

Series MMCX – micro miniature connectors

Description

HUBER+SUHNER MMCX connectors are intended for use in applications where the smallest dimensions have to be achieved. These 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.

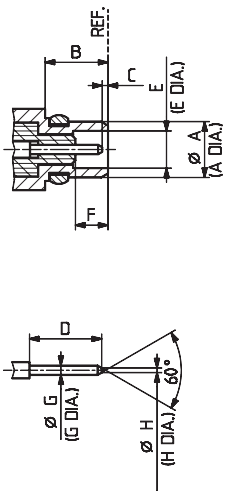
In addition, HUBER+SUHNER SMT MMCX connectors fully meet today's SMT (Surface Mount Technology) requirements with superior design, material selection and packaging. The HUBER+SUHNER SMT connectors are suitable to all reflow-soldered SMT-PCBs where impedance matching or screened signal transmission is necessary.

Content

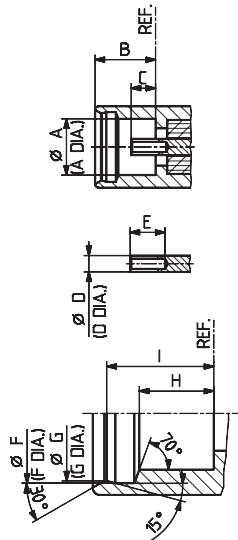
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Interface dimensions (mm/inches)

Plug (male)



Jack (female)



	Plug		Jack	
	min.	max.	min.	max.
A	-	2.40/0.094	2.41/0.095	-
B	2.70/0.106	-	-	2.65/0.104
C	0.00/0.000	0.25/0.010	0.90/0.035	1.20/0.047
D	1.23/0.048	-	0.70/0.028 nom.	
E	1.58/0.062	1.62/0.064	1.40/0.055	-
F	1.23/0.048	-	3.00/0.118	3.04/0.120
G*	0.38/0.015	0.42/0.017	2.88/0.113	2.92/0.115
H	-	0.20/0.008	1.57/0.062	1.63/0.064

	Jack		
G ¹⁾	2.88/0.113	2.90/0.114	2.92/0.115
I	2.34/0.092	2.30/0.091	2.26/0.089

Interface dimensions conformable to the standards:

International: IEC 61169-52

¹⁾ I is rated to G

Series MMCX – technical data

Electrical data	CECC 22000	Requirements
Impedance		50 Ω
Frequency range		DC to 6 GHz
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	≥ 10 ³ MΩ/≥ 500 MΩ ¹⁾
Contact resistance		
• Centre contact	4.4.2	≤ 5.0 mΩ/≥ 10 MΩ ¹⁾
• Outer contact	4.4.3	≤ 2.5 mΩ/≥ 5 MΩ ¹⁾
VSWR (mated pair)	4.4.1	(typical values)
• Up to 4 GHz		≤ 1.15
• 4 up to 6 GHz		≤ 1.40
		for cable connectors, see table below
RF leakage (measured at 1 GHz)	4.4.8	≥ 60 dB
• Connectors for flexible cables		≥ 70 dB
• Connectors for semi-rigid cables		

¹⁾ valid for MMCX "cube" connectors only

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

Mechanical data	CECC 22000	Requirements
Engagement force	4.5.4	≤ 15 N/3.4 lbs
Disengagement force	4.5.4	6 to 15 N/1.4 to 3.4 lbs
Contact captivation	4.5.2	≥ 10 N/2.3 lbs
Cable retention force ¹⁾	4.5.5	see pages 32 - 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 to +155 °C/-67 to +311 °F
Climatic category	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

Series MMCX – technical data

Environmental data for "cube" connectors only	CECC 22000 test conditions	Equivalent MIL test conditions
Temperature range		-40 to +90 °C/-40 to +194 °F
Climatic category	4.6.5 → 40/90/21	
Thermal shock	4.6.7	MIL-STD-202, method 107, -40 °C/40 °F and +90 °C/+194 °F, 30 min. each
Moisture resistance	4.6.6	MIL-STD-202, method 103, condition B
Vibration	4.6.3	3 cycles in 3 opposite directions 10 to 150 Hz, 10 to 60 Hz: 0.75 mm/0.030 in., 60 to 150 Hz: 10 G
Mechanical shock	4.6.4	MIL-STD-202, method 213, condition B

Material data		
Connector parts	Material	Plating
Centre contact	copper-beryllium alloy, bronze	gold/SUCOPRO® gold plating
Body	brass	gold/SUCOPRO® gold plating
Crimp ferrules	brass	gold/SUCOPRO® gold plating
Insulators	PTFE or PFA	

Material data for "cube" connectors only		
Connector parts	Material	Plating
Leads Contact sockets	bronze	gold
Body	LCP (liquid crystal polymer), brass	gold
Outer contact	brass	gold
Insulators	LCP (liquid crystal polymer), PTFE or PFA	

Processing data		
for "cube" connectors only	Test standard	Requirement
Lead free reflow process	IPC/JEDECJ-STD-020C	recommended
Adherent to the print <ul style="list-style-type: none"> • Shearing • Pulling (vertical to PCB) 		25 N/5.6 lbs 50 N/11.2 lbs

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

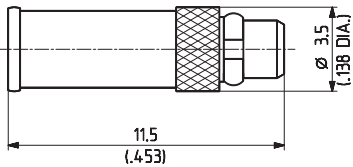
The products are designed and guaranteed to pass the above mentioned test procedures. Any additional or different requirement arising from specific applications or environmental conditions which is not covered by these test procedures is subject to request.

