

## F Series Miniature Circular High Density Connectors

### Brief introduction

F Series miniature circular high density connectors have straight push-pull configuration and self-latching function after mating. Features of F series include quick mating, high density, small volume, blind mating and environment resistance. It is mainly applied in environment needing high density or narrow space mounting and rotation mounting. This series are widely used in AC or DC electrical connection in military and commercial broadcasting station equipments, medical devices, test and inspection instruments, audio and video equipments, data collection and industry control applications.



### Main features

- plug and receptacle with straight push-pull locking system
- receptacle with jam nut mounting and IP68 protection degree
- plug and receptacle are loaded with pins or sockets
- types of termination: Plug-soldering; receptacle-soldering and straight PCB
- two types of antimating ways: single and double polarizations
- surface treatment methods: black and natural chrome plating
- shell code: 102, 103, 1031, 104, 105

### Main technical performances

#### [Mechanical]

- Durability: 1000 cycles
- Vibration: frequency 10~2000Hz, acceleration  $147\text{m/s}^2$ ,  $\leq 1\mu\text{s}$  discontinuity
- shock: acceleration  $490\text{m/s}^2$ ,  $\leq 1\mu\text{s}$  discontinuity

#### [Environmental]

- Temperature:  $-55^\circ\text{C} \sim +200^\circ\text{C}$
- Relative humidity: 95% at  $40^\circ\text{C}$
- receptacle compliant with IP68 protection degree
- Salt spray: 96h

#### [Electrical]

- Contact size, Contact resistance, Rated current:

Table 1

Contact size (mm)	Contact resistance (mΩ)	solder cup diameter (mm)	max. conductor size		Rated current (A)
			(mm <sup>2</sup> )	AWG	
Φ0.5	15	Φ0.5	0.06	30	Per Insert arrangement See Insert arrangement
Φ0.7	12.5	Φ0.75	0.15	26	
Φ0.9	5	Φ0.8	0.38	22	
Φ1.3	3	Φ1.2	0.62	20	
Φ1.6	2.5	Φ1.8	2.0	14	
Φ2.0	2	Φ2.0	2.0	14	
Φ2.3	1.5	Φ2.1	3.0	12	
Φ3.0	1	Φ3.1	5.0	10	

- Insulation resistance: normal temperature 5000MΩ  
200℃, 100MΩ  
Damp heat 100MΩ

—dielectric withstanding voltage

Table 2

Service level	Sea level V, AC	21336m altitude V, AC
I	1000	250
II	875	225
III	725	175

## Ordering Information

<b>Basic series</b>	F	102	Z10	J	056	-	149
<b>Shell code</b>	102-103-1031-104-105						
<b>Connector type</b>	Plug T103 Jam nut front panel mounting receptacle Z10 Jam nut front panel mounting straight PCB receptacle Z19 Cable receptacle Z14						
<b>Contact type</b>	pin J socket K						
<b>Layout</b>	See layout table						
<b>Dash no.</b>	—						
<b>Characteristic code</b>	See Table 3						

Table 3

Characteristic code		Type of termination	Color of identification	Plating type	Polarization
Z10	Z14, Z19, T03				
139	130	Soldering	Red	natural chrome plating	Single
149	140	Soldering	White	black chrome plating	Single
239	230	Soldering	Red	natural chrome plating	Double
249	240	Soldering	White	black chrome plating	Double

Note: Recommended contact sizes for Z19 receptacle are  $\Phi 0.5$ ,  $\Phi 0.7$ ,  $\Phi 0.9$ .



**Outline dimensions**

[T03 plug]

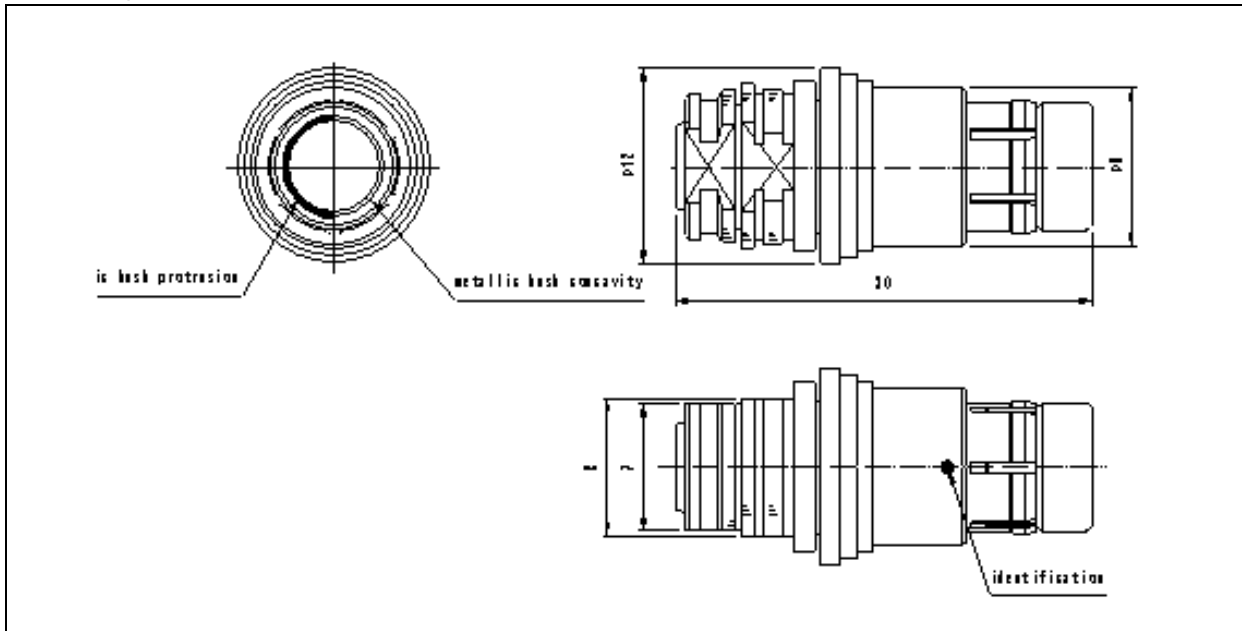


Table 4

shell size	D	d	L	S	Ø	outlet diameter
102	Ø12	Ø9	30	8	7	Ø3.8
103	Ø15	Ø12	33	11	10	Ø6
1031	Ø15.5	Ø12.4	33	11	10	Ø6.2
104	Ø18	Ø15	38	13	12	Ø8
105	Ø21	Ø18	44	16	15	Ø10

T03 plug loaded with sockets



T03 plug loaded with pins



[Z10 receptacle]

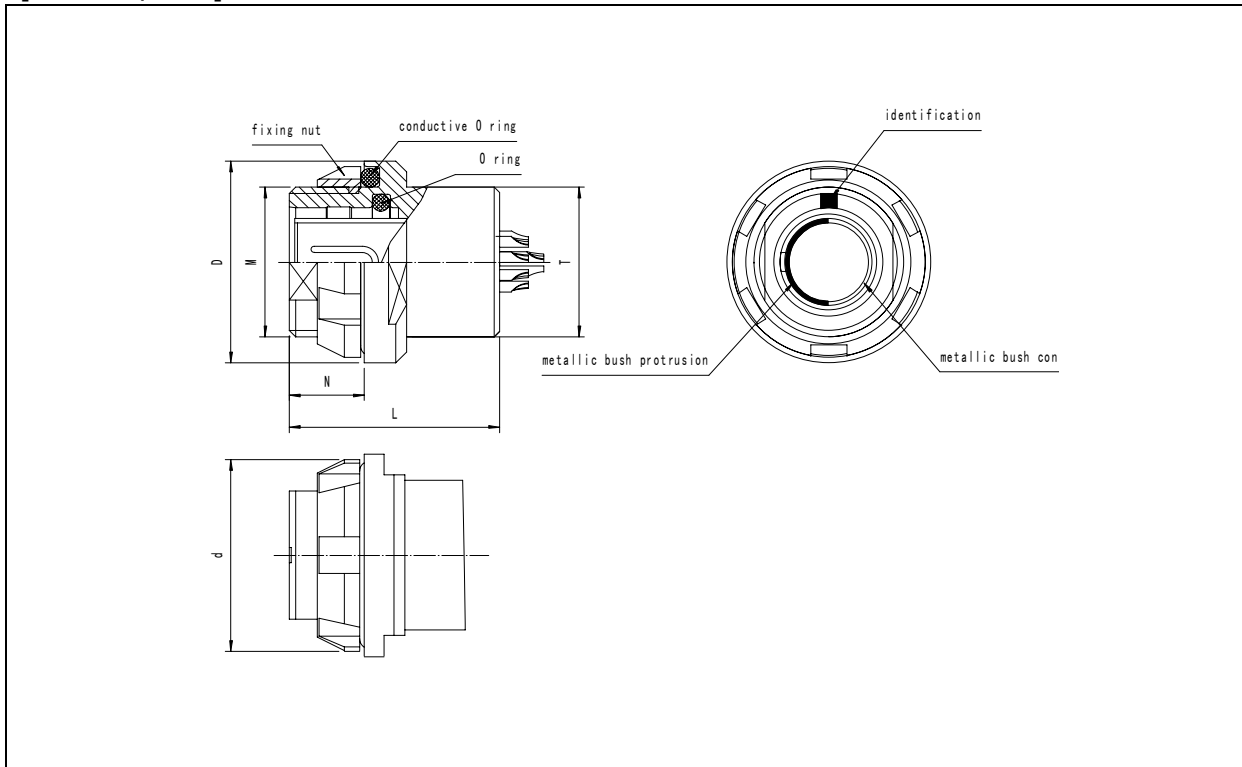


Table 5

shell size	D	M	N	L	T	d
102	Φ14	9X0.5	7	16.7	Φ9	Φ12
103	Φ18	14X1	8	22.7	Φ14	Φ18
1031	Φ19	14X1	7	18.7	Φ14	Φ18
104	Φ22	16X1	8	22.7	Φ16	Φ20
105	Φ27	20X1	10	26.7	Φ20	Φ25

Z10 receptacle loaded with pins



Z10 receptacle loaded with sockets



[Z19 receptacle]

The receptacle is Z10 type receptacle with the termination type of contact changed from solder cup to straight PCB type. Recommended contact sizes for Z19 receptacle are  $\Phi 0.5$ ,  $\Phi 0.7$ ,  $\Phi 0.9$ .

