MIL-T-81714E
2 March 1988
SUPERSEDING
MIL-T-81714D
31 December 1985

MILITARY SPECIFICATION

TERMINAL JUNCTION SYSTEM (TJS), ENVIRONMENT RESISTANT GENERAL SPECIFICATION FOR

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

1. SCOPE

1.1 Scope. This specification covers Terminal Junction System (TJS) components which are used for interconnection of wiring and incorporation of passive components (see 6.1). These environment resistant components have in common the use of crimp type external pin contacts in accordance with MIL-C-39029/1 for Series I or crimp type external socket contacts in accordance with MIL-C-39029/22 for Series II. This family of TJS components is designed to operate continuously over a temperature range of -65°C to 200°C, using any combination of temperatures generated by the electrical load and ambient temperature so that the maximum internal hot spot, combined temperature, will not exceed the maximum specified for the class of TJS component, unless otherwise specified (1.2, 3.1). The components making up the system and covered by this specification include:

a. Terminal junction bussing blocks (6.8.2)

(1) Feedback type (6.8.2.1)

(2) Feedthrough type (6.8.2.2)

b. Racks (mounting holders) for blocks (6.8.3)

c. Brackets, block mounting (6.8.4)

d. Wire in-line junctions (6.8.5)

e. Grounding terminal (6.8.6)

f. Grounding blocks (6.8.7)

g. Electronic blocks (6.8.8)

h. Electronic in-line junctions (6.8.9)

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Systems Engineering and Standardization Department (Code 53), Naval Air Engineering Center, Lakehurst, NJ 08733, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 5940

1.1.1 CTS. The TJS components conform to the requirements of MIL-STD-1277 and MIL-STD-454.

1.2 Classification.

1.2.1 Terminal junction components fabricated to this specification are classified as follows:

a. Series. The Series I and II TJS components are not interchangeable or intermateable.

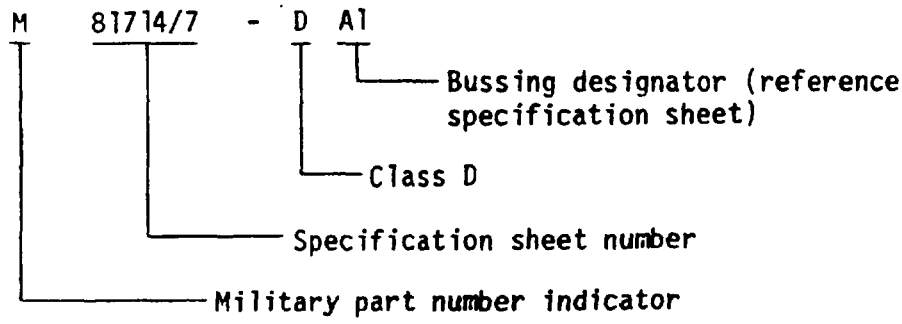
Series I. External pin contact crimped on wire.

Series II. External socket contact crimped on wire.

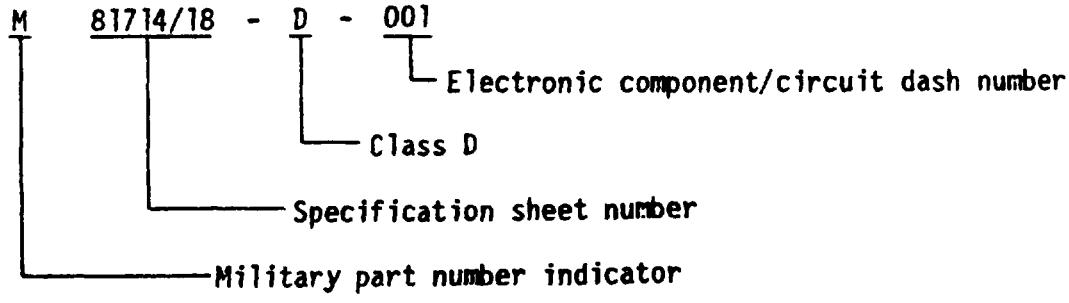
b. Classes. Terminal junction components described herein are Class D. Classes A, B and C components are inactive for new design. Class D components shall be used for direct Government acquisition. Appendix A provides performance tests and other information relating to Classes A, B and C. Appendix A indicates the relationship between Class D part numbers and the superseded part numbers of Classes A, B and C. Series II components of MIL-T-81714 meet Class D environmental requirements.

1.3 Military identification. The components covered by this specification shall be identified by a military part number, as shown by the applicable military specification sheet. Series I components shall be identified as in the following examples, or as otherwise specified (3.1).

Bussing Blocks 1/



Electronic Blocks 1/



Wire In-Line Junctions 1/

M 81714/12 - 20 D - 1

- 1: Bussing designator (for double In-Line Junctions only)
- D: Class D
- 20: Component designator (1.3.1)
- 81714/12: Specification sheet number
- M: Military part number indicator

Electronic In-Line Junctions 1/

M 81714/21 - 1 D 001

- 001: Electronic component/circuit dash number
- D: Class D
- 1: Style number
- 81714/21: Specification sheet number
- M: Military part number indicator

Racks and Brackets 1/

M 81714/5 - 1

- 1: Dash number
- 81714/5: Specification sheet number
- M: Military part number indicator

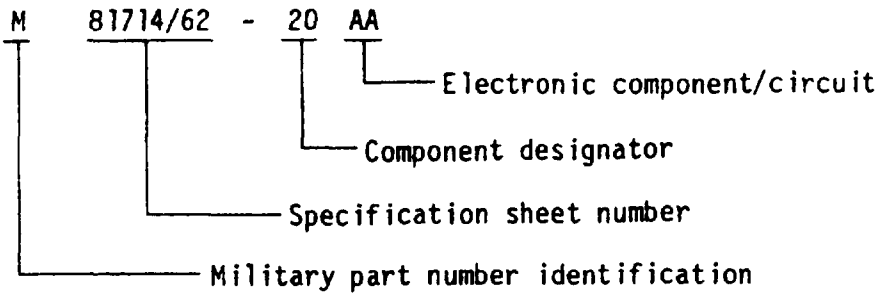
Series II components shall be identified as in the following examples or as otherwise specified (3.1).

Bussing Blocks 1/

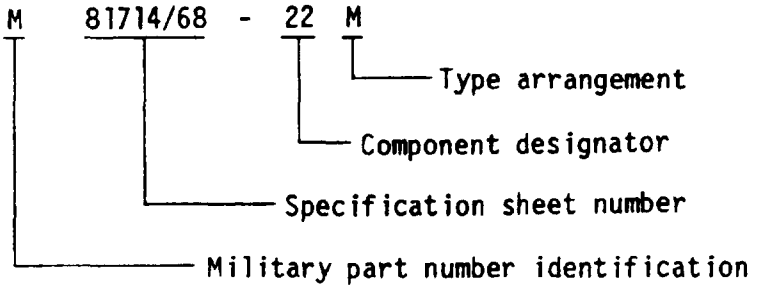
M 81714/60 - 22 - 01

- 01: Bussing designator
- 22: Component designator
- 81714/60: Specification sheet number
- M: Military part number indicator

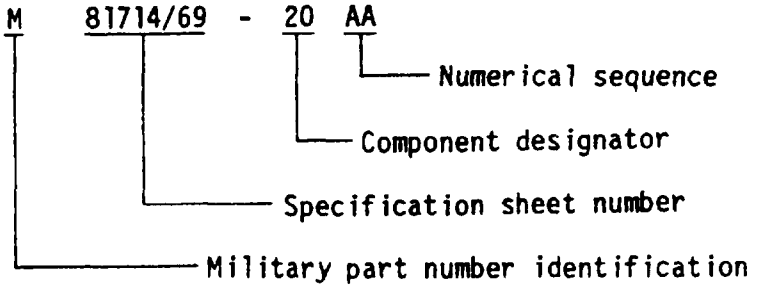
Electronic Blocks 1/



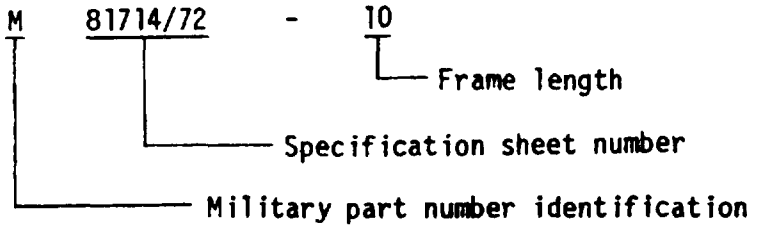
Wire In-Line Junctions



Electronic In-Line Junction 1/



Racks and Brackets 1/



Block Removal Tools 1/

M 81714/76 - 01

- 01 — Number of tine pairs
- 81714/76 — Specification sheet number
- M — Military part number identification

1/ The part number shall be printed as shown in the above examples, but without the spaces shown.

1.3.1 Component designator. A different component designator is required for each component having identical external contacts and for each combination of different contacts used in a block.

1.3.2 Bussing and circuit designator. The bussing and circuit designators shall be as shown on the applicable specification sheet (3.1).

1.3.3 Voltage rating. The maximum working voltages shall be as shown in Table XIII.

1.4 External contact conductor size range. Each external contact with the indicated dash number accommodates the range of conductor sizes specified in Table I.

1.4.1 Grommet wire sealing ranges. For TJS components, each grommet aperture for a specified contact dash number seals on the O.D. range of smooth finished wires specified in Table I.

CAUTION: WHEN SELECTING WIRE REQUIRING SEALING, THE FINISHED DIAMETER SHALL BE WITHIN THE O.D. RANGE SHOWN IN TABLE I.

TABLE I. Wire range accommodations.

Contact M39029/1	Mating end size	Wire barrel size	Conductor size	O.D. range of finished wires (inch)
-507	20	22D	28 26 24 22	0.030-0.054
-100	16	22	26 24 22	0.034-0.060
-101	16	20	24 22 20	0.040-0.083
-102	14	16	20 18 16	0.065-0.109
-103	12	12	14 12	0.097-0.142
Contact M39029/22	**Mating end size**	**Wire barrel size**	**Conductor size**	**O.D. range of finished wires (inch)**
-191	22	22	26 24 22	0.030-0.060
-192	20	20	24 22 20	0.040-0.083
-193	16	16	20 18 16	0.065-0.109
605	12	12	14 12	0.097-0.142

2. REFERENCED DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards and handbooks. Unless otherwise specified, the following specifications, standards and handbooks of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation form a part of this specification to the extent specified herein (see 2.4.1).

SPECIFICATIONS

Military

MIL-W-5088	Wiring, Aerospace Vehicle
MIL-H-5606	Hydraulic Fluid, Petroleum Base, Aircraft, Missile, and Ordnance
MIL-T-5624	Turbine Fuel, Aviation, Grades JP-4 and JP-5
MIL-L-7808	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base
MIL-A-8243	Anti-Icing and Deicing-Defrosting Fluid
MIL-W-16878	Wire, Electrical, Insulated, General Specification for
MIL-I-17214	Indicator, Permeability: Low-Mu (Go-No-Go)
MIL-C-22520	Crimping Tools, Terminal, Hand, Wire Termination, General Specification for
MIL-W-22759	Wire, Electric, Fluoropolymer-Insulated, Copper or Copper Alloy
MIL-L-23699	Lubricating Oil, Aircraft Turbine Engines, Synthetic Base
MIL-C-25769	Cleaning Compound, Aircraft Surface, Alkaline Water-base
MIL-C-39029	Contacts, Electric, General Specification for
MIL-C-39029/1	Contacts, Pin, Crimp Type, Terminal Junction Systems
MIL-C-39029/22	Contacts, Socket, Crimp Type, Common Termination Junction System
MIL-G-45204	Gold Plating (Electrodeposited)
MIL-C-55330	Connectors, Electrical and Fiber Optic, Packaging of

SPECIFICATIONS (Continued)

Military (Continued)

MIL-W-81044	Wire, Electric, Crosslinked Polyalkene Insulated, Copper or Copper Alloy
MIL-W-81381	Wire, Electric, Polyamide Insulated, Copper or Copper Alloy
MIL-I-81969/8	Installing and Removal Tools, Connector Electrical Contacts
MIL-I-81969/14	Installing and Removal Tools, Connector Electrical Contacts
MIL-I-81969/16	Installing and Removal Tools, Connector Electrical Contacts

STANDARDS

Military

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-202	Test Methods for Electronic and Electrical Component Parts
MIL-STD-454	Standard General Requirements for Electronic Equipment
MIL-STD-889	Dissimilar Metals
MIL-STD-1277	Splices, Chips, Terminals, Terminal Boards, Binding Posts, Terminal Junction System, Wire Caps, Electrical
MIL-STD-1285	Marking of Electrical and Electronic Parts
MIL-STD-1344	Test Methods, for Electrical Connectors
MIL-STD-45662	Calibration System Requirements
MS27488	Plug, End Seal, Electrical Connector

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. The issues of documents which have not been adopted shall be those in effect on the date of the cited DODISS (see 2.4.2).

