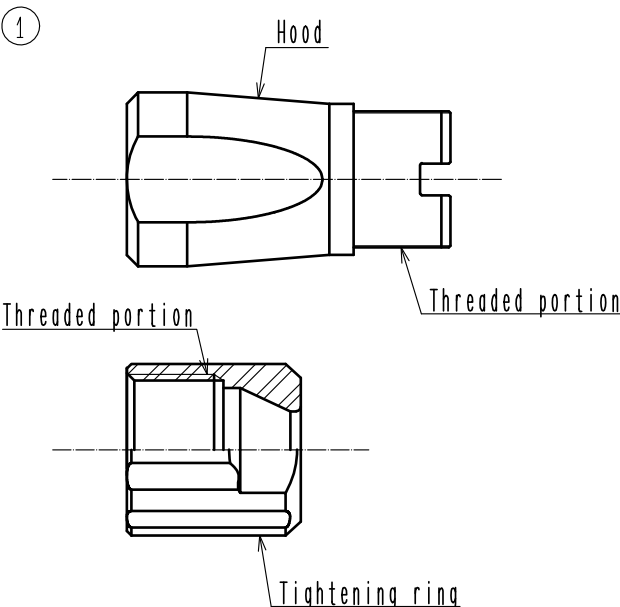
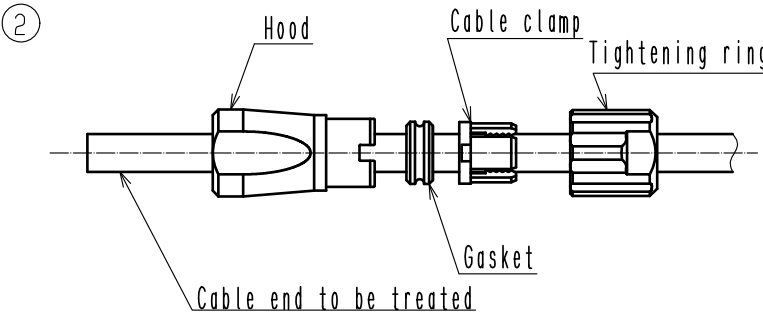
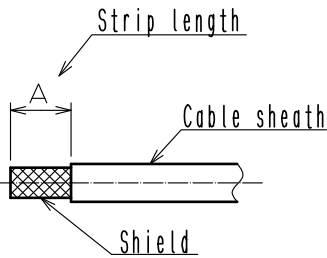
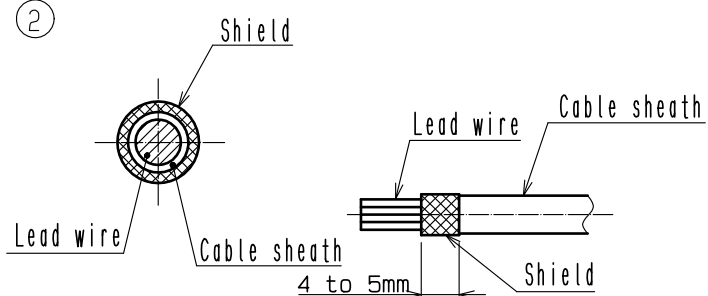
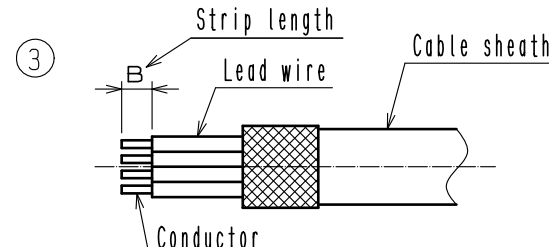
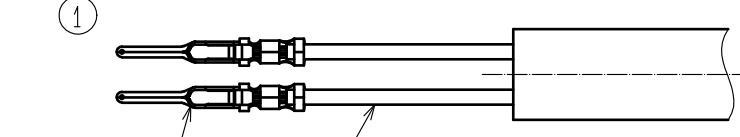
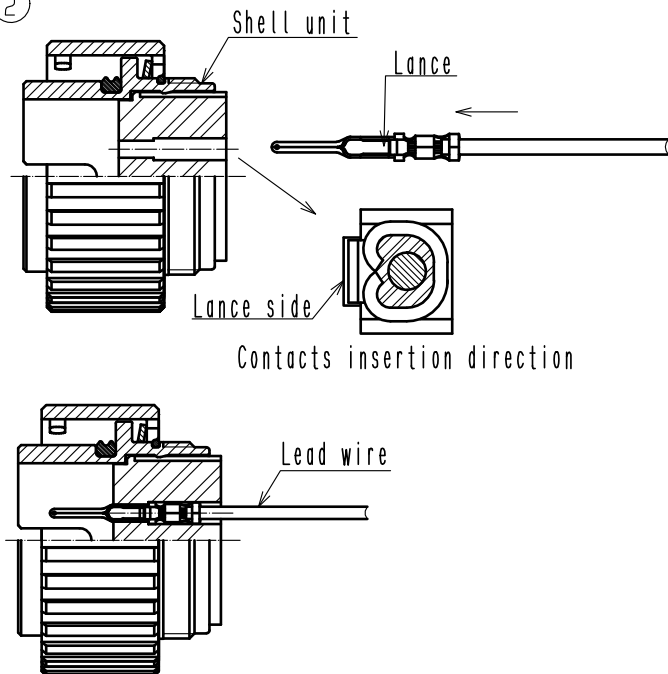


This document describes the recommended assembly procedure of LF connectors crimp type(Plug, Jack).

