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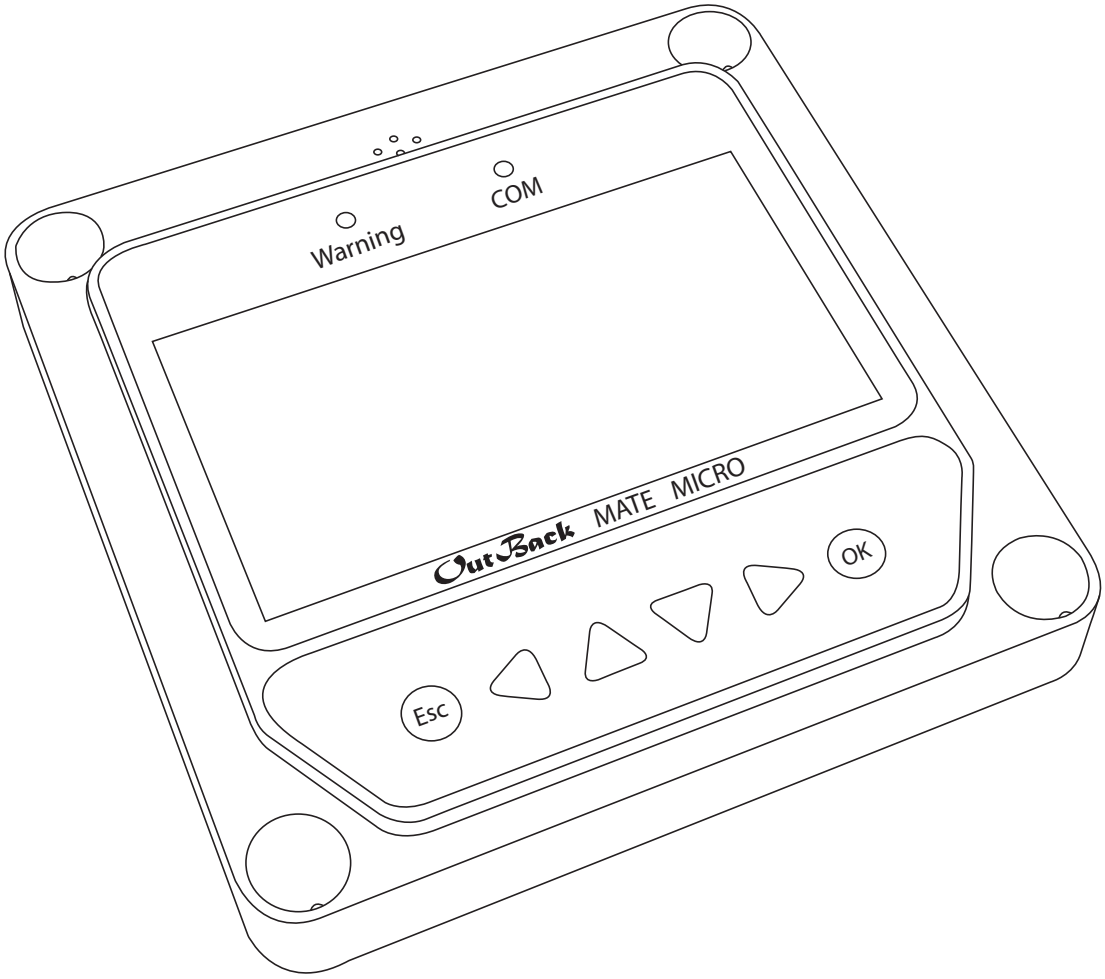

OutBack Mate Micro

User's Manual

About OutBack Power Technologies

OutBack Power Technologies is a leader in advanced energy conversion technology. Our products include true sine wave inverters/chargers, maximum power point tracking charge controllers, and system communication components, as well as circuit breakers, accessories, and assembled systems.

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Effective Date

June 2016

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IMPORTANT SAFETY INSTRUCTIONS

READ AND SAVE THESE INSTRUCTIONS!

This manual contains important safety, installation and operating instructions for the OutBack Mate Micro. These instructions are in addition to the safety instructions published for use with all OutBack products. Read all instructions and cautionary markings on the OutBack Mate Micro and on any accessories or additional equipment included in the installation. Failure to follow these instructions could result in sever shock or possible electrocution. Use extreme caution at all times to prevent accidents.

WARNING: GENERAL HAZARD

- Inspect the OutBack Mate Micro thoroughly. If there is any damage to the OutBack Mate Micro, notify the shipping company and OutBack Power immediately.
- Read all instructions and cautionary markings prior to installation.
- Keep the OutBack Mate Micro away from rain, exposure, severe dust, vibrations, corrosive gas, and intense electromagnetic interference.
- Do not allow water to enter the OutBack Mate Micro.
- There are no user serviceable parts inside the controller. Do not disassemble or attempt to repair the OutBack Mate Micro.

General Information

The next-generation OutBack Mate Micro remote display unit (for the OutBack FLEXmax 30/40 Series Charge Controller) is a display device that supports both the latest communication protocol and the voltage technology standard of solar controllers.

The OutBack Mate Micro monitors the operational data and working status of the connected charge controller in real-time. Via the six navigation keys on the OutBack Mate Micro, the user can oversee and modify the charge and discharge control parameters, set device parameters, and restore the OutBack Mate Micro to its factory default settings.

Features

The OutBack Mate Micro features include:

- Automatic identification and display of the type, model, and relevant parameters of the charge controller.
- Real-time display of operational data and working status of the connected devices in digital, graphic, and textual forms on a large multifunctional LCD screen.
- Six navigation/function keys.
- Data and power flow on the same lead, eliminating the need for external power.
- Real-time data monitoring and remote load switchover of the controllers, and data browse and modification of device parameters, charge control parameters and load control parameters.
- Alarm information is displayed via the LCD screen with an accompanying audible alarm.
- Longer communication distance based on RS485.

CAUTION: Equipment Damage

The OutBack Mate Micro is only compatible with the FLEXmax 30/40 Series Charge Controller. Do not install the OutBack Mate Micro with any other charge controller.

Installation

There are two installation methods available for the OutBack Mate Micro:

- Frame Mount
- Surface Mount

Required Tools:

- Drill
- Four ST4.2x32 Self-Tapping Screws (Frame Mounting Only)
- Four M4x8 Pan Head Screws
- Four M4 Nuts
- Four Screw Plugs
- Phillips Screwdriver

Mounting Information	
Mechanical Parameter	Parameter
Overall Dimension (in/mm)	4.49 x 4.49 x 1.90 (114 x 114 x 48.2)
Mounting Dimension (in/mm)	3.31 x 3.31 (84 x 84)
Terminal	ϕ4.3

Table 1, Mounting Information

See the following two sections for each mounting method.

