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Sunshine duration-direct radiometer

User manual

Index

1. Description

The LSI LASTEM Sunshine duration – direct radiometers is a sensor for measuring radiation coming directly from the sun and sunshine duration (referring to a certain threshold). Measurement is at visible and near infrared wavelength, with performances of a WMO II class pyranometer.

Being set the measurement site latitude, the instrument does not require any other seasonal repositioning for an ordinary precision relief. Higher precision are obtained with two seasonal repositioning only.

The sensitive element is made up of a radiation sensing sphere, which receives radiation from an anular sky portion of an amplitude of 90°. A rotating band shadows the sensing sphere as it passes behind the sun: the difference of radiation values in the opposite condition (shadow - light) is, with a good approximation, the direct sunshine radiation.

The sensor furnishes sunshine state: sun is "present" when the direct radiation is greater than 120 Wm^{-2} (WMO standard - 1981).

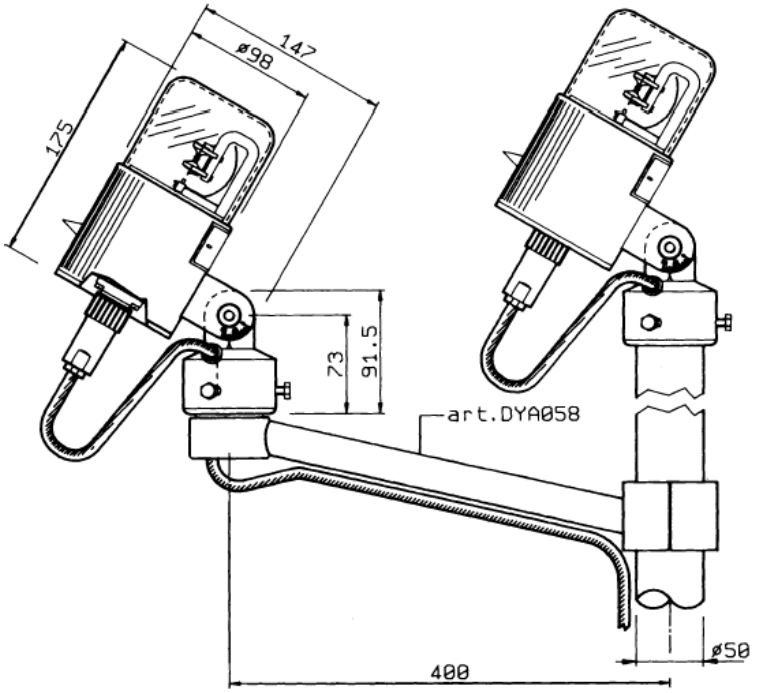
Sensor has two heaters: one for atmospheric moisture and the other for frost. In darkness, the rotating band is stopped and the logic output for sunshine presence is awitched to "off". Normalized outputs let the instrument compatible with the most part of other instrument: data logger, printer, timer.

1.1. Models

	Codes	
Power supply	12 Vcc	12 Vcc
Output	0÷5 V / on-off TTL	60÷300 mV / on-off TTL
Sunshine duration – direct radiometer	DPD503	DPD504

2. Technical Specifications

Sensitive element	photodiode
Operating latitude	0÷60°
Operating spectral band	300÷1100 nm
Measurement Range	1500 Wm^{-2}
Radiation electric output	Normalized
Tolerance	5% + 5 Wm^{-2}
Nonlinearity	< 1,5%
Thermic drift	< 2% (-10÷40 °C)
Operating temperature	0÷60 °C
Operating Temperature (with heating)	-30÷60 °C without frost
Rotating band speed	1 rps
Sunshine electric output	on/off TTL
Sunshine programming	120 Wm^{-2}
Power consumption	0,7 W
Moisture heater	1 W
Frost heater	20 W
No frost thermostat	5÷20 °C
Initialising time	always on (advised by LSI LASTEM) however T>1min
Cable	not included
Weight (without cable)	1,5 kg



3. Assembly instructions

3.1. Mounting

The sensor must be installed away from buildings, tree and other obstacles that may generate shadows or improper light diffusion in each day time and for every day of the year.

In order to mount the sensor on the pole:

- Insert the cable (DWA…) in its slot to the side of the sensor and make it pass in the pole till it reaches the opening at the bottom;
- Install the sensor at the top of the pole, pointing the red nose towards SOUTH if you are in the northern emisphere, towards NORTH if you are in the southern emisphere. Then tighten the three screws.
- Set the goniometer to an angle corresponding to the latitude of the measurement site;
- Connect the cable to the sensor.

