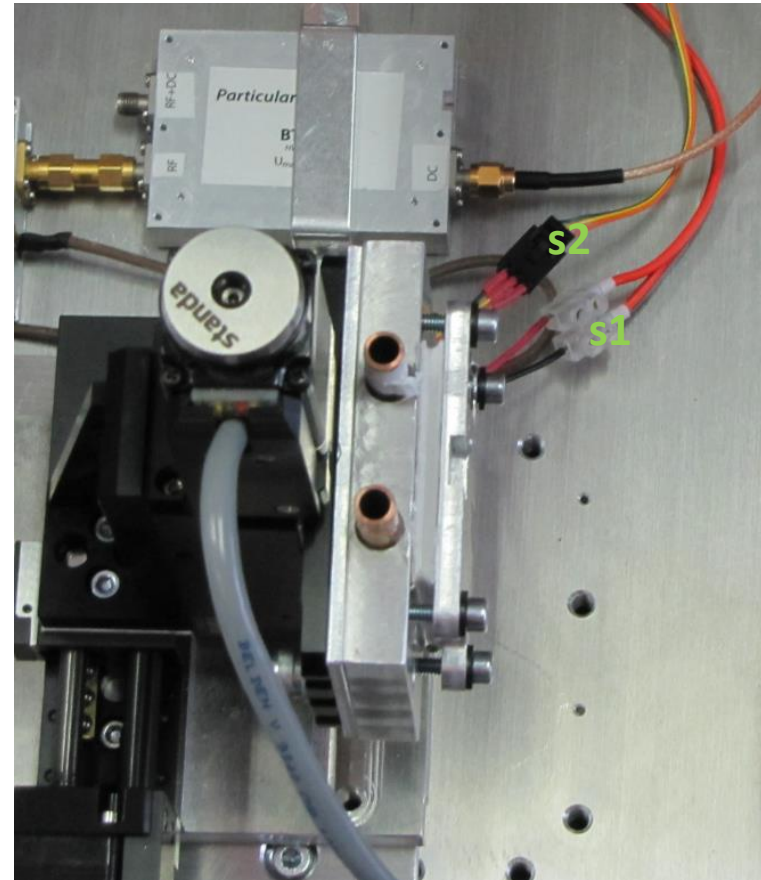
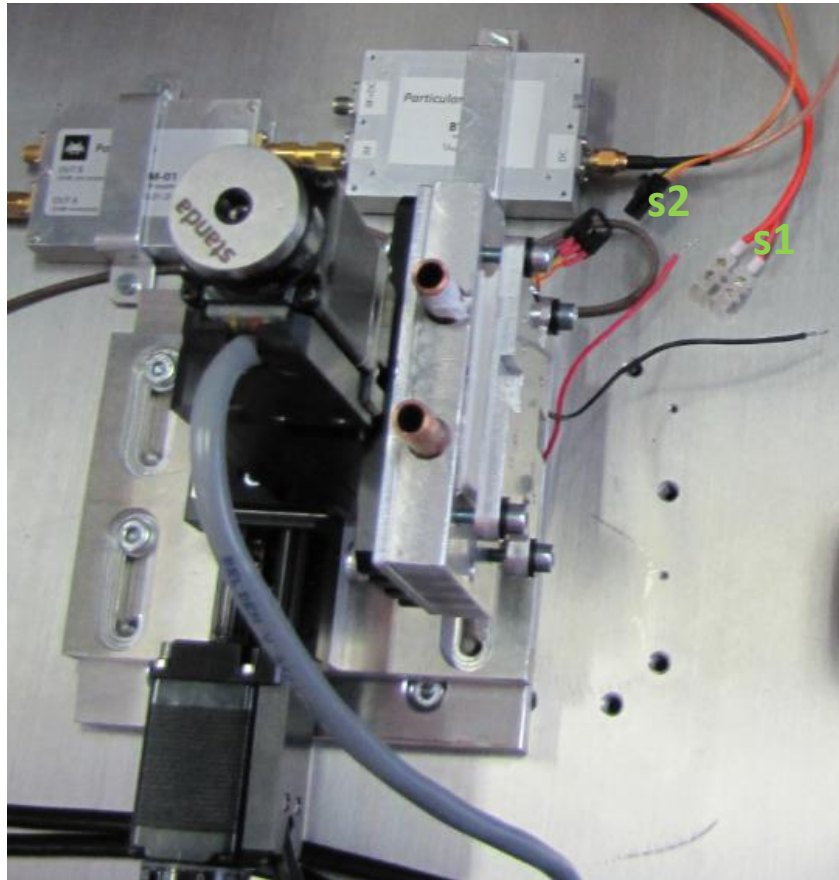
- ❑ Mount y-stage to the position
 - it comes with **mounting table** (cooling block – Peltier element – mounting plane) preinstalled.
 - place small **distance holder** to x-stage and screw the y-stage to x-stage (screws are in the bag with holder)





Moving stages (II)

- ❑ Connect the Peltier element (s1) power and Pt-100 temperature sensor (s2)

