METRIC

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SUPERSEDING
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21 January 1985
(See 6.7)

MILITARY SPECIFICATION

DRAWINGS, INSTALLATION CONTROL, FOR ELECTRONIC EQUIPMENT

This specification is approved for use by the Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the preparation and acquisition of installation control drawings for electronic equipment (see 6.3).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards and handbooks. The following specifications, standards and handbooks, form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

L-P-519 - Plastic Sheet: Tracing, Glazed and Matte Finish.

MILITARY

MIL-S-901 - Shock Tests, H.I. (High-Impact) Shipboard Machinery, Equipment and Systems, Requirements for.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 55Z3, Department of the Navy, Washington, DC 20362-5101 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC No. N6684 AREA DRPR

MIL-D-5480 - Data, Engineering and Technical: Reproduction Requirements For.
MIL-M-9868 - Microfilming of Engineering Documents, 35mm, Requirements For.
MIL-N-25027 - Nut, Self-Locking, 250°F, 450°F, and 800°F.
MIL-D-28000 - Digital Representation for Communication of Product Data: IGES Application subsets

STANDARDS

MILITARY

DOD-STD-100 - Engineering Drawing Practices.
MIL-STD-129 - Marking for Shipment and Storage.
MIL-STD-167-1 - Mechanical Vibrations of Shipboard Equipment (Type I - Environmental and Type II - Internally Excited).
MIL-STD-167-2 - Mechanical Vibrations of Shipboard Equipment (Reciprocating Machinery and Propulsion System and Shafting) Type III, IV, and V.
MIL-STD-242 - Electronic Equipment Parts, Selected Standards Switches.
MIL-STD-419 - Cleaning, Protecting and Testing Piping, Tubing and Fittings for Hydraulic Power Transmission Equipment.
MIL-STD-1310 - Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatability and Safety.
MIL-STD-1399 - Interface Standard for Shipboard Systems.
Section 102 - Low Pressure Dry Air Service For Surface Ships
Section 300 - Electric Power, Alternating Current. (Metric)
Section 390 - Electric Power, Direct Current, (Other Than Ship's Battery) For Submarines. (Metric)
Section 532 - Cooling Water for Support of Electronic Equipment. (Metric)
Section 702 - Synchro Data Transmission.
MIL-STD-1683 - Connectors and Jacketed Cable, Electric, Selection Standard for Shipboard Use.
MIL-STD-1806 - Marking Technical Data Prepared by or for the Department of Defense

HANDBOOK

MILITARY

MIL-HDBK-225 - Synchros Description and Operation

2.1.2 Other Government documents, drawings and publications. The following other Government documents, drawings and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

PUBLICATIONS

H4/H8	-	Cataloging Handbook H4/H8, Commercial and Government Entity (CAGE)
DOD-5220.22-M	-	Industrial Manual for Safeguarding Classified Information.

(Application for copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, DC 20402.)

NAVAL SEA SYSTEMS COMMAND (NAVSEA)

S-9086-S4-STM-000/CH-556	-	Naval Ship's Technical Manual, Hydraulic Equipment (Power Transmission and Control).
S-0300-AT-GTP-010/ESL	-	Standard Electrical Symbol List.
0967-LP-000-0110	-	Electronics Installation and Maintenance Book Installation Standards.
0967-LP-000-0130	-	Electronics Installation and Maintenance Book, Test Methods and Practices.
S9407-AB-HBK-010	-	Handbook of Shipboard Electromagnetic Shielding Practices.

(Copies of specifications, standards, and publications required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of the documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Y32.10 - Graphic Symbols for Fluid Power Diagrams. (DoD adopted)

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

UNIFORM CLASSIFICATION COMMITTEE AGENT

Uniform Freight Classification Ratings, Rules and Regulations

(Application for copies should be addressed to the Uniform Classification Committee Agent, Tariff Publication Officer, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

(Industry association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specification sheets, or MS standards), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Installation control drawings. Installation control drawings shall be in accordance with this specification and shall set forth the electrical, physical, mechanical, and interface, data for installing activities to develop plans and drawings for the installation of electronic equipment.

3.2 Preparation. Installation control drawings shall be prepared in accordance with the general drawing practices outlined in DOD-STD-100, except that "Roll" size sheets shall not be used. All sheets of multisheet data elements shall be the same size (see 3.3.4). Installation control drawings shall contain the information described in 3.3.6 through 3.3.15. The referenced figures prescribe the format for the information required. The quantitative values listed thereon are explanatory only. Finished installation control drawings shall contain the requirements of the installed equipment.

3.2.1 Numbering, coding, and identification. Numbering, coding, and identification in drawing blocks shall be as follows.

3.2.1.1 Each installation control drawing shall show the contractor's drawing number and the Commercial and Government Entity (CAGE) code for manufacturers in accordance with Publication H4/H8, and the contract number as shown on the award sheet.

3.2.1.2 Unless otherwise specified (see 6.2), the activity identification information shall be as shown on figures 1 and 2 and shall be entered in the title block.

3.2.1.3 Blocks of Government drawing numbers will not be supplied to the contractor. These numbers will be assigned and entered on the accepted final drawings by the government.

3.2.2 Dimensioning and tolerancing. Dimensioning and tolerancing shall be in accordance with DOD-STD-100. Unless otherwise specified, (see 6.2) metric units shall be required.

3.2.3 Multiview drawings. Multiview drawings shall be in accordance with DOD-STD-100.

3.2.4 Reference designations. Reference designations shall be in accordance with DOD-STD-100.

3.2.5 Abbreviations. Abbreviations shall be in accordance with DOD-STD-100. Abbreviations used on a drawing and not referenced in DOD-STD-100 shall be explained by a note on the drawing.

3.2.6 Mechanical symbols. Mechanical symbols shall be used in accordance ith DOD-STD-100. Symbols used on a drawing and not referenced in DOD-STD-100 hall be explained by a note on the drawing.

3.2.7 Line conventions and lettering. Line conventions and lettering shall e in accordance with DOD-STD-100.

3.2.8 Security classification. Security classification for drawings shall e marked in accordance with DOD-5220.22-M.

3.2.9 Drawing scale. Installation control drawings need not be to scale ut shall depict the relative proportions of items. The word "None" shall be ntered in the scale of the title block when not to scale.

3.2.10 Drawing submission. Submitted drawings shall meet one or more of he following requirements (see 6.2).

3.2.10.1 Installation design reservation data. Installation design reser- ation data may be furnished in the contractor's format see 6.3).

3.2.10.2 Preliminary and proposed final drawings. Preliminary and proposed inal drawings to be submitted to the Navy repository shall consist of one set of maged aperture cards and one set of drawings in International Graphics Exchange tandard (IGES) digital format (see 6.3). Drawings to be submitted to the ontracting activity shall consist of brownline drawings, type II, class 2 in ccordance with MIL-D-5480 and digital formatted data in accordance with IL-D-28000 and MIL-STD-1840.

3.2.10.3 Final drawings. Final drawings shall be provided in IGES digital ormat in accordance with MIL-D-28000 and MIL-STD-1840. Additionally, archival uality drawings shall be provided that are neat, clean and free from smears. The rawings shall be of such clarity that reproductions can produce fourth generation opies which meet the legibility and contrast requirements of MIL-D-5480. The rawing material shall have a thickness of 0.004 ± 0.0005 inch (0.01016 centimeter cm) ± 0.00127 cm) with matte finish on one side and glazed surface on the other ide (see 6.3). Stick-on drafting material (decals and paste-ons) shall not be sed on the submitted drawings. The information shall be shown on matte side and hall be right reading. Each drawing shall conform to one of the following:

(a) Inked plastic original. The plastic shall conform to L-P-519, type I, class 1, white.
(b) Blackline cloth right reading duplicated original conforming to type II, class 4 (direct photographic positive print) of MIL-D-5480.
(c) Blackline polyester film base right reading duplicate original conforming to type II, class 4 (direct photographic positive print) of MIL-D-5480.

3.2.11 Revisions. Revisions to existing drawings shall be as specified see 6.2 and 6.3). Existing drawings shall be those final drawings whose ori- inals or duplicate originals are on file by the Navy. Revision notations shall

be in accordance with DOD-STD-100. Revision to drawings shall be described in the drawing revision block; reference to subordinate documents for revision description is not permissible.

3.2.11.1 Minor. The contractor shall mark up a copy of the existing drawing supplied to the contractor by the Government, to reflect the current equipment configuration.

3.2.11.2 Complete. The contractor shall prepare a new original when specified.

3.3 Content and format. Installation control drawing content and format shall be developed in consonance with the progression of equipment design and production as specified herein.

3.3.1 Installation design reservation data. Installation design reservation data shall contain the information listed below and as specified (see 6.3). The preliminary information provided shall permit a design agent or shipyard to initiate installation planning for equipment to be installed. Subsequent drawings shall indicate changes made to these data.

(a) Total equipment weight and space requirements.
(b) Total equipment electrical power requirements including type (from sections 300 and 390 of DOD-STD-1399), power, voltage, frequency, power factor, phase (single or three phase).
(c) Auxiliary cooling and dry air requirements.
(d) Hydraulic fluid power requirements.
(e) Any unusual requirements such as size of equipment not permitting entry through ship doors or hatches.
(f) Total heat dissipation expressed in watts.

3.3.2 Preliminary installation control drawings. Preliminary installation control drawings shall consist of the drawings listed in 3.3.4, as applicable, and as specified (see 6.3). These drawings shall provide information which is sufficiently accurate and complete to permit design agents or shipyards to start installation design with no major changes expected which may affect installation design.

3.3.3 Proposed final installation control drawings. Proposed final installation control drawings shall consist of the data elements listed in 3.3.4, as applicable and as specified (see 6.3). These drawings shall be prepared after all discrepancies on the preliminary drawings have been corrected and information is final, accurate, and complete.

3.3.4 Final installation control drawings. Final installation control drawings shall consist of the following elements, as applicable and as specified (see 6.3). These drawings shall provide information which is final, accurate, and complete, to permit design agents or shipyards to proceed with construction pending receipt of equipment.

(a) Drawing list (see 3.3.6).
(b) Block diagram (see 3.3.7).
(c) Outline and installation drawing (see 3.3.8).

(d) Auxiliary cooling diagram (see 3.3.9).
(e) Auxiliary dry gas diagram (see 3.3.10).
(f) Cable running sheets (see 3.3.11).
(g) Summary list of installation material (see 3.3.12).
(h) Radio frequency (RF) transmission line diagram (see 3.3.13).
(i) Hydraulic fluid piping diagram (see 3.3.14).
(j) Synchro data transmission drawing (see 3.3.15).

3.3.5 Blocks. Blocks on preliminary, proposed final, and final drawings shall be as follows:

3.3.5.1 Title blocks. Title blocks shall be in accordance with figures 1 or 2 and as follows:

(a) Show drawing titles in the following form. See DOD-STD-100 for composition of item name.

ITEM NAME
TYPE DESIGNATION
TYPE OF DRAWING

(b) See figures 10 through 19 for examples of title lettering.
(c) Unless otherwise specified (see 6.2.), the Drawing No. block is for Government use.
(d) The other blocks are self-explanatory.

3.3.5.2 Signature blocks. Signature blocks shall be as shown on figures 1 or 2 and as follows:

(a) In the top block enter the Naval Sea Systems Command (NAVSEA) signature or Space and Naval Warfare (SPAWAR) signature, as applicable, unless otherwise specified (see 6.2).
(b) The acquisition manager, code, and date blocks are for Procuring activity use.

3.3.5.3 Validation blocks. Validation blocks shall be as shown on figures 1 or 2 and as follows:

(a) The Information and Data Validation block is for the contractor's signature and date of signature.
(b) The two lower blocks are for Navy use.

3.3.5.4 Revision blocks. Revision blocks shall be in accordance with figures 1 or 2. These blocks shall be used as specified in DOD-STD-100.

3.3.5.5 Materials, dimensions, and tolerance block. The materials, dimensions, and tolerance block shall be in accordance with figure 1.

3.3.6 Drawing list. The drawing list shall be prepared on a "B" size sheet in the format shown on figure 3, and shall contain the following:

(a) Identification of the equipment by nomenclature (item name and type designation).

(b) Each installation control drawing individually listed and identified by contractor's identification number and contractor's drawing number, with revision letter, if applicable.

(1) Government drawing numbers will be assigned and entered on the final drawings and drawing list by the procuring activity.
(2) Each outline and installation drawing listed shall be identified by the unit's type designation followed by unit number, in parentheses, and item name.

(c) The identification of equipment technical publications (technical manuals, field change bulletins, engineering change orders, ORDALTs and SHIPALTs which affect the installation or configuration of the equipment, operation and maintenance charts) by type designation, document title, and document identification number.
(d) The identification of equipment engineering drawings by type designation, drawing form, drawing number, and microfilm reel number in accordance with MIL-M-9868. When engineering drawings are furnished in a form other than digital or microfilm each top drawing (index) shall be listed individually.
(e) The identification of the equipment specification by specification number and date, including any revisions or amendments thereto.

3.3.6.1 Distribution statement. A distribution statement shall be located on page 1 of all installation control drawings in accordance with MIL-STD-1806, Distribution Statement C.

3.3.7 Block diagram. The block diagram shall be prepared in the format shown on figure 4 and shall contain the following:

(a) Single line blocks for units to be supplied with the equipment plus other items required to complete the installation. This includes items such as racks, junction boxes, motor generators isolation transformers, antennas, and hydraulic units. Blocks for the units and other items shall be arranged in a logical relationship to each other and shall meet the following requirements:

(1) The complete nomenclature and reference designation for each unit shall be shown.
(2) The reference designations for external receptacle connectors shall be shown and associated with their cables.
(3) Where standard electrical items such as junction boxes, transformers, and switches, are used, the standard symbol numbers and types in accordance with NAVSEA S0300-AT-GTP-010/ESL shall be shown.
(4) The blocks for units, junction boxes, motor generators, and similar items shall be limited to those required by this equipment. Cables and transmission lines going to other

equipment shall be shown as going to the first interface only. These interfaces shall be identified by name, but blocks shall not be shown for them.

(5) Units and items to be supplied with the equipment shall be identified as supplied with equipment (SWE).

(b) Cables and RF transmission lines which interconnect units, items, and other equipment, shall be shown by single lines from their origins to their destinations.

(1) Each cable and RF transmission line shall be identified by Navy cable designation (for example R-EA(50), R-RR(37), R-RY/Q(6)), type, and size.

a. These Navy cables designations will be assigned by the Government. The numerical part of each designation will be shown in parentheses. A note will state that the numbers in parentheses are for reference only and that the actual numbers are to be assigned by the installing activity.

b. The size will not be shown for cables to ship's power. A note will state that the sizes of these cables are to be determined by the installing activities.

c. Cable designations of the above type for cables to ship's power will not be shown. These cables will be identified by "W" numbers. A note will state that the cable designations for these cables are to be assigned by the installing activity, except when specified by the acquisition activity.

d. Cable designations and "W" numbers shall be keyed to the ones shown on the cable running sheets.

(2) Each cable and RF transmission line (excluding waveguide) except those to power will be identified by its electromagnetic compatibility category and group in accordance with NAVSEA S9407-AB-HBK-010.

a. Show the category only for cables to ship's power. Indicate that the groups are to be determined by the installing activity after the sizes have been determined.

b. Indicate that the installing activity may have to change group numbers of category S1, S2, and S4 cables in process of adding conduit to achieve the required isolation between cables.

c. Provide design performance sensitivities and frequency passbands of equipments connected to suscepter cables in categories S1, S2, and S4. Identify the cables to which these sensitivities and passbands apply.

(3) The types and sizes of cables going to interfacing equipment shall be shown. Cables between interfacing equip-

ments shall be identified by circuit designation if it is known, otherwise a "W" number shall be assigned to the cable.

(4) The interfacing equipment shall be identified by item name.

(5) Each individual cable to ship's power shall be identified by source of power, voltage, phase, and frequency (example: Ships power, 440 volts alternating current (V a.c.) 3-phase, 60 hertz (Hz)).

(c) Piping for auxiliary cooling, hydraulics, and dry air represented by single lines. Items such as valves, pressure gages, and thermometers shall not be shown on this drawing.

(d) Appropriate notes indicating:

(1) The limiting lengths of cable runs, if any.

(2) The relative locations of units to optimize operation, maintenance, reliability, cooling and safety. This includes clearances required to permit simultaneous opening of units for servicing.

(3) Electrical power requirements for each individual power source. The listing shall contain the following:

a. Type of power (type I, II or III as described in section 300 of DOD-STD-1399.

b. Normal operating voltage, frequency, phase, power factor and line current with tolerance for voltage and frequency. Show power factor as leading or lagging.

c. Peak starting line current in amperes, and recovery time.

d. Operating power-maximum demand in watts or kilowatts.

e. If the relationship between the normal operating voltage and line current, power factor, and power does not appear to be in accordance with standard engineering practice, explain the reason.

f. Explain any special power requirements which might result from wind loading, battle conditions, etc.

g. If applicable, state the power interrupt time; e.g., length of time power may be interrupted without the requirement to initiate restart sequence procedures (recovery time is interpreted to include restart sequence procedure(s)).

(e) Isolation transformers when required. Indicate whether or not isolation transformers are required and, if so, whether they are to be SWE or not supplied with equipment (NSWE).

(f) Cable assemblies supplied with the equipment identified by reference designation, type, size and electromagnetic category and group and also by Agency cable designation when used to connect two separately mounted units.

