DEPARTMENT OF THE ARMY **TM 5-6675-203-15**
TECHNICAL MANUAL
DEPARTMENT OF THE AIR
FORCE TECHNICAL ORDER **TO 49A3-6-1**

OPERATOR, ORGANIZATIONAL, FIELD AND DEPOT MIANTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOL LISTS ALTIMETER, SURVEYING 4,500 METERS 2 METER DIVISIONS (WALLACE AND TIERNAN TYPE FS-199) FSN 6675-641-3569

This copy is a reprint which Includes current pages from Changes 1, 2 and 6.

DEPARTMENTS OF THE ARMY AND THE AIR FORCE
OCTOBER 1960

SAFETY PRECAUTIONS

Remove batteries when altimeter is not in use. Be sure to cushion the altimeter against road shock and avoid sudden jarring at all times. Do not turn the adjusting screw beyond the limits (red lines) marked on the dial. When the desiccant turns pink it must be replaced.

TM 5-6675-203-15
C 6

CHANGE
No. 6

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *19 July 1978*

Operator, Organizational, Direct and General Support, and Depot Maintenance Manual, Including Repair Parts and Special Tools Lists:

ALTIMETER, SURVEYING: 4,500 METERS; 2 METER DIVISIONS (WALLACE AND TIERNAN TYPE FA-199) (NSN 6675-00641-3569)

TM 5-675-203-15, 12 October 1960, is changed as follows:

The title is changed as shown above.

Throughout manual, where FSN's are listed, change to "NSN" and add "00" as shown in title above.

Page 3. Paragraph 1*b* is superseded is follows:

b. You can improve this manual by calling attention to errors and by recommending improvements, using DA Form 2028 (Recommended Changes to Publications and Blank Forms) or by a letter, and

*** This change supercedes C 5, 25 May 1973.**

mail direct to Commander, US Army Troop Support and Aviation Materiel Readiness Command, ATTN: DRSTS--MPP, St. Louis, MO 63120. A reply will be furnished direct to you.

Page 63. Appendix II is superseded as follows:

APPENDIX II
COMPONENTS OF END ITEMS LIST

Section I. INTRODUCTION

1. Scope

This appendix lists integral components of and basic issue items for the Surveying Altimeter to help you inventory items required for safe and efficient operation.

2. General

The Components of End Item List is divided into the following sections:

a. Section II--Integral Components of the End Item. These items, when assembled, comprise the Surveying Altimeter and must accompany it whenever it is transferred or turned in. These illustrations will help you identify these items.

b. Section III--Basic Issue Items. These a re minimum essential items required to place the Surveying Altimeter in operation, to operate it, and to perform emergency repairs. Although shipped separately packed they must accompany the end items during operation and whenever it is transferred

between accountable officers. The illustrations will assist you with hard-to-identify items. This manual is your authority to requisition replacement BII, based on Table(s) of Organization and Equipment (TOE)/Modification Table of Organization and Equipment (MTOE) authorization of the end item.

3. Explanation of Columns

a. Illustration. This column is divided as follows:

(1) *Figure number.* Indicates the figure number of the illustration on which the item is shown (if applicable).

(2) *Item number.* The number used to identify item called out in the illustration.

b. National Stock Number (NSN). Indicates the National stock number assigned to the item and which will be used for requisitioning.

c. Part Number (P/N). Indicates the primary number used by the manufacturer, which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

d. Description. Indicates the Federal item name and, if required, a minimum description to identify the item.

e. Location. The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to an adjacent area.

Code *Used on*

f. Usable on Code. "USABLE ON" codes are included to help you identify which component items are used on the different models. Identification of the codes used in these lists are:

g. Quantity Required (Qty Reqd). This column lists the quantity of each item required for a complete major item.

h. Quantity. This column is left blank for use during inventory; Under the Rcv'd column, list the quantity you actually receive on your major item. The date columns are for use when you inventory the major item at a later date, such as for shipment to another site.

Section II.
INTEGRAL COMPONENTS OF END ITEM

(1) Illustration (a) Figure No.	(1) Illustration (b) Item No.	(2) National stock number	(3) Part No. & FSCM	(4) Description	(5) Location	(6) Usable on code	(7) Qty reqd	(8) Quantity Rcvd	(8) Quantity Date	(8) Quantity Date
5	2	6675-00-912-3385	FP7748 (79172)	Chart, Table I Conversion		CTA	1			
5	2	6675-00-912-3388	FPT749 (79172)	Chart, Table II & III Conversion		CTA	1			
5	2	6675-00-912-3390	FP7750 (79172)	Chart, Table IV Conversion		CTA	1			
5	3	6550-00-018-2182	FU2888 (79172)	Magnifier, Pocket		CTA	1			
5	5	6685-00-805-3353	FU3570 (79172)	Psy-chrometer Assembly		CTA	1			
3	4	6675-00-444-7110	FU3571 (79172)	Strap Assembly, Carrying		CTA	1			

Section III. BASIC ISSUE ITEMS

(1) Illustration (a) Figure No.	(1) Illustration (b) Item No.	(2) National stock number	(3) Part No. & FSCM	(4) Description	(5) Location	(6) Usable on code	(7) Qty reqd	(8) Quantity Rcvd Date	(8) Quantity Date	(8) Quantity Date
				TM 5-6675-203-15 Operator, Organization Field and Depot Maintenance Manual		CTA	1			
5	4	5120-00-014-1258	FP7744 (79172)	Wrench, Spanner		CTA	1			

Page 68. Appendix III is superseded and Appendix III.I is added as follows:

APPENDIX III
ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

1. Scope
This appendix lists additional items you are authorized for the support of the Surveying Altimeter.

2. General
This list identifies items that do not have to accompany the end item and that do not have to be turned in with it. These items are authorized to you by CTA, MTOE, TDA or JTA.

3. Explanation of Listing
National stock number, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. "USABLE ON" codes are identified as follows:

Code	*Used on*

Section II. ADDITIONAL AUTHORIZATION LIST

(1) National stock number	Part number & FSCM		(2) Description	Usable on code	(3) U/M	(4) Qty Auth
6135-00-120-1020	BA-30	(81349)	Battery, 1.5 Volts	CTA	EA	2
	P32290	(79172)	Lamp, Miniature, No.14 2.47 Volts Screw Base	CTA	EA	2
6675-00-991-8245	P25942	(79172)	Wick, Psychrometer	CTA	EA	6

APPENDIX III.I
EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

1. Scope

This appendix lists Expendable Supplies and Materials you will need to operate and maintain the Surveying Altimeter. These items are authorized to you by CTA 50-970, Expendable Items (except Medical, Class V, Repair Parts and Heraldic Items).

2. Explanation of Columns

a. Column 1-Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material.

b. Column 2-Level. This column identifies the lowest level of maintenance that requires the listed item.

c. Column 3-National Stock Number. This is the national stock number assigned to the item; use it to request or requisition the item.

d. Column 4-Description. Indicates the federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable

e. Column 5-Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., each (ea), inch (in), pair (pr), etc.). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements

Section II.
EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) Item number	(2) Level	(3) National stock number	(4) Description	(5) U/M
1	C,O	7920-00-401-8035	Cloth, Lint-free, non-abrasive, General Purpose Part No. 1001	BX
2	C,O	6640-00-597-674 5	Lens Tissue, NNNP40TYPE I CLASS I (81348)	PK
3	C,O	6850-00-680-2233	Desiccant, Activated 1.5 lb.	LB

Page 84. Under "description" column, make changes as follows: Line 9, change FPT728 to FRXA7728; line 14, change U14971 to CUXA14971; and line 15, change P25900 to CPXL25900.

Page 86. Under "description" column, make changes as follows: Line 3, change P82824 to CPX43190; and line 20, change FU8982 to FU4481.

By Order of the Secretary of the Army:

BERNARD W. ROGERS
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Brigadier General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25A, Operator maintenance requirements for Surveying Equipment.

TM 5-6675-203-15
C 2

TECHNICAL MANUAL

Operator, Organizational, Field and Depot Maintenance Manual, Including Repair Parts and Special Tool Lists

ALTIMETER, SURVEYING: 4,500 METERS, 2 METER DIVISIONS (WALLACE AND TIERNAN TYPE FS-199) FSN 6675-641-3569

TM 5-6675-203-15
CHANGES No. 2

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *7 August 1965*

TM 56675-203-15, 12 October 1960, is changed as follows:

Page 2. Delete "Section VII and VIII" and substitute:

SECTION VIII AND IX.

Page 2. After Section VI, add the following:

SECTION VI. 1. PREVENTIVE MAINTENANCE SERVICES.

General	20.1	36
Daily preventive maintenance service	20.2	36
Quarterly preventive maintenance service	20.2	36

Page 3. Paragraph 1, line 1. Before 'This," add a.

Page 3. Paragraph 1.

b. (Added) Report all deficiencies in this manual on DA Form 2028. Submit recommendations for

TAGO 173C - Aug. 700--490—63

changes, additions, or deletions to the Commanding Officer, U.S. Army Mobility Support Center, ATTN: S-IOMIS-MNI, P.O. Box 119, Columbus 16, Ohio. Direct communication is authorized.

c. (Added) Report all equipment improvement recommendations as prescribed by TM 38-750.

Page 36.

SECTION VI.1 PREVENTIVE MAINTE-NANCE SERVICES (Added)

20.1 General

To insure that the altimeter is ready for operation at all times, it must be inspected systematically, so that defects may be discovered and corrected before they result in serious damage or failure. The necessary Preventive Maintenance Services to be performed are listed and described in paragraphs 20.2 and 20.3. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit shall be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded, together with the corrective action taken, on DA Form 2404 at the earliest possible opportunity.

20.2 Daily Preventive Maintenance Services

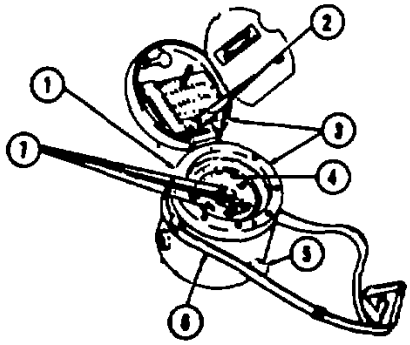
This paragraph contains an illustrated tabulated listing of preventive maintenance services which

must be performed by the operator. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to Figure 10.1 for the Daily Preventive Maintenance Services.

PREVENTIVE MAINTENANCE SERVICES

DAILY

7NS-6675-293-15 — WALLACE AND TIERNAN TYPE FA-190 — ALTIMETER



ITEM		PAR REF
1	BATTERIES. Replace defective batteries.	24
2	LAMPS. Replace burned-out lamps.	24
3	CASE AND COVER. Check for defective case, cover, or gaskets.	8
4	WINDOW. Clean a dirty window.	25
5	DESICCANT. Remove, dry, and replace silica gel when desiccant indicator turns pink.	23
6	STRAP. Check for worn, cracked, or rotted strap.	2
7	CONTROLS AND INSTRUMENTS. Inspect for damage and loose mounting. With the unit operating, check for proper operation.	4
	NOTE 1. ADJUSTMENTS. Make all necessary adjustments during operation.	

Figure 10.1. (Added) Daily preventive maintenance services.

20.3 Quarterly Preventive Maintenance Services

a. This paragraph contains an illustrated tabulated listing of preventive maintenance services which must be performed by Organizational Maintenance personnel at quarterly intervals. A quarterly interval is equal to 3 calendar months, or 250 hours of operation, whichever occurs first.

b. The item numbers are listed consecutively and indicate the sequence of minimum requirements. Refer to-Figure 10.2 for the Quarterly Preventive Maintenance Services.

Page 65. Paragraph 4.

4. Comments and Suggestions

(Superseded)

Suggestions and recommendations for changes to the basic issue items list will be submitted on DA Form 2028 to the Commanding Officer, U.S. Army Mobility Support Center, ATTN: SMOMS-MM, P.O. Box 119, Columbus 16, Ohio. Direct communication is authorized.

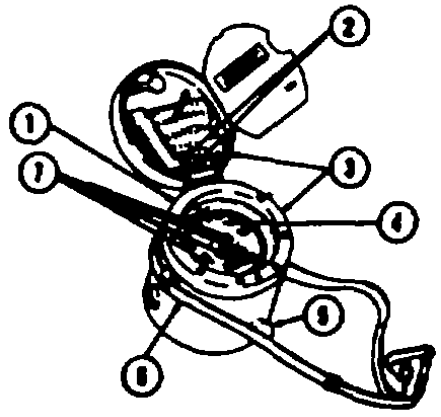
Page 80. Paragraph 6, lines 10, 11 and 12. Delete "General, U.S. Army Enginer Maintenance Center, ATTN: EMCJM, Corps of Engineers" and substitute: Officer, U.S. Army Mobility Support Center, ATTN: SMOMS-MM.

PREVENTIVE MAINTENANCE SERVICES

QUARTERLY

TMS-[illegible]-203-15 ALTIMETER

WALLACE AND TIERNAN TYPE FS-150



ITEM		PAR REF
1	BATTERIES. Replace defective batteries.	26
2	LAMPS AND SOCKETS. Replace burned-out lamps and defective sockets.	24
3	CASE AND COVER. Replace defective case, cover, or gaskets.	8
4	WINDOW. Replace cracked, scratched, or cloudy window. Clean a dirty window.	25
5	DESICCANT. Remove, dry, and replace silica gel when desiccant indicator turns pink.	23
6	STRAP. Replace worn, cracked, or rotted strap	2
7	CONTROLS AND INSTRUMENTS. Replace damaged instruments. Tighten loose mounting. With the unit operating, check for proper operation.	4
	NOTE 1. ADJUSTMENTS. Make all necessary adjustments during operation.	

[illegible]

Figure 10.2. (Added) Quarterly preventive maintenance services.

By Order of the Secretary of the Army:

EARLE G. WHEELER,
General, United States Army,
Chief of Staff.

Official:

J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Amy:

USASA (2)
DCSLO (1)
CNGB (1)
TSG (1)
CofEngrs (8)
CSigO (1)
CofT (1)
USA Maint Bd (1)
USAARTYBD (2)
USAARMBD (2)
USAIB (2)
USARADBD (2)
USAAESBD (2)
USAAVNBD (2)
USCONARO (5)
OS Maj Comd (5) except USARJ (10)
NDW (1)
Armies (2)
Corps (2)
USA Corps (2)
Div (2)
EngrBde (1)
USMA (2)
Svc Colleges (2)
Br Svc Sch (2) except USAES (100)
GENDEP (08) (10)
Engr Dep (08) (10)
Army Dep (2)
USA Trans Tml Comd (2)
Army Tmls (1)
USAMC (5)
USAMOCOM (2)
USAOSA (2)
Div Engr (2)
Engr Dist (2)
USAERDL (8)
Engr Fld Maint 8hope (2)
Engr Cen (5)
AMS (8)
Chicago Engr Proc Ofc (10)
USA Mob Spt Cen (36)
ESOO (10)
Fld Comd, DASA (8)
USACOMZEUR (2)
USAREUR Engr Sup Con Agcy (10)
USAREUR Engr Proc Cen (2)
MAAG (1)

JBUSMC (1)		6-200	29-21
Units organized under following TOE's (2 copies each except as indicated):		6-201	29-25
		6-300	29-26
		6-301	29-35
		6-302	29-36
5-5	5-107	6-525	29-51
5-6	5-237 (5)	6-535	29-52
5-15	5-262 (5)	6-537	29-55
5-16	5-267 (1)	6-565	29-56
5-38	5-278 (5)	6-575	29-57
5-45	5-279	6-576	29-105
5-46	5-327	6-577	29-109
5-48	5-348	29-1	39-51
5-49	5-500 (IA,	29-11	39-61
5-55	IB, IJ)	29-15	39-65
5-56	6-100	29-16	57-100

NG: State AG (3); units-same as Active Army except allowance Is one copy to each unit.
USASR: Same as Active Army except allowance is one copy to each unit.
For explanation of abbreviations used, see AR 320 50.

DEPARTMENT OF THE ARMY TECHNICAL MANUAL
DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER

Operator, Organizational, Field and Depot Maintenance Manual Including Repair Parts and Special Tool Lists ALTIMETER, SURVEYING: 4,500 METERS, 2 METER DIVISIONS (WALLACE AND TIERNAN TYPE FS-199) FSN 6675641-3569

TM 5-6675-203-15
TO 49A3-6-1
CHANGES No. 1

DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
WASHINGTON 25, D.C., *14 Jan. 1963*

TM 5-6675-203-15/TO 49A3-6-1, 12 October 1960, is changed as follows:

Note. Delete parentheses on all item in the allowance columns in the repair parts list.

Page 65. Delete paragraph 4 and substitute the following:

4. Comments and Suggestions

Suggestions and recommendations for changes to the basic issue items list will be submitted on DA Form 2028 to the Commanding Officer, U.S. Army Mobility Support Center, ATTN: SMOMSMS, Box 119, Columbus 16, Ohio. Direct communication is authorized.

TAGO 7615C - 650603 - January 1963

Page 73, paragraph 2. Delete subparagraph g through and including j, and substitute the following:

g. 15-Day Organizational Maintenance Allowance Per 100 Equipments. Shown for each repair part is either an allowance factor or an asterisk (*) allocation which indicates the following:

(1) An allowance factor is shown for each repair part authorized for stockage for the purpose of computing the quantity or repair parts to be stocked as the prescribed load. This factor is based on past experience with similar items and the latest mortality data for 500 hours operation per year, and is the average quantity required to provide organizational maintenance for 100 items of equipment for a 15-day period under average combat conditions.

(2) Repair parts required to perform organizational maintenance, which are not authorized for stockage, are identified by an asterisk and are to be requisitioned for immediate use only. Table I is the prescribed load listing of items quantitatively allocated in this technical manual and lists the combat essential items required to support the end item of equipment. It indicates the average quantity required to provide organizational maintenance for 1-5 and/or 6-10 items of equipment for a 15-ay period under average combat conditions.

Note. Combat essential items which must be stocked or on order at organizational maintenance at all times, regardless of demand, will be identified in the allowance column by a quantity in parentheses.

Table I. Prescribed load listing

Federal stock No.	Description	Functional group	Minimum stockage authorization	Unit of issue	15-day organizational maintenance allowances 1-5	6-10
68765-981-8460	DISC: desiccant indicator. (79172) FP6672.	6703	.....	.....	1	1
615-120-1020	BATTERY	6708	2	.....	(2)	(2)

(3) The quantity obtained from the use of table I is one prescribed load for a 15day period. This quantity will not be used when the authorized stockage is insufficient to repair one end item and/or assembly. A minimum stockage sufficient to repair one end item and/or assembly is authorized. These repair parts are identified by the following note in the description column (minimum stockage of ..... is authorized). The quantities contained in the prescribed load must be on hand or on order at all times. Units and organizations authorized additional prescribed loads will multiply the number of prescribed loads by the appropriate end item spread column of 1-5 or 6-10.

