HEADS-UP DISPLAY

HUD-A

HUD-s

HUD-AF

MANUAL

(revision 2/2016)

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1.   Introduction

Heads-up display HUD-A, HUD-s, HUD-AF (further - HUD-xx) – fully autonomous device for PO2 indication and conrol via 3 independent channels. The device can operate with standard oxygen cells, providing output voltage in the range of 5-30mV in the open air at standard atmosphere pressure.

HUD-A and HUD-AF models have fully autonomous power source (internal AAA battery).

HUD-s model has smaller size and power charge pin for external power source of 3-6V.

HUD-A and HUD-s models have permanent cable termination; HUD-AF is connected via Fischer 7-pin connector.

2.   Technical characteristics

Number of measuring channels / indication: 3

PO2 measurement accuracy: 0.1 bar

Indication: 3 channels with 5 LEDs each

Independent indication: 2 LEDs (red and green) with connection to AV1f or AV1eCCR

Battery: AAA battery 1.5V (HUD-A, HUD-AF models)

Uninterrupted operation duration: not less than 100 hours (HUD-A, HUD-AF models)

Tested depth: 250 meters

Calibration: air or oxygen

Operation temperatures range: -10C..+45C

Dimensions:

HUD-A, HUD-AF models: diameter 24mm; length 80mm

HUD-s model: diameter 20mm, length 50mm

Channels' input impedance: 50kOhm

3. Technical Design

1. Hi-resistant polycarbonate protective display
2. Wet contacts
3. Sealed cable
4. Two sealing O-rings

4. Switching On and Start of Work

To start the work turn off the protective display 1 and insert AAA battery 1.5V into the slot (mind the polarity!).

Ensure that sealing O-rings 4 are clean and are not damaged. Lubricate them with a thin layer of silicone grease prior to placing the protective display back.

HUD-xx will automatically switch on and internal testing will start upon inserting the battery. In case of successful testing all indicator LEDs will flash three times.
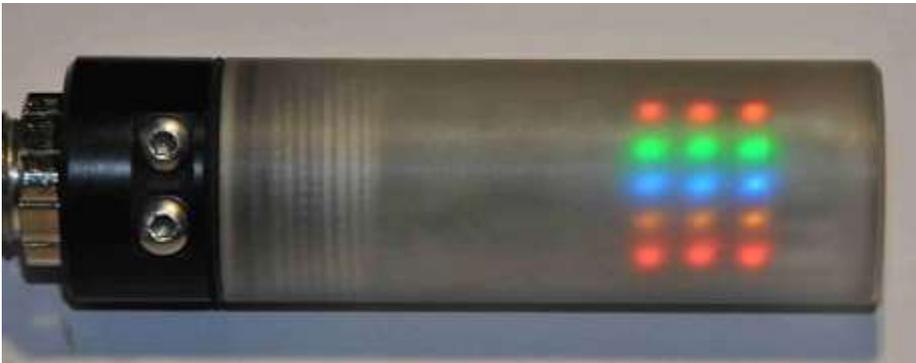
and battery charge level will be displayed for a few seconds.

Replace the battery, if the charge level is lower than yellow LED.

Upon testing completion HUD-xx will move to PO2 display mode.

HUD-xx will automatically switch off on surface in case of staying inactive for 3 min 30 sec.

30 seconds before switching off the device will warn about this with intense LEDs' flashing.

To switch the device from sleeping mode it's recommended to close wet contacts 2 with any metallic subject or by a wet finger.

In underwater mode HUD-xx will also immediately switch on.

5. PO2 display mode

Matrix of 3 columns with 5 LEDs each is used to display PO2 in HUD-xx. Each LED can either beam uninterruptedly, or flash with 1Hz frequency. Each of 3 columns displays PO2 of each own channel in accordance with the table.

PO2	Indication	
<0.2	Low red is flashing	
0.2...0.45	Low red is glowing	
0.45...0.65	Low red is glowing Yellow is glowing	
0.65...0.75	Yellow is glowing	
0.75...0.85	Yellow is flashing	
0.85...0.95	Yellow is glowing Blue is glowing	
0.95…1.05	Blue is glowing	
1.05...1.15	Blue is flashing	

1.15...1.25	Blue is glowing Green is glowing	
1.25...1.35	Green is glowing	
1.35...1.45	Green is flashing	
1.45...1.55	Green is glowing Red is glowing	
1.55...1.65	Red is glowing	
>1.65	Red is flashing	

6. Menu System

HUD-xx have simple Menu System to change main operation parameters:

- gas calibration (air/oxygen)
- display brightness
- atmospheric pressure.

