

Supplementary technical information 1

TC-LSFM temperature controlled chamber

Heating and temperature control system system

Chamber construction

The TC-LSFM chamber is made of Delrin (polyoxymethylene, POM), a biocompatible, autoclavable plastic material. The chamber has a volume of 12-13 ml. A heating plate is connected to the bottom of the chamber, and a temperature sensor is placed inside a hole drilled through the chamber wall (**Figure 1, Figure 2**).

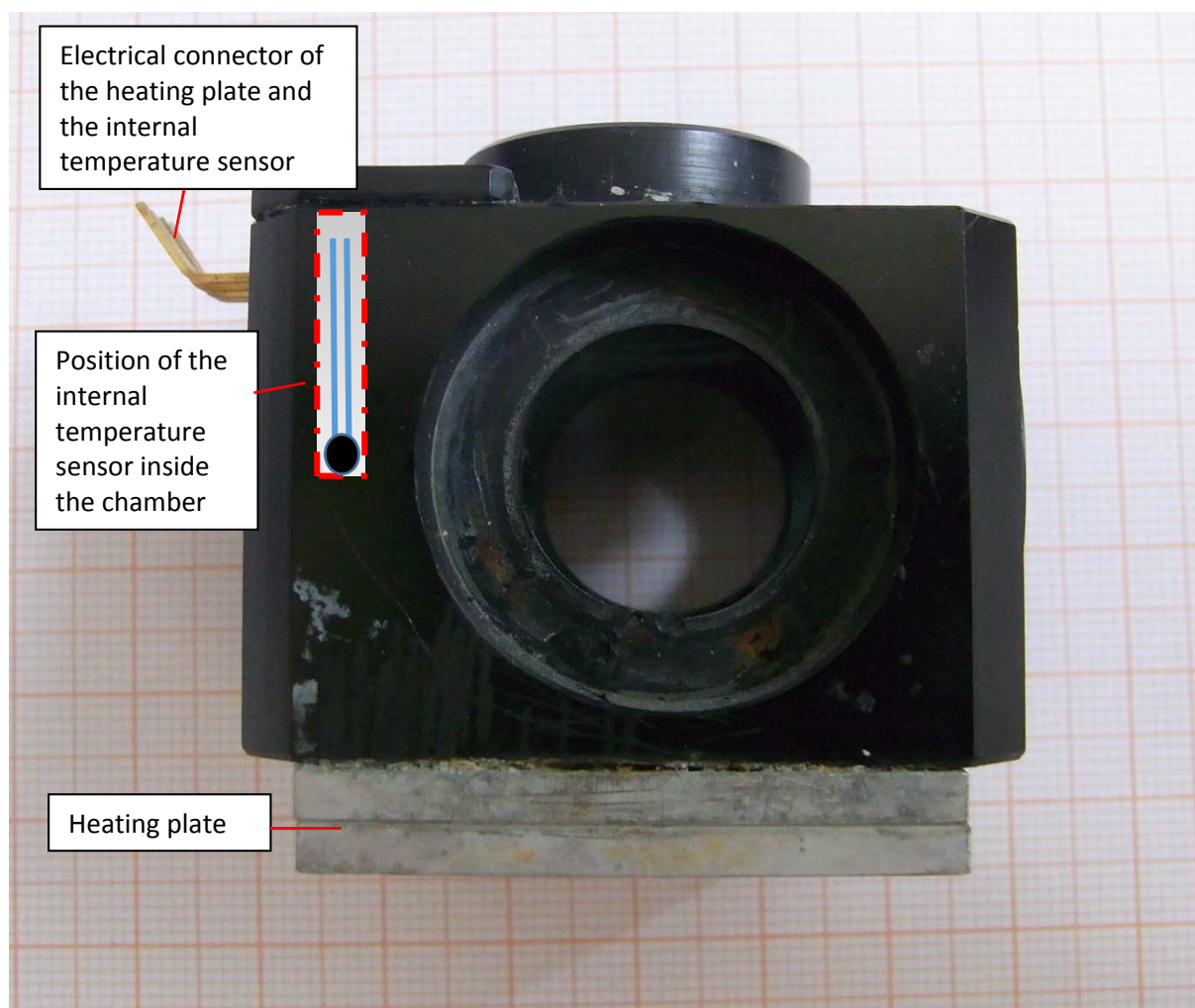


Figure 1 – Overview of the TC-LSFM chamber, side view.

