

## 1. Scope of application

This Technical Specification prescribes the work procedure for wiring PQ50WA-2U-PC2.

## 2. Connectors covered

<Product names>

### (1) Composition for using a female crimp housing

<Product code>

PQ50WA-2U-PC2	(plug cover case)	CL236-2092-0
PQ50WA/S-10S/34S-UNIT	(plug crimp case)	CL236-2085-0
PQ50WASX-46S-UNIT	(shielded plug crimp case)	CL236-2086-0
PQWT-CMA(**)	(gasket clamp) Representative	CL236-2028-0
PQWT-EBC(PG29)	(end bell cap)	CL236-2066-6
PQ50 -1618SCFA	(female connector)	CL236-2008-0
PQ50S -1822SCFA	(female connector)	CL236-2026-1
PQ50S -2428SCFA	(female connector)	CL236-2028-7

### (2) Composition for using a male crimp housing

PQ50WA -2U-PC2	(plug cover case)	CL236-2092-0
PQ50WA/S-10P/34P-UNIT	(plug crimp case)	CL236-2088-0
PQ50WASX-46P-UNIT	(shielded plug crimp case)	CL236-2086-0
PQWT-CMA(**)	(gasket clamp) Representative	CL236-2028-0
PQ50WT-EBC(PG29)	(end bell cap)	CL236-2066-6
PQ50A -1618PCFA	(male connector)	CL236-2007-7
PQ50SA -1822PCFA	(male connector)	CL236-2026-1
PQ50SA -2428PCFA	(male connector)	CL236-2028-7

## 3. Recommended applicable cables

Name of the manufacturer: Taiyo Cabletec Corporation

Product name: 2464-1007-SB(NPB) Black LF 44×17AWG (for power supply)  
2464-3599/IIA-SB Black LF 18P×23AWG (for signals)

Wire size: AWG#17×44cores Outer diameter of the cable φ22.5mm (for power supply)  
AWG#23×36cores (18 pairs) Outer diameter of the cable φ13.0mm(for signals)

## 4. Work procedure

Please refer to the following pages.

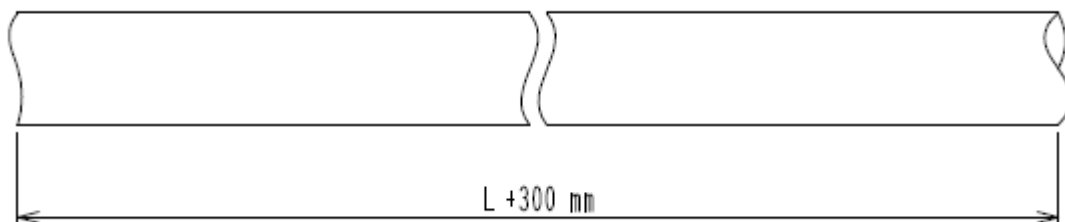
	COUNT	DESCRIPTION OF REVISIONS	DESIGNED	CHECKED	DATE
△					
TITLE PQ50WA-2U-PC2 Wiring Procedure			<b>HR</b> HIROSE ELECTRIC CO.,LTD.		
			APPROVED	RI.TAKAYASU	16.06.13
			CHECKED	NM.NISHIMATSU	16.06.10
			DESIGNED	TY.MIURA	16.06.10
			WRITTEN	TY.MIURA	16.06.10
TECHNICAL SPECIFICATION			ETAD-E3151-00		△ 1 / 30

## 【Work procedure 】

### 4-1. Cutting cables

Cut the cable you intend to use at the position of +300mm from the finished length L.

\*Check the finished length L by the wiring diagram provided by the manufacturer.



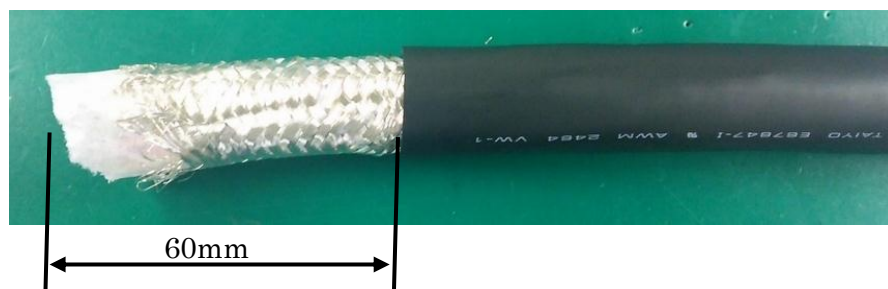
### 4-2. Termination/crimping of cables

#### 4-2-1 (On the signal side)

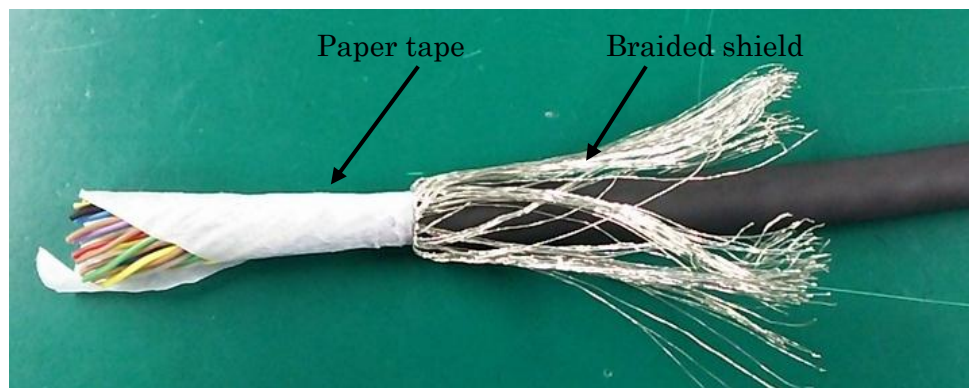
Put the end bell cap (PQWT-EBC(PG29)) and the gasket clamp (PQWT-CMA(\*\*)) through the cable in this order in advance.



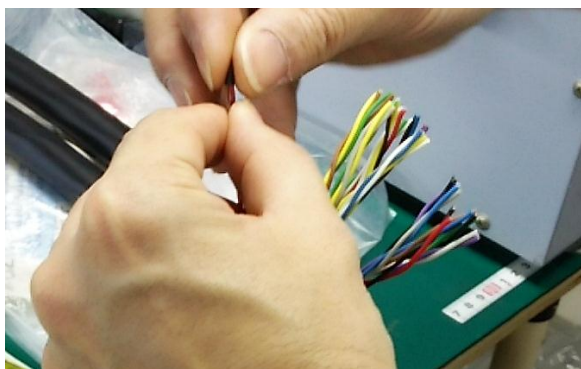
Strip the sheath off the cable by 60mm.



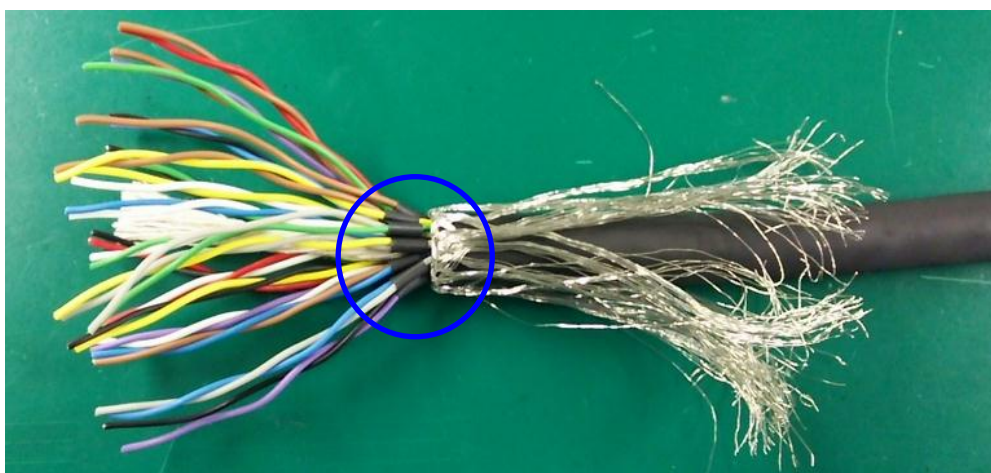
Unbind the braided shield, and turn it up.



Cut and remove the paper tape, and cover each pair of wires with a rubber tube (shrinkable tube etc.) so that the wires can be identified even after the twist has been removed.

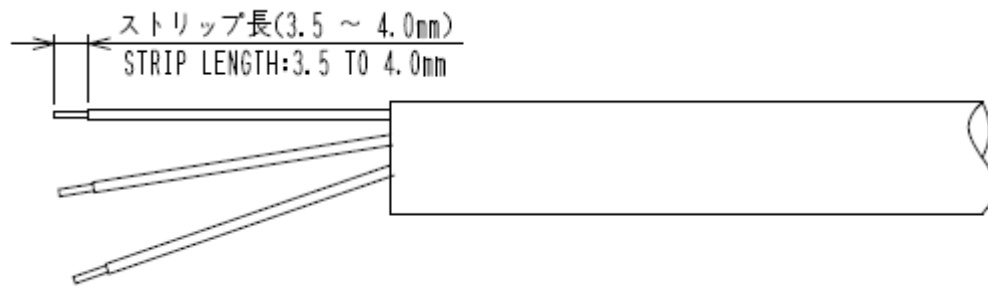


Finished state of covering the wire with a rubber tube.



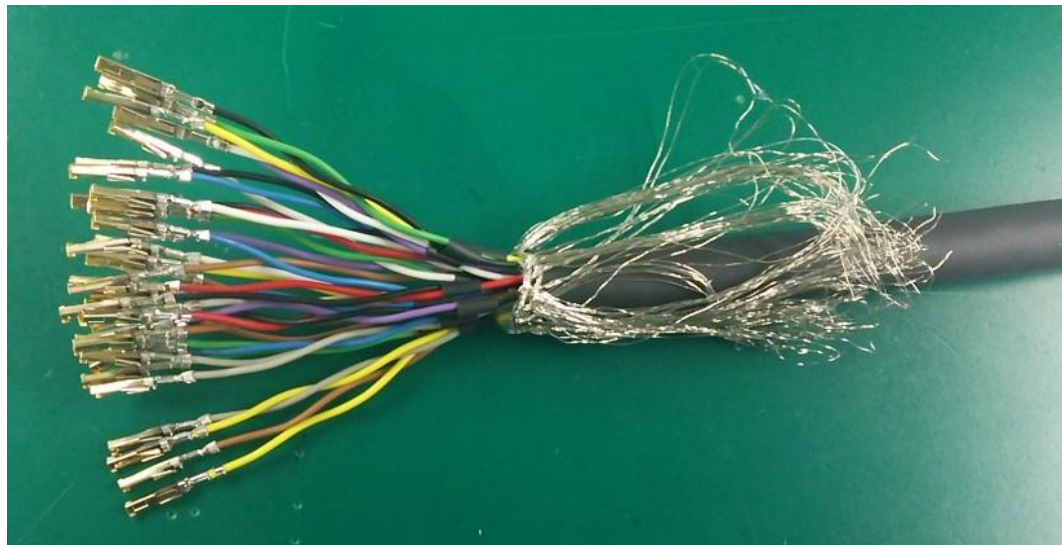
Strip the wire off and crimp the contacts.

Please refer to the Crimping Conditions Table and the Crimping Quality Standards of each contacts for the crimp height (C/H), insulation height (I/H) and the crimping quality standards.



Finishing crimping the contacts

Note: The photo below shows the crimped state of the PQ50S-2428SCFA female crimp contacts with the AWG#23 Cable.



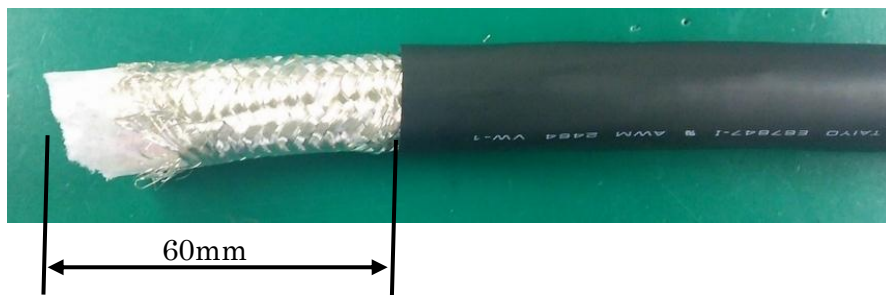


#### 4-2-2 (On the power supply side)

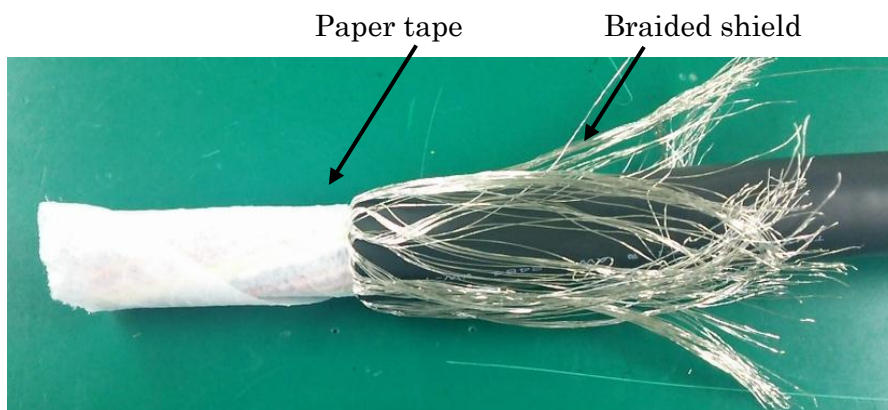
Put the end bell cap (PQWT-EBC(PG29)) and the gasket clamp (PQWT-CMA(\*\*)) through the cable in this order in advance.



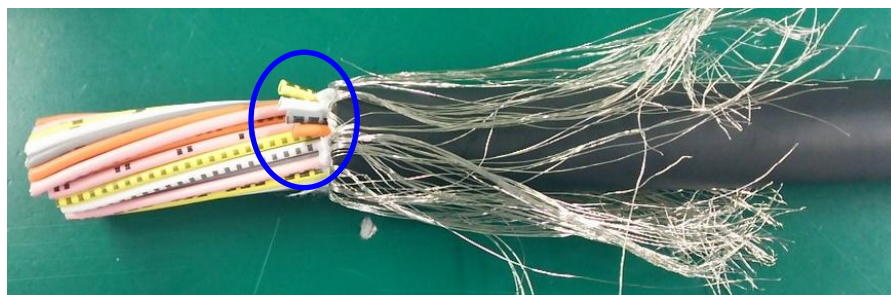
Strip the sheath off the cable by 60mm.



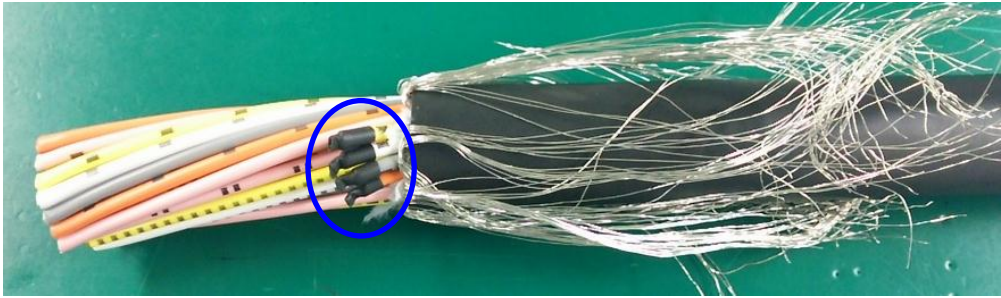
Unbind the braided shield, and turn it up.



Cut the paper tape, and the part of the cable which will be unused for wiring in advance.  
(\*They may be cut after crimping, as needed.)



Cover the cable end with a heat-shrinkable tube or an insulation tape so that the part of the cable which will be unused for wiring won't get into contact with the braided shield etc.



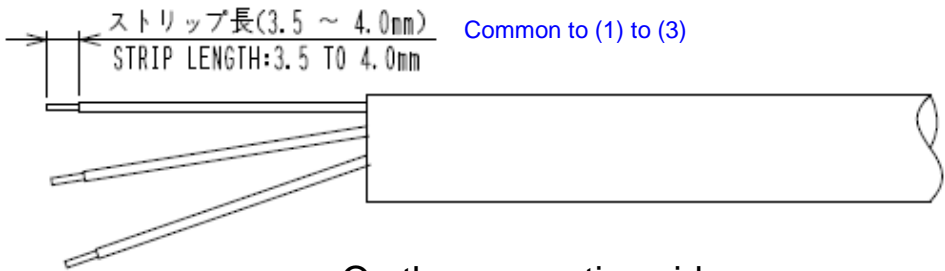
(1) Cover the cable allocated to the connector-side pin assignment (refer to the figure below for the details) No. A1-A5, B1-B5 (PQ50 contacts) with the shrinkable tube, strip the sheath off, and crimp the PQ50 contacts.

\*Please refer to the Crimping Conditions Table and the Crimping Quality Standards of each contact for the crimp height (C/H), insulation height (I/H) and the crimping quality standards.

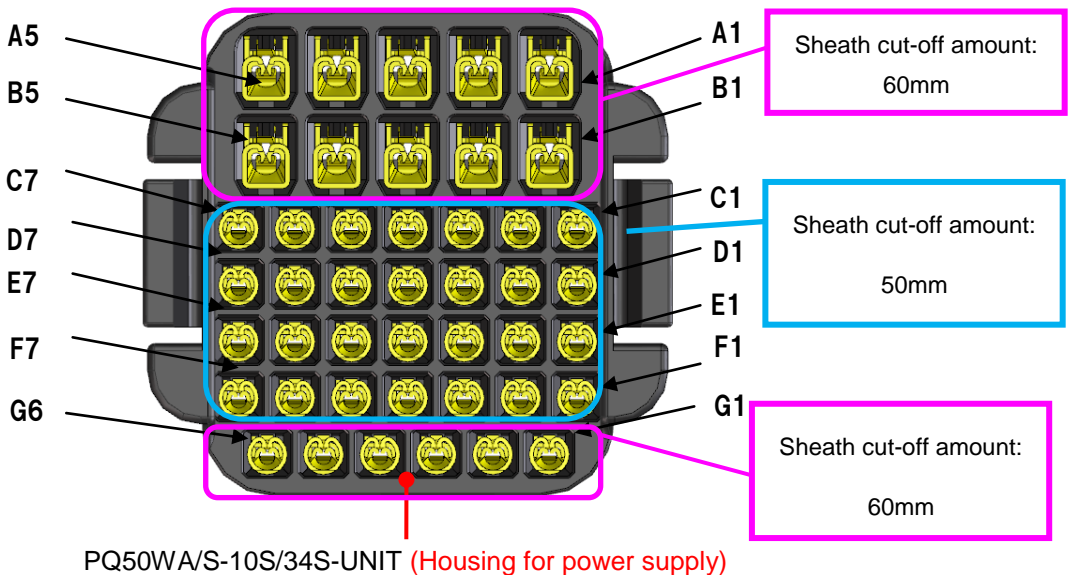
(2) Assort the cables (60mm) allocated to G1 - G6 (PQ50S contacts). Cover the assorted cables with the shrinkable tube.

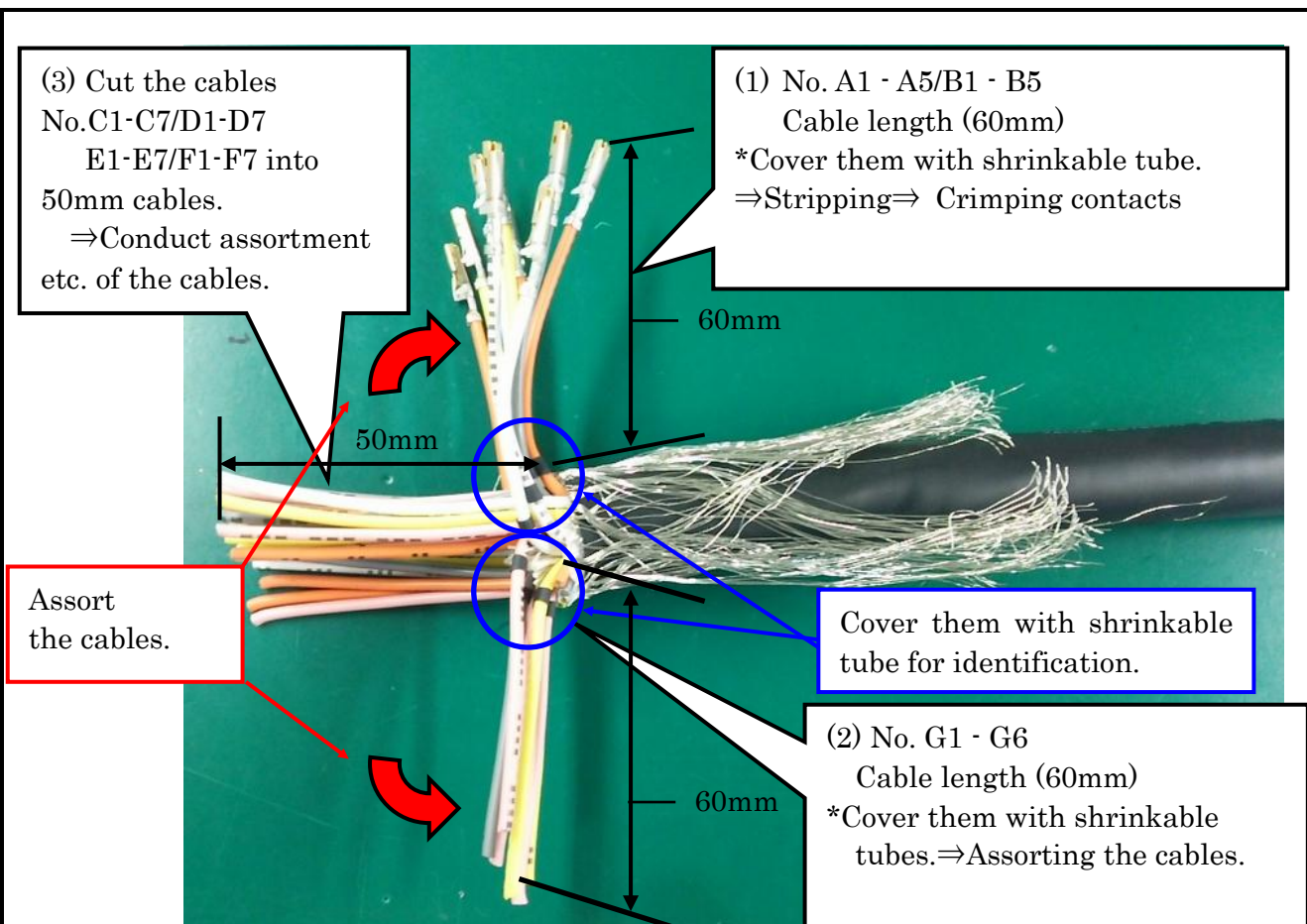
(3) Cut the cable allocated to C1-C7/D1-D7/E1-E7/F1-F7 into 50mm cables.  
\*The object at the center needs to be cut off together on this occasion.

Please refer to the Crimping Conditions Table and the Crimping Quality Standards of each contact for the crimp height (C/H), insulation height (I/H) and the crimping quality standards.



On the connection side



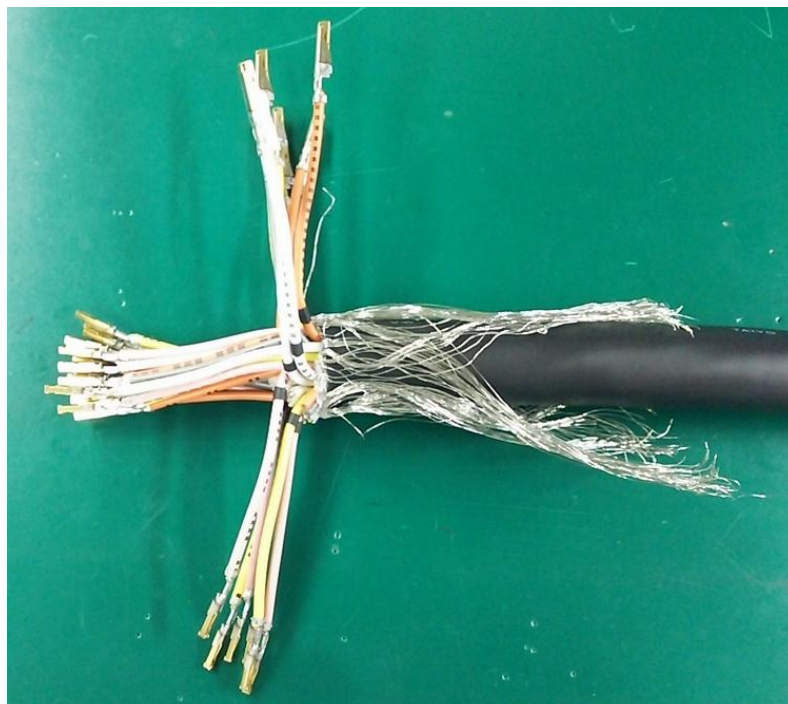


After completing the procedures (2) and (3), strip the wires and crimp the contacts.

\*In order to prevent mistakes in cutting and crimping cables, we recommend that the above operations be carried out in the order from (1) to (2) and (3).

#### Completion of crimped contacts

\*The photo below shows the status of PQ50-1618SCFA/PQ50-2022SCFA/PQ50S-1822SCFA female crimp contacts crimped with the AWG#17 Cable.



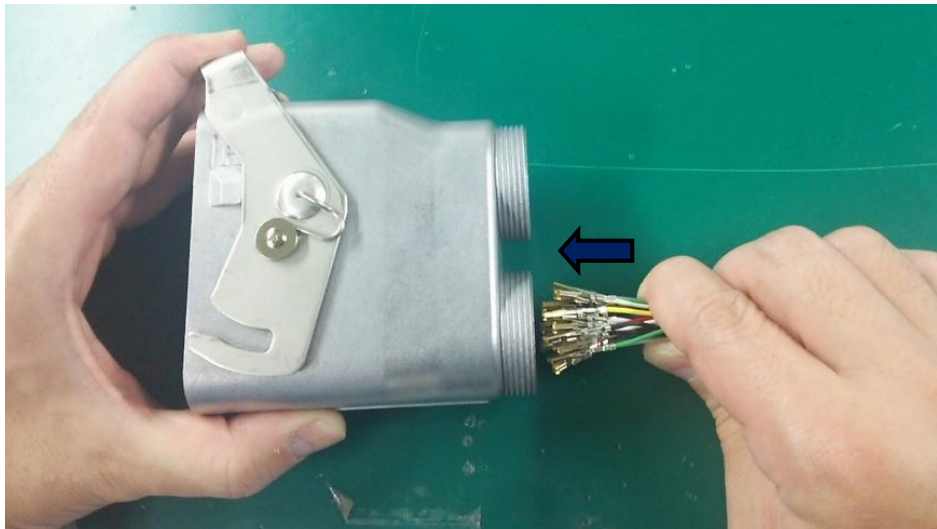


### **4-3. Inserting/embedding the crimp contacts in the cover case**

#### **4-3-1 Inserting/embedding the contacts in the cover case (on the signal side)**

Hold the bundle of crimped contacts, and get it through the signal-side cable port of the cover case (as shown in the photo below when the bottom side is the signal side).

\*You may also insert it in the cover case before crimping the contacts. Choose either method according to the wiring operation on the power supply/signal side.



After inserting in the cover case





Insert crimp contacts in the order of the pin assignment shown below.

Insert contacts in the order of easier wiring operation according to the allocation on the basis of each cable specification and the connector pin assignment.

\*Please refer to the wiring diagram provided by the manufacturer for the detailed pin assignment.

#### <Important points>

In the case of thin cables of no more than 0.5sq (AWG#20), you may insert them at any rows from a to h.

However, please insert adjacent contacts in the sequential order in order to prevent mistakes in insertion.

It is recommendable to insert the contacts in the sequential order from the contact around the center to adjacent ones while ensuring not to make insertion mistakes.

\*This operation is essential when you conduct wiring of thick wires of no less than 0.75sq (AWG#18).

In that case, provide stepped cut to the cables as needed into 60mm pieces for rows a and h, or 50mm for rows b, c, d, e, f and g.

- (1) Insert the crimp contacts in rows c, d, e and f.

In inserting them, be sure to insert them while leading the cables as far as possible so that they won't be entangled.

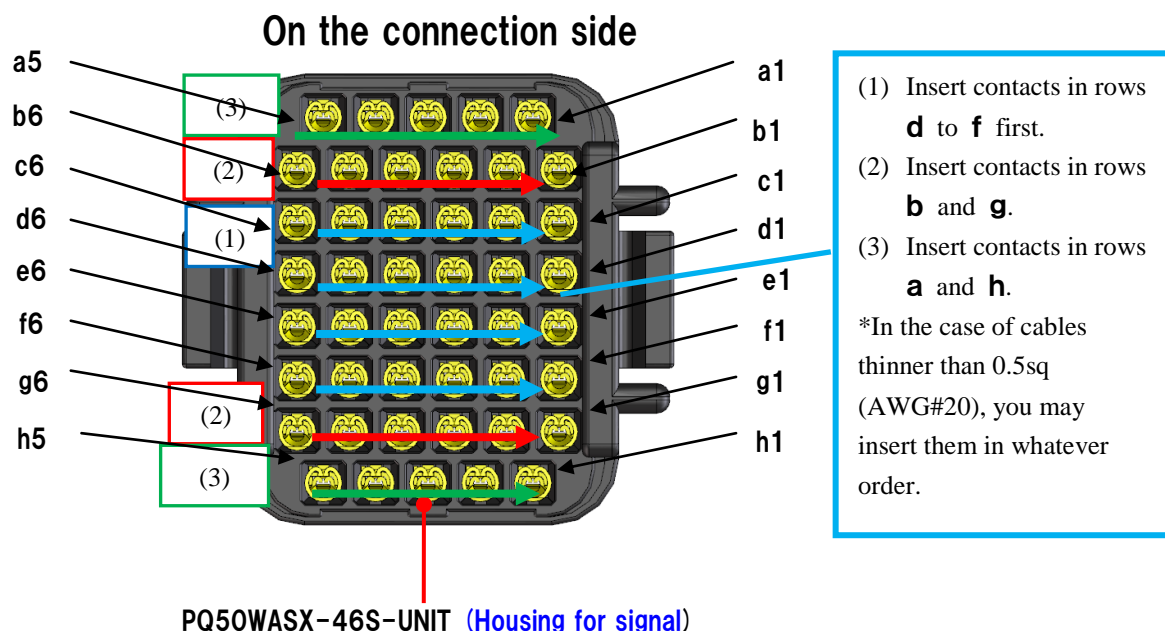
- (2) Insert them in rows b and g sequentially.

You may have fewer torsions of cables which will be placed in a straight position after completion if you lead the cables equally from both sides with the center being at b3/g3.

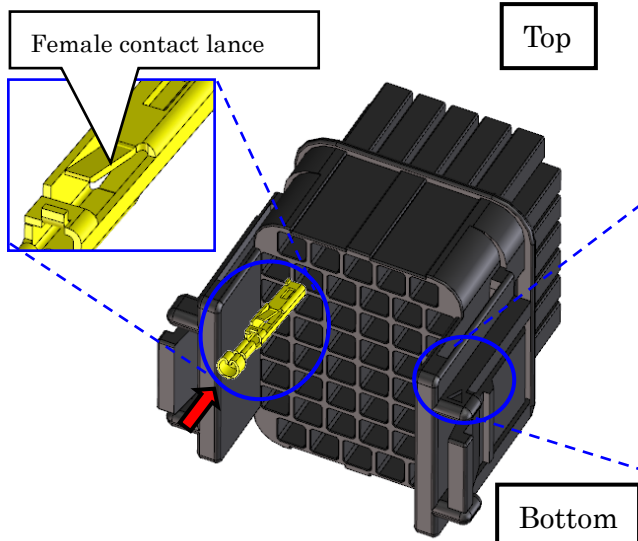
- (3) Insert contacts in rows a and h.

You may have fewer torsions of cables which will be placed in a straight position after completion if you lead the cables equally from both sides with the center being at a3/h3.

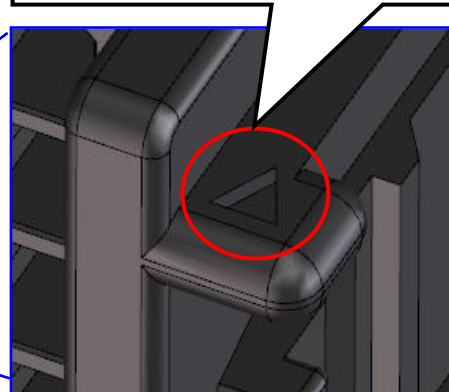
#### 【Example】



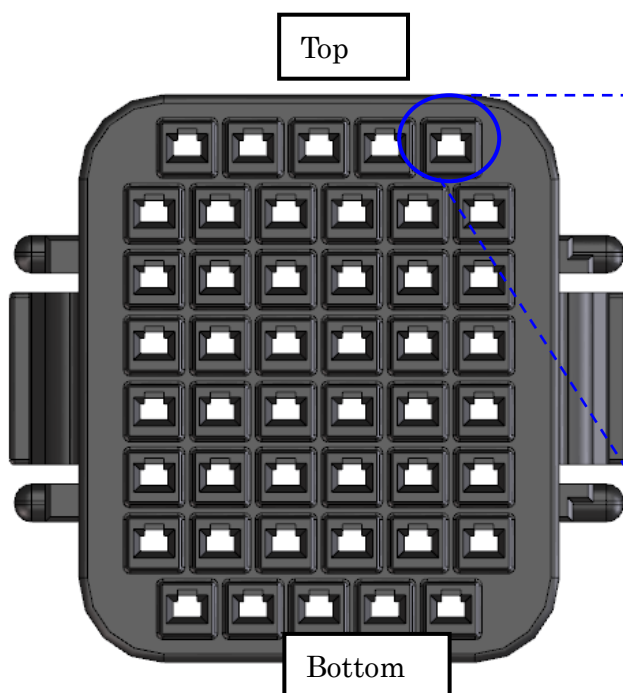
Direction of inserting a contact



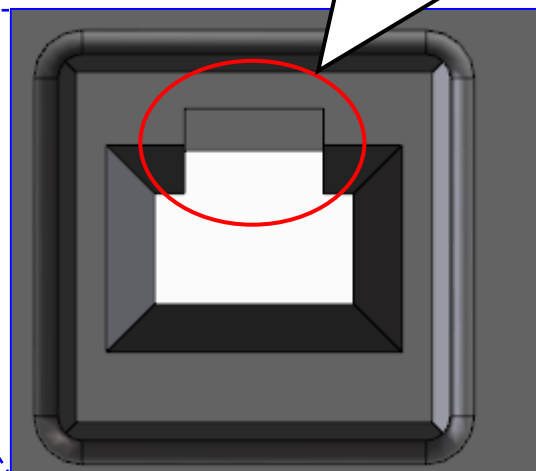
The mark on the top side (on the side of "Row a") indicates the direction shown by the  $\triangle$  mark in the figure.



【Front side when mated】



When seen from the mated side, the side shown with the hooking groove of the lance is the top side.



Completely inserted state of the contacts



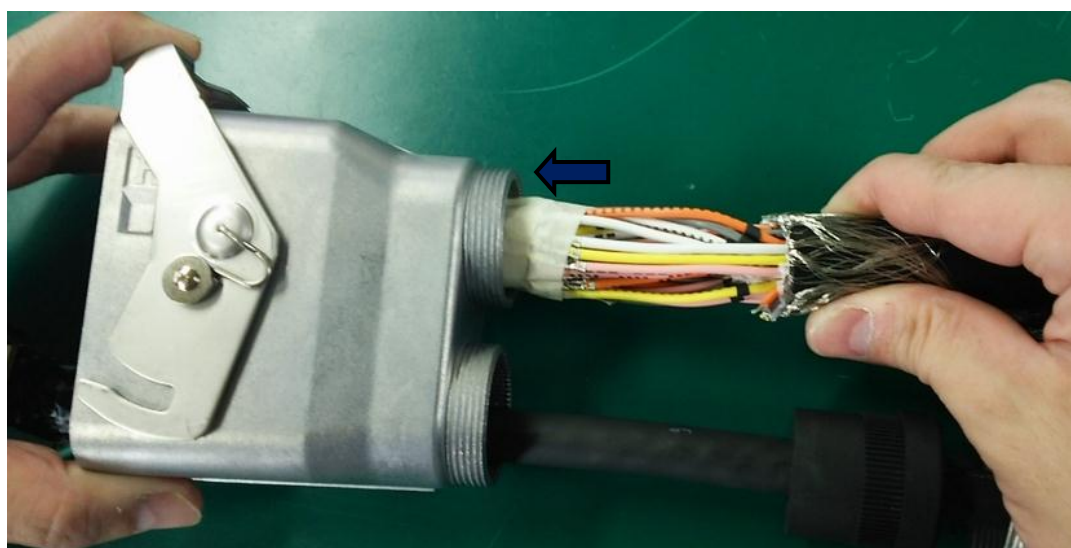
#### 4-3-2 Inserting/embedding the contacts in the cover case (on the power supply side)

Bind crimped contacts with a tape etc., and put the bundle through the power-supply side cable port of the cover case (as shown in the photo below when the top side is the power-supply side).

\*You may also insert it in the cover case before crimping the contacts. Choose either method according to the wiring operation of the power supply/signal side.



Hold the bundle of crimped contacts, and put it through the power-supply side cable port of the cover case (as shown in the photo below when the top side is the power-supply side).





Insert crimp contacts in the order of the pin assignment shown below.

Insert contacts in the order of easier wiring operation according to the allocation on the basis of each cable specification and the connector pin assignment.

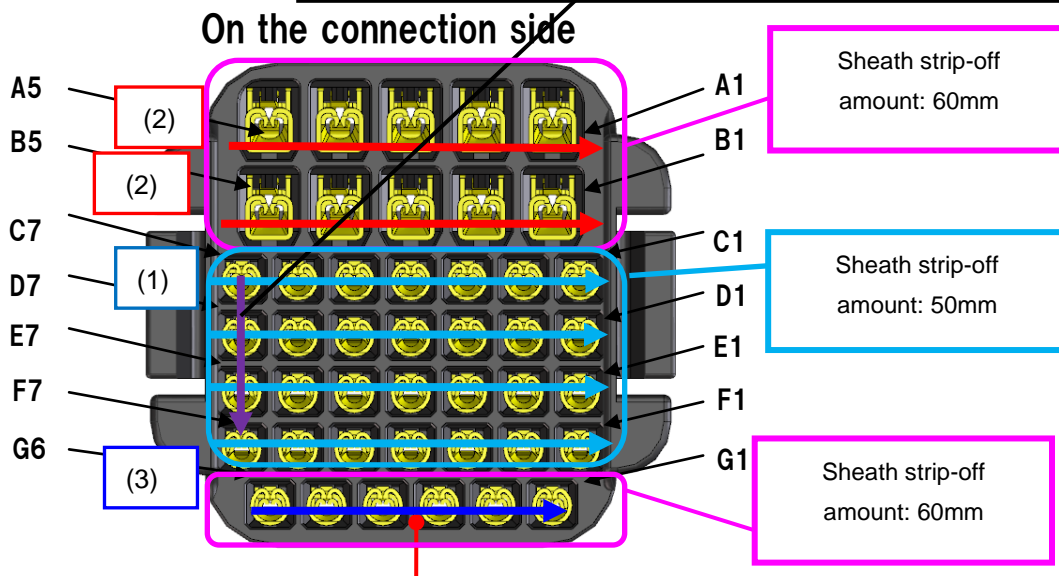
\*Please refer to the wiring diagram provided by the manufacturer for the detailed pin assignment.

<Important points>

It is recommendable to insert the contacts in the sequential order from the contact around the center to adjacent ones while ensuring not to make insertion mistakes.

- (1) Insert the cables provided with stepped cutting into 50mm in rows C, D, E and F.  
In inserting them, be sure to insert them while leading the cables as far as possible so that they won't be entangled.
- (2) Insert the cables provided with stepped cutting into 60mm in rows A and B sequentially.  
You may have fewer torsions of cables placed in a straight position after completion if you lead the cables equally from both sides with the center being at A3/B3.
- (3) Insert row G.

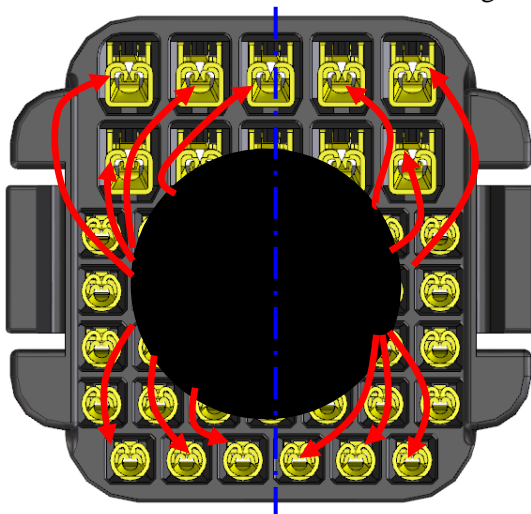
You may also insert them sequentially in the vertical



PQ50WA/S-10S/34S-UNIT (Housing for power supply)

<Image of leading cables>

You may have cables placed in a straight position without any torsion after completion if you lead the cables equally from both sides around the center as shown in the figure below.

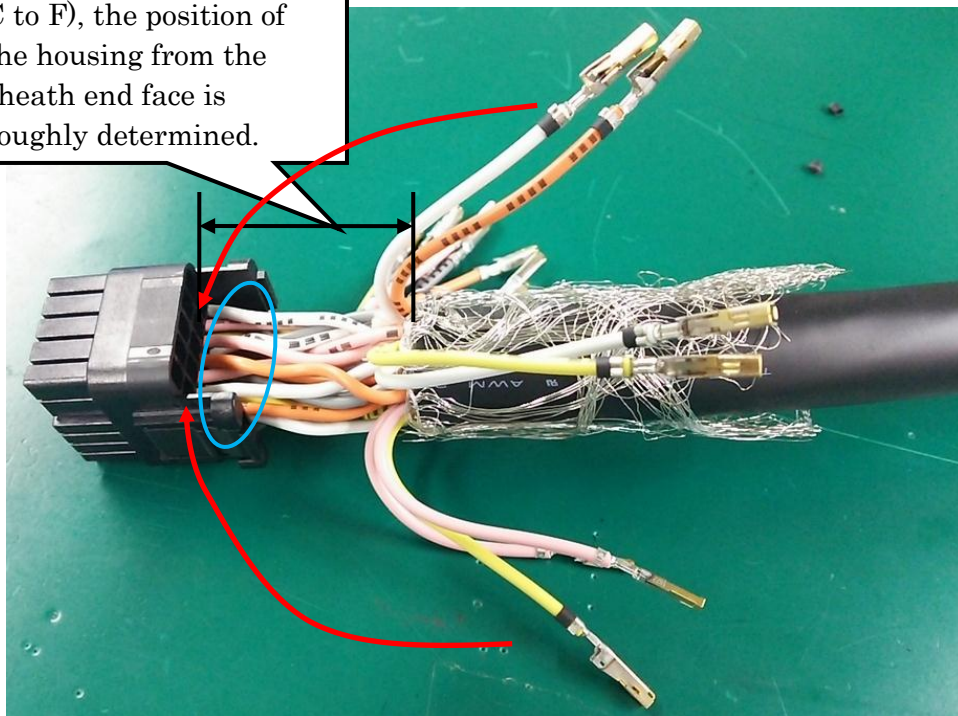


<(1) Inserted state (in rows C to F)>

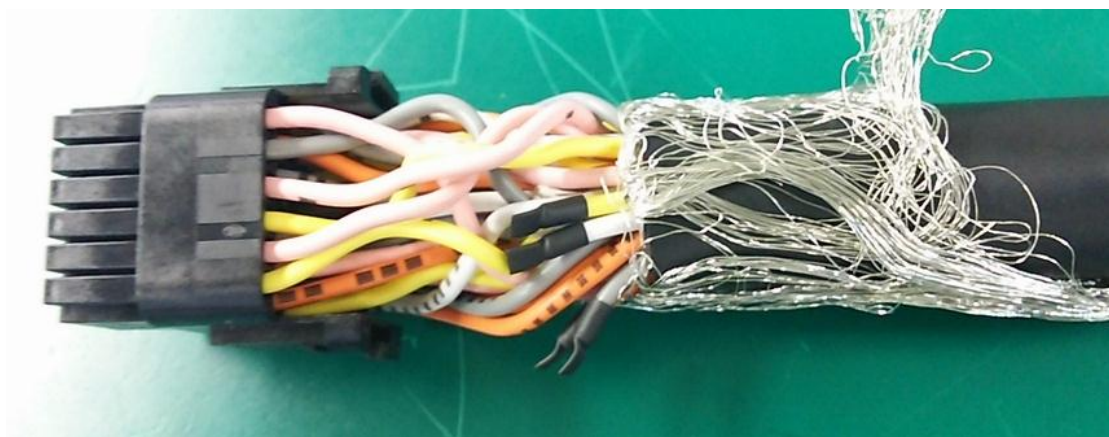
Under this condition, the relative relationship between the housing and the cable end face is determined by the bending force of the cables inserted in rows C, D, E and F.

