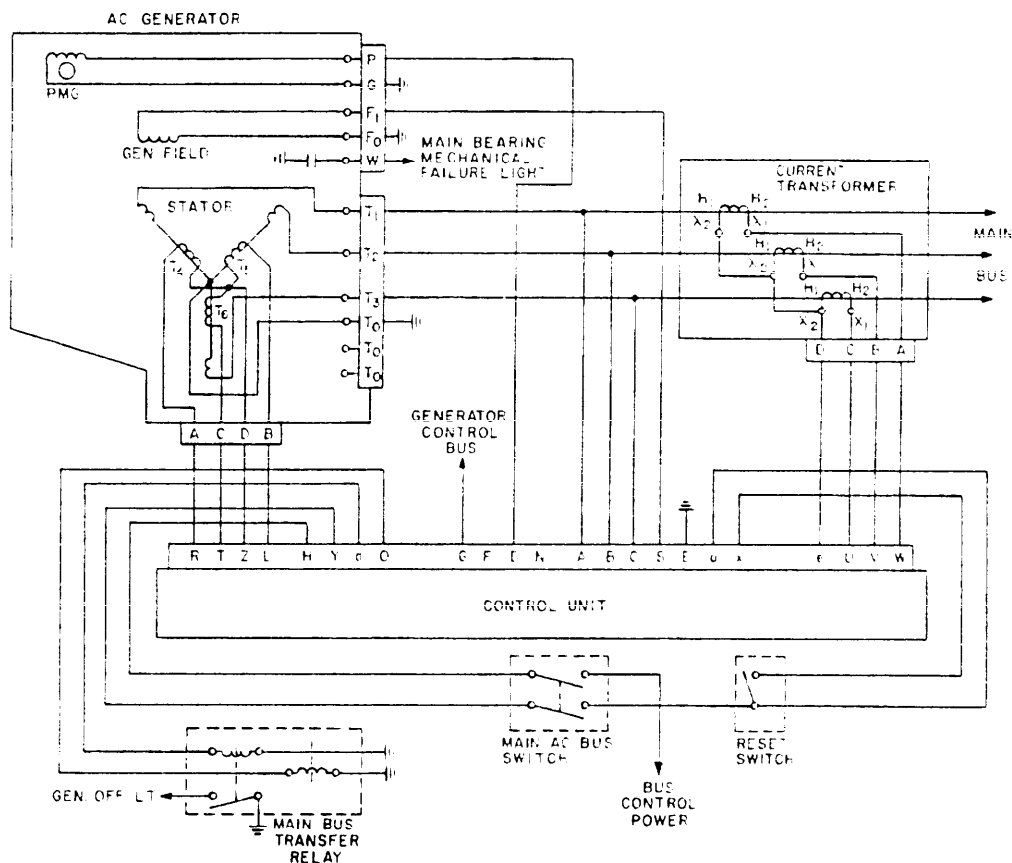
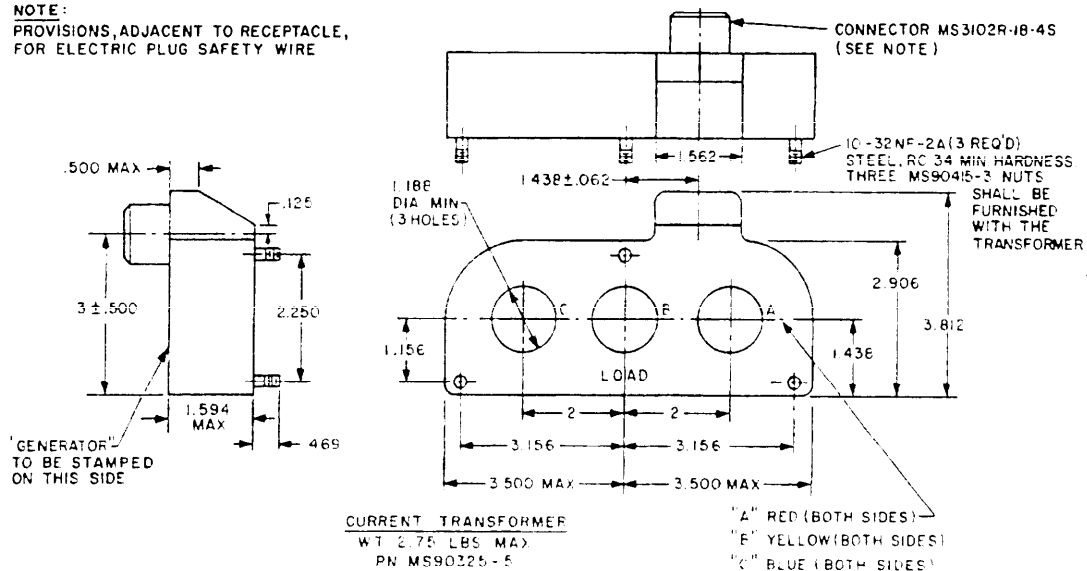