AMERICAN SOCIETY FOR TESTING MATERIALS

*ASTM D 3951 Commercial Packaging

*DOD adopted

SAE THE ENGINEERING RESOURCE FOR ADVANCING MOBILITY

AIR 1351 Manufacturers' Identification of Electrical Connector Contacts, Terminals and Splices

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

2.4 Source of documents.

2.4.1 Government specifications, standards and handbooks. Copies of the referenced federal and military specifications, standards and handbooks are available from the Department of Defense Single Stock Point, Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120. For specific acquisition functions, these documents should be obtained from the contracting activity or as directed by the contracting activity.

2.4.2 Sources for nongovernment publications. Nongovernment documents are generally available for reference from libraries and technical groups. The documents listed may be obtained as follows:

a. ASTM: Application for copies should be addressed to the American Society for Testing Materials, 1916 Race Street, Philadelphia, PA 19103.

b. AIR 1351: Application for copies should be addressed to the SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

3. REQUIREMENTS

3.1 Specification sheets. The individual part requirements shall be as specified herein and in accordance with the applicable specification sheets.

3.1.1 Precedence. In the event of conflict between this specification and the specification sheets, the latter shall govern.

3.2 Qualification. TJS components furnished under this specification and the applicable specification sheets shall be products which are qualified for listing on the applicable QPL (Qualified Products List) at the time set for opening of bids.

3.3 Materials. Materials shall be as specified herein, however, when a definite material is not specified, materials used shall meet the performance requirements of this specification. Materials shall be fungus resistant meeting the requirements of MIL-STD-454, Requirement 4. Approval of any constituent material shall not be construed as a guarantee for acceptance of the finished product.

3.3.1 Dissimilar metals. When dissimilar metals are employed in intimate contact with each other, protection against electrolytic corrosion shall be provided as specified in MIL-STD-889.

3.3.2 Nonmagnetic materials. All parts, including the racks, shall be made from materials which are classed as nonmagnetic (3.5.15).

3.3.3 Internal contact plating. Internal contacts shall be gold plated in accordance with MIL-G-45204, Type I, Grade C, Class 1 (fifty microinches (minimum)), over a suitable underplating. Accessory members of the internal contact assembly need not be plated, but shall comply with the requirements for dissimilar metals (3.3.1). Silver plate or silver underplate shall not be used.

3.3.4 Internal current carrying members. Internal current carrying members shall be copper alloy.

3.3.5 Housing. Housing shall be constructed of hard dielectric material.

3.3.6 Sealing grommet. Sealing grommet shall be silicone or silicone blend elastomer bonded to the housing and shall seal the specified wire diameter ranges.

3.4 Design and construction. TJS components shall be designed and constructed to withstand normal handling incident to installation and maintenance in service. Controlled dimensions shall be as specified (3.1).

3.4.1 Contacts. External contacts shall be qualified to MIL-C-39029/1 or MIL-C-39029/22. The design of the internal contact and the housing in which it is installed shall be such that it assures a minimum of 0.035 inch of electrical engagement with the installed external contact.

3.4.2 Contact retention design. The contact retention system shall be designed to provide positive retention of the external contact to meet the minimum contact retention requirement (see 3.5.4). Inserting and removal of an external contact from these components shall be by the applicable MIL-I-81969 installing and removal tool for the entire range of wire outside diameters as specified in Table I.

3.4.3 TJS component design (current carrying devices). These components shall comply with the applicable specification sheet. Separate cavities shall be provided for all contacts and contact interconnections which are not electrically interconnected. Wire sealing grommets shall be bonded or molded to the housing. There shall be no air paths through the walls of the housing, either to the outside or between contacts which are not electrically interconnected.

3.4.4 Grommet construction. The design of the grommet shall accommodate and seal on insulated wires having a smooth outside jacket and outside diameters within the range specified in Table I. The openings in the grommets for the entrance of the contacts shall not be covered or closed by a solid membrane. The design of the external component shall permit installing and removal of individual contacts without damage to the sealing member, using the applicable installing and removal tools.

3.4.5 End seal plugs. The grommets shall be designed to accept sealing plugs in accordance with MS27488 in lieu of wire and contacts. When installed, end seal plugs shall be installed with the knob end protruding out of the grommet wire hole and be seated against the grommet top face.

3.4.6 Bussing arrangement. The arrangement of internal contacts, bussing and circuitry shall be as specified (3.1 and 1.3).

3.4.7 Interchangeability. All TJS components having the same military part number shall be completely interchangeable with each other with respect to installation (physical) and performance (function) as specified herein.

3.4.8 Internal electronic components. Ratings and characteristics of electronic components shall be in accordance with the electronic component specification (3.1). Class designator in the TJS part housing electronic components applies to the basic TJS parts (bussing block and wire in-line junctions) only. Electronic junctions shall be rated at the electronic component level or the basic TJS part level, whichever has the lesser requirement (4.4.1.1.5).

3.4.9 Pin bus (Series II). The pin bus shall be one piece construction or equivalent assembly.

3.5 Performance. TJS components with specified MIL-C-39029 contacts installed with the applicable MIL-I-81969 tool shall be designed to meet the performance requirements stated herein when tested in accordance with the specified methods of Section 4.

3.5.1 Resistance to probe damage (Series I). When tested in accordance with 4.6.2, Series I internal contacts shall withstand the bending moment and depth of test probe insertion without evidence of damage that would interfere with mechanical performance and shall then comply with the contact resistance of 3.5.16 and low signal level contact resistance (3.5.17). Probe damage tests are not applicable to Series II components.

3.5.2 Maintenance aging. Applicable TJS components shall conform to this specification after maintenance aging testing in accordance with 4.6.3 and shall meet the requirements of Table VIII.

3.5.3 Contact insertion and removal forces. The contact insertion and removal forces shall comply with the requirements of Table VIII while being subjected to the maintenance aging test in accordance with 4.6.3.

3.5.4 Contact retention. When tested in accordance with 4.6.4, the axial displacement of the contacts with respect to the applicable component shall not exceed 0.012 inch.

3.5.5 Thermal shock. When tested in accordance with 4.6.5, there shall be no damage detrimental to operation of the TJS components after being subjected to the temperature extremes of Table X. There shall be electrical continuity on all contacts when measured at the high and low temperature extremes. The blocks shall meet the insulation resistance requirements of 3.5.11.

3.5.6 Dielectric withstanding voltage (DWV). When tested in accordance with 4.6.6, components shall show no evidence of breakdown or flashover when subjected to the test voltages and altitude of Table XI. During application of test voltage the leakage current shall not exceed two milliamperes. Corona shall not be considered as breakdown.

3.5.7 Fluid immersion. After being subjected to fluid immersion in accordance with 4.6.7, components furnished hereunder shall comply with contact insertion and removal forces (3.5.3), and insulation resistance at ambient temperature (3.5.11.1). Nonmetallic parts shall show no evidence of cracking, chipping, swelling or loosening of bonds or seams which will adversely affect their performance.

3.5.8 Vibration. Items furnished under this specification shall not be damaged and there shall be no loosening of parts due to vibration. Blocks shall remain firmly fixed with relation to each other and the rack or bracket. There shall be no interruption of electrical continuity longer than one microsecond in duration during the vibration test, when performed in accordance with 4.6.8.

3.5.9 Mechanical shock. Items shall not be damaged and there shall be no loosening of parts due to shock. Blocks shall remain firmly fixed with relation to each other and the rack or bracket. There shall be no interruption of electrical continuity longer than one microsecond during the exposure to mechanical shock, when performed in accordance with 4.6.9.

3.5.10 Humidity. When exposed to humidity in accordance with 4.6.10, the insulation resistance shall be a minimum of 100 megohms measured at the completion of the tenth cycle of test while at 20° ± 5°C and 95 percent relative humidity (R.H.).

3.5.11 Insulation resistance. Insulation resistance shall be measured at room and elevated temperatures in accordance with 4.6.11.

3.5.11.1 At room condition. The insulation resistance at room temperature shall be not less than 5000 megohms, when tested in accordance with 4.6.11.1.

3.5.11.2 At elevated temperature. The insulation resistance shall be not less than 50 megohms at the specified high temperature, when tested in accordance with 4.6.11.2.

3.5.12 Salt spray. Components with exterior metal parts and racks shall show no exposure of basis metal due to corrosion that will affect performance, when tested in accordance with 4.6.12.

3.5.13 Temperature life. The TJS components shall perform satisfactorily after exposure to the temperature life test (4.6.13), and shall comply with insulation resistance at elevated temperature (3.5.11.2) and low signal level contact resistance (3.5.17) measured at room temperature.

3.5.14 Ozone exposure. After being subjected to ozone in accordance with 4.6.14, there shall be no evidence of cracking of dielectric material or other damage which will adversely affect their performance.

3.5.15 Relative magnetic permeability. When tested in accordance with 4.6.15, the relative magnetic permeability shall not exceed 2.

3.5.16 Contact resistance (for other than electronic components). When tested in accordance with 4.6.16, the resistance across a series circuit of two external contacts of the same size and with same wire gage while they are carrying test current shall not exceed the values specified in Table II.

3.5.16.1 Electronic components. The resistance of electronic components shall be as specified in the internal passive component specification, taking into account the added resistance of the contacts (3.4.8).

3.5.17 Low signal level contact resistance (size 16 wire barrel and smaller). When tested in accordance with 4.6.17, the low signal level resistance of a series circuit of two external contacts of the same size and with the same wire gage shall not exceed the applicable values specified in Table III.

3.5.18 Voltage stability. The difference between the highest and lowest resistance values during the voltage stability test shall not exceed four millivolts, when tested in accordance with 4.6.18. The highest value shall not exceed the values specified in Table II.

3.5.19 Internal contact durability. When tested in accordance with 4.6.19, Series I components shall be capable of 100 insertions and withdrawals of a probe without damage. After being subjected to durability testing, the components shall comply with contact resistance (3.5.16) and contact retention (3.5.4). When tested in accordance with 4.6.19.1, Series II components shall be capable of 100 insertions and withdrawals of a qualified MIL-C-39029/22 contact. After durability testing, the components shall comply with the contact resistance requirements per 3.5.16 and contact retention (3.5.4).

TABLE II. Contact resistance limits.

Contact			Wire size	Test current (amperes)	Resistance (millivolts drop maximum)	
Part No.	Mating end size	Wire barrel size			Initial	After condition
M39029/1 -507	20	22D	22 28	5.0 1.5	55 40	65 45
-100	16	22	22 26	5.0 2.0	45 40	50 45
-101	16	20	20 24	7.5 3.0	45 40	50 45
-102	14	16	16 20	13.0 7.5	50 45	55 50
-103	12	12	12 14	23.0 17.0	40 35	45 40
M39029/22 -191	22	22	22 26	5.0 2.0	70 60	80 70
-192	20	20	20 24	7.5 3.0	55 45	65 55
-193	16	16	16 20	13.0 7.5	50 45	60 55
605	12	12	12 14	23.0 17.0	60 55	70 65

TABLE IIA. Contact resistance (between bussed contacts of different gages).

