

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, 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 antimismating 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 147m/s², ≤1μs discontinuity
- shock: acceleration 490m/s², ≤1μs discontinuity

[Environmental]

- Temperature: -55°C~+200°C
- Relative humidity: 95% at 40°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 ²)	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°C, 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

Basic series	F	102	Z10	J	056	-	149
Shell code 102-103-1031-104-105							
Connector type Plug T103 Jam nut front panel mounting receptacle Z10 Jam nut front panel mounting straight PCB receptacle Z19 Cable receptacle Z14							
Contact type Pin - J Socket - K							
Layout See layout table							
Dash no. —							
Characteristic code 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]

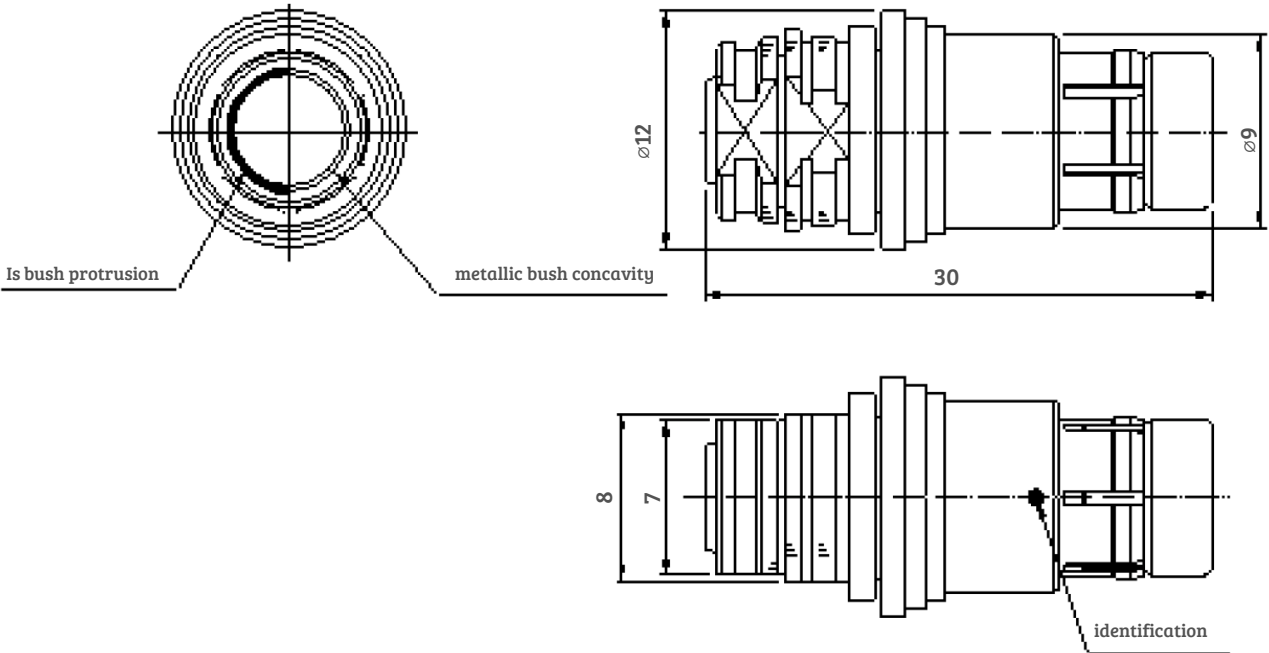


Table 4

Shell size	D	d	L	S	Q	Outlet diameter
102	$\Phi 12$	$\Phi 9$	30	6	7	$\Phi 3.8$
103	$\Phi 15$	$\Phi 12$	33	11	10	$\Phi 6$
1031	$\Phi 15.5$	$\Phi 12.4$	33	11	10	$\Phi 6.2$
104	$\Phi 16$	$\Phi 15$	38	13	12	$\Phi 8$
105	$\Phi 21$	$\Phi 18$	44	16	15	$\Phi 10$

T03 plug loaded with sockets



T03 plug loaded with pins



[Z10 receptacle]

