

# MS - 928 Battery Back-up Exchange Box

## User Manual

### 1. INTRODUCTION

This is an easy hook up Battery Backup Exchange Box with Voltage Comparator Circuitry.

In normal operation, the DC load is powered by the 13.8V DC INPUT(permanent source).

When the 13.8Vdc permanent source is accidental cut-off, the unit will switch to use the 12V Battery(by Voltage Comparator Circuitry) to power up the DC load for Backup purpose.

The unit is designed to accept a voltage range 11 ~ 15Vdc at the 13.8V DC INPUT.

While powering up the load ,at the same time, the 13.8V DC INPUT will deliver a small charging current to maintain the 12V Battery's state of charge.

### 2. CONTROL & INDICATION

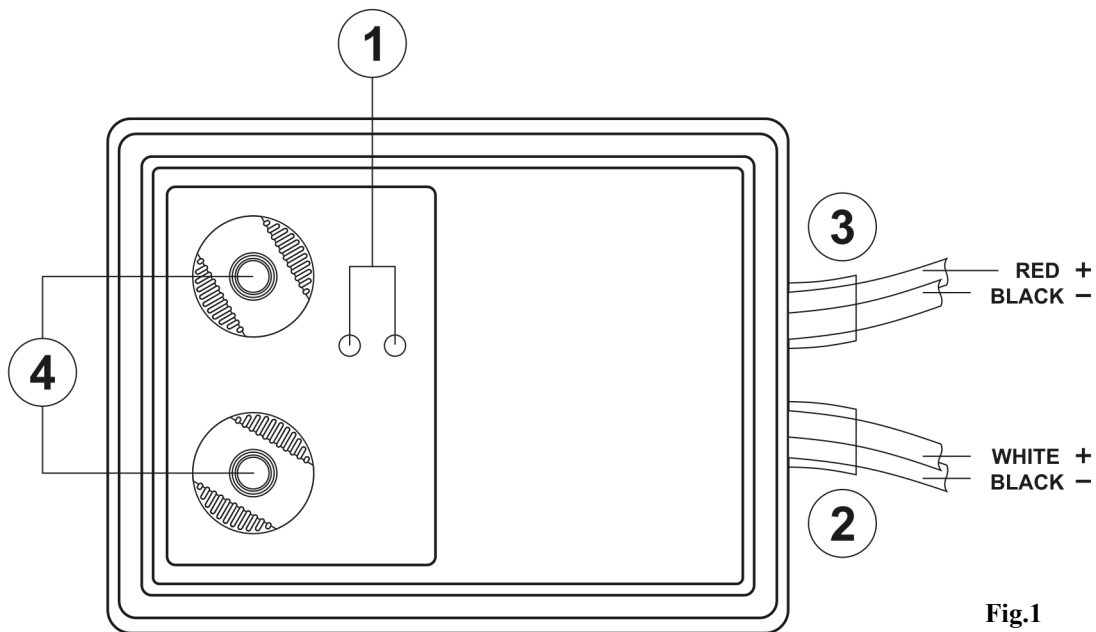


Fig.1

	Remarks
1. LED Indicator	Green : Normal    Red : Battery
2. 13.8V DC INPUT* connection cable	Also accept input range of 11 ~15VDC
3. 12V BATTERY INPUT connection cable	
4. Screw-On DC output terminal (20A Max)	input source voltage minus 0.8V ≤ DC output voltage < input source

**\*Warning! :**

- i.) The 13.8V DC INPUT (2) must not higher than 15Vdc, otherwise the exchange box and the 12V Battery will be damaged.
- ii.) When 13.8V DC INPUT (2) is 13.3 ~ 13.7Vdc, the charging voltage at the 12V Battery may be lower than 13.0Vdc which may not be able to compensate the battery's self-discharge rate.
- iii.) When 13.8V DC INPUT (2) is 11 ~ 13Vdc, the 12V Battery can not be charged.

## **LED Indication**

<b>Color</b>	<b>Indication</b>
Green**	The load is powered by the 13.8V DC INPUT (2) (Fig.1) and the battery is in maintenance charge
Red***	The load is powered by the 12V Battery (3) (Fig.1)

\*\* This exchange box has a battery charging characteristic when the LED is in Green.

A 0.4-0.6A maintenance charging current will be supplied from the 13.8V DC INPUT to the 12V battery

\*\*\* The unit does not have any protection feature to the battery, beware of over discharged of the 12V battery which will lower the life of the battery.

## **3. CONNECTION**

3.1 Make sure the 13.8Vdc voltage source is Off.

Note: The unit can also accept an input range of 11 ~ 15VDC.

3.2 Connect the 13.8V DC IN white cable (with spade terminal) to positive terminal and the Black cable (with spade terminal) to negative terminal of the 13.8Vdc voltage source.

3.3 Connect the BATTERY IN to 12V Battery(Red to positive terminal and Black to negative terminal of the 12V Battery). Then, the RED LED will be light.

3.4 Switch on the 13.8Vdc source, the GREEN LED will be light and the RED LED will be OFF.

3.5 If there is a Power On/Off Switch on the load, make sure it is switched to OFF.

Connect the DC Load to Screw-On DC output terminal.

Then, switch on the load and it is powered by the 13.8Vdc source now.

3.6 To test the battery backup feature, switch off the 13.8Vdc source. Then the RED LED will be light and the DC Load is powered by the 12V Battery. Switch on the 13.8Vdc source again, the GREEN LED will be light and the DC Load is powered by the 13.8Vdc source again.

**If the LED is not ON/the light LED is different from above/the load is not ON, disconnect the input sources & the load from the exchange box and follow the steps 3.7, 3.8 & 3.9 to find the source of error.**

3.7 Use a Voltmeter to check the output voltage of the 13.8Vdc source at the output terminal of the source. Make sure it is within 11 ~ 15Vdc.

3.8 Then, measure the 12V Battery's voltage(open-circuit voltage) at the output terminal of the Battery. If the voltage is below 12.0Vdc, the battery is nearly completely discharged and need to recharge again. If the voltage is below 11.5Vdc, the battery may be over-discharged and need to replace with an new one. Consult your Battery Manufacturer about the open-circuit voltage of the battery.

3.9 Connect the load directly to the 13.8Vdc source. Switch on the source and the load, make sure the load can be ON.

## **4. SPECIFICATIONS**

<b>13.8V DC INPUT</b>	
Input Voltage Range	11 ~ 15V
Output Load Current(Continuous)	25A
Voltage Drop between DC Load and 13.8V DC INPUT / 12V Battery	≤0.8V (@ 25A)
<b>Battery Charging Characteristic</b>	
Max. Charging Voltage	12.5Vdc (@ 13.3Vdc Input) 13.0Vdc (@ 13.8Vdc Input) 14.2Vdc (@ 15.0Vdc Input)
Max. Charging Current	0.4 ~ 0.6A