Series MMCX – cable connectors

Straight cable plugs (male)

For semi-rigid cables

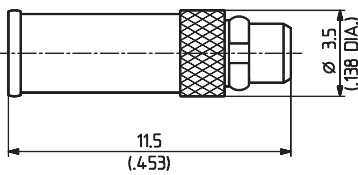
- Cable entry soldered
- Centre contact crimped



HUBER+SUHNER type	Item no.	Cable group (example)	Packaging	Assembly instruction	Crimp insert
11_MMCX-50-1-3/111_OE	22648893	Y2 (EZ_47)	single	9078	1
11_MMCX-50-2-1/111_OE 11_MMCX-50-2-1/111_OH	22645297 22649039	Y3, Y11, Y16 (EZ_86)	single bulk 100 pcs.	9170	

For flexible cables

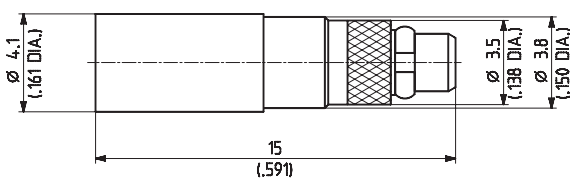
- HUBER+SUHNER full crimp



HUBER+SUHNER type	Item no.	Cable group (example)	Packaging	Assembly instruction	Crimp insert
11_MMCX-50-1-1/111_OE 11_MMCX-50-1-1/111_OH	22645298 22651666	U1 (EF_178)	single bulk 100 pcs.	9169	1/2.67
11_MMCX-50-1-2/111_OE 11_MMCX-50-1-2/111_OH	22645296 84027753	U0 (K_01152-07)	single bulk 100 pcs.		

For flexible cables

- HUBER+SUHNER full crimp



HUBER+SUHNER type	Item no.	Cable group (example)	Packaging	Assembly instruction	Crimp insert
11_MMCX-50-2-3/111_OE 11_MMCX-50-2-3/111_OH	22649899 23000258	U2 (EF_316)	single bulk 100 pcs.	9110	1 A
11_MMCX-50-2-4/111_OE	22649901	U4 (EF_316_D)	single		

Series MMCX – cable connectors

Right angle cable plugs (male)

For semi-rigid cables

- Cable entry soldered
- Centre contact soldered

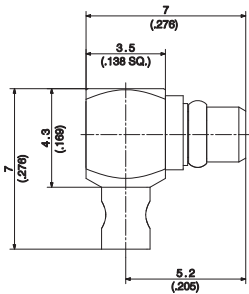


Fig. 1

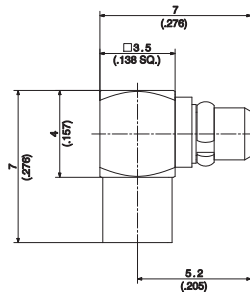


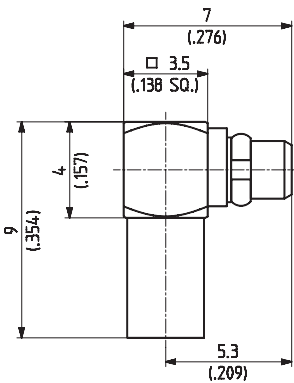
Fig. 2



HUBER+SUHNER type	Item no.	Cable group (example)	Packaging	Assembly instruction	Fig.
16_MMCX-50-1-12/111_OE 16_MMCX-50-1-12/111_OH	84030531 21000178	Y2, Y15 (EZ_47)	single bulk 100 pcs.	0000180777	1
16_MMCX-50-2-13/111_OE 16_MMCX-50-2-13/111_OH	84032569 84007944	Y3, Y11 (EZ_86)	single bulk 100 pcs.	0000214734	2

For flexible cables

- Cable entry crimp
- Centre contact soldered



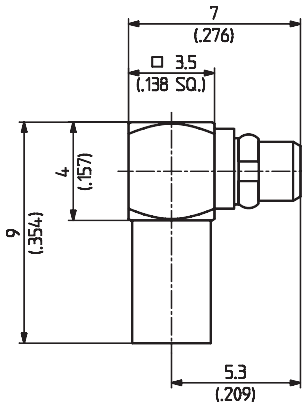
HUBER+SUHNER type	Item no.	Cable group (example)	Packaging	Assembly instruction	Crimp insert
16_MMCX-50-1-1/111_OE 16_MMCX-50-1-1/111_OH	22645955 22648762	U1 (EF_178)	single bulk 100 pcs.	9175	2.67

