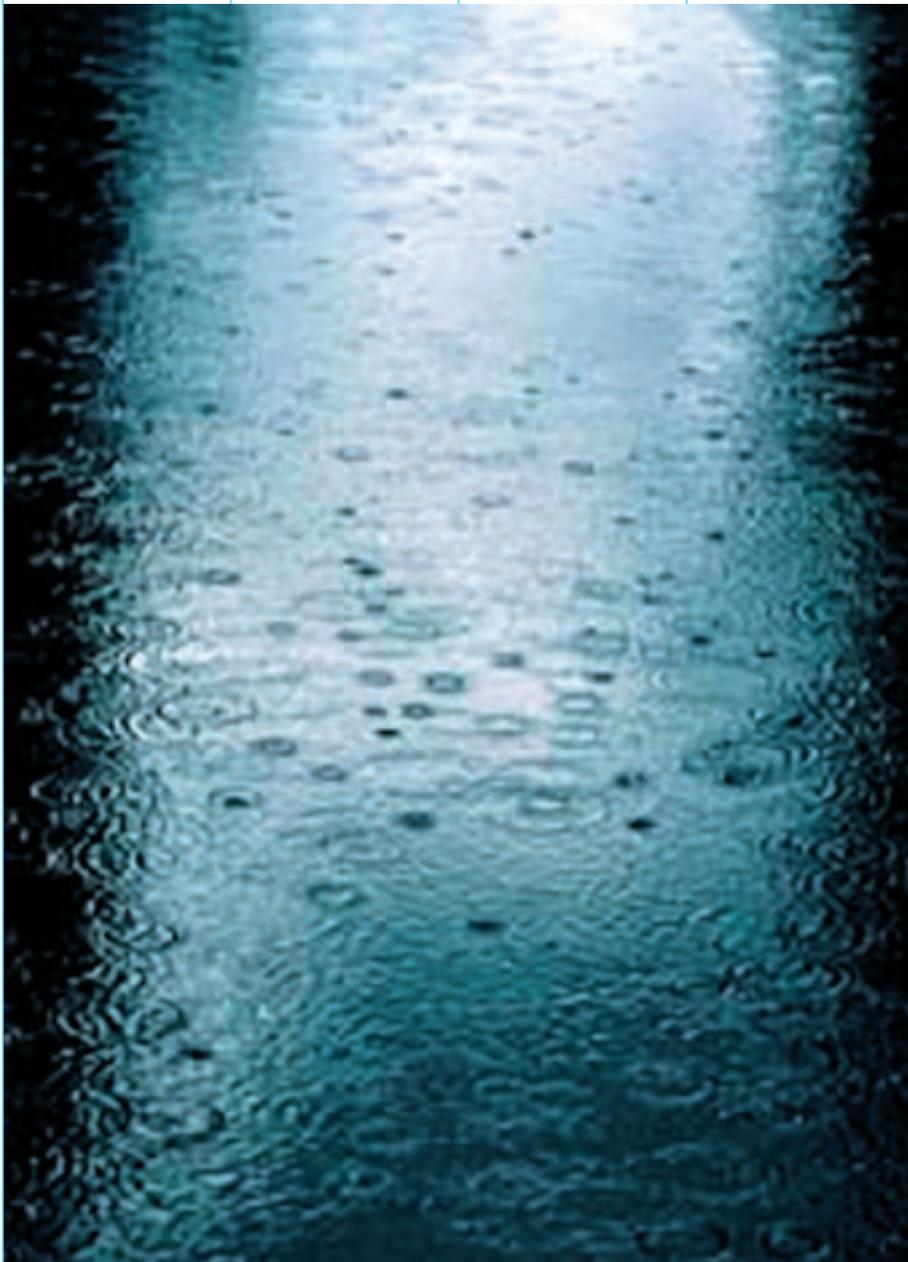


PRECIPITATION



THE WORLD OF WEATHER DATA

Measurement and Documentation:
Thies' range of service for meteorology,
environmental protection and industry



Today more than ever, the measurement, processing and analysis of meteorological data requires a high degree of measurement instrument precision and an optimal adaption of the data acquired to the task at hand.

For more than 60 years, we have been developing, producing and supplying practical instruments and systems for the analysis of weather data. Today we are one of the world's largest suppliers of such equipment.

Our close cooperation with scientific institutions and governmental agencies in many countries guarantees a constant and up-to-date flow of information about all aspects of individual national problems and projects and the rapid implementation of state-of-the-art developments and measurement techniques. Our instruments and systems fulfill in all respects both to the requirements of national weather services as well as those of the World Meteorological Organization in Geneva. Meteorological observations without computer-aided measurement and documentation systems are unthinkable today. THIES develops complete ready-for-use-systems which include precision data transmitters, data loggers, power supply units and personal computers with adapted software.



Precipitation	Any and all forms of water particles, liquid or solid, that fall from the atmosphere and reach the surface.
Dew Point	Indicates the temperature, where the saturation limit is reached – under cooling down of the air – and where dewing starts.
Evaporation	The loss of a certain water quantity, caused by a change of its aggregate state into gaseousness, under temperature influence.
Precipitation Quantity	The totality of the fallen liquid or solid precipitation. Indicated in mm, i.e. 1mm of precipitation = 1 litre per square meter.
Precipitation Meter	Generally for a precipitation collecting instrument, the collected quantity of which is measured by means of a measuring receptacle.
Precipitation Transmitter	Generally for a precipitation measuring instrument with electrical output. Here, an impulse is delivered for a defined precipitation quantity as output value.
Precipitation Recorder	Generally for a precipitation measuring instrument with mechanical recording of the collected precipitation quantity.
Snow Cross	Inset for precipitation meters. Avoids losses of snow in the precipitation funnel due to wind vorticities.
Rain	Water drops with a diameter of > 0.5 mm, falling down from the atmosphere
Drizzle	Water drops with a diameter of < 0.5 mm, falling down from the atmosphere.
Hail	Balls of ice with a diameter of approx. > 5 mm, falling down from the atmosphere.
Snow	Down-falling snow crystals, single or sticking together.
Precipitation Intensity	The fallen precipitation quantity within a certain time period (e.g. mm/min)
Droplet	A nozzle where the liquid precipitation is passed through, and dripped off in a defined drop size. This procedure achieves a high resolution for the precipitation measurement (e.g. 0.005 mm)
Tipping Bucket	The collected liquid precipitation is led into a tipping bucket which tips over at a certain weight. The tipping over corresponds to a defined precipitation quantity (e.g. ≥ 0.1 mm)
Evaporation Calculation acc. to Haude acc. to Wendling acc. to Penman-Monteith acc. to Richter	Mathematical calculation of the evaporation with different parameters: Day's value of evaporation from temperature and rel. humidity Hourly value of evaporation from temperature, rel. humidity, wind speed and radiation Day's value of the reference evaporation from temperature, rel. humidity, wind speed and radiation Day's value of evaporation above water from wind speed, water surface temperature, rel. air humidity and air temperature
Guidelines VDI 3786, Part 7 DIN 4049, Part 101	Meteorological measurements, precipitation hydrology, terms for precipitation and snow

