

REVISIONS			
SYMBOL	DESCRIPTION	DATE	APPROVAL
A	Revised & REDRAWN	6/3/91	<i>[Signature]</i>

**SHEET REVISION STATUS**

SH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
REV	A	A	A	A	A	A	A	A	A	A	A	A	A								
SH	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
REV																					

ORIGINATOR <i>[Signature]</i> /GSFC	DATE 5/20/91	FSC: 5935
APPROVED <i>[Signature]</i>	—	CONTACTS, ELECTRICAL, COAXIAL, AND HIGH VOLTAGE FOR ELECTRICAL CONNECTORS
CODE 311 APPROVAL <i>[Signature]</i> /GSFC	5/20/91	
CODE 311 SUPERVISORY APVL <i>[Signature]</i>	5.20.91	
ADDITIONAL APPROVAL		S-311-P-4/06

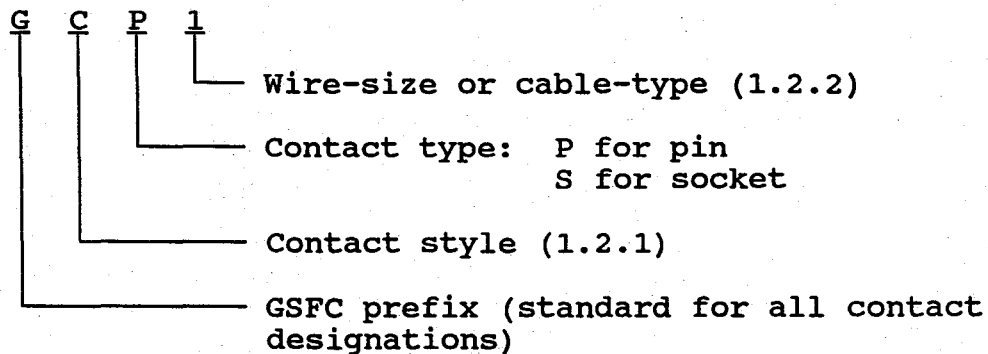
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION  
 GODDARD SPACE FLIGHT CENTER  
 GREENBELT, MARYLAND 20771

CAGE CODE: 25306 PAGE 1 OF 13

1. SCOPE.

1.1 Purpose. This specification delineates the requirements for rear-insertable and rear removable contacts for use with electrical connectors covered by GSFC specifications S-311-P-10 and S-311-P-4/05.

1.2 Contact-type designation. Contacts shall be of the following type designations, and shall be ordered by their type designation only. See Table II for listing of standard designs.



1.2.1 Contact style. Select contact style from Table I.

Table I. Contact style and attachment method

	CONTACT STYLE	Method of Attachment	
		Solder	Crimp
COAXIAL (1) Straight Right Angle	C CR	Center Conductor Center Conductor	Braid Braid
HIGH VOLTAGE Straight Right Angle	H HR	X X	Not Applicable Not Applicable

(1) Although the coaxial contacts are coaxial in design, they are not considered constant impedance connectors (i.e., their impedance is not controlled); application of these contacts should be limited to shield-through connections.

1.2.2 Wire-size or cable-type accommodation. Select the wire size or cable type from Table II.

## 2. APPLICABLE DOCUMENTS

- 2.1 Documents. The applicable documents, of the issue in effect on the date of invitation for bid or request for proposal, form a part of this specification to the extent specified herein.

### Federal Specifications

QQ-B-626	Brass, Leaded and Nonleaded, Rod, Shapes, Forgings, and Flat Products with finished edges (Bar, Flat wire, & Strip)
QQ-C-530	Copper-Beryllium Alloy, Bars, Rods and Wire
QQ-C-533	Copper-Beryllium Alloy Strip
QQ-N-290	Nickel Plating (Electrodeposited)

### Military Specifications and Standards

MIL-STD-105	Sampling Procedure and Tables
MIL-C-17	Cables, Radio Frequency, Coaxial
MIL-C-14550	Copper Plating (Electrodeposited)
MIL-G-45204	Gold Plating (Electrodeposited)

### Other Specifications

#### NASA/Goddard Space Flight Center

S-311-P-10	Connectors, Electrical, Miniature, Polarized Shell, Rack and Panel, for Space Flight Use.
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#### American Society for Testing and Materials

ASTM B-139	Standard Specification for Phosphor Bronze
ASTM D1710	Standard Specification for TFE-Fluorocarbon Rod
ASTM D4066	Standard Specification for Nylon Injection and extrusion Materials
ASTM E595	Materials from Outgassing in a Vacuum Environment, Standard Test Method for

- 2.2 Order of precedence. In the event of conflict between the text of this specification and reference cited herein, the text of this specification will take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been granted.