3.3.8 Outline and installation drawing. A separate drawing containing a first sheet and as many continuation sheets as required shall be prepared for each separately mountable unit assigned an individual nomenclature (item name and type designation). When two or more items are to be supplied in an equipment cabinet, a separate outline drawing depicting such cabinet, with items installed, shall be prepared. Each outline and installation drawing shall follow the format shown on figure 5 and shall include the following:

(a) A front elevation and such additional views as necessary to identify the following:

(1) Overall and principal dimensions necessary to establish the limits of space in all directions required for operation, maintenance, and installation.
(2) Clearances required for shock and vibration excursions.
(3) Clearances required to permit the opening of doors to obtain access to, and allow for the removal of units, assemblies, subassemblies, or parts.
(4) Clearance required for installation and removal of heavy or bulky items, access plates and travel or rotation of any moving item.
(5) Clearance required for cable, RF transmission line entrances (considering minimum bend radii) and cooling water or dry air entrances (considering minimum pipe bending radii). If cable bend radii are the controlling factors in clearances, show the clearances required using both straight and 90 degree connectors or stuffing tubes.
(6) Clearances required for ventilation.
(7) Clearance required above equipment to remove covers or components.
(8) Clearance required for maintenance personnel; identify these as clearances required for maintenance personnel.

(b) A breakdown of items which must be disassembled to permit entrance through access doors or hatches.
(c) Details for the equipment mounting as follows:

(1) Requirements for bolting, drilling, tapping, or welding.
(2) Dimensions and tolerances depicted on drilling or welding plans.
(3) Mounting hardware such as bolts, nuts, and flat washers required with identification as follows. (Nuts shall be self-locking and shall be in accordance with MIL-N-25027.)

a. By the MS number plus its dash number.
b. Bolt lengths to be determined by installing activity identified by diameter, MS number plus asterisk in lieu of dash number. (Example: 1.3 cm, MS 35307-*). Asterisk shall be explained by a note stating that the lengths of the bolts will be determined by the installing activity.

(4) Bolt hole clearances. When bolts (cap screws, machine screws, and studs) are installed using clearance holes, the clearance shall be minimized to properly share bolt shear loads and to reduce the effect of impacting due to load reversal under shock. The following shall be used for general guidance in determining clearances.

Nominal bolt diameter	Maximum diameter of hole
1.9 cm or smaller	Nominal bolt diameter plus 0.08 cm
Larger than 1.9 cm	Nominal bolt diameter plus 0.16 cm

(5) Flatness requirements for foundations.
(6) Torquing requirements for antenna, dome and other critical mounting nuts. Show dry and lubricated torquing values and indicate that prevailing or run on torque of self-locking nut is to be added to given torque.

(d) Sway braces where equipment height dictates the use of sway braces. Include a typical bracing arrangement.
(e) An indication as to whether or not resilient mounts are to be used. If such resilient mounts are NSWE, specify their type designation.
(f) The weight of each separately mountable item as installed. For liquid cooled items, wet weight shall also be indicated.
(g) Electrical power requirements including the following (electrical power requirements shall be in accordance with section 300 of MIL-STD-1399).

(1) Type of power (I, II, or III).
(2) Voltage, phase, frequency, operating line current, power factor, maximum operating power with tolerances for voltage and frequency. Indicate whether power factor is leading or lagging.
(3) Power source. If power is supplied by another unit, (not directly from ship's power) identify the other unit. If power is supplied by a motor generator set which is part of the equipment, the type and tolerances are not required.

(h) Heat dissipation requirements as follows:

(1) Total heat dissipation in watts (W).
(2) Breakdown of heat dissipation. When the item dissipates heat to both the air and auxiliary cooling devices, the amount of heat dissipated to the air and to auxiliary cooling shall be shown as separate values in Btu/hr.

(i) For continuous and reliable performance, operating temperature ranges, nonoperating temperature ranges and limits of relative humidity as determined by results of environmental test data, or recommended limits in the absence of such data. Show temperatures in degrees Celsius (°C)

(j) The location, size, and arrangement of ventilation openings and external ducts supplied or required and the following information as applicable:

(1) Flow rate in standard cubic meters per second (m^3/s) .
(2) Direction of flow.
(3) Equipment interface to ship's support service identifying the following, where applicable:

a. Duct size
b. Material
c. Allowable particle size
d. Allowable moisture content
e. Allowable velocity
f. Filter characteristics
g. Pressure required in inches of water

(k) The locations, types and dimensions for all cable and RF transmission line entrances identifying:

(1) The types and sizes of receptacle connectors, adapters, flanges, stuffing tubes, or clamps. Connectors, flanges, and associated hardware to be identified by Military part number. When the attitude of connectors is variable; for example, it can be pointed up or down, provide instructions for making the change. Also, show location of key on connector.
(2) Reference designations for connectors.
(3) The drilling requirements for the entrance plate by the use of a drilling plan.

(l) The location and identification by reference designations of all internal terminal boards and strips used for hookup of external cables, where connectors are not used.

(m) Instructions for hoisting, alining, water proofing, painting, and assembling the equipment.

(n) The center of gravity shown in three dimensions (on at least two views) for items weighing 10 kilograms or more . When two or more items are mounted together, the center of gravity shall be shown for each item and also for the combined items.

(o) Antenna data as follows:

(1) Dimensions for the location of the center of wind resistance.
(2) The resultant wind loading in pounds force at 100 knots for antennas with projected area of 0.10 square centimeters (cm^2) or more.

(3) Leveling tolerances on rotating antenna foundations.
(4) The antennas stowed position.
(5) The working circle dimensions for the limits of pitch and roll of stabilized antennas.

(p) Personnel and equipment safety requirements, such as warning of radiation hazard from a radioactive component.
(q) The following grounding method note: "Bonding and grounding shall be in accordance with MIL-STD-1310". If ground straps are required for any reason, the following information shall be provided:

(1) The number of ground studs required and the location of each.
(2) Types of hardware (bolts, nuts, and lock and flat washers) required to fasten the ground strap to the equipment and the mounting order arrangement.

(r) Auxiliary cooling details. Where auxiliary cooling is required, the following information shall be shown:

(1) Locations of connectors.
(2) Type of coolant used.
(3) Connector types, sizes, material and reference designations.
(4) A reference to the auxiliary cooling diagram for complete details.

(s) Dry gas details. Where dry gas is required, the following information shall be shown:

(1) Location and reference designations of connectors.
(2) Type of gas.
(3) Connector types, sizes and material.
(4) Leakage rates for pressurized units in cubic meters per second (std m^3/s).
(5) A reference to the auxiliary dry gas diagram for complete details.

(t) Hydraulic piping details. Where hydraulic piping is required, show the following:

(1) Locations of connectors.
(2) Type of fluid.
(3) Type, size and material of connectors.
(4) A reference to the hydraulic fluid piping diagram for complete details.

(u) The material of mounting and grounding surfaces.
(v) The grade and class of shock for the equipment as defined in MIL-S-901.

(w) Vibration requirements. Indicate whether or not the equipment meets the requirements for vibration as specified in MIL-STD-167-1 or MIL-STD-167-2. If so, indicate the type of vibration, for example, type I or type II.
(x) An indication as to whether or not a unit can be mounted exposed to weather.
(y) When required, list of special tools required for installation. (Special tools are defined as those tools not listed in the Federal Supply Catalog. Copies of this stock list may be consulted in the office of the Defense Contract Administration Management Area Operations (DCMAO)).

3.3.9 Auxiliary cooling diagram. Normally, demineralized cooling water or ethylene glycol/water mixture or both will be provided by the ship's cooling water system for support of electronic equipment. These systems are designed by the installing activities based on the appropriate Naval Sea Systems Command standard drawing and the cooling requirements of the electronic equipment as set forth on the auxiliary cooling diagram. In such cases the pumps, heat exchangers, coolant temperature control systems, flow controls, gages, piping, valves and other fittings are determined by the installing activity and are not required to be specified on the auxiliary cooling diagram. When the electronic equipment manufacturer designs a complete cooling system, all components, valves, piping, gages and fittings which the installing activities must assemble shall be specified on the auxiliary cooling diagram. In all cases the drawing shall clearly delineate the interface between the part of the system to be designed by the installing activity and the part designed by the electronic equipment manufacturer. The auxiliary cooling diagram shall follow the format shown on figure 13 and shall depict:

(a) All parts and their relative locations in the external coolant circuits, except that the part of the system to be designed by the installing activity shall be represented by a block with lines showing connections to the electronic equipment.
(b) The routing and direction of flow.
(c) The following information for each cooled unit:

(1) Type of coolant.
(2) Allowable contaminants, such a maximum allowable oxygen concentration in parts per million (p/m), chlorides in equivalent per million (e/m) and maximum allowable size of solids in microns (an installing activity cannot provide a coolant with requirements more stringent than those set forth in section 532 of MIL-STD-1399).
(3) Maximum allowable conductivity in micromhos per centimeter.
(4) Maximum allowable coolant inlet temperature.
(5) Design inlet coolant temperature.
(6) Minimum allowable coolant inlet temperature.
(7) Maximum allowable coolant flow rate in cubic meters per second (m^3/s) .
(8) Design coolant flow rate in m/sec .
(9) Coolant temperature rise through unit at design flow rate.
(10) Minimum allowable coolant flow rate in liters/sec . Also, indicate total system minimum flow rate, excluding such non-essential items as dummy loads, to facilitate

design of low flow alarms when the electronic equipment does not have integral low flow or thermal switches. If the equipment has such integral devices, so indicate.

(11) Coolant pressure drop across unit.
(12) Maximum allowable coolant inlet gage pressure in pascals (Pa).
(13) Back pressure limitations.
(14) Coolant test pressure for the cooled unit's internal parts.
(15) Pressure relief device blowout gage pressure in Pa
(16) Volume of coolant in unit.
(17) Procedure for connecting external piping (the unit will normally be shipped in clean condition and plugged to prevent contamination; the drawing shall explain how to remove the plug and indicate how contamination is to be avoided during hookup of external piping).
(18) Recommended cleaning procedure to be performed after installation (The Naval Sea Systems Command standard drawings provide a procedure for cleaning external cooling systems designed by installing activities before they are hooked up to the electronic equipment).
(19) Identification as (SWE) of all items supplied with equipment.
(20) Reference designations of piping connections to the equipment.

3.3.10 Auxiliary dry gas diagram. The auxiliary dry gas diagram shall follow the format shown on figure 7 and shall depict:

(a) Parts and their relative locations, including dry air lines and purge lines.

(1) The drawing is to indicate that the dry gas is to enter the RF transmission line at its lower end and that a purge line is to be run from its upper end to the vicinity of the input. The drawing will indicate that input and purge valves are to be located close to each other to facilitate purging.

(b) The routing and direction of flow.
(c) A statement that dry air conforming to section 102 of MIL-STD-1399 shall be supplied.
(d) All dry gas units with the following information:

(1) Type of gas (for example, air or nitrogen).
(2) Maximum dew point for the pressure specified.
(3) Minimum and maximum inlet pressures.
(4) Maximum pressure drop.
(5) Required purity moisture content.
(6) Recommended test pressure.
(7) Identification of dryer unit by model number and manufacturer's name and address, if applicable.
(8) Reference designations.

(e) Recommended cleaning procedure to be performed after installation.
(f) Identification as SWE, of all items supplied with the equipment.
(g) Estimated total leakage rate in std m^3/s.
(h) Estimated flow rate for purging, in std m^3/sec (one line at a time).

3.3.11 Cable running sheets. Cable running sheets shall consist of a title sheet and such other continuation sheets as required. The sheets shall be size A and shall conform to the following requirements:

(a) The title sheet shall contain revision status blocks and conform to the format shown on figure 8.
(b) The continuation sheets shall conform to the formats shown on the continuation sheets on figure 8.
(c) Separate cable running sheet(s) shall be provided for each cable, except that more than one cable, may be placed on one sheet, in some instances as shown on figures 8-3 and 8-5. The following information shall be provided, in the appropriate blocks and columns, for each cable:

(1) Cable type and size; types shall be in accordance with MIL-STD-242, except that the type only shall be shown for cables to ship's a.c. power. For cable(s) to ship's a.c. power, a note shall be added to indicate that the size is to be determined by the installing activity as shown on figure 8-4.
(2) Number of active conductors.
(3) Cable designation, or reference designation for cable assemblies supplied with the equipment, except that the cable designation shall not be shown for cables to a.c. power, the following shall apply.

a. The Government will assign the cable designation. The numerical part is for reference only and will be shown in parentheses; for example, R-RT(15). A note shall indicate that the actual numeral portions are to be assigned by the installing activity.
b. For cables to a.c. power a note shall be added to indicate that the cable designations are to be assigned by the installing activity as shown on figure 8-4. Identify these cables by "W" numbers to agree with the block diagram.
c. Cables between interfacing equipments shall be identified by circuit designation if it is known, otherwise a "W" number shall be assigned to the cable.

(4) Unit numbers of equipment at each end of cable.
(5) Item name or type designation of equipment at each end of the cable.
(6) Military part numbers for plug connectors at each end of the cable. The contacts of multiconductor connector as

required by MIL-STD-242 shall be assigned to cable conductors in accordance with MIL-STD-1683.

(7) Identity of each connector, terminal board or strip, and terminal or contact number, including contacts not used.
(8) Identity of each conductor by number, color code, and function.
(9) Identity of shield connections by contact or terminal and function.
(10) All conductors of multiconductor cable, whether active or spare.
(11) Cables going to other equipment identified by function only at the "to" end.
(12) Cables going to other equipment, shown to the first interface only.

(d) The cable running sheets shall show details of grounding, grouping or otherwise terminating cable shields.
(e) For non-standard cables the cable running sheets shall show the following as notes.

(1) Number of conductors in cable.
(2) Nominal diameter of conductor.
(3) Nominal area of conductor, in circular mils.
(4) Maximum outer diameter (o.d.) of cable.
(5) Rated voltage.
(6) Minimum bend radius.
(7) Current rating.
(8) Resistance or attenuation.
(9) Frequency range.
(10) Capacitance.
(11) Material of insulation, jacket and filler.
(12) Shielding details.
(13) Characteristic impedance.
(14) Cable manufacturer(s).
(15) Coaxial or multiconductor.
(16) Length of lay for pairs and triads.
(17) Conductor, pair or triad numbers and color codes.
(18) Weight per cable meter.

3.3.12 Summary list of installation material. The summary list of installation material shall serve as a master bill of material required to complete the installation. The drawing shall be prepared on a "C" size sheet in the format shown on figure 9 and shall indicate the following:

(a) Each item, designated as SWE or NSWE.
(b) Individual units to be supplied under the contract.
(c) All other items such as junction boxes, transformers, and switches, needed to complete the installation.

(1) Where such items are standard electrical items, show the types and symbol numbers in accordance with NAVSEA S0300-AT-GTP-010/ESL.

(d) Types and quantities of special tools, mounting equipment, mounting hardware, connectors, bulk material, parts, loose hardware, test equipment, and other items needed to complete the installation.

(1) The units with which these items are used shall be identified; for example, U/W item 1.
(2) Where installation kits are provided, list the contents individually.

(e) Types and sizes of cables to be supplied by the installing activity. Show "AR" (as required) in NSWE column.
(f) Cable assemblies to be SWE shall be identified as follows:

(1) Types of connectors.
(2) Lengths of cable assemblies.
(3) Types of cables.

(g) Waveguides, rigid or semi-rigid coaxial cables, including all components of waveguide and coaxial transmission line runs and fittings for such items as flanges, bends, adapters, and pressure windows and pressure inlets. Where waveguides are SWE, show the lengths of sections as well as overall lengths. Where exact numbers can not be specified show AR.
(h) Items used for auxiliary cooling, dry air, and hydraulic systems.

3.3.13 RF transmission line diagram. A detail drawing shall be required when waveguide, semi-rigid or rigid coaxial transmission line is used. This drawing shall depict the typical routing of the transmission line, shall conform to the format shown on figure 10 and shall include the following:

(a) Type of waveguide, semi-rigid or rigid coaxial transmission line, waveguide bends, twists, flexible sections, adapters, flanges, inner connectors, gaskets, alinement pins, and hardware (as approved by the command or agency concerned) identified by military part numbers. Also, include items such as hangers and deck and bulkhead penetrations.
(b) Connecting flanges on units connected by transmission line(s), identified by military part numbers.
(c) Entrance of dry air lines and purge lines, as applicable.
(d) Pressure fittings and waveguide pressure windows when required.
(e) Notes indicating any requirement limiting the overall length of the transmission line, the number and types of fittings (for example, E or H bend), and minimum radius bends.
(f) Notes indicating that fabrication and installation of waveguide or coaxial transmission line, including deck or bulkhead fitting, supports, preservation, painting and testing shall be in accordance with NAVSEA 0967-LP-000-0110.
(g) Note indicating that insertion loss and voltage standing wave ratio shall be in accordance with NAVSEA 0967-LP-000-0110, and that the measurements shall be made in accordance with NAVSEA 0967-LP-000-0130.

(h) When required, a note indicating that transmission lines shall be grounded in accordance with MIL-STD-1310.
(i) Reference to drawing list.
(j) Identity, as SWE, of all items supplied with the equipment.

