

We congratulate you on the purchase of your new ROTRONIC GTS measuring instrument. Please read these short instructions carefully before you use the device.

**1. Introduction**

The handheld instrument GTS is a robust instrument for the measurement of equilibrium humidity and temperature of paper and cardboard stacks etc. It may also be used for the measurement of the ambient relative humidity and temperature.

**2. Technical description**

The humidity is measured with a capacitive ROTRONIC HYGROMER AC-1 sensor. The capacity of the sensor changes with the relative humidity. These changes are detected, amplified and displayed using advanced electronics. For the temperature measurement, a Pt100 sensor is used.

**3. Setting to work**

Before using, a standard 9V disposable or rechargeable battery must be placed in the compartment at the back of the instrument. It is preferable to use leak proof batteries with a high storage capacity, such as e.g. alkali cells. Leaking batteries can destroy the instrument.

**Functions**

<b>ON</b>	Press pushbutton
<b>Switching rh / Temp</b>	Press pushbutton shortly
<b>OFF</b>	Press pushbutton and hold until display goes off
<b>Display rh or Temp</b>	3-digit LCD readout ( % RH or °C, indicated by a mark on the left side of the display)
<b>Battery test</b>	The sign in front of %RH or °C is flashing when the battery has to be changed.
<b>Humidity adjustment</b>	Potentiometer on the front side, covered by a small round cap.

**4. Performance of measurements**

The instruments are factory- adjusted; which means that a calibration after receipt of the instrument is not necessary. After switching on, the instrument is immediately ready for the measurement. The waiting time before you can read the measured humidity and temperature depends only on the acclimatization time of the probe and the medium to be measured. The acclimatization concerns both humidity and temperature. During the acclimatization which can last from a few up to 30 minutes, the instrument does not have to be switched on.

The necessary time depends on:

- Difference in humidity and temperature between sensor and medium to be measured
- Change of the measured variables during the acclimatization.

Humidity measurement provides a better picture of the progress of acclimatization since it responds much faster and more sensitively than the temperature measurement. Hence the 1/10 percent indication is particularly suitable as a trend indicator. The acclimatization may be considered as terminated, when the indication oscillates around a mean value. As it cannot be emphasised enough that accurate humidity measurements are extremely demanding, some of the most frequent errors are mentioned below:

**4.1 Sources of errors**

- Temperature errors caused by too short adaptation time
- Exposure to sun radiation during measurement, or the presence of radiators, cold outside-oriented wall, draught, heat radiated from body etc.
- Humidity errors due to sprayed steam / vapour or water, dripping water, attempts to measure non-hygroscopic substances, condensation.
- Contamination of the sensor with dust
- Discharged battery. The battery voltage drops considerably at temperatures below 10 °C.
- The instrument is out of the specified accuracy and has to be adjusted. See item 5.

If condensation occurs, the instrument will indicate a higher value than 99.9 %rh (= max. value); therefore the indication changes to 0 %rh and may even go higher, depending on the condensation. Condensation does not destroy or damage the humidity sensor. For the regeneration of the instrument, remove it from the humid ambient and keep it in a warm and dry place.

**The sensors are insensitive to chemicals as long as they occur in the normal concentrations (MAC values = Maximum Allowable Concentration). Consult the manufacturer in case of higher concentrations.**

After the measurement has been carried out, we recommend to put the instrument back into the case or in another place where it is protected against dust.

**4.2 Measurement in paper stacks**

The GTS instrument is specially designed for carrying out measurements in paper stacks. It represents a design optimum between the smallest possible thermal capacity, sufficiently high mechanical strength and good heat transfer between paper and sensor. To introduce the probe into the stack, the layer of paper above the desired measuring location must be slightly lifted. Friction between the probe-blade and the paper should be kept to a minimum since this will generate unnecessary heat and extend the measuring time. The same precautionary measures are necessary when the probe-blade is withdrawn from the paper stack in order to measure another one. During the measurement it is recommended to move the probe by a few mm after approx. 30 sec. so that the opening comes into contact with fresh paper. This will speed up the measurement because the quantity of water required for the measurement is supplied to the sensor more quickly. Avoid touching the probe-blade with the hand (temperature influence).

The instrument will automatically switch off after about 2 minutes. Switch it on again if necessary.

**4.3 Measurement of ambient humidity and temperature**

The GTS instrument, though it is designed for the measurement of paper stacks, may also be used for the measurement of the ambient. In order to get accurate measurements, it is important to acclimatize the instrument for a period of time, as the air is a good insulator (low temperature conductivity). Avoid touching the sword with your hands (temperature influence). Do not use the instrument in an air flow above 3 m/s, as the probe is not protected by a filter.