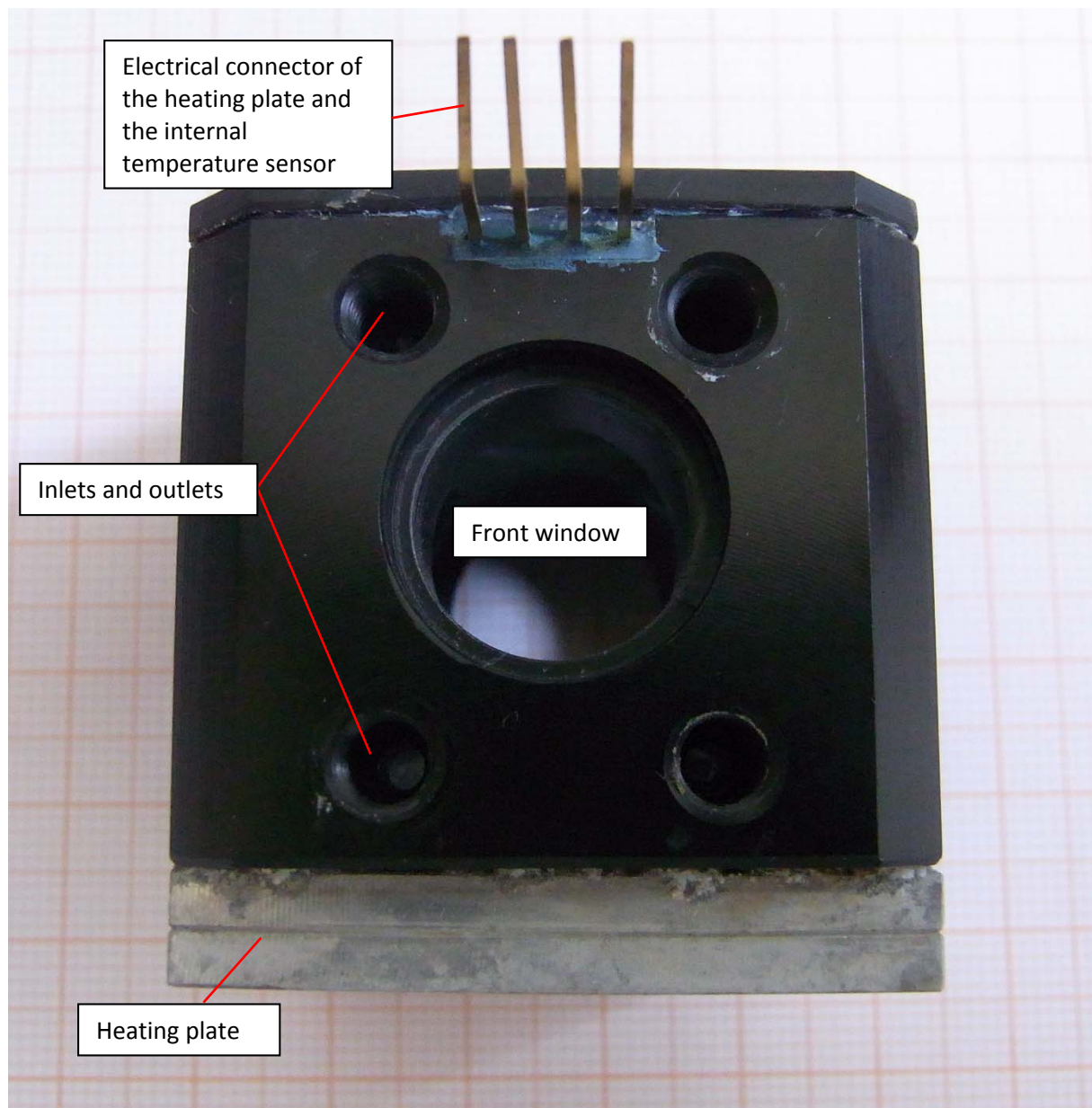


Figure 2- Overview of the TC-LSFM chamber, front view.

The electronic connector of both the heating plate and of the temperature sensor is placed at the top of the chamber. In case of spilling out of the medium from the chamber, this configuration avoid wetting the electronic contacts. This ensures a flawless functioning of the temperature control.

The temperature sensor, type Pt-100 (Distrelec Schuricht GmbH, Bremen, Germany) (**Figure 3**), is inserted into a hole drilled inside the chamber's wall, and placed at the same height of the specimen. This ensures that the measured temperature corresponds to the temperature of the specimen.