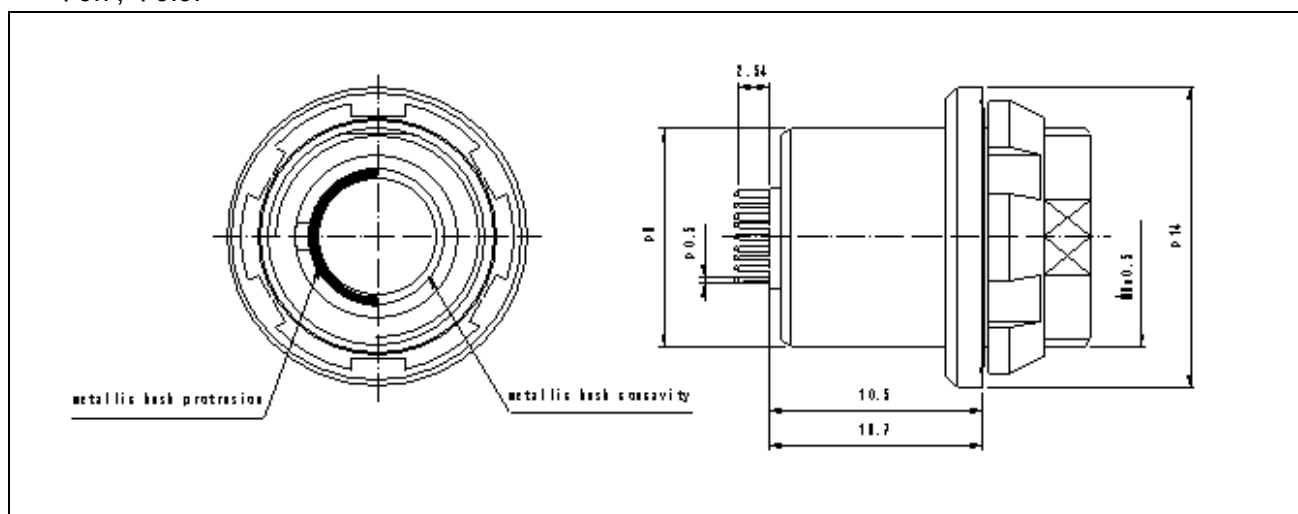


Table 6

shell size	contact size	d	N	M	T	D	L	L1
102	$\Phi 0.5$	$\Phi 0.5$	2.54	$9 \times 0.5$	$\Phi 9$	$\Phi 14$	10.5	16.7
	$\Phi 0.7$	$\Phi 0.5$	2.54					
	$\Phi 0.9$	$\Phi 0.5$	2.54					
103	$\Phi 0.5$	$\Phi 0.5$	2.54	$14 \times 1$	$\Phi 14$	$\Phi 18$	15.5	21.1
	$\Phi 0.7$	$\Phi 0.5$	2.54					
	$\Phi 0.9$	$\Phi 0.5$	2.54					
1031	$\Phi 0.5$	$\Phi 0.5$	2.54	$14 \times 1$	$\Phi 14$	$\Phi 19$	12.5	19.6
	$\Phi 0.7$	$\Phi 0.5$	2.54					
	$\Phi 0.9$	$\Phi 0.5$	2.54					
104	$\Phi 0.5$	$\Phi 0.5$	2.54	$16 \times 1$	$\Phi 15$	$\Phi 22$	15.5	22.5
	$\Phi 0.7$	$\Phi 0.5$	2.54					
	$\Phi 0.9$	$\Phi 0.5$	2.54					
105	$\Phi 0.5$	$\Phi 0.5$	2.54	$20 \times 1$	$\Phi 21.05$	$\Phi 27.1$	17.5	26.6
	$\Phi 0.7$	$\Phi 0.5$	2.54					
	$\Phi 0.9$	$\Phi 0.5$	2.54					

[Z14 cable receptacle]

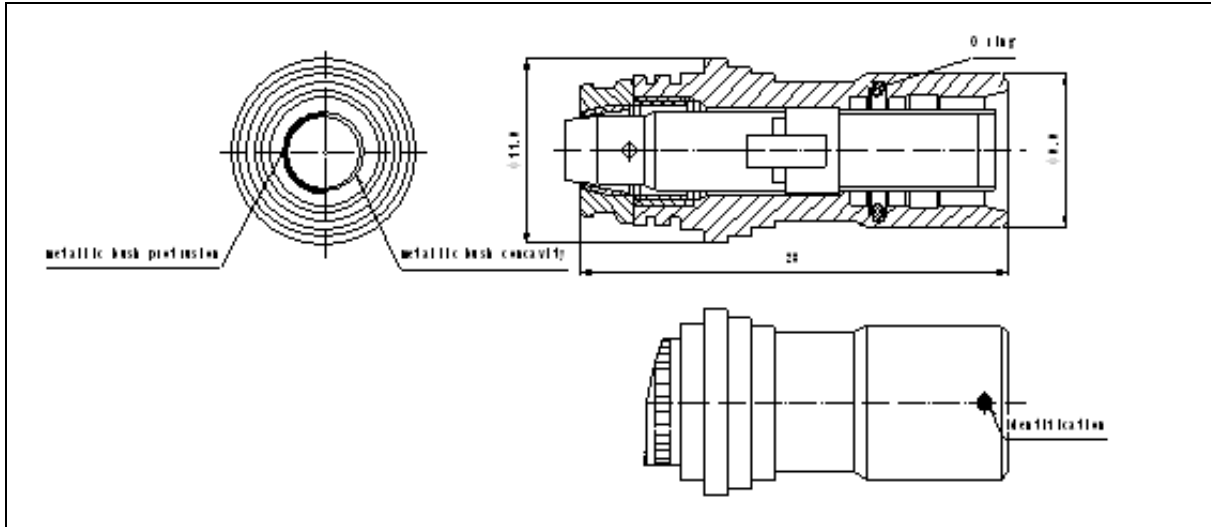


Table 7

Shell size	D	L	d	Cable out diameter
102	Φ11.9	28	Φ9.9	Φ38

[Z10, Z19 receptacle mounting cutout dimensions]

