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PERFORMANCE SPECIFICATION

POWER SUPPLY: HIGH VOLTAGE, SOLID STATE, 24 VOLTS, DIRECT CURRENT

This specification is approved for use by the U.S. Army Tank-automotive and Armaments Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers one type of power supply for conversion of low voltage direct current (dc) electrical energy into high voltage dc electrical energy (see 6.1).

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in section 3 and section 4 of this specification, whether or not they are listed.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E/BLUE, Warren, MI 48397-5000 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 2590

2.2 Government documents.

2.2.1 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 that issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplements thereto cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

QQ-S-571	- Solder, Tin Alloy: Tin Lead Alloy; and Lead Alloy.
TT-E-489	- Enamel, Alkyd, Gloss (For Exterior and Interior Surfaces).

STANDARDS

FEDERAL

FED-STD-595	- Colors.

DEPARTMENT OF DEFENSE

MIL-STD-193	- Painting Procedures and Marking for Vehicles, Construction Equipment and Material Handling Equipment.
MIL-STD-454	- Standard General Requirements for Electronic Equipment.
MIL-STD-461	- Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference.
MIL-STD-462	- Electromagnetic Interference Characteristics, Measurement of.
MIL-STD-810	- Environmental Test Methods and Engineering Guidelines.
MIL-STD-889	- Dissimilar Metals.
MIL-STD-1184	- Electrical Components for Automotive Vehicles; Waterproofness Tests.
MIL-STD-1275	- Characteristics of 28 Volt DC Electrical Systems in Military Vehicles.
MS27190	- Connector, Receptacle, Electrical-High Voltage, Waterproof.

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following document forms 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 documents not listed in the DoDISS are the issue of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B117	- Standard Test Method of Salt Spray (Fog) Testing.
ASTM B633	- Electrodeposited Coating of Zinc or Iron and Steel, Specification For.

(Application for copies should be addressed to American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

AMERICAN NATIONAL STANDARD INSTITUTE (ANSI)

ANSI S3.6	- Audiometers, Specification for.
ANSI/ASQC Z1.4	- Sampling Procedures and Tables for Inspection by Attributes.

(Application for copies should be addressed to American National Standard Institute, Inc., 11 W. 42nd Street, 13th Floor, New York, NY 10036.)

ACOUSTICAL SOCIETY OF AMERICA (ASA)

ASA 47	- Sound Level Meters.

(Application for copies of Acoustical Society of America publications should be addressed to the acoustical Society of America, 335 East 45th Street, New York, NY 10017.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, 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 First article. When specified (see 6.2), a first article sample shall be subjected to the first article inspection in accordance with 4.2.

3.2 Materials. Materials used shall be in accordance with the manufacturer's materials specifications for power supply. The materials embodied in the power supply when subjected to a storage temperature range of minus 80 degrees Fahrenheit (°F) to plus 185°F shall not cause a change in physical or dimensional properties which would result in out of specification operation of the power supply when operated over a temperature range of minus 65°F to plus 160°F (see 4.7.1). Recovered material shall be used to the maximum extent practicable.

3.2.1 Solder. Solder employed in making electrical connections shall be a resin core type (see 4.10).

3.2.2 Potting compound. The power transformer and voltage components shall be potted in a material to insure that the power pack meets the requirements specified herein.

3.3 Design and construction. The power supply shall conform to the manufacturer's design and construction for solid state 24 volt power supplies. The outline dimensions, the attaching hole locations and sizes and the electrical receptacle locations shall conform to figure 1. The electrical receptacles shall interface with the electrical receptacles referenced in figure 1 (see 4.7.1 and 4.7.2).

3.3.1 Safety. The design and development of the power supply shall provide fail-safe features for safety of personnel during the installation, operation, maintenance, and repair or interchanging of a complete equipment or component parts thereof (see 4.9).

3.3.2 Use of dissimilar metals. All metals used in the construction of the power supply shall be of a corrosion resistant type or shall be suitably protected to resist corrosion during the normal service life of the power supply (see 4.12). The use of dissimilar metals, especially brass, copper, or steel in intimate metal to metal contact which would foster galvanic action shall be avoided.

3.3.3 Steel. All steel parts shall be zinc plated to retard or prevent the formation of white corrosion products on surfaces exposed to stagnant water, high humidity atmospheres, salt water, marine atmospheres or cyclic condensation and drying (see 4.11).