3.3.14 Hydraulic fluid piping diagram. A hydraulic fluid piping diagram shall be required when hydraulic equipment is part of or is used with electronic equipment. This drawing shall be in the format shown on figure 18 and shall provide, directly or by reference as specified herein, information needed by an installing activity to assemble, install, clean, and test the hydraulic equipment. In addition, the drawing shall enable the installing activity to provide, assemble, install, clean and test the piping, hoses, and other fittings between the hydraulic equipment provided by an equipment contractor and the activity's hydraulic interface, where applicable. The drawing shall specify that the installation, cleaning, and testing of the hydraulic system and parts shall be in accordance with MIL-STD-419 and NAVSEA S9086-S4-STM-000/CH-556. Symbols on the drawing shall be in general accordance with ANSI Y32.10; any other symbols used shall be explained on the drawing. All units supplied with equipment shall be identified as "SWE". The drawing shall depict as a minimum:

(a) Parts and their relative locations.
(b) Type of hydraulic fluid to be used.
(c) Routing and direction of fluid flow.
(d) Fluid flow rates in m^3/min under normal operating conditions.
(e) Minimum allowable hydraulic fluid flow rate required by the hydraulic equipment.
(f) Nominal hydraulic fluid operating pressure required by the hydraulic equipment.
(g) Maximum allowable hydraulic fluid flow rate.
(h) Hydrostatic test pressure.
(i) Maximum allowable fluid operating temperature for which the hydraulic equipment is designed.
(j) Minimum allowable fluid temperature for which the hydraulic equipment is designed.
(k) Port connections.
(l) Filtration requirements.
(m) Reference designation of items such as hydraulic motors, valves, pumps, regulators, and associated electric solenoids.
(n) Identity of disconnects, such as unions.
(o) An indication that piping shall have vents at high points and drains at low points, as necessary to properly vent and drain the system.
(p) Relief valve setting and test procedure (NAVSEA S9086-S4-STM-000/CH-556).
(q) Special requirements, such as those for safety. Such requirements shall be shown in notes or tables with appropriate references.
(r) Fluid volume of parts.

3.3.15 Synchro data transmission drawing. A synchro data transmission drawing shall be required when equipment originates or terminates synchro signals. This drawing shall depict as a minimum (also see figure 19 for typical presentation):

(a) Equipment accuracy requirements in minutes of arc for both static and dynamic operations.

(1) The required accuracy of the input synchro data signal to allow the user equipment to operate within its designed limits.
(2) For synchro data signal generating equipment the design accuracy of the output signal.

(b) The electrical distribution of the interfacing synchro data signal internal to the generating or user equipment.

(1) All components, identified by their military designations or military part numbers.
(2) Resistors, capacitors, and inductors also identified by their electrical values.
(3) Input impedances where input synchro circuits are terminated in amplifiers or networks. A load impedance impressed on the secondary of a control transformer shall be in accordance with section 702 of MIL-STD-1399.
(4) The electrical characteristics of non-standard components, if any.

(c) Alinement requirements unique to the equipment.

(1) Recommend alinement tolerances necessary to achieve the specified equipment accuracy.

(d) Number identification of terminal boards and terminals and:

(1) Signal function.
(2) Signal parameter data.
(3) The direction of rotation and a precise correlation of the direction of rotation with respect to the function.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specifications where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.2 Nonconforming data item. Failure of the item to conform to the requirements of this specification will result in rejection as a nonconforming item.

4.3 Inspection of packaging. The packaging, packing and marking shall be inspected for compliance with section 5 of this document.

5. PACKAGING

5.1 Packaging. Data items delivered under this specification shall be packaged flat or rolled in the most appropriate commercial containers conforming to the requirements of Uniform Freight Classification Rules and Regulations which provide protection against deterioration and physical damage during shipment from contractor to receiving activity for immediate use.

5.1.1 Classified material. Classified material shall be packaged in accordance with DOD-5220.22-M.

5.2 Marking of shipment. Identification and address markings for interior packages and shipping containers shall be in accordance with MIL-STD-129.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Installation control drawings are intended for use by installing activities to plan and carry out installation of electronic equipment.

6.2 Acquisition requirements. Acquisition documents should specify the following:

(a) Title, number, and date of this specification.
(b) State contracting activity identification to be shown in title block (see 3.2.1.2).
(c) Whether drawings with metric units or Inch-Pound are required (see.3.2.2).
(d) Type of revision required (see 3.2.11).
(e) Whether Government or contractor will enter drawing numbers (see 3.3.5.1).
(f) State contracting activities name to appear in signature block (see 3.3.5.2).

(g) State the types of drawings required (see 3.2.10).

6.3 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contact. The applicable Data Item Description (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To insure correct contractural application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DoD FAR Supple-ment 27.475-1 exempts the requirements for a DD Form 1423.

Reference paragraph	DID number	DID Title	Suggested Tailoring
3.2.10.1 and 3.3.1	DI-DRPR-81243	Installation design reservation data	----
3.2.10.2	DI-EDRS-80407	Aperture Cards	----
3.2.10.2, 3.2.10.3, 3.3.2, 3.3.3, 3.3.4 and 3.2.11	DI-DRPR-81242	Installation control drawings	----

The above DID's were those cleared as of the date of this specification. The current issue of DoD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423.

NOTE: 1. DI-DRPR-81242 must be tailored, via the Contract Data Requirements List (CDRL), to specify the types of drawings to be delivered.

6.3.1 The data requirements of 6.3 and any task in sections 3, 4, or 5 of this specification required to be performed to meet a data requirement may be waived by the contracting/acquisition activity upon certification by the offeror that identical data were submitted by the offeror and accepted by the Government under a previous contract for identical item acquired to this specification. This does not apply to specific data which may be required for each contract, regard-less of whether an identical item has been supplied previously (for example, test reports).

6.4 Definitions. For the purpose of this specification, the following definitions shall apply.

6.4.1 Equipment. The term equipment is generic and applies to any or all equipment subdivisions as defined in MIL-STD-280.

6.4.2 Interface. A term used to denote any physical or functional con-frontation with items which are not part of the basic equipment being supplied.

6.4.3 RF transmission lines. A generic term used to denote rigid coaxial cable, and waveguide.

6.4.4 Installation control drawings. The term installation control drawing shall include those associated data lists, diagrammatic drawings and special drawings, as defined in this specification required for the installation of electronic equipment (see 3.1). Illustrations contained herein that are prepared in accordance with DOD-STD-100 as Installation Control Drawings will bear such notation adjacent to the title block.

6.5 Metric practices.

6.5.1 Selection. When expressing a quantity by a numerical value and a unit, prefix should preferably be chosen so that the numerical value lies between 0.1 and 1000. To minimize variety, it is recommended that prefixes representing 1000 raised to an integral power be used. However, three factors may justify deviation from the above:

6.5.1.1 In expressing area and volume, the prefixes hecto, deka-, deci-, and centi may be required, for example square hectometre, cubic centimetre.

6.5.1.2 In tables of values of the same quantity, or in a discussion of such values within a given context, it is generally preferable to use the same unit multiple throughout.

6.5.1.3 For certain quantities in particular applications, one particular multiple is customarily used. For example, the millimetre is used for linear dimensions in mechanical engineering drawings even when the values lie far outside the range 0.1 to 1000 mm; the centimetre is often used for body measurements and clothing sizes.

6.6 Subject term (key word) listing.

revision block
validation blocks

6.7 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Preparing activity:
Navy - SH
(Project DRPR-N317)

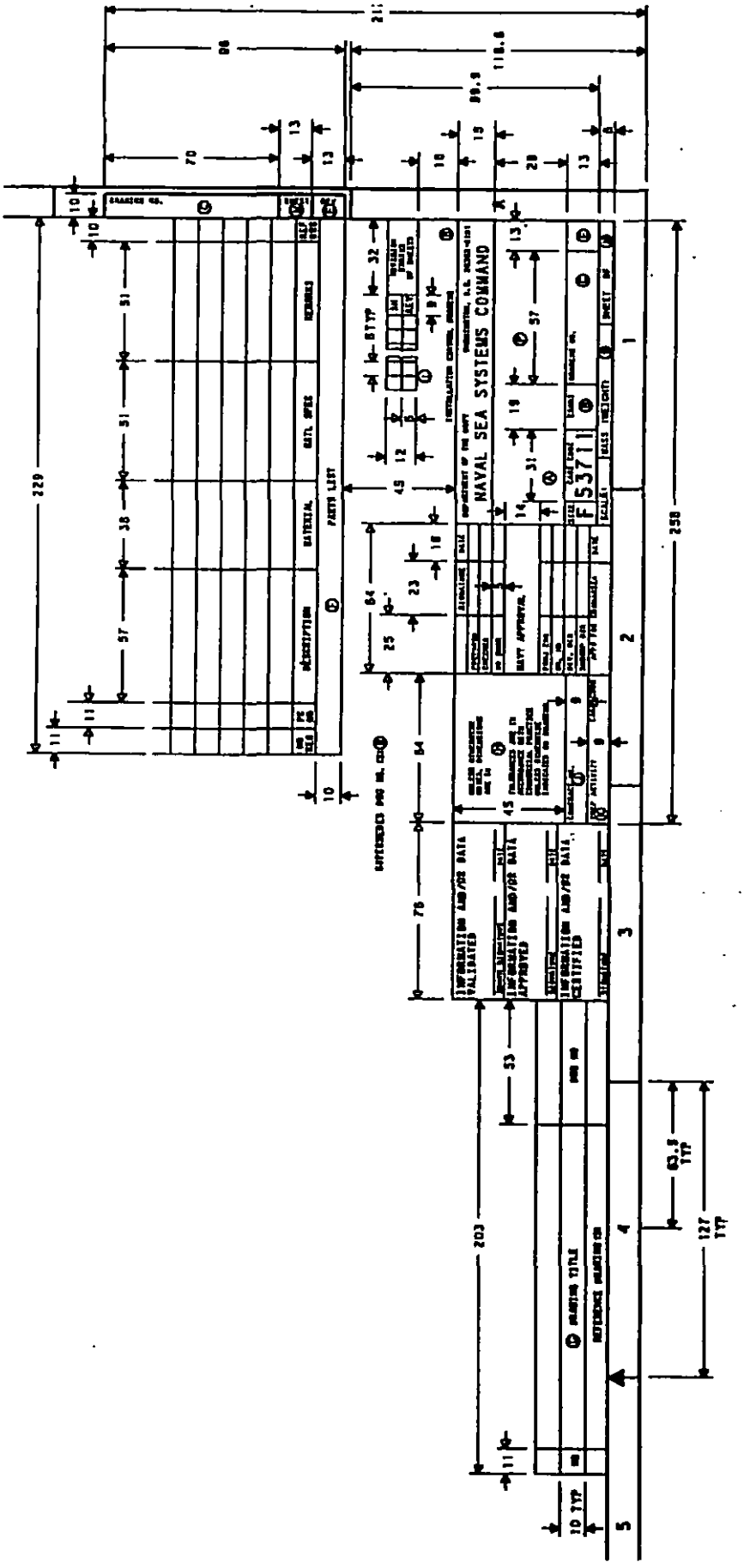
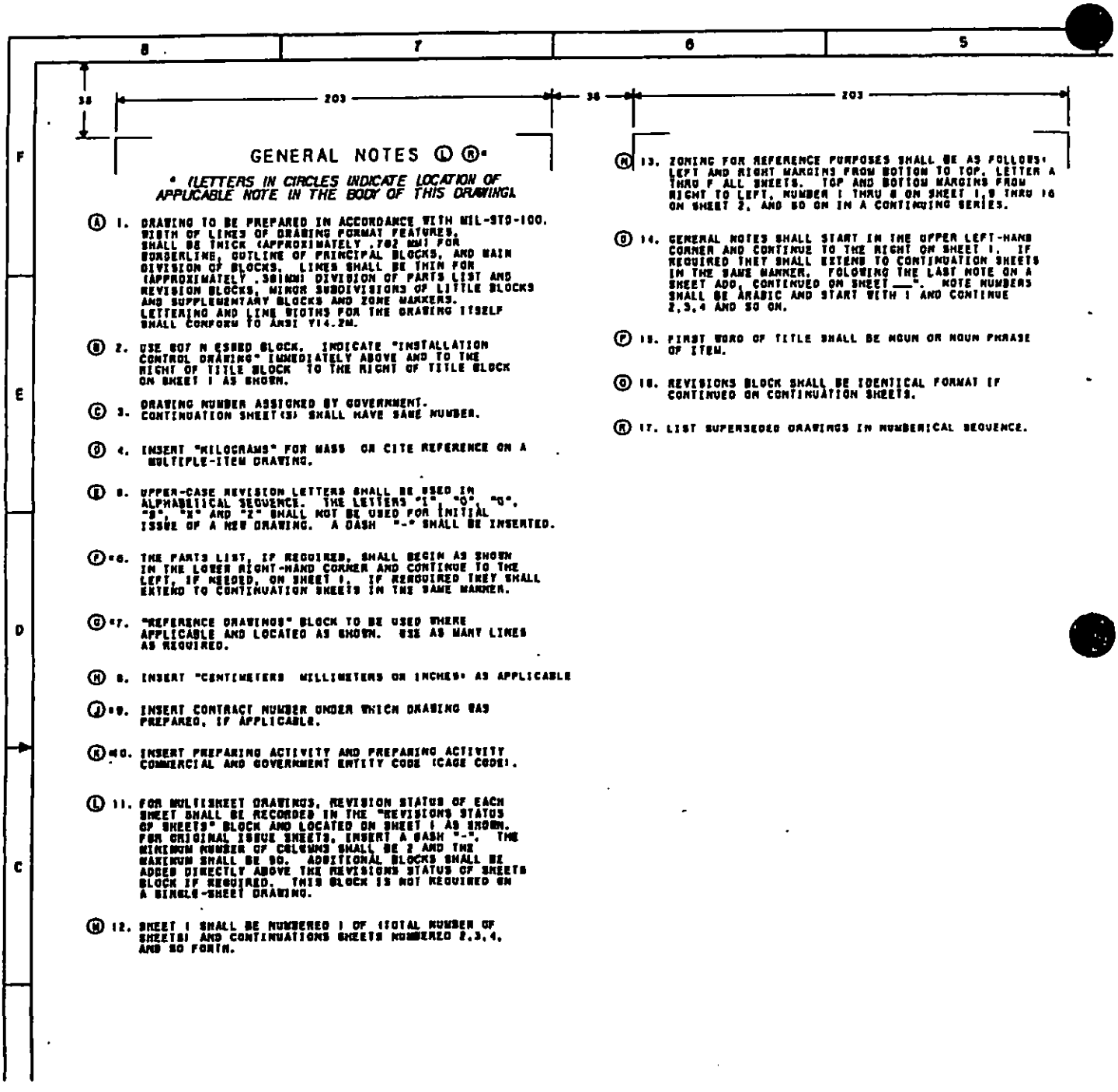


FIGURE 1-1 TITLE, REFERENCE, & SIGNATURE BLOCK FOR SIZE D, E & F SIZE DRAWINGS



GENERAL NOTES Ⓛ Ⓡ*

(LETTERS IN CIRCLES INDICATE LOCATION OF APPLICABLE NOTE IN THE BODY OF THIS DRAWING)

Ⓐ 1. DRAWING TO BE PREPARED IN ACCORDANCE WITH MIL-STD-100. WIDTH OF LINES OF DRAWING FORMAT FEATURES, SHALL BE THICK (APPROXIMATELY .702 mm) FOR BORDERLINE, OUTLINE OF PRINCIPAL BLOCKS, AND MAIN DIVISION OF BLOCKS. LINES SHALL BE THIN FOR (APPROXIMATELY .381mm) DIVISION OF PARTS LIST AND REVISION BLOCKS, MINOR SUBDIVISIONS OF LITTLE BLOCKS AND SUPPLEMENTARY BLOCKS AND ZONE MARKERS. LETTERING AND LINE WIDTHS FOR THE DRAWING ITSELF SHALL CONFORM TO ANSI Y14.2M.

Ⓑ 2. USE BOX IN ESSED BLOCK. INDICATE "INSTALLATION CONTROL DRAWING" IMMEDIATELY ABOVE AND TO THE RIGHT OF TITLE BLOCK TO THE RIGHT OF TITLE BLOCK ON SHEET 1 AS SHOWN.

Ⓒ 3. DRAWING NUMBER ASSIGNED BY GOVERNMENT. CONTINUATION SHEET(S) SHALL HAVE SAME NUMBER.

Ⓓ 4. INSERT "KILOGRAMS" FOR MASS OR CITE REFERENCE ON A MULTIPLE-ITEM DRAWING.

Ⓔ 5. UPPER-CASE REVISION LETTERS SHALL BE USED IN ALPHABETICAL SEQUENCE. THE LETTERS "I" "O", "Q", "S", "X" AND "Z" SHALL NOT BE USED FOR INITIAL ISSUE OF A NEW DRAWING. A DASH "-" SHALL BE INSERTED.

Ⓕ*6. THE PARTS LIST, IF REQUIRED, SHALL BEGIN AS SHOWN IN THE LOWER RIGHT-HAND CORNER AND CONTINUE TO THE LEFT, IF NEEDED, ON SHEET 1. IF REQUIRED THEY SHALL EXTEND TO CONTINUATION SHEETS IN THE SAME MANNER.

Ⓖ*7. "REFERENCE DRAWINGS" BLOCK TO BE USED WHERE APPLICABLE AND LOCATED AS SHOWN. USE AS MANY LINES AS REQUIRED.

Ⓗ 8. INSERT "CENTIMETERS MILLIMETERS OR INCHES" AS APPLICABLE

Ⓙ*9. INSERT CONTRACT NUMBER UNDER WHICH DRAWING WAS PREPARED, IF APPLICABLE.

Ⓚ*10. INSERT PREPARING ACTIVITY AND PREPARING ACTIVITY COMMERCIAL AND GOVERNMENT ENTITY CODE (CAGE CODE).

