

**Semi-Rigid Coaxial Cable
&
Coupler-Line**



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■ “SC series” Semi-rigid cables

Outline

Coax semi-rigid coaxial cable “SC series” is made from seamless copper tube. Compare to flexible cable, semi-rigid cable has more accuracy and consistency in structure, which offers stable impedance matching and low VSWR. Seamless outer conductor provides outstanding shield characteristics like 120~130dB up to SHF range. Low attenuation performance increases power rating. Wide range of Coax SC Series offers suitable cable diameter to achieve low insertion loss, which also gives high density, compactness and maximum space utilization. The standard specification of superior electrical and mechanical performance SC Series is listed in this catalogue. Also, you can select optimal combination of materials to satisfy your specific needs.

Key features

- **Low insertion loss**
Unequaled insertion loss compare to other type of cables.
- **Low VSWR**
The solid PTFE dielectric minimizes return loss.
- **Solid shield performance**
The solid outer conductor prevents signal leakage and noise with less than 130dB shield performance.
- **High power rating**
Low attenuation provides high power rating.
- **Benefit in handling**
User can enjoy easiness in handling such as bending, coiling, trimming leads, soldering and connector assembling.
- **Low impedance cable**
Wide range of low impedance cables lower than 20 ohms.

Applications

- Communication infrastructure including radar systems
- Computer systems
- Amplifiers for cellular base stations
- Control devices
- Electric devices for medical systems
- Physics, cryogenic studies
- Semiconductor test equipments
- Superconducting technologies

Wide range of “SC series”

According to applications, Coax offers variety of products.

- **Standard 50 ohms cable (Page 7)**
Standard cable in industry.
- **Special impedance cable (Page 8)**
7 ~ 122 ohms
- **Low temperature (Cryogenics) cable (Page 9)**
Made from low thermal conductivity materials to be used under low temperature conditions.
- **Heat-proof cable (Page 10)**
Max. operating temperature up to 300°C.
- **Probe cable (Page 10)**
Tube structure of center conductor gives easy connection of probe pin.
- **Aluminum cable (Page 10)**
Light weight and easy bending due to aluminum outer conductor.
- **Triaxial cable (Page 29)**
- **Custom order cable (Page 11)**
Made for individual customer’s requirement. Order of small quantity is welcome. Please refer the specification of each cable for detail.

Part No. and structure of SC series

Part number of SC series is determined as follows.

SC - □□□ S/□□□-□□-□□/□□-□□
 ① ② ③ ④ ⑤ ⑥ ⑦

① Diameter of outer conductor

Described by 100 times of outer conductor diameter [mm].

Ex. : ϕ 0.86mm \rightarrow 086
 ϕ 3.58mm \rightarrow 358

② Type of center conductor

“S” type cable uses thicker center conductor compared to the standard one. There is no mark for standard size. Applicable only to [SC-100S/50] and [SC-160S/50].

③ Characteristic impedance

Indicates characteristic impedance [Ω].

Ex. : 100 Ω \rightarrow 100
 50 Ω \rightarrow 50

④ Material and structure of center conductor

Material and structure of center conductor are described by the following symbols. In case of standard combination of oxygen-free copper as outer conductor and SPCP as center conductor, there is no mark on this part.

Symbol	Material of center conductor
O	Silver plated copper-clad steel
SC	Silver plated copper
CN	Cupronickel
SCN	Silver plated cupronickel
B	Beryllium copper
SB	Silver plated beryllium copper
W	Tungsten
AuW	Gold plated tungsten
SS	Stainless steel
SSS	Silver plated stainless steel
Ti	Titanium
STi	Silver plated titanium
PBC	Phosphor bronze
Nb	Niobium
C/Tu	Oxygen-free copper tube

⑤ Material and structure of outer conductor

Described by the following symbols. In case of oxygen-free copper, there is no mark on this part.

Symbol	Material of outer conductor
C	Oxygen-free copper
AL	Aluminum
CN	Cupronickel
SS	Stainless steel
B	Beryllium copper
Nb	Niobium
W	Tungsten

⑥ Surface finish of outer conductor

Described by the following symbols. If there is no mark, it indicates no plating on outer jacket.

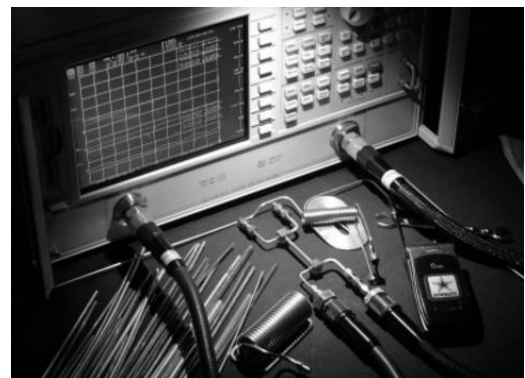
Symbol	Finish
SOL	Solder plate
TIN	Tin plate
Ni	Nickel plate
Au	Gold plate
Ag	Silver plate

Tin plate is standard finish for lead free requirement.

⑦ Material of dielectric

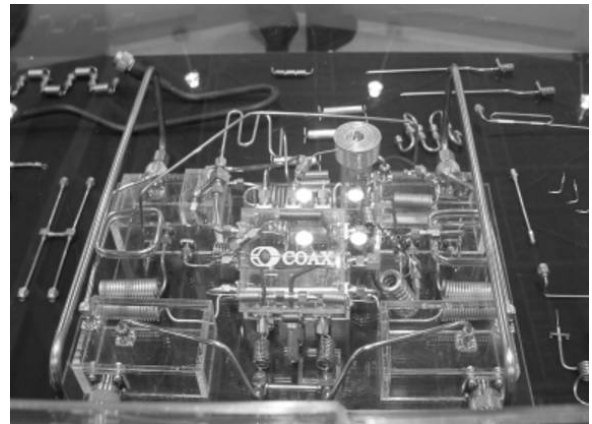
Described by the following symbols. In case of PTFE, there is no mark on this part.

Symbol	Material of dielectric
PI	Polyimide
PFA	PFA
PE	Polyethylene



Properties of conductors

	Density [g/cm ³]	Volume resistivity [μΩ·cm]	Thermal conductivity [W/m·K]
Silver	10.49	1.642	418.7
Pure copper	8.92	1.690	394.0
Oxygen-free copper	8.94	1.710	391.0
Beryllium copper	8.24	6.900	83.7
Cupronickel	8.94	37.500	29.3
Copper-clad steel (46%)	8.20	4.3983	
Aluminum	2.71	2.89	221.9
Tungsten	19.30	5.65	166.2
Gold	19.32	2.35	297.3
Stainless steel	7.90	72.0	15.1
Niobium	8.57	17.0	54.4
Tin	7.298	11.50	62.8
Lead	11.37	22.00	34.8
Brass (C2700)	8.53	6.20	121.4



Cable list by diameter

Please select your ideal size considering application.

Diameter ϕ [mm]	Part number	Application								
		50 Ω	50 Ω >	50 Ω <	Low temp.	Heat proof	Probe	Aluminum	PEEK	Custom
9.62	SC-962/50	○								
	SC-962/70.7			○						
6.35	SC-635/50	○								
	SC-635/50-SC-AL						○			
	SC-635/15-C/Tu		○							
	SC-635/25-C/Tu		○							
	SC-635/60			○						
	SC-635/70			○						
	SC-635/122-B			○						
5.00	SC-500/50	○								
3.58	SC-358/50	○								
	SC-358/100			○						
	SC-358/75			○						
	SC-358/70			○						
	SC-358/50-O-AL						○			
	SC-358/25-SC		○							
	SC-358/35.4-SC		○							
	SC-358/50-SC	○								
	SC-358/50-SSS-SS				○					
	SC-358/50-O-CN									○
	SC-358/50-CN-CN				○					
	SC-358/50-SCN-CN				○					
	SC-358/50-SS-SS				○					
	SC-358/61			○						
	SC-358/50-C/Tu						○			
SC-358/50-SC-PEEK								○		
2.80	SC-280/7-C/Tu		○							
2.40	SC-240/75			○						
	SC-240/17-SC		○							
	SC-240/10-SC		○							
2.19	SC-219/50	○								
	SC-219/70			○						
	SC-219/25		○							
	SC-219/50-O-AL						○			
	SC-219/50-SC	○								
	SC-219/50-SSS-SS				○					
	SC-219/50-CN-CN				○					
	SC-219/50-SCN-CN				○					
SC-219/50-SC-PEEK								○		

Diameter ϕ [mm]	Part number	Application								
		50 Ω	50 Ω >	50 Ω <	Low temp.	Heat proof	Probe	Aluminum	Custom	
2.19	SC-219/50-W-SS									○
	SC-219/75			○						
	SC-219/87.7			○						
	SC-219/50-O-SS									○
	SC-219/50-Nb-Nb				○					
	SC-219/50-NbTi-NbTi				○					
	SC-219/50-B-B				○					
	SC-219/50-SB-B				○					
	SC-219/50-SS-SS-PI					○				
	SC-219/50-C/Tu						○			
	SC-219/50-PBC/Tu						○			
1.60	SC-160/50	○								
	SC-160/50-SC	○								
	SC-160/50-O-CN									○
	SC-160/50-CN-CN				○					
	SC-160/50-SCN-CN				○					
	SC-160S/50-SS-SS-PI					○				
	SC-160S/50	○								
SC-160/50-NbTi-NbTi				○						
1.19	SC-119/50	○								
	SC-119/50-SC	○								
	SC-119/50-O-SS									○
	SC-119/12		○							
	SC-119/50-SS-SS-PI					○				
	SC-119/50-B-B				○					
	SC-119/50-SB-B				○					
	SC-119/50-SS-SS				○					
	SC-119/50-SSS-SS				○					
	SC-119/50-CN-CN				○					
	SC-119/50-SCN-CN				○					
SC-119/50-NbTi-NbTi				○						
1.00	SC-100/50	○								
	SC-100/75			○						
	SC-100/25		○							
	SC-100S/50	○								
0.86	SC-086/50	○								
	SC-086/50-SC	○								
	SC-086/50-O-CN									○
	SC-086/17		○							
	SC-086/50-SC-CN									○
SC-086/50-CN-CN				○						

Diameter ϕ [mm]	Part number	Application							
		50 Ω	50 Ω >	50 Ω <	Low temp.	Heat proof	Probe	Aluminum	Custom
086	SC-086/50-NbTi-NbTi				○				
	SC-086/50-SCN-CN				○				
	SC-086/50-BS-BS				○				
	SC-086/50-B-B				○				
	SC-086/50-SB-B				○				
	SC-086/50-SS-SS				○				
	SC-086/50-SSS-SS				○				
	SC-086/50-SS-SS-PI					○			
0.72	SC-072/50	○							
058	SC-058/50	○							
	SC-058/50-O-CN								○
	SC-058/50-O-SS								○
	SC-058/50-AuC								○
0.40	SC-040/50-CN-CN				○				
0.33	SC-033/50	○							
	SC-033/50-O	○							
	SC-033/50-AuW-CN								○
	SC-033/50-AuW-SS								○
	SC-033/50-SS-SS				○				
	SC-033/50-SSS-SS				○				
	SC-033/50-CN-CN				○				
	SC-033/50-NbTi-CN				○				

Standard 50Ω cable

Part number	Diameter φ[mm]	Material of center conductor			
		Gold plated tungsten	Silver plated copper wire	SPCP	Oxygen-free copper tube
SC-033/50	0.33	○			
SC-033/50-O	0.33			○	
SC-058/50	0.58			○	
SC-072/50	0.72			○	
SC-086/50	0.86			○	
SC-086/50-SC	0.86		○		
SC-100/50	1.00			○	
SC-100S/50	1.00			○	
SC-119/50	1.19			○	
SC-119/50-SC	1.19		○		
SC-160/50	1.60			○	
SC-160/50-SC	1.60		○		
SC-160S/50	1.60			○	
SC-219/50	2.19			○	
SC-219/50-SC	2.19		○		
SC-358/50	3.58			○	
SC-358/50-SC	3.58		○		
SC-500/50	5.00		○		
SC-635/50	6.35		○		

Special impedance cable

Coax produces variety of special impedance cable.

If you require any other impedance cable than the list, please contact our sales agent.

☆ **Characteristic impedance lower than 50Ω**

Part number	Diameter	Characteristic impedance [Ω]						
	φ [mm]	7	10	12	15	17	25	35.4
SC-086/17	0.86					○		
SC-100/25	1.00						○	
SC-119/12	1.19			○				
SC-219/25	2.19						○	
SC-240/10-SC	2.40		○					
SC-240/17-SC	2.40					○		
SC-280/7-C/Tu	2.80	○						
SC-358/25-SC	3.58						○	
SC-358/35.4-SC	3.58							○
SC-635/15-C/Tu	6.35				○			
SC-635/25-C/Tu	6.35							

☆ **Characteristic impedance higher than 50Ω**

Part number	Diameter	Characteristic impedance [Ω]						
	φ [mm]	60	61	70	75	87.7	100	122
SC-100/75	1.00						○	
SC-219/70	2.19			○				
SC-219/75	2.19				○			
SC-219/87.7	2.19					○		
SC-240/75	2.40				○			
SC-358/100	3.58						○	
SC-358/61	3.58		○					
SC-358/70	3.58			○				
SC-358/75	3.58				○			
SC-635/122-B	6.35							○
SC-635/60	6.35	○						
SC-635/70	6.35			○				

Low temperature (Cryogenic) cable

Semi-rigid cables for low temperature consist of low thermal conductivity metal materials on center and outer conductors. Low thermal conductivity materials minimize heat flow from outside under cryogenic conditions.

Part number	Diameter ϕ [mm]	Material of center conductor					Material of outer conductor				
		CN	SS	NbTi	B	BS	CN	SS	NbTi	B	BS
SC-033/50-CN-CN	0.33	○					○				
SC-033/50-SS-SS			○					○			
SC-040/50-CN-CN	0.40										
SC-086/50-SS-SS	0.86										
SC-086/50-CN-CN		○					○				
SC-086/50-B-B					○					○	
SC-086/50-BS-BS						○					○
SC-086/50-NbTi-NbTi				○					○		
SC-119/50-SS-SS	1.19		○					○			
SC-119/50-CN-CN		○					○				
SC-119/50-B-B					○						
SC-119/50-NbTi-NbTi				○					○		
SC-160/50-CN-CN	1.60	○					○				
SC-160/50-NbTi-NbTi				○					○		
SC-219/50-SS-SS	2.19		○					○			
SC-219/50-CN-CN		○					○				
SC-219/50-B-B					○					○	
SC-219/50-NbTi-NbTi				○					○		
SC-358/50-CN-CN	3.58	○					○				
SC-358/50-SS-SS			○					○			

◆ Symbol of materials

Symbol	CN	SS	Nb	B	BS
Material	Cupronickel	SUS304	Niobium	Beryllium copper	Brass

◆ Properties of conductors

Material	Density [g/cm ³]	Volume resistivity (20°C) [$\mu\Omega$ -cm]	Thermal conductivity [W/m·K]
Stainless steel (SUS304)	7.90	72.0	15.1
Cupronickel	8.94	37.5	29.3
Niobium	8.57	17.0	54.4
Oxygen-free copper	8.94	1.7	391.0
Silver	10.49	1.642	418.7
Beryllium copper	8.24	6.900	83.7

Heat-proof cable

Heat-proof semi-rigid cable uses polyimide as dielectric core instead of PTFE, which has been developed to be used in high temperature circumstances. Compare to the standard PTFE cable, heat-proof cable seldom gets influence of soldering heat. Under high temperature up to 300°C, heat-proof cable offers stable performance in physical and electric point of view.

Part number	Diameter φ[mm]	Material of center conductor	Material of outer conductor	Material of dielectric
SC-086/50-SB-SS-PI	0.86	Silver plated beryllium copper	Stainless steel	Polyimide
SC-119/50-SS-SS-PI	1.19	Stainless steel	Stainless steel	Polyimide
SC-160S/50-SS-SS-PI	1.60	Stainless steel	Stainless steel	Polyimide
SC-219/50-SS-SS-PI	2.19	Stainless steel	Stainless steel	Polyimide

Probe cable

Probe cable has been developed by using metal tube as center conductor. Due to the tube structure of center conductor, it is easy to connect probe pin in the center conductor. This series is ideal for variety of probes.

Part number	Diameter φ[mm]	Center conductor			Outer conductor
		Material	Diameter	Inside diameter	Material
SC-219/50-C/Tu	2.19	Oxygen-free copper tube	0.51±0.0254	0.4±0.05	Oxygen-free copper
SC-219/50-PBC/Tu	2.19	Phosphor bronze tube	0.51±0.0254	0.35±0.05	Oxygen-free copper
SC-358/50-C/Tu	3.58	Oxygen-free copper tube	0.91±0.0254	0.5±0.05	Oxygen-free copper

Aluminum cable

By using aluminum tube as outer conductor, it achieves about half weight of oxygen-free copper tube. This series is good choice to reduce unit weight. Taking full advantage of aluminum, you enjoy the softness of bending and forming. On designing and assembly situation, it can be used like flexible cable.

Part number	Diameter φ[mm]	Average weight [g/m]	Material of outer conductor	Weight of standard cable (For comparison)	
				Part number	Avg. weight [g/m]
SC-219/50-O-AL	2.19	10.3	Aluminum	SC-219/50	20.5
SC-358/50-O-AL	3.58	27.5	Aluminum	SC-358/50	46.6
SC-635/50-SC-AL	6.35	88.0	Aluminum	SC-635/50	147.0

Custom order cable

Custom order cable offers various combination of materials on outer/center conductors and dielectric according to customer's requirement. Besides cable's own function to convey RF signal, these products can be used for various purposes such as physics, chemical, medical, machine etc.

Order of small quantity is possible due to Coax proprietary way of production. Please contact our sales agent for custom combination of materials according to your specific application.

Part number	Diameter ϕ [mm]	Center conductor	Outer conductor	Dielectric
SC-033/50-AuW-CN	0.33	Gold plated tungsten	Cupronickel	PTFE
SC-033/50-AuW-SS	0.33	Gold plated tungsten	Stainless steel	PTFE
SC-058/50-AuC	0.58	Gold plated copper	Oxygen-free copper	PTFE
SC-058/50-O-CN	0.58	SPCP	Cupronickel	PTFE
SC-058/50-O-SS	0.58	SPCP	Stainless steel	PTFE
SC-086/50-O-CN	0.86	SPCP	Cupronickel	PTFE
SC-086/50-SC-CN	0.86	Silver plated copper	Cupronickel	PTFE
SC-119/50-O-SS	1.19	SPCP	Stainless steel	PTFE
SC-160/50-O-CN	1.60	SPCP	Cupronickel	PTFE
SC-219/50-O-SS	2.19	SPCP	Stainless steel	PTFE
SC-219/50-W-SS	2.19	Tungsten	Stainless steel	PTFE
SC-358/50-O-CN	3.58	SPCP	Cupronickel	PTFE

*SPCP : Silver plated copper-clad steel

Semi-rigid cable SC series

◇SC-962 series

Part number		SC-962/50	SC-962/70.7						
◇Structure/Material									
Outer conductor	Diameter±0.0254[mm]	9.62	9.62						
	Material	Oxygen-free copper	Oxygen-free copper						
Dielectric	Diameter±0.0254[mm]	8.35	8.35						
	Material	PTFE	PTFE						
Center conductor	Diameter±0.013[mm]	2.54	1.55						
	Material	Silver plated copper tube	Silver plated copper						
◇Electrical properties									
Characteristic impedance [Ω]		50±1.0	70.7±1.0						
Voltage withstanding VRMS(60Hz)		10000	8000						
Corona extinction voltage VRMS(60Hz)		5000	4000						
Max. operating frequency [GHz]		12	13						
Capacitance (Nominal) [pF/m]		95.2	67.3						
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power	Atten.	Power				
	0.5GHz	0.1	3035	0.11	2417				
	1.0GHz	0.15	2046	0.16	1638				
	5.0GHz	0.42	765	0.44	623				
	10.0GHz	0.68	482	0.7	396				
*Power rating [W] at 40°C	20.0GHz	-	-	-	-				
◇Mechanical properties									
Max. operating temperature [°C]		100	100						
Min. inside bend radius [mm]		19.0	19.0						
Average weight [g/m]		300.0	290.2						
Standard length [m]		2	1						

◇SC-635 series

Part number		SC-635/50	SC-635/50-SC-AL	SC-635/15-C/Tu	SC-635/25-C/Tu				
◇Structure/Material									
Outer conductor	Diameter±0.0254[mm]	6.35	6.35	6.35	6.35				
	Material	Oxygen-free copper	Aluminum	Oxygen-free copper	Oxygen-free copper				
Dielectric	Diameter±0.0254[mm]	5.31	5.31	5.31	5.31				
	Material	PTFE	PTFE	PTFE	PTFE				
Center conductor	Diameter±0.013[mm]	1.628	1.628	3.71	2.93				
	Material	Silver plated copper	Silver plated copper	Oxygen-free copper tube	Oxygen-free copper tube				
◇Electrical properties									
Characteristic impedance [Ω]		50±1.0	50±1.0	15±1.0	25±1.0				
Voltage withstanding VRMS(60Hz)		7000	7000	7000	7000				
Corona extinction voltage VRMS(60Hz)		3000	3000	3000	3000				
Max. operating frequency [GHz]		19	19	14	16				
Capacitance (Nominal) [pF/m]		95.5	95.5	317.4	190.4				
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power	Atten.	Power	Atten.	Power	Atten.	Power
	0.5GHz	0.15	1595	0.15	1580	0.28	1139	0.20	1483
	1.0GHz	0.23	1092	0.23	1079	0.41	789	0.29	1021
	5.0GHz	0.59	430	0.60	422	0.99	326	0.73	410
	10.0GHz	0.91	279	0.93	273	1.49	218	1.12	269
*Power rating [W] at 40°C	20.0GHz	-	-	-	-	-	-	-	-
◇Mechanical properties									
Max. operating temperature [°C]		100	100	100	100				
Min. inside bend radius [mm]		9.5	9.5	9.5	9.5				
Average weight [g/m]		147.0	88.0	142.57	142.5				
Standard length [m]		2 (MAX 20)	2 (MAX 20)	2	2				

◇SC-635 series

Part number		SC-635/60	SC-635/70	SC-635/122-B			
◇Structure/Material							
Outer conductor	Diameter±0.0254[mm]	6.35	6.35	6.35			
	Material	Oxygen-free copper	Oxygen-free copper	Oxygen-free copper			
Dielectric	Diameter±0.0254[mm]	5.31	5.31	5.31			
	Material	PTFE	PTFE	PTFE			
Center conductor	Diameter±0.013[mm]	1.278	1.00	0.287±0.0254			
	Material	SPC	SPC	Beryllium copper			
◇Electrical properties							
Characteristic impedance [Ω]		60±1.0	70±1.0	122±1.0			
Voltage withstanding VRMS(60Hz)		7000	6000	5000			
Corona extinction voltage VRMS(60Hz)		3000	2500	2000			
Max. operating frequency [GHz]		20	21	23			
Capacitance (Nominal) [pF/m]		79.3	68.01	39.02			
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power	Atten.	Power	Atten.	Power
	0.5GHz	0.16	1476	0.16	1317	0.53	281
	1.0GHz	0.23	1006	0.23	904	0.76	197
	5.0GHz	0.59	399	0.61	360	1.78	85.7
	10.0GHz	0.92	260	0.94	235	2.6	59.2
	20.0GHz	1.46	165	1.50	150	3.80	40.5
*Power rating [W] at 40°C	FRQ.	Atten.	Power	Atten.	Power	Atten.	Power
	0.5GHz	0.16	1476	0.16	1317	0.53	281
	1.0GHz	0.23	1006	0.23	904	0.76	197
	5.0GHz	0.59	399	0.61	360	1.78	85.7
	10.0GHz	0.92	260	0.94	235	2.6	59.2
	20.0GHz	1.46	165	1.50	150	3.80	40.5
◇Mechanical properties							
Max. operating temperature [°C]		100	100	100			
Min. inside bend radius [mm]		9.5	9.5	9.5			
Average weight [g/m]		140.3	137.3	132.9			
Standard length [m]		2 (MAX20)	2 (MAX 20)	2			

◇SC-500 series

Part number		SC-500/50				
◇Structure/Material						
Outer conductor	Diameter±0.0254[mm]	5.00				
	Material	Oxygen-free copper				
Dielectric	Diameter±0.0254[mm]	4.18				
	Material	PTFE				
Center conductor	Diameter±0.013[mm]	1.270				
	Material	Silver plated copper				
◇Electrical properties						
Characteristic impedance [Ω]		50±1.0				
Voltage withstanding VRMS(60Hz)		6000				
Corona extinction voltage VRMS(60Hz)		2400				
Max. operating frequency [GHz]		24				
Capacitance (Nominal) [pF/m]		95.2				
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power			
	0.5GHz	0.19	1095			
	1.0GHz	0.28	754			
	5.0GHz	0.71	303			
	10.0GHz	1.08	199			
	20.0GHz	(1.70)	(128)			
*Power rating [W] at 40°C	FRQ.	Atten.	Power			
	0.5GHz	0.19	1095			
	1.0GHz	0.28	754			
	5.0GHz	0.71	303			
	10.0GHz	1.08	199			
	20.0GHz	(1.70)	(128)			
◇Mechanical properties						
Max. operating temperature [°C]		100				
Min. inside bend radius [mm]		8.0				
Average weight [g/m]		91.0				
Standard length [m]		2 (MAX20)				

◇SC-358 series

Part number		SC-358/50	SC-358/100	SC-358/75	SC-358/70				
◇Structure/Material									
Outer conductor	Diameter±0.0254[mm]	3.58	3.58	3.58	3.58				
	Material	Oxygen-free copper	Oxygen-free copper	Oxygen-free copper	Oxygen-free copper				
Dielectric	Diameter±0.0254[mm]	2.98	2.98	2.98	2.98				
	Material	PTFE	PTFE	PTFE	PTFE				
Center conductor	Diameter±0.013[mm]	0.912	0.28	0.50	0.56				
	Material	SPCP	SPCP	SPCP	SPCP				
◇Electrical properties									
Characteristic impedance [Ω]		50±1.0	100±2.0	75±1.0	70±1.0				
Voltage withstanding VRMS(60Hz)		5000	5000	5000	5000				
Corona extinction voltage VRMS(60Hz)		1900	1500	2000	2000				
Max. operating frequency [GHz]		34	40	38	37				
Capacitance (Nominal) [pF/m]		95.6	48.0	63.5	67.8				
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power	Atten.	Power	Atten.	Power	Atten.	Power
	0.5GHz	0.26	630	0.35	364	0.28	512	0.28	541
	1.0GHz	0.37	436	0.51	254	0.41	356	0.40	375
	5.0GHz	0.91	180	1.22	107	1.00	148	0.97	156
	20.0GHz	2.09	79	2.73	49	2.28	66	2.23	69
*Power rating[W] at 40°C	FRQ.	Atten.	Power	Atten.	Power	Atten.	Power	Atten.	Power
	0.5GHz	0.26	630	0.35	364	0.28	512	0.28	541
	1.0GHz	0.37	436	0.51	254	0.41	356	0.40	375
	5.0GHz	0.91	180	1.22	107	1.00	148	0.97	156
	20.0GHz	2.09	79	2.73	49	2.28	66	2.23	69
◇Mechanical properties									
Max. operating temperature [°C]		125	125	125	125				
Min. inside bend radius [mm]		6.4	6.4	6.4	6.4				
Average weight [g/m]		46.6	43.1	43.9	44.2				
Standard length [m]		2 (MAX40)	2	2	2				

◇SC-358 series

Part number		SC-358/61	SC-358/25-SC	SC-358/35.4-SC	SC-358/50-SC				
◇Structure/Material									
Outer conductor	Diameter±0.0254[mm]	3.50±0.05	3.58	3.58	3.58				
	Material	Oxygen-free copper	Oxygen-free copper	Oxygen-free copper	Oxygen-free copper				
Dielectric	Diameter±0.0254[mm]	2.90±0.05	2.98	2.98	2.98				
	Material	PTFE	PTFE	PTFE	PTFE				
Center conductor	Diameter±0.013[mm]	0.695	1.628	1.28	0.91				
	Material	SPCP	Silver plated copper	Silver plated copper	Silver plated copper				
◇Electrical properties									
Characteristic impedance [Ω]		61±1.0	25±1.0	35.4±1.0	50±1.0				
Voltage withstanding VRMS(60Hz)		5000	2000	3000	5000				
Corona extinction voltage VRMS(60Hz)		1900	1000	1500	1900				
Max. operating frequency [GHz]		37	28	30	34				
Capacitance (Nominal) [pF/m]		78	190.4	134.5	95.2				
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power	Atten.	Power	Atten.	Power	Atten.	Power
	0.5GHz	0.28	572	0.34	556	0.29	624	0.26	630
	1.0GHz	0.4	397	0.49	387	0.42	433	0.37	436
	5.0GHz	0.96	164	1.17	162	1.01	179	0.91	180
	20.0GHz	2.2	72	2.63	72	2.3	79	2.09	79
*Power rating [W] at 40°C	FRQ.	Atten.	Power	Atten.	Power	Atten.	Power	Atten.	Power
	0.5GHz	0.28	572	0.34	556	0.29	624	0.26	630
	1.0GHz	0.4	397	0.49	387	0.42	433	0.37	436
	5.0GHz	0.96	164	1.17	162	1.01	179	0.91	180
	20.0GHz	2.2	72	2.63	72	2.3	79	2.09	79
◇Mechanical properties									
Max. operating temperature [°C]		125	125	125	125				
Min. inside bend radius [mm]		6.4	6.4	6.4	6.4				
Average weight [g/m]		43.4	56.47	50.87	46.07				
Standard length [m]		2	2 (MAX 30)	2 (MAX30)	2 (MAX40)				

