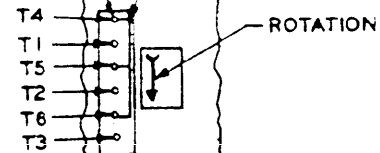


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6115

6 -  $\frac{5}{16}$ -24 UNF-3A X .875 LONG STEEL STUDS,  
Rc 34 MIN. HARDNESS, AND  
6-MS90415-5 NUTS.

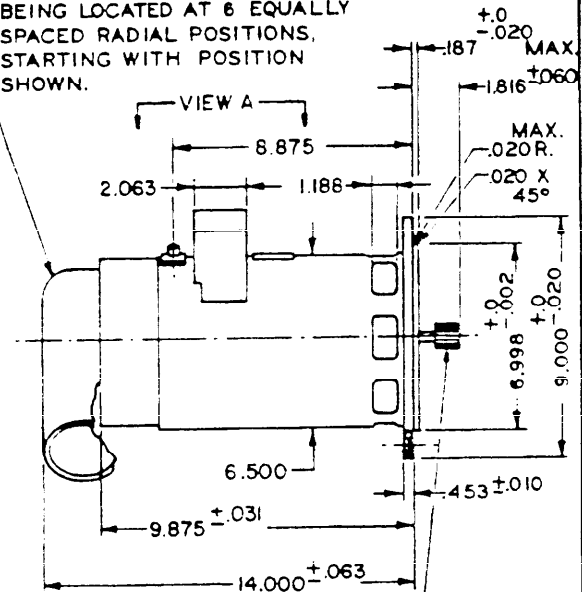
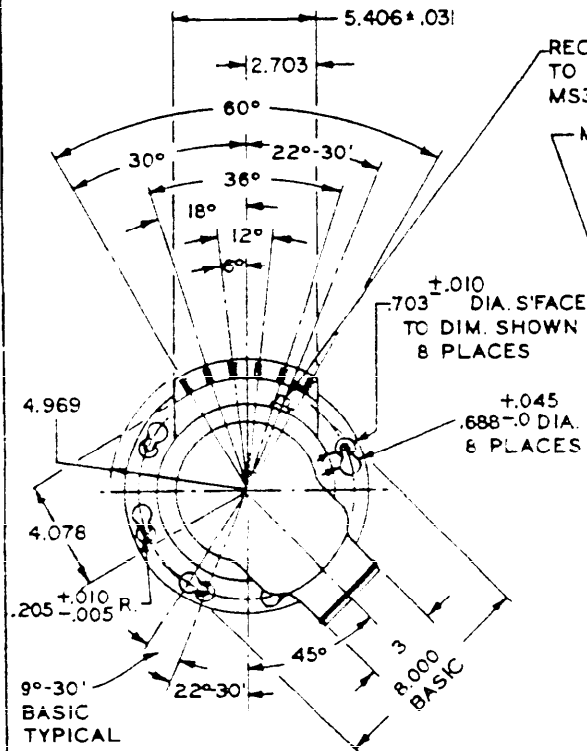
REMOVABLE JUMPER  
CONNECTING  
T4, T5 & T6  
TERMINAL COVER REQD



RECEPTACLE  
TO MATE WITH  
MS3126E-10-6S

VIEW A

MS 25160 - SHALL BE CAPABLE OF  
BEING LOCATED AT 6 EQUALLY  
SPACED RADIAL POSITIONS,  
STARTING WITH POSITION  
SHOWN.



SPLINE PER MS14169 FOR  
3/4 INCH SIZE PLASTIC  
SPLINE ADAPTER SHALL BE  
FURNISHED WITH GENERATOR.

TABLE 1

## GENERATOR DATA

|                              |  |
|------------------------------|--|
| RATED VOLTAGE                | 120 208V                                 |
| RATED OUTPUT                 | 20 KVA                                   |
| PHASE                        | 3  |
| SPEED RANGE                  | 7600-8400 RPM                            |
| MAX. SPEED FOR REGULATION    | 10,000 RPM                               |
| OVERSPEED                    | 11,000 RPM                               |
| RATED POWER FACTOR           | 0.75 to 1.0                              |
| EFF. MIN. AT RATED LOAD      | 85%                                      |
| OVERHUNG MOMENT - MAX.       | 280 IN-LB                                |
| FREQUENCY                    | 380-420 CPS                              |
| SHEAR                        | 1000-1400 IN-LB                          |
| GEN. ROTOR MOMENT OF INERTIA | WR <sup>2</sup> -0.28 LB-FT <sup>2</sup> |

MS90313-2, GENERATOR, MAX. WT.-48 LBS

(E) ENTIRE STANDARD REVISED

|  |  |   |
|--|--|---|
| P.A. NAVY A.S.<br>Other Cust             | TITLE<br>GENERATOR SYSTEM, 20 KVA, 400 HERTZ,<br>ALTERNATING CURRENT, INTEGRALLY EXCITED,<br>BRUSHLESS TYPE, AIRCRAFT, BLAST COOLED. | MILITARY STANDARD<br><b>MS90313(As)</b> |
| PROCUREMENT SPECIFICATION<br>MIL-G-21480 | SUPERSEDES:<br><b>MS25334</b>  | SHEET 1 OF 7                            |

This standard has been approved by the NAVAL AIR SYSTEMS COMMAND  
Department of the NAVY and is mandatory for use by  
that activity. All other military activities are requested  
to comply with this standard where suitable.

DD FORM 672-1 N

LIMITED COORDINATION

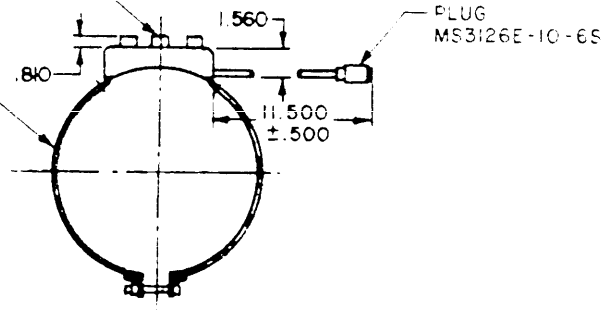
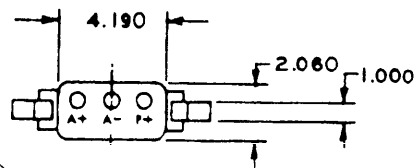
PREVIOUS EDITIONS OF THIS FORM ARE OBSOLETE. PROJECT NO. 6115-N419

