SAE International

SAE/USCAR-18 REVISION 3

Issued February 2002
Revised 2011-12

(R) FAKRA SMB RF CONNECTOR SUPPLEMENT

SUMMARY OF CONTENTS

QUESTIONS REGARDING THIS DOCUMENT: (248) 273-2470 FAX (248) 273-2494
TO PLACE A DOCUMENT ORDER: (724) 776-4970 FAX (724) 776-0790

1. SCOPE

This document is a supplement to SAE/USCAR 17 and is intended to give recommended usages for one and two way RF connectors and dimensional requirements for 2-way RF connectors and hybrid (RF & DC power) connectors which are not currently specified elsewhere. The radio frequency (RF) connector interface specified herein is suited for unsealed automobile applications up to 3 GHz and is intended for in-line, board mount, device mount, straight or angled applications. Dimensional requirements are specified in this document to ensure interchangeability. Performance requirements are specified in SAE/USCAR-2, and in SAE/USCAR-17.

2. REFERENCES

DIN 72594-1, - Road vehicles – Radio frequency interface – Dimensions and electrical requirements.

SAE/USCAR-2 Performance Specification for Automotive Electrical Connector Systems

SAE/USCAR-17 Performance Specification for Automotive RF Connector Systems

The SAE performance specs can be obtained from the following location:

SAE
400 Commonwealth Dr
Warrendale, PA 15096-0001
USA
www.sae.org

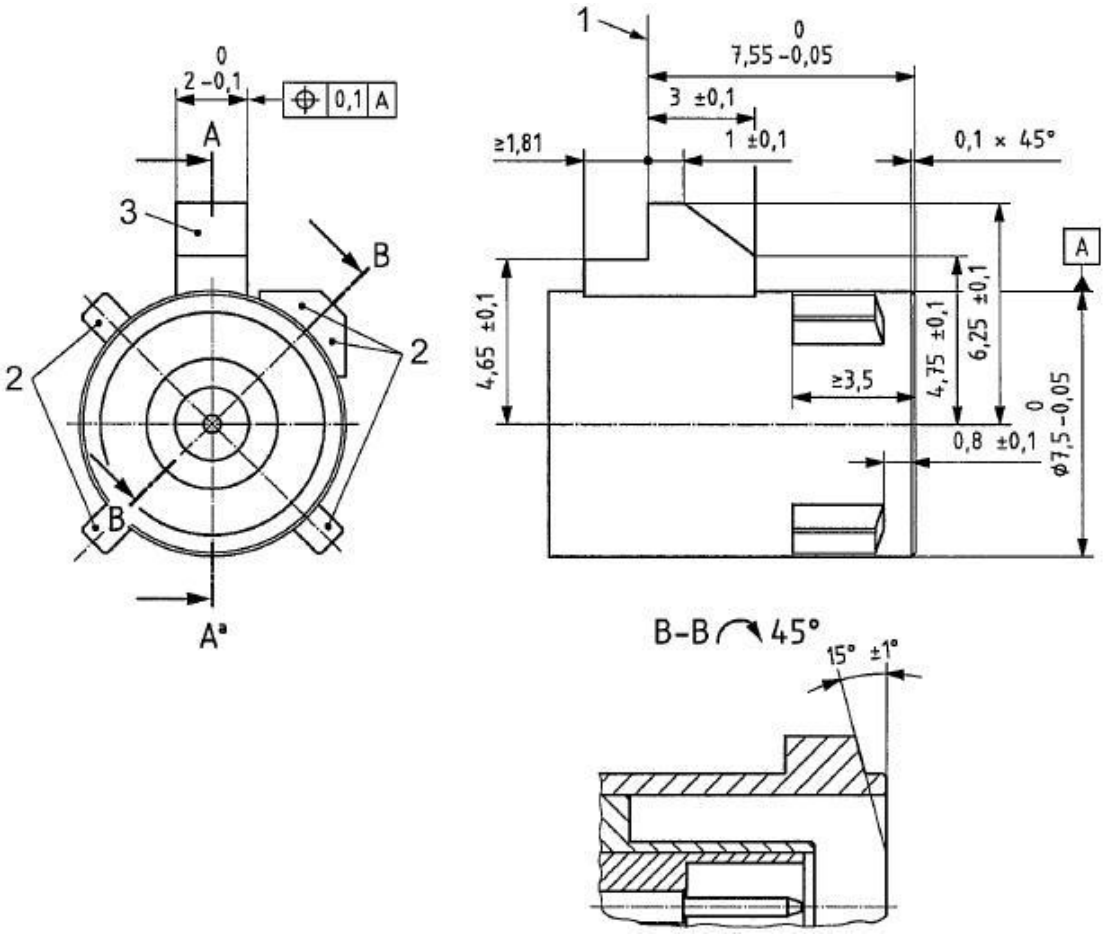
RAL RAL color charts are available from:

RAL
Sieburger Strasse 39
D-53757 Sankt Augustin
Telefon 49 22 41 - 16 05-0
Telefax 490 22 41 - 16 05-16
www.ral.de

Dorn Color, Inc.
11555 Berea Rd.
Cleveland, OH 44102
Phone: 216-634-2252
Fax: 216-634-2822
www.dorncolor.com