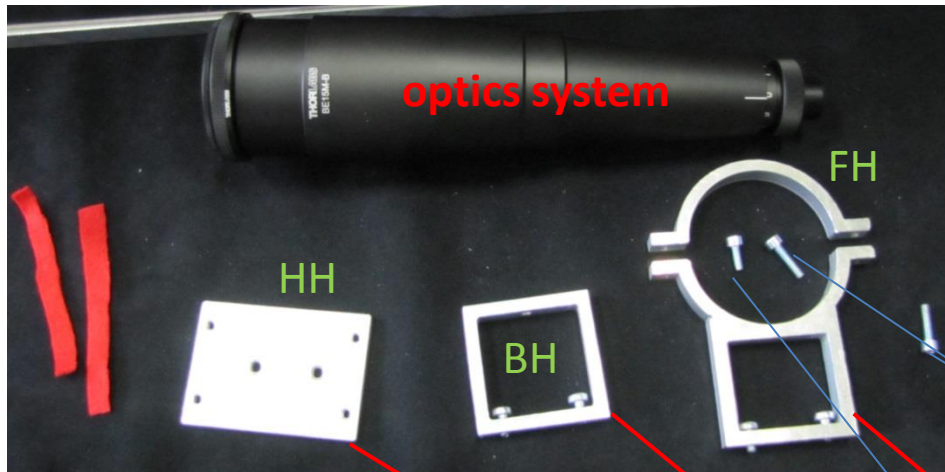




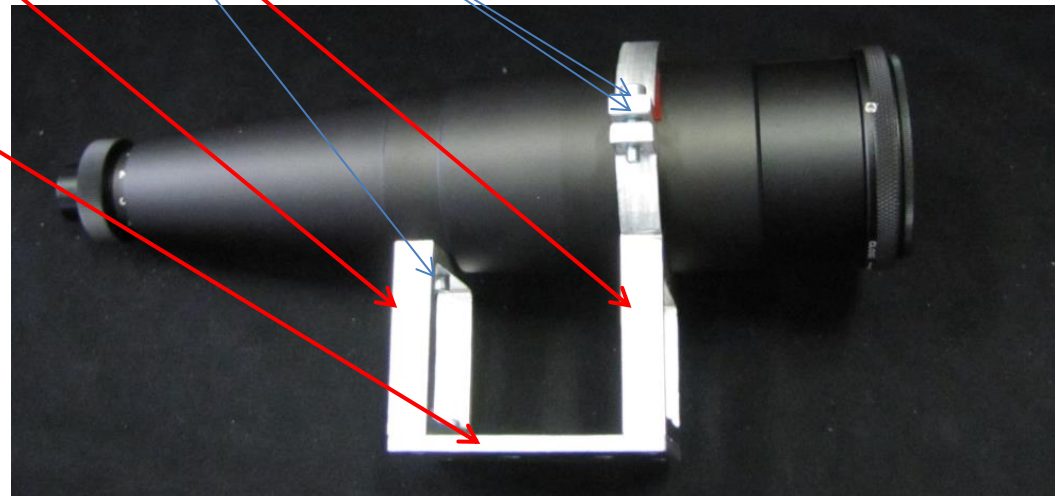
Optics (I)

□ Assembling optics

- take optics system (iris, lens, beam expander, collimator, fiber connector preinstalled) and mounts/holders from the packaging boxes
- Assemble FH,BH, HH together as indicated in the figure (red arrows)



- place optics system on the assembled mount and screw it (blue arrows)
- use red cloth to prevent optics system to slide in the mount as indicated in the figure below

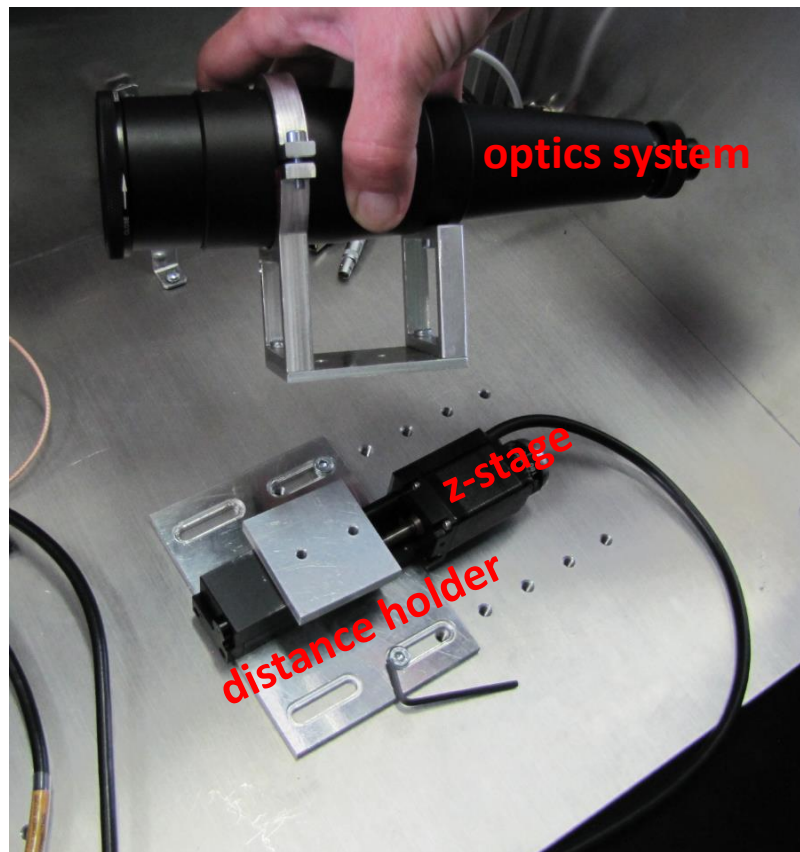




Optics (II)

□ Mount optics to the z-stage

- take the optics system (iris, lens, beam expander, collimator, fiber connector) from the packaging box
- place **distance holder** to z-stage and screw the optics system to the z-stage (screws are in the bag with holder). **IMPORTANT! Pay attention on the orientation of the distance holder!**





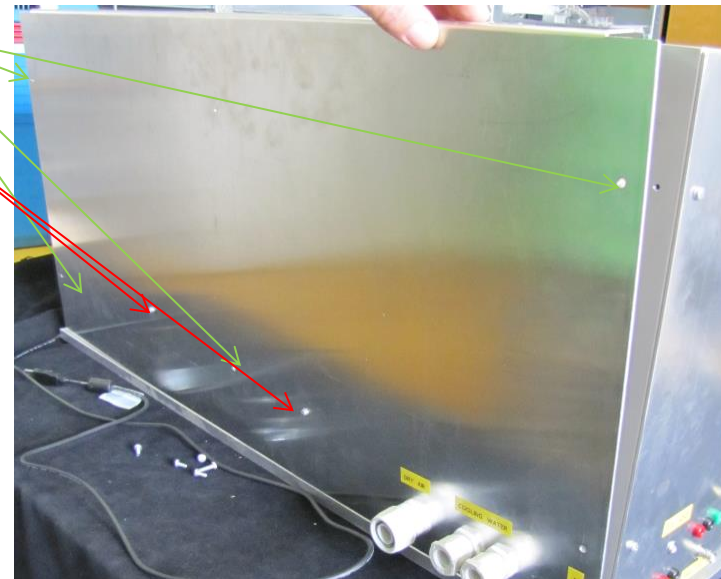
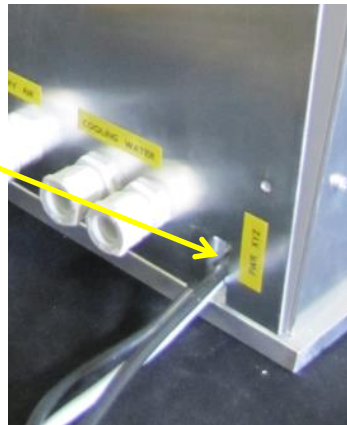
Moving Stages (III) – cable routing

- ❑ **Mount hose-plugs** (Dry air/N₂, cooling water for Peltier) on the back side of the housing box as indicated in the right figure