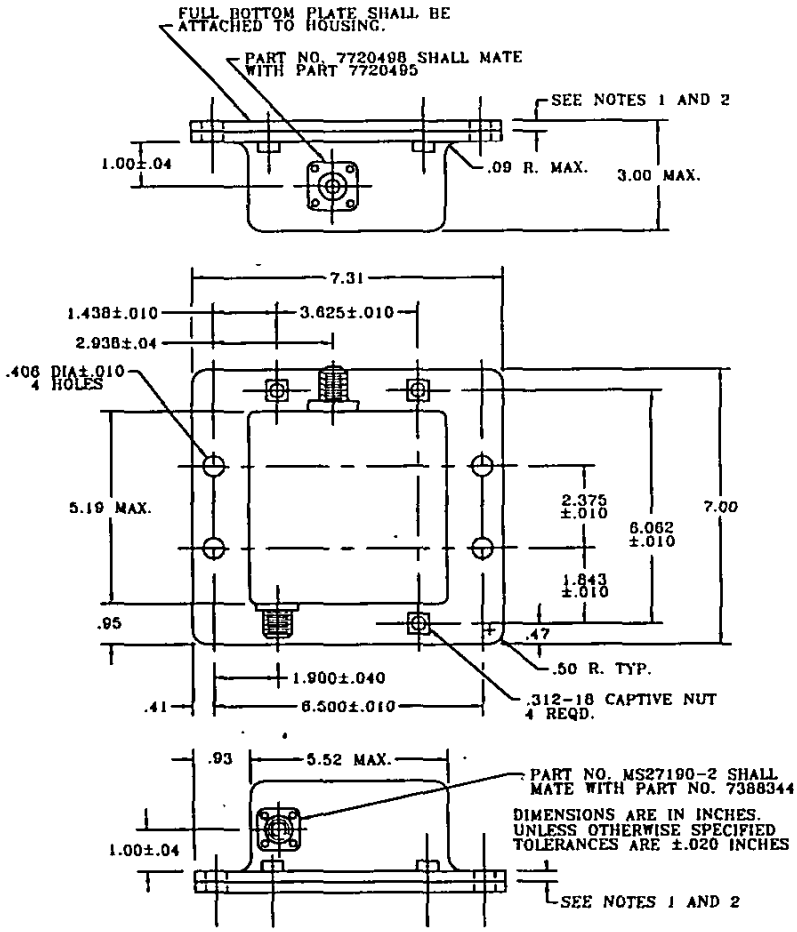
3.3.4 Wire and cable. Hookup wire shall meet the electrical and environmental requirements in this specification. Circuits shall be arranged and insulated so as to inhibit arcing.

3.3.5 Locking devices. Lock washers, self-locking nuts, safety wires, or other approved locking devices shall be incorporated where specified or where required to prevent loosening of components.

3.3.6 Weight. The power supply weight shall not exceed 6 pounds (see 4.7.3).

3.3.7 Soldering. Solder shall form a fillet with that portion of the wire or lead in contact with the terminal. Solder shall not obscure the contour of the wire or lead. For slotted terminals, solder may completely fill the slot. The manufacturer is responsible for selecting those materials and processes that will produce acceptable products to ensure minimal part solderability degradation.

3.3.8 Voltage. The power supply shall operate with a negatively grounded circuit. The output voltage shall have positive polarity (see 6.4).



Overall and Mounting Dimensions
Inch-Millimeter Equivalents

Inches	Millimeters
0.010	0.25
0.020	0.5
0.040	1.0
0.09	2.29
0.406	10.31
0.41	10.41
0.47	11.94
0.50	12.70
0.93	23.62
0.95	24.13
1.00	25.40
1.438	36.53
1.843	46.81
1.900	48.26
2.375	60.33
2.938	74.63
3.00	76.20
3.625	92.08
5.19	131.83
5.52	140.21
6.062	153.97
6.500	165.10
7.00	177.80
7.31	185.67

NOTES:

1. Dimensions are in inches and are for engineering references only.
2. Thickness of the aluminum material shall be 0.10 min.
3. Thickness of steel material shall be 0.062 min.

FIGURE 1. Power supply.

3.4 Performance.

3.4.1 Electrical.

3.4.1.1 Input voltage. The power supply shall operate and, except where otherwise specified, meet performance requirements with an input voltage of 18 to 30 volts (V) dc (see 4.7.4.1.1).

3.4.1.2 Low voltage input. The power supply shall be provided with protection against damage from continuous input potentials below 18 V dc (see 4.7.4.1.2).

3.4.1.3 Over voltage input. The power supply shall be capable of intermittent operation without damage or malfunction with input potentials from 30 to 35 V dc (see 4.7.4.1.3).

