BATTERY MONITOR BW-01 | OWNER'S MANUAL

Description and Features: This unit is an Intelligent, microprocessor based, panel mounted battery voltage monitor for display of the State of Charge of 12V / 24V battery with the help of buzzer and different patterns of Red / Yellow / Green LEDs: steady / blinking / slow or fast "Walking LEDs". 12V / 24V battery is detected automatically when voltage of 7 to 32V is seen on connection of the battery. Following parameters / conditions are displayed:

- Terminal voltage
- Charging in progress
- Alarm at programmed low voltage threshold.
- Alarm at programmed high voltage threshold
- 3- Day Timer / Switch OFF the unit for low voltage protection

Layout and Dimensions

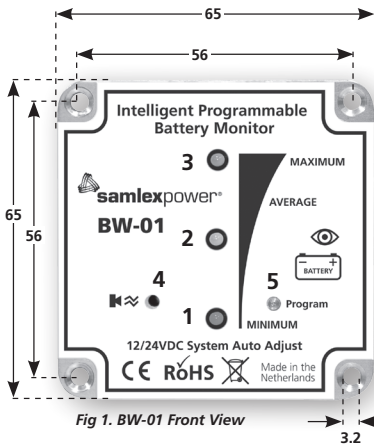*Fig 3. 0.25"/6.3 mm Female Quick Connect Receptacle Terminal Lug*

Fig 1. BW-01 Front View

Fig 2. BW-01 Back View & Battery Connection (Note: Same dimensions as front view)

Fig 1.:
1 – Red LED
2 – Yellow LED
3 – Green LED
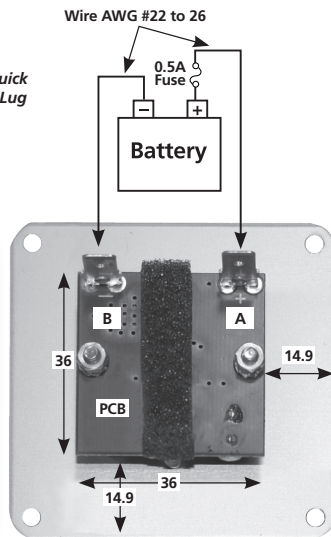**4** – Buzzer (at the back)
5 – Programming Button

Fig 2.:
A – 1/4" (6.3mm) Quick Connect Tab Terminal for connection to Positive (+) of the battery
B – 1/4" (6.3mm) Quick Connect Tab Terminal for connection to Negative (-) of the battery

Installation: Please refer to Figs 1 and 2 above. The unit consists of a 65 x 65 mm front plate with 4 x 3.2 mm holes for flush mounting on a wall / panel with 4 screws (#4, Tapping, Flat Head). The Printed Circuit Board (PCB) and Battery Input Connectors (0.25"/ 6.3 mm Quick Connect Tabs) are located at the back of the plate and project out to a depth of 25.5 mm. For flush mounting on the wall / panel, a pocket / slot measuring 30 mm x 30 mm x 40 to 50 mm depth is required to be made to accommodate the projection at the back.

Use AWG # 22 to 26 wires (e.g. telephone wires) to connect to the battery (See Fig. 2). Use a 0.5A fuse in series with the Positive wire. The fuse should be as close as possible to the battery Positive terminal (preferably within 7").

Refer to Fig 2. Battery Positive (+) and Negative (-) connections to the unit are made through Battery Input Connectors "A" and "B" (1/4"/6.3 mm Male Quick Connect Tabs). For this connection, use 0.25"/6.3 mm Female Quick Connect Receptacle Terminal Lugs on the wire ends (See Fig 3).

12V / 24V battery is detected automatically when voltage of 7 to 32V is seen on connection of the battery. At startup, Red LED is activated as a sign of power up. After some time, the unit is initialized and 12V / 24V battery is recognized. The State of Charge is displayed thereafter.

