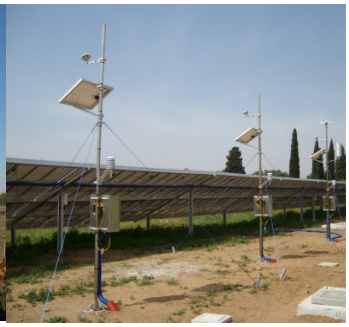


MW8000-ENG (V.8)






Meteorological sensors

Catalogue

LSI LASTEM Srl
20090 Settala Premenugo – Milano – Italy
Tel. (+39) 02 954141
Fax (+39) 02 95770594
Email: info@lsi-lastem.it
www.lsi-lastem.it

LSI – LASTEM meteorological sensors range overview

LSI LASTEM supplies a vast range of meteorological sensors addressed to their own data acquisition device as well as to third part data management systems. LSI LASTEM high-quality sensor allows to obtain realable and accurate measurments, easy installation and low maintenance.

Air temperature

Models		
	**Air temperature sensor (Pt100 output)** Air temperature sensor Pt100 output for indoor and, when closed inside the radiant screen for meteorological applications. Very good accuracy using 4 wires Pt100 1/3 DIN element. This sensor can be used in a very wide choice of environmental applications.	
Order numb.	**DMA033**	**EST033**
Connector	Free wires (4 wires)	Mini-Din connector
Data logger compatibility	M-Log (ELO007-008) R-Log (ELR515) E-Log (all models)	M-Log (ELO009) R-Log (ELR510)

Common features.		
Temperature	Principle	Pt100 1/3 DIN B
	Measuring range	Depending by the data acquisition system
	Uncertainty	0,10°C (0°C)
	Output	Pt100 DIN-IEC 751 table
	Resolution	0,01°C (M/R/ELog)
	Response time (T90 air)	30 sec. without protective filter, 6 min. with protective filter
General Information	Protection type	IP54
	Power consumption	none
	Operative temperature	-40÷+80°C
	Cable	L.5 m
	Input type on E/M/R-Log	Analog

Accessories	Order numb	
	**DYA230**	Multi plate natural ventilation radiant screen
	DYA233	Multi plate natural ventilation radiant screen for DYA046 arm
	**DYA231**	Multi plate forced ventilation radiant screen. 12 Vdc power supply
	DPA232	Multi plate forced ventilation radiant screen. 24 Vac power supply
	DYA051	Mast-mounting device for ø 50 mm pipe
	DZC101.S	ISO9000 type calibration certificate
	CSIT.T.10	ACCREDIA type calibration certificate

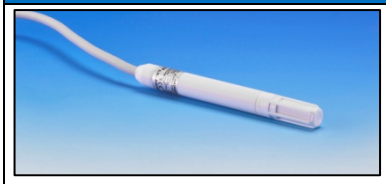
Surface temperature

Models		
	**Contact temperature sensor (Pt100 output)** Plate made sensor for surface temperature measurements. It has small dimension in order to be installed in small spaces. It can be fixed using adhesive band or thermoconductive paste.	
Order numb.	**DLE124**	**EST124**
Connector	Free wires (4 wires)	Mini-Din connector
Cable	L.20 m	L.10 m
Data logger compatibility	M-Log (ELO007-008) R-Log (ELR515) E-Log (all models)	M-Log (ELO009) R-Log (ELR510)

Common features.		
Temperature	Principle	Pt100 1/2 DIN A
	Measuring range	Depending by the data acquisition system
	Uncertainty	0,15°C (0°C)
	Output	Pt100 DIN-IEC 751 table
	Resolution	0,01°C (M/R/ELog)
	Response time (T90 H_2O)	35 sec.
General Information	Use	Indoor and outdor
	Dimension	30 x 20 mm. Thickness 2,5 mm
	Power consumption	None
	Operative temperature	-40÷+80°C
	Input type on E/M/R-Log	Analog

Accessories	Order numb	
	DZC101.S	ISO9000 type calibration certificate
	CSIT.T.10	ACCREDIA type calibration certificate
	MM7500	Thermoconductive paste for sensor installation on surfaces

Air temperature and Relative humidity

Models		
	**Thermohygrometer (direct output)** Air temperature and RH% sensor with Pt100 output for temperature and 0-1 Vdc output for RH%. For outdoor application it should be closed inside radiant screen. LSI LASTEM supplies a precise and reliable set of probes, suitable for a continuous measurement in severe environment, in presence of deep thermal and hygrometric ranges.	
Order numb.	**DMA672.1**	**ESU403.1**
Output	RH%: 0÷1 Vdc. °C: Pt100 DIN-IEC 751 table	
Power supply	6÷18 Vdc	
Connector	L.3 m free wires (8 wires)	L.3 m + N.2 Mini-Din connectors
Data logger compatibility	M-Log (ELO007-008) R-Log (ELR515) E-Log (all models)	M-Log (ELO009) R-Log (ELR510)

Common features.		
Temperature	Principle	Pt100 1/3 DIN B
	Measuring range	Depending by the data acquisition system
	Uncertainty	0,1°C (0°C)
	Resolution	0,01°C (M/R/ELog)
	Response time	4 sec T63 (1 m/s air speed)
Relative humidity	Principle	Capacitive
	Measuring range	0-100%
	Uncertainty	±1,5% RH (5-95%)
	Response time	10 sec T63 (1 m/s air speed)
General Information	Cable	L.3 m
	Protection type	IP54
	Operative temperature	-40÷+80°C

Accessories	Order numb	
	**DYA230**	Multi plate natural ventilation radiant screen
	DYA233	Multi plate natural ventilation radiant screen for DYA046 arm
	**DYA231**	Multi plate forced ventilation radiant screen. 12 Vdc power supply
	DPA232	Multi plate forced ventilation radiant screen. 24 Vac power supply
	DZC301.S	Calibration certificate
	DYA051	Mast-mounting device For ø 50 mm pipe

