

SERIES MMCX MINIATURE MICROAX CONNECTORS

Description

SUHNER® MMCX connectors are intended for use in applications where the smallest dimensions have to be achieved. MMCX connectors can be used in applications from DC to 6 GHz. The reliable "snap-on" coupling mechanism ensures that the electrical parameters are consistently reproduced. Due to its non-slotted outer contact, the MMCX series provides a low RF-leakage.

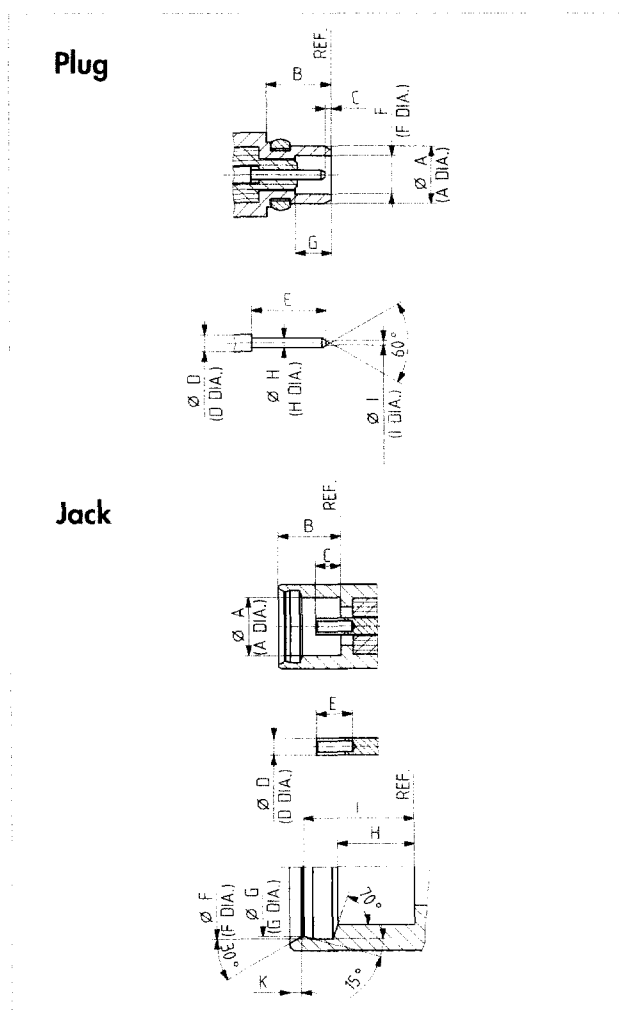
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Interface Dimensions

Interface Dimensions in mm / inches



	Plug		Jack	
	min.	max.	min.	max.
A	—	2.40/.094	2.41/.095	—
B	2.70/.106	—	2.60/.102	—
C	0.00/.000	0.25/.010	0.90/.035	1.20/.047
D	0.70/.028 nom.		0.70/.028 nom.	
E	—	3.15/.124	1.40/.055	—
F	1.58/.062	1.62/.064	3.00/.118	3.04/.120
G	1.45/.057	—	2.88/.113	2.90/.114
H	0.38/.015	0.42/.017	1.57/.062	1.63/.064
I	—	0.20/.008	2.30/.091	2.34/.092
K	—	—	—	0.23/.009

Technical Data

ELECTRICAL DATA	CECC 22000	TEST REQUIREMENTS
Impedance		50 Ω
Frequency range		DC ... 6 GHz (see also Appendix page 436)
VSWR	4.4.1	see table below
RF leakage (measured at 1 GHz) – connectors for flexible cables – connectors for semi-rigid cables	4.4.8	≥ 60 dB ≥ 70 dB
Dielectric withstanding voltage (at sea level)	4.4.5	500 V rms, 50 Hz
Working voltage (at sea level)		≤ 170 V rms, 50 Hz
Insulation resistance	4.4.4	$\geq 10^3$ M Ω
Contact resistance – centre contact – outer contact	4.4.2 4.4.3	≤ 5.0 m Ω ≤ 2.5 m Ω

TYPICAL VSWR	FREQUENCY RANGE			CABLE GROUP
	1 GHZ	2.5 GHZ	6 GHZ	
straight connectors	1.03	1.08	1.12	Y3, Y11
	1.04	1.08	1.12	U1
right angle connectors	1.03	1.08	1.13	Y3, Y11
	1.07	1.12	1.25	U1

Other connectors and cables on request

MECHANICAL DATA	CECC 22000	TEST REQUIREMENTS
Engagement force	4.5.4	≤ 15 N / 3.4 lbs
Disengagement force	4.5.4	6 N ... 15 N / 1.4 lbs ... 3.4 lbs
Contact captivation	4.5.2	≥ 10 N / 2.3 lbs
Cable retention forces ¹⁾	4.5.5	see pages 36 – 41
Durability (matings)	4.7.1	≥ 500

1) value considers maximum load of the cables without irreversible variations of specifications.

ENVIRONMENTAL DATA	CECC 22000 TEST CONDITIONS	EQUIVALENT MIL TEST CONDITIONS
Temperature range		- 55°C ... + 155°C / 67°F ... + 311°F
Climatic category acc. to IEC	4.6.5 → 55 / 155 / 21	
Thermal shock	4.6.7 → IEC 68-2-14 Na	MIL-STD-202, Method 107, Condition F
Moisture resistance	4.6.6 → IEC 68-2-3 Ca	MIL-STD-202, Method 106
Corrosion	4.6.10 → IEC 68-2-11 Ka	Saltspray test acc. to MIL-STD-202, Method 101, Condition B
Vibration	4.6.3 → IEC 68-2-6 Fc	MIL-STD-202, Method 204, Condition C

