

Starpath notes on setting up the 4002 digital barometer

In these notes, [Mode] means the button with Mode and a light bulb on it. [+] means button with Hist and + written on it, etc. [+/-] means use either button to move the selector or a numerical value up or down.

If it does not come on when you turn it on, remove top two screws holding mounting bracket on, remove mounting bracket, open up battery compartment. If no batteries, then add them, if batteries are there look for clear plastic tab to remove which is keeping them blocked. Use a fine point sharpie to write the date on the batteries.

(1) Set up procedure

(2) Hold [Mode] 1 second to see list of set up options

(3) Press [-] 6 times to mark Set, then press [OK].... When we say something is marked it means the arrow is pointing to it. Whenever you see an arrow you can move it around the screen with the [+] and [-] buttons.

(4) On the SET page with Language marked, press [ok]

(5) use [+] or[-] to get to Anglis or English, press [ok]

(6) with hour marked, press [ok], use [+] or [-] to select your choice of am/pm or 24 hour and press [ok]

(7) with hour marked , use [+] [-] to set it right and press [ok]

(8) ditto for minutes, then same with Year, month and day

(9) with Units marked, press [ok] and with Pressure marked press [ok] select hPa (same as millibars) or inHg in = inches, and Hg is the chemical symbol for mercury

(10) Likewise choose C or F degrees for temp and [ok]

(11) Back on UNITS page, use +/- to mark altitude and ok, to choose feet or meters and [ok]

(12) Use [MEM/back] button to get back to SET page

(13) Use [+/-] to mark altitude, [ok] then [+/-] to set actual altitude above sea level and [ok]. The altitude can be set in steps of 15 feet. (Note that 15 feet is about 0.55 mb of pressure change, so for very best data, we will want to ultimately make a fine adjustment to the pressure we get using calibrated reports.)

To find your altitude open Google Earth, type in your address and then put the cursor on your house, read your elevation in the status bar at the bottom of the page. That gives elevation of the land, then add how high the baro will be above the land. For use on a boat, just estimate the height of the baro above the water level as close as you can. You can check the Google Earth values with a topo map. These are online or for sale in map stores.

(14) from SET page select Pressure and [ok]

* * * Now we come to the first crucial decision to make about the pressure display. You have two things to set on this PRESSURE page. First choice is do you want to see the actual pressure at the elevation of the barometer that you just entered, or do you want to correct it to a sea level reading. This obviously assumes that you entered that elevation correctly, and that is in fact the elevation that the barometer will be located when you read it.

Or, do you want this barometer located at the elevation you entered to read, not the pressure where it is, but instead you want it to use the elevation you entered to correct the pressure so it reads what it would read if you were at sea level. The sea level pressure will be a higher value, by roughly 1 mb for every 27.4 feet it is above sea level.

Thus step 1 here is choose between sea level and actual. That is, with "sea level/actual" marked, press [ok] and then use [+/-] to choose between them.

If you choose Actual at this point, you are done with the pressure set up.

In fact, the elevation you have entered does not matter if you choose Actual. The barometer is simply reading the pressure it is exposed to and it tells you the result. The result is as accurate as the internal technical specifications of the device. For the 4002 unit, the accuracy is claimed to be ± 0.5 mb. Thus the value you read on the dial will be the correct pressure for your location, time, and elevation to within about 1 mb. Besides the manufacturer's statement, however, there is no way to know if this is true from National Weather Service (NWS) sources without bringing to your exact location another barometer with a higher accuracy specification.

The next step in this pressure setting is the one where we can adjust the value of the reading manually by up to ± 10 mb. This adjustment has value if you choose, not Actual, but Sea Level. If you choose Sea-level the device will correct the actual pressure by the amount called for by the elevation you entered and then show on the dial the pressure that the barometer would read if located at sea level at this time and location. The sea level pressure will always be higher than the actual value.

When we choose Sea level, we can compare that reading to NWS data and adjust the reading as needed. If we chose Actual, on the other hand, there is no virtue in doing an adjustment (the next step) since reference pressures are all corrected to sea level. The pressure adjustment option in the next step is essentially a way to correct for uncertainties in the elevation of the instrument.

(15) Go back with [Mem] button to the Pressure page. If you have waited a while, the system reverts to the normal mode, and you must get to the pressure page with [mode] for 1 sec, [+/-] to Set, then [ok], then [+/-] to Pressure, then [0k], then [+/-] to adjustment and [ok] then you see two values. The top is the offset now in the device and the current sea level pressure below it. Practice using [+/-] key to see how you can raise or lower that pressure. Then set the correction back to 0.0 and exit with [ok]. We do not yet know how much to adjust it, if any. This takes a while to learn.

Note when you choose Sea level display, the front screen shows a "Red" at the top right of the pressure, which stands for reduced, meaning the pressure is reduced to sea level reading. This is, however, a rather poor word since the pressure is actually increased to read sea level.

If you want to adjust the pressure to be as close as possible to the NWS reports, then the first step is to find the nearest source of accurate pressure. If you are near a weather buoy or a lighthouse, you can get the pressure from the National Data Buoy Center at <http://www.ndbc.noaa.gov>. If you are not near the water, then an air port will likely be the best source and you can get recent airport pressures at this link <http://www-frd.fsl.noaa.gov/mab/metar>. Once you find a good source, then start a list of comparisons. With this device it does not matter what the pressure is. Just make a table of time, date, and pressure from the source of choice and compare these point for point from the history option in the 4002 unit. Then average the differences to find your correction. The beauty of the 4002 is it has a high linearity of ± 0.2 mb over its full working range. So once you set it right at any pressure it will be right at all pressures.

Again, if you do nothing, and have *the elevation correct*, the pressure should be right to within ± 1 mb or so, but frequent comparisons with the NWS will confirm this. Remember you can set this device to a precision of 0.1 mb, so with care you can get very accurate pressures.

The value of accurate pressures is explained in *Modern Marine Weather* by David Burch. The Starpath Online Classroom also has a course on marine weather. See www.starpath.com/weather.

We will add more to this document about other features of this device in the near future.