



USER MANUAL

252

Thermo-Hygrograph



Contents

1.	Warranty	3
2.	General	3
3.	Place of installation	3
4.	Setting into operation	3
4.1.	Removing the transport lock	3
4.2.	Mounting the humidity measuring element	4
4.3.	Inserting the battery (quartz clockworks only)	4
4.4.	Winding up the clockwork (mechanical clockworks only)	4
4.5.	Setting the drum to local time	4
4.6.	Change of the recording period of mechanically reversible clockworks	4
5.	Service and maintenance	4
5.1.	Changing graph paper	4
5.2.	Changing the felt-tipped pens	5
5.3.	Felt-tipped pen contact pressure	5
5.4.	Cleaning and care	5
5.5.	Putting out of service	5
5.6.	Transport	5
6.	Clockworks (gear wheels or DIP switch)	5
6.1.	Mechanical clockwork (Fig. 2)	5
6.2.	Changeable mechanical clockwork (Fig. 3)	5
6.3.	Quartz clockwork (Fig. 4 or 5)	6
7.	Thermo-Hygrograph 252 (Fig. 1)	6
7.1.	Humidity measuring element N	6
7.2.	Humidity measuring element K	6
7.3.	Temperature measuring element	6
8.	Figures	7
9.	Drum recorders in general	9
9.1.	Description	9
9.2.	Choice of the place of installation	9
9.3.	Setting to work	9
9.4.	Exchange and application of graph paper	10
10.	Maintenance	11
11.	Disposal	13

1. Warranty

Please note the loss of warranty and non-liability by unauthorized manipulation of the system. You need a written permission of the LAMBRECHT meteo GmbH for changes of system components. These activities must be operated by a qualified technician.

The warranty does not cover:

1. Mechanical damages caused by external impacts (e.g. icefall, rockfall, vandalism).
2. Impacts or damages caused by over-voltages or electromagnetic fields which are beyond the standards and specifications in the technical data.
3. Damages caused by improper handling, e.g. by wrong tools, incorrect installation, incorrect electrical installation (e.g. false polarity) etc.
4. Damages which are caused by using the device beyond the specified operation conditions.

2. General

Thermo-Hygrographs are used to measure and record air temperature and relative humidity (r.h.). The measured values are recorded, using drum recorders driven by clockworks. These rugged and reliable precision products have been proven over decades of use in business, science and culture around the world. They are suited for service in industry and private environments. To take advantage of the high measuring accuracy and to maintain them for many years in service, please observe our following recommendations.

3. Place of installation

Install the instrument horizontally in a vibration-free location. Depending on the model, the permissible ambient temperature varies between $-35...+80$ °C. The instrument should be protected against direct heat radiation and conduction. For outdoor installation, a protection screen against radiation and precipitation is required.

4. Setting into operation

To open the instrument, gently push down the hood **2**, pull the locking knob **1** and swing up the hood. At the same time hold the styrofoam cushion **22** (located under the cover) and remove it after opening the instrument.

4.1. Removing the transport lock

Loosen the recording arm's transport lock **4** by turning it on the lifting rod **7** by about 90°. Remove the cardboard wedge at the switch-off lever **3** and save it. Carefully remove the protective cap from the felt-tipped pen **5** and save it.

4.2. Mounting the humidity measuring element

Take the humidity measuring element N out of its separate packing. Put the measuring element's mount **8** provided with two bore holes into the upper hooks. Put the lower mount **9** into the lower hook. At the same time lift the recording arm **10**; regenerate the humidity measuring element N as described under 6. The humidity measuring element K is already mounted and is maintenance-free.

4.3. Inserting the battery (quartz clockworks only)

Lift the recording arms using the switch-off lever **3**. Pull off the drum **12** straight and very carefully, making sure not to bend it sideways. Then push aside the yoke spring and check the polarity when inserting the battery (1.5 V, type Mignon/AA). Adjust the desired recording period at the gear wheels. Then remount everything carefully (don't bend the recording arms).

4.4. Winding up the clockwork (mechanical clockworks only)

The moving spring is stretched by turning the winding key **6** anti-clockwise.

4.5. Setting the drum to local time

The felt-tipped pens must be very close to the paper surface (adjusted by using the switch-off lever **3**). Turn the drum **12** counterclockwise until the pen matches the desired time line. If you have turned the drum too far, turn it back beyond the desired time line so that you can resume the adjustment from the beginning. This way the backlash of the toothed gears will be eliminated. Since a graph paper has been already inserted in the factory, the instrument is ready for operation after closing the hood. Attention: You must hear locking knob **1** clicking in place! After taking the device to the desired place of installation, you can put the felt-tipped pen into writing position by turning the switch-off lever **3**.

