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NETWORKING COMPONENTS

COAXIAL CONNECTORS

CABLE ASSEMBLIES

PRECISION TURNED PARTS

PLASTIC INJECTION MOULD PARTS

INDUSTRIAL ELECTRONICS



RF-Components for Mobile Radio Base Stations

Connectors, EMP Protection, Jumper Cables,
Adaptors, Tools and Accessories



Publisher

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Edition

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The Telegärtner Group

Telegärtner is a worldwide supplier of coaxial connectors, preassembled cables, networking components, precision turned parts, and plastic injection moulded parts, as well as industrial electronics. Our policy is, on the one hand, to meet the highest technical demands whilst, on the other, to treat conventional requirements from our customers with an equally high level of commitment.

Be it small or large series products, Telegärtner is the ideal standard components supplier and development partner for customers who have high expectations and who are looking for the best contacts to success.



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Subsidiary

Coaxial Connectors

Telegärtner has been developing and manufacturing high quality connectors to suit the requirements of radio frequency applications for over four decades. In addition to the standard ranges, custom built connectors to meet customer specifications are also designed, developed and manufactured.

As a result of many years experience in interconnection technology, Telegärtner is now able to provide fully tested coaxial assemblies to meet the ever more demanding specifications requested by customers. Flexible as well as semi-rigid, semi-flex and copper corrugated cables are assembled.



Telegärtner Quality

Production

Greater manufacturing flexibility is obtained by the use of fully and semi-automated production methods. Manual production by experienced and well trained personnel using latest production equipment, including CNC machines for sample production, compliment this flexibility.



State-Of-The Art Stocking Facilities

To meet the ever increasing logistic demands of a continuously growing market, we have invested in a new, fully automatic stocking facility. With more than 28.000 containers – serviced by four rack robots – this offers sufficient space for our wide range of products.



Development

New products are developed using 3D-CAD systems. The new product developments are then tested and optimised in our laboratories using the latest test and measurement equipment, such as network analyzers and intermodulation test equipment, as well as RF simulation software.





1

Connectors

SIMFix® – Connectors for corrugated cables

The RF connectors in the series SIMFix® are rugged connectors with threaded coupling for use in high performance transmitter applications. These connectors are waterproof

and are suitable for external use. Furthermore, they are designed to provide excellent technical performance, especially concerning return loss and intermodulation.

SIMFix® Pro Series – IP 68

The SIMFix® Pro range includes RF connectors for terminating 1/2" flex, 1/2", 7/8", 1 1/2" and 1 5/8" sized corrugated cables. This second generation of SIMFix® Pro connectors is a further improved and more compact design of our well tried and tested connector series with an especially high water impermeability (IP 68).

Assembly for all sizes is simple and reliable, thus guaranteeing constantly good electrical performance with regard to return loss and intermodulation.

Ease of termination of the cables has been greatly enhanced by the use of specially developed tooling, which allows for exact stripping of the corrugated cables in the shortest of time.

- Return Loss typ. > 40 dB up to 3 GHz
- Passive Intermodulation > 160 dBc (2x43 dB Test signals)
- Water Impermeability: IP 68
- No additional means of sealing necessary
- Simple assembly: only 2 piece-parts
- Tools for cable preparation

SIMFix® ST Series – IP 67

The SIMFix® ST (Short Type) range is the shorter version of the SIMFix® Pro connectors. It has almost the same design as the SIMFix® Pro except for the sealing, which is specified IP 67. Application areas are where especially short and cost-efficient connectors are needed, indoor applications or where additional sealing by taping is done.

Other available connector types

Telegärtner connectors for feeder and jumper cables (highly flexible) are available in 3 different types, as follows:

SIMFix®: For quick and easy assembly. Designed for feeder cables. Watertight.

Standard: Watertight types for feeder and jumper cables.

Short: Compact types for feeder and jumper cables. Self-adhesive sleeving is necessary for watertight external installation.

SIMFix® Pro – IP 68: Waterproof with a high margin of safety

Special seals on the sheath and outer conductor of the cable provide reliable protection against the ingress of water. Tested to a pressure of 2.5 bar (equivalent to water

pressure at a depth of 25 m), a high degree of security against damage from water is guaranteed – even after years of service – in every climate, world-wide.

3-fold protection concept

Protection Step 1:

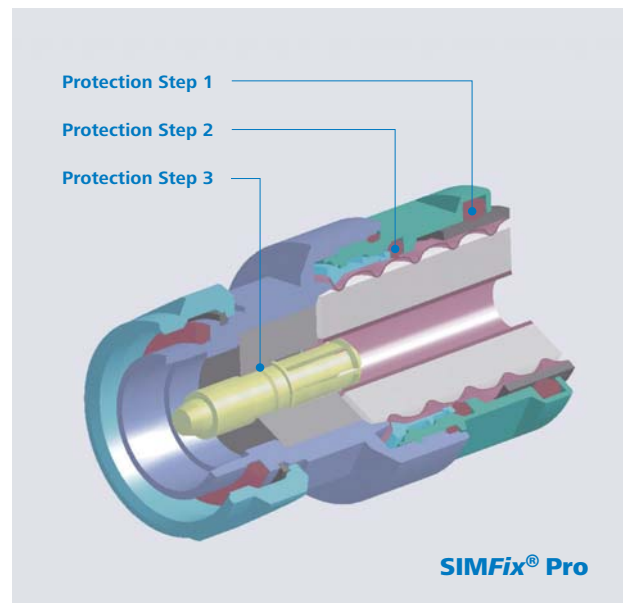
An O-ring on the outer jacket of the cable guarantees reliable protection against the ingress of water in normal applications of an undamaged cable.

Protection Step 2:

A special sealing to the outer conductor of the cable. Damage to the cable's outer jacket poses the danger that water will enter the connector between the outer jacket and the outer conductor of the cable. This is prevented by the additional sealing.

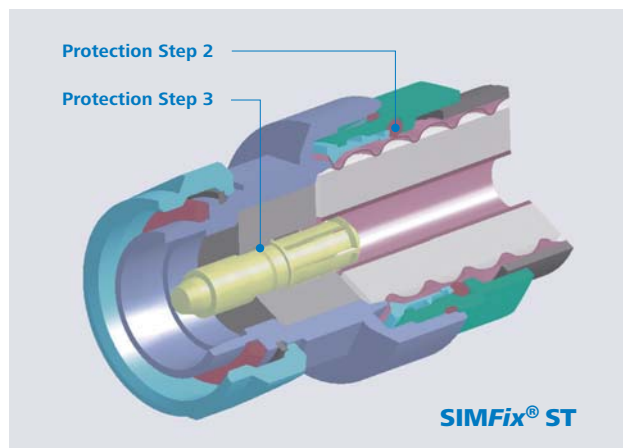
Protection Step 3:

Barrier sealed by protective steps taken on centre contact. Massive destruction of the cable resulting in water ingress into the dielectric and possibly even into the inner conductor can destroy the following cable segment and even damage the base station, if water is able to seep through the connector.



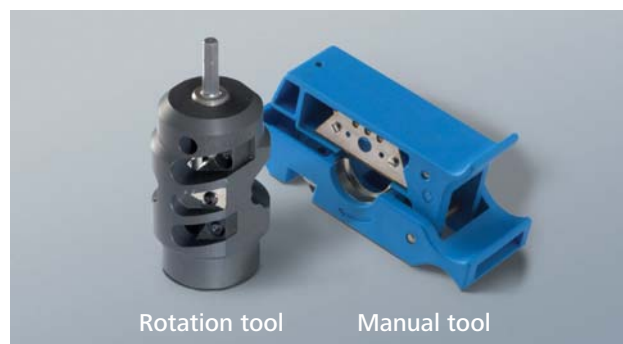
SIMFix® ST – IP 67 Short Type with 2-fold protection concept

The SIMFix® ST series connectors have only one sealing between the connector and the cable, which is located between the connector body and the outer conductor of the cable (Protection Step 2). The sealing between the connector and the cable jacket (Protection Step 1) does not exist. On outdoor usage we therefore recommend to use an additional special sealing tape or a heat shrink sleeve. Apart from that, it is identical to the SIMFix® Pro connectors. The preparation tools for SIMFix® Pro and ST connectors are the same.



Easy and fast assembly using special tools

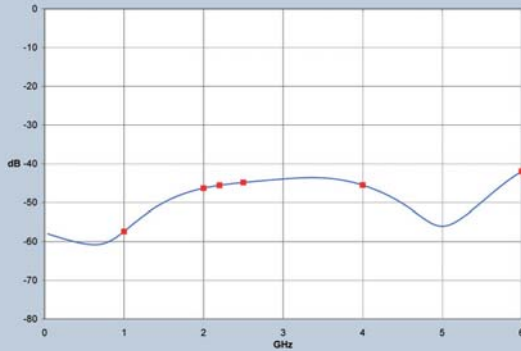
Types of tooling for cable preparation: Manual tool and rotation tool for electrical drills.



Technical Data Series 7-16 and N

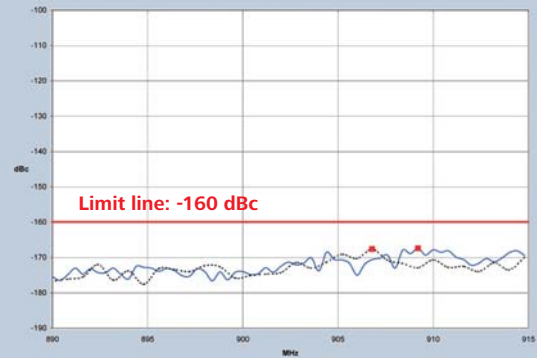
Excellent electrical performance. Trouble-free transmission in mobile networks.

Return Loss (J01120G0085 typ.)



1: 1,0 GHz = -57,4 dB	4: 2,0 GHz = -44,9 dB
2: 2,0 GHz = -46,3 dB	5: 4,0 GHz = -45,5 dB
3: 2,0 GHz = -45,6 dB	6: 6,0 GHz = -42,0 dB

Intermodulation (J01120G0085 typ.)



F1 UP (SolidLine) from = 925 MHz to = 940,8 MHz IM3 = -167,4 dBc at 909,2 MHz Carrier Power Level = 43 dBm	F2 DOWN (DotLine) from = 960 MHz to = 933,4 MHz IM3 = -167,6 dBc at 906,8 MHz CPL = 43 dBm
--	--

Mechanical Characteristics Series 7-16

Finish	
Inner conductor	Silver
Other conductive parts	Silver or silver with Telealloy flash (CuSnZn3)
Other parts	Silver, Nickel or Telealloy (CuSnZn3)
Coupling torque	25-35 Nm
Durability (mating cycles)	> 500

Thermal and Climatic Characteristics

Category to DIN IEC 68 Part 1	55/155/56
Protection to IEC 60529	
SIMFix Pro types	IP 68 (2.5 bar, axially and radially watertight)
SIMFix ST, short type with shrink sleeving and Standard types	IP 67

Electrical Characteristics

Contact resistance (only) inner contact	< 0.1 mΩ
Contact resistance (overall) inner contact	< 0.4 mΩ
Contact resistance (only) outer contact	< 0.1 mΩ
Contact resistance (overall) outer contact	< 0.2 mΩ
Insulation resistance	> 10 GΩ
Voltage proof	4 kV _{eff} /50 Hz
Impedance	50 Ω
Working voltage	< 2.7 kV _{eff} /50 Hz
Power handling	1.8 kW/1 GHz

Intermodulation

Intermodulation product 3rd. Order (typical); 2 unmodulated test signals at 43 dBm (20 W)	
at 800-1000 MHz	-117 dBm/-160 dBc
at 1600-2000 MHz	-112 dBm/-155 dBc

Mechanical Characteristics Series N

Finish	
Inner conductor	Silver
Other conductive parts	Silver or silver with Telealloy flash (CuSnZn3)
Other parts	Silver, Nickel or Telealloy (CuSnZn3)
Coupling torque	4-6 Nm
Durability (mating cycles)	> 500

Thermal and Climatic Characteristics

Category to DIN IEC 68 Part 1	40/155/21
Protection to IEC 60529	
SIMFix Pro types	IP 68 (2.5 bar, axially and radially watertight)
SIMFix ST, short type with shrink sleeving and Standard types	IP 67