Lead and insert the crimped cables (2) and (3), which are longer than (1) by 10mm.

(1) When inserted (in rows C to F), the position of the housing from the sheath end face is roughly determined.



Completely inserted state of the contacts

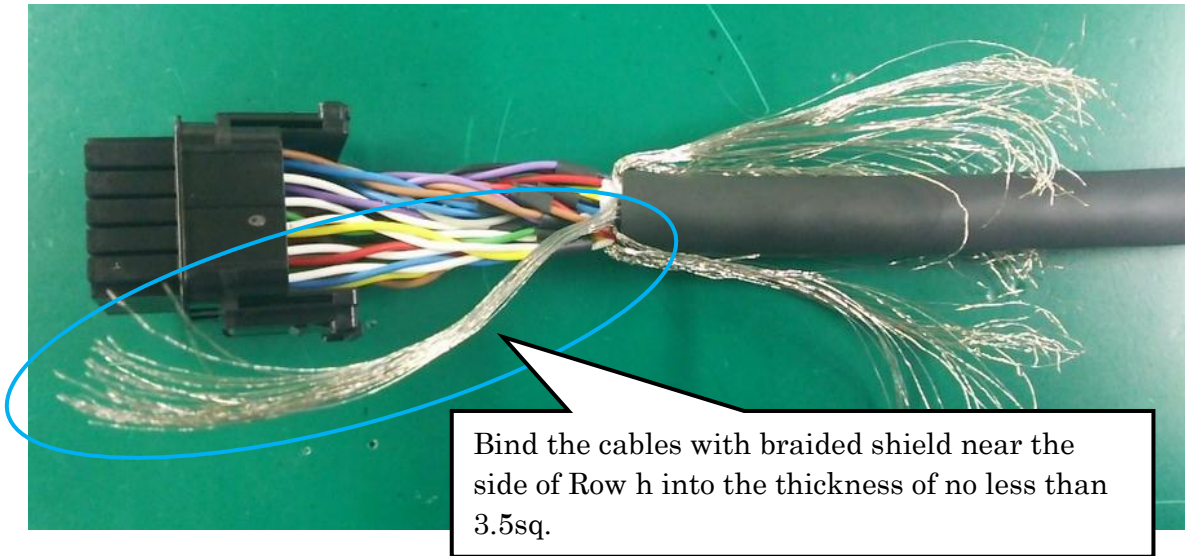


#### **4-4. Treatment of braided shield**

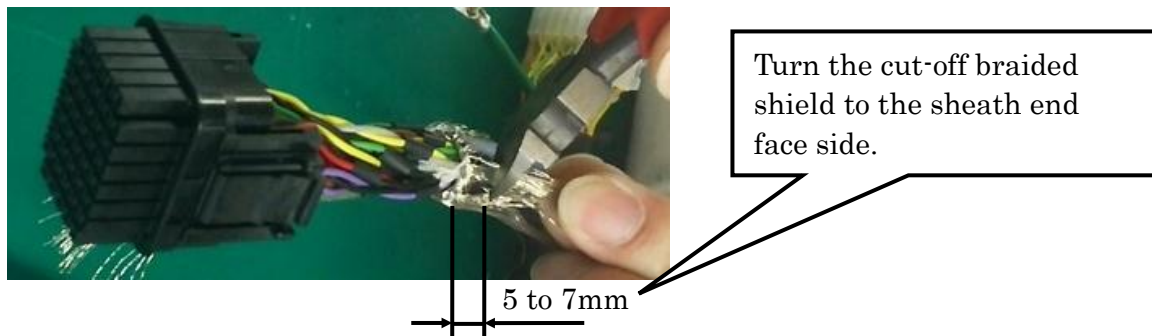
##### **4-4-1 Treatment of braided shield (on the signal side)**

Bind the stranded wires with braided shield so that the thickness (area dimension) will be recommendable 3.5 sq or more (AWG#12 or thicker).

\*Bind the cables with braided shield near the side of the contact address No. "Row h" of the housing. This will enhance the shielding performance by reducing the distance to overcome when embedding them in the plug case and fastening the round crimp contact with screws.



Cut off the remaining braided shield. (leaving 5 to 7mm from the sheath end face)  
Then, turn it up to the sheath end face side.

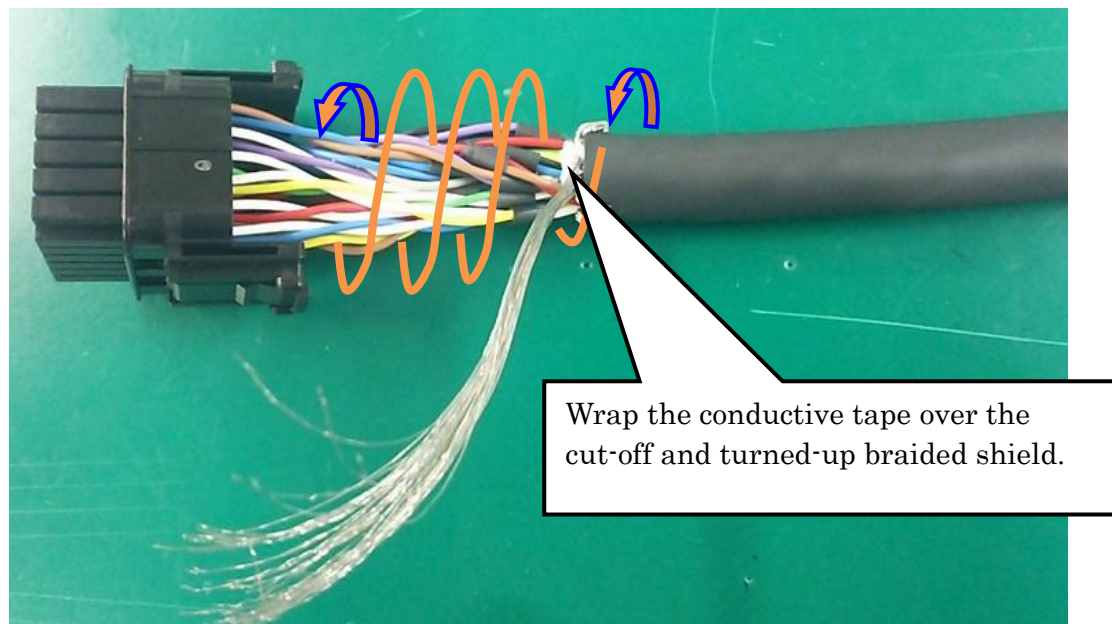




Start wrapping a conductive tape closely over the cut-off and turned-up braided shield, and wind it in a spiral onto the crimp housing side over the bundled braided shield.

\*Please be careful not to allow any gap in the pitch of the wrapped tape over the shield.

In addition, start wrapping the tape a little harder at first, and then, near the root on the housing side, wrap it just closely with the already-wrapped tape face end in a manner that no load is applied to the contact lance part.



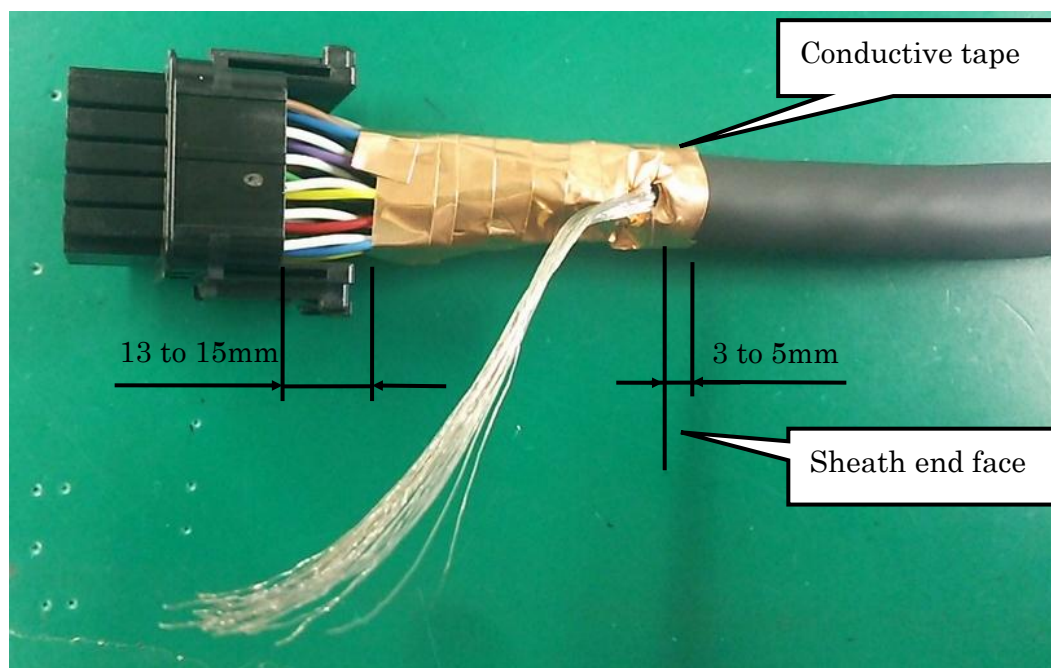
<A guide for wrapping a conductive tape>

Wrap the conductive tape up to the lengths shown below:

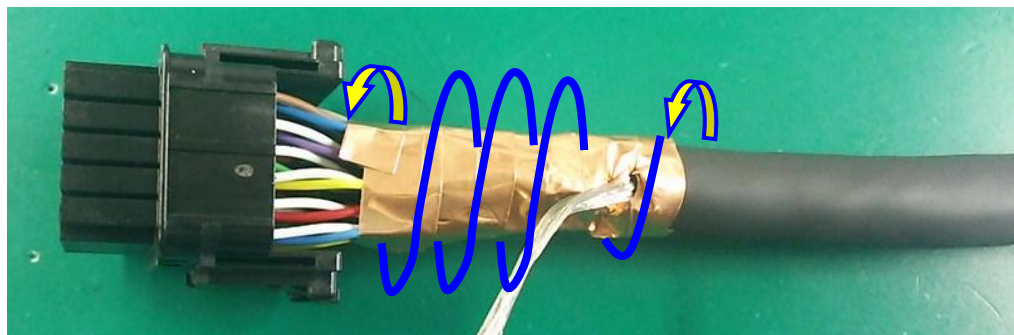
Guide: Wrapping length of a 12mm-wide conductive tape: about 30mm

Wrapping length of a 7mm-wide conductive tape: about 45mm

Finished state of the wrapped conductive tape



Start wrapping an insulation tape closely over the conductive tape, and wind it in a spiral onto the crimp housing side over the bundled braided shield.



\*Please be careful not to allow any gap in the pitch of the wrapped tape.

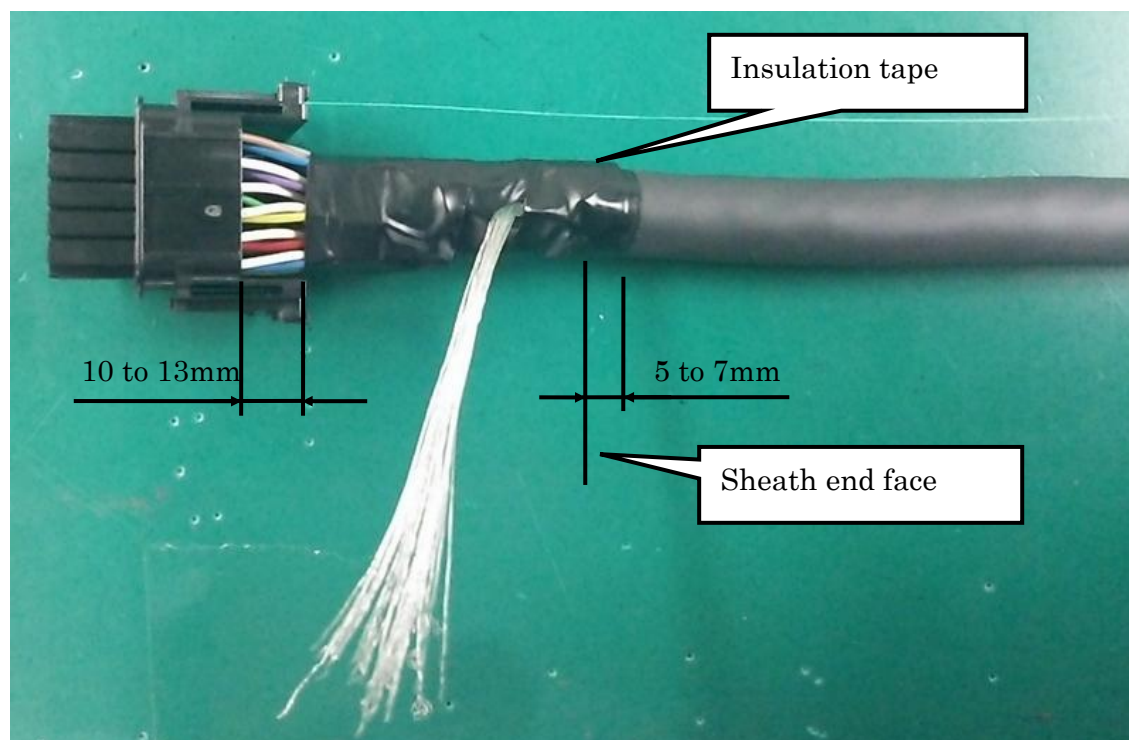
In addition, start wrapping the tape a little harder at first, and then, near the root on the housing side, wrap it just closely with the already-wrapped tape face end in a manner that no load is applied to the contact lance part.

