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INCH-POUND
A-A-XX159
PROPOSED

COMMERCIAL ITEM DESCRIPTION

FIBER OPTIC CONNECTORS, HERMAPHRODITIC, MULTIPLE REMOVABLE TERMINI

The General Services Administration has authorized the use of this commercial item description, for all federal agencies.

1. SCOPE. This Commercial Item Description (CID) covers circular, hermaphroditic style, multiple removable termini, fiber optic connectors and dust covers. This hermaphroditic style connector is intended for use in concatenation as opposed to point-to-point applications. The removable termini that are compatible with the connector types in this CID must be procured separately using CID A-A-XX160 (REMOVABLE TERMINI FOR MULTIPLE TERMINI FIBER OPTIC CONNECTORS). A hermaphroditic connector is one in which cable plugs are able to intermate with one another. The cable plug and jam nut mounted receptacle are the two connector styles addressed in this specification. The jam nut mounted receptacle itself is not hermaphroditic, is used at the interconnection box or panel, and is designed to mate with a cable plug in the forward position (female threads exposed). The cable plug is hermaphroditic, mates with the jam nut mounted receptacle when the cable plug is in the forward position, and is used to concatenate umbilical cable assemblies when one cable plug is in the forward position and the mating cable plug is in the back position (male threads exposed).

2. CLASSIFICATION.

2.1 Type. The fiber optic connectors specified in this CID shall be referred to by the type designation CP for cable plug and CR for jam nut mounted receptacle. The dust covers specified in this CID shall be referred to by the type designator DP for one with external threads and DR for one with internal threads. The detachable socket insert (front insert) shall be referred to by the type designation DI-A for configuration A (one with captivated alignment sleeves) and by DI-B for configuration B (one with through holes for alignment sleeves).

Note: The U.S. Government preferred system of measurement is the metric SI system. However, since this item was originally designed using inch-pound units of measurement, in the event of conflict between the metric and inch-pound units, the inch-pound units shall take precedence. The above note is applicable throughout this entire procurement specification.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be sent by letter to: Commander, Naval Sea Systems Command, SEA 03R42, 2531 Jefferson Davis Hwy. Arlington, VA 22242-5160

AMSC N/A

FSC 6060

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2.2 Number of Termini. The number of termini specified for both the connector and front insert shall follow the type designator as listed in Table 1. Number of termini does not apply to a dust cover.

Table 1. Connector/Dust Cover/Detachable Socket Insert Types

Type	Description <u>1/</u>
DP	Dust cover with external screw threads, wire rope with fastener, for 6, 8, & 12 termini cable plugs.
DR	Dust cover with internal screw threads, wire rope with fastener, for 6, 8, & 12 termini jam nut mounted receptacles.
CP-6	Connector, 6 termini, cable plug without a detachable socket insert. <u>2/</u>
CR-6	Connector, 6 termini, jam nut mount receptacle without a detachable socket insert.
CP-8	Connector, 8 termini, cable plug without a detachable socket insert. <u>2/</u>
CR-8	Connector, 8 termini, jam nut mount receptacle without a detachable socket insert.
CP-12	Connector, 12 termini, cable plug without a detachable socket insert. <u>2/</u>
CR-12	Connector, 12 termini, jam nut mount receptacle without a detachable socket insert.
DI-A-6	Detachable socket insert, front piece, configuration A, with 3 alignment sleeves.
DI-B-6	Detachable socket insert, front piece, configuration B, with through holes for alignment sleeves.
DI-A-8	Detachable socket insert, front piece, configuration A, with 4 alignment sleeves.
DI-B-8	Detachable socket insert, front piece, configuration B, with through holes for alignment sleeves.
DI-A-12	Detachable socket insert, front piece, configuration A, with 6 alignment sleeves.
DI-B-12	Detachable socket insert, front piece, configuration B, with through holes for alignment sleeves.

1/ Both the connector and detachable socket insert must be specified to obtain a complete part. Example: CP-12-DI-A-12 is a cable plug connector with 12 termini and a configuration A detachable socket insert.

2/ Cable plug includes a cable strain relief. No backshell is used with this configuration.

3. SALIENT CHARACTERISTICS.

3.1 Performance requirements. The connectors and dust covers listed in Table 1 shall meet the performance requirements specified in Table 2 when tested with removable termini that conform to CID A-A-XX160. Once tested and approved, any change in construction or material shall require connector re-testing to this table.

Table 2. Connector/Dust Cover Test Procedures and Performance Requirements

Test Procedure <u>15/</u>	Performance Requirement
Group I Tests: Visual/Dimensional/Optical	
• Size (EIA-455-13) <u>6/</u>	Dimensions per Appendix B
• Workmanship (EIA-455-13) <u>6/</u>	No pits, burrs; mates properly; <u>1/</u>
• Identification Markings (EIA-455-13) <u>6/</u>	Legible & permanent manufacturer name/logo
• Insert Retention Axial Strength (Apply pressure ≥ 0.7 MPa (100 psi) at 0.07 MPa/sec (10 psi/sec) rate and for 1 minute. Test both forward and backward directions.) <u>6/</u>	No axial displacement detrimental to performance; <u>1/</u>
• Insertion Loss, Initial (TIA/EIA-455-34, Methods A1 & B) <u>6/ 8/</u>	MM: 0.5 dB avg, 0.75 dB max <u>12/</u> SM: 0.5 dB avg, 0.75 dB max <u>12/</u> SM: 0.25 dB avg, 0.5 dB max <u>13/</u>
• Return Loss (EIA-455-107) <u>6/ 8/</u>	MM: None SM: 30 dB min <u>12/</u> SM: 40 dB min <u>13/</u>
Group II Tests: Mechanical	
• Cable Retention (EIA-455-6, Apply force ≥ 181.4 kg (400 pounds) for 10 minutes) <u>6/ 7/</u>	<u>1/ 2/</u>
• External Bending Moment (apply 71 N-m (628 in-lb) for 1 minute at rate of 1.1 N-m/minute (10 in-lb/minute)) <u>6/ 7/</u>	<u>1/ 3/</u>
• Coupling Engage & Disengage Torque (apply radial torque to engage & disengage coupling ring to threads) <u>6/</u>	<u>1/ 2/</u> maximum applied torque allowed = 4.5 N-m (40 in-lb)
• Twist (EIA-455-36, 1000 cycles at 12 cycles/minute, cable tension ≥ 48.9 N (11 lb) clamped at 10X cable outer diameter from connector) <u>6/ 7/</u>	No cable seal damage. <u>1/ 2/</u>
• Mating Durability (EIA-455-21, 1000 cycles) <u>6/</u>	<u>1/ 2/</u>
• Return Loss (EIA-455-107) <u>6/</u>	MM: None SM: 30 dB min <u>12/</u> SM: 40 dB min <u>13/</u>
• Crush (EIA-455-26, Load ≥ 1000 Newton (225 lb) for 7 cycles) <u>8/</u>	<u>1/ 2/</u>
• Impact (TIA/EIA-455-2, Method A) <u>6/ 7/</u>	<u>1/ 3/</u>
• Insertion Loss, Maximum (TIA/EIA-455-34, Methods A1 & B) <u>6/</u>	MM: 1.0 dB avg, 1.25 dB max <u>12/</u> SM: 1.0 dB avg, 1.25 dB max <u>12/</u> SM: 0.75 dB avg, 1.0 dB max <u>13/</u>
• Water Pressure (Immerse in water for 48 hr to 0.17 MPa (25 psi) for mated pair, to 0.10 MPa (15 psi) for unmated pair.) <u>9/</u>	<u>1/ 3/</u> no water penetration into connector interior

