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REPAIR & OVERHAUL
INSTRUCTIONS

MAGNETIC COMPASS
MODELS AN5766-3, AN5766-T3
AND
AN5766-T4

(This EO replaces EO 20-25EC-3 dated 15 Dec 54)

ISSUED ON AUTHORITY OF THE CHIEF OF THE AIR STAFF

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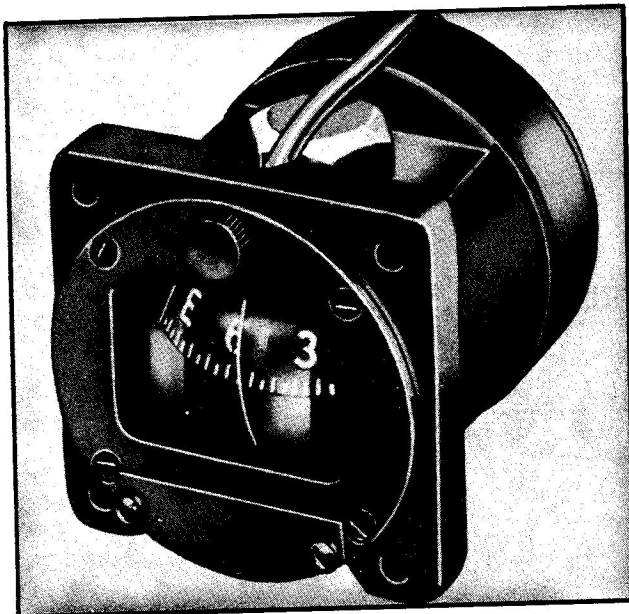
SECTION I
INTRODUCTION

Figure 1-1. Over-All View of Magnetic Compass

1-1. IDENTIFICATION.

1-2. This Handbook of Overhaul Instructions contains descriptive and overhaul data for the AN5766-3 Magnetic Compass, manufactured by Airpath Instrument Company, St. Louis, Missouri. (See figure 1-1.)

1-3. The compass is furnished with pressed-in lock nuts in the mounting holes. When mounting the instrument from the front of the panel, it becomes necessary to remove these locking nuts from the mounting flange. Therefore, some AN5766-3 compasses may have the pressed-in lock nuts removed when received at overhaul bases.

1-4. (Deleted.)

NOTE

EO 20-25EB-2 Handbook of Overhaul Instructions also provides overhaul and test data for some early AN5766-3 magnetic compasses, manufactured under the following contracts and bearing the serial numbers indicated: AF33(038)-14409, serial numbers below 656; AF33(038)-14859, serial numbers below 1750.

The floated card assembly used in the early AN5766-3 compasses was changed to a non-floating card assembly in the more recent units. Identification of the floated card assembly can be accomplished in an assembled compass by observing the smooth dome shape of the float top and the absence of the coil spring type card retainer.

Publication EO 20-25EB-2 should be used when overhauling AN5766-3 floated card units and this publication used when overhauling all AN5766-3 units with nonfloating card assemblies.

1-5. **PURPOSE.** This compass is intended for use as a standby instrument for the pilot of airplanes equipped with electrical directional instruments. It indicates, continuously, the heading of the airplane with reference to the magnetic field of the earth. Each unit is intended for flash mounting with four bolts on the instrument panel of the airplane. A miniature light bulb, mounted in a screw plug, which is accessible from the front side of the instrument, provides the necessary illumination for night use. The design of the compass permits removal of the compensator through the front of the panel without removing the compass from the airplane.

1-6. **LEADING PARTICULARS.** Table I lists the leading particulars, and figure 1-2 shows the principal over-all and mounting dimensions.

TABLE I. LEADING PARTICULARS	
Lamp voltage	3 V, dc
Damping	Liquid
Damping fluid specifications	3-GP-31
Expansion compensation	Bellows type
Visibility range	60 degrees
Weight:	
With fluid	12 ozs.
Without fluid	10 ozs.
Magnets	Permanent bar type
Lens	Flat, glass
Compensating adjustment location.	Front of unit

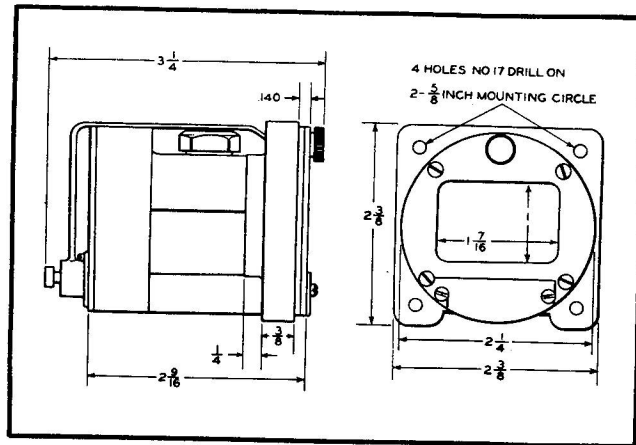


Figure 1-2. Principal Dimensions

1-7. Sections I, II, and III of this handbook contain overhaul and test instructions for the AN5766-3 magnetic compass. Overhaul and test instructions for additional models having physical differences are provided in Section IV by the use of Difference Data Sheets. The additional models included in Section IV are listed in Section IV.

1-8. Overhaul and test procedures for models included in Section IV are the same as the procedures given in Sections II and III except for the specific differences noted by the applicable difference data sheets.

SECTION II OVERHAUL INSTRUCTIONS

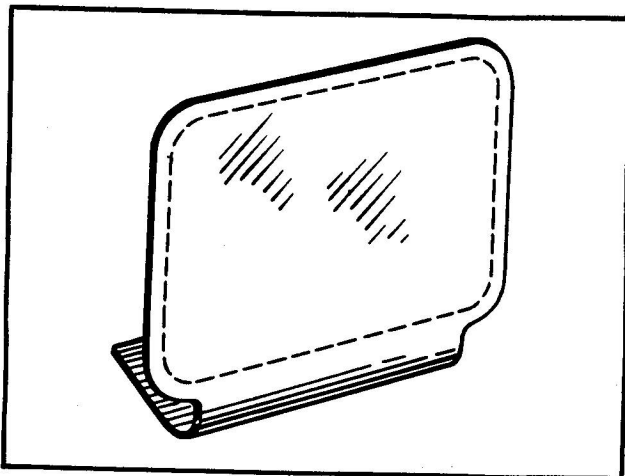


Figure 2-1. Lens Template

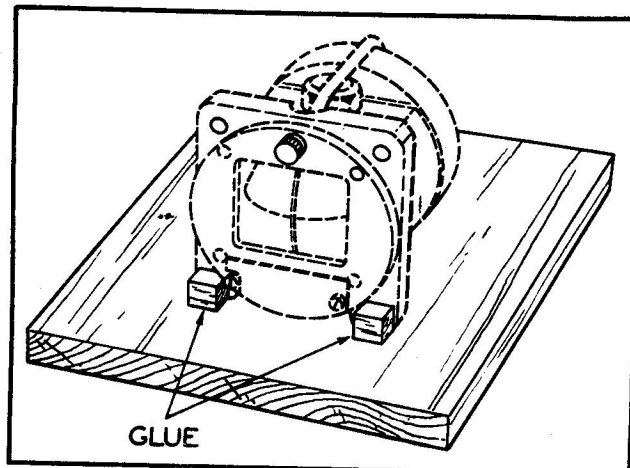


Figure 2-2. Compass Locating Block

2-1. **SPECIAL TOOLS.** No special tools are required for normal overhaul procedures. However, if it becomes necessary to magnetize or demagnetize the magnets in either the card assembly or the compensator assembly, simple improvised tools can be quickly constructed to accomplish these processes. These tools are shown in figures 2-1 through 2-3.