- ❑ **Route cables of the stages outside the housing box**

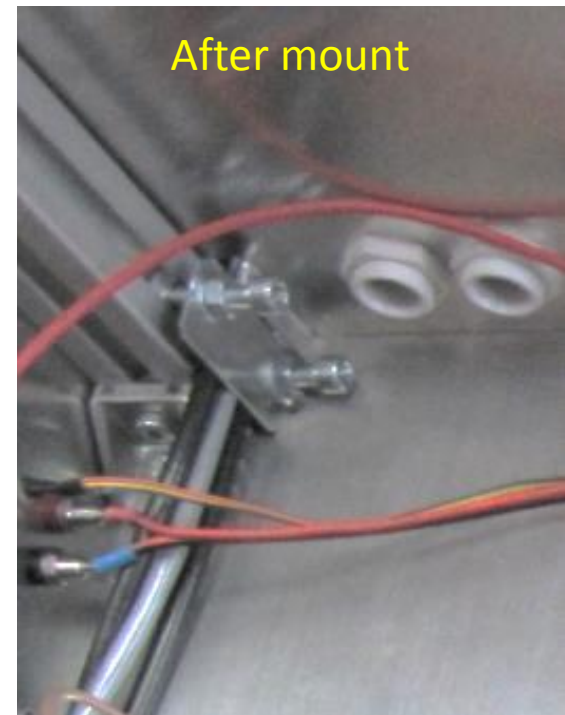
- Unscrew the back side of the housing box
- Loosen the screws used to hold laser and HV filter
- Push the cover backwards and lift it a bit to be able to get connectors through
- route the cables of the stages through





Moving Stages (IV) – cable routing

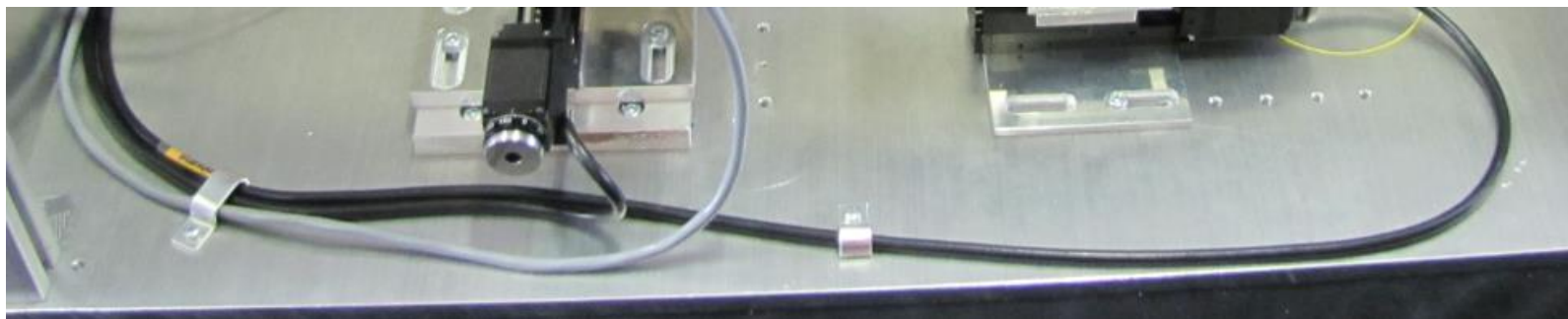
- ❑ Make sure that the stage cables on the inside are positioned as indicated in the figure
- ❑ Fix the cables by a **fixation washer**
 - Screw the back lid
 - Screw the washer so that the cables are fixed
 - Please note the cables should be routed underneath the Pt100, Peltier Power , amplifier power and amplifier out cables



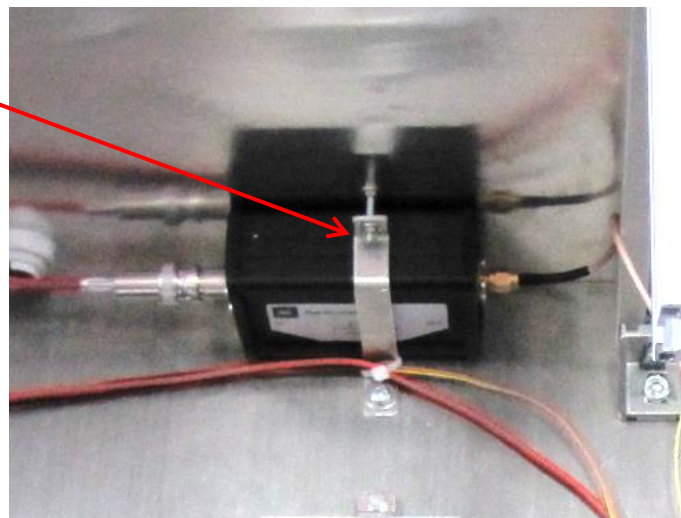


Moving Stages (V) – cable routing

- ❑ The stages cables should be routed through the cable holders



- ❑ Once the stage cables are in position slide in the HV filter to the optimum position (no mechanical stress) and tighten the screw that fixes it to the back side

