

USCAR-17 Supplement

SAENORM.COM : Click to view the full PDF of uscar18-5

SAE/USCAR-18 REVISION 5
July 2023

SAENORM.COM : Click to view the full PDF of uscar18-5

ISBN: 978-1-4686-0640-9



SAE/USCAR-18 REVISION 5

Issued	2002-02
Revised	2016-07
Stabilized	2023-07

USCAR-17 SUPPLEMENT

STABILIZED NOTICE

This document has been declared "Stabilized" by USCAR and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

SAENORM.COM : Click to view the full PDF of uscar18-5

The research data, analysis, conclusion, opinions, and other contents of this document are solely the product of the authors. Neither the SAE International (SAE) nor the United States Council for Automotive Research (USCAR) certifies the compliance of any products with the requirements of nor makes any representations as to the accuracy of the contents of this document nor to its applicability for purpose. It is the sole responsibility of the user of this document to determine whether or not it is applicable for their purposes.

Copyright © 2023 USCAR

Printed in U.S.A.

All rights reserved.

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

TABLE OF CONTENTS

1.	SCOPE	2
2.	REFERENCES.....	2
3.	SINGLE CONTACT	3
3.1	Male Unsealed Connector	3
3.2	Female Connector	6
3.3	Polarizing Ribs	7
3.4	Color Coding and Applications.....	8
4.	TWO WAY CONTACTS.....	9
4.1	Coding.....	9
4.2	Device Side Interface.....	9
4.3	Colors and Applications	10
5.	PACKAGING INFORMATION	11
APPENDIX A	DEFINITIONS.....	12
APPENDIX B	HYBRID (RF and DC) CONNECTOR INTERFACE.....	13
APPENDIX C	APPROVED CLIP SLOT	16
APPENDIX D	REVISIONS	17

SAENORM.COM : Click to view the full PDF of uscar18-5

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 and sealed automobile applications up to 6 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. Compliance with the dimensional requirements of this specification will not guarantee interoperability between different suppliers mating connectors. It is the supplier responsibility to ensure RF performance requirements are met with other suppliers mating connectors. 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.

ISO 20860-1, - Road vehicles – 50Ω impedance radio frequency connection system interface –
Part 1: 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:

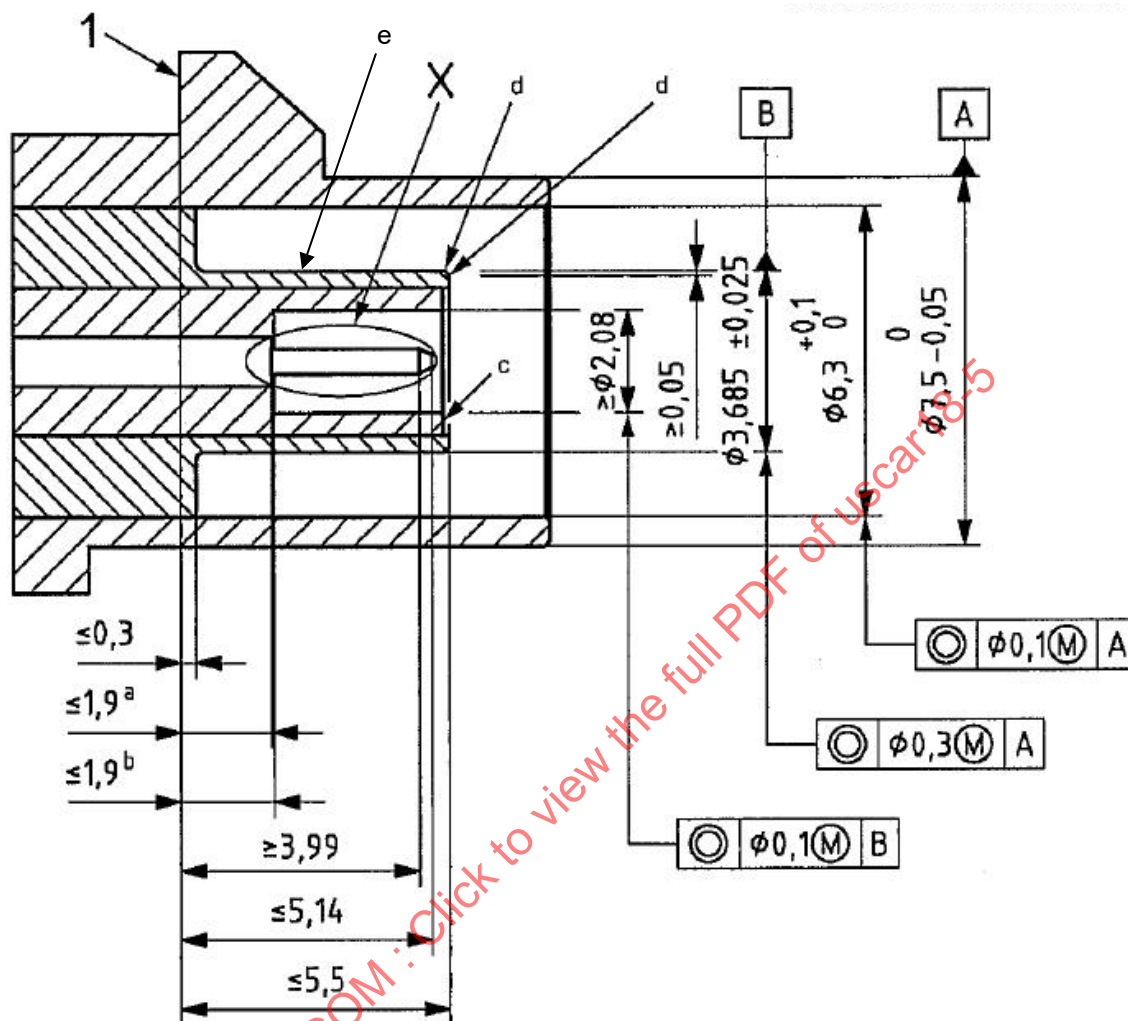
SAE
400 Commonwealth Dr
Warrendale, PA 15096-0001
USA
www.sae.org

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

Figure 1 - Male Connector Dimensions



Notes:

- 1 Reference Plane
a Center Contact (See FIGURE 2X)
b Dielectric Minimum Dimension
c Dielectric must not extend past the front plane of the outer contact
d No sharp burrs or edges
e Outer Contact to be selectively plated with Ni or Sn when required to meet electrical performance

