

MIL-M-81273A(WP)
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 SUPERSEDING
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MILITARY SPECIFICATION
 MANUALS, TECHNICAL,
 GENERAL SPECIFICATIONS FOR

(This specification has been approved by the
 Bureau of Naval Weapons, Department of the Navy.)

1. SCOPE

1.1 General. This specification sets forth the minimum requirements for the preparation of technical manuals covering all ordnance and support equipment, except avionics manuals. Technical manuals are prepared to provide the detailed and general knowledge required for effective utilization of equipment and systems under the cognizance of the Bureau of Naval Weapons or other authorizing activity. In the preparation of SWOP's, this specification supplements but does not replace MIL-M-20800. Manuals described herein are operational documents, which exclude factory acceptance, operational or technical evaluation of equipment or systems, or procedures performed by civilian personnel in support of Fleet equipment.

1.2 Classification. This specification considers every technical manual end-product which is purchased to fall within four interlocking descriptive categories or classifications. Each product can be classified according to edition, quality, type, and product

procured. The following paragraphs describe each of the classifications.

1.2.1 Classification by Edition. The history of every complete technical manual contains a number of stages or editions. This specification considers the normal editions to be as follows. Definitions are provided in Section 6.

Outline
 Writer's Draft
 Review Draft
 Preliminary Copy
 Formal Copy

1.2.2 Classification by Quality. There is only one acceptable grade of quality relating to editorial standards. Artwork and production standards shall be specified by the Procuring Activity. Artwork shall conform to the types exemplified in Figures 3-1 through 3-8.

1.2.3 Classification by Type. The broad subject matter covered in a technical manual determines the specific type of the manual. The basic specification provides general requirements applicable to all types. Specific

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requirements for each type are provided in the type specifications MIL-M-81273/1A through MIL-M-81273/7A. The following types of manuals are identified in these type specifications.

1.2.3.1 Assembly and Test (MIL-M-81273/1A). Assembly and test manuals are provided for use by personnel charged with preparing and readying equipment for Service use. They may also provide information on actual use of the equipment.

1.2.3.2 User's Manual (MIL-M-81273/2A). A user's manual stresses operating procedures and is oriented toward a specific task or required assignment. A user's manual is frequently arranged in handbook style with informal textual presentation.

1.2.3.3 Encyclopedic (MIL-M-81273/3A). An encyclopedic manual contains related information on a wide variety of similar equipments (mines, chemical munitions, etc.). They are written for personnel who are required to select one or more items from among many such items available. As such they summarize pertinent features of the equipment. They also are used to document simple items which are not complex enough to require individual manuals. In this latter case, operating and assembly procedures may be required.

1.2.3.4 Weapon System (MIL-M-81273/4A). A weapon system manual provides the information required to understand the operational concepts of a complete weapon system. Tactical or strategic uses are covered, as are logistics, operational characteristics, etc.

1.2.3.5 Maintenance (MIL-M-81273/5A). A maintenance manual provides information to personnel charged with maintenance and repair of previously assembled equipments and their spared components.

1.2.2.6 Electronics (MIL-M-81273/6A). Electronics manuals are written to a variety of level B to cover operation, maintenances etc. of electronic equipment. MIL-M-81273/6A provides for five distinct level of coverage: a specification for small electronics equipments; medium and large equipments; systems; fixed in stallations and special support equipment. These terms and their scope are explained in the introductory specification, Guides for Use of Specifications for Electronic Equipment (MIL-M-81273/6A Part I).

1.2.3.7 General Purpose (MIL-M-81273/7A). General purpose manuals are prepared for personnel needing fundamental or advanced knowledge of a specific area of ordnance or weaponry. Typical subjects covered are degaussing, safety, fire control, magnetics, etc.

1.2.4 Classification by Product Procured. In many cases, it may not be desirable to procure a complete manual. In such cases, the Procuring Activity may direct the preparation of one or more of the following partial products, or may specify a particular partial product not listed in order to meet the needs of a special situation.

- a. Volume
- b. Part
- c. Chapter
- d. Section
- e. Appendix
- f. Supplement

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- g. Index
- h. Glossary

2. APPLICABLE DOCUMENTS

2.1 The following documents form a part of this specification. Unless otherwise specified in the Procuring Document, the issue in force on the date of the invitation for bids shall apply.

2.1.1 Military Standards.

MIL-STD-12 Abbreviations for Use on Drawings
 MIL-STD-15 Electrical and Electronic Symbols
 MIL-STD-16 Electrical and Electronic Reference Designations
 MIL-STD-17 Mechanical Symbols
 MIL-STD-806 Graphic Symbols for Logic Diagrams

2.1.2 Publications.

DD 441 Industrial Security Manual for Safeguarding Classified Information
 Government Printing Office Style Manual
 Webster's Third New International Dictionary (Unabridged)

2.2 Copies of Military Standards are available at the Procuring Activity or as directed by the Contracting Officer.

3. REQUIREMENTS

3.1 General. This section provides a compilation of requirements which shall apply to all Technical Manuals procured under this specification. Included are requirements for presentation of subject matter, editorial style and format, physical and mechanical composition, and illustrations. Also

included is a summary of security requirements as they apply to preparation and handling of manuals.

3.2 Type (Subject Matter) Requirements. Type requirements define the scope, and basic outline of subject matter of the clauses of technical manuals procured under this specification. Type requirements are provided as a part of this specification (MIL-M-81273/1A through MIL-M-81273/7A). Unless a specific contract or procurement dictates otherwise, the type requirement or requirements specified in the contract shall take precedence over any other requirements. When two or more type requirements are necessary, to provide adequate coverage of complex subject matter in a manual, areas of overlap between type requirements should be resolved and clarified in the procurement contract.

3.3 Editorial Requirements. Style of writing, English usage, grammatical construction, format requirements of text presentation, and conventions of technical manual presentation are summarized in the following paragraphs.

3.3.1 Editorial Style and Development of Text. Style of writing and the method of development of textual material shall conform to the following guidelines:

3.3.1.1 All text should be written in the most specific and factual style possible, consistent with the complexity of the subject matter. The text shall be written in a straightforward literary style which does not call attention to itself.

3.3.1.2 Highly technical or esoteric vocabulary should not be used when more common phraseology will convey

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the same or similar meaning. Jargon should be avoided.

3.3.1.3 Abbreviated and terse sentences, while preferable to overly complex and lengthy sentences, should not be employed extensively in descriptive text.

3.3.1.4 In general, subject matter should be arranged so that the text proceeds from the general to the specific. A chapter might be organized to present broad, generalized statements or concepts of the operation of an equipment and then proceed to the detailed description of its circuitry. A definite statement of purpose or content shall be placed on the beginning of each chapter and principal subdivision.

3.3.1.5 The content of the technical manual shall be divided logically by volume and part (if required because of length or complexity), chapter, section, and as many additional levels of subordinate headings (Prime, secondary, third order, etc.) as required. Breakdown by section is not mandatory, section heads are used to divide a chapter into two or more clearly independent subchapters. Ample descriptive side heads for paragraphs and other Subdivisions should be provided to facilitate the location of specific information. Details of format used for heading are provided in Section 3.5.

3.3.1.6 At least two subordinate heads shall appear beneath any superior head; otherwise, no further breakdown beneath the level of the superior heading shall be used. For example, at least two or more third order heads will appear beneath a secondary head if it is necessary to further break down

the subject matter covered by the secondary head.

3.3.1.7 One or more sentences of descriptive text should be used after any heading before proceeding to a subordinate heading.

3.3.1.8 The depth of coverage and detail of the text should reflect the education and training level of the user. The level of training of the intended user shall be stated in the introduction of the manual as indicated in the Type Specification.

3.3.2 Grammatical Constructions. Grammatical usage shall conform to the following guideline:

3.3.2.1 Contemporary and accepted grammatical construction shall be used throughout the text.

3.3.2.2 The second person imperative shall be used in providing operating procedure (e. g., Rotate the POWER switch to STANDBY).

3.3.2.3 The third person indicative shall be used for description and discussion (e.g., When the POWER switch is placed in STANDBY, AC power is applied to the chart drive motor).

3.3.2.4 Direct address shall be avoided in all cases. (A sole specific exception is the informally written user's or job-oriented handbook.)

3.3.2.5 Closed-punctuation style should be used throughout the text.

3.3.3 Conventions of Text Presentation. This subsection provides specific and detailed requirements and conventions which govern the

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presentation of material of a technical manual.

3.1.3.1 Nomenclature. Nomenclature is divided into two categories, official and unofficial. The official nomenclature (as indicated on assigned LD's, nomenclature assignment sheets, etc.) shall be used on first encounter. Unofficial nomenclature consists of a shortened or abbreviated term or the nomenclature usually associated with a piece of equipment. The principal use of unofficial nomenclature in manuals is to conserve space or clarify confusing designations (see 3.3.3.1 (e)). The following rules shall govern the use of nomenclature in a technical manual.

a. Official nomenclature, when used, shall be written as follows:

Torpedo Mk 37 Mod 1
 Sonar Computer-Indicator Group
 AN/ BQA-3
 Mine Mk 52 Mods 0 through 7
 Mine Mk 52 Mods 1 through 4 and 6
 Mine Mk 52, All Mods.

b. When referring officially to two or more similar items of equipment in the sentence, they shall be written as follows:

Mine Mk 52 Mod 4 and Mine
 Mk55 Mod 0 are

c. Unofficially, the two mines in the preceding example may be referred to collectively as follows:

Mines Mk 52 Mod 4 and 55
 Mod 0 are

d. Items not bearing a Mark and Mod designation shall have, as their official nomenclature, the nomenclature appearing on the associated drawing and

LD. For purposes of further identification, the official drawing number may be used in conjunction with this identification when required (as in assembly manuals, etc).

e. When the nomenclature appearing on the drawing and LD is not sufficiently descriptive, a modifier may be used in descriptive writing. For example, an item designated officially as housing may be described as the potentiometer housing, thus differentiating it from other housings described concurrently.

f. When unofficial nomenclature is used to describe an item, the same nomenclature designation should be used consistently throughout the applicable portion of the manual.

g. Materials such as hydraulic fluids and lubricants shall be identified by name and part number or other Government Specification Number. If an acceptable alternate material exists, it should be listed for emergency use.

h. Manufacturer's names and brand names shall not be used (other than as specified for repair parts lists) unless they are required to differentiate between two similarly identified items which are not identical. For example, an equipment may accept either one of two power supplies. Both may have identical inputs and outputs and be mutually interchangeable. However, if they differ in internal construction, maintenance, calibration, etc., it may be necessary to provide the brand or trade name to distinguish between them.

i. In instances where material is commercially procured, a complete identification by manufacturer's designation catalog number, etc., shall be supplied. When listing commercially

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procured material as a requirement for performing a task, the words or equivalent shall be placed in parentheses after the name of the material.

3.3.3.2 Abbreviations. Abbreviations shall conform to the following standards:

a. All unusual and nonstandard abbreviations shall be spelled out upon first encounter followed by the abbreviation in parentheses. The same abbreviation shall then be used throughout the manual.

b. References shall be abbreviated when in parentheses (Fig.; Para.; Vol.; etc.) and spelled out when not in parentheses.

c. In tabular presentation, where space is at a premium, designations as in paragraph (b) may be abbreviated.

3.3.3.3 Capitalization and Punctuation. The following standards shall govern the use of capitals and punctuation marks.

a. The first letter of each word of official nomenclature shall be capitalized. Unofficial nomenclature, even though derived from official nomenclature, need not be capitalized. (See 3.3.3.1(a).)

b. The following terms shall be capitalized; no period shall be required:

AC, DC, VAC, CF (constant frequency), CPS, VDC, RMS, RC.

c. Reference designations shall be capitalized; no hyphen or other punctuation shall be required (e.g. C19; R23; Q17; T1).

d. Quotation marks should be avoided. Items using alphabetical letters for description shall not use quotation marks but shall use the hyphen (e.g., O-ring; A-frame; I-beam; C-clamp; etc.).

e. The words Volume, Chapter, Section, etc., shall appear in initial capitals when used for reference in the text.

f. Control designations, when referenced in procedural text, are normally written in full capitals (see 3.3.3.5(j)).

g. Commas should not be used between hyphenated phrases (e.g., 115-volt 400-cycle three-phase power).

3.3.3.4 Use of Numerals, Symbols, and Mathematical Expressions. The following standards shall be used in any numerical or other mathematical expression:

a. Numbers less than 10 shall be written out. Numerals should be used to express quantities of 10 or greater.

b. A sentence should not begin with a quantity expressed in Arabic numerals. If necessary, the sentence should be reorganized so as to place the numerals elsewhere; if not possible, the numerical quantity should be spelled out in words.

c. When used infrequently, Greek letter and other short symbols should be spelled out. For example, in descriptive text, the term delta tau is preferable to $\Delta\tau$; 22 kilohms is preferable to 22 $k\Omega$.

d. Symbols should be used where the full name designation would prove bulky or confusing.

e. Complex equations and mathematical proofs should be avoided in all but highly specialized manuals. Statements in English may be substituted for equations and proofs in cases where the explanation can be simplified by so doing.

f. In the presentation of a series of formulas, equations, etc., Arabic numerals may be assigned sequentially to each expression to simplify referencing and proofs.

g. When possible, explanations involving mathematics more complex than trigonometry should be avoided. In all cases, the level of mathematics shall not exceed the level of training and experience of the user, as specified in the procurement document.

h. Illustrations should be used to supplement complex trigonometric explanations.

i. In descriptive text, the symbols +, -, \pm , and \bullet (for degrees) may be used. Percent and units of measurement (inches, feet, etc.) shall always be written out in text; however, the symbols may be used in tabular presentation.

j. Consistency in the use and meaning of symbols throughout the manual shall be maintained.

3.3.3.5 Conventions of Format Preferences). The conventions which govern the presentation of textual material in the technical manual are as follows:

a. Figure and table references should be adjacent to the appropriate figure or table wherever practical. Exceptions may be made in the case of foldout

master schematics, functional block diagrams, etc.; these may be placed at the end of a section or chapter so that they may be unfolded and utilized continuously for reference throughout the preceding material. Where the number of illustration pages exceeds the number of text pages, it may be desirable to place all illustrations together in a separate section, chapter, etc.

b. Figures and tables shall be sequentially numbered with compound numbers within chapters. For example, Figure 5-17 connotes the seventeenth illustration in Chapter 5.

c. Pages within a chapter shall be numbered sequentially from the first page of a chapter, using compound numbers.

d. Appendices shall begin with the letter A, and continue sequentially throughout the alphabet. Pages within the appendix shall be designated A-1, A-2, B-1, B-2, etc.

e. Text, tables, and illustrations shall never be referenced by page number except in the index and table of contents. Text shall be referenced by the title of the chapter or heading as appropriate. Tables and illustrations shall be referenced by table and figure number.

f. Footnotes shall be used sparingly. Footnotes for text shall be designated by one or more asterisks at the appropriate place in the text. The footnote is placed at the bottom of that page, typed page width and separated from the text by a broken line. Footnotes to tables shall be designated by Arabic numerals beginning with 1 on each page. The footnote is placed at the bottom of the table within the closing lines or border of the table.

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g. When a small amount of material is needed for reference, either from the same or from another manual, this portion should be extracted, modified in context, and reproduced as needed. Larger amounts of material should be referenced fully, including manual designation, Volume, Part and Chapter.

h. Drawing numbers such as BUWEPS Dwg 1234567 shall be referenced without the word "number" and without the period after the abbreviation Dwg. Reference to contractor-originated drawings shall use the contractor's name or identification (e.g., Cosmos Corp. Dwg 1234567).

i. In order to incorporate additional hardware changes with a minimum of upgrading or change to the manual, unnecessary reference to the Mod designation or equipment should be avoided.

j. When controls, indicators, switches, panels, etc., are referenced in procedural portions of the text, the exact, inscribed designation appearing on the equipment shall be used. If the inscribed nomenclature or designation is not meaningful, an explanation shall appear upon first encounter. Because most control markings and panel designations are inscribed in capital letters, capital letters shall be used in the text. In those rare cases where panel markings are in lower case letters (certain commercially procured components) the appropriate panel marking shall be either underscored or set in italics as specified by the Procuring Activity.

k. Notes may be placed in the body of the text as indicated in 3.5. Notes are used to point out procedures or

conditions which otherwise may be misinterpreted or overlooked. They may also be used to clarify apparently contradictory or confusing situations, or to reference supplementary material or information of interest to the reader. In the latter instance, a note in the text is preferable to a footnote if the supplementary material or reference is lengthy.

