Bollard Light – Solar Powered Solution

Betta Lights (Pty) Ltd

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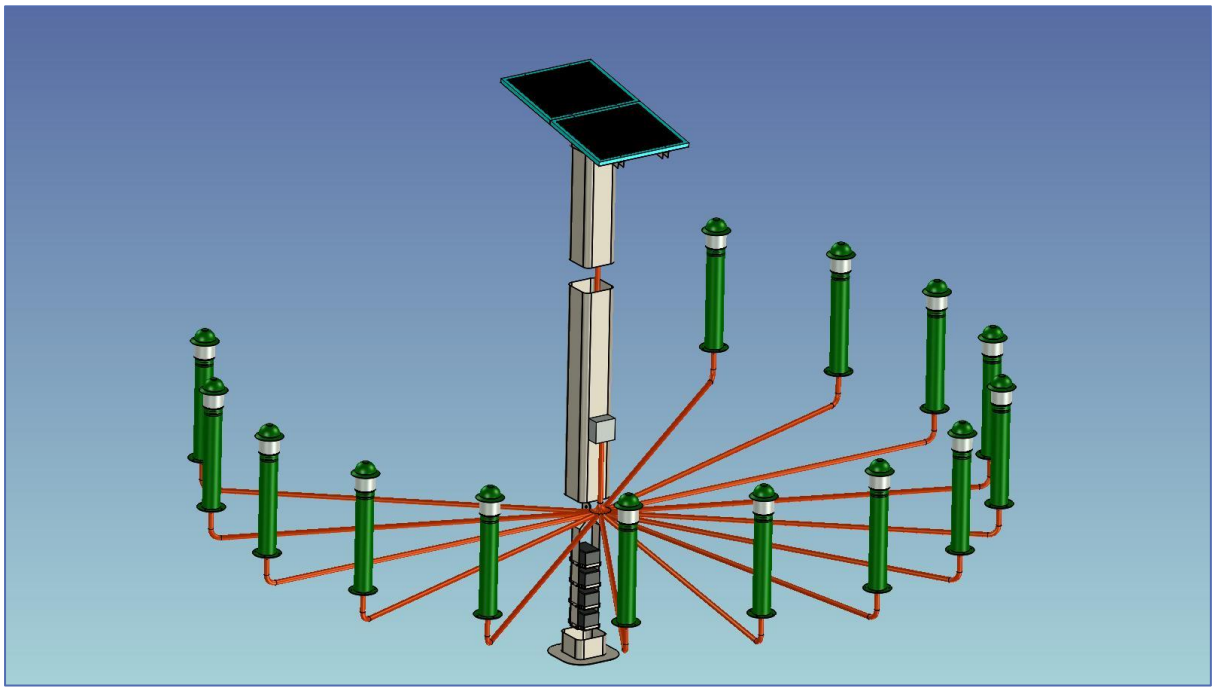
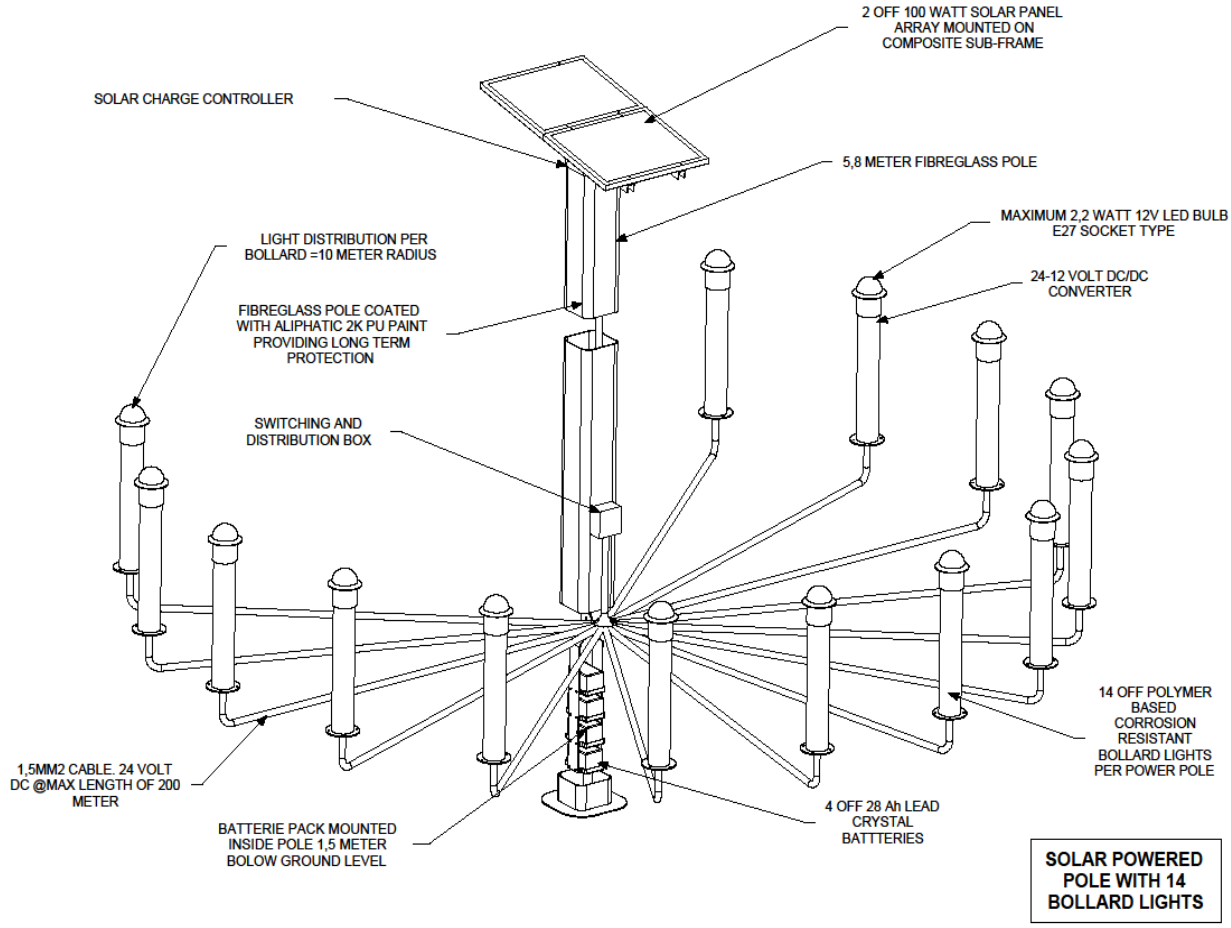
Solar Powered Bollard Light Solution:

Betta Lights solar powered ***Bollard*** light solution. The product is designed around the following key minimum functional specifications to determine the final technical solution:

- It must be powered from a single solar power source,
- It must be capable to power at least 10 x bollard lights from the single solar power source and must be switched ON automatically at dusk, and OFF at dawn.
- The lights can be disabled at night if required to do so.
- The systems must be corrosion resistant,
- It must be easy to install and to maintain,
- To facilitate cost effective installations, cables between the bollard lights and the main solar power source must be able to reach up to 200 meter, using standard 1.5 mm^2 cable.
- Batteries must be concealed in the pole structure (a) to keep the batteries cool at all times to extend their expected life and (b) to decrease the risk of theft or vandalism,
- Light must be soft, creating a warm romantic atmosphere and acceptable for people to walk in the pathways, and therefore not be white and bright at all,
- The product should be extremely power efficiant. The lowest possible light bulb wattage must be used, but still achieve above mentioned criteria,
- The Bollard lights must be able to be installed underneath plants and in the shade.
- The power must be safe and non lethal.





Technical Summary:

Based on the functional specification, the Betta Lights engineering team designed a solution with multiple bollard lights to be connected to a single main power source that is hosted in a fibreglass pole. The power pole can therefore be installed at an identified location where the sun is sufficient and the bollard lights can be installed anywhere on the premises, within a cable distance of 200 meter, using 1.5 mm^2 cables. Further distances can be acquired by increasing that specific cable size. The solution uses a 24-Volt DC power source, which will again allow for the use of thinner cables to be connected between the bollard lights and the power pole with best power efficiency.

The light voltage is converted from 24 to 12 volt in the bollard to accommodate the 12 volt bulbs, and to rectify voltage losses in the 24-volt cable from the power pole to the bollard.

Fibreglass pole structure:

The main power source is hidden in a fibreglass pole structure (it can be any length depending on the client's requirements). It is completely corrosion free and can withstand wind speeds of up to 140km per hour. The pole will is installed 1.5 meters deep in the ground and compacted with river sand or similar type.

Batteries:

The deep cycle Lead Crystal batteries used for the solution are stacked in a battery cage that is lowered in the inside of the pole structure to below ground level. It will keep the batteries cool under the ground to ensure longevity of the batteries. The solution entaills 4 x 28Ah Lead Crystal Batteries with an expected life of 10 years.

Betta MPPT solar Charge Controller:

The solar charge controller is a 24-Volt charger that will allow for the use of 1.5mm^2 cables and capable to be installed up to 200 meters between the power pole and bollard lights. The charge controller will automatically switch the lights “ON” at dusk and “OFF” at dawn. The unit can withstand 100 ^{0} C operational temperature without damaging itself. However, when the unit’s temperature reaches 65^0 C, the unit shuts all operational functions down, and monitors the situation. When the temperature drops, full functionality resumes, with no loss of data or settings. When the lead crystal battery temperature rises over its maximum rated temperature of 65^0 C, the solar charger will stop to charge the battery, to prevent a thermal runaway of the battery.

Solar PV panels:

2 x 100 Watt, 24-Volt solar panels are required to harvest the sun’s energy for the bollard solar powered light solution. Only the highest grade solar panels with all relevant certifications are used.

Distribution box:

The low voltage distribution box is a thermoplastic enclosure with a gasket lids to secure it from corrosion, dust and water. Two switches are fitted in the junction box that split the bollard lights into a dual channel solution to enable lights to be switched off in two sections.

The junction box is fitted external to the power pole for easy installation and maintenance.

