EO 20-25BA-3

ROYAL CANADIAN AIR FORCE

HANDBOOK WITH PART LIST

MAGNESYN REMOTE COMPASS INDICATORS AND TRANSMITTERS TYPES AN5730-2, -2A, -3 AND -6

(ECLIPSE-PIONEER)

"REVISION" NOTICE

LATEST REVISED PAGES SUPERSEDE THE SAME PAGES OF PREVIOUS DATE

Insert revised pages into basic publication. Destroy superseded pages.

ISSUED ON AUTHORITY OF THE CHIEF OF THE AIR STAFF

28 MAR 56
Revised 4 Jun 57

LIST OF RCAF REVISIONS

DATE	PAGE NO	DATE	PAGE NO

★ ★ ★ ★ ★

This Cover and "A" page is issued to identify as an EO, TO 5N1-2-8-1
dated 25 Oct 44 revised 5 Nov 56

All revisions to this Publication will be issued under this Engineering Order.

It is intended to reproduce this Publication in its entirety as an EO at the next reprint.

T. O. 5N1-2-8-1
(Formerly 05-15-5)

HANDBOOK

OPERATION, SERVICE, AND OVERHAUL

INSTRUCTIONS WITH PARTS CATALOG

MAGNESYN REMOTE COMPASS INDICATORS AND TRANSMITTERS

TYPES

AN5730-2, -2A, -3 AND -6

NAVY STOCK NOS.

R88-I-800, R88-I-800-10, R88-I-801,
R88-I-801-11, R88-I-803, R88-T-1950

(ECLIPSE-PIONEER)

REVISION NOTICE

LATEST REVISED PAGES SUPERSEDE THE SAME PAGES OF PREVIOUS DATE

Insert revised pages into basic publication. Destroy superseded pages.

PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE AND
THE CHIEF OF THE BUREAU OF AERONAUTICS

AF Olmsted AFB, Pa., 14 Nov 56, 4M

25 OCTOBER 1944
REVISED 5 NOVEMBER 1956

LIST OF REVISED PAGES ISSUED

INSERT LATEST REVISED PAGES. DESTROY SUPERSEDED PAGES.

Page Nr	*Date of Latest Revision*
i	1 March 1949
ii	1 March 1949
1	1 March 1949
3	15 August 1946
4	1 March 1949
4A	15 August 1946
4B	1 March 1949
5	15 August 1946
6	15 August 1946
8	1 March 1949
8A	15 August 1946
9	5 April 1945
13	10 November 1949
15	5 April 1945
16	5 April 1945
16A	15 August 1946
* 19	5 November 1956
20	1 April 1954
21	1 April 1954
28	15 August 1946
30	1 April 1954
31	15 June 1949
34	1 March 1949
34A	1 March 1949
36	1 March 1949
37	1 March 1949
38	15 June 1949
38A	15 August 1946
38B	15 August 1946
38C	15 August 1946
38D	15 August 1946
38E	15 August 1946
38F	15 August 1946
38G	15 August 1946
38H	15 August 1946
38J	15 August 1946
38K	15 June 1949
38L	15 August 1946
38M	15 August 1946
* 39	5 November 1956
40	15 June 1949
41	1 March 1949
43	10 November 1950
44	10 November 1950
51	1 March 1949
52	1 March 1949
53	1 March 1949
54	1 March 1949
55	15 August 1946
56	15 August 1946
57	15 August 1946
58	15 August 1946
59	15 August 1946

ADDITIONAL COPIES OF THE PUBLICATION MAY BE OBTAINED AS FOLLOWS: USAF

USAF ACTIVITIES.—In accordance with Technical Order No. 00-5-2.

NAVY ACTIVITIES.—Submit request to nearest supply point listed below, using form NavAer-140: NAS, Alameda, Calif.; ASD, Orote, Guam; NAS, Jacksonville, Fla.; NAS, Norfolk, Va.; NASD, Oahu; NASD, Philadelphia, Pa.; NAS, San Diego, Calif.; NAS, SEATTLE, Wash.

For listing of available material and details of distribution see Naval Aeronautics Publications Index NavAyer 00-500.

TABLE OF CONTENTS

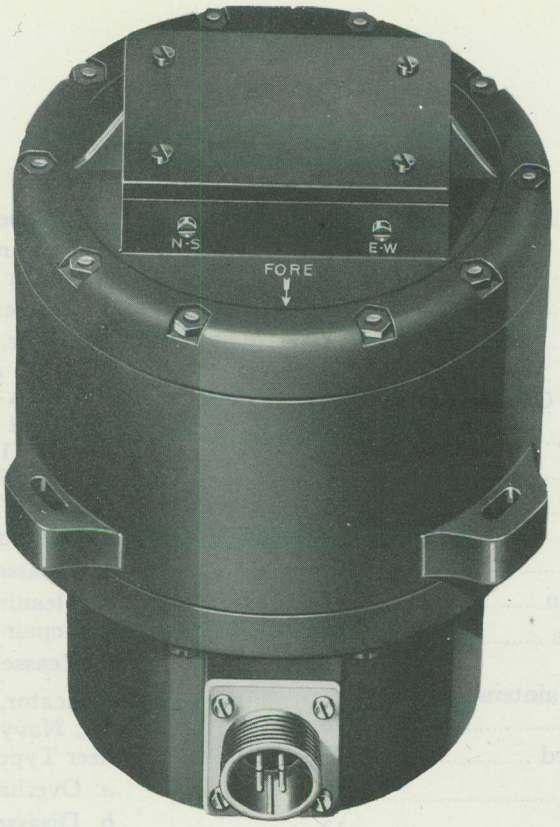


Figure 1—Three-Quarter View—Transmitter—Type AN 5730-3

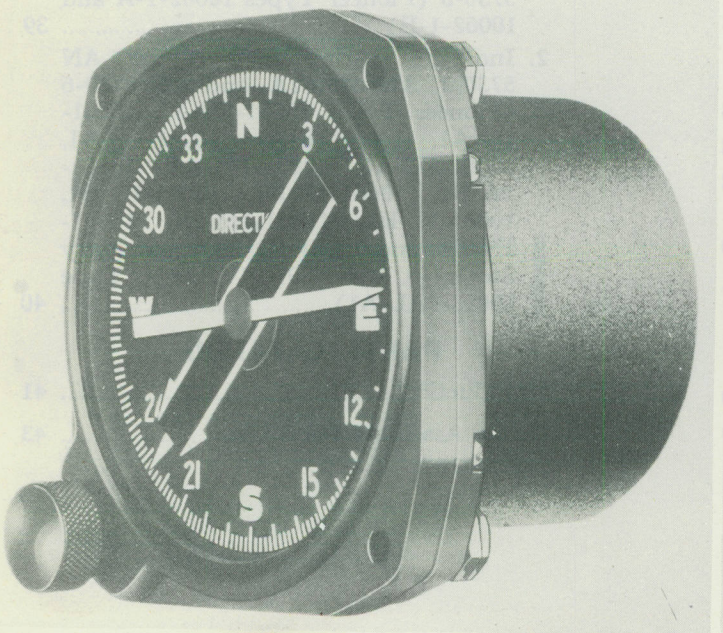


Figure 2—Three-Quarter View—Indicator—Navy Stock Nos. R88-I-800, R88-I-800-10, R88-I-801, and R88-I-801-11

Figure 2A—Three-Quarter View—Indicator—Navy Stock No. R88-I-803

SECTION I
INTRODUCTION

1. This Handbook is issued as the general basic instructions for the equipment involved.

2. This Handbook contains instructions for the installation, operation, maintenance, and overhaul, with Parts Catalog, for the remote-reading Magnesyn compass indicators and transmitters (Refer to Table I) manufactured by the Eclipse-Pioneer Division of Bendix Aviation Corporation, Teterboro, N. J.

3. Reference has been made in this Handbook to the following instructions which contain applicable data and information:

T. O. No.	TITLE
05-15-3	Installation, Compensation, and Swinging of Aircraft Compasses

TABLE NO. I

COMPARATIVE TABLE OF TYPE IDENTIFICATIONS FOR REMOTE-READING MAGNESYN COMPASS SYSTEM UNITS

Nomenclature	*AN Type*	*Navy Stock Nos.*	*Pioneer Type*
Indicator	AN 5730-2	R88-I-800	10061-1A-A1
	AN 5730-2	R88-I-800	10061-1D-A1
	AN 5730-2	R88-I-800	10061-1E-A1
	AN 5730-6	R88-I-801	10061-1G-A1
	AN 5730-6	R88-I-801	10061-1H-A1
	AN 5730-2A	R88-I-800-10	10061-1A-B1
	AN 5730-2A	R88-I-800-10	10061-1E-B1
	AN 5730-6	R88-I-801	10061-1G-B1
	AN 5730-6	R88-I-801	10061-1L-B1
	AN 5730-6	R88-I-801	10061-1M-B1
	AN 5730-2A	R88-I-800-10	10061-1Q-B1
	AN 5730-2A	R88-I-800-10	10061-1N-B1
	AN 5730-2A	R88-I-800-10	10061-1Y-B1
		R88-I-801-11	10098-1AL-A1
	AN 5730-2A	R88-I-803	10078-1T-A1
Transmitters	AN 5730-3	R88-T-1950	10062-1-A
	AN 5730-3	R88-T-1950	10062-1-B

SECTION II
DESCRIPTION

1. GENERAL. (*See figures 1, 2 and 2A.*)

a. The remote-reading Magnesyn compass system provides a means for locating the magnetic element of the compass remotely from local magnetic disturbances. The system incorporates a transmitter, as many as three indicators, and an inverter.

b. The transmitter, or blind compass, is installed in a place as free as possible from magnetic disturbances. The indicator, which reproduces movements of the compass element in the transmitter, can be installed in any desired location, since magnetic materials near the indicator will not affect the accuracy of the Magnesyn compass system. Such disturbances must be avoided only in the neighborhood of the transmitter. The inverter is required to change dc from a storage battery to ac for operation of the system.

c. The transmission of the magnetic indications of the compass to the indicator or indicators is entirely electrical, the only moving parts in the system, in addition to the inverter, being the compass float assembly and the indicator rotor. The compass system will operate at either 400 cycles at 26 volts, or 800 cycles at 52 volts, or any intermediate point so long as the frequency is from 13 to 17 times the voltage. The power required will not exceed 1.5 volt-amperes per unit (transmitter or indicator).

2. DETAILED.

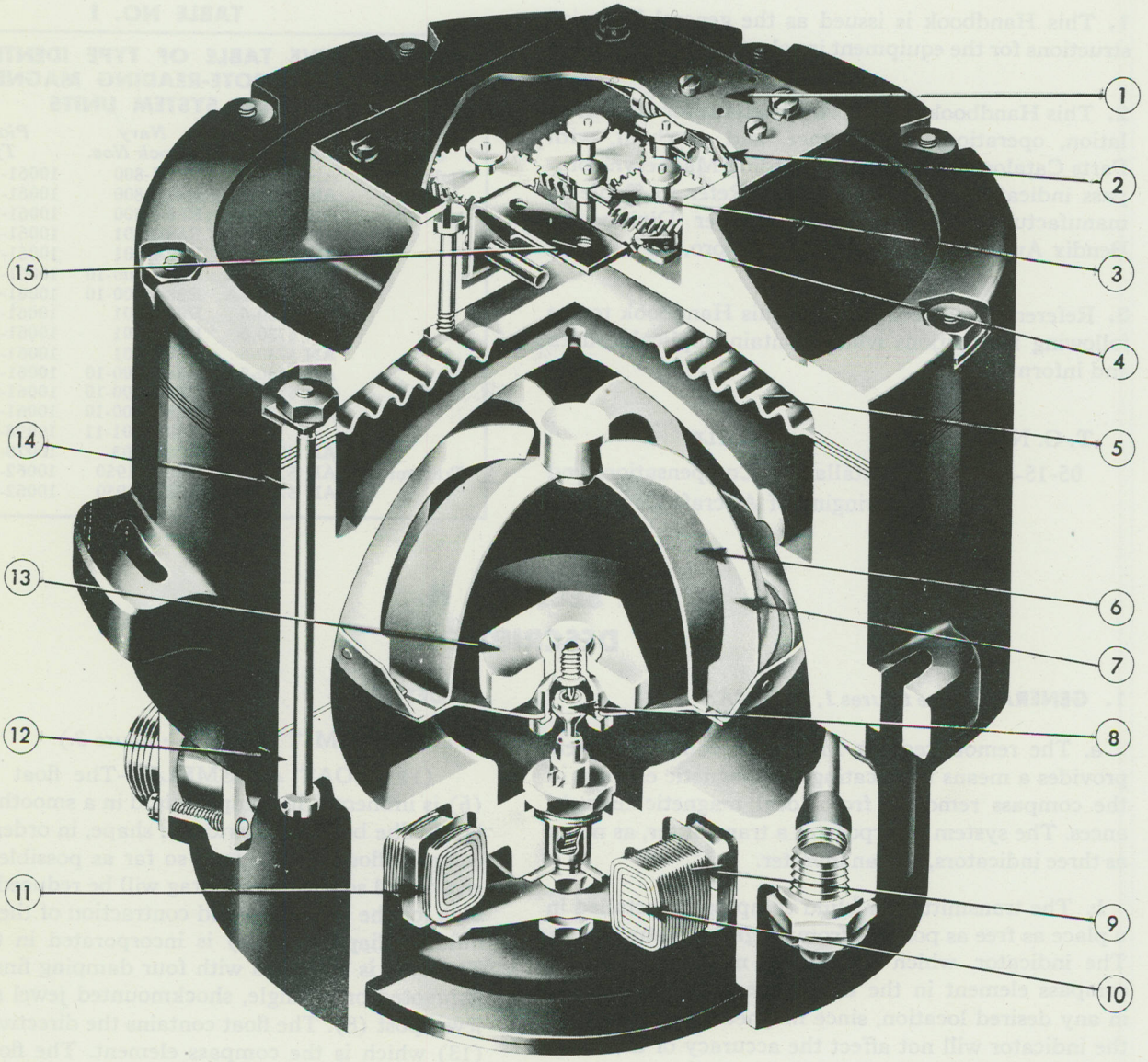
a. TRANSMITTER. (*See figure 3.*)

(1) FLOAT ASSEMBLY.—The float assembly (6) is immersed in compass fluid in a smooth surfaced bowl. The bowl is spherical in shape, in order that the compass float will be free, so far as possible, of swirl errors and so that liquid drag will be reduced. To provide for the expansion and contraction of the compass fluid, a diaphragm (5) is incorporated in the bowl. The float is equipped with four damping fins (7) and is pivoted on a single, shockmounted jewel spun in a jewel post (8). The float contains the directive magnet (13) which is the compass element. The float is free to rotate at any angle up to 20 degrees from the horizontal.

(2) FLUX GATE ASSEMBLY.—The Flux Gate assembly (11), or transmitter coil, is mounted directly beneath the compass magnet in the float assembly and involves no moving parts. It consists of circular laminations (10) around which is a toroidal winding (9). Four leads go to the coil. Two of these go to the power supply, while the remaining two leads go to the indicator through the junction box so that the transmitter and indicator are connected together in parallel.

(3) COMPENSATOR ASSEMBLY.

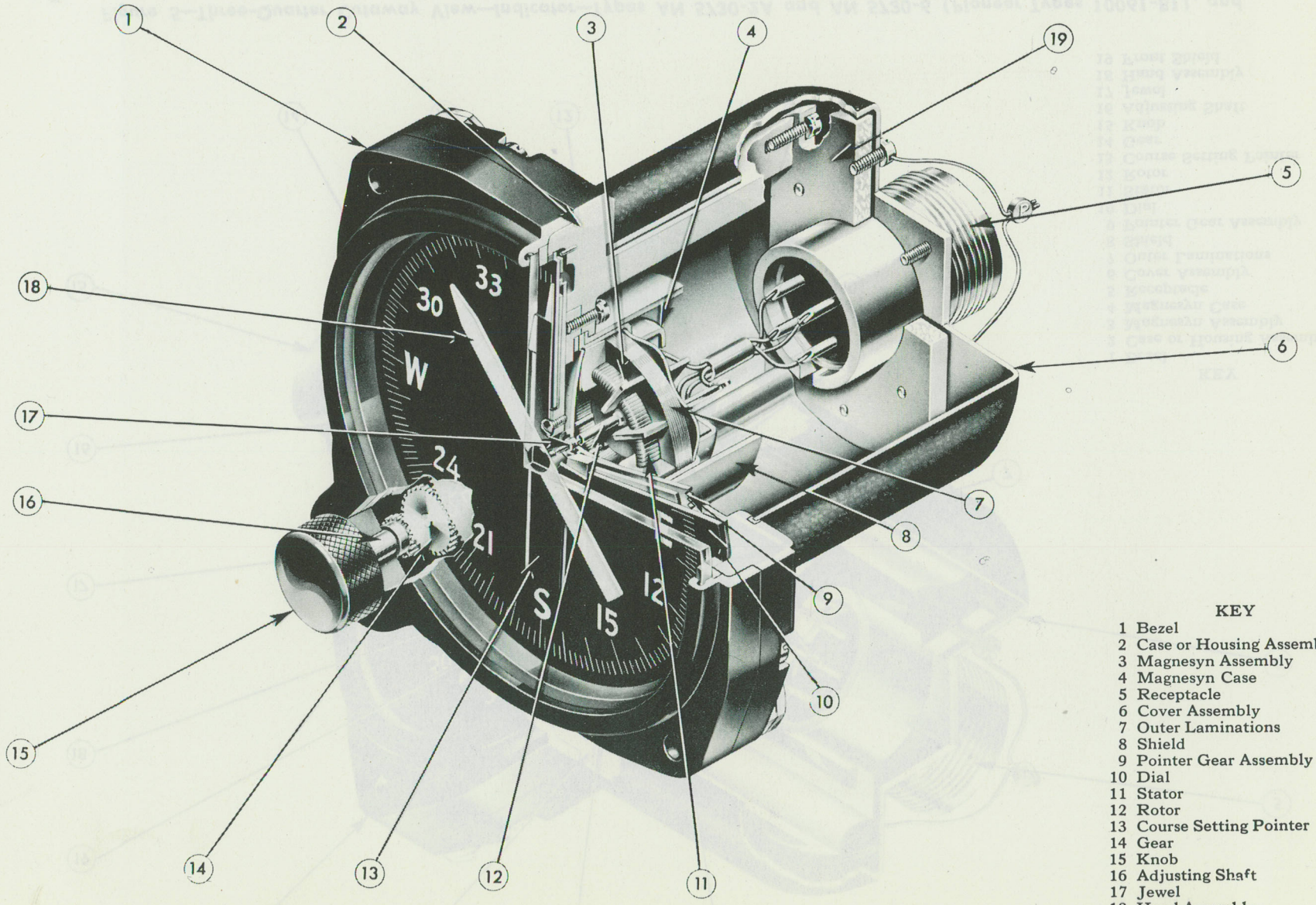
(*a*) The universal type compensator (1) provides the system with a means for correcting semi-



KEY

1 Compensator Assembly
2 Driver
3 Upper Magnet Assembly
4 Lower Magnet Assembly
5 Diaphragm
6 Float
7 Fin
8 Jewel Post
9 Winding
10 Laminations
11 Flux Gate
12 Lower Compass Bowl
13 Magnet
14 Upper Compass Bowl
15 Bracket

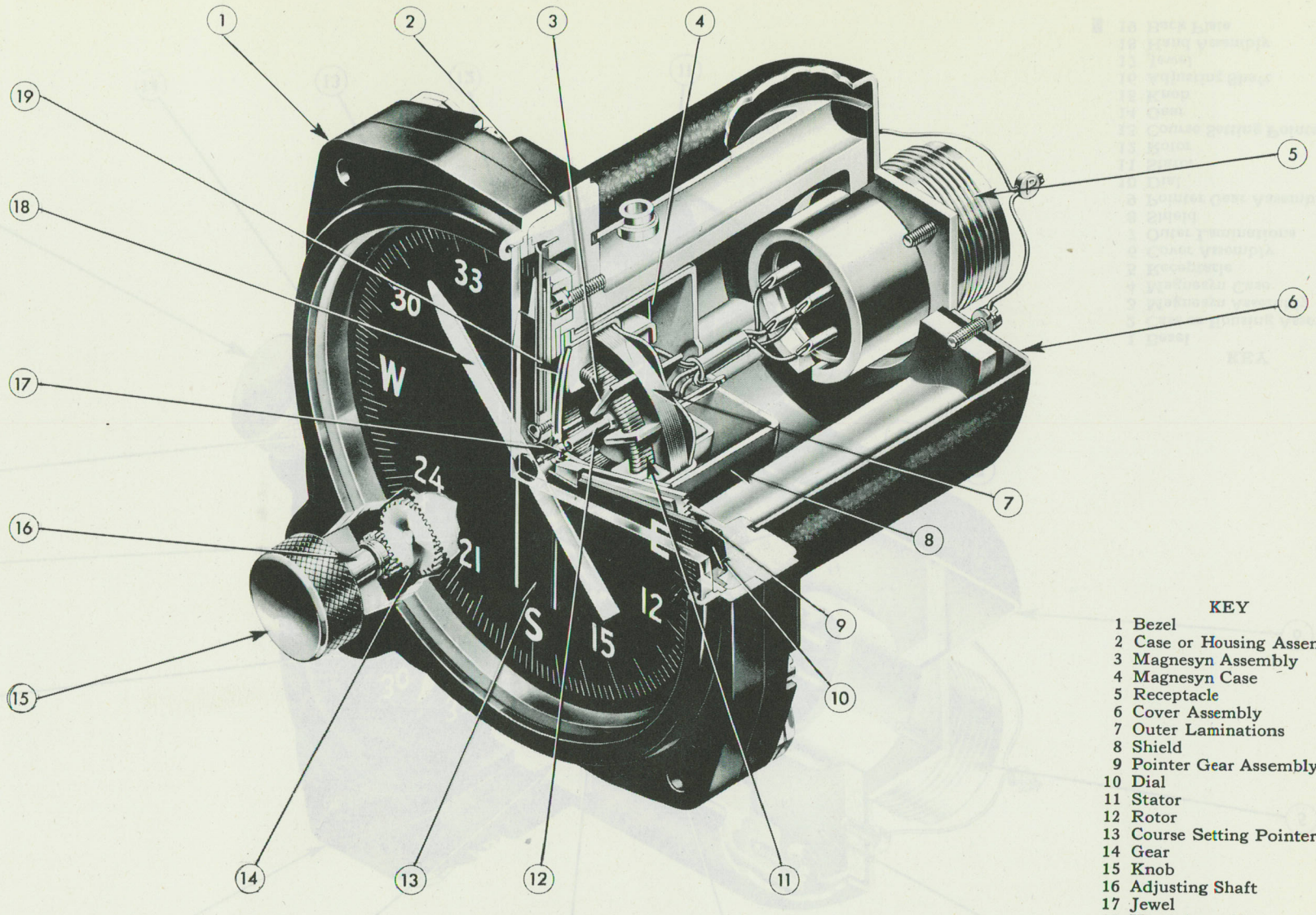
Figure 3—Three-Quarter Cutaway View—Transmitter—Type AN 5730-3



KEY

1 Bezel
2 Case or Housing Assembly
3 Magnesyn Assembly
4 Magnesyn Case
5 Receptacle
6 Cover Assembly
7 Outer Laminations
8 Shield
9 Pointer Gear Assembly
10 Dial
11 Stator
12 Rotor
13 Course Setting Pointer
14 Gear
15 Knob
16 Adjusting Shaft
17 Jewel
18 Hand Assembly
19 Back Plate

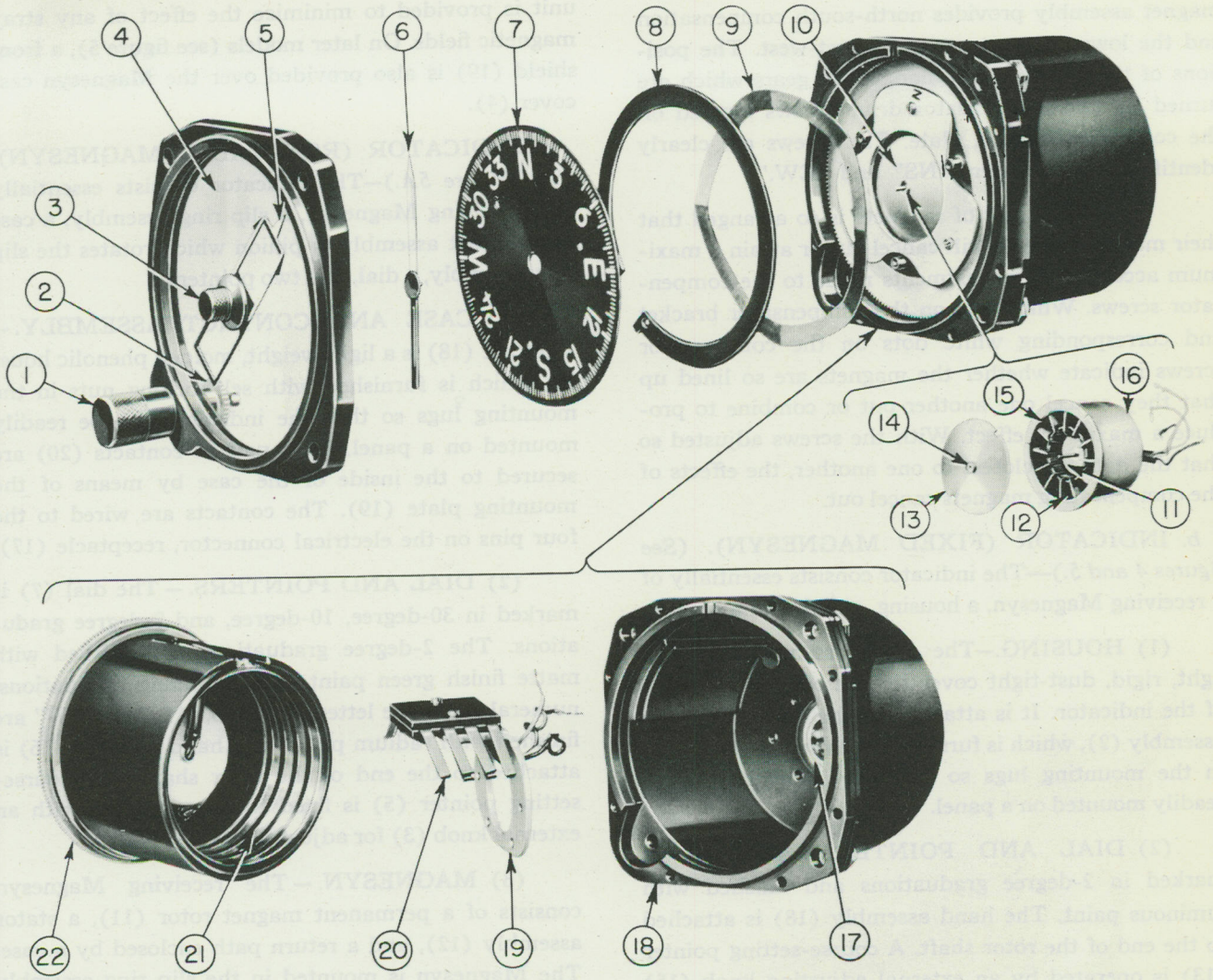
Figure 4—Three-Quarter Cutaway View—Indicator—Types AN 5730-2 and AN 5730-6 (Pioneer Type 10061--A1)



KEY

1 Bezel
2 Case or Housing Assembly
3 Magnesyn Assembly
4 Magnesyn Case
5 Receptacle
6 Cover Assembly
7 Outer Laminations
8 Shield
9 Pointer Gear Assembly
10 Dial
11 Stator
12 Rotor
13 Course Setting Pointer
14 Gear
15 Knob
16 Adjusting Shaft
17 Jewel
18 Hand Assembly
19 Front Shield

Figure 5—Three-Quarter Cutaway View—Indicator—Types AN 5730-2A and AN 5730-6 (Pioneer Types 10061-B1), and Navy Stock No. R88-I-801-11 (Pioneer Type 10098-1AL-A1)



1 Knob
2 Pinion
3 Knob
4 Glass
5 Course-Setting Pointer
6 Hand Assembly
7 Dial
8 Snap Ring
9 Friction Washer
10 Front Shield
11 Magnet Rotor
12 Stator
13 Magnesyn Cover
14 Jeweled Bearings
15 Magnesyn Case
16 Shield
17 Electrical Connector Receptacle
18 Case
19 Mounting Plate
20 Contacts
21 Slip Ring Assembly
22 Gear

Figure 5A—Three-Quarter Internal View—Indicator—Navy Stock No. R88-I-803

circular errors caused by the magnetic field of the plane.

(*b*) The compensator consists of two magnet assemblies, an upper (3) and a lower (4). The upper magnet assembly provides north-south compensation and the lower magnet assembly east-west. The positions of the magnets are changed by gears which are turned by two compensator drive screws located on the compensator front plate. The screws are clearly identified by the letters "NS" and "EW."

(c) Each pair of magnets is so arranged that their magnetic effects will cancel out or attain a maximum according to adjustments made to the compensator screws. White dots on the compensator bracket and corresponding white dots on the compensator screws indicate whether the magnets are so lined up that they cancel one another out or combine to produce a maximum effect. With the screws adjusted so that the dots are closest to one another, the effects of the compensating magnets cancel out.

b. INDICATOR (FIXED MAGNESYN). (*See figures 4 and 5.*)—The indicator consists essentially of a receiving Magnesyn, a housing, a dial, and a pointer.

(1) HOUSING.—The cover assembly (6) is a light, rigid, dust-tight cover for the component parts of the indicator. It is attached to the case or housing assembly (2), which is furnished with self-locking nuts in the mounting lugs so that the indicator can be readily mounted on a panel.

(2) DIAL AND POINTER. — The dial is marked in 2-degree graduations and finished with luminous paint. The hand assembly (18) is attached to the end of the rotor shaft. A course-setting pointer (13) is operated by an external adjusting knob (15) located in the lower left-hand corner of the indicator.

Note

The adjusting knob for Pioneer type 10098-1AL-A1 is extended and is similar to knob (1), figure 5A.

Both the course-setting pointer and the indicator hand are finished with luminous paint.

(3) MAGNESYN. — The receiving Magnesyn consists of a permanent magnet rotor (12), a stator assembly (11), and a return path enclosed by a case. The Magnesyn cover and case assembly have jeweled bearings (17) in which the rotor turns. The stator consists of a circular, laminated core. An exciting coil is wound around this core, and a lead is tapped off at each 120-degree point thus making four leads altogether: two input leads and two tapped leads. The outer laminations (7), which are concentric with the stator, serve as a return path for the magnetic flux of the rotor magnet. A shield (8) around the Magnesyn unit is provided to minimize the effect of any stray magnetic fields. On later models (see figure 5), a front shield (19) is also provided over the Magnesyn case cover (4).

c. INDICATOR (ROTATABLE MAGNESYN). (*See Figure 5A.*)—The indicator consists essentially of a receiving Magnesyn, a slip ring assembly, a case and contact assembly, a pinion which rotates the slip ring assembly, a dial, and two pointers.

(1) CASE AND CONTACT ASSEMBLY. — The case (18) is a light weight, molded phenolic housing which is furnished with self-locking nuts in the mounting lugs so that the indicator can be readily mounted on a panel. Four pair of contacts (20) are secured to the inside of the case by means of the mounting plate (19). The contacts are wired to the four pins on the electrical connector, receptacle (17).

(2) DIAL AND POINTERS. — The dial (7) is marked in 30-degree, 10-degree, and 2-degree graduations. The 2-degree graduations are finished with matte finish green paint. All remaining graduations, numerals, and the letters "N," "E," "S," and "W" are finished with radium paint. The hand assembly (6) is attached to the end of the rotor shaft. The course-setting pointer (5) is fixed to the glass (4) with an external knob (3) for adjustment.

(3) MAGNESYN. — The receiving Magnesyn consists of a permanent magnet rotor (11), a stator assembly (12), and a return path enclosed by a case. The Magnesyn is mounted in the slip ring assembly (21) which is composed of a molded phenolic tube in which four slip rings are imbedded. The gear (22) is secured to the outer circumference of the slip ring assembly and meshes with the pinion (2), thereby permitting rotation of the entire Magnesyn. The Magnesyn case (15) and cover (13) have jeweled bearings (14) in which the rotor turns. The stator consists of a circular, laminated core. An exciting coil is wound around this core, and a lead is tapped off at each electrical 120-degree point, thus making four leads altogether: two input leads and two tapped leads. The outer laminations, which are concentric with the stator, serve as a return path for the magnetic flux of the rotor magnet. The shield (16) and front shield (10) which are around the Magnesyn unit are provided to minimize the effect of any stray magnetic fields.

SECTION III
INSTALLATION, WIRING, AND COMPENSATION

1. INSTALLATION.

a. TRANSMITTER.

(1) LOCATION.

(*a*) In order to obtain accurate performance, it is essential that the transmitter be installed in a location having a minimum of magnetic interference. Therefore, it is advisable to install the transmitter as far as possible from all movable magnetic material, such as steel structures, guns, cables, ammunition, and loads which may be on or off the plane. It is not possible to compensate for the effects of movable magnetic masses since the disturbances set up will vary with their position at any given time.

(*b*) Care should also be taken to avoid the proximity of electric cables carrying direct current power circuits, lighting circuits, etc. Disturbances set up by d-c power will also be impossible to compensate; since they will be dependent at any moment on whether the power is on or off, and their intensity will vary with the amount of current flow.

(c) In choosing a suitable location, a direct reading compass should be used. Mount this compass in the selected location. Note the effect of changes in the position of all movable masses of magnetic material and of switching d-c power on and off in any circuits thought likely to cause interference. Make the tests on two headings 90 degrees apart. If a change in compass reading occurs on either of the two headings, choose another location and repeat the test for the new position.

(*d*) If the flow of d-c power affects the compass and if the location is satisfactory in other respects, it may be possible to eliminate the disturbances by rerouting the d-c cables, or to neutralize it by making use of a twisted pair for d-c output and return, in place of a single conductor and ground return.

(*e*) If the location is found to be satisfactory so far as the preceding disturbances are concerned, the ship should be swung tentatively on cardinal and intercardinal points and the performance of the test compass, with all compensation removed, observed.

(*f*) Select a location where maximum deviation is not more than 20 degrees and total spread not more than $\pm$ 40 degrees. Compass performance will be that much better if it is possible to find a location where deviation can be held to a substantially lower figure.

(2) MOUNTING.

(*a*) For the necessary outline and mounting dimensions, see figure 6.

(*b*) Mount the transmitter on a rigid, nonmagnetic platform to avoid the possibility of its twisting or vibrating in resonance with the engines of the plane. The amplitude of vibration of the platform must not be greater than .020 inch under normal conditions (500 to 2,500 cycles per minute). It is essential that nonmagnetic material, such as wood, brass, aluminum, etc., be used for all mounting parts, including screws, washers, bushing, and brackets, so that there will be no magnetic disturbance near the transmitter that might either prevent proper compensation of the instrument or make the resulting compensation unstable.

(c) Do *not* shock mount the transmitter. Shock mounting will amplify rather than absorb impressed vibration.

CAUTION

It is recommended that, wherever possible, present shock mounting of remote reading compass transmitters be discontinued.

(*d*) The plane of the mounting lugs must be horizontal in normal level flight. The line passing through the center of the receptacle and the center of the rear mounting hole must be parallel to the fore-and-aft axis of the airplane, with the arrow on the compensator housing pointing forward. Fine adjustments in alignment may be made by rotating the unit in its mounting slots. The mounting lugs of the transmitter are slotted to make this a simple operation.

b. INDICATOR.

(1) SELECTION.

(*a*) When installing a remote-reading Magnesyn compass system, incorporating more than one indicator, selection of indicators is necessary to avoid excessive pointer oscillation.

(*b*) Connect the two or three indicators and the transmitter that are to be installed in parallel to a source of 26-volt, 400-cycle current. With the power off, displace the pointers of the indicators and transmitter by shaking so that there will be at least a 20 degree difference between the instruments. Turn on the power. If, after several such pointer displacements and application of power, no excessive or rapid oscillation occurs, the tested transmitter and indicators are satisfactory to be installed together. If excessive oscillation occurs, the condition may be corrected by removing one indicator and connecting another unit in its place until a satisfactory combination is obtained.

Note

The indicator removed is usable in other combinations and will not require overhaul.

(2) LOCATION.—The indicator may be installed in any convenient location. As many as three indicators may be operated in the system.

(3) MOUNTING.

(*a*) For the necessary outline and mounting dimensions, see figures 7 and 7A.

(*b*) Mount the unit on a vibration-damped, snubbed panel so that the maximum movement of vibration (total motion) will never exceed 0.010 inch at frequencies up to 2,500 cycles per minute.

(c) The indicator may be mounted vertically or horizontally, or in any intermediate position. Cut a hole in the panel and mount the indicator from the rear with three No. 6-32 screws of sufficient length to engage the lock nuts which are an integral part of the case assembly.

(*d*) A minimum clearance of 1 inch should be provided to permit removal of the instrument from the panel, as well as for the disconnect plug at the rear of the unit.

2. WIRING. (*See figures 8, 9, and 10.*)

a. GENERAL.

(1) The transmitter and the indicator consist of similarly wound coils, interconnected, "A" to "A," "B" to "B," "C" to "C," and "D" to "D." See figure 8 for installation layout. Wires should be coded for proper identification.

(2) The electrical connections both to the indicators and to the transmitter are made to the AN standard disconnect plug receptacle on each unit. Each terminal is plainly lettered on the receptacle. It is essential to connect like designated terminals together between the transmitter and the indicator. The "B" terminal is common to all receptacles and must be externally grounded at the junction box. This ground must be made at only one point. It is very important that a good ground connection be made. An intermittent contact on the ground circuit will place a heavy strain on the instruments and may affect their calibration. Care also must be employed to avoid any reversal of leads between the transmitter and the indicator, since such a reversal will cause incorrect indication.

(3) Both the indicator and transmitter have a 4-terminal receptacle; the leads connecting these units are carried in flexible shielded cables. The input leads must be No. 18 stranded wire. The other connecting leads must be no smaller than No. 22 stranded wire. Wire connections must be made as shown in the external wiring diagram. (See figures 9 and 10.) A suitable junction box with the proper number of outlets should be provided. Where a source of power of 26 volts at 400 cycles, or of 52 volts at 800 cycles is not available, an auto transformer must be inserted in the junction box to transform the voltage available to the required voltage, provided that the frequency available is either 400 cycles ± 10 percent or 800 cycles ± 10 percent. Inverter, Pioneer type 12117-2-A, may be used as a source of power. (See figures 8, 9, and 10.)

FOR NAVAL PERSONNEL ONLY

For Naval installations, BuAer Drawing R-704 shall apply. Installation of the compass shall be in accordance with Specification No. AN-C-107.

Note

The Magnesyn system can function with as many as three indicators. Where more than one indicator is used, additional indicators should be wired in parallel with the first.

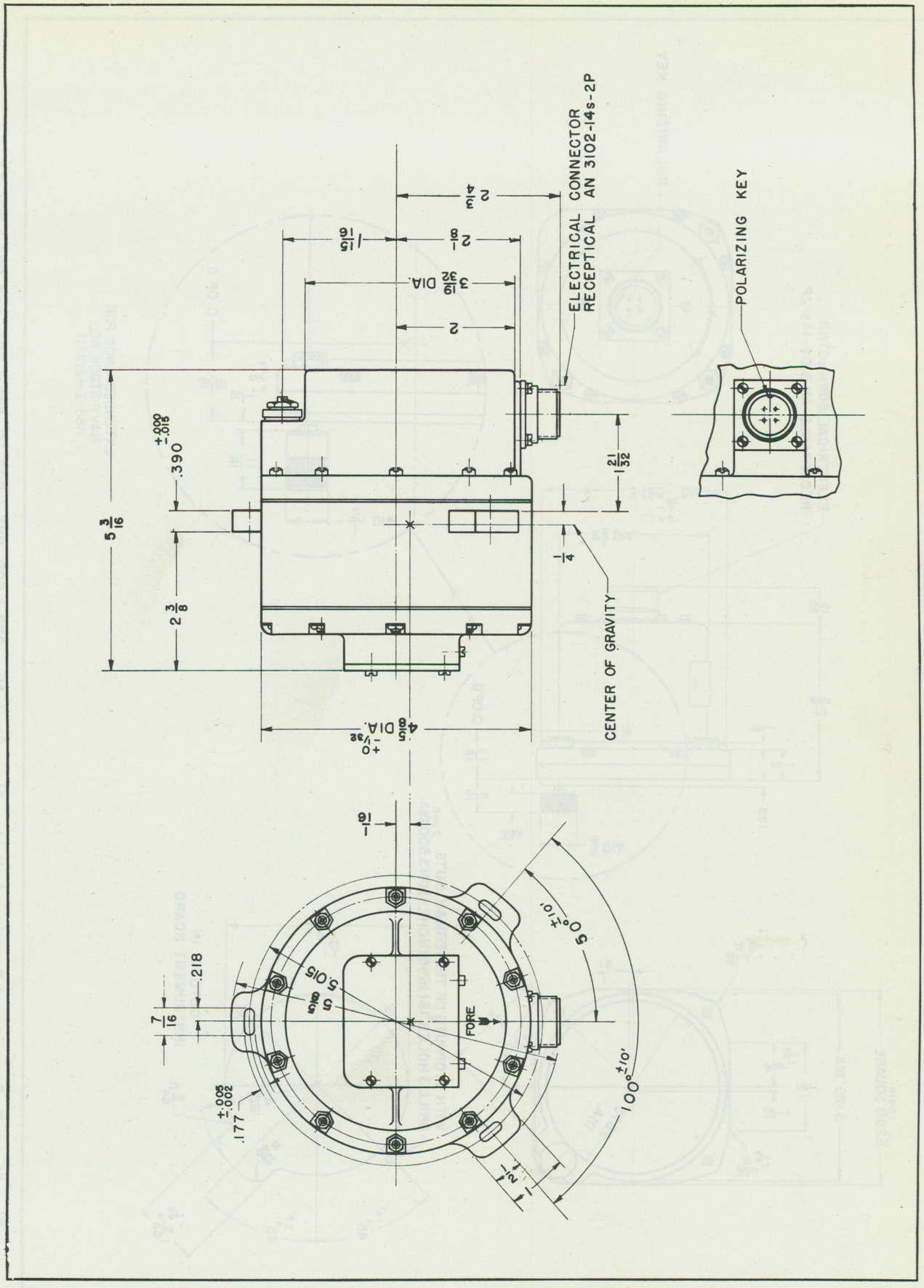


Figure 6—Dimensional Drawing—Transmitter—Type AN 5730-3

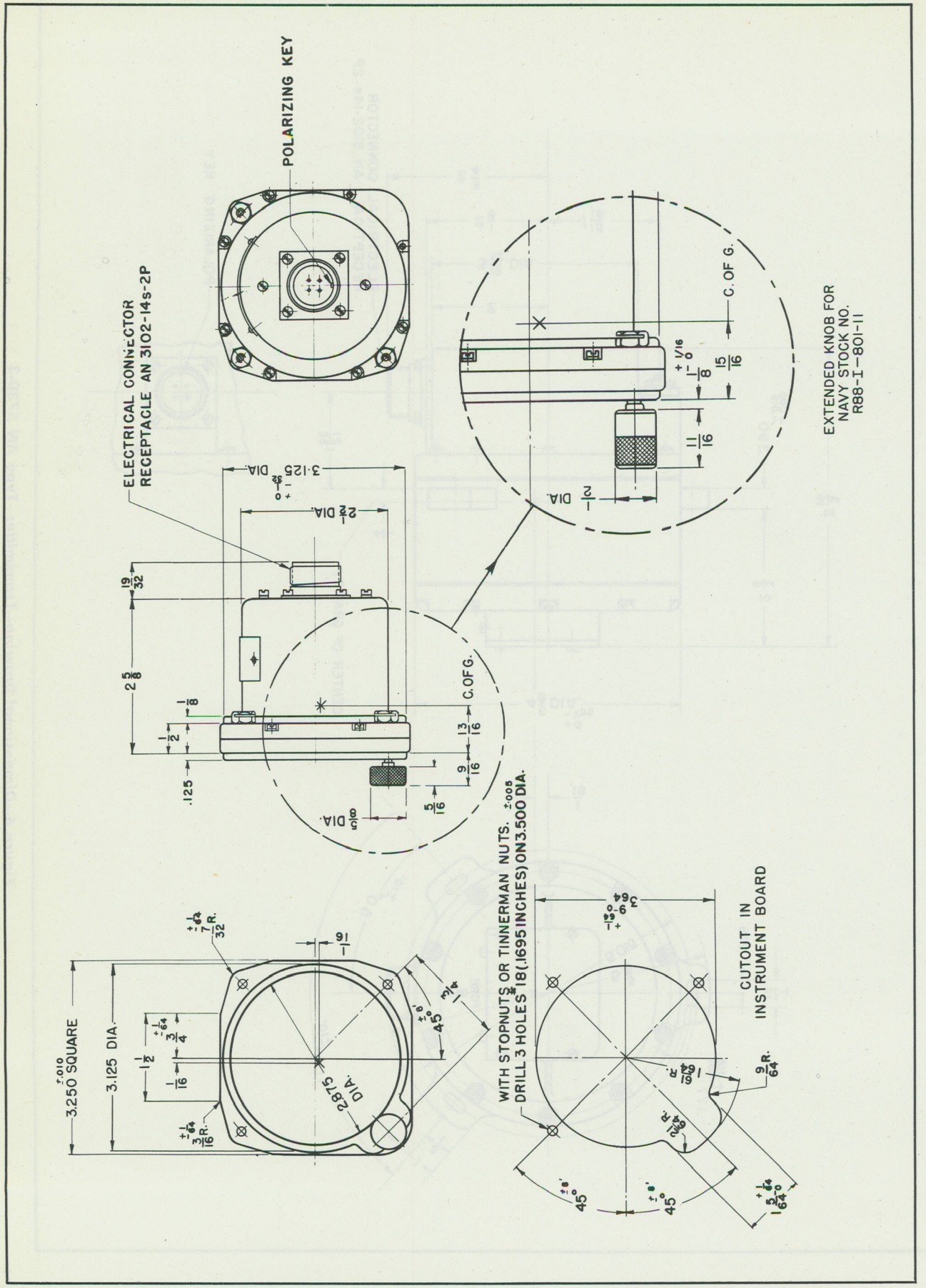


Figure 7—Dimensional Drawing—Indicator—Navy Stock Nos. R88-I-800, R88-I-800-10, R88-I-801, and R88-I-801-11

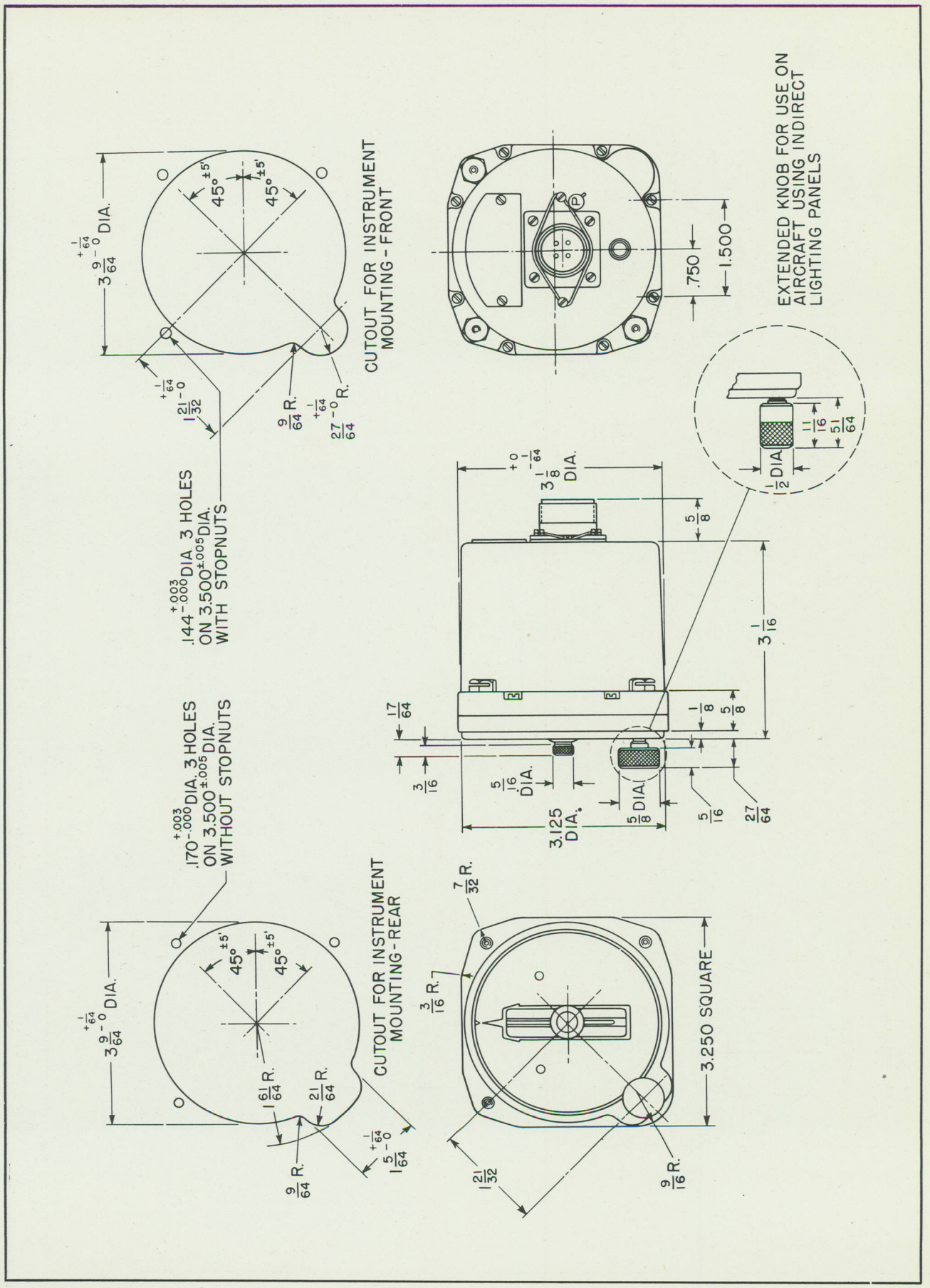
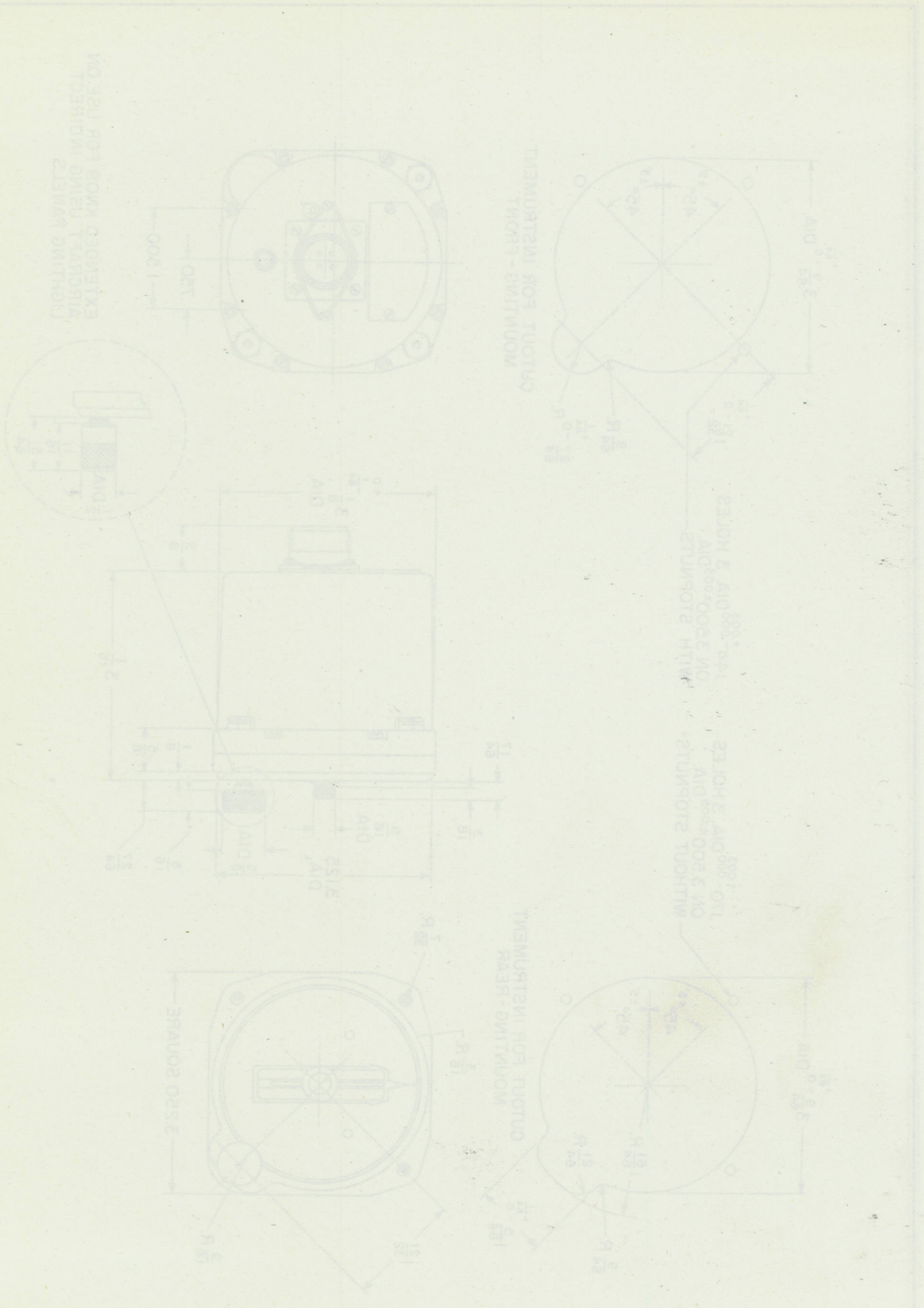


Figure 7A—Dimensional Drawing—Indicator—Navy Stock No. R88-I-803



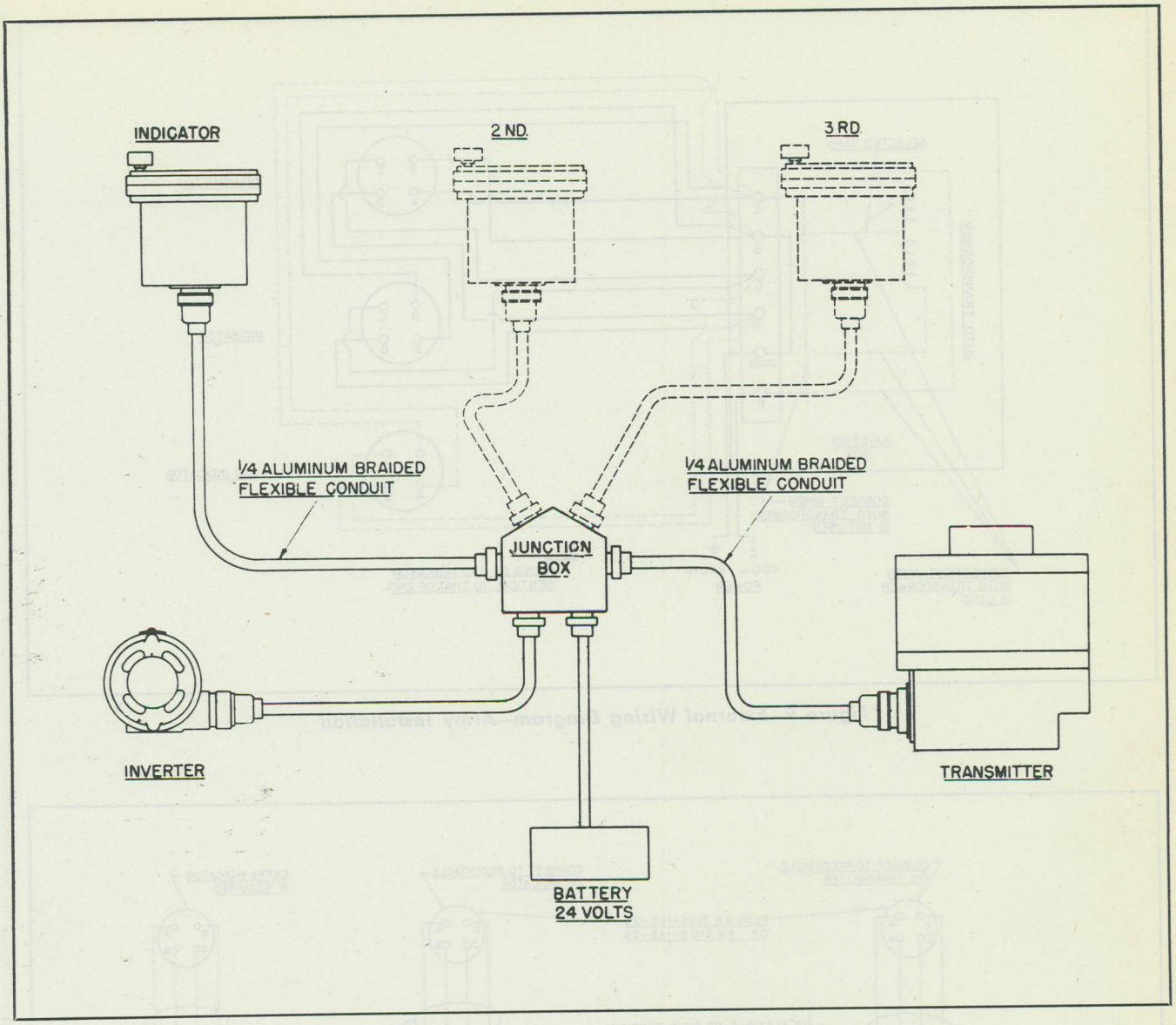


Figure 8—Schematic Installation Layout

b. INSTALLATION TESTS.

(1) After the installation has been completed and before connecting the units, check the continuity of the transmitter, the indicators, and all cables. Refer to section V, paragraph 5. *c.*

(2) After the installation and the wiring have been thoroughly checked, replace all plugs on their receptacles and switch on the rated power for the compass system with the engines not running. The indicator should read the approximate heading of the aircraft.

(3) With the rated power still on, start the engines. Slowly turn the airplane approximately 90 degrees and observe the indicators. Turn off the engines and note the indicator readings. Swing the aircraft approximately 90 degrees and note whether the hands of the indicator move in the direction of the new heading. If the hands fail to do so, the wiring is not continuous or one of the compass units is defective.

(4) If the individual units of the system fail to meet the preceding requirements check them in accordance with section V, paragraph 2. *a.* This routine must be performed in a location that will be favorable for compensation; that is, a place as free as possible from local magnetic disturbances.

3. COMPENSATION. Refer to the lastest issue of T. O. No. 05-15-3.

FOR NAVAL PERSONNEL ONLY

Swinging of the compass should be in accordance with Specification No. AN-C-106.

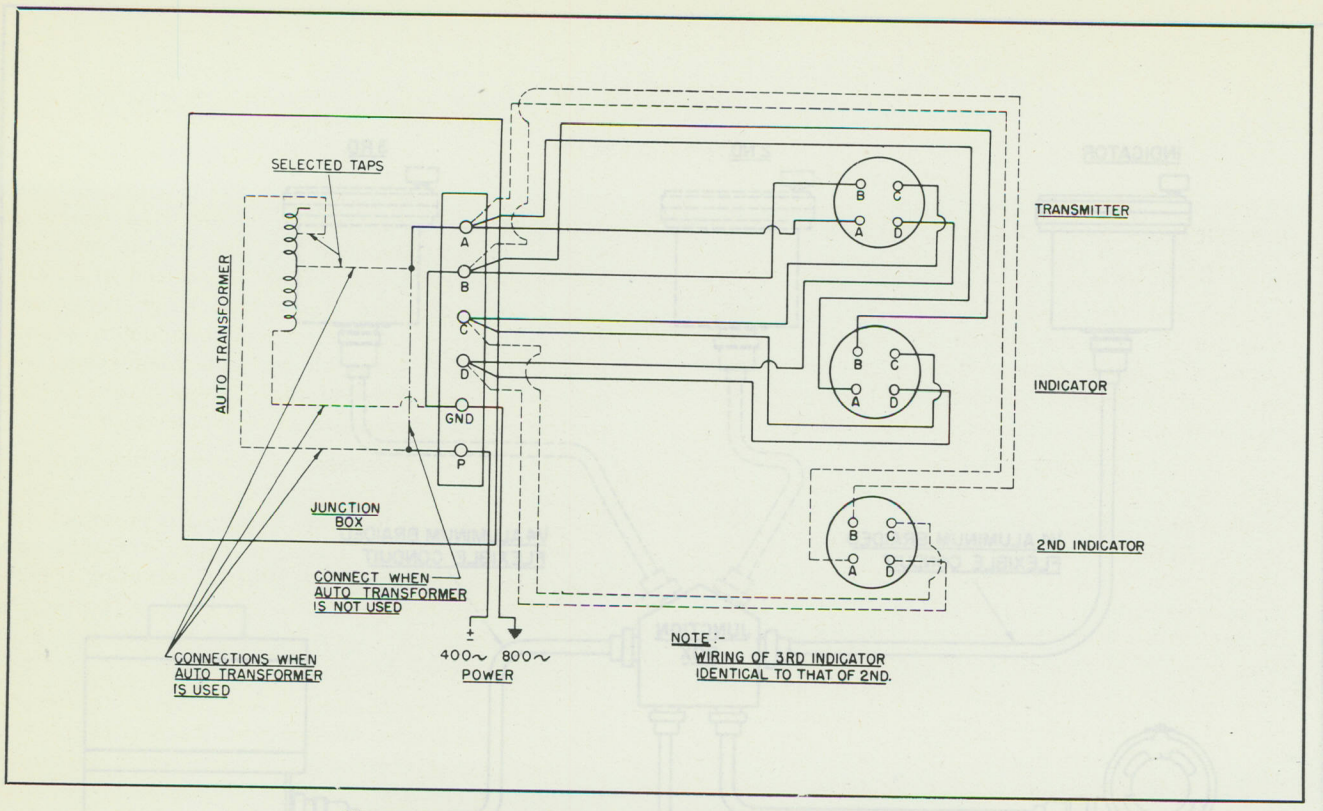


Figure 9—External Wiring Diagram—Army Installation

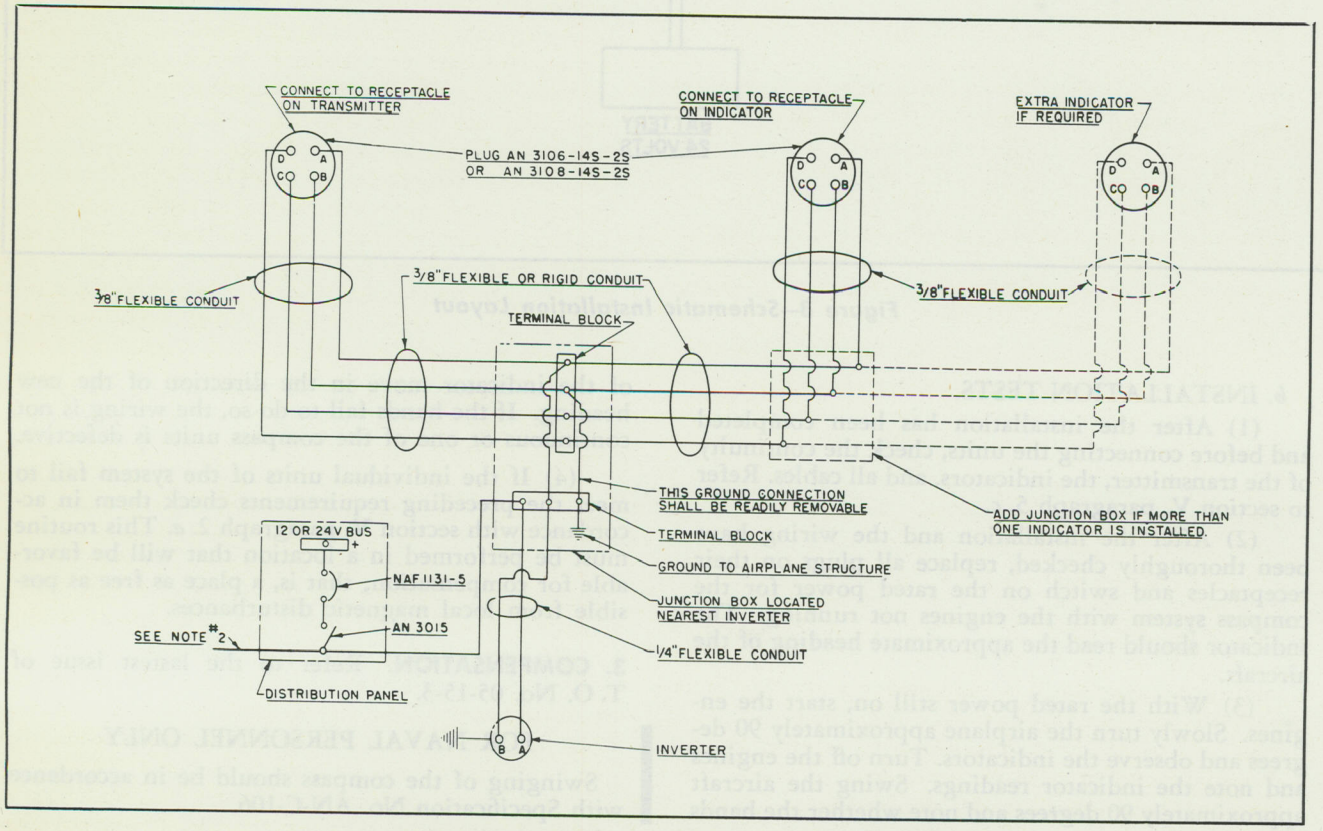


Figure 10—External Wiring Diagram—Navy Installation

SECTION IV
OPERATION

1. PRINCIPLES OF OPERATION. *(See figure 11.)*

a. GENERAL.

(1) In order to comprehend fully the principles of operation of the remote-reading Magnesyn compass system, the characteristics of a magnet, the magnetic properties of the earth, and the problems of the conventional magnetic compass must be understood.

(2) A magnet has magnetic "lines of force" which travel from its north pole around to its south pole. These lines of force cause the familiar attraction of one magnet to another. When no other magnetic material is near a magnet, these lines of force will have a certain pattern around the magnet. However, if a piece of soft iron is placed near a magnet, most of the lines of force will pass through the piece of soft iron, because soft iron is a good conductor of magnetic lines of force and offers a path of least resistance.

(3) The earth is, in reality, a huge magnet with its North Pole situated within the Arctic Circle and its South Pole within the Antarctic Circle. Magnetic lines of flux continuously leave the earth in the region of the South Magnetic Pole and enter in the region of the North Magnetic Pole.

(4) When a magnetic compass is installed in an airplane, it is subject to deviation error resulting from the ship's magnetism. Deviation error is caused by the magnetism of the steel and soft iron parts of the ship and by electrical conductors carrying direct current. An airplane in flight sets up vibration which allows the earth's field to induce relatively permanent magnetism in steel parts. The soft iron parts of the ship, on the other hand, readily acquire transient magnetism by induction from the earth's magnetic field. The magnetism thus induced in soft iron varies as the plane changes its direction in flight.

b. REMOTE-READING MAGNESYN COMPASS.

(1) The locations at which compass readings are most needed are very often in close proximity to the greatest magnetic disturbances. Because of the remote indicating feature of the Magnesyn system, the transmitting unit can be mounted in a position in the airplane where it will be least affected by the magnetic field of the ship itself and, therefore, will be free to a very great extent from the effect of deviation. This feature is particularly advantageous where the magnetic field of the airplane tends to shift from time to time as a result of changes in position or from the use of armament. The indicator units may be placed anywhere without regard to the ship's magnetic field.

(2) The remote-reading Magnesyn compass system operates on the principle of electro-magnetic induction. Electro-magnetic induction is the phenomenon whereby electrical voltage is induced in an electrical conductor when it is cut by magnetic lines of flux. Conversely, an electrical conductor, wound around a material capable of being magnetized, will induce magnetic lines of flux in the material when electric current flows through the conductor.

(3) In the Magnesyn a soft iron ring is placed around a magnet so that most of the magnet's lines of force pass through the ring. This ring is provided with an electrical winding similar to paper wrapping tape around an automobile tire. When alternating electric current flows through this winding, the soft iron ring will be alternately saturated and unsaturated with magnetic lines of force.

(4) The remote-reading Magnesyn compass system is actually two Magnesyns. Each consists of a permanent magnet rotor and a stator which is a toroidally wound coil on a laminated magnetic core. The rotor, magnetized along a line perpendicular to its axis of rotation, is free to revolve in the center of its stator. Since the rotor in the transmitter (compass element) is free to revolve, it aligns itself with the flux lines from the earth's magnetic field. (The indicator rotor is shielded and therefore is not affected by the earth's field.) Each stator, supplied with the same 400-cycle alternating current, is divided by two taps into three equal sections, and the corresponding taps of each unit are connected together. Since the taps in the transmitter stator are connected to the corresponding taps on the indicator stator, and both coils are supplied from the same a-c source, there will be no flow of 400-cycle alternating current between the two units, because the voltages at the taps of each one are at the same fundamental potentials.

(5) By dividing the electrical winding into three sections the voltages produced in each section will vary with the position of the magnet. As long as the magnet rotor of each unit remains in the same position in relation to its stator (electrical zero) there will be no flow of current between the transmitter and indicator. However, if one magnet is moved to a new position, the voltages in the three windings of one Magnesyn will be no longer the same as the voltages in the second Magnesyn. Since the transmitter magnet rotor (compass element) always remains aligned with the earth's field, the instant the aircraft alters its heading in relation to the earth's field, the stator, rigid in its housing, revolves around the rotor. This change in the relative position of the rotor and stator unbalances the voltages between the two Magnesyns, and

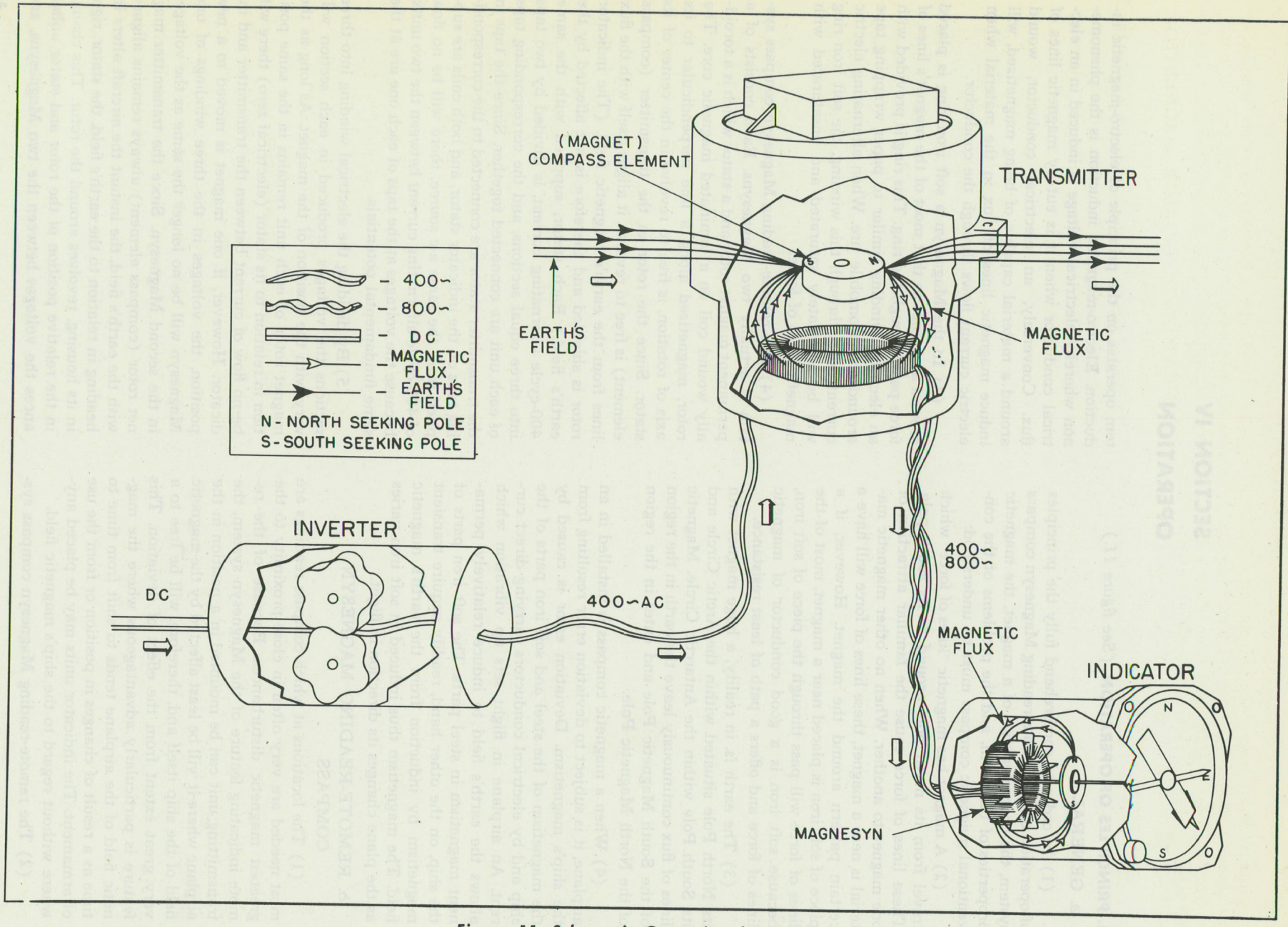


Figure 11—Schematic Operational Diagram

current will now flow between the two stators. In an attempt again to equalize the voltage potentials the indicator rotor, since it is shielded from the earth's field and is free to revolve, must follow the transmitter rotor and make the corresponding rotation. Thus the indicator hand, attached to the rotor shaft, follows any alteration in the ship's heading in relation to the earth's field.

(6) An additional annular core of magnetic material placed around the outside of each stator serves a dual purpose. It provides both a return path for magnetic flux and a shield against extraneous magnetic fields that may be present near the Magnesyn.

2. OPERATING INSTRUCTIONS. (*See figures 4 and 5.*)

a. INDICATOR (FIXED MAGNESYN).

(1) The course-setting pointer (13) provides a reference point for holding the airplane on its compass heading. By turning the external adjusting knob (15) located on the lower left-hand side of the indicator bezel, the pointer may be set on any desired course.

(2) Prior to each flight of the ship apply rated power to the remote-reading Magnesyn compass system and set the course-setting pointer on the compass heading determined for the flight.

(3) If a change in the ship's compass heading is made, the reminder, or course-setting pointer, must be reset accordingly.

b. INDICATOR (ROTATABLE MAGNESYN). (*See figure 5A.*)

(1) The rotatable Magnesyn provides an additional reference for holding the airplane on its course. By turning the external adjusting knob (1), which is located on the lower left-hand side of the indicator bezel, the dial, and Magnesyn, may be rotated to any desired position.

(2) Set the aircraft on the desired heading. When the compass pointer steadies, turn the adjusting knob (1) to rotate the dial (7) until the pointer on its desired heading is at top dead center or exactly on the index. Turn the knob (3) until the course-setting pointer (5) is also at top dead center and directly over the pointer. This arrangement provides a quick, ready reference should the aircraft go off its heading.

(3) The rotatable Magnesyn indicator may also be used in the same manner as the customary fixed Magnesyn with "N" remaining at top dead center. Refer to Section IV, paragraph 2. *a.*

SECTION V

SERVICE INSPECTION, MAINTENANCE, AND LUBRICATION

1. SERVICE TOOLS REQUIRED.—The following special test equipment is required to install and perform the necessary inspection and maintenance work.

Part No.	Nomenclature	Application
AAF part No. 43G23330 Navy Stock No. R88-T-829-500	Magnesyn Field Tester	To isolate trouble in the compass system.

2. SERVICE INSPECTION.

COLUMN NO. 44

NAVIGATION INSTRUMENTS

Preflight Inspection

Check if indication is consistent with heading of aircraft.

25-50 Hour or Intermediate Inspection

Inspect both the indicator and the transmitter for security of mounting. Tighten if necessary. Check all disconnect plugs and tighten if necessary. With the compass power supply on, turn the ship through 360 degrees. Note if the indicator follows the transmitter on all headings. If the indicator follows the motion of the ship the system may be assumed to be operating correctly. If the indicator fails to follow the motion of the ship, locate the trouble as outlined in paragraph 5, this section.

100-Hour Inspection

With the compass units properly connected, the rated power turned on, and the engines running, head the airplane successively magnetic north, east, south, and west. The indicator units must read the indication noted on the correction card. If they do not indicate as shown on the correction card, check the applied voltage and frequency, which must be 26 volts at 400 cycles, or 52 volts at 800 cycles, or some intermediate point where the frequency is 13 to 17 times the voltage. If the power supply is functioning properly, recompensate the system and prepare a new correction card. (Refer to section III, paragraph 3.) If recompensation fails to bring the reading within the specified tolerance, refer to paragraph 5, this section.

3. MAINTENANCE.

No maintenance is necessary other than that specified under the various inspection periods.

4. LUBRICATION

No lubrication is necessary for these units at any time.

5. SERVICE TROUBLES AND REMEDIES.

The transmitter and the indicator of the remote reading Magnesyn compass system are interchangeable, thus making it possible to put the compass system back in operation by removing the faulty unit, replacing it with a new one, and shipping the faulty unit to an overhaul depot for reconditioning. When replacing a transmitter or an indicator, recompensation and new correction card will be necessary. Refer to Section III, paragraph 3.

a. WIRING.—The following table is given to aid in locating errors in wiring. All indicator behavior is considered as referred to a transmitter pointed on a north heading. Letters used refer to wires corresponding to plug terminal pin markings anywhere in the circuit.

TROUBLE	PROBABLE CAUSE	REMEDY
NO TORQUE	1. "A" shorted to "B." 2. Power supply not operating.	1. Check and correct wiring. 2. Check and repair power supply.
REVERSE ROTATION	"A" and "B" reversed with "C" and "D" reversed.	Check and fix reversal.
ERRATIC OPERATION IN THE 90-DEGREE ARC BETWEEN 330 DEGREES AND 60 DEGREES	"C" open.	Check and fix wiring.
ERRATIC OPERATION IN THE 90-DEGREE ARC BETWEEN 300 DEGREES AND 30 DEGREES	"D" open.	Check and fix wiring.
POINTER PULLS IN AT BOTH 30 DEGREES AND 210 DEGREES (THAT IS AT EITHER OF THESE HEADINGS THE POINTER IS PULLED AWAY IN ONE DIRECTION OR THE OTHER)	1. "A" wire open (power supply reaching one unit). 2. "D" shorted to "A" or "B." 3. "A"-"D" phase open in either transmitter or indicator coils. 4. "A" and "D" reversed.	1. Check and fix wiring. 2. Check and fix wiring. 3. Check wiring. If the instrument has an open coil, forward the unit to the overhaul depot. 4. Check and fix reversal.
POINTER PULLS IN AT BOTH 330 DEGREES AND 150 DEGREES	1. "B" wire open (power supply reaching one unit). 2. "C" shorted to "A" or "B." 3. "B"-"C" phase open in either transmitter or indicator coils. 4. "B" and "C" reversed.	1. Check and fix wiring. 2. Check and fix wiring. 3. Check wiring. If the instrument has an open coil, forward the unit to an overhaul depot. 4. Check and fix reversal.
ERRATIC OPERATION IN THE 120-DEGREE ARC BETWEEN 300 DEGREES AND 60 DEGREES	"C"-"D" phase open in either transmitter or indicator coils.	Check wiring. If the instrument has an open coil, forward the unit to an overhaul depot.
POINTER PULLS IN AT BOTH ZERO DEGREES AND 180 DEGREES	1. "A" and "C" reversed with "B" and "D" reversed. 2. "A" and "D" reversed with "B" and "C" reversed.	1. Check and fix reversal. 2. Check and fix reversal.
POINTER PULLS IN AT BOTH 60 DEGREES AND 240 DEGREES	"A" and "C" reversed.	Check and fix reversal.
POINTER PULLS IN AT BOTH 120 DEGREES AND 300 DEGREES	"B" and "D" reversed.	Check and fix reversal.
POINTER PULLS IN AT BOTH 90 DEGREES AND 270 DEGREES	1. "C" shorted to "D." 2. "C" and "D" reversed. 3. "A" and "B" reversed.	1. Check and fix wiring. 2. Check and fix reversal. 3. Check and fix reversal.

Check	If Correct Results Are Not Obtained Probable Cause	Remedy
TRANSMITTER PIONEER TYPE 10062-1-A A AND B = APPROX. 120 OHMS B AND C = 40 OHMS C AND D = 40 OHMS D AND A = 40 OHMS These three values must be the same within 2 ohms of each other	Faulty transmitter.	Replace transmitter and forward it to overhaul depot.
TRANSMITTER PIONEER TYPE 10062-1-B A AND B = 12 TO 18 OHMS B AND C = 4 TO 6 OHMS C AND D = 4 TO 6 OHMS D AND A = 4 TO 6 OHMS These three values must be the same within 0.5 ohm of each other	Faulty transmitter.	Replace transmitter and forward it to overhaul depot.
INDICATOR ALL TYPES A AND B = 150 TO 200 OHMS B AND C = 50 TO 70 OHMS C AND D = 50 TO 70 OHMS D AND A = 50 TO 70 OHMS These three values must be the same within 2 ohms of each other	Faulty indicator.	Replace indicator and forward it to overhaul depot.

b. ISOLATING TROUBLES.

(1) If it has been definitely established that wiring errors have not caused the failure of the compass system, an attempt should be made to determine whether the source of the trouble is in the transmitter or indicator. This can be accomplished easily by using a magnesyn field tester, AAF part No. 43G23330, Navy Stock No. R88-T-829-500.

(2) Disconnect the magnesyn transmitter and indicator from the compass system wiring. Then turn the compass power on, and, with a voltmeter, check the wiring of the compass system for grounds and shorts at the indicator and transmitter disconnect plugs; that is, lead to ground and lead to lead. No voltage should be shown except on leads A to B and A to ground which should show 26 volts at 400 cycles. Turn off the power.

NOTE

Before the following tests are performed, the test instrument in the field tester should be checked occasionally for electrical-zero indication. This can be done at the bench or in the airplane without applying external power to the kit, as the kit circuit is self-powered by a small dry cell.

(3) The procedure for electrical-zero on the test instrument is as follows:

(a) Set the switch marked electrical-zero to electrical-zero position and note that the pointer reads 180 degrees ± 1 degree. If the test instrument passes this test then all other indicators that are in calibration with it will be all right. The test instrument may be connected in a circuit while this test is being made since the electrical-zero switch disconnects it from the circuit.

(b) Insert the test kit in series with the magnesyn system at the indicator location by connecting the test instrument to the indicator. Supply 26 volts 400 cycle power to terminals A and B of the test kit. Rotate the pointer of the test instrument and observe that the indicator follows smoothly. Check to see that

TROUBLE	PROBABLE CAUSE	REMEDY
TRANSMITTER		
SPINNING AND OSCILLATION OF THE FLOAT	Impressed vibration amplified by shock mounting.	Remove shock mounting. (Refer to section III, paragraph 1. *a.* (2) *(c).*)
SWIRL OF LIQUID GIVING ERRATIC INDICATION	Not enough liquid in the bowl.	Replace the transmitter and forward it to overhaul depot.
LEAKAGE OF COMPASS LIQUID	Leaky gaskets.	Replace the transmitter and forward it to overhaul depot.
COMPENSATOR DOES NOT HAVE SUFFICIENT COMPENSATING EFFECT	Weak compensation magnets.	Replace the transmitter and forward it to overhaul depot.
INDICATOR		
EXCESSIVE OSCILLATION WHEN AT LEAST TWO INDICATORS ARE USED	Incorrect combination of indicators.	Refer to section III, paragraph 1. *b.* (1).
ERRATIC INDICATION	Loose pointer.	Replace the indicator and forward it to overhaul depot.
INCORRECT INDICATION FOLLOWED BY SPINNING OF THE HAND	Spinning and oscillation of the transmitter float due to impressed vibration amplified by shock mounting.	Remove shock mounting. (Refer to section III, paragraph 1. *a.* (2) *(c).*)
SLUGGISH INDICATION	Dirty jewels or pivots.	Replace the indicator and forward it to overhaul depot.

when the test instrument is adjusted to the following points the indicator reads as follows within ± 4 degrees:

Test Indicator Degrees	*Magnesyn Compass Indicator*	*Test Indicator Degrees*	*Magnesyn Compass Indicator*
0	South (18)	180	North (0)
10	19	190	1
20	20	200	2
30	21	210	3
40	22	220	4
50	23	230	5
60	24	240	6
70	25	250	7
80	26	260	8
90	West (27)	270	East (9)
100	28	280	10
110	29	290	11
120	30	300	12
130	31	310	13
140	32	320	14
150	33	330	15
160	34	340	16
170	35	350	17
		360	South (18)

(c) Disconnect the ship's wiring from the transmitter. Connect the test instrument to the transmitter. Supply 26 volts 400 cycle power to terminals A and B of the tester. Note the position that the pointer of the test instrument points. Then, rotate the tester 100 degrees; hold it for 30 seconds to allow the magnet in the transmitter to follow, and then release the pointer of the tester. When rotated in either direction, the tester should return to ± 2 degrees of the original heading without tapping the transmitter.

(d) After a line maintenance check or after an indicator has been replaced because of failure or damage, a simple functional test of the installation may be made by slowly rotating the small, permanent magnet contained in the test instrument case directly over the top of the transmitter. This is performed as follows: Turn on the ship's compass power and observe the indicated heading of the aircraft. Hold the magnet over the transmitter so that the indicators will show approximately the observed heading. Rotate the magnet slowly stopping approximately every 90 degrees. This will cause the magnesyn system to operate as it would under actual flight conditions. Observe whether the indicators follow satisfactorily and show approximate heading of the magnet.

c. RESISTANCE CHECKS.—Using an ohmmeter, make the resistance checks listed in the following table on the individual units between the specified terminals in the receptacles of the transmitter and indicators. Note that these values for the transmitter differ according to the Pioneer type number.

d. MECHANICAL.—When it has been established that the electrical characteristics of all units are correct and that the wiring is not at fault, it will be necessary to determine whether the mechanical parts of the units are in good condition. There are certain troubles listed in the preceding table which may be of assistance in identifying and eliminating difficulties in the mechanical elements of the units.

6. INSTRUCTION FOR DRILLING DRAINAGE HOLES IN TRANSMITTER.

a. It is sometimes necessary to install the transmitter of the remote-reading Magnesyn compass system in aircraft where it is not completely protected from the elements. Snow, rain, sleet, moisture, and, occasionally, gasoline collect on top of the transmitter. If this moisture seeps into the compensator housing and finds its way through the gage hole, the functioning of the diaphragm will be impaired. This condition exists only in the transmitter, Pioneer type 10062-1-A, since later types are provided with means for drainage and have a plug supplied for sealing the gage hole. To remedy this condition in the transmitter, Pioneer type 10062-1-A, proceed according to the following instructions.

Note

The transmitter is a precision instrument. Handle it with extreme care when performing this operation.

b. Remove the four screws (3, figure 15) and lift the compensator assembly (1, figure 15) off the compensator housing (6, figure 15). The small diaphragm gage hole is now exposed. Fill the diaphragm gage hole with sealing wax (Dennison's No. 2, Black, or equivalent).

Note

Before sealing the diaphragm gage hole, make certain there are no liquids in the chamber on top of the diaphragm. A stream of compressed air directed into the hole will tend to bleed any liquid present in the chamber.

c. Construct a wooden jig according to figure 12. Place the transmitter, without the compensator assembly, in the jig (figure 13) so that the "FORE" arrow is pointing directly downward. The dowel pins on the jig will be fully inserted in the transmitter mounting holes. Place the jig, with transmitter, on the horizontal table of a vertical drill press. The edge of the electrical connector receptacle will rest on the table.

d. Mark out the centers for the two holes. (See figure 14.) Carefully drill the two 3/16-inch holes with the drill in a vertical position. If drilled according to instructions, the holes will be slightly slanted in relation to the top surface of the compensator housing (approximately 3 degrees). Be sure the drill does not penetrate through the housing more than 3/16 inch. To prevent chipping, a sharp drill is an absolute necessity. Thoroughly clean the surface of the compensator housing. Replace the compensator assembly and secure with the four screws (3, figure 15).

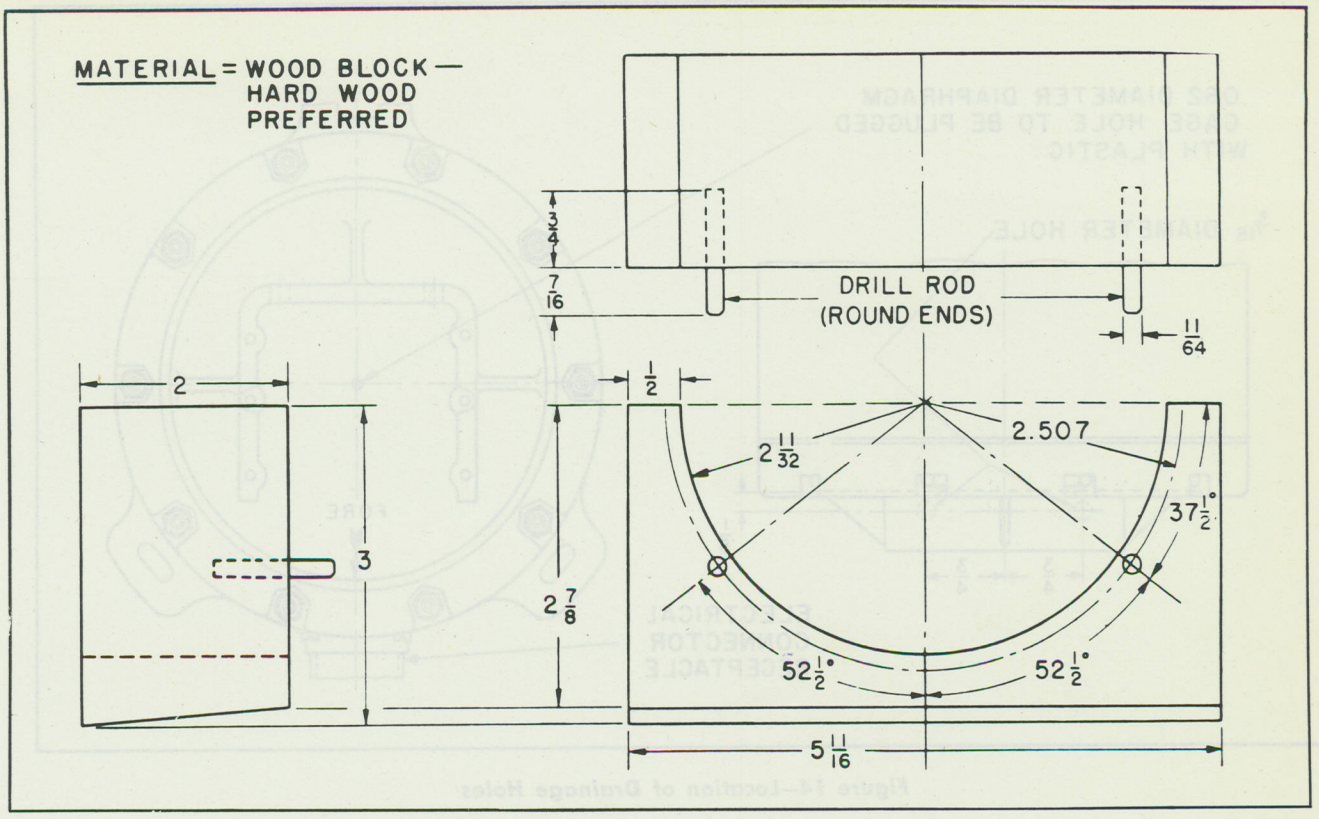


Figure 12—Jig for Drilling Drainage Holes

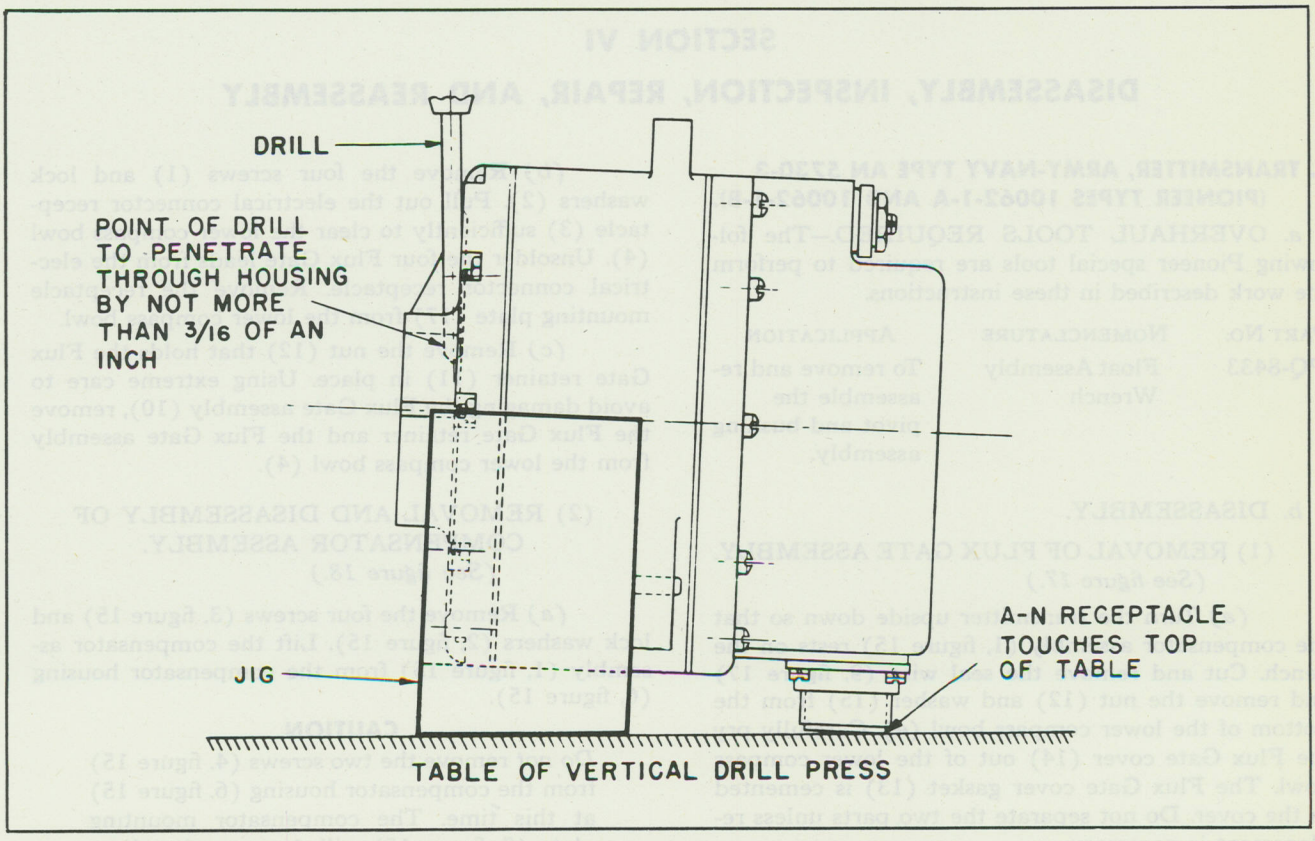


Figure 13—Position of Transmitter in Jig

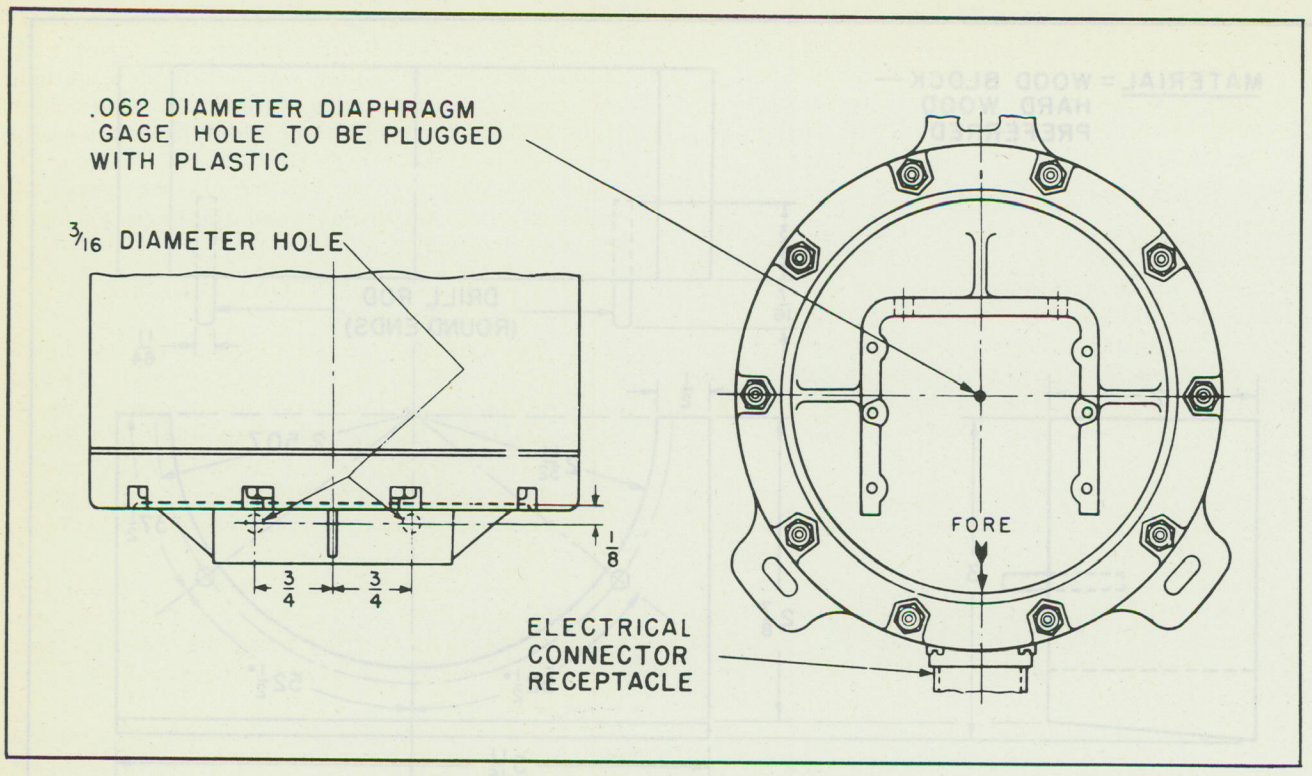


Figure 14—Location of Drainage Holes

SECTION VI

DISASSEMBLY, INSPECTION, REPAIR, AND REASSEMBLY

1. TRANSMITTER, ARMY-NAVY TYPE AN 5730-3 (PIONEER TYPES 10062-1-A AND 10062-1-B).

a. OVERHAUL TOOLS REQUIRED.—The following Pioneer special tools are required to perform the work described in these instructions.

PART NO.	NOMENCLATURE	APPLICATION
PQ-8433	Float Assembly Wrench	To remove and reassemble the pivot and bushing assembly.

b. DISASSEMBLY.

(1) REMOVAL OF FLUX GATE ASSEMBLY. *(See figure 17.)*

(a) Turn the transmitter upside down so that the compensator assembly (1, figure 15) rests on the bench. Cut and remove the seal wire (9, figure 17) and remove the nut (12) and washer (15) from the bottom of the lower compass bowl (4). Carefully pry the Flux Gate cover (14) out of the lower compass bowl. The Flux Gate cover gasket (13) is cemented to the cover. Do not separate the two parts unless replacement is necessary.

(b) Remove the four screws (1) and lock washers (2). Pull out the electrical connector receptacle (3) sufficiently to clear the lower compass bowl (4). Unsolder the four Flux Gate leads from the electrical connector receptacle. Remove the receptacle mounting plate (17) from the lower compass bowl.

(c) Remove the nut (12) that holds the Flux Gate retainer (11) in place. Using extreme care to avoid damaging the Flux Gate assembly (10), remove the Flux Gate retainer and the Flux Gate assembly from the lower compass bowl (4).

(2) REMOVAL AND DISASSEMBLY OF COMPENSATOR ASSEMBLY. *(See figure 18.)*

(a) Remove the four screws (3, figure 15) and lock washers (2, figure 15). Lift the compensator assembly (1, figure 15) from the compensator housing (6, figure 15).

CAUTION

Do not remove the two screws (4, figure 15) from the compensator housing (6, figure 15) at this time. The compensator mounting plate (7, figure 15) will drop, causing dam-

age to the diaphragm (9, figure 15), if the screws are removed *before* the compensator housing is separated from the upper compass bowl (1, figure 16). On later models these two screws are covered with sealing wax.

(b) Do not disassemble the compensator assembly (1, figure 15) unless it is necessary to magnetize or demagnetize the compensator magnets. If this operation is necessary, remove the four screws (1, figure 18) and lift off the compensator cover. Remove the spacing washers (2) from the magnet staffs and idler gear staff. The spacing washers are used to reduce the play of the magnet staff and the idler gear staff. There will be no spacing washers present if there was no evident play at reassembly.

(c) Remove the lower magnet assembly from the bracket. The two lower magnets, with their staffs and gears, are matched and must not be disassembled or interchanged with similar parts of other compensator assemblies. Mark these two parts and keep them together so they may be reassembled as a matched pair. Damage or wear to any part of the two lower magnets, their staffs, or gears, will require replacement of the compensator assembly (1, figure 15).

(d) Remove the upper magnet assembly from the bracket. The two upper magnets, with their staffs and gears are matched and must not be disassembled or interchanged with similar parts of other compensator assemblies. Mark these two parts and keep them together so they may be reassembled as a matched pair. Damage or wear to any part of the two lower magnets, their staffs, or gears, will require replacement of the compensator assembly (1, figure 15).

(e) Remove the idler gear assembly from the bracket. Do not disassemble the idler gear assembly. If damaged, replace the compensator assembly (1, figure 15). The two compensator drivers, the two compensator springs, and the two compensator knobs must not be removed from the bracket. If any of these parts is damaged, replace the compensator assembly (1, figure 15).

(3) INSPECTION OF DIAPHRAGM.
(See figure 19.)

(a) Before draining the compass bowl, it is advisable to measure the distance through the gage hole between the top surface of the compensator housing and the diaphragm, since this measurement must be made to determine the condition of the diaphragm. An accurate check on the diaphragm can be made only with the compass bowl filled.

(b) Remove the plug (5, figure 1) and measure the distance between the top surface of the compensator housing and the diaphragm. The distance must be 3/8 inch (+1/8 or 0.0 inch). (See figure 19). If the measurement does not meet this requirement, the diaphragm (9, figure 15) must be replaced with a new one during reassembly. Early models of Pioneer type 10062-1-A did not have the plug in the compensator housing but instead had a very small opening which was closed with sealing wax during reassembly. Scrape the sealing wax out of the gage hole and make the previously described measurement. Upon reassembly replace the old type compensator housing, PD-23534-1, with the later type housing (6, figure 15). With the new housing use two screws (4, figure 15), the compensator mounting plate (7, figure 15), and the plug (5, figure 15).

(4) REMOVAL OF FLOAT ASSEMBLY.
(See figure 16).

(a) Cut and remove the seal wire (9, figure 17). Remove the filling hole cap (8, figure 17) and washer (7, figure 17) from the lower compass bowl (4, figure 17). Drain out the aircraft compass fluid, Specification No. AN-VV-C-551. If replacement is necessary, unscrew the filling hole insert (6, figure 17) from the lower compass bowl and remove the lead seal (19, figure 17).

(b) Remove the eight screws (18, figure 17), two screws (5, figure 17), 10 nuts (11, figure 15), and 10 washers (10, figure 15) holding the upper compass bowl (1, figure 16) and lower compass bowl (4, figure 17) together.

(c) Since the gasket (10, figure 16) between the upper compass bowl (1) and the lower compass bowl (4, figure 17) is cemented in place, it will be necessary to break the seal to separate the two units. A dull razor blade is a suitable tool to perform this separation.

CAUTION

Use extreme care when separating the two bowls to avoid damage to the float assembly (2, figure 16).

(d) Remove the nut (16, figure 17) and washer (15, figure 17) from the bottom of the lower compass bowl (4, figure 17). When performing this operation, be sure the float assembly (2, figure 16) is supported properly to prevent damage to the float or its damping fins.

(e) Carefully lift the float assembly (2) out of the lower compass bowl (4, figure 17) by gripping the top float weight located between the four loose ends of the damping fins. The jewel post assembly (4, figure 16) and jewel post support (8) will remain attached to the float assembly. Remove the washer (9) from the jewel post support.

(f) Loosen the screw (7) in the jewel post support (8) sufficiently to permit removal of the jewel post assembly (4) from the jewel post support. Carefully remove the jewel post spring (6) from the jewel post support with a pair of tweezers.

(g) Remove the retainer screw (5) and separate the jewel post assembly (4) from the float assembly (2). Do not disassemble the jewel post assembly. Damage or wear to any part of it will require replacement with a new assembly.

(h) If necessary, the pivot and bushing assembly (3) may be unscrewed from the float assembly

(2), using the float assembly wrench, PQ-8433. Do not disassemble the pivot and bushing assembly.

Note

Further disassembly of the float assembly must not be undertaken. If it is worn or damaged, replace it with a new float assembly. Refer to section VI, paragraph c.

(5) SEPARATION OF COMPENSATOR HOUSING FROM UPPER COMPASS BOWL. *(See figure 15.)*

(a) Separate the compensator housing (6) from the upper compass bowl (1, figure 16) by breaking the seal made by the two cemented bowl gaskets (8, figure 15) with a razor blade. Remove the two bowl gaskets and the diaphragm (9) from the upper compass bowl.

(b) If necessary, the compensator mounting plate (7) may be removed from the compensator housing (6) by loosening the two screws (4). On later models the screws are covered with sealing wax.

c. CLEANING, INSPECTION, TESTING, AND REPAIR.

Note

After disassembly it is essential to keep all parts absolutely clean and free from dust and moisture, so that the complete instrument will function properly when reassembled.

(1) GENERAL.

(a) Examine the jewel post assembly for signs of wear. Clean the jewel and inspect it for cracks. A sharp-pointed needle is a useful tool for detecting cracks and flaws in the smooth surface of a jewel. A cracked or otherwise damaged jewel must be replaced with an entire jewel post assembly.

(b) Carefully inspect the pivot and bushing assembly for wear or dullness. A slight spherical roundness of the pivot point must not be mistaken for dullness, as this condition is necessary. A sharp needle point would have a tendency to break easily. Clean the pivot by inserting it in a piece of pithwood. A bent, scored, or worn pivot will necessitate the replacement of the pivot and bushing assembly.

(c) Thoroughly clean the gasket surfaces on the upper and lower compass bowls. The three bowl gaskets must be replaced with new ones. Before being used they must be impregnated with cellulose nitrate lacquer, Specification No. AN-TT-L-51, in order to make them impervious to compass liquid. Place the three new gaskets in a shallow dish and cover them with cementing lacquer diluted (approximately 25 percent) with a cellulose nitrate thinner, Specification No. AN-TT-T-256. Gently agitate the mixture, being careful not to injure the gaskets. To prevent floatation of the gaskets, place a metal frame over them. Place the dish in a vacuum chamber and evacuate to 10 inches of mercury, which is a pressure equivalent to 30,000 feet. Hold the vacuum until bubbles no longer exude from the gaskets. Gradually vent the chamber to atmospheric pressure and allow the gaskets to remain in the lacquer at least 10 minutes longer. At the end of that time, hang the gaskets separately on a rack to dry for at least 1 hour. They must be assembled in the transmitter within 24 hours after impregnation.

(d) Inspect the jewel post spring for excessive contraction due to shocks in service. The spring, with no tension, must be 13/32 ($\pm$.010) inch long. Under a load of 5.3 grams, the length must be 1/4 inch ($+1/64$ or -0.0 inch). If the spring fails to meet these specifications replace it with a new one.

(2) FLOAT ASSEMBLY.

(a) Immerse the float assembly in aircraft compass liquid, Specification No. AN-VV-C-551 and place in a vacuum chamber. Evacuate the chamber to 10 inches of mercury, which is a pressure approximately equivalent to 30,000 feet. The formation of bubbles indicates a leak in the float. If this condition exists, the float assembly must be replaced.

(b) The Float Assembly must be checked for both balance and swinging time before reassembly into the transmitter. Screw the pivot and bushing assembly (3, figure 16) into the bottom of the float, using the float assembly wrench, PQ-8433. Slide the small end of the jewel post assembly (4, figure 16), through the retainer screw (5, figure 16), and secure the jewel post assembly to the float. Mount the float and jewel post assembly on a jewel post support in a glass container filled with compass fluid. Thus, the same condition of balance occurs as in the completed transmitter, including any possible angle or dip. Using a reference line on the glass container, check the float for balance. If it is out of balance, file excess solder from the heavy side. If there is no solder on the heavy side, add a minute quantity to the light side. Add or subtract, as necessary, until the float assembly is in perfect balance within $\pm 2°$.

(c) While the float assembly is still assembled in the test unit as described in the preceding paragraph, check the float assembly for swinging time by marking off the circumference of the glass container in degrees. Lightly place a reference mark on the float directly opposite, and in line with, the zero mark on the scale. Magnetically deflect the float 30 degrees from its equilibrium position. Hold this position until the liquid comes to rest and then release. Observe the time required for the float assembly to return 25 degrees toward its equilibrium position. Repeat this test with the float deflected 30 degrees to the other side of its equilibrium position. The time of swing (average

of 2 readings) for the float to return 25 degrees must not be more than 4 seconds. If the time of swing exceeds the tolerance of 4 seconds, the float assembly must be replaced. After balancing or swing test has been completed, place the float and jewel post assembly in a rack, to prevent damage to the pivot, jewel, or fins, until assembly of the transmitter.

(3) COMPENSATOR ASSEMBLY.

(a) The compensator magnets must be demagnetized in a suitable demagnetizer and remagnetized in a suitable magnetizer before reassembly in order to bring the magnets to full strength. Be sure the black painted ends of the compensator magnets are magnetized with the same polarity. This will facilitate reassembly of the compensator assembly. After magnetizing the magnets, allow them to set 24 hours before assembling them into the compensator assembly.

(b) Clean the teeth of all gears with a glass fiber or hair brush. Wash in filtered benzene, Specification No. AN-4-1016B, and dry with clean, dry, oil-free air.

(4) FLUX GATE ASSEMBLY.

(a) Using a standard ohmmeter, test the Flux Gate assembly for resistance and continuity of the windings according to the following table.

AN 5730-3 (PIONEER TYPE 10062-1-A)

Red to Black—approximately 120 ohms

Black to Blue—40 ohms Blue to Yellow—40 ohms Yellow to Red—40 ohms	It is essential that these three resistances be equal within 2 ohms of each other.

AN 5730-3 (PIONEER TYPE 10062-1-B)

Red to Black—12 to 18 ohms

Black to Blue—4 to 6 ohms Blue to Yellow—4 to 6 ohms Yellow to Red—4 to 6 ohms	It is essential that these three resistances be equal within 0.5 of each other. The actual value, within the given limits, is not important.

(b) If the Flux Gate assembly does not meet these conditions, it must be replaced.

(5) CONVERSION OF PIONEER TYPE 10062-1-A TO 10062-1-B.

(a) The Pioneer type 10062-1-A transmitter can be converted to the Pioneer type 10062-1-B transmitter when desired, and when the necessary parts are available. It should be observed that both the Pioneer type 10062-1-A transmitter and the Pioneer type 10062-1-B transmitter bear the same AN 5730-3 designation, and are superficially distinguishable only by their Pioneer type numbers.

(b) In making the conversion from the Pioneer type 10062-1-A transmitter to the Pioneer type 10062-1-B transmitter, substitution of parts should be made in the following manner:

(c) Use Flux Gate Assembly, Part Number PC-52503-1 in place of Flux Gate Assembly, Part Number PC-23572-1.

(d) Use Lower Compass Bowl, Part Number PD-52635-1 in place of Lower Compass Bowl, Part Number PD-23533-1.

(e) Use Float Assembly PD-23645-1.

Note

It is necessary to point out that while the part number for the float assembly of Pioneer type 10062-1-A and the part number for the float assembly of Pioneer type 10062-1-B are identical, float assemblies removed upon disassembly of Pioneer type 10062-1-A transmitters must not be used in Pioneer type 10062-1-B transmitters unless the float assemblies so removed are identified by one black-painted damping fin, or a small embossed triangle on the counterweight at the top of the float. This procedure is necessary because only a limited number of the float assemblies prepared for use specifically in Pioneer type 10062-1-A transmitters, and identified by the triangle embossing or the black-painted fin, contain the delta or three-sided magnet. Only float assemblies containing the delta or three-sided magnet may be used in the Pioneer type 10062-1-B transmitters.

The float assemblies obtained on disassembly of Pioneer type 10062-1-B transmitters may be used in either Pioneer type 10062-1-A transmitters or Pioneer type 10062-1-B transmitters, without regard for identifying marks.

Change type number from 10062-1-A to 10062-1-B by stamping "B" over "A" on name plate.

(f) Conversion from the Pioneer type 10062-1-A transmitter to the Pioneer type 10062-1-B transmitter should be undertaken only at an overhaul depot or a depot similarly equipped.

(g) For the procedure to be followed in the disassembly and reassembly of Pioneer type 10062-1-A transmitters and Pioneer type 10062-1-B transmitters see Section VI, b. and d., this manual.

d. REASSEMBLY.

(1) REASSEMBLY OF FLOAT AND JEWEL POST ASSEMBLIES AND JEWEL POST SUPPORT TO LOWER COMPASS BOWL. *(See figure 16.)*

(a) Screw the pivot and bushing assembly (3) into the bottom of the float assembly (2) using the float assembly wrench, PQ-8433.

(b) Secure the jeweled end of the jewel post assembly (4) to the float assembly (2) by means of the retainer screw (5). Carefully insert the jewel post spring (6) into the jewel post support (8).

(c) Slide the jewel post assembly (4), attached to the float assembly (2), into the jewel post support (8). Secure the jewel post assembly in place by tightening the screw (7). The jewel post assembly must be free to slide, within its limits, in the jewel post support.

(d) Place the washer (9) in the lower compass bowl (4, figure 17). Insert the jewel post support (8, figure 16), with the float and jewel post assemblies attached, through the opening in the bottom of the lower compass bowl.

(e) Place the washer (15, figure 17) over the protruding end of the jewel post support (8, figure 16) and secure the jewel post support to the lower compass bowl with the nut (16, figure 17). Use extreme care when performing this operation to avoid damaging the float and damping fins.

(2) REASSEMBLY OF COMPENSATOR HOUSING AND UPPER AND LOWER COMPASS BOWLS. *(See figure 15.)*

(a) Secure the compensator mounting plate (7) to the bottom side of the compensator housing (6) with the two screws (4). Screw the plug (5) into the top of the compensator housing. Replace all old-type filter plugs with the new-type solid plugs. Cover the heads of the two screws (4) with Dennison's No. 2 Black Sealing Wax.

Note

Early models of Pioneer type 10062-1-A used a compensator housing with a very small gage hole that required plugging with sealing wax to prevent seepage of moisture into the diaphragm. If available, use the new type compensator housing, PD-23534-2, with the large countersunk gage hole and the two drainage holes for the compensator assembly. The compensator mounting plate, PB-52577-1, and threaded plug, PB-52576-1 must be provided with the new type compensator housing. Use the assembly unit, PC-52974-1. If the new type compensator housing is not used, refer to section V, paragraph 6, for the detailed instructions necessary to drill the two drainage holes in the old-type compensator housing and instructions for plugging the gage hole.

(b) Brush a light coating of cellulose nitrate lacquer, Specification No. AN-TT-L-51, diluted approximately 25 percent with cellulose nitrate thinner, Specification No. AN-TT-T-256, around the bottom edge of the compensator housing (6) and around the top edge of the upper compass bowl (1, figure 16). Place the diaphragm (9, figure 15) between two new impregnated bowl gaskets (8) paragraph c (1) *(c)* this section, and line up their screw holes using the locating hole provided in each part for that purpose.

(c) By inspection, note the *unequally* spaced mounting bosses on the upper compass bowl (1, figure 16). Place the diaphragm (9, figure 15) with its two bowl gaskets (8) on the top edge of the upper compass bowl so that their locating holes are between the mounting bosses that are closest together.

(d) Place the compensator housing (6) on top of the diaphragm (9) so that the arrow marked "FORE" is over the locating holes in the diaphragm and bowl gaskets.

(e) Brush a light coating of cellulose nitrate lacquer, Specification No. AN-TT-L-51, diluted approximately 25 percent with thinner, Specification No. AN-TT-T-256, on the top edge of the lower compass bowl (4, figure 17) and the bottom edge of the upper compass bowl (1, figure 16).

(f) Place the new impregnated bowl gasket (10, figure 16) (refer to section VI, paragraph c. (1) *(c)*) on the lower compass bowl, (4, figure 17). The locating hole in the bowl gasket will be in line with the boss provided for the electrical connector receptacle (3, figure 17). Place the upper compass bowl (1, figure 16), together with the compensator housing (6, figure 15), over the lower compass bowl. The arrow marked "FORE" will line up with the boss provided for the electrical connector receptacle.

(g) Insert the eight screws (18, figure 17) and two screws (5, figure 17) up through the lower compass bowl (4, figure 17), the upper compass bowl (1, figure 16), and the compensator housing (6, figure 15). Note that there are two screws (5, figure 17) provided with holes for wire sealing. One of them is to be used in a position directly to the left of the filling hole when facing the filling hole. The other screw is to be used in the second position to the right of the boss provided for the electrical connector receptacle when facing this boss. When these two screws are correctly placed, there will be just two screws (18, figure 17) between them.

(h) Place a washer (10, figure 15) over each screw (5, figure 17) and screw (18, figure 17) and secure with the ten nuts (11, figure 15). Tighten the screws as much as possible to prevent leaks between the two compass bowls and the compensator housing.

(3) FILLING OF COMPASS BOWL. *(See figure 17.)*

(a) If the filling hole insert (6) was removed during disassembly, place a new lead seal (19) over the opening and screw the filling hole insert into the lower compass bowl (4). Tighten the filling hole insert with a torquemeter wrench, applying 45 inch-pounds torque.

(b) In order to insure satisfactory performance of the transmitter at high altitudes, the compass bowl must be filled under a vacuum. The bowl must first be filled with aircraft compass liquid, Specification No. AN-VV-C-551. Submerge the bowl on its side, with the filling hole on top, in a tank of aircraft compass liquid.

(c) Place the tank in a vacuum chamber. Evacuate the chamber to 10 inches of mercury, a pressure approximately equivalent to 30,000 feet. Keep the tank in the chamber until all bubbling has ceased.

(d) Remove the tank from the chamber, place a finger over the filling hole, and remove the bowl from the fluid. Turn the bowl upside down and add

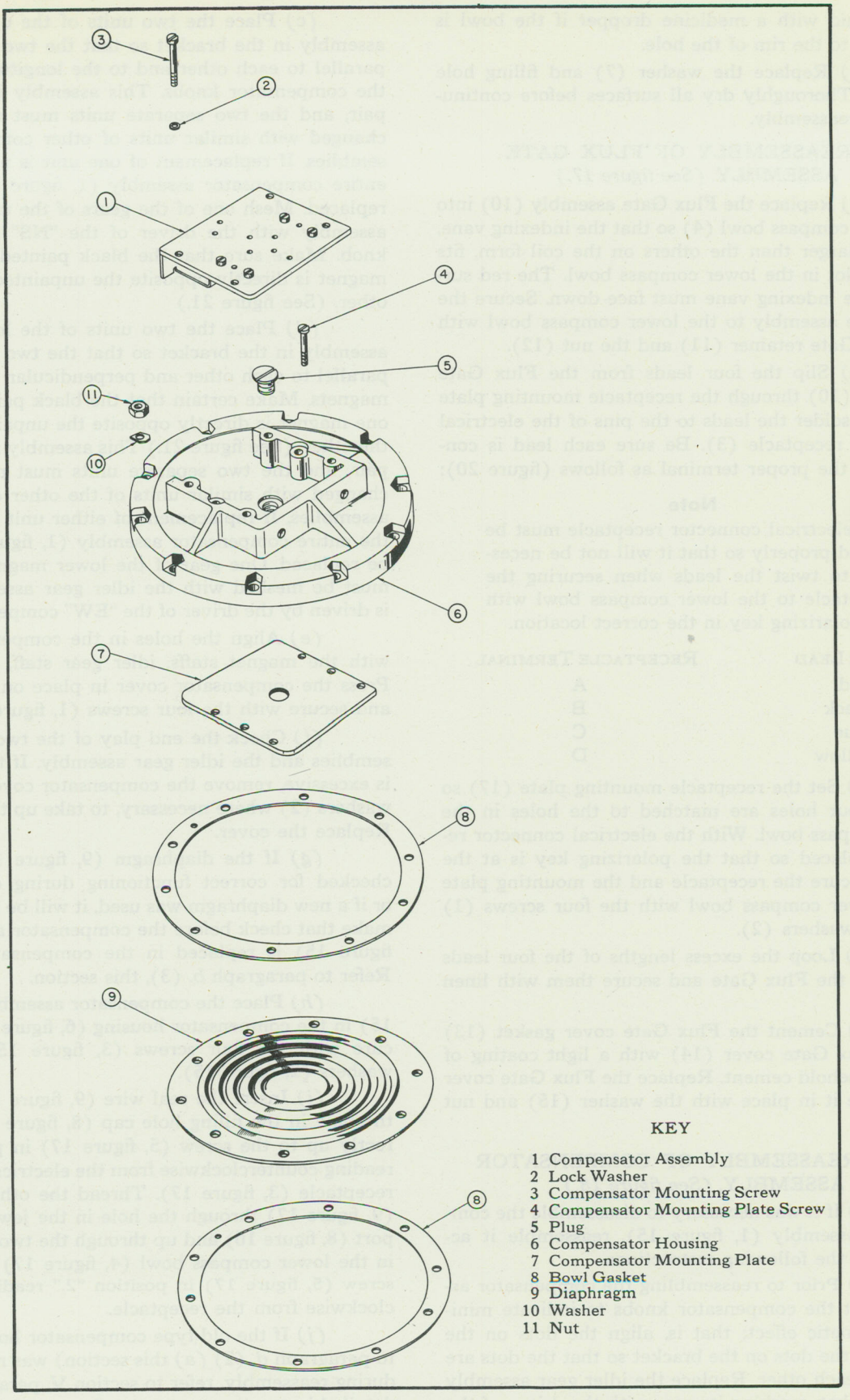


Figure 15—Exploded View Drawing—Main Assembly—Transmitter—Type AN 5730-3

more liquid with a medicine dropper if the bowl is not filled to the rim of the hole.

(e) Replace the washer (7) and filling hole cap (8). Thoroughly dry all surfaces before continuing with reassembly.

(4) REASSEMBLY OF FLUX GATE ASSEMBLY. *(See figure 17.)*

(a) Replace the Flux Gate assembly (10) into the lower compass bowl (4) so that the indexing vane, which is larger than the others on the coil form, fits into the slot in the lower compass bowl. The red surface of the indexing vane must face down. Secure the Flux Gate assembly to the lower compass bowl with the Flux Gate retainer (11) and the nut (12).

(b) Slip the four leads from the Flux Gate assembly (10) through the receptacle mounting plate (17) and solder the leads to the pins of the electrical connector receptacle (3). Be sure each lead is connected to the proper terminal as follows (figure 20):

Note

The electrical connector receptacle must be placed properly so that it will not be necessary to twist the leads when securing the receptacle to the lower compass bowl with the polarizing key in the correct location.

Color Lead	Receptacle Terminal
Red	A
Black	B
Blue	C
Yellow	D

(c) Set the receptacle mounting plate (17) so that its four holes are matched to the holes in the lower compass bowl. With the electrical connector receptacle placed so that the polarizing key is at the bottom, secure the receptacle and the mounting plate to the lower compass bowl with the four screws (1) and lock washers (2).

(d) Loop the excess lengths of the four leads back onto the Flux Gate and secure them with linen thread.

(e) Cement the Flux Gate cover gasket (13) to the Flux Gate cover (14) with a light coating of Duco household cement. Replace the Flux Gate cover and secure it in place with the washer (15) and nut (12).

(5) REASSEMBLY OF COMPENSATOR ASSEMBLY. *(See figure 18.)*

(a) If it was necessary to disassemble the compensator assembly (1, figure 15), reassemble it according to the following instructions.

(b) Prior to reassembling the compensator assembly, set the compensator knobs to indicate minimum magnetic effect; that is, align the dots on the knob with the dots on the bracket so that the dots are closest to each other. Replace the idler gear assembly in the bracket, meshing its gear with the driver of the "EW" compensator knob.

(c) Place the two units of the upper magnet assembly in the bracket so that the two magnets are parallel to each other and to the longitudinal axis of the compensator knobs. This assembly is a matched pair, and the two separate units must not be interchanged with similar units of other compensator assemblies. If replacement of one unit is necessary, the entire compensator assembly (1, figure 15) must be replaced. Mesh one of the gears of the upper magnet assembly with the driver of the "NS" compensator knob. Make sure that the black painted pole of one magnet is directly opposite the unpainted pole of the other. (See figure 21.)

(d) Place the two units of the lower magnet assembly in the bracket so that the two magnets are parallel to each other and perpendicular to the upper magnets. Make certain that the black painted pole of one magnet is directly opposite the unpainted pole of the other. (See figure 21.) This assembly is a matched pair, and the two separate units must not be interchanged with similar units of the other compensator assemblies. If replacement of either unit is necessary, the entire compensator assembly (1, figure 15) must be replaced. One gear of the lower magnet assembly must be meshed with the idler gear assembly which is driven by the driver of the "EW" compensator knob.

(e) Align the holes in the compensator cover with the magnet staffs, idler gear staff, and dowels. Press the compensator cover in place on the bracket and secure with the four screws (1, figure 18).

(f) Check the end play of the two magnet assemblies and the idler gear assembly. If the end play is excessive, remove the compensator cover and place washers (2) where necessary, to take up the end play. Replace the cover.

(g) If the diaphragm (9, figure 15) was *not* checked for correct functioning during disassembly, or if a new diaphragm was used, it will be necessary to make that check before the compensator assembly (1, figure 15) is replaced in the compensator housing. Refer to paragraph *b.* (3), this section.

(h) Place the compensator assembly (1, figure 15) in the compensator housing (6, figure 15) and secure with the four screws (3, figure 15) and lock washers (2, figure 15).

(i) Insert the seal wire (9, figure 17) through the hole in the filling hole cap (8, figure 17) and directly up to the screw (5, figure 17) in position "5," reading counterclockwise from the electrical connector receptacle (3, figure 17). Thread the other seal wire (9, figure 17) through the hole in the jewel post support (8, figure 16) and up through the two small holes in the lower compass bowl (4, figure 17) to the long screw (5, figure 17) in position "2," reading counterclockwise from the receptacle.

(j) If the old-type compensator housing (refer to paragraph *d.* (2) *(a)* this section) was not replaced during reassembly, refer to section V, paragraph 6, for detailed instructions necessary for reworking the compensator housing.

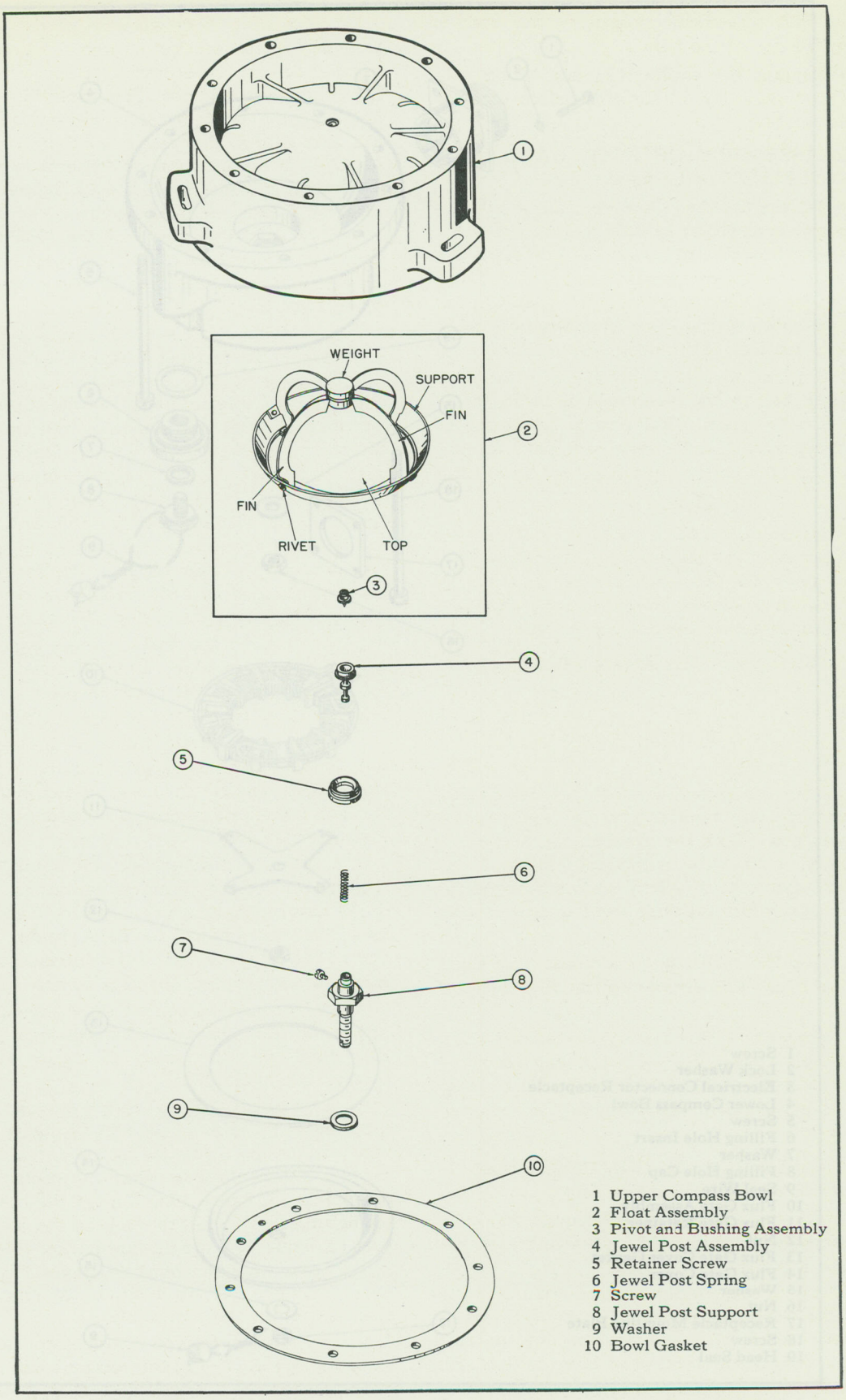
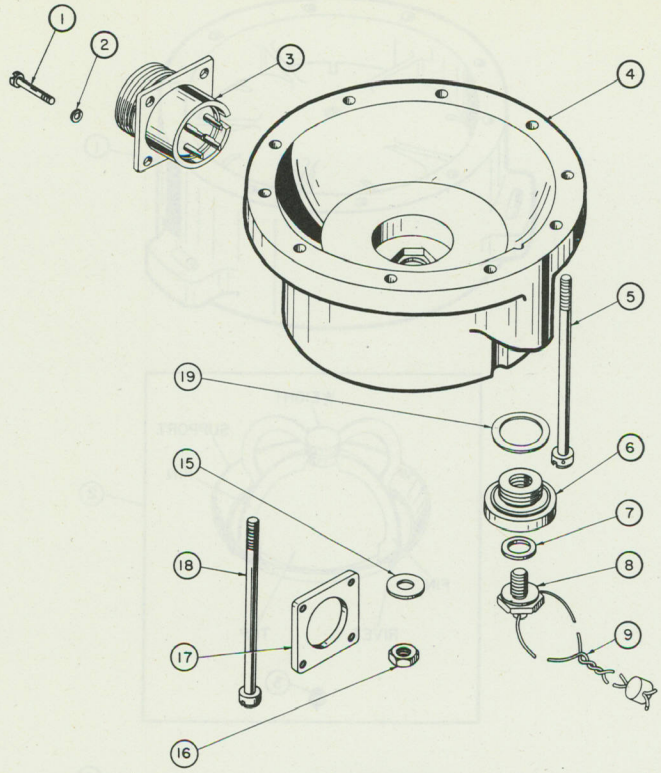
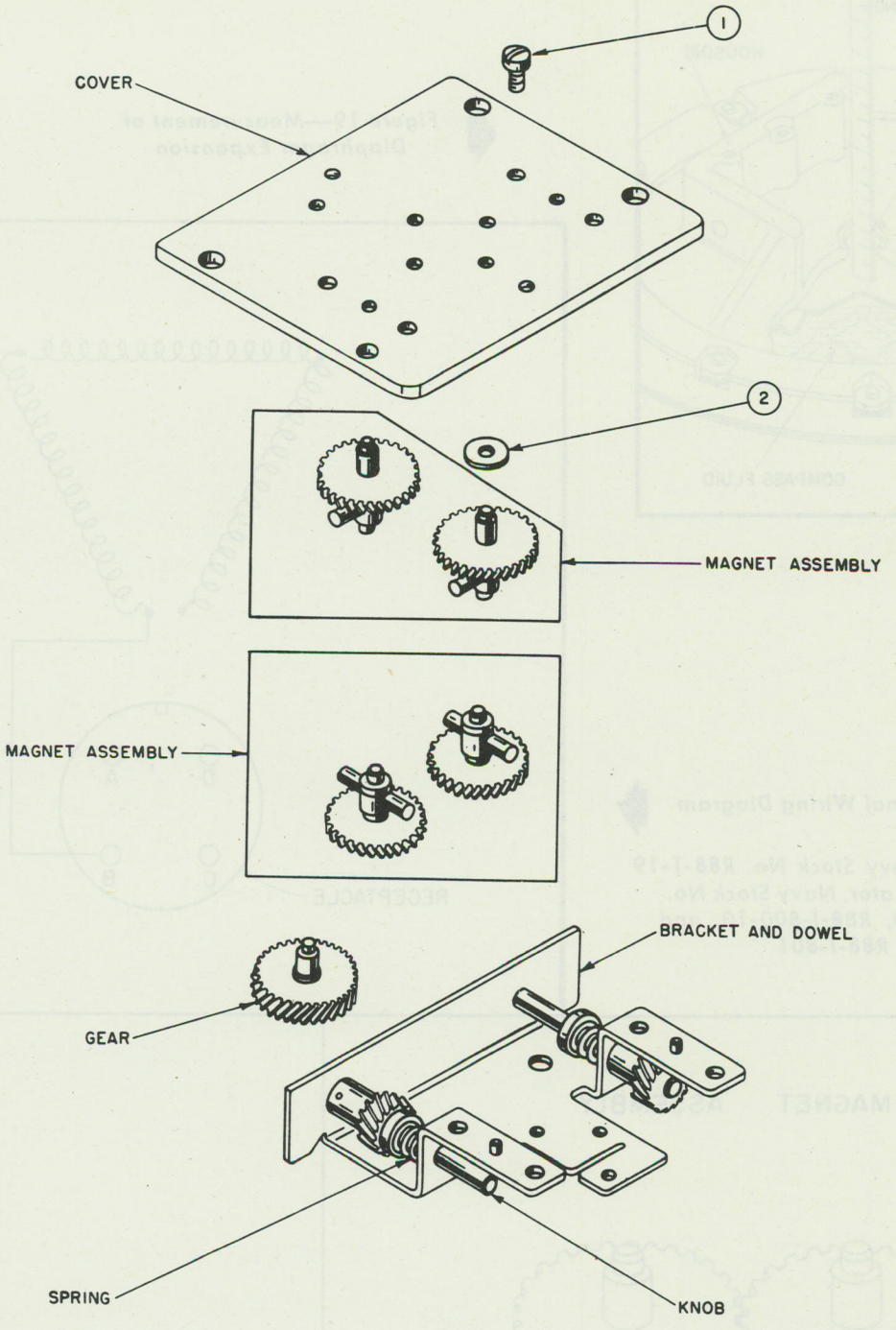


Figure 16—Exploded View Drawing—Main Assembly—Transmitter—Type AN 5730-3



1 Screw
2 Lock Washer
3 Electrical Connector Receptacle
4 Lower Compass Bowl
5 Screw
6 Filling Hole Insert
7 Washer
8 Filling Hole Cap
9 Seal Wire
10 Flux Gate Assembly
11 Flux Gate Retainer
12 Nut
13 Flux Gate Cover Gasket
14 Flux Gate Cover
15 Washer
16 Nut
17 Receptacle Mounting Plate
18 Screw
19 Head Seal

Figure 17—Exploded View Drawing—Main Assembly—Transmitter—Type AN 5730-3



KEY

1 Screw
2 Magnet Staff Spacing Washer

Figure 18—Exploded View Drawing—Compensator Assembly—Transmitter—Type AN 5730-3

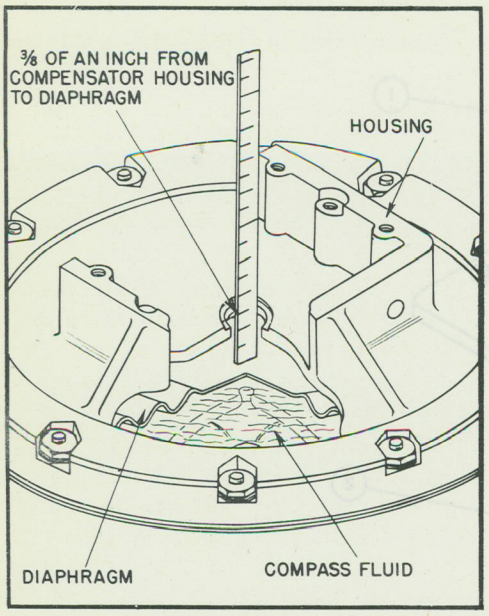


Figure 19—Measurement of Diaphragm Expansion

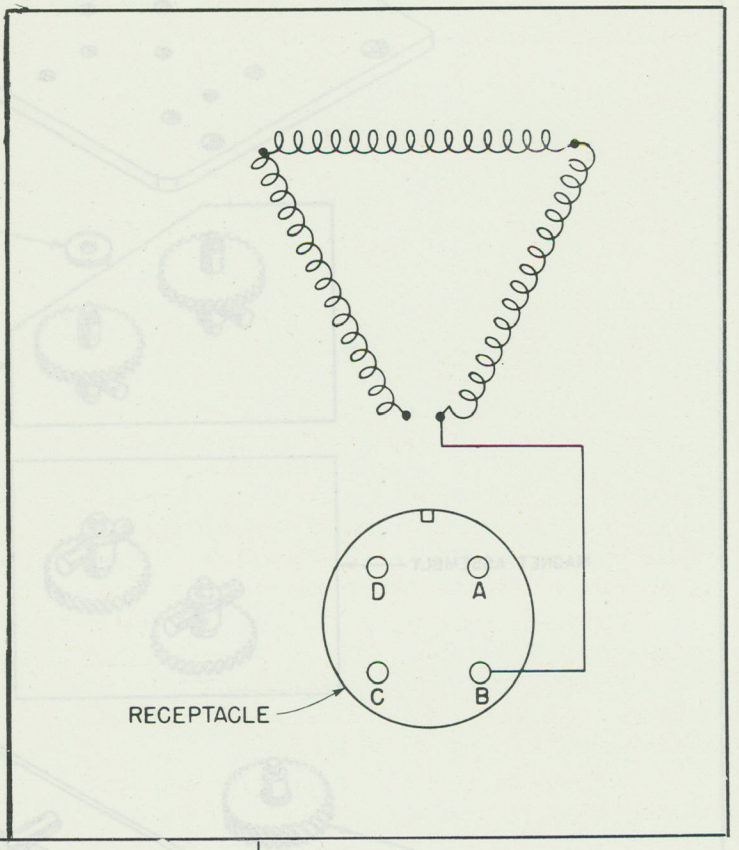


Figure 20—Internal Wiring Diagram

Transmitter Navy Stock No. R88-T-19 and Indicator, Navy Stock No. R88-I-800, R88-I-800-10, and R88-I-801

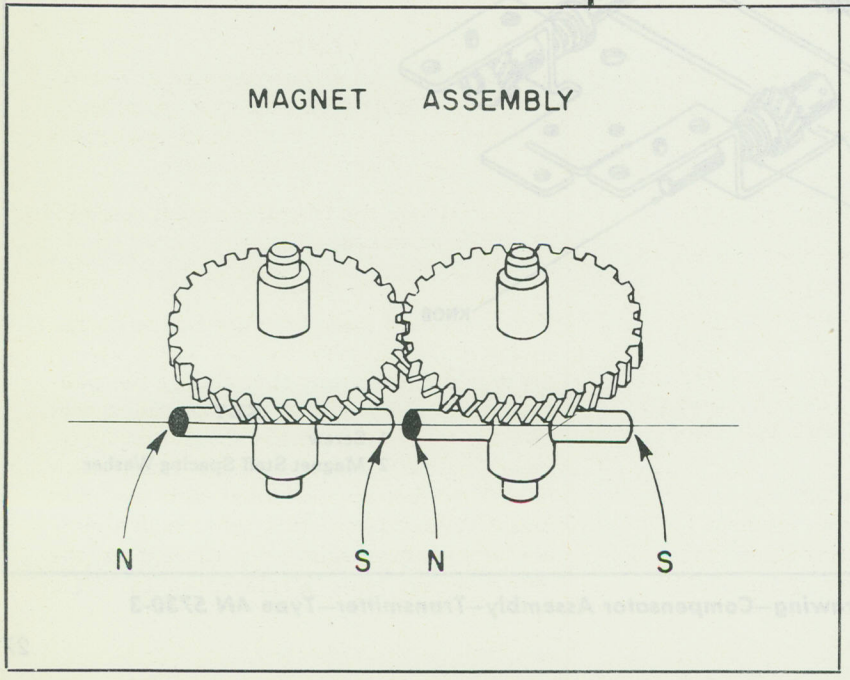


Figure 21—Position of Magnets in Compensator Assembly

2. INDICATOR, ARMY-NAVY TYPES AN 5730-2 AND AN 5730-6 (PIONEER TYPES 10061-1A-A1, 10061-1D-A1, 10061-1E-A1, 10061-1G-A1, AND 10061-1H-A1).

a. OVERHAUL TOOLS REQUIRED.—The following special tools and test equipment are required to perform the work prescribed in these instructions:

PART NO.	NOMENCLATURE	APPLICATION
PQ-2800	Taper Reamer	To taper ream new hand assembly.
PQ-8432	Magnesyn Cover Lifter	To facilitate disassembly of the Magnesyn case cover.
PQ-11735-1	Magnet Keeper	To maintain the magnetism of the Magnesyn shaft assembly at full strength.
PQ-15852-1	Stop Nut Swaging Punch	To assemble stop nut.
PQ-15922-1	Insert Piece	To assemble stop nut.
13308-1	Rotor Balance Stand	To check Magnesyn shaft assembly for unbalance.
13323-2	Magnesyn Test Transmitter	To calibrate and test Magnesyn indicator.

b. DISASSEMBLY.

(1) REMOVAL OF ELECTRICAL CONNECTOR RECEPTACLE. *(See figure 23.)*

(a) Break the seal wire (18) and remove the two screws (19) at the back of the indicator and slide the cover assembly (17) from the case assembly (9). The sieve assembly, located in the cover, is riveted in place and should not be removed. If sieve is imperfect, replace the complete cover assembly. Early models do not have a sieve assembly pressed into the cover.

(b) Remove the gasket (13) from the groove in the case.

(c) Unsolder the Magnesyn assembly leads from the electrical connector receptacle (16). Slide the insulating sleeving (6) off the leads.

(d) Remove the four screws (20) and lock washers (21) securing the receptacle to the back plate (14), and remove the receptacle and the gasket (15).

(e) Remove the four screws (20) and lock washers (21) that secure the back plate (14) to the case assembly (9) and lift off the back plate.

(2) REMOVAL OF MAGNESYN ASSEMBLY. *(See figure 22.)*

(a) Place the indicator face down and remove the six screws (24, figure 23), two screws (12, figure 23), six lock washers (25, figure 23), and two lock washers (11, figure 23) from the back of the mounting flange of the case. Remove the bezel assembly. Extract the gasket (6, figure 22) and glass (5) from the bezel (4). The adjusting shaft and knob assembly will come off with the bezel.

(b) Use a pair of tweezers to lift the short, crimped end of the clamp ring (2) from its hole in the knob and slide it back on the adjusting shaft (11). Extract the pin (3) securing the adjusting knob (1) to the adjusting shaft. Remove the adjusting knob and slide out the adjusting shaft.

(c) Remove the hand assembly (16), using a pointer lifter.

(d) Remove the spacing ring (7) that holds the dial (8) in place. The dial, the course setting pointer (14), the spacer washer (10), and the pointer gear assembly (13) may be lifted out as a unit. Remove the friction washer (9) found underneath the dial.

(e) Remove the two screws (15) on the course setting pointer and separate the pointer, the dial, the gear, and the spacer washer.

(f) Extract the gear and pin assembly (12) from the case assembly (9).

(g) Remove the three screws (22, figure 23) and lock washers (23, figure 23) that secure the retaining ring (1, figure 23) to the case assembly (9), and remove the retaining ring. Remove gasket (2, figure 23).

Note

Early models of the indicator do not have the gasket (2, figure 23). This gasket was added to reduce distortion of the Magnesyn case caused by variation in the frame, shield, and case. This gasket cannot be used with the old retaining ring, PB-23626. On reassembly, use new type retaining ring, PB-51237-1, and gasket.

(h) Extract the Magnesyn assembly and shield (7, figure 23) from the case assembly (9, figure 22) and remove the Magnesyn assembly from the shield.

(3) DISASSEMBLY OF MAGNESYN ASSEMBLY, *(See figure 23.)*

(a) Insert Magnesyn cover lifter, PQ-8432, into one of the slots in the Magnesyn case cover and pry the Magnesyn case cover from the Magnesyn case.

CAUTION

Extreme care must be exercised when removing the Magnesyn case cover in order to avoid damaging the shaft which protrudes through the Magnesyn case cover.

(b) Remove the Magnesyn shaft assembly (5) from the Magnesyn case.

Note

The Magnesyn assembly must not be further disassembled. Removal of the stator assembly would damage and thus change the characteristics of the stator. It is also important that the outer laminations should not be removed or disturbed because the laminations have been factory-assembled with the grain marks of each lamination set in such a manner as to insure uniformity throughout the entire return path. Replace the complete

Magnesyn assembly (3) if any of the following parts are damaged: stator assembly, outer laminations, Magnesyn case cover, Magnesyn case, or friction washer. The Magnesyn shaft assembly (5) and the jewels (4) may be replaced.

c. CLEANING, INSPECTION, TESTING, AND REPAIR. *(See figure 23.)*

(1) Examine the pin (8) pressed into the case. Replace it with a new one if necessary. If a stop nut (10) requires replacement, carefully punch the old stop nut out of the case. Replace the new stop nut, using the stop nut swagging punch, PQ-15852-1. Slide the insert piece, PQ-15922-1, in the slot of the stop nut to avoid damaging the new nut.

(2) Inspect the cover glass to be sure that it is clean and free from cracks. Check the gaskets to ascertain that they are in good condition. Replace them with new ones if necessary.

(3) With a fibre brush, clean the teeth of the pointer gear assembly (13, figure 22), the gear and pin assembly (12, figure 22), and the adjusting shaft assembly (11, figure 22). Wash with filtered benzene, Specification No. AN-4-1016B, and dry with clean air.

(4) Clean the pivot jewels (4, figure 23) with a pointed orange stick. Inspect the jewels for cracks and flaws with a sharp-pointed needle or a 15 to 30X magnifying glass. A cracked or otherwise damaged jewel must be replaced. If replacement is necessary, selection of jewels to fit the Magnesyn shaft assembly will be made at reassembly.

(5) Demagnetize the Magnesyn shaft assembly (5) with a suitable demagnetizer. Check the balance of the rotor in the rotor balance stand, 13308-1. If the rotor is out of balance, file some material from the heavy edge of the hub. Clean the pivots with pithwood. Bent, scored, or worn pivots will necessitate replacement of the Magnesyn shaft assembly.

(6) The magnet of the Magnesyn shaft assembly must be remagnetized before reassembly. Place the Magnesyn shaft assembly in a two-pole magnetizer and magnetize it to full strength. Place the Magnesyn shaft assembly in the magnet keeper, PQ-11735-1, until it is replaced within the stator assembly.

(7) Using a standard ohmmeter, test the stator assembly for resistance and continuity of the windings. The resistance of each phase must be within two ohms of the resistance of each of the other two phases. If the stator assembly fails to meet the above conditions, replace the complete Magnesyn assembly.

(8) Replace the gasket (13) with a new one.

(9) Inspect and check the hand assembly for balance. If unbalanced, remove material from, or add material to, the counterweight.

(10) Flush out the sieve assembly in the cover. Blow filtered benzene, Specification No. AN-4-1016B, through the sieve assembly with a blast of dry, clean air, from a direction opposite the entrance of foreign matter under operating conditions. If the sieve assembly is damaged, replace the entire cover assembly. Early models do not have a sieve assembly pressed into the cover.

d. REASSEMBLY.

(1) REASSEMBLY OF MAGNESYN ASSEMBLY. *(See figure 23.)*

(a) If either the Magnesyn shaft assembly (5) or the jewels (4) are to be replaced, a selection of jewels must be made to give the ends of the Magnesyn shaft assembly from a 0.0002- to 0.0003-inch radial play within the jewels. Hold the Magnesyn shaft assembly (5) with the magnet in the magnet keeper, PQ-11735-1, over the Magnesyn case. Apply, with a pin, a minute spot of Pioneer No. 1 oil (emergency alternate AN-0-6) on the untapered end of the shaft and on the pointer end of the shaft where it bears on the jewel. Slide the untapered end of the shaft into its jewel directly from the keeper.

(b) Replace the Magnesyn case cover, making sure that the end of the shaft to which the pointer will be attached protrudes through the jewel (4) in the cover. Make sure that the Magnesyn staff assembly has an end play of 0.002 to 0.005 inch. If the end play is not within these limits, adjust the jewels accordingly.

(c) Replace the shield (7) and the Magnesyn assembly into the case assembly (9). Replace the retaining ring (1) and gasket (2) and secure it in place with the three screws (22) and lock washers (23).

Note

To provide space for gasket (2) which reduces distortion of the Magnesyn case, caused by variations in frame, shield, and case, replace the retainer ring, PQ-23626-1, with the new-type retaining ring.

(2) REASSEMBLY OF ELECTRICAL CONNECTOR RECEPTACLE. *(See figure 23.)*

(a) Replace the back plate (14) on the case assembly (9) and secure it with the four screws (20) and lock washers (21).

(b) Replace the gasket (15) and the electrical connector receptacle (16) in the back plate, so that the polarizing key is at the bottom. Looking from the rear of the case, the corner without the stop nut must be in the lower right-hand corner. Secure the receptacle to the case assembly with the four screws (20) and lock washers (21).

(c) Slide the insulating sleeving (6) over the four leads from the Magnesyn assembly. Solder the leads to the proper terminals on the receptacle as follows (figure 20):

COLOR LEAD	RECEPTACLE TERMINAL
Red	A
Black	B
Blue	C
Yellow	D

(d) Replace the gasket (13) into the groove provided in the case, making certain that the entire circumference is properly fitted. Slide the cover assembly (17) on the indicator and secure with the two screws (19). Be sure that the cover presses firmly against the gasket throughout its circumference.

(3) REASSEMBLY OF DIAL AND HAND ASSEMBLY. *(See figure 22.)*

(a) Place the indicator face up in a suitable support stand. Apply a light film of Andok M-350 grease in the counterbore in the case provided for the gear and pin assembly (12). Replace the gear and pin assembly into the case assembly (9, figure 23).

(b) Replace the spacer washer (10, figure 22), the dial (8), and the course setting pointer (14), in the order given, onto the bushing of the pointer gear assembly (13). Align the two holes in the pointer and the gear, and secure them with the two screws (15).

(c) Replace the friction washer (9) and the course setting pointer, dial, and gear into the case. Make certain that the notches in the dial and the friction washer fit around the pin (8, figure 23) which is pressed into the case assembly (9, figure 23). Press the spacing ring (7, figure 22) in position over the dial, securing the dial and the friction washer in place.

(d) If the "C" and "D" terminals of the electrical connector receptacle (16, figure 23) are connected to the positive post of a 3-volt battery and the "A" and "B" terminals to the negative post, the magnet of the Magnesyn shaft assembly (5, figure 23) will assume an electrical zero position. Care must be taken that connections are correct before applying the d-c power, which must not be applied continuously for periods longer than one minute. "Electrical zero" is the term applied to a definite arbitrary reference position which the rotor will assume within the stator when this excitation is made. With the Magnesyn shaft assembly held in this position, carefully press the hand assembly (16, figure 22) on the tapered end of the shaft so that it indicates "N" (0 degrees). The accuracy of the indicator will depend on the precision with which the pointer is set *exactly* on top dead center ("N"). There must be no relative motion between the hand assembly and the shaft. If a new hand assembly is used, it must be reamed for a 3-degree taper fit, using taper reamer. PQ-2800.

(4) CALIBRATION.

(a) SCALE ERROR.

1. Connect the indicator to a Magnesyn test transmitter, 13323-2, and a source of 26-volt, 400-cycle power. Be sure that the power is applied across terminals "A" and "B" of the indicator receptacle.

2. By rotating the knob of the transmitter, take readings of the indicator at 10-degree points and record them in a data column. The error at any point must not exceed ± 3 degrees, with a spread not greater than 4 degrees.

USAF PERSONNEL ONLY

The following tolerances will apply to USAF personnel only: ± 2 degrees with a spread not greater than 3 degrees.

3. If the indicator exceeds the specific tolerances, the source of trouble may be either electrical or mechanical. It will therefore be necessary to determine by computation which is the cause, as outlined in the next paragraph.

4. Add, algebraically, the errors of points 180 degrees apart as recorded in the data column; for example, the error at 0 degrees plus the error at 180 degrees, etc. Take the algebraic difference between the most positive and the most negative sums and divide the difference by two. If the quotient exceeds 2½ degrees, the fault is of an electrical nature and lies within the stator assembly of the Magnesyn. This will necessitate replacement with a new Magnesyn assembly. If the quotient is 2½ degrees or less, the error is mechanical and may be minimized. Note the error at 90-degree and 270-degree points. File, or add material to, the counterweight of the hand assembly until the errors at these two points are equal and are of the same sign. In a similar manner, note the 0-degree and the 180-degree errors and file material from the appropriate side of the hub of the hand assembly until the error at these two points is equal and of the same sign.

(b) FRICTION ERROR.—With the indicator connected to the Magnesyn test transmitter, 13323-2, and a source of 26-volt, 400-cycle power, test it for friction at every 30-degree point. The indicator readings must not change more than 1 degree when the indicator is tapped lightly. If it fails to meet this requirement, inspect the jewels for defect or film, using a jeweler's loupe. Replace the jewels if further cleaning does not eliminate excess friction. Refer to paragraph 2. *d.* (1) this section. Also inspect the ends of the Magnesyn shaft assembly for rough or pitted surfaces. Polish with 0000 crocus paper or featherwood, if necessary. The assembly must have an end play of between 0.002 and 0.005 inch.

Note

Whenever the Magnesyn shaft assembly is removed from its stator field, the magnet keeper, PQ-11735-1, must be placed over the assembly in order that magnetism may be retained.

(5) REASSEMBLY OF BEZEL ASSEMBLY. *(See figure 22.)*

(a) Insert the adjusting shaft (11) into the hole provided in the bezel (4). Slip the clamp ring (2) over the end of the adjusting shaft protruding from the front of the bezel. Replace the adjusting knob (1) on the shaft and align the hole in the knob with the hole in the shaft. Secure them together with the pin (3). Slide the clamp ring over the groove in the adjusting knob so that the short crimp snaps into the shallow hole in the groove. In this position, the ring will cover completely both ends of the hole and retain the pin.

(b) Place the glass (5) and the gasket (6) back into the bezel (4).

(c) Before replacing the bezel assembly, touch

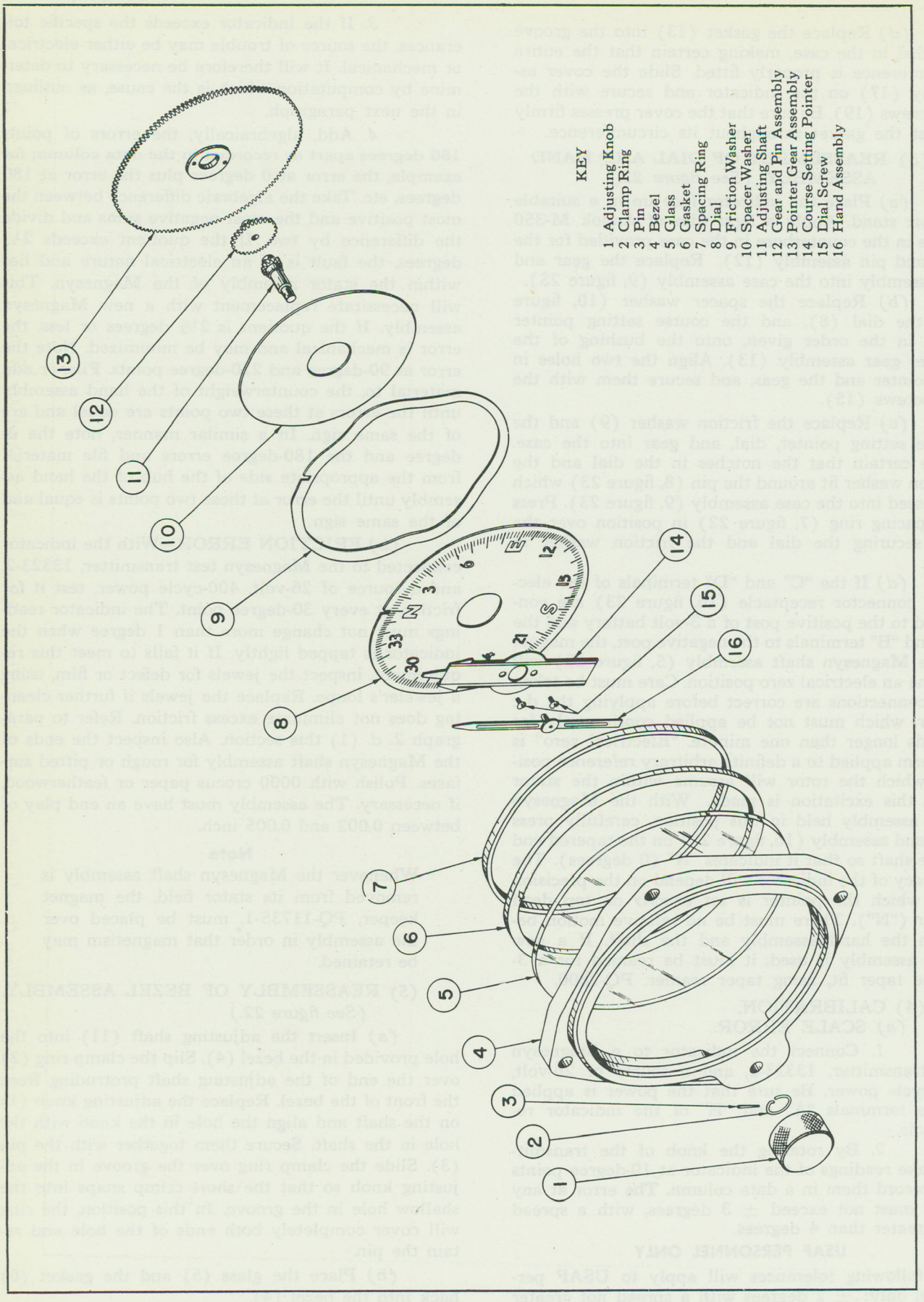


Figure 22—Exploded View Drawing—Main Assembly—Indicator—Types AN 5730-2 and AN 5730-6 (Pioneer Types 10061--A1)

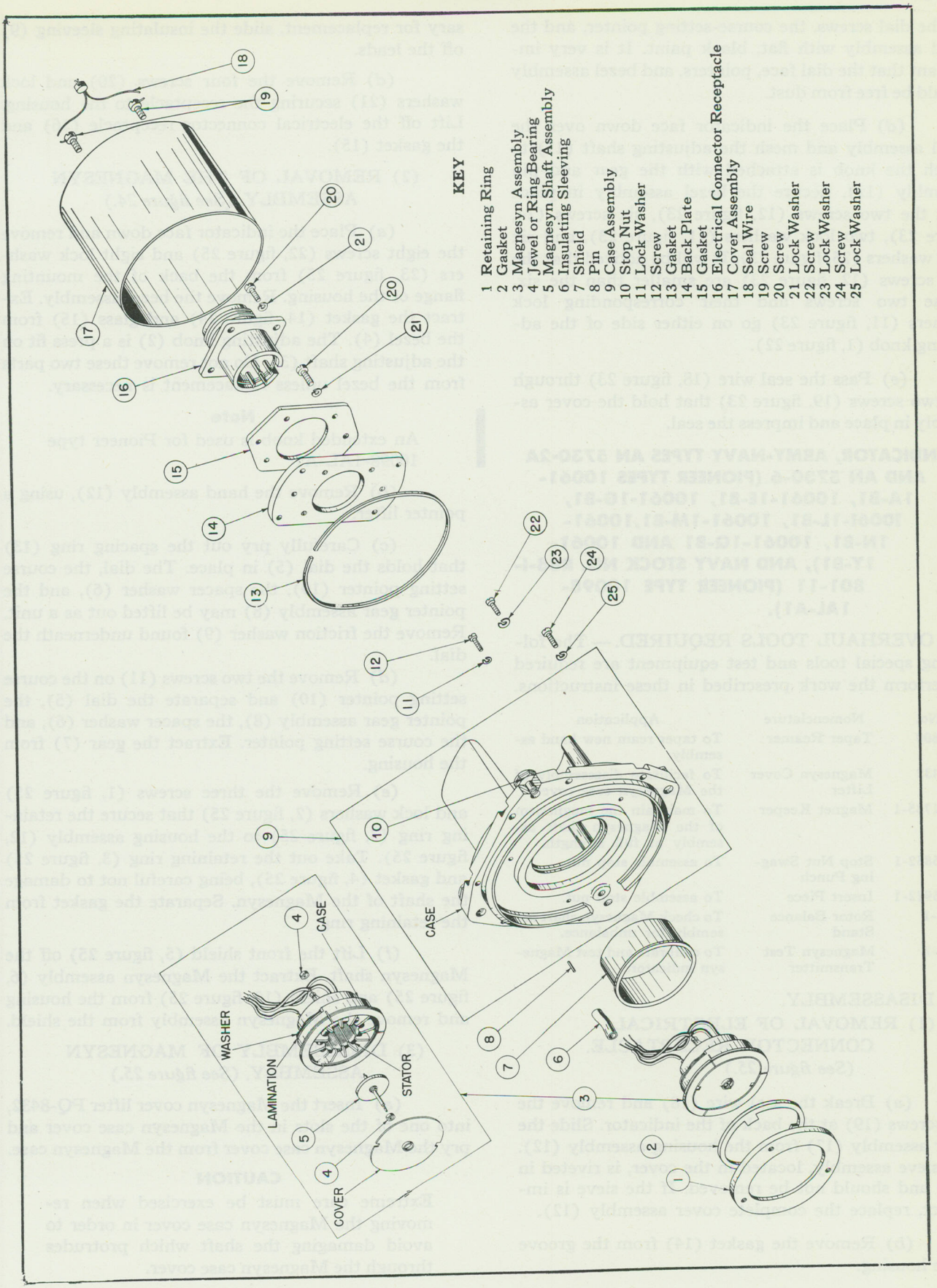


Figure 23—Exploded View Drawing—Main Assembly—Indicator—Types AN 5730-2 and AN 5730-6 (Pioneer Types 10061--A1)

up the dial screws, the course-setting pointer, and the hand assembly with flat, black paint. It is very important that the dial face, pointers, and bezel assembly should be free from dust.

(*d*) Place the indicator face down over the bezel assembly and mesh the adjusting shaft (11) to which the knob is attached with the gear and pin assembly (12). Secure the bezel assembly in place with the two screws (12, figure 23), six screws (24, figure 23), two lock washers (11, figure 23), and six lock washers (25, figure 23). It will be noticed that the two screws (12, figure 23) are smaller than the six. These two screws and their corresponding lock washers (11, figure 23) go on either side of the adjusting knob (1, figure 22).

(*e*) Pass the seal wire (18, figure 23) through the two screws (19, figure 23) that hold the cover assembly in place and impress the seal.

3. INDICATOR, ARMY-NAVY TYPES AN 5730-2A AND AN 5730-6 (PIONEER TYPES 10061-1A-B1, 10061-1E-B1, 10061-1G-B1, 10061-1L-B1, 10061-1M-B1, 10061-1N-B1, 10061-1Q-B1 AND 10061-1Y-B1), AND NAVY STOCK NO. R88-I-801-11 (PIONEER TYPE 10098-1AL-A1).

a. OVERHAUL TOOLS REQUIRED. — The following special tools and test equipment are required to perform the work prescribed in these instructions.

Part No.	Nomenclature	Application
PQ-2800	Taper Reamer	To taper ream new hand assembly.
PQ-8432	Magnesyn Cover Lifter	To facilitate disassembly of the Magnesyn case cover.
PQ-11735-1	Magnet Keeper	To maintain the magnetism of the Magnesyn shaft assembly at full strength.
PQ-15852-1	Stop Nut Swaging Punch	To assemble stop nut.
PQ-15922-1	Insert Piece	To assemble stop nut.
13308-1	Rotor Balance Stand	To check Magnesyn shaft assembly for unbalance.
13323-2	Magnesyn Test Transmitter	To calibrate and test Magnesyn indicator.

b. DISASSEMBLY.

(1) REMOVAL OF ELECTRICAL CONNECTOR RECEPTACLE. (*See figure 25.*)

(*a*) Break the seal wire (18) and remove the two screws (19) at the back of the indicator. Slide the cover assembly (17) from the housing assembly (12). The sieve assembly, located in the cover, is riveted in place and should not be removed. If the sieve is imperfect, replace the complete cover assembly (12).

(*b*) Remove the gasket (14) from the groove in the housing.

(*c*) Unsolder the Magnesyn assembly leads from the electrical connector receptacle (16). If necessary for replacement, slide the insulating sleeving (9) off the leads.

(*d*) Remove the four screws (20) and lock washers (21) securing the receptacle to the housing. Lift off the electrical connector receptacle (16) and the gasket (15).

(2) REMOVAL OF THE MAGNESYN ASSEMBLY. (*See figure 24.*)

(*a*) Place the indicator face down and remove the eight screws (22, figure 25) and eight lock washers (23, figure 25) from the back of the mounting flange of the housing. Remove the bezel assembly. Extract the gasket (14, figure 24) and glass (15) from the bezel (4). The adjusting knob (2) is a press fit on the adjusting shaft (3). Do not remove these two parts from the bezel unless replacement is necessary.

Note

An extended knob is used for Pioneer type 10098-1AL-A1

(*b*) Remove the hand assembly (12), using a pointer lifter.

(*c*) Carefully pry out the spacing ring (13) that holds the dial (5) in place. The dial, the course setting pointer (10), the spacer washer (6), and the pointer gear assembly (8) may be lifted out as a unit. Remove the friction washer (9) found underneath the dial.

(*d*) Remove the two screws (11) on the course setting pointer (10) and separate the dial (5), the pointer gear assembly (8), the spacer washer (6), and the course setting pointer. Extract the gear (7) from the housing.

(*e*) Remove the three screws (1, figure 25) and lock washers (2, figure 25) that secure the retaining ring (3, figure 25) to the housing assembly (12, figure 25). Take out the retaining ring (3, figure 25) and gasket (4, figure 25), being careful not to damage the shaft of the Magnesyn. Separate the gasket from the retaining ring.

(*f*) Lift the front shield (5, figure 25) off the Magnesyn shaft. Extract the Magnesyn assembly (6, figure 25) and shield (10, figure 25) from the housing and remove the Magnesyn assembly from the shield.

(3) DISASSEMBLY OF MAGNESYN ASSEMBLY. (*See figure 25.*)

(*a*) Insert the Magnesyn cover lifter PQ-8432, into one of the slots in the Magnesyn case cover and pry the Magnesyn case cover from the Magnesyn case.

CAUTION

Extreme care must be exercised when removing the Magnesyn case cover in order to avoid damaging the shaft which protrudes through the Magnesyn case cover.

(*b*) Remove the Magnesyn shaft assembly (8) from the Magnesyn case.

Note

The Magnesyn assembly must not be further disassembled. Removal of the stator assembly would damage, and thus change the characteristics of, the stator. It is also important not to remove or disturb the outer laminations, as the laminations have been factory assembled with the grain marks of each lamination set in such a manner as to insure uniformity throughout the entire return path. Replace the complete Magnesyn assembly (6) if any of the following parts are dam-

aged; stator assembly, outer laminations, Magnesyn case cover, Magnesyn case, or friction washer. The Magnesyn shaft assembly (8) and the jewels (7) may be replaced.

c. CLEANING, INSPECTION, TESTING, AND REPAIR. *(See figure 25.)*

(1) Examine the pin (11) pressed into the housing. Replace it with a new one if necessary. If a stop nut (13) requires replacement, carefully punch the old stop nut out of the housing. Replace the new stop nut, using the stop nut swagging punch, PQ-15852-1. Slide the insert piece, PQ-15922-1, in the slot of the stop nut to avoid damaging the new nut.

(2) Inspect the cover glass to be sure it is clean and free from cracks. Check the gaskets to be sure that they are in good condition. Replace them with new ones if necessary.

(3) With a fibre brush, clean the teeth of the pointer gear assembly (8, figure 24), the gear (7, figure 24), and the adjusting shaft (3, figure 24). Wash with filtered benzene, Specification No. AN-4-1016B, and dry with clean, dry air.

(4) Clean the pivot jewels (7, figure 25) with a pointed orange stick. Inspect the jewels for cracks and flaws with a sharp-pointed needle or a 15 to 30X magnifying glass. A cracked or otherwise damaged jewel must be replaced. If replacement is necessary, selection of jewels to fit the Magnesyn shaft assembly will be made at reassembly.

(5) Demagnetize the Magnesyn shaft assembly (8) with a suitable demagnetizer. Check the balance of the rotor on the rotor balance stand, 13308-1. If the rotor is out of balance, file some material from the heavy edge of the hub. Clean the pivots with pithwood. Bent, scored, or worn pivots will necessitate replacement of the Magnesyn shaft assembly.

(6) The magnet of the Magnesyn shaft assembly must be remagnetized before reassembly. Place the shaft assembly in a two-pole magnetizer, and magnetize it to full strength. The rotor must be placed in the magnet keeper, PQ-11735-1, until it is replaced within the stator assembly.

(7) Using a standard ohmmeter, test the stator assembly for resistance and continuity of the windings. The resistance of each phase must be within two ohms of the resistance of each of the other two phases. If the stator assembly fails to meet the above conditions, replace the complete Magnesyn assembly.

(8) Replace the gasket (14) with a new one.

(9) Inspect and check the hand assembly for balance. If unbalanced, remove the material from, or add material to, the counterweight.

(10) Flush out the sieve assembly in the cover. Blow filtered benzene, Specification No. AN-4-1016B, through the sieve assembly with a blast of dry, clean air, from a direction opposite to the entrance of foreign matter under operating conditions. If the sieve assembly is damaged, replace the entire cover assembly.

d. REASSEMBLY.

(1) REASSEMBLY OF MAGNESYN ASSEMBLY. *(See figure 25.)*

(a) If either the Magnesyn shaft assembly (8) or the jewels (7) are to be replaced, a selection of jewels must be made to give the ends of the Magnesyn shaft assembly from a 0.0002- to a 0.0003-inch radial play within the jewels. Hold the Magnesyn shaft assembly (8) with the magnet in the magnet keeper, PQ-11735-1, over the Magnesyn case. Apply, with a pin, a minute spot of Pioneer No. 1 oil (emergency alternate AN-0-6) on the untapered end of the shaft and on the pointer end of the shaft where it bears on the jewel. Slide the untapered end of the shaft into its jewel directly from the keeper.

(b) Replace the Magnesyn case cover, making sure that the end of the shaft to which the pointer will be attached protrudes through the jewel (7) in the cover. Make sure that the Magnesyn shaft assembly has an end play of 0.002 to 0.005 inch. If the end play is not within these limits, adjust the jewels accordingly.

(c) Replace the shield (10) and the Magnesyn assembly (6) into the housing assembly (12). Place the front shield (5) over the Magnesyn case cover. Press the gasket (4) into the counterbore of the retaining ring (3), replace the retaining ring, and secure it in place with the three screws (1) and lock washers (2).

(2) REASSEMBLY OF ELECTRICAL CONNECTOR RECEPTACLE. *(See figure 25.)*

(a) Replace the gasket (15) and the electrical connector receptacle (16) on the back of the housing assembly (12) so that the polarizing key is at the bottom. Looking from the rear of the housing, the corner without the stop nut must be in the lower right-hand corner. Secure the receptacle to the housing with the four screws (20) and lock washers (21).

(b) Slide the insulating sleeving (9) over the four leads from the Magnesyn assembly. Solder the leads to the proper terminals on the receptacle as follows (figure 20):

Color Lead	Receptacle Terminal
Red	A
Black	B
Blue	C
Yellow	D

(c) Replace the gasket (14) into the groove provided in the housing, making certain that the entire circumference is properly fitted. Slide the cover assembly (17) on the indicator and secure with the two screws (19). Be sure that the cover presses firmly against the gasket throughout its circumference.

(3) REASSEMBLY OF DIAL AND HAND ASSEMBLY. *(See figure 24.)*

(a) Place the indicator face up in a suitable support stand. Apply a light film of Andok M-350

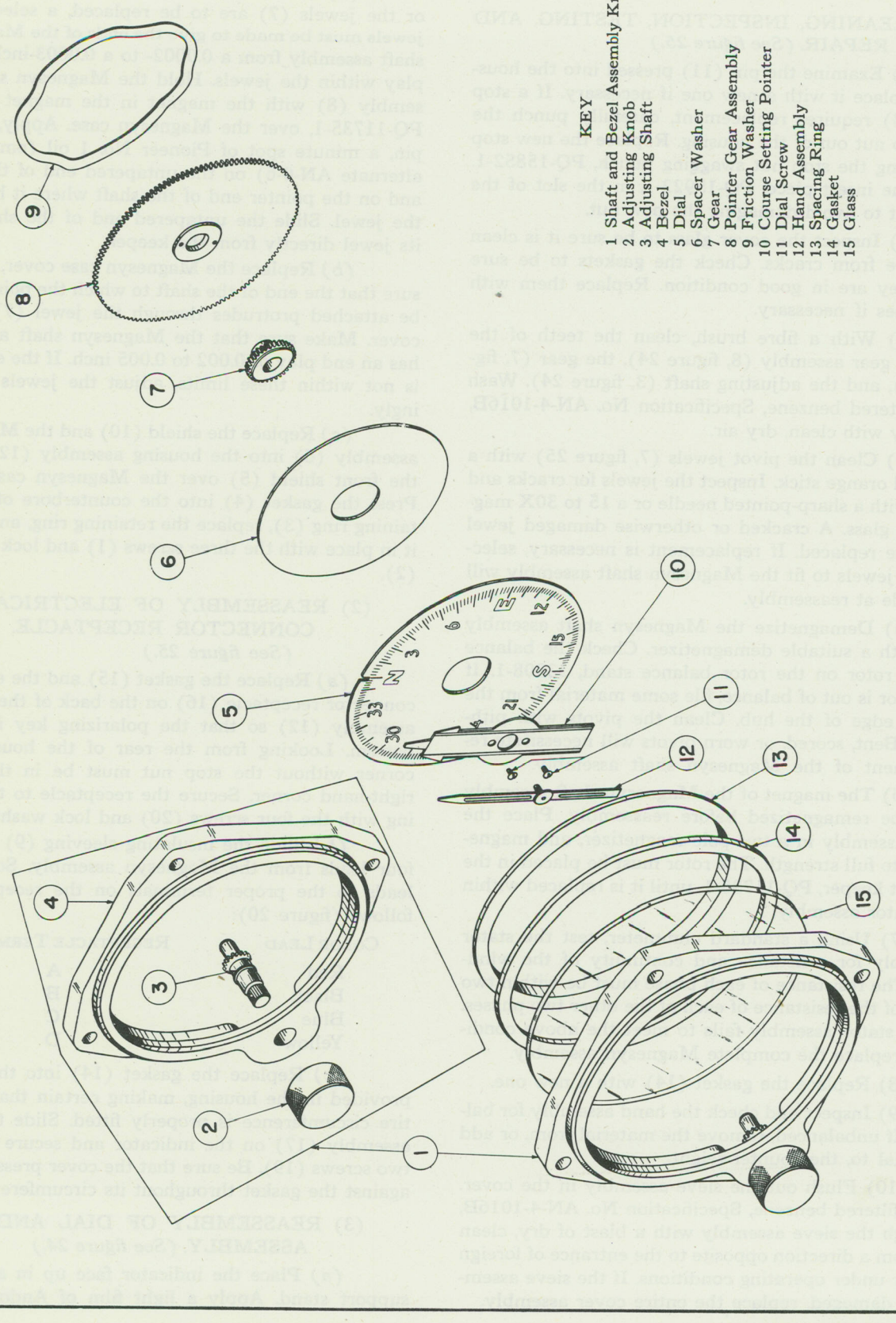


Figure 24—Exploded View Drawing—Main Assembly—Indicator—Types AN 5730-2A and AN 5730-6 (Pioneer Types 10061-B11), and Navy Stock No. R88-I-801-11 (Pioneer Type 10098-1AL-A1)

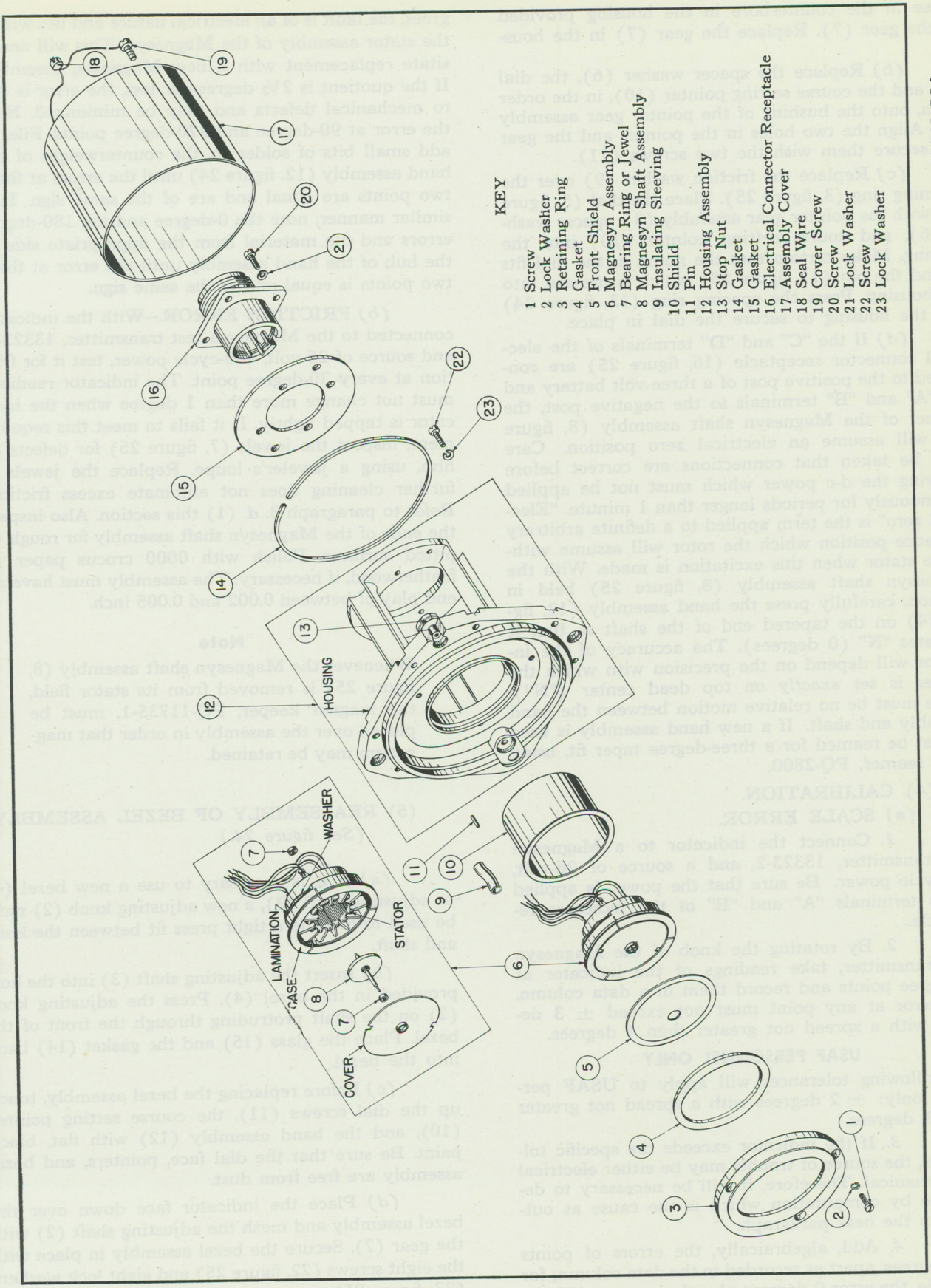


Figure 25—Exploded View Drawing—Main Assembly—Indicator—Types AN 5730-2A and AN 5730-6 (Pioneer Types 10061-B1), and Navy Stock No. R88-I-801-11 (Pioneer Type 10098-1AL-A1)

grease in the counterbore in the housing provided for the gear (7). Replace the gear (7) in the housing.

(b) Replace the spacer washer (6), the dial (5), and the course setting pointer (10), in the order given, onto the bushing of the pointer gear assembly (8). Align the two holes in the pointer and the gear and secure them with the two screws (11).

(c) Replace the friction washer (9) over the retaining ring (3, figure 25). Place the dial (5, figure 24) with the pointer gear assembly (8), spacer washer (6), and course setting pointer (10) into the housing. Make certain that the notch in the dial fits around the pin (11, figure 25) which is pressed into the housing. Press the spacing ring (13, figure 24) into the housing to secure the dial in place.

(d) If the "C" and "D" terminals of the electrical connector receptacle (16, figure 25) are connected to the positive post of a three-volt battery and the "A" and "B" terminals to the negative post, the magnet of the Magnesyn shaft assembly (8, figure 25) will assume an electrical zero position. Care must be taken that connections are correct before applying the d-c power which must not be applied continuously for periods longer than 1 minute. "Electrical zero" is the term applied to a definite arbitrary reference position which the rotor will assume within the stator when this excitation is made. With the Magnesyn shaft assembly (8, figure 25) held in position, carefully press the hand assembly (12, figure 24) on the tapered end of the shaft so that it indicates "N" (0 degrees). The accuracy of the indicator will depend on the precision with which the pointer is set *exactly* on top dead center ("N"). There must be no relative motion between the hand assembly and shaft. If a new hand assembly is used it must be reamed for a three-degree taper fit, using taper reamer, PQ-2800.

(4) CALIBRATION.

(a) SCALE ERROR.

1. Connect the indicator to a Magnesyn test transmitter, 13323-2, and a source of 26-volt, 400-cycle power. Be sure that the power is applied across terminals "A" and "B" of the indicator receptacle.

2. By rotating the knob of the Magnesyn test transmitter, take readings of the indicator at 10-degree points and record them in a data column. The error at any point must not exceed ± 3 degrees, with a spread not greater than 4 degrees.

USAF PERSONNEL ONLY

The following tolerances will apply to USAF personnel only: ± 2 degrees with a spread not greater than 3 degrees.

3. If the indicator exceeds the specific tolerances, the source of trouble may be either electrical or mechanical. Therefore, it will be necessary to determine by computation which is the cause as outlined in the next paragraph.

4. Add, algebraically, the errors of points 180 degrees apart as recorded in the data column; for example, the error 0 degrees plus the error at 180 degrees, etc. Take the algebraic difference between the most positive and the most negative sums and divide the difference by two. If the quotient exceeds 2½ degrees, the fault is of an electrical nature and lies within the stator assembly of the Magnesyn. This will necessitate replacement with a new Magnesyn assembly. If the quotient is 2½ degrees or less, the error is due to mechanical defects and may be minimized. Note the error at 90-degree and 270-degree points. File, or add small bits of solder to, the counterweight of the hand assembly (12, figure 24) until the errors at these two points are equal and are of the same sign. In a similar manner, note the 0-degree and the 180-degree errors and file material from the appropriate side of the hub of the hand assembly until the error at these two points is equal and of the same sign.

(b) FRICTION ERROR.—With the indicator connected to the Magnesyn test transmitter, 13323-2, and source of 26-volt, 400-cycle power, test it for friction at every 30-degree point. The indicator readings must not change more than 1 degree when the indicator is tapped lightly. If it fails to meet this requirement, inspect the jewels (7, figure 25) for defects or film, using a jeweler's loupe. Replace the jewels if further cleaning does not eliminate excess friction. Refer to paragraph 3. *d.* (1) this section. Also inspect the ends of the Magnesyn shaft assembly for rough or pitted surfaces. Polish with 0000 crocus paper or featherwood, if necessary. The assembly must have an end play of between 0.002 and 0.005 inch.

Note

Whenever the Magnesyn shaft assembly (8, figure 25) is removed from its stator field, the magnet keeper, PQ-11735-1, must be placed over the assembly in order that magnetism may be retained.

(5) REASSEMBLY OF BEZEL ASSEMBLY.
(See figure 24.)

(a) If it is necessary to use a new bezel (4) or adjusting shaft (3), a new adjusting knob (2) must be used to provide a tight press fit between the knob and shaft.

(b) Insert the adjusting shaft (3) into the hole provided in the bezel (4). Press the adjusting knob (2) on the shaft protruding through the front of the bezel. Place the glass (15) and the gasket (14) back into the bezel.

(c) Before replacing the bezel assembly, touch up the dial screws (11), the course setting pointer (10), and the hand assembly (12) with flat, black paint. Be sure that the dial face, pointers, and bezel assembly are free from dust.

(d) Place the indicator face down over the bezel assembly and mesh the adjusting shaft (2) with the gear (7). Secure the bezel assembly in place with the eight screws (22, figure 25) and eight lock washers (23, figure 25).

(e) Pass the seal wire (18, figure 25) through the two screws (19, figure 25) that hold the cover assembly in place and impress the seal.

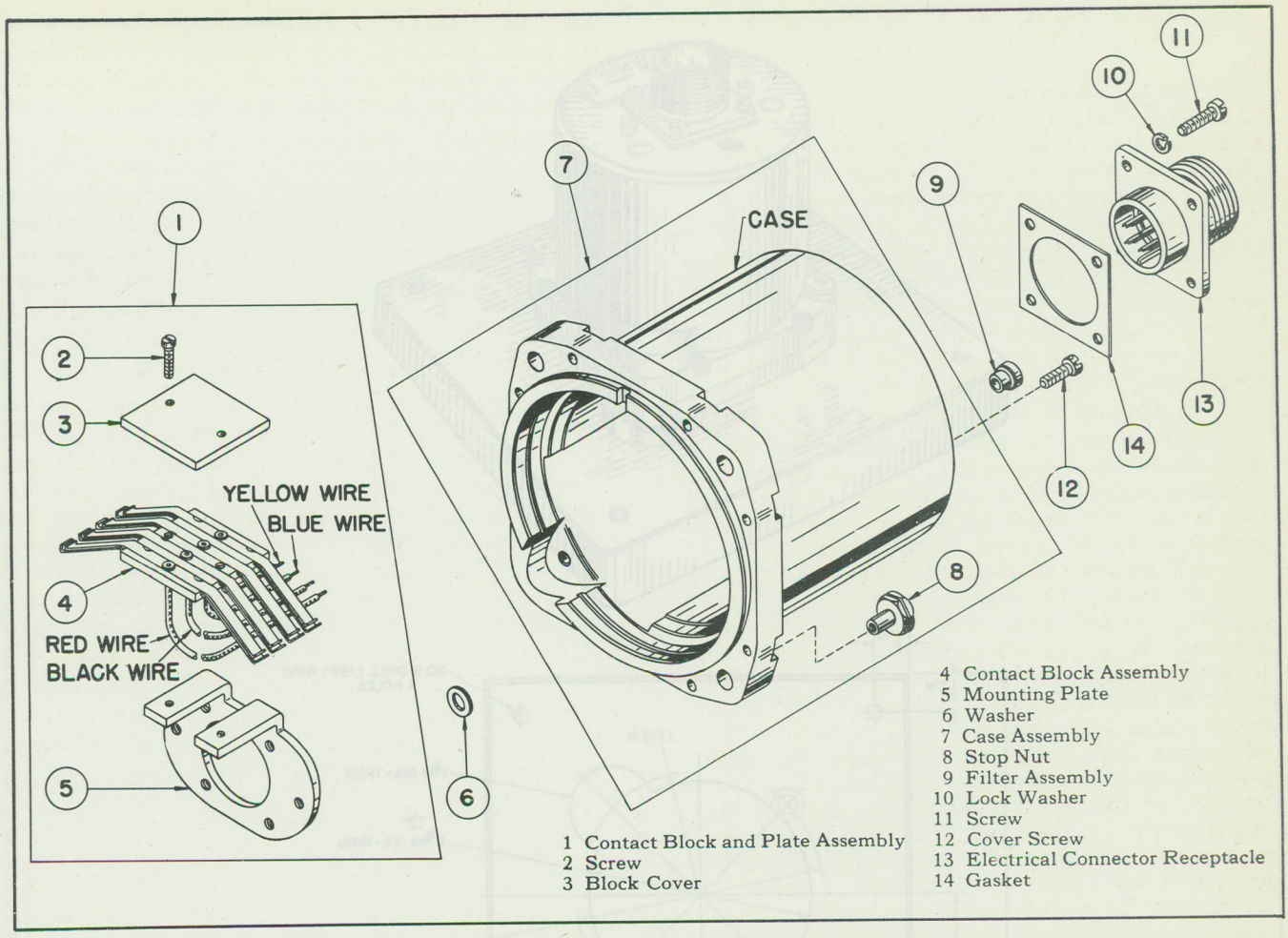
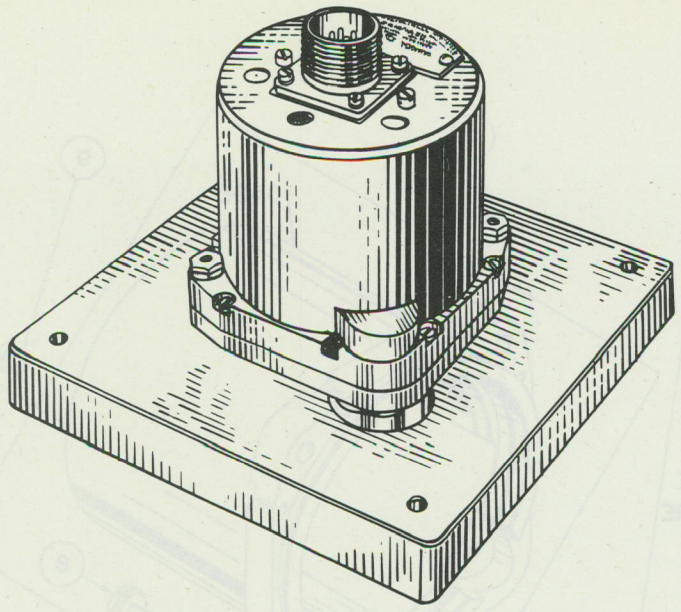


Figure 25A—Exploded View—Case and Contact Assembly—Indicator—Type AN 5730-2A, Navy Stock No. R88-I-803 (Pioneer Type 10078-1T-A1)

4. INDICATOR, ARMY-NAVY TYPE AN 5730-2A, NAVY STOCK NO. R88-I-803 (PIONEER TYPE 10078-1T-A1).

a. OVERHAUL TOOLS REQUIRED.—The following special tools and test equipment are required to perform the work prescribed in these instructions.

Part. No.	Nomenclature	Application
QB-70015-1 (Supersedes PQ-2800)	Taper Reamer	To taper ream new hand assembly.
QB-70677-1	Contact Holder	Jig for assembly of slip ring and contacts (4 required).
QB-8432-1 (Supersedes PQ-8432)	Magnesyn Cover Lifter	To facilitate disassembly of the Magnesyn case Cover.
QD-70696-2	Test Cable	To calibrate and test Magnesyn indicator, used in conjunction with the Magnesyn test transmitter, Pioneer type 13323-2.
QD-70745-1	Bench Block	To hold indicator during assembly and disassembly.
QE-10877-1	Jewel and Bearing Setter	To adjust jewels in Magnesyn assembly.
QE-4589-1	Demagnetizer	To demagnetize the Magnesyn shaft assembly.
13323-2-A, 13323-2-B (Navy Stock No. R88-T-912)	Magnesyn Test Transmitter	To calibrate and test Magnesyn indicator. Used in conjunction with the test cable, QD-70696-2.
13601-1	Varo-Power	Power supply to test indicator. (Now being designed. Detailed information will be supplied in a later revision of this Handbook.



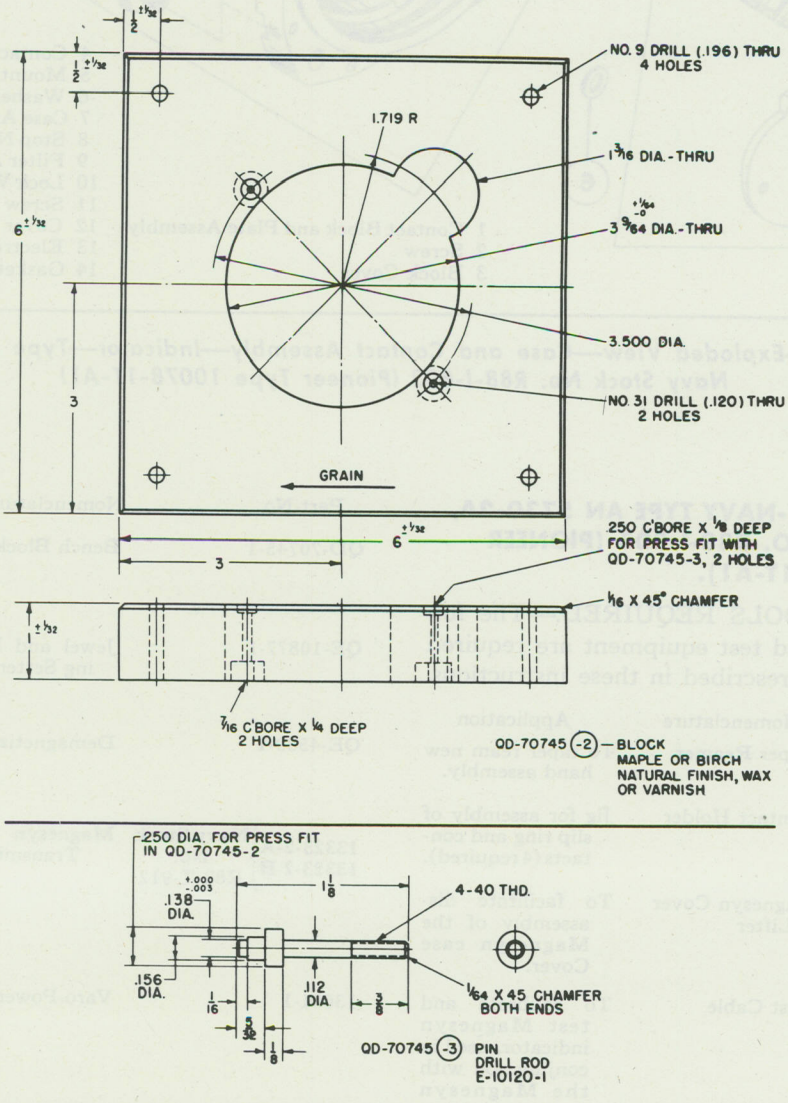


Figure 25B—Indicator on Bench Block, QD-70745-1

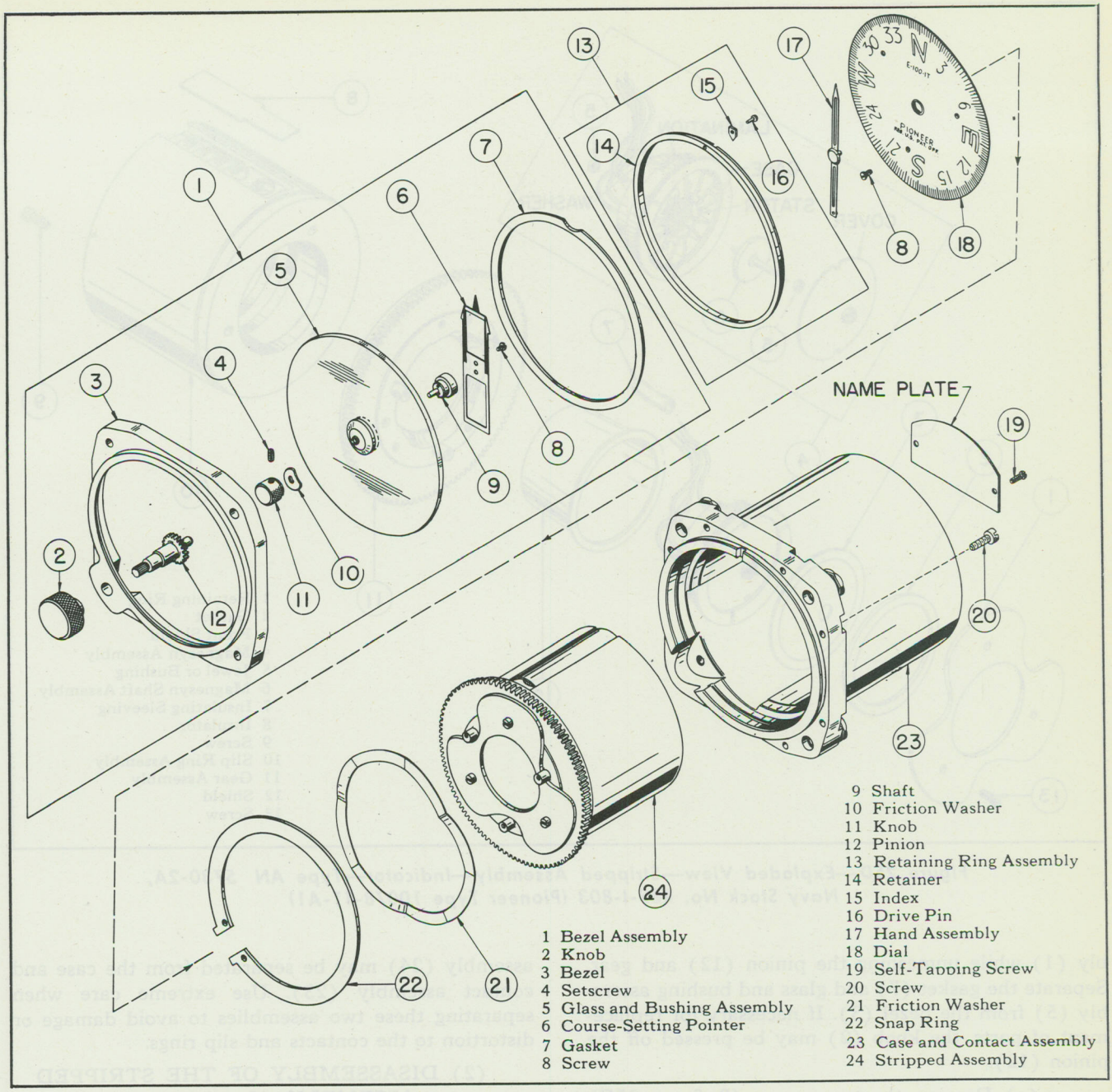


Figure 25C—Exploded View—Main Assembly—Indicator—Type AN 5730-2A, Navy Stock No. R88-I-803 (Pioneer Type 10078-1T-A1)

b. DISASSEMBLY.

(1) REMOVAL OF THE STRIPPED ASSEMBLY.

CAUTION

Before attempting to disassemble the indicator, turn the knob in the lower left corner of the bezel to rotate the mechanism until either "N" or "S" is at top dead center. This precaution is necessary to prevent fouling of the slip rings and damaging the spring contacts when separating the stripped assembly from the case and contact assembly.

(*a*) Cut and remove the seal wire. Place the indicator on the bench block, QD-70745-1, and remove the four screws (11, figure 25A) and lock washer (10) on the electrical connector receptacle (13). (See figure 25B.) Pull the receptacle away from the case a sufficient distance to permit unsoldering of the four insulated wires and removal of the receptacle. Do not take out the other two cover screws (12) which hold the contact block and plate assembly (1) to the inside of the case. These screws must not be taken out until the stripped assembly is removed.

(*b*) Remove the eight screws (20, figure 25C) and carefully lift the case off the bezel assem-

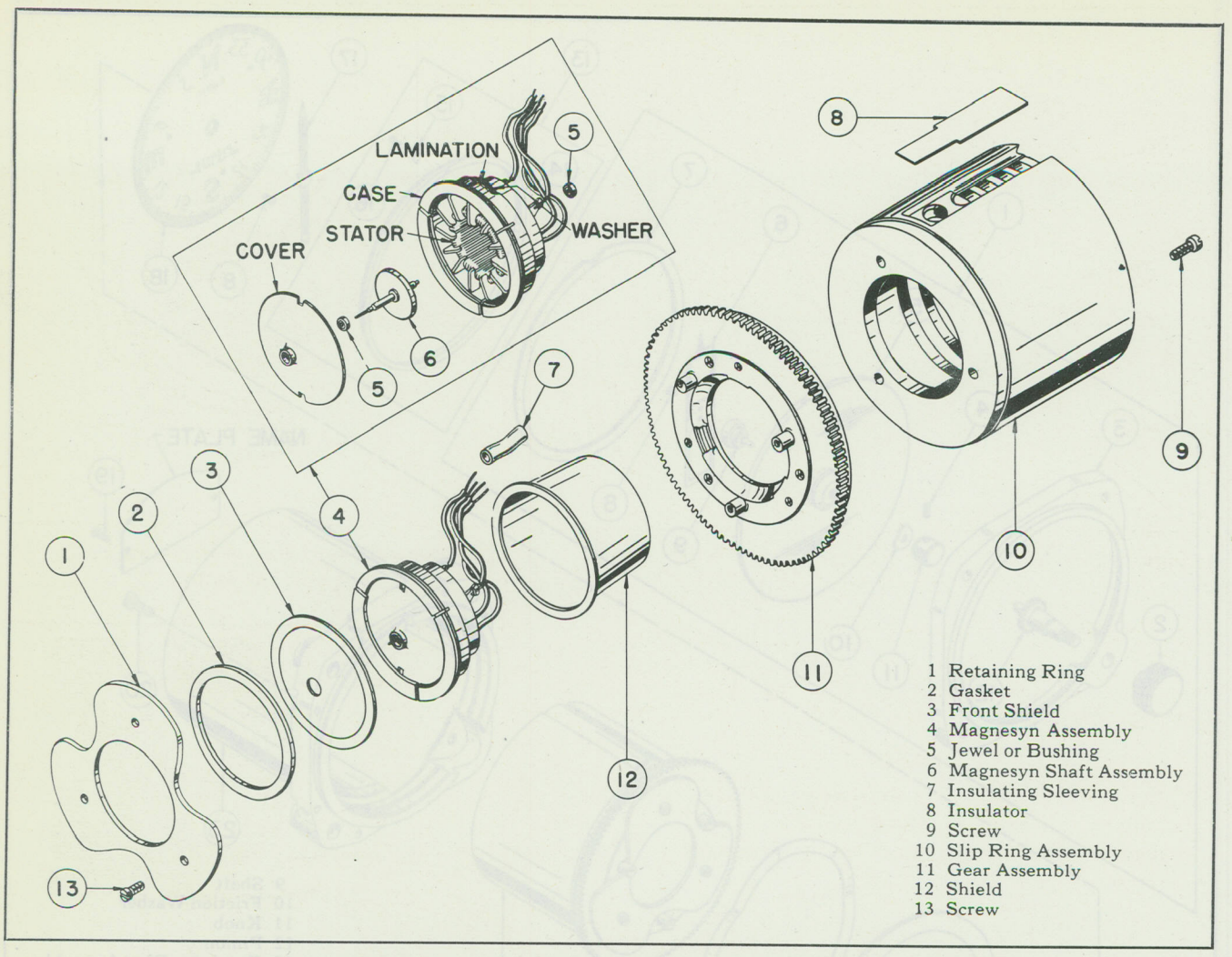


Figure 25D—Exploded View—Stripped Assembly—Indicator—Type AN 5730-2A, Navy Stock No. R88-I-803 (Pioneer Type 10078-1T-A1)

bly (1) while unmeshing the pinion (12) and gear. Separate the gasket (7) and glass and bushing assembly (5) from the bezel (3). If necessary for replacement of parts, the knob (2) may be pressed off the pinion (12).

(c) Remove the two screws (8, figure 25C) and separate the course-setting pointer (6). Loosen the setscrew (4) and slide the knob (11) off the shaft (9). Separate the shaft from the glass and bushing assembly (5). Use a new glass and bushing assembly if either of the parts is damaged.

(*d*) Lift the retaining ring assembly (13, figure 25C) out of the case. If the retainer (14) or index (15) requires replacement, the drive pin (16) may be pressed out of the retainer. Use a pointer puller to remove the hand assembly (17). Take out the three screws (8) and lift out the dial (18).