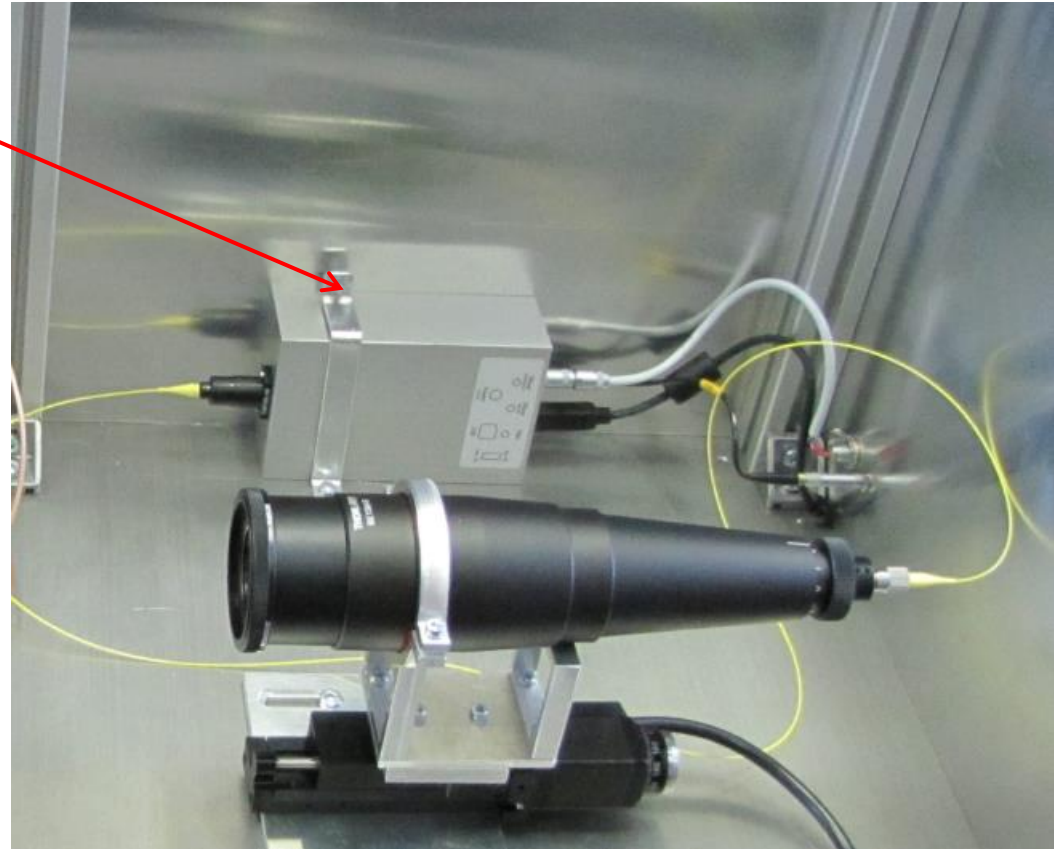




Laser (I)

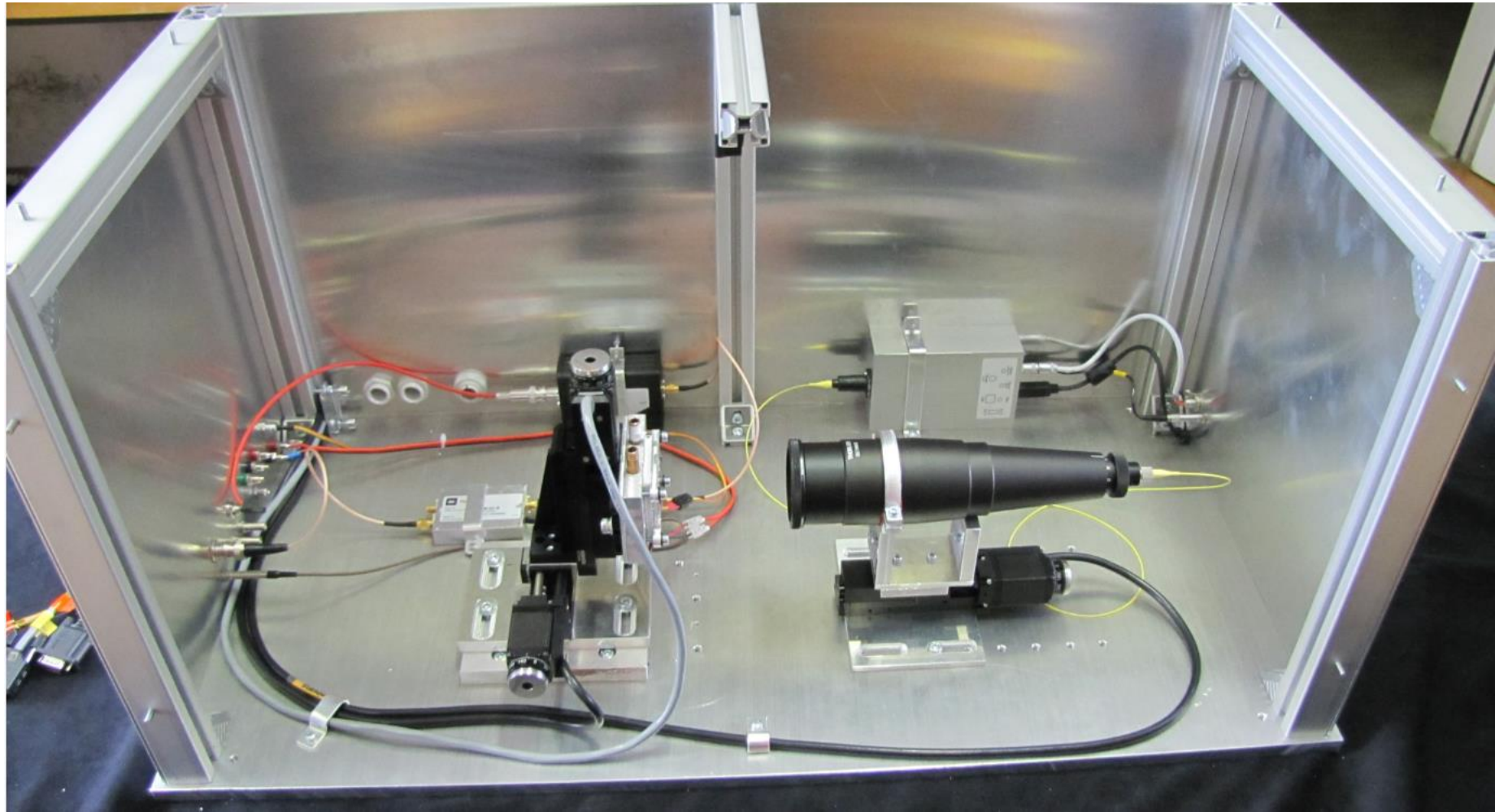
- ❑ Carefully unmounts the laser from the shipping package and mount it in the box! IMPORTANT – fiber is very sensitive – make sure to handle it with EXTREME care. Cut the plastic ropes that tie the laser to the supporting PCB and unwind the fiber from the fiber-roll.

- Unscrew laser holder so that it becomes very loose
- Insert the laser carefully in from the left side.
- Slide the laser to the appropriate position (no mechanical stress to cables and fiber)
- Tighten the laser holder screw
- Connect:
 - Laser power cable (2 pin lemo)
 - Laser trigger – to drv. output (short lemo)
 - USB cable for communication with PC
- Connect the fiber to the optics system as indicated in the picture on the right.





