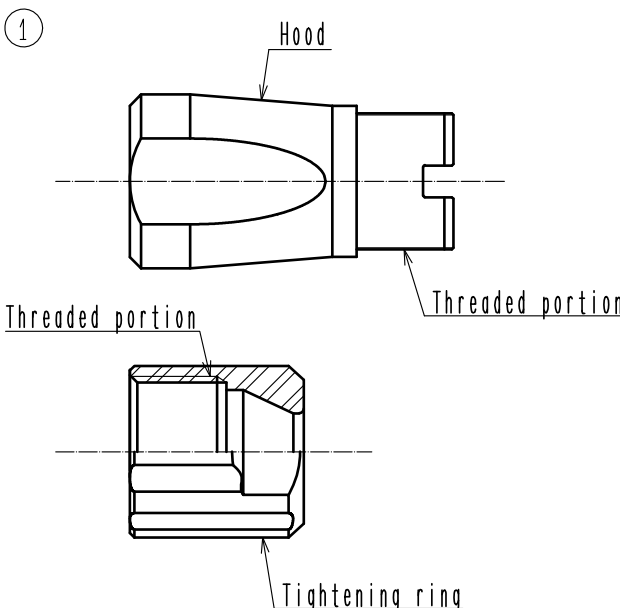
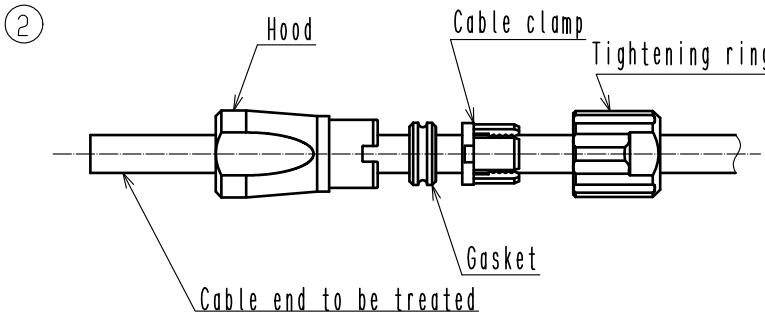
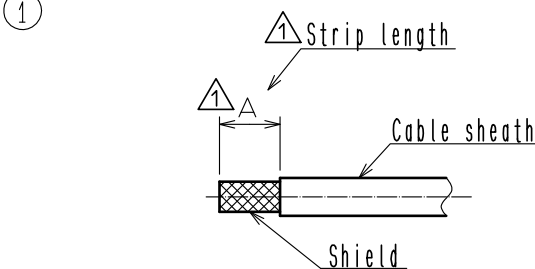


⚠ This document describes the recommended assembly procedure of LF connectors(Plug, Jack).

1. Procedure

No.	Drawing	Procedure Details								
1	⚠ Caution ⚠ Fasten the wiring jig securely so that it does not move even with the torque required to assemble the connector. Insufficient fixing may cause the connector to tilt during assembly, causing damage to the connector or failure to tighten with the specified torque.	[Plug Disassembly] ① With the cable assembly fixture fixed in place with a vice etc., mate it with the plug. Table 1. ⚠ ⚠ <table border="1"><thead><tr><th>Tool Name</th><th>Applicable Product</th></tr></thead><tbody><tr><td>LF07BP-T01</td><td>LF07WBP-※※</td></tr><tr><td>LF10BP-T01</td><td>LF10WBP-※※</td></tr><tr><td>LF13BP-T01</td><td>LF13WBP-※※</td></tr></tbody></table> ② Loosen the hood, and remove from the connector. ⚠ ⚠ Note) When removing, assembling and wiring, be sure to use a cable assembly fixture. Directly fixing the sleeve in place with a vice etc., could lead to damage, deformation or lacuna of retaining ring. [Jack Disassembly] ① With the cable assembly fixture fixed in place with a vice etc., mate it with the Jack. ⚠ ⚠ Note) When removing, assembling and wiring, be sure to use a cable assembly fixture. Directly fixing the sleeve in place with a vice etc., could lead to damage or deformation.	Tool Name	Applicable Product	LF07BP-T01	LF07WBP-※※	LF10BP-T01	LF10WBP-※※	LF13BP-T01	LF13WBP-※※
Tool Name	Applicable Product									
LF07BP-T01	LF07WBP-※※									
LF10BP-T01	LF10WBP-※※									
LF13BP-T01	LF13WBP-※※									
⚠	COUNT 2	DESCRIPTION OF REVISIONS DIS-C-00016067	DESIGNED DS. MATSUNE	CHECKED EJ. KUNII	DATE 20230907					
TITLE ⚠ LF CONNECTOR ASSEMBLY PROCEDURE.				HRS HIROSE ELECTRIC CO., LTD.						