Series MMCX – cable connectors

Right angle cable plugs (male)

For flexible cables

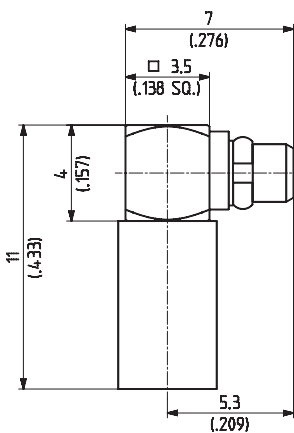
- Cable entry crimp
- Centre contact soldered



HUBER+SUHNER type	Item no.	Cable group (example)	Packaging	Assembly instruction	Crimp insert
16_MMCX-50-1-2/111_OE	22645956	U0 (K_01152-07)	single	9175	2.67
16_MMCX-50-1-2/111_OH	22649009		bulk 100 pcs.		

For flexible cables

- Cable entry crimp
- Centre contact soldered



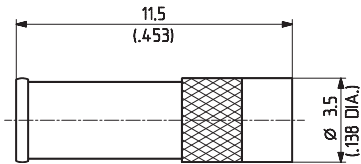
HUBER+SUHNER type	Item no.	Cable group (example)	Packaging	Assembly instruction	Crimp insert
16_MMCX-50-2-2/111_OE	22649374	U4 (EF_316_D)	single	9128	A
16_MMCX-50-2-2/111_OH	22651401		bulk 100 pcs.		
16_MMCX-50-2-4/111_OE	22649433	U2 (EF_316)	single		
16_MMCX-50-2-4/111_OH	22649635		bulk 100 pcs.		

Series MMCX – cable connectors

Straight cable jacks (female)

For semi-rigid cables

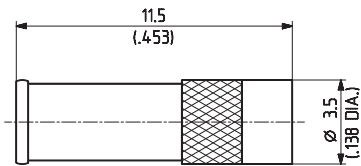
- Cable entry soldered
- Centre contact crimped



HUBER+SUHNER type	Item no.	Cable group (example)	Packaging	Assembly instruction	Crimp insert
21_MMCX-50-2-1/111_OE	22645290	Y3, Y11, Y16 (EZ_86)	single	9170	1

For flexible cables

- HUBER+SUHNER full crimp

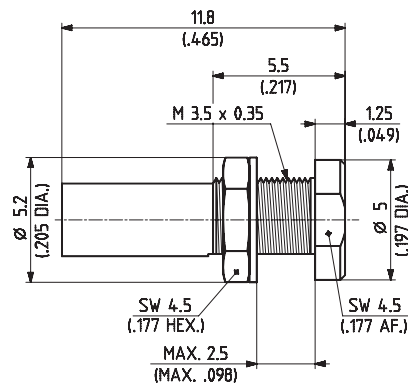


HUBER+SUHNER type	Item no.	Cable group (example)	Packaging	Assembly instruction	Crimp insert
21_MMCX-50-1-1/111_OE	22645288	U1 (EF_178)	single	9169	1/2.67
21_MMCX-50-1-2/111_OE	22645289	U0 (K_01152-07)			

Straight bulkhead cable jacks (female)

For semi-rigid cables

- Cable entry soldered
- Centre contact crimped
- Front mounting



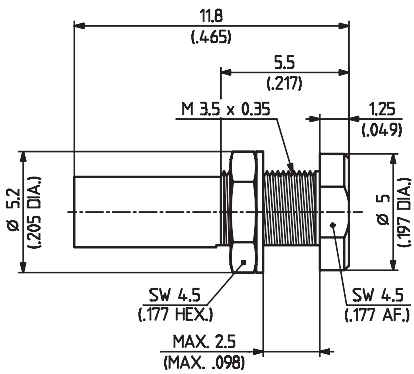
HUBER+SUHNER type	Item no.	Cable group (example)	Packaging	Assembly instruction	Mounting hole	Crimp insert
24_MMCX-50-2-1/111_OE	22645954	Y3, Y11, Y16 (EZ_86)	single	9170	ML68	1

Series MMCX – cable connectors

Straight bulkhead cable jacks (female)

For flexible cables

- HUBER+SUHNER full crimp
- Front mounting

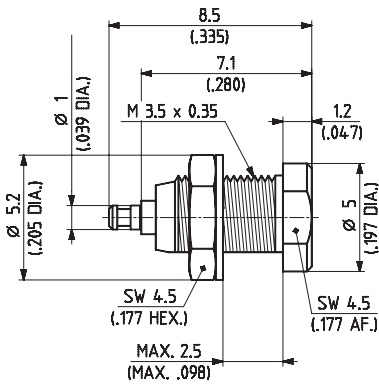


HUBER+SUHNER type	Item no.	Cable group (example)	Packaging	Assembly instruction	Mounting hole	Crimp insert
24_MMCX-50-1-1/111_OE	22645952	U1 (EF_178)	single	9169	ML68	1/2.67
24_MMCX-50-1-1/111_OH	23000416		bulk 100 pcs.			

