

Outdoor LED light

Solar power type

Commercial power type

Solar power type

Trademark: SOLARMIR



For those who seek a bright illumination over a wide range
with low power consumption

mcs
MICRO CONTROL SYSTEMS

Micro control systems LTD.

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1. Outdoor LED Light

MCS has commercialized solar power type LED light and commercial power type LED light for outdoor LED lights.

1.1 Solar power type LED light

Figure 1 shows solar power type LED light (SOLARMIR). “SOLARMIR” has been registered as trademark. Solar energy is converted into electricity in solar panel. The electricity is stored in a battery. LED lamp lights using the stored electricity power at night. Emergency power output is equipped standardly. Wireless communication system which monitors battery and circuit states may be installed as an option.

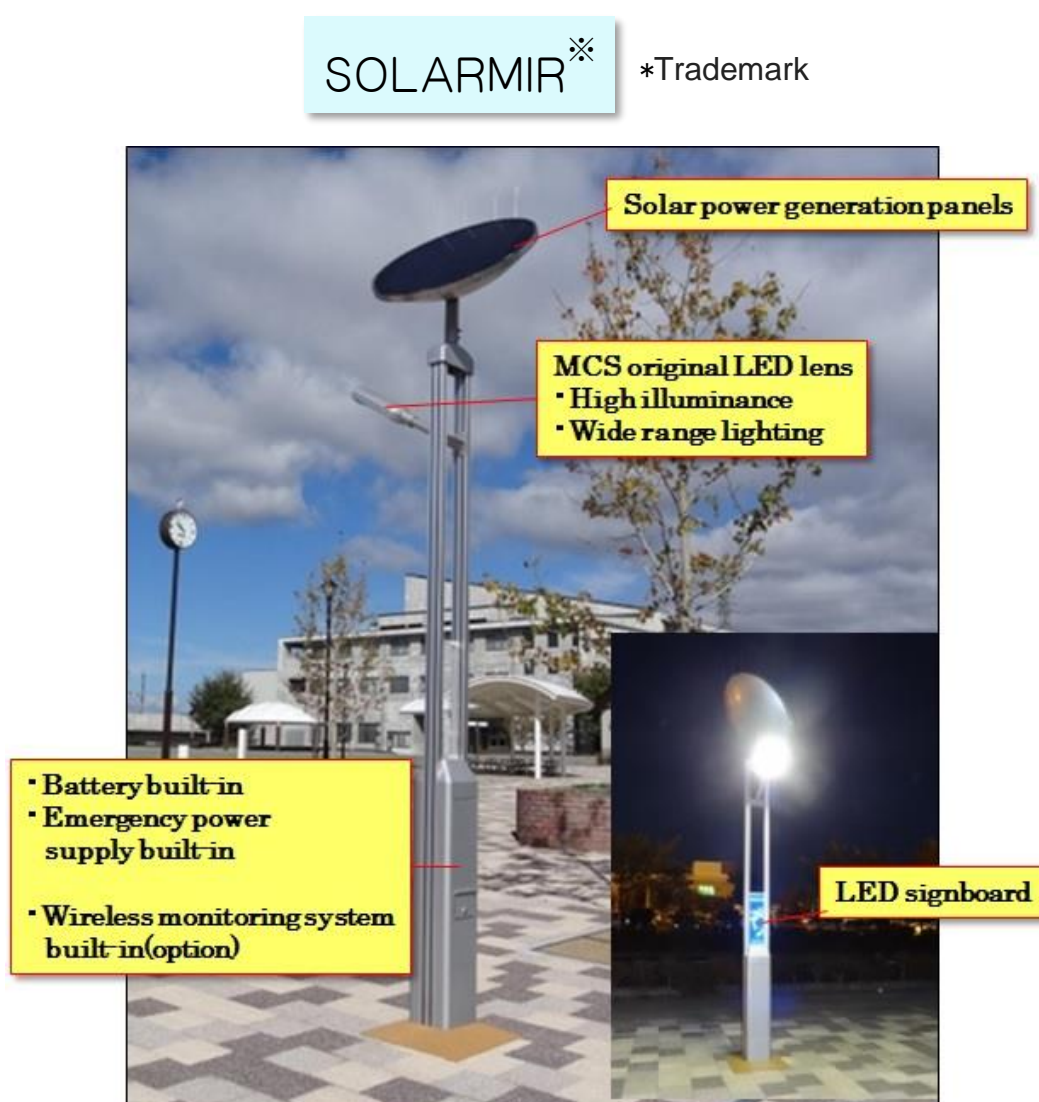


Fig.1 MCS solar power LED light system (Solarmir).