Mating end smaller gage	Mating end larger gage	Wire size smaller gage	Wire size larger gage	Test current (amperes)	Resistance (millivolts maximum)	
					Initial	After conditioning
20	16	24	16	3.0	45	55
20	16	20	16	7.5	55	65
16	12	20	12	7.5	45	55
16	12	16	12	13.0	50	60

TABLE III. Low signal level contact resistance.

Part No.	Contact Mating end size	Wire barrel size	Wire size	Contact resistance (milliohms maximum)	
				Initial	After conditioning
M39029/1 -507	20	22D	22 26 28	15 31 50	17 38 60
-100	16	22	22 26	15 31	17 38
-101	16	20	20 24	9 20	11 23
-102	14	16	16 20	5 13	8 16
M39029/22 -191	22	22	22 26	15 31	17 38
-192	20	20	20 24	9 20	11 23
-193	16	16	16 20	5 9	6 10

TABLE IIIA. Low signal level contact resistance (between bussed contacts of different gages).

Mating end smaller gage	Mating end larger gage	Wire size smaller gage	Wire size larger gage	Contact resistance (milliohms maximum)	
				Initial	After conditioning
20	16	24	16	20	23
20	16	20	16	9	11
16	12	20	12	9	10
16	12	16	12	5	6

3.5.20 Oversize external (Series I) contact protection. When tested in accordance with 4.6.20, Series I components shall be designed to prevent the entrance of an oversize external contact.

3.5.21 Altitude immersion. TJS components shall maintain a dielectric withstanding voltage at sea level as specified in Table XI when tested in accordance with 4.6.21.

3.5.22 Contact walkout. When tested in accordance with paragraph 4.6.22, contacts shall not become dislodged from their normal position and contact retention system shall suffer no functional damage and continue to meet the requirements of paragraph 4.6.4.

3.5.23 Retention system fluid immersion. When tested in accordance with paragraph 4.6.23, components shall meet the requirements of contact retention in paragraph 3.5.4. Effects of fluids on resilient sealing members shall not be a consideration during this test.

3.6 Marking.

3.6.1 Identification marking. The TJS components shall be marked in accordance with MIL-STD-1285 as specified. All markings shall be clear, sharply defined, and of a color which contrasts sharply with the background. Markings shall be legible at the end of all specified tests (3.1).

3.6.1.1 Classes A, B and C (Series I). Classes A, B and C (Series I) part numbers which have been superseded and are inactive for new design may be included on the marking of a new component (see Appendix A).

3.6.1.2 Air Force drawing AFLC 8027520 part numbers may be included on the marking of a component in addition to the Series II part numbers.

3.6.2 Functional marking. Top marking, cavity and circuit identification shall be as specified. All markings shall be clear, sharply defined and of a color which contrasts sharply with the background. Functional marking on bussed components shall be white and on electronic components shall be yellow. The bussing indicator line shall not be less than .010 inch width. Markings shall be legible at the end of all specified tests. SKT shall be marked on the face of the grommet to indicate the block accepts socket contact on the wire for Series II components.

3.6.3 Color code. For Series I components, the color of the grommet shall be blue. For Series II components, the color of the grommet shall be reddish brown.

3.6.4 Manufacturer's identification. Manufacturer's identification shall be in the form of a name, symbol or federal supply code for manufacturers (FSCM) and shall be located in the area specified in the specification sheet (see 3.1). If an identification symbol is used, it shall be specified in AIR-1351.

3.7 Workmanship. When examined in accordance with 4.6.1, all items furnished hereunder shall be free of foreign matter. Molded parts shall be free of cracks and sharp edges. Metal parts shall be free of burrs, sharp edges and cracks. Sealing members shall be free of tears and mold flash that will affect performance. TJS components shall be so designed that the contact openings for the entrance of the external contact and the contact retention system shall be free of foreign material, adhesive or any obstruction that would prevent smooth entrance and positive retention of the external contact.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of Sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 Test equipment and inspection facilities. Test equipment and inspection facilities shall be of sufficient accuracy, quality and quantity to permit performance of the required inspection. The contractor shall establish calibration of inspection equipment to the satisfaction of the Government. Calibration of the standards which control the accuracy of inspection equipment shall comply with the requirements of MIL-STD-45662.

4.1.2 Inspection conditions. Unless otherwise specified, all inspections shall be made under the following room conditions:

Temperature	15-35°C (59-95°F)
Relative humidity	45-75%
Air pressure	600-800 millimeters mercury

4.1.2.1 Preparation of samples. Items specified herein shall be wired with approximately three feet of wire, as applicable, from Table I and 4.4.1.1.1. Termination of wires to contacts shall be accomplished by using the appropriate MIL-C-22520 crimping tool. Contacts used to test TJS components shall have been qualified to MIL-C-39029. For bussing blocks, one contact cavity shall have the specified sealing plug. When installed, these end seal plugs shall have the knob end protruding out of the grommet wire hole and be seated against the grommet top face.

4.2 Classification of inspection. The inspection of items procured under this specification shall be classified as follows:

a.	Materials and design inspection	(4.3)
b.	Qualification inspection	(4.4)
c.	Quality conformance inspection	(4.5)
	(1) Inspection of product for delivery	(4.5.1)
	(2) Inspection of preparation for delivery	(4.5.2)
d.	Retention of qualification	(4.5.1.5.2)

4.3 Materials and design inspection. Materials and design inspection shall consist of certification that the materials and design used in fabricating the TJS components, as listed in 3.3 through 3.4.8, are in accordance with the applicable referenced standards, specifications or requirements prior to such fabrication. This certification shall be supported by verifying data and shall be furnished with the report of qualification testing.

4.4 Inspection.

4.4.1 Qualification inspection. The qualification inspection shall consist of the examinations and tests performed in the sequence listed in Table IV on the specified qualification test samples (4.4.1.1). The applicant shall request authorization to begin testing from the activity responsible for qualification (6.5). The applicant shall submit one test report and untested samples (4.4.2), both certified by a Government inspector, to the activity responsible for qualification (6.5).

4.4.1.1 Qualification test samples. Samples for the qualification tests shall be manufactured by the applicant's routine production process. The production samples shall be verified by a Government inspector in the test report and all samples submitted to the qualification activity. Unless otherwise specified by the qualification activity, means of verification shall be determined by the Government inspector. Blocks with racks or brackets may be qualified together provided the specified sampling requirements are met.

4.4.1.1.1 Wire preparation. Two sets of wires shall be provided. One set, for electrical testing, shall include the smallest and largest conductor wire permitted by each qualified MIL-C-39029 contact size within the allowable O.D. range as specified in Table I. The second set shall be maximum and minimum diameter wires used for environmental testing. Minimum diameter wire shall be qualified to MIL-W-81381/7, /8, /9, /10, or /21 or MIL-W-22759/32, /33, /44, /45, or /46. The maximum diameter wire shall be qualified to MIL-W-22759/16 or /17 for size 22D, MIL-W-22759/9, /10, /20, or /21 for size 22, or MIL-W-22759/7 or /8 for sizes 20, 16, and 12. The maximum and minimum wire shall be the largest and smallest outside diameter, respectively, within the wire range accommodations of Table I, for each contact size. The contact shall be crimped on the wire with a qualified MIL-C-22520 tool.

4.4.1.1.2 Bussed blocks. Bussing arrangements C1 or 38 of each basic Series I part number (3.1) will qualify all the bussing arrangements within that basic part number by similarity. Qualification of the most complicated bussing arrangement of each basic Series II part number will qualify all bussing arrangements within that basic part number by similarity.

4.4.1.1.2.1 Blocks, Group 1 and 2. For each group, two blocks mounted in racks or brackets shall be subjected sequentially to the Group 1 and 2 tests. One block shall be assembled with minimum wire and the other with maximum wire (4.4.1.1). One cavity in each block shall contain one MS27488 sealing plug.

NOTE: The racks used for the qualification of the blocks shall be qualified or shall be identical to those submitted for qualification under 4.4.1.1.3. Applicants not producing racks shall submit substantiating certification data that their tests were performed with qualified racks. For those blocks which require insulation resistance testing, an unplated or plated rack with conductive finish shall be used.

4.4.1.1.2.2 Blocks, Group 3. One block for each fluid specified (4.6.7), shall be subjected sequentially to the Group 3 tests. Half the contact cavities in each block shall be assembled with minimum diameter wire and half with maximum diameter wire (4.4.1.1.1).

4.4.1.1.3 Racks and brackets, Group 4. Racks and brackets shall be subjected sequentially to the Group 4 tests. A minimum of two blocks shall be included in each rack and one block in each bracket. All finishes shall be tested.

NOTE: The blocks shall be qualified or shall be identical to those sub- mitted for qualification under 4.4.1.1.2. Applicants not pro- ducing blocks shall submit certifications that qualified blocks were tested.

4.4.1.1.3.1 Racks. Two racks of the basic part number (3.1), one to be the smallest and one to be the largest the applicant wishes to qualify, shall be tested. Approval of the two sizes shall qualify all the rack sizes within the range submitted.

4.4.1.1.3.2 Brackets. Two brackets of each style the applicant wishes to qualify under the basic part number (3.1) shall be tested.

4.4.1.1.4 Wire in-line junctions. Each in-line junction type the applicant wishes to qualify shall be subjected sequentially to the qualification inspection tests specified in Table IV. Qualifying each size unbussed type MIL-T-81714/12 will qualify corresponding bussed type by similarity.

4.4.1.1.4.1 Wire in-line junctions, Groups 1 and 2. Two in-line junctions for each group shall be tested. One shall be assembled with minimum diameter wire and the other with maximum diameter wire (4.4.1.1.1).

TABLE IV. Qualification tests.

Title	Requirement paragraph	Test paragraph	Test Groups			
			1	2	3	4
Visual & mechanical examination	3.1, 3.3, 3.4	4.6.1	X	X	X	X
Magnetic permeability	3.5.15	4.6.15	X			X
Maintenance aging	3.5.2	4.6.3	X	X	X	
Contact insertion/ removal forces	3.5.3	4.6.3	X	X		
Contact retention	3.5.4	4.6.4	X	X		
Low signal level contact resistance	3.5.17	4.6.17	X	X		
Contact resistance	3.5.16	4.6.16	X			
Dielectric withstanding voltage (sea level)	3.5.6	4.6.6.1	X		X	
Altitude immersion	3.5.21	4.6.21	X			
Dielectric withstanding voltage (altitude)	3.5.6	4.6.6.2	X			
Thermal shock	3.5.5	4.6.5	X			X
Vibration	3.5.8	4.6.8	X			X
Mechanical shock	3.5.9	4.6.9	X			X
Temperature life	3.5.13	4.6.13		X		X
Insulation resistance (elev. temp.)	3.5.11.2	4.6.11.2		X		
Low signal level contact resistance	3.5.17	4.6.17		X		
Ozone	3.5.14	4.6.14		X		
Salt spray	3.5.12	4.6.12		X		X
Humidity	3.5.10	4.6.10	X			

TABLE IV. Qualification tests (Continued).

Title	Requirement paragraph	Test paragraph	Test Groups			
			1	2	3	4
Insulation resistance	3.5.11.1	4.6.11.1	X	X		
Fluid immersion	3.5.7	4.6.7			X	
Contact insertion/ removal forces	3.5.3	4.6.3			X	
Dielectric withstanding voltage	3.5.6	4.6.6	X	X	X	
Probe damage (Series I)	3.5.1	4.6.2	X			
Contact resistance	3.5.16	4.6.16	X			
Low signal level contact resistance	3.5.17	4.6.17	X	X		
Retention system fluid immersion	3.5.24	4.6.23	X			
Contact retention	3.5.4	4.6.4	X			
Internal contact durability	3.5.19	4.6.19	X			
Voltage stability	3.5.18	4.6.18	X	X		
Contact resistance	3.5.16	4.6.16	X	X		
Contact retention	3.5.4	4.6.4	X			
Oversize test external contact (Series I)	3.5.20	4.6.20	X			
Contact walkout	3.5.23	4.6.22	X			
Visual & mechanical examination	3.1	4.6.1	X	X	X	X

4.4.1.1.4.2 Wire in-line junctions, Group 3. One in-line junction for each fluid specified for each class (4.6.7) shall be tested. One end shall be assembled with minimum diameter wire and the other end with maximum diameter wire (4.4.1.1.1).

