

**D09847**



probe.  
Firmware update through RS232C serial port from version 3.0. Different types of SICRAM modules or probes can be connected to the input: Platinum sensor temperature, thermocouple, relative humidity/temperature, Discomfort index, continuous voltage ( $\pm 20V$ ), current (0...24mA), pressure, air speed and light.

**TECHNICAL DATA OF THE INSTRUMENT D09847**

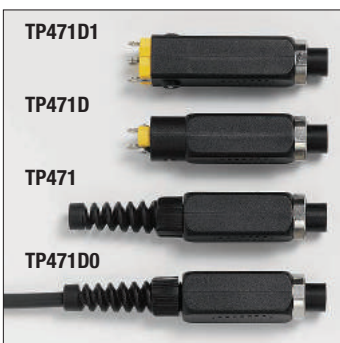
- Power supply:  
Battery: 4 1.5V AA alkaline batteries; operating time with high quality batteries: about 60 hours.  
Mains: through 12Vdc, 300mA external power supply, 2 pole connector.
- Operating conditions:  
Working temperature: -10...+60°C. Storage temperature: -25...+65°C.  
Relative Humidity: 0...90%R.H., not condensating.
- LCD display: 128x64 pixel (56x38 mm) graphic LCD.
- Keyboard: 18 multifunction keys and 3 function keys.
- Recorded data safety: independently from batteries charging conditions.
- Measured values storage: on 16 files divided into 16-sample pages.
- Quantity: 32.000 samples of 3 variables or 10.000 samples of 10 variables.
- Storage interval: 1 s...1 h. Time and date, real time.  
Accuracy: 1 minute/month maximum deviation.
- Serial interface:  
RS232C type galvanically insulated SUB D 9 male connector.  
Baud rate: 300...115.200 baud. Data bit: 8.  
Parity: none. Stop bit: 1.  
Flow control: Xon/Xoff. RS232C cable max.length: 15 m.
- immediate printing interval: 1 s...1 h.
- Firmware can be updated through PC using the instrument serial port.
- Probes connections: n° 3 DIN45326 8 pole connectors
- Dimensions and weight: 245x100x50 mm - 300 gr.
- Case: ABS - Protection: rubber.
- IP:64

**D09847 - CHARACTERISTICS OF THE SICRAM MODULES**

When the instrument is used together with the available SICRAM modules, its accuracy and resolution are stated in the section where these modules are described.

**D09847  
PORTABLE MULTIFUNCTION DATA-LOGGER INSTRUMENT**

D09847 is a multifunctional handheld board instrument and datalogger. It is provided with a 128x64 pixel (56x38 mm) graphic display and three independent inputs. Each input can be connected to one channel or two channel dual probes (ex. two thermocouples, relative humidity/temperature, etc.). The instrument automatically recognises SICRAM probes connected to the input (memory equipped and configurable intelligent probe).  
Functions: watch, hold, max., min., average, record, immediate or deferred start record logging, difference between the two inputs, relative measures, three input channel measurement and inside reference temperature display.  
Sampling time: one per second/input.  
Probe calibration through individual SICRAM module; calibration data permanent storage inside the probe.  
Storage capacity: 32.000 readings per input.  
Storage interval and printing can be configured between 1 second and 1 hour.  
RS232C serial output: from 300 up to 115.200 baud rate.  
Immediate or deferred print-out.  
Stored data can be displayed and stored data blocks can be deleted.  
Automatic shutout after 8 minutes can be disabled.  
Units of measurement can be selected according to the physical quantity of the connected



## TECHNICAL DATA OF SICRAM PROBES AND MODULES IN LINE WITH THE INSTRUMENTS

### Direct voltage and current

**VP473** SICRAM module for the measurement of direct voltage. When connected to a transmitter with voltage output, it can acquire the voltage signal. Measuring range:  $\pm 20$  Vdc. Input impedance: 1 M $\Omega$ .

**IP472** SICRAM module for the measurement of direct current. When connected to a transmitter with current output, it can acquire the current signal. Measuring range: 0...24 mA. Input impedance: 25  $\Omega$ .

### Temperature with Platinum sensors (PRT)

#### 4-wire Pt100 sensor temperature probes equipped with SICRAM module

Model	Type	Application range	Accuracy
<b>TP472I</b>	Immersion	-196 °C...+500 °C	$\pm 0.25$ °C (-196 °C...+300 °C) $\pm 0.5$ °C (+300 °C...+500 °C)
<b>TP472I.0</b> 1/3 DIN - Thin Film	Immersion	-50 °C...+300 °C	$\pm 0.25$ °C
<b>TP473P.I</b>	Penetration	-50 °C...+400 °C	$\pm 0.25$ °C (-50 °C...+300 °C) $\pm 0.5$ °C (+300 °C...+400 °C)
<b>TP473P.0</b> 1/3 DIN - Thin Film	Penetration	-50 °C...+300 °C	$\pm 0.25$ °C
<b>TP474C.0</b> 1/3 DIN - Thin Film	Contact	-50 °C...+300 °C	$\pm 0.3$ °C
<b>TP475A.0</b> 1/3 DIN - Thin Film	Air	-50 °C...+250 °C	$\pm 0.3$ °C
<b>TP472I.5</b>	Immersion	-50 °C...+400 °C	$\pm 0.3$ °C (-50 °C...+300 °C) $\pm 0.6$ °C (+300 °C...+400 °C)
<b>TP472I.10</b>	Immersion	-50 °C...+400 °C	$\pm 0.3$ °C (-50 °C...+300 °C) $\pm 0.6$ °C (+300 °C...+400 °C)
<b>TP49A.I</b>	Immersion	-70 °C...+250 °C	$\pm 0.25$ °C
<b>TP49AC.I</b>	Contact	-70 °C...+250 °C	$\pm 0.25$ °C
<b>TP49AP.I</b>	Penetration	-70 °C...+250 °C	$\pm 0.25$ °C
<b>TP875.I</b>	Globe-thermometer $\varnothing$ 150 mm	-30 °C...+120 °C	$\pm 0.25$ °C
<b>TP876.I</b>	Globe-thermometer $\varnothing$ 50 mm	-30 °C...+120 °C	$\pm 0.25$ °C
<b>TP87.0</b> 1/3 DIN - Thin Film	Immersion	-50 °C...+200 °C	$\pm 0.25$ °C
<b>TP878.0</b> 1/3 DIN - Thin Film	Photovoltaic	-40 °C...+85 °C	$\pm 0.25$ °C
<b>TP878.1.0</b> 1/3 DIN - Thin Film	Photovoltaic	-40 °C...+85 °C	$\pm 0.25$ °C
<b>TP879.0</b> 1/3 DIN - Thin Film	Compost	-20 °C...+120 °C	$\pm 0.25$ °C

#### Common characteristics

Resolution 0.01 °C from -200 °C to 350 °C / 0.1 °C from 350 °C to 800 °C  
Temperature drift @ 20 °C 0.003 %/°C

### 4-wire Pt100 and 2-wire Pt1000 probes

**TP471** Module for **NO** SICRAM temperature probes with Platinum sensor (PRT).  
Resistance values of the sensor @ 0 °C 25  $\Omega$ , 100  $\Omega$ , 500  $\Omega$   
Measuring range Pt25, Pt100 -200 °C ... +850 °C  
Measuring range Pt500 -200 °C ... +500 °C  
Accuracy with Pt25, Pt100 sensor  $\pm 0.03$  °C up to 350 °C  
 $\pm 0.3$  °C up to 850 °C  
Accuracy with Pt500 sensor  $\pm 0.5$  °C up to 500 °C  
Resolution 0.01 °C from -200 °C to 350 °C  
0.1 °C from 350 °C to 800 °C  
Temperature drift @ 20 °C 0.002 %/°C  
Excitation current 400  $\mu$ A impulsive, Duration=100 ms, Period=1 s

## Temperature with thermocouple sensors

**TP471D0** 1-input module for **NO** SICRAM probes with thermocouple sensors type K-J-E-T-N-R-S-B. **Without cold joint compensation.**

**TP471D** 1-input module for **NO** SICRAM probes with thermocouple sensors type K-J-E-T-N-R-S-B. **With internal sensor for cold joint compensation.**

**TP471D1** 2-input module for **NO** SICRAM probes with thermocouple sensors type K-J-E-T-N-R-S-B. **With internal sensor for cold joint compensation.**

*Characteristics of thermocouple temperature measurement (modules TP471D0, TP471D, TP471D1)*

Measuring range Tc: K	-200 ... +1370 °C
Measuring range Tc: J	-100 ... +750 °C
Measuring range Tc: T	-200 ... +400 °C
Measuring range Tc: N	-200 ... +1300 °C
Measuring range Tc: R	+200 ... +1480 °C
Measuring range Tc: S	+200 ... +1480 °C
Measuring range Tc: B	+200 ... +1800 °C
Measuring range Tc: E	-200 ... +750 °C

**Resolution** **0.05 °C up to 199.95 °C**  
**0.1 °C from 200.0 °C till full scale**

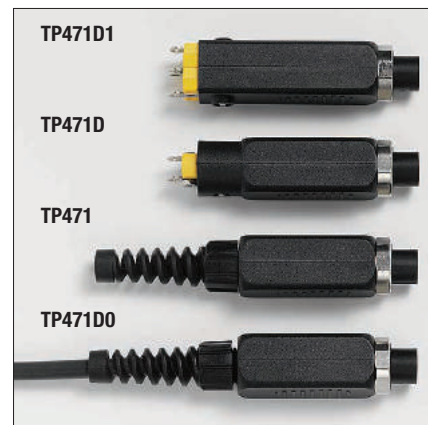
Instrument accuracy:	
Thermocouple K	±0.1 °C up to 600 °C ±0.2 °C above 600 °C
Thermocouple J	±0.05 °C up to 400 °C ±0.1 °C above 400 °C
Thermocouple T	±0.1 °C
Thermocouple N	±0.1 °C up to 600 °C ±0.2 °C above 600 °C
Thermocouple R	±0.25 °C
Thermocouple S	±0.3 °C
Thermocouple B	±0.35 °C
Thermocouple E	±0.1 °C up to 300 °C ±0.15 °C above 300 °C

**The accuracy is referred to the instrument only, the error due to the thermocouple or the cold joint reference sensor is excluded.**

Temperature drift @ 20 °C	0.02 %/°C
Drift after 1 year	0.1 °C/year

### Tolerance of the thermocouple probes:

The tolerance of a type of thermocouple corresponds to the maximum allowed deviation from the e.m.f. of any thermocouple of that type, with reference junction at 0°C. The tolerance is expressed in Celsius degrees, preceded by the sign. The tolerances refer to the operating temperature for which the thermocouple is provided, depending on the diameter of the thermo elements.



