

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

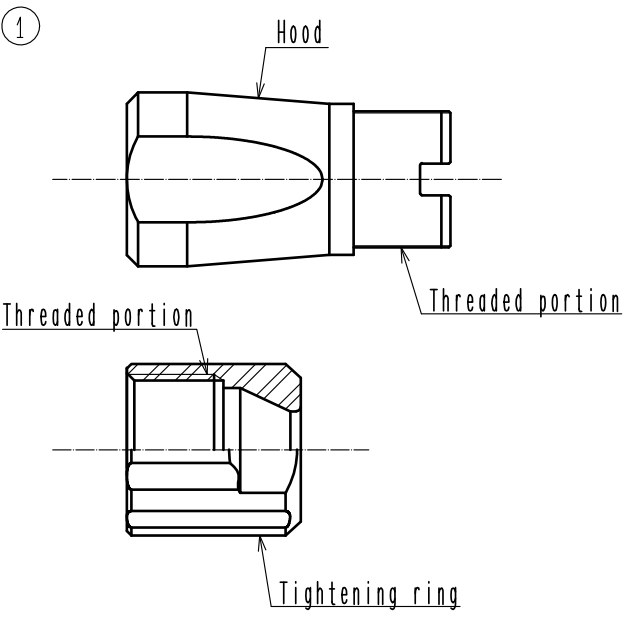
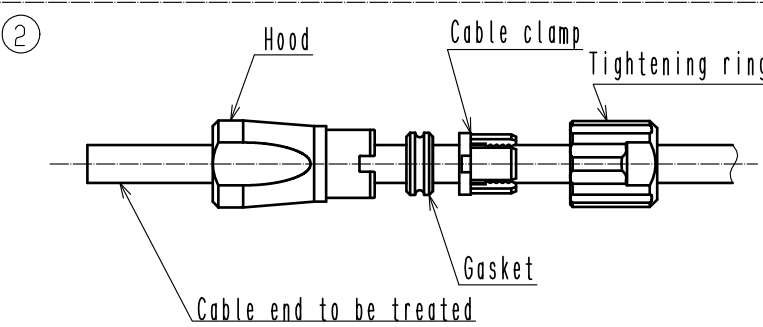
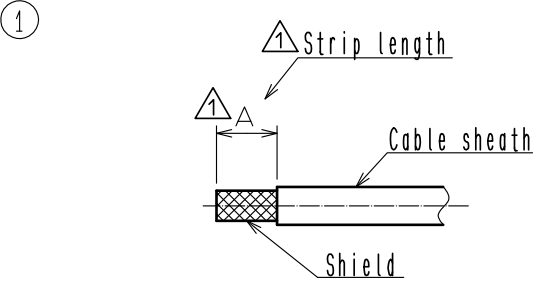
1. Procedure

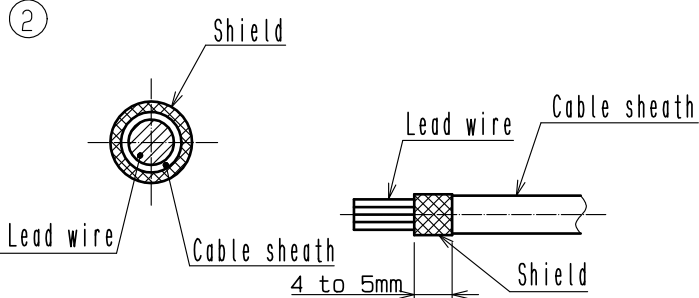
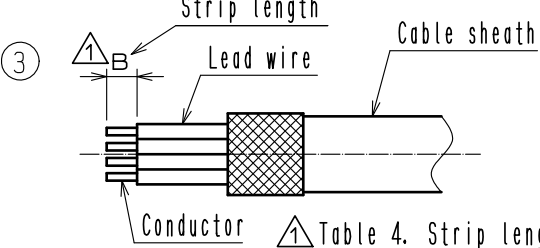
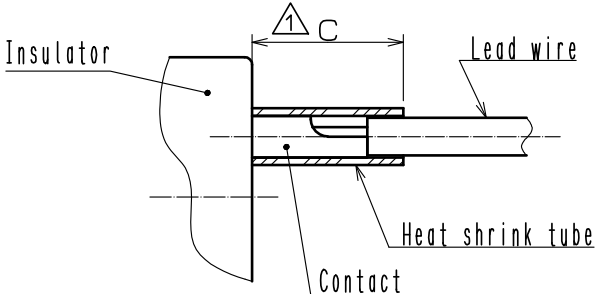
No.	Drawing	Procedure Details								
1	<p style="text-align:center;">Cable assembly fixture Delete product name ⚠ Plug Sleeve Insert Contact block Hood Retaining ring Detail view</p>	<p>[Plug Disassembly]</p> <p>① With the cable assembly fixture fixed in place with a vice etc., mate it with the plug.</p> <p>Table 1. ⚠⚠</p> <table border="1" style="width:100%; border-collapse: collapse;"> <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> <p>② Loosen the hood, and remove from the connector.</p> <p>⚠⚠ 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.</p>	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-※※									
	<p style="text-align:center;">Cable assembly fixture Delete product name ⚠ Jack Insert Contact block Hood Retaining ring Detail view</p>	<p>[Jack Disassembly]</p> <p>① With the cable assembly fixture fixed in place with a vice etc., mate it with the Jack.</p> <p>⚠ Table 2.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Tool Name</th> <th>Applicable Product</th> </tr> </thead> <tbody> <tr> <td>LF07BJ-T01</td> <td>LF07WBJ-※※</td> </tr> <tr> <td>LF10BJ-T01</td> <td>LF10WBJ-※※</td> </tr> <tr> <td>LF13BJ-T01</td> <td>LF13WBJ-※※</td> </tr> </tbody> </table> <p>② Loosen the hood, and remove from the connector.</p> <p>⚠ 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.</p>	Tool Name	Applicable Product	LF07BJ-T01	LF07WBJ-※※	LF10BJ-T01	LF10WBJ-※※	LF13BJ-T01	LF13WBJ-※※
Tool Name	Applicable Product									
LF07BJ-T01	LF07WBJ-※※									
LF10BJ-T01	LF10WBJ-※※									
LF13BJ-T01	LF13WBJ-※※									