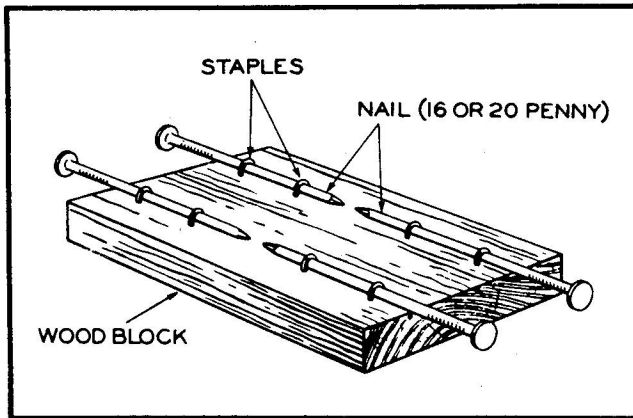


Figure 2-3. Card and Compensator Magnet Holder

2-2. DISASSEMBLY.

- a. Unscrew and remove the instrument lamp (1, figure 2-4).
- b. Remove the two bolts (3) and insulating grommets (4) to free the connector and contact assembly (2) from the expansion unit assembly (20).
- c. With a small screwdriver or small pen knife, remove the sealing compound from around the light contact assembly.
- d. Grasp the connector and contact assembly (2) at the rear of the compass, raise the assembly slightly, and withdraw it from the case (35).

NOTE

If difficulty is experienced in removing the connector and contact assembly, screw the light bulb into position and apply thumb pressure against the end of the bulb cap in order to force the connector out of the case. Exercise care to avoid bending the wire shield during removal.

- e. Remove the connector plate insulator (5) which will probably cling to the expansion unit (20). Also, remove the electrical scotch tape strips (6 and 7).
- f. Hold the compass in an upright position and, with a 3/4-inch socket or box-socket wrench, remove the filler cap (15). In most instances, the card retainer assembly (17) will be held in the filler cap by the filler cap gasket (18). If so, use a small scriber to pick out the filler cap gasket (18). Remove the card retainer assembly (17) and friction washer (16).

CAUTION

Do not compress the card retainer assembly spring.

g. Turn the case upside down to drain out the damping fluid. After the fluid has drained out, the compass should be handled with extreme care to avoid damaging the undamped card assembly.

h. Loosen the bolts (8 and 10) and rotate the compensator coverplate (9) from over the end of the compensator assembly (14).

i. Loosen the bolt at the lower center of the compensator assembly (14) and rotate it counterclockwise far enough to permit gripping it between the thumb and forefinger. Grasp the bolt and withdraw the compensator assembly from the case.

j. Remove the bolt (10) and compensator coverplate (9).

k. Remove the compensator housing (11) by taking out the two bolts (13) and one bolt (12). Place the compass in position, with the mounting surface facing upward, and remove the four bolts (25).

l. Lift off the bezel (24) and remove the bezel spacer gasket (26). With a small pen knife, scrape the sealing compound from the underside of the bezel. Exercise care not to penetrate the anodized surface of the bezel.

m. Lift out the lens (27) and remove the gasket (28). It may be necessary to scrape the gasket (28) off the case.

n. Place the mounting surface of the compass downward and remove the four bolts (21). Lift out the expansion unit assembly (20) and remove the gasket (22).

o. Insert a strip of paper approximately 1-3/4 inches wide and from 6 to 8 inches long between the top of the card assembly (23) and the case (35). (See figure 2-5.) Carefully rotate the case until the filler opening is at the bottom, and reciprocate the paper until the magnets on the card assembly are in position to permit the card to slide out of the case. Keep the card on the paper to prevent its being touched by the fingers.

NOTE

Never allow the fingers to come into contact with the fluorescent numbers on the card assembly.

p. Grasp the case (35, figure 2-4) firmly in one hand and, with a 1/2-inch box-socket or open-end wrench, unscrew and remove the jewel post assembly. (See figure 2-6.) Remove the jewel post washer (34, figure 2-4).

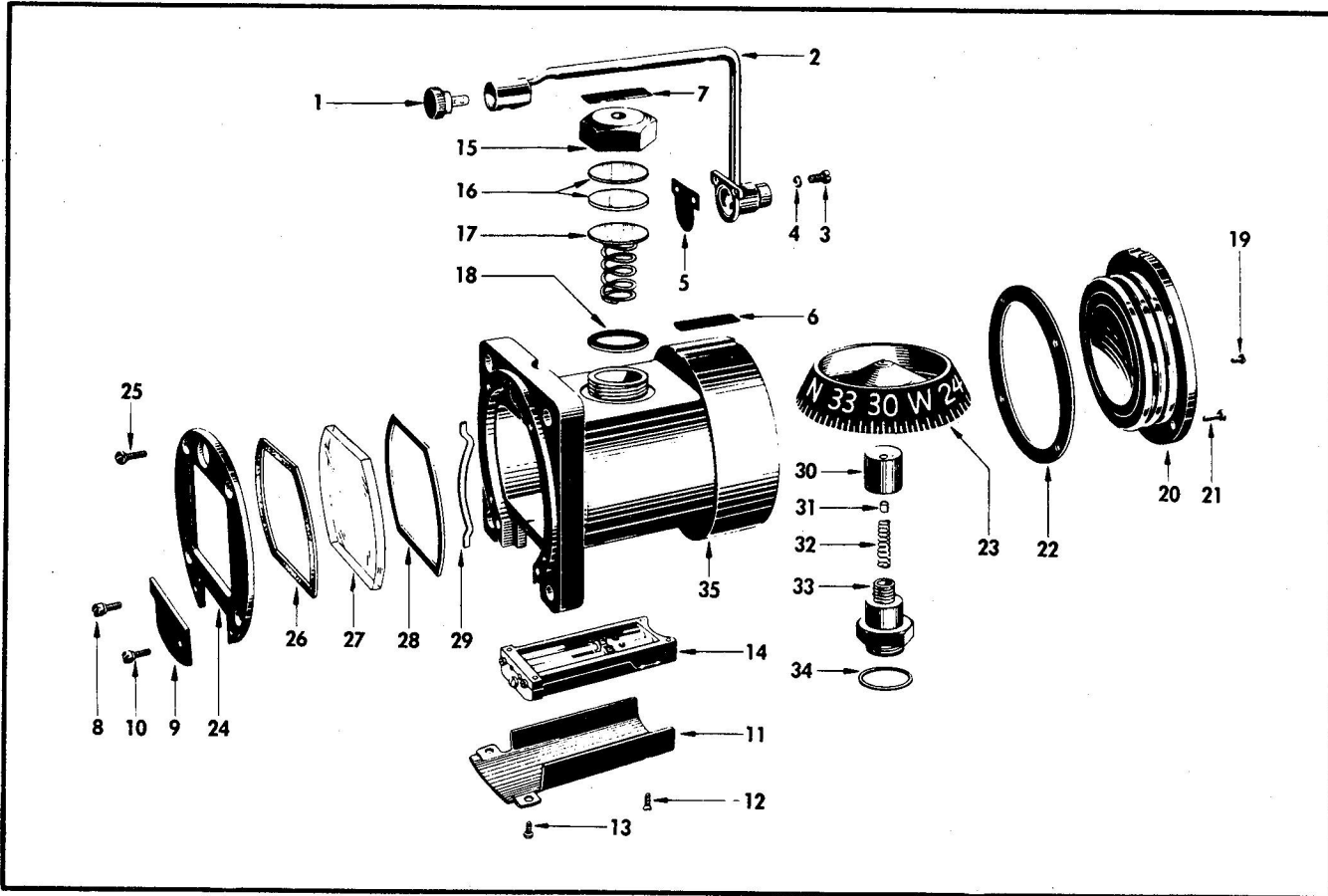
q. Wrap several turns of adhesive tape around the jewel post cap (30), clamp the hex portion of the jewel post (33) in a vise or hold it with a hex-socket wrench and, with dull pliers, unscrew and remove the jewel post cap (30) from the jewel post (33).