3.4.1.4 Output voltage. During operations, the output voltage of the power supply shall be not greater than 16.0 kilovolt (kV) or less than the output voltage values specified in table I, at the input voltage and load resistance specified in table I (see 4.7.4.1.4).

TABLE I. Output voltage.

Input Voltage V	Load Resistor Megohms	Output Voltage (minimum) kV
22	160	14.6
24	160	15.2
26	160	15.2
28	160	15.5
30	160	15.5
22	80	13.5
24	80	13.8
26	80	13.8
28	80	14.0
30	80	14.0

3.4.1.5 Output voltage ripple. The peak to peak ripple of the output voltage shall be not greater than 2.5 percent (%) of the output voltage (see 4.7.4.1.5).

3.4.1.6 Transient capability. Transients are the changing conditions of a characteristic to provide for compatibility between vehicular electric power supply and utilization equipment (see 4.7.4.1.6). Transient usually go beyond the steady-state limits and return to and remain within the steady-state limits within a specified time period (see 3.4.1.4). The transient may take the form of either a surge or a spike (see 4.7.4.1.6).

3.4.1.7 Input current. The power supply shall operate with an input current of not more than 0.60 ampere (A) (see 4.7.4.1.7).

3.4.1.8 Reverse polarity protection. The power supply shall not be damaged and the input current shall not exceed 5 milliamperes (mA) with polarity of the input voltage reversed (see 4.7.4.1.8).

3.4.1.9 Open circuit operation. The power supply shall not be damaged and shall meet the requirements of 3.4.1.4 operation with no load (see 4.7.4.1.9).

3.4.1.10 Short circuit protection. Automatic resetting type circuit protection shall be provided. The power supply shall withstand the test specified in 4.7.4.1.10. Subsequently, the power supply shall meet the requirements of 3.4.1.4 (see 4.7.4.1.10).

3.4.1.11 Endurance. The power supply shall operate no less than 1000 hours without failure (except tubes), and upon completion 1000 hours meet the requirements of 3.4.1.4 and 3.4.1.5 (see 4.7.4.1.11).

3.4.2 Environmental.

3.4.2.1 High temperature. The power supply shall meet the requirements of 3.4.1 after exposure to temperatures up to plus 185°F. The power supply shall meet the requirements of 3.4.1.4 and 3.4.1.5 during exposure to temperatures up to plus 160°F. The maximum output voltage shall not exceed 16.5 kV at extreme high temperatures and the output voltages shall conform to table I with a tolerance of ± 5 percent (see 4.7.4.2.1).

3.4.2.2 Low temperature. The power supply shall meet the requirements of 3.4.1 after exposure to temperatures down to -80°F. The power supply shall meet the requirements of 3.4.1.4 and 3.4.1.5 during exposure to temperatures down to -65°F. The output voltages shall conform to table I with a tolerance of ± 5 percent (see 4.7.4.2.2).

3.4.2.3 Shock. The power supply shall meet the requirements of 3.4.1.4, and shall evidence no breakage, loosened or distorted parts or other physical damage during exposure to half sine wave shocks, of 40 gravity units (g) for 18 millisecond (ms) duration in the direction of mutually perpendicular axes (see 4.7.4.2.3).

3.4.2.4 Vibration. The power supply shall meet the requirements of 3.4.1.4, and shall evidence no breakage, loosened or distorted parts or other physical damage after exposure to the peak vibration (see 4.7.4.2.4).

3.4.2.5 Humidity. The power supply shall meet the requirements of 3.4.1.4, and shall show no change in physical, electrical, or material characteristics after storage under induced high temperature and humidity conditions (see 4.7.4.2.5).

3.4.2.6 Waterproofness. The power supply shall evidence no air bubbles escaping from any sealed chambers while being submerged in a salt water solution and shall subsequently meet the requirements of 3.4.1.4 (see 4.7.4.2.6).

3.4.2.7 Corrosion resistance. The power supply shall meet the requirements of 3.4.1.4 and show no evidence of corrosion affecting performance after cyclic exposure to a salt fog atmosphere (see 4.7.4.2.7).

3.4.2.8 Fungus resistance. The power supply shall evidence no microbial growth adversely affecting performance after exposure to conditions favorable to fungus growth (see 4.7.4.2.8).

3.4.2.9 Electromagnetic compatibility. The power shall meet the requirements as specified in 4.7.4.2.9.

3.4.2.10 Noise level. The power shall be inaudible when operating (see 4.7.4.2.10).

3.5 Finish. The exterior surface of the power supply shall be painted, except the electrical connections with a gloss enamel. The color shall be white (see 4.7.2 and 4.8).