TECHNICAL SPECIFICATION				APPROVED	MR. YOSHIDA	20050105				
				CHECKED	MO. SATOH	20050105				
				CHARGED	YH. YAMADA	20050105				
				WRITTEN	YH. YAMADA	20050105				
				ETAD-C0099	⚠	1 / 7				

No.	Drawing	Procedure Details														
2	①  ② 	[Connector Assembly Preparation] ① Spray or brush Loctite 7649 primer, manufactured by Henkel Japan LTD., on the threaded portions of both the hood and the tightening ring, and then allow the primer-applied surfaces to dry completely. Notes (1) Leave to dry for 30 to 70 seconds at room temperature. (2) While drying, make sure there is sufficient ventilation, as solvent components are volatilized during drying. (3) After applying primer, keep the primer-applied surfaces away from dirt or dust. ② Thread the cable through the tightening ring, cable clamp, gasket, and hood in the order shown in the figure. Note) Threading of the components may not be possible after treating the cable.														
3	①  ① Table 3. Strip lengths [Unit: mm] <table><tr><th>Number of Contacts</th><th>A Length</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>20</td><td>23 to 24</td></tr><tr><td rowspan="2">11</td><td>22 to 23 (No. A to D)</td></tr><tr><td>23 to 24 (No. 1 to 7)</td></tr></table>	Number of Contacts	A Length	3	8 to 9	6	4	13 to 14	12	14 to 15	20	23 to 24	11	22 to 23 (No. A to D)	23 to 24 (No. 1 to 7)	[Cable-end stripping] ① Strip the cable at the appropriate length shown in the table 3. Notes (1) When stripping the cable sheath, be careful not to damage the shield. (2) Be careful not to damage the cable sheath, as it could affect waterproof performance.
Number of Contacts	A Length															
3	8 to 9															
6																
4	13 to 14															
12	14 to 15															
20	23 to 24															
11	22 to 23 (No. A to D)															
	23 to 24 (No. 1 to 7)															

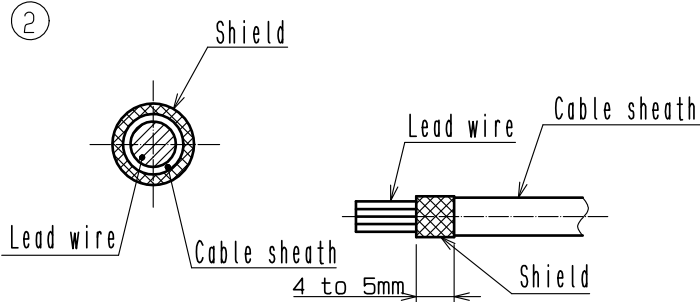
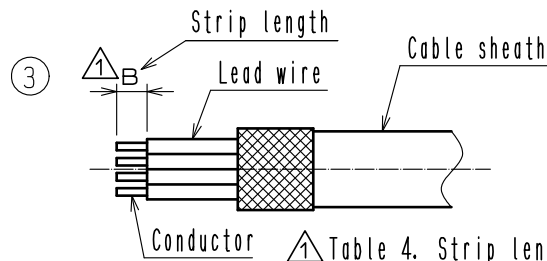
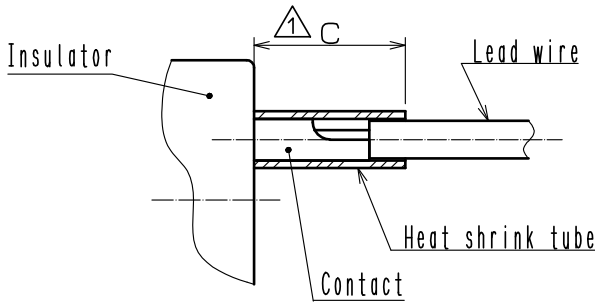
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No.	略 図	作業内容																					
3	② 	(Crimping of ground terminal) ② Fold the shield over the cable sheath uniformly.																					