CAUTION

Do not grasp the jewel post cap (30) hard enough with pliers to distort it.

r. Remove the mounted jewel (31) and jewel spring (32) from the jewel post (33).

s. Inspect the lubber line (29) and, if distorted or damaged to the extent that replacement is required, pry each end loose with a small screwdriver blade and remove the lubber line from the case. The lubber line should not be removed unless replacement is required.



- | | | |
|-----------------------------------|-----------------------------|--------------------------|
| 1. Instrument lamp | 12. Bolt | 24. Bezel |
| 2. Connector and contact assembly | 13. Bolt | 25. Bolt |
| 3. Bolt | 14. Compensator assembly | 26. Bezel spacer gasket |
| 4. Insulating grommet | 15. Filler cap | 27. Compass lens |
| 5. Connector plate insulator | 16. Friction washer | 28. Bezel sealing gasket |
| 6. Tape | 17. Card retainer assembly | 29. Lubber line |
| 7. Tape | 18. Filler cap gasket | 30. Jewel post cap |
| 8. Bolt | 19. Bolt | 31. Mounted jewel |
| 9. Compensator coverplate | 20. Expansion unit assembly | 32. Jewel spring |
| 10. Bolt | 21. Bolt | 33. Jewel post |
| 11. Compensator housing | 22. Expansion unit gasket | 34. Jewel post washer |
| | 23. Card assembly | 35. Compass case |

Figure 2-4. Magnetic Compass Assembly — Exploded View

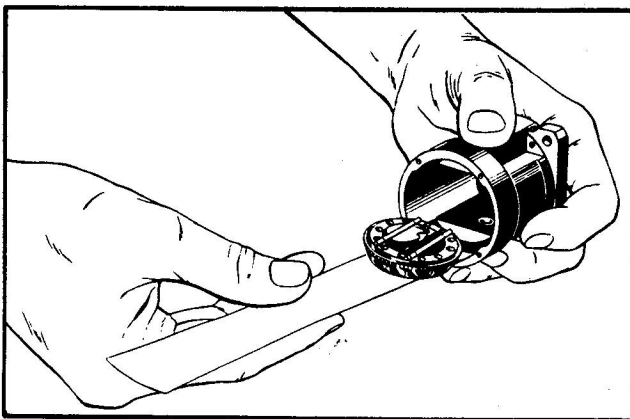


Figure 2-5. Removing Card Assembly

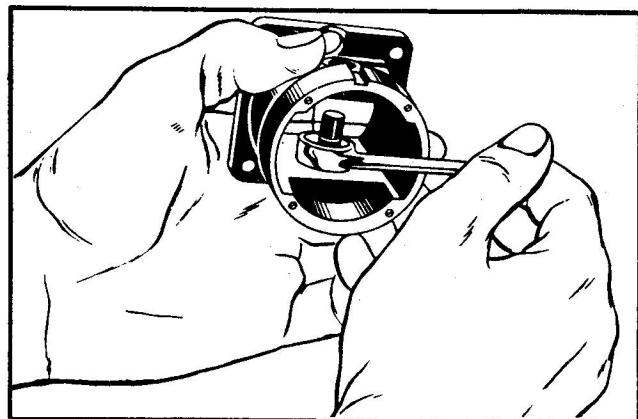


Figure 2-6. Removing Jewel Post Assembly

2-3. **CLEANING.** Wash all parts of the compass, except lens, connector and contact assembly, and instrument lamp in benzene.

Dry parts with a stream of compressed air from a pressure source not exceeding 20 psi. Make certain that all sealing compound has been removed from the case and the bezel and, if not, carefully scrape it off and rinse and dry the parts. After cleaning, carefully polish the mounted jewel with a small piece of pithwood.

Wash the lens with soap and warm water and rinse thoroughly to remove all traces of soap. Dry the lens with a lint free cloth or compressed air and, to safeguard against finger prints, avoid handling the lens after drying. Cover all parts with tracing paper or lint free cloth to prevent dust's contacting the parts prior to reassembly.

2-4. **INSPECTION.** All index numbers in Table II refer to figure 2-4.

TABLE II. INSPECTION

INDEX NO.	NOMENCLATURE	INSPECTION
1	Instrument lamp	Check red paint on glass of instrument lamp. If scratched, replace the lamp.
5	Connector plate insulator	Replace if cracked.
6 & 7	Acetate tape	Replace during reassembly.
9	Compensator coverplate	Straighten if bent; replace if broken. Relacquer if necessary in accordance with paragraph 2-18.
11	Compensator housing	Straighten if bent; replace if broken. Relacquer if necessary in accordance with paragraph 2-18.
14	Compensator assembly	Inspect for damaged gears, bent shafts, loose compensator housing, and loose magnets. Replace the entire assembly if any of these conditions exists.
15	Filler cap	Replace if cracked or otherwise damaged.
16	Friction washers	Replace if cracked or otherwise damaged.
17	Card retainer assembly	Check for broken spring and chipped or scratched paint. Replace for either condition. Check over-all length of spring with a one-inch micrometer (.635 ±.015).
18	Filler cap gasket	Replace during reassembly.
20	Expansion unit assembly	Check for distortion and visible cracks in bellows. Replace for either condition. Also check for chipped lacquer. Relacquer if necessary in accordance with paragraph 2-18. Check and set over-all length (.400 ±1/32).
22	Expansion unit gasket	Replace during reassembly.
23	Card assembly	Check for damaged graduations. Also check for bent or distorted pivot point and replace card assembly if any of these conditions exists.
24	Bezel	Replace if cracked or otherwise damaged. Also check for chipped lacquer. Relacquer if necessary in accordance with paragraph 2-18.
26	Bezel spacer gasket	Replace during reassembly.
27	Lens	Replace if cracked, broken, or scratched.
28	Bezel sealing gasket	Replace at reassembly.
29	Lubber line	Replace if bent or otherwise damaged. For correct removal of lubber line, refer to paragraph 2-2, s.

TABLE II. INSPECTION (Cont)

INDEX NO.	NOMENCLATURE	INSPECTION
30	Jewel post cap	Replace if damaged in cone or if cap is bent.
31	Mounted jewel	Check jewel with a magnifying glass for cracks. Feel the entire surface by rubbing the cup with the point of a sewing needle. If a crack or slightest imperfection is discovered, the jewel must be replaced.
32	Jewel spring	Check for correct length ($7/16 \pm 1/32$) and diameter ($.115 \pm .003$). Replace if distorted.
33	Jewel post	Replace if damaged.
34	Jewel post washer	Replace if broken or distorted.
35	Compass case	Check for cracks and damaged screw holes. Replace if cracked or if screw threads cannot be properly restored. Also check for chipped lacquer and relacquer if necessary in accordance with paragraph 2-18.

