

During recent years the automotive market has become involved with many multimedia applications. In particular higher frequencies for GSM and GPS applications have made the car industry demand new RF connectors.

Up to now many different ways of connecting and locking have been used. So the aim of the FAKRA standard (NORMENAUSSCHUß KRAFTFAHRZEUGE IM DIN e.V.) was to create a standardized connector system for all the different applications in the car industry.

Radiall as a major supplier of RF coaxial connectors in the world, was deeply involved in the new development and therefore launched the **SMB Carlock** series which was designed particularly for automotive applications and replied to the new MVRF (**M**otor **V**ehicule **R**adio **F**requency) interface.

MVRF-Interface

The new MVRF interface contains:

- a) standard SMB interface
- b) a plastic housing to ensure the locking and coding functions

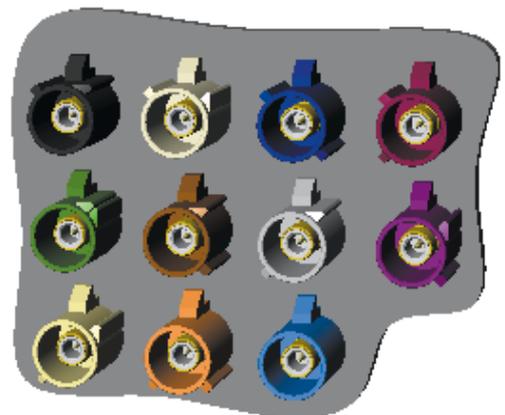


Obviously, our **SMB CARLOCK** interface meets all requirements according to the New Work item proposal ISO/TC 2 N 2149 to ensure compatibility with similar connectors.

Main product interest

The new **SMB Carlock** interface has all the features required to satisfy the demands of the Automobile industry:

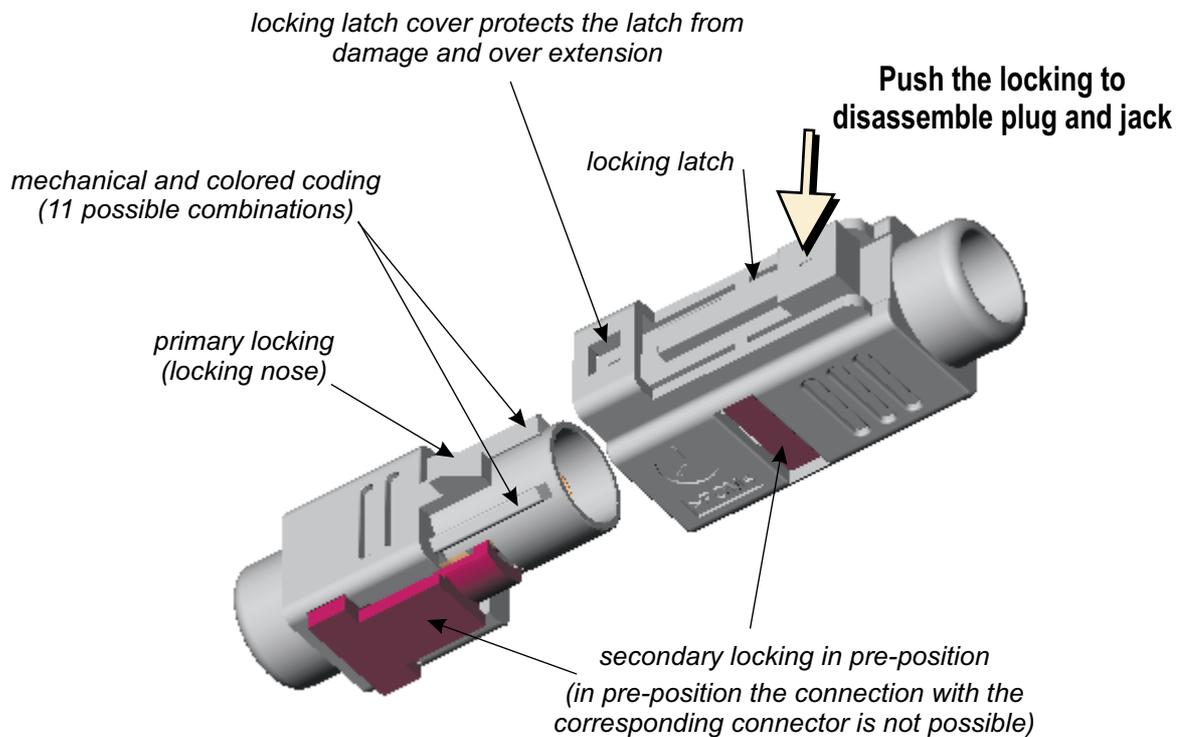
- 11 different mechanical and color coding schemes are available
- locking plastic housing
- minimum frequency range from DC to 6 GHz
- qualified for coaxial-cable 2.6mm/50 3.2mm/50 and 5mm/50
- minimum of 100 cycles (mate/demate)
- available in multiple and hybrid connector configurations
- accompanied by an audible “click” (locking nose).



