



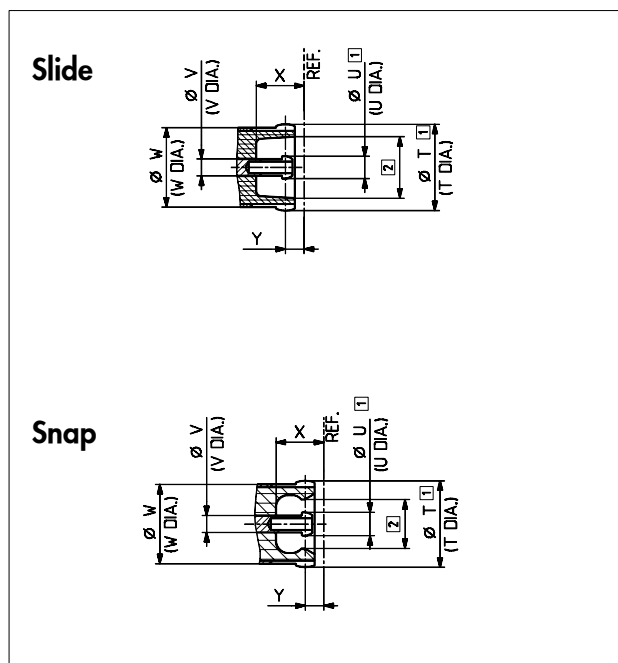
# SERIES MMBX MINIATURE MICROAX CONNECTORS

## Description

Modularity with a minimum space requirement is demanded for the existing and coming generation of systems (GSM 900 / 1800 / 1900, PCS, WCDMA, UMTS). To achieve this for all different systems, the smallest possible components must be used also for interconnections.

In order to reduce the variety of products and to achieve standardised systems (in other words: modularity), the new SUHNER Series MMBX™ (Micro Miniature Board Connector) contains a range of board and cable connectors which require a minimum of space. It offers all the necessary characteristics to obtain a unified design of the various systems.

## Interface Dimensions



## Interface Dimensions in mm / inches

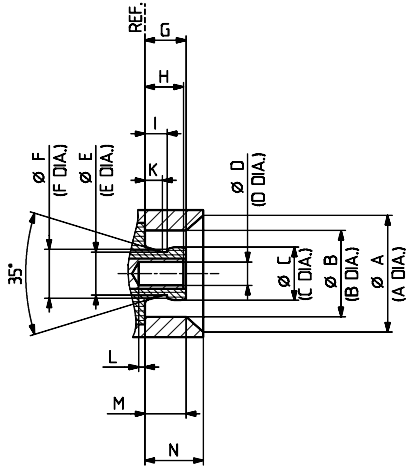
### Adaptors Within-Series

	min. / max. mm	min. / max. inches
T	3.70 nom.	.146 nom.
U	0.95 nom.	.037 nom.
V	0.70 nom.	.028 nom.
W	3.65 nom.	.144 nom.
X	2.05 nom.	.081 nom.
Y	0.80 nom.	.032 nom.

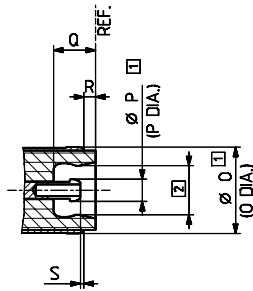
① Slotted and flared to meet electrical and mechanical requirements