2-5. TESTING.

2-6. INSTRUMENT LAMP.

2-7. Using an ohmmeter, connect one lead to the insulated metal ring at the base of the lamp and the other lead to the screw plug. If a resistance reading of 2-1/2 to 3-1/2 ohms is obtained, the filament is intact and the bulb is in good condition. If no reading is obtained, either the filament is burned out or the connection at the base of the bulb is defective and the lamp must be replaced.

2-8. CONNECTOR AND CONTACT ASSEMBLY.

2-9. Connect one lead of an ohmmeter to the insulated terminal in the connector end of the connector and contact assembly and the other lead of the ohmmeter to the outer surface of the connector. If a reading is obtained, it is an indication that the connector is grounded and must be replaced. Connect one lead of an ohmmeter to the insulated terminal at the connector end of the connector and contact assembly and the other lead to the insulated contact tube at the threaded socket of the assembly to test for continuity of the wire and connections through the assembly. If connections are in good condition, a maximum reading will be obtained.

2-10. EXPANSION UNIT ASSEMBLY.

2-11. Install the two connector bolts, insulating grommets, and the two identification plate screws in the expansion unit assembly in order to seal the assembly. Place the thumb over the hole in the center without exerting pressure and, while holding the unit between the thumb and fingers, immerse it in a container of soapy water. Squeeze gently and maintain pressure for approximately 30 seconds. If air bubbles appear in the soapy water, the expansion unit is leaking.

CAUTION

Do not remove the thumb from the center hole

while holding the expansion unit immersed, as water would be drawn into the bellows.

2-12. CARD MAGNETS.

NOTE

In most cases, replacement of the card assembly will be more practical than attempting to recharge the card magnets. However, card magnets may be recharged, if desired, by using a simple watchmaker's demagnetizer and the improvised card and compensator magnet holder. (See figures 2-7 and 2-2.) Follow the routine described in paragraph 2-19.

2-13. After the jewel post assembly and the lubber line have been installed in the case, place the entire card assembly on the jewel post and immerse the assembly in a glass container filled with aircraft compass fluid, Military Specification 3-GP-31. Place the compass on the compass locating block (figure 2-2), and locate it where no metal objects will be in close proximity to the compass. Most metals possess a magnetic quality; therefore, if tools and/or other metal objects, close at hand, are moved during a comparison test, previous readings will be nullified. Rotate the card assembly 30 degrees from the normal position by holding a small bar magnet sufficiently near the compass to create a 30-degree deflection. Hold the magnet in this position until the card becomes steady at the 30-degree deflection. Release the magnetic pull on the card by quickly moving the magnet away and, at the same time, start a stop watch and measure the time interval required for the card to move 25 degrees. Repeat this procedure, rotating the card in the opposite direction. Place a test compass, which is known to be in good condition, in the same location and at the same angle as the compass being overhauled (move this compass out of reach) and compare the reading of the test

compass with that of the one tested previously. If, for the compass being tested, the time required for the card to move 25 degrees is equal to that of the test compass, the card magnets are properly magnetized; however, if the movement of the compass being tested is slower than that of the test compass, the card assembly must either be replaced or remagnetized in accordance with paragraph 2-19.

2-14. COMPENSATOR MAGNETS.

NOTE

In most instances, it is more practical to replace the entire compensator assembly than to attempt repair. However, the magnets may be recharged in accordance with paragraph 2-20.

2-15. After making certain that the card magnets possess the proper strength, as described in paragraph 2-13, remove large metal objects from the immediate compass location and place the compass on the compass locating block. (See figure 2-2.) With the compensator removed, rotate the compass locating block until the card indicates a north or south position. Rotate the "N-S" screw (using a plastic screwdriver) in the compensator until the magnets are in their neutral position (parallel to each other) and slide the compensator into the compass, while holding the compass rigidly on the locating block to prevent any movement which would change the north or south setting.

NOTE

It is imperative that a plastic screwdriver be used in all testing operations since a metal screwdriver will be magnetic and produce inaccurate readings.

2-16. Rotate the "N-S" screw slowly until maximum card deflection is obtained in one direction. This deflection should be from 30 to 40 degrees. Record the degree of deflection so that it can be compared to the test compass (one known to be in good condition). Rotate the screw to produce maximum deflection in the opposite direction and record the results. This reading should be approximately the same as that in the previous direction. Position the compass locating block so the card indicates either an east or west position, and repeat the above procedure for testing the east and west deflections with the "E-W" screw. Remove the compass from the compass locating block and, without moving the block, place the test compass in exactly the same location on the block. Test this compass in accordance with the above instructions. If the readings obtained during the previous compass test are the same, the compensator magnets in the compass being tested are in good condition; but, if the readings are lower than in the previous test, the compensator assembly should be replaced, or the compensator magnets recharged in accordance with paragraph 2-20.

2-17. REPAIR OR REPLACEMENT.

2-18. REPAINTING PARTS. On all parts having chipped or worn painted surfaces, feather the edges of the chipped surface with No. 320 wet or dry abrasive

paper and remove all abrasive dust with compressed air. Using a spray gun adjusted to produce a fine spray, repaint the surface with black lacquer, Federal Specification TT-L-54, or an equivalent.

NOTE

No attempt should be made to repaint the card. If the indications on the card are damaged or the paint has been chipped, the card assembly should be replaced.

2-19. REMAGNETIZING CARD MAGNETS. If it is desired to remagnetize the card magnets, this can be accomplished by using a typical watchmaker's demagnetizer shown in figure 2-7, and the improvised card and compensator magnet holder shown in figure 2-3.

a. Place the card assembly in the card and compensator magnet holder (figure 2-3), with the card magnets bridged between the two pairs of nails, and position the card in the approximate center of the demagnetizer opening. (See figure 2-7.) While holding the card in this position, have a second operator press the switch on the demagnetizer, holding it for an instant, and then releasing it quickly. This demagnetizer operates on alternating current and, due to the nature of the electrical reaction at the instant the switch opens, the card magnets will be magnetized fully, partially, or demagnetized, and the polarity may be reversed. Experience has disclosed that in approximately 5 percent of all cases, the magnets will not be affected; in 47-1/2 percent of all cases, the magnets will be charged with correct polarity; and in 47-1/2 percent of all cases, the magnets will be charged with incorrect polarity. It may be necessary, therefore, to make several trials before the magnets are restored to full strength and correct polarity. Correct polarity of the card can be determined by setting it on the jewel post assembly after each trial and comparing it with the card in the test compass.

CAUTION

When removing and installing the card assembly in the compass case, be sure to use the method shown in figure 2-5.