	③  △ Table 4. Strip lengths [Unit: mm] <table><tr><th>Number of Contacts</th><th>B Length</th></tr><tr><td>3</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 rowspan="2">2±0.5</td></tr><tr><td>20</td></tr><tr><td rowspan="2">11</td><td>△ 3±0.5 (No. A to D)</td></tr><tr><td>△ 2±0.5 (No. 1 to 7)</td></tr></table>	Number of Contacts	B Length	3	2.5±0.5	6	2±0.5	4	3±0.5	12	2±0.5	20	11	△ 3±0.5 (No. A to D)	△ 2±0.5 (No. 1 to 7)	③ Strip the lead wire in the dimension shown in the table 4. Note) When stripping the cable, be careful not to damage the lead wire, the conductor, or the shield as it could lead to faulty insulation, faulty conduction or a loss of waterproof performance.							
Number of Contacts	B Length																						
3	2.5±0.5																						
6	2±0.5																						
4	3±0.5																						
12	2±0.5																						
20																							
11	△ 3±0.5 (No. A to D)																						
	△ 2±0.5 (No. 1 to 7)																						
4	② -1  △ Table 5. [Unit: mm] <table><tr><th>Number of Contacts</th><th>Contact Number</th><th>C Length</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> ⚠ Caution ⚠ When heating heat shrink tube, be careful hot air does not hit cable or insulation case directly.	Number of Contacts	Contact Number	C Length	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	[Soldering] ① Soldering conditions Soldering tip temperature: 350±10℃ Soldering time: 5 seconds MAX Notes △ (1) Follow the soldering conditions. Otherwise, the insulator may melt or the terminal may be loosened. (2) When soldering, be careful to avoid a cold joint, an overheated joint, or any other defects. (3) Check that the the solder is fused sufficiently where the lead wire and the contact are soldered. ② Soldering ② -1 For 6, 12, 20 and 11 (Contacts 1 to 7 only) Contact Types (1) Thread a heat shrink tube (with an inner diameter of φ1.1 MIN) over every second lead wire. The length of the tube should be in accordance with table 5. △ (2) Place the lead wire sheath to the contact and then solder. (3) With the heat shrink tube in contact with the insulator as shown in the diagram, apply heat to shrink the tube.
