METEOROLOGY

Compact Glossary of Meteorological Terms

Response value	The wind velocity at which the cup or the wind vane starts to move.
Barometer	General term for the device measuring the atmospheric pressure.
Barometric pressure	Pascal [Pa] = Newton per square meter [N/m^2]; 1hPa=1mbar; 1 bar=10^{5}Pa
Beaufort	Classification for certain wind velocity ranges: bft m/s bft m/s bft m/s bft m/s bft m/s bft m/s 0 0 - 0.2 1 0.3- 1.5 2 1.6- 3.3 3 3.4- 5.4 4 5.5- 7.9 5 8.0-10.7 6 10.8-13.8 7 13.9-17.1 8 17.2-20.7 9 20.8-24.4 10 24.5-28.4 11 28.5-32.6 12 32.7-36.9 13 37.0-41.4 14 41.5-46.1 15 46.2-50.9 16 51.0-56.0 17 56.1-61.2
Damping ratio	Measure for the damping of wind vanes. It is the ratio of successive damped deflection amplitudes (e.g. 3rd to 1st amplitude) in one direction.
Distance constant	Is the distance that has been passed by the wind and which is reached when, after a sudden change of the wind velocity, the velocity has reached 63% of the final value.
Gray code	One step digital code used for the wind direction.
Altitude formula	Mathematical reduction of the barometric air pressure to a reference altitude, at minimum to sea level (QFF). Example: with each altitude increase of 8m the pressure decreases by approximately 1hPa.
Detection limit	The lowest value of the wind velocity and wind direction where a stable measured value is established.
Normal pressure	The barometric normal pressure (1013.25hPa) that, according to DIN ISO 2533, serves as base value for the 'high pressure' and 'low pressure' data.
QFE	The atmospheric pressure that has been reduced to the elevation of an airport runway.
QFF	Designation used in aviation for the barometric air pressure that has been reduced to sea level (0m). Also serves as a common base for the barometric air pressure comparison of different weather stations with different elevations of the stations and it is the base for the presentation of the isobars in weather maps.
QNH	Designation commonly used in aviation for the barometric air pressure, which has to be entered into an altimeter as an initial value so the altimeter can indicate the altitude above sea level.
Altitude of station	The local elevation regarding the installation of the measuring station incl. the barometer above sea level.
Variation	The range in which the wind direction has been changing within the preceding 10 minutes (acc. to ICAO).
Wind velocity	Usual practical units: 1m/s = 3.6km/h = 1.9455knots
Wind direction	Specification of which direction the wind comes from. The specification is based on a clockwise setup starting from North to East (90°), South (180°) and West (270°) to North (360°).
Wind travel	Is the distance travelled by the wind during a certain period.

Table m/s related to km/h and Wind Intensity, Wind Intensity Designation

Wind intensity	Wind scale	meters / sec	km / hour	knots
Calm	0			<1
Light air	1	0.3 to 1.5	1 to 5	1 to 3
Light breeze	2	1.6 to 3.3	6 to 11	4 to 6
Gentle breeze	3	3.4 to 5.4	12 to 19	7 to 10
Moderate breeze	4	5.5 to 7.9	20 to 28	11 to 16
Fresh breeze	5	8.0 to 10.7	29 to 38	17 to 21
Strong breeze	6	10.8 to 13.8	39 to 49	22 to 27
Near gale	7	13.9 to 17.1	50 to 61	28 to 33
Gale	8	17.2 to 20.7	62 to 74	34 to 40
Strong gale	9	20.8 to 24.4	75 to 88	41 to 47
Storm	10	24.5 to 28.4	89 to 102	48 to 55
Violent storm	11	28.5 to 32.6	103 to 117	56 to 63
Hurricane	12	more than 32.7	more than 118	>64

METEOROLOGY

Meteo-Multisensor FMA-510

Meteo multisensor is a compact and light-weight multi-sensor system for measuring all important meteorological variables. The system can be freely configured to measure temperature, relative humidity, atmospheric pressure, wind velocity, wind direction, and rainfall.

- Eight essential weather parameters all combined in one device.
- Stable and accurate measured results.
- No moving parts.
- Low power consumption.
- Compact and light-weight.
- Quick and easy to set up.
- Low maintenance requirements.

This sensor is connected to two input sockets. To the output of the sensor values a cycle must have started (in the measuring instrument or in the software). The functions of this sensor supported by the devices V6 2590, 2690, 2890, 8590-9 8690-9, 5690-1 2 and devices V5 (only with the function pressure/measuring cycle).

Operation with the device in SLEEP mode is not possible!