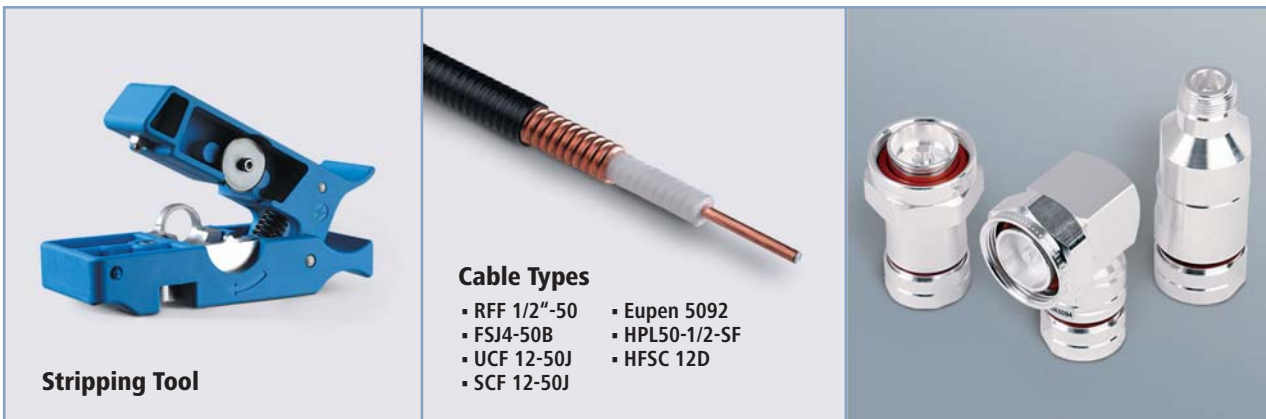
Electrical Characteristics

Contact resistance (overall) inner contact	< 2 mΩ
Contact resistance (overall) outer contact	< 0.5 mΩ
Insulation resistance	> 5 GΩ
Voltage proof	2.5 kV _{eff} /50 Hz
Impedance	50 Ω
Working voltage	< 1 kV _{eff} /50 Hz

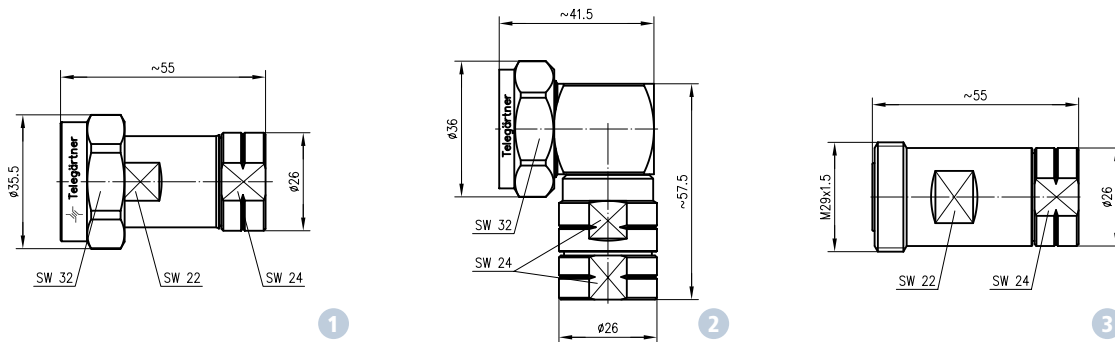
Intermodulation

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at 800-1000 MHz	-117 dBm/-160 dBc
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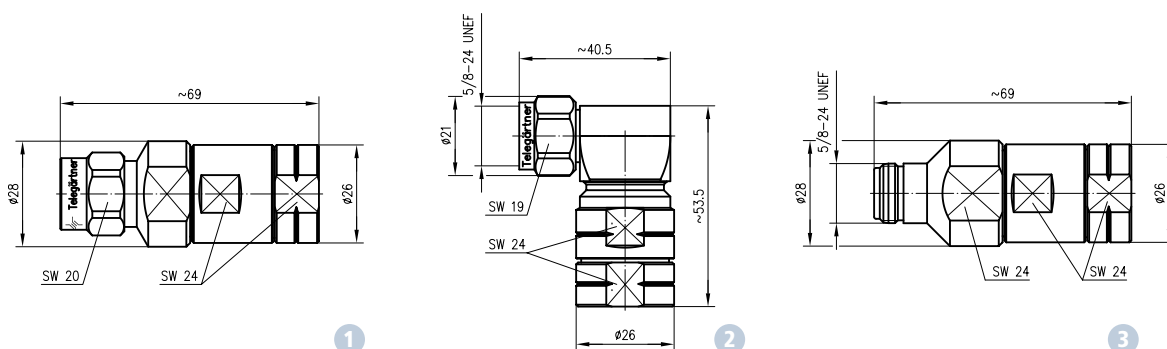
Connectors for 1/2" Highly Flexible Cables

1/2"
FLEX

Stripping Tool
Cable Types

- RFF 1/2"-50
- FSJ4-50B
- UCF 12-50J
- SCF 12-50J
- Eupen 5092
- HPL50-1/2-SF
- HFSC 12D

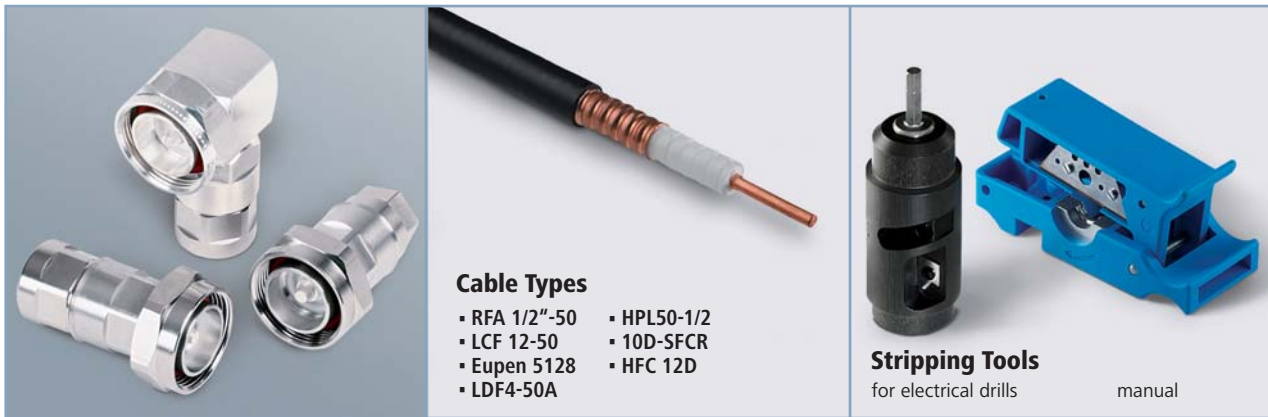
Series 7-16


Series	Design	Type	Protection Class	Order no.	Tool	Fig.
7-16	Straight plug	SIMFix Pro	IP 68	J01120B0077	N00091A0013	1
7-16	Straight plug	SIMFix ST	IP 67	J01120B0073	N00091A0004	1
7-16	Angle plug	SIMFix Pro	IP 68	J01120A0094	N00091A0013	2
7-16	Straight jack	SIMFix Pro	IP 68	J01121B0120	N00091A0013	3
7-16	Straight jack	SIMFix ST	IP 67	J01121B0114	N00091A0004	3

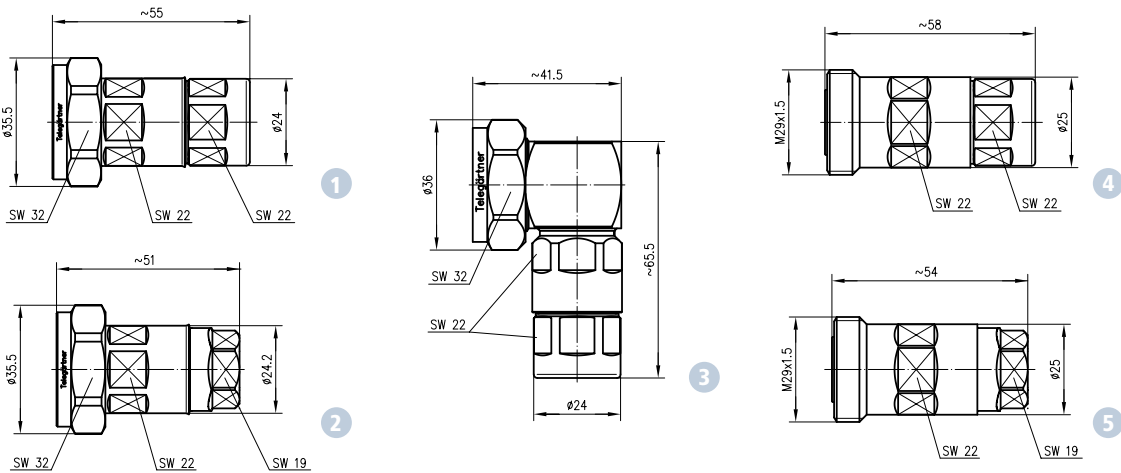
Series N


Series	Design	Type	Protection Class	Order no.	Tool	Fig.
N	Straight plug	SIMFix Pro	IP 68	J01020A0105	N00091A0013	1
N	Straight plug	SIMFix ST	IP 67	J01020A0098	N00091A0004	1
N	Angle plug	SIMFix Pro	IP 68	J01020A0147	N00091A0013	2
N	Straight jack	SIMFix Pro	IP 68	J01021A0163	N00091A0013	3
N	Straight jack	SIMFix ST	IP 67	J01021A0156	N00091A0004	3

Connectors for 1/2" Corrugated Cables

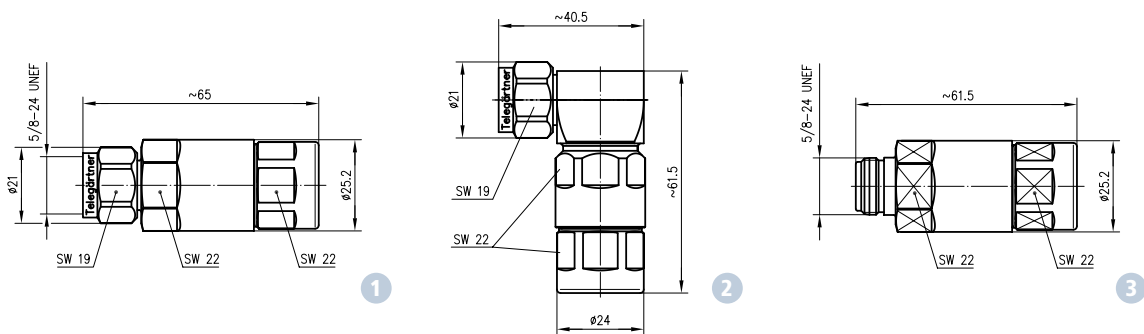


Series 7-16



Series	Design	Type	Protection Class	Order no.	Tool		Fig.
					Manual	Electric	
7-16	Straight plug	SIMFix Pro	IP 68	J01120G0085	N00091A0015	N00091A0018	1
7-16	Straight plug	SIMFix ST	IP 67	J01120H0085	N00091A0015	N00091A0018	2
7-16	Angle plug	SIMFix Pro	IP 68	J01120B0026	N00091A0015	N00091A0018	3
7-16	Straight jack	SIMFix Pro	IP 68	J01121G0136	N00091A0015	N00091A0018	4
7-16	Straight jack	SIMFix ST	IP 67	J01121H0136	N00091A0015	N00091A0018	5

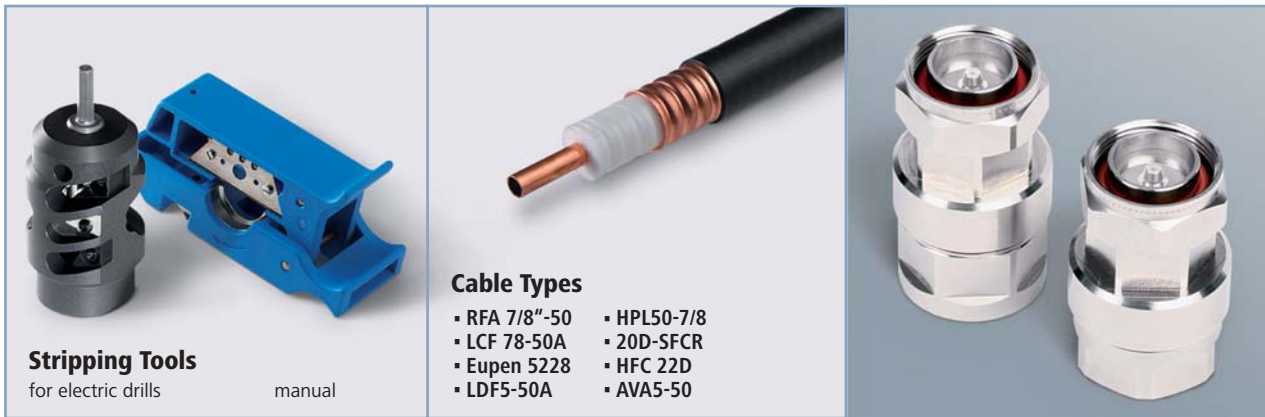
Series N



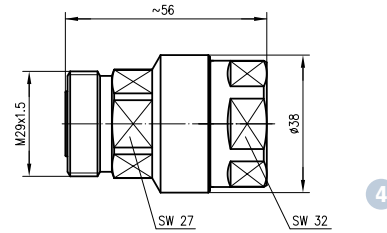
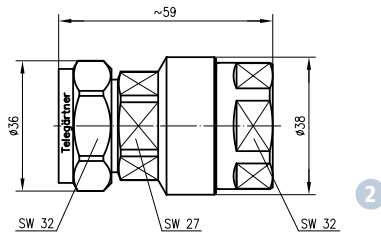
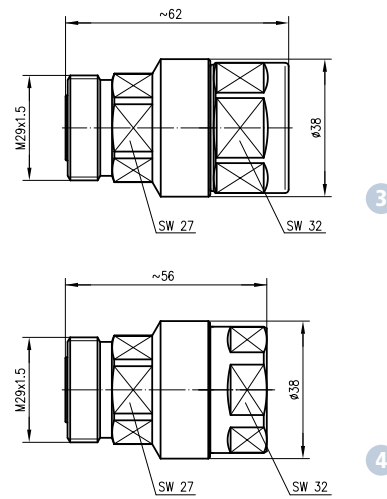
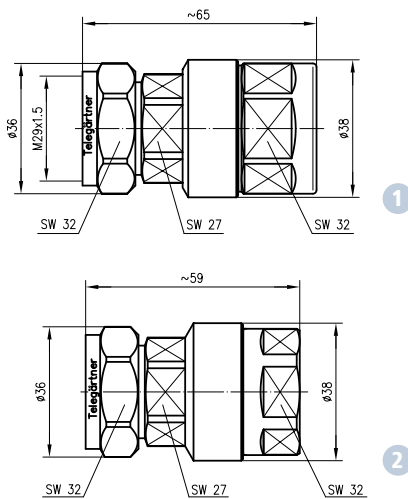
Series	Design	Type	Protection Class	Order no.	Tool		Fig.
					Manual	Electric	
N	Straight plug	SIMFix Pro	IP 68	J01020G0141	N00091A0015	N00091A0018	1
N	Angle plug	SIMFix Pro	IP 68	J01020B0044	N00091A0015	N00091A0018	2
N	Straight jack	SIMFix Pro	IP 68	J01021G0174	N00091A0015	N00091A0018	3

