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CLIMA

# Instruction for Use

020659/10/04

# *Hygro - Thermograph*

**1.0660.../ 1.0664.../ 1.0665...**

## Contents



## FIgures



## Tables



# 1 Models available

| Order-No. | Recording Time | Clockwork |
|---|---|---|
| 1.0660.xx.xxx | 1 day / 7 days, switchable | Spring clockwork mechanism |
| 1.0664.xx.xxx | 14 days / 31 days, switchable | Spring clockwork mechanism |
| 1.0665.xx.xxx | 1 / 7 / 31 days, switchable | Quartz clockwork mechanism |
| | | |
| | Humidity measuring range | |
| **...**00**...** | H (10...100 % rel.h. ; -35...+80 °C) | |
| **...**02**...** | K ( 0...100 % rel.h. ; 0...+80 °C) | |
| | | |
| | Temperature measuring range | Graduation |
| **...**000 | -35 ... +45 °C | 1 °C |
| **...**005 | -20 ... +60 °C | 1 °C |
| **...**011 | -10 ... +50 °C | 1 °C |
| **...**014 | 0 ... +40 °C | 0,5 °C |
| **...**015 | 0 … +50 °C | 0,5 °C |
| **...**017 | 0 ... +80 °C | 1 °C |

**Table 1: models available**

***Attention:***

***Hygro- Thermographs with Quartz clockwork mechanism are applicable only within a temperature range from –20 to +60°C!***

# 2 Application

The hygro-thermograph measures and records both the relative humidity and the air temperature of the surrounding atmosphere. The recording drum is driven with utmost precision either by a manual spring clockwork mechanism or by a battery-operated quartz clockwork. Either H or K humidity measuring elements can be used depending on the general on-site operating conditions.

**"H" measuring elements** are suitable for taking measurements in normal to very moist air at temperatures below and above 0°C.

**"K" measuring elements** are designed for use in normal to dry air in the temperature range above 0°C and require no maintenance.

Typical applications include environmental monitoring in computer rooms, factories, warehouses, offices, laboratories, nurseries, museums and galleries but they can also be used in meteorological measuring stations.

# 3 Set-up and Mode of Operation

The clockwork and the columns with the humidity measuring element and the temperature measuring element are mounted to a base plate. The instrument is protected by a tiltable transparent hood. The measuring elements react promptly thanks to large ventilation openings in the direction of measurement.

Humidity is measured by a hair (H) or by a synthetic (K) measuring element. These measuring elements consist of several hairs or fibres whose lengths change when the humidity changes. This change in length is recorded by a felt pen onto a paper recording strip via a system of levers. The measurement accuracy indicated for the H measuring element applies to regenerated measuring elements in decreasing humidity.

Temperature is measured by a high quality, aged bimetallic measuring element which has been bent to form a ring. The radius of the measuring element changes when the temperature changes. This change in radius is likewise recorded on the recording strips. The rotation of the drum allows time-dependent registration.

# 4 Preparation for Use

Unscrew the knurled-head screw and open the hood. Remove the foam rubber from the hood (transport protection). Push the switch-off lever to the left to raise the recording pens from the recording strip.

