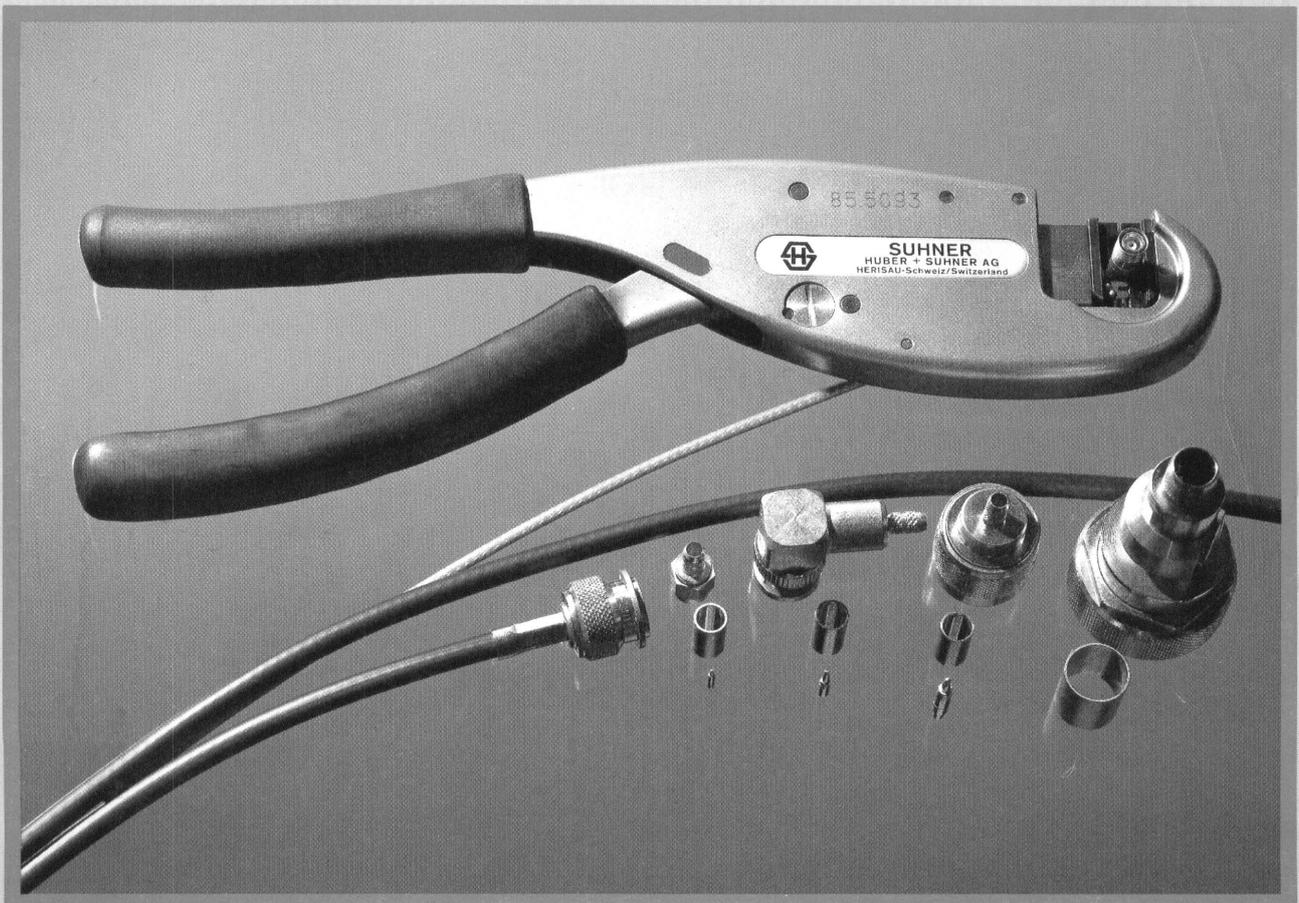




SUHNER CRIMPING SYSTEM FOR RF CONNECTORS

HUBER+SUHNER AG, RF and Microwave Division, Herisau/Switzerland



Crimp Technique

The SUHNER Crimp Technique is a reliable and economic connecting system for RF connectors.

The ever increasing need for RF coaxial connectors, constant shortage of qualified personnel and the need for higher reliability, demands a safe and rational connecting technique. Therefore RF connectors with crimp cable entry («Crimp Technique») gain more and more in importance.

With the crimp technique, conductors and contacts are connected to each other by a single application of defined force. The only accessory needed is a simple, easy to use tool.

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The demand for an improved connecting technique

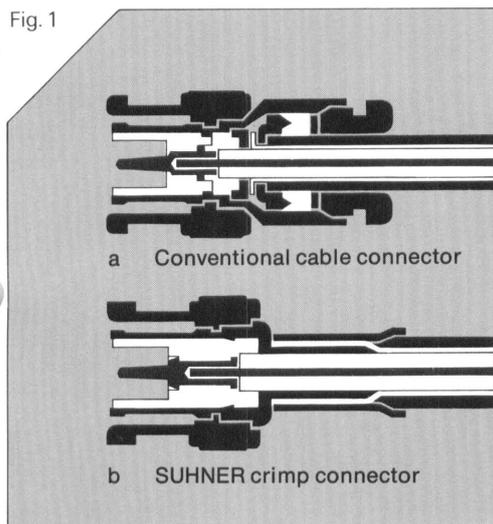
Cold welding replaces soldering

Crimping inner conductor

Conventional connecting techniques require soldered inner connections, while the screen contact depends on a pressure joint (Fig. 1).

The soldering requires skill and practice. Excessive heat damages the cable dielectric and can cause eccentricity of the cable's inner conductor. Unacceptable reflections result. A satisfactory pressure joint of the cable's outer conductor is achieved with several components. This means complicated stripping, awkward assembly, and possibly assembly mistakes.

Fig. 1



The requirements for a better connecting technique are accordingly:

- simple assembly, shorter assembly time
- no heat effect
- less components
- increased reproducibility, i.e. quality independent of the skill of the assembly personnel

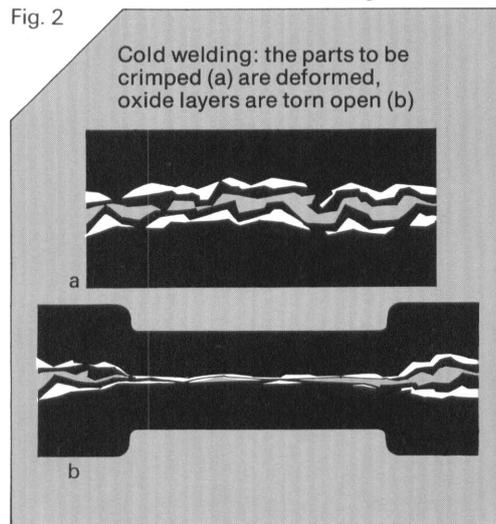
A reliable contact and sufficient mechanical strength must obviously be maintained.

Object of the crimping process is the achievement of a positive mechanical compression and cold welded connection. The effect of the force applied by the crimping tool on the contact components must be maintained after crimping.

This is the case when the originally soft connector parts harden during the crimping process and are thereby permanently deformed.

The crimp action should result in a high degree of cold welding between connector parts and cable. For this the metal parts to be connected must be brought within atomic spacing. They are then held by the occurring van der

Fig. 2



Waal forces (dispersion forces) and partly form a continuous metal structure.

An approach to the required spacing is only possible through deformation of the components. Thereby the surface is smoothed (Fig. 2) and the oxide and impurity layers are torn open.

Good cold welding and high contact pressure require accordingly:

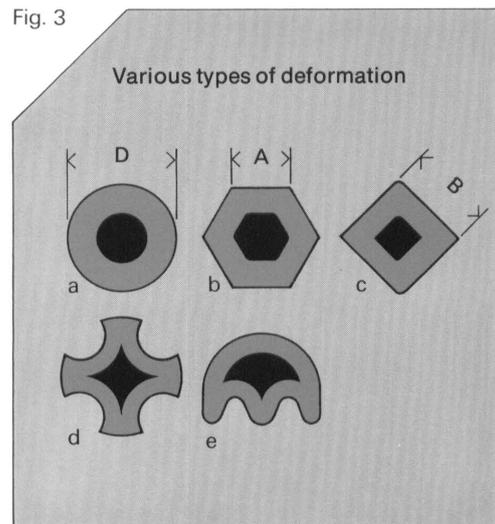
- largest possible deformation
- use of soft materials
- clean, oxide- and grease-free surfaces

Excessive deformation of the contact parts leads to a mechanical weakness, embrittlement and cracking of the crimped joint. With coaxial connectors the effect is aggravated, in that, for reasons of impedance matching, much deviation from the circular form is not possible.

Hence only type b and c of the deformations shown in Fig. 3 are suitable for RF connectors. Moreover, soft materials (e.g. copper) cannot be used for contact pins and contact sockets.

Tests made with square and hexagonal crimpings prove that unacceptable embrittlement or formation of cracks occurs, as soon as the circumference of

Fig. 3



the crimped part becomes smaller than that of the uncrimped part.

The basis for dimensioning crimp joints with maximum acceptable deformation is: $D\pi = 6A = 4B$.

Assuming this law of equal periphery, the cross-sectional area of a square is 78.6% of the original circle area (area deformation degree), but is still 90.5% for a hexagon.

The area reduction for square crimping is accordingly 2.25 times as large as for the hexagonal crimping!

Crimping outer conductors

This means a considerably greater pressure effect on the conductor to be connected, a better cold welding and therefore a connection of higher reliability.

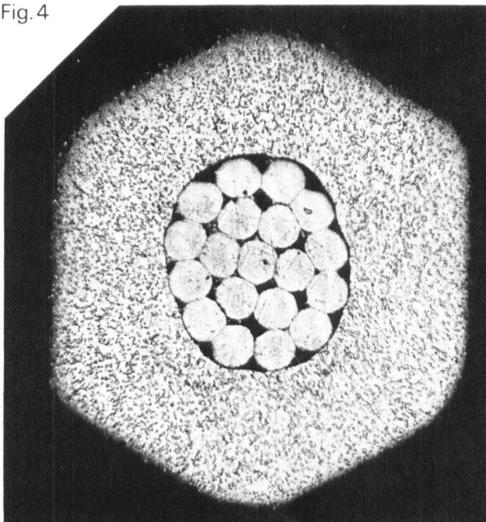
Fig. 4 shows microsections of hexagonal and square crimpings (RG 58 C/U, BNC) which were both dimensioned according to the law of equal periphery. The force necessary for crimping is in both cases 320 kp.

In Fig. 5 are shown the results of a series of tests on crimped inner conductors of series N connectors and RG 214/U cable. The relationship of crimp recesses to the uncrimped pin circumferences are given as percentages, and are shown relative to the pull out force. Optimum results are achieved with circumference ratios of 100% to 104%.

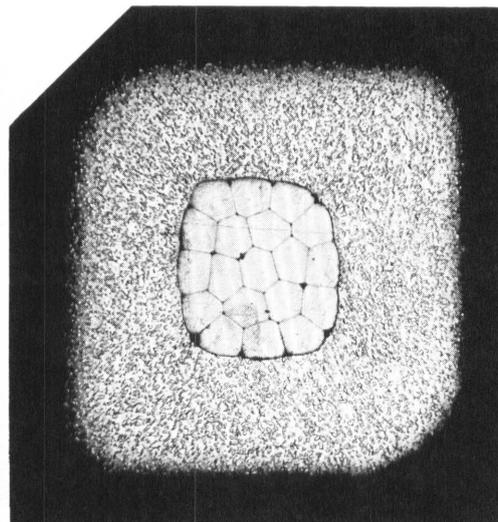
Here the same points of view apply. The wires of the cable screen are pressed on to the crimp spigot by means of an additional ferrule (Fig. 6). The crimp spigot must be of sufficient strength not to be deformed or flattened under the crimping pressure.

For obvious reasons, hexagonal crimping is used exclusively. The law of equal periphery is again valid for dimensioning. It is especially advantageous to provide the crimp spigot with a knurl in order to obtain an additional form of locking.