Technical Data:

Wind direction		
	Azimuth	0 to 360 °,resolution: 1° , with average value
	Accuracy	±3°
Wind velocity		
	Range	0,5 to 60 m/s, resolution: 0,1 m/s, with max. value and average value
	Accuracy	0 to 35 m/s ± 0,3 m/s or ± 3%, whichever is the largest 36 to 60 m/s ± 5%,
Barometric Pressure		
	Range	600 to 1100 mbar, resolution: 0,1 mbar
	Accuracy	±0,5 mbar at 0 to 30 °C ±1 mbar at -52 to +60 °C
Air temperature		
	Range	-52 to 60 °C, resolution: 0,1 K
	Accuracy	± 0,3 K at 20 °C (sensor element)
Relative humidity		
	Range	0 to 100 % r.H., resolution: 0,1% r.H.
	Accuracy	± 3% r.H. at 0 to 90 % r.H., ± 5% r.H. at 90 to 100 %
Rainfall - quantity		
	Surface area measured:	60 cm², resolution: 0,01 mm with sum value
	Accuracy*	≤5% of daily total, depending on weather conditions
Rainfall-intensity		
	Range	0 to 200 mm/h, resolution: 0,01 mm/h with maximum value
Dimensions		
	Height	240 mm
	Diameter	120 mm
	Weight	620 g
Cable		Sensor cable, fixed, 12 m long with 2 Almemo® digital input cable, 0.3 m
Powersupply		6 to 12V from the Almemo device
Heating (only FMA510H)		12 V DC max. 1.1A or 24 V DC/AC max. 0.6A
Mounting		
	direct	mounted on cross arm or tube with external diameter Ø 30mm and internal diameter >= Ø 24mm
	with adapter ZB9510MA27	mounted on tube with external diameter Ø 27 or Ø 30 mm

* Due to the of the phenomenon, deviations caused by spatial variations may exist in precipitation readings, especially in short time scale. The accuracy specification does not include possible wind induced error.

Accessories:

Mounting adapter (mobile weather station see 14.04) **Order no. ZB9510MA27**

Type:

Meteo-Multisensor FMA510, sensor cable, fixed, 12 m long with 2 Almemo® digital input cable, 0.3 m **Order no. FMA510**

Meteo-Multisensor FMA510, sensor cable, fixed, 12 m long with 2 Almemo® digital input cable, 0.3 m with heating incl. cable, fixed, 12 m long (mains adapter not included) **Order no. FMA510H**

METEOROLOGY

Mobile weather station

Universal mobile weather station for measuring a wide array of meteorological data, e.g. wind direction, wind velocity , relative atmospheric humidity, temperature, atmospheric pressure, rainfall quantity and intensity, and global radiation Quick and easy to install, robust design, and various power supply options (rechargeable battery, solar cell, car adapter)

Applications :

- Vehicle test tracks
- Racing tracks
- Sporting events
- Site evaluation for wind power plants
- Mobile helicopter landing fields
- Tracing industrial emissions
- Disaster control (tracing clouds of poisonous gas, observing local weather developments)
- Agricultural trials

Mobile weather station with data logger ALMEMO® 2690-8

Komponenten

- Data logger ALMEMO® 2690-8, including mains adapter 230 VAC.
- Weather-proof housing with lockable transparent door, Data logger mounted on DIN rail, Continuous power supply for data logger and Meteo sensor via external supply voltage
  Supply 230 VAC : Integrated socket with connecting cable led out, approx. 1.7 meters, for 230 V, with safety plug
  Power supply 10 to 30 VDC : 2 integrated banana sockets, wired to clamp connector inside housing (cable to external mains unit / rechargeable battery - to be provided by customer), Bridging of short-term supply failure by means of internal battery in ALMEMO® 2690-8.
- For supply 10 to 30 V : ALMEMO® supply cable ZA2690UK, electrically insulated, for external rechargeable battery / battery 9 to 12 V, ALMEMO® supply cable ZA2690EK, not electrically insulated.
- Weather-proof housing, with solar power supply, available on request.

Types :

Meteo sensor for measuring wind direction, wind velocity , relative atmospheric humidity, temperature, atmospheric pressure, rainfall quantity and intensity, plus 12 meters cable, with 2 ALMEMO® plug-in connectors	**Order no. FMA510**
Probe head for measuring global radiation, 0 to 1200 W/m2, with 1.5 meters cable	**Order no. FLA613GS**
Longer cable, total length 5 meters	**Order no. OA9613K05**
Mobile tripod stand, extendable up to 3.5 meters, with mountable adapter for Meteo sensor FMA510, including set of guys and anchoring fixtures (comprising 3 spring-snap hooks, guy lines (4 meters), and ground pegs) Dimensions (non-extended) approx. 1.6 x 0.15 meters - weight approx. 11 kg	**Order no. ZB9510ST**
Holder for 1 radiation probe head FLA613GS / VLM / UVA / UVB - length approx. 0.5 meters	**Order no. ZB9510MH**
Carry case (with space for 1 tripod stand including accessories and up to 2 probe head holders)	**Order no. ZB9510TT**
Case with ALMEMO® 2690-8 data logger set, including mains adapter 230 VAC and RS232 data cable	**Order no. MA26908KS**
ALMEMO® memory connector, with multi-media card (at least 32 MB) including USB card reader	**Order no. ZA1904MMC**
ALMEMO® supply cable, 10 to 30 VDC, output 12 VDC 0.2 A, electrically insulated	**Order no. ZA2690UK**
ALMEMO® supply cable, 9 to 12 VDC, not electrically insulated	**Order no. ZA1012EK**
Weather-proof housing with lockable transparent door, cable bushings and mast fixture, supply cable led out, approx. 1.7 meters, for 230 V, with safety plug, including ALMEMO® 2690-8 data logger installed on DIN rail (must be ordered specially) Housing material ABS (acrylonitrile butadiene styrene), 300 x 250 x170 mm (excluding mast fixture), weight (including measuring instrument) approx. 3.5 kg	**Order no. ZB9015AGA**
Carry case, universal, spacious, robust Exterior dimensions (WxHxD) approx. 51 x 35 x 30 cm	**Order no. ZB5600TK3**

