

## Instruction for use

020696/11/06

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# *Precipitation Recorder*

*acc. to Hellmann*

5.4010.../ 5.4011.../ 5.4015.../ 5.4016...



### **ADOLF THIES GmbH & Co. KG**

Hauptstraße 76

Box 3536 + 3541

Phone ++551 79001-0

[www.thiesclima.com](http://www.thiesclima.com)

37083 Göttingen Germany

37025 Göttingen

Fax ++551 79001-65

[info@thiesclima.com](mailto:info@thiesclima.com)

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## 1 Models available

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Order - no.	Recording time	Thrust
<b>5.4010.xx.000</b>	7 days	55 mm/ day
<b>5.4011.xx.000</b>	24 hours	16 mm/ hour
<b>5.4015.xx.000</b>	31 days	10 mm/ hour
<b>5.4016.xx.000</b>	31 days	20 mm/ hour
	<b>Heating</b>	<b>Ambient temperature</b>
<b>..10...</b>	none	0...+60°C
<b>..16...</b>	250 VA	-20...+60°C
<b>..17...</b>	270 VA with funnel heating	-30...+60°C

## 2 General Information

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This instrument is designed to measure and record precipitation as rain, snow, hail etc. striking the earth's surface.

For winter operation, it must be equipped with an electric heater. This heater, regulated by a thermostat, prevents the instrument from freezing and melts the snow.

The materials used in the construction (brass, Al alloy) have all been chrome-plated or varnished as corrosion protection. This guarantees a long operating life. The varnished case is made of stainless steel (V2A).

## 3 Construction

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At the top of the case, there is a set collar with a collector surface of 200 cm<sup>2</sup>. Below this, you will find the collecting funnel with the dirt filter to catch coarse dirt. The measuring and recording unit is mounted to a plate in the case. The rain entering the collecting funnel is channelled into a hose which carries it to a flushing tank. The swimmer indicates the water level which is recorded with the aid of a pen on a recording arm onto a recording roll/chart. Time-dependent registration is made possible by a battery- or spring wound operated transport clockwork. When the tank is filled to its maximum level, it is automatically emptied through a siphon. The rain water is collected in a collecting vessel.

The case has been provided with a bolt lever lock. Additional protection against tampering by unauthorized persons can be provided by a padlock.

## 4 Preparing for use

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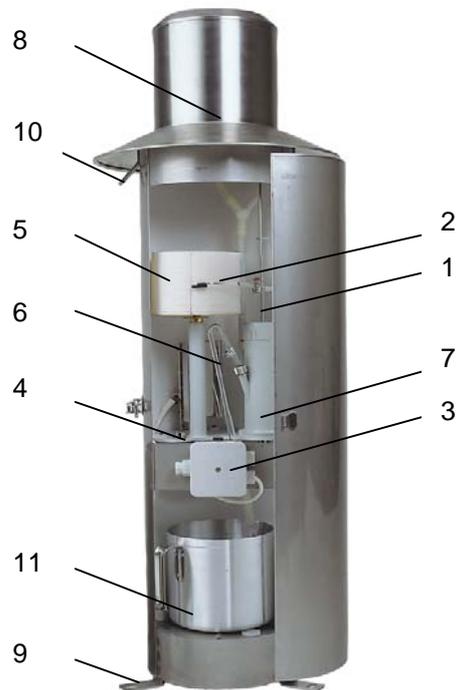


Abb. 5.4010/11

### 4.1 Installation of the instrument

The instrument must be set up on a plane surface such that it is accessible to precipitation from all sides. Building and trees must be at a distance at least equal to their respective heights.

Set the precipitation recorder onto a base plate and screw the feet to this plate. Care should be taken that the **bubble level (4)** in the instrument indicates a horizontal position. If necessary, balance the instrument by placing levelling pieces under the **feet straps (9)**. For using the instrument vibration free in stormy areas, you can secure the case additionally by means of wires through the 3 **upper straps (10)**.

Make sure, that the area for opening the door of the instrument is free of the wires.

Afterwards put the **dirt filter (8)** into the collecting funnel.

### 4.2 Putting the instrument into operation

Once you have set the instrument up and removed the transport securing device on the **cover of the flushing tank (1)**, swing the **recording arm (2)** forwards until it is stopped by the plate spring. For drum recorders 5.4010/11.. , wind the clockwork with the key you will find in the drum. The **clockwork (5)** itself is found (packed) in the lower part of the case. Unscrew the knurled nut on the axis, insert the clockwork onto the axis and screw it into place. Then return the recording arm to the clockwork and rotate the drum clockwise until the tip of the recording pen points to the appropriate day and time mark on the chart.

With continuous line recorder 5.4015/16... (w/o figure) the driving mechanism is a battery-operated quartz clockwork mechanism. It can be switched on by setting the switching lever to the green point (see 5.2.2).

Rotate the chart with the set wheel until the recording pen is on the true time marking. Enter the date onto the chart by hand.

