



ASTROCOMPASS

Care and Adjustment

1. To tighten motion of sight gear:

Loosen locknut.

Turn shoulder screw until you obtain desired friction.

Tighten locknut.

2. Entire sight assembly must be mounted firmly. Tighten the two screws behind the declination scale to insure correct mounting. At certain times during the day, 1° error in LHA causes up to 10° error in azimuth.

To check:

Unloosen two rear screws.

Set true bearing at 180° .

Sight down declination scale (0° south latitude) to the true bearing index.

Move sight assembly until it is aligned.

Tighten screws.

Draw a reference line on the north hour-angle head for future alignment.

Here is another method of checking the sight assembly:

Level astrocompass.

Set the latitude scale to 0° north latitude.

Set LHA to 270° .

Set the declination index to 0° and rotate the astrocompass head until a suitable distant object passes through the center of the sight.

Set the LHA drum to 90° and rotate the astrocompass head through 180° until you see the same distant object again through the sight. If the declina-

tion scale is correctly aligned on the north hour-angle head the object will still pass exactly through the sight.

Draw a reference line on the north hour-angle head for future alignment.

3. Check the three screws above and below the hour-angle head to see that they are snug. They mount the LHA scales on enclosed drive assembly.

4. To obtain correct latitude settings, tighten the two screws which fasten the micrometer knob and worm to the upright. Keep tension between worm and worm gear by checking to see that the two screws holding the springs are secure. Increase spring tension by bending the spring slightly.

5. Vibration of the airplane causes errors if the azimuth circle does not have a sufficient amount of friction to stay on set readings.

Increase tension in this manner:

Clamp spring leg in depressed position.

Remove two opposite screws from yoke to separate upper section from base.

Remove locknut.

Adjust tension until desired drag results.

Replace locknut and mount in reverse order.

You can adjust these nuts without removing the base if you have a special socket wrench that reaches through the base.

Cautions

1. To obtain best results, always make several observations and average them.

2. When declination and latitude are within 20° of each other, use the astrocompass as a pelorus.

3. In other latitudes, when the sun is above 45° , use the astrocompass as a pelorus.

4. Do not rely upon the astrocompass when you take bearings on bodies above 75° altitude.

5. Check alignment by using a sighting compass.

2. Place astrocompass in the standard and level.
3. Set the latitude and declination and LHA of the sun on the proper scales.
4. Rotate the astrocompass until the shadow of the bar falls between the parallel lines on the shadow screen.
5. Compare the true heading of the airplane with the astrocompass reading.
6. The difference between the two headings is the correction which must be applied to the astrocompass readings to obtain the true heading.
7. The error may be removed at one position of the astrocompass in the dome by loosening the base mounting screws and turning the standard until the two headings are the same. Tighten the base mounting screws and recheck alignment.

Another Method

1. Place a base standard on a saw-horse. Align it with a line drawn down the center of the horse.
2. Cut a notch at both ends of the line.
3. Align the saw-horse with the fore and aft axis of the airplane by dropping the plumb-bobs from the notches over a line parallel to the longitudinal axis.
4. Place the astrocompass on the saw-horse and find true heading. This is the correct true heading of the airplane.
5. Place the astrocompass in the base standard in the airplane to find the correction for that position.

Alignment Check

You can check the alignment by using the astrocompass as a pelorus. Set local hour angle at 0° or 180° and latitude at 90° . Obtain the bearing of some part of the airplane. Write this bearing down and keep it in your compartment so you can check alignment in flight on future missions.

Uses of the Astrocompass

1. **Check the true heading of the airplane.**
 - a. Place the instrument in the mount and level it. An error of 1° in level may cause an error of 1° or more in observation.
 - b. Set the latitude to the nearest degree.
 - c. Calculate and set the local hour angle of the body to be observed on the proper hour angle scale.
 - d. Set the declination of the body.
 - e. Rotate the bearing plate until the sights are aligned on the body. In observing the sun or moon, rotate the bearing plate until the shadow cast by the shadow bar falls between the proper marks on the translucent screen.
 - f. When the sights are aligned, read the true heading of the airplane against the lubber line.

2. Steer a true heading.

- a. Set the true heading you want to fly against the bearing plate lubber line.
- b. Set the instrument for latitude, declination and local hour angle and level it.
- c. Have the pilot turn the airplane until the selected body comes into your sights.
- d. Maintain heading by directional gyro.
- e. Check the true heading with the astrocompass at least every 15 minutes, altering the true heading steered on the directional gyro if necessary.

3. Identify a star.

- a. Place the compass in its mount and level it.
- b. Rotate the bearing plate until the true heading registers against the lubber line.
- c. Set the correct latitude.
- d. Turn the hour angle scale and adjust the declination scale until the star is on the sights.
- e. Read off the local hour angle of the star and its declination.
- f. Use the Air Almanac to calculate the sidereal hour angle of the star.
- g. From the table on the inside back cover of the Air Almanac, find the star by its declination and sidereal hour angle.

4. Use as a pelorus.

- a. Place the compass in its mount and level it.
- b. Set the true heading on the bearing plate, against the lubber line.
- c. Set the latitude scale to 90° . This makes the hour angle scales parallel to the bearing plate.
- d. Turn the hour angle knob until you sight the object, just as you would sight a star.
- e. Read the true bearing on the hour angle scale against the true bearing lubber line.
- f. Note that if the bearing plate were set to "N", you would read relative bearing.

Caution

When turning the local hour angle scale, be sure to push in the knob. Don't force it.

When observing the sun or moon, be sure that the shadow of the bar on the front sight falls between the parallel lines on the shadow screen.

When observing any other body, place your eye behind the small magnifying glass and sight the star through the intersection of the white lines of the foresight. If you do not sight the star through the intersection of the white lines, you can still get a correct reading when it is vertically above the point of intersection of the white lines. Do not change the declination setting to put the star at the intersection.