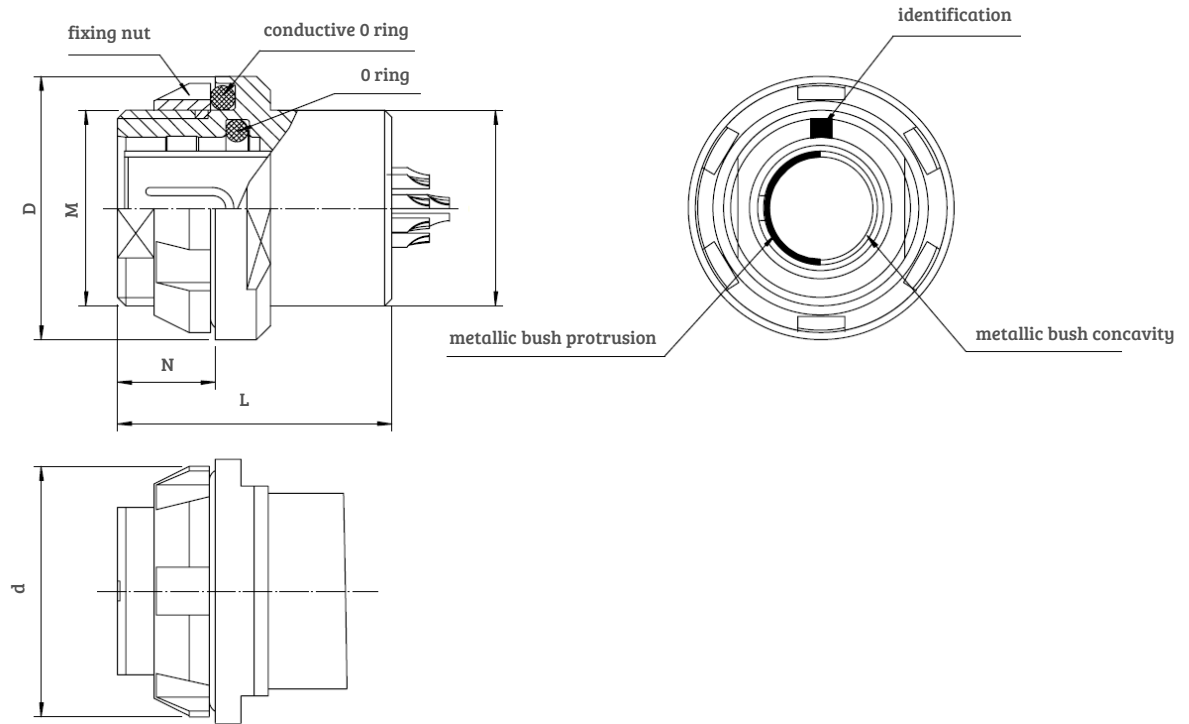


Table 5

Shell size	D	M	N	L	T	d
102	Φ14	9×0.5	7	16.7	Φ9	Φ12
103	Φ18	14×1	8	22.7	Φ14	Φ18
1031	Φ19	14×1	7	18.7	Φ14	Φ18
104	Φ22	16×1	8	22.7	Φ16	Φ20
105	Φ27	20×1	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 $\Phi 0.5$, $\Phi 0.7$, $\Phi 0.9$.

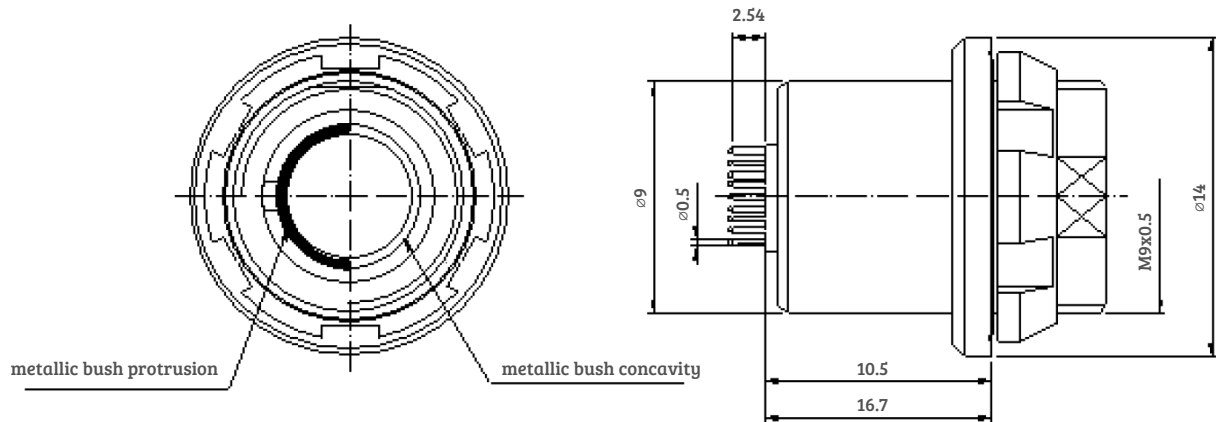


Table 6

Shell size	Contact size	d	N	M	T	D	L	L1
102	$\Phi 0.5$	$\Phi 0.5$	2.54	9×0.5	$\Phi 9$	$\Phi 14$	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	14×1	$\Phi 14$	$\Phi 18$	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	14×1	$\Phi 14$	$\Phi 19$	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	16×1	$\Phi 15$	$\Phi 22$	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	20×1	$\Phi 21.05$	$\Phi 27.1$	17.5	26.6
	$\Phi 0.7$	$\Phi 0.5$	2.54					
	$\Phi 0.9$	$\Phi 0.5$	2.54					



[Z14 cable receptacle]

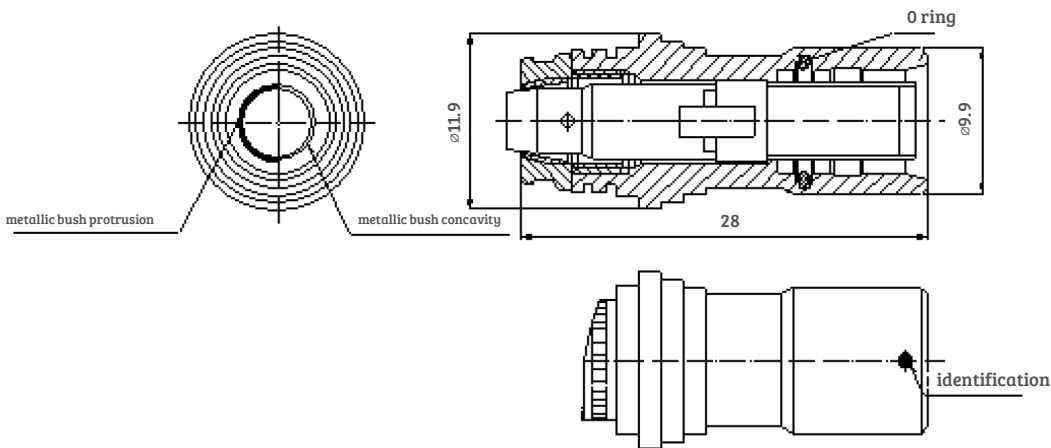


Table 7

Shell size	D	L	d	Cable outlet diameter
102	$\Phi 11.9$	28	$\Phi 9.9$	$\Phi 38$

[Z10, Z19 receptacle mounting cutout dimensions]