Air temperature and Relative humidity

Models				
Thermohygrometer (analog output) These thermohygrometers are instrument for measuring air temperature and relative humidity in severe outdoor environments. On model DMA675-685 an high efficency radiant screen with natural ventilation assured by the black special pain below the plates, assures that the sensitive element is protected by sun rays in order to measure precise air temperature. Models DMA667-669 are equipped with a forced ventilation screen to assure precise measurements even in low wind and high solar radiation conditions.				
Order numb.	**DMA675**	**DMA685**	**DMA667**	**DMA669**
Programmable output	0/4÷20 mA, 0/1÷5 V			
Power supply	12 Vdc	24 Vac	12 Vdc	24 Vac
Power consumption	1 W		2 W	3 W
Ventilation	Natural		Forced	

Common features.		
Temperature	Principle	Pt100 1/3 DIN B
	Measuring range	Programmable: -30÷+70°C, -50÷+50°C, -50÷+10°C,
	Uncertainty	0,2°C (0°C)
	Resolution	0,04°C
	Response time	4 sec T63 (1 m/s air speed)
Relative humidity	Principle	Capacitive
	Measuring range	0-100%
	Uncertainty	±1,5% RH (5-95%)
	Response time	10 sec T63 (1 m/s air speed)
General Information	Connector	7 pin IP65 watertight connector
	Protection type	IP65
	Operative temperature	-40÷+80°C
	Protections	Tranzorb abd Emifilters

Accessories	Order numb	
	DZC301.S	Calibration certificate
	DYA051	Mast-mounting device For ø 50 mm pipe
	DWA510	Cable L.= 10 m for DMA675-685-667-669
	DWA525	Cable L.= 25 m for DMA675-685-667-669
	DWA526	Cable L.= 50 m for DMA675-685-667-669
	DWA527	Cable L.= 100 m for DMA675-685-667-669
	MG2251	7 pin free female connector

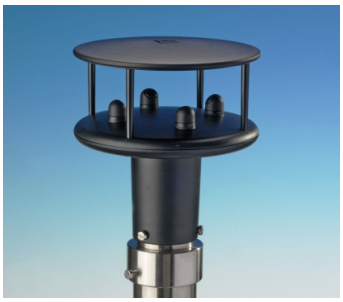
Wind speed&direction (wind cup and vane)

Models				
	**Wind speed and Direction ensemble** This sensor range includes, in a single apparatus, the both transducers for measuring wind speed and wind direction. Its use simplifies the installation requirements plus being smaller, lighter and cheaper. Combined wind speed and wind direction sensor with direct signal output (Hz) for wind speed and 0-1 Vdc output for wind direction. Model DNA122#S is based on potentiometer and it has output in Ω and very low power consumption, it can be used in application with low energy availability.			
Order numb.	**DNA121#C**	**DNA122#C**	**DNA821**	**DNA827**
WS output	0÷833 MHz		4÷20 mA	0÷5 Vdc
WD output	0-1 Vdc	0-2000 Ω	4÷20 mA	0÷5 Vdc
Power supply	12 Vdc		10÷30 Vac/dc	
Power consumption	30 mA	2 mA	0,5 W	
Wind direction principle	Hall effect sensor	2 KΩ potentiom.	Hall effect sensor	
Microprocessor			PIC 18F2620	
Data logger compatibility	M-Log (ELO007-008) R-Log (ELR515) E-Log (all models)			

Common features.		
Wind speed	Principle	N.32 step optoelectronic disk
	Measuring range	0-60 m/s
	Uncertainty	0÷3 m/s=1,5%, >3 m/s= 1%
	Resolution	0,07 m/s
Wind direction	Measuring range	0-360°
	Uncertainty	1%
	Resolution	0,3°
General Information	Connector	7 pin IP65 watertight connector
	Housing	Anodised aluminium,
	Cup&vane	PA6 plastic and fiberglass
	Threshold	0,26 m/s
	Mounting	mast ø 48 ÷ 50 mm
	Portections	Tranzorb and Emifilters

Accessories	Order numb	
	DZC405	Calibration certificate Includes in DNA121#C and DNA122#C
	DWA510	Cable L.= 10 m
	DWA525	Cable L.= 25 m
	DWA526	Cable L.= 50 m
	DWA527	Cable L.= 100 m
	MG2251	7 pin free female connector
	DNA124	Spare part: rotor
	DNA127	Spare part: vane
	MM2011	Spare part: bearings for Wind direction (QT.2 required)
	MM2020	Spare part: bearing for Wind speed (QT.2 required)

Wind speed and direction (ultra-sonic)

Models		
	**Ultrasonic anemometer** 2-axis ultrasonic anemometer without moving-parts. It is ideal for general meteorological applications requiring measurements with fast response even in low range wind speed conditions. LSI LASTEM data logger firmaware can read the data protocol of the DNB004 model.	
Order numb.	**DNB004**	**DNB005**
Output	RS232	RS232, 4-20 mA
Data logger compatibility	M-Log (all models) R-Log (all models) E-Log (all models)	

Common features.		
Wind speed	Measuring range	0÷60 m/s
	Uncertainty	2%
	Threshold	0,01 m/s
	Resolution	0,01 m/s
Wind direction	Measuring range	0÷359°
	Uncertainty	±3°
	Resolution	1°
General Information	Principle	Ultrasonic 2 axis
	Power supply	9÷30 Vdc
	Power consumption	15 mA
	Connector	IP65 watertight connector
	Housing	Luran
	Mounting	mast ø 44 ÷ 45 mm
	Operative temperature	-35÷ +70°C

Accessories	
DWA711	Cable for DNB004 L. 10 m
DWA710	Cable for DNB005 L.10 m
DNB091	Adapter for DNB004/5 on meteo pole Ø: 50 mm

Wind speed&direction, temperature&RH%, pressure

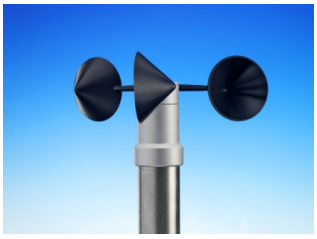
Models	Order numb.