## THERMOCOUPLE TOLERANCE CLASSES

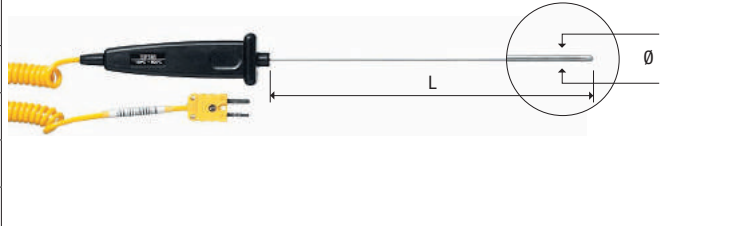
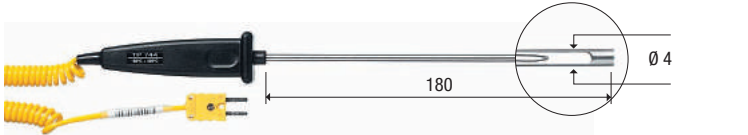
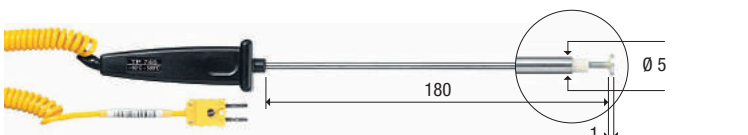
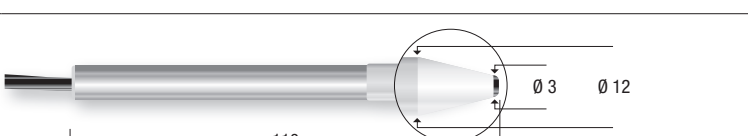

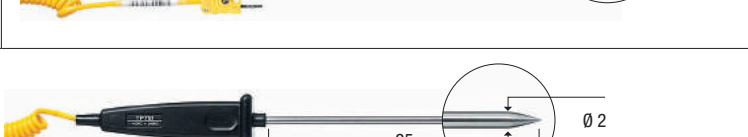
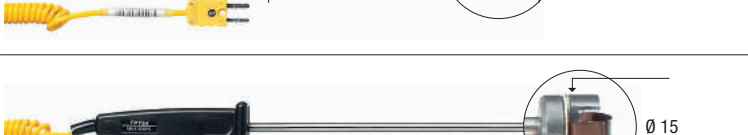
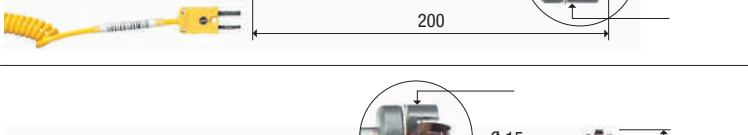
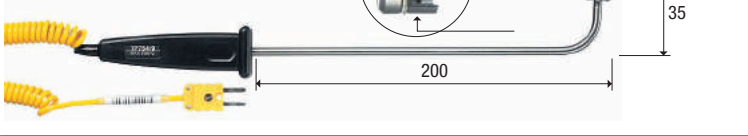

Tolerances according to the standard **IEC 60584-2**.

The values are referred to **thermocouples with reference junction at 0 °C**.

Type of thermo-couple	Class 1 tolerance		Class 2 tolerance		Class 3 tolerance	
	Temperature interval (°C)	Tolerance (°C)	Temperature interval (°C)	Tolerance (°C)	Temperature interval (°C)	Tolerance (°C)
<b>B</b>	---	---	+600...+1700	± 0.0025 × t	+600...+800	± 4
	---	---	---	---	+800...+1700	± 0.005 × t
<b>E</b>	-40...+375	± 1.5	-40...+333	± 2.5	-167...+40	± 2.5
	+375...+800	± 0.004 × t	+333...+900	± 0.0075 × t	-200...-167	± 0.015 × t
<b>J</b>	-40...+375	± 1.5	-40...+333	± 2.5	---	---
	+375...+750	± 0.004 × t	+333...+750	± 0.0075 × t	---	---
<b>K, N</b>	-40...+375	± 1.5	-40...+333	± 2.5	-167...+40	± 2.5
	+375...+1000	± 0.004 × t	+333...+1200	± 0.0075 × t	-200...-167	± 0.015 × t
<b>R, S</b>	0...+1100	± 1	0...+600	± 1.5	---	---
	+1100...+1600	± [1+0.003 × (t-1100)]	+600...+1600	± 0.0025 × t	---	---
<b>T</b>	-40...+125	± 0.5	-40...+133	± 1	-67...+40	± 1
	+125...+350	± 0.004 × t	+133...+350	± 0.0075 × t	-200...-67	± 0.015 × t

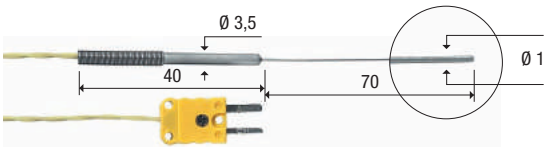
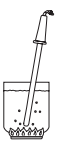
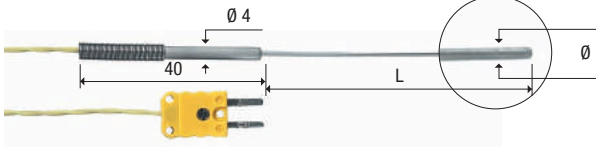
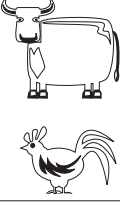



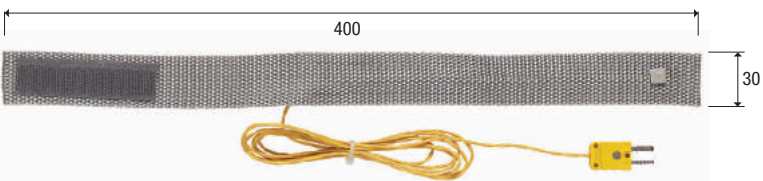
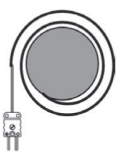
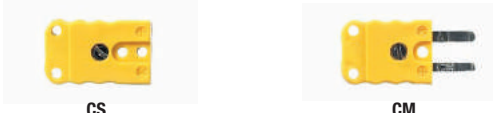

Note: t = temperature of the measuring junction in °C.

**THERMOCOUPLE PROBES TYPE "K" (CHROMEL - ALUMEL) WITH GROUNDED HOT JUNCTION**

CODE	°C max	$\tau$ s	DIMENSIONS (mm)		USE
TP741	800	2s	L=180	$\varnothing=1.5$	
TP741/1	400	2s	L=90	$\varnothing=1.5$	
TP741/2	800	2s	L=230	$\varnothing=1.5$	
TP742	800	2s	L=180	$\varnothing=2$	
TP742/1	400	2s	L=90	$\varnothing=2$	
TP742/2	800	2s	L=230	$\varnothing=2$	
TP743	800	3s	L=180	$\varnothing=3$	
TP744	400	4s			
TP745	500	5s			
TP746	250	2s			
TP750	-196 +1000	3s	L=500	$\varnothing=3$	
TP750.0	-196 +800	3s	L=300	$\varnothing=3$	
TP751	200	2s			
TP754	500	2s			
TP754/9	500	2s			
TP755	800	2s			
TP755/9	800	2s			



THERMOCOUPLE PROBES TYPE "K" (CHROMEL - ALUMEL) WITH GROUNDED HOT JUNCTION					
CODE	°C max	$\tau$ s	DIMENSIONS (mm)		USE
TP756	200	2s			
TP757	180	30s	MAGNETIC PROBE FOR CONTACT MEASUREMENTS ON MAGNETIC METALLIC SURFACES 		
TP758	400	4s	L=150	$\varnothing=4$	
TP758.1	400	4s	L=90	$\varnothing=4$	
TP772	400	3s			
TP774	250	2s			
TP776	200	2s			
TP777	200	3s			
TP647	300	2s	ACCREDIA calibration up to max. 300°C. 		
TP647/2	300	2s			
TP647/3	300	2s			
TP647/5	300	2s			
TP647/10	300	2s			
TP647/20	300	2s			
TP651	1200	6s	L=1200	$\varnothing=6$	
TP652	1200	6s	L=700	$\varnothing=6$	
TP655	180	2s			

THERMOCOUPLE PROBES TYPE "K" (CHROMEL - ALUMEL) WITH GROUNDED HOT JUNCTION						
CODE	°C max	$\tau$ s	DIMENSIONS (mm)			USE
TP656	200	1s	L=70	$\varnothing=1$		
TP656/1	1000	1s	L=500	$\varnothing=2$		
TP656/2	1000	1s	L=1000	$\varnothing=2$		
TP657/1	100	5s			 Flexible	
TP659	400	3s	L=150	$\varnothing=3$		
TP660	400	4s	L=150	$\varnothing=4.5$		
TP661	-60 +50	30s				
TP662	110	120s			<p>TAPE PROBES WITH VELCRO FOR MEASUREMENTS ON PIPES MAX DIAM. 110</p>  Certification up to 58°C	
CM CS	"K" "K"					
PW	"K"					

#### Response time for a 63% variation ( $\tau_{0,63}$ )

The response time  $\tau$ s is the response time of the sensor to a temperature variation, with a corresponding variation of the measured signal to a given percentage (63%) of the variation.