APPROVED 8 MAY 1964 REVISED (A) 8 JULY 1965 (B) 5 OCT. 1965 (C) 27 SEPT 1970 (D) 7 JAN 1977 (E) 26 MARCH 1978

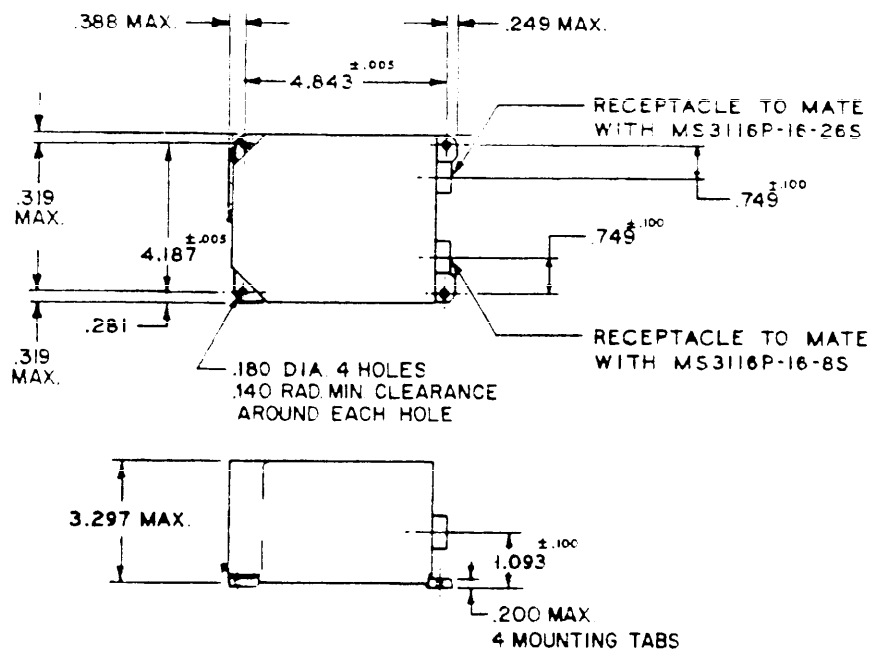
FED. SUP CLASS  
6115

10-32 POSTS, 3 REQ.  
(TERMINAL COVER  
REQUIRED). 3 MS3376-3  
NUTS SHALL BE FURNISHED  
WITH RECTIFIER

MOUNTING BAND SHALL  
BE SUITABLE FOR  
MOUNTING THE RECTIFIER  
ON THE 6.500 DIAMETER  
OF MS90313-2 GENERATOR



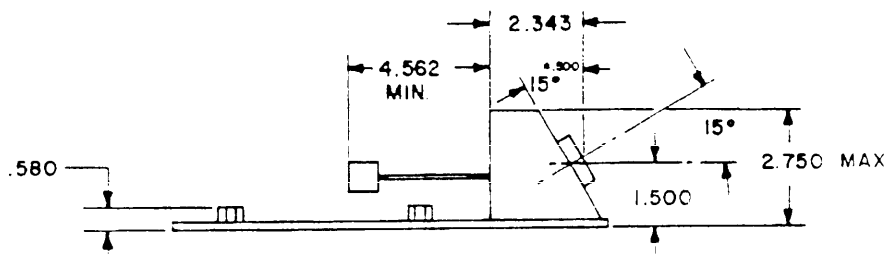
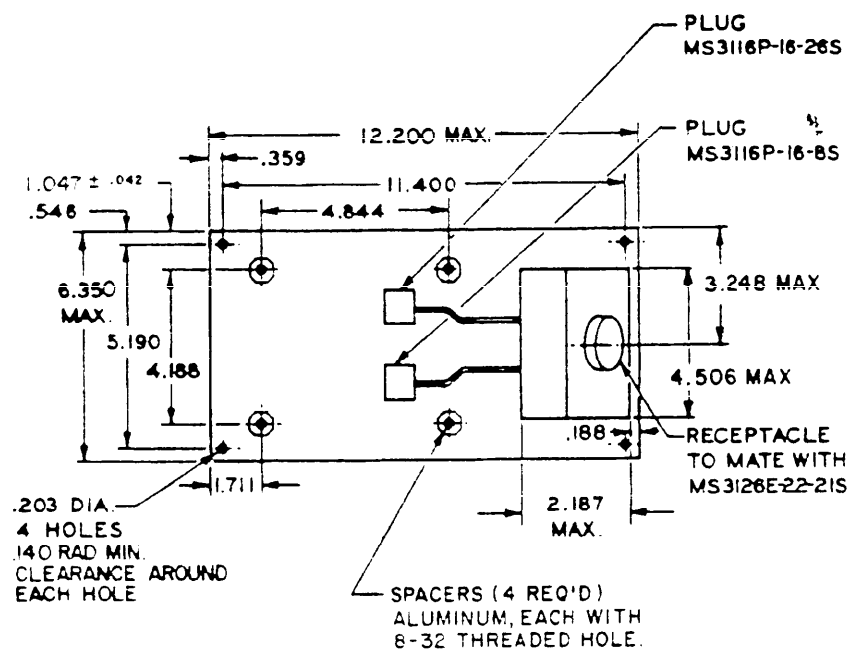
MS90313-3, RECTIFIER ASSEMBLY, MAX WT - 1.3 LBS



MS90313-4, GENERATOR CONTROL UNIT, MAX WT.-3 LBS

|  |  |                              |
|--|--|------------------------------|
| P.A. NAVY - AS<br>Other Cust             | TITLE<br>GENERATOR SYSTEM, 20 KVA, 400 HERZ,<br>ALTERNATING CURRENT, INTEGRALLY EXCITED,<br>BRUSHLESS TYPE, AIRCRAFT, BLAST COOLED | MILITARY STANDARD            |
| PROCUREMENT SPECIFICATION<br>MIL-G-21480 | SUPERSEDES:  | MS90313 (AS)<br>SHEET 2 OF 7 |

