TECHNICAL MANUAL

GS MAINTENANCE MANUAL
INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST

SENSITIVE ALTIMETER

PART NUMBERS	FEDERAL STOCK NUMBERS
671CPX4-037	6610-514-4183
671CPX4-037D	6610-526-6083
671CPX4-037DF	6610-179-5241
671CPU19-015	6610-251-0366
671CPU19-015D	6610-526-6067
671CPU19-015DF	6610-179-4312
671CLU4-035	6610-514-4176
671CL U4 -035D	6610-526-6054
671CLU4-035DF	6610-179-4309
1845X4-03	6610-388-0030
1845X4-03D	6610-526-6081
1845X4- 03DF	6610-179-2197

This manual supersedes TM 55-6610-247-40. 28 January 1964, including all changes.

HEADQUARTERS. DEPARTMENT OF THE ARMY

14 JULY 1971

This copy is a reprint which includes current pages from Changes 1 through 5.

WARNING

PRECAUTIONARY DATA

Personnel performing operations, procedures, and practices which are included or implied in this technical manual shall observe the following warnings. Disregard of these warnings and precautionary information can cause serious injury, death or destruction of material.

CLEANING SOLVENT. Cleaning solvent may be toxic. Use in well ventilated area. Avoid prolonged inhalation of fumes or direct contact with skin. Do not use solvent near open flame or in area where very high temperatures prevail.

COMPRESSED AIR. Do not direct compressed air near or directly against skin. Do not use air under high pressure, or from a source not having a moisture-trap for cleaning bearings.

RADIOACTIVE MATERIAL. This item may contain a small amount of radioactive material. Before overhaul or repair, item should be checked with AN/PDR-27 beta gamma radioac meter, FSN 6615-961-0846 or equivalent. Item containing radioactive material should be set aside and the contracting officer be contacted for disposition.

CHANGE
No. 6

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *24 June 1987*

GS Maintenance Manual
Including Repair Parts and Special Tools List

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1845X4-03DF	6610-179-2197

TM 55-6610-247-40, 14 July 1971, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	Insert pages
1-1 and 1-2	1-1 and 1-2
3-1 through 3-4	3-1 through 3-4
A-1/A-2	A-1/A-2

2. Retain this sheet in front of manual for reference purposes.

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

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SECTION I

INTRODUCTION

1-1. General Information.

This manual comprises overhaul instructions for sensitive altimeters, (figure 1-1), manufactured by Kollsman Instrument Corporation (89944), Syosset New York. Sections I through IV of this technical manual contain instructions for part numbers 671CPX4-037 671CPX4-037D, 671CPX4-037DF, 671CPU19- 015, 671CPUI9-01D, 671CPU19-015DF, 671CLU4-035, 671CLU4-035D and 671CLU4- 035DF. Overhaul instructions for part numbers 1845X4-03, 1845X4-03D and 1845X4-03DF are provided in section V by the use of difference data sheets.

a. Equipment Records. The Army maintenance management system and procedures established in DA PAM 738-751 apply to this equipment. The applicable forms as required by DA PAM 738-751 shall be used.

b. Reporting of Errors. The direct reporting of errors, omissions, and recommendations for improving this manual by the individual user is authorized and encouraged. Use DA Form 2028 Recommended changes to DA Publication) and forward it directly to the Commanding General, US Army Aviation Systems Command, ATTN: AMSAV-MPSD, 4300 Goodfellow Blvd., St. Louis, Missouri, 63120-1798.

c. Quality Control Personnel. Quality control personnel shall insure complete compliance with quality program and / or inspection system requirements specified in the contract and this manual. Any deviations from the established requirements shall be approved by the contracting officer or his designated representative.

d. Purpose of Equipment. The sensitive altimeter is for use on aircraft to indicate altitude of the aircraft above some reference point (generally sea level), assuming standard conditions of temperature and pressure. The sensitive altimeter measures existing ambient pressure. Since atmospheric pressure varies with altitude, this pressure is indicated on the dial in feet of altitude.

1-2. Description and Leading Particulars.

a. Description. Description of the sensitive altimeter is as follows:

(1) The sensitive altimeter case is of two-piece construction to insure an airtight seal. The mounting flange is equipped with self-locking nuts to facilitate mounting. An adjusting knob is located at the lower left corner of the case. A fitting at the rear of the case provides for connection to the aircraft static pressure system.

(2) Part numbers 671CPX4-037, 671CPU19-015, and 671CLU4-035 are basic instruments and are identical with each other with the exception of different parts as listed in the illustrated parts breakdown.

(3) Part numbers 671CPX4-037D, 671CPU19-015D, and 671CLU4-035D are instruments which have been modified as required by paragraph 2-5, and have been adjusted for 35,000 feet instead of 60,000 feet.

(4) Part numbers 671CPX4-037DF, 671CPU19-015DF, and 671CLU4-035DF are the final configuration and overhaul in accordance with the instructions in this manual and adjustment to the tolerances as required, will automatically change the instrument from a basic, or a D, to a DF configuration.

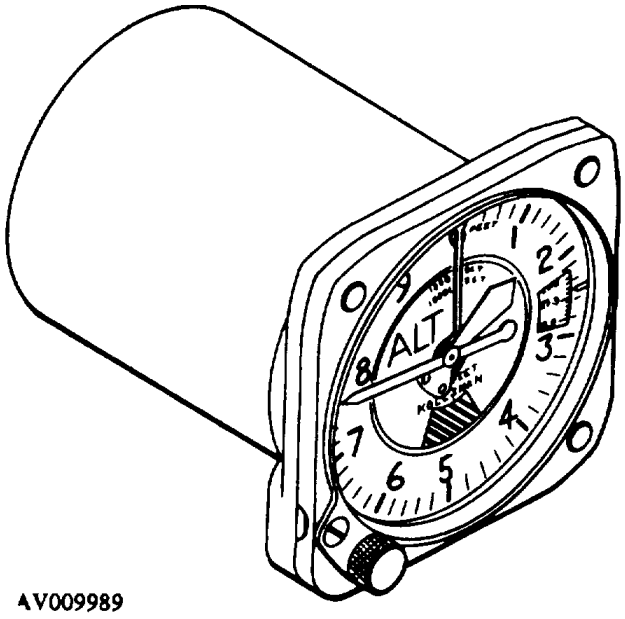

Figure 1-1. Sensitive Altimeter, Type 6 71 CPX4-03 7DF.

b. Leading Particulars. Leading particulars for the sensitive altimeter are found in table 1-1:

Table 1-1. Leading Particulars

Part Numbers 671CPX4-037DF, 671CPU19-015DF and 671CLU4-0350F

Dial Adjustments

Range ..... 35,000 feet
Barometric Scale ..... 28.1 to 31.0 inches of mercury.
Markings
- Dial ..... fluorescent luminescent material, Military Specification MIL-L-25142,and Matte Green G 6/6
- Barometric dial ..... Fluorescent luminescent material, Military Specification MIL-L-25142
- Pointers ..... fluorescent luminescent material, Military Specification MIL. L-25142

1-3. Test Equipment, Special Tools and Materials.

a. Special Tools and Test Equipment.

Special tools required are *listed in* table *1-2 and in* the repair parts and special tools list in appendix B.

b. Consumable Materials Required.

Consumable materials required are listed in table 1-3, and in the repair parts and special tools list in appendix B.

Table 1-2. Special Tools and Test Equipment

FIGURE	NOMENCLATURE	PART NUMBER
	Stand Assembly	TE 357-5003
	Vacuum Chamber	16-11-2
	Diaphram Fixture	TE5196
2-6	Balance Weight	TE630A.1
	Vernier Calibrating Tool	TE639
	Barometer Mercurial	MIL-B-4308 TYPE A1
	Broach, Jewelers (0-005-0.015) for Pointer Sizing	35450

Table 1-3. Consumable Materials

ITEM NUMBER	NOMENCLATURE	MILITARY SPECIFICATION
1	Beeswax	C-B-191B
2	Benzene	VV-B-231
3	Compass, Fluid	MIL-C-5020
4	Fluorescent Luminescent Material	MIL-L-25142
5	Kerosene	VV-K-211
6	Alpha Lubricant (powdered) Molykote Type M (or equivalent)	
7	Tallow	C-T-91C
8	Petrolatum	VV-P-236
9	Sealing Compound	MIL-S-22473
10	Instrument Oil	MIL-L-6085
11	Pithwood, C&E Marshall Div. of American Felt Corp. 40514 (or equivalent)	
12	Pegwood, C&E Marshall Div. of American Felt Corp. 40521 (or equivalent)	

SECTION II

ITEM MAINTENANCE

2-1. Disassemby.
Disassemble in the order of index numbers assigned to exploded view illustrations in figures 2-1and 2-2.

FIG & INDEX NO	PART NO.	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
2-1				
	671CPX4-037	ALTIMETER, Sensitive	1	A
	671CPX4-037D	ALTIMETER, Sensitive	1	A
	671CPX4-037DF	ALTIMETER, Sensitive	1	A
	671CPU19-015	ALTIMETER, Sensitive	1	B
	671CPU19-01SD	ALTIMETER, Sensitive	1	B
	671CPU19-Q1SDF	ALTIMETER, Sensitive	1	B
	671CLU4-035	ALTIMETER, Sensitive	1	C
	671CLU4-035D	ALTIMETER, Sensitive	1	C
	671CLU4-035DF	ALTIMETER, Sensitive	1	C
	1845X4-03	ALTIMETER, Sensitive	1	C
	1845X4-03D	ALTIMETER, Sensitive	1	D
	1845X4-03DF	ALTIMETER, Sensitive	1	D
-1	371-14	. . KNOB Adjusting	1	D
	X526	. KNOB, Adjusting	1	C
-2	371-13B	. NUT, Plain hexagon	1	
-3	371-18C	. SCREW, Machine	1	
-4	671CK4B	. STUD, Locking	1	
-5	FF1L310OSS8B	. SCREW, Machine	1	
-6	FFIL311SS8PX	. SCREW, Machine	1	
-7	371-128C	. SCREW, Machine	2	
-8	92101030000	. WASHER, Lock	1	
-9	671CK3C	. FLANGE, Mounting	1	ABC
	671CPU3	. FLANGE, Mounting	1	D
-10	371-22B	. WASHER, Flat.	1	
-11	371-12	. SPRING, Helical compression	1	
-12	371-21B	. SHIM	1	
-13	477KN43	. WASHER, Non-metallic	1	
-14	MS28105-17	. WINDOW, Dial	1	
-15	371-61B	. GASKET	1	
.16	2206.904-1	. POINTER, Dial	1	
-17	2206905-1	. POINTER, Dial	1	
-18	84289300101	. POINTER AND DISK ASSEMBLY	1	
-19	642K950B	. RING ASSEMBLY GASKET	1	ABC
	472K950B	. RING ASSEMBLY GASKET	1	D
-20	371K118B15	. RING, Setting	1	
-21	X30	. SCREW, Machine	2	
-22	371-58	. PIN, Dial locating	2	
-23	2206X03-1	. DIAL	1	
-24	371-30B	. SPACER	1	
.25	371-127B	. SHIM	1	
-26	371K24B3	. SHUTTER, Indicator	1	AC
	371K25B4	. SHUTTER, Indicator	1	B
	1845-24	. SHUTTER, Indicator	1	D

FIG & INDEX NO	PART NO.	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
-27	371K904C2	. DIAL ASSEMBLY BAROMETER	1	
-28	371-20B	. GEAR, Spur		
-29	371-903	. GEAR ASSEMBLY	1	
-30	371-914	. GEAR, Cluster spur	1	
-31	371-913	. GEAR. Assembly	1	
-32	371S54	. PIN, Straight headless	1	
-33	371S7	. RING, Retaining	1	
-34	371S904	. MECHANISM ASSEMBLY TOP PLATE	1	ABC
		See index I Figure 2-2 for Breakdown		
	1845-904	. MECHANISM ASSEMBLY TOP PLATE	1	D
		See index I Figure 2-2 for Breakdown		
-35	371-53	. PINION, Center	1	
-36	940-901	. MECHANISM ASSEMBLY	1	
		See index 12 Figure 2-2 for Breakdown		
-36A	12308	. SHIM-NYLON	1	
-37	371-46	. SPRING, Ring	1	
-38	371S25	. RING, Retaining	1	
-39	371-11	. RING., Retaining	1	
-40	371-10	. PIN, Straight headless	1	
-41	371-9B	. STEM, Knob adjustment.	1	
-42	371-45B	. WASHER. Leather	1	
-43	371-8	. PINION, Stem knob adjustment		
-44	371-16	. SHAFT, Idler		
-45	371K121	. WASHER, Spring tension		
-46	371-15	. GEAR, Idler	1	ABC
	1845-15	. GEAR, Spur	1	D
-47	671U1B	. CASE	1	

FIG & INDEX NO	PART NO.	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
2-2				
-1	371S904	. MECHANISM ASSEMBLY TOP PLATE	1	ABC
		See Figure 2-1 for NHA		
	1845-004	. MECHANISM ASSEMBLY TOP PLATE	1	D
		See Figure 2-1 for NHA		
-2	371-911	. . HUB AND WHEEL ASSEMBLY	1	
-3	371-60B	. . SCREW, Shoulder	3	
-4	371-907	. . PLATE ASSEMBLY. Top bearing	1	
-5	371-41	. . . PINION, Altimeter	1	
-6	371-909	. . . WHEEL AND HUB ASSEMBLY	1	
-7	371-52	. . . HAND STAFF, Short hand	1	
-8	371-908	. . . WHEEL ASSEMBLY	1	
-9	371-906	. . . PLATE AND BUSHING ASSEMBLY	1	
-10	371-910	. . WHEEL ASSEMBLY	1	
-11	371S905	. . PLATE ASSEMBLY, Top	1	ABC
	1845-905	. . PLATE ASSEMBLY. Top	1	
-12	940-901	. . MECHANISM ASSEMBLY	1	
		See Figure 2-1 for NHA	1	
-13	371-923	. . SETTING ASSEMBLY. Jewel	1	

FIG & INDEX NO	PART NO.	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
2-2-14	371-73B	. . PINION, Hand staff	1	
-15	371-80	. . PIN, Straight headed	2	
-16	940-71	. . LINK, Diaphram	1	
-17	371-72	. . ARM, Calibration	1	
-18	67iB90B	. . PIN, Tapered, plain	1	
-19	371-78	. . SETSCREW	1	
-20	940-915	. . SHAFT ASSEMBLY	1	
-21	671-73D2	. . . HAIR SPRING, Rocking shaft	1	
-22	371-79	. . . PIVOT, Drill rod	1	
-23	371-96	. . . JEWEL, Small	1	
-24	FFIL003	. . . SCREW, Machine	2	
-25	671-87B	. . . SCREW, Machine	1	
-26	940-129	. . . COUNTER WEIGHT	1	
-27	NO NUMBER	. . . ROCKING SHAFT AND SECTOR	1	
-28		ASSEMBLY		
-29	371-90B	. . SCREW	3	
-30	20632	. . PIN, Tapere	1	
-31	940-931	. . BRIDGE ASSEMBLY	1	
-32	371-96	. . . JEWEL	1	
-33	NO NUMBER	. . . BRIDGE AND POST ASSEMBLY	1	
-34	940-932	. . WHEEL AND HAIRSPRING ASSEMBLY	1	
-35	371-77	. . . HAIRSPRING MECHANISM	1	
-36	940-80	. . . DISK, Transmitter	1	
	671-924	. . . GEAR	1	
-37	371-75	. . WHEEL	1	
-38	176-71	. . . . WASHER, Flat	1	
-39	671-74B	. . . . . PINION, Intermediate	1	
-40	371-923	. . SETTING ASSEMBLY, Wheel jewel	1	
-41	709-909C	. . ARM AND BALANCE ASSEMBLY	1	
-42	371-80	. . . PIN, Straight headed	2	
-43	371-72	. . . ARM, Calibration	1	
-44	709-6	. . . LINK, Balance	1	
-45	371P933B	. . . BALANCE	1	
-46	40289320010	. . DIAPHRAGM ASSEMBLY	1	
-47	709-911B	. . BODY ASSEMBLY, Mechanism	1	
-48	371-95	. . . BEARING, Jewel	1	
-49	371-96	. . . JEWEL, Small	1	
-50	FFIL007	. . . SCREW, Machine	2	
-51	FFIL207	. . . SCREW, Machine	1	
-52	FFIL610	. . . SCREW. Diaphram	1	

a. Remove adjustment knob (1, figure 2-1) and nut (2) from adjustment knob stem (41).

b. Remove screw (3) located left of the knob stem. Remove locking stud (4).

c. Remove screws (5, 6, and 7) and lock- washer (8). Lift off mounting flange assembly (9), front washer (10), spring (11), and shim (12). Remove washer (13), glass window (14) and gasket (15).

d. Remove large pointer (16), intermediate pointer (17), and small pointer (18). Remove ring assembly (19). Lift out setting ring (20).

e. Remove dial screw (21)., pin (22). and lift off dial (23). Remove spacer (24) and shim (25) Remove shuttle (26) dial assembly (27). and gear (28)

NOTE

If the altimeter has not been previously

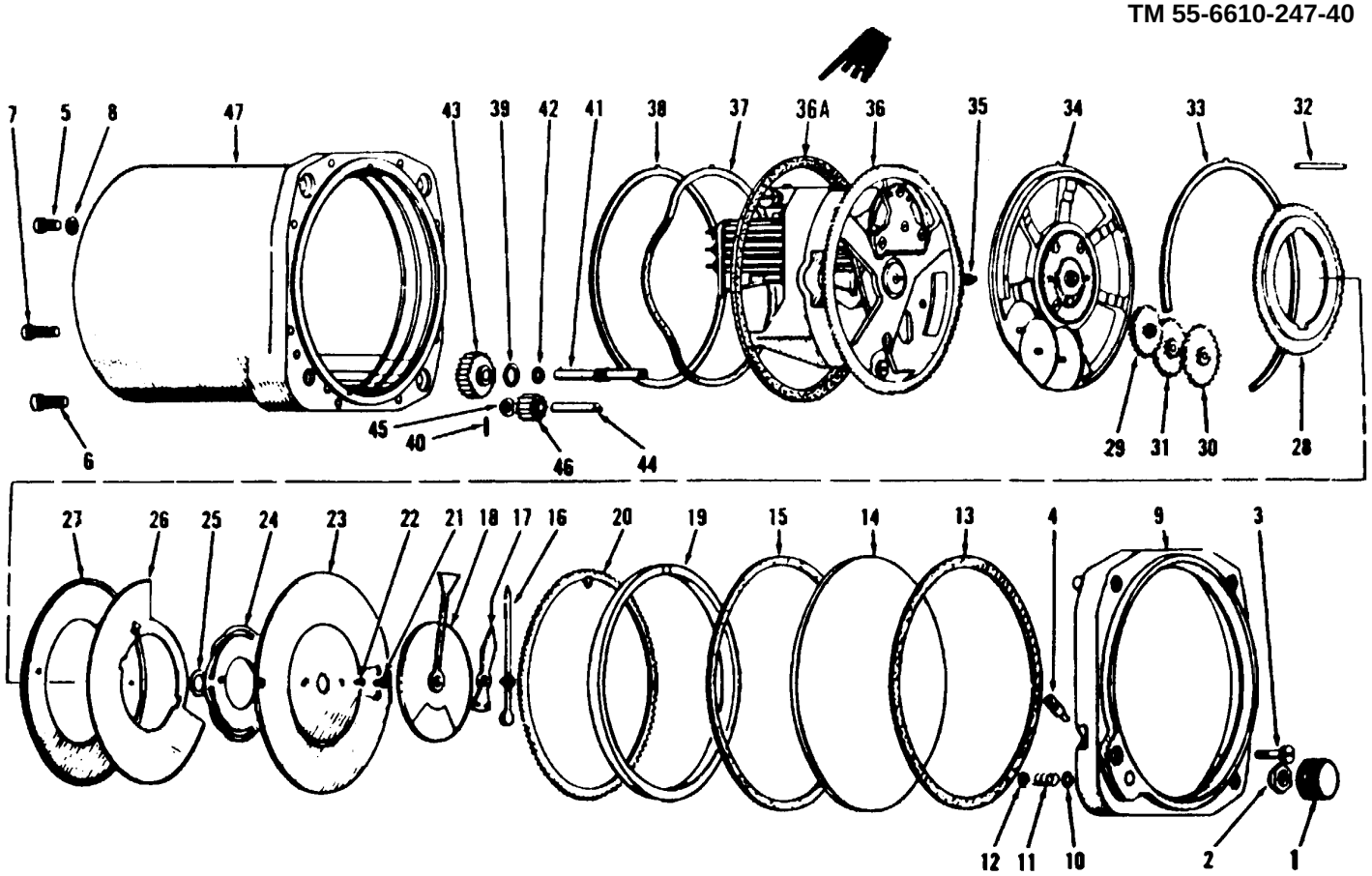

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Figure 2-1. Sensitive Altimeter Components,--Exploded View

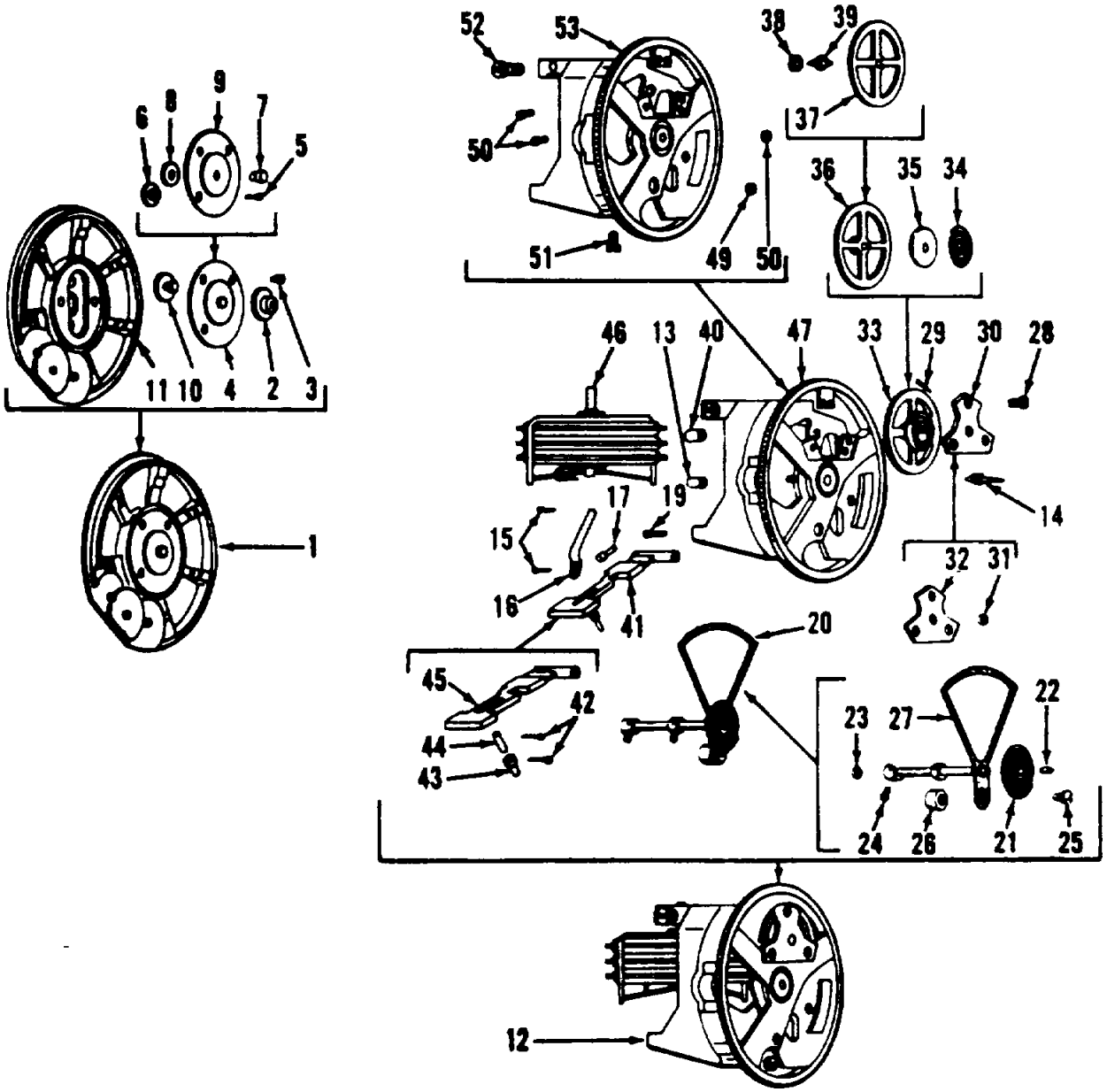

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Figure 2-2. Sensitive Altimeter Mechanism 4Assembly.-Exploded View.

modified to a 'D' configuration pointers (16, 17, and 18). ring (20) and dial (23) shall be discarded

f. Remove gear assemblies (29, 30 and 31).

g. Remove pin (32) and retaining ring (33).

h. Before removing top plate mechanism assembly (34). remove shoulder screws, (3, figure 2-2). Lift off top bearing plate assembly (4) and wheel assembly (10).

i. 'With a pair of parallel jaw pliers, grasp a spoke of top plate mechanism assembly (34, figure 2-1) and remove it from case (47). Refer to paragraph 2-4 for repair and replacement procedures of top plate mechanism assembly (34).

j. Grasp a spoke of mechanism assembly (36) and remove it from case (47). Refer to paragraph 2-4 for repair and replacement procedures for mechanism assemblv (36).

j.l. If installed, remove shim (36A) from the case.

k. Place top plate mechanism assembly (1, figure 2-21, diaphragm down, in a suitable assembly stand.

CAUTION

Pressure shall be applied evenly as any side pressure may break hand staff pinion

I. With back end of a pair of tweezers, press down on hand staff pinion (14), pressing jewel setting assembly (13) from mechanism body.

m. Lift pinion (35, figure 2-11 off top plate mechanism assembly (34).

n. Remove pin (15, figure 2-2), diaphragm link 16 h, and calibration arm (17).

o. Remove pin (42), balance link (44), and calibration arm 143).

NOTE

Calibration arms II - and 43) should be left in shaft assembly 120). Move these arms for adjustment and balancing only.

p. Remote setscrew (191, then lift shaft assembly 1201 straight up so lower pivot clears jewel. and remove it from mechanism through cutout provided in front of casting.

q. Remove screws 128) and carefully pry bridge assembly 130) from mechanism body. Carefully turn bridge assembly over toward center of mechanism assembly 1121. Holding bridge assembly firmly at right angles to mechanism, push tapered pin 42') free with pliers.

r. With tweezers inserted through opening in side -if casting. grip pinion of wheel and hair- spring assemble, (33) and lift it straight up so lower pivot clears jewel (31). Move wheel and hairspring assembly (33) along channel in mechanism body and out.

s. Loosen screw 150) and remove jewel setting assembly 140).

NOTE

The arm and balance assembly (41)and diaphragm assembly (46) should not be removed from mechanism body unless they are to be replaced.

t. Loosen screw (51) and remove arm ,and balance assembly (41).

u. Loosen screw (52) and remove diaphragm assembly (46) from body assembly (47).

v. Rocking shaft and sector assembly has a strong hairspring. Figure 2-3 shows direction of wind and position of end of hairspring so it will have three-fourths to one-turn tension when pinned at assembly.

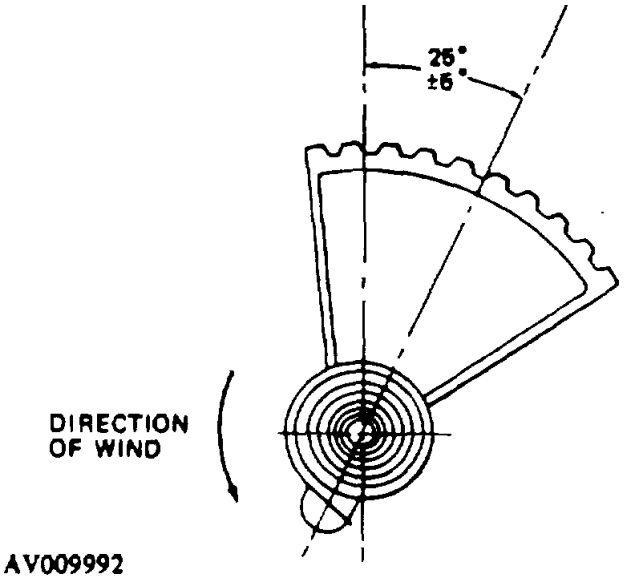

Figure 2-3. Direction of Hairspring on Rocking Shaft.

2-2. Cleaning.

Clean all parts by washing them in clean benzene, (item 2, table 1-3), and dry with clean, dry. compressed air. Clean pivots by pressing them into end grain of dry pithwood (item I 11. table 1-3) and twirling them between fingers. Clean jewels and bearing holes by twirling sharpened end of a pegwood stick (item 12, table 1-3) in hole. Clean sector and pinion teeth by brushing with a no. 2 watchmaker's brush dipped in benzene.

2-3. Inspection.

Inspect as follows:

a. Inspect all gear teeth for wear or damage.

b. Inspect jewels for chips or cracks.

c. All pinions and pivots must be free from

corrosion and their polished surfaces must have a mirror-like finish.

d. Hairspring must be of proper length and in good condition.

e. Bearing holes in links must not be worn.

f. Both compensating pins of aneroid diaphragm must rotate from very light finger pressure.

2-4. Repair and Replacement.

Repair and replace as follows:

a. To remove a jewel from an assembly, support unit in a suitable manner and tap it out. Replace jewel by tapping it into place from opposite side.

b. With a pin vise, hold wheel in a vertical plane and check position of hairspring. Wheel hairspring should be parallel to disk, and coils should lie in same plane. Refer to figure 2-4.

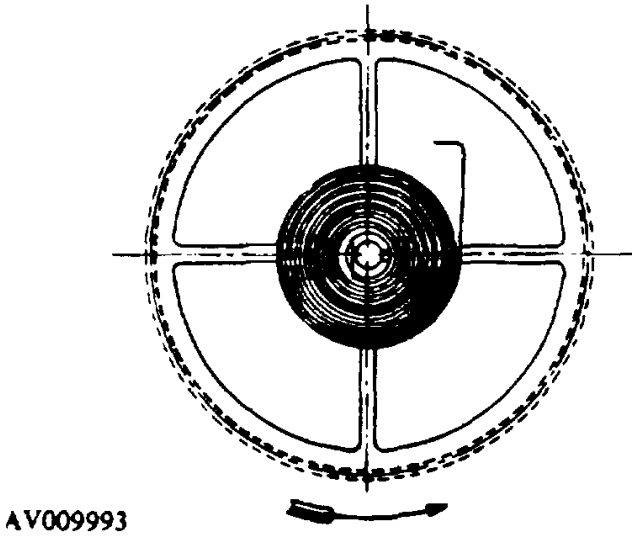

Figure 2-4. Position of Wheel Hairspring.

CAUTION

If hairspring is mounted on wheel, do not spin wheel at high speed, this will destroy hairspring.

c. Check concentricity of wheel in a truing caliper. Any eccentricity will be apparent by comparison with a fixed guide. Concentricity may also be checked by spinning wheel in a jeweler's lathe and checking its periphery against a guide.

d. Hold wheel assembly in a pin vise. Place a jeweler's screwdriver between disk and hairspring collet and pry hairspring from staff. Before replacing hairspring, collet must be squeezed together to insure a tight fit.

e. To remove wheel pinion. support it on a suitable staking frame and tap it out.

f. Calibration arms should not be removed from rocking shaft unless they are damaged.

g. Place rocking shaft assembly (20. figure 2-2). jewel end up. in a clamp and hold clamp in a vise. With a scribe or other sharp pointed tool. break up jewel (23) and remove all fragments. With a no. 53 drill head in a pin vise. drill through jewel setting. Using a 1-72 tap. grind end flat. Holding tap in a pin vise. screw it one or two turns into jewel setting. Pull tap and setting out of shaft. Place a new jewel setting assembly on shaft so flat face is up and tap it into place with a suitable punch.

h. Chuck shoulder of pivot (22) in a jeweler's lathe and carefully pull assembly away from pivot with a slight twisting motion. To replace pivot, place rocking shaft in clamp (as shown above for replacement of jewel), and hold clamp in a vise. Tap new pivot into place using a suitable punch.

NOTE

If pivot is loose, squeeze end of shaft in collet of a jeweler's lathe to make hole smaller before pressing in pivot.

i. Place plate assembly (4. figure 2-2) on staking frame with hand staff in suitable hole and wheel up. With suitable punch, tap short hand staff (7) free of wheel assembly (8) Place hand staff in suitable hole in staking frame so its shoulder rests on table. Locate plate and bushing assembly (9) on hand staff, then place wheel assembly (8) fin staff and tap it in place with suitable punch. See figure 2-5, for arrangement of parts.

Figure 2-5. Bearing Plate.

j. While holding plate assembly (4. figure 2-2). press staff of pinion (5) with back end of tweezers until it is flush with intermediate ;-heel and hub assembly (6).

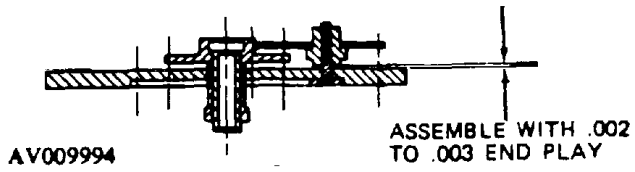

Figure 2-5. Bearing Plate

Place pointed ends of tweezers between bearing plate and wheel, and pry off wheel and hub assembly.

CAUTION

Use care when prying off wheel assembly so as not to bend staff of pinion.

k. Insert staff of pinion (5) in bearing hole from front side of plate. While holding pinion in place with finger, place intermediate wheel and hub

assembly (6) shoulder do, n. on pinion staff. Place assembly on table of staking frame so hub of intermediate wheel and hub assembly is in suitable hole. Insert 0.003 inch feeler gage between intermediate wheel and bearing plate. Press pinion down and remove feeler gage.

l. Reassemble unit. insuring wheel assembly pivots are in bearing holes when securing plate assembly (4) to plate assembly (11). Use a short hand "with weighted end cut off and paint removed. Press hand onto hand staff. Hold assembly so prepared hand is in vertical plane, then turn plate between fingers. Any friction will be indicated by tendency of hand to rotate with assembly. Any existing friction must be removed before replacing unit in case.

m. Pry retaining ring (39. figure 2-1) from groove and push pin (40) out of adjustment knob stem (41). Remove the stem. Examine leather flasher (42). If conditions warrant, replace washer.

n. Before leather washer is replaced it must be soaked in a hot mixture of the following:

Beeswax .....60 parts by weight
Tallow .....20 parts by weight
Petrolatum .....20 parts by "weight

o. After soaking washer in mixture, with draw washer and remove excess solution. Replace washer in recess of case, smooth side up. Replace retaining ring (39. figure 2-1) on hub of pinion (43) but not in groove. Place pinion in recess of case with hub toward front. Insert knob adjustment stem ’411 through case into hub of pinion. Align holes, insert pin (40). and *secure* pin with retaining ring (39).

p. Do not remove idler gear (46) unless absolutely necessary, as idler shaft (44) must be airtight. If necessary, place case, front down, on wooden block with idler shaft over suitable hole in block. Tap idler shaft out of case with pin punch.

q. Place case, front up, on bench. Place spring tension washer (45) and idler gear (46), hub down, in recess of case. Spring tension washer is toward rear of case. Insert idler shaft (44) through case, tapping into place with suitable punch. Place few drops of sealing compound (item 9, table 1-2) on each end of idler shaft.

2-5. Modification Criteria.

Modification criteria is as follows:

a. Basic altimeters are modified to a "D" configuration by exchanging the old items (16, 17, 18, 20 and 23. fig 2-1) with new parts listed In the I P B and adjusting the instrument for 35,000 feet instead of 60.000 feet

b. '"D" configuration altimeters are modified to a "DF" configuration automatically by adhering to the closer adjustment tolerances as required by his manual.

c. After the above changes have been made, remove data plate, stamp the letters "F" or "DF" as required after the present part number, reinstall data plate. and reidentify part numbers as follows

671CPX4-037 to 671CPX4-037DF
671CPX4-037D to 671CPX4-037DF
671CPU19-015 to 671CPU19-015DF
671CPU19-01D to 671CPU19-015DF
671CLU4-035 to 671CLU4-035DF
671CLU4-035D to 671CLU4-035DF

2-6. Lubrication.

Lubricate as follows:

a. A powdered lubricant, (item 6, table 1-31 if used on each end of compensating pins of aneroid diaphragm, will improve performance and substantially reduce hysteresis errors of sensitive altimeter.

b. Note in which detent compensating pins are located. Carefully remove pins. Fill dentents with powdered lubricant. Replace pins and with fingers. using very little pressure. roll compensating pins between two bearing surfaces. Remove pins and again fill detent with lubricant. Repeat until a minute amount of powdered lubricant is packed into detent. When properly lubricated, compensating pins will rotate smoothly from extremely light pressure. Remove excess lubricant from surfaces of compensator and diaphragm centerpiece.

c. Using a 0.010 wire brush, lubricate all pivots with a drop of instrument oil (item 10, table 1-2).

2-7. Reassembly and Testing.

Reassemble in reverse of disassembly as follows:

a. Before reassembling mechanism, check fit between center hole of plate assembly (11, figure 2-2) and center boss of body assembly (47).

b. Place top plate on mechanism body and check action by slowly rotating top plate. There should be no side play and fit should permit smooth action.

c. Insert straight end of diaphragm link (16) in slot of diaphragm centerpiece and secure it with a new pin (15). Bend and secure pin so it cannot turn in bearing hole. Hold diaphragm assembly (46) so link hangs down and check action of parts by slowly rocking diaphragm. There should be no play on bearing pin, yet parts should not bind.

d. Replace diaphragm assembly (46) in

body assembly (47), and secure it with screw (52). Replace balance assembly (45) in mechanism body and secure balance assembly with screw (51).

e. Replace setting assembly 140 and secure with screw (51).

CAUTION

Insure none of hairspring convolutions is between mechanism body and bridge plate when securing bridge plate to mechanism.

f. Insert wheel and hairspring assembly (33), hairspring up, through cutout in mechanism body, and place pivot into setting assembly (40). Hold bridge assembly (30) over mechanism and insert hairspring into post. Secure it with a new tapered pin (29) and cut off excess. Hairspring should be adjusted so first leaf is parallel to bridge plate. Secure bridge assembly to mechanism with screws (28)

g. Adjust end play of wheel and hairspring assembly (33) to 0.002 inch by moving setting assembly (40) in mechanism body. Hairspring should be evenly spaced between hairspring disk and surface of top plate, and all convolutions should lie in same plane. Approximately three or four coils of spring should extend past disk opposite hairspring post.

h. Check freedom of movement of wheel and hairspring assembly. Place mechanism body, diaphragm up, on assemble, stand. With hairspring relaxed, rotate wheel one-fourth turn and allows it to swing free. 'Wheel should return to its original position within 1/8 inch.

CAUTION'

When inserting rocking shaft, do not damage teeth of sector or wheel assembly.

i. Insert rocking shaft assembly (20) through cutout of mechanism body.

j. Adjust rocking shaft assembly by repositioning setscrew (19 figure 2-2) until an end play of 0.003 inch is obtained.

CAUTION

When checking tracking of sector, care shall be exercised not to allow wheel to run out of mesh while tension is applied to hairspring, as this will cause wheel to rotate rapidly and damage hairspring.

k. Sector should track approximately in center of wheel pinion of wheel and hairspring assembly (33) and in one plane. Lift up or press down on spokes of sector until correct alignment is obtained.

l. With mechanism on assembly stand. diaphragm up, turn rocking shaft in a clockwise direction until sector is disengaged from wheel pinion, and allow wheel to come to rest with no tension on hairspring.

CAUTION

After tension has been applied to hairspring and wheel pinion engaged with sector, the sector must be held at all times until rocking shaft assembly is connected to diaphragm assembly with link. If this is not done, hairspring tension will disengage pinion from sector and cause damage to hairspring.

m. Hold rocking shaft in this position be pressing against counterweight. and with a tooth pick turn wheel counterclockwise six revolutions (24 spokes) to apply tension to hairspring. With this tension maintained on hairspring, slowly reengage sector with %wheel pinion.

n. With tweezers, hold diaphragm link in line with slot in calibration arm of rocking shaft and slowly mole sector by its counterweight until bearing hole in link and bearing hole in calibration arm are aligned. Insert new bearing pin in aligned holes.

o. With small pair of needle-nose pliers. press head of pin until it bites into calibration arm. Bend pin at arm and toward rocking shaft. Test freedom of link. Link should haze no plan on bearing pin but should not bind in calibration arm.

p. A special balance weight, part no. TE630A.1 is necessary to adjust balance arm tension properly Figure 2-6 illustrates application of this w-eight. It should be noted that reference A shows a clearance of 1 32 inch between weight and mechanism body when weight is suspended on balance arm. To correct any error in tension of balance arm, turn balance assembly post and secure balance screws (51).

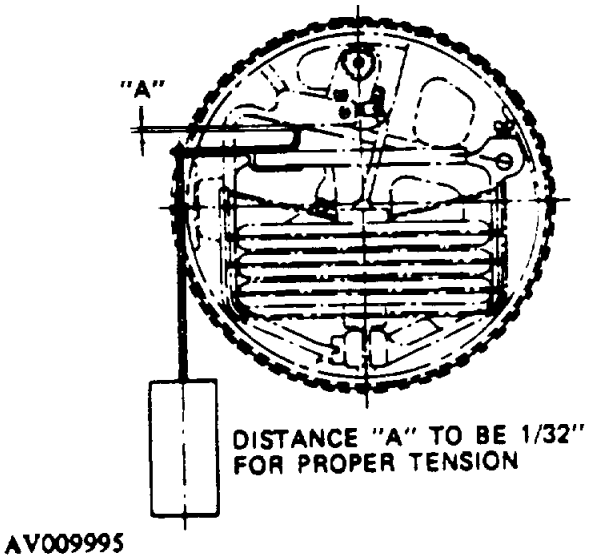

Figure 2-6. Application of Balance Weights.

NOTE

Spring of balance line from post to end of arm. A slight curve is permissible. If spring has more than a slight curve after it is set, it may be too weak and assembly should be checked by placing altimeter in pressure chamber and subjecting it to a minus 1,500 feet, then to maximum range of instrument. Balance assembly must not contact mechanism assembly or diaphragm.

q. Check alignment of balance link assembly with slot in arm of rocking shaft. Balance assembly must be adjusted so link is parallel with slot, to move in slot without binding. Insert link in slot and secure link with a new bearing pin.

r. Place pinion (14, figure 2-2) into jewel in mechanism body. Replace jewel settings assembly (13) and adjust it until an end play of 0.003 inch is obtained. Secure jewel setting assembly with screw (50).

s. Secure rocking shaft hairspring so it has from three-fourths to one turn tension.

t. When applying tension to wheel assembly hairspring as described in preceding steps *l* and *m*. 6 3/4 revolutions (27 spokes) tension must be applied to hairspring for this type of instrument.

2-8. Position Error Adjustments.

NOTE

Adjustment procedure as outlined in the following paragraphs applies to all altimeters covered in this publication, regardless of their range.

a. Balance arm on rocking shaft controls position error of instrument in normal operating position and 180° from this position. The sector counterweight controls position error at 90° and 270° from normal operating position.

b. Mount mechanism in stand assembly, part no. TE1357-5003, so wheel assembly is at 0 position, and place stand, dial up, on bench. Lightly press balanced hand-on-hand-staff pinion so it indicates 0. With mechanism in stand assembly and hand pressed onto hand-staff pinion at an indication of 0, hold instrumental dial vertical with 0 on top. Tap stand and note reading. Turn instrument 180° (this places 0 at bottom) and, after tapping, note indication of hand. If hand had moved clockwise, (plus error) by more than 30 feet, correct error by shortening effective length of calibration arm to which balance is connected. If error is minus effective length of calibration arm must be increased.

NOTE

If pointer t16 figure 2-1) does not position properly on to pinion (14 figure 2- 2), size pointer hub with broach (table 1-2) . If pointer hole diameter is too large. compress hub with collet In jeweler lathe and resize for positive fit

c. Hold mechanism dial vertical with 0 on top. Tap stand and note reading. Turn instrument 90° counterclockwise. This places 0 at left (9 o'clock). After tapping, note indication of hand. If hand has moved clockwise (plus error) by more than 30 feet, correct error by shifting position of sector counterweight toward rocking shaft. If error is minus by more than 30 feet, counterweight should be moved away from rocking shaft.

d. Alternate between two adjustments until a maximum position error of $\pm$ 5 feet is obtained.

e. Temperature compensation of an altimeter is necessary only if bracket or adjustment nuts have been disturbed or if compensator pins have fallen out and their original location cannot be determined.

f. Temperature compensation is greatly facilitated if a chamber is used in which air temperature can be regulated to give an overall change of 80°C (144°F). This allows testing and adjustment of altimeter temperature compensation with great convenience. If such chamber is not available. altimeter mechanism can be subjected to required variation of temperature by first placing it in a cold bath of kerosene (item 5. table 1-2) or compass fluid, then in a hot bath: or if only one vessel is available. cold reading of mechanism can be taken at room temperature. followed b. heating bath to a temperature 80°C (144°F) above room temperature before taking second reading. If liquid baths are used. there should be a third bath maintained at room temperature. Mechanism should be transferred to this bath before being immersed in extreme temperature bath to permit it to change temperature more slowly!- and avoid cracking jewels.

NOTE

Procedure for temperature compensation in a chamber in which air temperature can he regulated is same as that described below for liquid bath method of temperature compensation.

g. Baths will give different hydrostatic pressures at same depths, according to specific gravity of liquid at each temperature. Thus, if compass fluid is used, mechanism should be submerged 8 percent deeper in warm bath than in cold bath to equalize hydrostatic pressure. However, need for different immersion depths may be avoided by connecting two baths with a small tube. See figure 2-7. Tests are usually made at 40°C (104°F) and -40°C (-40°F).

h. Select two vessels, each large enough to contain mechanism, and connect them with a 1/8-inch copper tube (inside diameter) insuring tube.

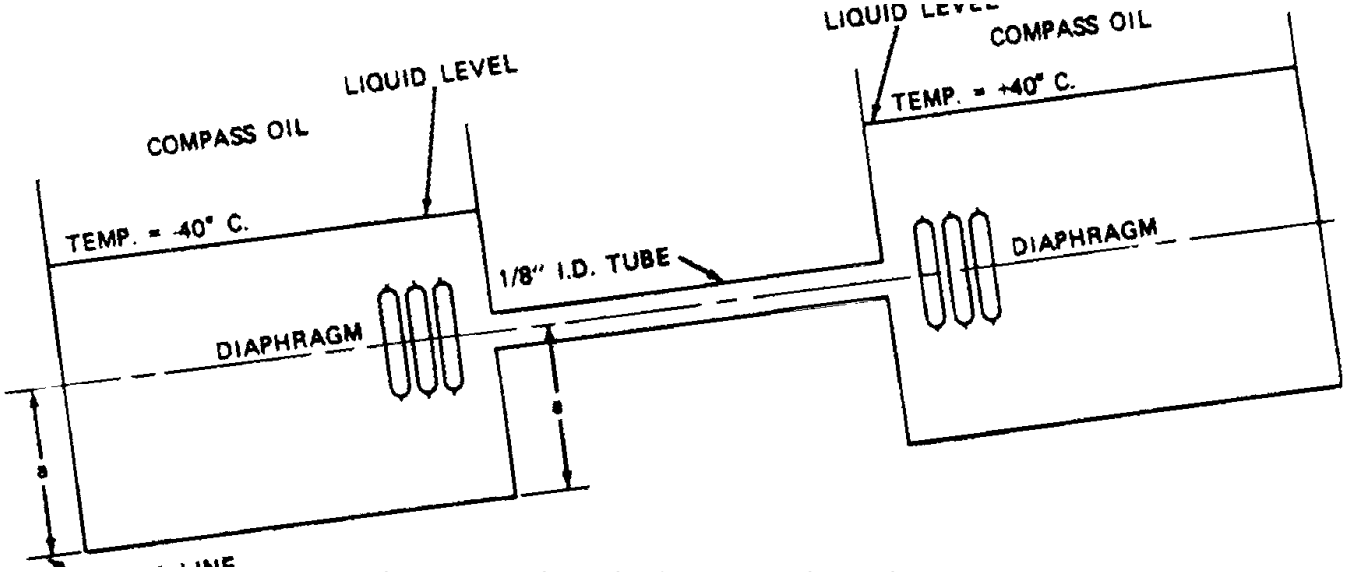

Figure 2-7. Schematic of Compensating Baths

openings in each bath are opposite center of diaphragm. Insure baths are on a level plane. Fill vessels with enough liquid to cover pointer of mechanism.

CAUTION

Avoid fires. Do not heat bath with an open flame or permit smoking or any spark of flame in same room. Bath is heated to a temperature well above flashing and burning points in case kerosene and certain volatile and inflammable constituents of liquid are distilled off during heating. Work in a place with good ventilation and safe exits. Keep extinguisher, for oil fires, within reach.

i. Liquid in hot bath can be heated safely by using one or more electric immersion heaters or by coil in bath, through which hot water or steam is circulated.

j. Liquid in cold bath can be cooled in a refrigerator, by a coil in bath through which a refrigerant is circulated, or by placing in bath one or more open metal vessels containing carbon dioxide, d˚ ice. If temperature cannot be lowered to -40 C (-40˚F) and held during test period, raise temperature of hot bath until it is 80˚C (144˚F) above that of the cold bath.

k. If it is not possible to have a difference of 80˚C (144˚F) between hot and cold baths, a smaller difference may be used, but allowable change of reading shown in table 2-1 will be proportionately reduced. If temperature difference is 40˚C (72˚F), allowable change of reading is half the allowable change with 80˚C (144˚F) temperature change.

l. Fluctuations in atmospheric pressure during compensation testing must be taken into account. These changes in pressure may be noted in terms of feet of altitude from another standard altimeter. For instance, if standard altimeter indicates 140 feet at start of compensation test and 170 feet when test is completed, mechanism undergoing compensation test will have changed plus 30 feet during same time. This error must be subtracted algebraically from reading obtained from test instrument in order to arrive at true compensation. In short period of bath test, atmospheric pressure variations may or may not occur. Generally, variations are of such slight magnitude as to be negligible. During a 2-hour ice box test, however, appreciable changes in atmospheric pressure may take place.

m. Bring baths to their proper temperatures, usually +40˚C (140˚F) and --40˚C (--40˚F), and stir liquid in each bath to insure uniform temperature throughout.

Table 2-1. Temperature Compensation

Temperature Difference	For 35,000 ft Altimeters
	Tolerance
Degrees Centigrade	Feet
80	+40
60	+30
40	+20

n. Place altimeter mechanism in stand assembly, part no. TE1357-5003.

o. With hand at 0. Immerse mechanism in

cold bath for five minutes. Tap frame lightly and record the reading. Any reading other than 0 is an error.

NOTE

Agitate liquid before taking reading. When tapping mechanism, strokes should be made vertically. Horizontal tapping may move mechanism sideways and so shift sector position.

CAUTION

To avoid cracking jewels, allow mechanism to warm up at room temperature. This is best done by immersing mechanism in a bath at room temperature before placing It in hot bath.

p. Remove mechanism, reset to 0 and immerse in hot bath for five minutes. Tap frame again and record reading.

q. If reading in hot bath does not differ from reading in cold bath by more than tolerances specified in table 2-1, the temperature compensation is satisfactory and no further adjustment is required.

NOTE

Table 2-2 shows progression of error throughout range of an instrument with maximum allowable error at zero feet altitude: therefore, to maintain a minimum error at various altitudes, it is important to compensate diaphragm as near to zero error as possible.

r. If difference in hot and cold bath readings exceeds tolerance shown in table 2-1, adjustment of temperature compensator is necessary.

s. When hot bath reading is greater than cold bath reading by 50 feet or more, move both push rods (pins) between diaphragm. Move rods, one at a time, by grasping compensator bracket with tweezers and twisting lightly to spring bracket away from end of rod while shifting rod by grasping it with another tweezer. A movement of one notch gives a correction of from 50 to 65 feet in the reading.

t. When original hot bath reading is less than 50 feet above cold bath reading or when remaining error after shifting push rods is still clockwise, giving a reading that is too high, turn diaphragm support nut between compensator bracket and mechanism body so it moves away from diaphragm. Turn second diaphragm support nut between compensator bracket and diaphragm in same direction. A turn of the diaphragm support nut results in a correction of 10 feet.

Table 2-2. Progression of Error

ALTITUDE IN FEET	ALLOWABLE CHANGE OF READING IN FEET
0	±30
6,000	±50
12,000	±80
18,000	±120
25,000	±155
35,000	±205

u. When hot bath reading is 50 feet or more below cold bath reading, move each push rod to next notch in compensator bracket, away from diaphragm.

v. If original hot bath reading is less than 50 feet below cold bath reading pr when remaining error after shifting push rods is still less than cold bath reading, turn diaphragm support nut between compensator bracket and diaphragm, then turn second diaphragm support nut in same direction.

w. When temperature compensation is completed, if altimeter was placed in a liquid bath, disassemble mechanism and clean all parts thoroughly to remove film of oil, paying particular attention to hairspring.

NOTE

Use of adjustable centerpiece on current altimeters has greatly simplified compensation adjustments. New centerpiece is made of beryllium copper which is a harder material than was formerly used on the old type centerpiece and insures a more friction-free bearing surface for compensator pins. Compensation procedure is basically the same, except now close adjustments are made with adjusting screw on centerpiece instead of two locknuts which were formerly used. A rough compensation may be obtained by positioning compensating pins in dimples of compensator. Each dimple will correct an error of approximately 60 feet. By increasing angle between compensating pins and centerpiece, a plus error can be corrected. Conversely, a lesser angle will correct a minus error. If distance between dimples is too great and does not permit satisfactory compensation, it may be further adjusted by turning screw on centerpiece. To correct

a plus error. turn screw out: to correct a minus error, turn screw in. Each revolution of screw will correct an error of approximately 80 feet.

NOTE

Check points listed in table 23 are primary check points to be used during position error adjustments.

x. Either change of diaphragm position or change in length of calibration arm speeds up or slows down mechanism with corresponding in crease or decrease in rate of hand rotation between zero and maximum altitude.

y. Shifting diaphragm position changes speed of rotation at high altitudes more than at low altitudes. Shifting diaphragm toward rocking shaft speeds tip mechanism while shifting it away from rocking shaft slows down mechanism. See figure 2-8.

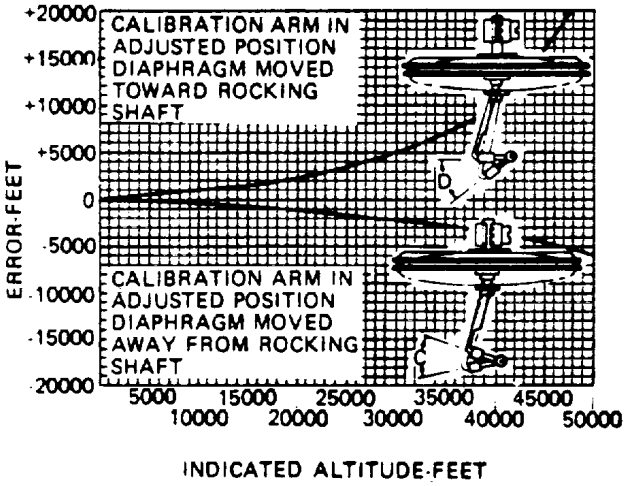

Figure 2-8. Effect of Diaphragm Movement on Error-feet Range.

z. Changing length of calibration arm causes change in speed of rotation throughout range. Adjustment of calibration arm speeds up or slows down mechanism throughout entire range. See figure 2-9.

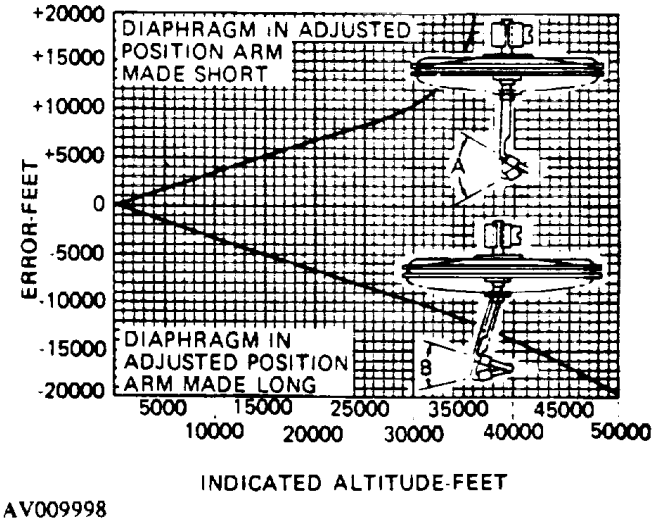

Figure 2-9. Effect of Calibration Arm Movement on Error-feet Range.

aa. By a combination of both adjustments. speed of rotation can be selectivelv increased or decreased in low, middle, or high altitude ranges.

ab. The following ratios may be applied when shifting calibration arm or diaphragm in relation to correction obtained in instrument indication. Ratios are approximate but ",ill help in adjusting procedure. Figures for calibration arm are based on a final change in reading of instrument caused by turning drum of vernier calibration tool. part no. TE 639, one segment. Figures for diaphragm are based on a final change in reading of instrument for initial change in reading. caused by moving diaphragm. Refer to table 2-4.

Table 2-3. Check Points

STANDARD ALTITUDES	EQUIVALENT ATMOSPHERIC PRESSURE MERCURY		SCALE ERROR TOLERANCE
FEET	MM	INCHES	FEET
0	760.0	29.92	±20
5,000	632.4	24.89	±40
20,000	349.1	13.75	±130
35,000	178.7	7.04	±350

ac. If calibration arm is adjusted with vernier calibration tool so drum moves distance two graduations, change in indications at 5,000 feet will be approximately 20 feet, and at 35,000 feet change will be Seven times as great or approximately 140 feet.

Ad. If diaphragm is shifted so hand indicates a change of 350 feet, change in indication at 35,000 feet will be 350 feet, and at 5.000 feet change will be 35 times less or approximately 10 feet.

ae. Using ratios in preceding paragraph a*b* and table 2-4, corrections in scale readings may be approximately calculated when working with both calibration arm and diaphragm corrections at same time.

Table 2-4. Adjustment Ratios

METHOD	RATIO	ALTITUDE
Calibration arm	1 to 1	5,000 feet
Calibration arm	7 to 1	35,000 feet
Diaphragm	1 to 35	5,000 feet
Diaphragm	1 to 1	35,000 feet

af. Move arm + 20 feet and diaphragm 350 feet. Refer to table 2-5.

ag. If position error is adjusted with vernier calibration tool so drum moves the distance between two graduations, change in indication at different altitudes will be as follows:

(1) Approximate change of 20 feet at 5.000 foot indication.

(2) Approximate change of 100 feet at 20.000 foot indication.

(3) Approximate change of 150 feet at 35.000 foot indication.

ah. A change of 325 feet at 35,000 foot indication, created by shifting diaphragm causes an:

(1} Approximate change of 125 feet at the 20,000 foot indication.

(2) Approximate change of 15 feet at the 5,000foot indication.

NOTE

The following are not inflexible rules, but are to be used as a guide in judging irregular pointer movement. From 0 to 25,000 feet, without vibration, hand must not jump more than an indication of 100 feet, and from 25,000 to 35,000 feet hand must move smoothly, although not necessarily regular when vibration is applied.

Table 2-5. Correction Effect

CORRECTION APPLIED	CHANGE AT 5,000 FEET	CHANGE AT 35,000 FEET
Arm + 20 feet	+20 feet	+140 feet
Diaphragm --350 feet	--10 feet	--350 feet
Total Correction	+10 feet	--210 feet

NOTE

The following observations are hints as to where friction will be found. If noticeable sticking or jumping occurs every revolution of the hand, examine hand-staff pinion. In this event. Hand-staff pinion may be too large. To overcome this, make up several staffs and use smallest one found. If sticking or jumping occurs once in each 12,000 feet of indication, examine wheel of wheel and hairspring assembly for corrosion, a burr between teeth, or a damaged tooth. If a noticeable sticking or jumping occurs once throughout entire range examine sector for corrosion, a burr between teeth, or a damaged tooth.

a*i.* Observe point where pinion meshes with sector. The point of mesh should be approximately 1/8 inch from end of sector arc at sea level pressure. It is important to have this starting position in order to have altimeter reach its maximum range of operation. To adjust position of sector, hold rocking shaft with special pliers and with the sector wrench turn sector as required. See figure 2-10.

2-9. Position Error Adjustment !'sing Vacuum Chamber.

Adjust as follows:

a. Mount mechanism in stand assembly, part no. TE1357-5003. so diaphragm is on same side as 0 and place it in vacuum chamber, part no. 16-11-2. so 0 is at top. By means of knob on stand assembly. set hand of test mechanism so that it will read 0 when master altimeter or barometer reads 0.

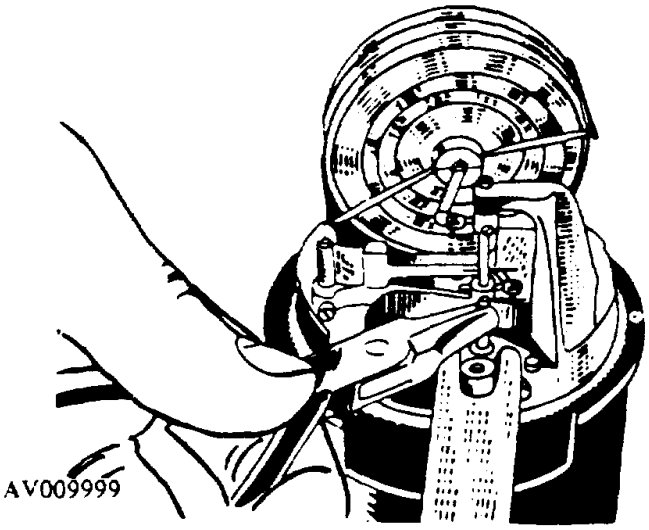

Figure 2-10. Shifting Sector of Rocking Shaft.

NOTE

If hands of master altimeter are below 0, close chamber and reduce pressure until hands indicate 0. Note position of hand of test instrument. If hand is not on 0. open chamber to atmosphere and turn adjustment knob to reposition hand. Repeat procedure until hands of both instruments indicate 0 simultaneously. If hands of master altimeter are above 0, procedure is similar to that described above, except instruments must be subjected to pressure.

b. Close pressure chamber and slowly decrease pressure until master altimeter or barometer indicates a reading equivalent to 5,000 feet.

c. If mechanism shows a plus or minus indication. remove it and adjust effective length of calibration arm to which diaphragm link is connected. If mechanism reading is too high. move calibration arm out of rocking shaft. If mechanism reading is too low, move calibration arm into rocking shaft. For accurate adjustment of calibration arm, use vernier calibration tool, part no. TE639. Clamp tool onto rocking shaft in highest possible position so drum rides against end of calibration arm. Then tighten clamp screw.

NOTE

Clamp screw and screwdrive; should be in exact alignment with calibration arm before screw is tightened. If not, calibration tool will not be correctly aligned to give accurate adjustment.

d. To move calibration arm into rocking shaft, loosen adjusting clamp screw just enough to permit arm to be moved and turn vernier drum clockwise. Rim of drum pushes calibration arm n to rocking shaft. When drum is turned the distance between two graduations, it moves arm sufficiently to change altimeter reading approximately 20 feet at 5,000 feet altitude. After adjusting length of calibration arm, tighten adjusting clamp screws and remove calibration tool from rocking shaft. To move calibration arm out of rocking shaft. turn drum of calibration tool counterclockwise while gently pressing end of calibration arm with finger to keep arm in contact with drum. When altimeter mechanism reading agrees with that of master altimeter or barometer at 0 and 5.000 feet. slowly reduce pressure until master altimeter indicates 20,000 feet and record indication of test altimeter. Reduce pressure to maximum range of instrument and note indication.

e. If mechanism indicates a reading above or below that of master altimeter, remove mechanism and adjust position of diaphragm in mechanism body. If mechanism reading is too high, move diaphragm out away from the rocking shaft). Position of diaphragm may be accurately adjusted with diaphragm calibrating tool, part no. TE5196. Screw end of tool into diaphragm centerpiece. Turn large adjustment knob clockwise until sleeve contacts castings. Loosen diaphragm clamping screw in mechanism body. To move diaphragm toward rocking shaft. turn adjustment knob counterclockwise. To move diaphragm away from rocking shaft, turn adjustment knob clock wise. Tighten diaphragm clamping screw and remove tool.