3. SINGLE CONTACT

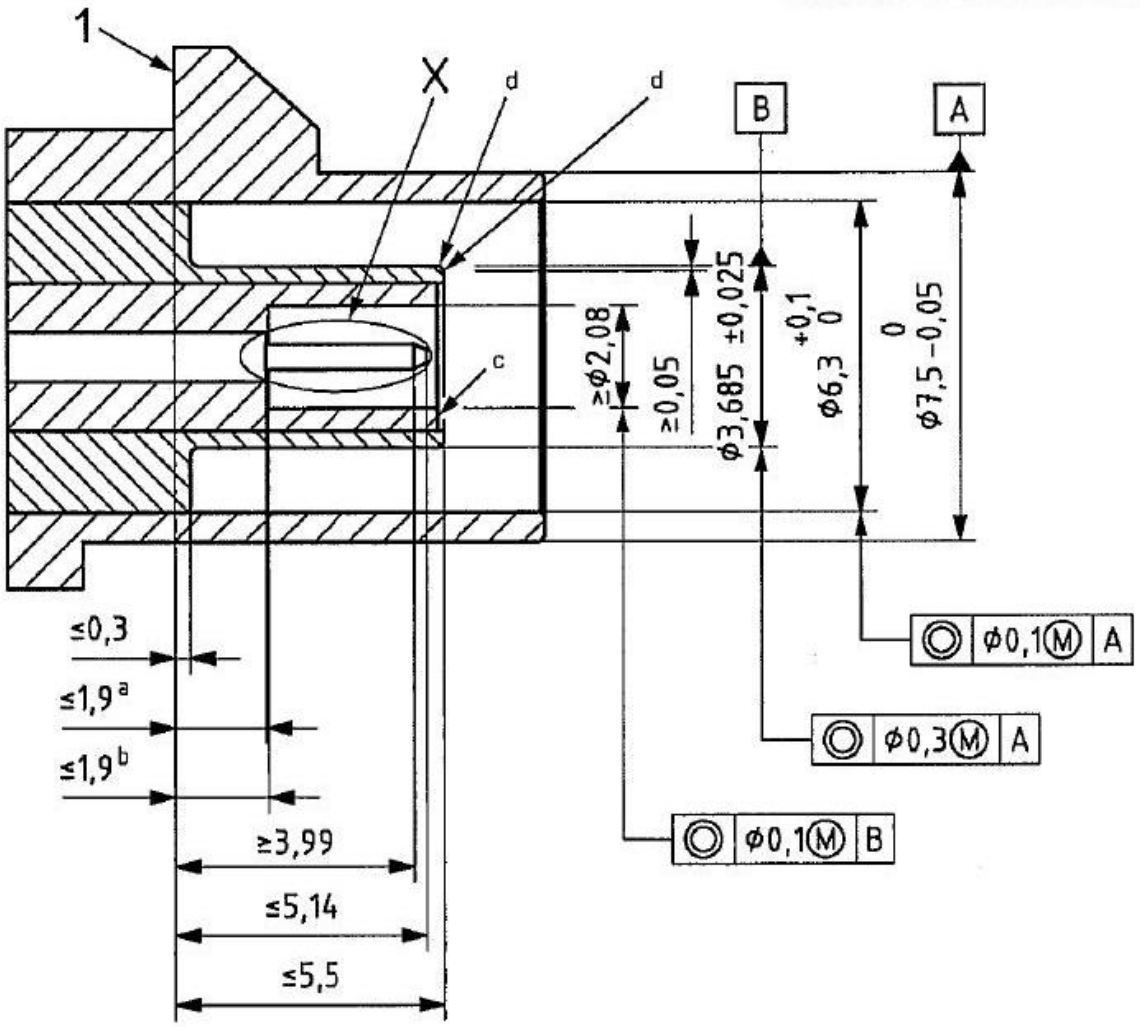
3.1 Male Connector Dimensions



KEY:

1 Reference Plane
2 Polarization Ribs (dimensions per Figure 5)
3 Locking Feature

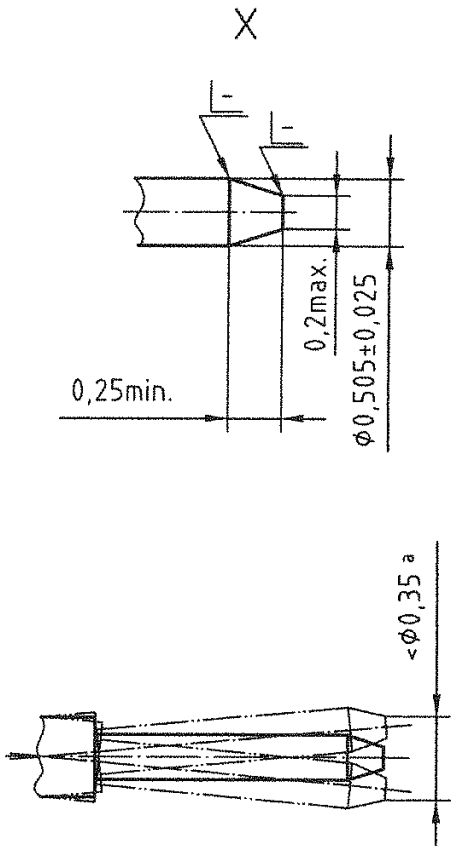
FIGURE 1: Male Connector Dimensions



KEY:

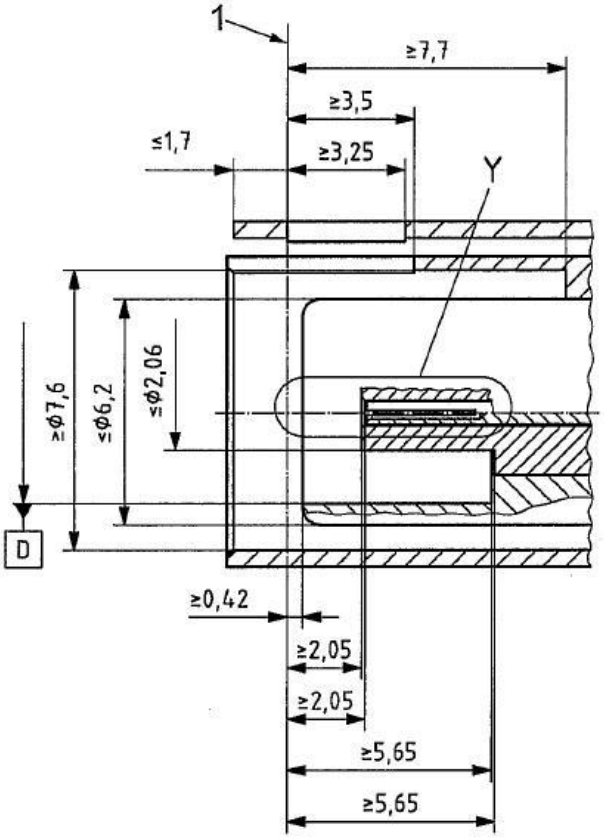
1 Reference Plane
- a Center Contact (See Detail X)
- b Dielectric Minimum Dimension
- c Dielectric must not extend past the front plane of the outer contact
- d No sharp burrs or edges

