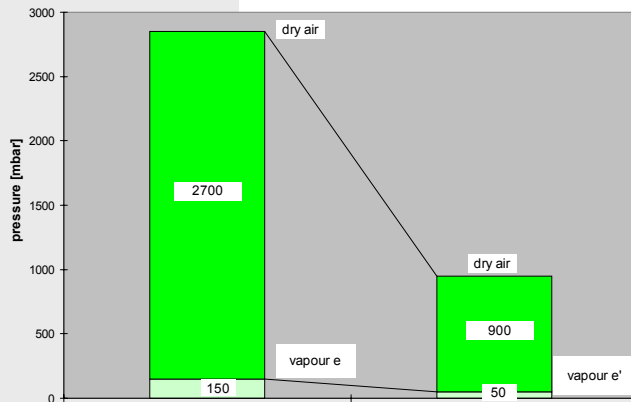
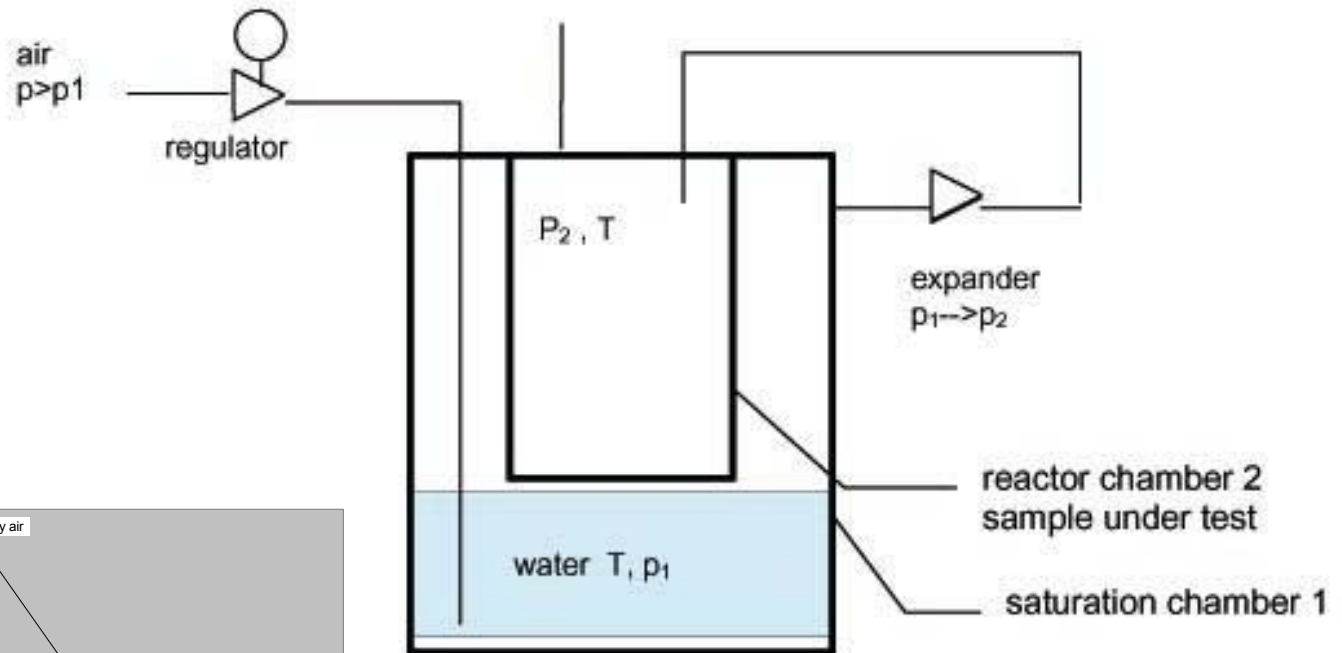