METEOROLOGY

Mobile weather station with ALMEMO® 8590-9 measuring module

Komponenten

- Data logger ALMEMO® 2690-8, including mains adapter 230 VAC.
- Weather-proof housing with lockable opaque door, Data logger mounted on DIN rail, Continuous power supply for data logger and Meteo sensor via external supply voltage
  Supply 230 VAC : Integrated socket with connecting cable led out, approx. 1.7 meters, for 230 V, with safety plug
  Power supply 10 to 30 VDC : 2 integrated banana sockets, wired to clamp connector inside housing (cable to external mains unit / rechargeable battery - to be provided by customer), Bridging of short-term supply failure by means of internal battery in ALMEMO® 2690-8.
- For supply 10 to 30 V : ALMEMO® supply cable ZA2690UK, electrically insulated, for external rechargeable battery / battery 9 to 12 V, ALMEMO® supply cable ZA2690EK, not electrically insulated.
- Weather-proof housing, with solar power supply, available on request.

Types :

Meteo sensor for measuring wind direction, wind velocity , relative atmospheric humidity, temperature, atmospheric pressure, rainfall quantity and intensity, plus 12 meters cable, with 2 ALMEMO® plug-in connectors	**Order no. FMA510**
Probe head for measuring global radiation, 0 to 1200 W/m2, with 1.5 meters cable	**Order no. FLA613GS**
Longer cable, total length 5 meters	**Order no. OA9613K05**
Mobile tripod stand, extendable up to 3.5 meters, with mountable adapter for Meteo sensor FMA510, including set of guys and anchoring fixtures (comprising 3 spring-snap hooks, guy lines (4 meters), and ground pegs) Dimensions (non-extended) approx. 1.6 x 0.15 meters - weight approx. 11 kg	**Order no. ZB9510ST**
Holder for 1 radiation probe head FLA613GS / VLM / UVA / UVB - length approx. 0.5 meters	**Order no. ZB9510MH**
Carry case (with space for 1 tripod stand including accessories and up to 2 probe head holders)	**Order no. ZB9510TT**
ALMEMO® 8590-9 measuring instrument, including mains adapter 230 VAC	**Order no. MA85909**
ALMEMO® memory connector, with multi-media card (at least 32 MB) including USB card reader	**Order no. ZA1904MMC**
ALMEMO® supply cable, 10 to 30 VDC, output 12 VDC 0.2 A, electrically insulated	**Order no. ZB3090UK**
ALMEMO® supply cable, 9 to 12 VDC, not electrically insulated	**Order no. ZB5090EK**
Weather-proof housing with lockable opaque door, cable bushings and mast fixture, supply cable led out, approx. 1.7 meters, for 230 V, with safety plug, including ALMEMO® 8690-9 data logger installed on DIN rail (must be ordered specially) Housing material ABS (acrylonitrile butadiene styrene), 300 x 250 x170 mm (excluding mast fixture), weight (including measuring instrument) approx. 3.5 kg	**Order no. ZB9015AGB**
Carry case, universal, spacious, robust Exterior dimensions (WxHxD) approx. 51 x 35 x 30 cm	**Order no. ZB5600TK3**

Mobile weather station

METEOROLOGY

Wind Velocity Sensor Type FVA615-2

- Wind velocity sensor for measuring the horizontal wind velocity.
- Cup-type made from stable plastic, electronics in weather-resistant aluminium housing, rotating mechanics guided in high-quality ball bearings.
- A special labyrinth reliably protects without friction and guards against water penetrating into the housing.
- With electronically controlled heating for winter operation to prevent ball bearings and external rotational parts from freezing.

Type:
Cup-type anemometer including ALMEMO® connector (0–2V) with 12m cable **Order No. FVA6152**

Technical Data:

Measuring range:	0.5 to 50m/s
Accuracy:	±0.5m/s ±3% of meas. value
Resolution:	0.1m/s
Measuring principle:	optoelectronically (slotted disk)
Sensor power supply:	9–30VDC through ALMEMO® device
Heating:	24VAC/DC max. 20W
Operative range:	-30 to +70 °C, with heating
Cable:	12m long, LiYCY 6 x 0.25mm²
Connection:	Adapter cable with ALMEMO® connector including supply cable for heating (length 1.5 m, free ends) A mains supply unit must be provided by the user on site.
Installation:	e.g. pole tube with holding thread PG21 / drilling 29mm Ø
Weight:	750g

Wind Direction Sensor Type FVA614

- Wind direction sensor for measuring the horizontal wind direction.
- Wind vane made from stable plastic, electronics in weather-resistant aluminium housing, rotating mechanics guided in high-quality ball bearings.
- A special labyrinth reliably protects without friction and guards against water penetrating into the housing.
- With electronically controlled heating for winter operation to prevent ball bearings and external rotational parts from freezing.