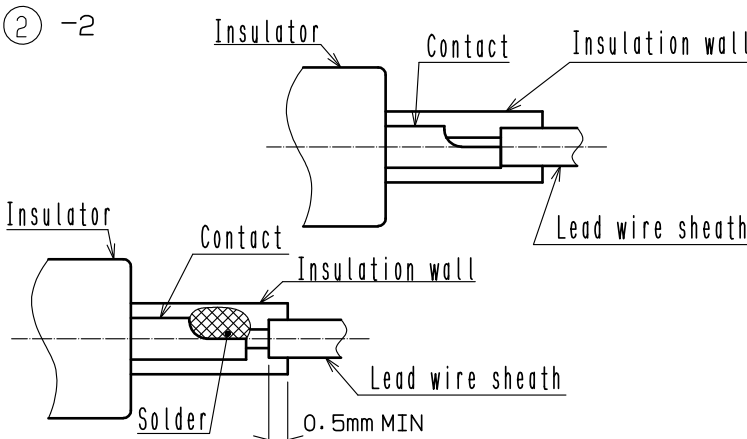
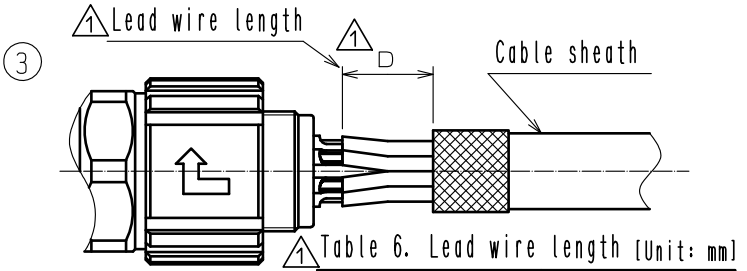
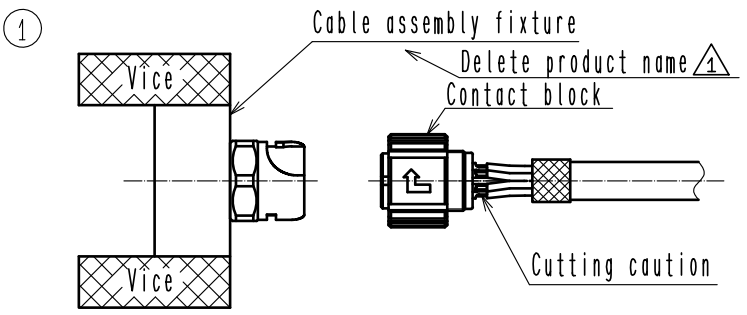
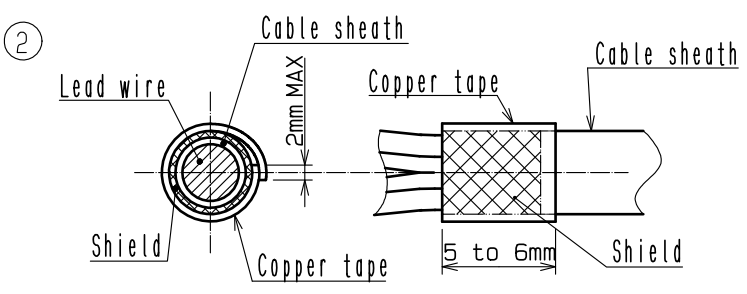
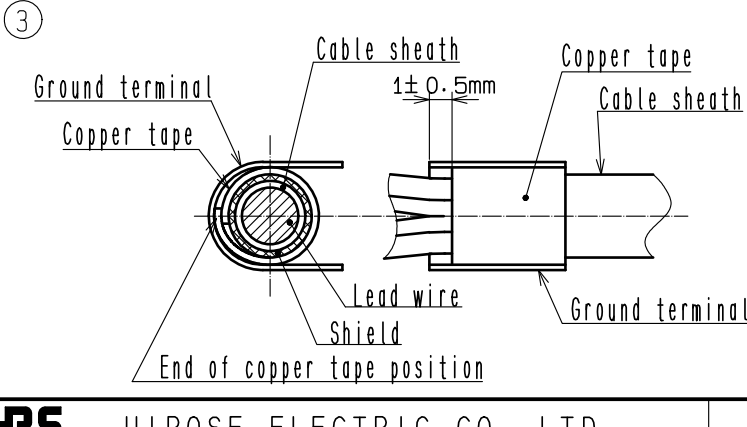
⚠ Caution ⚠  
Fasten the wiring jig securely so that it does not move even with the torque required to assemble the connector. Insufficient fixing may cause the connector to tilt during assembly, causing damage to the connector or failure to tighten with the specified torque.

