


1. Scope

This specification specifies the work procedure for connecting the PQ50WA-2 unit type straight plug (2 cables).

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COUNT	DESCRIPTION OF REVISIONS	DESIGNED	CHECKED	DATE	
▲	DIS-E-00011014	HY.MATSUDA	KG.OKITA	20260205	
TITLE		 HIROSE ELECTRIC CO., LTD.			
PQ50WA 2cable output Straight Plug Wiring Procedure					
APPROVED	RI.TAKAYASU				20160613
CHECKED	NM.NISHIMATSU				20160610
		DESIGNED	TY.MIURA	20160610	
		WRITTEN	TY.MIURA	20160610	
TECHNICAL SPECIFICATION		ETAD-E3151-00		▲ 1 / 3838	

3. Applicable products

The combination of the parts described in this specification is an example, and the combination of the parts is optional.

(1) Configuration when using female crimping housing

Product name	Product type	HRS No.
PQ50WA -2U-PC2	Plug Cover Case	236-2092-0
PQ50WA/S-10S/34 S-UNIT	Composite female crimping housing	236-2085-0
PQ50WASX-46S-UNIT	Female crimping housing with shield	236-2086-0
PQWT-CMA (22.5)	Gasket clamp	236-2101-0
PQWT-CMA (15.0)	Gasket clamp	236-2099-0
PQWT-EBC (PG 29)	End bell cap	236-2066-6
PQ50-1618SCFA	Female terminal	236-2008-0
PQ50S-1822SCFA	Small scalpel terminal	236-2026-1
PQ50S-2428SCFA	Small scalpel terminal	236-2028-7

(2) Configuration when using male crimping housing.

Product name	Product type	HRS No.
PQ50WA-2U-PC2	Plug Cover Case	236-2092-0
PQ50WA/S-10P/34 P-UNIT	Composite male crimping housing	236-2087-0
PQ50WASX-46 P-UNIT	Male crimping housing with shield	236-2088-0
PQWT-CMA (22.5)	Gasket clamp	236-2101-0
PQWT-CMA (15.0)	Gasket clamp	236-2099-0
PQWT-EBC (PG 29)	End bell cap	236-2066-6
PQ50 -1618 PCFA	Male terminal	236-2006-4
PQ50SA-1822 PCFA	Small male terminal	236-2029-0
PQ50SA-2428 PCFA	Small male terminal	236-2030-9

4. Applicable Cables

Maker name	Manufactured by Taiyo Cable Tech Co., Ltd
Product name	2464 -1007 - SB (NPB) Black LF 44 x 17 AWG (for power supply) 2464 -3599/IIA-SB Black LF 18 Px 23 AWG (for signals)
Wire size	AWG#17 x 44 Core Cable outer diameter 22.5 mm (for power supply) AWG#23 x 36 Cores (18 Pairs) Cable outer Diameter 13.0 mm (for signal)

5. Required Parts List

Components necessary for connection other than connector products are shown below.

Cut the cable to be used at a position of + 300 mm from the finished length L

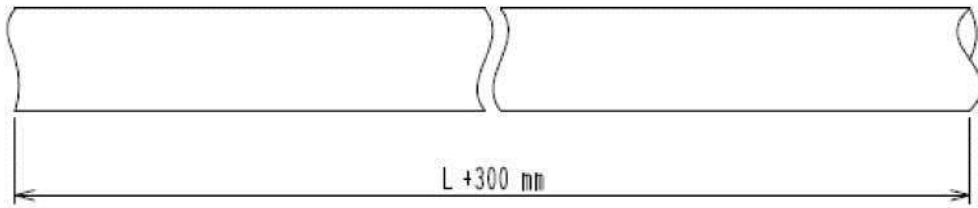
*For the finished length L, check the wiring diagram from the manufacturer.