4.4.1.1.5 Electronic junctions (electronic blocks and electronic in-line junctions).

a. Qualification of an electronic junction with the maximum number of passive electronic components (resistors, semi-conductors, diodes, etc.) shall qualify similar electronic components containing the same types of passive components.

b. Qualification of dimensional and material requirements may be by similarity to a qualified bussed component (bussed block or in-line junction.

c. When passive electronic components are qualified parts the only additional tests required are physical shock and vibration of the electronic component specification or MIL-T-81714, whichever has the lesser requirement.

d. If the passive electronic components are not qualified parts, certification acceptable to the qualification activity shall be furnished with the test report.

e. Electronic junctions shall be rated at the electronic component level or the bussed junction level whichever has the lesser requirement.

f. Sample sizes for each group of electronic blocks shall be the same as for bussed blocks (4.4.1.1.2). Sample sizes for each group of electronic in-line junctions shall be the same as for wire in-line junctions (4.4.1.1.4).

g. Assembly preparation shall be as specified in 4.1.2.1.

4.4.1.1.6 Grounding terminals and grounding blocks. Qualification of a grounding component may be by similarity to qualified bussed components designed with the same materials. The only additional tests which shall be performed when qualifying by similarity are those listed in Group 4. If not by similarity, the component shall be subjected to the full test sequence as specified in Table IV. Sampling size for grounding terminals shall be one terminal assembled with minimum wire and one assembled with maximum wire for Groups 1 and 2. For Group 3, one terminal shall be tested for each fluid. Half the terminals shall be assembled with minimum wire and half with maximum wire. Grounding blocks shall have the same sample size and shall be assembled the same as bussed blocks for testing (4.4.1.1.2). Assembly preparation shall be as specified in 4.1.2.1. The components shall be mounted during Groups 1 and 2 test sequences.

4.4.2 Samples for qualification activity (6.5).

4.4.2.1 Terminal junction system samples. Untested samples of each configuration tested by the applicant shall be submitted to the qualification activity in the following quantities: current carrying components - 5, racks and brackets - 2.

4.4.2.2 Wired contacts. For each contact size tested by the applicant, 15 minimum diameter wires and 15 maximum diameter wires crimped to contacts shall be submitted to the qualification agency. The wires shall be a minimum of two feet in length and shall have the end opposite the crimped contact stripped. The wired contacts may be the same as used during the applicant's test program. In addition, for each contact size tested by the applicant, 25 uncrimped contacts shall be submitted to the qualification activity. All external contacts shall be qualified to MIL-C-39029.

4.4.2.3 Installing and removal tools. MIL-I-81969/14 or /16 installing and removal tools for each contact size tested shall be furnished to the qualification activity. The quantities are as follows: 10 for sizes 22D, 22 and 20; 5 for size 16; and 3 for size 12.

4.4.2.4 End seal plugs. Ten MS27488 end seal plugs for each contact size tested by the applicant shall be furnished to the qualification activity. The plugs shall represent the part which will be provided by the applicant on procurement contracts.

4.4.3 Qualification failure. Any failures during examination or tests specified in Tables IV shall be reported to the qualification activity before continuing testing. Based on corrective action, authorization to complete the qualification tests will be granted. The applicant's products shall pass all requirements of this specification.

4.4.4 Assembly plants. To furnish products under this specification (3.2), assembly plants must be listed on, or approved for listing on, the applicable Qualified Products List. The qualified terminal junction system supplier shall certify that the assembly plant is approved for assembly and distribution of the supplier's parts. The assembly plant shall use only piece parts supplied by the qualified terminal junction system manufacturer. Qualification requirements will be dependent upon the type of assembly performed by the assembly plant. All assemblies produced at the assembly plant shall be subjected to the quality assurance provisions specified herein. Quality control requirements, including Government inspection surveillance, shall be the same as required for the qualified terminal junction system manufacturer.

4.5 Quality conformance inspection.

4.5.1 Inspection of product for delivery. Inspection of product for delivery shall consist of Groups A and B.

4.5.1.1 Inspection lot. An inspection lot, as far as practicable, shall consist of terminal junction components covered by one specification sheet, produced under essentially the same conditions, and offered for inspection at one time.

4.5.1.2 Disposition of sample units. Sample units which have been subjected to the Group A inspection may be delivered on the contract or order. Sample units which have been subjected to the Groups B and C inspection shall not be delivered on the contract or order.

4.5.1.3 Group A inspection. Group A inspection shall consist of the examinations and tests specified in Table V and shall be made on the same set of sample units in the order shown. In-process control of component parts, unrelated to lot sizes of finished terminal junction assemblies, may be used in lieu of examination and test of these components in the finished terminal junction assemblies to assure performance of these component parts.

TABLE V. Group A inspection.

Title	Terminal junction assemblies			Requirement paragraph	Test paragraph
	Blocks	In-line junctions	Racks & brackets		
Visual and mechanical examination	X	X	X	3.1	4.6.1
Dielectric withstanding voltage	X	X		3.5.6	*4.6.6.1
Insulation resistance	X	X		3.5.11.1	*4.6.11.1
Contact resistance	X	X		3.5.16	*4.6.16

*Simulated contacts may be used for this test (see 4.6.11).

4.5.1.3.1 Sampling plan. Statistical sampling and inspection shall be in accordance with MIL-STD-105 for general inspection Level II. The acceptable quality level (AQL) shall be 1.0 for major and 4.0 for minor defects.

4.5.1.4 Group B inspection. Group B inspection shall consist of the examinations and tests shown in Table VI, performed in the order shown, and shall be made on sample units which have passed the Group A inspection.

TABLE VI. Group B inspection.

Title	Blocks	In-line junctions	Requirement paragraph	Test paragraph
Maintenance aging	X	X	3.5.2	4.6.3
Contact resistance	X	X	3.5.16	4.6.16
Voltage stability	X	X	3.5.18	4.6.18

4.5.1.4.1 Sampling plan. The sampling plan shall be in accordance with MIL-STD-105, inspection level S-3 and the AQL shall be 4.0.

4.5.1.5 Group C inspection. Group C inspection for periodic verification of quality shall consist of all the examinations and tests specified in Table VII. Shipment shall not be held up pending results of this inspection.

4.5.1.5.1 Sampling plan. The number of samples required for Group C inspection shall be the same as required for qualification (4.4.1).

4.5.1.5.2 Retention of qualification.

a. In order to retain qualification, a summary of Group C test results (see 4.5.1.5) shall be furnished to the Qualification Activity at 24-month intervals and shall include summary results of Groups A and B tests performed during that period. The summary shall also include the number and type of any part failures. Failure to furnish the summary shall result in loss of qualification for that product. The qualified source shall request authorization to begin retention of qualification.

b. Any failures during Group C testing shall be reported immediately to the Qualification Activity. Authorization to complete Group C tests will be based on acceptance of the corrective action.

c. To retain qualification the applicant's products shall pass all requirements of Groups A, B and C tests.

4.5.2 Inspection of preparation for delivery. Sample packages and packs and the inspection of the preservation-packaging, packing and marking for shipment and storage shall be in accordance with requirements of Section 5 and the documents specified therein.

4.6 Methods of examination and test.

4.6.1 Visual and mechanical. TJS components shall be examined to insure conformance with this specification and the applicable specification sheet. For Group A inspection, in-process control of component parts, unrelated to lot sizes of finished items, may be utilized in lieu of examination of these component parts. Examination in a continuing manner shall be performed to assure compliance with the following requirements:

a.	Applicable military specification sheet	(3.1)
b.	Materials	(3.3)
c.	Design and construction	(3.4)
d.	Marking	(3.6)
e.	Workmanship	(3.7)

TABLE VII. Group C periodic tests.

Title	Requirement paragraph	Test paragraph	Test Groups			
			1	2	3	4
Maintenance aging	3.5.2	4.6.3	X	X	X	
Contact insertion/ removal forces	3.5.3	4.6.3	X	X		
Contact retention	3.5.4	4.6.4	X	X		
Low signal level contact resistance	3.5.17	4.6.17	X	X		
Contact resistance	3.5.16	4.6.16	X			
Altitude immersion	3.5.21	4.6.21	X			
Dielectric withstanding voltage (sea level)	3.5.6	4.6.6.1	X		X	
Thermal shock	3.5.5	4.6.5	X			X
Salt spray	3.5.12	4.6.12		X		X
Humidity resistance	3.5.10	4.6.10	X			
Insulation resistance	3.5.11.1	4.6.11.1	X	X		
Contact retention	3.5.4	4.6.4	X			
Internal contact durability	3.5.19	4.6.19	X			
Voltage stability	3.5.18	4.6.18	X	X		
Contact resistance	3.5.16	4.6.16	X	X		
Contact retention	3.5.4	4.6.4	X			
Visual & mechanical examination	3.1	4.6.1	X	X	X	X

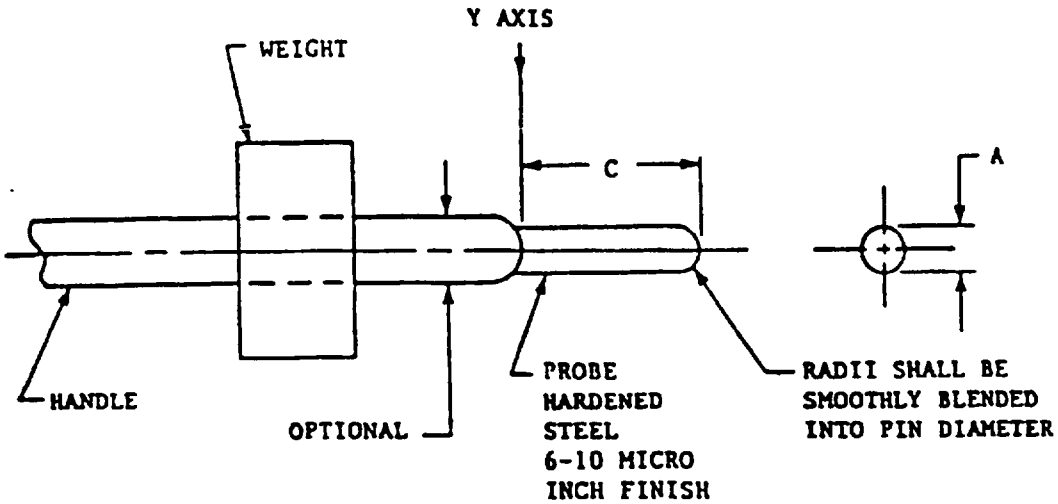
4.6.2 Probe damage (Series I). Items subjected to this test shall have the wire sealing member removed. The housing containing the internal contacts shall be held its full length in such a manner that the axis of the internal contacts shall be horizontal throughout the test. A minimum of four internal contacts shall be tested, each at three different depths, as follows:

a. Full insertion depth

b. Full insertion minus 0.040 ± .003 inch

c. Full insertion minus 0.110 ± .003 inch

The test probe for each contact size shall comply with Figure 1. The test probes shall be inserted into the internal contact to the specified depth, and the applicable bending moment, selected from Figure 1, shall be applied to the test probe, perpendicular to the major axis of the contact. With the bending moment force applied, the internal contact shall be rotated 360° by turning the housing in the plane perpendicular to the horizontal axis of the probe. This test shall be repeated for each insertion depth required. Following the probe test, the internal contacts shall comply with contact resistance (3.5.16) and low signal contact resistance (3.5.17) (3.5.1).