**5. Maintenance and service**

**5.1 Temperature probe**

The instruments are factory- adjusted. A temperature re-adjustment is normally not required. In case of doubts concerning the correct adjustment, please contact ROTRONIC AG.

**5.2. Humidity probe**

We recommend to check the instrument at least once per year in order to keep the specified accuracy. Use only ROTRONIC humidity standards to carry out this check!

The humidity standards are ampoules, which contain unsaturated salt solutions, for which we guarantee a shelf life time of 10 years. The nominal value, e.g. 50 %rh, is reached at 23 °C. Therefore we recommend to do the calibration at 23 ± 2 °C. If the ambient temperature is higher or lower, you have to consider the corresponding humidity, indicated on the cover of the humidity standards.

The GTS-Set consists of a carrying case, containing the instrument, humidity standards and the calibration device required for humidity calibration. If you do not have these accessories, you can order them from ROTRONIC or a ROTRONIC agent. (See accessories, item 6).

**The ROTRONIC humidity standards (CH poison class 3) are normally not dangerous for men but can cause irritations of the skin of sensitive persons. In case of contact with your skin or eyes, immediately wash out the solution thoroughly with plenty of water. The ROTRONIC humidity standards must not be swallowed!**

**Definitions:**

**Calibration** = Control measurement with a ROTRONIC humidity standard

**Adjustment** = Calibration + additional new adjustment to the nominal value

**Attention!**

**The instrument is designed for a 1-point adjustment; it should therefore be calibrated in the range it's normally used in. In the paper industry, this is usually 50 %rh.**

**Calibration steps for humidity measurement:**

- Unscrew the knurled cover of the calibration device. Remove the insertion ring.
- Insert the probe fully into the calibration device. Make sure the opening is looking downwards.
- Take a textile pad from the box of the humidity standards and put it into the cover of the calibration device. Before breaking the ampoule, hold it by the neck and shake slightly, until all the fluid is in the lower part. Then break off at the constriction between neck and body. Pour all the contents into the middle of the textile pad, slightly tapping if necessary to ensure complete emptying. Place the insertion ring with the metallic part on the textile pad.
- Hold the probe and the calibration device with the opening facing down and screw the cover back in its original position and after this operation.
- Allow sufficient acclimatisation time ( 45 – 50 min.) before checking the indication.
- Remove the small, round cap on the front side and adjust the potentiometer with a screwdriver, till the reading equals the value of the humidity standard.
- After calibration, remove the textile pad and dispose of it with the household refuse. The textile pads are designed for one-time use and must not be used again.
- Rinse the knurled cover and the insertion ring with plenty of water and dry.

**5.3 Contamination**

In order to avoid contamination of the probe, the instrument should be placed in the carrying case immediately after use.

**6. Accessories**

**6.1 Humidity standards**

<b>Nominal value :</b>	<b>Order code:</b>
50 %rh	<b>EA50-SCS</b> (standard value for paper measurement)
20 %rh	<b>EA20-SCS</b>
35 %rh	<b>EA35-SCS</b>
65 %rh	<b>EA65-SCS</b>
80 %rh	<b>EA80-SCS</b>

**6.2 Calibration device**

Calibration device for instrument GTS: Order Code: **EGS**

**7. Technical data**

Measuring range humidity	5...100 %rh
Measuring range temperature	-10...50 °C
Accuracy of humidity at 23°C	± 1.5 % rh
Hysteresis for a 10-95-10 %rh cycle	< 0.5 %rh
Time constant at 23 °C	<10 sec.
System temperature coefficient	± 0.5 % rh (probe & electronics)
Humidity sensor	Hygromer AC-1 capacitive sensor
Temperature sensor	Pt 100 B
Display	3 digit LCD ( %rh or °C/°F )
Resolution	0.1 % rh /0.1 °C
Supply	
Battery	9 V, IEC 6LF22
Accumulator	8.4 V, 110 mAh, IEC 6F22
Lifetime battery / accumulator (typical)	approx. 200 h / 50 h
Automatic cut-off	after approx. 2 minutes
Battery indication	low bat indication by flashing dot
Humidity adjustment	potentiometer adjustment from outside
Probe material	Aluminium
Probe dimensions	260 x 18 x 5 mm
Material of housing	ABS
Weight	approx. 300 g incl. battery

Dimensional diagram:

