

ROYAL CANADIAN AIR FORCE



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REPAIR & OVERHAUL  
INSTRUCTIONS  
COMPASS STANDBY, TYPE  
AN5766T3

ISSUED ON AUTHORITY OF THE CHIEF OF THE AIR STAFF

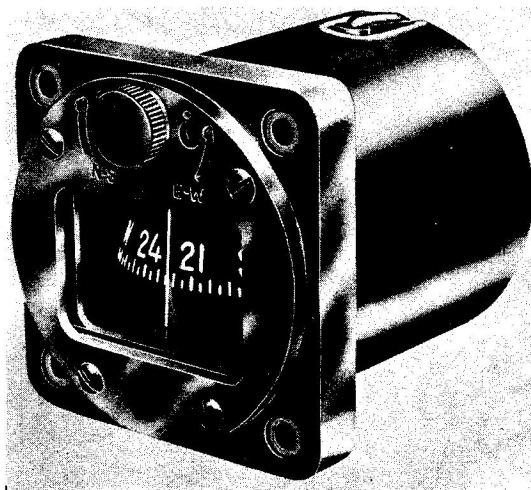
# LIST OF RCAF REVISIONS

<b>DATE</b>	<b>PAGE NO</b>	<b>DATE</b>	<b>PAGE NO</b>
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## SECTION I

### INTRODUCTION



**Figure 1-1. Standby Compass**

#### 1-1. GENERAL.

1-2. This handbook covers the overhaul and test procedures for the Standby Compass manufactured by Kollsman Instrument Corporation, Elmhurst, New York. (See figure 1-1.)

1-3. The following are the part number designations:

<i>Part Number</i>	<i>AN Type Number</i>
1630U-4-03	AN5766T3

1-4. Sections II and III contain overhaul and test instructions for the above type Standby Compass. Overhaul and test instructions for additional models are provided in Section IV by the use of Difference Data Sheets. The models included in Section IV are listed on the Difference Data Sheet Index.

#### 1-5. DESCRIPTION

The standby compass is designed as an emergency compass to be used in the event the remote indicating compass fails. It is a short period magnetic compass and is intended to indicate continuously the heading of the aircraft with reference to the earth's magnetic field.

#### LEADING PARTICULARS

##### ILLUMINATION:

Major Markings, C-28-96

Minor Markings, AN-L-1a

ELECTRICAL CONNECTION: 3 volts dc

WEIGHT: 7.6 oz.

MOUNTING: Tinnerman nuts

## SECTION II

### OVERHAUL INSTRUCTIONS

#### 2-1. SPECIAL TOOLS.

2-2. There are no special tools required to overhaul the Standby Compass.

#### 2-3. DISASSEMBLY.

2-4. Disassemble per figure 2-1 as follows:

- a. Remove four screws (2) and lockwashers (3). Unsolder red and white leads from light plug socket (1).
- b. Remove two screws (5) and wire clamp (4).
- c. Remove three flat head screws (8). Carefully with-

draw shell assembly (7) while directing wire through grommet (6).

d. Remove two screws (10), lockwashers (11) and lift off compensator plate (9). Remove spring washers (13), E-W and N-S drive gears (14 and 15), drive gear washers (16) and both N-S magnet gear assemblies (17 and 18). Loosen locknut (19) and back out bearing screws (20). Lift out both E-W magnet gear assemblies (21 and 22).

- e. Unscrew lamp (23).

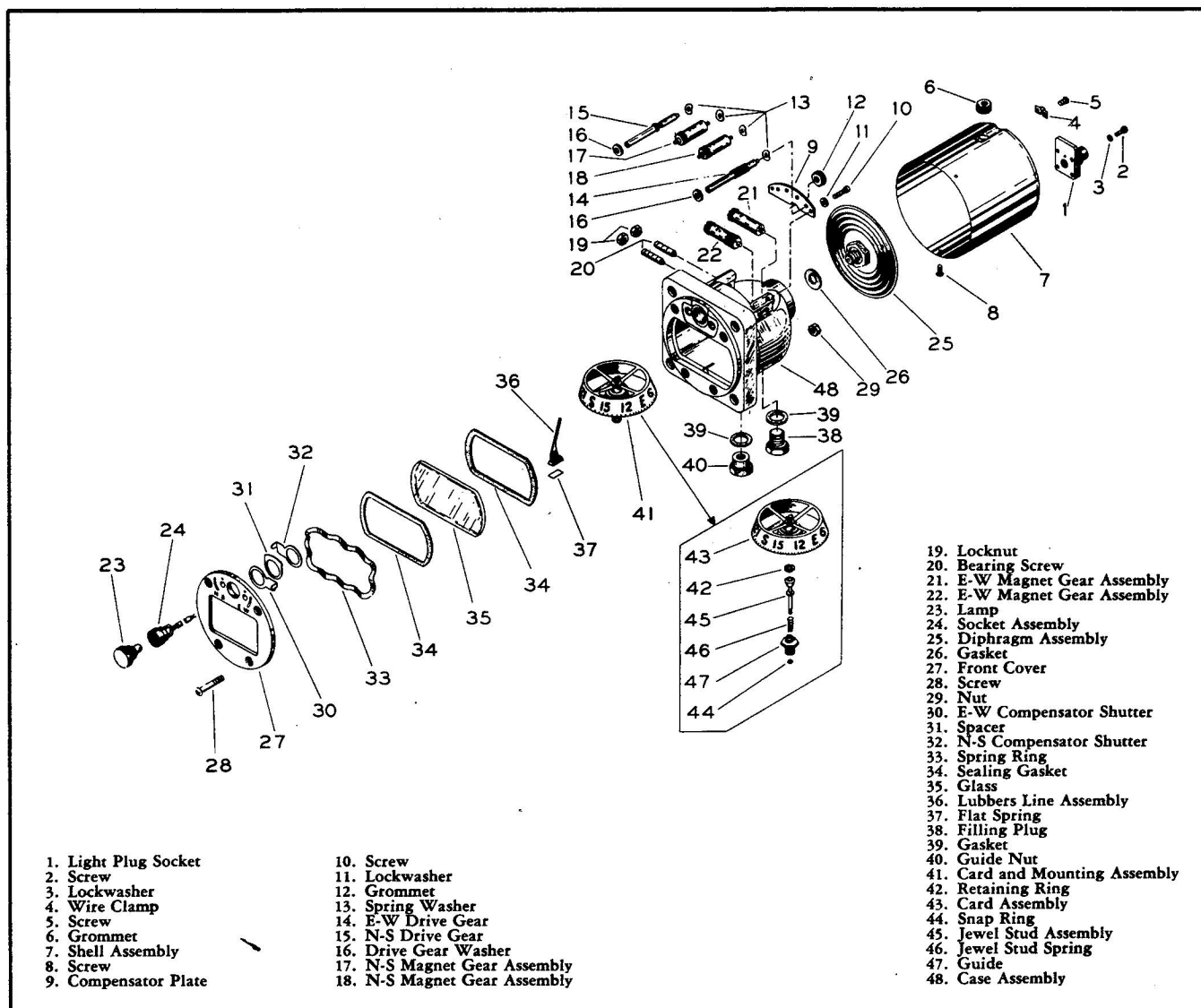


Figure 2-1. Standby Compass

**Note**

The socket assembly (24) is pressed into the case assembly. Have sufficient slack in the wire leads to prevent their breaking if it is necessary to remove the socket assembly.

f. With a suitable wrench unscrew diaphragm assembly (25). Examine gasket (26). If conditions warrant, replace it.

g. Remove four screws (28), nuts (29) and lift off front cover (27), compensator shutters (30 and 32), spacer (31), spring ring (33), sealing gaskets (34) and glass (35).

h. Slide lubbers line assembly (36) and flat spring (37) from groove in case.

i. Remove guide nut (40) and carefully direct card and mounting assembly (41) from case assembly (48).

