



Earth monitoring



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environmental
research

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P4 EARTH MONITORING

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P4.01

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METEOROLOGICAL INSTRUMENTS

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P4.01

Rain

Rain gauges are used to determine the precipitation at a certain point which is representative for a certain area. It is essential that the day-figures have an accuracy of 0.2 mm.

Important characteristics of rain gauges are:

- An adequate measuring area.
- A collecting bucket with a sharp edge, a smooth inside and such a shape that splashing out of precipitation is avoided.

Our rain gauges should meet these norms.

16.76 Rain gauge with large (external) collecting jar

Rain gauge consisting of a collecting funnel with collecting jar and measuring vessel. The rain gauge is connected to an external collecting jar (contents 20 liter) by a siphon tube. The rain gauge is specially designed for intensive precipitation (tropics). The collecting area measures 200 cm².



Rain gauge with large collecting jar



Standard rain gauge

16.77 Standard rain gauge

Rain gauge (in accordance with DIN 58666C) consisting of a collecting funnel with a 1 liter collecting jar and measuring vessel of 0-10 mm with a 0.1 mm division. Collecting area 200 cm².

16.78 Mechanical precipitation recorder

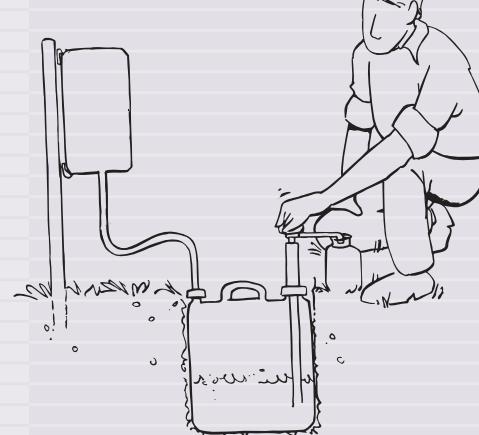
Mechanical self-recording rain gauge with sheet metal funnel with limit ring and siphon with automatic drain after 10 mm height of precipitation. The precipitation recorder has a collecting area of 200 cm².

Registration over a 7 day period. Scale division 0.1 mm. Complete with recording sheets and accessories. The mechanical self-recording rain gauge is suitable for measuring the precipitation intensity (determination of precipitation peaks).



Mechanical precipitation recorder

Using the hand-pump
the precipitation is pumped
from the collecting jar.



Measuring the precipitation
with the standard rain gauge.



BENEFITS

16.76 Rain gauge with large collecting jar

- Not sure if you can empty your gage in time?
- This meter does not mind being left alone
- No drop of rain is lost (total precipitation)
- Meant for remote areas with high rainfall

BENEFITS

16.77 Standard rain gauge

- Simple but durable and accurate rain gauge
- Pour rain in beaker; anyone can use this one



P4.01

METEOROLOGICAL INSTRUMENTS

Data gathered with the rain gauge with datalogger can be processed further with a personal computer.



11.41.21.SA e+ RAIN set with synthetic rain gauge

11.41.22.SA e+ RAIN with metal rain gauge

The standard e+ RAIN sets consist of a rain gauge and an integrated datalogger, a reading unit and software is supplied with the sets.

Characteristics

- The e+ RAIN logger measures the intensity of the rain over certain periods as well as totalled amounts (integrator function).
- The user can set the duration of the measurement periods himself, which makes it possible to measure both peak intensity as well as precipitation averages over longer periods.
- The integrator function makes it easy to rapidly determine how much rain has fallen during a certain period.
- The e+ logger has the capacity of responding with alarms when pre-set limits are exceeded and these can be sent on to the user via the e-SENSE system.

The e+ RAIN logger can be configured and read in a number of different ways:

- With an e-SENSE modem via e-SENSE direct or via the e-SENSE Internet data site.
- With a readout unit (IR) the readout unit can be used when the e+ sensor can be placed in the immediate vicinity of a computer (laptop).
- With the use of a data cable (IR) available in various lengths till 200 m.
- With an IrDa readout unit. The IrDa readout unit is designed to read the measurements of the e+ sensor with the aid of a laptop computer. This can be done at a distance of 1 to 2 metres from the e+ sensor. It requires the IrDa readout unit to be facing the infrared LEDs contained in the end of the e+ sensor.

