He/O$_2$ analyzer – firmware downloading procedure

Version 2   November 7, 2019

New firmware is available on the support page https://www.divesoft.cz/us/articles/9-analyzer/. Unzip the archive to appropriate directory. Every archive contains firmware for all hardware versions, choose the file intended for your version of the device. The file name is in the form **HeO_HWrevision_FWrevision.hex**; for example, HeO_24_218.hex is firmware 2.18 for HW revision 2.4.

Download and install the driver for the USB virtual serial port from the producer's website at http://www.ftdichip.com/Drivers/VCP.htm.

Download and install the FLIP program for firmware downloading. This program is available on the Microchip website at http://www.microchip.com; product page is https://www.microchip.com/DevelopmentTools/ProductDetails/PartNO/FLIP.

HW and FW versions are available at the splash screen after switching the device on. The display period can be extended by holding the ON/OFF button in the pressed position.

Recapitulation of versions:
- 1.0   first version with wand probe
- 2.1   integrated probe, LCD display (green or blue)
- 2.2   same as 2.1, changes in the rear connector (in addition, user TTL output)
- 2.3   OLED display (orange)
- 2.4   OLED display, rechargeable LiIon battery, barometric sensor
- 2.5   same as 2.4, internal improvements
- 3.0   lightweight version SOLO

Connect the analyzer to your computer using the USB cable. The analyzer must appear as an USB COM device, you can check it in Device Manager.

It is necessary to switch the device to firmware-upgrade mode (bootloader), which can be done in three ways:
- multiple key press (SOLO and HEA 2.5 and later)
- using the programming plug into the system connector (HEA only)
- inserting programming jumper in 9V battery compartment

Multiple key press:
Hold MENU and CAL keys pressed and then press and hold the ON/OFF key. The first two keys can be released now.

Programming plug:
Insert the plug into the system connector, press and hold the ON/OFF key. Then remove the plug.

Programming jumper:
There are two jumper pins in the 9V battery compartment. Connect them with the jumper. Press and hold the ON/OFF key. Remove the jumper.

In all cases the analyzer firmware must NOT be running, display should remain blank. In case the analyzer starts as usually, switch it off, check the plug or the jumper and repeat the procedure.

Start the FLIP program and perform the following steps in sequence:
  - select from the menu *Device*, *Select* and select the processor type. Select AT89C51ED2 for older units (version 1.0 – 2.3) or AT89C51RE2 for more recent units (version 2.4 and later)
  - select from the menu *File*, *Load HEX File* and open file with the new firmware.
  - select from the menu *Settings*, *Communication*, *RS232*, select the port which was created by connecting to USB
  - and set *Baud=115200*, leave *Manual Sync* empty. Leave the RS232 window open.

Press *Connect* button in the FLIP's RS232 window. The window will disappear and the program's basic screen will be accessible again .

On the left side there are four check boxes, check all of them (*Erase*, *Blank Check*, *Program*, *Verify*).

Press the *Run* button. The download starts, which takes approximately 60 seconds; progress is shown in the dialogue window.

When the download is done, release the ON/OFF button and close FLIP.

It is recommended to use the *Reset to default* function from the menu.

In the case of loading firmware intended for a different hardware version, the device will beep five times and shut itself down. In such case, repeat the procedure and load the correct FW version.

In case the download fails and the device doesn't start, repeat the firmware download. Common error is you don't keep the ON/OFF button pressed for the whole time.

In case the repeated connection with the analyzer fails, the device reset has to be done:
    - devices with 9V battery, disconnect the battery for several seconds
    - SOLO or HEA 2.5 and later, press simultaneously ESC + down arrow + up arrow + OK

If you don't succeed in firmware download or the procedure seems excessively complicated, ask your vendor for help.