Fig. 4

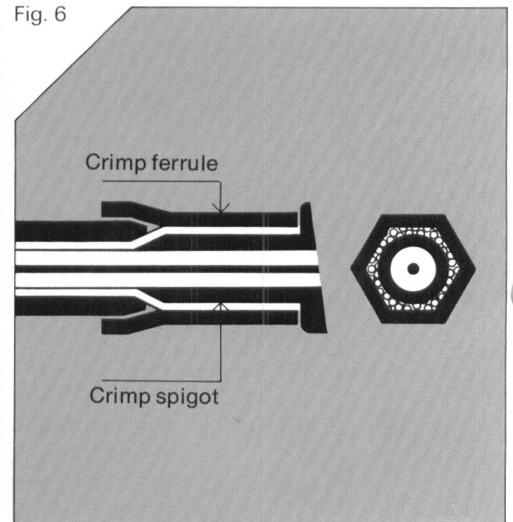


Crimping in accordance with MIL-C-39012, Category D, Pin 16-10
Pull-out force: 7 kp



SUHNER square crimping
Pull-out force: 12 kp

Fig. 6



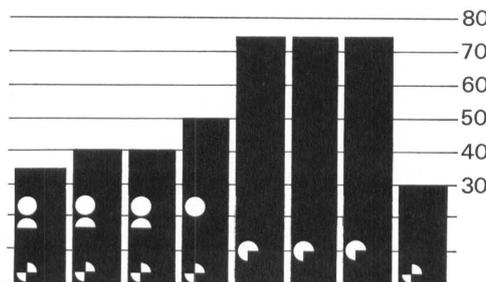
Crimping outer conductor

Fig. 5

Results of crimping tests on Series N inner conductors and RG 214/U cable

Pull-out force kp

Formation of fins
Formation of cracks
Inner conductor is pulled out
Inner conductor fractures



Crimp recess related to pin circumference 92 94 96 98 100 102 104 106%
Dimension of square crimp recess 2,15 2,2 2,25 2,3 2,35 2,4 2,45 2,5 mm

High demands on material, dimensions and tools

Narrow tolerances and accurately controlled materials, together with connectors, cables and tools made to fit one another, are indispensable in achieving a reliable crimp connection. The requirements of the crimp inserts are:

- exact maintenance of size
- high strength and hardness
- fine surface finish

As can be seen in Fig. 5, the best results were obtained with square dimensions of 2.35–2.45 mm. Permissible tolerances of ± 0.05 mm can be derived therefrom. For smaller square dimensions (e.g. for subminiature connectors of the Series SMA, SMB, SMC, SMS) tolerances of ± 0.03 mm are in fact necessary.

The demands upon the crimp inserts are very high. With crimping forces of 300–700 kp (Fig. 10), surface pressures up to 70 kp/mm² occur. Oil or air-hardened steels must therefore be used, which are profile ground in the hard state. This process permits maintenance of size and high surface finish.

The most important requirements of the contact parts are:

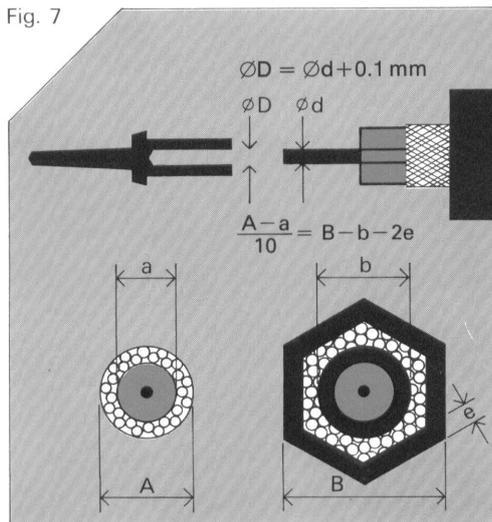
- matched exactly to the cable to be crimped
- close tolerances
- use of soft materials with controlled hardness

The dimensions of the crimping components must be individually adjusted to

the different RF cables. The formulas shown in fig. 7 are valid as a basis for dimensioning. In order to guarantee a constant quality of the crimped joint, the dimensions of the inner conductor must be maintained to 0.03 mm, those of the outer conductor to 0.05 mm.

- D = pin hole
- d = diameter of the inner conductor
- A = outside diameter of screen
- a = dielectric diameter
- B = hexagonal width of the crimp ferrule
- b = outside diameter of the crimp spigot
- e = wall thickness of crimp ferrule

Fig. 7



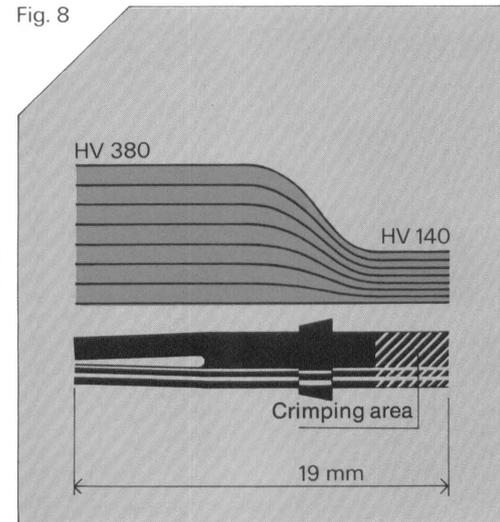
Basic rules for dimensioning crimp components

The components to be deformed should be made of the softest possible material. This allows a strong deformation without embrittlement or formation of cracks. Further, the necessary crimping forces can be kept low, which facilitates the construction of lighter and handier crimp tools.

Soft-annealed copper (HV 40–50) is specially suitable for crimp ferrules. The use of drawn tubes permits the maintenance of a diameter tolerance of ± 0.025 mm, which is difficult to achieve with free-cutting machining.

Centre contacts must be manufactured from a hard, non-abrasive material in order to provide a durable working life. Most coaxial connector specifications specify brass for contact pins and heat-treated beryllium copper (HV 380) for contact sockets. To make satisfactory crimping possible despite this, these parts are either made of different materials or partially annealed. This

Fig. 8



Hardness profile of a partially annealed contact socket

partial annealing involves complicated methods (e.g. RF induction heating), results however in contacts with greater conductivity and higher reliability than bonding various metals.

The following points should be noted concerning coaxial cables:

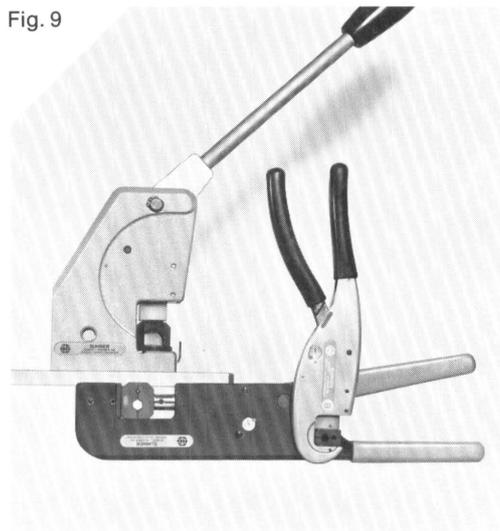
- Use only cables for which the appropriate crimp connector is specified
- Use only cables which correspond exactly to the respective standards

Crimp connectors for all standard cables (MIL, VDE, UR, CCTU, etc.) are available in proven designs today. The user should however verify in every case that the cable used corresponds to the given standard.

Should a crimp connector for a non-standard cable be required, it is advisable to contact the connector manufacturer.

With the dimensioning of connector components, crimp inserts, and the selection of materials and type of cable, the force necessary for crimping has been determined (Fig. 10). The crimp tools must be constructed to withstand this force without overstressing the tool frame. A small amount of flexing which results in an air gap between the inserts in some cases cannot be prevented. It must however be kept within controlled limits. It must be taken into account when dimensioning connector components and inserts.

Fig. 9



SUHNER crimp tools

Crimp tools should withstand a maximum crimp force of 1000 kp with a 1.5 safety margin. This dictates the use of high-tensile materials for practically all tool parts.

The exact alignment of the crimp inserts is of the utmost importance. Inserts that are mis-aligned in any plane cause formation of fins, cracks or insufficient crimping.

In order that the crimp process is concluded in every case, crimp tools must be provided with a ratchet, which permits the tool to be opened only after completion of the crimping cycle. If the crimping cannot be concluded (e.g. using a wrong connector component), an emergency release must be provided to make interruption possible. This interference must however be detectable afterwards (seal).

Crimp tools are precision instruments. They determine to a great extent the quality of the crimping. Therefore only tools clearly recommended by the connector supplier should be used.

Severe tests demonstrate the reliability

Before SUHNER crimp connectors are released for manufacture and use by the customer, they are submitted to severe tests. Certain tests are repeated periodically on production batches.

Crimping force

This measurement is made on a bench press with built-in force transducer. In addition the distance between the inserts is recorded in order to obtain a force/distance diagram (Fig. 10).

Pull-out force (holding-force of cable)

This measurement is made on a tensile tester. This is one of the most important measurements. Besides the absolute

Fig. 10

Cable	Crimp force	Crimp force	Pull-out force	Pull-out force	Pull-out force of complete connector
	Inner conductor	Outer conductor	Inner conductor	Outer conductor	
	kp	kp	kp	kp	kp
RG 196	400	400	3	9	11
RG 188	400	400	8	11	18
RG 58	370	600	12	33	40
RG 223	370	650	14	47	55
RG 59	425	500	14	45	50
RG 213	320	680	75	75	100
RG 214	320	600	75	85	100

magnitude of the force, the type of fracture is of interest. Where possible fracturing of the centre conductor or braid wires is aimed at. In the case of pulling-out from the connector, the pull-out force should be at least 80% of the tensile strength of the cable (Fig. 10).

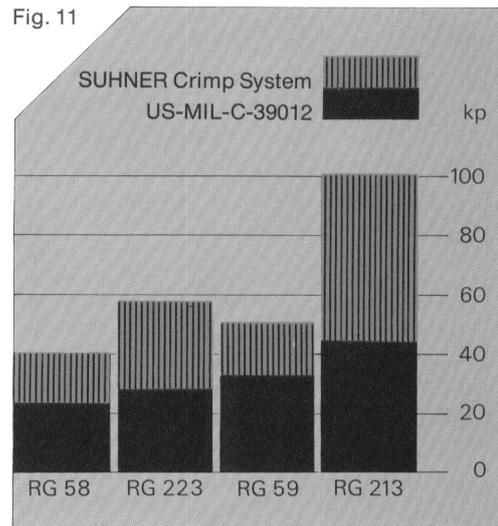
In Fig. 11 the values attained with optimum dimensioning are compared with those required by MIL.

Resistance of the crimp joint

The resistance between the cable and the crimped contact is measured (inner or outer conductor). In order to exclude thermal voltages, the measurement is carried out at 1 kHz. The voltage applied across the crimp joint is 200 microvolts, the current is limited to 150 mA.

The measurement of the resistance is usually carried out after the temperature tests.

Fig. 11



Microsection

A microsection of the crimp joint gives information on the degree of deformation and cold welding (Fig. 4).

Temperature shock

(in accordance with MIL-STD-202C/107B)

The specimens are exposed several times to a temperature shock (– 55° to + 200°C). Cracks due to overstressing during crimping will come to light. After the test resistance and pull-out force are measured.

Temperature cycling

(in accordance with MIL-STD-202C/102A)

This is an accelerated life test which includes several cycles – 55°C/18°C/125°C. Subsequently resistance and pull-out force are measured.

High temperature storage

This test also simulates aging of the crimp joint. The specimens are exposed for 1000 hours to a temperature of 125°C and continuously loaded to 1 A DC. After the test the resistance and pull-out force are measured.

Corrosion test

This test is to determine the degree of cold welding between connector parts and cable. The specimens are exposed to 0.5% concentrations of H₂S and SO₂ (24 hours each). The resistance is then measured.

