

Instruction for Use

021355/11/06

Precipitation Transmitter

5.4032.54.008 / 5.4032.55.008 / 5.4032.65.007



ADOLF THIES GmbH & Co. KG

Hauptstraße 76

Box 3536 + 3541

Phone ++551 79001-0

www.thiesclima.com

37083 Göttingen Germany

37025 Göttingen

Fax ++551 79001-65

info@thiesclima.com

Contents

1	Models available	2
2	Application	3
3	Mode of Operation	3
4	Recommendation for Site Selection / Standard Installation.....	4
5	Installation.....	4
5.1	Mechanical Mounting:	4
5.2	Electrical Mounting	5
6	Plug Mounting	5
7	Maintenance	6
7.1	Cleaning:	6
8	Functional Check	8
8.1	Functional test of “dropper system“:.....	8
8.2	Functional check of heating.....	9
9	Check of Tipping Bucket	9
10	Connection Diagrams	10
11	Technical Data.....	12
12	Dimensional Drawing.....	13

Figures

Figure 1: Instrument construction	7
Figure 2: PCB.....	8

Tables

Table 1: Models available.....	2
--------------------------------	---

1 Models available

Order-No.	Meas. System	Measuring Range	Resolution	Heating
5.4032.54.008	Tipping bucket dropper	max. 7 mm/min. max. 2 mm/min.	0,1 mm/min. 0,005 mm/min.	yes
5.4032.55.008	Tipping bucket dropper	max. 15 mm/min. max. 2 mm/min.	0,2 mm/min. 0,005 mm/min.	yes
5.4032.65.007	Tipping bucket dropper	max. 7 mm/min. max. 2 mm/min.	0,1 mm/min. 0,005 mm/min.	no

Table 1: Models available

2 Application

The instrument is designed to measure the height, quantity and the intensity of the precipitation striking the surface of the earth.

3 Mode of Operation

The precipitation is collected by the collecting surface of 200 cm², and detected by the collecting funnel, and is conducted to the following measuring systems for measurement.

Measurement is based on two measuring principles:

Measuring principle: dropper (for precipitation transmitters 5.4032.54.008 / 5.4032.55.008 / 5.4032.65.007)

With intensities up to 2 mm/min the precipitation is formed into droplets which are registered by a light barrier system and transmitted as electrical pulses.

$$1 \text{ dropper-pulse} = 0,005 \text{ mm precipitation}$$

Measuring principle: tipping bucket

Tipping bucket with 4 cm³ capacity each half shell (for precipitation transmitter 5.4032.55.008).

With intensities up to 15 mm/min the precipitation is measured with a tipping bucket that tips at a precipitation level of 0.2 mm (4 cm³) and empties itself while the other half is filled again. This tipping process releases a pulse by means of a magnet fixed to the tipping bucket in conjunction with a reed switch; this pulse can be transmitted to a datalogger.

$$4 \text{ cm}^3 \text{ tipping bucket volume} = 1 \text{ tipping bucket pulse} = 0,2 \text{ mm precipitation}$$

Tipping bucket with 2 cm³ capacity each half shell.

The precipitation transmitters 5.4032.54.008 and 5.4032.65.007 are equipped with a smaller tipping bucket system. It is possible to measure intensities of max. 7mm/min with it. The resolution is 0,1 mm.

$$2 \text{ cm}^3 \text{ tipping bucket volume} = 1 \text{ tipping bucket pulse} = 0,1 \text{ mm precipitation}$$

Trouble-free operation with low temperatures is ensured by a built-in electronic heating system for the collecting funnel, the housing jacket, the trough for the tipping bucket and its outlet. The precipitation transmitter 5.4032.65.007 is without heating.

4 Recommendation for Site Selection / Standard Installation

Depending on the wind speed a certain amount of precipitation particles is blown away over the collecting surface. Therefore, you should avoid an installation in the open country or directly in the lee of an obstacle. Well-suited are locations with wind breaks such as gardens with hedges or the like.