# *HUMIDTIY*



# *CALIBRATION*

## Schematic Construction:



$$RH = \frac{p_2}{p_1} * \frac{f(p_1)}{f(p_2)}$$

**$T_1 = T_2 = T = \text{const}$  – realized by a thermal high conductive construction of the humidity generator**

# THE NEXT STEP IN HUMIDITY CALIBRATION

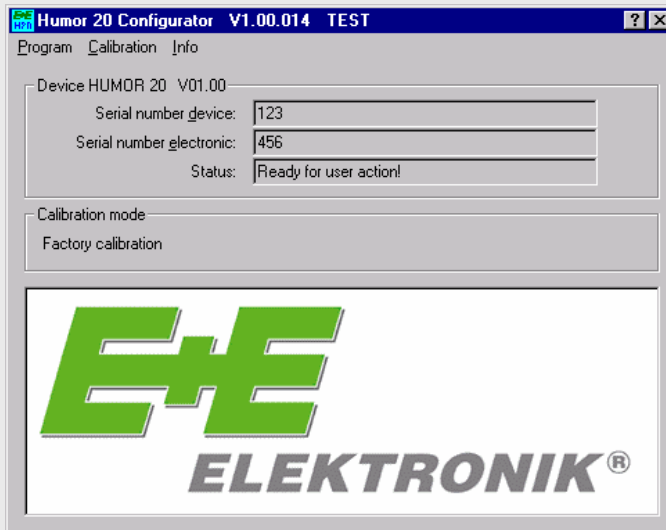


***HUMOR 20***  
***Easy maintenance as a main goal!***

**HUMOR 20**

# Easy Configuration & External Calibration

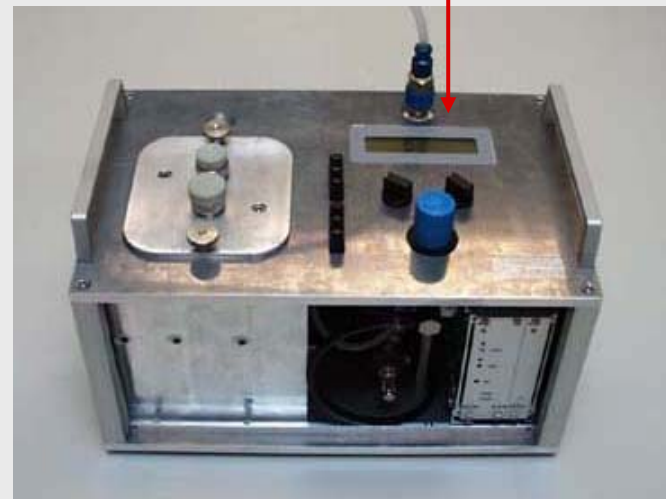
HUMOR 20



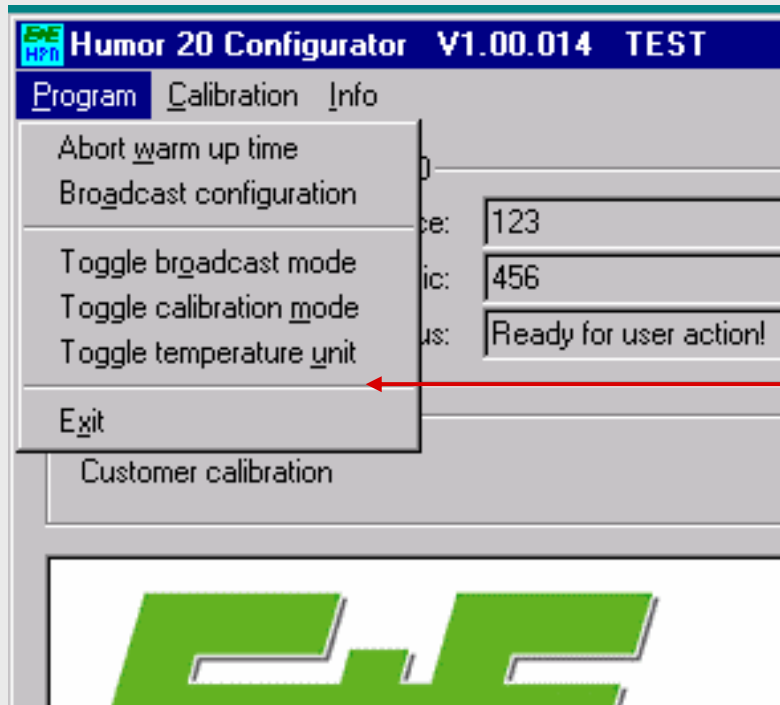
convenient communication by using

**HUMOR 20**

**configuration - software**



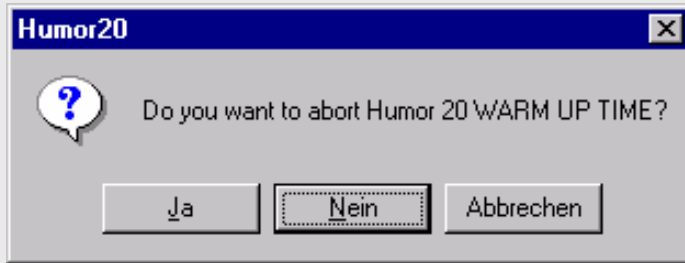
# The Configuration



## Functions:

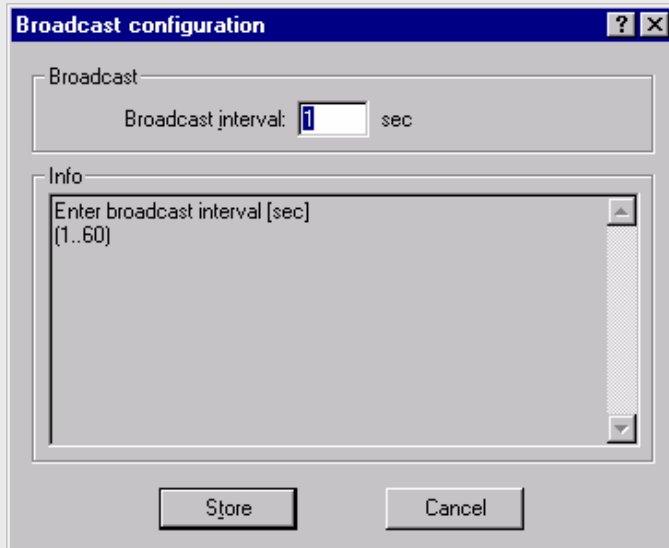
- abort warm up time
- broadcast configuration
- toggle broadcast mode
- toggle calibration mode
- toggle temperature mode

## *Abort Warm Up Time:*



ends the warm up time immediately –  
useful for presentations and exhibitions...