FIGURE 2: Male Cross Section



Detail X: Pin Dimensions

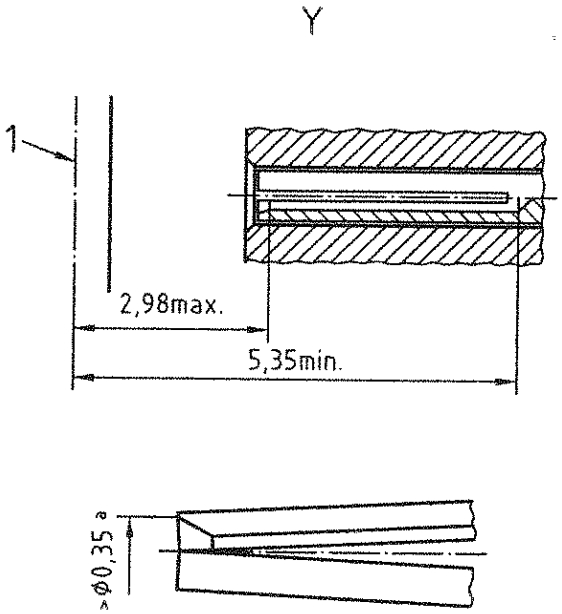
3.2 Female Connector Dimensions



KEY:

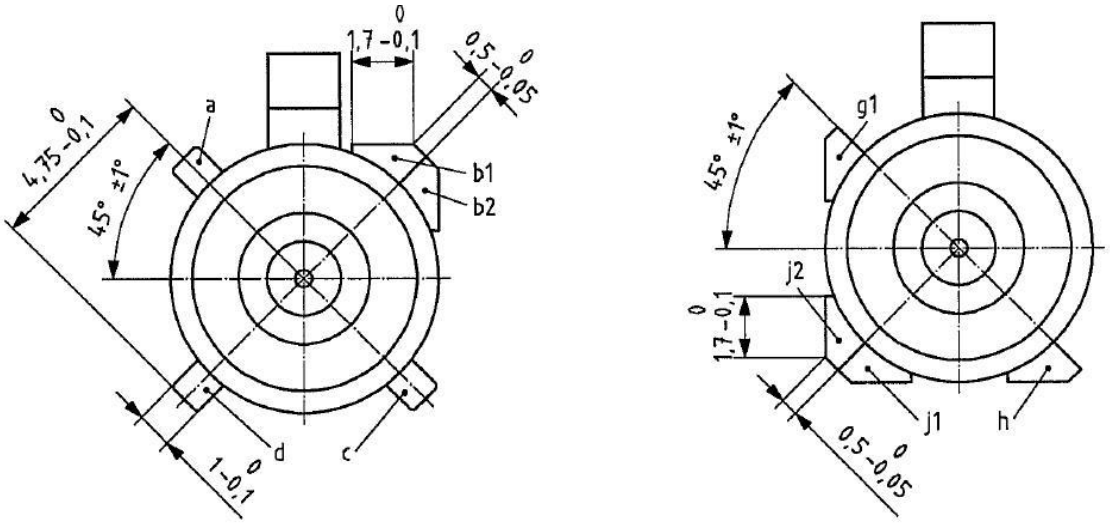
1 Reference Plane

FIGURE 3: Female Connector Dimensions



Detail Y: Female Contact

3.3 Polarizing Ribs



a) Ribs a, b1, b2, c, and d b) Ribs g1, h, j1, and j2

FIGURE 5: Polarizing Rib Dimensions

3.4 Color Coding and Applications

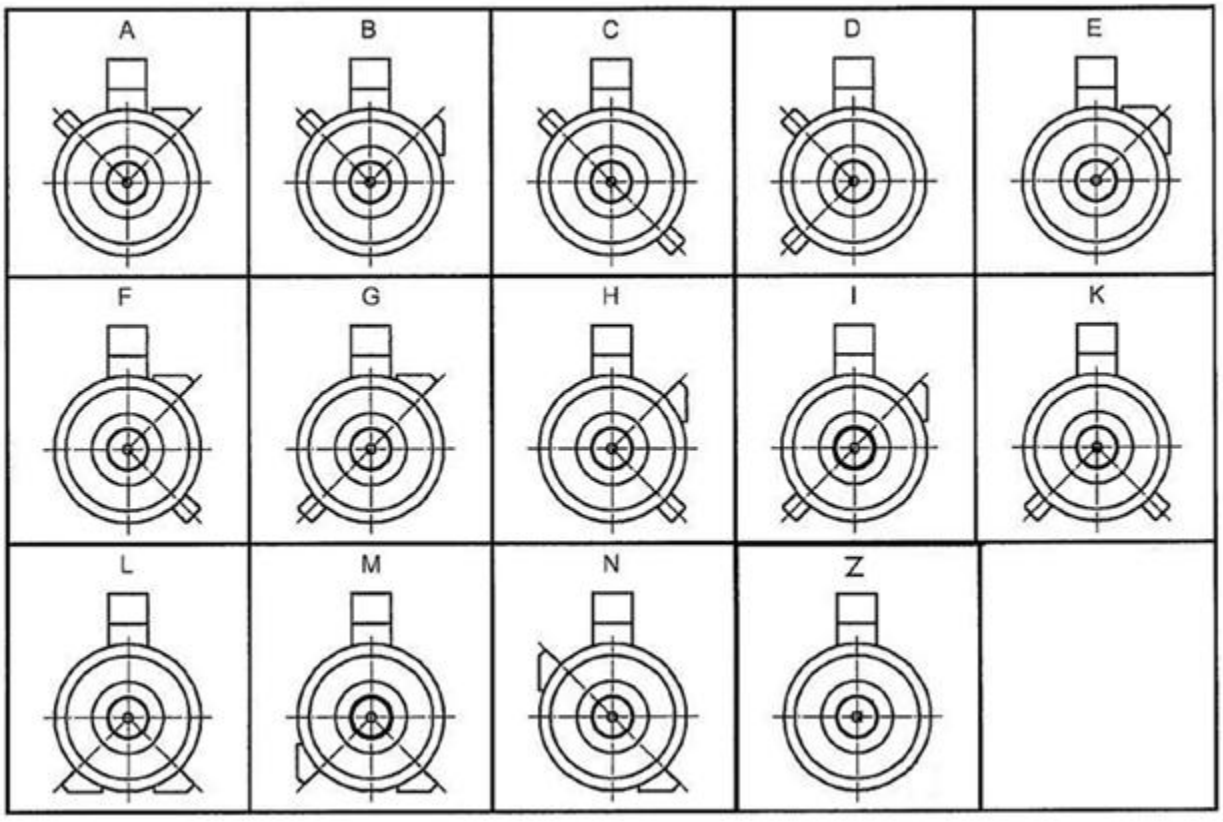


FIGURE 6: Mechanical Key Codes for Single Connectors

Coding	Rib Combination	Color	RAL No.	Usage
A	a – b1	Jet Black	9005	DAB
B	a – b2	Cream White	9001	DAB w/Power
C	a - c	Signal Blue	5005	GPS
D	a - d	Claret Violet	4004	Cellular Phone
E	b1 – b2	Leaf Green	6002	TV[1]/SDARS Terrestrial[2]
F	b1 – c	Nut Brown	8011	TV[3]/SDARS Terrestrial[4]
G	b1 – d	Blue Gray	7031	SDARS Terrestrial[5]
H	b2 – c	Heather Violet	4003	GPS Navigation
I	b2 – d	Beige	1001	Bluetooth
K	c – d	Curry	1027	SDARS Satellite
L	h – j1	Carmine Red	3002	Not Defined
M	h – j2	Pastel Orange	2003	RKE/TPMS[6]
N	h – g1	Pastel Green	6019	Not Defined
Z	No Ribs	Water Blue	5021	Universal (Neutral) Code

TABLE 1: Color, Polarization, and Usage – Single Contact

[1] UHF where defined by receiver
[2] XM Radio
[3] VHF where defined by receiver
[4] Sirius Radio
[5] Interoperable
[6] Remote keyless entry/tire pressure monitoring system

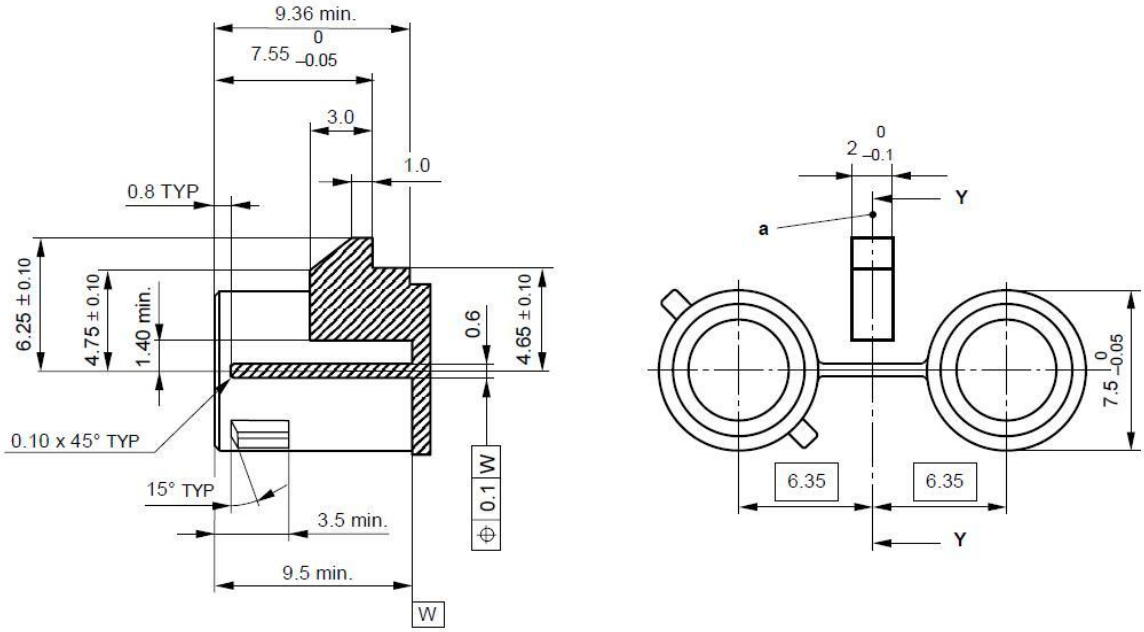
4. 2 WAY CONTACTS

4.1 Coding

Two-way connector coding uses the following scheme:

The left side of the device male connector (pin contact) viewed from the mating face uses identical coding to those shown in Section 3 for one-way connectors. The right side male connector viewed from the same position uses a neutral coding in all cases. An example is shown in paragraph 4.2. The center rib prevents one-way connectors from inadvertently being plugged to two-way receptacles.

