RIG SMART™
SYSTEMS

OPERATORS MANUAL

BOP Management Systems

Contents

BOP Management Systems

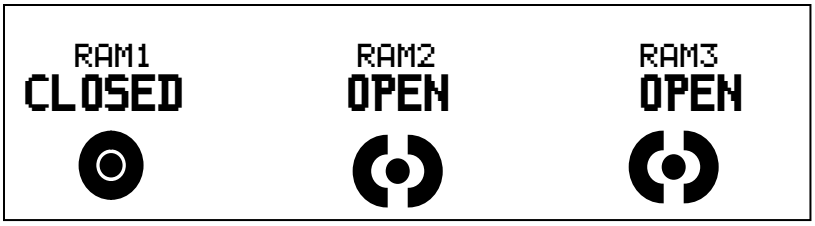
Rigsmart Systems offers a number of different systems based on the type of rig being outfitted. One system specifically designed for snubbing units is called the BOP Management System.

1 Description

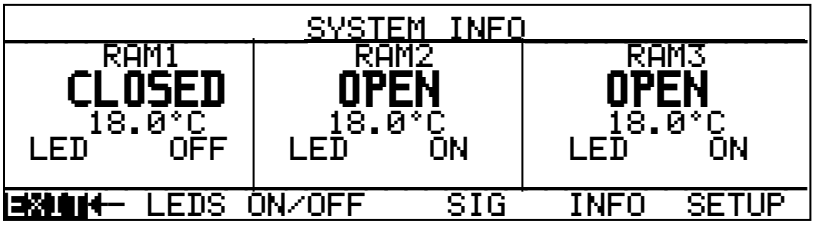
The BOP Management System consists of a pair of Ram Position Sensors for each BOP Ram on the unit, an LED Ram Indicator Module for each set of rams, and a Rigsmart Display Panel to control and monitor the entire system. Ram Position Sensors are attached to each side of the rams, allowing accurate position sensing, in case one side remains closed or partially closed, while the other side is open. Each LED Ram Indicator Module will correspond to a pair of ram sensors. A green light indicates that both sides of the ram are open, while a red light indicates that one or both sides of the ram are closed. The Rigsmart Panel acts as a ram indicator and can turn off the LED ram indicators when they are not being used, in order to conserve battery life. If equipped, the Strobe Hub allows for long range viewing of ram position sensor status. If one ram position sensor is detecting its BOP ram is closed, the strobe light will switch to red.

2 BOP Management Normal Operation

In normal operation, the panel will display the current BOP ram status with the graphic shown below.



Pressing the SELECT button will open the Secondary Operation Screen. On this screen, BOP ram pair status, LED status and average ram pair temperature is displayed, as shown below.

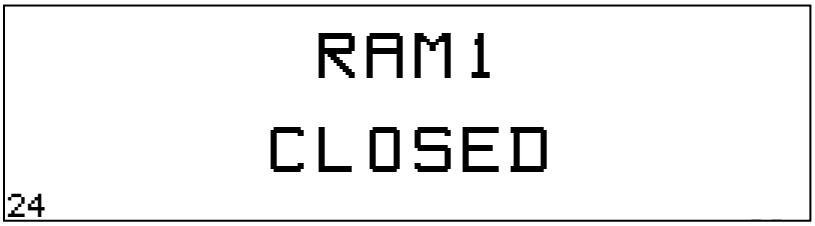


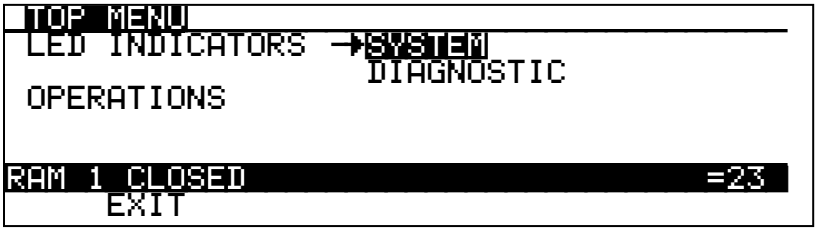
After displaying the Secondary Operation Screen for 8 seconds, the panel will automatically return to the Main Operation Screen.