1. Procedure

No.	Drawing	Procedure Details												
1	<p>Cable assembly fixture</p> <p>Vice</p> <p>Plug</p> <p>Insert</p> <p>Sleeve</p> <p>Contact block</p> <p>Hood</p> <p>Note) Vice fixed band</p> <p>Retaining ring</p> <p>A Detail view</p> <p>Jack</p> <p>Note) Vice fixed band</p> <p>Caution</p> <p>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.</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><thead><tr><th>Tool Name</th><th>Applicable Product</th></tr></thead><tbody><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> <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><thead><tr><th>Tool Name</th><th>Applicable Product</th></tr></thead><tbody><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	LF10BP-T01	LF10WBP-※※	LF13BP-T01	LF13WBP-※※	Tool Name	Applicable Product	LF10BJ-T01	LF10WBJ-※※	LF13BJ-T01	LF13WBJ-※※
Tool Name	Applicable Product													
LF10BP-T01	LF10WBP-※※													
LF13BP-T01	LF13WBP-※※													
Tool Name	Applicable Product													
LF10BJ-T01	LF10WBJ-※※													
LF13BJ-T01	LF13WBJ-※※													
△	COUNT	DESCRIPTION OF REVISIONS	DESIGNED	CHECKED	DATE									
△	1	DIS-C-00017110	HT. ZENBA	EJ. KUNII	20240219									
TITLE				HRS HIROSE ELECTRIC CO., LTD.										
LF connector crimp type assembly procedure				APPROVED	HY. KOBAYASHI 20190404									
				CHECKED	HY. KOBAYASHI 20190404									
				CHARGED	KN. IKEHARA 20190404									
				WRITTEN	KN. IKEHARA 20190404									
TECHNICAL SPECIFICATION				ETAD-C0414-00	△ 1 6									

No.	Drawing	Procedure Details											
2	<p>①</p>  <p>Hood</p> <p>Threaded portion</p> <p>Threaded portion</p> <p>Tightening ring</p> <p>②</p>  <p>Hood</p> <p>Cable clamp</p> <p>Tightening ring</p> <p>Gasket</p> <p>Cable end to be treated</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 volatilized 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>Strip length</p> <p>A</p> <p>Cable sheath</p> <p>Shield</p> <p>Table 3. Strip lengths <span style="float: right;">[Unit: mm]</span></p> <table border="1" data-bbox="268 1765 890 1904"> <thead> <tr> <th rowspan="2">Number of Contacts</th><th colspan="2">A Length</th></tr> <tr> <th>Male contact</th><th>Female contact</th></tr> </thead> <tbody> <tr> <td>12</td><td>19 to 20</td><td>21 to 22</td></tr> <tr> <td>20</td><td>28 to 29</td><td>30 to 31</td></tr> </tbody> </table>	Number of Contacts	A Length		Male contact	Female contact	12	19 to 20	21 to 22	20	28 to 29	30 to 31	<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												