Response time is referred:

- Immersion probes in water at 100 °C
- Surface probes in contact with metals surface at 200 °C
- Air probes in air temperature at 100 °C

## Relative humidity and temperature

### Relative humidity and temperature probes equipped with SICRAM module

Model	Temperature sensor	Application range		Accuracy	
		%RH	Temperature	%RH	Temp
HP472ACR	Pt100	0...100%RH	-20 °C...+80 °C	±1.5% (0...85%RH) ±2.5% (85...100%RH) @ T=15...35 °C  (2 + 1.5% measure)% @ T= remaining field	±0.3 °C
HP473ACR	Pt100	0...100%RH	-20 °C...+80 °C		±0.3 °C
HP474ACR	Pt100	0...100%RH	-40 °C...+150 °C		±0.3 °C
HP475ACR	Pt100	0...100%RH	-40 °C...+150 °C		±0.3 °C
HP475AC1R	Pt100	0...100%RH	-40 °C...+180 °C		±0.3 °C
HP477DCR	Pt100	0...100%RH	-40 °C...+100 °C		±0.3 °C
HP478ACR	Pt100	0...100%RH	-40 °C...+150 °C		±0.3 °C
HP480	Pt100	0...100%RH	-40 °C...+60 °C		±0.25 °C
HP481	Pt100	0...100%RH	-40 °C...+60 °C		±0.25 °C

#### Common characteristics

##### Relative Humidity

Sensor	Capacitive
Resolution	0.1%RH
Temperature drift @ 20 °C	0.02 %RH/°C
Response time %RH at constant temperature	10 s (10→80 %RH; air speed=2 m/s)

##### Temperature with Pt100 sensor


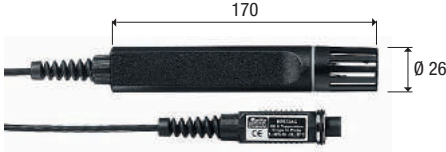
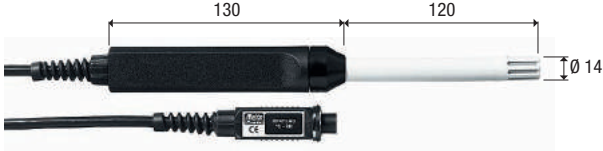
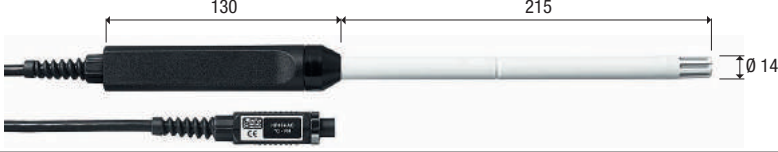

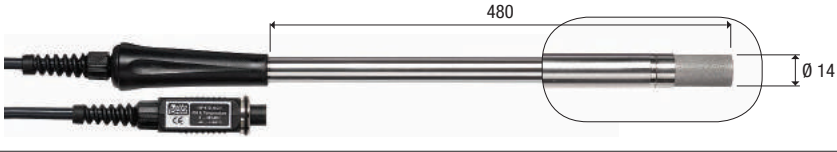



Resolution	0.1 °C
Temperature drift @ 20 °C	0.003 %/°C

#### Protections and solutions for relative humidity and temperature probes

- P1** 200µm stainless steel grid protection for probes Ø26, thread M24x1.5. For temperatures up to 80 °C.
- P2** 20µm PE sintered polythene protection for probes Ø26, thread M24x1.5. For temperatures up to 80 °C.
- P3** 20µm sintered bronze protection for probes Ø26, thread M24x1.5. For temperatures up to 150 °C.
- P4** 20µm sintered PE complete cap for probes Ø26, thread M24x1.5. For temperatures up to 80 °C.

- P6** 10µm sintered stainless steel protection for probes Ø14, thread M12x1. For temperatures up to 180 °C.
- P7** 20µm PTFE protection for probes Ø14, thread M12x1. For temperatures up to 150 °C.
- P8** 20µm stainless steel grid and PBT protection for probes Ø14, thread M12x1. For temperatures up to 100 °C.
- HD75** 75% RH saturated solution for checking the relative humidity sensor, complete with screw adaptor for probes Ø14, M12×1 thread.
- HD33** 33% RH saturated solution for checking the relative humidity sensor, complete with screw adaptor for probes Ø14, M12×1 thread.

### RELATIVE HUMIDITY AND TEMPERATURE PROBES

COD.	Sensors	Range RH - Temp.	USE
HP472ACR	RH Pt100	0...100% RH -20°C...+80°C	
HP572ACR	RH TC.K		
HP473ACR			
HP474ACR		0...100% RH -40°C...+150°C (-40°C...+180°C for HP475AC1R)	
HP475ACR	RH Pt100		
HP475AC1R			
HP477DCR			
HP478ACR			
HP480 HP481	RH Pt100	0...100% RH -40°C...+60°C	

### SATURATED SOLUTIONS AND PROBE PROTECTIONS

COD.			USE
HD75 HD33 HD11	Threaded ring nut M24 x 1.5 for probes Ø 26 Threaded ring nut M12 x 1 for probes Ø 14		
P1 P2 P3 P4	Ø 26	M 24x1.5	
P6 P7 P8	Ø 14	M 12x1	



## Pressure

**PP471** SICRAM module for the measurement of absolute, relative and differential pressure. It works with pressure probes of the series TP704 and TP705. It gives the instantaneous value and the peak of the pressure. The module is supplied with cable L=2m and 8-pole female DIN 45326 connector.

Accuracy	±0.05% of the full scale (f.s.)
Duration of the peak	≥ 5 ms
Accuracy of peak	±0.5% f.s.
Dead band of peak	≤ 2% f.s.

### Pressure probes of the series TP704 and TP705 to be connected to the PP471 module

Full scale pressure	Maximum over-pressure	Resolution	ORDERING CODES			Accuracy from 20 to 25°C	Working temperature	Connection
			Differential pressure	Relative pressure (with respect to atmosphere)	Absolute pressure			
			NON insulated Membrane	Insulated membrane	Insulated membrane			
10.0 mbar	20.0 mbar	0.01 mbar	TP705-10MBD			0.50 % FSO	0...+60 °C	Tube Ø 5 mm
20.0 mbar	40.0 mbar	0.01 mbar	TP705-20MBD			0.50 % FSO	0...+60 °C	Tube Ø 5 mm
50.0 mbar	100 mbar	0.01 mbar	TP705-50MBD			0.50 % FSO	0...+60 °C	Tube Ø 5 mm
100 mbar	200 mbar	0.1 mbar	TP705-100MBD			0.25 % FSO	0...+60 °C	Tube Ø 5 mm
				TP704-100MBGI		0.25 % FSO	-10...+80 °C	¼ BSP
200 mbar	400 mbar	0.1 mbar	TP705-200MBD			0.25 % FSO	0...+60 °C	Tube Ø 5 mm
				TP704-200MBGI		0.25 % FSO	-10...+80 °C	¼ BSP
400 mbar	1000 mbar	0.1 mbar		TP704-400MBGI		0.25 % FSO	-40...+125 °C	¼ BSP
500 mbar	1000 mbar	0.1 mbar	TP705-500MBD			0.25 % FSO	0...+60 °C	Tube Ø 5 mm
600 mbar	1000 mbar	0.1 mbar		TP704-600MBGI		0.25 % FSO	-40...+125 °C	¼ BSP
1.00 bar	2.00 bar	1 mbar	TP705-1BD			0.25 % FSO	0...+60 °C	Tube Ø 5 mm
					TP705BARO	0.25 % FSO	0...+60 °C	Tube Ø 5 mm
				TP704-1BGI		0.25 % FSO	-40...+125 °C	¼ BSP
2.00 bar	4.00 bar	1 mbar			TP704-1BAI	0.25 % FSO	-40...+120 °C	¼ BSP
			TP705-2BD			0.25 % FSO	0...+60 °C	Tube Ø 5 mm
				TP704-2BGI		0.25 % FSO	-40...+125 °C	¼ BSP
5.00 bar	10.00 bar	1 mbar			TP704-2BAI	0.25 % FSO	-25...+85 °C	¼ BSP
				TP704-5BGI		0.25 % FSO	-40...+125 °C	¼ BSP
					TP704-5BAI	0.25 % FSO	-25...+85 °C	¼ BSP
10.0 bar	20.0 bar	0.01 bar		TP704-10BGI		0.25 % FSO	-40...+125 °C	¼ BSP
					TP704-10BAI	0.25 % FSO	-25...+85 °C	¼ BSP
20.0 bar	40.0 bar	0.01 bar		TP704-20BGI		0.25 % FSO	-40...+125 °C	¼ BSP
					TP704-20BAI	0.25 % FSO	-25...+85 °C	¼ BSP
50.0 bar	100.0 bar	0.01 bar		TP704-50BGI		0.25 % FSO	-40...+125 °C	¼ BSP
					TP704-50BAI	0.25 % FSO	-25...+85 °C	¼ BSP
100 bar	200 bar	0.1 bar		TP704-100BGI		0.25 % FSO	-40...+125 °C	¼ BSP
					TP704-100BAI	0.25 % FSO	-25...+85 °C	¼ BSP
200 bar	400 bar	0.1 bar		TP704-200BGI		0.25 % FSO	-40...+125 °C	¼ BSP
					TP704-200BAI	0.25 % FSO	-25...+85 °C	¼ BSP
500 bar	1000 bar	0.1 mbar		TP704-500BGI		0.25 % FSO	-40...+125 °C	¼ BSP
	700 bar	0.1 mbar			TP704-500BAI	0.25 % FSO	-25...+85 °C	¼ BSP

**PP472** SICRAM probe for the measurement of barometric pressure

Measuring range	600...1100 mbar
Resolution	0.1 mbar
Accuracy @ 20 °C	±0.3 mbar
Operating temperature	-10...+60 °C

**PP473 S0** SICRAM probe for the measurement of relative pressure with respect to the atmosphere or differential pressure in the range ± 250 Pa. The probe uses a silicon piezoresistive sensor with high accuracy and temperature compensation, which has excellent linearity, repeatability and stability over the time. A special **auto-zero** circuit periodically equalizes the differential pressure at the sensor input and corrects the offset; this feature makes the probe insensitive to the mounting position and compensates the sensor aging and the deviation of the zero with temperature changes, virtually eliminating maintenance operations. A typical application of the probe is clean rooms monitoring.

Measuring range	± 250 Pa (± 2.5 mbar)
Maximum overpressure	50 kPa
Resolution	0.1 Pa
Accuracy @ 25 °C	± (0.2 Pa + 1.5% of the measure)
Accuracy @ 0...50 °C	± (0.2 Pa + 3% of the measure)
Operating temperature	-10...+60 °C
Response time	0.125 s
Long-term stability	± 0.5% f.s. nominal (1000 h @ 25 °C)
Fluid in contact with the membrane	Non-corrosive dry gas or air
Connection	Ø 5 mm Tube

**PP473 S1...PP473 S8**

SICRAM probes for the measurement of differential pressure.

Measuring range	<b>S1</b> =f.s. 10 mbar	<b>S2</b> =f.s. 20 mbar	<b>S3</b> =f.s. 50 mbar
	<b>S4</b> =f.s. 100 mbar	<b>S5</b> =f.s. 200 mbar	<b>S6</b> =f.s. 500 mbar
	<b>S7</b> =f.s. 1 bar	<b>S8</b> =f.s. 2 bar	
Maximum overpressure	<b>S1,S2,S3</b> =200 mbar	<b>S4</b> =300 mbar	<b>S5,S6</b> =1 bar
	<b>S7</b> =3 bar	<b>S8</b> =6 bar	
Accuracy @ 25 °C	<b>S1,S2,S3</b> =0.5% f.s. <b>S4</b> =0.25% f.s. <b>S5,S6,S7,S8</b> =0.15% f.s.		