Internal contact mating end size	A ± .0005 dia (inch)	C ± 0.010 (inch)	Bending moment +10% (lb - inch) about 'Y' axis
12	0.094	0.615	2.00
14	0.077	0.615	2.00
16	0.062	0.615	0.50
20	0.040	0.615	0.50

FIGURE 1. Test probe.

4.6.3 Maintenance aging (except racks and brackets). Inserting and removal of a contact shall be considered one cycle. For qualification only, all cavities shall be subjected to one cycle of inserting and removal. A minimum of 20 percent, but not less than 3 contacts, shall be then subjected to nine additional cycles of inserting and removal, using the specified military tools. The contact inserting and removal forces (3.5.3) shall be measured during the first and tenth cycle as specified in Table VIII (3.5.2).

TABLE VIII. Contact insertion and removal forces.

Contact size			Insertion and removal force (pounds max)
Contact	Mating end	Wire barrel end	
M39029/1 -507	20	22D	10
-100	16	22	10
-101	16	20	10
-102	14	16	15
-103	12	12	15
M39029/22 -191	22	22	10
-192	20	20	15
193	16	16	15
605	12	12	15

4.6.4 Contact retention. Contact retention shall be tested in accordance with MIL-STD-1344, Method 2007, under the tensile load of Table IX.

TABLE IX. Axial tension loads for contact retention.

Contact size			Axial tension load (pounds - minimum)
Contact	Mating end	Wire barrel end	
M39029/1 -507	20	22D	10
-100	16	22	12
-101	16	20	20
-102	14	16	25
-103	12	12	30
M39029/22 -191	22	22	10
-192	20	20	15
-193	16	16	25
605	12	12	30

4.6.5 Thermal shock. Wired components shall be tested in accordance with MIL-STD-1344, Method 1003, Test Condition 'A' except applying temperature extremes in Table X in lieu of steps 1 and 3. Components shall be mounted in racks. Following the fifth cycle, with the ambient temperature reduced to -15°C, a minimum of three contacts shall be mated and unmated five times. Electrical continuity shall be determined at the low and high temperature extremes. Insulation resistance at ambient temperature shall be measured at the completion of the final cycle.

TABLE X. Temperature extremes.

Temperature extremes		
Extremes	Degrees C	Degrees F
Low	-65 +0 -5	-85
High	200 +3 -0	392

4.6.6 Dielectric withstanding voltage.

4.6.6.1 Dielectric withstanding voltage, sea level. Wire components shall be tested in accordance with Method 3001 of MIL-STD-1344, Test Condition I. The applicable test voltages of Table XI shall be applied between all adjacent contacts not common and between the housing and each contact closest to the housing and the rack. Blocks shall be mounted in a rack during this test and the conductive plated or unplated rack shall be connected to one test lead of the transformer during the housing/contact phase of the test. In-line junctions shall be closely wrapped in metal foil which shall be connected to one test lead of the transformer (3.5.6).

4.6.6.2 Dielectric withstanding voltage (DWV), altitude. Wired components shall be tested in accordance with Method 3001, Test Condition IV, MIL-STD-1344. After 30 minutes at the simulated altitude, the samples shall be tested as specified in 4.6.6.1 (3.5.6).

TABLE XI. DWV test voltages.
(These are not working voltages)

SERIES I AND II		
Altitude Conditions	Test Voltages (RMS)	
	For Sizes 12, 16, 20, 22	22D
Sea level	1,500	1000
50,000 feet	800	525
70,000 feet	600	325
100,000 feet	200	110

4.6.7 Fluid immersion. Components shall be subjected to fluids in accordance with Method 1016 of MIL-STD-1344 and Table XII. Safety precautions shall be taken for flammable fluids when performing electrical requirements after fluid immersion (3.5.7).

TABLE XII. Test fluids.

Sample number	MIL-STD-1344 Method 1016 test fluid
1	a
2	b
3	c
4	d
5	e
6	f
7	g
8	h
9	i
10	j
11	k
12	l

4.6.8 Vibration.

4.6.8.1 Sine vibration. TJS components shall be subjected to the test specified in Method 204, Test Condition G, of MIL-STD-202. Duration of vibration at specified temperatures shall be as follows:

a. 4 hours at -50°C.

b. 4 hours at +200°C.

c. 4 hours at ambient temperature.

4.6.8.2 Random vibration. TJS components shall be subjected to the test specified in Method 2005 of MIL-STD-1344. The following details shall apply:

a. Test Condition VI - Letter "J" at ambient temperature.

b. Vibration shall be performed at ambient temperature.

c. Duration shall be 8 hours in the longitudinal direction and 8 hours in a perpendicular direction for a total of 16 hours.

4.6.8.3 Block mounting. The blocks shall be mounted in racks or brackets during the vibration test. The rack shall have a minimum of two and a maximum of X-1 blocks, where X represents the maximum number of blocks accommodated by the rack. The rack or bracket shall be firmly attached to the vibration table. A suitable sensor shall monitor the vibration of the

block(s) at a point near the blocks. The wire bundles shall be clamped to nonvibrating points a minimum of eight inches from the blocks. Feed through blocks shall be wired at both faces. The clamping length of the wires shall be chosen to avoid resonance of the wire bundles.

4.6.8.4 In-line junction mounting. In-line junctions shall be firmly attached to the vibration table. A suitable sensor shall monitor the vibration at a point near the junctions. The wires shall be clamped to nonvibrating members a minimum of eight inches from the junctions, and the clamping length of the wires shall be chosen to avoid resonance of the wires.

4.6.9 Mechanical shock. Wired components shall be subjected to the test specified in Method 2004 of MIL-STD-1344. Components shall be mounted by normal means, with 100 milliamperes maximum current flow through the series circuit during shock. Components shall be monitored for any discontinuities. A detector capable of detecting all discontinuities in excess of 1 microsecond shall be used. The following details shall apply:

a. Test condition D.

b. The wire bundle shall be clamped to fixed points at least 8 inches from the rear of the TJS component.

4.6.10 Humidity. TJS components shall be subjected to the humidity test specified in Method 1002, Type II, omitting subcycle step 7b of MIL-STD-1344. The following details and exceptions shall apply:

a. Step 7a shall be performed during the last cycle.

b. Three hours minimum after the start of step 7a, during the final cycle and while the devices are still subjected to high humidity, the insulation resistance (4.6.11) shall be measured when the chamber temperature reaches 20° ± 5°C and condensation is observed on the devices.

4.6.11 Insulation resistance. An insulation resistance measurement in accordance with Method 3003 of MIL-STD-1344 (3.5.11) shall be made on wired blocks mounted in an unplated or plated conductive aluminum rack. The resistance shall be measured between all but not more than three pairs of adjacent contacts which are not common and between all but not more than six contacts closest to the housing and the rack. For in-line junctions, the resistance shall be measured between the conductor of the wire and metallic foil wrapped around the main body of the junction (3.5.11.1). Simulated contacts may be used for performing this test, in lieu of actual contacts. Any other variations from specified procedures shall be approved by the qualifying activity.

4.6.11.1 Insulation resistance at room condition. When tested at room condition, the component shall meet the requirement of 3.5.11.1.

4.6.11.2 Insulation resistance at elevated temperature. When tested at elevated temperatures, the component shall meet the requirements of 3.5.11.2. The measurement shall be made at the end of the temperature life test (4.6.13) while the devices are at elevated temperature.

4.6.12 Salt spray (corrosion). TJS components shall be subjected to a salt spray test in accordance with Method 1001, Test Condition C, MIL-STD-1344. The salt concentration shall be five percent. The specimens shall then be dried in a circulating air oven at a temperature of 38°C ± 3°C (100°F ± 5°F) for a period 12 hours maximum, after which they shall be removed (blocks shall be taken out of the racks) and inspected. Wiring type components shall be filled with contact wire assemblies or end seal plugs (3.5.12).

4.6.13 Temperature life. Wired blocks mounted in racks, and in-line junctions shall be subjected to the 200°C +3 -0 for a period of 1000 hours. For electronic components, the test conditions shall not exceed the specified performance of the passive component(s) (3.4.8) (3.5.13).

4.6.14 Ozone exposure. Components shall be subjected to the test specified in Method 1007 of MIL-STD-1344 (3.5.14).

4.6.15 Magnetic permeability. The permeability of the TJS components shall be tested in accordance with Method 3006 of MIL-STD-1344. The components shall not be carrying current during the measurement (3.5.15).

4.6.16 Contact resistance. Measurements shall be made at 25° ± 3°C in accordance with Method 3004 of MIL-STD-1344 using the test current specified in Table II. The resistance shall be measured at a point 3 ± .12 inches from the tip of each external contact shown in Figures 2 and 3. No tension shall be applied to the wires or contact. A minimum of four pairs of each contact size shall be tested (3.5.16).

4.6.16.1 Bussing blocks. For feedback blocks, the resistance across a mated pair of adjacent contacts that are interconnected within the block shall be measured. For feedthrough blocks, the measurement shall be taken across a mated pair of contacts having the same identification on both faces of the block.

4.6.16.2 Wire in-line junctions. Measurement(s) shall be made across all mated pairs of contacts.

4.6.16.3 Electronic components. Resistance measurements shall be made in accordance with the internal passive component(s) specification.

4.6.17 Low signal level contact resistance (size 16 wire barrel and smaller). Measurements shall be made at 25° ± 3°C in accordance with Method 3002 of MIL-STD-1344 and Figures 2 and 3. The resistance shall be measured at a point 3 ± .12 inches from the tip of each external contact. No tension shall be applied to the wires or contact. A minimum of four pairs of each contact size shall be tested (3.5.17).

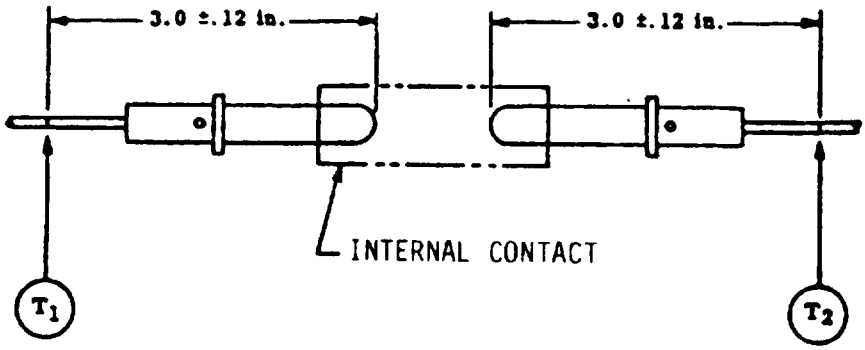


FIGURE 2A. Test sample connections for feedthrough blocks and in-line junctions (Series I).

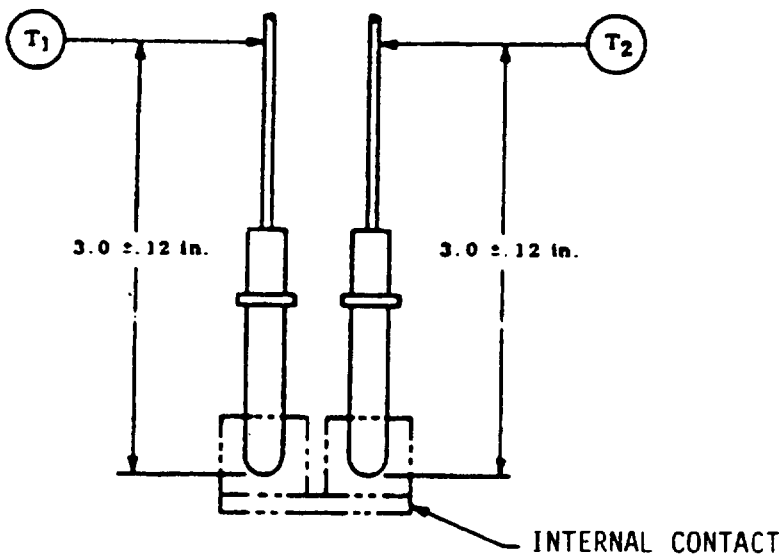


FIGURE 2B. Test sample connections for feedback blocks (Series I).

