EIGENBRODT®

AUTOMATIC PRECIPITATION SAMPLER (COLLECTOR) AND ANALYSER (MONITOR)

TECHNICAL ALTERATIONS

- The technical description corresponds to the current products. Alterations because of technical improvements are possible. Requested functions or features are only binding, if confirmed in a contract in written form.
- Specifications are subject to change without prior notice— Errors and omissions excepted.
- Goods are subject to prior sale

ILLUSTRATIONS

- Please take into account, that illustrations are intended to clarify certain points. There may therefore be discrepancies between the illustrations and the written text.

LIABILITY

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UNIT OVERVIEW – CONTENT

EIGENBRODT® develops and produces Precipitation Sampler and – Analyser for more than 25 years very successful.

The instruments are in use worldwide and all year round under several climatic conditions at the measurement sites of our customers. (Universities, Environmental Departments, Weather Services, Research Institutes, Industrial Companies)

It is possible to fulfil most of the wished applications with the range of offered standard configurations.

Specific applications or adaptations to special environment conditions are possible. Please challenge us.

German EPA measuring site on Sylt Island

- Suitable for all year use
- Sensitive Precipitation Sensors for all environmental conditions
- Very low service and maintenance requirements

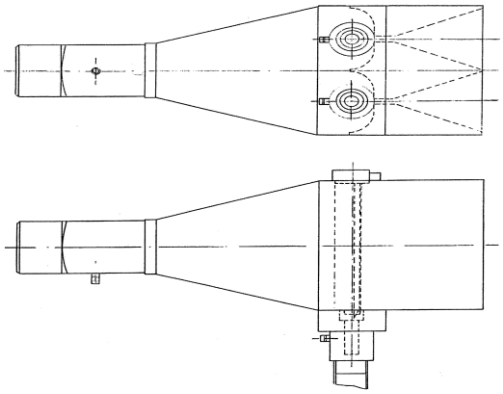
EIGENBRODT® FOG SAMPLERS

FOG WATER COLLECTION ON THE IMPACTOR PRINCIPLE

All types of Eigenbrodt fog sampler feature the same principle of collection:
Fog water is collected with a sampler operating on the impactor principle (see figure). The air is sucked at a rate of rd. 125 m³/h through a twin nozzle behind. A specially designed deposition body is placed onto which the fog droplets are impacted. The deposition body has a vertically oriented hole in its centre which is connected to the impaction surface by numerous small bored holes. The centre hole and the instruments exits are connected by tubes so that a slight under pressure is applied sustaining a slight air flow through the capillary holes.

The deposition body has a small rim at each side preventing the deposited water from being ripped off and carried away with the fast air stream. The fog droplets which are deposited coagulate and this water is sucked into the small holes due to capillary forces and under pressure and drains into the centre from where it flows into two collection bottles.

By this way a rapid separation of the collected water from the strong air stream behind the nozzle is reached and problems as evaporation or continuing reactions are minimized. Behind the nozzle the air is guided by semicircular surfaces to the exit in order to avoid turbulences



(Schematic view of the FOG SAMPLER and the deposition bodies.)

Functionality	NES 210	NES 215	ANES 220
Manual switching on/off the sampling mode	✓	✓	—
Fog sensor allowing automatic switching on/off the sampling mode	—	—	✓
System completely built for outside operation all year long	—	✓	✓
Sample bottle 2x50 ml DURAN glass	✓	—	—
Sample bottle 250 ml DURAN glass	—	✓	✓
Rugged and reliable side channel blower	—	✓	✓
Regular vacuum cleaner, that needs to be sheltered against ambient influences	✓	—	—
Thermoelectric-cooling/heating for sample bottle	—	✓**	✓**
Timed security switch off for vacuum cleaner / pump	—	✓	✓
Automatic stop of sampling outside temperature limits	—	O	✓
Stand for fog sampler	O	O	O
Data logging	—	O	O

—: not available O: optional available ✓: Standard feature of this type
* Sampling can be automatically switched on/off with external digital fog signal (to be provided by customer)
** System can optionally be provided without thermoelectric-cooling/heating system

FOG SAMPLER NES 210 – MANUAL FOG SAMPLER WITH REGULAR VACCUM CLEANER

NES 210 with vacuum cleaner (subject to change) and optional stand.

FEATURES:

- New design – combines a high efficiency with a low dispersion - Design: German Weather Service; Meteorological Observatory Hohenpeißenberg, Dr. Peter Winkler
- Regular vacuum cleaner
- Manual switching on/off

SPECIFICATIONS

Sample unit	
Length x width x height:	360 x130 x 260 mm
Weight:	Approx. 2,1 kg
Sampling orifice:	120 x 120 mm
Operating temperature:	+0…40°C
Collection volume:	2x50 (borosilicate glass bottles)
Collection height:	Approx. 1700 mm (including optional stand)
Vacuum cleaner	
Dimensions vacuum cleaner length x width x height	35x35x40 mm (subject to change)
Connected power	220/230V,50/60Hz, 1000 W (1250 W max)
Legth hose:	Approx. 1,5

CONTENS OF DELIVERED PROGRAM

Sample unit
Vacuum cleaner
2 x 50ml bottle borosilicate glass
Documentation

OPTIONS

Extra bottle DURAN glass, 50ml
Stand

Vacuum cleaner is not built for outside use. Customer End-user needs to take appropriate actions to protect the machines electrical parts against ambient influences. (User has to provide weather protection for the vacuum cleaner)

FOG SAMPLER NES 215 – MANUAL FOG SAMPLER WITH SIDE CHANNEL BLOWER

Robust construction due to die cast aluminium
Ruggedness and proven reliability

Cooled/heated

Not Cooled/heated

FEATURES

- New side channel blower (working in pumping mode) with extended life time compared with vacuum cleaner.
- Basic frame out of Alu-profiles, PVC-plates planked housing
- Integrated collecting system
- Automatic thermoelectric (Peltier) cooling/heating for the sample.
- Manual switching on/off the blower, or triggered by external digital signal.
- Electronics (switch) for switching on/ off is installed into lockable electronic housing
- Can be mounted onto regular Eigenbrodt precipitation collector stand.

SPECIFICATIONS

Sample unit	(integrated into housing)
Length x width x height:	360 x130 x 260 mm
Weight:	Approx. 1,9 kg
Sampling orifice:	120 x 120 mm
Operating temperature:	+0…40°C
Collection volume:	250ml (borosilicate glass bottle)
Collection height:	Approx. 1800 mm (including optional stand)
Complete unit	
Length x width x height:	440 x 750 x1090 mm (including shelter and optional fog sensor)
Weight:	Approx. 65 kg
Connected power	220/230V,50/60Hz, 1300 W

CONTENS OF DELIVERED PROGRAM

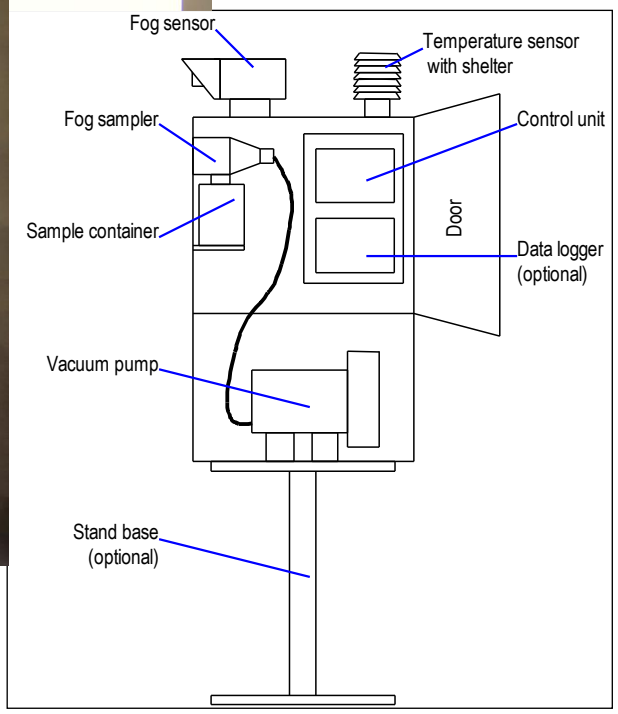
Sample unit, integrated
Side channel blower
Thermo-electric cooling/heating system for sample
Rugged housing for outside operation
Documentation