CAUTION

The extent that diaphragm may be moved toward rocking shaft is limited by balance arm. Do not move diaphragm too far toward rocking shaft or its expansion in high ranges will be stopped by balance arm.

f. Shifting diaphragm to correct indication at maximum altitude alters both 0 position and setting at 5,000 feet. therefore, mechanism must be adjusted again so it indicates 0 and 5,000 feet in accordance with preceding steps.

g. Further adjustment of mechanism should be made as required until readings come within tolerances specified in table 26.

h. Check backward movement of mechanism by slowly increasing pressure until altimeter indicates a minimum of 1,500 feet. maximum of 2.300 feet. Sector must be shift with special pliers and wrench as described in paragraph 28, until above condition exists. See figure 210.

Table 2-6. Adjustment Tolerance

STANDARD ALTITUDES	EQUIVALENT ATMOSPHERIC PRESSURE MERCURY		SCALE ERROR TOLERANCE
FEET	MM	INCHES	FEET
0	760.0	29.92	±20
500	746.4	29.39	±20
1.000	732.9	28.86	±20
1,500	719.7	28.33	±25
2,000	706.6	27.82	±30
2,500	693.8	27.31	±30
3,000	681.1	26.81	±30
4,000	656.3	25.84	±35
5,000	632.4	24.89	±40
20,000	349.1	13.75	±130
35,000	178.7	7.04	±350

2-10. Replacing Mechanism in Case.

a. Press retaining ring (38, figure 21) into lowest groove with locating nib in slot at top of case.

b. Place ring spring 134 on a flat surface. Note that there are three high points located 1200 apart. Spring should be placed in case so that of three high points, one at locating nib faces out toward dial. There are three pads or high spots on underside of top plate mechanism assembly 134). These pads should be matched with high points on ring spring. With units assembled in case in this manner, stresses on mechanism body will be evenly distributed and potential source of barometric pressure errors will be eliminated.

b.l. Place shim (36A) on top of ring spring (37).

c. Lower mechanism assembly 136) into case so sector counterweight is next to adjustment knob pinion.

NOTE

Do not replace mechanism top plate assembly (34) with top bearing plate or wheel assembly assemblied. First remove these parts.

d. Replace mechanism top plate so aligning pin is in slot of case. Press it down so hole in top plate. fits over loss of mechanism body. Secure top plate with retaining ring (33). Replace spring (32) directly opposite knob stem.

e. With a test knob on knob stem, check action of parts by rotating mechanism assembly. Action should be smooth and slightly stiff without any binding. Improper action of mechanism assembly may be caused by too tight a mesh between pinion (43) and gear on mechanism body.

CAUTION

Excessive force shall not be used in pressing on center pinion as hand staff can easily be broken.

f. Place a 0.005-inch-thick slotted shim on boss of casting with hand staff in slot. With tweezers, press center pinion, hub up, onto hand staff until it rests against shim.

g. Replace wheel assembly, pinion up, so gear is in mesh with center pinion. Lower top bearing plate onto top plate insuring wheel assembly is in mesh with hand-staff pinion and wheel assembly pivot is in pivot hole.

h. Lightly press short hand onto hand staff. While holding top bearing plate in place with finger, lightly flick end of hand. An oscillating, springlike resistance to movement indicates correct assembly. Secure top bearing plate to top plate with screws.

2-11. Operation Check.

Operational check is as follows:

a. Press long hand onto hand staff and place mechanism in pressure chamber, part no. 16 112.

b. Decrease pressure at a rate of 3,000 feet per minute until an indication of 30,000 feet is reached, them allow pressure to return to room pressure at same rate. The hand should move smoothly. A slight hesitation is permissible but hand should not hang on an indication, then suddenly jump to the next point. During this check, instrument should be vibrated.

c. If any friction is apparent, it is in top plate mechanism assembly. Determine cause of malfunction by disassembling top plate mechanism and examining for oxidation or dirt on hand-staff bushing assembly, bearing holes, and pivots. Also examine gear teeth for burrs or damage.

2-12. Closing and Sealing.

Close and seal as follows:

a. Replace gear assembly (31. figure 2-1) meshing it with idler gear (46). Replace cluster spur gear (30) further from adjustment pinion. Replace gear assembly (29) that meshes with pinion (43).

b. Replace gear (28). Replace dial assembly (27) aligning reading 29.92 with rivet hole at right of top plate. Replace shutter (26) locating lips of shutter in slots of setting mark gear.

c. Replace dial (23) aligning rivet holes with holes in top plate and hold it temporarily in place b. inserting a toothpick in each hole. with dial held in this position, insure inner setting mark indicates 0 and barometric dial indicates 29.92 "reference mark on dial. If inner setting marker barometric dial is not in its correct position. dial (23) must be removed and mark or barometric dial positioned correctly.

d. Remote one toothpick at a time. And secure outer dial to top plate with pins (29).

e. Replace third hand hub and wheel assembly, meshing it with intermediate pinion.

f. Place shim (25) on third hand hub and wheel assembly. Replace spacer (24) and dial (23), and secure it with dial screws (21).

g. **Deleted.**

Figure 2-11. **Deleted**

h. Replace ring assembly gasket (19).

i. Replace third pointer (18) with a suitable pointer replacing tool. Replace intermediate pointer (17) in the same manner as described for small pointer. Press large pointer (16) on hand staff so it indicates same altitude as master when barometric scale is set to indicate existing barometric pressure.

j. With suitable adjustment knob, turn mechanism so the large pointer indicates 0. Intermediate and small pointers should also indicate exactly 0. With finger, move large pointer 90° clockwise. This should put intermediate pointer in such a position that small pointer is barely visible along outside edge. Repeat procedure by moving large pointer 90° counterclockwise from 0 and note position of pointers. Position should be the same as above but on opposite side. If above conditions do not exist. pointer which is out of position may be shifted with a toothpick to desired position. Turn mechanism back to its original position.

k. Insure pointers do not interfere with each other and that large hand will clear glass.

l. Replace gasket (15, figure 2-1) window dial (14), and washer (13). Replace shim (12), spring (11), and washer (10) on knob stern. Replace mounting flange (9) and secure it with lockwasher (8) and screws (5, 6, and 7).

NOTE

If the altimeter has not been previously modified to a "D" configuration, install new pointers (16, 17, and 18), and dial (23) with part numbers as listed in the I.P.B.

m. Replace nut (2) and adjust knob (1). Lightly tap instrument glass to remove friction Check barometric pressure and compare it with that read front a station barometer If necessary to adjust barometric dial, pull adjustment knob forward and while holding it in this position turn it to reset barometric dial. When desired barometric pressure is indicated, release knob.

n. Insert locking stud (4) into case so it ride in recess of knob stem. Secure locking stud with screw (3).

2-13. Leak Check.

Check for leaks as follows:

a. Connect rubber tubing to static connection and apply suction sufficient to produce a change in reading of approximately 18,000 feet. At this point, clamp off tubing and note any change in reading. Over a period of minute, pointer should not move more than 100 feet.

b. If a leak is apparent , return altimeter to

atmospheric pressure. Then apply a pressure to move long pointer once around dial (--1.000 feet). While maintaining this pressure, submerge instrument in a container of water to determine location of leak. Leak around flange is caused by a died out or damaged sealing gasket (15). Flange must be removed and gasket replaced. Leak around knob stem indicates a dried out leather washer.

c. Leak around static fitting connection on rear of case due to damaged or stripped threads may be repaired by drilling out thread cavity and installing helicoil or reducer hushing. Size Will not exceed limits of standard static fitting (1/8 inch IPT). All leak test tolerances must be maintained as outlined in paragraph 310.

2-14. Painting Requirements.

Paint in accordance with table 2-7.

Table 2-7. Painting Requirements

ITEM NAME	PAINT TYPE AND SPECIFICATION	METHOD OF APPLICATION	NO. OF COATS	NOTES
Case	MIL-E-5556 Color 37038	Spray	2	Paint outside surface only
Bezel	Fed. Spec. 595 Color 37875	Brush	1	Paint center top of bezel
Case and Bezel	IT-P-600	Spray	1	35,000 Ft. Paint outside surface only
Dials Pointers Numbers	MIL-L-25142	Brush	1	Paint chipped surfaces

SECTION III

FINAL TEST PROCEDURES

3-1. General.

Final test procedures for the sensitive altimeter include a visual examination, coordination test, zero setting test, scale error test, hysteresis and after effect test, friction test, low temperature scale error test, case leak test, and position error test. Unless otherwise specified, the sensitive altimeter shall be tested at standard sea level atmospheric pressure of 29.92 Hg and a room temperature of 25 ° C (77°F).

3-2. Visual Examination.

Inspect each instrument for the following:

a. Appearance of case including chips or cracks.

b. Burred or loose screws.

c. Appearance of dial and pointers.

d. Clearance of hands.

e. Appearance of glass for cleanliness and freedom from chips or cracks.

3-3. Test Requirements.

Testing will be performed with vibrator on and in a normal operating position and a MILB 4308, type Ai barometer will be used.

3-4. Deleted.

3-5. Zero Setting Test.

Perform zero setting test as detailed in paragraph **5-2***d*(1).

NOTE

Rotate adjustment knob for one complete revolution of mechanism to test gear mesh for smooth operation. There shall be no binding or rough movement of gears. If adjustment knob turns too tightly or grinds, it is an indication of improper mesh between pinion gear in case and mechanism body.

Table 3-1. Altitude Pressure Table, Feet VS Inches of Mercury

PRESSURE INCHES	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
28.0	1824	1814	1805	1795	1785	1776	1766	1756	1746	1737
28.1	1727	1717	1707	1698	1688	1678	1668	1659	1649	1639
28.2	1630	1620	1610	1601	1591	1581	1572	1562	1552	1542
28.3	1533	1523	1513	1504	1494	1484	1475	1465	1456	1446
28.4	1436	1427	1417	1407	1398	1388	1378	1369	1359	1350
28.5	1340	1330	1321	1311	1302	1292	1282	1273	1263	1254
28.6	1244	1234	1225	1215	1206	1196	1186	1177	1167	1158
28.7	1148	1139	1129	1120	1110	1100	1091	1081	1072	1062
28.8	1053	1043	1034	1024	1015	1005	995	986	976	967
28.9	957	948	938	929	919	910	900	891	881	872
29.0	863	853	844	834	825	815	806	796	787	777
29.1	768	758	749	739	730	721	711	702	692	683
29.2	673	664	655	645	636	626	617	607	598	589
29.3	579	570	560	551	542	532	523	514	504	495
29.4	485	476	467	457	448	439	429	420	410	401
29.5	392	382	373	364	354	345	336	326	318	308
29.6	298	289	280	270	261	252	242	233	224	215
29.7	205	196	187	177	168	159	149	140	131	122
29.8	112	103	94	85	75	66	57	47	38	29

Table 3-1. Altitude Pressure Table, Feet VS Inches of Mercury (Cont)

PRESSURE INCHES	0.00	0.01	0.02	0.03	0.04	0.05	0.0O	0.07	0.08	0.09
29.9	20	10	+1	8	17	2	36	45	54	63
30.0	73	82	91	100	110	119	128	137	146	156
30.1	165	174	183	192	202	211	220	229	238	248
30.2	257	266	275	284	293	303	312	321	330	339
30.3	348	358	367	376	385	394	403	412	421	431
30.4	440	449	458	467	476	485	494	504	513	522
30.5	531	540	549	558	567	57o	585	594	604	613
30.6	622	631	640	649	658	667	676	685	694	703
30.7	712	721	730	740	749	758	767	776	785	794
30.8	803	812	821	830	839	848	857	866	875	844
30.9	893	902	911	920	929	938	947	956	965	974
31.0	983	992	1001	1010	1019	1028	1037	1046	1055	106

3-6. Scale Error Test.

Scale error test at room temperature of 25°C (77°F) is as follows:

a. Set zero setting system for standard sea level pressure (barometric dial 29.92). Record the reading in feet shown by the pointers (this reading will be used for an aftereffect check). Place instrument in an altitude chamber which is connected to a barometer and source of suction and pressure.

b. If barometer indicates more than 29.92 inches of mercury, close chamber and reduce pressure until barometer indicates 0 altitude. Note position of pointers of test instrument and if pointers are not on 0, open chamber to atmosphere and turn adjustment knob to reposition pointers. Repeat procedure until pointers of instrument indicate 0, simultaneously with indication of 29.92 inches of mercury or barometer.

c. Subject altimeter successively to pressures indicated with an asterisk (*) in table 3-2 at a rate of change in pressure of approximately 3,000 feet per minute. The altimeter shall remain at pressure corresponding to each test point for I minute before a test reading is taken except as noted for hysteresis an(d aftereffect test. Scale error shall not exceed tolerances specified in table 3-2. Do not change the 35,000 foot scale error pressure before starting the hysteresis check. hysteresis and aftereffect test shall be performed with this test. If instrument fails to meet this test, it must be readjusted.

3-7. Hysteresis and After-effect Test.

This test must be performed with scale error test described in paragraph 3-6.

a. Keeping vibrator on, the hysteresis test shall begin not more than 15 minutes after the initial exposure of the altimeter to the 35,000foot pressure of the scale error test. While the altimeter is at the 35,000foot reading, the hysteresis test shall commence. Pressure shall be increased at a rate simulating a descent in altitude at a rate of 5,000 to 20,000 feet per minute until within 3,000 feet of 18,000 feet. The test point will then be approached at a rate of approximately 3,000 feet per minute. The altimeter will be kept at the 18,000foot pressure for at least 5 minutes but not more than 15 minutes before a test reading is taken. The pressure shall then be increased further, in the same manner as before, until a 14,000foot pressure is reached. The altimeter shall be kept at this pressure for at least one minute but not more than 10 minutes before a test reading is taken. The pressure will then be increased, in the same manner as before, until atmospheric pressure is reached. Neither of the two recorded readings shall differ from the corresponding reading during scale error test by more than 120feet. Not more than five minutes after reaching atmospheric pressure, the aftereffect error shall be recorded. Error shall not exceed 30 feet. Allowance must be made for change in local barometric pressure for aftereffect check. Refer to table 3-3.

First Check Point	18,000	379.4 MM
Second Check Point	14,000	446.4 MM

NOTE

Equipment must be leak-proof during the test.

b. If instrument fails to meet this test. trouble may be corrected by decreasing tension on balance arm. Adjustments on balance arm are very critical as a change of balance tension will affect static balance as well as adjustment; therefore, only very minor adjustments should be made. A misaligned link on balance arm may also cause an apparent hysteresis error. If error cannot be

Table 3-2. Scale Error Test

STANDARD ALTITUDES	EQUIVALENT ATMOSPHERIC PRESSURE HG PRESSURE MERCURY		SCALE ERROR TOLERANCE
FEET	MM	INCHES	FEET
0	760.0	29.92	*±20
500	746.4	29.39	±20
1,000	732.9	28.86	*±20
1,500	719.7	28.33	±25
2,000	706.6	27.82	*±30
3,000	681.1	26.81	±30
4,000	656.3	25.84	*±35
5,000	632.4	24.89	±40
6,000	609.0	23.98	*±40
8,000	564.4	22.22	*±60
10,000	522.6	20.58	*±80
12,000	483.3	19.03	*±90
14,000	446.4	17.57	*±100
16,000	411.8	16.21	*±110
18,000	379.4	14.94	*±120
20,000	349.1	13.75	*±130
22,000	320.8	12.63	*±140
25,000	281.9	11.10	*±155
30,000	225.6	8.88	*±180
35,000	178.7	7.04	*±350

corrected by either of the methods described above, diaphragm assembly must be replaced.

3-8. Friction Test.

Test for friction as follows:

a. While holding pressure constant at any point or points as listed in table 3-4 take two readings: first, before tapping instruments, and, second, after tapping it. Change in reading of pointers shall not exceed tolerances given in table 3- 4.

Table 3-3. Hysteresis and After Effect

TEST POINTS	STANDARD ALTITUDE IN FEET	EQUIVALENT ATMOSPHERIC PRESSURE (MM HG)	PERMISSIBLE VARIATION FROM SCALE ERROR (FEET)
First Hysteresis Test Point	18,000	379.4	75
Second Hysteresis Test Point	14,000	446.4	75
After Effect		Local Pressure	30

b. While operating instrument at rate corresponding to an increase in altitude of approximately 3,000 feet per minute, a further check for friction is as follows:

(1) From 0 to 25,000 feet, without vibration, pointer must not jump more than indicated tolerances given in table 3-4.

(2) From 25,000 to 30,000 feet, movement of pointer must be smooth although not necessarily regular when vibration is applied.

(3) This test may be combined with test for scale error.

(4) If instrument fails to meet this test, it must be disassembled and cleaned.

