

Miniature Waterproof Shielded Connectors

LF Series



■ Features

1. Ease of shielded termination and connector assembly

All components are self-aligning and do not require complex assembly tooling. The shield of the cable is connected with the metal housing of the connector using simple shielding clamp, supplied with the connector.

2. Water and dust protected

IP67 protection rating. Complete protection against dust penetration and against water penetration when mated assembly is submerged at the depth of 1.8 meter for 48 hours.

3. Bayonet lock

Short turn bayonet lock assures secure vibration resistant mating of the connectors.

4. High current rating capacity

Number of contacts	Current rating
3	5A max.
4	10A max.
6, 12 and 20	2A max.
11	10A max. 2A max.

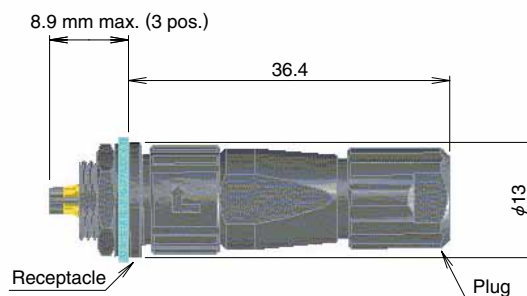
5. RoHS compliant

All components and materials comply with the requirements of the EU Directive 2002/95/EC.

■ Applications

Sensors, robots, injection molding machines, NC, factory automation equipment, surveying instruments, measuring instruments, medical equipment, surveillance cameras and base stations.

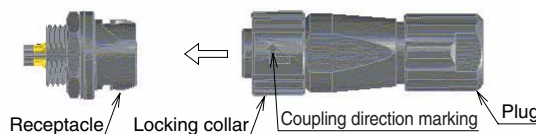
Mated dimensions



Short turn bayonet lock

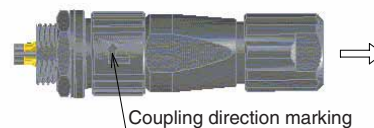
Mating:

Insert the plug, and then turn the locking collar clockwise, as indicated by the coupling direction marking.

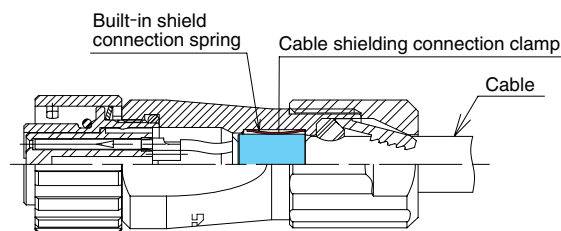


Un-mating:

Turn the locking collar counter-clockwise then pull off the plug.



Shielding Connection - Plug



LF Series Miniature Waterproof Shielded Connectors

Product Specifications

Rating	Voltage rating	125V AC, 175V DC (3 pos.) 125V AC, 125V DC (4 pos.) 30V AC, 42V DC (6 pos., 12pos., 20pos.) 125V AC, 125V DC (11 pos. A to D) 30V AC, 42V DC (11 pos. 1 to 7)
	Current rating	5A max. (3 pos.) 10A max. (4 pos.) 2A max. (6 pos., 12pos., 20pos.) 10A(11 pos. A to D), 2A(11 pos. 1 to 7)
	Operating temperature range	-25°C to +85°C (Note 1)
	Storage temperature range	-25°C to +85°C (Note 2)

Item	Specification	Conditions
1.Contact resistance	15 mΩ max. (3, 6, 12, 20 pos.) 5 mΩ max. (4 pos.) 5 mΩ max. (A to D), 15mΩ max. (1 to 7)(11 pos.)	1A DC
2.Insulation resistance	1000 MΩ min.	500V DC (3, 4 pos.) 100V DC (6, 12, 20 pos.) 500V DC (A to D), 100V DC (1 to 7)(11pos.)
3.Withstanding voltage	No flashover or insulation breakdown.	1250V AC/one minute (3, 4 pos.) 300V AC/one minute (6, 12, 20 pos.) 1250V AC(A to D),300V AC(1 to 7) / one minute(11pos.)
4.Vibration	No electrical discontinuity for 10μs max.	Frequency: 10 to 500Hz, single amplitude of 0.75mm, acceleration of 98 m/s ² for 3 hours in 3 axis.
5.Shock	No electrical discontinuity for 10μs max.	Acceleration of 490m/s ² , 11ms duration, sine half-wave waveform, 3 cycles in each of the 3 axis.
6.Durability (Mating/un-mating)	30 mΩ max. (3, 6, 12, 20 pos.) 10 mΩ max. (4 pos.) 10 mΩ max.(A to D), 30 mΩ max.(1 to 7)(11pos.)	1000 cycles
7.Temperature cycle	Insulation resistance: 100 MΩ min.	Temperature: -55°C → Room temperature → +125°C → Room temperature Time: 30 → 10 to 15 → 30 → 10 to 15 (minutes) 5 cycles
8.Humidity	Insulation resistance: 10 MΩ min. (When temperature high) Insulation resistance: 100 MΩ min. (Dry state)	96 hours at temperature of 40°C and humidity of 90% to 95%.
9.Water / dust protection	When mated with corresponding connector.	Complete dust protection. No water penetration when submerged for 48 hours at the depth of 1.8 meter.