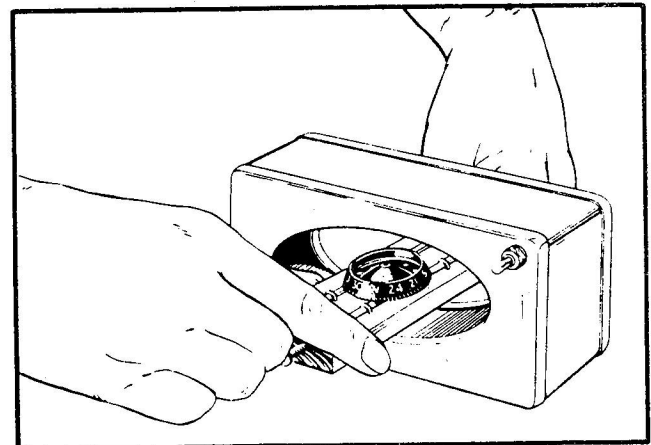


Figure 2-7. Remagnetizing Card Magnets

b. Insert the card in the compass case, with the card resting on the jewel post, and immerse the compass in a glass container filled with compass fluid, Specification 3-GP-31. Test for proper card deflection in accordance with instructions given in paragraph 2-13. It is likely that the deflection will be too great because the magnets will probably be overcharged, and it will be necessary to reduce the charge to a value which will produce the proper card deflection.

c. To make this reduction, remove the card assembly from the compass and place it on a wooden or plastic ruler with the magnets parallel to the ruler.

d. Hold the card assembly approximately eight inches from the opening in the watchmaker's demagnetizer and, while holding the demagnetizer switch closed, draw the card slowly away from the demagnetizer until it is out of the effective magnetic field.

e. Place the card assembly in the compass, immerse the compass in the liquid, and test to determine if the magnets have been sufficiently reduced to produce the correct degree of deflection. It may be necessary to repeat this operation several times in order to restore the magnets to their proper charged strength. If the first operation fails to reduce the magnet strength sufficiently, the next operation should be begun by placing the card an inch or two closer to the demagnetizer before pulling it away. A few such trials will enable the operator to restore the magnet strength with little difficulty.

2-20. REMAGNETIZING COMPENSATOR MAGNETS.

It is unlikely that the compensator magnets will ever lose their charge; however, if they do, it is usually more practical to replace the entire compensator assembly than to attempt to recharge the magnets. If, however, it is desired to recharge the magnets, follow the procedure given below.

a. Check the card deflection in accordance with paragraph 2-14 to determine if the compensator magnets are weak.

b. Drill the rivet heads out of the recesses in the upper portion of the two-piece diecast compensator frame.

c. Separate the two portions of the frame and remove the compensator shafts. Do not attempt to remove the magnets from the shafts as they can be charged while in place.

d. Using the improvised card and compensator magnet holder (figure 2-3), place one of the shafts that control the north and south deflections between one pair of large nails, so that the magnet will be held lengthwise between the nails.

e. Insert the card and compensator magnet holder in the center of the demagnetizer and hold the switch closed for a few seconds; then release it quickly and remove the shaft from the holder. As with the card magnets, approximately 5 percent of the trials will produce no effect; 47-1/2 percent will charge the magnets properly; and the remaining 47-1/2 percent will indicate reversed polarity. Reversing polarity will not affect the compass operation since the shaft can be turned 180 degrees so that the proper attraction will be imposed on the card magnets.

NOTE

One end of each compensator magnet is dyed

black so that the proper relationship between magnets can be established visually when re-assembling the compensator. If the polarity of the magnets has been reversed, the markings should be changed before reassembly.

f. Position the compass case on the compass locating block, with the card set at a cardinal position for easy reading. Insert the shaft with the newly charged magnet in the correct position in the lower portion of the diecast frame, and slide the frame into the compass case.

g. Using the plastic screwdriver, rotate the compensator shaft to produce maximum card deflection in one direction. The deflection should be approximately 20 degrees but should be compared to the test compass for accuracy.

h. Rotate the compensator shaft to produce maximum card deflection in the opposite direction. These deflections should be identical. It is probable that the magnet will have greater strength than is necessary. Greater strength will produce excessive card deflection. Therefore, it will be necessary to reduce the strength of the magnet in accordance with the following instructions.

i. Remove the lower portion of the frame from the compass case, remove the shaft from the frame, and insert the magnet between the two large nails in the same manner as when the magnet was charged.

j. Hold the card and compensator magnet holder approximately eight inches from the demagnetizer (switch closed) and draw the holder away from the demagnetizer along a straight line until it is out of the effective magnetic field. It will be necessary to again insert the shaft into the lower portion of the compensator frame and slide the frame into the compass case to check for proper deflection. Repeat this operation as many times as necessary. When the deflection is approximately 20 degrees, the strength will be near the correct value. The actual value can be determined only after both north and south magnets have been charged and reduced to equal strength, inserted in the compass case, and the deflection compared with that of the test compass.

k. Recharge the east and west magnets in accordance with preceding instructions.

l. When all compensator magnets have been restored to their proper magnetic value, assemble the compensator so that each pair of magnets, when in line with each other, will have a north pole adjacent to a south pole.

m. To assemble the two portions of the diecast frame, it will be necessary to drill through the lower frame and install a small rivet at each corner to hold the frame together. These rivets should be soft, preferably aluminum, for easy upsetting and, if not aluminum, must be of another metal which has no magnetic attraction. The rivet heads must be recessed so there will be no interference when the compensator assembly is slipped into the compass case. If preferred, the lower case can be drilled and tapped and, in place of the rivets, small screws installed to hold the two portions of the compensator frame together.

2-21. ADJUSTING LUBBER LINE.

a. Remove the compensator from the test compass and place the compass on the compass locating block.

positioning it accurately against the small blocks (figure 2-2).

b. Remove all metal objects within an approximate 24-inch radius of the compass, and allow the card to settle.

c. Record the exact reading and remove the compass from the block.

d. Without moving the block, place the compass being overhauled in exactly the same position on the locating block and allow the card to settle. The reading should be exactly the same as the test compass reading. If a slight variation exists, press the lubber line carefully with the tip of the finger, while holding the compass tightly against the locating block, to prevent any movement. (See figure 2-8.) The lubber line can be slightly bent in this manner if care is exercised. After the lubber line is in correct alignment with the proper mark on the card, check for vertical positioning and straighten if necessary. The lubber line must also clear the dial when the compass is tilted as much as 18 degrees.

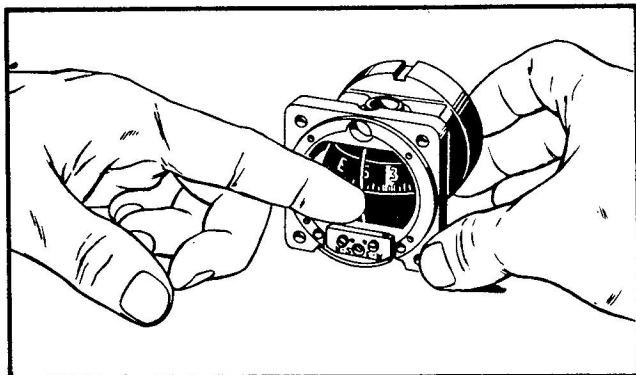


Figure 2-8. Adjusting the Lubber Line

2-22. LUBRICATION. No lubrication is required.

2-23. REASSEMBLY.

a. Insert the jewel spring (32, figure 2-4) in the jewel post (33) and place the mounted jewel (31) on top of the spring. Make certain that the recessed end of the mounted jewel faces upward.

b. Carefully position the jewel post cap (30) on the jewel post (33) and rotate it clockwise until tight.

c. With the adhesive tape, which was used for removal, still on the jewel post cap (30), hold the hexagonal portion of the jewel post in a vise or with a hex-socket wrench, and tighten the cap firmly with dull pliers. Exercise care not to grasp the cap tightly enough to distort it.

d. Using a small piece of pithwood, depress the mounted jewel against the spring and release it to make certain that the jewel is free to move up and down in the jewel post. If the jewel binds, remove it to determine the trouble and make necessary corrections.

e. Place the jewel post washer (34) over the threads at the bottom of the jewel post (33) and screw the jewel post assembly into the case (35). Tighten with a 1/2-inch box-socket or open-end wrench. (See figure 2-6.)

f. Place the card assembly (23, figure 2-4) upside down on the piece of paper used for removing it, and slide it into the case (35) until the needle of the card

assembly is above the filler cap (15). (See figure 2-5.) Turn the case to an upright position which will allow the needle on the card to drop into the jewel cone, and slide out the strip of paper.

g. Place the two friction washers (16, figure 2-4) in the filler cap. Insert the filler cap gasket (18) into the filler cap and screw the filler cap on the case finger tight.