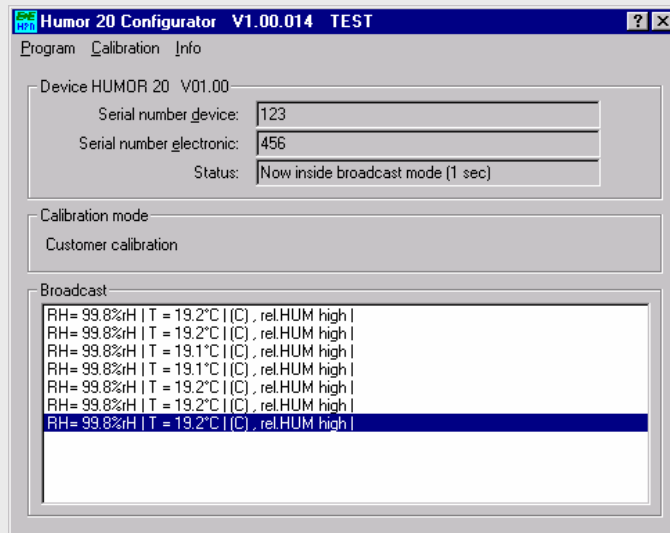
## *Broadcast Configuration:*



measurement data will be indicated on  
the screen as well as stored in a log –  
file according the selected broadcast  
interval

## Toggle Broadcast Mode:

switch from config./calibration mode to broadcast mode and back again

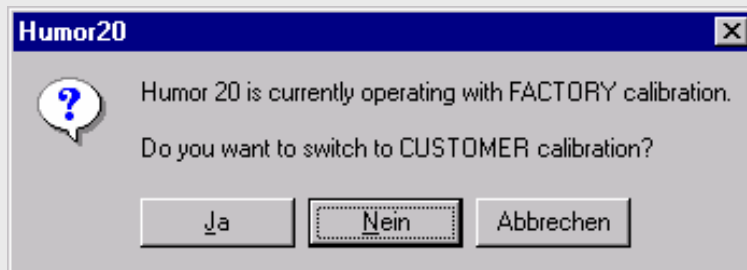


### broadcast mode:

measurement data (RH, T, warnings) will be displayed on your PC and stored in a log-file frequently.

(acc. broadcast interval)

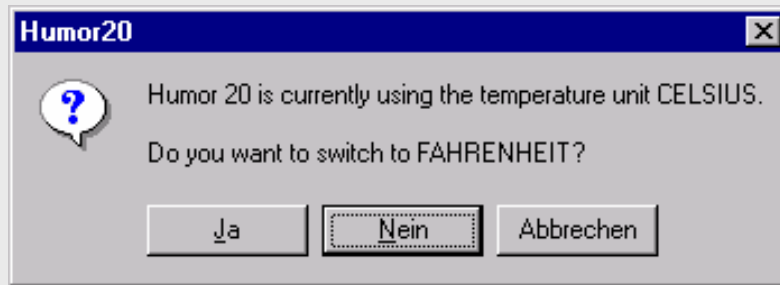
## Toggle Calibration Mode:



switch between **FACTORY** and **CUSTOMER** calibration and back again

the current mode is visible on the display showing either **F** or **C**

## *Toggle Temperature Mode:*



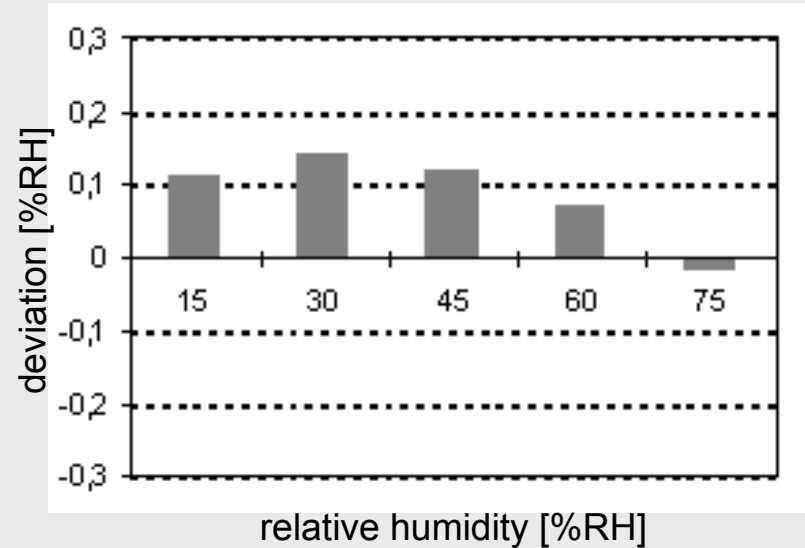
switch between temperature units –  
degrees CELSIUS or FAHRENHEIT