Ⓛ 11. FOR MULTISHEET DRAWINGS, REVISION STATUS OF EACH SHEET SHALL BE RECORDED IN THE "REVISIONS STATUS OF SHEETS" BLOCK AND LOCATED ON SHEET 1 AS SHOWN. FOR ORIGINAL ISSUE SHEETS, INSERT A DASH "-". THE MINIMUM NUMBER OF COLUMNS SHALL BE 2 AND THE MAXIMUM SHALL BE 30. ADDITIONAL BLOCKS SHALL BE ADDED DIRECTLY ABOVE THE REVISIONS STATUS OF SHEETS BLOCK IF REQUIRED. THIS BLOCK IS NOT REQUIRED ON A SINGLE-SHEET DRAWING.

Ⓜ 12. SHEET 1 SHALL BE NUMBERED 1 OF (TOTAL NUMBER OF SHEETS) AND CONTINUATIONS SHEETS NUMBERED 2,3,4, AND SO FORTH.

Ⓡ 13. ZONING FOR REFERENCE PURPOSES SHALL BE AS FOLLOWS: LEFT AND RIGHT MARGINS FROM BOTTOM TO TOP, LETTER A THRU F ALL SHEETS. TOP AND BOTTOM MARGINS FROM RIGHT TO LEFT, NUMBER 1 THRU 8 ON SHEET 1, 9 THRU 16 ON SHEET 2, AND SO ON IN A CONTINUING SERIES.

Ⓟ 14. GENERAL NOTES SHALL START IN THE UPPER LEFT-HAND CORNER AND CONTINUE TO THE RIGHT ON SHEET 1. IF REQUIRED THEY SHALL EXTEND TO CONTINUATION SHEETS IN THE SAME MANNER. FOLLOWING THE LAST NOTE ON A SHEET ADD, CONTINUED ON SHEET ___". NOTE NUMBERS SHALL BE ARABIC AND START WITH 1 AND CONTINUE 2,3,4 AND SO ON.

Ⓠ 15. FIRST WORD OF TITLE SHALL BE NOUN OR NOUN PHRASE OF ITEM.

Ⓢ 16. REVISIONS BLOCK SHALL BE IDENTICAL FORMAT IF CONTINUED ON CONTINUATION SHEETS.

Ⓡ 17. LIST SUPERSEDED DRAWINGS IN NUMBERICAL SEQUENCE.

FIGURE 1-2 GENERAL NOTES SHEET 1

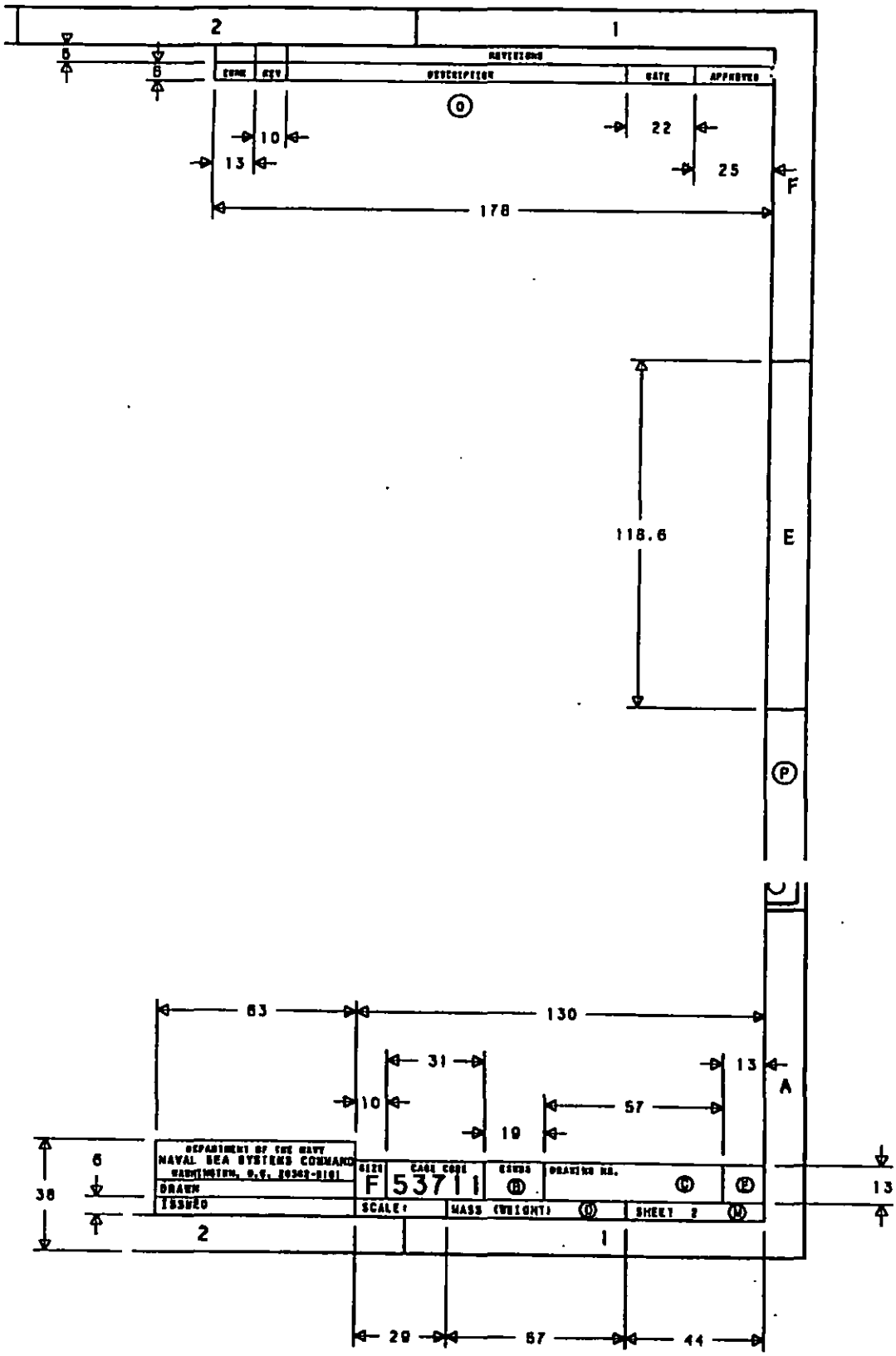


FIGURE 1-3 CONTINUATION SHEET TITLE BLOCK SIZE D, E & F

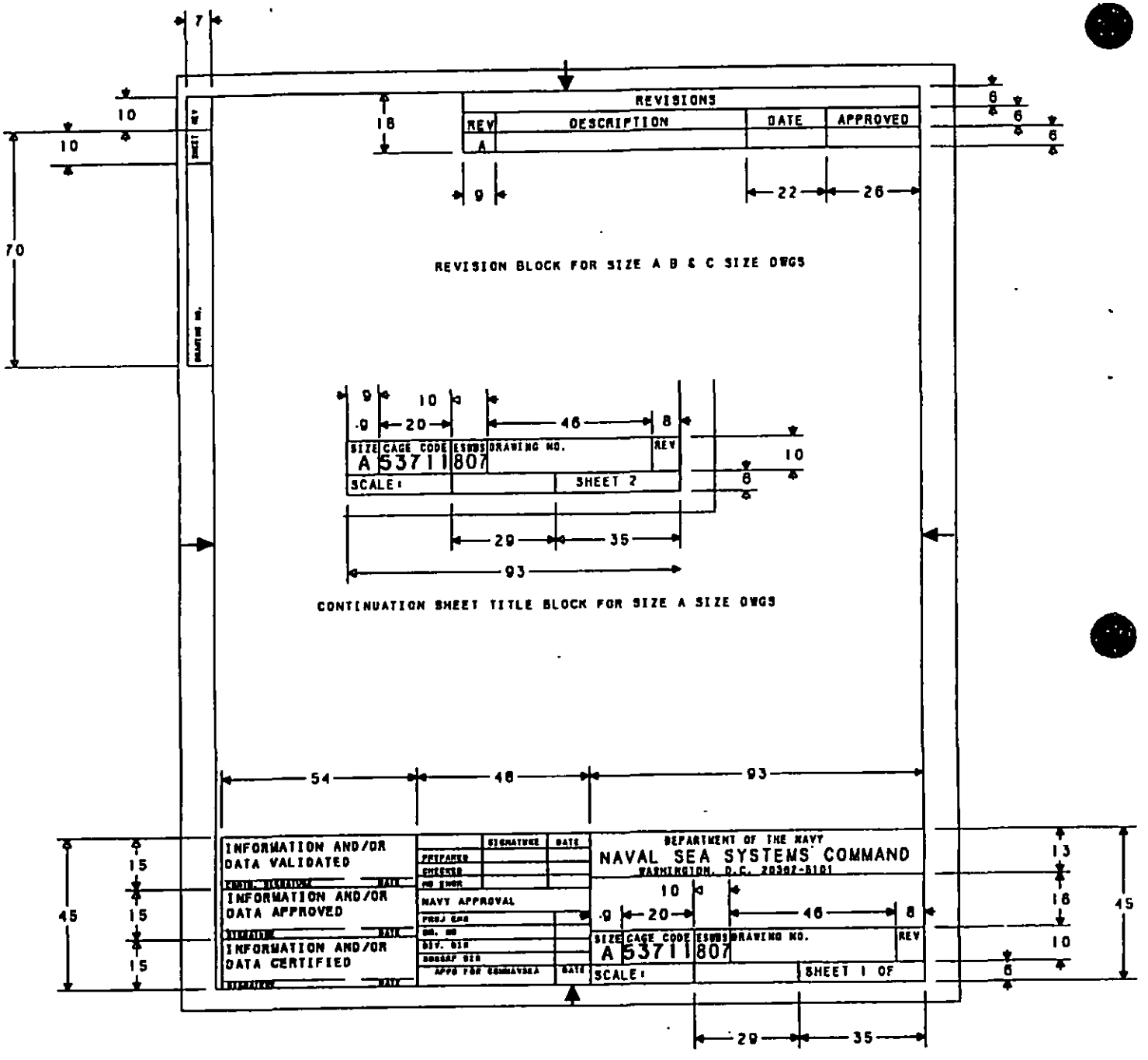
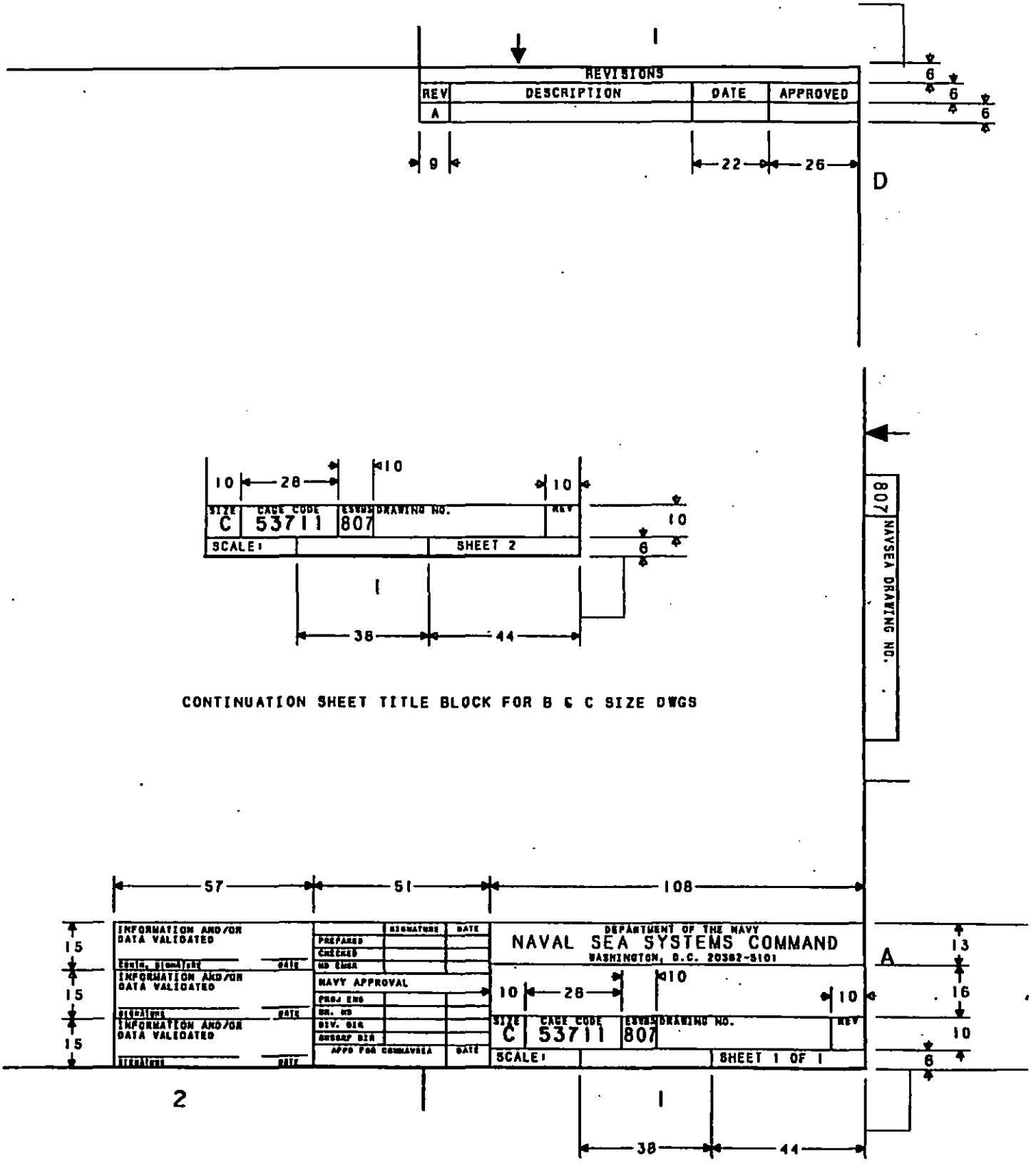


FIGURE 2 TITLE BLOCK FOR SIZE A SIZE DWGS



CONTINUATION SHEET TITLE BLOCK FOR B & C SIZE DWGS

FIGURE 2-1 TITLE BLOCK FOR B & C SIZE DWGS

DOCUMENT NOMENCLATURE	DOCUMENT IDENTIFICATION			
	CONTR. IDENT. NO.	DRAWING NUMBER	REV LTR	NAVSEA/NAVY STOCKING NUMBER
TRANSPONDER SET AN/ABC-10				
DRAWING LIST	12345	100010	C	
BLOCK DIAGRAM		100020	B	
AUXILIARY DRY GAS SYSTEM DIAGRAM		100030	B	
CABLE RUNNING SHEETS		100040	C	
SUMMARY LIST OF INSTALLATION MATERIAL		100050	C	
OUTLINE AND INSTALLATION DRAWING				
RT-859/ABC-10 (UNIT 1), RECEIVER-TRANSMITTER		100060		
KIT-1A/T SEC (UNIT 2), TRANSPONDER COMPUTER		100070	B	
C6280/ABC (UNIT 3), CONTROL TRANSPONDER		100080	C	
PP-6609/ABC-5 (UNIT 4), POWER SUPPLY		100090	C	
AS-177/ABC (UNIT 5), ANTENNA	12345	100100	B	
RT-859/ABC TECHNICAL MANUAL PP-6609/ABC-5 TECHNICAL MANUAL				0987-123-1231 0987-123-1232
AN/ABC-10 ENGINEERING DRAWINGS (MICROFILM EQUIPMENT SPECIFICATION SHIPS-N-5432 OF 1 JUL 87				REEL NO. M/F 12345

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	DRAWING RELEASED BY NAVSEA		

THIS SAMPLE DRAWING SHALL BE CONSIDERED AS INFORMATIONAL ONLY. IT IS COMPLETE TO THE DEGREE NECESSARY TO ILLUSTRATE A CONDITION. DRAWINGS SHALL CONFORM TO THE REVISED REQUIREMENTS SET FORTH IN THIS SPECIFICATION.