Product name	Applications	Size	Quantity and length (Standard)	Related Pages
Heat-shrinkable tube	For identification of signal side twisted pair	Free	Twisted Pair Minutes	P.5
	Power supply side unconnected wire part insulation protection	Free	Free	P.8
	For power supply side stage cut recovery length identification	Free	Free	P.9
	Braided shield to braided shield to joint part solder protection of ground wire	C 5 ~ 6	15 ~ 20 mm	P. 21
Conductive tape	Signal side noise shielding	Recommended 7 ~ 12 mm Width	Approx. 450 mm to 300 mm	P. 18
Insulating tape	For Conductive Tape Protection	Recommended 10 mm Width	Signal: Approx. 350 mm Power Supply: Approx. 200 mm	P. 19
Ground wire	Braided shield to connector ground terminal connection	Recommended: 3.5 sq (AWG#12) to 5 sq (AWG#10)	50 ~ 100 mm x 2	P. 20
Solder	For joining braided shields to grounding wires	Free	Free	P. 20
JIS C 2805 R 5.5 Round Crimp Terminal	For connecting the ground terminal to ground wire	3.5 sq (AWG #12) to 5 sq (AWG #10) with Applicable Mounting Screw Hole Diameter ϕ 3.2 ~ 3.7	2 pieces	P. 30
Round Head Screw with Spring Washer and Flat Washer	For connecting ground terminal to round terminal	M3 x 4	2 pieces	P. 32
Lubricant (KURE 5 -56, etc.)	For fastening gasket clamps	-	-	P. 34

6-1. Cable Cutting

Cut the cable to be used at a position of + 300 mm from the finished length L.

*For the finished length L, check the wiring diagram from the manufacturer.



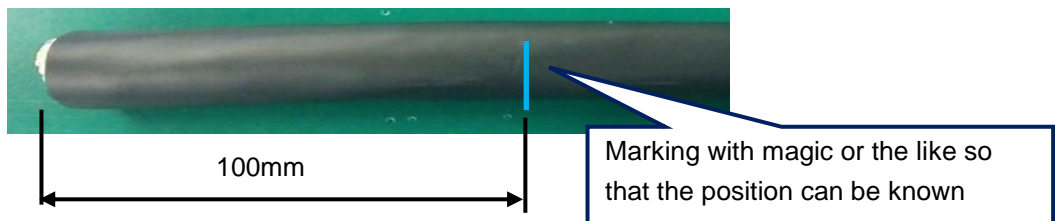
6-2 Cable Terminal Processing/Crimping

6-2-1. Cable Terminal Processing (signal side)

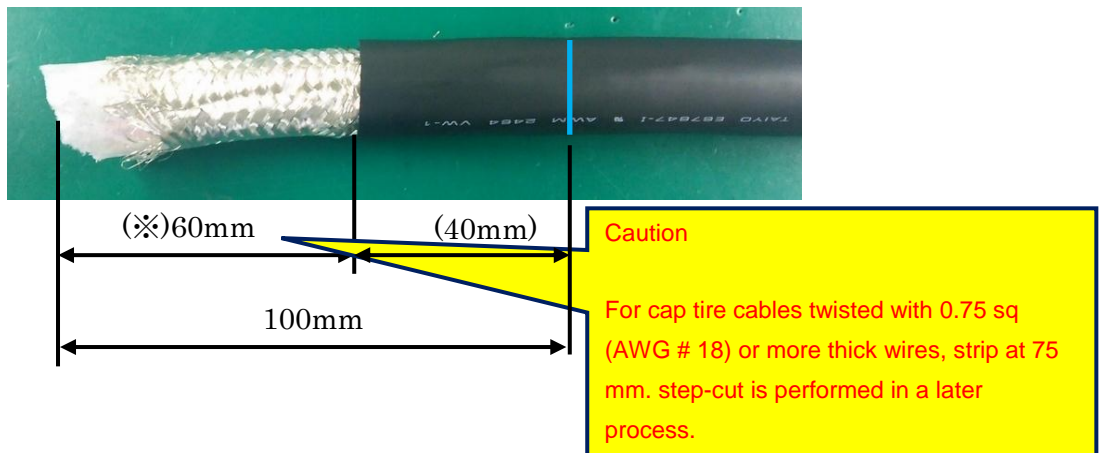
Route the end bell cap (PQWT-EBC (PG 29)) and gasket clamp (PQWT-CMA (15.0)) through the cable in that order.