	Male contact	Female contact											
12	19 to 20	21 to 22											
20	28 to 29	30 to 31											

No.	Drawing	Procedure Details											
3	<p>②</p>  <p>Shield Lead wire Cable sheath 4 to 5mm Shield</p>	<p>(Crimping of ground terminal)</p> <p>② Fold the shield over the cable sheath uniformly.</p>											
	<p>③</p>  <p>Strip length B Lead wire Cable sheath Conductor</p> <p>Table 4. Strip lengths [Unit: mm]</p> <table><tr><th>Number of Contacts</th><th>B Length</th></tr><tr><td>12</td><td rowspan="2">1.5 ~ 2</td></tr><tr><td>20</td></tr></table>	Number of Contacts	B Length	12	1.5 ~ 2	20	<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>						
Number of Contacts	B Length												
12	1.5 ~ 2												
20													
4	<p>①</p>  <p>Crimp contacts Lead wire</p> <p>Table Apply tools</p> <table><tr><th>Type</th><th>Tool name</th><th>Product No.</th></tr><tr><td>Manual</td><td>Manual crimping tool</td><td>HT802/HR12-SC-1</td></tr><tr><td rowspan="2">Automatic</td><td>Automatic crimping tool</td><td>CM-105C</td></tr><tr><td>Applicator</td><td>AP105-HR12-1</td></tr></table> <p>②</p>  <p>Shell unit Lance Lance side Contacts insertion direction Lead wire</p>	Type	Tool name	Product No.	Manual	Manual crimping tool	HT802/HR12-SC-1	Automatic	Automatic crimping tool	CM-105C	Applicator	AP105-HR12-1	<p>[Crimp connection]</p> <p>① Crimp the crimp terminal to the lead wire.</p> <p>② Regarding crimp quality standards such as crimp height, please confirm the crimp condition table attached to the applicable tool in the left table.</p> <p>③ Insert the crimped terminal into the hole of the shell unit. When inserting the terminal, align the direction of the terminal hole with the terminal as shown in the figure, and insert until it clicks. After inserting the product, pull the lead wire lightly (about 2 to 3 N) to make sure that the terminal is fixed.</p> <p>Notes</p> <p>(1) If the terminal is not aligned during insertion, it will be damaged.</p> <p>(2) If the terminal is pushed too much during insertion, the housing may be damaged and the terminal may stick out to the mating surface.</p> <p>(3) If the lead wire is pulled 20 N or more after insertion, the terminal and housing may be damaged.</p>