Frame Mount

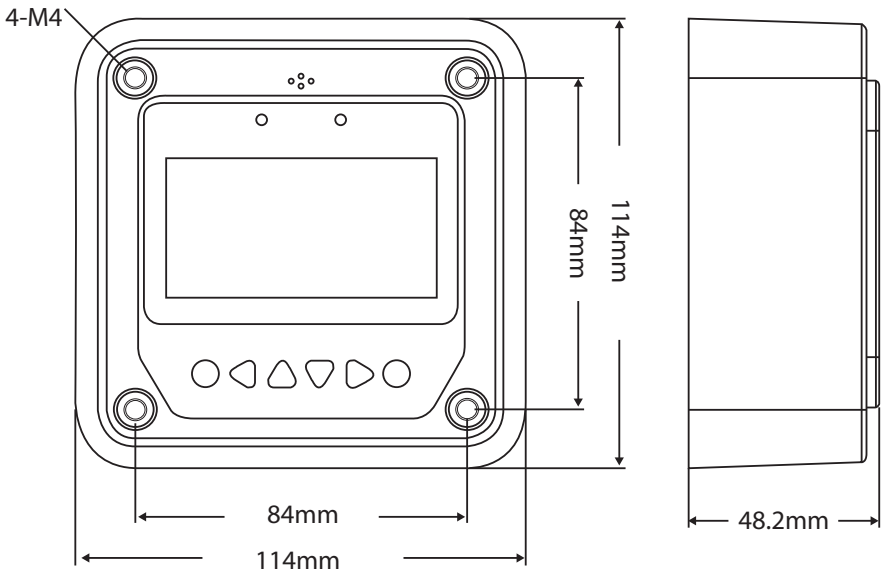

Figure 1, Frame Mount Dimensions (in/mm)

Installation

1. Locate and drill the screw holes based on the frame mounting dimension of the base, and erect the plastic expansion bolts.
2. Use four ST4.2x32 self-tapping screws to fix the frame.

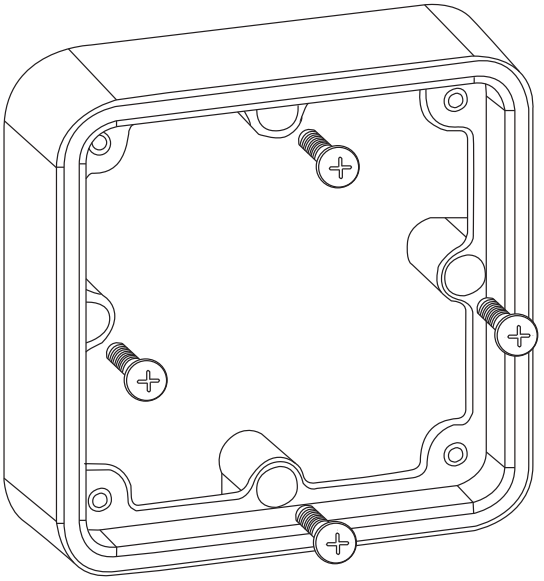

Figure 2, Frame Mounting

3. Use four M4x8 pan head screws to mount the OutBack Mate Micro to the frame.

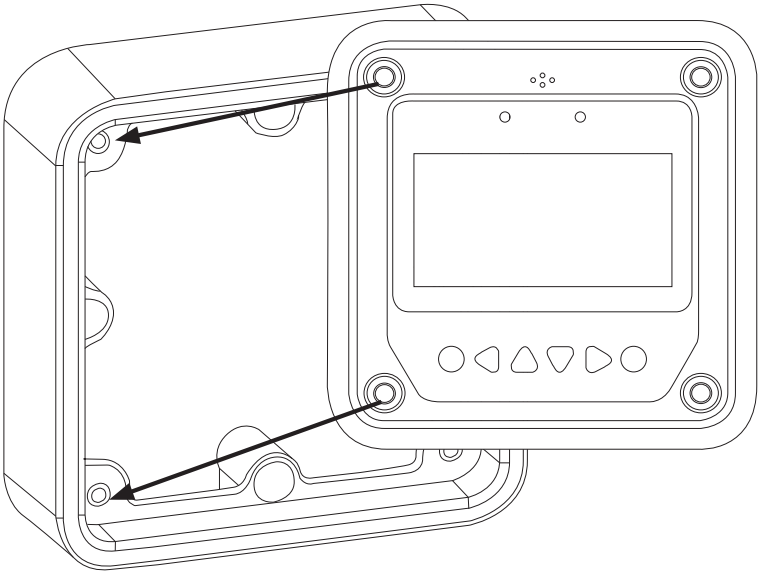

Figure 3, OutBack Mate Micro Mounting

4. Affix the four screw plugs to the screw holes.

Surface Mount

Notice

Prior to installation, consider the amount of space required to plug/unplug the communication cable, as well as the length of the cable.

1. Locate and drill the screw holes based on the size of the installation surface.
2. Use four M4x8 pan head screws with M4 nuts to mount the OutBack Mate Micro onto the surface.
3. Affix the four screw plugs to the screw holes.