< A guide for wrapping an insulation tape >

Wrap the insulation tape up to the length shown below:

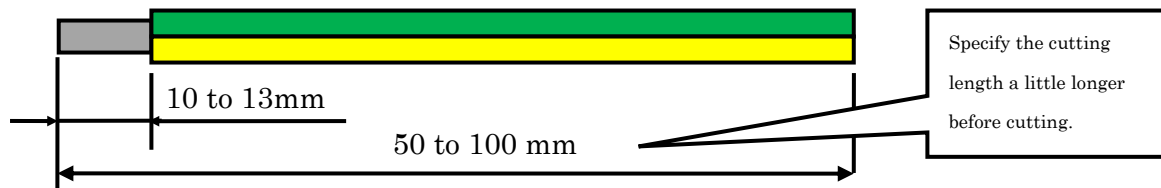
Guide: Wrapping length of a 10mm-wide insulation tape: about 45mm

Finished state of the wrapped insulation tape



#### 4-3-2 Connecting FG cables (on the signal side)

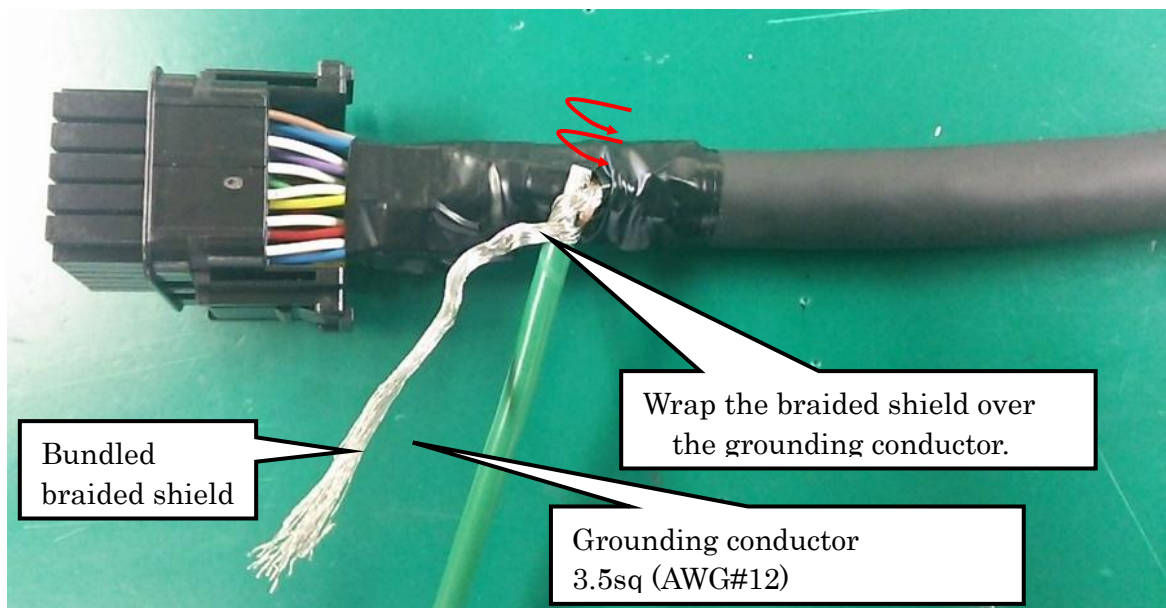
Strip the sheath off the recommended 3.5sq (AWG#12) grounding conductor (green/yellow).



Wrap the bundled braided shield in a spiral to cover the tip end of the grounding conductor with the end sheath stripped off.

Start wrapping the shield over the grounding conductor at a position 10mm away from the root of the bundled braided shield.

\*This is meant to make the cable flexible in response to the bending force applied to the cable.

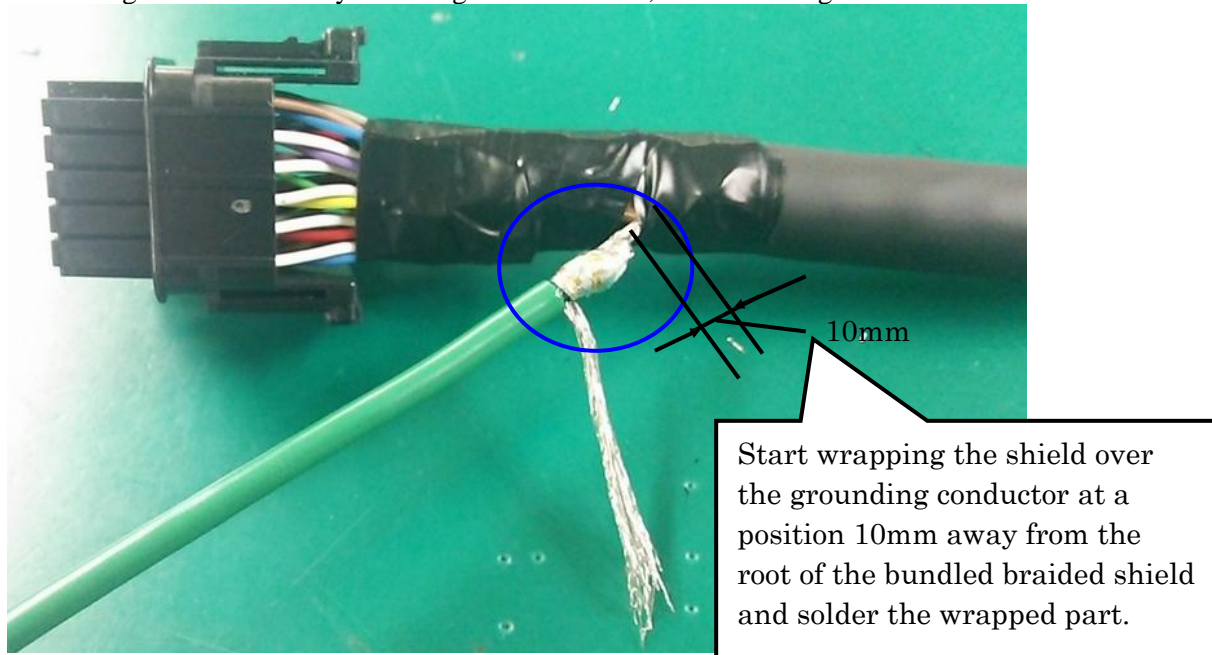


Solder the place wrapped with the braided shield.

#### 【Soldering conditions】

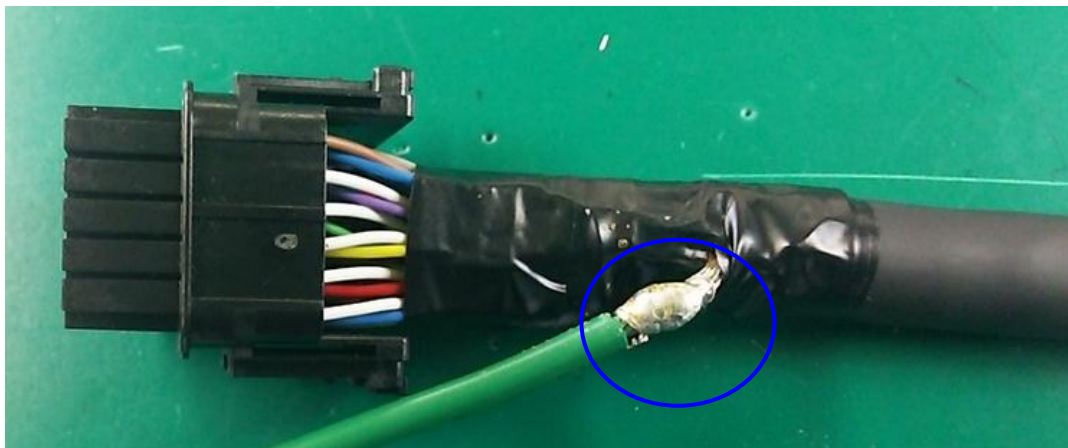
Temperature of the soldering iron tip: 400°C - 420°C

Soldering time: Preliminary soldering for about 1 sec, final soldering for about 2 sec





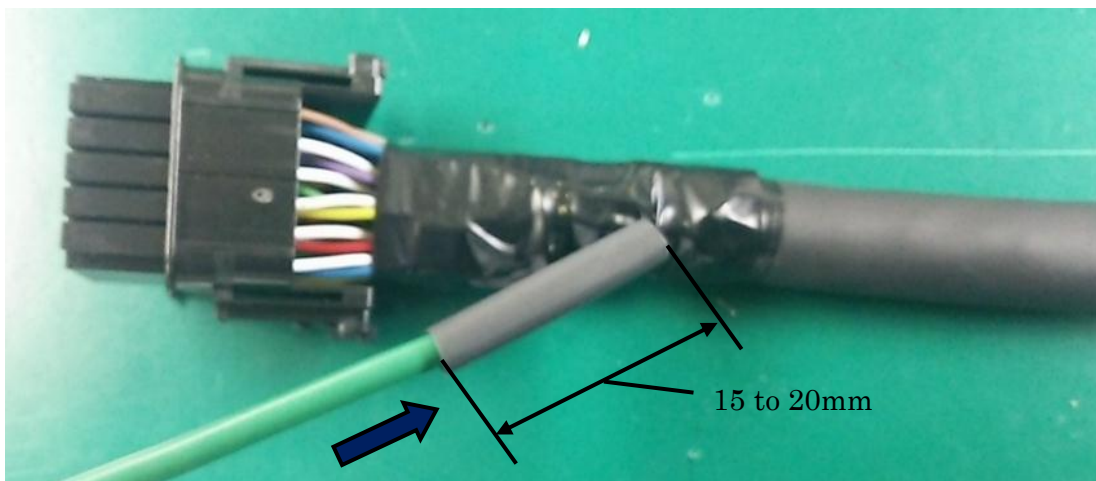
Finishing the soldering operation of the grounding conductor



Cut off the remaining braided shield.

Cover the soldered part with a heat-shrinkable tube.

Recommended heat-shrinkable tube diameter:  $\phi 5-6$ , 15-20mm long

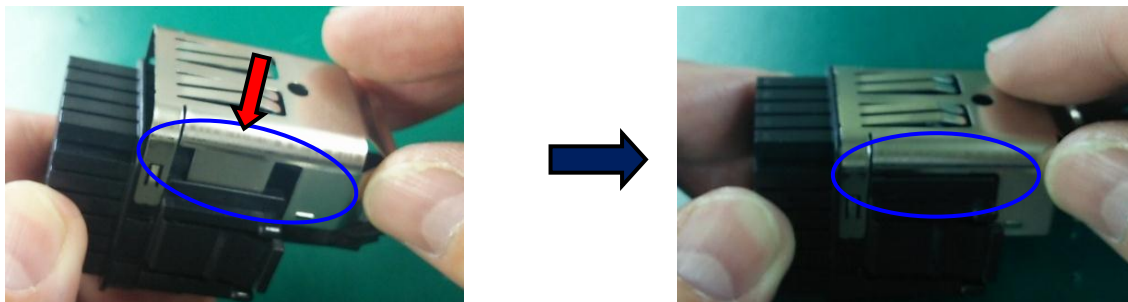


Shrink the heat-shrinkable tube.



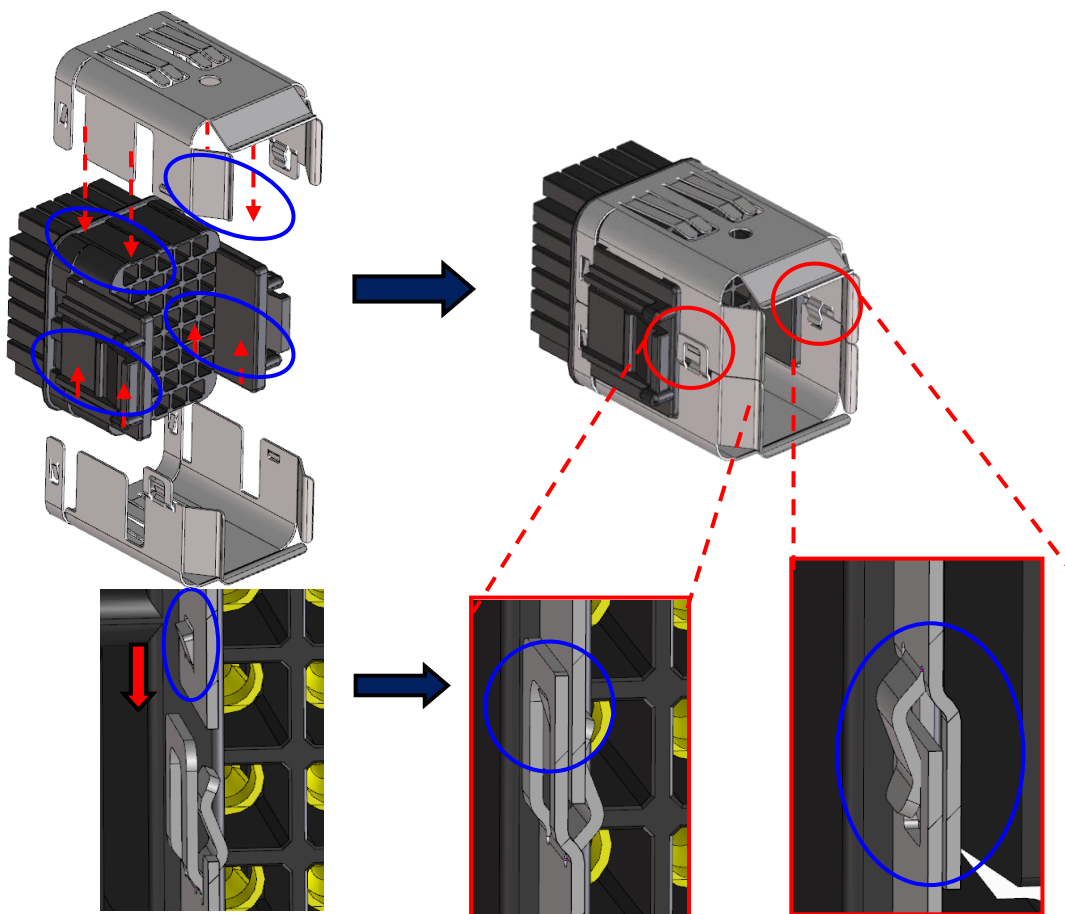
#### 4-3-3 Embedding shells (on the signal side only)

Embed the attached 2 shells to the housing (the photo below shows the shell S).



#### <Mating the shells>

Insert the shells into the 4 grooves of the housing.

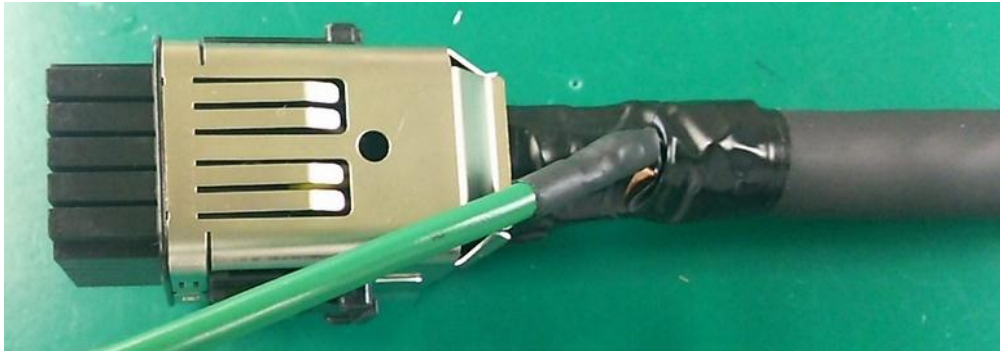


As shown in the figure, please confirm that the shells are correctly mated at 2 mating positions.