4.2 Dimensions of the Device Side Interface



Section Y-Y

FIGURE 7: Two-Way Contacts, 12.7mm Centers

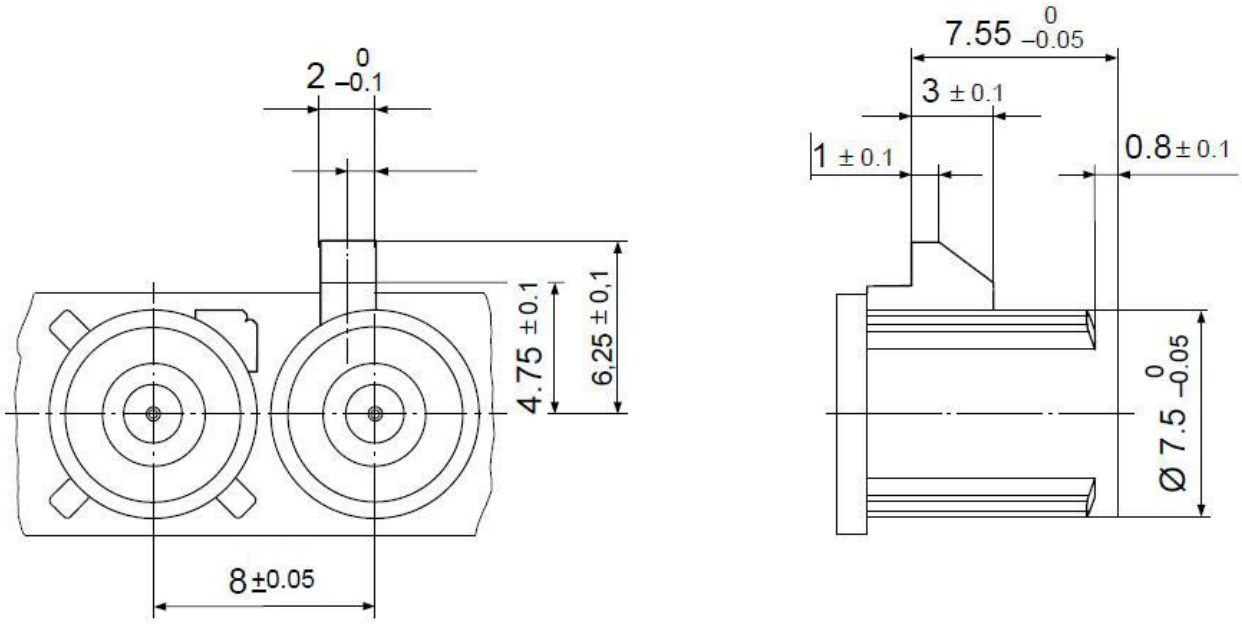


FIGURE 8: Two-Way Contacts, 8.0mm Centers – In-line and Board Mount

4.3 Colors and Applications

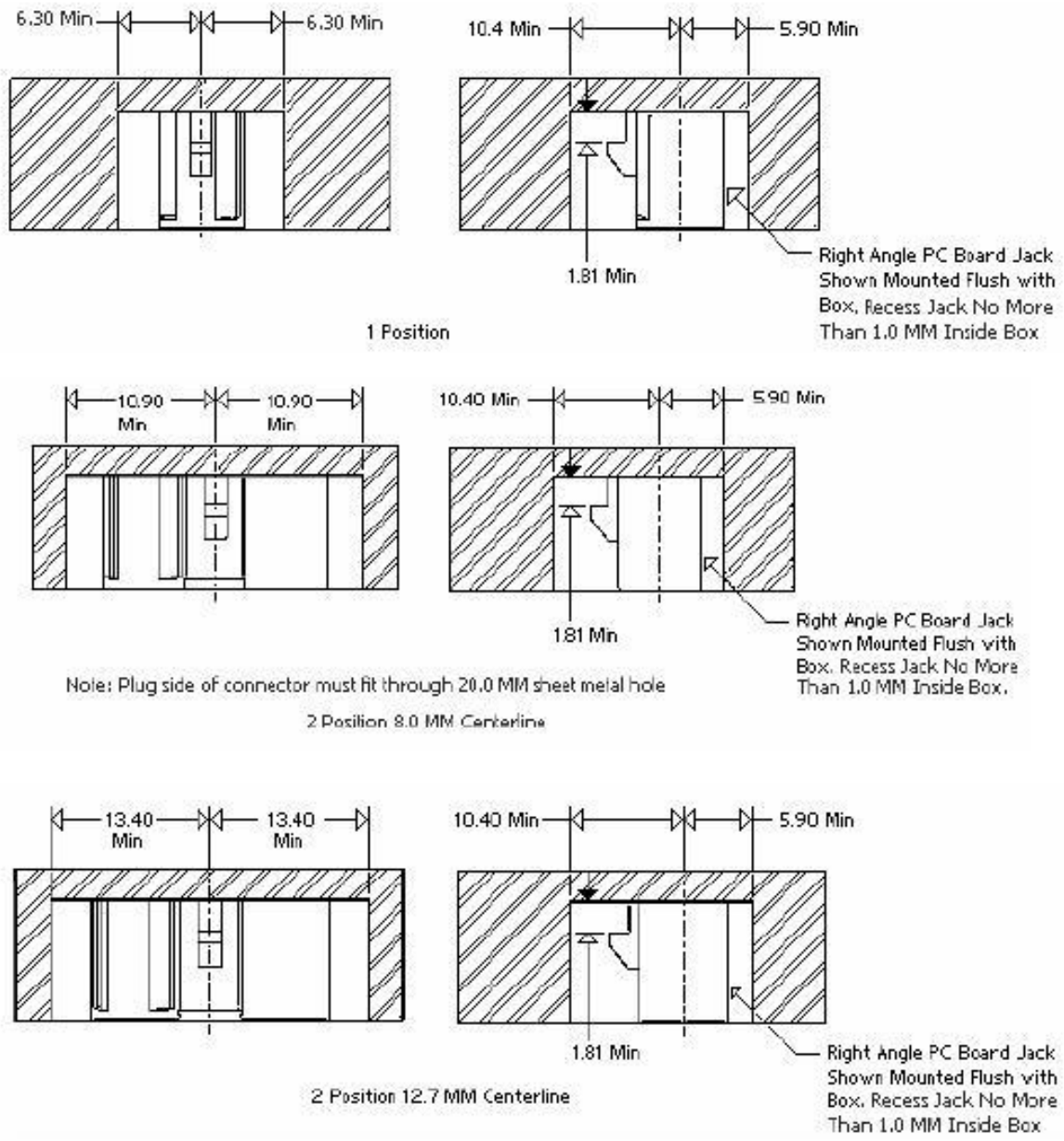
Coding	**Color**	**RAL Number**	**Usage – Cavity 1** (Keying per FAKRA one way)	**Usage – Cavity 2** (Neutral)
A2	Jet Black	9005	Not Defined	Not Defined
B2	Cream White	9001	Not Defined	Not Defined
C2	Signal Blue	5005	GPS	Cellular Phone
D2	Claret Violet	4004	Not Defined	Not Defined
E2	Leaf Green	6002	TV[1]	TV[2]
F2	Nut Brown	8011	TV[3]	TV[2]
G2	Blue Gray	7031	SDARS Satellite	SDARS Terrestrial

TABLE 2: Color, Polarization, and Usage – Two Contact

[1] UHF where defined by receiver
[2] Frequency not defined
[3] VHF where defined by receiver

5. PACKAGING INFORMATION

These dimensions represent the minimum clearance required for the mating cable plug.