For mounting the sensor with DYA058 side support:

- Insert the cable (DWA…) in its slot to the side of the sensor;
- Fix the support DYA058 to the pole and the sensor to the support, pointing the red nose towards SOUTH if you are in the northern emisphere, towards NORTH if you are in the southern emisphere;
- Set the goniometer to an angle corresponding to the latitude of the measurement site;
- Connect the cable to the sensor.

3.2. Configuring LSI LASTEM dataloggers

E/R/M-Log dataloggers configuration for the usage of the probe (only for mod. DMD504) can be done using 3DOM application: from this program open the desired instrument configuration, select *Measures* for General Parameters Menu, then click the *Add* button on the right. From the sensor library that appears, select DPD504. 3DOM assigns the new sensor to a free input channel. Electrical connection must respect this assignment.

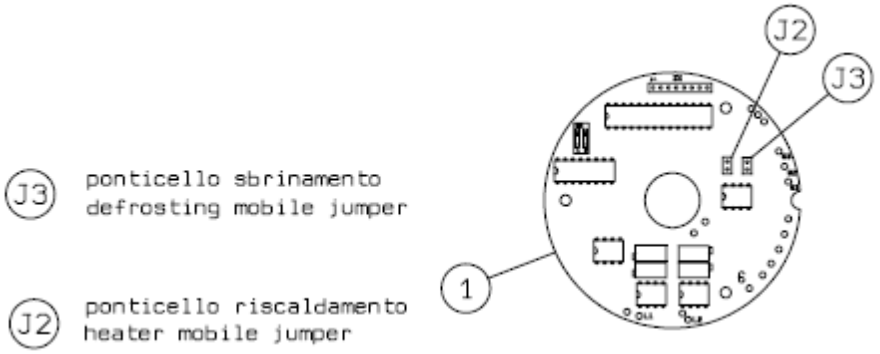
Consult for more details User's Manual and Quick Start Guide relative to your own datalogger, and 3DOM manual; all these documents are inside the LSI LASTEM product DVD – MW6501.

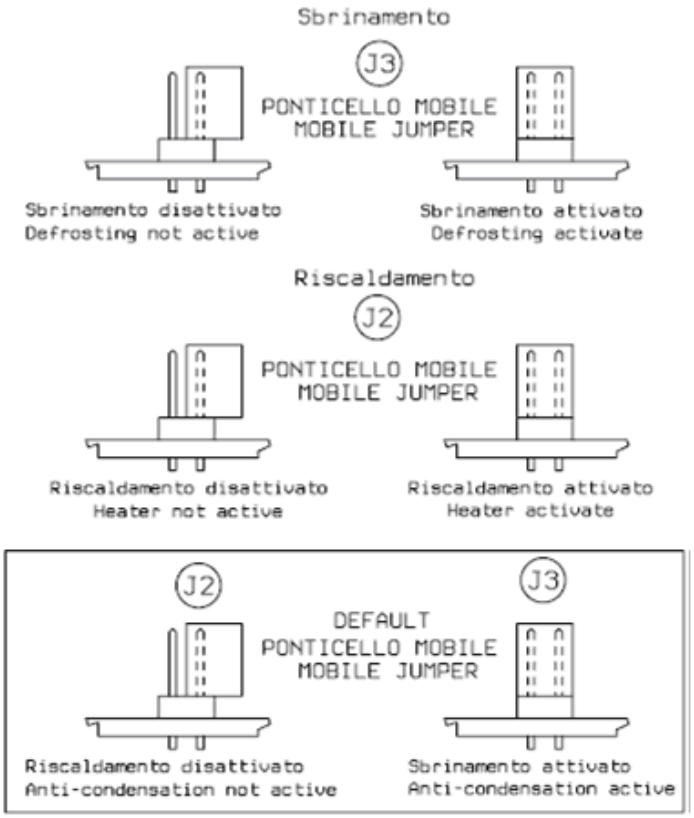
3.3. Electrical connection

Please use the reference connection diagram at §6.

4. Use and maintenance

The sensor is endowed with heating for atmospheric moisture and with a no frost system in order to prevent frost forming on the glass dome. By default setting no frost system is ON, while the heating is OFF. In order to change this configuration, operate on instrument electronic board as described in the picture below.