(*e*) Use a pair of standard retaining ring pliers to pull out the snap ring (22, figure 25C). Remove the friction washer (21). Now the stripped assembly (24) may be separated from the case and contact assembly (23). Use extreme care when separating these two assemblies to avoid damage or distortion to the contacts and slip rings.

(2) DISASSEMBLY OF THE STRIPPED ASSEMBLY. (*See figure 25D.*)

(*a*) Take out the three screws (13) and remove the retaining ring (1). Lift out the gasket (2) and front shield (3). Remove the insulator (8) which covers the soldered connections on the four slip rings. Unsolder the four Magnesyn stator leads from their respective slip rings. Carefully push the shield (12) and the Magnesyn assembly (4) out of the slip ring assembly (10). Gradually work the insulating sleeving (7) through the shield (12) and separate the Magnesyn assembly. The gear assembly (11) may be removed from the slip ring assembly after taking out the three screws (9). Do not disassemble the gear assembly or the slip ring assembly. Excessive wear or damage to either of these parts will require new assemblies.

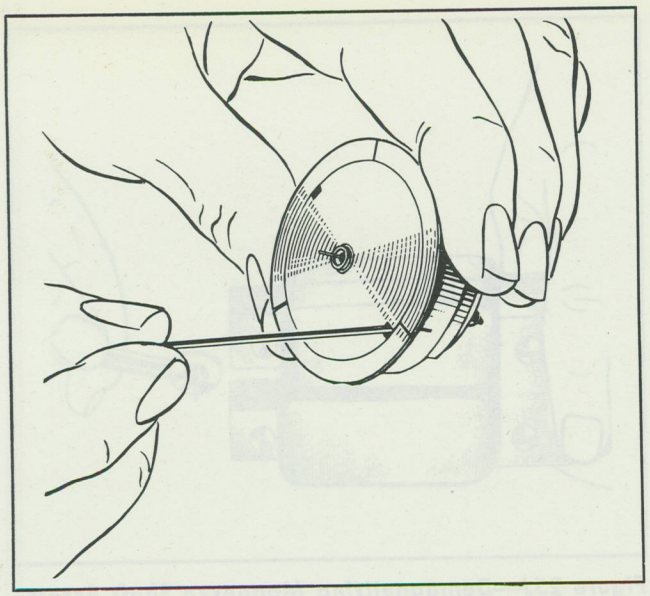


Figure 25E—Removing Magnesyn Cover With Lifter, QB-8432-1

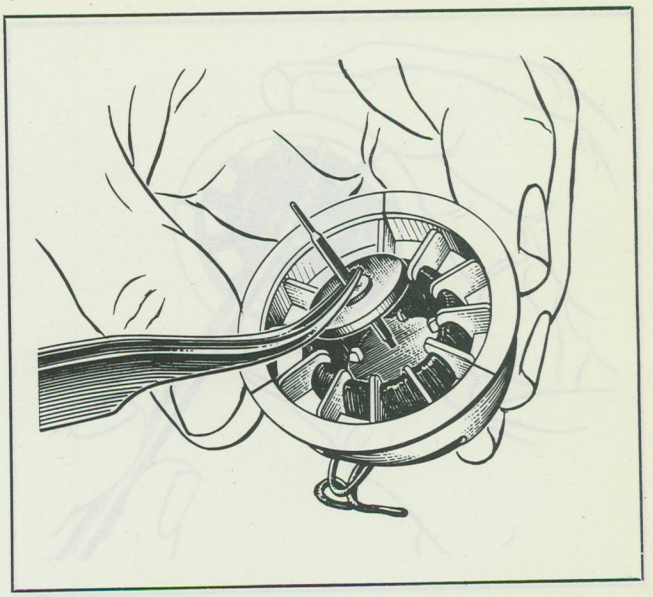


Figure 25F—Withdrawing Magnesyn Shaft Assembly From Stator

(*b*) Insert the Magnesyn cover lifter, QB-8432-1, into one of the slots in the Magnesyn case cover and carefully pry the cover from the Magnesyn case. (See figure 25E.)

CAUTION

Extreme care must be exercised when removing the Magnesyn case cover to avoid damaging the shaft which protrudes through the cover.

(c) Withdraw the Magnesyn shaft assembly (6, figure 25D) from the Magnesyn stator. (See figure 25F.) The Magnesyn assembly (4) must not be further disassembled. Removal of the stator assembly would damage and thus change the characteristics of the stator. It is also important that the outer laminations should not be removed or disturbed because the laminations have been factory-assembled with their grain marks set in such a manner as to insure uniformity throughout the entire return path. Replace the complete Magnesyn assembly if any of the following parts is damaged: stator assembly, outer laminations, Magnesyn case cover, Magnesyn case, or friction washer. The Magnesyn shaft assembly (6) and the jewels (5) or bushing rings may be replaced.

(3) DISASSEMBLY OF THE CASE AND CONTACT ASSEMBLY.
(*See figure 25A.*)

(*a*) Remove the two cover screws (12) and extract the contact block and plate assembly (1) from the case. Take out the two screws (2) and separate the mounting plate (5) and the block cover (3) from the contact block assembly (4). Unsolder the four insulated wires from the eyelets in the contact block. Do not disassemble the contact block assembly (4). If any part is broken or damaged, use a new assembly.

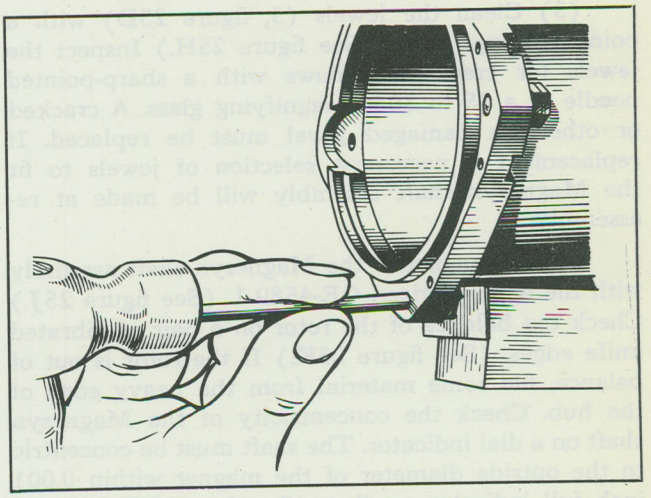


Figure 25G—Replacing Stop Nut

(*b*) The gasket (14) may be removed if necessary. If the filter assembly (9) is damaged, replace the washer (6) and spin over a new filter assembly in the case. If a stop nut (8) requires replacement, carefully punch the old stop nut out of the case. Replace the new stop nut using a swaging punch. (See figure 25G.) Slide a flat metal strip in the slot of the stop nut to avoid damaging the new nut.

c. CLEANING, INSPECTION, TESTING, AND REPAIR.

(1) Inspect the cover glass to be sure it is clean and free from cracks. Check the gaskets to be certain that they are in good condition. Replace them with new ones if necessary.

(2) With a fibre brush, clean the teeth of the gear assembly (11, figure 25D). Wash with an approved cleaning solution and dry with clean, dry air.

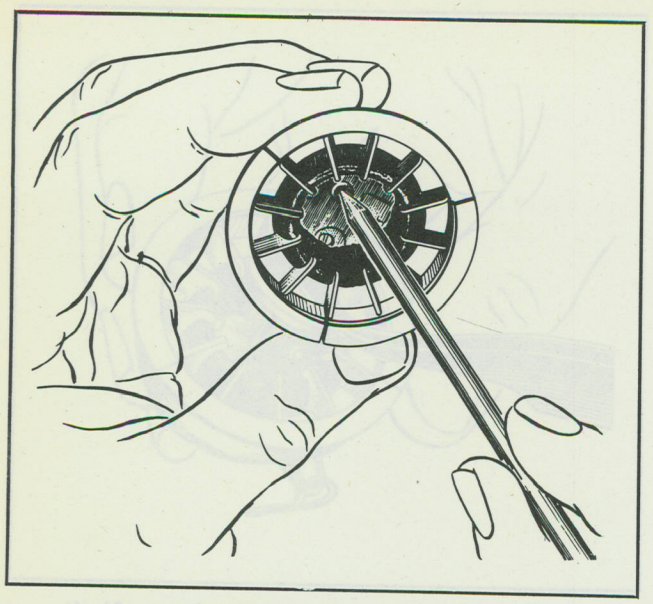


Figure 25H—Cleaning Pivot Jewels

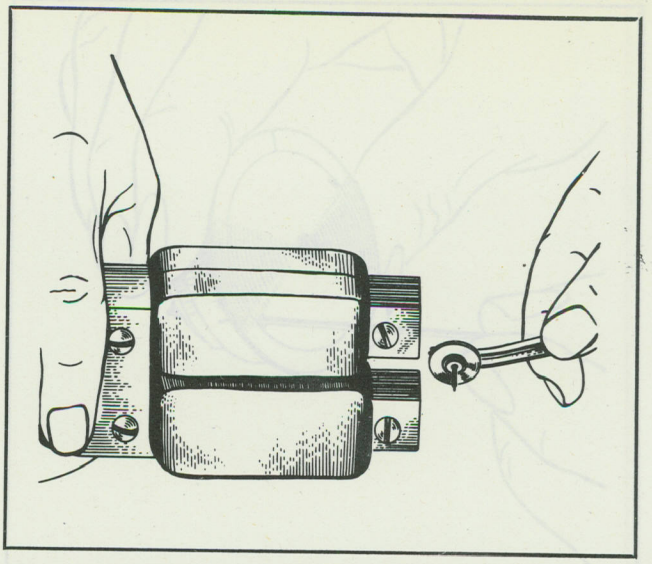


Figure 25J—Demagnetizing Magnesyn Shaft Assembly With Demagnetizer, QE-4589-1

(3) Clean the jewels (5, figure 25D) with a pointed orange stick. (See figure 25H.) Inspect the jewels for cracks and flaws with a sharp-pointed needle or a 15 to 30× magnifying glass. A cracked or otherwise damaged jewel must be replaced. If replacement is necessary, selection of jewels to fit the Magnesyn shaft assembly will be made at reassembly.

(4) Demagnetize the Magnesyn shaft assembly with the demagnetizer, QE-4589-1. (See figure 25J.) Check the balance of the rotor on a pair of vibrated knife edges. (See figure 25K.) If the rotor is out of balance, file some material from the heavy edge of the hub. Check the concentricity of the Magnesyn shaft on a dial indicator. The shaft must be concentric to the outside diameter of the magnet within 0.001 inch full indicator reading. (See figure 25L.) Clean the pivots by inserting and turning in a piece of pithwood. Bent, scored, or worn pivots will necessitate replacement of the Magnesyn shaft assembly.

(5) Magnetize the magnet of the Magnesyn shaft assembly before reassembly. Place the shaft assembly in a two-pole magnetizer, and magnetize it to full strength. The rotor should be placed in a suitable magnet keeper until it is replaced within the stator assembly.

(6) Using a standard ohmmeter, test the stator assembly for resistance and continuity of the windings. The resistance of each phase must be within two ohms of the resistance of each of the other two places. If the stator assembly fails to meet the preceding conditions, replace the complete Magnesyn assembly.

(7) Inspect and check the hand assembly (17, figure 25C) for balance. If unbalanced, remove material from, or add material to, the counterweight.

(8) Flush out the filter assembly in the case. Blow an approved cleaning solution through the filter assembly with a blast of dry, clean air, from a direction opposite to the entrance of foreign matter under operating conditions. For replacement of the filter assembly, refer to paragraph 4. *b.* (3) (*b*).

(9) Carefully examine the slip ring assembly for indications of corrosion, scoring, pitting, or rough spots. Clean the four slip rings with No. 1 polishing paper and wash with an approved cleaning solution, then dry with a stream of clean, dry air. Place two drops of an approved lubricating oil on a piece of soft lint-free cloth. After the oil is completely absorbed, use the cloth to wipe the surfaces of the four slip rings. This operation will provide a slight film of oil which, in turn, will discourage future corrosion of the slip rings.

(10) Inspect the contact block assembly (4, figure 25A) for any signs of damage, distortion, denting, or corrosion of the contacts. The four contacts must be perfectly aligned, approximately 30 degrees from their horizontal. If it is impossible to meet this condition, use a new assembly. Remove any bits of metal, dirt, or corroded material which may have collected on the ends of the contacts and wash the assembly in an approved cleaning solution. Check the four leads to be certain they are in good condition and firmly soldered to the contact block. The leads may be replaced with new ones if necessary. Use Surco-Soflex, formula S, tinned, stranded, insulated wire cut to the desired length. When replacing a lead, be sure the proper color code is observed. (See figuse 25M.) When soldering, use tin-lead solder, Federal Specification No. QQ-S-571a, with a flux made of 50 percent rosin and 50 percent alcohol or turpentine.

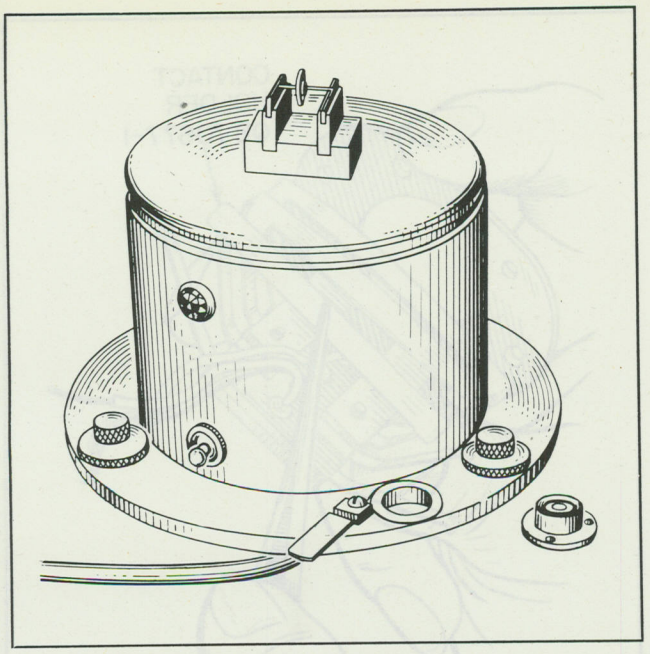


Figure 25K—Checking Balance of Rotor

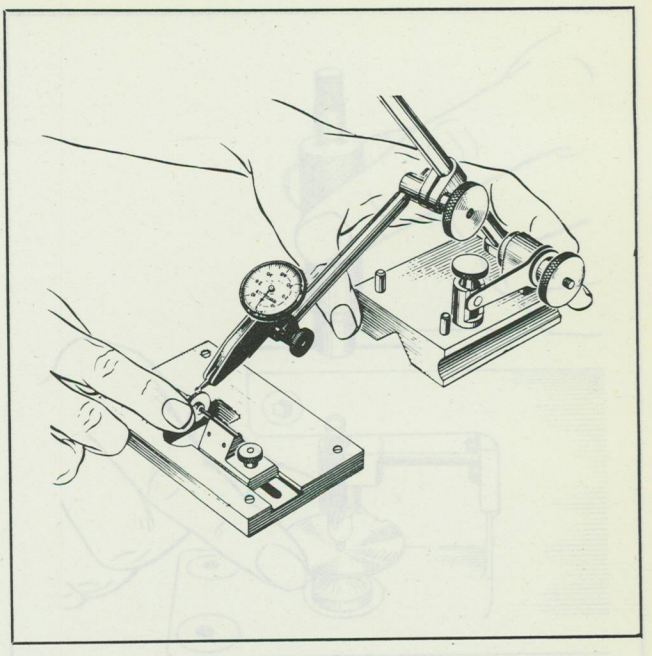


Figure 25L—Checking Concentricity of Magnesyn Shaft Assembly

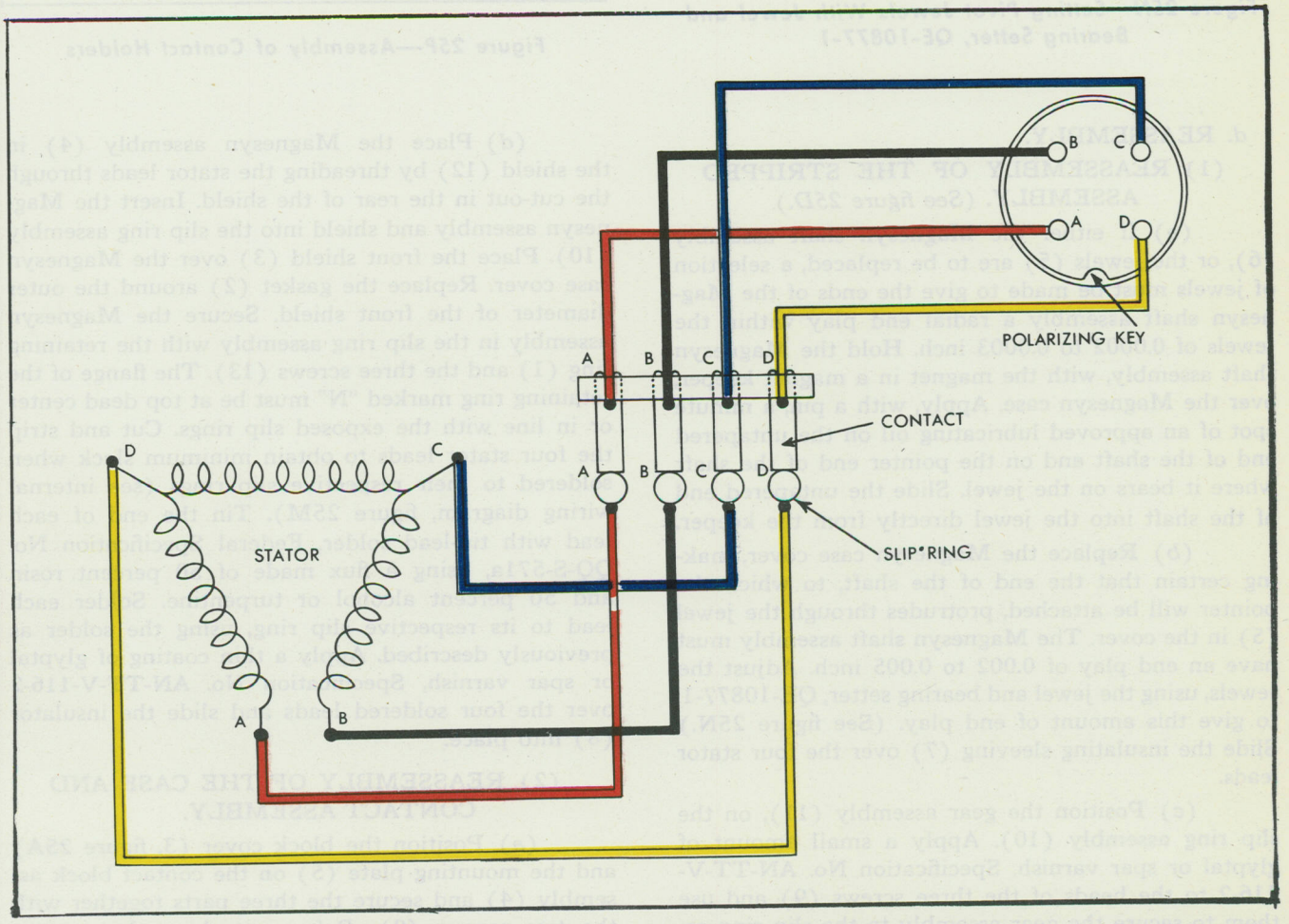


Figure 25M—Internal Wiring Diagram—Indicator—Navy Stock No. R88-I-803 (Pioneer Type 10078-1T-A1)

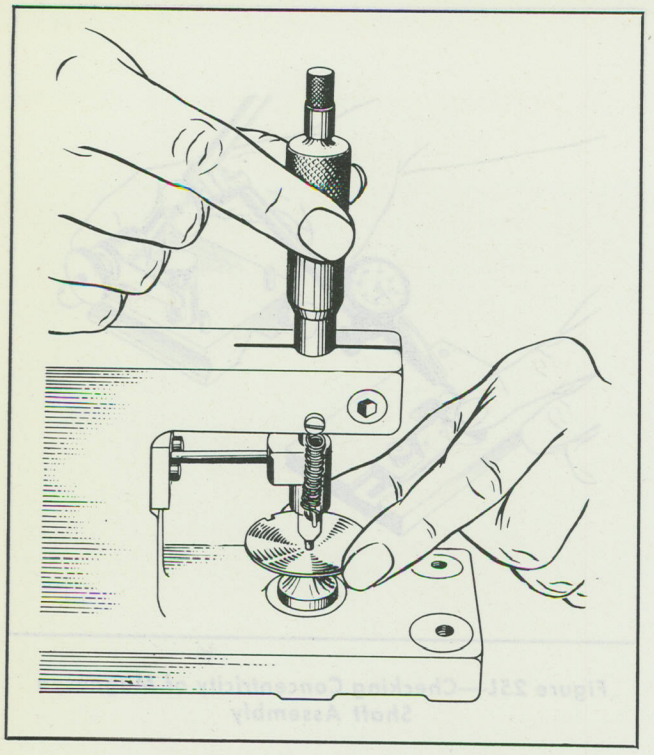


Figure 25N—Setting Pivot Jewels With Jewel and Bearing Setter, QE-10877-1

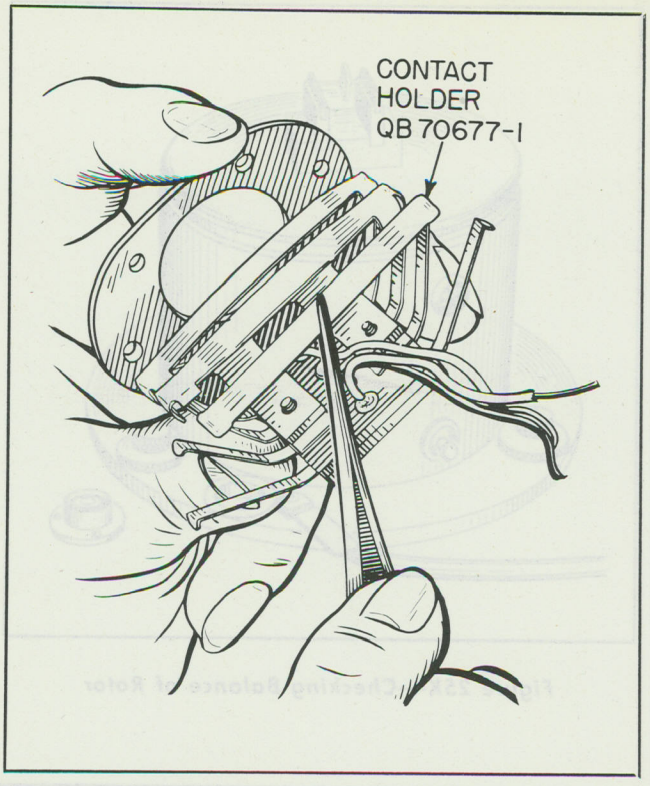


Figure 25P—Assembly of Contact Holders

d. REASSEMBLY.

(1) REASSEMBLY OF THE STRIPPED ASSEMBLY. (*See figure 25D.*)

(*a*) If either the Magnesyn shaft assembly (6), or the jewels (5) are to be replaced, a selection of jewels must be made to give the ends of the Magnesyn shaft assembly a radial end play within the jewels of 0.0002 to 0.0003 inch. Hold the Magnesyn shaft assembly, with the magnet in a magnet keeper, over the Magnesyn case. Apply, with a pin, a minute spot of an approved lubricating oil on the untapered end of the shaft and on the pointer end of the shaft where it bears on the jewel. Slide the untapered end of the shaft into the jewel directly from the keeper.

(*b*) Replace the Magnesyn case cover, making certain that the end of the shaft, to which the pointer will be attached, protrudes through the jewel (5) in the cover. The Magnesyn shaft assembly must have an end play of 0.002 to 0.005 inch. Adjust the jewels, using the jewel and bearing setter, QE-10877-1, to give this amount of end play. (See figure 25N.) Slide the insulating sleeving (7) over the four stator leads.

(c) Position the gear assembly (11), on the slip ring assembly (10). Apply a small amount of glyptal or spar varnish, Specification No. AN-TT-V-116-2 to the heads of the three screws (9) and use them to secure the gear assembly to the slip ring assembly.

(*d*) Place the Magnesyn assembly (4) in the shield (12) by threading the stator leads through the cut-out in the rear of the shield. Insert the Magnesyn assembly and shield into the slip ring assembly (10). Place the front shield (3) over the Magnesyn case cover. Replace the gasket (2) around the outer diameter of the front shield. Secure the Magnesyn assembly in the slip ring assembly with the retaining ring (1) and the three screws (13). The flange of the retaining ring marked "N" must be at top dead center or in line with the exposed slip rings. Cut and strip the four stator leads to obtain minimum slack when soldered to their respective slip rings (see internal wiring diagram, figure 25M). Tin the end of each lead with tin-lead solder, Federal Specification No. QQ-S-571a, using a flux made of 50 percent rosin and 50 percent alcohol or turpentine. Solder each lead to its respective slip ring, using the solder as previously described. Apply a thin coating of glyptal or spar varnish, Specification No. AN-TT-V-116-2 over the four soldered leads and slide the insulator (8) into place.

(2) REASSEMBLY OF THE CASE AND CONTACT ASSEMBLY.

(*a*) Position the block cover (3, figure 25A) and the mounting plate (5) on the contact block assembly (4) and secure the three parts together with the two screws (2). *Before* attaching the contact block and plate assembly (1) to the case, a contact

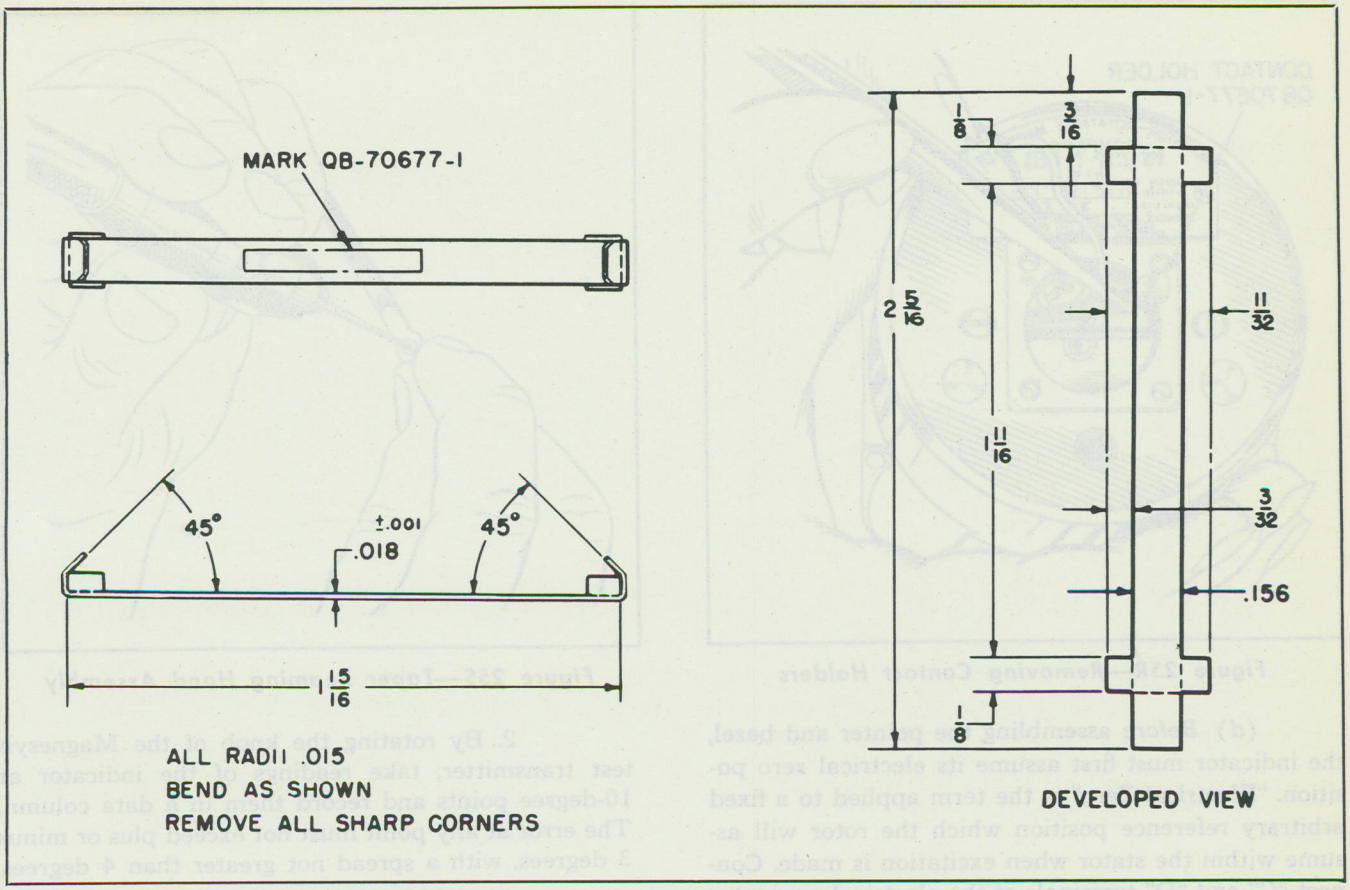


Figure 25Q—Dimensional Drawing—Contact Holder, QB-70677-1

holder, QB-70677-1, must be placed over each pair of contacts. (See figure 25P.) This precaution will protect both the contacts and the slip rings when the stripped assembly (24, figure 25C) is replaced in the case. The contact holders may be fabricated according to figure 25Q.

(*b*) Carefully position the contact block and plate assembly (1, figure 25A) inside of the case and secure from the outside of the case with the two cover screws (12). The contacts must be in the top of the case.

(3) REPLACEMENT OF THE STRIPPED ASSEMBLY AND ELECTRICAL ZERO SETTING.

(*a*) Replace the stripped assembly (24, figure 25C) in the case and contact assembly (23). Make certain that the "N" stamped on the retaining ring (1, figure 25D) is at top dead center of the case. Place the friction washer (21, figure 25C), around the outside circumference of the stripped assembly and replace the snap ring (22).

(*b*) After the stripped assembly (24, figure 25C) is secured in the case, insert a pair of tweezers through the receptacle hole in the rear of the case and disengage the contact holder, QB-70677-1, from each pair of contacts. (See figure 25R). If the gasket (14, figure 25A) was removed from the case, replace it with a new one. Pull the four leads outside the case through the receptacle hole and solder them to their respective terminals on the electrical connector receptacle (13) as follows: (See figure 25M.)

Color Lead	Receptacle Terminal
Red	A
Black	B
Blue	C
Yellow	D

When soldering, use tin-lead solder, Federal Specification No. QQ-S-571a, with a flux made of 50 percent rosin and 50 percent alcohol or turpentine. Secure the receptacle to the rear of the case with the four screws (11) and lock washers (10).

(*c*) Position the dial (18, figure 25C) over the front of the stripped assembly (24) with the character "N" exactly in line with the notch in the rim of the case. Secure the dial in place with the three screws (8). Press in the retaining ring assembly (13) until it fits snugly between the rim of the case and the outside circumference of the dial. The index will fit into the notch in the case. If it is necessary to replace the index (15) with a new one, use a new oversize drive pin (16) when assembling it.

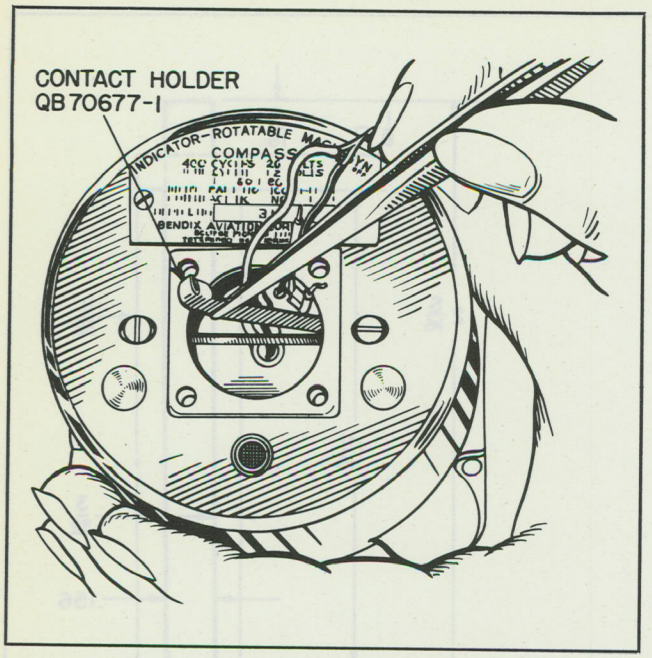


Figure 25R—Removing Contact Holders

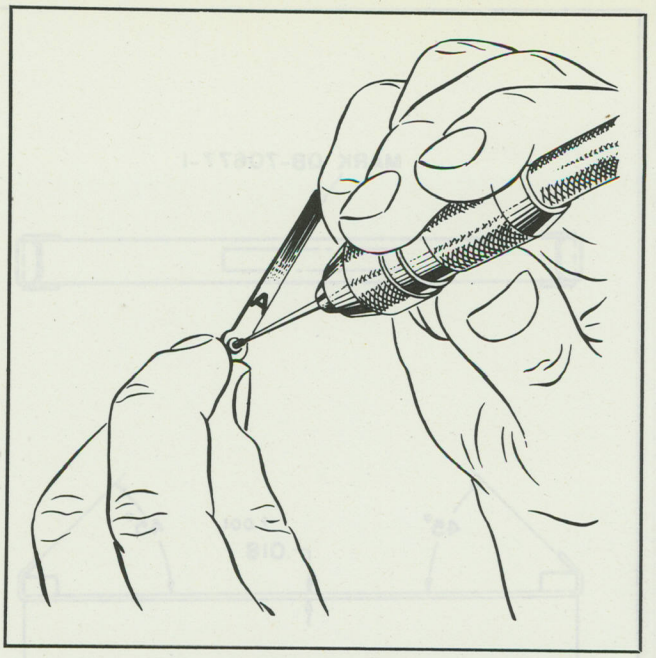


Figure 25S—Taper Reaming Hand Assembly

(*d*) *Before* assembling the pointer and bezel, the indicator must first assume its electrical zero position. "Electrical Zero" is the term applied to a fixed arbitrary reference position which the rotor will assume within the stator when excitation is made. Connect "C" and "D" terminals of the electrical connector receptacle (13, figure 25A) to the positive post of a 3-volt battery and the "A" and "B" terminals to the negative post. After making certain that the connections are correct, apply the d-c power for *not more* than 1 minute continuously. The Magnesyn shaft assembly will assume an electrical zero position within its stator. Without disturbing the position of the Magnesyn shaft assembly, carefully press the hand assembly (17, figure 25C) on the tapered end of the shaft so that it indicates exactly "N" (0 degrees). The accuracy of the indicator will depend on the precision with which the pointer is set exactly on top dead center ("N"). There must be no relative motion between the hand assembly and the shaft. If a new hand assembly is used, it must be reamed for a 3-degree taper fit, using the taper reamer, QB-70015-1. (See figure 25S.)

(4) CALIBRATION.

(*a*) SCALE ERROR.

1. Connect the indicator to a Magnesyn test transmitter, Pioneer type 13323-2, with the test cable, QD-70696-2. Make up the cable according to figure 25T. Connect the test transmitter to a source of 26-volt, 400-cycle power. Use the Varo-Power, 13601-1, if available. Power must be applied to the indicator across the "A" and "B" terminals of the receptacle. (See figure 25U.)

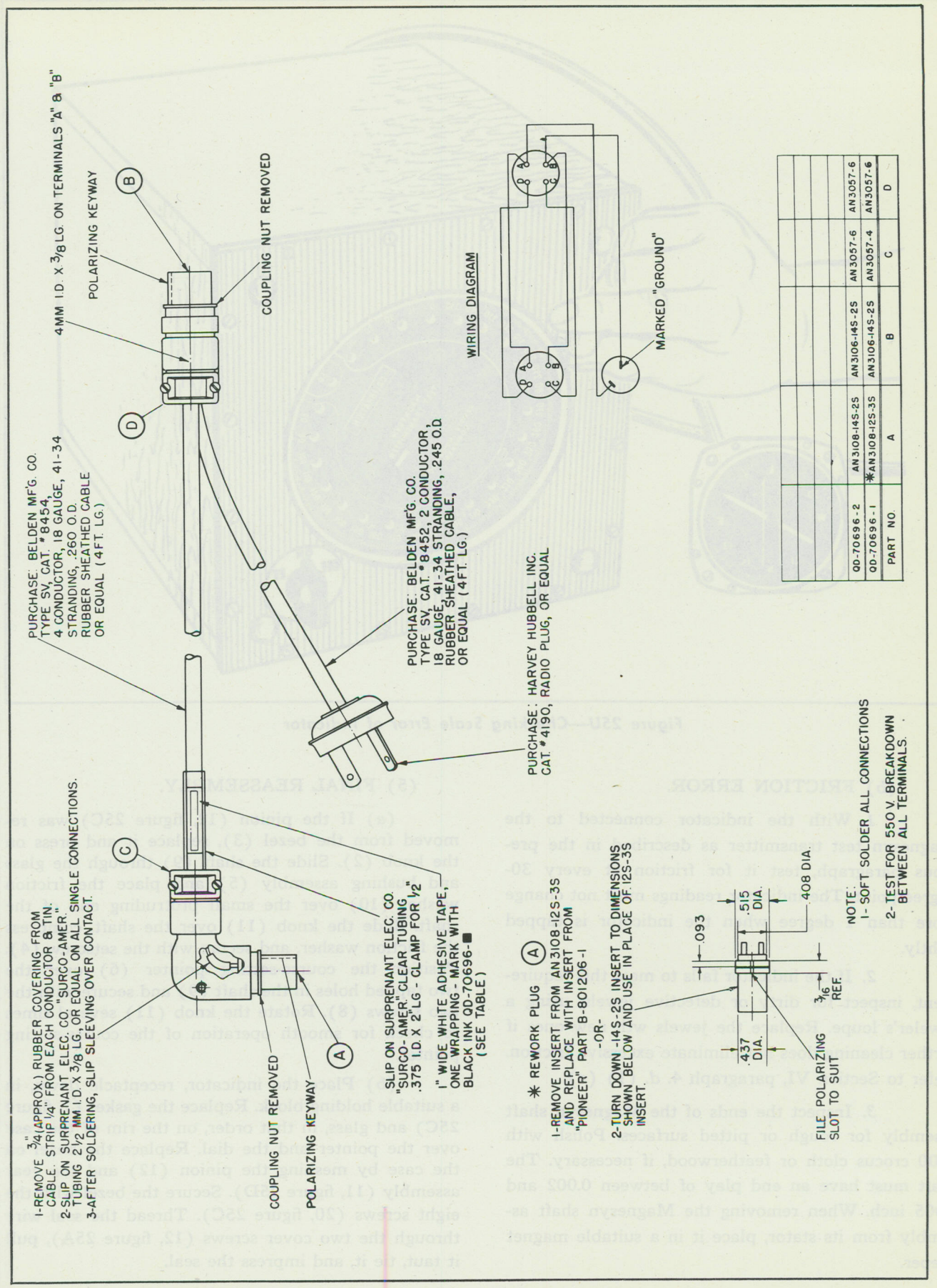
2. By rotating the knob of the Magnesyn test transmitter, take readings of the indicator at 10-degree points and record them in a data column. The error at any point must not exceed plus or minus 3 degrees, with a spread not greater than 4 degrees.

USAF PERSONNEL ONLY

The following tolerances will apply to USAF personnel only: ± 2 degrees with a spread not greater than 3 degrees.

3. If the indicator exceeds the specified tolerances, the source of trouble may be either electrical or mechanical. Therefore, it will be necessary to determine by computation which is the actual cause as outlined in the next paragraph.

4. Add, algebraically, the errors of points 180 degrees apart as recorded in the data column; for example, the error at 0 degrees plus the error at 180 degrees, etc. Take the algebraic difference between the most positive and the most negative sums and divide the difference by two. If the quotient exceeds 2½ degrees, the fault is of an electrical nature and lies within the stator of the Magnesyn assembly. This condition will necessitate replacement of the Magnesyn assembly. Refer to section VI, paragraph 4. *d.* (1) (*d*). If the quotient is 2½ degrees or less, the error is caused by mechanical defects and may be minimized. Note the error at the 90-degree and the 270-degree points. File or add small bits of solder to the counterweight of the hand assembly until the errors at these two points are equal and are of the same sign. In a similar manner, not the 0-degree and the 180-degree errors and file material from the appropriate side of the hub of the hand assembly. until the error at these points is equal and of the same sign.