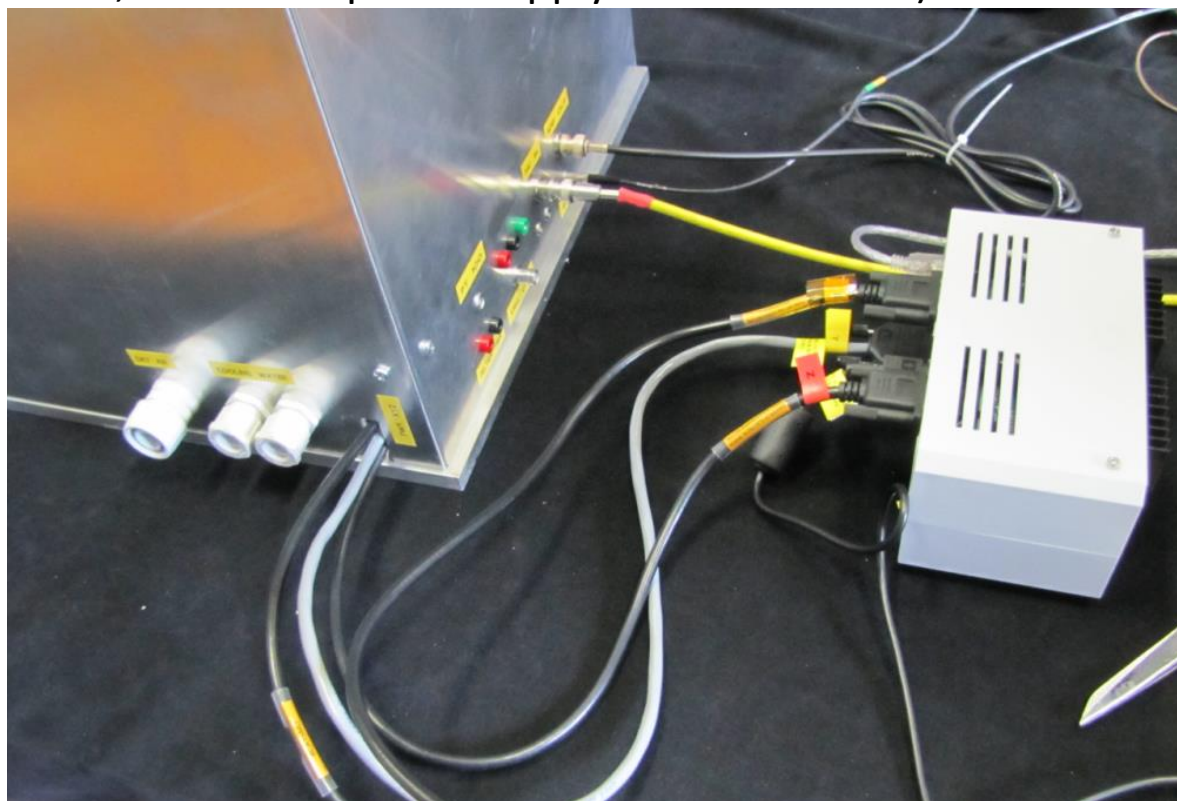
How should it look at this point ?





Connections outside (I)

- ❑ Connect the controller to the stages: make sure stages correspond to the right controller (try in the software)
 - **IMPORTANT (read instructions at the side of the controller box) – connect firmly the connectors before powering the controller!**
 - connect the controller via USB cable to the PC
- ❑ Some of the connectors on the front side are not used i.e. can be used for different purposes (multi channel readout, additional power supply for detectors ...).
- ❑ The connections used in the basic configuration in the front panel are:
 - amplifier power (lemo)
 - amplifier output (BNC)
 - HV for the detector (HV BNC)
 - Pt-100 (4 pole lemo)
 - Peltier power (2 bananas)

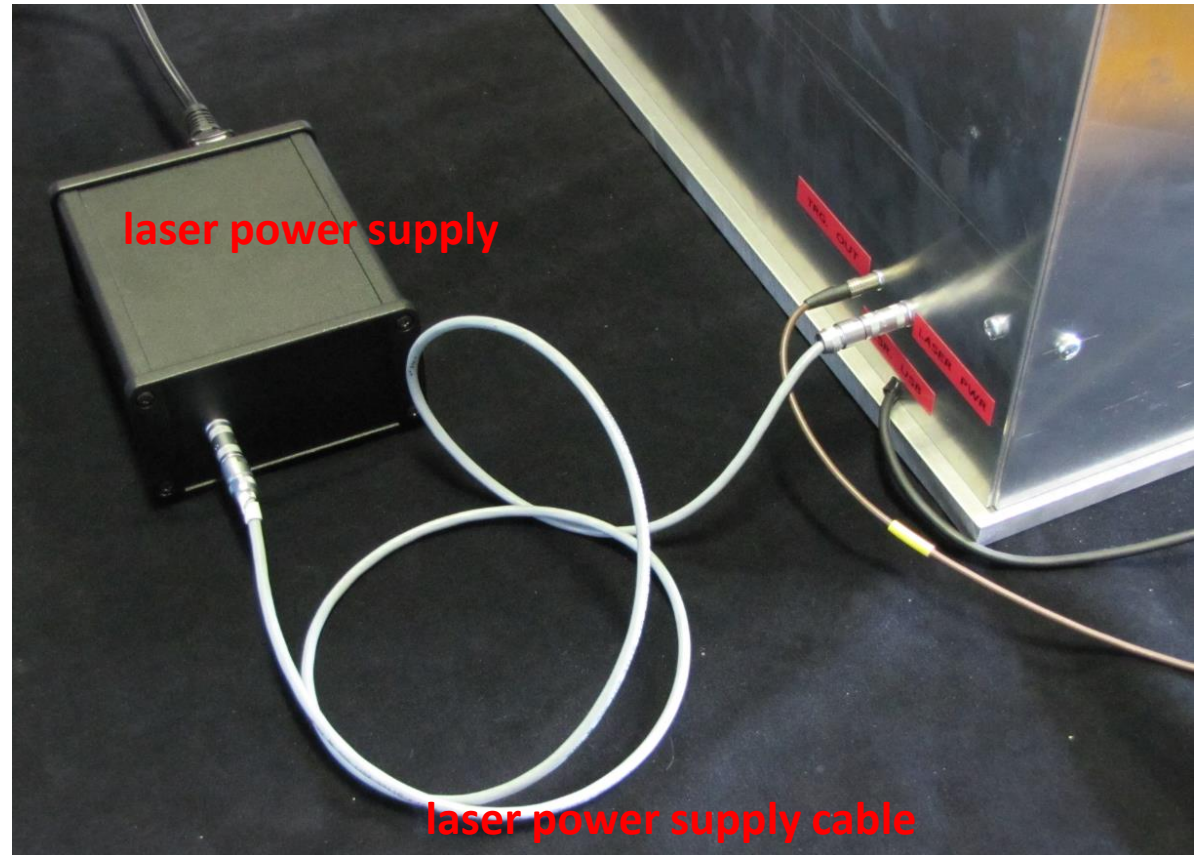




Connections outside (II)

- ❑ On the opposite side of the housing there are connections related to the laser operation:

- laser power supply cable
- trigger output (lemo)
- USB cable for connection of laser to PC