3.3.3.6 Conventions of Format (Safety). Cautions and warnings should be used sparingly because of their special importance to the user of the manual. The following guidelines governing safety precautions shall be used:

a. Cautions shall be used to call attention to a procedure which, if not followed exactly, can lead to damage or destruction of equipment. They always precede the applicable portion of the text. Format of the caution shall be as indicated in 3.5.

b. Warnings shall be used to call attention to dangerous or hazardous conditions inherent in procedural information. They always precede the applicable portion of the text. Format shall be as indicated in 3.5.

c. The criterion to be used in differentiating between a warning and caution is one of physical injury to the person performing the procedures in the text. If both damage to equipment and personal injury may occur, a warning shall be used.

d. Cautions and warnings do not usually appear in descriptive or generalized text; they are reserved for procedural portions of the text in which the user will be performing the critical procedures.

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e. Generalized or descriptive portions of a manual should be so written that a user will not attempt to extract procedural information which may have dangerous or hazardous implications.

f. When both a warning and a caution precede a step, the caution shall appear first.

g. Warnings shall be written in context so that they may be extracted verbatim for the safety summary (see 3.5). Cautions shall also be written in full context.

3.3.4 Applicable Documents. The requirements stated in Section 3.3 shall be supplemented by the following documents.

3.3.4.1 GPO Style Manual. The GPO Style Manual shall be used as a guideline for all punctuation, abbreviations, capitalizations, and general editorial requirements where they do not conflict with the requirements in this specification.

3.3.4.2 Webster's Third New International Dictionary (Unabridged). This dictionary shall be used for both definitions and spelling of all words where they do not conflict with the requirements of this specification.

3.4 Illustrations Requirements. Artwork shall conform to one of the types defined below as specified by Procuring Activity.

3.4.1 Military Standards. The following Military Standards shall apply to all artwork prepared for manuals:

MIL-STD-12 Abbreviations for
Use on Drawings
MIL-STD-15 Electrical
Electronic Symbols

MIL-STD-16 Electrical and
Electronic Reference Designations
MIL-STD-17 Mechanical Symbols
MIL-STD-806 Graphic Symbols
for Logic Diagrams

3.4.2 Image Sizes. Size and format of art submitted for reproduction shall be as follows:

3.4.2.1 All board art, except as noted in 3.4.2.5, shall be 1-1/2 times the size of the final printed size.

3.4.2.2 Vertical format shall be used in all cases except where subject matter requires horizontal format.

3.4.2.3 All single-page illustration shall be either a full page or a fill column in width.

3.4.2.4 Image size shall be as indicated in Table 3-1.

3.4.2.5 For special purpose applications (large, complex schematics, etc.), original art may be twice the size of final printed size, if authorized by the Procuring Activity.

3.4.3 Materials. Only those materials commonly accepted as standard for preparation of quality art shall be used.

3.4.3.1 All reference material and intermediate products used in generation of art shall be supplied by the Procuring Activity. All source data shall be returned to the Procuring Activity at the completion of the contract.

3.4.4 Board Sizes. All artwork with the exception noted in 3.4.4.3 shall be mounted as follows:

3.4.4.1 Page-sized or smaller than

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Table 3-1

ILLUSTRATION IMAGE SIZE

Original Size (In.)		Reproduced Size (In.)		Format	Reduction	Comment
W.	H.	W.	H.			
4-7/8	x 12-3/4	3-1/4	x 8-1/2	Vertical, Column width	1 1/2 to 1	Board Mounted
10-1/2	x 12-3/4	7	x 8-1/2	Vertical, Page width	1-1/2 to 1	Board Mounted
13-1/2	x 9-3/4	9	x 6-1/2	Horizontal, Page width	1-1/2 to 1	Board Mounted
30-3/4	x 12-3/4	20-1/2	x 8-1/2	Vertical, Foldout	1-1/2 to 1	Board Mounted, width is maximum allowable
41	x 17	20-1/2	x 8-1/2	Vertical, Foldout	2 to 1	Rolled (see 3.4.2.5)
41	x 30	20-1/2	x 15	Vertical, Foldout/Foldup	2 to 1	Rolled (see 3.4.2.5)

page-sized artwork shall be mounted on illustration board 15" x 20".

3.4.4.2 Foldout artwork shall be mounted on illustration board 20" x 30".

3.4.4.3 When larger mounting than that specified in 3.4.4.2 is required, artwork shall not be mounted but rolled carefully on a cardboard tube.

3.4.4.4 Halftone art shall be mounted on single-weight illustration board and line art on 170# index bristol.

3.4.4.5 Identification shall be placed on the lower right-hand corner of each board, as follows:

OP _____
 Vol., _____ Part _____ (if applicable)
 Fig. _____
 Type (H. T. or Line)

3.4.4.6 The classification shall be stamped at the top and bottom center on both front and back sides.

3.4.5 Crop Marks. Crop marks shall be used on halftone and combination art.

3.4.6 Dimension Marks. The reduction requirements shall be indicated in inches at the bottom of every illustration.

3.4.7 Covers. Each piece of board art shall be covered with brown kraft paper. Airbrushed illustrations or other delicate work shall be further protected by an inner cover of oil or wax-free tracing paper.

3.4.7.1 Identification shall be placed in the upper right-hand corner of the kraft paper cover, as follows:

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OP _____
 Vol. ____ Part _____ (if applicable)
 Fig. _____
 Type (H. T. or Line)

3.4.7.2 The classification shall be stamped on the top and bottom center of the cover .

3.4.8 Standards of Illustration Quality. The following standards shall apply to all artwork:

3.4.8.1 Lines shall be clean and sharp. Intense black ink shall be used. Mechanical shading shall be used only for crosshatching.

3.4.8.2 Good commercial mediums and techniques suited to the subject matter shall be used in renderings. Good contrast and clarity of detail for offset reproduction shall be maintained.

3.4.8.3 When retouching, coverage shall be kept to the minimum consistent with good appearance. Blemishes, trade names, unsightly, or extraneous matter shall be removed. AU defects shall be corrected.

3.4.8.4 Schematics prepared to electronics drafting standards may be used if approved by the Procuring Activity.

3.4.8.5 Cartoons are used, only, when authorized by the Procuring Activity.

3.4.8.6 Nomenclature and callouts shall be IBM Mid-Century Code 50 Type-writer. Complete nomenclature shall be used; key numbers and legend shall not be used unless authorized by the Procuring Activity. Nomenclature shall be typed on white adhesive-backed paper stock

3.4.8.7 Clear acetate overlays shall be used for nomenclature on halftones and combination art only; frosted acetate shall be used for Color separation. Register marks shall be used on all overlays.

3.4.8.8 Artype 2001-BW arrows with arrowheads, or equivalent, shall be used. Arrows shall be short and straight with no doglegs. Arrows shall be placed on the overlay with the nomenclature, except when used on line drawings where overlays are unnecessary.

3.4.8.9 New art should match existing art in format and style. Changes to an existing illustration should match the original technique.

3.4.8.10 Color may be used only when authorized by the Procuring Activity. Color shall not be used for decorative purposes. Each color shall be placed on a separate frosted overlay; all overlays shall be registered with the basic art.

3.4.8.11 If required by the Procuring Activity, a final-size stablene (or equivalent), printed on the front, shall be provided. A 120-line screen shall be used for all halftones, with nomenclature overlays, if any, in place.

3.5 Mechanical and Production Requirements. This section sets forth the requirements for typing, laying out, printing, and binding the manual. Detailed are the typographical requirements, layout and format for both single page and foldout composition, pagination requirements, headings and format for the typed page, order and arrangement of front and back matter, and other data not specifically editorial in content. Format requirements for issuing

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changes to existing manuals are included separately under section 3.5.6.

3.5.1 Typography. Typography shall conform to the following standards:

3.5.1.1 Technical manuals may be either typeset or typewritten as required by the Procuring Activity. Detailed requirements are as follows:

a. When the contract requires typeset copy, each page shall be furnished in reproduction size (defined as 1 to 1 reduction) on white enamel coated paper or similar grade of proof paper.

b. When typewriter copy is required, each page shall be in reproduction size using an IBM Executive typewriter with 10-point Modern type face or as specified by the Procuring Activity. Mylar carbon ribbon shall be used.

c. Typewriter copy shall be submitted on a good grade, hard finish white paper stock, equivalent to sixty-weight offset paper, which will provide a sharp, clear image.

d. Except for headings or special display type faces, when approved by the Procuring Activity, typeset and typewritten copy shall not be combined in the same manuscript.

e. Right-hand margins shall be justified only if specified by the Procuring Activity.

f. Reproducible manuscript shall cover only one side of a page and be clean and sharp without visible erasures.

3.5.1.2 Acceptable type faces and sizes are given in Table 3-2.

Deviations shall be permitted only on approval of the Procuring Activity.

3.5.2 Page Composition. Detailed instructions for composition of both single pages and foldouts are provided as follows:

3.5.2.1 Typing shall be single-spaced within the body of the text with six lines to the inch.

3.5.2.2 Text shall be page width, unless a two column format is specified by the Procuring Activity. Image area for a single page shall be 42 picas wide by 63 picas deep. This is to include the running heads, classification, and folios. Basic page and trim sizes are given in Table 3-3 and Figure 3-9.

3.5.2.3 Except as noted in 3.5.2.4, copy shall be double-spaced between paragraphs and before primary and secondary heads. When a section head appears within a chapter, copy shall be triple spaced before the section head and double spaced below it. (Details of placement and format of headings are given in 3.5.4.)

3.5.2.4 Spacing between paragraphs shall be varied as necessary to make adjustments for balancing or flushing of column lengths. The last page of a chapter or section may have unbalanced column lengths of one or two lines.

3.5.2.5 When text and illustration (or table.) appear on the same pages, no less than five lines of text per column shall appear. Less than five lines may be used on a single page if it is the last page in a section or chapter.

3.5.2.6 Pages should be laid out to conserve space without sacrificing

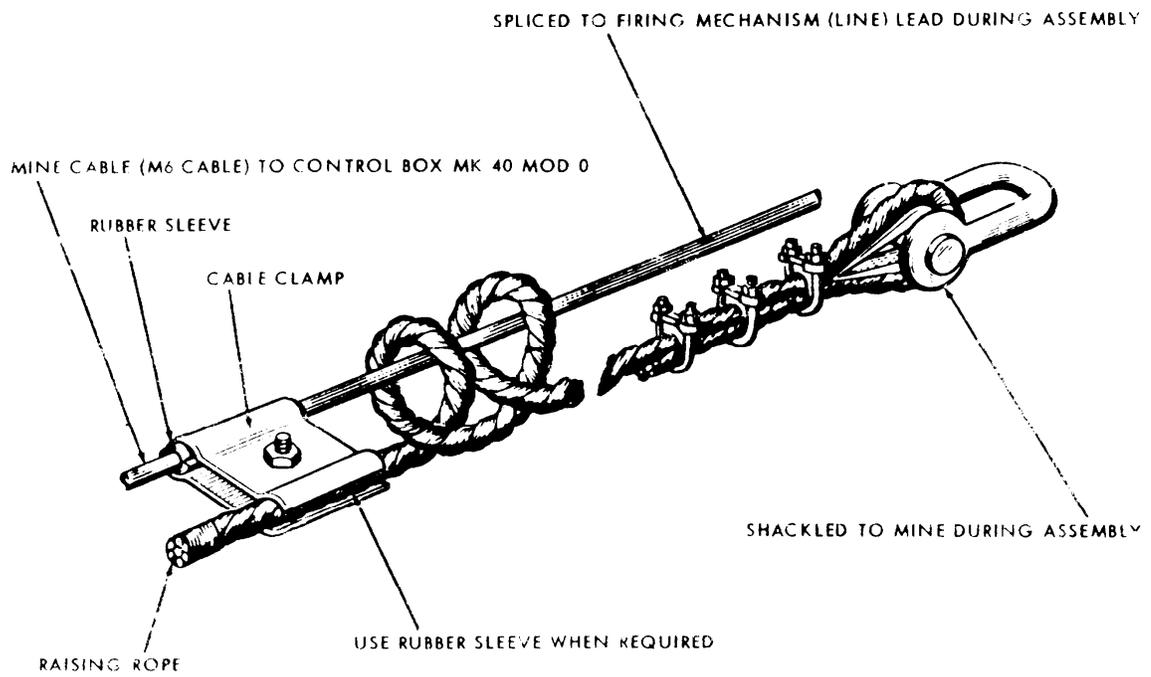


Figure 3-1 Example of Line Artwork (Inked)

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Figure 3-2 Examples of Retouched Halftone Artwork

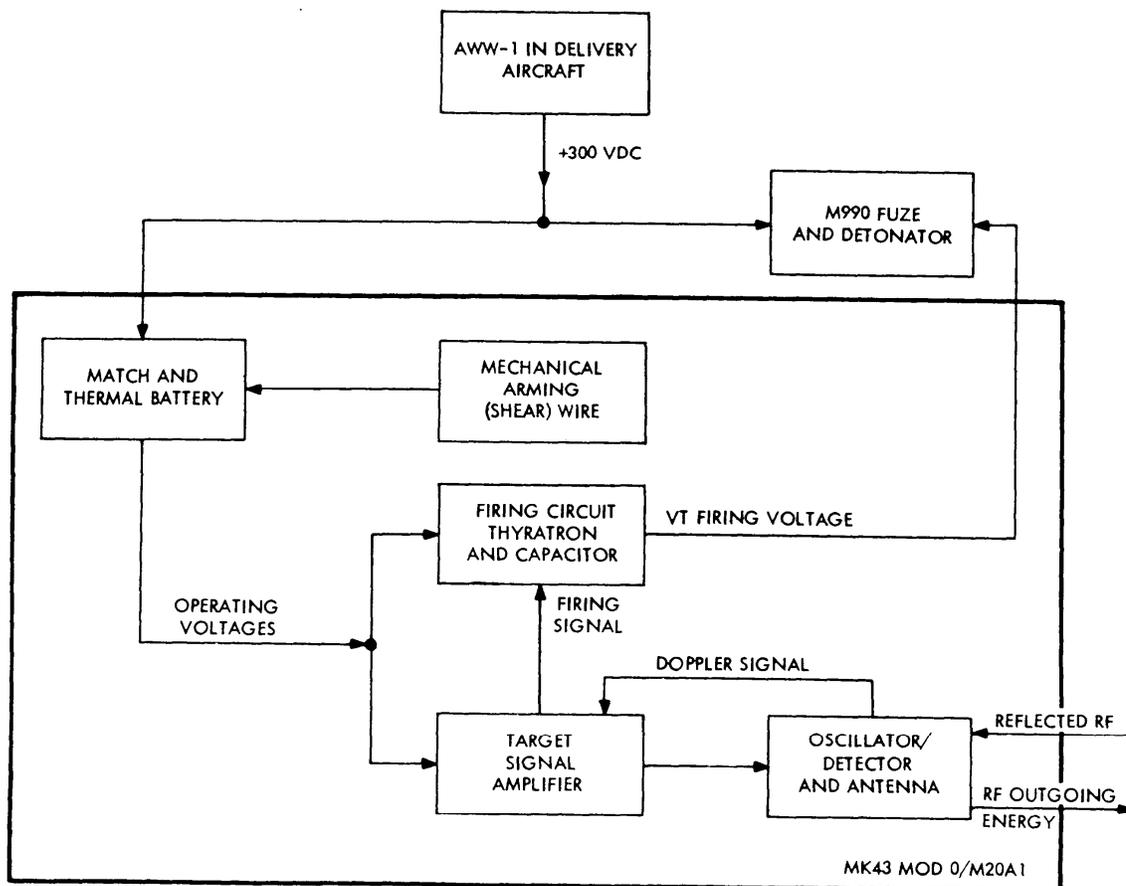


Figure 3-3 Example of a Block Diagram (Leroy)