Insert the enclosed **siphon (6)** into the lateral nozzle of the **flushing tank (7)** until it catches (clamp) and screw it into place. First of all, put the enclosed 50-m-hose onto the lower end of the siphon. Now slowly put just enough water into the collector opening to make the flushing tank empty itself. Now the recording pen will point exactly to the zero point on the chart.

For instrument with heaters, you will have to provide an **electrical connection (3)**. The built-in thermostat switches the heater on automatically at about +5 °C. The instrument can not be used in below freezing weather without the heater.

During such weather, remove the flushing tank and the clockwork from the precipitation recorder and store them in a suitable place.

### Evaluating the recording strip

In order to determine the amount of precipitation during a given period of measurement, it will be necessary to measure the precipitation level both at the beginning and the end of the measurement period. The difference between these two values represents the amount of precipitation per measurement period. Don't forget to include the recorded siphoning off (10 mm) in your calculations.

After a longer period of dryness, the recording pen tends to somewhat exceed the 10 mm mark before siphoning off.

Dust and dirt may have affected the adhesion conditions within the siphon. If the instrument is exposed to heavy rainfall or to vibrations, the precipitation may be siphoned off before the 10 mm mark.

## 5 Maintenance

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### 5.1 Changing the recording pen

Carefully remove the used felt pen from the recording arm. Take the tip protector of the new pen off and insert this pen onto the recording arm. Never touch the tip of the pen and never attempt to write with the felt pen by hand.

### 5.2 Changing the recording strip

#### 5.2.1 Drum recorder

If the drum is selectable, swing the selecting switch to the left for 1 day recording time or to the right for 7 days recording time.

The recording chart must be changed once a week if set to 7 day operation, once a day if set to 24-hour operation.

After swinging the recording arm forward, unscrew the knurled nut on the drum axis, raise and wind the clockwork. Then remove the chart holder and lift the chart from the drum. Make sure that the new recording chart always fits to the lower edge of the drum.

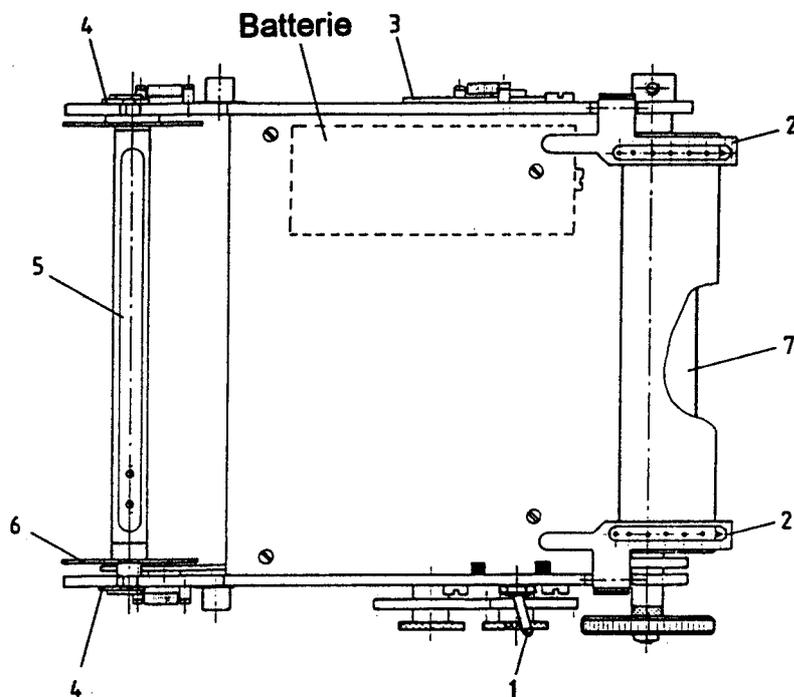
Replace the chart holder to secure the recording chart.

When the clockwork has been re-inserted, the recording arm returned to its operating position and the drum rotated to the correct time, the instrument is again ready for use.

### 5.2.2 Strip chart recorder

In these recorders, the recording strip chart has to be changed once every 31 days at the latest. This can be done as follows:

Raise both recording strip holders (2), press the stopping lever to the left and tilt out the clockwork table. Remove the winding spool (5) which is held by two latches (4) and then remove the limit disk (6) to withdraw the paper roll. Place the new roll of recording paper onto the spare spindle (7) and insert it, feed the recording strip over the spiked rollers, tilt the clockwork mechanism table back into its original position and lock it into place. Then fold the end of the recording strip at an angle, clamp it beneath the spring of the winding spool and advance it a bit. After the winding spool has been inserted, return the recording strip holders back to their original position and set switching lever (1) to „green“. Once the recording pens have been swivelled back into position and the true time set, the instrument is once again ready to resume operation.



### 5.3 Changing the battery

The battery of the continuous line recorder has an operating life of 9 months up to 0 °C in normally climatic condition. In order to make sure that the transport mechanism does not unexpectedly stop, thus leading to a loss of recordings, change the battery after 6 months of use at minus temperatures up to – 20°C.

Type of battery : MN 1300 M3 (Ultra), Fa. Duracell.

