Barometer

Operating instructions – Putting into operation -

A metal barometer is a device for measuring air pressure under different weather conditions. Inside, a nickel silver case, under vacuum, is so stretched by a spring that there is a state of equilibrium between it, i.e. the case, and the air pressure column resting on it. If the air pressure increases, then the case will be pressed together; if it decreases, the case will correspondingly expand. This movement is transformed by a lever and a fine chain into rotary motion of a pointer. Starting from a central position, the lever rotates to the right with increasing air pressure and to the left with decreasing air pressure. For those barometers whose works are visible, this type of movement transformation can be easily seen.

In order to obtain reliable weather predictions, one should be aware of the principles determining the weather and follow the instructions regarding adjustment of the instrument:

The air pressure acting on the barometer depends on the altitude of the site where the instrument is positioned. This is easy to understand, as the air column which presses on the nickel silver case will be shorter, i.e. smaller, the higher the site is at which the barometer is located. In order to obtain a weather prediction which is of value, the effect of the altitude of the site on the indicator must be eliminated. All specifications regarding the altitude of mountains, towns or cities assume a sea level of 0 meters. Equally, all specifications of air pressure must be referred to sea level. Only in this way is it possible to compare air pressure at different locations with one another and thereby to make predictions about the weather.

For a long time already, therefore, it has been a convention that room barometers only display a reading with reference to sea level. This is 760 mm or 1013,25 mbar (many barometer scales also have the comment ”referred to sea level”). It is calculated by adding the air pressure difference to the absolute barometer reading at a particular location – measured using a mercury barometer – which corresponds to the difference in altitude between the site and the sea surface. The rule of thumb for calculating the difference in pressure is: 11 m difference in altitude = 1 mm mercury column (Torr) difference in pressure, or 10 m = 1,2 mbar.

An example: in Nuremberg, there is an air pressure measured with a mercury barometer of 730 mm. Nuremberg lies at an altitude of 309 m. The difference in air pressure to sea level is 309 m, that is 309 ϶ 11 = 28 (or 28 mm difference in air pressure). A metal barometer displaying air pressure referred to the sea level would indicate 758 mm, that is 730 + 28 mm (= local air pressure + difference in pressure with reference to sea level).

Before putting the barometer into operation, therefore, the blue works pointer is to be adjusted corresponding to the previously mentioned factors. This is achieved by making small turns of the slit screw, which can be seen in the opening of the cover on the works on the rear side of the barometer.

For those who, for whatever reason, do not wish to take the trouble themselves of carrying out the adjustment, or simply do not happen to have pencil and paper to hand, there is however quite an easy method: your daily newspaper, the radio station covering your area and, in many cities and towns, also the telephone service include barometer readings in daily weather forecasts, weather maps or weather reports. Set your barometer according to this: It requires little effort and is precisely accurate (750 mm mercury column = 1000 mbar, or 3 mm correspond to 4 mbar).

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