# Laboratory apparatus for the accurate, facile and rapid determination of visible light photoreaction quantum yields

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# Supporting Information

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## *S1 High power LEDs for illumination*

To assure a maximum in light output, efficiency and lifetime of the LEDs, an adequate heat management is essential. We use LEDs with a metal base and mount them on aluminum disks of 25 mm in diameter with thermally conductive adhesive pads. The disks themselves are then thermally connected to a larger heat sink (Sk-189-50sa, Fischer Elektronik)[1]. On the one hand this ensures effective heat dissipation while on the other hand the LED can still be freely rotated. For a square shape of the semiconductor die of the LED this allows optimal matching of the imaged beam profile to the aperture of the cuvette.

Besides the rotation, the possibility to move the LED horizontally and vertically is also essential for the alignment. A displaced LED is imaged less precisely and with less efficiency by the photographic lens. As shown in Figure S1, we implement this by mounting the heat sink on two perpendicular translation stages (DT25/M, Thorlabs GmbH (see footnote 1)).

To allow for a simple and quick change of the LEDs, short wires with pin plugs are soldered to each individual LED. They can directly be connected to the constant current source (675 mA, LT-1088, LED-tech (see footnote 1)).

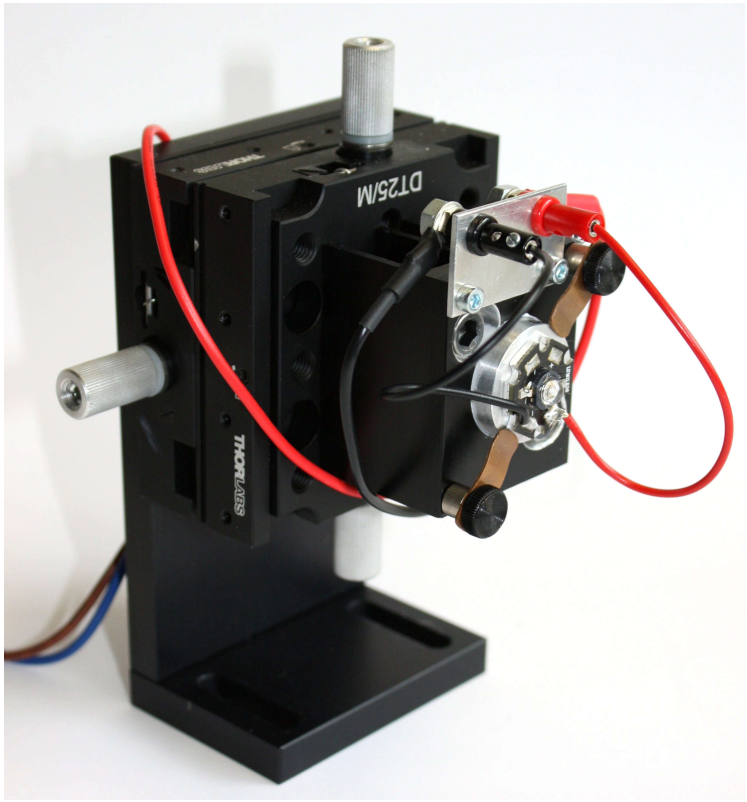



**Fig. S1** Image of the assembled LED stage.

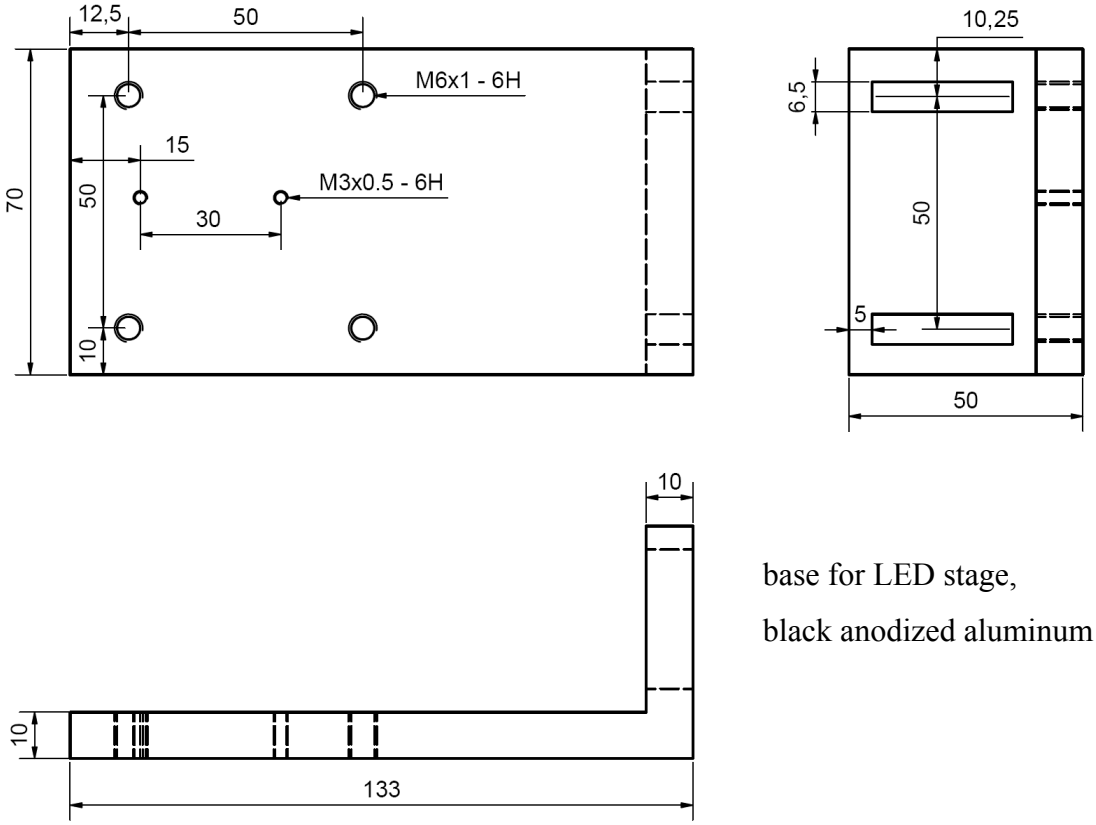
[1] Mention of vendor names and model numbers is for technical communication purposes only and does not necessarily imply recommendation of these units, nor does it imply that comparable units from another vendor would be any less suitable for this application.

## *S2 Adjusting the sample cell*

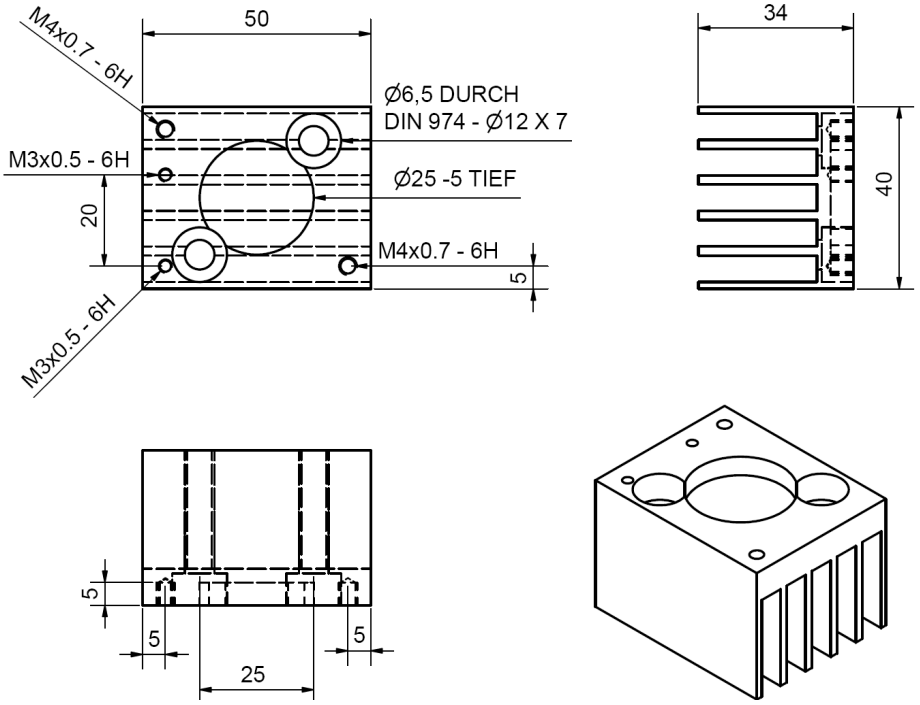
We use 1-cm absorption cuvettes (e.g., 110 QS, Hellma Optik GmbH (see footnote 1)). This ensures reproducibility and a favorable near perpendicular incidence of the radiation. The whole cuvette mount is adjustable in height. If sufficient sample solution is available, the cell can be shifted downwards to insert a magnetic stir bar. A convenient and inexpensive solution for rotating the stir bar is to use a magnet on a DC motor (1524B024S-R-15A, Faulhaber GmbH (see footnote 1)) whose speed can be adjusted with a switchable AC adapter.