Connectors for 7/8" Corrugated Cables

7/8"

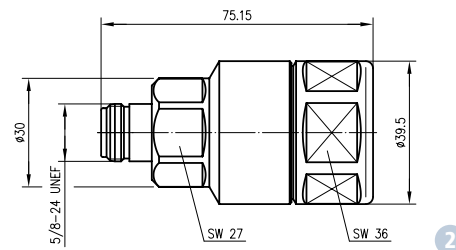
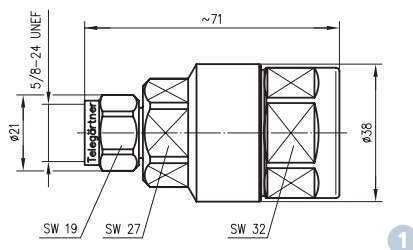


Series 7-16



Series	Design	Type	Protection Class	Order no.	Tool		Fig.
					Manual	Electric	
7-16	Straight plug	SIMFix Pro	IP 68	J01120G0084	N00091A0014	N00091A0019	1
7-16	Straight plug	SIMFix ST	IP 67	J01120H0084	N00091A0014	N00091A0019	2
7-16	Straight jack	SIMFix Pro	IP 68	J01121G0132	N00091A0014	N00091A0019	3
7-16	Straight jack	SIMFix ST	IP 67	J01121H0132	N00091A0014	N00091A0019	4

Series N



Series	Design	Type	Protection Class	Order no.	Tool		Fig.
					Manual	Electric	
N	Straight plug	SIMFix Pro	IP 68	J01020G0142	N00091A0014	N00091A0019	1
N	Straight jack	SIMFix Pro	IP 68	J01021G0175	N00091A0014	N00091A0019	2

1 1/4"

Connectors for 1 1/4" Corrugated Cables



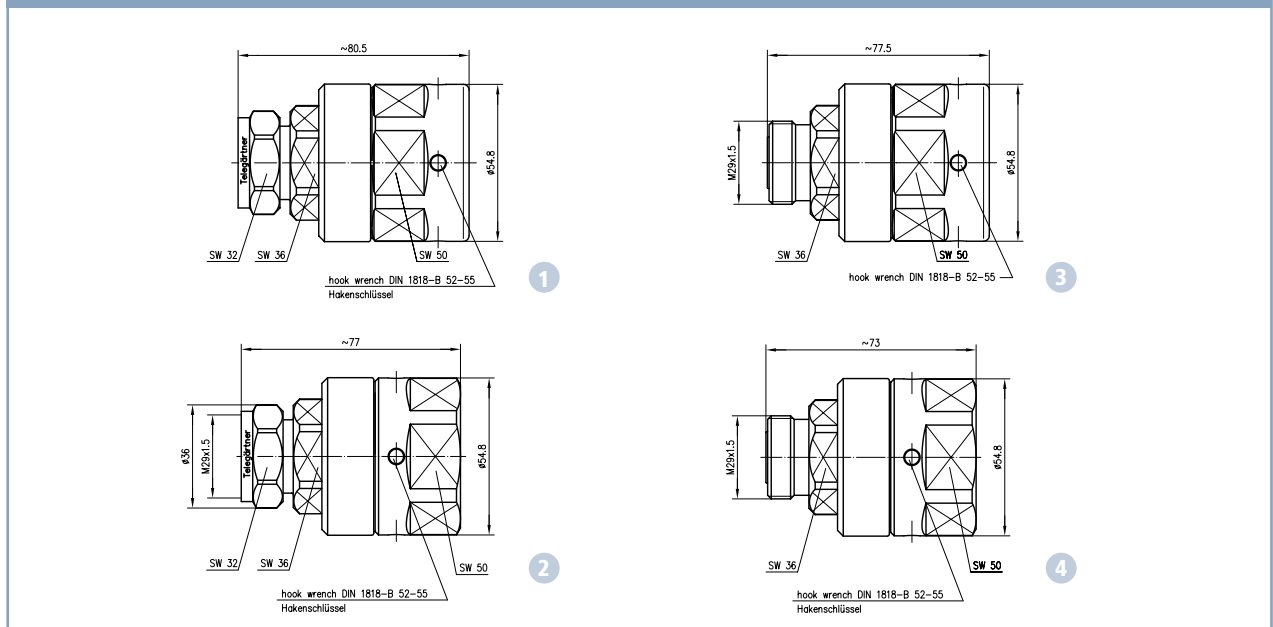
Cable Types

- RFA 1 1/4"-50
- LCF 114-50A
- Eupen 5328
- LDF6-50A
- HPL50-1 1/4

Termination Tool Set

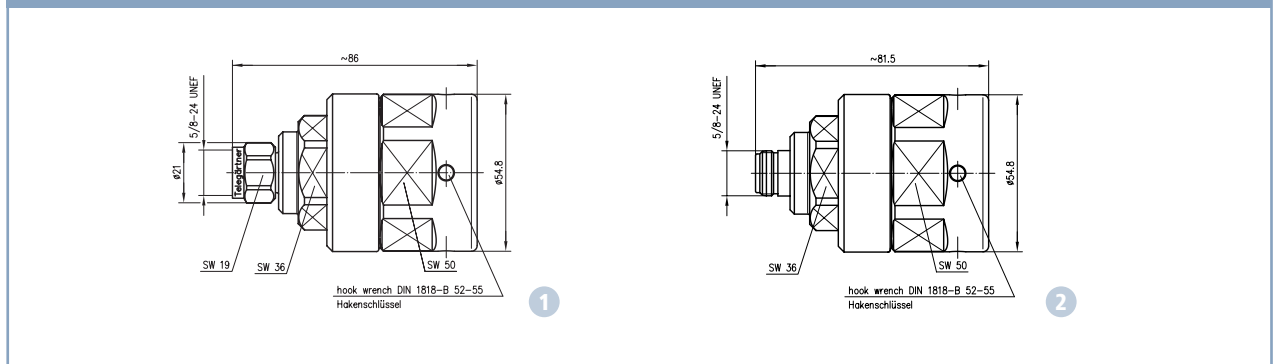
for 1 1/4" and 1 5/8" SIMFix® Pro/ST
Order-No. R00200A0011

Series 7-16



Series	Design	Type	Protection Class	Order no.	Tool	Fig.
7-16	Straight plug	SIMFix Pro	IP 68	J01120G0087	R00200A0011	1
7-16	Straight plug	SIMFix ST	IP 67	J01120H0087	R00200A0011	2
7-16	Straight jack	SIMFix Pro	IP 68	J01121G0138	R00200A0011	3
7-16	Straight jack	SIMFix ST	IP 67	J01121H0138	R00200A0011	4

Series N



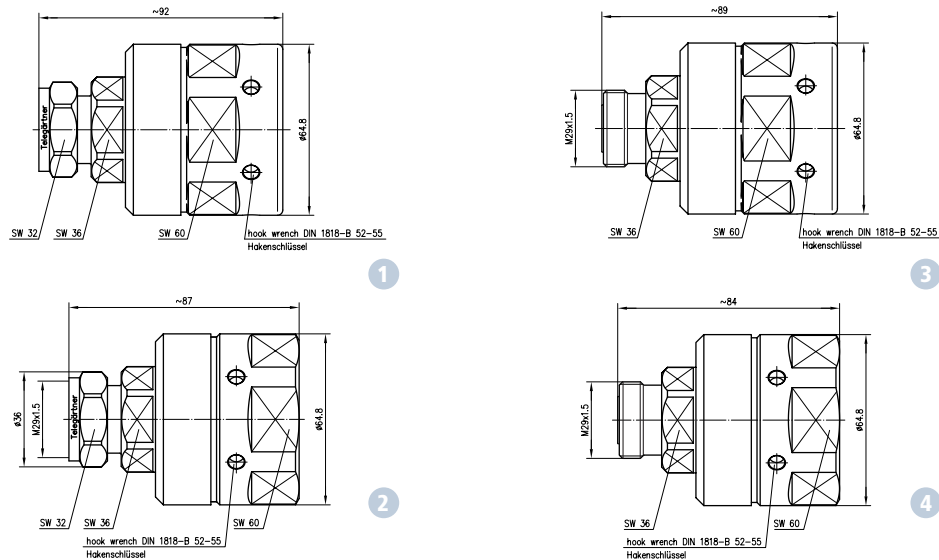
Series	Design	Type	Protection Class	Order no.	Tool	Fig.
N	Straight plug	SIMFix Pro	IP 68	J01020G0143	R00200A0011	1
N	Straight jack	SIMFix Pro	IP 68	J01021G0178	R00200A0011	2

Connectors for 1 5/8" Corrugated Cables

1 5/8"

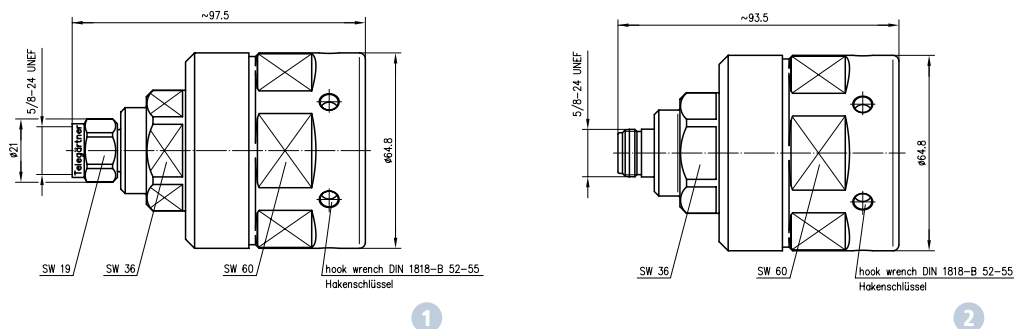


Series 7-16



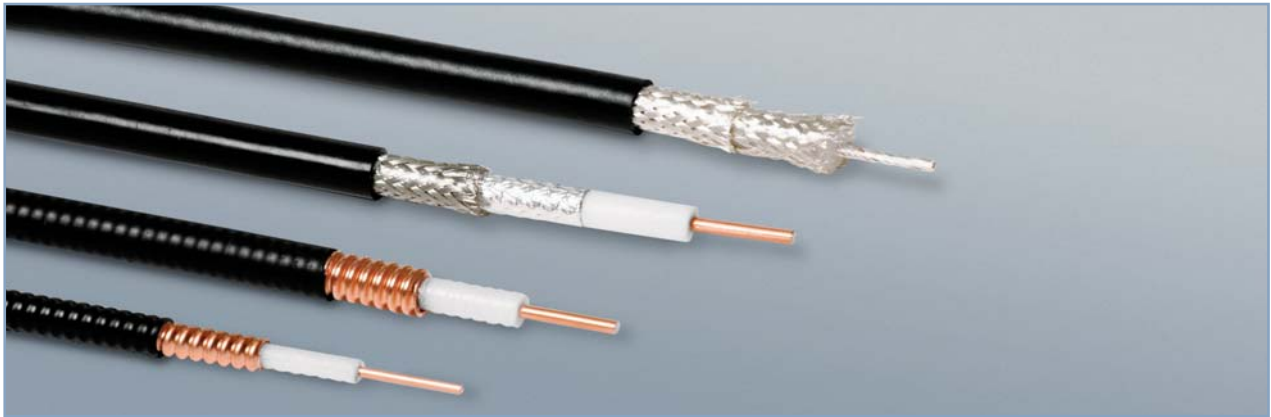
Series	Design	Type	Protection Class	Order no.	Tool	Fig.
7-16	Straight plug	SIMFix Pro	IP 68	J01120G0088	R00200A0011	1
7-16	Straight plug	SIMFix ST	IP 67	J01120H0088	R00200A0011	2
7-16	Straight jack	SIMFix Pro	IP 68	J01121G0139	R00200A0011	3
7-16	Straight jack	SIMFix ST	IP 67	J01121H0139	R00200A0011	4

