

MIL-M-0038784A(TM)

1 May 1974

SUPERSEDING

MIL-M-63000C (TM)

18 December 1970

used in lieu of

MIL-M-38784

1 January 1968

MILITARY SPECIFICATION

MANUALS, TECHNICAL:

GENERAL REQUIREMENTS

This limited coordination Military specification has been prepared by Army Material Command, based upon currently available technical information, but it has not been approved for distribution as a coordinated Military specification. However, pending its distribution as a coordinated Military specification, it may be used in procurement.

1. SCOPE

1.1 *Scope.* This specification covers the general requirements for the preparation of manuscripts (6.3.11) and reproducible copy (6.3.22) for equipment publications and changes thereto. The examples at the rear of this specification are typical and may be adapted to fit the specific equipment or situation being covered.

1.2 *Paragraphs with limited applicability.* This specification contains paragraphs which are not applicable to all services. Such paragraphs are prefixed to indicate the services to which they pertain: (A) for Army; (N) for Navy; (MC) for Marine Corps; and (F) for Air Force. Paragraphs which are applicable to all services are prefixed (all). Unless otherwise indicated, subparagraphs are applicable to the same services as is the paragraph of which they are a part.

2. APPLICABLE DOCUMENTS

2.1 *Government documents.* The following documents, of the issue in effect on the date of invitation for bids, or request for proposal, form

a part of this specification to the extent specified herein.

SPECIFICATIONS

MIL-M-63001(TM) Manuals, Technical: Basic Issue Items List, Items Troop Installed or Authorized List, Repair Parts and Special Tools List.

STANDARDS

Military
MIL-STD-12 Abbreviations for Use on Drawings, Specifications, Standards, and in Technical Documents

MIL-STD-15-2 Electrical Wiring Equipment Symbols for Ship's Plans

MIL-STD-15-3 Electrical Wiring Symbols for Architectural and Electrical Layout Drawings

FSC TMSS

MIL-M-0038784A(TM)**STANDARDS**

MIL-STD-17-1	Mechanical Symbols
MIL-STD-17-2	Mechanical Symbols for Aeronautical, Aerospacecraft and Spacecraft Use
MIL-STD-100	Engineering Drawing Practices
MIL-STD-1309	Definition of Terms for Automatic Electronic Test and Checkout

(Copies of documents required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

Library of Congress

Catalog NO. Z253.U58 US Government
Printing Office
Style Manual

Joint Chiefs of Staff

Pub 1 Dictionary of US
Military Terms for
Joint Usage

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, DC 20402.)

PUBLICATIONS

Occupational Safety and Health Act, Public Law 91-956, dtd 29 December 1970, and Executive Order 11612

2.2. *Other publications.* The following documents form part of this specification to the extent specified herein. Unless otherwise indicated, the latest military approved issue in effect on date of invitation for bids, or request for proposal shall apply.

Department of Defense

DOD 5200.1-R Information Security Program Regulations

ANSI X3.5 Flowchart Symbols and Their Usage in Information Processing

Army

AR 310-25 Dictionary of United States Army Terms (Short Title: AD)

ANSI Y32.2 Graphic Symbols for Electrical and Electronic Diagrams

AR 310-50 Authorized Abbreviations and Brevity Codes

ANSI Y32.3 Welding Symbols

ANSI Y32.14 Graphic Symbols for Logic Diagrams

Air Force

Technical Order

00-25-203 Standard Functional Criteria for Design and Operation of Clean Rooms

ANSI Y14.15 Electrical and Electronic Diagrams

ANSI Y32.16 Reference Designations for Electrical and Electronic Parts and Equipment

(Application for copies should be addressed to the American National Standards Institute, Inc. 1430 Broadway, New York, NY 10018.)

3. REQUIREMENTS

NOTE: Most of the following requirements are applicable both to manuscript and to reproducible copy. Where requirements for manuscripts and reproducible copy differ, such differences are clearly indicated.

3.1 *General.*

3.1.1 *Conflict between specifications.* (All) Except for MIL-M-63001 (TM) (Army only), where the requirements of detail specifications conflict with the general style and format requirements specified herein, the requirements of this specification shall apply. Where the requirements of the US Government Printing Office Style Manual conflict with the format requirements specified herein, or in any applicable military standard, format requirements of this specification and the military standards shall apply.

3.1.2 *Copyrights and advertising.* (All) Unless authorized by the contract, copyrighted material shall not be incorporated into any publication without the written permission of the copyright owner. Publication material prepared in accordance with this specification shall contain no advertising matter.

3.1.2.1 (A) Unless otherwise specified by the procuring activity, the copyright credit line shall be placed at the top of the table of contents page.

3.1.3 *Jointly used publications.* (All) When publications are procured by one Service for joint use with another Service, refer to 3.2.2.4.

See figure 1, note b, and figure 2, note a, regarding showing two or more publication numbers on cover/title page. Paragraphs in joint publications which do not apply to all services concerned, shall be marked to indicate the services to which they apply. For example, "4-4 *Landing gear* (Army only) The Landing Gear ***

3.1.4 *Interim copy.* (N, MC, F) When approved copies of the manuscript are to be used as interim editions or preliminary issues, for train-

ing purposes or other early uses, the contract will state whether the text shall be single spaced and also state exactly how copies shall be reproduced and bound.

3.1.5 *Use of commercial manuals.* (N, MC, F) If approved by the procuring activity, a contractor who has commercial manuals covering equipment being procured may submit printed copies for approval instead of preparing new manuscript copy.

3.1.6 *Completeness.* (All)

3.1.6.1 *Manuscripts.* Unless otherwise specified, a manuscript package shall be complete in all respects, and shall contain all front matter, text, illustrations, tables, and charts. The words "The End" shall appear at the bottom of the last page.

3.1.6.2 *Reproducible copy.* Reproducible copy shall consist of all text pages, including tables, charts, and illustrations, suitable for use in development of printing plates.

3.2 *Format.* (All)

3.2.1 *Manuscripts.* When a contract requires a manuscript (or draft) for a basic manual, the manuscript shall be fully edited, double-spaced, and shall appear on one side of the sheet only. The text shall be prepared in a single column format with left margin justification only. Except for certain presentations authorized by the procuring activity, the page size shall be approximately 8-1/2 x 11 inches. Any method of duplication, covering, and binding that will provide legible, collated copies of the manuscript will be acceptable subject to prior approval by the procuring activity.

3.2.2 *Reproducible copy.* Equipment used for preparing the instructions and marginal copy shall be adequate for the purpose intended and shall provide clearly legible, easily usable publications at the most economical cost, considering both initial preparation and follow-on costs, such as reproduction, printing, handling, filing, storing, and shipping. Office composing machines, typewriters, and typesetting equip-

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ment, or a combination thereof, electric accounting machines, computers, punched cards, tapes, etc., may be used for preparing text. Suggested type styles and sizes are shown in figures 3 and 4. Copy shall be prepared as specified below, unless it can be prepared as economically in double-columned justified right margin format. The page elements not imprinted on the page, including corrections, shall be fastened to the page in a manner that will permit repeated handling of the reproducible copy over a period of years. Reproducible copy shall be mounted and covered when required by the procuring activity. Text may be separately prepared in single-column galleys and then attached to the appropriate layout page. Refer to 6.3.8 for definition. In addition, for Navy, the reproducible copy shall be of a quality which will permit reduction to 16mm or 35mm negatives as specified by the procuring activity (multi-frame negatives for foldouts) suitable for subsequent enlargement to full size photolithographic negatives which will be used to produce offset printing plates. Minimum acceptable material shall have the following features:

- a. Double-column, or single-column across the entire page.
- b. Single spacing.
- c. Unjustified right margins.
- d. Headings prepared on the same composing equipment as the text.
- e. Oversize sheets when the text is in 12-point type.

3.2.2.1 *Leading and spacing.* Layout shall conserve space without lessening usability or clarity of material. Blank pages and spaces shall be avoided whenever possible. Leading and spacing as indicated by figure 3 shall be used for best legibility and conservation of space. Double spacing of text within paragraphs, or similar wastefulness, is unacceptable. Slight variations are permitted in order to avoid layout practices that would result in:

- a. The first line of a paragraph being at the bottom of a page or column.
- b. The last line of a paragraph being at the top of a new page.
- c. Warnings, cautions, and notes being divided so that first lines appear on one page and remaining lines on another. (First lines may appear in the left column, and remaining lines in the right column on the same page.)

3.2.2.2 *Page size and reproduction area.* Text and artwork for a reproducible copy page which will require no reduction photographically for printing shall not exceed the dimensions given in the following table for the indicated printed size manual. The detail specifications or the contract will indicate the size in which a manual will be reproduced when 4 by 5-3/4, 4 by 8, or 16-1/2 by 10-3/4 inch size is required (otherwise 8-1/4 by 10-3/4 inch size shall be provided). 4 by 5-3/4 inch manuals shall not exceed 200 pages.

TABLE I. PAGE SIZE AND REPRODUCTION AREA FOR REPRODUCIBLE COPY

Page Size of Printed Manuals (inches)	Width - Text/Art		Depth - Text/Art		Depth (Including Marginal Copy)	
	(inches)	(picas)	(inches)	(picas)	(inches)	(picas)
(A) 4 by 5-3/4	3-1/8	19	4-1/2	27	5	30
4 by 8	3-1/8	19	7	42	7-1/2	45
8-1/4 by 10-3/4	*7	42	9	54	10	60
16-1/2 by 10-3/4	15-1/4	91	9	54	10	60

*Single-column width; when double-columned, each column shall be 20 picas (approximately 3-3/8 inches) wide with a 2-pica (approximately 1/4 inch) gutter between. Reproducible copy may be prepared oversize

with the actual overall area utilized to be of such size that when the copy is photographically reduced to the prescribed size of the image area for the manual, the text will be reproducible 10-point.

3.2.2.3 *Marginal copy.* Marginal copy (generally the publication number and page number) shall be placed outside that portion of the page used for either narrative text, full page tabular data, or full page illustrations, but within the printing area dimensions of the page. When applicable, marginal copy may also consist of the change number, security classification page content/equipment identification, figure number and figure title. Also refer to 3.2.3.

3.2.2.4 *Publication number.* The publication number assigned by the procuring activity shall appear in the upper-outer corner of each page. However, when all the information for a 4 by 5-3/4 or 4 by 8 inch publication is placed horizontally on all pages, and all pages are to be printed head to foot, the publication number shall be placed in the upper-right corner of all pages. If the publication is jointly used, the publication number of the procuring and using activities shall appear on the same line, separated by a slash (/) with that of the procuring activity appearing first. For example, TM9-1000-200-15/TO 36-1-22.

3.2.3 *Page numbering.* (All) (See figure 5)

3.2.3.1 *Manuscripts.* (A) Pages shall be numbered consecutively in Arabic numerals, beginning with the cover/title page as page 1 and shall be centered at the bottom of the page. These page numbers are used only to establish the continuity of the manuscript pages and have no bearing on page numbers which will appear later in the printed publication.

3.2.3.2 *Reproducible copy.* Except for foldout pages at the end of the manual, the page number shall appear in the lower-outer corner of each page (see 3.2.4). However, when all the information for a 4 by 5-3/4 or 4 by 8 inch publication is placed horizontally on all pages, and all pages are to be printed head to foot, the page number shall be placed in the lower-right corner of all pages.

3.2.3.2.1 *Blank page number.* A blank page shall be assigned a number, but it shall appear on the preceding or following page; for example, if page 10 of Chapter 1 is blank, page 9 shall bear

the number 1-9/(1-10 blank); or if page 9 of Chapter 1 is blank, page 10 shall bear the number (1-9 blank)/1-10. Also, when applicable, an added page, such as 1-10.1, shall show that 1-10.2 is blank.

3.2.3.2.2 *Pages, paragraphs, tables, illustrations.* Pages, paragraphs, illustrations, and tables for chapters and sections shall be numbered consecutively within each chapter, using two-part Arabic numerals separated by a hyphen. The first part shall be the chapter number and the second part the order within the chapter. For example: 2-17 shall be the 17th page, or paragraph, in Chapter 2, figure 2-17 shall be the 17th illustration appearing in Chapter 2, table 2-17 shall be the 17th table in Chapter 2. (A publication may contain both a figure 2-17 and table 2-17.) If a chapter is so short that the chapter can be completed on one page, permitting another chapter to start on the same page, both chapter numbers shall be indicated, for example, 3-1/4-1. For numbering of blank pages, refer to 3.2.3.2.1. Manuals divided into chapters and, in turn, into sections, shall contain consecutively numbered pages, paragraphs, illustrations, and tables for the entire chapter. Page numbering for publications prepared by computers is explained in the applicable detail specification. Number of illustrations for Army RPSTL manuals is explained in MIL-M-63001 (TM).

3.2.4 *Headings.* (All) Numbers and titles for parts, chapters, sections, appendixes, alphabetical index, etc., shall be centered at the top of the first page of text for each. Parts, chapters, appendixes, and the alphabetical index shall begin on a right-hand page. The Section I heading shall be centered immediately below the chapter heading; subsequent section headings shall be centered on the page preceding applicable text. The chapter heading shall be separated from the heading for Section I by a horizontal line across the page as shown in figure 6.

3.2.5 *Foldout pages.* (All) Foldout pages shall be prepared only when approved by the procuring activity. If determined necessary, foldout pages may be prepared for the 4 by 8 and 8-1/4 by 10-3/4 inch manuals. Foldout pages

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shall not be used in 4 by 5-3/4 inch or 16-1/2 by 10-3/4 inch manuals. All foldout and foldout-foldup pages shall be prepared for printing on one side and full blank aprons shall be used on all foldout pages. A publication, or volume of a publication shall be so arranged that all foldout pages, including foldout-foldup pages, fall at the end of the publication, or applicable volume. Such pages shall follow the last section, last appendix, or alphabetical index, whichever forms the last portion of the publication or volume. The figure numbers for foldouts, and

foldout-foldups, shall be FO-1, FO-2, etc. Foldout and foldout-foldup pages shall not be assigned page numbers. (They will be collated by figure number.) The figure title shall be centered. All foldups, and all foldouts exceeding four folds, shall include a diagram, fold marks, or written instructions for refolding. The diagram or instructions shall appear in a conspicuous place on the foldout-foldup, such as the apron. Maximum page sizes, maximum foldout page sizes, and maximum printable area foldout and foldout-foldup pages shall be as follows:

Manual Size	Foldout/foldout-foldup maximum page size (including blank apron)	Foldout/foldout-foldup maximum printable area
4 by 5-3/4	None	N/A
4 by 8	F/O 29 x 8	23-3/4 by 7-1/2**
#4 by 8	F/O-F/U 29 by 14	23-3/4 by 13-1/4
8-1/4 by 10-3/4	F/O 47 by 10-3/4	37-1/2 by 10
8-1/4 by 10-3/4	F/O-F/U 47 by 20	37-1/2 by 19-1/4
16-1/2 by 10-3/4	None	N/A
*8-1/4 by 10-3/4	F/O 56 by 10-3/4	46-1/2 by 10
*8-1/4 by 10-3/4	F/O-F/U 56 by 19-3/4	46-1/2 by 19

#Army, Navy, Marine Corps only

*Navy only.

Minimum margins for the above: 1/4 inch, head and side opposite binding

1/2 inch, bottom, except ** 1/4 inch bottom

3.2.6 *Blank pages.* (All) Blank pages normally require no marginal copy. However, if the reverse side is classified, the classification markings (refer to 3.4) shall appear at the top and bottom center of the blank page. The notation "This page intentionally left blank" is required only for a blank page in a Navy manual. Showing the page number on the printed side of the sheet, for example, 1-9/(1-10 blank) is considered adequate for all other manuals.

3.2.7 *Emergency page markings.* (All) Emergency page markings are not considered marginal copy. Pages containing emergency information shall have a broken black border in accordance with the requirements of figure 7.

3.2.8 *Indentation for warnings, cautions, and notes.* All lines of warnings cautions, and

notes shall be indented approximately five spaces or characters from both left and right margins.

3.2.9 *Tables and charts.* (All) (See 3.2.3.2.2 for numbering of tables.)

3.2.9.1 *Manuscripts only.* (All) Tables and charts for manuscripts shall be on separate sheets, which shall be inserted in the manuscript as the page immediately following the first reference thereto.

3.2.9.2 *Manuscripts and reproducible copy.* (A)

3.2.9.2.1 *Number and title.* If so required by the procuring activity, charts shall be treated as figures, i.e., given a figure number. Otherwise,

charts shall be treated as an integral part of the text. The table or chart (figure) number and title shall be centered above the table or chart. The first letter of the first word and of each principal word shall be capitalized; the remaining letters shall be lowercase. The first letter of the first word of column titles shall be capitalized; the remaining letters shall be lowercase. Carryover lines shall be indented two spaces. Tables applicable to one service, in a manual that will be used by more than one service, shall be identified.

3.2.9.2.2 *Continued material.* (Figure 8) When a table or chart is continued on a following page, the number and title shall be repeated, followed by a dash and the word "Continued." Column titles shall also be repeated. When information opposite an item is continued, the item shall be repeated, followed by a dash and the word "Continued."

3.2.9.2.3 *Footnotes.* Numbering of footnotes to tables or chart shall be independent of that of footnotes to the text. The references shall be indicated by consecutive superior numbers within each table or chart. (Superior lowercase letters, asterisks, or other designation may be used where numbers would cause confusion.) The footnotes, which shall be kept to the minimum consistent with clarity, shall be placed immediately below the table or chart in which they are referenced. If a table or chart is continued onto other pages, all footnotes shall be placed at the bottom of the page on which they are referenced, or at the end of the table or chart, and the directory note, "See footnotes at the end of table or chart," (figure 8), shall be placed at the bottom of pages containing footnote references. For footnotes coming before the end of the table or chart, and for a directory note, a 1-inch rule shall be placed flush left below the table or chart and the footnote or directory note placed thereunder. Footnotes at the end of the table or chart shall be started on the second line below the closing rule. All table or chart notes and footnotes shall be indented five spaces and carryover lines shall return to the left margin (figure 8).

3.2.9.2.4 *Rules.* Vertical rules may be drawn between columns where required for clarity, except that no rule shall be placed to the left of the first column or to the right of the last column.

A horizontal rule shall be placed at the beginning and at the end of the table or chart. No rule shall be inserted at the bottom of the table or chart if it is to be continued on the following page.

3.2.10 *Illustration cutline.* (All) (G, figure 6) The point at which an illustration, table, or chart is to be placed shall be indicated by a break in the text and the insertion of the figure number and title, and illustration identification number. Cutlines shall be placed at the end of the first paragraph or subparagraph to which they pertain. The figure number shall begin at the left margin and there shall be a 1-1/2-inch space above and below the cutline. Cutlines for foldout illustrations shall be placed at the end of the publication. For reproducible copy, the illustration is mounted in place and the cutline becomes the figure title.

3.2.11 *Illustration legends.* (All)

3.2.11.1 *Figure titles.* Illustrations shall be assigned figure titles. Except for foldout illustrations (see 3.2.5), the title shall follow the figure number and be placed below the applicable illustration. Figure titles should begin with an identifying name; examples: *Guidance System*; *Engine Assembly*. The title shall describe the contents or purpose of the illustration. In manuals used by more than one service, illustrations which are applicable to some but not all of the services shall have the services to which they apply identified, e.g., "Figure 2-3. (Army only) Fuel indicator." When the illustration is classified, the service identification shall follow security classification.

3.2.11.2 *Illustration legends.* (Figure 9). Legends shall be so placed that the last line of the legend is four spaces above the cutline and shall be headed by the word "legend" followed by the number of the figure to which it is applicable. The entire legend shall be indented 5 spaces. If the legend is continued, the figure number and title shall be repeated, followed by the word "continued." Only that information which is necessary to clearly identify the items shall be included in the legend. Where methods such as the tabular presentation technique are used, no legends are required.

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3.2.11.3 *Illustration identification numbers.* Illustration identification numbers shall be obtained as needed from the procuring activity and shall be placed in the lower right-hand corner of the illustration within the crop marks, in 4—6 point type.

3.2.12 *Divisions.* (All) A publications shall be divided into parts, chapters, sections, and paragraphs, as appropriate. There shall be at least two of each subdivision used; i.e., where there is a part one there shall be a part two; where there is a chapter 1, there shall be a chapter 2, etc.

3.2.12.1 *Parts.* Parts shall be numbered consecutively throughout the publication with the number spelled out, e. g., "PART ONE", "PART TWO". (see A, figure 6 for format). A manual may be divided into parts where, in a combined manual, it is desired to separate the coverage for the various maintenance levels, where more than one model is covered, and the differences between models are so great that coverage together is not feasible, or in any situation where a breakdown between "Chapter" and "Volume" can be justified. A part shall always be a division of a volume, never a separate volume in itself.

3.2.12.2 *Chapters.* Arabic numerals shall be used to number chapters consecutively throughout the publication. Format shall be as shown by B, figure 6.

3.2.12.3 *Sections.* Roman numerals shall be used to number sections consecutively within the chapter to which they pertain. Format shall be as shown by C, figure 6.

3.2.12.4 *Paragraphs.* The first letter of the first word and of each principal word in the paragraph title shall be capitalized, (D, figure 6). No text shall appear on the same line as the paragraph title. Paragraph numbering for calibration is explained in specification covering calibration. Except when the text does not warrant assignment of headings, or when such headings cannot logically be assigned, all paragraphs shall be titled. Breakout shall be planned so as to subordinate that which should be subordinated.

3.2.12.4.1 *Subdivision of paragraphs.* Subdivision of paragraphs shall be numbered or lettered as shown below: (Underscored items to be italicized on reproducible copy.)

- a. First subdivision: *a, b, c, *** z, aa, *** az, *** ba, *** bz.*
- b. Second subdivision: (1), (2), (3).
- c. Third subdivision: (a), (b), (c).

Breakdowns beyond the third subdivision shall not be used without specific approval of the procuring activity. The first subdivision title (E, figure 6) shall be indented 3 spaces, the first letter of the first word and of each principal word shall be capitalized, and the title shall be underscored or italicized for manuscript and italicized for reproducible copy. Text shall begin on the same line as the title and the title and text shall be separated by a period and two spaces. The first letter of the first word of the second subdivision title shall be capitalized and the title shall be indented 5 spaces and underscored (italicized). If there is no subdivision title, the first sentence shall be indented 5 spaces (F, figure 6). Spacing and rules for running-in of text are the same as for the first subdivision. Third subdivision titles shall be as prescribed for second subdivision titles except that they shall be indented 7 spaces. Although subdivision need not be titled, if one such subdivision is titled, all subparagraphs of the same level within that paragraph shall be titled. The second and all following subdivision lines shall begin at the left margin.

3.2.12.5 *Procedure steps and checklist items.* Procedure steps and checklist items shall be numbered consecutively with Arabic numerals. The steps/items shall be indented 2 spaces and be in block format as shown below:

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3-52. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
    1. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
    2. xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
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3.2.12.6 *Appendixes.* (All) Appendix headings shall be capitalized and centered. They shall be identified by capital letters, e.g., APPENDIX A, APPENDIX B, etc., and shall

immediately follow the last chapter. Pages, paragraphs, illustrations, and tables for appendixes shall be numbered in Arabic numerals, preceded by the capital letter of the appendix. For example, A-17 shall be the 17th page or paragraph in Appendix A; figure B-17 shall be the 17th illustration in Appendix B; table C-17 shall be the 17th table in Appendix C. Where there is only one appendix, no letter shall be used.

3.2.12.7 *Glossaries.* (All) Glossaries shall be used in equipment publications only when the terms are not adequately defined in the text, or in the Army, Navy, Air Force, DOD, or standard dictionary. If a glossary is required, it shall immediately precede the index, if any. Glossary head shall consist of the word "GLOSSARY" capitalized and centered. Page numbers for a glossary shall be consecutively numbered in Arabic numerals with the word Glossary preceding the page number; example: Glossary 4.

3.2.12.8 *Indexes.* (All) (Figures 10 & 11) An index shall be prepared when the number of paragraphs in a publication exceeds 50. It shall list pertinent subjects under every topic for which users are likely to look. Topics shall be listed alphabetically (numerically where numbers rather than letters are involved). All applicable paragraph and page numbers for each item shall be indicated. The index shall be so constructed as to enable the user to locate easily any part, information, or operation described in the text. The index head shall consist of the word "INDEX" capitalized and centered. Page numbers for alphabetical indexes shall be consecutively numbered in Arabic numerals with the word Index preceding the page number; example: "Index 17."

3.3 *Development of text.* (All) Text should be presented in language free of vague and ambiguous terms, using the simplest words and phrases which will convey the intended meaning. All essential information must be included, either by direct statements or by reference. For maximum clarity and usefulness, there shall be consistency in terminology within the same publication or series of publications. To the extent that the nature of the data being present will allow, there shall be consistency of organiza-

tion among like-type publications. Sentences shall be short and concise. Punctuation shall be used in a manner which aids in reading and prevents misreading. Well planned word order requires a minimum of punctuation. When extensive punctuation is necessary for clarity, sentences shall be rewritten. The US Government Printing Office Style Manual shall be used as a general guide for capitalization, punctuation, compounding of words, numerals in the text, and spelling of non-technical words. Technical words shall be used only when no other wording will convey the intended meaning. Quotation marks and underscoring shall not be used for emphasis. Words which have more than one meaning which will fit the context in which they are used, such as "replace" in the sense of "install again," shall not be used. Chapter, section, and paragraph headings shall be descriptive of the contents of the division they head; "General" and "Miscellaneous" shall not be used unless no other title will suffice. Enough information shall be provided to assure peak performance of the equipment. Pages containing emergency information shall be marked by a broken black border. Federal Stock Numbers, part numbers and source, maintenance, and recoverability (SMR) codes (Army only) shall not be used, in the text. Federal Stock Numbers and part numbers may be used in tables and in legends for illustrations. Clean room information as described in TO 00-25-203 shall be provided for Air Force manuals. Nomenclatures shall be consistent within a publication and throughout parts lists, parts breakdowns, and other directly related publications. The identification used on an assembly drawing is not necessarily complete, approved, nomenclature for the part it identifies. When required, detail specifications shall contain additional nomenclature requirements. Statements which explain applicability for individual items of equipment shall use specific serial number(s), block designation(s), specific model designation(s), or similar identification. Such terms as "on later equipment" and "on early serial numbers" shall not be used.