Note. An exception is made for those units and organizations required to have on hand, boxed or packaged prescribed load(s) pursuant to a special mission assignment. Such prescribed loads(s) will be computed or selected separately from quantities authorized for stockage at permanent station.

(4) Subsequent changes to allowances will be limited as follows:

(a) No decrease in the stated quantity of combat essential items is authorized.

(b) No change in the range of items is authorized. If additional items are considered necessary, a recommendation should be forwarded to the technical services activity having cogniz-

ance of the MPLL (Master Prescribed Load List) or prescribed load of repair parts for exception or revision to the allowance list.

(c) Decreases in the stated quantity of items other than combat essential items are authorized to a minimum quantity of one and increases in the stated quantity are authorized for all items when justified by demand and usage experience. Detailed procedures for performing these adjustments are prescribed in AR 735-35.

h. Guide Quantities Per 100 Equipments. Shown for each repair part applicable to 3d, 4th, and/or 5th echelon maintenance is either an allowance factor or an asterisk allocation which indicates the following:

(1) A guide quantity factor is shown for each part authorized to be stocked by field maintenance and supply support activities (3d and 4th echelons'), and the number of repair parts recommended for depot maintenance (5th echelon'). This factor is based on the latest mortality data for 500 hours operation per year and is the average quantity required by the various maintenance echelons to provide maintenance and supply support for 100 items of equipment for a 15-day period under average combat conditions.

(2) The quantities of repair parts authorized

for stockage are determined using the following mathematical formula:

Quantity of equipment to be supported, multiplied by the listed allowance factor, divided by 100.

Fractions derived from the use of the above formula will be rounded to whole numbers as follows:

If the result is 1 or more and includes a fraction that is 0.5 or more, the quantity is rounded to the next higher number.

Example: If the number of equipment supported is 30 and the allowance factor for 100 equipments is 5, the following formula would be used:

$$30 \times 5 \div 100 = 1.5$$

The resulting .fraction is 0.5; therefore, the stockage is 2.

If the result is 1 or more and includes a fraction of less than 0.5, the quantity reverts to the next lower number. When the computed result is less than 0.5, no quantity is authorized for field and depot maintenance. However, if the item is combat essential, a quantity of 1 is authorized.

Example: If the number of equipment supported is 30 and the allowance factor for 100 equipments is 28, the following formula would be used:

$$30 \times 28 \div 100 = 8.4$$

The resulting fraction is less than 0.5; therefore, the stockage is 8.

(3) In the guide quantity columns for field maintenance, additional repair parts which may be required to perform maintenance, but not authorized for stockage, are listed without a guide quantity factor. These items are identified by an asterisk.

(4) Parts that may be required for depot maintenance, in addition to those allocated, are identified by an asterisk. These parts are to be requisitioned, when required, if not obtainable from reclamation, fabrication, or local procurement. (5) Combat essential items of a critical nature which must be stocked at field maintenance at all times, regardless of demand will be identified In the allowance column by inclosing the allowance factor in parentheses. Parts authorized for use but not for initial stockage will be identified with an asterisk in the allowance column.

i. Field Maintenance 15-Day Level, Ad and 4th Echelons.

(1) *Third echelon.* This column lists the initial guide quantity allowance factors of repair parts authorized for initial stockage by Engineer Field Maintenance Shops (non-TOE), Engineer Field Maintenance Companies, Direct Support (TOE 5237), and similar TOE units to provide

3d echelon maintenance for Mobility Command equipment and to provide organizational maintenance repair parts for supported units for a 15-day period. Additional repair parts are allocated by an asterisk for immediate use only. Upon establishment of supply records, recorded demand experience will be used to compute stockage objectives on authorized repair parts Review of stockage objectives will be performed in the time cycle prescribed by major commanders. Repair parts allocated for immediate use only may be stocked when demand experience indicates a stockage of at least one.

(2) *Fourth echelon.* This column lists initial guide quantity allocation factors of repair parts authorized for initial stockage by Engineer Field Maintenance Shops (non-TOE), Engineer Heavy Maintenance Companies (TOE 5-278), and similar TOE units to provide 4th echelon maintenance for Mobility Command equipment for a 15-day period. Additional repair parts are allocated by an asterisk for immediate use only. Upon establishment of supply records, recorded demand experience will be used to compute stockage objectives on authorized repair parts. Review of the stockage objectives will be performed in the time cycle prescribed by major commanders. Repair parts allocated for immediate use

only may be stocked when demand experience indicates a stockage objective of at least one.

(3) *Units with TOE capability of performing partial or complete field maintenance for organic Mobility Command equipment.* Units organized under TOE's S-114, 5-115, 5-117, 5-129, and similar TOE's with TOE capability of performing partial or complete field maintenance for organic Mobility Command equipment will be authorized to stock 3d and/or 4th echelon repair parts only when specific agreements are made between the commander of the designated Engineer Parts Supply Activity, normally Direct Support Units (DSU) and using unit. Parts so furnished are in addition to the prescribed load and will be adjusted as demands indicate.

(4) *Units with TOE Mission to provide maintenance for Mobility Command equipment of supported units.* Units organized under TOE's such as 5-214 and 5-500 with the assigned mission to provide field maintenance for Mobility Command equipment of supported units are authorized to stock 3d and 4th echelon repair parts. These repair parts will be issued from the appropriate parts supply activity (parts depot and/or DSU). Such stockage is in addition to the pre-

scribed load and will be adjusted as demands indicate.

j. Depot Maintenance, 5th Echelon. This column lists the quantity of repair parts recommended for Engineer Depot Maintenance Shops (non-TOE) to provide depot maintenance for 100 equipments. Additional repair parts are allocated by an asterisk, for immediate use only. Explanation of the asterisk allowance is contained in h above.

Page 80. Delete paragraph 6 and substitute the following:

b. Comments and Suggestions

Report all deficiencies in this manual on DA Form 2028. Submit recommendations for changes, additions, or deletions, to repair parts allocation and allowance factors and other data. Additional data on climatic and terrain conditions of operation, operational age of the equipment, and the hours operated in the period covered by item 7 of DA Form 2028 are desired. Submit to the Commanding Officer, U.S. Mobility Support Center, ATTN: SMOMS-MS, P. O. Box 119, Columbus 16, Ohio. Direct communication is authorized.

All changes, additions, or deletions of Federal stock numbers or manufacturer's part numbers within these changes should be appropriately reflected in the index.

Changes, additions, or deletions to Repair Parts List as follows:

Page	Item	Action	Source codes				Federal stock No.	Description	Unit of issue	Expendability	Quantity incorporated in unit	15-day organizational maintenance allowance per 100 equipments	Guide quantities per 100 equipments		
			Techincal service	Source	Maintenance	Recoverability							Field maintenance 15-day-level		Depot maintenance
												2d echelon	3d echelon	4h echelon	5h echelon
			a	b	c	d	e	f	g	h	i	j	k	l	m
84	1	Chg cols f, j, and k.	…	…	…	…	6135-120-1020	6703 — ALTIMETER BATTERIES (minimum stockage of 2 is authorized).	…	…	…	(2)	(2)		
88	1	Add	…	…	…	…	6675-981-8460	DISC * * * (79172) FP5672							

BY ORDER OF THE SECRETARIES OF THE ARMY AND THE AIR FORCE:

EARLE G. WHEELER,
General, United States Army,
Chief of Staff.

Official:

J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

CURTIS E. LEMAY,
Chief of Staff, United States Air Force.

Official:

R. J. PUGH,
Colonel, United States Air Force,
Director of Administrative Services.

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Active Army:

USASA (2)
CNGB (1)
C80O (1)
CofEngrs (3)
CofT (1)
TSG (1)
AMC (6)
AMC Det No. 1 (Ord) (5)
USCONARO (I)
U8S CD Agcy (2)
OS Maj Comd (6) except
USASETAF (2)
USARJ (10)
MDW (1)
Armies (2)
Corps (2)
Div (2)
Engr Bde (1)
Svc College (2)
Br Svc Sch (2) except
USAES (100)
USMA (2)
GENDEP (OS) (2)
Engr See, GENDEP (OS) (10)
Army Dep (2)
Engr Dep (OS) (10)
Trans Tml Comd (2)
Army Tml (2)
OSA (2)
Dist Engr (2) except
Buffalo, Chicago.
Detroit, Alaska,
Los Angeles, New
Orleans, New York,
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San Francisco, Omaha,
Kansas, Baltimore,
Ft. Worth, Eastern Ocean,
Philadelphia Rock Island,
St Louis, St Paul (1)
Div Engr (2) except
Lower Miss Valley.
North Central (None)
Engr Fld Maint Shop (3)
Engr RD Lab (3)
Engr Cen (6)
AMS (3)
Chicago Proc Ofc (10)
USA Mob Spt Agcy (36)

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5-167	29-51
5-237 (5)	29-52
5-262 (5)	29-55
5-267 (1)	29-56
5-278 (5)	29-57
5-279	29-105
5-327	29-109
5-348	39-51
5-500	39-61
(IA, IB, IJ)	39-65
6-100	57-100

NG: State AG (8); unit - same as Active Army except allowance is one copy each unit

USAR: Same as Active Army except allowance is one copy each unit

For explanation of abbreviations used, see AR 320-50.

TECHNICAL MANUAL
No. 675-203-15
TECHNICAL ORDER
No. 49A3-6-1

DEPARTMENTS OF THE ARMY
AND THE AIR FORCE

WASHINGTON 25, D.C., *12 October 1960*

OPERATOR, ORGANIZATIONAL, FIELD AND-DEPOT MAINTENANCE MANUAL, INCLUDING REPAIR PARTS AND SPECIAL TOOL LISTS

ALTIMETER, SURVEYING: 4,500 METERS, 2 METER DIVISIONS (WALLACE AND TIERNAN TYPE FS-199) FSN 6675-641-3569

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SECTION I
INTRODUCTION

1. Scope

This manual provides information for the care and use of the Surveying Altimeter, Type FA-199, manufactured by Wallace and Tiernan, Belleville, N. J. (fig. 1). Sections II through VIII include description, preparation for shipment or storage, principles of operation, operating instructions, methods of altimetry and maintenance procedure.. Section VIII consists of calibration and conversion tables and charts for reference by the text.

2. Description and Use

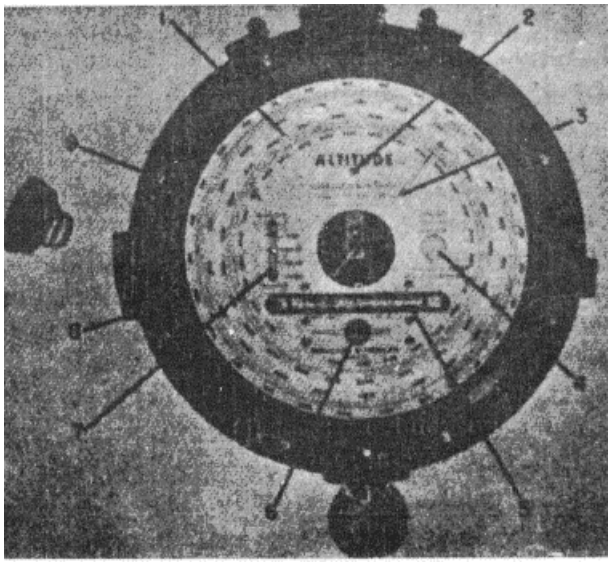
The Surveying Altimeter is a portable instrument provided with a carrying strap and is used in obtaining elevations for supplementary vertical control of aerial photographs for topographic mapping, pipe line and highway location, geological and geophysical exploration, and similar requirements.

Figure 1. Wallace and Tiernan Surveying Altimeter Type FA-199.

SECTION II
DESCRIPTION

3. General

The Surveying Altimeter is an aneroid type altimeter weighing approximately nine pounds, designed for use up to 4,500 meters above and 300 meters below sea level. It consists of a pressure sensing mechanism, a pointer, a dial, and various accessories, housed in an aluminum case and cover.



1	Annular mirror	5	Thermometer
2	Phillips head dial screw	6	Adjusting screw
3	Pointer	7	Revolution counter
4	Desiccant indicator	8	Bezel ring
		9	Screw

Figure 2. Dial of surveying altimeter.

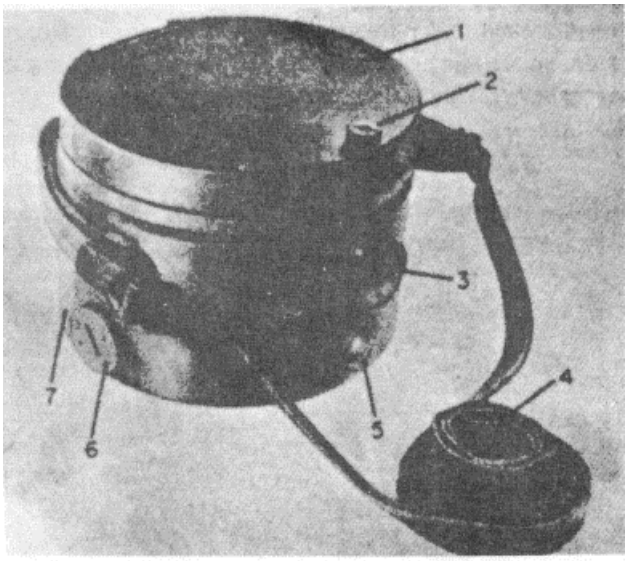
4. Dial

a. The altimeter had a circular-dial (fig. 2) with four scales, two outer scales 6Vs inches in diameter, and two inner scales 47/8 inches in diameter. All graduations are black and are numbered every 50 meters. Each scale covers approximately one fourth of the range. Since the pointer (3, fig..2) makes four revolutions to cover the entire range, a revolution indicator (7) is provided so the observer can determine upon which scale the instrument is operating. The scales are custom calibrated to intervals of 2 meters, in accordance with table 51 of the Fifth Revised Edition, Smithsonian Meteorological Tables except that the indicated altitude is 300 meters greater than that given in the tables. In order to avoid negative values, zero on the scale corresponds to -300 meters of table V. The scale ranges to 4,500 meters of table V, but is marked 4,800 meters on the dial.

b. An annular mirror (1), located in the dial between the outer and inner scales, is provided so that reading parallax may be eliminated by superimposing the pointer on its reflected image.

c. A mercury alloy thermometer (5) is mounted in the dial to provide instrument temperature which is required to obtain maximum accuracy.

d. The pointer may be set to agree with other altimeters or to the correct pressure-altitude by slowly turning the adjusting screw (6) which is located in the face of the dial. The screw is reached by removing the lid, bezel ring, and window. This screw should not be turned beyond the adjustment limits marked in red on the dial. A desiccant con-



1 Cover
2 Latch knob
3 Lamp cap
4 Carrying strap
5 Desiccant tube cap
6 Battery cap
7 Case

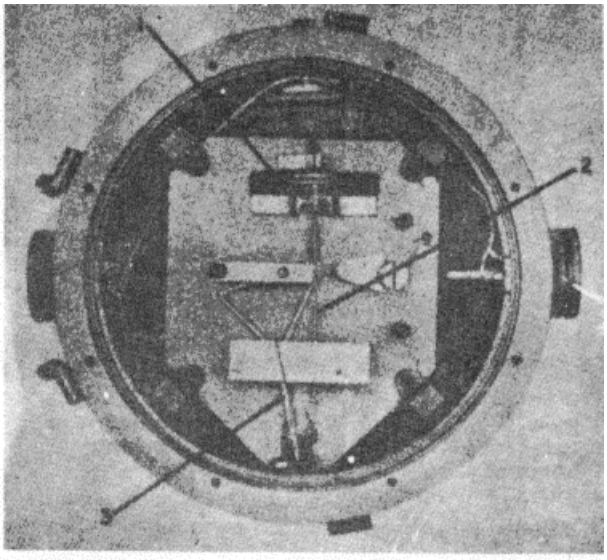
Figure 3. Case and cover surveying altimeter.

dition indicator (4) of filter paper impregnated with cobalt salt is inserted in the dial so that the observer has a means of knowing when the desiccant is spent. When the desiccant condition indicator turns pink the silica gel should be removed, dried, and replaced.

5. Case and Cover

The case (7, fig. 3) is the housing for the mechanism. It is made of aluminum and is 81,inches in diameter and 6 1/4 inches deep. Rubber shock

mounts are provided to protect the mechanism from shock and vibration. The lower portion of the case which houses the mechanism can be made airtight by tightening all threaded caps, that is, the lamp cap (3, fig. 3), battery cap (6) and desic-



1 Pressure sensing element
2 Actuator rod
3 Support bracket and gear sector assembly

Figure 4. Mechanism of surveying altimeter.

cant cap (5), and shifting the movable vent plug (11, fig. 5) to the closed position and closing the cover. The interior of the instrument is maintained at a low humidity by means of silica gel desiccant contained in a receptacle reached by removal of a cap in the side of the case. Electric light

1	Temperature correction chart assembly	6	Cover assembly
2	Conversion charts	7	Pointer
3	Pocket magnifier	8	amps
4	Spanner wrench	9	Wicks
5	Psychrometer assembly	10	Vent
		11	Vent plug

Figure 5. Accessories of surveying altimeter.

for the dial is furnished by two 21/½ volt screw type lamps (Mazda 14) which are mounted in the clear plastic ring which encircles the dial and diffuses the light evenly. Energy for the lamps is provide(d by two size D flashlight batteries which are housed in a separate container inside the case. The lamps and batteries can easily be replaced by removing the screw plugs in the side of the case. The intensity of light can be regulated by the rheostat an(d switch located on the side of the case. The cover contains the storage space for the accessories.

6. Mechanism

The mechanism contains the pressure sensing element (1, fig. 4), the linkage, and the pointer. The pressure sensing element is a capsule which is sensitive to changes in atmospheric pressure. Movement of the capsule is transmitted to the pointer through a linkage consisting of the actuating rod (2), support bracket and gear sector assembly (3), pinion, and pointer shaft.

7. Accessories

The accessories, which are mounted in the cover, consist of a pocket magnifier (3, fig. 5), a psychrometer assembly (5), a spanner wrench (4) for tightening the caps, a container of spare psychrometer wicks (9), a spare pointer in a container (7), two spare lamps (8), two sets of correction and conversion tables furnished on 6 x 4 cards (3), and a wiring diagram of the electric illumination system.

SECTION III
PREPARATION FOR SHIPMENT OR STORAGE

8. General

Prepare the Surveying Altimeter for shipment or transport by tightening all caps, shifting the vent plug (11, fig. 5) to the closed position, and closing the cover.