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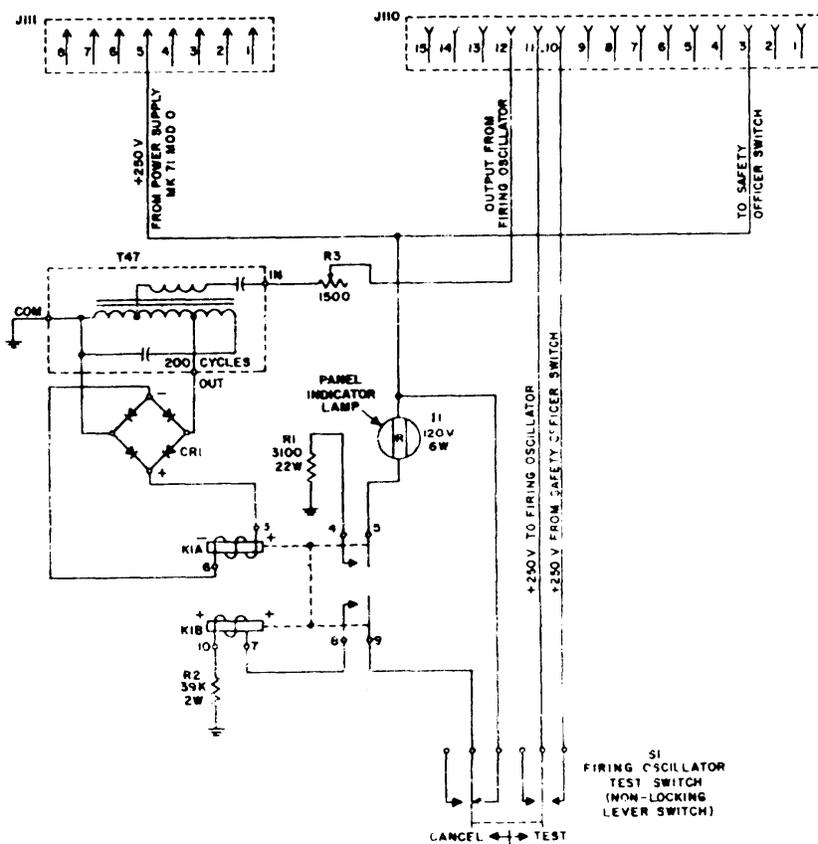


Figure 3-4 Example of a Schematic Diagram (Leroy)

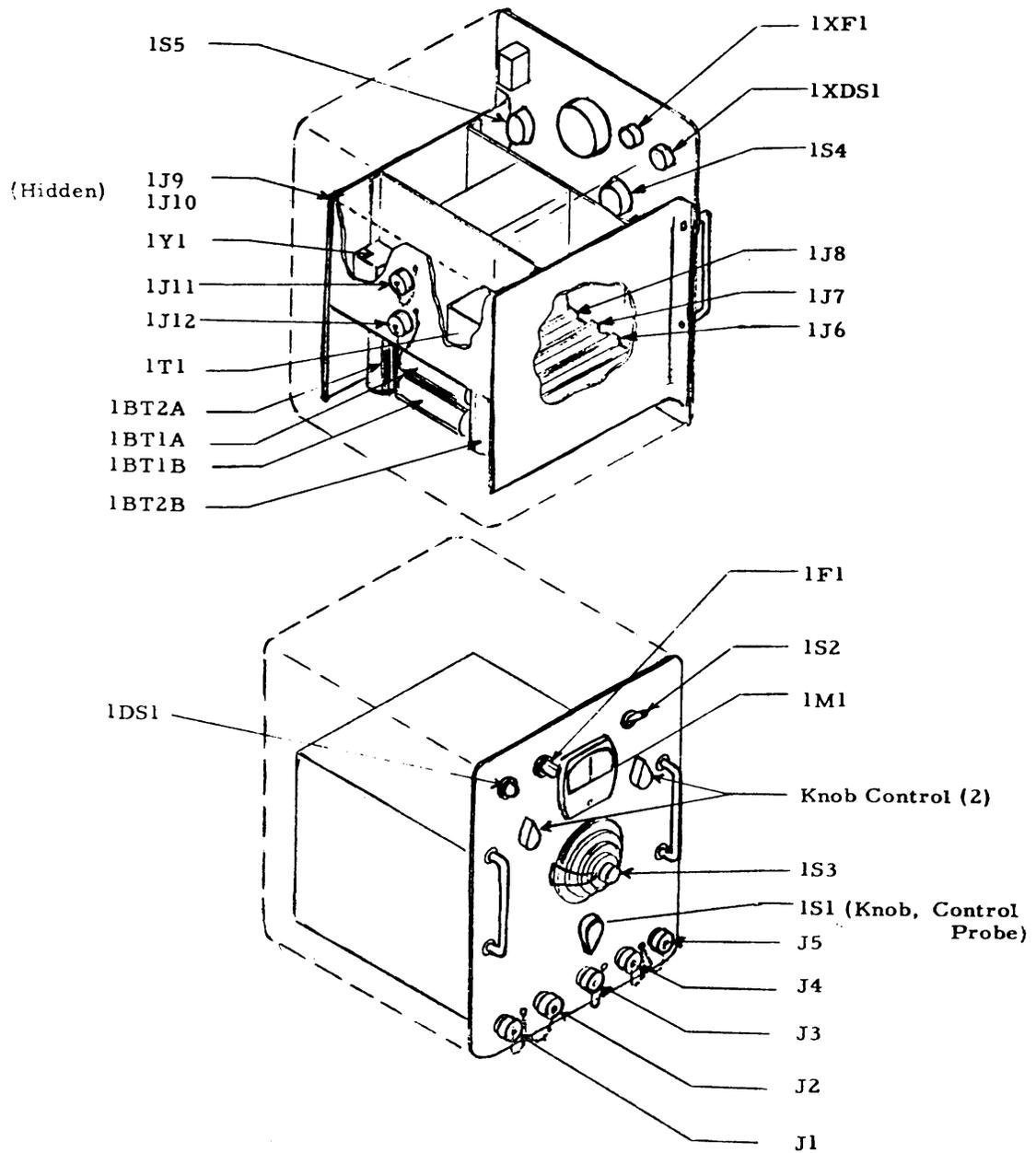


Figure 3-5 Example of Line Artwork (Pencil Sketch)

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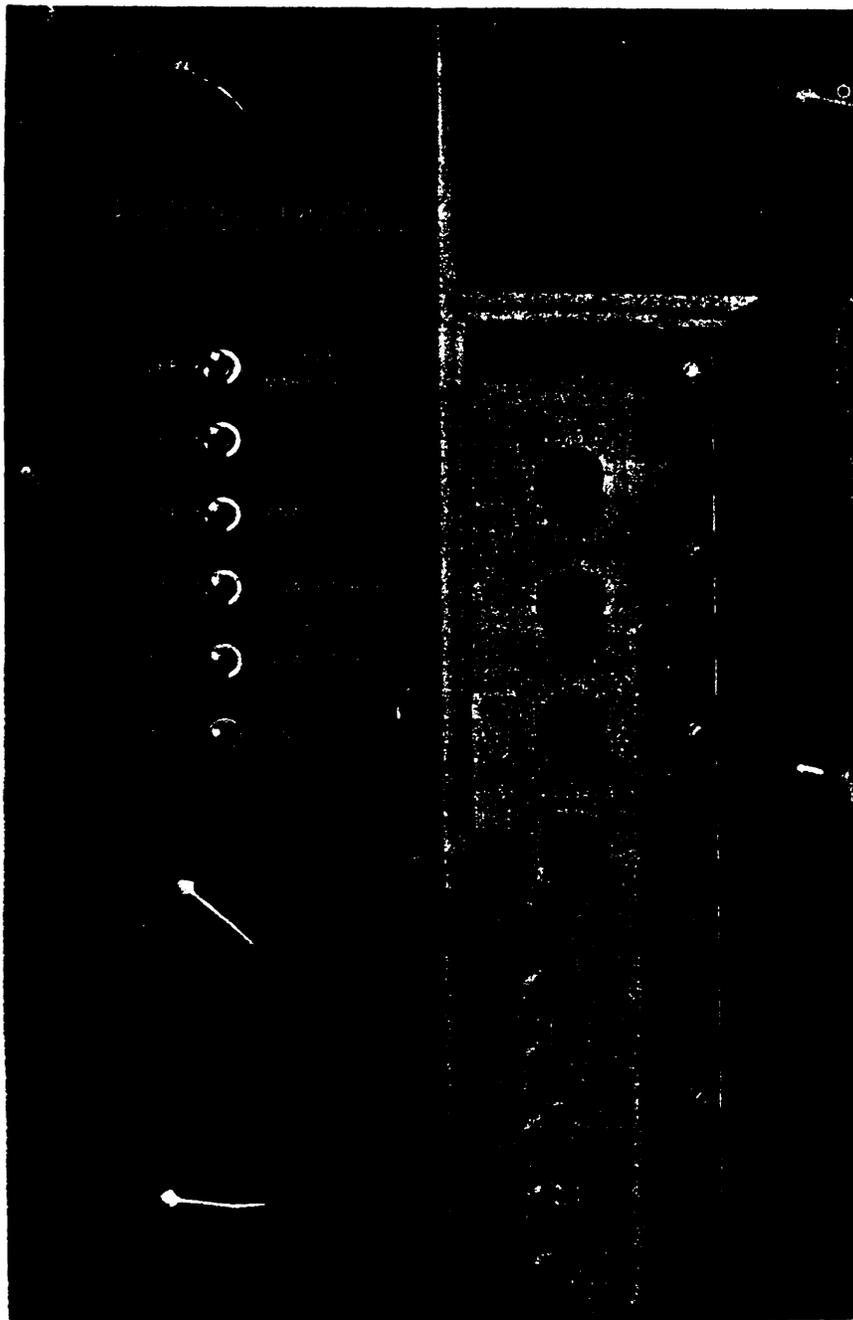


Figure 3-6 Example of Halftone Artwork (Not Retouched)

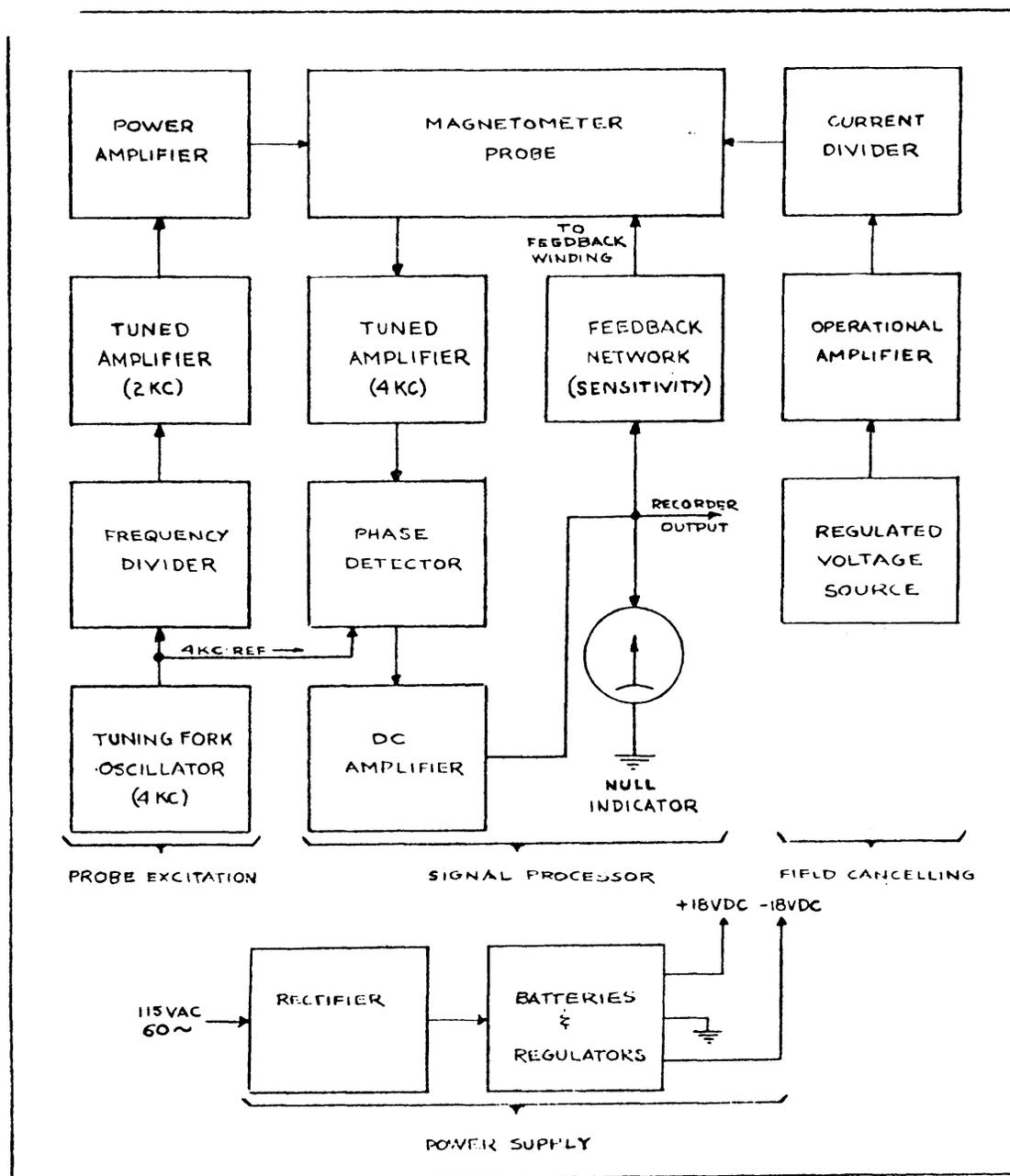


Figure 3-7 Example of Block Diagram (Pencil Sketch)

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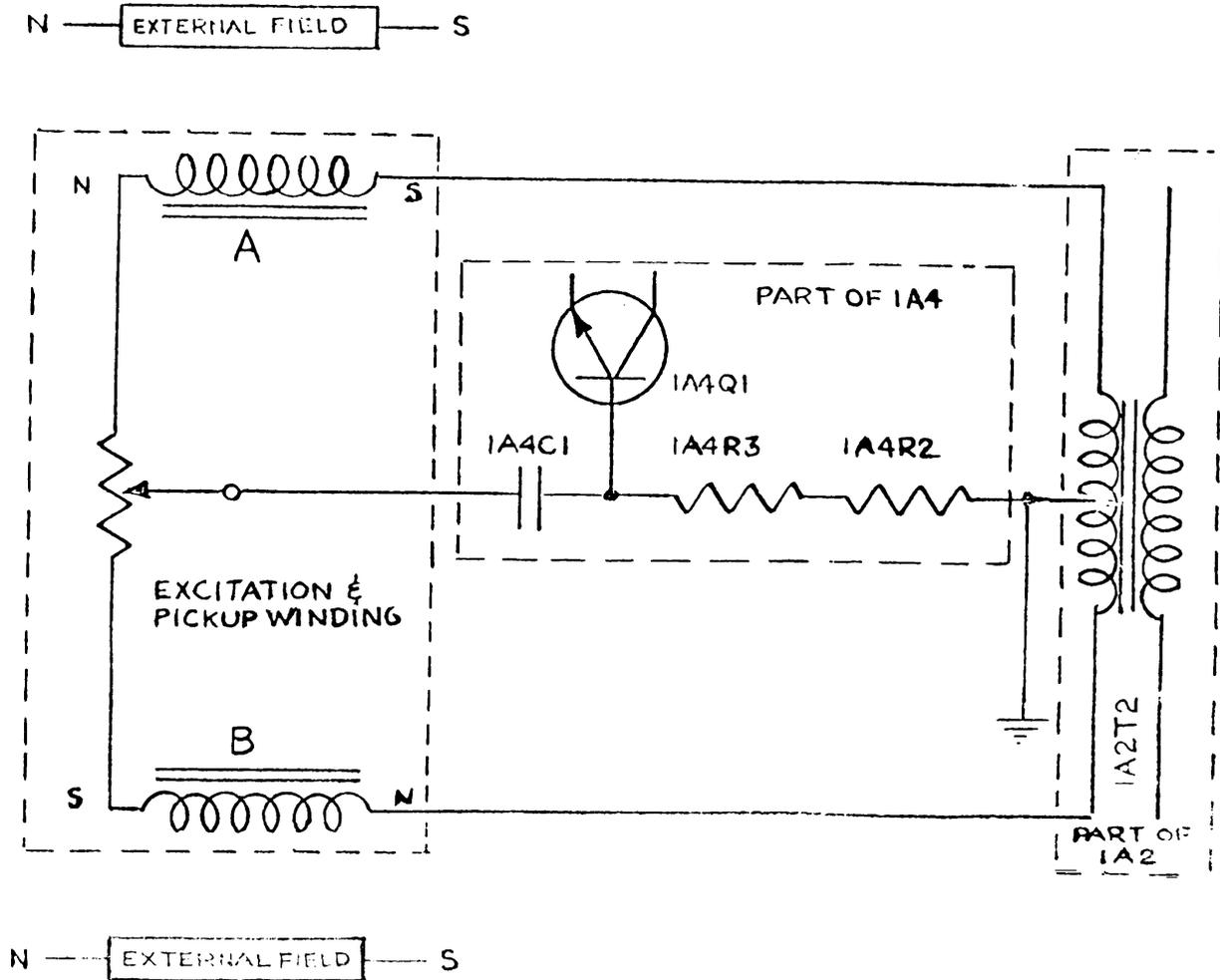


Figure 3-8 Example of a Schematic Diagram (Pencil Sketch)

Table 3-2

TYPE FACES AND SIZES

Copy	Typeset ¹	DS Varsityper	IBM Typewriter ²
Title page			
List of Effective Pages			
Forward			
Center head	14-pt Vogue Bold caps	670-12 caps	Text type caps
Body	Text type	Text type	Text type U & lc
Change Record			
Center head	14-pt Vogue Bold caps	670-12 caps	Text type caps
Body	Text type	Text type	Text type U & lc
Contents, illustrations, tables, safety summary			
Center head	14-pt Vogue Bold caps	670-12 caps	Text type caps
Body	Text type	Text type	Text type U & lc
Text, body	10-pt on 12 Modern flush left, except for steps of procedure which indent 1-em	600-10 flush left, except for steps of procedure which indent 1-em	Flush left, 2 except for steps of procedure which indent 1-em
Text, emphatic	10-pt bold of text type	780-10	Text type underscored
First order head	12-pt Vogue Bold caps, on a line alone	670-10 caps, on a line alone	Text type, caps, on a line alone, underscored
Second order head	10-pt Bold Face of text type U & lc, run-in with text, followed by a period	780-10 caps, run-in with text, followed by a period, underscored	Text type, caps, run-in with text, followed by a period, underscored

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Table 3-2 (Cont.)