To switch calibration on it is recommended to close wet contacts 3 times in the PO2 indication mode within 1.5 seconds.

This will require some skill, and possibly, you will not succeed from the first trial. Try several times.

This procedure is designed on purpose to avoid any possibility of calibration mode switch on by mistake when swimming on surface.

The Menu has circular sequence:

Air calibration -> Oxygen calibration -> Display brightness -> Atmospheric pressure -> Air calibration -> etc.

To switch between menu item close wet contacts once and shortly. To select and confirm any menu item - close wet contacts once for 1-2 seconds.

7. Calibration

When switching calibration mode on HUD-xx will display one of two calibration options: by air or by oxygen.

In case of choice of calibration by air figures 2 and 1 will alternatively flash with 2Hz frequency.

In case of choice of calibraton by oxygen figures 9 and 8 will alternatively flash.
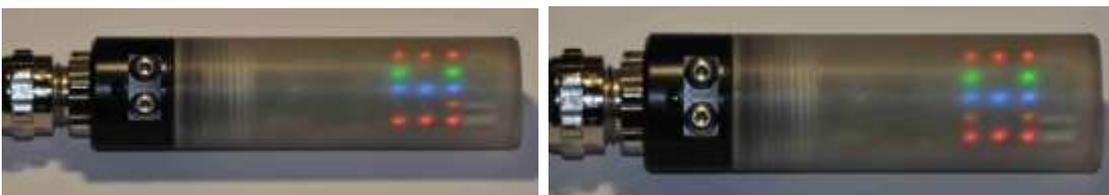
Upon choosing the calibration option mode close wet contacts for 1 second to start calibration process. Upon this indicator will intensely flash, and calibration process will start. Upon successful calibration HUD-xx will automatically switch to PO2 indication mode and store the calibration coefficients in a nonvolatile memory.

ATTENTION! IMPORTANT!

HUD-xx don't have pressure sensor. By default calibration is executed based on assumption that atmospheric pressure is 1000mBar. When calibrating in high altitude regions or in hugh atmospheric pressure PO2 level will be consequently increased or decreased in proportion.

See article 9 to change preset atmospheric pressure,

8. Display brightness adjustment

HUD-xx have 7 display brightness levels. Brightness is adjusted from the lowest to the highest in a circular mode.

To adjust brightness:

- Enter Menu (close wet contacts 3 short quick times)

- Choose Brightness Adjustment item (Air calibration ->Oxygen calibration -> Brightness Adustment)

- Enter Adjustment mode by a long button pressing (1-2sec)

- Choose required display brightness level by consequent short pressings

- Confirm your choice by a long (1-2 seconds) pressing

Selected brightness level will be stored in a nonvolatile memory and be valid till the next adjustment.

9. Preset atmospheric pressure adjustment

HUD-xx do not have biilt-in atmospheic pressure sensor, that is why you are to set the most appropriate atmospheric pressure value by yourself BEFORE CALIBRATION PROCESS in order to have PO2 level displayed in a correct way when atmospheric pressure is too low/too high and when diving in high altitude regions.

HUD-xx allows to choose the following discrete values:

1050mBar – 1000mBar – 950mBar – 900mBar – 850mBar in accordance with table below:

1050mBar	
1000mBar	
950mBar	
900mBar	

|	
850mBar	
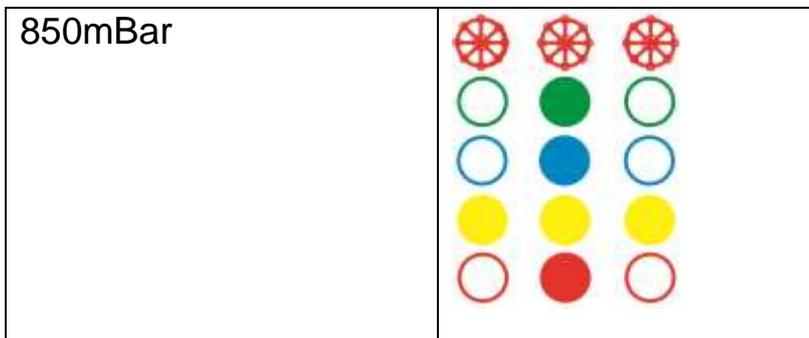
To adjust atmospheric pressure:

- Enter Menu (close wet contacts 3 short quick times)
- Choose Atmospheric Pressure Adjustment item (Air calibration ->Oxygen calibration -> Brightness Adustment-> Atmospheric Pressure adjustment)
- Enter Adjustment mode by a long button pressing (1-2sec)
- Choose required value by consequent short pressings
- Confirm your choice by a long (1-2 seconds) pressing

Selected brightness level will be stored in a nonvolatile memory and be valid till the next adjustment.