INSTALLATION CONTROL DRAWING

DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
WASHINGTON, D.C. 20362-5101

TRANSPONDER SET
AN/ABC-10
DRAWING LIST

SIZE	CAGE CODE	TECHNOLOGIES NO.	REV
C	53711	807	

SCALE: | SHEET 1 OF 1

807 REVISED DRAWING NO.

MIL-D-23140D(NAVY)

FIGURE 3 DRAWING LIST

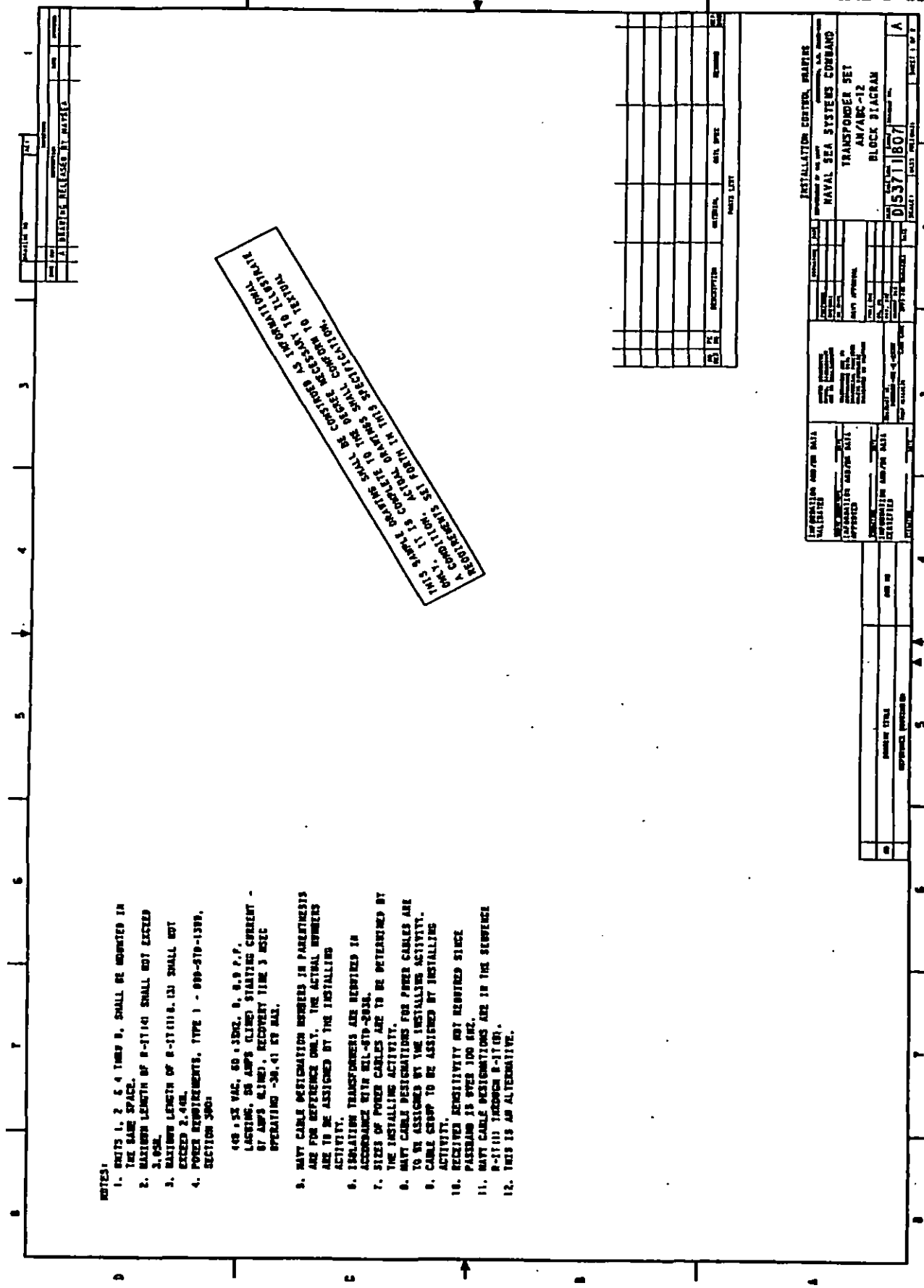


FIGURE 4-1 BLOCK DIAGRAM

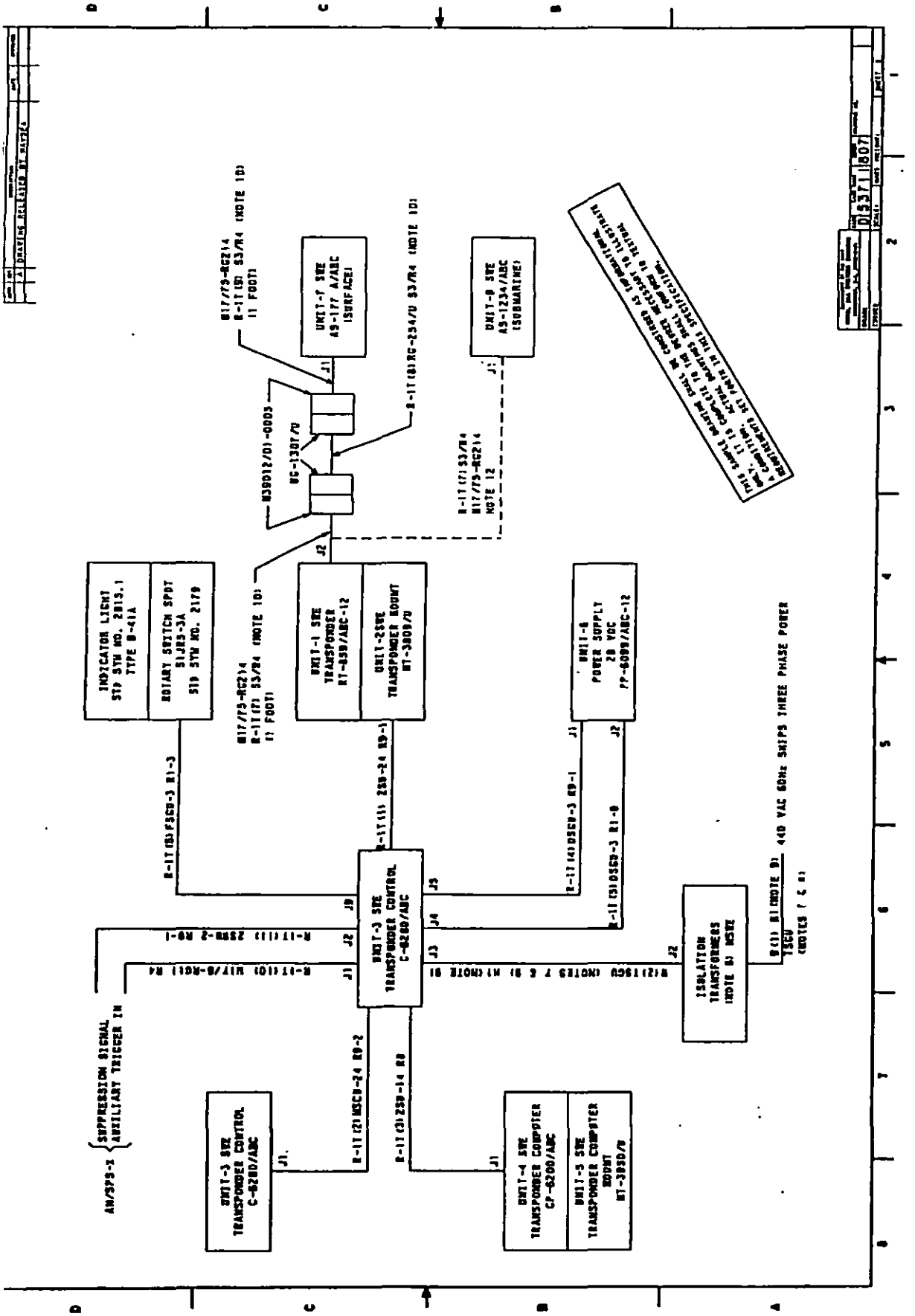


FIGURE 4-2 BLOCK DIAGRAM

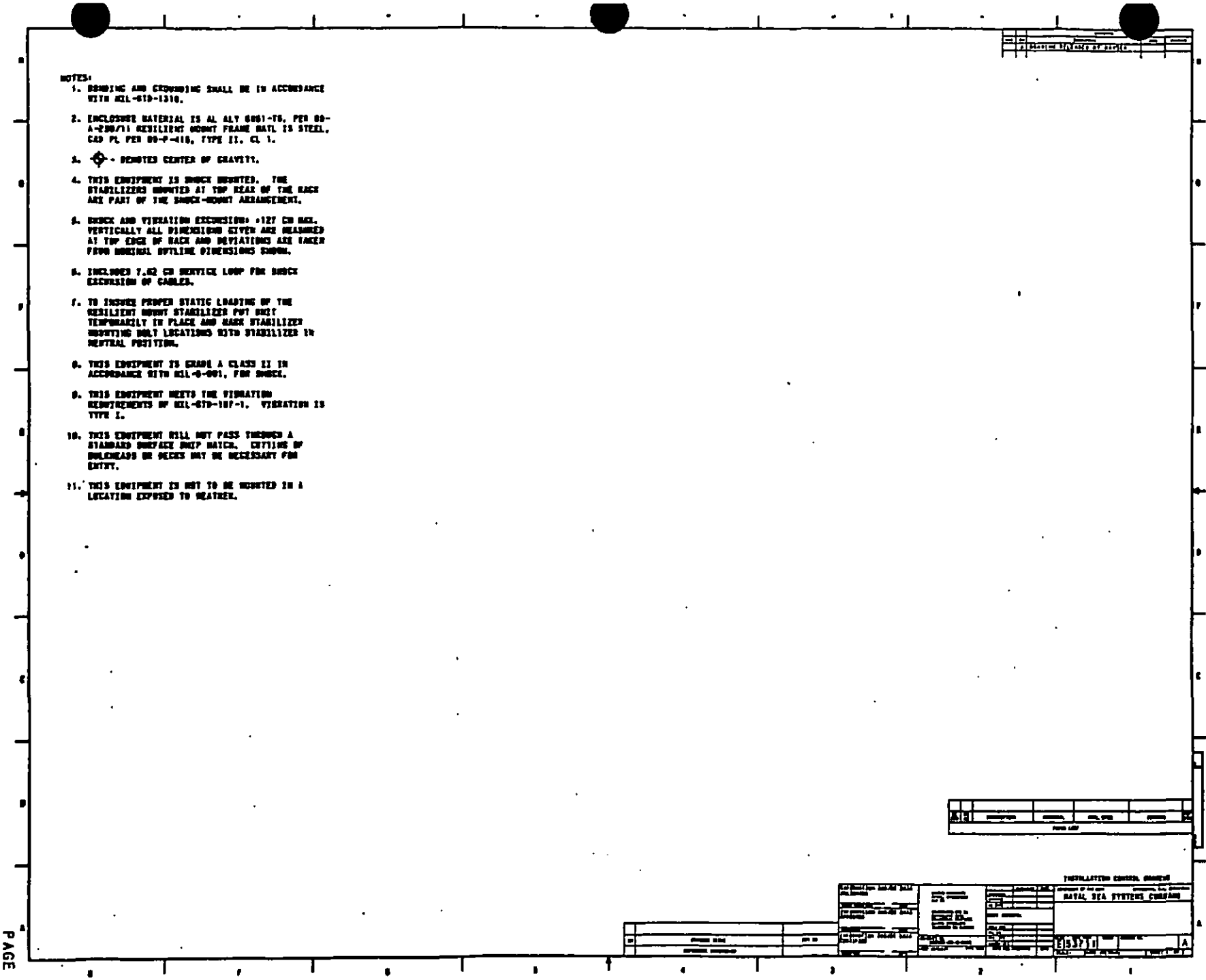


FIGURE 5-1 OUTLINE AND INSTALLATION DRAWING

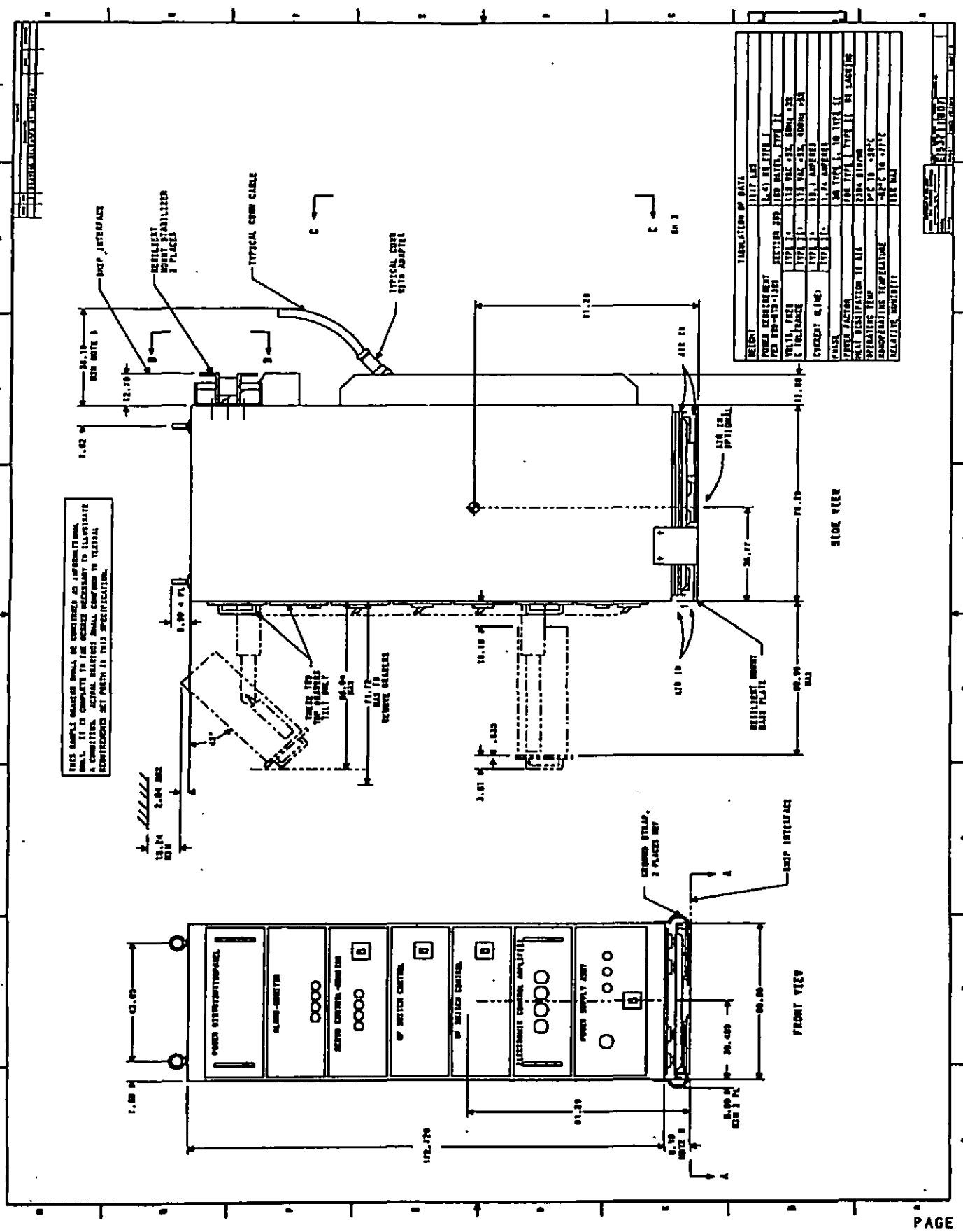


FIGURE 5-2 OUTLINE AND INSTALLATION DRAWING

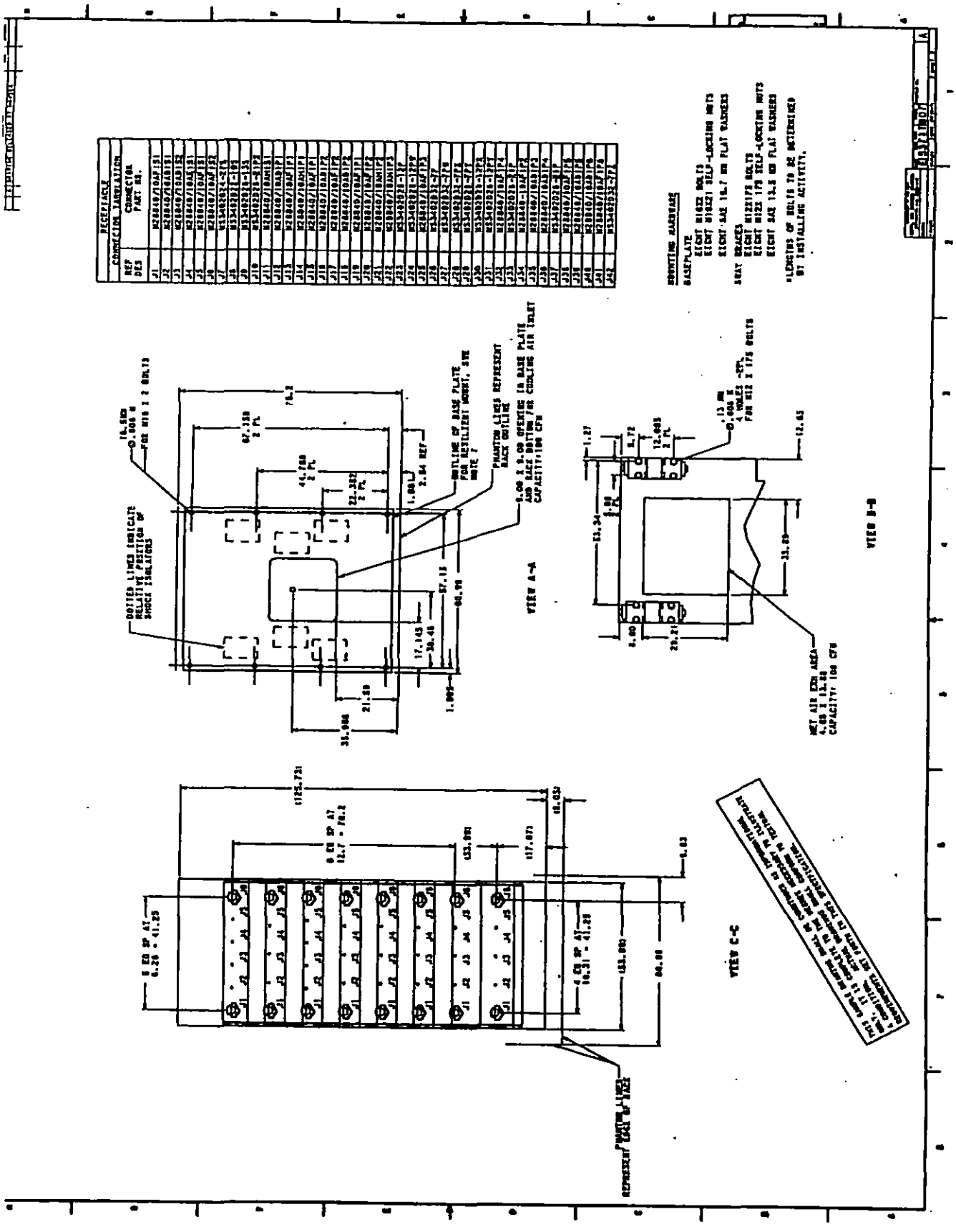


FIGURE 5-3