MATERIAL DATA

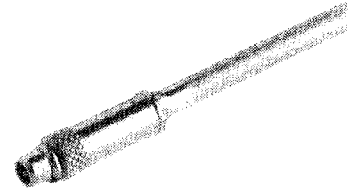
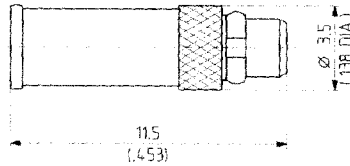
CONNECTOR PART	STANDARDS	MATERIAL	PLATING
Bodies, Crimp ferrules	QQ-B-626	brass	gold
Centre contacts	QQ-C-530	beryllium-copper, hardened	gold
Insulators	ASTM-D-1457, BS 4271 Grade B	PTFE	

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

Cable Connectors for Semi-Rigid Cables

straight plugs

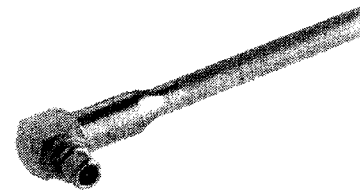
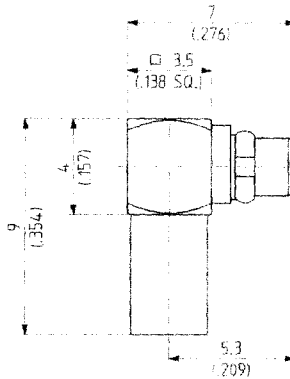
- > cable entry soldered
- > centre contact crimped



SUHNER TYPE	Ident. no.	Cable group (example)	Crimp size	Assembly instruction	Weight	Notes
11 MMCX-50-1-3	• 648893	Y2 (EZ 47)	1	9078	0.50 g/.018 oz.	crimp insert 76 Z-0-2-53
11 MMCX-50-2-1	• 645297	Y3, Y11 (EZ 86)	1	9170	0.50 g/.018 oz.	crimp insert 76 Z-0-2-53

right angle plugs

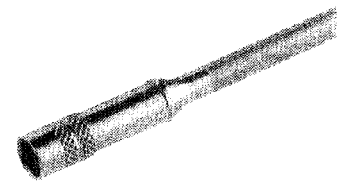
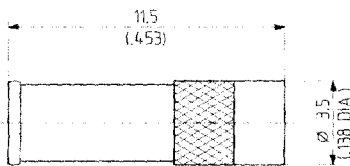
- > cable entry soldered
- > centre contact soldered



SUHNER TYPE	Ident. no.	Cable group (example)	Assembly instruction	Weight	Notes
16 MMCX-50-1-4	• 649182	Y2 (EZ 47)	9077	0.65 g/.023 oz.	
16 MMCX-50-2-1	• 645957	Y3, Y11 (EZ 86)	9176	0.65 g/.023 oz.	

straight jack

- > cable entry soldered
- > centre contact crimped



SUHNER TYPE	Ident. no.	Cable group (example)	Crimp size	Assembly instruction	Weight	Notes
21 MMCX-50-2-1	• 645290	Y3, Y11 (EZ 86)	1	9170	0.50 g/.018 oz.	crimp insert 76 Z-0-2-53

- centre contact captivated

straight bulkhead jacks

- > cable entry soldered
- > centre contact crimped

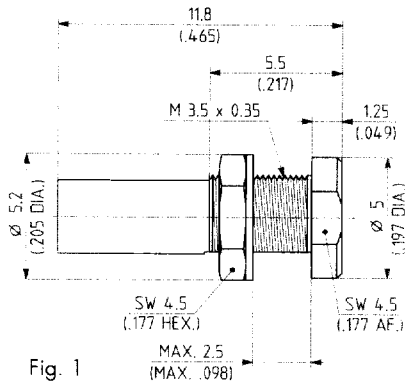


Fig. 1

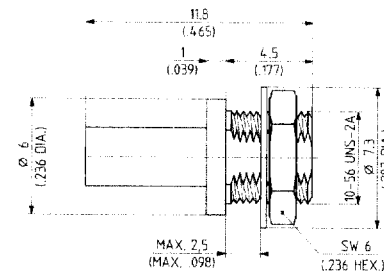
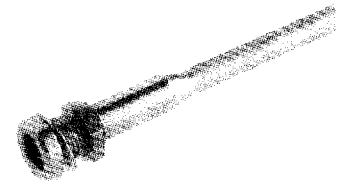


Fig. 2



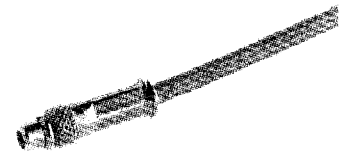
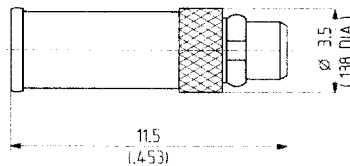
SUHNER TYPE	Ident. no.	Cable group (example)	Crimp size	Assembly instruction	Weight	Fig.	Notes
24 MMCX-50-2-1	● 645954	Y3, Y11 (EZ 86)	1	9170	0.60 g/.021 oz.	1	mounting hole ML 68 rear mounting
24 MMCX-50-2-6	● 650605	Y3, Y11 (EZ 86)	1	9170	0.60 g/.021 oz.	2	mounting hole ML 11 front mounting

crimp insert 76 Z-0-2-53

Cable Connectors for Flexible Cables

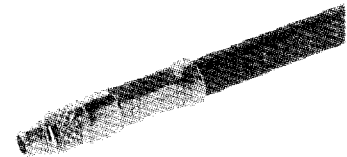
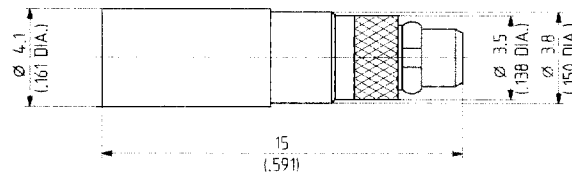
straight plugs

- > SUHNER® full crimp



SUHNER TYPE	Ident. no.	Cable group (example)	Crimp size	Assembly instruction	Weight	Notes
11 MMCX-50-1-1	● 645298	U1 (RG 178 B/U)	1 / 2.67	9169	0.50 g/.018 oz.	