For an optimal working, LSI LASTEM advises a continuos functioning and an initialising time always ON. If power supply can't support it, however keep an initialising time greater than 1 minute.

5. Conformity declaration

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Ref. CE011/06

CE CONFORMITY DECLARATION

Producer declaration about the warranty that the series production is up to the Certified sample

Producer declaration about the conformity to the EMC European rules

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Name of the producer: LSI SpA

We hereby declare that all the products of the following series:

Product name: Direct Rediation – Sunshine Duration Meter
Codes: DPD503 – DPD504

Produced by our company are produced in the same way as the exemplar tested at the accredited centre "Prima Ricerca & Sviluppo Srl" (Via Conciliazione 1, 22100 Tavernola (CO)), that issued the Test Report "EMC.TR.04.146".

The products satisfy the requirements imposed by the European rule
EMC DIRECTIVE 89/336 EEC (included EEC 93/68)

Compliance with this directive implies conformity to the following European Norms (in brackets are the equivalent international standards)

- EN 50082 – 1
- EN 55011
- EN 55022 (CISPR 22) – Electromagnetic Interference
- EN 55024 (IEC61000-4-2,3,4,5,6,8,11) – Electromagnetic Immunity
- EN 61000-3-2 (IEC610000-3-2) – Power Line Harmonics
- EN 61000-3-3 (IEC610000) – Power Line Flicker
- EN 60950 (IEC60950) – Product Safety

In accordance to the aforesaid rules, products are marked CE.

The present declaration covers all the options derived by the specified product.

Dr. Giulio Certo
General Manager and Representative

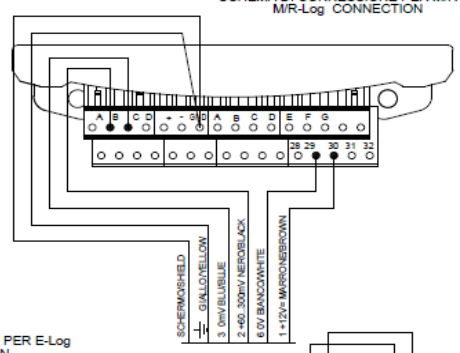
6. Drawings

RADIOMETRO DIRETTO ELIOFANOMETRO/DIRECT RADIOMETER AND SUNSHINE SENSOR

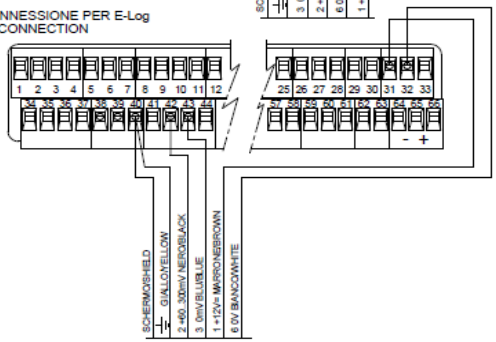
☐ Code DPD503 : USCITE/OUTPUTS:Sig1 RAD.DIRETTA/DIRECT RADIATION 0..5Vdc 0..1500W/m²
Sig2 INSOLAZIONE SI/NO-SUNSHINE STATUS ON/OFF TTL
ALIMENTAZIONE/POWER SUPPLY 12Vdc

☐ Code DPD504 : USCITE/OUTPUTS:Sig1 RAD.DIRETTA/DIRECT RADIATION 60..300mV 0..1500W/m²
Sig2 INSOLAZIONE SI/NO-SUNSHINE STATUS ON/OFF TTL
ALIMENTAZIONE/POWER SUPPLY 12Vdc

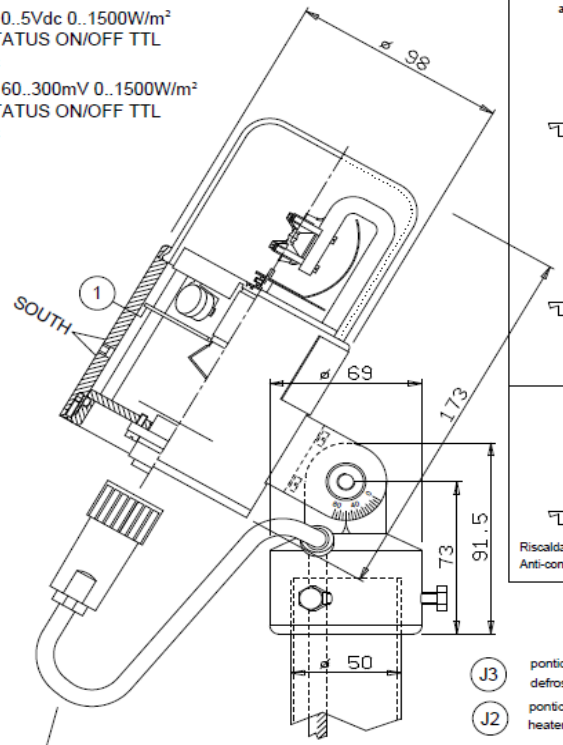
SCHEMA DI CONNESSIONE PER M/R-Log
M/R-Log CONNECTION