FED. SUP CLASS  
6115

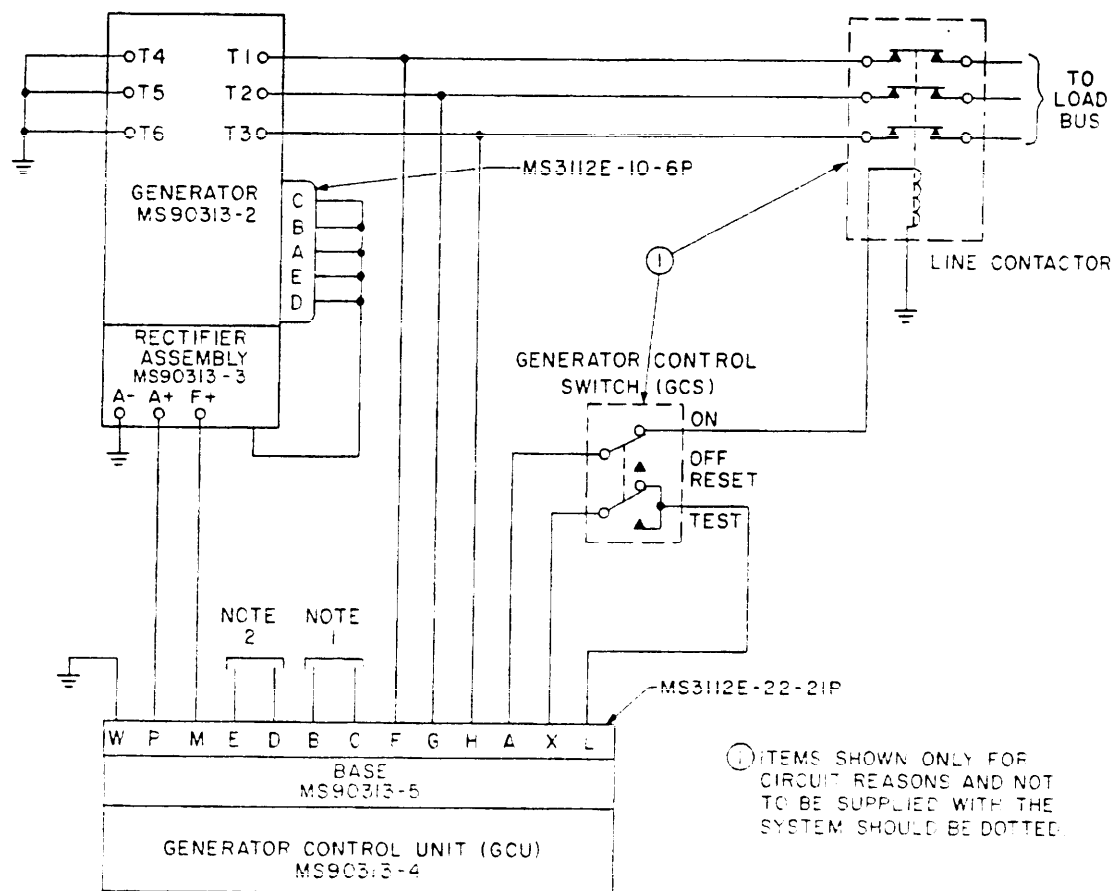


MS90313-5, BASE, MAX WT.-2.5 LBS

This military standard is approved by NAVAL AIR SYSTEMS COMMAND, Department of the Navy and shall be used by all other military activities are required to employ this standard where suitable

APPROVED 8 MAY 1964 REVISED (E) FOR CHANGES SEE SHEETS 1 THRU 7

|  |   |                   |
|--|---|-------------------|
| P.A. NAVY - AS<br>Other Cust             | TITLE<br>GENERATOR SYSTEM, 20 KVA, 400 HERTZ,<br>ALTERNATING CURRENT, INTEGRALLY EXCITED,<br>BRUSHLESS TYPE, AIRCRAFT, BLAST COOLED | MILITARY STANDARD |
|  |   | MS90313 (AS)      |
| PROCUREMENT SPECIFICATION<br>MIL-G-21480 | SUPERSEDES:   | SHEET 3 OF 7      |



TEST CIRCUIT

### REQUIREMENTS:

1. THE AIRCRAFT MANUFACTURER SHALL ALLOW CONNECTING LEAD LENGTH AND BLAST TUBE LENGTH FOR THE LIMITING GENERATOR DIMENSIONS SHOWN ON THIS DRAWING.
2. THE AIRCRAFT MANUFACTURER SHALL PROVIDE CONNECTING LEADS SHOWN.
3. THE AIRCRAFT MANUFACTURER SHALL ALLOW ADEQUATE CLEARANCE FOR INSTALLING AND REMOVING THE ITEMS SHOWN ON THIS STANDARD FROM THE AIRCRAFT.
4. THE REQUIREMENTS OF MIL-G-21480 PERTAIN WITH THE FOLLOWING EXCEPTIONS.

DELETE THE FOLLOWING PARAGRAPHS

[illegible]

DELETE ANY ADDITIONAL ENVIRONMENTAL REQUIREMENTS. THE SYSTEM SHALL MEET THE REQUIREMENTS OF MIL-E-81910 UNLESS OTHERWISE SPECIFIED BY THE DETAILED SPECIFICATION.

3.4.2.1 DEFUITS AND ADD: TEMPERATURE AND ALTITUDE. THE GENERATOR SHALL MEET THE TEMPERATURE-ALTITUDE REQUIREMENTS OF MIL-E-81910 FOR FLASH-COOLED EQUIPMENT. CONTROL COMPONENTS SHALL MEET THE TEMPERATURE-ALTITUDE REQUIREMENTS OF MIL-E-81910 FOR SELF-COOLED EQUIPMENT.