Precipitation



Precipitation Transmitter
with electrical output for automatic
data acquisition



Precipitation meter
for the mechanical acquisition of the
precipitation for determining the water
entry, e. g. in soil, artificial lakes, ponds
etc.

Evaporation pan (Class A) with an evaporation transmitter for measurement of evaporation, e. g. in the agricultural field



Laser-Precipitation Monitor
for the measurement and detection
of different types of precipitation
such as drizzle, rain, hail, snow

Rain Monitor
with electrical output for acquisition
of precipitation periods or control of
protecting devices



Precipitation

Model Brief Description

Mechanical Precipitation Meter

Precipitation Meter

acc. to Hellmann
This meter meets the requirements of the German Weather Bureau.

The precipitation is collected in a vessel and then measured in litres in the measuring cylinder.

Consist of:

- 1 upper part
- 1 lower part
- 1 collecting can
- 1 support
- 1 measuring cylinder

Order No.

5.4000.00.000

500447

210248

Technical Data

Meas. cylinder 200 cm³ ± 10 mm precipitation
Graduation 0.1 mm precipitation
Collecting area 200 cm²
Collecting can 1.4 l
Model acc. to DIN 58666 C
Material stainless steel
Dimension Ø 190 x 450 mm
Weight 3.2 kg



Rain and Snow Meter

acc. to Hellmann
Described as above, with additional parts:

- 2 snow crosses
- 1 cover
- 1 upper part
- 1 lower part
- 1 collecting can

5.4001.00.000

502506

500447

Model acc. to DIN 58666 D as preceding
Material case stainless steel
Snow cross stainless steel
Cover Aluminium, anodized
Collecting can PE
Weight 6.5 kg



Rain and Snow Meter

acc. to Hellmann
small-size model
Same measuring principle as with 5.4000.00.00, but smaller housing with smaller collecting area.

The precipitation is collected directly in the measuring receptacle.

5.4005.00.000

Meas. cylinder 250 cm³ ± 25 mm precipitation
Graduation 1 mm precipitation
Collecting area 100 cm²
Dimensions Ø 120 x 255 mm
Weight 1.25 kg



Accessories

Snow Cross

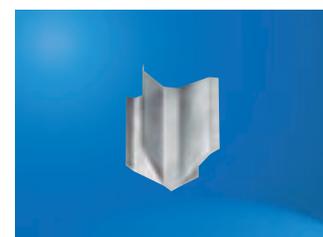
Is put into the collecting funnel of the Precipitation Meter or Rain and Snow Meter in order to avoid losses caused by snow vorticities.

502506

for 5.4000... / 5.4001...
Material stainless steel
Dimensions 150 x 150 x 240mm
Weight 0.25 kg

502507

for 5.4005.00.000
Material stainless steel
Dimensions 100 x 100 x 200 mm
Weight 0.15 kg



Precipitation

Model Brief Description

Accessories

Measuring Cylinder 10
for 5.4000... / 5.4001...
acc. to DIN 58667 B

Measuring Cylinder 25
for 5.4005.00.000



Mechanical Precipitation Recorder

Precipitation Recorder

acc. to Hellmann
A standard mechanical precipitation measurement instrument employed in meteorology acc. to VDI 3786, p. 7. Except for the heating system, this instrument requires no additional auxiliary power. The instrument case is made of stainless steel.



Precipitation Recorder

acc. to Hellmann
A standard mechanical precipitation measurement instrument employed in meteorology acc. to VDI 3786, page 7. Except for the heating system, this instrument requires no additional auxiliary power. The instrument case is of stainless steel.



Order No.

210248

210249

5.4010.xx.000

5.4011.xx.000

.10.

.16.

5.4015.xx.000

5.4016.xx.000

...10.

...16.

Technical Data

Measuring range 0 ... 10 mm precipitation
Graduation 0.1 mm precipitation

Measuring range 0 ... 25 mm precipitation
Graduation 1 mm precipitation

Recording time
7 days
24 hours
Heating
none
Heating
42 V AC / 250 VA

Thrust
55 mm / day
16 mm / hour
Collecting area
200 cm²
Collecting height
1.0 m
Recording width
80 mm \triangleq 10 mm precipitation
Graduation
0.1 mm precipitation
Transport mech.
drum clockwork
acc. to DIN 58658

Collecting can
2.75 l
Ambient temp.
0 ... +60 °C (w/o. heat.)
-20 ... +60 °C (w. heat.)
Dimensions
Ø 370 x 1000 mm
Weight
13 kg

Thrust
10 mm / hour
Thrust
20 mm / hour
Heating
none
Heating
42 V AC / 250 VA

Collecting area
200 cm²
Collecting height
1.0 m
Recording width
80 mm \triangleq 10 mm precipitation

Graduation
0.1 mm precipitation
Transport mech.
strip chart
Recording time
31 days
Collecting can
ca. 2.75 l
Dimensions.
Ø 485 x 1000 mm
Weight
21 kg

Model Brief Description

Accessories

Recording chart

(not depicted)
For 5.4010... / 5.4011...
(1 set = 100 pcs)

Recording Roll

For 5.4015... / 5.4016...

Felt pen

(not depicted)
For all Thies precipitation recorders

Device to Refuse Birds

Protection against bird droppings for the collecting funnels of the precipitation recorders (5.4010/11..., 5.4015/15..). Refuses birds on the edge of the collecting funnel

Power Supply Unit

Power supply unit to provide power to the heating of the preceding precipitation recorder.

