



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

IN REPLY REFER TO

NAVSEAINST 9300.1A
OPR 56Z14
28 Sep 88

NAVSEA INSTRUCTION 9300.1A

From: Commander, Naval Sea Systems Command

Subj: SHIPBOARD ALTERNATING CURRENT ELECTRIC POWER

Ref: (a) MIL-STD-1399(NAVY), Section 300, Interface Standard for Shipboard Systems, Electric Power, Alternating Current (Metric)
(b) MIL-F-24638(SH), Frequency Changer, Solid State, Air Cooled (Naval Shipboard)
(c) MIL-F-24122C(SH), Frequency Changer, Solid State (Naval Shipboard)
(d) MIL-M-19633B, Motor-Generator, 60 Cycle, AC to 400 Cycle AC (Voltage and Frequency Regulated) Shipboard Service

1. Purpose. To revise and define Naval Sea Systems Command (NAVSEA) policy relative to the selection of input electric power to newly designed or extensively modified user equipment. The intent is to minimize the need for power conversion equipment aboard U.S. Navy ships. This is a major change to the current instruction.

2. Cancellation. NAVSEAINST 9300.1 of 2 October 1981.

3. Background. The predominant electric power for utilization on board ships is 440 V, 60 Hz. The increased use of 400 Hz by user equipment designers has caused a significant growth in the requirements for power conversion equipment, with commensurate detrimental impact on platform space and weight utilization. Present electronic power supply technology precludes the need for such extra conversion equipment and its elimination in new designs will permit either increased payload capacity or reduced ship size. Elimination of 400 Hz power conversion equipment will lessen the complexity of power distribution systems and potentially improve the reliability and survivability of U.S. Navy ships.

4. Discussion. NAVSEA has the responsibility for the total shipboard system integration. All new user equipment, systems, and subsystems, as well as those currently installed which require major modifications in the future shall follow the policy summarized below.

5. Policy. User equipment installed on surface ships and submarines which have 60 Hz as their primary ship service system

shall be designed to operate from the following alternating current power services in accordance with the characteristics listed in reference (a):

a. 440 V, 60 Hz, 3 phase, ungrounded, Type I

b. For user equipment requiring less than 5 kVA and for which 440 V, 60 Hz, 3 phase, ungrounded, Type I, power is not practical, the following shall be the order of preference:

(1) 440 V, 60 Hz, ungrounded, 1 phase, Type I

(2) 115 V, 60 Hz, ungrounded, 3 phase, Type I

(3) 115 V, 60 Hz, ungrounded, 1 phase, Type I

c. Service to aircraft and aviation support equipment shall operate from 440 V, 60 Hz, 3 phase, ungrounded, Type I power. Where such power is not practical, the following may be substituted:

(1) 440 V, 400 Hz, 3 phase, ungrounded, Type II or Type III

(2) 440 V, 400 Hz, 1 phase, ungrounded, Type II or Type III

(3) 115 V, 400 Hz, 3 phase, ungrounded, Type II or Type III

(4) 115 V, 400 Hz, 1 phase, ungrounded, Type II or Type III

(5) 115/200 V, 400 Hz, 3 phase, 4 wire, Wye-grounded, Type III

d. Service to avionic shops shall operate from 440 V, 60 Hz, 3 phase ungrounded, Type I power. Where such power is not practical, the following power may be substituted:

115/200 V, 60 Hz, 3 phase, 4 wire, Wye-grounded, Type I

e. Consistent with NAVSEA policy regarding nuclear powered ships, NAVSEA 08 will ensure compliance with reference (a) for equipment and systems under its cognizance.

6. Deviation Procedure. The following procedure shall be used in the submission and resolution of deviation requests:

a. Deviation requests (except for those concerning equipment under the cognizance of SEA 08) shall be submitted to Commander,

Naval Sea Systems Command (SEA 05) via the equipment project/program manager and platform acquisition/logistic manager (where appropriate) with two copies to NAVSEA Electrical Systems Sub-group (NAVSEA 56Z). Unless the deviation is approved by NAVSEA 05 (NAVSEA 08 for nuclear-related equipment), the user equipment will not be approved for shipboard use. COMNAVSEA will be the final appeal authority.

b. Deviation requests shall contain a cost-benefit trade-off analysis which addresses the impact on ship platform versus equipment in terms of weight, space, power consumption, reliability, life cycle costs, and total ship effectiveness criteria.

c. Solid-state frequency changers in accordance with references (b) or (c) shall be utilized in all surface ships if the use of 400 Hz power is approved. For user equipment requiring 400 Hz and 30 kW or less total load per ship a motor-generator set in accordance with reference (d) may be used.

7. Action. All Research and Development and Acquisition Managers of equipment, subsystems, and systems to be installed aboard ship shall comply with this policy.



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