Type	Tool name	Product No.											
Manual	Manual crimping tool	HT802/HR12-SC-1											
Automatic	Automatic crimping tool	CM-105C											
	Applicator	AP105-HR12-1											

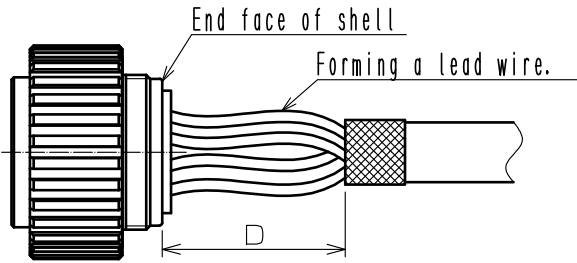
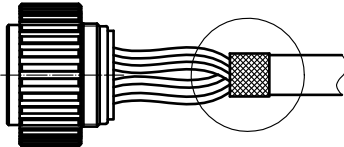
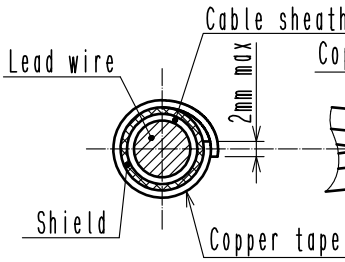
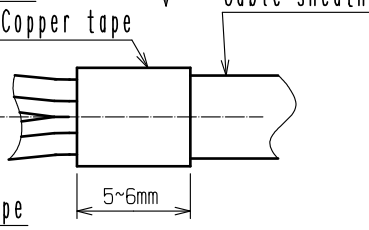
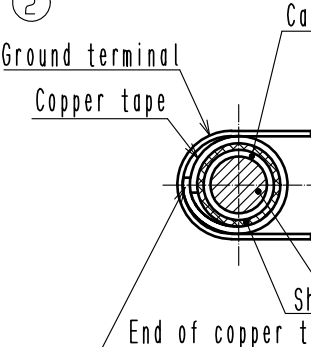
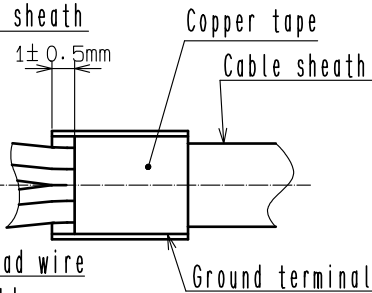
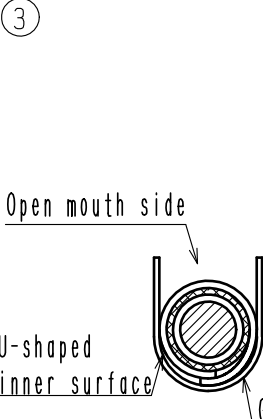
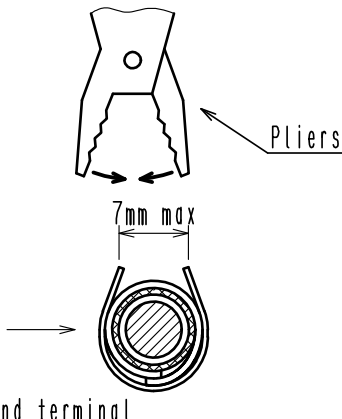
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No.	Drawing	Procedure Details						
4	<div><div>③</div><div></div><div>Table 6. Lead wire length</div><table><thead><tr><th>Number of Contacts</th><th>D Length</th></tr></thead><tbody><tr><td>12芯</td><td>15 ~ 16</td></tr><tr><td>20芯</td><td>20 ~ 21</td></tr></tbody></table></div>	Number of Contacts	D Length	12芯	15 ~ 16	20芯	20 ~ 21	<div><div>③</div><div>After inserting the terminal, form the lead wire as shown in the left figure.</div><div>The distance between shell end surface and cable sheath end surface shall be shown in the table 6.</div><div>Note)</div><div>If this distance is not satisfied, secure connection of the clamped shield to the shell may not be acquired.</div></div>
Number of Contacts	D Length							
12芯	15 ~ 16							
20芯	20 ~ 21							
5	<div><div>①</div><div></div><div></div><div></div></div> <div><div>②</div><div></div><div></div></div> <div><div>③</div><div></div><div></div></div>	<div>[Crimping of ground metal]</div> <div><div>①</div><div>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.</div><div>Note)</div><div>Make sure that the overlapping portion of the tape is under 2mm.</div></div> <div><div>②</div><div>The ground terminal should be placed over the copper tape as shown in the diagram.</div><div>The end of the copper tape should be at the bottom face of the U-shape.</div><div>Note)</div><div>If the end of the copper tape faces the mouth, the ground terminal will not cover the tape ends after crimping.</div></div> <div><div>③</div><div>Next, to prevent the ground terminal from falling, use a pliers, etc. to close the mouth of the ground terminal to the appropriate size.</div><div>This process will make it easier to crimp the ground terminal.</div></div>						