LED and Buzzer Indications for Voltage Levels:

*NOTE: Term "Walking LEDs" has been used to indicate cyclical, sequential lighting pattern of Red, Yellow and Green LEDs. This pattern indicates that charging is taking place. Following 2 patterns are used:

- **"Walking LED's - Fast" + Beep:** Indicates charging at voltage that is higher than the programmed value of High Voltage Threshold (14.8V (Preset) / 15.3V / 16V for 12V battery and 29.6V (Preset) / 30.6V / 32.0V for 24V battery). The loop is: {Red **»** Yellow **»** (Green + Beep) **»** All OFF}… repeats this sequential loop.
- **"Walking LED's – Slow":** Indicates charging at voltage higher than 13.3V (12V battery) / 26.6V (24V battery) but lower than the programmed value of High Voltage

Threshold (14.8V (Preset) / 15.3V / 16V for 12V battery and 29.6V (Preset) / 30.6V / 32.0V for 24V battery). The loop is: (Red **»** Yellow **»** Green**»** All OFF)… repeats this sequential loop.

Status of LEDs and Buzzer	Battery Voltage indicated for 12V Battery	Battery Voltage indicated for 24V Battery
*Walking LED's - Fast + Beep (Indicates charging in progress and the voltage is higher than the programmed threshold of Over Voltage Alarm)	> 14.8 (Preset) / 15.3 / 16.0	> 29.6 (Preset) / 30.6 / 32.0
*Walking LED's - Slow (Indicates charging in progress under normal conditions)	> 13.3 But <(14.8V (Preset) / 15.3 / 16.0V)	> 26.6V But < (29.6V (Preset) / 30.6 / 32.0V)
Green	> 12.4	> 25.0V
Green+Yellow	> 11.6	> 23.2V
Yellow	> 11.2	> 22.2V
Yellow+Red	> 10.9	> 21.8V
Red	> 10.5	>21.4V
(Green +Yellow + Red) - Blinking	-	> 21V
Following pattern indicates voltage is below the programmed threshold for Low Voltage Alarm: (Red + Green) **»** (Yellow + Beep)… repeats 10 times **»** (Red + Green) **»** (Yellow)… repeats 10 times **»** All LEDs OFF. Unit enters Sleep Mode. There is a beep every min.	< 10.5 (Preset) or < programmed values of 10.6V / 10.7V / 10.8V / 10.9V / 11.0V /11.1V / 11.2V	< 21V (Preset) or < programmed values of 21.2V / 21.5V / 21.6V / 21.8V / 22.0V / 22.2V / 22.4V

High Voltage Alarm during Charging: Following voltage thresholds can be programmed to warn about over voltage condition during charging (See programming procedure given separately).

- 14.8V (Preset) / 15.3V / 16V for 12V battery
- 29.6V (Preset) / 30.6V / 32.0V for 24V battery

This facility can be used to indicate onset of "Equalization Stage" when charging Flooded / Wet Cell Batteries. During "Equalization Stage", the battery is intentionally overcharged to 15.3 to 16V (12V battery) / 30.6 to 32V (for 24V battery) for limited time of 1 to 3 Hrs. During this time, it is necessary to monitor the battery for overheating / electrolyte level / measurement of individual cell voltages and for turning OFF Equalization at the appropriate time.

The display pattern is "Walking LEDs – Fast" + Beep. In this pattern, the display / buzzer loop is: {Red » Yellow » (Green + Beep) » All OFF}......Repeats this sequential loop.