Optional:

For installation in the field an optional field support is available (art. nr.: 11.41.92.01). The metal rain gauge can be optionally fitted with a heater which requires an external power source.



e+ RAIN set (rain gauge with datalogger, with optional field support)

METEOROLOGICAL INSTRUMENTS



Wind

There are several methods for the measuring of wind: instantaneous wind measuring (actual), the wind path meter (day averages) and the continuous registration (wind speed and wind direction).

16.53 Hand anemometer

Measuring of local wind speed. Scale in km/h (0-120), Beaufort (0-12), m/s (0-35) and MPH (0-80).

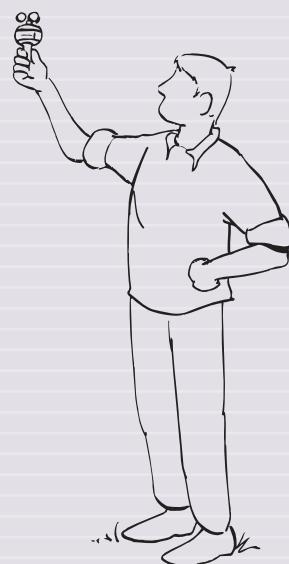
16.55 Wind measuring / anemometer set

The wind measuring instrument is a simple porta-

ble instrument, consisting of a mechanical wind vane, and a telescopic tripod stand. There is a built-in compass to align the instrument to 'North'. The digital anemometer serves for the measurement of wind speed, and is suited for mobile use. It consists of a wind transmitter with firmly connected cable and a display instrument by means of a plug. The wind transmitter is made of corrosion-free material and the display is made of sturdy plastic. The button for function is installed in a way that an easy operation is possible.

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Determining the actual wind speed.



Hand anemometer



Wind vane with tripod



Digital anemometer



METEOROLOGICAL INSTRUMENTS

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The temperature in a compost stack is measured with a long probe.



Temperature and humidity

Temperature and humidity are two important meteorologic parameters. They have a great influence on numerous processes in nature, such as the evaporation rate of water, germination of seeds and the spread of (plant) diseases. Specially the daily temperature cycle is important here.

Measuring the air temperature usually takes place at a standard height. The thermometer must be protected against direct sunlight.

This can be done by using a temperature screen.

16.34 Digital thermometer

The K-thermocouple thermometer has a standard probe with a length of 12 cm packed in a case.

There are also three specially designed compost temperature probes available with a length of 50, 100 and 150 cm.

The thermometer can be used to measure temperature in degrees Celsius and Fahrenheit and has a measuring range of -50 tot +150°C. Accuracy is 0.5°C. The display can be read to 0.1°C. The thermometer has options to display the measurement and to reset the maximum- and minimum temperature and hold facility. Power supply four 1.5 V AAA batteries.

The stainless steel compost temperature probes have a handle and a rod with a diameter of 10 mm. The point of the rod contains a temperature sensor, thermal insulated from the rod by an insulation collar. Influence of heat exchange between rod and material to be measured is minimal. The instrument can also be used to measure temperature in ensilage, hay, peat or other soft materials or liquids.

BENEFITS

16.34 Digital thermometer

- Probe with isolated tip; reacts in seconds
- Three lengths of probes available

The thermometer is waterproof (IP67), has a large display and membrane key-pad.



Digital thermometer with compost temperature probe



Relative humidity and temperature meter

The temperature and relative humidity is measured with the portable meter.