HRS

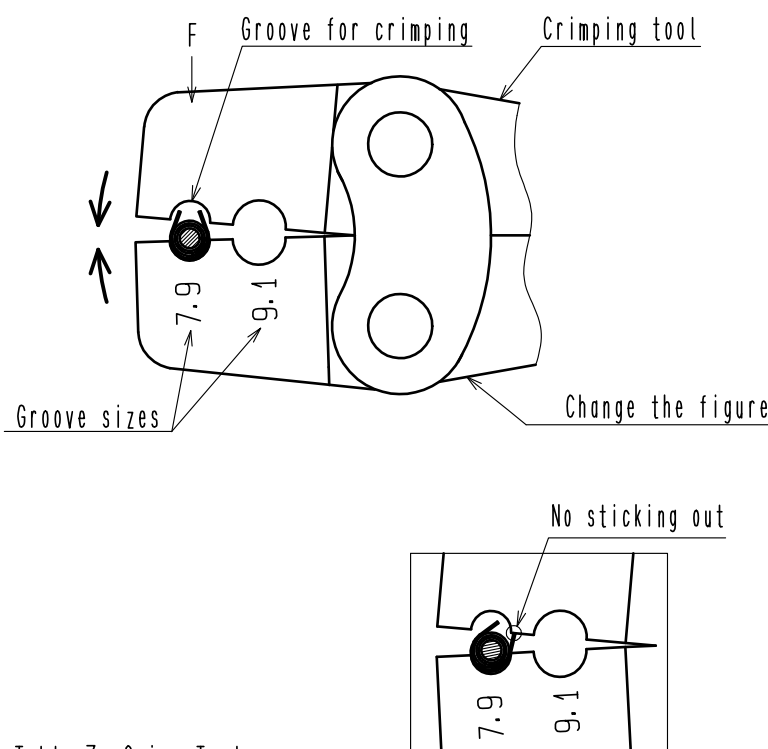
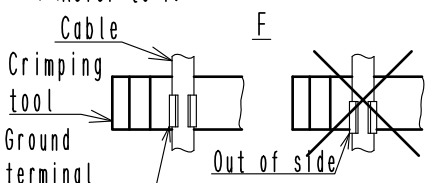
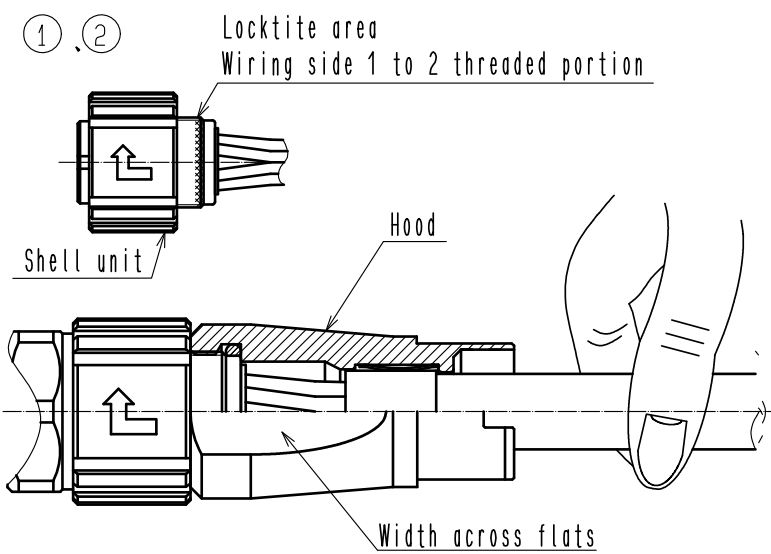
HIROSE ELECTRIC CO., LTD.

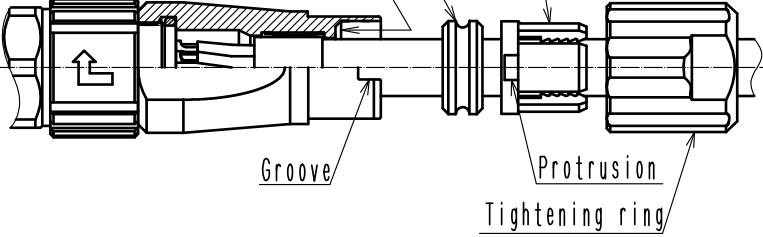
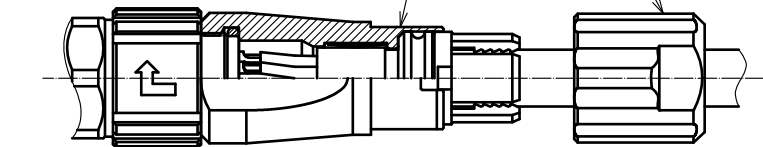
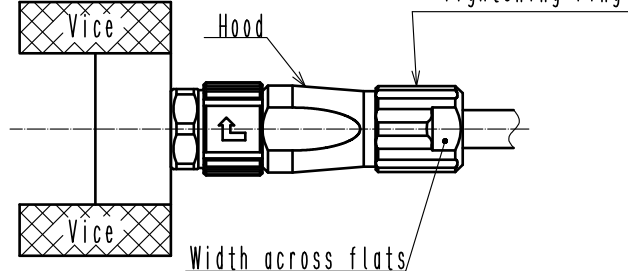
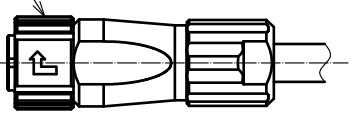
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No.	Drawing	Procedure Details											
5	<div><div>④</div><div></div></div> <div><div>Table 7. Crimp Tools</div><table><tr><th>Crimp Tool Name</th><th>Groove Size</th><th>Applicable Cable</th><th>Ground Terminal Outer Diameter After Crimping</th></tr><tr><td rowspan="2">LF-TC-01</td><td>7.9</td><td>Φ7.3</td><td>Φ7.9mm~Φ8.1mm</td></tr><tr><td>9.1</td><td>Φ8.7</td><td>Φ9.1mm~Φ9.3mm</td></tr></table></div>	Crimp Tool Name	Groove Size	Applicable Cable	Ground Terminal Outer Diameter After Crimping	LF-TC-01	7.9	Φ7.3	Φ7.9mm~Φ8.1mm	9.1	Φ8.7	Φ9.1mm~Φ9.3mm	<div><div>④</div><div><p>Place the ground terminal into the groove of the crimp tool as shown in the figure, and then crimp.</p><p>Note)</p><p>The appropriate cable size for each groove is shown in table 7.</p><p>⚠ Cautions</p><p>(1)Be careful not to stick out the ground terminal from the tool. ※Refer to F.</p><div></div><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.</p><p>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></div></div>
Crimp Tool Name	Groove Size	Applicable Cable	Ground Terminal Outer Diameter After Crimping										
LF-TC-01	7.9	Φ7.3	Φ7.9mm~Φ8.1mm										
	9.1	Φ8.7	Φ9.1mm~Φ9.3mm										
6	<div><div>① ②</div><div></div></div> <div><div>Table 8. Recommended Tightening Torque</div><table><tr><th>Shell Size</th><th>Tightening Torque</th><th>Width across flats</th></tr><tr><td>LF10</td><td>1N・m~1.5N・m</td><td>13 mm</td></tr><tr><td>LF13</td><td>1.5N・m~2N・m</td><td>16 mm</td></tr></table></div>	Shell Size	Tightening Torque	Width across flats	LF10	1N・m~1.5N・m	13 mm	LF13	1.5N・m~2N・m	16 mm	<div><div>[Connector assembly] ⚠</div><div><div>①</div><div><p>Mate the cable-assembled shell unit with inserted terminals fixture. (Applicable tool) Plug assembly:Reference table 1. Jack assembly:Reference tabel 2.