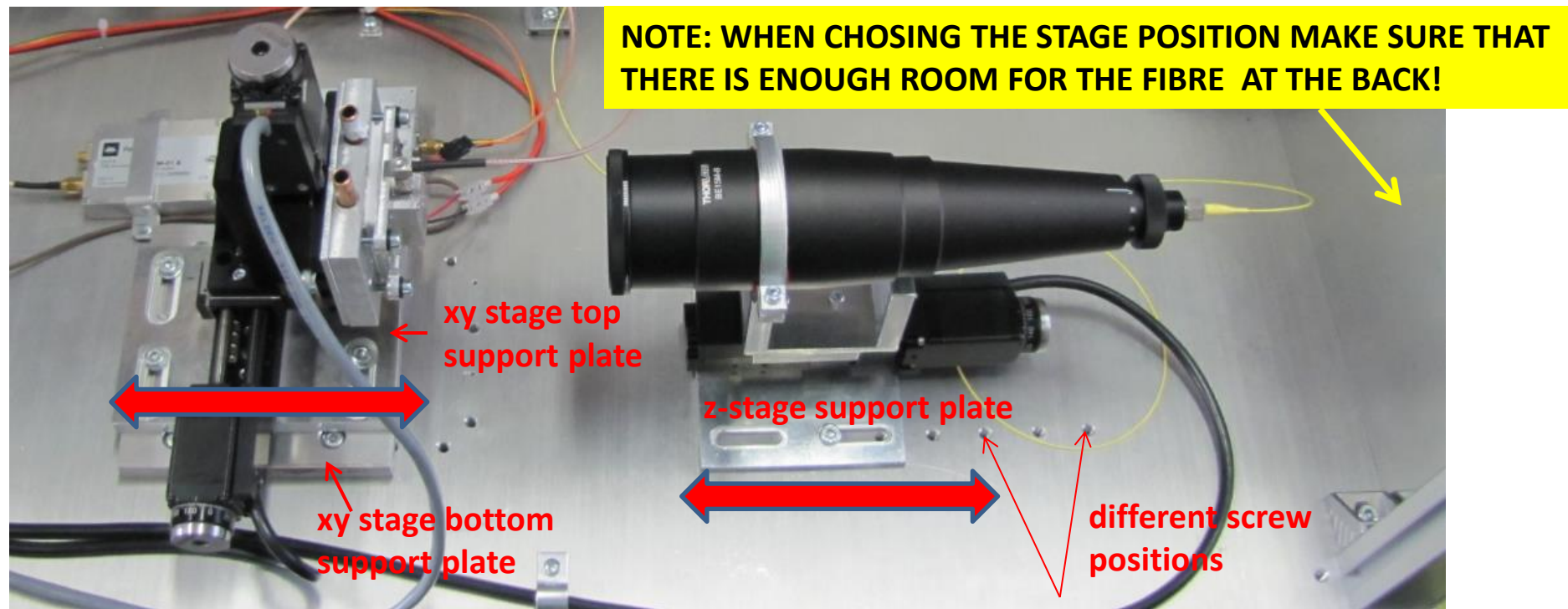
PLEASE NOTE:

Laser power supply should **ONLY** be connected to 220 V/50 Hz (EU standard). Use converter for other voltage ratings.



Adjusting stage positions (I)

- ❑ Depending on the sample/mount used, the stages should be brought to proper position to get the focus at the sample position.
- ❑ To adjust the range of the stages in **z-axis** (optical axis)
 - the stage can be shifted by sliding the z-stage support plate (unscrew the plate and position it). If even larger range is required used different screw positions.
 - alternatively the support plate of x and y stages can be shifted. Unscrew the top support plate, then the bottom support plate, shift it to the right position and fix it with screws.





Adjusting stage positions (II)



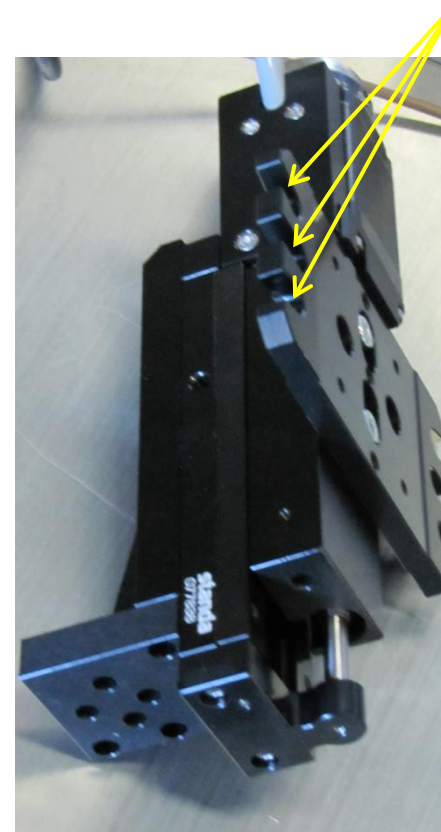
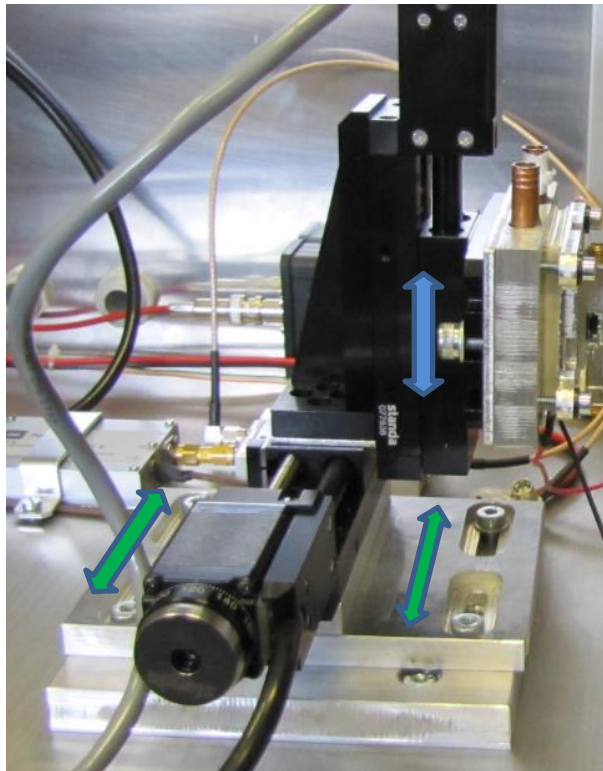
x-axis

- unscrew the xy stage top support plate and slide it to the proper position (see bottom figure)



y-axis

- Mounting table can be positioned at three different places at the y-stage (unscrew the mounting table and fix it in appropriate position – important - make sure that the distance washer is in place)