Copy	Typeset ¹	DS Varsityper	IBM Typewriter
Caution Center head	10-pt Bold Face of text type caps	780-10 caps	Text type caps
Body	Text type indented 2ms on each side	Text type U & lc indented 2-ems on each side	Text type U & lc indented 2-ems on each side
Note Head	10-pt text type caps, run-in with text, followed by colon	10-pt text type caps, run-in with text, followed by colon	Text type caps, run-in with text followed by colon
Body	10-pt text type U & lc indented 2-ems on each side	10-pt text type U & lc indented 2-ems on each side	Text type U & lc indented 2-ems on each side
Chapter or sec- tion numbers and titles, appendix num - bers and titles	14-pt Vogue Bold caps, centered	670-12 caps, centered	Text type caps, centered
Section number and title within a chapter	12-pt Vogue Bold U & lc centered	670-12 U & lc, centered	Text type U & lc centered
Index Center head	14-pt Vogue Bold caps	670-12 caps	Text type caps
Body	8-pt text type U & lc	10-pt text type U & lc	Text type U & lc
Figure captions	10-pt Vogue Bold Italics U & lc, centered pyramid style	605-10 U & lc centered pyramid style	Text type U & lc centered pyramid style
Classification	12-pt Vogue Bold caps, centered at top and bottom of page	670-12 capa, centered at top and bottom of page	Text type caps, centered at top and bottom of page

Table 3-2 (Cont.)

Copy	Typeset ¹	DS Varityper	IBM Typewriter ²
Third order head	10-pt of text type caps and sm. caps U & lc, run-in with text, followed by a period	600-10 caps, run-in with text, followed by a period	Text type U & lc, underscored, run-in with text, followed by a period
Fourth order head	10-pt italic or text type U & lc run-in with text, followed by a period	605-10 U & lc run-in with text, followed by a period	Text type, caps, run-in with text, followed by a period, not underscored
Equations and fire control symbols	10-pt italic of text type U & lc	605-10 U & lc or 710-10	Text type U & lc
Text Footnotes	6-pt text type U & lc	600-7 U & lc	Text type U & lc at bottom of the page, separated from text by a hyphenated line
Table title	10-pt Bold of text type caps, centered pyramid style	780-10 caps, centered pyramid style	Text type caps, centered pyramid style
Number	Text type, U & lc	780-10 U & lc	Text type U & lc
Table column heads and body text	8-pt text type U & lc. To conserve space, subheads may be set in smaller size, but no smaller than 6+	600-8 U & lc. To conserve space, subheads may be set in smaller size, but no smaller than 6-pt	Text type U & lc
Footnotes	6-pt text type U & lc	600-7 U & lc	Text type U & lc at bottom of table enclosed by a line at end of table
Warning Center head	12-pt Vogue Bold caps	670-12 caps	Text type caps underlined

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Table 3-2 (Cont.)

Copy	Typeset ¹	DS Varsityper	IBM Typewriter ²
Body	Text type, indented 2-ems on each side	Text type U & lc, indented 2-ems on each side	Text type U & lc indented 2-ems on each side
Fixed heads	12-pt Vogue Bold caps, centered at top of page	670-12 caps, centered at top of page	Text type caps, centered at top of page
Page numbers	12-pt Vogue Bold, centered at bottom of page	670-12 caps, centered at bottom of page	Text type caps, centered at bottom of page
Change number	12-pt Vogue Bold caps, flush right on odd pages, flush left on even pages	670-12 caps, flush right on odd pages, flush left on even pages	Text type caps, flush right on odd pages, flush left on even page 8

¹ Acceptable substitute type faces are:
 Vogue Bold - Futura, Spartan, Twentieth Century, Sans Serif, or similar
 Modern - Garamond, Bodoni, Bookman, or similar

² Type face shall be IBM 10-pt. Modern.

usability or clarity of material. The following guideline for acceptable page layout shall apply:

a. Text shall be single spaced within paragraphs.

b. Paragraphs shall be laid out so that the last line of a paragraph does not fall on a new page or in another column.

c. Subheads shall be placed so that the associated text does not fall in an adjacent column or page.

d. Sufficient space shall be left between mathematical expressions (equations, formulas, etc.) and the

body of the adjacent text to provide for ease of reading and understanding.

e. Notes, cautions and warnings shall be divided so that their headings and their first lines are not separated from the remaining lines.

f. A page shall never begin with a widow.

g. A page shall never end with a hyphen.

h. No more than two consecutive lines of type ending in hyphenations shall be permitted.

i. A right hand page shall never be

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blank. Blank pages (except in manuals to which changes have been issued) shall be avoided.

3.5.2.7 All initial lines of paragraphs shall be indented eight units. Itemized listings within paragraphs shall be in columnar form with the initial lines of an item indented eight unit and second line runovers indented four units.

3.5.2.8 Foldout pages shall be as shown in Figure 3-10. Foldout pages should be held to two-page fold if possible. When an illustration is of a size which exceeds the limits set in 3.4.2.4, it should be broken into two or more foldouts, and be designated as sheet 1, sheet 2, and so on. Sufficient overlap of content shall be included so as to ensure continuity and ease of reference. The figure number and title shall appear on each sheet.

3.5.2.9 Foldout pages may be backed up by a diagram or chart when authorized by the Procuring Activity.

3.5.2.10 Foldout/foldup pages shall be as shown in Figure 3-11.

3.5.2.11 Blank aprons on the binding side shall be utilized for legends, explanatory notes, voltage and resistance data, etc. which pertain to the illustration on the foldout except when foldouts or foldout/foldups are bound in a separate volume.

3.5.2.12 Foldout illustration captions shall be placed at the bottom of the illustration, centered in the exposed portion of the top fold. The classification and manual number shall be centered at the top and bottom of the exposed portion of the top fold. The page number shall be centered at the bottom of the fold

above the classification. Details of format with respect to typed captions are given in 3.5.4.3.

3.5.2.13 If the foldout has no apron, the right and left margin shall be the same as that for a single page.

3.5.2.14 Vertical space terms are as follows:

1-1/2 Spaces = plus 1/2 blank space between lines

Double Space = 1 full blank space between lines

Triple Space = 2 full blank spaces between lines

Quadruple Space = 3 full blank spaces between lines

3.5.3 Pagination. The following rules shall apply to pagination:

3.5.3.1 All chapters shall start on a right-hand page.

3.5.3.2 All right-hand pages shall be paginated with odd numbers.

3.5.3.3 Foldout pages shall always be right-hand pages and carry one page number; where several foldouts appear sequentially, they shall receive odd-numbered page numbers, (e.g., 3-153, 3-155, 3-157, etc.).

3.5.3.4 Arabic numerals shall be used for pagination throughout the text and back matter. Page numbers preceding the first section shall be sequentially arranged (except as in 3.5.5) in lower case Roman numerals. If a frontispiece is required, it shall be the last even-numbered Roman numeral page.

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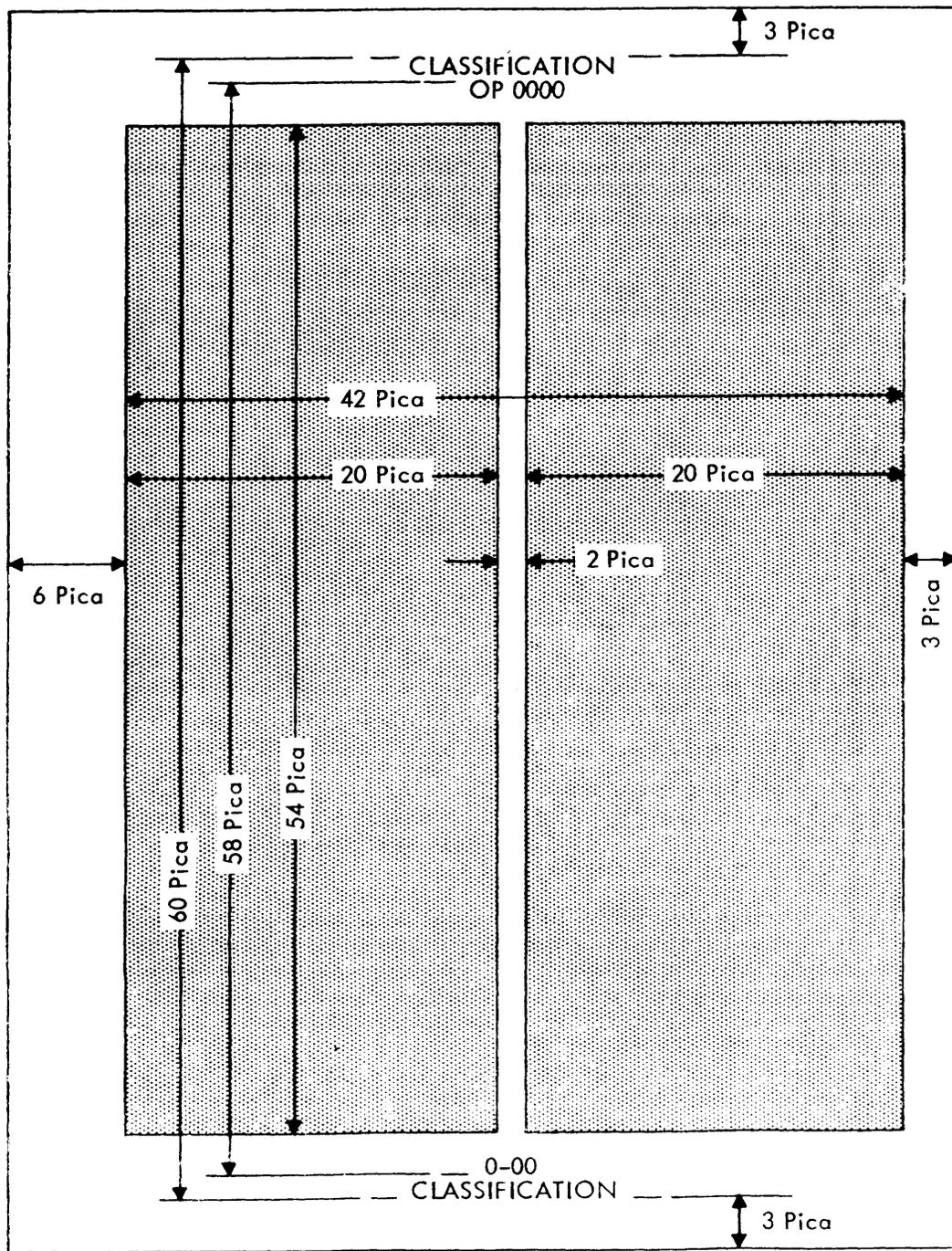


Figure 3-9 Page Size and Trim Size (Single Page)

Table 3-3

c a

T BASIC PAGE AND TRIM SIZES

Page Size (Inches) (Trim Size)	Type ¹ Page Size (Picas)	No. of Columns	Column Measure (Picas)	Gutter (Picas)
4-1/2 x 7 (4-3/8 x 6-3/4)	21 x 37	1	21	
6 x 9-3/8 (5-7/8 x 9-1/8)	26-1/2 x 49	1	26-1/2	
8-1/2 x 11 (8-3/8 x 10-3/4)	42 x 60	2	20	2
8-1/2 x 11 (8-3/8 x 10-3/4)	42 x 60	1	42	

¹Includes running heads, folio (page numbers), and classification at top and bottom of page.

3.5.3.5 Each chapter shall be paginated sequentially from the beginning of the chapter, except as in 3.5.3.3.

3.5.3.6 In all but Secret publications, no page number is required on a blank page. In secret publications, blank single and foldout pages shall be assigned numbers in sequence. For example, if page 2-12 of a publication is blank, page 2-11 shall bear both numbers, 2-11 and 2-12. Page 2-13 will then fall as a right-hand page.

3.5.4 Format. This section provides details of the format to be used throughout the text of the manual. Information on required format for front and back matter is detailed in 3.5.5.

3.5.4.1 Headings. Textual heads used in the text of a manual are normally those for part, chapter, section, and primary,

secondary and third order, fourth order, and supplemental heads.

a. Part. When the organization of the manual requires it, the text may be divided into two or more parts. These are usually independent portions, capable of standing alone. An index weight tab sheet, with the appropriate identification on the tab, may be used to separate the parts of the manual.

b. Chapter Headings. Chapter headings shall be placed at the top of the page as shown in Figure 3-12. The chapter number shall be in initial caps, and placed one inch below the top margin of the page area. The chapter title shall be in full caps and centered beneath the chapter number.

c. Section Heads. Section heads shall be in initial caps, not underscored and

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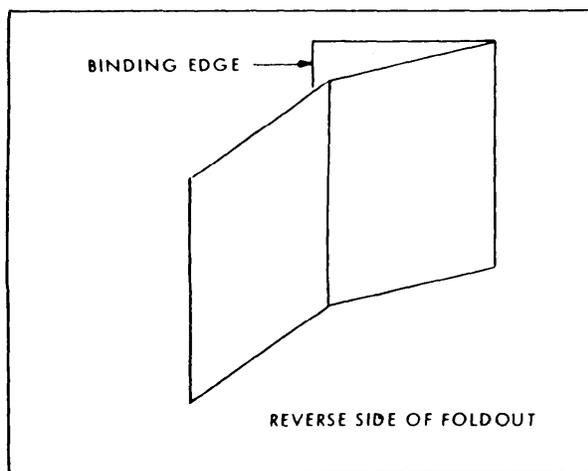
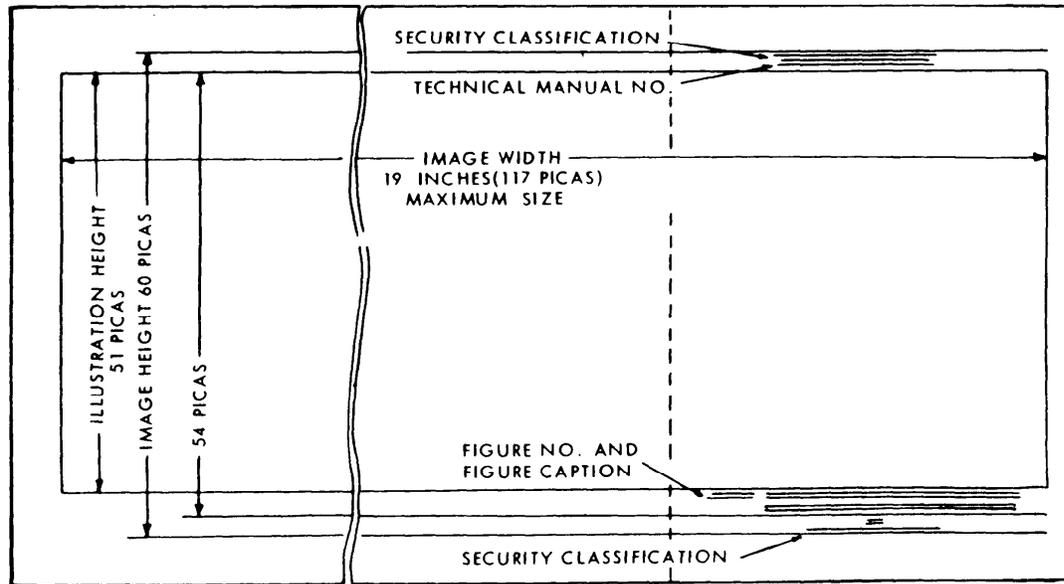