Finished state of embedded shells



## Finished state of mounted grounding conductor and shells

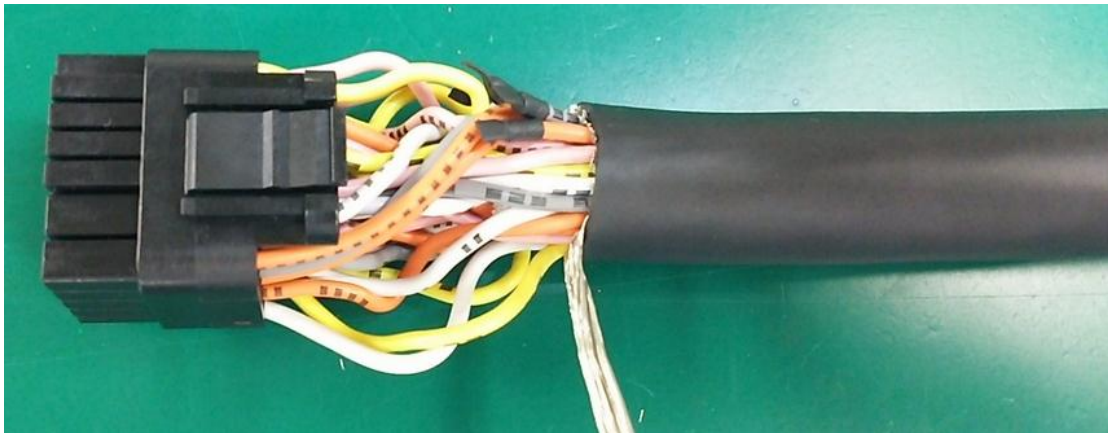


### 4-3-4. Treatment of the braided shield (on the power supply side)

Solder the grounding conductor in the similar manner as on the signal side.

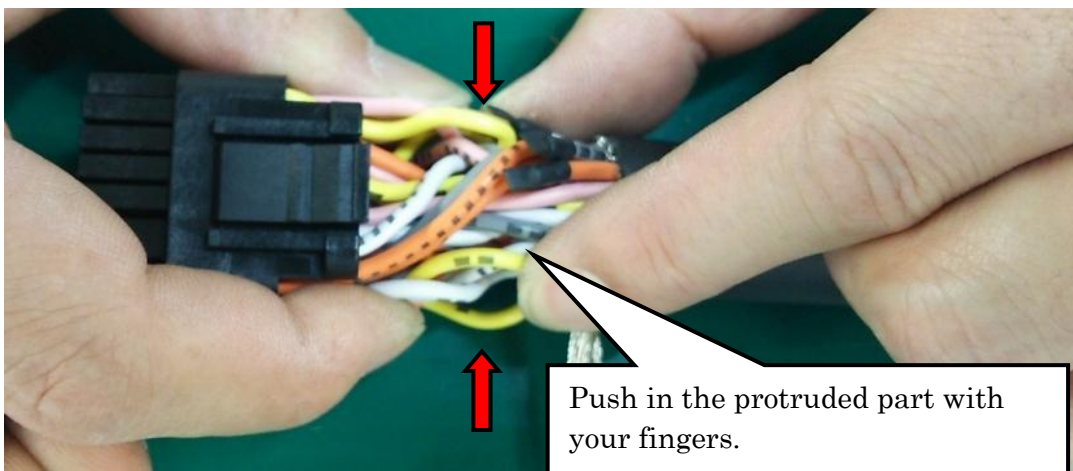
The braided shield needs to be treated to gather the stranded wires to the thickness of a signal cable, i.e. no less than 3.5sq (AWG#12 or thicker).

Bind the braided shield near the arrangement address No. “Row G” of the housing.



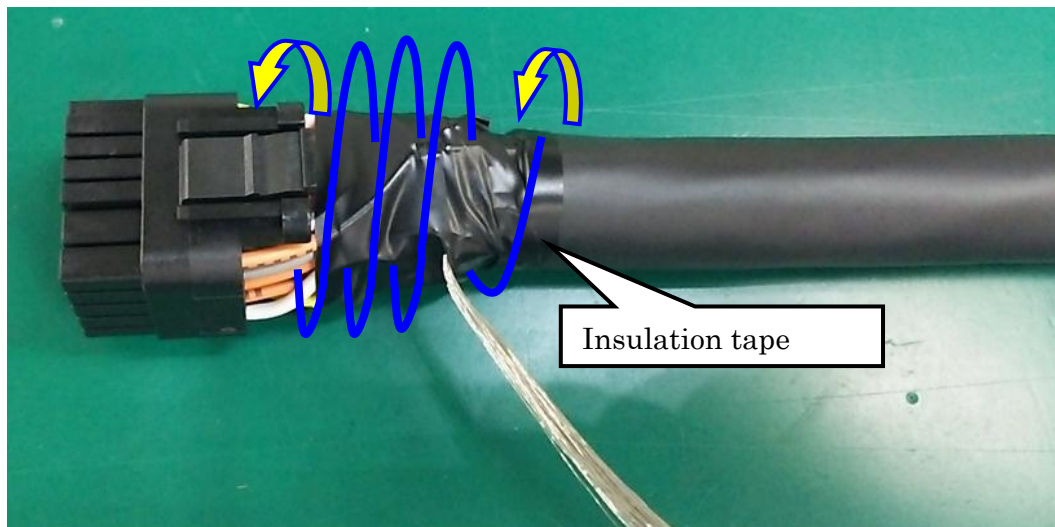
Cut off all the remaining braided shield. (Never leave it on the sheath surface.)

As the cables in rows A, B and G jut out due to the redundant length, push in the protruded part with your fingers in a manner to squeeze the outside.

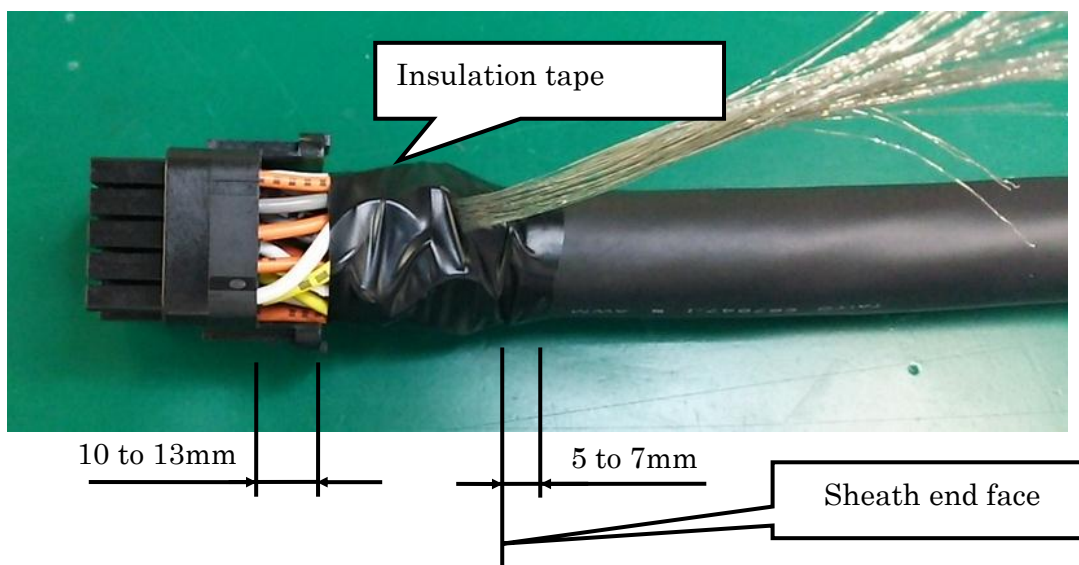




On the power supply side, start wrapping the insulation tape in a spiral from the sheath end face over to the crimp housing side across the bundled braided shield without wrapping the conductive tape.



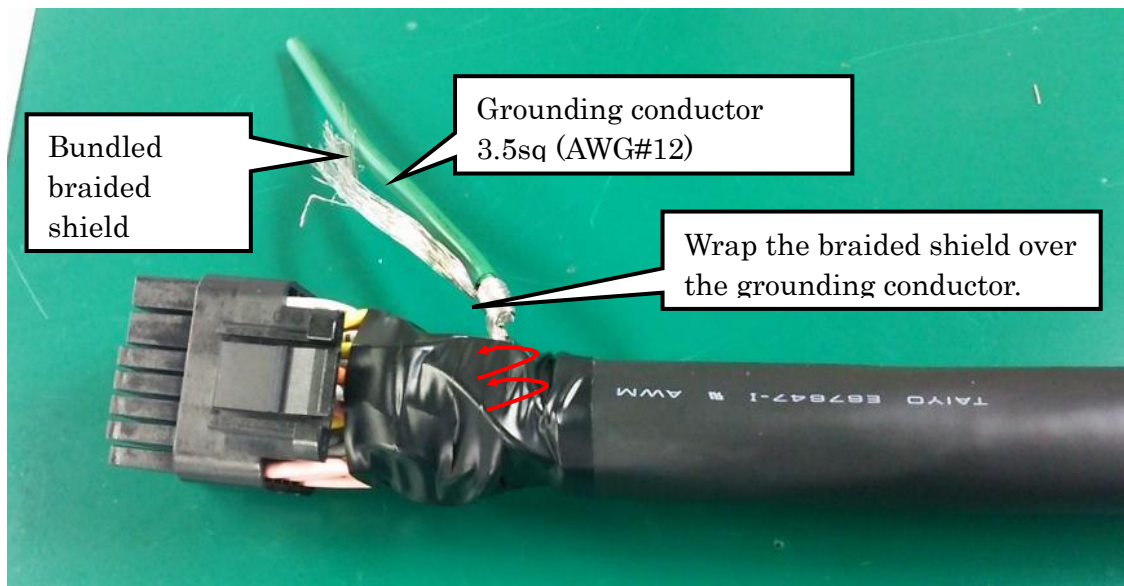
Finished state of wrapped insulation tape



#### 4-3-5 Connecting FG cables (on the power supply side)

Just as for the signal side, strip the sheath off the grounding conductor and wrap the bundled braided shield in a spiral over the tip end of the conductor.

Start wrapping the shield over the tip end of the grounding conductor at a position 10mm away from the root of the bundled braided shield.

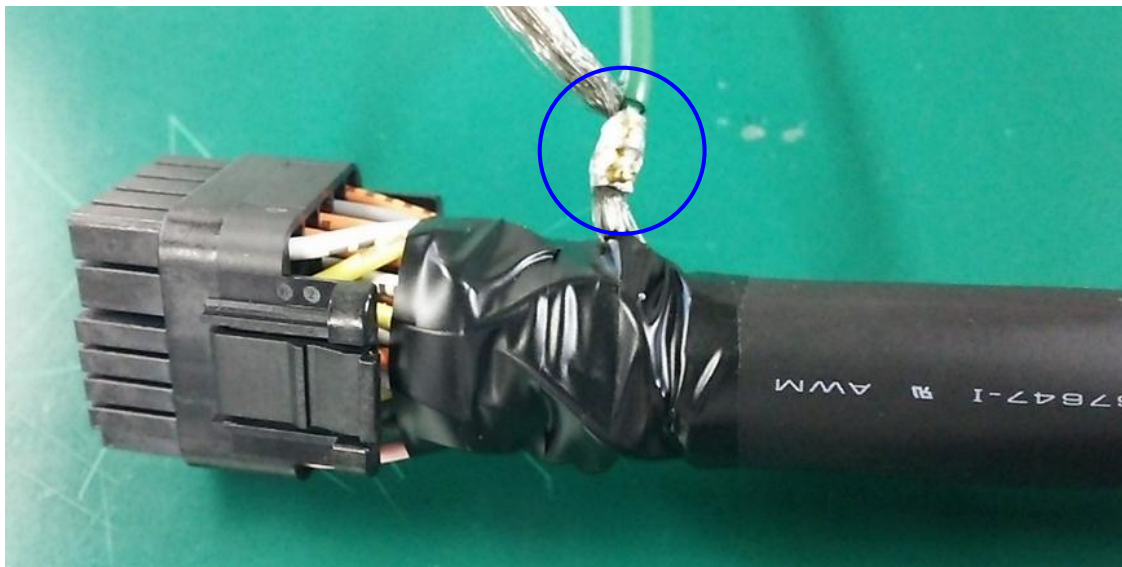


Just like for the signal side, solder the parts wrapped with braided shield.

#### 【Soldering conditions】

Temperature of the soldering iron tip: 400°C - 420°C

Soldering time: Preliminary soldering for about 1 sec, final soldering for about 2 sec



Cut off the remaining braided shield.

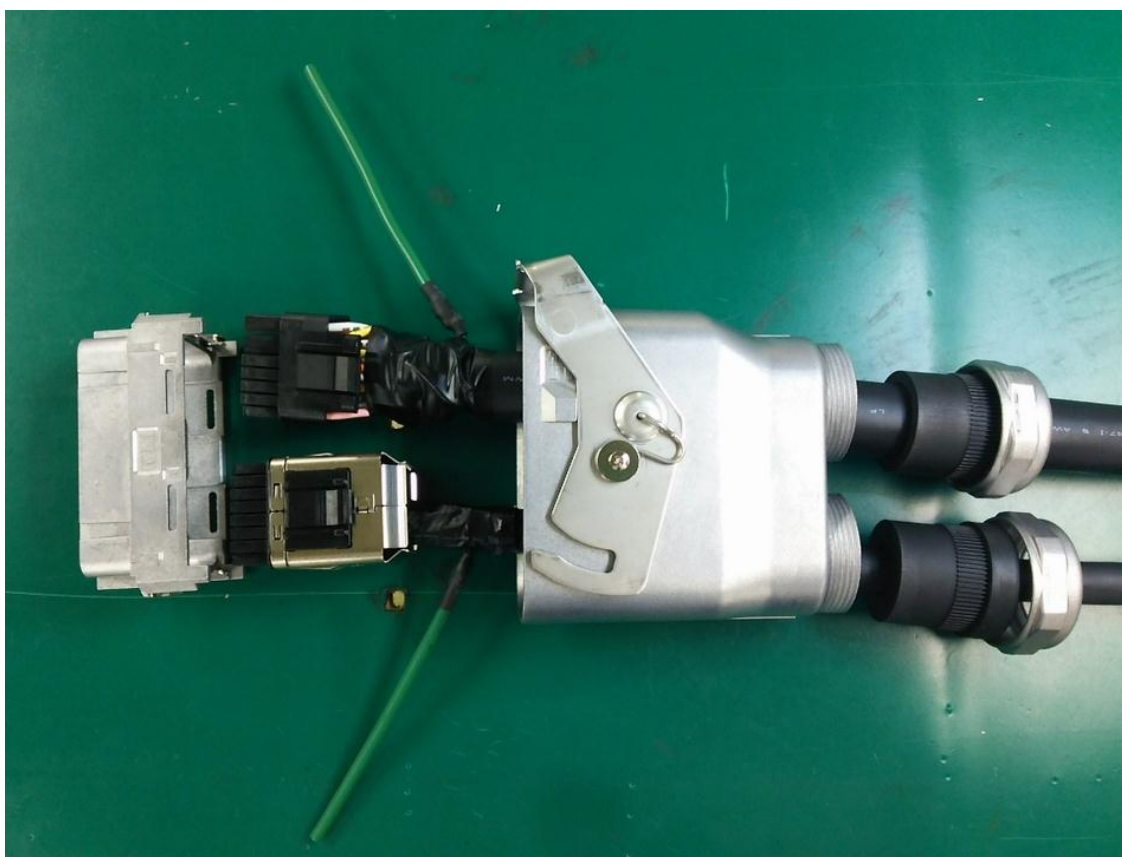


Just like for signal cables, cover the soldered part with a heat-shrinkable tube.