Number of Contacts	Contact Number	C Length																					
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																					

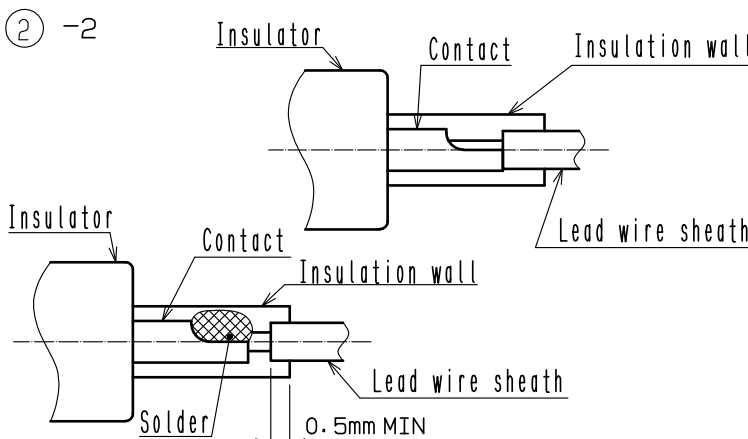
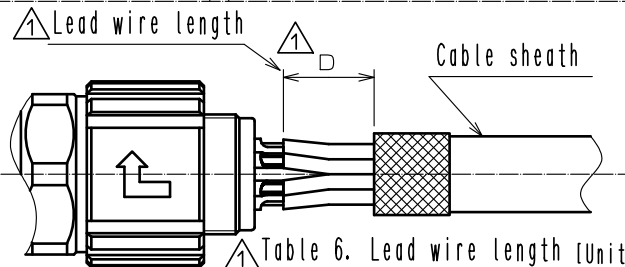
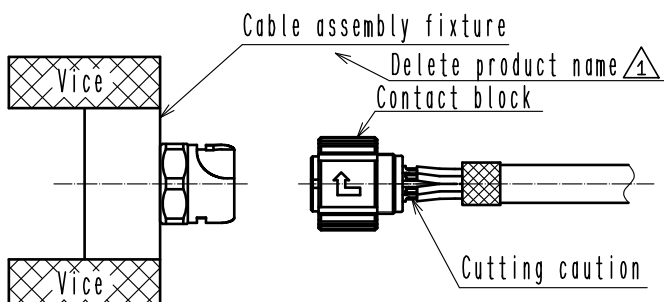
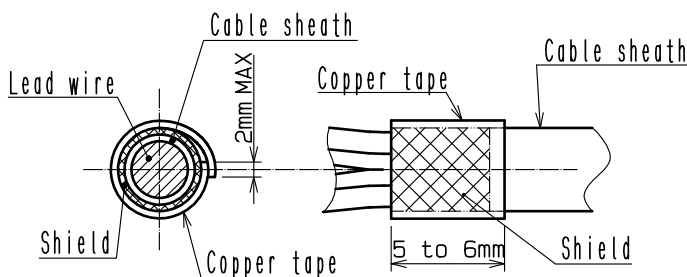
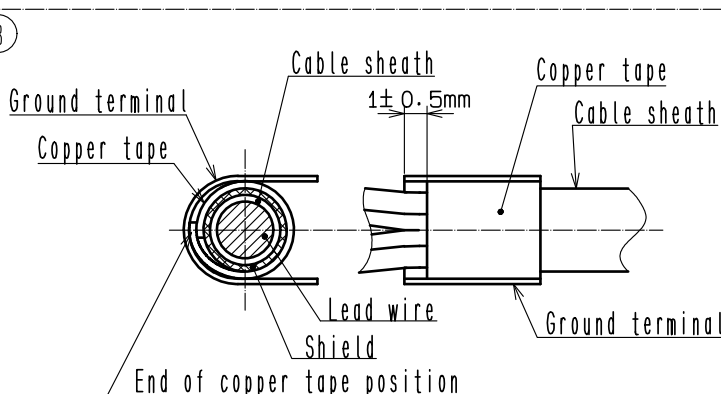
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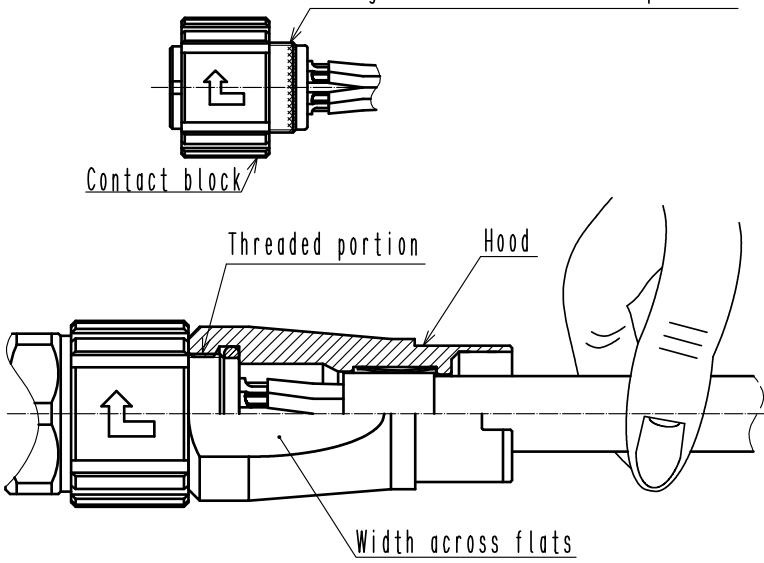
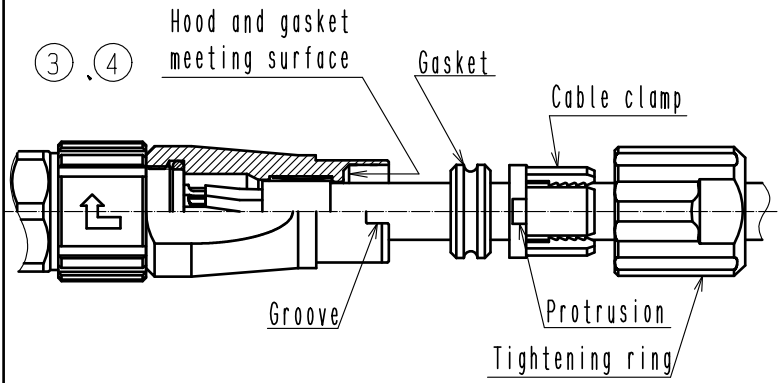
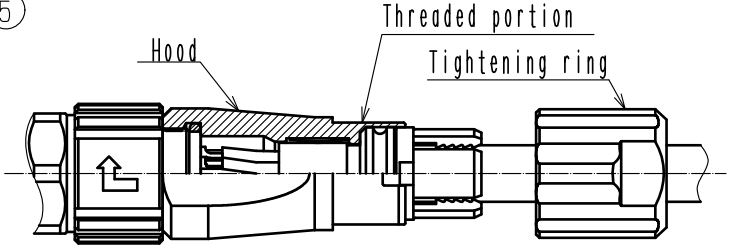
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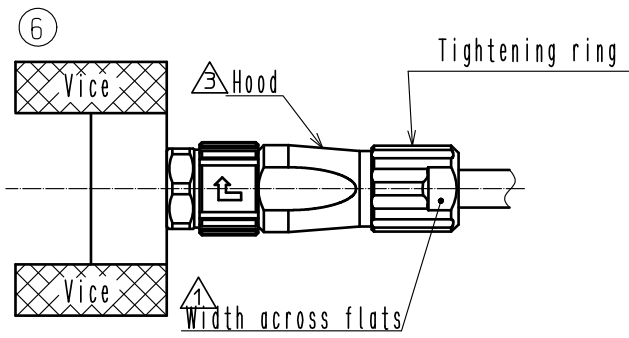
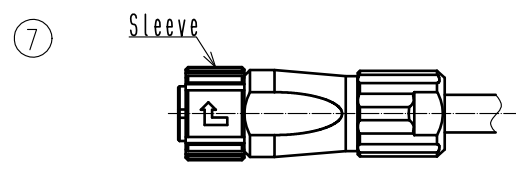
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No.	Drawing	Procedure Details													
4	② -2  Insulator, Contact, Insulation wall, Lead wire sheath, Solder, 0.5mm MIN	① ② -2 For 3, 4 and 11 (Contacts A to D only) Contact Types (1) Place the lead wire sheath to the contact and then solder. ① (2) When soldering, the insulation wall should overlap the lead wire by more than 0.5mm, as shown in the diagram, in order to maintain insulation between the contacts.													