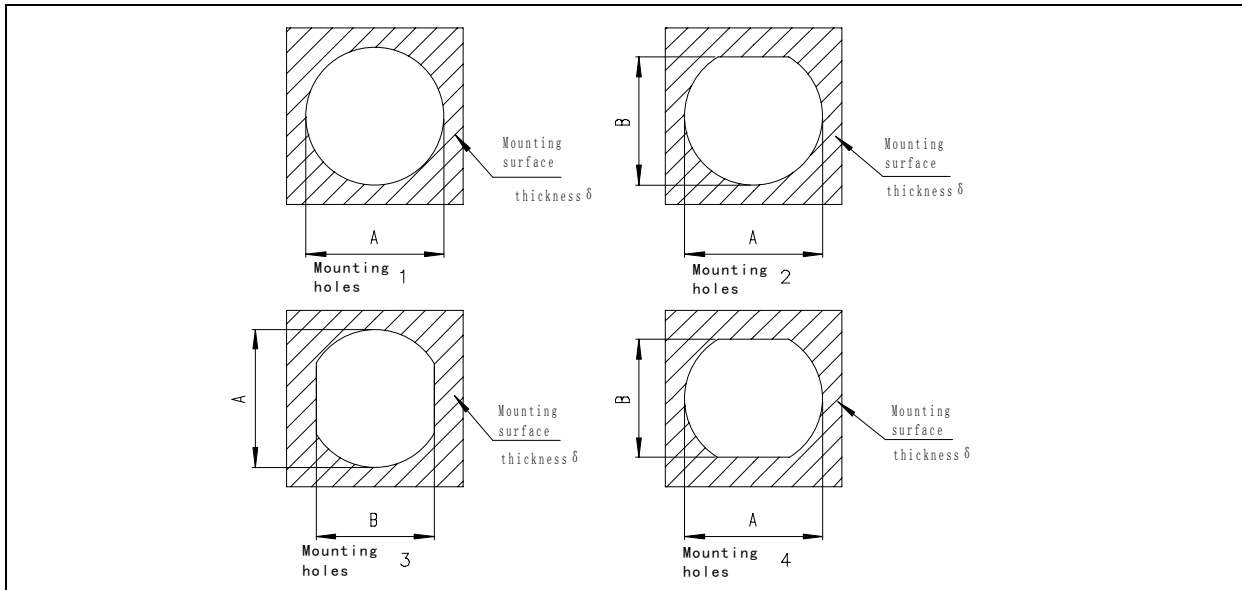


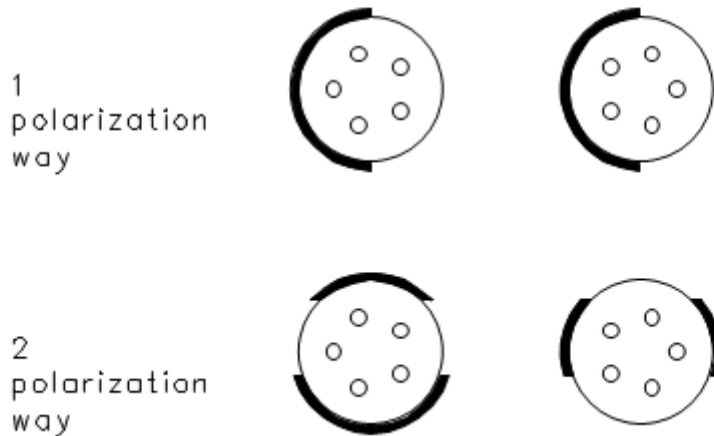
Table 8

Shell size	A	B	δ	Mounting hole type
102	Φ9.1	7.9	3.5	4
103	Φ14.1	13.3	3	2
1031	Φ14.1	12.1	3	3
104	Φ16.1	15.3	4	2
105	Φ20.1	19.1	5	2

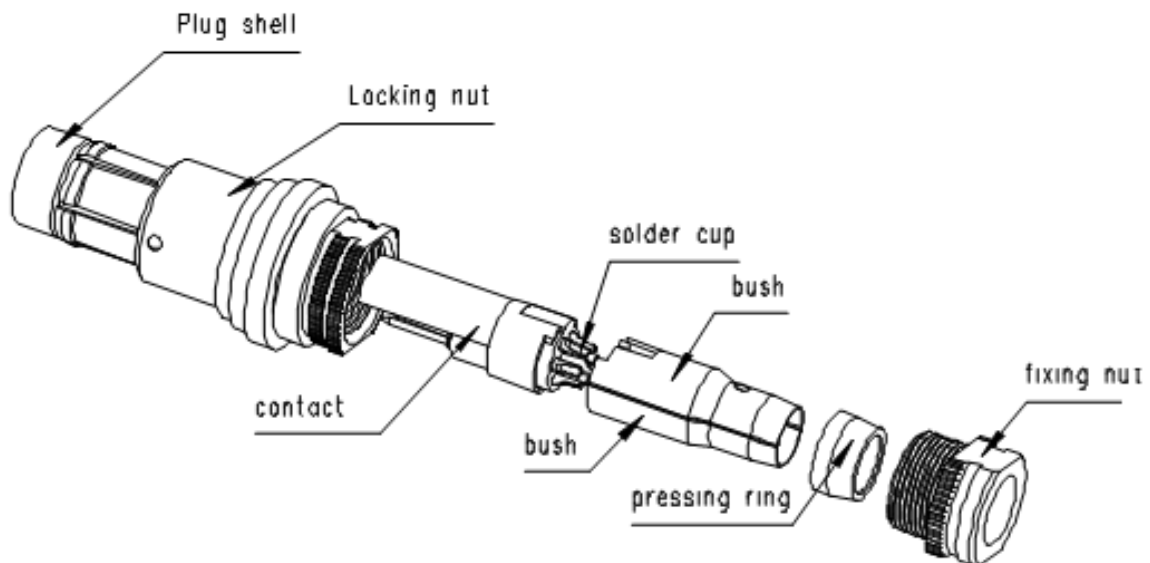
[Polarization guiding ways for T03 plug, Z10 receptacle, Z14 receptacle and Z19 receptacle]