Precipitation Transmitter

Ombrometer

The measuring receiver transmits the values measured for amount and intensity of precipitation. Depending on the maximum possible intensity, either drops are counted or the turnovers of a tipping bucket are counted or a combination of both these measuring principles is employed. The collecting funnel is of zinc-plate and the cover is made of stainless steel grey varnished. The heating system is regulated by a thermostat.

Order No.

205243
205245

205247
205248

500847

5.4010.00.010

5.3288.20.000

5.4031.xx.000
.11.
.31.
.51.

Technical Data

Recording time 7 days
24 hours

Thrust 10 mm / hour
20 mm / hour
Recording time 31 days

Colour violet

Material stainless steel
Clamping diameter Ø 160
Dimensions Ø 360 x 100 mm
Weight 0.32 kg

Primary voltage 230 V / 50 Hz / 2 A
Secondary voltage 42 V / 300 VA / 8 A
Fuse primary and secondary
Type of protection IP 65
Dimensions 125 x 175 x 125 mm
Weight 5.5 kg

Meas. principle Intensity
Dropper max. 2 mm / min.
Tipping bucket max. 10 mm / min.
Combination 2 mm / min.,
10 mm / min.

Collecting area 200 cm²
Resolution 0.005 mm (dropper)
0.1 mm (tipping bucket)

Electr. output Imp. 5 V, 15 mA (TTL)
Heating 70 W; 24 V AC/DC
Ambient temp. -25 ... +60 °C
Operating voltage 8 ... 29 V AC / 60 mA
or
10 ... 38 V DC / 50 mA

Housing stainless steel, varnished
Mounting onto a mast Ø 50 mm
Dimensions Ø 225 x 480 mm
Weight 6.5 kg



Precipitation

Model Brief Description

Precipitation Transmitter

Precipitation Transmitter

- pulse output
- with intensity-dependent linearization

Instrument serves as sensor for quantity and intensity of precipitation, for the digital transmission of measuring values.

The measuring principle is in accordance to the "Guide to Meteorological Instruments No 8" of the WMO.

The precipitation is conducted into the tipping bucket via the collecting area and funnel. On achieving the maximum volume capacity the bucket tips over. Each tipping event is acquired contract-free, is linearized, and output for further processing.

Precipitation Transmitter

- pulse output
- with intensity-dependent linearization

This precipitation transmitter has an additional heating for the casing, and is therefore well-suited particularly for the use in mountains.

Order No.

5.4032.35.007
.008

5.4032.45.008

Technical Data

Heating none
Heating 48.5 W; 24 V AC/DC

Collecting area 200 cm²
Resolution 0.1 mm NS
Intensity max. 11 mm / min.
Meas. principle tipping bucket
Electr. output pulses

Ambient temp. -25 ... +60 °C
with heating
0 ... +60 °C
w/o heating

Supply Electronics 5 ... 24 V DC
(2-leads-circuit)
Heating 24 V AC/DC
Housing stainless steel
Mounting onto mast Ø 50 mm
Dimensions Ø 186 x 445 mm
Weight 3.3 kg

Heating 113.5 W; 24 V AC/DC

Collecting area 200 cm²
Resolution 0.1 mm NS
Intensity max. 11 mm / min.
Meas. principle tipping bucket
Electr. output Pulses

Ambient temp. -25 ... +60 °C w. heat.

Supply Electronics 5 ... 24 V DC
(2-leads-circuit)
Heating 24 V AC/DC
Housing stainless steel
Mounting onto mast Ø 50 mm
Dimensions Ø 197 x 445 mm
Weight 3.3 kg



Precipitation

Model Brief Description

Precipitation Transmitter

Precipitation Transmitter

- analogue output
- pulse output
- with intensity-dependent linearization

Instrument serves as sensor for quantity and intensity of precipitation, for the analogue transmission of measuring values.

The precipitation is conducted into the tipping bucket via the collecting area and funnel. On achieving the maximum volume capacity the bucket tips over. Each tipping event is acquired contract-free, is linearized, and output for further processing.

Analogue output:
The following output functions are selectable:

1.) The analogue output is available as accumulated value in proportion to the precipitation pulses. Here, the analogue value is reset automatically to zero mm precipitation in case of measuring value exceeding, or through an external pulse.

2.) The analogue output can deliver the data as gliding accumulated value over a selectable time (10 / 60 min., 6 / 24 h).

Pulse output:
The precipitation pulse is available in parallel to the analogue output via an optocoupler

Order No.

5.4033.35.xxx
.36.
.040
.041
.073
.061

Technical Data

Heating	48.5 W; 24 V AC/DC
Heating	none
Electr. output 1	0 ... 20 mA (< 500 Ω) 4 ... 20 mA (< 500 Ω) 0 ... 5 V 0 ... 10 V
Electr. output 2	pulses
Meas. range	selectable 10 / 20 / 25 / 50 mm
Collecting area	NS
Resolution	200 cm ²
Intensity	0.1 mm NS
Meas. principle	max. 11 mm / min.
Operating voltage	tipping bucket 24 V AC / DC or (w/o heating supply) 10 ... 28 V DC 14 ... 28 V DC (10 V-outp.)
Ambient temp.	-25 ... +60 °C with heating 0 ... +60 °C w/o heating
Housing	Stainless steel
Mounting	onto mast Ø 50 mm
Dimensions	Ø 186 x 445 mm
Weight	3.3 kg



Precipitation



Model Brief Description

Precipitation Measuring Systems

Precipitation Transmitter
same as 5.4032.35.008, however connectable to the precipitation datalogger 509040

M-LOG5W-Counter, Precipitation Datalogger
Serves for the storing of precipitation impulses of the precipitation transmitter 5.4032.35.508

Wireless- USB-Adapter 433 MHz
Serves for the read-out the precipitation datalogger 509040 by means of a PC

GP- Shell-Software
Serves for the setting, and communication of the precipitation datalogger 509040 as well as for reading the measuring data out by means of an external PC

Order No.