P.A. NAVY A.S.  
Other Cust

TITLE  
GENERATOR SYSTEM, 20 KVA, 400 HERTZ,  
ALTERNATING CURRENT, INTEGRALLY EXCITED,  
BRUSHLESS TYPE, AIRCRAFT, BLAST COOLED

**MILITARY STANDARD**

MS90313 (AS)

PROCUREMENT SPECIFICATION  
MIL-G-21480

**SUPERSEDES:**

SHEET 4 OF 7

FED. SUP CLASS

6115

- 3.4.8 CHANGE "FIGURE 3" TO "FIGURE 1" OF THIS SPECIFICATION.
- 3.4.8.2 CHANGE "5 MINUTES" TO "2 MINUTES".
- 3.4.9.3 ADD: THE GENERATOR SYSTEM SHALL BE DESIGNED SO THAT UPON REMOVAL OF ANY CONNECTOR PLUG THE GENERATOR AND GCU SHALL BE DE-ENERGIZED.
- 3.4.9.6.1.1 CHANGE "10,000 HOUR LIFE" TO "1000 HOUR LIFE".
- 3.4.9.8.1 ADD: RECTIFIER ASSEMBLY. THE GENERATOR SHALL BE EQUIPPED WITH AN EXTERNALLY MOUNTED RECTIFIER ASSEMBLY FOR RECTIFICATION OF PMG OUTPUT TO THE GENERATOR EXCITER FIELD AS SHOWN ON THIS DRAWING.
- 3.4.10.5 CHANGE "5000 HOURS" TO "4000 HOURS".
- 3.4.17 DELETE AND ADD: RELIABILITY. THE SYSTEM MTBF (MEAN TIME BETWEEN FAILURE) SHALL BE NOT LESS THAN 1200 HOURS. THIS FIGURE SHALL APPLY TO FAILURES WHICH WILL CAUSE SYSTEM OPERATION TO DEVIATE FROM PERFORMANCE REQUIREMENTS.
- 3.5.1 CHANGE "FIGURE 3" TO "FIGURE 1" OF THIS SPECIFICATION.
- 3.5.4 DELETE AND ADD: WAVEFORM. THE CREST FACTOR FOR EACH PHASE VOLTAGE WAVEFORM SHALL BE  $1.41 \pm 10\%$ . NO SINGLE HARMONIC SHALL EXCEED 3% OF THE FUNDAMENTAL.
- 3.5.5 CHANGE "5 AMPS MINIMUM CONTINUOUS CAPACITY" TO "2 AMPS MINIMUM CONTINUOUS CAPACITY".
- 3.5.7.2 CHANGE "FIGURE 6" TO "FIGURE 1" OF THIS SPECIFICATION.
- 3.5.7.3 DELETE AND ADD: UNDERVOLTAGE. UNDERVOLTAGE PROTECTION SHALL BE PROVIDED BY A STATIC ELEMENT WHICH FUNCTIONS TO DISCONNECT THE SYSTEM FROM THE LOAD BUS AND DEENERGIZE THE GENERATOR WITHIN A PERIOD OF  $t + 1$  SECONDS AFTER ANY PHASE VOLTAGE (LINE-NEUTRAL) FALLS TO  $100 \pm 5$  VOLTS. THE SYSTEM SHALL BE CAPABLE OF BEING RESET WITHIN 1 SECONDS AFTER THE LOWEST PHASE VOLTAGE EXCEEDS 105 VOLTS.
- 3.5.7.4 DELETE AND ADD: UNDERFREQUENCY. UNDERFREQUENCY PROTECTION SHALL BE PROVIDED BY A STATIC ELEMENT WHICH FUNCTIONS TO DISCONNECT THE SYSTEM FROM THE LOAD BUS WITHIN A PERIOD OF FROM 1 TO 5 SECONDS AFTER THE FREQUENCY FALLS TO  $375 \pm 5$  HZ. AFTER EITHER AUTOMATIC OR MANUAL RESET, THE UNDERFREQUENCY PROTECTION SHALL PROVIDE FOR THE SYSTEM TO BE AUTOMATICALLY RECONNECTED TO THE BUS WITHIN 2 SECONDS AFTER THE FREQUENCY EXCEEDS  $375 \pm 5$  HZ. THE SPREAD BETWEEN DROPOUT AND PICKUP SHALL NOT BE LESS THAN 4 HZ.