All-in one weather sensor

All-In-One sensor to measure temperature, relative humidity, wind speed and direction (with self-alignment via a built-in compass), and barometric pressure. It is compatible with LSI LASTEM data logger range.

DNB100		
Wind speed	Range	0÷60 m/s
	Uncertainty	±0.5 m/s or 5% of reading
	Resolution	0,1 m/s
Wind direction	Range	0÷360°
	Uncertainty	± 5° @ wind speed > 2.2 m/s
	Kompass	Uncertainty ±2°
	Resolution	1°
Temperature	Range	-40÷+50 °C
	Uncertainty	±0.2°C
	Resolution	0,1°C
RH%	Range	0÷100%
	Uncertainty	±3%
	Resolution	1%
Pressure	Range	600÷1100 hPa
	Uncertainty	±0.35 hPa
	Resolution	0,1 hPa
General	Power supply	8÷36 VDC
	Output	RS-232, RS-485, SDI-12
	Power consumption	25 mA
	Environmental limit	-50÷+70 °C
	Data logger compatibility	RS232 port on: M-Log (all models) R-Log (all models) E-Log (all models)

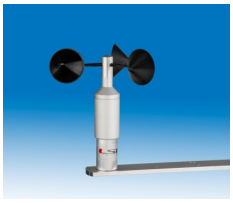
Wind speed (wind cup)

Models	Order numb.		
	**Compact size anemometer** Compact size and good mechanical strength allow this sensors type to be used in strong wind applications, where long term reliability without maintenance, as in wind farms surveys and wind turbine. These sensors are compatible with LSI-LASTEM data loggers, but they can be used also with third parts systems. Wind speed sensor uses high quality relay reed.		
	DNA202		
	Wind speed	Principle	Relay Reed
		Measuring range	0÷75 m/s
		Uncertainty	2,5%
		Threshold	0,5 m/s
	General Information	Output	2,65 Hz x m/s
		Connector	4 pin IP65 watertight connector
		Housing	Anodised aluminium,
		Mounting	mast ø 48 ÷ 50 mm
		Data logger compatibility	M-Log (ELO007-008) R-Log (ELR515) E-Log (all models)

Accessories		
	MN1071	Cable each m
	**DYA046**	Coupling bar for WS+WD sensors on ø 45 ÷65 mm pole
	DNA207	Spare part: rotor

Wind speed (wind cup)

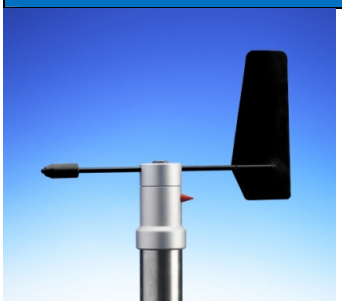
Models			
	**Anemometer (direct output)** Wind speed sensor with direct signal output. These anemometer are usefull where it is required a low threshold and good accuracy even at very low wind speed range. Wind speed element is a tachometer with 32 steps giving a very good resolution. Wind speed sensor with direct signal output (Hz/m/s). DNA302#C with heater to avoid ice formation on its body in case of cold climate. DNA304#C model with low power consumption for low energy applications.		
Order numb.	**DNA301#C**	**DNA302#C**	**DNA304#C**
Output	0-883 Hz.		
Power supply	12 Vdc	24 Vca	12 Vdc
Heater	-	YES (-20°C)	-
Power consumption	20 mA	20 W	2 mA
Calibratin certificate	Includes		
Data logger compatibility	M-Log (ELO007-008), R-Log (ELR515), E-Log (all models)		

Models					
	**Anemometer (analog output)** Wind speed sensor with analog signal output. DNA802 and DNA806 are equipped with heater to avoid ice formation in case of cold climate. All models are based on microprocessor technology; every wind speed sensor has, on the basis of its geometry, different responses on each point of its measurement range; the microprocessor adjusts the signal linearity at any wind speed value, obtaining a precise measurement.				
Order numb.	**DNA801**	**DNA802**	**DNA805**	**DNA806**	**DNA807**
Output	4÷20 mA	4÷20 mA	0÷20 mA	0÷20 mA	0÷5 Vdc
Power supply	10÷30 Vac/dc	24 Vac/dc	10÷30 Vac/dc	24 Vac/dc	10÷30 Vac/dc
Heater	-	YES (-20°C)	-	YES (-20°C)	-
Power consumption	0,5 W	20 W	0,5 W	20 W	0,5 W
Microprocessor	PIC 18F2620				

Common features.		
Wind speed	Principle	N.32 step optoelectronic disk
	Measuring range	0-50 m/s
	Uncertainty	0÷3 m/s=1,5%, >3 m/s= 1%
	Resolution	0,06 m/s
General Information	Connector	7 pin IP65 watertight connector
	Housing	Anodised aluminium,
	Mounting	mast ø 48 ÷ 50 mm