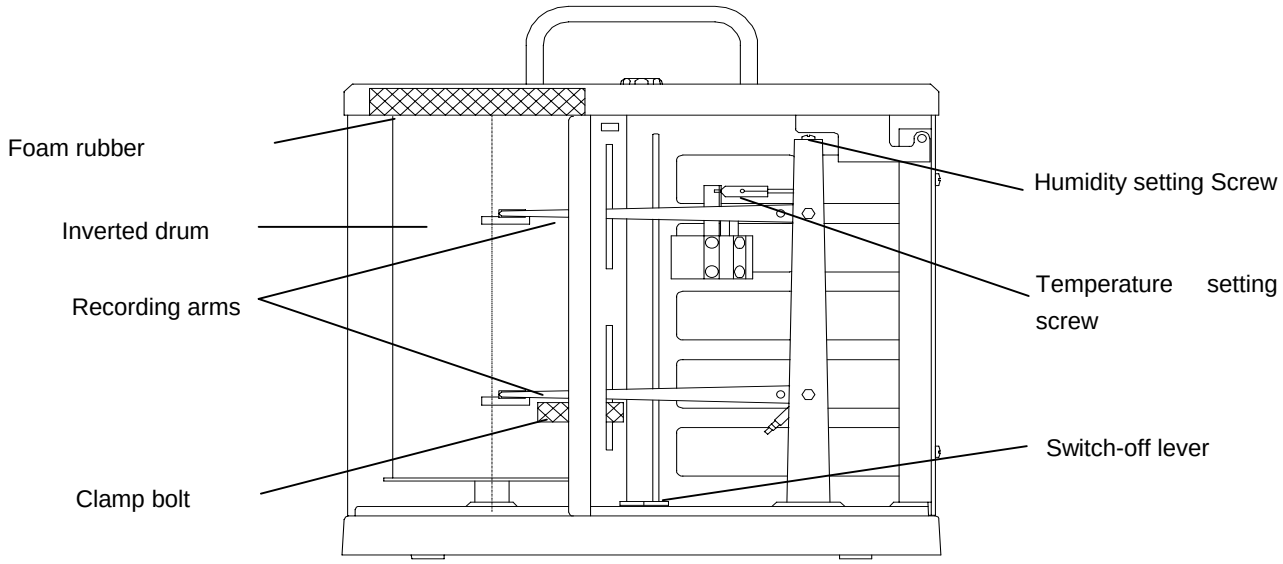
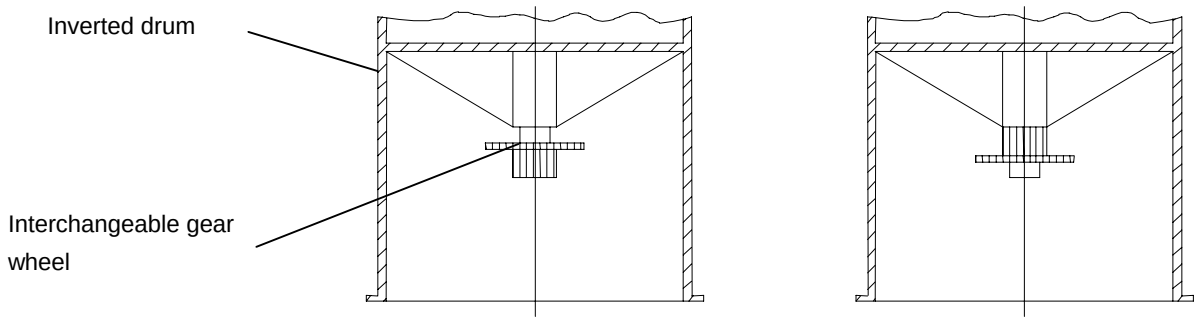



**Figure 1: Hygro - Thermograph**

Setting the desired recording time

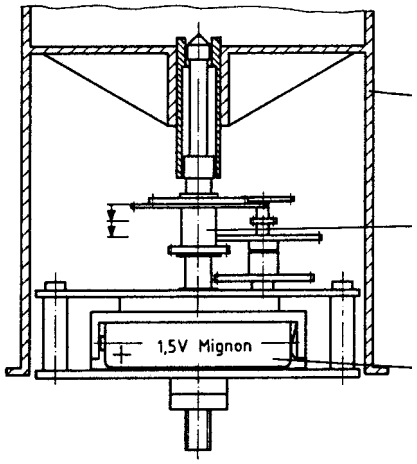
For instruments with a spring clockwork mechanism, unscrew the winding key by turning it towards the right and remove the inverted drum from the drive mechanism. The desired recording time can be set by changing the interchangeable gear wheel on the drum.




| Order No. | Recording time | Recording time |
|---|---|---|
| 1.0660.xx.xxx | 1 day | 7 days |
| 1.0664.xx.xxx | 14 days | 31 days |

Instrument with Quartz Clockwork.