Figure 2A - Male Cross Section

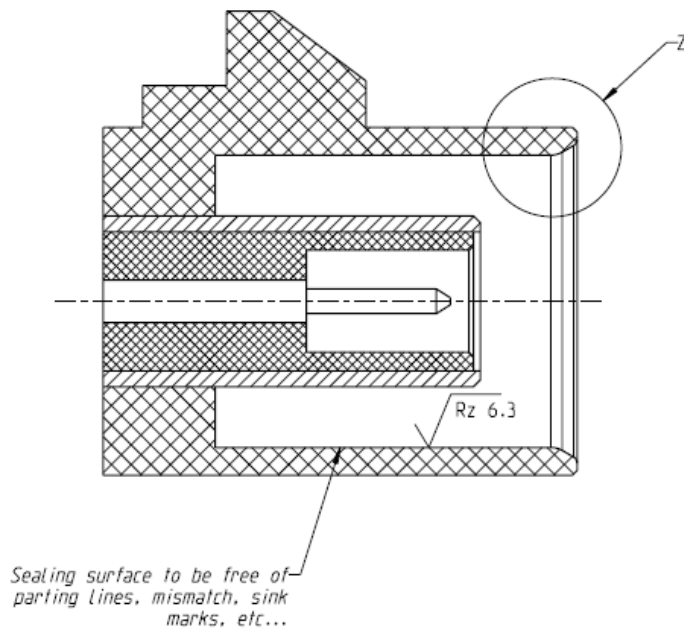


Figure 2B - Sealed Male

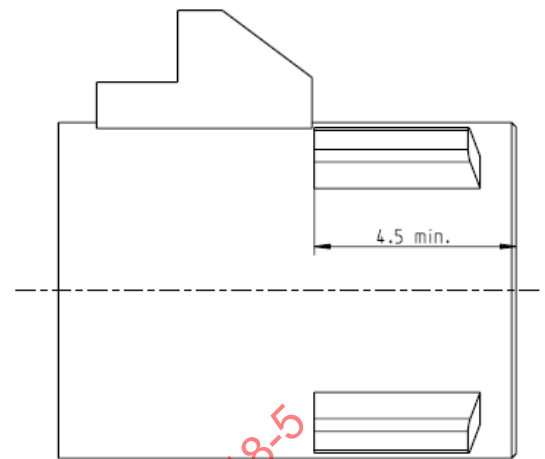


Figure 2C - Sealed Male

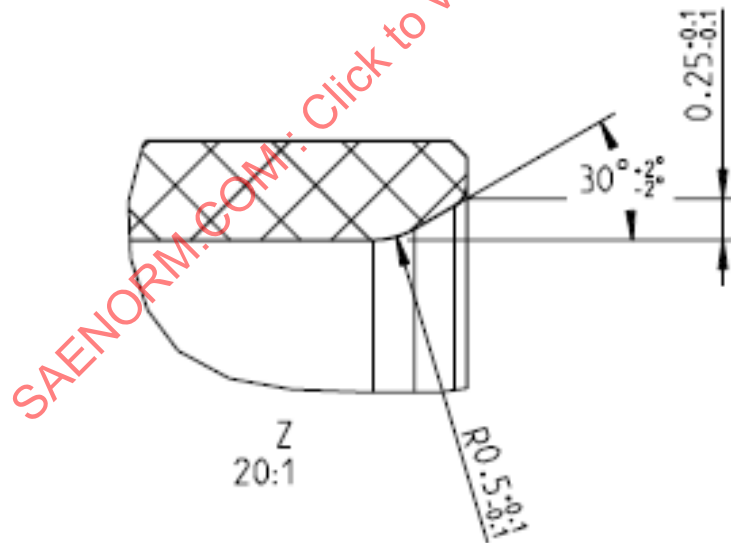


Figure 2D - Sealed Male

For Additional dimensional information refer to Figure 2A

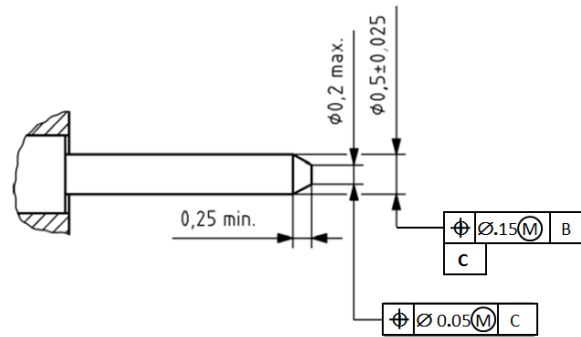
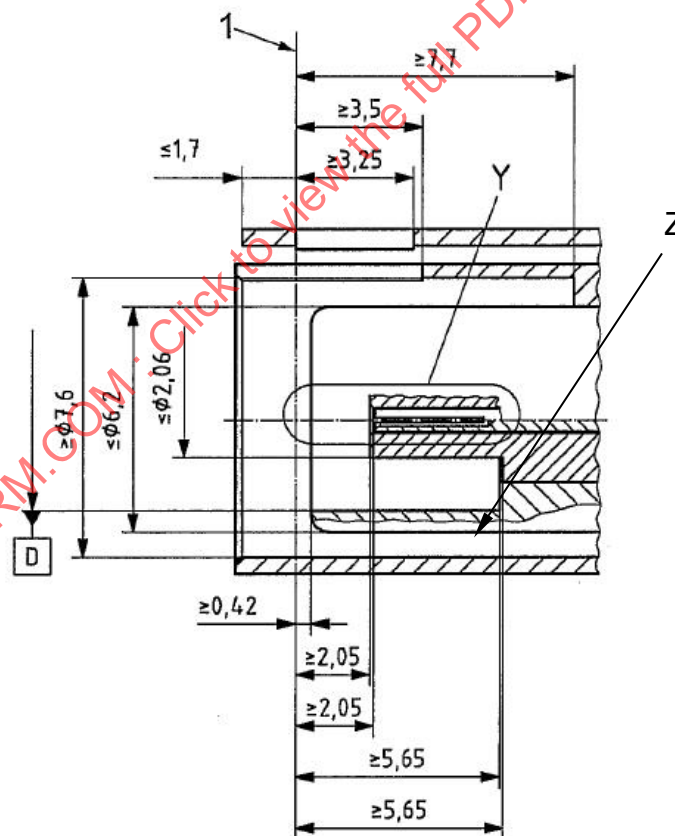