## 5.4 Cleaning the system

Particles of dirt, leaves, twigs etc. which may have fallen into the collecting funnel may block the outlet and consequently must be removed. To clean the flushing tank, remove the thumb screw beneath the mounting plate. Carefully remove the cover, the swimmer and the siphon. If there has been a long period of dryness, it will be particularly important to remove dust deposits from the curvature of the siphon.

Do this by rinsing with clean water.

## 5.5 Verifying display accuracy

The spare siphon included in the delivery has been adjusted and can be installed in the flushing tank. After the siphon has been changed, it is important to make sure that the tip of the felt pen is at zero when the flushing tank is emptied.

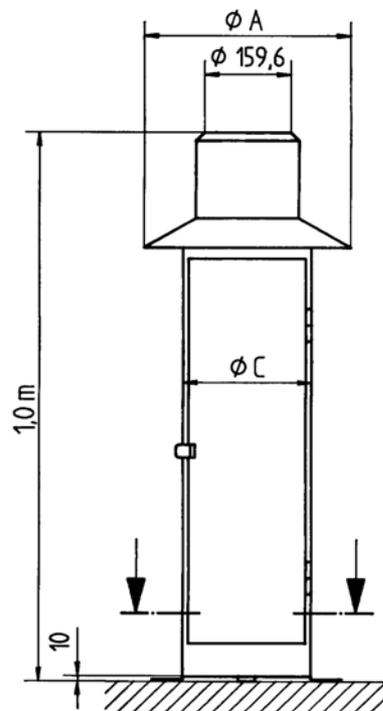
Siphoning off takes place at a water level of 10 mm.

Siphoning off can be carried out with unadjusted siphons by pushing it in respectively pulling it out of the lateral nozzle of the flushing tank. The stop is governed by a screwed clamp. You can set the felt pen tip to the correct height with the knurled screw (marked red) on the recording arm. (zero line).

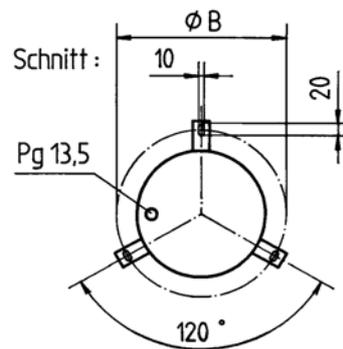
## 6 Technical Data

Description		
Collecting area	200 cm <sup>2</sup> (WMO-Norm)	
Height of instrument	1,0 m	
Housing	stainless steel	
Recording width	80 mm	
Graduation	0,1 mm Precipitation	
Collecting vessel	2,7 l	
<b>Order-no.:</b>	<b>5.4010.../4.011...</b>	<b>5.4015.../ 5.4016...</b>
Type of recording	Drum recorder acc. to DIN 8300 and 58658	Strip chart recorder
Type of clockwork	Spring wounded	Battery operated
Recording time	7 days or 24 hours	31 days
Thrust	55mm/ Tag or 16 mm/ Std.	10mm/ h. or 20mm/ h.
Operating time	8 days	31 days
Gear accuracy	< ± 30 sec./day at 20°C (acc. DIN 8300)	< ± 60 sec./day at 20°C (acc. DIN 16240)
Weight	13 kg	21 kg

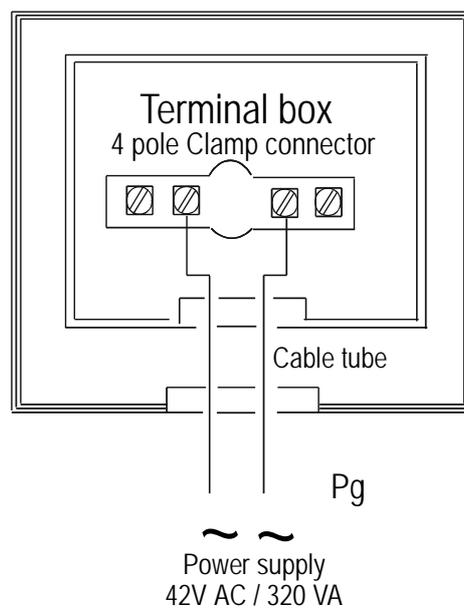
## 7 Dimensions



Order no.	5.4010... 5.4011...	5.4015... 5.4016...
$\phi A$	370	485
$\phi B$	304	449
$\phi C$	230	375



## 8 Connecting diagram



## 9 Spare parts

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<b>Model</b>	<b>Order-no.</b>	<b>Remarks</b>
Fibre tipping pen	500847	min. order 6 pieces
Recording strip 7 days	205243	100 sheets
Recording strip 24 hours	205245	100 sheets
Recording roll 31 days ; 10 mm/h	205247	min. order 12 rolls
Recording roll 31 days ; 20 mm/h	205248	min. order 12 rolls



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Hauptstraße 76      37083 Göttingen Germany  
P.O. Box 3536 + 3541      37025 Göttingen  
Phone ++551 79001-0      Fax ++551 79001-65  
www.thiesclima.com      info@thiesclima.com



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