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1. COMPARISON OF VARIOMETERS

Variometers measure vertical velocity. Mechanical as well as electric systems measure the very small air stream between capacity and the outside pressure. Mechanical variometers extract the energy for the indicator movement from this equalising pressure airstream. Therefore the indication is slow and because of the fragile nature of these instruments, they are not suited to rough handling. Electric variometers receive the movement energy from the battery, so the indication is fast. These instruments are also more rugged. In principle, the advantages are on the side of the electronic instruments. On the negative side are the higher purchase price and the indispensable battery.

These disadvantages are compensated by the various possibilities of modern electronics, which give the pilot additional information (take the load off him) and increase his performance and safety. There are two decisive aspects we want to point out to you. Firstly, the proverbial high quality standard of aviation products.

Secondly we want to warn you of too many mostly unnecessary selectronic requirements, which could adversely effect the performance and reliability.

We have recognised these problems, so our designs, quality control and service of our instruments are second to none. We have never been tempted to put anything on the market unless it has been tested over many years.

2. GENERAL DATA ON OUR VARIO-SYSTEM

2.1 HOUSING AND MODULAR CONSTRUCTION PRINCIPLE:

The outside dimensions of our varios have been derived from practical considerations.

The basic model 'finch', because of its flat housing (80*100*36) can be installed on either side of the cockpit or on the panel.

Series 800 from 'Til' to 'Albatross' have a newly developed octagonal housing with a depth of 161mm.

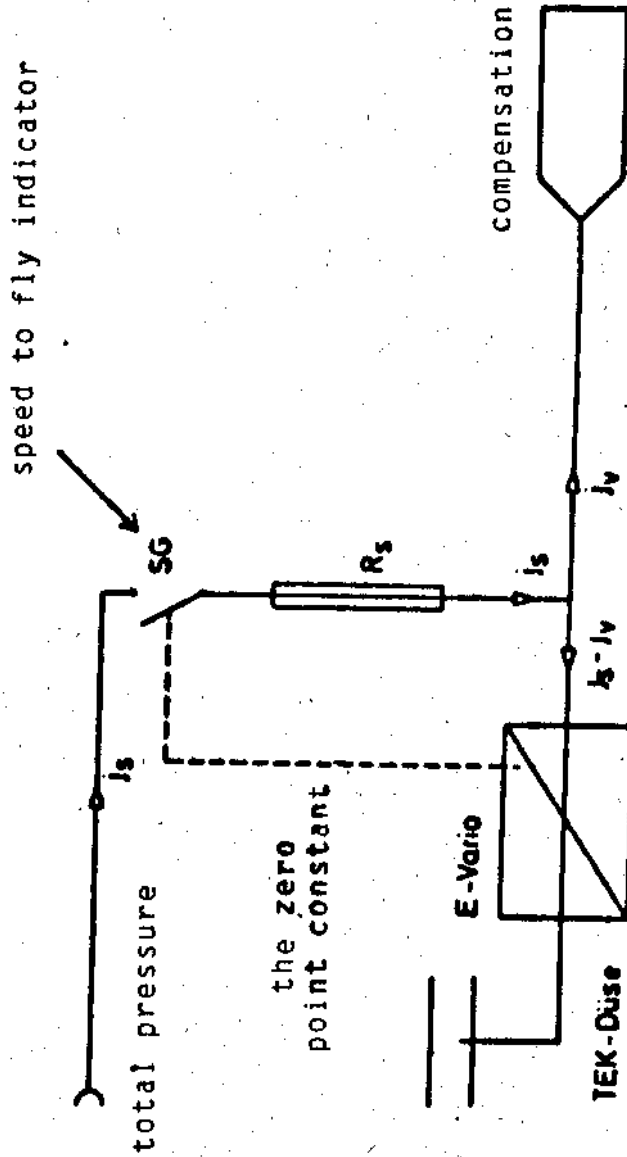
Installation problems inherent to the old square housings have been overcome. We consider square housings as outdated. All 800 models can be converted to a different type with a minimum of effort.

Our modular construction method makes this possible. All components can be exchanged with plug connections. Service and repairs can also be done faster and cheaper. The plug-connection technique hides the risk of bad contacts. To achieve the high reliability demanded in aviation, we used gold as contact material. For the same reason, all '800' models use amplifiers of highest quality. Metal film resistors guarantee the stability of all components over long periods of time.

2.2 METAL PROBES:

All our varios are equipped with metal probes. The equalising airstream is converted by the 'hot wire' principle into a change in resistance. The development of our variometers goes back to the development of the metal probe. Our quality standard could not have been reached without them.