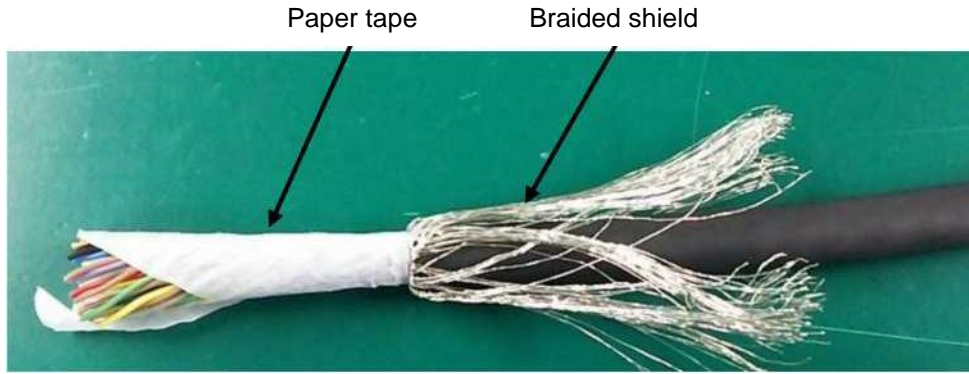
Marking is performed by magic or the like at a position 100 mm from the end face of the cable. (* This is done as a mark for positioning the gasket clamp.)



Strip 60 mm of the sheath of the cable.



Untie and fold the braided shield.



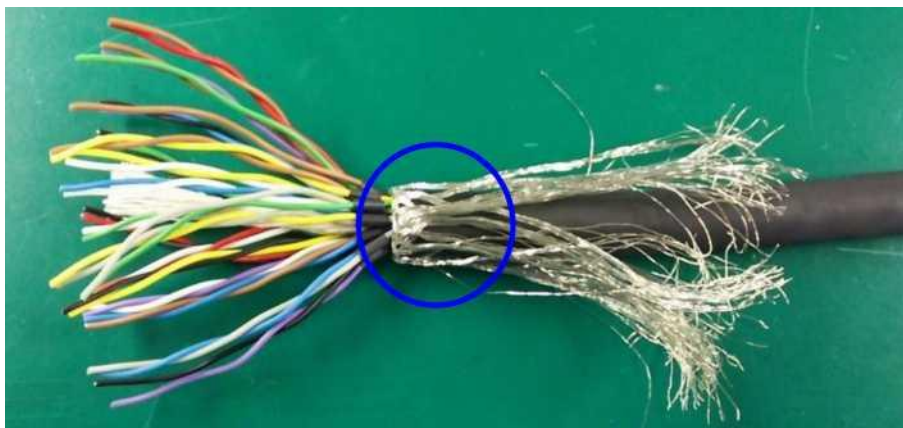
Cut the paper tape and cover each pair of shrink tubes so that they can be identified even if the twist is undone. (* Since the purpose of the contraction tube is to identify the twisted pair, thermal contraction is not performed.)



A contraction tube is passed through each pair. Then, each pair is twisted and loosened



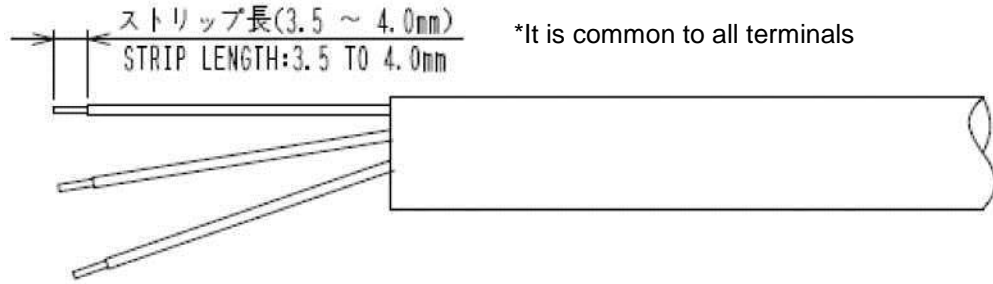
Insert the shrink tube and it is complete



6-2-2. Terminal crimping (signal side)

