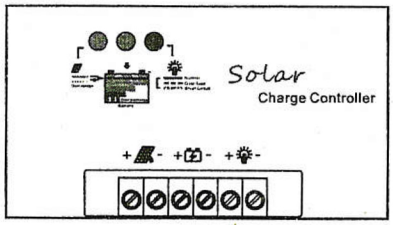
User's Manual



PWM Solar Charge Controller

1. General Safety Instructions

Danger of explosion due to improper handling of batteries! Corrosive hazard by leaking battery acid! Keep children away from batteries and acid! Smoking, fire and naked lights are prohibited when handling batteries. Prevent sparking and wear eye protection gear during installation.

Solar modules generate power from light incidence. Even by low light incidence solar modules carry the full voltage. Therefore, work cautiously and avoid sparking during all work.

Use only well-isolated tools!

If the regulator is operated in a manner not specified by the manufacturer, the regulator's constructive protective measures can deteriorate.The factory signs and marking may not be modified, removed or made unrecognizable. All work must be performed in conformity with the national electrical specifications and related local regulations!

When installing the regulator in foreign countries, information concerning regulations and protective measures must be obtained from the relevant institutions / authorities.

Do not begin the installation until you are sure that you have technically understood the manual and perform the work only in the order provided in this manual!

The manual must be available during all work performed on the system, third parties included.

This manual is a component of the system regulator and must be included with the regulator when given to a third person.

The Controller is equiped with a low power surge protection. The installer had to care for a efficient lightning protection.

2. Scope of Application

The charge regulator is only suitable for regulating photovoltaic solar modules. Never connect another charging source to the charge regulator. This can destroy the regulator and / or source.
The regulator is only suitable for the following chargeable 12V or 24V battery types:
-Lead storage batteries with liquid electrolytes
-Sealed lead storage batteries; AGM, GEL

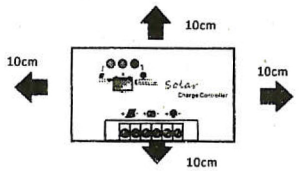
Important!The regulator is not suited for nickel Cadmium, nickel metal hydride, lithium ions or other rechargeable or non-rechargeable batteries.

The regulator may only be used for the particular solar applications provided.Also,observe

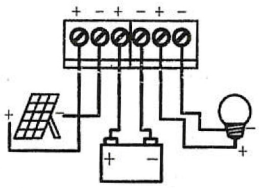
3. Installation

install the regulator near the battery on a suitable surface. The battery cable should be as short as possible and have a suitable cable diameter size to minimize loss, e.g. 4 mm² at 20 A and 2m length.A temperature compensated final charge voltage will extend the batteries lifetime and uses the optimum charge capacity.

Do not install the controller to direct sunlight.
To ensure the air confection on each side keep a distance of 10 cm to the regulator.



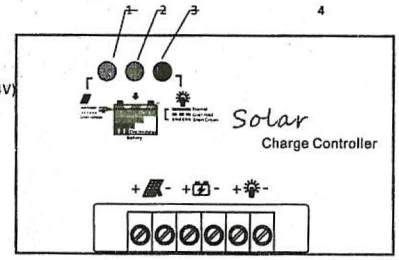
Connecting the Regulator
1.Connect the battery to the charge regulator - plus and minus
2.Connect the photovoltaic module to the charge regulator - plus and minus
3. Connect the consumer to the charge regulator - plus and minus
The reverse order applies when deinstalling!
An improper sequence order can damage the controller!



System connection

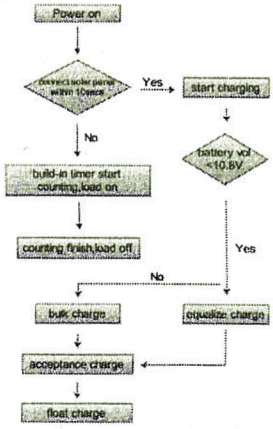
4. System indicator

1.Solar Indicator
Off:without enough sun,charge off.
Fast flashing:Buck/equalize charge
Constant on:Acceptance charge
Slow flashing:Float charge
2.Battery Indicator
Green:Battery power is full(BVOFF>13.4V)
Orange:Battery power is middle(12.4V<BVOFF<13.4V)
Red:Battery power is low(11.2V<BVOFF<12.4V)
Red-flshing:Battery over discharge.(11.2V<BVOFF)
3.Consume Indicator
Off:Controlleroutput closed
On:Output normal
Slow Flashing:coninus over-current
Fast Flshing:Short-circuit

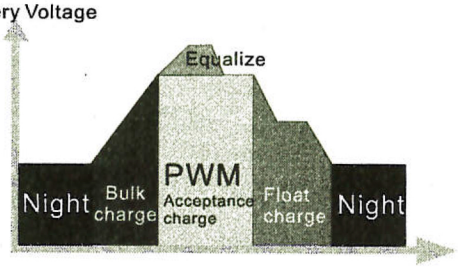


5. Protective functions of the controller

- Protection against reverse polarity of solar modules
- Protection against reverse polarity of the connected
- Protection against reverse polarity of connected battery
- Short-circuiting at the module input
- Short-circuiting at the load output
- Protection against over charging
- Open circuit-proof during operation without battery or consumer
- Reverse current protection at night
- Overvoltage and undervoltage protection
- Over load protection at load output
- Deep discharging protection/low voltage disconnect



6. Charging Program



7. Technical parameter

Model	LTD1210N	LTD1220N	LTD1230N
Rated charge current	10A	20A	30A
Rated discharge current	10A	20A	30A
System Voltage	12V/24V Auto		
Max solar panel voltage	40V		
Over load protection	130%(maintain for 60 secs)		
	160%(maintain for 5 secs)		
	over-load(immediately shut down)		
Self-consume	<6mA		
Charge circuit voltage drop	<0.26V		
Discharge circuit voltage drop	<0.15		
Equalize charging voltage	14.8V		
Bulk charging voltage	14.2V		
Acceptance voltage(PWM)	14.2V		
Float charging voltage	13.8V		
Charge return voltage	13.2V		
Discharge stop voltage	11.2V		
Discharge return voltage	12.6V		
Temperature compensation	-4mV/℃/2V		
Operating temperature	-35℃-55℃		
Dimension	140x90x28mm		
Weight	210g		

*All voltage X2 when using 24V system