SLAC-I Solar charge controller User Manual

Thank you very much for choosing our product. This product manual provides important information and advices for product installation, use and troubleshooting. Before using this product, please read carefully and thoroughly.

SLAC -I was developed by the latest solar technology standard, this product has many outstanding feature:

Multi-functional LCD display.
Programmable battery low voltage disconnect with new ALVD(Adaptive low disconnect).
Selectable battery type – Lead acid battery with liquid electrolyte, lead-acid battery with solid electrolyte(Gel type or AGM type). We can adjust the controller by programming according to battery type.
Sophisticated programmable nightlight function. Can be programmed to two lighting periods during the night.
The charging characteristics include automatic adaption to the ambient temperature.
Max .16 mm² connector binding posts. Max safety current can reach 91A.
Built-in one year date logger.
The controller has a built-in voltage drop compensation which automatically compensates battery wire voltage drops of up to 250mV.
Complete electronic protection such as over temperature, over charge, over discharge, over current, short circuit, reverse polarity.

Wiring and grounding:

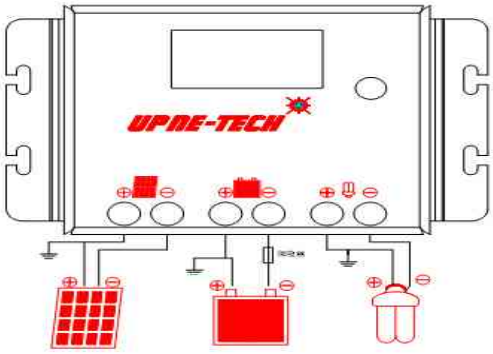
The controller is intended for indoor use only or installed in distribution box. Protect it from direct sunlight and rain. If installed in distribution box, should avoid the position of condensed water drip. The controller measures the ambient temperature to adapt the charging voltage. To ensure the start-up of controller, battery voltage should exceed 10V if the system voltage is 12V, and battery voltage should exceed 20V if the system voltage is 24V.

If the battery voltage is not within the normal operation range at start-up, a status display according to the section ERROR DESCRIPTION occurs.

Connect the controller by following steps to avoid installation faults.

1. Connect the wire to the controller, then to the battery.
2. Connect the wire to the controller, then to the photovoltaic modules.
3. Connect the wire to the load, then to the controller.

Follow the reverse procedure when uninstalling to avoid any damage.



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Starting up the controller:

Self Test

As soon as controller is supplied with power either from the battery or solar array, it starts a self test routine, this is indicated first by ruining LCD bars for approx. 0.5 seconds, then every coded symbol will display for about a second. Then the display changes to normal operation.

System Voltage

The controller adjusts itself automatically to 12V or 24V system voltage, As soon as the voltage as the time of start up exceeds 20V, the controller assumes a 24V system.

If the battery voltage is not within the normal operation range(approx.12V to 15.5V or approx.24V to 31V) as start up， a status display according to the section ERROR DESCRIPTION occurs.

Battery Type

The controller is preset to operate with lead acid batteries with liquid electrolyte. If you intend to use a VRLA battery(GEL type) you can adjust the controller in Programming Meau1.The equalization charge is deactivated then. In case of any doubts, please consult your dealer.

Display Functions

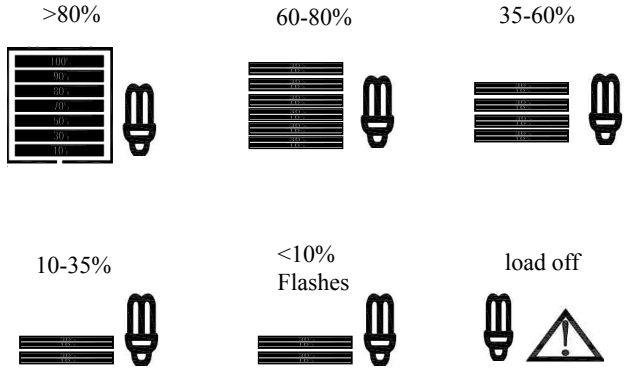
In normal operation mode the controller displays the state of charge (available energy) of battery. Any change of the state of charge (SOC) to a lower status is additionally signaled acoustically.