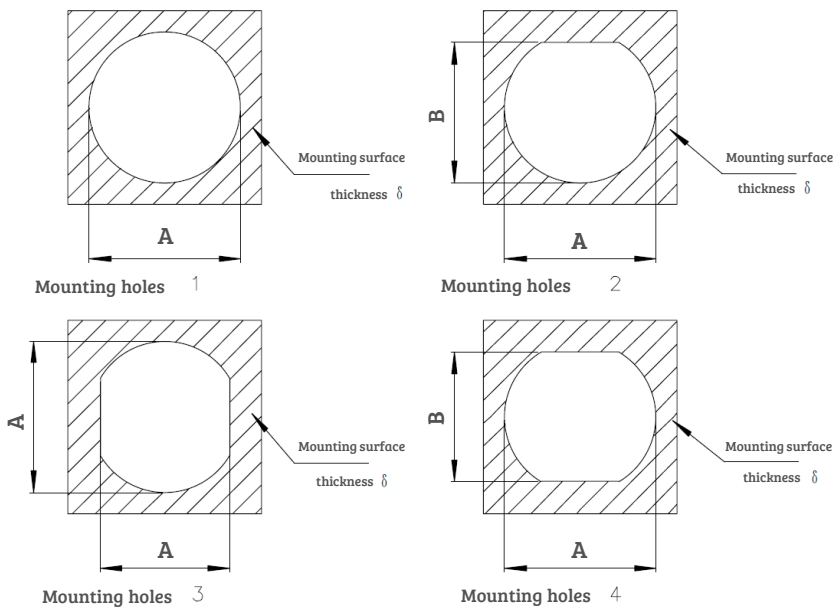


Table 8

Shell size	A	B	δ	Mounting hole type
102	$\Phi 9.1$	7.9	3.5	4
103	$\Phi 14.1$	13.3	3	2
1031	$\Phi 14.1$	12.1	3	3
104	$\Phi 16.1$	15.3	4	2
105	$\Phi 20.1$	19.1	5	2

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

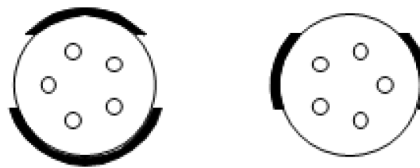
When plug and receptacle are mating, this series have 2 kinds of polarization guiding ways which are achieved by the half round sleeve fixing insulator bush. See the figures below:

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.

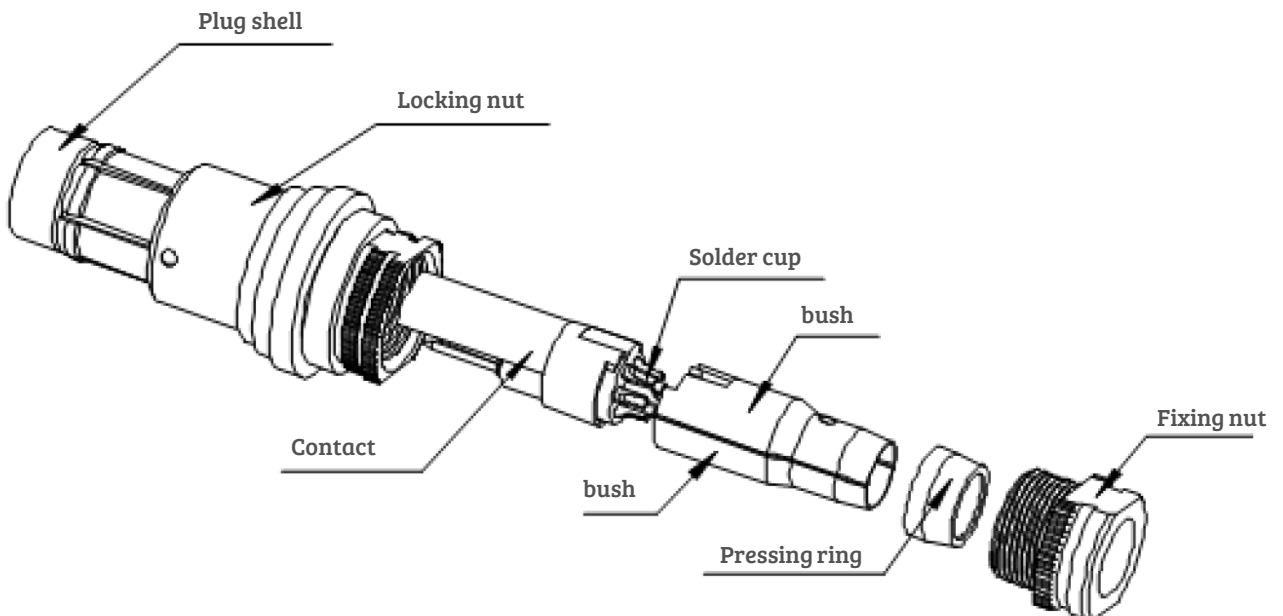
1 polarization way



2 polarization way



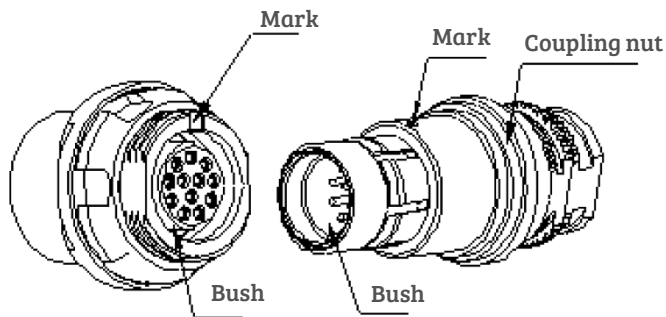
[T03 plug assembling configuration]



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

Z10 receptacle

T03 plug

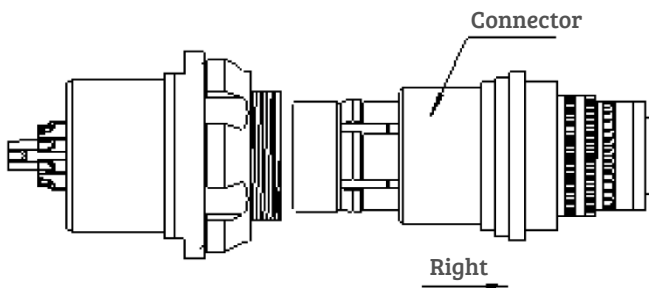
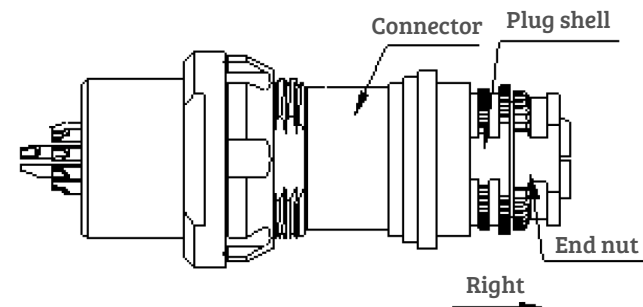


Mate

After align the marks on plug and receptacle (that's the alignment of the half round sleeves of plug and receptacle), push plug into receptacle.

Mate in place

The *click* sound means plug and receptacle are mating in place and locked with each other.

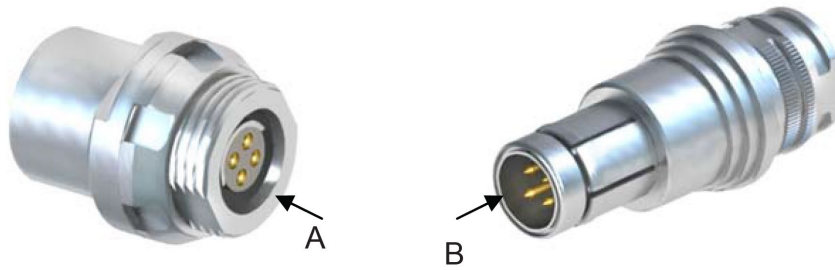


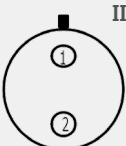
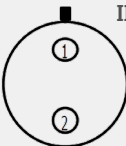
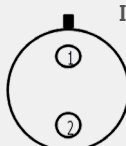
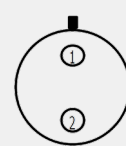
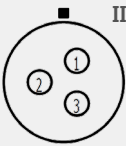
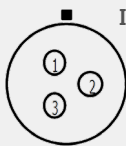
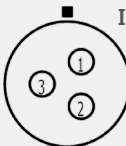
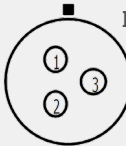
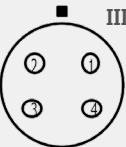
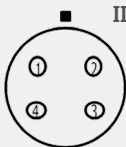
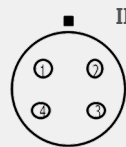
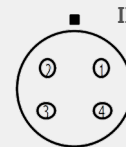
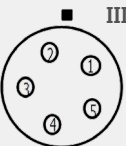
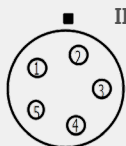
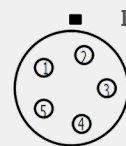
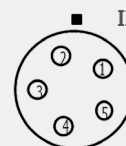
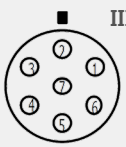
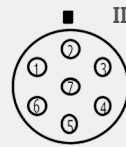
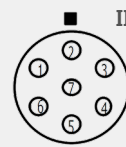
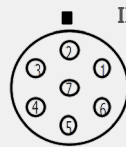
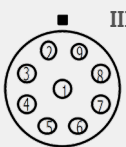
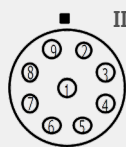
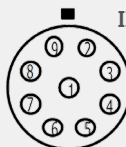
Unmate plug and receptacle

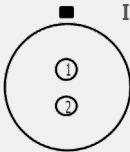
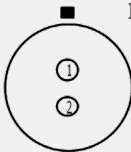
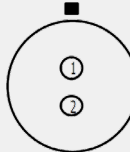
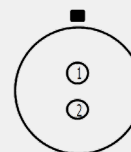
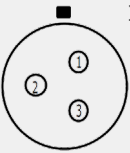
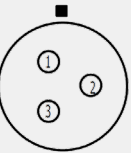
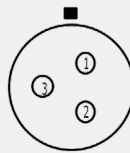
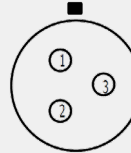
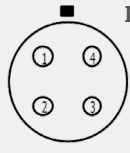
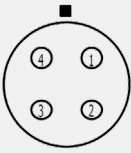
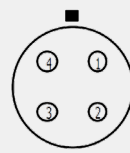
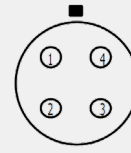
Pull the coupling nut to the right to separate plug and receptacle.