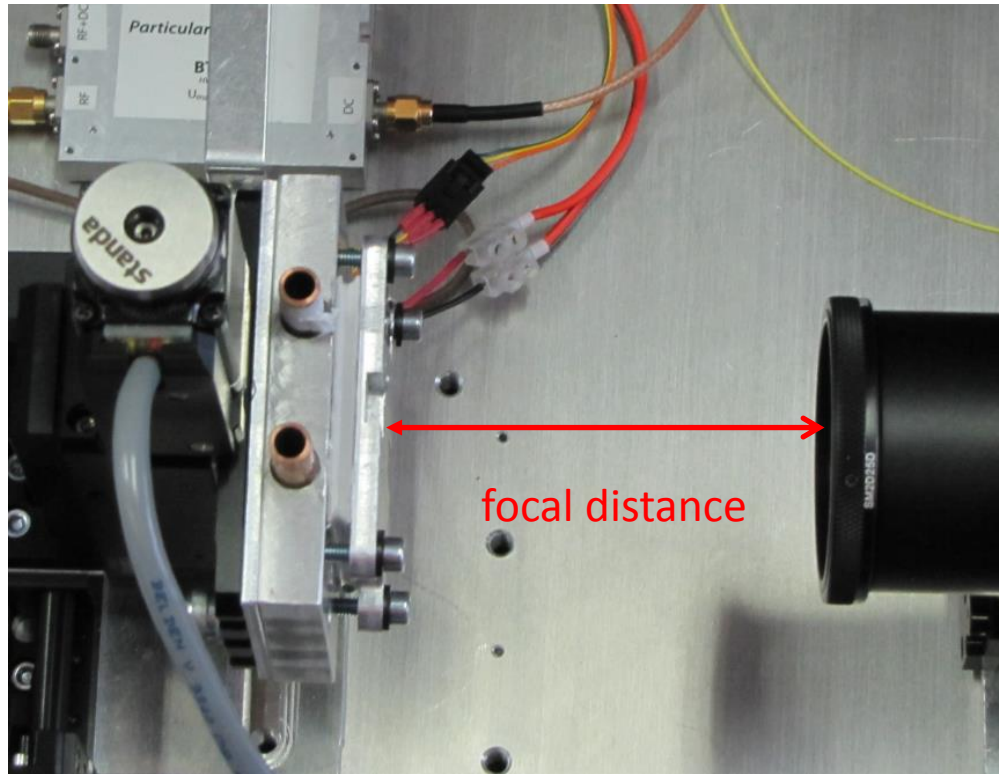


ALWAYS MAKE SURE THAT STAGES IN EXTREME POSITIONS DO NOT HIT ANY OBJECT!



Focus

- ❑ The focus length depends on the wavelength of the laser. The precise value should be obtained with sample mounted by a so called knife edge scan. Approximate focal distances are
 - 8.2-8.3 cm for red (658 nm) laser
 - 8.4-8.5 cm for infra-red (1064 nm) laser



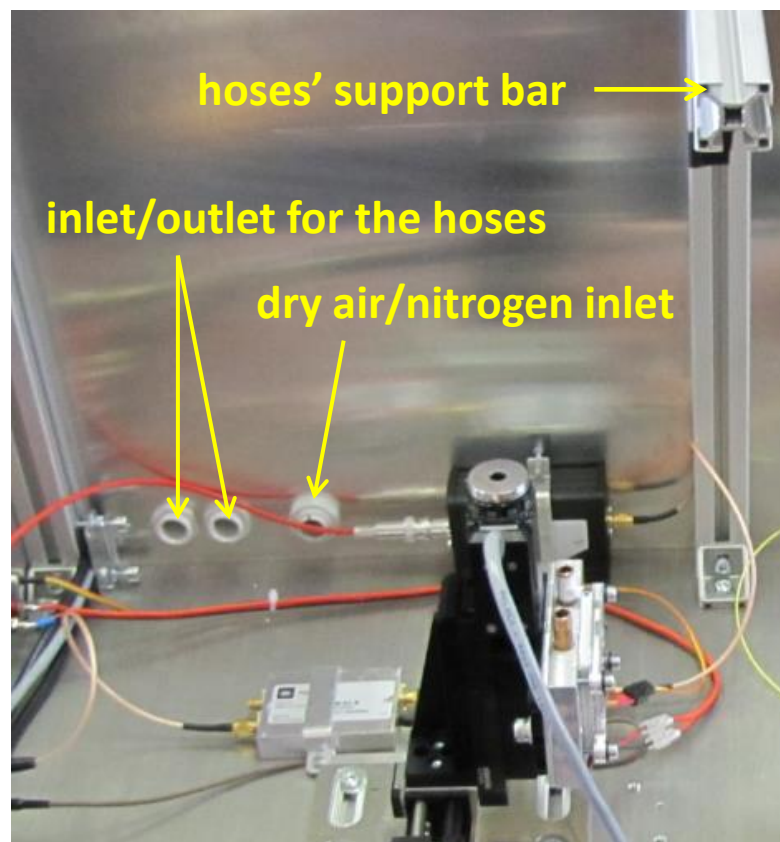
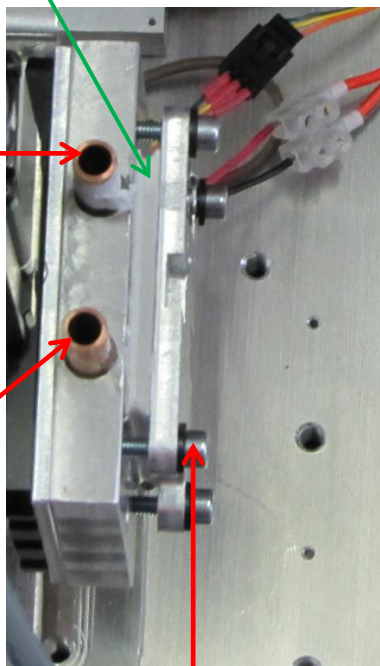
Cooling and heating the samples

Peltier element is placed between the mounting plane and a liquid/water cooled block (cooling block) and can be used for cooling and heating the samples. The hoses and the choice of the coolant are the left to the user. To minimize the mechanical stress to the tables please use the bar above the y-stage to support the hoses. Make sure that there that hoses are properly fitted and there is no coolant leak. If cooling the samples below the dew point make sure the box is flushed by nitrogen or dry air to avoid moisture.