9. Packing, Handling, and Storage

Pack in a suitable box or other container with sufficient padding around the altimeter to minimize the effects of jolts or vibration. The altimeter should be handled carefully in transit. The altimeter does not require any special treatment for storage; however, for protection, store in a dry place free of excessive heat and vibration.

***Caution*: Remove the batteries when the altimeter is not in use.**

SECTION IV
PRINCIPLES OF OPERATION

10. Atmospheric Pressure-Altimeter Relationship

a. The basic principle of altimetry is that the pressure caused by the weight of the column of air above the observer decreases as the observer rises in altitude. The relationship between pressure and altitude is not constant since air is compressible. Furthermore, changes in air density caused by variations in temperature, relative humidity, and gravity will change the pressure versus altitude ratio.

b. In order to eliminate the need for converting pressure readings to altitude, the altimeter described herein is calibrated in meters; however to calibrate an altimeter a standard pressure-altitude relationship must be used. Because altitude does not have a constant relationship to pressure, the altimeter can be used only to measure differences in elevation with respect to some base or reference station, preferably a known benchmark.

c. The pressure-altitude relationship holds goo(d only for certain standard conditions. If these conditions do not exist while a survey is being made. then corrections must be applied. Air temperature and relative humidity have the greatest effect on: the density of the air and are therefore the most significant. Application of these corrections is described in section VI.

d. The air temperature mentioned above must not be confused with the instrument temperature

which can also affect the altimeter reading if different from the 75° F. at which the instrument was calibrated. The altimeters are calibrated so that the error is small. However, when maximum accuracy is desired, this correction should be applied.

e. Barometric pressure changes will affect the altimeter just as altitude changes do. Since the atmosphere is continually changing, it is necessary to take pressure changes into consideration. The success with which pressure changes are evaluated will determine the accuracy of the altimeter survey. During inclement weather and when there are high, gusty winds, atmospheric conditions are very unstable and altimetry will not yield accurate results.

f. If reasonable limitations and precautions are observed, a majority of the elevations will be found correct within one meter and the maximum error will seldom exceed three meters.

11. Pressure Sensing Element

a. The pressure sensing element is a capsule which has one end secured in a fixed position by means of an anchor block fastened to the mounting plate. The other end is free and is linked to the pointer. Since the case is vented, the external pressure exerted on the capsule is the atmospheric pressure. Should the atmospheric pressure decrease, the capsule expands; should it increase, the capsule contracts. In this manner, changes in atmospheric pressure result in movement of the free end of the capsule. This movement is transmitted to the pointer through a linkage consisting

of the actuating rod, support bracket unit, pinion, and pointer shaft (fig. 4).

b. A blacklash spring provides for the elimination of backlash in the linkage, by keeping a constant tension for all positions of the sector and pinion.

c. The amount of movement is proportional to the change in atmospheric pressure, the capsule expanding or contracting until the forces acting upon it cancel each other. Since the pressure within the evacuated capsule is insignificant, the pressure may be considered zero. Therefore. the only forces acting on the capsule are the atmospheric pressure and the capsule resistance to distortion.

SECTION V
OPERATING INSTRUCTIONS

12. General

Essentially, the altimeter operating instructions as described in this section are limited to reading the dial accurately and operating the sling psychrometer (wet and dry bulb thermometers). Instructions on the use of the altimeter in measuring altitude may be found in section VI.

13. Dial Reading

a. After opening the cover, the altimeter is ready for operation. Essentially, operation consists of reading the dial accurately while holding the altimeter as level as possible in a horizontal position. Readings may be made immediately after the cover is opened; however, before reading, tap the plastic window lightly with a finger or pencil. When reading, position the eye so that the pointer and its image in the annular mirror coincide. Error is greatly reduced if the eye sights along the pointer and if the accessory pocket magnifier is used. Since the pointer makes four revolutions to cover the entire range, refer to the revolution indicator to determine which of the four scales to read. Use the outside scale for the first revolution and work in toward the center of the dial for each succeeding revolution. Count the subdivisions from the smaller figure to the larger and interpolate to the nearest 1/2 meter.

b. For reading at night, illuminate the dial using the switch on the side of the case. The intensity of light may be regulated with the rheostat. Remove the batteries when altimeter is not in use.

Caution: **Be sure to cushion the altimeter against road shock and avoid sudden jarring at all times.**

14. Operating Sling Psychrometer

The sling psychrometer is the accessory which provides the wet and dry bulb thermometer readings for the air temperature and relative humidity correction factors. Remove the instrument from the cover of the altimeter and proceed as follows:

a. Slide the handle off the thermometer as far as possible.

b. Rotate the thermometer head 1800 and the handle 90° on its end of the link.

c. Saturate the wick on the wet bulb thermometer with water.

d. Hold the handle of the psychrometer in one hand with the link and thermometer assembly at right angles. Rotate the thermometers two or more revolutions per second for at least one minute.

e. Read and record the temperature of both thermometers. Repeat until two successive readings agree.

f. Refer to section VIII for the use of these readings in obtaining the air temperature and relative humidity correction factor. Section VIII explains the use of the various charts and tables.

SECTION VI
METHODS OF ALTIMETRY

15. General

This section outlines the methods of altimetry used in conjunction with surveying altimeters manufactured by Wallace & Tiernan. The altimetry methods described herein are confined to three: the single-base, the two-base, and the leapfrog. The single-base method requires a minimum of observers and equipment. However, because it requires the application of many correction factors it is not the most practical or accurate of the three methods. The two-base method is the most widely used and is generally accepted as the standard for accuracy. It does not require the application of all the correction factors needed in the single-base method. Instead, a calibration is made which compensates for air density over the area to be surveyed, and, through the use of two-base altimeters, a highly accurate altimeter survey is possible. The leapfrog method again requires the use of the same series of correction factors used with the single-base system. However, the leapfrog method has an advantage over both the other fixed-base methods in that the altimeters used are always in close relationship to each other and therefore operate under reasonably similar atmospheric conditions. This contrasts with fixed-base methods where the roving altimeters move continually away from the base station and perhaps encounter pressure and temperature conditions which do not

affect the base instruments. The results obtained using the leapfrog method are more accurate than those obtained using the single-base method, and compare favorably with the two-base method results.

16. Optimum Accuracy Considerations

In order to insure the most accurate results regardless of the altimetry method employed, certain general considerations, corrections, and conditions should be observed. These are as follows:

a. The accuracy of altimeter work is directly connected to the stability of the prevailing weather conditions. Values recorded when weather conditions are unstable are usually so erratic as to constitute a waste of time. Wind velocities are usually an excellent guide to follow in determining whether scheduled operations are to be conducted. In general, the most favorable results are obtained with winds up to 10 miles per hour. However, reasonably favorable results are possible with winds up to 15 miles per hour. When the wind velocity exceeds 15 miles per hour, operations should be cancelled. In general, the early morning hours between six and nine o'clock, and the early evening hours between four and eight o'clock afford the most stable pressure conditions. However, excellent results have been obtained up to midnight and later.

b. Prior to a scheduled operation, all altimeters in the set to be used must be calibrated, and a calibration correction factor must be determined for each instrument. This is accomplished using the following procedure:

(1) A suggested method of calibration is by use of the W & T Portable Test Kit FU2904. This kit consists of a hand pump with connecting tubing permitting simultaneous calibration of up to six altimeters. The connection to the altimeter is made at the vent tube (10, fig. 5).

(2) Exert vacuum or pressure to run the altimeters through full range making comparison readings, using one altimeter as a standard, and noting the differences at each 50 meter scale division for each altimeter, charting these differences for later use.

Note. If more than 6 altimeters are to be calibrated, use the same altimeter as a standard.

(3) It is advisable to make a new set of comparison readings at least every three months, or when instruments have been shipped over long distances, severely jarred, or when an instrument is to be used with a group with which it has not been previously calibrated.

Caution: **Once an altimeter has been calibrated, do not move the adjusting screw unless it is to be recalibrated.**

c. Prior to the start of the actual recording run, all observers should set their watches in common agreement. A check of all watches should be made at the completion of the run to determine whether time corrections need be applied to the field readings. Watches obviously erratic or unreliable must not be used.

d. When recording altimeter readings, read the dial in accordance with the instructions described in paragraph 13.

e. The same points shouL11 be visited twice if practicable. These successive visits will provide a mean value which in most cases will be more accurate than any single reading. Revisits should not be closer together than one hour for each point, and the time interval should be longer, if convenient.

f. It is desirable that one or more known elevations (other than the base stations) be included in each line of altimeter points to be run.

g. When running a new altimeter line adjacent to a previously completed line, one or more of the points of the old line should be included in the new line. This use of common points will provide an indication of the consistency of the final results. Also, the use of these points will provide additional values which can be used to determine the final mean result of the common point or points.

17. Precautions

The following general precautions and/or limitations should be observed whenever possible.

a. Observe station and field altimeters under similar conditions outdoors, but protect them from sun and strong winds. Between stations keep the altimeter shaded.

b. Cushion the altimeter against road shock, and avoid sudden jarring at all times.

c. Avoid midday observations. Best results may be obtained following the recommended observation periods described in paragraph 16a.

d. Avoid observations during thunderstorms, squalls, or other unstable conditions.

e. For best results, the initial and final reading of any run should not be over four hours apart.

f. Prior to the recording run, all altimeters to be used must be observed simultaneously at intervals over a period of at least one day.

g. If possible, the difference in elevation between the bases should not exceed 75 meters, and a lesser distance is desirable.

h. The distance between the base stations should not exceed 12 miles, (1 mile = 1.609 kilometers.)

i. Observations should not be taken outside the range of the base stations, as they may not be reliable.

18. Single-Base Method of Altimetry

Field surveys using the single-base method of altimetry are conducted as follows:

a. For the base station, select a point of known elevation, centrally located if possible, among the points for which elevations are to b)e determined. Allow the instruments to rest at the base station for approximately 10 minutes prior to taking the first observation, to allow them to become fully adjusted to the prevailing conditions of pressure and temperature. After this period, they may be set in agreement, if desired. During this period, a check should be made to insure that all observers watches are in agreement.

b. The first observation is made at the base station, and particular care should be taken because it is upon this observation that the accuracy of all

the differences in elevation between the base station and the unknown points depends.

c. After the initial reading has been made, and the time, temperature, and humidity conditions have been recorded, the field instruments may be transported to any of the other points (within 10 miles of the base station) for which elevation reading are desired. Observations of indicated altitude, time, temperature, and humidity (wet and dry bulb readings) are made at each point and recorded. During this period, the base station altimeter is read at five-minute intervals, and all changes in weather conditions are noted and recorded. During the point to point traverse, readings may also be taken of other known points of elevation to maintain a running check upon the readings being taken at each point in the scheduled run. These checks are particularly desirable when they can be taken near the points in the scheduled run which are most distant from the base station.

d. After all desired points have been traversed and observed, each instrument is returned to the base station for the final observation of altitude, time, temperature, and humidity. This final observation must be taken with the same accuracy as the initial observation, and since it is taken at the base station, it is desirable for the work to be arranged so that a loop or circuit is formed by the points in the run. The circuit should be arranged so that not more than four hours is required to complete the run.

e. During the run, any standard level or transit notebook may be used for recording the field notes,

or Wallace and Tiernan Form 1851, or equivalent. may be used (fig. 6). When making and recording observations, if there is any difference in elevation between the point for which an observation is desired, and the point where the instrument was actually read, the difference in elevation should be determined by direct measurement using a tape or similar device. This measured difference in elevation is not set down in the field notes. Instead, the difference is noted -

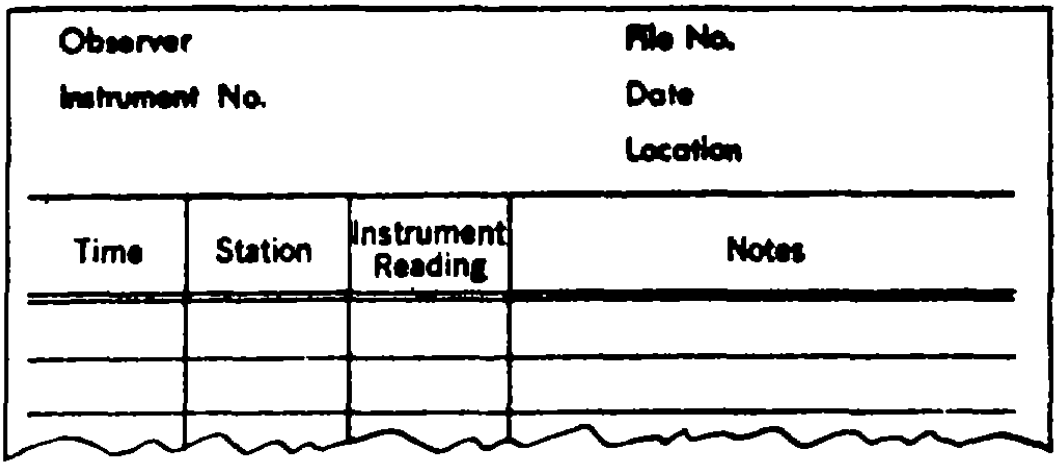


Figure 6. Wallace & Tiernan Form 1851.

with the appropriate algebraic sign as a correction to the altitude reading of the point actually observed in order to record the "FIELD ALTIMETER READINGS" of the desired point. If the observed point is lower than the desired point, the correction is plus (+), and if higher than the desired point, is minus (-).

f. After the field run has been , completed, the field notes are used to make the final computation. To make the final computation, a form similar to the one shown in figure 7 may be used. Computations are made in accordance with the following procedure:

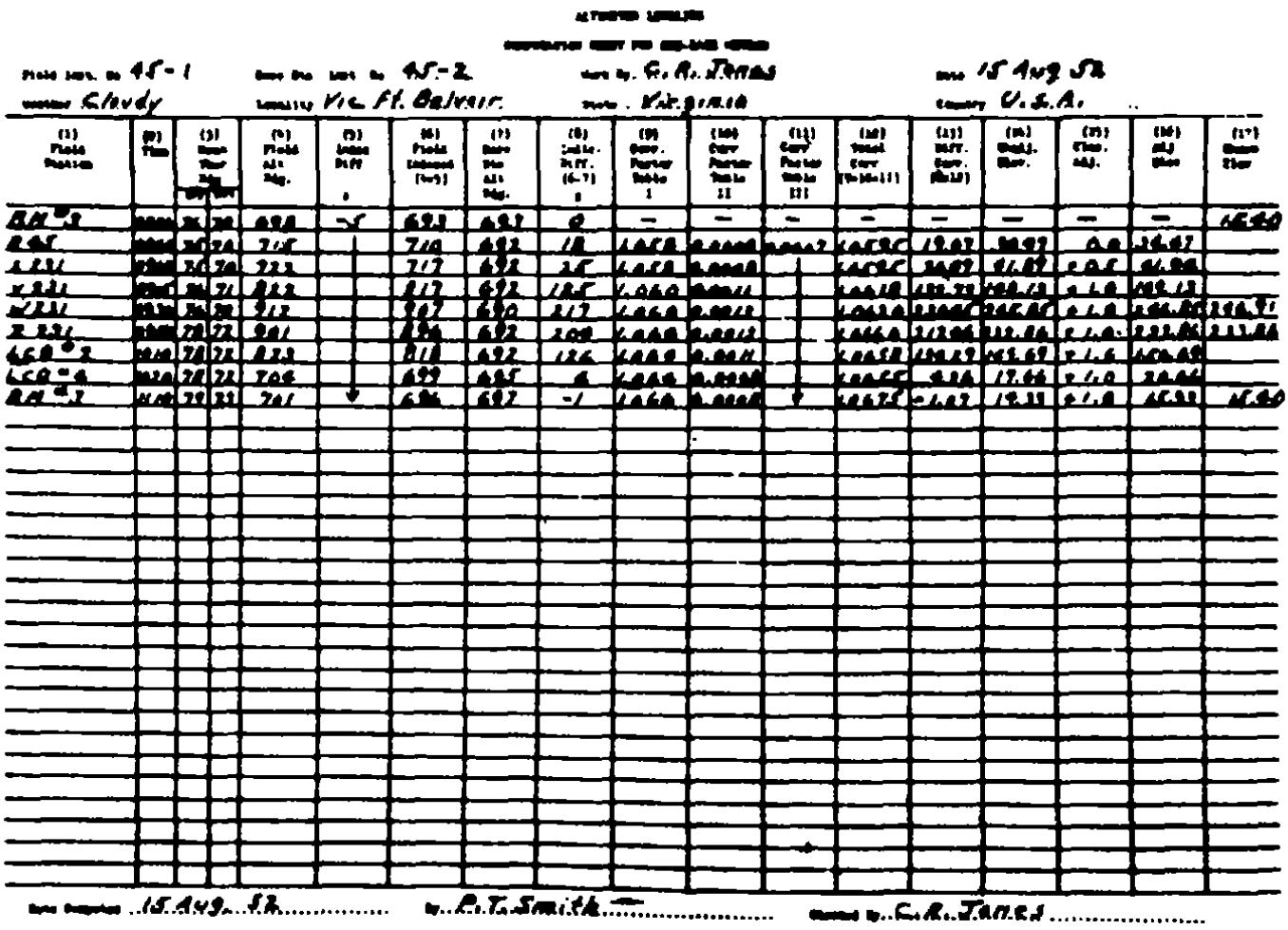


Figure 7. Single-base method final computation form.

(1) In the first column of the form, record the station name and number and such brief description as may facilitate identification. Any marked change in the weather such as rain or wind squall should be noted in parentheses.
(2) In the second column, record the time of each field observation to the nearest minute.
(3) In the third column, record the mean wet and dry bulb thermometer readings. These means are the averages of the wet and dry bulb readings obtained at the field and base stations.
(4) In the fourth column, record the field altimeter reading for the base station and each point observed.
(5) In the fifth column, record the "INDEX DIFFERENCE." This difference is the algebraic difference of the base station altimeter reading minus the field altimeter reading taken at the base station.
(6) In the sixth column, center the "FIELD INDEXED" computation. "FIELD INDEXED" shows field altimeter readings changed to correspond with the initial station altimeter reading by applying the index difference in turn to each of the field instrument observations. Should it be convenient to set the two instruments to the same value for the initial reading at the base station, no entries need be made in columns 5 and 6.