Table 2. Connector/Dust Cover Test Procedures and Performance Requirements (Continued)

Test Procedure <u>15/</u>	Performance Requirement
Group III Tests: Environmental	
• Temperature Humidity Cycling (TIA/EIA-455-5, Type 2) <u>6/</u>	<u>1/</u> <u>2/</u>
• Temperature Cycling (TIA/EIA-455-3, -40°C/65°C for 5 cycles) <u>6/</u>	<u>1/</u> <u>2/</u>
• Temperature Life (TIA/EIA-455-4, 110°C for 240 hours) <u>6/</u> <u>14/</u>	<u>1/</u> <u>3/</u>
• Return Loss (EIA-455-107) <u>6/</u>	MM: None SM: 30 dB min <u>12/</u> SM: 40 dB min <u>13/</u>
• Insertion Loss, Maximum (TIA/EIA-455-34, Methods A1 & B) <u>6/</u>	MM: 1.0 dB avg, 1.25 dB max <u>12/</u> SM: 1.0 dB avg, 1.25 dB max <u>12/</u> SM: 0.75 dB avg, 1.0 dB max <u>13/</u>
Group IV Tests: Materials	
• Fungus Resistance (TIA/EIA-455-56, parts only) <u>11/</u>	<u>4/</u>
• Salt Spray (TIA/EIA-455-16, 500 hours at 35°C) <u>8/</u>	<u>5/</u>
• Ozone Exposure (Test equipment per ASTM-D-1149; air velocity ≥ 2 ft/sec, 70 ± 5 °C, ozone concentration of 100 to 150 ppm for 2 hours) <u>11/</u>	No evidence of excessive swelling or embrittlement in the connector seals.
• Fluid Immersion (EIA/TIA-455-12) Immerse in each fluid for 24 hours at 20 to 25 °C. <u>10/</u> <u>11/</u>	<u>3/</u> No swelling, softening, fluid penetration, discoloration; no loss of sealing or ID marking.

Notes for Table 2:

1/ No visual evidence of cracking, degradation, deterioration, distortion, separation, corrosion, etc.

2/ Change in optical transmittance ≤ 0.5 dB for MM (multimode), ≤ 0.5 dB for SM (single mode) both during and after the test per EIA/TIA-455-20.

3/ Change in optical transmittance ≤ 0.5 dB for MM, ≤ 0.5 dB for SM after the test per EIA/TIA-455-20.

4/ Materials shall show no, sparse or very restricted microbial growth and reproduction. Little or no chemical, physical or structural change shall be detectable.

5/ No visible evidence of salt penetration into the connector sealed area shall be observed. No corrosive effects shall be seen on the external connector parts that could be detrimental to the operation of the connector.

6/ Perform on two mated pair, cable plug-to-jam nut mount receptacle configuration.

7/ Perform on cable plug end only.

8/ Perform on two mated pair, cable plug-to-cable plug configuration.

9/ Perform on one mated pair and one unmated pair, cable plug-to-cable plug configuration.

10/ A 24 hour immersion shall be performed in the following fluids or the commercial

equivalent: fuel oil (MIL-F-16884), turbine fuel (JP-5, JP-8 MIL-T-5624), isopropyl alcohol (TT-I-735), hydraulic fluid (MIL-H-17672 and MIL-H-5606), lubricating oil (MIL-L-17331, MIL-L-23699), Chevron Int'l Coolanol 25R (MIL-C-47220 Type IV), sea water (3% NaCl).

11/ May be performed on separate components versus an assembled connector.

12/ Requirement for average is average value of termini per connector. Values specified are those for standard optical signal level performance.

13/ Requirement for enhanced optical signal level performance. Different/revised polishing procedure may be used. Unless otherwise specified in the contract, tests for performance verification shall be performed to standard performance requirement.

14/ Test temperature may not be realistic for cable used to terminate connector. If so, double test time for every 10 °C decrease in the test temperature.

15/ When not specified, optical measurements shall be made at the 1300 nm wavelength window. A minimum of 8 fibers shall be monitored during testing. Each fiber shall be monitored individually with no fiber concatenation allowed. Both single mode and multimode fibers shall be monitored. Optical source launch conditions: For SM fiber use 30 mm diameter mandrel and for MM fiber use 70/70 restricted.

3.2 Interchangeability. The fiber optic connectors and dust covers specified in this CID shall conform to appendix A for interchangeability verification and appendix B for dimensions required for interchangeability.

3.3 Sealing. Connector shall be designed so that an unmated cable plug and jam nut receptacle, as well as mated combinations of these connectors and dust covers, can meet the requirements of Table II, as applicable.

3.4 Connector detachable socket inserts.

3.4.1 The insert shall be comprised of two pieces, a detachable front insert and a fixed rear insert that meets intermateability requirements. Front insert is to include only the portion that covers the socket termini alignment sleeves. (See appendix B, figures 4, 5 and 6).

3.4.2 There shall be two configurations for the front socket insert. In one configuration, configuration A, the termini are to be retained in the connector rear insert and alignment sleeves in the front insert when the front insert is separated from the connector. In the other configuration, configuration B, termini with alignment sleeves are to be retained in the connector rear insert when the front insert is separated from the connector.

