

INCH-POUND

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SUPERSEDING
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DETAIL SPECIFICATION

CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL, INTERVEHICULAR (24 VOLT TO 12 VOLT REDUCTION)

Inactive for new design after 27 April 2000.

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

1. SCOPE

1.1 Scope. This specification covers one type of cable assembly used to interconnect the 24-volt (V) electrical system of a Military-type towing vehicle and the 12V electrical system of a commercial trailer or semitrailer.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 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 of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

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 cited in the solicitation or contract.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-130 – Identification Marking of U.S. Military Property.
MIL-STD-1916 – DOD Preferred Methods for Acceptance of Product
MS75020 – Connector, Plug, Electrical – 12 Contact, Intervehicular, 24 Volt, Waterproof.

(Copies of these documents are available online at <http://quicksearch.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

Comments, suggestions, or questions on this document should be addressed to: DLA Land and Maritime, Attn: VAI, P.O. Box 3990, Columbus, Ohio, 43218-3990 or emailed to FluidFlow@dlam.mil. Since contact information can change, you may want to verify the currency of this address information using ASSIST Online Database at <https://assist.dla.mil>.

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AEROSPACE INDUSTRIES ASSOCIATION (AIA)

NAS 3417 - Packaging of Electrical Cable-Cord-Wire

(Copies of these documents are available online at <http://www.aia-aerospace.org> or from the Aerospace Industries Association, 1000 Wilson Boulevard, Suite 1700, Arlington, VA 22209-3901.)

SAE INTERNATIONAL

SAE J560 - Seven-Conductor Electrical Connector for Truck-Tractor Jumper Cable.

SAE J561 - Electrical Terminals-Eyelet and Spade Type.

SAE J1067 - Seven Conductor Jacketed Cable for Truck Trailer Connections.

(Copies of these documents are available on line at www.sae.org from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, and Tel: 877-606-7323 [inside USA and Canada] or 724-776-4970 [outside USA], email at CustomerService@sae.org.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, 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 Description. The cable assembly shall consist of a 7-contact cable connector cable conforming to SAE J1067, a voltage control unit, not less than 2 feet of 7-conductor cable conforming to SAE J1067, and a 12-contact cable connector plug conforming to MS75020. The voltage control unit shall provide the required reduction of voltage from a 24V tractor system for 24V or 12V trailer operation.

3.2 First article. When specified (see 6.2), the contractor shall furnish a cable assembly for first article inspection and approval (see 4.1.1 and 6.4).

3.3 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.4 Construction. The cable assembly shall be constructed so that a straight pull of not less than 75 pound-force (334 N) between the jumper cable and each cable connector plug or the voltage control enclosure shall be resisted without damage to the components. Cable terminations, at cable connector plugs and at the voltage control unit, shall incorporate a strain relief which relieves all tension from the individual electrical connections. Conductor insulation shall be protected against abrasion, due to vibration or as a result of applied tension, at points of contact with conducting material.

3.4.1 Cable. Jumper cable shall conform to SAE J1067.

3.4.2 Cable terminations. The 7-contact cable connector plug shall conform to SAE J560. The 12-contact cable connector plug shall be the pin type conforming to MS75020, Part or Identifying Number (PIN) MS75020-1. Conductor terminals, within the control box, shall conform to SAE J561 with the type to be determined by the manufacturer.

3.4.3 Cable dimensions. The cable shall be molded into a cylindrical coil incorporating spring-like properties, so that following extension, the cable will retract to its original shape. The cable length from the 12-contact cable connector plug to the voltage control unit shall be not less than 2 feet (.610 m) when extended, and the coil length shall be not more than 6 inches (15.24 cm) when the cable is retracted. The cable length from the voltage control unit to the 7-contact cable connector plug shall be not less than 10 feet when extended and the coil length shall be not more than 2 feet (.610 m) when the cable is retracted. Cable shall be marked for identification by either painting or embossing during manufacturing process.

3.4.4 Voltage control unit. The voltage control unit shall adapt the 24V truck potential to the 12V trailer requirements. The voltage control unit shall incorporate a rotary selector which, by selective positioning, will insert the required resistance in the marker, clearance, and tail lamp circuit for the various trailer lamp requirements indicated herein. Selector positions shall include resistance values for 8, 10, 12, 14, and 16 lamp circuits of 4 candlepower per each position appropriately marked according to the number of lamps in the circuit. The stop lamp circuits provide for two 21 candlepower lamps. Right and left turn signal circuits shall each provide for one 21 candlepower lamp. The auxiliary circuit shall provide for two 21 candlepower lamps. Circuits shall be based on standard SAE lamp bulb ratings. Resistors shall be of the wire-wound type and rated for the wattage required to be dissipated. All electrical components and wiring shall be mechanically and electrically secure from damage due to severe vibration and shock. The voltage control unit shall be mounted in a weather-resistant, metal enclosure. The enclosure shall be provided with mounting brackets for the purpose of mounting the voltage control unit on military-type towing vehicles.

3.4.5 Circuit continuity. Conductors shall be connected through the voltage control unit to the respective contacts on each cable connector plug, as indicated in table I, to provide continuity of the electrical circuits from the towing vehicle to the towed vehicle.

TABLE I. Interconnection of contacts on respective cable connector plugs.

Circuit function	12-contact plug (MS75020-1)	7-contact plug (SAE J560)	Wire Color
Ground return to towing vehicle	D	1	wht
Marker, clearance, and tail lamps	E	2 and 6	blk & brn
Left turn directional signal	B	3	yel
Stop	F	4	red
Right turn directional signal	J	5	grn
Auxiliary circuit	K	7	blu

3.5 Treatment and painting. Treatment and painting shall be in accordance with the manufacturer's standard commercial practice.

