



SOLAR STREET LIGHT 7M



USER MANUAL & TECHNICAL DESCRIPTION FOR THE SOLAR STREET LIGHT 7M

PV street-lamp must be composed of:

Crystalline PV module;

Charge controller Light sensor working with time bands through PV module sensor with timed turning off programmable by n° 4 internal switches;

Control electronics for LED with flux reduction;

Plumb sealed batteries without maintenance;

Steel top-of-pole mounting structure with side opening battery box with fixed tilt (according to the latitude of installation - section 3 of this technical description);

LED luminaire (power indicated in the section 10 of this technical description);

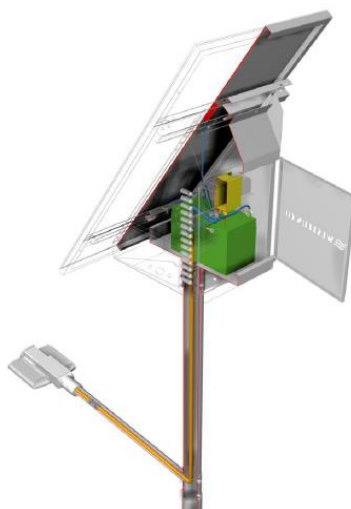
Lamp-bracket.

System description:

The PV street-lamp is dimensioned to work with programmed turning ON up to 12 hours per night with reduced luminous flux and autonomy of 4 days in case of NO SUN condition.

The electronic circuit with 12V/24V nominal voltage (auto-detect), has got the function of charge controller with MPPT technology. It makes their search of the point of the module's maximum power (MPPT) and it allows the regulation of activation hours according to the produced energy (auto-management algorithm).

The control electronic soft the PVstreet-lamp must have on the same printed circuit board the possibility to connect a hardware module for setting and system control through a RADIO or GSM communication





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Technical description of each component

Charge controller for PV lighting:

SPB-LS is a charge regulator for the charge of batteries from PV module; it has been specially designed for the use in off-grid PV lighting systems (PV street-lamp). The charge controller code SPB-LS is housed inside a metal box that is protected from water (IP66 degree); therefore it can be installed directly on the PV pole without having to add additional protections. The charge circuit from PV module has got an efficient algorithm for the search of the maximum power point (MPPT) that is capable of operating over an extended field of voltages. It is allowed a maximum voltage on the PV module up to 100V. The regulator can charge either 12V Pb batteries or 24V Pb batteries. On power ON, SPB-LS automatically recognizes if the battery is at 12V or 24V and it automatically adjusts the charge thresholds. The regulator automatically manages the power on and off of the lamp. At dusk (when the voltage of the PV module drops below the V night threshold) the charge controller switches on the lamp and keeps it on for a number of hours that can be set by the user (the default setting is 8 hours). You can also set some programs for lamp's power on with working hours with reduced flux (dimmer). In this way you can check accurately the lamp consumption so to remain inside the dimensioning of the PV off-grid system.

- Charge controller code SPB-LS
- ISO 9001:2008 certified manufacturer.
- MPPT charge.
- Wide range of input voltage of the PV module (up to 100V).
- Max power of PV module: 225W @ 12V and 450W @ 24V.
- Integrated blocking diode.
- 12/24V auto detect.
- Switch for battery selection: sealed, GEL or flooded lead acid.
- Switch for selection of battery distance: 1mt or 10mt (base of pole).
- Switch for setting depth of discharge (DoD) 30% or 70%.
- Battery charge compensated in temperature
- Integrated light sensor (through PV module).
- Possible load activation with flux reduction.
- Switch to program the hours of load activation.
- Auto-management for hours of lamp activation.





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- Protection for battery polarity inversion.
- Overload and over temperature protection.
- Low battery protection.
- LEDs for the following indications: 12/24V; on/off load; on/off flux reduction; current from PV; protections.
- IP65 metal box for outdoor application.