3.4.3 A captivated socket head cap screw (compatible with 5/64 inch Allen wrench) is to be used as the attachment actuator for securing the two insert pieces.

3.4.4 Linear position of the termini cavities shall be established when the mating end faces of the front and rear inserts are joined. (See appendix B, figure 8).

3.4.5 Rear insert shall have sufficient depth to engage with and retain the spring retaining clip on the socket termini.

3.4.6 Rear insert shall be keyed and secured to prevent rotation within the plug and receptacle connectors.

3.5 Front insert configuration A.

3.5.1 Front insert shall contain alignment sleeves as part of the insert and conform to applicable figures in appendix B.

3.5.2 Termini are to be retained in the connector rear insert and alignment sleeves in the front insert when the front insert is separated from the connector.

3.5.3 Insert shall be keyed so that the front and rear inserts are engaged and aligned properly prior to front insert contacting socket termini.

3.5.4 Once front insert is detached, there shall be direct access to termini end faces.

3.5.5 Alignment sleeve material shall be ceramic. Alignment sleeve may have a slot/opening running axially along the entire length.

3.6 Front insert configuration B.

3.6.1 Front insert shall contain alignment sleeve clearance cavities and conform to applicable figures in appendix B.

3.6.2 Termini with alignment sleeves are to be retained in the connector rear insert when the front insert is separated from the connector.

3.6.3 Insert shall be keyed so that the front and rear inserts are engaged and aligned properly prior to front insert contacting socket termini alignment sleeves.

3.6.4 Once termini alignment sleeves are removed, the front socket insert shall be detachable for termini end face cleaning.

3.7 Strain relief. The strain relief on the cable plug shall be re-enterable (field repairable) for maintenance purposes. Strain relief shall be achievable using the approved Navy tooling described in table 1H of NAVSEA Drawing 7325763. The limits on the cable outer diameter for each cable plug shall be as listed in table 3.

Table 3. Cable Outer Diameter Limits For Cable Plug Strain Relief

Connector Plug Type	Minimum Cable Outer Diameter mm (inches)	Maximum Cable Outer Diameter mm (inches)
CP-6	6.50 (.256)	9.50 (0.374)
CP-8	11.00 (.433)	13.70 (0.540)
CP-12	14.00 (0.551)	16.20 (0.639)

3.8 Connector protective caps. All connectors specified in this CID shall be provided with a disposable cap or cover. The cap shall be free of mold release, lubricants, or any other contaminants.

3.9 Connector/termini interchangeability. All connectors (with the same termini count), dust covers, accessories and replaceable parts of the same type listed in this CID shall be physically and functionally interchangeable without need for modification of such items or of the mating equipment and shall be interoperable with their counterpart connectors. Refer to Appendix A for interchangeability test procedures and requirements.

3.10 Identification markings. The connector shall be marked with a yellow band and either the manufacturer's name, CAGE Code or logo.

3.11 Plating. An environmentally friendly and abrasion resistant plating shall be used on the aluminum connector and dust covers that conforms to the following requirements:

3.11.1 Dimensional compatibility. Connector shall conform to the dimensional requirements in appendix B.

3.11.2 Application constraints. Connector with an environmentally friendly and abrasion resistant plating shall meet the 500 hour salt spray requirement and show no signs of surface plating degradation when examined visually after 500 mating cycles, including any applicable wrench tightening. Connector plating shall withstand other test conditions in table 2.

3.11.3 Environmental exposure resistant. Connector with environmentally friendly and abrasion resistant plating shall be resistant to fungus, ozone and ultraviolet (UV) light.

3.11.4 Color. The connector color shall be nonreflective.

3.12 Accessories. Dust covers shall be equipped with insulated, coated, braided steel wire rope and a means of mounting to the connector or panel/interconnection box, as applicable. Jam nut mounted receptacle shall be equipped with jam nut per appendix B, figure 1.

3.13 Optical transmittance instrumentation stability. Optical transmittance instrumentation shall be subjected to the following stability tests before table 2 testing is performed. The first test should consist of measuring the transmitted power through each channel once every minute for a 4 hour period. The second test should consist of measuring the transmitted power through each channel once every 30 minutes for a 96 hour period. The data for each channel should be analyzed to determine average transmittance, minimum and maximum transmittance, the standard deviation of the transmittance, and the minimum and maximum percent deviation of transmittance.

3.14 Fabrication compatibility. Insertion and removal of termini with respect to the connectors specified in this CID shall be achievable using the approved Navy tool kit described in NAVSEA Drawings 6872813 and 7325763.

3.15 Socket termini for detachable socket inserts. Socket termini to be used with a configuration A front socket insert are to be purchased without the alignment sleeves. Socket termini to be used with a configuration B front socket insert are to be purchased with the alignment sleeves.

4. REGULATORY REQUIREMENTS.

4.1 Recovered materials. Products provided are encouraged to be manufactured with recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR).

5. QUALITY ASSURANCE PROVISIONS.

5.1 Interchangeability conformance. As a precursor to market acceptability, the interchangeability requirements in Appendix B of this CID shall be met.

5.2 Market acceptability. Connectors and dust covers procured to this CID shall have demonstrated commercial market acceptability. Suppliers will demonstrate market acceptability by showing that they have sold more than 50 fiber optic, multiple termini connectors to commercial customers and have been selling the product for greater than 2 years.

5.3 Product conformance. The products provided shall meet the salient characteristics of this Commercial Item Description, conform to the producer's own drawings, specifications, standards, and quality assurance practices, and be the same product offered for sale in the commercial marketplace. The Government reserves the right to require proof of such conformance.

6. PACKAGING.

6.1 Preservation, packaging, packing and marking shall be as specified in the contract or order (See Ordering data).

7. NOTES.

7.1 Ordering data. Purchasers should specify the following:

7.1.1 When Government testing is required. Test samples required are as follows:

- (1) One mated connector pair, types CP-12 and CR-12, and one mated connector pair, types CP-12 and CP-12, with a five meter length of cable from each connector. The opposite end of each cable is to be terminated with ST connectors. Each mated connector pair shall have 6 single mode and 6 multimode termini (pins/sockets).
- (2) Parts comprising CP-12, CR-12, and DP-A are to be provided for materials testing which include fungus resistance, salt spray, and ozone exposure.