Series MMCX – receptacles with solder end

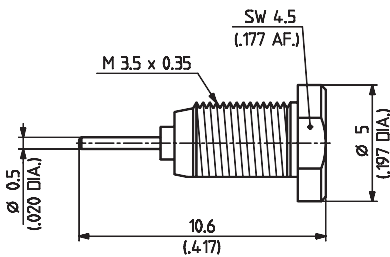
Receptacles, jacks (female)

- Bulkhead mounted



HUBER+SUHNER type	Item no.	Packaging	Mounting hole
22_MMCX-50-0-1/111_OE	22645951	single	ML 68
22_MMCX-50-0-1/111_OH	22660126	bulk 100 pcs.	

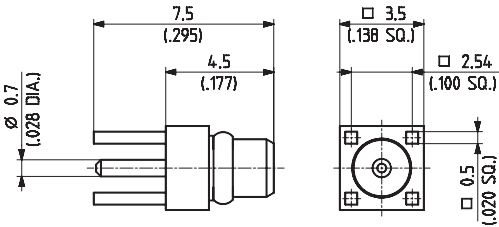
- Bulkhead mounted



HUBER+SUHNER type	Item no.	Packaging	Mounting hole
22_MMCX-50-0-4/111_OH	22660282	bulk 100 pcs.	M 3.5 × 0.35

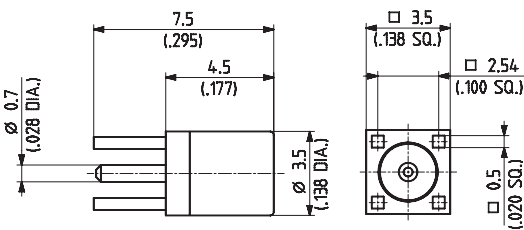
Series MMCX – PCB connectors

Straight PCB plugs (male)



HUBER+SUHNER type	Item no.	Packaging	Mounting hole	Notes
81_MMCX-50-1-1/111_OE	22646298	single	ML 44	without stand-off

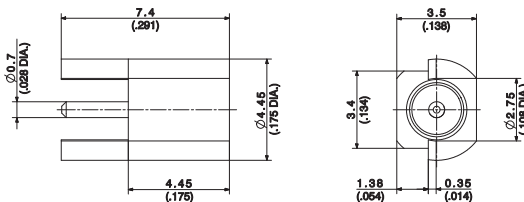
Straight PCB jacks (female)



HUBER+SUHNER type	Item no.	Packaging	Mounting hole	Notes
82_MMCX-50-0-1/111_NE	22645958	single	ML 44	without stand-off
82_MMCX-50-0-1/111_NH	22648469	bulk 100 pcs.		

Jacks for horizontal applications

- Edge mount



HUBER+SUHNER type	Item no.	Packaging	PCB layout	Notes
82_MMCX-S50-0-2/111_KE	22648789	single	see application notes on page 126	
82_MMCX-S50-0-2/111_KH	22649680	bulk 100 pcs.		
82_MMCX-S50-0-2/111_KG	22649679	tape and reel	see application notes on page 126	blister tape containing 750 pcs.
82_MMCX-S50-0-2/111_KL-1	23041776			blister tape containing 1500 pcs.

Series MMCX – PCB connectors

Straight PCB jacks (female)