ATTENTION! Selected atmospheric pressure value will be stored in a nonvolatile memory and be valid till the next adjustment. When changing dive conditions, CHECK PRESET ATMOSPHERIC PRESSURE VALUE!

## 10. Joint operation with AV1F and AV1eCCR

HUD-xx has 2 separate independent LEDs (red and green) to connect the device as a common dependent HUD. There indicators does not depend either on HUD-xx electronics or on the inside, and are managed exclusively by the external dive computer.
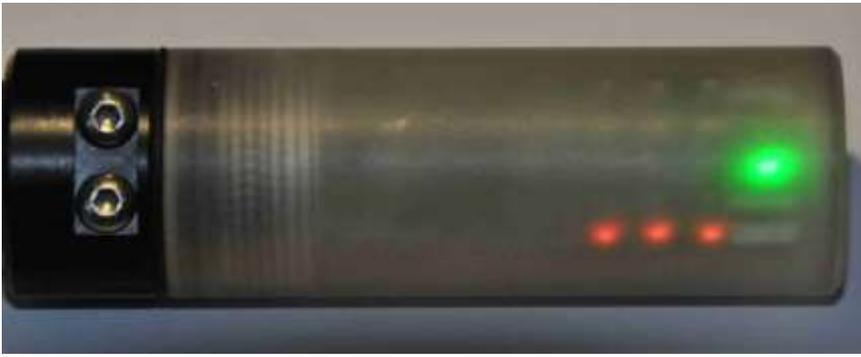