The zero point constant, linearity and symmetry characteristic of these probes guarantee reliable service for years under extreme conditions. Expensive zero point automatic is unknown with metal probe variometers. The slightly higher power intake in comparison with



(*) DBP 1523270

(**) DBP 2227600

Hicruistors is negligible. You can be sure that with a battery capacity of 4 Ah (radio operation included) the operational period would be at least 15-20*.

2.3 DOUBLE SOUND ACOUSTIC:

Our varios are equipped with the proven double sounds generators. In addition to the normal visual indication, an audio sound, rising linearly in pitch to the vario-indication, is included.

The base sound is interrupted from zero upwards with rising tact frequency.

This sound system, which has been copied by practically all our competitors covers the sink range and the interrupted lift signal is also a physiological help when thermalling. Especially in critical situations you have to be able to rely unconditionally on the audio. The start of the interrupted signal, which is set to +0.1m/sec at the factory, guarantees that you are in lift, irrespective of temperature of altitude.

2.4 INDICATION CHARACTERISTIC:

Practice has proven that a vario meter, which is too sensitive, overloads the pilot, while with a slow vario meter too many informations get lost. In our new '800' series, special emphasis was put on optimisation of the sound, dampening gust filtering without sacrificing speed.

We have also developed a gust filter which gives you additional safety from false readings in turbulence. Many unnecessary turns in search for lift can now be avoided.

2.5 TOTAL ENERGY COMPENSATION:

T.E. compensation with venturi-jets has proved itself over the years, as a cost efficient and reliable alternative to the electronic method. Therefore we used it in good faith in our new bird series. We always have suitable venturies in stock.

2.6 SPEED TO FLY INDICATOR:

'Bruckners' idea to instal a capillary between total pressure and capacity, which changed the vario to a 'speed to fly' indicator, gave cross country soaring a new impulse. We picked this idea up immediately and have used it successfully in our varios for years.

The 'speed to fly' indicators in our '800' series are also based on this principle. After switching to 'speed to fly', just keep the speed at the zero indication and this is optimum 'McCready' speed. It could not be more simple.

We have investigated the various 'speed to fly' systems for altitude errors. The results were published at the 15. OSTIV congress in 1976. According to that, for every 1000M Altitude,

the speed is about 3% to high.

Our systems are calibrated at 1500M, so the errors in all practical flight altitudes are negligible.

2.7 INTEGRATOR:

Our models 'Lark', 'Red Robin', 'Goldameir' and 'Albatross' contain a calculation unit, which gives you a running review of the vario-indications of the last minute. This information is used mainly for practical decisions. At any time you are in the position to interrupt the process by pressing key 0-1 and start vcu. The integrator indication is an average value with a time constant of 30 secs and is visible on the flat band screen.

2.8 SECOND INSTRUMENTS:

On all varios of the new bird series, allowance is made for the connection of second instruments. The sec instrument is in a parallel circuit the main instrument. The connection of a second instrument does not influence the power consumption and indication speed. Besides the flat band instruments with installation flange, we have the circular face instruments with 60 and 80mm installation diameter. You can decide between these two sizes. In either case the connection cable and screening to prevent compass error by the permanent magnet of the instrument, is included.

2.9 CAPACITY:

Every capacity is precisely calibrated, to avoid the 'windbeard' and similar effects. The containers are filled with steel wool and carefully sealed. This ensures that the probes and the electronics are not interfered with by the capacity. With the commencement of the bird series (1978), we offered you a large variety of different variometers.

The decision to enlarge our program came from the realisation that this is the only way to fulfill the different requirements. On the following page you'll find detailed descriptions of our products.

3. SPECIFICATION OF THE VARIOUS MODELS OF THE BIRD SERIES

3.1 With the introduction of the new model 'Sparrow' we reach the quality standard of metal probe varios in the area of pure audio varios. The low price and its reliability are two good points in the argument for better flight safety. The 'Finch' consists of a metal probe with amplifier electronic, the complete standard double sound generator and speaker. These are fitted in a flat housing (80*100*36). The little box can be fitted to either side of the cockpit or on the panel. Wrong operation is impossible, except to forget to switch it on. This model is fitted with a solid plug, where one or two

indicating instruments can be connected.

The amplifier is set up in such a way that it can be used for various other than ours. Connecting angles for installation are also included.

3.2 MODEL VW 801 'Til'

In this price efficient model of the series '800' the concept of VW 3 SG was continued. model 'Til' is a compact instrument where all components including indicator instrument, are united. The instrument can be switched manually to either vario or speed to fly indication. The range of 'speed to fly' is from 0 to 3m/s average climb. Besides the 'speed to fly' being able to be changed to different wing loading. The improvement against the VW 3 DG is the enlarged range 5, 10m/s and an improved zero setting. We recommend the 'Til' for situations such as limited room on the panel or when a simple installation is required.