Results of tests on Series N inner conductors and RG 214/U cable

	Crimp force	Crimp joint resistance before	Crimp joint resistance after	Pull-out force before	Pull-out force after
Temperature cycling Temperature shock High temperature storage Corrosion test	approx. 350 kp for all specimens	0.06 mΩ 0.03 mΩ 0.05 mΩ 0.05 mΩ	0.03 mΩ 0.03 mΩ 0.02 mΩ 0.06 mΩ	Inner conductor fractures at approx. 75 kp	Inner conductor fractures at approx. 75 kp

SUHNER Crimp Technique: economical, reliable, simple

The SUHNER crimp technique completely fulfills the requirements for a better connecting technique as outlined at the beginning:

- The quality of the connection remains constant from connector to connector. It is almost independent of the skill of assembly personnel.
- Crimp connectors are simple in construction and therefore favourable in price. SUHNER crimp connectors are supplied as only 3 individual components! (Fig. 1b).
- Crimping means reduced assembly times, personnel training and inspection. On average the assembly time is 40–50% shorter than with conventional connectors. Even for small batches it is economical to purchase a crimping tool and use crimp connectors.
- The SUHNER crimp technique does not impose any heat effect on cable or connector. The assembly can be carried out anywhere, even where no power is available: in the open, on building sites, at sea, and places with explosion hazards.
- The SUHNER crimp technique requires only 5 different crimp inserts for the preferred cable and connectors series.

SUHNER Crimp tool size	Connector series	Cable types (e.g.)		
		single screen	double screen	Diel. Ø of cable
1/2 A	SMA, SMB, SMC, SMS, BNC, MCX, QLA	RG 178, RG 196	—	1 mm
		RG 174, RG 188 RG 316	K02252-d	2 mm
2 B	SMA, BNC, TNC C, N, UHF, M, H4, SHV	RG 58 RG 141 RG 303	RG 223 RG 142	3 mm
2 C	BNC, TNC, C, N, UHF, M, H4, SHV	RG 59	G04233-d	4 mm
2 D	N (75 Ohm)	RG 11	RG 216/U	7 mm
3 D	C, N, UHF, 7 – 16	RG 213	RG 214	7 mm

Crimping Procedure

The following sequence of operations is valid for all tools (small crimp tool, large crimp tool, table press).

Stripping the cable

For stripping the dimensions shown in the assembly instructions supplied with the connectors, are to be maintained exactly. Cut dielectric at right angles to the axis of the cable. Do not damage inner and outer conductors.

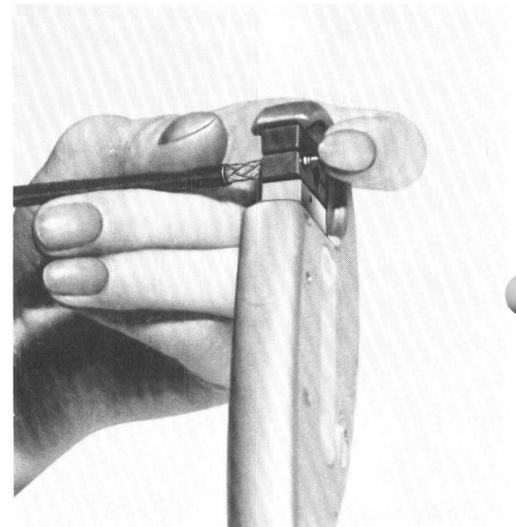
Crimping centre contact

Contact pin to abut completely against dielectric.

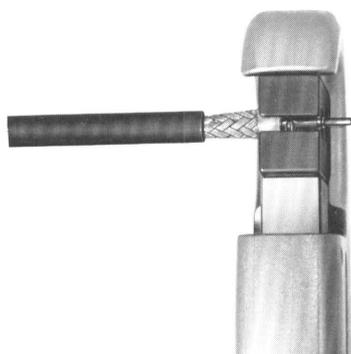
Crimp until the tool can be opened again.



Push dielectric into cylindrical insert of the small recess of the crimp die.



During the crimping, press contact pin against the dielectric and the latter against the crimp die. Emergency release if crimping cannot be completed (see page 11).

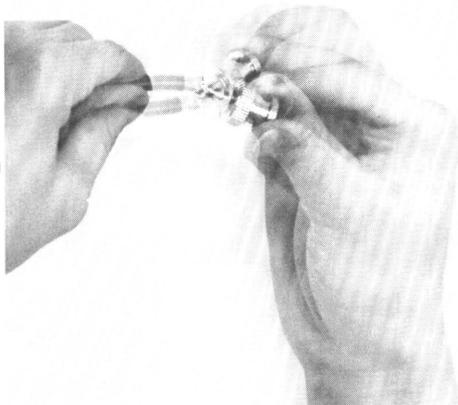


Crimping outer conductor

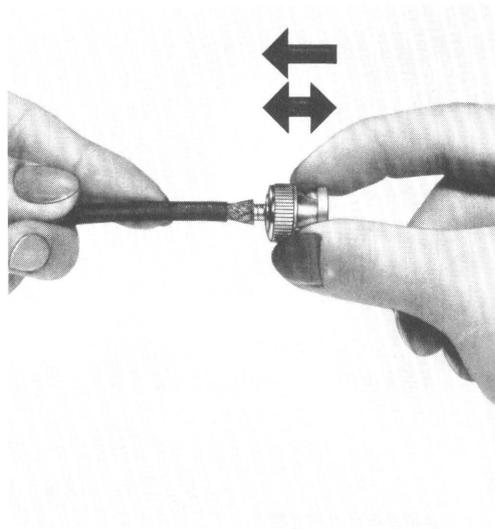
Push ferrule and coloured taper sleeve if used over the cable.



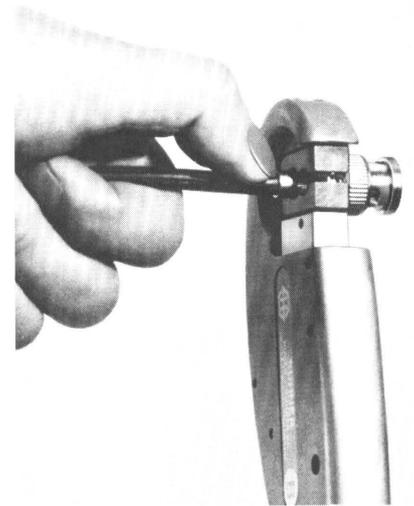
Spread out screen slightly by circling movement of the dielectric.



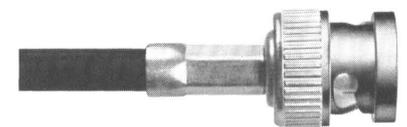
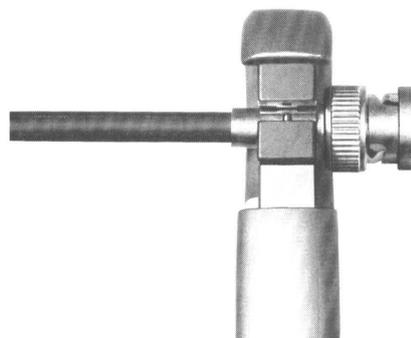
Push crimped contact pin through the crimp spigot into the connector body, until it can be felt to engage. To check, draw cable back slightly. Push ferrule over screen until it is flush against the connector body. Take care that there are no screen wires between body and ferrule.



Crimp until tool can be released.



Place connector into the large recess of the crimp die so that the ferrule is flush against the connector body and the latter is flush against the crimp die.



If crimped correctly, the crimped area will extend to the end of the ferrule adjacent to the connector body. Emergency release if crimping cannot be completed (see page 11).

Tools Accessories

For code numbers, see page 13

Small crimp tool

Small crimp tool

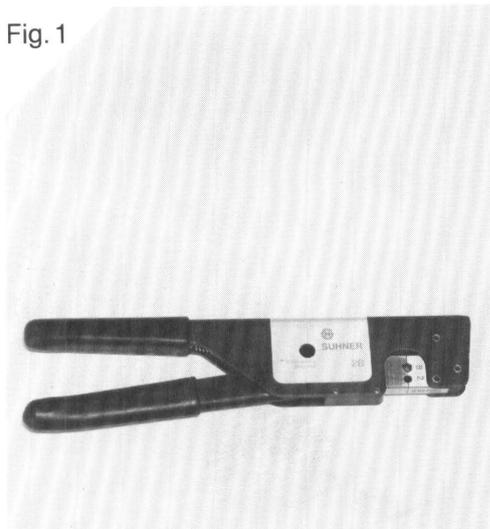
Large crimp tool

Suitable for single assembly and small batch productions:
Available with fixed (noninterchangeable) crimp dies of size 2B or 2C for cables with dielectric diameters of 3 mm or 4 mm.

Suitable for single assembly and small batch productions:
Supplied with 3 different crimp inserts for cable with dielectric diameter up to 4 mm.
Interchangeable crimp inserts.

Suitable for small to medium production batches.
Supplied with 4 different crimp inserts for cable with dielectric diameter up to 7 mm.
Interchangeable crimp inserts.

Fig. 1



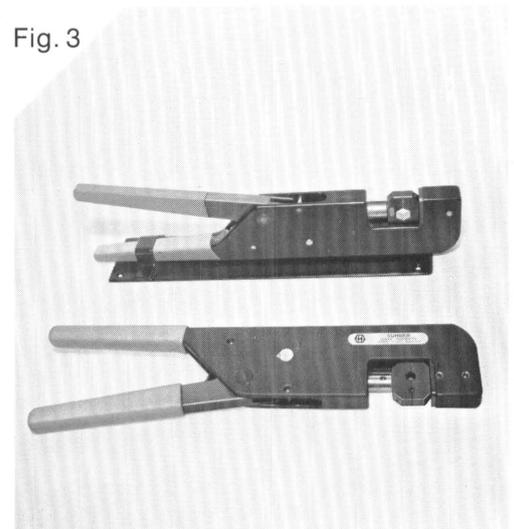
Colour black, weight 610 g, length 245 mm.
The tool is provided with a locking device and can only be opened if the contact is satisfactorily crimped.
Emergency release if crimping cannot be completed (see page 11).

Fig. 2.



Colour silver, weight 560 g, length 232 mm.
Handy grip, anatomically correctly shaped to reduce fatigue, specially suitable for women.
The tool is provided with a locking device and can only be opened if the contact is satisfactorily crimped.
Emergency release if crimping cannot be completed (see page 11).

Fig. 3



Colour black, weight 820 g, length 320 mm.
Accessories:
Support plate for fixing the tool to bench.
Cutting insert for cutting cables.
The tool is provided with a locking device and can only be opened if the contact is satisfactorily crimped.
Emergency release if crimping cannot be completed (see page 11).

Stripping device

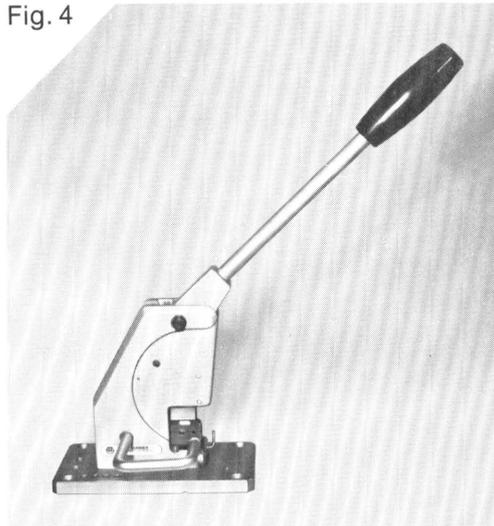
Table press

Suitable for assembly of large production batches at fixed working position.

Supplied with 4 different crimp inserts for cable with dielectric diameter up to 7 mm.

Same interchangeable crimp inserts as for large crimp tool.

Fig. 4



Colour hammer-forged grey, weight 5 kg, height 478 mm.

Stop for positioning of inner conductor and crimp body, so that right hand is free, also used for cutting cables to desired length.

Accessories:

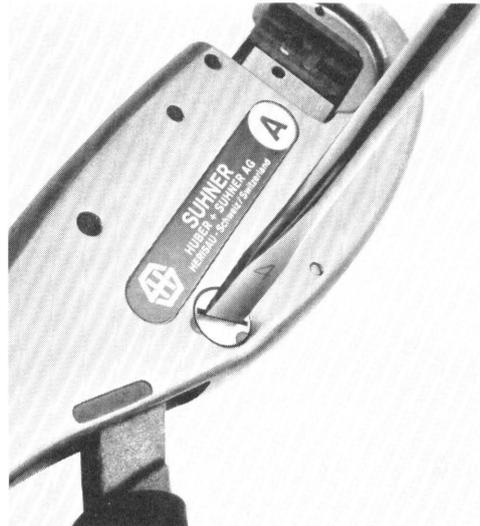
Cutting insert for cutting cables.

The table press is provided with a locking device and can only be opened if the contact is satisfactorily crimped.

Emergency release if crimping cannot be completed (see page 11).

Emergency release

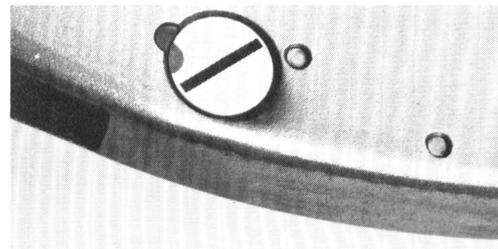
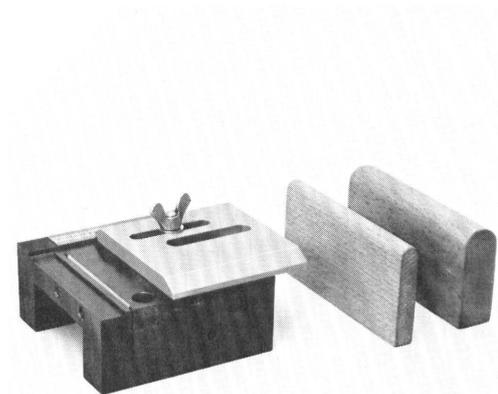
Emergency release if crimping cannot be completed (wrong crimp inserts, wrong individual components, etc.)



Remove cover-screw. Release spring catch with screwdriver. Replace screw. (This interference is subsequently detectable owing to the red colour seal).

Stripping device

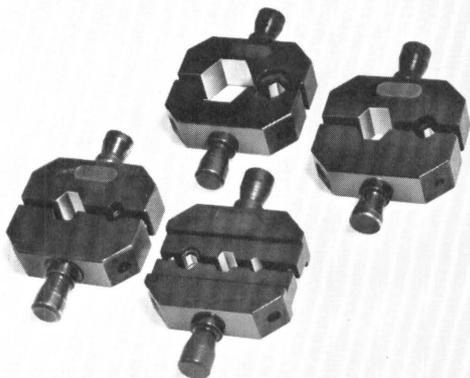
Blade height adjusted by means of 2 eccentrics and stripping length by adjustable top plate.



Crimp inserts

Material: Special tool steel alloy, hardened by heat treatment. Interchangeable lower and upper parts, therefore suitable for left and right handed operation. Tolerance max. 0.05 mm. Centring pins and guide slots ensure accurate alignment of the jaw halves during the crimping operation.

Fig.6

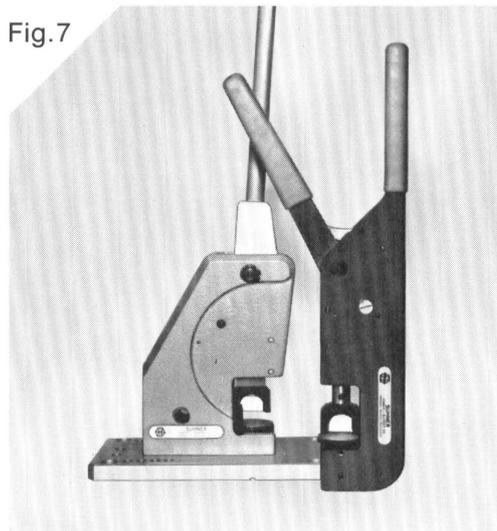


The crimp inserts are provided with different colour codes, corresponding to the respective cable diameter (see tool list, page 13).

Cutting insert

Used with large crimp tool and table press. Suitable for cable up to 12 mm outer diameter.

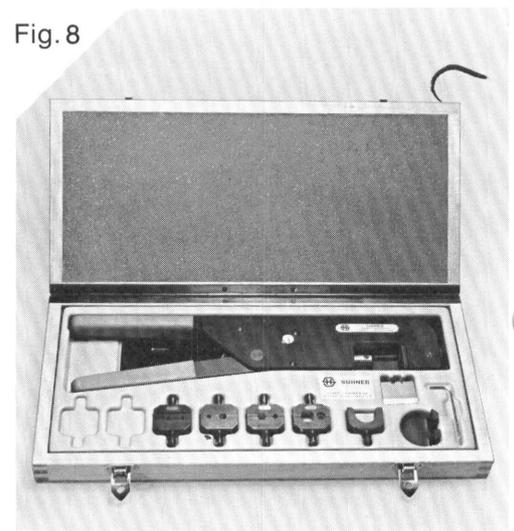
Fig.7



Tool set for large crimp tool

Protected and clearly-arranged storage of tool and inserts. Cardboard box with vacuum formed plastic tray for tool and tool inserts. Wooden case with same contents.

Fig.8



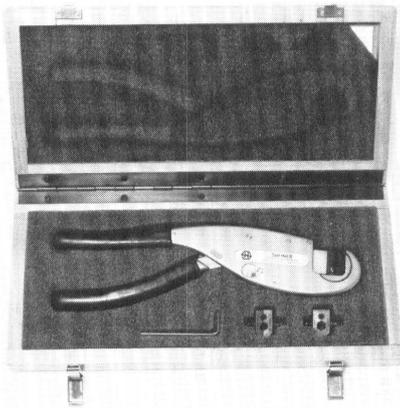
Contents:
large crimp tool
support plate for assembly bench
crimp inserts 1/2 A, 2 B, 2 C, 3 D
cutting insert
10 spare blades for cutting insert
Allen key

Tool list and ordering codes

Tool set for small crimp tool

Protected and clearly-arranged storage of tool and inserts. Wooden case with foam tray for tool and inserts.

Fig. 9



Contents:
small crimp tool
crimp inserts 1/2 A, 2 B, 2 C
Allen key
instruction sheet

Fig. (pages 10 – 12)	Article	Ordering Codes
1	Small crimp tool with fixed insert in cardboard box 2 B for cable with dielectric \varnothing 3 mm 2 C for cable with dielectric \varnothing 4 mm	75 Z-0-3-4 75 Z-0-4-4
2	Small crimp tool, for interchangeable inserts, without inserts, in cardboard box	75 Z-0-0-50
9	with all interchangeable inserts and foam tray, in wooden box Wooden box with foam tray, without tool Inserts, see fig. 6	75 Z-0-0-51 76 Z-0-0-51
3	Large crimp tool for interchangeable inserts without inserts with all interchangeable inserts and support plate, in cardboard box	75 Z-0-0-1 76 Z-0-0-14
8	with all interchangeable inserts and support plate, in wooden box Wooden box with plastic tray, without tool Support plate for fixing to assembly bench Inserts, see fig. 6	76 Z-0-0-15 76 Z-0-0-11 76 Z-0-0-3
4	Table press for interchangeable inserts, without inserts Inserts, see fig. 6	75 Z-0-0-2
5	Stripping device	74 Z-0-0-11
6	Inserts for small crimp tool 75 Z-0-0-50 Crimp inserts for cable with dielectric \varnothing 1 and 2 mm insert 1/2 A for cable with dielectric \varnothing 3 mm insert 2 B for cable with dielectric \varnothing 4 mm insert 2 C Inserts for large crimp tool 75 Z-0-0-1 and table press 75 Z-0-0-2 Crimp inserts for cable with dielectric \varnothing 1 and 2 mm insert 1/2 A identity colour red for cable with dielectric \varnothing 3 mm insert 2 B identity colour orange for cable with dielectric \varnothing 4 mm insert 2 C identity colour yellow for cable with dielectric \varnothing 7 mm insert 3 D identity colour violet	76 Z-0-2-51 76 Z-0-3-51 76 Z-0-4-51 76 Z-0-2-1 76 Z-0-3-1 76 Z-0-4-1 76 Z-0-7-1
7	Cutting insert for cable up to \varnothing 12 mm Spare blades for cutting insert	76 Z-0-0-1 76 Z-0-0-2

Coloured taper sleeves to reinforce cable entry

Coaxial cable assemblies with crimp connectors

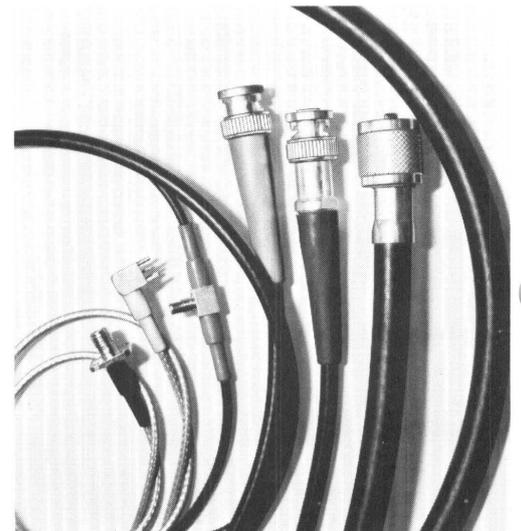
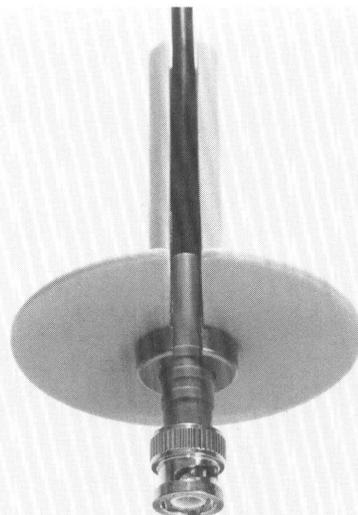
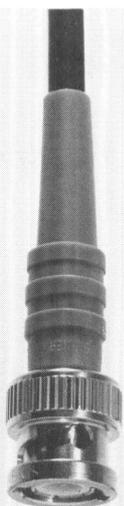
These sleeves also provide a colour coding in many applications.

A satisfactory cable assembly is of great importance for all RF connections. SUHNER manufactures ready-for-use cables in any variation required by the customer. The purchase of cable assemblies with connectors offers many advantages:

Material PE
 Colours black, brown, red, orange, yellow, green, blue, violet, grey, white
 Suitable for crimp connectors for cables up to 7 mm Ø dielectric
 Heat-resistant up to 70° C

- faultless assembly by trained specialists
- no stocking of connectors and cables
- no scrap
- no expenditure on assembly equipment
- electrically matched cables and connectors from the same supplier
- markings and colour codings
- tested in accordance with customers specifications, where required