1.2 Commercial power type LED light

Figure 2 shows outdoor LED light using commercial power type (100V, 200V) instead of solar power. LED lens system is as same as the solar power LED light.



Fig. 2 Commercial power type LED light using commercial power supply

2. MCS original LW (Long Wide) lens adoption

MCS has developed a new lighting technology for LED light equipment. Figure 3 shows the LW lens in LED Light. LW lens realizes wide range / long distance lighting.



Fig. 3 LW lens in LED Light.

MCS has obtained patents for LW lens, equipment and lighting method as below.

• Japanese Patent No. 5641544

"Distributed light dispersion control type LED lighting device, apparatus and lighting method"

• Japanese Patent No. 5641547

"Distributed light distribution controlled type LED lighting device and lighting method using the device"

3. MCS LED light characteristics

The characteristics of the MCS outdoor LED light are shown below.

3.1 High illuminance, wide range and low power consumption

By applying MCS original LED lenses in the LED light, high illuminance, wide range illuminance and low power consumption are obtained.

■ An example of illumination for wide parking lot (Fig.4)

○ Lighting conditions

- Parking lot area : 6000 m²
- 21 LED light poles has been installed in the parking lot area. Total input power putted in 21 LED lights is 680 W.

○ Illuminance measurement result

- Minimum illuminance : above 2 lux over the total area.
- Average illuminance over the total area : 9.8 lx.

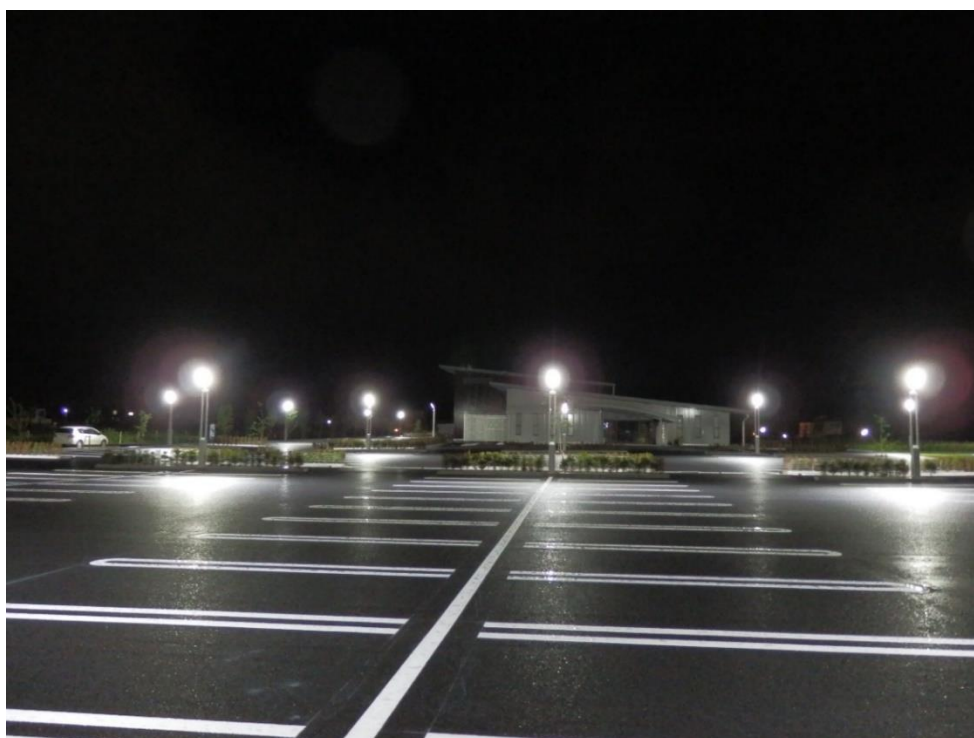


Fig.4 Parking lot night scenery of central public hall
(in Saku city, Nagano prefecture).

3.2 Distribution lighting with three-dimensional LED lens orientation

In order to control the light irradiation direction, three-dimensional LED lens orientation has been adopted. As the result, it is possible to design a desired lighting, according to customer demands as shown in Fig.5. The irradiation area shows rectangular shape. The irradiation shape can be controlled with micro lens configuration on LED lens.



Fig. 5 Illumination distribution with three-dimensional LED lens orientation.