# RECALIBRATION

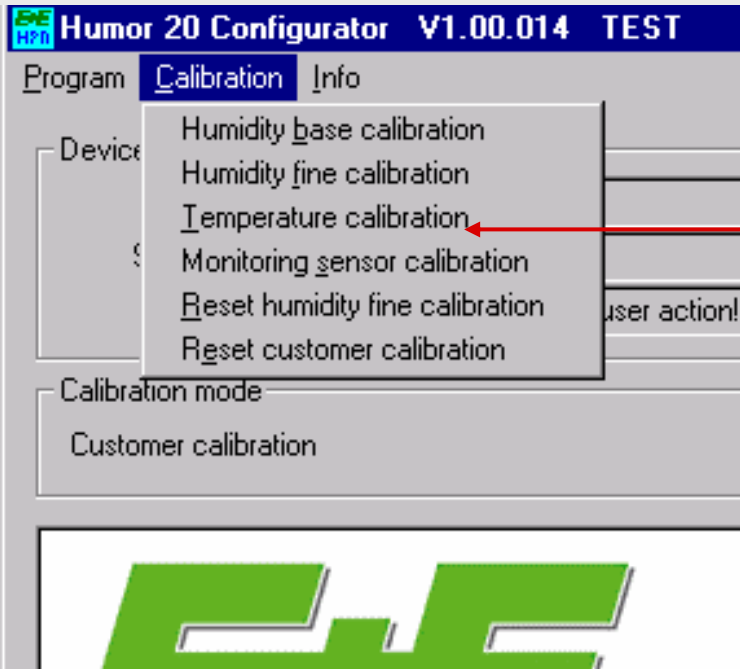
## *Recalibration Interval?*

- industrial purpose:  
we recommend approx. 2 years
- metrological purpose:  
according local legislation
- for a period of 1 year a stability better than 0,5% RH is expected



