

## Instruction for Use

020571/03/97

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# Meteorograph

1.0840.00.00x



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## **Contents**

1	Models available .....	3
2	Application .....	3
3	Set-up and Mode of Operation.....	3
4	Preparation for Use.....	4
5	Maintenance .....	5
5.1	Changing the recording strip .....	5
5.2	Changing the recording pens .....	6
5.3	Regenerating the humidity measuring element.....	6
5.4	Checking the bimetallic setting.....	6
5.5	Checking and resetting the air pressure.....	6
6	Technical Data.....	8
7	Scale Drawing.....	9

# 1 Models available

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Order-No.	measuring range	Graduation	Recording Time
1.0840.00.000	Humidity: 10....100 % rel. h. Temperature: -35 ... +45 °C Air pressure: 945...1052 hPa	5 % 1° C 1 hPa	1 day / 7 days, adjustable
1.0840.00.005	Humidity: 10....100 % rel. h. Temperature: -20 ... +60 °C Air pressure: 945...1052 hPa	5 % 1° C 1 hPa	1 day / 7 days, adjustable

## 2 Application

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The Meteorograph measures and records the relative humidity, the temperature and the air pressure of the atmosphere of the surroundings.

Taking the elevation indicated by the user into consideration, the Meteorograph is set to the reduced air pressure at sea level (qff). This guarantees that the instrument is operational at the indicated elevation. If no elevation has been indicated by the user, the Meteorograph indicates the air pressure relative to the elevation where it is in operation (qfe).

The measurement receiver is a set of aneroid capsules whose lift is dependent on the air pressure. This lift is transferred over a system of levers to a recording strip. The instrument can be set up anywhere owing to a spring mechanism in the recording drum. Outside power sources are not required.

Typical areas of application include computer rooms, production and storage halls, offices, laboratories, tree nurseries, museums and galleries and also meteorological measuring stations.

## 3 Set-up and Mode of Operation

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The instrument has a hinged cover. The hinges are situated at the base. The measuring elements (bimetallic measuring element and the humidity measuring element) are attached to a column. The openings in the cover guarantee good ventilation.

These measuring elements consist of several fibres or hairs which change their length when the humidity fluctuates. Temperature is measured by means of a high-quality, aged bimetallic measuring element which has been bent into a circle. When the temperature changes, the radius of the measuring element changes. A set of 8 copper beryllium aneroid capsules serve as the measuring element. They have been especially pre-aged and are temperature-compensated.

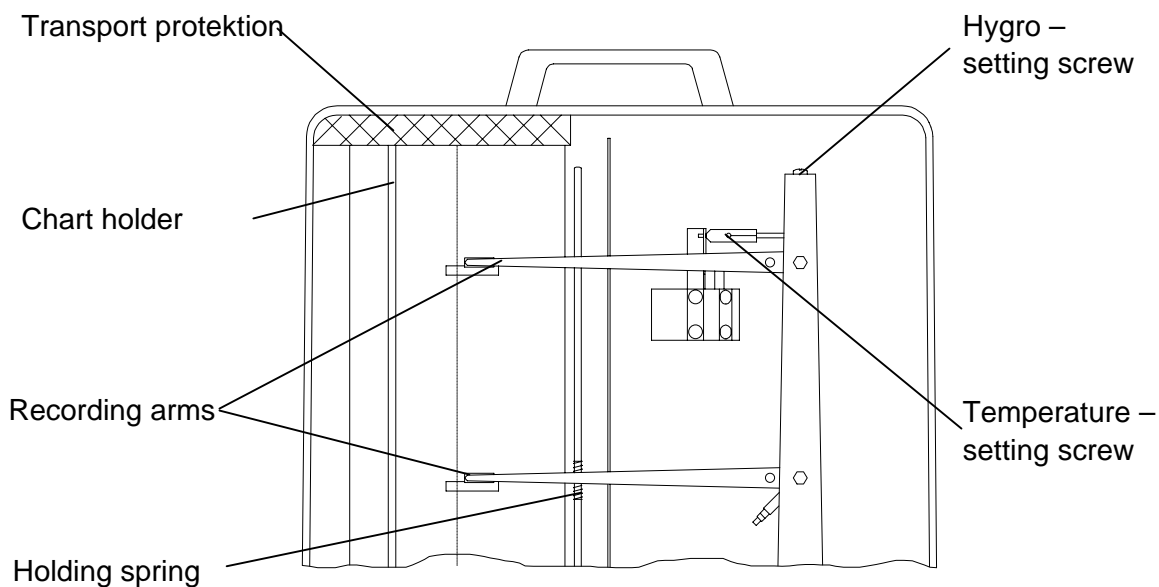
Axes transfer the changes in length of the measuring elements onto the recording arm which has been provided with fibre-tipped recording pens. The paper recording strip is clamped to a drum clockwork