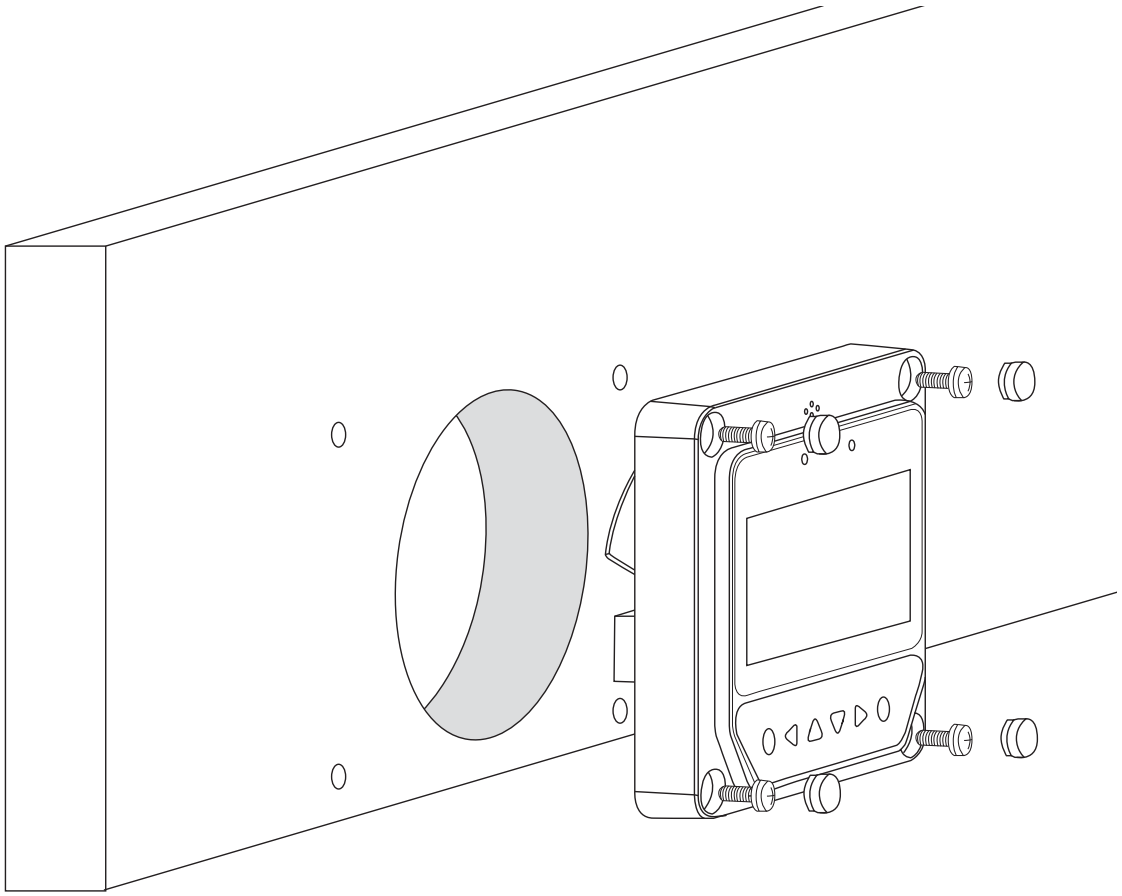

Figure 4, Surface Mounting the OutBack Mate Micro

Product Features

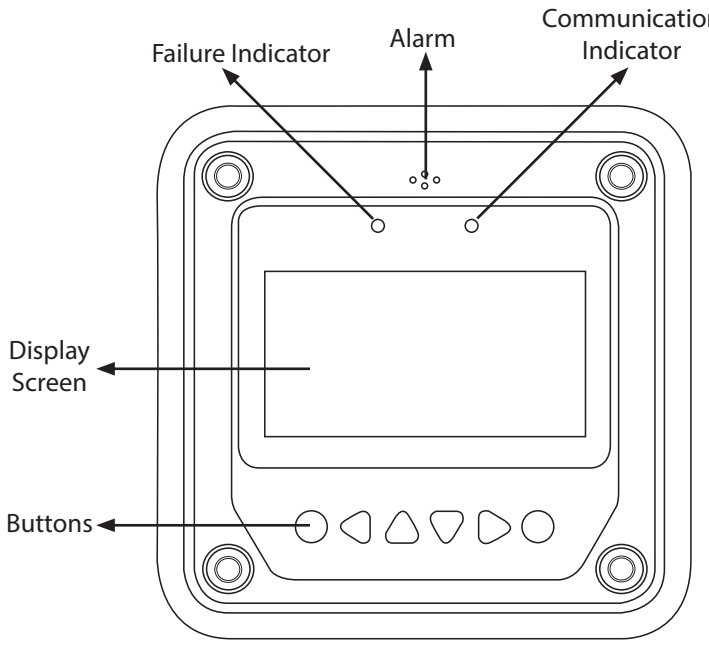

Figure 5, Front Overview

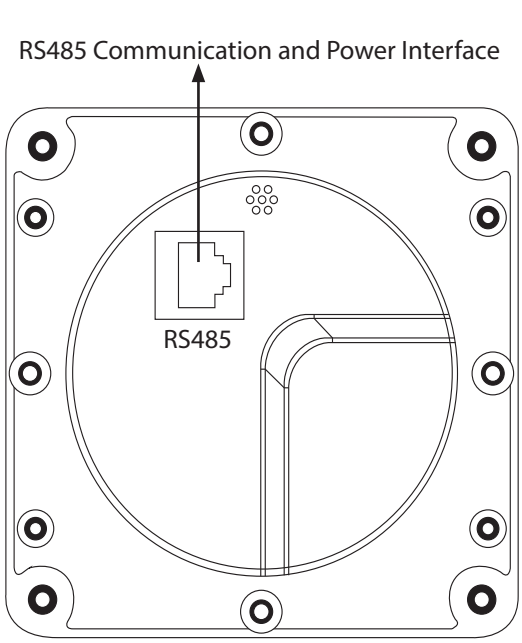

Figure 6, Rear Overview

Product Features	
Failure Indicator	The failure indicator flashes if the connected device fails. For failure information, check the controller manual.
Alarm	An audible alarm that sounds when a fault occurs. This can be activated or deactivated
Communication Indicator	This indicates the communication status between the OutBack Mate Micro and the OutBack FLEXmax Charge Controller.
Display Screen	LCD operational interface
Buttons	Four navigational buttons (up, down, left, and right) and two operational buttons (OK and Esc)
RS485 Communication and Power Interface	Communication and power supply cable interfaces, used for a communications connection with the controller.

