



THE READOUT

WHAT'S NEW

BAKER SERVICE ADDED

Capital Avionics is constantly looking for ways to expand our component repair capabilities. It is part of our commitment to serve as many customers as possible with our special brand of prompt, local, expert service. In keeping with that commitment, we have recently added BAKER audio legacy products to our maintenance capabilities. The BAKER brand of products is well-established in the industry and we are proud to add it to our capabilities list. You can look to us for maintenance support for the following products:

- B1035/B1045 Audio Control Panels
- M1035 Audio Control Panels
- M1045 Audio Control Panels
- M1050 Amplifiers/Accessories
- M5055 Audio Control Panels



As usual, we offer a quick-turn service on BAKER products. Just let us know how we can best meet your needs. For complete information, contact Al Ingle, General Manager.

HONEYWELL TEST ACCESSORIES

Did you know that Capital Avionics manufactures and sells test sets and accessories for Honeywell autopilots? If you have autopilot testing requirements, our test sets and accessories have proven their reliability, and we invite you to inquire about any of the following equipment:

- Slip Clutch Test Stand
- Custom Gear Adapter
- Adapter Hub and Pin Assembly

Honeywell autopilot systems that are supported with this equipment are as follows:

- KAP/KFC 100/150
- KAP 140
- KFC 225
- KFC 200/250



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In This Issue:

- Baker Service
- Honeywell Test Accessories
- Tech Tips

For these specific autopilot needs, or any other requirement you might have, call David Wood, Test Equipment Manager.

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The Earth's Magnetic Field

NOTE: During the design and construction of this company's CA-320 digital compass, we were surprised at how little we knew about the Earth's magnetic field. This turns out to be important from an aircraft maintenance standpoint and therefore will be the subject of a multipart series, starting with this edition.

We begin with the concept of **permeability**, or μ . We have all taken a bar magnet and sprinkled metal filings on it to see the lines of force expressed as continuous clumps from the north pole to the south pole of the magnet. The Earth's magnetic field is no different. Its lines of force (or flux) flow from one pole to another but are too weak to see in this way. We can, however, detect these lines of force and determine aircraft heading by measuring the magnetic field with a wet compass or flux valve based sensor. In the case of the wet compass, a floating bar magnet aligns parallel to the lines of force, its north pole pointing to the Earth's south pole. A 360° cylindrical index is attached to this magnet and as it continually points south, the pilot knows his magnetic heading. In the case of flux valve based sensors, the magnetic field is systematically allowed to energize a high permeability core surrounded by triaxial coils, then it is abruptly expelled from it. This induces voltages into the coils, the magnitude of which represent the magnetic heading of the aircraft.

So where does permeability come into this? Aircraft contain many different types of metals and self-generated magnetic fields which alter the Earth's magnetic field as it passes through the airframe, inducing errors that need compensation. It is these errors that we must understand and permeability is the key. It is defined as:

The ratio of flux density produced by a given material compared to the flux density produced by an air core.

$$\mu = \frac{B}{H}$$

or
where **B** is the flux density in gauss and **H** is the magnetic field strength in oersteds.

The magnetic field entering the aircraft from free space (with a permeability of one) has parallel lines of force. As these lines of force strike other magnetic fields and ferrous materials with permeabilities other than one, they no longer travel in parallel lines. If a compass or flux valve is in one of these areas, their heading measurement will contain errors. So as aircraft technicians, it is the change in permeability that we must concern ourselves with.

Next month we explore these magnetic distortions and how to address them.