## HUMOR 20 - External Recalibration

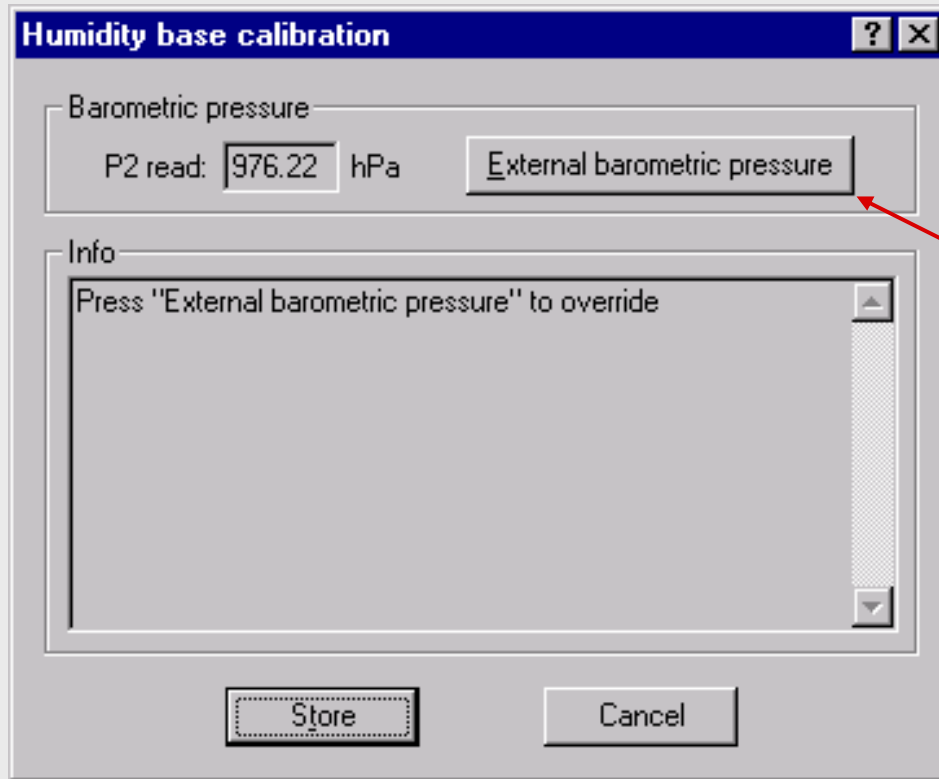
CALIBRATION



### Functions:

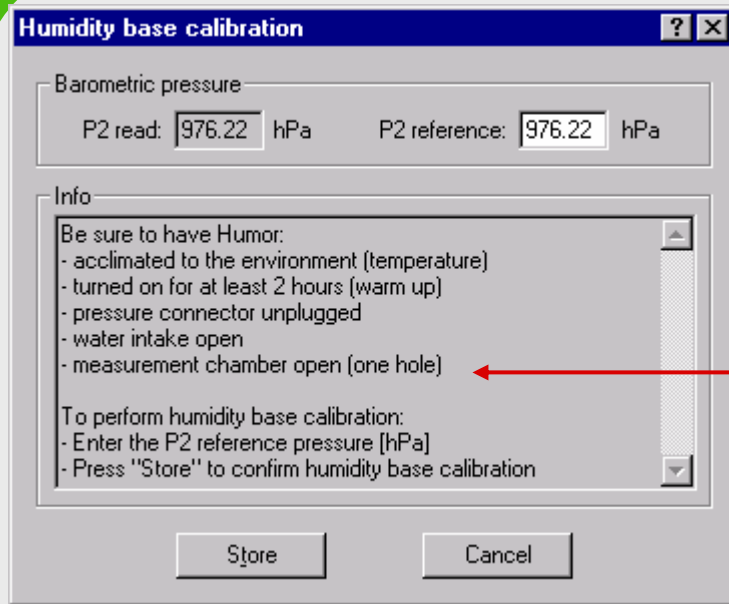
- Humidity basic calibration:
- Humidity fine calibration
- Temperature calibration
- Monitoring sensor calibration
- Reset humidity fine calibration
- Reset customer calibration

## Humidity Base Calibration:



**External pressure ref. has to be highly accurate, otherwise results will be worse than without one!!**

**Before basic calibration all these requirements have to be fulfilled!!**



**During basic calibration entire system has to be un-pressurized !!**

### Function principle:

**Step 1 (optional):** The offset absolute pressure transmitter P2 read (measuring chamber - 0...2.000 hPa) will be rebalanced to the entered reference value. Without any reference P2 will be considered as reference value.

**Step 2:** The offset of absolute pressure transmitter P1 (saturation chamber – 0...20.000 hPa) will be balanced to P2 read = P2 reference

*The Result:*

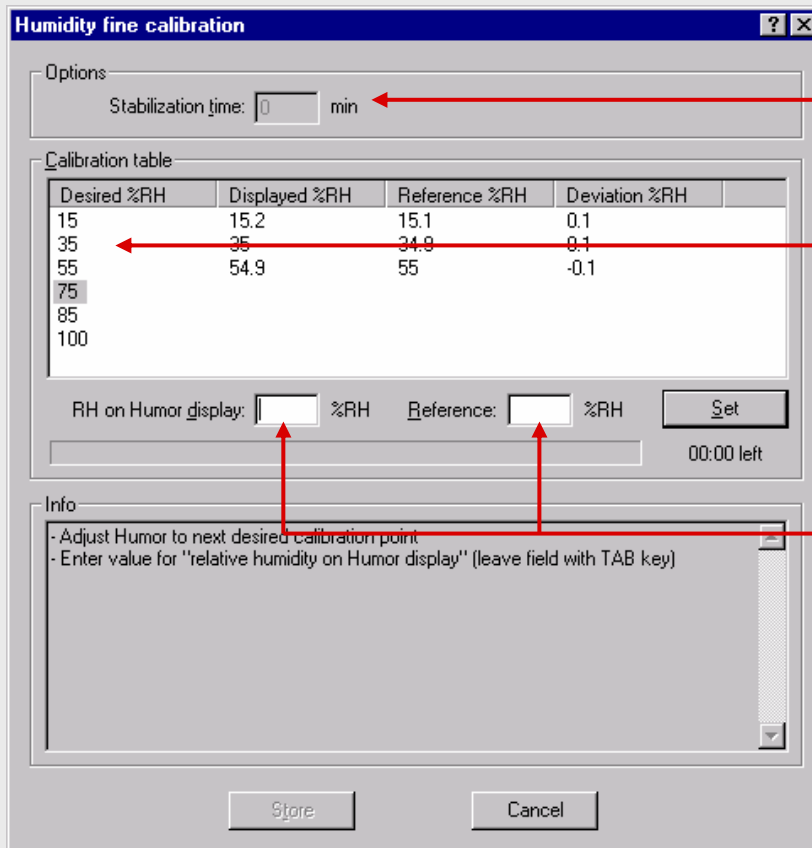
$$RH = \frac{p_2}{p_1} \times 100\% = \frac{\cancel{980\text{ hPa}}}{\cancel{980\text{ hPa}}} \times 100\% = 100\%$$

After offset correction of both pressure transmitter even without external reference the accuracy of the HUMOR 20 will be better than  $\pm 0,75\%$  !

**!! In general a basic calibration is sufficient!!**

## Humidity Fine Calibration:

Possibility to adjust the HUMOR 20 characteristic according an **highly accurate external reference** (certified dew point mirror...) in 6 points!