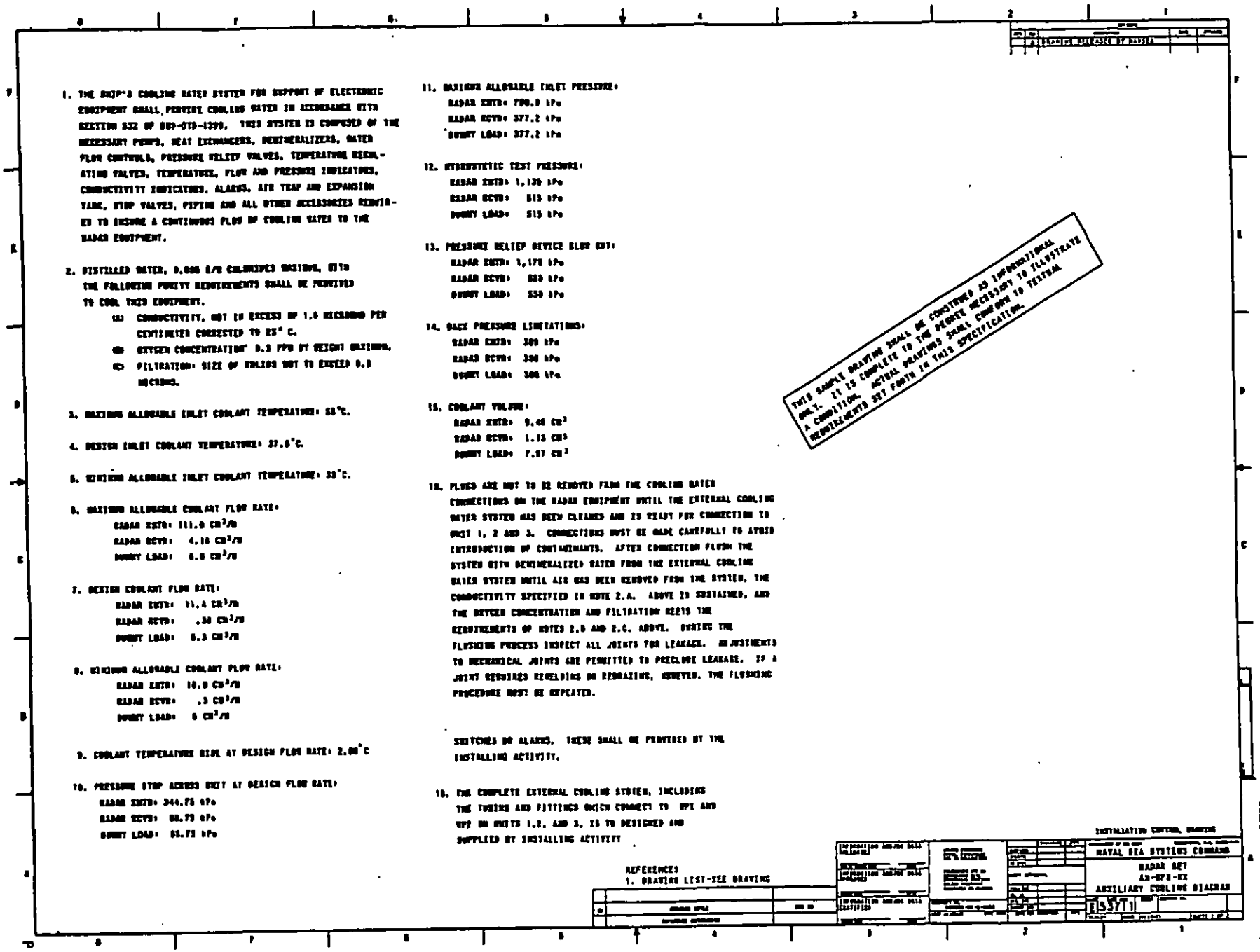


FIGURE 6-1 AUXILIARY COOLING DIAGRAM

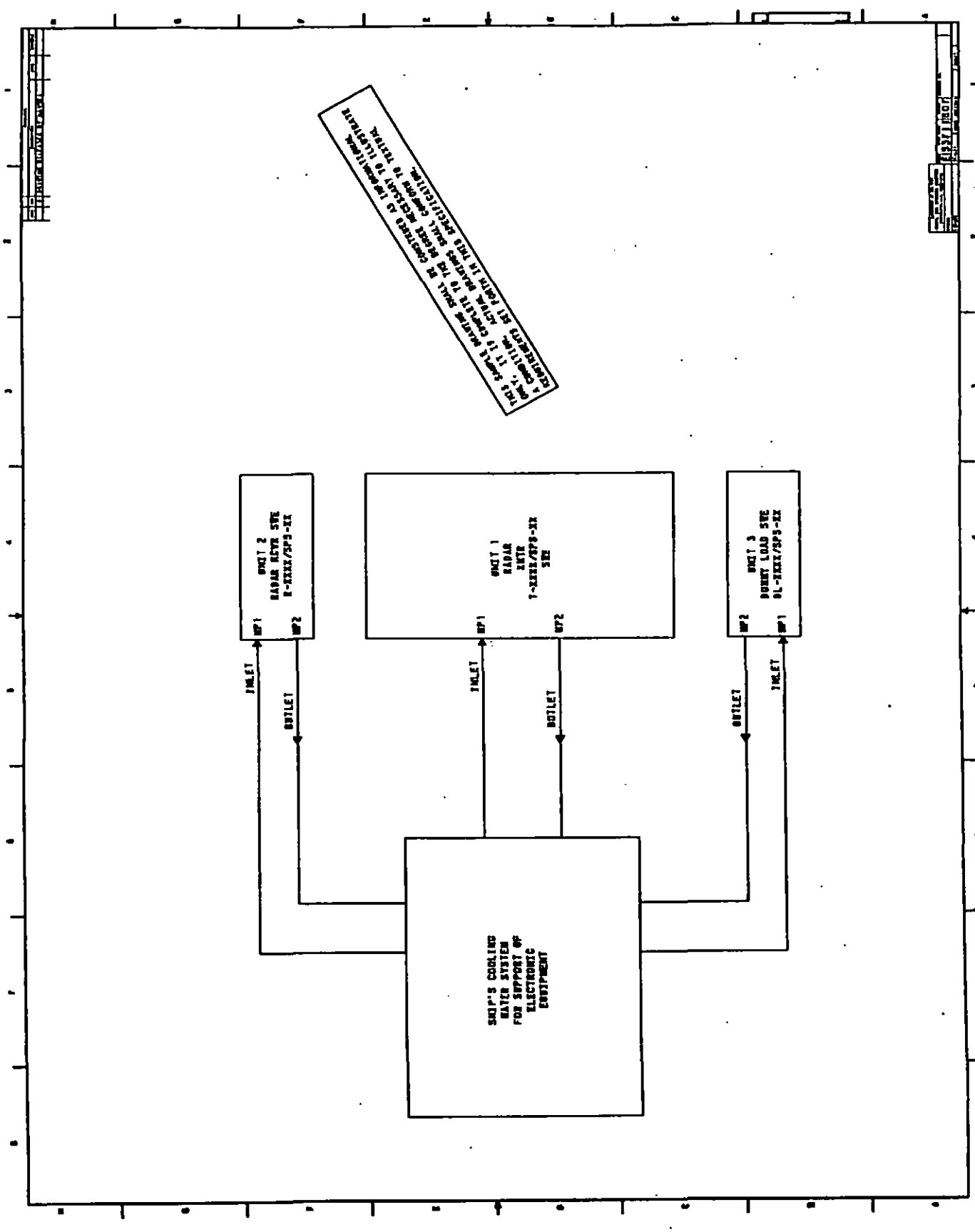


FIGURE 6-2 AUXILIARY COOLING DIAGRAM

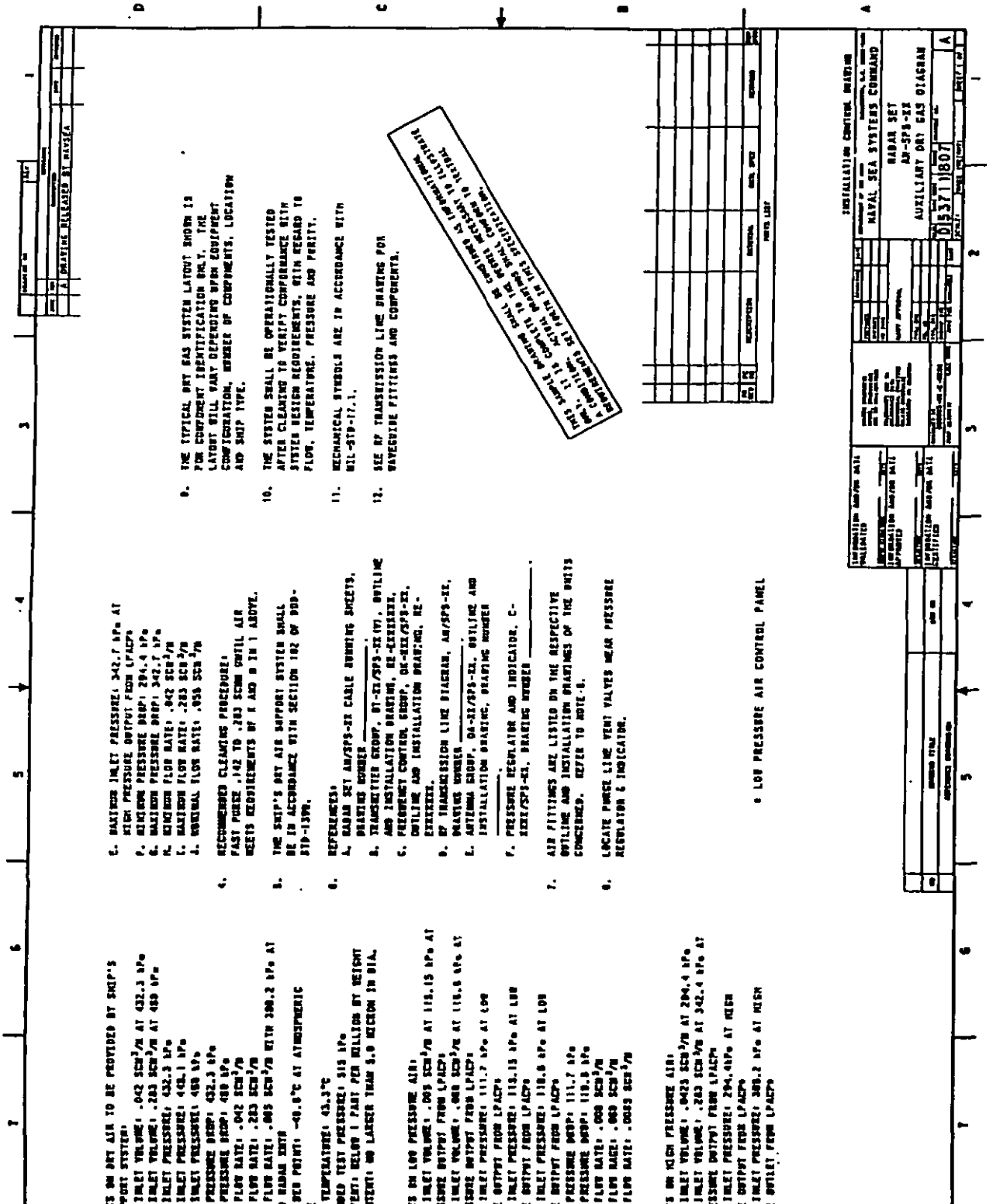


FIGURE 7-1 AUXILIARY DRY GAS DIAGRAM

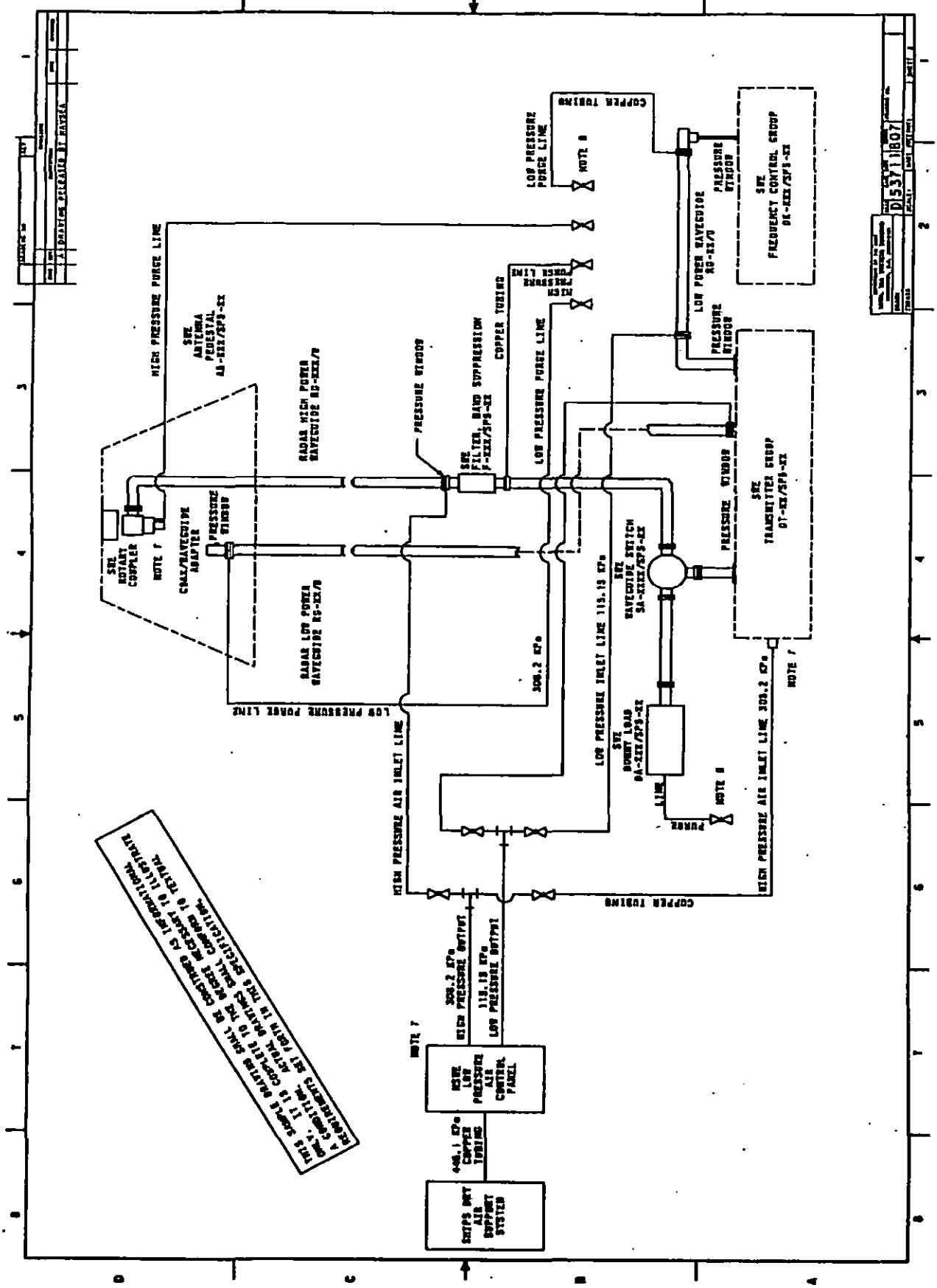


FIGURE 7-2 AUXILIARY DRY GAS DIAGRAM

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	DRAWING RELEASED BY NAVSEA		
B	SHEET 3, R-1T7 CHANGED TO RG-214/U	1/1/70	
C	SHEETS 4 & 5 ADDED	9/1/70	

THIS SAMPLE DRAWING SHALL BE CONSTRUED AS INFORMATIONAL ONLY. IT IS COMPLETE TO THE DEGREE NECESSARY TO ILLUSTRATE A CONDITION. ACTUAL DRAWINGS SHALL CONFORM TO TEXTUAL REQUIREMENTS SET FORTH IN THIS SPECIFICATION.