According to the WMO-directive for precipitation measuring instruments the distance between the installed instrument and the next obstacle should be at least four times the height of this obstacle. If this is not practicable, at least keep an azimuth angle of $< 45^\circ$ with regard to the surrounding plants, buildings etc.

The measuring instrument is to be installed in a way that the collecting surface has horizontal position and a distance of 1 m to the ground. If regular snowfall is to be expected in the area of the measuring instrument this distance should be higher.

Attention

■ *Precipitation gauges are to be installed in a way that ensures a vibration-less operation*

5 Installation



Attention

*Electrical connection of this instruments must be done only by qualified expert.
The instrument must be opened in dry ambience only.
The uncovered electronics must not be damaged.*

5.1 Mechanical Mounting:

Unpack the precipitation transmitter. Take the tipping bucket packed in the small box out of the collecting funnel. Place the precipitation transmitter on the foot and fix with the 6 screws (6) in the foot. Release the 2 screws (5) on the housing jacket and pull off the housing jacket by moving upwards. Check that the spirit level in the base plate shows horizontal assembly; otherwise adjust the screws in the foot.

Insert the tipping bucket in the step bearings making sure it is on the right side (magnet facing electronics housing).

Attention:

■ *Do not touch the inside surfaces of the tipping bucket.*

Remark:

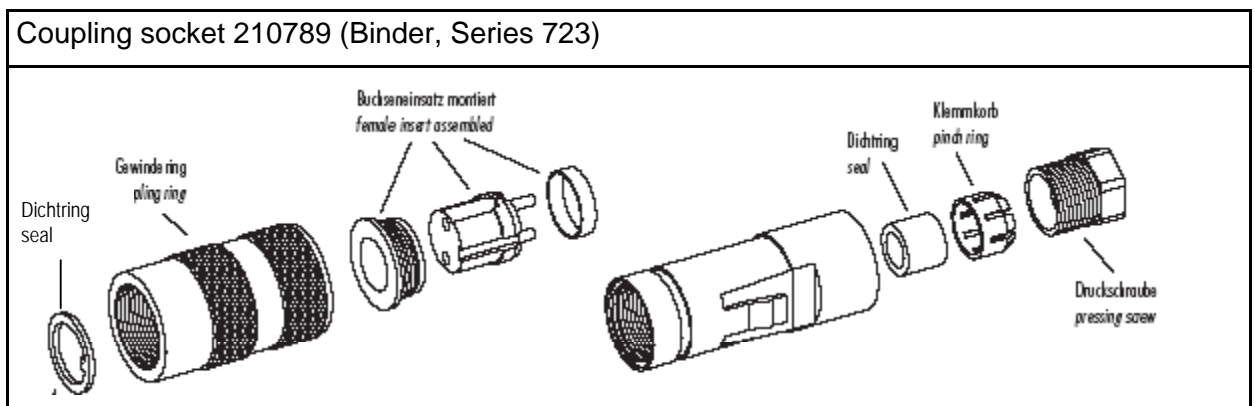
The inlet screen in the collecting funnel should be removed in winter when there is snowfall.

5.2 Electrical Mounting

Make the electrical connection with the plug supplied according to the diagram of connections. After applying the operating voltage perform a functional check.

Carefully place the housing jacket back on the unit and fix using the housing screws. The precipitation transmitter is now ready for operation.

6 Plug Mounting



7 Maintenance



Attention

*Electrical connection of this instruments must be done only by qualified expert.
The instrument must be opened in dry ambience only.
The uncovered electronics must not be damaged.*



Attention:

Before removing the housing jacket the supply voltage of the heating must be switched off.