② Dimension to meet electrical and mechanical requirements

### Jack (female)



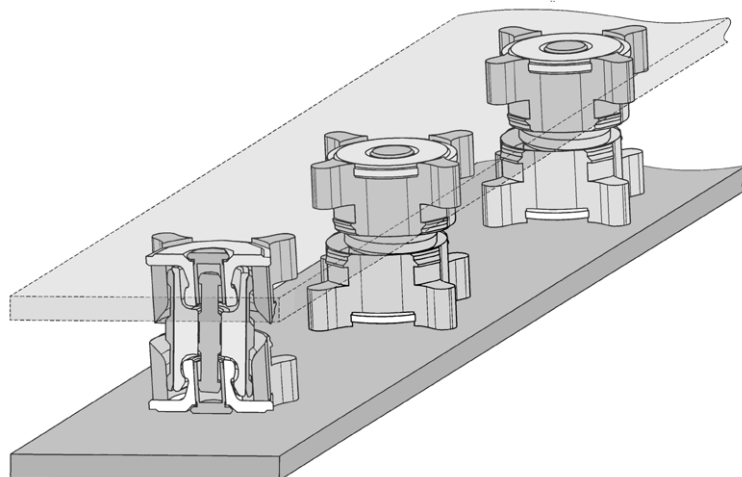
### Plug (male)



### MMBX Connectors:

	min. mm	min. inches	max. mm	max. inches
A	5.00 nom.	.197 nom.	5.00 nom.	.197 nom.
B	3.68	.145	3.71	.146
C	2.25	.089	2.30	.091
D	0.98	.039	1.01	.040
E	1.85 nom.	.073 nom.	1.85 nom.	.073 nom.
F	2.10 nom.	.083 nom.	2.10 nom.	.083 nom.
G	—	—	1.80	.071
H	1.55	.061	1.75	.069
I	0.90	.035	—	—
K	0.75 nom.	.030 nom.	0.75 nom.	.030 nom.
L	0	0	—	—
M	1.45	.057	—	—
N	2.50 nom.	.098 nom.	2.50 nom.	.098 nom.
O	3.70 nom.	.146 nom.	3.70 nom.	.146 nom.
P	0.95 nom.	.037 nom.	0.95 nom.	.037 nom.
Q	1.85 nom.	.073 nom.	1.85 nom.	.073 nom.
R	0.50 nom.	.020 nom.	0.50 nom.	.020 nom.
S	0.10 nom.	.004 nom.	0.10 nom.	.004 nom.

- ① Slotted and flared to meet electrical and mechanical requirements
- ② Dimension to meet electrical and mechanical requirements



Direct interconnections with excellent electrical and mechanical properties

## Technical Data of Cable Connectors

ELECTRICAL DATA	CECC 22000	REQUIREMENTS	
for cable groups		U1 <sup>1)</sup>	U2, U4
Impedance		50 Ω	
Frequency range		DC ... 6 GHz <sup>2)</sup>	
Return loss		see table below	
RF-leakage (measured at 2.5 GHz) MMBX-Interface only	4.4.8	- 100 dB	
Dielectric withstanding voltage (at sea level)	4.4.5	500 V rms, 50 Hz	750 V rms, 50 Hz
Working voltage (at sea level) - unmated	IEC 169-1 14.6.1	165 V rms, 50 Hz (calculated)	250 V rms, 50 Hz (calculated)
Working voltage (at 21'000 m / 70'000 ft.) - mated and unmated	Appendix C	28 VAC 50 Hz (calculated)	42 VAC 50 Hz (calculated)
Insulation resistance	4.4.4	≥ 1 GΩ	
Contact resistance - centre contact	4.4.2	≤ 5 mΩ	
- outer contact	4.4.3	≤ 1 mΩ	

TYPICAL RETURN LOSS	CONNECTOR TYPE	CABLE TYPE	FREQUENCY RANGE			CABLE GROUP
			DC - 1 GHz	1 - 2.5 GHz	2.5 - 6 GHz	
Straight connectors	RG 178	RG 178	- 33 dB	- 30 dB	- 26 dB	U1 <sup>1)</sup>
	RG 316	RG 316	- 33 dB	- 30 dB	- 26 dB	U2
	K 02252 D	K 02252 D	- 33 dB	- 30 dB	- 26 dB	U4
	EF 316 D	EF 316 D	- 33 dB	- 30 dB	- 22 dB	U4
Right angle connectors	RG 178	RG 178	- 33 dB	- 24 dB	- 20 dB	U1 <sup>1)</sup>
	RG 316	RG 316	- 33 dB	- 30 dB	- 22 dB	U2
	K 02252 D	K 02252 D	- 33 dB	- 30 dB	- 24 dB	U4
	EF 316 D	EF 316 D	- 33 dB	- 28 dB	- 20 dB	U4

MECHANICAL DATA	CECC 22000	REQUIREMENTS
Engagement force	4.5.4	max. 30 N / max. 6.7 lbs
Disengagement force	4.5.4	8 - 30 N / 1.8 - 6.7 lbs
Contact captivation	4.5.2	≥ 10 N / 2.3 lbs
Cable retention force <sup>3)</sup>	4.5.5	on request
Durability (matings)	4.7.1	100

1) Cable dielectricum < 0.88 mm / .035 in.