(7) In the seventh column, record the "BASE STATION ALTIMETER READING." The "BASE STATION ALTIMETER READING" is interpolated directly from the station record of the base station altimeter to the probable reading at the minute the field observation was made.
(8) In the eighth column, record the "INDICATED DIFFERENCE." 'INDICATED DIFFERENCE" represents the apparent difference in elevation between the observed base station altitude and the observed field altitude, and is obtained by algebraically subtracting the value in column seven from the value in column 6 directly opposite.
(9) In the ninth column, enter the combined correction factor for temperature and relative humidity. To establish this correction factor, use the wet and dry bulb reading shown in column 3 and apply the correction factor shown in table I.
(10) In the tenth column, enter the correction for altitude above or below altimeter scale reading of 450 meters shown in table II.
(11) In the eleventh column, enter the latitude correction (correction for north or South of the equator shown in table III.
(12) In the twelfth column, enter the total correction factor. This factor is obtained by adding the corrections entered in columns 9, 10, and 11.

(13) In the thirteenth column, enter the "DIFFERENCE CORRECTED." "DIFFERENCE CORRECTED" is obtained by multiplying the values from columns 8 and 12.
(14) In the fourteenth column, enter the "UNADJUSTED ELEVATION." "UNADJUSTED ELEVATION" is determined by the algebraic addition of the successive values from column 13 to the initial station elevation.
(15) In the fifteenth column ("CLOSURE ADJUSTMENT"), space is provided for the arithmetical adjustment of the difference between the initial and final values obtained at the benchmark. Intermediate elevation values are adjusted proportionately. If the field altimeter observations have included other points of known elevation, the series of observed elevations are adjusted to the known elevations.
(16) In the sixteenth column, enter the "ADJUSTED ELEVATIONS." "ADJUSTED ELEVATIONS" are determined by the algebraic sums of the values shown in columns 14 and 15.
(17) In the seventeenth column ("KNOWN ELEVATIONS"), space is provided for the recording of any elevations of occupied points which have previously been determined by spirit leveling, so that "CLOSURE ADJUSTMENT" factors may be applied between these stations.

19. Two-Base Method of Altimetry

In the application of the two-base method of altimetry, it is not necessary to apply the correction factors for temperature, relative humidity, latitude, or altitude as required in other altimetry methods. The application of these correction factors is obviated by calibrating the density of the column of air over the area which is to be surveyed. This is done by reading base altimeters located at the vertical extremities of the area at same time the field altimeter (at the unknown elevation) is read. To find the elevation of the field station, the difference in altitude readings which are taken simultaneously at the field station an(l the lower base (F' and L', fig. 8) is determine(l, as well as the difference in altitude between the

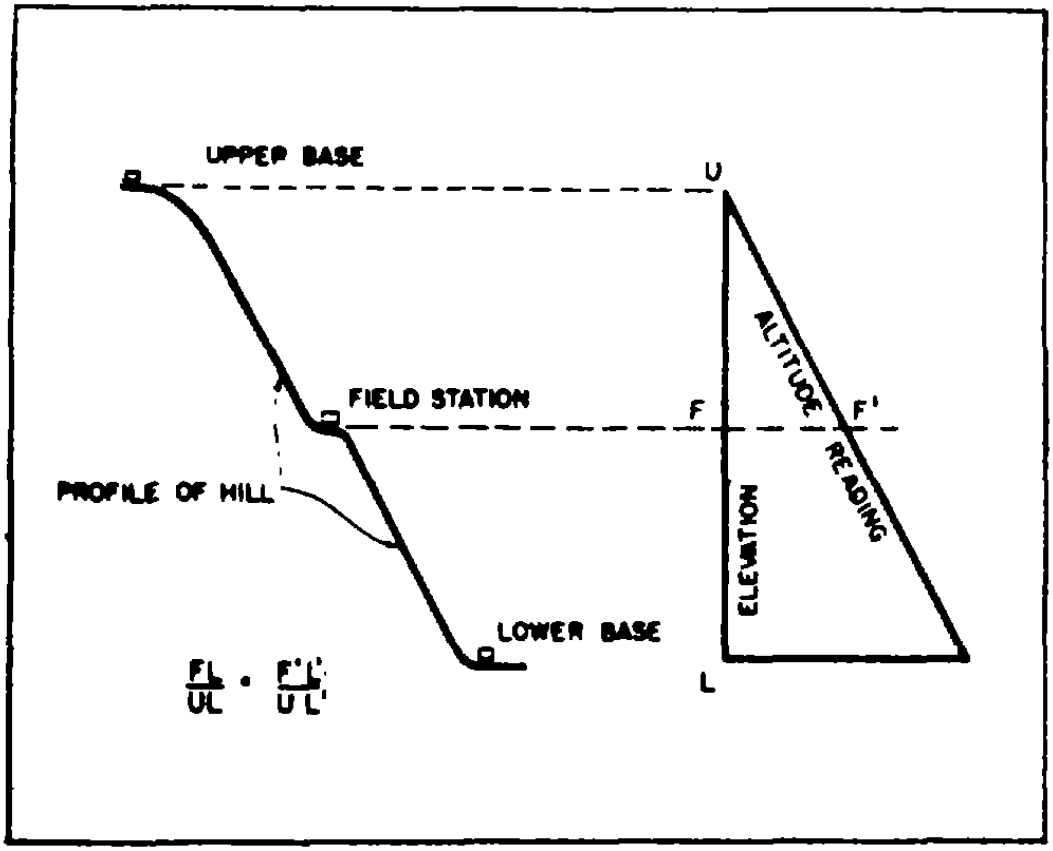


Figure 8. Two-base method.

upper base (U) and the lower base (L'). Since the difference in the elevation between the bases (U and L) is known, a simple proportion calculation may be used to determine the true difference in elevation between the field station (F) and the lower base (L). In the application of the two-base method, follow the general considerations and observe the precautions previously described in this section, and proceed as follows:

a. Select the lower and upper base stations in the area to be surveyed and establish their elevation.. These bases should be within 10 miles distance of each other, and closer if possible. These bases should be chosen so that most of the points to be surveyed fall within the elevation range between them. Best results are obtained when the difference in elevation between bases is 60 to 90 meters. In this case the average error will be less than one meter. When the vertical distance between bases is 600 meters, the average error will be less than two meters. During the survey, one altimeter will be located at each base. However, any number of instruments may be used in conducting the field survey.

b. Before starting the survey, all altimeters to be used are adjusted at one of the base stations so that they are exactly in agreement. While all the instruments are at this base they should be read simultaneously five times at two-minute intervals, with readings taken on the even minute. The mean of the five readings is established, and is fled as the correct reading of all the individual altimeters for this point. The instrument which is selected to remain at this base is considered the comparison

standard. If all the altimeters are not adjusted to correspond with each other at the starting base, an index difference will have to be used. The altimeters which are to be taken from the starting base (one for the second base station and the field altimeters) are compared with the comparison standard altimeter selected to remain at the starting base. The index difference is the algebraic difference between the reading of the comparison standard, or starting point altimeter, and the readings of each of the other altimeters, taken at the starting point base,

c. During the course of the survey, each altimeter reading with the exception of the reading taken using the comparison standard altimeter, must be corrected for its index difference. However, if all instruments were adjusted to the same value for the initial reading at the starting point, no corrections for index difference are necessary.

d. Base altimeters must be shaded, and read at five-minute intervals. Any changes in weather conditions (especially wind speed) must be noted.

e. Field altimeters must be shielded from the sunlight, and readings taken at each observation point on the even minute at two-minute intervals. Readings may be started immediately on arrival at the field station unless there has been an appreciable temperature change from the previous station. If this is the case it may be necessary to wait for five or ten minutes.

f. When reading the altimeter follow the instructions described in paragraph 13.

g. When convenient, it is desirable to compare the field altimeters with each other during the

course of the survey. It is also desirable to visit field stations and make observations using different instruments in order to maintain a check of the accuracy of the readings.

h. At the end of the day, or after all the required observations have been made, all altimeters are returned to the base where the comparison standard altimeter is located. The altimeters are again read simultaneously as they were at the start of the survey as an added check of the index differences.

i During the field survey, any standard level or transit notebook may be used for recording the field notes, or Wallace and Tiernan Form 1851, or equivalent, may be used (fig. 6).

j. After the field run has been completed, the field notes are used as a basis for making the final computation. To make the final computation, a form such as Wallace and Tiernan Form 1925 (shown in fig. 9), may be used. Computations are made in accordance with the following procedure.

(1) Enter the instrument numbers, upper and lower bases, observers' names, computer's name, checker's name, date, locality, and state, in the spaces provided in the heading of the form.

(2) Enter the elevation of the lower base, the elevation of the upper base, and the calculated difference in elevation between those two bases in blocks I, II, and III, respectively.

(3) Enter the station number and the time the reading was taken, in the blocks provided.

(4) Follow the computation key provided in each of the blocks on the form to complete the calculation.

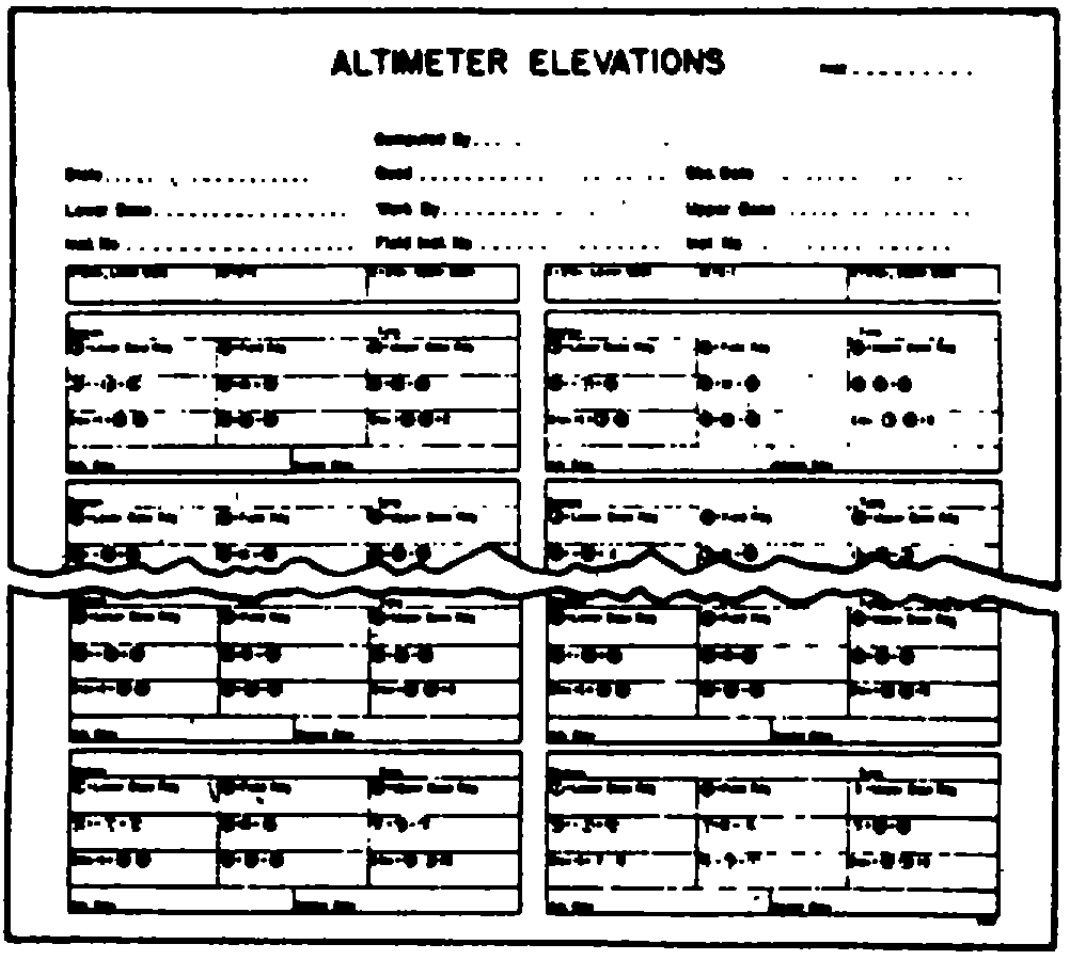


Figure 9. Wallace & Tiernan Form 1925.

(5) The adjustment of the computed altimeter elevations depends largely upon the observations made with the roving altimeters at benchmarks and other known points of elevation. These observations are known as check or tie points. A minimum of two such points is desirable and more should be obtained, if possible. If only two check points are used, the observer can make an error at one of them,

and that error will influence the final results for all other points obtained by that observer for the entire day. When more than two check or tie points are used, the computer can usually discover a faulty check point recording, provided an ordinary misreading is the apparent cause. Because of the different conditions and circumstances under which a day's observations using any one altimeter are made, the computing and adjustment of new elevations require good judgment on the part of the computer, and a good knowledge of field procedure is helpful.

(6) Regardless of how carefully the adjustments and corrections are made, discrepancies will still appear when elevations using altimeters are found for benchmarks or other points which have previously been determined by higher order methods. When this is the case, the computer will have to adjust each series of observed elevations in order to make them agree with the check or tie points. Comparable corrections must then be applied to the elevations observed using the altimeter at new points which are generally found in the series between check or tie points. It is assumed that such corrections are likely to be influenced by various factors such as elevation, elapsed time, and horizontal distances. Between two tie points which differ greatly in elevation it is probably

best to prorate the adjustment through the intermedate new points, according to elevation. If the ties are at nearly the same elevation, prorating according to time, distance, or locality, may be the best method. However, this is left to the computer's judgment.

Note. In order to eliminate computations when employing the two-base method of altimetry, a Wallace and Tiernan Palmer Altirule, or equivalent, may be used. This device permits a direct calculation of elevation.

20. Leapfrog Method of Altimetry

In the application of the leapfrog method of altimetry, the same corrections for temperature and relative humidity are required as for the single-base method previously described. However, the observational methods differ, and are as follows:

a. Two altimeters (A and B, fig. 10) are read simultaneously at the base station. After this initial reading, altimeter A remains at the base station, and altimeter B advances to the first field station.

b. After altimeter B advances, the two instruments are read simultaneously. The appropriate correction factors for temperature and relative humidity are applied, and the difference in the two readings gives the correct elevation for the first field station.

c. Next, altimeter A leaves the base station and leapfrogs the first field station, advancing to the second field station. During this period, altimeter

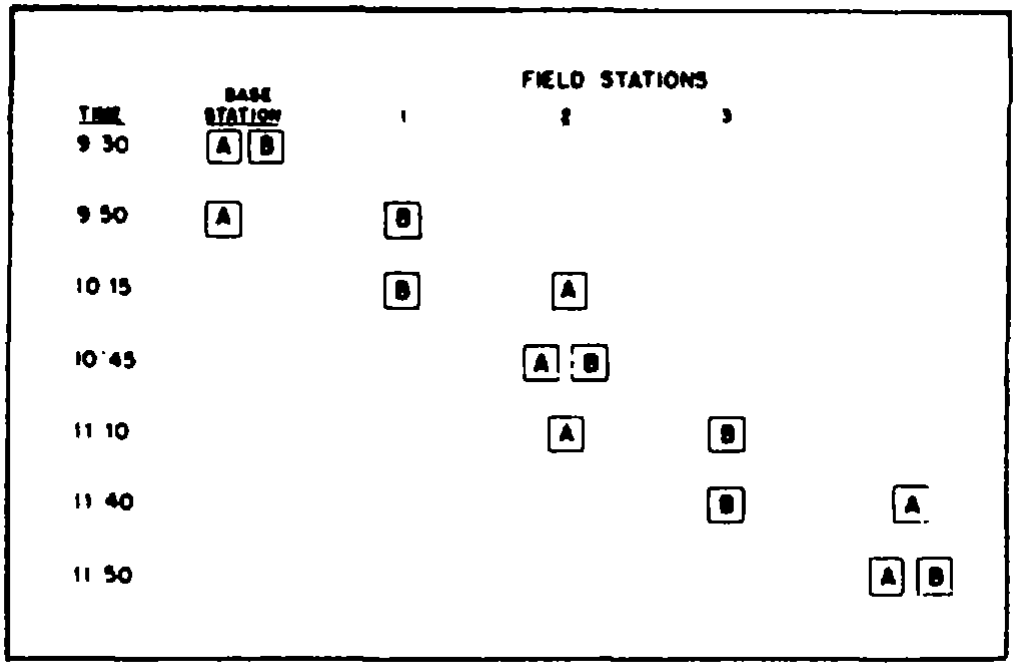


Figure 10. Leapfrog method.

B remains at the first field station. When altimeter A reaches the second field station, both instruments are again read simultaneously.

d. After completing the procedure described in *c* above, the difference in elevation readings are corrected, and the correct elevation for the second field station is determined with respect to the first field station.

e. The altimeters are then brought to the second field station and a reading is taken with both instruments. After this comparison, altimeter B advances to the third field station, and altimeter A leapfrogs to the fourth field station. Again the altimeters are brought together at the fourth field station, and compared. This procedure is repeated until all points for which coverage is desired have been traversed.

f. The survey may be speeded up by employing additional altimeters, and by comparing readings at every third or fourth field station instead of at alternate stations.

g. At the completion of the survey, computations are made using the same procedures outlined for the single-base method of altimetry, described in paragraph 18.

SECTION VII

MAINTENANCE

21. General

The Surveying Altimeter is a precision instrument with the dial individually calibrated for its particular mechanism. The dial and mechanism of each altimeter are matched parts, marked with a serial number, and are not interchangeable. Therefore, field maintenance is limited to the adjustments and procedures described below.

22. Calibration

Calibration of the altimeter is restricted to setting pointer to agree with the desired reference. To set the pointer, remove the bezel ring and plastic window as described in paragraph 25, and, using a screwdriver, slowly turn the adjusting screw (6, fig. 2). The maximum extent of the adjustment is approximately +50 meters.

Caution: **Do not turn the adjusting screw beyond the limits (red lines) marked on the dial.**

23. Renewing the Desiccant

When the desiccant indicator in the dial turns pink, the silica gel must be removed, and dried or replaced with fresh desiccant. Unscrew the cap (5, fig. 3) in the side of the case and remove the desiccant from the tube. Replace in the reverse order.

24. Removal and Replacement of Lamps and Batteries

Replace defective lamps or exhausted batteries by unscrewing the appropriate cap in the case. Batteries should be removed when altimeter is not in use.

25. Removal and Replacement of Cover, Bezel Ring, and Plastic Window

a. Remove the two screws and separate the cover from the case.

b. Unscrew the screws (9, fig. 2) and lift the bezel ring (8) from the case.

c. Remove the plastic window from the gasket and place the gasket back in its groove to prevent damage.

d. Replace the window, bezel ring, and cover in the reverse order; however, insert the window in the bezel ring so that the vent tube fits the notch provided for it in the ring.