OPTIONS

Downgrade for no heating/cooling function for the sample bottle
Extra bottle DURAN glass, 250ml
Data logging with signal PCB memory
Stand base
Fog sensor
Temperature/humidity probe with 2x1V output
Automatic switching off below 2°C and above 17 °C
Stand base

AUTOMATIC FOG SAMPLER ANES 220

IMPROVED



FEATURES

- Fog sampler operating on the impactor principle with new design – combines a high efficiency with a low dispersion
- Sample design: German Weather Service Meteorological Observatory, Hohenpeißenberg; Dr. Peter Winkler
- Housing construction for all year operation
- Single sample bottle 250ml (borosilicate-glass)
- Thermoelectric integrated heating and cooling of the sample
- Electronics for switching on/ off the blower is installed into lockable electronic housing.
- Automatic optical fog detection in order to automatically switch on and switch off the fog sampling.
- Rugged and reliable side channel blower (working in pumping mode) with extended life time compared to vacuum cleaner application.
- Thermoelectric cooling and heating
- Temperature/Humidity probe analogue signal output. Built into radiation shield and mounted at the side of the sampler.
- Temperature switch off deactivates automatically the blower with temperatures below 2°C and above 17 °C. This avoids freezing of the fog near 0°C and overheating of the blower at high temperatures.
- Optional: Data logging with signal PCB NES memory, logging temperature, humidity, visibility and time switching on/off the blower. The data logger can easily be programmed and read out via a regular terminal program, e.g. Putty (or similar).

TECHNICAL DESCRIPTION

CONTROL OF AUTOMATIC OPERATION

The laser based visibility sensor ONED 250 detects the visibility of the fog. In case the visibility is below a set point for a certain time, the control electronics starts the operation of vacuum pump, which continuously sucks fog through the fog sampling device. In case the visibility is above the set point for a certain time the pump is stopped.
The sampling process is also stopped when ever the ambient temperature is below 2°C in order to prevent the twin nozzles blocking by icing. In most climate conditions there can be no fog expected with temperatures higher than 17°C, therefore also the sampling is being stopped automatically. (limits can be changed on customer request)
An automatic system also prevents from damages by switching off the side channel blower for a certain time after a defined time of continuous operation.

CLIMATE CONTROL FOR THE SAMPLE

A controlled thermoelectric heating and cooling system for the samples enables all year operation of the fog sampler. – The sample keeps longer the composition of chemicals.

DATA LOGGING (OPTIONAL)

The basic information as switching on/off the pump; ambient temperature and humidity can be logged by an (optional) data logger, which is built into the main housing.

SPECIFICATIONS

Sample unit	(integrated into housing)
Length x width x height:	360 x130 x 260 mm
Weight:	Approx. 1,9 kg
Sampling orifice:	120 x 120 mm
Operating temperature:	+0…40°C
Collection volume:	250ml (borosilicate glass bottle)
Collection height:	Approx. 1800 mm (including optional stand)
Complete unit	
Length x width x height:	440 x 750 x1090 mm (including shelter and fog sensor)
Weight:	Approx. 70 kg
Connected power	2204230V,50/60Hz, 1300 W

CONTENS OF DELIVERED PROGRAM

Sample unit, integrated
Side channel blower
Thermo-electric cooling/heating system for sample
Rugged housing for outside operation
Fog sensor
Temperature/humidity probe
Documentation

OPTIONS

Downgrade for no heating/cooling function for the sample bottle
Extra glass-bottle, 250ml
Data logging with signal PCB memory
Stand base

NILU PARTICLE FALLOUT COLLECTOR AND PRECIPITATION COLLECTOR

The NILU Particulate Fallout Collector and the NILU Precipitation Collector have been developed to collect representative samples of dry and wet atmospheric particulate fallout for subsequent analysis.
The design and development of the NILU collectors are based on an evaluation of similar equipment in use in various countries, including available wet precipitation collectors for meteorological purposes. In addition to the given performance criteria, factors such as construction materials, ease of handling and transportability determined the shape and dimensions of the collectors. The Fallout Collector has been considered by ISO (International Standardization Organization) for adoption as an international reference collector for particulate fallout. Its design is according to the recommendations of ISO as the present use of materials and procedures permit. (ISO/DIS 4222.2).

The mounting stand can be used for both collector types. Its design allows both collectors to have the same position relative to the bird ring. The stand is adjustable in height so that the collectors can always be adjusted to the prescribed height above ground (for instance when the snow depth varies), and to facilitate the changing of collectors. The Precipitation Collector is not designed to be used in freezing conditions. During freezing conditions, when the evaporation losses are low, the Fallout Collector can be used as precipitation collector as well. In addition the sampling capacity is greater.

A product by:

NILU INNOVATION

THE NILU PARTICULATE FALLOUT COLLECTOR SF1

- **Collector with lid**
- **Stand out of stainless steel**
- **Ground spike**

Specifications SF 1

- Material collector HD-polyethylene
- Mounting stand stainless steel
- Diameter of collection surface: 200 mm (ISO standard)
- Collector height: 400 mm (ISO standard)
- Height above ground, adjustable: 1,7…2,6 m (incl. ISO standard)

OPTION SF 1

- Expansion bolts instead of ground spike for rocky surfaces
- Each part can be ordered separately

CONTENS OF DELIVERED PROGRAM

- 1 pc p.no. 9721, Fallout Collector
- 1 pc p.no. 9723, Lid
- 1 pc p.no. 9724, Steel ring
- 1 pc p.no. 9729, Telescope
- 1 pc p.no. 9730, Basket
- 1 pc p.no, 9728, Ground Spike

THE NILU PARTICULATE FALLOUT COLLECTOR RS1

- **Precipitation funnel**
- **PE-bottle (2,5 litre)**
- **Stand out of stainless steel**
- **Ground spike**

SPECIFICATIONS RS 1

- Material collector: HD-polyethylene
- Mounting stand: stainless steel
- Diameter of collection surface: 200 mm (ISO standard)
- Height above ground, adjustable: 1,7…2,6 m (incl. ISO standard)

OPTION RS 1

- Expansion bolts instead of ground spike for rocky surfaces
- Each part can be ordered separately

CONTENS OF DELIVERED PROGRAM

- 1 pc p.no.9722, Precipitation Collector
- 1 pc p.no. 9723, Lid
- 1 pc p.no. 9724, Steel ring
- 2 pc p.no. 9725, 2.5 litre bottle
- 2 pc p.no. 9726, Screw cap
- 1 pc p.no. 9732, Bugsieve
- 1 pc p.no. 9727, Funnel - Bottle Adapter
- 1 pc p.no. 9731, O-ring
- 1 pc p.no. 9729, Telescope
- 1 pc p.no. 9730, Basket
- 1 pc p.no. 9728, Ground Spike

BULK SAMPLER BUS 125/KE

a total precipitation collector for obtaining samples for the analysis of organic content - suitable for permanent / routine operation

- **Sample cooled to approximately 5° C for storage**
- **Funnel- and sample bottle heating enables all year round operation**
- **DURAN-glass funnel with 500 cm² collection area**
- **PELTIER cooling / heating for low power consumption**
- **Optional HD-PE configuration**

TECHNICAL DESCRIPTION

A new kind of precipitation collector designed as a routine able bulk-collector to obtain samples for analysis of organic traces. Funnel- and sample bottle heating enables year round operation. Cooling to a temperature of 5 °C prevents the loss of volatile sample components. The DURAN-boro-silicate glass funnel helps prevent droplets adhering to the funnel and is pH neutral.
Direct material, funnel shape and the collection surface correspond to the standards of the VDI-recommendations 3870 (VDI: Association of German Engineers) and LAWA-regulations.