Table 2, Product Features

Monitoring Screen

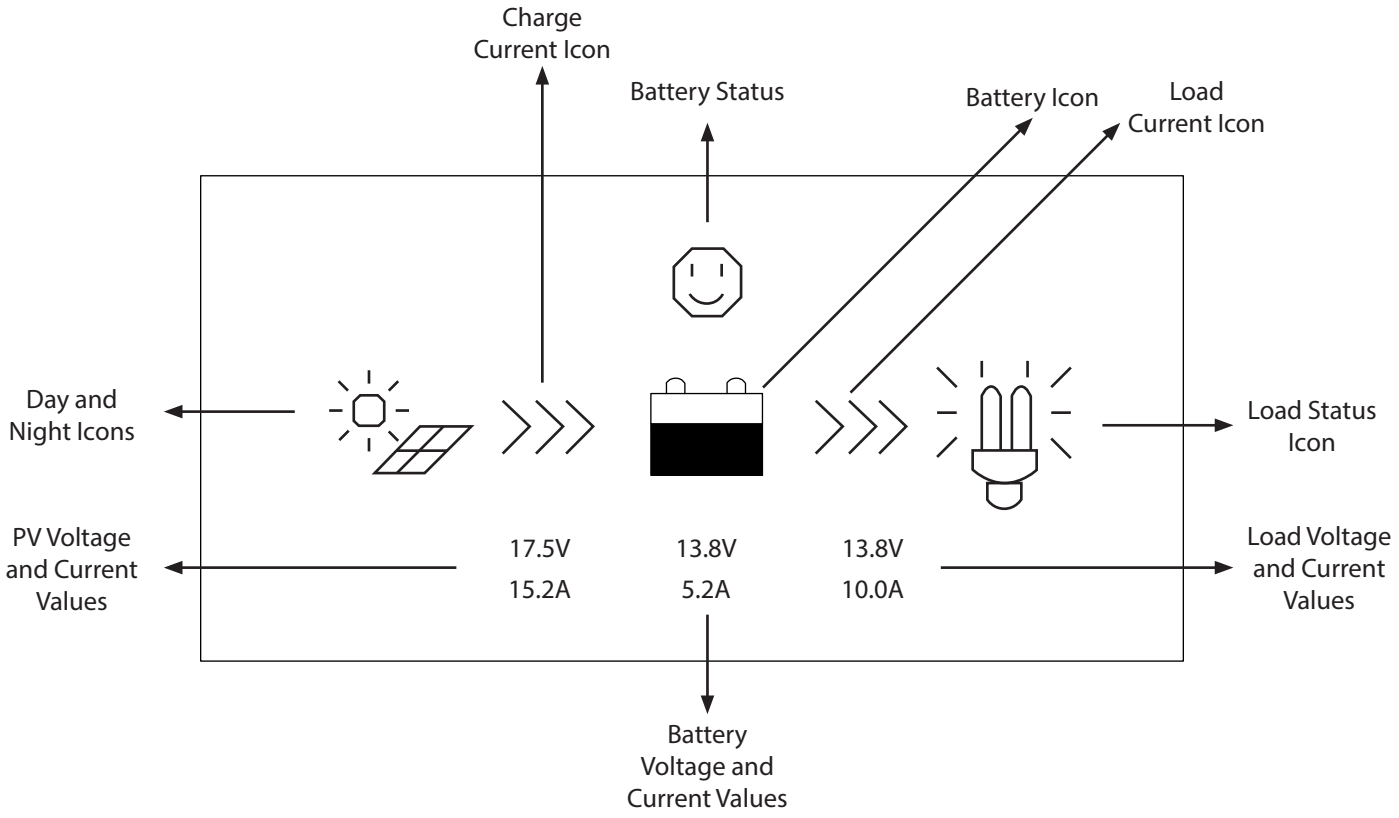

Figure 7, Monitoring Screen Overview

Monitoring Screen Icons	
Day and Night Icons	- Night, - Day: The threshold voltage is 1V. Higher than 1V is daytime.
Charge Current Icon	The charge current icon will be static if there is no activity and dynamic if there is a charge current.
Battery Icon	- Over Discharge - Normal
Battery Status Icons	- Normal Voltage - Under Voltage - Over Discharge
Load Current Icon	The load current icon will be static if there is no activity and dynamic if there is a discharge current.
Load Status Icon	- Load On - Load Off

Notice

In Manual Mode, pressing "OK" will switch the load status between "ON" and "OFF".

Table 3, Monitoring Screen Icons

Operation

Buttons

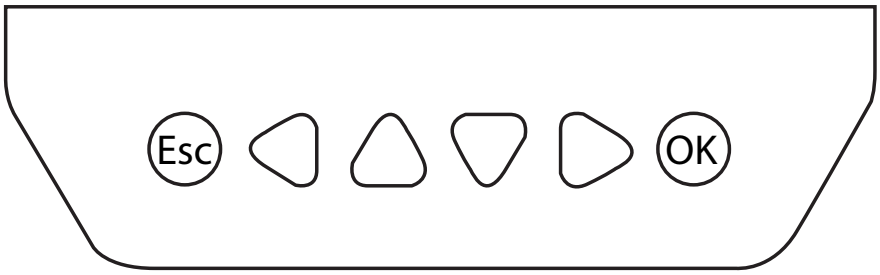

Figure 8, Outback Mate Micro Buttons

From left-to-right, the buttons are: Esc, Left, Up, Down, Right, and OK. Pressing OK will navigate to a subpage, and pressing Esc will take the user back to the previous page.

The default page is the "Browse" mode. Pressing OK and inputting the correct password will allow the user to enter "Modification" mode. The left and right buttons are used to move the cursor, while the up and down buttons are used to modify parameters. When modifying parameters, OK can be used to confirm the modification, while Esc can be used to cancel the modification.

Main Menu

The Main Menu is accessed by pressing Esc. On the Main Menu, the up and down buttons are used to move the cursor up and down the menu items. The screen displays 4 list items at a time. Press OK to select a subpage any of the listed subpages:

1. Monitoring
2. Device Info.
3. Test Operation
4. Control Para.
5. Load Set
6. Device Para
7. Device PSW.
8. Factory Reset
9. Failure Info.
10. Meter Para.

Real-Time Monitoring

There are 14 screens for the "Monitoring" subpage. See the figure below. Move between the rows by pressing up or down. Move along a row by pressing right or left.

