

PBB-475 BALANCING BALLS

Some aircraft have an inherent magnetic field which makes compass compensation difficult or impossible using only the standard polyplane compensator. Some contributing factors are:

1. Steel tubing framework; ie, Pitts, Mooney, Bellanca and others.
2. Induced and permanent magnetic fields from various components; ie, radios, instruments, accessories, etc.

The polyplane compensator has an E/W and N/S adjustment screw. Also, the N/S field does not affect the E/W plane and vice versa. This means that the N/S compensator is effective only 45° each side of N/S cardinal headings and the E/W compensator is effective only 45° each side of E/W with strongest affect at the cardinal headings and growing weaker to the 45° quadrants. This can result in pretty good readings at the cardinal points and large errors at the intermediate points.

One solution to the problem has been to degauss the aircraft, a very time consuming task, and at best, not too reliable. Plus, the magnetism can be re-introduced into the aircraft.

Magnetic Shielding material, (a nickle alloy), at times, can be effective to contain magnetism such as that radiated by some models of the turn co-ordinator, some radio amplifiers, and some radio navigational indicators (physical presence, not electrical).

The PBB-475 Balancing Balls have been designed to give additional compensation. The F.A.A. says the maximum error on any one heading should not exceed plus (+) or minus (-) 10 degrees.

NOTE - Before beginning the Balancing Balls procedure, the polyplane compensator must be neutralized. This is accomplished by locating the dots on the adjusting screws at the Nine O'Clock position to align with the dots on the polyplane compensator frame.

The PBB-475 Balancing Balls consist of two (2) nylon balls with magnets inserted through the center line of the balls, each magnet having a North and South pole. The balls are attached to a mounting bracket by means of two (2) stainless steel screws. The bracket is attached to the Vertical Card Magnetic Compass by removing the lower two (2) screws in the rear of the compass and reinserting the two (2) screws with bracket. Mounting is correct when a ball is on each side of the compass at approximately the Eight O'Clock position and Four O'Clock position.

(Continued on Back)

Care should be taken not to bend the ball bracket. Do not move balls. These have been pre-set at the factory for a neutral position.

With compass installed in aircraft, with engines running and all normal radios "ON", position aircraft to magnetic North. Take reading on Vertical Card Magnetic Compass and jot down error; for example, N - 13° or + 21°. Do not attempt to "zero" this error. Next, position aircraft to magnetic East, note errors as above; ie, E - 21° or + (Plus). Do not remove errors. Then, as above, record errors on South and West.

Now, return aircraft to cardinal heading with greatest error; example, E - 21°. Now, slowly move one ball and gently, tapping compass, remove all the error on this heading.

Next, turn the aircraft to magnetic South; and slowly rotate the other balancing ball until all error is removed.

If the above is performed correctly, the reciprocal cardinal heading should be close. Do not reposition balls.

NOTE - In some aircraft the foregoing procedure may be more effective by adjusting the PBB-475 Balancing Balls in the 45° quadrants.

What we have done is to negate maximum magnetic error in the aircraft, and can now swing the aircraft using the regular compensators for fine adjustment, using standard swinging procedures.

NOTE - MAXIMUM polyplane compensator correction is attained when the adjusting screw is rotated clockwise or counter-clockwise 180°, or to Three O'Clock. DAMAGE to the compensator mechanism will occur if the adjusting screws are forced beyond 180° in either direction.

When complete, lay a fine bead of super glue around base of the balls to prevent their moving.

The Balancing Balls operate in the horizontal plane of the compass sensing magnet while the polyplane compensator operate relating to the vertical axis of the compass sensing magnet.