NOTE

The filler cap should not be tightened at this time as it will be necessary to remove it in order to fill the compass with liquid after it is completely assembled. It should, however, be installed at this time to prevent the card's falling out of place.

h. If the lubber line (29) was removed during disassembly, place a new lubber line into position and carefully press the ends of the lubber line into the notches in the case with a thin blade screwdriver or pen knife blade. Exercise care to prevent distorting the lubber line.

i. Test the card magnets in accordance with paragraph 2-12. Also, at this point, the lubber line should be adjusted to its correct position in accordance with paragraph 2-21.

j. Position the case (35) with the mounting face upward and place the bezel sealing gasket (28) in the recess of the case.

k. Carefully slide the lens template (figure 2-1) over the lens (27, figure 2-4) from the top edge, and position the template so there will be an equal amount of play at each side of the lens. While holding the template tight against the lens, spray with a heavy coat of white lusterless lacquer enamel, Military Specification JAN-L-73, and allow it to dry enough to prevent smearing before removing the template. Bake the painted lens for six hours at a temperature of 93°C (200°F).

NOTE

Painting of the lens is necessary in order to produce proper light reflection. Do not handle the surface of the lens with the fingers.

l. Grasp the lens (27) by its edges and carefully lay it on top of the gasket (28).

NOTE

It is advisable to replace all gaskets at time of overhaul.

m. Place the bezel spacer gasket (26) on the lens (27), positioning it evenly from all sides, and install the bezel (24) with the four bolts (25). Tighten the bolts (25) progressively to avoid reversing the concave surface of the bezel.

NOTE

The bezel is slightly concave, and the bolts should be tightened until it is almost flat. Check often by laying a straight edge across the bezel. If the bolts are tightened to the

extent that the bezel is flat or slightly convex, the lens will probably be cracked even though the crack may not appear until later.

n. Place the expansion unit gasket (22) on the expansion unit (20) and rotate it until all screw holes in the gasket are in alignment with the screw holes in the expansion unit assembly.

o. Place the case (35) on a flat surface, mounting face downward, and carefully position the expansion unit assembly (20) on the case. Make certain that the screw holes for attaching the connector and contact assembly (2) are in correct position. Install the four bolts (21) and tighten progressively. Place the compensator housing (11) in position on the bottom of the case (35) and install the two bolts (13) at the front end and one bolt (12) at the rear.

p. Remove the filler cap (15) from the case (35) and insert the compass into a container prepared for filling the compass by means of evacuation. The container should be fitted with an air tight lid so that a vacuum line and gage can be attached to the lid in order to evacuate all air from the compass when filling it with fluid. (See figure 2-9.) The size of the container should not be any larger than necessary to accommodate the compass in an upright position and to permit hand room for installing the filler cap, while the compass is immersed in the fluid.

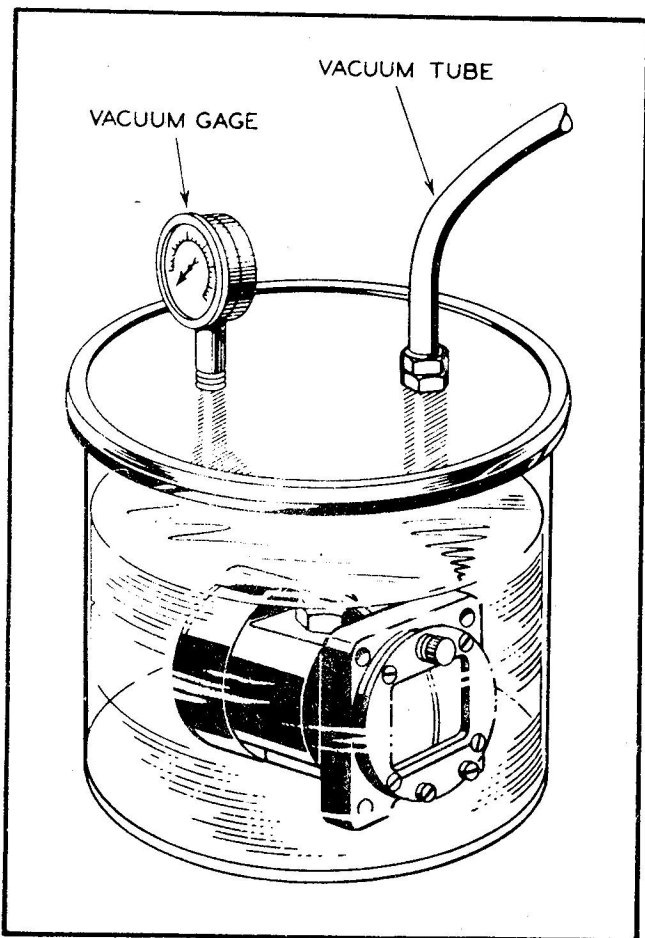


Figure 2-9. Evacuating Container

q. Holding the compass in the evacuating container, fill the compass with fluid and remove all air bubbles by rotating it end to end and side to side several times. Add fluid to the container until it is approximately 1/2-inch above the top of the compass. (See figure 2-9.) Place the rubber gasket under the flat lid and close the container. Connect the tube in the lid to a vacuum pump and evacuate to 28-29 inches Hg as shown on the vacuum gage which is also attached to the lid. Continue the evacuating process for a minimum of three hours in order to remove all traces of air from the compass assembly.

r. After the evacuating process has been completed, immerse the filler cap (15), with the card retainer assembly (17) and gasket (18) in place, with the retainer assembly facing upward. While the assembly is immersed in the fluid, work the retainer into the filler opening. Screw the cap down as tight as possible with the fingers.

CAUTION

The filler cap must always be installed while the compass is immersed in fluid.

s. Carefully remove the compass from the container and tighten the filler cap securely with a socket or box-socket wrench. Exercise care when removing the compass from the fluid to be sure that the filler cap has been tightened sufficiently to prevent any possibility of air being drawn into the compass. If the compass is not raised too rapidly, the surface tension of the fluid will help prevent the admission of air.

t. Remove the fluid from the outside of the compass with compressed air and insert the strip of electrical acetate tape (6) in the groove at the upper rear of the compass case (35) and install the second piece of electrical acetate tape (7) on the filler cap (15). This tape must be aligned with the connector and contact assembly (2).

u. Apply a heavy coating of aircraft instrument sealing compound Specification MIL-C-4003 to bottom edge of lens with a No.2 touch-up brush. Exercise care to apply the compound completely across the bottom of the lens, in the corners, and along the edge of the bezel. The material should be applied so that no air bubbles appear. Make certain that the compound does not get on the face of the compass or the lens; if it does, however, it can be removed with a clean cloth moistened with alcohol. The purpose of applying this sealing compound is to prevent light spilling out at the bottom of the lens and through the compensator door and housing. At night, this light filtration could cause glare and distraction to the pilot.

v. Attach the compensator coverplate (9) to the bezel (24) with the bolt (10) but do not tighten at this time. Insert the bolt (8) in the bezel (24) but do not tighten.