3-9. Low Temperature Scale Error Test

For a period of not less than 6 hours prior to this test, altimeter shall not have been subjected to any test involving operation at other than atmospheric pressures. Scale error (room temperature) test shall be repeated except that temperature of the altimeter during test shall be approximately __35° C (__31' F). Test points shall be those given in table 3-5. Change in scale errors of this test from corresponding scale errors of room temperature test shall not exceed tolerances specified in table 3-5. During this test, friction shall be checked. If instrument fails to meet this test, diaphragm must be compensated as described in paragraph 3-8 *r*, and instrument readjusted. If the temperature compensation adjustments are not disturbed, then the cold temperature test is not required.

Table 3-4. Friction Tolerance

ALTITUDE FEET	TOLERANCE FEET
1,000	± 70
2,000	±70
3,000	± 70
5,000	±70
10,000	± 80
15,000	± 90
20,000	±100
25,000	±120
30,000	±140
35,000	±160

Table 3-5. Low Temperature Scale Error Test (-35°C)

TEST ALTITUDE			TOLERANCE
FT	MM HG	INHG	(±feet)
0	760.0	29.92	30
6,000	609.0	23.98	60
12,000	483.3	19.03	90
18,000	379.4	14.94	120
25,000	281.9	11.10	155
30,000	225.6	8.88	180

3-10. Case Leak Test.

Connect static pressure connection of indicator to a source of suction. Apply a suction sufficient to produce a change of indication of pointers of approximately 18,000 feet. With source closed off during a period of 60 seconds, difference of indications shall not exceed 100 feet. If a leak is indicated, check instrument and correct for leak as described.

3-11. Position Error Test

At normal atmospheric pressure, readings shall be taken while instrument is being tapped lightly in each of several different positions. Change in pointer indication with change in instrument position shall not exceed 30 feet. If instrument fails to meet this test, it must be adjusted for balance as described in paragraph 2-8.

SECTION IV

PRESERVATION, PACKAGING, PACKING

AND MARKING REQUIREMENTS

Preservation, packaging, packing, and marking for sensitive altimeter, part numbers 671CPX4-037DF, 671CPU19-015DF, 671CLU4035DF, and 1845X403DF shall be in accordance with figure 4-1.

PRESERVATION, PACKAGING, PACKING AND MARKING REQUIREMENTS

NOMENCLATURE	STOCK NUMBER		
Altimeter, Sensitive	As listed in Paragraph 4-1		
	PART NUMBER: As listed in Paragraph 4-1		
NET WEIGHT	DIMENSIONS	GROSS WEIGHT	CUBIC FEET

All specifications and standards applicable to the requirements herein shall be the issue in effect on date of invitation for bids.

PACKAGING

☒ LEVEL A ☐ LEVEL C

☒ PACKAGING SHALL BE IN ACCORDANCE WITH SPECIFICATION MIL-P-116, THE FOLLOWING DETAILED REQUIREMENTS SHALL APPLY:

UNIT PKG QTY	METHOD	PRESERVATIVE	WRAP	DUNNAGE	CONTAINER
1	IId	NONE	MIL-B-121 Grade A	PPP-C-1120 or MIL-P-26514 or MIL-C-81013	MIL-D-6055

☐ OTHER

☐ PRESERVATION AND PACKAGING SHALL BE SUCH AS TO PREVENT DETERIORATION OR DAMAGE DURING HANDLING AND SHIPMENT TO THE FIRST DESTINATION

PACKING ☐ LEVEL A ☒ LEVEL C

☐ ITEMS SHALL BE PACKED IN CONTAINERS CONFORMING TO SPECIFICATION NO.

☐ PLYWOOD USED SHALL BE STANDARD GRADE WITH EXTERIOR GLUE OF GROUP B OF NN-P-530. THIS PLYWOOD SHALL BE TREATED WITH A WATER REPELLANT CONFORMING TO TT-W-572. PLYWOOD CONTAINERS SHALL BE CONSTRUCTED WITH FILLER CLEATS ON ALL PANELS EITHER BEVELED OR NOTCHED 1/4 INCH ON THE BOTTOM OF EACH END, OR SHALL BE OF SUCH LENGTH AS TO LEAVE A 1/4 INCH CHANNEL FOR DRAINAGE ON EACH END, PER PPP-B-601.

☒ ITEM SHALL BE PACKED IN A MANNER TO INSURE CARRIER ACCEPTANCE AND SAFE DELIVERY AT DESTINATION. CONTAINERS SHALL BE IN ACCORDANCE WITH UNIFORM FREIGHT CLASSIFICATION RULES OR REGULATIONS OF OTHER CARRIERS APPLICABLE TO THE MODE OF TRANSPORTATION.

☐ OTHER.

MARKING

☒ a. MARKING FOR SHIPMENTS (1968 JUN) THE CONTRACTOR SHALL MARK ALL SHIPMENTS UNDER THIS CONTRACT IN ACCORDANCE WITH THE EDITION OF MIL-STD-129, "MARKING FOR SHIPMENT AND STORAGE" IN EFFECT AS OF THE DATE OF THIS SOLICITATION. ASSET (24681) IN ADDITION, PART NUMBER AND SERIAL NUMBER, IF ANY, SHALL BE MARKED ON UNIT CONTAINER.

☐ b. ADDITIONAL MARKING REQUIREMENTS. EACH INTERIOR PACKAGE SHALL BE MARKED ON AT LEAST TWO (2) SIDES WITH A SILHOUETTE OF THE AIRCRAFT. WHERE THE SIZE OF THE UNIT CONTAINER IS TOO SMALL TO PERMIT THE APPLICATION OF TWO (2) LABELS, A SINGLE LABEL SHALL BE APPLIED. IF THE PACKAGE IS TOO SMALL FOR ONE (1) NONE ALL BE REQUIRED. WHEN THE UNIT CONTAINER IS THE SHIPPING CONTAINER AND THE ITEM IS PACKED LEVEL A, EACH CONTAINER SHALL BE MARKED ON TWO (2) SIDES, TOP AND ONE (1) END WITH A SILHOUETTE OF THE AIRCRAFT. THE SIZE OF THE SILHOUETTE MAY VARY, BUT WILL BE LARGE ENOUGH TO FACILITATE EASY VISUAL IDENTIFICATION WITHOUT OBSCURING OTHER MARKINGS. THE NOMENCLATURE OF THE MAJOR COMPONENTS SHALL BE EXTENDED TO INDICATE THE END ITEM APPLICATION AND THE POSITION OF THE PART (e.g., GEAR BOX, MAIN FOR APPLICABLE AIRCRAFT, WING ASSEMBLY, RIGHT, FOR APPLICABLE AIRCRAFT). REQUESTS FOR SILHOUETTES SHOULD BE SUBMITTED AT LEAST 20 DAYS PRIOR TO THE PAINT TO COMMANDING OFFICER, TOBYHANNA ARMY DEPOT, ATTN: AMXTO-IT, TOBYHANNA, PA 18466

☒ c. MATERIEL CONDITION MARKING SHALL BE APPLIED IN ACCORDANCE WITH PARAGRAPH 5.1.6 OF MIL-STD-129. A MATERIEL CONDITION TAG OF THE APPLICABLE TYPE WILL BE SECURELY ATTACHED DIRECTLY TO ALL UNINSTALLED OR STORED AERONAUTICAL OR AIR DELIVERY ITEMS. WHEN SUCH ITEMS ARE PLACED OR STORED IN CARTONS, PACKAGES, CRATES OR METAL SHIPPING CONTAINERS, A DUPLICATE MATERIEL CONDITION TAG OR LABEL WILL BE SECURELY ATTACHED TO THE EXTERIOR OF THE PACKAGE OR CONTAINER IN SUCH A MANNER THAT WILL AFFORD MAXIMUM PROTECTION FROM HANDLING AND WEATHER. TAGS WILL BE COMPLETED EITHER BY TYPEWRITTEN OR PRINTED BLACK LEAD PENCIL ENTRIES. ITEMS OF A COMMON OR NONTECHNICAL NATURE (i.e., COMMON HARDWARE, RAW MATERIALS, ETC.) THE SERVICEABILITY OF WHICH IS OBVIOUS, AND THE IDENTITY AND INSPECTION REQUIREMENTS ARE ADEQUATELY INDICATED BY COMMERCIAL TAGS, LABELS OR MARKINGS MAY BE RECEIVED, STORED, ISSUED OR SHIPPED WITHOUT MATERIEL CONDITION TAGS.

☐ d. OTHER

AV009726

Figure 4-1. Preservation, Packaging, Packing and Marking Requirements.

SECTION V

DIFFERENCE DATA SHEETS

5-1.Overhaul instructions for the types included in this section are the same as the procedures for the specified type covered in the preceding sections of this manual. except for the differences noted herein.

5-2. Difference Data For Sensitive Altimeter, Part Numbers 1845X403, 1845X403D, and 1845X403DF.

The instructions contained in the preceding sections of this technical manual apply except for the differences noted in this data sheet.

a. Leading Particulars. Leading particulars are the same as for part number 671CPX403TDF, except for the omission of inner and outer setting markers.

b. *Disassembly*. Disassembly is the same as for part number 671CPX4037DF, except for the omission of inner and outer markers.

c. *Modification Criteria*. Modification criteria is the same as for part number 671CPX4-037 except the part numbers are reidentified as follows:

1815X403 to 1845X403DF

184SX403D to 1845X403DF

d. *Testing.* Testing is the same as for part number 671CPX4-037DF except as follows:

(1) *Zero Setting Test.* Altimeter shall be subjected to atmospheric pressure. Pressure scale shall be set, successively, at values listed in table 5-1. Altimeter shall be tapped or vibrated lightly and pointer indication noted. After series of readings has been recorded. difference between readings at setting of 29.92 and each other setting shall be found. These differences shall be recorded and compared with values in CORRECT DIFFERENCES column. Recorded values shall not differ from correct differences by more than 25 feet at any setting.

(2) *Scale Error Test.* The room temperature scale error test is the same except that reading shall be taken at 500. 1.500 and 3.000 feet in addition to the other test points.

(3) *Hysteresis and Aftereffect Test*. Not more than 15 minutes after altimeter has been first subjected to pressure corresponding to upper limit of scale in scale error at room temperature test, pressure shall be increased at a rate corresponding to a decrease in altitude of approximately 3,000 feet per minute until pressure corresponding to first test point given in table 5-2 is reached Altimeter shall remain at this pressure for at least 5 minutes but not more than 15 minutes. before test reading is taken. After reading has been taken, pressure shall be further increased at specified rate until pressure corresponding to second test point given in table 5-2 is reached. Altimeter shall remain at this pressure for at least 1 minute but not more than 10 minutes before test reading is taken. After reading has been taken, pressure shall be further increased at specified rate until atmospheric pressure is reached. Reading of altimeter at either of two test points shall not differ from reading of altimeter for corresponding altitude in scale error test, by more than tolerance given in table 5-2. Not less than I minute and not more than 5 minutes after completion of hysteresis test, pointers shall have returned to their original reading, corrected for any change in atmospheric pressure. within tolerance given in table 5-2 as third test point.

Table 5-1. Zero Setting .Mechanism 1845X403DF

SETTING PRESSURE SCALE	CORRECT DIFFERENCES
28.5	1,340
23.92	0
30.9	893

Table 5-2. Hysteresis--1845X4-03DF

TEST POINTS	STANDARD ALTITUDE	EQUIVALENT ATMOSPHERIC PRESSURE	PERMISSIBLE VARIATION
First point	25,000	11.10	150
Second point	20,000	13.75	150
Third point		Ground level	60

(4) *Overpressure Test.* Altimeter shall be subjected to an absolute pressure of 50 inches of mercury for a period of I hour. For a period of not less than 6 hours following this overpressure. altimeter shall not be subjected to any operation other than atmospheric pressure. Scale errors shall not vary from previously noted scale errors by more than tolerances listed in table 53.

Table 5-3. Variation From Original Scale Errors After Subjection to 50 Hg--1845X4-03DF

STANDARD ALTITUDE FEET	VARIATION FEET
00	30
500	30
1,000	30
1,500	45
2,000	45
3,000	45
4,000	45

Table 5-3. Variation From Original Scale Errors After Subjection to 50 Hg--1845X4-03DF

STANDARD ALTITUDE FEET	VARIATION FEET
6,000	45
8,000	45
10,000	60
12,000	60
14.000	60
16,000	60
18,000	60
20,000	75
22,000	75
24,000	75
28.000	75
32,000	90
35,000	105
0	

APPENDIX A

REFERENCES

DA PAM 738-751 Functional Users Manual for The Army Maintenance Management System Aviation (TAMMS-A)

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APPENDIX B

REPAIR PARTS AND SPECIAL TOOLS LIST

Current as of April 1971

Section I. Introduction

B-1. Scope.
This appendix lists repair parts, special tools, test and support equipment, and maintenance supplies required for the performance of general support maintenance of the altimeter, pressure.

B-2. General.
This repair parts and special tools listing is divided into the following sections:

a. Repair Parts--Section II. A list of repair parts authorized for the performance of maintenance at tile general support level in figure and item number sequence. Maintenance supplies IMSUPI are listed within the section in ascending Federal stock number sequence.

b. Special Tools, Test and Support Equipment--Section III. A list of special tools, test and support equipment authorized for the performance of maintenance at the general support level in figure and item number sequence.

c. Federal Stock Number and Reference Number Index--Section IV.
This section is divided as follows:

(1) A list of Federal stock numbers in ascending numerical sequence, cross--referenced to the illustration figure and item number.

(2) A list of reference numbers in ascending alphanumerical sequence, cross--referenced to the manufacturer's Federal supply code. illustration figure and item number.

B-3. Explanation of Columns.
The following provides an explanation of columns in the tabular lists in sections II and III:

a. Source, Maintenance and Recoverability Codes (SMR), Column 1.

(1) Source code indicates the selection status and source for the listed item. Source codes are:

Code	Explanation
P	Repair parts, special tools and test equipment supplied from the GSA / DSA, or Army supply system, and authorized for use at indicated maintenance categories.
P2	Repair parts, special tools and test equipment which are procured and stocked for insurance purposes because the combat or military essentially of the end item dictates that a minimum quantity be available in the supply system.
P9	Assigned to items which are NSA design controlled: unique repair parts, special tools, test, measuring and diagnostic equipment, which are stocked and supplied by the Army COMSEC Logistic System and which are not subject to the provisions of AR 38041.
P10	Assigned to items which are NSA design controlled: special tools, test, measuring and diagnostic equipment for COMSEC support, which are ac countable under the provisions of AR 38041, and which are stocked and supplied by the Army COMSEC Logistic System.
M	Repair parts, special tools and test equipment which are not procured or stocked. as such, in the supply system but are to be manufactured at indicated maintenance levels.
A	Assemblies which are not procured or stocked as such, but are made up of two or more units. Such component units carry individual stock numbers and descriptions, are procured and stocked separately and can be assembled to form the required assembly at indicated maintenance categories.
X	Parts and assemblies that are not procured or stocked because the failure rate is normally below that of the applicable end item of component. The failure of

Code	Explanation
	such part or assembly should result in retirement of the end item from the supply system.
AK	Repair parts which are not procured or stocked. The requirement for such items will be filled by the next higher assembly or component.
X2	Repair parts, special tools, and test equipment which are not stocked and have no foreseen mortality. The indicated maintenance category requiring such repair parts will attempt to obtain the parts through cannibalization or salvage. The item may be requisitioned with exception data, from the end item manager, for immediate use.
G	Major assemblies that are procured with PEMA funds for initial issue only as exchange assemblies at DSU and GSU level. These assemblies will not be stocked above the DS and GS level or returned to depot supply level.

NOTE

Cannibalization or salvage may be used as a source of supply for any items source coded above except those coded X1 and air craft support items as restricted by AR 70042.

(2) Maintenance code indicates the lowest category of maintenance authorized to install the listed item. The maintenance level codes are:

Code	Explanation
C	Crew or operator maintenance.
O	Organizational maintenance.
F	Direct support maintenance.
H	General support maintenance.