Our connector also features : **primary and secondary locking.**

The secondary locking feature prevents the connector from being pushed out of the plastic housing if the mating connector is not properly engaged. In addition, the secondary locking must be fully engaged before the mating connector can be installed. The plastic housing is drop and crush resistant to protect the contact from mechanical damage and accepts cables up to 5mm. The locking latch is protected from damage and over extension. Mating and unmating is detectable and accompanied by an audible “click” (locking nose).

Cable plug and cable jack (secondary locking not closed)



Multiple position connectors

SMB Carlock duplex connectors and multiple connector groups are possible. Duplex locking mechanisms are located between the two connectors. Multiple connectors can have a single or multiple locking mechanisms. Multiple locking mechanisms allows a single or a matching multiple connector to be mated



Coaxial cable

Radiall in manufacturing also coaxial cables fitting connectors for 2.6/50/S cable with low losses (ask for our catalog D1040 DE).

OVERVIEW MECHANICAL CODING

Coding	A	B	C	D	E	F	G	H	I	K	Z
Plug											
Jack											
Color	black	Signal white	blue	bordeaux violet	green	brown	grey	violet	beige	curry	Water blue
RAL-Nbr.	RAL 9005	RAL 9003	RAL 5005	RAL 4004	RAL 6002	RAL 8011	RAL 7031	RAL 4003	RAL 1001	RAL 1027	RAL 5021
Device* application	radio without phantom supply	radio with phantom supply	GPS	Mobil phone	TV 1	TV 2	Remote control	Radio controlled parking heating	open	radio with IF	Neutral coding

* Not standard specification

On duplex-connectors the locking is in the middle, on multiple connectors, the locking nose can be:

- middle (must be connected with specific mating connector)
- on all sides (can connect single or specific mating connectors)

FINDER GUIDE & ORDERING PROCESS :

- The coax inserts and the plastic housings can be ordered separately.
- The standard coax contacts are finished in gold. All other finishes upon request.

ATTENTION the Radiall coaxial inserts fit only the Radiall housings.

Plastic housing Inserts	Single			Duplex (2 contacts)	
	R197 110_90 page 18	R197 120_90 page 18	R197 130_90 page 18	R197 211_90 page 18	R197 220_90 page 18
R114 082 305 Straight plug full crimp type for 2.6/50/S cable page 17	R197 110_00 page 12			R197 211_00 page 15	
R114 086 305 Straight plug full crimp type for RTK031 cable page 17	R197 110_02 page 12				
R114 089 305 Straight plug full crimp type for 5/50/S cable page 17	R197 110_01 page 12			R197 211_01 page 15	
R114 185 305 Right angle plug crimp type for 2.6/50/S cable page 17		R197 120_00 page 12			R197 220_00 page 15
R114 189 305 Right angle plug crimp type for 5/50/S cable page 17		R197 120_01 page 12			R197 220_01 page 15
R114 242 305 Straight jack full crimp for 2.6/50/S cable page 17			R197 130_00 page 13		
R114 246 305 Straight jack full crimp for RTK031 cable page 17			R197 130_02 page 13		
R114 249 305 Straight jack full crimp for 5/50/S cable page 17			R197 130_01 page 13		

_ means coding letter (see first table).

Example : R197 110 A00 is composed with : insert R114 082 305, Plastic housing R197 110 A90 with coding A.

You can order : - either a complete cable plug R197 120 B00 (coding B)
- or separately the insert R114 185 305 and the empty housing R197 120 B90.