3.3.1 *References.* (All) The text shall refer to:
a. Only models or types covered by the manual. To facilitate coverage of modified or additional models or types at a later date,

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references should be held to a minimum consistent with clarity.

b. The basic number of Government specifications and standards is listed in the Department of Defense, Index of Specifications and Standards (DODISS). Specifications or standards shall not be referenced for essential information concerning a procedure.

c. Materials, such as lubricants, cleaning fluids, etc., by Government specification number, when applicable. When the contractor cannot ascertain the Government specification, or cannot locate it in the DODISS, he shall request this information from the procuring activity, furnishing complete information concerning the material's composition, properties, characteristics, applications, manufacturer's specification number, etc. Where design considerations require use of a proprietary specification a Government specification shall be listed as an emergency substitute, if such a substitute exists. If no such emergency substitute specification exists, the contractor and the Government shall confer to resolve the problem. If the proprietary specification is copyrighted, refer to 3.1.2. For Army, the text shall cite the common name or the Federal Item Name e.g., (paint, acrylic) and reference that item in the Consumable Maintenance Supplies and Materials table.

d. Temperature readings as calibrated on the equipment. If other than Fahrenheit, the temperature reading in Fahrenheit shall follow parenthetically. General temperature references, such as room temperature, shall normally be given in degrees Fahrenheit. If required, equivalent temperature degrees in Centigrade, Rankine, or Kelvin shall be given in parentheses.

e. Speed, distance, and meter readings as calibrated on the equipment. If the detail specification so requires, conversion of US measurements to metric measurements, or vice versa, shall be indicated.

f. Switch positions and panel markings exactly as marked on the equipment, except symbols on panel markings may be spelled out when they cannot be produced by the composing equipment used to prepare the manuscript or reproducible copy for the manual, such as the symbol for "ohm," "infinity," etc.

g. Measurements in US standard units (ounces, pounds, gallons, inches, feet, knots, miles, etc.) except instances in which metric measurements are required. Torque shall be

expressed in the English system as "lb-ft", "lb-in" etc. It shall be expressed in the Metric system as "Kg-m", etc.

h. Illustrations by figure number, including section letter/number when applicable, and the sheet number for multisheet illustrations. References shall be made only to illustrations within the same publication or another volume of the same publication, e.g., TM 9-3410-328-34 may refer to TM 9-3410-328-34P, or TM 3410-328-12.

i. Item numbers on illustrations first, followed by the figure number; example: (34, figure 2-6). However, when multiple references in a paragraph refer to the same figure, only the first reference need indicate the figure number. Additional references need indicate only the item number until the sequence is broken by a reference to a different figure number. Example: "Disassembly of Air Valve, (Figure 4-12). Unscrew safety disc retainer (2) from valve body (1) and remove safety disc (3) and safety disc washer (4)." When the sequence is unbroken for procedures requiring two or more pages, the figure number shall be repeated after the first reference on each succeeding page. If two or more figures are involved in the same sequence, the figure with the greater number of items shall be cited as described above. Item callouts for items of remaining figures shall have the item number precede the figure number; e.g., "21, figure 2-5." In such cases, the paragraph lead-in shall contain a statement similar to the following: "Item numbers below refer to figure 3-5 unless otherwise indicated."

j. Parts on illustrations by enough of their reference designation to identify the item. Example: A6R11.

k. Tables by table number. References shall be made only to tables within the same manual, or another volume of the same manual.

l. Other supporting paragraphs in the same manual or another volume of same manual, by paragraph number, (e.g., para 3-4, para 3-4a). (Duplication of material within the manual shall be avoided except when required for clarity or emphasis.)

m. Other subparagraphs of the same primary paragraph as "above" or "below."

n. Other publications by identifying numbers. Material of less than two pages or which can be condensed to two pages shall be repeated rather than referenced. Reference may be made only to publications in the publication

system(s) of the Service(s) that will use the manuals and shall be only those that will be available to the organization that will be using the publication. However, reference shall not be made to publications of a temporary nature or those that receive distribution limited to certain organizations or activities.

o. *Footnotes, when essential for references, explanations, comments, etc.* If used in text, consecutive numbers beginning with "1" shall be used. The numbering system, as long as it is consistent, may be per page, per section, per chapter or per publication; however, per volume for a multi-volume publication. Identical footnotes shall not be repeated within the unit chosen for numbering (page, section, chapter, or volume). Footnotes in the text shall not be used for mandatory requirements. In tables, footnote references shall be numbered separately for each table in accordance with the US Government Printing Office Style Manual. Footnotes to the text shall be placed at the bottom of the page; footnotes to tables, below the applicable table.

p. (A) References for Appendix A shall be limited to those documents referred to in the publication and shall be grouped according to subject, with group headings numbered as paragraphs.

3.3.2 *Grammatical person and mood.* (All) The second person imperative mood shall be used for procedures ("Remove test set from carrying case."). Third person indicative mood shall be used for description and discussion. "When switch A is in the ON position, lamp 34 lights."

3.3.3 *Readability.* (A) Narrative text (those pages that consist of not less than 200 words in consecutive sentences per page) shall conform to the following readability standards:

3.3.3.1 *Standard No. 1.* The average sentence length (ASL) shall not exceed 20 words. The desired ASL is 1 to 17 words.

3.3.3.2 *Standard No. 2.* The average word length (AWL) shall not exceed 1.60 syllables. The desired AWL is 1 to 1.50 syllables. The length of a word is measured by the number of its syllables. Mandatory words shall be excluded from this restriction. (See 6.3.12).

3.3.3.3 *Standard No. 3.* The percent of personal sentences (PPS) shall not be less than 15% of the total number of sentences in the narrative text. The desired PPS is 20% and above. (See 6.3.19).

3.3.4 *Abbreviations.* (All) Use of abbreviations shall be held to a minimum (when in doubt, spell it out) and each shall be defined the first time it appears. The abbreviation shall follow its definition. Abbreviations used shall be in accordance with the requirements of MIL-STD-12, AR 310-50(A), and other official documents. However, if a publication is prepared on composing equipment cited in 3.2.2 which cannot produce a certain abbreviation or symbol, such as "±" for plus or minus, an abbreviation such as "POM," may be used, provided the new abbreviation does not conflict with one presently listed in authorized guidance documents. Such new abbreviations must be explained in the manual's foreword, preface, introduction, or glossary. Procuring activity approval is required for use of new abbreviations in Navy and Marine Corps manuals.

3.3.5 *Military terms.* Military terms used shall be in accordance with Joint Chiefs of Staff (JCS) Publication 1 and any dictionary or glossary of military terms of the appropriate Service.

3.3.6 *Automatic electronic test and checkout terminology.* Terms used for automatic electronic test and checkout shall be in accordance with MIL-STD-1309.

3.3.7 *Use of "shall," "will," "should," and "may."* The words "shall" or "will" shall be used to express a mandatory requirement. The word "should" shall be used to express nonmandatory provisions. The word "may" shall be used to express permissiveness..

3.3.8 *Tables, charts, graphs.* (All) Reference date (other than illustrations, drawings, diagrams) shall usually be presented in tabular, chart, or graph form. Any other type of data which lends itself to tabular, chart, or graph form may also be so presented. Tables, charts, and graphs shall be so designed that they are easily

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understood. Charts and graphs shall be considered illustrations, and assigned figure numbers; however, if a particular chart or graph is small, and will not require referencing except from adjacent text, it shall be included within a paragraph of text without identification as a figure. Format requirements for a specific table, chart, or graph are indicated in the applicable detail specification.

3.3.9 Warnings, cautions, and notes. (All) Warnings and cautions shall precede the text but follow paragraph headings to which they apply. Notes may precede or follow applicable text, depending on the material to be highlighted. However, the requirements of the detail specification apply when it specifies another location. The requirement of the detail specification also applies when repetition or summarization of warnings/cautions is required. Warnings, cautions, and notes shall not contain lettered or numbered procedural steps nor shall the headings be numbered. When a warning, caution, or note consists of two or more paragraphs the heading WARNING, CAUTION, NOTE, shall not be repeated above each paragraph. If it is necessary to precede a paragraph by both a warning and a note, or a caution and a note, etc., warnings shall precede cautions, which in turn shall precede notes. Figure 12 illustrates the styles. Refer to 3.2.8 regarding indentation. Warnings, cautions, and notes shall be short, concise and used only to emphasize important or critical data. Warnings and cautions may be worded positively or negatively and shall state the hazard and result or reason, unless obvious. Following are the definitions of warning, caution, and note. These definitions shall be used in manuals where the detail specification requires these terms to be defined.

WARNING: An operating or maintenance procedure, practice, condition, statement, etc., which, if not strictly observed, could result in injury to or death of personnel.

CAUTION: An operating or maintenance procedure, practice, condition, statement, etc., which, if not strictly observed, could result in damage to, or destruction of, equipment.

NOTE: An operating or maintenance procedure, condition, statement, etc., which it is essential to highlight. In Navy and Marine Corps

manuals, cautions shall also be used if a loss of mission effectiveness is involved.

3.3.9.1 Health hazards precaution data. (All) Procedures prescribed for the operation and maintenance of equipment shall be consistent with the safety standards established by the Occupational Safety and Health Act, Public Law 91-596 and Executive Order 11612. When hazardous chemicals or adverse health factors, in the environment or use of the equipment cannot be eliminated, appropriate precautionary requirements shall be included.

3.4 Security classification markings. (All) The security classification for titles or parts, chapters, sections, appendixes, paragraphs, illustrations, and tables, and the contents of paragraphs, illustrations and tables shall be identified in accordance with DOD 5200-1-R.

3.4.1 Overall classification.

3.4.1.1 (A) The overall classification assigned to a technical manual (each volume in a multi-volume manual shall be considered independently) shall agree with the highest classification assigned to any material therein.

a. *Manuscripts.* Each manuscript page shall be marked with the overall assigned defense classification. It shall be placed at the top and bottom of the outside front and back covers, title page (if any), and all pages, regardless of the contents of the page. The defense classification of each paragraph, section, chapter, appendix, illustration, table, or other portion shall be indicated as prescribed in DOD 5200.1-R.

b. *Reproducible copy.* Pages of a manual prepared as reproducible copy shall be marked as indicated in 3.4.1.2 and 3.4.2. The defense classification of each paragraph, section, chapter, appendix, illustration, table or other portion shall be indicated as prescribed in DOD 5200.1-R.

3.4.1.2 (N, MC, F) The overall classification shall be placed at the top and bottom of the cover or title block page and on the spine, if any. When this results in a cover or title block page being marked with a higher classification than that assigned to the contents of that page, an explanation of the higher classification shall be made

beneath the bottom classification marking; For example:

CONFIDENTIAL

(This page is UNCLASSIFIED)

or

SECRET

(This page is CONFIDENTIAL)

3.4.2 *Classification of each page.* (N, MC, F) Each page (other than the front and back cover page with a title block, and backbone) shall be marked according to its highest content at the top and bottom of the page, except that when the classification of two back-to-back pages differ, then the higher classification shall be placed on both pages. A blank page backing up a classified page shall show the classification of the classified page. Unclassified sheets (both pages being unclassified) shall be so marked. If the classification shown on the last page of a basic manual is not the same as that shown on the cover, then a blank sheet which shows the same classification (excluding Restricted Data notations - if applicable) as the cover/title block page shall be added to the back of the manual. When any page, except a blank page, is marked with a higher classification than that assigned to its contents, an explanation shall be made on that page beneath the bottom classification marking; for example:

CONFIDENTIAL

(This page is UNCLASSIFIED)

or

SECRET

(This page is CONFIDENTIAL)

3.4.3 *Downgrading/declassification.* (All) When required, downgrading/declassification markings shall be applied in accordance with DOD 5200.1-R.

3.5 *Front matter.* (All) The front portion of a manual shall consist of the following, as contrac-

tually specified or as stated in the detail specification:

- a. (All) Cover/Title block page
- b. (A, F) Warning page
- c. (N, MC, F) List of effective pages (for looseleaf changes only)
- d. (N, MC) Promulgation page
- e. (N, MC) Change record
- f. (N, MC) Foreword/Preface
- g. (All) Table of contents
- h. (N, MC, F) List of illustrations
- i. (N, MC, F) List of tables
- j. (N, MC) Safety summary

3.5.1 *Cover/Title block page.* (All) Copy for the cover/title block page shall contain the information indicated by figures 1 & 2. Unless otherwise stated by the procuring activity, the information for both a cover and a title block page shall be the same. The procuring activity will also indicate which (or that both) shall be provided. Copy for the back cover of a classified manual shall show the security classification at the top and bottom in the same size and style type as shown on the front cover. When a manual will require a backbone, the procuring activity will so state. Copy for the backbone for an Army manual shall be in accordance with figure 13; for a Navy manual in accordance with figure 14. When a title block followed by text on the same page is used instead of a cover, the title block shall be confined to a 7 x 5-1/2 inch area. Type size shall be such that all the information can be included within the prescribed area for title block usage (see figure 6).

3.5.1.1 *Preliminary issues.* (N, MC, F) Refer to 6.3.20 for definition. When applicable; the word PRELIMINARY shall be centered above the words TECHNICAL MANUAL.

3.5.1.2 *Copy number.* (F) Distribution of preliminary manuals is controlled by use of a sequential copy number. Therefore, in the upper left corner of the cover/title block page for such manuals shall appear:

SEQUENTIAL COPY

No. ... of ... Copies

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If a preliminary manual is changed, each changed cover/title block page must also show space for the receiver of the change to enter the proper sequential copy number.

3.5.1.3 *Draft manuals.* (A) Refer to 6.3.4.1 and 6.3.6 for definitions. The words "Draft" or "Final Draft" as specified by the procuring activity shall be centered above the words TECHNICAL MANUAL.

3.5.1.4 *Title* (All) The publication title, as indicated by the applicable detail specification, shall be positioned slightly below the words indicating the type of publication; e.g., "Technical Manual," "Technical Order," etc.

3.5.1.4.1 *Maintenance levels.* (A, N, MC) The levels of maintenance, as appropriate, shall be shown beneath the publication type.

3.5.1.4.2 *Nomenclature.* (All) The nomenclature of the equipment, type, model, Federal Stock Number, part number (blocks, serial numbers, registration numbers, if appropriate) shall be positioned below the words identifying the manual type. If so requested by the procuring activity, the Federal stock number and identification of equipment other than the major items covered in the manual shall be indicated. Also, the classification of the equipment nomenclature shall be indicated (U), (C), (S), as specified in DOD Manual 5200.1-R when the manual itself is classified.

3.5.1.4.3 *Manufacturer.* (F) Identification of the designer of the equipment shall appear below the equipment nomenclature. If the equipment is designed by a sub-contractor but the manual is prepared by the prime contractor, the parenthetical statement "(Manual prepared by)" (6-point) shall appear below the designer's name. However, the identification shall be omitted for any manual applicable to more than one manufacturer unless the prime contractor prepared the manual for two or more sub-contractors, in which case the "(Manual prepared by)" statement only shall be used.

3.5.1.5 *Contract number.* (N, F) The original contract number shall be placed on all new issues and carried forward on all subsequent cover/title block pages. If the contract number for a change or revision is different from the original number, the number applicable to the change or revision shall be indicated on the cover/title block pages, in addition to the original number. No more than two contract numbers, the original and the latest, need appear.

3.5.1.6 *Distribution statement.* (N) A statement, as specified by the procuring activity, in accordance with DOD 5200.1-R shall be placed on the cover or title block page of each manual.

3.5.1.7 *Supersedure notice.* (All) When the manual under preparation supersedes other manuals or portions of manuals, a supersedure notice, which will be furnished by the procuring activity, shall be placed at a point on the cover/title block page selected by the procuring activity. If an unclassified manual supersedes a classified manual, or if a manual of a lower classification supersedes one of a higher classification, the following statement shall be included. "This manual supersedes (insert proper publication number) dated (insert date of superseded publication), which shall be destroyed in accordance with applicable security regulations."

3.5.1.8 *Supplement notice.* (N, MC, F) Cross-reference notes to supplements, or to augmenting manuals, shall be placed on basic publication title block pages initially, or at time of change or revision.

3.5.1.9 *Special handling.* (All) When specified by the procuring activity, manuals containing classified information which may be liable to inadvertent disclosure to foreign governments or foreign nationals shall bear the following notice: "Special Handling Required - Not Releasable to Foreign Nationals." When it is determined the classified manual information may be released to certain foreign governments or foreign nationals, the following notice shall be used: "Special Handling Required - Not Releasable to Foreign Nationals except (insert name of nations to which disclosure is authorized) by authority of Date"

3.5.1.10 *Effective date.* (A, N, F) When a manual becomes effective later than the date upon which it is distributed, a notice similar to the following shall be used: "The effective date of this publication is (). Instructions herein shall not be used prior to that date."

3.5.1.11 *Additional warning notices.* When pertinent, the markings required by DOD 5200.1-R shall be placed on the cover of the publication.

3.5.1.12 *Authority notice* (N, F) The authority notice will be provided by the procuring activity. Cover and title blocks for manuals to be jointly used by the Navy and Air Force shall show a joint authority notice.

3.5.1.13 *Page total and copy number.* (N, MC, F) Manuals classified Secret (with or without RESTRICTED DATA or FORMERLY RESTRICTED DATA notations) shall show the statements: "This publication consists of *... classified pages of *... total pages. Copy No. #... of #... copies. (* - quantity shall be inserted upon completion of reproducible copy.) (# - numbers will be inserted following reproduction.)

3.5.1.14 *Publication date.* (N, MC, F) If the procuring activity does not advise the contractor the exact date to use, the publication date shall be the date at which the last material to be included was received (copy freeze date — refer to 6.3.2). The day, month, and year shall be given in that sequence; example: 1 JULY 1971. (For Navy and Marine Corps manuals the publication date will always be the 1st or 15th of the month.)

3.5.1.15 *Change numbers.* The change number and date shall be shown on the cover/title page as follows: CHANGE 1 — 15 DECEMBER 1973.

3.5.1.15.1 *Change strip.* (N) The cover/title block page for a change shall bear a change notice strip across the top of the page. Type style and sizes should be similar to the following:

(36-point)	(12-point)
CHANGE	LATEST CHANGED PAGES SUPERSEDE
NOTICE	THE SAME PAGES OF PREVIOUS DATE
(12-point)	Insert changed pages into basic publication. Destroy superseded pages. (8-point)

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3.5.1.16 *For official use only (FOUO).* (A, F)

a. (F) When the procuring activity so requests, manuals shall contain the notice FOR OFFICIAL USE ONLY at the bottom center of the cover/title block page.

b. (A) When specified by the procuring activity, the manual shall be marked "FOR OFFICIAL USE ONLY" in bold letters in at least 18-point type. This marking shall be placed near the bottom of the front cover, back cover, and each page. The front cover shall also show a cancellation date as provided by the procuring activity.

3.5.1.17 *This page is unclassified.* (N, MC, F)
Refer to 3.4.2 for use of this notation.

3.5.1.18 *Automatic, time phased downgrading and declassification system.* (All)
Cover/title block pages shall reflect the applicable special marking notation centered at the bottom of the page beneath the classification marking. Refer to DOD 5200.1-R. The downgrading notation, when applicable, shall include an "origination date," which will be provided by the procuring activity, from which to figure the downgrading intervals.

3.5.1.19 *For MAP or Consortium use only.*
(F) When the procuring activity so requests, manuals prepared for limited non-US use (such as for Military Assistance Program (MAP) or Consortium) shall contain the statement "For MAP Use Only" or "For Consortium Use Only" placed on the cover/title block page in the position designated by the procuring activity.

3.5.1.20 *Reprint information.* (F) Refer to 6.3.21 for definition. When a manual is reprinted and changes to the manual are merged with the basic manual, a notice similar to the following shall be included on the cover/title block page: "BASIC AND ALL CHANGES HAVE BEEN MERGED TO MAKE THIS A COMPLETE PUBLICATION."

3.5.1.21 *Aircraft flight manual.* (F) See figure 16. General cover/title block page requirements apply, except as follows:

3.5.1.21.1 *Illustration.* (F) A large, clear, black and white photographic view of the aircraft in flight with appropriate background scenery may be placed on the title block page, provided the additional cost involved is negligible. Each change and revision shall then contain the same view. The illustration shall be designed and placed so as not to interfere with the printed information. Unless the cost for such an illustration is negligible, procuring activity is required for the inclusion of this illustration.

3.5.1.21.2 *Title.* (F) The words FLIGHT MANUAL and the type designation may be presented in any size and format suitable for an attractive cover/title block page. When applicable, the words PRELIMINARY, UTILITY, or PARTIAL shall be placed above the words FLIGHT MANUAL.

3.5.1.21.3 *Partial manual cover/title block page.* (F) A note shall be included, when appropriate, stating: "This publication is incomplete without (publication number)."

3.5.1.21.4 *Supersedure notice.* (F) The supersedure notice for a change or revision shall be placed so as not to interfere with the illustration. It shall include a list of all currently replaced operational and safety supplements as well as a reference to the appropriate technical order index for the current status of flight manuals, operational and safety supplements, and flight crew checklists. Replaced supplements shall be listed individually. When several alphabetically sequenced supplements are replaced, they shall be grouped. When no operational or safety supplements are replaced, the notice shall read: "REFER TO APPLICABLE TECHNICAL ORDER INDEX, AND SUPPLEMENT THERETO, FOR THE CURRENT STATUS OF FLIGHT MANUALS, OPERATIONAL/SAFETY SUPPLEMENTS AND FLIGHT CREW CHECKLISTS."

3.5.1.21.5 *Classified supplements.* (F) When a flight manual revision is issued in two parts (for example, an unclassified basic manual and a classified supplement), the supersedure notice shall appear only on the cover/title block page of the basic unclassified flight manual. To assure

that operational and safety supplements pertaining to the classified supplement are not destroyed before the new classified supplement is received, the supersedure notice on the cover/title block page of the basic unclassified flight manual shall show the following:

a. An asterisk shall precede each number, or group of numbers, for those operational and safety supplements that will be incorporated into the new supplement. The asterisk shall also be used if the operation and safety supplements contain information which will be included in both the new basic manual and the new supplement.

b. The supersedure notice shall be followed by a special note to explain the asterisk, for example: "Retain this (these) operational/safety supplement(s) until receipt of supplementary (publication number) dated"

3.5.1.21.6 *Emergency procedure notice.* (F) One or both of the following statements, as designated by the procuring activity, shall appear on the cover/title block page of all classified aircraft flight manuals, including changes, classified revisions, and applicable classified supplements.

"When Section III, Emergency Procedures, is withdrawn from this manual for use in control towers, the security classification of Section III shall be cancelled."

"Radio transmission in the clear of pertinent emergency operating instructions contained herein is authorized under emergency conditions."

3.5.1.21.7 *Issue code.* (F) An issue code shall precede the original issue date. The letter "A" shall be used for the first issue of the manual; the letter "B" for the first revision; the letter "C" for the second revision; etc.

3.5.1.22 *Safety supplements.* (F) See figures 16 and 17.

3.5.1.22.1 *Margin.* (F) The margin shall consist of "SS's" on all four sides with the words "SAFETY SUPPLEMENT" at the bottom of the page. Refer to the NOTE following 3.5.1.22.4.

3.5.1.22.2 *Title designation.* (F) The words "SAFETY SUPPLEMENT" shall be positioned above the words "TECHNICAL MANUAL" or "FLIGHT MANUAL." The nomenclature shall be the same as on the basic manual. Refer to the NOTE following 3.5.1.22.4.

3.5.1.22.3 *Supplement notices and supersedure notices.* (F) A notice shall reference the basic manual supplemented, and, if applicable, reference any publication replaced. For example:

"THIS PUBLICATION SUPPLEMENTS (publication number) DATED.....Reference to this supplement will be made on the cover/title block page of the basic publication by personnel responsible for maintaining the publication in current status." NOTE: The second sentence shall be omitted from safety supplements for aircraft flight manuals.

"THIS PUBLICATION SUPPLEMENTS (publication number) DATED.....Reference to this supplement will be made on the cover/title block page of the basic publication, and opposite each affected portion of the basic publication, by personnel responsible for maintaining the publication in current status." NOTE: This notice is not applicable to safety supplements for aircraft flight manuals and is to be used only when the using command so requests.

"THIS PUBLICATION SUPPLEMENTS (publication number) DATED.....AND SUPERSEDES INTERIM SAFETY SUPPLEMENT (publication number) DATED.....Reference to this supplement shall be made on the cover/title block page of the basic publication by personnel responsible for maintaining the publication in current status." NOTE: The second sentence shall be omitted from safety supplements for aircraft flight manuals.

NOTE: When a safety supplement is issued prior to publication of a basic flight manual, in addition to the applicable notice above, a statement worded as follows shall follow the first sentence in the notice: "Basic flight manual, (publication number), is under preparation and should be distributed in the near future."

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3.5.1.22.4 *Responsibility notice* (F) The responsibility notice shall be positioned as shown in figure 15. NOTE: The margin of SS's, the words SAFETY SUPPLEMENT at the top and bottom of the page, and the responsibility notice, shall all be printed in red. Therefore, such information shall be prepared on a separate overlay.

3.5.1.22.5 *Publication date*. (F) When a publication date is required, it shall be the same as the date of the replaced interim safety supplement unless the formal supplement contains additional changes. The date shall be positioned as shown in figures 16 and 17.

3.5.1.22.6 *Security information*. The security markings shall be the same as for other cover/title block pages, except as follows:

a. The classification shall be placed at the top center of the border, and be centered at the bottom of the page above the words SAFETY SUPPLEMENT.

b. The espionage law notice shall be used unless the supplement carries the RESTRICTED DATA notation.

c. The special handling notice (3.3.9.1.12) shall not be shown on classified safety supplements for classified nuclear weapon loading and delivery manuals intended for MAP or non-US use.

3.5.1.23 *Operational supplements*. (F) See figures 18 and 19.

3.5.1.23.1 *Margin*. The margin shall consist of "OS's" on all four sides with the words OPERATIONAL SUPPLEMENT at the bottom of the page. (The margin shall be printed in black.)

3.5.1.23.2 *Title designation*. The words OPERATIONAL SUPPLEMENT shall be positioned above the words "TECHNICAL MANUAL" or "FLIGHT MANUAL." The nomenclature shall be the same as on the basic manual. (The title will be printed in black.)

3.5.1.23.3 *Supplement notices and supersedure notices*. A notice shall reference the

basic manual supplemented, and, if applicable, reference any publication replaced. For example:

"THIS PUBLICATION SUPPLEMENTS (publication number) DATED.....Reference to this supplement shall be made on the cover/title block page of the basic publication by personnel responsible for maintaining the publication in current status." NOTE: The second sentence shall be omitted from operational supplements for aircraft flight manuals.

"THIS PUBLICATION SUPPLEMENTS (publication number) DATED.....Reference to this supplement shall be made on the cover/title block page of the basic publication, and opposite each affected portion of the basic publication, by personnel responsible for maintaining the publication in current status."

NOTE: This notice is not applicable to operational supplements for aircraft flight manuals and shall be used only when the using command so requests.

"THIS PUBLICATION SUPPLEMENTS (publication number) DATED.....AND SUPERSEDES INTERIM OPERATIONAL SUPPLEMENT (publication number) DATED.....Reference to this supplement shall be made on the cover/title block page of the basic publication by personnel responsible for maintaining the publication in current status." NOTE: The second sentence shall be omitted from operational supplements for aircraft flight manuals.

3.5.1.23.4 *Responsibility notice*. (F) The responsibility notice shall be positioned as shown in figure 18. (It shall be printed in black.)

3.5.1.23.5 *Publication date*. (F) When a publication date is required, the date shall be the same as the date of the replaced interim operational supplement, unless the formal supplement contains additional changes. The date shall be positioned as shown in figures 18 and 19.

3.5.1.23.6 *Security information.* (F) The security markings shall be the same as for other cover/title block pages, except as follows:

a. The classification shall be placed at the top center of the border and be centered at the bottom of the page above the words OPERATIONAL SUPPLEMENT.

b. The espionage law notice shall be used unless the supplement carries the RESTRICTED DATA notation.

c. The special handling notice (3.3.9.12) shall not be shown on classified operational supplements for classified nuclear weapon loading and delivery manuals intended for MAP or non-US use.

3.5.2 *Warning page.* (A, F) A warning page consisting of the more vital warnings extracted from those scattered throughout the publication shall be used when extreme care must be exercised in the presence of potential danger, such as high voltage, radioactive material, toxic chemicals, or high pressure. The warning page shall be placed on the inside front cover or be the initial page(s) of the manual. See figure 20. For Air Force manuals, the warning page shall be used only when specifically required by the procuring activity and shall be numbered with lower case letters; e.g., a,b,c,etc.

3.5.3 *List of effective pages.* (ALL) When specified by the procuring activity, a list of effective pages shall be prepared in accordance with figures 21, 22 or 23, as applicable. This page shall back up the title block page, or back up a separate change page when the procuring activity so specifies, and shall be identified by the letter "A" in the lower left corner. When additional space is required, "B", "C", etc., pages shall be added. The list of effective pages shall be a complete list of all manual pages, including title block page, "A" page, blank pages, deleted pages, added pages, and foldout pages. (Foldout figure numbers shall be considered page numbers.) The list of effective pages shall be updated for each manual change. The listing shall be held to a minimum by grouping numbers, where applicable. The page numbers for a blank page and the printed side of the sheet shall be listed as separate numbers, even though a double number will appear on the printed side of

the sheet. Appropriate change numbers shall be shown in the "Change No." column. The words "Deleted" or "Blank" shall be placed alongside the page number of pages so affected.

3.5.3.1 *Procuring activity.* (F) The abbreviation "USAF" shall be placed in the lower right corner of the list of effective pages (page "A" only). If the Air Force procures a manual for exclusive Army or Navy use, the symbol in the lower right corner of the page shall still show USAF, since the Air Force was the procuring activity.

3.5.3.2 *Operation and organizational maintenance manuals for missiles.* (F) In addition to standard requirements, the following applies to the list of effective pages for operation and organizational maintenance manuals for missiles: The lower portion of the page shall show the publication numbers of all current checklists applicable to the manual.

3.5.3.3 *List of effective pages for multivolume publications.* (N) A list of effective pages shall be prepared for the basic manual. In a multivolume manual the complete list of effective pages shall be shown in Volume 1. The remainder of the volumes shall include the listing of pages provided in that particular volume.

3.5.4 *Promulgation page.* (N, MC) When a promulgation page is required by the contract, the reproducible copy for it will be provided by an organization of the procuring activity at the time that the manual is to be printed. Each volume of a multivolume publication will require such a page. When a manual is revised, a new page shall be provided. The promulgation page shall be the first right-hand page following the list of effective pages. These pages shall be numbered with lowercase letters; e.g., a, b, c, etc.

3.5.5 *Change record.* (N, MC) A permanent change record, in accordance with figure 23, shall be included in each separate volume. The change record shall be the first right-hand page following the promulgation page. The change record page does not apply to EOD publications. These pages shall be numbered with lowercase letters, e.g., a, b, c, etc.

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3.5.6 *Foreword or preface.* (N, MC) When required by the detail specification or contract, a Foreword or Preface shall precede the Table of Contents in each manual, or volume of a manual. A Foreword or Preface shall contain the purpose and scope of the manual plus any other information required by the detail specification. When necessary, a Foreword or Preface shall define new abbreviations and symbols. The first volume of a manual shall contain general information regarding all volumes and specific information applicable to Volume 1, as required. These pages shall be numbered with lowercase Roman numerals; e.g., i, ii, iii, iv, etc.

3.5.7 *Table of contents.* (figures 24, 25, & 26.). (All)

3.5.7.1 *Manuscripts only.* The page number column for tables of contents shall be left blank.

3.5.7.2 *Reproducible copy and manuscripts.* A table of contents listing parts, chapters, sections, and paragraphs in the same order and with the exact title used in the text shall be placed at the beginning of each publication. Paragraph titles in publications containing indexes (see 3.2.11.8) shall be omitted from the table of contents. There shall be no table of contents preceding individual parts, chapters, or sections. When specified by the procuring activity, each volume of a multivolume manual shall have tables of contents covering the entire set. Entries shall indicate volume in which referenced material appears; e.g., "Operating Instruction, Vol 1." For Navy, Marine Corps, Air Force, layout shall conform to figure 23 except that a single column format may be used when the table of contents is one page or less or a majority of the titles are lengthy. For Army, format shown in figures 25 or 26, as appropriate, shall be used. These pages shall be numbered with lowercase Roman numerals, e.g., i, ii, iii, iv, etc.

3.5.8 *List of illustrations.* (N, MC, F) Unless otherwise specified by the procuring activity, publications containing ten or more illustrations (including charts and graphs assigned figure numbers) shall have a list of illustrations showing the figure number, title, and page number of each figure. (Foldout illustrations shall show figure

number and title only.) The security classification, if any, of illustration titles shall be indicated. Layout shall be double column, except that a single column format may be used when the list of illustrations is one page or less, or the majority of illustration titles are lengthy. Each volume in a set of manuals shall contain its own list of illustrations. In addition, Volume 1 shall contain a list of illustrations for all volumes in the set. These pages shall be numbered with lower case Roman numerals; e.g., i, ii, iii, iv, etc.

3.5.9 *List of tables.* (N, MC, F) Unless otherwise specified by the procuring activity, publications containing ten or more tables shall have a list of tables showing the table number, title, and page number of each table. The security classification, if any, of table titles shall be indicated. Each volume in a set of manuals shall contain its own list of tables. In addition, Volume 1 shall contain a list of tables for all volumes in the set. These pages should be numbered with lowercase Roman numerals; e.g., i, ii, iii, iv, etc.

3.5.10 *Safety summary.* (N, MC) When applicable, a safety summary in accordance with figure 27 shall be included in each volume. It shall include all general precautions (high voltage warning, warning against servicing alone, and resuscitation statement), all warnings and all cautions which, if not observed, may result in serious damage to the equipment or loss of mission effectiveness. If necessary, warnings and cautions shall be rephrased so that they can be understood out of context. Each item shall be referenced to the page on which it appears. The safety summary shall follow the list of tables. These pages shall be numbered with lowercase Roman numerals; e.g., i, ii, iii, iv, etc.

3.6 *Illustrations.* (All) Style and techniques shall be of a quality which will produce artwork that will clearly, adequately, and economically portray the information to be illustrated. Illustrative material shall be used to: describe an item or idea if this can be done more efficiently and effectively by graphic methods; clarify text; present phases difficult to describe by text alone; call attention to details; and furnish graphic identification of parts and tools. The minimum number of illustrations essential for these purposes shall be used. Multiple-sheet, or sequence

number, illustrations, in addition to step-by-step operational type, may be used for depicting disassembly, assembly, removal, installation, etc. Illustrations, other than foldouts, shall be located as near as possible to the point at which they are first referenced, except where this would require unnecessary duplication of illustrations. Full page illustrations that will be placed sideways on a page shall be turned from upright to 90 degrees counterclockwise with the figure number and title beneath the illustration (in viewing position) at the right edge of the page. Full page illustrations, including those for foldout pages, that have been prepared in exact printing size (or in the same size as text pages) shall have the marginal copy (6.3.13) mounted thereon. Full page photographs that are oversize shall either have the marginal copy separate, or have the marginal copy also prepared proportionately oversize and mounted on (included in) the photograph unless the procuring activity advises which method shall be used. Line drawings, including those for foldout pages, shall be reduced to the appropriate size and mounted on the reproducible page. Halftone illustrations shall be furnished separately and mounted. Space shall be provided on the reproducible page for strip-in of the halftone.

3.6.1 *Scale.* (All) - Illustrations shall be prepared to as small a scale as possible with all essential detail legible; be same size as areas they will occupy in the manual page or such oversize as to permit uniform reduction to this size. Refer to 3.2.4 regarding foldout pages.

3.6.2 *Photographs/line drawings.* (All) Unless otherwise specified by the procuring activity, the selection of either a photograph or line drawing method shall be determined by the practical considerations of the purpose and suitability of the illustration in the publication, the economy of preparation and reproduction, the nature of source data, and the availability of the equipment. Existing and available illustrations shall be used where they meet the requirements herein. In the early development of equipment, a line drawing shall be used if the equipment is not available for photographing. Rendered drawings, either airbrush or wet-brush, are also acceptable if such preparation is the most efficient method.

3.6.3 *Photographs.* (All) Photographs shall be detailed and sharp, free of heavy shadows, distorted objects, cluttered foregrounds or backgrounds, and give good contrast from white, middle tones, and black.

3.6.3.1 *Retouching.* (All) Photographic retouching shall be held to a minimum through good photography. Retouching shall be used to emphasize detail, exclude unwanted detail, correct slight photographic defects and to eliminate undesirable shadow for that portion of the photograph related to the text only. Quality of retouched photographs shall be such that tonal values are held when reproduced.

3.6.3.2 *Prescreened photographs.* (All) When approved by the procuring activity, prescreened photographs are acceptable as reproducible copy provided that they are of proper quality, size, and mounted on the reproducible copy of the text page or marginal copy.

3.6.4 *Line drawings.* (All) Line drawings shall be of high reproduction quality. India ink, pencil, or other suitable material capable of maintaining consistently high density tonal values, shall be used for preparing the line drawings. Line drawings include schematics, wiring diagrams, block diagrams, and similar types of illustrations.

3.6.5 *Diagrams.* (All) Electrical and electronic diagrams prepared for a technical manual shall be in accordance with the requirements of ANSI Y14.15. When required by the detail specification, each electrical and electronic diagram shall include a table indicating the highest reference designation used.

3.6.6 *Engineering drawings.* (All) If approved by procuring activity, engineering drawings which comply with the applicable military specification for engineering drawings preparation are acceptable as technical manual illustrations provided they meet the reproducible requirements herein. Borders, title blocks, manufacturer's notes and irrelevant material shall be removed.

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3.6.7 *Continuous tone illustrations.* (All) Continuous tone illustrations (those containing tonal values of gray as well as black, which are not created by lines or dots) whether photographs or drawings, shall be clear in detail, sharp in contrast of tones and with light and shadow in proper relation to a consistent light source. The background shall be an intense white. It shall extend the full width and depth of the artwork.

3.6.8 *Combination illustrations.* (All) Presentation of a subject by combining photographs, or continuous tone illustration, with line drawings, shall be limited to where this presents the subject more accurately or more clearly.

3.6.9 *Multiple-sheet illustrations.* (All) Multiple-sheet illustrations shall be consecutively sheet numbered following the title, for example: "Figure 2-17. Wing Hydraulic Assembly (Sheet 1 of 3)." Remaining sheets shall be numbered in consecutive order, Sheet 2 of 3, and Sheet 3 of 3. If some of the sheets of a multiple-sheet illustration are foldout pages, both the single sheets and the foldout sheets shall be located at the back of the manual and assigned foldout sheet numbers (see 3.2.4).

3.6.10 *Multiple-section illustrations.* (All) Each section of a multiple-section illustration shall be identified by a capital letter. Sections may or may not be captioned, but if one section is captioned, all shall be captioned. Each caption, with the identifying letter as its first character, shall be centered with respect to the section to which it applies. Where captions are not used, the identifying letters shall be centered. Identifying letters and captions shall be larger and bolder than any other lettering on the illustration. Sections need not be separated by lines. (See figure 28.)

3.6.11 *Cartoons.* (All) When approved by the procuring activity, the use of animated drawings, color printing, and other visual techniques are permitted. Animated drawings shall not include cartoon characters. Such presentations must serve a functional purpose.

3.6.12 *Other types of illustrations.* (All) If required, the publication may contain illustrations such as frontispiece (assembled view), exploded, operational, procedural, functional, location view, phantom, lubrication, waveform, etc. See figures 28 through 30. Photographs of a cutaway model are acceptable, but preparation of a special cutaway illustration for manual only use requires procuring activity approval.

3.6.13 *Color in illustrations.* (All) Color shall be used in illustrations only where absolutely necessary to clarify functional operations. The number of colors shall be kept to a minimum by use of tints, patterns, cross-hatching, dots, etc. When color is required, the primary colors (red, blue, yellow) should be used first. Yellow shall not be used by itself. Specific approval of the procuring activity is required for each use of color in a manual.

3.1.13.1 *Separation of colors.* (All) The black and white, or key, illustration may be prepared on the illustration board or on acetate. Each succeeding color overlay shall be made on acetate, or equivalent, and attached securely to the key illustration. Each color overlay shall be marked with its correct color. A color legend shall be an integral part of an illustration. The legend shall contain an exact duplicate of each solid, tint, or pattern of color and identify the usage in the illustration.

3.6.13.2 *Register marks.* (All) The key illustration and each overlay shall contain a minimum of three register marks located outside the reproduction area at the sides, top and bottom. The register marks on each acetate overlay shall accurately align with one another and with the key art.

3.6.14 *Border rules.* (All) Border rules shall not be used for single illustrations, but may be used to separate multiple-section illustrations on the same page.

3.6.15 *Use of the human figure.* (All) Where it is necessary to illustrate an operation, procedure, or installation, illustrations may include a human figure or parts of the body. Jewelry shall not appear in any illustration. The

human figure shall not be permitted to obscure details of the equipment necessary for a complete understanding of its operation. The human figure shall be clothed in regulation clothing designated by the procuring activity.

3.6.16 *Credit lines.* (All) The photographer's or artist's name shall not appear on any artwork; neither shall a manufacturer's name, symbol, or trademark appear thereon for the purpose of identifying the illustration. A contractor's *illustration identification number* may be used for Navy, Marine Corps, and Air Force artwork; when used, such numbers shall be in approximately 4- to 6-point type in one of the corners of the illustration sufficiently removed to avoid being confused as a part of the illustration.

3.6.17 *Callouts.* (All) Item numbers, reference designations, nomenclature, leader lines, legends, procedures, and similar material placed directly on the illustration, shall be used when necessary to identify significant features. (MIL-STD-100) Callouts should be typeset or prepared by a mechanical method, rather than freehand lettering, except that engineering drawings, prepared as stated in paragraph 3.6.6 are acceptable. Unless otherwise specified by the procuring activity, type size shall be consistent within each illustration and no smaller than 8 or larger than 10-point. Lettering shall be in upper case. Nomenclatures shall appear on illustrations only if it can be done without crowding or reducing type size so as to make reading difficult. (Diagram callouts may reduce to 6-point.) Callouts placed on the illustration shall be neatly and squarely trimmed and affixed to prevent shifting and loss. Federal Stock Numbers, source, maintenance, and recoverability (SMR) codes shall not be placed on illustrations.

3.6.17.1 *Item numbers.* (All) Item numbers for each separate figure shall start with Arabic numeral 1 and continue consecutively. (All the multiple-sheet illustrations in a set shall be considered one figure.) Sequence shall be from top to bottom or clockwise, when possible. The suffixing system prescribed in 3.7.2.2 may be used in basic publications when errors are discovered so late in preparation that renumbering of all following item numbers would delay submittal. Suffixing item numbers need not be

eliminated for a revision unless the illustration must be re-prepared. Item numbers used on exploded views to show disassembly or functional procedures shall be numbered and placed in disassembly or functional sequence. When illustrations used in a repair parts manual are also used in a narrative manual or in a combination narrative and parts manual, an item number indicating disassembly or functional procedure sequence may be placed in parentheses after the repair part callout item number. All items shown as exploded on exploded views shall be identified.

3.6.17.2 *Nomenclature.* (All) Nomenclature of more than one line may have the left or right margin justified or may be in inverted pyramid style. All lines of copy shall parallel the horizontal edges of the figure, whenever possible.

3.6.17.3 *Leader lines.* (All) Leader lines may end close to the callout and object, or may touch the objects to which the lines apply. Lines shall be uniform, short and straight as possible; however, dogleg shaped lines are permitted. Lines shall not cross or come in contact with other callout lines nor shall they obscure essential details. A line shall be highlighted or changed from black to white if it will make the line easier to follow; also, arrowheads may be added for clarity.

3.6.18 *Legends.* (All) When item numbers are used, a legend consisting of their numerical listing and their identification shall be placed next to the illustration. If a callout is deleted from an illustration, the word "(Deleted)" in parentheses shall be placed after the appropriate number in the legend. (The preceding also applies to the Group Assembly Parts List of an Illustrated Parts Breakdown manual.)

3.6.19 *Steps.* (All) Operational or procedural illustrations shall have one or more text steps with each illustrated step. The text step shall be as close to the illustrated step as possible. Steps shall be identified in the order in which they are to be accomplished. See figure 29 for an example. Alternate types of operational and procedural step illustrations are acceptable. See figure 30. Text for steps may be in upper case or a combination of upper and lowercase.

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3.6.20 *Reference designations.* (All) The information and application of electrical and electronic reference designations shall be in accordance with ANSI Y32.16. For reference designations for logic diagrams, see ANSI Y32.14. For Army manuals, reference designations marked on equipment take precedence.

3.6.21 *Overlays for callouts.* (All) (Refer to 3.6.13.2 regarding register marks.)

3.6.21.1 (N, MC) For manuals prepared for the Navy and Marine Corps, the callouts shall be produced on clear material and placed on an acetate overlay to produce a one-short square halftone.

3.6.21.2 (A, F) Callouts may be placed directly on continuous tone art or may be placed on an acetate or plastic overlay. (Callouts shall be placed directly on line drawing.)

3.6.22 *Crop and size marks.* (All) Each separately supplied illustration shall have the reproduction area defined by crop marks appearing on each of the four corners marking the horizontal and vertical dimensions of the area to be reproduced. The lines shall extend no closer than 1/4 inch to the outside of the reproduction area. The exact reproduction size shall be indicated (in Navy, Marine Corps, Air Force manuals in inches; in Army manuals in picas) between the crop marks. Marks shall be drawn with black pencil, not with ink or grease crayon. Crop marks shall be approximately 3/8-inch long and shall not cross or touch. See figure 31.

3.6.23 *Mounting of illustrations.* (All) Illustrations which have not been prepared on illustration board shall be securely fastened to a mounting board of sufficient thickness to lie flat and not curl by a process that will protect the illustration, will not discolor or distort the illustration, and will assure its being free of wrinkles and blisters. The size of the mounting board shall allow for a minimum border of 1-1/2 inches on all four sides of the image area of each illustration to accommodate required external identification markings. Security classification, if applicable, shall be placed at the top and

bottom center of both sides of the mounting board. See Figure 32. Refer to 3.6.26 for the mounting of copy prints. When specified by the procuring activity, illustrations larger than 18 x 30 inches may be furnished unmounted and rolled in protective cylinders.

3.6.24 *Identifying illustrations (reproducible copy).* (All) Illustrations not affixed to the completed reproduction page shall bear the publication number, figure number, and page number outside of the reproduction area. The security classification, if applicable, shall be placed at the top and bottom center, also outside the reproduction area. To eliminate the possibility of printing illustrations in incorrect position, the TOP of the artwork shall be identified. See figure 32.

3.6.25 *Covering of illustrations.* (All) All board mounted illustrations shall be protected by an inner flap of non-oily tissue and an outer flap of heavy paper. The tissue overlay and protective flap shall be secured to the back of the mounting board at the top of the illustration and folded over the face of the illustration. In the outside lower right corner of the outer flap shall appear the figure number and publication number. See figure 33. The security classification, if applicable, shall also be placed at the top and bottom center of the outer flap.

3.6.26 *Copy prints.* (All) When specified by the procuring activity, copy prints or negatives of each illustration shall be furnished. When a manuscript is furnished, each illustration copy print shall be approximately the same size as a page of text (8-1/2 by 11 inches) except for those foldout size, which shall not exceed maximum foldout dimensions. When reproducible copy is required, a mounted copy print or negative of each illustration shall be provided.

3.6.27 *Line drawing details.* (All)

3.6.27.1 *Darkness and sharpness of lines.* (All) The darkness and sharpness of lines shall be sufficient to reproduce clearly at required reproduction size without additional treatment. See figures 33 and 34. Parallel lines on wiring and schematic diagrams shall in no case be less than

1/16 inch apart when reduced to printed size. Secondary lines, such as those used to indicate extensions or measurements, shall be lighter but strong enough to reproduce clearly at reproduction size. Shading may be used to give substance and form to the item depicted, to sharpen the contrast between the subject and its background, or to increase effectiveness. (For Army manuals, procuring activity approval is required for use of shading.) Shadows shall be used only when necessary to provide a clear understanding of form, shape, or depth. Shading effects shall not be used for decorative purposes. Accented lines may be used to emphasize detail. Lines, cross-hatching, or mechanical patterns used for coding shall remain clearly defined when reduced to reproduction size. See figure 35.

3.6.27.2 Electrical and electronic symbols. (All) Graphic symbols for electrical and electronic parts on schematic drawings, signal flow drawings, and wiring diagrams shall be in accordance with ANSI Y32.2. Electrical wiring symbols for architectural and electrical layout drawings shall be in accordance with MIL-STD-15-3. Electrical wiring equipment symbols for ships plans shall be in accordance with MIL-STD-15-2.

3.6.27.3 Mechanical symbols. (All) Graphic symbols for mechanical parts on diagrams and line drawings shall be in accordance with MIL-STD-17-1 and MIL-STD-17-2.

3.6.27.4 Flowchart Symbols. (All) Flowchart symbols shall be in accordance with the requirements of ANSI X3.5.

3.6.27.5 Logic diagram symbols. (All) Graphic symbols for logic diagrams shall be in accordance with ANSI Y32.14.

3.6.27.6 Welding symbols. (All) The requirements of ANSI Y32.3 shall be followed.

3.6.27.7 New symbols. (All) New symbols not presently contained in previously cited documents may be used if explained in the manual's foreword, preface, introduction, or glossary. For Navy and Marine Corps manuals, procuring activity approval is required before new symbols are used.

3.6.28 Unacceptable reproducible illustrations. (All) The following will not be accepted as reproducible illustrations:

- a. Continuous tone film negatives.
- b. Film positives (except for color overlay preparation, or for the black key drawing of a color illustration).
- c. Brown line prints, photostats, bromides, and prints made by similar reproduction processes.
- d. Bleed illustrations.
- e. Line illustrations containing weak or broken lines.
- f. Illustrations containing illegible lettering.

3.7 Changes.

3.7.1 Manuscripts. (All) When a contract requires that manuscript copy for changes to a looseleaf manual be provided, only changed paragraphs to a page need be typed; material for unchanged paragraphs may be taken from a printed copy of the existing manual and mounted in proper place on the proposed change page, if this will be more efficient.

3.7.1.1 General. (A) Manuscripts for looseleaf changes may be either typed or be prepared by the cut-and-paste method described in 3.7.1.2. Copy shall be furnished for both sides of the page on which a change is made, even though change is made to one side only. Printed pages from the publication may be used as manuscript for the unchanged pages. No continuous tone artwork, whether for changed or unchanged pages, shall be screened.

3.7.1.2 Cut-and-paste method. Pages removed from printed publications to be used without change shall be pasted on black or opaque paper of the same size as the rest of the manuscript. Unchanged portions of pages may also be mounted and used in conjunction with the typed, double spaced new material.

3.7.2 Reproducible copy and manuscripts. (All)

3.7.2.1 Numbering of changes. (All) Each change to a manual shall be numbered in

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sequence. Numbering of changes after each revision of a manual shall begin over again with number 1. Unless the procuring activity advises otherwise, the change date shall be the date at which the material to be included was received (copy freeze date). (For Navy and Marine Corps manuals the change date will always be the 1st or 15th of the month.)

3.7.2.2 Numbering of added material. (All) Except when added at the end of a sequence, (in which case the next consecutive number shall be used) paragraphs, illustrations, tables and pages shall be numbered either by adding an uppercase letter (2-3A) or a decimal (2-3.1) to the preceding paragraph/illustrations/table/page number. Army manuals shall be numbered in accordance with the decimal system. The letters "I" and "O" shall not be used. Pages shall not be added between a right-hand (odd numbered) and a left-hand (even numbered) page. When new material is to be added to a right-hand page, any overrun shall be carried to the left-hand page. The overrun from the left-hand page shall be placed on the added page. Where material is to be added to a right-hand page and adequate blank space is available on the preceding left-hand page, the layout of the two pages shall be changed according to the following sample to avoid lettered or decimal pages. If blank space is available on page 3.2 and material is to be added to page 3.3, material at top of page 3.3 shall be moved to bottom of 3.2 and the new material added at the top of page 3.3. If pages, paragraphs, illustrations, or tables are added by a later change, those added by an earlier change shall be renumbered. However, if this involves renumbering more than 10 paragraphs or more than five pages, the renumbering system demonstrated in the following example shall be used instead of renumbering. An addition between 2-4B and 2-4C shall be numbered 2-4B1; an addition between 2-4.2 and 2-4.3 shall be numbered 2-4.2.1, etc. Procedural steps shall be handled in a similar manner; e.g., an addition between steps 1 and 2 shall be numbered 1a, 1b, etc., unless otherwise specified by procuring activity.

3.7.2.3 Unavailability of reproducible copy. (F) If reproducible copy is not available for a changed page, a printed page containing text or line drawings, suitably changed, may be used as

reproducible copy. For unavailable photographs, the negatives used to print the manual may be used to produce a copy print. The copy print should be changed, as necessary, and used as reproducible copy.

3.7.2.4 Difference data sheets. (A, F) When specified by detail specification, difference data sheets shall be used to provide information on additional models of equipment which constitute minor changes from the basic design. Separate Difference Data Sheets shall be prepared for each additional model covered. The first page of the Difference Data Sheet portion shall conform generally to figure 36.