Further information: “Ein neuartiger Niederschlagssammler zur Gewinnung von Proben für die Analytik organischer Spurenstoffe”; Gefahrstoffe – Reinhaltung der Luft 60 (2000) Nr. 1 / 2, S. 69 / 70 Autor: Dipl. Chem. Oliver Merten, Landesumweltamt Brandenburg

CONSTRUCTIONAL DETAILS

The precipitation collector is of modular construction and consists of the following components:

- Tube housing with strengthening ring and anchor points
- DURAN-glass funnel is removable for maintenance
- Heating insert with electronically controlled heating for melting the snow in the funnel while limiting evaporation

Removable sample insert with aluminium sample bottle, maintenance free PELTIER cooling / heating and integrated control electronics

SPECIFICATIONS

Collection surface	500 cm²
Power Supply, total	230 VAC,50 Hz. max.100VA
Heating/cooling, electronical controlled	
Funnel heating	12 V DC, 50 Watt
Sample heating	12 V DC, 40 Watt
Sample cooling	12 V DC, 40 Watt
Operating position	1500 mm; foundation is necessary
Dimensions	H 1500 mm
	∅ 315 m
Weight	35 kg

Specifications are subject to change without prior notice, E & OE

CONTENS OF DELIVERED PROGRAM

Thick walled PVC housing with lockable door
Collection funnel out of DURAN-Glass
Anchoring robes with earth rod and tension
Funnel heating
Collecting insert with PELTIER- cooling/heating
Documentation

OPTION

Bird protection ring
Mini data logger for temperature, including data handling

AUTOMATIC PRECIPITATION SAMPLER UNS 130/E AND UNS 130/D

one sample bottle, for universal use

- **Funnel, 500 cm² collection surface**
- **Compact housing**
- **Collection electronic drive**
- **Single sample bottle (5 litre)**
- **Chemically neutral material of single components**
- **Electronic heating, thermostatic controlled**
- **Precipitation sensor RS 85 - sensitivity 0,05mm**

TECHNICAL DESCRIPTION

The collector is developed for universal use and can be modified for the users' specific problems. The compact module system and the automatic collection system make it possible for use in extremely difficult locations, such as ships, research platforms, mountain stations, towers etc.. The funnel is inserted from the top into the thick walled PVC housing. The sample bottle can be easily removed from the apparatus at the end of the period of measurement for laboratory analysis. Every single component which is used for measurement is made out of chemically neutral material. Direct material, funnel shape and the collection surface correspond to the standards of the VDI-recommendations 3870 (VDI: Association of German Engineers). A thermostatically controlled heater is intended for winter operation

Type E: The collection funnel is connected with a hose to the 5000 ml sample bottle via a outlet.

Type D: The collection funnel is connected with a hose to the sample insert module for collection of two samples, via a outlet. There are 2 pcs. HD-PE collection bottles provided each 1500 ml for collecting the samples.

PRINCIPLE OF MEASUREMENT

An impulse from the Precipitation Sensor RS 85 at the start of precipitation causes the cover device to open up the collection funnel in the following way: The lid moves up, swings to the side and sinks down to prevent introducing aerodynamic interference to the sampling process. The precipitation coming from the funnel flows over a pipe into the bottle. When precipitation has ceased, a signal from the Precipitation Sensor RS 85, which operates with an adjustable heating element, causes a motor to close the collection funnel. For winter operation proportionally controlled funnel and main chamber heating for the sample bottle are provided

SPECIFICATIONS

Collection surface	500 cm²
Precipitation Sensor RS 85	
- status	Precipitation yes/no
- switch on	without delay
- switch off	with delay
Power , total	230 VAC, 50 Hz. max.250 VA
Direct current supply collector internal	
Heating,	
thermostatically controlled	24 V DC, 2 x 30 Watt
Funnel lid motor	24 V DC, 50 Watt
Operating Position	
Total height with stand	1500 mm; foundation is necessary
base	
Dimensions	H 800 mm
	L 470 mm
	W 350 mm
Weight	
Sampler	46 kg
Stand base	17 Kg

CONTENS OF DELIVERED PROGRAM

Thick walled PVC housing with basic frame and
door with lock
Collection funnel out of HD-PE
Sample bottle out of PE (5 litres)
Lockable Alu housing with drive unit and control electronics
Sample heating
Precipitation Sensor RS 85

OPTION

Sample bottle 10 litre HD-PE
Sample bottle out of Duran-glass or teflon
Collection funnel out of Duran-glass or Quarzglass
2-fold sample bottle insert module
Opto-electronical Precipitation Sensor IRSS88
Stand base, made of galvanized steel
LCD working hour meter
Mini data logger

UNS 130/D 2-fold sample bottle insert with DURAN glass (optional)

NSA 161/R T-N PRECIPITATION SAMPLER

Precipitation sampler for control of radioactivity in total deposition

- **Sampling of total deposition**
- **Corresponding to the recommendations of the German guideline for control of emissions and immissions for nuclear plants**

TECHNICAL DESCRIPTION

The precipitation collector is designed to collect the precipitation for later on radioactive analysis, which is requested by German law to nuclear plants. The analysed element is the active concentration of γ-rays per litre collected precipitation.
To determine the active radiation consecration correctly, one collector shall be placed within the main wind direction of the nuclear site and the other one on the opposite direction.

The housing with a cylindrical shape is made out of polyethylene, double walled and isolated with mineral wool. An open collection funnel out of PE with integrated rim is used to collect the total deposition and can be removed from the instrument for cleaning. At the front of the instrument there is a lockable door to enable the changing of the sample container
During the winter season the inner chamber will be kept at a temperature of some degrees over zero by two thermostatically controlled convective heating and axial ventilators, to melt down the snow and to avoid the freezing of the water in the sample container.

PRINCIPLE OF MEASUREMENT

The precipitation, collected in the funnel area flows via a outlet and a drain off house into distributing system out of PE. 4 pieces bottle (20 litres each) are filled one after the other. In case all bottles are completely filled an integrated overflow leads the additional water to the outlet. A meter scale indicated the collected precipitation within each of the bottles.