Note 1: Includes temperature rise caused by the current flow.

Note 2: The term "storage" refers to products stored for long period of time prior to mounting and use. Operating temperature range and humidity range covers non-conducting condition of installed connectors in storage, shipment or during transportation.

Materials / Finish

Components	Material	Finish / Color	Remarks
Body / back shell	Zinc alloy	Nickel plated	_____
Insulator	PPS	Black	UL94V-0
Contacts	Copper alloy	Gold plated	_____
Gasket	Chloroprene rubber	Black	_____

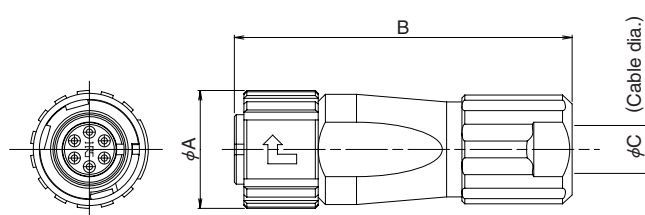
Ordering Information

LF 07 - W B P - 6 S

① ② ③ ④ ⑤ ⑥ ⑦

① Series name	: LF
② Shell size	07 10 13
③ Waterproof	W : Waterproof type
④ Lock Mechanism	B : Bayonet lock
⑤ Connector type	P : Plug R : Receptacle J : Jack
⑥ Number of contacts	: 3, 4, 6, 11, 12, 20
⑦ Contact type	P : Male contact S : Female contact

■ Plugs

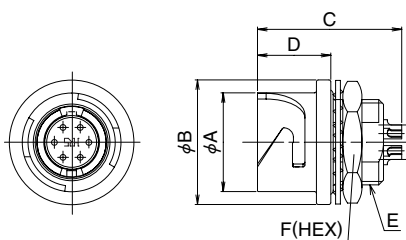


(Shown one example)

Unit:mm

Part number	CL No.	Contact	Number of contacts	φA	B	φC	Weight	RoHS
LF07WBP-3S	136-0003-7	Female	3	12.3	35.3	5	11g	YES
LF07WBP-3P	136-0004-0	Male						
LF07WBP-6S	136-0001-1	Female	6					
LF07WBP-6P	136-0002-4	Male						
LF10WBP-4S	136-0005-2	Female	4	14.8	41.8	7.3	17g	
LF10WBP-4P	136-0006-5	Male						
LF10WBP-12S	136-0007-8	Female	12					
LF10WBP-12P	136-0008-0	Male						
LF13WBP-20S	136-0009-3	Female	20	17.9	51.9	8.7	29g	
LF13WBP-20P	136-0010-2	Male						
LF13WBP-11S	136-0011-5	Female	11					
LF13WBP-11P	136-0012-8	Male						

■ Receptacles



(Shown one example)

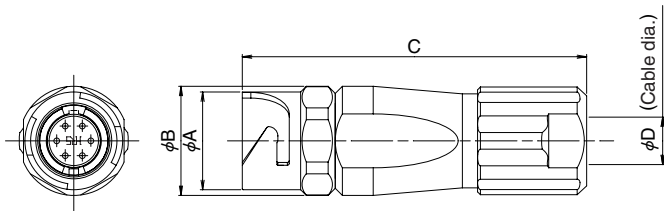
Unit:mm

Part number	CL No.	Contact	Number of contacts	φA	φB	C	D	E	F	Weight	RoHS
LF07WBR-3P	136-1003-2	Male	3	10.3	13	15.15	7.65	M9×0.75	11	4g	YES
LF07WBR-3S	136-1004-5	Female				15.05					
LF07WBR-6P	136-1001-7	Male	6			15.25					
LF07WBR-6S	136-1002-0	Female									
LF10WBR-4P	136-1005-8	Male	4	12.8	15.3	19.05	7.75	M11×0.75	13	6g	
LF10WBR-4S	136-1006-0	Female				17.25				5g	
LF10WBR-12P	136-1007-3	Male	12			6g					
LF10WBR-12S	136-1008-6	Female									
LF13WBR-20P	136-1009-9	Male	20	15.9	18.3	19.05	7.75	M14×0.75	17	9g	
LF13WBR-20S	136-1010-8	Female								10g	
LF13WBR-11P	136-1011-0	Male	11							9g	
LF13WBR-11S	136-1012-3	Female								10g	

Note: Recommended hex nut tightening torque: 1.5 to 2 N·m (3,4,6, and 12 pos.), 2 to 2.5 N·m (11, 20 pos.)