Recommended heat-shrinkable tube diameter:  $\phi 5-6$ , 15-20mm long

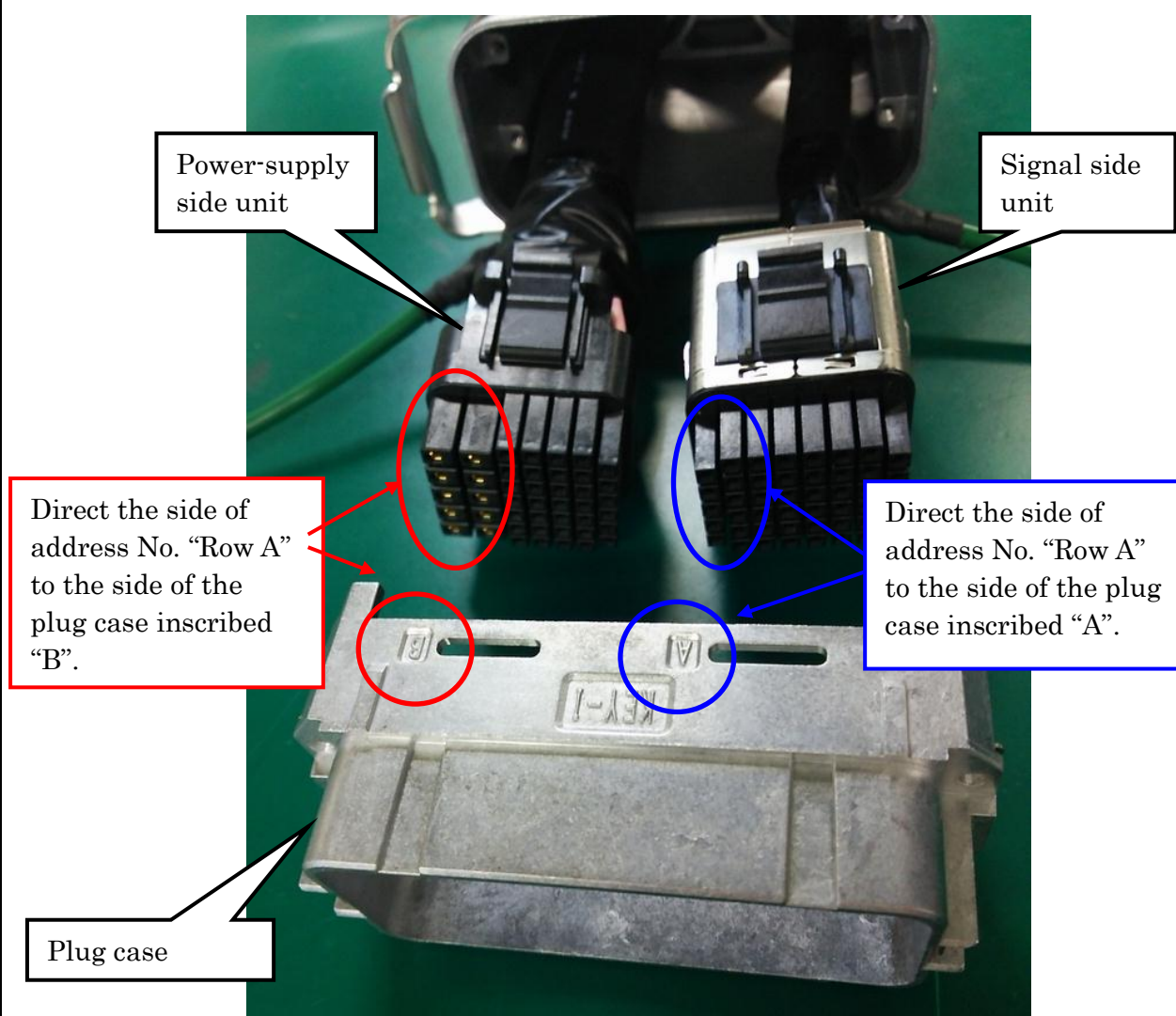


Completed wiring for the signal-side unit/power-supply side unit



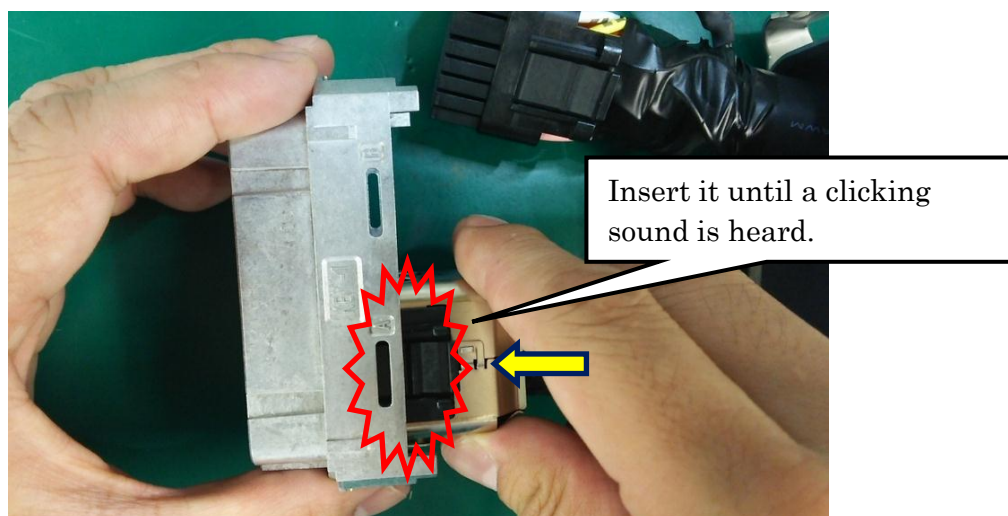


#### 4-4 Insert the signal unit/power supply unit



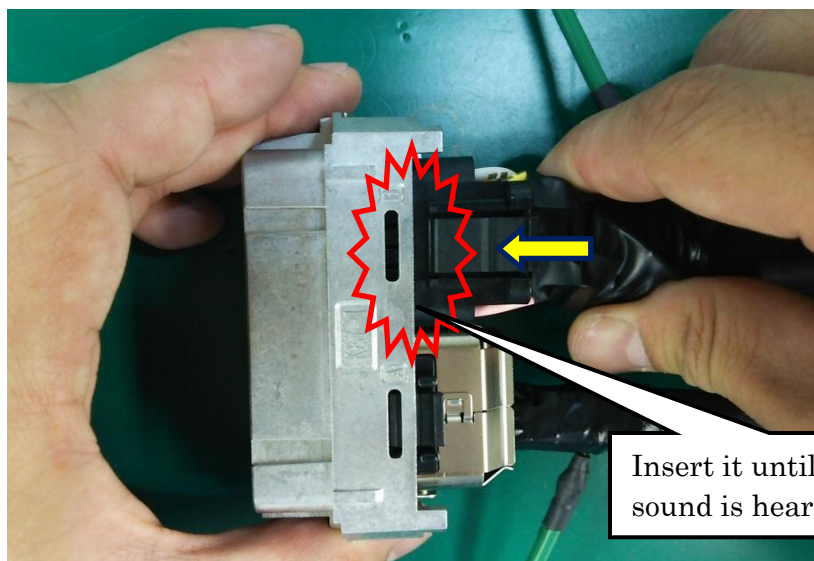
Insert the signal side unit.

Be sure to insert it until a locking sound of the housing is heard.



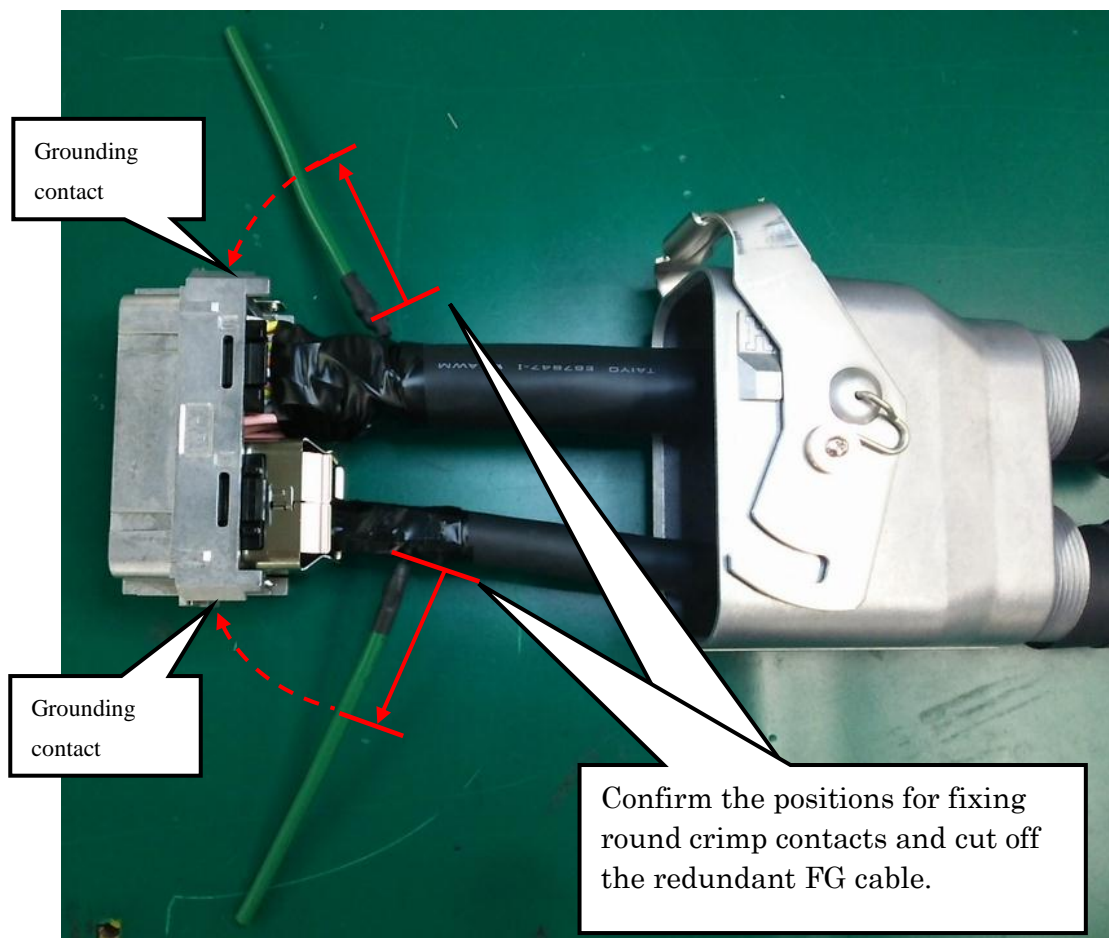
Insert the power-supply side unit.

Just like for the signal side, insert the unit until a locking sound of the housing is heard.



#### **4-5 Installation of FG cables and round crimp contacts to be fixed to the plug case**

Confirm the positions for fixing round crimp contacts and the grounding connector screw holes on the plug case side, and cut off the redundant FG cable.



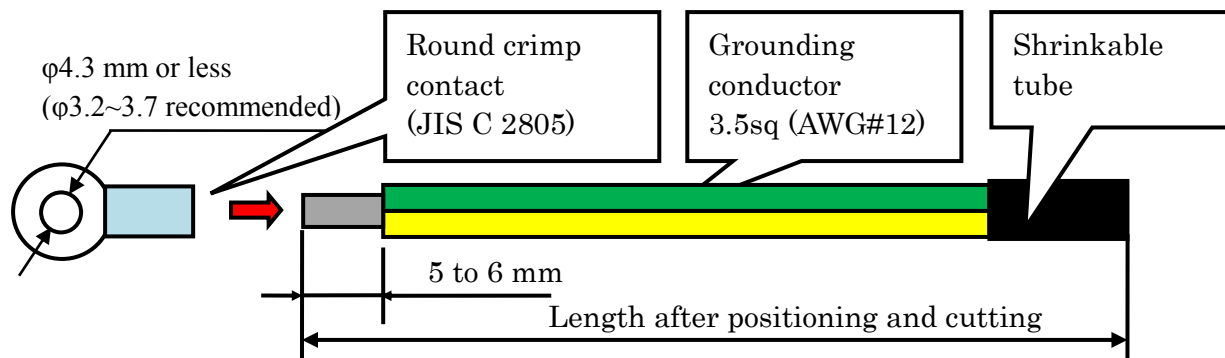
Strip off the grounding conductor (green/yellow).