**2-5. DISASSEMBLY OF CARD AND MOUNTING ASSEMBLY.**

a. Pick out retaining ring (42) from center of card assembly (43).

b. Remove snap ring (44) and slide jewel stud assembly (45), and jewel stud spring (46) from guide (47).

**2-6. CLEANING.**

2-7. GENERAL. Clean all parts, with the exception of the card assembly, in benzine or some other approved solvent and dry with air from a hose.

2-8. LENS. The lens may be cleaned with soap and water and then rinsed.

2-9. JEWEL. Clean the jewel in benzine or other approved solvent, and then rub with pithwood.

2-10. PIVOT. Clean the pivot by pressing it into the end grain of a piece of pegwood and twirl.

**2-11. INSPECTION.**

2-12. CASE. Inspect for cracks. Cracks are cause for rejection. All internal surfaces must be dull black.

2-13. DIAPHRAGM. If the diaphragm visually appears to be in good condition, it may be used again.

2-14. LENS. Inspect for cracks, chips or air bubbles which might interfere with a clear, undistorted vision of the card and lubbers line. Replace it if any of these faults are apparent.

2-15. ELECTRICAL CIRCUIT. Check the circuit for continuity. (See figure 2-2.)

2-16. JEWEL STUD ASSEMBLY. Inspect the jewel for cracks or chips. Replace if necessary.

2-17. CARD ASSEMBLY. The card should be absolutely round as checked against a circle 1.625 inches in diameter.

**2-18. TESTING.****2-19. CARD ASSEMBLY.**

a. The bottom surface of the card should not be distorted as compared with a flat surface.

b. Check card assembly for balance by placing it on a jewel and stud in a test bowl. The deviation of the plane of the card from the horizontal should not be greater than one degree.

2-20. CARD MAGNETS. It is seldom that card magnets require magnetizing. A practical method of testing the strength of magnets is to place the magnet and card assembly on a jewel stud in a test bowl and, using another magnet, deflect the card 30° from its position of rest. Hold the card in this position until the liquid comes to rest and then withdraw the magnet. Note by means of a stop watch, the time it takes to pass through 25 degrees. Deflect the card in the opposite direction and repeat the test. The average of the two times should not exceed 1.8 seconds nor be less than 1.4 seconds. The time of swing from equal angles either side of the equilibrium position should be the same for both directions. Improperly magnetized magnets or an unbalanced conditioned of the card may be the cause of unequal periods.

2-21. COMPENSATOR MAGNETS. It is seldom that compensator magnets require magnetizing; however, if it is necessary they may be charged while in the magnet gears, but they must be removed from the case assembly.

a. A method of determining the strength of the compensator magnets is to install the compensators in a compass that has card magnets known to be of full strength. With the compensator magnets in the neutral position and the compass aligned on a N-S axis, apply the maximum amount of compensation by means of the N-S magnets. The deflection should not be less than 30 degrees, nor more than 40 degrees. Repeat this test with the compass aligned on E-W axis and adjust

E-W compensating magnets. The deflection should not be less than 30 degrees nor more than 40 degrees.

b. Another method of determining if the compensator magnets are too strong is to place the magnets in the neutral position and align the compass on the N-S axis. Apply the maximum amount of compensation by rotating the E-W magnets. The card deflection should not exceed 2 degrees. Repeat by aligning the compass on the E-W axis and rotate the N-S magnets.

**Note**

The dot stamped on one side of each compensator magnet gear, indicates the north-seeking pole of the magnet. The E-W magnet should be magnetized to a lesser degree than the N-S magnets since they are nearer the compass magnets and their effect is greater than that of the N-S magnets.

**2-22. REPAIR.**

2-23. GUIDE ASSEMBLY. Check the movement of the jewel stud assembly in the guide by allowing it to drop of its own weight in the bearing hole. Stickiness due to corrosion may be cleaned, using a 0.635  $\begin{smallmatrix} +0008 \\ -0000 \end{smallmatrix}$  inch reamer.

2-24. CARD PIVOT. Inspect the pivot. It must be free of pit marks, burrs and foreign matter. Polish the pivot by holding it against a pegwood stick chucked in the collet of a jeweler's lathe. Use a light abrasive if necessary.

**2-25. LUBRICATION.**

2-26. No lubrication required.

**2-27. REASSEMBLY.**

2-28. ASSEMBLY OF CARD AND MOUNTING ASSEMBLY. (See figure 2-1.)

a. Insert jewel stud assembly (45) into jewel stud spring (46) and through guide (47). Secure parts with snap ring (44). Test action of spring.

b. Insert jewel stud assembly into pivot cavity of

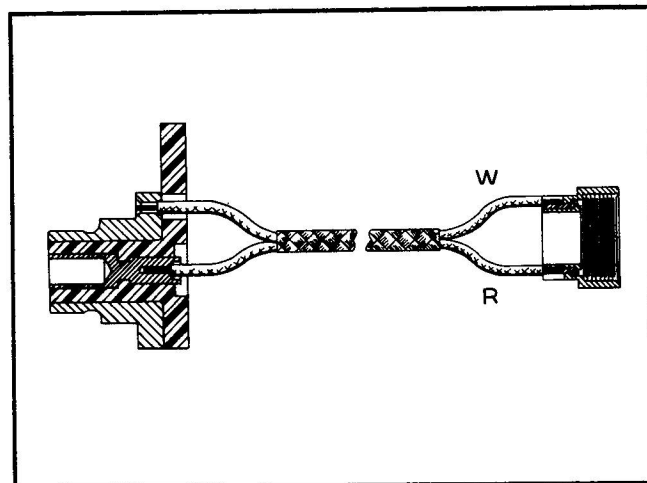


Figure 2-2. Electrical Wiring

## Paragraphs 2-28 to 2-29

card assembly (43). Replace retaining ring (42) in groove of card assembly.

## 2-29. ASSEMBLY OF COMPASS. (See figure 2-1.)

a. Carefully direct card and mounting assembly (41) into case assembly (48). Secure with gasket (39) and guide nut (40). Replace filling plug (38) and gasket (39).

b. Install flat spring (37) and lubbers line assembly (36) in groove of case.

c. To obtain a perfect seal, the rubber sealing gasket (34) must be cemented in case. (See 1, figure 2-3.) The adhesive used is Minnesota Mining and Manufacturing Company's 3M Sealer Formula EC 1093 (MIL-S-7126). This cement is to be thinned with special non-solvent accelerator EC 1063 in the proportion of seven parts by weight of EC 1093 to one part by weight of EC 1063.

**Note**

Sealer can only be used for a period of three hours after preparation.

d. Spread a moderate amount of prepared sealer in corner of gasket recess. Sealer should cover approximately one-third the width of the shoulder.

e. Insert sealing gasket (34) into case recess and follow with glass (35) and another gasket (34).

**Note**

Above sealing compound is not required on the second gasket.

f. Place spring ring (33) on second gasket.

g. Place E-W compensator shutter (30) and N-S compensator shutter (32) with spacer (31) interposed over light socket assembly.

h. Place front cover (27) over parts and fasten lightly with four screws (28) and nuts (29).

**CAUTION**

Do not tighten screws. Gasket must not be compressed.

i. Place case in oven set at 70°C (158°F) for four hours. Remove and allow to return to room temperature.

j. Tighten four screws (28).

k. Insert E-W magnet gear assembly (22) into case so dot stamped adjacent to magnet is up. Install other E-W magnet gear assembly (21) with dot displaced 180° from other installation. Turn in bearing screws (20) and adjust end play to 0.005 inch. Lock with nut (19). The gear assemblies should turn freely but not loosely.

l. Position E-W magnet gear assemblies so magnets are in a neutral position (parallel). (See figure 2-4.)

m. Insert E-W drive gear (14) through drive gear

washer (16) and into case so spiral meshes with spiral of E-W magnet gear and dot on slotted end is next to dot on front cover (27).

n. Insert N-S drive gear (15) through drive gear washer (16) and into case so dot stamped on slotted end is next to dot on front cover (27). Position two N-S magnet gear assemblies (17 and 18) so magnets are parallel and dots are 180° apart. Insert gears in case in this manner. Make certain N-S drive gear (15) does not shift position during installation. (See figure 2-4.)

o. Replace four spring washers (13) with concave side facing rear of case.

p. Slide grommet (12) over lead wire, position it between compensator plate (9) and case. Secure compensator plate with two screws (10) and lockwashers (11).

q. Check position of dots on ends of drive gears with respect to dots in front of case when magnets of each pair are parallel. The dots must be adjacent.

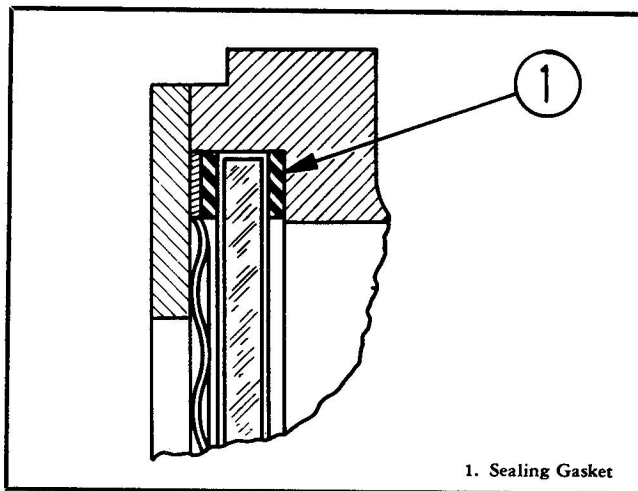


Figure 2-3. Sealing of Glass in Case

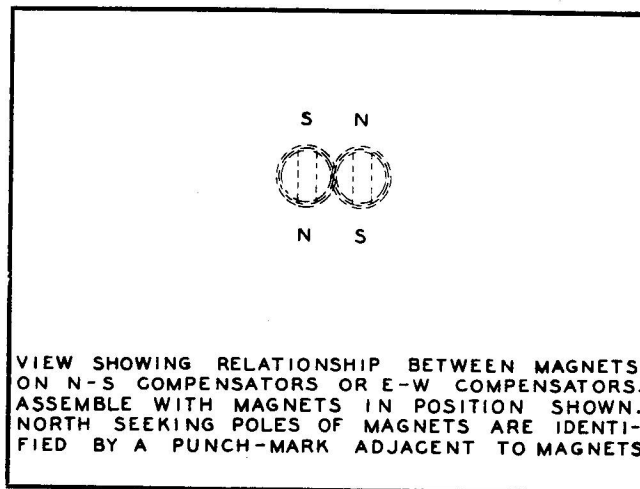


Figure 2-4. Position of Magnets

## 2-30. FILLING THE COMPASS.

**Note**

The bulb assembly should be screwed into the socket to prevent liquid from entering the socket.

a. Fill bowl with filtered aircraft compass liquid ((3GP-31)). This liquid must be clean and free from moisture.

b. Fill and drain the compass several times until it is absolutely clean. The filling and draining process washes out dirt particles which might have lodged in the chamber during overhaul. Close the diaphragm insert hole and swirl the liquid around. Any foreign material remaining in the liquid will then be immediately apparent.

c. Fill the compass and diaphragm and, with the diaphragm insert hole open and up, place both in a container of clean compass liquid so that they are completely submerged. Place the container in a vacuum chamber and evacuate to at least 3 inches of mercury absolute, and allow the compass and diaphragm to remain in this condition for one hour.

d. Increase pressure to atmospheric. With the compass submerged, tilt it and allow any bubbles to escape through the diaphragm insert opening. Replace diaphragm while units are submerged in the liquid.