LF Series Miniature Waterproof Shielded Connectors

Jacks



(Shown one example)

Unit:mm

Part number	CL No.	Contact	Number of contacts	φA	φB	C	φD	Weight	RoHS
LF07WBJ-3P	136-2003-8	Male	3	10.3	11.5	36.3	5	11g	YES
LF07WBJ-3S	136-2004-0	Female							
LF07WBJ-6P	136-2001-2	Male	6						
LF07WBJ-6S	136-2002-5	Female							
LF10WBJ-4P	136-2005-3	Male	4	12.8	13.8	42.4	7.3	16g	
LF10WBJ-4S	136-2006-6	Female							
LF10WBJ-12P	136-2007-9	Male	12						
LF10WBJ-12S	136-2008-1	Female							
LF13WBJ-20P	136-2009-4	Male	20	15.9	16.9	52.4	8.7	29g	
LF13WBJ-20S	136-2010-3	Female						30g	
LF13WBJ-11P	136-2011-6	Male	11					29g	
LF13WBJ-11S	136-2012-9	Female						30g	

■Applicable tools



Unit:mm

Description	Part number	CL No.	LF series Applicable cable dia.
Manual cable clamp crimp	HR10A-TC-02	150-0041-2	5 (Note)
	LF-TC-01	150-0234-6	7.3 · 8.7

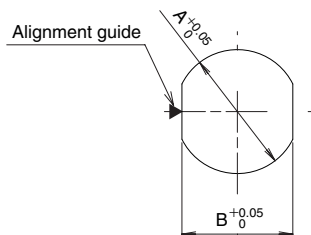
Note: Applicable cable dia. is only 5mm for LF series.

■Solder termination fixture



Part number	CL No.	Applicable connectors
LF07BP-T01	150-0232-0	LF07WBP-6S,6P,3S,3P
LF07BJ-T01	150-0233-3	LF07WBJ-6S,6P,3S,3P
LF10BP-T01	150-0235-9	LF10WBP-4S,4P,12S,12P
LF10BJ-T01	150-0236-1	LF10WBJ-4S,4P,12S,12P
LF13BP-T01	150-0237-4	LF13WBP-20S,20P,11S,11P
LF13BJ-T01	150-0238-7	LF13WBJ-20S,20P,11S,11P

■Panel Cutout



unit (mm)

Shell size	A	B	Panel thickness
LF07	φ9.05	8.1	0.5 to 2
LF10	φ11.05	10.2	0.7 to 2
LF13	φ14.05	13.1	0.7 to 2

■Contact position arrangement and specifications

Shell size	LF07		LF10		LF13	
Contact configuration						
Number of contacts	3	6	4	12	11	20
Withstanding voltage	1250V AC	300V AC	1250V AC	300V AC	4 AC1250V 7 AC300V	AC300V
Current rating	5A	2A	10A	2A	4 10A 7 2A	2A
Insulation resistance	1000MΩ		1000MΩ	1000MΩ	1000MΩ	
Contact resistance	15mΩ		5mΩ	15mΩ	4 5mΩ 7 15mΩ	4mΩ
Solder pot inner diameter	1.15mm	0.8mm	1.7mm	0.8mm	4 φ1.7 7 φ0.8	0.8mm

Note 1: The contact configuration as viewed from the female contact connector mating side.

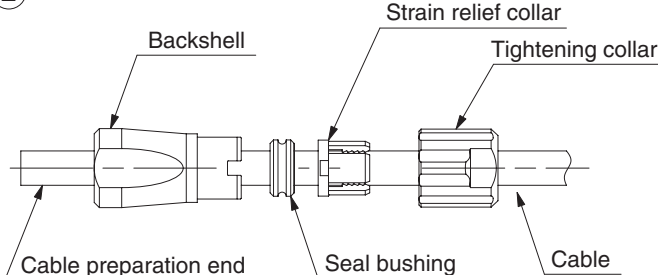
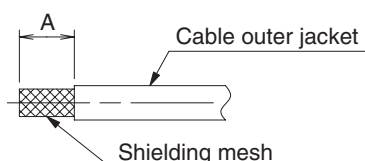
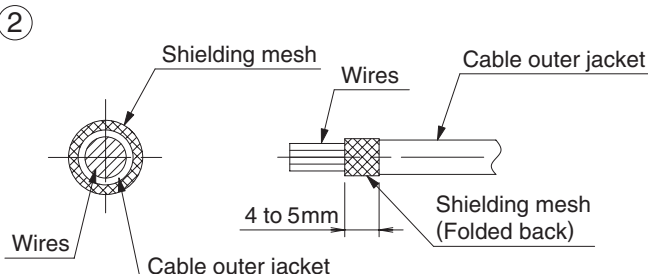
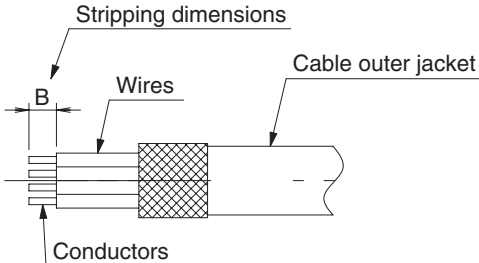
Note 2: The ▼ symbol indicates polarizing key position.