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NOTE:  
PROVISIONS, ADJACENT TO RECEPTACLE,  
FOR ELECTRIC PLUG SAFETY WIRE



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P.A. NAVY - AS Other Cust	TITLE GENERATOR SYSTEM, ALTERNATING CURRENT INTEGRALLY EXCITED, 60 KVA BRUSHLESS (P-3 AIRCRAFT)	MILITARY STANDARD MS90325 (AS)
PROCUREMENT SPECIFICATION MIL-G-21480	SUPERSEDES:	SHEET 2 OF 6

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

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## 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 GENERATOR SHOWN ON THIS STANDARD FROM THE AIRCRAFT.
4. REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON DATE OF INVITATION FOR BIDS. THE REQUIREMENTS OF SPECIFICATION MIL-G-21480 PERTAIN WITH THE FOLLOWING EXCEPTIONS.

## DELETE THE FOLLOWING PARAGRAPHS:

3.4.2.2 THROUGH 3.4.2.8, 3.5.7.5, 3.5.9, 4.5.20, 4.5.22.1 THROUGH 4.5.22.3, 4.5.22.3.1 THROUGH 4.5.22.3.4, 4.5.23.1 THROUGH 4.5.23.1.2, 4.5.24.1 THROUGH 4.5.24.3.4, 4.5.25.1 THROUGH 4.5.25.2.1, 4.5.32.

3.4.2 DELETE AND ADD: ENVIRONMENTAL REQUIREMENTS. ALL COMPONENTS SHALL OPERATE IN ACCORDANCE WITH THIS SPECIFICATION WHEN SUBJECTED TO THE CONDITIONS OF MIL-E-81910.

3.4.7 DELETE AND ADD: MANUAL SYSTEM CONTROL. THE SYSTEM, AS INSTALLED ON THE AIRCRAFT, SHALL BE EQUIPPED WITH A MANUAL CONTROL SWITCH WITH THE FOLLOWING THREE POSITIONS:

RESET (MOMENTARY) GENERATOR SYSTEM DEENERGIZED AND MAIN LINE CONTACTOR OPEN AS LONG AS SWITCH IS HELD IN THIS POSITION. SYSTEM RETURNS TO "ON" CONDITION AS SOON AS SWITCH IS RELEASED.

ON GENERATOR AUTOMATICALLY COMES ON THE BUS WHEN ITS ELECTRICAL CHARACTERISTICS ARE WITHIN PRESCRIBED LIMITS. GENERATOR WARNING LIGHT "OFF" IF GENERATOR IS ON THE BUS. GENERATOR WARNING LIGHT "ON" IF MAIN LINE CONTACTOR IS OPEN. PROTECTIVE SYSTEM OPERATIVE.

OFF GENERATOR ELECTRICALLY DEENERGIZED AND MAIN LINE CONTACTOR IS OPEN. GENERATOR WARNING LIGHT "ON".

3.4.8 REPLACE "FIGURE 3" WITH "FIGURE 1" OF THIS SPECIFICATION.

3.4.8.1 LOAD CAPACITY. ADD: THE SYSTEM SHALL BE CAPABLE OF DELIVERING 150% RATED OUTPUT AT RATED POWER FACTOR UNDER THE MAXIMUM AIR TEMPERATURE/ALTITUDE CONDITIONS OF -100°C/30,000 FT WHILE BLAST COOLED 125% RATED OUTPUT AT 45°C (MAXIMUM)/5000 FT AND 55°C (MAXIMUM)/SEA LEVEL WHILE SELF COOLED.