4.6. Change of the recording period of mechanically reversible clockworks

See also Fig. 3. When delivered, the recording period is 7 days. In order to change the recording period to 1 day, open the instrument's housing **2**, unscrew the winding key **6** clockwise and pull the drum completely off the axis.

The gear wheel in the lower part of the drum has to be pulled off and is re-inserted vice versa. Afterwards reassemble everything.

5. Service and maintenance

5.1. Changing graph paper

Using the switch-off lever **3**, take the pen off the paper. Loosen the metal clasp **13** on the clockwork drum by pushing it up. Remove the old graph paper and put on a new one. Both chart ends must be below the metal clasp; the lower edge of the chart must fit evenly to the lower edge of the clockwork drum. Refix the metal clasp. Set the time as described under 3.5.

5.2. Changing the felt-tipped pens

Carefully pull the used felt-tipped pen **5** from the recording arm and attach a new pen. Remove the protective cap and save it.

5.3. Felt-tipped pen contact pressure

To adjust the correct contact pressure, first put the recording arm into writing position using the switch-off lever **3**. Tilt the device by about 30° to the front. If the felt-tipped pens are adjusted correctly, they should now be 1...2 mm from the chart surface. You may have to turn the screws **14** to set the tips to the correct distance. Too much pressure (thick recording line) generates too much friction between the felt-tipped pens and the graph paper, leading to wrong measuring results. If the pressure is too weak (thin recording line) there is a risk that the recording will be interrupted.

5.4. Cleaning and care

The bearings should not be oiled. Every three to five years, mechanical clockworks should be maintained by a clock maker. The rest of the device may be carefully cleaned, using a soft brush or a damp cloth.

5.5. Putting out of service

If the device is temporarily put out of service, the felt-tipped pens must be covered with the supplied caps to prevent them from drying out.

5.6. Transport

Use the switch-off lever **3** to lift the recording arms and secure them with the cardboard wedge (see 2.1); put the protective caps onto the felt-tipped pens. The recording arm **10** of the humidity measuring element must be secured with the transport lock **4** so that the measuring element is unstressed (recording arm tip at approx. 20% r.h.). For dispatch the humidity measuring element (except the humidity measuring element K) must be unhooked and put into the original flip pack. During transport the quartz clockwork **15** should not be in operation.

6. Clockworks (gear wheels or DIP switch)

6.1. Mechanical clockwork (Fig. 2)

Recording time: 1 or 7 days (depending on model)
 Temperature range: -35...+65 °C

6.2. Changeable mechanical clockwork (Fig. 3)

Recording time: 1 or 7 days (selectable by changing the gear wheels **24**)
 Temperature range: -35...+65 °C

6.3. Quartz clockwork (Fig. 4 or 5)

Recording time: 1/7/ 31 days (can be changed by gear wheels **15** resp. DIP switch **15**)
 Temperature range: -10...+50 °C (Alkaline battery)
 -35...+60 °C (rechargeables)

7. Thermo-Hygrograph 252 (Fig. 1)

The proven natural hair grid is the most frequently used device to measure humidity. Especially advantageous is the use of synthetic fiber in rooms and in temperatures between -10...+40 °C, since no regeneration is required.

7.1. Humidity measuring element N

The humidity measuring element N consists of human hair that is subject to aging. To maintain its high measuring accuracy, it should therefore be regenerated regularly (approx. every 14 days). To do so, moisten all hair of the measuring element **18** with distilled water. After about 2 minutes, the device will indicate 95 % r.h.. If this value is not reached, a value of 95 % r.h. must be adjusted using the humidity adjusting screw **16**. Due to storage/delivery times etc. we recommend to treat the humidity measuring element this way when the device is first put into operation. If the values at the measuring location frequently reach 95 % r.h. the measuring element regenerates automatically.

Measuring element: standardized hair grid with seven hair bundles
 Measuring range: 5...100 % r.h.
 Accuracy: ± 2 % r.h. (with regular regeneration)
 Range of application: -35...+70 °C; 0...100 % r.h.

7.2. Humidity measuring element K

A soiled humidity measuring element K (synthetic fiber) may only be cleaned with a soft, dry brush.

Do not regenerate the humidity measuring element K!