2.1 **BOP Management Standard Alerts**

2.1.1 BOP Ram Alert

When the BOP rams close, the panel screen flashes and pneumatic control is activated. There is no audible alarm for this. The screens are shown below:



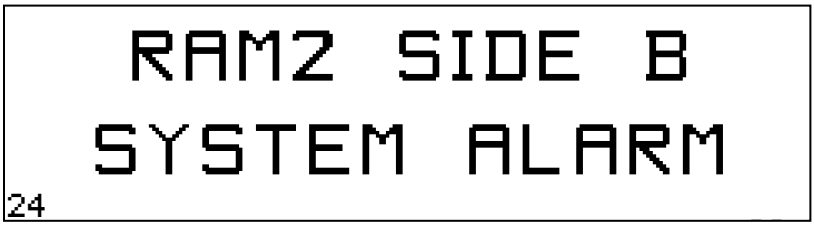


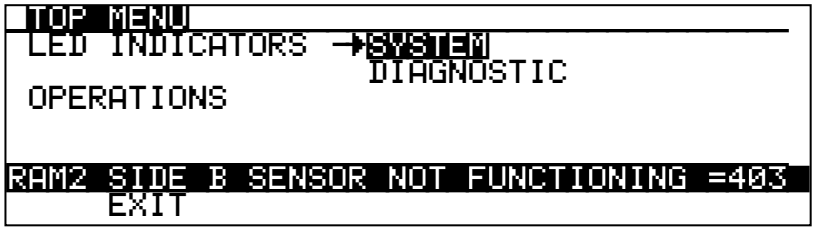
2.1.2 Accumulator Pressure Warning

Accumulator pressure is monitored by the Rigsmart System. If the accumulator pressure drops below its set operating pressure, a Rigsmart alarm circuit will sound a buzzer and turn on the yellow warning light. Once normal pressure is restored, the buzzer will be silenced, and the yellow light turned off.

2.2 **BOP Management Operating Alarms**

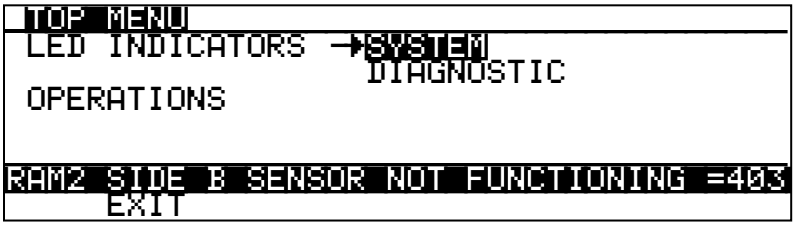
When the system encounters a problem, an alarm message will flash on the panel screen and the panel will beep. The message will flash and the beeping will continue until the detected problem is resolved.





2.3 **BOP Management Top Menu**

During normal system use the operator will occasionally need to access more advanced system menus to turn on and off different parts of the system. The system's design is modular, so sets of rams and LEDs can be added or eliminated without major software changes. Also, LEDs can be individually turned on or off, rather than all at once. All of these options can be accessed from the Top Menu.

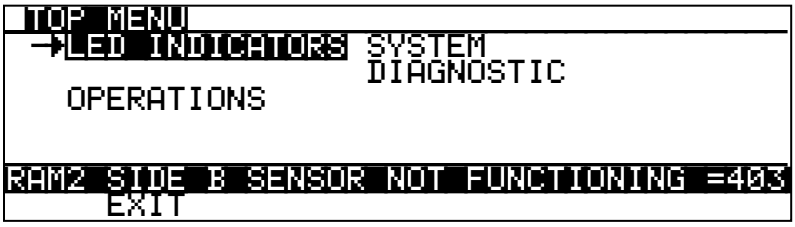


2.3.1 LED Indicators Menu

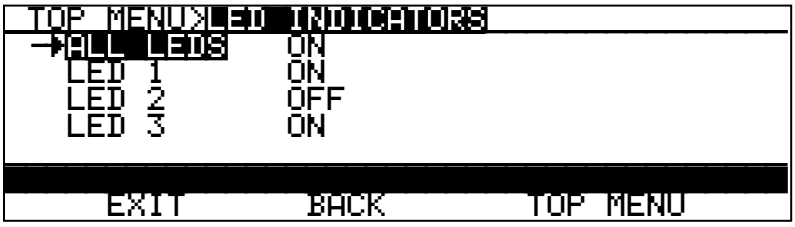
When the snubbing unit is not being used, the LED Indicator Modules can be turned off, in order to extend their battery life.

To turn on or off LEDs individually, follow these steps:

- From the Top Menu, use the arrow buttons to select LED INDICATORS and press the SELECT button.