Type:
Wind vane including ALMEMO® connector (0–2V) with 12m cable **Order No. FVA614**

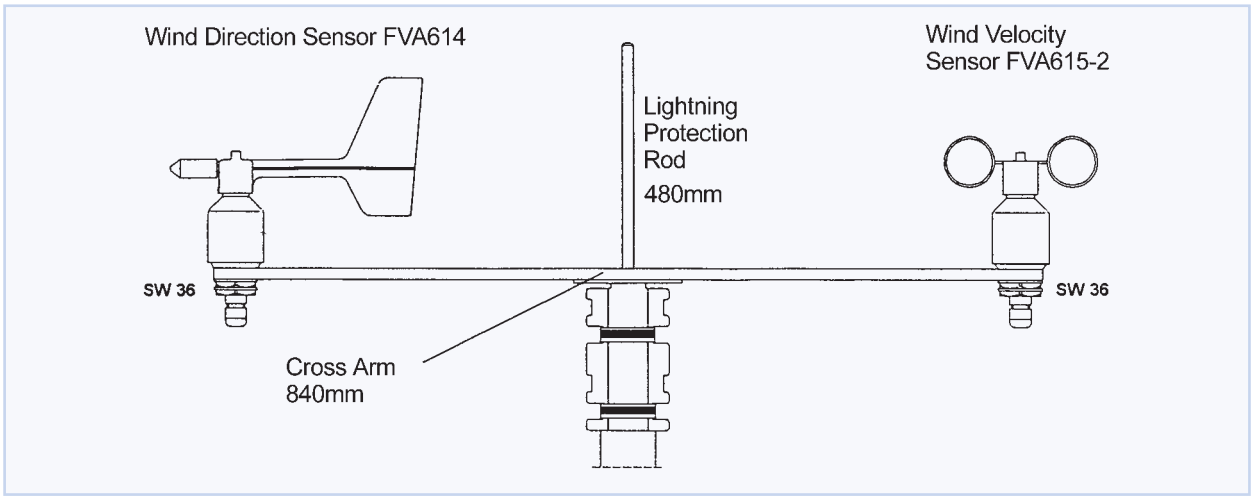
Technical Data:

Measuring range:	0 to 360°
Accuracy:	±5°
Resolution:	11.25° (5 bit Gray code)
Measuring principle:	optoelectronically (slotted disk)
Sensor power supply:	9–30VDC through ALMEMO® device
Heating:	24VAC/DC max. 20W
Operative range:	-30 to +70 °C, with heating
Cable:	12m long, LiYCY 6 x 0.25mm²
Connection:	Adapter cable with ALMEMO® connector including supply cable for heating (length 1.5 m, free ends) A mains supply unit must be provided by the user on site.
Installation:	e.g. pole tube with holding thread PG21 / drilling 29mm Ø
Weight:	1100g

METEOROLOGY

Accessories for wind direction and wind velocity sensors

Example - fitted to mast



Cross-arm for separate wind direction and wind velocity sensors inclusive assembly utilitis for mast Ø 48 to 102 mm **Order no. ZB9015TC**

Lightning protection rod **Order no. ZB9015BS**

Rainfall Sensor Type FRA916

- Rainfall sensor according to the tipping scale principle with electronic counting of the table tilts and direct conversion into the amount of rainfall.
- Rainfall sensor with sieve bar for protection against insects or other contaminations.

Types:

Rainfall sensor without heating including ALMEMO® connector with 12m cable **Order No. FRA916**

Rainfall sensor with heating in insulated metal housing incl. ALMEMO® connector with 12m cable **Order No. FRA916H**

Technical Data:

Measuring range:	0.2mm/pulse
Resolution:	0.2mm
Capture cross section:	400cm²
Heating :	24 V DC/AC, max. 30 W
Operating range :	0 to +50 °C, with heating -30 to +50 °C
Cable :	12 m
Connection :	Adapter cable with ALMEMO® connector including supply cable for heating (length 1.5 m, free ends) A mains supply unit must be provided by the user on site.
Material of housing:	corrosion-proof metal
Material of tipping scale:	weather-resisting plastic
Dimensions:	280mm high, 240mm Ø
Weight:	2.4kg

Accessories:

Push-in/put-up stand with mounting flange	Order No. ZB9916AF
Longer cable, please specify length (L)	Order No. ZB9060K(L)

METEOROLOGY

Precipitation detector, types FRA616D and FR8616D

- The sensor reacts to precipitation in the form of either rain or snow within just a few seconds.
- It detects even very slight precipitation.
- The precipitation detector reacts by switching a relay. It does not provide a continuous measuring signal; it operates with a step function :
  If it detects precipitation, display in ALMEMO® measuring instrument : 1.0000,
  if it does not detect precipitation, display in ALMEMO® measuring instrument : 0.0000.
- The precipitation detector is designed for use for example in automatic ventilation or shading systems, or in automatically controlled greenhouses, etc.