Note 3: Withstanding voltages are test voltage values.

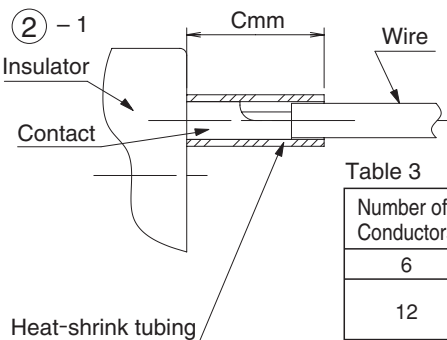
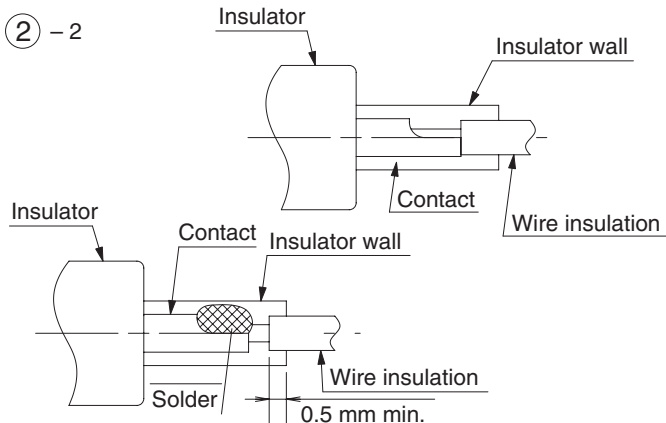
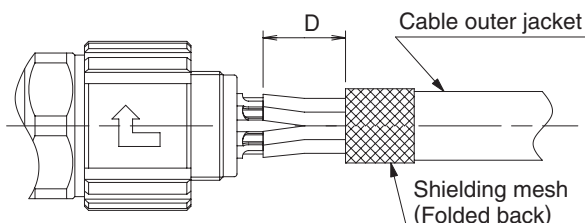
■ Termination and Assembly Instructions

The connectors are delivered with pre-assembled condition and the disassembly as shown No.1.

No.	Illustration	Operation								
1	①	Plug disassembly ① Insert the plug into securely held solder termination fixture as shown. <table border="1"><thead><tr><th>Fixture Part No.</th><th>Applicable connector</th></tr></thead><tbody><tr><td>LF07BP-T01</td><td>LF07WBP-6S,6P,3S,3P</td></tr><tr><td>LF10BP-T01</td><td>LF10WBP-4S,4P,12S,12P</td></tr><tr><td>LF13BP-T01</td><td>LF13WBP-20S,20P,11S,11P</td></tr></tbody></table>	Fixture Part No.	Applicable connector	LF07BP-T01	LF07WBP-6S,6P,3S,3P	LF10BP-T01	LF10WBP-4S,4P,12S,12P	LF13BP-T01	LF13WBP-20S,20P,11S,11P
	Fixture Part No.	Applicable connector								
	LF07BP-T01	LF07WBP-6S,6P,3S,3P								
	LF10BP-T01	LF10WBP-4S,4P,12S,12P								
LF13BP-T01	LF13WBP-20S,20P,11S,11P									
②	② Loosen the backshell turning it counter clockwise and remove it from the body/insulator assembly.									
①	Jack Disassembly ① Insert the jack into the securely held solder termination fixture as shown. <table border="1"><thead><tr><th>Fixture Part No.</th><th>Applicable connector</th></tr></thead><tbody><tr><td>LF07BJ-T01</td><td>LF07WBJ-6S,6P,3S,3P</td></tr><tr><td>LF10BJ-T01</td><td>LF10WBJ-4S,4P,12S,12P</td></tr><tr><td>LF13BJ-T01</td><td>LF13WBJ-20S,20P,11S,11P</td></tr></tbody></table>	Fixture Part No.	Applicable connector	LF07BJ-T01	LF07WBJ-6S,6P,3S,3P	LF10BJ-T01	LF10WBJ-4S,4P,12S,12P	LF13BJ-T01	LF13WBJ-20S,20P,11S,11P	
Fixture Part No.	Applicable connector									
LF07BJ-T01	LF07WBJ-6S,6P,3S,3P									
LF10BJ-T01	LF10WBJ-4S,4P,12S,12P									
LF13BJ-T01	LF13WBJ-20S,20P,11S,11P									
②	② Loosen the backshell turning it counterclockwise.									
2	①	Connector Assembly ① Apply a coating of Loctite 7649 (Manufactured by Henckel Japan, Ltd.) primer to the threaded sections of the backshell and the tightening collar. Completely dry the coated surfaces. Note (1) Drying time at room temperature is approximately 30 to 70 seconds. (2) Ensure sufficient ventilation of the area at time of drying. (3) Take necessary steps to protect the coated surfaces from contamination.								