Measuring element standardized harp with seven synthetic fiber bundles
 Measuring range 25...70 % r.h.
 Accuracy ± 3 % r.h.
 Range of application -10...+40 °C; 25...70 % r.h.

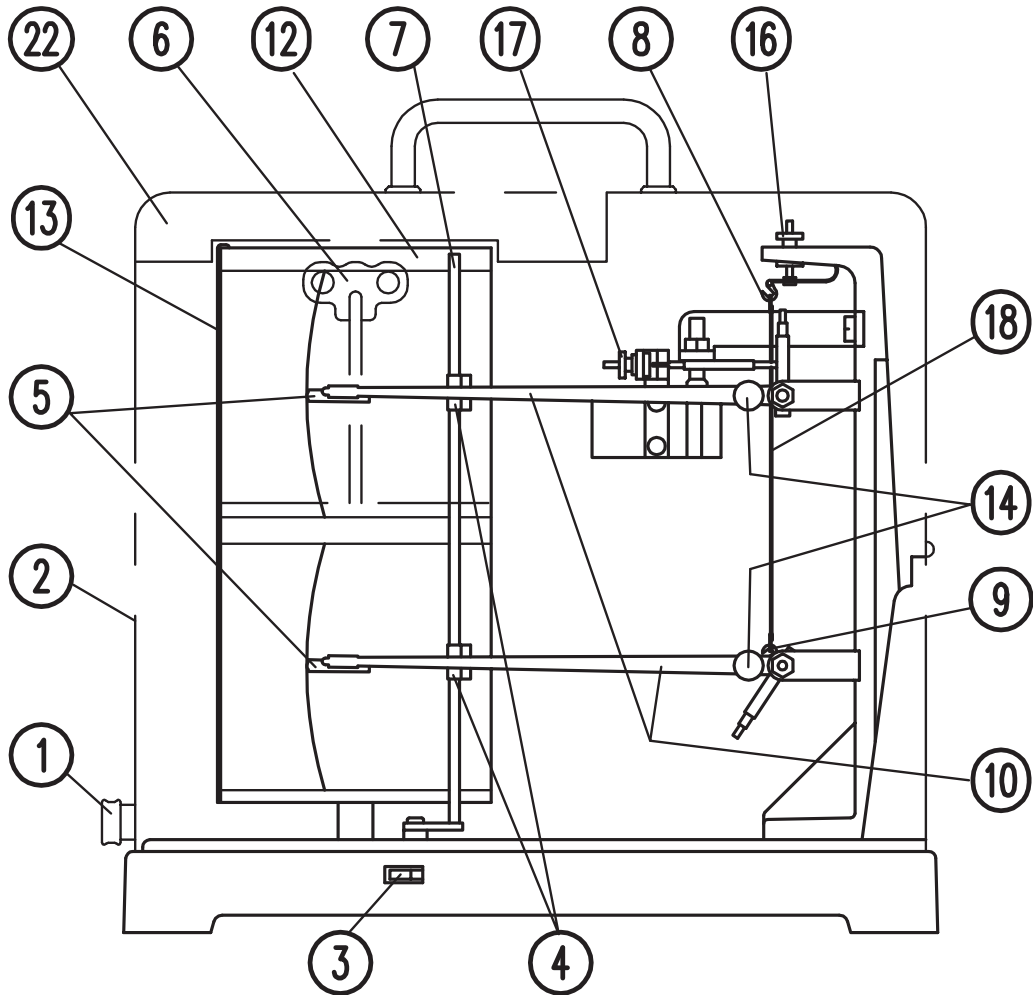
7.3. Temperature measuring element

From time to time a reference measurement should be made, using a calibrated thermometer. For this purpose, place the calibrated thermometer as close as possible to the temperature measuring element. If required, the felt-tipped pen can be set to the correct temperature value by turning the temperature adjustment nut **17**.

Measuring element: high quality, aged bimetal
 Accuracy: ± 0.3 °C
 Range of application: -40...+80 °C