A thin aperture placed in front of the sample cell is helpful for both alignment and blocking of stray light that might disturb the measurement. In our case, a square aperture of 8 x 8 mm is used according to the square shape of the semiconductor die of the LEDs. During the adjustment, we replace the sample cell with an equally sized "dummy cuvette" that has a white card or semitransparent paper in the middle. This little device acts as screen for the image of the LED die. It allows checking whether the LED is properly aligned and oriented and no light is cut by the aperture or the side walls of the cuvette.

## *S3 Design drawings*[2]

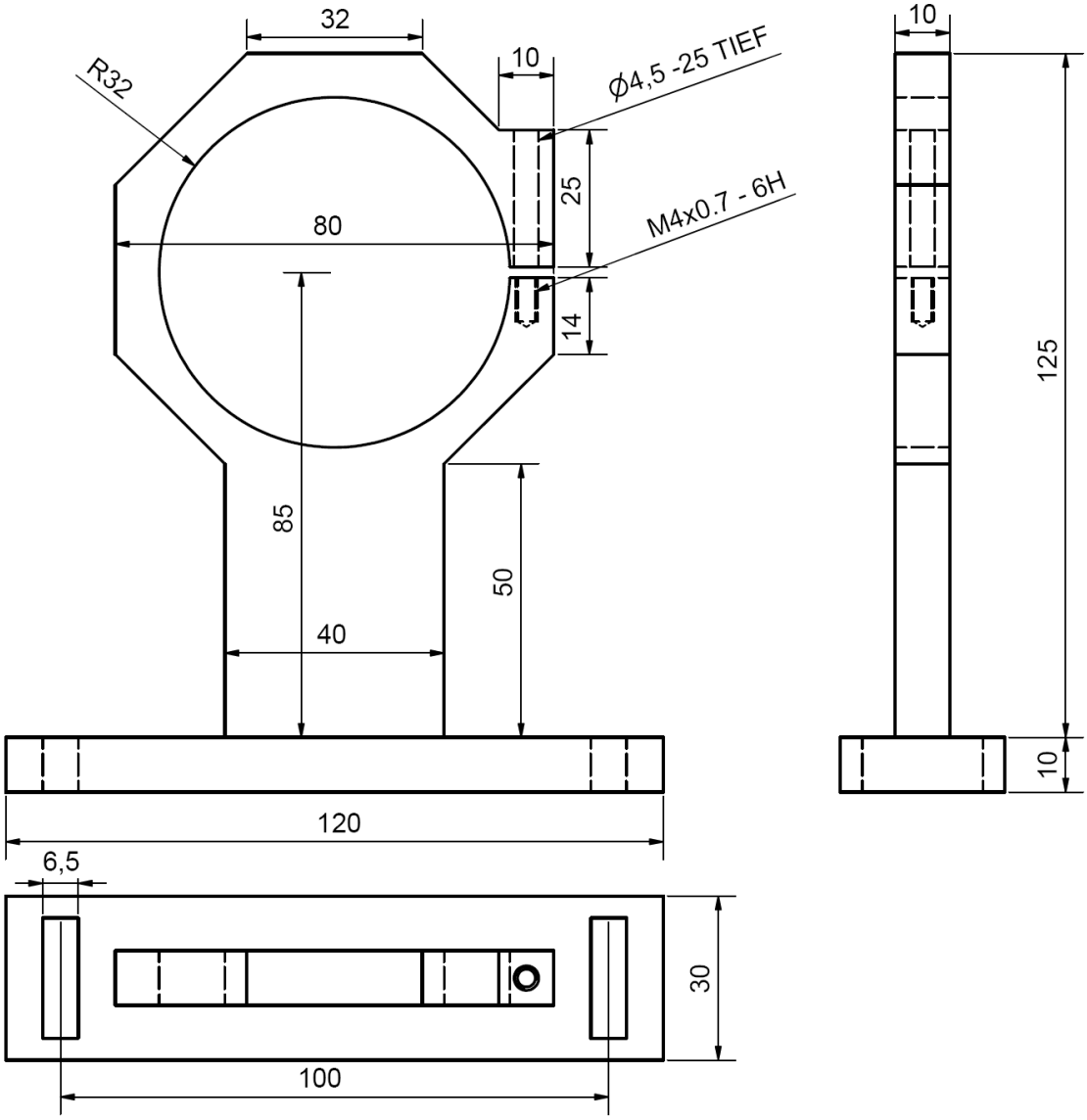