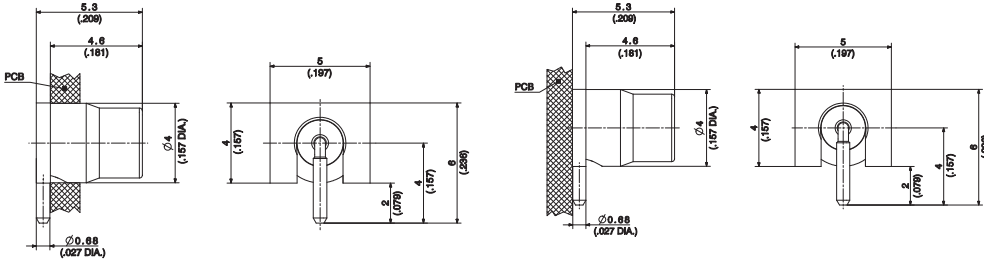


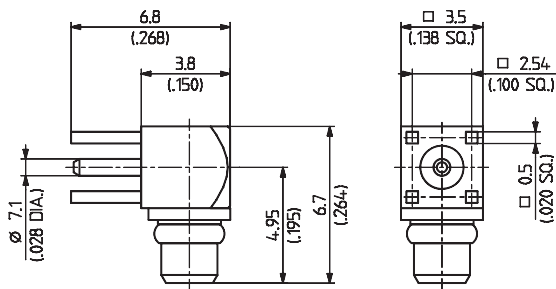
Fig. 1

Fig. 2



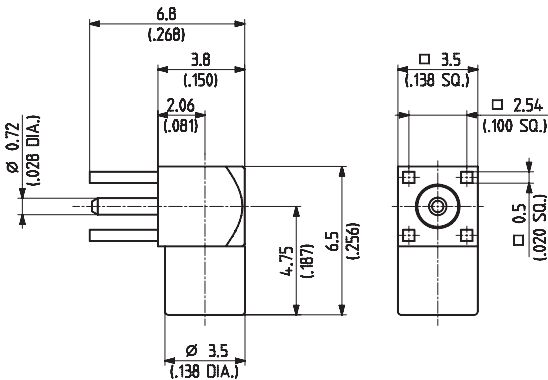
HUBER+SUHNER type	Item no.	Packaging	Mounting hole	Notes	
82_MMCX-50-0-8/111_OE	22652153	single	ML 167	through-hole mount	1
82_MMCX-50-0-8/111_OM	22660270	tape and reel			
82_MMCX-50-0-18/111_OM	23023564	tape and reel	ML 130	surface mount technology	2

Right angle PCB plugs (male)



HUBER+SUHNER type	Item no.	Packaging	Mounting hole	Notes
84_MMCX-50-0-1/111_OH	22658819	bulk 100 pcs.	ML 44	without stand-off

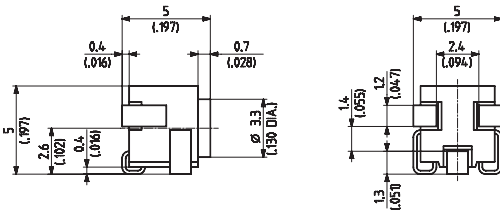
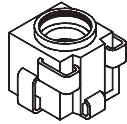
Right angle PCB jacks (female)



HUBER+SUHNER type	Item no.	Packaging	Mounting hole	Notes
85_MMCX-50-0-1/111_OE	22645968	single	ML 44	without stand-off
85_MMCX-50-0-1/111_OH	22646636	bulk 100 pcs.		

Series MMCX – "cube" connectors

Jacks for straight (vertical) applications



HUBER+SUHNER type	Item no.	Packaging	PCB layout	Notes
82_MMCX-S50-0-55/119_OM	84021645	tape and reel	see application notes on page 126	blister tape containing 1500 pcs.

Jacks for right angle (horizontal) applications



HUBER+SUHNER type	Item no.	Packaging	PCB layout	Notes
85_MMCX-S50-0-55/119_OM	84021646	tape and reel	see application notes on page 126	blister tape containing 1500 pcs.

Combination jack

for straight (vertical) or right angle (horizontal) applications



HUBER+SUHNER type	Item no.	Packaging	PCB layout
90_MMCX-S50-0-55/119_OE	84021577	single	see application notes on page 126
90_MMCX-S50-0-55/119_OH	84021269	bulk 100 pcs.	

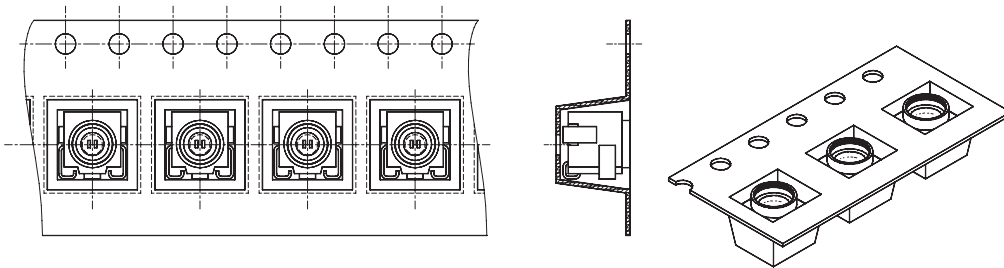
Series MMCX – "cube" connectors – packaging

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

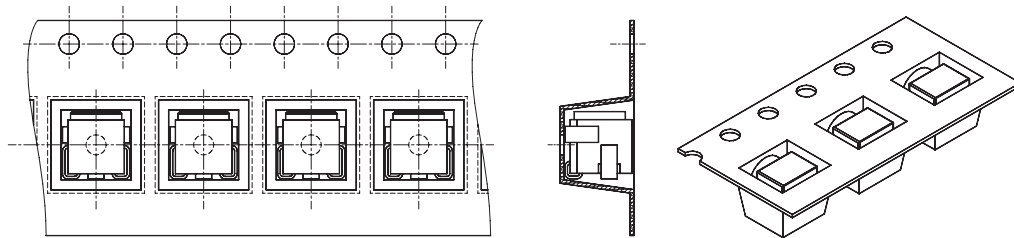
For automated placement the connectors can be supplied on industry standard tape-and-reel. Depending on the application, they are packaged uniformly either for vertical or horizontal mounting.