FIGURE 2. Connections for contact resistance and low signal level contact resistance measurements.

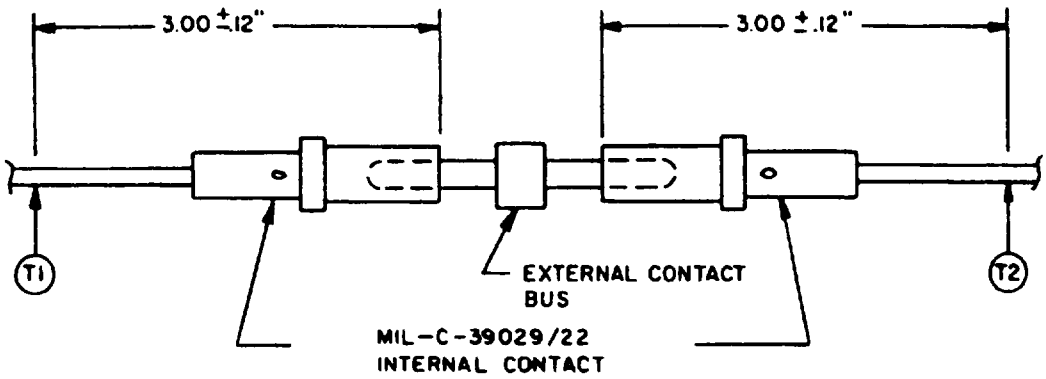


FIGURE 3A. Test sample connections for in-line junctions (Series II).

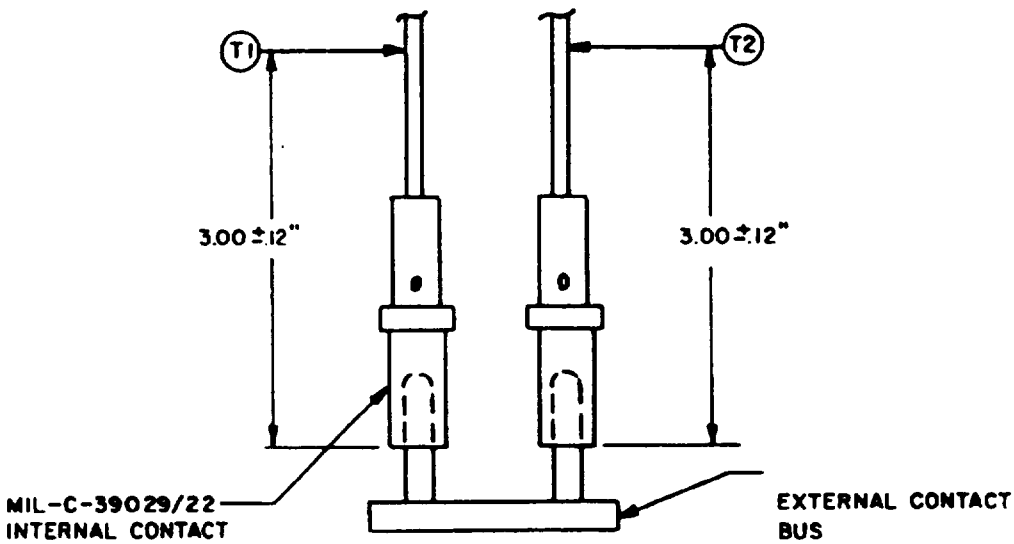


FIGURE 3B. Test sample connections for feedback blocks (Series II).

FIGURE 3. Connections for contact resistance and low signal level contact resistance measurements.

4.6.17.1 Bussing blocks. For feedback blocks the resistance across a mated pair of adjacent contacts that are interconnected within the block shall be measured. For feedthrough blocks the measurement shall be taken across a mated pair of contacts having the same identification on both faces of the block.

4.6.17.2 Wire in-line junctions. Measurement(s) shall be made across all mated pairs of contacts.

4.6.18 Voltage stability. An external force of .5 ± .1 pound shall be applied axially to the wire during the potential drop measurements performed in accordance with 4.6.16. A minimum of four contacts for each contact size shall be tested. A total of ten potential drop readings, being the high and low readings for each of the following steps during and following bending of the wire of each contact tested shall be recorded. Do not rotate the wire from one position to the next. Any discontinuity or interruption of the applied current shall be noted (3.5.18).

Preliminary - Position the TJS component so that one side points North while its top is horizontal. All five tests shall be made on one external contact mated to a socket contact.

Step One - Position the wire attached to a mated contact so that its axis is 90 degrees from the top surface of the component.

Step Two - Bend the wire so that its axis is parallel to the surface of the component and its free end points North. The bend shall occur at the point where the wire exits from the component.

Step Three - Bend the wire 180 degrees so that its free end points South.

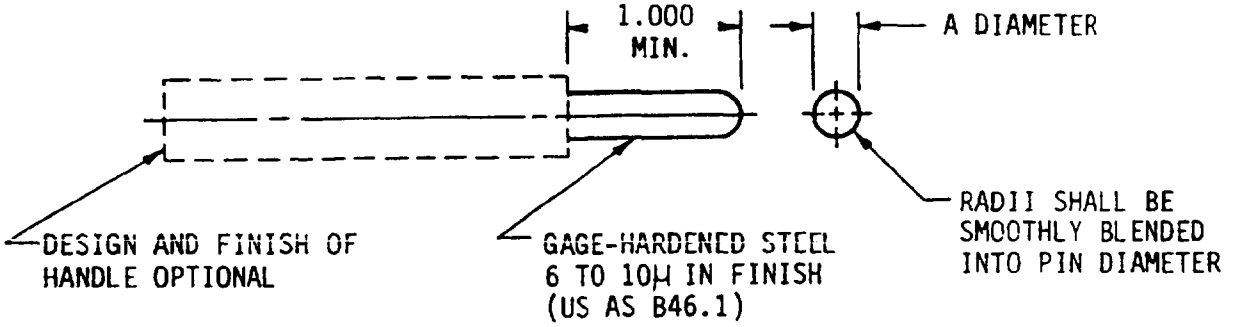
Step Four - Straighten the bend in the wire. Now bend the wire so that its free end points West.

Step Five - Bend the wire 180 degrees so that its free end points East.

4.6.19 Internal contact durability (Series I). TJS component to be tested shall be held in a position wherein the center axis of the internal contact is vertical. A minimum of four of each size contact shall be tested. The gage pin shown in Figure 4 shall be inserted into the internal contact with a force not exceeding 15 pounds until it comes up against a positive stop, and then be completely withdrawn. A cycle consists of one insertion and one withdrawal. The internal contact durability test shall consist of 100 cycles (3.5.19).

4.6.19.1 Internal contact durability testing (Series II). The Series II component shall be held in a position wherein the center axis of the internal contact is vertical. A minimum of four of the contacts shall be tested. A wired qualified MIL-C-39029/22 contact shall be used for each of the tested internal contacts. The wired contacts shall be inserted onto the internal pins with a force not to exceed 15 pounds until it comes up against a positive stop, then withdrawn. A cycle consists of one insertion and withdrawal. The durability test shall consist of 100 cycles. The subsequent contact resistance testing may utilize an unused qualified MIL-C-39029/22 contact and contact retention.

4.6.20 Oversize external contact protection (Series I). At least four installed internal contacts of each size shall be tested by attempting to axially insert into the internal contact the applicable oversize gage pin contact defined in Figure 4. The test gage shall be positioned for insertion in the internal contact and a force of 3 pounds ± 2 ounces shall be applied to the gage pin in the direction of the internal contact (3.5.21).



		"A" Diameter +0.0000 -0.0002	
M39029/1	Contact size	Internal contact durability test gage pin diameter	Oversize
-507	20-22D	0.041	0.046
-100	16-22	0.063	0.070
-101	16-20	0.063	0.070
-102	14-16	0.078	0.088
-103	12-12	0.095	0.105

FIGURE 4. Gage pins for: Internal contact durability and oversize protection test (Series I).

4.6.21 Altitude immersion. TJS components shall be tested in accordance with Method 1004 of MIL-STD-1344. The following details shall apply:

a. Chamber pressure shall be 75,000 feet.

b. All wire ends shall be located within the chamber and exposed to the chamber atmosphere but not submerged or sealed.

c. At the end of the third cycle while the devices are still submerged in the solution at ambient temperature, the dielectric withstanding voltage test (4.6.6.1) shall be performed.

4.6.22 Contact walkout. Two contacts in each component shall be tested in accordance with MIL-STD-1549. The contacts shall be crimped to stranded steel cable of an appropriate size and installed in the part. The components shall be mounted in a test fixture and a 3 pound load shall be applied to the cable. One 360° rotation of the fixture as shown in Figure 5 with the component mounted shall constitute one cycle. The component shall be subjected to 100 cycles at a rate of 10 to 20 cycles per minute.

4.6.23 Retention system fluid immersion. Components with external contacts removed shall be immersed in the fluids listed in Table XII (one sample per fluid) for 2 hours at room temperature. After removal, excess fluid shall drain from the components for 4 hours and the contacts re-installed. The components then shall be subjected to contact retention as specified in paragraph 4.6.4.

5. PACKAGING (for direct Government procurement)

5.1 Preservation. Preservation shall be Level A or commercial.

5.1.1 Level A. Level A shall be in accordance with MIL-C-55330.

5.1.2 Commercial. Commercial shall be in accordance with ASTM D 3951.

5.2 Packing. Packing shall be in Level A or commercial.

5.2.1 Level A. Level A shall be in accordance with MIL-C-55330.

5.2.2 Commercial. Commercial shall be in accordance with ASTM D 3951.

5.3 Marking. Marking shall be in accordance with MIL-STD-129.

5.3.1 Component packaging marking (Series I). Class D component packages shall be identified with the Class D part number and the word "supersedes" followed by the superseded Class A, B and C part numbers.

5.3.2 Component packaging marking (Series II). Series II component packages shall be identified with the military part number in accordance with 1.3 for the specific component.

5.4 Contacts and end seal plugs. The number of contacts supplied with blocks and in-line junctions shall be a minimum of one more for feedback and two more for feedthru blocks than the number of cavities specified. For feedback blocks, two end seal plugs and for feedthru, four end seal plugs shall be provided.