2.3 Copies of documents. Copies of federal and military documents may be obtained from the Standardization Document Order Desk, 700 Robbins Avenue, Building #4-Section D, Philadelphia, PA 19111-5094. Copies of ASTM publications are available from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

### 3. REQUIREMENTS

3.1 General. The general requirements of S-311-P-10 shall be met. In addition, individual contacts shall meet the requirements of this specification.

3.2 Materials, design and construction. The contacts shall be of the material, design, construction and physical dimensions as specified herein. All contacts shall be designed to permit individual insertion and removal from connectors with use of manufacturer-approved tools. Contacts shall be constructed to be used with connectors conforming to S-311-P-10.

#### 3.2.1 Coaxial contacts.

3.2.1.1 Design. Coaxial contacts shall meet the applicable requirements of this specification. Center contacts shall be captivated. The contacts shall meet the physical dimensions as specified in figures 1 - 4.

#### 3.2.1.2 Materials.

3.2.1.2.1 Outer conductor. Plug outer contacts shall be brass in accordance with QQ-B-626, Alloy 360. Receptacle outer contacts shall be beryllium copper in accordance with QQ-C-530.

3.2.1.2.2 Center conductor. Pin center contact shall be brass in accordance with QQ-B-626, Alloy 360. Socket center contacts shall be phosphor bronze in accordance with ASTM B-139, Alloy B2.

3.2.1.2.3 Retaining ring. The retaining ring shall be beryllium copper in accordance with QQ-C-530 or QQ-C-533.

3.2.1.2.4 Dielectric. The insulator shall be teflon in accordance with ASTM D1710.

3.2.1.3 Finishes. All metal parts (except retaining ring) shall be gold plated in accordance with MIL-G-45204, type II, grade C over copper plate in accordance with MIL-C-14550, 0.000050 inch thick, minimum. The retaining ring shall be nickel plated in accordance with QQ-N-290, 0.000040 inch thick minimum.

3.2.2 High voltage contacts.

3.2.2.1 Design. High voltage contacts shall meet the applicable requirements of this specification. The contacts shall meet the physical dimensions as specified in figures 5-8 .

3.2.2.2 Materials.

3.2.2.2.1 Contacts. Pin contacts shall be brass in accordance with QQ-B-626, Alloy 360-HH. Socket contacts shall be phosphor bronze in accordance with ASTM B-139, Alloy B2.

3.2.2.2.2 Retaining ring. The retaining ring shall be beryllium copper in accordance with QQ-C-530 or QQ-C-533.

3.2.2.2.3 Dielectric. Insulators shall be nylon in accordance with ASTM D4066.

3.2.2.3 Finishes. All metal parts (except the retaining ring) shall be gold plated in accordance with MIL-G-45204, type II, grade C over copper plate in accordance with MIL-C-14550, 0.000050 inch thick, minimum. The retaining ring shall be nickel plated in accordance with QQ-N-290, 0.000040 inch thick minimum.

3.3 Performance. The requirements of S-311-P-10 shall be met, except as specified herein.

3.3.1 Gold-plating thickness. When tested in accordance with 4.2.1, the gold plating thickness shall be as specified herein. The sample of contacts shall be withdrawn from each lot and subjected to the gold plating thickness test. Sample quantity shall be in accordance with MIL-STD-105, S-4 sampling level, 1% AQL level.

3.3.2 Residual magnetism. When tested in accordance with 4.2.2, the residual magnetism shall not exceed a gamma level greater than one-tenth (1/10) times the number of contacts. The contacts shall not exceed 500 per group. This test shall only be performed when contacts are procured separate from the connector as specified in S-311-P-10.