⚠⚠ Note) Vice fixed ban

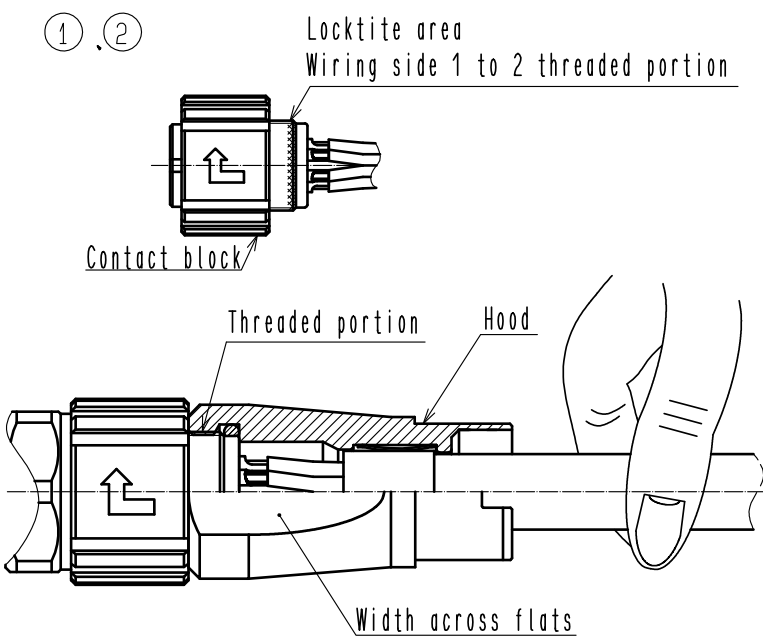
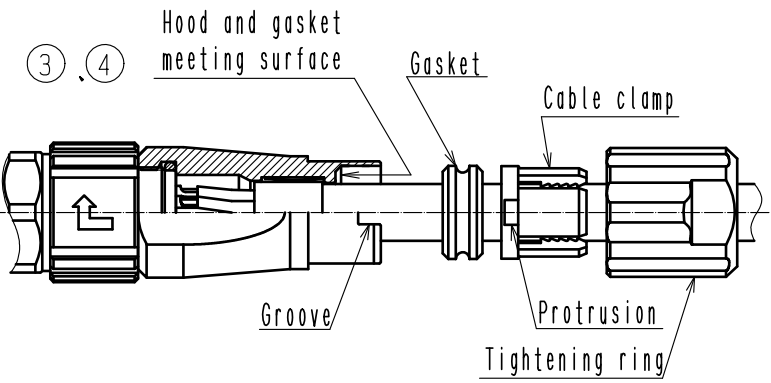
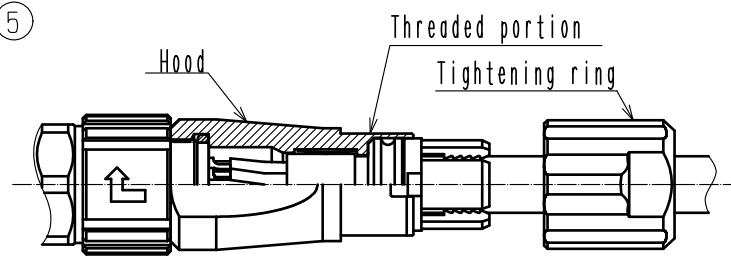
COUNT	DESCRIPTION OF REVISIONS	DESIGNED	CHECKED	DATE												
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<p>TITLE</p> <p>⚠</p> <p style="text-align:center;">LF CONNECTOR ASSEMBLY PROCEDURE.</p>		<p><b>HRS</b> HIROSE ELECTRIC CO., LTD.</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>APPROVED</td> <td>MR. YOSHIDA</td> <td>20050105</td> </tr> <tr> <td>CHECKED</td> <td>MO. SATOH</td> <td>20050105</td> </tr> <tr> <td>CHARGED</td> <td>YH. YAMADA</td> <td>20050105</td> </tr> <tr> <td>WRITTEN</td> <td>YH. YAMADA</td> <td>20050105</td> </tr> </table>			APPROVED	MR. YOSHIDA	20050105	CHECKED	MO. SATOH	20050105	CHARGED	YH. YAMADA	20050105	WRITTEN	YH. YAMADA	20050105
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WRITTEN	YH. YAMADA	20050105														
<p>TECHNICAL SPECIFICATION</p>		<p>ETAD-C0099</p>		<p>⚠ 1 / 7</p>												

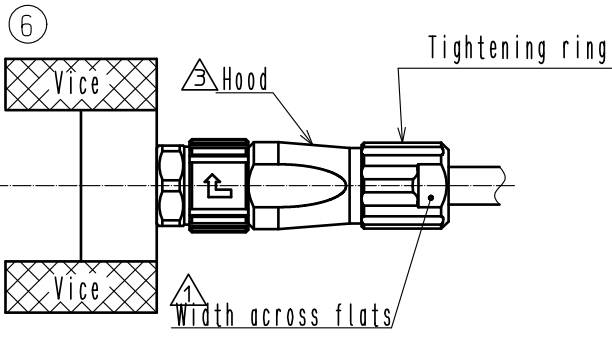
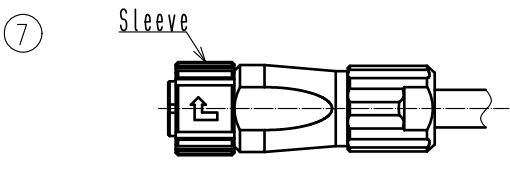
No.	Drawing	Procedure Details														
2	<p>①</p>  <p>②</p> 	<p>[Connector Assembly Preparation]</p> <p>① Spray or brush Loctite 7649 primer, manufactured by Henkel Japan LTD., on the threaded portions of both the hood and the tightening ring, and then allow the primer-applied surfaces to dry completely.</p> <p>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 volatized during drying.                  (3) After applying primer, keep the primer-applied surfaces away from dirt or dust.</p> <p>② Thread the cable through the tightening ring, cable clamp, gasket, and hood in the order shown in the figure.</p> <p>Note) Threading of the components may not be possible after treating the cable.</p>														
3	<p>①</p>  <p>△</p> <p>Table 3. Strip lengths <span style="float: right;">[Unit: mm]</span></p> <table border="1" data-bbox="268 1758 874 2033"> <thead> <tr> <th>Number of Contacts</th> <th>A Length</th> </tr> </thead> <tbody> <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> </tbody> </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)	<p>[Cable-end stripping]</p> <p>△ ① Strip the cable at the appropriate length shown in the table 3.</p> <p>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.</p>
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)															