Figure 3-10 Foldout Page Format

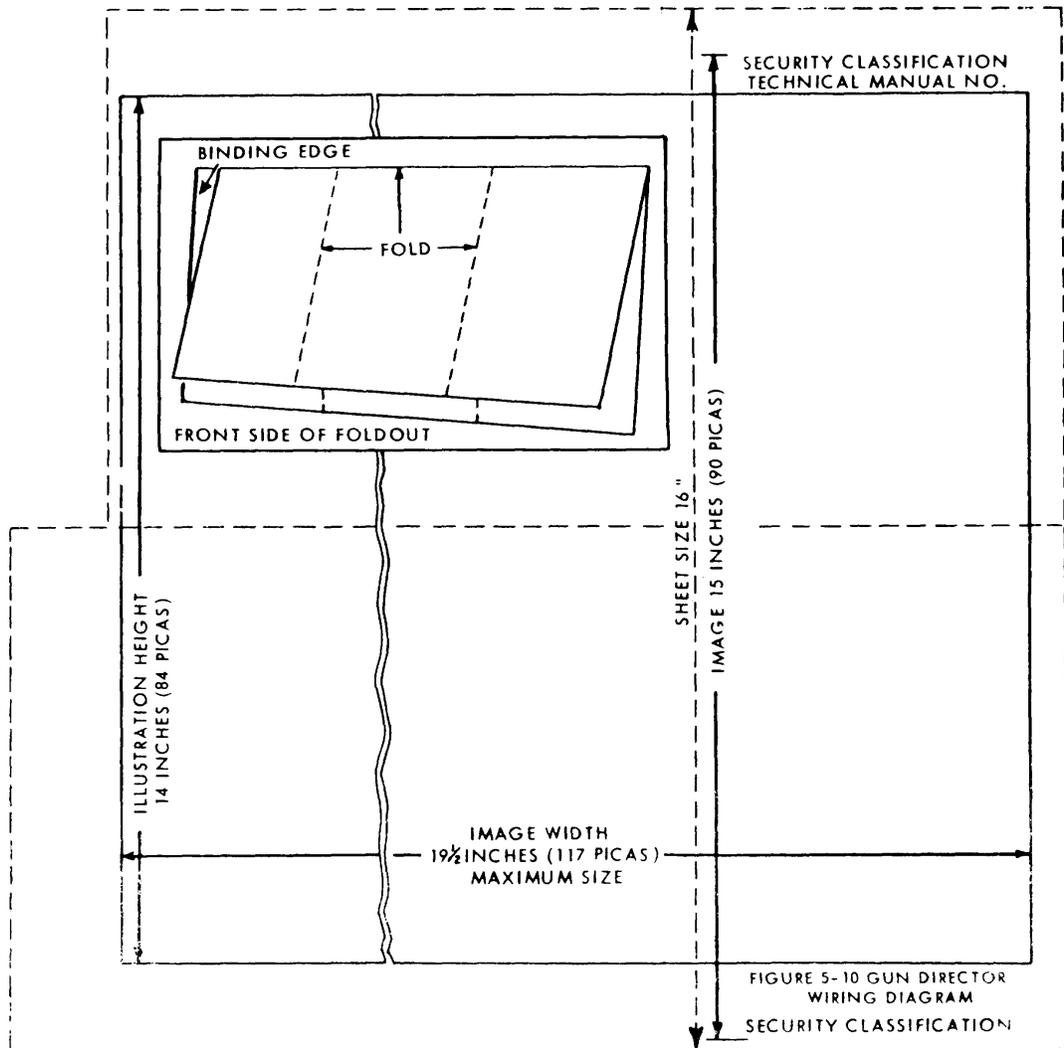


Figure 3-11 Fold-out/Foldup Page Format

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OP 0000

Minor solenoid: The solenoid associated with each magnetometer. Its function is to produce a field whose polarity and strength balance the external magnetic field as seen at the magnetometer. Magnetometer coils 1 and 2 normally connect to the minor solenoid.

Gradient control circuit: A circuit which compensates, by means of a variable current fed to the minor solenoid, for the effects of localized magnetic gradients present at each magnetometer coil.

For purposes of analysis, the magnetometer control system may be divided into five basic sections: the ambient field compensating circuit (the major solenoid); the excitation circuits; the measuring circuit; the gradient compensation circuit; and the deperm process monitoring circuits. Of these, the measuring circuit, the major solenoid, and the deperm process monitoring circuits are common to all magnetometers. The excitation circuits and the gradient compensation circuit are physically and functionally associated with individual magnetometer coils. These basic circuit areas delineated in the simplified schematic, Figure 3-4.

AMBIENT FIELD COMPENSATING CIRCUIT. The ambient field compensating circuit consists of ALL (normally 96) major solenoid coils connected in series and powered by the two regulated power supplies shown in Figure 3-4. The output current from the power supply is adjusted by means of the coarse and fine variable resistors for all major solenoid coils. Gradient in the ambient field as seen at individual magnetometer are compensated by means of the gradient compensation circuit described later.

Excitation CIRCUIT. In Magnetometer Mk 6, the excitation circuit consists of six coils and two non-linear thyrite resistive elements forming the basic magnetometer circuit discussed in the previous sub-section. A total of six excitation coils are used in each magnetometer; these coils shown in Figure 3-4 as L1A, B, and C, and L2A, B, and C, correspond functionally with the two coils L1 and L2 of Figure 3-1. The coils designated B and C (Fig. 3-4) serve to saturate their respective cores on each half-cycle. The coils designated "A" provide the differential which drives one half of the circuit further into saturation than the other.

To further this effect, the two non-linear thyrite elements, resistors whose value varies inversely with the current through them, are placed in series with L1A and L2A. These two elements, TH-1 and TH-2, increase the disparity of current flow through the two halves of the circuit by presenting a decreasing resistance to the coil, whose impedance is already decreased due to saturation. The opposite effect takes place in the other half of the circuit; the thyrite element in this case presents increased resistance to the coil through which the lesser current flows. The two thyrite elements thus serve to "amplify" the current disparity by introducing an additional non-linear function in the circuit. The current flow over one complete cycle through one excitation coil will, therefore, resemble that shown in Figure 3-5. As noted in the theoretical discussion in the previous sub-section, a high degree of

3-8

Figure 3-12 Single Page Single Column Format

OP 0000

THEORY OF OPERATION. Fuzes in the M900 series are initiated electrically from either DC or DC/RF from the delivery aircraft. Additional mechanical safety is provided in flight by an arming wire which is secured to the sleeve of the Mk 26 Safety Device.

Figures 2-3 and 2-4 are schematic of fuze M990C and D, and Fuse M990E, respectively. Circuit differences in the C and D are indicated by the shaded areas on figure 2-3.

As noted above, -C, -D, and -E fuses are RF-initiated while the numbered mods (-D1, -D2, -E1, and -E2) are DC-only initiated. (RF operation does require a DC component however.) RF operation allows pilot selection of arming and functioning delay times as a function of the RF frequencies fed to the fuze from the oscillators of the AWW-1 Fuze Function Control Set.

RF OPERATION. Operation with RF is as follows:

1. DC and RF voltages are applied simultaneously at the input of the fuze (figure 2-3). The DC component immediately charges the capacitor associated with squib S8. When charged, the capacitor actuates squib S8, thus isolating the fuze from further input. Capacitors C1 and C3 are also charged.
2. One or more RF components are coupled to the tuned LC circuits across the input transformer; the specific tuned circuit which is activated is, a function of the frequency of the RF component.
3. As shown in figure 2-3, each tuned circuit is associated with one of the squibs S1 through S6. When the circuit is actuated, the associated squib is blown and its switch (shown by means of the broken lines) is thereby operated.

4. Resistors R1, 2, 3, and 4 control the time constant discharge rate of C1 and the associated charging rate of C2. When C2 is charged to the operating level of Thyatron

V1, the tube fires, causing the arming bellows to operate (figure 2-5) (various combinations of R1, 2, 3, and 4 will provide the appropriate arming delay time as indicated in table 2-3).

5. After the arming bellows have operated the rotor, the fuze is fully armed and all switches are in position for detonation.
6. Upon impact, the trembler switches are subjected to the required G forces and close, thus completing the firing circuit to the detonator. Depending on the functioning delay set into the fuze, the discharge time of C3 is determined by resistors R5, 6, 7, 8, 9, and 10 as indicated in table 2-3. When C4 has charged sufficiently, Thyatron V2 fires. With the firing of V2, a live circuit to the detonator is completed and the firing function is initiated.

DC PRESELECTION. With DC-only operation, the function of the fuze is slightly less complex. As noted previously, Fuzes D1, D2, E1, and E2 are "preselected." That is, the various squibs required to produce a succinct arming and functioning delay time are fired at the depot prior to issue. Thus, only the DC component is required to initiate the fuze. Other than this pre-firing of squibs, operation is identical to that described above.

Preselection of any fuze is accomplished by pre-firing those squibs which will provide the arming times shown in table 2-3. This is performed only at the depot level and is not an authorized field modification.

Figure 3-13 Single Page Two Column Format

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centered. The section number and title should be on a single line.

d. Primary Heads. Primary heads shall be in full caps, underscored, standing alone, flush left at margin with one line of space preceding the heading shown in the following example:

WEAPON DELIVERY SEQUENCE

When prelaunch procedures listed in Chapter 4 have been completed,

e. Secondary Head. Secondary heads shall be in full caps, underscored, run into the paragraph, and followed by periods. Secondary heads shall never stand alone; text should be arranged so an introductory statement follows the heading if the only material to be presented is a listing or itemization. An example of a secondary head is as follows:

ADJUSTMENT OF TRANSFORMER T2. Proper alinement of Transformer

f. Third-Order Heads. Third-order heads shall be in initial caps underscored, and run into the paragraph, followed by a period, and indented 8 units for the first line. Third-order heads shall never stand alone except when followed by a listing of items. An example of a third-order head is as follows:

Feedback Loop. Sufficient negative feedback is provided to the. . .

g. Fourth-Order Heads. Fourth and Lower order heads (when authorized by the Procuring Activity) are set in full caps, run into the paragraphs, not underscored and followed by a period and indented 12 units. Fourth order heads shall never stand alone except when followed by a listing of items. An example of a fourth order head is as follows:

GAIN ADJUST CONTROL. The GAIN ADJUST control, located on. . .

h. Supplemental Heads. If additional heads are required below the level of the fourth-order head, or if noncaptioned sequential steps are enumerated at any level, they shall be in the order as follows: Arabic numeral; lower case letter; Arabic numeral in parentheses; lower case letter in parentheses; Arabic numeral under - scored; lower case letter underscored. If a paragraph caption is required, it shall be in initial caps, run-in, not underscored and followed by a period.

i. Numbered Headings. In complex manuals, where cross references are required, paragraphs maybe numbered if authorized by the Procuring Activity.

3.5.4.2 Tabular Presentation. Tables shall be arranged as shown in Figure 3-14. Tabular format shall be as follows:

a. The number of the table, i.e., Table 2-4, etc., shall be in initial cap. and centered over the title.

b. The title of the table shall be in full caps and inverted pyramid style if it exceeds one line.

c. There shall be a double space between the table number and table title.

d. Column heads shall be in initial caps and centered above the column.

e. If more than one page is required, only the table number and column heads shall be carried to the next page. The table number shall be followed by the parenthetical expression (Cont).

f. Footnotes shall be designated by superior Arabic numerals and numbered consecutively, beginning with 1

HASP III PAYLOAD EJECTION POINTS

LAUNCH ELEVATION ANGLE: 75°				
Fuze Delay Period (seconds)	Altitude (feet)	Horizontal Range (feet)	Slant Range (yards)	Radar Acquisition Angle (degrees)
12	39,000	11,900	13,600	73
20	60,800	20,200	21,400	72
30	84,500	28,000	29,700	72
40	103,300	36,500	39,600	71
50	119,500	45,100	42,600	69
60	132,500	53,500	47,600	68
70	142,300	62,000	51,800	67
80	148,900	70,500	54,600	65
90	152,300	79,000	57,100	63
97(Apogee)	153,000	84,300	58,300	61
110	149,600	95,900	59,100	57
120	143,500	104,400	59,100	54
LAUNCH ELEVATION ANGLE: 80°				
Fuze Delay Period (seconds)	Altitude (feet)	Horizontal Range (feet)	Slant Range (yards)	Radar Acquisition Angle (degrees)
12	40,100	8,000	13,500	79
20	62,600	13,000	21,600	78
30	86,600	18,900	29,500	78
40	107,100	24,700	36,600	77
50	124,300	30,500	42,300	76
60	138,300	36,300	47,600	75
70	149,000	42,100	51,500	74
80	156,800	47,900	54,600	73
90	161,200	53,700	56,700	72
98(Apogee)	162,800	58,400	57,600	70
110	160,700	65,200	57,700	68
120	155,600	71,000	57,000	65

Figure 3-14 Tabular Format

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on each succeeding page. In multipage tables, the text of each footnote shall appear at the bottom of the page where it applies.

g. No separation between the body and footnotes of a table shall be required, except at the end of the table. At the end of the table, footnotes shall be preceded and followed by a solid line.

h. Tabular material shall be placed with vertical and horizontal lines. Side rules should be avoided when not required for clarity.

i. Horizontal rulings shall be placed at the discretion of the writer for maximum clarity.

j. When a table is continued on two or more pages, a full-width horizontal line shall be used at the bottom of the table on the last page; other pages are left open at the bottom.

k. Incidental tabular material, usually small listings of two or three items which can be presented in a single column and which does not bear a title number, shall be ruled in the same manner as a formal table.

l. Graphs and charts are not considered to be tables but figures.

3.5.4.3 Format of Illustration Pages. The following rules govern use of typed captions on illustrations. Additional information on page composition of illustration pages is given in 3.5.2.

a. Figure numbers and titles shall be separated by four units of space between the figure number and title centered on the page.

b. The word Figure and the figure title shall be in initial caps. Figure shall not be abbreviated.

c. A blank space shall be left above and below the figure title.

d. If the title exceeds one line of type, it shall appear in inverted pyramid style and single spaced.

e. The caption shall be centered at the bottom of the top sheet of a foldout illustration.

f. A frontispiece shall have its title centered, but shall bear no figure number. (A frontispiece is an illustration on having a general application to the entire manual.)

3.5.4.4 Format of Warnings, Cautions and Notes. Format of warnings, cautions, and notes shall be as follows:

a. Warning. The word WARNING shall be set in full caps and centered over the body of the text separated by a blank space before and after the word WARNING. The body of the text shall be indented eight units from the left- and right-hand margins.

b. Caution. The word CAUTION shall be set in full caps and centered over the body of the text separated by a blank space before and after the word CAUTION. The body of the text shall be indented eight units from the left- and right-hand margins.

c. Note. The word NOTE shall be set in all caps and run into the first line of text. The body of the text shall be indented eight units from the left- and right-hand margins.

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3.5.4.5 Technical Manual Identification Number. The identification number, as assigned by the Procuring Activity, shall appear at the top center of every page as shown in Figure 3-9.

3.5.4.6 Classification. Classification of the manual shall appear as shown in Figures 3-9 and 3-10.

3.5.5 Arrangement and Organization of Content. This section provides details of the organization of the various parts of the manual. The following rules shall apply, with the exceptions noted, to manuals complete under a single cover, separate volumes making up a manual, and parts of a volume when the volume is divided for convenience into two or more parts. When authorized, separate volumes or parts can vary in organization within a single binder; as an example, the index and appendix of a multi-volume manual may be bound separately.

3.5.5.1 The manual shall be divided into the following subordinate parts:

- a. Title Page
- b. List of Effective Pages
- c. Foreword
- d. Change Record
- e. Table of Contents
- f. List of Illustrations*
- g. List of Tables*
- h. Safety Summary*
- i. Body or text of manual
- j. Appendix*
- k. Index
- l. Distribution List

3.5.5.2 Items marked with an asterisk in 3.5.5.1 may be omitted if not required by the content of the manual.

3.5.5.3 Items a through h in 3.5.5.1 are frequently referred to as front matter; items j, k and l are referred to as back matter.