Bollard light and its pole structure:

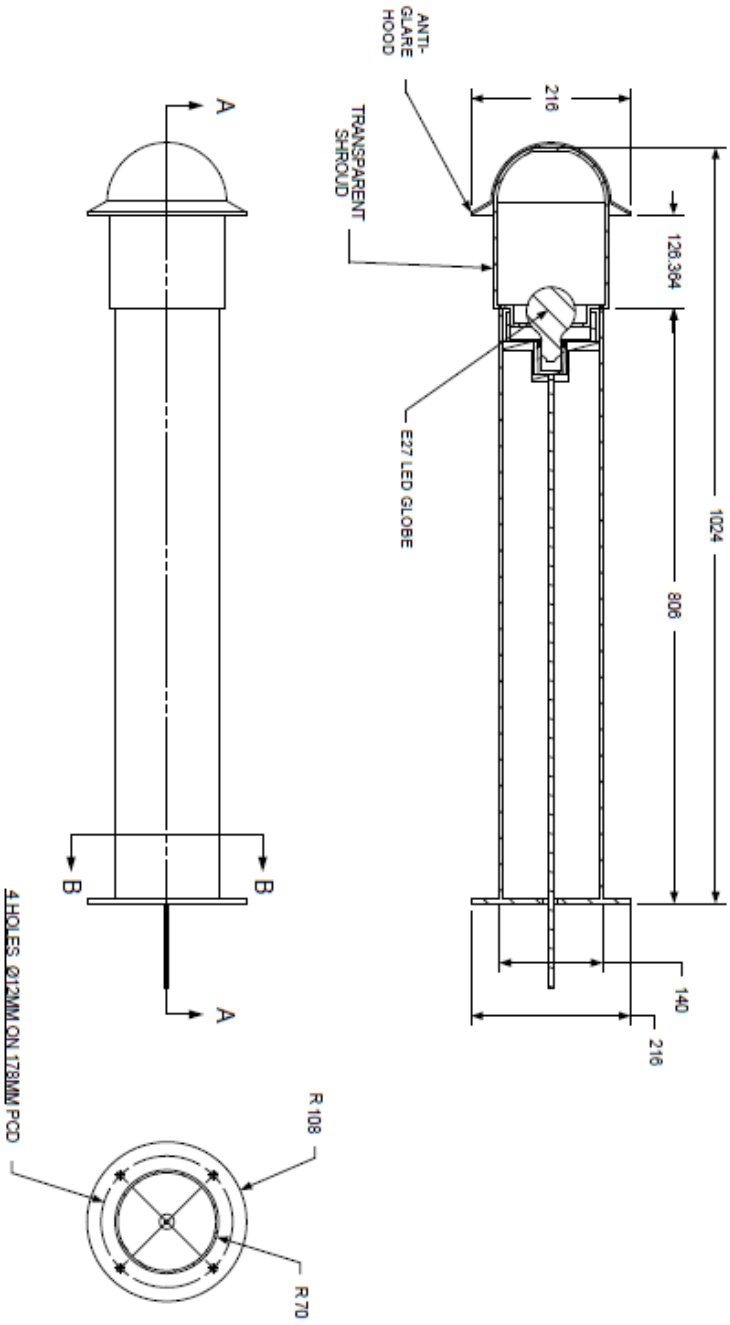
To increase durability of the bollard light pole, it is constructed from polymer materials that is corrosion resistant and light to transport. The solution consists of 14 bollard lights that use 2.2 watt LED light bulbs, or alternatively 1.3 watt LED light bulbs capable to connect 20 bollard lights to a single power pole.

The 2.2 watt light bulb distributes light @ 10 meter radius; whereas the 1.3 watt light bulb distributes light @ 8 meter radius. The light is 12-Volt bulb with a 24V to 12V DC to DC converter build in the pole to secure the best efficiency rates. The LED light is fitted to an E27 socket with a frosted white defuser fitted over the light bulb to distribute the light and to protect it from water.

The 2.2 watt LED light bulb brightness reading at a distance of 500 mm horizontal from the light head = 51 Lux.

The 1.3W watt ED light bulb brightness reading at a distance of 500 mm horizontal from the light head = 25 Lux.

Betta Bollard Light Drawing



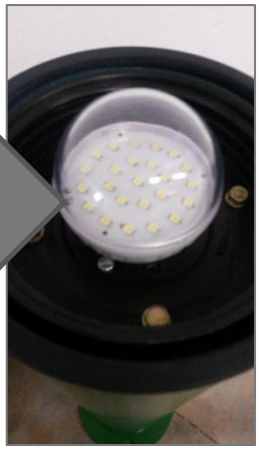
The height of 1024 mm can be adapeted to suite customer's requirements.

Mounting holes on bottom 216 mm flange: 4 x 12 mm holes, 90 degrees appart, on 178 mm PCD.

Allow for 30 mm diameter, 30 mm deep space in cemtre for cable excit gland, or extend it for complete conduite route.

Light fitting for Bollard light

LED bulb: 12Volt 1.3W or 2.2W with 360-degree uniform light distribution



E27 Socket for LED light bulb