No.	略 図	作業内容																					
3		<p>( Crimping of ground terminal )</p> <p>② Fold the shield over the cable sheath uniformly.</p>																					
	 <p>③ Strip the lead wire in the dimension shown in the table 4.</p> <p>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.</p> <p>△ Table 4. Strip lengths [Unit: mm]</p> <table border="1" data-bbox="523 712 997 1014"> <thead> <tr> <th>Number of Contacts</th> <th>B Length</th> </tr> </thead> <tbody> <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> </tbody> </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)								
Number of Contacts	B Length																						
3	2.5±0.5																						
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	△ 2±0.5 (No. 1 to 7)																						
4	 <p>② -1</p> <p>△ Table 5. [Unit: mm]</p> <table border="1" data-bbox="284 1541 914 1821"> <thead> <tr> <th>Number of Contacts</th> <th>Contact Number</th> <th>C Length</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>△ Caution △ When heating heat shrink tube, be careful hot air does not hit cable or insulation case directly.</p>	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	<p>[Soldering]</p> <p>① Soldering conditions Soldering tip temperature: 350±10℃ Soldering time: 5 seconds MAX</p> <p>Notes △</p> <p>(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.</p> <p>② Soldering</p> <p>② -1 For 6, 12, 20 and 11 (Contacts 1 to 7 only) Contact Types</p> <p>(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.</p> <p>△ (2) Place the lead wire sheath to the contact and then solder.</p> <p>(3) With the heat shrink tube in contact with the insulator as shown in the diagram, apply heat to shrink the tube.</p>
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																					

No.	Drawing	Procedure Details														
4	<p>② -2</p>  <p>Insulator, Contact, Insulation wall, Lead wire sheath, Solder, 0.5mm MIN</p> <p>③</p>  <p>Lead wire length, D, Cable sheath</p> <p>Table 6. Lead wire length [Unit: mm]</p> <table border="1" data-bbox="542 840 965 1030"> <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>6 to 7</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>18 to 19</td> </tr> <tr> <td>20</td> <td>18 to 19</td> </tr> </tbody> </table>	Number of Contacts	D Length	3	6 to 7	6	6 to 7	4	10 to 11	12	13 to 14	11	18 to 19	20	18 to 19	<p>①</p> <p>② -2 For 3, 4 and 11 (Contacts A to D only) Contact Types</p> <p>(1) Place the lead wire sheath to the contact and then solder.</p> <p>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.</p> <p>③</p> <p>① After soldering, the distance between the contact end surface and the cable sheath end should be as shown in the table 6.</p> <p>① (Note) If this distance is not satisfied, secure connection of the clamped shield to the shell may not be acquired.</p>
Number of Contacts	D Length															
3	6 to 7															
6	6 to 7															
4	10 to 11															
12	13 to 14															
11	18 to 19															
20	18 to 19															
U	<p>①</p>  <p>Cable assembly fixture, Delete product name, Contact block, Cutting caution, Vice</p> <p>②</p>  <p>Lead wire, Cable sheath, Shield, Copper tape, 2mm MAX, 5 to 6mm</p> <p>③</p>  <p>Ground terminal, Cable sheath, Copper tape, Cable sheath, Lead wire, Shield, End of copper tape position, 1±0.5mm, Ground terminal</p>	<p>[Crimping of ground metal]</p> <p>① After soldering, extract contact block from the cable assembly fixture.</p> <p>Note) Be careful that the lead wire does not break or bend at the soldered area.</p> <p>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.</p> <p>Note) Make sure that the overlapping portion of the tape is under 2mm.</p> <p>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.</p> <p>Note) If the end of the copper tape faces the mouth, the ground terminal will not cover the tape ends after crimping.</p>														