5.4032.35.508

509040

212783

212784

Technical Data

Heating	48.5 W; 24 V AC/DC
Collecting area	200 cm ²
Resolution	0.1 mm NS
Intensity	max. 11 mm / min.
Meas. principle	tipping bucket
Electr. output	pulses
Ambient temp.	-25 ... +60 °C
Supply	
Electronics	6 V DC
Heating	24 V AC/DC
Housing	stainless steel
Mounting	onto mast Ø 50 mm
Dimensions	Ø 186 x 445 mm
Weight	3.3 kg

Measuring value input	Impulse
Memory capacity	approx. 100 000 impulses
Operating voltage	by inserted 3.6V/2400 mAh Lithium battery

Data format	CSV-File
System requirement	WIN98SE, XP, VISTA, WIN7

Precipitation

Model Brief Description

Precipitation Measuring Systems

Precipitation Transmitter

Same as 5.4032.35.007 however with inserted precipitation datalogger 509040

Order No.

5.4032.35.507

Technical Data

Collecting surface	200 cm ²
Resolution	0,1 mm NS
Intensity	max. 11 mm / min.
Measuring principle	Tipping bucket
Electr. output	Impulses
Ambient temp.	0 ... +60 °C
Operating voltage	6V DC
Supply	By inserted Lithium-battery
Housing	Stainless steel
Mounting	on mast Ø 50 mm
Dimension	Ø 186 x 445 mm
Weight	3.3 kg
Datalogger:	
Memory capacity	approx. 100 000 impulses
Supply	by inserted 3.6V/2400 mAh Lithium battery

The wireless read-out of the data is carried out via optional accessories:

- **Wireless- USB-Adapter**

212783

- **GP- Shell-Software**

212784

Accessories for Precipitation Transmitter

Device to Refuse Birds

Protection against bird droppings for the collecting funnels of the Ombrometer (5.4031.11/31/51...). Refuses birds on the edge of the collecting funnel.

5.4031.11.010

Material	stainless steel
Clamping diameter	Ø 225 mm
Dimensions	Ø 380 x 100 mm
Weight	0.41 kg

Device to Refuse Birds

For Precipitation Transmitter and Precipitation Recorder. (5.4032.35.007/8; 5.4033.35/36...)

5.4010.00.010

Material	stainless steel
Clamping diameter	Ø 186 mm
Dimensions	Ø 360 x 100 mm
Weight	0.32 kg

Device to Refuse Birds

For Precipitation Transmitter 5.4032.45.008

5.4010.00.011

Material	stainless steel
Clamping diameter	Ø 197 mm
Dimensions	Ø 370 x 100 mm
Weight	0.35 kg

Stand

Used to mount the preceding Ombrometer, resp. Precipitation Transmitter. The collecting area can be elevated to a height of 1; 1.2 or 1.5 m.

9.4031.35.xxx
.36.xxx
.065
.085
.115

Material	steel, zinc plated stainless steel
Collecting height	1.0 m 1.2 m 1.5 m
Total length	0.6 m, 0.8 m resp. 1.15 m
Tube diameter	48.3 mm
Mounting distance	450 mm
Weight	approx. 6.5 kg, 7.5 kg, 8.5 kg



Precipitation

Model Brief Description

Accessories for Precipitation Transmitter



Wind Protection Element

Serves as optional accessory for uninterrupted acquisition even in case of wind. It provides that the precipitation gets into the measuring instrument almost without swirling.

Suitable for Ombrometer and precipitation transmitter.

The wind shield is mounted onto a stand together with the measuring instrument (see order.-no. 9.4031.35/36...).



Power Supply Unit

Provides power, for Ombrometer and Precipitation Transmitter.

The primary and secondary voltages have separate fuses. Synthetic case.



Power Supply Unit

For power supply of the reinforced heating with precipitation transmitter 5.4032.45.008



Power Supply Unit Compact

Used for the power supply of the Ombrometers and Precipitation Transmitters. The primary and secondary voltages are protected by fuses. A terminal strip is integrated additionally for the connection and distribution of the measuring cables.

Order No.

Technical Data

5.4032.00.000

Material
Ring, Receptacle, Connecting bar
Lamella
Diameter
Length of lamella
Total height
Receptacle
Weight

Steel, zinc plated
Stainless steel
1000 mm
520 mm
800 mm
for Ø 48 mm
18 kg

9.3388.00.000

Primary
Secondary
Housing
Protection
Dimensions
Weight

230 V / 50 ... 60 Hz
26 V AC / 3.46 A
24 V AC / 0.5 A
12 V DC / 0.3 A
Synthetic
IP 65
125 x 125 x 125 mm
2.7 kg

9.3388.00.001

Primary
Secondary
Housing
Protection
Dimensions
Weight

230 V / 50 ... 60 Hz
24 V AC / 140 VA
Synthetic
IP 65
200 x 200 x 135 mm
3.7 kg

9.3389.10.000
.010

Primary
Secondary
Clamp distributor
Housing
Protection
Dimensions
Weight

230 V / 50 Hz / 0.63 A
115 V / 60 Hz / 1.3 A
2 x 24 V AC / 27.5 VA
1 x 24 V AC / 75 VA
1 x 24 V AC / 5 VA
1 x 24 V DC / 2 W
20 pole
Synthetic
IP 65 for housing
300 x 200 x 140 mm
4.4 kg

Model Brief Description

Precipitation Monitoring

Laser Precipitation Monitor

The Laser Precipitation Monitor serves as measuring value transmitter, and is well-suited for the measurement and detection of different types of precipitation such as

- drizzle
- rain
- hail
- snow
- and mixed precipitation.

The acquisition comprises the types of precipitation, intensity and the spectrum.

All measuring values are available for the user via an RS485/422 interface.

In addition, the instrument is equipped with two further digital outputs (opto-couplers), which output, for ex., pulses and state of precipitation.

The optical components are equipped with an integrated heating.

Order No.