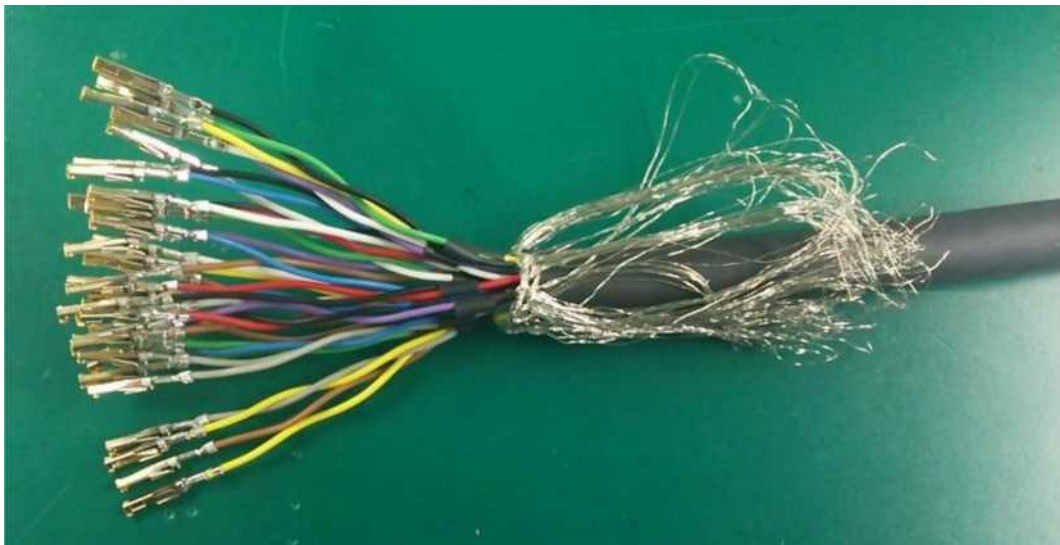
Strip the wires and crimp the terminals.

For crimp height (C/H) and insulation height (I/H) and crimp quality standards, refer to the crimp conditions table and crimp quality standards document for each terminal.



< Terminal crimping completed >

*The photo shows the PQ50S -2428SCFA female crimping terminal crimped to AWG # 23 wire.

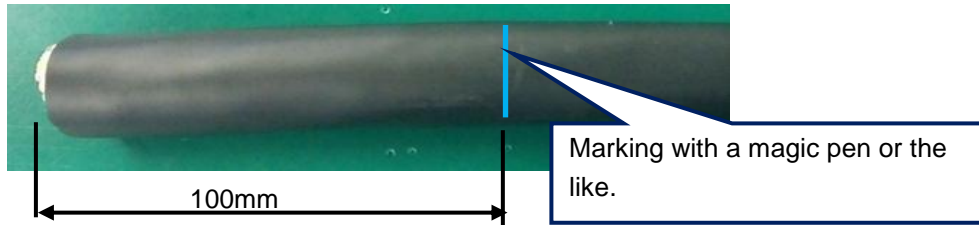


6-2-3. Cable terminal processing (power supply side)

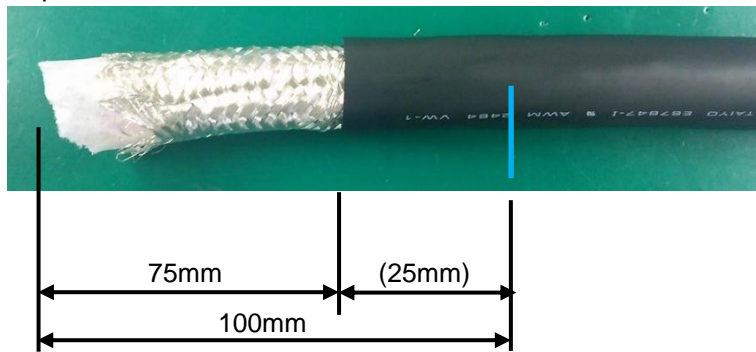
Route the end bell cap (PQWT-EBC (PG 29)) and gasket clamp (PQWT-CMA (22.0)) through the cable in that order.



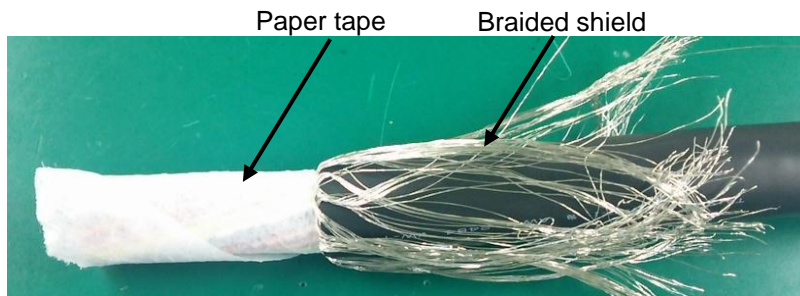
Mark the cable 100 mm from the end of the cable with a marker.
(* This is done as a mark for positioning the gasket clamp.)