4. QUALITY ASSURANCE PROVISIONS

4.1 The Quality Assurance Provision of S-311-P-10, except where modified herein shall be met.

4.2 Test methods.

4.2.1 Plating thickness. Plating thickness shall be measured in accordance with MIL-G-45204.

4.2.2 Residual magnetism. Residual magnetism testing shall be in accordance with S-311-P-10.

5. PACKAGING. Packaging shall be in accordance with S-311-P-10.

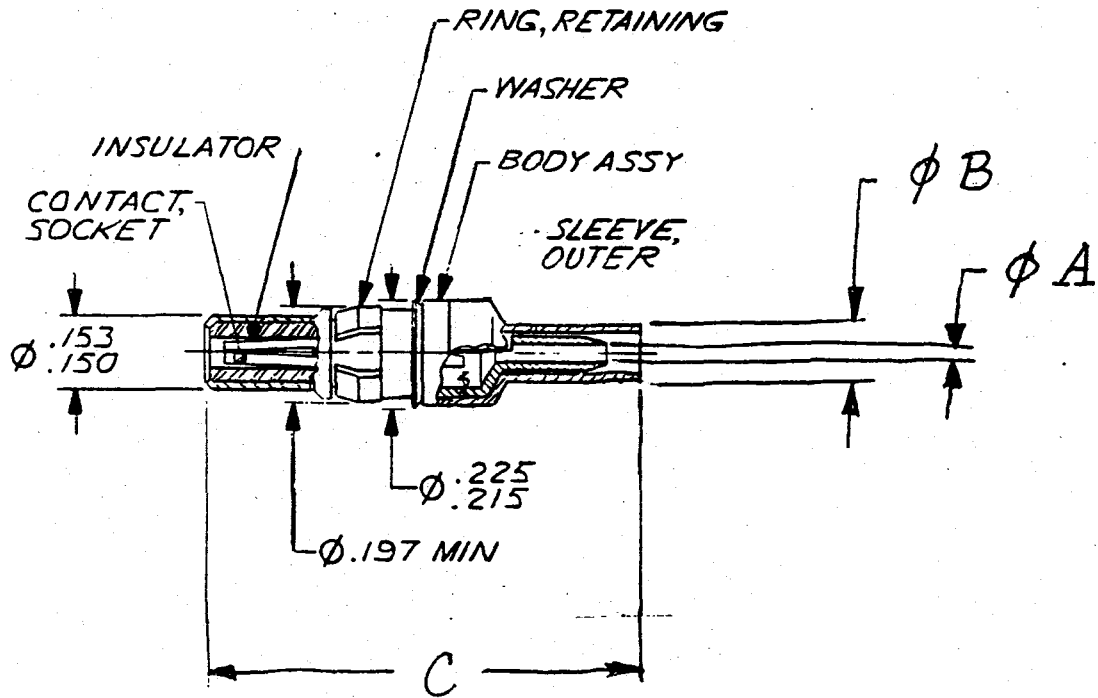
6. NOTES. None.

**TABLE II - DESIGN STANDARDS**

Contact-type Designation <u>1/</u>	Wire Size or Cable Type <u>2/</u>		Figure
	OLD	NEW	
GCP1	RG-196/U	RG-178B/U	1
GCP2	RG-187/U	RG-179B/U	1
	RG-188/U	RG-316B/U	1
GCP3	RG-195/U	RG-180B/U	1
GCP4	RG-58/U	RG-58B/U	1
GCRP1	RG-196/U	RG-178B/U	3
GCRP2	RG-187/U	RG-179B/U	3
	RG-188/U	RG-316B/U	3
GCRP3	RG-195/U	RG-180B/U	3
GCRP4	RG-58/U	RG-58B/U	3
GCS1	RG-196/U	RG-178B/U	2
GCS2	RG-187/U	RG-179B/U	2
	RG-188/U	RG-316B/U	2
GCS3	RG-195/U	RG-180B/U	2
GCS4	RG-58/U	RG-58B/U	2
GCRS1	RG-196/U	RG-178B/U	4
GCRS2	RG-187/U	RG-179B/U	4
	RG-188/U	RG-316B/U	4
GCRS3	RG-195/U	RG-180B/U	4
GCRS4	RG-58/U	RG-58B/U	4
GHP6	N/A	<u>3/</u>	5
GHS6	N/A	<u>3/</u>	6
GHRP6	N/A	<u>3/</u>	7
GHR6	N/A	<u>3/</u>	8

