DAT32 - MICROCLIMATE DATALOGGERS

DAT32 is a tool designed for the study, the measurement and verification of Microclimate in working environments, according to:

UNI EN ISO 7726	UNI EN ISO 7730	UNI EN ISO 27243	UNI EN ISO 7933	UNI ENV ISO 11079	UNI EN ISO 8996
Ergonomics of the thermal environment. Instruments for measuring physical quantities	Moderate Thermal Environments - Determination of the PMV and PPD indices and specification of the condition for thermal comfort	Hot environments. Estimation of the heat stress on working man, based on the WBGT Index (Wet bulb Globe temperature)	Ergonomics of the thermal environment - Analytical determination and interpretation of heat stress using calculation of the predicted heat strain	Evaluation of cold environments - Determination of required clothing insulation (IREQ)	Ergonomics of the thermal environment - Determination of metabolic rate

The instrument with dedicated software environments moderate, Warm, and Cold Environments and Discomfort with specific probes, it is able to perform the following measures:

Globe temperature	Natural wet bulbe temperature
Ambient temperature	Atmospheric pressure
Relative Humidity	Air velocity
Air temperature at the height of the head (1,7m subject standing; 1,1m subject sitting)	Air temperature at the height of the abdomen (1,1 m subject standing; 0,6m subject sitting)
Air temperature at the height of the ankles (0,1 m)	Temperature at the floor level
Net radiation temperature	Net radiation
Radiant temperature asymmetry	Illuminance, luminance, PAR, irradiance, CO and CO2

According to measurements performed, with its specific software, calculates the following parameters:

tr	Mean radiant temperature
PMV	Predicted mean vote
PPD	Predicted Percentage Dissatisfied
DR	Draught Rating
tO	Operative temperature
IS	Scharlau Index
DI	Thom Index
THI	Thermohygrometric Index
RSI	Relative Strain Index
SSI	New Summer Simmer Index
HI	Heat Index
H	Humidex Index
TEQ	Equivalent Temperature Index

To compute the calculation of these indexes, temperature and relative humidity of the air have to be detected and the measured values to be inserted in the table “Discomfort indexes”

WBGT Indoor	Wet bulb Globe temperature
WBGT Outdoor	Wet bulb Globe temperature in the presence of radiation
SWp	Sweat rate
Ep	Predicted evaporative heat flow
PHS	Tre - Water loss - Dlim tre - Dlimloss50 - Dlimloss95
IREQ	Required clothing insulation
DLE	Duration Limit Exposure
RT	Recovery time
WCI	Wind chill index
PDv	Percentage Dissatisfied due to vertical temperature difference (head-ankles)
PDf	Percentage Dissatisfied due to floor temperature
PDΔ	Percentage Dissatisfied due to radiant asymmetry
FLD	Average Day Light Factor

The calculation of the FLD index requires light measurement photometric probe LP-471PHOT. Requires program type C

SATEMA
13856 VIGLIANO B.SE - Via Milano, 395
Tel. +39 015811102 - Fax 0158853029
Mail: info@satema.it http://www.satema.it

TECHNICAL SPECIFICATIONS

Three operating programs are already uploaded on the instrument and they can be used according to the analysis:

type A:	type B:	type C:
Analysis of the Microclimate in moderate, hot and cold environments	Analysis of Discomfort in moderate environments	Measurement of Physical Quantities for general purposes. Display maximum, minimum and average values. The instrument with electronic probe allows measuring temperature, temperature and relative humidity, air velocity, flow, light (with photometric/radiometric, CO and CO2 probes).

Instrument

Dimensions (LxWxH) and weight:	220x180x50 mm, 1100 g with batteries	
Materials :	ABS, Polycarbonate and Aluminium	
Display:	Backlit, dot matrix 128x64 dots, visible area 56x38mm	
Condizioni operative		
Working Temperature:	-5 … 50°C	
Storage Temperature:	-25 … 65°C	
Working Relative Humidity:	0 … 90% RH non condensing	
Protection degree:	IP64	
Instrument uncertainty:	± 1 digit @ 20°C	
Supply:	Mains adapter 12Vdc/1A	
Batteries:	Four 1.5V batteries size C-BABY	
Autonomy (7800mAh batteries):	With temperature and RH probes 200 hours; with hotwire probe @ 5m/s 100 hours	
Power assorbed:	instrument off < 45µA	
Security of stored data:	unlimited	
Storage capacity:	67600 storages of 8 inputs each	
Storage internal:	to select between: 15, 30 seconds, 1, 2, 5, 10, 15, 20, 30 minutes and 1 hour	
Printing internal:	to select between: 15, 30 seconds, 1, 2, 5, 10, 15, 20, 30 minutes and 1 hour	
Connections:	Input for probes with electronic module 8 male 8-pole DIN 45326 connectors	
RS232C serial interface:	Galvanically isolated, Baud rate configurable between 1200 and 38400 baud, Data Bit 8, Parity None, Stop Bit 1, Flow control Xon/Xoff; Serial cable length Max 15m	
USB interface:	Type 1.1 - 2.0 galvanically isolated, memory divided in 64 blocks	
EMC standard:	Safety:	EN61000-4-2, EN61010-1 level 3
	Electrostatic discharge:	EN61000-4-2 level 3
	Electrical Fast Transients:	EN61000-4-4 level 3, EN61000-4-5 level 3
	Voltage variations:	EN61000-4-11
	Electromagnetic interference susceptibility IEC1000-4-3	
	Electromagnetic interference emission EN55020 class B	