System conditions are displayed as follows:

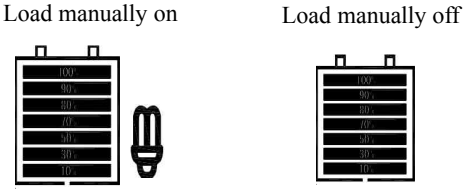
The percentage corresponds to the available energy until Low Voltage Disconnect in relation to a fully charged battery.

As long as the solar array supplies enough voltage to charge the battery, this is indicated by up moving bars alternately to the state of charge display.

In normal operation the loads can be switched on and off by pushing the button. This is indicated in the display:



Pushing button within one second, load will manually on or off.



Low Voltage Disconnect Function

The controller has 5 different modes to protect the battery from being deeply discharged. The controller is preset to Mode 1 from the factory, Use Programming Menu 2.to change the setting(see back page).

Mode1: Disconnect at 11.4V/22.8V (at nominal load current) up to 11.9V/23.8V(at no load current). Normal operation mode for good battery protection.

Mode2: Disconnect at 11.0V/22.0V (at nominal load current) up to 11.75V/23.5V(at no load current). Mode with lower disconnection point. Battery is cycled deeper, this can shorten battery lifetime.

Mode 3: Disconnect at 11.0V/22.0V to 12.2V/24.4V depending on load current and previous charging cycles. This adaptive mode leads to longer lifetime of the battery because it allows recovery of the battery by full recharge. Maximum battery life.

Mode4: Disconnect at 11.5V/23V fixed setting. Appropriate if bypass loads draw current directly from battery.

Mode5: Disconnect at 11.0V/22.0V fixed setting .Appropriate if bypass loads draw current directly form battery. Mode with lower disconnection point. Battery is cycled deeper, this can shorten battery lifetime.

Safety Features

	PV terminals	Battery terminals	Load terminals
Reverse polarity	24V system: no 12V system: yes	Protected (buzzer alarm warning)	Protected (1)
Short circuit	Protected (2)	Protected(3) (with fuse on battery)	Switches off immediately(2)
Over current	Controller will reduce the current.	Protected	Switches off with a delay (4)
Reverse charge	Protected	No effect	No effect
Over voltage	Max. 55V	Max. 55V	Switches off above 15.5/31.0 V
Under voltage	No effect	Switches off load	Switches off.
Over temperature	When over temperature occurs, the controller will reduce the charging current. If the temperature of controller reaches a high level, the load will automatically be switched off.		

(1) Controller can protect itself, but load might be damaged.
(2) Short circuit current: >4x—6x nominal current, <400 A.
(3) We strongly recommend that add a fuse between battery and controller. The battery may be permanent damaged when short circuit occurs.
(4) > 200% rated current: Load will be switched off with 3s delay.

Warning: Two or more error conditions at the same time may cause damage to the controller. Always remove the present fault condition before next operation

Nightlight Function

The controller comes with a sophisticated nightlight function. It controls the load output at night and is widely programmable. Two modes are available:

Dusk to Dawn and Evening/Morning. The mode can be selected in Programming Menu 3.

If Evening/Morning mode is selected, Programming Menu 4 allows choosing the Evening timing behaviors, and Programming Menu 5 allows choosing the Morning timing behaviors.

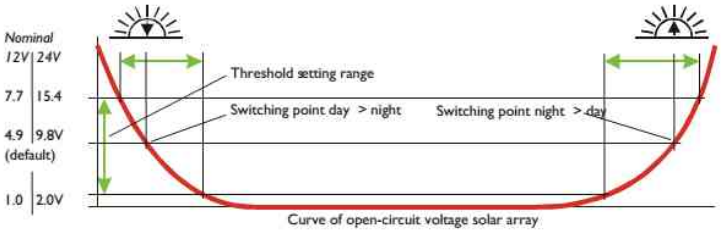
Mind that the load output is switched off as soon as the battery has reached the Low Voltage Disconnect threshold, the Low Voltage Disconnect had priority above the nightlight function.

Mid of night is detected automatically as the middle between dusk and dawn, no real time setting is required. It may take some days until the controller has “learnt” midnight. This method can cause some inaccuracy but avoids any clock readjustment. The controller’s Mid of night can be different from the real time midnight depending on your location.

The controller recognizes day and night based on the solar array open circuit voltage. In Programming Menu 6 this day/night threshold can be modified according to the requirements of the local conditions and the solar array used.

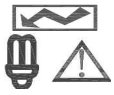
The two voltage levels before/after the slash are valid for 12V and 24V systems respectively.