3.6 Identification markings. The cable assembly shall be marked for identification in accordance with MIL-STD-130.

3.7 Workmanship. The cable assembly shall be fabricated in accordance with the current state-of-the-art practices of the industry. Metal surfaces shall be smooth and free from sharp edges. Component parts shall be securely mounted and arranged for accessibility.

4. VERIFICATION

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

- a. First article inspection (see 4.1.1).
- b. Conformance inspection (see 4.1.2).

4.1.1 First article inspection. The first article inspection shall be performed on one cable assembly when a first article is required (see 3.2 and 6.2). This inspection shall include the examination of 4.4, the tests of 4.5, and, when specified, the first article packaging inspection of 4.6 (see 6.2). The first article may be either a first production item or a standard production item from the supplier's current inventory provided the item meets the requirements of the specification and is representative of the design, construction, and manufacturing technique applicable to the remaining items to be furnished under the contract.

4.1.2 Conformance inspection. The quality conformance inspection shall include the examination of 4.4, the tests of 4.5, and the packaging inspection of 4.6. This inspection shall be performed on the samples selected in accordance with 4.3.

4.2. Responsibility for compliance. All items shall meet the requirements of sections 3 and 5. The inspection set forth in this document shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in this document 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.

4.2.1 Component and material inspection. Components and materials shall be inspected in accordance with all the requirements specified herein and in applicable referenced documents.

4.3 Sampling. Sampling and inspection procedures shall be in accordance with MIL-STD-1916. The unit of product shall be one cable. All cables offered for delivery at one time shall be considered a lot for the purpose of inspection.

4.3.1 Sampling for examination. Guidance for inspection level and an Acceptable Quality Level (AQL) is provided in 6.5.1.

4.3.2 Sampling for tests. Guidance for inspection level and an Acceptable Quality Level (AQL) is provided in 6.5.2.

4.4 Examination. Each cable assembly selected shall be examined for compliance with the requirements specified in section 3 of this specification. Any redesign or modification of the contractor's standard product to comply with specified requirements, or any necessary redesign or modification following failure to meet specified requirements shall receive particular attention for adequacy and suitability. This element of inspection shall encompass all visual examinations and dimensional measurements. Noncompliance with any specified requirement shall constitute one defect.

4.5 Tests. Each cable assembly selected shall be tested as specified in 4.5.1 through 4.5.3.

4.5.1 Tension test. A straight pull, of not less than 75 pound-force shall be applied continuously, for a period of 1 minute, between jumper cable and each cable connector plug and between jumper cable and the voltage control unit. Following the tension test, each component shall be examined for damage and electrical connections examined to insure that strain relief provisions are adequate to determine conformance to 3.4.

4.5.2 Voltage drop test. A 24V potential shall be applied to the contacts of the 12-contact cable connector plug and the voltage measured in each circuit of the 7-contact cable connector plug, with current flowing in the circuit corresponding to the load requirements of the circuit, to determine conformance to 3.4.4. The minimum voltage at the bulbs shall be not less than 10V.

4.5.3 Continuity test. Cable assembly shall be tested for continuity of the electrical circuit, between corresponding contacts of the cable connector plugs for all circuit conditions, to determine conformance to 3.4.5.

4.6 Packaging inspection. The inspection of the preservation, packaging, and marking shall be in accordance with the requirements of NAS 3417. The inspection shall consist of the quality conformance inspection; and, when specified (see 6.2), a first article pack shall be furnished for examination and test within the time frame required (see 6.2).

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contract 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 activities within the Military Service or Defense Agency, or within the military service's system commands. 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. This cable assembly is intended for use to inter-connect the 24V electrical system of a military type towing vehicle with the 12V electrical system of commercial trailers.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2 and 2.2.1).
- c. When a first article is required for inspection and approval (see 3.2 and 6.4).
- d. When a first article pack inspection is required and time frame required for submission (see 4.1.1 and 4.6).
- e. Level of preservation and level of packing required (see 5.1).

6.3 Data requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements will be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (CDRL), incorporated into the contract. When the provisions of DoD Federal Acquisition Regulations (FAR) Supplement, Part 27, Sub-Part 27.475-1 (DD Form 1423) are invoked and the DD Form 1423 is not used, the data should be delivered by the contractor in accordance with the contract or purchase order requirements.

6.4 First article. When a first article inspection is required, the item will be tested and should be a first production item or it may be a standard production item from the contractor's current inventory as specified in 4.1.1. The first article should consist of one unit. The contracting officer should include

specific instructions in acquisition documents regarding arrangements for examination, test, and approval of the first article.

6.5 Sampling procedures.

6.5.1 Sampling for examination. Recommended inspection level is II and Acceptable Quality Level is 4.0 (see [4.3.1](#)).

6.5.2 Sampling for tests. Recommended inspection level is I and Acceptable Quality Level is 4.0 (see [4.3.2](#)).

6.6 Subject term (key word) listing.

Accessory
Truck tractor

6.7 Environmentally preferable material. Environmentally preferable materials should be used to the maximum extent possible to meet the requirements of this specification. As of the dating of this document, the U.S. Environmental Protection Agency (EPA) is focusing efforts on reducing 31 priority chemicals. The list of chemicals and additional information is available on their website at <http://www.epa.gov/osw/hazard/wastemin/priority.htm>. Included in the list of 31 priority chemicals are cadmium, lead, and mercury. Use of these materials should be minimized or eliminated unless needed to meet the requirements specified herein (see Section 3).

6.8 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue, due to the extent of the changes.

CONCLUDING MATERIAL

Custodians:
Navy – YD
DLA – CC

Preparing activity:
DLA – CC

(Project 2590-2012-004)

Review activity:
Navy – SA

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online data at <https://assist.dla.mil>.