Bulk supply in bags of one single or 100 pcs. (90_MMCX-S50-0-55)

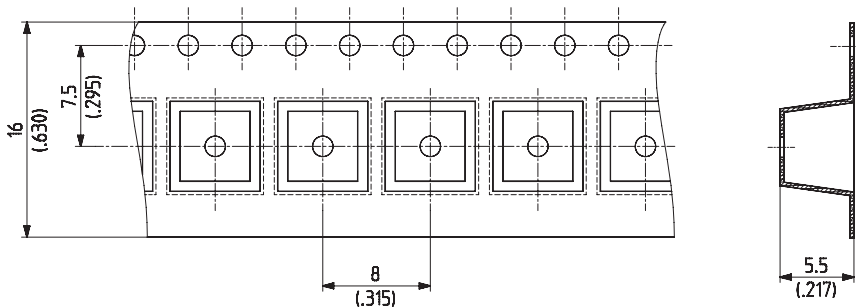
This delivery form supports vertical or horizontal applications of the SMT MMCX connector. It is suitable for manual or automated tube fed pick-and-place assembly.



1. Straight (vertical) application (82_MMCX-S50-0-55)



2. Right angle (horizontal) application (85_MMCX-S50-0-55)

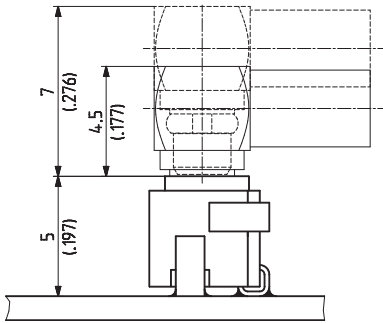


Dimensions of blister carrier tape

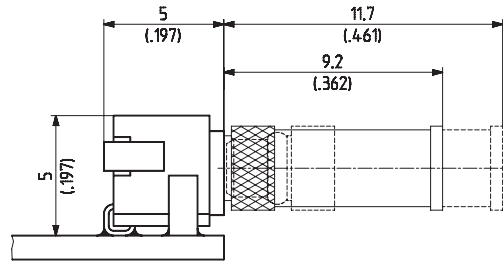
The 16 mm/0.630 in. blister tape is delivered on reels of 330 mm/13 in. diameter and in tough cardboard boxes.

Series MMCX – "cube" connectors – 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.

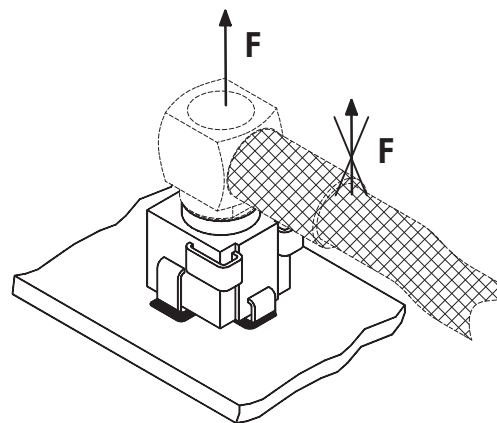
Non-axial forces – such as improper pulling at the cable entry or the cable portion of right angle mating connector – may cause excessive torque forces, which could result in damage to the solder joints.

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.



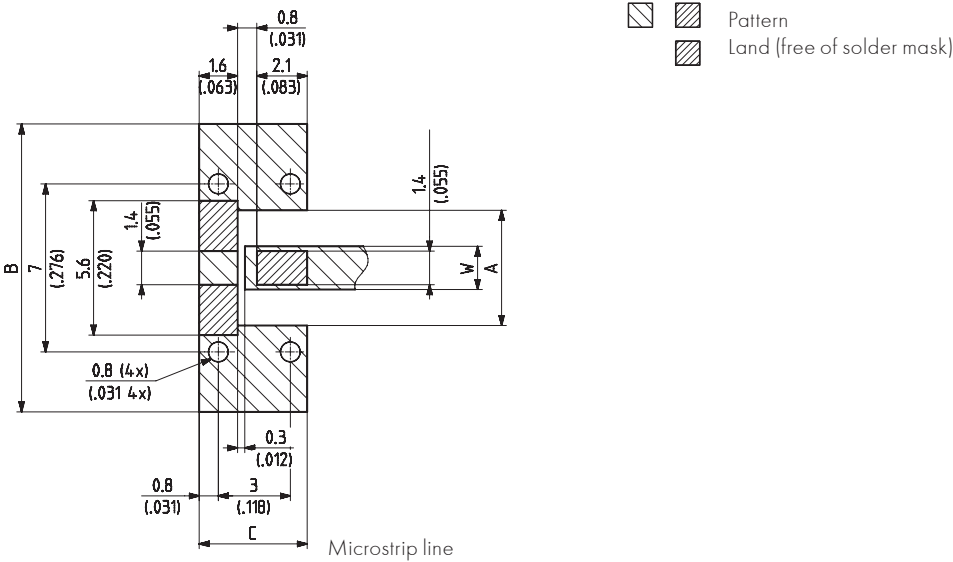
Warning:
force must not be applied to this region.