REFERENCES:
1. DRAWING LIST-SEE DRAWING

90										
80										
70										
60										
50										
40										
30										
20										
10										
0		C	A	B	C	C				
	0	1	2	3	4	5	6	7	8	9

190										
180										
170										
160										
150										
140										
130										
120										
110										
100										
	0	1	2	3	4	5	6	7	8	9

SHEET REVISION STATUS

INSTALLATION CONTROL DRAWING

		SIGNATURE	DATE
INFORMATION AND/OR DATA VALIDATED	PREPARED		
CONTR. SIGNATURE DATE	CHECKED		
	HD ENGR		
INFORMATION AND/OR DATA APPROVED	NAVY APPROVAL		
SIGNATURE DATE	PROJ ENG		
	GR. HD		
INFORMATION AND/OR DATA CERTIFIED	DIV. DIR		
	SUBGRP DIR		
SIGNATURE DATE	APPD FOR COMNAVSEA		DATE

DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
WASHINGTON, D.C. 20362-5101

TRANSPONDER SET
AN/ABC-12
CABLE RUNNING SHEETS

SIZE	CAGE CODE	ESWBS	DRAWING NO.	REV
A	53711	807		C
SCALE: NONE				SHEET 1 OF 5

FIGURE 8-1

CABLE TYPE & SIZE MSCU-24	ACTIVE WIRES 20	CABLE DESIGNATION R-1T(1)
	UNIT A	UNIT B
UNIT NUMBER	UNIT 3	C.B.I.
UNIT NAME	TRANSPONDER CONTROL	CONNECTING BOX
CABLE CONNECTOR	MS3406DJ24D28PW	NONE

UNIT A TERM. NO.	WIRE NO.	COLOR CODE	UNIT B TERM. NO.	FUNCTION
P1 PIN M	1	BLK	TB3 TERM 4	IFF CAUTION LIGHT
P1 N	2	WHT	TB1 15	I/P CONTROL
P1 T	3	RED	TB2 20	VERIFICATION BIT NO. 1
P1 S	4	GRN	TB2 18	MODE C ENABLE
P1 L	5	ORN	TB1 13	EMERGENCY CONTROL
P1 F	6	BLU	TB1 12	MODE 3/A ENABLE
P1 G	7	WHT/BLK	TB1 11	STANDBY CONTROL
P1 H	8	RED/BLK	TB1 10	MODE 2 ENABLE
P1 P	9	GRN/BLK	TB1 9	SENSITIVITY CONTROL
P1 U	10	ORN/BLK	TB1 14	POWER RELAY CONTROL
P1 Y	11	BLU/BLK	TB2 9	MODE 3/A, C1
P1 X	12	BLK/WHT	TB2 10	MODE 3/A, C2
P1 W	13	RED/WHT	TB2 11	MODE 3/A, C4
P1 R	14	GRN/WHT	TB2 15	MODE 3/A, D1
P1 K	15	BLU/WHT	TB2 16	MODE 3/A, D2
P1 E	16	BLK/RED	TB2 17	MODE 3/A, D4
P1 A	17	WHT/RED	TB2 19	ZEROIZE RETURN
P1 B	18	ORN/RED	TB3 1	MODE 4 DISABLE
P1 C	19	BLU/RED	TB3 6	TEST MODE CONTROL
P1 D	20	RED/GRN	TB2 7	MODE 1 ENABLE
P1 J	21	ORN/GRN	TB1 16	SPARE
P1 Q	22	BLK/WHT/RED	TB1 17	SPARE
P1 V	23	WHT/BLK/RED	TB1 18	SPARE
P1 PIN Z	24	RED/BLK/WHT	TB1 TERM 19	SPARE

SIZE	CAGE CODE	ESWBS	DRAWING NO.	REV
A	53711	807		A
SCALE: NONE			SHEET 2	

FIGURE 8-2

REV | SHEET | DRAWING NO.

CABLE TYPE & SIZE TSGU-3		ACTIVE WIRES 3	CABLE DESIGNATION R-IT(6)
	UNIT A		UNIT B
UNIT NUMBER	C.B.I		UNIT B
UNIT NAME	CONNECTING BOX		INIDCATOR LIGHT
CABLE CONNECTOR	NONE		MS3406DJ15DPX

UNIT A TERM.NO.	WIRE NO.	COLOR CODE	UNIT B TERM. NO.	FUNCTION
TB1 PIN 1	1	BLACK	J1 PIN A	115VAC
TB1 PIN 2	2	WHITE	J1 PIN B	115VAC
TB1 PIN 3	3	RED	J1 PIN C	115VAC

CABLE TYPE & SIZE M17/75-RG214		ACTIVE WIRES 1	CABLE DESIGNATION R-IT(7)
	UNIT A		UNIT B
UNIT NUMBER	UNIT 1		R-IT8
UNIT NAME	TRANSMITTER		SEMI-RIGID COAX LINE
CABLE CONNECTOR	M39012/06-0006		M39012/02-0002

UNIT A TERM.NO.	WIRE NO.	COLOR CODE	UNIT B TERM. NO.	FUNCTION
P2				RF SIGNAL LINE

CABLE TYPE & SIZE RG-333/U		ACTIVE WIRES 1	CABLE DESIGNATION R-IT(8)
	UNIT A		UNIT B
UNIT NUMBER	R-IT7		R-IT9
UNIT NAME	FLEXIBLE COAX LINE		FLEXIBLE COAX LINE
CABLE CONNECTOR	UG-XXX/U		UG-XXX/U

UNIT A TERM.NO.	WIRE NO.	COLOR CODE	UNIT B TERM. NO.	FUNCTION
				RF.SIGNAL LINE

CABLE TYPE & SIZE M17/75-RG214		ACTIVE WIRES 1	CABLE DESIGNATION R-IT(9)
	UNIT A		UNIT B
UNIT NUMBER	R-IT8		UNIT 10
UNIT NAME	SEMI-RIGID COAX LINE		ANTENNA
CABLE CONNECTOR	M39012/02-0002		M39012/06-0006

UNIT A TERM.NO.	WIRE NO.	COLOR CODE	UNIT B TERM. NO.	FUNCTION
			J1	RF SIGNAL LINE

SIZE	CAGE CODE	ESWBS	DRAWING NO.	REV
A	53711	807		B
SCALE: NONE			SHEET 3.	

FIGURE 8-3

REV | SHEET | DRAWING NO.

CABLE TYPE & SIZE TSGU (NOTE 1)	ACTIVE WIRES 3	CABLE DESIGNATION (NOTE 2)
	UNIT A	UNIT B
UNIT NUMBER	UNIT 1	
UNIT NAME	RECEIVE TRANSMITTER	CONNECTING BOX
CABLE CONNECTOR	M3406DJ22B22S	

UNIT A TERM. NO.	WIRE NO.	COLOR CODE	UNIT B TERM. NO.	FUNCTION
P2 A	1	BLACK		115 VAC PHASE A
P2 B	2	WHITE		115 VAC PHASE B
P2 C	3	RED		115 VAC PHASE C

NOTES:

1. CABLE SIZE TO BE DETERMINED BY INSTALLING ACTIVITY.

2. NAVY CABLE DESIGNATION TO BE ASSIGNED BY INSTALLING ACTIVITY.

SIZE	CAGE CODE	ESWBS	DRAWING NO.	REV
A	53711	807		C
SCALE: NONE			SHEET 4	

FIGURE 8-4

REV
SHEET
DRAWING NO.

CABLE TYPE & SIZE TSGU-100	ACTIVE WIRES 3	CABLE DESIGNATION R-EZ(1)
	UNIT A	UNIT B
UNIT NUMBER	4	
UNIT NAME	PWR DISTRIBUTION UNIT	FILTER ASSEMBLY
CABLE CONNECTOR	MS3406DJ36B5P	

UNIT A TERM. NO.	WIRE NO.	COLOR CODE	UNIT B TERM. NO.	FUNCTION
P401 - A	1	BLK	FL1-2	440 VAC 60 HZ
P401 - B	2	WHT	FL2-2	440 VAC 60 HZ
P401 - C	3	RED	FL3-3	440 VAC 60 HZ

CABLE TYPE & SIZE DHOF-9	ACTIVE WIRES 2	CABLE DESIGNATION R-EZ(2)
	UNIT A	UNIT B
UNIT NUMBER	4	6
UNIT NAME	PWR DISTRIBUTION UNIT	INIDCATOR LIGHT
CABLE CONNECTOR	MS3406DJ22A22P	MS3406DJ22A22S

UNIT A TERM. NO.	WIRE NO.	COLOR CODE	UNIT B TERM. NO.	FUNCTION
P418 - A	1	BLK	P613 - A	+ 28 VDC ANTENNA
P418 - B			P613 - B	NOT USED
P418 - C	2	WHT	P613 - C	+ 28 VDC RETURN
P418 - D			P613 - D	NOT USED

CABLE TYPE & SIZE FHOF-4	ACTIVE WIRES 4	CABLE DESIGNATION R-EZ(3)
	UNIT A	UNIT B
UNIT NUMBER	4	2
UNIT NAME	PWR DISTRIBUTION UNIT	RECEIVER EXCITER
CABLE CONNECTOR	MS3406DJ20A4P	MS3406DJ20A4S

UNIT A TERM. NO.	WIRE NO.	COLOR CODE	UNIT B TERM. NO.	FUNCTION
P407 - A	1	BLK	P244 - A	115 VAC UNREG
P407 - B	2	WHT	P244 - B	115 VAC UNREG RTN
P407 - C	3	RED	P244 - C	115 VAC HTR PWR
P407 - D	4	GRN	P244 - D	115 VAC HTR RTN

SIZE	CAGE CODE	ESWBS	DRAWING NO.	REV
A	53711	807		C
SCALE: NONE			SHEET 5	

FIGURE 8-5

ITEM NO.	QUANTITY NSWE	QUANTITY SWE	ITEM NAME	PART, TYPE OR MODEL NUMBER	MANUFACTURER'S NAME OR FEDERAL SUPPLY CODE	REMARKS
1		1	TRANSPONDER	RT-XXX/APX-XX	BENDIX RADIO CORP	
2		1	TRANSPONDER MOUNT	MT-XXXX/U UNIT 2	BENDIX RADIO CORP	U/W ITEM 1
3		1	TRANSPONDER CONTROL	C-XXXX( )(P)/APX UNIT 3	ADMIRAL CORP	
4		1	TRANSPONDER CMPTR	KIT/XX ISEC UNIT 4	RCA	
5		1	COMPUTER MOUNT	MT XXXX/U UNIT 5	RCA	U/W ITEM 4
6		1	POWER SUPPLY 28 VDC	PP-XXXX/APX-XX UNIT 6	WILLIAM WALTERS INC	
7	1		CONNECTION BOX	4-4TB20M-3		STD SYM 438
8	1		INDICATOR LIGHT	B-41A		STD SYM 2815.1
9	1		ROTARY SWITCH	15R24A4-2		STD SYM 801.1
10		1	ANTENNA (SURFACE)	AS-XXXX/UPX UNIT 7	BENDIX RADIO CORP	
10		1	ANTENNA (SUBMARINE)	AS-( )/BPX UNIT 7	BENDIX RADIO CORP	
11	1		ENCLOSURE, ALUM			U/W ITEM 3
12	5		BULB, LIGHT, 28 V DC	MS-25237-327		PANEL LIGHTS ITEM 3
13	AR		TUBING HEAT SHRINKABLE	CLASS 1 POLYOLEFIN MIL-23053A		
14	1		COVER, SWITCH	PLASTIC	FABRICATED BY INST ACTIVITY	U/W ITEM 9
15	1		HINGE,	TO SUIT WORK		U/W ITEM 14
16	2		SCREW,	TO SUIT WORK		
17	1		LATCH,	TO SUIT WORK		
18	4		9/16 INCH SCREWS,	MS35307-#		MTG HARDWARE ITEM 2
19	4		NUTS, SELF-LOCKING	MS17830-9C		MTG HARDWARE ITEM 2
20	4		FLAT WASHERS	MS 15795-843		MTG HARDWARE ITEM 2
21	4		1/2 INCH SCREWS	MS 35307-#		MTG HARDWARE ITEM 5
22	4		NUTS, SELF LOCKING	MS 17830-8C		MTG HARDWARE ITEM 5
23	4		FLAT WASHERS	MS 15795-818		MTG HARDWARE ITEM 5
24	221		LUG, WIRE	MS 21004-3		U/W CABLES TO UNIT 7
25		1	TOOL, CONNECTOR ENGAGING & EXTG	BENDIX PART NO. 2004307-0001	BENDIX RADIO CORP	U/W ITEM 1
			INTERCONNECTING CABLES AND ASSOCIATED FITTINGS			
26	AR		CABLE	DSGU		R-1T(4), R-1T(5)
27	↕		↕	FSGU-3		R-1T(6)
28	↕		↕	MSGU-44		R-1T(7)
29	AR		CABLE	TSGU-##		PRIM. PWR.
30		1	CONNECTOR KIT	DRJN-37422-164	CANNON	
31		1	CONNECTOR	MS3406DJ13B3S		MATES WITH 4J1
32		1	↕	MS3406DJ15B2P		SUPPLIED WITH ITEM 5
33		1	↕	M39012/01-0005		MATES WITH R-1T(7)
34		3	↕	M39012/01-0002		MATES WITH 1J1
35		1	↕	M39012/02-0002		MATES WITH 10J1
36		1	CONNECTOR	MS3406DJ36A10S		MATES WITH 8J1

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	DRAWING RELEASED BY NAVSEA		

THIS SAMPLE DRAWING SHALL BE CONSTRUED AS INFORMATIONAL ONLY. IT IS COMPLETE TO THE DEGREE NECESSARY TO ILLUSTRATE A CONDITION. DRAWINGS SHALL CONFORM TO THE FORMAT, REQUIREMENTS SET FORTH IN THIS SPECIFICATION. ACTUAL

LEGEND
AR - AS REQUIRED
NSWE - NOT SUPPLIED WITH EQUIPMENT
SWE - SUPPLIED WITH EQUIPMENT
U/W - USED WITH

LENGTHS TO BE DETERMINED BY INSTALLING ACTIVITY

SIZETO BE DETERMINED BY INSTALLING ACTIVITY

INSTALLATION CONTROL DRAWING

DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
WASHINGTON, D.C. 20362-5101

TRANSPONDER SET
AN/APX-XX

SUMMARY LIST OF INSTALLATION MATERIAL

SIZE C | CAGE CODE 53711 | DRAWING NO. 807 | REV

SCALE: | SHEET 1 OF 1

FIGURE 9 SUMMARY LIST OF INSTALLATION MATERIAL

NOTES:

1. THE TYPICAL TRANSMISSION LINE LAYOUT SHOWN IS FOR COMPONENT IDENTIFICATION ONLY. THE TRANSMISSION LINE RUN WILL VARY DEPENDING UPON EQUIPMENT CONFIGURATION, UNIT LOCATION AND SHIP TYPES.

2. THE OVERALL WAVEGUIDE RUN SHALL NOT EXCEED 30.48 METERS.

3. THE OVERALL WAVEGUIDE RUN SHALL BE AS STRAIGHT AS POSSIBLE WITH A MINIMUM NUMBER OF BENDS AND TWISTS.

4. DECK AND BULKHEAD FITTINGS SHALL BE IAW NAVSEA 0967-LP-000-0110, SECTION 8.

5. WAVEGUIDE SUPPORTS SHALL BE LOCATED AND COMPLY WITH NAVSEA 0967-LP-000-0110, SECTION 8.

6. PREFORMED BENDS AND TWISTS IAW MIL-W-3970 SHALL BE USED WHENEVER POSSIBLE. IN SITUATIONS REQUIRING CUSTOM MADE BENDS OR TWIST BY THE INSTALLING ACTIVITY. THE BENDS SHALL BE LIMITED TO A MINIMUM RADIUS OF X INCHES AND THE TWIST TO A MINIMUM LENGTH OF X INCHES. THE FLANGES WILL BE ATTACHED AT MINIMUM OF 2.54 CM FROM THE END OF THE BEND AND 3.175 CM FROM THE END OF THE TWIST. THE ASSEMBLIES SHALL COMPLY WITH NAVSEA 0967-LP-000-0110 SECTION 8 FOR FABRICATION.

7. IF THE TRANSMISSION LINE MUST CROSS THE SHIPS EXPANSION JOINT OR THERE IS MOTION BETWEEN THE WAVEGUIDE AND A SHOCKMOUNTED UNIT, A FLEXIBLE SECTION, SELECTED FROM MIL-W-287, SHALL BE INSTALLED IN ACCORDANCE WITH NAVSEA 0967-LP-000-0110, SECTION 5.

8. FABRICATION AND INSTALLATION OF WAVEGUIDE SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS, PROCEDURES AND METHODS OF NAVSEA 0967-LP-000-0110, SECTION 5.

9. CONVERSION COATINGS AND PAINTING OF WAVEGUIDES SHALL BE IN ACCORDANCE WITH NAVSEA 0967-LP-000-0110, SECTION 5.

10. PRESSURE WINDOWS WITH GAS PORTS SHALL BE INSTALLED AT THE ENDS OF THE TRANSMISSION LINES IF THE CONNECTING UNITS ARE NOT PRESSURIZED AND DO NOT HAVE AIR INPUT CONNECTIONS PROVIDED THE WINDOWS SHALL BE COMPATIBLE WITH REGARDS TO MATERIAL, FINISH, MATING SURFACE CONFIGURATION, DIMENSIONS AND MOUNTING HOLES FOR MIL-F-3922 FLANGES. PRESSURE WINDOW WILL WITHSTAND 308.2 kPa AND THE GAS PORT SHALL INTERFACE WITH A 1/4" IPS COPPER TUBING.

11. THE WAVEGUIDE SHALL BE PROVIDED WITH EXPANDED METAL CAGE TO PROTECT IT FROM DAMAGE. THE DUMMY LOAD SHALL BE PROVIDED WITH AN EXPANDED METAL CAGE FOR SAFETY PROTECTION OF PERSONNEL.

12. DRY AIR SHALL BE USED FOR PURGING AND PRESSURIZATION OF THE TRANSMISSION LINE AND SHALL BE IAW THE AUXILIARY DRY GAS DIAGRAM, NAVSEA 0967-LP-000-0110, SECTION 5, AND DOD-STD-1399, SECTION 102.

13. THE COMPLETE WAVEGUIDE RUN SHALL BE TESTED IAW NAVSEA 0967-LP-000-0110, SECTION 5.

14. THE INSERTION LOSS FOR THE TRANSMISSION LINE SHALL NOT EXCEED 3.6 DB/30.48 M, AND SHALL BE MEASURED IN ACCORDANCE WITH NAVSEA 0967-LP-000-0130.

15. THE VSWR SHALL NOT EXCEED 1.3:1 FOR THE FREQUENCIES COVERED BY THIS EQUIPMENT.

16. GROUNDING WHEN REQUIRED SHALL BE IN ACCORDANCE WITH MIL-STD-1310.

17. ADAPTER IS DESIGNED FOR PRESSURIZATION. IF ADAPTER IS NOT AVAILABLE, A PRESSURE WINDOW TO FIT WAVEGUIDE SHALL BE INSTALLED.