3.3 Lark VW 811

The advantage over the 'Til' is a separate circular indicator instrument and an integrator. This instrument fulfills all requirements for modern cross country flying. In switch position 'V', the Lark works as a reliable metal probe vario on the circular gauge. Even in extreme altitudes and temperatures this instrument will not let you down. Also in turbulence the Lark will show you the way up. The flat band indicator will show you the average climb of the last 2 or 3 circles. By pressing the 0 button, the whole process starts again. In 'speed to fly' position 'S', you fly with the Lark optimally fast from thermal to the expected climb rate is keyed in on the 'McCreedy' switch. Now the indicator on the circular instrument and the audio signal of the Lark help you to fly at the correct speed. Above zero the continuous sound tells you to speed up. Just as easy is the final glide and dolphin soaring under a cloud street.

At any time during the flight, the flat band indicator in switch position 'S' shows you how accurate your speed to fly was.

3.4 RED ROBIN VW 821:

The possibility of remote switching from vario to 'speed to fly' indication is a feature of the Red Robin. Switches 'S' and 'V' are omitted.

Red Robin has 2 metal probes against 1 in the 'Lark' and the 'Til'. One is for the variometer, the other for the 'speed to fly' indicator. Therefore at any time you can display either vario or 'speed to fly' at the circular scale instrument by remote switching. Red figures indicate 'speed to fly' values. The remote switch can be installed wherever suitable such as stick, trim lever etc. As on the other models, the vario is well dampened and the scale displays intergrated values.

In 'speed to fly' mode the vario signal is still audible, which is handy when flying into a lift area

3.5 GOLDAMEIR VW 831

The Goldameir is an instrument where after switchint on, no manual operation is requered. It ahs two metal probes (same as Red Robin.)

You can forget about switching from vario to 'speed to fly' because both readings are displayed on the circular instruments. To distinguish between the readings markers 'V' and 'S' are fitted.

If you are a circling enthusiast, readings 'S' and 'V' supported by audio will give you useful information besides the average climb display on the flat band instrument. Between thermals you only have to follow the speed to fly instruments 'S'.

Contrary to the technique employed with 'Til, Lark & Red Robin', the speed to fly indicator in the Goldameir is not set to zero, bot to the appropriate 'McCready' value. As an example, at a glide of 'McCready'1 the speed to fly indicator 'S' is at +1m/s.

The Goldameir is calibrated at the factory to a mean wing loading. So high and low wing loadings have to be compensated by flying a bit faster or slower. The audio works the same way as on the other varios.

Ingo Renner pioneered this type of speed to fly method and practiced it with obvious success. The advantages are clear. The actually flown 'McReady' value is permanently displayed, so errors are virtually impossible to make. Misinterpretations of the displays, because of the omission of the vario - speed to fly switch, are eliminated.

With the Goldameir on the panel you can concentrate on other important things - cloud development, navigation, practical decisions etc.

4. BROAD VIEW OF ALL MODELS

VW 711 'Finch'

miniaturised, reliable audio vario with metal probe and double sound generator. Possibility for connection of indicator - instrument and measuring range of 5m/s.

VW 801 'Til'

Improvement of the proven model VW 3 SG with new electronics. Compact vario with fatted indicator instrument. Manual switching from vario to speed to fly. Measuring range 5m/s and 10m/s.

VW 811 'Lark'

Development of model 'Til' by adding circular indicator.
Running display of average climb at the flat band indicator.

VW 821 'Red Robin'

Same as 'Lark', but remote switching.

VW 831 'Goldameir'

simplified operation by omission of switches. Two circular indicators display continuously vario and speed to fly readings and flat band instrument displays. Average climb.

VW 841 'Albatros'

Same as 'Goldameir, but possibility to key in 'McCready' values.

5. TECHNICAL DATA

Power supply

Unit

Battery voltage
Power intake
(Vario to normal strength)
Wrong polarity fuse

Operational Limits

Altitude
Vertical speed

No limits

Accuracy

Vario
Speed to fly

Altitude influence

Recommended Extras

Vario
Speed to fly

T.E. Jet
Water tap.
Cust filter.

Display Characteristics

Time constant average value
Ring scale from 10 to 90% in
Audio - time constant

Dimensions

Measurements - without indicator
+ With indicator

Front Screen, Octagon, Depth

List of Features

Capacity

Hoses and connection material, Cable (2M). Indicator instrment.

Installation an operation manual.