Option:

Precipitation detector
designed for connection to 24 V AC Order no. OR8616U6

Technical data :

Voltage connection	230 V AC ±10% 6 VA (50/60 Hz) Optional 24 V AC
Power draw	
Electronics	3 VA
Preheating	1 VA
Total heating	3 VA
Admissible ambient temperature	-30 to +60 °C
Storage temperature	-30 to +70 °C
Relative humidity	0 to 100 %
Relay drop-out delay	5 minutes ± 15%
Test voltage	
Terminals L or N --- Electronics	1.5 kV
Electronics --- Relay contacts	1.5 kV
Electromagnetic compatibility	EN50081-1; EN50082-2; EN61010-1
Relay output	250 V AC, max. 4 A, 300 VA inductive
Duty classification	approx. 1 million operations
Housing	
Material	polycarbonate, gray
Protection system	IP65
Mounting system	Tubular steel pole, diameter approx. 25 to 50 mm
Weight	approx 0.8 kg (incl. mounting materials)
Connection	
FR8616D	with connecting terminals
FRA616D	with ALMEMO® connector and 12-meter connection cable

Types :

Precipitation sensor including mounting materials **Order no. FR8616D**

Precipitation sensor including mounting materials, ALMEMO® connector, and 12-meter cable **Order no. FRA616D**

METEOROLOGY

Global Radiation Probe Head Type FLA613GS

- Measuring head in anodized aluminium housing with a plastic dome that is transparent to UV light.
- Rain and splash-proof system, additionally with desiccant to prevent dome from inside condensation.
- Particularly suitable for outdoor measurements, e.g. in medical and biological research, weather information and forecast systems, climatology, agriculture and for general public information.

Type (including test protocol)

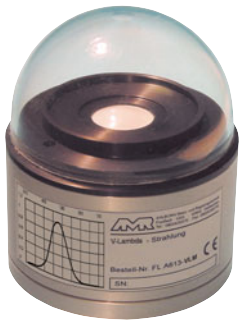
Weather-proof measuring head for measuring the global radiation, incl. ALMEMO® connector with 1.5m cabler

Order No. FLA613GS

Technical Data:

Measuring range:	0 to approx. 1200W/m²
Spectral sensitivity:	400nm to 1100nm
Maximum spectral sensitivity:	780nm
Signal output:	0V to 2V
Power supply:	+5V to +15V
Mounting:	2 screws M4, in base plate
Cable passage:	downwards
Housing:	anodized aluminium
Diffusor:	PTFE
Dome:	PMMA
Cos correction:	error f2 < 3%
Linearity:	< 1%
Absolute error:	< 10%
Residual voltage: (E = 0)	< 10mV
Nominal temperature:	22°C ±2°C
Operating temperature:	–20°C to +60°C
Dimensions:	housing: 55 mm high dome 40 mm high diameter: 80 mm
Weight:	approx. 300 g

Radiation measuring head Type FLA613VLM



- Measuring head in anodized aluminum housing, with UV-transparent plastic dome.
- Rain-proof, splash-protected system, with desiccant to prevent condensation forming on the inside of the dome.
- Especially suitable for measuring operations outdoors, e.g. in medical, biological, and climate research, in weather information forecast systems, in agriculture, and for the purposes of general information for the public.
- The spectral sensitivity of the receiver corresponds approximately to that of the human eye.

Types (including test protocol)

Weather-resistant measuring head for measuring the radiation intensity including cable, 1.5 m, and ALMEMO® connector

Order No. FLA613VLM

Technical Data:

Measuring range :	0 to 170 klux (approx. 250 W/m2)
Spectral sensitivity :	360 to 760 nm
Max. spectral sensitivity :	550 nm
Signal output	0 to 2 V
Power supply :	+5 to +15 V
Mounting :	2 screws, M4, in base plate
Cable passage :	downwards
Housing :	anodized aluminum
Diffusor :	PTFE
Dome :	PMMA
Cos correction :	error f2 <3%
Linearity :	<1%
Absolute error :	< 10 %
Residual voltage (E = 0) :	<10 mV
Nominal temperature :	22 ± 2 °C
Operating temperature :	-20 to +60 °C
Dimensions :	Housing : 55 mm high Dome : 40 mm high Diameter : 80 mm
Weight :	approx. 300 g

METEOROLOGY

UVA Radiation Probe Head Type FLA613UVA

- Measuring head in anodized aluminium housing with a plastic dome that is transparent to UV light.
- Rain and splash-proof system, additionally with desiccant to prevent dome from inside condensation.
- Particularly suitable for outdoor measurements, e.g. in medical and biological research, weather information and forecast systems, climatology, agriculture and for general public information.