SPECIFICATIONS

Collection surface	5000 cm²
Power supply, total	230 VAC / 50 Hz , max. 400 VA
Heating thermostatically controlled	
Inner chamber heating	2 x 200 Watt , 230 VAC
Operation position	1500 mm; foundation is necessary
Housing dimensions	H 1250 mm
	∅ 900 m
Weight	
Sampler	68 kg
Stand base	14 kg

CONTENS OF DELIVERED PROGRAM

- double walled, isolated PE housing with lockable door
- Collection funnel out of PE
- Heating thermostatically controlled
- Sample container out of HD-PE , 4 x 20 litre
- Bird protection ring (removable)

AUTOMATIC PRECIPITATION SAMPLER NSA 181 – BASIC TYPE

NSA 181/S

- **Compact instrument build up in modular structure, insulated PVC housing**
- **Precipitation Sensor RS 85**
- **Collection funnel, 500 cm² collection surface**
- **Sample bottle (5 litre), 2-fold weekly sample bottle (2x5 litre) or single sample bottle insert (8x1 litre)**
- **Electronic control with SIEMENS® technology**
- **Electrical heating system, thermostatically controlled**
- **Chemically neutral material of sample contact components**

NSA 181/E (picture shows optional items)

TECHNICAL DESCRIPTION

The precipitation sampler is used for the purpose of collecting the precipitation, depending of its configuration, in a large sample bottle (E configuration), 2 bottles for weekly samples (D configuration) or in 8 separate day or single daily samples (S configuration). The individual sample bottle can be easily removed from the apparatus at the end of the period of measurement for laboratory analysis. Every single component which is used for measurement is made out of chemically neutral material and placed in a thermally insulated housing. At high temperatures the housing is ventilated automatically to avoid overheating from intense radiation of the sun. For winter operation an electronically controlled funnel heating and a heating for the sample room are provided.
Direct material, funnel shape and the collection surface correspond to the standards of the VDI-recommendations 3870. (VDI: Association of German Engineers)

PRINCIPLE OF MEASUREMENT

At the start of precipitation an impulse from the Precipitation Sensor RS 85 (optional NRS80 or IRSS 88) causes the cover mechanics to open up the collection funnel in the following way: The lid moves up, swings to the side and sinks down to prevent introducing aerodynamic interference to the sampling process. The rim of the funnel remains to be the highest part of the collector. The design of the collector avoids back-splashing of water into the funnel itself. The precipitation coming from the funnel flows over a pipe directly into the sample bottle (E configuration) or into a ring funnel an then through a hole into the rotating head. The rotating head is connected to the individual hard polyethylene sample bottle by drain pipes and silicone hoses (D or S configuration). When precipitation has ceased a signal from the Precipitation Sensor causes a motor to close the collection funnel.

Distribution of precipitation samples - configuration „D“ and „S“:

The precipitation coming from the funnel flows into a ring funnel an then through a hole into the rotating head. The rotating head is connected to the individual hard polyethylene sample bottle by drain pipes and silicone hoses. A SIEMENS® LOGO® control, which is programmable, causes a motor to advance the ring funnel and gathered precipitation fall into the following bottle by the way of the next opening of the rotating head. In case of breakdown in the external power supply all switching points will be caught up automatically. An accumulator will provide current for time control and for control of the rotating head at least for 24 hours to ensure the bottle changing.

CONTENS OF DELIVERED PROGRAM IN GENERAL

Double walled insulated PVC housing

Collection funnel of HD-polyethylene

Control electronics with lid

Heating for funnel and sample bottles

Precipitation Sensor RS 85

OPTIONS

Sample bottle out of DURAN-glass or Teflon

Collection funnel out of Duran-glass or Quartz-glass

Opto-electronical Precipitation Sensor IRSS 88

Precipitation Sensor NRS 80 or RS 85 OP for locations without or few snowfall

High (snow) top heated or not heated (option “H”)

Dry sample container out of PE or DURAN-glass

LCD-hour meter

Data logging systems

Stand base, made of galvanized steel

Various signals for external data acquisition

Solar power supply (special conditions may apply)

Tipping bucket system

CONTENS OF DELIVERED PROGRAM SPECIFIC TO CONFIGURATION

Configuration „E“ – with one sample bottle

Sample bottle out of HD-polyethylene (5000 ml or 10000 ml)

Sample room heating

Configuration „D“ – for 2 weekly samples

2-fold collecting insert module (bottle tray) with sample bottles out of HD-PE (5000 ml)

Sample bottle heating in ground sheet instead of collection room heating

Control electronics for rotating head

Configuration „S“ – for 8 days single sample

8-fold collecting insert module (bottle tray) with sample bottles out of HD-PE (1000 ml)

Second set sample bottles out of HD-polyethylen

Sample bottle heating in ground sheet instead of collection room heating

Impulse unit for rotating head

Optional: event depending collection of precipitation

→ OPTION: AUTOMATIC PRECIPITATION SAMPLER NSA 181/K


NSA 181/KD


NSA 181/KE - DURAN glass


NSA 181/KS - DURAN glass

- **Compact instrument build up in modular structure, insulated PVC housing for easy service**
- **Precipitation Sensor RS 85**
- **Electronic control with SIEMENS® technology**
- **Collection funnel, 500 cm² collection surface**
- **Sample bottle (5 litre), 2-fold weekly sample bottle or single sample bottle insert**
- **Automatic climate control system for sample room to 4-6°C. (adjustable temperature 3…10°C optional)**
- **Cooling FCKW free**
- **Chemically neutral material of single components**

TECHNICAL DESCRIPTION

The precipitation sampler is used for the purpose of collecting the precipitation, depending of its configuration, in a large sample bottle, in 8 separate day or single samples or weekly samples. The individual sample bottle can be easily removed from the apparatus at the end of the period of measurement for laboratory analysis. Every single component which is used for measurement is made out of chemically neutral material and placed in a thermally insulated housing. At high temperatures the housing is cooled automatically to avoid overheating from intense radiation of the sun. For winter operation an electronically controlled funnel heating and a heating for the sample bottles, respectively sample room heating are provided.
Direct material, funnel shape and the collection surface correspond to the standards of the VDI-recommendations 3870. (VDI: Association of German Engineers)

PRINCIPLE OF MEASUREMENT

An impulse from the Precipitation Sensor RS 85 at the start of precipitation causes the cover device to open up the collection funnel in the following way: The lid moves up, swings to the side and sinks down to prevent introducing aerodynamic interference to the sampling process. The precipitation coming from the funnel flows over a pipe directly into the sample bottle (E type) or into a ring funnel an then through a hole into the rotating head. The rotating head is connected to the individual hard polyethylene sample bottle by drain pipes and silicone hoses (D or S type). When precipitation has ceased, a signal from the Precipitation Sensor RS 85, which operates with an adjustable heating element, causes a motor to close the collection funnel.

Distribution of Precipitation samples - configuration „D“ and „S“:

The precipitation coming from the funnel flows into a ring funnel an then through a hole into the rotating head. The rotating head is connected to the individual hard polyethylene sample bottle by drain pipes and silicone hoses. A SIEMENS® LOGO® control, which is programmable, causes a motor to advance the ring funnel and gathered precipitation fall into the following bottle by the way of the next opening of the rotating head. In case of breakdown in the external power supply all switching points will be caught up automatically.

Principle of Cooling

At the bottom of the collector an automatic working refrigerating machine with defrost automatic is installed. With the help of a plate evaporating unit with ventilation the temperature of the cooling space is constant held on 4-6 ºC

CONTENTS OF DELIVERED PROGRAM IN GENERAL

Double walled insulated PVC housing

Collection funnel of polyethylene (respectively out of DURAN-glass in DURAN execution)

Control electronics for drive for lid

Heating for funnel and sample bottles

Precipitation Sensor RS 85

Refrigerating machine with defrost automatic

(refrigerating agent R 134 a, FCKW-free)

Precipitation sensor RS 85

OPTIONS

Sample bottle out of DURAN-glass or teflon

Collection funnel out of Duran-glass or Quarz-glass

Opto-electronical Precipitation Sensor IRSS 88

Precipitation Sensor NRS 80 or RS 85 OP for areas without snow

Snowtop

Dry sample container out of PE or DURAN-glass

LCD-hour meter

Data logging systems

Stand base, made of galvanized steel

CONTENTS OF DELIVERED PROGRAM SPECIFIC TO CONFIGURATION

Configuration „E“ – with one sample bottle

Sample bottle out of HD-Polyethylen (5000 ml or 10000 ml) (respectively out of DURAN-glass in DURAN execution)