Accessories

9CPRS232	Connection cable 9 - pole Sub-D female connector for RS232C
CP22	USB 2.0 connection cable connector type A - connector type B
BAG32	Carrying case for the DAT32 and its accessories
SWD10	100-240Vac/12Vdc-1A Stabilized mains power supply
VTRAP32	Tripod equipped with 6-input head and 4 probe holders cod. DAT3218K
HD3218K	Probe shaft
AM32	Two-clamp shaft for two probes
AQC	200cc. distilled water and 3 braids for DAT3201 orDAT3217DM probes

SATEMA
13856 VIGLIANO B.SE - Via Milano, 395
Tel. +39 015811102 - Fax 0158853029
Mail: info@satema.it http://www.satema.it

DAT32 - OPERATIVE SOFTWARE

EXPLANATORY TABLES - HOW TO USE PROBES FOR MICROCLIMATIC MEASUREMENTS

SW / P.O	Main calculated indices		Environment	Standard
BASIC P.O. type A	ta : Air temperature tr : Mean radiant temperature PMV : Predicted mean vote PPD : Predicted Percentage Dissatisfied DR : Draught rating to : Operative temperature teq : Equivalent Temperature Index	IS: Scharlau Index DI: Thom Index THI: Thermohygrometric Index RSI: Relative Strain Index SSI: New Summer Simmer Index HI: Heat Index H: Humidex Index	Moderate	UNI EN ISO 7730
Hot environment P.O. type A	WBGT : Wet bulb globe temperature SWp : Sweat rate Ep : Predicted evaporative heat flow PHS : Predicted Heat Strain Model		Severe hot	UNI EN ISO 27243 UNI EN ISO 7933
Cold environment P.O. type A	IREQ : Required clothing insulation DLE : Duration limit exposure RT : Recovery time WCI : Wind chill index		Severe cold	UNI EN ISO 11079
Analysis of Discomfort P.O. type B	PDv : Percentage Dissatisfied due to vertical temperature difference (head-ankles). PDf : Percentage Dissatisfied due to floor temperature PDΔ : Percentage Dissatisfied due to radiant asymmetry		Moderate	UNI EN ISO 7730
BASIC P.O. type C	ta : air temperature RH-t : Humidity-temperature Va- t : Air velocity, temperature and flow lux : Illuminance cd/m2 : Luminance µW/m2 : Irradiance W/m2 : Irradiance µmol/m2s : PAR ppm: CO and CO2 FLD: Average Day Light Factor		Uso generale	

Table of probes for DAT32A operating program: Microclimatic Analysis	
TP3207	Dry bulb temperature probe
TP3275	Globe temperature probe Ø 150mm (alternatively TP3276)
TP3276	Globe temperature probe Ø 50mm (alternatively TP3275)
AP3203	Omnidirectional hotwire probe (0°C…80°C)
AP3203-F	Omnidirectional hotwire probe (-30°C…+30°C)
HP3201	Natural wet bulb temperature probe
HP3217R	Combined temperature and relative humidity probe
HP3217DM	Two-sensor probe for measuring natural wet bulb temperature and dry bulb temperature (alternatively: HP3201 and TP3207)

SATEMA

13856 VIGLIANO B.SE - Via Milano, 395

Tel. +39 015811102 - Fax 0158853029

Mail: info@satema.it http://www.satema.it

DAT32 - BASIC SOFTWARE A - MICROCLIMATIC INDICES

The following table lists all the necessary probes for determining the microclimatic indices.

The following indices are obtained by using the BASIC software.

Each line shows the combination of probes to use for calculating the indices.