Assembly with simple tool



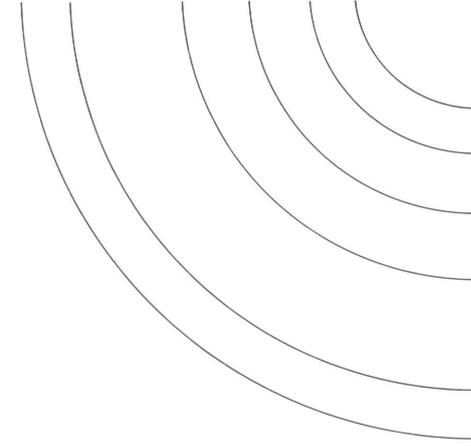
Colour	for cable with outer Ø 2.2 mm	for cable with outer Ø 2.6 mm	for cable with outer Ø 3.0 mm	for cable with outer Ø 5.1 mm	for cable with outer Ø 5.4 mm	for cable with outer Ø 6.1 mm	for cable with outer Ø 6.7 mm
black	78 Z-0-1-1	78 Z-0-2-1	78 Z-0-2-3	78 Z-0-3-4	78 Z-0-3-5	78 Z-0-4-4	78 Z-0-4-5
brown	78 Z-1-1-1	78 Z-1-2-1	78 Z-1-2-3	78 Z-1-3-4	78 Z-1-3-5	78 Z-1-4-4	78 Z-1-4-5
red	78 Z-2-1-1	78 Z-2-2-1	78 Z-2-2-3	78 Z-2-3-4	78 Z-2-3-5	78 Z-2-4-4	78 Z-2-4-5
orange	78 Z-3-1-1	78 Z-3-2-1	78 Z-3-2-3	78 Z-3-3-4	78 Z-3-3-5	78 Z-3-4-4	78 Z-3-4-5
yellow	78 Z-4-1-1	78 Z-4-2-1	78 Z-4-2-3	78 Z-4-3-4	78 Z-4-3-5	78 Z-4-4-4	78 Z-4-4-5
green	78 Z-5-1-1	78 Z-5-2-1	78 Z-5-2-3	78 Z-5-3-4	78 Z-5-3-5	78 Z-5-4-4	78 Z-5-4-5
blue	78 Z-6-1-1	78 Z-6-2-1	78 Z-6-2-3	78 Z-6-3-4	78 Z-6-3-5	78 Z-6-4-4	78 Z-6-4-5
violet	78 Z-7-1-1	78 Z-7-2-1	78 Z-7-2-3	78 Z-7-3-4	78 Z-7-3-5	78 Z-7-4-4	78 Z-7-4-5
grey	78 Z-8-1-1	78 Z-8-2-1	78 Z-8-2-3	78 Z-8-3-4	78 Z-8-3-5	78 Z-8-4-4	78 Z-8-4-5
white	78 Z-9-1-1	78 Z-9-2-1	78 Z-9-2-3	78 Z-9-3-4	78 Z-9-3-5	78 Z-9-4-4	78 Z-9-4-5
Assembly tool	74 Z-0-2-1	74 Z-0-2-1	74 Z-0-2-1	74 Z-0-3-6	74 Z-0-3-6	74 Z-0-4-6	74 Z-0-4-6

Crimp Connectors

Key to connector code

SUHNER coaxial crimp connectors are available in the following series:
BNC, C, H4, M, MCX, N, QLA, SHV, SMA, SMB, SMC, SMS, TNC, UHF, 7 - 16

11 BNC - 50 - 3 - 26 c



- Index «c» if inner conductor is captivated in both directions.
- Type variant (continuous)
- Dielectric diameter rounded to whole millimetres
- Impedance 0 no matching
50 matched to 50 Ω
75 matched to 75 Ω
- RF connector series
- Functional type

for cable with outer ∅ 10.3 mm (RG213)	for cable with outer ∅ 10.8 mm (RG214)
78 Z-0-7-1	78 Z-0-7-2

74 Z-0-7-2	74 Z-0-7-3
------------	------------

- | | |
|--|---|
| | 11
straight cable plug |
| | 16
angle cable plug |
| | 21
straight cable jack |
| | 24
straight bulkhead jack for single hole mounting |
| | 25
straight panel jack with flange |
| | 29
bulkhead jack with angle cable entry for single hole mounting |
| | 47
T adaptor |
| | 71
cable feed-through |
| | 83
straight cable receptacle for printed circuits |
| | 86
angle cable receptacle for printed circuits |

Suitable cables

In our supply programme the most frequently used types of cable are quoted for each type of connector. The following table contains the important dimensions of these and other suitable cables.

You will find in the lists on pages 19–33 a suitable crimp connector if your cable corresponds to the dimensions of one of the cables quoted here.

Important:

The permissible diameter tolerances for faultless crimping are small. Please ask us or our agents about the suitability of cables with dimensions similar to those listed here.

Cu	plain copper
CuSt	Copper-plated steel wire
CuStAg	silvered copper-plated steel wire
Sn	tinned copper wire
Ag	silvered copper wire
AgAg	double screening, silvered copper
PVC I	flexible polyvinylchloride
PVC II	non-migrating polyvinylchloride
PE	Polyethylene
PTFE	Polytetrafluorethylene
FEP	Fluorethylenpropylene
GSi	Fibreglass braided and silicone impregnated
HT	Semi-conductor compound

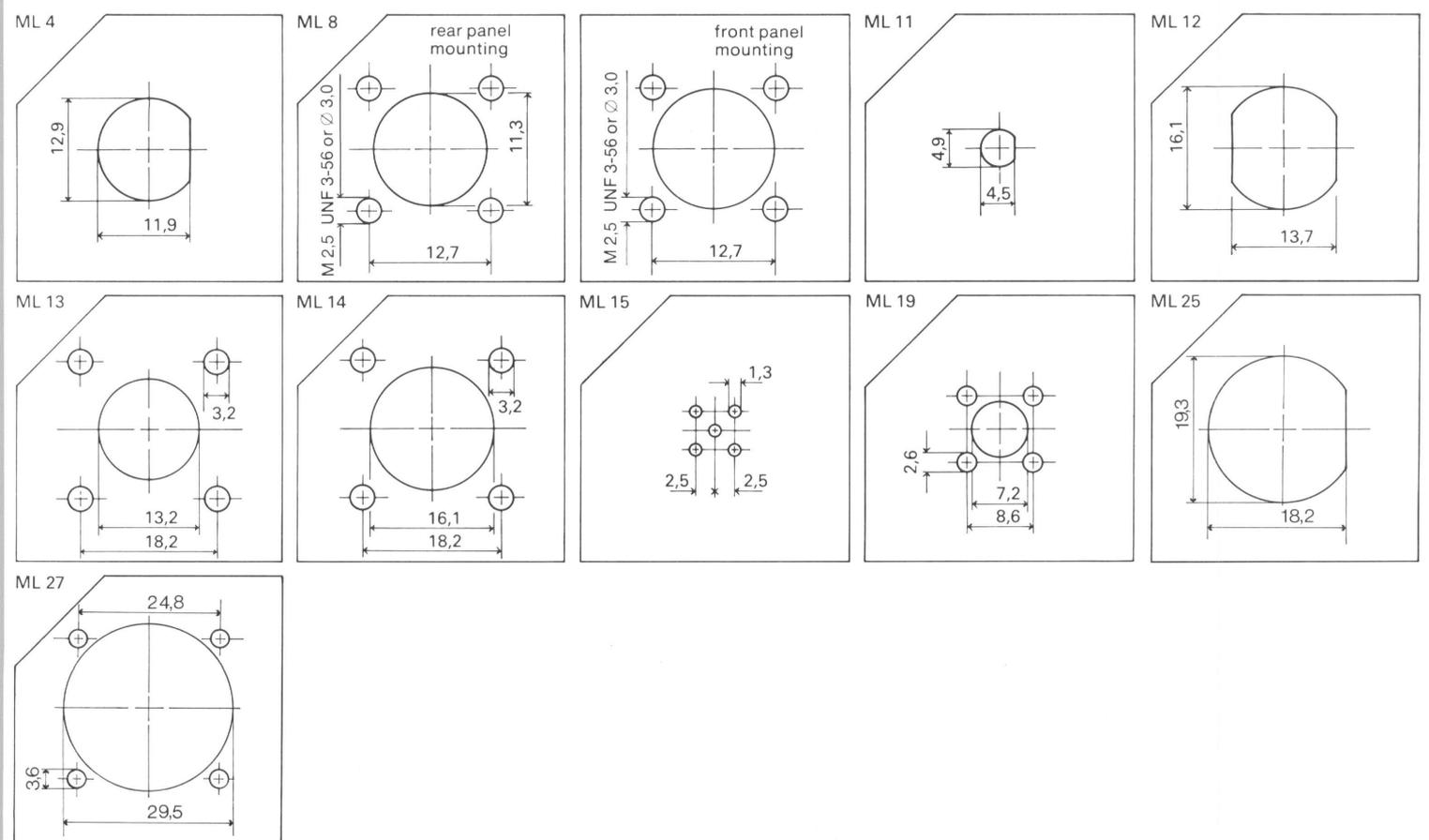
Nominal impedance	Popular types of cable	Specification to	Inner Conductor			Dielectric		Screen			Sheath	
			Material	Construct.	Ø mm	Material	Ø mm	Number	Material	Ø mm	Material	Ø mm
50 Ω	RG 196 A/U	MIL	CuStAg	7×0.1	0.3	PTFE	0.87	1	Ag	1.37	PTFE	2.05
	RG 178 B/U	MIL	CuStAg	7×0.1	0.3	PTFE	0.87	1	Ag	1.37	FEP	1.8
	G 01122	SUHNER	CuSt	Wire	0.3	PE	1.05	1	Cu	1.4	Nylon	1.7
	RG 174/U	MIL	CuSt	7×0.16	0.48	PE	1.5	1	Sn	2.0	PVC I	2.6
	RG 188 A/U	MIL	CuStAg	7×0.17	0.51	PTFE	1.5	1	Ag	2.0	PTFE	2.6
	RG 316/U	MIL	CuStAg	7×0.17	0.51	PTFE	1.5	1	Ag	2.0	FEP	2.5
	K 02252-d	SUHNER	CuStAg	7×0.17	0.51	PTFE	1.5	2	AgAg	2.5	FEP	3.0
	RG 303/U	MIL	CuStAg	Wire	0.95	PTFE	2.95	1	Ag	3.6	FEP	4.3
	RG 141 A/U	MIL	CuStAg	Wire	0.95	PTFE	2.95	1	Ag	3.6	PTFE+GSi	4.3
	RG 58 C/U	MIL	Sn	19×0.18	0.9	PE	2.95	1	Sn	3.6	PVC II	4.95
	RG 223/U	MIL	Ag	Wire	0.89	PE	2.95	2	AgAg	4.2	PVC II	5.3
	RG 142 B/U	MIL	CuStAg	Wire	0.95	PTFE	2.95	2	AgAg	4.2	FEP	4.95
	RG 213/U	MIL	Cu	7×0.75	2.25	PE	7.25	1	Cu	8.1	PVC II	10.3
	RG 214/U	MIL	Ag	7×0.75	2.25	PE	7.25	2	AgAg	8.7	PVC II	10.8
75 Ω	G 03233	SUHNER	Cu	7×0.16	0.48	PE	2.95	1	Cu	3.6	PVC II	5.0
	G 03233-d	SUHNER	Sn	Wire	0.47	PE	2.95	2	AgAg	4.2	PVC II	5.3
	RG 59 B/U	MIL	CuSt	Wire	0.6	PE	3.7	1	Cu	4.5	PVC II	6.1
	G 04233-d	SUHNER	CuSt	Wire	0.6	PE	3.7	2	AgAg	5.3	PVC II	6.7
	RG 11 A/U	MIL	Sn	7×0.4	1.2	PE	7.25	1	Cu	8.15	PVC II	10.3
	RG 216/U	MIL	Sn	7×0.4	1.2	PE	7.25	2	CuCu	8.7	PVC II	10.8
—	G 03130-HT	SUHNER	Cu	Wire	0.5	PE	3.0	1	Cu	4.0	PVC I	5.0

Cross reference list

* With the SUHNER types the inner conductor is captivated (Improvement compared with US-MIL types).