3.6 Identification marking. Identification and marking of this power supply shall be permanent and legible on a nameplate with a red background color containing the following as a minimum (see 4.7.2):

Danger, High Voltage, 16,000 Volts Power Supply
Military Part Number (see 6.2)
Federal Stock Number (see 6.2)
Manufacturer's Serial Number
Manufacturer's Identification
U.S. Military Property

4. VERIFICATION

4.1 Classification of inspection. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.2).
b. Conformance inspection (see 4.4).
   1. Examination (see 4.4.2).
   2. Tests (see 4.4.3).
c. Control tests (see 4.5).

4.2 First article inspection. Unless otherwise specified (see 6.2), first article inspection shall be performed on five power supplies when a first article is required (see 3.1). This inspection shall include the examinations in table II, in the order specified in table III.

4.3 Inspection conditions. Unless otherwise specified (see 6.2), all inspections shall be conducted under the following conditions:

a. Air temperature 73 ± 18°F.
b. Barometric pressure 28.5 ± 2 inches mercury (Hg).
c. Relative humidity 50 ± 30 percent.

4.4 Conformance inspection.

4.4.1 Sampling.

4.4.1.1 Lot formation. An inspection lot shall consist of all the power supplies of one type and part number, from an identifiable production period, from one manufacturer submitted at one time for acceptance.

4.4.1.2 Sampling for examination. Samples for conformance examination shall be selected in accordance with ANSI/ASQC Z1.4.

4.4.2 Examination.

4.4.2.1 Classification of defects. For examination purposes, defects shall be as classified as listed in table IV.

4.4.3 Test. Each power supply shall be subjected to the conformance test specified in table II, except that the test shall be performed at 24 V input only, and load resistance adjusted to 80-160 megohms.

TABLE II. Classification of inspections.

Title	Requirement	Inspection	First article	Quality conformance		Control
				Examination	Tests	
Materials and construction	3.2 thru 3.3.5, 3.3.7 & 3.3.8	4.7.1	X			X
Defects (see 4.4.2 and table IV)	3.3, 3.5 and 3.6	4.7.2	X	X		X
Weight	3.3.6	4.7.3	X			
Performance	3.4					
Electrical	3.4.1					
Input voltage	3.4.1.1	4.7.4.1.1	X			
Low voltage input	3.4.1.2	4.7.4.1.2	X			X
Over voltage input	3.4.1.3	4.7.4.1.3	X			X
Output voltage	3.4.1.4	4.7.4.1.4	X			X
Output voltage ripple	3.4.1.5	4.7.4.1.5	X			X
Transient capability	3.4.1.6	4.7.4.1.6	X		X	
Input current	3.4.1.7	4.7.4.1.7	X			X
Reverse polarity protection	3.4.1.8	4.7.4.1.8	X			X
Open circuit operation	3.4.1.9	4.7.4.1.9	X			X
Short circuit protection	3.4.1.10	4.7.4.1.10	X			X
Endurance	3.4.1.11	4.7.4.1.11	X			X
Environmental	3.4.2					
High temperature	3.4.2.1	4.7.4.2.1	X			
Low temperature	3.4.2.2	4.7.4.2.2	X			
Shock	3.4.2.3	4.7.4.2.3	X			X
Vibration	3.4.2.4	4.7.4.2.4	X			X
Humidity	3.4.2.5	4.7.4.2.5	X			
Waterproofness	3.4.2.6	4.7.4.2.6	X			
Corrosion resistance	3.4.2.7	4.7.4.2.7	X			
Fungus resistance	3.4.2.8	4.7.4.2.8	X			
Electromagnetic compatibility	3.4.2.9	4.7.4.2.9	X			
Noise level	3.4.2.10	4.7.4.2.10	X			

