



GLIDING NEW ZEALAND INCORPORATED

ADVISORY CIRCULAR
AC 3-17

**COMPASS INSTALLATION AND
MAINTENANCE**

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Introduction

The compass installation requirement for gliders is prescribed in the New Zealand Civil Aviation Rules Part 104.101, and states that an operational magnetic compass is always required in a glider.

Part 104.107 brings the maintenance of the glider compass into the Gliding NZ Tech 22 Maintenance Program, and applies to all gliders maintained under this program.

Glider compasses are not subject to conditions as severe as those found in powered aircraft, so changes in the performance of the compass are therefore much less likely. For example, there is very little magnetic influence due to airframe magnetisation or heavy electrical currents.

Furthermore, glider operations under visual conditions in New Zealand are such that pilots have very little use for a compass. Navigation is normally by moving from one lift source to another. Widespread use is made of GPS instruments which give direction to a turnpoint. Guidance for compass maintenance takes these factors into account.

Section 1: Annual Inspection

With each annual inspection the general condition and function of the compass needs to be checked. Some things to look for are:

- the compass is clearly visible to the pilot and not obscured by other equipment
- the heading markings are legible and not faded or degraded such as to render them unreadable
- there is sufficient fluid in the compass with no signs of fluid leaks
- the compass rotates smoothly when the fuselage is rotated
- the compass does not move significantly when powered instruments are turned on or off
- the compass bearing is close to the runway direction when facing directly down the runway
- there has been no new equipment installed close to the compass that could influence it
- any speakers (which contain strong magnets) or beepers are well away from the compass
- the location of the compass on the instrument panel has not been changed since last inspection
- the compass and surrounding instruments are mounted with non-ferrous screws and nuts

Section 2: Calibration Limits

A calibration check of a glider compass is required every four years.

The calibration limit for gliders under Tech 22 is that the reading must be within eight degrees (8°) of the magnetic heading on each of the eight principal directions.

If this cannot be achieved by adjustment of the compass, or by shifting the compass to a different location on the panel, then the instrument must be considered unserviceable. This invalidates CAA Rule Part 104.101 so the aircraft cannot be flown until a serviceable compass is installed.

On each occasion where a satisfactory calibration check has been performed, and the compass reads within calibration limits, an entry needs to be made in the glider log book.

Placarding a compass deviation card is optional for gliders not equipped for cloud flying.

Section 3: Calibration Site

There are two ways to align the glider to take a reading:

- use a bearing compass (an accurate compass with a sighting device attached)
- use a calibrated compass swing site, consisting of alignment marks on the ground

In either case, the site chosen for performing the calibration check needs to be completely free of magnetic influence (except for the magnetic field of the earth itself). Such influences include steel structures like hangars, underground pipes or cables, and steel bars buried in concrete pads.

For active gliding clubs time can be saved by marking out a compass swing site. Do this using a calibrated bearing compass. A suitable area needs to be available on the gliding field, and a durable marking method. There is further information on compass swing sites in CAA AC 43-7 Part 2.

Section 4: Swing Procedure

The glider must be in normal flight configuration, except the undercarriage can be down. A wing walker or wing stand is acceptable on a wing tip if it doesn't influence the compass when removed. All electrical equipment which could be used in flight must be switched on, including the transponder. Gliders with retractable engines do not need to have the engine running.

Any person standing near the the nose of the glider should remove all magnetic or ferrous items, such as screwdrivers in pockets. Consider removing watches and other jewellery.

The procedure is to place the aircraft accurately on each of the principal magnetic headings in turn, then write down the corresponding compass reading. If the compass reading is within the limit specified in Section 2 on all eight headings, no further adjustment is required.

Section 5: Sequence of Compass Adjustment

When adjusting the compass use a non-magnetic screwdriver. Remove the cover plate to gain access to the compensator screws. There are separate compensators for N-S and E-W.

1. With the glider in flight configuration, align the nose on the 0-degree (north) heading. If the aircraft compass is not in alignment with magnetic north, adjust the north-south compensator screw until the compass reads 0 degrees.
2. Align the glider to the 90-degree (east) heading. If the aircraft compass does not indicate 90 degrees, adjust the east-west compensator screw until it reads 90°.
3. Align the glider to the 180-degree (south) heading. Note the indicated heading on the aircraft compass. If it is not 180°, adjust the north-south compensator screw to remove half the difference between the reading and actual heading. For example if the compass reads 184° while the aircraft is positioned at 180°, adjust until the compass indicates 182°.
4. Align the glider to the 270-degree (west) heading. If the compass does not indicate 270°, adjust the east-west compensator to split the difference as in the above step.
5. Swing the glider around all the headings. Starting with the current heading (270°) write down the actual reading on the compass.

Section 6: Documentation in Log Book

A typical release-to-service entry in the glider log book might read:

A compass swing was carried out on this aircraft at <location> on <date> and the compass was found (*or, adjusted*) to be within the limits specified in AC 3-17. In respect of that maintenance the aircraft is released to service.

Notes

1. The manufacturer of the Airpath compass, commonly used in NZ, states that diaphragms have a service life of 5-10 years. This means that as aircraft age the chance of fluid leaking out is increased. If this occurs, and you want to have the compass repaired, look for an engineer with an I (instrument) rating in the GNZ system. Or purchase a repair kit.
2. A compass purchased directly from a northern hemisphere supplier would probably be set to operate in the northern hemisphere unless specified otherwise. The difference is that the direction of the angle of dip is different in each hemisphere.
3. South Pacific Avionics is a supplier of compasses in NZ. They are set up for southern hemisphere operation.