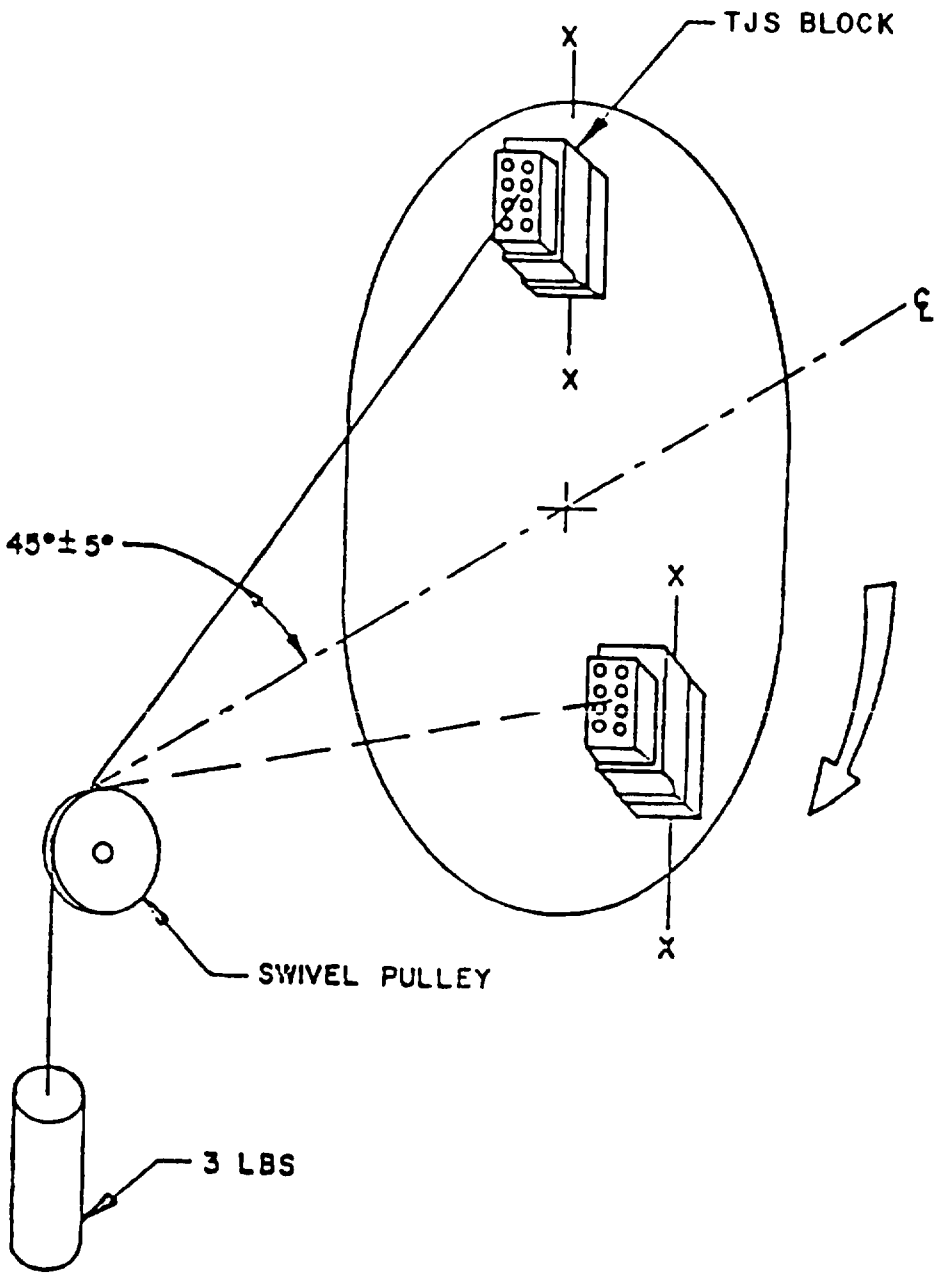


FIGURE 5. Contact walk-out test setup.

6. NOTES

6.1 Intended use. TJS components are intended for electrical distribution use. They are suitable for use in Integrated Wire Termination System (IWTS), and environment resistant wiring, in accordance with MIL-W-5088.

6.2 End seal plugs. End seal plugs should be installed by the user in all contact holes in the grommet when no wired contact assembly is used. Sealing the holes will prevent the entrance of moisture, dust or other contaminants. When installed, sealing plugs shall have the knob end protruding out of the grommet wire hole and be seated against the grommet top.

6.3 Wire diameters. The components of this specification are not designed for wire diameters outside of the limits specified in Table I. Caution should be exercised when using wires having diameters greater or less than specified in Table I. Wires having diameters exceeding the specified maximum distorts the grommet, and if enough oversized wires are used, may prevent the insertion of other contacts in the blocks. Wires having diameters smaller than specified will not be properly sealed by the grommet and will permit the entrance of moisture or other contaminants. In addition, the wiring guidelines of MIL-W-5088 should be followed for proper installation of TJS components.

6.4 Ordering data. Acquisition documents should specify:

a. Title, number and date of this specification.

b. Title, number and date of the applicable specification sheet and the complete military part number (see 1.3 and 3.1).

c. Levels of preservation-packaging and packing (see 5.1).

d. For indirect shipment of blocks and in-line junctions, whether contacts or end seal plugs are not to be furnished.

e. Special marking required (3.6).

f. Whether contact installing and removal tools are to be furnished.

g. For direct government acquisition, Class D Series I components shall be acquired in lieu of Classes A, B and C following the one year depletion of stock (see Appendix A, paragraph 60.2).

h. Whether Series II block removal tools are to be furnished.

6.4.1 Contacts. Crimp external contacts in accordance with MIL-C-39029/1 or MIL-C-39029/22 may be ordered in bulk.

6.4.2 End seal plugs. End seal plugs may be ordered in bulk in accordance with MS 27488.

6.4.3 Indirect shipments. For indirect shipments, blocks and in-line junctions may be supplied without contacts.

6.4.4 End seal plugs. For indirect shipments, TJS components may be supplied without grommet end seal plugs.

6.5 Qualification. With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in the applicable Qualified Products List (QPL) whether or not such products have actually been so listed by that date. The attention of the suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the QPL for MIL-T-81714 is the Naval Air Systems Command. The Naval Avionics Center, Indianapolis, IN, has been designated by the Naval Air Systems Command as agent for establishment of the QPL. Requests for information pertaining to and applications for qualification should be addressed to:

Commanding Officer
Naval Avionics Center
6000 East 21st Street
Indianapolis, IN 42619-2189
Attn: Code B/714
Telephone:
(317) 353-3274
AV 369-3274

6.6 Indirect shipments. The preservation, packaging, packing and marking specified in Section 5 apply only to direct purchases by or direct shipment to the Government and are not intended to apply to contracts between the supplier and contractor.

6.7 Maximum working voltages.

TABLE XIII.

Condition	Voltage (volts RMS)
Sea level	600
70,000 feet	300

6.8 Definitions. These definitions are applicable to this specification.

6.8.1 Terminal junction system. The terminal junction system consists of bussing blocks, racks, brackets, wire in-line junctions, grounding terminals, grounding blocks, electronic blocks and electronic in-line junctions that are used for interconnecting electrical components and equipment in an electrical or electronic system.

6.8.2 Terminal junction bussing blocks. A terminal junction bussing block is a receptacle having multiple internal contacts interconnected in parallel to form one or more circuits. Blocks are normally contained and retained in a rack or mounting bracket. Blocks may be of the feedback or feedthrough type.

6.8.2.1 Feedback bussing blocks. A feedback bussing block has one face containing contact cavities and is used for general purpose interconnection and bussing.

6.8.2.2 Feedthrough bussing blocks. A feedthrough bussing block has two faces containing contact cavities. The faces are diametrically opposite each other. A contact on one face of a block is electrically and mechanically common with a contact having the same identification letter but exiting from the other face of the block. Feedthrough bussing blocks are used for general purpose interconnection and bussing in applications where circuit wiring must be connected to two sides of a panel, bulkhead or patchboard.

6.8.3 Racks (tracks or rails). A rack is used to contain and retain a number of blocks. Two types are available, one for feedback blocks and one for feedthrough blocks. The Series I racks have provisions for side or bottom mounting.

6.8.4 Mounting bracket. A mounting bracket is used where 3 or less feedback bussing blocks or electronic blocks have to be mounted.

6.8.5 Wire in-line junction, single and double (disconnect splice). A wire in-line junction is essentially a feedthrough environment resistant disconnect component for joining wires. It consists of a body with internal contacts which accommodates removable external contacts. The in-line junction is particularly suitable for incorporation into harness wiring or terminating equipment pigtails.

6.8.6 Grounding terminals. The grounding terminal is a single internal contact connected to an external mounting stud. Grounding terminals are used where grounding or a power connection of equipment is necessary.

6.8.7 Grounding blocks (grounding modules). The grounding blocks are feedback receptacles having multiple internal contacts interconnected in parallel to form one circuit which in turn is connected to either a mounting stud or mounting bracket and grounding plate. These components can also be used for power distribution connections at a buss.

6.8.8 Electronic blocks (electronic modules). Like the feedback bussing blocks, electronic blocks have one face containing contact cavities. The contact cavities are internally connected by passive electronic components in various combinations. Blocks are normally contained and retained in a rack or mounting bracket.

6.8.9 Electronic in-line junction (electronic disconnect splice). Electronic in-line junctions serve the same function as the standard wire in-line junction except these components have resistor, diode or fuse type components incorporated.

6.8.10 Bussed. As used in this specification, "bussed" means interconnected electrically within the component housing. Bussing arrangements and their circuit designators are shown on the applicable specification sheet.

6.8.11 Component. Component is defined by MIL-T-81714 specification sheet.

6.8.12 External contact. External contact is the removable contact crimped on the wire.

6.8.13 Internal contact. Internal contact is the non-removable contact contained in the component.

6.8.14 End seal plugs (sealing plugs). End seal plugs are the plastic devices used to seal unused cavities in the grommet of a TJS component.

6.8.15 Module. Module is a common bussed portion of a block.

6.9 Patent notice. The Government has a royalty-free license under the following listed patent for the benefit of manufacturers of the item either for the Government or for use in equipment to be delivered to the Government.

U. S. Patent Number

4,090,764

6.10 Subject term (keyword) listing.

Blocks
Brackets
Bussing
Electronic
Feedback
Feedthru
Junctions
Racks
Terminals

6.11 International standardization agreement. Certain provisions of this specification are the subject of international standardization agreement NEPR 85. When amendment, revision or cancellation of this specification is proposed which will modify the international agreement, the preparing activity will take appropriate reconciliation action through international standardization channels including departmental standardization offices, if required.

6.12 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:
Army - ER
Navy - AS
Air Force - 85

Review Activities:
Navy - EC, OS
Air Force - 99
DLA - GS

User Activities:
Army - MU, AV, AT, WC, MI
Navy - SH

Preparing Activity:
Navy - AS
(Project 5940-1000)

SUPERSEDED CLASSES A, B & C COMPONENTS

10. SCOPE.

10.1 Scope. This appendix details the requirements and tests only for classes A, B and C components. The relationship of classes for bussing blocks, electronic blocks, wire in-line junctions and electronic in-line junctions are shown in paragraph 60.1. Classes A, B and C components are inactive for new design. Class D components shall be used for direct Government acquisition. This appendix is a mandatory part of specification MIL-T-81714 Terminal Junction System. The information contained herein is intended for compliance.

10.2 Classification. Terminal junction components shall be classified as follows:

a. Class A 150°C (302°F) max environmental type, limited fluid resistance.

Class B 175°C (347°F) max environmental type, extended fluid resistance.

Class C 200°C (392°F) max environmental type, limited fluid resistance.

b.

Class	Housing color	Grommet color
A	Green	Green
B	Red	White
C	Black	Red

10.3 Military identification. The components covered by this specification shall be identified by a military part number, as shown by the applicable military specification sheet. The components shall be identified as in the following examples, or as otherwise specified (30.1).

Bussing blocks 1/

M 81714/7 - A A1

- A1 — Bussing designator (ref. spec. sheet)
- A — Class (A, B and C)
- 81714/7 — Specification sheet number
- M — Military part number indicator

Electronic blocks 1/

M 81714/18 - A - 001

- 001 — Electronic component/circuit dash number
- A — Class (A, B and C)
- 18 — Specification sheet number
- M — Military part number indicator

Wire In-Line Junctions 1/

M 81714/12 - 20 A - 1

- 1 — Bussing designator (for double In-Line Junctions only)
- A — Class (A, B and C)
- 20 — Component size (1.3.1)
- 12 — Specification sheet number
- M — Military part number indicator

Electronic In-Line Junctions 1/

M 81714/21 - 1 A - 001

- 001 — Electronic component/circuit dash number
- A — Class (A, B and C)
- 1 — Style number
- 21 — Specification sheet number
- M — Military part number indicator

1/ The part number, when printed on the component, shall be printed as shown in the above examples, but without the spaces shown.

20. REFERENCED DOCUMENTS.

20.1 The referenced documents are as cited in MIL-T-81714.

20.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

20.3 Source of documents.

20.3.1 Government specifications, standards and handbooks. Copies of the referenced federal and military specifications, standards and handbooks are available from the Department of Defense Single Stock Point, Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120. For specific acquisition functions, these documents should be obtained from the contracting activity or as directed by the contracting activity.

30. REQUIREMENTS.

30.1 Specification sheets. The individual part requirements shall be as specified herein and in accordance with the applicable specification sheets.

30.1.1 Precedence. In the event of conflict between this specification and the specification sheets, the latter shall govern. Except, for all applicable specification sheets, Classes A, B and C components are inactive for new design. Only Class D components shall be used for direct Government acquisition. In the event of conflict between this specification and the Referenced Documents (2.), the requirements of this specification shall govern.