All of the materials used - stainless steel, brass, aluminium - are corrosion-resistant and guarantee a long operating life.

## 4 Preparation for Use

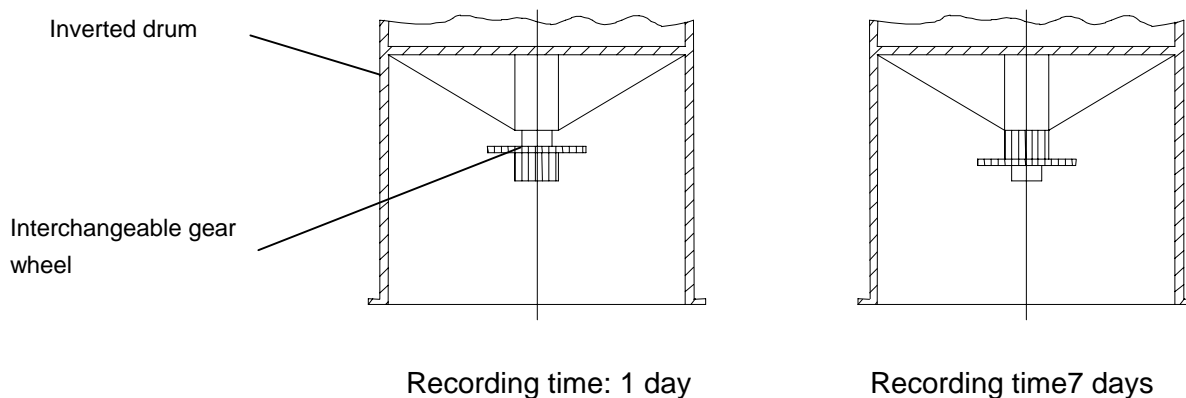
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1.) Open the cover of the instrument by pressing the catch and remove the foam piece transport protection from the cover. Press the switch-off lever to the left so that the recording pens swing off the recording strip.

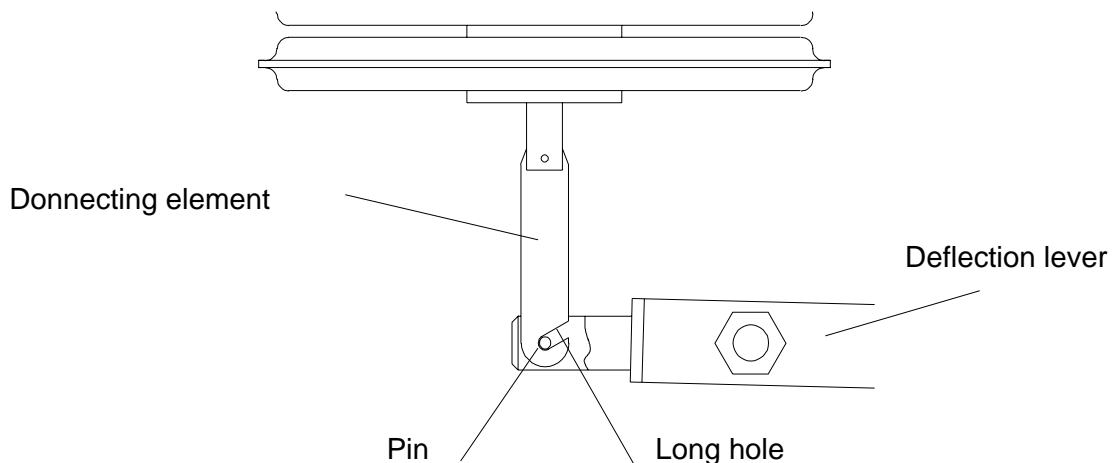


2.) Setting the desired recording time

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.



