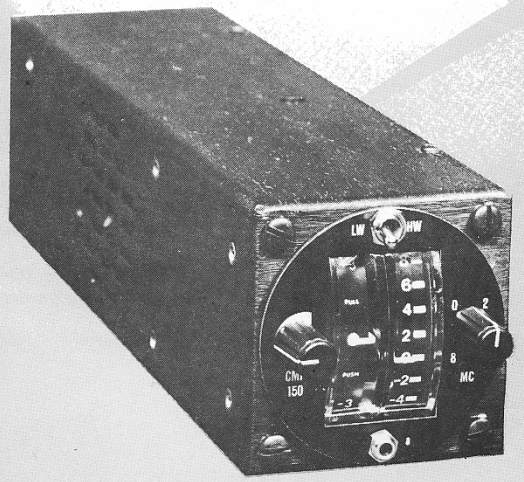
MK IV DIRECTOR



The Cambridge MkIV Director combines in a single compact package a Speed Director, a 30 second Averager, and a unique new 4-function Audio design.

The Cambridge MkIV Director, when used with any fairly recent model Cambridge variometer, simultaneously provides a full visual and audible variometer indication, a continuous visual and audible Speed-to-fly indication, and a continuous read-out of the last 30 seconds average climb or sink.

The Cambridge MkIV Director eliminates **all** switching between CLIMB and CRUISE. There are no 'modes' to select or to remember. The Variometer remains unchanged, the Speed Director remains unchanged, the Averager remains unchanged. The Audio simultaneously provides thermalling as well as cruising information, without any change in 'mode'. At or near the correct speed, there is a 'dead-band', where the Audio goes silent.

The Cambridge MkIV Director, by eliminating all confusion, truly simplifies the pilot's job. It frees him to concentrate on the flight rather than the flying. Compact enough to fit into a standard 2¼" or 57mm hole, and outstandingly simple to install, the MkIV Director represents a really major advance in the field of soaring instrumentation.

BUSINESS MEMBER

Cambridge Aero Instruments, Inc.
300 Sweetwater Ave., Bedford, MA USA 01730 Tel. 617 275-0889 TWX 710-326-7588

Installation

The MkIV Director is connected into the system as shown in Fig. 1. The cable is plugged into the 7-pin outlet at the back of a Cambridge variometer or Integrator. The only other connections are to the ship's pitot and static via flexible tubing.

If a more versatile Integrator is required, the Cambridge Integrator can be incorporated into the system. See Fig. 2.

It is essential that the variometer be effectively T.E. compensated. Venturis, Brunswick and IRVING tubes are excellent. We strongly recommend that the sometimes disturbing turbulence and gust sensitivity of T.E. systems be removed, by restrictors or gust filters. This has the added benefit of producing a better variometer system.

FIGURE 1

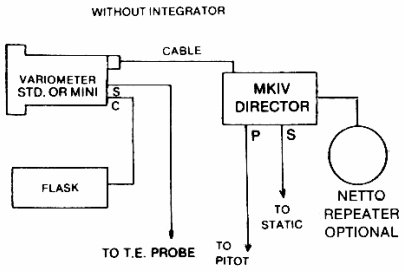
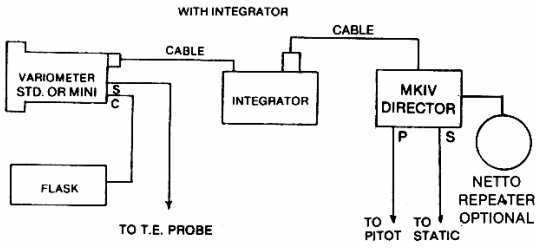


FIGURE 2



WARNING

The Cambridge MkIV Director is not an Airspeed Indicator, and must not be used as such, it cannot replace the ASI in any way, and does not relieve the pilot of responsibility for maintaining safe operating airspeeds at all times.

Description and Operation

The MkIV Director is provided with the following in-flight controls and indicators:

Zero-reader for Speed-to-fly.

30 Second Averager indicator.

Wing-loading selector switch for flying with water or dry

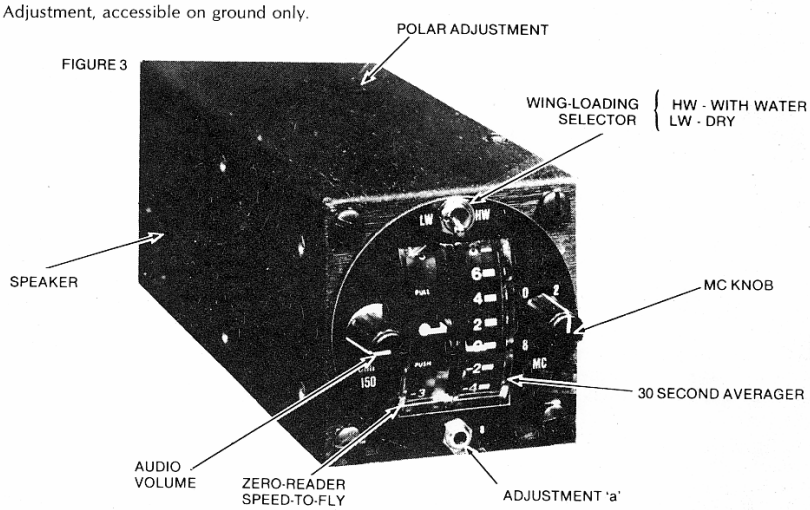
MC Knob to set in anticipated thermal strength.

