

SECTION 3. GROUND OPERATIONAL CHECKS FOR AVIONICS EQUIPMENT (NON ELECTRICAL)

12-37. COMPASS SWING must be performed whenever any ferrous component of the system (i.e. flux valve compensator, or Standby Compass) is installed, removed, repaired, or a new compass is installed. The magnetic compass can be checked for accuracy by using a compass rose located on an airport. The compass swing is normally effected by placing the aircraft on various magnetic headings and comparing the deviations with those on the deviation cards. Refer to CFR14, 23.1327, 14 CFR 23.1547, and the equipment or aircraft manufacturer's manual.

a. A compass swing must be performed on the following occasions:

- (1) When the accuracy of the compass is suspected.
- (2) After any cockpit modification or major replacement involving ferrous metal.
- (3) Whenever a compass has been subjected to a shock; for example, after a hard landing or turbulence.
- (4) After aircraft has passed through a severe electrical storm.
- (5) After lighting strike.
- (6) Whenever a change is made to the electrical system.
- (7) Whenever a change of cargo is likely to affect the compass.
- (8) When an aircraft operation is changed to a different geographic location with a major change in magnetic deviation. (e.g., from Miami, Florida to Fairbanks, Alaska.)

(9) After aircraft has been parked on one heading for over a year.

(10) When flux valves are replaced.

b. Precautions.

(1) The magnetic compass must be checked for accuracy in a location free of steel structures, underground pipes or cables, or equipment that produces magnetic fields.

(2) Personnel engaged in the compensation of the compass shall remove all magnetic or ferrous material from their possession.

(3) Use only nonmagnetic tools when adjusting the compass.

(4) Position the aircraft at least 100 yards from any metal object.

(5) All equipment in the aircraft having any magnetic effect on the compass must be secured in the position occupied in normal flight.

c. Compass Swing Procedures.

(1) Have the aircraft taxied to the NORTH (0°) radial on the Compass Rose. Use a hairline sight compass (a reverse reading compass with a gun sight arrangement mounted on top of it) to place the aircraft in the general vicinity. With the aircraft facing North and the person in the cockpit running the engine(s) at 1000 rpm, a mechanic, standing approximately 30 feet in front of the aircraft and facing South, "shoots" or aligns the master compass with the aircraft center line. Using hand signals, the mechanic signals the person in the cockpit to make additional adjustments to align the aircraft with the master

compass. Once aligned on the heading, the person in the cockpit runs the engine(s) to approximately 1,700 rpm to duplicate the aircraft's magnetic field and then the person reads the compass.

NOTE: (1) For conventional gear aircraft, the mechanic will have to position the magnetic compass in the straight and level position or mount the tail of the aircraft on a moveable dolly to simulate a straight and level cruise configuration. (2) Remember the hairline sight compass is only intended to be used as a general piece of test equipment.

(2) If the aircraft compass is not in alignment with the magnetic North of the master compass, correct the error by making small adjustments to the North-South brass adjustment screw with a nonmetallic screw driver (made out of brass stock, or stainless steel welding rod). Adjust the N-S compensator screw until the compass reads North (0°). Turn the aircraft until it is aligned with the East-West, pointing East. Adjust the E-W compensator screw until it reads 90° . Continue by turning the aircraft South 180° and adjust the N-S screw to remove one-half of the South's heading error. This will throw the North off, but the total North-South should be divided equally between the two headings. Turn the aircraft until it is heading West 270° , and adjust the E-W screw on the compensator to remove one-half of the West error. This should divide equally the total E-W error. The engine(s) should be running.

(3) With the aircraft heading West, start your calibration card here and record the magnetic heading of 270° and the compass reading with the avionics/electrical systems on then off. Turn the aircraft to align with each of the lines on the compass rose and record the com

pass reading every 30° . There should be not more than a plus or minus 10° difference between any of the compass' heading and the magnetic heading of the aircraft.

(4) If the compass cannot be adjusted to meet the requirements, install another one.

NOTE: A common error that affects the compass' accuracy is the mounting of a compass or instruments on or in the instrument panel using steel machine screws/nuts rather than brass hardware, magnetized control yoke, structural tubing, and improperly routed electrical wiring, which can cause unreasonable compass error.

(5) If the aircraft has an electrical system, two complete compass checks should be performed, one with minimum electrical equipment operating and the other with all electrical accessories on (e.g. radios, navigation, radar, and lights). If the compass readings are not identical, the mechanic should make up two separate compass correction cards, one with all the equipment on and one with the equipment off.

(6) When the compass is satisfactorily swung, fill out the calibration card properly and put it in the holder in full view for the pilot's reference.

d. Standby (wet) Compass. Adjustment and compensation of the Standby Compass may also be accomplished by using the "compass swing" method.