◇SC-358 series

Part number		SC-358/50-SS-SS	SC-358/50-SSS-SS	SC-358/50-O-CN	SC-358/50-CN-CN	
◇Structure/Material						
Outer conductor	Diameter±0.0254[mm]	3.58	3.58	3.58	3.58	
	Material	SUS304	SUS304	Cupronickel	Cupronickel	
Dielectric	Diameter±0.0254[mm]	2.98	2.98	2.98	2.98	
	Material	PTFE	PTFE	PTFE	PTFE	
Center conductor	Diameter±0.013[mm]	0.91	0.91	0.91	0.91	
	Material	SUS304	Silver Plated SUS304	SPCP	Cupronickel	
◇Electrical properties						
Characteristic impedance [Ω]		50±1.0	50±1.0	50±1.0	50±1.0	
Voltage withstanding VRMS(60Hz)		5000	5000	5000	5000	
Corona extinction voltage VRMS(60Hz)		1900	1900	1900	1900	
Max. operating frequency [GHz]		34	34	34	34	
Capacitance (Nominal) [pF/m]		95.2	95.2	95.2	95.2	
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Atten.	Atten.	Power	Atten.
	0.5GHz	1.7	0.6	0.51	367.0	1.2
	1.0GHz	2.3	0.8	0.72	256.5	1.7
	5.0GHz	5.2	1.8	1.69	109.5	3.8
	10.0GHz	7.4	2.6	2.48	74.9	5.4
	20.0GHz	10.5	3.7	3.67	50.6	7.6
*Power rating [W] at 40°C						
◇Mechanical properties						
Max. operating temperature [°C]		125	125	125	125	
Min. inside bend radius [mm]		10	10	6.4	6.4	
Average weight [g/m]		46	46	46.5	47	
Standard length [m]		2	2	2	2	

◇SC-358 series

Part number		SC-358/50-SCN-CN	SC-358/50-O-AL	SC-358/50-SC-PEEK	
◇Structure/Material					
Outer conductor	Diameter±0.0254[mm]	3.58	3.58	3.58±0.1	
	Material	Cupronickel	Aluminum	Oxygen-free copper	
Dielectric	Diameter±0.0254[mm]	2.98	2.98	2.98±0.1	
	Material	PTFE	PTFE	PEEK	
Center conductor	Diameter±0.013[mm]	0.91	0.91	0.71±0.0254	
	Material	Silver plated cupronickel	SPCP	Silver Plated copper	
◇Electrical properties					
Characteristic impedance [Ω]		50±1.0	50±1.5	50±2.5	
Voltage withstanding VRMS(60Hz)		5000	5000	2500	
Corona extinction voltage VRMS(60Hz)		1900	1900	950	
Max. operating frequency [GHz]		34	34	30	
Capacitance (Nominal) [pF/m]		95.2	95.2	121.7	
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Atten.	Power	Atten.
	0.5GHz	0.5	0.27	619	0.6
	1.0GHz	0.7	0.39	429	1.0
	5.0GHz	1.5	0.96	178	3.8
	10.0GHz	2.1	1.43	119	7.0
	20.0GHz	3.0	2.19	78	13.1
*Power rating [W] at 40°C					
◇Mechanical properties					
Max. operating temperature [°C]		125	125	200	
Min. inside bend radius [mm]		6.4	6.4	12	
Average weight [g/m]		47	27.5	22	
Standard length [m]		2	2 (MAX 40)	2	

◇SC-358 series (Probe cable)

◇SC-280 series

Part number		SC-358/50-C/Tu		SC-280/7-C/Tu	
◇Structure/Material					
Outer conductor	Diameter±0.0254[mm]	3.58		2.80	
	Material	Oxygen-free copper		Oxygen-free copper	
Dielectric	Diameter±0.0254[mm]	2.98		2.23	
	Material	PTFE		PTFE	
Center conductor	Diameter [mm]	0.91±0.0254		1.89±0.0254	
	Inside diameter [mm]	(0.5±0.05)		-	
	Material	Oxygen-free copper tube		Oxygen-free copper tube	
◇Electrical properties					
Characteristic impedance [Ω]		50±1.0		7±1.5	
Voltage withstanding VRMS(60Hz)		5000		2000	
Corona extinction voltage VRMS(60Hz)		2000		500	
Max. operating frequency [GHz]		34		32	
Capacitance (Nominal) [pF/m]		95.5		680.1	
*Attenuation [dB/m] at 20°C	FRQ.	Atten.		Atten.	Power
	0.5GHz	0.39		1.2	132
	1.0GHz	0.95		1.8	93
	5.0GHz	1.43		4.0	40
	10.0GHz	1.83		5.8	28
	20.0GHz	2.19		8.4	19
◇Mechanical properties					
Max. operating temperature [°C]		125		125	
Min. inside bend radius [mm]		9.5		10	
Average weight [g/m]		45.2		35	
Standard length [m]		1		2	

◇SC-240 series

Part number		SC-240/75	SC-240/17-SC	SC-240/10-SC	
◇Structure/Material					
Outer conductor	Diameter±0.0254[mm]	2.40	2.40	2.40	
	Material	Oxygen-free copper	Oxygen-free copper	Oxygen-free copper	
Dielectric	Diameter±0.0254[mm]	1.92	1.92	1.92	
	Material	PTFE	PTFE	PTFE	
Center conductor	Diameter±0.013[mm]	0.32	1.30	1.50	
	Material	SPCP	Silver plated copper	Silver plated copper	
◇Electrical properties					
Characteristic impedance [Ω]		75±1.5	17±3.0	10±3.0	
Voltage withstanding VRMS(60Hz)		2500	2000	2000	
Corona extinction voltage VRMS(60Hz)		1200	850	500	
Max. operating frequency [GHz]		59	41	39	
Capacitance (Nominal) [pF/m]		63.3	290.9	459.5	
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power	Atten.	Power
	0.5GHz	0.43	253	0.70	197
	1.0GHz	0.62	177	1.00	138
	5.0GHz	1.47	75	2.31	59
	10.0GHz	2.16	51	3.36	41
*Power rating [W] at 40°C	20.0GHz	3.32	34	4.91	28
				6.89	20
◇Mechanical properties					
Max. operating temperature [°C]		125	125	125	
Min. inside bend radius [mm]		3.5	6.5	6.5	
Average weight [g/m]		21.3	29.7	32.6	
Standard length [m]		2 (MAX10)	2	1	

◇SC-219 series

Part number		SC-219/50	SC-219/70	SC-219/25	SC-219/50-O-AL				
◇Structure/Material									
Outer conductor	Diameter±0.0254[mm]	2.19	2.19	2.19	2.19				
	Material	Oxygen-free copper	Oxygen-free copper	Oxygen-free copper	Aluminum				
Dielectric	Diameter±0.0254[mm]	1.67	1.67	1.67	1.67				
	Material	PTFE	PTFE	PTFE	PTFE				
Center conductor	Diameter±0.013[mm]	0.510	0.32	0.92	0.510				
	Material	SPCP	SPCP	SPCP	SPCP				
◇Electrical properties									
Characteristic impedance [Ω]		50±1.5	70±1.5	25±2.0	50±1.5				
Voltage withstanding VRMS(60Hz)		2500	2500	2000	2500				
Corona extinction voltage VRMS(60Hz)		1500	1200	850	1500				
Max. operating frequency [GHz]		61	67	51	61				
Capacitance (Nominal) [pF/m]		95.6	68.7	190.3	95.6				
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power	Atten.	Power	Atten.	Power	Atten.	Power
	0.5GHz	0.45	254.3	0.46	226.7	0.58	212.5	0.48	240.6
	1.0GHz	0.64	177.4	0.67	158.5	0.83	148.9	0.68	168.2
	5.0GHz	1.51	75.2	1.56	67.8	1.92	64.0	1.60	71.9
	10.0GHz	2.21	51.4	2.29	46.4	2.80	44.0	2.34	49.2
*Power rating [W] at 40°C	20.0GHz	3.29	34.3	3.41	31.4	4.12	29.9	3.47	33.2
◇Mechanical properties									
Max. operating temperature [°C]		125	125	125	125				
Min. inside bend radius [mm]		3.2	3.2	6.5	3.2				
Average weight [g/m]		20.5	19.3	22.8	10.3				
Standard length [m]		2 (MAX 40)	2	2	2 (MAX 40)				

◇SC-219 series

Part number		SC-219/50-SC	SC-219/75	SC-219/50-87.7	SC-219/50-CN-CN				
◇Structure/Material									
Outer conductor	Diameter±0.0254[mm]	2.19	2.19	2.49	2.19				
	Material	Oxygen-free copper	Oxygen-free copper	Oxygen-free copper	Cupronickel				
Dielectric	Diameter±0.0254[mm]	1.67	1.67	1.67	1.67				
	Material	PTFE	PTFE	PTFE	PTFE				
Center conductor	Diameter±0.013[mm]	0.510	0.28	0.2	0.510				
	Material	Silver plated copper	SPCP	SPCP	Curpronickel				
◇Electrical properties									
Characteristic impedance [Ω]		50±1.5	75±1.5	87.7±2.0	50±1.5				
Voltage withstanding VRMS(60Hz)		2500	2500	2000	2500				
Corona extinction voltage VRMS(60Hz)		1500	1200	1000	1500				
Max. operating frequency [GHz]		61	68	71	61				
Capacitance (Nominal) [pF/m]		95.2	63	54.5	95.2				
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power	Atten.	Power	Atten.	Power	Atten.	Power
	0.5GHz	0.45	254.0	0.48	208	0.56	176	0.48	240.6
	1.0GHz	0.64	177.4	0.69	146	0.79	123	0.68	168.2
	5.0GHz	1.51	75.6	1.66	62	1.86	53	1.60	71.9
	10.0GHz	2.21	51.7	2.37	42	2.71	36	2.34	49.2
*Power rating [W] at 40°C	20.0GHz	3.29	34.8	3.51	29	4	24	3.47	33.2
◇Mechanical properties									
Max. operating temperature [°C]		125	125	125	125				
Min. inside bend radius [mm]		3.2	3.2	3.2	3.2				
Average weight [g/m]		20.2	19.2	19.0	20.2				
Standard length [m]		2 (MAX40)	2 (MAX20)	2	2				

◇SC-219 series

Part number		SC-219/50-SCN-CN	SC-219/50-O-SS	SC-219/50-W-SS	SC-219/50-SS-SS		
◇Structure/Material							
Outer conductor	Diameter±0.0254[mm]	2.19	2.19	2.19	2.19		
	Material	Cupronickel	SUS304	SUS304	SUS304		
Dielectric	Diameter±0.0254[mm]	1.67	1.67	1.67	1.67		
	Material	PTFE	PTFE	PTFE	PTFE		
Center conductor	Diameter±0.013[mm]	0.51	0.51	0.51	0.51		
	Material	Silver plated cupronickel	SPCP	Tungsten	SUS304		
◇Electrical properties							
Characteristic impedance [Ω]		50±1.5	50±1.5	50±5.0	50±1.5		
Voltage withstanding VRMS(60Hz)		2500	2500	2500	2500		
Corona extinction voltage VRMS(60Hz)		1500	1500	1500	1500		
Max. operating frequency [GHz]		61	61	61	61		
Capacitance (Nominal) [pF/m]		95.2	95.2	95.2	95.2		
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Atten.	Power	Atten.	Power	Atten.
	0.5GHz	0.8	1.09	113.7	1.36	88.1	3.0
	1.0GHz	1.2	1.55	80.0	1.94	62.0	4.2
	5.0GHz	2.7	3.54	35.0	4.41	27.2	9.4
	10.0GHz	3.8	5.09	24.3	6.32	19.0	13.5
*Power rating [W] at 40°C	20.0GHz	5.3	7.36	16.8	9.11	13.2	19.2
	◇Mechanical properties						
Max. operating temperature [°C]		125	125	125	125		
Min. inside bend radius [mm]		3.2	3.2	3.2	6.4		
Average weight [g/m]		20.2	18.55	20.83	17		
Standard length [m]		2	2	2	2 (MAX 3)		

◇SC-219 series

Part number		SC-219/50-SSS-SS	SC-219/50-NbTi-NbTi	SC-219/50-Nb-Nb	SC-219/50-SS-SS-PI	
◇Structure/Material						
Outer conductor	Diameter±0.0254[mm]	2.19	2.19	2.19	2.19	
	Material	SUS304	NbTi	Niobium	SUS304	
Dielectric	Diameter±0.0254[mm]	1.67	1.67	1.67	1.67	
	Material	PTFE	PTFE	PTFE	PTFE	
Center conductor	Diameter±0.013[mm]	0.51	0.51	0.51	0.51	
	Material	Silver Plated SUS304	NbTi	Niobium	SUS304	
◇Electrical properties						
Characteristic impedance [Ω]		50±1.5	50±1.5	50±1.5	50±2.0	
Voltage withstanding VRMS(60Hz)		2500	2500	2500	2500	
Corona extinction voltage VRMS(60Hz)		1500	1500	1500	1500	
Max. operating frequency [GHz]		61	61	61	61	
Capacitance (Nominal) [pF/m]		95.2	95.2	95.2	116.2	
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Atten.	Atten.	Atten.	Power
	0.5GHz	1	2.7	1.3	4.5	41
	1.0GHz	1.5	3.9	1.8	6.9	26
	5.0GHz	3.3	8.6	4.1	20.5	9
	10.0GHz	4.6	12.2	5.8	(39.2)	(5)
*Power rating [W] at 40°C	20.0GHz	6.5	17.3	8.3	(59.4)	(3)
	◇Mechanical properties					
Max. operating temperature [°C]		125	100	125	300	
Min. inside bend radius [mm]		6.4	10	10	6.4	
Average weight [g/m]		17.0	18.5	19.5	16.6	
Standard length [m]		2 (MAX 3)	1	2	2	