2) Cables are specified up to 5 GHz only

3) Value considers maximum load of the cables without irreversible variations of specifications.

## Technical Data of Cable Connectors (cont.)

ENVIRONMENTAL DATA	CECC 22000 TEST CONDITIONS	EQUIVALENT MIL TEST CONDITIONS
Temperature range		-55°C ... +155°C / -67°F ... +311°F
Climatic category	→ 55 / 155 / 21	
Thermal shock	4.6.7 → IEC 68-2-14 Na	MIL-STD-202, Method 107 G, Condition B1
Moisture resistance	4.6.6 → IEC 68-2-3 Ca	MIL-STD-202, Method 106 F
Corrosion	4.6.10 → IEC 68-2-11 Ka	MIL-STD-202, Method 101, Condition B
Vibration	4.6.3 → IEC 68-2-6 Fc	MIL-STD-202, Method 204 D, Condition A

## MATERIAL DATA

CONNECTOR PART	STANDARDS	MATERIAL	PLATING
Centre contact	QQ-C-530	beryllium-copper, hardened	gold
Outer contact	QQ-C-530	beryllium-copper, hardened	SUCOPRO
Body	QQ-B-626	brass	SUCOPRO
Crimp ferrules	SUHNER® specification	E-copper	gold
Insulators		PTFE	

Some connectors may have a specification that differs from the above mentioned data.

## Technical Data of PCB Connectors

ELECTRICAL DATA	CECC 22000	REQUIREMENTS		REQUIREMENTS	
		Nominal PCB distance 6.7 mm / .264 in.		Nominal PCB distance 11.7 mm / .461 in.	
Impedance		50 Ω		50 Ω	
Frequency range		DC ... 6 GHz		DC ... 6 GHz	
Typical return loss (mated pair)	H+S	6.3 mm / .248 in.	7.0 mm / .276 in.	11.2 mm / .441 in.	12 mm / .472 in.
- up to 2 GHz		-30 dB	-35 dB	-32 dB	-26 dB
- 2 up to 6 GHz		-30 dB	-23 dB	-23 dB	-20 dB
Dielectric withstanding voltage (at sea level)	4.4.5	1 kV rms, 50 Hz		1 kV rms, 50 Hz	
Working voltage (at sea level)	IEC 169-1 11.6.1	≤ 330 V rms, 50 Hz		≤ 330 V rms, 50 Hz	
Insulation resistance	4.4.4	≥ 1 GΩ		≥ 1 GΩ	
Contact resistance					
- centre contact	4.4.2	≤ 5 mΩ		≤ 5 mΩ	
- outer contact	4.4.3	≤ 1 mΩ		≤ 1 mΩ	

## Technical Data of PCB Connectors (cont.)

RF-LEAKAGE	REQUIREMENTS	REQUIREMENTS
	Nominal PCB distance 6.7 mm / .264 in.	Nominal PCB distance 11.7 mm / .461 in.
MMBX-Interface only up to 2.5 GHz		- 100 dB
PCB to PCB, up to 2.5 GHz	- 45 dB	- 50 dB

MECHANICAL DATA	CECC 22000	REQUIREMENTS	
Engagement force (Slideside)	4.5.4	< 15 N / 3.4 lbs	< 20 N / 4.5 lbs
Disengagement force (Slideside)	4.5.4	< 15 N / 3.4 lbs	< 20 N / 4.5 lbs
Contact captivation	4.5.2	10 N / 2.3 lbs	
Durability (matings)	4.7.1	100	