base for LED stage,
black anodized aluminum

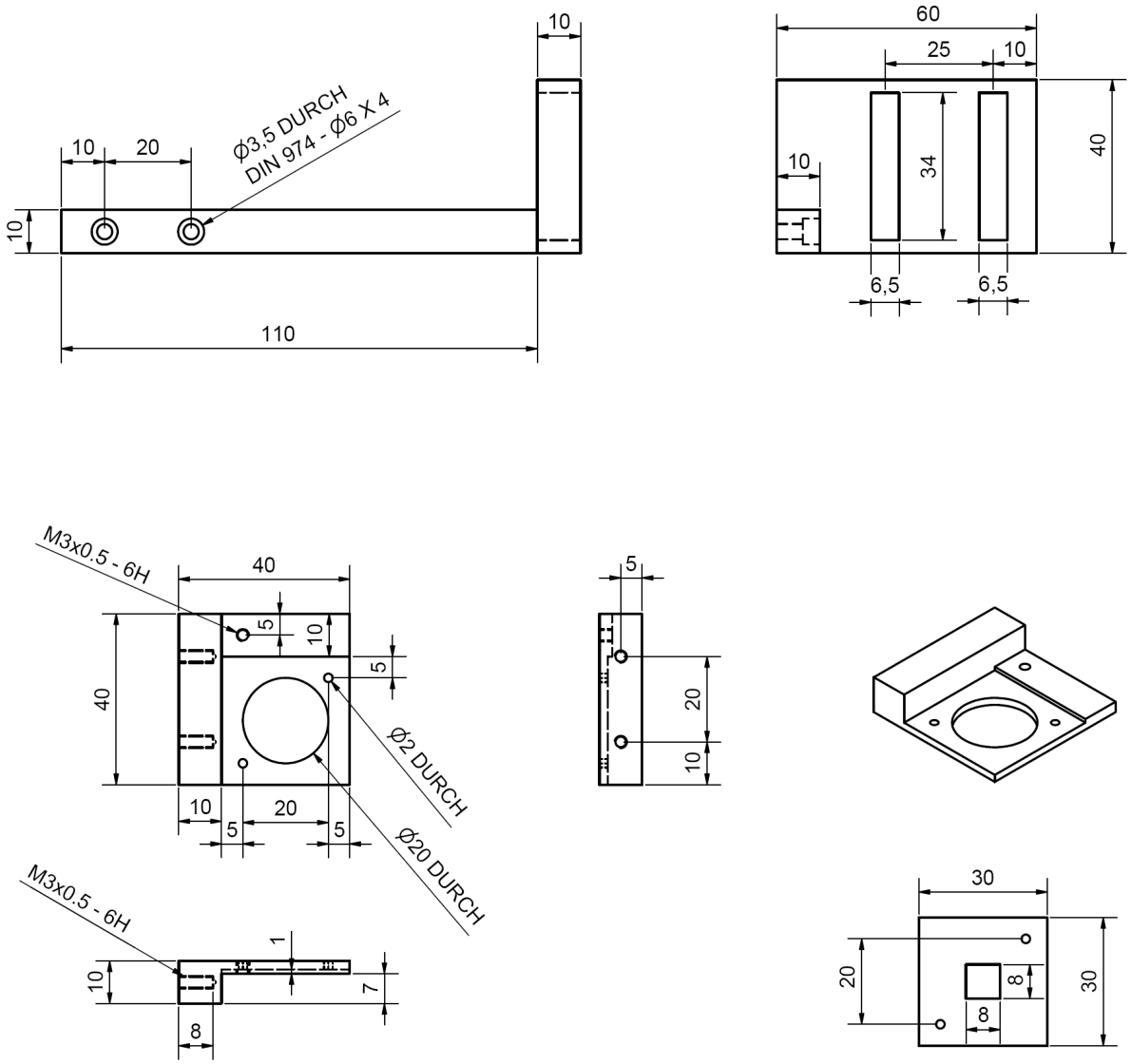



heat sink (Sk-189-50sa, black anodized aluminum) with connections for LED

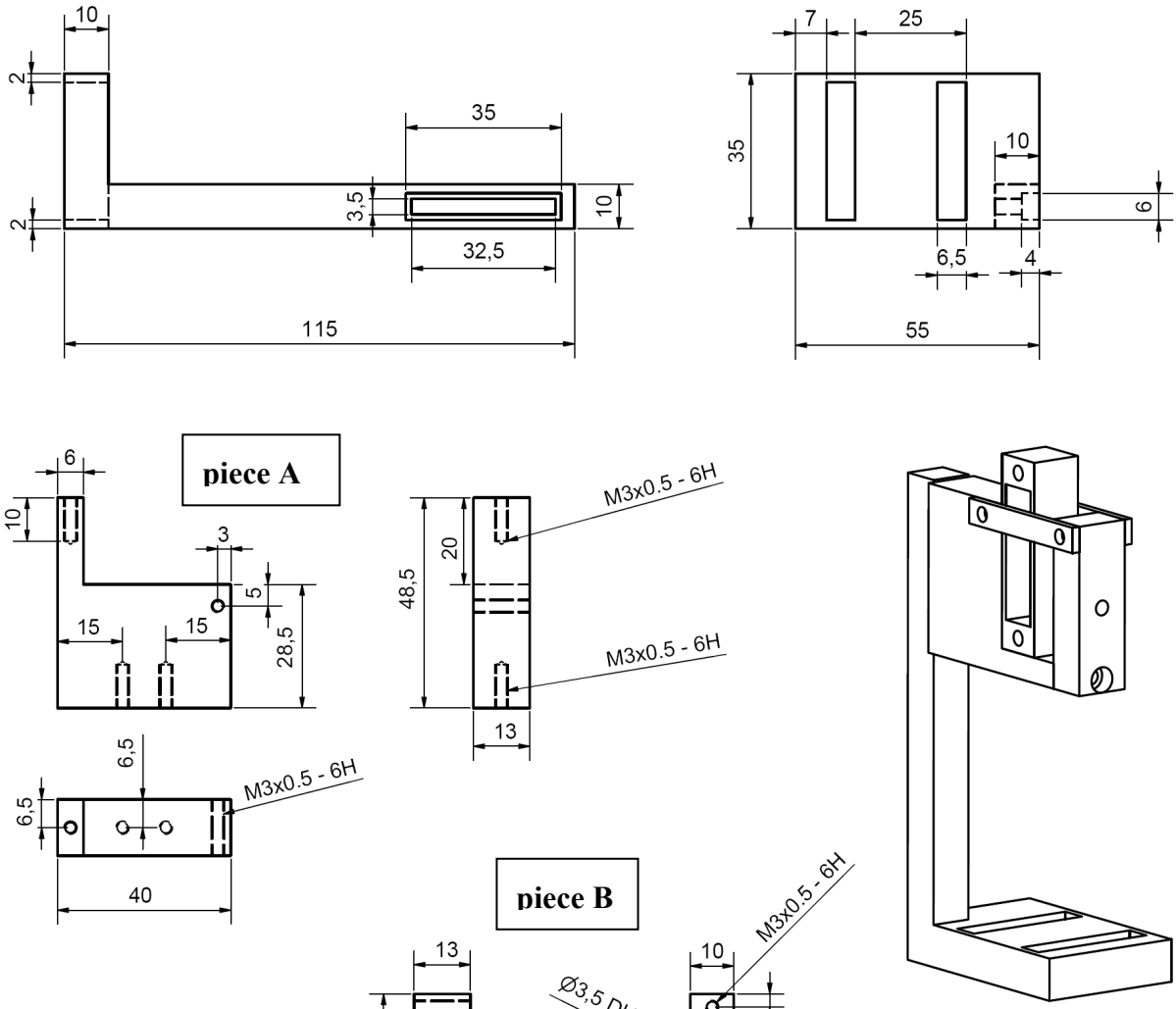
[2] Electronic CAD files of the mechanical components can be requested from the authors.