Operating temperature -10...+60 °C

Fluid in contact with the membrane non-corrosive dry gas or air

Connection Ø 5 mm Tube



## Air speed

### Air speed probes equipped with SICRAM module

	AP471 S1 AP471 S3	AP471 S2	AP471 S4
Type of measure	Wind speed, calculated flow rate, air temperature		
Type of sensor <i>Speed</i>	NTC thermistor	Omnidirectional NTC thermistor	
<i>Temperature</i>	NTC thermistor	NTC thermistor	
Measuring range			
<i>Speed</i>	0.1...40 m/s	0.1...5 m/s	
<i>Temperature</i>	-25...+80°C	-25...+80°C	0...80°C
Measurement resolution: <i>Speed</i>	0.01 m/s 0.1 km/h 1 ft/min 0.1 mph 0.1 knot		
<i>Temperature</i>	0.1°C		
Measurement accuracy: <i>Speed</i>	±0.2 m/s (0.10...0.99 m/s) ±0.4 m/s (1.00...9.99 m/s) ±0.8 m/s (10.00...40.00 m/s)	±0.05 m/s (0.10...0.99 m/s) ±0.15 m/s (1.00...5.00 m/s)	
<i>Temperature</i>	±0.8°C (-25...+80°C)		
Minimum speed	0.1 m/s		
Air temperature compensation	0...80°C		
Unit of Measurement <i>Speed</i> <i>Flow rate</i>	m/s – km/h – ft/min – mph – knot l/s - m³/s - m³/min - m³/h - ft³/s - ft³/min		
Pipeline section for flow rate calculation	0.0001...1.9999 m²		
Cable length	~2m		



### Vane probes equipped with SICRAM module

	AP472 S1	AP472 S2
Type of measurements	Wind speed, calculated flow rate, air temperature	Wind speed, calculated flow rate
Diameter	100 mm	60 mm
Type of measurement <i>Speed</i> <i>Temperature</i>	Vane Tc K	Vane ----
Measuring range		
<i>Speed</i>	0.6...25 m/s	0.5...20 m/s
<i>Temperature</i>	-25...+80 °C (*)	-25...+80 °C (*)
Resolution		
<i>Speed</i>	0.01 m/s – 0.1 km/h - 1 ft/min – 0.1 mph – 0.1 knot	
<i>Temperature</i>	0.1 °C	----
Accuracy		
<i>Speed</i>	±(0.4 m/s + 1.5% f.s.)	
<i>Temperature</i>	±0.8 °C	----
Minimum speed	0.6 m/s	0.5 m/s
Units of measurement <i>Speed</i> <i>Flow Rate</i>	m/s – km/h – ft/min – mph – knot l/s - m³/s - m³/min - m³/h - ft³/s - ft³/min	
Pipeline section for flow rate calculation	0.0001...1.9999 m²	
Cable length	~2 m	

(\*)The indicated value refers to the vane's working range.

### SICRAM modules for Pitot tubes

	AP473 S1	AP473 S2	AP473 S3	AP473 S4
Type of measure	Air speed, calculated flow rate, differential pressure, air temperature			
Measuring range				
<i>Differential pressure</i>	10 mbar	20 mbar	50 mbar	100 mbar
<i>Air speed (*)</i>	2 ... 40 m/s	2 ... 55 m/s	2 ... 90 m/s	2 ... 130 m/s
<i>Temperature</i>	-200...+600 °C	-200...+600 °C	-200...+600 °C	-200...+600 °C
Resolution				
<i>Air speed</i>	0.1 m/s - 1 km/h - 1 ft/min - 1 mph - 1 knots			
<i>Temperature</i>	0.1°C			
Accuracy				
<i>Air speed</i>	±0.4% f.s. of pressure		±0.3% f.s. of pressure	
<i>Temperature</i>	±0.8 °C			
Minimum air speed	2 m/s			
Compensation of air temperature	-200...+600 °C (with K type thermocouple connected to the module)			
Measuring unit <i>Air speed</i> <i>Flow rate</i>	m/s – km/h – ft/min – mph - knots l/s – m³/s – m³/min – ft³/s – ft³/min			
Pipeline section for flow rate calculation	100...100000 cm² 0.01...10 m²			

(\*) At 20 °C, 1013 mbar and negligible Ps (Static Pressure).

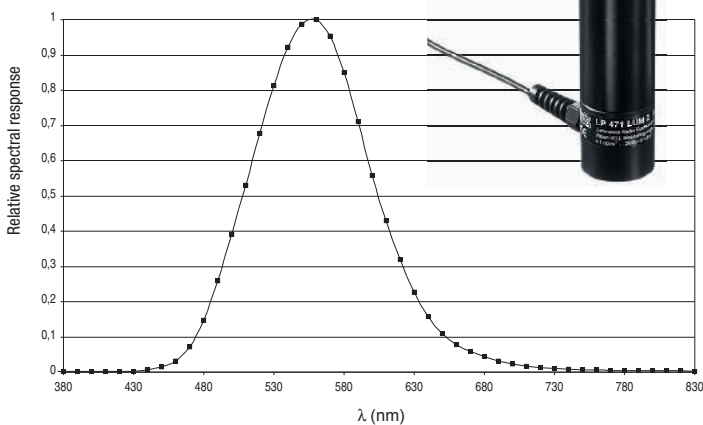
## Photometry and Radiometry

LP471PHOT Probe for the measurement of <b>illuminance</b> , equipped with SICRAM module.				
Measuring range (lux)	0.10...199.99	...1999.9	...19999	...199.99x10 <sup>3</sup>
Resolution (lux)	0.01	0.1	1	0.01 x 10 <sup>3</sup>
Spectral range	In agreement with standard photopic curve V( $\lambda$ )			
$\alpha$ (temperature coefficient) f <sub>6</sub> (T)	<0.05% K			
Calibration uncertainty	<4%			
f <sub>1</sub> (in agreement with photopic response V( $\lambda$ ))	<6%			
f <sub>2</sub> (response according to cosine law)	<3%			
f <sub>3</sub> (linearity)	<1%			
f <sub>4</sub> (instrument reading error)	<0.5%			
f <sub>5</sub> (fatigue)	<0.5%			
Class	B			
Drift after one year	<1%			
Working temperature	0...50 °C			
Reference standard	CIE n°69 – UNI 11142			



LP471LUM2 Probe for the measurement of <b>luminance</b> , equipped with SICRAM module.				
Measuring range (cd/m <sup>2</sup> )	0.1...1999.9	...19999	...199.99x10 <sup>3</sup>	...1999.9x10 <sup>3</sup>
Resolution (cd/m <sup>2</sup> )	0.1	1	0.01 x 10 <sup>3</sup>	0.1 x 10 <sup>3</sup>
Optical angle	2°			
Spectral range	In agreement with standard photopic curve V( $\lambda$ )			
$\alpha$ (temperature coefficient) f <sub>6</sub> (T)	<0.05% K			
Calibration uncertainty	<5%			
f <sub>1</sub> (in agreement with photopic response V( $\lambda$ ))	<8%			
f <sub>3</sub> (linearity)	<1%			
f <sub>4</sub> (instrument reading error)	<0.5%			
f <sub>5</sub> (fatigue)	<0.5%			
Class	C			
Drift after 1 year	<1%			
Working temperature	0...50 °C			
Reference standard	CIE n°69 – UNI 11142			

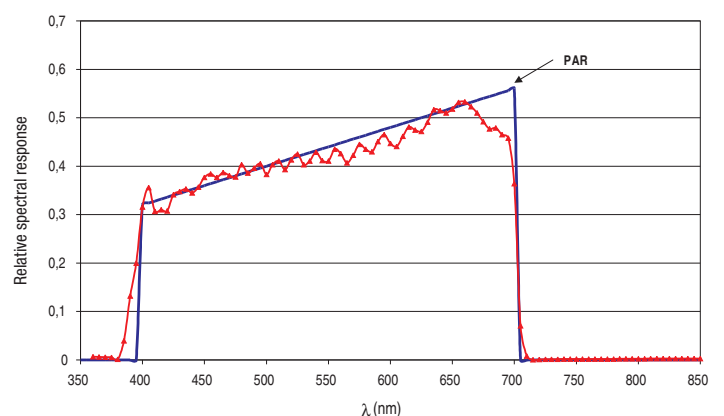
Typical response curve of the probes LP471PHOT and LP471LUM2:



LP471PAR Quantum radiometric probe for the measurement of the **photon flow across the chlorophyll range PAR**, equipped with SICRAM module.

Measuring range (μmol/m <sup>2</sup> s)	0.01... 199.99	200.0...1999.9	2000...10000
Resolution (μmol/m <sup>2</sup> s)	0.01	0.1	1
Spectral range	400 nm...700 nm		
Calibration uncertainty	<5%		
f <sub>2</sub> (response according to cosine law)	<6%		
f <sub>3</sub> (linearity)	<1%		
f <sub>4</sub> (instrument reading error)	±1 digit		
f <sub>5</sub> (fatigue)	<0.5%		
Drift after one year	<1%		
Working temperature	0...50 °C		

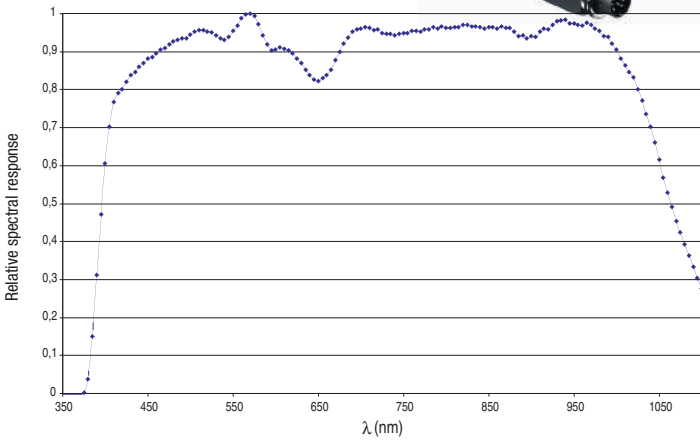
Typical response curve of the probe LP471PAR:





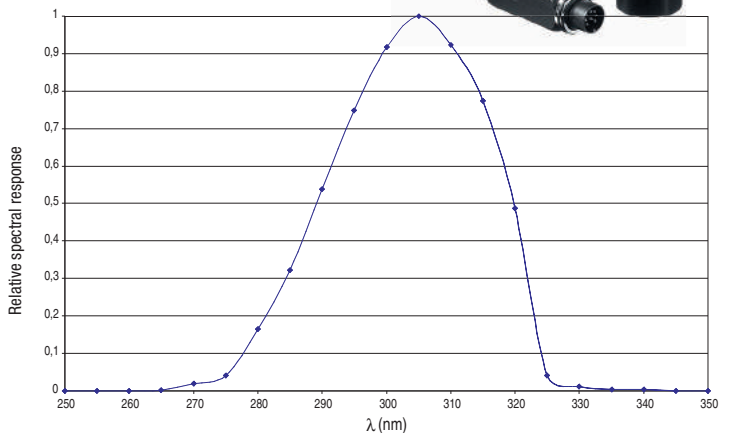
LP471RAD Probe for the measurement of irradiance, equipped with SICRAM module.				
Measuring range (W/m <sup>2</sup> )	0.1x10 <sup>-3</sup> ...999.9x10 <sup>-3</sup>	1.000...19.999	20.00...199.99	200.0...1999.9
Resolution (W/m <sup>2</sup> )	0.1x10 <sup>-3</sup>	0.001	0.01	0.1
Spectral range	400 nm...1050 nm			
Calibration uncertainty	<5%			
f <sub>2</sub> (response according to cosine law)	<6%			
f <sub>3</sub> (linearity)	<1%			
f <sub>4</sub> (instrument reading error)	±1 digit			
f <sub>5</sub> (fatigue)	<0.5%			
Drift after one year	<1%			
Working temperature	0...50 °C			

Typical response curve of the probe LP471RAD:



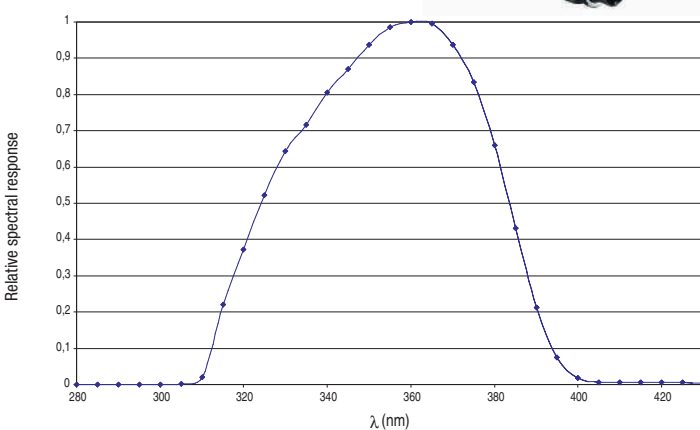
LP471UVB Probe for the measurement of the UVB irradiance, equipped with SICRAM module.				
Measuring range (W/m <sup>2</sup> )	1x10 <sup>-3</sup> ...999.9x10 <sup>-3</sup>	1.000...19.999	20.00...199.99	200.0...1999.9
Resolution (W/m <sup>2</sup> )	0.1x10 <sup>-3</sup>	0.001	0.01	0.1
Spectral range	280 nm...315 nm (Peak 305 nm)			
Calibration uncertainty	<5%			
f <sub>2</sub> response according to cosine law	<6%			
f <sub>3</sub> (linearity)	<2%			
f <sub>4</sub> (instrument reading error)	±1 digit			
f <sub>5</sub> (fatigue)	<0.5%			
Drift after one year	<2%			
Working temperature	0...50 °C			

Typical response curve of the probe LP471UVB:



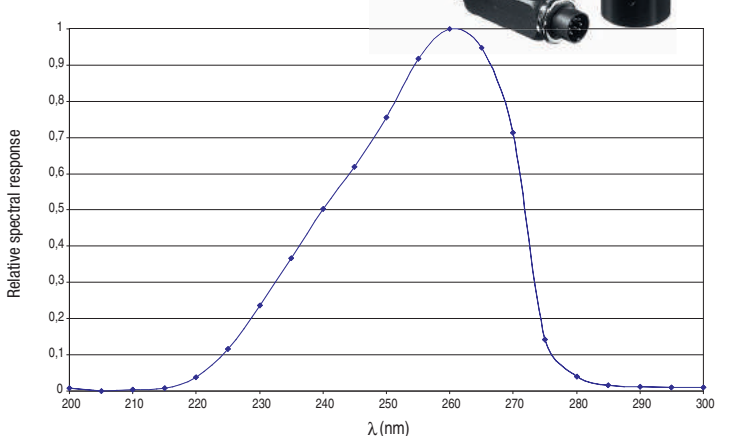
LP471UVA Probe for the measurement of UVA irradiance, equipped with SICRAM module.				
Measuring range (W/m <sup>2</sup> )	1x10 <sup>-3</sup> ...999.9x10 <sup>-3</sup>	1.000...19.999	20.00...199.99	200.0...1999.9
Resolution (W/m <sup>2</sup> )	0.1x10 <sup>-3</sup>	0.001	0.01	0.1
Spectral range	315 nm...400 nm (Peak 360 nm)			
Calibration uncertainty	<5%			
f <sub>2</sub> (response according to cosine law)	<6%			
f <sub>3</sub> (linearity)	<1%			
f <sub>4</sub> (instrument measuring error)	±1 digit			
f <sub>5</sub> (fatigue)	<0.5%			
Drift after one year	<2%			
Working temperature	0...50 °C			

Typical response curve of the probe LP471UVA:



LP471UVC Probe for the measurement of the UVC irradiance, equipped with SICRAM module.				
Measuring range (W/m <sup>2</sup> )	1x10 <sup>-3</sup> ...999.9x10 <sup>-3</sup>	1.000...19.999	20.00...199.99	200.0...1999.9
Resolution (W/m <sup>2</sup> )	0.1x10 <sup>-3</sup>	0.001	0.01	0.1
Spectral range	220 nm...280 nm (Peak 260 nm)			
Calibration uncertainty	<5%			
f <sub>2</sub> (response according to cosine law)	<6%			
f <sub>3</sub> (linearity)	<1%			
f <sub>4</sub> (instrument reading error)	±1 digit			
f <sub>5</sub> (fatigue)	<0.5%			
Drift after one year	<2%			
Working temperature	0...50 °C			

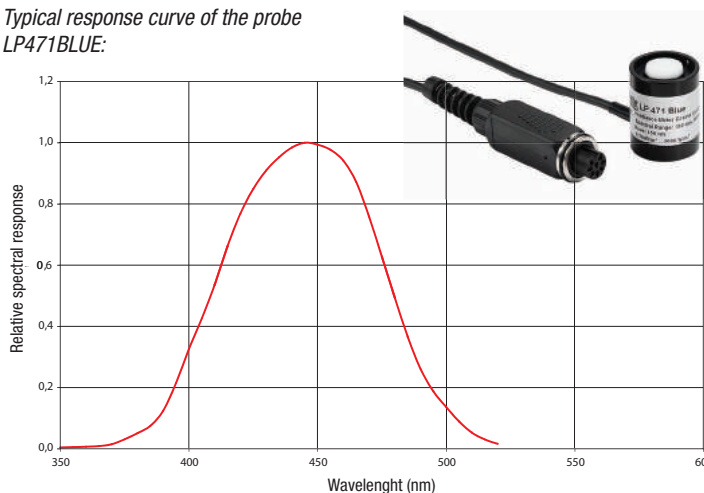
Typical spectral response of the probe LP471UVC:



**LP471BLUE** Probe for the measurement of **effective irradiance in the blue light spectrum**, equipped with SICRAM module.

Measuring range (W/m <sup>2</sup> )	0.1x10 <sup>-3</sup> ...999.9x10 <sup>-3</sup>	1.000...19.999	20.00...199.99	200.0...1999.9
Resolution (W/m <sup>2</sup> )	0.1x10 <sup>-3</sup>	0.001	0.01	0.1
Spectral range	380 nm...550 nm. Effective irradiance for blue light hazard B(λ)			
Calibration uncertainty	<10%			
f <sub>2</sub> (response according to cosine law)	<6%			
f <sub>3</sub> (linearity)	<3%			
f <sub>4</sub> (instrument reading error)	±1 digit			
f <sub>5</sub> (fatigue)	<0.5%			
Drift after one year	<2%			
Working temperature	0...50 °C			

Typical response curve of the probe LP471BLUE:



The radiometric probe LP 471 BLUE measures the irradiance (W/m<sup>2</sup>) in the spectral range of Blue light. The probe consists of a photodiode with an appropriate filter and is provided with a diffuser for correct measurement according to the cosine law. The spectral response curve of the probe allows measuring the effective irradiance for blue light hazard (curve B (λ)) according to the standards ACGIH/ICNIRP) in the spectral range from 380 nm to 550 nm. Optical radiations in this range can produce photochemical retinal injury. Another field of application is the monitoring of the blue light irradiance in the treatment of neonatal jaundice.

**LP471P-A** Two sensors combined probe for the measurement of **illuminance and UVA irradiance**, equipped with SICRAM module.

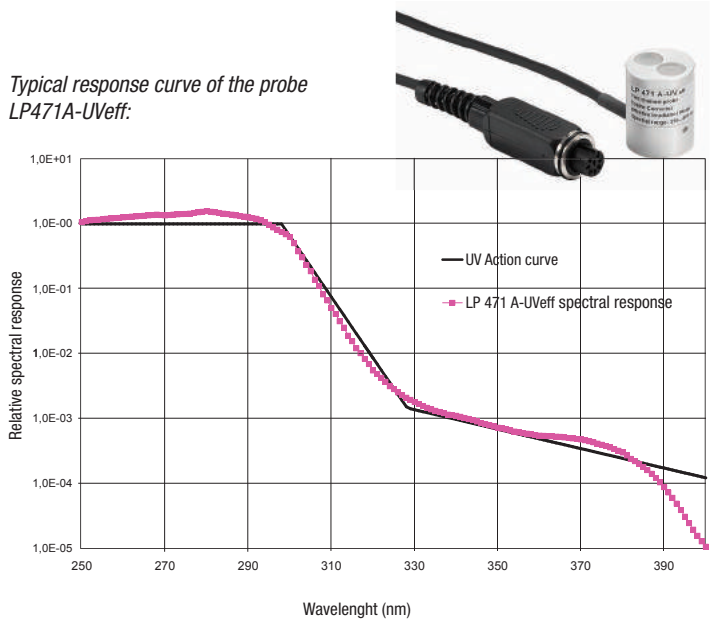
<b>Illuminance</b>				
Measuring range (lux)	0.3...199.99	...1999.9	...19999	...199.99x10 <sup>3</sup>
Resolution (lux)	0.01	0.1	1	0.01x10 <sup>3</sup>
Spectral range	In agreement with photopic standard curve V(λ)			
α (temperature coefficient) f <sub>6</sub> (T)	<0.05% K			
Calibration uncertainty	<4%			
f <sub>1</sub> (in agreement with photopic response V(λ))	<6%			
f <sub>2</sub> (response according to cosine law)	<3%			
f <sub>3</sub> (linearity)	<1%			
f <sub>4</sub> (instrument reading error)	<0.5%			
f <sub>5</sub> (fatigue)	<0.5%			
Class	B			
Drift after one year	<1%			
Working temperature	0...50 °C			
Reference standard	CIE n°69 – UNI 11142			
Response curve	see response curve of the probe LP471PH0T			