3.3 Diffusion lighting

For customers who wish diffusion (diffused) lighting similar to fluorescent lights, MCS can also offer LED light that uses diffusion sheet instead of LED lens.

3.4 Long life and waterproof

LED light apparatus has a lifespan of more than 60,000 hours (*). LED light apparatus also has waterproof function against rainy weather

(*) It is more than about four times the lifetime of a fluorescent lamp.

4. Farther, wider illumination distribution characteristics

MCS has realized more farther and wider lighting by using LW lens according to customers' needs and the light pole installation environment.

Figures 6 (a) and (b) show no lens lighting and illumination distribution (optical simulation) with LW lens lighting, respectively. Illumination conditions are same except LED lens conditions. As shown in Fig.6, the LW lens distribution is farther and wider than that of no lens lighting.

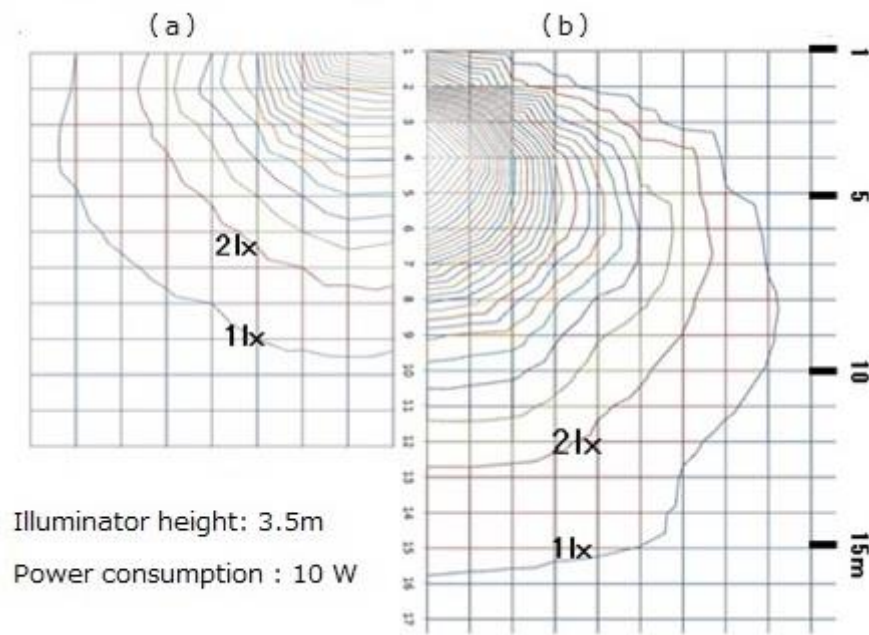


Fig.6 Comparison of illumination area for LW lens and no lens.

(a) No lens, (b) LW lens

Table 1 shows comparison between LW lens lighting and no lens lighting. As shown in Table 1, the illuminance area above 1 lx is 94 m² for the LW lens. The illuminance area above 1 lx is 51 m² for no lens lighting. It is possible to illuminate 1.8 times wider than lighting without the lens. The illuminance area over 2 lx is 56 m² for LW lens. It is possible for LW lighting to illuminate twice area under the same input power as compared with no lens lighting.

Table 1. Comparison between LW lens lighting and no lens lighting.

Area(m ²) Illuminance(lx)	Illuminance Area for LW lens S_{LW}	Illuminance Area for LW lens $S_{no\ lens}$	Area ratio $S_{LW}/ S_{no\ lens}$
Illuminance area above 1lx	94	51	1.8
Illuminance area above 2lx	56	28	2.0

5. Countermeasure against light pollution with LW lens

Recently, "light pollution" caused by illumination light is becoming a problem due to the rise of residents' consciousness for the residence environment.

As shown in Fig. 7, the light leaked from the street light may enter into the apartment (Fig. 7) or the private residence (Fig. 8). The leaked light might become a light pollution.

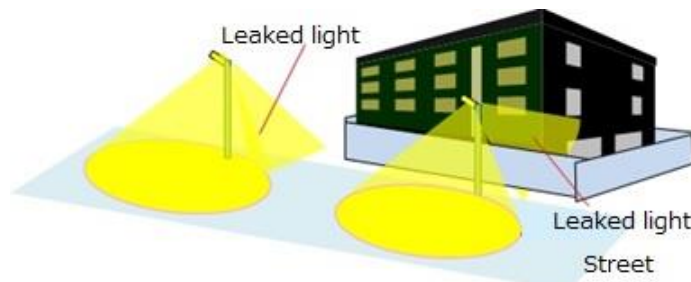


Fig.7 Leaked light from street light into apartment.