Series N

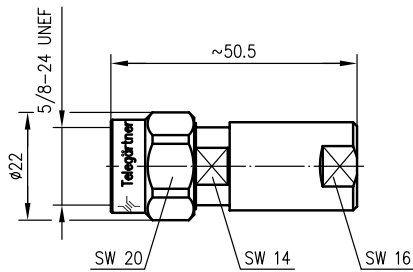


Series	Design	Type	Protection Class	Order no.	Tool	Fig.
N	Straight plug	SIMFix Pro	IP 68	J01020G0144	R00200A0011	1
N	Straight jack	SIMFix Pro	IP 68	J01021G0179	R00200A0011	2

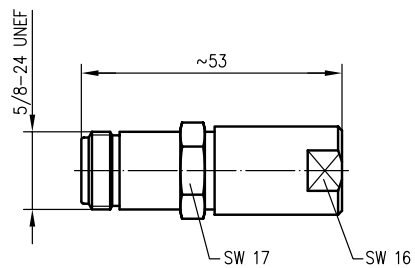
Connectors for 1/4" Corrugated Cables



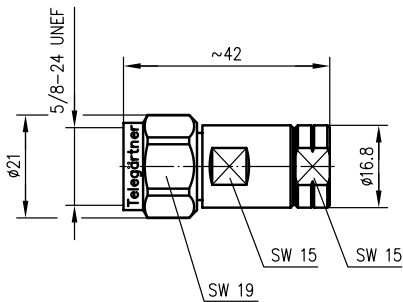
Connectors for 1/4"



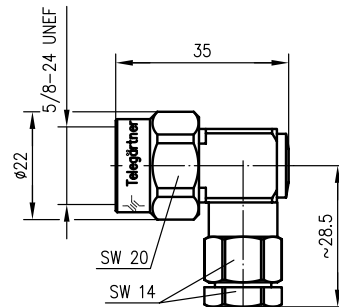
1



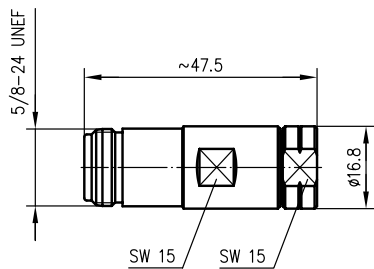
2



3



4



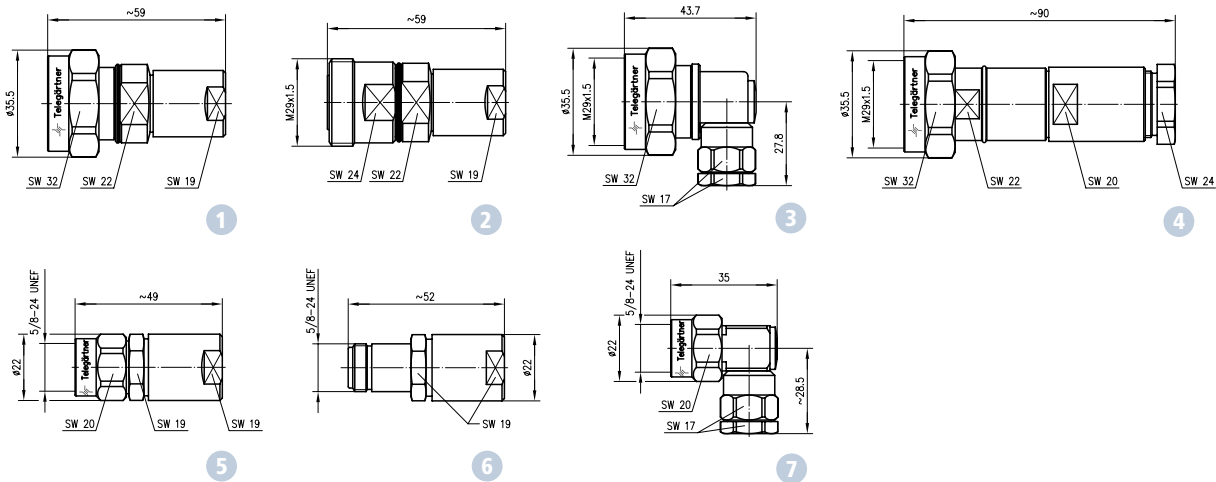
5

Ø	Cable	Series	Design	Type	Order no.	Assembly	Fig.
1/4"	CF 14-50J; Eupen 5062; HPL 50-1/4	N	Straight plug	Standard	J01020A0028	B25	1
		N	Straight jack	Standard	J01021A0043	B25	2
1/4"	FSJ1-50; RFF 1/4" Cu2Y-50; SCF 14-50J; Eupen 5042	N	Straight plug	SIMFix	J01020A0150	B85	3
		N	Angle plug	Short	J01020A0126	B62	4
		N	Straight jack	SIMFix	J01021A0188	B85	5

Connectors for 3/8" Corrugated Cables, RG-213 and RG-214 Cables

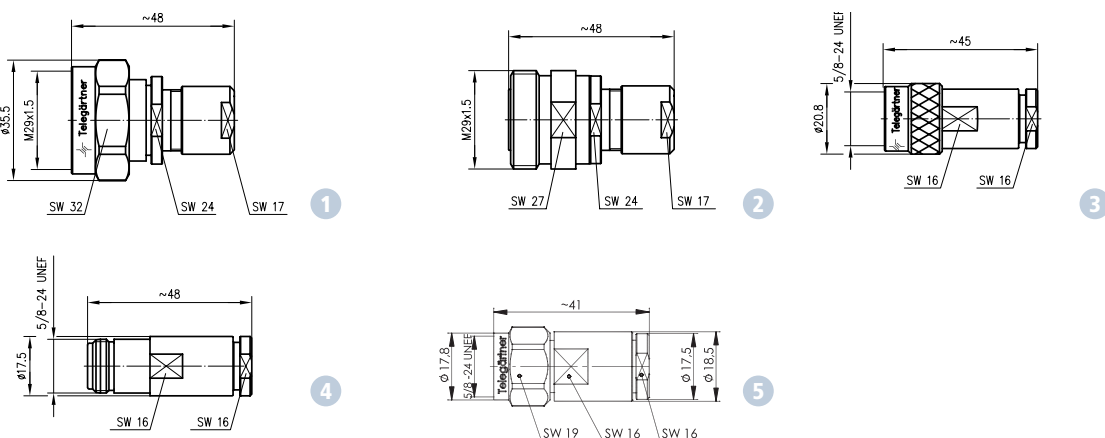
3/8"
RG-213
RG-214

Connectors for 3/8"



Ø	Cable	Series	Design	Type	Order no.	Assembly	Fig.
3/8"	Eupen 5088; RF 3/8"-50; LCF 38-50J; HPL50-3/8	7-16	Straight plug	Standard	J01120A0019	B31	1
		7-16	Straight jack	Standard	J01121A0043	B31	2
3/8"	LDF2-50	7-16	Straight plug	Standard	J01120A0022	B31	1
		7-16	Straight jack	Standard	J01121A0045	B31	2
3/8"	SCF 38-50J	7-16	Angle plug	Short	J01120A0034	D07	3
3/8"	Flexwell 3/8" Cu2Y-50	7-16	Straight plug	Standard	J01120A0733	B08	4
3/8"	Eupen 5088; RF 3/8"-50; LCF 38-50J; HPL50-3/8	N	Straight plug	Standard	J01020A0010	B29	5
		N	Straight jack	Standard	J01021A0041	B29	6
3/8"	LDF2-50	N	Straight plug	Standard	J01020A0031	B29	5
		N	Straight jack	Standard	J01021A0045	B29	6
3/8"	SCF 38-50J	N	Angle plug	Short	J01020A0124	D07	7

Connectors for RG-213/214



Ø	Cable	Series	Design	Type	Order no.	Assembly	Fig.
103 mm	RG-213/U	7-16	Straight plug	Standard	J01120A0732	B09	1
		7-16	Straight jack	Standard	J01121A0011	B21	2
108 mm	RG-214/U	7-16	Straight plug	Standard	J01120A0731	B09	1
		7-16	Straight jack	Standard	J01121A0012	B21	2
103 – 108 mm	RG-213/U; RG-214/U	N	Straight plug	Standard	J01020H1070	B01	3
		N	Straight jack	Standard	J01021H1076	B04	4
103 mm	LMR 400,...	N	Straight plug	Standard	J01020A0149	B82	5

7-16 (DIN) Connectors Overview

Ø	Cable	Cable Type	Design	Order no.	Type	IP Class	Weight
	RG-213/U	B	Straight plug	J01120A0732	Standard	IP 67	100 g
			Straight jack	J01121A0011	Standard	IP 67	100 g
	RG-214/U	B	Straight plug	J01120A0731	Standard	IP 67	100 g
			Straight jack	J01121A0012	Standard	IP 67	100 g
3/8"	Eupen 5088; RF 3/8"-50; LCF 38-50J; HPL50-3/8	F	Straight plug	J01120A0019	Standard	IP 68	150 g
			Straight jack	J01121A0043	Standard	IP 68	150 g
3/8"	LDF2-50	F	Straight plug	J01120A0022	Standard	IP 68	150 g
			Straight jack	J01121A0045	Standard	IP 68	150 g
3/8"	SCF 38-50J	J	Angle plug	J01120A0034	Short	IP 54	140 g
3/8"	Flexwell 3/8" Cu2Y-50	F	Straight plug	J01120A0733	Standard	IP 67	200 g
1/2" Flex	RFF 1/2"-50; FSJ4-50B UCF 12-50J; SCF 12-50J Eupen 5092; HPL50-1/2-SF HFSC 12D	J	Straight plug	J01120B0077	SIMFix Pro	IP 68	170 g
			Straight plug	J01121B0073	SIMFix ST	IP 67	170 g
			Angle plug	J01120A0094	SIMFix Pro	IP 68	250 g
			Straight jack	J01121B0120	SIMFix Pro	IP 68	160 g
1/2"	RFA 1/2"-50; LCF 12-50 Eupen 5128; LDF4-50A HPL50-1/2; 10D-SFCR HFC 12D	F/X	Straight plug	J01120G0085	SIMFix Pro	IP 68	120 g
			Straight plug	J01120H0085	SIMFix ST	IP 67	110 g
			Angle plug	J01120B0026	SIMFix Pro	IP 68	230 g
			Straight jack	J01121G0136	SIMFix Pro	IP 68	110 g
7/8"	RFA 7/8"-50; LCF 78-50A Eupen 5228; LDF5-50A HPL50-7/8; 20D-SFCR HFC 22D; AVA5-50	F	Straight plug	J01120G0084	SIMFix Pro	IP 68	200 g
			Straight plug	J01120H0084	SIMFix ST	IP 67	190 g
			Straight jack	J01121G0132	SIMFix Pro	IP 68	190 g
			Straight jack*	J01121H0132	SIMFix ST	IP 67	180 g
7/8"	RFXT 7/8"-50	X	Straight plug	J01120A0050	SIMFix	IP 67	450 g
			Straight jack	J01121A0086	SIMFix	IP 67	440 g
1 1/4"	RFA 1 1/4"-50; LCF 114-50A Eupen 5328; LDF6-50A HPL50-1 1/4	F	Straight plug	J01120G0087	SIMFix Pro	IP 68	540 g
			Straight plug	J01120H0087	SIMFix ST	IP 67	530 g
			Straight jack	J01121G0138	SIMFix Pro	IP 68	530 g
			Straight jack	J01121H0138	SIMFix ST	IP 67	520 g
1 5/8"	RFA 1 5/8"-50; LCF 158-50A Eupen 5438; LDF7-50A HPL50- 1 5/8"; HFC 42D AVA7-50	F	Straight plug	J01120G0088	SIMFix Pro	IP 68	700 g
			Straight plug	J01120H0088	SIMFix ST	IP 67	675 g
			Straight jack	J01121G0139	SIMFix Pro	IP 68	690 g
			Straight jack	J01121H0139	SIMFix ST	IP 67	665 g



Packaging:

Individually packed in PE foil, together with assembly instruction

B: Braided Cable

F: Feeder Cable (with annular corrugated outer conductor)

J: Jumper Cable (with spiral corrugated outer conductor)

X: Radiating Cable

* With integrated earthing wire.