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

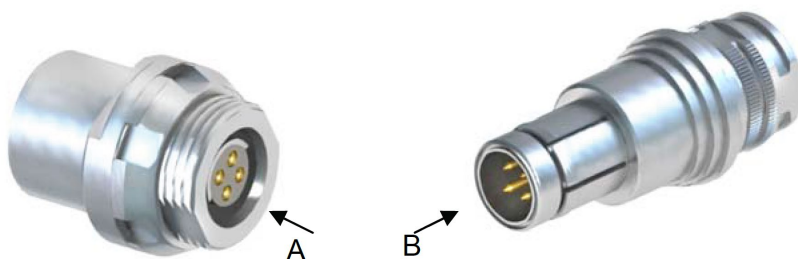


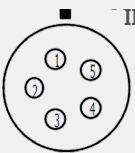
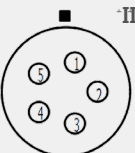
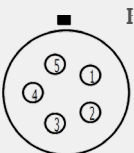
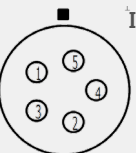
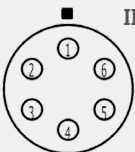
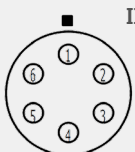
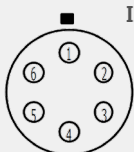
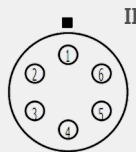
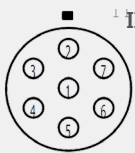
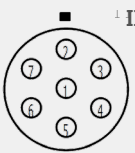
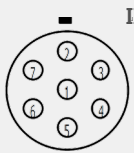
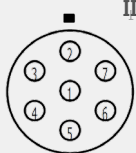
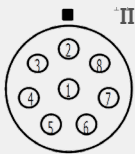
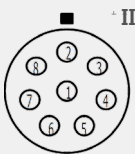
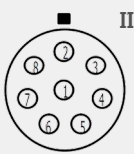
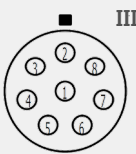
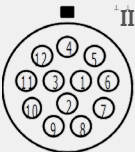
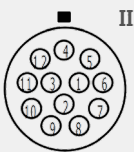
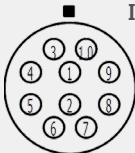
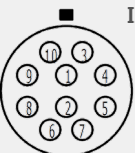
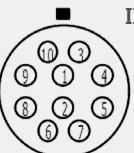
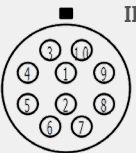
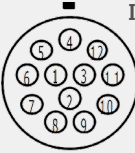
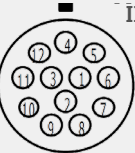
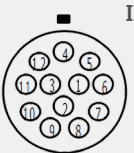
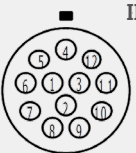
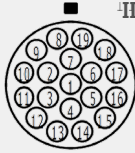
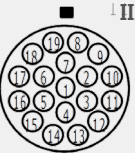
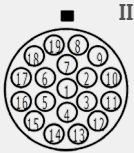
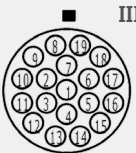
Insert arrangement				Shell code	Insert arrangement	Number of contacts	Contact dia. mm	Rated current, A
Receptacle with pin	Plug with pin	Receptacle with sockets	Plug with sockets					
Direction A	Direction B	Direction A	Direction B					
				102	01	2	0.9	6.3
					02	3	0.9	5.5
					03	4	0.7	3.8
					054	5	0.7	3.6
					056	7	0.5	1.5
					059	9	0.5	1.0

				103	051	2	1.3	9
					052	3	1.3	8.5
					053	4	0.9	5.0

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

Insert arrangement

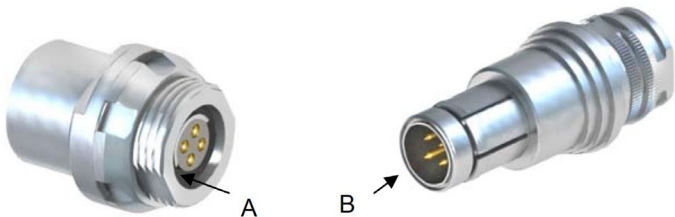


Insert arrangement				Shell code	Insert arrangement	Number of contacts	Contact dia. mm	Rated current, A
Receptacle with pin	Plug with pin	Receptacle with sockets	Plug with sockets					
Direction A	Direction B	Direction A	Direction B					
				103	054	5	0.9	4.8
					056	6	0.7	3.5
					057	7	0.7	3.2
					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