PREPARED BY

EWCAP (ELECTRICAL WIRING COMPONENT APPLICATION PARTNERSHIP)

It is recommended that non-plastic (i.e. die cast) housings provide a provision for adding the color code in some way. Device manufacturers that incorporate recessed PCB male designs are also requested to include 12 sq. mm minimum of RAL color on the panel near to the mating face of the connector to assist in assembly operations.

APPENDIX A
DEFINITIONS

For this document, the following terms and definitions apply:

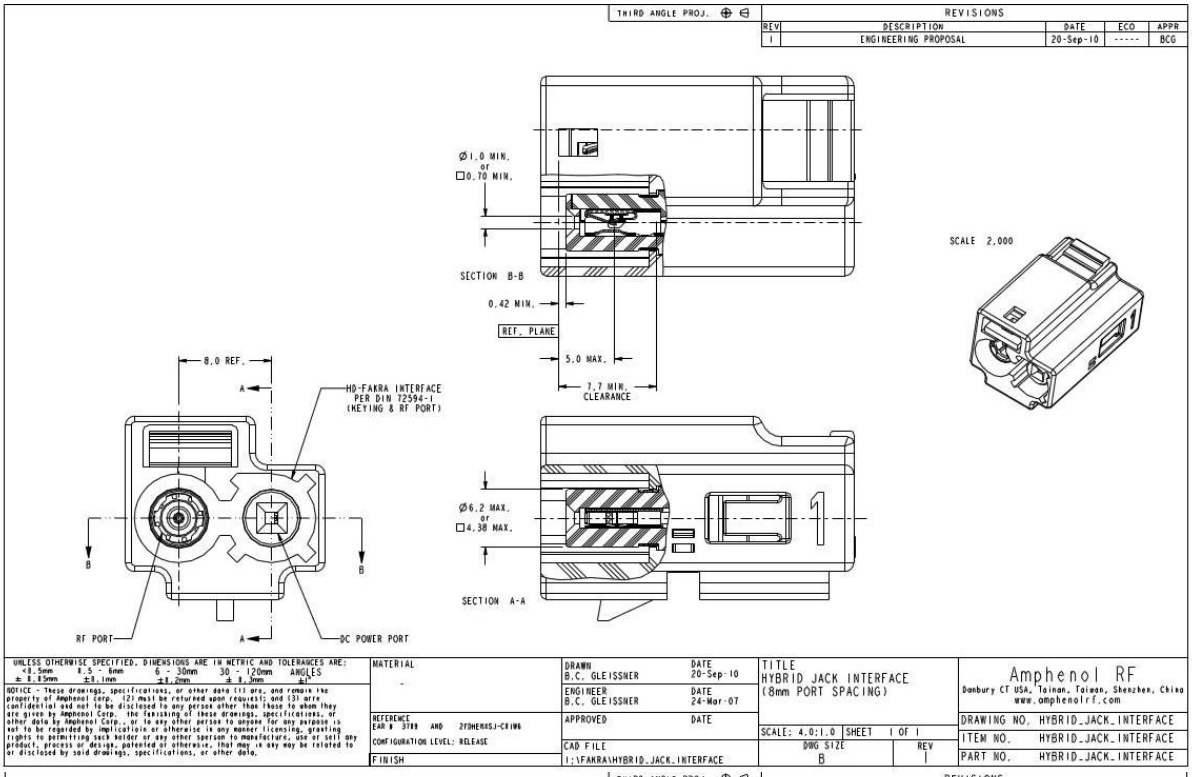
Male Contact
Pin contact
Contact intended to make electrical engagement on its outer surface and which will enter a female contact (socket)

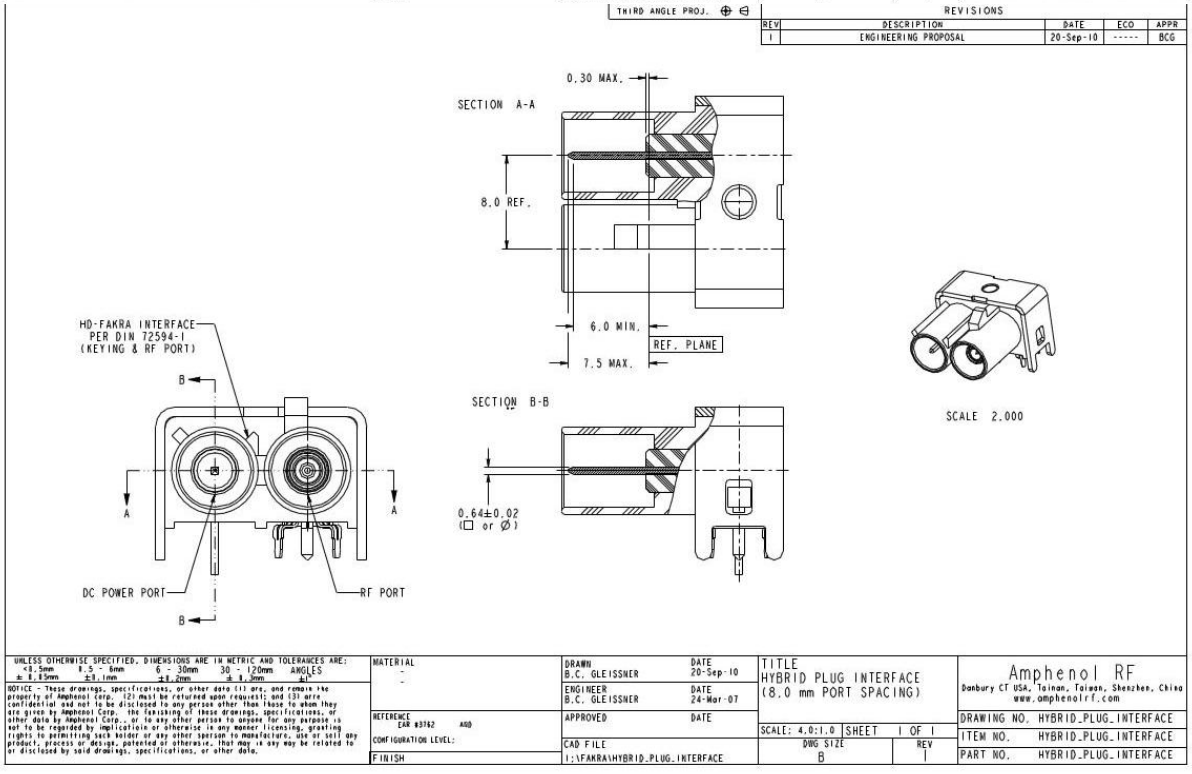
Female Contact
Socket contact
Contact intended to make electrical engagement on its inner surface and which will accept entry of a male contact (pin)