7.1.2 Quantity and type of connectors and/or dust caps required.

7.1.3 When this CID is used for procurement, the product conformance clause must appear in the solicitation.

7.1.4 Preservation, packaging, packing and marking requirements.

7.2 Test methods and standards.

- ANSI standards are available from the American National Standards Institute, Attn: Customer Service, 11 West 42nd Street, New York, NY 10036.
- ASTM standards are available from the American Society of Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.
- EIA standards are available from the Electronics Industries Association, Engineering Department, 2001 Eye Street, NW, Washington, DC 20006.
- Federal Government publications are available from the Standardization Documents Order Desk, 700 Robbins Avenue, Philadelphia, PA 19120-5094.
- Fiber Optic Military Specification and related NAVSEA Drawings are available at the following Web Site: <http://www.it-umbrella.navy.mil> (click on the word "Fiber" at the bottom of the Home Page).

PREPARING ACTIVITY:
NAVY - SH

APPENDIX A

FIBER OPTIC MULTIPLE REMOVABLE TERMINI CONNECTOR
INTERCHANGEABILITY REQUIREMENTS

Interchangeability. All connectors (with the same termini count) having the same part number (such as CP-12) and tools shall be physically and functionally interchangeable without need for modification of such items or of the mating equipment and shall be interoperable with their counterpart connectors. Interchangeability shall be performed on separate components and assemblies than those used for and as a precursor to any quality assurance provisions for market acceptability or product conformance inspections.

1. Interoperability of counterpart connectors. Interoperability of the termini and connector shall be performed as specified in 1a and 1b and Table I.
 - a. Plug and receptacle. This test is applicable for connector plugs and receptacles being considered.
 - (1) Test sample configuration. Different plug and receptacle sources shall be mated as specified in the Table I. This test is repeated with all previously certified sources of plugs and receptacles that are identified as being interchangeable and previously certified sources of termini.
 - (2) Tests performed. Tests shall be performed as specified in 1b using each plug and receptacle configuration specified in Table I.
 - b. Optical performance test for interoperability.
 - (1) Test method. Test shall be performed to EIA-455-34, Methods 1A and B. Power meter or test set with a wide area detector and adapters specifically for A-A-XX160 termini and ST connector plug interface shall be used. One terminus pigtail shall be used to simulate the pre-cut cable. The terminus is inserted into the termini adapter (at detector end) and a measurement obtained. Next, perform the post-cut cable measurement. The terminus is inserted into the connector plug and mated with the mating terminus in the connector receptacle. The ST connector on the mating terminus pigtail is inserted into the ST connector adapter (at detector end) and a measurement obtained.
 - (2) Test requirement. The different between the pre-cut and post cut cable measurements shall be ≤ 0.75 dB for multimode fiber and ≤ 0.75 dB for single mode fiber.

Table I. Interchangeability Test Variations

X = Previously Certified Connector Y = Candidate Connector
 A = Previously Certified Termini

Test Variation	Connector Receptacle	Termini Socket	Connector Plug	Termini Pin
1	X	A	Y	A
2	Y	A	X	A
3	Y	A	Y	A

2. Insert-terminus compatibility.

- a. Test sample configuration. Termini from a previously certified source shall be placed in the connectors specified in Table I. This test is performed to verify conformance to termini insertion and removal force level requirements.
- b. Test performed. Tests shall be performed as specified in 2c and 2d using test variation 3 specified in Table I. A minimum of 6 socket termini and 6 pin termini shall be tested.
- c. Termini insertion and removal force test.
 - (1) Test method. Non-terminated pin and socket termini shall be inserted into a previously certified connector using a terminus insertion tool. Measure the force required to insert each terminus. A terminus removal tool shall then be engaged to unlock each terminus. Measure the force required to remove each unlocked termini.
 - (2) Test requirement. The termini insertion force and the force required to remove unlocked termini shall not exceed 98 N (22.0 lb).
- d. Termini retention force test.
 - (1) Test method. Test shall be performed on non-terminated pin and socket termini one at a time. Terminus shall be inserted into a previously certified connector. An axial compressive load shall be applied to the front face of the terminus tending to push the terminus to the rear of the connector insert. A pre-load not greater than 13.3 N (3 lb) may be used to seat the terminus for the initial measurement. Axial loads shall be applied at a rate of 4.4 N/s (1.0 lb/s) up to a maximum load 98 N (22.0 lb). The maximum load shall be maintained for at least 5 seconds.
 - (2) Test requirement. Termini shall be retained in their inserts up to a maximum load of 98 N (22.0 lb).

