

AIRSOOB ANGLE OF ATTACK METER

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Please do not contact Jim directly for construction details - this is provided "AS IS", no guarantees - use at your own risk etc. etc.

The "Lift Reserve Indicator" has been referred to as an angle of attack meter, a lift management system and an air speed system. It is probably all of the above.

The lift reserve indicator we are talking about is similar to the instrument known commercially as the LRI Lift Reserve Indicator. It consists of a rectangular shaped air stream probe and a commercially available differential pressure gauge. There are two air pressure ports, each on separate faces of the probe. The differential pressure between the two ports yields lift reserve readouts. The high pressure port on the gauge is connected to the top surface port.

The gauge used is a "DWYER MINIHELIC II" pressure gauge. Part number 2-5002. This gauge reads 0-2" of water column. The gauge face is removable and is modified by LRI to have 3 separate zones. (see my version below) The first zone is the "red zone" which is from 0 to .5" of water. The second zone (white or yellow) goes from .5" to 1.0" of water. The third zone is from 1.0" to 2.0" of water column.

The red zone indicates that the airplane is no longer generating enough lift to sustain level flight. The top of the red sector and the bottom of the white or yellow sector is the point that wing is generating "just" enough lift to support the aircraft. During takeoff as the needle clears the red sector and moves into the yellow sector the plane has enough lift for takeoff. On landing the goal is to get the tires to just touch the runway when the needle is one mark from the top of the red sector. (0.4) You will rotate the probe and repeat landings until the needle is at this point. The probe position should be marked in this position so that it will be evident during a preflight if it has moved.

The white or yellow sector is the slow speed region of the aircraft. The final approach on landing is flown with the needle centered in the white or yellow zone. The turn to final should be done with the needle no lower than the white/ green zone.

The green zone is the region where there is ample lift and the needle will most probably pegged. (4.0")

The location of the probe should be out of the prop wash and located between 15% and 30% of the wing chord as measured from the leading edge. The angle to start is recommended to be about 50 degrees from the bottom of the wing. A Cessna 172, that was fitted with this device had the probe at 69.5 degrees from the bottom of the wing surface. You

will have to determine this on your own plane.

They recommend that the gauge be mounted at the top left portion of the instrument panel so that the eyes don't have to move far from where they look during the landing phase.

What is involved in the calibration?

The time to calibrate typically is an hour which includes three adjustments to establish the correct angle of the probe.

Calibration:

The entire calibration procedure consists of adjusting the angle of the probe so that the indicator's needle reads one division below (to the left of) "zero" at the instant of flared touch down with application of full up-elevator control. Variations in flap setting, center of gravity, and wing loading have no bearing on the reproducibility of this calibration.

Fly the aircraft around the pattern and land as slowly as prudent by reference to the conventional instruments. At the moment of flared touchdown, with full up-elevator control applied, observe the LRI reading. If the reading is one division below (to the left of) "zero", no further calibration is needed. The LRI is calibrated to indicate zero lift reserve when dynamic lift is at the threshold of supporting the aircraft (one g of lift), elevator authority is lost, and mushing sink is imminent.

If the LRI needle reads below (to the left of) the indication which is one division below (again, to the left of) "zero" remove the probe and, rotate the probe rearward (lessening the angle) approximately one degree for each division that the needle deviated from one division below "zero". Rotate the probe forward (lessening the angle) if the needle was above (to the right of) one division below "zero".

When the LRI is properly calibrated, make a slight scratch along the side of the probe where it meets the mounting bracket. This reference scratch should be checked as part of your pre-flight visual.

Below is what the gauge face should look like.