5.4110.00.xxx
000

100
200
300

Technical Data

Operating voltage	24 V AC / DC or 22...30 V DC (< 750mA)
Operating voltage	115 V AC, 15 Ω
Operating voltage	230V AC, 15 Ω
Operating voltage	12 ... 24 VDC, 600 mA
Measuring value	Precipitation
Particle size	0.16 ... > 8mm Ø
Particle speed	0.2 ... 20 m/s
Intensity	< 0,005 mm/h (drizzle) > 250 mm/h
Output intensity	
-via RS485	: resolution 0.001 mm/h
Output quantity	
-via RS485	: resolution 0.01 mm
-via data output.	: pulses (res. 0.1 mm; 0.01 mm; 0.005 mm)
Accuracy with	
Quantity meas.	< 15% (rain, 0.5-20 mm/h) < 30% (snow)
Precipit. types	drizzle (also freezing) rain (also freezing) hail snow snow grains/ ice needles soft hail/ice grains
Precipitation output	
-via RS485	Synop, Metar
-via digital output	frequency
Accuracy	
for precipitation	drizzle > 97%
output (comparing	rain > 99%
with synoptic	hail > 95%
observation)	snow > 99%
	snow grains > 60%
	soft hail t.b.d.
Sensors	
Laser diode	785nm, max0.5mW
Laser class	1M (EN60825-1:1994 A2:2001)
Measuring surface	45.6 cm ²
Data output	
RS 485	1200 ... 115200Bd potential isolation
Digital output	duplex 2 x opto couplers, potential isolation
General	
Ambient conditions	-40 °C ... +70 °C, 0 ... 100% r.h.
Dimensions	270 x 170 x 540 mm
Weight	4.8 kg
Protection	IP 65
EMC immunity	EN61326 with
EMC radiation	EN61000-4-3 EN61326 class B



Precipitation



Model Brief Description

Precipitation Monitoring

Laser Precipitation Monitor

The following additional sensors can be connected to this model:

- temperature
- rel. humidity
- wind speed
- wind direction

Suitable Transmitters:

Hygro-Thermotransmitter

1.1005.54.000

Wind Transmitter

4.3519.00.000

Wind Direction Transmitter

4.3129.00.000

For more details and techn. data see 5.4110.00.000

Accessories for Laser Precipitation Monitor

Instrument Support

For the vibration-reduced operation of the LPM on an available concrete foundation, provided by the customer. The support consists of a vertical tube with firmly welded-on tripod stand and struts.



Wind Protection Element

Serves as optional accessory for uninterrupted acquisition even in case of wind. It provides that the precipitation gets into the Laser-Precipitation-Monitor (LNM) almost without swirling.

Together with the LNM, the wind shield is mounted to a carrier or mast.



PC-Program LNM View

Ref. chapter "Software"

Order No.

5.4110.10.x00

4.3187.61.100
.200
.300

5.4200.00.000

9.1700.99.000

Technical Data

Additional Meas.

Value Input

Temperature	Pt 100
Meas. range	-40 ... +70 °C
Resolution	0.1 °C
Accuracy	±0.1 °C

Rel. humidity	0 ... 1V
Meas. range	0 ... 100% r.h.
Resolution	0.1%
Accuracy	±0.1%

Wind speed	0 ... 630Hz
Meas. range	0 ... 50 m/s
Resolution	0.1 m/s
Accuracy	±0.1 m/s

Wind direction	serial synchronous
Meas. range	0 ... 360 degree
Resolution	11.25 degree

Tube length	1 m
	2 m
	3 m

Tube diameter	60 mm
Tripod stand	645 x 645 mm
Weight	30 kg
Material	steel, hot-dip galvanized

Material	Steel, zinc plated
Frame	Stainless steel
Lamella	600 x 480 x 400 mm
Dimension	(L x W x H)

Mounting set	for mast
	Ø 48-102 mm,
	optional
	Ø 132-200 mm
Weight	18 kg

Model Brief Description

Precipitation Monitoring

Precipitation Monitor

The instrument is designed to detect the beginning and the end of precipitation. It can be used for status report, or as signal transmitter for the control of rain protection devices, such as windows, awnings, or Venetian blinds.

The precipitation is detected opto-electronically via a measuring area of approx. 25 cm².

A relay-contact signalises the state of precipitation. (Precipitation yes/no).

Integrated heating avoids snow covering or freezing of the instrument during winter operation.

Delivery including mast holder, which can be used for wall mounting as well.

Precipitation Sensor

Instrument serves for determination of the instantaneous precipitation intensity. Herefrom, control- and warning signals can be derived.

The precipitation is detected opto-electronically via a measuring area of approx. 25 cm².

Output of the measuring signal as intensity-dependent analogue value.

Integrated heating avoids snow covering or freezing of the instrument during winter operation.

Delivery including mast holder, which can be used for wall mounting, as well.

Order No.

5.4103.10.000
.700

5.4103.20.041
.741

Technical Data

Connection	Cable gland Plug connection
Measuring value	Precipitation yes/no
Switch-on delay	none
Switch-on condition	1 ... 15 incid. within 50s adjustable
Switch-off delay	25 ... 375s in 25s steps adjustable
Sensor area	25 cm ²
Drop size	≥ 0.2 mm
Output	single-pole double throw switch
Contact load at 5.4103.10.000 at 5.4103.10.700	max. 230 V AC/DC; 4 A max. 60 V AC/DC; 4 A
Operating voltage	24 V AC/DC ±15%
Operating current	ca. 70 mA
Heating current	max. 1 A
Ambient temp.	-30 ... +60 °C
Protection	IP 65
Dimensions	130 x 140 x 40 mm
Weight	0.4 kg
EMC	EN 61000-6-2 EN 61000-6-3
Connection	Cable gland Plug connection
Measuring value	Precipitation intensity
Measuring range	0 ... 10 mm / min.
Electr. output	4.0 ... 8.0 mA (= 0 ... 0.01 mm/min.) 8.0 ... 12.0 mA (= 0.01 ... 0.1 mm/min.) 12.0 ... 16.0 mA (= 0.1 ... 1.0 mm/min.) 16.0 ... 20.0 mA (= 1.0 ... 10 mm/min.)
Sensor area	25 cm ²
Drop size	≥ 0.2 mm
Operating voltage	24 V AC/DC ±15%
Operating current	ca. 90 mA
Heating current	max. 1 A
Ambient temp..	-30 ... +60 °C
Protection	IP 65
Dimensions	130 x 140 x 40 mm
Weight	0.4 kg
EMC	EN 61000-6-2 EN 61000-6-3



Precipitation

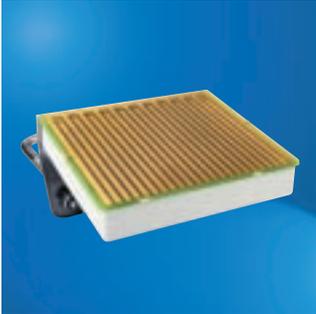
Model Brief Description

Precipitation Monitoring

Rain Monitor

The instrument is designed for electrical acquisition of start and end of precipitation. The precipitation drops are detected by a sensor area, and with wetting a contact is closed.