Remove the inverted drum from the drive mechanism and set the recording time with the red gear wheel by clicking it into place at the appropriate height. Make sure that the yellow gear wheel is properly engaged. Place the enclosed battery into the recess provided with the poles in the correct direction.




| Position of the red gear wheel | |
|---|---|
| up | 7 days |
| middle | 31 days |
| down | 1 day |

Place the recording strip onto the inverted drum (see 6.1 Changing the recording strip) and insert this onto the drive mechanism until it locks into place!

Remove the lower recording arm from the clamp bolt (transport safety device). Remove the tip protector from the felt pen. For instruments with a spring clockwork mechanism, wind the clockwork with the key in the drum, turning it to the left. Rotate the drum counter clockwise to the correct time. Close the hood and screw the knurled-head screws back into place. Press the switch-off lever to the right stop in order to lower the recording pens onto the recording strip.

# 5 Maintenance

## 5.1 Changing the recording strip

This should be done regularly at the time where the recording strip starts; for example if you are using a 7 day recording period, then change the strip every Monday morning. After swinging the recording arm forwards, raise the chart holder and remove the recording strip. Place the new recording strip onto the drum and fix it into position by inserting the chart holder. Make sure that the new recording strip fits snugly and smoothly against the lower edge of the drum. Rewind the clockwork mechanism every time you change the recording strip. Swing the recording arms back to their original position and rotate the drum counter clockwise to the correct time. The instrument is now ready for use.

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**Recording Strips** (1 set = 100 sheets), order-no. key

| | "H" Measuring element | | | | "K" measuring element | | | |
|---|---|---|---|---|---|---|---|---|
| °C | 1 day | 7 days | 14 days | 31 days | 1 day | 7 days | 14 days | 31 days |
| -35...+45 | 205142 | 205086 | 205153 | 205169 | | | | |
| -20...+60 | 205143 | 205083 | 205158 | 205168 | | | | |
| -10...+50 | 205138 | 205092 | 205155 | 205166 | | | | |
| 0...+40 | 205123 | 205094 | 205150 | 205160 | 205131 | 205097 | 205151 | 205161 |
| 0…+50 | 205124 | 205095 | | | 205132 | 205110 | | |
| 0...+80 | 205126 | 205103 | 205280 | 205281 | 205134 | 205112 | 205282 | 205283 |

**Table 2: Recording Strips**

## 5.2 Changing the recording pens

Remove the recording pens carefully from the recording arms. Remove the tip protection from the new pen. Make sure that you do not touch the recording tip when you place the new pen into position.

**Spare Recording pens** (minimum order of 6) Order-No. 500 847

## 5.3 Regenerating the humidity measuring element

"H" measuring elements dry out when the relative humidity is less than 60%. This results in an increase in the zero point of approximately 5% or more rel. humidity. At ca. 60% rel, humidity, maximum inaccuracy is reached in 3 weeks. This time is shorter when the humidity value is even lower. Accuracy can be restored by regeneration. Simply place the instrument in saturated air for some hours. At the conclusion of the regeneration process, check whether the measuring element has returned to 95% rel. humidity. This value can be set on the humidity setting screw.

Measuring elements which are located out-of-doors or in huts regenerate automatically because the central European climate is such that, particularly at night - humidities of 95% occur.

*“K” measuring elements do not degenerate, and consequently do not have to be regenerated.*

## 5.4 Checking the bimetallic setting

The accuracy of the bimetallic element is checked by carrying out a comparative measurement. In a temperature-constant room hang a precision mercury thermometer next to the hygro-thermograph. Allow about 20 minutes adjustment time and then compare the temperature values. If a correction is necessary, do this with the aid of the temperature setting screw on the bimetallic element.