◇SC-219 series

Part number		SC-219/50-B-B	SC-219/50-SB-B	SC-219/50-SC-PEEK	
◇Structure/Material					
Outer conductor	Diameter±0.0254[mm]	2.19	2.19	2.19±0.05	
	Material	Beryllium copper	Beryllium copper	Oxygen-free copper	
Dielectric	Diameter±0.0254[mm]	1.67	1.67	1.67±0.05	
	Material	PTFE	PTFE	PEEK	
Center conductor	Diameter±0.013[mm]	0.51	0.51	0.37	
	Material	Beryllium copper	Silver Plated Beryllium copper	Silver Plated copper	
◇Electrical properties					
Characteristic impedance [Ω]		50±1.5	50±1.5	50±3.0	
Voltage withstanding VRMS(60Hz)		2500	2500	1250	
Corona extinction voltage VRMS(60Hz)		1500	1500	750	
Max. operating frequency [GHz]		61	61	51	
Capacitance (Nominal) [pF/m]		95.2	95.2	121.7	
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Atten.	Atten.	
	0.5GHz	0.9	0.6	0.9	
	1.0GHz	1.3	0.8	1.4	
	5.0GHz	2.9	1.8	4.6	
	10.0GHz	4.1	2.5	8.1	
	20.0GHz	5.8	3.5	14.6	
◇Mechanical properties					
Max. operating temperature [°C]		125	125	200	
Min. inside bend radius [mm]		6.4	6.4	6.4	
Average weight [g/m]		18.9	18.9	20	
Standard length [m]		2	2	2	

◇SC-219 series (Probe cable)

Part number		SC-219/50-C/Tu	SC-219/50-PBC/Tu		
◇Structure/Material					
Outer conductor	Diameter±0.0254[mm]	2.19	2.19		
	Material	Oxygen-free copper	Oxygen-free copper		
Dielectric	Diameter±0.0254[mm]	1.67	1.67		
	Material	PTFE	PTFE		
Center conductor	Diameter [mm]	0.51±0.0254	0.51±0.0254		
	Inside diameter [mm]	(0.4±0.05)	(0.35±0.05)		
	Material	Oxygen-free copper tube	Phosphor bronze tube		
◇Electrical properties					
Characteristic impedance [Ω]		50±1.5	50±1.5		
Voltage withstanding VRMS(60Hz)		2500	2500		
Corona extinction voltage VRMS(60Hz)		1500	1500		
Max. operating frequency [GHz]		61	61		
Capacitance (Nominal) [pF/m]		95.6	95.6		
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Atten.		
	0.5GHz	0.68	1.55		
	1.0GHz	1.58	3.55		
	5.0GHz	2.33	5.1		
	10.0GHz	2.93	6.32		
	20.0GHz	3.46	7.38		
◇Mechanical properties					
Max. operating temperature [°C]		125	125		
Min. inside bend radius [mm]		6.4	6.4		
Average weight [g/m]		19.0	19.3		
Max. length [m]		1	1		

◇SC-160 series

Part number		SC-160/50	SC-160/50-SC	SC-160S/50-O-CN	SC-160/50-CN-CN		
◇Structure/Material							
Outer conductor	Diameter±0.0254[mm]	1.60	1.60	1.60	1.60		
	Material	Oxygen-free copper	Oxygen-free copper	Cupronickel	Cupronickel		
Dielectric	Diameter±0.0254[mm]	1.05	1.05	1.05	1.05		
	Material	PTFE	PTFE	PTFE	PTFE		
Center conductor	Diameter±0.013[mm]	0.320	0.320	0.320	0.320		
	Material	SPCP	Silver plated copper	SPCP	Cupronickel		
◇Electrical properties							
Characteristic impedance [Ω]		50±2.0	50±2.0	50±2.0	50±2.0		
Voltage withstanding VRMS(60Hz)		2000	2000	2000	2000		
Corona extinction voltage VRMS(60Hz)		1000	1000	1000	1000		
Max. operating frequency [GHz]		97	97	97	97		
Capacitance (Nominal) [pF/m]		95.2	95.2	95.2	95.5		
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power	Atten.	Power	Atten.	Power
	0.5GHz	0.7	124.2	0.7	124.2	1.41	65.2
	1.0GHz	1.0	87.8	1.0	87.8	2.01	45.9
	5.0GHz	2.31	37.5	2.31	37.5	4.57	20.2
	10.0GHz	3.55	26.5	3.35	26.5	6.54	14.1
	20.0GHz	4.91	17.3	4.91	17.3	9.41	9.8
*Power rating [W] at 40°C	FRQ.	Atten.	Power	Atten.	Power	Atten.	Power
	0.5GHz	0.7	124.2	0.7	124.2	1.41	65.2
	1.0GHz	1.0	87.8	1.0	87.8	2.01	45.9
	5.0GHz	2.31	37.5	2.31	37.5	4.57	20.2
	10.0GHz	3.55	26.5	3.35	26.5	6.54	14.1
	20.0GHz	4.91	17.3	4.91	17.3	9.41	9.8
◇Mechanical properties							
Max. operating temperature [°C]		125	125	125	100		
Min. inside bend radius [mm]		3.0	3.0	3.0	3.0		
Average weight [g/m]		12.5	12.6	12.6	12.6		
Standard length [m]		2 (MAX 20)	2 (MAX 20)	2	2		

◇SC-160 series

Part number		SC-160/50-SCN-CN	SC-160/50-NbTi-NbTi	SC-160S/50	SC-160S/50-SS-SS-PI		
◇Structure/Material							
Outer conductor	Diameter±0.0254[mm]	1.60	1.60	1.60	1.60		
	Material	Cupronickel	NbTi	Oxygen-free copper	SUS304		
Dielectric	Diameter±0.0254[mm]	1.05	1.05	1.24	1.24		
	Material	PTFE	NbTi	PTFE	Polyimide		
Center conductor	Diameter±0.013[mm]	0.320	0.32	0.377	0.291		
	Material	Silver plated cupronickel	NbTi	SPCP	SUS304		
◇Electrical properties							
Characteristic impedance [Ω]		50±2.0	50±2.5	50±2.0	50±2.0		
Voltage withstanding VRMS(60Hz)		2000	2000	2000	2000		
Corona extinction voltage VRMS(60Hz)		1000	1000	1200	1000		
Max. operating frequency [GHz]		97	97	82	69		
Capacitance (Nominal) [pF/m]		95.5	95.6	95.3	114.1		
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Atten.	Atten.	Power	Atten.	Power
	0.5GHz	1.3	4.3	0.6	145.4	2.8	25
	1.0GHz	1.9	6.1	0.85	102.3	8.7	16
	5.0GHz	4.2	13.7	1.98	44.2	24.4	6
	10.0GHz	6	19.4	2.88	30.6	(39.8)	(3)
	20.0GHz	8.5	27.5	4.24	20.7	(66.9)	(2)
*Power rating [W] at 40°C	FRQ.	Atten.	Atten.	Atten.	Power	Atten.	Power
	0.5GHz	1.3	4.3	0.6	145.4	2.8	25
	1.0GHz	1.9	6.1	0.85	102.3	8.7	16
	5.0GHz	4.2	13.7	1.98	44.2	24.4	6
	10.0GHz	6	19.4	2.88	30.6	(39.8)	(3)
	20.0GHz	8.5	27.5	4.24	20.7	(66.9)	(2)
◇Mechanical properties							
Max. operating temperature [°C]		100	90	125	300		
Min. inside bend radius [mm]		3	6.4	3.0	6.0		
Average weight [g/m]		12.6	12	10.5	8.4		
Max. length [m]		2	1	2 (MAX 20)	2		

◇SC-119 series

Part number		SC-119/50	SC-119/50-SC	SC-119/50-O-SS	SC-119/12					
◇Structure/Material										
Outer conductor	Diameter±0.0254[mm]	1.19	1.19	1.19	1.19					
	Material	Oxygen-free copper	Oxygen-free copper	SUS304	Oxygen-free copper					
Dielectric	Diameter±0.0254[mm]	0.94	0.94	0.94	0.94					
	Material	PTFE	PTFE	PTFE	PFA					
Center conductor	Diameter±0.013[mm]	0.287	0.287	0.287	0.695					
	Material	SPCP	Silver plated copper	SPCP	SPCP					
◇Electrical properties										
Characteristic impedance [Ω]		50±2.5	50±2.5	50±2.5	12±2.5					
Voltage withstanding VRMS(60Hz)		2000	2000	2000	900					
Corona extinction voltage VRMS(60Hz)		1000	1000	1000	400					
Max. operating frequency [GHz]		108	108	108	81					
Capacitance (Nominal) [pF/m]		95.6	95.2	95.2	375.5					
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power	Atten.	Power	Atten.	Power	Atten.	Power	
	0.5GHz	0.79	85.4	0.79	85.4	1.93	36.7	1.73	41.7	
	1.0GHz	1.12	60.6	1.12	60.6	2.73	25.9	2.46	29.4	
	5.0GHz	2.58	26.7	2.58	26.7	6.19	11.4	5.57	12.9	
	*Power rating [W] at 40°C	10.0GHz	3.73	18.8	3.73	18.8	8.84	8.0	8.00	9.0
		20.0GHz	5.44	12.8	5.44	12.8	12.65	5.6	11.43	6.3
◇Mechanical properties										
Max. operating temperature [°C]		125	125	125	125					
Min. inside bend radius [mm]		3.0	3.0	3.2	5.0					
Average weight [g/m]		5.6	5.7	5.2	7.5					
Standard length [m]		2 (MAX 10)	2 (MAX 5)	2	2					

◇SC-119 series

Part number		SC-119/50-SS-SS	SC-119/50-SSS-SS	SC-119/50-CN-CN	SC-119/50-SCN-CN
◇Structure/Material					
Outer conductor	Diameter±0.0254[mm]	1.19	1.19	1.19	1.19
	Material	SUS304	SUS304	Cupronickel	Cupronickel
Dielectric	Diameter±0.0254[mm]	0.94	0.94	0.94	0.94
	Material	SUS304	PTFE	PTFE	PTFE
Center conductor	Diameter±0.013[mm]	0.287	0.287	0.287	0.287
	Material	SUS304	Silver Plated SUS304	Cupronickel	Silver Plated Cupronickel
◇Electrical properties					
Characteristic impedance [Ω]		50±2.5	50±2.5	50±2.5	50±2.5
Voltage withstanding VRMS(60Hz)		2000	2000	2000	2000
Corona extinction voltage VRMS(60Hz)		1000	1000	1000	1000
Max. operating frequency [GHz]		108	108	108	108
Capacitance (Nominal) [pF/m]		95.2	95.2	95.2	95.2
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Atten.	Atten.	Atten.
	0.5GHz	5.3	1.8	3.8	1.5
	1.0GHz	7.4	2.6	5.4	2.1
	5.0GHz	16.6	5.8	12.0	4.7
	10.0GHz	23.5	8.2	17.0	6.7
	20.0GHz	33.3	11.6	24.0	9.5
◇Mechanical properties					
Max. operating temperature [°C]		100	100	100	100
Min. inside bend radius [mm]		3.2	3.2	3.2	3.2
Average weight [g/m]		5	5	5.1	5.3
Max. length [m]		2	2	2	2

◇SC-119 series

Part number		SC-119/50-B-B	SC-119/50-SB-B	SC-119/50-SS-SS-PI	SC-119/50-NbTi-NbTi	
◇Structure/Material						
Outer conductor	Diameter±0.0254[mm]	1.19	1.19	1.19±0.05	1.19	
	Material	Beryllium copper	Beryllium copper	SUS304	NbTi	
Dielectric	Diameter±0.0254[mm]	0.94	0.94	0.94±0.05	0.94	
	Material	PTFE	PTFE	Polyimide	PTFE	
Center conductor	Diameter±0.013[mm]	0.287	0.287	0.22	0.287	
	Material	Beryllium copper	Silver Plated Beryllium copper	SUS304	NbTi	
◇Electrical properties						
Characteristic impedance [Ω]		50±2.5	50±2.5	50±2.5	50±2.5	
Voltage withstanding VRMS(60Hz)		2000	2000	2000	2000	
Corona extinction voltage VRMS(60Hz)		1000	1000	1000	1000	
Max. operating frequency [GHz]		108	108	91	108	
Capacitance (Nominal) [pF/m]		95.2	95.6	114.8	95.2	
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Atten.	Atten.	Power	Atten.
	0.5GHz	1.6	1	7.3	15	5.5
	1.0GHz	2.3	1.4	10.9	10	7.8
	5.0GHz	5.1	3.1	29.3	3	17.3
	20.0GHz	10.5	6.3	(76.7)	(1)	34.7
*Power rating [W] at 40°C	10.0GHz	7.3	4.4	(46.7)	(2)	24.5
	20.0GHz	10.5	6.3	(76.7)	(1)	34.7
	◇Mechanical properties					
	Max. operating temperature [°C]		100	100	300	100
	Min. inside bend radius [mm]		3.2	3.2	6	5
Average weight [g/m]		5.5	5.5	4.5	5	
Max. length [m]		2	2	2	1	

◇SC-100 series

Part number		SC-100/50	SC-100/75	SC-100/25	SC-100S/50				
◇Structure/Material									
Outer conductor	Diameter±0.0254[mm]	1.00	1.00	1.00	1.00				
	Material	Oxygen-free copper	Oxygen-free copper	Oxygen-free copper	Oxygen-free copper				
Dielectric	Diameter±0.0254[mm]	0.60	0.6	0.60	0.77				
	Material	PTFE	PTFE	PTFE	PTFE				
Center conductor	Diameter±0.013[mm]	0.19	0.1	0.33	0.234				
	Material	SPCP	SPCP	SPCP	SPCP				
◇Electrical properties									
Characteristic impedance [Ω]		50±2.5	75±2.5	25±2.0	50±2.5				
Voltage withstanding VRMS(60Hz)		2000	2000	500	2000				
Corona extinction voltage VRMS(60Hz)		700	850	200	750				
Max. operating frequency [GHz]		169	190	143	133				
Capacitance (Nominal) [pF/m]		98.6	63.3	189.7	95.0				
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power	Atten.	Power	Atten.	Power		
	0.5GHz	1.22	47.4	1.32	41.5	1.55	37.6	0.95	60.4
	1.0GHz	1.74	33.6	1.87	29.6	2.20	26.5	1.35	42.5
	5.0GHz	3.96	14.7	4.25	12.8	4.99	11.6	3.10	18.6
	10.0GHz	5.68	10.8	6.1	8.7	7.13	8.1	4.47	12.7
*Power rating [W] at 40°C	20.0GHz	8.2	7	8.79	6.8	10.25	5.6	6.49	8.8
	◇Mechanical properties								
Max. operating temperature [°C]		125	125	125	125				
Min. inside bend radius [mm]		3	3.0	3	3.0				
Average weight [g/m]		5.3	5.1	5.6	4.1				
Standard length [m]		2 (MAX 5)	2	2	2 (MAX 5)				