26. Removal and Replacement of Pointer

a. Remove the cover, bezel ring, and plastic window as described in paragraph 25.

b. Calibrate the altimeter, as described in paragraph 22, so that when reinstalling the pointer, it may be set at the same scale reading as the known standard. This will compensate for any changes in atmospheric pressure while the pointer is removed from the instrument.

c. Using a small screwdriver, loosen the clamping screw, then lift the pointer from the shaft (fig. 11.)

d. Replace the pointer. Carefully install it on the shaft, so that the shaft is flush with the top of the pointer hub. Set the pointer to read the same as the standard instrument, and tighten the clamping screw.

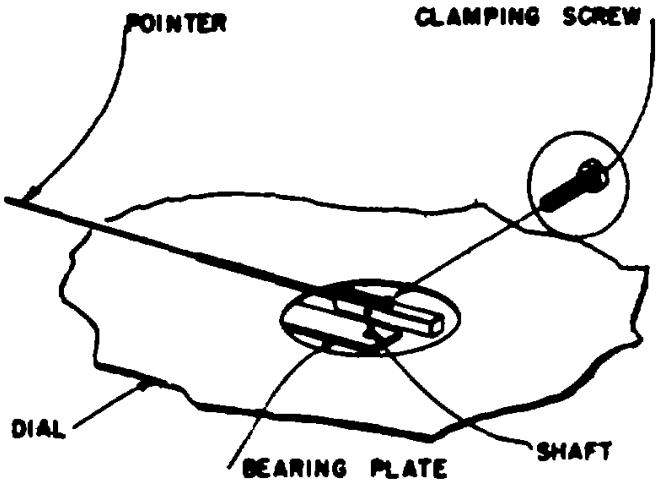


Figure 11. Removing the pointer

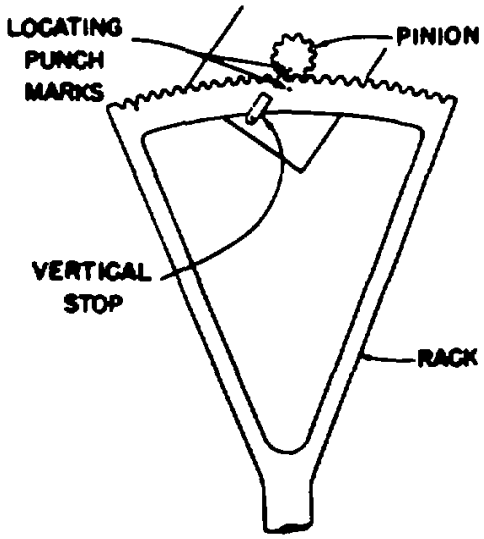


Figure 12. Rack and pinion alignment.

Note. Do not use the adjusting crew to acquire the correct reading. The pointer must be set correctly before tightening the clamping or.

e. Replace the plastic window, bezel ring, and cover as described in paragraph 26.

27. Rack and Pinion Alinement

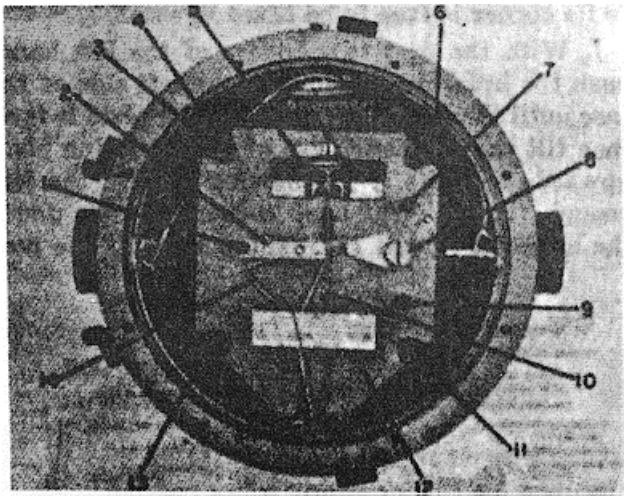
Occasionally following a severe shock, the altimeter may show an error of some magnitude, which may indicate that the rack and pinion have jumped a tooth. Remove the cover, bezel ring, plastic window, pointer, and dial as described in the appropriate paragraph above. Check the rack and pinion for punch marks. The punch mark on the rack will be located between two teeth whereas the punch mark on the pinion will be on one tooth of the pinion. When in proper mesh, the two marks must line up as shown in figure 12. If out of proper mesh, swing the vertical stop away from the rack, using a small pliers. Holding the pointer shaft with one hand to prevent turning, gently raise the rack above the pinion and rotate the pinion until the punch marks line up. Allow the rack to settle to its normal position and return the vertical stop back over the rack. Replace the dial, pointer, plastic window, bezel ring, and cover as described in the appropriate paragraphs above.

28. Removal and Replacement of Mechanism

a. Remove the cover, bezel ring, plastic window, and pointer as described above.

b. Unscrew the three phillips head screws in the dial and lift the dial from the posts.

c. Remove the four screws (8, fig. 13) which hold the mounting plate to the rubber shock mount brackets (4, 6, 11, and 18).



1	Post	8	Adjusting
2	Top bearing plate	9	Post
3	Screw	10	Actuating rod
4	Mounting bracket	11	Mounting bracket
6	Pressure sensing element	12	Mounting plate
6	Mounting bracket	18	Mounting bracket
7	Post	14	Rack of support bracket assembly

Figure 13. Removal of mechanism assembly.

d. With the case positioned so that the two posts (7 and 9) are to the right, grasp the posts between the thumb and forefinger of the right hand so that the mechanism will not drop into the case. These two posts are all that should be held in removing the mechanism from the case.

e. Press the near side of the mounting bracket (4) with the thumb so that the bracket shifts to clear the mounting plate (12). Let the bracket rest against the upper end of the mounting plate so its corner is free to be lifted upward.

f. With the first two fingers of the left hand, push the bracket (18) toward the left side of the case until the corner of the mounting plate is free, then tilt the left hand edge of the mounting plate upwards and lift it out moving toward the left enough for the right hand corners to slide under the brackets (6 and 11). The portion of the post

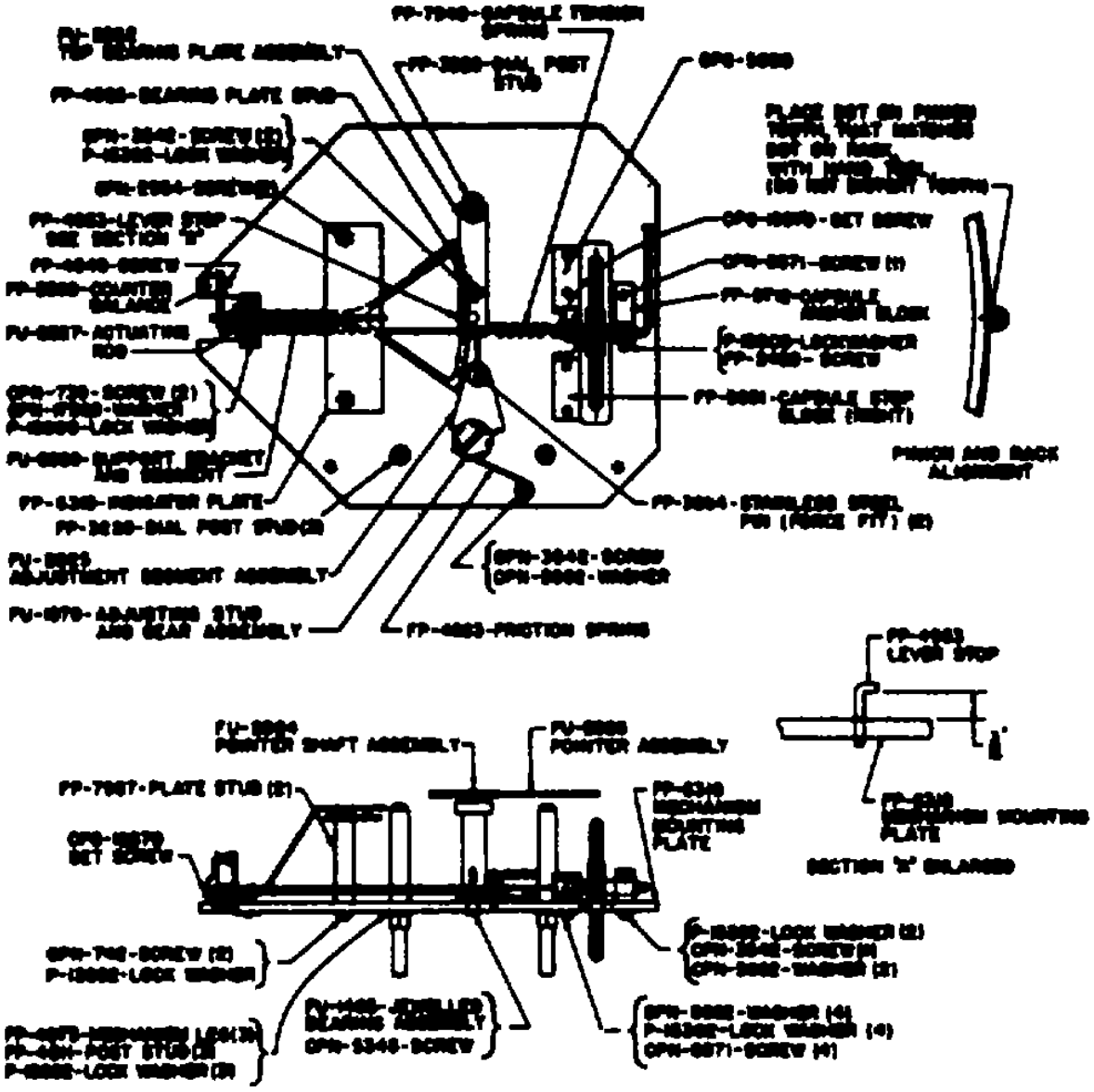


Figure 14. Altimeter mechanism assembly.

(1, 7, and 9) which extends under the mounting plate will then clear the desiccant and battery containers.

g. Replace the mechanism in the reverse order.

h. Replace the dial, pointer, plastic window, bezel ring, and cover as described in the appropriate paragraphs above.

SECTION VIII
CORRECTION AND CONVERSION TABLES

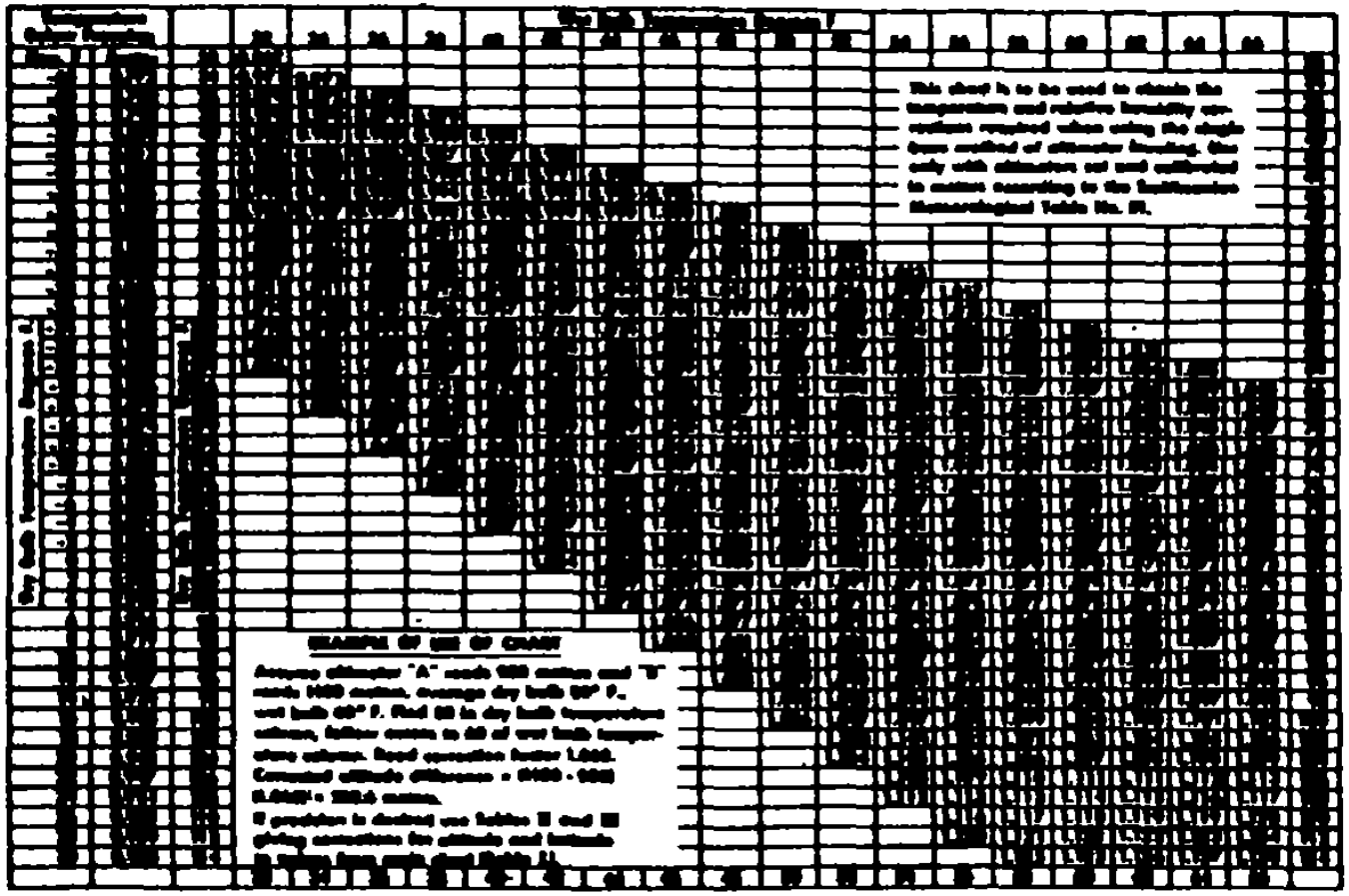
29. General

When using the single base and leapfrog methods of altimetry, corrections are required for air temperature, relative humidity, altitude, and latitude. This section provides instructions on the use of the tables that are required to make the above mentioned corrections. These tables are supplied with the altimeter on 4 x 6 inch plastic cards, stored in the cover. An individual instrument temperature correction graph is hinged in the cover. In addition, this section provides for converting inches pressure to meters altitude when calibrating the altimeter with a mercurial barometer.

30. Table I, Air Temperature and Relative Humidity Correction

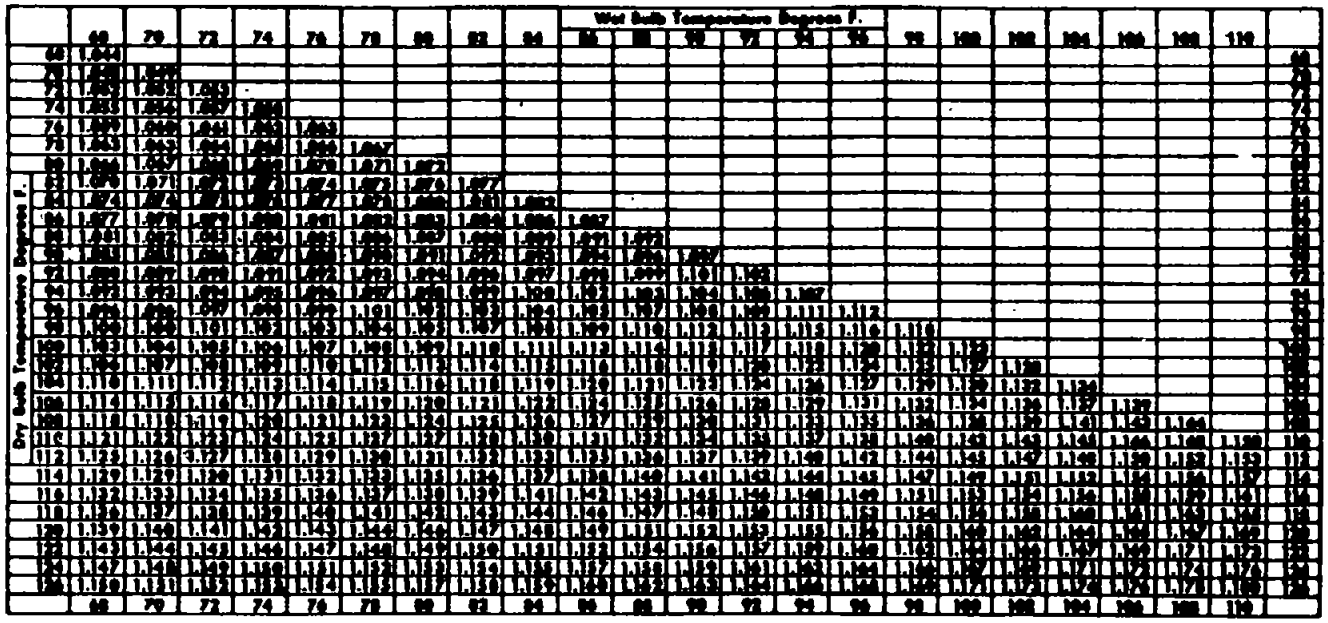
Table I combines the correction factors for air temperature and relative humidity. The wet and dry bulb temperatures are obtained with the sling psychrometer. Knowing the wet and dry bulb temperatures the correction factor can be determined from the table. For example, assume altimeter A reads 900 meters and B 1,100 meters (both corrected for instrument calibration), average dry bulb reading 800 F. and average wet bulb reading 600 F. Find 80 along dry bulb temperature column, follow across to 60 of wet bulb temperature column. Read correction factor 1.063. Corrected altitude difference = (1,100-900) (1.063) = 212.6

TABLE I.
Air Temperature and Relative Humidity Correction Factor for Altitude



(continued on reverse side)

TABLE I. (Continued)
Air Temperature and Relative Humidity Correction Factor for Altitude



meters. If precision is desired, use tables II and III providing corrections for altitude and latitude for values from table I.

31. Table II, Altitude Correction

Table II provides corrections for altitude above or below altimeter readings of 450 meters. These values are to be added to values from table I. For example, assume the mean altitude reading is

$$\frac{1{,}100 + 900}{2} = 1{,}000 \text{ meters.}$$

Find intersection of 1,000 meters and wet bulb 60° F., interpolate between lines, giving about + 0.0007. Add this value to value obtained from table I, 1.063 + 0.0007 = 1.0637. Corrected altitude difference-(1,100-900) (1.0637) = 212.74 meters.

22. Table III, Latitude Correction

Table III provides corrections for latitudes north or south of the equator. The values taken from the latitude correction table will be added to the values from tables I and II when operating at other than 450 latitude. For example, at 800 latitude the correction from the latitude table is approximately 0.0014.

Value obtained from table I = 1.063
Correction from table II = 0.0007
Correction from table III = 0.0014
Corrected altitude, difference = (1,100-900)
(1.0651) = 213.08 meters.