Male Connector
Pin connector
Connector containing a male center contact

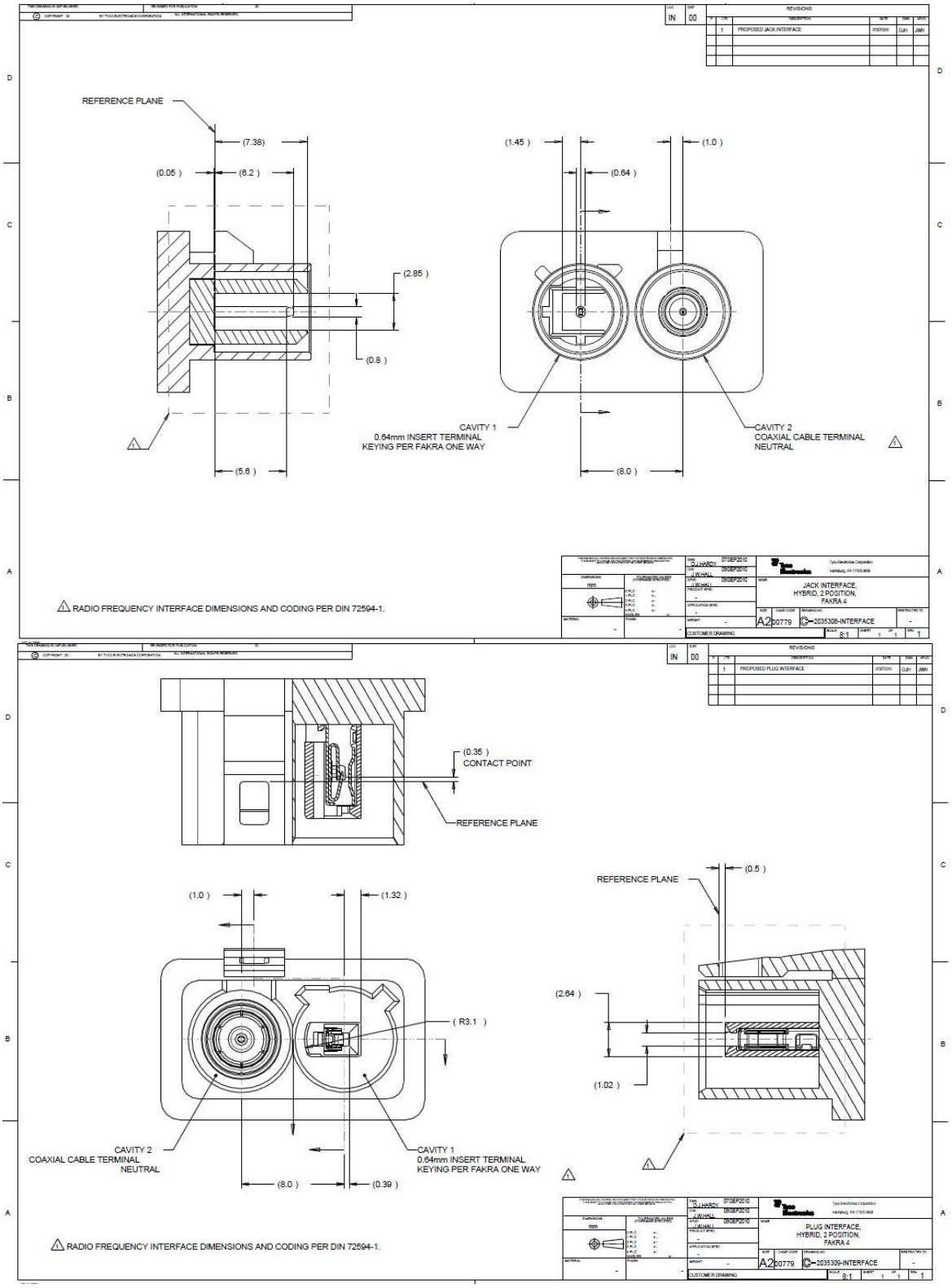
Female Connector
Socket connector
Connector containing a female center contact