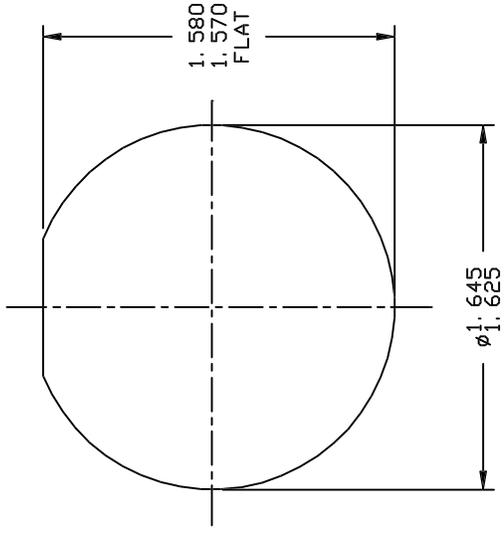
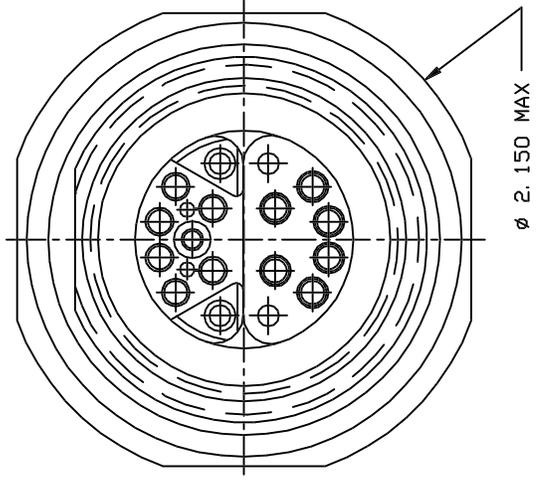
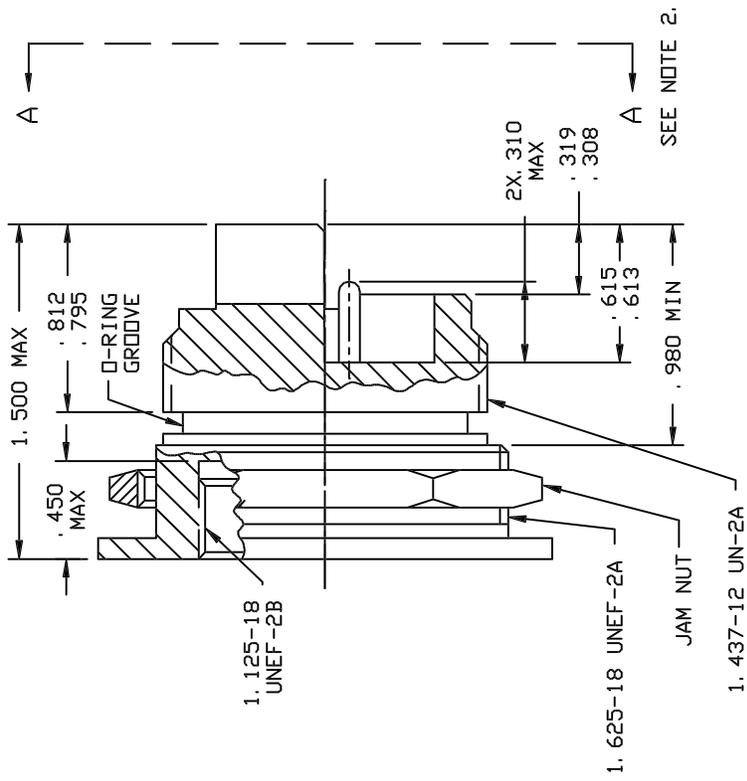
3. Installation and removal tools inspection. Tools supplied shall be listed on NAVSEA Drawings 6872813 and 7325763. Tools shall be used during termini/connector assembly and testing to verify performance.

APPENDIX B

FIBER OPTIC MULTIPLE REMOVABLE TERMINI CONNECTOR
INTERCHANGEABILITY DIMENSIONS

This appendix has the figures with interchangeability dimensions for the connector and dust cover as listed in the following table:

<u>Figure Number</u>	<u>Description</u>
1	Interchangeability Dimensions For Jam Nut Mounted Receptacle
2	Interchangeability Dimensions For Cable Plug - In Forward Position
3	Interchangeability Dimensions For Cable Plug - In Back Position
4	Interchangeability Dimensions For 6 Termini Front Face Configuration (Common For Cable Plug And Jam Nut Mounted Receptacle)
5	Interchangeability Dimensions For 8 Termini Front Face Configuration (Common For Cable Plug And Jam Nut Mounted Receptacle)
6	Interchangeability Dimensions For 12 Termini Front Face Configuration (Common For Cable Plug And Jam Nut Mounted Receptacle)
7	Interchangeability Dimensions For Detachable Socket Insert And Alignment Sleeve (Common For Cable Plug And Jam Nut Mounted Receptacle)
8	Interchangeability Dimensions For Insert Cavity Configuration
9	Interchangeability Dimensions For Dust Cover, Jam Nut Mounted Receptacle
10	Interchangeability Dimensions For Dust Cover, Cable Plug