◇SC-086 series									
Part number		SC-086/50		SC-086/50-SC		SC-086/17		SC-086/50-BS-BS	
◇Structure/Material									
Outer conductor	Diameter±0.0254[mm]	0.86		0.86		0.86±0.05		0.86	
	Material	Oxygen-free copper		Oxygen-free Copper		Oxygen-free copper		Brass	
Dielectric	Diameter±0.0254[mm]	0.66		0.66		0.66±0.05		0.66	
	Material	PTFE		PTFE		PTFE		PTFE	
Center conductor	Diameter±0.013[mm]	0.203		0.203		0.46		0.203	
	Material	SPCP		Silver Plated Copper		SPCP		Brass	
◇Electrical properties									
Characteristic impedance [Ω]		50±3.0		50±3.0		17±3.0		50±3.0	
Voltage withstanding VRMS(60Hz)		2000		2000		500		2000	
Corona extinction voltage VRMS(60Hz)		750		750		200		750	
Max. operating frequency [GHz]		154		154		119		154	
Capacitance (Nominal) [pF/m]		96.2		96.2		280		96.2	
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power	Atten.	Power	Atten.	Power	Atten.	
	0.5GHz	1.11	45.7	1.11	45.1	2.2	24.7	2.2	
	1.0GHz	1.58	31.8	1.58	31.8	3.1	17.4	3.1	
	5.0GHz	3.6	13.8	3.6	13.8	6.9	7.7	7.1	
	*Power rating [W] at 40°C	10.0GHz	5.18	9.6	5.17	9.6	9.8	5.4	10.1
	20.0GHz	7.48	6.7	7.48	6.7	14	3.7	14.4	
◇Mechanical properties									
Max. operating temperature [°C]		125		125		125		100	
Min. inside bend radius [mm]		3		3		15		4	
Average weight [g/m]		3.1		3.1		3.9		2.9	
Standard length [m]		2 (MAX 5)		2 (MAX 5)		2		2	

◇SC-086 series

◇SC-086 series									
Part number		SC-086/50-O-CN		SC-086/50-SC-CN		SC-086/50-SS-SS		SC-086/50-SSS-SS	
◇Structure/Material									
Outer conductor	Diameter±0.0254[mm]	0.86		0.86		0.86		0.86	
	Material	Cupronickel		Cupronickel		SUS304		SUS304	
Dielectric	Diameter±0.0254[mm]	0.66		0.66		0.66		0.66	
	Material	PTFE		PTFE		PTFE		PTFE	
Center conductor	Diameter±0.013[mm]	0.203		0.203		0.203		0.203	
	Material	SPCP		Silver Plated Copper		SUS304		Silver Plated SUS304	
◇Electrical properties									
Characteristic impedance [Ω]		50±2.5		50±2.5		50±2.5		50±3.0	
Voltage withstanding VRMS(60Hz)		2000		2000		2000		2000	
Corona extinction voltage VRMS(60Hz)		750		750		750		750	
Max. operating frequency [GHz]		154		154		154		154	
Capacitance (Nominal) [pF/m]		95.2		95.2		95.2		96.2	
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power	Atten.	Power	Atten.	Power	Atten.	
	0.5GHz	2.14	24	2.14	24	7.3		2.6	
	1.0GHz	3.04	17	3.04	17	10.3		3.7	
	5.0GHz	6.87	7.5	6.87	7.5	23		8.3	
	*Power rating [W] at 40°C	10.0GHz	9.79	5.2	9.79	5.2	32.7		11.7
	20.0GHz	14.01	3.6	14.01	3.6	46.4		16.5	
◇Mechanical properties									
Max. operating temperature [°C]		125		125		100		100	
Min. inside bend radius [mm]		3.2		3.2		3.2		3.2	
Average weight [g/m]		3.1		3.1		3.1		3.1	
Max. length [m]		2		2		2		2	

◇SC-086 series

Part number		SC-086/50-SS-SS-PI	SC-086/50-CN-CN	SC-086/50-SCN-CN	SC-086/50-B-B
◇Structure/Material					
Outer conductor	Diameter±0.0254[mm]	0.86±0.05	0.86	0.86	0.86
	Material	SUS304	Cupronickel	Cupronickel	Beryllium copper
Dielectric	Diameter±0.0254[mm]	0.66±0.05	0.66	0.66	0.66
	Material	Polyimide	PTFE	PTFE	PTFE
Center conductor	Diameter±0.013[mm]	0.15	0.203	0.203	0.203
	Material	SUS304	Cupronickel	Silver plated Cupronickel	Beryllium copper
◇Electrical properties					
Characteristic impedance [Ω]		5.0±3.0	50±2.5	50±2.5	50±3.0
Voltage withstanding VRMS(60Hz)		2000	2000	2000	2000
Corona extinction voltage VRMS(60Hz)		750	750	750	750
Max. operating frequency [GHz]		151	154	154	154
Capacitance (Nominal) [pF/m]		117.2	95.2	96.2	96.2
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power	Atten.	Atten.
	0.5GHz	10.5	4.6	5.4	2.3
	1.0GHz	15.4	3.2	7.7	3.3
	5.0GHz	39.1	1.2	17.1	7.4
	10.0GHz	(60.4)	(0.8)	24.3	10.6
*Power rating [W] at 40°C	20.0GHz	(95.6)	(0.5)	34.6	15.2
◇Mechanical properties					
Max. operating temperature [°C]		300	100	100	100
Min. inside bend radius [mm]		6.4	3.2	3.2	3.2
Average weight [g/m]		2.7	3.1	3.1	2.9
Standard length [m]		2	2 (MAX 3)	2	2 (MAX 3)

◇SC-086 series

Part number		SC-086/50-SB-B	SC-086/50-NbTi-NbTi		
◇Structure/Material					
Outer conductor	Diameter±0.0254[mm]	0.86	0.90 +0.04/-0.04		
	Material	Beryllium copper	NbTi		
Dielectric	Diameter±0.0254[mm]	0.66	0.66		
	Material	PTFE	PTFE		
Center conductor	Diameter±0.013[mm]	0.203	0.203		
	Material	Silver plated beryllium copper	NbTi		
◇Electrical properties					
Characteristic impedance [Ω]		50±3.0	50±3.0		
Voltage withstanding VRMS(60Hz)		2000	2000		
Corona extinction voltage VRMS(60Hz)		750	750		
Max. operating frequency [GHz]		154	154		
Capacitance (Nominal) [pF/m]		95.2	96.2		
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Atten.		
	0.5GHz	1.4	6.8		
	1.0GHz	2.0	9.6		
	5.0GHz	4.4	21.6		
	10.0GHz	6.3	30.5		
	20.0GHz	8.9	43.1		
◇Mechanical properties					
Max. operating temperature [°C]		100	90		
Min. inside bend radius [mm]		3.2	3.2		
Average weight [g/m]		2.9	3		
Standard length [m]		2 (MAX 3)	1		

◇SC-072 series

Part number		SC-072/50					
◇Structure/Material							
Outer conductor	Diameter±0.0254[mm]	0.72					
	Material	Oxygen-free copper					
Dielectric	Diameter±0.0254[mm]	0.42					
	Material	PTFE					
Center conductor	Diameter±0.013[mm]	0.127					
	Material	SPCP					
◇Electrical properties							
Characteristic impedance [Ω]		50±3.0					
Voltage withstanding VRMS(60Hz)		750					
Corona extinction voltage VRMS(60Hz)		500					
Max. operating frequency [GHz]		244					
Capacitance (Nominal) [pF/m]		94.8					
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power				
	0.5GHz	1.73	24				
	1.0GHz	2.46	17				
	5.0GHz	5.57	7.6				
	20.0GHz	11.43	3.7				
*Power rating [W] at 40°C	FRQ.	Atten.	Power				
	0.5GHz	1.73	24				
	1.0GHz	2.46	17				
	5.0GHz	5.57	7.6				
	20.0GHz	11.43	3.7				
◇Mechanical properties							
Max. operating temperature [°C]		125					
Min. inside bend radius [mm]		1.8					
Average weight [g/m]		2.8					
Standard length [m]		2					

◇SC-058 series

Part number		SC-058/50		SC-058/50-O-CN		SC-058/50-O-SS		SC-058/50-AuC	
◇Structure/Material									
Outer conductor	Diameter±0.0254[mm]	0.58		0.58		0.58		0.58	
	Material	Oxygen-free copper		Cupronickel		Stainless steel (SUS304)		Oxygen-free copper	
Dielectric	Diameter±0.0254[mm]	0.42		0.42		0.42		0.42	
	Material	PTFE		PTFE		PTFE		PTFE	
Center conductor	Diameter±0.013[mm]	0.127		0.127		0.127		0.127	
	Material	SPCP		SPCP		SPCP		Gold plated copper	
◇Electrical properties									
Characteristic impedance [Ω]		50±3.0		50±2.5		50±2.5		50±3.0	
Voltage withstanding VRMS(60Hz)		750		750		750		750	
Corona extinction voltage VRMS(60Hz)		500		500		500		500	
Max. operating frequency [GHz]		244		244		244		244	
Capacitance (Nominal) [pF/m]		94.8		95.2		95.2		94.8	
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power	Atten.	Power	Atten.	Power	Atten.	Power
	0.5GHz	1.73	19	3.50	10.1	4.27	8.32	1.87	20
	1.0GHz	2.46	14	4.96	7.14	6.05	5.87	2.66	14
	5.0GHz	5.57	6.2	11.16	3.17	13.61	2.61	6.01	6.3
	20.0GHz	11.43	3.0	22.60	1.56	27.50	1.29	12.29	3.1
*Power rating [W] at 40°C	FRQ.	Atten.	Power	Atten.	Power	Atten.	Power	Atten.	Power
	0.5GHz	1.73	19	3.50	10.1	4.27	8.32	1.87	20
	1.0GHz	2.46	14	4.96	7.14	6.05	5.87	2.66	14
	5.0GHz	5.57	6.2	11.16	3.17	13.61	2.61	6.01	6.3
	20.0GHz	11.43	3.0	22.60	1.56	27.50	1.29	12.29	3.1
◇Mechanical properties									
Max. operating temperature [°C]		125		125		125		125	
Min. inside bend radius [mm]		1.5		3.2		3.2		1.5	
Average weight [g/m]		1.5		1.5		1.4		1.5	
Standard length [m]		1		1		1		1	

◇SC-040 series

Part number		SC-040/50-CN-CN			
◇Structure/Material					
Outer conductor	Diameter±0.0254[mm]	0.4			
	Material	Cupronickel			
Dielectric	Diameter±0.0254[mm]	0.26			
	Material	PTFE			
Center conductor	Diameter±0.013[mm]	0.08			
	Material	Cupronickel			
◇Electrical properties					
Characteristic impedance [Ω]		50±3.0			
Voltage withstanding VRMS(60Hz)		500			
Corona extinction voltage VRMS(60Hz)		150			
Max. operating frequency [GHz]		392			
Capacitance (Nominal) [pF/m]		96.2			
*Attenuation [dB/m] at 20°C	FRQ.	Atten.			
	0.5GHz	13.7			
	1.0GHz	19.3			
	5.0GHz	43.3			
*Power rating [W] at 40°C	10.0GHz	61.3			
	20.0GHz	86.9			
◇Mechanical properties					
Max. operating temperature [°C]		100			
Min. inside bend radius [mm]		1.3			
Average weight [g/m]		0.8			
Standard length [m]		2			

◇SC-033 series

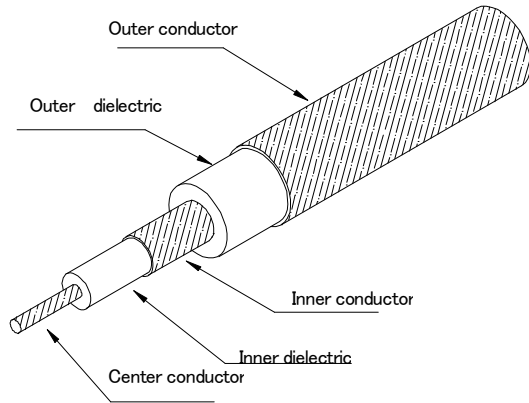
Part number		SC-033/50	SC-033/50-O	SC-033/50-AuW-CN	SC-033/50-AuW-SS				
◇Structure/Material									
Outer conductor	Diameter±0.0254[mm]	0.33	0.33	0.33	0.33				
	Material	Oxygen-free copper	Oxygen-free copper	Cupronickel	Stainless steel (SUS304)				
Dielectric	Diameter±0.0254[mm]	0.26	0.26	0.26	0.26				
	Material	PFA	PFA	PFA	PTFE				
Center conductor	Diameter±0.013[mm]	0.080	0.080	0.080	0.080				
	Material	Gold plated tungsten	SPCP	Gold plated tungsten	Gold plated tungsten				
◇Electrical properties									
Characteristic impedance [Ω]		50±3.0	50±3.0	50±3.0	50±3.0				
Voltage withstanding VRMS(60Hz)		500	500	500	500				
Corona extinction voltage VRMS(60Hz)		150	150	150	150				
Max. operating frequency [GHz]		392	392	392	392				
Capacitance (Nominal) [pF/m]		96.2	95.2	95.2	95.2				
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power	Atten.	Power	Atten.	Power	Atten.	Power
	0.5GHz	3.3	6.1	2.9	7	5.69	3.5	6.96	2.94
	1.0GHz	4.7	4.3	4.1	4.9	8.05	2.5	9.85	2.08
	5.0GHz	10.6	1.9	9.2	2.1	18.1	1.1	22.11	0.92
*Power rating [W] at 40°C	10.0GHz	15	1.3	13.1	1.5	25.7	0.79	31.34	0.65
	20.0GHz	21.4	0.9	18.7	1	36.4	0.56	44.49	0.46
◇Mechanical properties									
Max. operating temperature [°C]		100	100	100	100				
Min. inside bend radius [mm]		1.3	1.3	1.5	1.5				
Average weight [g/m]		0.49	0.43	0.49	0.46				
Standard length [m]		1	1	1	1				

◇SC-033 series

Part number		SC-033/50-SS-SS	SC-033/50-SSS-SS	SC-033/50-CN-CN	SC-033/50-NbTi-CN
◇Structure/Material					
Outer conductor	Diameter±0.0254[mm]	0.33	0.33	0.33	0.33
	Material	SUS304	SUS304	Cupronickel	Cupronickel
Dielectric	Diameter±0.0254[mm]	0.26	0.26	0.26	0.26
	Material	PFA	PTFE	PFA	PFA
Center conductor	Diameter±0.013[mm]	0.08	0.08	0.08	0.08
	Material	SUS304	Silver Plated SUS304	Cupronickel	NbTi
◇Electrical properties					
Characteristic impedance [Ω]		50±3.0	50±3.0	50±3.0	50±3.0
Voltage withstanding VRMS(60Hz)		500	500	500	500
Corona extinction voltage VRMS(60Hz)		150	150	150	150
Max. operating frequency [GHz]		392	392	392	392
Capacitance (Nominal) [pF/m]		96.2	96.2	96.2	96.2
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Atten.	Atten.	Atten.
	0.5GHz	18.9	6.4	13.7	17.8
	1.0GHz	26.8	9.1	19.3	25.3
	5.0GHz	60	20.3	43.3	56.5
	10.0GHz	84.9	28.8	61.3	79.9
	20.0GHz	120.2	40.8	86.9	113
*Power rating [W] at 40°C					
◇Mechanical properties					
Max. operating temperature [°C]		100	100	100	100
Min. inside bend radius [mm]		1.5	1.5	1.3	1.3
Average weight [g/m]		0.4	0.4	0.44	0.4
Standard length [m]		1	1	1	1

Triaxial cable

Structure of semi-rigid triaxial cable is shown below. It is used not only for RF but also for various applications.