When plug and receptacle are mating, this series have 2 kinds of polarization guiding ways which are achieved by the half round sleeve fixing insulator bush. See the figures below:

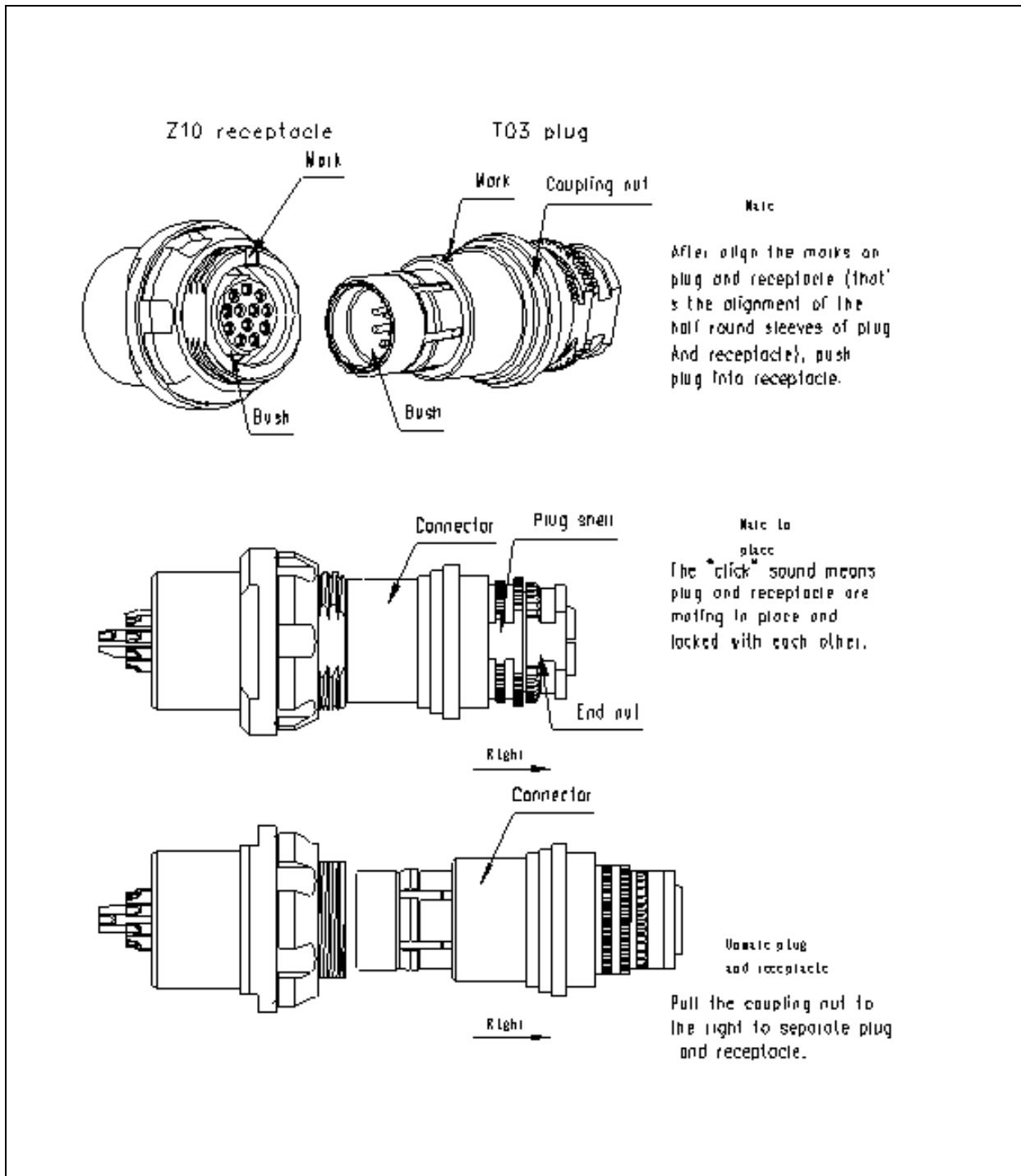
Note plug and receptacle for the first polarization way can not intermate with those for the second way. Only plug and receptacle with the same polarization way can be combined to use.



[T03 plug assembling configuration]



[T03 plug, Z10 receptacle (Z14 receptacle, Z19 receptacle ) operating method]

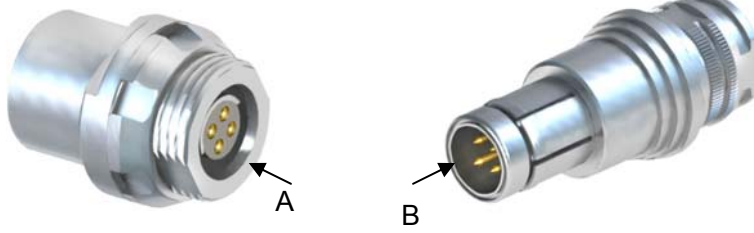


Note: after mating in place, if push end nut or plug end cable to the right, the locking will be firmer, and plug and receptacle separation can not be achieved.