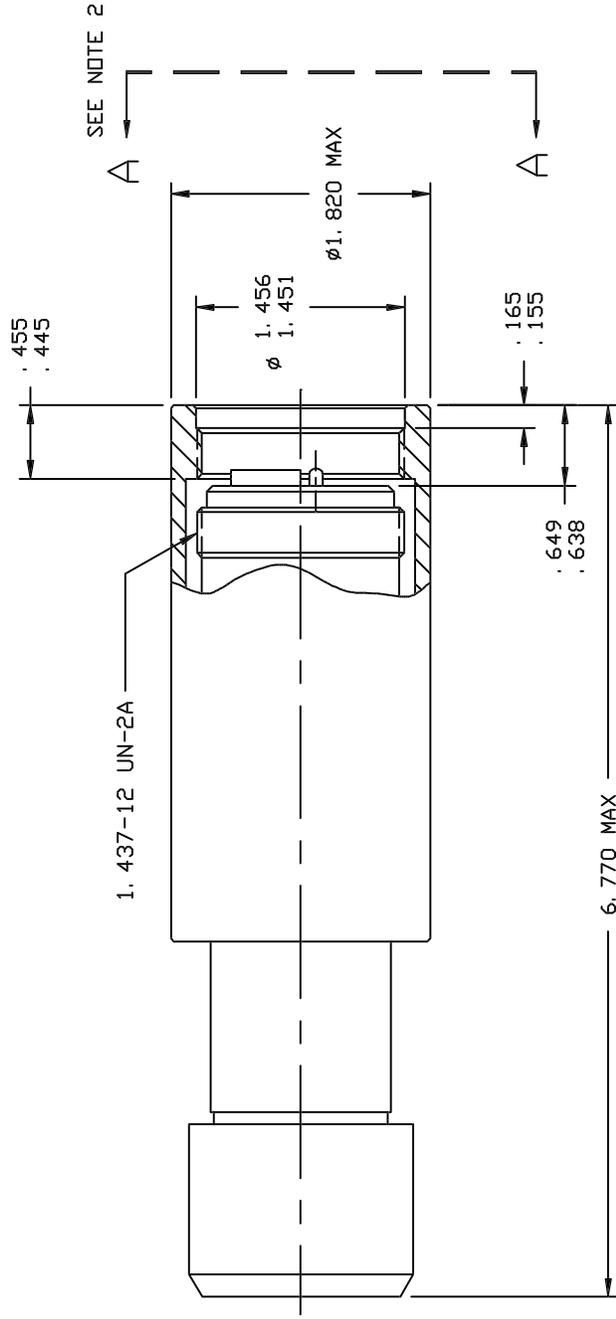
PANEL CUTOUT
.150 MAX THICKNESS

FIGURE 1.
INTERCHANGEABILITY DIMENSIONS FOR
JAM NUT MOUNTED RECEPTACLE

1. DIMENSIONS ARE IN INCHES.
2. FOR VIEW OF FRONT FACE SEE FIGURES 4, 5 & 6.

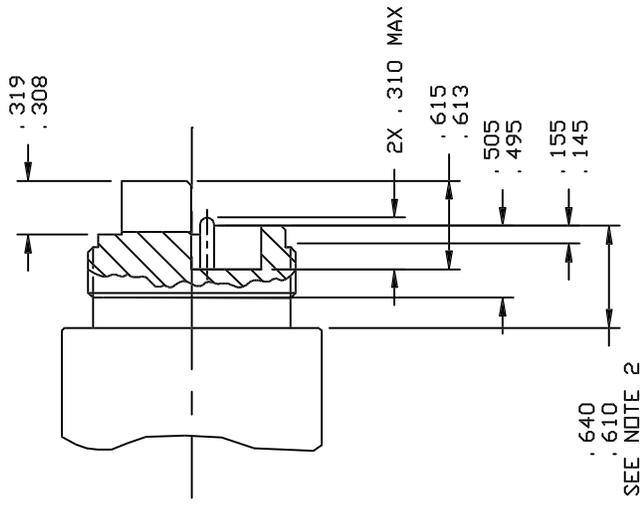
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DATE : 7-31-99



1. DIMENSIONS ARE IN INCHES.
2. FOR VIEW OF FRONT FACE SEE FIGURES 4, 5 & 6.

FIGURE 2.
INTERCHANGEABILITY DIMENSIONS FOR CABLE PLUG
- IN FORWARD POSITION

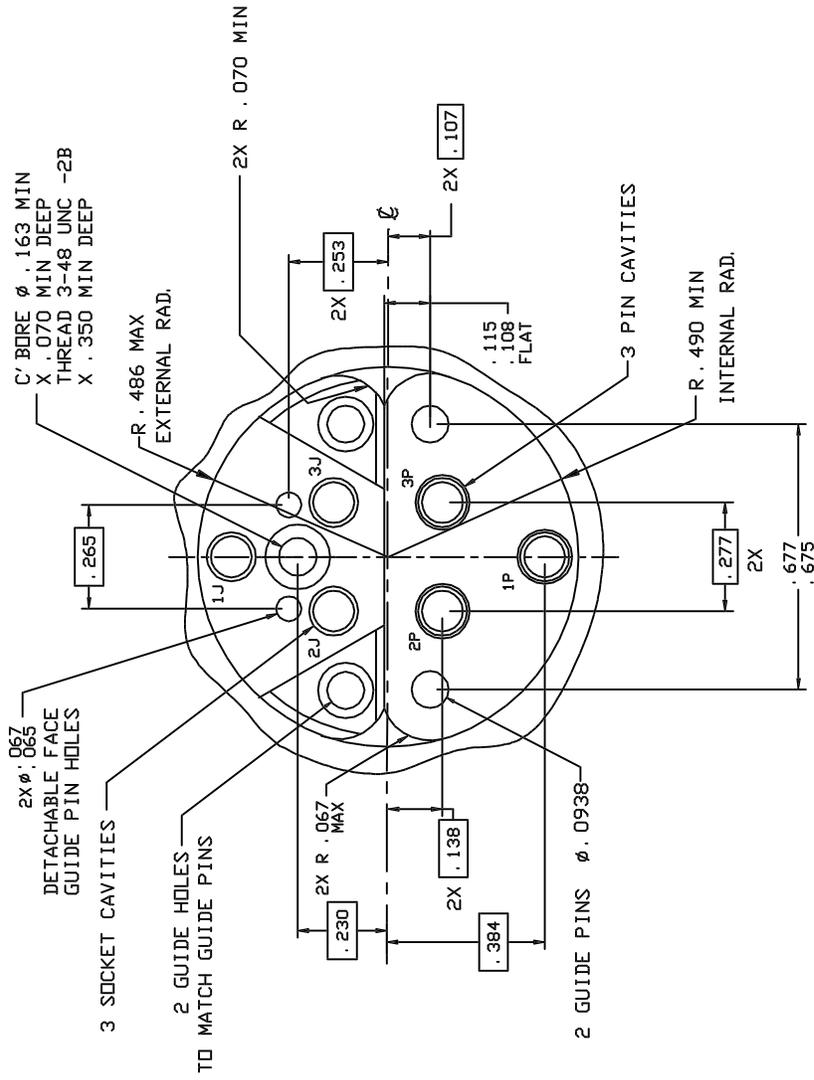


1. DIMENSIONS ARE IN INCHES.
2. TO ACCOMMODATE A VARYING POSITION PLUG TO PLUG FOR SEALING.

FIGURE 3.
INTERCHANGEABILITY DIMENSIONS FOR CABLE PLUG
- IN BACK POSITION

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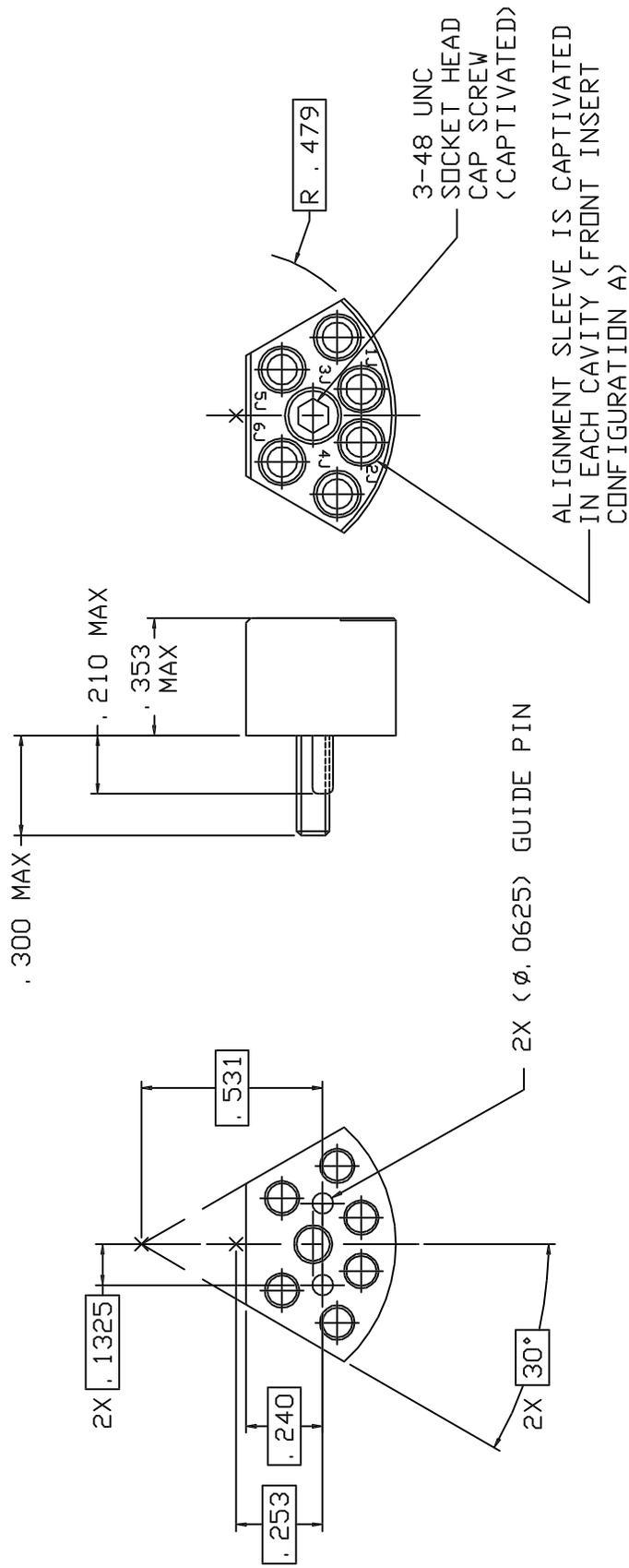
DATE : 7-31-99