30.5.2 Maintenance aging. Applicable TJS components shall conform to this specification after maintenance aging testing in accordance with paragraph 40.6.3 and shall meet the requirements of Table A-I.

30.5.3 Contact insertion and removal forces. The contact insertion and removal forces shall comply with the requirements of Table A-I while being subjected to the maintenance aging test in accordance with paragraph 40.6.3.

30.5.5 Thermal shock. When tested in accordance with paragraph 40.6.5, there shall be no damage detrimental to operation of the TJS components after being subjected to the temperature extremes of Table A-II. There shall be no interruption of electrical continuity exceeding one microsecond during this test. Blocks shall remain firmly fixed with relation to each other and the rack at all times.

30.5.6 Dielectric withstanding voltage (DWV). When tested in accordance with paragraph 40.6.6.1, components shall show no evidence of breakdown or flashover when subjected to the test voltages and altitude of Table A-III. During application of test voltage the leakage current shall not exceed two milliamperes. Corona shall not be considered as breakdown.

30.5.7 Fluid immersion. After being subjected to fluid immersion in accordance with paragraph 40.6.7, components furnished hereunder shall comply with contact insertion and removal forces (30.5.3), and insulation resistance at ambient temperature (30.5.11.1). Nonmetallic parts shall not evidence cracking, checking, swelling, or loosening of bonds or seams which will adversely affect their performance.

30.5.8 Vibration. Items furnished under this specification shall not be damaged and there shall be no loosening of parts due to vibration. Blocks shall remain firmly fixed with relation to each other and the rack or bracket. There shall be no interruption of electrical continuity longer than one microsecond in duration during the vibration test, when performed in accordance with paragraph 40.6.8.

30.5.9 Mechanical shock. Items shall not be damaged and there shall be no loosening of parts due to shock. Blocks shall remain firmly fixed with relation to each other and the rack or bracket. There shall be no interruption of electrical continuity longer than one microsecond during the exposure to mechanical shock, when performed in accordance with paragraph 40.6.9.

30.5.10 Humidity. When exposed to humidity in accordance with paragraph 40.6.10, the insulation resistance shall be a minimum of 100 megohms measured at the completion of the tenth cycle of test while at 20° ± 5°C and 95 percent relative humidity (R.H.).

30.5.11 Insulation resistance. Insulation resistance shall be measured at room and elevated temperatures in accordance with 4.6.11.

30.5.11.1 At room condition. The insulation resistance at room temperature shall be not less than 5000 megohms, when tested in accordance with 4.6.11.1.

30.5.21 Altitude immersion. TJS components shall maintain a dielectric withstanding voltage at sea level as specified in Table A-III, when tested in accordance with paragraph 40.6.21.

40. QUALITY ASSURANCE PROVISIONS.

40.6.3 Maintenance aging (except racks and brackets). Insertion and removal of a contact shall be considered one cycle. A minimum of 20 percent, but not less than 3 contacts shall be subjected to nine additional cycles of insertion and removal, using the specified military tools. The contact insertion and removal forces (30.5.3) shall be measured during the first and tenth cycle (30.5.2).

TABLE A-I. Contact insertion and removal forces.

Contact size			Insertion and removal force (pounds max.)
Contact M39029/1	Mating end	Wire barrel end	
-507	20	22D	10
-100	16	22	10
-101	16	20	10
-102	14	16	15
-103	12	12	15

40.6.5 Thermal shock. Wired components shall be tested in accordance with MIL-STD-1344, Method 1003, Test Condition "A" except, applying temperature extremes in Table A-II in lieu of steps 1 and 3. Components shall be mounted in racks. Following the fifth cycle, with the ambient temperature reduced to -15°C, a minimum of three contacts shall be mated and unmated five times. At the completion of the latter test, the samples shall be returned to room temperature for further inspection. A suitable instrument shall be employed to indicate any discontinuity or interruption of current flow (30.5.5).

TABLE A-II. Temperature extremes.

Block class	Temperature extremes		
	Extremes	Degrees C	Degrees F
A, B & C	Low	-65^{+0}_{-5}	-85
A	High	150^{+3}_{-0}	302
B	High	175^{+3}_{-0}	347
C	High	200^{+3}_{-0}	392

40.6.6.1 Dielectric withstanding voltage, sea level. Wire components shall be tested in accordance with Method 3001 of MIL-STD-1344, Test Condition I. The applicable test voltages of Table A-III shall be applied between all adjacent contacts not common and between the housing and each contact closest to the housing and the rack. Blocks shall be mounted in a rack during this test and the conductive rack shall be connected to one test lead of the transformer during the housing/contact phase of the test. In-line junctions shall be closely wrapped in metal foil which shall be connected to one test lead of the transformer (30.5.6).

TABLE A-III. DWV test voltages.
(These are not working voltages)

Conditions	Test voltages (RMS)	
	For sizes 12, 16, 20, 22	For size 22 HD
Sea level	1,500	1,000
70,000 feet	600	325

40.6.7 Fluid immersion. Wired components shall be immersed in the fluids specified for the required temperature and time periods. All fluid immersion samples shall be subjected to the subsequent tests. Safety precautions should be taken for flammable fluids when performing electrical requirements after fluid immersion (30.5.7).

40.6.7.1 Classes A, B and C. A separate block or in-line junction shall be immersed in one of each of the required fluids as specified in Tables A-IV and A-V for Classes A, B and C.

TABLE A-IV. Fluid immersion.
(Class A and C blocks and in-line junctions)

Block or in-line junction number	Test group number		Test fluid specification	Test condition
	Block	In-line junction		
1	3	3	MIL-H-5606	Immerse sample in fluid at 23°C ± 5°C for 20 hours.
2	3	3	MIL-L-23699	Remove and drain for one hour in free air at 23°C ± 5°C.

TABLE A-V. Fluid immersion.
(Class B blocks and in-line junctions)

Block or in-line junction	Test group number		Test fluid specification and types	Test condition
	Block	In-line junction		
1	3	3	MIL-L-7808	(a) Immerse wired block or in-line junction in fluid at 120 ± 3°C for five minutes.
2	3	3	MIL-L-23699	(b) Remove sample and allow to drain for one hour at 23 ±5°C. (c) Expose sample to 175 ± 3°C in an air circulating oven for 22 hours. One cycle consists of steps (a), (b) and (c). (d) Repeat for seven cycles.
3	3	3	MIL-H-5606	Same as above, except immerse in fluid at 85 ± 3°C for step (a). Expose sample to 104 ± 3°C for step (c).
4	3	3	MIL-A-8243	Same as MIL-L-7808, except immerse in fluid at 65 ± 3°C for step (a).
5	3	3	MIL-C-25769 (pH 10 - 12 & diluted for cleaning)	
6	3	3	MIL-T-5624 (JP-5)	Immerse sample in fluid at 23 + 5°C for 20 hours. Remove and drain for 4 hours at 23 ± 5°C.

40.6.8 Vibration.

40.6.8.2 Vibration, Classes A, B, C. The blocks, wired and mounted in accordance with paragraph 40.6.8.3 and in-line junctions, wired and mounted in accordance with paragraph 40.6.8.4 shall be vibrated in accordance with Method 204, Test Condition D, MIL-STD-202. In addition, the vibration shall be performed at a low ambient temperature of -50°C and the applicable high ambient temperature (see Table A-II). All busses in the block shall be wired in series with 100 ± 10 milliamperes of current allowed to flow. A suitable instrument shall be employed to monitor the current flow and to indicate discontinuity of contact or interruption of current flow. Duration of vibration at extreme temperatures shall be 25 percent of the duration specified for the room temperature condition (30.5.8).

40.6.8.3 Block mounting. The blocks shall be mounted in racks or brackets during the vibration test. The rack shall have a minimum of two and a maximum of X-1 blocks, where X represents the maximum number of blocks accommodated by the rack. The rack or bracket shall be firmly attached to the vibration table. A suitable sensor shall monitor the vibration of the block(s) at a point near the blocks. The wire bundles shall be clamped to nonvibrating points a minimum of eight inches from the blocks. Feedthrough blocks shall be wired at both faces. The clamping length of the wires shall be chosen to avoid resonance of the wire bundles.

40.6.8.4 In-line junction mounting. In-line junctions shall be firmly attached to the vibration table. A suitable sensor shall monitor the vibration at a point near the junctions. The wires shall be clamped to nonvibrating members a minimum of eight inches from the junctions, and the clamping length of the wires shall be chosen to avoid resonance of the wires.

40.6.9 Mechanical shock.

40.6.9.2 Mechanical shock, Classes A, B, C. Blocks wired as described in paragraph 4.6.8.1 and mounted in racks or brackets as described in paragraph 40.6.8.3 shall be subjected to Method 213, Test condition A, MIL-STD-202. One shock shall be applied in each direction of the three major axes of the blocks. A minimum of eight inches of wire shall be unsupported from the face of the blocks. A suitable instrument shall be employed to indicate any discontinuity or interruption of current flow (30.5.9).

40.6.10 Humidity.

40.6.10.2 Moisture resistance, Classes A, B, C. Wired components shall be tested in accordance with Method 106 of MIL-STD-202 with the exception that steps 7a and 7b shall be deleted. Insulation resistance measurements shall be made as follows:

a. At high humidity the reading shall be a minimum of 100 megohms.

b. After the drying period, the insulation resistance shall then be measured and shall be a minimum of 1000 megohms 30.5.10.

40.6.11 Insulation resistance. An insulation resistance measurement in accordance with Method 3003 of MIL-STD-1344 (3.5.11) shall be made on wired blocks mounted in a plated or unplated conductive aluminum rack. The resistance shall be measured between all but not more than three pairs of adjacent contacts which are not common and between all but not more than six contacts closest to the housing and the rack. For in-line junctions, the resistance shall be measured between the conductor of the wire and metallic foil wrapped around the main body of the junction (3.5.11.1).

40.6.11.1 Insulation resistance at room condition. When tested at room condition, the component shall meet the requirement of 3.5.11.1. Simulated contacts may be used for performing this test, in lieu of actual contacts. Any other variations from specified procedures shall be approved by the qualifying activity.

40.6.21 Altitude immersion. TJS components shall be tested in accordance with Method 1004 of MIL-STD-1344. The following details shall apply:

a. Chamber pressure for Classes A, B and C shall be 70,000 feet.

b. All wire ends shall be located within the chamber and exposed to the chamber atmosphere but not submerged or sealed.

c. At the end of the third cycle while the components are still submerged in the solution at ambient temperature, the dielectric withstanding voltage test (40.6.6.1) shall be performed.

50. PACKAGING.

50.1 Preservation. See 5.1.

50.3.1 Component packaging marking. Component packages shall be identified with Classes A, B or C part numbers.

60. NOTES.

60.1 Superseded part numbers. The superseding Class D part number is developed by replacing the A, B or C Class letter by D in the superseded part number. Examples of such supersession are as follows:

a. Bussing blocks. Part numbers M81714/7-AA1, -BA1 and -CA1 are superseded by M81714/7-DA1.

b. Electronic blocks. Part numbers M81714/18-A-001, -B-001 and -C-001 are superseded by M81714/18-D-001.

c. Wire in-line junctions. Part numbers M81714/12-20A-1, -20B-1 and -20C-1 are superseded by M81714/12-20D-1.

d. Electronic in-line junctions. Part numbers M81714/21-1A-001, -1B-001 and -1C-001 are superseded by M81714/21-1D-001.

INSTRUCTIONS: In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge *(DO NOT STAPLE)*, and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

NOTE: This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification 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.

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-T-81714E	TERMINAL JUNCTION SYSTEM, ENVIR. RESISTANT, GEN SPEC

3a. NAME OF SUBMITTING ORGANIZATION

b. ADDRESS *(Street, City, State, ZIP Code)*

4. TYPE OF ORGANIZATION *(Mark one)*

- ☐ VENDOR
- ☐ USER
- ☐ MANUFACTURER
- ☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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