PART NO.	A	B	C	D
QD-70696-2	AN3108-14S-2S	AN3106-14S-2S	AN3057-6	AN3057-6
QD-70696-1	*AN3108-12S-3S	AN3106-14S-2S	AN3057-4	AN3057-6

Figure 25T—Dimensional Drawing—Test Cable, QD-70696-2

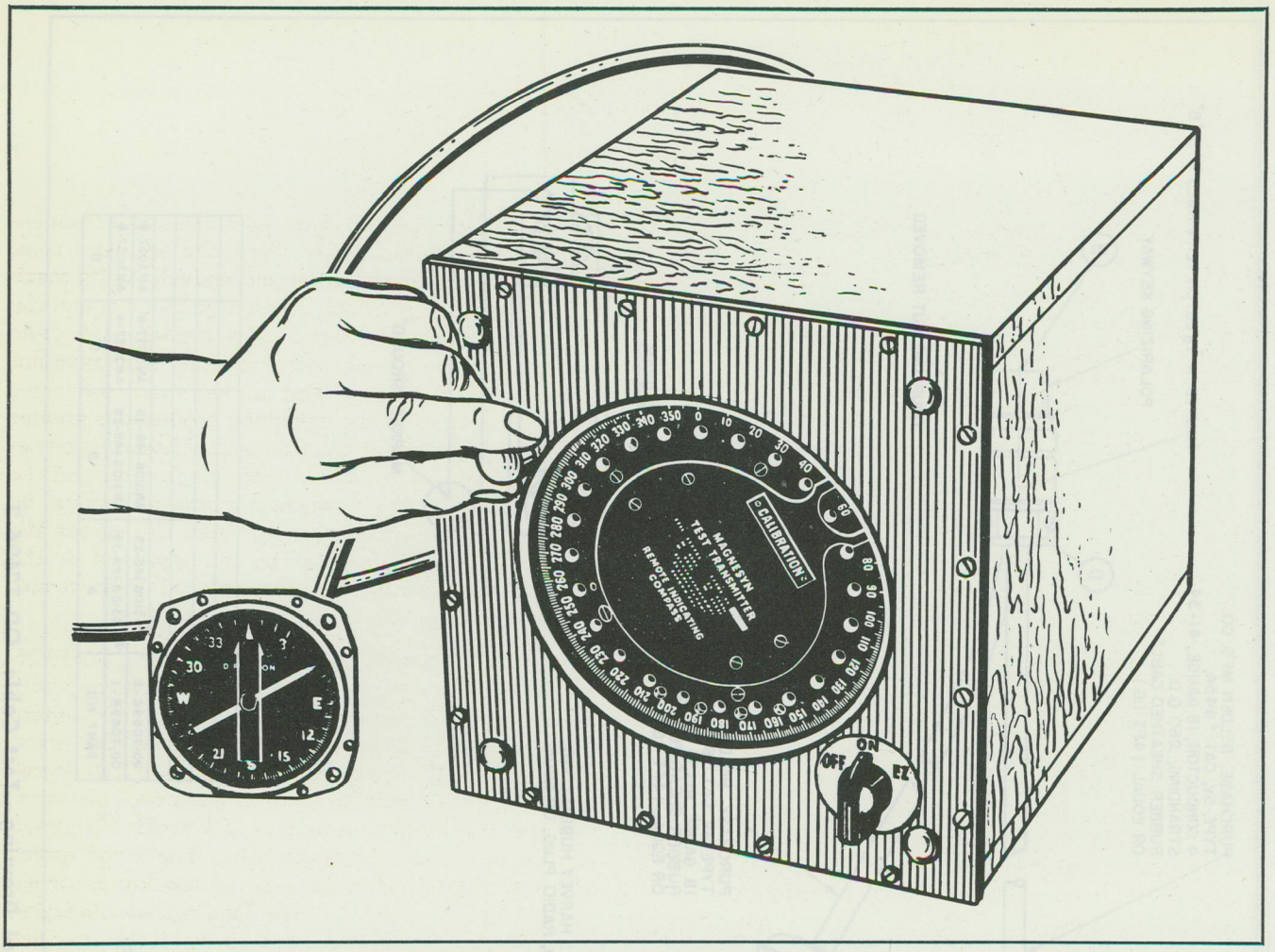


Figure 25U—Checking Scale Error of Indicator

(*b*) FRICTION ERROR.

1. With the indicator connected to the Magnesyn test transmitter as described in the previous paragraph, test it for friction at every 30-degree point. The indicator readings must not change more than 1 degree when the indicator is tapped lightly.

2. If the indicator fails to meet this requirement, inspect for dirty or defective jewels, using a jeweler's loupe. Replace the jewels wth new ones if further cleaning does not eliminate excessive friction. Refer to Section VI, paragraph 4. *d.* (1) (*a*).

3. Inspect the ends of the Magnesyn shaft assembly for rough or pitted surfaces. Polish with 0000 crocus cloth or featherwood, if necessary. The shaft must have an end play of between 0.002 and 0.005 inch. When removing the Magnesyn shaft assembly from its stator, place it in a suitable magnet keeper.

(5) FINAL REASSEMBLY.

(*a*) If the pinion (12, figure 25C) was removed from the bezel (3), replace it and press on the knob (2). Slide the shaft (9) through the glass and bushing assembly (5) and place the friction washer (10) over the small protruding end of the shaft. Slide the knob (11) over the shaft, compress the friction washer, and secure with the setscrew (4). Position the course-setting pointer (6) over the two tapped holes in the shaft (9) and secure with the two screws (8). Rotate the knob (11) several times to check for smooth operation of the course-setting pointer.

(*b*) Place the indicator, receptacle down, in a suitable holding block. Replace the gasket (7, figure 25C) and glass, in that order, on the rim of the case over the pointer and the dial. Replace the bezel on the case by meshing the pinion (12) and the gear assembly (11, figure 25D). Secure the bezel with the eight screws (20, figure 25C). Thread the seal wire through the two cover screws (12, figure 25A), pull it taut, tie it, and impress the seal.

SECTION VII
TEST PROCEDURE

1. TRANSMITTER, ARMY-NAVY TYPE AN 5730-3 (PIONEER TYPES 10062-1-A AND 10062-1-B).

a. OVERHAUL TOOLS REQUIRED.—The following special test equipment is required to perform the work described in this paragraph.

PART NO.	NOMENCLATURE	APPLICATION
13275-2	Standard Turntable	To check transmitter
13331-1	Magnesyn Test Indicator	To check transmitter

b. CONDITIONS. — Whenever the temperature, pressure, and magnetic field strength are not specified definitely, it is understood that the test is to be made at room temperature (approximately 25° C (77° F)), atmospheric pressure (approximately 29.92 inches of mercury) in a horizontal field strength of approximately 0.18 gauss, and a vertical field strength of approximately 0.54 gauss in the direction normal in the Northern Hemisphere. When tests are made with temperature, pressure, or magnetic field strength differing materially from the above values, proper allowance must be made from the specified conditions. The excitation must be a 26-volt, 400-cycle, single-phase source and, unless otherwise specified, the transmitter must be tapped lightly before taking readings.

c. PROCEDURE.—Each transmitter must be subjected to the following tests in the order given below.

(1) FRICTION ERROR.—With the transmitter connected to a Magnesyn test indicator, 13331-1, test it for friction at every 30-degree point. The Magnesyn test indicator must not change more than ½ degree when the transmitter is tapped lightly. If the transmitter fails to meet the tolerance, inspect the float pivot for a smoothly rounded tip, and the jewel for defects. Replace if necessary. Check the length of the jewel post spring. Check the float assembly for balance and leaks. Refer to section VI, paragraph 1. c. (1) and (2).

(2) COMPENSATOR RANGE.—The Magnesyn test indicator, 13331-1, must be used for this test. With a vertical plane through the center of the transmitter case, along the arrow marked "FORE," parallel to the magnetic meridian, and with the east-west compensator system set to its zero mark, the north-south compensator system must be set successively to its maximum east and maximum west adjustments and the maximum deviations noted. With a vertical plane passing through the center of the transmitter, along the arrow marked "FORE," at right angles to the magnetic meridian, and with the north-south compensator system set to its zero mark, the east-west compensator system must be set successively to its maximum north and maximum south adjustments, and the maximum deviations noted. The greatest deflection produced by the compensator on either axis must not be more than 20 degrees and not less than 15 degrees in both directions. If the deflection produced is greater than 20 degrees, the compensator magnets must be demagnetized in a suitable two-pole magnetizer and the demagnetizer or the compensator assembly must be replaced. If the deflection is less than 15 degrees, the compensator magnets must be remagnetized or the compensator assembly must be replaced. Refer to section VI, paragraph 1. c. (3).

(3) TILT ERROR. With the compensator removed, connect the transmitter to a Magnesyn test indicator, 13331-1. Tilt the transmitter at a 10-degree angle about any axis. The reading must not change more than 6 degrees. The float must rotate freely when the transmitter is tilted at a 20-degree angle. If the transmitter fails to meet these tolerances, check the pivot for the required spherical roundness and for alignment. Refer to section VI, paragraph 1. c. (1) *(b)*. If the pivot is out of alignment, it must be replaced. Refer to section VI, paragraph 1. *d.* (1).

(4) COMPASS ERROR WITH COMPENSATOR REMOVED.—Mount the transmitter, with the compensator assembly removed, on a standard turntable, 13275-2, so that a plane along the arrow marked "FORE" coincides with the 0- to 180-degree marks of the turntable and a magnetic meridian, when the turntable reading is zero. Using a Magnesyn test indicator, test the transmitter. The error spread must not exceed 4 degrees with an absolute error not greater than 3 degrees. Take readings at 30-degree points. If the transmitter fails to meet the specified tolerance of this test but passes the friction test (this section, paragraph 1. c. (1)) and tilt test (this section, paragraph 1. c. (3)), the Flux Gate must be replaced. Refer to section VI, paragraph 1. *d.* (4).

(5) COMPASS ERROR WITH COMPENSATOR.—Set the compensator to indicate minimum magnetic effects; that is, align the dots on the knobs with the dots on the bracket. The transmitter error with compensator must not differ by more than 2 degrees from the transmitter error without the compensator assembly, when tested at 0-, 90-, 180-, and 270-degree points. If the transmitter fails to meet this specified tolerance, check the alignment of the compensator adjusting knobs and the magnetic nulls of the compensator magnets.

(6) HIGH TEMPERATURE. — Subject the transmitter to a temperature of 71° C (159.8° F) for two hours. This must not cause any leakage of liquid or damage to the float. If there is evidence of leakage, tighten the 10 long screws. If the leakage persists, replace the bowl gaskets with freshly impregnated ones. Refer to section VI, paragraph 1. c. (1) (c). Do not mistake liquid coming from around the screws for a leak. There is a clearance around the screws into which the liquid seeps when the bowl is filled. If the float assembly is damaged by the high temperature, it must be replaced. Refer to section VI, paragraph 1. *d.* (1).

(7) LOW TEMPERATURE. — Subject the transmitter to a temperature of —54° C (—61.2° F) for two hours. This must not cause any leakage of liquid or damage to the float. It the transmitter does not meet this requirement, follow the procedure described in the preceding paragraph. Upon completion of this test, tighten each of the 10 long screws an additional turn.

2. INDICATOR, ARMY-NAVY TYPES AN 5730-2, AN 5730-2A, AND AN 5730-6 (PIONEER TYPES 10061-1A-A1, 10061-1D-A1, 10061-1E-A1, 10061-1G-A1, 10061-1H-A1, 10069-1M-A1, 10061-1A-B1, 10061-1E-B1, 10061-1G-B1, 10061-1L-B1, 10061-1M-B1, 10061-1N-B1, 10061-1Q-B1, 11061-1Y-B1 AND 10078-1T-A1), AND NAVY STOCK NO. R88-1-801-11 (PIONEER TYPE 10098-1AL-A1)

a. OVERHAUL TOOLS REQUIRED.—The following special test equipment is required to perform the work described in this paragraph.

PART NO.	NOMENCLATURE	APPLICATION
13323-2.	Magnesyn Test Transmitter	To check the indicator

b. CONDITIONS.— Whenever the temperature, pressure and magnetic field strength existing at the time of the test are not specified definitely, it is understood that the test is to be made at room temperature (approximately 25° C (77° F), atmospheric pressure (approximately 29.92 inches of mercury), in a horizontal field strength of approximately 0.18 gauss, and a vertical field strength of approximately 0.54 gauss in the direction normal in the Northern Hemisphere. When tests are made with temperature, pressure, or magnetic field strength differing materially from the above values, proper allowance must be made from the specified conditions. Unless otherwise specified, the instrument must be tapped lightly before taking readings.

c. PROCEDURE.—Each indicator must be subjected to the following tests in the order given below.

(1) INSULATION BREAKDOWN.—The application of 550 volts at a commercial frequency between any receptacle pin and the receptacle mounting screw for a period of one minute must cause no electrical breakdown of insulation. If the insulation breaks down, replace the Magnesyn assembly. Refer to section VI, paragraph 2. *d.* (1) for Army-Navy types AN 5730-2 and AN 5730-6 (Pioneer types 10061-1A-A1, 10061-1D-A1, 10061-1E-A1, 10061-1G-A1, and 10061-1H-A1). Refer to section VI, paragraph 3. *d.* (1) for Army-Navy types AN 5730-2A and AN 5730-6 (Pioneer types 10061-1A-B1, 10061-1E-B1, 10061-1G-B1, 10061-1L-B1, 10061-1M-B1, 10061-1N-B1, 10061-1Q-B1, and 10061-1Y-B1). Refer to section VI, paragraph 4. *d.* (1) (*d*) for Army-Navy type AN 5730-2A (Pioneer type 10078-1T-A1).

(2) SCALE ERROR.—Using the Magnesyn test transmitter, 13323-2, test the indicator for scale errors at each 30-degree point. The error spread must not exceed 4 degrees with an absolute error not greater than 3 degrees.

USAF PERSONNEL ONLY

Connect the repeater indicator to the Magnesyn test transmitter, Pioneer type 13323-2, and a source of 26-volt, 400-cycle power and test for scale error at every 10-degree point. The error at any point must not exceed plus or minus 2 degrees. Errors between any two points must not exceed a spread of 3 degrees.

If the indicator does not meet the specified tolerance, refer to section VI, paragraph 2. *d.* (4) *(a)* for Army-Navy types AN 5730-2 and AN 5730-6 (Pioneer types 10061-1A-A1, 10061-1D-A1, 10061-1E-A1, 10061-1G-A1, and 10061-1H-A1). Refer to section VI, paragraph 3. *d.* (4) *(a)* for Army-Navy types AN 5730-2A and AN 5730-6 (Pioneer types 10061-1A-B1, 10061-1E-B1, 10061-1G-B1, 10061-1L-B1, 10061-1M-B1, 10061-1N-B1, 10061-1Q-B1, and 10061-1Y-B1). Refer to section VI, paragraph 4. *d.* (4) *(a)* for Army-Navy type AN 5730-2A (Pioneer type 10078-1T-A1).

(3) FRICTION ERROR.—With the indicator connected to a Magnesyn test transmitter, 13323-2, test it for friction at every 30-degree point. The indicator readings must not change more than 1 degree when the indicator is tapped lightly. If it fails this test, refer to section VI, paragraph 2. *d.* (4) *(b)* for Army-Navy types AN 5730-2 and AN 5730-6 (Pioneer types 10061-1A-A1, 10061-1D-A1, 10061-1E-A1, 10061-1G-A1, and 10061-1H-A1). Refer to section VI, paragraph 3. *d.* (4) *(b)* for Army-Navy types AN 5730-2A and AN 5730-6 (Pioneer types 10061-1A-B1, 10061-1E-B1, 10061-1G-B1, 10061-1L-B1, 10061-1M-B1, 10061-1N-B1, 10061-1Q-B1, and 10061-1Y-B1). Refer to section VI, paragraph 4. *d.* (4) *(b)* for Army-Navy type AN 5730-2A (Pioneer type 10078-1T-A1).

PARTS CATALOG

INTRODUCTION
SECTION VIII

1. This Parts Catalog contains illustrations and lists of procurable and nonprocurable parts and special tools used in conjunction with the overhaul of the Remote Reading Magnesyn Compass System manufactured by the Eclipse Pioneer Division of Bendix Aviation Corporation, Teterboro, N. J.

TABLE NO. II

COMPARATIVE TABLE OF TYPE IDENTIFICATIONS FOR REMOTE-READING MAGNESYN COMPASS SYSTEM

Nomenclature	*Type*	*Navy Stock No.*	*Pioneer Type*
Transmitter	AN 5730-3	R88-T-1950	10062-1-A
Transmitter	AN 5730-3	R88-T-1950	10062-1-B
Indicator	AN 5730-2	R88-I-800	10061-1A-A1
Indicator	AN 5730-2	R88-I-800	10061-1D-A1
Indicator	AN 5730-2	R88-I-800	10061-1E-A1
Indicator	AN 5730-6	R88-I-801	10061-1G-A1
Indicator	AN 5730-6	R88-I-801	10061-1H-A1
Indicator	AN 5730-2A	R88-I-801	10078-1T-A1
Indicator	AN 5730-2A	R88-I-800-10	10061-1A-B1
Indicator	AN 5730-2A	R88-I-800-10	10061-1E-B1
Indicator	AN 5730-6	R88-I-801	10061-1G-B1
Indicator	AN 5730-6	R88-I-801	10061-1L B1
Indicator	AN 5730-6	R88-I-801	10061-1M-B1
Indicator	AN 5730-2A	R88-I-800-10	10061-1N-B1
Indicator	AN 5730-2A	R88-I-800-10	10061-1Q-B1
Indicator	AN 5730-2A	R88-I-800-10	10061-1Y-B1
Indicator		R88-I-801-11	10098-1AL-A1

2. Section IX, "Group Assembly Parts Lists" consists of a breakdown of the complete units into subassemblies and detailed parts.

a. FIGURE AND INDEX NUMBER COLUMN.—In this column the digits preceding the hyphen refer to the figure in the Parts Catalog on which a part or assembly is illustrated. The digits following the hyphen are the index number of a procurable part or assembly. A nonprocurable assembly containing procurable parts has a figure number but no index number. A nonprocurable part has no figure nor index number. No figure nor index number is listed for the article itself.

b. PART NUMBER COLUMN.—In this column are listed part numbers that are the same as drawing numbers for procurable and nonprocurable parts and assemblies. A part number for a nonprocurable part or assembly is marked with an asterisk.

c. NOMENCLATURE COLUMN.—In this column each assembly is listed followed by its components indented properly to show their relationship to the assembly.

d. UNITS PER ASSEMBLY COLUMN.—This column lists the quantity of parts or assemblies required in the immediately preceding assembly of which the unit is a component.

e. TOTAL QUANTITY AND INSTRUMENT TYPE NUMBER COLUMNS.—Under each Pioneer type number, in the instrument type number columns between "Units per Assembly" and "Total Quantity," the interchangeability of the parts and assemblies making up that instrument is indicated. In the "Total Quantity" column is listed the total quantity of units required in each instrument which is designated by an "X" in the instrument type number column. A number in place of an "X" designates the total quantity of units required for that particular instrument. Either a number or an "X" in the instrument type number column indicates that the units per assembly apply to that instrument.

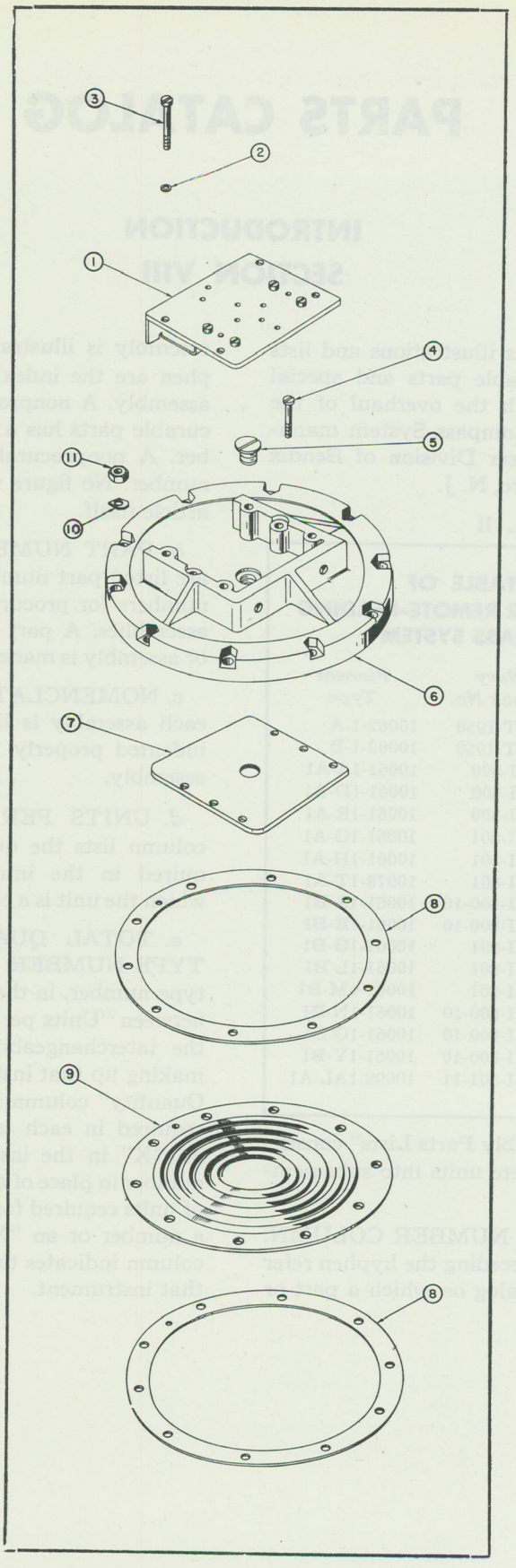


Figure 26—Exploded View Drawing—Main Assembly—Transmitter—Type AN 5730-3

TYPE AN 5730-3 (PIONEER TYPES 10062-1-A AND 10062-1-B)

FIGURE & INDEX NUMBER	PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	TOTAL QTY.	10062-1-A	10062-1-B	UNITS PER ASSY
	10062-1-A	Transmitter Assembly—Remote reading compass	1	X		1
	10062-1-B	Transmitter Assembly—Remote reading compass	1		X	1
26–1	PD 23548-1	Compensator Assembly	1	X	X	1
	*PC 23564-1	Cover—Compensator	1	X	X	1
29–1	FFil-O-302E	Screw	4	X	X	4
29–2	PB 8214	Washer—Magnet staff spacing	AR	X	X	AR
	*PB 23553-1	Magnet Assembly—Lower	1	X	X	1
	*PB 23554-1	Magnet Assembly—Upper	1	X	X	1
	*PB 23555-1	Gear Assembly—Idler	1	X	X	1
	*PB 23561-1	Bracket And Dowel Assembly	1	X	X	1
	*PB 23560-1	Driver—Compensator	2	X	X	2
	*PB 20389	Spring—Compensator	2	X	X	2
	*PB 23565-1	Knob—Compensator	2	X	X	2
26–2	LW-O-4BN	Washer—Lock	4	X	X	4
26–3	PB 52365-1	Screw—Compensator mounting	4	X	X	4
26–4	PB 52364-1	Screw– Compensator mounting plate	2	X	X	2
26–5	PB 52576-1	Plug	1	X	X	1
26–6	PB 23534-2	Housing—Compensator	1	X	X	1
26–7	PB 52577-1	Plate—Compensator mounting	1	X	X	1
26–8	PB 23568-1	Gasket—Bowl	3	X	X	2
26–9	PC 23571-1	Diaphragm	1	X	X	1
26–10	PB 52850-1	Washer	10	X	X	10
26–11	N-O-8E	Nut	10	X	X	10
27–1	PD 23535-1	Bowl—Compass, upper	1	X	X	1
27–2	PD 23645-1	Float Assembly	1	X	X	1
27–3	PB 23578-1	Pivot And Bushing Assembly	1	X	X	1
	*PB 50315-1	Weight—Float, top	1	X	X	1
	*PC 23647-1	Support—Damping fin	1	X	X	1
	*PB 23644-1	Top—Float	1	X	X	1
	*PC 23641-1	Fin—Damping	3	X	X	3
	*PC 23641-2	Fin—Damping	1	X	X	1
	*PB 51394-1	Rivet—Tubular	4	X	X	4
27–4	PB 23637-1	Post Assembly—Jewel	1	X	X	1
27–5	PB 50307-1	Screw—Retainer	1	X	X	1
27–6	PB 50881-1	Spring—Jewel post	1	X	X	1
27–7	PB 50326-1	Screw	1	X	X	1
27–8	PB 23567-1	Support—Jewel post	1	X	X	1
27–9	56-74	Washer	2	X	X	2
27–10	PB 23568-1	Gasket—Bowl	3	X	X	1
28–1	FFil-O-410CP	Screw	4	X	X	4
28–2	LW-O-4CP	Washer—Lock	4	X	X	4
28–3	PD 20443-4	Receptacle—Electrical connector	1	X	X	1
28–4	PD 23533-1	Bowl—Compass, lower	1	X		1
28–4	PD 52635-1	Bowl—Compass, lower	1		X	1
28–5	PB 23642-2	Screw	2	X	X	2
28–6	PC 50382-1	Insert—Filling hole	1	X	X	1
28–7	56-74	Washer	1	X	X	1
28–8	PB 23671-1	Cap—Filling hole	1	X	X	1
28–9	583-34	Wire—Seal	2	X	X	2
28–10	PC 23572-1	Gate Assembly—Flux	1	X		1
28–10	PC 52503-1	Gate Assembly—Flux	1		X	1
28–11	PB 23566-1	Retainer—Flux Gate	1	X	X	1
28–12	PB 22547-2	Nut	2	X	X	2
28–13	PB 23639-1	Gasket—Flux Gate cover	1	X	X	1
28–14	PB 23570-1	Cover—Flux Gate	1	X	X	1
28–15	W-O-10B	Washer	2	X	X	2
28–16	N-O-10B	Nut	1	X	X	1
28–17	PB 23526-1	Plate—Receptacle mounting	1	X	X	1
28–18	PB 23642-1	Screw	8	X	X	8
28–19	PB 50383-1	Seal—Head	1	X	X	1

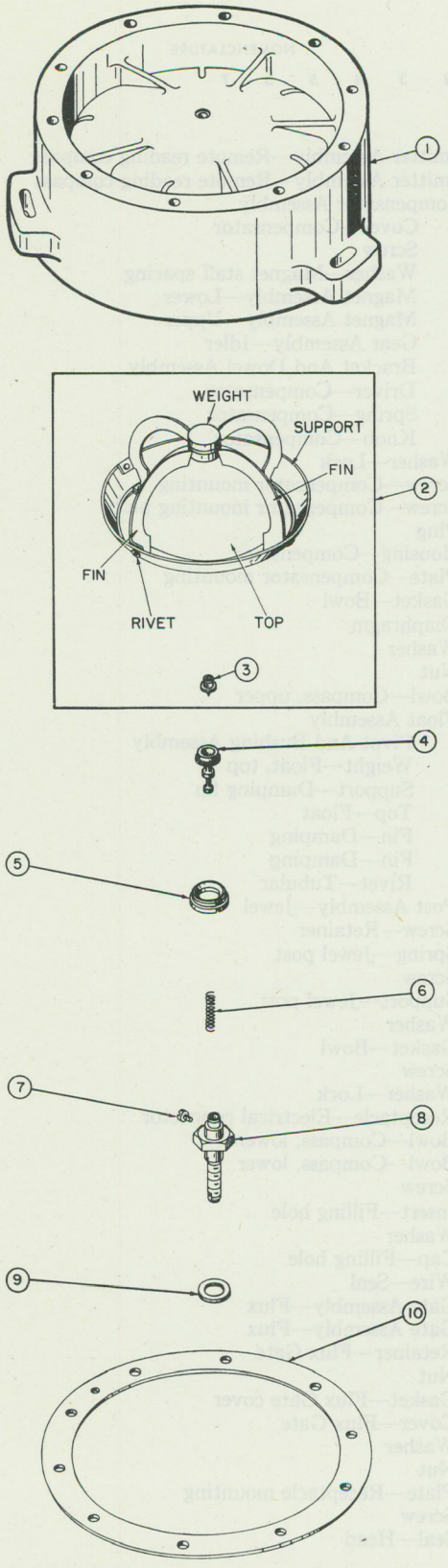


Figure 27—Exploded View Drawing—Main Assembly—Transmitter—Type AN 5730-3

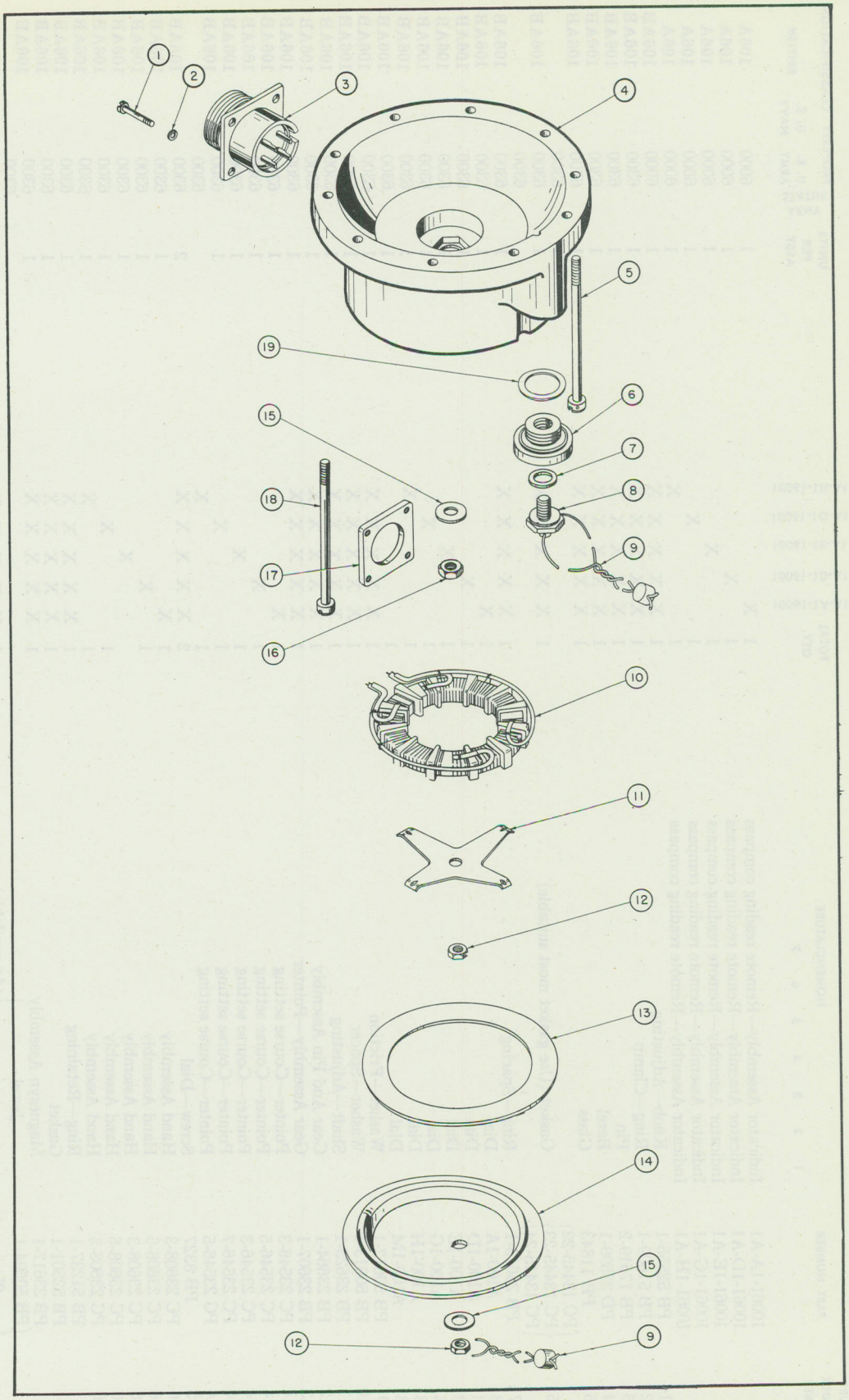
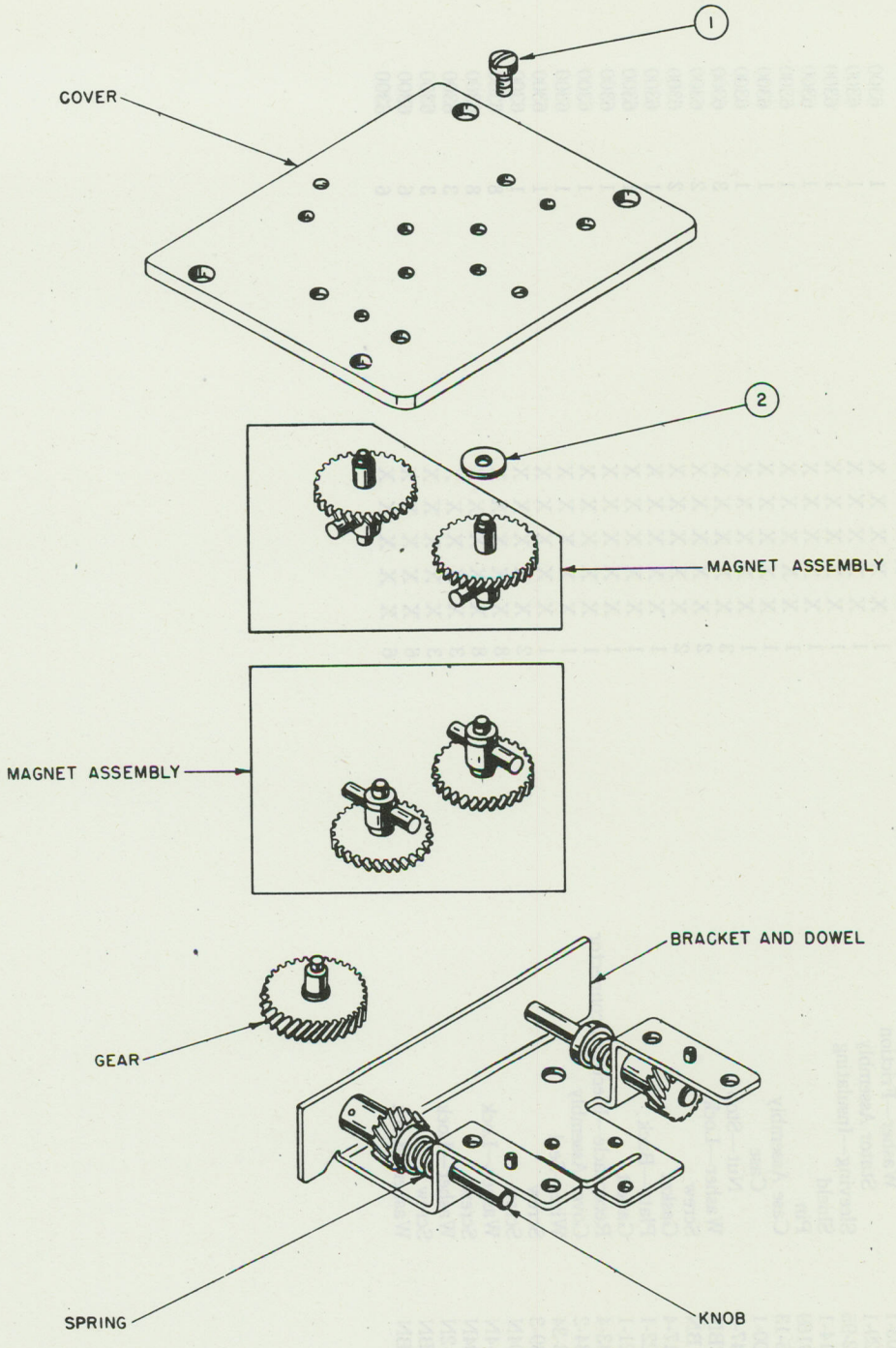


Figure 28—Exploded View Drawing—Main Assembly—Transmitter—Type AN 5730-3

TYPE AN 5730-2 (PIONEER TYPES 10061-1A-A1, 10061-1D-A1, AND 10061-1E-A1)

TYPE AN 5730-6 (PIONEER TYPES 10061-1G-A1 AND 10061-1H-A1)

FIGURE & INDEX NUMBER	PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	TOTAL QTY.	10061-1A-A1	10061-1D-A1	10061-1E-A1	10061-1G-A1	10061-1H-A1	UNITS PER ASSY	ARMY STATUS	PROPERTY CLASSIFICATION U. S. ARMY	U. S. NAVY	BRITISH
	10061-1A-A1	Indicator Assembly—Remote reading compass	1	X					1		6000		106A
	10061-1D-A1	Indicator Assembly—Remote reading compass	1		X				1		6000		106A
	10061-1E-A1	Indicator Assembly—Remote reading compass	1			X			1		6000		106A
	10061-1G-A1	Indicator Assembly—Remote reading compass	1				X		1		6000		106A
	10061-1H-A1	Indicator Assembly—Remote reading compass	1					X	1		6000		106A
30–1	PB 52555-1	Knob—Adjusting	1	X	X	X	X	X	1		6000		106AB
30–2	PB 51609-1	Ring—Clamp	1	X	X	X	X	X	1		6300		106AB
30–3	PB 17619-2	Pin	1	X	X	X	X	X	1		6300		106AB
30–4	PD 23599-1	Bezel	1	X	X	X	X	X	1		6300		106AB
30–5	PB 11843	Glass	1	X	X	X	X	X	1		6300		106AB
30–6	PC 13445-22 / PC 13445-23 / PC 13445-24	Gasket (Use gasket most suitable)	1	X	X	X	X	X	1		6300		106AB
30–7	PB 23613-1	Ring—Spacing	1	X	X	X	X	X	1		6300		106AB
30–8	A100-1A	Dial	1	X					1		6300		106AB
30–8	A100-1D	Dial	1		X				1		6300		106AB
30–8	A100-1E	Dial	1			X			1		6300		106AB
30–8	A100-1G	Dial	1				X		1		6300		106AB
30–8	A100-1H	Dial	1					X	1		6300		106AB
30–8	A100-1M	Dial	1						1		6300		106AB
30–9	PB 50612-1	Washer—Friction	1	X	X	X	X	X	1		6300		106AB
30–10	PB 50613-1	Washer—Spacer	1	X	X	X	X	X	1		6300		106AB
30–11	PB 23625-1	Shaft—Adjusting	1	X	X	X	X	X	1		6300		106AB
30–12	PB 23664-1	Gear And Pin Assembly	1	X	X	X	X	X	1		6300		106AB
30–13	PB 23607-1	Gear Assembly—Pointer	1	X	X	X	X	X	1		6300		106AB
30–14	PC 23546-3	Pointer—Course setting	1	X					1		6300		106AB
30–14	PC 23546-5	Pointer—Course setting	1		X				1		6300		106AB
30–14	PC 23546-3	Pointer—Course setting	1			X			1		6300		106AB
30–14	PC 23546-7	Pointer—Course setting	1				X		1		6300		106AB
30–14	PC 23546-5	Pointer—Course setting	1					X	1		6300		106AB
30–15	PB 8327	Screw—Dial	2	X	X	X	X	X	2		6300		106AB
30–16	PC 23608-3	Hand Assembly	1	X					1		6300		106AB
30–16	PC 23608-5	Hand Assembly	1		X				1		6300		106AB
30–16	PC 23608-3	Hand Assembly				X			1		6300		106AB
30–16	PC 23608-6	Hand Assembly	1				X		1		6300		106AB
30–16	PC 23608-5	Hand Assembly	1					X	1		6300		106AB
31–1	PB 51237-1	Ring—Retaining	1	X	X	X	X	X	1		6300		106AB
31–2	PB 52501-1	Gasket	1	X	X	X	X	X	1		6300		106AB
31–3	PB 23617-1	Magnesyn Assembly	1	X	X	X	X	X	1		6300		106AB
31–4	PB 50594-1 or PC 53819-1	Jewel / Ring—Bearing (As available)	2	X	X	X	X	X	2		6300		106AB
31–5	PB 52571-1	Shaft Assembly—Magnesyn	1	X	X	X	X	X	1		6300		106AB
	*PC 23627-1	Cover—Magnesyn case	1	X	X	X	X	X	1		6300		106AB
	*PC 23628-1	Case—Magnesyn	1	X	X	X	X	X	1		6300		106AB
	*PB 23616-1	Lamination—Outer	12	X	X	X	X	X	12		6300		106AB



KEY

1 Screw
2 Magnet Staff Spacing Washer

Figure 29—Exploded View Drawing—Compensator Assembly—Transmitter—Type AN 5730-3

TYPE AN 5730-2 (PIONEER TYPES 10061-1A-A1, 10061-1D-A1, AND 10061-1E-A1)

TYPE AN 5730-6 (PIONEER TYPES 10061-1G-A1 AND 10061-1H-A1)

FIGURE & INDEX NUMBER	PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	TOTAL QTY.	10061-1A-A1	10061-1D-A1	10061-1E-A1	10061-1G-B1	10061-1H-A1	UNITS PER ASSY	ARMY STATUS	PROPERTY CLASSIFICATION U. S. ARMY	U. S. NAVY	BRITISH
	*PB 23603-1	Washer—Friction	1	X	X	X	X	X	1		6300		106AB
	*PC°23629-1	Stator Assembly	1	X	X	X	X	X	1		6300		106AB
31–6	PE 21992-95	Sleeving—Insulating	1	X	X	X	X	X	1		6300		106AB
31–7	PB 52914-1	Shield	1	X	X	X	X	X	1		6300		106AB
31–8	PB 19169	Pin	1	X	X	X	X	X	1		6300		106AB
31–9	PD 50585-13	Case Assembly	1	X	X	X	X	X	1		6300		106AB
	*PE 23600-1	Case	1	X	X	X	X	X	1		6300		106AB
31–10	O-247-1	Nut—Stop	3	X	X	X	X	X	3		6300		106AB
31–11	LW-O-2BN	Washer—Lock	2	X	X	X	X	X	2		6300		106AB
31–12	FFil-O-204 1-2 BN	Screw	2	X	X	X	X	X	2		6300		106AB
31–13	PC 51217-4	Gasket	1	X	X	X	X	X	1		6300		106AB
31–14	PB 23622-1	Plate—Back	1	X	X	X	X	X	1		6300		106AB
31–15	PB 23621-1	Gasket	1	X	X	X	X	X	1		6300		106AB
31–16	PD 20443-4	Receptacle—Electrical connector	1	X	X	X	X	X	1		6300		106AB
31–17	PB 23634-2	Cover Assembly	1	X	X	X	X	X	1		6300		106AB
31–18	583-34	Wire—Seal	1	X	X	X	X	X	1		6300		106AB
31–19	PB 50539-3	Screw	2	X	X	X	X	X	1		6300		
31–20	FFil-O-404N	Screw	8	X	X	X	X	X	8		6300		
31–21	LW-O-4N	Washer—Lock	8	X	X	X	X	X	8		6300		
31–22	FFil-O-204N	Screw	3	X	X	X	X	X	3		6300		
31–23	LW-O-2N	Washer—Lock	3	X	X	X	X	X	3		6300		
31–24	FFil-O-4041-2BN	Screw	6	X	X	X	X	X	6		6300		
31–25	LW-O-4BN	Washer—Lock	6	X	X	X	X	X	6		6300		