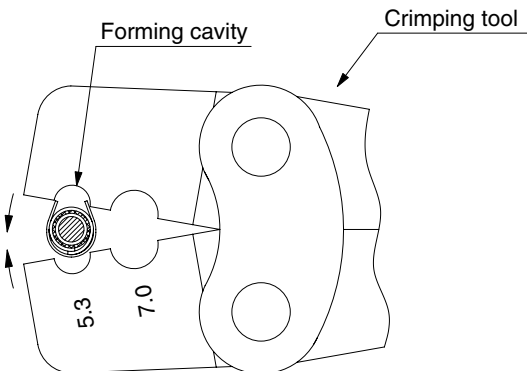
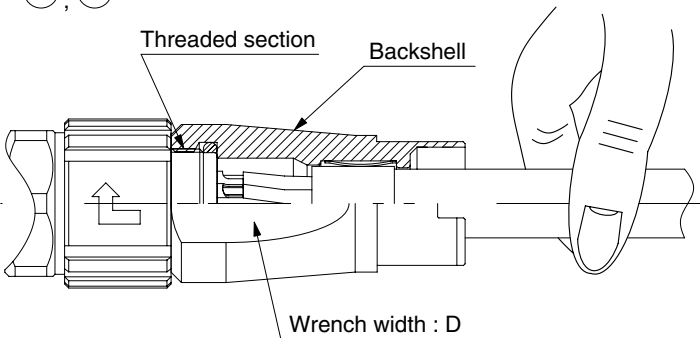
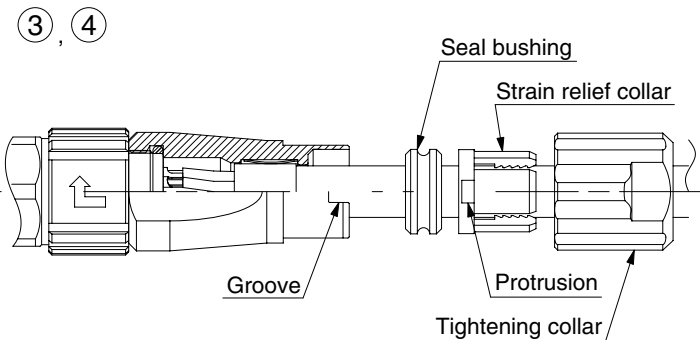
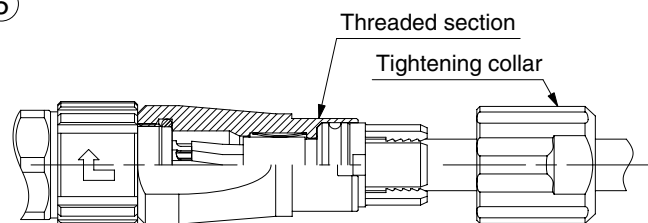
No.	Illustration	Operation														
2	② 	② Thread the tightening collar, strain relief collar, seal bushing and the backshell over the cable as illustrated.														
3	①  Table 1. Stripping Dimensions <table><tr><th>Number of Conductors</th><th>A mm</th></tr><tr><td>3</td><td rowspan="2">8 to 9</td></tr><tr><td>6</td></tr><tr><td>4</td><td>13 to 14</td></tr><tr><td>12</td><td>14 to 15</td></tr><tr><td>11</td><td>22 to 23 (No.A to D) 23 to 24 (No.1 to 7)</td></tr><tr><td>20</td><td>23 to 24</td></tr></table>	Number of Conductors	A mm	3	8 to 9	6	4	13 to 14	12	14 to 15	11	22 to 23 (No.A to D) 23 to 24 (No.1 to 7)	20	23 to 24	Cable preparation ① Strip the cable's outer jacket to the dimensions illustrated in the table 1. Note (1) Exercise caution not to damage the shielding mesh. (2) Any damage to the cable's outer jacket may affect the waterproof performance of the assembled connector.	
Number of Conductors	A mm															
3	8 to 9															
6																
4	13 to 14															
12	14 to 15															
11	22 to 23 (No.A to D) 23 to 24 (No.1 to 7)															
20	23 to 24															
	② 	② Fold back the shielding mesh over the cable's outer jacket assuring that it is uniform on its diameter.														
	③  Table 2. Stripping Dimensions <table><tr><th>Number of Conductors</th><th>B mm</th></tr><tr><td>3</td><td>2.5±0.5</td></tr><tr><td>6</td><td>2±0.5</td></tr><tr><td>4</td><td>3±0.5</td></tr><tr><td>12</td><td>2±0.5</td></tr><tr><td>11</td><td>3±0.5 (No.A to D) 2±0.5 (No.1 to 7)</td></tr><tr><td>20</td><td>2±0.5</td></tr></table>	Number of Conductors	B mm	3	2.5±0.5	6	2±0.5	4	3±0.5	12	2±0.5	11	3±0.5 (No.A to D) 2±0.5 (No.1 to 7)	20	2±0.5	③ Strip the wires to the dimensions illustrated in the Table 2. Note When stripping the wires exercise caution not to damage it's insulation, folded over shielding mesh or cable's outer jacket.
Number of Conductors	B mm															
3	2.5±0.5															
6	2±0.5															
4	3±0.5															
12	2±0.5															
11	3±0.5 (No.A to D) 2±0.5 (No.1 to 7)															
20	2±0.5															