N Connectors Overview

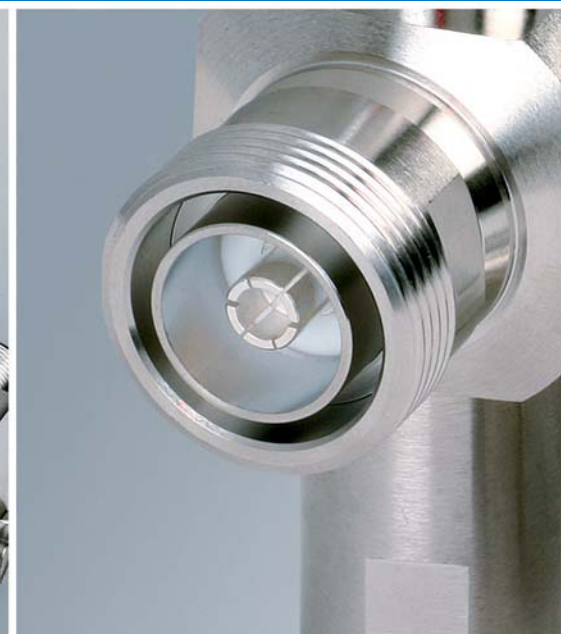
Ø	Cable	Cable Type	Design	Order no.	Type	IP Class	Weight
	RG-213/U	B	Straight plug	J01020H1070	Standard	IP 67	60 g
	RG-214/U		Straight jack	J01021H1076	Standard	IP 67	60 g
1/4"	CF 14-50J; Eupen 5062;	F	Straight plug	J01020A0028	Standard	IP 67	70 g
	HPL50-1/4		Straight jack	J01021A0043	Standard	IP 67	70 g
1/4"	FSJ1-50; RFF 1/4"	F	Straight plug	J01020A0150	SIMFix	IP 67	60 g
	Cu2Y-50; SCF 14-50; Eupen 5042		Angle plug	J01020A0126	Short	IP 54	70 g
			Straight jack	J01021A0188	SIMFix	IP 67	65 g
3/8"	Eupen 5088; RF 3/8"-50;	F	Straight plug	J01020A0010	Standard	IP 54	90 g
	LCF 38-50J; HPL50-3/8		Straight jack	J01021A0041	Standard	IP 54	90 g
3/8"	LDF2-50	F	Straight plug	J01020A0031	Standard	IP 54	90 g
			Straight jack	J01021A0045	Standard	IP 54	90 g
3/8"	SCF 38-50J (HCF 3/8")	J	Angle plug	J01020A0124	Short	IP 54	75 g
1/2" Flex	RFF 1/2"-50; FSJ4-50B	J	Straight plug	J01020A0098	SIMFix ST	IP 67	170 g
	UCF 12-50J; SCF 12-50J		Straight plug	J01020A0105	SIMFix Pro	IP 68	170 g
	Eupen 5092; HPL50-1/2-SF		Angle plug	J01020A0147	SIMFix Pro	IP 68	180 g
	HFSC 12D		Straight jack	J01021A0156	SIMFix ST	IP 67	160 g
			Straight jack	J01021A0163	SIMFix Pro	IP 68	160 g
1/2"	RFA 1/2"-50; LCF 12-50	F/X	Straight plug	J01020G0141	SIMFix Pro	IP 68	180 g
	Eupen 5128; LDF4-50A		Angle plug	J01020B0044	SIMFix Pro	IP 68	165 g
	HPL50-1/2; 10D-SFCR		Straight jack	J01021G0174	SIMFix Pro	IP 68	160 g
	HFC 12D						
7/8"	RFA 7/8"-50; LCF 78-50A	F	Straight plug	J01020G0142	SIMFix Pro	IP 68	200 g
	Eupen 5228; LDF5-50A		Straight jack	J01021G0175	SIMFix Pro	IP 68	190 g
	HPL50-7/8; 20D-SFCR						
	HFC 22D; AVA5-50						
7/8"	RFXT 7/8"-50	X	Straight plug	J01020A0077	SIMFix	IP 67	450 g
			Straight jack	J01021A0052	SIMFix	IP 67	450 g
1 1/4"	RFA 1 1/4"-50; LCF 114-50A	F	Straight plug	J01020G0143	SIMFix Pro	IP 68	540 g
	Eupen 5328; LDF6-50A		Straight jack	J01021G0178	SIMFix Pro	IP 68	530 g
	HPL50-1 1/4						
1 5/8"	RFA 1 5/8"-50; LCF 158-50A	F	Straight plug	J01020G0144	SIMFix Pro	IP 68	700 g
	Eupen 5438; LDF7-50A		Straight jack	J01021G0179	SIMFix Pro	IP 68	690 g
	HPL50- 1 5/8"; HFC 42D; AVA7-50						



Packaging:

Individually packed in PE foil, together with assembly instruction

- B:** Braided Cable
- F:** Feeder Cable (with annular corrugated outer conductor)
- J:** Jumper Cable (with spiral corrugated outer conductor)
- X:** Radiating Cable



2

EMP Protection

Surge Suppressors

To protect against EMP caused by lightning strikes in the direct vicinity of base stations, Telegärtner has developed a range of surge suppressors with 7/16- and N-Series interfaces.

There are two different functional designs:

- Surge suppressors with Gas Discharge Tube
- Quarter Wavelength Shorting Stub – with or without DC pass

$\lambda/4$ shorting Stub Protectors

These surge suppressors act like narrow bandpass filters. Only a narrow bandwidth is allowed to pass; other frequencies are shorted and discharged to ground. The design of these surge suppressors involves a direct and solid short-circuit between the centre and outer conductor of the coaxial device.

This short-circuit path, in the form of a coaxial line and of a precisely defined length, is designed to have an electrical length equivalent to one quarter wavelength ($\lambda/4$) of the signal frequency to be transmitted. As an alternating voltage of the correct frequency passes along the quarter-wavelength shorting stub it experiences a 90° phase angle rotation, is then reflected totally at the short (180° phase angle rotation) and finally travels back along the quarter wavelength stub (= a further phase angle rotation of 90°). This represents a total phase angle rotation of 360° . The reflected signal and the incident signal are in phase and the operating signal does not see the short.

It is, therefore, not affected by it. However, if an alternating voltage of a different frequency is present, then these special factors are not given and the energy is short-circuited (= discharged to ground).

λ/4 shorting Stub Protectors with DC pass

DC pass types are λ/4 stub protectors, which – as is the case with gas capsule protection devices – allow a DC current to pass in order to feed, for example, mast top antennas (MTAs).

The advantage of these new λ/4 stub protectors (as opposed to the gas discharge types) is that they retain the excellent transmission and PIM characteristics of the λ/4 shorting stub protectors.

Advantages

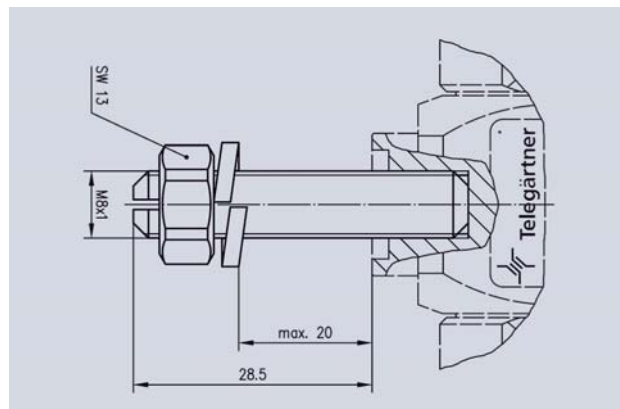
- Very high discharge currents are possible
- Very good transmission and intermodulation characteristics
- Complete discharge of the excess voltage
- Automatically operational again after the surcharge subsides, no special precautions necessary to protect the DC supply current
- Matching of the frequency range up to a range of over 10 GHz possible
- Maintenance free and waterproof
- Since only the desired frequency range is allowed to pass, there is an additional, useful filter effect (excluding odd multiples of the quarter wavelength frequency)

Applications

λ/4 stub protectors are used particularly in transmission paths between antenna and base station, as well as where transmit and receive signals use a common cable, involving high power signal levels.

In principle, the use of λ/4 shorting stubs in the receive path can also be recommended. In the event of a pre-amplifier being used at the Rx end, then it would be necessary to use the new special λ/4 shorting stub protector with DC pass.

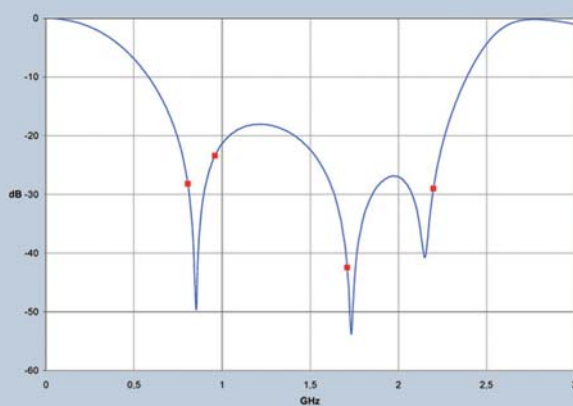
Accessory: Fixing Kit



Fixing Kit Order Number: H06000A0024

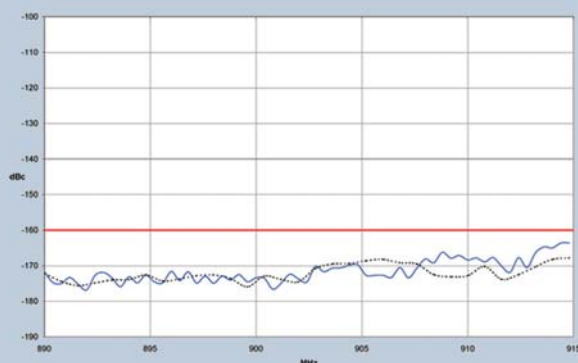
Technical Data

Return Loss Tri-Band-Type (J01125A0024)



1: 810 MHz = -27,3 dB 3: 1710 MHz = -35,4 dB
2: 960 MHz = -25,6 dB 4: 2200 MHz = -33,9 dB

Intermodulation Performance (PIM 3rd. order) < -160 dBc



λ/4 Shorting Stubs

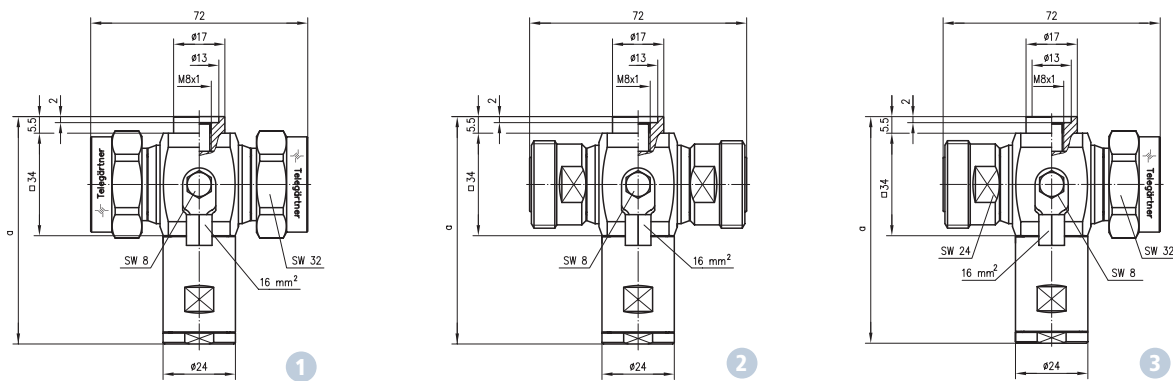
Technical Data

Mechanical Characteristics	
Materials	
Spring contact	CuBe2
Other metal parts	CuZn39Pb3
Insulators	PTFE
Gaskets	Silicon
Finish	
Spring contact	Cu2Ag5
Other metal parts	CuSnZn3
Coupling torque Series N	4-6 Nm
Coupling torque Series 7-16	25-35 Nm
Durability (mating cycles)	> 500
Thermal and Climatic Characteristics	
Category to DIN IEC 68 Part 1	
Series N	40/155/21
Series 7-16	55/155/56
Protection level to DIN 40050/IEC 529	IP 67

Electrical Characteristics	
VSWR	< 1.15
Insertion loss	< 0.1 dB
Intermodulation	
Intermodulation product 3rd Order (typical) at 800-1000 MHz	-160 dBc
2 unmodulated test-signals at 43dBm (20W) at 1600-2000 MHz	-155 dBc
Max. Power at 2200 MHz	500 W
Max. Discharge Current	
Standard Types of quarterwave shorting stubs	100 kA (8/50 μs test impulses)
Types with DC pass	30 kA (8/50 μs test impulses, multiple)
Maximum Working Voltage for DC pass types	
	85 V