■ **Part number and structure**

Part number of semi-rigid triaxial cable is determined as follows.

$$SC - \underbrace{\square\square\square}_{\textcircled{1}} - \underbrace{\square\square\square}_{\textcircled{2}} - \underbrace{\square\square\square}_{\textcircled{3}}$$

- ① Described by 100 times of outer conductor diameter [mm].
- ② Characteristic impedance of inner coaxial cable.
- ③ Characteristic impedance of outer coaxial cable.

Please contact our sales agent for other types of triaxial cables.

Part number		SC-635-50-15	SC-635-50-25		
◇Structure/Size/Material					
Outer conductor	Diameter±0.05[mm]	6.35	6.35		
	Material	Oxygen-free copper	Oxygen-free copper		
Outer dielectric	Diameter±0.05[mm]	5.31	5.31		
	Material	PTFE	PTFE		
Inner conductor	Diameter±0.05[mm]	3.71	2.93		
	Material	Oxygen-free copper	Oxygen-free copper		
Inner dielectric	Diameter±0.05[mm]	2.98	2.93		
	Material	PTFE	PTFE		
Center conductor	Diameter±0.0254[mm]	0.904	0.67		
	Material	SPCP	SPCP		
◇Electrical properties					
Outer characteristic impedance [Ω]		15±1.0	25±1.0		
Inner characteristic impedance [Ω]		50±1.0	50±1.5		
*Attenuation [dB/m] at 20°C	FRQ.	Atten.	Power	Atten.	Power
	Inner				
	0.5GHz	0.26	312	0.34	196
	1.0GHz	0.37	216	0.49	136
	5.0GHz	0.91	89	1.17	57
	10.0GHz	1.36	59	1.73	38
	Outer				
	0.5GHz	0.27	536	0.2	705
	1.0GHz	0.39	372	0.29	485
	5.0GHz	0.95	153	0.72	195
10.0GHz	1.43	102	1.1	128	
◇Mechanical properties					
Max. operating temperature [°C]		125	125		
Average weight [g/m]		161	153		
Max. length [m]		2	2		

■ “CL series” Coupler lines

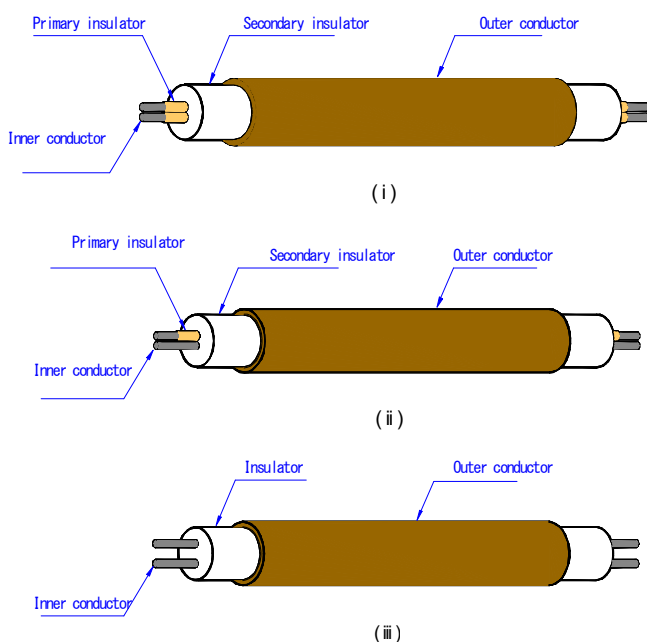
Outline

“CL Series” coupler line is consists of a pair of wire center conductors shielded by a drawn outer conductor. CL Series has been designed to offer broadband directional coupler and many types of circuit elements by cutting to an appropriate length and lead forming depending on operating frequency and applications. Outer conductor is made from seamless oxygen-free copper, which attains physical attributes of semi-rigid coaxial cable. Lightweight and compactness with very little noise from outside, easy mounting on circuit board by soldering are also benefits of CL Series.

Structure

The basic construction of CL Series is two inner conductors shielded by outer jacket and there are 3 types. In case of tight coupling type, a pair of inner conductors has to be set very closely with parallel and constant distance. To obtain this status, one or both inner conductors are primary insulated with polyimide then set together covered by PTFE (See i , ii of Figure 1). As iii of Figure 1 shows, distance of two inner conductors of loose coupling type is wider than that of tight coupling type and covered by PTFE. Seamless non-oxygen copper is used for outer shield.

[Figure 1]

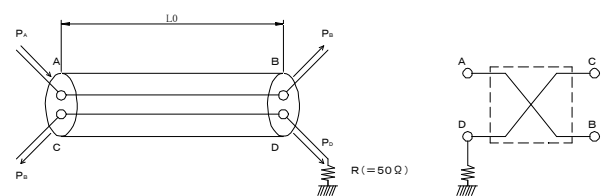


Function

Function of quarter wavelength frequency L_0 is as follows (Figure 2). Coupler line is 4 ports circuit partly coupling 2 wires A-B and C-D. Input signal to port A, according to coupling value, right amount of signal is conveyed to port B and C with no output on port D, which is the ideal performance of directional coupler.

There is 90 degree phase difference between input port A and output port B, same phase on port A and C. However slight reflection on each port brings slight output that should be ideally none. Defining output power on each port as P_B, P_C, P_D , and input power as P_A , calculation is as follows.

[Figure 2]



1. Through ; L [dB]

$$L[dB] = 10 \log \frac{P_A}{P_B} \dots \dots \dots \textcircled{1}$$

2. Coupling ; C [dB]

$$C[dB] = 10 \log \frac{P_A}{P_C} \dots \dots \dots \textcircled{2}$$

3. Isolation ; I [dB]

$$I[dB] = 10 \log \frac{P_A}{P_D} \dots \dots \dots \textcircled{3}$$

4. Directivity ; D [dB]

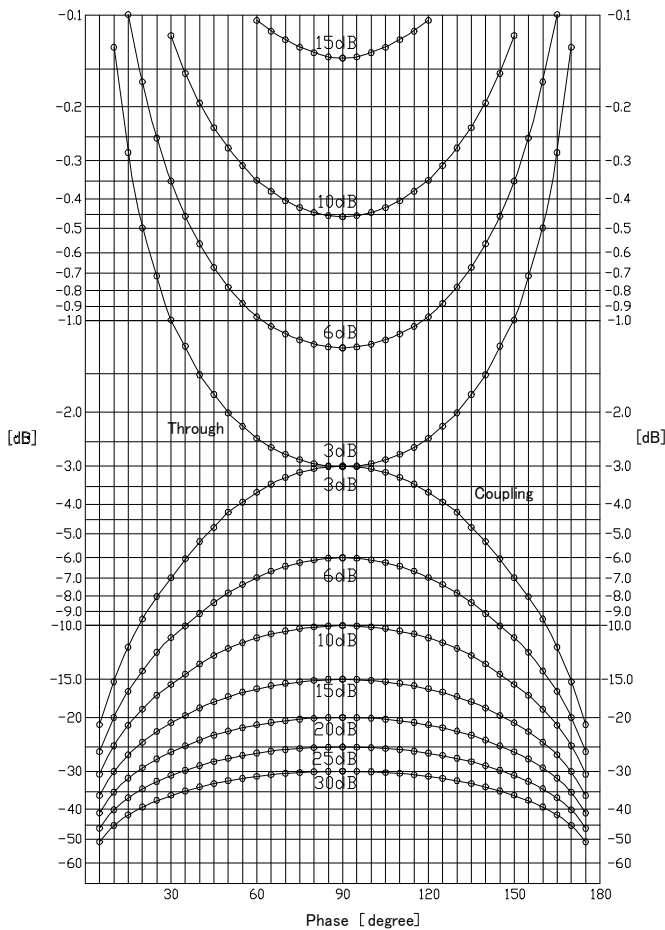
$$D[dB] = 10 \log \frac{P_C}{P_D} \dots \dots \dots \textcircled{4}$$

In case of 3 dB coupling, output power of P^B and P^C is about the same and no output at P^D , this type is called hybrid.

Coupling properties

Figure 3 represents coupling curves. Vertical axis shows relative power output of coupling and through, 90 degree at horizontal axis indicates frequency of quarter wavelength. Curves in the chart are calculated by the calculation ⑤ and ⑥. Upward curves show coupling value, downward curves show through output.

[Figure 3]



※ Coupling power output

$$P_C = \frac{P_O \sin^2 \theta}{1 - (1 - \sin^2 \theta)P_O} \dots \dots \dots \textcircled{5}$$

θ ; Phase
 P_O ; Coupling power output at $\theta=90^\circ$

※ Through power output

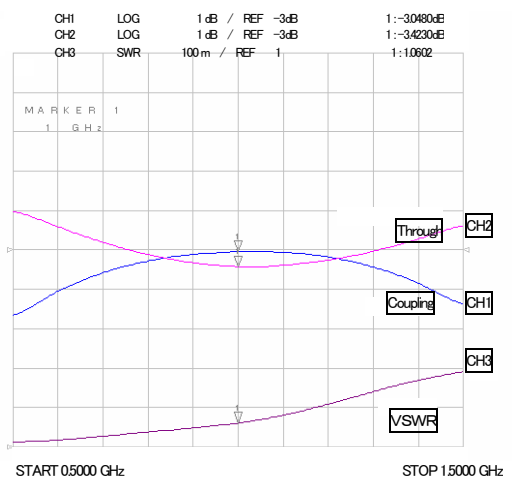
$$P_T = 1 - P_C \dots \dots \dots \textcircled{6}$$

Plotted data

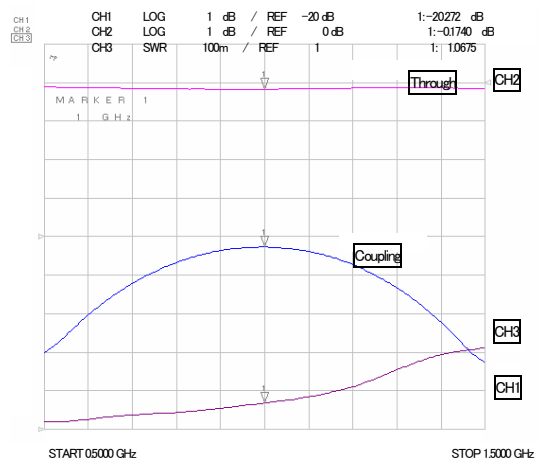
The insertion loss of coupler line is defined as input power minus total output powers and it typically becomes less than 0.3dB. In case of standard 3dB coupler line, coupling range is $-3\pm 0.3\text{dB}$ and if the coupling gets stronger like -2.8dB , through output at the middle of frequency becomes -3.2dB . As Figure 4 indicates, coupling output and through output crosses at the center of operating frequency.

Figure 5 shows one example properties of -20dB directional coupler line.

[Figure 4]



[Figure 5]



Phase

As (i) of Figure 6 represents, defining phase at port A as $\angle \phi$, phase difference at port B becomes 90 degree $\angle \phi - 90^\circ$, coupling output at port C becomes the same as port A $\angle \phi$. Based on this, the phase at each port on Figure 6 (ii) will be as follows.

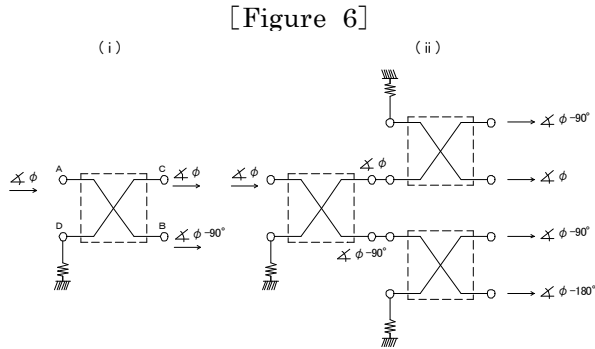
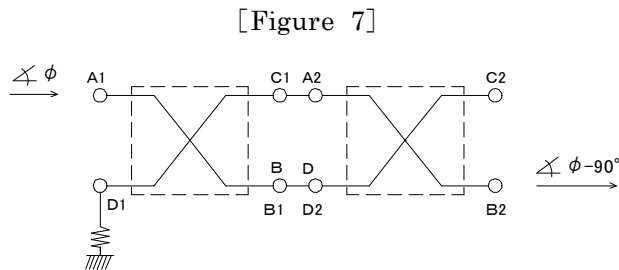


Figure 7 shows connection of two 3dB couplers. Around center frequency of this configuration, signals offset each other at port C2 by coupling output signal of A1→C1→C2 and signal of A1→B1→C2, these 2 signals are opposite phase. On the other hand, signal from A2 and coupling output signal from D2 enhance the phase at B2 due to the same phase of $\angle \phi - 90^\circ$



Designing

1) The length of coupler line (1/4 wavelength)

$$\ell = \frac{\zeta \cdot V_0}{4 \cdot f_0} \dots \dots \dots \textcircled{7}$$

- ζ ; Velocity factor
- V_0 ; Propagation velocity at vacuum
($= 3 \times 10^{11}$ [mm/sec])
- f_0 ; Center frequency[Hz]

※Velocity factory 63% ($\zeta = 0.63$)
Center frequency $f_0 = 1 \text{ GHz}$ ($= 1 \times 10^9$ [Hz])

Outer jacket length ℓ [mm] is calculated as follows.

$$\ell = \frac{0.63 \times 3 \times 10^{11}}{4 \times 1 \times 10^9} = 47.25 \text{ [mm]}$$

Required length is 47.25mm plus lead length.