- 3.) Clamp the recording chart onto the drum (see chapter 5.1), afterwards insert the drum with the recording chart onto the driving mechanism until it stops!
- 4.) Release the central recording arm from the holding spring (transport safety device).
- 5.) Remove the piece of foam plastic (transport safety device) from the lower recording arm. Please see to it that the connection (connecting element) and the deflection lever below the aneroid capsules are in function, as given below. If necessary, lift the recording arm and fit the pin into the long hole.



- 6.) Remove the tip protection from the recording pens.
- 7.) Wind-up the clock work by rotating the key (located in the drum) to the left, and then turn the drum contra-clockwise to the real time.
- 8.) Secure the cover again to the base of the instrument, and press the switch-off lever to the right until it stops, so that the recording pens will be lowered onto the recording strip.

## 5 Maintenance

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### 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.

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

Meas. range	Recording time / Order No.	
	1 day	7 days
-35...+45°C	205197	205192
-20...+60°C	205073	205190

## 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

"Hair" 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.

## 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.

## 5.5 Checking and resetting the air pressure

As already described in point 2 „ Application“ , when the elevation is not known, the Meteorograph is set such that it indicates the air pressure at the measuring site. If you want this instrument to indicate the air pressure reduced to sea level, then you will have to reset it ! A change in elevation of 10 meters changes the air pressure by 1,2 hPa. The instrument must also be reset if the site of an instrument indicating air pressure reduced to sea level is changed.

### Setting process:

1. First determine the current prevailing air pressure at the site  $P_{qfe}$ , for example, with the aid of a mercury barometer
2. Then determine elevation  $Z$
3. Calculate the air pressure  $P_{qff}$  reduced to sea level.

$$P_{qff} = P_z + P_{gfe} = \frac{Z_m}{10m} \times 1,2 \text{ hPa} + P_{gfe}$$

### Example:

Site : Nuremberg  
Elevation  $Z$  : 309 m  
Air pressure  $P_{qfe}$  : 920,3 hPa (mercury barometer)

$$P_{qff} = \frac{309 \text{ m}}{10 \text{ m}} \times 1,2 \text{ hPa} + 920,3 \text{ hPa} = \underline{957,38 \text{ hPa}}$$

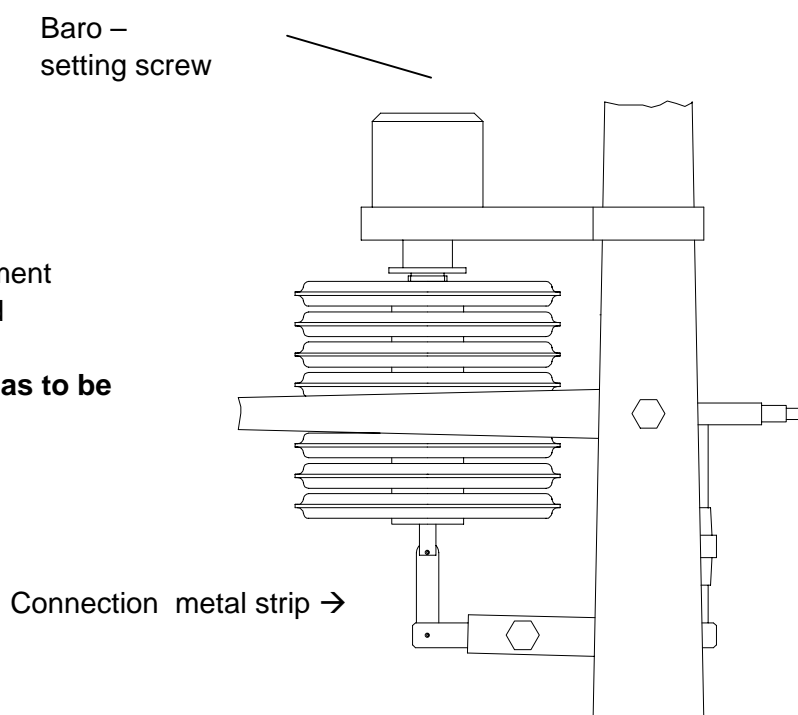
The instrument must be set to this value

### For your information :

The telephone service of the Weather Service will be happy to give you the air pressure reduced to sea level. If you make use of this service, then you won't have to carry out the above calculation.