The unit is designed so that all parts requiring maintenance are readily accessible after removal of the housing jacket. A free inlet is essential for exact measurement; the inside surfaces of the tipping bucket and dropper system must also be clean and free of grease. The maintenance interval depends on the soiling level of the unit. A visual inspection is recommended at shorter intervals as any particles falling in from above, e.g. leaves, bird droppings etc. may impair measurement.

7.1 Cleaning:

Required tools: cleaning product for stainless steel, clean cloth

Pull out the filter in the housing jacket by moving upwards to remove and clean.

Remove the housing jacket. Pull the filter (1) out of the dropper system (3) by moving upwards, then unscrew the dropper (2) underneath with the dropper wrench key. Clean the filter (1) and dropper (2)..

Attention

Do not damage edge of dropper.

Carefully take the tipping bucket out of the bearing and clean with a cloth and the cleaning product. Replace cleaned parts.

Attention

Do not touch the inside of the tipping bucket after cleaning.

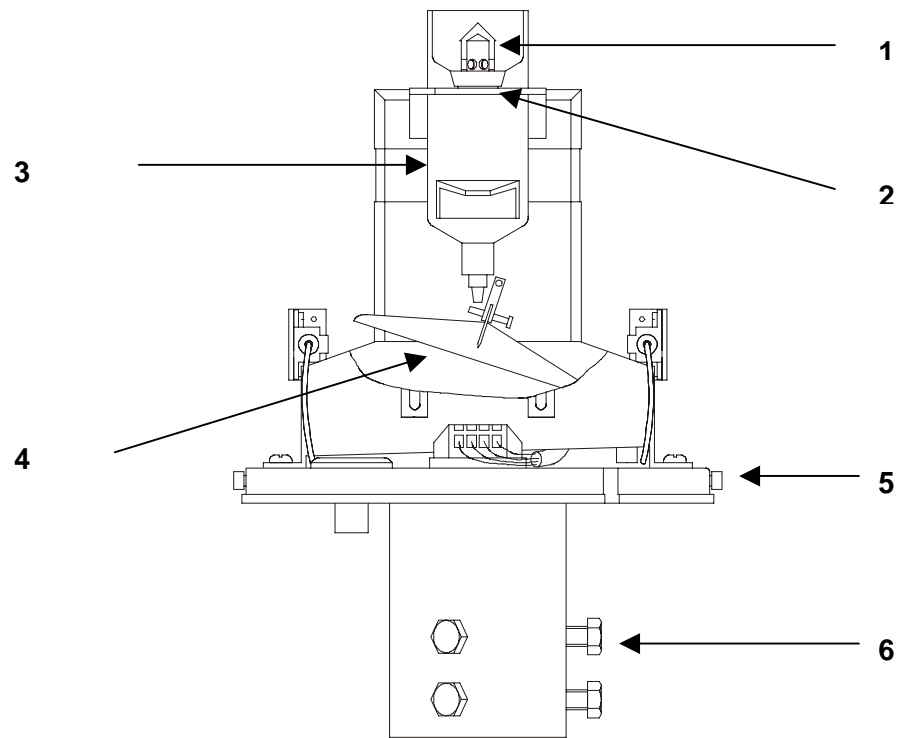


Figure 1: Instrument construction

8 Functional Check

The precipitation transmitter is ready for operation after the operating voltage is applied. General functioning can be checked once directly at the receiver. To do so, allow water to drip into the collecting funnel. The resulting dropper and tipping pulses can be checked at the receiver. The precipitation transmitter itself offers another option for control. For this purpose the housing cover of the electronics system is unscrewed. 3 LEDs are available on the PCB for this function.

