General Knowledge

Altimeter

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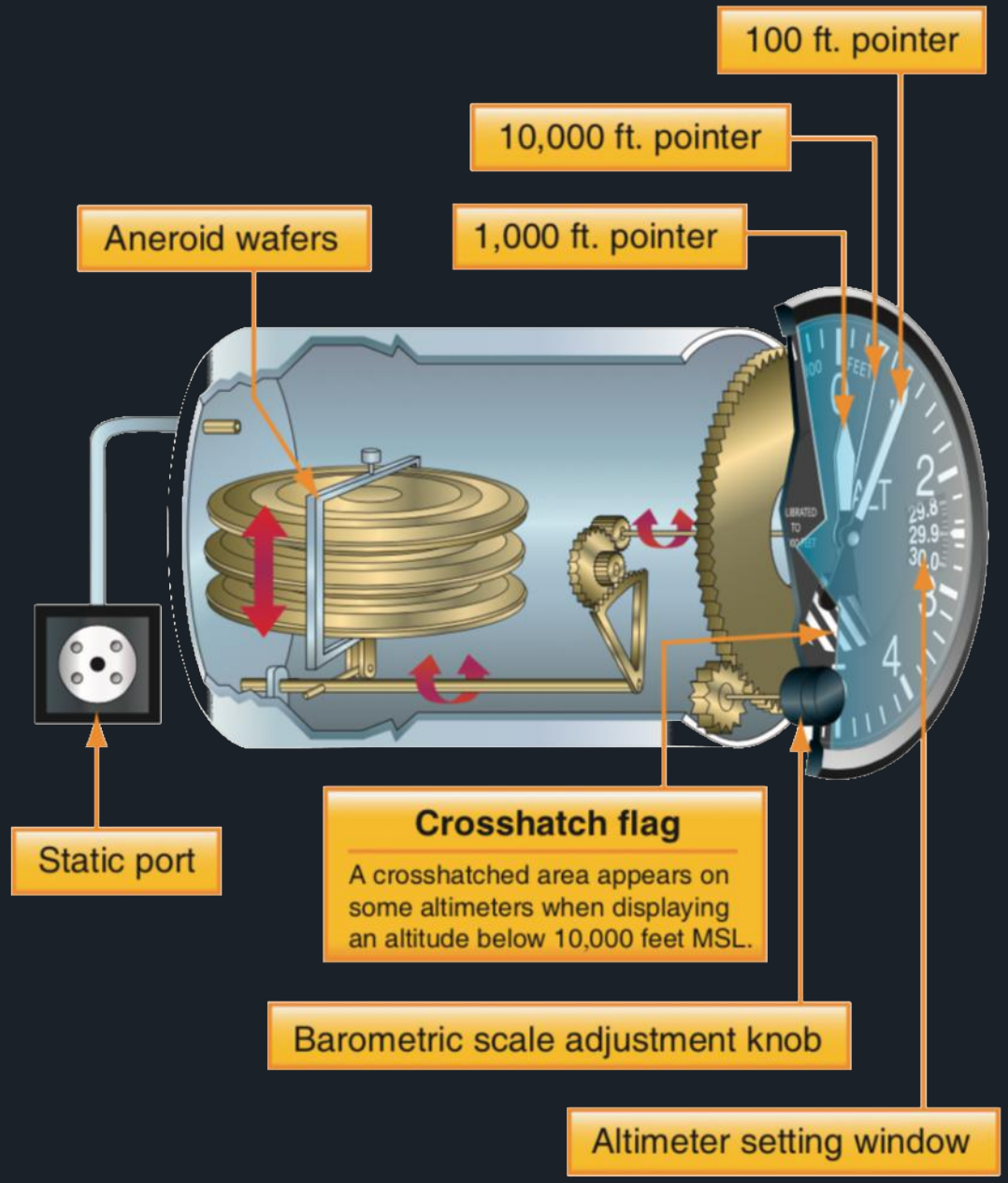

Definition

The altimeter is an instrument that measures the height of an aircraft above a given pressure level.

Principle of Operation

A stack of sealed aneroid wafers comprise the main component of the altimeter. An aneroid wafer is a sealed wafer that is evacuated to a constant internal pressure These wafers are free to expand and contract with changes to the static pressure.

A higher static pressure presses down on the wafers and causes them to collapse. A lower static pressure allows the wafers to expand.

A mechanical linkage connects the wafer movement to the needles on the indicator face, which translates compression of the wafers into a decrease in altitude and translates an expansion of the wafers into an increase in altitude.

Source: Pilot Handbook of Aeronautical Knowledge
Images courtesy of: Pilot Handbook of Aeronautical Knowledge

Types of Altitude

01	Indicated Altitude	Read directly from the altimeter.
02	True Altitude	The vertical distance of the aircraft above sea level—the actual altitude.
03	Absolute Altitude	The vertical distance of an aircraft above the terrain, or above ground level (AGL).
04	Pressure Altitude	The altitude indicated when the altimeter setting window (barometric scale) is adjusted to 29.92 "Hg.
05	Density Altitude	Pressure altitude corrected for variations from standard temperature.

Effect of Non Standard Pressure and Temperature

It is easy to maintain a consistent height above ground if the barometric pressure and temperature remain constant, but this is rarely the case. The pressure and temperature can change between takeoff and landing even on a local flight. If these changes are not taken into consideration, flight becomes dangerous.

From High to Low, Look Out Below

If an aircraft is flown from a high pressure area to a low pressure area without adjusting the altimeter, a constant altitude will be displayed, but the actual height of the aircraft above the ground would
be lower then the indicated altitude.

From Hot to Cold Look Out Below

Adjustments to compensate for nonstandard pressure do not compensate for nonstandard temperature. Since cold air is denser than warm air, when operating in temperatures that are colder than standard, the true altitude is lower than the altimeter indication.