**NOTES:**

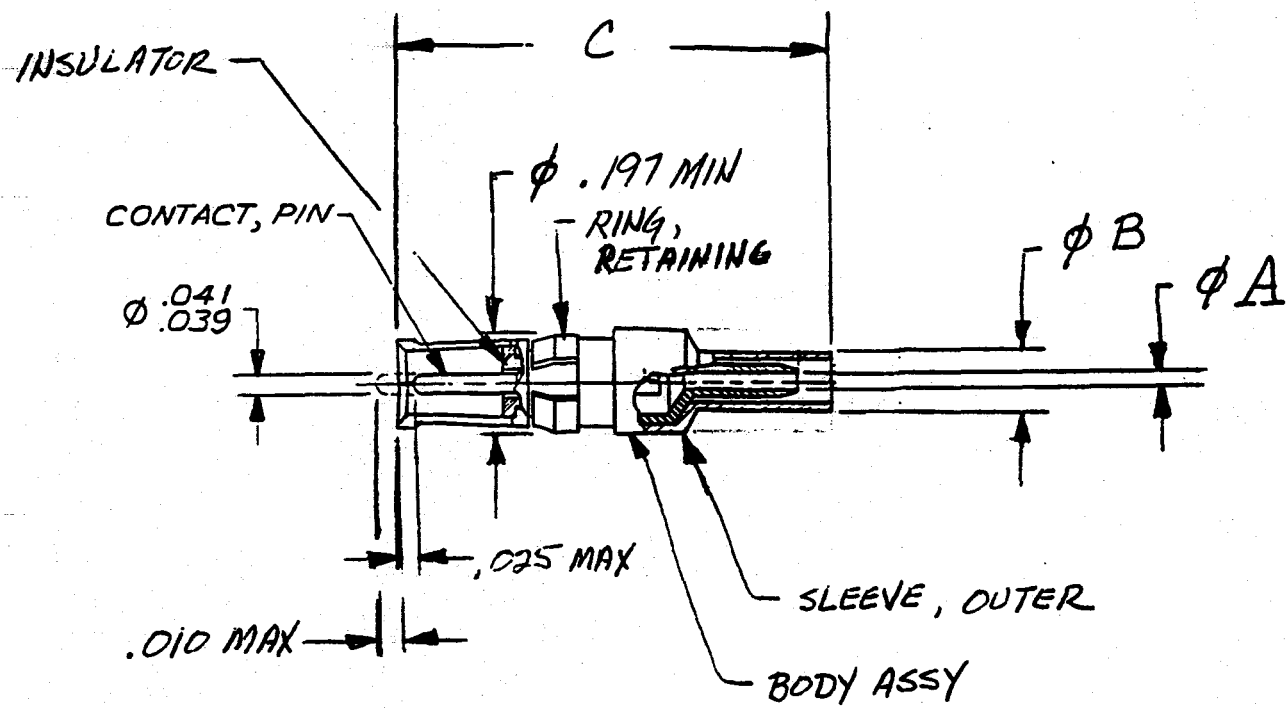
- 1/ Contact-type designation (see 1.2)
- 2/ Coaxial cable in accordance with MIL-C-17.
- 3/ High voltage contacts will accommodate conductor size AWG 20 and smaller.



Contact-type Designation	A $\pm 0.005$	B $\pm 0.005$	C $\pm 0.015$
GCP1	0.045	0.125	0.935
GCP2	0.067	0.150	0.935
GCP3	0.110	0.235	1.040
GCP4	0.125	0.235	1.040