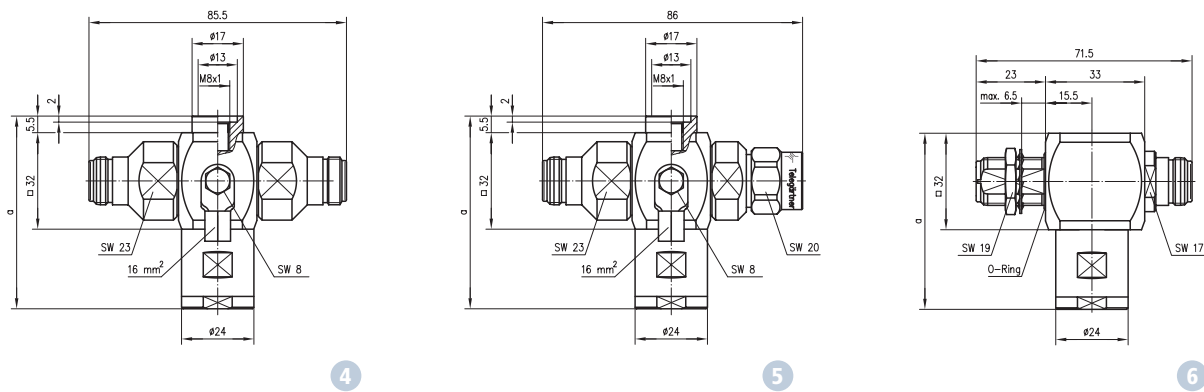
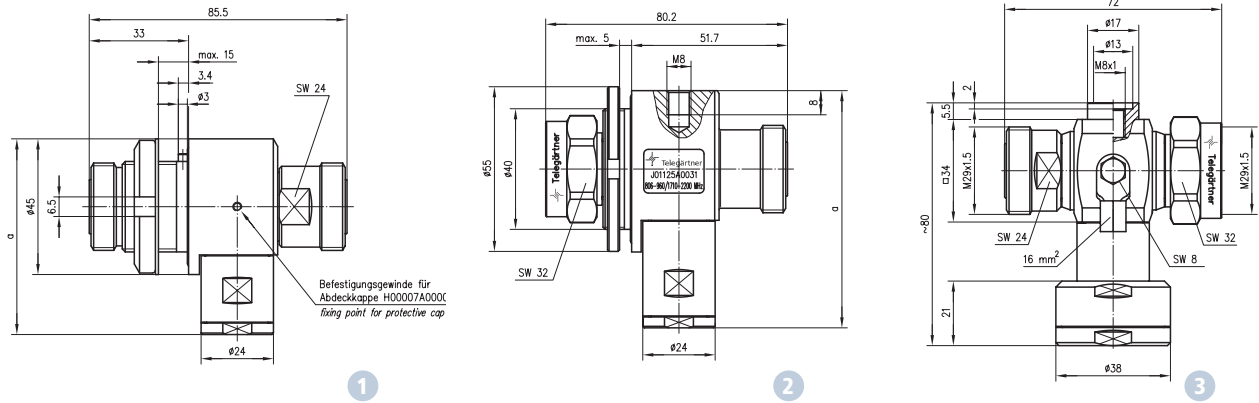
λ/4 Shorting stub types



Type	Frequency range (MHz)										Fig
	380-430	800-900	806-960 1710-2200	870-970	1700-1900	1700-2300	1850-2000	1920-2170	2250-2500	2500-2700	
7-16 m-m			J01125A0022 ⁽¹⁰⁾					J01125A0033 ⁽¹⁴⁾			1
7-16 f-f	J01125A0020 ⁽⁹⁾	J01125A0007 ⁽¹⁾	J01125A0023 ⁽¹⁰⁾	J01125A0000 ⁽¹⁾	J01125A0002 ⁽⁴⁾		J01125A0009 ⁽⁴⁾	J01125A0032 ⁽¹⁴⁾			2
7-16 m-f	J01125A0019 ⁽⁹⁾	J01125A0008 ⁽¹⁾	J01125A0024 ⁽¹⁰⁾	J01125A0001 ⁽¹⁾	J01125A0003 ⁽⁴⁾	J01125A0017 ⁽⁴⁾	J01125A0010 ⁽⁴⁾	J01125A0021 ⁽⁴⁾	J01125A0016 ⁽⁷⁾	J01028A0030 ⁽⁷⁾	3

λ/4 Shorting Stub

λ/4 Shorting Stub Types



Type	Frequency range (MHz)									Fig	
	380-430	800-900	806-960 1710-2200	870-970	1700-1900	1700-2300	1850-2000	1920-2170	2250-2500		2500-2700
7-16 f-f (bulkhead)		J01125A0011 ⁽²⁾		EW940108-00 ⁽²⁾			J01125A0013 ⁽⁶⁾				1
7-16 m-f (bulkhead)		J01125A0012 ⁽³⁾	J01125A0031 ⁽¹⁰⁾	J01125A0006 ⁽³⁾	J01125A0015 ⁽⁵⁾		J01125A0014 ⁽⁵⁾				2
7-16 m-m DC pass*			J01125A0028								-
7-16 m-m DC-Pass*			J01125A0029								-
7-16 m-f DC pass*			J01125A0030								3
N f-f		J01028A0015 ⁽⁴⁾		EW950200-00 ⁽⁸⁾	EW950200-30 ⁽⁴⁾	J01028A0020 ⁽⁴⁾	J01028A0017 ⁽⁴⁾		J01028A0019 ⁽⁷⁾		4
N m-f		J01028A0016 ⁽¹¹⁾		J01028A0008 ⁽¹¹⁾	J01028A0009 ⁽⁴⁾	J01028A0021 ⁽⁴⁾	J01028A0018 ⁽⁴⁾		J01028A0022 ⁽⁷⁾		5
N f-f (bulkhead)	J01028A0029 ⁽⁹⁾					J01028A0028 ⁽¹¹⁾					6



Dimensions (compare to drawings):

- 1) Dimension a=97 mm 4) Dimension a=64 mm 7) Dimension a=59 mm 10) Dimension a=72 mm
- 2) Dimension a=98 mm 5) Dimension a=69 mm 8) Dimension a=92 mm 11) Dimension a=58.5 mm
- 3) Dimension a=102 mm 6) Dimension a=65 mm 9) Dimension a=178 mm

* 100 V (Operating voltage)

Surge Suppressors with Gas Discharge Tube

Voltage Surge Protection with Gas Discharge Tube

The method of operation of this device can be likened in principle to an electrical switch which, when a certain voltage (d.c. sparkover voltage) is reached, switches the inner conductor to ground.

The design of this device consists of a Gas Discharge Tube installed directly between the inner and outer conductors of a coaxial line. When a higher voltage than the impulse sparkover voltage (=overvoltage) appears on the line, the Gas Discharge Tube will fire and, depending on the prevalent energy, a glow discharge of between 75-90V (current in milliampere range) or ionisation with an arc voltage of 10-20V (currents ranging from amps to kiloamps) takes place. When the energy subsides (= is converted to heat), the discharge extinguishes itself automatically. After a cooling-down period of 30 secs., the Gas Discharge Tube is fully operational again. After several very high discharge currents occurring within a few seconds of each other, the functionality of the device may be impaired. It is recommended, therefore, that the gas capsules are replaced at certain intervals.

Applications

The main usage of the surge suppressor with gas discharge tube is between the antenna and the base station. For high power signal transmission lines, $\lambda/4$ surge arrestors are recommended, as the non-linear characteristics of the gas cartridge can produce inter-modulation products.

Advantages

- Broad-band applications (to around 2.5 GHz)
- Transmission of DC voltages possible, e.g. remote feeding of antenna amplifiers over the coaxial cable
- Maximum impulse Discharge current up to 40 KA
- Different variants available from 75 to 1400 V
- Installation in a waterproof unit

Selection of suitable lightning protector with gas discharge tube

Generally speaking, the spark-over voltage of the discharge tube should be kept as low as possible. However, in order to avoid an unintentional ignition of the tube, the spark-over voltage should be at least twice the peak voltage occurring under normal working conditions.



Example:

$P = 100 \text{ W}$

$Z = 50 \Omega$ (with VSWR 1:1)

Peak voltage = $U_{\max} = \sqrt{P \times Z} = 71 \text{ V}$

Recommended spark-over voltage = $2 \times U_{\max} = 142 \text{ V}$

Most suitable Lightning Protector is 145 V Type

(J01028A0036)

Technical Data

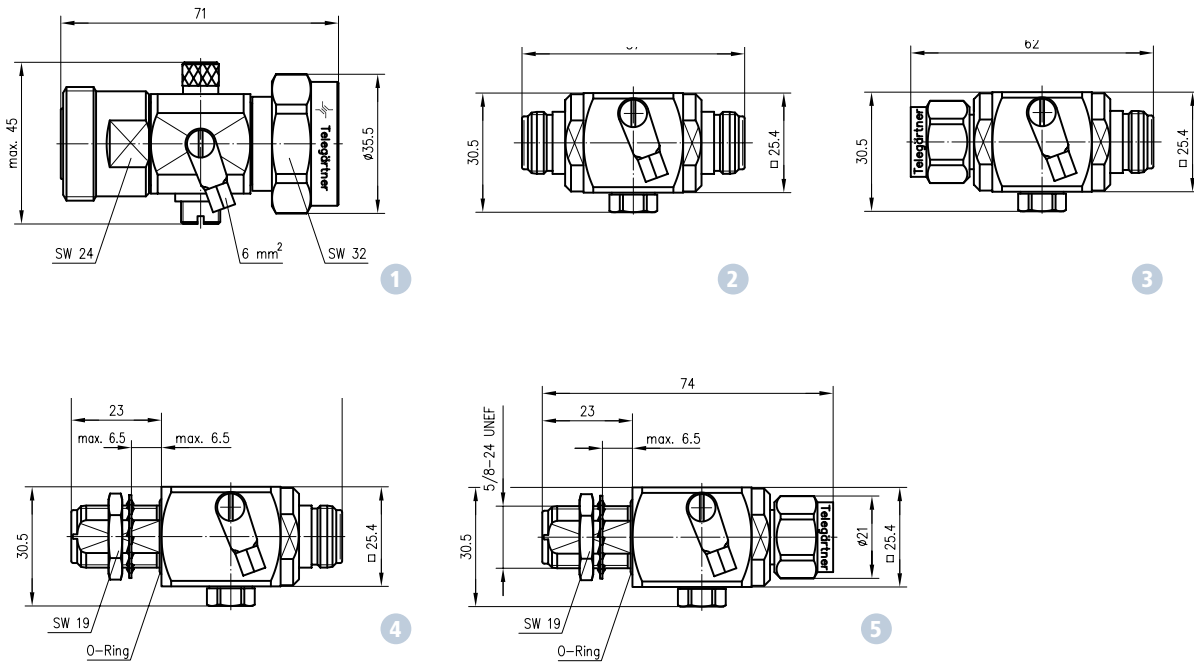
Mechanical Characteristics	
Materials	
Spring contact	CuBe2
Other metal parts	CuZn39Pb3
Insulators	PTFE
Gaskets	Silicon
Finish	
Spring contact	Cu2Ag5
Other metal parts	CuSnZn3
Coupling torque Series N	4-6 Nm
Coupling torque Series 7-16	25-35 Nm
Durability (mating cycles)	> 500

Thermal and Climatic Characteristics connectors		
	Series N	Series 7-16
Category to DIN IEC 68 Part 1	40/155/21	55/155/56
Protection level to DIN 60529	IP 68	IP 54
Electrical Characteristics		
	Series N	Series 7-16
Max. frequency	2.5 GHz	1.5 GHz
VSWR	< 1.151 (2.5 GHz)	< 1.06 (1.5 GHz)
Insertion loss	< 0.2 dB	< 0.1 dB
Impulse Discharge Current	2500 x 10 A (10/1000 μ s)	
	1000 x 500 A (10/1000 μ s)	
	5 x 20000 A (8/20 μ s)	
	1 x 40000 A (8/20 μ s)	

Surge Suppressors with Gas Discharge Tube



Gas Discharge Tube Types



Type	Nominal DC spark-over voltage								Fig.
	75 V	90 V	145 V	230 V	470 V	600 V	800V	1000 V	
7-16 m-f	EW940021-00	EW940021-00	EW940021-00	J01125A0004					1
N f-f	J01028A0031	J01028A0033	J01028A0035	J01028A0037	J01028A0039	J01028A0040	J01028A0042	J01028A0043	2
N m-f	J01028A0032	J01028A0034	J01028A0036	J01028A0038		J01028A0041			3
N f-f bulkhead		J01028A0044		J01028A0045					4
N m-f bulkhead				J01028A0046					5

i Packaging: Individually packed in PE foil, together with assembly instruction. Mating-face of 7-16 jacks are protected with a PE-cap



Jumper Cables

The jumper cables are fitted at both ends with 7-16 connectors and/or N connectors by our partner company **Quadrant Connections Ltd**. The cable is a highly flexible 1/2" corrugated type. The very low intermodulation products of the jumper cables

are tested on special intermodulation test systems. They are tested up to a frequency of 2.5 GHz. The jumper cables are waterproof and sealed to allow external use. Intermodulation test results for the jumper cables are also available. (Order no. U00100A0000)

Protection Classification IP 68

The 7-16 connectors also incorporate an additional seal between centre contact and connector housing in the mating-face (barrier-seal). A 360° inductive solder of the outer conductor – apart from contributing to excellent PIM and Return Loss Characteristics – also provides additional protection against ingress of moisture in the event of the cable sheath being damaged.