	TP3207	TP3275	TP3276	AP3203	AP3203-F	HP3201	HP3217R	HP3217DM
t_a: Air temperature.	•							
								•
							•	
t_r: Mean radiant temperature.	•	•		•	•			
	•		•	•	•			
		•		•	•			•
			•	•	•			•
		•		•	•		•	
			•	•	•		•	
PMV: Predicted mean vote. **PPD:** Predicted Percentage Dissatisfied	•	•		•	•		•	
	•		•	•	•		•	
		•		•	•		•	•
			•	•	•		•	•
		•		•	•		•	
			•	•	•		•	
DR: Draught rating.	•			•	•			
				•	•			•
				•	•		•	
t_o: Operative temperature.	•	•		•	•			
	•		•	•	•			
		•		•	•			•
			•	•	•			•
		•		•	•		•	
			•	•	•		•	
T_{eq}: Equivalent temperature. (necessary for measuring: **atmospheric pressure**)	•						•	
							•	
							•	•
IS : Scharlau Index							•	
DI : Thom Index							•	
THI : Thermohygrometric Index							•	
RSI : Relative Strain Index							•	
SSI : New Summer Simmer Index							•	
HI : Heat Index							•	
H : Humidex Index							•	
T_{eq} **:** Equivalent Temperature Index							•	
To compute the calculation of these indexes, temperature and relative humidity of the air have to be detected and the measured values to be inserted in the table “Discomfort indexes”								

SATEMA
13856 VIGLIANO B.SE - Via Milano, 395
Tel. +39 015811102 - Fax 0158853029
Mail: info@satema.it http://www.satema.it

DAT32A - HOT ENVIRONMENT SOFTWARE - INDICES

The following indices are obtained by using the Hot environments software:

Each line shows the combination of probes to use for calculating the indices

			TP3207	TP3275	TP3276	AP3203	HP3201	HP3217R	HP3217DM
WBGT Indoor: Wet bulb globe temperature				•			•		
					•		•		
WBGT Outdoor: Wet bulb globe temperature in the presence of radiation			•	•			•		
			•		•		•		
				•			•	•	
					•		•	•	
SWp: Sweat rate **Ep**: Predicted evaporative heat flow			•	•		•		•	
			•		•	•		•	
				•		•		•	•
					•	•		•	•
				•		•		•	
					•	•		•	
PHS	(1)	T_{re}	•	•		•		•	
		Water loss	•		•	•		•	
		$D_{lim\ tre}$		•		•		•	•
		$D_{limloss50}$			•	•		•	•
		$D_{limloss95}$		•		•		•	
					•	•		•	

(1)

T_{re} : Predicted rectal temperature

$D_{lim\ tre}$: Maximum allowable exposure duration for heat storage

$D_{limloss50}$: Maximum allowable exposure duration for water loss, standard subject

$D_{limloss95}$: Maximum allowable exposure duration for water loss, 95% of the working population

SATEMA
13856 VIGLIANO B.SE - Via Milano, 395
Tel. +39 015811102 - Fax 0158853029
Mail: info@satema.it http://www.satema.it

DAT32A - COLD ENVIRONMENT SOFTWARE - INDICES

The following indices are obtained by using the Cold environments software:

Each line shows the combination of probes to use for calculating the indices

			TP3207	TP3275	TP3276	AP3203-F (3)	HP3201	HP3217	HP3217DM
(2)	IREQ:	Required clothing insulation	•	•		•		•	
	DLE:	Duration limit exposure	•		•	•		•	
	RT:	Recovery time		•		•		•	•
	WCI:	Wind chill index			•	•		•	•
				•		•		•	
						•		•	
			•			•			
						•			•

(2)

(2) Using IREQ, DLE, RT, WCI it is possible to calculate:

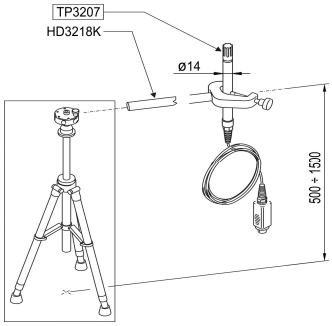
- Ratio of surface area of the clothed body to the surface area of the nude body
- Mean skin temperature
- Fraction of wet skin
- Total convective heat conduction
- Total radiative heat conduction
- Partial water pressure at ambient temperature
- Surface temperature of clothing
- Evaporative resistance of limiting layer and clothing
- Heat exchange by evaporation
- Respiratory heat exchange by convection and evaporation
- Heat exchange by radiation
- Heat exchange by convection
- Duration limit exposure
- Required clothing insulation
- Intrinsic clothing insulation

(3) AP3203: 0°C…+80°C
AP3203-F: -30°C…+30°C

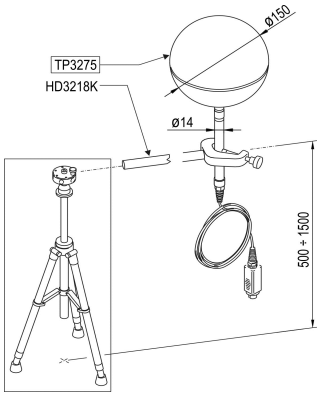
SATEMA
13856 VIGLIANO B.SE - Via Milano, 395
Tel. +39 015811102 - Fax 0158853029
Mail: info@satema.it http://www.satema.it