Type according to US-MIL-C-39012, Category B	SUHNER type	Type according to US-MIL-C-39012, Category B	SUHNER type
39012/01-0007	11 N-50-7-43c	39012/55-3014	11 SMA-50-3-55c
/01-0008	11 N-50-7-44c	/55-3016	11 SMA-50-3-56c
/02-0008	21 N-50-7-13c	/55-3019	11 SMA-50-2-55c
/02-0009	21 N-50-7-14c	/55-4019	11 SMA-50-2-5c
/02-0016	25 N-50-7-13c	/55-4021	11 SMA-50-3-5c
/02-0017	25 N-50-7-14c	/55-4022	11 SMA-50-3-6c
/03-0004	24 N-50-7-14c	/55-4023	11 SMA-50-3-6c
/03-0005	24 N-50-7-15c	/55-4024	11 SMA-50-3-5c
/05-0002	16 N-50-7-12c	/56-4019	16 SMA-50-2-5c
/05-0003	16 N-50-7-13c	/56-4021	16 SMA-50-3-5c
		/56-4022	16 SMA-50-3-6c
/06-0022	11 C-50-7-14c	/56-4023	16 SMA-50-3-6c
/06-0023	11 C-50-7-15c	/56-4024	16 SMA-50-3-5c
		/57-4019	21 SMA-50-2-5c
/16-0004	11 BNC-50-3-4c	/57-4021	21 SMA-50-3-5c
/16-0005	11 BNC-50-3-16c	/57-4022	21 SMA-50-3-6c
/16-0008	11 BNC-50-4-4c	/57-4023	21 SMA-50-3-6c
/17-0004	21 BNC-50-3-2c	/57-4024	21 SMA-50-3-5c
/17-0005	21 BNC-50-3-9c		
/17-0008	21 BNC-50-4-1c	/67-0005	11 SMB-50-1-10
/18-0004	25 BNC-50-3-13c	/67-0009	11 SMB-50-2-10c
/18-0005	25 BNC-50-3-17c	/68-0005	21 SMB-50-1-10
/18-0008	25 BNC-50-4-1c	/68-0009	21 SMB-50-2-10c
/19-0003	24 BNC-50-3-1c	/69-0008	16 SMB-50-1-3c
/19-0004	24 BNC-50-3-8c	/69-0009	16 SMB-50-2-4c
/19-0007	24 BNC-50-4-1c		
/20-0002	16 BNC-50-3-13c	/73-0005	11 SMC-50-1-10
/20-0003	16 BNC-50-3-18c	/73-0009	11 SMC-50-2-10c
		/74-0005	21 SMC-50-1-10
/26-0005	11 TNC-50-3-9	/74-0009	21 SMC-50-2-10c
/26-0006	11 TNC-50-3-25	/75-0008	16 SMC-50-1-3c
/26-0007	11 TNC-50-4-7	/75-0009	16 SMC-50-2-4c
/26-0015	11 TNC-50-3-24		
/26-0016	11 TNC-50-3-14		
/26-0020	11 TNC-50-2-5c		
/27-0005	21 TNC-50-3-7c *		
/27-0007	21 TNC-50-4-6c *		
/27-0016	21 TNC-50-3-9c *		
/28-0005	24 TNC-50-3-6c *		
/28-0007	24 TNC-50-4-5c *		
/28-0016	24 TNC-50-3-8c *		
/28-0020	24 TNC-50-2-3c *		
/29-0005	25 TNC-50-3-14c*		
/29-0007	25 TNC-50-4-11c*		
/29-0016	25 TNC-50-3-22c*		
/30-0005	16 TNC-50-3-13c*		
/30-0006	16 TNC-50-3-21c*		
/30-0007	16 TNC-50-4-10c*		
/30-0016	16 TNC-50-3-18c*		

Mounting holes



Type Range

In addition to the standard programme of crimp connectors presented on the following pages, we supply special types for a certain minimum demand, on request.

There are separate data sheets for RF connectors with soldered inner conductors, screwed cable entry, bulkhead receptacles, adaptors and between series adaptors for all series. Please request further details.

Cable feed-throughs



Crimp insert

Braiding

No. of screens

Insulation dia. mm.

Suitable cable

50 Ω Cable

Assembly instructions

Mounting hole
(see page 18)

Type



Remarks

RG 196 A/U	0.87	1	71 Z-0-1-3	ML 11	3052	A	with round flange
RG 188 A/U	1.5	1	71 Z-0-2-2	ML 11	3052	A	with round flange
K 02252-d	1.5	2	71 Z-0-2-7	ML 11	3052	A	with hexagonal flange SW 6
RG 58 C/U	2.95	1	71 Z-0-3-13	ML 13	3081	B	with square 1"-flange
RG 223/U	2.95	2	71 Z-0-3-14	ML 13	3081	B	with square 1"-flange
RG 213/U	7.25	1	71 Z-0-7-7	ML 14	3081	D	with square 1"-flange
RG 214/U	7.25	2	71 Z-0-7-8	ML 14	3081	D	with square 1"-flange
75 Ω Cable							
RG 59 B/U	3.7	1	71 Z-0-4-8	ML 13	3081	C	with square 1"-flange
G 04233-d	3.7	2	71 Z-0-4-9	ML 13	3081	C	with square 1"-flange

Series BNC



Practical cable connector, bayonet coupling mechanism, corrosion-resistant, for sheath diameters between 2.0 and 11.0 mm.

Impedance 50 and 75 ohms*
 Recommended frequency range DC - 4000 MHz
 Working voltage max. 1 kV RMS/50 Hz
 Inner contact type with index c = captive others = secured against pull from cable end
 Insulation PTFE
 Surface finish inner contact gold-plated other parts Sucoplate®
 Temperature range -55... +165°C

* BNC connectors are dimensionally designed for 50 ohm systems. Mateability with BNC 75 ohm connectors is nevertheless guaranteed. The 75 ohm type does not ensure a good matching.

Suitable cable example	No. of screens	Insulation dia. mm.	Straight cable plug		Angle cable plug	
			Assembly instructions	Assembly instructions		
50 Ω Cable						
RG 196 A/U	0.87	1	11 BNC-50-1-5c	9068	16 BNC-50-1-2c	3079
G 01122	1.05	1				
RG 174/U	1.5	1	11 BNC-50-2-13c	9068		
					16 BNC-50-2-3c	3079
RG 188 A/U	1.5	1	11 BNC-50-2-13c	9068		
					16 BNC-50-2-3c	3079
K 02252-d	1.5	2	11 BNC-50-2-14c	9068		
					16 BNC-50-2-5c	3079
RG 58 C/U	2.95	1				
			11 BNC-50-3-4c 33012/16-0004	3015	16 BNC-50-3-13c 39012/20-0002	3015
			11 BNC-50-3-25c	3015		
			11 BNC-50-3-41c	3015		
					16 BNC-50-3-5c	3058
RG 223/U	2.95	2	11 BNC-50-3-16c 39012/16-0005	3015		
					16 BNC-50-3-7c	3058
					16 BNC-50-3-18c 39012/20-0003	3015
			11 BNC-50-3-42c	3015		
75 Ω Cable						
G 03233	2,95	1	11 BNC-75-3-8c	3015		
					16 BNC-75-3-3c	3058
G 03233-d	2.95	2				
			11 BNC-75-3-9c	3015		
					16 BNC-75-3-4c	3058
RG 59 B/U	3.7	1				
			11 BNC-50-4-4c 39012/16-0008	3015	16 BNC-50-4-10c	3015
			11 BNC-75-4-4c	3015		
					16 BNC-75-4-4c	3058
			11 BNC-75-4-16c	3015		
G 04233-d	3.7	2				
			11 BNC-75-4-6c	3015		
			11 BNC-75-4-17c	3015		
					16 BNC-75-4-5c	3058
Other Cables						
G 03130 HT (low-noise)	3,0	1	11 BNC-50-3-36c	3015		

Italics: Type to US-MIL-C-39012, category B.

Series M



Simple miniature coaxial connector, screw-on coupling mechanism, corrosion-resistant, for cable sheath diameters 2.8–6.8 mm.

Impedance 50 and 75 ohms
 Recommended frequency range DC-4000 MHz
 Working voltage max. 500 V RMS/50 Hz
 Inner contact captive
 Insulation PTFE
 Surface finish silver-plating
 Temperature range -55...+165°C

*M connectors are dimensionally designed for 50 ohm systems. They are, however interchangeable with 75 ohm connectors. The 75-ohm type does not ensure a good matching.

Crimp insert

Braiding

Inner contact

No. of screens

Insulation dia. mm.

Suitable cable example

50 Ω Cable

Assembly instructions

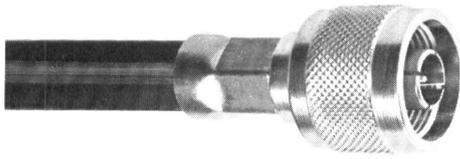
Straight cable plug



Remarks

RG 58 C/U	2.95	1	11 M-50-3-1c	3018	B	Inner contact soldered
RG 223/U	2.95	2	11 M-50-3-6c	3018	B	Inner contact soldered
75 Ω Cable						
G 03233	2.95	1	11 M-75-3-1c	3018	B	Inner contact soldered
G 03233-d	2.95	2	11 M-75-3-3c	3018	B	Inner contact soldered
RG 59 B/U	3.7	1	11 M-75-4-1c	3018	B	Inner contact soldered
G 04233-d	3.7	2	11 M-75-4-3c	3018	C	Inner contact soldered

Series N



Sturdy precision type coaxial connector, with screw-on coupling mechanism, corrosion-resistant, for sheath diameters 4.8–11.4 mm.

Impedance	50 ohms
Recommended frequency range	DC - 10000 MHz
Working voltage	max. 1 kV RMS/50 Hz
Inner contact	captive
Insulation	PTFE
Surface finish	Inner contact gold-plated, remaining parts Sucoplate®
Temperature range	–55... +165°C

No. of screens		Insulation dia. mm.		Suitable cable example	Straight cable plug	Angle cable plug
				50 Ω Cable		
RG 58 C/U	2.95	1		11 N-50-3-28c		16 N-50-3-26c
RG 223/U	2.95	2		11 N-50-3-29c		16 N-50-3-27c
RG 213/U	7.25	1		11 N-50-7-43c <i>39012/01-0007</i>		16 N-50-7-12c <i>39012/05-0002</i>
RG 214/U	7.25	2		11 N-50-7-44c <i>39012/01-0008</i>		16 N-50-7-30c 16 N-50-7-13c <i>39012/05-0003</i> 16 N-50-7-31c
				75 Ω Cable		
G 03233	2.95	1		11 N-75-3-8c		
G 03233-d	2.95	2		11 N-75-3-9c		
RG 59 B/U	3.7	1		11 N-75-4-8c		16 N-50-4-2c
G 04233-d	3.7	2		11 N-75-4-9c		16 N-50-4-3c
RG 11 A/U	7.25	1		11 N-75-7-16c		
RG 216/U	7.25	2		11 N-75-7-18c		

Italics: Type to US-MIL-C-39012, category B.

Series C



Precision coaxial connector, bayonet coupling mechanism, corrosion-resistant, for cable sheath diameters 4.9–11.4 mm.

Impedance	50 ohms
Recommended frequency range	DC - 10000 MHz
Working voltage	max. 1.5 kV RMS/50 Hz
Inner contact	captive
Insulation	PTFE
Surface finish	Inner contact gold-plated, other parts Sucoplate®
Temperature range	–55... +165°C

No. of screens		Insulation dia. mm.		Suitable cable example	Straight cable plug	Angle cable plug
				50 Ω Cable		
RG 58 C/U	2.95	1		11 C-50-3-7c		
RG 223/U	2.95	2		11 C-50-3-8c		
RG 213/U	7.25	1		11 C-50-7-14c <i>39012/06-0022</i>		
RG 214/U	7.25	2		11 C-50-7-15c <i>39012/06-0023</i>		

Italics: Type to US-MIL-C-39012, category B.

Mounting hole ML 12
(see page 18)
max. panel
thickness 6.4 mm

Crimp insert

Braiding

Inner contact

Assembly instructions

Mounting hole
ML 14
(see page 18)

Remarks

**Straight cable
jack**



**Bulkhead jack
1-hole mounting**



**Panel jack
with flange**



21 N-50-3-7c	24 N-50-3-11c	25 N-50-3-6c	4 holes, 3.4 mm. dia.	3063	2	B	
				3080		B	Inner contact soldered, partly air-insulated
21 N-50-3-8c	24 N-50-3-12c	25 N-50-3-7c	4 holes, 3.4 mm. dia.	3063	2	B	
				3080		B	Inner contact soldered, partly air-insulated
21 N-50-7-13c <i>39012/02-0008</i>	24 N-50-7-14c <i>39012/03-0004</i>	25 N-50-7-13c <i>39012/02-0016</i>	4 holes, 3.4 mm. dia.	3061	3	D	
				3076		D	Inner contact soldered, partly air-insulated
21 N-50-7-14c <i>39012/02-0009</i>	24 N-50-7-15c <i>39012/03-0005</i>	25 N-50-7-14c <i>39012/02-0017</i>	4 holes, 3.4 mm. dia.	3061	3	D	
				3076		D	Inner contact soldered, partly air-insulated
21 N-75-3-8c				3063	2	B	
21 N-75-3-9c				3063	2	B	
21 N-75-4-8c		25 N-75-4-8c	4 holes, 3.4 mm. dia.	3063	2	C	
						C	Inner contact soldered, partly air-insulated Connector not matched to 75 ohms
21 N-75-4-9c	24 N-75-4-9c	25 N-75-4-9c	4 holes, 3.4 mm. dia.	3063	2	C	
				3080		C	Inner contact soldered, partly air-insulated Connector not matched to 75 ohms
21 N-75-7-16c		25 N-75-7-16c	4 holes, 3.4 mm. dia.	3061	2	D	
21 N-75-7-18c		25 N-75-7-18c	4 holes, 3.4 mm. dia.	3061	2	D	

Mounting hole ML 25
(see page 18)
max. panel
thickness 3.5 mm.