Series MMCX - "cube" connectors - application notes

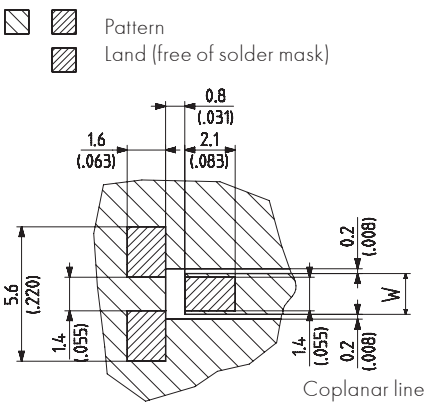
Recommended mounting pattern

Material FR 4 ($\epsilon_r = 4.6$)



PCB thickness	W	A	B	C
1.0 mm/0.039 in	1.8 mm/0.071 in	2.4 mm/0.094 in	12 mm/0.472 in	4.5 mm/0.177 in
1.6 mm/0.063 in	2.8 mm/0.110 in	4.8 mm/0.189 in	16 mm/0.630 in	5.0 mm/0.197 in

Material FR 4 ($\epsilon_r = 4.6$)



PCB thickness	W
0.8 mm/0.031 in	1.85 mm/0.037 in
1.0 mm/0.039 in	1.70 mm/0.067 in
1.2 mm/0.047 in	1.60 mm/0.063 in
1.6 mm/0.063 in	1.50 mm/0.159 in

Data valid for PCB material FR 4 ($\epsilon_r = 4.6$)

Series MMCX – "cube" connectors – application notes

Automated pick-and-place for MMCX "cube" connectors

The MMCX "content" connectors can be processed on all state-of-the-art pick-and-place machines.

Application hints

- Position of the connectors in the carrier tape
For the uniform orientation of the connectors refer to the figures in section "packaging" (see page 125).
- Connector pick up by suction tip
Vertical mounting (82_MMCX-S50-0-55)
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.

Horizontal mounting (85_MMCX-S50-0-55)

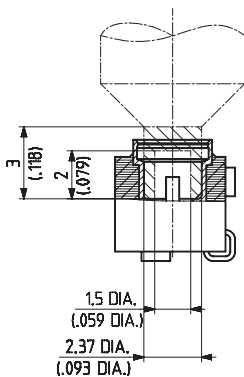
The suction tip meets an even surface and can be a suitable standard one:

Vision system alignment inspection

The optical alignment inspection of the MMCX "cube" 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.



Recommendation for an insertion tip

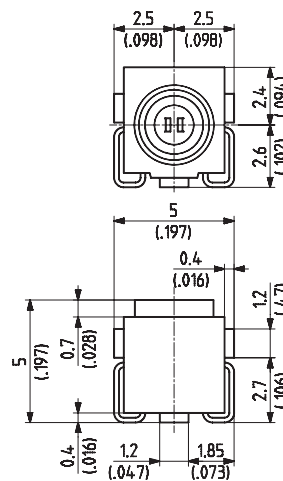
Soldering

MMCX "cube" connectors are compatible with reflow soldering methods. Infrared soldering (IR, IC – max. 260 °C/ 500 °F, 10 s) is recommended. Lead free solder pastes (96.5 % tin, 3.5 % silver) can be used with a thickness of 0.20 mm/0.008 in. to 0.25 mm/0.010 in. if stencilled or screened in accordance with our recommended mounting pattern. The stand-off of 0.4 mm/0.016 in. 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, MMCX "cube" connectors withstand solvents such as alcohols, halogenated hydrocarbons and azeotropic solutions, as well as water mixed with alkaline saponifiers.



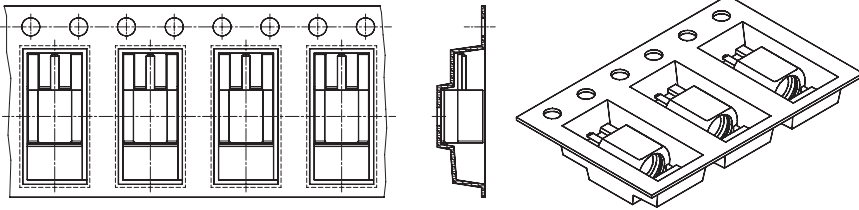
Series MMCX – edge mount connectors – packaging

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

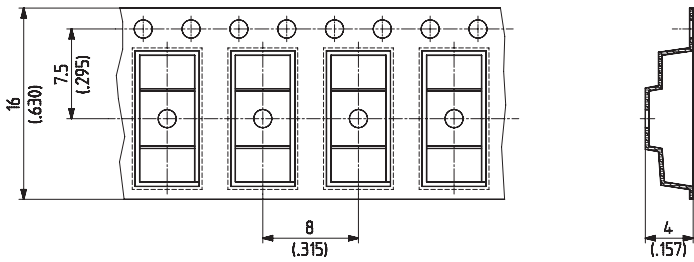
Bulk supply in bags of 100 pcs.