2) Setting 20dB coupler on 800MHz center frequency, coupling output at 250MHz is calculated by formula 5.

i) Center frequency f_0 ; 800MHz, Frequency f ; 250MHz, Phase ; θ

$$\theta = \frac{f}{f_0} \times 90 \dots \dots \dots \textcircled{8}$$

$$\theta = \frac{250}{800} \times 90 = 28.125^\circ$$

ii) Coupling output at center frequency

$$P_o = 10^{-\frac{20}{10}} = 0.01$$

iii) Coupling power output P_c at 250MHz from formula 5

$$P_c = \frac{0.01 \sin^2 28.125}{1 - 0.01(1 - \sin^2 28.125)} \doteq 2.24 \times 10^{-3}$$

$$10 \log P_c = 10 \log 2.24 \times 10^{-3} \doteq -26.5 \text{ [dB]}$$

3) As an example, using 10dB coupler unit at 1GHz center frequency, frequency range more than 11.5dB is calculated as follows.

$$10^{-\frac{11.5}{10}} = \frac{0.1 \sin^2 \theta}{1 - 0.1(1 - \sin^2 \theta)}$$

$$\therefore \theta \doteq 55.9^\circ$$

∴ Phase range to be $55.9^\circ \sim 124.1^\circ$
Frequency range to be 620MHz \sim 1380MHz

Applications

- 3dB coupler
- 6dB, 10dB...30dB directional coupler
- Power dividers / combiners
- Single balanced mixer
- Diplexer
- Power monitor

For simple diplexer, two 3dB hybrids are used as shown Figure 7. To separate 1GHz from 50MHz signal, if both signals are fed into port A1, the 1GHz signal would come to port B2 and 50MHz signal would reach port C2.

When you need a specific directional coupling other than our standard value like 18dB, 15dB coupler can be used for this purpose by setting the center frequency higher to make 18dB be target point on the 15dB coupling curves. For this setting, the formula 5 is used.

Coupler line assembly

1 Cutting and stripping

- (i) Outer jacket length is determined by the calculation ⑦ at Designing section. Please refer the coupler line list for velocity factor. Cutting length should be addition of outer jacket length and lead length.
Cut the shield at right angles to length with buzz saw or coping saw. Please be careful not to make burrs on the cutting surface.
- (ii) 3dB coupler line is cut and pre-aligned by Coax according to customer's requirement. Assembles need to trim the insulation growth due to high temperature of soldering.
- (iii) Coupler lines except 3dB one are cut and stripped by Coax according to customer's instruction because that procedure requires special tools for trimming.

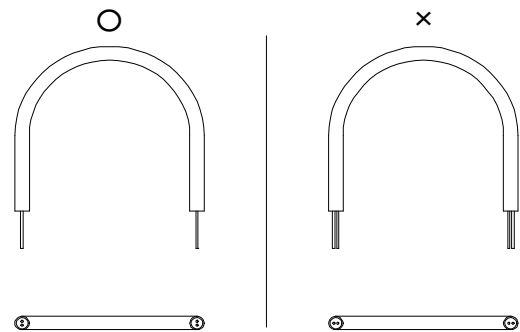
2 Key points for coupler line mounting

- (i) To reduce coupling unbalance, the length of two naked leads, which typically connected to 50 ohm characteristic impedance lines, should be minimized (ideally zero).
- (ii) To mount coupler line on a circuit board, both ends of outer conductor have to be solidly grounded. If the grounding is done even slightly inside part from the edges, it may affect the electrical performance and heat radiation.

- (iii) Please be careful on the following points for bending.
 - a) Bending tool should be used.
 - b) Bend slowly.
 - c) Keep minimum inside bend radius.

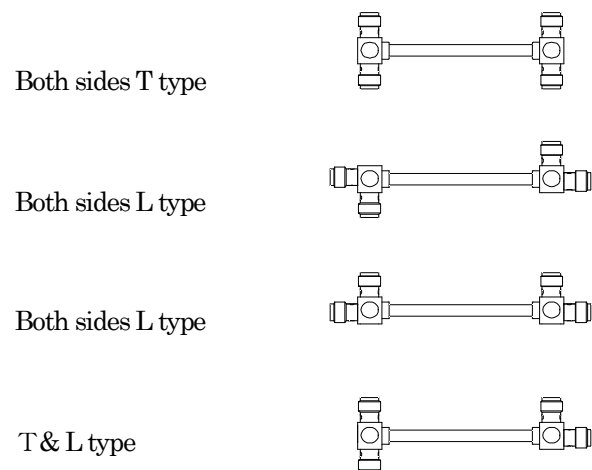
Please make length of 2 center conductors the same like Figure 8.

[Figure 8]



3 Connector attachment

These connectors have been developed for coupler lines. By attaching connectors, coupler line can easily be wired in components.



Structure and electrical properties

Part number of coupler line is described as follows.

CL - $\square\square\square$ / $\square\square$ - $\square\square\square$
 ① ② ③

①Diameter of outer conductor

Described by 100 times of outer conductor diameter (mm).

<Ex.> ϕ 2.40mm → 240
 ϕ 3.58mm → 358

②Coupling (dB)

Indicates coupling value in dB. If there is no number, it means 3dB hybrid.

<Ex.> CL-240 → 3dB
 CL-358/3 → 3dB
 CL-358/10 → 10dB

③Surface finish of outer conductor

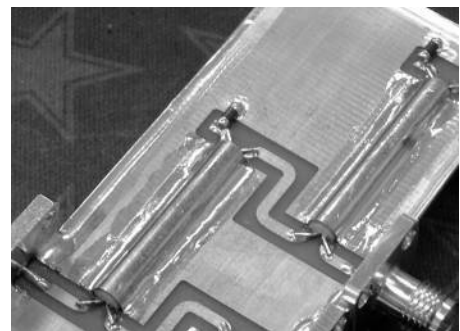
Surface finish of outer conductor is described

by the following symbols. If there is no mark, it means no plating on outer jacket.

Symbol	Surface finish
SOL	Solder plate
TIN	Tin plate (lead free)

◇Remarks about Coupler line list

- ※ 1 Max. insertion loss in the list does not include coupling loss.
- ※ 2 Power rating is the calculated value at ideal conditions like VSWR=1.0, ground temperature 40°C so please take this value just as reference. Power rating can be changed according to applications and circumstances.
 When you design it, please consider 50-70% as actual value and evaluate with actual applications. When you use it at high power conditions, please well consider heat radiation.



◇3dB 90° Hybrid series

Part Number		CL-160/3	CL-240	CL-240/3	CL-358
◇Structure/Material					
2 center conductors	Material	SPCP	SPCP	SPCP	SPCP
	Diameter [mm]	0.18	0.287	0.287	0.42
Outer conductor	Material	Oxygen-free copper	Oxygen-free copper	Oxygen-free copper	Oxygen-free copper
	Diameter [mm]	1.60±0.15	2.40±0.15	2.40±0.15	3.58±0.15
Dielectric core		Polyimide PTFE	Polyimide PTFE	Polyimide PTFE	Polyimide PTFE
◇Electrical properties					
Coupling [dB]		3.0±0.3	3.0±0.3	3.0±0.3	3.0±0.3
Insertion loss Max. [dB]		0.3	0.3	0.3	0.3
Isolation Min. [dB]		20	20	20	20
VSWR Max.		1.2	1.2	1.2	1.2
Velocity factor [%]		67	63	67	64
Power rating [W] at 40 °C	0.5GHz	118	249	249	477
	1.0GHz	82	174	174	332
	1.5GHz	67	141	141	267
	2.0GHz	57	121	121	229
	2.5GHz	51	107	107	203
	3.0GHz	46	97	97	184
Min. inside bend radius [mm]		R6	R6.4	R6.4	R10

◇3dB 90° Hybrid series

Part Number		CL-358/3	CL-635/3	CL-962/3	
◇Structure/Material					
2 center conductors	Material	SPCP	SPCP	SPC	
	Diameter [mm]	0.42	0.76	1.2	
Outer conductor	Material	Oxygen-free copper	Oxygen-free copper	Oxygen-free copper	
	Diameter [mm]	3.58±0.15	6.35±0.15	9.62	
Dielectric core		Polyimide PTFE	Polyimide PTFE	Polyimide PTFE	
◇Electrical properties					
Coupling [dB]		3.0±0.3	3.0±0.3	3.0±0.3	
Insertion loss Max. [dB]		0.3	0.3	0.3	
Isolation Min. [dB]		20	20	20	
VSWR Max.		1.2	1.2	1.2	
Velocity factor [%]		67	70	70	
Power rating [W] at 40 °C	0.5GHz	477	1126	2073	
	1.0GHz	332	775	1410	
	1.5GHz	267	620	1119	
	2.0GHz	229	528	947	
	2.5GHz	203	466	830	
	3.0GHz	184	420	744	
Min. inside bend radius [mm]		R10	N/A	N/A	

◇Directional coupler CL-240 series

Part Number		CL-240/10			
◇Structure/Material					
2 center conductors	Material	SPCP			
	Diameter [mm]	0.41			
Outer conductor	Material	Oxygen-free copper			
	Diameter [mm]	2.4±0.1			
Dielectric core		PTFE			
◇Electrical properties					
Coupling [dB]		10.0±0.5			
Insertion loss Max. [dB]		0.3			
Directivity Min. [dB]		20			
VSWR Max.		1.15			
Velocity factor [%]		68			
Power rating [W] at 40° C	270.5	270.5			
	188.9	188.9			
	152.8	152.8			
	131.3	131.3			
	116.6	116.6			
	105.8	105.8			
Bendable		N/A			

◇Directional coupler CL-358 series

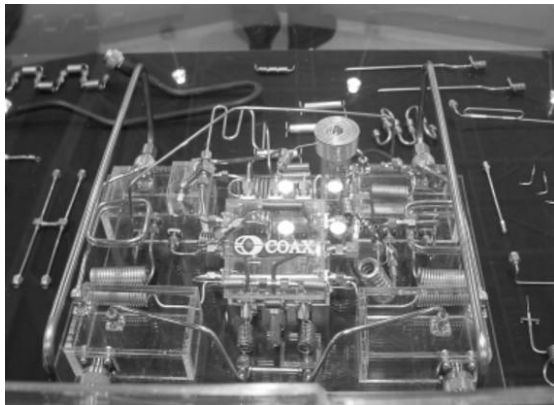
Part Number		CL-358/4.77	CL-358/6	CL-358/10	CL-358/15
◇Structure/Material					
2 center conductors	Material	SPCP	SPCP	SPCP	SPCP
	Diameter [mm]	0.58	0.56	0.66	0.66
Outer conductor	Material	Oxygen-free copper	Oxygen-free copper	Oxygen-free copper	Oxygen-free copper
	Diameter [mm]	3.4±0.1	3.5±0.1	3.5±0.1	3.5±0.1
Dielectric core		PTFE	PTFE	PTFE	PTFE
◇Electrical properties					
Coupling [dB]		4.77±0.3	6.0±0.5	10.0±0.5	15.0±0.5
Insertion loss Max. [dB]		0.3	0.3	0.3	0.3
Directivity Min. [dB]		20	20	20	20
VSWR Max.		1.2	1.15	1.15	1.15
Velocity factor [%]		68	70	70	70
Power rating [W] at 40° C	0.5GHz	456	528	579	579
	1.0GHz	317.4	366	401.8	401.8
	1.5GHz	256	295	323.5	323.5
	2.0GHz	219.5	253	276.8	276.8
	2.5GHz	194.6	224	245.1	245.1
	3.0GHz	176.3	202	221.7	221.7
Bendable		N/A	N/A	N/A	N/A

◇Directional coupler CL-358 series

Part Number		CL-358/20	CL-358/25	CL-358/30	
◇Structure/Material					
2 center conductors	Material	SPCP	SPCP	SPCP	
	Diameter [mm]	0.66	0.51	0.42	
Outer conductor	Material	Oxygen-free copper	Oxygen-free copper	Oxygen-free copper	
	Diameter [mm]	3.6±0.1	3.6±0.1	3.5±0.1	
Dielectric core		PTFE	PTFE	PTFE	
◇Electrical properties					
Coupling [dB]		20.0±0.5	25.0±0.5	30.0±0.5	
Insertion loss Max. [dB]		0.3	0.3	0.3	
Directivity Min. [dB]		20	20	20	
VSWR Max.		1.15	1.15	1.2	
Velocity factor [%]		70	70	70	
Power rating [W] at 40° C	0.5GHz	571.9	520.5	426.6	
	1.0GHz	397	361.7	297.1	
	1.5GHz	319.6	291.5	239.9	
	2.0GHz	273.6	249.7	205.8	
	2.5GHz	242.3	221.2	182.5	
	3.0GHz	219.2	200.2	165.4	
Bendable		N/A	N/A	N/A	

Semi-rigid cable assembly

With the long experience as semi-rigid cable manufacturer, Coax supports variety of customer needs from small quantity. If you have your own requirements on cable selection, configuration, design and electrical properties, please contact our sales agent. Coax satisfies your demands from special combination of cable materials to optimal connector development integrating accumulated know-how into an assembly.



Delay line

Delay lines made from semi-rigid cable yields stable and consistent electric performance. Our long experience forming technique makes it possible to fit into space constraints. Coax supports you from cable selection, designing and sample production to mass production for commercial use.

Coax does not require fixed design and specification from customer. If you provide us with the information like following, we will offer optimal cable selection and designing.