Collection room heating

Configuration „D“ – for 2 weekly samples

2-fold collecting insert module (bottle tray) with sample bottles out of HD-PE (5000 ml) (respectively out of DURAN-glass in DURAN execution)

Sample bottle heating in ground sheet instead of collection room heating

Control electronics for rotating head

Configuration „S“ – for 8 days single sample

8-fold collecting insert module (bottle tray) with sample bottles out of HD-PE (1000 ml) (respectively out of DURAN-glass in DURAN execution)

Second set sample bottles out of HD-Polyethylen (respectively out of DURAN-glass in DURAN execution)

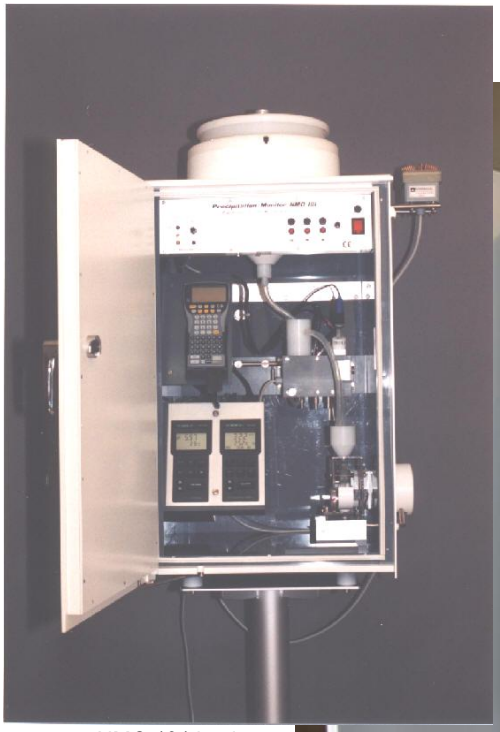
Sample bottle heating in ground sheet instead of collection room heating

Impulse unit for rotating head

Optional: event depending collection of precipitation

AUTOMATIC PRECIPITATION ANALYSER NMO 191 – TYPE

for continuous measurement of pH, electrical conductivity and intensity/ quantity of precipitation



NMO 191 basic

NMO 191/E

New 3,5“ touch-LCD

NMO 191/S

- **High performance and long stability through the use of:**
  - **Reliable electronic compounds with industry standard**
  - **Assorted material proven field operation for many years**
  - **Precise and stable sensors/probes**
  - **Rugged design for dependable operation in nearly all climate conditions**
- **Collection funnel with 500 cm² collection surface allowing up to 50ml sample with 1mm of precipitation**
- **PLC electronic control with SIEMENS® technology**
- **continuous measurement of pH, electrical conductivity, intensity and quantity of precipitation –> New data with less than 0,5mm precipitation**
- **Industrial standard measuring instrument, microprocessor controlled with 3,5” touch screen display.**
- **Multiple options for automatic data recording of significant precipitation data (like internal data logging system and/or SD-card memory)**
- **Various interfaces optional (RS-232, RS 485, Ethernet)**
- **Chemically neutral material of single components**
- **Precipitation Sensor RS 85**

TECHNICAL DESCRIPTION

The continuous measurements of pH and conductivity yield instantaneous values for the amount of dissolved trace substances as well as the acidity. The synchronous measurement of the two parameters allows quality control of the results and a good estimate of the amount of free acid in the precipitation. Acidity and amounts of trace substances obtained by precipitation correspond closely to the temporal development of the precipitation event. Therefore the concurrent measurement of amount and intensity of precipitation gives insight into the physics of the removal processes. Analysis of precipitation in laboratories is possible through the separation of material flowing through the measurement block and material collected in the sample bottle. Every single component which is used for measurement is made out of chemically neutral material and placed in a terminally insulated housing. Direct material, funnel shape and the collection surface correspond to the standards of the VDI-recommendations 3870 (VDI: Association of German Engineers). This monitor is fitted with electronically controlled heatings for winter operation.
Automatic working ventilation starts to replace inside air with filtered ambient air at temperatures of 25° and above. Alternatively an optional refrigerating machine with defrost automatic is installed. With the help of a plate evaporating unit with ventilation the temperature of the cooling space is constant held on 4-7 ºC.

PRINCIPLE OF MEASUREMENT

An impulse from the precipitation sensor at the start of precipitation causes the cover device to open up the collection funnel in the following way: The lid moves up, swings to the side and sinks down to prevent introducing aerodynamic interference to the sampling process.
From the funnel the precipitation to flows a tipping bucket, being separated into two equal portions. One half is collected directly in the sample bottles (optional), the second half flows into the temperature controlled measuring unit. There it first flows by the electrical conductivity and temperature measurement – then it will be drop wise (galvanic) separated and - then the water passes by the pH probe.
When precipitation has ceased, a signal from the precipitation sensor RS 85, which operates with an adjustable heating element, causes a motor to close the collection funnel.

Principle of Cooling (optional)

At the bottom of the collector an automatic working refrigerating machine with defrost automatic is installed. With the help of a plate evaporating unit with ventilation the temperature of the cooling space is constant held on 4-6 ºC

CONTENTS OF DELIVERED PROGRAM IN GENERAL

- Double walled insulated PVC housing
- Collection funnel of HD-PE
- Sensor controlled heating for sample room
- Sensor controlled heating for funnel minimising evaporation losses when melting snow.
- Precipitation Sensor RS 85 (details see information “meteorology catalogue”)
- Electronic PLC control with SIEMENS® technology for funnel cover and sample distributor (if applicable)
- Calibrated tipping bucket system for precipitation measurement
- Temperature controlled measuring insert with combined conductivity and temperature sensor and pH probe
- Modular “Multichannel Measuring Device” with integrated microcontroller and 3,5” LCD-touch screen for pH, conductivity and temperature.
- Ventilation system with filter for sample room temperatures above 25°C

OPTIONS

- ✓ Opto-electronical Precipitation Sensor IRSS 88
- ✓ Precipitation Sensor NRS 80 or RS 85 OP for areas with few snow
- ✓ Data various acquisition options (SD-card, internal memory,
- ✓ Output: RS232, RS485, Ethernet
- ✓ LCD operating hour meter
- ✓ Stand base, made of galvanized steel
- ✓ High(-snow) top
- ✓ Dry sample container unit (deposit gauge: diameter 200mm x 400mm high)
- ✓ Washing system
- ✓ Heating for drain

CONTENTS OF DELIVERED PROGRAM SPECIFIC TO CONFIGURATION

Configuration „E“ – with one sample bottle

Sample bottle out of HD-Polyethylen (5000 ml)

Configuration „S“ – for 8 days single sample

8-fold collecting insert module (bottle tray) with sample bottles out of HD-PE (750 ml)
Second set sample bottles out of HD-Polyethylen
Time based bottle assignment through control-system

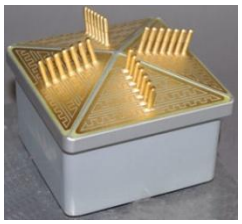
Configuration „KS“ – for 8 days single sample

8-fold collecting insert module (bottle tray) with sample bottles out of HD-PE (750 ml)
Second set sample bottles out of HD-Polyethylen
Time based bottle assignment through control-system
Automatic cooling CFC-free

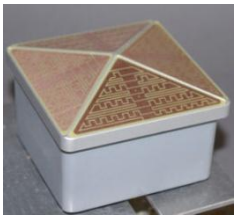
OPTIONS FOR PRECIPITATION SAMPLER AND –ANALYZER

Different Precipitation sensors
Different types of Precipitation Sensors, specially adapted to various applications and local conditions.