Accessories		
	**DYA046**	Coupling bar for WS+WD sensors on ø 45 ÷65 mm pole
	DZC405	Calibration certificate. Included in DNA301-302-304#C
	DNA110	Cable for DNA30x#C. L.=10 m
	DNA125	Cable for DNA30x#C. L.=25 m
	DWA510	Cable for DNA80x. L.= 10 m
	DWA525	Cable for DNA80x. L.= 25 m
	DWA526	Cable for DNA80x. L.= 50 m
	DWA527	Cable for DNA80x. L.= 100 m
	MM2025	Spare part: bearings
	DNA204	Spare part: rotor

Wind direction (wind vane)

Models	Order numb.		
	**Compact size wind direction sensor** This sensor can be jointed to the measurement of the wind speed in many applications where it is required a small and lite size but also very strong mechanical resistance. It is ideal for portable or lite AWS and where the wind alarm is required to be joint over the wind speed and direction. On this regard, LSI LASTEM data loggers can open a digital output when wind speed is over a programmable value and the wind direction is coming from a defined angle.		
	DNA212		
	Wind speed	Principle	Hall effect sensor
		Measuring range	0÷360°
		Uncertainty	5°
	General Information	Output	0÷1 V
		Connector	4 pin IP65 watertight connector
		Housing	Anodised aluminium,
		Threshold	0,25 m/s
		Power supply	12 Vdc
		Power consumption	10 mA
		Mounting	mast ø 48 ÷ 50 mm
		Data logger compatibility	M-Log (ELO007-008), R-Log (ELR515), E-Log (all models)

Accessories		
	MN1071	Cable each m
	**DYA046**	Coupling bar For WS+WD sensors on ø 45 ÷65 mm pole
	DNA218	Spare part: vane

Wind direction (wind vane)

Models			
	**Wind direction sensor (direct output)** Wind direction sensor with direct signal output. DNA310-311#C uses a hall effect encoder system. DNA314#C is equipped with a potentiometer to reduce its power consumption in low energy applications. DNA311#C is equipped with a heater system to avoid ice formation on its body in case of cold climate.		
Order numb.	**DNA310#C**	**DNA311#C**	**DNA314#C**
Principle	Hall effect sensor		Potentiometer
Output	0÷1 V		0-2000 Ω
Power supply	12 Vdc	24 Vdc/ca	-
Heater	-	YES	-
Power consumption	10 mA	20 W	Max 2 mA
Calibratin certificate	Included		
Data logger compatibility	M-Log (ELO007-008), R-Log (ELR515), E-Log (all models)		

Models					
	**Wind direction sensor (analog output)** Wind direction sensor with analog signal output. DNA811-815 are equipped with heater to avoid ice formation on its body in case of cold climate.				
Order numb.	**DNA810**	**DNA811**	**DNA814**	**DNA815**	**DNA816**
Principle	Hall effect sensor				
Output	4÷20 mA		0÷20 mA		0÷5 Vdc
Power supply	10÷30 Vac/dc	24 Vac	10÷30 Vac/dc	24 Vac	10÷30 Vac/dc
Heater	-	YES	-	YES	-
Power consumption	0,5 W	20 W	0,5 W	20 W	0,5 W

Common features.		
Wind direction	Measuring range	0÷360°
	Uncertainty	3°
	Threshold	0,16 m/s
General Information	Connector	7 pin IP65 watertight connector
	Housing	Anodised aluminium,
	Mounting	mast ø 48 ÷ 50 mm

Accessories		
	**DYA046**	Coupling bar For WS+WD sensors on ø 45 ÷65 mm pole
	DZC404	Calibration certificate Included in DNA010-011#C
	DNA110	Cable for DNA31x#C L.=10 m
	DNA125	Cable for DNA31x#C L.=25 m
	MG2252	7 pin free male connector for DNA31x#C
	DWA510	Cable L.= 10 m
	DWA525	Cable L.= 25 m
	DWA526	Cable L.= 50 m
	DWA527	Cable L.= 100 m
	MG2251	7 pin free female connector for DNA81x sensors
	DNA217	Spare part: rotor
	MM2025	Spare part: bearings

Solar radiation (global irradiance)

Models		
Secondary Standard Pyranometers For solar irradiance measurement, according to ISO 9060 and WMO No. 8 (Part I, Chapter 7). First Class ISO 9060 (total uncertainty, daily total: 5%),		
Order numb.	**DPA251.1**	**DPA851**
Output	µV/W/m2	0/4÷20 mA, 0/1÷5 V
Power supply	-	10÷30 Vac/dc
Maximum solar irradiance	2000 W/m2	0÷1500 W/m2
Cable	L. 10 m	7 pin IP65 watertight connector
Installation (on ø 50 mm pole)	Using DYA034 or DYA035 + DYA051	Using DYA051
Data logger compatibility	M-Log (ELO007-008), R-Log (ELR515), E-Log (all models)	

Common features.		
Pyranometer	Principle	Termopile
	Type	Secondary Standard WMO (ISO9060) – Kipp&Zonen CMP11
	Spectral range	285÷2800 nm
	Uncertainty	2% daily
	Response time	5 sec
General Information	Housing	Anodised aluminium,

Accessories		
	**DYA035**	Tilt arm for Pyranometers
	DYA034	Arm for fixing DPA153, DPA251.1 to DYA051 collar
	DYA051	Mast-mounting device for ø 50 mm pipe
	**DEA852**	Converter for Pyranometers. 0/4÷20 mA, 0/1÷5 V Power consumption: 10 mA+output Power supply 10÷30 Vac/dc . Requires DWAxxx cable
	DWA510	Cable L.= 10 m
	DWA525	Cable L.= 25 m
	DWA526	Cable L.= 50 m
	DWA527	Cable L.= 100 m
	DPA245	Occultation band for diffuse radiation (DPA153, DPA251.1 only)
	MG2251	7 pin free female connector

Solar radiation (global irradiance)

