

FATHOM

D I V E S Y S T E M S

HUD USER MANUAL

v3.2



FATHOM Heads Up Display

The Heads Up Display (HUD) is a visual display that provides the diver with essential PO₂ information. The FATHOM HUD utilizes a modified Smithers Code, which is a system of flashing lights that communicates PO₂ information to the diver. The HUD monitors each of the three sensors and displays the PO₂ on three LEDs. Each of the LEDs corresponds to a sensor. Each LED can flash red, white, blue, green, or orange. The brightness of the LEDs is adjusted automatically based on ambient light.

The HUD flash pattern is:

- A single orange flash is 1.0 bar/ata.
- The number of green flashes is the number of tenths above 1.0, so three green flashes is 1.3 bar/ata.
- The number of blue flashes is the number of tenths below 1.0, so two blue flashes is 0.8 bar/ata.

The built-in piezo button controls the HUD. One (1) long push turns it on or off and three (3) short pushes calibrates (see below). To count as multiple pushes, each push of the piezo button must happen within one-third (1/3) of a second of the preceding push. The HUD also has a wet contact switch that will automatically turn itself on when the diver enters the water.

When the HUD is first switched on, all three LEDs will flash green at full brightness for one second (to load the battery), then the center LED (cell 2) will indicate the battery voltage, using one green flash for each 0.1 V above 3.0 V, and one red flash for each 0.1 V below (e.g. 3.4 V = 4 green flashes, 2.8 V = 2 red flashes). One orange flash indicates 3.0 V. It is worth replacing the battery when it gets to 3.0 V or below, indicated by orange or red flashes at startup. Battery life will depend somewhat on LED brightness and how often they flash (i.e. how close to a PO₂

of 1.0 you are diving). A SAFT 14250 primary cell should provide 200+ hours of diving. The HUD has an auto-off feature. If the PO₂ does not change for an hour, and the button is not pressed, the HUD switches itself off.

PO ₂	Display
2.0 +	10 green, 10 white, 10 red
1.9	9 green, 10 white, 10 red
1.8	8 green, 10 white, 10 red
1.7	7 green, 10 white, 10 red
1.6	6 green, 10 white, 10 red
1.5	5 green, 10 white, 10 red
1.4	4 green, 10 white, 10 red
1.3	3 green, 10 white, 10 red
1.2	2 green, 10 white, 10 red
1.1	1 green, 10 white, 10 red
1.0	1 orange
0.9	1 blue
0.8	2 blue
0.7	3 blue
0.6	4 blue
0.5	5 blue
0.4	6 blue
0.3	6 blue, 10 white, 10 red
0.2	6 blue, 10 white, 10 red
0.1	6 blue, 10 white, 10 red
0	6 blue, 10 white, 10 red

The FATHOM HUD has a visual alarm feature, a distinctive high-visibility warning alternates with the flash pattern if the average PO₂ of enabled cells is below 0.4 PO₂ or above 1.6 PO₂. The visual alarm rapidly flashes alternating red and white LEDs at full brightness to get the diver's attention. The visual alarm is disabled when the HUD is dry on the surface.

Calibration

Calibration is the process on the rebreather's monitoring devices (handset or HUD) used to align the oxygen sensors' output in millivolts to a known partial pressure of oxygen.

To calibrate the FATHOM HUD, flush the loop with oxygen and push the piezo button three times within 1.5 seconds. It might take a little practice to get this, but it is intended to prevent accidental calibrations. If you successfully complete the calibrate sequence, all three lights will come on bright red for 1 second. If you don't see that, it didn't get the calibration command. Cells that calibrate correctly flash green for 1 second, and if there is a problem with an individual cell, that cell's LED will flash red for 1 second. Each cell calibrates independently of the others. Calibration failure may occur because the cell voltage is out of range (e.g. below 35 mV in 100% oxygen) or the cell voltage is unstable. Calibration data (and other settings) are retained even if power is disconnected (e.g. when changing the battery). After you calibrate, each of the sensors should be flashing one orange. That means the PO₂ is between 0.95 and 1.05. The actual value that's used for calibration is 0.98.

Installation

The External HUD with unterminated cable needs to be installed in your CCR head by a trained technician. An appropriate sized cable gland should be used to seal the 6.2 mm cable. After trimming the cable to length, it should be waterblocked to prevent moisture from traveling up the cable. The following table indicates which wires correspond to which cells.

Cell 1	Red
Cell 2	Brown
Cell 3	Purple
Ground	Black

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