METEOROLOGICAL INSTRUMENTS



16.45 Portable relative humidity and temperature meter

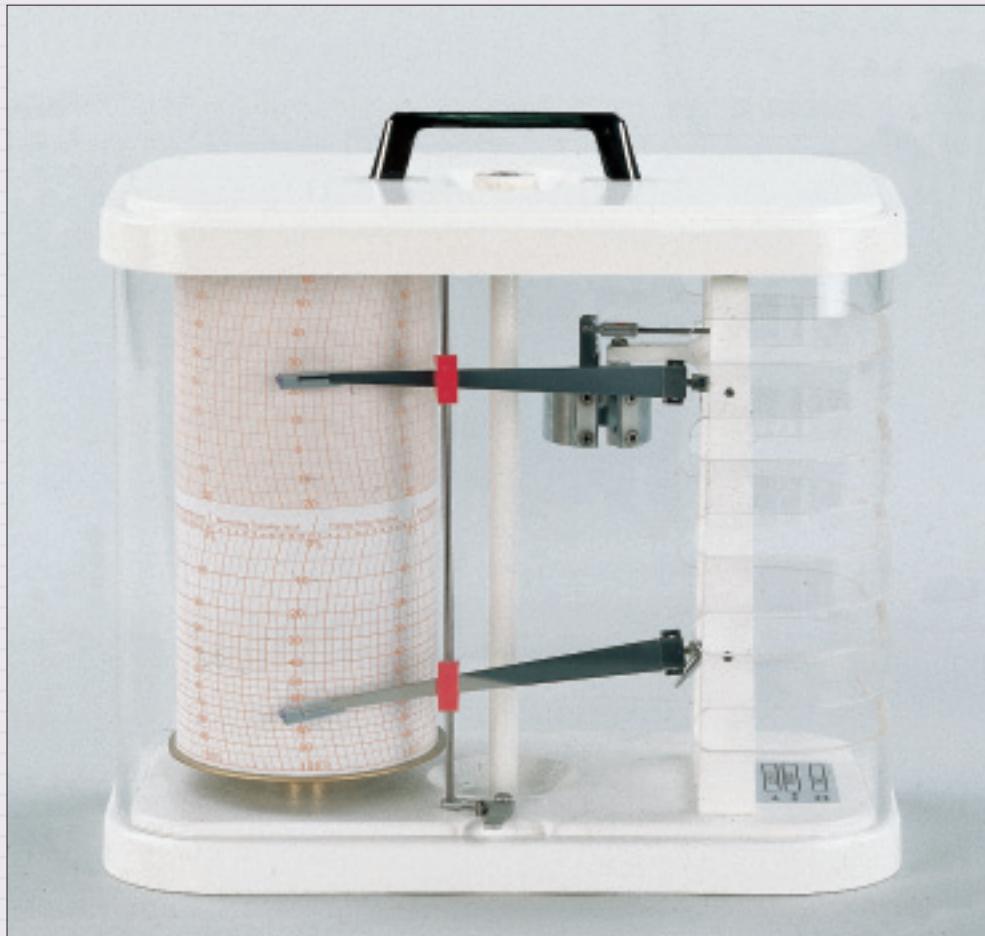
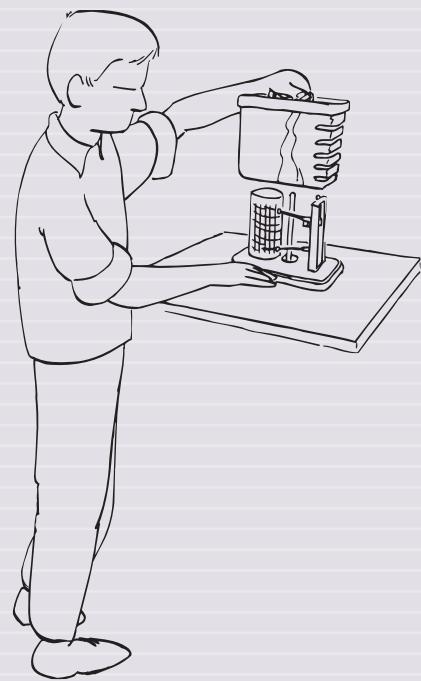
The portable digital relative humidity and temperature meter displays directly relative humidity or temperature. The meter is equipped with a separate probe with 1.5 m cable and has a high contrast LCD display. Measuring range relative humidity 0 to 100%. Resolution 0.1%. Accuracy +/- 2%. Measuring range temperature -20 to +60°C. Resolution 0.1°C. Accuracy +/- 0.2°C.

16.46.Q Thermo-hygrograph

The hygro-thermograph independently measures and records the relative humidity and the temperature of the surroundings. This self-recording thermohygrograph has a bimetal as temperature element and a hair-wire measuring element for humidity. The instrument is supplied with a quartz clockwork (switchable 1, 7 or 31 days). Measuring range 0-100% relative humidity. Accuracy +/- 2.5% of the measuring range. Temperature range -10 to +50°C. Accuracy +/- 1%. Inclusive registration charts with recording period of 7 days and spare pens.

P4.01

After exchanging the recording sheet the hood is placed over the thermo-hygrograph again.