<b>UVA irradiance</b>				
Measuring range (μW/cm <sup>2</sup> )	0.10...199.99	...1999.9	...19999	...199.99x10 <sup>3</sup>
Resolution (μW/cm <sup>2</sup> )	0.01	0.1	1	0.01x10 <sup>3</sup>
Spectral range	315 nm...400 nm (Peak 360 nm)			
Calibration uncertainty	<5%			
f <sub>2</sub> (response according to cosine law)	<6%			
f <sub>3</sub> (linearity)	<1%			
f <sub>4</sub> (instrument reading error)	±1 digit			
f <sub>5</sub> (fatigue)	<0.5%			
Drift after one year	<2%			
Working temperature	0...50 °C			
Response curve	see response curve of the probe LP471UVA			

**LP471A-Uveff** Probe for the measurement of **total effective irradiance according to UV weighting curve**, equipped with SICRAM module.

<b>Total effective irradiance</b>	
Measuring range (W <sub>eff</sub> /m <sup>2</sup> )	0.010...19.999
Resolution (W <sub>eff</sub> /m <sup>2</sup> )	0.001
Spectral range	UV action curve for erythema measurement (250 nm...400 nm)
Calibration uncertainty	<15%
f <sub>3</sub> (linearity)	<3%
f <sub>4</sub> (instrument reading error)	±1 digit
f <sub>5</sub> (fatigue)	<0.5%
Drift after one year	<2%
Working temperature	0...50 °C
Reference standard	CEI EN 60335-2-27
<b>UVA irradiance</b>	
Measuring range (W <sub>eff</sub> /m <sup>2</sup> )	0.1...1999.9
Resolution (W <sub>eff</sub> /m <sup>2</sup> )	0.1
Spectral range	315 nm...400 nm
<b>UV-BC irradiance</b>	
Measuring range (W <sub>eff</sub> /m <sup>2</sup> )	0.010...19.999
Resolution (W <sub>eff</sub> /m <sup>2</sup> )	0.001
Spectral range	250 nm...315 nm

Typical response curve of the probe LP471A-Uveff:

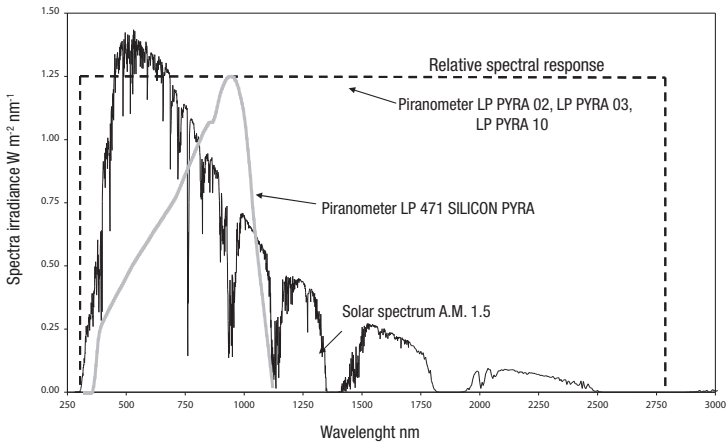


LP 471 PYRA 02.5  
LP 471 PYRA 10.5



<b>LP471 SILICON-PYRA</b> Probe for the measurement of <b>global solar irradiance</b> , equipped with SICRAM module.				
Measuring range (W/m <sup>2</sup> )	0.1x10 <sup>-3</sup> ... 999.9x10 <sup>-3</sup>	1.000...19.999	20.00...199.99	200.0...1999.9
Resolution (W/m <sup>2</sup> )	0.1x10 <sup>-3</sup>	0.001	0.01	0.1
Spectral range	400 nm...1100 nm			
Calibration uncertainty	<3%			
f <sub>2</sub> (response according to cosine law)	<3%			
f <sub>3</sub> (linearity)	<1%			
f <sub>4</sub> (instrument reading error)	±1 digit			
f <sub>5</sub> (fatigue)	<0.5%			
Drift after 1 year	<2%			
Working temperature	0...50 °C			

Typical response curve of the probe LP471 SILICON-PYRA:



**VP472** SICRAM module for the connection of pyranometers (e.g. "secondary-standard" LP PYRA 10, first class LP PYRA 02 and second class LP PYRA 03) or albedometers (e.g. first class LP PYRA 05 and second class LP PYRA 06).

Measuring range	-25...+25 mV
Resolution	1 W/m <sup>2</sup> , 1 μV
Accuracy	±1 W/m <sup>2</sup> , ±3 μV
Sensitivity	selectable from 5 to 30 μV/Wm <sup>-2</sup>

## ORDERING CODES:

**D09847:** Includes the D09847 datalogger, n.4 1.5V alkaline batteries, instruction manual, carrying case and **software Deltalog3** downloadable from Delta OHM website. The modules, the probes and the cable for data download have to be ordered separately.

## Accessories for D09847

**9CPRS232:** Female/female sub D 9 pole extension cable for RS232C (null modem)

**C.205:** Serial connection cable with USB connector for PC and Sub- D 9-pole connector for the instrument. The cable has a built-in USB/RS232 converter and connects the instrument D09847 directly to the USB port of the PC.

## Pt100 temperature probes equipped with SICRAM module

**TP472I** Immersion probe, Pt100 sensor. Stem Ø 3 mm, length 300 mm. Cable length 2 m.

**TP472I.0** Immersion probe, Pt100 sensor. Stem Ø 3 mm, length 230 mm. Cable length 2 m.

**TP473P.I** Penetration probe, Pt100 sensor. Stem Ø 4 mm, length 150 mm. Cable length 2 m.

**TP473P.0** Penetration probe, Pt100 sensor. Stem Ø 4 mm, length 150 mm. Cable length 2 m.

**TP474C.0** Contact probe, Pt100 sensor. Stem Ø 4 mm, length 230mm, contact surface Ø 5 mm. Cable length 2m.

**TP475A.0** Air probe, Pt100 sensor. Stem Ø 4mm, length 230mm. Cable length 2 m.

**TP472I.5** Immersion probe, Pt100 sensor. Stem Ø 6 mm, length 500 mm. Cable length 2 m.

**TP472I.10** Immersion probe, Pt100 sensor. Stem Ø 6 mm, length 1,000 mm. Cable length 2 m.

**TP49A.I** Immersion probe, Pt100 sensor. Stem Ø 2.7 mm, length 150 mm. Cable length 2 m. Aluminium handle.

**TP49AC.I** Contact probe, Pt100 sensor. Stem Ø 4 mm, length 150 mm. Cable length 2 m. Aluminium handle.

**TP49AP.I** Penetration probe, Pt100 sensor. Stem Ø 2.7 mm, length 150 mm. Cable length 2 m. Aluminium handle.

**TP875.I** Globe thermometer Ø 150 mm with handle, complete with SICRAM module. Cable length 2 m.

**TP876.I** Globe thermometer Ø 50 mm with handle, complete with SICRAM module. Cable length 2m.

**TP87.0** Immersion probe, Pt100 sensor. Stem Ø 3 mm, length 70 mm. Cable length 2 m.

**TP878.0** Contact probe for solar panels. Cable length 2 m.

**TP878.1.0** Contact probe for solar panels. Cable length 5 m.

**TP879.0** Penetration probe for compost. Stem Ø 8 mm, length 1 m. Cable length 2 m.

## Pt100 and Pt1000 temperature probes without SICRAM module

**TP47.100.0** Direct 4 wires Pt100 sensor immersion probe. Probe's stem Ø 3mm, length 230 mm. Connection cable 4 wires with connector, length 2 m.

**TP47.1000.0** Pt1000 sensor immersion probe. Probe's stem Ø 3 mm, length 230 mm. Connection cable 2 wires with connector, length 2 m.

**TP87.100.0** Direct 4 wires Pt100 sensor immersion probe. Probe's stem Ø 3 mm, length 70 mm. Connection cable 4 wires with connector, length 2 m.

**TP87.1000.0** Pt1000 sensor immersion probe. Probe's stem Ø 3 mm, length 70 mm. Connection cable 2 wires with connector, length 2 m.

## Modules for NON SICRAM temperature probes

**TP47** Module for the connection of **NO** SICRAM probes with Platinum sensor (PRT). Works with Pt25, Pt100 and Pt500 probes. Designed for the connection of 4-wire sensors. .