3.5.5.4 Details of each item listed in 3.5.5.1, with the exception of i, are given as follows.

a. The title page shall be a right-hand page prepared as shown in Figure 3-15. The date shown shall be either the first or fifteenth day of the month in which the publication is submitted for printing. (Volumes or parts of a publication may carry separate dates as required.) The title page shall be assigned a lower case Roman numeral (i) as its page number but it shall not be imprinted.

b. The list of effective pages shall be prepared as shown in Figure 3-16. Unclassified distribution lists are not shown in the page count. The list of effective pages shall be assigned a lower case Roman (ii) with additional sheets assigned the designation iiA, iiB, etc., as required. It shall be a left-hand page, backing up the title page.

c. A foreword page shall be prepared according to Figure 3-17. The word FOREWORD shall be dropped six picas, set in full caps and centered. Text shall be typed page width with paragraph indentation. A foreword shall state the purpose of the manual, its usage, peculiarities, mission, etc., in highly synopaized form. A lower case Roman (iii) shall be assigned as a page number. The foreword shall be a right-hand page.

d. A change record shall be prepared as shown in Figure 3-18. It

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shall be a left-hand page and bear a lower case Roman (iv).

e. The table of contents shall be a right-hand page prepared according to Figure 3-19. The table of contents page shall list chapters, sections and primary heads. Secondary heads may be listed only if necessary for usability and approved by the Procuring Activity. A lower case Roman numeral (v) is assigned. Additional pages shall carry progressively higher numbers. All first lines are indented eight units with second line run-overs indented four units. Additional pages shall carry over the heading CONTENTS (Cont.) and the word Page over the page column number only. Chapter references shall not be carried over.

f. The list of illustrations page (Fig. 3-20) may be either a right or left -hand page or, if the table of contents page has additional unused space, both pages may be combined. Format shall be the same as that for table of contents pages. Additional page sheets shall carry over the heading ILLUSTRATIONS (Cont.) and the word Page over the page number column only.

g. A list of tables page is prepared according to Figure 3-21. It may be either a right or left-hand page, or be placed below the list of illustrations if there is sufficient space. Format shall be the same as that for contents and list of illustrations pages. Additional pages shall carry over the heading TABLES (Cont.) and the word Page over the page number column only.

h. The safety summary page, Figure 3-22, (when required by the content of the manual), shall end as a

right-hand page if a frontispiece is used in the publication and shall be prepared as shown in Figure 3-22. Otherwise, it shall be a left-hand page. This may be accomplished by readjusting the 10C ation of the ILLUSTRATIONS and TABLES pages. If no frontispiece is used, the safety summary page shall & a left-hand page. The safety summary shall list all warnings as they appear in the text of the publication and may also summarize-general safety precautions if required. Introductory paragraphs are typed 42 picas wide. The caption WARNING shall be typed only once, set in full caps and centered above the text containing the warnings; text of each warnings shall be indented eight units from both margins and set off from subsequent warnings by a double space. The applicable page reference (s) shall follow the closing period of the warning and shall be separated by four units. Additional pages of the safety summary shall carry the caption SAFETY SUMMARY (Cont.)

i. The body of the text is divided into chapters and sections. Chapters are designated by single Arabic numerals in sequence. Sections are designated by single Arabic numerals sequentially from the beginning of each chapter.

j. Appendices shall be designated by upper case letters, alphabetically from A as required. Format requirements are identical to that required for the main body of the text. Illustrations and tables in an appendix shall bear the applicable appendix letter designation (e.g. Figure A-1, Table C-14, etc.).

k. The index, as shown in Figure 3-23, shall be prepared in two 20-pica

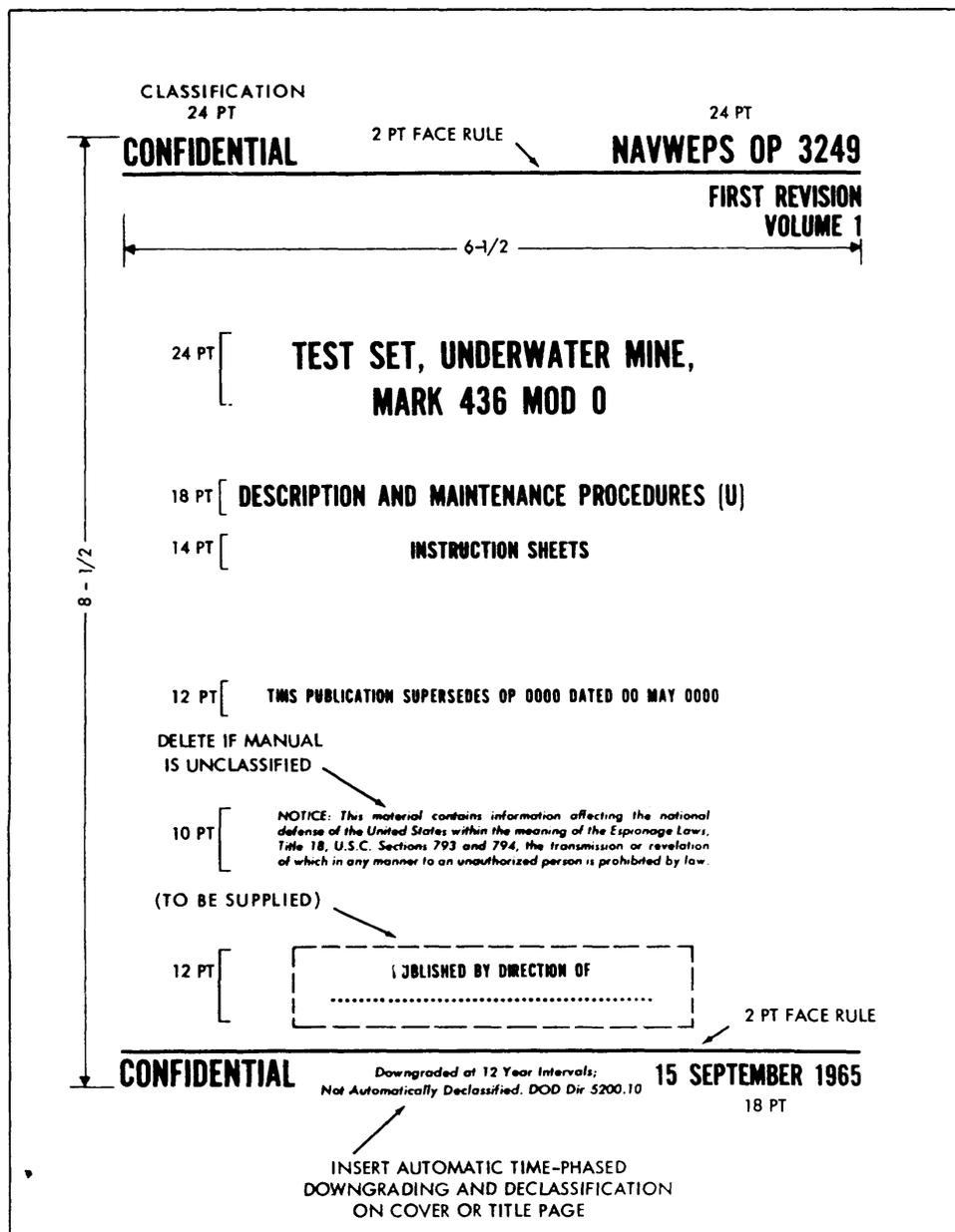


Figure 3-15 Title Page Format

MIL-M-81273A(WP)

CLASSIFICATION OP 0000			
LIST OF EFFECTIVE PAGES			
Page	Change No.	Page	Change No.
Title	Change 1	4-1	Original
ii thru iii	Change 1	5-1	Change 1
iv	Original	5-2 thru 5-5	Original
v thru ix	Change 1	5-6 thru 5-7	Change 1
1-1 thru 1-8	Change 1	5-8	Original
2- 1	Change 1	5-8A thru 5-8B	Change 1
2-2 thru 2-3	Original	5-9	Original
2-4 thru 2-5	Change 1	5-10	Change 1
2-6 thru 2-7	Original	5-11 thru 5-13	Original
2-8	Change 1	5-14	Change 1
2-9	Original	5-15 thru 5-16	Original
2-9A thru 2-9B	Change 1	5-17	Change 2
2-10	Original	5-18 thru 5-19	Change 1
2-11 thru 2-18	Change 2	5-20 thru 5-21	Original
3- 1	Change 1	5-22 thru 5-55	Change 1
3-2	Original	6-1 thru 6-8	Change 2
3-3 thru 3-6	Change 1	6-9 thru 6-39	Original
3-7	Original	7-1 thru 7-8	Change 1
3-8 thru 3-9	Change 2	7-9	Original
3-10 thru 3-11	Change 1	A-1 thru A-2	Original
3-12 thru 3-14	Original	I-1 thru I-3	Change 2
3-15 thru 3-22	Change 1		

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CLASSIFICATION

Figure 3-16 List of Effective Pages Format

CLASSIFICATION
OP 0000

FOREWORD

1. This copy of Ordnance Pamphlet 0000 has been prepared for use during the operational evaluation period. Purpose and scope of this publication are contained in Chapter I.
2. This publication is for use among activities- having immediate need for the information. Information contained herein is subject to change.
3. This publication supersedes any preliminary or review drafts bearing an earlier date.
4. Comments concerning suggested correction- or revisions to this publication are invited and should be sent to:

Commander, U. S. Naval Ordnance Laboratory
White Oak
Silver Spring, Maryland
(Attn: Code HR).
5. Upon completion of operational evaluation and subsequent release for service use, this publication will be revised and stocked in Cognizance I.

iv
CLASSIFICATION

Figure 3-17 Foreword Page Format

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OP 0000

CHANGE RECORD

Change Number	Date	Title and or Brief Description	Signature of Validating Officer

iii

Figure 3-18 Change Page Format

OP 0000

CONTENTS

	Page
Chapter I - INTRODUCTION AND DESCRIPTION	
Purpose and Scope	1-1
Reference Publications	1-1
Use of Pressure-Vacuum Distributor	1-1
Physical Description	1-1
General	1-1
Power Requirements	1-1
Temperature Limitations	1-1
Carrying Case Assembly	1-2
Vacuum Pump	1-6
Associated Equipment	1-6
Chapter 2 - PREPARATION FOR USE	
General	2-1
Space Requirements	2-1
Unpackaging	2-1
Inspection	2-1
Chapter 3 - PRINCIPLES OF OPERATION	
General	3-1
Functional Description	3-1
Chapter 4 - MAINTENANCE	
General	4-1
Preventive Maintenance	4-1
Purpose	4-1
Inspecting Pressure-Vacuum Distributor	4-1
Cleaning Pressure -Vacuum Distributor	4-1
Paint Retouching Pressure -Vacuum Distributor	4-4
Servicing the Vacuum Pump	4-4
Lubrication	4-7
Corrective Maintenance	4-7
Purpose	4-7
Replacing Vacuum Pump Component	4-7
Replacing Vacuum Pump	4-7
Replacing O-Rings	4-8
Replacing Quick-Disconnect Socket	4-9
Repairing Hose Assemblies	4-9

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Figure 3-19 Table of Contents Page Format

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columns per page. Subordinate categories shall be indented four units progressively, with second line carry-overs indented four units from its first line. Additional pages of index shall carry over the heading INDEX (Cont.) with INDEX set in full caps. The page reference shall follow immediately after the last word of the indexed item. Pages of the index than be numbered 1-1, etc.

1. The distribution list shall be prepared according to Figure 3-24. It shall be page width, single-spaced, with a double space between listings. Codes shall be used only to designate desks within an activity; the name of the activity and its address shall be written out. The number of copies for each recipient shall be shown at the right margin of the page if greater than one. The distribution list shall bear no classification unless it is in itself classified. It shall show the OP number but shall not be included in the table of contents or list of effective pages.

3.5.6 Changes to Existing Manuals. This section covers the procedures for issuing changes to existing publications. A change to a manual consists of the issuance of supplemental or corrected pages which are physically incorporated in an existing edition of the manual and/or instructions for pen and ink changes. A revision (see 3.5.7) is a complete reissue of all pages of a publication and is advisable when the total number of change pages approach is 60%.

shall be centered on a sheet of paper which bears the OP number and classification (if any). If two deleted pages back each other, or fall in sequence of more than two pages, the statement Pages () deleted or Figures () deleted shall be placed at the bottom of the preceding page as at the top of the next complete page. Change symbols (see 3.5.6.6) shall be used in the margin adjacent to such statements.

3.5.6.2 When an entire page is changed, its backing page shall be reprinted. Pages reprinted but not changed shall not bear the new change number.

3.5.6.3 When it is necessary to delete a portion of text from a single page, a vertical arrow shall be placed in the blank column resulting from the deletion.

3.5.6.4 When it is necessary to add text to a page, additional pages shall be numbered consecutively with the number of the left-hand page upper case letters (e.g. 3-34A, 3-34B, etc.). If the additional text falls at the end of a chapter, the added pages shall bear the next higher sequential numbers.

3.5.6.5 Tables and illustrations which are added shall be designated in the same manner as changed pages (e.g., Figure 6-2A, Table 3-1A, 3-1B, etc.). Tables and illustration should bear the same basic number as the preceding material.

3.5.6.6 Where a portion of the text on a page has been changed, a vertical black bar (change symbol) shall be placed at the outside margin (to the left for a left-hand column and to the right for a right-hand column) running the length of the changed text. Where the entire page is

OP 0000

ILLUSTRATIONS

Figure	Title	Page
1-1	Digital Computer Mk 130 Mod 0 in Fire Control System Mk 113 Mod 2.	1-2
1-2	Functional Communication between Digital Computer Mk 130 Mod 0 and Attack Console, Block Diagram).	1-5
2-1	Digital Computer Major Sections	2-2
2-2	Digital Computer Major Section with Doors Removed.	2-3
2-3	Card Test Panel	2-4
2-4	Computer Test Panel...	2-6
2-5	Tape Reader	2-8
2-6	Marginal Check Panel.	2-10
2-7	Power and Check Unit, Service Position with Tape Reader Removed	2-13
2-8	Power and Check Unit, Internal View Showing Heat Exchanger.	2-14
2-9	Output and Control Unit.	2-16
2-10	Typical Drawer Assembly	2-17
2-11	Arithmetic and Micro Program Unit.	2-18
2-12	Memory Unit	2-22
2-13	Typical Circuit Card.	2-24
2-14	Digital Computer -Attack Console Connections	2-27
2-15	Digital Computer Unit Interconnections	2-29
2-16	Digital Computer Unit Interconnections	2-31
3-1	Inputs and Outputs, Block Diagram	3-3
3-2	Digital Computer, Simplified Block Diagram	3-17
3-3	Digital Computer, Functional Block Diagram.	3-19
3-4	Word Structure	3-24
3-5	Sheffer Stroke Logic Gate	3-29
3-6	Sheffer Stroke Gate Flip-Flop	3-32
3-7	Two-Stage Gated Flip-Flop	3-33
3-8	Control Gate	3-34
3-9	Emitter Follower	3-35
3-10	Power On Sequence, Simplified Electrical Schematic Diagram	3-37
3-11	Arithmetic Unit, Simplified Block Diagram	3-47
3-12	Micro Program Unit, Block Diagram	3-58
3-13	Micro Program, Simplified Flow Chart	3-59
3-14	Micro Program Unit, Functional Diagram	3-61
3-15	Micro Operation 023T.	3-67

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Figure 3-20 List of Illustration Page Format

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TABLES

Table		Page
1-1	Analog-To-Digital Shaft Converters	1-6
1-2	Digital Input Words.	1-7
1-3	Digital Output Words.	1-8
1-4	Operating Requirements.	1-8
1-5	Computer Capabilities	1-9
2-1	Card Test Panel Components	2-3
2-2	Computer Test Panel Components.	2-5
2-3	Tape Reader Components	2-9
2-4	Marginal Check Panel Components	2-10
2-5	Marginal Check Voltage Limits	2-11
2-6	Meter Relay Voltage Limits	2-12
2-7	Power Supply	2-12
2-8	Output and Control Unit Drawer Functions	2-19
2-9	Arithmetic and Micro Program Unit Drawer Functions	2-21
2-10	Memory Unit Drawer Functions.	2-21
2-11	Computer Circuit Cards.	2-23
2-12	System Cable Connections	2-26
3-1	Analyzer Console Switch, Handcrank, and Relay Functions for Lambda (2) Word.	3-5
3-2	Attack Console Functions for Xi (2) Word	3-11
3-3	Analyzer Console Indicator and Relay Functions for Mu (2) Word	1-12
3-4	Address Orders	3-25
3-5	No-Address Orders	3-26
3-6	Power of 2.	3-28
3-7	Sheffer Stroke Logic Gate Truth Table.	3-31
3-8	Arithmetic Unit Registers.	3-46
3-9	Read Split and Write Split Functions.	3-48
3-10	Adder Truth Table and Logic Equations	3-56
3-11	Micro Operations on Logic Diagram (BuOrd Dwg 2075215)	3-64
3-12	Inputs to Logic Unit Causing a Logical 1 Output.	3-75
3-13	Alteration Unit Flip-Flops.	3-77
3-14	H Register Selection of Memory Addresses	3-95
3-15	Digital Input and Output Words	3-100
3-16	Digital Input Word Bit Designations	3-103
3-17	Digital Output Words, Bit Information	3-105

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Figure 3-21 List of Tables Page Format

OP 0000

SAFETY SUMMARY

LISTED BELOW IS EVERY "WARNING" CONTAINED IN THIS PUBLICATION AND THE PAGE ON WHICH THE "WARNING" IS LOCATED. ALL PERSONNEL INVOLVED IN THE OPERATION AND MAINTENANCE OF THIS EQUIPMENT MUST FULLY UNDERSTAND THE "WARNINGS" AND THE PROCEDURES BY WHICH THE HAZARD IS TO BE REDUCED OR ELIMINATED.