Crimp insert

Braiding

Inner contact

Assembly instructions

Mounting hole
ML 14
(see page 18)

Remarks

**Straight cable
jack**



**Bulkhead jack,
1-hole mounting**



**Panel jack,
with flange**



21 C-50-3-6c				3063	2	B	
				3015	2	B	
21 C-50-3-7c				3063	2	B	
				3015	2	B	
21 C-50-7-12c	24 C-50-7-12c	25 C-50-7-15c	4 holes, 3.4 mm. dia.	3061	3	D	
21 C-50-7-13c	24 C-50-7-13c	25 C-50-7-16c	4 holes, 3.4 mm. dia.	3061	3	D	

Series

Precision subminiature coaxial connector
in 3 types
SMB Snap-on
SMC Screw-on
SMS Slide-on

Impedance 50 ohms
Recommended frequency range DC - 10000MHz for SMC
DC - 4000 MHz for SMB, SMS
Inner contact captive
Insulation PTFE
Surface finish inner contact sockets
SMB, SMC, SMS and
outer spring contact SMB:
hard gold-plated
(HV 380...450)
other metal parts:
gold-plated
Temperature range -55... +165°C



No. of screens

Insulation dia. mm.

Suitable cable example

SMB

RG 178 B/U }
RG 196 A/U }

RG 174/U }
RG 188 A/U }

K 02252-d

SMC

RG 178 B/U }
RG 196 A/U }

RG 174/U }
RG 188 A/U }

K 02252-d

SMS

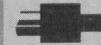
RG 178 B/U }
RG 196 A/U }

RG 174/U }
RG 188 A/U }

K 02252-d

Assembly instructions

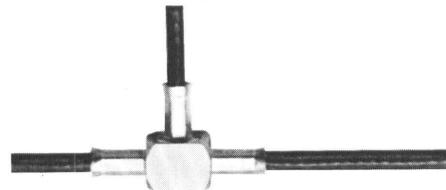
Straight cable plug



No. of screens	Insulation dia. mm.	Suitable cable example	No. of screens	Insulation dia. mm.	Remarks
1	0.87	RG 178 B/U } RG 196 A/U }	1	0.87	11 SMB-50-1-10 39012/67-0005 3077
1	1.5	RG 174/U } RG 188 A/U }	1	1.5	11 SMB-50-2-10c 39012/67-0009 3077
2	1.5	K 02252-d	2	1.5	11 SMB-50-2-11c 3077
1	0.87	RG 178 B/U } RG 196 A/U }	1	0.87	11 SMC-50-1-10 39012/73-0005 3077
1	1.5	RG 174/U } RG 188 A/U }	1	1.5	11 SMC-50-2-10c 39012/73-0009 3077
2	1.5	K 02252-d	2	1.5	11 SMC-50-2-11c 3077
1	0.87	RG 178 B/U } RG 196 A/U }	1	0.87	11 SMS-50-1-10 3077
1	1.5	RG 174/U } RG 188 A/U }	1	1.5	11 SMS-50-2-10c 3077
2	1.5	K 02252-d	2	1.5	11 SMS-50-2-11c 3077

Italics: Type to US-MIL-C-39012, category B.

Subminiature junction



No. of screens

Insulation dia. mm.

Suitable cable example

Crimp insert

Braiding

Assembly instructions

Type

Remarks



No. of screens	Insulation dia. mm.	Suitable cable example	No. of screens	Insulation dia. mm.	Remarks
1	0.87	RG 178 B/U } RG 196 A/U }	1	0.87	47 S-0-1-1 3048 A Inner contact soldered
1	1.5	RG 174/U } RG 188 A/U }	1	1.5	47 S-0-2-1 3048 A Inner contact soldered
2	1.5	K 02252-d	2	1.5	47 S-0-2-7 3048 A Inner contact soldered

Assembly instructions		Assembly instructions		Assembly instructions		Assembly instructions		Remarks	
Angle cable plug		Straight cable jack		Bulkhead jack, 1-hole mounting		Angle bulkhead jack, max. panel thickness 2.4 mm			
									
16 SMB-50-1-10	3096	21 SMB-50-1-10	3096	24 SMB-50-1-10	3077				A
		39012/68-0005						1	A
16 SMB-50-2-10c	3096	21 SMB-50-2-10c	3096	24 SMB-50-2-10c	3077			1	A
		39012/68-0009						1	A
16 SMB-50-2-11c	3096	21 SMB-50-2-11c	3096	24 SMB-50-2-11c	3077			1	A
								1	A
16 SMC-50-1-10	3096	21 SMC-50-1-10	3096	24 SMC-50-1-10	3077			1	A
		39012/74-0005		39012/76-0005				1	A
16 SMC-50-2-10c	3096	21 SMC-50-2-10c	3096	24 SMC-50-2-10c	3077			1	A
		39012/74-0009		39012/76-0009				1	A
16 SMC-50-2-11c	3096	21 SMC-50-2-11c	3096	24 SMC-50-2-11c	3077			1	A
								1	A
16 SMS-50-1-10	3096	21 SMS-50-1-10	3096	24 SMS-50-1-10	3077	29 SMS-50-1-4c	3038	1	A Inner contact soldered
								1	A
16 SMS-50-2-10c	3096	21 SMS-50-2-10c	3096	24 SMS-50-2-10c	3077	29 SMS-50-2-4c	3038	1	A Inner contact soldered
								1	A
16 SMS-50-2-11c	3096	21 SMS-50-2-11c	3096	24 SMS-50-2-11c	3077	29 SMS-50-2-7c	3038	1	A Inner contact soldered
								1	A

Subminiature

Printed Circuit

cable entries



No. of screens		Insulation dia. mm		Suitable cable example		Straight		Angle		Remarks	
						Assembly instructions		Assembly instructions			
											
RG 178 B/U	0.87	1	83 SMC-0-1-2	3052	86 SMC-50-1-2	3048	A				
RG 196 A/U	1.5	1	83 SMC-0-2-2	3052	86 SMC-50-2-2	3048	A				
RG 174/U	1.5	2	83 SMC-0-2-7c	3052	86 SMC-50-2-7c	3048	A				
RG 188 A/U											
K 02252-d											

Mounting hole ML 15
(see page 18)

Series SMA



Precision sub-miniature coaxial connector, with screw-on coupling mechanism, for cable sheath diameters 2.6–5.7 mm.

Impedance	50 ohms	
Recommended frequency range	DC - 18 GHz	(with semi-rigid cables)
	DC - 12.4 GHz	(with flexible cables)
Working voltage	335 V RMS/50 Hz; for 1.5 mm insulated connectors 250 V RMS/50 Hz	
Insulation	PTFE	
Body and contacts	Beryllium bronze	
Surface finish	contact pins and sockets	hard gold-plated (HV 380...450)
	other metal parts	gold-plated
Temperature range	-55... +165°C	

No. of screens		Insulation dia. mm.		Assembly instructions	
Suitable cable example		Straight cable plug			
50 Ω Cable					
RG 174/U	1.5	1	11 SMA-50-2-5c	3069	
RG 188 A/U			<i>39012/55-4019</i>		
RG 316/U			11 SMA-50-2-55c	3069	
			<i>39012/55-3019</i>		
K 02252-d	1.5	2	11 SMA-50-2-6c	3069	
			11 SMA-50-2-56c	3069	
RG 58 C/U	2.95	1	11 SMA-50-3-5c	3069	
RG 141 A/U			<i>39012/55-4021</i>		
RG 303/U			<i>-4024</i>		
			11 SMA-50-3-55c	3069	
			<i>39012/55-3014</i>		
RG 142 A/U	2.95	2	11 SMA-50-3-6c	3069	
RG 223/U			<i>39012/55-4022</i>		
			<i>-4023</i>		
			11 SMA-50-3-56c	3069	
			<i>39012/55-3016</i>		

Italics: Type to US-MIL-C-39012, category B.

Series MCX



Microminiature coaxial connector for cable sheath diameters 1.7–3.0 mm

Impedance	50 ohms	
Recommended frequency range	DC - 2000 MHz	
Inner contact	Connector types with index «c» are captivated	
Insulation	PTFE	
Surface finish	Spring contacts	hard gold-plated (HV 350...450)
	Other metal parts	gold-plated
Temperature range	-55... +125°C	

No. of screens		Insulation dia. mm.		Assembly instructions	
Suitable cable example		Straight cable plug			
50 Ω Cable					
RG 178 B/U	0.87	1	11 MCX-50-1-10	3097	
RG 196 A/U					
RG 174/U	1.5	1	11 MCX-50-2-10c	3097	
RG 188 A/U					
RG 316/U					
K 02252-d	1.5	2	11 MCX-50-2-11c	3097	

Series QLA



Subminiature coaxial connector with quick lock mechanism, for cable sheath diameters 1.7–3.0 mm

Impedance	not matched	
Recommended frequency range	DC - 1400 MHz	
Inner contact	Connector types with index «c» are captivated	
Insulation	PTFE	
Surface finish	Contacts gold-plated	Latch springs Sucoplate®
	Outer metal parts nickel-plated	
Temperature range	-55°C... +150°C	

No. of screens		Insulation dia. mm.		Assembly instructions	
Suitable cable example		Straight cable plug			
50 Ω Cable					
RG 178 B/U	0.87	1	11 QLA-01-1-8	9007	
RG 196 A/U					
RG 174/U	1.5	1	11 QLA-01-2-8c	9007	
RG 188 A/U					
RG 316/U					
K 02252-d	1.5	2	11 QLA-01-2-9c	9007	
RG 58 C/U	2.95	1	11 QLA-01-3-1c	3015	
RG 141 A/U					

Assembly instructions		Assembly instructions		Assembly instructions		Crimp insert Braiding Inner contact		Remarks
Angle cable plug		Straight cable jack		Panel jack, with flange	Mounting hole ML 19 (see page 18)			
16 SMA-50-2-5c 39012/56-4019	3070	21 SMA-50-2-5c 39012/57-4019	3069	25 SMA-50-2-5c 39012/58-4019	4 holes, 2.6 mm. dia.	3072	A	Inner contact soldered
							A	Stainless steel Inner contact soldered
16 SMA-50-2-6c	3070	21 SMA-50-2-6c	3069	25 SMA-50-2-6c	4 holes, 2.6 mm. dia.	3072	A	Inner contact soldered
							A	Stainless steel Inner contact soldered
16 SMA-50-3-5c 39012/56-4021 -4024	3070	21 SMA-50-3-5c 39012/57-4021 -4024	3069	25 SMA-50-3-5c 39012/58-4021 -4024	4 holes, 2.6 mm. dia.	3072	B	Inner contact soldered
							B	Stainless steel Inner contact soldered
16 SMA-50-3-6c 39012/56-4022 -4023	3070	21 SMA-50-3-6c 39012/57-4022 -4023	3069	25 SMA-50-3-6c 39012/58-4022 -4023	4 holes, 2.6 mm. dia.	3072	B	Inner contact soldered
							B	Stainless steel Inner contact soldered

Assembly instructions		Assembly instructions		Assembly instructions		Assembly instructions		Remarks
Angle cable plug		Straight cable jack		Bulkhead jack, 1-hole mounting	Mounting hole ML 11 (see page 18) max. panel thickness 5 mm.	Straight PCB, cable receptacle		
								
16 MCX-50-1-5c	3098	21 MCX-50-1-10	3097	24 MCX-50-1-10	3097	83 MCX-0-1-5	3099	1 A
								A Inner contact soldered
		21 MCX-50-2-10c	3097	24 MCX-50-2-10c	3097	83 MCX-0-2-5	3099	1 A
								A Inner contact soldered
16 MCX-50-2-10c	3098							A Inner contact soldered
16 MCX-50-2-6c	3098	21 MCX-50-2-11c	3097	24 MCX-50-2-11c	3097	83 MCX-0-2-6	3099	1 A
								A Inner contact soldered

Assembly instructions		Assembly instructions		Assembly instructions		Crimp insert Braiding Inner contact		Remarks
Angle cable plug		Straight cable jack		Bulkhead jack, 1-hole mounting	Mounting hole ML 23 (see page 18) max. panel thickness 4 mm.			
								