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



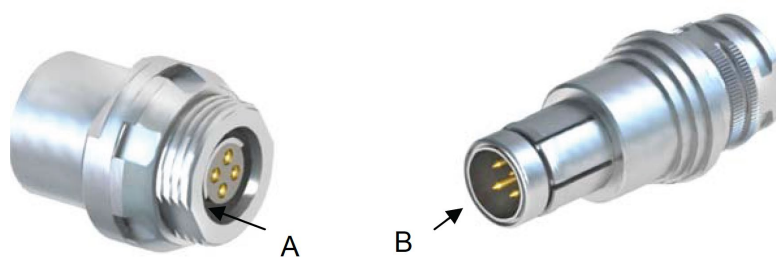
Insert arrangement

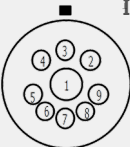
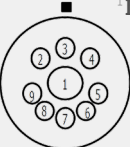
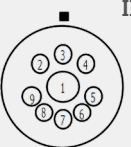
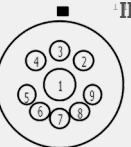
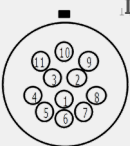
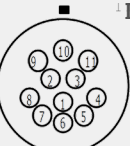
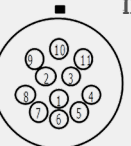
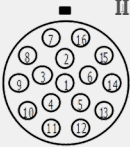
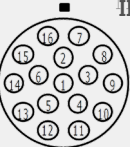
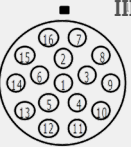
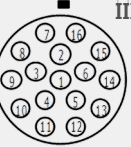
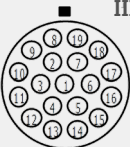
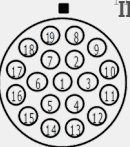
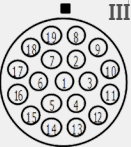
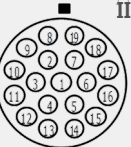
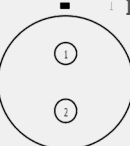
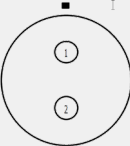
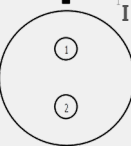
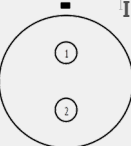
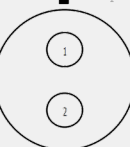
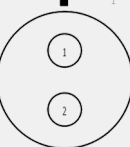
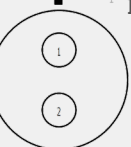
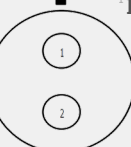
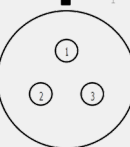
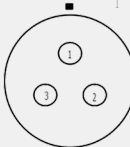
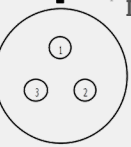
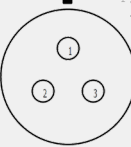


Insert arrangement				Shell code	Insert arrangement	Number of contacts	Contact dia. mm	Rated current, A	
Receptacle with pin	Plug with pin	Receptacle with sockets	Plug with sockets						
Direction A	Direction B	Direction A	Direction B						
				104	051	2	0.9	4.8	
					040	3	0.7	3.5	
					037	4	0.7	3.2	
					087	4	2	2.3	20
							2	0.9	2.0
					053	5	1.3	7.5	
					065	6	0.9	4.5	
					054	7	0.9	4.5	
					066	8	0.9	4.5	

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

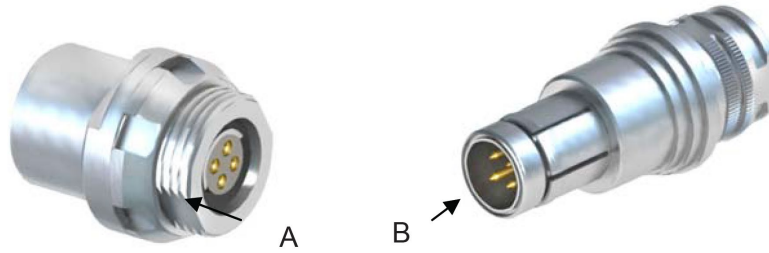
Insert arrangement

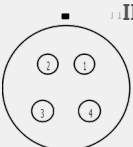
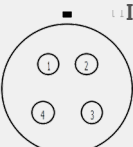
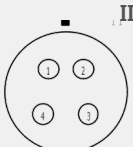
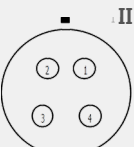
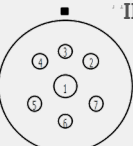
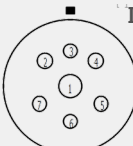
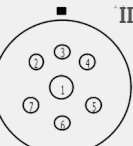
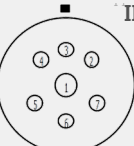
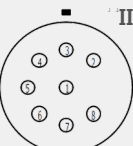
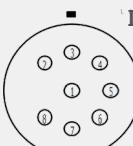
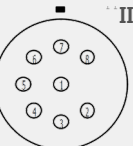
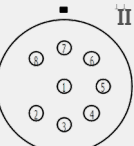
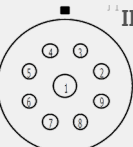
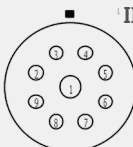
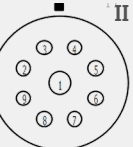
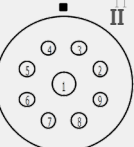
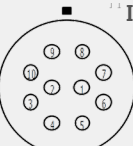
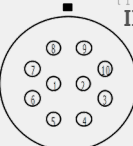
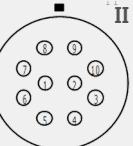
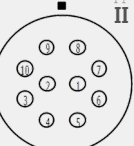
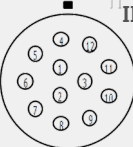
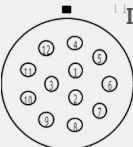
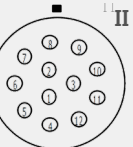
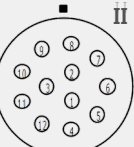
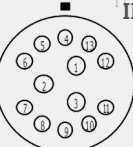
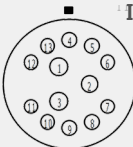
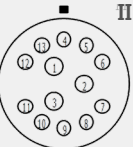
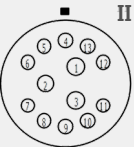


Insert arrangement				Shell code	Insert arrangement	Number of contacts		Contact dia. mm	Rated current, A
Receptacle with pin	Plug with pin	Receptacle with sockets	Plug with sockets						
Direction A	Direction B	Direction A	Direction B						
				104	055	9	1	1.3	
							8	0.9	
					056	11		0.9	4.0
					086	16		0.7	2.6
					092	19		0.7	2.5
				105	051	2		2.0	18
					087	2		3.0	20
					052	3		2.0	16