Fig.8 Leaked light from street light into private residence.

Figure 9 shows suppression effect of light pollution with the LW lens. Along the road, the irradiation shape is rectangular. The optical axis of the LW lens is adjusted so that the ray is suppressed to enter into the housing site area. Counter measurement against "light pollution" becomes possible according to installation conditions of outdoor lights.

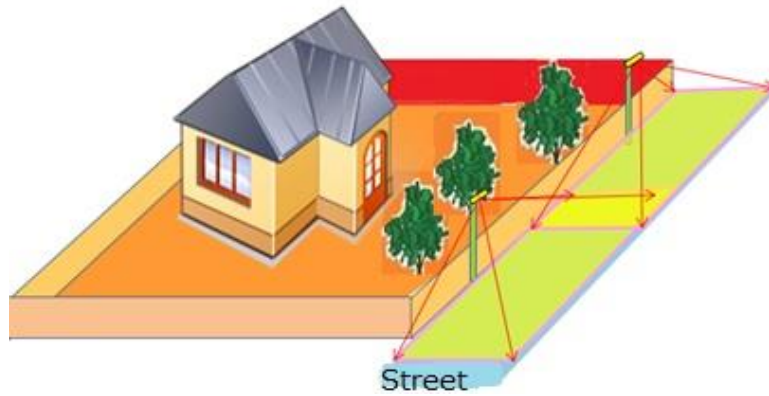


Fig.9 Suppression effect of light pollution with LW lens

6. Lighting using LW lens for large scale parking area

Figure 10 shows ordinary lighting for large scale parking lot (ex. Large scale store). In the large parking lot, light ray from the ordinary outdoor light does not reach to distant regions. As the result, bright places and dark places occur. Furthermore, in the outside region of parking lot, light rays leaked from the parking lamps invade into the surrounding houses. It causes light pollution.



Fig.10 Ordinary lighting image for large scale parking lot of large store.

Figure 11 shows lighting image for large scale parking using LW lens. By applying the long distance and wide illumination characteristics of LW lens, there is little change in brightness. Furthermore, Lighting with less light leakage becomes possible.

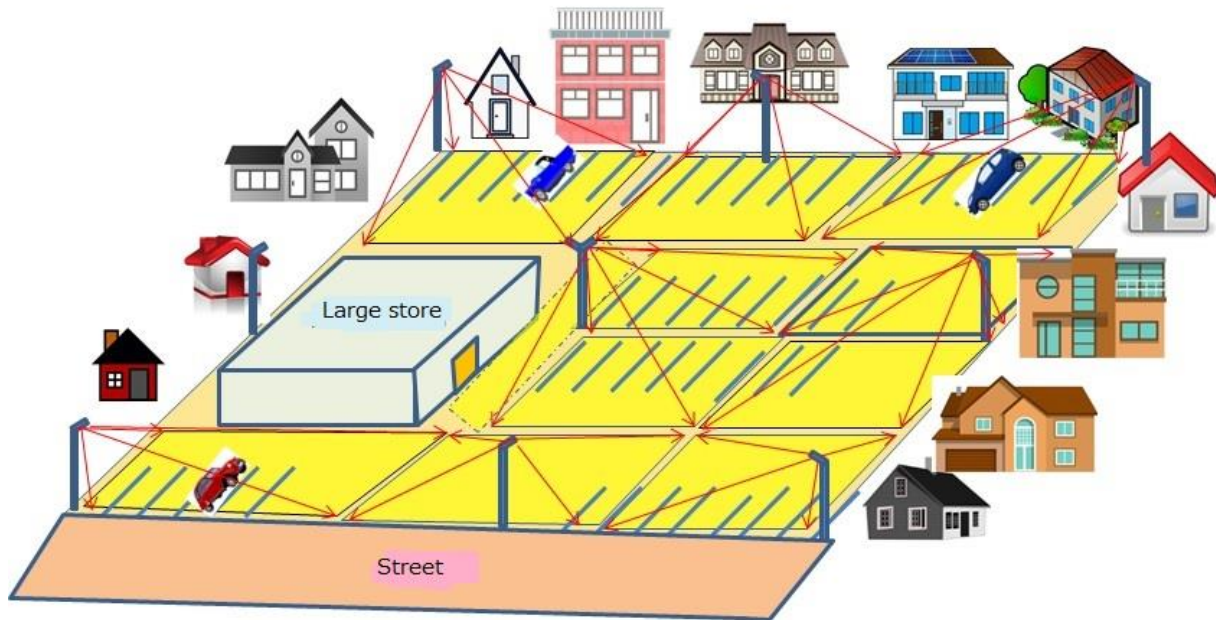


Fig.11 Image of lighting for large scale parking using LW lens.