Charge controller SPB-LS Picture:



PV module:

The PV modules must be properly dimensioned according to the place / latitude of installation and the requested hours of lamp activation per night.

PV module type and dimensions		Pmax (Wp)	Imp (A)	Vmp (V)	Isc (A)	Voc (V)	Peso (Kg)
85 Wp (958x680x34mm)	**	85	4,76	17,9	5,02	22,1	7,6
100 Wp (1325x655x34mm)		100	6,1	16	6,88	20	10,8
145 Wp (1508x680x34mm)	**	145	8,17	18	8,69	22,2	11,8

** SOLARWORLD® PV modules





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Top-of-pole mounting structure:

Codes WTP20_2x150Ah (20°) - WTP30_2x150Ah (30°) - WTP55 (55°)

Hot galvanized structure

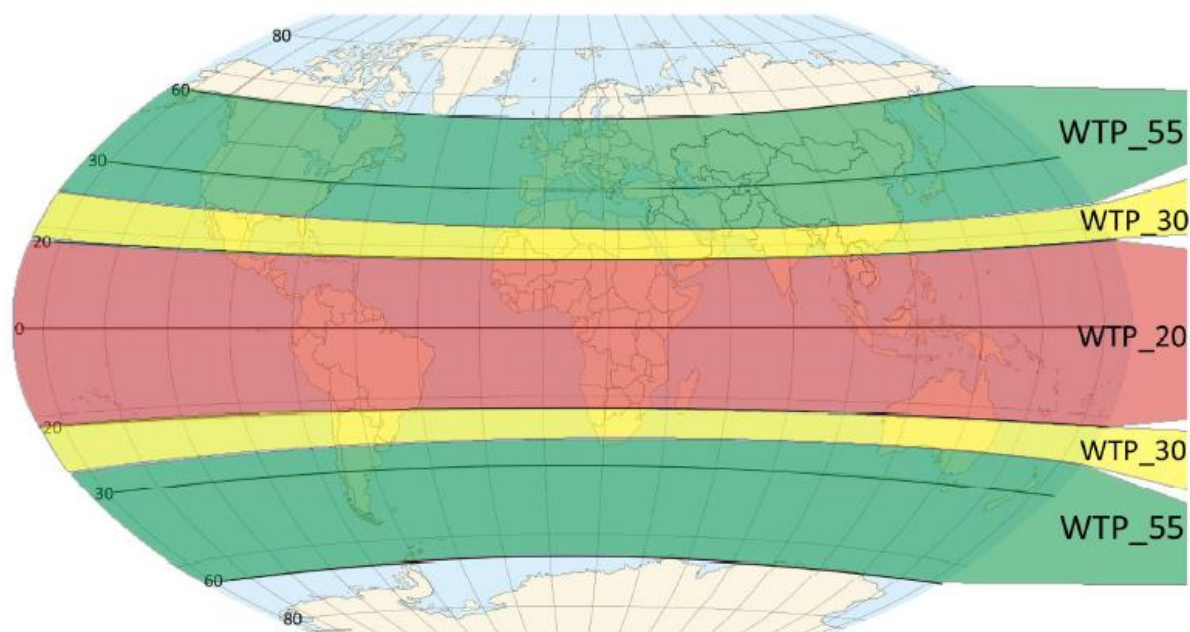
Box with slits for ventilation

Box with rear opening

Rear door can be opened through blocking screw

Fixing for pole - diameter 102mm - with blocking screws

Box for batteries and charge controller





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Kit of supports:

Steel structure

Fixing for top-of-pole mounting structure

Length according to the PV modules



Lamp-bracket:

Steel tubular lamp-bracket - diameter 60mm and length 1000mm with tilt 10° respect to the horizontal

Joint to pole - diameter 102mm - welded to the lamp-bracket

Slots for cable passage between joint and lamp-bracket

Hot dip galvanizing

Code BZ100/60T



Pole:

Hot-galvanized tapered pole - height 7metersabove ground type Western Co. code RDI7800/4

H. tot 7.8m

Diameter at the bottom =168mm

Diameter on the top = 102mm

Metal thickness = 4mm



Batteries / Accumulators:

Batteries must be of 12V nominal voltage-lead for cyclic use of charge and discharge, with low auto-discharge, realized in AGM/VRLA technology (with absorbed electrolyte and valves-regulated), in air tight box with safety valves, without maintenance.