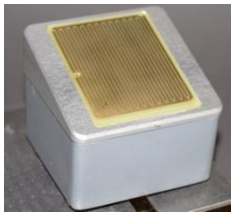
Available for:	
UNS 130	✓
NSA 181	✓
NSA 181/K	✓
NMO191	✓



RS 85: standard Precipitation Sensor. It is suitable for almost all climatic conditions. The snow catching pins allow a very good detection also of snow events.



The RS 85 OP is like the standard Precipitation Sensor RS85, but without snow pins. The pyramid shape allows a good detection to all 4 directions. This sensor suitable for operation in areas with few snowfall, like in maritime climatic conditions.



Precipitation Sensor NRS 80 is suitable for the use in areas with few snowfall, for instance in maritime climatic conditions.

Ideal for high polluted areas or close to the sea also for low power applications with solar and/or battery power supply we recommend the use of the Precipitation Sensor IRSS 88. The measurement principle is opto-electronical. In order to determine the precipitation, the number of drops and also the detecting interval length are adjustable.

Snow top - OPTION "H" (heated or not heated)
Housings with snow top have a better aerodynamic profile and influences therewith the rain collection rate
The snow top configuration can be (optional) constantly heated and therefore avoids that snow can be built up on the housing. This option is useful especially in areas with lots of snow fall.

Available for:	
UNS 130	-
NSA 181	✓
NSA 181/K	✓
NMO191	✓

DURAN Configurations

By collection of precipitation for analysis of organic components it is important to choose an alternative contact material for sample bottles and funnels than Polyethylene. For all types of instruments funnels and sample bottles are available in DURAN-glass. The distribution system for type "D" and "S" is made out of PTFE.

Available for:	
UNS 130	✓
NSA 181	✓
NSA 181/K	✓
NMO191	✓

STAND BASE

The robust stand base for Precipitation Sampler and – Analyser has a good stand. It is made out of steel, hot-dip galvanised for outdoor use. The total height, stand base and instrument, will be between 1.5 m up to 1.8 m following the WMO recommendations. Customized stand bases for other collecting heights are available on request.

The precipitation sensor can be also mounted on a stand base of its own. (hot-dip galvanised)
This allows to locate the sensor separated from the field of direct influence of the sampler. The height of the sensor is approx. 1,5 m above ground.

Available for:	
UNS 130	✓
NSA 181	✓
NSA 181/K	✓
NMO191	✓

DONWGRADE: NO HEATING

In areas with +0°C temperatures throughout the whole year, a heating of sample room or precipitation funnel are not necessary. Therefore all Eigenbrodt Precipitation Collectors or Precipitation Monitors can be supplied without a heating system being installed.

Available for:	
UNS 130	✓
NSA 181	✓
NSA 181/K	✓
NMO191	✓

DONWGRADE: BULK VERSION

Some guide lines or research applications do not require a wet only execution of the collectors or monitors. Therefore all EIGENBRODT Precipitation Collectors or Precipitation Monitors can be supplied as bulk version without automatic funnel covering mechanism or precipitation detection.

Available for:	
UNS 130	✓
NSA 181	✓
NSA 181/K	✓
NMO191	✓

COLLECTION FUNNELS

Collection of precipitation for analyzing organic components as well as mercury in the precipitation, the choice of the best fitting contact material like sample funnels is very important. In these cases PTFE and DURAN-glass, in some cases also stainless steel are preferable to HD-polyethylene. Collecting precipitation for acidifying components HD-PE is seen as the appropriate contact material to the sample. Eigenbrodt has designed a complete series of collection funnels to fit the collector the application. Care was taken to achieve a smooth surface to reduce any deposits in the funnel.

Available for:	
UNS 130	✓
NSA 181	✓
NSA 181/K	✓
NMO191	✓

The special design of the funnel with cylindrical part > radius of the funnel allows splash water and also snowflakes to stay inside the funnel.

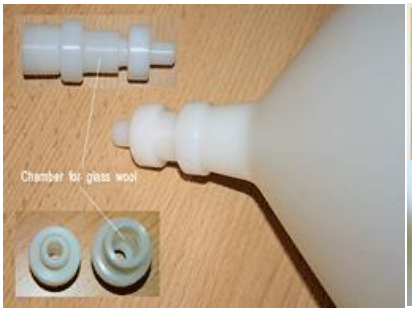
- HD-PE, 500cm² - maximum theoretical collecting capacity: 50ml with each 1mm precipitation
- DURAN, 490cm² - maximum theoretical collecting capacity: 49ml with each 1mm precipitation
- Stainless steel, 500cm² - maximum theoretical collecting capacity: 50ml with each 1mm precipitation
- PTFE, 500cm² - maximum theoretical collecting capacity: 50ml with each 1mm precipitation

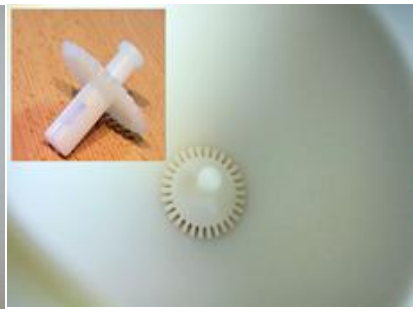
Dry Sample Container Unit

For certain research situations it is not only interesting to sample the wet-only deposition, but also the dry-only deposition at the same place during periods of no precipitation. The DSC-unit allows this type of samples. It maintains open during periods of no rain, and will be closed with the coverlid during rainy periods automatically.
The DSC-unit can be ordered heated and unheated. As material for the sample container HD-PE or DURAN-glass can be chosen.

Available for:	
UNS 130	✓
NSA 181	✓
NSA 181/K	✓
NMO191	✓

Filter elements





Some site conditions may require particle filer for the collection funnels (leafs, lims,..) .
Eigenbrodt does have a choice of different type dirt-filters.
Of course, depending on the application the type (dirt filer, filter-chamber with glass wool) or the contac
be selected.

Available for:		
UNS 130	✓	
NSA 181	✓	can
NSA 181/K	✓	
NMO191	✓	

Solar power supply (with battery back up)

The collector versions UNS 130, and NSA 181 (not with K-option) may optionally be operated with solar power supply.
The size of the battery and solar modules depends different facts (location of the collector, the distance to overcome a period without sun shine, the connected electricity consumers) and needs to be adopted to the single application. Due to the high power consumption of heating and cooling machines within the precipitation collectors, it is usually not economically worthwhile to quip these instruments with an solar power supply.

Available for:	
UNS 130	✓
NSA 181	✓
NSA 181/K	-
NMO191	-

LCD OPERATING HOUR METER

The LCD hour meter counts the lid open hours of the instrument. The value can be set to zero via a reset switch manually.

Available for:

UNS 130	✓
NSA 181	✓
NSA 181/K	✓
NMO191	✓

SD-card Logger (data acquisition)

Available for:

UNS 130	✓
NSA 181	✓
NSA 181/K	✓
NMO191	✓

The all new SD-card data logger allows in combination with Eigenbrodt MULTI-SIGNAL PCBs to log data sets on SD-memory cards. This allows retrieving the data simply by replacing the SD-card.
The unit is easy to operate: Just to push in the SD-card and the logging file is automatically been created. All data from this point of time will be written to the SD-card. In case the file already exists, the new data will be added at the end of the file. The file is logged in text format and can be opened with most file editors. A built in serial port (RS232/RS485) allows programming the Eigenbrodt signal PCB from the sample room. The SD-card writer can be retrofitted to all Eigenbrodt precipitation collectors and monitors with built in MULTI-SIGNAL PCB "Serial" or "Memory".