No.	Drawing	Procedure Details																				
⑤ U	④ <p>Open mouth side</p> <p>U-shaped inner surface</p> <p>Ground terminal</p> <p>Pliers</p> <p>E</p>	④ ⚠ 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. ⚠ Table 7. <table border="1" data-bbox="1034 450 1441 589"> <thead> <tr> <th>Shell Size</th> <th>E</th> </tr> </thead> <tbody> <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> </tbody> </table>	Shell Size	E	LF07	5mm MAX	LF10	7mm MAX	LF13													
Shell Size	E																					
LF07	5mm MAX																					
LF10	7mm MAX																					
LF13																						
	⑤ <p>Groove for crimping</p> <p>Crimping tool</p> <p>Delete product name</p> <p>F</p> <p>Groove sizes</p> <p>5.3</p> <p>7.0</p> <p>Change the figure</p> <p>No sticking out</p> <p>5.3</p> <p>7.0</p> <p>⚠ Table 8. Crimp Tools</p> <table border="1" data-bbox="229 1512 986 1675"> <thead> <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> </thead> <tbody> <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> </tbody> </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 ⚠ Place the ground terminal into the groove of the crimp tool as shown in the figure, and then crimp. ⚠ Note) The appropriate cable size for each groove is shown in table 8. ⚠ Caution ⚠ (1) Be careful not to stick out the ground terminal from the tool. ※ Refer to figure F. <p>Cable</p> <p>Crimping tool</p> <p>Ground terminal</p> <p>E</p> <p>Out of side</p> <p>(2) Ensure that both ground terminal plates are inserted into the crimping die set before starting to crimp.                      ⚠ 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.</p>
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	 <p>①, ②</p> <p>Locktite area Wiring side 1 to 2 threaded portion</p> <p>Contact block</p> <p>Threaded portion Hood</p> <p>Width across flats</p> <p>△ Table 9. Recommended Tightening Torque</p> <table border="1" data-bbox="263 896 941 1041"> <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>1N·m to 1.5N·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	1N·m to 1.5N·m	13mm	LF13	1.5N·m to 2N·m	16mm	<p>[Connector assembly]</p> <p>① Mate the cable-assembled contact block with the cable assembly fixture. (Applicable tool) Plug assembly: Reference table 1. Jack assembly: Reference table 2.</p> <p>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.</p> <p>△ (Refer to ETAD-C0522-00)</p> <p>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.</p> <p>(2) If the cable is rotated it could cause a disconnection. The cable should be kept in place by hand, etc.</p>
Shell Size	Tightening Torque	Width across flats												
LF07	1N·m to 1.5N·m	10mm												
LF10	1N·m to 1.5N·m	13mm												
LF13	1.5N·m to 2N·m	16mm												
	 <p>③, ④</p> <p>Hood and gasket meeting surface</p> <p>Gasket</p> <p>Cable clamp</p> <p>Groove</p> <p>Protrusion</p> <p>Tightening ring</p>	<p>③ Insert the gasket until it hits the hood and gasket meeting surface.</p> <p>④ Align the protrusions of the cable clamp with the grooves of the hood and insert.</p> <p>△ 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.</p>												
	 <p>⑤</p> <p>Hood</p> <p>Threaded portion</p> <p>Tightening ring</p>	<p>△, △</p> <p>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).</p>												

No.	Drawing	Procedure Details												
6	<p>⑥</p>  <p>① Table 10. Recommended tightening torque</p> <table border="1" data-bbox="231 526 893 660"> <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 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> </tbody> </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	<p>①</p> <p>⑥ Tighten the tightening ring to the hood. The recommended torque is shown in Table 10.</p> <p>⚠ Caution ⚠</p> <p>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.</p>
Shell Size	Tightening Torque	Wrench Width												
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	<p>⑦</p> 	<p>⑦ Remove the connector from the cable assembly fixture, holding it by the sleeve.</p> <p>Do not pull on the cable. It may cause breakage.</p>												
7		<p>[Waterproof Performance Test]</p> <p>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.</p>												