50 Ω

DC - 2 GHz
usable up to 6 GHz

GENERAL

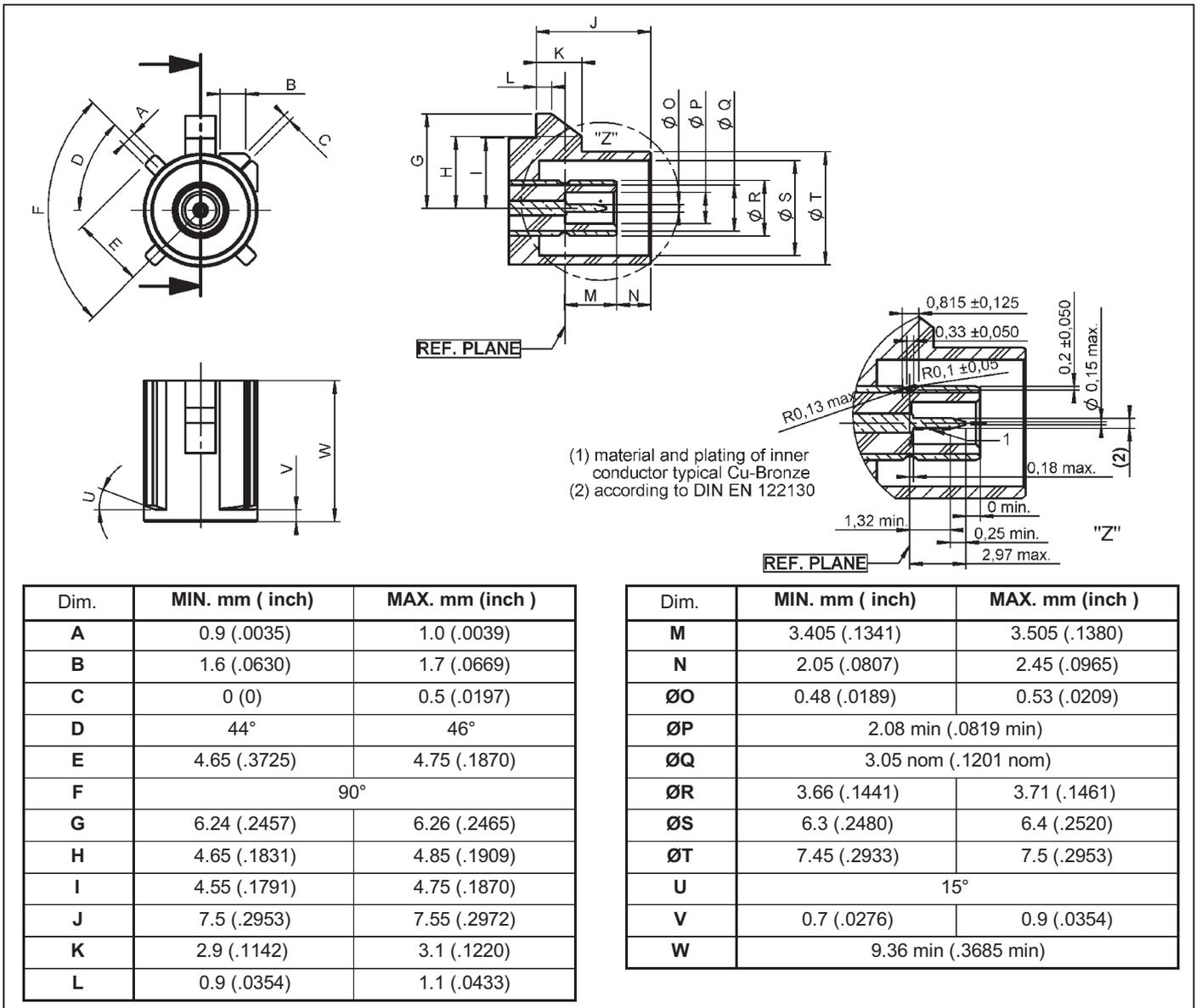
- Standard SMB Interface for Motor Vehicle Radio Frequency to assure connector compatibility
- Secondary locking
- Reduction of different RF interfaces to one interface
- Reduction of piece parts
- Plugs have female contacts
- Jacks have male contacts