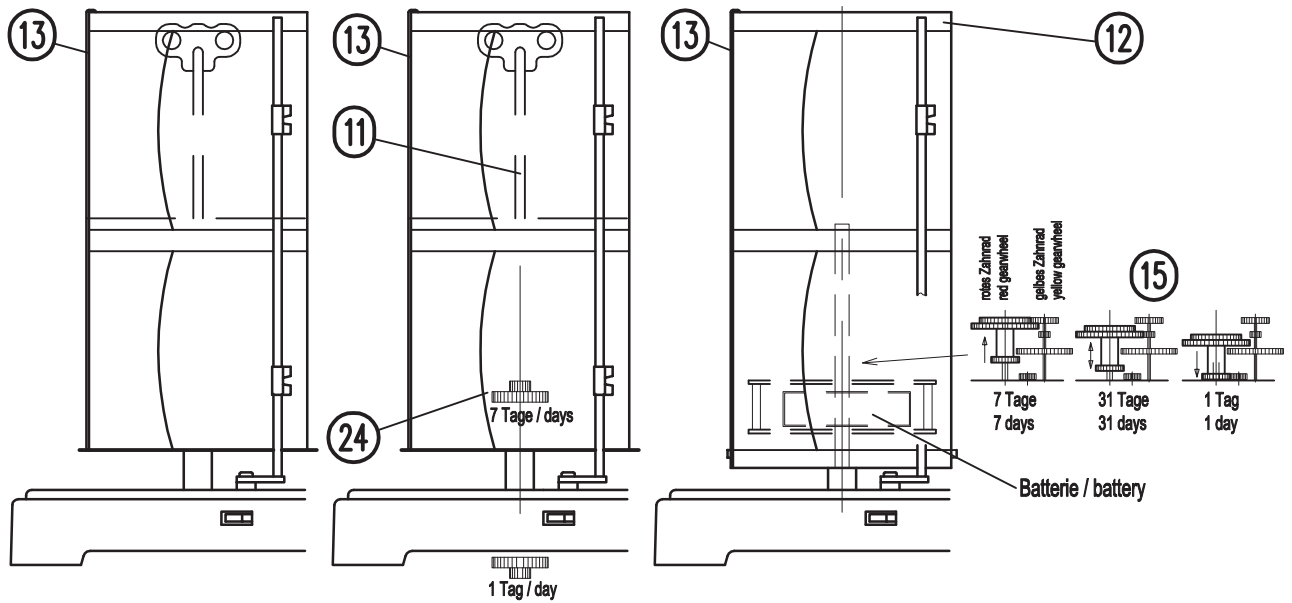


8. Figures



Thermohygrograph 252 Abb./Fig.1

CLOCKWORK WITH ADJUSTABLE GEAR WHEELS



Uhrwerk 1 oder 7 Tage
clockwork 1 or 7 days
mechanisch / mechanical
Abb. / Fig. 2

Uhrwerk 7 Tage / 1 Tag
clockwork 7 days / 1 day
mechanisch umsteckbar
mechanical reversible
Abb. / Fig. 3

Quarz-Uhrwerk 1 / 7 / 31 Tage
quartz clockwork 1 / 7 / 31 days
elektrisch / electrical
Abb. / Fig. 4

CLOCKWORK WITH DIP SWITCH

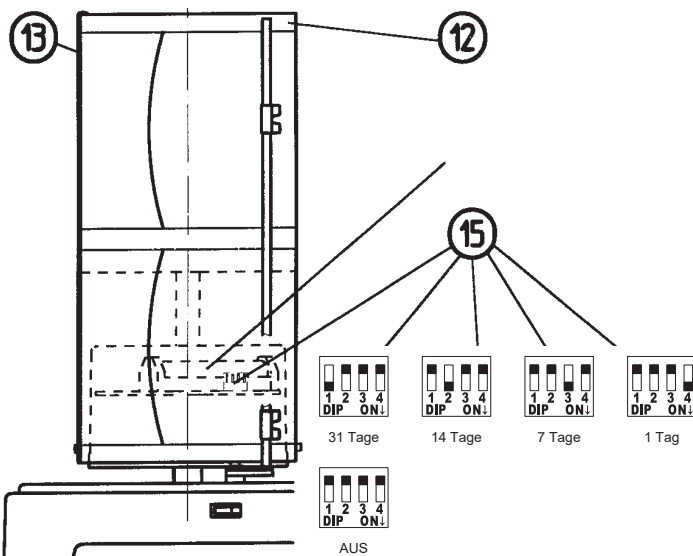


Abb. / Fig. 5

9. Drum recorders in general

9.1. Description

LAMBRECHT meteo Drum Recorders especially consist of the measuring element, which deforms in dependence of the measuring value, the recording device, the lever gearing, which transfers the deforming of the measuring element to the recording device, as well as the clockwork drive with the recording drum. All parts are mounted on a stable base plate, which guarantees the firm correlation of the indicated parts and thus the maintenance of the measuring accuracy.