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

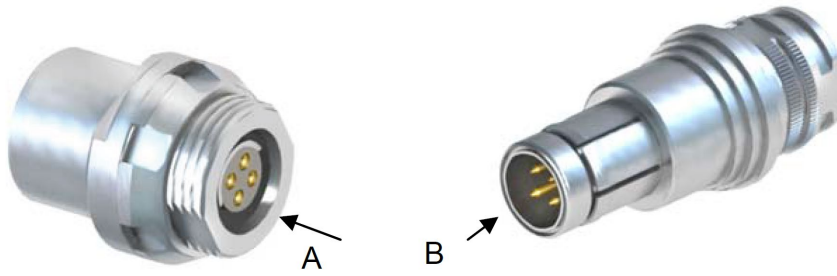
Insert arrangement

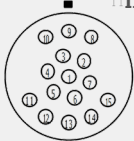
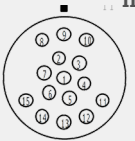
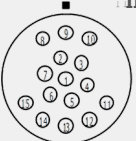
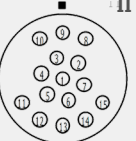
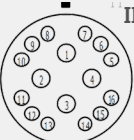
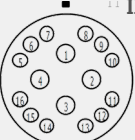
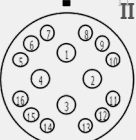
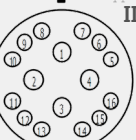
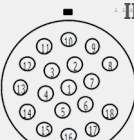
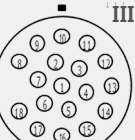
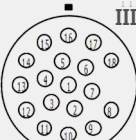
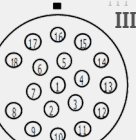
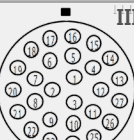
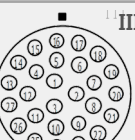
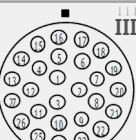
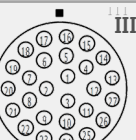
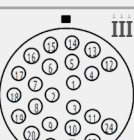
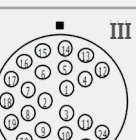
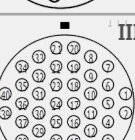
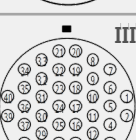
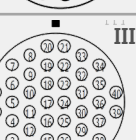
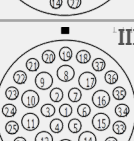
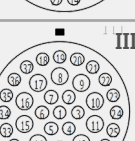
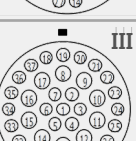
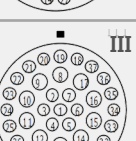


Insert arrangement				Shell code	Insert arrangement	Number of contacts		Contact dia. mm	Rated current, A
Receptacle with pin	Plug with pin	Receptacle with sockets	Plug with sockets						
Direction A	Direction B	Direction A	Direction B						
				105	053	4		2.0	
					054	7	1	2.0	19
							6	1.3	5.0
					067	8		1.3	72
					101	9	1	2.0	19
							8	1.3	4.0
					062	10		1.3	63
					069	12		1.3	5.5
					104	13	3	1.3	?
							10	0.7	?

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

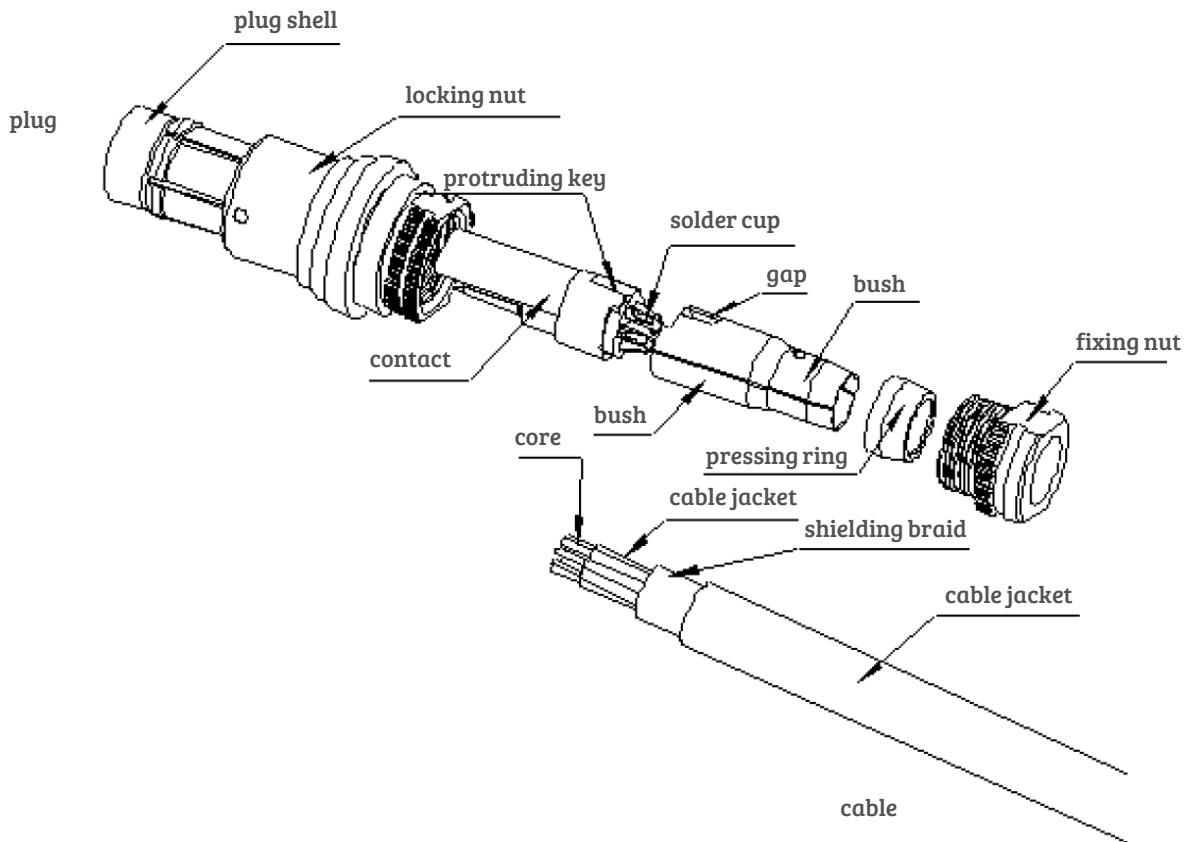
Insert arrangement



Insert arrangement				Shell code	Insert arrangement	Number of contacts	Contact dia. mm	Rated current, A	
Receptacle with pin	Plug with pin	Receptacle with sockets	Plug with sockets						
Direction A	Direction B	Direction A	Direction B						
				105	058	15	0.9	3.7	
					110	16	4	1.6	10
							12	0.7	0.5
					038	18	0.9	3.2	
					102	27	0.7	2.2	
					093	24	0.7	2.5	
					122	40	0.5		
					137	37	10	0.7	2.2
							27	0.5	1