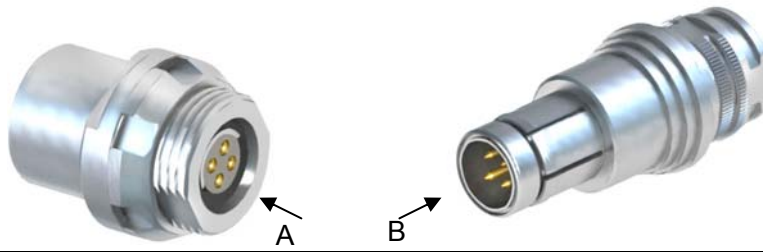


## Insert arrangement



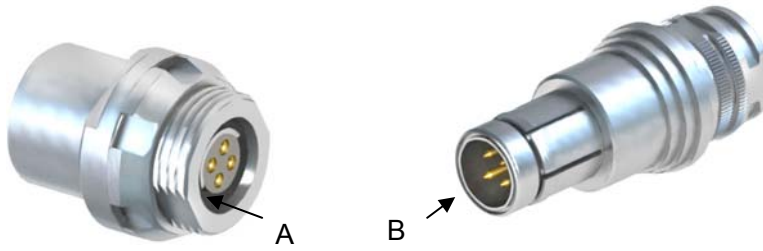
Insert arrangement				Shell E <sub>L</sub>	Case I	Number of contacts	Con- diti- on	Re- lated c u l e r
Receptacle with Direction	Plug with pins Direction	Receptacle with Direction	Plug with sockets Direction					
				102	051	2	1.3	9
					052	3	1.3	8.5
					053	4	0.9	5.0
					054	5	0.7	3.6
					056	7	0.5	1.5
					059	9	0.5	1.0

Note: I, II and III stand for withstanding voltage levels. See Table 2 in Page 2 for details.



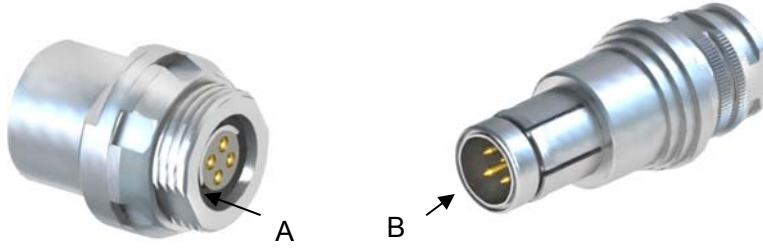
Insert arrangement				Shell code	Case diameter	Number of contacts	Conductivity	Rated current
Receptacle with pins	Plug with pins	Receptacle with sockets	Plug with sockets					
Direction	Direction	Direction	Direction					
				103	044	4	0.9	8
					066	6	0.7	3.5
					057	7	0.7	3.2
					058	8	0.7	2.5
					062	12	0.5	1.5
				1031	010	10	0.7	3.2
					012	12	0.7	3.0
					019	19	0.5	1.8

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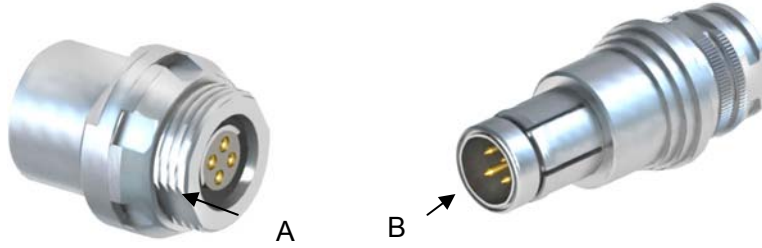
Insert arrangement				Shell code	Case code	Number of contacts	Conductivity	Rated current
Receptacle with pins		Plug with sockets						
Direction	Direction	Direction	Direction					
				104	05	2	1.6	1.5
					04	3	1.6	1.3
					037	4	1.3	8.0
					087	4 { 2	2.3	2.0
					053	5	0.9	7.5
					065	6	0.9	4.5
					054	7	0.9	4.5
					068	8	0.9	4.5

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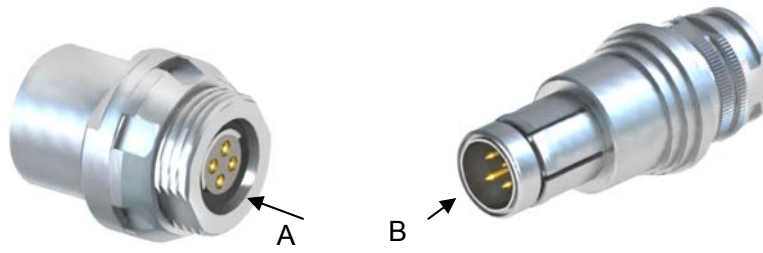
Insert arrangement				Shell Et	Case	Number	Conductivity	Rated
Receptacle with socket	Plug with pins	Receptacle with pin	Plug with socket					
Direction A	Direction B	Direction A	Direction B					
				104	051	1	1.5	18
				104	086	1	0.9	4.0
				104	086	16	0.7	2.5
				104	092	19	0.7	2.5
				105	051	2	2.0	18
				105	087	2	3.0	20
				105	052	3	2.0	16