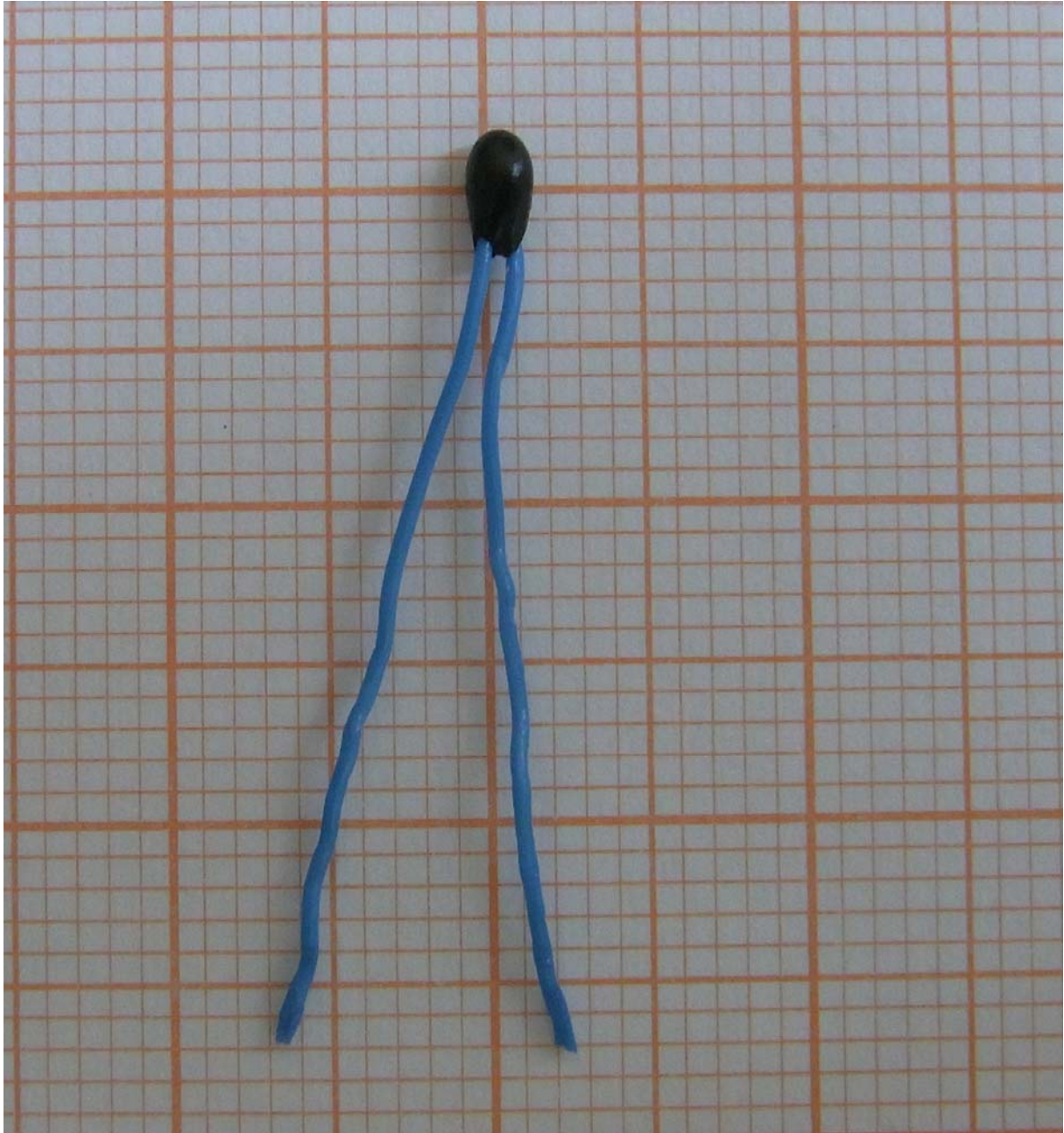


Figure 3 – Pt100 temperature sensor.



Figure 4 – Heating foil mounted in the heating plate.

The heating plate is composed by a heating foil (Minco HK5291, Distrelec Schuricht GmbH, Bremen, Germany) inserted between two aluminum plates (**Figure 4**).

Temperature controller

The temperature controller was designed and built by the Electronic Workshop of the European Molecular Biology Laboratory (EMBL, Heidelberg, Germany) (**Figure 5**).



Figure 5 – EMBL-GP197 heating controller.

The device features a microcontroller-based PID-control loop feedback system (proportional-integral-derivative controller). The PID-controller maintains the set temperature with a precision of ± 0.5 °C. The power supplied to the heating foil is given by a pulse-width modulated (PWM) voltage, which is controlled by the PID-system. The heating power is about 6W by a pulse-width modulation 30% Pwr-On 70% Pwr-Off, with a 24V power supply.