An integral heating system ensures ice and snow free operation in winter. Complete with a mast fixing that can also be utilised for wall mounting.



Power Supply Unit

Provides power to the preceding Precipitation Monitor. The primary and secondary voltages have separate fuses. Synthetic case.



Datalogger System

Datalogger DLN

The datalogger acquires the output pulse measurement values (0,1 mm prec/imp.) of max. 2 precipitation transmitters as well as one temperature value from a Pt100. It stores the data together with time and date in accordance with the set memory cycle.

In addition, measuring data of an LNM (5.4110.xx.xxx) can be acquired and stored.

The read-out of the stored data is carried out directly via the serial interface, USB, or by means of an SD-card.

Date, time, station name, and memory cycle can be set via 3 keys.

The instrument can be operated in battery-supplied mode (mains-independent).

The pulses of the precipitation transmitter can be processed potential-free via opto-coupler.



Order No.

5.4105.00.000

9.3388.00.002

5.1756.00.000

Technical Data

Measuring value	Precipitation yes/no
Switch-on delay	none
Switch-off delay	5.5 min.
Sensor area	40 cm ²
Contact	1 change over
Contact load	max. 42 V DC, max 1 A; max. 4,5 W
Operating voltage	24 V AC/DC; max. 4 W
Ambient temp.	-30 ... +50 °C
Protection	IP 65
Cable	3 m; LiYY 5 x 0.25 mm ²
Dimensions	76.5 x 54 x 18 mm
Weight	0.5 kg

Primary voltage	230 V / 50 Hz
Secondary voltage	24 V AC / 20 AV
Protection	IP 65
Dimensions	107 x 125 x 100 mm
Weight	1.2 kg

Measuring value inputs	2 x Reed contact/impulses 1 x temperature Pt100 1 x serial (COM2)
Measuring range Pt100	-40 ... 70 °C
Measuring value output	2x opto-coupler (max. 24V, 1 mA)
Query cycle (Pt100)	1s ... 60 min.
Memory cycle	1 ... 60 min.
Memory capacity	4 MB (non-volatile)
Number data records	360448 (3 channels) 163840 (10 channels)
Data output	COM1: RS 232 USB Device SD-Card
Additional interface COM2	RS485 half-duplex (connection of an LNM or output of telegram)
Display	2 lines a 16 characters
Clock	Real time clock
Supply via:	
Battery connection	12V DC (10.5 ... 15V) and / or
Charching connection	16.5 ... 28 V DC 16 ... 24 V AC 50/60Hz
Power consumption	Max. 500 mA
Ambient temp.	-30 ... +60 °C
Protection	IP20
Mounting	DIN rail
Connection	clamp
Dimension	155 x 85 x 60 mm
Weight	0.7 kg

Precipitation

Model Brief Description

Datalogger System

SD-Card

Serves as portable data carrier for reading the measuring data out from the DATALOGGER-DLN

Evaporation

Evaporation Meter

acc. to Pichè
This is a measuring tube with a scale, which is closed on both ends.
The lower end is closed with the blotting paper.

Blotting Paper

(1 set = 100 papers)

Evaporation Pan "Class A"

A stainless steel pan to hold the water for evaporation.

Smoothing Pipe

with suspension measuring rod

A measuring instrument to determine the water level in an Evaporation pan.
A pointed rod in a smoothing pipe scans the water level by a micro meter.

Min.-Max.-Immersion Thermometer

This thermometer is used to measure the temperature on the bottom of the evaporation pan. This allows comparison of the ambient temperature with existing measurements.

Order No.

9.2200.00.000

6.1425.00.000
.001

205270
205271

6.1428.10.000

6.1428.11.000

6.1428.14.000

Technical Data

Memory capacity 2 GB
Format FAT 16

with blotting paper Ø 55 mm
with blotting paper Ø 33 mm
Measuring range 0 ... 30 ml
Graduation 0.1 ml
Volume 36 ml
Total length 325 mm
Weight 0.1 kg

Diameter 55 mm
33 mm

Diameter 1206.5 mm = 47,5"
Height 254 mm = 10"
Material stainless steel
Weight 26 kg

Measuring range 0 ... 100 mm
Graduation 0.05 mm
Height of level 177.8 mm = 7"
Material stainless steel
Dimensions Ø 200 x 300 mm
Weight 2.4 kg

Range of indication -30 ... +50 °C
Accuracy ±0.5 K
Graduation 1 °C
Measurement fluid mercury
Material Aluminium, anodised
Dimensions 60 x 220 x 45 mm
Weight 0.26 kg



Evaporation

Model Brief Description

Evaporation

Ultrasonic Evaporation Transmitter

- With analogue output

For the automatic measurement of the evaporation height with the aid of an ultrasonic sensor.

Referring to a reference height the down-going water-level is measured continuously, and is output as current or voltage. The evaporation transmitter is temperature-compensated.



Ultrasonic Evaporation Transmitter

- With serial synchronous output

For the automatic measurement of the evaporation height with the aid of an ultrasonic sensor.

Referring to a reference height the down-going water-level is measured continuously, and is output as serial synchronous telegram.

It is possible to connect it directly to a THIES-Datalogger TDL14 / DLxMET / DL16 for example.

The evaporation transmitter is temperature compensated.



Ultrasonic Evaporation Transmitter

- With RS485-Interface

The measured value is output as a serial data telegram via an RS485 interface.

The data telegram operate may, for example, data logger or process control systems.



Order No.

