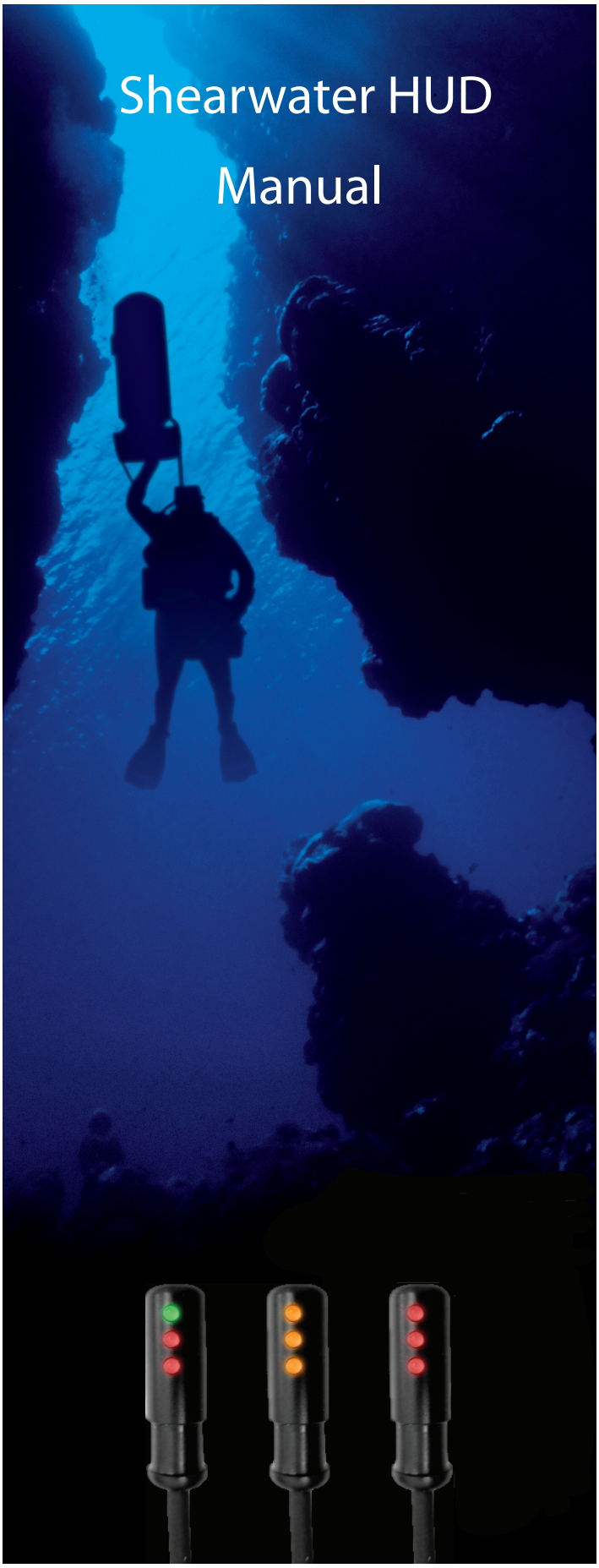
Shearwater HUD Manual



Contents

WARNING

Never risk your life on only one source of information. Use a second computer or tables. If you choose to make riskier dives, obtain the proper training and work up to them slowly to gain experience.

This computer will fail. It is not whether it will fail but when it will fail. Do not depend on it. Always have a plan on how to handle failures. Automatic systems are no substitute for knowledge and training.

No technology will keep you alive. Knowledge, skill, and practiced procedures are your best defense. (Except for not doing the dive, of course.)

Introduction

The logic of the Shearwater HUD is as follows:

First, there are “bad” alarms and “good” alarms. For example a fire bell is a bad alarm. It is bad because the absence of a ringing bell doesn’t mean there is no fire. It just means the alarm isn’t ringing. The fire bell may not be ringing because the battery is dead, the smoke detector isn’t in the right place, the installer screwed up the installation, there is a foreign object stuck in the ringer .....

It doesn’t mean that everything is ok.

A good alarm is one where there is an obvious difference between the lack of function and the lack of an alarm. A solid green light doesn’t do that.

There are integrated and redundant HUDs too. Integrated HUDs can alarm you for things like deco ceilings and distance from setpoint. But they can’t do that and be redundant too. If you want redundant, then they have to be calibrated separately and they can’t display “deco” information unless they have a separate deco computer with its own set of tissues, gases, etc.

And of course there is the HUD that just displays the setpoint. This type is very useful for scootering, low visibility, filming, and manually maintaining setpoint.

With the Shearwater HUD, we tried to find the best of all worlds. It displays the ppo2. Since it uses three LEDs, it can display them faster. A typical 1.3 takes about 2 seconds to read.

But instead of a continuously varying display time, it’s always 5 seconds. It displays nothing in between. So as the ppo2 gets farther from 1.0 the light DENSITY gets higher.

So 0.80 is RR_____ RR_____ RR_____ but 0.20 is RRRRRRRR__ RRRRRRRR __RRRRRRRR__

And, if you are more than 0.50 away from 1.00, it turns up the power to the high intensity LEDs. So they get brighter.

At 0.20 you have three very bright red LEDs flashing just about continuously in the corner of your eye.

And there were a couple of unexpected benefits. You don’t have to count. For me at least, if I engage my eyes to look, I don’t need to actually engage my brain to count to 3. It’s hard to explain, because obviously some part of my brain is counting.

And a stray sensor jumps out at you. All three flash three times, then one flashes once more. It catches your attention when they don't all flash the same number of times.

So the Shearwater HUD is a PP02 meter that is redundant and also has some use as an alarm.

Operating the HUD

The HUD is controlled by a button on the box.

Turn HUD On/Off

One push of the HUD button will turn the HUD on, while one subsequent push will turn the HUD off.

Calibrate the HUD

To calibrate, you need to push the HUD button three times within 1 second. It might take a little practice to get this, but it is intended to prevent accidental calibrations. If you successfully do the calibrate sequence, all three lights will come on bright red for 5 seconds. If you don't see that, it didn't get the calibration command.

Display Descriptions

After calibration, each of the sensors should be flashing one orange. That means the PP02 is between 0.95 and 1.05. The actual value it uses for calibration is 0.98.

If a sensor fails calibration, it will flash one red and one green. It can be useful to look at the millivolts display on the Shearwater computer to see why a sensor didn't calibrate. In these two example pictures, sensor one has failed and is alternating between red and green

The rest of the flash pattern is: The number of greens is the number of tenths above 1.0 so three green is 1.3 ppo2. The number of reds is the number of tenths below 1.0 so two red is 0.8

If, when you turn it on, you get orange flashing for 30 seconds, that indicates a low battery.

Attaching the HUD to a Rebreather

The box straps onto the breathing hose up beside your head so it is completely out of the way. At the same time, you can reach the button to turn it off and on. The LED display arm can be connected to any rebreather.

HUD Battery Change Instructions

The box contains the processor and battery. To change the battery, remove the top cover on the box. The battery should last for months or even years. The battery is a 3.6 V Lithium - Saft 14500