3.4.9.2.1 ADD: MAIN BEARING FAILURE WARNING. A SYSTEM TO SENSE DRIVE END BEARING FAILURE AND AN AUXILIARY BEARING TO TAKE OVER SUPPORT OF THE GENERATOR ROTOR UPON FAILURE OF THE PRIMARY BEARING SHALL BE INCORPORATED IN THE GENERATOR.

3.4.9.2.2 ADD: GREASE LUBRICATED BEARINGS. WHEN GREASE LUBRICATED BEARINGS ARE USED IN ANY COMPONENT THEY SHALL BE PACKED WITH KYTOX-240 AC: GREASE MEETING SPECIFICATION MIL-G-27617. THE GREASE SHALL FILL NOT LESS THAN 45% OR MORE THAN 55% OF THE BEARING VOIDS AND BE EQUALLY DISTRIBUTED ACROSS THE RACE WIDTH. BEARING RINGS, BALLS OR ROLLERS, AND SHIELDS SHALL BE MADE OF AISI-440C STAINLESS STEEL. THE RINGS AND ROLLING ELEMENTS SHALL BE HEAT TREATED TO A ROCKWELL "C" SCALE HARDNESS OF 58 TO 62. BEARING TOLERANCES SHALL MEET AFMA CLASS ABEC-7. IF BEARING SUPPORTS ARE NON-FERROUS, THE BEARING SHALL BE INSERTED INTO A STEEL SLEEVE MECHANICALLY SECURED TO THE BEARING SUPPORTS. THE BEARING SUPPORTS SHALL BE DESIGNED SUCH THAT THE BEARING RACES ARE POSITIVELY LOCKED TO PREVENT RACE MOVEMENT ON THE SHAFT OR WITHIN THE BORES, YET ALLOW THE AXIAL MOVEMENT NECESSARY TO ACCOMMODATE THE THERMAL EXPANSION DIFFERENTIALS BETWEEN THE ROTOR AND GENERATOR CASE.

NOTE: DUPONT DE NEMOURS & COMPANY INCORPORATED TRADEMARK.

3.4.9.3 ADD: THE GENERATOR SYSTEM SHALL BE SO DESIGNED THAT UPON REMOVAL OF ANY CONNECTOR PLUG, EXCEPT CURRENT TRANSFORMER CONNECTOR, THE GENERATOR AND REGULATOR SHALL BE DEENERGIZED. DELETE: "FOR THREE PHASE GENERATORS PHASE SEQUENCES SHALL BE T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>. NEUTRAL TERMINALS FOR THESE PHASES SHALL BE T<sub>4</sub>, T<sub>5</sub> AND T<sub>6</sub> RESPECTIVELY. IF A SINGLE NEUTRAL TERMINAL IS REQUIRED, IT SHALL BE MARKED G."

3.4.9.7 DELETE AND ADD: LIFE OF GENERATOR. GENERATORS SHALL HAVE A SERVICE LIFE OF 10,000 HOURS WITH NO MAINTENANCE OTHER THAN THE GREASE LUBRICATED BEARINGS AT INTERVALS NOT TO EXCEED 4,000 HOURS.

3.4.10 ADD: A REDUNDANT FLY WHEEL DIODE SHALL BE INCORPORATED IN THE GENERATOR CONTROL UNIT.

3.4.12 ADD: THE SYSTEM SHALL HAVE A MINIMUM TIME BETWEEN MAINTENANCE ACTIONS OF 4,000 HOURS.

to employ this standard where suitable.