</p></div></div><div><div>②</div><div><p>Coat the threaded portion of the shell block with Loctite 263 compound(manufactured by Henkel Japan, Ltd.) or equivalent. (Reffer to ETAD-C0522-00) tightening it with a torque specified in the table 8.</p></div></div><div><div>Notes</div><div><p>(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></div></div></div>		
Shell Size	Tightening Torque	Width across flats											
LF10	1N・m~1.5N・m	13 mm											
LF13	1.5N・m~2N・m	16 mm											
<div><div>HRS</div><div>HIROSE ELECTRIC CO., LTD.</div></div>		<div><div>ETAD-C0414-00</div><div><div>2</div><div>5</div><div>6</div></div></div>											

No.	Drawing	Procedure Details									
6	<p>③ ④</p>  <p>Hood and gasket meeting surface Gasket Cable clamp Groove Protrusion Tightening ring</p> <p>⑤</p>  <p>Threaded portion Tightening ring</p> <p>⑥</p>  <p>Vice Hood Tightening ring Width across flats</p> <p>Table 9. Recommended tightening torque</p> <table border="1" data-bbox="231 1355 885 1467"> <thead> <tr> <th>Shell Size</th><th>Tightening Torque</th><th>Wrench Width</th></tr> </thead> <tbody> <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> <p>⑦</p>  <p>Sleeve</p>	Shell Size	Tightening Torque	Wrench Width	LF10	0.8N·m to 1N·m	14mm	LF13	1N·m to 1.5N·m	16mm	<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 Apply Loctite 7649 of Henkel Japan Ltd., to the thread of the hood. After checking that it has dried, apply Loctite 263 around the full circumference.</p> <p>⑥ Tighten the tightening ring to the hood. The recommended torque is shown in Table 9.</p> <p><b>⚠ Caution</b> 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> <p>⑦ Remove the connector from the cable assembly fixture, holding it by the sleeve. Do not pull on the cable. It may cause breakage.</p>
Shell Size	Tightening Torque	Wrench Width									
LF10	0.8N·m to 1N·m	14mm									
LF13	1N·m to 1.5N·m	16mm									
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>									