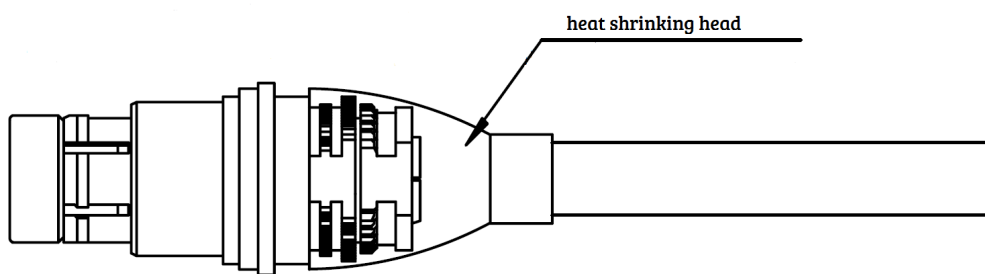
Note: I, II and III stand for withstanding voltage levels. See Table 2 in Page 2 for details.

Cabling method for T03 plug and Z14 receptacle



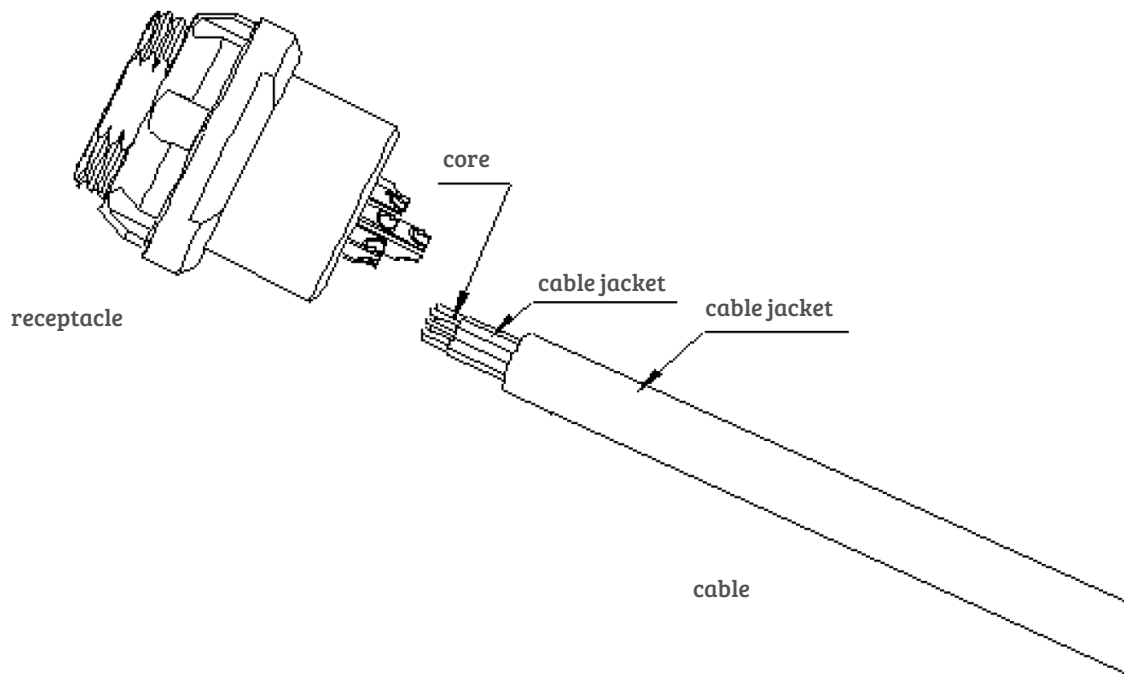
Plug cabling and processing method:

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 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.
9. Push the heat shrinking head to plug shell step and heat it to shrink.



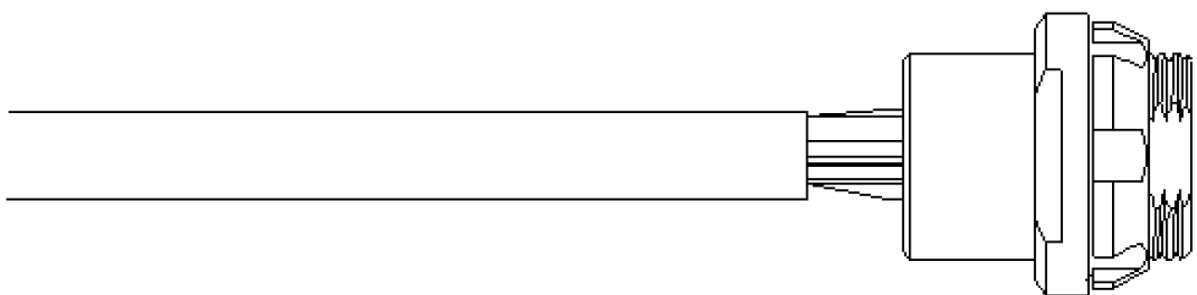
Cable assembly

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



Cable assembly