PROCESSING DATA	CECC 00802	TEST
Soldering method (excluding wave soldering)	6.2 class A	7.2.4 a) cat. 3
Adherent to the print - shearing - pulling (vertical to PCB)	7.3.3	150 N / 33.7 lbs 150 N / 33.7 lbs

MATERIAL DATA			
CONNECTOR PART	STANDARDS	MATERIAL	PLATING
Centre contact	QQ-C-530	beryllium-copper	gold
Outer contact	SUHNER® specification	C97	SUCOPRO
Body	QQ-B-626	brass	SUCOPRO
Insulators		LCP / PFA	

ENVIRONMENTAL DATA	CECC 22000 TEST CONDITIONS	EQUIVALENT MIL TEST CONDITIONS
Temperature range		- 55°C ... +155°C / - 67°F ... + 311°F
Climatic category	→ 55 / 155 / 21	
Thermal shock	4.6.7 → IEC 68-2-14 Na	MIL-STD-202, Method 107 G, Condition B1
Moisture resistance	4.6.6 → IEC 68-2-3 Ca	MIL-STD-202, Method 106 F
Corrosion	4.6.10 → IEC 68-2-11 Ka	MIL-STD-202, Method 101, Condition B
Vibration	4.6.3 → IEC 68-2-6 Fc	MIL-STD-202, Method 204 D, Condition A

Some connectors may have a specification that differs from the above mentioned data.

## Technical Data of Adaptors Between Series

ELECTRICAL DATA	CECC 22000	REQUIREMENTS		
Impedance		50 $\Omega$		
Frequency range		DC ... 6 GHz		
Typical return loss	H+S	DC - 1 GHz - 38 dB	1 - 2.5 GHz - 33 dB	2.5 - 6 GHz - 28 dB
Dielectric withstanding voltage (at sea level)	4.4.5	1 kV rms, 50 Hz		
Working voltage (at sea level)	IEC 169-1 11.6.1	$\leq$ 330 V rms, 50 Hz		
Insulation resistance	4.4.4	$\geq$ 1 G $\Omega$		
Contact resistance				
- centre contact	4.4.2	$\leq$ 5 m $\Omega$		
- outer contact	4.4.3	$\leq$ 1 m $\Omega$		

RF-LEAKAGE	REQUIREMENTS
MMBX Interface only up to 2.5 GHz	- 100 dB
Adaptors up to 2.5 GHz	- 90 dB

MECHANICAL DATA	CECC 22000	REQUIREMENTS
Engagement force (MMBX)	4.5.4	max. 30 N / <i>max. 6.7 lbs</i>
Disengagement force (MMBX)	4.5.4	8 - 30 N / <i>1.8 - 6.7 lbs</i>
Durability (matings)	4.7.1	500

MATERIAL DATA			
CONNECTOR PART	STANDARDS	MATERIAL	PLATING
MMBX Centre contact	QQ-C-530	beryllium-copper	gold
MMBX Outer contact	QQ-B-626/QQ-C-530	brass/beryllium-copper	SUCOPRO
MMBX Body	QQ-B-626/QQ-C-530	brass/beryllium-copper	SUCOPRO
MMBX Insulators		PTFE, LCP / PTFE, PFA	

ENVIRONMENTAL DATA	CECC 22000 TEST CONDITIONS	EQUIVALENT MIL TEST CONDITIONS
Temperature range		- 55°C ... +155°C / - 67°F ... + 311°F
Climatic category	→ 55 / 155 / 21	
Thermal shock	4.6.7 → IEC 68-2-14 Na	MIL-STD-202, Method 107 G, Condition B1
Moisture resistance	4.6.6 → IEC 68-2-3 Ca	MIL-STD-202, Method 106 F
Corrosion	4.6.10 → IEC 68-2-11 Ka	MIL-STD-202, Method 101, Condition B
Vibration	4.6.3 → IEC 68-2-6 Fc	MIL-STD-202, Method 204 D, Condition A

Some connectors may have a specification that differs from the above mentioned data.