Moreover the hinged protecting case is connected with the base plate by a frame joint and spring catch. At the head end, a handle has been provided for, while the side walls of the casing are glazed or have some ventilation holes, so that the measuring value may affect the measuring element unchecked. From a recess in the base plate – approx. before the recording drum – protrudes the grooved head of the adjustable lever connected with the damper rod. The felt-tipped pen is lifted up from the chart by means of the adjustable lever.

The construction of the multiple recorders is analogously the same. According to the number of the measuring values to be determined, there are two or three measuring elements in the casing and also the same number of transmission and recording devices. The recording drum has been provided with the driving mechanism also used in the single recorders, it is, however, twice or treble as high (recording width).

9.2. Choice of the place of installation

Recording instruments have to be installed on a firm table or a cantilever free from vibration. Vibrations, to which the instruments are exposed, generally cause a thick and blurred recording with a too high consumption of ink. Furthermore it has to be guaranteed that the measuring value may influence the measuring element unchecked and unadulterated. Especially Thermographs as well as Hygrographs have, therefore, to be protected against thermal radiation or heat conduction respectively. When installing the instrument in the open air, in most cases the use of a protection screen, e.g. Thermometer Screen (1096) acc. to DIN 58 658, our catalogue no. (1096), which protects the instruments against radiation influence and rain, is necessary.

9.3. Setting to work

Recording instruments have to be unpacked carefully paying attention to the completeness of all accessories (graph paper, felt-tipped pen and eventually hair grid).

After having put up the instrument on a firm base, the spring catch can be unlocked and the casing be opened. The recording lever fastened during the transport has to be taken off the damper rod by cutting the string or by removing the metal clamp respectively. This clamp may be moved to the lower end of the damper rod, so that on one hand it does not hamper the movements of the recording lever and on the other hand it can be used again for locking the recording lever on a possible transport. The cardboard, which secures the adjustable lever, has then to be removed.

Referring to the instructions for use of the different instruments, the measuring element and the transmission device have to be prepared for the measurements (according to the type of instruments: insert and regenerate hair grid and connect measuring elements with the write device etc.). After that, the recording device is to be started. For this purpose, the recording lever must be departed from the recording drum by means of the damper rod and the

protecting cap has to be taken from the felt-tipped pens.

The value of the record depends largely on the pressure of the felt-tipped pen on the graph paper. Should the recording pressure be too strong the friction between the pen and the paper is too high so that the measuring value will not be recorded steadily according to its temporary course, but by degrees. In case of a very low recording pressure, there runs the risk that the recording may be interrupted at times. The recording pressure may be controlled after having put the pen on the paper by inclining the instrument by approx. 30° forward. When doing this the felt-tipped pen will dislodge from the paper for approx. 1–2 mm. If the pen is too loose or too tight the milled nut at the side of the axis of the recording lever has to be adjusted in such a way that the correct tension of the springy recording lever is achieved.

In the case of Large-Size Barographs this adjustment is not necessary, as the recording lever has pivotally been fixed at a slightly inclined axis and thus the pen is always close to the paper because of its own weight and that of the recording lever. As the recording pressure depends besides the weight of the recording device also on the inclination of the recording lever joint to the horizontal line, in case of these instruments care has to be taken for an exact and horizontal installation. In the case of drum recorders with adjustable recording pressure, a slight inclination of the place of installation may be considered by turning the milled adjustment screw.

Having put on a graph paper (see below) and wound up the clockwork, the instrument has to be taken to the prepared place of installation, the felt-tipped pen has to be started and, in case, the start of the recording should be marked by the time (by lifting the recording lever slightly by approx. 1–2 mm). The instrument is now ready for use.

9.4. Exchange and application of graph paper

The application of a new graph paper has to be made in the following order:

1. Preparation of a new graph paper by putting down the date, the place and, in case, the number of the instrument as well as the dimensions (in the case of blank graph papers). Especially in the case of meteorological measurements, the graph papers should be stored near the instrument, so that between the ambient air and the chart the hygroscopical balance may develop. By this, alterations of the length of the graph paper, which spoil the paper, are avoided.
2. Marking the time on the old chart by lifting the recording lever carefully by about 1–2 mm and by fixing the time.
3. Lifting the felt-tipped pen off the paper by means of a disengaging device. If necessary, the instrument should be taken to a place suitable for the change of the graph paper.
4. Opening of the casing by means of the spring catch.
5. Loosening the metal clamp, which serves to fastening the graph paper (pushing upwards) and taking off the inscribed paper.
6. Winding up of the clockwork in the direction of the engraved arrow in the cover of the drum.
7. Application of the new, already prepared graph paper. Press the chart closely to the drum, so that it fits tightly everywhere and its lower edge has good contact with the slightly protruding edge of the drum. Attach the metal clamp again.
8. Adjusting the recording drum to the time of the beginning of the recording. For this the felt-tipped pen has to