HUD-A connection scheme:
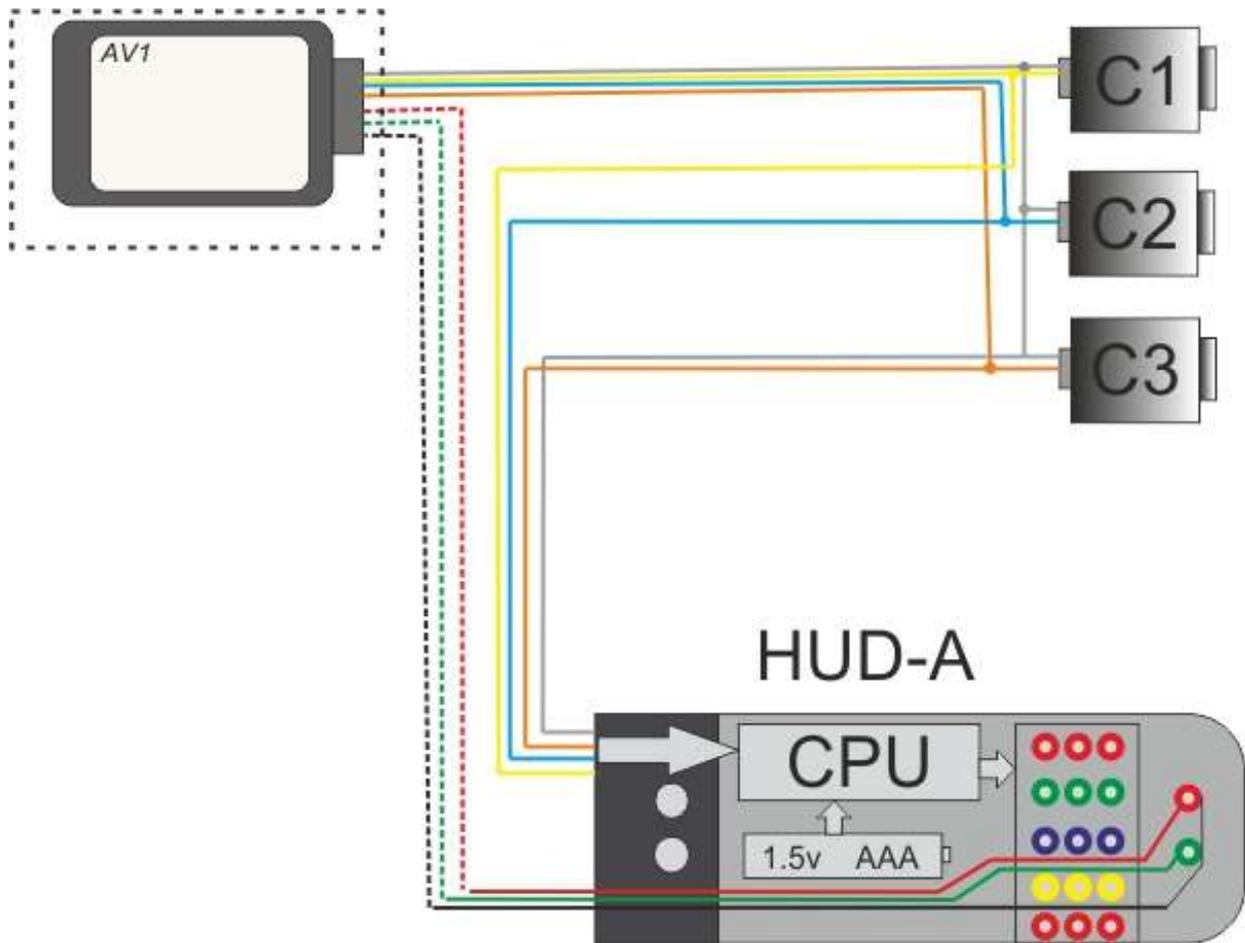
HUD-s connection scheme:
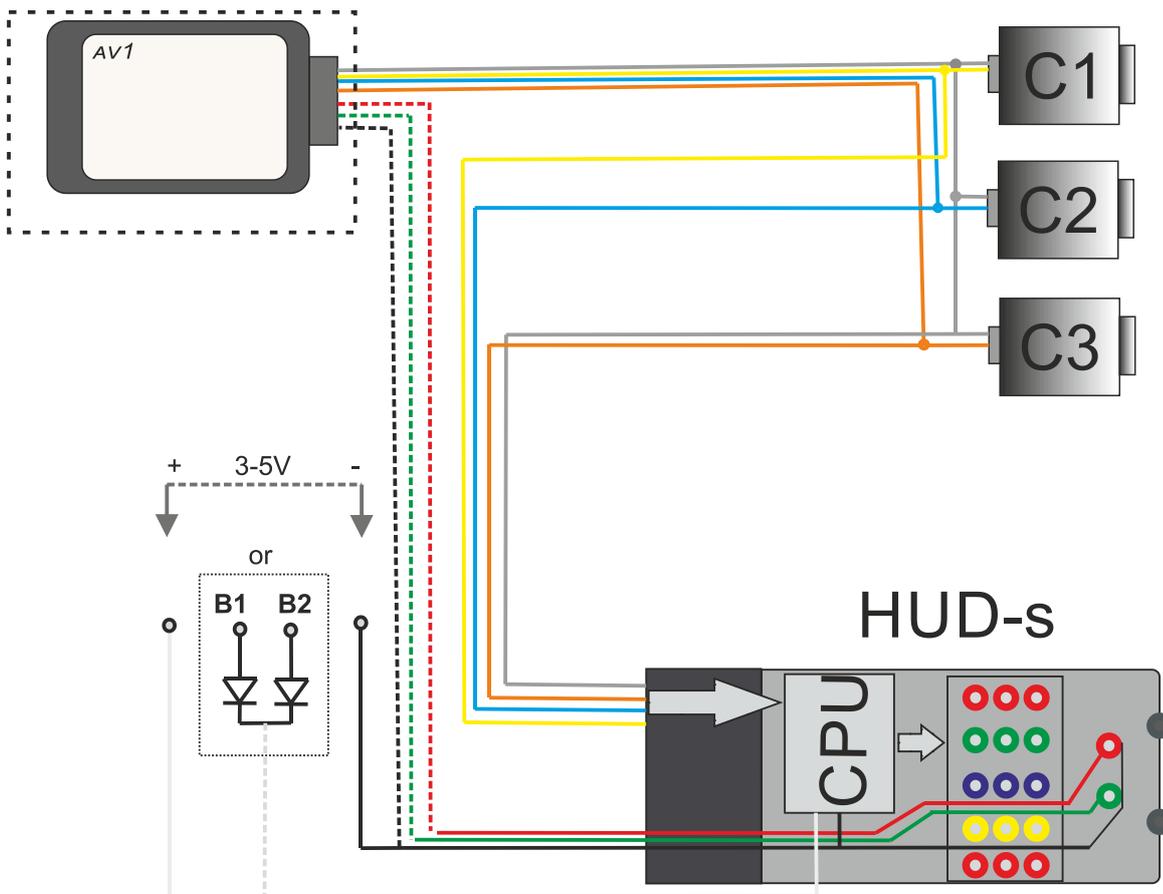
ATTENTION! IMPORTANT!
When connecting HUD-A and HUD-s to the rebreather it is strongly forbidden to cut off sealed cable end 3. This cable end is an integral part of HUD-A and HUD-s. Its damage can affect the device' operation and put HUD-A and HUD-s out of order.

11. Storage

With long intervals of usage it is recommended to take the battery off to avoid complete discharge and electrolyte leakage.