To find the right value, we recommend measuring the solar array open circuit voltage at the time when twilight has reached the level when the controller should switch on/off. This value can then be set according the description in the programming section.



Error Description

Error	Indication	Cause	Corrective action
		Battery is low	Load will reconnect as soon as battery is recharged.
	 flashes	Over current / Short circuit of loads	Switch off all loads. Remove short circuit. Controller will switch on load

Loads are not supplied			automatically after max 1 minute.
		Controller is thermally overloaded and has disconnected the loads.	Cool down the controller. Load will be switched on automatically.
		Battery voltage too high (>15.5 / 31.0 V)	Check if other sources overcharge the battery. If not, controller is damaged.
		Battery wires or battery fuse damaged, battery has high resistance	Check battery wires, fuses and battery.
Battery power is low after a short time.		Battery has low capacity	Replace the battery.
Battery wrong polarity	Permanent sound	Battery is connected with reverse polarity.	Change polarity.
Battery is not being charged during daytime.	No up-moving bars	Solar array faulty or wrong polarity	Check Solar array and wiring. Remove faulty.
Controller limits solar current.	 flashes	Controller is thermally Overloaded or solar array exceeds nominal current of controller.	Mount controller at a location with better ventilation or check solar array current.

Programming your Solar Controller

The button switch has three push modes:

1）Short push　Shorter than 1 seconds

2）Long push　2 to 8 seconds

3）Lock push　8 seconds or longer

By pushing the button for 8 sec in normal operation mode the programming lock-out is activated to prevent any accidental settings change. Another 8 sec push releases the lock-out.

With a long push, you can enter the programming mode. The programming menu structure is described in the back page. A black wide arrow means a long push (2s-8s), a gray narrow arrow means a short push (<1sec). The dotted lines under "Setting" mean you see the actual selection there. During selection the symbols under "Settings menu" are flashing.

When you exit the configuration menu, the controller displays the state of charge (available energy) of the battery and the status of the load.

Mind that once you have entered the configuration menu you can exit it at the last item only. We therefore recommend that you first note down your required settings and then do the configuration in one go.

All configuration settings are stored in a non-volatile memory and remain stored even if the controller was disconnected from the battery.

If you want to reset the controller to the factory to the factory settings, choose Programming Menu 9.

SLAC-I Technical Characteristics

Model	SLAC-I 20A/30A/40A/50A/60A
Rated System voltage	12V/24V auto recognition
Rated System current	20A 30A 40A 50A 60A
Boost charge	14.5V / 29V(25 °C) 2 h Activation: battery voltage < 12.3/24.6 V
Equalization	14.8V/29.6(25 °C) 2 h Activation: battery voltage < 12.1/24.2 V (at least one time every 30 days)
Float charge	13.8V / 27.6V(25 °C)
Deep discharge protection, cut-off voltage	11 – 12 V / 22 – 24 V depending on setting
Reconnect level	12.8V/25.6V
Overvoltage protection	15.5V/31.0 V
Max. charge current	20A 30A 40A 50A 60A
Max. load current	20A 30A 40A 50A 60A
Self consumption	4mA
Max. Panel/ Battery voltage	55V
Temperature compensation	-4.5mV/cell*k
Grounding	Positive grounding
Battery type	Lead acid (GEL, AGM, flooded)
Dimensions (WxHxD)	140mm*96mm*40mm
Max. wire size	16 mm²
Ambient temperature	-40°C-+60°C
IP grade	IP22
Altitude	≤4000m
Net weight	356g