6.1432.10.xxx
.040
.041
.073

6.1432.20.400

6.1432.20.500

Technical Data

Electr. output 0 ... 20 mA
4 ... 20 mA
0 ... 5 V

Measuring range 0 ... 100 mm
Accuracy $\pm 1.5\%$ of mr.
(0 ... 50 °C)

Resolution 0.1 mm
Operating voltage 10 ... 32 V DC
Current load approx. 40 mA + I_{out}
Ambient temp. -15 ... +50 °C
Connection Cable 5 m,
LiYCY 4 x 0.25 mm²

Dimensions \varnothing 100 x 430 mm
Weight 3.5 kg

Measuring range 0 ... 100 mm
Accuracy $\pm 1.5\%$ v. Mr.
(-10 ... +50 °C)

Resolution 0.1 mm
Electr. output interface
serial synchronous
Data protocol 12 Data bits and
12 Control bits
Operating voltage 10 ... 32 V DC
Current load approx. 40 mA active
approx. 2 mA
stand by

Ambient temp. -15 ... +50 °C
Connection Cable 5 m,
LiYCY 4 x 0.25 mm²
Dimensions \varnothing 100 x 430 mm
Weight 3.5 kg

Measuring range 0 ... 100 mm
Accuracy $\pm 1.5\%$ v. Mb.
(0 ... +50 °C)
Resolution 0.1 mm

Electr. output Interface RS485 (half-duplex)
Baudrate 1200-57600 Baud
Data format 8 Bit; no parity;
1 Stopbit

Operating voltage 10 ... 32 V DC
Current load approx. 40mA active
approx. 2 mA
standby

Ambient temp. -15 ... +50 °C
Connection Cable 5 m, LiYCY
4 x 0,25 mm²

Dimensions \varnothing 100 x 430 mm
Weight 3.5 kg

Precipitation

Model Brief Description

Software

PC-Program LNM View

- communication
- visualization
- filing

The program LNM serves for the display of data, which are induced by the LNM. The program can file the data sent by the LNM as well as represent them in graphic form. Thanks to a user-friendly surface design it is possible to analyse each record, sent by the LNM, in a very simple way.

Order No.

9.1700.99.000

Technical Data

System Requirements

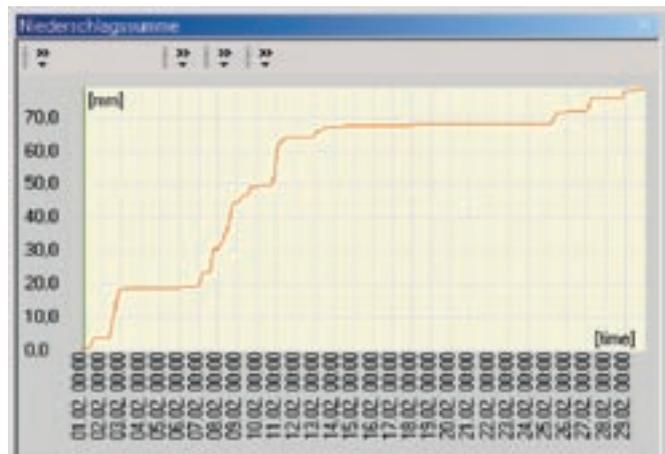
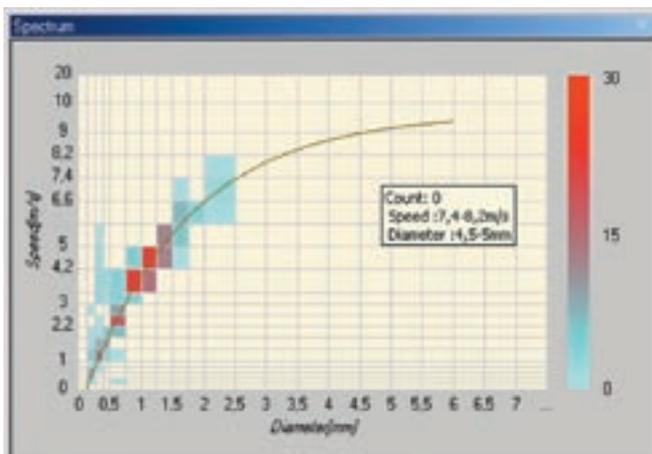
The program is made for Microsoft Windows® XP / 2000.

Minimum PC requirement
PC

1 GHz,
512 MBRAM

Graphic resolution
Graphic colours

800 x 600
16bit TrueColor



Precipitation Evaporation

Model Brief Description

Order No.

Technical Data

Software

Mevis T light, Version 2.2

9.1796.40.001

MEVIS T light is a software for information, data acquisition and data processing for meteorological and environmental data, acquired by the THIES dataloggers TDL 14, DLxMET or DL16. The data acquired by max. 5 dataloggers are read-out with MEVIS-light and documented. The reading-out of the data to the PC is effected in 4 different ways: via MODEM to a COM-interface, via MEMORY-CARD, SD-CARD and read-out unit to a LPT-interface or via network with DL16. The documented data can be used in 3 different ways: various graphical presentations, presentations in tabular form, exporting of data for the processing with application programs of the customer.

Graphical presentation:

Graphic 12-in-1

- for max. 12 meas. channels in 4 x/t-diagrams

Graphic 4-in-4

- for max. 4 meas. channels in 4 x/t-diagrams

Graphic 4-in-1

- for max. 4 meas. channels in 1 x/t-diagrams

Day's values 4-in-4

- for max. 4 meas. channels in 4 diagrams as day's stage mean value

Day's values 4-in-1

- for max. 4 meas. channels in 1 diagram as day's stage mean value

Presentation in tabular form:

4 Channel-List

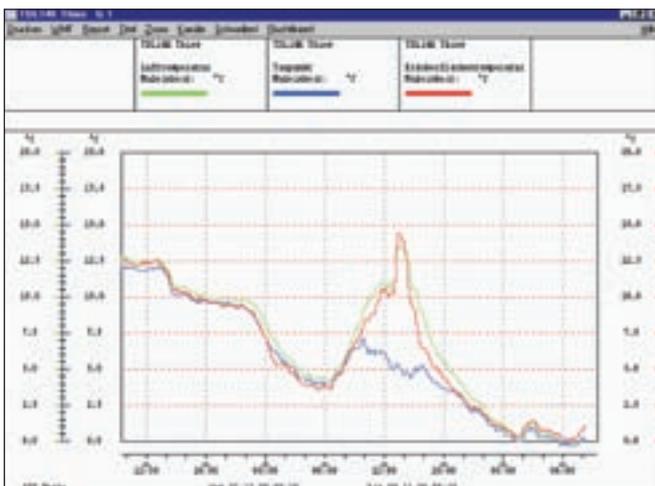
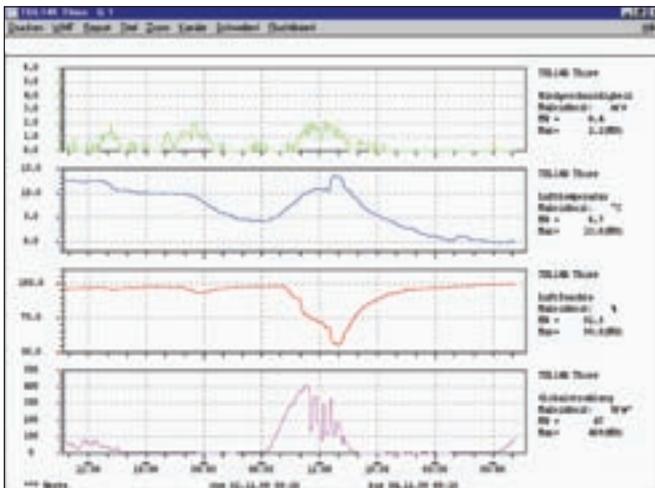
- 4 channels (also from different stations) are listed

Station list

- all channels of one station are listed

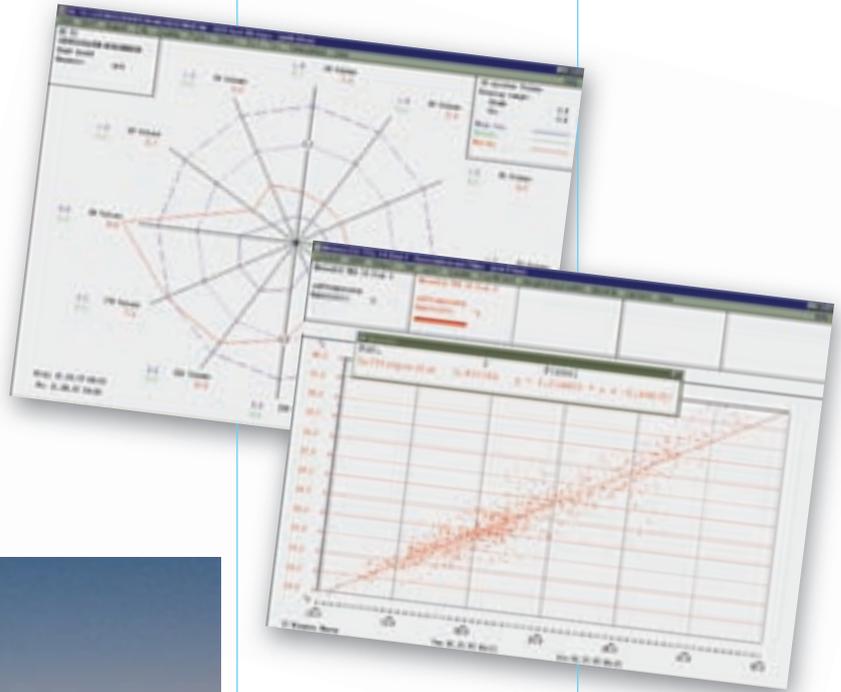
MEVIS T-light minimum system requirements:

- PC
- Windows 2000 / XP / Vista / Win 7
- Hard disc 100 MB free capacity



Time	Temperature (°C)	Humidity (%)	Wind Speed (km/h)	Precipitation (mm)
27.12.99 24:00	11.3	0.0	0.02	0.054
28.12.99 24:00	9.0	0.1	0.94	0.490
29.12.99 24:00	10.9	0.0	1.12	0.594
30.12.99 24:00	12.0	0.0	1.33	0.23
31.12.99 24:00	11.4	3.9	1.22	0.940
01.12.99 24:00	10.7	0.0	1.00	0.11
02.12.99 24:00	12.2	10.7	0.20	0.401
03.12.99 24:00	6.0	0.0	1.07	0.394
04.12.99 24:00	2.4	0.0	0.94	0.245
05.12.99 24:00	4.5	0.0	0.42	0.944
06.12.99 24:00	3.9	0.1	1.12	0.309
07.12.99 24:00	6.9	3.5	0.64	0.440
08.12.99 24:00	4.0	4.9	0.24	0.405
09.12.99 24:00	5.9	0.0	0.39	0.439
10.12.99 24:00	4.1	2.1	0.27	0.443
11.12.99 24:00	4.2	2.9	0.47	0.431
12.12.99 24:00	3.4	0.0	0.42	0.140
13.12.99 24:00	1.2	0.0	0.20	0.251
14.12.99 24:00	3.4	1.7	0.24	0.429
15.12.99 24:00	-1.0	0.0	0.62	0.1023
16.12.99 24:00	-2.0	0.0	0.40	0.2923
17.12.99 24:00	0.4	0.2	0.27	0.325
18.12.99 24:00	0.2	2.1	0.22	0.312
19.12.99 24:00	-0.2	1.4	0.39	0.243
20.12.99 24:00	-1.0	0.1	0.17	0.207
21.12.99 24:00	-1.9	0.0	0.20	0.244
22.12.99 24:00	-1.2	-3.5	0.15	0.115
23.12.99 24:00	1.1	2.4	0.14	

THIES –
as versatile as require
the international tasks



THIES-CLIMA – Worldwide

Weather and environmental monitoring technology needs a competent partner

Climatic measurement and intelligent analysis are international tasks. They do not only demand a worldwide cooperation of the responsible authorities, but also a comprehensive network of sensors

and analytical systems. We have developed a smoothly functioning system of partners and subsidiaries throughout the world to provide expert advice there where you need it.

THIES assumes complete supervision of the tasks at hand, from project planning to the installation of the system, from staff training to the processing of the measurement results. Should you want to contact one of our foreign partners, please write or call us first in Göttingen. We will provide you with the exact address.



Information is everything. Please ask for our complete catalogue and product descriptions concerning all questions of weather data acquisition – or attend our internet page: www.thiesclima.com



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