<Reference> Recommended JIS C 2805 round crimp contact

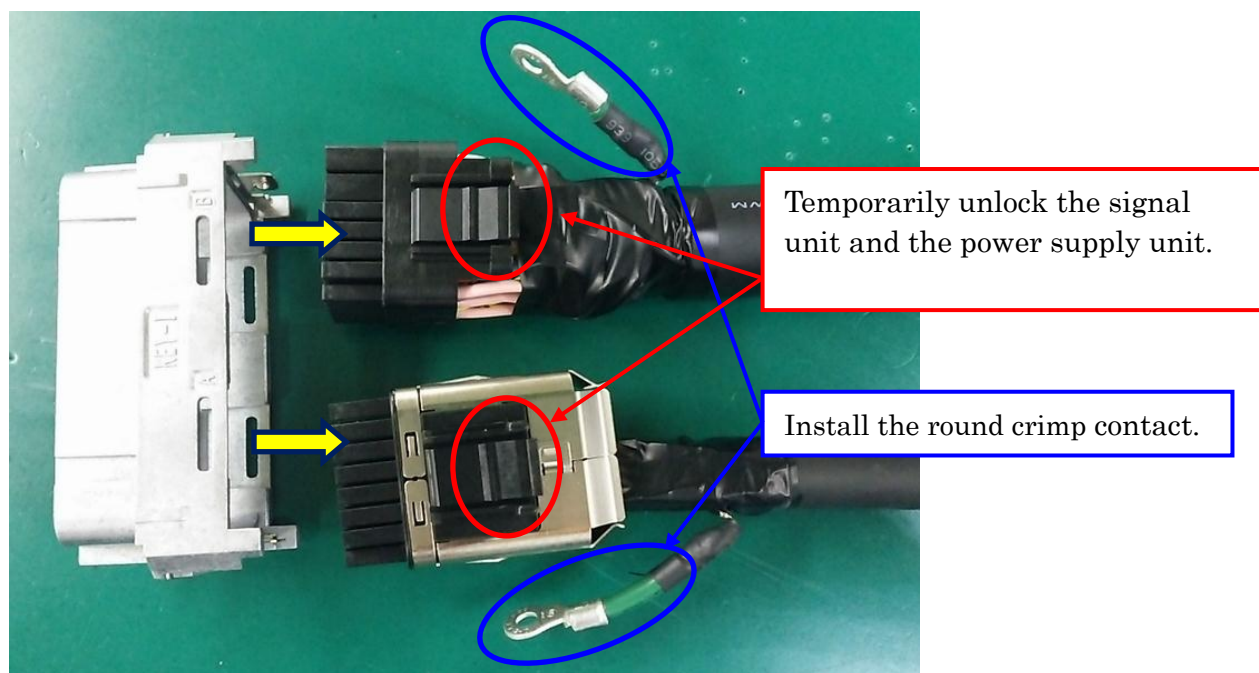
3.5sq (AWG#12)-compliant fixing screw hole diameter  $\phi 3.2 - 3.7$

(Ex.) R5.5-3M/R5.5-3N/R5.5-3S/R5.5-3.5N/R5.5-3.5S/R5.5-3.5

manufactured by NICHIFU Co.,Ltd. etc.

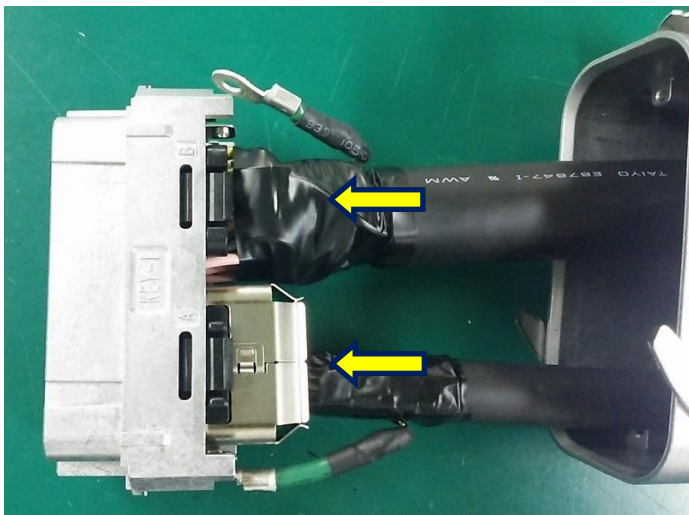


After cutting off the redundant cable length, temporarily remove the signal unit and the power supply unit, crimp the round crimp contact described above with a commercially available tool. (both on the signal and the power supply sides)



Insert the signal unit and the power supply unit again.



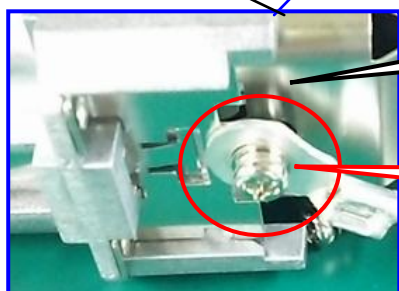
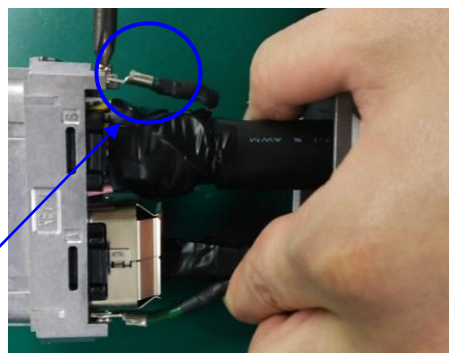


Fix the round crimp contact with screws to the screw holes of the grounding contact.  
 \*Please use commercially available “M3×4 spring washer + round head screw with flat washer” for the fixing screws.

**Recommended tightening torque: 0.32 - 0.63 N/m**

<On the signal unit side>

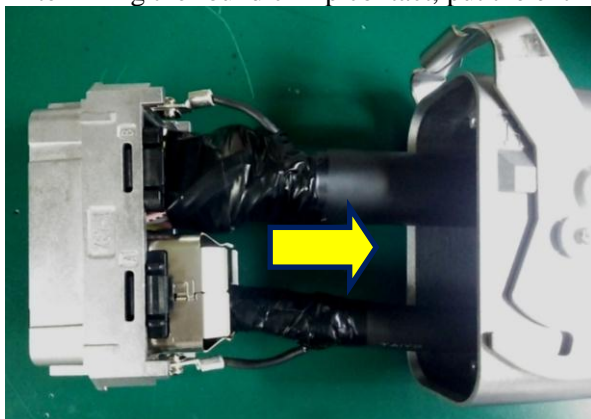
<On the power supply unit side>



Grounding contact

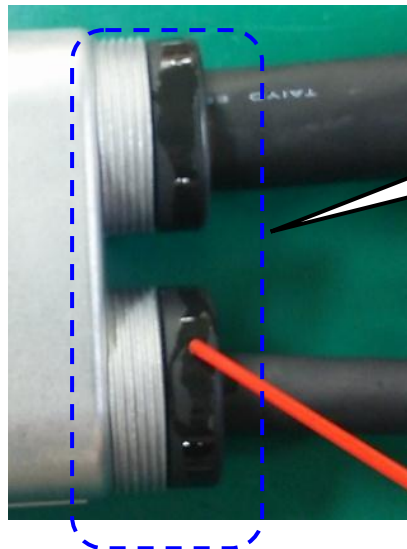
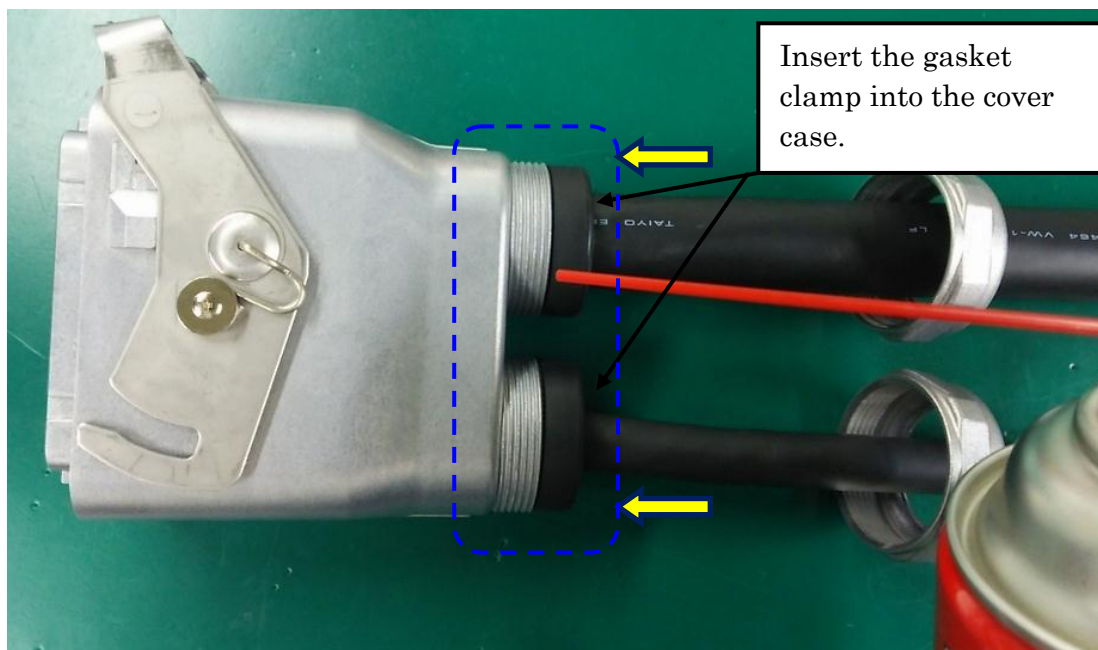
Fixed state of a round crimp contact

After fixing the round crimp contact, put the entire plug case in the cover case.



#### 4-6 Embedding the end bell cap

Insert the gasket clamp into the cover case in a sliding manner, and apply lubricant (KURE 5-56 etc.) to the side of the gasket clamp and the threaded parts of the cover case.



Apply lubricant (KURE 5-56 etc.) to the side of the gasket clamp and the threaded parts.

#### **【Important points】**

In some cases, due to the friction force between the gasket clamp and the end bell cap, the cable may rotate when you rotate the end bell cap.

For this reason, if you apply lubricant such as KURE 5-56 to the side of the gasket clamp, the rotation of the cable may be improved.

Additionally, on some occasions, when you loosen the once-tightened gasket clamp, the cable may rotate.

Slide the end bell cap, and temporarily fix it in the cover case by manually tightening the screw.

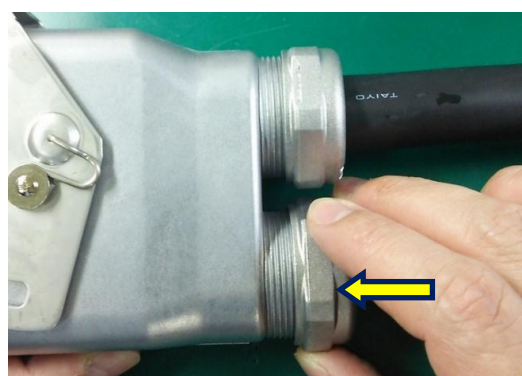
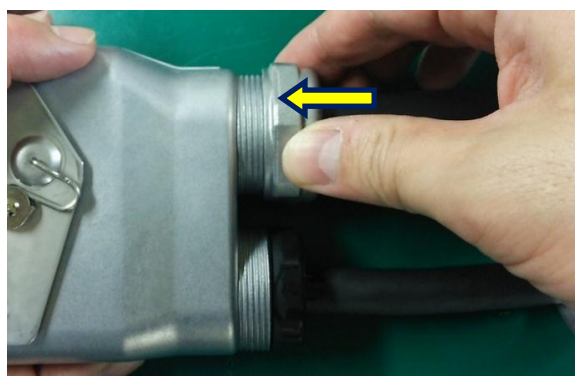
### 【Important points】

When it is hard to tighten the screw, rotate the end bell cap counter-clockwise with the end bell cap pressed toward the cover case side until a “click” sound is heard, indicating the mated state of the threads, and tighten the screw again in this state.

Care should be taken that, if you forcibly tighten the screw when it is hard to do it, the screw could bite into or be tightened into the case in the middle of the way, and it couldn't be removed.

<Tightening the end bell cap on the power supply side>

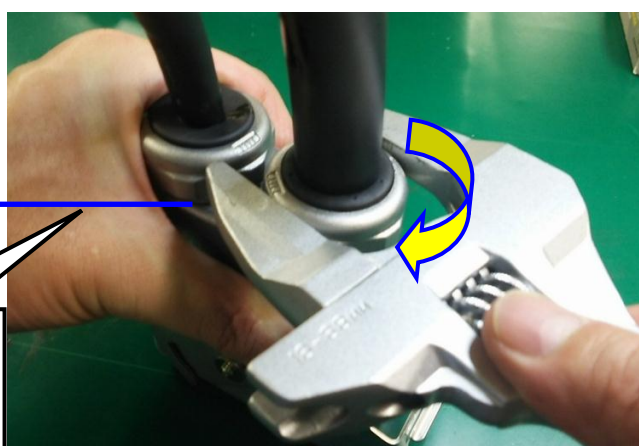
< Tightening the end bell cap on the signal side>



Tighten up the end bell cap with a large diameter wrench (with the open width of 45mm or more).



Tighten up the end bell cap down to the end face of the cover case.  
(Until the screw can't be tightened any more)



Tighten up the  
end bell cap  
down to the end  
face of the cover  
case.

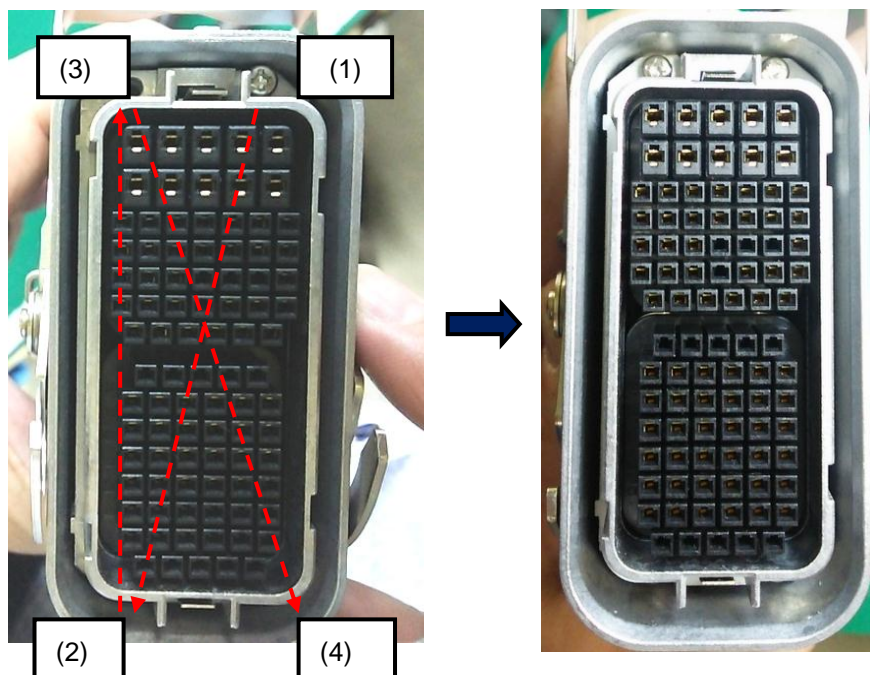


#### 4-7 Screw tightening the plug case

Fix the plug case at 4 places with attached screws while pressing it in the mating axis direction.  
When tightening the screws, after temporarily fixing the case in the order of (1)⇒(2)⇒(3)⇒(4) diagonally, give a final tightening in the same order. \*Our recommended torque for the final tightening is as follows:

**Recommended tightening torque: 0.32 - 0.63 N/m**

Finished state of screw-tightening operation



#### 4-8 Completed harness