# 6 Technical Data

| | |
|---|---|
| **Humidity** | |
| Measuring range | 10 ... 100 % rel. humidity "H" |
| | 0 ... 100 % rel. humidity "K" |
| Graduation | 5 % rel. humidity |
| Temp.- working range | -35 ... +70°C "H" |
| | 0 ... +80°C "K“ |
| Measurement accuracy | ± 2 % rel. humidity "H" |
| | ± 3 % rel. humidity "K" |

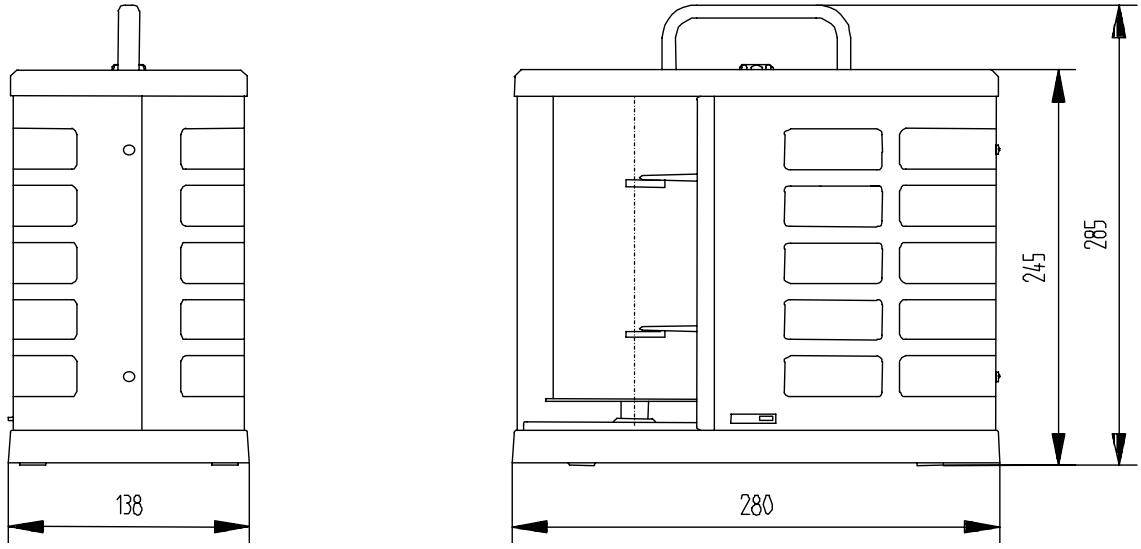
| | |
|---|---|
| **Temperature** | |
| Measuring range | -35 ... +80°C (see models available) |
| Graduation | 1°C bzw. 0,5°C (see models available) |
| Measurement accuracy | ± 1 % of measuring range |

| | |
|---|---|
| **Clockwork** | |
| Spring clockwork mechanism | |
| Recording time | 1 day / 7 days resp. |
| | 14 days / 31 days; (see models available) |
| Thrust | 11,45 mm/h.; 40,01 mm/day resp. |
| | 20 mm/day; 9 mm/day |
| Temperature range | -35 ... +80°C |
| Gear accuracy | ± 60 s/day at 20°C acc. to DIN 8300 |

| | |
|---|---|
| Quartz clockwork | |
| Recording time | 1 day / 7 days / 31 days |
| Thrust | 11,45 mm/h.; 40,01 mm/h; 9 mm/h |
| Temperature range | -20 ... +60°C similar to DIN 8300 B |
| Gear accuracy | ± 2 s/day |
| Battery capacity | > 1 year at 20°C (mignon battery 1,5 V) |

| | |
|---|---|
| Clockwork drum | S 93 x 186 similar to DIN 58658 |
| Recording strip | Similar to DIN 16232 |
| Recording width | 2 x 82 mm |
| Weight | 2,7 kg |

# 7 Scale Drawing

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