



INDUSTRIE- UND LUFTFAHRTELEKTRONIK GMBH

SB-9 Audiovariometer with emergency battery

The small audio vario SB-9 has been built as a vario with the small size (according to the 5 ¼ inch air norm) in order to save space. Current consumption is so low that the small accumulator, mounted externally on it's back, is capable to supply the instrument with current for up to 10 hours.

This way the vario can also serve as an emergency variometer, in case the onboard line should fail to supply power, apart from it's normal service during which it is being supplied by the on board line. In contrast to a mechanical emergency vario it will deliver an acoustic signal - even in the unexpected situation of a failure of the onboard line.

For the emergency accumulator to be always ready for service, it is being recharged from the onboard line permanently.

The SB-9 will not have to be carried as a normally useless instrument. Should the onboard supply fail, one still has an - electrical - vario which will work for the rest of the flight with certain.

SB-9

Particularities:

Operation normally from 12 V onboard supply line, should this fail, it can be switched to it's own emergency accumulator.



Runs for about 10 hours in the emergency mode, at low volume.

After power consumption of about half the emergency accumulator's capacity, the audio generator is switched off automatically (depending on volume: 1 to 4 hours running) to safeguard another 5 hours of - quiet - operation

When run from the onboard supply line the instrument offers 2 different types of response, the fast 1s and the 3s response. When running on it's own accumulator, the 3s response is used.

The emergency accumulator is permanently charged from the onboard supply line, is therefore always charged.

Fits in 57 mm standard cut off. Depth behind panel is 115 mm. Weight is 500 grams. Mounting of the flask behind the instrument panel is very easy thanks to it's small size (60 x 60 x 78 mm)

Principle of measurement

The transducer is a thermal flow measurement device using thermistors at constant temperature, developed by ILEC. It offers an excellent stability of zero output, a very short response time of 5 milliseconds, and strong independence of calibration of changes in temperature of the instrument. It ensures the instruments famous high precision.

Signal conditioning

The raw variometer signal coming from the transducer is fed to two different electronic filters in parallel. With the help of the V1 / V2 - filter switch, the display (visual and acoustic) can alternatively be switched to one of the following filters:

V1: 3-sec-filter: first order filter with a response equivalent a good moving vane type

V2: 1-sec-filter: second order filter with a fast, however strongly damped response.

In the emergency case only the 3-sec-filter is available.

Audio generator

Visual meter indication is important but the audio provides the heart of the SB-9. The base frequency of the audio signal increases exponentially with vertical speed. It's base pitch is modulated by a slow frequency which varies with the rate of climb. At zero climb this frequency is reduced to zero producing a continuous tone. In sink the modulation frequency is constant at 1 per second. This double tone ILEC audio is a delight to listen to, providing instant information on rate of climb or sink between +/- 30 kts. This wide range provides accurate information in the weakest and strongest thermals.

Altitude error

The calibration factor of the variometer depends on air density and therefore on altitude. When measuring the actual vertical speed, the indicated value decreases at 5% per 1000 meters increase in altitude. In the altitude range from 200 to 2200 m NN the altitude error remains within +/- 5%, at 1200 m NN , the calibration altitude, the error is zero.

Technical Data:

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| Supply Voltage: | 10 to 15 Volts |
| Consumption: | 10mA up to 30 mA, depending on audio |
| Dimensions: | 61 x 62 x 115mm (fits in 57mm standard cut off) |
| Weight: | 0.5 kg |
| Temp. Range: | Operating: -20 to + 60 deg C |
| Measurement: | +/- 30 kts |
| Audio: | +/- 30 kts |
| Meter: | +/- 10 kts |
| Zero Accuracy: | +/- 0.3 kts from -20 to + 50 deg C |
| Calibration: | Measurement: +/- 2% |
| | Meters: +/- 3% |
| Altitude: | 0 to 45000ft |