APPENDIX B
HYBRID (RF and DC) TYPE 1 STYLE DUAL CONNECTOR INTERFACE

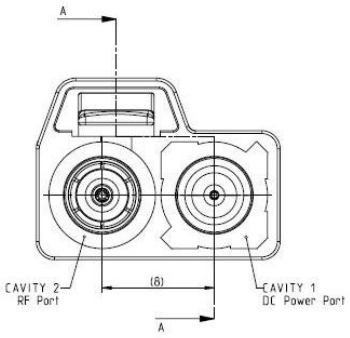


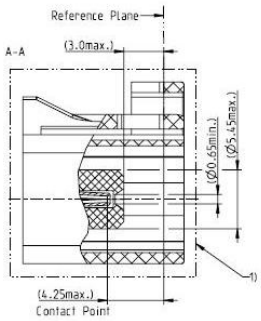


HYBRID (RF and DC) TYPE 2 STYLE DUAL CONNECTOR INTERFACE



HYBRID (RF and DC) TYPE 3 STYLE DUAL CONNECTOR INTERFACE

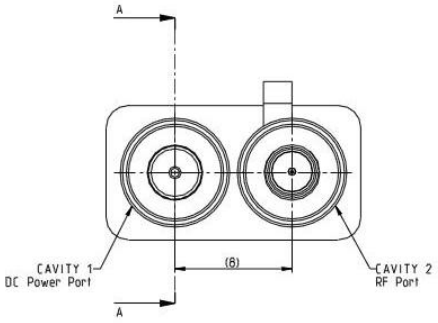


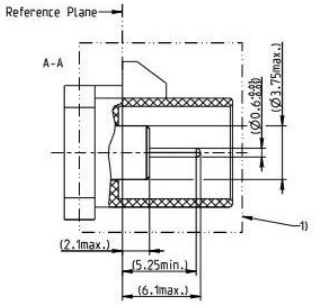


DRAFT

1) RADIO FREQUENCY INTERFACE DIMSENSIONS AND CODING PER DIN 72594-1

Rosenberger Hochfrequenztechnik 84526 Tittmoning Pro/ENGINEER	general tolerance ISO 2768 m-H	assembly instr. ---	scale: 5:1 (1:1)	crimp insert: ---	
		panel piercing ---	series: ---	cable: ---	
	date	name	title: jack interface, hybrid, 2 position		
	drawn 12.01.2006	Rosenberger			
	check.				
	appr.				
			drawing-no.: 99K118-Interface		sheet: 1 of: 1
	distribution to:	FE AZ QSH RMT .			
rev. change-no. name date			remarks:		



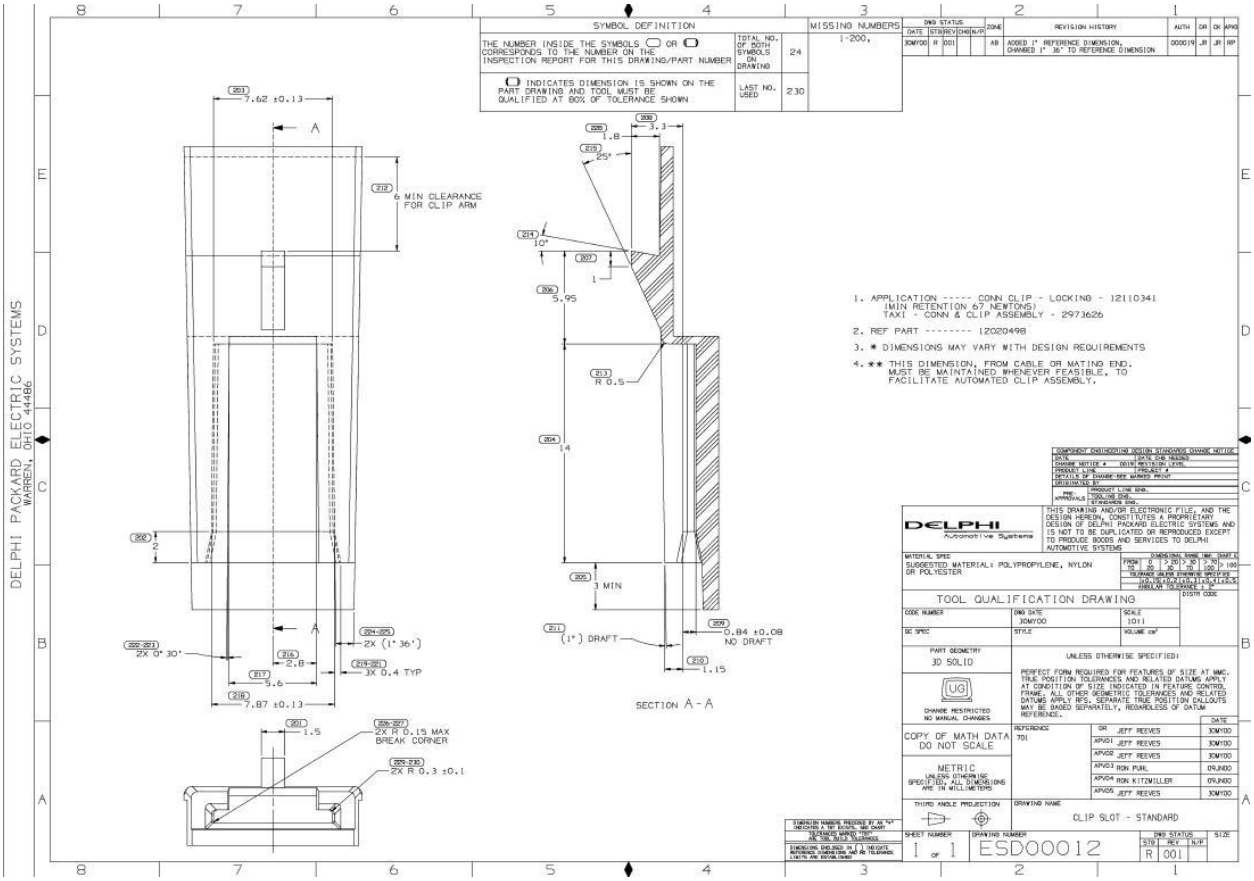


DRAFT

1) RADIO FREQUENCY INTERFACE DIMSENSIONS AND CODING PER DIN 72594-1

Rosenberger Hochfrequenztechnik 84526 Tittmoning Pro/ENGINEER	general tolerance ISO 2768 m-H	assembly instr. ---	scale: 5:1 (1:1)	crimp insert: ---	
		panel piercing ---	series: ---	cable: ---	
	date	name	title: plug interface, hybrid, 2 position		
	drawn 12.01.2006	Rosenberger			
	check.				
	appr.				
			drawing-no.: 99S118-interface		sheet: 1 of: 1
	distribution to:	FE AZ QSH RMT .			
rev. change-no. name date			remarks:		

APPENDIX C
RECOMMENDED CLIP SLOT DIMENSIONS



APPENDIX D
REVISIONS

This specification was approved by USCAR/EWCAP on 4-10-03.

Any revisions since that date have been incorporated into the specification. Revisions which altered the content of the specification are recorded below:

DATE	SECTION	SUMMARY OF CHANGES MADE	NOTES
5-22-01		Final Draft Released	
4-7-03	2	Revised References.	
	5	Revised packaging information.	
11-10-10	5	Added device color code recommendations	
	APP C	Added RF-DC Hybrid Interfaces	
	APP D	Added recommended clip slot	
12-10-10	3	Added Figures and Dimensions for single connector systems	
	Table 1	Added Z (Neutral) key code	
3-14-11	Appendix A	Revised definitions; changed all references from plug and receptacle to male (pin) and female (receptacle.)	