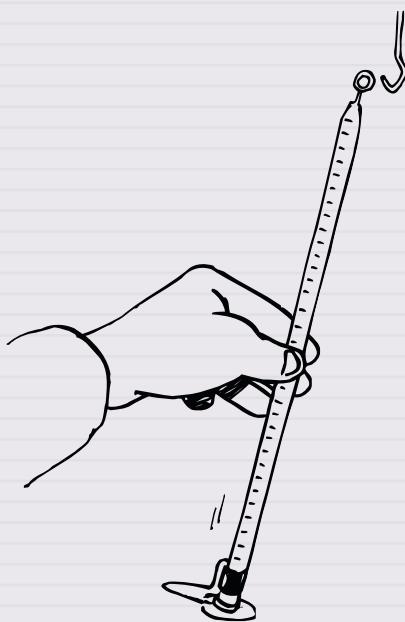
Thermo-hygrograph



METEOROLOGICAL INSTRUMENTS

P4.01

The evaporation meter should hang free to obtain correct measurement.



Evaporation

Measuring the evaporation rate is particularly important for irrigation projects to determine the watering regime.

16.85 Piche evaporation meter

Simple and cheap instrument for measuring the evaporation. A humid filter paper disk is used here under a glass measuring tube closed at one end and filled with water. The paper surface is constantly wetted.

Division 0 - 30 mm.

Inclusive evaporation discs and disc holder.

The instrument only indicates the evaporation rate.

Suitable for educational purposes.

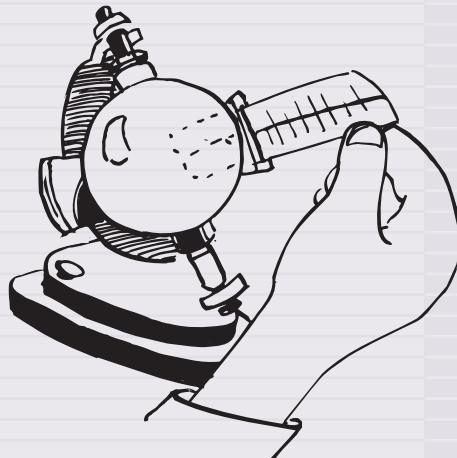
16.93 Sunshine recorder

Sunshine recorder according to Campbell-Stokes for the registration of the number of hours of sunshine per day.

To be used between 40° NL (northern latitude) and 40° SL (southern latitude).

With glass sphere in frame and balance water level on the ground plate. The sunshine recorder is supplied inclusive recording sheets.

The recording sheet is placed in the sunshine recorder.



Sunshine recorder

METEOROLOGICAL INSTRUMENTS



16.89 Evaporation pan

The class-A evaporation pan is used to determine the evaporation rate of open water.

The pan has a 1206 mm diameter and an inside height of 254 mm, an evaporation area of 1.15 m² and is made of high grade stainless steel.

The evaporation pan is supplied complete with highly qualified evaporation micrometer and stilling well (wave dampening cylinder), water level and wooden support for evaporation pan. Measuring range of the evaporation micrometer 100 mm. Accuracy 0.02 mm.

For a more exact use of the evaporation pan it is recommended to use an additional wind path meter.

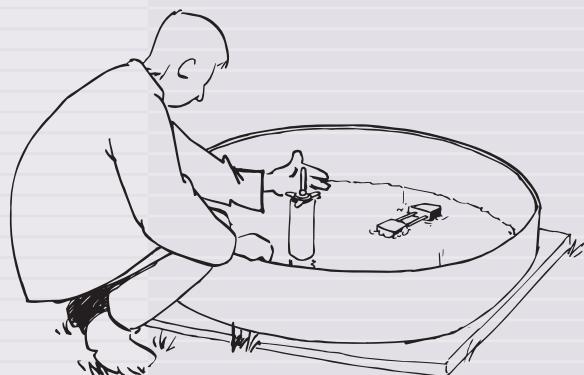
For automatic measurement of the evaporation use can be made of a level sensor. The level sensor consists of a sensitive pressure transducer built in a stainless steel housing.

The sensor has a pressure range of 0-20 mbar, accuracy 0,25%. Output signal 0-20 mA, power supply voltage 8-28 V. The sensor is supplied with 5 m cable.