DAT32A - PROBE A Microclimatic Analysis

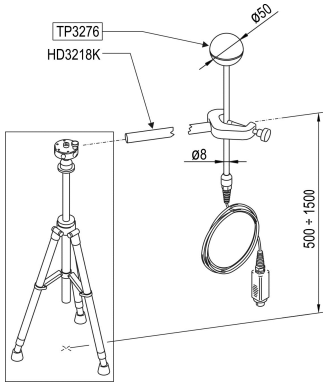
TP3207 Temperature probe, Pt100 sensor. Probe stem Ø 14mm, length 140 mm. Cable length 2 metres. Equipped with electronic module. Used for calculating the following indices: IREQ,WCI, DLE, RT, PMV, PPD, WBGT, SR. Used for calculating Mean radiant temperature.
Measuring range: -40°C…+100°C



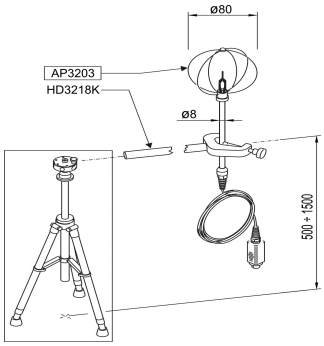
TP3275 Globe temperature probe, Pt100 sensor, globe Ø 150 mm. Stem Ø 14 mm, length 110 mm. Cable length 2 metres. Equipped with electronic module. Used for measuring: Mean radiant temperature, WBGT.
Measuring range: -10°C…+100°C



TP3276 Globe temperature probe, Pt100 sensor, globe Ø 50 mm. Stem Ø 8 mm, length 110 mm. Cable length 2 metres. Equipped with electronic module. Used for measuring: Mean radiant temperature, WBGT.
Measuring range: -10°C…+100°C



AP3203 Omnidirectional hotwire probe. Measuring range: air velocity 0÷5 m/s. Probe stem Ø 14 mm, length 110 mm. Cable length 2 metres. Equipped with electronic module. Used for calculating the following indices: IREQ,WCI, DLE, RT, PMV, PPD, SR. Used for calculating Mean radiant temperature.
Measuring range: 0°C…+80°C

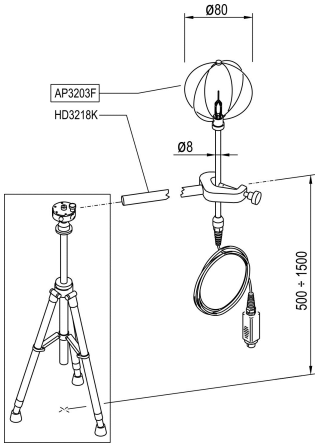


SATEMA
13856 VIGLIANO B.SE - Via Milano, 395
Tel. +39 015811102 - Fax 0158853029
Mail: info@satema.it http://www.satema.it

DAT32A - PROBE A Microclimatic Analysis

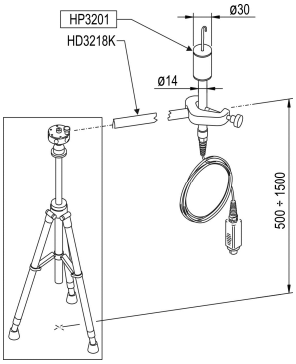
AP3203-F

Omnidirectional hotwire probe. Measuring range: air velocity 0÷5 m/s. Probe stem Ø 14 mm, length 110 mm. Cable length 2 metres. Equipped with electronic module. Used for calculating the following indices: IREQ,WCI, DLE, RT, PMV, PPD, SR. Used for calculating Mean radiant temperature.
Measuring range: -30°C…+30°C



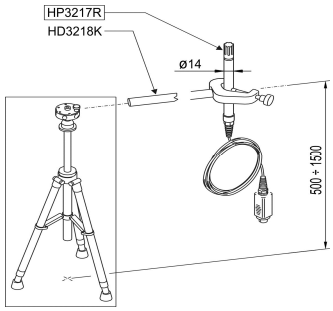
HP3201

Natural wet bulb probe. Pt100 sensor. Probe stem Ø 14 mm, length 110 mm. Cable length 2 metres. Equipped with electronic module, spare braid and 50cc. distilled water. Used for measuring: WBGT.
Measuring range: 4°C…+80°C