APPLICABLE STANDARDS

- DIN EN 122130
- IEC 169-10
- MIL-C-39012/67-71 + 95-96
- CECC 22130
- ISO/TC 2 N 2149

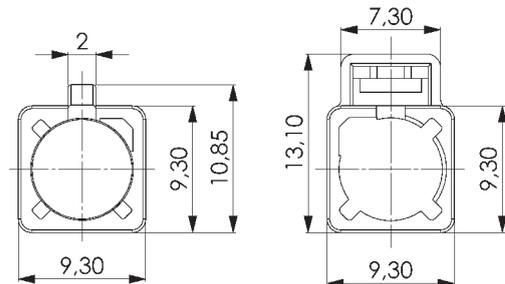
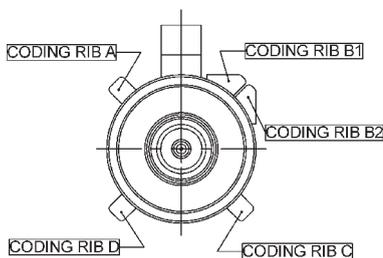
APPLICATIONS

- Car radio (RDS, RDS-TMC, DAB)
- Mobile communication (GSM)
- Navigation systems (GPS)
- Security service
- Comfort electronic (remote controlled device)
- Base station



Coding is determined by the combination of two coding ribs.

Main values from jack and plug interface



Coding	A	B	C	D	E	F	G	H	I	K	Z
Rib-combination	A + B1	A + B2	A + C	A + D	B1 + B2	B1 + C	B1 + D	B2 + C	B2 + D	C + D	Neutral coding

TEST/CHARACTERISTICS	STANDARD REFERENCE	VALUES/REMARKS
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ELECTRICAL

Impedance		50												
Frequency range (usable up to 6 GHz)		DC - 100 MHz (for radio-signals) DC - 2 GHz (for GPS, GSM, TV)												
V.S.W.R. max up to 4 GHz <i>Straight plug</i> <i>Right angle plug</i> <i>Straight jack</i>		<table border="1"> <thead> <tr> <th>2.6/50</th> <th>3.2/50</th> <th>5/50</th> </tr> </thead> <tbody> <tr> <td>1.05+0.05F (GHz)</td> <td>1.05+0.05F (GHz)</td> <td>1.02+0.05F (GHz)</td> </tr> <tr> <td>1.03+0.05F (GHz)</td> <td></td> <td>1.03+0.05F (GHz)</td> </tr> <tr> <td>1.07+0.05F (GHz)</td> <td>1.07+0.05F (GHz)</td> <td></td> </tr> </tbody> </table>	2.6/50	3.2/50	5/50	1.05+0.05F (GHz)	1.05+0.05F (GHz)	1.02+0.05F (GHz)	1.03+0.05F (GHz)		1.03+0.05F (GHz)	1.07+0.05F (GHz)	1.07+0.05F (GHz)	
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Insertion loss <i>up to 0.1 GHz</i> <i>up to 1 GHz</i> <i>up to 2 GHz</i>	MIL	<0.3 dB <0.5 dB <0.7 dB												
Insulation resistance		1000 M mini												
Center contact resistance <i>center contact</i> <i>outer contact</i>	MIL	< 20 m < 10 m												
Working voltage in Veff		335 Veff maxi												
Dielectric withstanding voltage <i>at sea level</i>	IEC 801-2	> 1000 V eff.												
Screening effectiveness up to 1 GHz		> 30 dB												

MECHANICAL

Durability (matings)		100
Center contact retention force		10 N mini
Plastic housing - force to engage locking device		≥ 80 N
Plastic housing - force to separate locking device		15 - 35 N
Cable retention force RG174, RG188, RG316, KX3B, KX22 RTK031 RG58, RG141, KX15 <i>cable 2.6/50</i> <i>cable 3.2/50</i> <i>cable 5/50</i>		≥120 N ≥110 N ≥180 N
Coding		11 mechanical and colored coding

ENVIRONMENTAL

Temperature range		- 40 / + 110 C
Thermal shock <i>accelerating frequency</i>	DIN 60068-2-27	20g/11ms 1x in every main axis 1/2 sinus
High temperature test		120°C / 1.000 h
Vibration	DIN EN 60068-2-6	sinus 10 g / 10-500 Hz
Shock	DIN 60068-2-27	1/2 sinus 50g / 11 ms
Hermetic test	CECC	10 ⁻⁵ bar cm ³ /s
Leakage	CECC	difference pressure 100 up to 110 kPa : 1 bar cm ³ /h