NOTE: *The unit will not reset even after the battery voltage drops below the programmed Over Voltage Threshold. This is helpful to know that an over voltage condition existed. The alarm can be reset manually as follows:*
- *Press and hold Programming Button » Beep will be heard » Release the Button*

Low Voltage Alarm: Following voltage thresholds can be programmed to warn about low voltage condition (See programming procedure given separately).
- < 10.5 (Preset) or < programmed values of 10.6V / 10.7V / 10.8V / 10.9V / 11.0V /11.1V / 11.2V
- < 21V (Preset) or < programmed values of 21.2V / 21.5V / 21.6V / 21.8V / 22.0V / 22.2V / 22.4V

When the programmed Low Voltage Threshold is reached, the following LED / Buzzer pattern will be observed:

» (Red + Green) **»** (Orange + Beep)…….Repeats 10 times

» (Red + Green) **»** (Orange)….. Repeats 10 times

» All LEDs OFF. Unit enters Sleep Mode. There is a beep every minute so that it is clear that the unit is not in a "3 Day Off Mode."

NOTE: *The unit will reset only when the battery voltage rises to > 13.3V (for 12 V battery) / 26.6 V (for 24V battery) i.e. when charging takes place.*

3-Day Timer: A 3-Day Timer has been provided to automatically switch OFF the unit after 3 days of switching ON of the Timer or if the battery voltage drops below 10.4V (for 12V battery) or 20.8V (for 24V battery). The Timer will be automatically switched OFF after the battery voltage rises above 13,3V (for 12V battery) or 26.6V (for 24V battery).

ON / OFF Modes can be programmed as shown under heading "Programming Alarm Thresholds / 3-Day Timer."

Programming Procedure: Brightness of LED Display:
The unit comes preset with brightness of the LEDs set at Normal (Bright). The brightness can be dimmed or the LEDs can be switched OFF. Settings can be changed with the help of the Programming Button (5, Fig 1). Settings are performed in sequential order in a loop: Bright **»** Dim **»** OFF **»** Bright **»** Dim **»** OFF… repeats the loop.

For changing the Setting: Press and hold Programming Button **»** Beep will be heard **»** Release the Button.

Please note that when the LED display is switched OFF, the Buzzer alarm protocols stay active in the background. Hence, if Under Voltage / Over Voltage condition is activated, the LED display and Buzzer alarm protocols for the abnormal condition will be activated.

Programming Procedure: Alarm Thresholds / 3-Day Timer

Thresholds of Low Voltage / High Voltage Alarms and Timer ON / OFF settings are programmed with the help of Programming Button (5, Fig 1) and by monitoring the LED and Buzzer indication patterns. **CAUTION! Alarm thresholds are to be programmed only when the voltage is between 10.5V and 13.3V (for 12V battery) and between 21V and 26.6V (for 24V battery). In this condition, the LEDs / Buzzer will not be indicating (i) "charging" i.e., will not be displaying "Walking LEDs – Fast+Beep" or "Walking LEDs – Slow" or (ii) "Low or High Voltage Alarm".**

Programming Modes are SEQUENTIAL as shown in the sequence given below. This means that in order to access programming of the desired parameter, it will be necessary to pass through the previous programming positions. Press Programming Button (5, Fig 1) and hold it in pressed condition. Release the Button ONLY when the LED + Beeping pattern for the desired parameter is displayed.

The sequence starts with Programming Mode for Low Voltage Thresholds first followed by High Voltage Thresholds and then followed by Timer ON/OFF. *Before the start of each Programming Mode, all the 3 LEDs and buzzer will blink simultaneously 3 times.*

To **START**, press Programming Button (5, Fig 1) and hold it in pressed condition. **Release the Button ONLY when the LED + Beeping pattern for the desired parameter is displayed.**

**» Long beep » {(Red+Yellow+Green+Beep) » (Red+Yellow+Green+Beep)}…
3 Times (Low Voltage Threshold Programming Menu starts)**

↓

LOW VOLTAGE MENU STARTS	12V Battery	24V battery
(Red + Beep) - 3 blinks	10.5 (Preset)	21V (Preset)
↓		
(Red + Beep) - Steady	10.6	21.2
↓		
(Red + Yellow + Beep) - 3 Blinks	10.7V	21.5V
↓		
(Red + Yellow + Beep) - Steady	10.8V	21.6V
↓		
(Yellow + Beep) - 3 Blinks	10.9V	21.8V
↓		
(Yellow + Beep) - Steady	11.0V	22.0V
↓		
(Yellow + Green + Beep) - 3 Blinks	11.1V	22.2V
↓		
(Yellow + Green + Beep) - Steady	11.2V	22.4V