3.7.2.4.1 Format. (A, F) See figure 37.

a. Sheets shall be identified with the title "DIFFERENCE DATA SHEET" centered at the top of each page.

b. The first page of each sheet (for a specific model) shall have a heading in uppercase type consisting of the nomenclature and the model, type, or part number of the item covered. The heading shall be accentuated by having lines drawn above and below it and extending across the width of the page. The heading shall be followed by a statement to this effect: "THE INSTRUCTIONS CONTAINED IN THE PRECEDING CHAPTERS OF THIS TECHNICAL MANUAL ARE APPLICABLE TO THIS MODEL EXCEPT FOR THE DIFFERENCES CITED IN THIS DIFFERENCE DATA SHEET."

c. Sheets for each model shall start on a right-hand page. Page numbers, figure numbers, and table numbers shall run consecutively throughout the section. Sheets shall be added as required. Paragraphs need not be numbered, but if numbering is used, single Arabic numerals, beginning with "1" for each added model shall be used.

3.7.2.4.2 Content. (A, F) Sheets shall briefly specify how operation and maintenance procedures for that model differ from the procedures for the representative model contained in the preceding sections or chapters.

Sheets shall contain the following data, as appropriate, and shall not exceed four pages.

a. An external view of the model if the view is significantly different from the one shown in Chapter 1.

b. A table of tabulated data if the data are significantly different from those contained in Chapter 1.

c. Illustrations which are essential for clarifying differences. Illustrations in preceding sections or chapters shall not be duplicated, but may be referenced if necessary. Reference shall not be made to illustrations on other Difference Data Sheets.

d. Brief coverage of subjects specified for the original model. The title of each of the preceding chapters shall be listed in the same order of arrangement as the manual. Short, concise statements shall be used to convey the similarity or explain the difference in procedures.

3.7.2.5 Technical order field change notices (TOFCN) and technical order change notices (TOCN). (F) In the procurement of a weapon system, a Central Technical Order Control Unit (CTOCU) is sometimes established. This organization is authorized to approve TOFCNs and TOCNs and arrange for their reproduction and issuance.

3.7.2.5.1 (F) Occasionally, circumstances require that a manual change be immediately prepared to enable work to proceed. Such a change is assigned a CTOCU control number, is known as a TOFCN, and has a cover sheet prepared in the manner of figure 38. Recipients of the change file each TOFCN cover sheet after the manual's title page until a TOCN is received, replacing the TOFCN. A TOFCN is normally authorized for only 30 days use; however, this may be extended by the procuring activity, when necessary. The instructions in a TOFCN are prepared similarly to those for an operational or safety supplement (refer to 3.5.1.22) except that changes for a particular page are prepared on a sheet separate from those changes for another page. Each page is assigned the page number of the same page being corrected.

3.7.2.5.2 (F) A TOCN is a change issued to supersede one or more TOFCN. A TOCN differs from a standard change (replacement of entire pages) in that a cover sheet is included, prepared in the manner of figure 39. The cover sheet shall list the CTOCU control numbers of the superseded TOFCNs. The cover sheet for a TOCN will be filed by recipients following the manual's cover page.

NOTE: The same format is used for the cover sheet of a TOFCN and TOCN. For the former, PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE, is added to the bottom of the cover sheet. For the latter, the word "FIELD" is crossed out of the title. A TOFCN does not include a title page or list of effective pages; therefore, the cover sheet serves as both and lists the page numbers of all pages changed, added, and deleted by TOFCN. A TOCN does include a title page and list of effective pages; therefore, the cover sheet shall list only the CTOCU control number of the TOFCNs being superseded by the TOCN. Cover sheets shall be prepared and submitted as reproducible copy or negatives, or reproduced copy, as contractually specified.

3.7.2.6 Transmittal cover sheets. (F) Changed pages classified secret shall be covered with a transmittal cover sheet (see figure 39.) Occasionally, changed pages to a secret manual may only be confidential, or changed pages to a secret or confidential manual may be unclassified. (However, the changed title page will still show the manual's overall classification.) When this occurs, an appropriate transmittal cover sheet (see figures 40, 41 and 42) shall be prepared. Each transmittal cover sheet shall be prepared and submitted in the same form as the changed pages, i.e., reproducible copy or negative.

3.7.2.7 Change guides. (N) A publication change guide shall be issued with each change (see figure 43). The change guide shall:

a. Be the first page of each change with additional pages as required.

b. Provide clear instructions for required changes listed page by page.

c. Specify deleted or added pages, reasons for the changes, instructions for completing the change record, and instructions that the guide be

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inserted in the volume.

d. If applicable, indicate that the change is the result of an ordinance equipment alteration (ORDALT) and identify that ORDALT by number.

e. Include an instruction for holders of the manuals at ORDALT accomplishing activities not to incorporate the change in their copies of the manual until it is verified that the ORDALT has been accomplished. Also, the publication change guide shall include an instruction for all other holders of the manual to incorporate the changes in their copies of the manual.

3.7.2.8 *Changes to illustrations.* (All) When changes are made to illustrations, the original artwork shall be used unless the preparation of new artwork is less expensive.

3.7.2.8.1 *Multiple-sheet illustration changes.* (All)

a. (N, MC, F) Sheets added to a set of multiple-sheet illustrations which fall between existing sheets shall be assigned the preceding number plus consecutive capital letters. For example, if a sheet is added between sheets 2 and 3 the new added sheet becomes 2A. If possible, the new sheet should be added after the last sheet and be assigned the next consecutive number.

b. (A) Follow procedure described in a above except that decimals (e.g., 2.1) shall be used rather than letters.

3.7.2.8.2 *Item number changes.* (All) Where a change to an illustration adds item numbers between existing numbers, the added numbers shall be the same as the preceding item number, plus an uppercase letter, e.g., 22A, 22B, etc. (Suffix letters 1 and 0 shall be omitted.) Army manuals shall use decimals (22.1, 22.2, in lieu of 22A, 22B).

3.7.2.9 *Deleted paragraphs, illustrations, tables.* (N, MC, F) Where a change deletes a paragraph, illustration, or table without substituting another, the space formerly occupied by the paragraph, illustration, or table can be used for other instructions, except for sufficient space to provide 1/4-inch above and below a sentence

such as "Paragraph 4-2 deleted." or "Figure 4-2 deleted." or "Table 4-2 deleted." The Table of Contents, List of Illustrations, List of Tables, and Alphabetical Index, shall be changed as necessary.

3.7.2.10 *Deleted pages.* (All) When page number continuity is broken by deletion of a page and a blank page results, a statement indicating the deletion shall be placed in the bottom margin (right or left corner, or centered, as space permits) of the preceding page, or top margin of the succeeding page; for example, "All data on page ..., including figure ... deleted." This also applies when two back-to-back pages are deleted and the same manual change affects a preceding page, but a preceding or following page shall not be changed merely to add this statement. In such instances, the list of effective page listings (For Army, change transmittal sheet) will be adequate.

3.7.2.11 *Change number.* (All) Each page containing changed or added material shall bear the words "Change..." placed at the bottom of the page in the same corner and on the same line with the page number. The change number shall begin about 1/2-inch to the right of the page number for an even numbered page, and end about 1/2-inch to the left of the page number for an odd numbered page. See figure 44. For foldout pages, the change number shall be placed in the lower-outer corner of the page. This change number requirement is also applicable to all added pages including those placed at the end of a publication.

3.7.2.12 *Change symbols.* (All) See figure 45. Changes (except as noted below) to the text and tables (including new material on added pages) shall be indicated by a vertical line or a symbol in the margin extending close to the entire area of the material affected (outer margin for double-columned material, margin opposite binding edge for single-columned material). Exception: pages with emergency markings (black diagonal lines around three edges) may have the vertical line or change symbols placed along the inner margins. Previous change symbols on a page shall be deleted when a page is subsequently changed. Symbols shall show current changes only. The vertical line change symbol shall be 6-

point (3/32-inch) in width. It may be 3- or 4-point (3/64-inch) for pages showing emergency page markings, if the symbol is not placed at the inner margin. When a change symbol, such as a number sign "#" or plus mark "+" or black circle or black square, or the letter "C", "R", or "X" is used, its meaning shall be explained in the introductory portion of the manual. For "action change codes" used in Army RPSTL, see MIL-M-63001. Change symbols are not required for:

- a. Introductory material.
- b. Indexes and tabular data where the change cannot be identified.
- c. Blank space resulting from the deletion of text, or an illustration, or part of an illustration, or a table. Refer to 3.7.2.9.
- d. Correction of minor inaccuracies, such as spelling, punctuation, relocation of material, renumbering of paragraphs, etc., unless such correction changes the meaning.
- e. Replacement or addition of a complete part, chapter, or section.
- f. (F) Illustrated Parts Breakdown technical manuals.

3.7.2.13 *Photographs, line drawings, charts, and graphs.* (All) Unless otherwise specified by the procuring activity, a miniature pointing hand shall be used for photographs and line drawings (other than diagrams and schematics) to highlight the area containing the changed information. Changes confined to the same general area shall be indicated only once on the illustration. A vertical line next to changed text and callouts on illustrations may be used in lieu of a pointing hand. A vertical line next to changed material may be used on a chart or graph. For Navy, Marine Corps, and Air Force Illustrated Parts Breakdown technical manuals, illustrations require no change symbols.

3.7.2.14 *Diagrams and schematics.* (N,MC, F) Unless otherwise specified by the procuring activity, shading and screening shall be used for diagrams and schematics to highlight the area containing the changed information. Extensively changed presentations may be indicated by a screen border around the affected area.

3.7.2.15 *Changes to looseleaf publications.* (A)

3.7.2.15.1 *New material identification.* The new material shall be identified by a vertical bar in the left margin opposite the changed material. An explanation of the method used shall be included in the transmittal sheets.

3.7.2.15.2 *Change sheets.* The change sheets shall include a tabular list of pages to be removed from the basic publication and of new or revised pages to be added. They shall include, when pertinent, supersession notes and special instructions. (See fig.46.)

3.7.2.16 *Changes to bound publications.* (A)

3.7.2.16.1 *Rescissions.* When a paragraph is to be deleted, the number of the page on which it appears shall be stated, followed by a statement that the paragraph is rescinded. For example: "Page 3. Paragraph 2-1 is rescinded."

3.7.2.16.2 *Additions.* Except when added to the end of a sequence, added paragraphs shall be numbered according to the point system; e.g., 3-2.1, 3-2.2, a.1, b.2. When added to the end of a series, the sequence shall be continued by picking up the next highest number or letter. The number of the page where the added material would appear if it were incorporated into the existing manual shall be stated, followed by a statement to the effect that the material is being added. This shall be followed by the number, title, and text of the new paragraph. Example:

"Page 3-14. Paragraph 3-5b (1-1) is added after 3-5b(1).

(1.1) Loosen the two screws (3) in the mounting plate (12)."

3.7.2.16.3 *Text supersessions.* When a paragraph is changed extensively or replaced entirely, the paragraph shall be superseded. The number of the page on which the paragraph appears shall be stated, followed by a statement to the effect that the paragraph is superseded. This shall be followed by the number, title, and the text of the superseding paragraph. Example:

"Page 1-1. Paragraph 1-2 is superseded as follows:

1-2. Record and Report Forms.

a. DA Form 2258, Depreservation Guide of Engineer Equipment.

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b. For other record and report forms applicable to operator/crew and organizational maintenance, refer to TM 38-750.

3.7.2.16.4 *Minor changes.* When a minor change to a lengthy paragraph is necessary, only the affected portion of the paragraph shall be stated. For example: "Page 1-10, paragraph 1-12b(3). In line 1, "four copies" is changed to read "three copies".

3.7.2.16.5 *Changes to tabular material.* When changes are required in lengthy tabular material, such as additions, deletions and substitutions, the changes shall be arranged in page number sequence and not by type of action. The page on which each change occurs shall be shown. Example:

Page 56. Delete the following from the list of classes:

5133 Drills, Counterbores, and Counter-sinks
5905 Resistors

Page 63. Change class number "2960" appearing between class 2930 and 2940 to read "2935."

Page 68. Add "6610 Flight Instruments" to the list of classes in proper numerical order.

Delete "6115 Generators and Generator Sets" from the list of classes.

3.8 *Revisions.* (All) A revision (refer to 6.3.2.23 for definition) shall be prepared only if authorized by the procuring activity. Revisions shall incorporate current information from previously issued changes to the existing publication. (Refer to 3.9.4.) Contractors shall present the following information to the procuring activity for consideration in approving a revision:

a. Percentage of change.

b. Reason for revision; such as, change in equipment configuration, new technical manual specification to be complied with, etc. This information shall be presented sufficiently in advance to permit the procuring activity time to reach a decision, yet not delay submittal of data.

3.8.1 *Renumbering and removal.* (N,MC,F) In a revision, all pages shall be renumbered, as necessary, to eliminate all number suffixes and to establish correct sequence. Suffixed paragraph, illustration, and table numbers shall be retained when use of the manual will not be substantially improved by renumbering. All change numbers (and change dates, if any) shall be removed from pages. All partial pages and all miniature hand, shading, screening, vertical-line-in-margin, and other change symbols, shall be eliminated. For item numbers on illustrations, refer to 3.6.17.1.

3.8.2 *Revision change symbols.* (N,MC,F) After all previous change symbols have been eliminated, new change symbols shall be inserted unless specified otherwise by the procuring activity, to identify technical changes in text, illustrations, and tables that differ in the revision from those contained in the latest previous edition of the manual. (See 3.7.2.9)

3.9 *Supplements.* (N, MC, F) Supplements (refer to 6.3.25 for definition) shall not be issued in lieu of a change to cover minor changes to text, illustrations, or tables.

3.9.1 *Classified supplements.* (N, MC, F) Where classified information will comprise 10 percent or less of the manual's content and would be concentrated in one area of the manual (also applicable for higher classified information) such information shall be prepared as a classified supplement to the manual, permitting the basic manual to be issued at a lower classification or as an unclassified publication. The cover/title block pages of the basic manual and the supplement shall contain a cross-reference to each other. Supplements shall contain the minimum amount of information required to protect security and maintain continuity of thought. Procuring activity approval is required for each supplement.

3.9.2 *Safety and operational supplements.* (F) Safety supplements are issued as an expeditious means of reflecting safety information when a hazardous or safety condition exists. Operational supplements are issued as an expeditious means of conveying information when

work stoppages or mission essential deficiencies are involved. The instructions in safety and operational supplements shall be as follows:

3.9.2.1 Purpose/general, instructions paragraphs. (F)

a. The purpose paragraph shall briefly state why the information is being provided.

b. The general paragraph shall state what established or generated the requirement for the instruction.

c. The instructions paragraph shall provide new procedures or information or changes, including deletions, in existing procedures. Specific page(s) and paragraph(s) where the information applied in the manual shall be stated (e.g., "Page 4-3, paragraph 4-6, is hereby amended to delete step c."). Where words in an existing paragraph or procedural step are to be corrected, the entire paragraph or step shall be restated. Statements, such as "the third line of paragraph 2-5 is hereby amended to ..." shall not be used. In tables, individual entries or line items shall be considered as paragraphs or procedural steps. Instructions to amend illustrations may be used if it can be done clearly and concisely (e.g., "Value of resistor R1 is amended to read 5 ohms."). If the illustration change cannot be clearly stated, a new figure shall be provided in the supplement.

3.9.3 Status page for flight manual safety and operational supplements. (F) The last page of each flight manual safety and operational supplement shall consist of a status page. See figure 48. The status page shall be prepared and submitted as reproducible copy or negative, as contractually required.

3.9.4 Incorporation of supplements into Manuals. (N, MC, F) Whenever practical, supplements, other than those of a higher classification, will be incorporated into the manual's next change. Supplements, other than those with a higher classification, shall be incorporated into the manual's next revision.

3.10 Brief Manuals. (All) Manuals of eight pages or less shall:

a. Not have a cover or title page, list of

effective pages, table of contents, list of illustrations, or list of tables.

b. Have the first page consist of a title block and text below it.

c. Have chapters or sections begin on left-hand or right-hand pages with no blank pages. Contain more than one chapter or section on a page, where possible.

d. Have pages, paragraphs, illustrations, and tables numbered consecutively throughout the manual with single Arabic numerals, disregarding chapter and section numbers.

e. Always be revised, never have changes issued thereto. (For Air Force, operational or safety supplements may be issued to brief manuals when the situation warrants.) (When it is intended to authorize future changes to a manual, the basic manual must be issued with a full cover/title block page and list of effective pages.)

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. (All) Unless otherwise specified in the contract, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities and services acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Contractor inspection. (All) Material furnished in accordance with this specification shall be inspected by the supplier for conformance to the applicable requirements herein.

4.3 Government inspection. (All) Material furnished in accordance with this specification shall be subject to inspection, verification, and approval or disapproval by the Government as specified by the terms of the contract. Inspection/verification will be performed by the Government prior to acceptance.

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4.4 *In-process reviews.* (All) When specified by the procuring activity, these reviews shall be performed by its representatives during preparation of the equipment publication, primarily as guidance to the contractor and to assure that the publications are written in conformance with contract and specification requirements. The reviews may be conducted at the contractor's facility, or at the procuring activity's facility, at any time during the development of the publication, but normally prior to preparation of the final draft equipment publication (FDEP). These in-process reviews are not a part of validation or verification and shall not be used to take the place of validation verification.

4.5 *Validation and Verification Requirements.* (A)

4.5.1 *Validation.* The draft equipment publication (DEP) shall be validated by the contractor in accordance with the validation schedule. A 100 percent validation of the operating and maintenance procedures shall be performed for technical accuracy and adequacy of content. Validation of readability shall conform to the requirements in 4.5.1.6. Validation of RPSTL shall be performed as specified in MIL-M-63001 (TM).

a. Validation includes, but is not limited to, the actual performance by contractor personnel of operating and maintenance procedures. It includes review of instructions for checkout, calibration, alignment, scheduled removal and replacement, and a review of associated checklists to assure technical accuracy and adequacy.

b. All disassembly, cleaning, inspection, testing, repair, replacement, reassembly, troubleshooting, preventive maintenance checks and services, and similar maintenance procedures shall be validated by actual performance. All other data, such as schematic diagrams, wiring data, and descriptive data, shall be checked to assure accuracy.

4.5.1.1 *Validation schedule.* Within the number of days specified by the statement of work portion of the contract, the contractor shall provide the technical office identified in Item 6 of DD Form 1423, Contract Data Requirements List, with a schedule for accomplishment of

validation requirements. The procuring activity reserves the right to inspect, reject, and require revision of the validation schedule. This right shall be exercised within the number of days specified by the statement of work portion of the contract. Otherwise, it will be assumed that the validation schedule is acceptable as written. Reviews may be performed on a chapter-by-chapter basis during preparation or upon completion of the DEP. The validation schedule shall indicate (1) the calendar dates for performance of the validation; (2) the location where validation is to be conducted; (3) whether the validation will be on the equipment or simulated; and (4) whether the validation will be on a chapter-by-chapter basis or on the complete manuscript.

4.5.1.2 *Performance.* The DEP shall be reviewed for:

a. *Conformance to applicable requirements of the governing documents.* This review shall include editorial review of the manuscript.

b. *Technical accuracy and adequacy of the content.* This review shall include the actual performance or simulation of the operating and maintenance instructions on the equipment/system for which the DEP was written. Simulation shall be used only when the procuring activity has approved this method by its acceptance of the validation schedule. This validation shall include but not be limited to a review for:

(1) Maintenance instructions for all functions specified in the maintenance allocation chart.

(2) Repair parts, special tools, and test equipment required to perform functions specified in the maintenance allocation chart.

(3) Essentiality of illustrations cited in the text.

(4) Existence and adequacy of references cited in the text.

(5) Instructions for manufacturing items source coded "M", for assembling items source coded "A", and for repairing items coded as recoverable, repairable.

4.5.1.2.1 *Revalidation.* All material changed or corrected as a result of engineer tests, service tests, user coordination, and validation/verifica-

tion shall be revalidated to meet the validation requirements of this specification.

4.5.1.2.2 *Separation of responsibility.* The Government reserves the right to require that contractor personnel performing operating and maintenance instructions on the equipment during validation be independent from the Contractor's manuscript preparation activity.

4.5.1.3 *Correction of errors.* The contractor shall correct all contractor errors found in the manuscript during validation, at no cost to the Government. After Government acceptance of the manuscript, the Government reserves the right to require the contractor to correct all errors found in the manuscript, at no cost to the Government, within the number of days specified in the statement of work portion of the contract. The contractor is not liable for any equipment adversely affected by errors in the manuscript.

4.5.1.4 *Records.* The contractor shall maintain records showing dates of validation reviews, manuscript material reviewed, findings, and action taken. The procuring activity reserves the right to examine these records at the contractor's facility.

4.5.1.5 *Government-provided information.* The contractor is not responsible for the adequacy and accuracy of Government furnished information provided for inclusion in the manuscript. The contractor shall include in his reviews a validation that all such Government-furnished information is properly and correctly reflected in the manuscript. The contractor shall be responsible for notifying the procuring activity of any inaccurate or inadequate data or of any data which is inconsistent with the contents of the manuscript.

4.5.1.6 *Validation of Readability.* (A) Narrative text shall be validated for conformance to the readability standards specified in 3.3.3. If one or more of the standards are exceeded, the manuscript shall be rewritten as required to meet the standards. Random sampling shall be used. Selected samples shall represent as equally as possible the various types

of narrative material; such as operation, description, maintenance, and troubleshooting instructions. The number of samples taken, using 100-word per page units, shall be in accordance with the following table:

From Total Pages Narrative	Number of Samples
Under 26	3 minimum
26 to 90	5
91 to 150	8
151 to 280	13
281 to 500	20
Over 500	32 maximum

4.5.1.6.1 *Sample marking.* The sample shall be marked as follows:

a. The sample shall start at the beginning of a sentence. Headings and captions shall not be included in the sample.

b. All words, including nomenclature, alphameric expressions, symbols and abbreviations which are surrounded by white space shall be counted in sequence to reach the 100-word total. The following are examples counted as one word (10-foot, 1.345, M14A1, G's, -10 degrees F, etc.).

4.5.1.6.2 *Average Sentence Length (Standard No. 1).* The average sentence length shall be computed as follows:

a. Total all words in all samples. This figure will be in even hundreds.

b. Total all sentences in all samples. If the 100-word mark occurs within a sentence but after half of the words in that sentence, count the sentence when totalling sentences. Otherwise, include the words necessary to achieve 100-word count but do not include the sentence in the sentence count.

c. Divide the total number of words by the total number of sentences. Carry the quotient to hundredths and round it off to a whole number of words. (17.49 shall be rounded off to 17 and 17.50 shall be rounded off to 18.)

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4.5.1.6.3 *Average Word Length (Standard No. 2)*. The average word length shall be computed as follows:

- a. Identify by underlining all mandatory words (6.3.12) in the sample and count them.
- b. Add a corresponding number of nonmandatory words from the narrative that appears after the end of the sample and mark the new end point of the adjusted 100-word sample. The adjusted sample will now contain exactly 100 nonmandatory words.
- c. Count all syllables in the 100 nonmandatory words in the adjusted sample.
- d. Total all nonmandatory words in all samples. This figure will be in even hundreds.
- e. Divide total syllables by total words. Round off the quotient; e.g., round off 1.603 to 1.60 and 1.605 to 1.61.

4.5.1.6.4 *Personal Sentences (Standard No. 3)*. The percentage of personal sentences shall be computed as follows:

- a. Take samples consisting of 100 sentences per sample using the sample pages already selected. Succeeding pages may be added to attain the 100 sentence requirement of each sample.
- b. Count the number of personal sentences in each sample.
- c. Total all sentences in all samples.
- d. Total all personal sentences in all samples.
- e. Divide total number of personal sentences by the total number of sentences. Convert quotient to percent.

4.5.2 *Verification*. (All) Representatives of the procuring activity will verify the contractor's validation. In addition to reviewing the DEP for conformance to the requirements of the governing documents, and inspecting the contractor's validation records, the Government reserves the right to perform verification by one or more of the following:

- a. Witnessing the validation reviews performed by the contractor.
- b. Performing at the contractor's plant the contractor's validation review as scheduled by

the contractor in accordance with the validation schedule.

c. Reviewing the technical content of the DEP by having Government personnel perform on the equipment, either at the contractor's plant or at Government facilities, the operating and maintenance instructions.

5. PREPARATION FOR DELIVERY

5.1 *Packaging*. (All) Unless otherwise specified, the material furnished in accordance with this specification shall be packaged as follows:

5.1.1 *Manuscript*. (All) Manuscript shall be packaged flat in cartons or wrapped separately. Elaborate containers are unnecessary. The illustration and text material may be separated in one package, or may be in separate packages. Large, unmounted illustrations may be rolled. Copies of large illustrations to be used for review purposes only may be folded. Packaging need only be adequate for providing for safe delivery and for providing protection against forms of damage that frequently occur during shipping.

5.1.2 *Reproducible copy*. (All) Reproducible copy shall be packaged flat and double packaged. Illustrations shall not be folded or rolled. The interior material shall be waterproof and free of any chemical substance that would discolor or otherwise render the reproducible copy useless. The exterior package shall be a standard commercial carton at least equal to Interstate Commerce standards and of sufficient strength to provide for safety and safe delivery, and to protect the reproducible copy against forms of damage that frequently occur during shipping. Packaging that provides protection against seldom encountered extremes is unnecessary.

5.1.3 *Classified material*. (All) Classified material shall be packaged in accordance with DOD 5200.1-R.

5.1.4 *Original Illustrations*. (All) When the procuring activity requires that the original illustrations be furnished, they shall be packaged as contractually required; for example, if an

original oversize line drawing is on vellum or tracing cloth it could be rolled if the contract so authorizes.

5.2 *Package information.* (All) In addition to sender and addressee information, the exterior of each package shall bear the following:

Publication identifying number.
 Contract or purchase order number.
 "Manuscript," when applicable.
 "Reproducible copy," when applicable.
 Number of packages in shipment.

5.3 *Packing list.* (All) A copy of the letter of transmittal, or the packing list, shall be placed inside the package. When a shipment consists of several packages, the letter of transmittal or packing list shall be enclosed in the first package and shall identify the material that was wrapped in each package.

5.4 *Shipment.* (All) Shipments shall be by first class mail, parcel post, rail express, registered or insured, as necessary. Air mail, special delivery, special handling, air express, hand carrying, shall be used when deemed advisable by the contractor or procuring activity.

6. NOTES

6.1 *Intended use.* (All) Publications prepared in accordance with the general style and format requirements of this specification are intended for use in the operation and maintenance of equipment or for accomplishment of assigned missions.