VIEW A-A

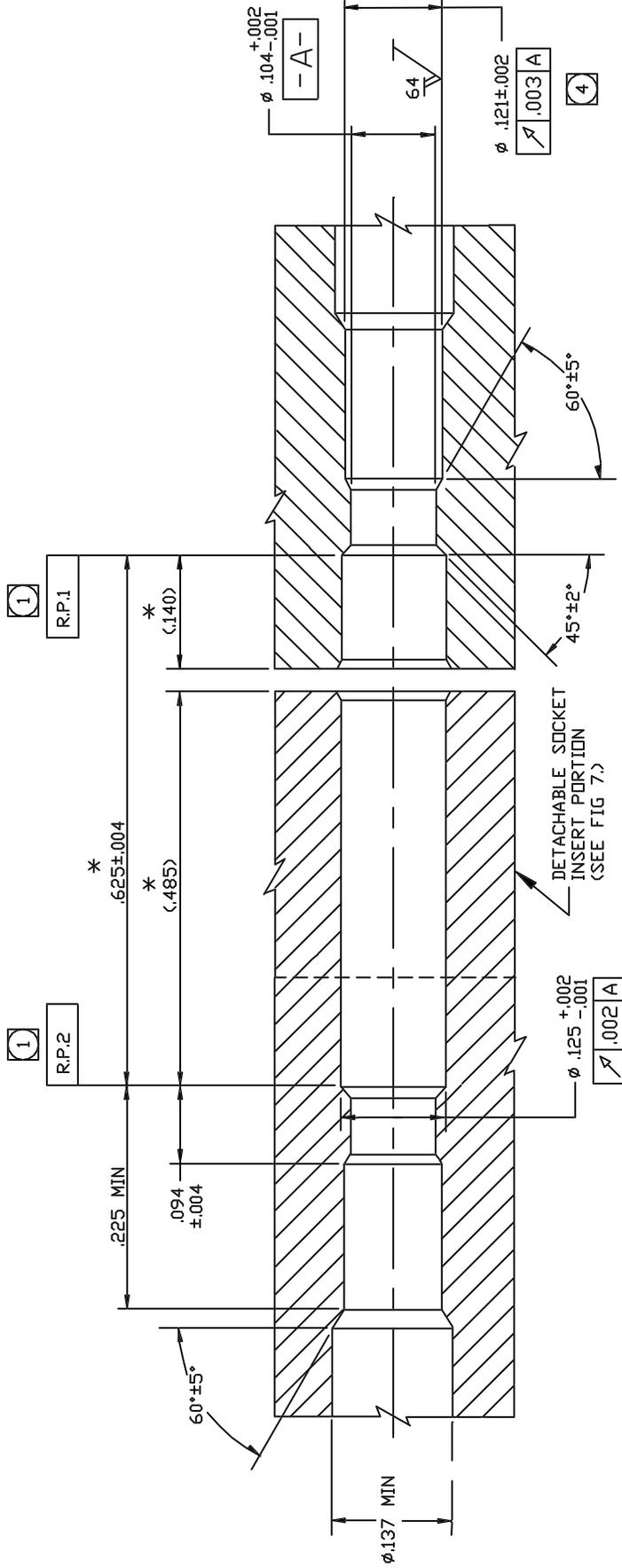
1. DIMENSIONS ARE IN INCHES.

FIGURE 4
INTERCHANGEABILITY DIMENSIONS FOR
6 TERMINI FRONT FACE CONFIGURATION
(COMMON FOR CABLE PLUG AND JAM NUT MOUNTED RECEPTACLE)



1. DIMENSIONS ARE IN INCHES.

FIGURE 7
INTERCHANGEABILITY DIMENSIONS FOR
DETACHABLE SOCKET INSERT AND ALIGNMENT SLEEVE
<COMMON FOR CABLE PLUG AND JAM NUT MOUNTED RECEPTACLE>