Desired %RH	Displayed %RH	Reference %RH	Deviation %RH
15	15.2	15.1	0.1
35	35	34.9	0.1
55	54.9	55	-0.1
75			
85			
100			

adjust set point to the desired value!

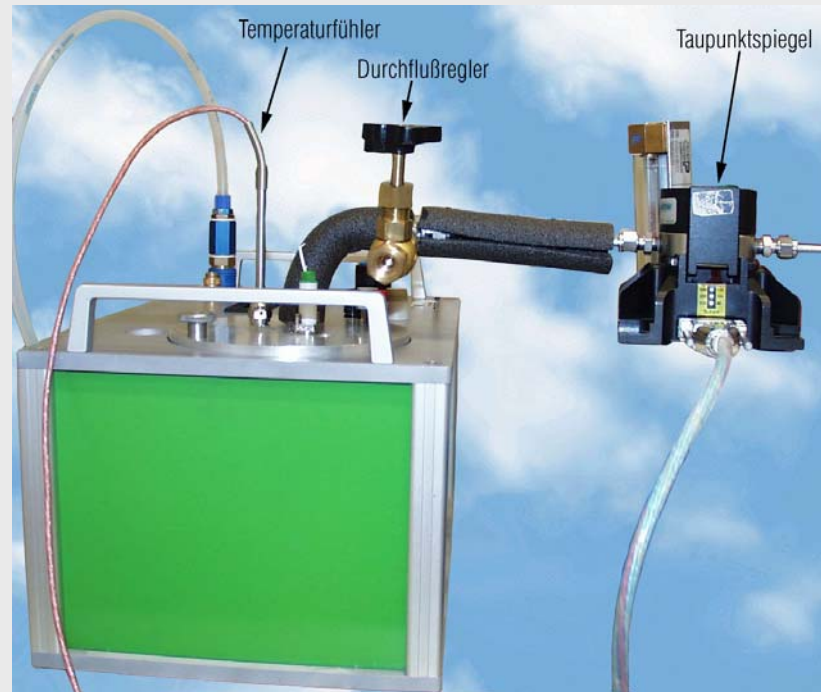
After the selected stabilization time

displayed RH- and reference value have to be entered.

## *Remarks:*

- Before starting a fine calibration, a basic calibration has to be done.
- At 100% RH set point the HUMOR 20 has to be un – pressurized – remove pressure connector, open water intake, open measuring chamber (1whole).
- **To reach outstanding accuracy highly accurate references are needed (certified dew point mirror) !**

*To implement a certified dew point mirror additional instrumentation is necessary !!*

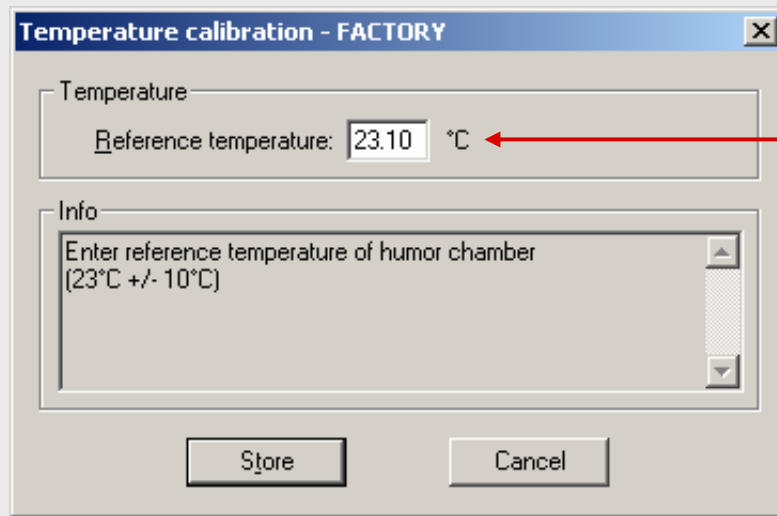


### *Main Advantage:*

- Customers (standardization & metrological institutes) are able to alter the characteristics of the HUMOR 20 to their prevailing standards!