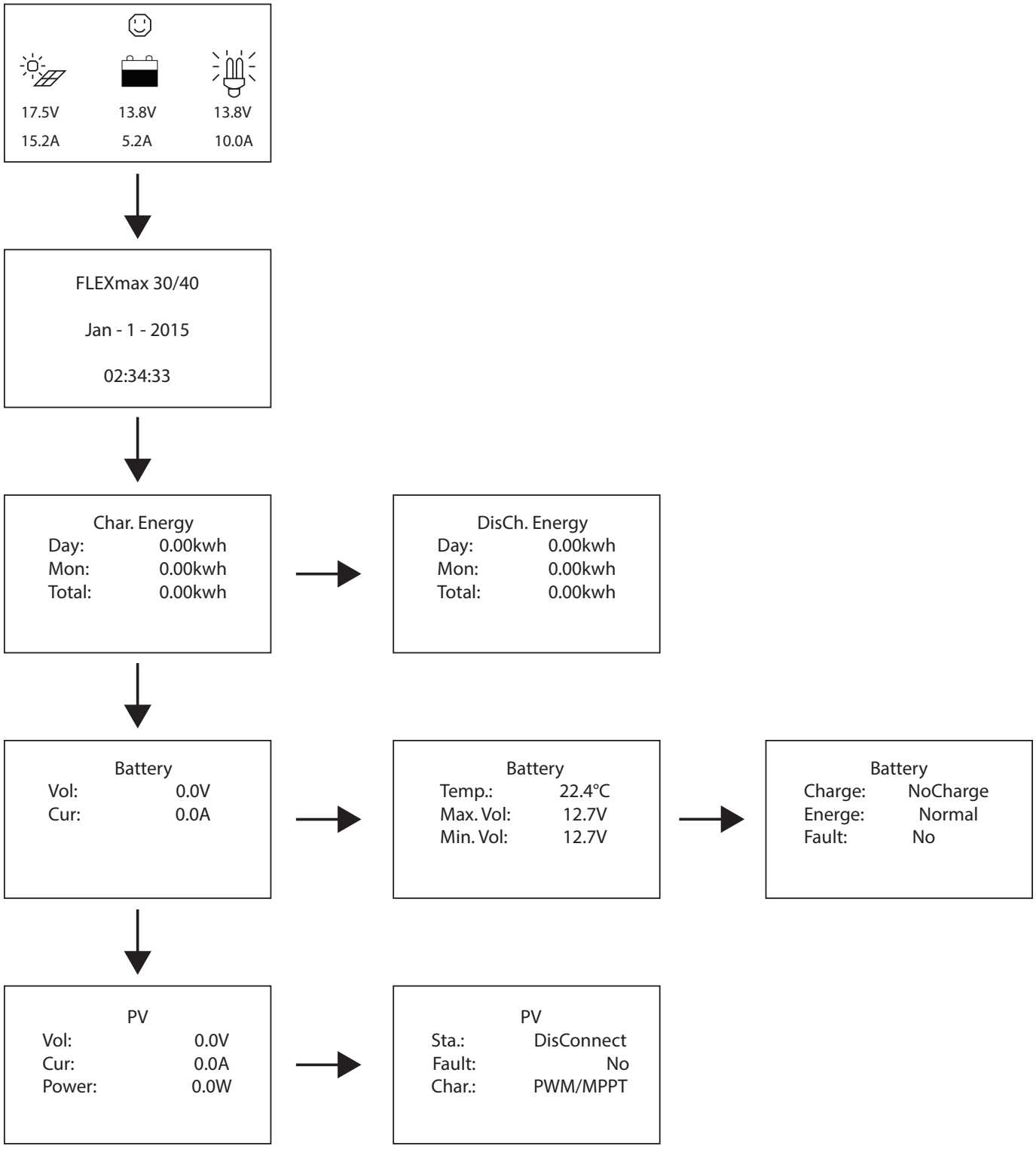

Figure 9, Monitoring Screens

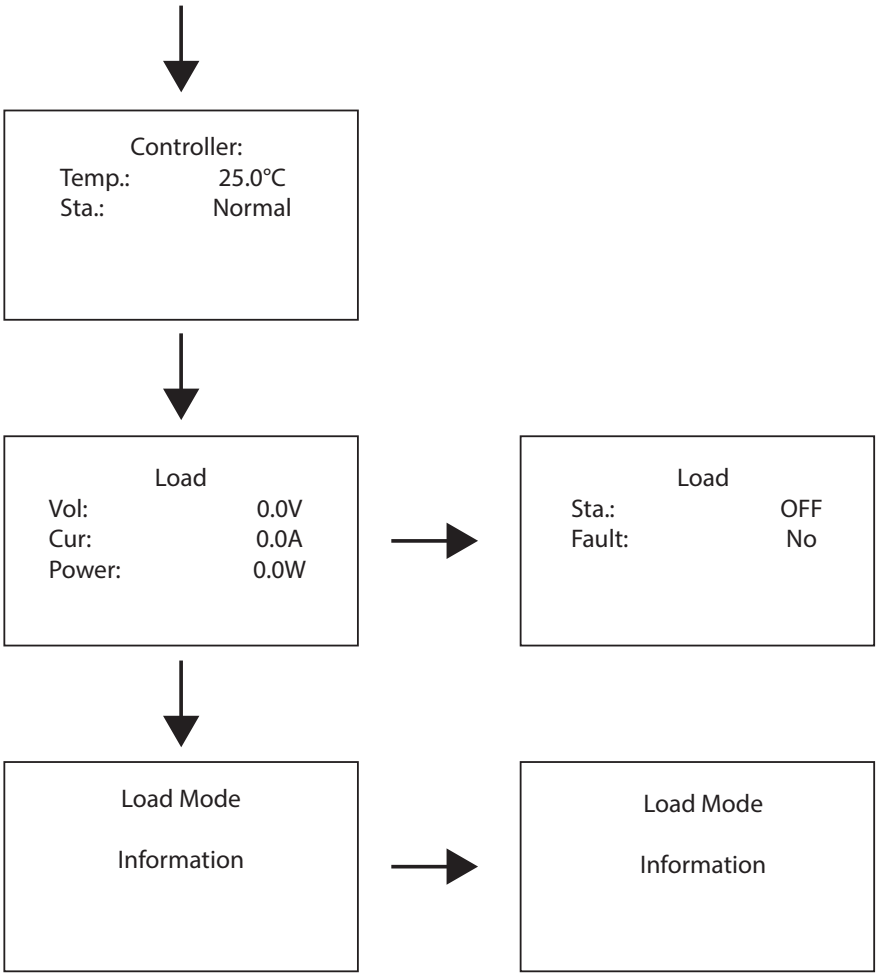

Figure 9, Monitoring Screens, continued

Device Information

The product model, parameters, and SN code of the controller are displayed on the Device Information screen. See the figure below.

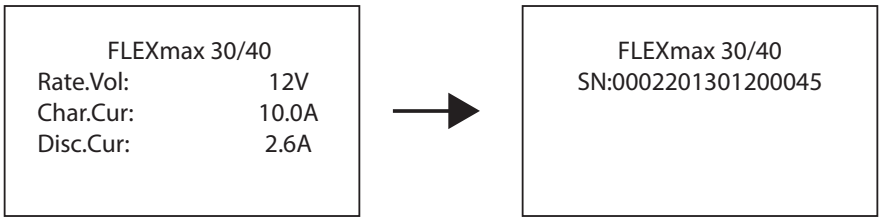

Figure 10, Device Information Screen

Test Operation

Load switch test operation is conducted on the connected charge controller to determine if the load output is normal. This test operation does not affect working settings under actual load. The charge controller will exit from test mode when exiting the operational interface of the test.

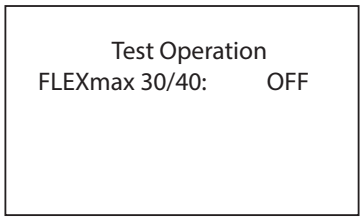

Figure 11, Test Operation Screen

Operation

Control Parameters

See the figure below for the scope of the parameters that are available on the Control Parameters page.