16 QLA-01-1-1c	3091							1 A
		21 QLA-01-1-1c	3089	24 QLA-01-1-1c	3089			A Inner contact soldered, partly air-insulated
								A Inner contact soldered
								1 A
16 QLA-01-2-1c	3091							A Inner contact soldered, partly air-insulated
		21 QLA-01-2-1c	3089	24 QLA-01-2-1c	3089			A Inner contact soldered
								1 A
16 QLA-01-2-4c	3091							A Inner contact soldered, partly air-insulated
		21 QLA-01-2-4c	3089	24 QLA-01-2-4c	3089			A Inner contact soldered
								2 B

High voltage

Series SHV



Safe High Voltage coaxial connector to NIM NC-545 and ANSI N 42.4, bayonet coupling mechanism, for cable sheath diameters 4.4–6.7 mm

- Impedance 50 ohms
- Recommended frequency range DC - 300 MHz
- Inner contact captivated
- Insulation (a) PTFE (b) Polystyrene
- Nuclear radiation resistance Polystyrene insulated: 10¹⁰ rad.
- Surface finish inner contacts gold-plated other metal parts Sucoplate[®]
- Temperature range PTFE insulated: -65°C... +200°C Polystyrene insulated: -55°C... +100°C

Suitable cable example	Insulation dia. mm.	No. of screens	Straight cable plug		Straight cable jack		
			Assembly instructions	Part No.	Assembly instructions	Part No.	
50 Ω Cable	RG 58 C/U	2.95	1		3092		3092
					3092		3092
				11 SHV-50-3-5c	3092	21 SHV-50-3-5c	3092
RG 223/U	2.95	2	11 SHV-50-3-3c	3092	21 SHV-50-3-3c	3092	
75 Ω Cable	RG 59 B/U	3.7	1		3092		3092
					3092		3092
				11 SHV-50-4-5c	3092	21 SHV-50-4-5c	3092
G 04233-d	3.7	2	11 SHV-50-4-3c	3092	21 SHV-50-4-3c	3092	

Series MHV (H4)



Handy and safe-to-touch coaxial connector, with bayonet coupling mechanism, corrosion-resistant, for sheath diameters 4.9–6.8 mm.

- Impedance 50 ohms
- Safety if live end is jack (female)
- Recommended frequency range DC - 400 MHz
- Working voltage (safe voltage) max. 5 kV RMS/50 Hz (continuous)
- Inner contact loose
- Insulation PTFE
- Surface finish inner contact gold-plated, other parts Sucoplate[®]
- Temperature range -55... +165°C

Suitable cable example	Insulation dia. mm.	No. of screens	Straight cable plug		Straight cable jack		
			Assembly instructions	Part No.	Assembly instructions	Part No.	
50 Ω Cable	RG 58 C/U	2.95	1		3092		3092
75 Ω Cable	RG 59 B/U	3.7	1		3092		3092

Mounting hole ML 4
(see page 18)
max. panel
thickness 3.5 mm.

Crimp insert

Braiding

Inner contact

Assembly instructions

Assembly instructions Assembly instructions

Bulkhead jack 1-hole mounting		Panel jack, with flange		Mounting hole ML 8 (see page 18)			Remarks
							
24 SHV-50-3-1c	3092	25 SHV-50-3-1c	4 threads UNF 3 – 56, M 2.5	3092	2	B	Insulator PTFE
24 SHV-50-3-5c	3092	25 SHV-50-3-5c	4 threads UNF 3 – 56, M 2.5	3092	2	B	Insulator nuclear radiation resistant
		25 SHV-50-3-2c	4 holes, 3.1 mm. dia.	3092	2	B	Insulator PTFE
		25 SHV-50-3-6c	4 holes, 3.1 mm. dia.	3092	2	B	Insulator nuclear radiation resistant
24 SHV-50-3-3c	3092	25 SHV-50-3-3c	4 threads UNF 3 – 56, M 2.5	3092	2	B	Insulator PTFE
		25 SHV-50-3-4c	4 holes, 3.1 mm. dia.	3092	2	B	Insulator PTFE
24 SHV-50-4-1c	3092	25 SHV-50-4-1c	4 threads UNF 3 – 56, M 2.5	3092	2	C	Insulator PTFE Connector not matched to 75 ohms
24 SHV-50-4-5c	3092	25 SHV-50-4-5c	4 threads UNF 3 – 56, M 2.5	3092	2	C	Insulator nuclear radiation resistant Connector not matched to 75 ohms
		25 SHV-50-4-2c	4 holes, 3.1 mm. dia.	3092	2	C	Insulator PTFE Connector not matched to 75 ohms
		25 SHV-50-4-6c	4 holes, 3.1 mm. dia.	3092	2	C	Insulator nuclear radiation resistant Connector not matched to 75 ohms
24 SHV-50-4-3c	3092				2	C	Insulator PTFE Connector not matched to 75 ohms

Crimp insert

Braiding

Inner contact

Assembly instructions

Remarks

	3078	B	Inner contact soldered
	3078	C	Inner contact soldered Connector not matched to 75 ohms

Straight cable jack	Bulkhead jack 1-hole mounting	Panel jack with flange	Mounting hole ML 8 (see page 18)	Remarks
	24 TNC-50-2-4c 39012/28-0020			9063 1 A
				9063 1 A
				3015 2 B
21 TNC-50-3-7c 39012/27-0005	24 TNC-50-3-6c 39012/28-0005			3015 2 B
		25 TNC-50-3-12c	4 holes, 3.1 mm. dia.	3015 2 B
		25 TNC-50-3-14c 39012/29-0005	4 threads UNF 3 – 56, M 2.5	3015 2 B
				3015 2 B
21 TNC-50-3-9c 39012/27-0016	24 TNC-50-3-8c 39012/28-0016			3015 2 B
		25 TNC-50-3-21c	4 holes, 3.1 mm. dia.	3015 2 B
		25 TNC-50-3-22c 39012/29-0016	4 threads UNF 3 – 56, M 2.5	3015 2 B
				3015 2 B
				3015 2 B
				3058 B
				3058 B
				3015 2 C
21 TNC-50-4-6c 39012/27-0007	24 TNC-50-4-5c 39012/28-0007			3015 2 C
		25 TNC-50-4-11c	4 threads UNF 3 – 56, M 2.5	3015 2 C
		25 TNC-50-4-12c	4 holes, 3.1 mm. dia.	3015 2 C
				3015 2 C
				3015 2 C
21 TNC-50-4-7c	24 TNC-50-4-6c			3015 2 C
		25 TNC-50-4-14c	4 holes, 3.1 mm. dia.	3015 2 C
		25 TNC-50-4-13c	4 threads UNF 3 – 56, M 2.5	3015 2 C
				3015 2 C

Mounting hole ML 4
(see page 18)
max. panel
thickness 3.5 mm

Crimp insert

Braiding

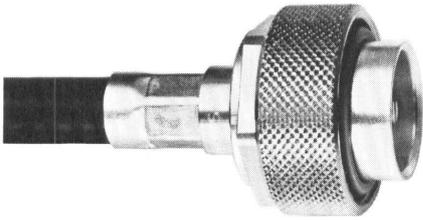
Inner contact

Assembly instructions

Mounting hole
ML 8
(see page 18)

Remarks

Series 7/16



Coaxial connector to IEC 169-4, VG 95250 and DIN 47223, with screw on coupling mechanism, for sheath diameters 10 – 11,3 mm.

Impedance	50 ohms
Recommended frequency range	DC-7.5 GHz
Inner contact	captivated
Insulation	PTFE
Surface finish	contacts silver-plated other metal parts SUCOPLATE®
Temperature range	-65...+165° C

No. of screens		Straight cable plug		Angle cable plug	
Insulation dia. mm					
Suitable cable example					
50 Ω Cable					
RG 213/U	7.25 1	11-716-50-7-1c			
RG 214/U	7.25 2	11-716-50-7-2c			
RG 213/U	7.25 1	11-716-50-0-2c <i>with 71 Z-0-7-21</i>		11-716-50-0-2c <i>with 71 Z-0-7-21</i>	
RG 214/U	7.25 2	11-716-50-01-2c <i>with 71 Z-0-7-22</i>		11-716-50-0-2c <i>with 71 Z-0-7-22</i>	

Series UHF



Simple coaxial connector with screwed joint, corrosion-resistant
Inner contact also fits 4 mm banana plug
Cable sheath diameters 4.9– 11.4 mm.

Impedance	not matched
Recommended frequency range	DC - 200 MHz
Working voltage	max. 500 V RMS/50 Hz
Inner contact	captivated
Insulation	(a) polypropylene (PP) (b) PTFE
Surface finish	inner contact silver-plated other parts nickel-plated
Temperature range	(a) -25... +70° C (b) -55... +165° C

No. of screens		Straight cable plug		Angle cable plug	
Insulation dia. mm					
Suitable cable example					
50 Ω Cable					
RG 58 C/U	2.95 1				
RG 223/U	2.95 2				
RG 213/U	7.25 1				
RG 214/U	7.25 2				
75 Ω Cable					
RG 59 B/U	3.7 1				
G 04233-d	3.7 2				

Mounting hole ML 27
(see page 18)
max. panel
thickness 6.5 mm.

Crimp insert

Braiding

Inner contact

Assembly instructions

Angle bulkhead jack	Straight cable jack	Bulkhead jack 1-hole mounting	Mounting holes Mounting hole ML 27 (see page 18) max. panel thickness 6.5 mm.	Remarks	
					
	21-716-50-7-1c	25-716-50-7-1c	4 holes, 3.6 mm. dia.	9017 3 D	
	21-716-50-7-2c	25-716-50-7-2c	4 holes, 3.6 mm. dia.	9017 3 D	
25-716-50-0-2c with 71 Z-0-7-21	21-716-50-0-2c with 71 Z-0-7-21	25-716-50-0-2c with 71 Z-0-7-21	4 holes, 3.6 mm. dia.	9087 D	Combination-System Inner contact soldered
25-716-50-0-2c with 71 Z-0-7-22	21-716-50-0-2c with 71 Z-0-7-22	25-716-50-0-2c with 71 Z-0-7-22	4 holes, 3.6 mm. dia.	9087 D	Combination-System Inner contact soldered

Insulation	Insulation	Insulation	Remarks
Assembly instructions Straight cable plug 	Assembly instructions Angle cable plug 	Assembly instructions Straight cable jack 	
	16 UHF-0-3-4c	PTFE 3058	B Inner contact soldered
11 UHF-0-3-17c	PP 3075		2 B
11 UHF-0-3-19c	PTFE 3075		2 B
11 UHF-0-3-20c	PTFE 3075	21 UHF-0-3-3c	PTFE 3075 2 B
	16 UHF-0-7-4c	PTFE 3076	2 B
11 UHF-0-7-17c	PP 3075		3 D
11 UHF-0-7-19c	PTFE 3075	21 UHF-0-7-4c	PTFE 3075 3 D
11 UHF-0-7-18c	PP 3075		3 D
	16 UHF-0-4-5c	PTFE 3058	C Inner contact soldered
11 UHF-0-4-14c	PP 3075		2 C
11 UHF-0-4-16c	PTFE 3075	21 UHF-0-4-3c	PTFE 3075 2 C
11 UHF-0-4-15c	PP 3075		2 C
11 UHF-0-4-17c	PTFE 3075		2 C

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