- Use the arrow buttons to select either all LEDS or the particular LED to be changed and press SELECT. Use the arrow buttons to change the state of the LED(s) to either 'ON' or 'OFF'. Once the correct state is displayed, press the ACCEPT button twice to save the change.



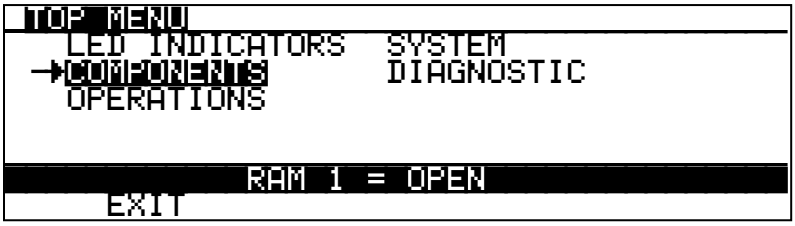
2.3.2 Enable/ Disable

If a particular RAM pair or LED is not required, it can be disabled from the system. While this device is disabled, no communication will occur between its transducer and the panel. The transducer will not operate and will not register alarms on the panel. All other devices (that have not been disabled) will continue to work as normal.

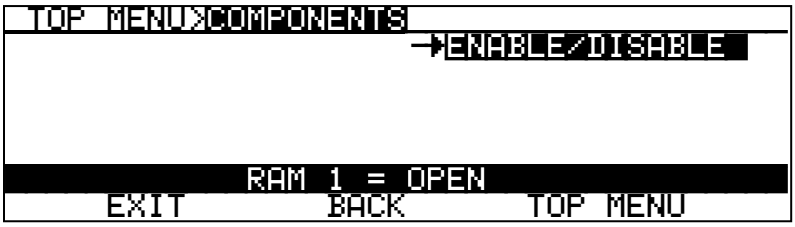
To disable (or re-enable) a device, follow these steps:

- Enter the supervisor permission code, as outlined in the Troubleshooting section.

- In the Top Menu, use the arrow buttons to highlight COMPONENTS and press the SELECT button.



- Using the arrow buttons, highlight ENABLE / DISABLE and press SELECT.
- Highlight MANUAL and press SELECT.
- Highlight RAM&LEDS and press SELECT.



- Highlight the specific RAM or LED to be enabled or disabled and press SELECT.
- Once selected, use the arrow buttons to change the value to ENABLE or DISABLE and press the ACCEPT button twice to save the change.

3 BOP Management Troubleshooting

Symptom	Cause	Solution
Panel Alarm Message		
Panel displays the message “RAM## SYSTEM ALARM” (where ## represents a number-letter combination referring to a ram)	• The panel is not receiving a signal from the indicated Ram Position Sensor	• Reposition the antenna so that it is in direct line-of-sight with the Ram Position Sensors • Check antenna connection • Check for signs of physical damage
Panel displays the message “RAM## LOW BATTERY” (where ## represents a number letter combination referring to a ram)	• The battery in the indicated Ram Position Sensor is low	• Contact the Rigsmart service department for a replacement battery.
Panel Display		
Panel incorrectly shows a ram as being open when it is closed, or vice versa	• One side of the rams is locked or stuck in an unexpected position	• Verify by physically checking the rams
	• The panel antenna is not positioned where it can receive the best signal from the Ram Position Sensors: too far away, behind an obstruction, etc	• Reposition the antenna so that it is in direct line-of-sight with the Ram Position Sensors
	• The panel is receiving a conflicting signal from another sensor with the same ID	• If a replacement component has been received recently, ensure that the red and black wires have been cut on the old component
LED Indicators		
The LED Indicator lights flash alternating red and green	• The LED Indicator is not receiving a signal from the Ram Position Sensors	• Check the Rigsmart panel for displayed errors, then check the signal strength screen • Reposition the LED Indicator so that it is in direct line-of-sight with the Ram Position Sensors • Check for signs of physical damage • The battery in one of the Ram Position Sensors may be dead. Contact the Rigsmart service department.
The LED Indicator gives a double flash, or no longer flashes brightly	• The LED Indicator battery is low	• Contact the Rigsmart service department for a replacement battery
The LED Indicator does not turn on or off when turned on or off by the panel	• The LED Indicator cannot receive a signal from the panel	• Try turning the LED Indicators on and then off again, or vice versa • Reposition the LED Indicator so that it is in direct line-of-sight with the panel antenna • Check for signs of physical damage • Contact the Rigsmart Service department for assistance with adjusting the transmission settings
	• The LED Indicator has been disabled	