WARNINGS

The voltage used in the vacuum pump is dangerous and may be fatal if contacted. Make certain that power to the electrically operated vacuum pump is disconnected before any maintenance is performed. Pages 4-1, 4-7.

Cleaning solvents are flammable and should be used sparingly and in a well-ventilated area. Make certain that no sparks, open flames, or other sources of ignition are present. Do not use cleaning solvents on any parts that are above room temperature. Make certain that adequate fire extinguishing apparatus is readily available. Pages 4-4, 4-6

Vapors of cleaning solvents are toxic if inhaled for extended periods. Make certain that solvent containers are kept closed except when solvents are being used. Wash hands thoroughly with soap and hot water after using cleaning solvents. Pages 4-4, 4-6

Paints are flammable. Use in a well-ventilated area, and eliminate all possible sources of ignition. Page 4-4

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Figure 3-22 Safety Summary Page Format

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INDEX

- | | |
|----------------------------------|-------------------------------------|
| Adjustments | Adjustment and Calibration |
| 22 KC Mixer Amplifier, 6-86 | Discrimination Chassis, 6-41 |
| Brake, 6-51 | Receiver-Oscillograph |
| Center Frequency Module | Chassis, 6-42 |
| Zero, 6-41 | Timing and Control Chassis, 6-39 |
| Control Track Generator, 6-52 | Alinement |
| Converter -Amplifier, 6-87 | After Repair, 6-86 |
| DC Amplifier and Low Pass | Converter Amplifier, 6-37 |
| Filter, 6-42 | Discriminator Calibrator, 6-38 |
| Discriminator-Amplifier | Fixed Frequency Converter, 6-45 |
| Subassembly, 6-45 | Local Oscillator, 6-18 |
| Galvanometers, 6-47 | Receiver (Units 4A1 and |
| Lateral (Galvanometer), 6-47 | 4A2), 6-43 |
| Metering-Amplifier Subassembly | Sensitivity Test Amplifier, 6-36 |
| AFC Hold -In and Capture | Tunable Frequency Converter |
| Range, 6-46 | RF Amplifier, 6-44 |
| Amplifier Output, 6-46 | Tunable RF Amplifier, 6-36 |
| Audio Monitor, 6-46 | Amplifiers |
| Deviation Meter, 6-46 | Emitter Follower, 3-29 |
| Modulator-Demodulator, | Fixed-Tuned RF, 3-36 |
| Unit 5A3, 6-52 | Limiter, 3-25 |
| Pinch Roller, 6-51 | Microphone, 3-59 |
| Power Supply (Discriminator | Motor Drive, 3-50 |
| Chassis), 6-41 | Record, 3-19 |
| Power Supply (Miss Distance | Sensitivity Test, 3-35 |
| Chassis), 6-36 | AN/SKQ-1 Operational checkout, 6-28 |
| Record Amplifier, 6-49 | Attenuator Pads, 3-35 |
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| Frequency Response, 6-50 | Amplifier Subassembly, 6-46 |
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| +100 VDC Power Supply, | Block Diagram, Miss Distance |
| Unit 2A3, 6-39 | Chassis, 3-34 |

I-1
CLASSIFICATION

Figure 3-23 Index Format

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OP 0000	
DISTRIBUTION	
	Copies
Commanding Officer USS NEREUS (AS 17) Fleet Post Office San Francisco, California 96601	1
Commanding Officer U.S. Naval Ammunition Depot Navy No. 66, Fleet Post Office San Francisco, California 96612	1
Commanding Officer U.S. Naval Weapons Station Seal Beach, California 90740	1
Commanding Officer U.S. Naval Advanced Undersea Weapons School U.S. Naval Base Key West, Florida 33040	1 5
Commander Operational Test and Evaluation Force (LCDR J. E. ALSOVER, Code 431) Norfolk, Virginia 23511	1
Deputy Commander (Code 401) Operational Test and Evaluation Force, Pacific U.S. Naval Air Station North Island San Diego, California 92135	1
Staff, Commander Submarine Force, U.S. Pacific Fleet (HEIKKEN, MTC (OPTEVFOR)) Fleet Post Office San Francisco, California 96601	1

Figure 3-24 Distribution List Format

MIL-M-81273A(WP)

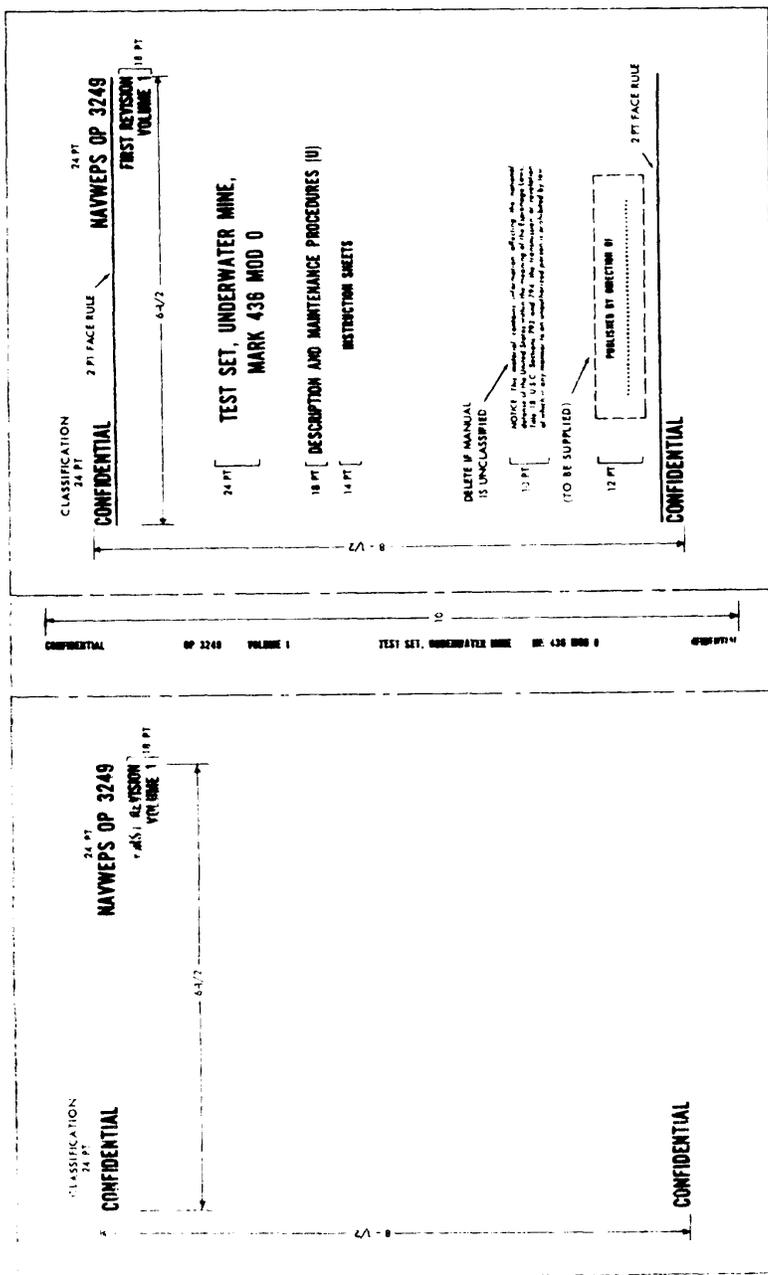


Figure 3-25 Front Cover, Spine, and Back Cover Format

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changed, the change symbol shall not be used. Figure 3-26 shows a correctly prepared change page.

3.5.6.7 When additional changes require further additions to pages, illustrations or tables previously changed, an Arabic numeral and hyphen shall designate the addition (e.g., 2-26A-1, 2-26A-2, etc.).

3.5.6.8 The letters I and O shall not be used to designate change pages. When more than 24 consecutive pages are changed (down to the letter Z), the Procuring Activity should specify such alternate methods as may be required.

3.5.6.9 New and changed pages shall be attached as enclosures to a cover letter, the format of which shall be specified by the Procuring Activity. The cover letter shall provide instructions for incorporating the change.

3.5.6.10 Material prepared as a change should match the format of the original manual. The change number shall appear at the outer margin in line with the page number as shown in Figure 3-26.

3.5.6.11 All changes shall be issued with new front and back matter required. Changes to front and back matter shall be indicated by the change symbol and other format requirements as specified in this section. The title page shall bear the statement Change _ Entered in full caps beneath the publication number. (The date appearing on the title page shall not be changed.) The list of effective pages shall be revised to reflect the insertion of the change.

3.5.6.12 In certain cases, it may be possible to incorporate a small change by a shifting of text to adjacent pages.

If unchanged copy is shifted to an adjacent unchanged page, the unchanged page shall be given a change number. Because no new or changed text has been added, the relocation of text shall be indicated by a change symbol to the right of the page number only.

3.5.7 Revisions. Revisions require no unique preparation with respect to format other than the addition of the revision number on the external covers and the title page. For example, Revision 1 shall have the words FIRST REVISION in full caps beneath the OP number.

3.6 Security. This section details security procedures and requirements for technical manuals.

3.6.1 The classification of any volume or part of the technical manual shall be that of the most highly classified page.

3.6.2 When required by the Procuring Activity, individual pages of a manual may bear the classification applicable to the individual page. This is usually required when a manual may be broken into smaller parts (check sheet, etc.) by the user. When two pages of different classification are backed up to form a single printed sheet, both pages shall bear the same classification (the higher of the two) .

3.6.3 The Procuring Document shall determine the security applicable to the content of the technical manual. The procedures and requirements in DD 441, Industrial Security Manual for Safeguarding Classified Information shall apply to all handling and transmittal of the technical manual and related information.

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The _____

Install _____

A. When _____

B. Make _____

Figure 3-46 (Deleted) _____

Paragraph (Deleted)
Record _____

Calibrate _____

Figure 3-45A Fuel Transfer

Figure 3-47 Fuel Tanks

0-00
CLASSIFICATION

Change 1

PARS. ADDED

PAR. DELETED

FIG. DELETED

TEXT CHANGED

FIG. TITLE CHANGED

CHANGE NO

Figure 3-26 Preparation of Change Page

3. 6.4 Unclassified manuals require no statement of such either on the covers or the pages.

3.7 Interim Drafts. As noted in 3.1, the specifications set forth in Chapter 3 apply to formal copy publications. Specifications for all draft copies issued prior to the issuance of the formal copy are usually specified in the Procuring Document. In general, production standards and art standards shall be specified by the Procuring Activity.

3. 7.1 Unless otherwise directed, the supplier shall provide the Procuring Activity with the following drafts prior to the submission of the end product, either Preliminary or Formal.

Outline
 Writer's Draft
 Review Draft
 Preliminary Copy

3. 7.2 The definitions of these drafts as given in Section 6 shall apply to the requirements of this specification.

3. 7.3 Reduced -Coverage Draft Copies. When authorized by the Procuring Activity, reduced-coverage writer's drafts and review manuals may be submitted. This option is generally invoked for equipment and system manuals for which the hardware is in a developmental stage or when unexplored areas of knowledge or applications are being investigated. In projects of this nature, there is a wide-spread time scale involved in the phases of development such as to render obsolete much of the material general generated in the earlier phases of the program.

3. 7.3.1 Depth of Coverage. The reduced-coverage option allows less than complete technical description in all

areas of the manual. Organization, however, should parallel the final product insofar as this is possible at the time the draft copies are prepared. In a reduced-coverage manual, procedural information is presented in skeletal form. The intent of the procedure is given in sufficient detail to allow cognizant engineering and technical personnel to evaluate the accuracy and adequacy of the procedure. Functional descriptions are limited to "black-box" coverage with no requirement to present specific values of components, tolerances, waveforms, etc. In all areas where specific information is unavailable, a complete statement of proposed coverage shall be made.

3. 7.3.2 Examples of Reduced-Coverage. Figure 3-27 and 3-28 present specific examples of typical reduced-coverage format.

3. 7.3.3 Reduced-Coverage; Difference between Writer's and Review Drafts. When separate writer's draft and review draft copies are required for equipment and maintenance manuals (or in any other publication where extensive procedural information is required), two levels of reduced-coverage are authorized. For writer's draft, the procedural steps only need to be summarized; no information on how to perform the steps is required and no explanatory or transitional material is provided. In the writer's draft, the procedures generally are written in a more passive -voice style. In the review draft, procedural information may also include transitional material which is explanatory and tends to break up the procedural information into blocks or specific tasks. This contrasts to subsequent drafts which contain not only the steps involved, and the specific transitional and explanatory data, but

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also details the manner and techniques involved in performing the steps.

3.7.3.4 As more specific data becomes available, it shall be incorporated into the review manual. This applies not only to procedural information as detailed in 3.7.3.3 above, but to functional descriptions, theory of operation, etc.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility of Supplier. The supplier shall be responsible for inspection of all drafts and end products prepared under this Specification to ensure technical accuracy and compliance with the standards set forth in this document. This inspection shall take place prior to submission of material to the Procuring Activity.

4.2 Materials to be Reviewed. Unless modified by the Procuring Document, the supplier shall conduct reviews of the following draft or review documents prior to the submission of the end product required.

4.2.1 Outline. Outlines shall be desk reviewed to ensure conformity with the general provisions of this specification and the manual type requirement.

4.2.2 Writer's Draft and Review Draft. Writer's draft and review drafts shall be checked for conformity with the outline, general editorial style, content of illustrations and technical accuracy with respect to the subject matter. The draft shall be clearly marked to indicate its status as review material only, thus restricting its possible use by the Fleet as an operational document.

4.2.3 Preliminary Copy. Depending upon the specific requirements of the Procuring Document, the Preliminary Copy may be (1) of a standard equal to that of the formal manual, or (2) less than complete with respect to format, layout, quality of print, etc. It may also be less than complete technically if all hardware is not available. The technical coverage of the manual shall reflect the design characteristic of all available hardware at the specified engineering cut-off date for Preliminary Drafts. If the standard is that of the formal manual, the requirements in paragraph 4.2.4 shall apply. If less stringent standards are specified, it shall be checked editorially and typographically as described in paragraphs 4.3.1a, b, d, and e. An on-site review, according to 4.3.2, shall be conducted if required.

4.2.4 Formal Manual. The formal manual shall conform to all specifications set forth in Section 3. Desk reviews (4.3.1) and on-site reviews (if required by subject matter) (4.3.2) shall be employed to ensure compliance.

4.3 Types of Reviews. Two types of reviews shall be employed to ensure quality and accuracy: the desk review and the on-site review. Supplier shall be responsible.

4.3.1 Desk Review. The desk review shall be performed at all stages of manual development. It shall consist of a meticulous reading of all prepared text and examination of all art to ensure compliance with requirements of the specification and Procuring Document. The desk review shall evaluate the following characteristics:

a. Editorial Accuracy. The manual shall be checked for the quality of

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Chapter 4

PRINCIPLES OF OPERATION

Section 3 - Fluxmeters Mk 3 Mod 2, Functional Description

GENERAL

The purpose of the fluxmeters is to measure and record (by means of an associated graphic recorder) the output of the underwater range coil. There are, at present, twelve fluxmeters available for use with any given degaussing range control system.

