OVERVIEW OF DC LOW POWER PROTECTIONS

PRODUCT: SEAKEEPER 1, SEAKEEPER 2, SEAKEEPER 3, SEAKEEPER 4

DESCRIPTION

This Technical Bulletin gives an overview of DC Seakeeper Low Power Protections and how to navigate the Battery Monitoring Configuration manager.

LOW POWER PROTECTION – VOLTAGE BASED (FLOODED/AGM/GEL BATTERIES)

Seakeeper continually monitors battery voltage and will run at full power until 11.1 VDC is detected when operating with non-lithium batteries. If the measured voltage at the Seakeeper does not increase above 11.1 VDC, then the unit will continue to de-rate power consumption until it reaches 67% of its flywheel target speed. At this point, an alarm will trigger and the Seakeeper will power down. This is a safety feature to alert the user that their batteries are in a low charge state. The DC Input Voltage Low alarm (code: 111) is designed to alarm before any other system to maintain enough battery power to run navigation and other critical equipment.

LOW POWER PROTECTION – STATE OF CHARGE BASED (LITHIUM BATTERIES)

The 11.1 VDC protection is not compatible with lithium batteries due to high discharge voltage characteristics. When installing Lithium batteries, an external Battery Management System (BMS) or NMEA 2000 battery shunt will be required to provide low power protection. Seakeeper is equipped with a NMEA 2000 State of Charge (SoC) based logic that will automatically trigger low power mode when a 20% SOC is detected. A schematic of a generic BMS integration is shown in the figure below:

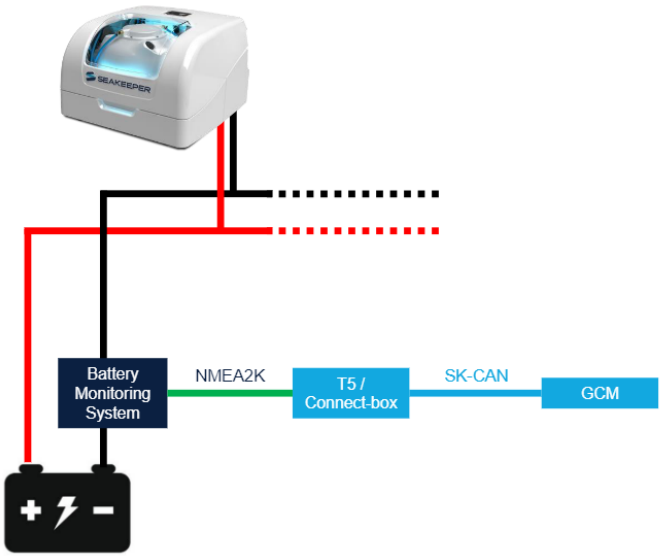

Figure 1: Lithium Battery SOC Monitoring

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BATTERY MONITORING CONFIGURATION

Seakeeper defaults to voltage based low power protection until a NMEA 2000 SoC signal is observed on the NMEA backbone. When this observation occurs, the operator will be prompted to access the Battery Monitoring Configuration Manager to select the proper SoC signal or to opt for continued voltage-based monitoring.

If powered by a lithium battery, the Seakeeper and BMS must be connected to a common NMEA 2000 network to prevent excessive discharge of the battery bank. An external BMS with a shunt can be used in place of a NMEA 2000 SOC signal, however, the Seakeeper will not provide any battery monitoring functionality. The following guide will explain the functionality of the user interface and menus.

1. To access the battery monitoring configuration manager, press and hold the battery icon on the Home screen until the Battery Monitoring Configuration pop-up appears.

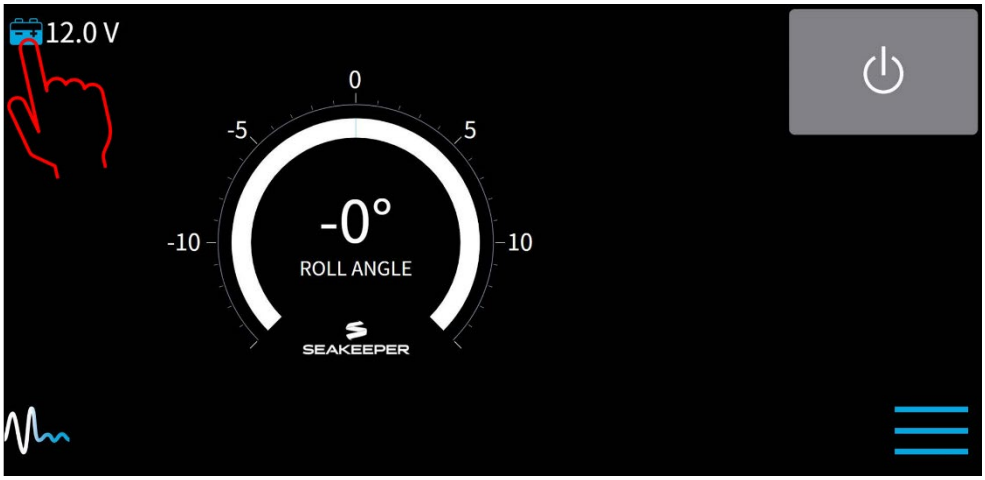

Figure 2: Accessing Battery Monitoring Configuration – Standard method

2. The Battery Monitoring Configuration will initiate a pop-up after detecting the SoC signal automatically. From this pop-up window, one can also open the Battery Monitoring Configuration by pressing the Continue button.