be put in the immediate vicinity of the graph paper by means of the disengaging device, without touching the paper. Then the clockwork drum has to be turned counter-clockwise (looking from above) until the pen lies above that curve of the graph paper, which corresponds to the actual time. If the drum has been turned too far, it has to be pushed back in the opposite direction and then be slowly turned again counter-clockwise to the corresponding curves, until the pen has been adjusted to the correct time. This is the only way by which the „backlash“ of the clockwork can be made ineffective.

9. Raise again the recording lever entirely, close the casing, take the instrument to the place suitable for measurements.

10. The pen should then again be brought into contact with the paper and the time should be marked, showing the beginning of the recording.

11. Completion of the description of the old graph paper (special events, time markings etc.).

10. Maintenance

The maintenance of the measuring elements has to be effected according to the operating instructions of the different instruments. The maintenance of the recording device is restricted to the change of the graph paper to be effected at the times of observation as well as to the exchange of the felt-tipped pen.

When attaching the new felt-tipped pen you should pay attention to push it up against the recording lever so that the writing radius will remain unchanged.

Do not oil all joints and bearings (exception: clockwork as well as pivot bearings of Large-Size Barographs). The lever systems and recording devices supported in elastic pivots carry out relatively slow and small movements so that an oiling is not only unnecessary but even noxious in the most cases.

The drum clockworks, however, should be cleaned and slightly reoiled by a watchmaker at intervals of 3 to 5 years. It is recommendable to specify the temperature range in which the instruments will be utilized so that the most suitable oil can be chosen.

At regular intervals depending on the degree of contamination of the air, also the lacquered and chromium-plated surfaces of the recorders should be cleaned with a soft brush, or in case of considerable contamination, with a piece of wet cloth. Particularly when using the recorders in the open air (in the thermometer screen), adherent dirt otherwise often feigns a corrosion.

At the same time it might be necessary to eliminate errors at the recording device, which cause a faulty recording. As far as they need not be corrected by experts the errors are indicated as follows:

1. The pen writes jerks in the curve.

Reason:

a) The recording lever has been tightened too much.

Remedy:

Adjustment of the knurled screw near the axis of the recording lever (see description above).

b) The joints and axle bearings are dirty.

Remedy:

The recorder must be sent to the manufacturer. Cleaning of the joints and axle bearings is just possible after having dismantled the recorder. Afterwards a calibration is necessary.

2) The felt-tipped pen records a very thin curve and sometimes stops writing altogether.

Reason:

The pen does not press tightly enough against the paper.

Remedy:

The knurled nut has to be operated at the recording lever.

3) The curve is thick and blotchy.

Reasons:

a) The installation of the instrument is not free from vibrations.

Remedy:

Proper installation (see above).

b) Pen or paper are unsuitable.

Remedy:

LAMBRECHT meteo pens and graph papers have to be used.

We draw your attention to the fact that the correlation between ink, graph paper and recording pen has been tested in a variety of experiments in order to ensure perfect records, which, these tests proved, are guaranteed when using LAMBRECHT meteo graph papers and felt-tipped pens.

In case of recording instruments, the clock drums of which are equipped with a device for direct changing over from weekly to daily rotation, the switching over is effected by turning the hand lever below the recording drum:

To the **left**: recording duration **24 hours**

To the **right**: recording duration **1 week**

The inscription on the hand lever and base plate allows to ascertain very easily the actual service condition. Care should be taken that the lever is always turned to the right or to the left up to the top. If, however, the recording period is switched by interchanging the gears, special instructions will be supplied with the instruments.

11. Disposal

LAMBRECHT meteo GmbH is listed and registered at the Stiftung Elektro-Altgeräte Register ear under:

WEEE-Reg.-Nr. DE 45445814

In the category of monitoring and control instruments, device type: "Monitoring and control instruments for exclusively commercial use".

Within the EU



The device has to be disposed according to the European Directives 2002/96/EC and 2003/108/EC (Waste Electrical and Electronic Equipment). Do not dispose the old device in the household waste! For an environmentally friendly recycling and disposal of your old device, contact a certified disposal company for electronic waste.

Outside the EU

Please follow the regulations in your country regarding the appropriate disposal of waste electronic equipment.