TABLE III. *Order of first article testing.*

Sample	Paragraph	Test
1	4.7.4.1.4	Output voltage
	4.7.4.1.5	Output voltage ripple
	4.7.4.1.7	Input current
	4.7.4.1.8	Reverse polarity protection
	4.7.4.1.10	Short circuit protection
	4.7.4.1.2	Low voltage input
	4.7.4.1.3	Over voltage input
	4.7.4.1.9	Open circuit operation
	4.7.4.1.4	Output voltage
	4.7.4.1.5	Output voltage ripple
	4.7.4.1.6	Transient capability
	4.7.4.1.4	Output voltage
	4.7.4.1.5	Output voltage ripple
	4.7.4.2.4	Vibration
	4.7.4.1.4	Output voltage
	4.7.4.2.6	Waterproofness
	4.7.4.1.4	Output voltage
2	4.7.4.1.4	Output voltage
	4.7.4.2.10	Noise level
	4.7.4.2.9	Electromagnetic
	4.7.4.1.4	compatibility
	4.7.4.2.7	Output voltage
	4.7.4.1.4	Corrosion resistance
		Output voltage
3	4.7.4.1.4	Output voltage
	4.7.4.2.8	Fungus resistance
	4.7.4.1.4	Output voltage
4	4.7.4.1.4	Output voltage
	4.7.4.2.3	Shock
	4.7.4.1.4	Output voltage
	4.7.4.2.5	Humidity
	4.7.4.1.4	Output voltage

TABLE III. Order of first article testing - Continued.

Sample	Paragraph	Test
5	4.7.4.1.4	Output voltage
	4.7.4.1.5	Output voltage ripple
	4.7.4.2.1	High temperature
	4.7.4.2.2	Low temperature
	4.7.4.1.7	Input current
	4.7.4.1.2	Reverse polarity protection
	4.7.4.1.10	Short circuit protection
	4.7.4.1.4	Output voltage
	4.7.4.1.2	Low voltage input
	4.7.4.1.3	Over voltage input
	4.7.4.1.4	Output voltage
	4.7.4.1.5	Output voltage ripple
	4.7.4.1.11	Endurance
	4.7.4.1.4	Output voltage
	4.7.4.1.5	Output voltage ripple

TABLE IV. Classification of defects.

Category	Defect	Method of examination
Critical	None	
Major		
101	Incorrect dimensions affecting interchangeability (see 3.3).	SIE 1/
102	Nonconformance in design and construction (see 3.3).	Visual and SIE
Minor		
201	Incorrect dimension not affecting interchangeability (see 3.3).	SIE
202	Improper finish (see 3.5).	Visual
203	Improper marking (see 3.6).	Visual

1/ SIE = Standard Inspection Equipment.

4.5 Control tests. Control test shall be conducted on two power supplies from each lot of 100 units consecutively produced, except that no more than four or less than two may be selected in any one month period. Power supplies shall be selected from a lot which has passed the examination specified in 4.4.2 and test specified in 4.4.3. The power supplies shall be subjected to the tests specified in table II, in the order specified in table V.

TABLE V. Control tests.

Sample	Paragraph	Test
1, 3	4.7.4.1.7	Input current
	4.7.4.1.8	Reverse polarity protection
	4.7.4.1.10	Short circuit protection
	4.7.4.1.2	Low voltage input
	4.7.4.1.3	Over voltage input
	4.7.4.1.4	Output voltage
	4.7.4.1.5	Output voltage ripple
	4.7.4.1.9	Open circuit operation
	4.7.4.2.3	Shock
2, 4	4.7.4.1.7	Input current
	4.7.4.1.8	Reverse polarity protection
	4.7.4.1.10	Short circuit protection
	4.7.4.1.2	Low voltage input
	4.7.4.1.3	Over voltage input
	4.7.4.1.4	Output voltage
	4.7.4.1.5	Output voltage ripple
	4.7.4.1.9	Open circuit operation
	4.7.4.2.4	Vibration

4.6 Failure. Failure of any power supply to pass any of the specified conformance or control tests shall be cause for the Government to refuse acceptance of the production quantity represented, until action taken by the contractor to correct defects and prevent recurrence has been approved by the Government.

4.7 Method of inspection.

4.7.1 Materials and construction. Conformance to 3.2 through 3.3.5, 3.3.7, and 3.3.8 shall be determined by inspection of contractor records providing proof of certification that design, construction, processing and materials conform to requirements. Applicable records shall include drawings, specifications, design data, receiving inspection records, processing and quality control standards, vendor catalogs and certifications, industry standards, test reports, and rating data.

4.7.2 Defects. Conformance to 3.3, 3.5, and 3.6 shall be determined by examination for the defects listed in table IV. Examination shall be visual, tactile, or by measurement with Standard Inspection Equipment (SIE).

4.7.3 Weight. To determine conformance to 3.3.6, the power supply shall be weighed on a calibrated scale. The overall weight shall not exceed 6 pounds.

4.7.4 Performance. Except as otherwise specified herein or in applicable specifications, test specimens shall be thermally stabilized for one hour prior to being subjected to tests.

4.7.4.1 Electrical.

4.7.4.1.1 Input voltage. To determine conformance to 3.4.1.1, the input voltage shall be monitored through performance testing.