- > SUHNER® full crimp



SUHNER TYPE	Ident. no.	Cable group (example)	Crimp size	Assembly instruction	Weight	Notes
11 MMCX-50-2-3	● 649899	U2 (RG 316/U)	1A	9110	0.83 g/.029 oz.	
11 MMCX-50-2-4	● 649901	U4 (K 02252 D)	1A	9110	0.83 g/.029 oz.	

- centre contact captivated

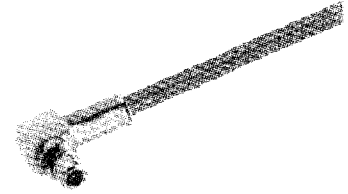
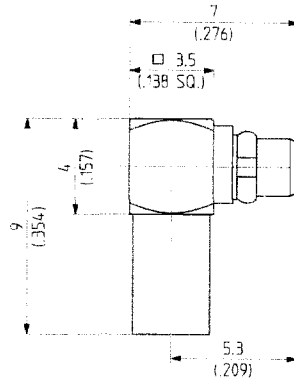
cable groups see page 36

assembly tools see page 403

mounting holes see page 441

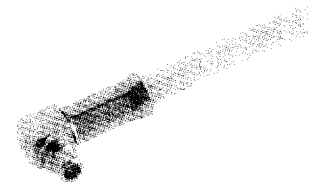
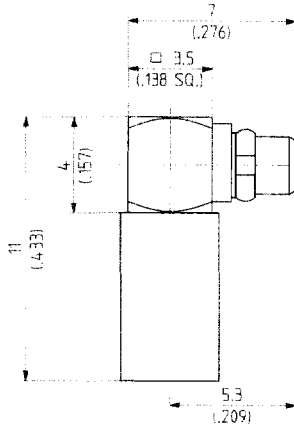
right angle plug

- > cable entry crimp
- > centre contact soldered



SUHNER TYPE	Ident. no.	Cable group (example)	Crimp size	Assembly instruction	Weight	Notes
16 MMCX-50-1-1	• 645955	U1 (RG 178 B/U)	2.67	9175	0.65 g/.023 oz.	

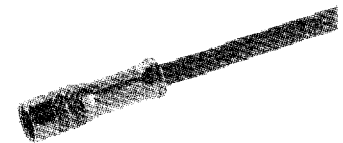
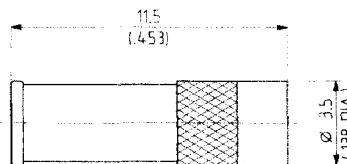
- > cable entry crimp
- > centre contact soldered



SUHNER TYPE	Ident. no.	Cable group (example)	Crimp size	Assembly instruction	Weight	Notes
16 MMCX-50-2-2	• 649374	U4 (K 02252 D)	A	9128	0.86 g/.030 oz.	
16 MMCX-50-2-4	• 649433	U2 (RG 316/U)	A	9128	0.86 g/.030 oz.	

straight jack

- > SUHNER® full crimp

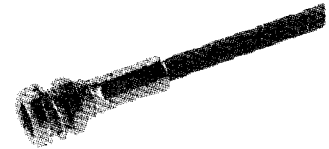
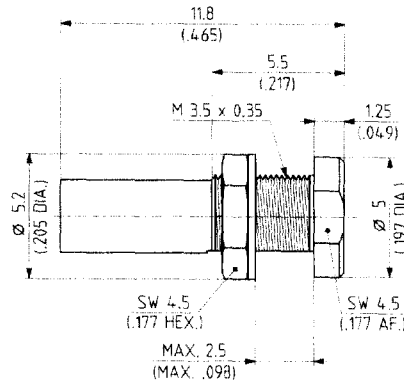


SUHNER TYPE	Ident. no.	Cable group (example)	Crimp size	Assembly instruction	Weight	Notes
21 MMCX-50-1-1	• 645288	U1 (RG 178 B/U)	1 / 2.67	9169	0.50 g/.018 oz.	

- centre contact captivated

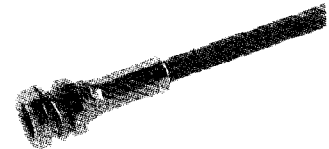
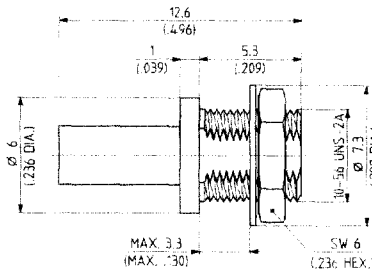
straight bulkhead jack

- > SUHNER® full crimp
- > front mounting



SUHNER TYPE	Ident. no.	Cable group (example)	Crimp size	Assembly instruction	Weight	Notes
24 MMCX-50-1-1	• 645952	U1 (RG 178 B/U)	1 / 2.67	9169	0.60 g / .021 oz.	mounting hole ML 68

- > SUHNER® full crimp
- > rear mounting



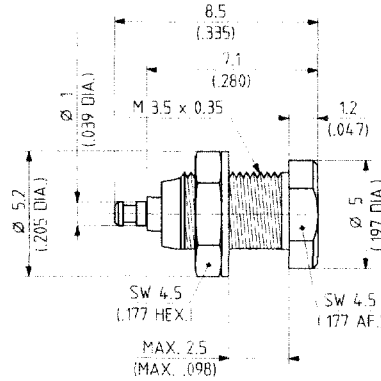
SUHNER TYPE	Ident. no.	Cable group (example)	Crimp size	Assembly instruction	Weight	Notes
24 MMCX-50-1-6	• 652041	U1 (RG 178 B/U)	1 / 2.67	6169	0.60 g / .021 oz.	mounting hole ML 11