Figure 2X - Pin Dimensions

Note: Au Plating to be selectively applied to the contact zone of the center contact

3.2 Female Connector

Must meet dimensions shown in Figure 3A and 3Y



Note:

- 1 Reference Plane
- Y Center Contact (See FIGURE 3Y)
- Z Outer Contact (socket) to be selectively plated with Ni or Sn when required to meet electrical performance

Figure 3A - Female Connector Dimensions

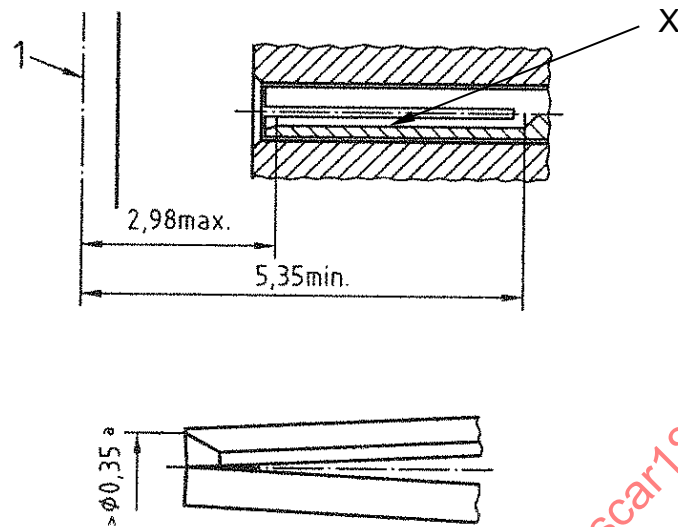


Figure 3Y - Female Contact

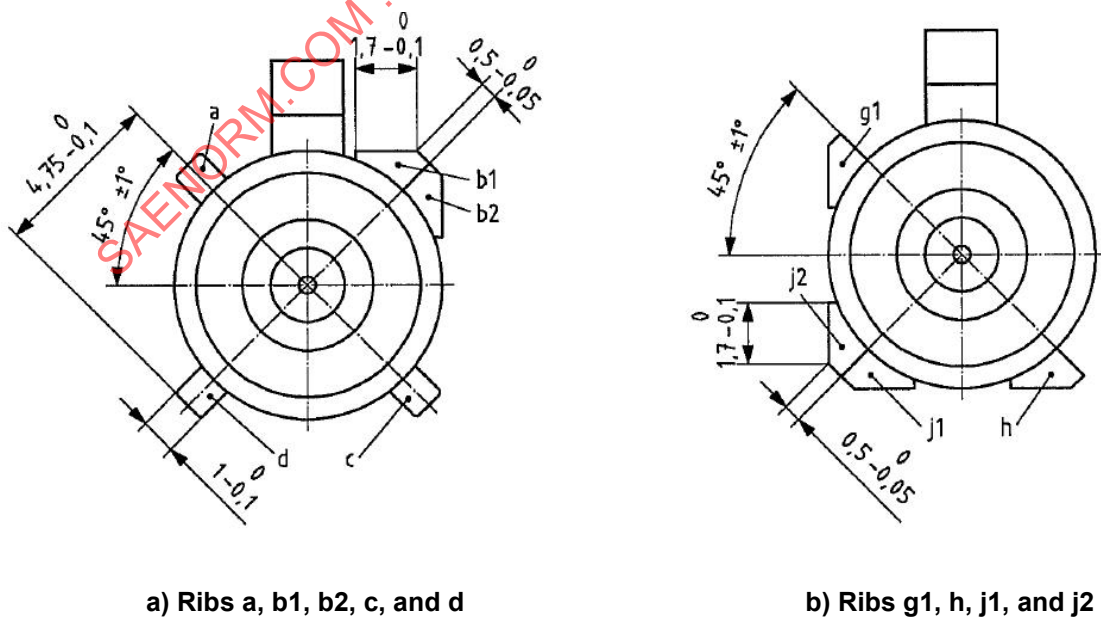
1 Reference Plane

a The catch circle must be coaxially arranged to reference datum axis D (geometrically ideal)