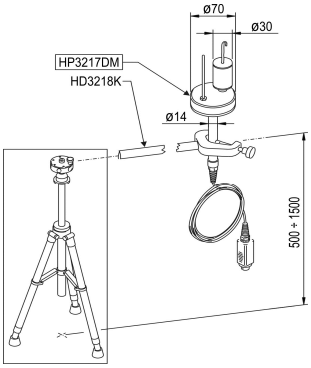
HP3217R

Combined temperature and relative humidity probe. Capacitive RH sensor, Pt100 temperature sensor. Probe stem Ø 14 mm, length 110 mm. Cable length 2 metres. Equipped with electronic module. Used for calculating the following indices:
IREQ,WCI, DLE, RT, PMV, PPD, SR.
Measuring range: 40°C…+100°C



HP3217DM

Double natural wet bulb probe and temperature probe (dry bulb). Probe stem Ø 14 mm, length 110 mm. Cable length 2 metres. Equipped with double electronic module, spare braid and 50cc. distilled water.
Measuring range: 4°C…+80°C



SATEMA
13856 VIGLIANO B.SE - Via Milano, 395
Tel. +39 015811102 - Fax 0158853029
Mail: info@satema.it http://www.satema.it

DAT32B - SOFTWARE B DISCOMFORT

Table of probes for DAT32B operating program: Analysis of Discomfort

TP3227K Temperature probe composed of 2 independent probes, temperature of the head and abdomen

TP3227PC Temperature probe composed of 2 independent probes, temperature of the ankles and the floor.

TP3207P Temperature probe Pt100 sensor, floor temperature

TP3207TR Probe for measuring radiant temperature (net-radiometer)

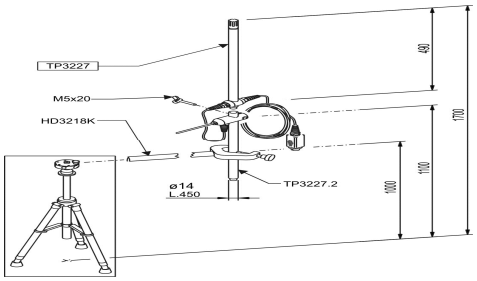
The following table lists all the necessary probe for determining the microclimatic indices.

The following indices are obtained by using the Analysis of Discomfort software:

Each line shows the combination of probes to use for calculating the indices

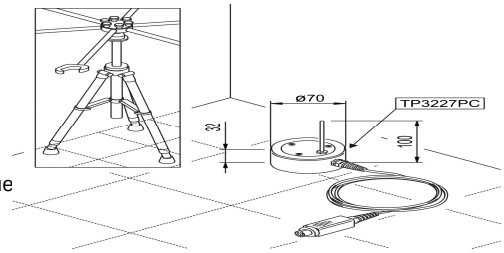
		TP3227K	TP3227PC	TP3207P	TP3207TR	LP 471 Phot
PD_v:	Percentage Dissatisfied with vertical temperature difference (head-ankles).	•	•			
PD_f:	Percentage Dissatisfied with floor temperature.		•			
				•		
PD_Δ:	Percentage Dissatisfied with radiant asymmetry.				•	
FLD:	Average Day Light Factor Requires HD32.1 program C					•

TP3227K Temperature probe composed of 2 independent probes, Pt100 sensor. Stem diameter Ø 14 mm, length 500 mm. Cable length 2 metres. Equipped with double electronic module and TP3227.2 extension shaft Ø 14 mm, length 450 mm. Used for measuring local discomfort due to vertical thermal gradient. It can be used for studying subjects sitting or standing. The height of one probe can be regulated. sensore Pt100. Diametro gambo Ø 14 mm, lunghezza 500 mm. Cavo lunghezza 2 metri. Completa di modulo Measuring range -10°C…+100°C.



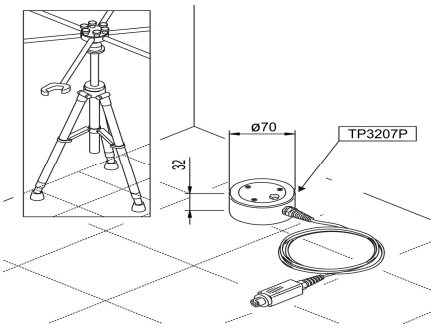
TP3227PC Temperature probe composed of 2 independent probes, Pt100 sensor, one for measuring floor temperature (diameter Ø 70 mm, height 30 mm), the other for measuring temperature at the height of the ankles (diameter Ø 3 mm, height 100 mm). Cable length 2 metres. Equipped with double electronic module. Used for measuring local discomfort due to vertical thermal gradient.

Measuring range -10°C…+100°C.



TP3207P Pt100 sensor temperature probe, for measuring floor temperature (diameter Ø 70 mm, height 30 mm). Cable 2 meters long. Equipped with electronic module. Used for the assessment of dissatisfied people to floor temperature due to radiant asymmetry.

Measuring range -10°C…+100°C.