Voltage: 12V

Capacity: 100/150 Ah in C20

Pb sealed AGM/VRLA without maintenance

Low auto-discharge





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LED luminaire for PV street-lighting suitable for bracket or top-pole installation:

LED lighting luminaire suitable for bracket or top-pole installation.

The supporting structure of the luminaire, which acts as a heat sink too, is made of extruded aluminium alloy EN AW 6060 T5 EN - T6 state, thickness 6mm, dim. 233/380x300mm, height 79mm.

It is made up of a suitable number of fins exchanging the heat produced by the lighting body with the external environment in order to keep the LEDs' junction temperature at a value that ensures a life longer than 60.000 hours LM70 @700mA at 25°C ambient temperature (critical failures included).

The anodising treatment is able to ensure resistance to the external environment and promotes heat dissipation. The perfectly flat lower section of the frame is used to secure optics light sources. The side caps are made of die-cast aluminium - alloy EN 46100 - epoxy enamelled, after phosphide greasing treatment (chromium-free) and they are coupled with the body by silicone sealant and screws. Universal attack to bracket or top-pole made of hot galvanized and painted steel Ø 60 mm. Adjustable tilting system which allows an inclination of 0° / -5° / -10° / -30° for bracket installation and of 0° for top-pole installation. EPDM gasket applied on proper housing obtained from the body and from the side caps.

The closing screen is in tempered high transparency flat glass - thickness 4mm with decorative serigraphy; it is fixed on the apparatus body by 4 glass-stop accessories made of die-cast aluminium - alloy EN 46100 - epoxy glazed after phosphide greasing treatment (chromium-free) and screws. The screen can be easily removed to allow the access to wiring box.

The colour of the side caps, of the glass-stop and of the attack is: "starry silver". The luminaire has an interior air exchange filter.

The photometric measure complies with UNI EN 11356 and LM-79-08. "Cut-off" photometric emission in compliance with regional laws for light pollution. The optical system is composed of optical modules with high optical efficiency (about 92%) made of polymethyl methacrylate (PMMA). Luminous source constituted of high efficiency LED (142 lm/W – If=350mA & Tj=25°C) with 4500K colour temperature and CRI 70. The LEDs are mounted on printed circuit boards manufactured with a layer of aluminium support, ceramic insulation layer and copper conductive layer, total thickness of 1,6 mm. Between the dissipating part and the LED circuit there is a layer of thermo-conductive material so to improve the thermal continuity between the parties. LED 5mm – 15° blue colour with decorative function installed in the street side cap. Power supply composed of electronic LED Driver (92% typical) - Class of Insulation III, entirely located inside the wiring compartment, that has to ensure the continuity of the LED modules' power supplying, fixed with screws on housing obtained on the luminaire extruded body and connected to LED modules through cables fixed on the output terminal. 12/24 VDC supplying voltage. Thermal protection, overload / short-circuit and overvoltage protections. Possibility to make the luminaire work at reduced flux of 30% according to the settings on the external Western Co charge regulator or automatically. H07RN-F 3x1.5 mm². Neoprene black supply cable (+Vin, -Vin, Dimmer) outgoing from the luminaire. IP68 external connector for cable with max section 4mm² and max external diameter of 13,5mm.

Dimensions: 300 x 299/446 mm.

Height: 84mm.

Protection degree of optical and wiring compartments: IP65.

Weight: 8,25/10,35 kg.





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Superficie esposta al vento laterale: 0,03/0,05 m².

Superficie esposta al vento in pianta: 0,10/ 0,15m².