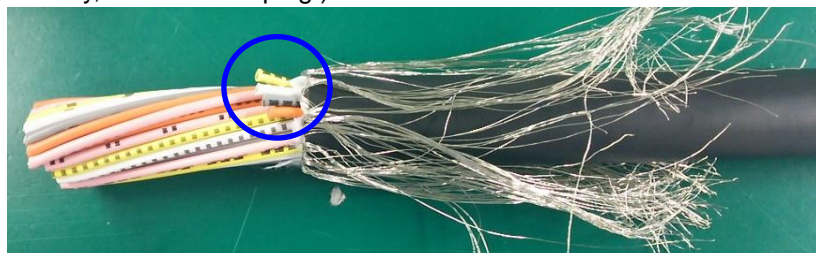
Strip 75 mm of the sheath of the cable



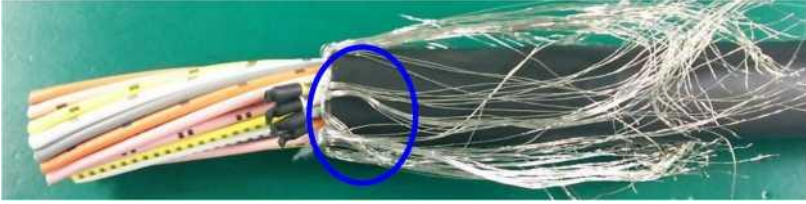
Untie the braided shield and fold it back.



Cut the paper tape and cut any unused wires beforehand.
(If necessary, cut after crimping.)



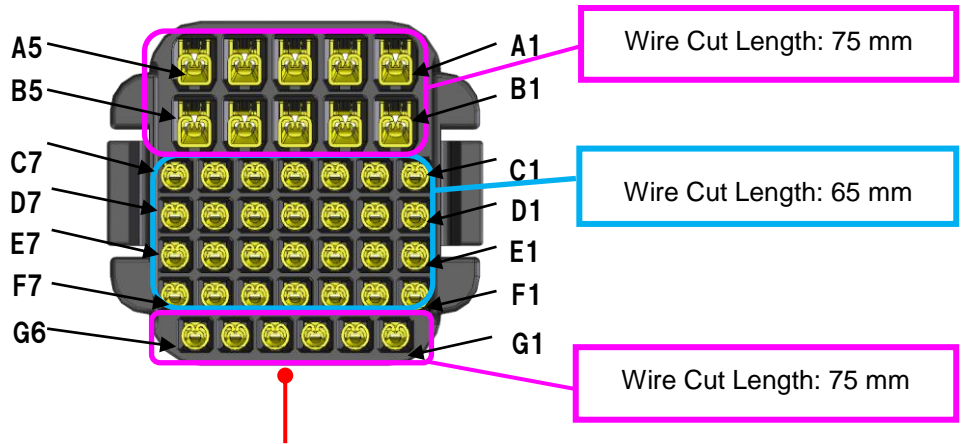
Cover the end with a heat-shrinkable tube so that the conductor cross section of an unused wire does not come into contact with a braided shield or the like.



6-2-4 Step-cut processing (power supply side)

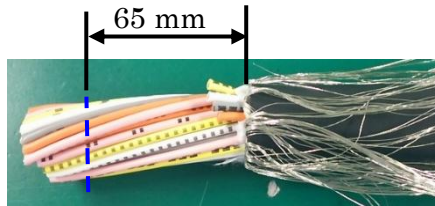
Depending on the pin arrangement below, divide the wire into 2 types of 75 mm and 65 mm. Cutting to the cable. (Cut the center of the cable at this time.)

In order to prevent the wire from being cut or crimped, crimping is performed according to the following procedures (1) - (2) - (3).