Models		
First class Pyranometers For solar irradiance measurement, according to ISO 9060 and WMO No. 8 (Part I, Chapter 7). First Class ISO 9060 (total uncertainty, daily total: 5%),		
Order numb.	**DPA153**	**DPA854**
Output	µV/W/m2	0/4÷20 mA, 0/1÷5 V
Power supply	-	10÷30 Vac/dc
Maximum solar irradiance	2000 W/m2	0÷1500 W/m2
Cable	L. 10 m	7 pin IP65 watertight connector
Installation (on ø 50 mm pole)	Using DYA034 or DYA035 + DYA051	Using DYA051
Data logger compatibility	M-Log (ELO007-008), R-Log (ELR515), E-Log (all models)	

Common features.		
Pyranometer	Principle	Termopile
	Type	First class WMO (ISO9060)
	Spectral range	305÷2800 nm
	Uncertainty	5% daily
	Response time	27 sec
General Information	Housing	Anodised aluminium,

Accessories		
	**DYA035**	Tilt arm for Pyranometers
	DYA034	Arm for fixing DPA153, DPA251.1 to DYA051 collar
	DYA051	Mast-mounting device for ø 50 mm pipe
	**DEA852**	Converter for Pyranometers. 0/4÷20 mA, 0/1÷5 V Power consumption: 10 mA+output Power supply 10÷30 Vac/dc . Requires DWAxxx cable
	DWA510	Cable L.= 10 m
	DWA525	Cable L.= 25 m
	DWA526	Cable L.= 50 m
	DWA527	Cable L.= 100 m
	DPA245	Occultation band for diffuse radiation (DPA153, DPA251.1 only)
	MG2251	7 pin free female connector

Solar radiation (global irradiance)

Models		
Second class Pyranometers For solar irradiance measurement, according to ISO 9060 and WMO No. 8 (Part I, Chapter 7). First Class ISO 9060 (total uncertainty, daily total: 10%),		
Order numb.	**DPA053**	**DPA860**
Output	µV/W/m2	0/4÷20 mA, 0/1÷5 V
Power supply	-	10÷30 Vac/dc
Maximum solar irradiance	2000 W/m2	0÷1500 W/m2
Cable	L. 5 m	7 pin IP65 watertight connector
Installation (on ø 50 mm pole)	Using DYA034 or DYA035 + DYA051	Using DYA051
Data logger compatibility	M-Log (ELO007-008), R-Log (ELR515), E-Log (all models)	

Common features.		
Pyranometer	Principle	Termopile
	Type	Second class WMO (ISO9060)
	Spectral range	305÷2800 nm
	Uncertainty	10% daily
	Response time	60 sec
General Information	Housing	Anodised aluminium,

Accessories		
	**DYA035**	Tilt arm for Pyranometers
	DYA032	Arm for fixing DPA053 to DYA051 collar
	DYA051	Mast-mounting device for ø 50 mm pipe
	**DEA852**	Converter for Pyranometers. 0/4÷20 mA, 0/1÷5 V Power consumption: 10 mA+output Power supply 10÷30 Vac/dc . Requires DWAxxx cable
	DWA510	Cable L.= 10 m
	DWA525	Cable L.= 25 m
	DWA526	Cable L.= 50 m
	DWA527	Cable L.= 100 m
	MG2251	7 pin free female connector

Solar radiation (Net radiation: incoming and outgoing short-wave)

Models		
Net radiometer Net radiometers are sensors for measuring net radiation, i.e.the difference between the radiation arriving directly from the sky and reflected short wave and emitted long wave radiation from the ground. The primary sensitive element is a high sensitivity thermopile.		
Order numb.	**DPA240**	**DPA840**
Output	µV/W/m2	0/4÷20 mA, 0/1÷5 V
Power supply	-	10÷30 Vac/dc
Range	-1500÷1500 W/m2	-150÷1500 W/m2
Cable	L. 10 m	7 pin IP65 watertight connector
Installation (on ø 50 mm pole)	Using DYA031 + DYA051	Using DYA051
Data logger compatibility	M-Log (ELO007-008), R-Log (ELR515), E-Log (all models)	

Common features.		
Pyranometer	Principle	Termopile
	Spectral range	300÷6000 nm
	Uncertainty	5% daily
General Information	Housing	Plated brass and Aluminium,

Accessories	
DYA051	Mast-mounting device For ø 50 mm pipe
DYA031	Arm for fixing For DPA240 only (required DYA051)
DWA510	Cable L.= 10 m (DPA540, DPA548)
DWA525	Cable L.= 25 m (DPA540, DPA548)
DWA526	Cable L.= 50 m (DPA540, DPA548)
DWA527	Cable L.= 100 m (DPA540, DPA548)
MG2251	7 pin free female connector

Solar radiation (4-components net radiation: short and long wave)

Models	Order numb.		
	**4-component net radiometer** DPA266 is a 4-component net-radiation sensor that is used for scientific-grade energy balance studies. The instrument has separate measurements of solar (Short Wave or SW) and Far Infra-Red (Long Wave or LW) radiation.		
	DPA266 **4 components** **Net radiometer**		
		Output	4 x µV/W/m2
		Principle	Thermopile
		Measurements	Incoming&outgoing short wave (pyranometer)
			Incoming&outgoing long wave (pyrgeometer)
		Range	0 ÷2000 W/m2
	Pyranometer	Type	Second class WMO (ISO9060)
		Spectral range	305÷2800 nm
	Pyrgeometer **General**	Spectral range	4500÷50.000 nm
		Temperature sensor	Pt100
		Heating	1,6 Watt, 12 Vdc
		Cable	L.5 m
		Data logger compatibility	M-Log (ELO007-008), R-Log (ELR515), E-Log (all models)

Solar radiation (UV-A)