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

This delivery form is suitable for manual or automated tube fed pick-and-place assembly.



Straight (horizontal) application

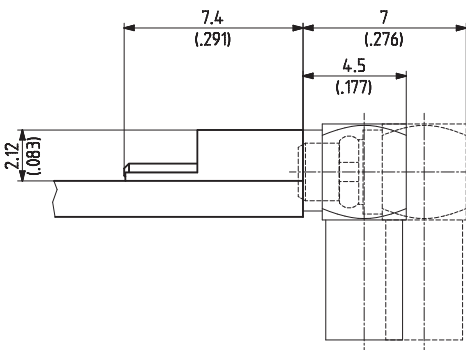


Dimensions of blister carrier tape

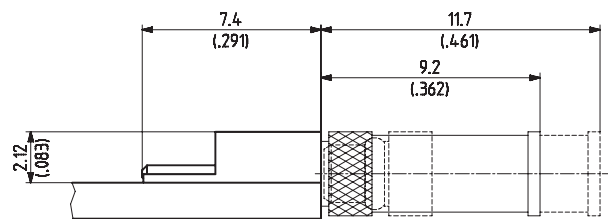
The 16 mm/0.630 in. blister tape is delivered on reels of 330 mm/13 in. diameter and in tough cardboard box.

Series MMCX edge mount connectors – 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.

Series MMCX – edge mount connectors – application notes

Appropriate operation for MMCX edge mount

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 128.

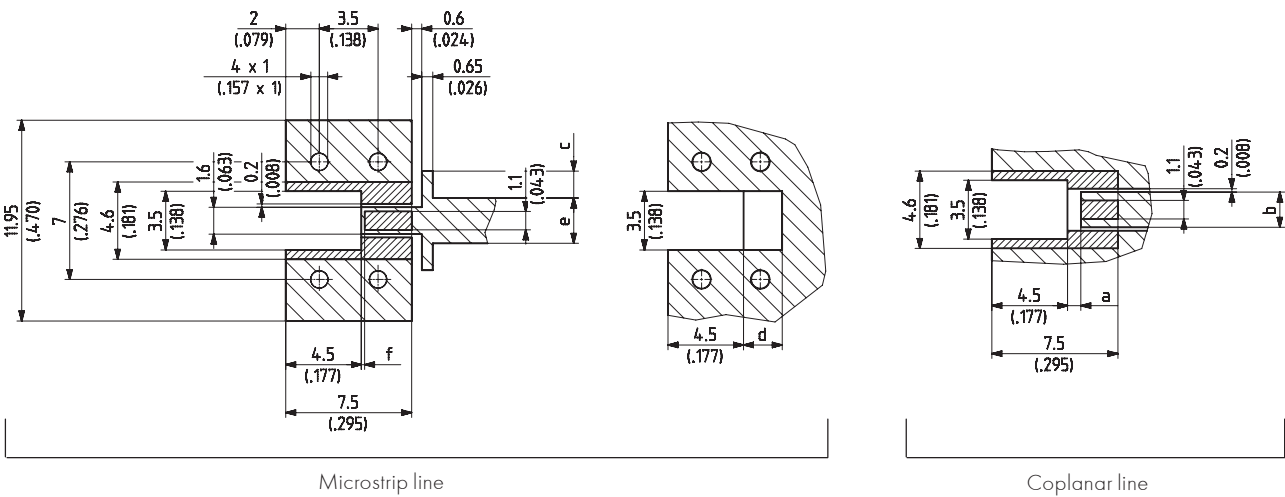
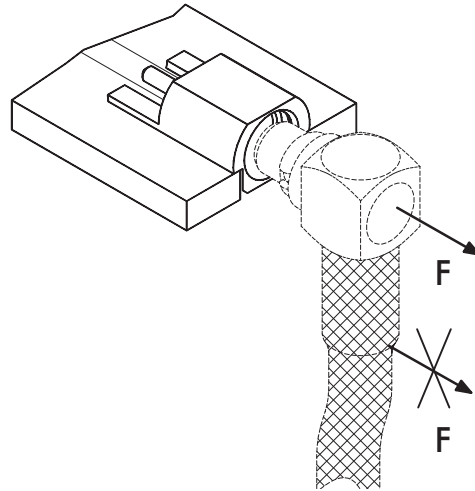
Recommended mounting pattern for MMCX edge mount

Material FR 4 ($\epsilon_r = 4.6$)

-   Pattern
-  Land (free of solder mask)



Warning:
force must not be applied to this region.



PCB thickness	a	b	c	d	e	f
0.8 mm/0.031 in.	1.6/0.063	1.90/0.075		1.1/0.043	1.4/0.055	1.0/0.039
1.0 mm/0.039 in.	1.4/0.055	1.75/0.069	0.3/0.012	1.2/0.047	1.8/0.071	0.9/0.035
1.6 mm/0.063 in.	0.8/0.031	1.55/0.061	1.6/0.063	2.3/0.091	2.8/0.110	0.4/0.016