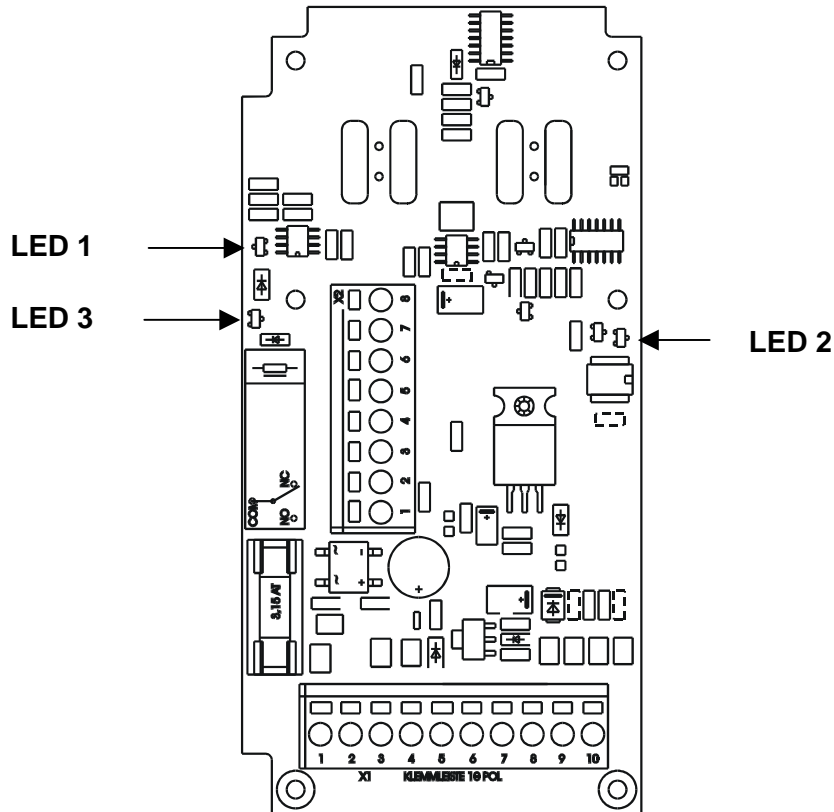


Figure 2: PCB

8.1 Functional test of “dropper system“:

Function	LED 2
No precipitation	off
With precipitation	flashes

8.2 Functional check of heating

The heating is ready for operation when the operating voltage is applied. The heating is switched on with a surface temperature (funnel) of $< 5^{\circ}\text{C}$. The operating status of the heating can be checked using 2 LEDs.

Function	LED 1	LED 3
Op. voltage. on / heating off	on	off
Op. voltage. on / heating on	on	on
Op. voltage. off	off	off

9 Check of Tipping Bucket

To check the precipitation transmitter it is recommended slowly introducing a specific precipitation volume.

Model 5.4032.55.008:

With an even water inlet of 400 ml over 15 minutes a pulse number of 100 ± 6 should be output.

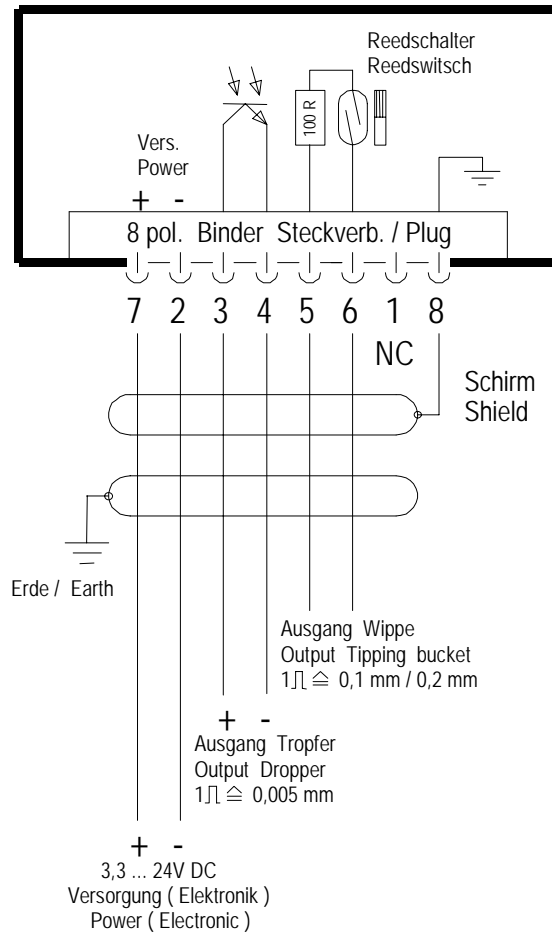
Model 5.4032.54.008 and 5.4032.65.007:

With an even water inlet of 200 ml over 15 minutes a pulse number of 100 ± 5 should be output.