6.2 *Ordering data.* (All) Procurement documents should specify:

- a. Title, number, and date of this specification.
- b. Types of equipment publications required. (Operation instruction manual, Maintenance instruction manual, Inspection manual, Parts list manual, etc.)
- c. Requirements for a copyright release. (3.1.2)

d. Whether an approved manuscript will be used as an interim preliminary issue; whether copy shall be single spaced; how copies shall be reproduced and bound. (3.1.4)

e. Deviations from format and quality of manuscripts to be furnished. (3.2.1)

f. Whether reproducible text copy shall be mounted and covered. (3.2.2)

g. (N) Whether 16mm or 35mm negatives shall be furnished. (3.2.2)

h. Size of manual if other than 8-1/4 x 10-3/4 and not specified in detail specification. (3.2.2.2)

I Publication number. (3.2.2.4)

j. Illustration identification number. (3.2.11.3)

k. Front matter if not in detail specification. (3.5)

l. (A,N) Whether the manual shall require a backbone. (3.5.1)

m. (A) Whether manual is marked "draft" or "final draft". (3.5.1.3)

n. If FSN and identification of equipment is required for cover. (3.5.1.4.2)

o. Supersedure notice. (3.5.1.7)

p. (N) Wording for the title page distribution statement. (3.5.1.6)

q. Special handling notice requirements. (3.5.1.9)

r. (N,F) Authority notice for a title page on jointly used manuals. (3.5.1.12)

s. (F) Whether the FOR OFFICIAL USE ONLY notice is required. (3.5.1.16a)

t. (A) FOR OFFICIAL USE ONLY requirements (3.5.1.16b)

u. Origination date. (3.5.1.18)

v. (F) For MAP or Consortium use only requirements. (3.5.1.19)

w. (F) Emergency procedure notice. (3.5.1.21.6)

x. (F) Warning page requirements. (3.5.2)

y. When the list of Effective Pages is required. (3.5.3)

z. Location of List of Effective Pages. (3.5.3)

aa. (N,MC) Promulgation page requirements. (3.5.4)

ab. (N,MC) Whether preface or foreword is required (if not in detail specification). (3.5.6)

ac. (N,MC,F) If list of illustrations is not required. (3.5.8)

ad. (N,MC,F) If list of tables is not required. (3.5.9)

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ae. Special considerations in the selection of photographic or line drawing methods for illustrations. (3.6.2)

af. If prescreened photographs are acceptable. (3.6.3.2)

ag. If engineering drawings are acceptable. (3.6.6)

ah. If animated drawings, color printing, and other visual techniques are acceptable. (3.6.11; 3.6.13).

ai. If type size smaller than 6 point or larger than 8 point shall be used for callouts. (3.6.17)

aj. If illustration larger than 18 by 30 inches may be unmounted and rolled. (3.6.23)

ak. If copy prints are acceptable. (3.6.26)

al. (A) Whether shading may be used. (3.6.27.1)

am. If numbering of changes to procedural steps shall be different than that outlined in this specification. (3.7.2.2)

an. (A) Difference Data Sheet requirements. (3.7.2.4)

ao. Revision change symbol requirements. (3.8.2)

ap. Whether status page will be reproducible copy or negatives. (3.9.3)

aq. Quality Assurance Provision. (4)

ar. If packaging shall be other than required by paragraph 5.

6.3 Definitions. (All)

6.3.1 *Change* (All) A change to or modification of information in an existing publication.

6.3.2 *Copy freeze date*. (All) The copy freeze date is a date set by contractor or procuring activity after which no more additions, deletions, or changes will be accepted to the publication under preparation. Additions, deletions, and changes after that date will be accumulated for preparation of subsequent change or revision of the publication.

6.3.3 *Callout*. Anything placed on an illustration to aid in identifying the objects being illustrated, such as item numbers, nomenclatures, leadlines, arrows, procedures, and, when placed directly on the illustration, legends (keys).

6.3.4 *Draft Equipment Publication(s) (DEP)*. (A) Those publications prepared during the development phase of the equipment, which are used for engineering tests, service tests, and initial production tests, usually of prototype models of equipment. The DEP are also used for coordination and review by user agencies. The term DEP is also used to define the publication that is sent for user coordination during revision of DA equipment publications.

a. The DEP is prepared in the format prescribed by applicable specification. It is an updated version of PDEP which includes all changes as a result of the engineering design test and physical teardown function of the maintenance evaluation.

b. This definition replaces terms formerly used to refer to publications used for the above purpose and phase of development (draft manuscript, draft TM, preliminary manuscripts, review copy, etc.).

6.3.5 *Department of the Army Equipment Publications (DAEP)*. (A) Those publications that have been authenticated, printed, and distributed for use during the production and operations phase of the life cycle of the equipment.

6.3.6 *Final Draft Equipment Publication(s) (FDEP)*. (A) Those publications prepared during the final development of initial phase of the equipment and used for printing of the DA equipment publication.

a. The FDEP is the final document (manuscript copy, reproducible copy, or page negative) with illustrations, ready for transmittal to The Adjutant General (TAG) for printing and publication as an authenticated DA equipment publication. The FDEP includes all necessary changes and final resolutions of all comments and recommendations made as a result of engineer test, service test, validation/verification, user coordination, and maintenance, literature conference.

b. This definition replaces terms formerly used to refer to publications used for the above purpose and phase of development (final manuscript, final draft manuscript, final draft TM, draft TM, manuscript for review, etc.).

6.3.7 *Item Index numbers/letters.* Those callouts which consist of a number or letter leading to a legend (key) which defines the symbols used.

6.3.8 *Layout page.* (All) A blank sheet showing marginal copy only, used by an editor to indicate where text, illustrations, or tabular data, will appear on the reproducible copy. Text, line drawings, or tabular data, can be prepared separately, then firmly attached to the layout page to form reproducible copy.

6.3.9 *Leader lines.* A line with or without arrowhead extending from item number or letter/nomenclature to item.

6.3.10 *Legend (key).* A tabular listing of the callout numbers or letters and their meanings; e.g.,

- 1 - Giget, 1/2-in.
- 2 - Bloget, articulated.

6.3.11 *Manuscript.* Typed or otherwise reproduced draft material which requires further editing and copy preparation before composition by the printer.

6.3.12 *Mandatory words.* (A) For readability purposes, mandatory words are defined as follows:

a. The basic noun plus the significant modifiers linked with it that identify a specific part, component, or item of equipment in the Army Supply System, including model numbers, e.g., M151, UH1C, and RT-651/ARC-95.

b. The noun and significant modifiers that identify a technical publication, e.g., TM 9-1005-223-10, or -20P manual; or major parts of the manual, e.g., PMCS, MAC, RPSTL, Aircraft Inventory Master Guide (AIMG), power schedules and fuel flow charts; also such publication terms as; direct support, general support, and depot maintenance.

c. Actual titles placarded (by stencil, decal, etc.) on the equipment. These titles specifically identify switches, gages, dials, and controls and

are mandatory for use in describing operation and maintenance. Such titles are normally capitalized in the equipment manual.

d. Technical designations for which there can be no permissible substitution, e.g., 149.975-MHZ, 125.5-volt. ATTN: AMSEL-MA-ML, FSN 2520-234-5678, oscillation, 15 megahertz frequency, etc.

e. Any word or group of words directed by procuring activity or higher headquarters for verbatim inclusion.

6.3.13 *Marginal copy.* Printed matter, such as page numbers, publication numbers, etc., which appear in the margin, i.e., outside of the text/illustration area.

6.3.14 *Multivolume publications.* (All)

6.3.14.1 (A, F) Multivolume publications are assigned individual publication numbers. If a volume, because of its bulk, warrants being further divided, the procuring activity will decide how these divisions shall be identified.

6.3.14.2 (N,MC) A multivolume publication is assigned one publication number with the various volumes identified as Volume 1, Volume 2, etc. If the size of the volume requires separation, divisions are further identified as Volume 3, Part 1: Volume 3, Part 2; etc.

6.3.14.3 (F) Whereas all the manuals covering a specific piece of equipment may form a set of manuals, these are not intended to be known as a multivolume set. Instead, if for example, the maintenance instructions for an aircraft are divided into a series of manuals to individually cover the armament system, electronic system, hydraulic system, etc., such a group of manuals, for the purpose of this specification, would be called a multivolume set.

6.3.15 *Nomenclature callout.* Nomenclatures or partial nomenclatures placed directly on the illustration; e.g., "articulated bloget," "1/2 in. gidget."

6.3.16 *Part.* A part is the next higher division of a publication above chapter and may be used

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whenever the nature of the publication calls for such a major breakdown. For example, when it is desired to separate the material by maintenance levels but the amount or nature of the material does not lend itself to the chapter breakout, or where coverage of each major assembly must be broken down into chapters; e.g., engine, electrical system, etc.

6.3.17 *Part of a manual.* (A) The next higher subdivision of a manual after chapters.

6.3.18 *Parts of volumes of a manual.* (N,MC) When a manual is divided into volumes, the volumes may be further divided into parts.

6.3.19 *Personal sentence.* (A) A sentence is personal when it is addressed directly to the reader and contains either actually or by implication, the personal pronoun "you". Examples of personal sentences are as follows:

- a. Interrogative: Are you wondering why this schematic doesn't show all the lines?
- b. Imperative: Remove cable.
- c. Declarative: This is a fact you should always remember: you have two types of dampers.

6.3.20 *Preliminary draft equipment publication(s) (PDEP).* Those publications prepared during the development phase of the equipment which are used for engineering design test and the physical teardown function of the maintenance evaluation of prototype models of equipment.

6.3.21 *Preliminary issue.* (N, MC, F) A preliminary publication is normally intended for interim use to make the technical information available for test, verification, training purposes, and operational use pending receipt of formal printed publications.

6.3.22 *Reprint.* (All) A reprint is a second or subsequent printing of a manual, including all changes. Normally, all changes are merged with the basic looseleaf manual and a note to that effect is added to the title page.

6.3.23 *Reproducible copy.* All text pages, including tabular data and illustrations mounted in place, suitable for photographing without further change, from which a negative is produced for offset printing.

6.3.24 *Revision.* (All) A revision is a second or subsequent edition of a publication which supersedes the preceding edition, including changes.

6.3.25 *Stripping.* To remove all or part of text copy or an illustration by mortising and replacing the material with something else, particularly with reference to reproduction copy. A screened halftone negative stripped in a line negative is a "strip-in". The combination is called a composite.

6.3.26 *Supplement.* (N, MC, F) A supplement is a subsidiary document which complements information in a manual.

6.3.27 *Technical manual.* (All) A technical manual is a publication (exclusive of those of an administrative nature) containing a description of equipment, weapons, or a weapon system, with instructions for effective use; and parts lists or parts breakdowns.

6.3.28 *Validation.* The process by which the contractor tests a DEP for accuracy and adequacy of the technical content, and by review, determines that the format and content meet the requirements of regulatory documents provided as a part of the procurement package.

6.3.29 *Verification.* (A) The process by which the Government determines a DEP or a manufacturer's publication to be accurate and adequate for operation and maintenance of the equipment.

6.4 *Supersession data.* (A) This specification supersedes MIL-M-38784 dated 1 January 1968, and MIL-M-63000C (TM), dated 18 Dec 70.

6.5 *Identification of changes.* (All) The changes in this specification are extensive; therefore, the changes have not been marked. Bidders and contractors are cautioned to evaluate the requirements of this specification based on the entire contents.

Custodians: **Preparing Activity:**
Army — TM Army — TM

Review Activities:
Army — AT, AV, CE, EL, ME, MI, SC,
SL, WC.
Project No. TMSS A056

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TM 3-1040-257-1

TECHNICAL MANUAL

**OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT, AND
GENERAL SUPPORT MAINTENANCE MANUAL**

FLAMETHROWER, PORTABLE, M9A1-7

FSN 1040-089-5034

HEADQUARTERS, DEPARTMENT OF THE ARMY

JUNE 197

Figure 1 (A) Example of a Cover (Sheet 1 of 4)

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		TYPE SIZE IN POINTS
(Note a & v)	SECURITY CLASSIFICATION	24
(Note b)	PUBLICATION NUMBER(S)	24
(Note c)	Formerly (previous publication number)	14
(Note d)	<hr/>	1
(Note e)	TECHNICAL MANUAL	14
	OPERATION INSTRUCTIONS	
(Note f)	MAINTENANCE INSTRUCTIONS	18
	INSPECTION INSTRUCTIONS	
	(as appropriate)	
(Note g)	Maintenance level(s)	14
	NOMENCLATURE OF EQUIPMENT-(U) (C) (S)	
(Note h)	TYPE, MODEL, PART NUMBER, FEDERAL STOCK NUMBER	18 to 24
(Note i)	<i>Manufacturer of Equipment</i>	8
(Note j)	<i>Contract Number</i>	8
(Note k)	<i>Distribution Statement</i>	10
(Note l)	<i>superseure Notice</i>	10
(Note m)	<i>Supplement Notice</i>	10
(Note n)	<i>Special Handling Notice</i>	10
(Note o)	<i>Effective Date Notice</i>	10
(Note p)	NOTICE: National Security Information: Unauthorized disclosure subject to criminal sanction.	8
	<i>(Authority Notice)</i> Published by direction of Commander, Naval Systems Command.	
(Note q)	Published under authority of the Secretary of the Air Force.	8
	Published by direction of Commander, NavalSystems Command and under authority of the Secretary of the Air Force.	
(Note r)	This publication consists of classified pages of total pages. Copy	8
(Note d)	No.ofcopies.	1
(Note s)		18
(Note t)	DATE CHANGE-DATE	14
(Note u)	For Official Use Only	14
(Note a & v)	SECURITY CLASSIFICATION	24
(Note w)	This page is unclassified	14
(Note x)	DOWNGRADING NOTICE	8

Figure 1. (All) Example of Cover for a Classified /
Unclassified Manual. (Sheet 2 of 4)

NOTES

- a. (All) The security classification assigned by the procuring activity shall be shown, including RESTRICTED DATA and FORMERLY RESTRICTED DATA, as applicable.
- b. (All) The procuring activity will furnish the publication number(s). If the manual will be jointly used by more than one Service, the procuring Service's number shall appear at the top with the other using Service's number immediately below it and each Service's number shall be prefixed with the word Army, Navy, Marine Corps, or Air Force, as appropriate. All numbers shall appear above the ruled line. Navy manuals divided into volumes and parts shall show appropriate numbers below the publication number.
- c. (All) When a manual is renumbered, the former publication number shall appear below the new publication number, preceded by the word "Formerly." Both numbers shall remain at this location until the first following revision, at which time only the new number shall appear.
- d. (All) A line shall be placed below the publication number(s) and above the date.
- e. (All) The words TECHNICAL MANUAL shall appear in the upper center portion of the page, aircraft flight manuals excepted.
- f. (All) The technical manual title, OPERATION INSTRUCTIONS, MAINTENANCE INSTRUCTIONS, INSPECTION INSTRUCTIONS, etc, as indicated by the applicable technical specification, shall be positioned slightly below the words TECHNICAL MANUAL.
- g. (A, N, MC) For maintenance manuals, the level(s) of maintenance (organizational, direct and general support, intermediate, depot), as appropriate, shall be shown beneath the manual type.
- h. (All) The nomenclature of the equipment, type, model, part number (blocks, serial numbers, registration numbers, if appropriate) shall be positioned below the words identifying the manual type. The federal stock number and identification of any other equipment covered by the manual shall be shown only if specifically required by the procuring activity. Also, the classification of the equipment nomenclature shall be indicated (U), (C), (S), as specified in DoD Manual 5200.1-R, when the manual itself is classified.
- i. (F) Identification of the designer of the equipment shall appear below the equipment nomenclature. If the equipment is designed by a subcontractor but the manual is prepared by the prime contractor, the parenthetical statement "(Manual prepared by)" (6-point) shall appear below the designer's name. However, the identification shall be omitted for any manual applicable to more than one manufacturer unless the prime contractor prepared the manual for two or more subcontractors, in which case the "(Manual prepared by)" statement only shall be used.
- j. (N, F) The original contract number shall be placed on all new issues and carried forward on all subsequent cover pages. If the contract number for a change or revision is different from the original number, the number applicable to the change or revision shall be indicated on any new cover pages, in addition to the original number. No more than two contract numbers, the original and the latest, need appear.
- k. (N) The requirements of DoD Directive 5200.1-12 are applicable for distribution statements.

Figure 1. (All) Example of Cover for a Classified/Unclassified Manual. (Sheet 3 of 4)

NOTES (continued)

l. (N, MC, F) When a manual supersedes a previous issue, or other manuals, a supersedure notice shall be placed in the space indicated. For Navy manuals, a *Revision number* shall appear above the publication number.

m. (N, MC, F) When a supplement is issued to a basic manual, reference to it shall appear in a supplement notice in the space indicated.

n. (All) Manuals containing classified information which may be liable to inadvertent disclosure to foreign governments or foreign nationals shall bear a special handling notice.

o. (A, N, F) When a manual becomes effective later than its issuance, an effective date notice shall appear in the space indicated.

p. (N, MC, F) The espionage law notice shall be placed on the cover page for all classified manuals, including those bearing a FORMERLY RESTRICTED DATA marking, but not on those bearing a RESTRICTED DATA marking.

q. (N, F) The appropriate authority notice will be provided by the procuring activity.

r. (M, MC, F) Manuals classified Secret (with or without RESTRICTED DATA or FORMERLY RESTRICTED DATA markings) shall show the page total and copy number.

s. (N, MC, F) Refer to 3.5.1.23.6 regarding the date to be used.

t. (All) Changed cover pages shall show a change number and date below the date of the basic manual. Navy manuals shall show a change strip across the top of the page.

u. (A, F) The cover page shall show For Official Use Only when the procuring activity so requests.

v. (All) When a cover page is prepared for a change to a classified manual, the security classification information on the basic cover page shall be retained unless the classification has been downgraded or cancelled.

w. (All) When the contents of the manual are classified but the information on the cover page is unclassified, the bottom of the cover page shall state "This page is unclassified."

x. (All) The applicable downgrading notice shall be indicated.

Spacing between the necessary information shall be such as to result in an attractive well balanced cover page.

Figure 1. (All) Example of Cover for a Classified/Unclassified Manual. (Sheet 4 of 4)

		TYPE SIZE IN POINTS
(Note a)	PUBLICATION NUMBER	24
(Note b)	_____	1
(Note c)	TECHNICAL MANUAL	14
(Note d)	OPERATION INSTRUCTIONS MAINTENANCE INSTRUCTIONS OVERHAUL INSTRUCTIONS WITH PARTS BREAKDOWN	18
(Note e)	(AS APPROPRIATE) MAINTENANCE LEVEL(S)	14
(Note f)	NOMENCLATURE OF EQUIPMENT—TYPE, MODEL, PART NUMBER, FEDERAL STOCK NUMBER	18 to 24
(Note g)	Manufacturer of Equipment	8
(Note h)	Contract Number	8
(Note i)	Supersedure Notice	10
(Note j)	Distribution Statement	10
(Note k)	Authority Notice (as appropriate)	8
(Note l)	_____	1
(Note 1)	DATE	18

Text

(Note m) Supersedure Notice

(Note n)

Figure 2. (All) Example of a Title Block (Sheet 1 of 2)

NOTES

- a. **(All)** The procuring activity will furnish the publication number(s). If the manual will be jointly used by more than one Service, the procuring Service's number shall appear at the top with the other using Service's number immediately below it. When the manual will be jointly used, each Service's number shall be prefixed with the word Army, Navy, Marine Corps, or Air Force, as appropriate.
- b. **(All)** A line shall be placed below the publication number(s) and above the date.
- c. **(All)** The words TECHNICAL MANUAL shall appear in the upper center portion of the page.
- d. **(All)** The technical manual title, OPERATION INSTRUCTIONS, MAINTENANCE INSTRUCTIONS, OVERHAUL INSTRUCTIONS WITH PARTS BREAKDOWN, etc, as indicated by the applicable technical content specification, shall be positioned below the words identifying the manual type. The federal stock number and identification of any other equipment covered by the manual shall be shown only if specifically required by the procuring activity.
- e. **(A, N, MC)** For maintenance manuals, the level(s) of maintenance (organizational, intermediate, depot) as appropriate, shall be shown beneath the manual type.
- f. **(All)** The nomenclature of the equipment, type, model, part number, etc, shall be positioned below the words identifying the manual type. The federal stock number and identification of any other equipment covered by the manual shall be shown only if specifically required by the procuring activity.
- g. **(F)** Identification of the designer of the equipment shall appear below the equipment nomenclature. If the equipment is designed by a subcontractor but the manual is prepared by the prime contractor, the parenthetical statement "(Manual prepared by)" (6-point) shall appear below the designer's name. However, the identification shall be omitted for any manual applicable to more than one manufacturer unless the prime contractor prepared the manual for two or more subcontractors, in which case the "(Manual prepared by)" statement only shall be used.
- h. **(N, F)** The original contract number shall be placed on all new issues and carried forward on all subsequent title blocks. If the contract number for a revision is different from the original number, the number applicable to the revision shall be indicated on any new cover pages, in addition to the original number. No more than two contract numbers, the original and the latest, need appear.
- i. **(N, MC, F)** When a manual supersedes a previous issue, or other manuals, a supersedure notice shall be placed in the space indicated.
- j. **(N)** The requirements of DoD Directive 5200.1-R are applicable for distribution statements.
- k. **(N, F)** The appropriate authority notice will be provided by the procuring activity.
- l. **(N, MC, F)** Refer to 3.5.1.23.5 regarding the date to be used.
- m. **(A)** When a manual supersedes a previous issue, or other manuals, a supersedure notice shall be placed in the space indicated.
- n. **(All)** The security classification assigned by the procuring activity shall be shown at the top and bottom center of the page. (24-point type)

Spacing between the necessary information shall be such as to result in an attractive well balanced title block.

Figure 2. (All) Example of a Title Block.
(Sheet 2 of 2)

USE	STYLE AND SIZE	CAPITALIZATION	LEADING (Points)	SPACING
1. Marginal Copy	Futura demibold 10, Vogue bold 12, Gothic or Roman bold or extra bold 10	Upper- and lowercase	2	6-point above or below text
1a. Publication number, Page number	Futura demibold 10, Gothic bold 10	Uppercase	-	6-point above or below text
1b. Change number	Futura demibold 10, Gothic bold 10	Upper- and lowercase	-	6-point below text
1c. Security classification	Vogue bold 12	Uppercase	-	6-point above or below text
1d. Page content/equipment identification	Futura demibold 10	Upper- and lowercase	2	6-point above text
1e. Deleted page(s) notation	Futura demibold 8	Upper- and lowercase	2	6-point above or below text
2. Text	Modern 10 or 12, Roman bold or medium 10	Upper- and lowercase	1	12-point above or below illustration or table 6-point above warning, caution, note heading 6-point below warning, caution, note text
2a. Emphasis	Vogue bold 10	Upper- and lowercase	1	
2b. Formulas and Equations	Modern Italics 10	Upper- and lowercase	1	12-point above and below text, illustration, or table
3. Part Numbers, Chapter Numbers and Titles; Appendix and Alphabetical Index Headings	Futura demibold *14, Vogue bold *14	Uppercase	6	48-point below marginal copy 18-point above text; illustration, or table
4. Section Number and Title	Futura demibold 12, Vogue bold 10, Gothic bold or extra bold *14	Uppercase	6	24-point below chapter title, when applicable 28-point below marginal copy, when applicable 18-point above text, illustration, or table
5. Paragraph Headings				
5a. Primary Sideheads	Futura demibold 12, Vogue bold 10, Gothic bold or extra bold 10	(A) Upper- and lowercase (N, MC, F) Uppercase	2	8-point below preceding text, Part, Chapter, Section title, or marginal copy
5b. First Subordinate Sidehead	Modern Italic 10, Vogue bold 10, Roman bold 10	(A) Upper- and lowercase Italics (N, MC, F) Uppercase underlined	1	4-point below preceding text or marginal copy
5c. Second Subordinate Sidehead	Modern Italic 10, Vogue bold 10, Roman bold 10	(A) Upper- and lowercase Italics (N, MC, F) Uppercase	1	4-point below preceding text or marginal copy

Figure 3. (All) Style, Size, Capitalization, Leading and Spacing (Typeset). (Sheet 1 of 3)

	USE	STYLE AND SIZE	CAPITALIZATION	LEADING (Points)	SPACING
5d.	Third Subordinate Sidehead	Modern Italic 10, Vogue bold 10, Roman bold 10	(A) Upper- and lowercase Italics (N, MC, F) Uppercase for first letter of each principal word, entire sidehead underlined	1	4-point below preceding text or marginal copy
5e.	Fourth Subordinate Sidehead	Modern Italic 10, Vogue bold 10, Roman bold 10	(A) Upper- and lowercase Italics (N, MC, F) Uppercase for first letter of each principal word	1	4-point below preceding text or marginal copy
6.	Figure Number and Title	Modern Italic 8, Vogue bold Italic 10, Gothic bold Italic 10	Uppercase for first letter of each principal word	2	6-point below illustration
7.	Legend (key)				
7a.	On artwork	Modern 8, Roman bold or medium 8	Uppercase	1	Set solid above caption
7b.	In text	Modern 8, Roman bold or medium 8	Uppercase for first letter of first word	1	6-point below illustration, 6-point above figure title
8.	Warnings (heading)	Century bold Italic 10, Vogue 10 boxed, Gothic bold *14	Uppercase	-	Set solid above legend line 4-point above and below text
9.	Cautions (heading)	Century bold Italic 10, Vogue 10 boxed, Gothic extra bold 10	Uppercase	-	4-point above and below text
10.	Notes (heading)	Modern Italic 8 or 10, Vogue bold 10, Gothic extra bold 10	Uppercase	-	4-point above and below text
11.	Footnotes	Modern 6	Upper- and lowercase	1	2-point below table. Full measure at bottom of page separated by a 1-inch hairline
12.	Table Number and Title	Modern Italic 8, Gothic bold Italic 10	Uppercase for first letter of each principal word	2	Center above table, repeat on continued pages
13.	Table Column Heads	Modern 10, Vogue bold 10, Roman bold or medium 10	Uppercase or upper- and lowercase	1	-----
14.	Table Text	Modern 10 or 12, Roman bold or medium 8	Upper- and lowercase	2	-----
15.	Boxheads	Modern 8	Uppercase or upper- and lowercase	-	Repeat on continued pages
16.	Rules	Hairline 2	-----	-	-----

Figure 3 (All) Style, Size, Capitalization, Leading and Spacing (Typeset), (Sheet 2 of 3)

USE	STYLE AND SIZE	CAPITALIZATION	LEADING (POINTS)	SPACING
17. Parts Lists Column Heads	Century 8, Modern 8	Uppercase	1
18. Parts Listings	Modern 6, 8, 10, Roman bold or medium	Upper- and lowercase	11

5
6

*If 14-point is not available, the next smaller size is permitted.

All type sizes may be plus or minus one point.

Slight variations in leading and spacing are permitted. Refer to 3.2.2.1.

Reproducible copy, that will require no reduction, shall use above type sizes.

Reproducible copy prepared oversize shall use type that will reduce to specified sizes.