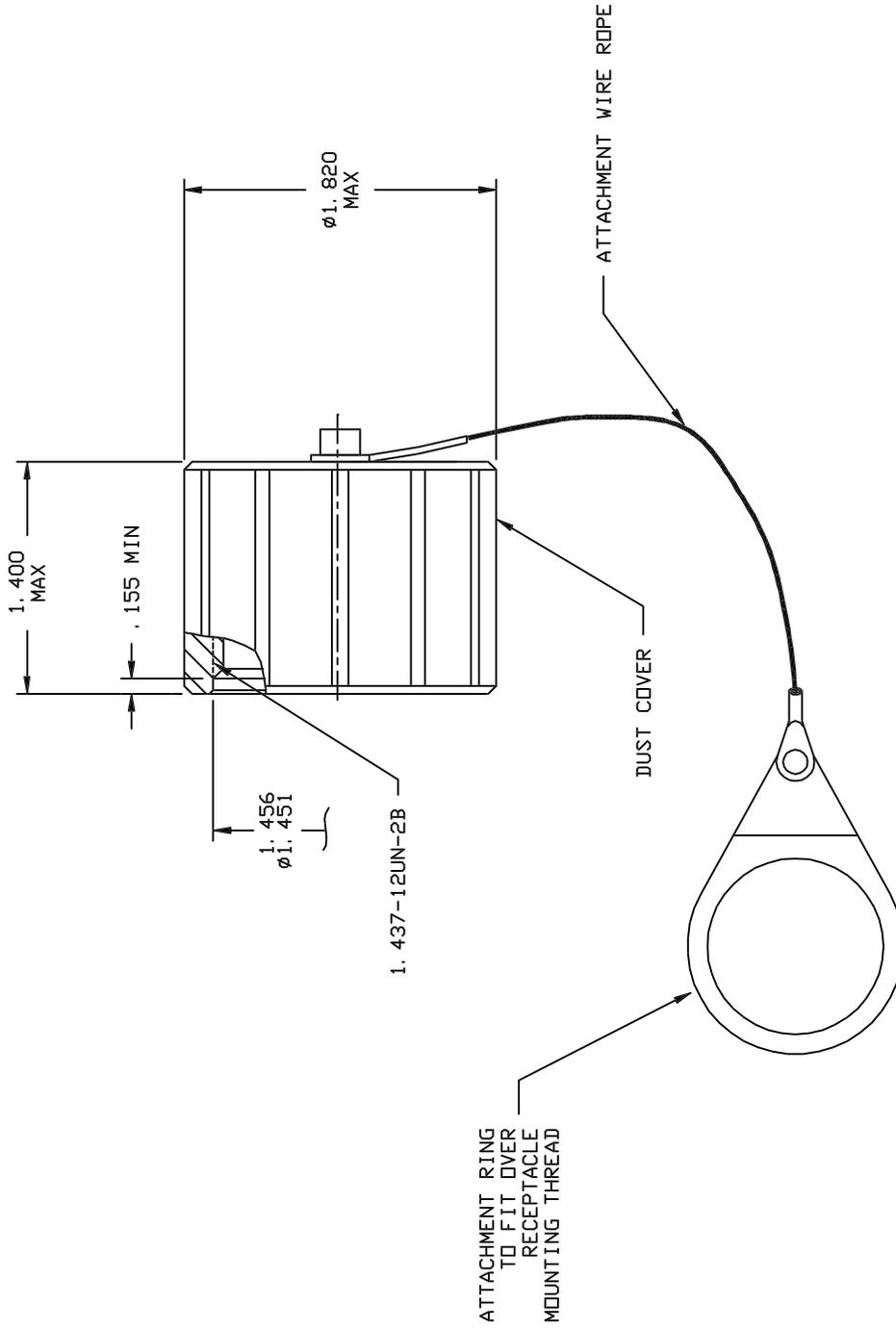


SOCKET CAVITY

PIN CAVITY

5. DIMENSIONS ARE IN INCHES.
- 4 TERMINUS SEALING SURFACE.
3. DIMENSIONS SHOWN ARE TYPICAL FOR PIN AND SOCKET CAVITIES EXCEPT THOSE NOTED WITH AN ASTERISK (*).
2. MATING CAVITIES TO BE ALIGNED: $\oplus \ominus \phi 010$
- 1 PIN TERMINI PROTRUDE .378 FROM R.P.1
SOCKET TERMINI WITH ALIGNMENT SLEEVE
PROTRUDE .423 FROM R.P.2

FIGURE 8
INTERCHANGEABILITY DIMENSIONS FOR
INSERT CAVITY CONFIGURATION

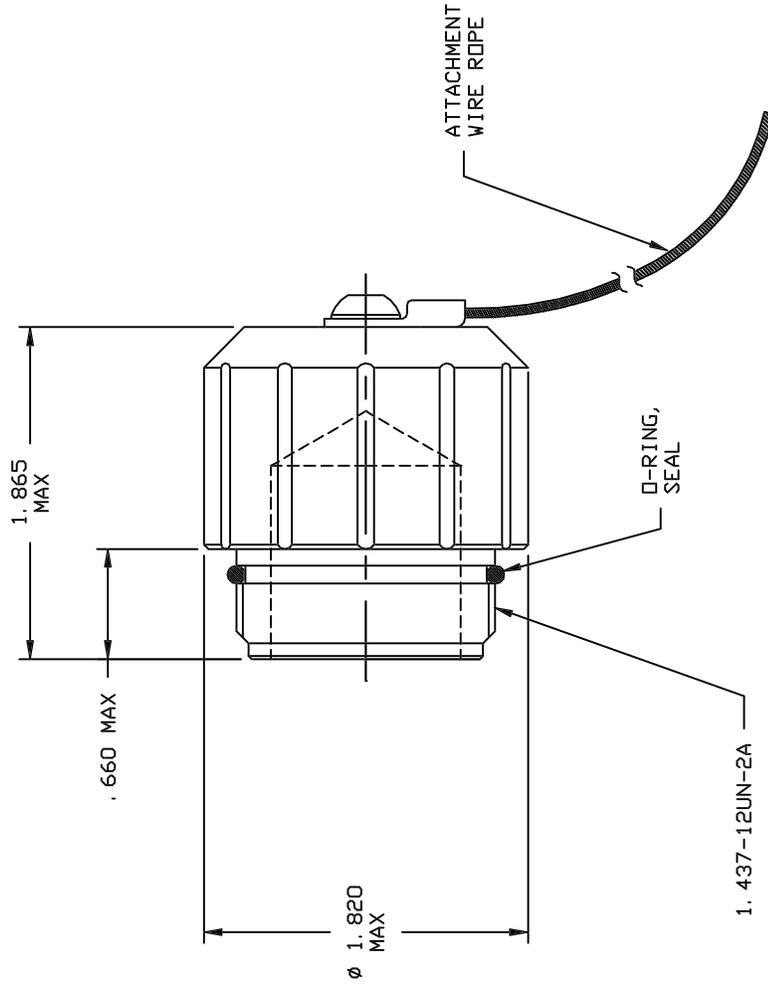


1. DIMENSIONS ARE IN INCHES.

FIGURE 9
INTERCHANGEABILITY DIMENSIONS FOR
DUST COVER, JAM NUT MOUNTED RECEPTACLE

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APPENDIX B

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1. DIMENSIONS ARE IN INCHES.

FIGURE 10
INTERCHANGEABILITY DIMENSIONS
FOR DUST COVER, CABLE PLUG