- centre contact captivated

Receptacle with Solder Ends

receptacle, female

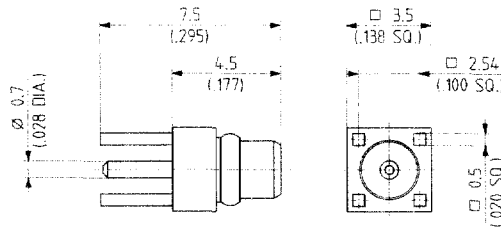
> bulkhead mounted



SUHNER TYPE	Ident. no.	Mounting hole	Weight	Notes
22 MMCX-50-0-1	• 645951	ML 68	0.45 g / .016 oz.	

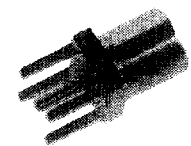
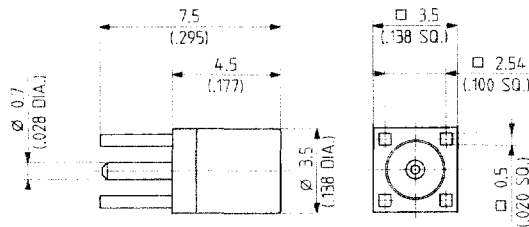
PCB Connectors

straight PCB plug



SUHNER TYPE	Ident. no.	Mounting hole	Weight	Notes
81 MMCX-50-0-1	• 646298	ML 44	0.25 g / .009 oz.	without stand-offs

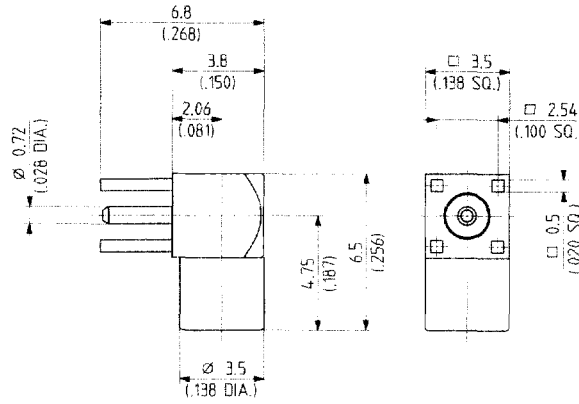
straight PCB jack



SUHNER TYPE	Ident. no.	Mounting hole	Weight	Notes
82 MMCX-50-0-1	• 645958	ML 44	0.25 g / .009 oz.	without stand-offs

• centre contact captivated

right angle PCB jack

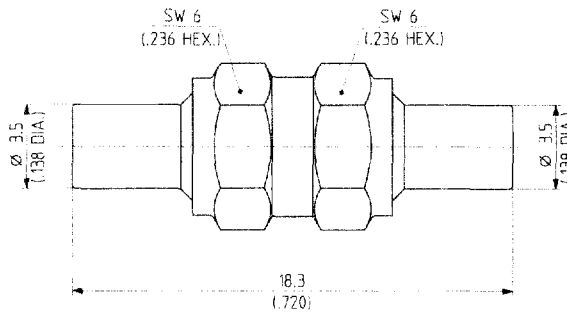


SUHNER TYPE	Ident. no.	Mounting hole	Weight	Notes
85 MMCX-50-0-1	• 645968	ML 44	0.45 g/.016 oz.	without stand-offs

Adaptors Within-Series

straight adaptor

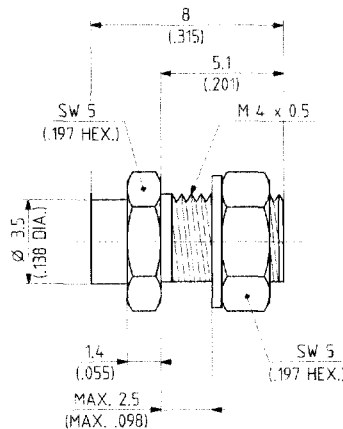
> jack to jack



SUHNER TYPE	Ident. no.	Weight	Notes
31 MMCX-50-0-1	• 645960	2.10 g/.074 oz.	DC - 6 GHz: ≤ 1.10

bulkhead adaptor

> jack to jack



SUHNER TYPE	Ident. no.	Mounting hole	Weight	Notes
34 MMCX-50-0-1	• 650516	ML 88	0.67 g/.023 oz.	DC - 1.5 GHz: ≤ 1.06; 1.5 - 6 GHz: ≤ 1.22

• centre contact captivated



SERIES SMT MMCX MICROMINIATURE COAXIAL CONNECTORS

Description

SUHNER SMT MMCX connectors form a new generation of coaxial connectors. They fully meet today's SMT (Surface Mounted Technology) requirements with superior design, material selection and packaging.

The SMT MMCX incorporates all the advantages of the well-proven MMCX interface:

- high quality of a traditional PCB connector
- excellent reproducibility of electrical characteristics up to 6 GHz
- outstanding mechanical characteristics due to the superior MMCX snap-on mechanism
- wide MMCX product range with many choices of cable type, connector style and adaptors.

The combination design is capable of both vertical and horizontal mounting. This allows stocking of only one part number for customers who load their own SMT magazines.