The sensor is read-out with a datalogger. To configure and read-out the datalogger and to process the measuring data, use is made of the evaporation pan software.

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As the wind influences the evaporation rate, it is important to use a wind path meter in combination with the evaporation pan.



Evaporation pan, complete set



Evaporation micrometer



Automatic level sensor

BENEFITS

16.89 Evaporation pan

- Stainless steel for decades of operation
- Very accurate but simple micrometer read-out
- Basic tool to predict evapotranspiration
- Can be combined with pressure sensor & logger



PARTS LIST

Art.no.	Description	Qty. in set	Art.no.	Description	Qty. in set
Meteorological instruments (P4.01)					
RAIN In our product range we supply three types of rain measuring instruments: - Rain gauges (with collecting vessel). - Rain recorder (mechanical). - e+ RAIN sets (with built-in datalogger).					
16.76	Rain gauge, with large external collecting jar, surface 200 cm ² , capacity max. 600 mm precipitation, complete with bracket and precipitation vessel 0 - 10 mm, graduation in 0.1 mm	1	11.41.22.SA	e+ RAIN set with metal rain gauge. Complete set including e+ RAIN gauge, e+ RAIN logger, reading unit (RS232) and software.	1
16.77	Standard rain gauge, with brass limit ring 200 cm ² , collecting jar contents 1.4 liter (for 70 mm precipitation). Incl. measuring vessel 0 - 10 mm, graduated in 0.1 mm	1	**11.41.22	e+ RAIN (metal) set consisting of e+ RAIN logger (art. no. 11.41.21.01), e+ RAIN sensor (metal) (art. no. 11.41.22.01) and battery set (art. no. 11.41.90.01). It is recommended to use the standard field support (11.41.92.02).	1
16.77.01	Spare precipitation vessel for 16.76 and 16.77 rain gauges: Precipitation vessel, 0 - 10 mm, graduated in 0.1 mm	1	**11.11.10	Reading unit for DIVER (RS232) (optical principle), is used to program and read out the DIVER, incl. cable with RS232 connection	1
16.78	Mechanical precipitation recorder, collecting area 200 cm ² , float/syphon type emptying automatically after 10 mm precipitation, drum rotation 7 days, complete with collecting jar, measuring vessel, registration charts, pen and accessories	1	**11.11.14	CD-ROM with Logger Data Manager (LDM) software (for Win 95, Win 00, Win XP and Win NT4.0) and USB driver software. Operating instructions included on CD-ROM for Diver, LDM and USB driver.	1
16.78.01	Accessories for 16.78 precipitation recorder Registration charts, package of 100 pcs	1	11.41.92.01	Accessories for e+ RAIN sets: Field support (stainless steel) for mounting of the 11.41.21 (e+ RAIN synthetic rain gauge with logger), incl. mounting material and vandalism proof bolts for mounting of the logger	1
16.46.02	Fibre pen, set of 5 pieces, colour violet	1	11.11.10.01	Optional reading unit (USB) Reading unit for DIVER (optical principle), with USB connection, used to program and read out the Diver, with cable with USB connection. Incl. installation software and operating instructions.	1
11.41.21.SA	e+ RAIN set with synthetic rain gauge. Complete set with e+ RAIN gauge, reading unit (RS232) and software.	1	11.31.90	Optional reading unit for IRDA communication e+ infrared communicator to program and read out the e+ sensor from a distance (1 to 2 m)	1
**11.41.21	e+ RAIN set, consisting of an e+ RAIN logger (art. no. 11.41.21.01), an e+ RAIN sensor (art. no. 11.41.21.02) and battery set (art. no. 11.41.90.01). It is recommended to use the standard field support (11.41.92.01)	1	Note: e+ RAIN gauges can also be connected to e-SENSE SMS modems for telemetric communication (see P4.32)		
**11.11.10	Reading unit for DIVER (RS232) (optical principle), is used to program and read out the DIVER, incl. cable with RS232 connection	1	WIND Two types of wind measuring instruments are supplied: - Simple hand anemometer - Wind measuring/anemometer set		
**11.11.14	CD-ROM with Logger Data Manager (LDM) software (for Win 95, Win 00, Win XP and Win NT4.0) and USB driver software. Operating instructions	1	16.53	Cup hand anemometer no. 4001, scale ranges 0-120 km/h, 0-12 Beaufort, 0-35 m/s & 0-80 MPH	1
			16.55	Wind direction/speed meter set. Complete wind measuring unit consisting of wind vane, telescopic	1

