

Required devices for the calibration of climatic chambers within the authorized concept of esz AG calibration & metrology

For the calibration of climatic chambers in the authorized representative concept, with the help of the software solution **calibration expert - climatic test chamber (CTC)** certain requirements apply to the performance of the calibrations as well as to the test equipment used.

The testing process of the software solution CTC refers to the guideline DKD-R 5-7 (calibration of climatic chambers, method A - unloaded). The esz AG has successfully validated typical measuring instruments, as listed below, which are applicable for the calibration of climatic chambers.

The data acquisition unit being used for calibration will be controlled remotely by CTC. Therefore, an interface control has been developed for below listed devices.

Furthermore, every measuring instrument being used for calibration of climatic chambers with CTC needs accredited calibration. If the measuring instrument has not been calibrated by esz AG, an additional fee will be charged due to the requirement of importing the calibration data into the CTC database.

The following devices* (→ techn. minimum requirement) are qualified for the calibration of climatic chambers within the authorized concept of the esz AG:

**no purchase via esz AG*

■ **measuring instrument - temperature:**

- air temperature sensor: **Pt100**, class 1/10 DIN B (recommended!)
10x, one of it blackened (optimal teflon-coated, black)
i.e. TC Mess- und Regeltechnik Pt100-1/10B 18-1-6,0-4-100-CE4CLA
recommended minimum protective tube length > 10 cm
- air temperature logger:
 - option 1: **Ahlborn Almemo 710** (usable for 10 sensors)
+ Almemo adapter (10x) for Pt100 (ZA9030FS2)
 - option 2 (discontinued by the manufacturer):
HP / Agilent / Keysight 34970A (or 34972A)
+ multiplex card Agilent / Keysight 34901A (+ adapter box)

■ **measuring instrument - humidity:**

- air humidity sensor: specification $\pm 1,3$ % r.H. (at ~ 23 °C), repeatability < 0,3 % r.H.
i.e. Ahlborn FHAD 36R
- air humidity logger: **Ahlborn Almemo 2590A-2A (or – 4A)**

■ **assistive devices - thermo-hygro-barometer**

- data logger: specification:
temperature ± 1 K, humidity ± 3 %, atmospheric pressure ± 5 mbar
i.e. TFA Dostmann LOG220 or Voltcraft DL-220THP

■ **tools:**

- connector-cable temperature:
option 1: Almemo ZA 1919-DKU (→ Ahlborn Almemo 710)
option 2: National Instruments GPIB-USB-HS (→ HP / Agilent / Keysight 34970A)
- connector-cable humidity:
Almemo ZA 1919-DKU (→ Ahlborn Almemo 2590)
- cubic frame:
The useful volume of the climatic chamber getting calibrated has to be spanned by the arrangement of the measuring locations of the sensors. Therefore, it is recommended to use a cubic frame. Alternatively shelves of the climatic chamber can be used to span a volume.

Prices for accredited calibration of the instruments CTC:

article description:	ord. no. calibration:	price (net):
measuring instruments (sensors):		
temperature sensors (set of 10)	S-DTEMP-CTS-SET set: 9x temp. + 1x temp (blackened)	1.350,- €
humidity sensors (set of 2)	S-DFEUCHTE-CTC-OPTION set: 2x humidity	775,- €
temperature sensor (1x)	S-DTEMP-STK	465,- €
temperature sensor (2-5x)	S-DTEMP-SET2-5	715,- €
measuring instruments (display unit):		
Ahlborn Almemo 710	AHL-D710	300,- €
Agilent 34970A	AGI-D34970A	240,- €
Ahlborn 2590A-2	AHL-D25902	195,- €
Ahlborn 2590A-4AS	AHL-D25904AS	195,- €
assistive devices: i.e.		
Dostmann LOG220	DOS-DLOG220	240,- €
Voltcraft DL 220THP	VOL-DDL220THP	240,- €

Software requirements for the calibration of climatic chambers within the authorized concept of esz AG calibration & metrology:

- Windows 10 or higher
- .NET Framework Version 6 or higher
- calibration expert – CTC
<https://update.esz-ag.de/cePLUS/setup.exe>
- data acquisition unit, Ahlborn:
 - ALMEMO Control configuration software
http://usb.almemosupport.de/CP210x_Universal_Windows_Driver.zip
- data acquisition unit, HP/Agilent/Keysight:
 - NI-488.2
<http://www.ni.com/download/ni-488.2/7273/en/>
 - NI-VISA
<http://www.ni.com/download/ni-visa-run-time-engine/7222/en/>