X Au plating to be selectively applied to the contact zone of the center contact (socket)

3.3 Polarizing Ribs

Must meet dimensions shown in FIGURE 5



a) Ribs a, b1, b2, c, and d

b) Ribs g1, h, j1, and j2

Figure 5 - Polarizing Rib Dimension

3.4 Color Coding and Applications

Must comply with FIGURE 6 and TABLE 1

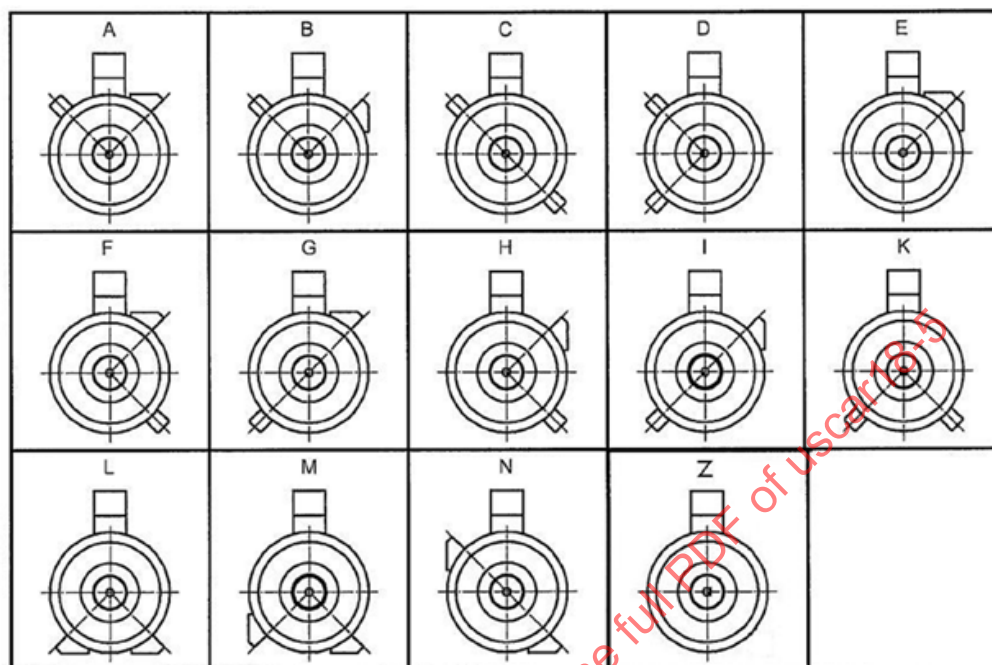


Figure 6 - Mechanical Key Codes for Single Connectors

Table 1 - Color, Polarization, and Usage – Single Contact

Coding	Rib Combination	Color	RAL No.	Usage
A	a – b1	Jet Black	9005	DAB / AM-FM
B	a – b2	Cream White	9001	DAB w/Power / AM-FM
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 / CAMERA
G	b1 – d	Blue Gray	7031	SDARS Terrestrial ⁵
H	b2 – c	Heather Violet	4003	GPS Navigation
I	b2 – d	Beige	1001	Bluetooth / VPM ⁷
K	c – d	Curry	1027	SDARS Satellite AM-FM
L	h – j1	Carmin Red	3002	VPM ⁷
M	h – j2	Pastel Orange	2003	RKE/TPMS ⁶
N	h – g1	Pastel Green	6019	DSRC / VPM ⁷
Z	No Ribs	Water Blue	5021	Universal (Neutral) Code

Typical Usage: Coordinate color and polarization with OEM

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

⁷ Dedicated Short Range Communication / Video Processing Module

4. TWO 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 of a potential application is shown in Section 4.2. The center rib prevents one-way connectors from inadvertently being plugged to two-way receptacles.