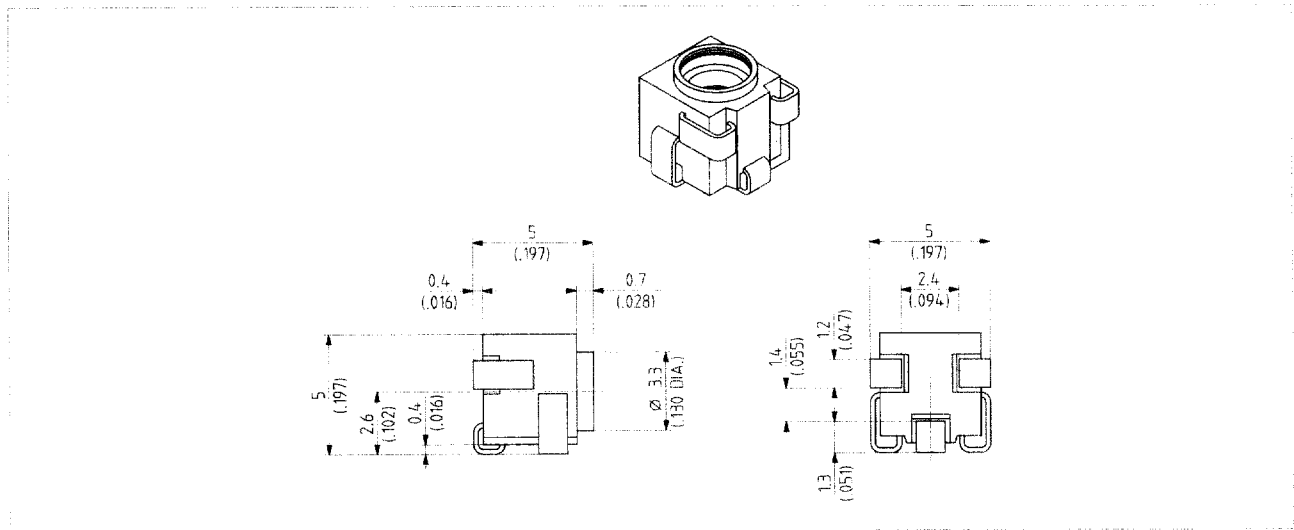
SUHNER SMT connectors are suitable for all reflow-soldered SMT-PCBs where impedance matching or screened signal transmission is necessary.

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Dimensions



Technical Data

ELECTRICAL DATA	CECC 22000	TEST REQUIREMENTS
Impedance		50 Ω
Frequency range		DC ... 6 GHz (see also Appendix page 436)
VSWR (mated pair) – up to 4 GHz – 4 up to 6 GHz		≤ 1.15 ≤ 1.40
Dielectric withstanding voltage (at sea level)	4.4.5	500 V rms, 50 Hz
Working voltage (at sea level)		≤ 170 V rms, 50 Hz
Insulation resistance	4.4.4	≥ 500 MΩ
Contact resistance – center conductor – outer conductor	4.4.2 4.4.3	≤ 10 mΩ ≤ 5 mΩ

MECHANICAL DATA	CECC 22000	TEST REQUIREMENTS
Engagement force	4.5.4	≤ 15 N / 3.4 lbs
Disengagement force	4.5.4	6 N ... 15 N / 1.4 ... 3.4 lbs
Contact captivation	4.5.2	≥ 10 N / 2.3 lbs
Durability (matings)	4.7.1	≥ 500

ENVIRONMENTAL DATA	CECC 22000 TEST CONDITIONS	EQUIVALENT MIL TEST CONDITIONS
Temperature range		– 40°C ... + 90°C / – 40°F ... + 194°F
Climatic class acc. to IEC	4.6.5 → 40 / 90 / 21	
Temperature shock	4.6.7	MIL-STD-202, Method 107, – 40°C/– 40°F and + 90°C/ + 194°F, 30 min. each
Humidity	4.6.6	MIL-STD-202, Method 103, Condition B
Vibration	4.6.3	3 cycles in 3 opposite directions 10–150 Hz, 10–60 Hz: 0.75 mm/.030 in., 60–150 Hz: 10 g
Mechanical shock	4.6.4	MIL-STD-202, Method 213, Condition B

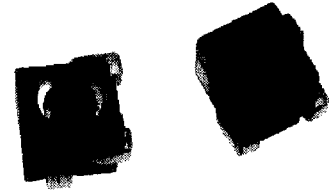
PROCESSING DATA	CECC 00802	TEST
Soldering method (excluding wave soldering)	6.2 class A	7.2.4. a), cat. 1 and 3
Resistance to soldering heat	7.2.2	7.2.4. a), cat. 1
Solderability	7.2.1	7.2.4. b)
Leaching	7.2.3	7.2.4. b), 10 s
Adherent to the print – bending of PCB – shearing – pulling (vertical to PCB)	7.3.2 7.3.3	1 mm/.040 in., 30 s 40 N/9.0 lbs, 10 s 60 N/13.5 lbs, 10 s

MATERIAL DATA			
CONNECTOR PART	STANDARDS	MATERIAL	PLATING
Leads Contact socket	ASTM-B-103	phosphor bronze	tinned gold
Outer conductor	QQ-B-626	brass	gold
Body / insulator		LCP (liquid crystal polymer)	

SMT MMCX Connectors

SMT combination jack

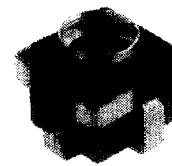
bulk packaging 100 pcs.



SUHNER TYPE	Ident. no.	PCB-Layout	Weight	Notes
90 MMCX-S50-0-51	650505	see application notes	0.20 g/.007 oz.	

SMT jack for straight (vertical) applications

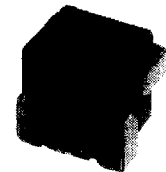
tape-and-reel packaging



SUHNER TYPE	Ident. no.	PCB-Layout	Weight	Notes
82 MMCX-S50-0-51	650299	see application notes	0.20 g/.007 oz.	blister tape containing 750 pcs.
82 MMCX-S50-0-51	650504	see application notes	0.20 g/.007 oz.	blister tape containing 1500 pcs.