1. Delay time
2. Space constraint
3. Operating frequency
4. Power
5. Attenuation

Delay time [ns]	Length [m]	SC-635/50		SC-500/50		SC-358/50		SC-219/50	
		Weight [g]	Atten. [dB]	Weight [g]	Atten. [dB]	Weight [g]	Atten. [dB]	Weight [g]	Atten. [dB]
4.76	1.00	147.0	0.2	91.0	0.3	46.6	0.4	20.5	0.6
5	1.05	154.5	0.2	95.6	0.3	48.9	0.4	21.5	0.7
10	2.10	308.7	0.5	191.1	0.6	97.9	0.8	43.1	1.3
20	4.20	617.4	0.9	382.2	1.1	195.7	1.6	86.1	2.7
50	10.50	1543.5	2.3	955.5	2.8	489.3	3.9	215.3	6.7
100	21.00	3087.0	4.6	1911.0	5.7	978.6	7.8	430.5	13.4

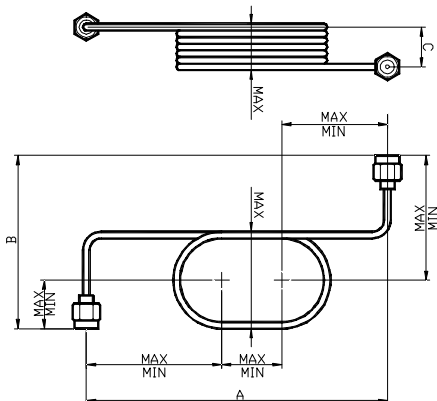
Max. attenuation at 1GHz

Delay time [ns]	Length [m]	SC-160/50		SC-119/50		SC-100/50		SC-086/50	
		Weight [g]	Atten. [dB]	Weight [g]	Atten. [dB]	Weight [g]	Atten. [dB]	Weight [g]	Atten. [dB]
4.76	1.00	12.5	1.0	5.6	1.1	5.3	1.7	3.1	1.6
5	1.05	13.1	1.1	5.9	1.2	5.5	1.8	3.2	1.7
10	2.10	26.3	2.1	11.8	2.4	11.0	3.7	6.4	3.3
20	4.20	52.5	4.2	23.6	4.7	22.1	7.3	12.9	6.6
50	10.50	131.3	10.5	59.0	11.8	55.2	18.3	32.1	16.6
100	21.00	262.5	21.0	118.0	23.5	110.5	36.5	64.3	33.2

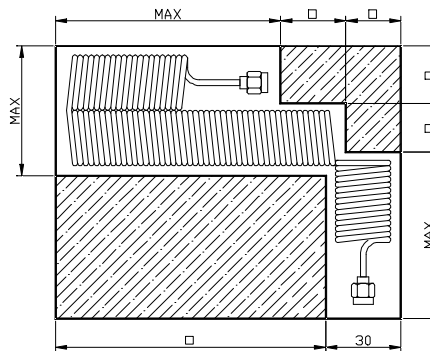
Max. attenuation at 1GHz

◆ How to specify the dimensions (example)

① In case design is fixed



② In case space is fixed

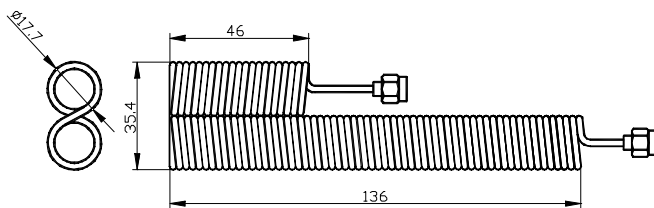


◆ Examples of delay line

① Coil type

SC-219/50 (Cable length : 4.0[m])

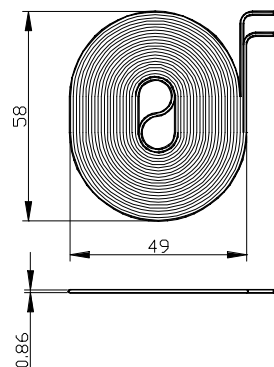
Delay time : 19.0[nsec]



② One layer circle type

SC-086/50 (Cable length : 2.0[m])

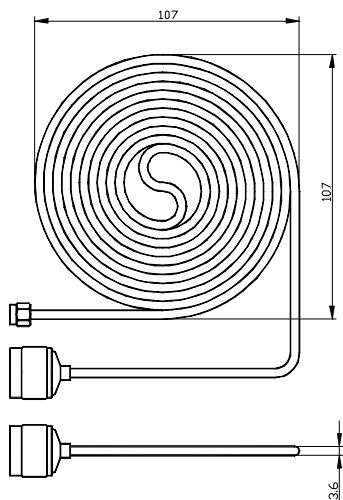
Delay time : 9.5[nsec]



③ One layer circle type

SC-358/50 (Cable length : 2.0[m])

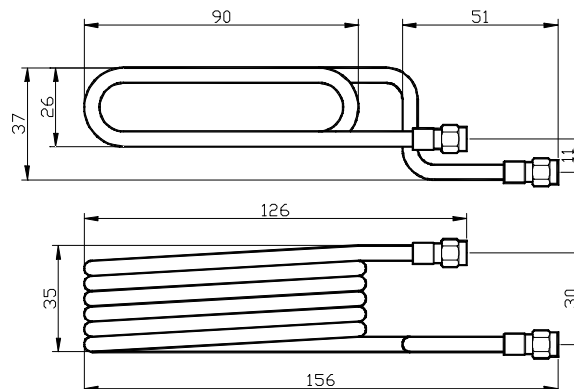
Delay time : 9.5[nsec]



④ Ellipse type

SC-500/50 (Cable length : 1.3[m])

Delay time : 6.2[nsec]

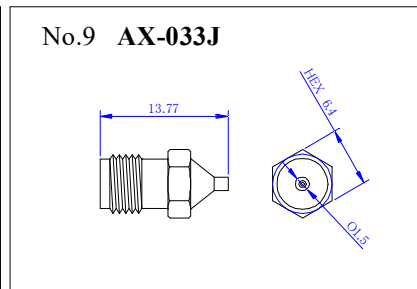
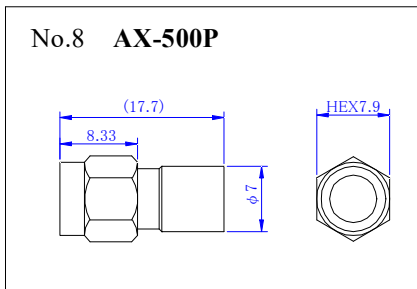
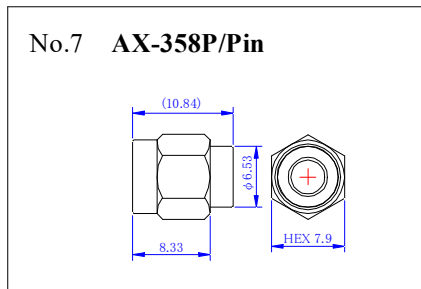
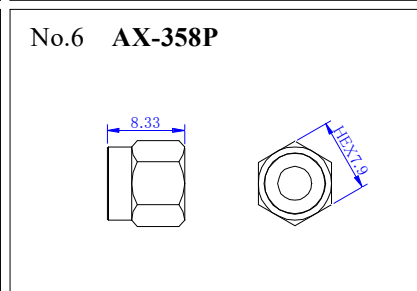
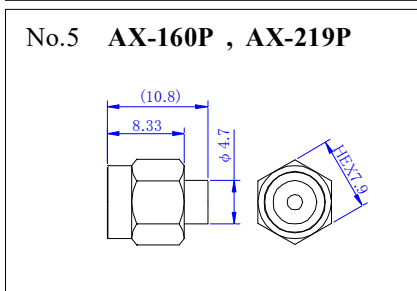
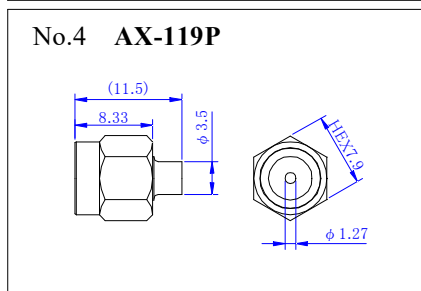
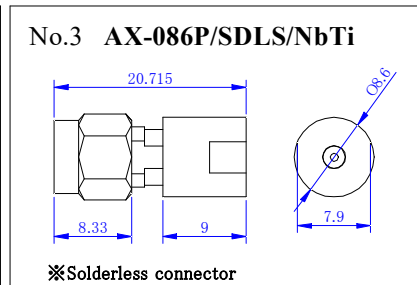
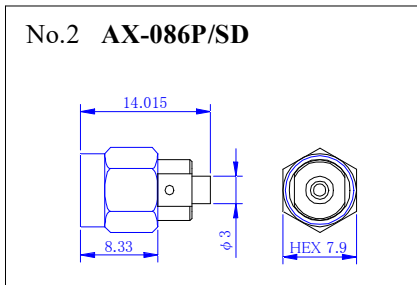
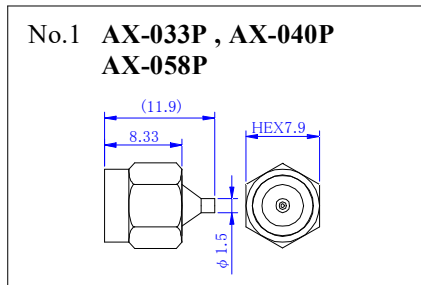


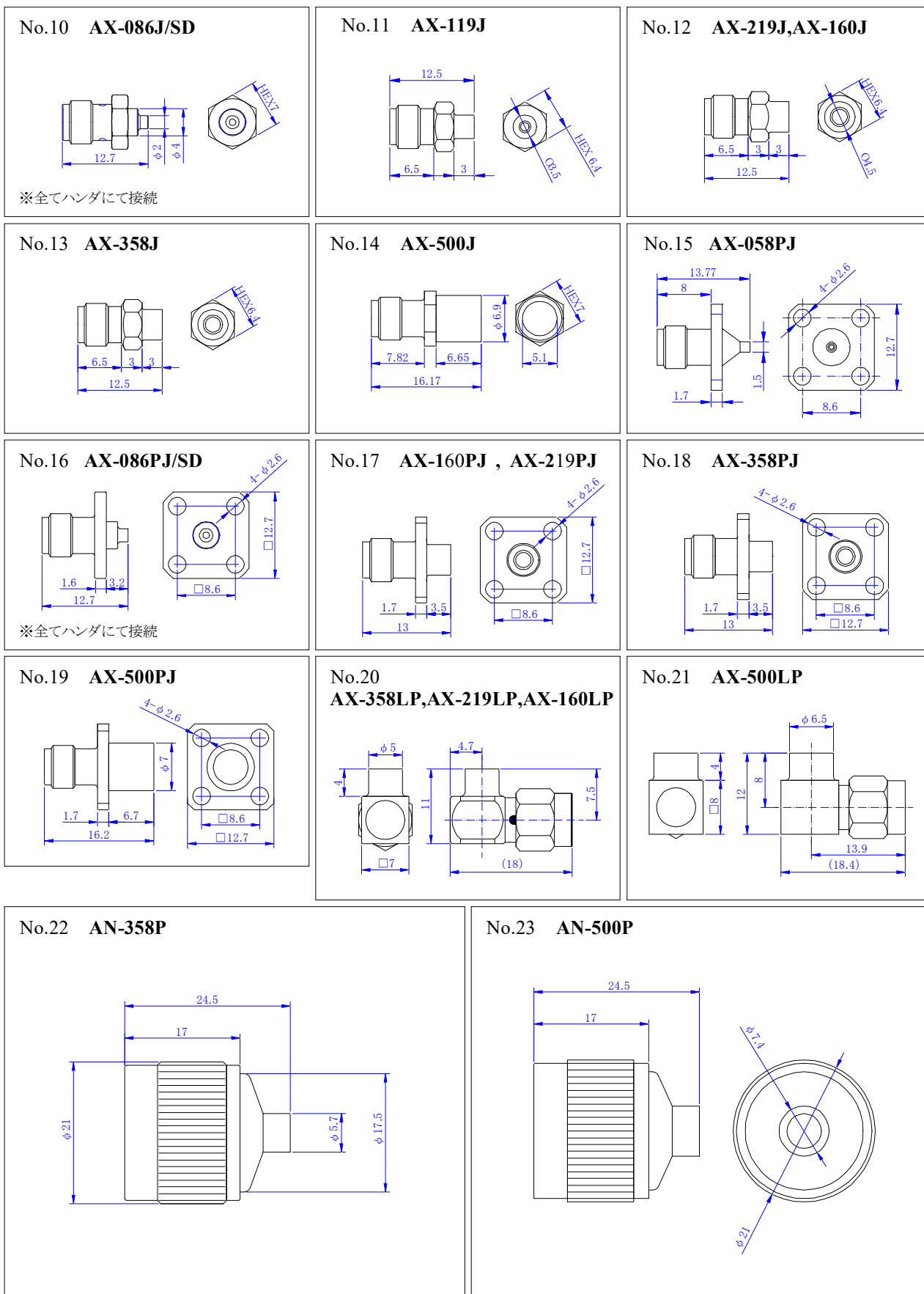
■ Connectors for SC series semi-rigid cables

The numbers in the list correspond to the drawings at following pages.

We procure and assemble connectors which are not listed in this table. Please contact your sales agent for your specific requirement. Specifications can be changed without notice.

Cable	Connector				
	SMA				N
	Straight Plug	Straight Jack	Panel Jack	Right Angle Plug	Straight Plug
SC-033/50	No.1	No.9	×	×	×
SC-040/50	No.1	×	×	×	×
SC-058/50	No.1	×	No.15	×	×
SC-086/50	No.2 , No.3	No.10	No.16	×	×
SC-119/50	No.4	No.11	×	×	×
SC-160/50	No.5	No.12	No.17	No.20	×
SC-219/50	No.5	No.12	No.17	No.20	×
SC-358/50	No.6 , No.7	No.13	No.18	No.20	No.22
SC-500/50	No.8	No.14	No.19	No.21	No.23





Connectors for CL series Coupler lines

These connectors are assembled and provided by Coax.
Specifications can be changed without notice.

< Notice >

Coupler line assemblies more than 2GHz frequency range (outer jacket length less than 30mm) may not have satisfactory electrical performance because physical length is too short.

Coupler lines connector list

Coupler Line	Type	P/N	Coupling [dB]							
			-3	-4.77	-6	-10	-15	-20	-25	-30
CL-240 series	T	CLX-240J/T	~1GHz	x	x	x	x	x	x	x
		CLX-240J/T/BK		x	x	x	x	x	x	x
	L	CLX-240J/L		x	x	x	x	x	x	x
		CLX-240J/L/BK		x	x	x	x	x	x	x
CL-358 series	T	CLX-358J/T	~2.5GHz						x	x
		CLX-358J/T/BK	~2.5GHz						x	x
	L	CLX-358J/L	~2GHz						x	x
		CLX-358J/L/BK	~2GHz						x	x
		CLX-358J/L-SC	x	x	x	x	x	x	~2.5GHz	