Models		
UV-A radiometer Radiometers measure radiation in the UV-A spectrum. The sensitive element is a photodiode with optical filter with interferential deposition in order to improve the spectral transmission. Correction for cosine response with diffuser for radiations arriving from low angles.		
Order numb.	**DPA007**	**DPA816**
Output	0÷300 mV	0/4÷20 mA, 0/1÷5 V
Power supply	12 Vdc	10÷30 Vac/dc
Power consumption	10 mA	0,7 W
Cable	L. 10 m	7 pin IP65 watertight connector
Installation (on ø 50 mm pole)	Using DYA034 or DYA035 + DYA051	Using DYA051
Data logger compatibility	M-Log (ELO007-008), R-Log (ELR515), E-Log (all models)	

Common features.		
UV-A sensor	Principle	Photodiode
	Spectral range	315÷400 nm
	Uncertainty	12% daily
	Measuring range	0÷70 W/m2
General Information	Housing	Anodised aluminium,

Accessories

DYA051	Mast-mounting device for ø 50 mm pipe
DYA034	Arm for fixing For DPA007 only (requires DYA051)
DWA510	Cable L.= 10 m (DPA816)
DWA525	Cable L.= 25 m (DPA816)
DWA526	Cable L.= 50 m (DPA816)
DWA527	Cable L.= 100 m (DPA816)
MG2251	7 pin free female connector

Solar radiation (UV-B)

Models		
UV-B radiometer Radiometers measure radiation in the UV-B spectrum. The sensitive element is a photodiode with optical filter with interferential deposition in order to improve the spectral transmission. Correction for cosine response with diffuser for radiations arriving from low angles.		
Order numb.	**DPA009**	**DPA821**
Output	0÷300 mV	0/4÷20 mA, 0/1÷5 V
Power supply	12 Vdc	10÷30 Vac/dc
Power consumption	10 mA	0,7 W
Cable	L. 10 m	7 pin IP65 watertight connector
Installation (on ø 50 mm pole)	Using DYA034 or DYA035 + DYA051	Using DYA051
Data logger compatibility	M-Log (ELO007-008), R-Log (ELR515), E-Log (all models)	

Common features.		
UV-A sensor	Principle	Photodiode
	Spectral range	280÷315 nm
	Uncertainty	15% daily
	Measuring range	0÷5 W/m2
General Information	Housing	Anodised aluminium,

Accessories

DYA051	Mast-mounting device for ø 50 mm pipe
DYA034	Arm for fixing For DPA009 only (requires DYA051)
DWA510	Cable L.= 10 m (DPA821)
DWA525	Cable L.= 25 m (DPA821)
DWA526	Cable L.= 50 m (DPA821)
DWA527	Cable L.= 100 m (DPA821)
MG2251	7 pin free female connector

Sunshine duration

Models	Order numb.

Sunshine duration gauge

The sensor measures sunshine duration (referred to a certain threshold) and direct radiation from the sun. Measurement is made in the visible range and near infrared, to second class WMO pyrometric specifications. Once set up for the latitude and location, the sensor does not require seasonal positioning unless greater precision is needed, accomplished by two annual adjustments. For each rotation, the instrument determines the two radiation levels of the beam, with and without the direct action of the sun disc, and calculates the difference, which gives a good approximation to the direct radiation level. The instrument also supplies the sunshine status, defined as present when direct radiation is above 120 Wm-2 (WMO standard, 1981). The sensor has two actionable heaters: a continuous anti-condensation heater and a thermostatic one for defrosting. in conditions of darkness, the band is stopped and the sunshine status is set to "no

DPD504		
	Output	RS232
Direct radiation	Principle	Non-tracking sensor
	Sensitive element	Photodiode
	Spectral range	300÷1100 nm
	Uncertainty	15% daily
	Measuring range	0÷1500 W/m2
	Output	60÷300 mV
	Output	on/off TTL
Sunshine duration	Threshold	120 W/m2 of direct radiation
	Power supply	12 Vdc
General	Sensor Power consumpt.	0,7 W
	Anticondesation heater	1 W
	Defrosting heater	20 W
	Mast-mounting	For ø 50 mm pipe
	Data logger compatibility	M-Log (ELO007-008), R-Log (ELR515), E-Log (all models)

Accessories

DYA058	Lateral arm for ø 50 mm pipe
DWA510	Cable L.= 10 m
DWA525	Cable L.= 25 m
DWA526	Cable L.= 50 m
DWA527	Cable L.= 100 m

Rain intensity

Models		
	**Rain gauge** Rain gauge is a sensor to measure rain quantity. The measurement device is composed of a collector cone and a double chamber bascule connected to a magnete that operates one reed switch, which generates impulses that can be counted by external meters: each impulse is equal to 0.2 mm of rain (optional 0.1 and 0,5 mm). Aluminium housing. The rain gauge can be placed either directly on the ground by means of the DYA039 base plate or mounted on the top (using DYA040 tripod) or the lateral side (using DYA058+DYA040) of 50 mm diameter. meteorological mast. For sites with sub-zero temperatures, the thermostatic heated models (DQA131#C) ensure the complete melting of snow, even at extreme temperatures.	
Order numb.	**DQA130#C**	**DQA131#C**
Heaters	NO	YES
Heater power supply	-	24 Vac
Heater power consumption	-	60 W

Common features		
Rain gauge	Principle	Tipping bucket
	Design	WMO accordance
	Diameter	203 mm
	Inlet area	324 cmq
	Resolution	0,2 mm
	Uncertainty	Intensity 0÷1 mm/min: ± 0,2 mm Intensity 1÷10 mm/min: 1%
	Output	Pulses 0,5 A/24V non inductive
	Housing	Aluminium
	Weight	2,8 Kg
	Calibration certificate	Included
	Data logger compatibility	M-Log (ELO007-008), R-Log (ELR515), E-Log (all models)