SMT jack for right angle (horizontal) applications

tape-and-reel packaging



SUHNER TYPE	Ident. no.	PCB-Layout	Weight	Notes
85 MMCX-S50-0-51	650298	see application notes	0.20 g/.007 oz.	blister tape containing 750 pcs.
85 MMCX-S50-0-51	650503	see application notes	0.20 g/.007 oz.	blister tape containing 1500 pcs.

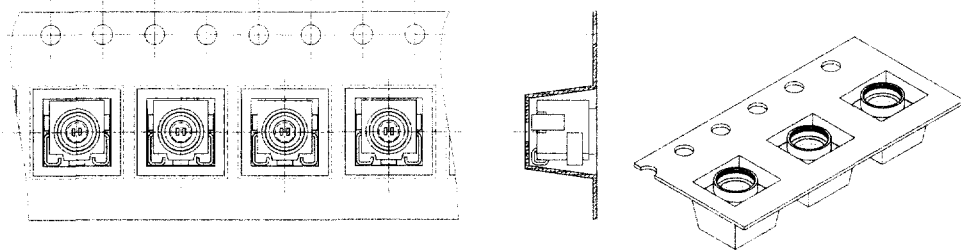
Packaging

Blister tape supply in accordance with IEC 286-3/EIA-481

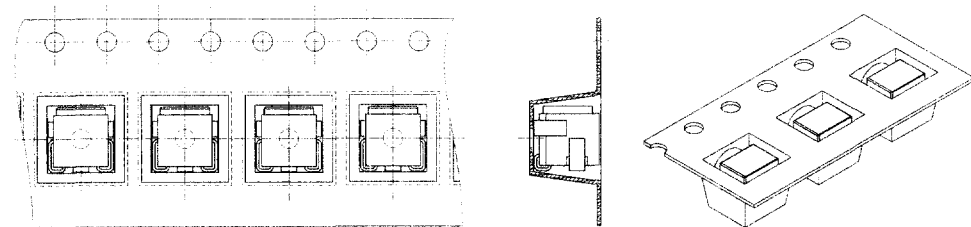
For automated placement the connectors can be supplied on industry standard tape-and-reel. Depending on the application, they are packaged uniformly either for vertical or horizontal mounting.

Bulk supply in bags of 100 pcs. (90 MMCX-S50-0-51)

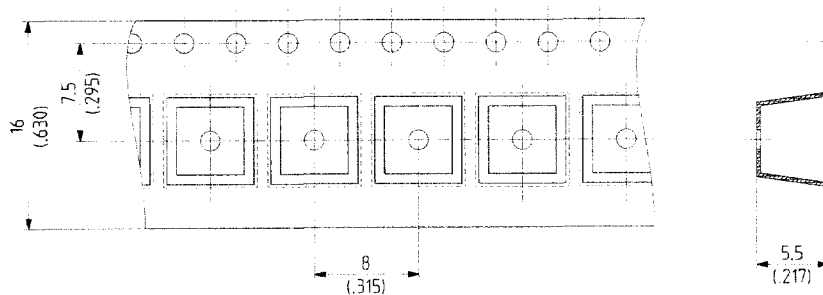
This delivery form supports vertical or horizontal applications of the SMT MMCX connector. It is suitable for manual or automated tube fed pick-and-place assembly.



1. straight (vertical) application (82 MMCX-S50-0-51)



2. right angle (horizontal) application (85 MMCX-S50-0-51)

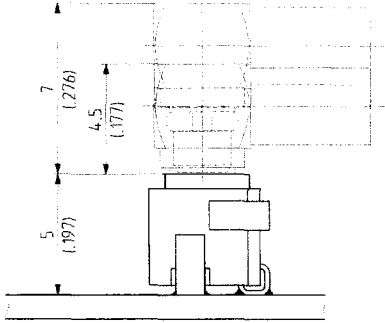


Dimensions of blister carrier tape

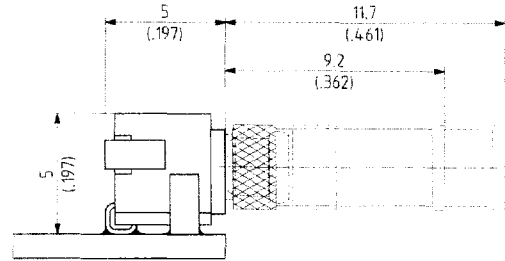
The 16 mm/.63 inches blister tape is delivered on reels of 330 mm/13 inches diameter and in tough cardboard boxes.

Application Notes

Dimensions of mated pair and clearance for mating



Vertical mounting together with a right angle cable connector (can be rotated by 360°)



Horizontal mounting together with a straight cable connector

Appropriate operation

Surface-mounted electronic components exhibit a lower adherence force to the PCB than through-hole components.

The solder joints act as a mechanical fixation to the board and also function as the electrical contact. Therefore the following has to be considered:

- Avoid forces from the cable of the mating connector to the surface mount connector.

Fix the cable sufficiently and in several places.

- Apply only axial forces during the mating and demating of the connector parts.

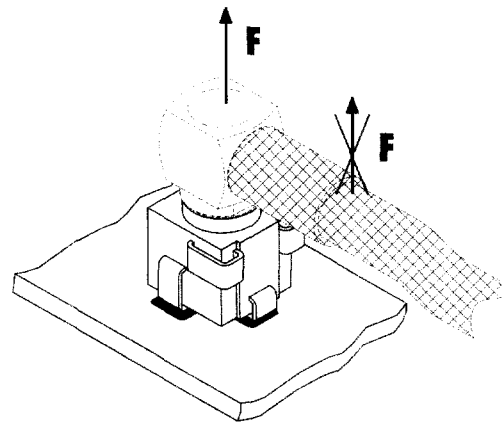
Non-axial forces — such as improper pulling at the cable entry or the cable portion of right angle mating connector — may cause excessive torque forces, which could result in damage to the solder joints.