33. Table IV, Meters to Feet Conversion

Table IV is provided for conversion of meters to feet. The table gives the equivalents in feet and ten thousandths of a foot for each unit from 1 to 50 meters so that values in hundredths of a foot can be obtained from 1 to 5,000 meters by moving the decimal point. For example, to convert 4,205 meters to feet

4,200 meters	=	13,779.50 feet
5 meters	=	16.40 feet
4,205 meters	=	13,795.90 feet

34. Table V, Feel to Meters Conversion

Table V is the converse application of table IV, converting feet to meters.

35. Individual Instrument Temperature Correction

The instrument correction chart gives corrections above or below 75° F. The temperature correction curve is drawn individually for each instrument and is attached to the chart mounting plate (fig. 15). The altimeter indication may change if the instrument temperature differs from the 750 F. at which the instrument was calibrated even though the atmospheric pressure remains constant. When maximum accuracy is required the instrument temperature correction should be applied to the altimeter reading as follows:

a. If the instrument temperature differs from the temperature at which it was calibrated (76° F.), correct the instrument reading by means of the chart in the lid. Find the altimeter reading along the bottom line of the chart. Go up in a

TABLE II.
ALTITUDE CORRECTION CHART

Corrections for altitude above or below altimeter readings of 450 meters. Three values to be added to values from Table I.

EXAMPLE OF USE OF CHART

Mean of altitude reading is $\frac{1100 + 900}{2}$ = 1000 meters.

Find intersection of 1000 M and wet bulb 60° F and interpolate between items, giving approximately + 0.0007. Add this value to value obtained from Table I. 1.063 + 0.0007 = 1.0637

Corrected altitude difference = (1100-900) (1.0637) = 212.74 M

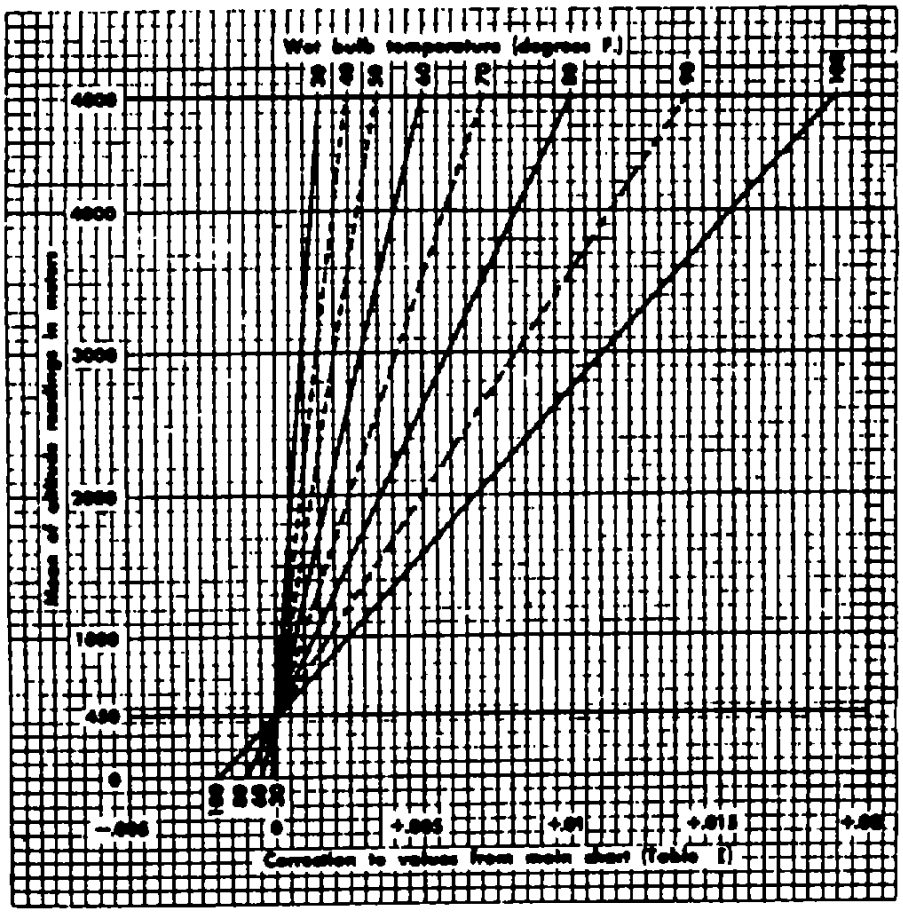


TABLE III.
LATITUDE CORRECTION CHART

Correction for latitude north or south of the equator. The values taken from latitude correction chart shall be added to the values from Tables I and II.

EXAMPLE OF USE OF CHART

For latitude 30° the correction from the latitude chart is approximately 0.0014.

Value obtained from Table I	= 1.063
Correction from Table II	= 0.0007
Correction from Table III	= 0.0014

Corrected altitude difference = (1100-900) (1.0651) = 213.08 meters.

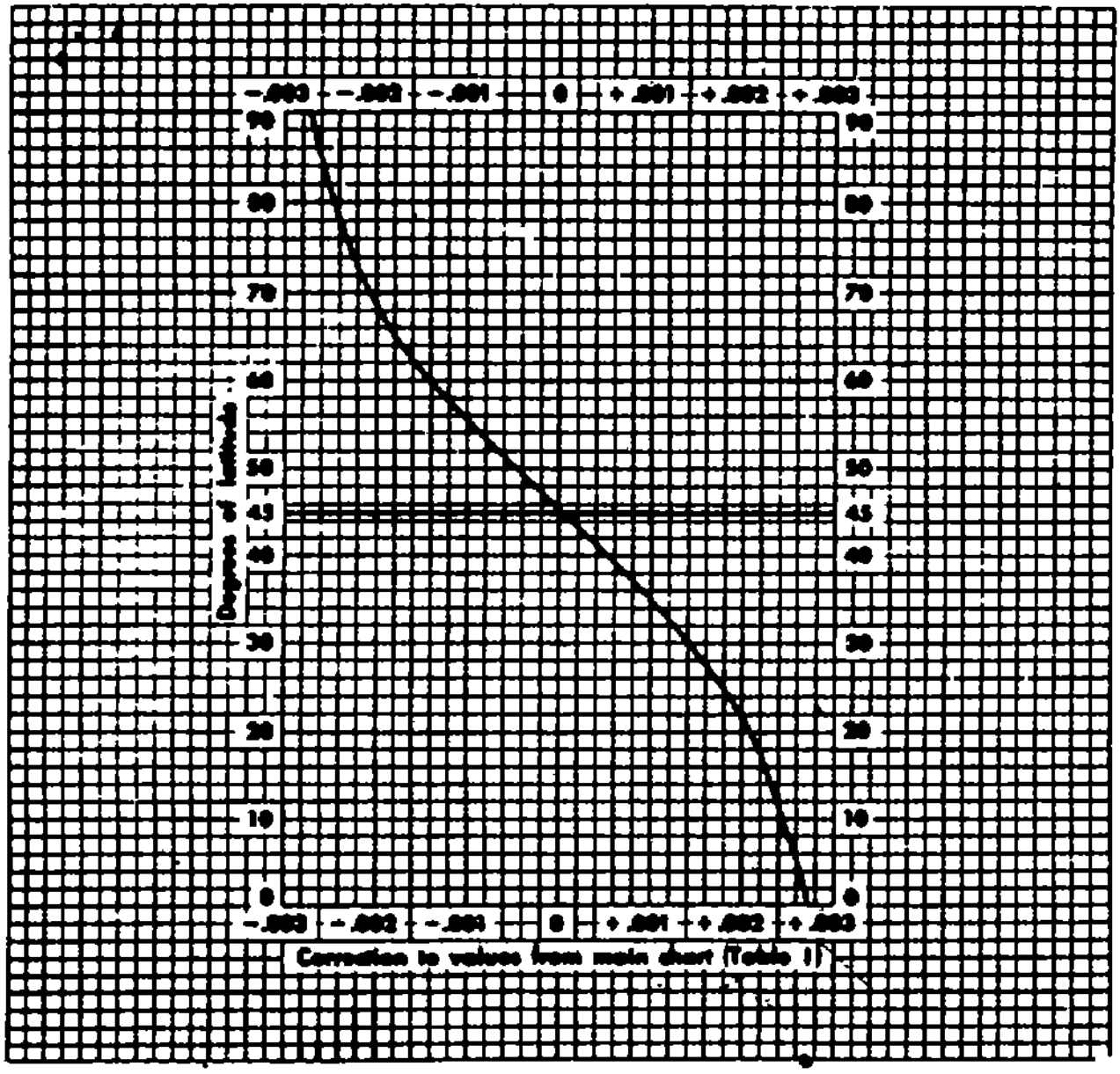


TABLE IV

CONVERSION OF METERS TO EET

Reduction Factor: 1 Meter = 3.2808333 Feet

Meters	Feet	Meters	Feet
1	3.28083	26	85.30167
2	6.56167	27	88.58250
3	9.84250	28	91.86333
4	13.12333	29	95.14417
5	16.40417	30	98.42500
6	19.68500	31	101.70583
7	22.96583	32	104.98667
8	26.24667	33	108.26750
9	29.52750	34	111.54833
10	32.80833	35	114.82917
11	36.08917	36	118.11000
12	39.37000	37	121.30983
13	42.65083	38	124.67167
14	45.93167	39	127.95250
15	49.21250	40	131.23333
16	52.49333	41	134.51417
17	55.77417	42	137.79500
18	59.05500	43	141.07583
19	62.33583	44	144.35667
20	65.61667	45	147.63750
21	68.89750	46	150.91133
22	72.17833	47	154.19917
23	75.45917	48	157.48000
24	78.74000	49	160.76083
25	82.02083	50	164.04167

TABLE V

CONVERSION OF FEET TO METERS

Reduction Factor: 1 Foot = 0.3048006 Meter

Feet	Meters	Feet	Meters
1	0.30480	26	7.92482
2	0.06960	27	8.22962
3	0.91440	28	8.53442
4	1.21920	29	8.83922
5	1.52400	30	9.14402
6	1.82880	31	9.44482
7	2.13360	32	9.75362
8	2.43840	33	10.05842
9	2.74321	34	10.36322
10	3.04801	35	10.66802
11	3.35281	36	10.97282
12	3.65761	37	11.27762
13	3.96241	38	11.58242
14	4.26721	39	11.88722
15	4.57201	40	12.19202
16	4.87681	41	12.49682
17	5.18161	42	12.80163
18	5.48641	43	13.10643
19	5.79121	44	13.41123
20	6.09601	45	13.71603
21	6.40081	46	14.02083
22	6.70561	47	14.32563
23	7.01041	48	14.63043
24	7.31521	49	14.93523
25	7.62002	50	15.24003

straight line to the curved line. Go the left in a straight line and read the collection per degree Fahrenheit.

b. Multiply this value by the difference between instrument temperature and 75° F. to obtain the total correction noting whether it is a plus or minus correction.

c. If the instrument temperature is above 750 F., add the correction algebraically to the altimeter reading.

d. If the instrument temperature is below 750 F., subtract the correction algebraically from the altimeter reading.

e. For example, the altimeter reads 3,000 meters, the thermometer reads 50° F.

(1) Find 3000 M on chart.

(2) Follow up to correction curve.

(3) Go left to edge and read correction per degree F In this case the correction is plus .09 M per degree F.

(4) Since the temperature of 500 is 250 less than 750 F., subtract (plus .09 x 25) from 3000 M; or 3000-(+.09 x 25) =3000-2.25 = 2997.8 M, which is the corrected reading.

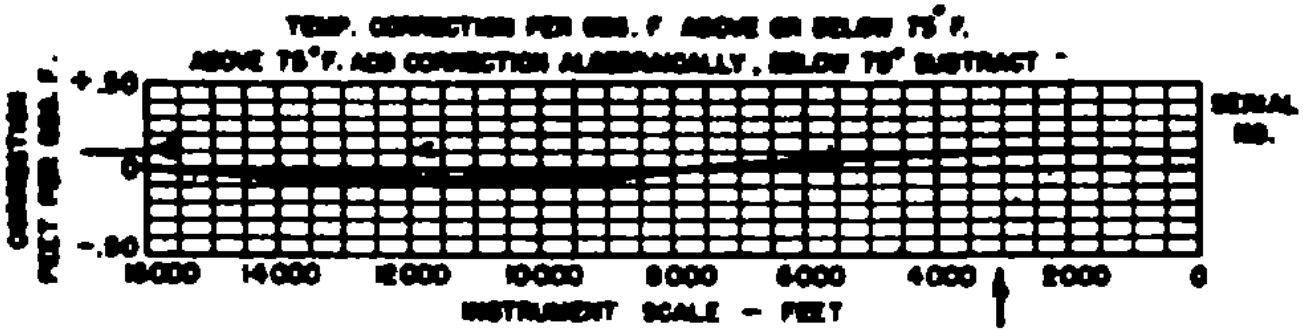


Figure 15. Typical individual instrument temperature correction chart.

36. Table VI, Conversion Table - Meters to Inches Mercury (SMT #51)

An inches mercury-pressure to meters-altitude conversion table is provided in this manual for use in calibrating-the altimeter with a mercurial barometer.

TABLE VI

CONVERSION TABLE - METERS TO INCHES MERCURY

-300 M to 4500 M SMT #51

Altitude Meters	Pressure In. Hg.	Altitude Meters	Pressure In. Hg.	Altitude Meters	Pressure In. Hg.
-300	31.003	1300	25.558	2900	21.069
-250	30.816	1350	25.404	2950	20.942
-200	30.631	1400	25.251	3000	20.816
-150	30.446	1450	25.099	3050	20.691
-100	30.263	1500	24.948	3100	20.567
-50	30.081	1550	24.798	3150	20.443
0	29.900	1600	24.649	3200	20.320
50	29.720	1650	24.500	3250	20.197
100	29.541	1700	24.353	3300	20.076
150	29.363	1750	24.207	3350	13.955
200	29.186	1800	24.061	3400	19.835
350	29.011	1850	23.916	3450	19.716
300	28.837	1900	23.772	3500	19.597
350	28.663	1950	23.629	3550	19.479
400	28.490	2000	23.487	3600	19.362
450	28.319	2050	23.346	3650	19.246
500	28.149	2100	23.205	3700	19.130
550	27.980	2150	23.065	3750	19.015
600	27.811	2200	22.927	3800	18.900
650	27.644	2250	22.789	3850	18.786
700	27.478	2300	22.652	3900	18.673
750	27.312	2350	22.515	3950	16.561
800	27.148	3400	22.380	4000	18.449
850	26.985	2450	22.245	4050	18.338
900	26.822	2500	22.111	4100	18.228
950	26.661	2550	21.978	4150	18.118
1000	26.500	2600	21.846	4200	18.009
1050	26.341	2650	21.715	4250	17.901
1100	26.182	2700	21.584	4300	17.793
1150	26.025	2750	21.454	4350	17.686
1200	25.868	2800	21.325	4400	17.579
1250	25.713	2850	21.197	4450	17.474
				4500	17.369

APPENDIX I

MAINTENANCE ALLOCATION CHART

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1. General

The maintenance allocation chart lists all maintenance and repair operations authorized for the various echelons.

2. Maintenance

Maintenance is any action taken to keep materiel in a serviceable condition or to restore it to serviceability when it is unserviceable. Maintenance of materiel includes the following:

a. Service. To clean, to preserve, and to replenish fuel and lubricants.

b. Adjust. To regulate periodically to prevent malfunction.

c. Inspect. To verify serviceability and to detect incipient mechanical failure by scrutiny.

d. Test. To verify serviceability and to detect incipient mechanical failure by use of special equipment such as gages, meters, and so on.

e. Replace. To substitute serviceable assemblies, sub-assemblies, and parts for unserviceable components.

f. Repair. To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes but is not limited to, inspecting, cleaning, preserving, adjusting, replacing, welding, riveting, and straightening.

g. Overhaul. To restore an item to completely serviceable condition as prescribed by-serviceability standards developed and published by heads of technical services. This is accomplished through employment or the technique of "Inspect and Repair only as Necessary" (IROAN). Maximum utilization of diagnostic and test equipment is combined with minimum disassembly of the item during the overhaul process.

3. Explanation of Columns

a. Functional Group. The functional group is a numerical group set up on a functional basis. The applicable functional grouping indexes are taken from the Corps of Engineers functional grouping indexes, and appear on the maintenance allocation chart in their correct numerical sequence. These indexes are normally set up according to their proximity to each other and their function.

b. Components and Related Operation. This column contains the functional index grouping heading, subgroup headings, and a brief description of the part starting with the noun name. It also designates the operation to be performed such as service, adjust, inspect, test, replace, repair, and overhaul.

c. Echelon Maintenance.

Column 1, First Echelon. First echelon maintenance is that maintenance performed by the user or operator of the equipment, such as servicing, cleaning, lubricating, and limited adjustments. It also includes

removal and replacement of items to accomplish servicing and lubrication.

Column 2, Second Echelon. Second echelon maintenance is that maintenance performed by trained personnel provided for that purpose in the using organization, such as replacement of all items in column 2, limited parts fabrication from bulk material, adjustments, and repair of assemblies, components, and end items that can be accomplished without extensive disassembly.

Column 3, Third Echelon. Third echelon maintenance is that maintenance performed by specially trained units in direct support of the using organization, such as replacement of all items in columns 2 and 3, repair assemblies, components, and end items, and fabricate parts from bulk material.

Column 4, Fourth Echelon. Fourth echelon maintenance is that maintenance performed by units organized as semifixed or permanent shops to serve lower echelon maintenance within a geographical area, such as replacement of items in columns 2, 3, and 4, repair end items, overhaul assemblies and components, and fabricate general use common hardware and parts.

Column 5, Fifth Echelon. Fifth echelon maintenance is that maintenance authorized to overhaul assemblies, components,

and end items, and replacement of all parts in columns 2, 3, 4, and 5.

d. Symbol X. This symbol in the appropriate column indicates the lowest echelon responsible for performing that particular maintenance operation, but does not necessarily indicate repair parts will be stocked at that level.

e. Remarks. The remarks column is used to explain why maintenance that would normally be done at a lower echelon, is moved to a higher echelon because of some peculiarity in the construction of the end item.