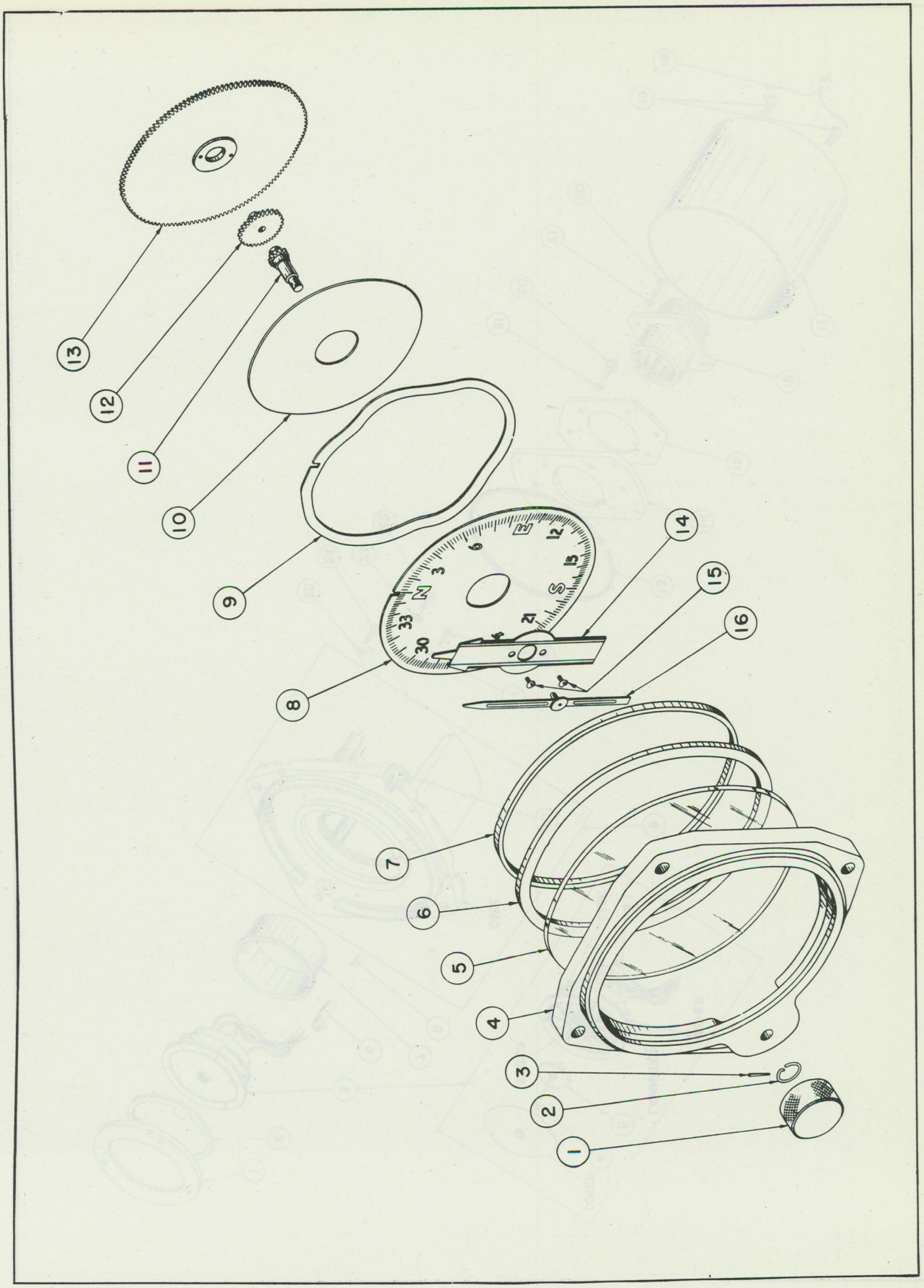


Figure 30—Exploded View Drawing—Main Assembly—Indicator—Types AN 5730-2 and AN 5730-6 (Pioneer Types 10061--A1)

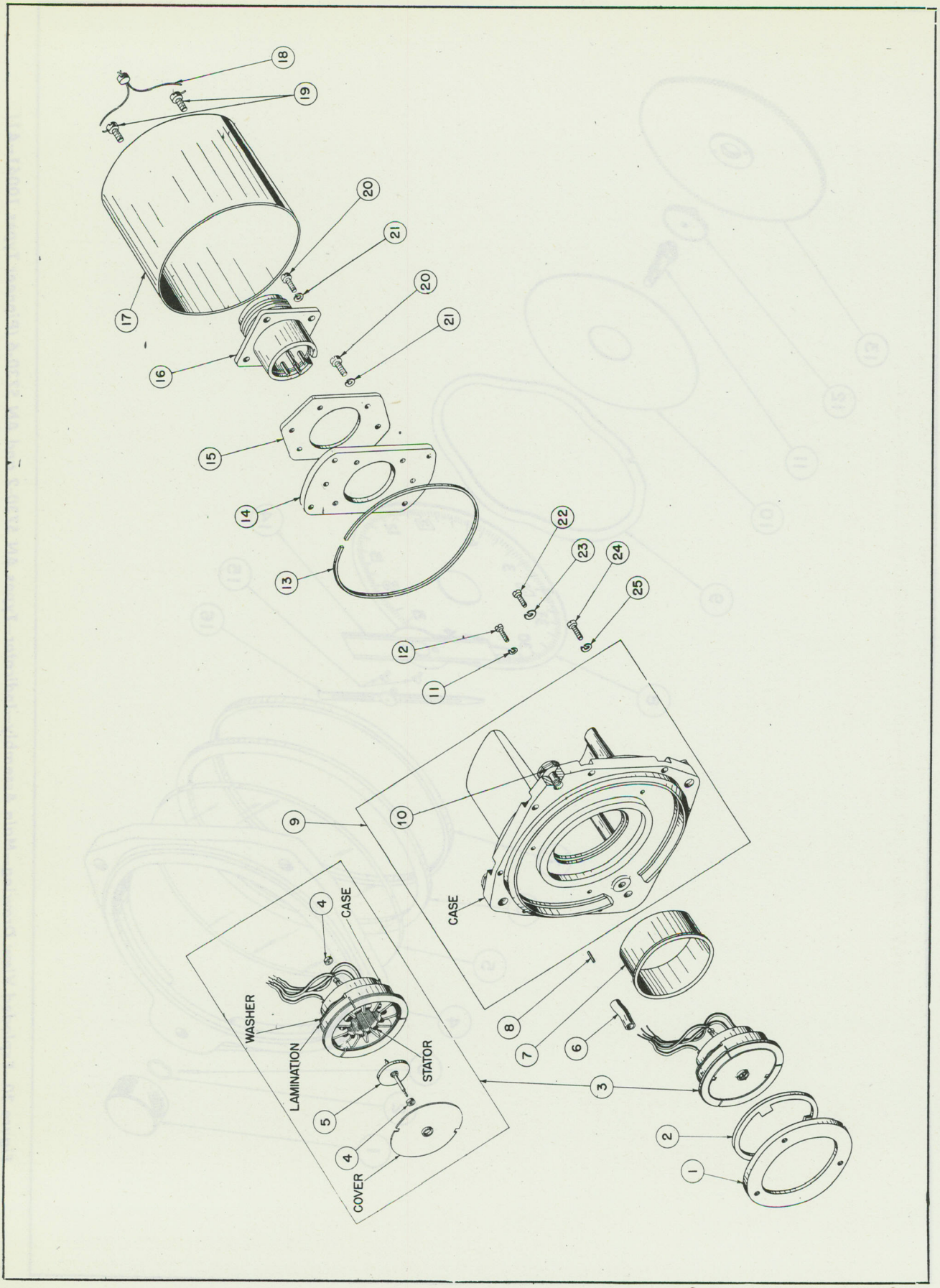


Figure 31—Exploded View Drawing—Main Assembly—Indicator—Types AN 5730-2 and AN 5730-6 (Pioneer Types 10061--A1)

TYPE AN 5730-2A (PIONEER TYPES 10061-1E-B1, 10061-1M-B1, 10061-1N-B1, 10061-1Q-B1 AND 10061-1Y-B1)
TYPE AN 5730-6 (PIONEER TYPES 10061-1A-B1, 10061-1G-B1, AND 10061-1L-B1)
NAVY STOCK NO. R88-I-801-11 (PIONEER TYPE 10098-1AL-A1)

FIGURE & INDEX NUMBER	PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	TOTAL QTY.	10061-1A-B1	10061-1E-B1	10061-1G-A1	10061-1L-B1	10061-1M-B1	10061-1N-B1	10061-1Q-B1	10061-1Y-B1	10098-1AL-A1	UNITS PER ASSY	ARMY STATUS	PROPERTY CLASSIFICATION U. S. ARMY	Y. S. NAVY	BRITISH
	10061-1A-B1	Indicator Assembly—Remote reading compass	1	X									1				
	10061-1E-B1	Indicator Assembly—Remote reading compass	1		X								1				
	10061-1G-B1	Indicator Assembly—Remote reading compass	1			X							1				
	10061-1L-B1	Indicator Assembly—Remote reading compass	1				X						1				
	10061-1M-B1	Indicator Assembly—Remote reading compass	1					X					1				
	10061-1N-B1	Indicator Assembly—Remote reading compass	1						X				1				
	10061-1Q-B1	Indicator Assembly—Remote reading compass	1							X			1				
	10061-1Y-B1	Indicator Assembly—Remote reading compass	1								X		1				
	10098-1AL-A1	Indicator Assembly—Remote reading compass	1									X	1				
32–1	PB 52558-1	Knob, Shaft, And Bezel Assembly	1	X	X	X	X	X	X	X	X		1				
32–1	PB 52558-2	Knob, Shaft, And Bezel Assembly	1									X	1				
32–2	PB 52559-1	Knob—Adjusting	1	X	X	X	X	X	X	X	X		1				
32–2	B 800000-1	Knob—Extension	1									X	1				
32–3	PB 51828-1	Shaft—Adjusting	1	X	X	X	X	X	X	X	X	X	1				
32–4	PD 51821-1	Bezel	1	X	X	X	X	X	X	X	X	X	1				
32–5	A100-1A	Dial	1	X									1				
32–5	A100-1E	Dial	1		X								1				
32–5	A100-1G	Dial	1			X							1				
32–5	A100-1L	Dial	1				X						1				
32–5	A100-1M	Dial	1					X					1				
32–5	A100-1N	Dial	1						X				1				
32–5	A100-1Q	Dial	1							X			1				
32–5	A100-1Y	Dial	1								X		1				
32–5	A100-1AL	Dial	1									X	1				
32–6	PB 50613-1	Washer—Spacer	1	X	X	X	X	X	X	X	X	X	1				
32–7	PB 51830-1	Gear	1	X	X	X	X	X	X	X	X	X	1				
32–8	PB 51825-1	Gear Assembly—Pointer	1	X	X	X	X	X	X	X	X	X	1				
32–9	PB 24125-2	Washer—Friction	1	X	X	X	X	X	X	X	X	X	1				
32–10	PC 23546-3	Pointer—Course setting	1	X									1				
32–10	PC 23546-3	Pointer—Course setting	1		X								1				
32–10	PC 23546-6	Pointer—Course setting	1			X							1				
32–10	PC 23546-7	Pointer—Course setting	1				X						1				
32–10	PC 23546-7	Pointer—Course setting	1					X					1				
32–10	PC 23546-8	Pointer—Course setting	1						X				1				
32–10	PC 23546-9	Pointer—Course setting	1							X			1				
32–10	PC 23546-23	Pointer—Course setting	1								X		1				
32–10	C801329-2	Pointer—Course setting	1									X	1				
32–11	PB 52013-1	Screw—Dial	2	X	X	X	X	X	X	X	X	X	2				
32–12	PC 51823-3	Hand Assembly	1	X									1				
32–12	PC 51823-3	Hand Assembly	1		X								1				
32–12	PC 51823-6	Hand Assembly	1			X							1				
32–12	PC 51823-7	Hand Assembly	1				X						1				
32–12	PC 51823-7	Hand Assembly	1					X					1				
32–12	PC 51823-8	Hand Assembly	1						X				1				
32–12	PC 51823-9	Hand Assembly	1							X			1				
32–12	PC 51823-23	Hand Assembly	1								X		1				
32–12	C801331-2	Hand Assembly	1									X	1				
32–13	PB 51833-1	Ring—Spacing	1	X	X	X	X	X	X	X	X	X	1				
32–14	PC 13445-13 / PC 13445-14 / PC 13445-26	Gasket (Use gasket most suitable)	1	X	X	X	X	X	X	X	X	X	1				
32–15	PB 11843	Glass	1	X	X	X	X	X	X	X	X	X	1				

TYPE AN 5730-2A (PIONEER TYPES 10061-1E-B1, 10061-1M-B1, 10061-1N-B1, 10061-1Q-B1 AND 10061-1Y-B1)
TYPE AN 5730-6 (PIONEER TYPES 10061-1A-B1, 10061-1G-B1, AND 10061-1L-B1)
NAVY STOCK NO. R88-I-801-11 (PIONEER TYPE 10098-1AL-A1)

FIGURE & INDEX NUMBER	PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	TOTAL QTY.	10061-1A-B1	10061-1E-B1	10061-1G-A1	10061-1L-B1	10061-1M-B1	10061-1N-B1	10061-1Q-B1	10061-1Y-B1	10098-1AL-A1	UNITS PER ASSY	ARMY STATUS	PROPERTY CLASSIFICATION U. S. ARMY	U. S. NAVY	BRITISH
33–1	FFil-O-204N	Screw	3	X	X	X	X	X	X	X	X	X	3				
33–2	LW-O-2N	Washer—Lock	3	X	X	X	X	X	X	X	X	X	3				
33–3	PB 51832-1	Ring—Retaining	1	X	X	X	X	X	X	X	X	X	1				
33–4	PB 51829-1	Gasket	1	X	X	X	X	X	X	X	X	X	1				
33–5	PB 51834-1	Shield—Front	1	X	X	X	X	X	X	X	X	X	1				
33–6	PB 23617-1	Magnesyn Assembly	1	X	X	X	X	X	X	X	X	X	1				
33–7	PC 53819-1 or PB 50594-1	Ring—Bearing Jewel (As available)	2	X	X	X	X	X	X	X	X	X	2				
33–8	PB 52571-1	Shaft Assembly—Magnesyn	1	X	X	X	X	X	X	X	X	X	1				
	*PC 23627-1	Cover—Magnesyn case	1	X	X	X	X	X	X	X	X	X	1				
	*PC 23628-1	Case—Magnesyn	1	X	X	X	X	X	X	X	X	X	1				
	*PB 23616-1	Lamination	12	X	X	X	X	X	X	X	X	X	12				
	*PB 23603-1	Washer—Friction	1	X	X	X	X	X	X	X	X	X	1				
	*PC 23629-1	Stator Assembly	1	X	X	X	X	X	X	X	X	X	1				
33–9	PE 21992-95	Sleeving—Insulating	1	X	X	X	X	X	X	X	X	X	1				
33–10	PB 52914-1	Shield	1	X	X	X	X	X	X	X	X	X	1				
33–11	PB 19169	Pin	1	X	X	X	X	X	X	X	X	X	1				
33–12	PC 51530-5	Housing Assembly	1	X	X	X	X	X	X	X	X	X	1				
	*PE 51822-1	Housing	1	X	X	X	X	X	X	X	X	X	1				
33–13	O-247-1	Nut—Stop	3	X	X	X	X	X	X	X	X	X	3				
33–14	PC 51217-4	Gasket	1	X	X	X	X	X	X	X	X	X	1				
33–15	PB 21129-5	Gasket	1	X	X	X	X	X	X	X	X	X	1				
33–16	PD 20443-4	Receptacle—Electrical connector	1	X	X	X	X	X	X	X	X	X	1				
33–17	PB 23634-2	Cover—Assembly	1	X	X	X	X	X	X	X	X	X	1				
33–18	583-34	Wire—Seal	2	X	X	X	X	X	X	X	X	X	2				
33–19	PB 50539-3	Screw—Cover	4	X	X	X	X	X	X	X	X	X	4				
33–20	FFil-O-404N	Screw	4	X	X	X	X	X	X	X	X	X	4				
33–21	LW-O-4N	Washer—Lock	8	X	X	X	X	X	X	X	X	X	8				
33–22	FFil-O-404 1-2 BN	Screw	8	X	X	X	X	X	X	X	X	X	8				
33-23	LW-O-4BN	Washer—Lock															

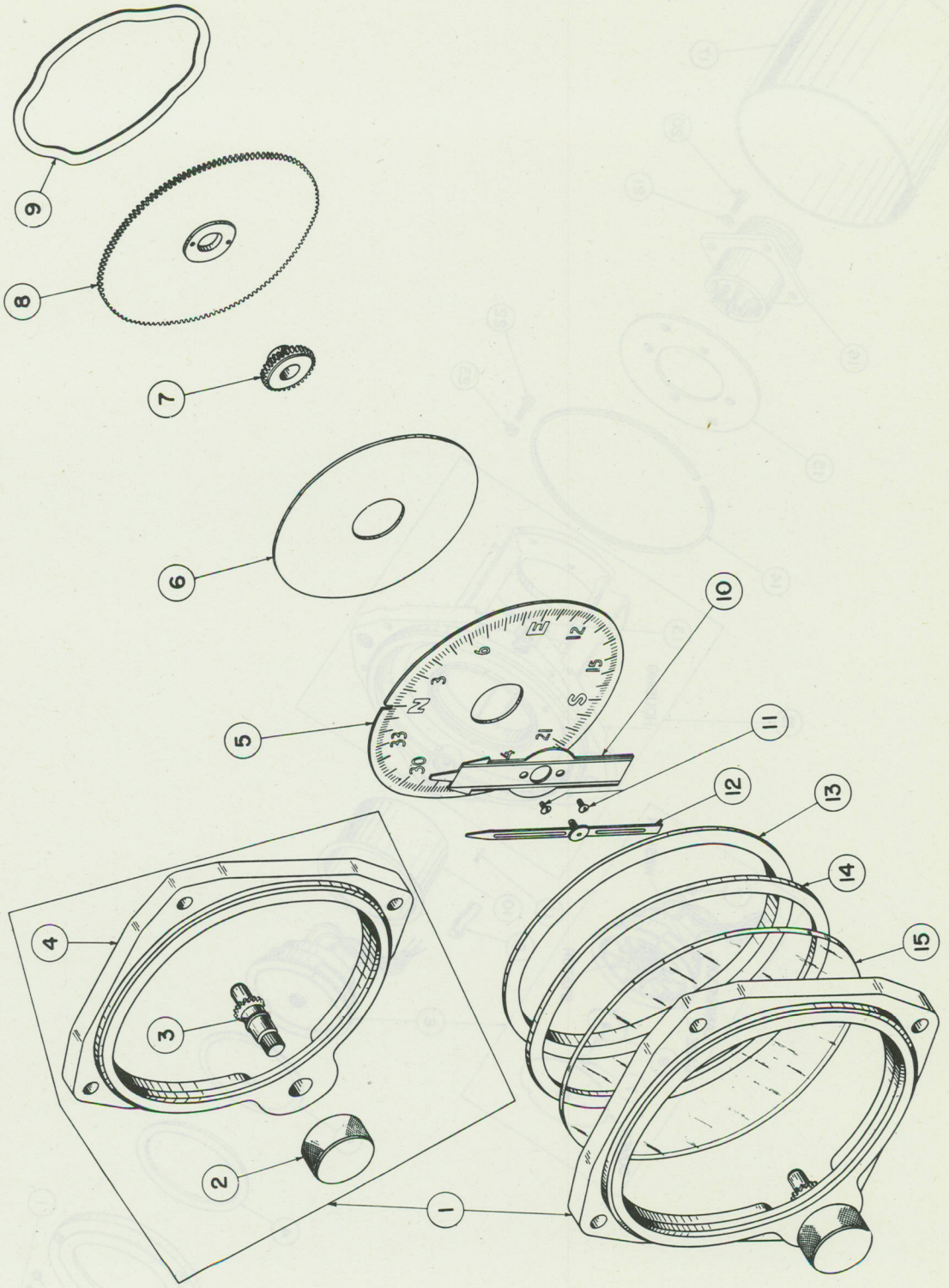


Figure 32—Exploded View Drawing—Main Assembly—Indicator—Types AN 5730-2A and AN 5730-6 (Pioneer Types 10061-B1), and Navy Stock No. R88-I-801-11 (Pioneer Type 10098-1AL-A1)

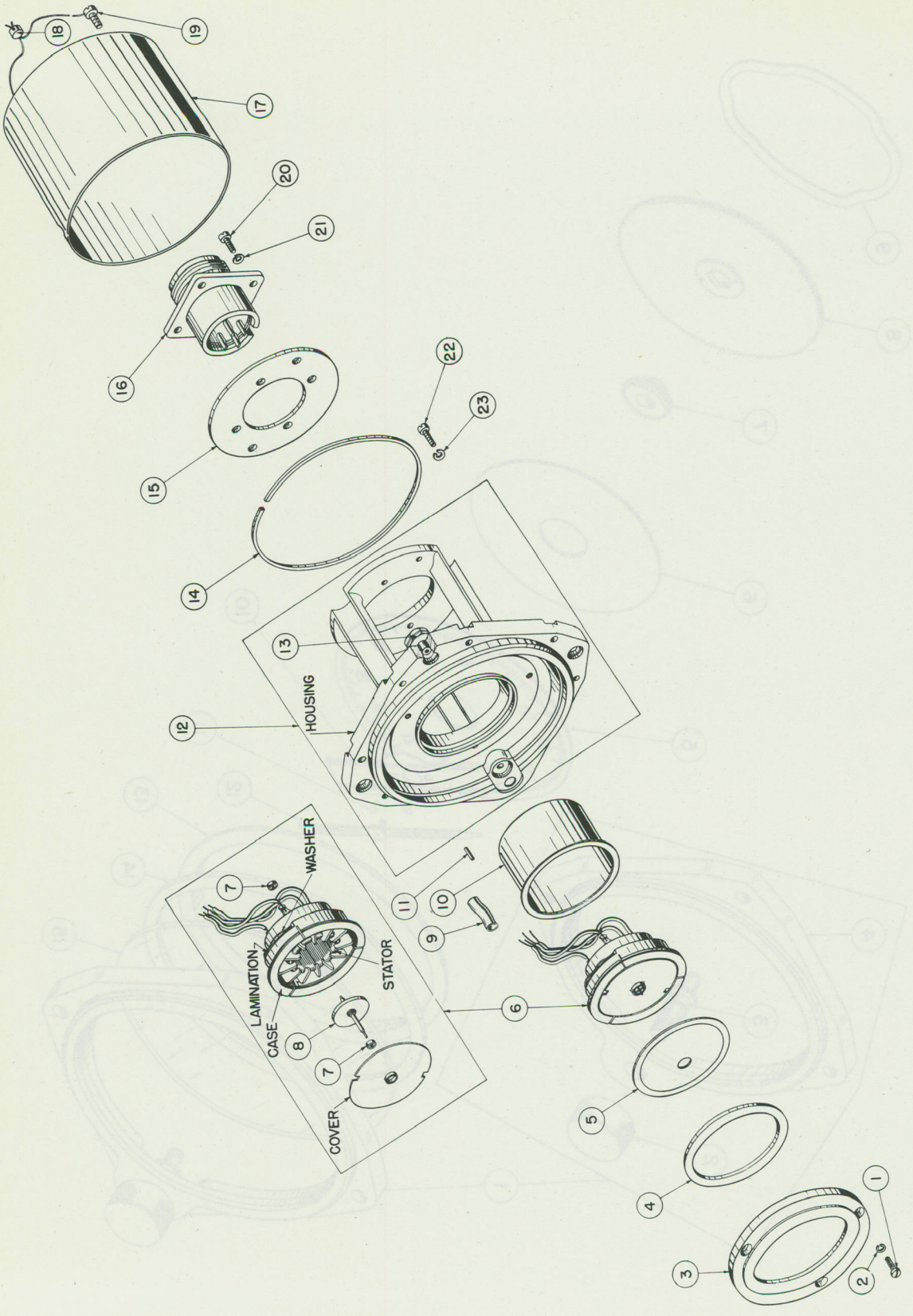


Figure 33—Exploded View Drawing—Main Assembly—Indicator—Types AN 5730-2A and AN 5730-6 (Pioneer Types 10061-B1), and Navy Stock No. R88-I-801-11 (Pioneer Type 10098-1AL-A1)

TYPE AN 5730-2A (PIONEER TYPE 10078-1T-A1)

FIGURE & INDEX NUMBER	PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	UNITS PER ASSY	ARMY STATUS	PROPERTY CLASSIFICATION U. S. ARMY	U. S. NAVY	BRITISH
	10078-1T-A1	Indicator Assembly---Remote reading compass	1				
34-1	PC 19163-24	Bezel Assembly	1				
34-2	PB 52559-1	Knob	1				
34-3	PB 51821-2	Bezel	1				
34-4	CS-O-202SS	Setscrew	1				
34-5	B 800205-1	Glass and Bushing Assembly	1				
34-6	PC 54267-2	Pointer—Course setting	1				
34-7	{PC 13445-13 PC 13445-14 PC 13445-26}	Gasket (Use gasket most suitable)	1				
34-8	PB 8327	Screw	5				
34-9	B 800201-1	Shaft	1				
34-10	B 800198-1	Washer—Friction	1				
34-11	B 800202-1	Knob	1				
34-12	PB 54025-1	Pinion	1				
34-13	PB 54264-2	Ring Assembly—Retaining	1				
34-14	PB 54060-1	Retainer	1				
34-15	PB 54266-1	Index	1				
34-16	PB 54265-1	Pin—Drive	1				
34-17	PB 51823-25	Hand Assembly	1				
34-18	E100-1T	Dial	1				
	*PC 54029-1	Plate—Name	1				
34-19	O-330-1	Screw—Self-tapping	2				
34-20	FFil-O-406BN	Screw	8				
34-21	PB 54028-1	Washer—Friction	1				
34-22	PB 54027-1	Ring—Snap	1				
34-23	PD 54016-1	Case and Contact Assembly	1				

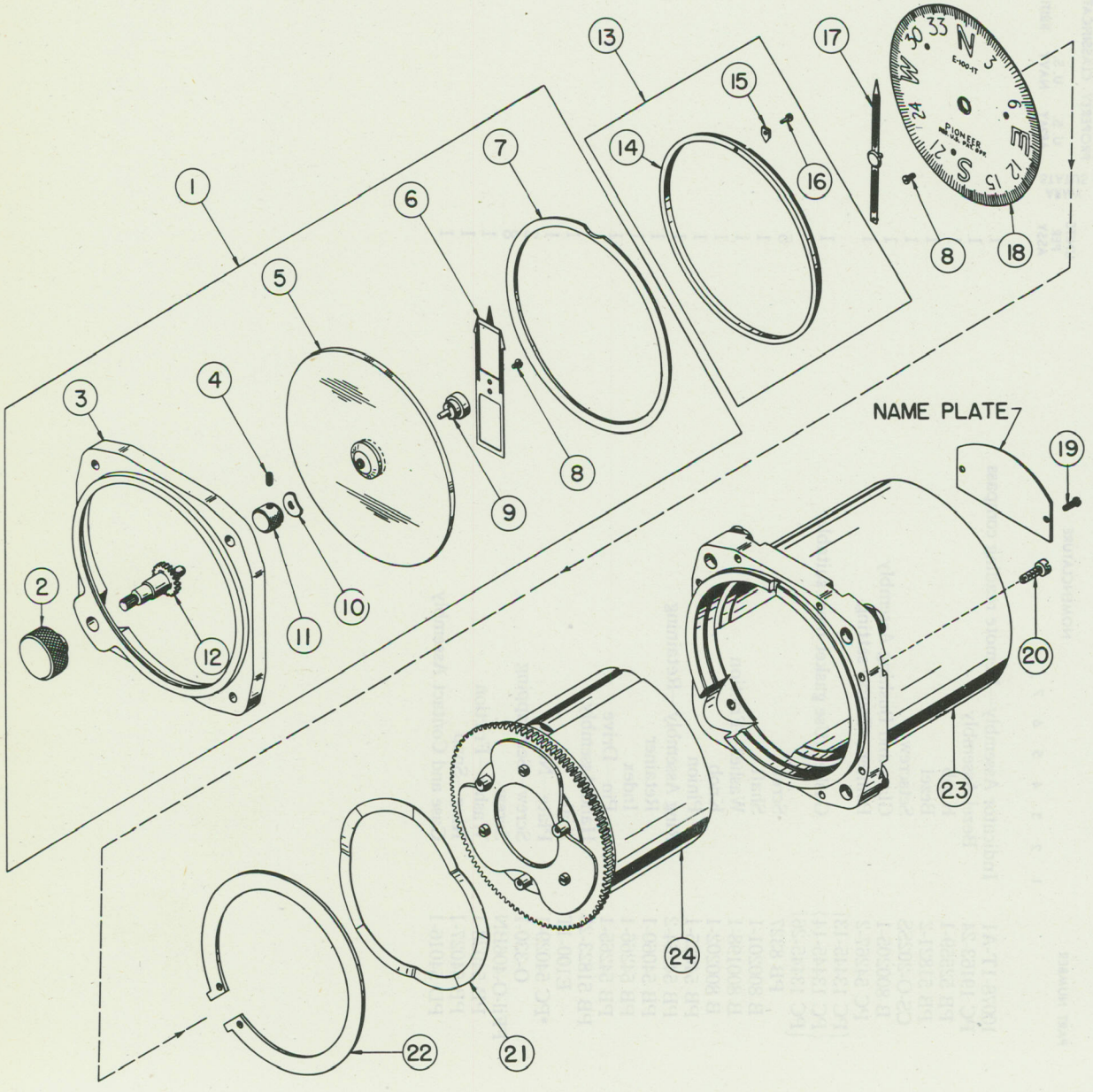


Figure 34—Exploded View—Main Assembly—Indicator—Type AN 5730-2A, Navy Stock No. R88-I-803 (Pioneer Type 10078-1T-A1)

TYPE AN 5730-2A (PIONEER TYPE 10078-1T-A1)

FIGURE & INDEX NUMBER	PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	UNITS PER ASSY	ARMY STATUS	PROPERTY CLASSIFICATION U. S. ARMY	U. S. NAVY	BRITISH
35–1	B 801545-1	Contact Block and Plate Assembly	1				
35–2	FFil-O-205	Screw	2				
35–3	B 801548-1	Cover—Block	1				
35–4	B 801546-1	Block Assembly—Contact	1				
35–5	PC 54021-1	Plate—Mounting	1				
	*WBA-2433-25	Wire—Insulated	1				
	*WBC-2433-23	Wire—Insulated	1				
	*WBD-2433-27	Wire—Insulated	1				
	*WBH-2433-20	Wire—Insulated	1				
35–6	PB 14869	Washer	1				
35–7	PD 50585-59	Case Assembly	1				
	*PE 54022-1	Case	1				
35–8	O-247-1	Nut—Stop	3				
35–9	PB 51969-3	Filter Assembly	1				
35–10	LW-O-4N	Washer—Lock	4				
35–11	FFil-O-407N	Screw	4				
35–12	PB 50539-5	Screw—Cover	2				
35–13	AN 3102-14S-2P	Receptacle—Electrical connector	1				
35–14	PB 54023-1	Gasket	1				
34–24	PD 54007-1	Stripped Assembly	1				
36–1	PB 54013-1	Ring—Retaining	1				
36–2	PB 54014-1	Gasket	1				
36–3	PB 51834-1	Shield—Front	1				
36–4	PC 23617-2	Magnesyn Assembly (Pioneer No. CL-11)	1				
36–5	PB 50594-1 / PC 53819-1 / PB 53818-1	Jewel / Bushing / Bushing (As available)	2				
36–6	PB 52571-1	Shaft Assembly—Magnesyn	1				
	*PC 23627-1	Cover—Magnesyn	1				
	*PC 23628-1	Case—Magnesyn	1				
	*PB 23603-1	Washer—Friction	1				
	*PB 23616-1	Laminations—Outer	12				
	*PC 23629-2	Stator	1				
36–7	SSTA-300-38	Sleeving—Insulating	1				
36–8	PB 54015-1	Insulator	1				
36–9	FFil-O-405	Screw	3				
36–10	PD 54009-1	Ring Assembly—Slip	1				
36–11	PC 54008-1	Gear Assembly	1				
36–12	PB 52914-1	Shield	1				
36–13	FFil-O-203	Screw	3				

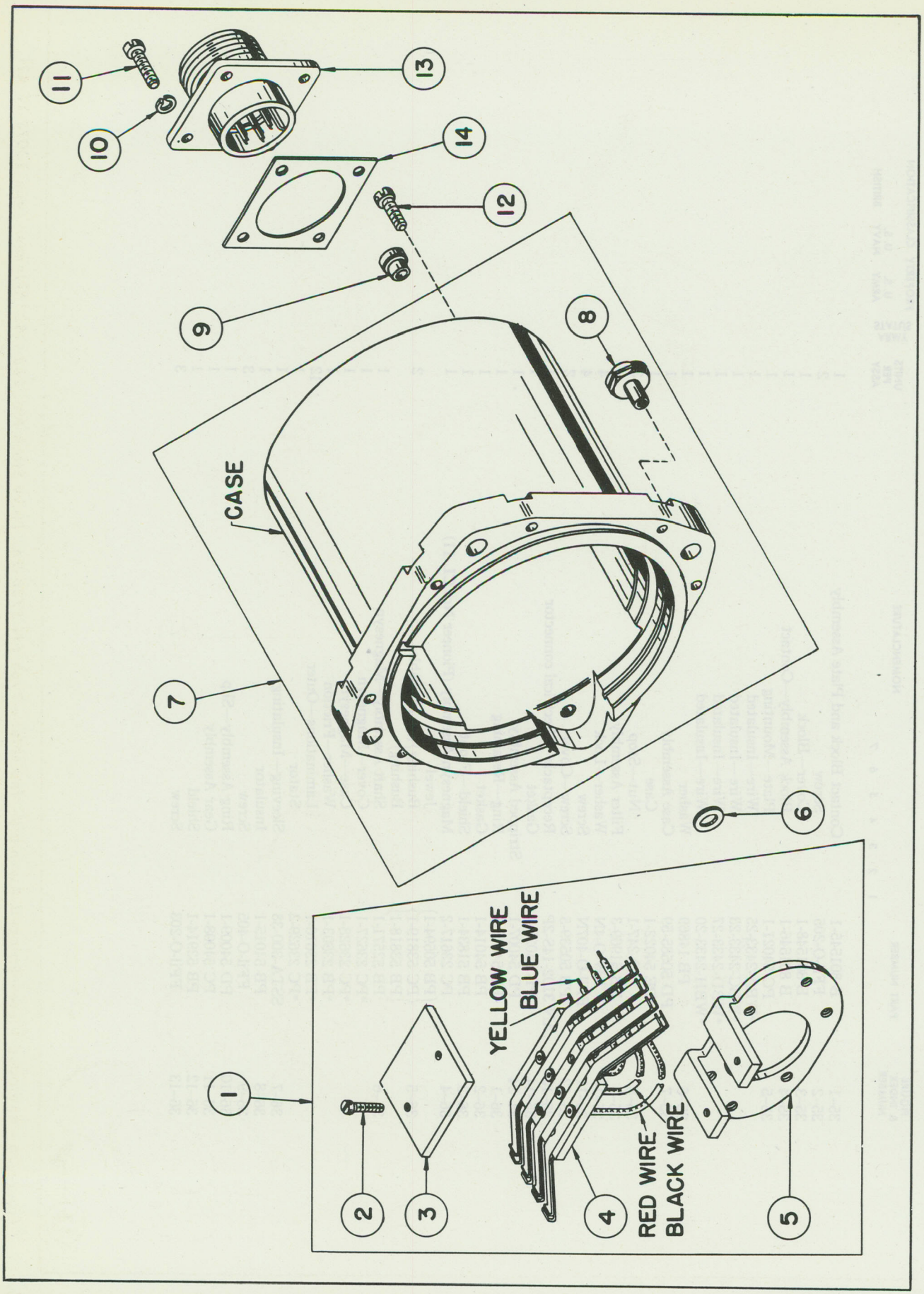


Figure 35—Exploded View—Case and Contact Assembly—Indicator—Type AN 5730-2A, Navy Stock No. R88-I-803 (Pioneer Type 10078-1T-A1)

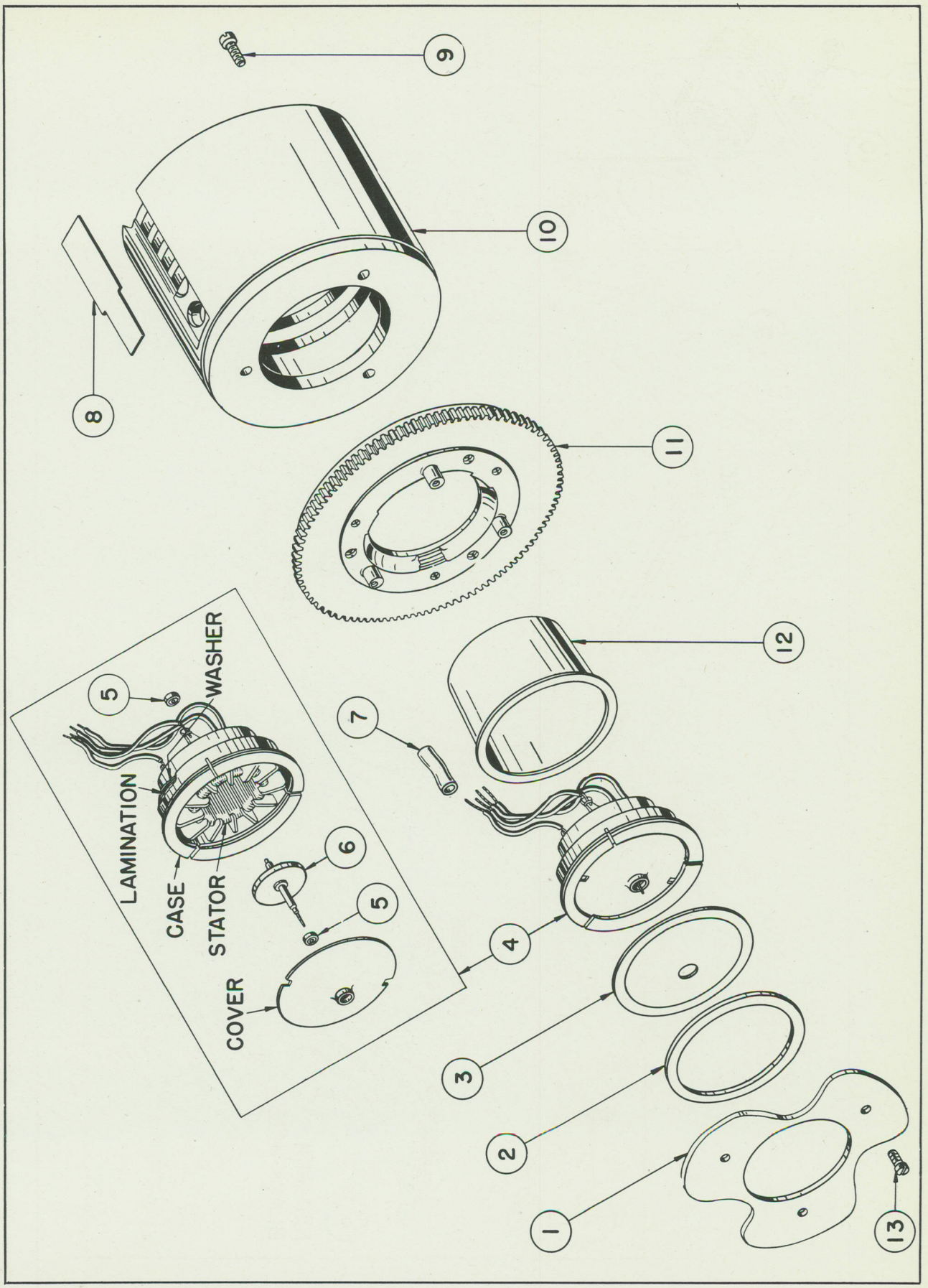


Figure 36—Exploded View—Stripped Assembly—Indicator—Type AN 5730-2A, Navy Stock No. R88-I-803 (Pioneer Type 10078-1T-A1)

LAMINATION
CAGE
ROTATE
COVER
WATER