P.A. NAVY - AS Other Cust	TITLE GENERATOR SYSTEM, ALTERNATING CURRENT INTEGRALLY EXCITED, 60 KVA BRUSHLESS (P-3 AIRCRAFT)	MILITARY STANDARD MS90325 (AS)
PROCUREMENT SPECIFICATION MIL-G-21480	SUPERSEDES:	SHEET 3 OF 6

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3.5.1 DELETE AND ADD: VOLTAGE LIMITS. THE TRANSIENT AND STEADY STATE VOLTAGE SHALL REMAIN WITHIN THE LIMITS OF FIGURE 1 OF THIS SPECIFICATION FOR ALL BALANCED LOAD CONDITIONS WHILE THE SYSTEM IS OPERATING UNDER ALL ENVIRONMENTAL AND LOAD CONDITIONS DEFINED HEREIN. THE REGULATOR SHALL BE ADJUSTED AT ROOM AMBIENT SO THAT THE GENERATOR DELIVERS  $117 \pm 0.5$  VOLTS AT THE POINT OF REGULATION WHEN THE GENERATOR IS OPERATING AT NO LOAD AND 6000 RPM.

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. THE TOTAL HARMONIC CONTENT SHALL NOT EXCEED 5% FOR ALL NORMAL OPERATING CONDITIONS.

3.5.5 ADD: THE PERMANENT MAGNET GENERATOR USED FOR INTEGRAL CONTROL POWER SHALL RECOVER TO NORMAL VOLTAGE AFTER A SHORT CIRCUIT CHANGE "5 AMPS MINIMUM CONTINUOUS CAPACITY" TO "2 AMPS MINIMUM CONTINUOUS CAPACITY".

3.5.7.2 OVERVOLTAGE. CHANGE "FIGURE 6" TO "FIGURE 1" OF THIS SPECIFICATION AND ADD: "MAXIMUM DURATION OF OVERVOLTAGE ABOVE 130 VOLTS SHALL BE LIMITED TO 5 SECONDS."

3.5.7.3 UNDERVOLTAGE. DELETE AND ADD: THERE SHALL BE AN UNDERVOLTAGE PROTECTIVE DEVICE WHICH SHALL FUNCTION TO DISCONNECT THE GENERATOR FROM THE LOAD BUS AND DEENERGIZE IT WHEN ANY PHASE VOLTAGE, LINE TO NEUTRAL IS BELOW 90 VOLTS FOR A PERIOD OF  $4 \pm 1$  SECONDS. THERE SHALL BE NO PROTECTIVE FUNCTION OF THE UNDERVOLTAGE PROTECTIVE DEVICE WHEN ALL PHASE VOLTAGES EXCEED 105 VOLTS.

3.5.7.4 UNDERFREQUENCY. DELETE AND ADD: THERE SHALL BE AN UNDERFREQUENCY PROTECTIVE DEVICE WHICH SHALL FUNCTION TO DISCONNECT THE GENERATOR FROM THE LOAD BUS, WITHIN ONE SECOND, WHEN THE OUTPUT FREQUENCY OF THE GENERATOR IS LESS THAN  $367 \pm 3$  HZ. THE UNDERFREQUENCY PROTECTIVE DEVICE SHALL FUNCTION TO CONNECT THE GENERATOR TO THE LOAD BUS, WITHIN ONE SECOND, WHEN THE FREQUENCY OF THE GENERATOR IS ABOVE  $383 \pm 3$  HZ.

3.5.7.6 ADD: AN M83287/01-22 INDICATOR WITH MANUAL RESET SHALL BE INCLUDED ON THE GENERATOR CONTROL UNIT TO SHOW WHEN THE FEEDER FAULT PROTECTIVE CIRCUIT HAS BEEN ACTIVATED.

3.5.7.7 DELETE: "OFF RESET" IN TWO PLACES AND ADD: "RESET".

3.5.8 DELETE AND ADD: THE SYSTEM SHALL MEET THE REQUIREMENTS OF MIL-E-81910, CLASS NO. III F FOR THE GENERATORS AND CONTROL EQUIPMENT, EXCEPT THE TEN MICROFARAD FEED-THROUGH CAPACITOR SHALL BE REMOVED.

4.2.1.1 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.

4.5.3.1 CHANGE "FIGURE 3" TO "FIGURE 1" OF THIS SPECIFICATION.

4.5.12 DELETE AND ADD: THE GENERATOR, GENERATOR CONTROL UNIT, AND CT SHALL BE SUBJECTED TO A ELECTROMAGNETIC INTERFERENCE TEST IN ACCORDANCE WITH MIL-F-81910, FOR CLASS III F EQUIPMENT.