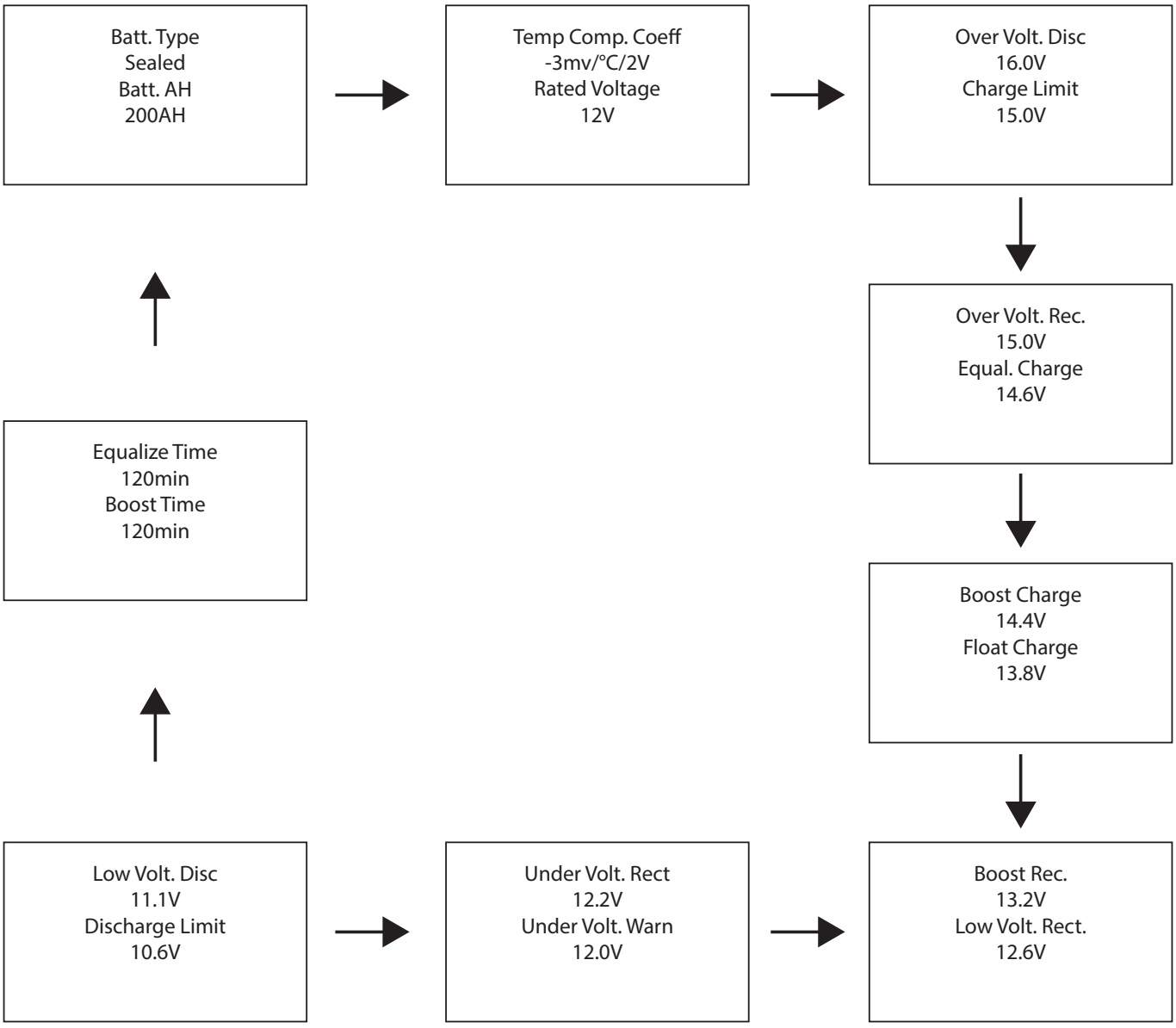

Figure 12, Control Parameters Screens

Control Parameters		
Parameters	Default	Range
Battery Type	Sealed	Sealed/Gel/Flooded/User
Battery Ah	200Ah	1~9999Ah
Temperature Compensation Coefficient	-3mv/°C/2V	0~9mv
Rated Voltage	Auto	Auto/12V/24V/36V/48V

Table 4, Control Parameters

Battery Voltage Parameters

Notice

The parameters in the table below are from a 12V system at 25°C. Multiply this by 2 in 24V systems, 3 in 36V systems, and 4 in 48V systems.

Battery Voltage Parameters				
Battery Charging Setting	Sealed	Gel	Flooded	User
Over Voltage Disconnect Voltage	16.0V	16.0V	16.0V	9~17V
Charging Limit Voltage	15.0V	15.0V	15.0V	9~17V
Over Voltage Reconnect Voltage	15.0V	15.0V	15.0V	9~17V
Equalize Charging Voltage	14.6V	--	14.8V	9~17V
Boost Charging Voltage	14.4V	14.2V	14.6V	9~17V
Float Charging Voltage	13.8V	13.8V	13.8V	9~17V
Boost Reconnect Charging Voltage	13.2V	13.2V	13.2V	9~17V
Low Voltage Reconnect Voltage	12.6V	12.6V	12.6V	9~17V
Under Voltage Warning Reconnect Voltage	12.2V	12.2V	12.2V	9~17V
Under Voltage Warning Voltage	12.0V	12.0V	12.0V	9~17V
Low Voltage Disconnect Voltage	11.1V	11.1V	11.1V	9~17V
Discharging Limit Voltage	10.6V	10.6V	10.6V	9~17V
Equalize Duration	120min	--	120min	0~180min
Boost Duration	120min	120min	120min	0~180min

Table 5, Battery Voltage Parameters

Notice

- When the battery type is sealed, gel, or flooded, the adjusting range of the equalize duration is 0 to 180min and the boost duration is 10 to 180min.
- The following conditions must be observed when modifying the parameters for the user battery type:
  - Over Voltage Disconnect Voltage > Charging Limit Voltage ≥ Equalize Charging Voltage ≥ Boost Charging Voltage ≥ Float Charging Voltage > Boost Reconnect Charging Voltage
  - Over Voltage Disconnect Voltage > Over Voltage Reconnect Voltage
  - Low Voltage Reconnect Voltage > Low Voltage Disconnect Voltage ≥ Discharging Limit Voltage
  - Under Voltage Warning Reconnect Voltage > Under Voltage Warning Voltage ≥ Discharging Limit Voltage
  - Boost Reconnect Charging Voltage > Low Voltage Disconnect Voltage.