Accessories		
	DYA039	Base plate for ground installation
	DYA040	Mast-mounting device for ø 50 mm pipe
	DYA058	Lateral support. Requires DYA040
	DWA510	Cable L.= 10 m
	DWA525	Cable L.= 25 m
	DWA526	Cable L.= 50 m
	DWA527	Cable L.= 100 m
	MG2251	7 pin free female connector
	**DEA280**	Integrator for DQA130#C/131#C Range: 0-20 mm. Output: 4-20 mA Power supply: 24 Vac
	DEA285	Integrator for DQA130#C/131#C Range: 0-20 mm. Output: 4-20 mA Power supply: 12 Vdc
	DEA282	Integrator for DQA130#C/131#C Range: 0-20 mm. Output: 0-5 Vdc Power supply: 24 Vac

Rain presence

Models	Order numb.

Rain presence sensor

Rain presence sensors are used when it is necessary to discriminate between pluviometric rainfall and condensation. The measurement principle employed is that of conductivity between two electrodes; these are kept above enviromental temperature in order to prevent condensation forming.

DQA060	Principle	Capacitive
	Power supply	12 Vdc
	Measure	Presence of rain
	Output	Relay contact (1A-40V)
	Operative temperature	0÷+50°C

Accessories

DYA051	Mast-mounting device for ø 50 mm pipe
DWA510	Cable L.= 10 m
DWA525	Cable L.= 25 m
DWA526	Cable L.= 50 m
DWA527	Cable L.= 100 m

Wetness presence

Models	Order numb.

Wetness presence sensor

The wet presence sensors detect the presence of water irrespective of the source. These sensors are also based on the principle of conductivity between electrodes, which are arranged on petals exposed in four directions.

DQA057	Principle	Conductimetric
	Measure	Presence of water
	Output 1	100 mV present, 200 mV absent
	Output 2	Open collector 100 mA 40 Vmax
	Operative temperature	-15÷ +50°C
	Power supply	12 Vdc

Accessories

DYA051	Mast-mounting device For ø 50 mm pipe
MN1071	Cable

Barometric pressure

Models		
Barometers Sensors for measuring atmoshperic pressure. DQA240.1#C is more suitable for LSI-LASTEM data acquisition systems. The DQA250 model is suitable in applications where a low accuracy (0,3 hPa) is required		
Order numb.	**DQA240.1#C**	**DQA250.1**
Output	0÷1 V	0÷1 V
Power supply	12 Vdc	24 Vac
Power consumption	0,25 W	4 mA
Uncertainty	1 hPa	0,3 hPa (+15÷+25°C)
Thermal drift	0,1 hPa/°C (-10÷+60°C)	< 0,2 hPa
Calibration certificate	Includes	

Models				
	Sensors for measuring atmoshperic pressure. Calibration is made using trimmers. DQA223 model uses a thermocompensation system to reduce the thermal effect on the pressure measurement, furthermore on those models the analogue output is locally selectable.			
Order numb.	**DQA201**	**DQA202**	**DQA208**	**DQA223**
Output	4÷20 mA		0÷5 Vdc	0/4÷20 mA, 0/1÷5 V, 0/60÷300 mV
Power supply	24 Vac	12 Vdc		12 Vdc
Power consumption	1 W			4 mA
Uncertainty	1 hPa			1 hPa
Thermal drift	0,1 hPa/°C (-10÷+60°C)			0,01 hPa/°C (-10÷+60°C)

Common features.		
Barometer	Principle	Piezoelectric
	Range	800÷1100 hPa
	Maximum pressure limit	2000 hPa
	Protection	IP43

Evaporation

Models	Order numb.

Evaporimeter

LSI-LASTEM evaporimeter pan and wooden platform are built to WMO standards for class "A" evaporimeters.
The pan is in stainless steel. The wooden platform is made of white plastic. The stainless steel still well is housed in the pan and contains the evaporimeter level sensor. The automatic type is equipped with a piezometric water level sensor with analogue output, it can be connected to electronic acqusition systems. On the LSI-LASTEM data logger it is possible to program the "on-switch"of an electric valve for the automatic filling of water at a certain time if the measured water level is below 25 cm deep.

DYI010		
Evaporation pan	Design	WMO Class A
	Housing	Stainless steel AISI 304
	Evaporation surface	1,143 m2
	Steel well	Included
	Weight	22 Kg
	Dimensions	Ø 1207 mm, H. 254

Accessories

DYI013	Plastic made platform
DQC102	Piezometric type water level sensor
	Range: 0÷200 mm/H2O
	Output: 4÷20 mA
	power supply: 12 Vdc
DWA510	Cable L.= 10 m
DWA525	Cable L.= 25 m
DWA526	Cable L.= 50 m
DWA527	Cable L.= 100 m

Soil temperature

Models		
Soil temperature sensors DLA400 is used on surface ir in the first 50 cm deep soil temperature measurements. Pickets assure sensor stability when it is not deep inserted in the ground or in case of surface measurement. A ring is used to fix the sensor to the requested deepness. A radiand screen protect the rod from the direct solar radiation. DLE041 is made of a water-proof shank completely inserted inside the soil at the requested deepness.		
Order numb.	**DLA400**	**DLA041**
Uses	on surface ir in the first 50 cm deep soil	Fill-in inside the soil

Common features		
Soil temperature	Principle	Pt100 1/2 DIN B
	Measuring range	Depending by the data acquisition system
	Uncertainty	0,15°C (0°C)
	Uscita	Pt100 DIN-IEC 751 table
	Cable	L.10 m
	Housing	Stainless steel AISI 304