4.7.4.1.2 Low voltage input. To determine conformance to 3.4.1.2, the power supply shall be subjected to 22 V dc input. The output load resistor shall be 80 megohms. Input voltage shall be reduced to zero and then returned to 22 V dc input. Rate of change of voltage shall be 1 V every 3 minutes.

4.7.4.1.3 Over voltage input. To determine conformance to 3.4.1.3, the power supply shall be subjected to an input potential of 35 V dc for 1 minute.

4.7.4.1.4 Output voltage. To determine conformance to 3.4.1.4, the power supply shall be connected in a circuit simulating that used in intended service with means for varying the input voltage and accurately measuring the output voltage. A 5-minute warm up period shall precede the test. The power supply shall be connected with a load resistor of 160 megohms, and the input voltage shall be varied as specified; the corresponding output voltages shall be recorded to determine compliance with table I and 3.4.1.4. The load shall then be reduced to 80 megohms, and the input voltage shall be varied; the corresponding output voltages shall be recorded to determine compliance with 3.4.1.4 and table I.

4.7.4.1.5 Output voltage ripple. To determine conformance to 3.4.1.5, The power supply shall be tested as follows: Connect the power supply to a 160-megohms divided load resistor and microammeter. Place the microammeter in the grounded side of the line. A 5-minute warm up period shall precede the test. Use an oscilloscope to measure the voltage across the 50,000-ohm portion of the load resistor adjacent to the microammeter. Convert the microammeter readings to (average) dc output voltage. Obtain the peak alternating current (dc) voltage readings from the oscilloscope. Then calculate the voltage variation as peak ac voltage divided by (average) dc output voltage to determine compliance with 3.4.1.5.

4.7.4.1.6 Transient capability. To determine conformance to 3.4.1.6 and MIL-STD-1275, the power supply with a load of 160 megohms shall be subject to an input voltage of 30 V with a superimposed square wave impulse of 70 V peak (100 V peak total) of 50 ± 5 ms duration and a repetition rate of 6 ± 0.5 seconds for a period of 8 hours. After the test, the power supply shall be tested as specified in 4.7.4.1.4 to determine compliance with 3.4.1.4.

4.7.4.1.7 Input current. To determine conformance to 3.4.1.7, an ammeter shall be used to determine the input current.

4.7.4.1.8 Reverse polarity protection. To determine conformance to 3.4.1.8, the source polarity shall be reversed, and voltage from 0 to 40 V dc shall be applied. A multirange ammeter in the input circuit shall be used to indicate the current magnitude and its direction.

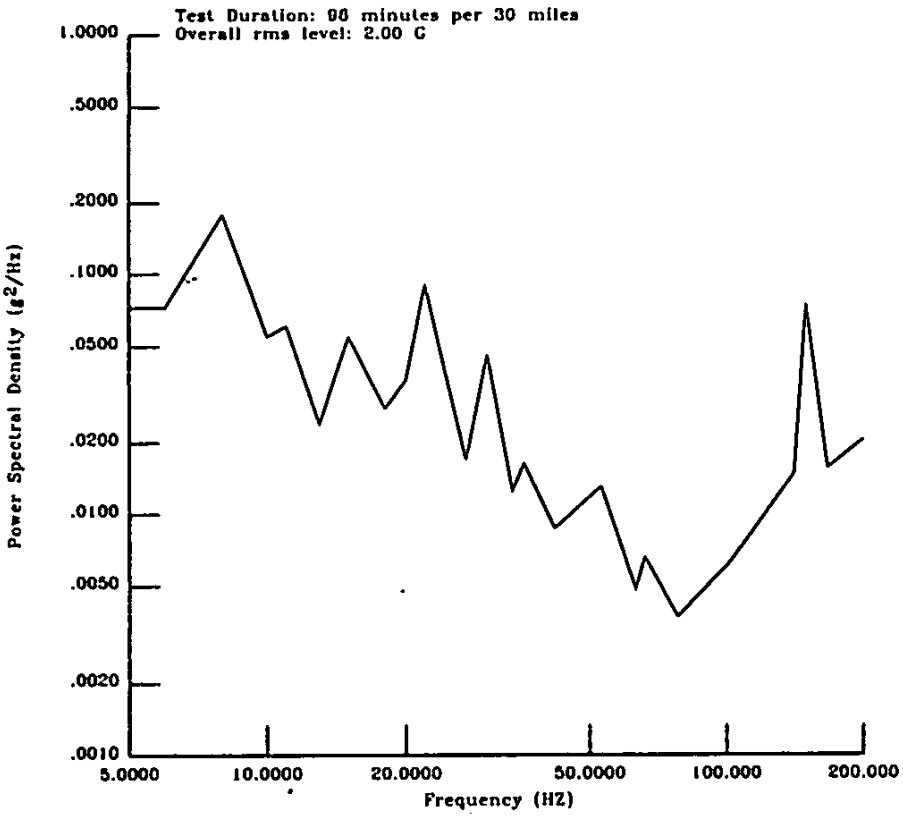
4.7.4.1.9 Open circuit operation. To determine conformance to 3.4.1.9, the power supply shall be operated with no load for 5 minutes and tested in accordance with 4.7.4.1.4.