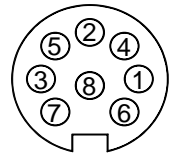
Remark:

Every precipitation transmitter is checked for proper functioning, adjusted and calibrated at the factory. Should settings have been altered over time by external influences, we recommend having the unit checked and calibrated at the factory.

5.4032.65.007



View on the soldered joint of the counter plug.



11 Technical Data

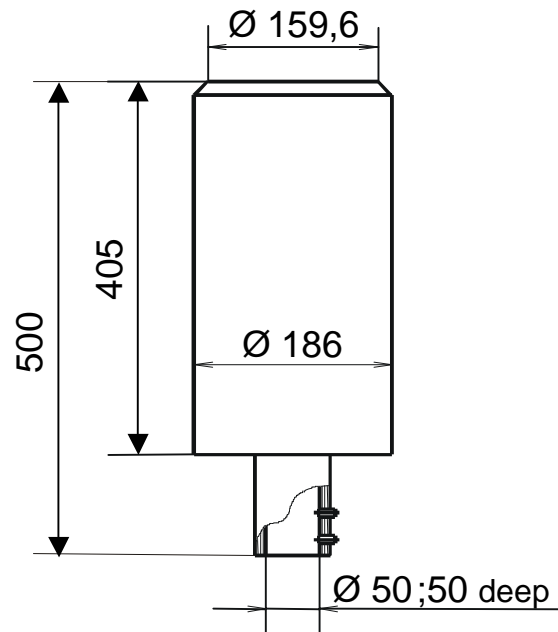
Description	MIN	TYPE	Max	Unit
Tipping bucket system:				
• Instrument 5.4032.55.008:				
Capacity of tipping bucket		4		cm ³
Measuring range	0		15	mm/min
Resolution (1 pulse)		0,2		mm
Accuracy (with 1,8 mm/min) *		< 4		%
• Instrument 5.4032.54.008: • Instrument 5.4032.65.007:				
Capacity of tipping bucket		2		cm ³
Measuring range	0		7	mm/min
Resolution (1 pulse)		0,1		mm
Accuracy (with 0,67 mm/min) *		< 5		%
Dropper – System:				
Measuring range	0		2	mm/min
Resolution (1 pulse)		0,005		mm
Accuracy (with 0,67 mm/min)		5	< 10	%
Output signal: tipping bucket system Reed contact (max. 0,5w, max. 42V)				
Switching capacity			0,5	W
V cc			42	V
Pulse length	30		50	ms
Pulse frequency	0		2	Hz
Output signal: dropper system Open collector: (galvanic isolation)				
Switched current		1		mA
Pulse length		125		ms
Pulse frequency			8	Hz
General:				
Collecting area		200		cm ²
Ambient temperature (with heating)	-25		60	°C
Ambient temperature (without heating)	0		60	°C
Mounting on stand pipe (1 ½")			50	Ømm
Weight			4	kg
Supply voltage for electronics	3,3		24	V DC
Power consumption for electronics		< 5		mA
Supply voltage for heating		24		V(AC/DC)
Heat output		70		W

- * = The accuracy levels were determined under laboratory conditions:

Information:

A precipitation height of 1 mm corresponds to a water volume of 1 litre on 1 m² ground area.

12 Dimensional Drawing





ADOLF THIES GmbH & Co. KG

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



- Alterations reserved -