Class of insulation: III (SELV).

Warranty: 5 years.



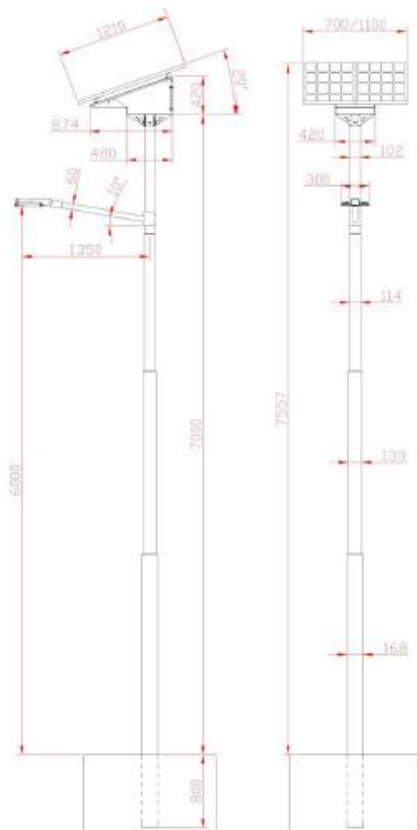
Available versions

Photometric data were measured in the laboratory according to standard: UNI11356 and LM79-08.

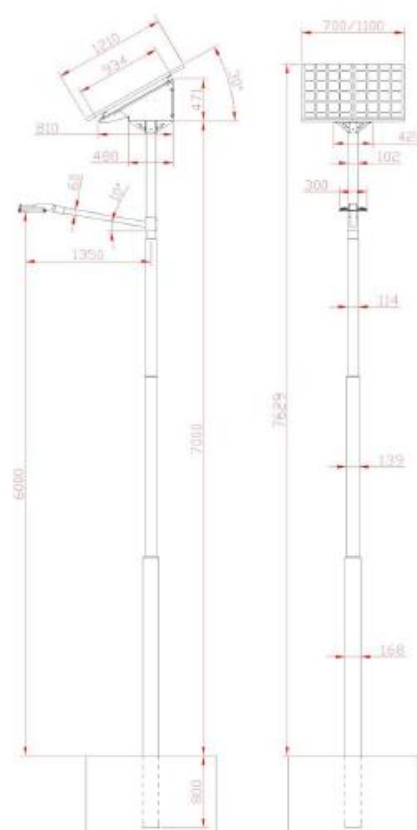
CODE	NUMBER OF LEDs	POWER [W]*	LED CURRENT [mA]	INITIAL LED FLUX [lm]*	INITIAL LUMINAIRE FLUX [lm]*	LUM EFF [lm/W]*	A [mm]	WEIGHT [kg]	SIDE-TOP SURFACE [mm ²]
WL20	20	20	310	2590	2170	108	299	8,25	0,03 - 0,10
WL24	24	24	310	3090	2590	108			
WL30	20	30	450	3550	2980	99			
WL36	24	36	450	4210	3530	98			
WL40	20	40	620	4250	3570	89			
WL48	24	48	620	5050	4240	88			
WL60	40	60	450	7000	5870	98	446	10,35	0,05 - 0,15
WL72	48	72	450	8330	6980	97			
WL80	40	80	620	8420	7060	88			
WL96	48	96	620	9980	8370	87			

*Ta: ambient temperature = 25°C

WTP_20 (tilt 20°)



WTP_30 (tilt 30°)