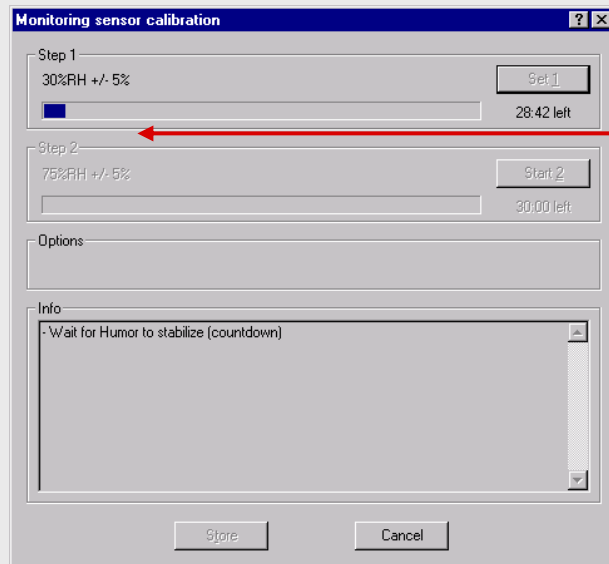


## Temperature Calibration:



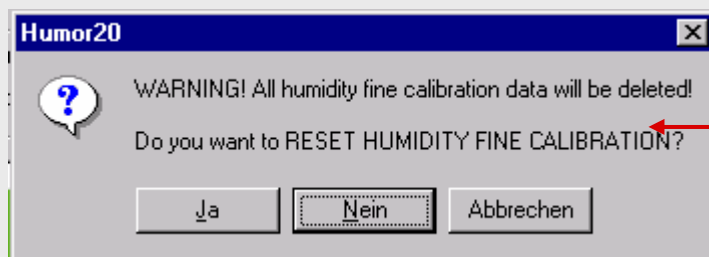
The temperature measurement of the HUMOR 20 can be adjusted by entering the announced value of an accurate external reference in the restricted area of 23 degC +/-10 degC

## Monitoring Sensor Calibration:



Adjust given set point – wait for stabilisation time - enter reference value !!

## Reset Humidity Fine Calibration:



Humidity fine calibration data will be deleted?

# Mechanical Improvements

*Measuring Chamber: from circular...*



**previous:**

**d = 120 mm**



## ***Rectangular Measuring chamber !***



**dimensions:**

**100 x 110 mm**



### ***Main Advantage:***

- HUMOR 20 matches the dimensions of room transmitters and data loggers

## *Internal Construction:*

A HUMOR 20 **filled** with DI water can be tilt up to 20°

angle up to  
20 °



## *Main Advantage:*



→ Portable while ready for user action (loop calibration!)

## *Inaccuracy of Measurements:*

### *data sheet:*

10 < RH ≤ 45 %RH - ±0,5 %RH

45 < RH ≤ 70 %RH - ±0,7 %RH

70 < RH ≤ 85 %RH - ±0,9 %RH

85 < RH ≤ 95 %RH - ±1,3 %RH

remark: extended inaccuracy of measurement results from the standard inaccuracy increased with a multiplying factor K=2