Event Data Logger

The event data logger stores date and time of the opening- and closure times of the lid. The data can be read out with PC or laptop via a RS 232 interface or USB interface (depending on logger type)

Available for:

UNS 130	✓
NSA 181	✓
NSA 181/K	✓
NMO191	✓

Tipping bucket

The precipitation collectors NSA181/NSA181K and UNS 130 can optionally be equipped with a tipping bucket. With the Precipitation Monitors NMO191 the tipping bucket is standard.
This system provides digital pulses of the precipitation amount being collected with through the collection funnel. In combination with the EIGENBRODT MULTI-SIGNAL PCBs Serial or Memory, it is possible to log rainfall amount and also the intensity.
Note for NSA181/NSA181K: In order to fit the tipping bucket into the housing, the cylindrical with be extended as shown in the picture right hand side.

Available for:

UNS 130	✓
NSA 181	✓
NSA 181/K	✓
NMO191	✓

- The design may change based on the collector type.
- Resolution: 0,05mm precipitation, calibrated up to 70 mm/h precipitation

Temperature monitoring for sample room

The Pt100 temperature sensor is installed into the sample room as shown left hand side. The data is available as Pt100 signal. In combination with the EIGENBRODT signal PCBs, the temperature data of the sample room can be accessed as 4-20mA signal or as serial signal, depending on version of the PCB.

Available for:

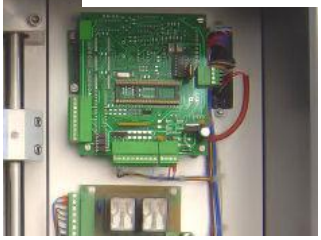
UNS 130	✓
NSA 181	✓
NSA 181/K	✓
NMO191	✓

MULTI-SIGNAL PCBs – Data acquisition

The signal board provides galvanically isolated digital signals for status indication and function control of the collectors/monitors. These signals can be logged e.g. with a data logger or any other capable data acquisition system. Upon request an optional data logging system can be provided.

- Precipitation yes/no
- Failure funnel door
- Bottle position and failure distributor (with versions T, S, S-16 and D)
- Temperature sample room (optional)
- Rainfall amount/intensity (optional)
- pH, el. conductivity and rain temperature (with NMO191 only)

Available for:
UNS 130 ✓
NSA 181 ✓
NSA 181/K ✓
NMO191 ✓



The built in signal PCBs/data acquisition provides valuable status information of the **Eigenbrodt Precipitation Collectors and Acid Rain Analyser / Monitors**

SIGNAL	NSA-Standard	NSA-Serial	NSA-Memory	NMO-Serial	NMO-Memory
Digital					
Precipitation yes/no	✓	✓	✓	✓	✓
Failure funnel door	✓	✓	✓	✓	✓
Failure distributor (only with models D, T and S, S-16)	-	✓	✓	✓	✓
Precipitation amount (only with tipping bucket option)	✓	✓	✓	✓	✓
Output	Relay output (closer), potential free, galvanically separated from other power circuits.				
Analogue					
Temperature (only with the order of Pt 100 option for sample room temperature)	✓	✓	✓	✓	✓
Output	4...20 mA, 0…10 V (others on request)				
Serial					
Precipitation yes/no	-	✓	✓	✓	✓
Failure funnel door	-	✓	✓	✓	✓
Bottle number (only with models D, T and S, S-16)	-	✓	✓	✓	✓
Failure distributor (only with models D, T and S, S-16)	-	✓	✓	✓	✓
Precipitation amount and rainfall intensity (only with tipping bucket option)	-	✓	✓	✓	✓
Programmable accumulation interval time for tipping bucket pulses. (NSA, only with tipping bucket option)	-	✓	✓	✓	✓
Programmable time of the day for resetting the tipping bucket counter: (NSA, only with tipping bucket option)	-	✓	✓	✓	✓
Temperature (only with the order of temperature observation option for sample room)	-	✓	✓	✓	✓
pH, electrical conductivity and rain temperature at adjustable intervals (NMO 191 only)	-	-	-	✓	✓
Averaged data of pH, electrical conductivity and rain temperature at adjustable intervals (NMO 191 only)	-	-	-	✓	✓
Output/Input	Bi-directional interface RS 232 / RS 485 to program the PCB and to retrieve the data. The communication is possible with terminal programs like Putty® - No further special communication software is needed. Gathering information and send via below communication protocols is possible: 1.Satellite communication 2.GSM 3.GPRS 4.VPN 5.PSTN				
Optional Ethernet output/input	-	-	✓	✓	✓
Number of Data sets	-	-	> 160.000*	-	> 100.000*

* Depending on optional features like temperature, tipping bucket the total number of data sets may change.

TECHNICAL DATA

TECHNICAL DATA: NSA 181 – TYPE

	NSA 181 /E	NSA 181/HE	NSA 181 /D	NSA 181 /HD	NSA 181 /S	NSA 181 /HS
Collection surface	---------- 500 cm²----------					
Precipitation Sensor RS 85						
Status	----------Precipitation yes / no ----------					
Switch on	----------without delay ----------					
Switch off	---------- with delay ----------					
Power supply						
Input supply voltage	230 V AC, 50 Hz	230 V AC, 50 Hz	230 V AC, 50 Hz	230 V AC, 50 Hz	230 V AC, 50 Hz	230 V AC, 50 Hz
Maximum connected load	270 Watt	370 Watt	270 Watt	370 Watt	270 Watt	370 Watt
cooling	–	–	–	–	–	–
Drive						
Cover for funnel	----------24 V DC, max. 50 Watt ----------					
Distributor	–		–		----------6 V DC----------	
Heating						
Precipitation Sensor (RS85)	----------24 V DC, 50 Watt, proportionally controlled----------					
Funnel	----------24 V DC, 50 Watt, proportionally controlled----------					
Heating sample room	230 V AC, 50Hz alt. 24 V DC. 100 Watt		24 V DC, 100 Watt, controlled		24 V DC, 100 Watt, controlled	
Heating snow top	–	24 V DC, 100 Watt	–	24 V DC, 100 Watt	–	24 V DC, 100 Watt
Dimensions						
height [mm]	950		950		950	
wide [mm]	520	520	520	520	520	520
depth [mm]	560	640	560	640	560	640
Weight						
Sampler [kg]	71	75	78	82	78	82
Stand base [kg]	16	14,6	16	14,6	16	14,6
Operating position						
Total height with stand base [mm]	1575	1675	1575	1675	1575	1675
	----------by use of stand base foundation necessary----------					

TECHNICAL DATA: NSA 181/K – Option

	NSA 181 /KE	NSA 181/KHE	NSA 181 /KD	NSA 181 /KHD	NSA 181 /KS	NSA 181 /KHS
Collection surface	---------- 500 cm²----------					
Precipitation Sensor RS 85						
Status	----------Precipitation yes / no ----------					
Switch on	----------without delay ----------					
Switch off	---------- with delay ----------					
Power supply						
Input supply voltage	230 V AC, 50 Hz	230 V AC, 50 Hz	230 V AC, 50 Hz	230 V AC, 50 Hz	230 V AC, 50 Hz	230 V AC, 50 Hz
Maximum connected load	430 Watt	530 Watt	430 Watt	530 Watt	430 Watt	530 Watt
Cooling	230 V AC, 160 Watt					
Drive						
Cover for funnel	----------24 V DC, max. 50 Watt----------					
distributor	–		–		----------6 V DC----------	
Heating						
Precipitation Sensor (RS85)	----------24 V DC, 50 Watt, proportionally controlled----------					
Funnel	----------24 V DC, 50 Watt, proportionally controlled----------					
Heating sample room	230 V AC, 50Hz alt. 24 V DC. 100 Watt		24 V DC, 100 Watt, controlled		24 V DC, 100 Watt, controlled	
Heating snow top	–	24 V DC, 100 Watt	–	24 V DC, 100 Watt	–	24 V DC, 100 Watt
Dimensions						
height [mm]	1250	1350	1250	1350	1250	1350
wide [mm]	485	485	485	485	485	485
depth [mm]	660	640	660	640	660	640
Weight						
Sampler [kg]	93	97	100	104	100	104
Stand base [kg]	14,6	14,6	14,6	14,6	14,6	14,6
Operating position						
Total height (up to funnel top edge) with stand base [mm]	1575	1675	1575	1675	1575	1675
	---------- by use of stand base foundation necessary ----------					