4.7.4.1.10 Short circuit protection. To determine conformance to 3.4.1.10, the output of the power supply shall be short-circuited with the power supply operating into a 160 megohm load within the functional voltage range (18 to 30 V). Subsequent to the test the power supply shall be subjected to the test specified in 3.7.4.1.4.

4.7.4.1.11 Endurance. To determine conformance to 3.4.1.11, the power supply shall be subjected to continuous operation with 26 V input and a 160 megohm load resistor for 1000 hours. At intervals of 50 hours, the specimen shall be tested as specified in 4.7.4.1.4 to determine compliance with 3.4.1.4. Upon completion of the endurance test, the power supply shall be tested as specified in 4.7.4.1.4 and 4.7.4.1.5 to determine conformance with 3.4.1.4 and 3.4.1.5.

4.7.4.2 Environmental.

4.7.4.2.1 High temperature. To determine conformance 3.4.2.1, the high temperature cycling test of MIL-STD-810, method 501, procedure II shall be followed, except that the power supply stabilization temperature shall be 185°F. The operation shall be conducted with test item stabilized at 160°F and shall consist of the tests specified in 4.7.4.1.4 and 4.7.4.1.5 to determine compliance with 3.4.1.4 and 3.4.1.5 to determine compliance with 3.4.1, the power supply shall pass the tests specified in 4.7.4.1 upon completion of the low temperature test specified in 4.7.4.2.2.



BREAKPOINTS FREQ	PSD VALUE
5	.07220
6	.07220
8	.17660
10	.05490
11	.06070
13	.02360
15	.05490
18	.02740
20	.03600
22	.09030
27	.01670
30	.04620
34	.01240
36	.01630
42	.00870
53	.01300
63	.00480
66	.00660
78	.00370
102	.00630
141	.01470
150	.07400
167	.01550
200	.02030

FIGURE 2. Basic transportation, two wheeled trailer environment, longitudinal axis.

4.7.4.2.2 Low temperature. To determine conformance to 3.4.2.2, the low temperature cycling test of MIL-STD-810, method 502, procedures I and II shall be followed, except that the storage temperature shall be -80°F for 12 hours. The operation test, procedure II, shall be conducted with test item stabilized at -65°F and shall consist of the tests specified in 4.7.4.1.4 and 4.7.4.1.5 to determine compliance with 3.4.1.4 and 3.4.1.5. Upon stabilization at 77°F after cycling, the power supply shall be tested as specified in 4.7.4.1 to determine compliance with 3.4.1.

4.7.4.2.3 Shock. To determine conformance with 3.4.2.3, the power supply shall be tested in accordance with the shock test of MIL-STD-810, method 516, figure 516.4-4, except the duration shall be 18 milliseconds. The peak amplitude shall be 40g. After the test the power supply shall be tested as specified in 4.7.4.1.4 to determine compliance with 3.4.1.4.

4.7.4.2.4 Vibration. To determine conformance to 3.4.2.4, the power supply shall be subjected to a vibration test using figure 1, except the loading shall be 10 g's. This figure represents the basic transportation, two wheeled trailer environments, longitudinal axis. The spectrum is broad band random with peaks and notches at various discrete frequency bands. Break points are provided for establishing the spectrum shape. After the test, the power supply shall be tested as specified in 4.7.4.1.4 to determine conformance to 3.4.1.4.

4.7.4.2.5 Humidity. To determine conformance to 3.4.2.5, the power supply shall be tested as specified in MIL-STD-810, method 507, procedure II. After the test, the power supply shall be tested as specified in 4.7.4.1.4 to determine compliance with 3.4.1.4.

4.7.4.2.6 Waterproofness. To determine conformance to 3.4.2.6, the power supply shall be tested in accordance with type II, class 2, method 100, procedure I of MIL-STD-1184. The power supply shall not be operated while immersed in the solution. After the test, the power supply shall be tested as specified in 4.7.4.1.4 to determine compliance to 3.4.1.4.