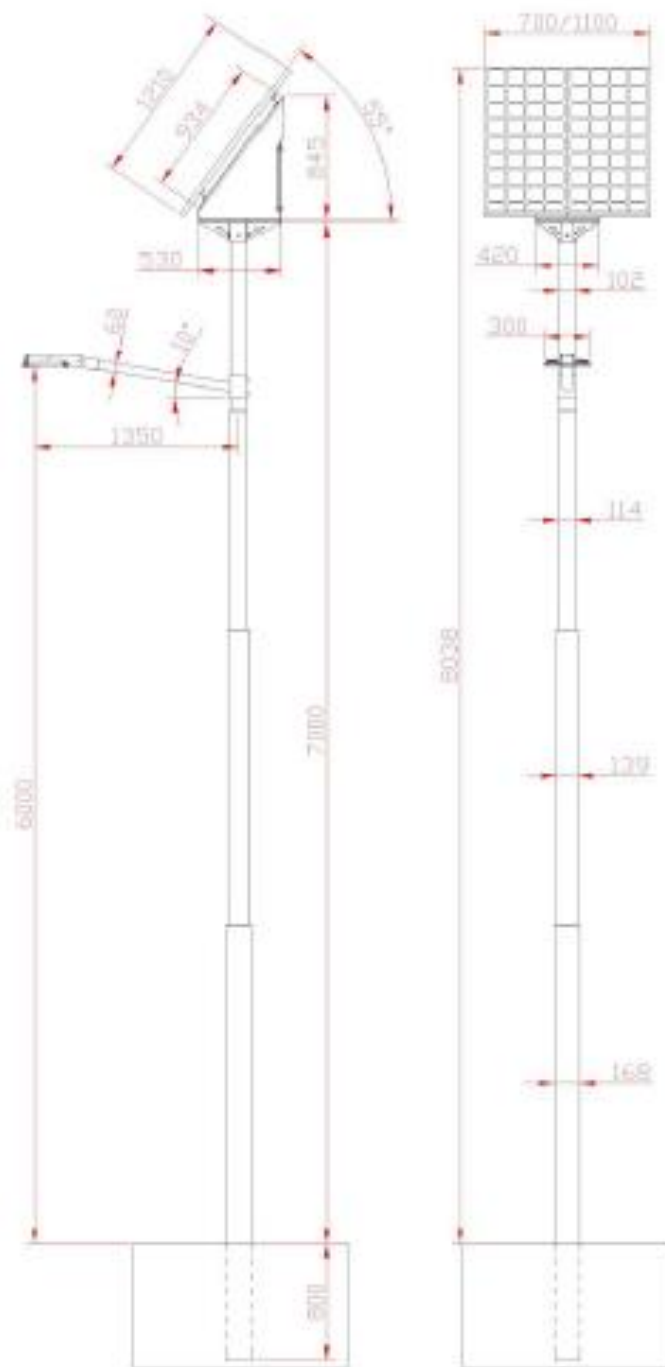




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WTP_55 (tilt 55°)





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Basement:

The study and the calculation of the size of the plinth for the fixing of the PV street-lamp must be made by the system designer and it must take into consideration also the soil type and the location of installation. In the entered data there are standard indications.

MINIMUM CEMENT BASEMENT (You must design the plinth by the type of soil in the place of installation) .

FOUNDATIONS - MINIMUM PLINTH

- Concrete casting with typical resistance $R_{ck}=250 \text{ daN/cm}^2$ reinforced with reinforcing bars having an improved adhesion - steel FeB44k not controlled.
- Length of the pole inside the ground-foundations: 80cm.
- If the ground is able to absorb a long-duration tension of 0,8 - 1,0 daN/cm^2 and very short-duration tensions of 1,4 -1,8 daN/cm^2 there is no need of sub-foundations. Instead, if the ground has a quality, you have to cast under the plinth a layer of lean clay (magrone) enough large to bring back the tension on the ground within the limit values.
- Stresses at the bottom of the standard pole (Trieste - Italy with $ct = 1$) in all directions: $N = 250 \text{ daN}$ (Normal effort); $M = 2167 \text{ daN m}$ bending moment, $V = 351 \text{ daN}$ (cut).

The dimensioning is valid for any Italian place (including the zone 8 of Trieste), with roughness class D (open countryside), for topography coefficients $ct = 1$ (ordinary situations).

- In case of exceptional situations such as hilly crests or mountains the foundation will be properly increased