SATEMA

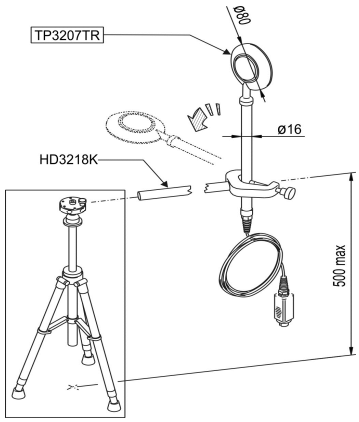
13856 VIGLIANO B.SE - Via Milano, 395

Tel. +39 015811102 - Fax 0158853029

Mail: info@satema.it http://www.satema.it

DAT32B - SOFTWARE B DISCOMFORT

TP3207TR Probe for measuring radiant temperature. Probe stem Ø 16 mm, length 250 mm. Cable length 2 metres. Equipped with electronic module. Used for the evaluation of dissatisfied people due to radiant asymmetry.
Measuring range: 0°C…+60°C



LP471PHOT Photometric probe for illuminance measurement, spectral response in agreement with standard photopic vision, diffuser for cosine correction.
Measurement range: 0.01 lux…200·10^3 lux.

Measurement range lux	0.01…199.99	…1999.9	…19999	…199.99·10^3
Resolution lux	0.01	0.1	1	0.01 ·10^3
Spectral range	in agreement with standard photopic curve V(λ)			
Class	C (B on request)			
Calibration uncertainty	<4%			
f'1 (with photopic response V(λ))	<8%			
f2 (response according to the cosine law	<3%			
f3 (linearity)	<1%			
f4 (instrument reading error)	<0.5%			
f5 (fatigue)	<0.5%			
α (temp. coefficient) f6 (T)	<0.05%K			
Drift after 1 year	<1%			
Functioning temperature	0…50°C			
Reference standard	CIE n. 69 - UNI 11142			

SATEMA
13856 VIGLIANO B.SE - Via Milano, 395
Tel. +39 015811102 - Fax 0158853029
Mail: info@satema.it http://www.satema.it

DAT32C SOFTWARE C - PROBES

CO and CO2 probes

HD320A2 Carbon monoxide (CO) probe, fullscale 500ppm. 2m cable. Complete with electronic module.

HD320B2 CO2 probe, fullscale 500 ppm. Ø 14 mm, total length 200 mm. 2 m cable. Complete with electronic module.

Temperature probes Pt100 sensor with electronic module

TP 472 I Immersion probe, Pt100sensor. Stem Ø 3 mm, length 300 mm. Cable 4wire, 2 meters long. Range -196…+500°C Accuracy +/-0.25°C (-196...+350°C); +/-0.4°C (+350...+500°C)

TP 472 I.0 Immersion probe, Pt100sensor. Stem Ø 3 mm, length 230 mm. Cable 2 meters long. Range -50…+400°C. Accuracy +/-0.25°C (-50...+350°C); +/-0.4°C (+350...+400°C)

TP 473 P.0 Penetration probe, Pt100sensor. Stem Ø 4mm, length 150 mm. Cable 2 meters long. Range -50…+400°C Accuracy +/-0.25°C (-50...+350°C); +/-0.4°C (+350...+400°C)

TP 474 C.0 Contact probe, Pt100sensor. Stem Ø 4mm, length 230mm, contact surface Ø 5mm. Cable 2 meters long Range -50...+400°C. Accuracy +/-0.3°C (-50...+350°C); +/-0.4°C (+350...+400°C)

TP 475 A.0 Air probe, Pt100sensor. Stem Ø 4mm, length 230mm. Cable 2 meters long. Range -50...+250°C. Tr = 12s Accuracy +/-0.3°C (-50...+250°C)

TP 472 I.5 Immersion probe, Pt100sensor. Stem Ø 6mm, length 500 mm. Cable 2 meters long. Range -50…+400°C Tr = 3s Accuracy +/-0.3°C (-50...+350°C); +/-0.4°C (+350...+400°C)

TP 472 I.10 Immersion probe, Pt100sensor. Stem Ø 6mm, length 1,000mm. Cable 2 meters long. Range -50…+400°C. Tr = 3s Accuracy +/-0.3°C (-50...+350°C); +/-0.4°C (+350...+400°C)

TP49A Immersion probe, Pt100sensor. Stem Ø 2.7mm, length 150mm. Cable 2 meters long. Aluminium handle. Range -70…+400°C. Tr = 3s Accuracy +/-0.25°C (-50...+350°C); +/-0.4°C (+350...+400°C)

TP49AC Contact probe, Pt100sensor. Stem Ø 4 mm, length 150mm. Cable 2 meters long. Aluminium handle. Range -70...+400°C. Accuracy +/-0.25°C (-50...+350°C); +/-0.4°C (+350...+400°C)