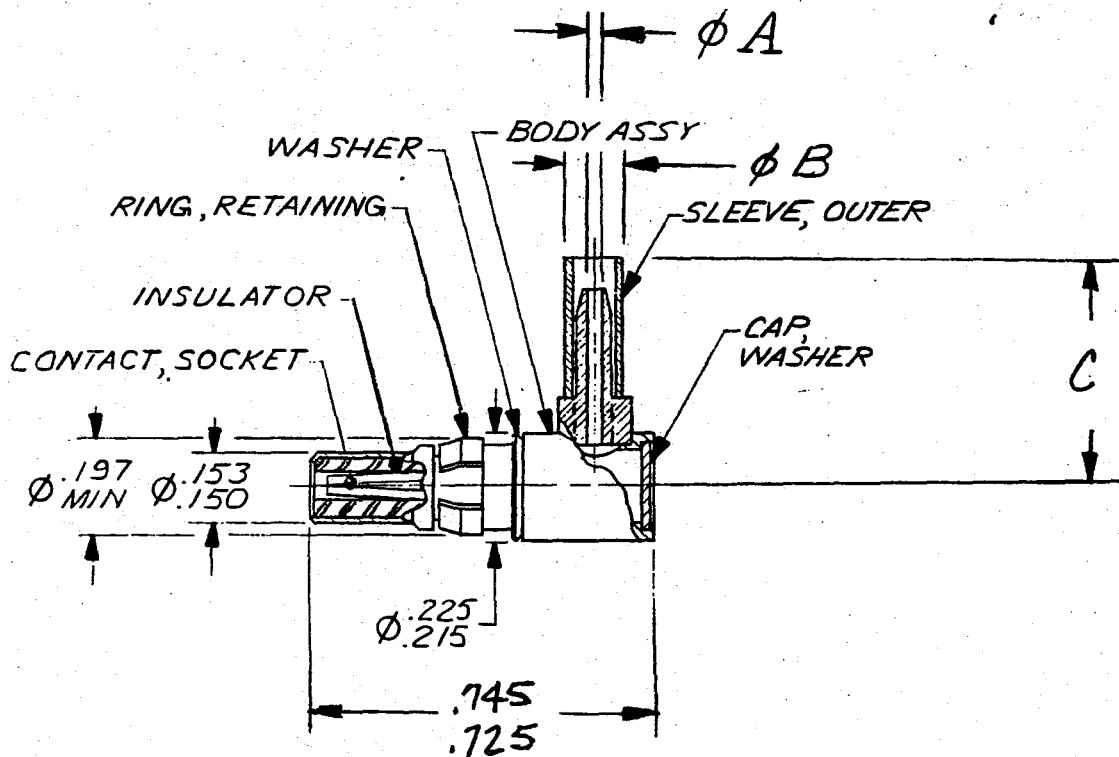
FIGURE 1 - STRAIGHT COAXIAL PLUG  
(SOCKET CENTER CONTACT)





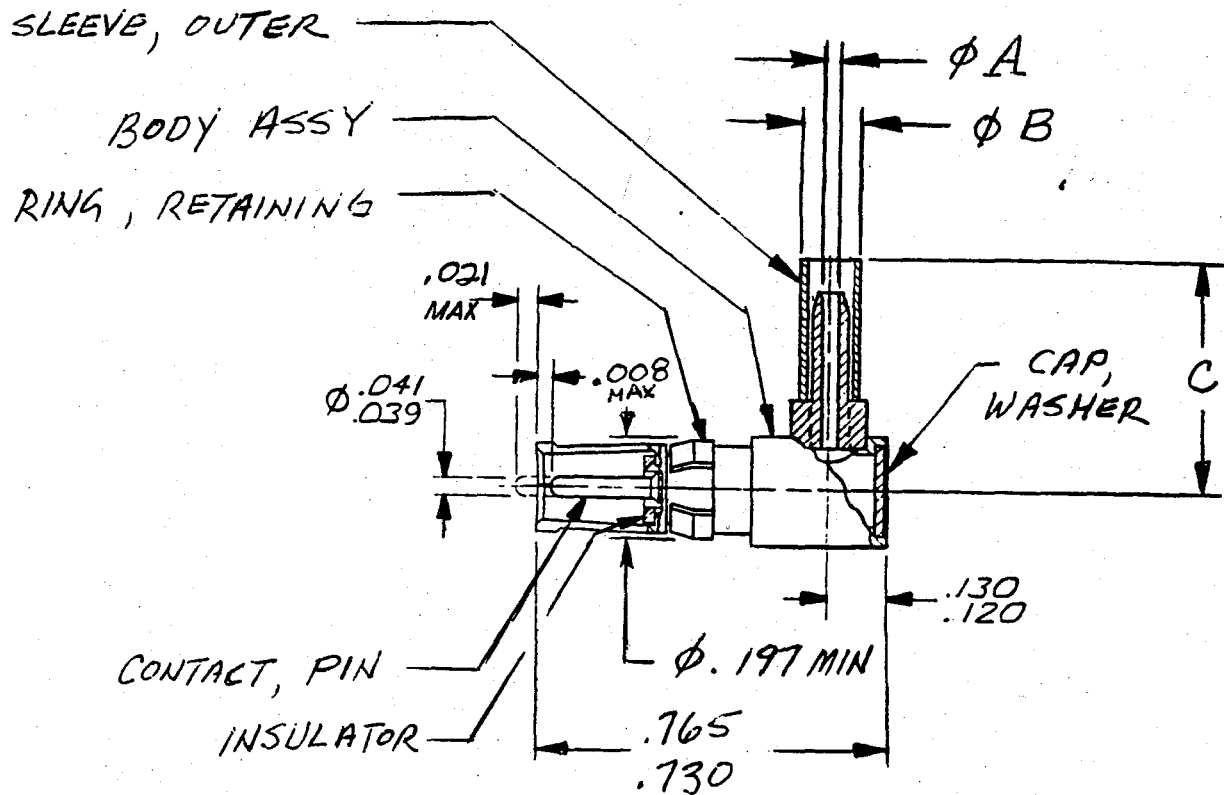
Contact-type Designation	A ± 0.005	B ± 0.005	C ± 0.012
GCS1	0.045	0.125	0.947
GCS2	0.067	0.150	0.947
GCS3	0.110	0.235	1.056
GCS4	0.125	0.235	1.056