	③  Lead wire length, D, Cable sheath ① Table 6. Lead wire length [Unit: mm] <table><thead><tr><th>Number of Contacts</th><th>D Length</th></tr></thead><tbody><tr><td>3</td><td>6 to 7</td></tr><tr><td>6</td><td>10 to 11</td></tr><tr><td>4</td><td>13 to 14</td></tr><tr><td>12</td><td>18 to 19</td></tr><tr><td>11</td><td></td></tr><tr><td>20</td><td></td></tr></tbody></table>	Number of Contacts	D Length	3	6 to 7	6	10 to 11	4	13 to 14	12	18 to 19	11		20	
Number of Contacts	D Length														
3	6 to 7														
6	10 to 11														
4	13 to 14														
12	18 to 19														
11															
20															
5	①  Cable assembly fixture, Delete product name, Contact block, Cutting caution, Vice	[Crimping of ground metal] ① After soldering, extract contact block from the cable assembly fixture. Note) Be careful that the lead wire does not break or bend at the soldered area.													
	②  Lead wire, Cable sheath, Shield, Copper tape, 2mm MAX, 5 to 6mm	② Wrap copper tape, of width 5 to 6mm, around the shield to prevent it from loosening. Make sure that the shield does not extend out of the copper tape. Note) Make sure that the overlapping portion of the tape is under 2mm.													
	③  Ground terminal, Copper tape, Cable sheath, Lead wire, Shield, End of copper tape position, 1±0.5mm	③ The ground terminal should be placed over the copper tape as shown in the diagram. The end of the copper tape should be at the bottom face of the U-shape. Note) If the end of the copper tape faces the mouth, the ground terminal will not cover the tape ends after crimping.													
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		⑤ 4 7													

No.	Drawing	Procedure Details																				
5	④ Open mouth side U-shaped inner surface Ground terminal Pliers E	④ ① Next, to prevent the ground terminal from falling, use a pliers, etc. to close the mouth of the ground terminal to the appropriate size as shown in table 7. This process will make it easier to crimp the ground terminal. ④ Table 7. <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													
	Shell Size	E																				
LF07	5mm MAX																					
LF10	7mm MAX																					
LF13																						
	⑤ Groove for crimping Crimping tool Delete product name Groove sizes 5.3 7.0 Change the figure No sticking out Table 8. Crimp Tools <table><tr><th>Shell Size</th><th>Crimp Tool Name</th><th>Groove Size</th><th>Applicable Cable</th><th>Ground Terminal Outer Diameter After Crimping</th></tr><tr><td>LF07</td><td>HR10A-TC-02</td><td>5.3</td><td>Φ5</td><td>Φ5.3mm to Φ5.5mm</td></tr><tr><td>LF10</td><td>LF-TC-01</td><td>7.9</td><td>Φ7.3</td><td>Φ7.9mm to Φ8.1mm</td></tr><tr><td>LF13</td><td>LF-TC-01</td><td>9.1</td><td>Φ8.7</td><td>Φ9.1mm to Φ9.3mm</td></tr></table>	Shell Size	Crimp Tool Name	Groove Size	Applicable Cable	Ground Terminal Outer Diameter After Crimping	LF07	HR10A-TC-02	5.3	Φ5	Φ5.3mm to Φ5.5mm	LF10	LF-TC-01	7.9	Φ7.3	Φ7.9mm to Φ8.1mm	LF13	LF-TC-01	9.1	Φ8.7	Φ9.1mm to Φ9.3mm	⑤ ① Place the ground terminal into the groove of the crimp tool as shown in the figure, and then crimp. ① Note) The appropriate cable size for each groove is shown in table 8. ⚠ Caution ③ (1) Be careful not to stick out the ground terminal from the tool. ※Refer to figure F. Cable E Crimping tool Ground terminal Out of side (2) Ensure that both ground terminal plates are inserted into the crimping die set before starting to crimp. ④ ※Refer to figure on the left. If the ground terminal is stuck out and crimped, without following the above precautions it may not be assembled into the connector or the performance may be impaired.