TP49AP Penetration probe, Pt100sensor. Stem Ø 2.7mm, length 150mm. Cable 2 meters long. Aluminium handle. Range -70...+400°C. Accuracy +/-0.25°C (-50...+350°C); +/-0.4°C (+350...+400°C)

TP875 Globe thermometer Ø 150 mm with handle. Cable 2 meters long Range -30…+120°C - Accuracy +/- 0.25°C

TP876 Globe thermometer Ø 50 mm with handle. Cable 2 meters long Range -30…+120°C - Accuracy +/- 0.25°C

TP87 Immersion probe, Pt100sensor. Stem Ø 3 mm, length 70 mm. Cable 2 meters long. Range -50…+200°C, accuracy +/- 0.25°C

TP878 Contact probe for solar panels. Cable 2 meters long, or 5 meters long (TP878.1). Range +5…+80°C, accuracy +/- 0.25°C

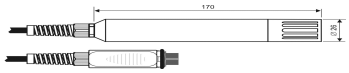
TP879 Penetration probe for compost. Stem Ø 8 mm, length 1 meter. Cable 2 meters long. Range -20…+120°C, accuracy +/-0.25°C

SATEMA
13856 VIGLIANO B.SE - Via Milano, 395
Tel. +39 015811102 - Fax 0158853029
Mail: info@satema.it http://www.satema.it

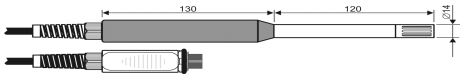
DAT32C SOFTWARE C - PROBES

Relative humidity and temperature probes using electronic module

HP 472 ACR %RH and temperature (Pt100) combined probe, dimensions Ø 26x170 mm. 2 m connecting cable. Range -20…+80°C , 0…100%RH. Accuracy 0…40°C +/-1.5%RH (5…90%RH); +/-2.5%RH (90...100%RH) - +/-0.3°C



HP 473 ACR %RH and temperature (Pt100) combined probe, dimensions: handle Ø 26x130 mm, probe Ø 14x110 mm.2 m connecting cable. Range -20…+80°C , 0…100%RH. Accuracy 0…40°C +/-1.5%RH (5…90%RH); +/-2.5%RH (90...100%RH). +/-0.3°C

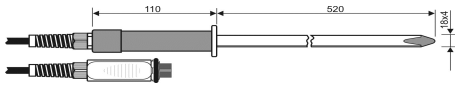


HP 474 ACR %RH and temperature (Pt100) combined probe, dimensions: handle Ø 26x130 mm, probe Ø 14x210 mm. 2 m connecting cable.Range -40…+150°C , 0…100%RH. Accuracy -40…150°C (180°C) +/-(1.5+0.02 time the displayed value). +/-0.3°C

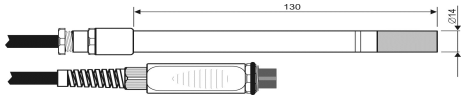
HP 475 ACR %RH and temperature (Pt100) combined probe, dimensions: handle Ø 26x130 mm, stainless-steel tube Ø 12x560 mm. Terminal tip Ø 13.5x75 mm. Range -40…+150°C , 0…100%RH. Accuracy -40…150°C (180°C) +/-(1.5+0.02 time the displayed value). +/-0.3°C

HP 475AC1R %RH and temperature combined probe. 2 m connection cable. Handle Ø 26x110 mm. Stainless steel stem Ø 14x480 mm. Range -40…+150°C , 0…100%RH. Accuracy -40…150°C (180°C) +/-(1.5+0.02 time the displayed value). +/-0.3°C

HP 477 DCR %RH and temperature combined sword probe. 2 m connecting cable. Handle Ø 26x110 mm. Probe tube 18x4 mm, length 520 mm. Range -40…+150°C , 0…100%RH. Accuracy -40…150°C (180°C) +/-(1.5+0.02 time the displayed value). +/-0.3°C



HP 478 ACR %RH and temperature combined probe. Dimensions Ø 14x130 mm. 5m connection cable. Range -40…+150°C , 0…100%RH. Accuracy -40…150°C (180°C) +/-(1.5+0.02 time the displayed value). +/-0.3°C



Wind speed measurement probes

AP 471 S1 Hot-wire telescopic probe, measuring range: 0.1…40m/s. Cable length 2 metres. Directional NTC thermistor.
Range 0,1…40m/s, -25…+80°C. Compensation 0…+80°C. Probe diameter (measure) 8mm.

AP 471 S2 Omnidirectional hot-wire probe, cable length 2 metres . Range: 0.1…5m/s, -25…+80°C. Compensation 0…+80°C. Probe diameter (measure) 8mm.

AP 471 S3 Hot-wire telescopic probe with terminal tip for easy position, cable length 2 metres. Range 0,1…40m/s, -25…+80°C.