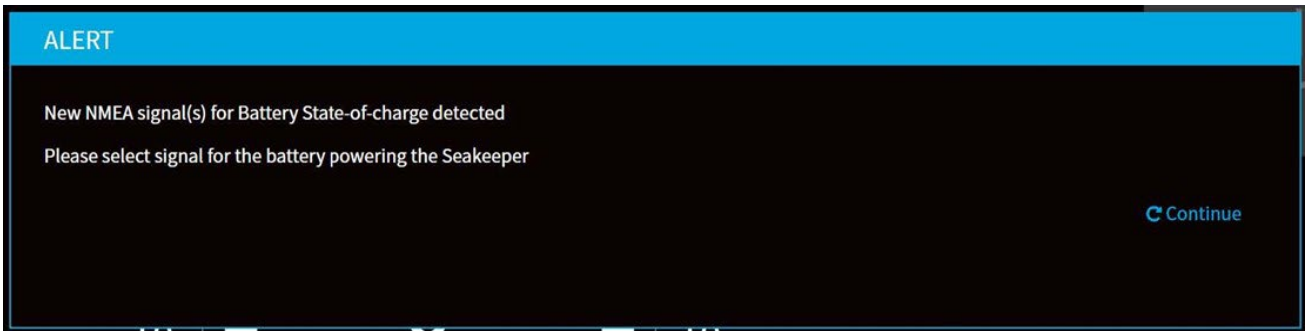

Figure 3: Alert pop-up indicating the SoC signal present on NMEA2000 network.

3. Once the Battery Monitoring Configuration manager window appears, press the dropdown menu down arrow and select SoC source from the dropdown menu.

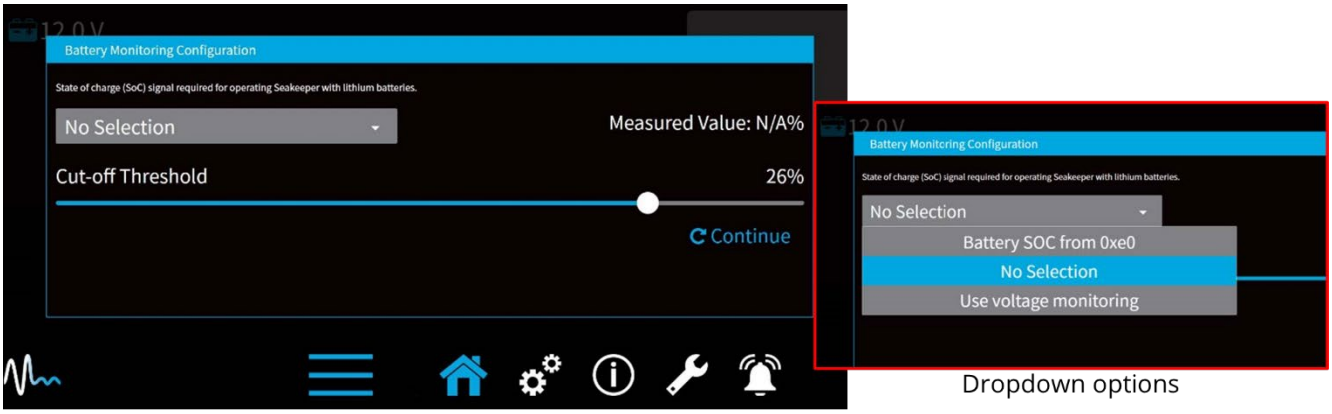

Figure 4: Battery Monitoring Configuration window

The dropdown options include:

- ***Battery SOC*** – This option allows the user interface to monitor the NMEA2000 network for the battery state of charge (required if lithium batteries are used to power the Seakeeper). When selected, the Cut-off threshold slider will determine at what battery charge the Seakeeper begins powering back to conserve battery power. Also, the display will show battery state of charge.
- ***No Selection*** – This is the default setting for the configuration manager. Low voltage protection at 11.1 VDC is used until a different option is selected.
- ***Use voltage monitoring*** – This disables SoC logic and uses actual battery voltage to initiate lowering power drawn by the Seakeeper when battery voltage drops to 11.1 VDC.

The **Cut-off Threshold Slider** controls the level of charge at which the Seakeeper will begin lowering the power it draws. The default setting is 20% charge. The slider allows the selection between 10% and 30% charge state.

Note: The battery monitoring configuration prompt will display when a SoC signal is detected regardless of battery chemistry, or if the SoC signal is applicable to the Seakeeper. It is the responsibility of the installer or operator to properly configure the low power protection mode. Contact Applications@seakeeper.com or your Factory Technical Representative with any questions.