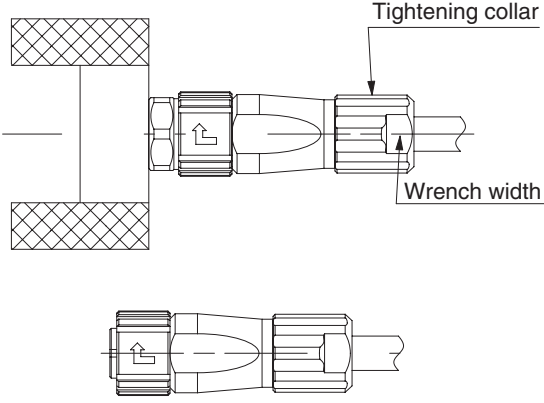
LP Series Miniature Waterproof Shielded Connectors

No.	Illustration	Operation																																
4	② - 1  Table 3 <table><tr><th>Number of Conductors</th><th>Number of contacts</th><th>C mm</th></tr><tr><td>6</td><td>1 to 6</td><td>4</td></tr><tr><td rowspan="2">12</td><td>1 to 9</td><td>4</td></tr><tr><td>10 to 12</td><td>6</td></tr><tr><td rowspan="2">20</td><td>1 to 5, 16 to 20</td><td>4</td></tr><tr><td>6 to 15</td><td>6</td></tr><tr><td rowspan="2">11</td><td>1 to 4</td><td>6</td></tr><tr><td>5 to 7</td><td>4</td></tr></table> ② - 2  ③  Table 4. Wire Dimensions <table><tr><th>Number of Conductors</th><th>D mm</th></tr><tr><td>3</td><td rowspan="2">6 to 7</td></tr><tr><td>6</td></tr><tr><td>4</td><td>10 to 11</td></tr><tr><td>12</td><td>13 to 14</td></tr><tr><td>11</td><td rowspan="2">18 to 19</td></tr><tr><td>20</td></tr></table> Soldering ① Soldering conditions Soldering iron tip temperature: 350±10℃ Soldering time: within 5 sec. Note (1) Assure that the solder compound is sufficiently melted on the soldering iron tip. (2) When applying, make sure that the solder will flow correctly at all the contact surfaces between the conductor and the contact. ② - 1 6, 12, 20, 11(No.1~7) Conductors (1) Place a heat-shrink tubing (inside diameter of 1.1 mm min.) over every other wire. Perform the soldering of the contact and the (2) conductor, with the wire's insulation touching the contact as shown. After soldering, slide the heat shrink tubing (3) over the soldered joint and shrink it. The tubing should touch the insulator as shown. ② - 2 3, 4, 11(No.A~D) Conductors (1) Perform the soldering of the contact and the conductor, with the wire's insulation touching the contact as illustrated. (2) When soldering, to maintain the insulation between adjacent contacts. Make sure that the wire's insulation remains below the edge of the insulator's wall 0.5 mm min., as illustrated. ③ After the soldering, keep a distance of D between the contact end and the cable's outer jacket as illustrated. Note The distance of D is required in order to assure correct assembly of the backshell.	Number of Conductors	Number of contacts	C mm	6	1 to 6	4	12	1 to 9	4	10 to 12	6	20	1 to 5, 16 to 20	4	6 to 15	6	11	1 to 4	6	5 to 7	4	Number of Conductors	D mm	3	6 to 7	6	4	10 to 11	12	13 to 14	11	18 to 19	20
Number of Conductors	Number of contacts	C mm																																
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No.	Illustration	Operation							
5	① Solder termination fixture Body / insulator assembly Soldered joints	Crimping of the Shielding Clamp ① After completion of the soldering operations carefully remove (holding on the locking collar) the body/insulator assembly from the solder termination fixture. Note Exercise caution not to damage or deform the solder joints.							
	② Cable outer jacket Wires Shielding mesh Copper tape 2 mm max. 5 to 6mm	② Wrap the folded over shielding mesh with 5 to 6 mm wide copper tape to assure that it will not become loose. Apply the copper tape so that the shielding mesh does not protrude from under it. Note After wrapping the copper tape, the tape should overlap itself by 2 mm max.							
	③ Ground clamp Copper tape Cable outer jacket 1±0.5mm Copper tape Cable outer jacket Wires Shielding mesh Overlap of the copper tape Shielding clamp	③ Insert the “U” shaped shielding clamp over the copper tape as shown on the illustration. It is critical that the overlap of the copper tape is located inside the shielding clamp as shown on the illustration. Note When the end of the copper tape wrapping is positioned at the open side of the ground fitting, the end portion of the copper tape wrapping will no longer be covered by the ground fitting when the ground fitting is crimped.							