mount for the photographic lens (black anodized aluminum)

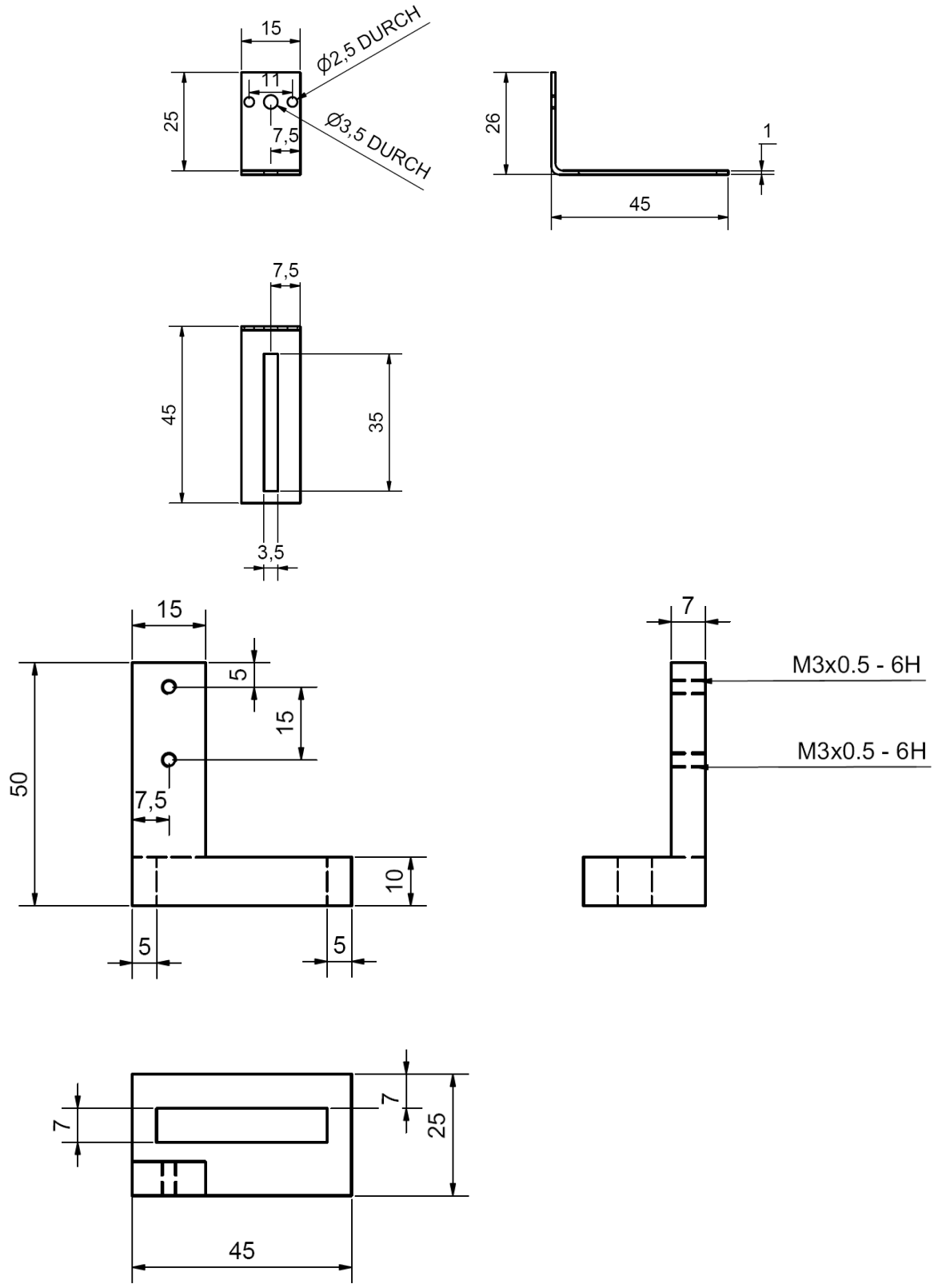



base for the removable aperture in front of the cuvette (black anodized aluminum)




cuvette mount + dummy cuvette

(black anodized aluminum, except for pieces A+B: PVC)




base for magnetic stirrer motor (black anodized aluminum)