Shell Size	Crimp Tool Name	Groove Size	Applicable Cable	Ground Terminal Outer Diameter After Crimping																		
LF07	HR10A-TC-02	5.3	Φ5	Φ5.3mm to Φ5.5mm																		
LF10	LF-TC-01	7.9	Φ7.3	Φ7.9mm to Φ8.1mm																		
LF13	LF-TC-01	9.1	Φ8.7	Φ9.1mm to Φ9.3mm																		

No.	Drawing	Procedure Details												
6	①, ②  Table 9. Recommended Tightening Torque <table border="1"> <thead> <tr> <th>Shell Size</th><th>Tightening Torque</th><th>Width across flats</th></tr> </thead> <tbody> <tr> <td>LF07</td><td>1N·m to 1.5N·m</td><td>10mm</td></tr> <tr> <td>LF10</td><td>1.5N·m to 2N·m</td><td>13mm</td></tr> <tr> <td>LF13</td><td>1.5N·m to 2N·m</td><td>16mm</td></tr> </tbody> </table>	Shell Size	Tightening Torque	Width across flats	LF07	1N·m to 1.5N·m	10mm	LF10	1.5N·m to 2N·m	13mm	LF13	1.5N·m to 2N·m	16mm	[Connector assembly] ① Mate the cable-assembled contact block with the cable assembly fixture. (Applicable tool) Plug assembly: Reference table 1. Jack assembly: Reference table 2. ② Coat the threaded portion of the contact block with Loctite 263 compound (manufactured by Henkel Japan, Ltd.), tightening it with a torque specified in the table 9. ⚠ (Refer to ETAD-C0522-00) Notes (1) The applied loctite should not protrude out further than the wiring side 1 to 2 threaded portion. If it does, it may affect waterproof performance and locking. Please remove any protruding loctite with a cloth or cotton swab, etc. (2) If the cable is rotated it could cause a disconnection. The cable should be kept in place by hand, etc.
Shell Size	Tightening Torque	Width across flats												
LF07	1N·m to 1.5N·m	10mm												
LF10	1.5N·m to 2N·m	13mm												
LF13	1.5N·m to 2N·m	16mm												
	③, ④ 	③ Insert the gasket until it hits the hood and gasket meeting surface. ④ Align the protrusions of the cable clamp with the grooves of the hood and insert. ⚠ Note) If the groove of the hood and the protrusion of the clamp are not properly aligned, the cable could be twisted when the tightening ring is being tightened, which could lead to a disconnection.												
	⑤ 	⚠ ⑤ Apply Loctite 7649 of Henkel Japan Ltd., to the thread of the hood. After checking that it has dried, to prevent loosening, apply LOCTITE 263 manufactured by HENKEL JAPAN Co., Ltd. according to the Loctite applying procedure manual (ETAD-C0522-00).												

No.	Drawing	Procedure Details												
6	⑥  ① Table 10. Recommended tightening torque <table><tr><th>Shell Size</th><th>Tightening Torque</th><th>Wrench Width</th></tr><tr><td>LF07</td><td>0.8N·m to 1N·m</td><td>10mm</td></tr><tr><td>LF10</td><td>0.8N·m to 1N·m</td><td>14mm</td></tr><tr><td>LF13</td><td>1N·m to 1.5N·m</td><td>16mm</td></tr></table>	Shell Size	Tightening Torque	Wrench Width	LF07	0.8N·m to 1N·m	10mm	LF10	0.8N·m to 1N·m	14mm	LF13	1N·m to 1.5N·m	16mm	① ⑥ Tighten the tightening ring to the hood. The recommended torque is shown in Table 10. ⚠Caution⚠ Depending on the hardness of the cable, a gap may be visible between the tightening ring and the hood, but be careful not to tighten any further. Overtightening the screws until there is no clearance can cause damage or deterioration of performance.
	Shell Size	Tightening Torque	Wrench Width											
LF07	0.8N·m to 1N·m	10mm												
LF10	0.8N·m to 1N·m	14mm												
LF13	1N·m to 1.5N·m	16mm												
	⑦ 	⑦ Remove the connector from the cable assembly fixture, holding it by the sleeve. Do not pull on the cable. It may cause breakage.												
7		[Waterproof Performance Test] When assembly is completed, apply 17.6kPa of air pressure to the connector from the mating side for 30 seconds, and check that no air bubbles appear from the inside of the connector.												

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