### Remark

The connecting element between the aneroid capsules and the transmission lever **has to be** attached.



## 6 Technical Data

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### Humidity

Measuring range	10 ... 100 % rel. humidity "H"
Graduation	5 % rel. humidity
Temp.- working range	-35 ... +70°C "H"
Measurement accuracy	$\pm 2$ % rel. humidity "H" + 1 Scale graduation @ 65% rel. h. and room temperature
Measuring element	"hair"

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### Temperature

Measuring range	see models available
Graduation	1°C
Measurement accuracy	$\pm 1$ % of measuring range + 1 Scale graduation
Measuring element	Bi- metal

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### AIR PRESSURE

Measuring range	945...1052 hPa
Messgenauigkeit	$\pm 0,8$ hPa+ 1 Scale graduation @ 65% rel. h. and room temperature
Graduation	1 hPa
Measuring element	Set of Aneroid- Capsules, temperature- compensated

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### Clockwork

Spring clockwork mechanism	
Recording time	1 day / 7 days resp.
Thrust	11.45 mm/h.; 40.01 mm/day resp.
Temperature range	-35 ... +80°C
Gear accuracy	$\pm 60$ s/day at 20°C acc. to DIN 8300

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### Generally

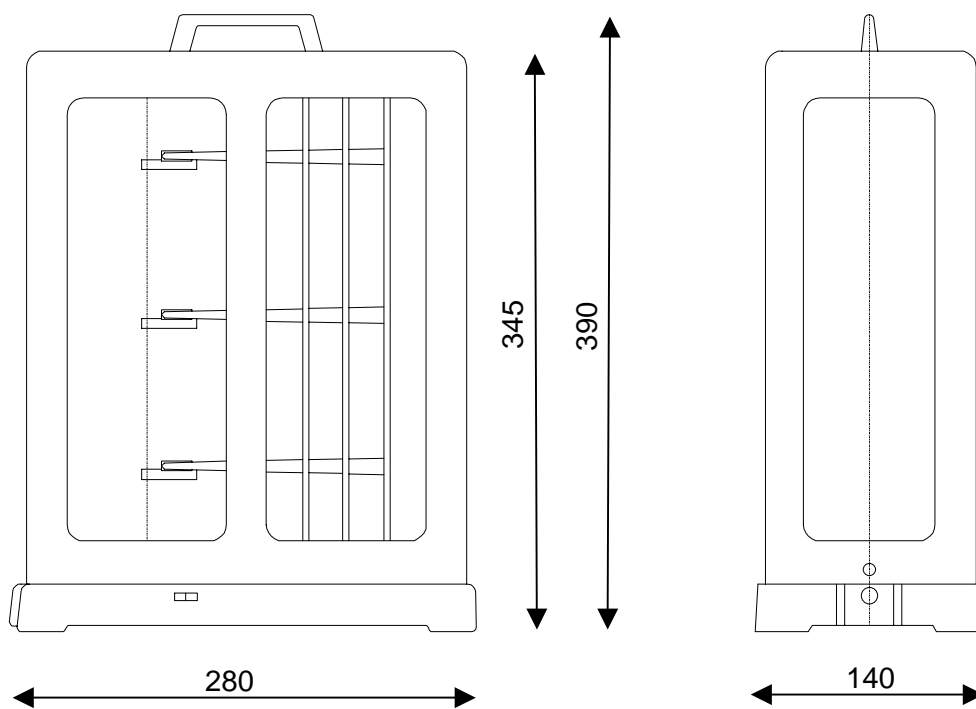
Clockwork drum	S 93 x 279 similar to DIN 58658
Recording strip	Similar to DIN 16232
Recording width	3 x 82 mm
Weight	4.5 kg

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## 7 Scale Drawing

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