**TP471** Module for the connection of **NO** SICRAM probes with Platinum (PRT) sensor: Works with Pt25, Pt100 and Pt500

	probes. Designed for the connection of 4-wire sensors.
<b>TP471D0</b>	1-input module for <b>NO</b> SICRAM thermocouple probes type K-J-E-T-N-R-S-B. <b>Without cold junction compensation.</b>
<b>TP471D</b>	1-input module for <b>NO</b> SICRAM thermocouple probes type K-J-E-T-N-R-S-B. <b>With internal temperature sensor for cold junction compensation.</b>
<b>TP471D1</b>	2-input module for <b>NO</b> SICRAM thermocouple probes type K-J-E-T-N-R-S-B. <b>With internal temperature sensor for cold junction compensation.</b>

### Thermocouple temperature probes

<b>TP741</b>	Type K thermocouple immersion probe. Stem $\varnothing$ 1.5 mm, length 180 mm. Maximum temperature 800 °C.
<b>TP741/1</b>	Type K thermocouple immersion probe. Stem $\varnothing$ 1.5 mm, length 90 mm. Maximum temperature 400 °C.
<b>TP741/2</b>	Type K thermocouple immersion probe. Stem $\varnothing$ 1.5 mm, length 230 mm. Maximum temperature 800 °C.
<b>TP742</b>	Type K thermocouple immersion probe. Stem $\varnothing$ 2 mm, length 180 mm. Maximum temperature 800 °C.
<b>TP742/1</b>	Type K thermocouple immersion probe. Stem $\varnothing$ 2 mm, length 90 mm. Maximum temperature 400 °C.
<b>TP742/2</b>	Type K thermocouple immersion probe. Stem $\varnothing$ 2 mm, length 230 mm. Maximum temperature 800 °C.
<b>TP743</b>	Type K thermocouple immersion probe. Stem $\varnothing$ 3 mm, length 180 mm. Maximum temperature 800 °C.
<b>TP744</b>	Type K thermocouple air probe. Stem $\varnothing$ 4 mm, length 180 mm. Maximum temperature 400 °C.
<b>TP745</b>	Type K thermocouple contact probe. Probe terminal $\varnothing$ 5 mm, stem length 180 mm. Maximum temperature 500 °C.
<b>TP746</b>	Type K thermocouple contact probe. Stem $\varnothing$ 12 mm. Probe terminal $\varnothing$ 3 mm, stem length 110 mm. Maximum temperature 250 °C.
<b>TP750</b>	Type K thermocouple immersion probe. Stem $\varnothing$ 3 mm, length 500 mm. Temperature -196...+1000 °C.
<b>TP750.0</b>	Type K thermocouple immersion probe. Stem $\varnothing$ 3 mm, length 300 mm. Temperature -196...+800 °C.
<b>TP751</b>	Type K thermocouple penetration probe. Stem $\varnothing$ 2 mm, length 25 mm. Maximum temperature 200 °C.
<b>TP754</b>	Type K thermocouple contact probe. Probe terminal $\varnothing$ 15 mm, stem length 200 mm. Maximum temperature 500 °C.
<b>TP754/9</b>	Type K thermocouple contact probe. Probe terminal $\varnothing$ 15 mm, stem length 200 mm. End bent at 90° with respect to the stem. Maximum temperature 500 °C.
<b>TP755</b>	Type K thermocouple contact probe. Probe terminal $\varnothing$ 27 mm, stem length 300 mm. Maximum temperature 800 °C.
<b>TP755/9</b>	Type K thermocouple contact probe. Probe terminal $\varnothing$ 27 mm, stem length 300 mm. End bent at 90° with respect to the stem. Maximum temperature 800 °C.
<b>TP756</b>	Type K thermocouple penetration probe. Stem $\varnothing$ 1.6 mm x 80 mm. Probe terminal $\varnothing$ 1.2 mm x 22 mm. Maximum temperature 200 °C.
<b>TP757</b>	Type K thermocouple contact probe. For measurements on metallic surfaces. $\varnothing$ 20 mm x 100 mm. Maximum temperature 180 °C.
<b>TP758</b>	Type K thermocouple penetration probe. Stem $\varnothing$ 4 mm, length 150 mm. Maximum temperature 400 °C.
<b>TP758.1</b>	Type K thermocouple penetration probe. Stem $\varnothing$ 4 mm, length 90 mm. Maximum temperature 400 °C.
<b>TP772</b>	Type K thermocouple contact probe. Probe terminal $\varnothing$ 5 mm, cable length 500 mm. Maximum temperature 400 °C.
<b>TP774</b>	Type K thermocouple contact probe. Probe terminal 60 x 35 mm, stem length 200 mm. Maximum temperature 250 °C.
<b>TP776</b>	Type K thermocouple penetration probe. Stem $\varnothing$ 2 mm, length 90 mm. Maximum temperature 200 °C.
<b>TP777</b>	Type K thermocouple contact probe. Probe terminal $\varnothing$ 3 mm, stem length 350 mm. Maximum temperature 200 °C.
<b>TP647</b>	Type K thermocouple immersion probe. Cable length 1 m. Maximum temperature 300 °C.

<b>TP647/2</b>	Type K thermocouple immersion probe. Cable length 2 m. Maximum temperature 300 °C.
<b>TP647/3</b>	Type K thermocouple immersion probe. Cable length 3 m. Maximum temperature 300 °C.
<b>TP647/5</b>	Type K thermocouple immersion probe. Cable length 5 m. Maximum temperature 300 °C.
<b>TP647/10</b>	Type K thermocouple immersion probe. Cable length 10 m. Maximum temperature 300 °C.
<b>TP647/20</b>	Type K thermocouple immersion probe. Cable length 20 m. Maximum temperature 300 °C.
<b>TP651</b>	Type K thermocouple immersion probe. Stem $\varnothing$ 6 mm, length 1200 mm. Maximum temperature 1200 °C.
<b>TP652</b>	Type K thermocouple immersion probe. Stem $\varnothing$ 6 mm, length 700 mm. Maximum temperature 1200 °C.
<b>TP655</b>	Type K thermocouple contact probe. For measurements on tubes $\varnothing$ 6...25 mm. Cable length 2 m. Maximum temperature 180 °C.
<b>TP656</b>	Type K thermocouple immersion probe. Stem $\varnothing$ 1 mm, length 70 mm. Cable length 3 m. Maximum temperature 200 °C.
<b>TP656/1</b>	Type K thermocouple immersion probe. Stem $\varnothing$ 2 mm, length 500 mm. Cable length 3 m. Maximum temperature 1000 °C.
<b>TP656/2</b>	Type K thermocouple immersion probe. Stem $\varnothing$ 2 mm, length 1000 mm. Cable length 3 m. Maximum temperature 1000 °C.
<b>TP657/1</b>	Type K thermocouple flexible probe. Probe terminal $\varnothing$ 5 mm. Cable length 500 mm. Maximum temperature 100 °C.
<b>TP659</b>	Type K thermocouple penetration probe. Stem $\varnothing$ 3 mm, length 150 mm. Maximum temperature 400 °C.
<b>TP660</b>	Type K thermocouple penetration probe. Stem $\varnothing$ 4.5 mm, length 150 mm. Maximum temperature 400 °C.
<b>TP661</b>	Type K thermocouple penetration probe. Stem length 85 mm. Temperature -60...+50 °C.
<b>TP662</b>	Type K thermocouple tape probe. With Velcro, for measurements on tubes up to $\varnothing$ 110 mm. Maximum temperature 110 °C.
<b>CM</b>	Standard male K thermocouple connector.
<b>CS</b>	Standard female K thermocouple connector.
<b>PW</b>	Type K thermocouple extension cable with male connector on one side and female connector on the other side. Available lengths: 2, 5, 10, 15, 20 m.

### Combined relative humidity and temperature probes equipped with SICRAM MODULE

<b>HP572ACR</b>	%RH and temperature combined probe, <b>K thermocouple sensor</b> . Dimensions $\varnothing$ 26x170 mm. 2 m connecting cable.
<b>HP472ACR</b>	%RH and temperature combined probe, dimensions $\varnothing$ 26x170 mm. Connection cable length 2 metres.
<b>HP473ACR</b>	%RH and temperature combined probe. Handle dimensions $\varnothing$ 26x130 mm, probe $\varnothing$ 14x120 mm. Connection cable length 2 metres.
<b>HP474ACR</b>	%RH and temperature combined probe. Handle dimensions $\varnothing$ 26x130 mm, probe $\varnothing$ 14x215 mm. Connection cable length 2 metres.
<b>HP475ACR</b>	%RH and temperature combined probe. Connection cable length 2 metres. Handle $\varnothing$ 26x110mm. Stainless steel stem $\varnothing$ 12x560 mm. Tip $\varnothing$ 13.5x75 mm.
<b>HP475AC1R</b>	%RH and temperature combined probe. Connection cable length 2 metres. Handle $\varnothing$ 80 mm. Stainless steel stem $\varnothing$ 14x480 mm.
<b>HP477DCR</b>	%RH and temperature combined sword probe. Connection cable length 2 metres. Handle $\varnothing$ 26x110 mm. Probe's stem 18x4 mm, length 520 mm
<b>HP478ACR</b>	%RH and temperature combined probe. Connection cable length 5 metres. Stem made of stainless steel $\varnothing$ 14x130 mm.

- HP480** Temperature and humidity probe for compressed air systems. Connection cable length 2m. Fitted with sintered AISI 316 15µm filter, measuring chamber, air flow regulation valve and 3 quick couplings 1/4" (Italian, German and American standard).
- HP481** Probe for the measurement of humidity and temperature in pipes. 2m connecting cable. 15µ sintered AISI 316 stainless steel filter, G ½" threading.
- P1** 200µm stainless steel grid protection for probes Ø26, thread M24x1.5. For temperatures up to 80 °C.
- P2** 20µm PE sintered polythene protection for probes Ø26, thread M24x1.5. For temperatures up to 80 °C.
- P3** 20µm sintered bronze protection for probes Ø26, thread M24x1.5. For temperatures up to 150 °C.
- P4** 20µm sintered PE complete cap for probes Ø26, thread M24x1.5. For temperatures up to 80 °C.
- P6** 10µm sintered stainless steel protection for probes Ø14, thread M12x1. For temperatures up to 180 °C.
- P7** 20µm PTFE protection for probes Ø14, thread M12x1. For temperatures up to 150 °C.
- P8** 20µm stainless steel grid and PBT protection for probes Ø14, thread M12x1. For temperatures up to 100 °C.
- HD75** 75% RH saturated solution for checking the relative humidity sensor, complete with screw adaptor for probes Ø14, M12×1 thread.
- HD33** 33% RH saturated solution for checking the relative humidity sensor, complete with screw adaptor for probes Ø14, M12×1 thread.
- HD11** 11% RH saturated solution for checking the relative humidity sensor, complete with screw adaptor for probes Ø14, M12×1 thread.

### Probes and Modules for pressure measurement

- PP471** SICRAM module for the measurement of absolute, relative and differential pressure. Works with the pressure probes of the series TP704 and TP705. Supplied with cable L=2m and 8-pole DIN 45326 female connector.

### Pressure probes of the series TP704 and TP705

- PP472** SICRAM probe for the measurement of barometric pressure. Measuring range 600...1100 mbar. Resolution 0.1 mbar. Operating temperature -10...+60 °C.
- PP473 S0** SICRAM probe for the measurement of relative pressure with respect to the atmosphere or differential pressure. Measuring range ± 250 Pa (± 2.5 mbar). With **auto-zero** circuit. Operating temperature -10...+60 °C. For non-corrosive dry gas or air.
- PP473 S1** SICRAM probe for the measurement of differential pressure. Full scale 10 mbar. Operating temperature -10...+60 °C.
- PP473 S2** SICRAM probe for the measurement of differential pressure. Full scale 20 mbar. Operating temperature -10...+60 °C.
- PP473 S3** SICRAM probe for the measurement of differential pressure. Full scale 50 mbar. Operating temperature -10...+60 °C.
- PP473 S4** SICRAM probe for the measurement of differential pressure. Full scale 100 mbar. Operating temperature -10...+60 °C.
- PP473 S5** SICRAM probe for the measurement of differential pressure. Full scale 200 mbar. Operating temperature -10...+60 °C.
- PP473 S6** SICRAM probe for the measurement of differential pressure. Full scale 500 mbar. Operating temperature -10...+60 °C.
- PP473 S7** SICRAM probe for the measurement of differential pressure. Full scale 1 bar. Operating temperature -10...+60 °C.
- PP473 S8** SICRAM probe for the measurement of differential pressure. Full scale 2 bar. Operating temperature -10...+60 °C.