4.2 Device Side Interface

Must meet the dimensions FIGURE 7, FIGURE 8 and TABLE 2

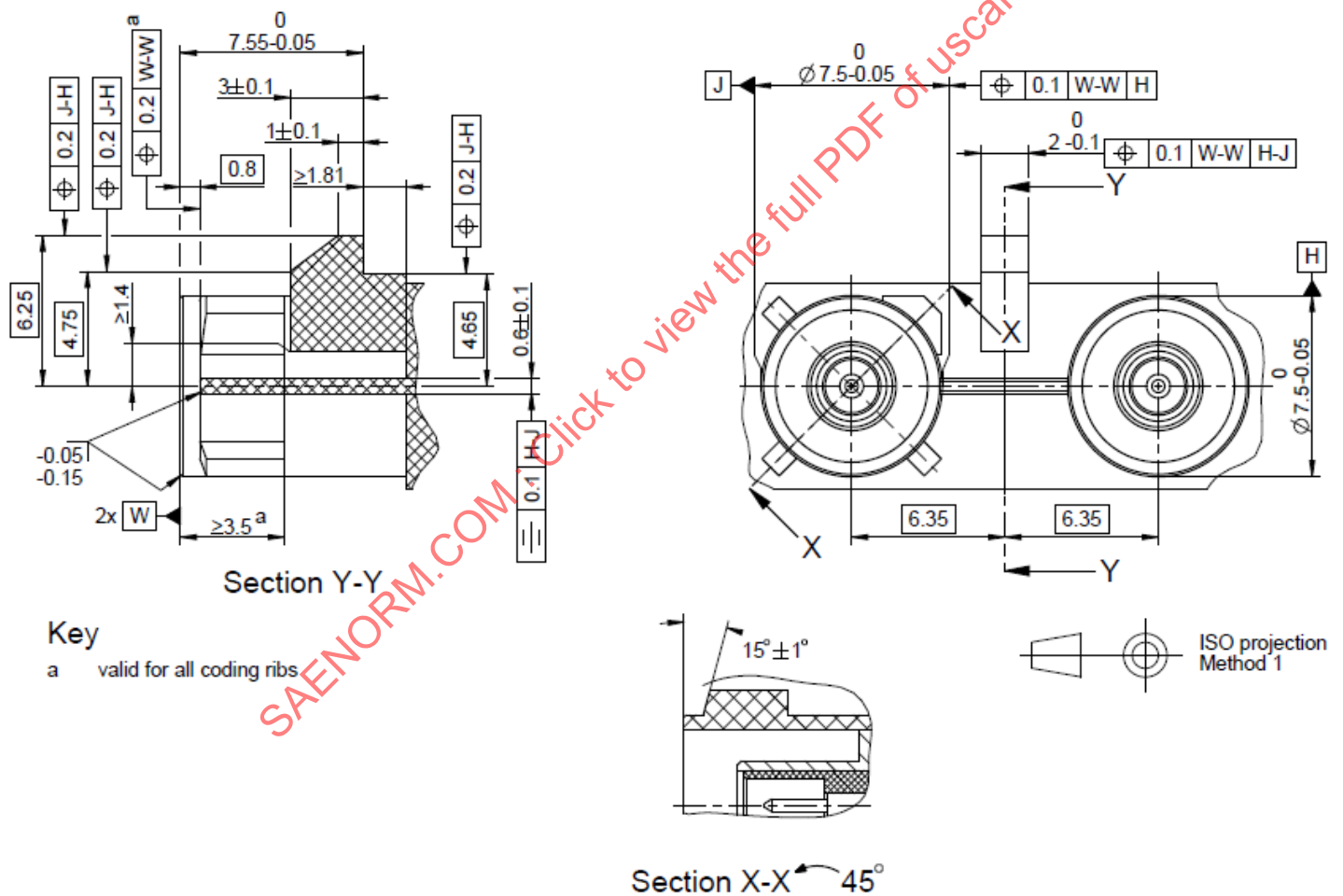


Figure 7 - Two-Way Contacts, 12.7mm Centers

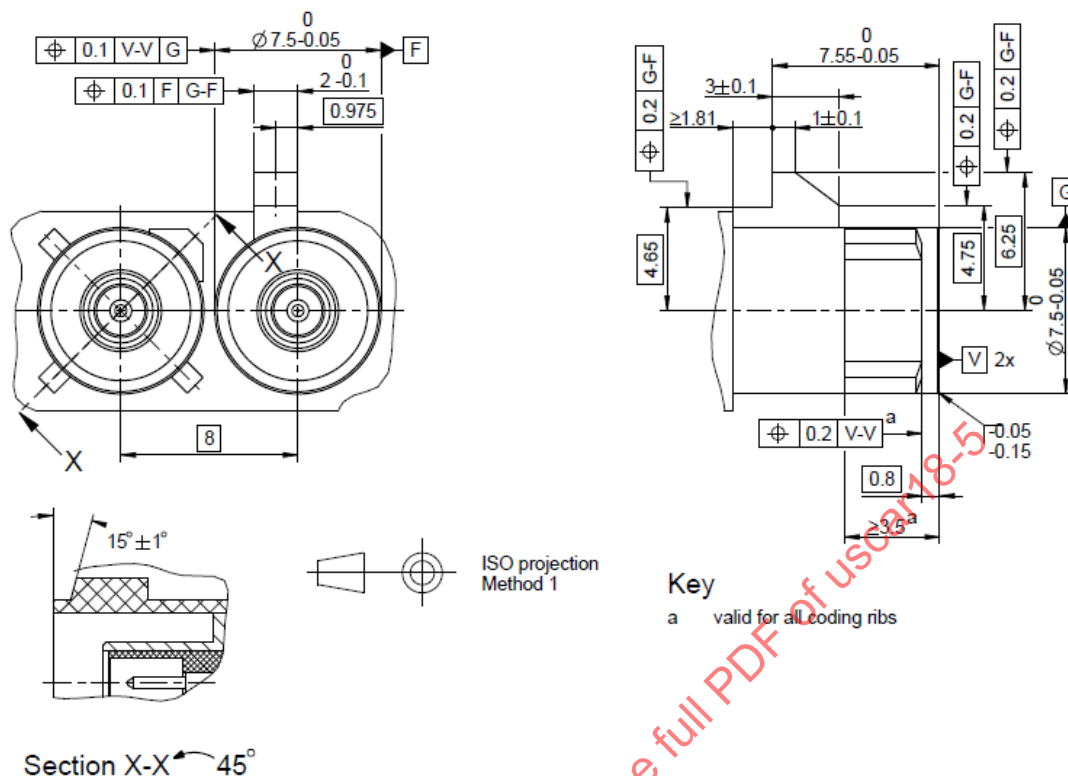


Figure 8 - Two-Way Contacts, 8.0mm Centers – In-line and Board Mount

4.3 Colors and Applications

Table 2 - Color, Polarization, and Usage – Two Contact

Coding	Color	RAL Number	Usage – Cavity 1 (Keying per one way) ⁴	Usage – Cavity 2 (Neutral) ⁴
A2	Jet Black	9005	AM-FM	Not Defined
B2	Cream White	9001	AM-FM	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
H2	Heather Violet	4003	Not Defined	Not Defined
I2	Beige	1001	VPM	VPM
K2	Curry	1027	AM-FM	AM-FM
L2	Carmin Red	3002	VPM	VPM

NOTES:

¹ UHF where defined by receiver

² Frequency not defined

³ VHF where defined by receiver

⁴ Usage is recommended but not mandatory coordinate color and polarization with OEM

NOTE: 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 must include 12 sq. mm minimum of RAL color on the panel near to the mating face of the connector to assist in assembly operations.

5. PACKAGING INFORMATION

The dimensions of FIGURE 9 represent the minimum clearance required for the mating cable plug.