**Note**

To remove all external traces of compass liquid dip the compass into a container of carbon tetrachloride and blow off with air from a hose.

## 2-31. CASING.

a. Direct wire lead through grommet (6) of shell assembly (7).

b. Solder red lead to center terminal and white lead to light plug socket flange (1).

c. Secure shell assembly (7) with three flat head screws (8).

d. Secure lead with wire clamp (4) and two screws (5).

e. Secure light plug socket (1) with four screws (2) and lockwashers (3).

**SECTION III****TEST PROCEDURES**

3-1. GENERAL. Unless otherwise specified, all tests shall be made at an atmospheric pressure of approximately 29.92 inches of mercury and a temperature of approximately 25°C (77°F) and the compass in a magnetic field having a horizontal component of approximately 0.18 oersted and a vertical component of approximately 0.54 oersted.

**3-2. INDIVIDUAL TESTS.**

3-3. COMPASS ERROR WITHOUT COMPENSATION. When the plane of the mounting surface is at right angles to the magnetic meridian, the compass shall indicate North (0-degrees) and/or South (180-degrees) within 2 degrees. The compass shall then be turned about its vertical axis from the above position by reference to an accurate circular scale to each 30-degree heading. The error at any point, after allowing for alignment error, shall not exceed 1 degree. This test shall be made with compensators set at zero.

3-4. REMEDIAL ACTION. If instrument fails this test check the magnetic field surrounding the instrument. If it is within the limits as specified in paragraph 3-1 disassemble the instrument and check for weak card magnets or friction.

3-5. FRICTION ERROR. The compass card shall be deflected 5 degrees from its equilibrium position, released, allowed to come to rest, and read. The test shall be repeated deflecting the card 5 degrees in the opposite direction. It shall return to within 1 degree of its original position, without vibration or tapping.

3-6. REMEDIAL ACTION. If instrument fails this test check for weak card magnets, damaged pivot or jewel or a defective card assembly.

3-7. BALANCE. The compass shall be held in its normal operating position. The deviation of the plane of the card from the horizontal as determined by any suitable method shall not exceed one degree. Both compensators shall be in a neutral position for this test.

3-8. REMEDIAL ACTION. If instrument fails this test, remove the card assembly and check it for balance.

3-9. LEVELING. The compass shall be held in its normal operating position. The deviation of the lubbers line from the vertical as determined by any suitable method shall not exceed one degree.

3-10. REMEDIAL ACTION. The lubbers line may be removed and bent to satisfy the above conditions.

**SECTION IV**  
**DIFFERENCE DATA SHEET INDEX**

<i>Kollsman Type</i>	<i>AN Type</i>	<i>Page</i>
1630X-4-03	5766T3	7

Overhaul and test procedures for the models included in this section are the same as the procedures for Kollsman Type 1630U-4-03, AN Type 5766T3, Standby Compass except for the specific differences noted by the applicable Difference Data Sheet. Sections II and III contain complete overhaul and test information for Kollsman Type 1630U-4-03, AN Type 5766T3, Standby Compass.



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**STANDBY COMPASS**

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**TYPE 1630X-4-03**  
**AN TYPE 5766T3**

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

**LEADING PARTICULARS****ILLUMINATION:**

Major Markings, C-28-96

Minor Markings, AN-L-1a

**ELECTRICAL CONNECTION:** 3 volts dc**WEIGHT:** 7.6 ozs.**MOUNTING:** Mounting holes not counterbored to accommodate Tinnerman nuts.**SPECIAL TOOLS** — Same as for type 1630U-4-03**DISASSEMBLY** — Same as for type 1630U-4-03**CLEANING** — Same as for type 1630U-4-03**INSPECTION** — Same as for type 1630U-4-03**TESTING** — Same as for type 1630U-4-03**REPAIR** — Same as for type 1630U-4-03**LUBRICATION** — Same as for type 1630U-4-03**REASSEMBLY** — Same as for type 1630U-4-03**TEST PROCEDURES** — Same as for type 1630U-4-03