- Very low intermodulation products (IMP3)
- Hexagonal coupling nuts for correct torque and high-contact pressure
- Waterproof for external use
- Excellent return loss and attenuation
- Fully soldered inner- and outer conductor

3/8" Jumper cables and other cable size available on request

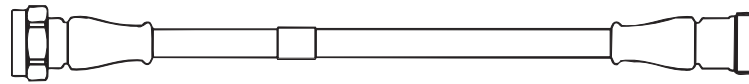
Technical Data (7-16 types)

Mechanical Characteristics	
Materials	
Spring contact	CuBe2
Other metal parts	CuZn39Pb3
Insulator	PTFE
Gaskets	Silicon
Finish	
Spring contact	Cu2Ag5
Outer surface	Cu2Ag5
Coupling torque	25-35 Nm
Cables	
<ul style="list-style-type: none"> • 1/2" highly flexible spiral corrugated cable • Colour: black (standard) or grey RAL7047 (option) • Bend radius min. 30 mm 	
Thermal and Climatic Characteristics	
Temperature range	-40 °C – +60 °C
Relative humidity	10 % – 100 %
Corrosion and UV resistant	
Protection to DIN 40050/IEC 529	IP 68

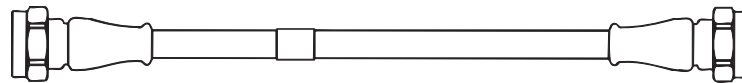
Electrical Characteristics	
Return Loss (VSWR)	
up to 1000 MHz	-38 dB (1.02:1) typical -30 dB (1.06:1) min.
up to 2200 MHz	-32 dB (1.05:1) typical -28 dB (1.08:1) min.
Attenuation (dB)	
up to 1000 MHz	0,11 dB/m
up to 2200 MHz	0.17 dB/m (+0.1 dB for connectors)
Power handling	
up to 1000 MHz	500 W min.
up to 2200 MHz	300 W min.
Impedance	50 Ω (±2 Ω)
Contact potential	no dissimilar metal surfaces
Voltage rating	1100 V
Velocity of propagation	78.5 % min.
Intermodulation / Intermodulation products 3rd Order (typical) 2 unmodulated test signals each at 43dBm (20 W)	
to 1000 MHz	-165 dBc (-122 dBm) typ. -157 dBc (-114 dBm) min.
to 2200 MHz	-165 dBc (-122 dBm) typ. -157 dBc (-114 dBm) min.

Jumper Cables

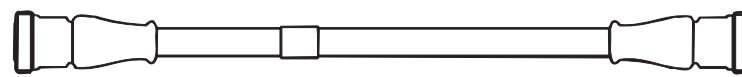
1/2" highly flexible corrugated cable



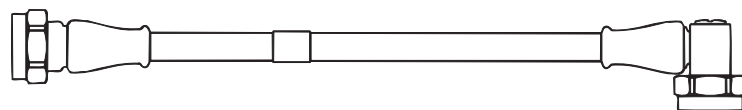
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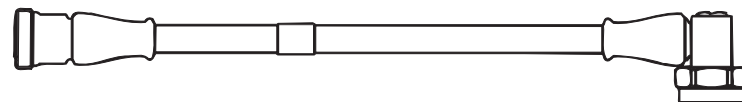
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4



5

Cable Type	Length	Order no.	Weight	Fig.
Plug - Jack (7-16)	0.5 m	L00010D0550	425 g	1
	1.0 m	L00010D0551	550 g	1
	1.5 m	L00011D0182	675 g	1
	2.0 m	L00011D0183	800 g	1
	2.5 m	L00012D0061	925 g	1
	3.0 m	L00012D0062	1050 g	1
	4.0 m	L00013D0056	1300 g	1
Plug - Plug (7-16)	0.5 m	L00010D0552	425 g	2
	1.0 m	L00010D0553	550 g	2
	1.5 m	L00011D0184	675 g	2
	2.0 m	L00011D0185	800 g	2
	2.5 m	L00012D0063	925 g	2
	3.0 m	L00012D0064	1050 g	2
	4.0 m	L00013D0058	1300 g	2
Jack - Jack (7-16)	0.5 m	L00010D0559	425 g	3
	1.0 m	L00010D0600	550 g	3
	1.5 m	L00011D0198	675 g	3
	2.0 m	L00011D0199	800 g	3
	5.0 m	L00013D0057	1550 g	1

Cable Type	Length	Order no.	Weight	Fig.
Jack - Jack (7-16)	2.5 m	L00012D0073	925 g	3
	3.0 m	L00012D0074	1050 g	3
	4.0 m	L00013D0073	1300 g	3
	5.0 m	L00013D0074	1550 g	3
	Plug - Angle plug (7-16)	0.5 m	L00010D0565	425 g
1.0 m		L00010D0566	550 g	4
1.5 m		L00011D0186	675 g	4
2.0 m		L00011D0187	800 g	4
2.5 m		L00012D0065	925 g	4
3.0 m		L00012D0066	1050 g	4
4.0 m		L00013D0061	1300 g	4
Jack - Angle plug (7-16)	0.5 m	L00010D0567	425 g	5
	1.0 m	L00010D0568	550 g	5
	1.5 m	L00011D0188	675 g	5
	2.0 m	L00011D0189	800 g	5
	2.5 m	L00012D0067	925 g	5
	3.0 m	L00012D0068	1050 g	5
	4.0 m	L00013D0063	1300 g	5
	5.0 m	L00013D0064	1550 g	5
	5.0 m	L00013D0062	1550 g	4

4

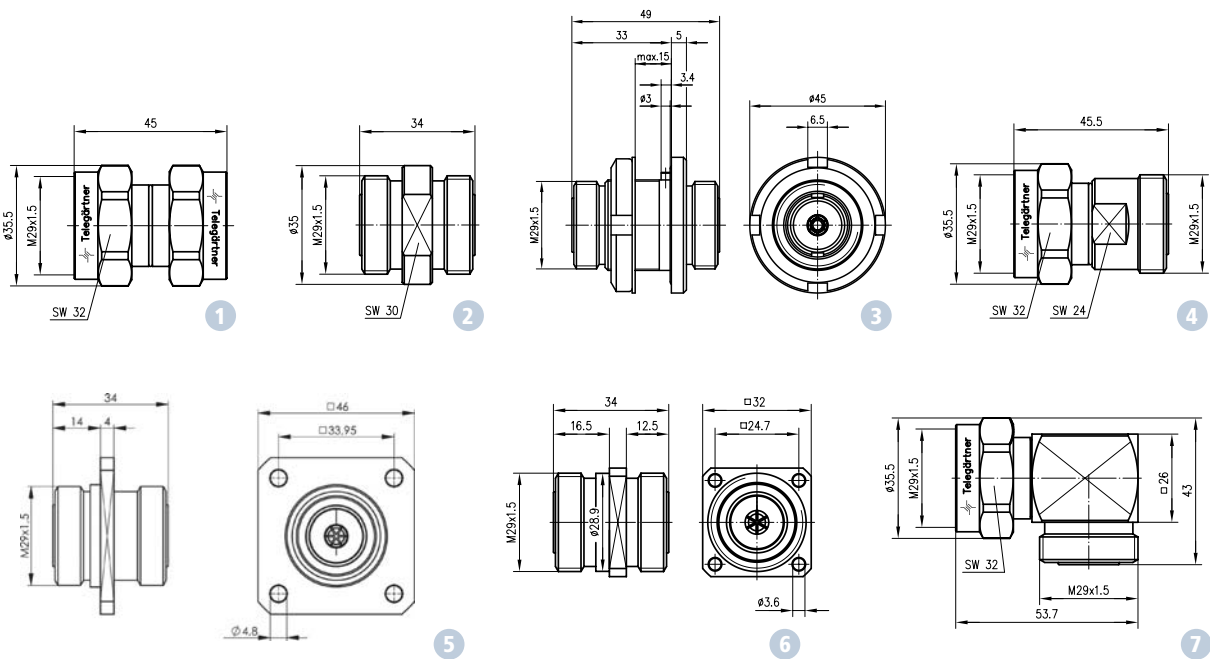
Adaptors and Dust Caps, 7-16 and N

The adaptors in the 7-16 and N series are waterproof and suitable for external use. The connector plug is fitted with a hexagonal nut and should be connected utilising the

recommended torque (7-16: 25-35 Nm; N: 4-6 Nm). This ensures a lasting connection with low return loss and excellent intermodulation characteristics.



Adaptors 7-16



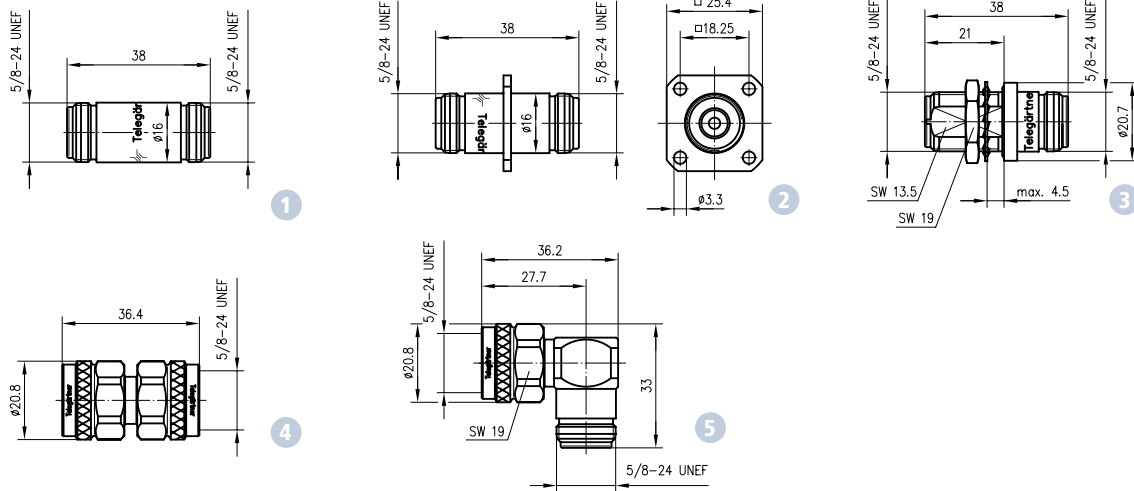
Type	Type	Order no.	Panel Piercing	Fig.
7-16 adaptor	plug-plug	J01123A0000		1
7-16 adaptor IEC Type 169-4 IEC-6	jack-jack	J01123A0001		2
7-16 adaptor IEC Type 169-4 IEC-8	jack-jack, bulkhead	J01123A0003	Z61	3
7-16 adaptor with flange IEC Type 169-4 IEC-7	jack-jack, flange	J01123A0002	Z60	5
7-16 adaptor	plug-jack	J01123A0006		4
7-16 adaptor with flange	jack-jack	J01123A0007	Z12	6
7-16 angle adaptor	plug-jack	J01123A0004		7



Packaging: Individually packed in PE foil, together with assembly instruction. Mating-face of 7-16 jacks are protected with a PE-cap

Adaptors and Dust Caps, 7-16 and N

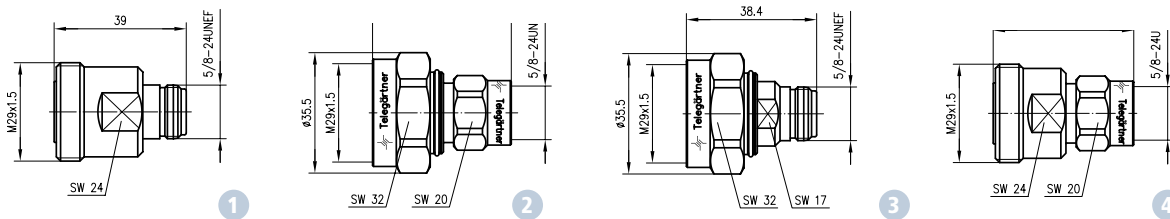
Adaptors N



Type	Type	Order no.	Panel Piercing	Fig.
N adaptor	jack-jack	J01024A0004		1
N adaptor with flange	jack-jack, flange	J01024A0005	Z08	2
N adaptor	jack-jack, bulkhead	J01024A0006	Z10	3
N adaptor	plug-plug	J01024I1094		4
N angle adaptor	plug-jack	J01024I1096		5

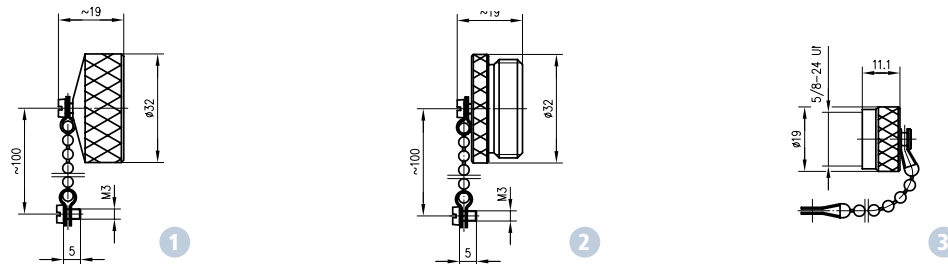
i Packaging: Individually packed in PE foil, together with assembly instruction. Mating-face of 7-16 jacks are protected with a PE-cap

Inter Series Adaptors 7-16 – N



Type	Order no.	Fig.
7-16 jack-N jack	J01122A0008	1
7-16 plug-N plug	J01122A0009	2
7-16 plug-N jack	J01122A0010	3
7-16 jack-N plug	J01122A0011	4

Dust Caps



Type	Order no.	Fig.
7-16 dust cap for jacks	H00070A0000	1
7-16 dust cap for plugs	H00070A0001	2
N dust cap for jacks	H00010A1122	3

Tools and Accessories

Stripping Tools (1/2" and 7/8")

The stripping tools are used for preparing cables for terminating with and SIMFix® Pro and SIMFix® ST connectors.