Operation

Load Setting

The Load Setting page is used to set the four load working modes of the charge controller:

1. Manual
2. Light On / Off
3. Light On+ Timer
4. Time Control

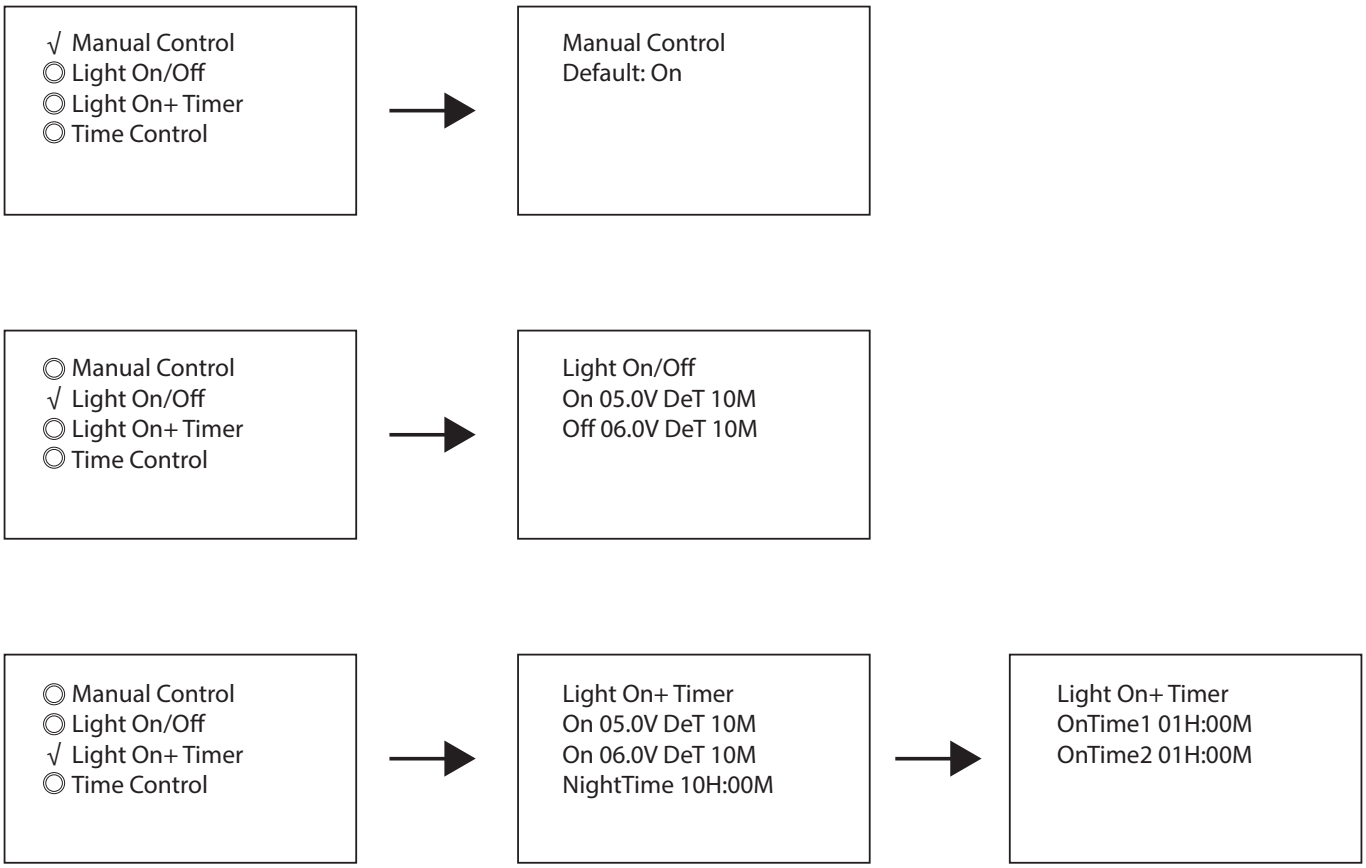

Figure 13, Load Setting Screens

Manual Control	
Mode	Function
On	The load is on, and will stay on, given that the battery capacity is sufficient and there are no abnormal conditions.
Off	The load is off.

Table 6, Manual Control

Light On/Off	
Mode	Function
Light On Voltage (Night Threshold)	When the input voltage of the solar module is lower than the Light On voltage, the load output is turned on automatically, given that the battery capacity is sufficient and there are no abnormal conditions.
Light Off Voltage (Day Threshold)	When the input voltage of the solar module is higher than the Light Off voltage, the load ouput is automatically turned off.
Delay Time	During this period, if the light signal voltage continues to match the Light On/Off voltage, it will carry out any corresponding actions (Adjustment Range: 0~99min).

Table 7, Light On/Off

Light On+ Timer		
Mode	Function	Whenever the working time is set to 0, there will not be a working period. The real working time of T2 depends upon the Night Time and the length of T1 and T2.
Working Time 1(T1)	The working period of the load after the light control turns on the load.	
Working Time 2 (T2)	The working period of the load before the light controls turns off the load.	
Night Time	Total calculated night time of the controller.	

Table 8, Light On+ Timer

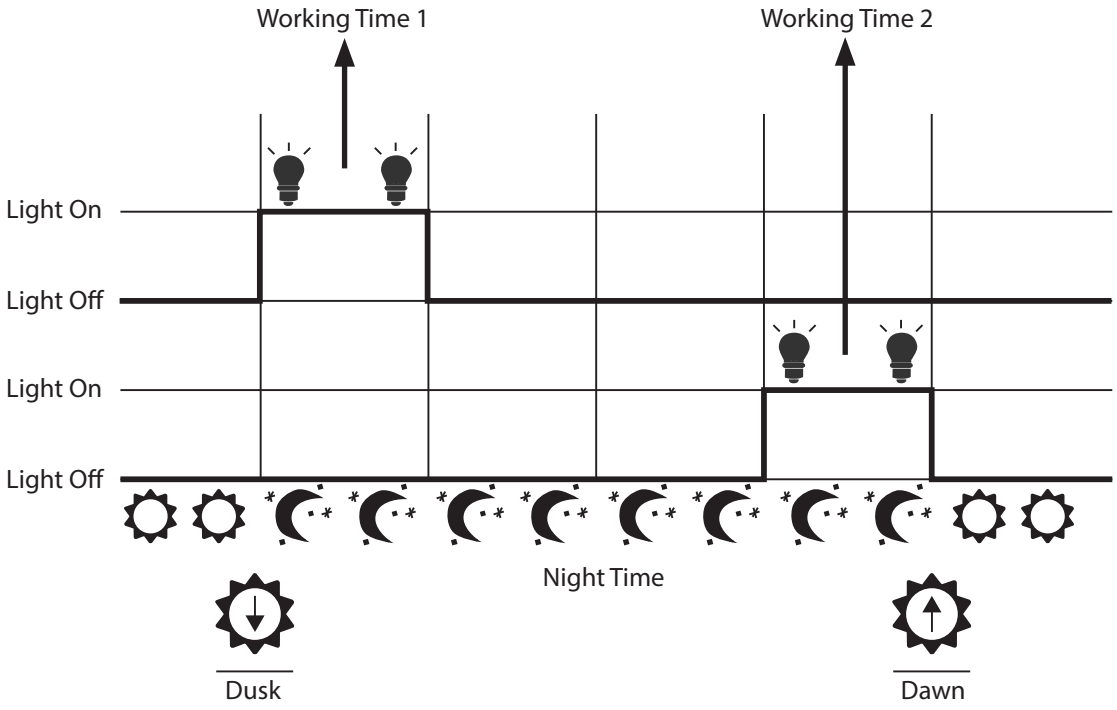

Figure 14, Light On/Off Working Time

Time Control		
Mode	Function	
Working Time 1(T1)	The On/Off time of the load is controlled through the real-time clock mode.	Working Time 1 is the compulsory working time for the load, while Working Time 2 is optional.
Working Time 2 (T2)	Working Time 2 provides a dual timer control function of the load.	