Figure 12 shows the optical calculation result for central public hall parking lot of Saku city (Nagano prefecture in Japan) shown in page 4.

In the figure, 3 block areas are shown. Each block area is $32\text{m} \times 16\text{m}$. No.1-8 show LED light pole numbers. A LED pole is installed on each corner of the block. The total LED power allocated to one block area ($32\text{m} \times 16\text{m}$) is $48 (= 4 \times 12)$ W. Distribution lighting with three-dimensional LED lens orientation was adopted to achieve the uniform illumination.

Under LED power condition 48W, minimum illuminance was above 2 lx over the total area. The average illuminance was about 13 lx according to the optical calculation. Very uniform lighting is realized. These numerical values were almost the same as the measured illuminance. It has been confirmed that light from LED lamp hardly leaks to the back of the LED pole. Therefore, by using LW lens method, high and uniform illuminance can be obtained evenly over a wide area under less LED power condition.

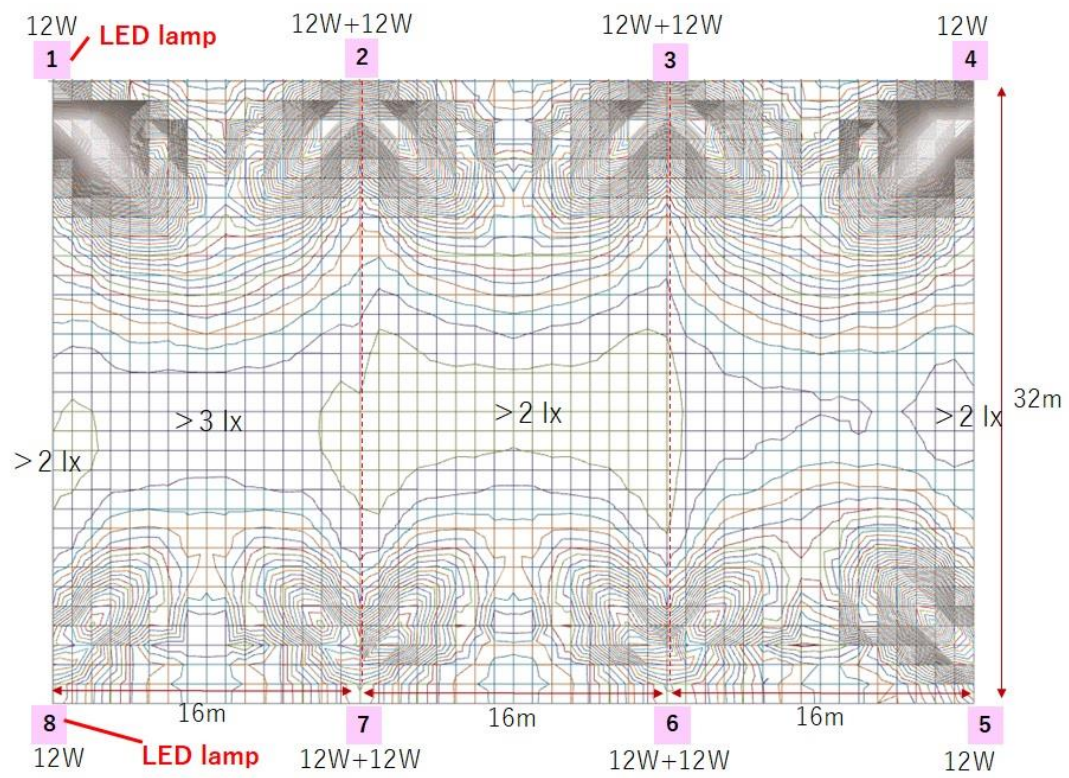








Fig.12 the optical calculation result for central public hall parking lot of Saku city (shown in page 4).


7. Proven technologies, assortment of certain parts


Table 2 shows the parts for solar type outdoor LED light.