- 3.5.8 DELETE AND ADD: ELECTROMAGNETIC INTERFERENCE. THE SYSTEM SHALL MEET THE REQUIREMENTS OF MIL-E-81910 CLASS NO. III FOR THE GENERATORS AND CONTROL EQUIPMENT, EXCEPT THE TEN MICROFARAD FEEDTHROUGH CAPACITOR SHALL BE REMOVED.
- 4.1.1.1 ADD: QUALIFICATION TESTS SHALL BE SUPPLEMENTED WITH A MINIMUM 100 HOUR FAILURE FREE FLIGHT TEST BEFORE CONSIDERATION IS GIVEN TO INCORPORATING THE ITEM ON THE QUALIFIED PRODUCTS LIST.
- 4.5.3.1 CHANGE "FIGURE 3" TO "FIGURE 1" OF THIS SPECIFICATION.
- 4.5.3.2 CHANGE "FIGURE 3" TO "FIGURE 1" OF THIS SPECIFICATION.
- 4.5.6 DELETE LAST SENTENCE AND ADD: THIS TEST IS NOT REQUIRED FOR ACCEPTANCE IF THE MANUFACTURER CAN DEMONSTRATE TO THE SATISFACTION OF THE ACTIVITY RESPONSIBLE FOR QUALIFICATION THAT THE GENERATOR IS SO DESIGNED AS TO PRECLUDE EXCITER REVERSAL. THIS TEST NEED NOT BE INCLUDED AS A QUALIFICATION TEST.
- 4.5.12 DELETE AND ADD: ELECTROMAGNETIC INTERFERENCE. THE SYSTEM SHALL BE SUBJECTED TO AN ELECTROMAGNETIC INTERFERENCE TEST IN ACCORDANCE WITH MIL-E-81910 FOR CLASS III E EQUIPMENT.
- 4.5.13 DELETE AND ADD: WAVEFORM. THE CREST FACTOR AND HARMONIC CONTENT, LINE-LINE AND LINE-NEUTRAL, OF THE OUTPUT VOLTAGE SHALL BE DETERMINED UNDER THE FOLLOWING CONDITIONS:
- (A) AT GENERATOR SPEED OF 8000 RPM FOR NO LOAD, AND IN 20% LOAD INCREMENTS TO FULL RATED LOAD, UNITY POWER FACTOR.
  - (B) CONDITION (A) SHALL BE REPEATED FOR 0.75 POWER FACTOR.
  - (C) CONDITIONS (A) AND (B) SHALL BE REPEATED AT GENERATOR SPEEDS OF 7600 AND 8400 RPM.
- THE FOLLOWING REQUIREMENTS MUST BE MET DURING ALL ABOVE TESTS. THE LINE-NEUTRAL CREST FACTOR SHALL BE  $1.41 \pm 10\%$ . NO HARMONIC SHALL EXCEED 3% OF THE FUNDAMENTAL.
- 4.5.20.1 DELETE AND ADD: SALT FOR CONTROL COMPONENTS. CONTROL COMPONENTS SHALL BE SUBJECTED TO A SALT FOR TEST IN ACCORDANCE WITH MIL-E-81910 EXCEPT THE DURATION OF THE TEST SHALL NOT EXCEED 24 HOURS. AT THE COMPLETION OF THIS TEST THE UNIT SHALL SUCCESSFULLY DEMONSTRATE ITS BUILDUP CHARACTERISTICS, THE EFFECT OF APPLICATION AND REMOVAL OF RATED AND 200% LOAD, AND PROTECTIVE FUNCTIONS.