Recommendation:

Application of the assembly tools 74 Z-0-0-225 or 74 Z-0-0-272 when disengaging right angle connectors. The tool 74 Z-0-0-272 can simultaneously be used as a mating support for straight connectors.



Warning:
force must not be applied to this region



1. Vertical mounting (82 MMCX-S50-0-51)

You have the choice between the contact of the suction tip on the outer edge of the outer conductor sleeve (convenient circular or square standard tip) or the insertion of a special tip into the connector interface.

When using an insertion tip consider that the outer conductor sleeve is only centered along one axis.

A chuck alignment is possible only along this axis, which however is fully sufficient.

2. Horizontal mounting (85 MMCX-S50-0-51)

The suction tip meets an even surface and can be a suitable standard one:

- Vision system alignment inspection

The optical alignment inspection of the SMT MMCX connector is supported by its asymmetrical contour in vertical as well as horizontal applications.

- Placement

For placing the connectors, the special arrangement of the leads must be considered. When applying a suction tip, the eccentricity of the outer conductor sleeve has to be taken into account.

Soldering

SMT MMCX connectors are compatible with reflow soldering methods.

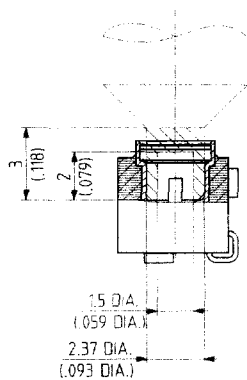
Infrared soldering (IR, IC – max. 260°C/500°F, 10 s) and vapour phase soldering (215°C/419°F, max. 30 s) are recommended.

Normal "eutectic" solder pastes (63% tin, 37% lead, metal content 85 – 90%) can be used with a thickness of 0.20 mm/.008 inches to 0.25 mm/.010 inches if stencilled or screened in accordance with our recommended mounting pattern. The stand-off of 0.4 mm/.016 inches enables an easy visual inspection of the soldered joint.

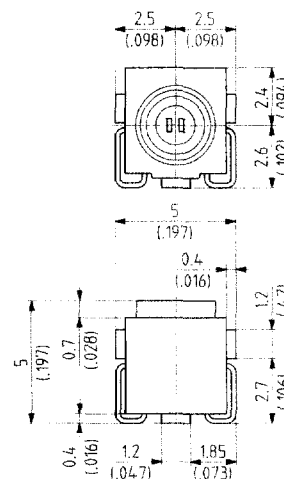
Cleaning

The stand-off also allows effective cleaning after soldering, if necessary. It is especially advantageous when applying aqueous solutions.

Because of the material used, SMT MMCX connectors withstand solvents such as alcohols, halogenated hydrocarbons and azeotropic solutions, as well as water mixed with alkaline saponifiers (refer to CECC 00802).



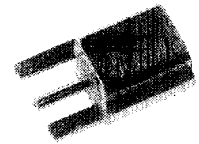
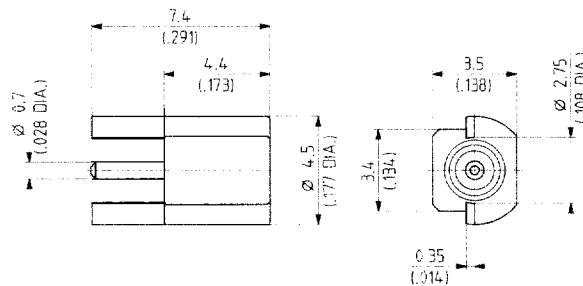
recommendation for an insertion tip



SMT MMCX Connectors (Edge Mount)

For the electrical data and temperature range of edge mount types, please see the MMCX standard specifications page 44.

SMT jack for horizontal applications



SUHNER TYPE	Ident. no.	PCB-Layout	Weight	Notes
82 MMCX-S50-0-2	648789	see application note	0.20 g/.007 oz.	
82 MMCX-S50-0-2	649680	see application note	0.20 g/.007 oz.	bulk packaging 100 piece
82 MMCX-S50-0-2	649679	see application note	0.20 g/.007 oz.	blister tape containing 750 pcs /tape-and-reel
82 MMCX-S50-0-2	650668	see application note	0.20 g/.007 oz.	blister tape containing 1500 pcs./tape-and-reel

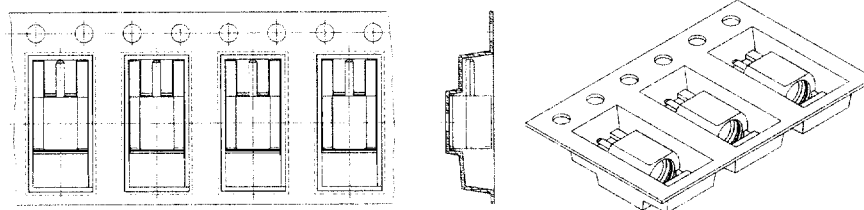
Packaging

Blister tape supply in accordance with IEC 286-2/EIA-481

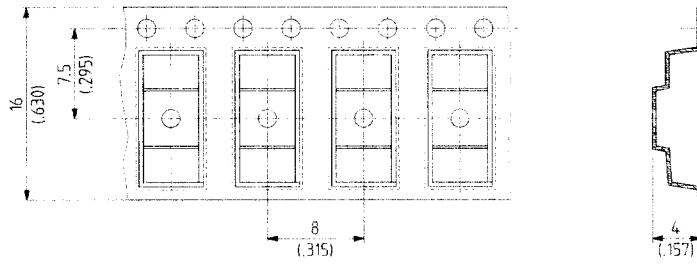
For automated placement the connectors can be supplied on industry standard type-and-reel.

Bulk supply in bags of 100 pcs.