(3) Recoverability code indicates whether unserviceable items should be returned for recovery or salvage. Items not coded are nonrecoverable. Recoverability codes are:

Code	Explanation
R	Applied to repair parts (assemblies and components), special tools and test equipment which are considered economically reparable at direct and general support maintenance levels. when the item is no longer economically reparable, it is normally disposed of at the GS level. 'when supply considerations dictate, some of these repair parts may be listed for automatic return to supply for depot level repair as set forth in AR 71050. When so listed, they will be replaced by supply on an exchange basis.
S	Repair parts, special tools, test equipment and assemblies which are economically reparable at DSU and GSU activities and which normally are furnished by supply on an exchange basis. When items are determined by a GSU to be uneconomically reparable, they will be evacuated to a depot for evaluation and analysis before final disposition.
T	Higher dollar value recoverable repair parts, special tools, and test equipment which are subject to special handling and are issued on an exchange basis. Such items will be repaired or overhauled at depot maintenance activities only. No repair may be accomplished at lower levels.
U	Repair parts. special tools and test equipment specifically selected for salvage by reclamation units because of precious metal content, critical materials, high dollar value or reusable casings or castings.

b. Federal Stock Number, Column 2. Indicates the Federal stock number assigned to the item and will be used for requisitioning purposes. Items source coded A. XI. XI. or X2 are not assigned a Federal stock number.

c. Description, Column 3. Indicates the Federal item name and any additional description of the

item required. An explanation of notes and I or codes used in this column appear at the end of the figure(s) breakdown. The description column contains the following subcolumns.

(1) *Reference number and manufacturer's code*. Indicates a part number or other reference number for the listed item, followed by the applicable five-digit Federal supply code for manufacturers, in parentheses.

(2) Usable on code. Indicates an alpha coding to reflect the application of the listed item to the specific manufacturer's model designation. No entries in this column indicate the item listed applies to all models. See paragraph B4 for identification of the usable on codes.

d. Unit of Measure (U/M), Column 4. A two-character alphabetical abbreviation indicating the amount or quantity of the item upon which the allowances are based (e.g., FT, EA. PR*).*

e. Quantity Incorporated in Unit. Column 5. Indicates the quantity of the item used in the assembly. A "V" appearing in this column in lieu of a quantity indicates that a definite quantity cannot be indicated.

f. Thirty-day GS Maintenance Allowance, Column 6.

(1) The allowance column is divided into three subcolumns. Indicated in each subcolumn, opposite the first appearance of each item, is the total quantity of items authorized for the number of equipment supported. Subsequent appearances of the same item will have the letters "REF" in this column. Items authorized for use as required, but not for initial stockage, are identified with an asterisk (*) in the allowance column.

(2) The quantitative allowance for GS level of maintenance will represent initial stockage for a 30-day period for the number of equipments supported.

(3) Determination of the total quantity of parts required for maintenance of more than 100 of these equipments can be accomplished by converting the equipment quantity to a decimal factor by placing a decimal point before the next to last digit of the number to indicate hundredths, and multiplying the decimal factor by the parts quantity authorized allowance for 51100 allowance column. Example: authorized allowance for 51 100 equipments is 40; for 150 equipments. multiply 40 by 1.50, or 60 parts required.

(4) The basis ,f issue for authorized special tools, test and support equipment is the number of end items of equipment supported.

g. One year Allowance per 100 Equipments/Contingency Planning Purposes. Column 7. Indicates opposite the first appearance of each item. the total quantity required for distribution and contingency planning purposes. The range of items indicates total quantities of all authorized items required to provide for adequate support of 100 equipments for 1 year.

h. Depot Maintenance Allowance per 100 Equipments, Column 8. Not applicable.

i. Illustration, Column 9. Illustrations appear in the narrative portion of this manual. This column is divided as follows:

(1) *Figure number. column 9a*. Indicates the figure number of the illustration in which the item is shown. Appearance of the letters 'NISUP" in this column indicate maintenance supplies located in Section II, the letters "TOOL" indicate special tools located in section III.

(2) *Item number, column 9b*. Indicates the callout number to reference the item in the illustration.

B-4. Special Information. Identification if the usable on codes included in column 3 of sections II and and III are:

Code	Used On	Code	Used On
A	671CPX4-037DF	C	671CLU4-035DF
A	671CPX4-037D	C	671CLU4-035D
A	671CPX4-037	C	671CLU4-035
B	671CPU19-015DF	D	1845X4-03DF
B	671CPU19-015D	D	1845X4-03D
B	671CPU19-015	D	1845X4-03

B-5. How to Locate Repair Parts.

a. When Federal stock number or reference number is Unknown:

(1) *First.* Find the exploded view illustration of the assembly or subassembly to which the repair part belongs.

(2) *Second.* Identify the repair part on the illustration and note the illustration figure and item number of the repair part.

(3) *Third.* Using the repair parts listing, find the figure and item number listed in the illustration column.

b. When Federal stock or reference number is Known:

(1) *First.* Using the index of Federal stock numbers and reference numbers, find the pertinent Federal stock number or reference number. This index is in ascending Federal stock number sequence, followed by a list of reference numbers in ascending alphanumerical sequence, cross referenced to the illustration figure and item number.

(2) *Second.* Using the repair parts listing, find the figure and item number listed in the illustration column referenced in the index of Federal stock numbers and reference numbers.

B-6. Federal Supply Codes for Manufacturers.

Code	Manufacturer
19315	Bendix Corp The Navigation and Control Division Teterboro NJ 07608
30120	Ideal-Acrosmith 3913 Evans Ave Cheyenne WY 82001
89944	Kollsman Instrument Corp 575 Underhill Blvd Syossett NY 11791
94499	Dow Corning Corp Alpha Molykote Plant 64 Harvard Ave Stamford CT 06902
96906	Military Standards Promulgated By Standardization Div Directorate Of Logistic Services DSA

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR CODE			USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30 DAY GS MAINT ALW (a) 1 20	(b) 21 50	(c) 51 100	(7) 1 YR ALWPER 100 EQUIP CNTCGY	(8) DEPOT MAINT ALWPER 100 EQUIP	(9) ILLUSTRATION (a) FIG NO	(b) ITEM NO
	6610-514-4183	6710PX4-037	(89944)	ALIMETER SENSITIVE.....	A	EA							1-1	
	6610-526-6083	6710PX4-037D	(89944)	ALIMETER SENSITIVE.....	A	EA							1-1	
	6610-179-5241	6710PX4-037DF	(89944)	ALIMETER SENSITIVE.....	A	EA							1-1	
	6610-251-0366	6710PU19-015	(89944)	ALIMETER SENSITIVE.....	B	EA							1-1	
	6610-526-6067	6710PU19-015D	(89944)	ALIMETER SENSITIVE.....	B	EA							1-1	
	6610-179-4312	6710PU19-015DF	(89944)	ALIMETER SENSITIVE.....	B	EA							1-1	
	6610-514-4176	6710LU4-035	(89944)	ALIMETER SENSITIVE.....	C	EA							1-1	
	6610-526-6054	6710LU4-035D	(89944)	ALIMETER SENSITIVE.....	C	EA							1-1	
	6610-179-4309	6710LU4-037DF	(89944)	ALIMETER SENSITIVE.....	C	EA							1-1	
	6610-388-0030	1845-X4-03	(89944)	ALIMETER SENSITIVE.....	D	EA							1-1	
	6610-526-6081	1845-X4-03D	(89944)	ALIMETER SENSITIVE.....	D	EA							1-1	
	6610-179-2197	1845-X4-03DF	(89944)	ALIMETER SENSITIVE.....	D	EA							1-1	
				SECTION II REPAIR PARTS										
P--H--	5355-180-8443	371-14	(89944)	KNOB.....	ABC	EA		*	*	*			2-1	1
P--H--	5355-667-6717	X526	(89944)	KNOB.....	C	EA	1	*	*	*			2-1	
P--H--	5310-275-1745	371-13B	(89944)	NUT, PLAIN, HEXAGON.....		EA	1	*	*	*			2-1	2
P--H--	5305-033-6173	371-18C	(89944)	SCREW, MACHINE.....		EA	1	*	*	*			2-1	3
P--H--	5307-487-5680	6710K4B	(89944)	STUD, LOCKING.....		EA	1	*	*	*			2-1	4
P--H--	5305-579-1704	FFIL310SS8B	(89944)	SCREW, MACHINE.....		EA	1	*	*	*			2-1	5
P--H--	5305-285-8658	FFIL311SS8PX	(89944)	SCREW, MACHINE.....		EA	1	*	*	*			2-1	6
P--H--	5305-206-8082	371-128C	(89944)	SCREW, MACHINE.....		EA	1	*	*	*			2-1	7
P--H--	5310-225-8384	92101030000	(89944)	WASHER, LOCK.....		EA	2	*	*	*			2-1	8
P--H--	6610-936-8534	6710K3C	(18315)	FLANGE, MOUNTING.....	ABC	EA	1	*	*	*			2-1	9
P--H--	6685-613-5403	6710PU3	(89944)	FLANGE, MOUNTING use until . exhausted no replacement	D	EA	1	*	*	*			2-1	
P--H--	5340-183-7998	371-22B	(89944)	SHIM-0050 INCHES THICK.....		EA	1	*	*	*			2-1	10
P--H--	5340-235-1607	371-12	(89944)	SPRING, HELICAL, COMPRESSION		EA	1	*	*	*			2-1	11
P--H--	5340-183-7997	371-21B	(89944)	SHIM		EA	1	*	*	*			2-1	12
P--H--	5330-641-7517	477KN43	(89944)	WASHER, NONMETALLIC		EA	1	*	*	*			2-1	13
P--H--	5355-538-6384	MS28105-17	(89944)	WINDOW, DIAL.....		EA	1	*	*	*			2-1	14
P--H--	6610-141-3577	371-61B	(89944)	GASKET.....		EA	1	*	*	*			2-1	15
P--H--	5355-668-6367	2206-904-1	(89944)	POINTER, DIAL.....		EA	1	*	*	*			2-1	16
P--H--	5355-667-7456	2206-905-1	(89944)	POINTER, DIAL.....		EA	1	*	*	*			2-1	17
P--H-- 18	6610-109-5517	84289300101	(89944)	POINTER AND DISK ASSEMBLY		EA	1	*	*	*	*			2-1
P--H--	6610-034-3706	642K950B	(89944)	RING ASSEMBLY GASKET.....	ABC	EA	1	*	*	*			2-1	19
X1--		472K950B	(89944)	RING ASSEMBLY.....	D	EA	1	*	*	*			2-1	19
P--H--	6685-329-0858	371K118B15	(89944)	RING, SETTING		EA	1	*	*	*			2-1	20
P--H--	5305-297-2173	X30	(89944)	SCREW, MACHINE.....		EA	2	*	*	*			2-1	21
P--H--	6685-180-9073	371-58	(89944)	PIN, DIAL, LOCATING.....		EA	2	*	*	*			2-1	22
P--H--	5355-519-7480	2206X03-1	(89944)	DIAL, SCALE.....		EA	1	*	*	*			2-1	23
P--H--	6610-329-0856	371-308	(89944)	SPACER.....		EA	1	*	*	*			2-1	24
P--H--	6610-095-8261	371-1278	(89944)	SHIM		EA	1	*	*	*			2-1	25

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR CODE			USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30 DAY GS MAINT ALW (a) 1 20	(b) 21 50	(c) 51 100	(7) 1 YR ALWPER 100 EQUIP CNTCGY	(8) DEPOT MAINT ALWPER 100 EQUIP	(9) ILLUSTRATION (a) FIG NO	(b) ITEM NO
X2-H--		371K24B3	(89944)	SHUTTER, INDICATOR.....	ABC	EA	1						2-1	26
P--H--	6610-225-0254	371K25B4	(89944)	SHUTTER.....	B	EA	1	*	*	*			2-1	26
P--H--	69610-049-5103	1845-24	(89944)	SHUTTER.....	D	EA	1	*	*	*			2-1	26
P--H--	6610-443-8910	371K904C2	(89944)	DIAL ASSEMBLY, BAROMETRIC		EA	1	*	*	*			2-1	27
P--H--	6610-329-0345	371-20B	(89944)	GEAR, SPUR.....		EA	1	*	*	*			2-1	28
P--H--	6610-703-6819	371-903	(89944)	GEAR, ASSEMBLY.....		EA	1	*	*	*			2-1	29
P--H--	3020-704-1523	371-914	(89944)	GEAR CLUSTER, SPUR.....		EA	1	*	*	*			2-1	30
P--H--	3020-704-1524	371-913	(89944)	GEAR, ASSEMBLY.....		EA	1	*	*	*			2-1	31
P--H--	5315-181-6314	371S54	(89944)	PIN, STRAIGHT HEADLESS.....		EA	1	*	*	*			2-1	32
P--H--	5340-181-5814	371S7	(89944)	RING, RETAINING		EA	1	*	*	*			2-1	33
X2-H--		371S904	(89944)	MECHANISM ASSEMBLY, TOP PLATE	ABC	EA	1	*	*	*			2-1	34
X2-H--		1845-904	(89944)	MECHANISM ASSEMBLY, TOP PLATE	D	EA	1						2-1	34
P--H--	6610-181-5354	371-53	(89944)	PINION CENTER.....		EA	1	*	*	*			2-1	35
P--H--		940-901	(89944)	MECHANISM ASSEMBLY			1						2-1	36
P--H--	5365-097-6502	12308	(89944)	SHIM-NYLON		EA	1	*	*	*	*		2-1	36A
P--H--	6610-334-6861	371-46	(89944)	SPRING, RING		EA	1	*	*	*			2-1	37
P--H--	5340-598-2203	371S25	(89944)	RING RETAINING		EA	1	*	*	*			2-1	38
P--H--	5340-282-4971	371-11	(89944)	RING, RETAINING		EA	1	*	*	*			2-1	39
P--H--	5315-537-1301	371-10	(89944)	PIN STRAIGHT HEADLESS.....		EA	1	*	*	*			2-1	40
P--H--	5355-326-0695	371-9B	(89944)	KNOB STEM ADJUSTMENT		EA	1	*	*	*			2-1	41
P--H--	5330-887-4662	371-45B	(89944)	WASHER LEATHER		EA	1	*	*	*			2-1	42
P--H--	3020-181-6075	371-8	(89944)	PINION KNOB STEM ADJUSTING		EA	1	*	*	*			2-1	43
P--H--	6610-180-8915	371-16	(89944)	SHAFT IDLER		EA	1	*	*	*			2-1	44
P--H--	5310-487-5605	371K121	(89944)	WASHER, SPRING TENSION.....		EA	1	*	*	*			2-1	45
P--H--	6610-487-5590	371-15	(89944)	GEAR, IDLER.....		EA	1	*	*	*			2-1	46
P--H--	6610-287-4709	1845-15	(89944)	GEAR SPUR.....		EA	1	*	*	*			2-1	46
P--H--	6610-349-6406	671U1B	(89944)	CASE.....		EA	1	*	*	*			2-1	47
				MECHANISM ASSEMBLY										
				TOP PLATE MECHANISM ASSEMBLY AND MECHANISM ASSEMBLY									2-2	
X2-H-	6685-166-7277	371S904	(89944)	MECHANISM ASSEMBLY, TOP. PLATE	ABC	EA	1						2-2	1
X2-H--	6930-300-1387	1845-904	(89944)	MECHANISM, ASSEMBLY, TOP PLATE	D	EA	1						2-2	
P--H--	6610-181-5369	371-911	(89944)	. . HUB AND WHEEL ASSEMBLY		EA	1	*	*	*			2-2	2
P--H--	5305-033-6174	371-60B	(89944)	. . SCREW, SHOULDER		EA	3	*	*	*			2-2	3
P--H--4	6610-181-5684	371-907	(89944)	. . PLATE ASSEMBLY TOP BEARING		EA	1	*	*	*	*			2-2
X1--		371-41	(89944)	. . . GEAR, ALTIMETER		1							2-2	5
X1--		371-909	(89944)	. . . WHEEL AND HUB ASSEMBLY		1							2-2	6
X1--		371-52	(89944)	. . . HANDSTAFF SHOR THAND.		1							2-2	7
X1--		371-908	(89944)	. . . WHEEL ASSEMBLY		1							2-2	8
X1--		371-906	(89944)	. . . PLATE AND BUSHING ASSEMBLY		1							2-2	9
P--H--	6685-181-5415	371-910	(89944)	. . WHEEL ASSEMBLY		EA	1	*	*	*			2-2	10