Type (including test protocol)
Weather-proof measuring head for measuring the UVA radiation including cable, 1.5 m, and ALMEMO® connector
Order No. FLA613UVA

Technical Data:

Measuring range:	0 to approx. 3mW/cm²
Spectral sensitivity:	310 to 400nm
Maximum spectral sensitivity:	335nm
Signal output:	0V to 2V
Power supply:	+5V to +15V
Mounting:	2 screws M4, in base plate
Cable passage:	downwards
Housing:	anodized aluminium
Diffusor:	PTFE
Dome:	PMMA (transparent to UV)
Cos correction:	error f2 < 3%
Linearity:	< 1%
Absolute error:	< 10%
Residual voltage: (E = 0)	< 10mV
Nominal temperature:	22°C ±2°C
Operating temperature:	–20°C to +60°C
Dimensions:	housing: 55 mm high dome 40 mm high diameter: 80 mm
Weight:	approx. 300 g

UVB RadiationProbe Head Type FLA613UVB

- Measuring head in anodized aluminium housing with a plastic dome that is transparent to UV light.
- Rain and splash-proof system, additionally with desiccant to prevent dome from inside condensation.
- Particularly suitable for outdoor measurements, e.g. in medical and biological research, weather information and forecast systems, climatology, agriculture and for general public information.

Type (including test protocol)
Weather-proof measuring head for measuring the UVB radiation including cable, 1.5 m, and ALMEMO® connector
Order No. FLA613UVB

Technical Data:

Measuring range:	0 to approx. 50µW/cm²
Spectral sensitivity:	215 to 315nm
Maximum spectral sensitivity:	335nm
Signal output:	0V to 2V
Power supply:	+5V to +15V
Mounting:	2 screws M4, in base plate
Cable passage:	downwards
Housing:	anodized aluminium
Diffusor:	PTFE
Dome:	PMMA (transparent to UV)
Cos correction:	error f2 < 3%
Linearity:	< 1%
Absolute error:	< 10%
Residual voltage: (E = 0)	< 10mV
Nominal temperature:	22°C ±2°C
Operating temperature:	–20°C to +60°C
Dimensions:	housing: 55 mm high dome 40 mm high diameter: 80 mm
Weight:	approx. 300 g

METEOROLOGY

Star Pyranometer Type FLA628S

- Star pyranometer, according to Dirmhirn, for measuring the global radiation, the sky radiation and the short-wave radiation.
- Independent from ambient temperature through differential temperature measurement.
- Cut precision glass cupola for shielding from external environmental effects.
- Levelling by 3 setting screws and an integrated bubble.
- Delivery including a factory calibration certificate.

Type (including test protocol)
Star pyranometer including 3m cable with ALMEMO® connector and programmed calibration value **Order No. FLA628S**

Technical Data:

Measuring range:	0 to 1500W/m²
Resolution:	0.1W/m²
Spectral range:	0.3 to 3µm
Output:	approx. 15µV/Wm⁻²
Impedance:	approx. 35Ω
Operative range:	–40 to +60°C
Accuracy:	cosine effect + azimuth effect + temperature influence
Cosine effect:	<3% of measured value (0 to 80° inclination)
Inclination azimuth effect:	< 3% of meas. val.
Temperature influence:	< 1% of meas. val. (–20 to +40°C)
Nominal temperature:	22°C ±2°C
Linearity:	<0.5% (0.5 to 1330W/m²)
Stability:	<1% of the meas. range per year
Settling time:	25s (t95)
Dimensions:	160mm Ø, 75mm high, hole circle: 134mm Ø, holes: 8mm Ø
Weight:	1kg

Accessories:

Shadow belt with stand	Order No. ZB9628SB

Barometric pressure Measuring connector type FDA612SA

- Compact design allows direct plug-on to measuring instruments.
- High measurement accuracy through piezo-resistive pressure sensor.

Type:
Barometric pressure Measuring connector **Order No. FDA612SA**

Technical Data:

Measuring range:	700 to 1050 mbar (total range 0 to 1050 mbar)
Overload capacity:	max. 1.5-fold of fin. val. range
Accuracy:	±0.5% of fin. val.
Nominal temperature:	25°C
Temperature drift:	< ±1% of final value
Compensated temperature range:	0 … +70°C
Operating range:	–10 to +60°C, 10 to 90% r.H. non-condensing
Air humidity:	10 to 90% non-condensing
Dimensions:	90 x 20 x 7.6 mm
Hose connection:	Ø 5mm, 12mm long
Sensor material:	aluminium, nylon, silicone, silica gel, brass

Accessories:

Connecting cable 0.2m	Order no. ZA9060AK1
Extension cable, 2m long	Order No. ZA9060VK2
Extension cable, 4m long	Order No. ZA9060VK4

METEOROLOGY

Humidity / temperature transmitter in all-weather protective housing Type MT8xx6AGx

- Capacitive humidity sensor with / without Pt100 temperature sensor.
- Stable all-weather protective housing.
- Designed for supply voltage 15 to 24 V DC.

Technical Data:

Operative range :	–30 to +60 °C, 0 to 90 % r.H. (non-condensing)
Humidity measuring circuit	
Sensor:	capacitive thin-film sensor
Measuring range:	0 to 100 % r.H.
Accuracy:	±2% r.H. in the range < 90% r.H. at nominal temperature
Reproducibility:	±1% r.H. at nominal temperature
Nominal temperature:	25°C ±3°C
Electronics, accuracy	±0.2% of measured value ±0.5% RH, TC 0.04% RH / K
Temperature measuring circuit	
Sensor:	Pt100
Accuracy:	Pt100: IEC 751, class B
Electronics, accuracy	±0.2% of measured value ±0.2 K, TC 0.01°C / K
Dimensions	All-weather protection Ø 85 mm, H approx. 100 mm
Electronics box	80 x 80 x 25 mm