	④ Commercially available pliers E Shielding clamp Overlap of the copper tape Table 5 <table><tr><th>Shell size</th><th>E</th></tr><tr><td>LF07</td><td>5mm max.</td></tr><tr><td>LF10</td><td rowspan="2">7mm max.</td></tr><tr><td>LF13</td></tr></table>	Shell size	E	LF07	5mm max.	LF10	7mm max.	LF13	④ Using commercially available pliers bend the open ends of the shielding clamp as illustrated assuring that it stays in place. The dimension of E, between opposing edges of the shielding clamp is necessary to assure correct final crimp.
Shell size	E								
LF07	5mm max.								
LF10	7mm max.								
LF13									

LF Series Miniature Waterproof Shielded Connectors

No.	Illustration	Operation																												
5	⑤ 	⑤ Both sides of the shielding clamp must be placed in the forming cavity of the tool (as shown on the illustration) and crimped over the cable by closing the tool completely. <table border="1"><thead><tr><th>Crimping tool</th><th>Forming cavity</th><th>Applicable cable diameter</th><th>Shielding clamp diameter after crimping</th></tr></thead><tbody><tr><td rowspan="2">HR10A-TC-02</td><td>5.3</td><td>5mm</td><td>5.3mm to 5.5mm</td></tr><tr><td>7.0</td><td>—</td><td>—</td></tr><tr><td rowspan="2">LF-TC-01</td><td>7.9</td><td>7.3mm</td><td>7.9mm to 8.1mm</td></tr><tr><td>9.1</td><td>8.7mm</td><td>9.1mm to 9.3mm</td></tr></tbody></table>	Crimping tool	Forming cavity	Applicable cable diameter	Shielding clamp diameter after crimping	HR10A-TC-02	5.3	5mm	5.3mm to 5.5mm	7.0	—	—	LF-TC-01	7.9	7.3mm	7.9mm to 8.1mm	9.1	8.7mm	9.1mm to 9.3mm										
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6	①, ② <table border="1"><caption>Table 6</caption><thead><tr><th>Shell size</th><th>Tightening torque</th><th>Wrench width</th></tr></thead><tbody><tr><td>LF07</td><td>1N·m~1.5N·m</td><td>10mm</td></tr><tr><td>LF10</td><td>1N·m~1.5N·m</td><td>13mm</td></tr><tr><td>LF13</td><td>1.5N·m~2N·m</td><td>16mm</td></tr></tbody></table>	Shell size	Tightening torque	Wrench width	LF07	1N·m~1.5N·m	10mm	LF10	1N·m~1.5N·m	13mm	LF13	1.5N·m~2N·m	16mm	Connector Assembly ① Place the body/insulator assembly in the applicable solder termination fixture. For plug assembly <table border="1"><thead><tr><th>Fixture Part No.</th><th>Applicable connector</th></tr></thead><tbody><tr><td>LF07BP-T01</td><td>LF07WBP-6S,6P,3S,3P</td></tr><tr><td>LF10BP-T01</td><td>LF10WBP-4S,4P,12S,12P</td></tr><tr><td>LF13BP-T01</td><td>LF13WBP-20S,20P,11S,11P</td></tr></tbody></table> For jack assembly <table border="1"><thead><tr><th>Fixture Part No.</th><th>Applicable connector</th></tr></thead><tbody><tr><td>LF07BJ-T01</td><td>LF07WBJ-6S,6P,3S,3P</td></tr><tr><td>LF10BJ-T01</td><td>LF10WBJ-4S,4P,12S,12P</td></tr><tr><td>LF13BJ-T01</td><td>LF13WBJ-20S,20P,11S,11P</td></tr></tbody></table> ② Coat the thread section of the body/insulator assembly with Loctite 271 compound (manufactured by Henckel Japan, Ltd.) or equivalent, tightening it with a torque specified in the table 6. Note It is critical that the cable itself will not turn or twist during this operation.	Fixture Part No.	Applicable connector	LF07BP-T01	LF07WBP-6S,6P,3S,3P	LF10BP-T01	LF10WBP-4S,4P,12S,12P	LF13BP-T01	LF13WBP-20S,20P,11S,11P	Fixture Part No.	Applicable connector	LF07BJ-T01	LF07WBJ-6S,6P,3S,3P	LF10BJ-T01	LF10WBJ-4S,4P,12S,12P	LF13BJ-T01	LF13WBJ-20S,20P,11S,11P
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	③, ④ 	③ Slide forward the seal bushing and insert it in the backshell until fully seated. ④ Slide forward the strain relief collar and insert it in the backshell, making sure that the opposing protrusions fit inside the corresponding grooves, as shown on the illustration. Note It is critical that the protrusions are inside the corresponding grooves.																												
	⑤ 	⑤ Verify that the Locktite 7649 primer (or equivalent) on the threaded sections of the backshell and tightening collar are dry. Apply the Locktite 271 compound to the tightening collar's threaded section and attach it to the backshell.																												