AP 471 S4 AP 471 S5 Omnidirectional hot-wire telescopic probe with base, measuring range: 0.1…5m/s. Cable length 2 metres.

SATEMA

13856 VIGLIANO B.SE - Via Milano, 395
Tel. +39 015811102 - Fax 0158853029
Mail: info@satema.it http://www.satema.it

DAT32C SOFTWARE C - PROBES

AIR speed measurement vane probes

AP472S1 Vane probe with thermocouple, Ø 100mm. Speed from 0.6 to 25m/s; temperature from -25 to 80°C. Cable length 2 metres.

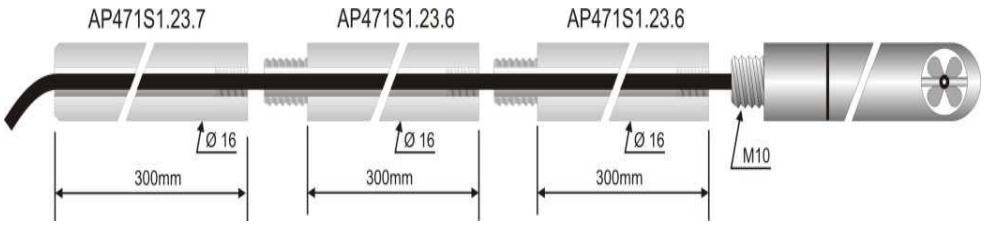
AP472S2 Vane probe, Ø 60mm. Speed from 0.5 to 20m/s. Cable length 2 metres.

AP472S4L Vane probe, Ø 16mm. Speed from 0.8 to 20m/s. Cable length 2 metres.

AP472S4LT Vane probe with thermocouple, Ø 16mm, speed from 0.8 to 20m/s. Temperature from -25 to 80°C with thermocouple K sensor. Cable length 2 metres.

AP472S4H Vane probe, Ø 16mm speed from 10 to 40m/s. Cable length 2 metres.

AP472S4HT Vane probe with thermocouple, Ø 16mm speed from 10 to 50m/s. Temperature from -25 to 80°C with thermocouple K sensor(*). Cable length 2 metres.



SATEMA
13856 VIGLIANO B.SE - Via Milano, 395
Tel. +39 015811102 - Fax 0158853029
Mail: info@satema.it http://www.satema.it

DAT32C SOFTWARE C - PROBES

Photometric and radiometric probes

LP471 PHOT Photometric probe for illuminaNCE measurement complete with electronic module, spectral response in agreement with standard photopic vision, diffuser for cosine correction. Measurement range: 0.01 lux…200·10^3 lux.

LP471 RAD Radiometric probe for IRRADIANCE measurement complete with electronic module; in the 400nm…1050nm spectral range, diffuser for cosine correction. Measurement range: 0.1·10-3W/m2 …2000 W/m2.

LP471 PAR Quantum radiometric probe for the measurement of the photon flow across the chlorophyll range PAR (Photosynthetically Active Radiation 400nm…700nm) complete with electronic module measurement in µmol/m-2s-1, diffuser for cosine correction. Measurement range: 0.01µmol/m-2s - 1…10·10^{3}µmol/m-2s-1.

LP471 UVA Radiometric probe for IRRADIANCE measurement complete with electronic module; in the 315nm…400nm, peak 360nm, UVA spectral range, quartz diffuser for cosine correction. Measurement range: 0.1·10-3W/m2…2000 W/m2.

LP471 UVB Radiometric probe for IRRADIANCE measurement complete with electronic module, in the 280nm…315nm, peak 305nm, UVB spectral range, quartz diffuser for cosine correction. Measurement range: 0.1·10-3W/m2…2000 W/m2.

LP471 UVC Radiometric probe for IRRADIANCE measurement complete with electronic module, in the 220nm…280nm, peak 260nm, UVC spectral range, quartz diffuser for cosine correction. Measurement range: 0.1·10-3W/m2…2000 W/m2.

LP471 LUM2 Photometric probe for luminance measurement complete with electronic module, spectral response in agreement with standard photopic vision, vision angle 2°.
Measurement range: 0.1 cd/m2…2000·103 cd/m2.

LP471 ERY Radiometric probe for EFFECTIVE TOTAL IRRADIANCE (Weff /m2) according to the UV action curve (CEI EN 60335-2-27) complete with electronic module. Spectral range: 250 nm…400 nm, quartz diffuser for cosine correction. Measurement range: 0.1·10-3Weff /m2 … 2000 Weff /m2

LP BL Base with levelling device (except LP 471 LUM 2).

SATEMA
13856 VIGLIANO B.SE - Via Milano, 395
Tel. +39 015811102 - Fax 0158853029
Mail: info@satema.it http://www.satema.it