Manual stripping tools:

- Precise cable outer jacket removal
- Precise cutting of outer conductor, dielectric and inner conductor
- Edge forming of the outer conductor
- Removal of burrs on the inner conductor
- Adjusting screw for accommodating cable tolerances
- The tool is supplied with a hardened blade (including spare blade) for prolonged use.

Rotating stripping tool for use with an electric power drill

- Exact stripping of cable jacket, outer conductor, dielectric and inner conductor.

Termination Tool set for SIMFix® ST/Pro 1 1/4" + 1 5/8" Connectors

The tool kit includes tools for preparing the cable and for terminating all SIMFix® Pro 1 1/4" + 1 5/8" connectors made by Telegärtner. Furthermore there are 2 empty pockets for adding on 1/2" + 7/8" stripping tools.

- Sheath Cutter for 1 1/4" and 1 5/8" corrugated cables
- Sawing Guides 1 1/4", 1 5/8"
- Deburring Tools 1 1/4", 1 5/8"
- Cable knife
- Brush for removing metal shavings
- Spanners for SIMFix® Pro/ST 1/2", 7/8", 1 1/4" and 1 5/8"



Rotation stripping tool

Manual stripping tool



Tools and Accessories

Stripping Tools and Spare Blades for Stripping Tools

For Cable	Stripping Tools	Connector Type	Series	Order no.
1/2" (flex)	Manual stripping tool	SIMFix ST	7-16; N	N00091A0004
	Manual stripping tool	SIMFix Pro*	7-16; N	N00091A0013
1/2"	Manual stripping tool	SIMFix Pro* + ST	7-16; N	N00091A0015
	Rotating stripping tool for use with a electric power drill	SIMFix Pro* + ST	7-16; N	N00091A0018
7/8"	Manual stripping tool	SIMFix Pro + ST	7-16; N	N00091A0014
	Rotating stripping tool for use with a electric power drill	SIMFix Pro + ST	7-16; N	N00091A0019
1 1/4" + 1 5/8"	Tool kit	SIMFix Pro + ST	7-16; N	R00200A0011
1/2" (flex)	Spare blades (2 round, 1 small) for manual stripping tool			N00099A0001
1/2" + 7/8"	Spare blades (4 large, 1 small) for manual stripping tool			N00099A0000
1/2" + 7/8"	Spare blade for outer conductor of the rotating stripping tool			B06011A0039
1/2" + 7/8"	Spare blade for inner conductor of the rotating stripping tool			B06011A0041

* suitable for straight and angled types

Spanner, Sheath Cutter, Open ended Wrench

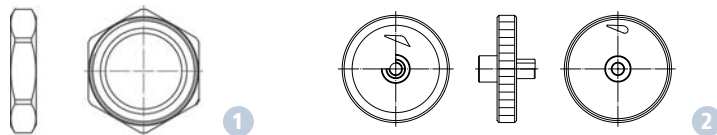
For terminating connectors on 1 1/4" and 1 5/8" corrugated cables (already included in Tool kit R00200A0011).



Spanner and Sheath Cutter	Cable	Order no.
Spanner DIN 1810-B52-55 for SIMFix Pro/ST	1 1/4"	N00050A0001
Sheath Cutter for SIMFix Pro/ST	1 1/4"	N00080A0004
Spanner DIN 1810-B68-75 for SIMFix Pro/ST	1 5/8"	N00050A0003
Sheath Cutter for SIMFix Pro/ST	1 5/8"	N00080A0005
Double open end wrench AF19/22	1/2"	N00050A0011
Double open end wrench AF22/27	1/2"+7/8"	N00050A0012
Double open end wrench AF32/36	7/8", 1 1/4", 1 5/8"	N00050A0013

Sawing guide, Flare and Deburring Tool

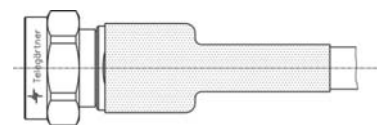
For terminating connectors on 1 1/4" and 1 5/8" corrugated cables (already included in tool kit R00200A0011).



Sawing Guide	Cable	Order no.	Fig.
Sawing Guide for SIMFix Pro/ST 1 1/4"	1 1/4"	N00091A0016	1
Sawing Guide for SIMFix Pro/ST 1 5/8"	1 5/8"	N00091A0017	1
Flare and deburring tool for SIMFix Pro/ST	1 1/4"+1 5/8"	N00099A0005	2

Adhesive Shrink-Sleeves

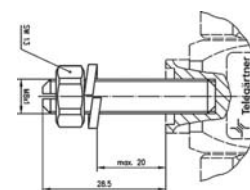
An adhesive shrink-sleeve is required for the short bodied connector to ensure waterproofing. (Not required for SIMFix Pro connectors). These are fitted over the junction between the connector and cable. By applying heat the adhesive process begins, so that the adhesive shrink-sleeve follows the exact contours of the connector and cable junction. This distributes the adhesive on the inside of the sleeve and, on cooling and hardening, provides a watertight joint.



Adhesive Shrink-Sleeves	Length	Cable	Order no.
Adhesive Shrink-Sleeves for short connectors	(l=70 mm)	1/4"	B00101A0008
Adhesive Shrink-Sleeves for short connectors	(l=70 mm)	3/8" + 1/2"	B00102A0005
Adhesive Shrink-Sleeves for short connectors	(l=100 mm)	7/8"	B00103A0000

Fixing kit for λ/4 Shorting Stubs

For mounting λ/4 Shorting Stubs on (earthing) bus bars. Contents: Bolt, hex. locking nut, lock washer



Fixing kit	Order no.
Mounting kit for λ/4 Shorting Stubs	H06000A0024

IP Classification of Degree of Protection

The degree of protection is classified according to IEC 60529. The coding system used is the IP Code (International Protection). The coding denotes the level of

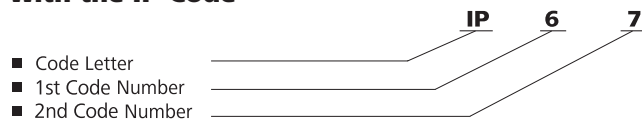
protection against the ingress of solid bodies (first code number) and the ingress of water (second code number).

Protection against solid foreign bodies*	
1st Code Number	Description
0	No particular protection
1	Protection against ingress of solid foreign bodies with a diameter of 50 mm or more
2	Protection against ingress of solid foreign bodies with a diameter of 12.5 mm or more
3	Protection against ingress of solid foreign bodies with a diameter of 2.5 mm or more
4	Protection against ingress of solid foreign bodies with a diameter of 1.0 mm or more
5	Dust protected
6	Dust-proof

Protection against water*	
2nd Code Number	Description
0	No particular protection
1	Protection against dripping water
2	Protection against vertically dripping water. There must be no harmful effect on materials tipped (in a container) up to 15° from its normal position.
3	Protection against fine water spray
4	Protection against water spray
5	Protection against water jet
6	Protection against strong water jet
7	Protection against water, when the material is immersed in water
8	The material is suitable for continuous submersion in water. Must be agreed between customer and supplier.

* Definitions see IEC 60529

Example of Classification in Accordance with the IP Code

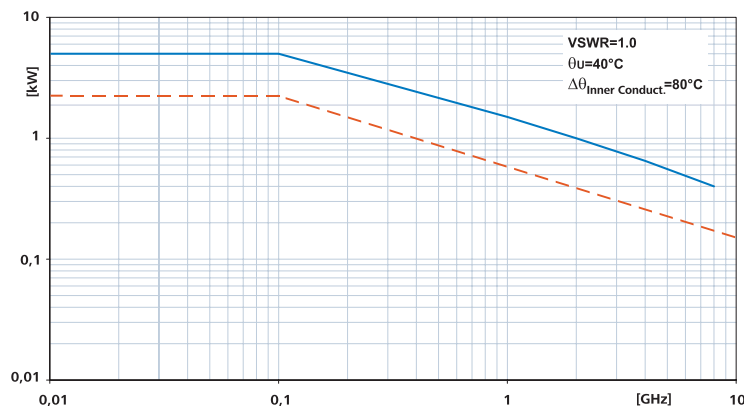


A housing with IP Classification

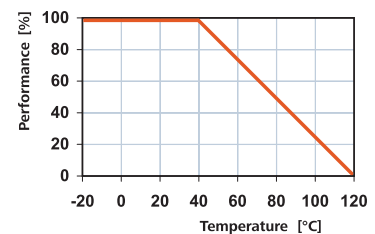
6 No ingress of dust

7 When subjected to submersion in water at a defined pressure and for a defined length of time, the ingress of water must be so restricted that no damage is caused. Submersion Bath: Water level above the enclosure: 0.15 m measured from the top of the enclosure, 1.0 m measured from the bottom of the enclosure. Duration of Test: 30 mins. TG Specification for Simfix Connectors: height of water level: 25 m: is equivalent to 2.5 bar; duration of test: 24 hrs.

Performance Diagrams



Power derating by temperature



Conversion Table: VSWR – Return Loss – Reflection Coefficient

The reflection behavior in coaxial connectors can be described as Return Loss, Reflection Coefficient or Voltage Standing Wave Ratio (VSWR). The relation between these three values is shown in the following table.

Use also our online calculator on our website www.telegaertner.com. Here you can compute online the relationship of these three sizes to each other.

Return Loss	Reflection Coefficient	VSWR	Return Loss	Reflection Coefficient	VSWR
10	0.316	1.923	30.5	0.030	1.060
10.5	0.298	1.848	31	0.028	1.056
11	0.282	1.780	31.5	0.027	1.054
11.5	0.266	1.726	32	0.025	1.051
12	0.252	1.671	32.5	0.024	1.048
12.5	0.237	1.618	33	0.022	1.045
13	0.224	1.578	33.5	0.021	1.043
13.5	0.211	1.538	34	0.020	1.040
14	0.199	1.497	34.5	0.019	1.038
14.5	0.188	1.462	35	0.018	1.036
15	0.178	1.430	35.5	0.017	1.034
15.5	0.165	1.396	36	0.016	1.032
16	0.158	1.374	36.5	0.015	1.030
16.5	0.150	1.350	37	0.014	1.028
17	0.141	1.329	37.5	0.013	1.027
17.5	0.133	1.304	38	0.013	1.025
18	0.126	1.285	38.5	0.012	1.022
18.5	0.119	1.268	39	0.011	1.021
19	0.112	1.251	39.5	0.011	1.020
19.5	0.106	1.235	40	0.010	1.020
20	0.100	1.220	40.5	0.009	1.018
20.5	0.094	1.208	41	0.009	1.017
21	0.089	1.193	41.5	0.008	1.016
21.5	0.084	1.180	42	0.008	1.015
22	0.079	1.171	42.5	0.008	1.014
22.5	0.075	1.160	43	0.007	1.013
23	0.071	1.151	43.5	0.007	1.012
23.5	0.067	1.142	44	0.006	1.012
24	0.063	1.133	44.5	0.006	1.011
24.5	0.060	1.124	45	0.005	1.011
25	0.057	1.118	45.5	0.005	1.011
25.5	0.053	1.111	46	0.004	1.010
26	0.050	1.105	46.5	0.004	1.009
26.5	0.047	1.100	47	0.004	1.008
27	0.045	1.094	47.5	0.004	1.008
27.5	0.042	1.088	48	0.004	1.008
28	0.040	1.082	48.5	0.004	1.008
28.5	0.038	1.078	49	0.004	1.007
29	0.035	1.073	49.5	0.003	1.007
29.5	0.034	1.069	50	0.003	1.006
30	0.032	1.064			

* Errors and omissions excepted!

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