18. PARTS ARE TO BE SUPPLIED BY INSTALLING ACTIVITY UNLESS IDENTIFIED AS SPE.

19. FLEXIBLE ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH NAVSEA 0967-LP-000-0110.

THIS SAMPLE DRAWING SHALL BE CONSTRUED AS INFORMATIONAL ONLY. IT IS COMPLETE TO THE DEGREE NECESSARY TO ILLUSTRATE A CONDITION. ACTUAL DRAWINGS SHALL CONFORM TO TEXTUAL REQUIREMENTS SET FORTH IN THIS SPECIFICATION.

PARTS LIST HAS BEEN SCALED FOR LEGIBILITY

NO REQ	ITEM NO	DESCRIPTION	MATL SPEC	REMARKS
AR	1	FLANGE (CHOKE)	M3922/82-001	
AR	2	FLANGE (COVER)	M3922/57-001	
AR	3	90° H BEND	M3970/13-012	
AR	4	WAVEGUIDE	WBS/1-053-120	
1	5	90° STRAIGHT TWIST	M3970/1-012	
AR	6	90° E. BEND	M3970/7-012	
AR	7	45° E. BEND	M3970/5-012	
AR	8	WAVEGUIDE DECK FITTING		MAKE
1	9	WAVEGUIDE FLEXIBLE	FC187BCCA12	MIL-W-287
1	10	DIRECTIONAL COUPLER	CU-594/ABC	SPE
1	11	WAVEGUIDE SWITCH	SA-596/ABC	SPE
1	12	DUMMY LOAD	DA-597/ABC	SPE
1	13	ADAPTER (WAVEGUIDE TO SERIES N COAXIAL)	M22641/16-11	
AR	14	BULKHEAD FITTING		MAKE
1	15	PRESSURE WINDOW	P/N 12345	XXX CORP OR EQUAL
AR	16	WAVEGUIDE SUPPORT		MAKE

PARTS LIST

REFERENCES
1. DRAWING LIST-SEE DRAWING

INSTALLATION CONTROL DRAWING
NAVAL SEA SYSTEMS COMMAND
TRANSPONDER SET AN/ARC-12
RF TRANSMISSION LINE DIAGRAM
SIZE E 53711

MIL-D-23140D(NAVY)

FIGURE 10-1 RF TRANSMISSION LINE DIAGRAM

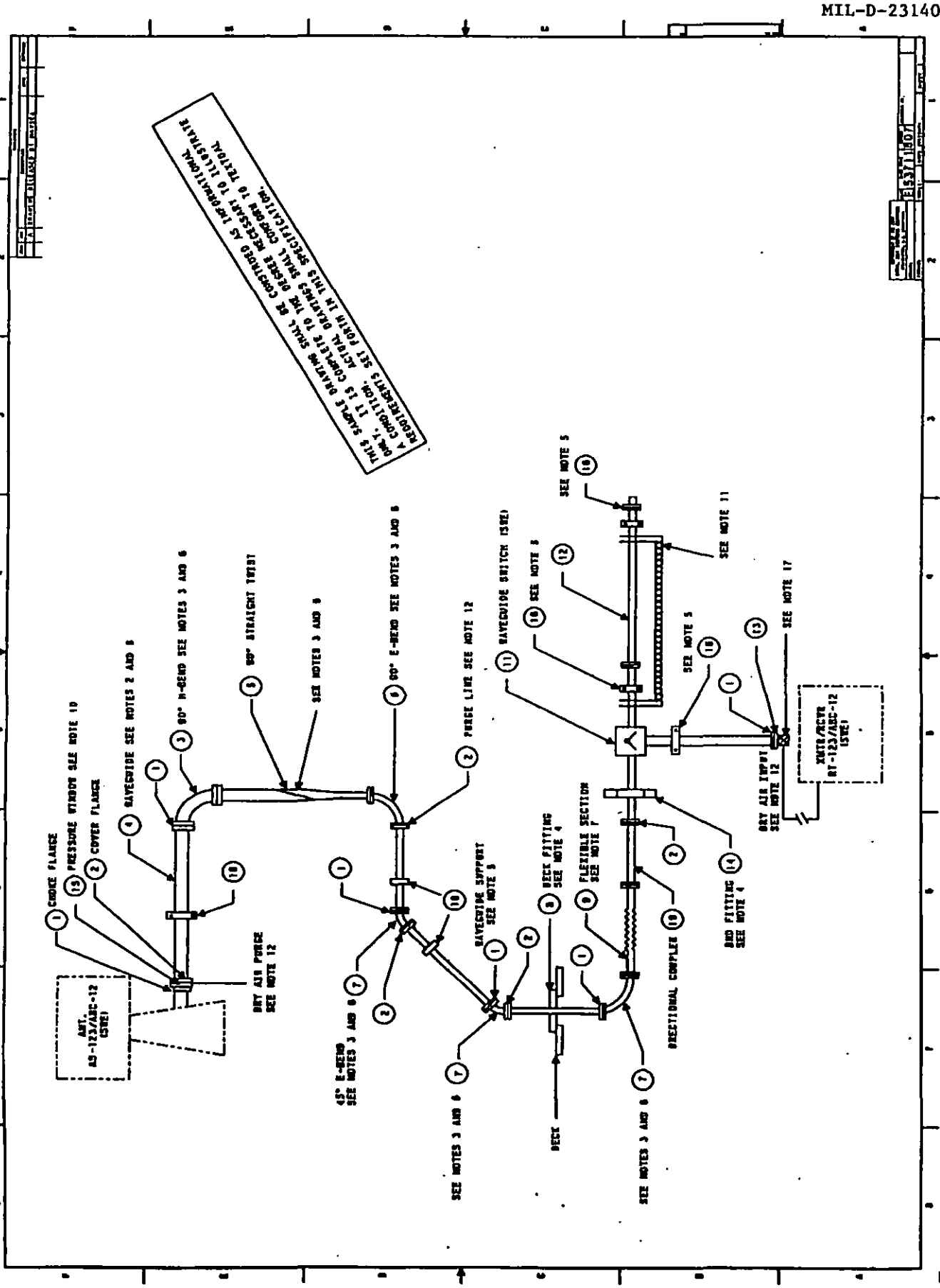


FIGURE 10-2 RF TRANSMISSION LINE DRAWING

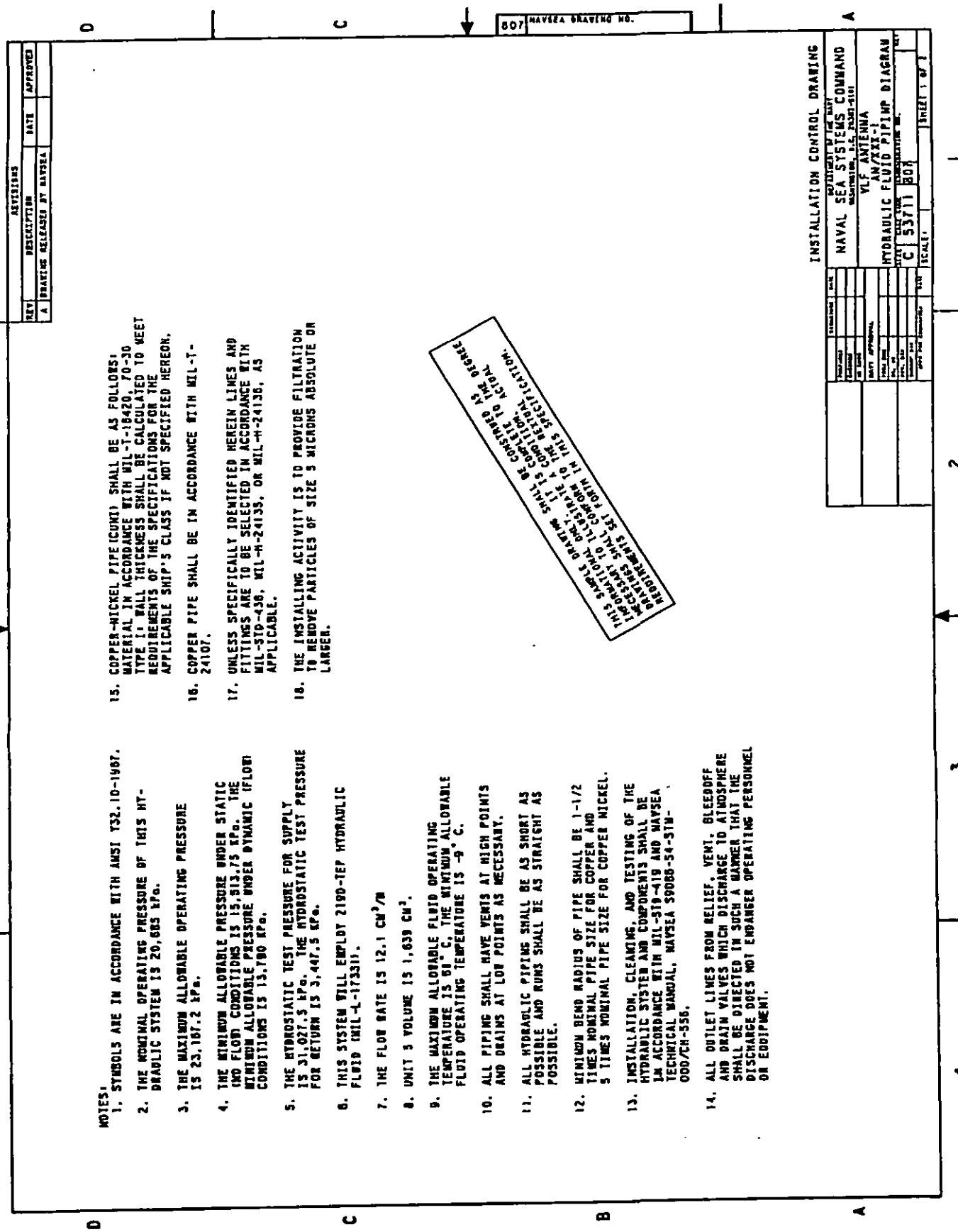


FIGURE 11-1 HYDRAULIC FLUID PIPING DIAGRAM

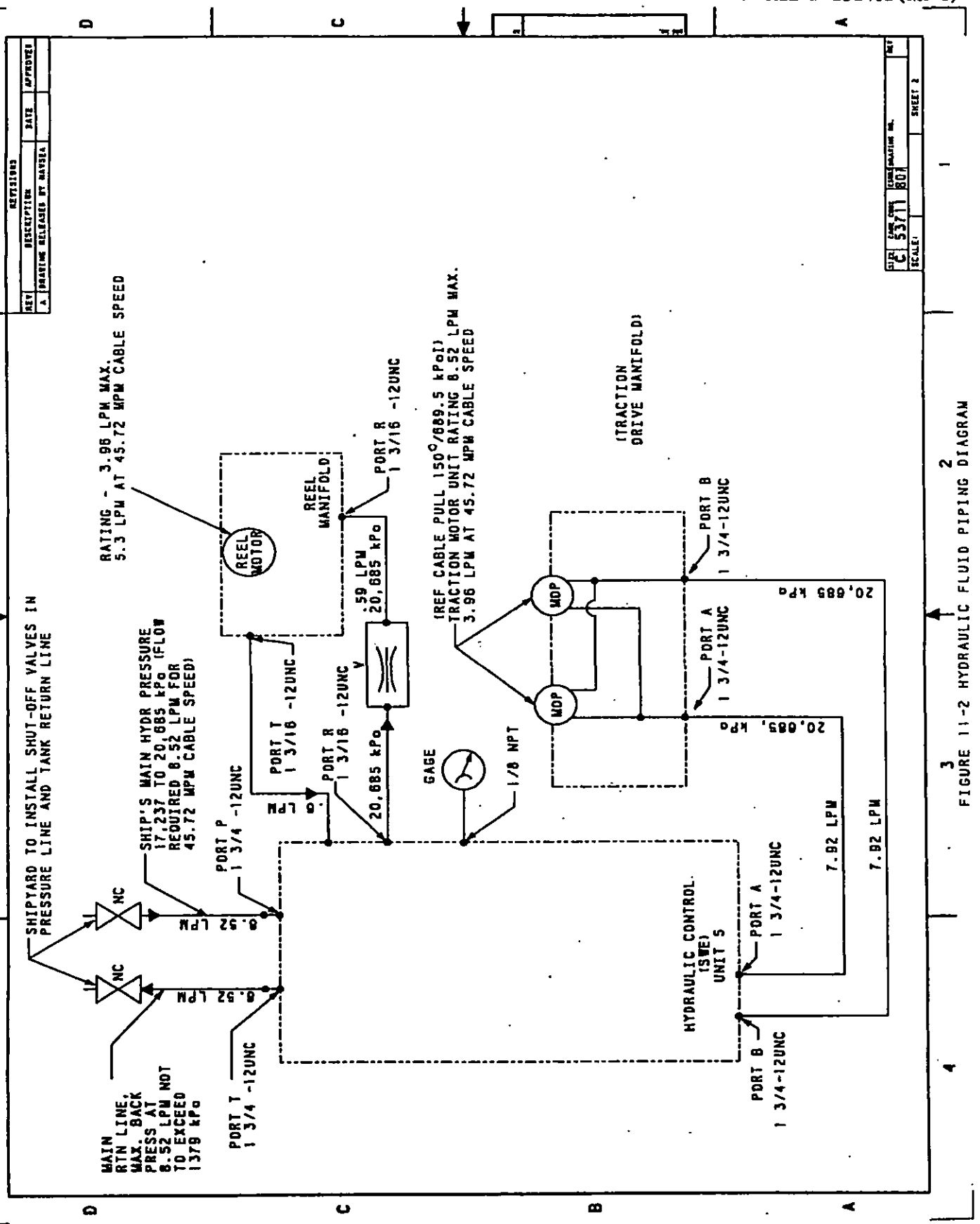


FIGURE 11-2 HYDRAULIC FLUID PIPING DIAGRAM

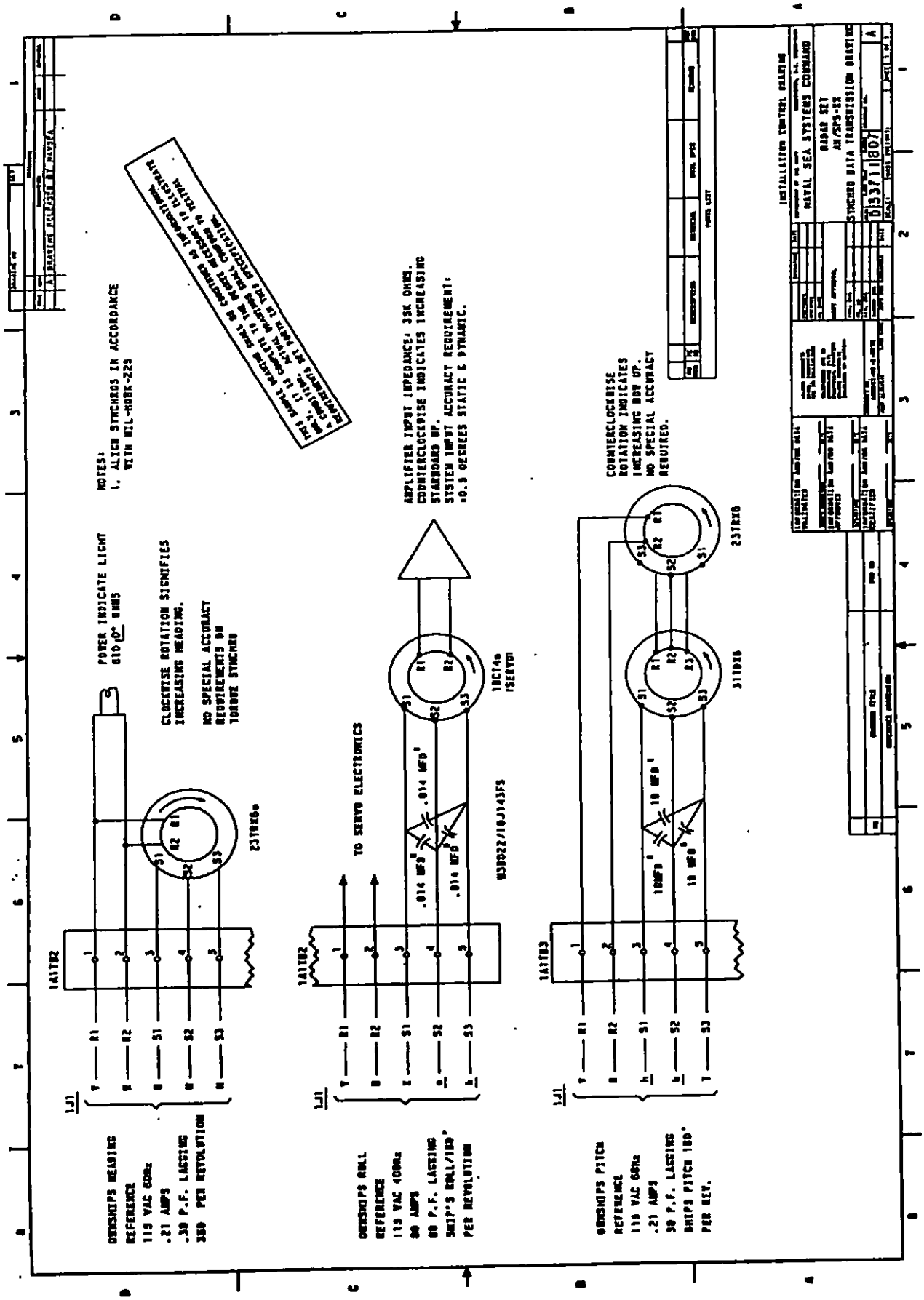


FIGURE 12 SYNCHRO DATA TRANSMISSION