Table 2 Parts for solar type outdoor LED light


High efficiency · Lifetime solar panel	
 <p>Square type solar panel</p>	 <p>Round type solar panel</p>
High illuminance and wide range lighting with original lens adoption	
 <p>LED lighting using LW lens (Completely waterproof)</p>	 <p>Aluminum casting shade</p>
Selection of storage battery according to request	
 <p>Lithium battery</p>	 <p>Deep cycle lead battery</p>

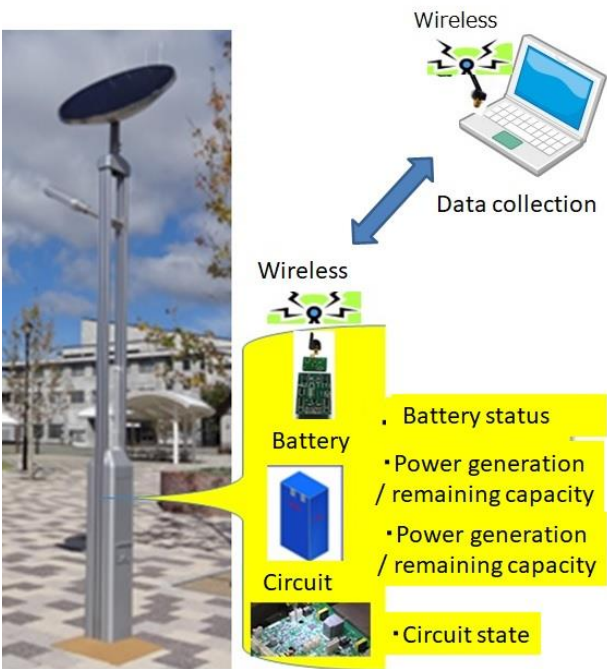
8. Extensive options

Emergency power supply in case of disaster	
	<p>AC 100V, 300W emergency power can be supplied, by using solar electricity stored in batteries in the Solarmir main unit.</p>
	<p>When the commercial power supply is lost by earthquake, typhoon and tsunami etc. solar power can be used as a power supply for mobile phone power, wireless communication etc.</p>

LED signboard	
	<p>Promoter signboard and propaganda LED board can be installed on the LED lighting pole.</p>

Seven colors illumination	
	<p>Seven colors illumination can be attached on the LED light pole.</p>

Wind/solar hybrid power generation type solarmir	
	<p>In addition to solar panels, MCS can supply an optional wind power generator (brown windmill in the left picture) that can generate electricity efficiently against omnidirectional wind.</p>

Monitor function (option) in the lighting lamp with wireless communication	
	<p>As an option, MCS can supply wireless monitoring system to monitor the power generation state, circuit state, etc.</p> <p>Please inquire in detail.</p>

9. Solarmir product lineup

9.1 Part number specification system

SLR - type - ① - ② - ③ - ④ - ⑤ - ⑥

- Type

5800: Square solar panel

5810: Round solar panel

5900: Commercial power supply (No solar panel)

5910: Separation type (Solar panel separate type)

- ① : Pole color

BR: Brown

SI : Silver

- ② : Solar panel power capacity

P80 : 80W

P110:110W

P124:124W

- ③: Types of LED lighting

Numerical values show total LED power

S10~22 :Aluminum casting shade

T10~22 :one wide area lighting lamp

W20~30 :two wide area lighting lamp

※ LED power for two lamps type of SLR-5900 can be used up to 40 W.

- ④: Battery type and capacity

Li110: lithium ion 1.1kWh

Pb136: Deep cycle lead battery 1.36kWh

Pb182: Deep cycle lead battery 1.82kWh

- ⑤: LED signboard

Sb : Equipment

(No statement: No signboard)


- ⑥ : Emergency power supply

AC : AC power supply is equipped.


(No statement: No equipment)

9.2 Solarmir series


9.2.1 Standard type Solarmir (1 light type)

SLR-5800-BR/SI-Pxxx-Sxx-Pbxxx/Lixxx-Sb/_-AC/_		
Body	Solar module: 110~124 W (62 w single crystal) LED lighting lamp: 10 ~ 22 W Pole: Aluminum casting + aluminum frame, stainless steel	
Characteristics	No sun compensation (at full charge): 5 days (10 W, no option) Long life: Made in Japan Corrosion resistance: Since there is no rusting, it does not deteriorate the aesthetic appearance.	
Others	LED lighting: wide area light distribution by original light distribution lens. Sealed Deep Cycle Battery Commercial power supply combined type / Li-ion battery type	
Option	LED signboard: Optional advertisement, company name, logo etc. AC 100 V: Power supply (Option)	
Size: W900XD1050XH4650		