Subject to change without notice.
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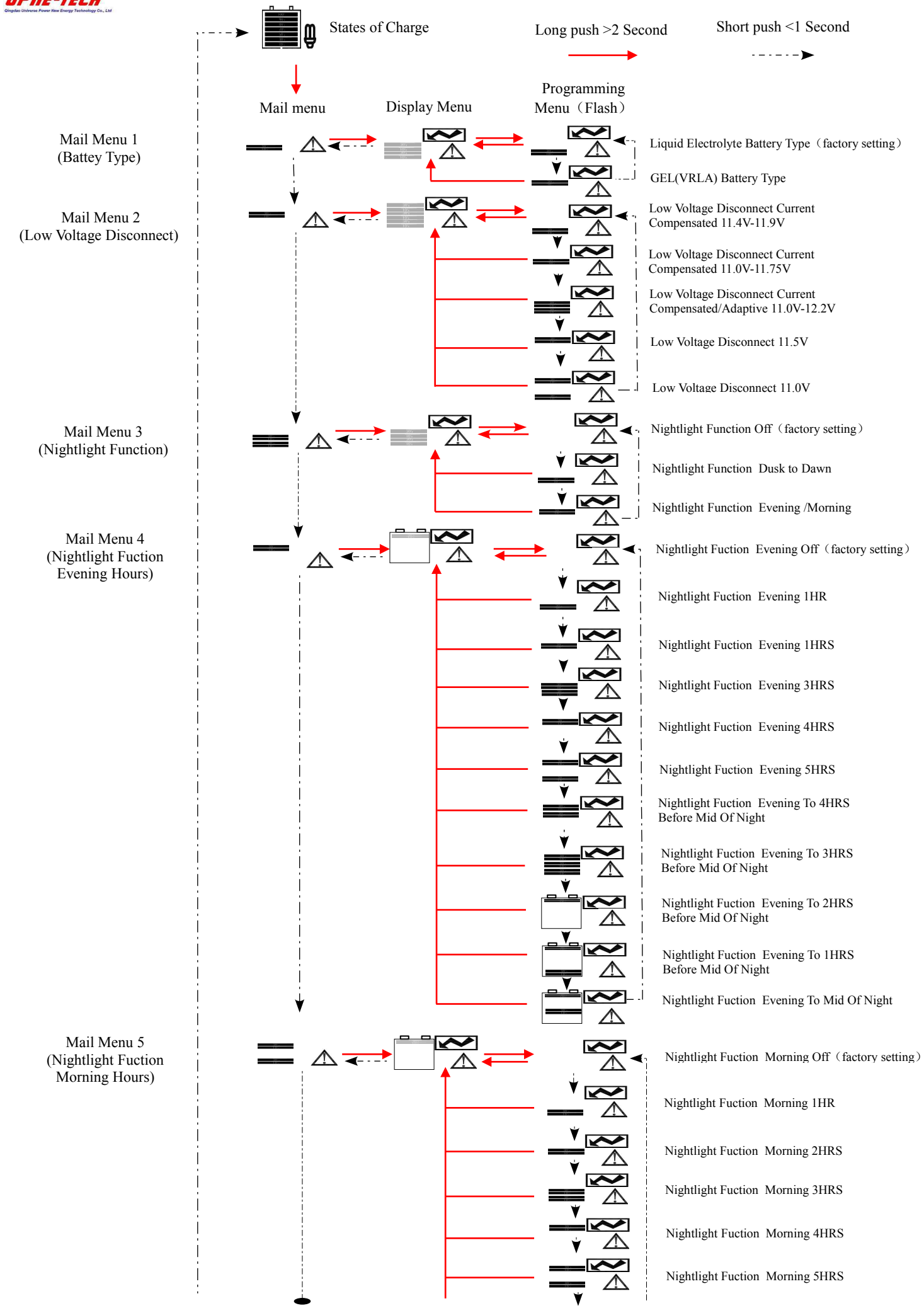