FIGURE 2 - STRAIGHT COAXIAL RECEPTACLE  
(PIN CENTER CONTACT)



Contact-type Designation	A $\pm 0.005$	B $\pm 0.005$	C $\pm 0.020$
GCRP1	0.045	0.125	0.485
GCRP2	0.067	0.152	0.485
GCRP3	0.110	0.235	0.540
GCRP4	0.125	0.235	0.540

FIGURE 3 - RIGHT ANGLE COAXIAL PLUG  
(SOCKET CENTER CONTACT)



Contact-type Designation	A $\pm 0.005$	B $\pm 0.005$	C $\pm 0.020$
GCRS1	0.045	0.125	0.485
GCRS2	0.067	0.152	0.485
GCRS3	0.110	0.235	0.540
GCRS4	0.125	0.235	0.540

FIGURE 4 - RIGHT ANGLE COAXIAL RECEPTACLE  
(PIN CENTER CONTACT)

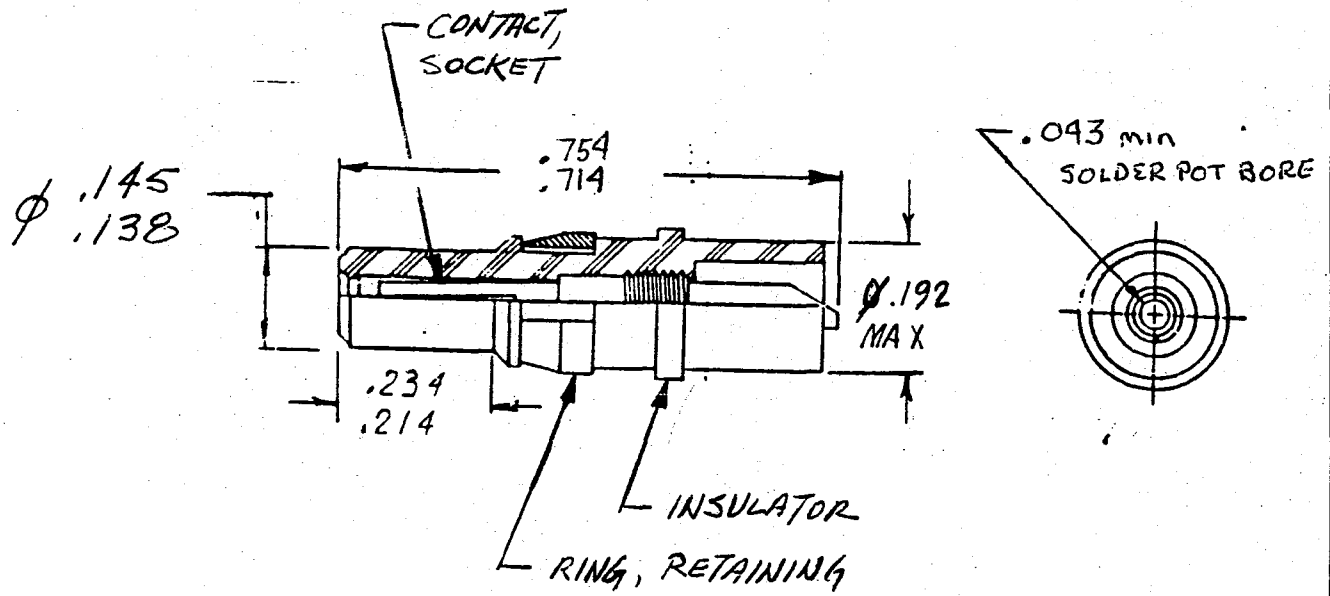


FIGURE 5 - STRAIGHT HIGH VOLTAGE PLUG (SOCKET CENTER CONTACT)

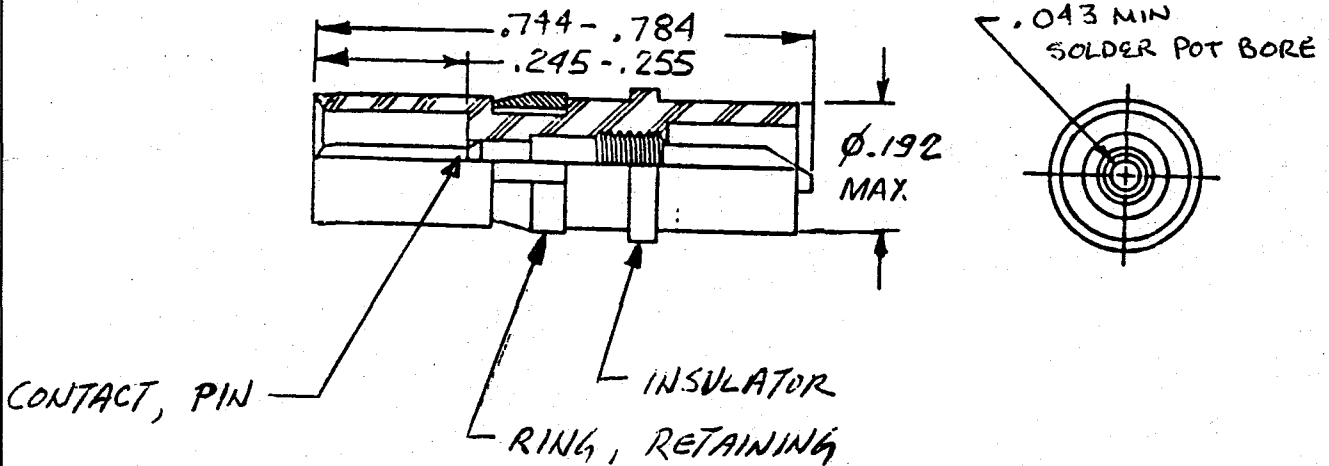


FIGURE 6 - STRAIGHT HIGH VOLTAGE RECEPTACLE (PIN CENTER CONTACT)