9.2.2 Round type Solarmir (1 light type)

SLR-5810-BR/SI-P80-Sxx-Pbxxx/Lixxx-Sb/_-AC/_		
Body	Solar module: 80W LED lighting lamp: 10 ~ 22 W Pole: Aluminum casting + aluminum frame, stainless steel	
Characteristics	No sun compensation (at full charge): 5 days (10 W, no option) Long life: Made in Japan Corrosion resistance: Since there is no rusting, it does not deteriorate the aesthetic appearance.	
Others	LED lighting: wide area light distribution by original light distribution lens. Sealed Deep Cycle Battery Commercial power supply combined type / Li-ion battery type	
Option	LED signboard: Optional advertisement, company name, logo etc. AC 100 V: power supply (Option)	
Size: W1000XD1100XH4620		


9.2.3 Wide area lighting type Solarmir (1 light type)

SLR-5800-BR/SI-Pxxx-Txx-Pbxxx/Lixxx-Sb/_-AC/_		
Body	Solar module: 110~124 W (62 w single crystal) LED lighting lamp: 10 ~ 22 W Pole: Aluminum casting + aluminum frame, stainless steel	
Characteristics	No sun compensation (at full charge): 5 days (10 W, no option) Long life: Made in Japan Corrosion resistance: Since there is no rusting, it does not deteriorate the aesthetic appearance.	
Others	LED lighting: wide area light distribution by original light distribution lens. Sealed Deep Cycle Battery Commercial power supply combined type / Li-ion battery type	
Option	LED signboard: Optional advertisement, company name, logo etc. AC 100 V: power supply (Option)	
Size: W900XD1150XH4650		


9.2.4 Wide area lighting type Solarmir (2 light type)

SLR-5800-BR/SI-Pxxx-Wxx-Pbxxx/Lixxx-Sb/_-AC/_	
Body	Solar module: 110~124 W (62 w single crystal) LED lighting lamp: 10 ~ 22 W Pole: Aluminum casting + aluminum frame, stainless steel
Characteristics	No sun compensation (at full charge): 5 days (10 W, no option) Long life: Made in Japan Corrosion resistance: Since there is no rusting, it does not deteriorate the aesthetic appearance.
Others	LED lighting: wide area light distribution by original light distribution lens. Sealed Deep Cycle Battery Commercial power supply combined type / Li-ion battery type
Option	LED signboard: Optional advertisement, company name, logo etc. AC 100 V: power supply (Option)
Size: W900XD1660XH4650	


9.2.5 Commercial supply power type solarmir (1 light type)

SLR-5900-BR/SI-Txx-Sb/_		
Body	<p>Commercial supply power (AC 100 V, 200 V)</p> <p>LED lighting lamp: 10 ~ 22 W</p> <p>Pole: Aluminum casting + aluminum frame, stainless steel</p>	
LED lens	<p>LED lighting: wide area light distribution by original light distribution lens.</p>	
Option	<p>Backup at power failure</p> <p>LED signboard: Optional advertisement, company name, logo etc.</p> <p>AC 100 V: power supply (Option)</p>	
Size: W400XD1050XH4280		