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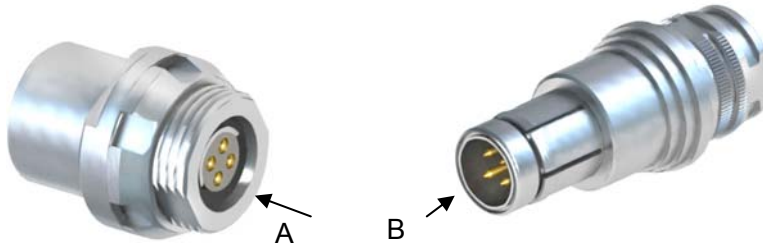
Insert arrangement				Shell Ej	Number of contacts	Contact pitch	Rated current				
Receptacle with socket		Plug with pins									
Direction A	Direction B	Direction A	Direction B								
				105	5	2.0	19				
								067	7	1.3	5.0
								062	9	1.3	6.3

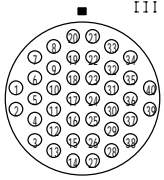
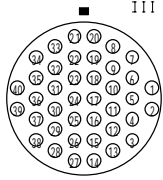
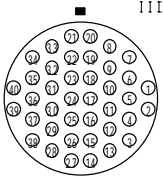
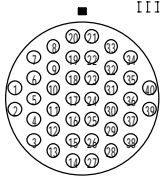
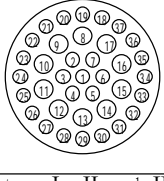
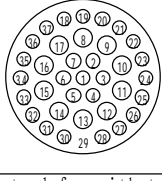
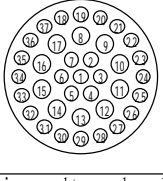
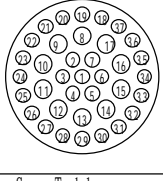
Note: I, II and III stand for withstanding voltage levels. See Table 2 in Page 2 for details.



Insert arrangement				Shell Ei	Number of contacts	Rated current			
Receptacle with sockets	Plug with pins	Receptacle with pins	Plug with sockets						
Direction A	Direction B	Direction A	Direction B						
				105	3	1.5 0.7			
							038	6	0.9 3.7
							038	12	0.9 3.2
							093	18	0.7 2.5

Note: I, II and III stand for withstanding voltage levels. See Table 2 in Page 2 for details.

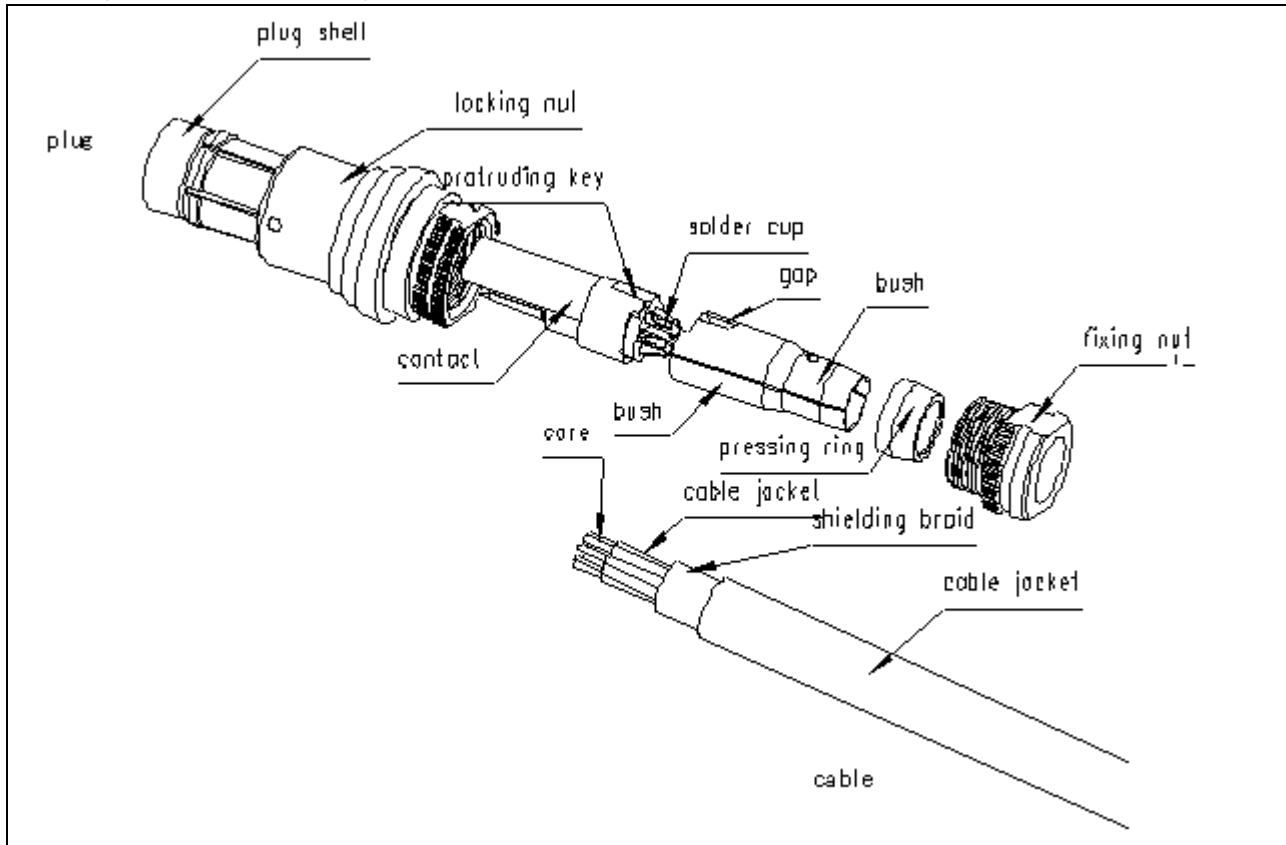


Insert arrangement				Shell code	Insert arrangement	Number of contacts	Contact dia.	Rated current
Receptacle with	sockPlug with pins	Receptacle with	pinPlug with sockets					
Direction A	Direction B	Direction A	Direction B					
 	 	 	 	105	1 2 7 3	10 27	0.7 0.5	2.2 1

Note: I, II and III stand for withstanding voltage levels. See Table 2 in Page 2 for details.

