

Air Density

Air Density is program for Android devices, like smart phones or tablets for throttle compensation regarding air density. Program calculates air density from altitude and/or pressure, humidity and temperature. Throttle compensation is then linearly derived from base point and increment, regarding air density. Program works either with input metric units meter and Celsius or feet and Fahrenheit.

The temperature (1) means temperature of the air. So it is necessary to have and use thermometer which does not absorb light radiation from surrounded objects or sun. Avoid black thermometers and do not measure on sun. Also be sure to measure directly on place where model will fly. Temperature of the air can be different on concrete and adjacent grass. Such difference can affect results.

There are two ways how to use this program. Air density can be calculated from altitude and air pressure at sea level, or from local pressure.

Mode 1:

Altitude (4) is altitude over the sea level. Altitude can be measured either by GPS or used known altitude for example from maps or other sources. Useful program can be found for example [HERE](#).

Sea level pressure (5) should be obtained from meteorological sources, but it has only small impact to the result, so program will give useful result also with standard pressure 1013hPa.

Mode 2:

Enter altitude 0 to **control (4)**. That will indicate that program is in **mode 2** and does not have to include altitude to the calculation.

Local air pressure measured on the place in (5) will be used for calculating air density.

Humidity (6) in % also does not have large impact to results. So it is enough to enter number with precision +/- 10%. Using default value 50% also does not make too large difference in normal conditions.

All settings described above will be used to calculation of air density. **The result is visible in box (2).**

Units are selectable in control (9).

Calculated air density is used for throttle compensation. Program uses non dimensional numbers for throttle. The base throttle at standard density 1.2kg/m³ (6) is used as start point for linear compensation.

The slope for compensation (7) is defined as throttle increment per 0.1kg/m³ of air density. It means if throttle at base density is 150 and increment is 10, then the throttle will be 150 at 1.2 kg/m³ or 160 at 1.1 kg/m³ or 170 at 1 kg/m³ etc. Negative increment will cause reversed compensation.

Result for throttle is then displayed in green box (3).

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Temperature [deg. C]:
- 20 +

Air density [kg/m³]:
1.199

Target throttle:
150

Altitude [m]:
- 0 +

Sea air pressure [hPa]:
- 1013 +

Humidity [%]:
- 50 +

Throttle at base density 1.2kg/m³:
- 150 +

Throttle increment per 0.1kg/m³:
- 10 +

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