Types (including manufacturer's test certificate)
Temperature sensor Signal output (corresponds to 0 to 100 % r.H. / -30 to +70 °C)

Without temperature sensor	Output 0 to 10 V	Load ≥1 kΩ max. 10 mA	**Order No. MT8616AG2**
Without temperature sensor	Output 0 to 1 V	Load ≥1 kΩ max. 10 mA	**Order No. MT8616AG5**
Without temperature sensor	Output 0 to 20 mA	Load RL max. 500 Ω	**Order No. MT8716AG3**
Without temperature sensor	Output 4 to 20 mA	Load RL max. 500 Ω	**Order No. MT8716AG4**
Pt100 temperature sensor	Output 2 x 0 to 10 V	Load ≥1 kΩ max. 10 mA	**Order No. MT8636AG2**
Pt100 temperature sensor	Output 2 x 0 to 1 V	Load ≥1 kΩ max. 10 mA	**Order No. MT8636AG5**
Pt100 temperature sensor	Output 2 x 0 to 20 mA	load RL max. 500 Ω	**Order No. MT8736AG3**
Pt100 temperature sensor	Output 2 x 4 to 20 mA	Load RL max. 500 Ω	**Order No. MT8736AG4**

ALMEMO® Humidity / temperature sensor in all-weather protective housing Typ FHA646AG

- Supply voltage via ALMEMO® device.
- Sensor cable connected via screw terminals, optional up to 30m.

Accessories, Options:

Longer ALMEMO® connecting cable, per meter (max. 30 m)
Order No. ZB9060K

Type (including manufacturer's test certificate)
Humidity / temperature sensor in all-weather protective housing including ALMEMO® connecting cable, 2 m
Order No. FHA646AG

Technical Data:

Operative range :	–30 to +60 °C, 0 to 90 % r.H. (non-condensing)
Humidity measuring circuit	
Sensor:	capacitive thin-film sensor
Measuring range:	0 to 100 % r.H.
Accuracy:	±2% r.H. in the range < 90% r.H. at nominal temperature
Reproducibility:	±1% r.H. at nominal temperature
Nominal temperature:	25°C ±3°C
Temperature measuring circuit	
Sensor:	NTC type N
Accuracy:	NTC: –20 to 0°C: ±0.4°C 0 to 60°C: ±0.1°C
Reproducibility:	0.1°C
Dimensions	All-weather protection Ø 85 mm, H approx. 100 mm
Electronics box	80 x 80 x 25 mm

ROOM AIR CONDITIONS

Comfort Index Measurement

new!

Mobile measuring stand with sensors for evaluating the level of thermal comfort (similar to illustration)

Technical features:

- Complies with ISO 7730 and DIN 1946 Part 2.
- The ALMEMO® system can be networked for the connection simultaneously of up to 100 sensors and arithmetic channels.
- Independent measuring process in real-time mode.
- Various display and output options : real-time mode, offline measuring operations or to storage media, e.g. floppy disks or ZIP drives.
- Data is saved in binary format; it can be used for the purposes of calculating other parameters and can be exported either online or offline, e.g. ASCII, MS-EXCEL, DiaDEM, etc.
- Graphical presentation of measured data and calculated data in a format with data export options.
- Automatic recognition of the customer's own or other third-party sensor technology.
- Comprehensive, clear, meaningful evaluation.

Types: (sensor set for one level)

Globe thermometer	**Order No. : FPA805GTS**
Humidity / temperature sensor	**Order No. : FHA646E1**
Thermo-anemometer, up to 1 m/s, without smoothing, response time 100 ms, including carry case	**Order No. : FVA605TA1OU**
Stand for measuring operations at heights of 0.1 to 1.7 meters, including 1 set of instrument holders for 1 level (traverse including traverse holder and sensor fastening), including carry case	**Order No. ZB1001PPD**
Set of instrument holders for extra levels (as above)	**Order No. ZB1001MH**

Device selection

ALMEMO® 2690-8 hand-held data logger, 5 inputs, including mains unit and data cable, can be used for 1 measuring level (see page 01.14)	**Order No. MA26908KS**
ALMEMO® 2890-9 hand-held data logger, 9 inputs, including mains unit, can be used for 3 measuring levels (see page 01.15)	**Order No. MA28909**
ALMEMO® data cable, V24 interface, electrically insulated	**Order No. ZA1909DK5**
Bluetooth wireless link, class 2, from ALMEMO® device to PC (USB) (see page 04.04)	**Order No. ZA1709BT2DKU**

Software

WinControl for 20 measuring points / 1 device, including additional module for comfort index measurement	**Order No. SW5600WC1** **Order No. SW5600WCZM1**

Accessories

Carry case, universal, spacious, robust, for globe thermometer, humidity sensor, and data logger Exterior dimensions (WxHxD) approx. 51 x 35 x 30 cm	**Order No. ZB5600TK3**

Operative range :

It is possible with this measuring setup to measure all the physical parameters needed for assessing and evaluating thermal comfort simultaneously on three levels. This provides reliable evaluation of the performance of heating and ventilating systems. The data acquired from the series measuring the operative temperature (globe temperature), room temperature, and room air flow and humidity, and the necessary input parameters (e.g. clothing factor, activity level, and mechanical power) are used together to calculate the PMV (predicted mean vote) and PPD (predicted percent of dissatisfied) values (as per EN ISO 7730) and the degree of turbulence (as per DIN 1946 Part 2). These values are calculated either online or offline using the AMR WinControl software in conjunction with the additional module for comfort index measurement.