PARTS LIST



Art.no.	Description	Qty. in set	Art.no.	Description	Qty. in set
	tripod for wind vane and anemometer connected to digital measuring instrument.				
**16.55.01	Wind direction measuring set. Portable set consisting of mechanical wind vane with telescopic tripod. Measuring range 0-360°, graduation in 10°, with integrated compass. Complete in carrying case.	1		ork (switchable 1, 7 or 31 days), complete with registration charts with recording period of 7 days and pens	
**16.55.02	Digital anemometer set. Portable set consisting of wind transmitter (cup type) connected to a digital measuring instrument. Measuring range 0.5-50 m/sec, accuracy +/- 0.5 m/sec, operating temperature range -30 till +70°C (ice free).	1	16.46.01	Accessories for 16.46.Q thermohygrograph: Registration charts, package of 100 pieces, registration period 7 days	
	TEMPERATURE AND HUMIDITY Three types of instruments are supplied: - digital thermometer - digital rh/temp meter - thermo-hygrograph		16.46.02	Fibre pen, set of 5 pieces, colour violet	
16.34	K-thermocouple thermometer, waterproof IP67, measuring range -50 till +150°C, -58 till 302°F, resolution 0.1°C and 0.2°F, accuracy typ. +/- 0.5°C, min. and max. memory, hold function, complete with probe 120 mm, Ø 3 mm, in case		16.46.03	Hair harp for thermo hygrograph	
	Accessories for 16.34 thermometer:		16.85	EVAPORATION For evaporation studies we offer two instruments for measuring direct evaporation and one set for sunshine duration studies: - evaporimeter - evaporation pan - sunshine duration meter	
16.34.11	Exchangeable compost temperature probe for 16.34 thermometer, length 500 mm, Ø 10 mm, class 1 K-type thermo-couple, max. deviation 1.5°C, incl. 1.5 m standard curling cable		16.85.01	Piche evaporation meter, measuring range 0 - 30 ml, with hanger and one set of evaporation discs, Ø 55 mm	
16.34.12	Exchangeable compost temperature probe for 16.34 thermo-meter, length 1000 mm, Ø 10 mm, class 1 K-type thermo-couple, max. deviation 1.5°C, incl. 1.5 m standard curling cable		16.89	Accessories for 16.85 evaporation meter: Evaporation discs, Ø 30 mm, package of 100 pieces	
16.34.13	Exchangeable compost temperature probe for 16.34 thermometer, length 1500 mm, Ø 10 mm, class 1 K-type thermo-couple, max. deviation 1.5°C, incl. 1.5 m standard curling cable		**16.89.01	Evaporation pan, class A, standard set	
	Portable digital relative humidity and temperature meter, with separate probe with 1.5 m cable. Measuring range rel. humidity 0-100%, accuracy +/-2%. Measuring range temp. -20 to +60°C, accuracy +/-0.2°C. Dimensions probe 140x19 mm. In leather case		**16.89.02	Stainless steel evaporation pan, Ø 1206 mm, height 254 mm (inside)	1
16.45			**16.89.03	Hook gauge micrometer, measuring range 100 mm, accuracy 0.02 mm	1
			**16.89.05	Stilling well	1
				Wooden support for evaporation pan	1
			16.89.08	Accessories for 16.89 evaporation pan: Level sensor to measure the water level in an evaporation pan. Pressure range 0-20 mbar, accuracy 0.25%, output Signal 0-20 mA, power supply voltage 8-28 V, cable length 5 m	
			16.89.16	Software (CD) for datalogger type Datahog 2 (for use with evaporation pan). To configure the datalogger and to read out and process the measuring data with an IBM-compatible PC. Software to be used with computers with Windows 95/98/NT/ME/2000 and XP	
			16.93	Sunshine recorder according to Campbell Stokes, for recording of sunshine in the equatorial zone (0-40 degr.), with set of recording cards	
16.46.Q	Thermo-hygrograph, measuring range -10 to +50°C and 0-100% rel. humidity, drum with quartz clockw-			Accessories for 16.93 sunshine recorder: Recording cards, package of 380 pieces	