4.5.13 (C) DELETE AND ADD: CONDITIONS (A) AND (B) SHALL BE REPEATED AT RATED SPEED THE LINE-TO-NEUTRAL CREST FACTOR OBTAINED BY THE ABOVE TEST SHALL BE  $1.41 \pm 10$  PERCENT. THE VALUE OF ANY HARMONIC DURING THE ABOVE TEST SHALL NOT EXCEED 3 PERCENT OF THE FUNDAMENTAL. THE TOTAL HARMONIC CONTENT SHALL NOT EXCEED 5 PERCENT.

4.5.20.1 DELETE AND ADD: THE GCU AND CT SHALL BE SUBJECTED TO A SALT FOG 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.

4.5.20.2 DELETE AND ADD: 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, THE EFFECT OF APPLICATION AND REMOVAL OF RATED AND 200% LOAD, AND PROTECTIVE FUNCTIONS.

4.5.21 DELETE AND ADD: THE GENERATOR, GCU AND CT 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: THE GENERATOR SHALL BE SUBJECTED TO A DUST TEST IN ACCORDANCE WITH MIL-F-81910. AT THE COMPLETION OF THIS TEST THE UNIT SHALL SUCCESSFULLY DEMONSTRATE ITS BUILDUP CHARACTERISTICS, THE EFFECTS OF APPLICATION AND REMOVAL OF RATED AND 200% LOAD, AND PROTECTIVE FUNCTIONS.

4.5.23 ADD: THE GENERATOR, GCU AND CT SHALL BE SUBJECTED TO A VIBRATION TEST IN ACCORDANCE WITH MIL-E-81910, EXCEPT THAT THE AMPLITUDE OF VIBRATION MONITORED AT THE ANTI-DRIVE END OF THE GENERATOR DURING THE MAIN BENDING MODE SHALL BE LIMITED TO 20G'S BUT THE VIBRATION INPUT SHALL NOT BE LOWERED BELOW 5G'S. 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.

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P.A. NAVY - AS Other Cust	TITLE GENERATOR SYSTEM, ALTERNATING CURRENT, INTEGRALLY EXCITED, 60 KVA BRUSHLESS (P-3 AIRCRAFT)	MILITARY STANDARD MS90325(A)
PROCUREMENT SPECIFICATION MIL-G-21480	SUPERSEDES:	SHEET 4 OF 6

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4.5.24 DELETE AND ADD: THE GENERATOR, GCU AND CT SHALL BE SUBJECTED TO A SHOCK TEST IN ACCORDANCE WITH MIL-E-81910. AT THE COMPLETION OF PROCEDURE I, 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: THE GENERATOR, GCU AND CT 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-E-81910.

## NOTES:

- 10-32 UNF-3A STAINLESS STEEL STUD, RC34 MIN, 0.468 MIN LENGTH WITH BARRIERS TO ACCOMMODATE TERMINAL LUGS MS25036-3, NUT MS90415-3. (3 REQ'D).
- 1/4-28 UNF-3A STAINLESS STEEL STUD, RC34 MIN, 0.453 MIN LENGTH WITH BARRIERS TO ACCOMMODATE TERMINAL LUGS MS25036-57, NUT MS90415-4. (2 REQ'D).
- 3/8-24 UNF-3A STAINLESS STEEL STUD, RC34 MIN, 0.667 MIN LENGTH WITH BARRIERS TO ACCOMMODATE TERMINAL LUGS MS25036-22 INSTALLED BACK TO BACK ON T1, T2, & T3. ONE TERMINAL LUG MS25036-25 ON T0, NUT MS90415-6 (4 REQ'D).
- DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED. TOLERANCES: FRACTIONS & DECIMALS  $\pm 1/32$ ,  $\pm .016$ .
- ALL OUTLINE DIMENSIONS ARE LIMITING DIMENSIONS ONLY.
- COMPONENTS SHOWN ENCLOSED IN DOTTED LINES NOT FURNISHED UNDER THIS DRAWING.