The software : The averaging number is preset at 200 measuring points but this is variable and can be modified. The PMV and PPD values and the degree of turbulence can be displayed and documented in y/t or x/y diagrams either each one separately or together with other measurable variables. A software wizard is available to guide the user step-by-step through the various settings. If measurement is started online, the first value (as per EN 7730) is indicated after completion of the first 200 measuring operations. The calculation of these values is then further processed, continuously updated and displayed, and - optionally - saved and / or exported; (see Chapter 06)

ROOM AIR CONDITIONS

WBGT Measurement

Application Range:

The wet bulb globe temperature (WBGT) is the decisive parameter for evaluating the work stress at heat-exposed working places and the operation and cool-off times involved. Temperature, radiation and relative humidity are determined by measuring the dry temperature, the natural humid temperature of a psychrometer and the globe temperature of a globe thermometer. These are all combined as WBGT.

Technical Data:

Accuracy:	Class B (DIN/IEC 751)
Sensor:	Pt100 4-conductor, arranged in the center
Globe thermometer:	matt black copper globe with suspension
Diameter:	approx. 150mm
Operating temperature:	–50 to 200°C
Cable length:	3m

Types:

Globe thermometer (Pt100 4L)	**Order No. FPA805GTS**
Psychrometer with disengageable ventilator	**Order No.FNA846WB**

Note:

For WBGT measurements the use of a psychrometer with a disengageable ventilator is compulsory

METEOROLOGY

Thermo Hygrograph Type SK3015

- Proven device for continuous recording of temperature and humidity data in rooms with air conditioning, e.g. in museums, galleries, computer rooms etc.
- Stable, white lacquered aluminium diecast housing with handle for transportation.
- The clear Macrolon panoramic hood guarantees a convenient monitoring of the measured values.

Technical Data:

Measuring range, humidity:	0 to 100% r.H.
Operating range:	10 to 97% r.H.
Accuracy:	±2.5% of entire measuring range
Measuring ranges, temperature:	
Type 3015-1:	–35 to +45°C (hair harp)
Type 3015-2:	–20 to +60°C (hair harp)
Type 3015-3:	0 to +40°C (synthetic harp)
Type 3015-4:	0 to +80°C (synthetic harp)
Accuracy:	±2.5% of entire measuring range
Drum size:	93.3mm Ø
Writing height:	2 x 82mm
Dimensions:	1280 x 138 x 260mm
Weight:	2.75kg
Standard version:	with electronic switch clock for 7/31 days and 24 hr with 100 recording stripes for 7 days

Types:

Type SK 3015-1 incl. 100 recording stripes for 7 days –35 to +45°C	**Order No. SK30151**
Type SK 3015-2 incl. 100 recording stripes for 7 days –20 to +60°C	**Order No. SK30152**
Type SK 3015-3 incl. 100 recording stripes for 7 days 0 to +40°C	**Order No. SK30153**
Type SK 3015-4 incl. 100 recording stripes for 7 days 0 to +80°C	**Order No. SK30154**

Option:

Optionally the following versions are available free of charge (please specify the required option when ordering):

mechanical clock for 7 days (1.67mm feed)	Order No. OK3015MT
electrical clock for 7 days (1.67mm feed)	Order No. OK3015ET
mechanical clock for 24 hours (11.5 mm feed)	Order No. OK3015MH
electrical clock for 24 hours (11.5 mm feed)	Order No. OK3015EH
At additional charge: mechanical switch clock 7 days/24h	Order No. OK3015MTH

Accessories:

100 sheets recording stripes for 7 days for type SK 3015-1	Order No. ZK3015PT1
100 sheets recording stripes for 7 days for type SK 3015-2	Order No. ZK3015PT2
100 sheets recording stripes for 7 days for type SK 3015-3	Order No. ZK3015PT3
100 sheets recording stripes for 7 days for type SK 3015-4	Order No. ZK3015PT4
100 sheets recording stripes for 24 hours for type SK 3015-1	Order No. ZK3015PH1
100 sheets recording stripes for 24 hours for type SK 3015-2	Order No. ZK3015PH2
100 sheets recording stripes for 24 hours for type SK 3015-3	Order No. ZK3015PH3
100 sheets recording stripes for 24 hours for type SK 3015-4	Order No. ZK3015PH4
100 sheets recording stripes for 31 days for type SK 3015-1	Order No. ZK3015PM1
100 sheets recording stripes for 31 days for type SK 3015-2	Order No. ZK3015PM2
100 sheets recording stripes for 31 days for type SK 3015-3	Order No. ZK3015PM3
100 sheets recording stripes for 31 days for type SK 3015-4	Order No. ZK3015PM4
1 set stylus violet (2 pieces)	Order No. ZK3015FS