It is suitable for manual or automated tube fed pick-and-place assembly.



straight (horizontal) application

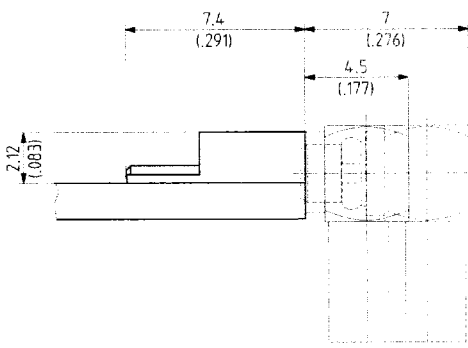


dimensions of blister carrier tape

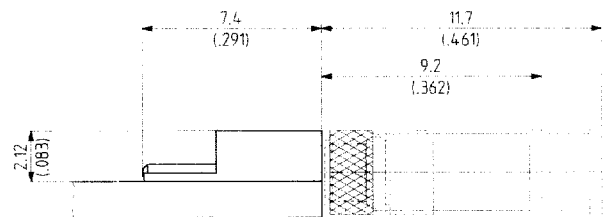
The 16 mm/ .63 inches blister tape is delivered on reels of 330 mm/ 13 inches diameter, in a tough cardboard box.

Application Notes

Dimensions of mated pair and clearance for mating



Horizontal mounting together with a right angle cable connector



Horizontal mounting together with a straight cable connector

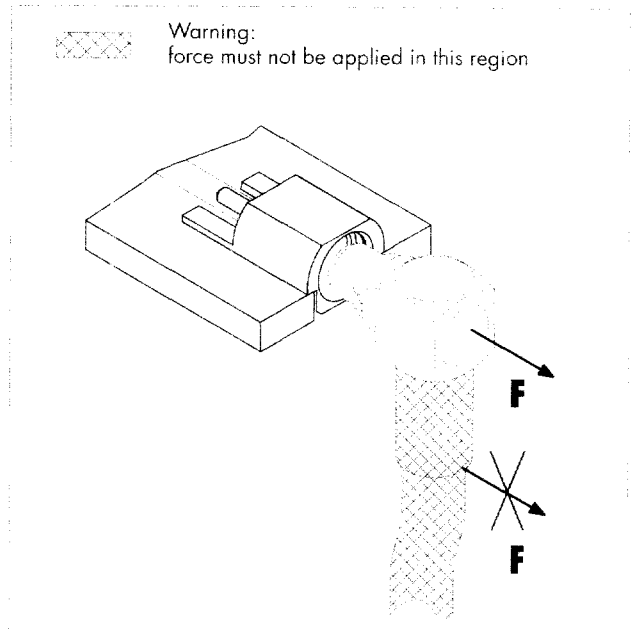
Appropriate operation

For appropriate operation the following has to be considered:

- Avoid forces from the cable of the mating connector to the surface mount connector.
- Fix the cable sufficiently and in several places.
- Apply only axial forces during the mating and demating of the connector parts.

Non-axial forces — such as improper pulling at the cable entry or the cable portion of a right angle mating connector — may cause excessive torque forces, which could result in damage to the solder joints.

For further information about soldering or cleaning, please see page 59.

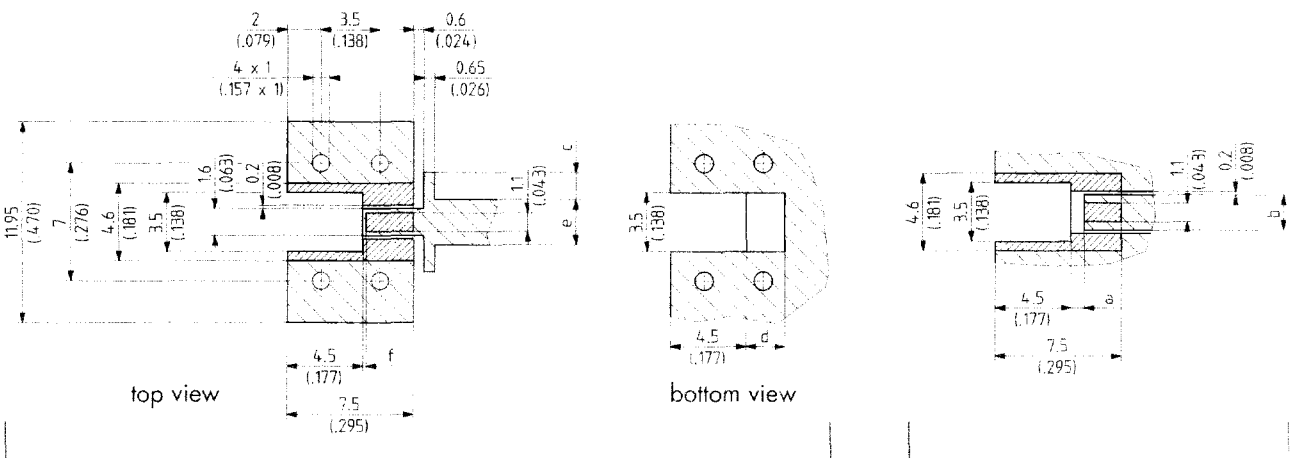


Recommended mounting pattern

Material FR 4 ($\epsilon_r = 4.6$)

pattern

land (free of solder mask)



Microstrip line

Coplanar line

PCB thickness	a	b	c	d	e	f
0.8 mm / .031 in.	1.6 / .063	1.90 / .075		1.1 / .043	1.4 / .055	1.0 / .039
1.0 mm / .039 in.	1.4 / .055	1.75 / .069	0.3 / .012	1.2 / .047	1.8 / .071	0.9 / .035
1.6 mm / .063 in.	0.8 / .031	1.55 / .061	1.6 / .063	2.3 / .091	2.8 / .110	0.4 / .016

Automated pick-and-place

Instructions for automated pick-and-place process see page 58.