OPERATIONAL CONCEPT

The fluxmeter is an integrating device, that is, it integrates the voltage output of the range coil with respect to time so that the resulting ship's magnetic signature is represented by a sine wave. The magnitude of the sine wave is therefore a function of the magnitude of the ship's signature.

FLUXMETER INPUT. A balanced-current device exists at the input circuit of the fluxmeter. This circuit produces an EMF opposite in polarity to that generated in the range coil. Because the two EMF's are of equal value, but in opposition to each other, the effects of resistance and inductance within the range coil and associated cable are cancelled.

FIRST AMPLIFICATION. A conventional DC amplifier featuring triode pre-amplification for stability receives the input signal from the range coil. A rising voltage at the grid of triode V1 (12AX7) causes the tube to conduct, thus causing a small current flow in an associated transformer-coupled second stage. Further current amplification is provided by a high-gain pentode (V2) which in turn drives a ballistic galvanometer device.

As the galvanometer is driven off-center, a net RF signal is developed in its
as a result of the unbalanced condition. The magnitude of the RF signal

Figure 3-27 Reduced Coverage Writer (Review Draft (Typical);
Electronics Equipment Theory of Operation

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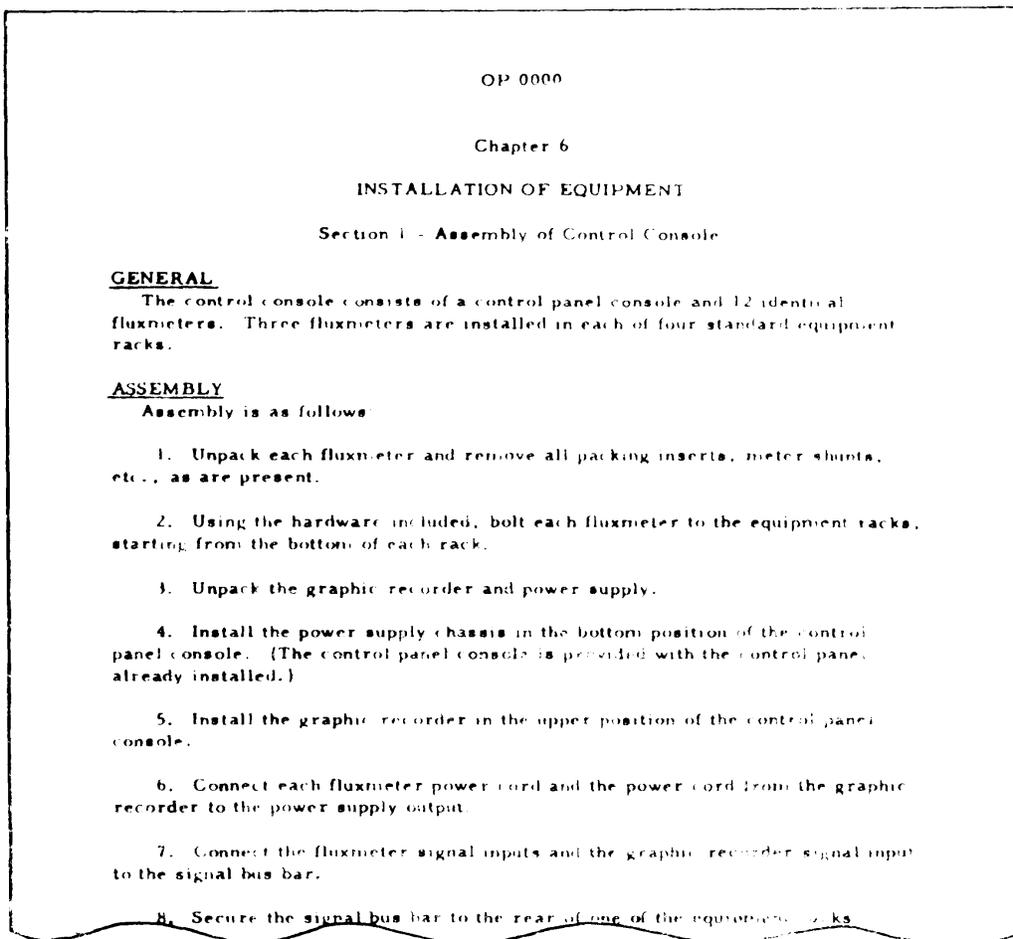


Figure 3-28 Reduced Coverage; Writer's Draft (Typical)
Electronics Equipment Assembly

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editorial style (detailed in 3.3) including logical organization of headings, proper references to figures and titles, clarity of expression, grammar, consistency between text and front and back matter, and adequacy of the information presented in illustrations.

b. Typography. The manual shall be proofed for correct spelling, punctuation, capitalization, and adherence to the original writer's draft.

c. Graphic Quality. The quality of art prepared for the manual shall be checked for compliance with the standards in 3.4.

d. Correct Incorporation of Comments. The desk review shall ensure that comments from previous drafts have been incorporated into the manual and are in context with existing text.

e. Technical Accuracy. The manual shall be checked to ensure that all technical material is accurately described and is current up through the cut-off date specified in the Procurement Document.

f. Compliance with Format. The manual shall be checked to ensure compliance with the format and layout requirements in Section 3.5.

4.3.2 On-Site Review. Two on-site reviews are generally required. These are operational checks of procedural information contained in the manual and are required only for manuals which are equipment-oriented.

a. Validation. Validation is conducted by the Manual-Supplying Activity to ensure that all procedural information is correct and understandable. All assembly, hookup, wiring,

preparatory, and operational procedures shall be performed as described in the draft copy of the manual, using the equipment described. Discrepancies shall be corrected before issuance of the Preliminary Copy.

b. Verification. Verification shall consist of the same procedures as validation but shall be conducted by a team consisting of representatives of the Procuring Activity, the Supplying Activity, and technicians (civilian or Fleet personnel) not previously involved in preparation of the manual. All procedural steps shall be performed by these technicians while the remainder of the team acts as observers and notes discrepancies and errors. The Supplying Activity shall supply both technical writers and design personnel who are directly concerned with the publications and equipment. Formally agreed-upon and corrected procedures shall be generated as a result of verification and incorporated into the text of the manual.

c. Verification Schedules. A schedule of verification requirements shall be supplied to the Procuring Activity prior to verification as indicated in Procurement Document. It shall list the following information:

Equipment to be checked
 Applicable publications
 Proposed date
 Special tools, hardware, test equipment and facilities required
 Required personnel (as in "b" above)
 Approximate duration
 Proposed source of equipment to be verified
 Agenda, including steps to be verified

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d. Supplying Activities Responsibilities. It shall be the responsibility of the Supplying Activity to arrange for the staging of verification and to coordinate the same through the Procuring Activity. Where the Supplying Activity is a prime contractor, supplying both equipment and documentation, the supplier will provide the Procuring Activity with the proposed verification schedule and acknowledge compliance with the requirements listed under paragraph c. The Supplying Activity shall also arrange for equipment and all supporting testing and handling gear to be 1 available and in good working condition. The Procuring Activity will coordinate the efforts of all parties concerned and arrange for availability of personnel listed in paragraph b. The Procuring Activity will then provide the Supplier with an approved staging schedule as modified by time and circumstance.

Where documentation only is provided, the Supplying Activity shall determine the availability of equipment and personnel and notify the Procuring Activity of the proposed verification schedule and requirements listed under paragraph c.

When directed by the Procuring Activity, the prime contractor shall undertake to provide the equipment, tools, and personnel required under paragraph c and notify the Procuring Activity of availability. The Procuring Activity will coordinate the efforts of all parties and provide to each an approved modified verification schedule and agenda.

It shall be the responsibility of the Supplying Activity to inspect and approve the facilities provided. Where discrepancies that would tend to interfere with thorough verification are noted, the Supplying Activity shall submit a written list to the Procuring Activity. The Procuring Activity shall

then take such corrective measures as deemed necessary to permit verification to proceed expeditiously.

e. Report of Verification. A report shall be made to the Procuring Activity stating results and recommendations.

4.4 Acceptance. The Procuring Activity shall be the sole agent in determination of quality of material prepared under this specification. Completed material shall be accepted by an official representative of the Procuring Activity.

5. PREPARATION FOR DELIVERY

5.1 The supplier shall ship all material to the Procuring Activity as specified in the Procuring Document.

5.2 Unless otherwise specified by the Procuring Activity, standard commercial-quality packaging practices shall be used in packing of material for shipment. Packaging shall be such as to ensure acceptance by common or other carrier for safe transportation at the lowest rate to the point of delivery. Materials shall be packaged flat in cartons with filler to hold the material tight and stable.

5.3 The outside of each shipping container shall have a label affixed to one end. The label shall contain the following information:

- Type of material enclosed (negatives, draft, copies, etc.)
- Contract identification number
- Manual OP number
- Quantity (where applicable)
- Carton number and number of cartons in shipment (carton 3 of 7, etc.)
- Name of Prime Contractor and, if applicable,- name of

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subcontractor originating the enclosed material.

5.4 Classified material shall be packed, shipped, and marked according to the provisions of DD 441, Industrial Security Manual for Safeguarding of Classified Information.

5.5 A packing list or letter of transmittal shall be enclosed in one of the cartons. The carton containing the list or letter of transmittal shall be so marked on the label specified in 5.3.

6. NOTES AND CONCLUDING MATERIAL

6.1 General. This section provides a summary of information for the user of this Specification in the preparation of the Procuring Document, and a glossary of terms used throughout the Specification.

6.2 Ordering Data. When preparing a Procuring Document using MIL-M-81273(WP) as the sole basis, the user should reference this specification and include specific direction in the Procuring Document exercising the following options as provided in this Specification.

6.2.1 Subject Matter Specification. The type (subject matter) specification as required in 3. 2 and provided in the Appendix should be called out. Where two or more specifications are required for a single publication, areas of possible conflict should be determined and resolved.

6.2.2 Level of Subject Matter. The educational level of the intended user (high school graduate, college or Military Academy Graduate, A-school training, etc.) should be defined in

order that the detail of subject matter is correct and appropriate.' Refer to 3.3.1.8.

6.2.3 Typography The Procuring Activity should specify typographic and production requirements for the end product as required in paragraph 3.5.1.

6.2.4 Paragraph Numbering. Paragraph 3.5.4. 1 provides options for the use of numbered paragraphs throughout the publication. If it is determined that this option is desirable, the affected chapters, volumes, etc., should be called out.

6.2.5 Classification. The classification of the overall manual is provided to the contractor. If it is desired to subclassify individual portions of the publication, the intent to do so and the necessary criteria should be provided (see 3.6.2).

6.2.6 Organization. As indicated in 3.5.5, the publication may be broken into parts, volumes , etc. Guidelines may be proposed by the Procuring Activity if such requirements are evident.

6.2.7 Page Size. If any page size other than 8-1/2 x 11 inches as, specified in 3. 5.2.2 is desired, it should be noted.

6.2.8 Review and Draft Copy Submission. If any variation in the requirements of draft and review copy submission is desired (see 3. 7), it should be noted.

6.2.9 Preliminary Copy Requirements. At the discretion of the Procuring Activity, Preliminary Copy may be prepared to the same standards as the Formal Copy. The Procuring

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Document must specify the standards for the Preliminary Copy. If less than Formal Copy standards are required, the following options must be specified:

- a. Grade of artwork
- b. Illustrations; drop-in or full page

6.2.10 Formal copy Requirements.

Type of art (Figs. 3-1 through 3-8) and format (page width with drop in illustrations or double-column) for the formal copy must be defined by the Procuring Activity.

6.2.11 Reduced Coverage. Reduced coverage for draft copy (see 3.7. 3) must be specified if desired.

6.3 Waivers. It shall be the responsibility of the Supplying Activity to request from the Procuring Activity the following options:

6.3.1 Any optional requirement having to do with format or production of a type which cannot be foreseen when the Procuring Document is originated. As an example, the Supplying Activity will be in the best position to determine requirements for foldout illustrations; therefore, they should initiate the request for the option provided in 3.4.2.5.

6.3.2 Any deviation from any requirement in this specification which is prefaced by the word "shall".

6.4 Definitions. The following terms, defined as follows, are used throughout this document. The definitions given as follows shall apply in all cases and shall be considered official when questions of meaning or interpretation arise.

Appendix. An appendix is an addition

to the text of the basic manual, inserted in the back matter as directed in Section 3.5. It frequently contains data which, although required to complete the basic text, are referred to only infrequently.

Art or Graphics Requirements. A standard of illustration quality defined in Section 3.4 and as designated by the Procuring Activity and the Procurement Document.

Document (other than Procurement Document). Synonymous with the word "publication."

Draft. A general term used to describe any publication in its developmental or review form.

Figure. This term is applied to both illustrations and graphs, special purpose graphs, etc., and any supporting data not specifically tabular.

Formal Copy- Manuals which have been prepared to support production equipment.

Interim Changes. Interim Changes are issued when Fleet requirements demand that corrected or additional information be provided to manual holders without the delays inherent in producing a permanent printed change.

Interim Copy or Interim Product. A manuscript or publication issued for review or interim use and written to the standards required by this Specification.

Manual. A general term used to encompass the end product in its broadcast sense. The end product required by the procurement document under this Specification is a publication, irrespective of its composition. In this

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Specification, the word manual is not restricted to a single manual under one cover; the manual may consist of a number of parts or volumes.

Naval Message Change. A Naval Message Change transmits essential information involving safety, reliability, or effectiveness. Since NMC's are transmitted by Naval Speedletter or Naval Message means, they include only minimal textual changes.

Outline. A document defining the proposed content of a publication down to a level specified in the Procuring Document. It is generally required by the Procuring Activity prior to the commencement of writing. The outline also consists of a proposed list of illustrations keyed to the text, a description of the proposed type of illustration (halftone, line, etc., size and content). The outline also provides an estimated page count and details the type of coverage planned for each major breakdown in the text.

Part. A part is an arbitrary designation which may be any of the following, depending upon the context in which it is used: (1) a portion of a volume bound under a separate cover; (2) a portion of a volume bound within another part under the same cover; (3) a portion of the complete manual when the complete manual is bound under one cover.

Preliminary Copy. Manuals of a relaxed format which contain all text and illustrations required for review in the validation/verification process. Such manuals should be prepared as far as is feasible to provide for ready conversion to formal manuals.

Procuring Activity. The agency, field command, laboratory, or commercial

establishment which is the purchaser of a document covered by this Specification.

Procuring Document. A contract or other formal requirement originated by the Procuring Activity which require the supplier to provide 1 document covered by this Specification.

Production Standards. A quality and format of printing, layout, composition, and binding as defined in Section 3.5 unless otherwise designated by the Procurement Document.

Reprint. A reprint is a second or subsequent printing run of a publication with no alteration from the previous printing.

Review Draft. A Review Draft of a non-equipment oriented manual serves primarily as a document for technical and editorial review. A Review Draft may also be based upon equipment which has reached a firm design stage. Procedural steps are checked against equipment when available, or specific statement shall be made in the text when this is not possible. Illustrations are complete but are usually prepared according to relaxed art standards. Where text is not available, a clear, definitive statement of the proposed text is included. Review is generally conducted by technical developmental personnel, BUWEPS, and selected field and Fleet activities.

Supplement. A supplement is a separate manual which provides supplemental information to that provided in the basic manual. It may provide supplemental information on a separate usage of the equipment described in the basic manual, or specialised information not required for all users. Frequently, the

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organization of the supplement is derived from the basic manual and provides only "difference data."

Supplier or Supplying Activity. The organisation which prepares and submits to the Procuring Activity a document covered by this Specification.

Text. The text is defined as all materials in a publication including such front and back matter as may exist. In

a more limited sense, it represents the printed page versus the illustrations, when used in that context.

Writer's Draft. A writer's draft is prepared upon acceptance of the outline. The writer's draft may be illustrated by pencil sketches or unretouched, screened photographs. Text reflects a high quality of editorial style but may be less than complete with respect to equipment coverage.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION <i>(Mark one)</i>
b. ADDRESS <i>(Street, City, State, ZIP Code)</i>	<input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER <input type="checkbox"/> OTHER <i>(Specify):</i> _____
5. PROBLEM AREAS	
a. Paragraph Number and Wording:	
b. Recommended Wording:	
c. Reason/Rationale for Recommendation:	
6. REMARKS	
7a. NAME OF SUBMITTER <i>(Last, First, MI) - Optional</i>	b. WORK TELEPHONE NUMBER <i>(Include Area Code)</i>
7b. ADDRESS <i>(Street, City, State, ZIP Code)</i>	7c. TELEPHONE NUMBER <i>(Include Area Code)</i>

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STANDARDIZATION & DOCUMENTS DIV.

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