Table 9, Time Control

Device Parameter

The Device Parameter page allows the user to check/modify the following charge controller data:

- » Firmware Version
- » Device ID
- » LCD Backlight Timer
- » Device Clock

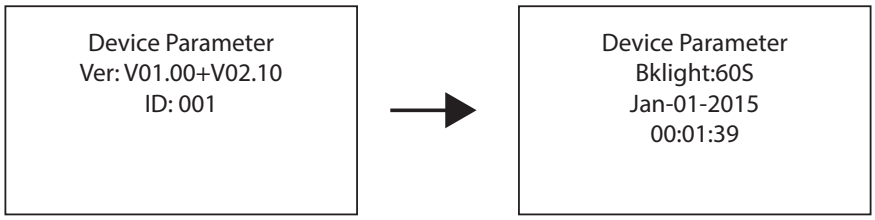

Figure 15, Device Parameter Screens

Notice

The bigger the ID value of the connected device, the longer it will take the OutBack Mate Micro to identify the device (maximum interval <6 minutes).

Device Parameters	
Parameter	Definition
Ver	The version of the charge controller's firmware and hardware.
ID	The charge controller's ID number.
Bklight	How long the backlight on the charge controller will stay on without user interaction (seconds).
Month-Day-Year H:M:S	The internal clock of the charge controller.

Table 10, Device Parameters

Device Password

✓	Notice The default password is 000000.

The password of the charge controller can be modified via the Device Password page. The password is a 6-digit figure which is required before any modifications to any of the following pages:

- Control Parameter
- Load Setting
- Device Parameter
- Device Password
- Factory Reset

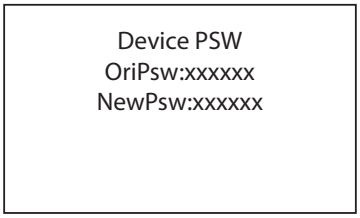

Figure 16, Device Password Screen

Factory Reset

The default parameter values of the charge controller can be restored via the Factory Reset page. The parameters from the following pages will be effected:

- Control Parameter
- Load Setting
- Charge Mode
- Device Password

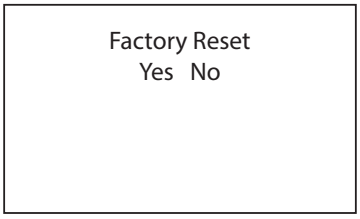

Figure 17, Factory Reset Screen

Operation

Failure Information

The current failure information of the charge controller can be checked via the Failure Information page. A maximum of 15 failure messages can be displayed. When the failures are eliminated, the corresponding failure information on the display will also be eliminated.

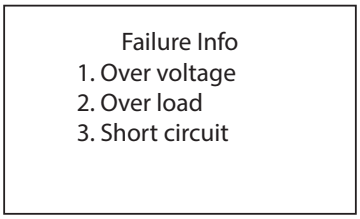

Figure 18, Failure Information Screen

List of Possible Failures	
Failure Information	Details
Load MOS-Short	The MOSFET load driver has been shorted.
Load Circuit	The load circuit has been shorted.
Load O. cur.	The load circuit is over current.
Input O. cur.	PV input is over current.
RPP Short	The reverse polarity protection MOSFET has been shorted.
RPP Break	The reverse polarity protecion MOSFET has been broken.
Char. MOS-Short	The charge driver MOSFET has been shorted.
Input O. cur.	The input is over current.
Disc. O.O.Ctrl.	Discharging is not being controlled.
Ctrler O.Temp.	The controller is over temperature.
Comm. Timeout	Communication has timed out between the OutBack Mate Micro and the charge controller.

Table 11, List of Possible Failures

Meter Parameter

The meter model, software, hardware, and SN NO. version can be checked via the Meter Parameter page. The following three parameters can also be modified:

- Switch Pages
- Backlight
- Audible Alarm

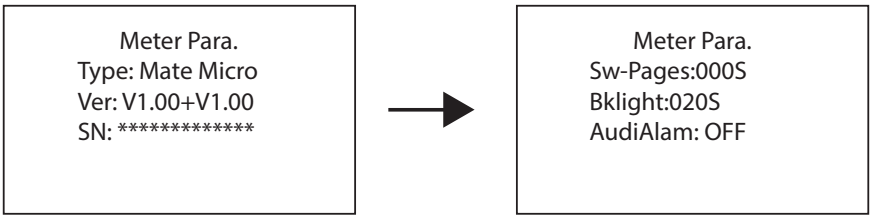

Figure 19, Meter Parameter Screen

Notice
After changing the Sw-Pages parameter, the user must wait 10 minutes for the effect to take place.

Meter Parameters			
Parameters	Default	Range	Details
Sw-Pages	0	0~120S	How long until the pages will switch without user interaction (seconds).
Bklight	20	0~999S	How long the backlight on the charge controller will stay on without user interaction (seconds).
AudiAlam	OFF	ON/OFF	Turns ON/OFF the audible alarm noise.

Table 12, Meter Parameters

Technical Specifications

Technical Specifications	
Electrical Specifications	
Power Consumption	Backlight and Acoustic Alarm (ON) <65mA
	Backlight ON <23mA
	Backlight OFF <15mA
Mechanical Specifications	
Faceplate Dimensions	98 x 98mm
Frame Dimensions	114 x 114mm
Connector Type	RJ45
Meter Cable	Standard 2m, Max 50m
Meter Weight	Simple Package: 0.23Kg, Standard Package: 0.32Kg
Environmental Specifications	
Ambient Temperature	-20°C to +70°C

Table 13, Technical Specifications

Communication Cable Specifications

Definition of Interface Pins	
Pin No.	Definition
1	Power+5~12V Input
2	Power+5~12V Input
3	RS485-B
4	RS485-B
5	RS485-A
6	RS485-A
7	GND
8	GND

Table 14, Definition of Interface Pins

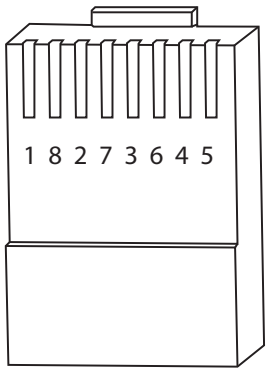

Figure 20, Communication Cable Pins

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