Functional group	Components and related operation	Echelons of maintenance					Remarks
		1	2	3	4	5	
26	ACCESSORIES, PUBLICATIONS, AND TOOLS						
2602.1	ACCESSORIES						
	Accessories						
	Replace		X				
	Psychrometer Assembly						
	Replace		X				
	Repair		X				
2602.3	SPECIAL TOOLS						
	Wrench, Spanner						
	Replace		X				
2602.4	PUBLICATIONS						
	Publications						
	Replace		X				
67	PRECISION AND TOPOGRAPHICAL INSTRUMENTS						
6703	ALTIMETER						
	Strap, Carrying						
	Replace		X				

Functional group	Components and related operation	Echelons of maintenance					Remarks
		1	2	3	4	5	
	Cap, Battery & Lamp						
	Replace		X				
	Repair		X				
	Gasket, Cap						
	Replace	X					
	Lamp						
	Replace	X					
	Socket Assembly, Lamp						
	Replace		X				
	Repair		X				
	Batteries						
	Replace	X					
	Desiccant Tube Cap						
	Replace		X				
	Silica Gel (6 Grams)						
	Service	X					Dry only
	Replace		X				
	Gasket, Hinge						
	Replace		X				

Gasket, Cover						
Replace		X				
Clip, Spanner Wrench						
Replace		X				
Clip, Pocket Magnifier						
Replace		X				
Clip, Psychrometer						
Replace		X				
Clip, Spare Indicator (Pointer)						
Replace		X				
Holder, Spare lamp						
Replace		X				
Cover						
Replace		X				
Bezel Ring						
Replace		X				
Gasket, Bezel						
Replace		X				
Window						
Service	X					
Replace		X				
Pointer						
Replace		X				

Functional group	Components and related operation	Echelons of maintenance					Remarks
		1	2	3	4	5	
	Cap Assembly, Vent						
	Replace		X				
	Repair		X				
	Mechanism Assembly						
	Adjust		X				
	Replace				X		
	Repair				X		
	Chamber and Bezel Assembly						
	Replace				X		
	Repair				X		
	Thermometer, Self Indicating						
	Replace		X				

APPENDIX II

BASIC ISSUE ITEMS LIST

1. General

Section II lists the accessories, tools, and publications required in 1st echelon maintenance and operation, initially issued with, or authorized for the altimeter.

2. Explanation of Columns

a. Source Codes. The information provided in each subcolumn is as follows:

(1) *Technical services.* The basic number of the technical service assigned supply responsibility for the item is shown. Those with no number shown are Corps of Engineers supply responsibility. Other Technical Service basic numbers are—

11 ---------- Signal Corps
12 ---------- Adjutant General's Corps

(2) *Source.* The selection status and method of supply are indicated by the following code symbols:

(*a*) P--applied to repair parts which are high mortality parts; procured by technical services, stocked and supplied from the technical service depot system, and authorized for use at indicated maintenance echelons.

(*b*) P1-applied to repair parts which are low mortality parts; procured by technical services, stocked only in and sup-

plied from technical service key depots, and authorized for installation at indicated maintenance echelons.

(3) *Maintenance.* The lowest maintenance echelon authorized to use, stock, install, or manufacture the part is indicated by the following code symbol:

O ---------- Organizational Maintenance
(1st and 2d Echelon)

b. Federal Stock Numbers. When a Federal stock number is available for a part, it will be shown in this column, and used for requisitioning purposes.

c. Description.

(1) The item name and a brief description of the part are shown.

(2) A five-digit Federal supply code for manufacturers and other technical services is shown in parentheses followed by the manufacturer's part number, for identification purposes. This number will be used for requisitioning purposes when no Federal stock number is indicated in the Federal stock number column.
Example: (08645) 86453

d. Unit of Issue. Where no abbreviation is shown in this column, the unit of issue is each.

e. Expendability. Those items classified as nonexpendable are indicated by letters NX. Items not indicated by NX are expendable.

f. Quantity Authorized. This column lists the quantities of parts, accessories, tools, or publica-

tions authorized for issue to the equipment, operator, or crew.

g. Quantity Is8ue with Equipment. This column lists the quantities of repair parts, accessories, tools, or publications that are initially issued with each item of equipment. Those indicated by an asterisk are to be requisitioned.

h. Illustrations. This column is divided into two columns which provide the following information:

(1) Figure number. The identifying number of the illustration.

(2) Item number. The referenced number for the part shown in the illustration.

3. Index to Federal Supply Code for Maintenance

79172-Wallace and Tiernan Inc.

4. Comments and Suggestions

Suggestions and recommendations for changes to the basic issue items list will be submitted on DA Form 2028 to the Commanding General, U.S. Army Engineer Maintenance Center, ATTNEMCJM, Corps of Engineers, Box 119, Columbus 16, Ohio. Direct communication is authorized.

Source codes				Federal stock No.	Description	Unit of issue	Expendability	Quantity authorized	Quantity issued with equipment	Illustration	
Technical service	Source	Maintenance	Recoverability							Fig.	Item
					GROUP 26 ACCESSORIES PUBLICATIONS, AND TOOLS						
					2602.1 ACCESSORIES						
	P1	O			Magnifier, Pocket (79172) FU2883			1	1	5	3
	P1	O			Psychrometer Assembly (79172) FU3570			1	1	5	5
	P1	O			Container, Wick (79172) U14972			1	1	5	9
	P1	O			Cap, Container (79172) FP7746			1	1	3	3
	P1	O			Chart, Table I Conversion (76172) FP7748			1	1	5	2
	P1	O			Chart, Table II and III Conversion (79172) FP7749			1	1	5	2

	P1	O	----------		Chart, table IV Conversion (79172) FP7750 ----------		1	1	5	2	
11	P	O	------	6135-120-1020	Battery ----------		2	(*)			
					*To Be Requisitioned						
					2602.3 SPECIAL TOOLS						
	P1	O	----------		Wrench, Spanner (79172) FP7744 ----------		1	1	5	4	
					2602.3 PUBLICATIONS						
12	P	O	----------		Department of the Army, Organizational Field, and Depot Maintenance Manual, Including Repair Parts and Special Tool Lists TM 5-6675-203-15 ----------		2	2			
					GROUP 67 PRECISION AND TOPOGRAPHICAL INSTRUMENTS 6703 ALTIMETER						
	P1	O	----------		Hand, Indicating (79172) FU2826 ----------		1	1			
	P	O	----------		Lamp, Miniature Screw Base No. 14, 2.47 V., 0.30 amp (79172) P32290 ----------			2	2	5	8

APPENDIX III

MAINTENANCE AND OPERATING SUPPLIES

Component application	Source of supply	Federal stock No.	Description	Quantity required for initial operation	Quantity required for 8 hours operation
67 Precision and Topographical Instruments. 6703 Altimeter.	3	6850-264 -90- 8	Desiccant, Activated Silica Gel. 1 ½ oz. can.	6 grams	As Required

APPENDIX IV

REPAIR PARTS LIST

1. General

a. This appendix lists repair parts and special tools for organizational, field, and depot maintenance. It indicates the allocation and allowance factors of repair parts authorized for organizational maintenance (2d echelon), the guide quantity factors to be used for initial repair parts stockage by field maintenance (3d and 4th echelons), and recommends quantities of repair parts for depot maintenance (5th echelon). Information and data contained herein serve as requisitioning reference material, and as a guide to determine stockage of repair parts.

b. Price information for stock-type repair parts may be obtained from applicable DA SM type 2series supply manuals.

c. Repair parts lists are arranged as follows:

(1) Individual parts and major assemblies are listed alphabetically by item name within the functional groups.

(2) Assembly components and subassemblies are indented and listed alphabetically by item name under major assemblies.

(3) Standard hardware, bulk material, and parts peculiar with more than one application are listed in functional groups 9500.1, 9500.2, and 9901, respectively.

d. Allowances are based on 500 hours operation per year.

2. Explanation of Repair Parts and Tool Lists

a. Source Codes. This column is subdivided into four columns as follows:

(1) Technical service. This column lists the basic number of the technical service assigned supply responsibility for the part. Blank spaces denote Corps of Engineers supply responsibility. General Engineer supply parts are identified by the letters GE in parentheses, following the nomenclature in the description column. Other technical service basic numbers are—

3	Chemical Corps
9	Ordnance Corps
11	Signal Corps

(2) *Source.* The selection status and source of supply for each part are indicated by the following code symbols:

(*a*) P-applied to repair parts which are high mortality parts; procured by technical services, stocked in and supplied from the technical service depot system, and authorized for use at indicated maintenance echelons.

(*b*) P1-applied to repair parts which are low mortality parts; procured by technical services, stocked only in and supplied from technical service key depots, and authorized for installation at indicated maintenance echelons.

(*c*) M-applied to repair parts which are not procured or stocked but are to be

manufactured by using units at indicated maintenance echelons.

(d) A-applied to assemblies which are not procured or stocked as such but are made up of two or more units, each of which carry individual stock numbers and descriptions and are procured and stocked and can be assembled by units at indicated maintenance echelons.

(e) X-applied to parts and assemblies which are not procured or stocked; the mortality of which is normally below that of the applicable end item; and the failure of which should result in retirement of the end item from service.

(f) X1-applied to repair parts which are not procured or stocked, the requirement for which will be supplied by use of next higher component or assembly.

(g) X2-applied to repair parts which are not stocked. The indicated maintenance echelon requiring such repair parts will attempt to obtain from salvage; if not obtainable from salvage, such repair parts will be requisitioned with supporting justification through normal supply channels.

(h) C-applied to repair parts authorized for local procurement. If not obtainable from local procurement, such repair parts will be requisitioned through normal supply channels with a sup

porting statement of nonavailability from local procurement.

(*i*) Z-applied to obsolete repair parts no longer stocked or procured.

(3) *Maintenance.*

(*a*) The lowest maintenance echelon authorized to install or manufacture the part is indicated by the following code symbols:

O	Organizational Maintenance (1st and 2d echelon)
F	Field Maintenance (3d echelon)
H	Field Maintenance (4th echelon)
D	Depot Maintenance (5th echelon)

(*b*) This column is blank when components of kits or sets are listed that are not applicable to the item of equipment, or when an item is source coded X1.

(4) *Recoverability.* Repair parts that are recoverable are indicated by one of the following code symbols:

(*a*) R-applied to repair parts and assemblies which are economically repairable and, when available, are furnished by supply on an exchange basis.

(b) S-applied to repair parts which may be placed in "Ready for Issue" condition by cleaning, replating, anodizing, adjusting, welding, and similar operations.

b. Federal Stock Numbers. When a Federal stock number is available for a part, it will be shown in this column, and used for requisitioning purposes.

c. Description.

(1) The item name and a brief description of the part shown.

(2) A five-digit Federal supply code for manufacturer's and or other technical services is shown in parentheses followed by the manufacturer's part number. This number will be used for requisitioning purposes when no Federal stock number is indicated in the Federal stock number column.
Example: (08645) 86453.

(3) Repair part quantities included in kits, sets, and assemblies, that differ from the actual quantity used on this specific end item, are listed in parentheses.

(4) When repair parts are source coded C, the manufacturer's part number will be used for local procurement.

d. Unit of Issue. Where no abbreviation is shown in this column, the unit of issue is each.

e. Expendability. Nonexpendable items are indicated by the letters NX. Items not indicated by NX are expendable.

f. Quantity Incorporated in Unit. The actual number of parts used in the application indicated is shown in this column. A zero is shown when components of kits or sets are listed that are not applicable to this specific end items.

g. Guide Quantity Per 100 Equipments. Shown for each repair part applicable to 2d, 3d, 4th, and or 5th echelon maintenance is either an allocation factor or an asterisk allowance which indicates the following:

(1) An allowance factor is shown for each repair part prescribed for stockage by organizational maintenance (2d echelon). A guide quantity factor is shown for each part authorized to be stocked by field maintenance and supply support activities (ad and 4th echelons), and the number of repair parts recommended for depot maintenance (5th echelon). This factor is based on the latest mortality data for 500 hours operation per year and is the average quantity required by the various maintenance echelons to provide maintenance and supply support for 100 items of equipment for IS-day period of anticipated consumption frequency under average combat conditions.

(2) The quantities of repair parts authorized for stockage are determined using the following mathematical formula:

Quantity of equipment to be supported multiplied by listed allocation factor, divided by 100.

Fractions derived from the use of the above formula will be rounded to whole numbers as follows:

(*a*) If the result is 1 or more and includes a fraction that is .5 or more, the quantity is rounded to the next higher number.

Example: If the number of equipments supported is 0SO and the allowance factor for 100 equipments is 5. the following formula would be used:

$$30 \times 5 \div 100 = 1.5$$

The resulting fraction is 1.5, therefore, the stockage is 2.

(b) If the result is 1 or more and includes the fraction of less than .5, the quantity is rounded to the next lower number. When the computed result is less than 1, organizational maintenance is authorized a minimum of 1. When the computed result is less than .5, no quantity is authorized for field and depot maintenance.

Example: If the number of equipments supported is 30 and the allowance factor for 100 equipments is 28, the following formula would be used:

$$30 \times 28 \div 100 = 8.4$$

The resulting fraction is less than .5, therefore, the stockage is 8.

(3) In the guide quantity columns for field maintenance, additional repair parts which may be required to perform maintenance, but are not authorized for stockage, are listed without guide quantity factor. These items are identified by an asterisk and are to be requisitioned for immediate use only.

(4) Parts that may be required for depot maintenance in addition to those allocated are identified by an asterisk. Those parts are to be requisitioned when required, if not obtainable from reclamation, fabrication, or local procurement.

h. Organizational Maintenance 15-Day Level, 2d Echelon. The quantity determined using the procedure described above is one prescribed load for a 1-day period. The quantities contained in the prescribed load must be on hand or on order at all times. Major commanders will determine the number of prescribed loads that second echelon units will carry. WHEN MAJOR COMMANDERS AUTHORIZE MORE THAN ONE PRESCRIBED LOAD, USE THE FOLLOWING FORMULA, instead of the one shown above. Multiply the number of equipments by the number of prescribed loads authorized, times the allowance factor, and then divide by 100.

Example:

No. of Equipments		*No. of Prescribed Loads*		*Allowance Factor*	*No. of Parts Authorized For Stockage*
30	X	3	X	5 ÷ 100	4.5 = 5

i. Field Maintenance 15-Day Level, Ad and 4th Echelons.

(1) *Third echelon.* This column lists the initial guide quantity allowance factor of repair parts authorized for initial stockage by Engineer Field Maintenance Shops (non-TOE), Engineer Field Maintenance Companies (TOE 5-157), and similar TOE units to provide Sd echelon maintenance for Engineer equipment and to provide organizational maintenance repair parts for supported units for a i-day period. Additional repair parts are allocated by an asterisk for immediate use only. Upon establishment of supply records, recorded demand ex-

perience will be used to compute stockage objectives on authorized repair parts. Review of stockage objectives will be performed in the time cycle prescribed by major commanders. Repair parts allocated for immediate use only may be stocked when demand experience indicates a stockage of at least one.

(2) *Fourth echelon.* This column lists initial guide quantity allocation factors of repair parts authorized for initial stockage by Engineer Field Maintenance Shops (non-TOE), Engineer Field Maintenance Companies (TOE 5-157), and similar TOE units to provide 4th echelon maintenance for Engineer equipment for a 15-day period. Additional repair parts are allocated by an asterisk for immediate use only. Upon establishment of supply records, recorded demand experience will be used to compute stockage objectives on authorized repair parts. Review of the stockage objectives will be performed in the time cycle prescribed by major commanders. Repair parts allocated for immediate use only may be stocked when demand experience indicates a stockage of at least one.

(3) *Units with TOE capability of performing partial or complete field maintenance for organic Engineer' equipment.* Unit-s organized under TOE's 5-316, 5-316, 5-328, 5-329, 5-355P, 5-356P, 5-415, 5-416, and similar TOE's with TOE 77

capability of performing partial or complete field maintenance for organic Engineer equipment will be authorized to stock 3d and/or 4th echelon repair parts only when specific agreements are made between the commander of the designated Engineer Parts Supply Activity, normally direct support units (DSU), and using units. Parts so furnished are in addition to the prescribed load and will be adjusted as demands indicate.

(4) Units with TOE mission to provide maintenance for Engineer equipment of supported units. Units organized under TOE's such as -464 and 5-00 with the assigned mission to provide field maintenance for Engineer equipment of supported units are authorized to stock 3d and 4th echelon repair parts. These repair parts will be issued from the appropriate parts supply activity (parts depot and/or DSU). Such stockage is in addition to the prescribed load and will be adjusted as demands indicate.

j. Depot Maintenance, 5th Echelon. This column lists the quantity of repairs recommended for stockage by Engineer Depot Maintenance Shops (non-TOE) and Engineer Depot Maintenance Companies (TOE 6-278) to provide depot maintenance for 100 equipments. .Additional repair parts are allocated by an asterisk, for immediate use only. Explanation of the asterisk allowance is contained in g above.

k. *Illustrations*. This column is divided as follows:

(1) *Figure number.* Indicates the number of the illustration in which the part is shown.

(2) *Item number.* Indicates the reference number used to point out the part in the illustration.

3. Index to Federal Stock Numbers and Manufacturer's Part Numbers

Listed alpha-numerically in the back of this manual are the requisitioning numbers shown in the Federal stock number and/or description column. The alphabetical 0 is listed as a numerical 0 (zero).

Example of index sequence:

A	BX6-27	38.50
AAA	T295	3830-141-4957
A12x3	0124	3848 212
A1-950	1-77	389/100.2
A1A22	2530-048-7342	389/10-18
B	2815-097-5429	3895-128-7642

4. Abbreviations

gm ----------Gram (s)
lg ----------Long (length)
Thd ----------Thread (s) (ed)

5. Index to Federal Supply Code for Manufacturer's

79172 - Wallace and Tiernan, Inc.

6. Comments and Suggestions

Commanders of maintenance activities are encouraged to submit comments, suggestions, and recommendations for changes to repair parts allocation and allowance factors, and other content date Data will be submitted on DA Form 2028. Additional data on climatic and terrain conditions of operation, operational age of the equipment, and the hours operated in the period covered by item 7 of the form is desired. Submit to the Commanding General, U.S. Army Engineer Maintenance Center, ATTN: EMCJM, Corps of Engineers, P. O. Box 119, Columbus 16, Ohio. Direct communication is authorized.