No.	Illustration	Operation												
6	⑥ 	⑥ Remove the connector from the solder termination fixture, holding it by the locking collar. Do not pull on the cable. <table border="1"> <thead> <tr> <th>Shell size</th><th>Tightening torque</th><th>Wrench width</th></tr> </thead> <tbody> <tr> <td>LF07</td><td>0.8N·m~1N·m</td><td>10mm</td></tr> <tr> <td>LF10</td><td>0.7N·m~1N·m</td><td>13mm</td></tr> <tr> <td>LF13</td><td>1 N·m~1.5 N·m</td><td>16mm</td></tr> </tbody> </table>	Shell size	Tightening torque	Wrench width	LF07	0.8N·m~1N·m	10mm	LF10	0.7N·m~1N·m	13mm	LF13	1 N·m~1.5 N·m	16mm
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1. To maintain the water/dust protection performance and the cable clamp force, use a cable that is within the range of applicable diameter.
2. Consult HRS representative when using different cables.

■ Cable Specifications (Reference)

	No. of contact	3 pos.	4 pos.	6 pos.	12 pos.	20 pos.	11 pos.	
Conductor	Material	Soft copper wire	Soft copper wire	Soft copper wire	Soft copper wire	Soft copper wire	Soft copper wire	Soft copper wire
	Size (mm)	φ0.18	φ0.26	φ0.16	φ0.16	φ0.16	φ0.26	φ0.16
	Construction	20 /φ0.18 mm dia.	20 /φ0.26 mm dia.	7 /φ0.16 mm dia.	7 /φ0.16 mm dia.	7 /φ0.16 mm dia.	26 /φ0.26 mm dia.	7 /φ0.16 mm dia.
	Size (AWG)	AWG #20	AWG #16	AWG #26	AWG #26	AWG #26	AWG #16	AWG #26
	Sectional area	————	1.25	————	0.14	0.14	1.25	0.14
	Diameter (mm)	φ0.98	φ1.5	φ0.48	φ0.48	φ0.48	φ1.5	φ0.48
Insulator	Diameter (mm)	φ1.5 (Standard)	φ2.1 (Standard)	φ0.88 (Standard)	φ0.9 (Standard)	φ0.9 (Standard)	φ2.1 (Standard)	φ0.95 (Standard)
	Thickness (mm)	0.26	0.3	0.2	0.21	0.21	0.3	0.235
Shield	Material	Soft copper wire	Soft copper wire	Soft copper wire	Soft copper wire	Soft copper wire	Soft copper wire	
	Density	85%	80%	85%	80%	80%	80%	
	Diameter (mm)	φ3.6	φ5.5	φ3.4	φ4.2	φ5.1	φ6.7	
Jacket	Diameter (mm)	φ5±0.2	φ7.3±0.2	φ5±0.2	φ7.3±0.2	φ8.7±0.2	φ8.7±0.2	