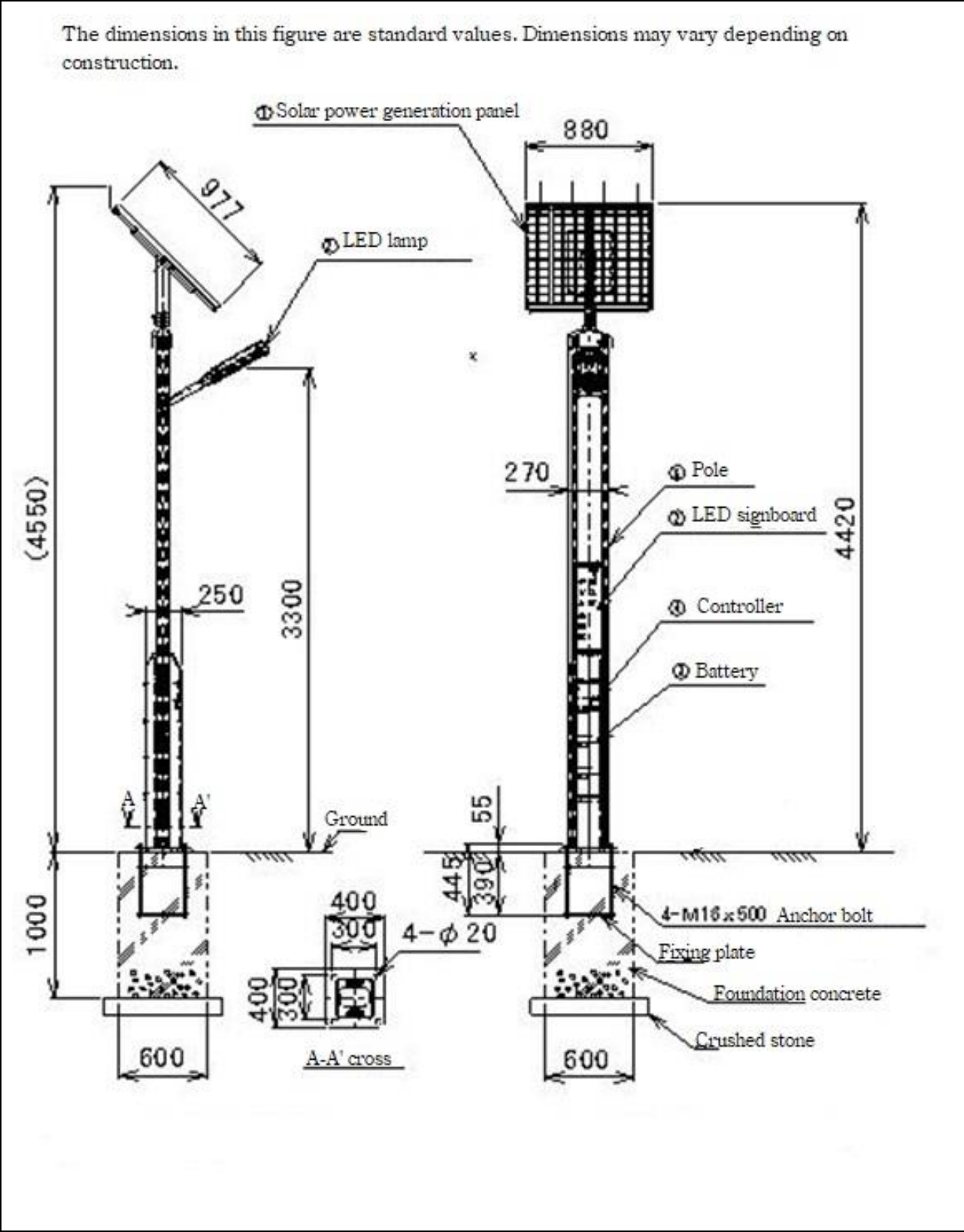
9.2.6 Commercial supply power type solarmir (2 light type)

SLR-5900-BR/SI-Wxx-Sb/_		
Body	Commercial supply power (AC 100 V, 200 V) LED lighting lamp: 10 ~ 22 W Pole: Aluminum casting + aluminum frame, stainless steel	
LED lens	LED lighting: wide area light distribution by original light distribution lens.	
Option	Backup at power failure LED signboard: Optional advertisement, company name, logo etc. AC 100 V: power supply (Option)	
Size:W1700XD400XH4280		

9.2.7 Separate type Solarmir

SLR-5910-BR/SI-Pxxx-Txx/Wxx-Pbxxx/Lixxx-Sb/_-AC/_		
Body	Solar module: 124~220W LED lighting lamp:10~40W（One or two lights are arranged in the required direction） Pole: Aluminum casting + aluminum frame, stainless steel	
Characteristics	No sun compensation (at full charge): 5 days (10 W, no option) Long life: Made in Japan Corrosion resistance: Since there is no rusting, it does not deteriorate the aesthetic appearance.	
Others	LED lighting: wide area light distribution by original light distribution lens. Sealed Deep Cycle Battery Commercial power supply combined type / Li-ion battery type	
Option	LED signboard: Optional advertisement, company name, logo etc. AC 100 V: power supply（Option）	
※MCS will decide the specification by customer's meeting.		

10. Solar power type LED lighting “Solarmir” installation specification



If you are interested in these products and have any questions, please contact the following E-mail address.



ISO9001 ISO14001

MCS has acquired certification of ISO 9001 (quality management system) and ISO 14001 (environmental management system). MCS is actively working on quality control and environmental preservation.



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