IT IS NOT THE INTENT OF THIS SPECIFICATION TO SPECIFY, THE METHODS OR COMPOSING EQUIPMENT TO BE USED, BUT ONLY TO SPECIFY REQUIRED RESULTS.

Figure 3 (All) Style, Size, Capitalization, Leading and Spacing (Typeset). (Sheet 3 of 3)

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	USE	STYLE AND SIZE	CAPITALIZATION
1.	Marginal Copy		Upper-and lowercase
1a.	Publication number, Page Number	660-12	Uppercase
1b.	Change number	660-12	Upper-and-lowercase
1c.	Security classification	660-14, 670-14	Uppercase
1d.	Page content/equipment identification	670-10	Upper-and lowercase
1e.	Deleted page(s) notation	660-8	Upper-and lowercase
2.	Text	600-10, 680-10	Upper-and lowercase
2a.	Emphasis	675-10	Upper-and lowercase
2b.	Formulas and Equations	605-10 Italics	Upper-and lowercase
3.	Part Numbers, Chapter Numbers and Titles; Appendix and Alphabetical Index Headings	1208-14 or Headliner 1471-14	Uppercase
4.	Section Number and Title	670-10, 670-12	Uppercase
5.	Paragraph Headings		
5a.	Primary Sideheads	670-10	Uppercase
5b.	First Subordinate Sidehead	600-10, 670-10, 680-10	(A) Upper-and lowercase Italics (N, MC, F) Uppercase under- lined
		605-10 Italics	
5c.	Second Subordinate Sidehead	600-10, 670-10, 680-10	(A) Upper-and lowercase Italics (N, MC, F) Uppercase
		605-10 Italics	
5d.	Third Subordinate Sidehead	600-10, 670-10, 680-10	(A) Upper-and lowercase Italics (N, MC, F) Uppercase for first letter of each principal word, entire sidehead underlined
		605-10 Italics	
5e.	Fourth Subordinate Sidehead	600-10, 670-10, 680-10	(A) Upper-and lowercase Italics (N, MC, F) Uppercase for first letter of each Principal word
		605-10 Italics	
6.	Figure Number and Title	664-10, 675-10	Uppercase for first letter of each principal word
7.	Legend (key)		
7a.	On artwork	600-10	Uppercase
7b.	In text	600-10	Uppercase for first letter of first word
8.	Warnings (heading)	670-10 boxed	Uppercase

Figure 4. (All) Style, Size, and Capitalization (Varitype) Sheet 1 of 2

USE	STYLE AND SIZE	CAPITALIZATION
9. Cautions (heading)	670-10 boxed	Uppercase
10. Notes (heading)	670-10	Uppercase
11. Footnotes	600-6	Upper- and lowercase
12. Table Number and Title	660-10, 670-10	Uppercase for first letter of the first word
13. Table Column Heads	670-10	Uppercase or upper- and lowercase
14. Table Text	600-10	Upper- and lowercase
15. Boxheads	670-10	Uppercase or upper- and lowercase
16. Rules		
17. Parts Lists Column Heads	600-10	Uppercase
18. Parts Listings	600-6, 600-8, 600-10, 680-6, 680-8, 680-10	Upper- and lowercase

IT IS NOT THE INTENT OF THIS SPECIFICATION TO SPECIFY THE METHODS OR COMPOSING EQUIPMENT TO BE USED, BUT ONLY TO SPECIFY REQUIRED RESULTS.

Figure 4. (All) Style, Size and Capitalization (Varitype). (Sheet 2 of 2)

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1. **Parts (within a manual)** To be numbered consecutively, with the part number spelled out, all in capital letters; for example, PART ONE, PART TWO. (3. 2. 12.1)
NOTE: When necessary, Navy may divide volumes of a manual into parts. 6. 3. 18
2. **Chapters** To be numbered consecutively, using Arabic numerals; for example, Chapter 1, Chapter 2. (3. 2. 12. 2)
3. **Sections** To be numbered consecutively within each chapter, using capital Roman numerals; for example, Section I, Section II. (3. 2. 12. 3)
4. **Appendix** To be lettered consecutively using capital letters; for example, Appendix A, Appendix B. (3.2.12.6)
5. **Pages** Cover/title page (Army manuscript). Arabic numeral 1. (3.2.3.1)

List of Effective Pages. Capital letters, A, B, C, etc. (3.5.3)
Promulgation page. Lowercase letter, a. (3.5.4)
Change Record Page. Lowercase letter, c. (3.5.5)
Warning Page. Lowercase letters, a, b, c, etc. (3.5.2)
Safety summary. Lowercase Roman numerals, i,ii,iii, etc. (3.5.10)
Front matter (Foreword, Preface, Table of Contents, List of Illustrations, List of Tables). To be numbered consecutively using lowercase Roman numerals, i, ii, iii, etc.
Main portion of the manual. (Includes Introduction when it is Section I.) To be numbered consecutively using two-part Arabic numerals, the first part representing the chapter and the second part being the numerical sequence within the chapter/section; for example, 1-1, 1-2, 2-1, 2-2. (3. 2. 3)
Appendix. To be numbered consecutively using the letter of the appendix, followed by the Arabic numeral showing sequence within the appendix; for example, A-1, B-2. (3.2.12.6)
Glossary. To be numbered consecutively using Arabic numerals preceded by the word Glossary; for example, Glossary 1, Glossary 2. (3.2.12.7)
Alphabetical Index. To be numbered consecutively, using Arabic numerals preceded by the word Index; for example, Index 1, Index 2. (3.2.12.8)
Blank page. Number shall appear on preceding or following page. (3. 2. 6). (3. 2. 3. 2. 1)
Foldout page. To be unnumbered. (3. 2. 5)

Computer prepared manuals. As required by the technical content specification. (3.2.5)

- | | |
|---|---|
| 6. Illustrations (single page) | Same as for pages in main portion of the manual. Same as for pages in the Appendix. (3.2.3.2.; 3.2.12.6) |
| 6A Illustrations (foldout page) | To be numbered consecutively, using Arabic numerals preceded by the letters FO: example, FO-1, FO-2. (3.2.5) |
| 6B Illustrations (multi-sheet) | To be consecutively sheet numbered, Sheet 1 of 3, Sheet 2 of 3, etc. Added sheets, Sheet 2A, Sheet 2B, etc. (3.6.9) |
| 6C Illustrations (RPSTL manual) | As required by the detail specification. (3.2.5) |
| 7. Tables | Same as for pages in main portion of the manual. Same as for pages in the Appendix. (3.2.5; 3.2.12.6) |
| 8. Item numbers | Each figure to be consecutively numbered, using Arabic numerals, 1, 2, 3, etc. (3.6.17.1) Added item numbers, 1A, 1B, 2A, 2B, etc, or 1.1, 1.2, 2.1, 2.2, etc. (3.7.2.2) |
| 9. Paragraphs | Same as for pages in main portion of the manual. Same as for pages in the Appendix. (3.2.12.4; 3.2.12.6) |
| 10. Procedural steps | To be numbered within a paragraph in numerical sequence with Arabic numerals for example, 1, 2, 3, 4, etc. (3.2.12. 5) |
| Substeps | To be numbered consecutively within a step using Arabic numerals in parentheses; for example, (1), (2), etc. (3.2.12.5) |
| Sub-substeps | To be lettered within a substep in alphabetical sequence using lowercase letters in parentheses; for example, (a), (b), etc. (3.2.12.4.1c) |
| 11. Difference Data sheets | Page numbers, figure numbers, table numbers to be numbered consecutively throughout the section. Paragraphs need not be numbered but if numbered, single Arabic numerals are to be used beginning with 1 or each model (3.7.2.4.1c) |
| 12. Changes (pages, illustrations, tables, paragraphs) | Material added between existing material, the preceding number plus consecutive capital letter suffixes or decimal system shall be used; example, 2-4A, 2-4B, 2-4.1, 2-4.2 (3.7.2.2) |
| 12A Steps | Material added between existing material, the preceding number or letter plus consecutive letters or numeral suffixes, or the decimal system shall be used; example, a1, a2, (1a), (1b), a.1, a.2, (1.1), (1.2). (3.7.2.2) |

Figure 5. (All) Numbering Summary. (Sheet 2 of 2)

MIL-M-0038784A(TM)

A → PART FOUR

AUXILIARY EQUIPMENT

B → CHAPTER 16

SIGHTING AND FIRE CONTROL EQUIPMENT

C → Section I. INTRODUCTION

D → 16-1. Scope.

This chapter contains information on the arrangement of the sighting and fire control equipment used on the 40-mm automatic gun M1 mounted on the 40-mm antiaircraft gun carriage M2A1.

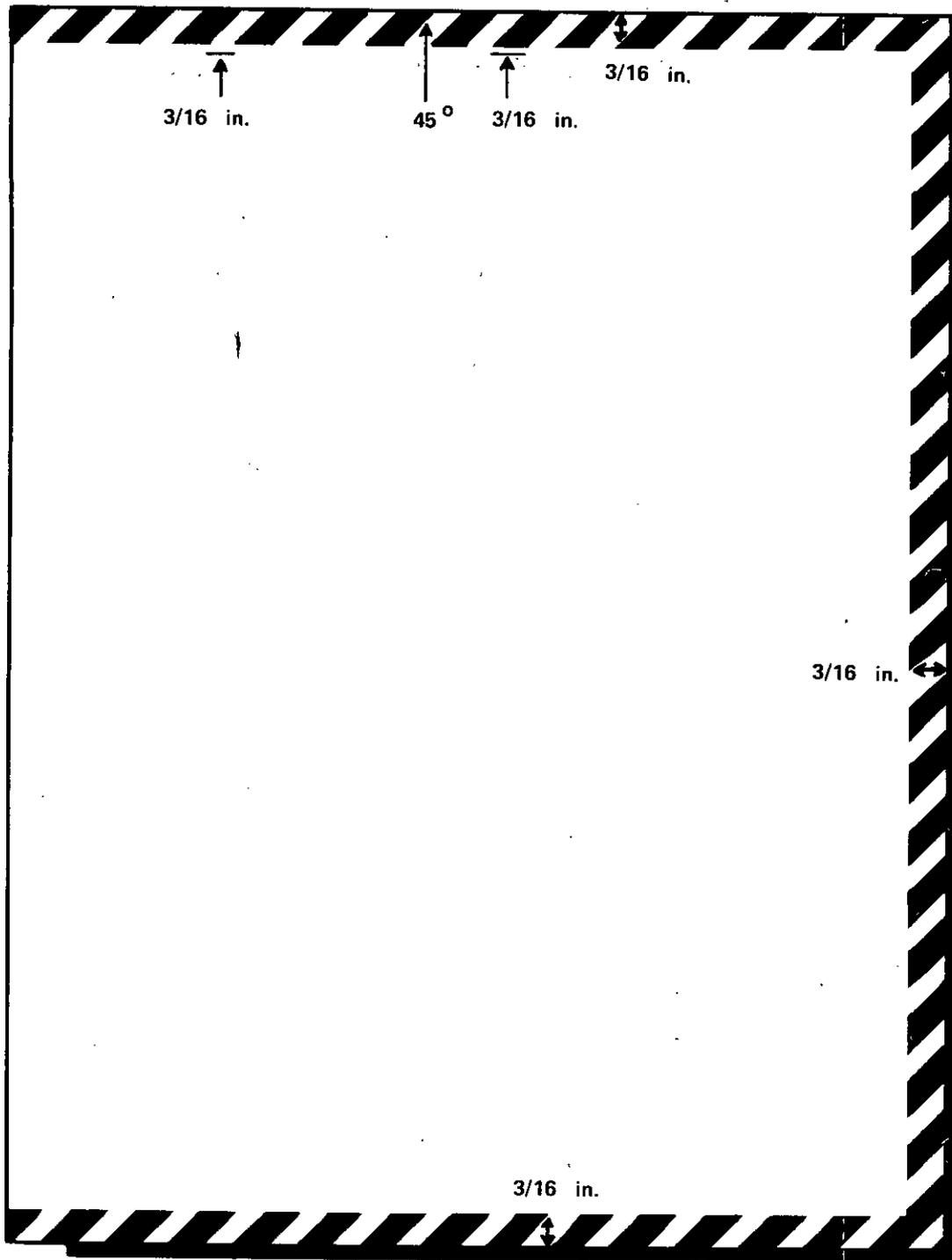
16-5. Orientation.

a. General. The oil gear M3, because of its additional features of self-synchronous operation and the self-contained hydraulic stops for elevation, requires painstaking operation.

Note: The procedure outlined in b and c below should be followed carefully if faulty operation is to be avoided.

E → b. Azimuth Gear. The azimuth oil gear M3 (fig. 16-4) can be oriented as follows:
(Indent 3)

Figure 6 (A) Example of a Typical Manuscript Page.



NOTES

- COLOR-** Black
- PLACE-** Three Unbound Edges
- BORDER-** 3/16 Inch Wide
- MARKING-** 3/16 Inch Wide
- ANGLE OF MARKING-** 45 Degrees
- SPACE BETWEEN MARKINGS-** 3/16 Inch Wide

Figure 7. (All) Emergency Page Markings.

Legend for fig. 0-0:

- | | |
|--|----------------------------|
| 1. Screw, fil-hd, 4-40 x 1/2 | 8. Indicator light glass |
| 2. Plate | 9. Maltese cross indicator |
| 3. Lockwasher, internal star,
1/4 in. | light |
| 4. Trigger guard | 10. Screw |
| 5. Relay | 11. Battery testing button |
| 6. Connector | 12. Wiring harness |
| 7. Indicator light shell | 13. Screw |

Figure 0-0. GCU wiring tester—exploded view (Illustration identification number)

Figure 9. (All) Example of Cutline with Legend.

MIL-M-0038784A(TM)

INDEX

	Paragraph
Additional equipment required	1-14
Adjustments and alignments:	
APC alignment, receiver	5-38
Beam and blower time delay adjustments, power amplifier	5-42
Cable length adjustment	2-16
Combined alarm adjustment, receiver	5-39
Combiner 2A16 adjustments, receiver	5-41
If gain and age alignment, receiver	5-36
Initial adjustments	2-14
Low RF alarm adjustment, power amplifier	4-18
Order wire level adjustment, transmitter	5-35
Squelch adjustment, receiver	5-37
Traffic level adjustment, receiver	4-17
Traffic level adjustment, transmitter	4-16
VCO frequency adjustment, receiver	5-40
Adjustments, extent of initial	2-14
AGC checks and adjustments, receiver	5-180
Air filters:	
Cleaning	4-7b
Removal or replacement	4-15
Amplifier, Radio Frequency AM-6090/GRC-143 (Refer to power amplifier listing)	
Antenna alignment indicator 4A7:	
Controls and indicators	3-6
Description	1-12c
Use	3-18
Antenna Group AN/TRA-37	1-14a
Antijamming	3-21
APC alignment, receiver	5-38
Authority of demolition	6-3
Block diagram functioning of Radio Set AN/GRC-143	5-3
Cable length adjustments	2-16
Cable loop back test	5-26

Figure 10. (All) Sample of Index

Figure does not pertain to Army.
To be supplied by other service.

Figure 11. (N) Alternate Alphabetical Index.

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* **WARNING**

The following step applies dangerous potentials up to 7000 volts DC to exposed terminals and wiring in the oscilloscope chassis. Exercise extreme caution when working inside this chassis throughout the rest of this procedure.

* **CAUTION**

All aluminum welding fluxes are highly corrosive. Exercise care to prevent the flux from entering the cooler core. Complete removal of the flux residues is essential for the same reason.

NOTE

Be sure to shut off the telephone system when the radar set is not operating. It usually obtains power from a separate source.

* *Borders optional*★ **METHOD A**

(Above headings are normally for typeset copy but may be inserted with any copy.)

WARNING or **WARNING**

Extended flight is not possible after tail rotor drive system failure. Autorotation must be entered immediately.

CAUTION or **CAUTION**

The speed deceser gear must be kept clean at all times to prevent contamination of the lube system. Do not separate the casing halves under any condition.

NOTE

Two flange bolts adjacent to each of the leakage air hose fittings are installed with heads aft.

★ **METHOD B**★ *Use one method consistently*

(Above is for copy prepared by office composing equipment or automated equipment. Underlining may be omitted for equipment without such a capability.)

Figure 12. (All) Examples of Warnings, Cautions, and Notes.

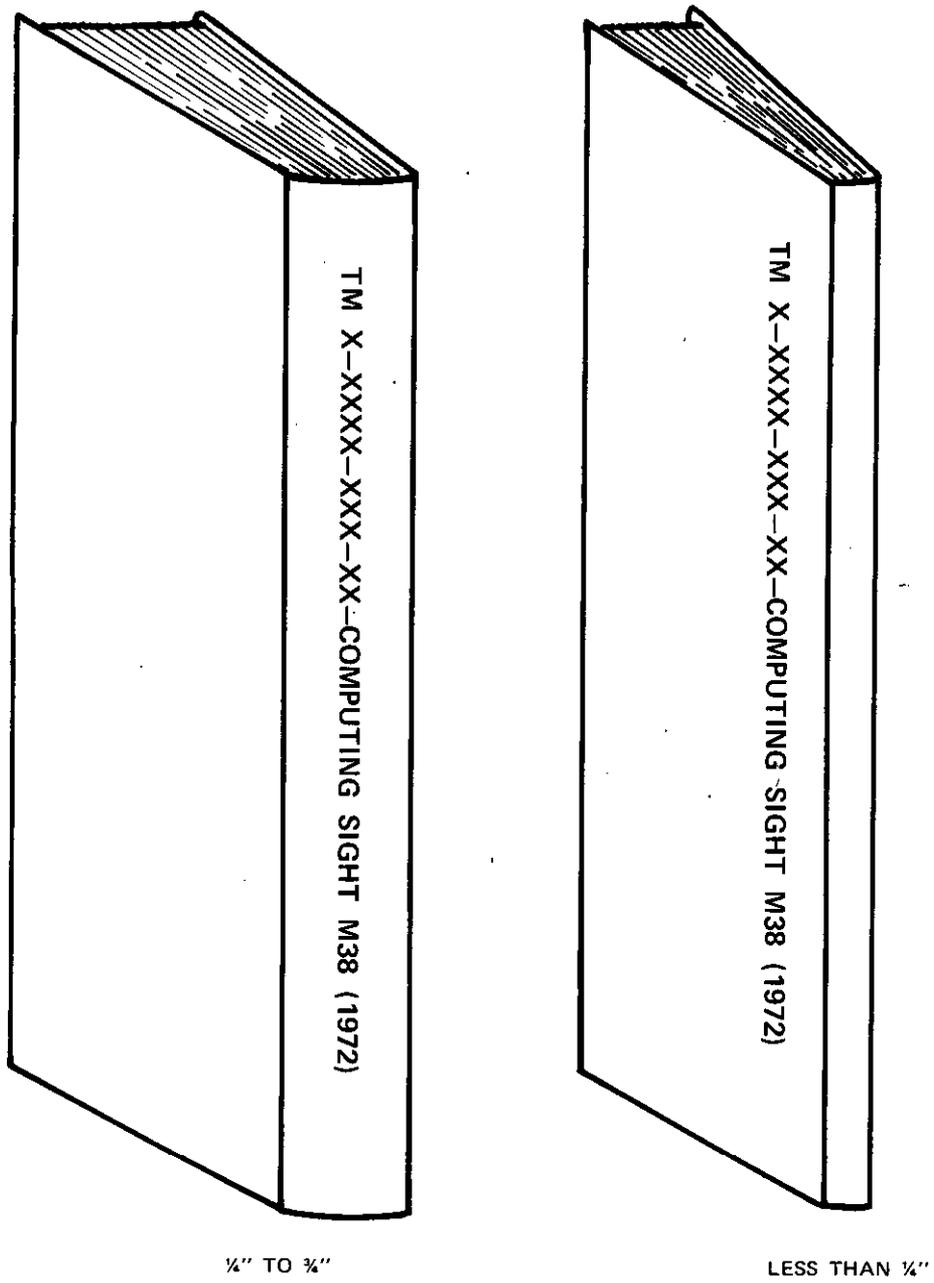


Figure 13. (A) Backbone for Cover.

MIL-M-0038784(TM)

Figure does not pertain to Army.
To be supplied by other service.

Figure 14. (N) Backbone Format for a Binder.

Figure does not pertain to Army.
To be supplied by other service.

Figure 15 (F) Flight Manual Cover Page.

MIL-M-0038784A(TM)

Figure does not pertain to Army.

To be supplied by other service.

Figure 16. (F) Safety Supplement (Aircraft).

Figure does not pertain to Army.
To be supplied by other service.

Figure 17. (F) Safety Supplement (Equipment).

MIL-M-0038784A(TM)

Figure does not pertain to Army.
To be supplied by other service.

Figure 18. (F) Operational Supplement (Aircraft).

Figure does not pertain to Army.

To be supplied by other service.

Figure 19. (F) Operational Supplement (Equipment).

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WARNING

RADIATION HAZARD



Co 60

Tube types 0A2 and 6530/PL-35 (TR tube) used in this equipment contain radioactive material (para 0-0). These tubes are potentially hazardous when broken; see qualified medical personnel and the Safety Director if you are exposed to or cut by broken tubes. For first aid instructions see TB 750-237 and AR 755-15. Use extreme care in replacing these tubes (para 0-0) and follow safe procedures in their handling, storage, and disposal (para 0-0). Refer to paragraph 0-0 and to TB 750-237 and AR 755-15 for instructions on handling, storage, and disposal of radioactive material.

Never place radioactive tubes in your pocket.

Use extreme care not to break radioactive tubes while handling them.

Never remove radioactive tubes from cartons until ready to use them.

SAMPLE A

ELECTROMAGNETIC RADIATION

**DO NOT STAND IN THE DIRECT PATH OF THE ANTENNA
WHEN THE POWER IS ON! DO NOT WORK ON THE WAVE
GUIDES WHILE THE POWER IS ON!**

High frequency electromagnetic radiation can cause fatal internal burns. It can literally "cook" internal organs and flesh. If you feel the slightest warming effect while near this equipment **MOVE AWAY QUICKLY!**

SAMPLE B

Figure 20. (All) Samples of Warning Page Information (Sheet 1 of 2)

WARNING

RADIATION HAZARD

This equipment contains the following radioactive tubes:
(List applicable tubes and equipment locations)
Radiation may be present at unsealed or broken waveguide elements.

Example C

WARNING

DANGEROUS CHEMICALS

are used in this equipment
DEATH
or severe burns may result if personnel fail to observe safety precautions.

Example D

WARNING

HIGH VOLTAGE

is used in the operation of this equipment
DEATH ON CONTACT
may result if personnel fail to observe safety precautions.
Learn the areas containing high voltage in each piece of equipment.
Be careful not to contact high-voltage connections when installing or operating
this equipment.
Before working inside the equipment, turn power off and ground points of high
potential before touching them.

Example E

WARNING

GASES OR AIR UNDER PRESSURE

3000 PSI AIR PRESSURE

is used in the operation of this equipment.
DEATH
or severe injury may result if personnel fail to observe safety precautions.

Example F

Figure 20. (All) Examples of Warning Page Information (Sheet 2 Of 2)

MIL-M-0038784A(TM)

TYPE SIZE
IN POINTS

(Note a)

CLASSIFICATION

18

PUBLICATION NUMBER

10

LIST OF EFFECTIVE PAGES

18

Insert new, changed, and added pages; remove replaced and deleted pages. On a changed page, the text affected by the latest change is indicated by a vertical bar in the margin opposite the changed material. Changes to illustrations are indicated by a miniature pointing hand; changes to schematic diagrams are shown by a shaded area. Added or completely revised chapters, sections, paragraphs, tables, etc., are indicated by a vertical bar by the title only. A zero in the Change No. column indicates an original page.

8

Total number of pages in this manual is 92 consisting of the following:

8

Cover	2	2-32	1
A	2	2-33-2-46	0
i, ii, iii	2	2-47	1
1-1	0	2-48-2-49	0
1-2	1	2-50	2
1-3	0	2-51-2-56	0
1-4-1-5	2	2-57	1
1-6 Blank	2	2-58-2-60	2
2-1	2	2-60.1	2
2-2	0	2-60.2 Blank	2
2-3-2-4	2	2-61	2
2-5-2-12	0	2-62-2-64	0
2-12.1	2	2-65	2
2-12.2 Blank	2	2-66-2-67	0
2-13	0	2-68	1
2-14	2	3-1-3-2	1
2-15-2-25	0	3-3	2
2-26	2	3-4	1
2-27	1	3-5	2
2-28	0	3-6-3-8	1
2-29	1	3-9-3-12	2
2-30-2-31	0		

8

A Change 2

6

(Note a)

CLASSIFICATION

10

(Note a) (This page is UNCLASSIFIED)

18

8

NOTES

- a. When the cover page is classified, the security classification shall be placed top and bottom of the List of Effective Pages. However, since information on the List of Effective Pages is unclassified, the note "(This page is UNCLASSIFIED)" shall be added at the bottom. If the cover page bears the note "(This page is UNCLASSIFIED)" then the List of Effective Pages need show no classification.

Figure 21. (A) Format and Copy for Change List of Effective Pages.

Figure does not pertain to Army.
To be supplied by other service.

Figure 22. (N, MC, F) Example of List of Effective Pages,
4 by 8 inch Manual.

MIL-M-0038784A(TM)

Figure does not pertain to Army.

To be supplied by other service.

Figure 23. (N, MC) Example of Change Record.

Figure does not pertain to Army.
To be supplied by other service.

Figure 24. (N, MC, F) Table of Contents.

MIL-M-0038784A(TM)

*TM 3-1040-257-14

TECHNICAL MANUAL

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C. 29 June 1973

Operator's Organizational, Direct Support, and General Support
Maintenance Manual

FLAMETHROWER, PORTABLE, M9A1-7
FSN 1040-089-5034

	Paragraph	Page
CHAPTER 1.	INTRODUCTION	
Section I.	General	1-1
Section II.	Description and data	1-3
CHAPTER 2.	OPERATION INSTRUCTIONS	
Section I.	Controls	2-1
Section II.	Operation under usual conditions	2-7
Section III.	Operation under unusual conditions	2-15
CHAPTER 3.	OPERATOR'S MAINTENANCE INSTRUCTIONS	
Section I.	Preventive-maintenance services	3-1
Section II.	Preventive-maintenance checks and services	3-3
CHAPTER 4.	ORGANIZATIONAL MAINTENANCE INSTRUCTIONS	
Section I.	Service upon receipt of materiel	4-1
Section II.	Painting and lubrication	4-8
Section III.	Servicing	4-11
Section IV.	Preventive-maintenance checks and services	4-15
Section V.	Troubleshooting	4-19
Section VI.	Tanks	4-21
Section VII.	Sphere carrier	4-26
Section VIII.	Gun	4-27
CHAPTER 5.	DIRECT SUPPORT MAINTENANCE INSTRUCTIONS	
Section I.	Servicing	5-1
Section II.	Gun	5-5
Section III.	Hose	5-9
Section IV.	Tanks	5-11
Section V.	Sphere carrier	5-21
CHAPTER 6.	GENERAL SUPPORT MAINTENANCE INSTRUCTIONS	
Section I.	Testing and servicing	6-1
Section II.	Gun	6-3
Section III.	Tank pressure section	6-6
CHAPTER 7.	SHIPMENT, ADMINISTRATIVE STORAGE, AND DESTRUCTIONS TO PREVENT ENEMY USE	
Section I.	Shipment and administrative storage	7-1
Section II.	Destruction to prevent enemy use	7-3
APPENDIX A.	REFERENCES	A-1
APPENDIX B.	BASIC ISSUE ITEMS LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST	B-1
APPENDIX C.	MAINTENANCE ALLOCATION CHART	C-1
INDEX		Index 1

*This manual supersedes TM 3-1040-257-12, 23 August 1968 and TM 3-1040-257-34, 6 September 1968, including all changes.