Military standard is approved by NAVAL AIR SYSTEMS COMMAND, Department of the Navy and shall be used by their activity. All other military activities are required to employ this standard where suitable.

|  |   |   |
|--|---|---|
| P.A. NAVY - AS<br>Other Cust             | TITLE<br>GENERATOR SYSTEM, 20 KVA, 400 HERTZ,<br>ALTERNATING CURRENT, INTEGRALLY EXCITED,<br>BRUSHLESS TYPE, AIRCRAFT, BLAST COOLED | MILITARY STANDARD<br><b>MS 90313 (AS)</b> |
| PROCUREMENT SPECIFICATION<br>MIL-G-21480 | SUPERSEDES:   | SHEET 5 OF 7                              |

4.5.20.2 DELETE AND ADD: OIL/SALT WATER INGESTION, GENERATORS. THE GENERATOR SHALL BE SUBJECTED TO AN OIL/SALT WATER INGESTION TEST IN ACCORDANCE WITH MIL-E-81910. AT THE COMPLETION OF THIS TEST THE UNIT SHALL SUCCESSFULLY DEMONSTRATE ITS BUILDUP CHARACTERISTICS AND THE EFFECT OF APPLICATION AND REMOVAL OF RATED AND 200% LOAD.

4.5.21 DELETE AND ADD: FUNGUS RESISTANCE. SYSTEM COMPONENTS SHALL BE SUBJECTED TO A FUNGUS TEST IN ACCORDANCE WITH MIL-E-81910, WITH THE INSTALLATION INSTRUCTIONS AND MOUNTING NUTS ATTACHED. AT THE COMPLETION OF THIS TEST THE UNIT SHALL SUCCESSFULLY DEMONSTRATE ITS BUILDUP CHARACTERISTICS, THE EFFECT OF APPLICATION AND REMOVAL OF RATED AND 200% LOAD, AND PROTECTIVE FUNCTIONS. MOUNTING NUTS ARE TO BE UNAFFECTED AND THE PACKAGE HOLDING THE NUTS SUITABLE FOR SHIPMENT. INSTRUCTIONS ARE TO BE LEGIBLE.

4.5.22 DELETE AND ADD. SAND AND DUST. THE GENERATOR SHALL BE SUBJECTED TO A SAND AND DUST TEST IN ACCORDANCE WITH MIL-E-88190 ~~AT THE COMPLETION OF THIS TEST THE UNIT SHALL SUCCESSFULLY DEMONSTRATE ITS BUILDUP CHARACTERISTICS AND THE EFFECT OF APPLICATION AND REMOVAL OF RATED AND 200% LOAD.~~

4.5.23.1.1 DELETE AND ADD: GENERATOR. THE GENERATOR AND RECTIFIER ASSEMBLY SHALL BE  
SUBJECTED TO A VIBRATION TEST IN ACCORDANCE WITH MIL-E-81910, EXCEPT THAT THE AMPLITUDE OF VIBRA-  
TION MONITORED AT THE ANTI-DRIVE END OF THE GENERATOR DURING THE MAIN BENDING MODE SHALL BE  
LIMITED TO 25 G's, BUT THE VIBRATION INPUT SHALL NOT BE LOWERED BELOW 5 G's. AT THE COMPLETION  
OF THIS TEST, THE UNIT SHALL SUCCESSFULLY DEMONSTRATE ITS BUILDUP CHARACTERISTICS AND THE APPLICA-  
TION AND REMOVAL OF RATED AND 200% LOAD.

4.5.23.1.2 DELETE AND ADD: CONTROL COMPONENTS. CONTROL COMPONENTS SHALL BE SUBJECTED TO A VIBRATION TEST IN ACCORDANCE WITH MIL-E-81910, EXCEPT THAT THE VIBRATION RANGE SHALL BE FROM 5 TO 500 HZ. AT THE COMPLETION OF THIS TEST THE UNIT SHALL SUCCESSFULLY DEMONSTRATE ITS BUILDUP CHARACTERISTICS, THE EFFECT OF APPLICATION AND REMOVAL OF RATED AND 200% LOAD, AND PROTECTIVE FUNCTIONS.

4.5.24 DELETE AND ADD SHOCK. SYSTEM COMPONENTS SHALL BE SUBJECTED TO A SHOCK TEST IN ACCORDANCE WITH MIL-E-81910. AT THE COMPLETION OF PROCEDURE 1, THE UNIT SHALL SUCCESSFULLY DEMONSTRATE ITS BUILDUP CHARACTERISTICS. THE EFFECT OF APPLICATION AND REMOVAL OF RATED AND 200% LOAD, AND PROTECTIVE FUNCTIONS. THERE SHALL BE NO FAILURE OF THE MOUNTING ATTACHMENTS AND THE TEST ITEM SHALL REMAIN IN PLACE AND NOT CREATE A HAZARD DURING PROCEDURE III.

4.5.25 DELETE AND ADD HUMIDITY. SYSTEM COMPONENTS, EXCEPT THOSE TESTED UNDER PARAGRAPH 4.5.20.1, SHALL BE SUBJECTED TO A HUMIDITY TEST IN ACCORDANCE WITH MIL-E-81910. AT THE COMPLETION OF THIS TEST THE UNIT SHALL SUCCESSFULLY DEMONSTRATE ITS BUILDUP CHARACTERISTICS, THE EFFECT OF APPLICATION AND REMOVAL OF RATED AND 200% LOAD, AND PROTECTIVE FUNCTIONS.