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR CODE			USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30 DAY GS MAINT ALW (a) 1 20	(b) 21 50	(c) 51 100	(7) 1 YR ALWPER 100 EQUIP CNTCGY	(8) DEPOT MAINT ALWPER 100 EQUIP	(9) ILLUSTRATION (a) FIG NO	(b) ITEM NO
P--H--	6685-181-5686	371S905	(89944)	PLATE ASSEMBKY TOP.....	ABC	EA	1	*	*	*			2-2	11
X1--		1845-905	(89944)	PLATE ASSEMBLY TOP.....	D								2-2	11
X1--		940-901	(89944)	MECHANISM ASSEMBLY.....			1						2-2	12
P--H--	6685-167-0940	371-923	(89944)	SETTING ASSEMBLY WHEEL JEWEL		EA	1						2-2	13
P--H--	6685-181-6074	371-73B	(89944)	PINION, HANDSTAFF.....		EA	1	*	*	*			2-2	14
P--H--	5315-514-1434	371-80	(89944)	PIN, STRAIGHT HEADED.....		EA	1	*	*	*			2-2	15
P--H--	1280-570-9096	940-71	(89944)	LINK, DIAPHRAGM.....		EA	1	*	*	*			2-2	16
P--H--	5841-675-6493	371-72	(89944)	ARM CALIBRATION.....		EA	1	*	*	*			2-2	17
P--H--	5315-038-0342	671B90B	(89944)	PIN, TAPERED, PLAIN.....		EA	1	*	*	*			2-2	18
P--H--	5305-487-5600	371-78	(89944)	SETSCREW.....		EA	1	*	*	*			2-2	19
P--H--	6685-025-1874	940-915	(89944)	SHAFT ASSEMBLY.....		EA	1	*	*	*			2-2	20
P--H--	6685-181-9925	671-73D2	(89944)	HAIRSPRING, ROCKING SHAFT		EA	1	*	*	*			2-2	21
P--H--	6610-315-8757	371-79	(89944)	PIVOT, DRILL ROD.....		EA	1	*	*	*			2-2	22
P--H--	6685-181-4214	371-96	(89944)	JEWEL, SMALL.....		EA	1	*	*	*			2-2	23
P--H--	5305-217-8094	FF1L003	(89944)	SCREW, MACHINE.....		EA	2	*	*	*			2-2	24
P--H--	5305-217-8147	671-87B	(89944)	SCREW, MACHINE.....		EA	1	*	*	*			2-2	25
P--H--	6610-601-4510	940-129	(89944)	COUNTERWEIGHT.....		EA	1	*	*	*			2-2	26
P--H--	5305-537-1302	371-90B	(89944)	SCREW.....		EA	3	*	*	*			2-2	28
P--H--	5315-527-0159	20632	(89944)	PIN, TAPERED.....		EA	1	*	*	*			2-2	29
P--H--	6685-304-6931	940-931	(89944)	BRIDGE ASSEMBLY.....		EA	1	*	*	*			2-2	30
P--H--	6685-181-4214	371-96	(89944)	JEWEL, SMALL.....		EA	1	*	*	*			2-2	31
A--H--		940-932	(89944)	WHEEL AND HAIRSPRING ASSEMBLY		EA	1						2-2	33
P--H--	6685-180-8551	371-77	(89944)	HAIRPSING MECHANISM.....		EA	1	*	*	*			2-2	34
P--H--	6610-535-1325	940-80	(89944)	DISK, TRANSMITTER.....		EA	1	*	*	*			2-2	35
P--H--	6685-703-7591	671-924	(89944)	GEAR.....		EA	1	*	*	*			2-2	36
X1--		371-75	(89944)	WHEEL.....			1						2-2	37
P--H--	5310-523-5607	176-71	(89944)	WASHER,FLAT.....		EA	1	*	*	*			2-2	38
X1--		671-74B	(89944)	PINION, INTERMEDIATE.....			1						2-2	39
P--H--	6685-167-0940	371-923	(89944)	SETTING ASSEMBLY WHEEL JEWEL		EA	1	*	*	*			2-2	40
P--H--	6610-570-9091	709-909C	(89944)	ARM AND BALANCE ASSEMBLY		EA	1	*	*	*			2-2	41
P--H--	5315-514-1434	371-80	(89944)	PIN, STRAIGHT HEADED.....		EA	2	*	*	*			2-2	42
P--H--	5841-675-6493	371-72	(89944)	ARM, CALIBRATION.....		EA	1	*	*	*			2-2	43
P--H--	6685-035-5792	709-6	(89944)	LINK, BALANCE.....		EA	1	*	*	*			2-2	44
X1----		371P933B	(89944)	BALANCE.....			1						2-2	45
P--H--	6610-976-3371	40289320010	(89944)	DIAPHRAGM, ASSEMBLY.....		EA	1	*	*	*			2-2	46
X1-- 47		709-911B	(89944)	BODY ASSEMBLY MECHANISM				1						2-2
P--H--	6660-327-6454	371-95	(89944)	BEARING, JEWEL.....		EA	1	*	*	*			2-2	48
P--H--	6685-181-4214	371-96	(89944)	JEWEL SMALL.....		EA	1	*	*	*			2-2	49
P--H--	5305-207-3065	FF1L007	(89944)	SCREW MACHINE.....		EA	2	*	*	*			2-2	50
P--H--	5305-443-2671	FF1L207	(89944)	SCREW MACHINE.....		EA	1	*	*	*			2-2	51
P--H--	5305-207-3084	FF1L610	(89944)	SCREW, DIAPHRAGM.....		EA	1	*	*	*			2-2	52

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR CODE	USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30 DAY GS MAINT ALW (a) 1 20	(b) 21 50	(c) 51 100	(7) 1 YR ALWPER 100 EQUIP CNTCGY	(8) DEPOT MAINT ALWPER 100 EQUIP	(9) ILLUSTRATION (a) FIG NO	(b) ITEM NO
		MAINTENANCE SUPPLIES										
P--H--	6810-281-5272	BENZENE,TECHNICAL FED W B-231		CL	V	*	*	*			MSUP	
P--H--	6810-290-0051	NAPHTHA, COMPAS FLUID..... MIL C-5020, 1 QT CAN		QT	V	*	*	*			MSUP	
P--H--	8010-526-1915	COATING COMPOUND MIL L 25142		KT	V	*	*	*			MSUP	
P--H--	8030-081-2335	SEALING, COMPOUND MILS 22473		CC	V	*	*	*			MSUP	
P--H--	9140-242-6748	KEROSINE FED VV K-211.....		GL	V	*	*	*			MSUP	
P--H--	9150-223-4129	I.UBRICATING OIL MIL-L 6085 ..		QT	V	*	*	*			MSUP	
P--O--	9150-250-0926	PETROLATUM TECHNICAL FED VV-R-236		EA	V	*	*	*			MSUP	
P--H--	9150-390-5690	MOLYKOTE M55 (94499) LURICATING OIL MOLYBDENUM DISULFIDE		QT	V	*	*	*			MSUP	
P--H--	9160-253-1173	BEESWAX,TECHNICA-FED C-B-191		OZ	V	*	*	*			MSUP	
P--H--	9160-263-8767	TALLOW,INEDIBLE FED C-T-91		EA	V	*	*	*			MSUP	
		SECTION III										
		SPECIAI. TOOLS, TEST, AND SUPPORT EQUIPMENT										
P--H--	4920-490-3280	TE1357-5003 (89944) STAND ASSEMBLY.....		EA	V	*	*	*			TOOL	
P--H--	4920-574-3301	TEB30AI (19944) WEIGHT,BALANCE ADJUSTMENT		EA	V	*	*	*			TOOL	
P--H--	4920-560-1601	TE519 (89944) I IXEURL,DIAPHRAGM		EA	V	*	*	*			TOOL	
X2-H--		TE639 (89944) CALIBRATING TOOL.....		EA	V	*	*	*			TOOL	
P--H--	6636-133-7676	16 11 2 (30120) CHAMBER.VACUUM.....		EA	V	*	*	*			TOOL	
P--H--	6685-511 9864	BAROMETER MIL-B-4308B.....		EA	V	*	*	*			TOOL	

SECTION IV

FEDERAL STOCK NUMBER

CROSSREFERENCED TO FIGURE

AND ITEM NUMBER

STOCK NUMBER	FIGURE NO	ITEM NO	STOCK NUMBER	FIGURE NO	ITEM NO	STOCK NUMBER	FIGURE NO	ITEM NO
1280-570-9096	2-2	16	5340-598-2203	2-1	38	6610-526-6067	1-1	
3020-181-6075	2-1	43	5355-180-8443	2-1	1	6610-526-6081	1-1	
3020-704-1523	2-1	30	5355-326-0695	2-1	41	6610-526-6083	1-1	
3020-704-1524	2-1	31	5355-519-7480	2-1	23	6610-535-1325	2-2	35
4920-490-3280	TOOL		5355-538-6384	2-1	14	6610-570-9091	2-2	41
4920-574-3301	TOOL		5355-667-6717	2-1	1	6610-601-4510	2-2	26
4920-605-1601	TOOL		5355-667-7456	2-1	17	6610-703-6819	2-1	29
5305-033-6173	2-1	3	5355-668-6367	2-1	16	6610-936-8534	2-1	9
5305-033-6174	2-2	3	5841-675-6493	2-2	17	6610-976-3371	2-2	46
5305-206-8082	2-1	7	5841-675-6493	2-2	43	6636-133-7676	TOOL	
5305-207-3065	2-2	50	6610-019-5517	2-1	18	6660-327-6454	2-2	48
5305-207-3084	2-2	52	6610-034-3706	2-1	19	6685-025-1874	2-2	20
5305-217-8094	2-2	24	6610-049-5103	2-1	26	6685-035-5792	2-2	44
5305-217-8147	2-2	25	6610-095-8261	2-1	25	6685-167-0940	2-2	13
5305-285-8658	2-1	6	6610-141-3577	2-1	15	6685-167-0940	2-2	40
5305-297-2173	2-1	21	6610-179-2197	1-1		6685-180-8551	22	3-4
5305-443-2671	2-2	51	6610-179-4309	1-1		6683-180-9073	21	2-2
5305-487-5600	2-2	19	6610-179-4312	1-1		6685-181-4214	22	2-3
5305-537-1302	2-2	28	6610-179-5241	1-1		6685-181-4214	22	3-1
5305-579-1704	2-1	5	6610-180-8915	2-1	44	6685-181-4214	2-2	49
5307-487-5680	2-1	4	6610-181-5354	2-1	35	6685-181-5686	2-2	11
5310-225-8384	2-1	8	6610-181-5369	2-2	2	6686-181-6074	2-2	14
5310-275-1745	2-1	2	6610-181-5415	2-2	10	6685-181-9925	2-2	21
5310-487-5605	2-1	45	6610-181-5684	2-2	4	6685-304-6931	2-2	30
5310-523-5607	2-2	38	6610-225-0254	2-1	26	6685-329-0858	2-1	20
5315-038-0342	2-2	18	6610-251-0366	1-1		6685-511-98(4	TOOL	
5315-181-6314	2-1	32	6610-287-4709	2-1	46	6685-613-5403	2-1	9
5315-514-1434	2-2	15	6610-315-8757	2-2	22	6685-703-7591	2-2	36
5315-514-1434	2-2	42	6610-329-0345	2-1	28	6810-281-5272	MSUP	
5315-527-0159	2-2	29	6610-329-0856	2-1	24	6810-290-005 1	MSUP	
5315-537-1301	2-1	40	6610-334-6861	2-1	37	8010-526-1915	MSUP	
5330-641-7517	2-1	13	6610-349-6406	2-1	47	8030-081-2335	MSUP	
5330-887-4662	2-1	42	6610-388-0030	1-1		9140-242-6748	MSUP	
5340-181-5814	2-1	33	6610-443-8910	2-1	27	9150-223-4129	MSUP	
5340-183-7997	2-1	12	6610-487-5590	2-1	46	9150-250-0926	MSUP	
5340-183-7998	2-1	10	6610-514-4176	1-1		9150-390-5690	MSUP	
5340-235-1607	2-1	11	6610-514-4183	1-1		9160-253-1173	MSUP	
5340-282-4971	2-1	39	6610-526-6054	1-1		9160-263-8767	MSUP	

SECTION IV

REFERENCE NUMBER

CROSS-REFERENCED TO FIGURE

AND ITEM NUMBER

REFERENCE NUMBER	MFG CODE	FIG NO	ITEM NO	REFERENCE NUMBER	MFG CODE	FIG NO	ITEM NO
FFIL003	89944	2-2	24	371-52	89944	2-2	7
FFIL007	89944	2-2	50	371-53	89944	2-1	35
FFIL207	89944	2-2	51	371-58	89944	2-1	22
FFIL310SS8B	89944	2-1	5	371-60B	89944	2-2	3
FFIL310SS8PX	89944	2-1	6	371-61B	89944	2-1	15
FFIL610	89944	2-2	52	371-72	89944	2-2	17
MOLYKOTE M55	94499	MSUP		371-72	80944	2-2	43
MS28105-17	96906	2-1	14	371-73B	89944	2-2	14
TE1357-5003	89944	TOOL		371-75	89944	2-2	37
TE5196	89944	TOOL		371-77	89944	2-2	34
TE630A1	89944	TOOL		371-78	89944	2-2	19
TE639	89944	TOOL		371-79	89944	2-2	22
X30	89944	2-1	21	371-8	89944	2-1	43
X526	89944	2-1	1	371-80	89944	2-2	15
16-11-2	30120	TOOL		371-80	89944	2-2	12
176-71	89944	2-2	38	371-9B	89944	2-1	1
1845-15	89944	2-1	46	371-90B	89044	2-2	28
1845-24	89944	2-1	26	371-903	89944	2-1	29
1845-904	89944	2-1	34	371-906	89944	2-2	9
1845-904	89944	2-2	1	371-907	89944	2-2	1
1845-905	89944	2-2	11	371-908	89944	2-2	8
1845X4-03	89944	1-1		371-909	89944	2-2	6
1845X4-03D	89944	1-1		371-910	89944	2-2	10
1845X4-03DF	89944	1-1	1	371-911	89944	2-2	2
20632	89944	2-2	29	371-913	89944	2-1	31
2206-904-1	89944	2-1	16	371-914	89944	2-1	30
2206-905-1	89944	2-1	17	371-923	89944	2-2	13
2206X03-1	89944	2-1	23	371-923	89944	2-2	40
371-10	89944	2-1	40	371-95	89944	2-2	48
371-11	89944	2-1	39	371-96	89944	2-2	23
371-12	89944	2-1	11	371-96	89944	2-2	31
371-127B	89944	2-1	25	371-96	89944	2-2	49
371-128C	89944	2-1	7	371K118B15	89944	2-1	20
371-13B	89944	2-1	2	371K121	89944	2-1	45
371-141	89944	2-1	1	371K24B3	89944	2-1	26
317-15	89944	2-1	46	371K25B4	89944	2-1	26
371-16	89944	2-1	44	371K904C2	89944	2-1	27
37-18C	89944	2-1	3	371P933B	89944	2-2	45
371-20B	89944	2-1	28	371S25	89944	2-1	38
371-21B	89944	2-1	12	371S54	89944	2-1	32
371-22B	89944	2-1	10	371S7	89944	2-1	33
371-30B	89944	2-1	24	371S904	89944	2-2	1
371-41	89944	2-2	5	371S904	89944	2-1	34
371-45B	89944	2-1	42	371S905	89944	2-2	11
371-46	89944	2-1	37	40289320010	89944	2-2	46

REFERENCE NUMBER	MFG CODE	FIG NO	ITEM NO	REFERENCE NUMBER	MFG CODE	FIG NO	ITEM NO
472K950B	89944	2-1	19	671CPX4-037	89944	1-1	
477KN43	89944	2-1	13	671CPX4-037D	89944	1-1	
642K950B	89944	2-1	19	671CPX4-037DF	89944	1-1	
671-73D2	89944	2-2	21	671U1B	89944	2-1	47
671-74B	89944	2-2	39	709-6	89944	2-2	44
671-87B	89944	2-2	25	709-909C	89944	2-2	41
671-924	89944	2-2	36	709-911B	89944	2-2	47
671B90B	89944	2-2	18	84289300101	89944	2-1	18
671CK3C	89944	2-1	9	92101030000	19315	2-1	8
671CK4B	89944	2-1	4	940-129	89944	2-2	26
671CLU4-035D	89944	1-1		940-71	89944	2-2	16
671CLU4-035	89944	1-1		940-80	89944	2-2	35
671CLU4-035DF	89944	1-1		940-901	89944	2-2	12
671CPU19-015	89944	1-1		940-901	89944	2-1	36
671CPU19-015D	89944	1-1		940-915	89944	2-2	20
671CPU19-015DF	89944	1-1		940-931	89944	2-2	30
671CPU3	89944	2-1	9	940-932	89944	2-2	33

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