Figure 25 (A) Example of Table of Contents Pane for Printed Publications.

MIL-M-0038784A(TM)

*TM 0-1410-380-12

TECHNICAL MANUAL

NO. 9-1410-380-12

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., 30 May 1973.

OPERATOR AND ORGANIZATIONAL MAINTENANCE MANUAL:
SURFACE ATTACK GUIDED MISSILE XMGM-31A
(PERSHING 1a FIELD ARTILLERY MISSILE SYSTEM)

	Paragraph	Page	Frame
CHAPTER 1. INTRODUCTION			
Section I. General	1-1	1-1	1A8
II. Description and data	1-7	1-3	1A10
CHAPTER 2. DESCRIPTION AND THEORY OF OPERATION	2-1	3-1	1B6
CHAPTER 3. OPERATING INSTRUCTIONS			
Section I. General	3-1	3-1	1C2
II. Service upon receipt of materiel	3-3	3-1	1C2
III. Removal of first stage from container	3-6	3-6	1C7
IV. Removal of second stage from container	3-10	3-14	1D3
V. Removal of guidance section from container	3-14	3-16	1D5
VI. Installation of first stage into container	3-17	3-23	1D12
VII. Installation of second stage into container	3-21	3-25	1E2
VIII. Installation of guidance section into container	3-25	3-26	1E3
IX. Assembly of missile on EL	3-28	3-28	1E5
X. Disassembly of missile from EL	3-60	3-52	1G3
XI. Operation under unusual conditions	3-73	3-60	1G11
CHAPTER 4. MAINTENANCE INSTRUCTIONS			
Section I. Repair parts, tools, and equipment	4-1	4-1	2A2
II. Cleaning and painting	4-5	4-2	2A3
III. Surface damage criteria	4-7	4-4	2A5
IV. Preventive-maintenance services	4-15	4-6	2A7
V. Troubleshooting	4-23	4-28	2C5
CHAPTER 5. CORRECTIVE MAINTENANCE			
Section I. General	5-1	5-1	2D2
II. Corrective maintenance of first stage	5-3	5-1	2D2
III. Corrective maintenance of second stage	5-18	5-10	2D4
IV. Corrective maintenance of guidance section and warhead section	5-29	5-19	2E9
APPENDIX A. REFERENCES		A-1	2F2
B. BASIC ISSUE ITEMS LIST AND TROOP INSTALLED OR AUTHORIZED LIST		B-1	3A2
C. MAINTENANCE ALLOCATION CHARTS		C-1	3E2
INDEX		Index 1	3F2

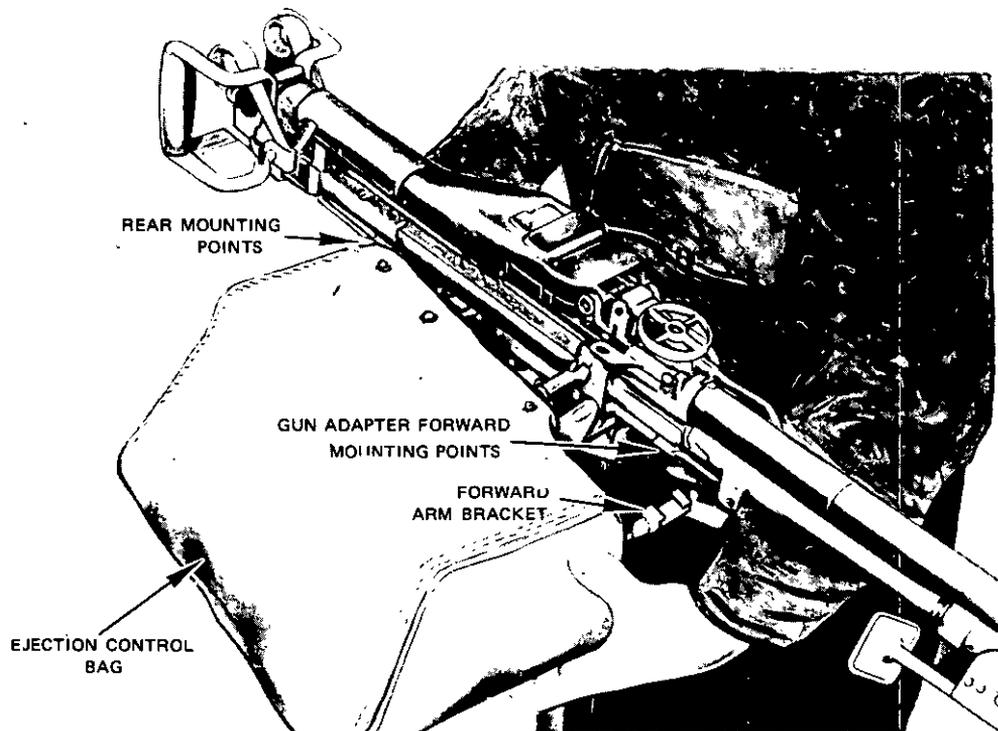
*This revision supersedes TM 9-1410-375-12, dated 3 February 1964, including all changes, and microfiche C1, dated 1 Jan 73.

Figure 26. Example of Table of Contents for Microfiche.

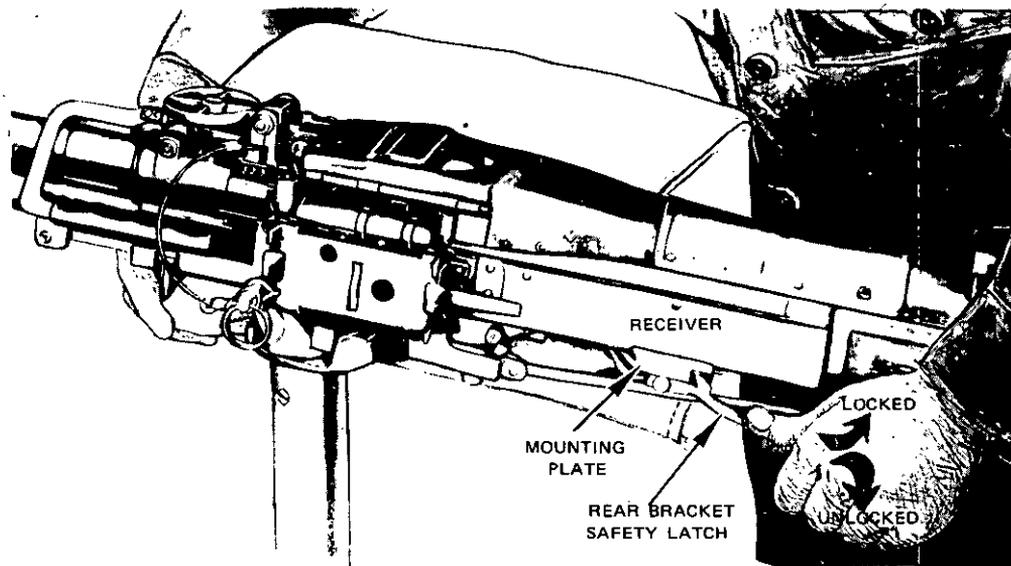
MIL-M-0038784A(TM)

Figure does not pertain to Army.
To be supplied by other service.

Figure 27. (N, MC) Example of Safety Summary.



STEP 1 - POSITION EJECTION CONTROL BAG ON MOUNTING POINTS.

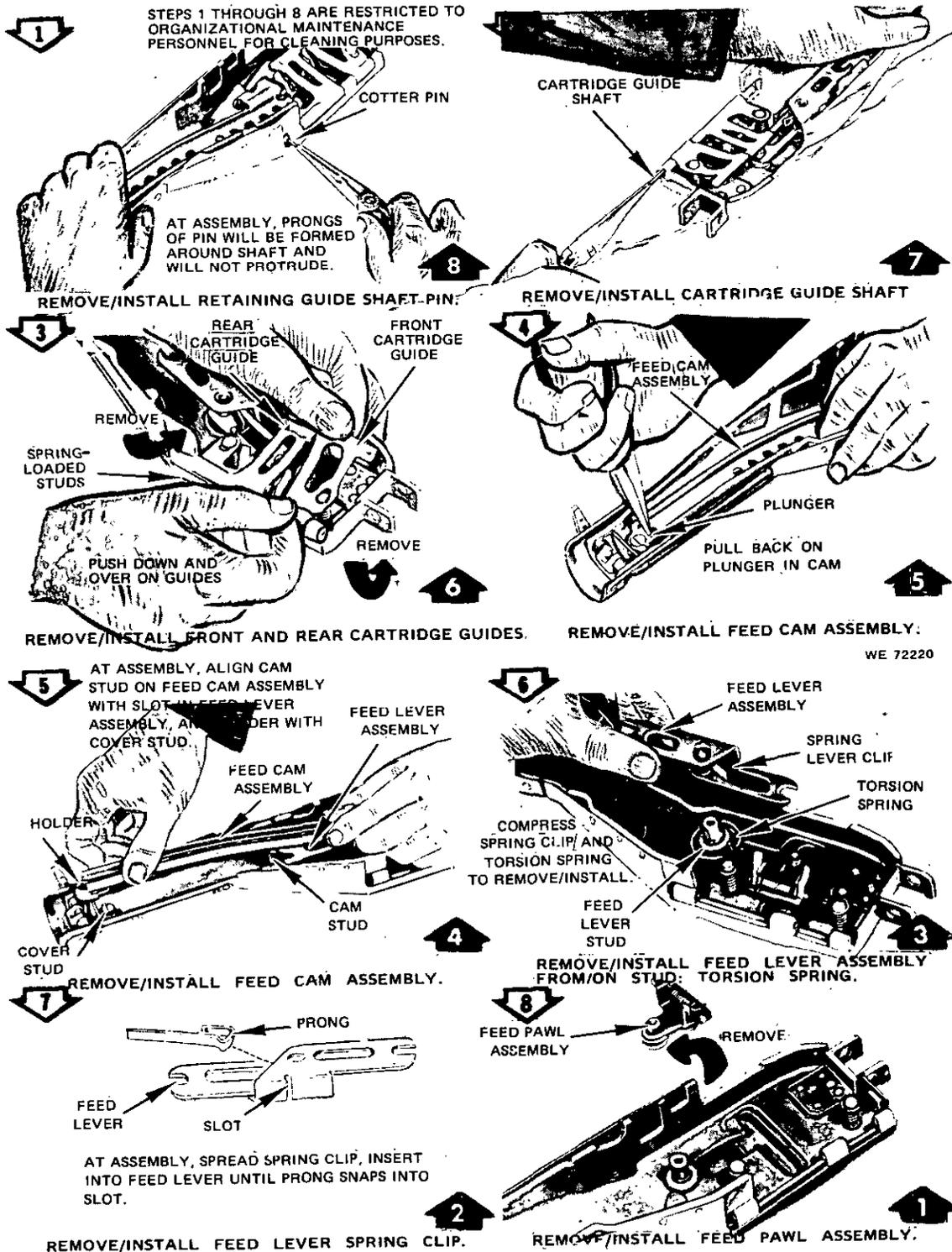


STEP 2 - LOCKED OR UNLOCKED POSITION.

Figure 28. Example of a Multiple Section Illustration

WE 72168

MIL-M-0038784A(TM)



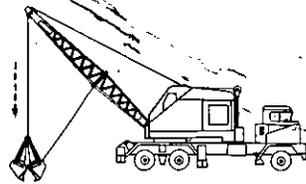
WE 72220

WE72219

Figure 29. (All) Pictorial Procedure.

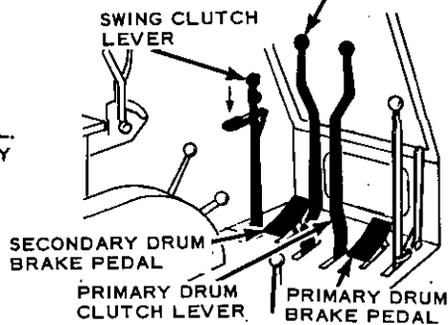
FILLING THE CLAMSHELL

PULL BACK ON THE DRUM CLUTCH LEVERS UNTIL THE CLAMSHELL BUCKET IS HIGH ENOUGH TO CLEAR THE MATERIAL BEING MOVED, THEN PUSH THE DRUM CLUTCH LEVERS TO NEUTRAL POSITION, APPLYING BOTH BRAKE PEDALS. SWING CLAMSHELL OVER MATERIAL.



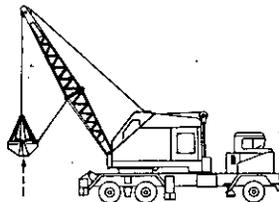
RELEASE THE SECONDARY DRUM BRAKE PEDAL TO OPEN CLAMSHELL BUCKET, THEN RELEASE PRIMARY DRUM BRAKE PEDAL TO LOWER CLAMSHELL BUCKET ONTO MATERIAL.

SECONDARY DRUM CLUTCH LEVER



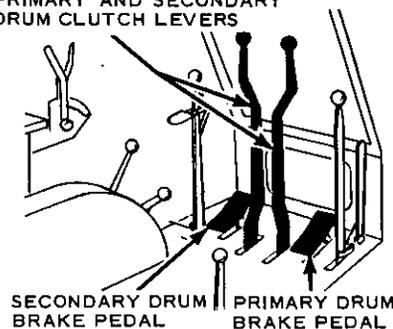
CLOSING AND HOISTING

TO CLOSE THE CLAMSHELL BUCKET PULL BACK ON THE SECONDARY DRUM CLUTCH LEVER. HOLD THE LEVER UNTIL THE BUCKET IS FILLED WITH MATERIAL AND CLOSED. WHEN THE BUCKET IS CLOSED, RELEASE THE



PRIMARY DRUM BRAKE PEDAL AND PULL THE PRIMARY DRUM CLUTCH LEVER BACK. HOLD BOTH LEVERS BACK UNTIL THE LOAD HAS REACHED THE DESIRED HEIGHT. RETURN BOTH DRUM CLUTCH LEVERS TO NEUTRAL AND AT THE SAME TIME APPLY BOTH DRUM BRAKE PEDALS.

PRIMARY AND SECONDARY DRUM CLUTCH LEVERS

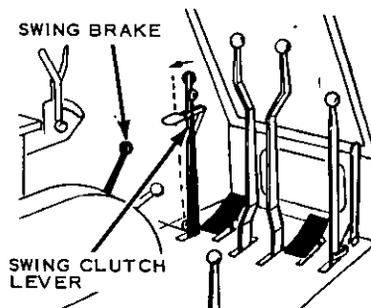


SWINGING

PUSH THE SWING CLUTCH LEVER FORWARD TO SWING THE CRANE TO THE LEFT. PULL IT TO THE REAR TO GO TO THE RIGHT. SWING SLOWLY AND EVENLY TO AVOID BUCKET WHIPPING. WHEN HANDLING FINE MATERIALS KEEP LOAD ON SECONDARY LINE BUT COORDINATE PRIMARY DRUM TO AVOID EXCESSIVE SLACK IN PRIMARY LINE.



SWING BRAKE



DUMPING

TO DUMP THE BUCKET, RELEASE THE SECONDARY DRUM BRAKE PEDAL.

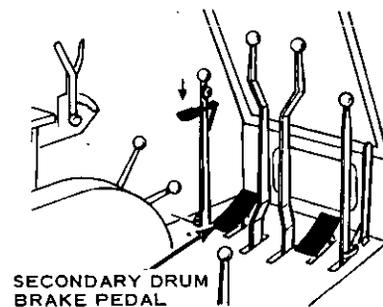
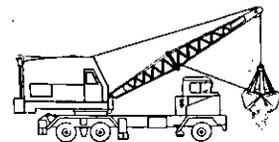


Figure 30 (All) Operational View

MIL-M-0038784A(TM)

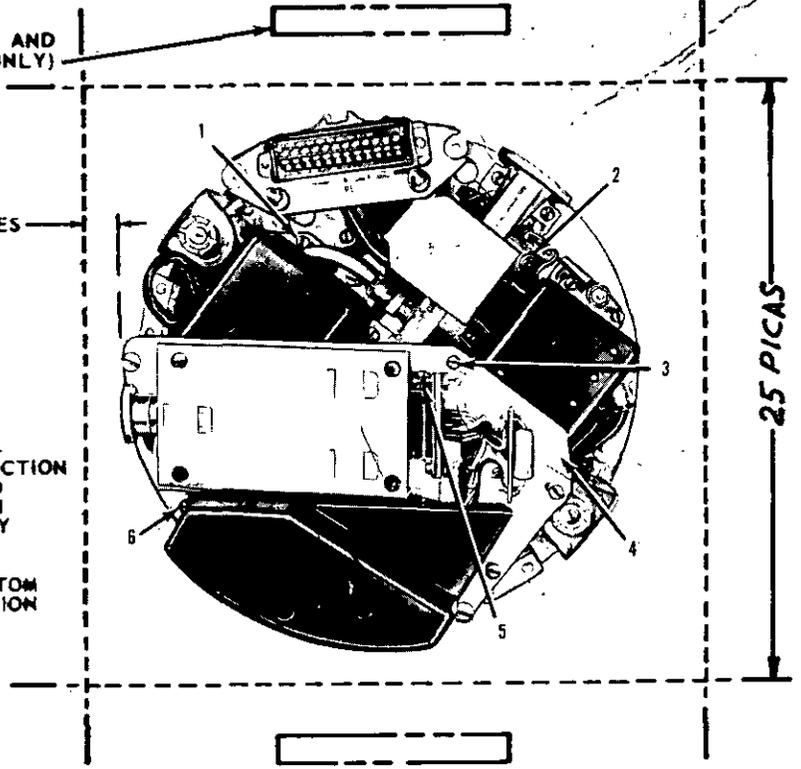
SECURITY CLASSIFICATION - TOP AND BOTTOM (CLASSIFIED BOARD ART ONLY)

1/4 TYPICAL 4 SIDES

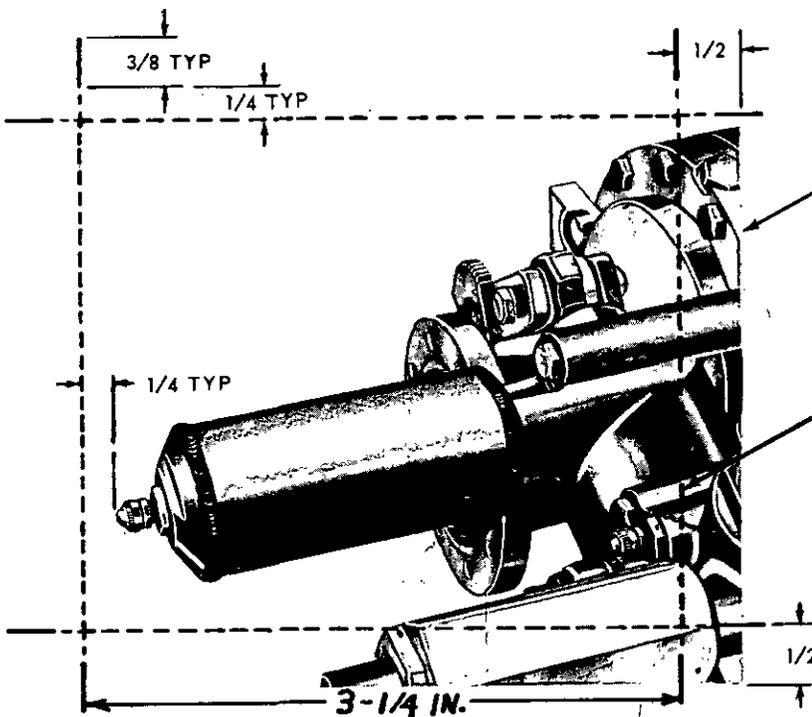
25 PICAS

NOTES:

1. DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
2. DIMENSIONS GIVEN ARE FOR ILLUSTRATIONS PREPARED FOR 1/3 REDUCTION (150% OF REPRODUCTION SIZE), AND SHOULD BE SCALED UP OR DOWN ON ILLUSTRATIONS PREPARED FOR ANY OTHER REDUCTION RATIO.
3. MARK REPRODUCTION SIZE AT BOTTOM OR RIGHT SIDE, WHICHEVER DIMENSION IS CRITICAL.



COMPLETE VIEW OF SUBJECT (H/T)



THIS AREA TO BE RETOUCHE
OR RENDERED TO THE SAME
QUALITY AS THE AREA WITHIN
THE CROP MARKS

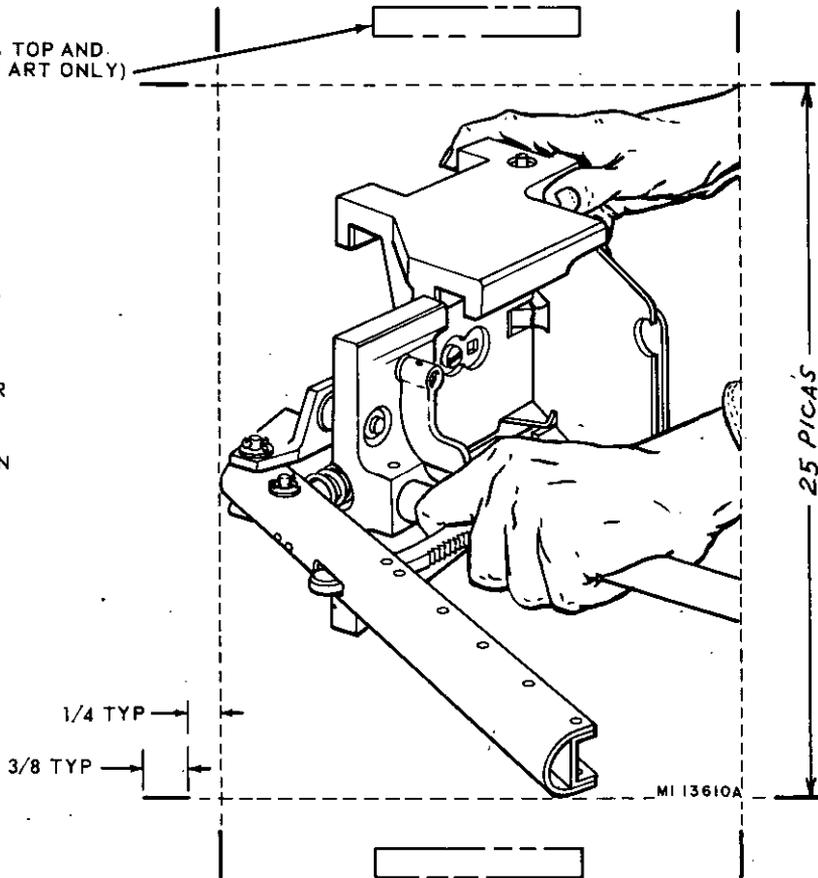
DOTTED LINES ARE FOR
REFERENCE ONLY AND ARE
NOT TO BE INCLUDED ON
THE ORIGINAL ART

PARTIAL VIEW OF SUBJECT (H/T)

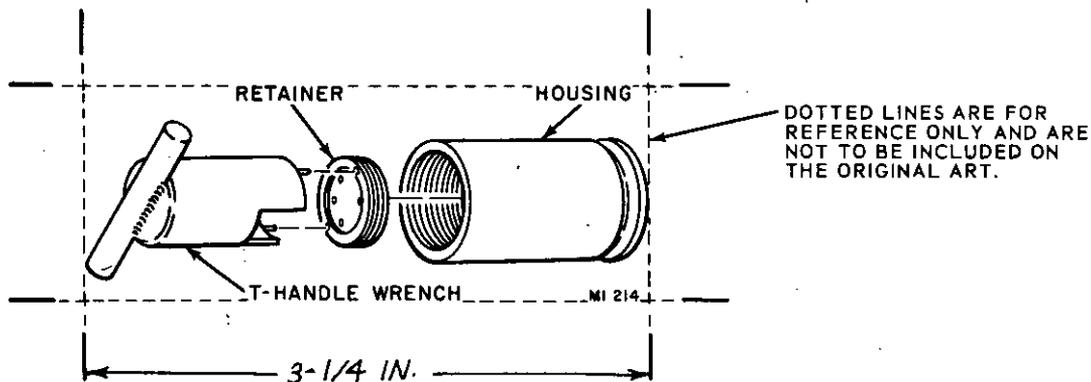
SECURITY CLASSIFICATION - TOP AND BOTTOM (CLASSIFIED BOARD ART ONLY)

NOTES:

1. DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
2. DIMENSIONS GIVEN ARE FOR ILLUSTRATIONS PREPARED FOR 1/3 REDUCTION (150% OF REPRODUCTION SIZE), AND SHOULD BE SCALED UP OR DOWN ON ILLUSTRATIONS PREPARED FOR ANY OTHER REDUCTION RATIO.
3. MARK REPRODUCTION SIZE AT BOTTOM OR RIGHT SIDE, WHICHEVER DIMENSION IS CRITICAL.