w. Set the compass on the locating block and position it on either a north or south heading. Neutralize the compensator by matching the dots on the compensator shafts with those on the compensator frame and slide the compensator assembly (14) into position. Using the finger tips, push the compensator rearward as far as it will go and, if the card deflection exceeds one degree, adjust the "N-S" screw, using the plastic screwdriver. Remove the compensator assembly (14) and repeat the procedure for either an east or west heading. Rotate

the compensator coverplate (9) over the compensator opening and tighten the bolts (8 and 10).

x. Insert the connector and contact assembly into the hole in the compass mounting flange and, if the lamp socket end of the connector and contact assembly does not slide easily into the opening in the compass, screw the end of a 5/16-32 cap bolt, shown in figure 2-10, into the lamp socket and carefully tighten the nut on the bolt to pull the lamp socket through the compass flange. Be sure to use a soft plastic gasket under the nut to prevent marring the bezel. Also, when screwing the cap bolt into the lamp socket, stop just before the end of the bolt contacts the connector tube to avoid damaging it. By using the puller, the connector and contact assembly can be installed without danger of bending the tubing which connects the lamp socket with the connector at the back. Carefully position the connector, at the back of the connector and contact assembly (2, figure 2-4), on the expansion unit assembly (20), and slide the connector plate insulator (5) between the expansion unit and the attaching flange on the connector assembly. Install the two bolts (3) with the insulating grommet (4) on each bolt and tighten securely.

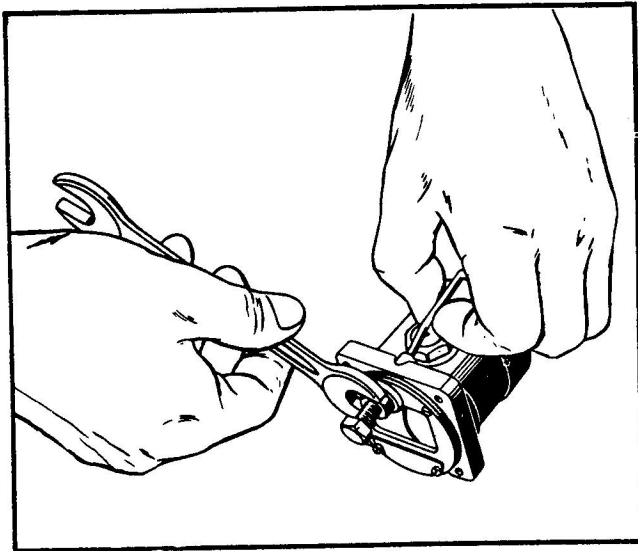


Figure 2-10. Installing Connector and Contact Assembly

y. Place the compass on the plate of an arbor press and carefully apply light pressure to the connector tube to force it down into the groove at the rear of the case. Do not apply heavy pressure at this point.

z. Screw the instrument lamp (1) into the lamp socket in the end of the connector and contact assembly. Fill the space at back of light socket with aircraft instrument sealing compound, Specification MIL-C-4003. Pack compound firmly and smooth off the surface with a stick moistened with alcohol. Also, fill the narrow gap between the bezel and the case with the compound, carefully wiping off the surplus with a clean cloth. Make certain there are no open spots. It is important that each compass be completely sealed so that, during night flying, there will be no light spilling out around the bezel. Check for light leakage by placing the compass in a dark room, and apply additional sealing compound if necessary.

2-24. CONVERSION KIT.

TABLE III. CONVERSION KIT CONTENTS

Part No.	Part Name	Quantity
CB21-313	Card assembly	1
CB21-232	Jewel post cap	1
CB21-201M	Jewel post	1
CB21-233	Jewel spring	1
CB21-314	Card retainer assembly	1
CB21-710A	Friction washer	2

2-25. A conversion kit, No. CB21-313MK can be procured for converting, at time of overhaul, or when replacement of the card is required, all early style compasses not equipped with the present style jewel post and card assemblies. Compasses having the early style parts are those with serial numbers between AF51-1 and AF51-656 and between AF51-1 and AF51-1750. Contents of Kit No. CB21-313MK are listed in Table III.

CAUTION

Complete familiarization with this handbook of overhaul instructions is essential before conversion of an early style compass is attempted, using this kit.

a. Disassemble the compass in accordance with the prescribed procedure.

NOTE

Removal of the bezel, lens, or lubber line is not required.

b. Remove the jewel post and the card assembly from the case. Disassemble, and discard all of these parts except the mounted jewel.

c. Remove the jewel post from the kit, and drop the mounted jewel (removed from the original jewel post) into the jewel hole in the new jewel post. It should fall freely into the hole. If the jewel shows evidence of binding, do not force it into the hole, but remove it and proceed as follows.

d. Check the outside diameter of the mounted jewel. Ream the jewel post hole with a suitable reamer from 0.002 inch to 0.003 inch larger than the outside diameter of the mounted jewel.

NOTE

If a reamer is not available, select a mounted jewel from stock and check it for "drop fit" in the jewel post hole.

e. Reassemble the jewel post assembly and check it in accordance with regular overhaul procedure.

f. Obtain a new jewel post washer from stock and install the jewel post assembly in accordance with the regular overhaul procedure.

g. Install the dial, expansion unit, and proper gaskets obtained from stock, and assemble the compass in accordance with regular overhaul procedure.

CAUTION

If the lubber line has not been removed, it

will be necessary to check the dial clearance up to an 18-degree tilt before completely assembling the compass. If a new lubber line has been installed, it is also advisable to check the dial-lubber line clearance before completely assembling the compass.

**SECTION III
TEST PROCEDURE**

3-1. Because of the construction of the Magnetic Compasses, all portions of the unit will have been tested

during the reassembly process, and the unit is ready for installation.

MAGNETIC COMPASS**MODEL AN5766-T3**

THE INSTRUCTIONS CONTAINED IN PRECEDING SECTIONS OF THIS HANDBOOK APPLY EXCEPT FOR THE DIFFERENCES GIVEN IN THIS DATA SHEET.

LEADING PARTICULARS. Same as for AN5766-3.

SPECIAL TOOLS. Same as for AN5766-3.

DISASSEMBLY. Same as for AN5766-3.

NOTE

This compass has removable spring lock nuts inserted in the mounting holes for convenience when mounting the compass on the back side of the panel. When mounting on the front of the panel, it will be necessary to remove these spring lock nuts from the mounting holes. Therefore, when compasses are received for overhaul purposes, the data plate may indicate that it is an AN5766-T3, although the spring lock nuts are not present. With the spring lock nuts removed, the AN5766-T3 compass is identical with the AN5766-3.

CLEANING. Same as for AN5766-3.

INSPECTION. Same as for AN5766-3.

TESTING (during overhaul). Same as for AN5766-3.

REPAIR OR REPLACEMENT. Same as for AN5766-3.

LUBRICATION. None required.

REASSEMBLY. Same as for AN5766-3. (See above "Note.")

TEST PROCEDURE (after overhaul). Same as for AN5766-3.

MAGNETIC COMPASS**MODEL AN5766-T4**

THE INSTRUCTIONS CONTAINED IN PRECEDING SECTIONS OF THIS HANDBOOK APPLY EXCEPT FOR THE DIFFERENCES GIVEN IN THIS DATA SHEET.