4.7.4.2.7 Corrosion resistance. To determine conformance to 3.4.2.7, the power supply shall be subjected to the salt fog test in accordance with ASTM B117, for four test cycles (192 total hours) while in sealed condition with no internal parts exposed. After the test, the power supply shall be tested as specified in 4.7.4.1.4 to determine compliance with 3.4.1.4.

4.7.4.2.8 Fungus resistance. To determine conformance to 3.4.2.8, the power supply shall be tested as specified in MIL-STD-810, method 508, for a continuous period of 90 days from the time of inoculation. After the test, the power supply shall be tested as specified in 4.7.4.1.4 to determine compliance with 3.4.1.4.

4.7.4.2.9 Electromagnetic compatibility. To determine conformance to 3.4.2.9, the power supply shall conform to the applicable provisions of MIL-STD-461 for class A3 equipment and shall be tested in accordance with MIL-STD-462.

4.7.4.2.10 Noise level. To determine conformance to 3.4.2.10, inaudibility shall be as determined by three listeners with hearing not over 20 decibels (dB) loss as evidenced by a hearing test made within 6 months of test of the power supply. The hearing test shall have been made by a person meeting the criteria of the inter-society committee on industrial technician training, and using a pure tone audiometer, either wide range or limited range type meeting the requirements of ANSI S3.6. The power supply shall be operated at 28 V and resistor load of 160 megohms. The unit shall be in an environment not exceeding 40 decibels (a weighted system response) [dB(A)] measured with the units not operating. The environment measurement shall be made with a sound level meter which meets the requirements for type II of ASA 47. The listeners shall be positioned so that each ear in turn shall be positioned 12 inches from the nearest surface of the power supply unit and five surfaces shall be so employed.

4.8 Finish. To determine conformance to 3.5, the exterior surfaces of the power supply shall be painted, except the electrical connections, with a gloss enamel conforming to TT-E-489 in accordance with MIL-STD-193. Color shall be white conforming to chip 17875 of FED-STD-595.

4.9 Safety. To determine conformance to 3.3.1, the power supply shall meet the applicable safety requirements specified in requirement 1 of MIL-STD-454.

4.10 Solder. To determine conformance to 3.2.1, solder employed in making electrical connections shall be a resin core type conforming to QQ-S-571.

4.11 Steel. To determine conformance to 3.3.3, all steel parts not to be painted or not otherwise protected against corrosion shall be zinc plated in accordance with ASTM B633.

4.12 Use of dissimilar metals. To determine conformance to 3.3.2, except where necessary to complete an electrical circuit, contact between dissimilar metals which would foster galvanic action should be avoided where such contacts are not necessary to complete an electrical circuit, but is otherwise unavoidable parts shall be insulated as specified in MIL-STD-889 for type II, class 3 components.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

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

6.1 Intended use. Power supply assemblies covered by this specification are intended for use in tactical military vehicles to supply high voltage electrical energy used in viewing devices. This power supply is a compact, light-weight replacement for the power supply described in figure 1 within drawings D7355743 and D7978752.

6.2 Ordering data. Procurement documents should specify the following:

a. Title, number, and date of this specification.
b. Drawing title, number, and date (see 3.3).
c. If first article samples are not required (see 3.1).
d. Specify military part number (see 3.6).
e. Specify the Federal Stock Number (see 3.6).
f. If responsibility for inspection shall be other than as specified (see 4.1.2).
g. If inspection conditions shall be other than as specified (see 4.3).
h. If first article inspection is not required (see 4.2).
i. Selection of applicable level of packaging standard or packaging data sheet (see 5.1).
j. Issue of Department of Defense Index of Specifications and Standards (DoDISS) and the specific issue of individual documents referenced (see 2.2 and 2.3).

6.3 Positive output polarity. Positive output polarity is essential in producing an image on the viewing screen (see 3.3.8).

6.4 Subject term (key word) listing.

Direct Current Power Devices
Electrical Energy
Electrical Power
Power Conversion

Custodian:
Army - AT

Preparing activity:
Army - AT

(Project 2590-0235)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-PRF-62071C(AT)	2. DOCUMENT DATE (YYMMDD) 951206

3. DOCUMENT TITLE
Power Supply: High Voltage, Solid State, 24 Volts, Direct Current

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY

a. NAME	b. TELEPHONE (Include Area Code) (1) Commercial (810) 574-8745	(2) AUTOVON DSN 786-8745
c. ADDRESS (Include Zip Code) Commander U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E/BLUE Warren, MI 48397-500^	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	