Peltier element is rated for max.
15.4 V and 8.5 A.

coolant
inlet/outlet

coolant
outlet/inlet

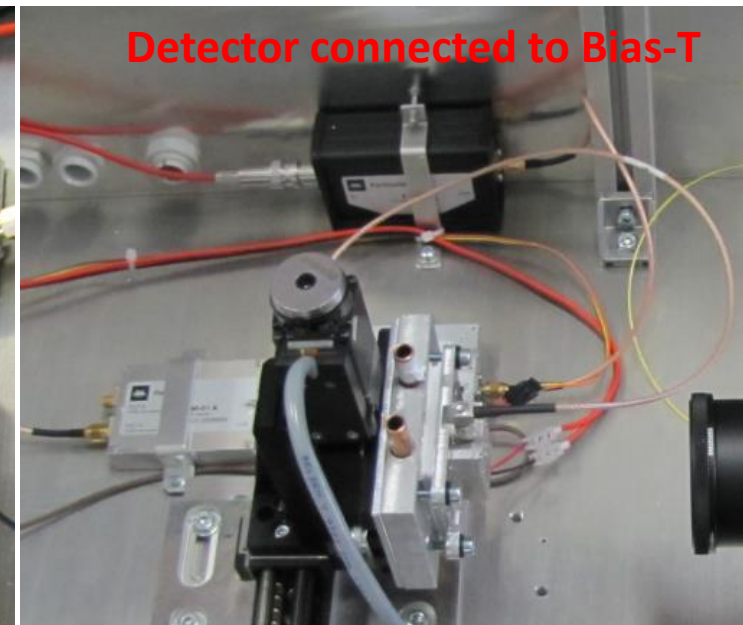
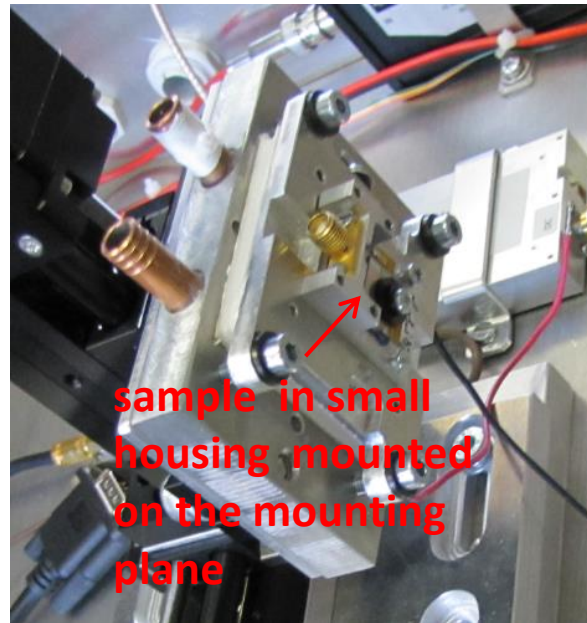
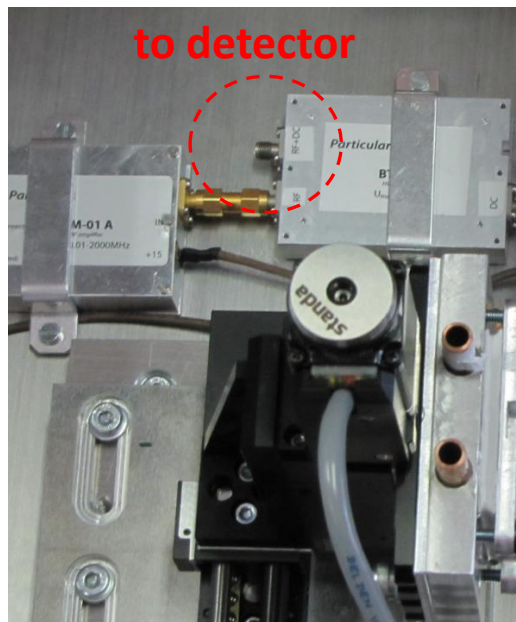


Replace metal screws with plastic ones and isolate the mounting plane for maximum ΔT .



Connecting detector/sample

Detector/sample is connected to Bias-T with SMA-SMA cable. **Using longer cable prevents** (i.e. moves out of the region of interest) distortion of the measured pulse due to reflections caused by improper impedance matching – note the sensors have different impedances and it is impossible to have impedances matched for every sample.



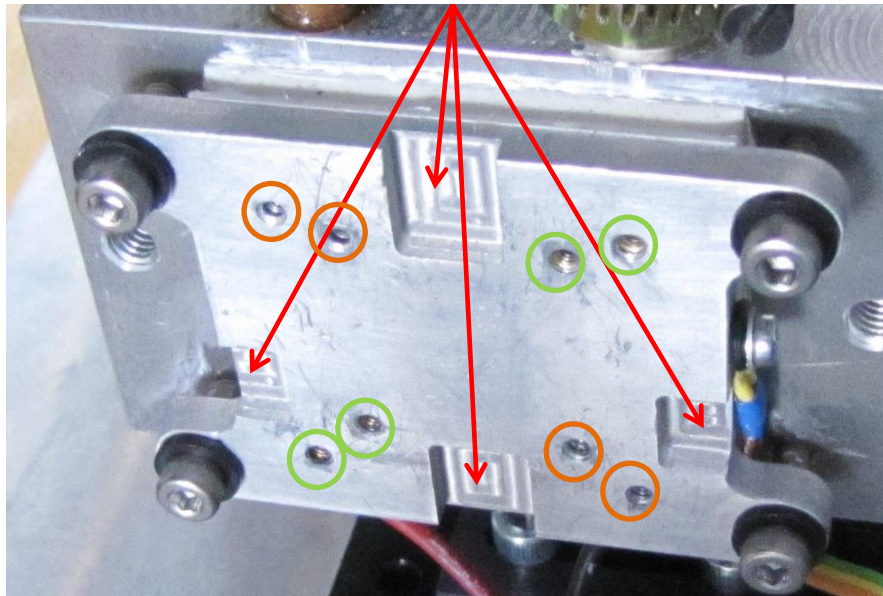
A small pad detector housing with test sample (FZ-p silicon diode) is included.



Mounting table and plane

- ❑ The standard mounting table has the mounting plane with the following layout
 - M2 = screw hole of 2 mm diameter
 - M2.5 = screw hole of 2.5 mm diameter

openings for SMA connectors





Help needed? Warnings!

- ❑ Please contact support@particulars.si in case of questions, advice, help or comment!
- ❑ Please use common sense at all points during the assembly. Although there is a very small chance that anything can go wrong make sure to follow all precautions:
 - Note the voltage ratings of the power supplies (laser requires 220 V/50Hz)
 - Read the instruction on the sticker of the stage controller!
 - Do not look into the laser fiber while laser is in operation!
 - Make sure that the stages in extreme positions do not hit any objects!