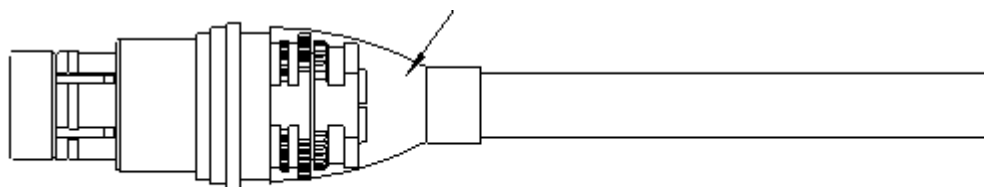


## Cabling method for T03 plug and Z14 receptacle



### Plug cabling and processing method:

1. Strip the core. Stripping length is according to the practical requirement;
2. Screw off the fixing nut on plug and take pressing ring, bush and contact from plug;
3. Pull the heat shrinking head, fixing nut and pressing ring from the cable stripped end and pull the heat shrinking tube with appropriate size on each core;
4. After soldering the cable, push the heat shrinking tube to soldering point and heat the heat shrinking tube to protect soldering point;
5. Use bush gap as a tool to clip the protruding key of contact rotating in the plug shell and after the alignment of metallic sleeve protrusion of contact and inner hole gap of plug shell, push the contact into plug shell;
6. Put the other bush into plug shell and form a sleeve with the bush in step 5;
7. Put pressing ring on the slant of the bush;
8. Use the tool to screw down nut. After that, control shrinking head move on the plug center axis line;
9. Push the heat shrinking head to plug shell step and heat it to shrink.

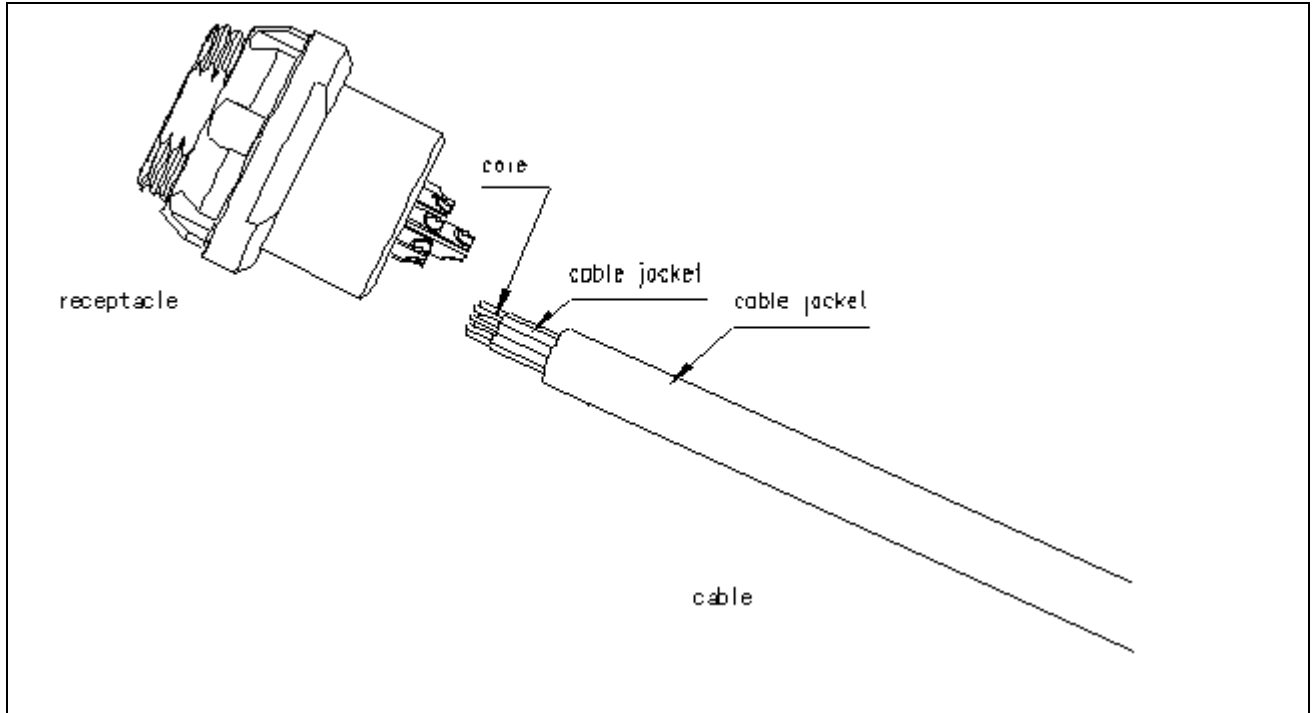


Cable assembly





## Z10 receptacle cabling method



### Receptacle cabling and processing method:

1. Strip the core. Stripping length is according to the practical requirement;
2. Pull the heat shrinking tube with appropriate size on each core;
3. After soldering the cable, push the heat shrinking tube to soldering point and heat the heat shrinking tube to