PARTIAL VIEW OF SUBJECT (LINE)



COMPLETE VIEW OF SUBJECT (LINE)

Figure 31. (All) Cropping and Sizing of Illustrations. (Sheet 2 of 2)

MIL-M-0038784A(TM)

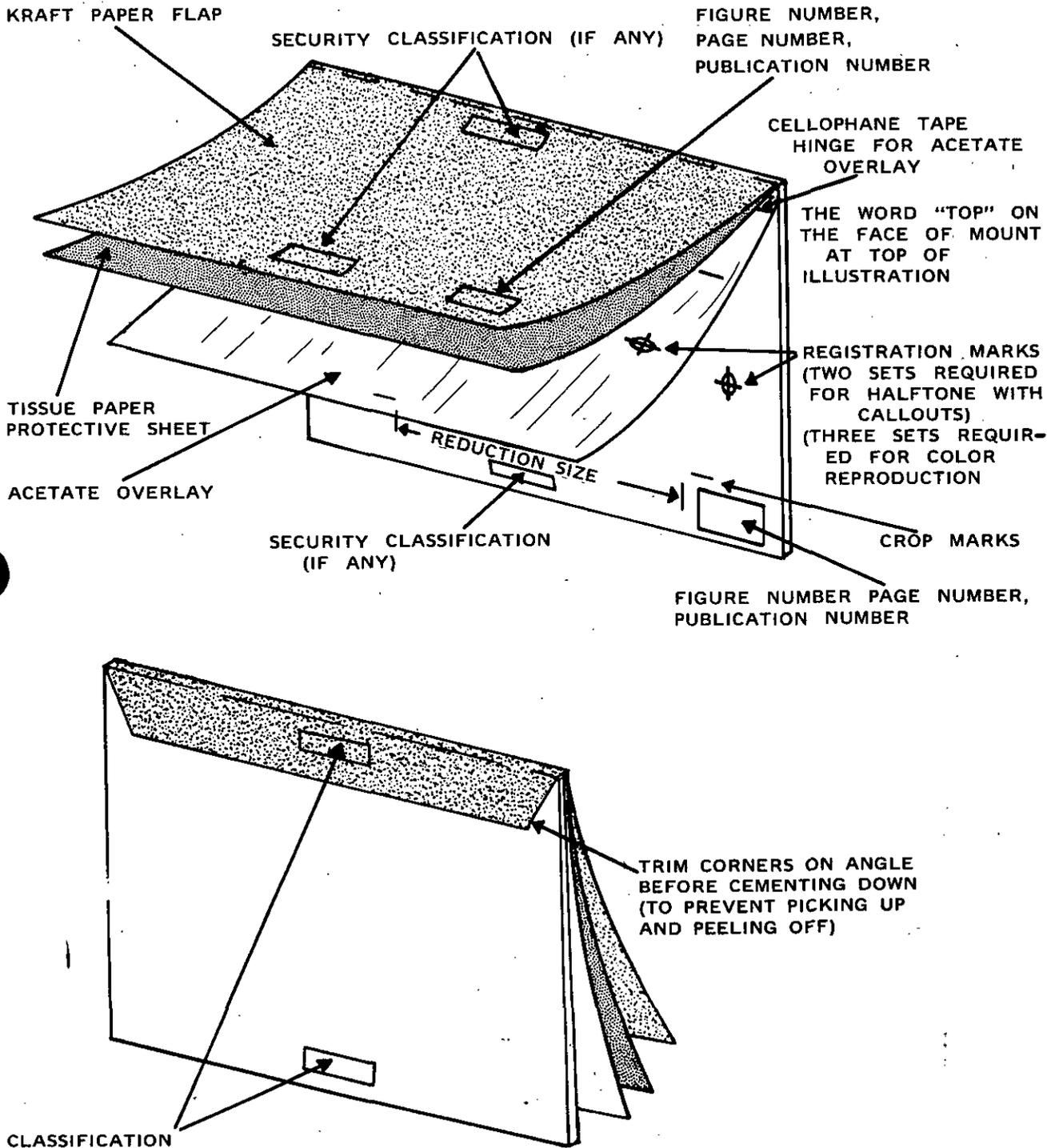
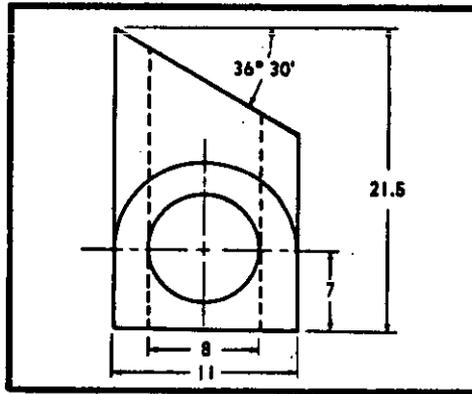
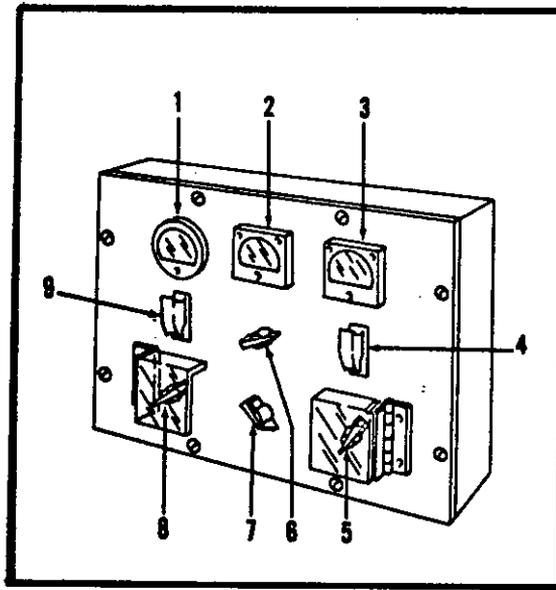
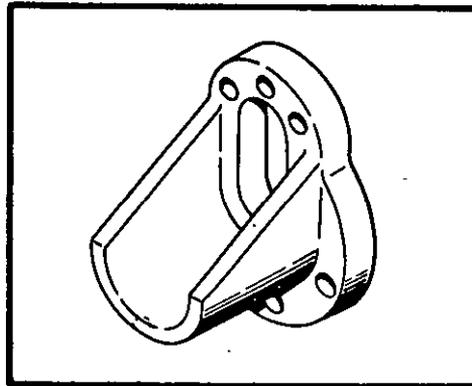


Figure 32. (All) Identification, Marking and Protective Covering for Artwork.



**MAIN OUTLINE HEAVY, SECONDARY
AND DIMENSION LINES LIGHTER**



**SUFFICIENT SHADING FOR
DIMENSIONAL EFFECT**

Figure 33. (All) Examples of Angle of View, Line Weight and Shading.

MIL-M-0038784A(TM)

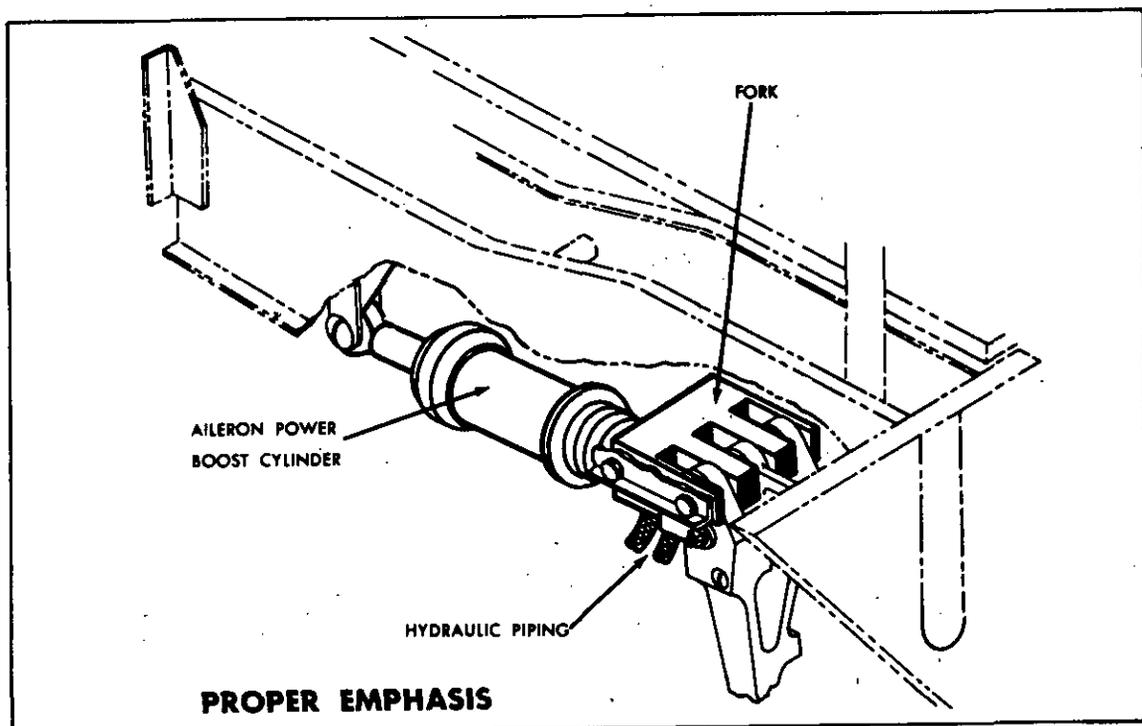


Figure 34. (All) Emphasis and Subordination of Detail.

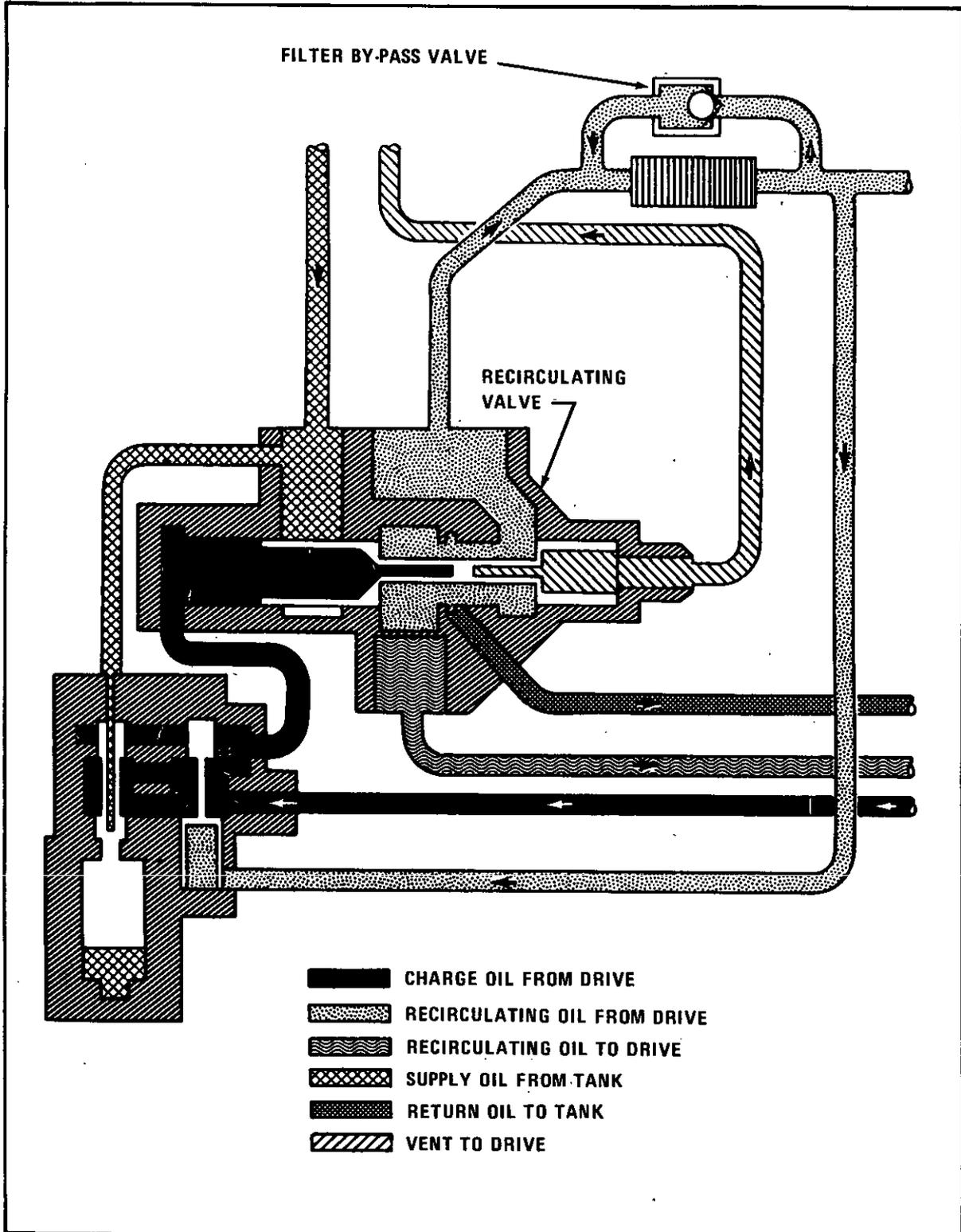


Figure 35. (All) Use of Patterns Instead of Colors.

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CHAPTER 4

DIFFERENCE DATA SHEETS

4-1 INTRODUCTION

Overhaul and test procedures for the models included in this section are the same as the procedures for Regulator Air Pressure Valve, Part No. 1361-596038, except for the specific differences noted by the applicable Difference Data Sheet. Chapters 1 through 3 contain complete overhaul and test information for Regulator Air Pressure Valve, Part No. 1361-596038.

4-2 INDEX OF DIFFERENCE DATA SHEETS.

Models covered by Difference Data Sheets are as follows:

PART NO.	PAGE NO.
1361-596038M1	4-3
1361-596038M2	4-5
1361-596038M3	4-7
1361-596038M4	4-11

Figure 36. (A,F) First Page of Difference Data Sheet Section.

DIFFERENCE DATA SHEET

FUEL PUMP

MODEL 4X-2

THE INSTRUCTIONS CONTAINED IN THE PRECEDING CHAPTERS OF THIS TECHNICAL MANUAL ARE APPLICABLE TO THIS MODEL EXCEPT FOR THE DIFFERENCE CITED IN THIS DIFFERENCE DATA SHEET

1. INTRODUCTION AND GENERAL INFORMATION.

Same as Model 4X-1, except the maximum output capacity is increased to 4.8 cubic feet per minute and the output pressure adjustment is increased to 22 pounds per square inch.

2. SPECIAL TOOLS AND TEST EQUIPMENT. Same as for Model 4X-1, except seat refacing tool, Part No. 249Y, is not required.

3. PREPARATION FOR USE AND SHIPMENT. Same as Model 4X-1.

4. OPERATION INSTRUCTIONS. Same as Model 4X-1.

5. MAINTENANCE. Model 4X-2 is equipped with a replaceable nylon seat in the by-pass valve (7, figure 5-2).

Inspection of the seat is the same as for Model 4X-1; however, if it is unserviceable, the nylon seat will be replaced rather than refaced. To remove the seat, use a 3/8 inch allen wrench and unscrew counter-clockwise. To install a nre seat, apply a light film of lubricating oil to the threads and torque to 20 inch pounds.

Test the same as Model 4X-1, except the output pressure shall be set at 22 pounds per square inch and the measured fuel flow must be between 4.3 and 4.8 cubic feet per minute.

6. DIAGRAMS. Not applicable.

7. ILLUSTRATED PARTS BREAKDOWN. Seat, Part No. 45462, is used in lieu of Part No. 28431 (9, Figure 7-1).

Figure 37. (A,F) Difference Data Sheet.

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Figure does not pertain to Army.
To be supplied by other service.

Figure 38. (F) TOFCN Cover Sheet.

Figure does not pertain to Army.
To be supplied by other service.

Figure 39. (F) TOCN Cover Sheet.

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Figure does not pertain to Army.
To be supplied by other service.

Figure 40. (F) Transmittal Notice for a Secret Change.

Figure does not pertain to Army.
To be supplied by other service.

Figure 41 (F) Transmittal Notice for Use When All Pages of a Change
to a Secret Manual Are No Higher Than Confidential

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Figure does not pertain to Army.
To be supplied by other service.

Figure 42. (F) Transmittal Notice for Use When Pages of a Change to a
Classified Manual are All Unclassified.

Figure does not pertain to Army.
To be supplied by other service.

Figure 43. (N) Change Guide.

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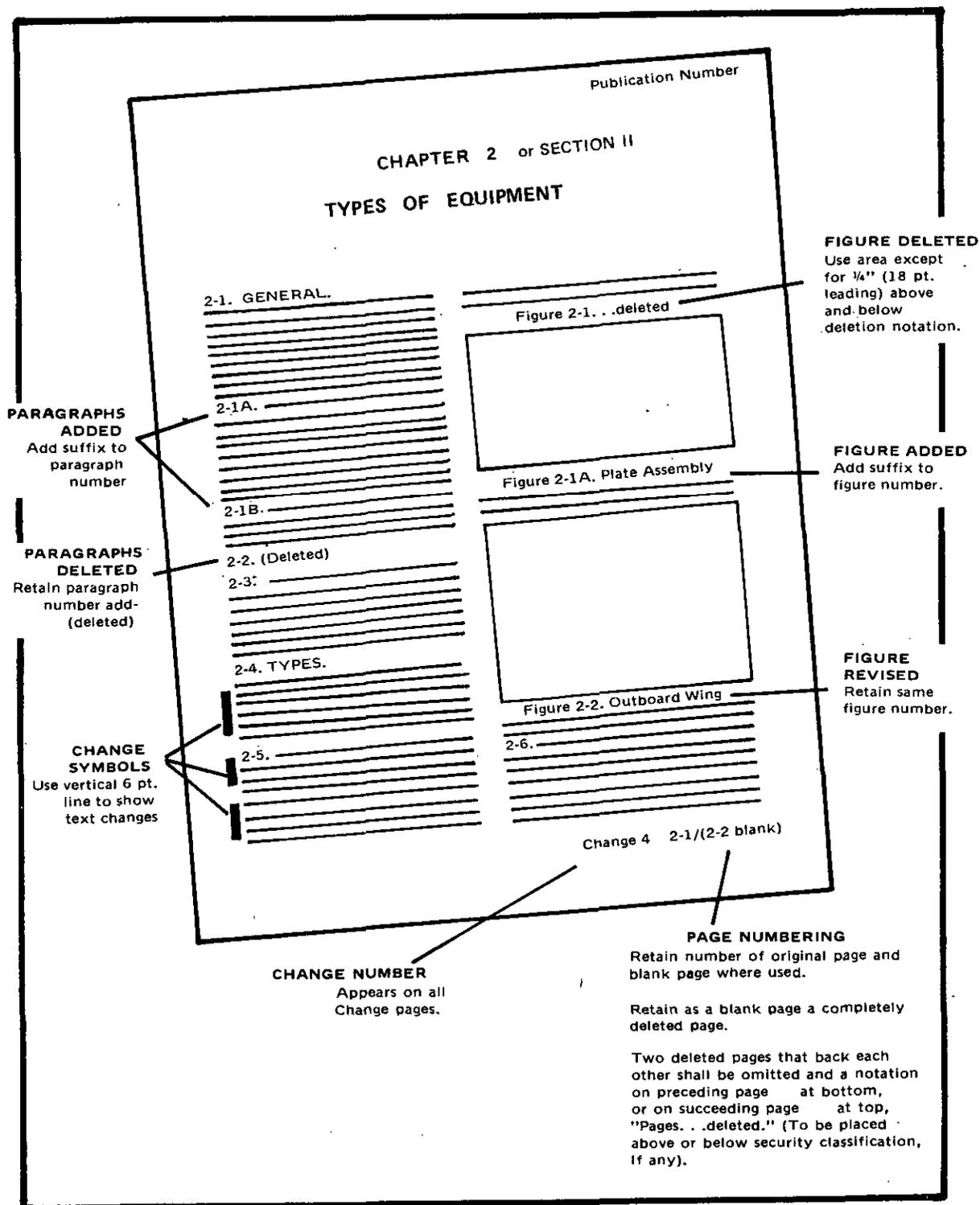
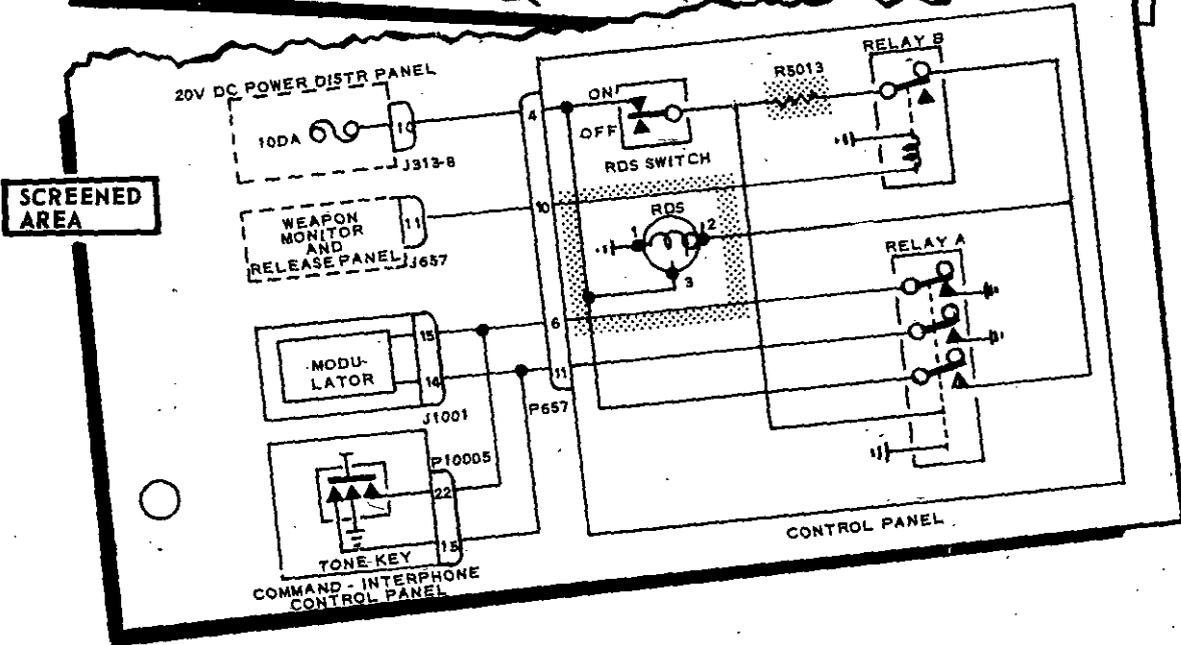
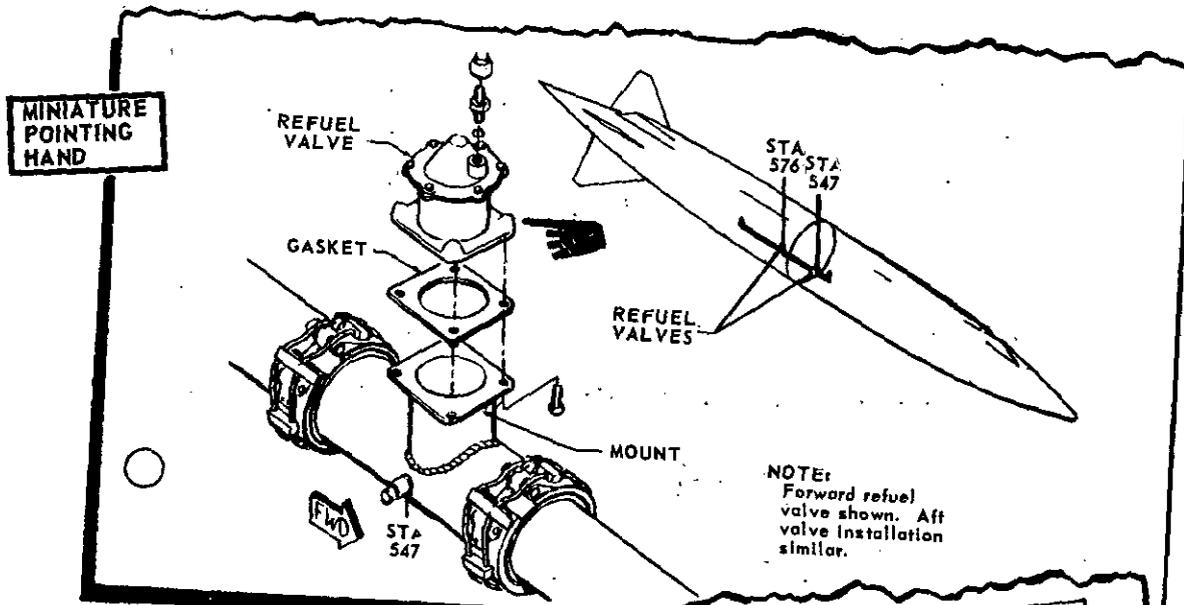


Figure 44. (All) Requirements for Change Pages.



VERTICAL LINE

8-140. FREE-FALL BOMBING SYSTEM INTERCHANGEABILITY.

8-141. The mission capability of the interchangeable package is determined by the part number of the interchangeable package, the type of release panel (bomb pod control or weapon monitor and release), and the type of ballistic data unit (MBIC or BLU MK) installed in the package. The letters MBIC or BLU MK are decalated on a tab located in the lower right hand corner of the ballistic control panel and indicate the type of ballistic data unit installed in the package. The tab is physically connected by a cord to the ballistic data unit. The following chart indicates mission capabilities for various combinations of components:

Change 1 8-21

Figure 45. (All) Example of Change Symbols

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TM9-4931-334-14/2

C1

**CHANGE
NO. 1**

**HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C. 6 June 1972**

**Operator's Organizational, Direct Support
and General Support Maintenance Manual**

**TEST SET
RADAR AN/TPM-22**

(4931-707-1229)

TM 9-431-334-14/2, 5 June 1970, is changed as follows:

Remove old pages and insert new pages as indicated below.

New or changed material is indicated by a vertical bar in the margin of the page.

3. Added or revised illustrations are indicated by a vertical bar adjacent to the illustration identification number.

Remove Pages	Insert Pages	Remove Pages	Insert Pages
5-13 through 5-16	5-13 through 5-16	6-113 and 6-114	6-113 and 6-114
6-1 and 6-2	6-1 and 6-2	6-151 and 6-152	6-151 and 6-152
6-23 and 6-24	6-23 and 6-24	6-167 and 6-168	6-167 and 6-168
6-25 and 6-26	6-25, 6-26 and 6-26.1	6-177 and 6-178	6-177 and 6-178
6-27 through 6-38	6-27 through 6-38	6-183 through 6-192	6-183 through 6-192
6-43 through 6-46	6-43 through 6-44.3 through 6-46	6-195 through 6-198	6-195 through 6-198, and 6-198.1
6-51 through 6-56	6-51 through 6-56	6-199 and 6-200	6-199 and 6-200
6-75 through 6-80	6-75 through 6-80, 680.1 and 6-80.2	6-213 through 6-216	6-213 through 6-216
6-81 through 6-88	6-81 through 6-88	6-219 through 6-224	6-219 through 6-224
6-95 and 6-96	6-95 and 6-96	B3 and B4	B3 and B4

File this change sheet in front of the publication for reference purposes.

Figure 46. (A) Change Sheet, Including List of Pages to be Removed and Inserted.

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Figure does not pertain to Army.
To be supplied by other service.

★U.S. GOVERNMENT PRINTING OFFICE: 1977-703-020:5829

Figure 47. (F) Status Page for Operational and Safety Supplements to
Flight Manuals.