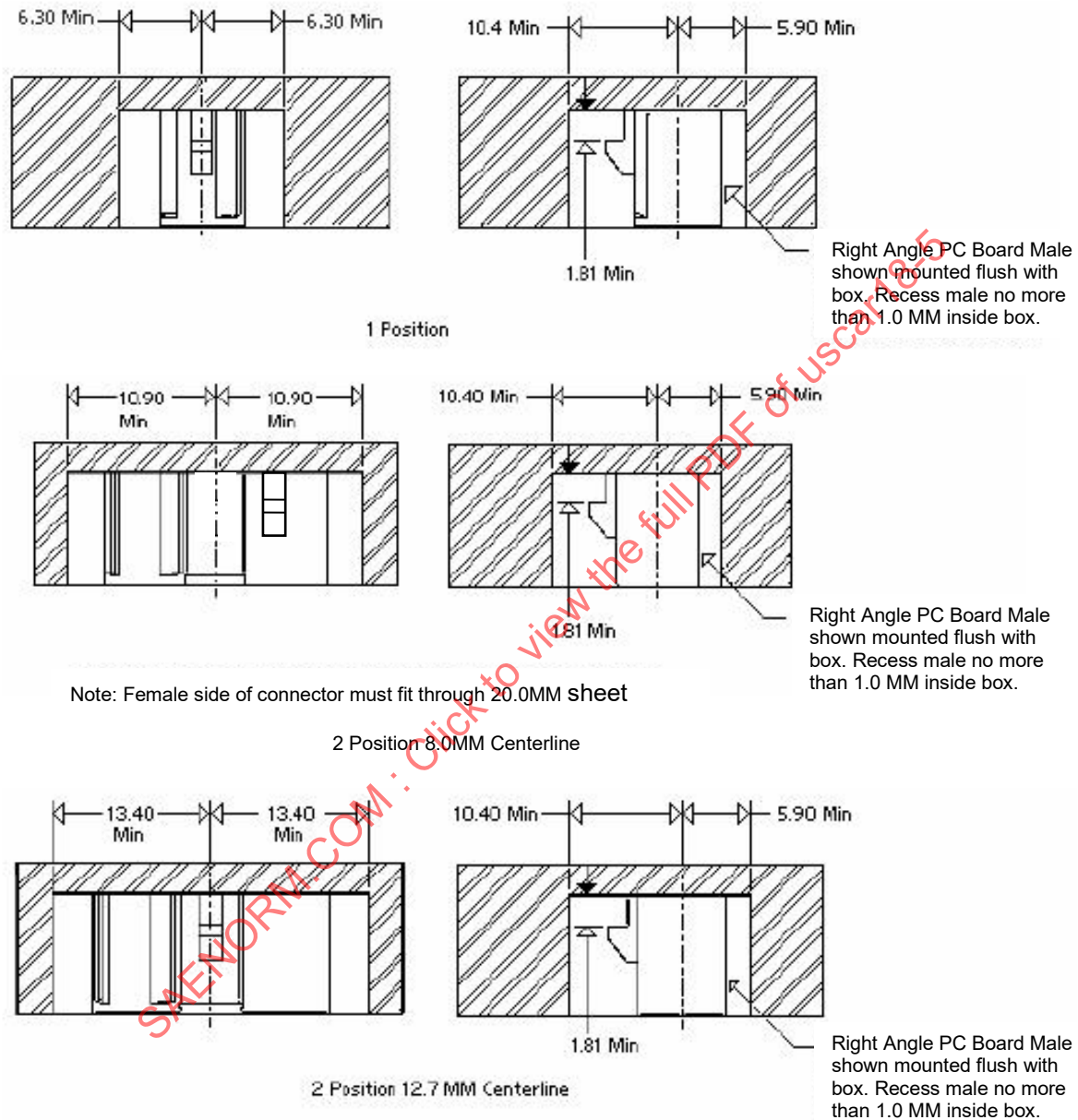


Figure 9 - Clearance Dimensions

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

SAENORM.COM : Click to view the full PDF of uscar18-5

APPENDIX B
HYBRID (RF and DC) CONNECTOR INTERFACE

TYPE 1 STYLE DUAL