### Hot-wire probes equipped with SICRAM module for the measure of air speed

- AP471 S1** Hot-wire telescopic probe, measuring range: 0.1...40m/s. Cable length 2 m.
- AP471 S2** Omnidirectional hot-wire probe, measuring range: 0.1...5m/s.

Cable length 2 m.

- AP471 S3** Hot-wire telescopic probe with terminal tip for easy position, measuring range: 0.1...40m/s. Cable length 2 m.
- AP471 S4** Omnidirectional hot-wire telescopic probe with base, measuring range: 0.1...5m/s. Cable length 2 m.

### Vane probes equipped with SICRAM module for the measure of air speed

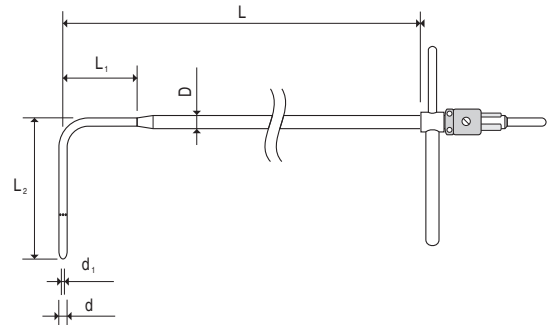
- AP472 S1** Vane probe with K type thermocouple, Ø100 mm. Measuring range 0,6...25 m/s; temperature from -25 to 80 °C. Cable length 2 m.
- AP472 S2** Vane probe, Ø 60 mm. Measuring range: 0.5...20 m/s. Cable 2 m.
- AST.1** Telescopic shaft (minimum length 210 mm, maximum length 870 mm) for AP472S1 and AP472S2 vane probes.
- AP471S1.23.6** Fixed extension shaft Ø 16 x 300 mm, M10 male thread on a side, female on the other. For vane probes AP472 S1 and AP472 S2
- AP471S1.23.7** Fixed extension shaft Ø 16 x 300 mm, M10 female thread on a side only. For vane probes AP472 S1, AP472 S2.

### Modules for Pitot Tubes

- AP473 S1** SICRAM module for **Pitot tubes**. Differential pressure up to 10 mbar, air speed from 2 to 40 m/s. The Pitot tube has to be ordered separately.
- AP473 S2** SICRAM module for **Pitot tubes**. Differential pressure up to 20 mbar, air speed from 2 to 55 m/s. The Pitot tube has to be ordered separately.
- AP473 S3** SICRAM module for **Pitot tubes**. Differential pressure up to 50 mbar, air speed from 2 to 90 m/s. The Pitot tube has to be ordered separately.
- AP473 S4** SICRAM module for **Pitot tubes**. Differential pressure up to 100 mbar, air speed from 2 to 130m/s. The Pitot tube has to be ordered separately.
- PW:** Connection cable between AP473S... module and **Pitot tube**. Length 2m.

### Pitot tubes

Stainless steel Pitot tubes to measure air speed and temperature (only for models provided with K thermocouple). Equipped with silicon tube external Ø



Code	d mm	d <sub>1</sub> mm	D mm	L mm	L <sub>1</sub> mm	L <sub>2</sub> mm	Temp.	Thermo couple K	Material
T1-300	3	1	6	300	30	72	0...600 °C	---	AISI 316
T2-400	5	2	8	400	45	120		---	
T2-600	5	2	8	600	45	120		---	
T3-500	8	3,2	8	500	---	192		---	
T3-800	8	3,2	8	800	---	192		---	
T3-800TC	8	3,2	8	800	---	192		TC	
T4-500	10	4,0	10	500	---	240		---	
T4-800	10	4,0	10	800	---	240		---	
T4-800TC	10	4,0	10	800	---	240		TC	
T4-1000	10	4,0	10	1000	---	240		---	
T4-1000TC	10	4,0	10	1000	---	240		TC	

6 mm, internal  $\varnothing$  4 mm, length 2 m. **PW cable has to be ordered separately.**

## Photometric and radiometric probes with sicram module

<b>LP471PHOT</b>	Photometric probe equipped with SICRAM module for measuring illuminance, spectral response according to the standard photopic vision, diffuser for cosine correction. Measuring range: 0.1 lux...200x10 <sup>3</sup> lux.
<b>LP471RAD</b>	Radiometric probe equipped with SICRAM module for measuring <b>irradiance</b> in the 400 nm...1050 nm spectral range, complete with diffuser for cosine correction. Measuring range: 0.1x10 <sup>-3</sup> W/m <sup>2</sup> ...2000 W/m <sup>2</sup> .
<b>LP471PAR</b>	Quantum radiometric probe equipped with SICRAM module for measuring photon flow across the chlorophyll range PAR (Photosynthetically Active Radiation 400 nm...700 nm) in $\mu\text{mol}/\text{m}^2\text{s}$ , with diffuser for cosine correction. Measuring range: 0.01 $\mu\text{mol}/\text{m}^2\text{s}$ ...10x10 <sup>3</sup> $\mu\text{mol}/\text{m}^2\text{s}$ .
<b>LP471UVA</b>	Radiometric probe equipped with SICRAM module for measuring <b>irradiance</b> in the 315 nm...400 nm UVA spectral range, peak 360 nm, complete with quartz diffuser for cosine correction. Measuring range: 1x10 <sup>-3</sup> W/m <sup>2</sup> ...2000 W/m <sup>2</sup> .
<b>LP471UVB</b>	Radiometric probe equipped with SICRAM module for measuring <b>irradiance</b> in the 280 nm...315 nm UVB spectral range, peak 305 nm, complete with quartz diffuser for cosine correction. Measuring range: 1x10 <sup>-3</sup> W/m <sup>2</sup> ...2000 W/m <sup>2</sup> .
<b>LP471UVC</b>	Radiometric probe equipped with SICRAM module for measuring <b>irradiance</b> in the 220 nm...280 nm UVC spectral range, peak 260 nm, complete with quartz diffuser for cosine correction. Measuring range: 1x10 <sup>-3</sup> W/m <sup>2</sup> ...2000 W/m <sup>2</sup> .
<b>LP471LUM2</b>	Photometric probe equipped with SICRAM module for measuring <b>luminance</b> , spectral response in agreement with standard photopic vision, vision angle 2°. Measuring range: 0.1 cd/m <sup>2</sup> ...2000x10 <sup>3</sup> cd/m <sup>2</sup> .
<b>LP471BLUE</b>	Radiometric probe equipped with SICRAM module for measuring the <b>effective irradiance</b> in the spectral range of <b>Blue</b> light. Spectral range 380 nm...550 nm, diffuser for cosine correction. Measuring range: 0.1x10 <sup>-3</sup> W/m <sup>2</sup> ...2000 W/m <sup>2</sup> .
<b>LP471P-A</b>	Combined probe equipped with SICRAM module for measuring the illuminance (lux), with standard photopic spectral response, and the irradiance ( $\mu\text{W}/\text{cm}^2$ ) in the UVA spectral range (315-400 nm, with peak at 365 nm). Both sensors are equipped with diffuser for the correction according to the cosine law. Illuminance measuring range: 0.3 lux...200x10 <sup>3</sup> lux. Irradiance measuring range: 1 mW/m <sup>2</sup> ...2000 W/m <sup>2</sup> . The probe provides the ratio of the UVA irradiance and the illuminance in $\mu\text{W}/\text{lumen}$ (quantity of interest in the museums field). Supplied with 2 m cable.
<b>LP471A-UVeff</b>	Combined probe equipped with SICRAM module for measuring the <b>total effective irradiance</b> according to the weighting curve UV. The two sensors are used to correctly measure the total effective irradiance in the range 250-400 nm. Both sensors are equipped with diffuser for the correction according to the cosine law. The probe provides the total effective irradiance ( $E_{\text{eff}}$ ), the effective irradiance in the range UV-CB and the UVA irradiance. Total effective irradiance measuring range: 0.01 W/m <sup>2</sup> ... 20 W/m <sup>2</sup> . B_C effective irradiance measuring range: 0.01 W/m <sup>2</sup> ...20 W/m <sup>2</sup> . UVA irradiance measuring range: 0.1 W/m <sup>2</sup> ... 2000 W/m <sup>2</sup> . Supplied with 2 m cable.
<b>LP471Silicon-Pyra</b>	Pyranometer with silicon photodiode equipped with SICRAM module for measuring the <b>global solar irradiance</b> , with diffuser for cosine correction. Spectral range: 400...1100 nm. Measuring range: 0...2000 W/m <sup>2</sup> . Fixed cable 5m long.
<b>LP 471 PYRA 02.5</b>	Probe consisting of a first class pyranometer LP PYRA 02 and a 5 m long cable equipped with SICRAM module.
<b>LP 471 PYRA 02.10</b>	Probe consisting of a first class pyranometer LP PYRA 02 and a 10 m long cable equipped with SICRAM module.
<b>LP 471 PYRA 03.5</b>	Probe consisting of a second class pyranometer LP PYRA 03 and a 5 m long cable equipped with SICRAM module.
<b>LP 471 PYRA 03.10</b>	Probe consisting of a second class pyranometer LP PYRA 03 and a 10 m long cable equipped with SICRAM module.
<b>LP BL</b>	Base with leveling device for photo and radiometric probes

(excluding LP471LUM2 and LP471PYRA...). It has to be assembled to the probe at our factory, before shipment.

**LP BL3**

Adjustable wall support for photometric and radiometric probes (excluding LP471LUM2 and LP471PYRA...).

**VP472**

SICRAM module for the connection of pyranometers or albedometers. Measuring range: -25...+25 mV.

## Modules for direct voltage and current measurement

**VP473**

SICRAM module for the measurement of direct voltage. When connected to a transmitter with voltage output, it can acquire the voltage signal. Measuring range:  $\pm 20$  Vdc. Input impedance: 1 M $\Omega$ .

**IP472**

SICRAM module for the measurement of direct current. When connected to a transmitter with current output, it can acquire the current signal. Measuring range: 0...24 mA. Input impedance: 25  $\Omega$ .