4.5.30 DELETE FIRST SENTENCE AND ADD: ALL SYSTEM COMPONENTS EXCEPT THE GENERATOR SHALL BE SUBJECTED TO THE ACCELERATION TESTS OF MIL-F-881810. AT THE COMPLETION OF THE TESTS THE UNIT SHALL SUCCESSFULLY DEMONSTRATE ITS BUILDUP CHARACTERISTICS. THE EFFECT OF APPLICATION AND REMOVAL OF RATE AND 200% LOAD AND PROTECTIVE FUNCTIONS

## NOTES:

1. PINS B AND C FOR CONSTANT SPEED DRIVE INTERLOCK. OPENING THIS CIRCUIT SHALL DEENERGIZE THE SYSTEM.
2. PINS D AND E FOR GROUND POWER INTERLOCK. OPENING THIS CIRCUIT SHALL DEENERGIZE THE SYSTEM.
3. GENERATOR CONTROL SWITCH AND LINE CONTACTOR SHOWN FOR INTERCONNECTIONS ONLY AND ARE NOT FURNISHED UNDER THIS DRAWING.
4. DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED, TOLERANCES: LINEAR  $\pm .030$ ; ANGULAR  $\pm 1^\circ$ .
5. ALL OUTLINE DIMENSIONS ARE LIMITING DIMENSIONS ONLY.

| ITEM   | PART NUMBER |
|--|-------------|
| COMPLETE SYSTEM (CONSISTS OF ONE GENERATOR<br>ONE RECTIFIER, ONE BASE AND ONE GCU) | MS90313-1   |
| GENERATOR  | MS90313-2   |
| RECTIFIER ASSEMBLY   | MS90313-3   |
| GCU  | MS90313-4   |
| BASE   | MS90313-5   |

FOR DESIGN FEATURE PURPOSES, THIS STANDARD TAKES PRECEDENCE OVER PROCUREMENT DOCUMENTS REFERENCED HEREIN. REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON DATE OF INVITATION FOR BIDS.

This military standard is approved by NAVAL AIR SYSTEMS COMMAND, Department of the Navy and should be used by all military activities not actively employing this standard where suitable.

|  |   |                   |
|--|---|-------------------|
| P.A. NAVY - AS<br>Other Cust             | TITLE<br>GENERATOR SYSTEM, 20 KVA, 400 HERTZ,<br>ALTERNATING CURRENT, INTEGRALLY EXCITED,<br>BRUSHLESS TYPE, AIRCRAFT, BLAST COOLED | MILITARY STANDARD |
|  |   | MS90313 (AS)      |
| PROCUREMENT SPECIFICATION<br>MIL-G-21480 | SUPERSEDES:   | SHEET 6 OF 7      |

APPROVED 8 MAY 1964 REVISED (E) FOR CHANGES SEE SHEETS 1 THRU 7

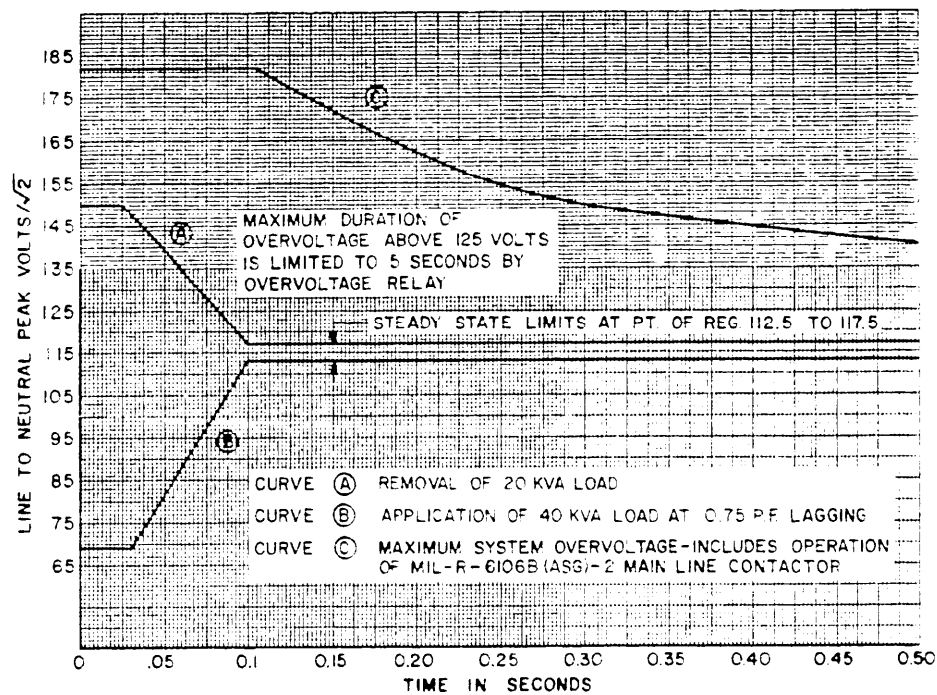
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FIGURE 1. SYSTEM VOLTAGE LIMITS.

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|  |   |                                  |
|--|---|----------------------------------|
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| PROCUREMENT SPECIFICATION<br>MIL-G-21480 | SUPERSEDES  | SHEET 7 OF 7                     |