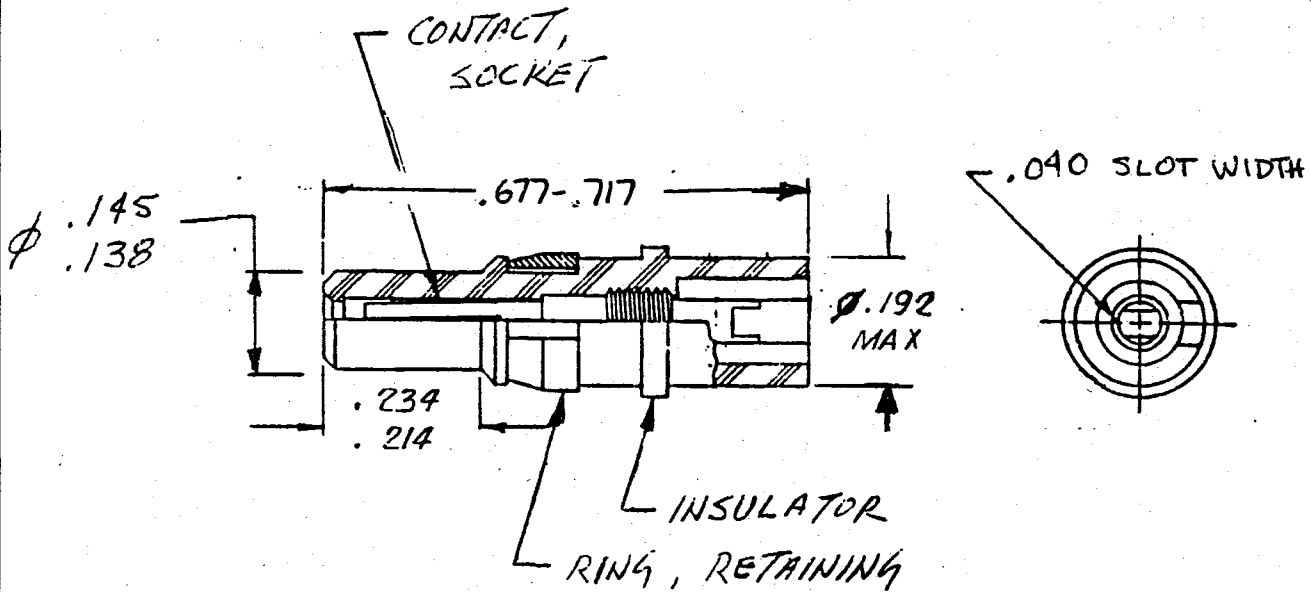


FIGURE 7 - RIGHT ANGLE HIGH VOLTAGE PLUG  
 (SOCKET CENTER CONTACT)

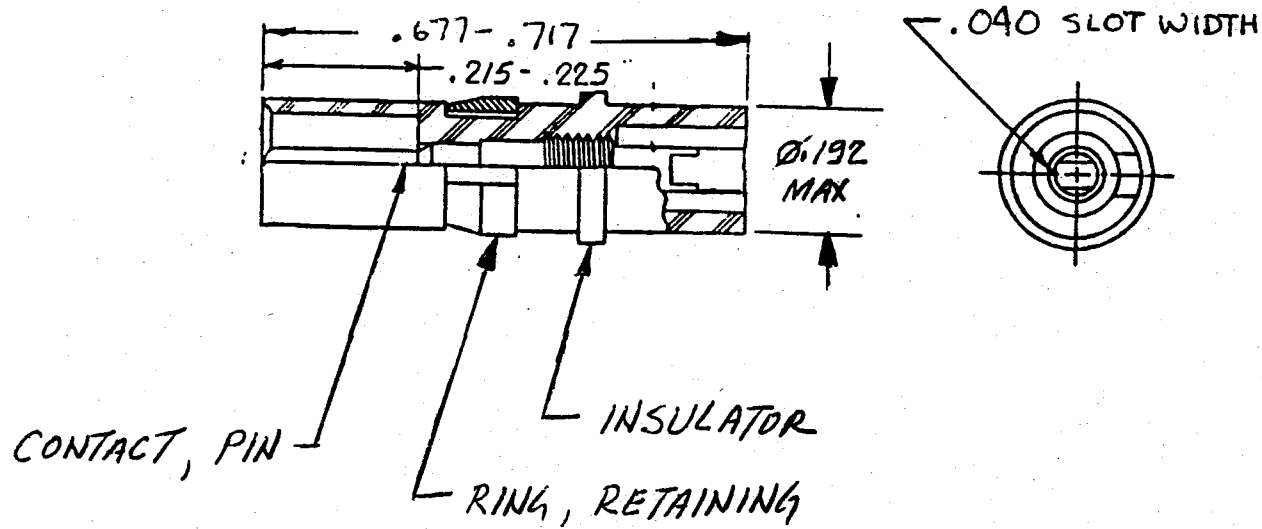


FIGURE 8 - RIGHT ANGLE HIGH VOLTAGE RECEPTACLE  
 (PIN CENTER CONTACT)