↓

**{(Red+Yellow+Green+Beep) » (Red+Yellow+Green+Beep)}… 3Times
(High Voltage Threshold Programming Menu starts)**

↓

HIGH VOLTAGE MENU STARTS	12V Battery	24V battery
Steady Red + Long Beep	14.8V	29.6V
↓		
Steady Yellow + Long Beep	15.3V	30.6V
↓		
Steady Green + Long Beep	16.0V	32.0V

↓

**Long Pause
(3-Day timer Programming Menu Starts)**

3 DAY TIMER ACTIVATION	
Short Beep (No LED)	3-Day Timer ON

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Long Pause	
3 DAY TIMER DE-ACTIVATION	
Long Beep (No LED)	3-Day Timer OFF

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Programming sequence ends. Release Programming Button

Specifications

Battery System Voltage	12V / 24V (Auto Detection)
Input voltage Range	7 VDC to 32 VDC
Input current	Less than 30 mA
Battery Input Connectors	¼" / 6.3 mm Male Quick Connect Tabs
Input Wiring	AWG # 22 to 26
Fuse*	0.5A
Dimensions, mm	65 x 65 x 25.5
Weight	35 gm

* In series with Positive wire preferably within 7" from the Battery Positive

2 YEAR LIMITED WARRANTY

Battery Monitor BW-01 manufactured by Samlex America, Inc. (the "Warrantor") is warranted to be free from defects in workmanship and materials under normal use and service. The warranty period is 2 years for the United States and Canada, and is in effect from the date of purchase by the user (the "Purchaser").

Warranty outside of the United States and Canada is limited to 6 months. For a warranty claim, the Purchaser should contact the place of purchase to obtain a Return Authorization Number.

The defective part or unit should be returned at the Purchaser's expense to the authorized location. A written statement describing the nature of the defect, the date of purchase, the place of purchase, and the Purchaser's name, address and telephone number should also be included.

If upon the Warrantor's examination, the defect proves to be the result of defective material or workmanship, the equipment will be repaired or replaced at the Warrantor's option without charge, and returned to the Purchaser at the Warrantor's expense. (Contiguous US and Canada only)

No refund of the purchase price will be granted to the Purchaser, unless the Warrantor is unable to remedy the defect after having a reasonable number of opportunities to do so. Warranty service shall be performed only by the Warrantor. Any attempt to remedy the defect by anyone other than the Warrantor shall render this warranty void. There shall be no warranty for defects or damages caused by faulty installation or hook-up, abuse or misuse of the equipment including exposure to excessive heat, salt or fresh water spray, or water immersion.

No other express warranty is hereby given and there are no warranties which extend beyond those described herein. This warranty is expressly in lieu of any other expressed or implied warranties, including any implied warranty of merchantability, fitness for the ordinary purposes for which such goods are used, or fitness for a particular purpose, or any other obligations on the part of the Warrantor or its employees and representatives.

There shall be no responsibility or liability whatsoever on the part of the Warrantor or its employees and representatives for injury to any persons, or damage to person or persons, or damage to property, or loss of income or profit, or any other consequential or resulting damage which may be claimed to have been incurred through the use or sale of the equipment, including any possible failure of malfunction of the equipment, or part thereof. The Warrantor assumes no liability for incidental or consequential damages of any kind.

**Samlex America Inc. (the "Warrantor")
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DETAILED PRODUCT INFORMATION

For a complete user manual including specifications, application notes, installation instructions, trouble shooting and more, please visit the web page for this product on www.samlexamerica.com. Product page can be found using the "Search by Model" field.