Audio Volume Control.

Adjustment 'a'.

Polar Adjustment, accessible on ground only.

FIGURE 3



If the pilot wishes to thermal, or just fly around, he should follow the variometer only, which can be left in any sensitivity desired, and ignore the Speed-to-fly Zero-reader. Or he can follow the Audio.

If the pilot wishes to cruise for speed, he should follow the Speed-to-fly Zero-reader, or the Audio. He should set in an anticipated next thermal with the MC knob, which is calibrated for 0 thru 8 knots, or 800 FPM. When the Zero-reader is above the center-zero, slow up. When it is below zero, speed up. At the correct speed it will approach zero. In this respect the Speed-to-fly Director is analogous to the familiar McCready ring system.

The Audio is a multi-function device, which has 4 distinct modes of operation. These modes mean different things, depending on whether the pilot wishes to Climb, or to Cruise. This may seem a little complex at first, but after a very brief period of familiarization, the Audio is very simple to follow.

The 4 modes are as follows:

Interrupted tone, rising in pitch with increasing climb.

Continuous tone, falling in pitch with increasing sink.

Silence. This is the 'dead-band'.

Alarm Tone, falling in pitch with increasing sink.

The pilot interprets these 4 modes slightly differently, depending on whether he is Climbing or Cruising, as follows:

WARRANTY

All Cambridge variometer products are guaranteed against defects for TWO YEARS from date of original purchase, when used in sailplanes only. The warranty is limited to parts and labor, and the unit must be returned to the factory. The warranty is void if the equipment is misused, or if repairs are performed by unauthorized persons.

	PILOT WISHES TO	
	CLIMB OR FLY AROUND	CRUISE
Interrupted Tone	Ship is climbing	Slow up, going up!
Continuous Tone	Ship is Sinking	Slow up
Silent Band	Ship is Sinking faster	Correct Speed
Alarm Tone	Ship is Sinking even faster	Speed up

Thus the pilot can look, or he can listen. His only manual operation is to occasionally adjust the MC knob, based on his achieved climbs, and an assessment of the conditions ahead.

Polar Adjustment for Sailplane

If the MkIV Director is used with any Cambridge Minivariometer, or with any standard size Cambridge variometer of Rev.15 or greater, the pilot can set in the ship's polar himself. To verify if the variometer is suitable for this adjustment, check the rear of the instrument. It should be provided with a screw-driver adjustment for the zero. Screwdriver adjustments on the front glass are not suitable for this.

If the Variometer is not provided with a rear-adjustment, the MkIV Director must be calibrated with another suitable variometer, or at the factory. (However, such variometers may be used in conjunction with the Director; they can simply not be used for calibration purposes).

For Polar calibration, set the Variometer to X1, and switch Director to LW. Set the MC Knob to 0. Adjust the Variometer zero-adjust (rear of instrument) to give a vario CLIMB reading, according to the table below.

Sailplane L/D 30:1	Vario is +5.1 KTS. or +2.5m/s
Sailplane L/D 33:1	Vario is +4.3 KTS. or +2.2m/s
Std. Class L/D 36:1	Vario is +3.6 KTS. or +1.8m/s
15 M. Class L/D 40:1	Vario is +3 KTS. or +1.5m/s
Open Class L/D 44:1	Vario is +2.5 KTS. or +1.2m/s

Estimate settings for other L/D figures.

Now adjust the POLAR Adjustment (See Figure 3) on the top of the Director box to bring the Speed-to-fly Zero-reader in the Director to its middle zero-point.

Rezero the Variometer with the rear zero-adjust. The Speed-to-fly Zero-reader will now read negative.

Flight Test to Set Adjustment 'a'

Perform one test flight in calm, smooth air. A flight in the late evening or early morning is recommended. Trim the ship at between 2000 and 3000 ft. (600-900m.) to fly at the maximum L/D speed (about 50 KTS. or 55 MPH or 90 KPH for most ships).

Set "MC" Control to 0, and switch to LW. With a screwdriver, adjust the Control 'a' to bring the Zero-reader pointer to zero.

General Data

Input: Power and Variometer signals via 7-pin plug & cable.
Pitot and Static via hose connectors.

Power Consumption: approx. 45 m/a, at 11-18 VDC, at full volume.

Dimensions: 2-3/8" x 2-3/8" x 9" long.

To Order: CMP 150 for Knots or FPM.
CMP 140 for M/S.

BUSINESS MEMBER

Cambridge Aero Instruments, Inc.
300 Sweetwater Ave., Bedford, MA USA 01730 Tel. 617 275-0889 TWX 710-326-7588