Source Code				Federal Stock No.	Description
Techincal service	Source	Maintenance	Recoverability		
					GROUP 22–MISCELLANEOUS BODY, CHASSIS OR HULL, AND ACCESSORY ITEMS 2210 DATA PLATES AND IN- STRUCTION HOLDERS
	X2	O			DIAGRAM: Wiring (79172) FP7740
					GROUP 26–ACCESSORIES, PUBLICATIONS, TEST EQUIP MENT AND TOOLS
					2602.1 ACCESSORIES
	P1	O			CHART ASSEMBLY: Correction (79172) FU3567
	P1	O			CHART: Table I Conversion (79172) FP7748
	P1	O			CHART: Table II and II Conver- sion (79172) FP7749
	P1	O			CHART: Table IV Conversion (79172) FP7750
	X2	O			CONTAINER: Spare indicating hand (79172) FP7745
	X2	O			CONTAINER: Wick (79172) U14972
	P	O			MAGNIFIER: Pocket (79172) FU2883
	P1	O			PSYCHROMETER ASSEMBLY (79172) FU 3570
	P1	O			6685-641-3575 THERMOMETER
	P	O			WICK (79172) P25942
					2602.3–SPECIAL TOOLS
	P1	O			WRENCH: Spanner (79172) FP7744

Unit of issue	Expendability	Quantity incorporated in unit	15 day organizational maintenance allowance per 100 equipments	Guide quantities per 100 equipments			Illustrations	
				Field maintenance 15 -day level		Depot maintenance	Fig No.	Item No.
			2D ECH	3D ECH	4D ECH	5TH ECH		
.....	.....	.....	1	(*)	(*)	(*))		
.....	.....	.....	1	(*)	(*)	20	5	
.....	.....	.....	1	(*)	(*)	20	5	
.....	.....	.....	1	(*)	(*)	20	5	
.....	.....	.....	1	(*)	(*)	20	5	
.....	.....	.....	1	(*)	(*)	(*)		
.....	.....	.....	1	(*)	(*)	(*)		
.....	.....	.....	1	(*)	(*)	40	5	
.....	.....	.....	1	(*)	(*)	20	5	
.....	.....	.....	1	(*)	(*)	20	5	
.....	.....	.....	1	(*)	(*)	40	5	
.....	.....	.....	1	(*)	(*)	12	5	

Source Code				Federal Stock No.	Description
Techincal service	Source	Maintenance	Recoverability		
					GROUP 67–PRECISION AND TOPOGRAPHICAL INSTRUMENTS 6703–ALTIMETER
11	P	O			6135-120-1020 BATTERIES
	P1	O			CAP: Container (79172) FP7746
	X2	H			CHAMBER AND BEZEL ASSEMBLY (79172) FU3555
	X2	O			BEZEL ASSEMBLY (79172) FU3562
	X2	H			BRACKET: Shock mounting (79172) FP7953
	X2	H			DIFFUSER: Light (79172) FU3556
	P1	O			GASKET: Battery cap (79172) FP7715
	P1	O			GASKET: Bezel and Flange (79172) FP7729
	P1	O			KNOB: Rheostat (79172) FP7728
	P	O			LAMP: Miniature #14, 2.47 volt, 0.30 amp(79172) P32290
	X2	H			LIGHT SHIELD AND SPACER ASSEMBLY (79172) FU3767
	P1	H			LUG: Terminal (79172) P17294
	P1	H			NUT: Hexagon brass No. 4-36 (79172) CPN3638
	X2	H			RHEOSTAT: Mallory MGR (6 ohm 4 watt) (79172) U14971
	P1	H			RING: O (79172) P25900
	X2	H			RING: Retaining (79172) P21203
	P	O			SCREW: Fillister head stainless steel No. 8-32 x ½ in. Lg (79172) P19101

			15 day organizational maintenance allowance per 100 equipments	Guide quantities per 100 equipments			Illustrations	
				Field maintenance 15 -day level		Depot maintenance	Fig No.	Item No.
			2D ECH	3D ECH	4D ECH	5TH ECH		
		2	(*)	(*)	(*)	(*)		
		2	(*)	(*)	(*)	8	3	3
		1			(*)	(*)	3	7
		1	(*)	(*)	(*)	(*)		
		4			(*)	(*)		
		1			(*)	(*)		
		3	(*)	(*)	(*)	18		
		1	(*)	(*)	(*)	100		
		1	(*)	(*)	(*)	10		
		1	(*)	1	(*)	60	5	8
		2			(*)	(*)		
		3			(*)	15		
		1			(*)	8		
		1			(*)	(*)		
		1			(*)	8		
		2			(*)	(*)		
		8	(*)	1	(*)	48	2	9

Source Code				Federal Stock No.	Description
Techincal service	Source	Maintenance	Recoverability		
					6703 - ALTIMETER-Continued
	P	H		5305-696-5113	SCREW: Machine round head (79172) CPE3542
		P1	H		SCREW: Round head brass No. 4-36 x $^{3}/_{8}$ in. Lg (79172) CPN737
		P1	O		SETSCREW: Allen head stainless steel No. 4-40 x $^{1}/_{8}$ in. lg Rheostat knob (79172) P32324
		P1	0		SOCKET ASSEMBLY: Lamp (79172) FU3558
9	P	H		5310-013-1043	WASHER: Lock (79172) P15362
		P1	H		WIRE: No. 18 white SRIR (79172) P28751 (5 ft lg)
		X2	O		HINGE: Cover (79172) FP7731
					HOLDER: Spare lamp (79172) P15921
		P1	O		KNOB: Latch (79172) FP7733
		X2	O		PIN: Cover hinge (79172) FP7732
		X2	O		PLATE: Retaining (79172) FP7739
		X2	O		ROD: Latch (79172) FP7734
		X2	O		SCREW: Clip (79172) FP7735
9	P	O		5305-022-7305	CREW: Machine flathead (79172) CPE15134
9	P	O		5305-696-5113	SCREW: Machine roundhead (79172) CPE15134
		P	O		SCREW: Round head brass No. 4-36 x $^{3}/_{16}$ in. Lg (79172) CPE6113
9	P	O		5310-306-3156	WASHER: Flat brass (79172) CPE5662
9	P	O		5310-013-1043	WASHER: Lock (79172) P15362
		P1	O		WASHER: Vent cap (79172) FP5697
		X2	H		DIAL UNIT: Altimeter (79172) FU3932

Unit of issue	Expendability	Quantity incorporated in unit	15 day organizational maintenance allowance per 100 equipments	Guide quantities per 100 equipments			Illustrations	
				Field maintenance 15 -day level		Depot maintenance	Fig No.	Item No.
			2D ECH	3D ECH	4D ECH	5TH ECH		
		2		(See Group 9500.1)				
		1			(*)	8		
		1	(*)	(*)	(*)	8		
		2	(*)	(*)	(*)	10		
		1		(See Group 9500.1)				
		1			(*)	10		
		1	(*)	(*)	(*)	(*)		
		2	(*)	(*)	(*)	(*)		
		1	(*)	(*)	(*)	10	3	2
		2	(*)	(*)	(*)	(*)		
		1	(*)	(*)	(*)	(*)		
		1	(*)	(*)	(*)	(*)		
		1	(*)	(*)	(*)	(*)		
		2		(See Group 9500.1)				
		2		(See Group 9500.1)				
		8	(*)	1	(*)	48		
		2		(See Group 9500.1)				
		10		(See Group 9500.1)				
		1	(*)	(*)	(*)	10		
		1			(*)	(*)	2	1

Source Code				Federal Stock No.	Description
Techincal service	Source	Maintenance	Recoverability		
					6703–ALTIMETER–Continued
	P	O			DISC: Desiccant indicator (79172) FP5672
	X2	H			MECHANISM ASSEMBLY (79172) FU3019
	X2	H			ADJUSTMENT SEGMENT ASSEMBLY (79172) FU2825
	X2	H			BALANCE: Counter (79172) FP5598
	P1	H			BEARING ASSEMBLY: Jewelled (79172) FU1465
	P1	H			BEARING PLATE STUD (79172) FP4526
	X2	H			BLOCK: Capsule anchor (79172) FP5712
	X2	H			BLOCK: Capsule stop (right) (79172) FP5681
	X2	H			LEG: Mechanism (79172) FP4075
	P1	H			PIN: Stainless steel (79172) FP3864
	X2	H			PINION AND RACK ALINEMENT (79172) CPG5680
	X2	H			PLATE: Indicator (79172) FP6319
	X2	H			PLATE: Mechanism mounting (79172) FP6318
	P1	O			POINTER ASSEMBLY (79172) FU2826
	X2	H			POINTER SHAFT ASSEMBLY (79172) FU2824
	X2	H			ROD: Actuating (79172) FU2827
	P1	H			SETSCREW (79172) CPG19370
	P1	H			SCREW (79172) CPN
	P1	H			SCREW (79172) CPN
	P1	H			SCREW (79172) CPN
	P1	H			SCREW (79172) CPN
	P	H			SCREW (79172) CPN

Unit of issue	Expendability	Quantity incorporated in unit	15 day organizational maintenance allowance per 100 equipments	Guide quantities per 100 equipments			Illustrations	
				Field maintenance 15 -day level		Depot maintenance	Fig No.	Item No.
			2D ECH	3D ECH	4D ECH	5TH ECH		
		1	8	10	(*)	100	2	4
		1			(*)	(*)	14	
		1			(*)	(*)	14	
		1			(*)	(*)	14	
		1			(*)	10	14	
		1			(*)	8	14	
		1			(*)	(*)	14	
		1			(*)	(*)	14	
		3			(*)	(*)	14	
		2			(*)	12	14	
		1			(*)	(*)	14	
		1			(*)	(*)	14	
		1			(*)	(*)	14	
		1	(*)	(*)	(*)	15	14	
		1			(*)	(*)	14	
		1			(*)	(*)	14	
		2			(*)	8	14	
		2			(*)	12	14	
		4			(*)	24	14	
		1			(*)	8	14	
		2			(*)	12	14	
				2		(*)	12	14

Source Code				Federal Stock No.	Description	
Techincal service	Source	Maintenance	Recoverability			
					6703–ALTIMETER–Continued	
	P1	H			SCREW (79172) CPN8871	
	P1	H			SCREW (79172) FP2420	
	P1	H			SCREW (79172) FP4040	
	P1	H			SPRING: Capsule tension (79172) FP7940	
	P1	H			SPRING: Friction (79172) FP4683	
	X2	H			STOP: Lever (79172) FP4953	
	X2	H			STUD ADJUSTING AND GEAR ASSEMBLY (79172) FU1878	
	P1	H			STUD: Dial post (79172) FP3228	
	X2	H			PLATE STUD (79172) FP7957	
	X2	H			STUD: POST (79172) FP4011	
	X2	H			SUPPORT BRACKET AND SEGMENT (79172) FU2828	
	X2	H			TOP BEARING PLATE AS-SEMBLY (79172) FU2262	
	P1	H			WASHER (79172) CPN7860	
	P1	H			WASHER (79172) CPN5662	
	P1	H			WASHER: Lock (79172) P13000	
	P	H			WASHER: Lock (79172) P13662	
9	P	H		5310-013-1043	WASHER: Lock (79172) P15362	
	P1	H			SCREW: Binding head brass No. 2-56 x $^{3}/_{16}$ in. Lg (79172) CPE22837	
					SCREW: Fillister head stainless steel No. 8-32 x $1^{1}/_{8}$ in. Lg (79172) P26233	
9	P	H		5305-290-3014	SCREW: Machine roundhead (79172) CPE742	
	P	H			SCREW: Cross recess brass head No. 2-56 x ¼ in. Lg (79172) CPH19795	
	P1	O			SHIM: Cover hinge (as required) (79172) FP3588	
		P	O		SILICA GEL (79172) E524	
		P1	O		STRAP ASSEMBLY: Carrying (79172) FU3571	15 day

Unit of issue	Expendability	Quantity incorporated in unit	organizational maintenance allowance per 100 equipments	Guide quantities per 100 equipments			Illustrations	
				Field maintenance 15 -day level		Depot maintenance	Fig No.	Item No.
			2D ECH	3D ECH	4D ECH	5TH ECH		
.....	.....	5			(*)	30	14	
.....	.....	1			(*)	8	14	
.....	.....	1			(*)	8	14	
.....	.....	1			(*)	8	14	
.....	.....	1			(*)	8	14	
.....	.....	1			(*)	(*)	14	
.....	.....	1			(*)	(*)	14	
.....	.....	2			(*)	8	14	
.....	.....	2			(*)	(*)	14	
.....	.....	3			(*)	(*)	14	
.....	.....	1			(*)	(*)	14	
.....	.....	1			(*)	(*)	14	
.....	.....	2			(*)	12	14	
.....	.....	7			(*)	56	14	
.....	.....	3			(*)	18	14	
.....	.....	5			(*)	30	14	
.....	.....	3		(See Group 9500.1)			14	
.....	.....	3			(*)	18		
.....	.....	2			(*)	42		
.....	.....	4		(See Group 9500.1)				
.....	.....	7			(*)	42	2	2
.....	.....	(*)	(*)	(*)	8			
.....	.....	6	(*)	2	(*)	48		
.....	.....	1	(*)	(*)	(*)	50	3	4

Source Code				Federal Stock No.	Description
Techincal service	Source	Maintenance	Recoverability		
					6703–ALTIMETER–Continued
	X2	H			STUD: Adjusting (79172) FU1878
	X2	H			SUPPORT BRACKET AND SEG-
					` MENT (79172) FU2828
	P1	O			6685-174-6235 THERMOMETER ASSEMBLY
					(79172) FU3568
					GROUP 95– GENERAL USE STANDARDIZED PARTS 9500.1–STANDARD HARDWARE AND PARTS
9	P	O		5305-022-7305	SCREW, MACHINE, FLATHEAD:
					Brass No. 2-56 thd size, 5/16 in. lg
9	P	H		5305-290-3014	SCREW, MACHINE, ROUND-
					HEAD: Brass No. 6-32 thd size,
					$^{3}/_{8}$ in. lg
9	P	H		5305-696-5113	SCREW, MACHINE, ROUND-
					HEAD: Cadmium or zinc plated,
					No. 4-36 thd size, ¼ in. lg
9	P	O		5310-306-3156	WASHER FLAT: Brass, No. 4
					screw size
9	P	O		5310-013-1043	WASHER LOCK: Cadmium or zinc
					plated, No. 4 screw size

Unit of issue	Expendability	Quantity incorporated in unit	15 day organizational maintenance allowance per 100 equipments	Guide quantities per 100 equipments			Illustrations	
				Field maintenance 15 -day level		Depot maintenance	Fig No.	Item No.
			2D ECH	3D ECH	4D ECH	5TH ECH		
		1			(*)	(*)	2	6
		1			(*)	(*)		
		1	(*)	(*)	(*)	10	2	5
		2	(*)	(*)	(*)	12		
		4			(*)	24		
		4			(*)	24		
		2	(*)	(*)	(*)	12		
		19	(*)	(*)	(*)	114		

Number	Code	Cross-reference	Group	Number	Code	Cross-reference	Group
CPE 15134	79172	5305-022-7305	6703	CPN 739	79172	----------	6703
			9500.1	CPN 742	79172	----------	6703
CPE 22837	79172	----------	6703	CPN 8871	79172	----------	6703
CPE 3542	79172	5305-696-5113	6703	E 524	79172	----------	6703
			9500.1	FP 2420	79172	----------	6703
CPE 5662	79172	5310-306-3156	6703	FP 3228	79172	----------	6703
			9500.1	FP 3864	79172	----------	6703
CPE 6113	79172	----------	6703	FP 4011	79172	----------	6703
CPE 742	79172	5305-290-3014	6703	FP 4040	79172	----------	6703
			9500.1	FP 4075	79172	----------	6703
CPG 19370	79172	----------	6703	FP 425	79172	----------	6703
CPG 5680	79172	----------	6703	FP 483	79172	----------	6703
CPH 19795	79172	----------	6703	FP 4953	79172	----------	6703
CPN 17860	79172	----------	6703	FP MOB	79172	----------	6703
CPN 2954	79172	----------	6703	FP M72	79172	----------	6703
CPN 3542	79172	----------	6703	FP 5681	79172	----------	6703
CPN 3638	79172	----------	6703	FP 67	79172	----------	6703
CPN 5345	79172	----------	6703	FP 5712	79172	----------	6703
CPN 5662	79172	----------	6703	FP 6318	79172	----------	6703
CPN 737	79172	----------	6703	FP 6319	79172	----------	6703

FP 7115	79172	----------	6703	FP 7957	79172	----------	6703
FP 7728	79172	----------	6703	FP 8569	79172	----------	6703
FP 7729	79172	----------	6703	FP 8570	79172	----------	6703
FP 7730	79172	----------	6703	FP 8588	79172	----------	6703
FP 7731	79172	----------	6703	FU 1465	79172	----------	6703
FP 7732	79172	----------	6703	FU 1878	79172	----------	6703
FP 7733	79172	----------	6703	FU 2262	79172	----------	6703
FP 7734	79172	----------	6703	FU 2824	79172	----------	6703
FP 7735	79172	----------	6703	FU 2825	79172	----------	6703
FP 7736	79172	----------	6703	FU 2826	79172	----------	6703
FP 7737	79172	----------	6703	FU 2827	79172	----------	6703
FP 7738	79172	----------	6703	FU 2828	79172	----------	6703
FP 7739	79172	----------	6703	FU 2883	79172	----------	2602.1
FP 7740	79172	----------	2210	FU 3019	79172	----------	6703
		----------	6703	FU 3555	79172	----------	6703
FP 7744	79172	----------	2602.3	FU 3556	79172	----------	6703
FP 7745	79172	----------	2602.1	FU 3558	79172	----------	6703
		----------	6703	FU 3562	79172	----------	6703
FP 7746	79172	----------	6703	FU 3563	79172	----------	6703
FP 7748	79172	----------	2602.1	FU 3564	79172	----------	6703
FP 7749	79172	----------	2602.1	FU 3567	79172	----------	2602.1
FP 7750	79172	----------	2602.1	FU 3568	79172	----------	6703
FP 7940	79172	----------	6703	FU 3570	79172	----------	2602.1
FP 7953	79172	----------	6703	FU 3571	79172	----------	6703

Number	Code	Cross-reference	Group
FU 3767	79172	----------	6703
FU 3932	79172	----------	6703
P 10163	79172	----------	6703
P 13000	79172	----------	6703
P 13662	79172	----------	6703
P 15362	79172	5310-0131043	6703 9500.1
P 15921	79172	----------	6703
P 17214	79172	----------	6703
P 19101	79172	----------	6703
P 21203	79172	----------	6703
P 25900	79172	----------	6703
P 25942	79172	----------	2602.1
P 26233	79172	----------	6703
P 27886	79172	----------	6703
P 28751	79172	----------	6703
P 32290	79172	----------	2602.1 6703
P 32324	79172	----------	6703
P 7175	79172	----------	6703
U 14971	79172	----------	6703
U 14972	79172	----------	2602.1 6703
5305-022-7305	79172	CPE 15134	6703 9500.1
5305-290-3014	79172	CPE 742	6703 9500.1
5305-696-5113	79172	CPE 3542	6703 9500.1
5310-013-1043	79172	P 15362	6703 9500.1
5310-306-3156	79172	CPE 5662	6703 9500.1
6135-120-1020	----------	----------	6703
6685-174-6235	----------	----------	6703

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