Accessories	
DLA403	Radiant screen for DLA400
DLA404	Deepness setting ring for DLA400
DLA401	Picket L.50 mm for DPA400
DLA402	Connection rod for DPA400

Soil moisture&temperature

Models	Order numb.		
	**Soil moisture sensor** DQA340 - Ideal for monitoring of volumetric moisture in soils and other porous materials. Sensor based on TDR technology (Time Domain Reflectometry). This assures good accuracy even in very wet soils, without special calibration for mineral soils. Using its rods, the sensor can be fitted in the material for 11 cm. It measure soil mosture in a 0-100% range and also contact temperature.		
	DQA304		
	Moisture	Principle	TDR (Time domain reflectometry)
		Measuring range	0÷100%
		Uncertainty	0÷40%: ± 1%, 40÷70%: ± 2%
	Temperature	Principle	Pt100 1/2 DIN B
		Uncertainty	± 0,2°C
	General	Power supply	6÷24 Vdc
		Power consumption	Sleep: 5 mA, Measuring: 120 mA
		Cable	L.5 m
		Output	2x0÷1 V

Visibility

Models	Order numb.		
	**Visibility sensor** The DPA305 visibility sensor with a measuring range up to 2 km is designed to detect fog and haze on roads and in tunnels. With both digital and analogue outputs as well as relays for switching external equipment the sensor can be integrated into Intelligent Transport Systems and used for automatically switching warning signs in changing visibility conditions		
	DPA305		
	Visibility	Principle	Forward scatted meter with 45°angle
		Measuring range	<10 m÷2 Km Visibility (MOR)
		Uncertainty	<= 10%
		Output	4÷20 mA
		N.3 switching relays	1) Fault 2) Visibility threshold 3) YES/NO precipitation or 2nd visibility threshold
		Power supply	9÷36 Vdc
		Power consumption	6 W in normal running (no-dew heater ON) 2,5 W no-dew heater OFF
		Operative temperature	-30÷ +50°C

Water level

Models					
	**Water level sensor (summergible)** Piezometric summergible water level sensors. Inside the sensor there is a piezoelectric element able to detect di pressure difference between the pressure at the deepness where the sensor is placed and the outside pressure. This pressure difference, in relation with the water column above the sensor, is in function with the water level. Sensors are equipped with a special cable (ventilated) in which runs a tube, the tube permits to the external air pressure to reach the measuring element.				
Order numb.	**DQC001.15**	**DQC001.20**	**DQC001.25**	**DQC001.30**	**DQC001.35**
Summergible cable	L.15 m.	L.20 m.	L.25 m.	L.30 m.	L.35 m.
	DQC001.40	**DQC001.45**	**DQC001.50**	**DQC001.55**	**DQC001.60**
Summergible cable	L.40 m.	L.45 m.	L.50 m.	L.55 m.	L.60 m.

Common features		
Water level	Principle	Piezometric type
	Range	0÷10 m
	Uncertainty	< 0,5% Full scale (IEC60770)
	Thermal drif	<0,2% Full scale/10K
	Thermal compensation	0÷70°C
	Power supply	12÷36Vdc
	Power consumption	Max 20 mA
	Output	4÷20 mA (two wires)
	Material	Body: stainless steel. Sensor: ceramic, seals FKM Cable: PVC
	Dimensions	Ø: 27 mm, L:109,6 mm

Water level

Models		
	**Water level sensor (altra-sonic)** The sensor measured the time needed to the ultra-sonic wave, emitted from the sensor, to return to the sensor; it is function of the distance between the sensor and the reflecting surface bellow it. These models are more suitable than the summergible type, when the installation of the summergible type is difficult due to strong current river boarder not accessible, etc.	
Order numb.	**DQL003**	**DQL005**
Range	0,25÷5 m	0,4÷8 m

Common features

Water level	Principle	Ultra-sonic (70 kHz)
	Uncertainty	± 1 cm (+18÷+30°C, 860-1060 hPa)
	Operative temperature	-40÷+80°C
	Power supply	20÷36 Vdc
	Output	4÷20 mA
	Material	PVDF
	Weight	1,8 Kg

Accessories

DYA044	Lateral support for ø 50 mm pipe

Snow level

Models	Order numb.

Snow level sensor

The robust design of the DQL011 makes it ideal for the reliable measurement of snow-depth in extreme conditions. The additional air-temperature detection feature permits precise measurement of snow-depth over a wide temperature range. The powerful ultrasonic impulses emitted by this snowdepth sensor deliver reliable readings even when there is a difficult reflection ratio, as is the case with powdery or fresh snow. The sensor is characterized by its high level of operating reliability, low energy consumption and ease of use in the field.

DQL011		
Snow level	Principle	Ultra-sonic (frequency 50 kHz)
	Range	0÷8 m
	Resolution	1 mm
	Uncertainty	< 0,1% Full scale
	Beamwidth	12°
Air temperature	Principle	Semiconductor in radiant shield
	Range	-40÷+60°C
	Resolution	0,1°C
	Uncertainty	< 0,15%
General	Power supply	10,5÷15 Vdc
	Power consumption	Max 200 mA, 5 mA (stand-by)
	Energy consumption	0,5 Ah/day (1 min.measuring interv.)
	Output 1	2x0/4-20 mA
	Output 2	RS232
	Operative temperature	-40÷ +60°C
	Material	Aluminium
	Installation	Mast-mounting for 61 mm pipe
	Connector	12 pin-connector (cable not included)

Accessories

DYA047	Lateral support For ø 50 mm pipe
MN1072	Cable Each meter

LSI LASTEM Srl
20090 Settala Premenugo – Milano – Italy
Tel. (+39) 02 954141
Fax (+39) 02 95770594
Email: info@lsi-lastem.it
www.lsi-lastem.it