SCHEMA DI CONNESSIONE PER E-Log
E-Log CONNECTION



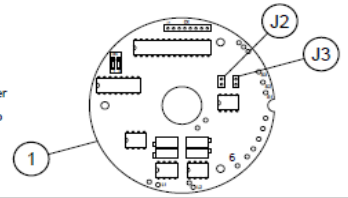
Pin	
1	+12 Vdc ALIMENTAZIONE/POWER SUPPUPPLY
2	+Sig1 (vedi targhetta/see label) RADIAZIONE DIRETTA/DIR. RADIATION
3	-Sig1Sig2 COMUNE/COMMON
4	+Sig2 TTL 0-5V STATO ELIOFANIA/ SUNSHINE
5	Schermo Screen
6	0Vdc COMUNE ALIM./POW.SUPPLY & RISCALDAMENTO/HEATER
7	⏚ CONTENITORE/ARMATURE



CABLES Code DWA5..

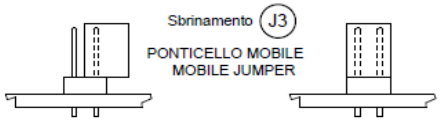
J3 ponticello sbrinamento
defrosting mobile jumper

J2 ponticello riscaldamento
heater mobile jumper



** La buona efficacia del sistema anticondensa richiede una alimentazione ininterrotta.
Well functioning of anti-condensation system requires a nonstop power supply.

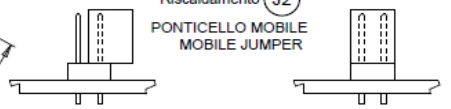
Sbrinamento J3
PONTICELLO MOBILE
MOBILE JUMPER



Sbrinamento disattivato
Defrosting not active

Sbrinamento attivato
Defrosting activate

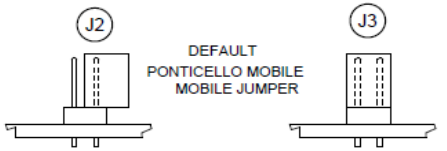
Riscaldamento J2
PONTICELLO MOBILE
MOBILE JUMPER



Riscaldamento disattivato
Heater not active

Riscaldamento attivato
Heater activate

J2 J3
DEFAULT
PONTICELLO MOBILE
MOBILE JUMPER



Riscaldamento disattivato
Anti-condensation not active

Sbrinamento attivato
Anti-condensation active

e	10-12-12	A.A.	E.C.	CGC	A.As.	Inserito indicazione di connessione
d	19-04-07	A.A.	B.K.	CGC	A.As.	Inserito indicazione di connessione a data logger LSI e nota **(RNC 32/07)
c	02-05-06	A.A.	B.K.	CGC	A.As.	Eliminato scheda alimentatore eliminato articolo 24Vca cod.dpd501
b	27-06-03	A.A.	CGC	C.F.	C.F.	AGGIORNAMENTO GENERALE PROGETTO 13-03
a	15-05-00	A.A.	CGC	C.F.	C.F.	AGGIUNTO CARTIGLIO CONFORME AGGIORNATO COME DA R.A.C. n°26/00
Origine	26-06-95	A.A.				Descrizione della revisione
Esp.di revisione	Data	(R)	(C)	(V)	(A)	

Il manuale del prodotto e' presente nel CD Prodotti LSI ed inoltre sul sito www.lsi-lastem.it
The user's manual for this equipment is inside the LSI's products CD and it is available also on www.lsi-lastem.it

Scala:

Codice:

Disegno/Drwg.: DISACC3698e

Descrizione/Description: RADIOMETRO DIRETTO ELIOFANOMETRO
DIRECT RADIOMETER AND SUNSHINE SENSOR

N.di pag.