TECHNICAL DATA: NSA 191 – TYPE

	NMO 191	NMO 191/E	NMO 191/S	NMO 191/KS	NMO 191/KHE
Collection surface	---------- 500 cm²----------				
Precipitation Sensor RS 85					
Status	----------Precipitation yes / no ----------				
Switch on	----------without delay ----------				
Switch off	---------- with delay ----------				
Operating voltage					
Input supply voltage	230 V AC, 50 Hz	230 V AC, 50 Hz	230 V AC, 50 Hz	230 V AC, 50 Hz	230 V AC, 50 Hz
Maximum connected load	320 Watt	320 Watt	320 Watt	530 Watt	530 Watt
cooling	–	–	–	230 V AC, 160 Watt	230 V AC, 160 Watt
Direct voltage supply internally					
Drive					
Cover for funnel	----------24 V DC, max. 50 Watt----------				
Distributor	–	–	----------6 V DC----------		–
Heating					
Precipitation Sensor (RS85, RS85OP, NRS80,)	----------24 V DC, 20 Watt, proportionally controlled----------				
Funnel	----------24 V DC, 50 Watt, proportionally controlled----------				
Heating sample room	24 V DC, 100 Watt, prop. controlled				
Heating snow top	–	–	–	–	24 V DC, 100 Watt
Heating measurement block	----------12 V DC, 50 Watt, proportionally controlled----------				
pH-Measurement					
Measurement range	2-12 pH at -5…+80°				
resolution	1 Digit = 0,01 pH				
Type	Low maintenance combination glass-gel electrode				
Precipitation amount					
Resolution	0,05 mm/impulse				
Precision	Calibrated ± 2 % (at intensities up to 30 mm/h)				
Type	Tipping bucket				
Electrical conductivity and temperature					
Measurement range	0 µS/cm – 1999 µS/cm at -5…+80°C				
Type	4-pole platinum electrode				
Integrated Temperature	NTC30				
Dimensions					
Height [mm]	950	1250	1350	1350	1350
wide [mm]	520	485	520	520	485
depth [mm]	560	660	640	640	640
Weight					
Sampler [kg]	approx. 90	approx. 95	approx. 100	approx. 110	approx. 115
Stand base [kg]	16	14,6	14,6	14,6	14,6
Operating position					
Total height with stand base [mm]	1575	1575	1675	1675	1775
	----------by use of stand base foundation necessary----------				

MOST COMMON OPTIONS AND FEATURES

	UNS 130	NSA 181	Option: NSA 181 K	NMO 191
Heating	X	X	X	X
Cooling		X	X	(X)*
Automatic climate control of sample room to preset temperature			X	(X)
Automatic climate control of sample room to adjustable temperature of 3…10 °C			X	(X)
Snow Top – heated or unheated		X	X	X
Distributor applications				
Single sample bottle (1 x 5 Litre HD-PE)	X	X	X	(X)
Single sample bottle (1 x 10 Litre HD-PE)	X	X	X	
Single sample bottle (1 x 5 Litre DURAN glass)	X	X	X	
Single sample bottle (1 x 10 Litre DURAN glass)	X	X	X	
Distributor system HD-PE (2 x 1,5 Litre HD-PE sample bottles)	X			
Distributor system PTFE (2 x 1,5 Litre DURAN glass sample bottles)	X			
Distributor system HD-PE (2 x 5 Litre HD-PE sample bottles)		X	X	
Distributor system PTFE (2 x 5 Litre DURAN glass sample bottles)		X	X	
Distributor system 2 x 5 Litre "Mercury"-Execution			X	
Distributor system HD-PE (9 x 1 Litre HD-PE sample bottles)		X	X	(X)
Distributor system PTFE (9 x 1 Litre DURAN glass sample bottles)		X	X	
Dry sample container unit				
Dry sample container unit with HD-PE container – heated or unheated	X	X	X	X
Dry sample container unit with DURAN container – heated or unheated	X	X	X	X
Sensor type				
NRS 80	X	X	X	X
RS 85 OP (no snow catching pins)	X	X	X	X
RS 85	X	X	X	X
IRSS 88	X	X	X	X
Funnel type				
HD-PE-funnel with HD-PE-funnel outlet	X	X	X	X
DURAN glass funnel with PTFE-funnel outlet	X	X	X	
DURAN glass funnel with glass connector and glass pipe	X	X	X	
Accessories				
Stand base for the collector / monitor	X	X	X	X
Stand for precipitation sensor, 1,5 m high, stainless steel anodized	X	X	X	X
Working hour meter	X	X	X	X
Mini-Event Data logger	X	X	X	-
SC-card logger (only in combination with memory or serial signal PCB)	X	X	X	X
Signal PCB Type NSA	X	X	X	-
Signal PCB Type NSA Serial	X	X	X	-
Signal PCB Type NSA Memory	X	X	X	-
Signal PCB Type NMO	-	-	-	X
Signal PCB Type NMO Serial	-	-	-	X
Signal PCB Type NMO Memory				X

* Only with some models

SPECIAL CUSTOMIZED DESIGNS

PRECIPITATION COLLECTOR NSA 181/KD – MERCURY
for 2 weekly samples, with constant cooling and specialized for mercury samples

NSA 181/KHD – Mercury
with “snow top” option for mountain applications

BASED ON PRECIPITATION COLLECTOR NSA 181/K – SERIES

Advanced options:

- **special distribution system with magnetic valves – shut to the environment during times of no precipitation**
- **Special snow top (optional)**
- **chemically neutral material of single components (DURAN glass and PTFE)**

PRECIPITATION COLLECTOR NSA 181/KD - VMM
for 2 weekly samples, with constant cooling

NSA 181/KD - VMM
Including data logging system

BASED ON PRECIPITATION COLLECTOR NSA 181/K – SERIES

Advanced options:

- **Special distribution system with 3 bottles**
- **Signals for:**
  - **Bottle position**
  - **Failure temperature sample room**
  - **Failure distributor**
  - **Door signal**
- **Data logging including GSM data transfer**

PRECIPITATION COLLECTOR NSA 181/KHT
for 3 weekly samples, with constant cooling

BASED ON PRECIPITATION COLLECTOR NSA 181/K – SERIES

Advanced options:

- **Special distribution system with 3 bottles**
- **Special snow top (optional)**
- **Signals for:**
  - **Bottle position**
  - **Failure temperature sample room**
  - **Failure distributor**
  - **Door signal**

PRECIPITATION COLLECTOR UNS 130/E - BATTERY
for single sample bottle

UNS 130/E
Low power consumption with solar and/or battery supply

BASED ON PRECIPITATION COLLECTOR UNS 130 – SERIES

Advanced options:

- **Low power consumption**
- **Precipitation sensor IRSS 88**
- **Battery supply / solar power supply**
- **Automatic switch for 230 V AC / 12 V DC battery**