MATERIALS

Plastic housing <i>plug</i> <i>jack and R/A receptacle</i>		Polyoxymethylene (POM) PA 6.6 30%FV (polyamid 30% glass fiber reinforced)
Secondary locking <i>plug</i> <i>jack</i>		Polyoxymethylene (POM) PA 6.6 (polyamid 6.6)
Spring parts		Bronze
Others pieces		Brass
Insulator		PTFE

PLATING

Body		Nickel
Center contact		Gold
Outer contact / form		Nickel / slotted
Ferrule		Nickel

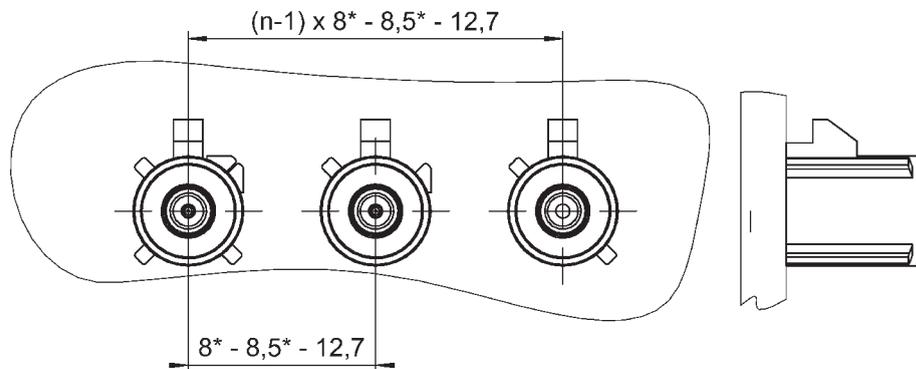
Packaging : **Standard** 100 pieces - **Unit** add W after the P/N.

All dimensions are in mm.

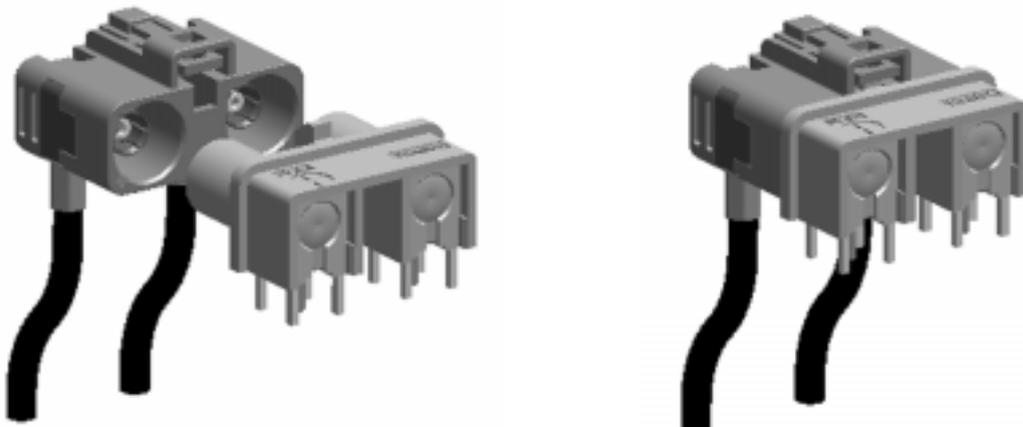
The coding on each connector is separate and independent from the locking function of the plastic housings.

Possible distance between multiple coaxial lines :

- ☞ **12.7 mm** (nominal)
Coding option on one or several sides possible in order to assemble with single connectors (upon request, please contact us).
- ☞ **8.5 mm***
Coding option on one or several sides possible, reduction of outer dimension
- ☞ **8.0 mm***
Coding option only on **one** side possible, maximal reduction of outer dimensions



Locking functions on all interfaces or in the middle of the housing, with the exception of 8.0* mm and 8.5* mm separation. Here, the locking nose can be on one side only.



CUSTOM PRODUCTS

Custom designs use the same SMB-Carlock standard interface adapted to the customer's special requirements. Radiall has the capability to design, develop, and produce customized connector products in very short time according to customer specifications.

* upon request