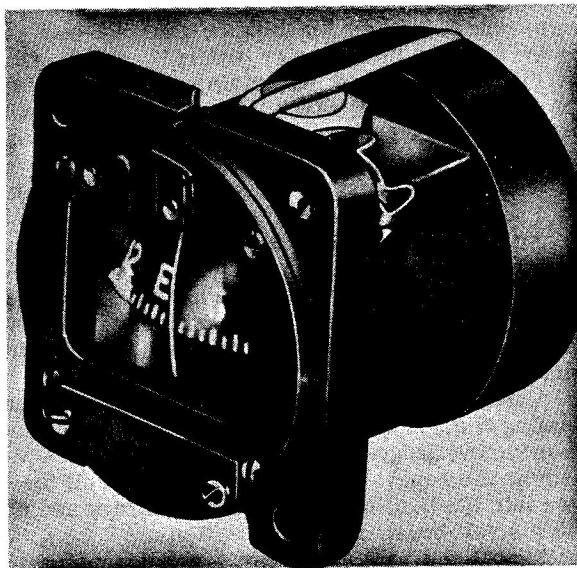


Figure 4-1. Identifying View of AN5766-T4 Compass

LEADING PARTICULARS. Same as for AN5766-3, except that the lamp voltage is 28 volts, direct current.

SPECIAL TOOLS. Same as for AN5766-3.

DISASSEMBLY. Same as for AN5766-3, except for the following differences. (See figure 4-2.)

- a. The lamp is removed by rotating the cover on the connector and contact assembly to the open position. The spring behind the lamp will be free to fall out.
- b. The connector plate insulator (5, figure 2-4) and tape strips (6 and 7) are not used on this compass.

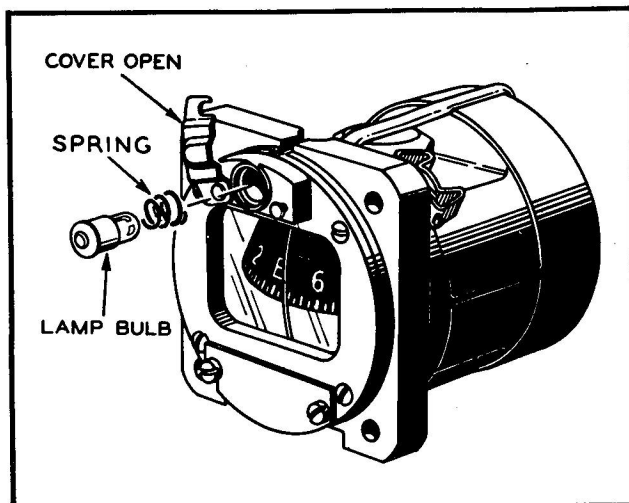


Figure 4-2. Lamp Removal and Replacement

c. The connector and contact assembly is removed in accordance with the following routine: Release the connector at the back of the compass by removing the two bolts (3). Bend the tube upward enough to allow it to move over the back edge of the compass and slide the lamp socket out of the hole in the bezel and mounting flange of the case. The mating slot in the mounting flange and bezel will permit the tube to slide out when rotated at approximately 90 degrees from the mounted position.

NOTE

The insulating grommets (4, figure 2-4) are not used on this compass.

CLEANING. Same as for AN5766-3.

INSPECTION. Same as for AN5766-3.

TESTING (during overhaul). Same as for AN5766-3, except the resistance reading should be between 68 and 72 ohms.

REPAIR OR REPLACEMENT. Same as for AN5766-3.

LUBRICATION. None required.

REASSEMBLY. Same as for AN5766-3, except for the following differences.

a. Do not install the tape strips (6 and 7, figure 2-4), connector plate insulator (5), and insulating grommets (4), as these parts are not required on this compass. Install the connector and contact assembly as follows: Slide the tube into the slot at the top edge of the bezel and mounting flange of the case, and when it reaches the bottom of the slot rotate the tube to position the lamp socket horizontally with respect to the case. Then press the lamp housing into the mating hole in the bezel and mounting flange of the case, making certain that the boss on the lamp housing enters the locating hole in the bezel. When the lamp housing is flush against the bezel, bend the tube carefully to position the connector at the proper location for attaching to the expansion unit assembly (20) with the two bolts (3).

b. Cut a soft, 3/4-inch diameter rod (wood or plastic) so it will have a long taper at one end. Slide the tapered end of the rod between the light tube and expansion unit, with the flat surface against the expansion unit, and carefully pull the tube out to form a definite loop in the light tube. This will insure the proper seating of the tube inside the plastic lamp housing.

c. Install the lamp and spring by rotating the lamp socket cover into the open position, sliding the spring into the socket (large end first), inserting the lamp into the socket with the base facing outward, and closing the cover on the socket.

d. Seal the light leaks around the lamp housing and bezel in accordance with paragraph 2-23, z.

TEST PROCEDURE (after overhaul). Same as for AN5766-3.

CONVERSION KIT. A conversion kit No. CB21-550MK can be procured for converting an AN5766-T3 compass to an AN5766-T4 compass. This conversion adapts the AN5766-T3 so it can be lighted with 28 volts, direct current instead of three volts, direct current. Contents of kit No. CB21-550MK are listed in Table IV.

TABLE IV. CONVERSION KIT CONTENTS

Part No.	Part Name	Quantity
CB21-550	Connector and contact assembly	1
CB21-601-4	Bezel	1
CB21-735H	Identification plate	1
CB21-915G	Bezel sealing gasket	1
AN3140-327	Instrument lamp	1

CONVERSION PROCEDURE.

a. Remove the present connector and contact assembly in accordance with paragraph 2-2, a through e. Discard insulating grommets (4, figure 2-4), connector plate insulator (5), and tape strips (6 and 7).

b. Place a rectangular piece of rubber (1/4 inch thick x 7/8 inch x 1-1/4 inch) on the lens. Install a three-inch "C" clamp on the rubber pad with the clamp screw against the expansion unit at the rear of the compass. Allow room for a second "C" clamp on the rubber pad. A small piece of paper should be used to protect the paint on the rear of the compass.

c. Tighten the clamp enough to prevent possible air leakage, but do not tighten in excess of 50 psi.

d. Remove the four bezel bolts (25, figure 2-4), and lift the bezel (24) up and over the frame of the "C" clamp.

e. Using a small pen knife, remove the sealing compound from around the mounting face of the case.

f. Slide the new bezel (CB21-601-4) and new bezel sealing gasket (CB21-915G) on the screw of a second three-inch "C" clamp, making certain that both parts are arranged in their proper order.

g. Install the second "C" clamp alongside the first "C" clamp with the screw of the second clamp against the rubber pad. Tighten the second clamp equal to the first clamp.

h. Remove the first clamp with the old bezel and bezel sealing gasket. Discard the bezel and gasket.

i. Attach the new bezel and bezel sealing gasket in accordance with paragraph 2-23, m.

j. Remove the second "C" clamp and rubber pad.

k. Remove the compensator cover plate (9) from the old bezel (24) and attach it to the new bezel with the same bolts that held it to the old bezel.

l. Using a jeweler's saw, fine tooth hack saw, or an equaling file, cut a 3/32-inch width slot in the top of the mounting flange of the case in line with the slot already in the bezel. This slot must extend all the way down into the light hole. Remove all filings and chips with a small brush or compressed air.

m. Install the new connector and contact assembly (CB21-550) in accordance with the preceding paragraph entitled, "REASSEMBLY."

n. Remove the identification plate from the expansion unit and discard it. Install the new identification plate (CB21-735H).

o. Install the new instrument lamp (AN3140-327), and seal light leaks around the bezel and light housing in accordance with paragraph 2-23, z.