ITEM	PART NUMBER
COMPLETE SYSTEM (CONSISTING OF ONE GENERATOR, ONE GENERATOR CONTROL UNIT, AND ONE CURRENT TRANSFORMER)	MS90325-0
GENERATOR	MS90325-1
GENERATOR CONTROL UNIT	MS90325-4
CURRENT TRANSFORMER	MS90325-5

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P.A. NAVY - AS  
Other Cust

TITLE  
GENERATOR SYSTEM, ALTERNATING  
CURRENT INTEGRALLY EXCITED,  
60 KVA BRUSHLESS (P-3 AIRCRAFT)

MILITARY STANDARD

MS90325(AS)

PROCUREMENT SPECIFICATION  
MIL-G-21480

SUPERSEDES:

SHEET 5 OF 6

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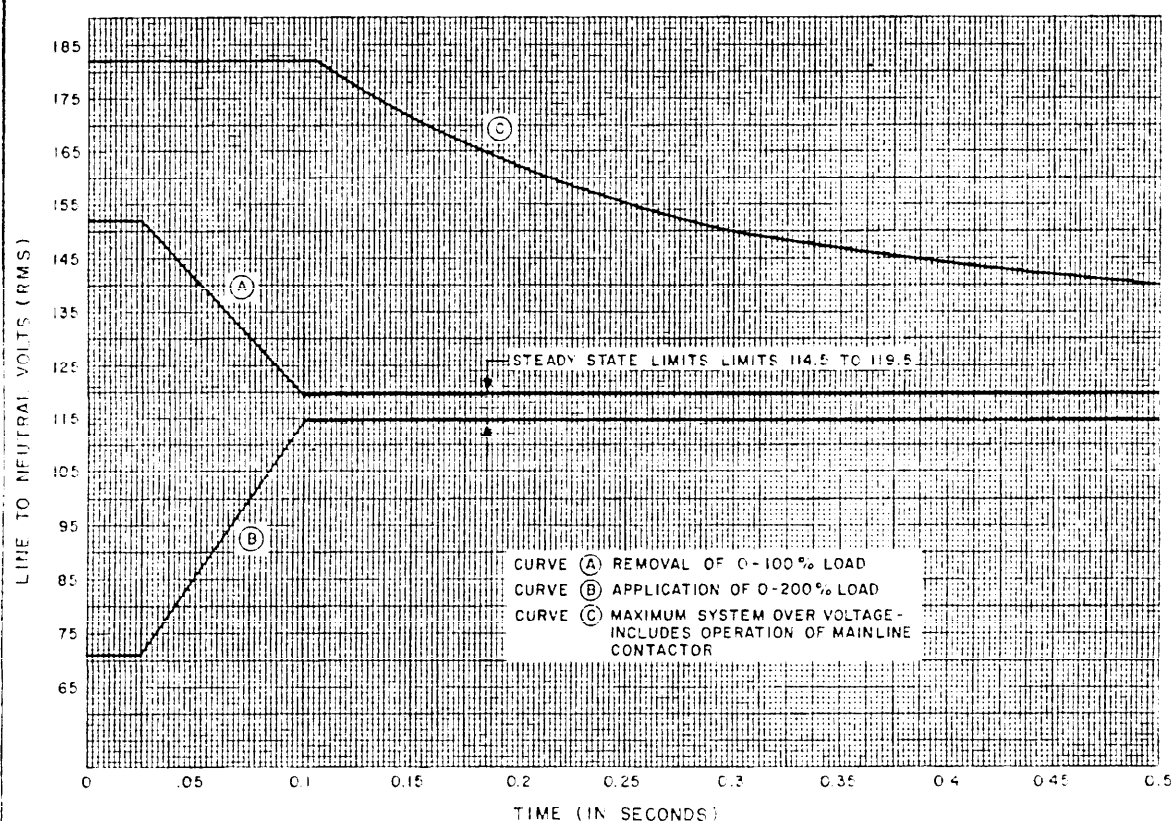


FIGURE 1. SYSTEM VOLTAGE LIMITS

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P.A. NAVY - AS Other Cost	TITLE GENERATOR SYSTEM, ALTERNATING CURRENT INTEGRALLY EXCITED, 60 KVA BRUSHLESS (P-3 AIRCRAFT)	MILITARY STANDARD <b>MS90325 (AS)</b>
PROCUREMENT SPECIFICATION MIL-G-21480	SUPERSEDES:	SHEET 6 OF 6