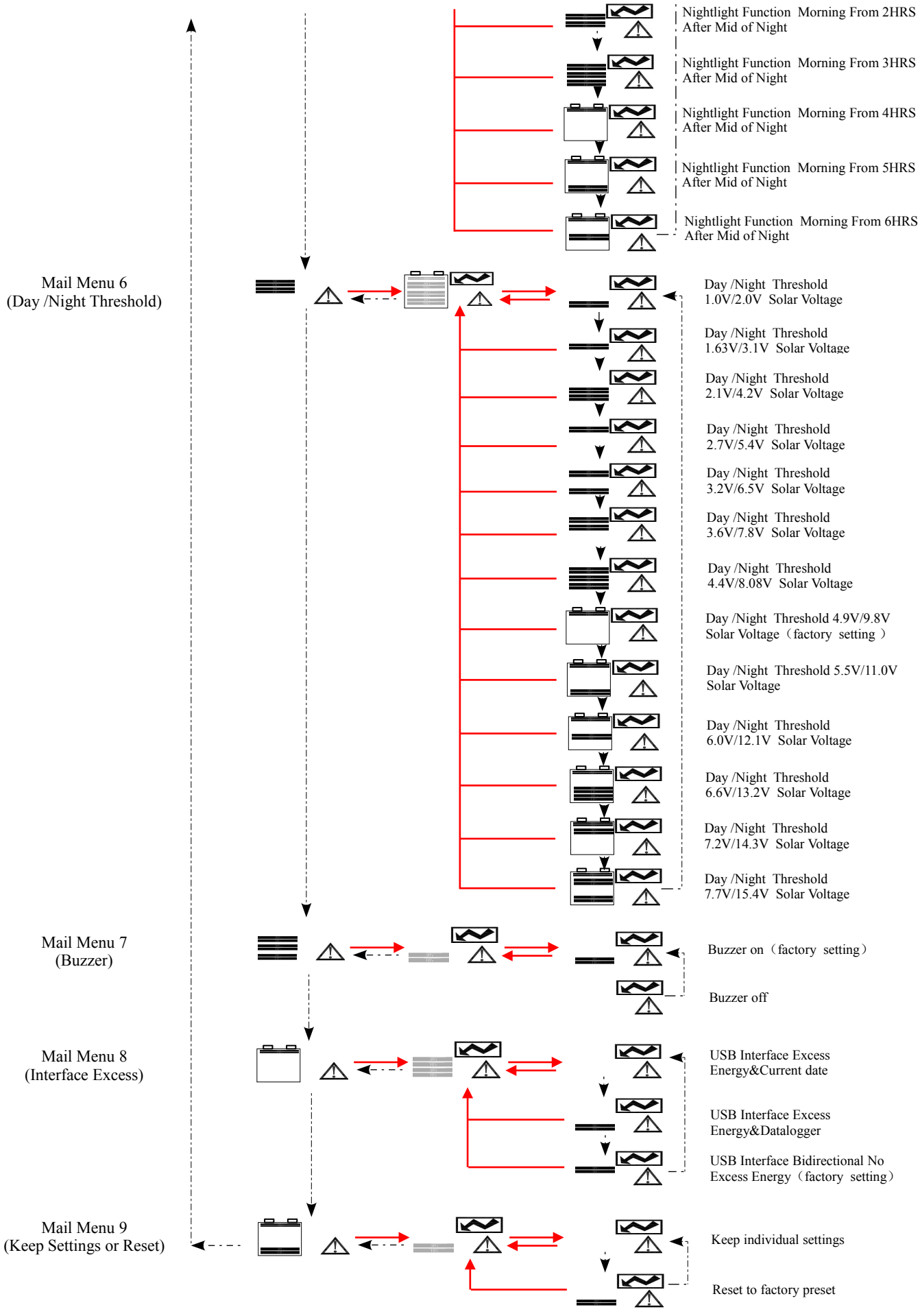
Nightlight Function Morning From 2HRS After Mid of Night
Nightlight Function Morning From 3HRS After Mid of Night
Nightlight Function Morning From 4HRS After Mid of Night
Nightlight Function Morning From 5HRS After Mid of Night
Nightlight Function Morning From 6HRS After Mid of Night
Mail Menu 6 (Day /Night Threshold)
Day /Night Threshold 1.0V/2.0V Solar Voltage
Day /Night Threshold 1.63V/3.1V Solar Voltage
Day /Night Threshold 2.1V/4.2V Solar Voltage
Day /Night Threshold 2.7V/5.4V Solar Voltage
Day /Night Threshold 3.2V/6.5V Solar Voltage
Day /Night Threshold 3.6V/7.8V Solar Voltage
Day /Night Threshold 4.4V/8.08V Solar Voltage
Day /Night Threshold 4.9V/9.8V Solar Voltage（factory setting）
Day /Night Threshold 5.5V/11.0V Solar Voltage
Day /Night Threshold 6.0V/12.1V Solar Voltage
Day /Night Threshold 6.6V/13.2V Solar Voltage
Day /Night Threshold 7.2V/14.3V Solar Voltage
Day /Night Threshold 7.7V/15.4V Solar Voltage
Mail Menu 7 (Buzzer)
Buzzer on（factory setting）
Buzzer off
Mail Menu 8 (Interface Excess)
USB Interface Excess Energy&Current date
USB Interface Excess Energy&Datalogger
USB Interface Bidirectional No Excess Energy（factory setting）
Mail Menu 9 (Keep Settings or Reset)
Keep individual settings
Reset to factory preset