### *ÖKD accreditation guarantees:* (at 25 degC ± 3 degC)

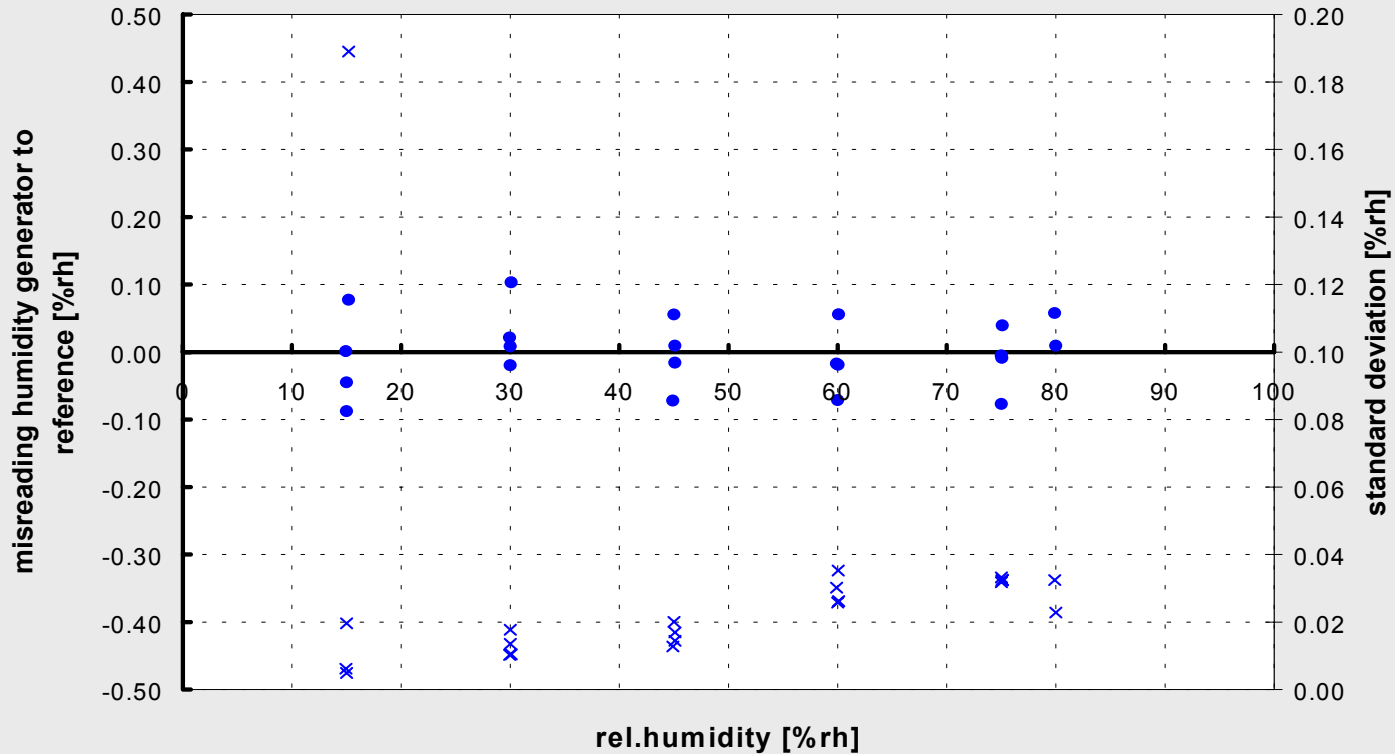
10 < RH ≤ 45 %RH - ±0,2%RH

45 < RH ≤ 70 %RH - ±0,35 %RH

70 < RH ≤ 85 %RH - ±0,5 %RH

# After Customer Calibration:

## misreading humidity generator



Humidity generator in comparison with a certified dew point mirror –  
 deviation stored as a correction function -

**Achieved accuracy depends only on the used humidity reference !**

# Calibration - Certificate

ÖSTERREICHISCHER KALIBRIERDIENST

AKKREDITIERT DURCH DAS  
BUNDESMINISTERIUM FÜR WIRTSCHAFTLICHE ANGELEGENHEITEN



Kalibrierlaboratorium für die Messgröße Relative Feuchte und Temperatur  
Calibration laboratory for measuring relative humidity and temperature

YOUR PARTNER IN SENSOR TECHNOLOGY  
E+E ELEKTRONIK



Kalibrierschein  
Calibration Certificate

Objekt Hersteller	Feuchtemeßgerät E+E Elektronik	Die Kalibrierung erfolgt auf der gesetzlichen Grundlage der §§ 18 und 19 des Mess- und Eichgesetzes (MEEG) Nr. 152/1993 in gültiger Fassung. Dieser Kalibrierschein dokumentiert die Eichfähigkeit auf separate Normale mit Angabe der physikalischen Einheiten in Übereinstimmung mit dem Internationalen Einheitensystem (SI). Die Kalibrierung wurde gegen ein Referenzstandard der Kalibrierung in der Normale durchgeführt.
Typ	HRMOR 10 S	
Hersteller-Nr. Ser.Nr.	P11160, 72.02	
Auftraggeber Datum	E+E Elektronik 26-02-2002	
Kalibrier-Nr. Anzahl der Seiten des Kalibrierscheins	3	
Datum der Kalibrierung	26-02-2002	

Dieser Kalibrierschein darf nur vollständig und unverändert weiterverleihen werden. Anträge oder Änderungen sind unzulässig. Kalibrierscheine ohne Unterschrift und Stempel haben keine Gültigkeit.  
This calibration certificate may not be reproduced either alone or full. Calibration certificates without signature and seal are not valid.

Stempel	Datum	Zustimmungsrechtlicher	Bereitsteller
Seal	Date	Authorized person	Person in charge
	26-02-2002	DI Christl Pöp	DI Christl Pöp

E+E Elektronik Ges.m.b.H. Langenstein 1, A-4210 Engerndorf-C, Austria, Tel. +43 (725) 605-0, Fax +43 (725) 605-383, FN 163731 Landesgericht Linz, UID-Nr.: ATU4846181, DWR 0962789

KALIBRIERSCHEIN  
Laboratorium 23

Nr.	KAW0043	43 ÖKD 62-02
Erzeugnis	Feuchtemeßgerät	
Erzeugnis-Nr.	HRMOR 10 S, S.Nr.: P11160, 72.02	
Erzeugnis-Name	Feuchte	
Datum	26-02-2002	
Seite	Seite 2	

ist	Feuchtemeßwert Output value	Referenzwert mit Feuchte Reference value rel. Humidity	Abweichung Prozentschwankung von Referenzwert Deviation from reference value	Unsicherheit der Messung Measurement uncertainty
at	(%)	(%)	(%)	(%)
20.00	32.27	32.15	0.12	0.3
20.50	32.27	32.17	0.10	0.3
21.00	32.27	32.18	0.09	0.3
21.50	32.27	32.19	0.08	0.3
24.00	32.27	32.23	0.04	0.3

gekalibriert bei  
in condition

Kalibrierungstemperatur: 25 ± 0.3 °C  
Temperature of calibration

erfahren  
in procedure

Standardabweichungserfahren von E+E Elektronik „Anweisung für die Kalibrierung von Feuchtemeßgeräten“  
Standard calibration procedure of E+E Elektronik „Anweisung für die Kalibrierung von Feuchtemeßgeräten“  
(„Instruction for calibration of Humidity Calibrators“)

issued in house by our  
ÖKD accredited  
calibration laboratory!

## Main Advantage:

→ traceable to international standards

→ reduced delivery periods (shipment to PTB not longer necessary)