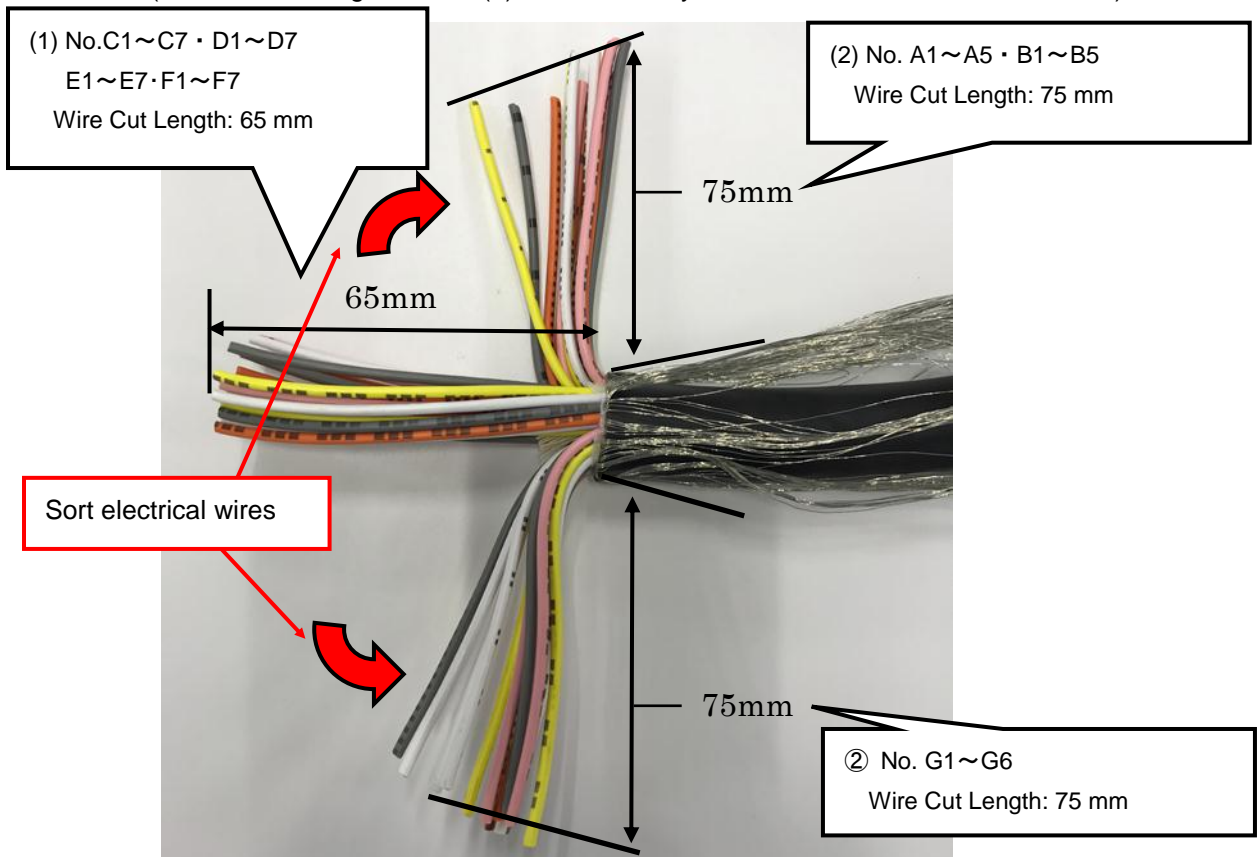
PQ50WA/S-10S/34S-UNIT (Composite Female Crimping Housing)

Pin arrangement No. C1 to C7, D1 to D7, E1 to E7, F1 to F7 - Cut the length of the wire divided into G1 to G6 at a position 65 mm from the end face.



Pin arrangement number on the outside of the housing From the end face of the wire which is divided into A1 to A5, B1 to B5, G1 to G6, Cut at 5 mm.

(In order to distinguish from (1), each line may be covered with a contraction tube.)



(1) No. C1~C7 · D1~D7
E1~E7 · F1~F7
Wire Cut Length: 65 mm

(2) No. A1~A5 · B1~B5
Wire Cut Length: 75 mm

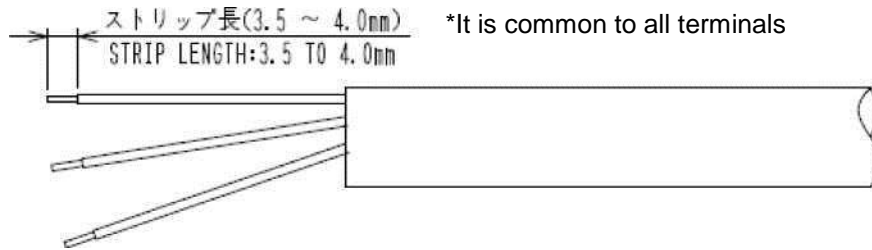
Sort electrical wires

② No. G1~G6
Wire Cut Length: 75 mm

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Pin Alignment No. Strip A1 to A5 and B1 to B5 and crimp the terminal for PQ 50.

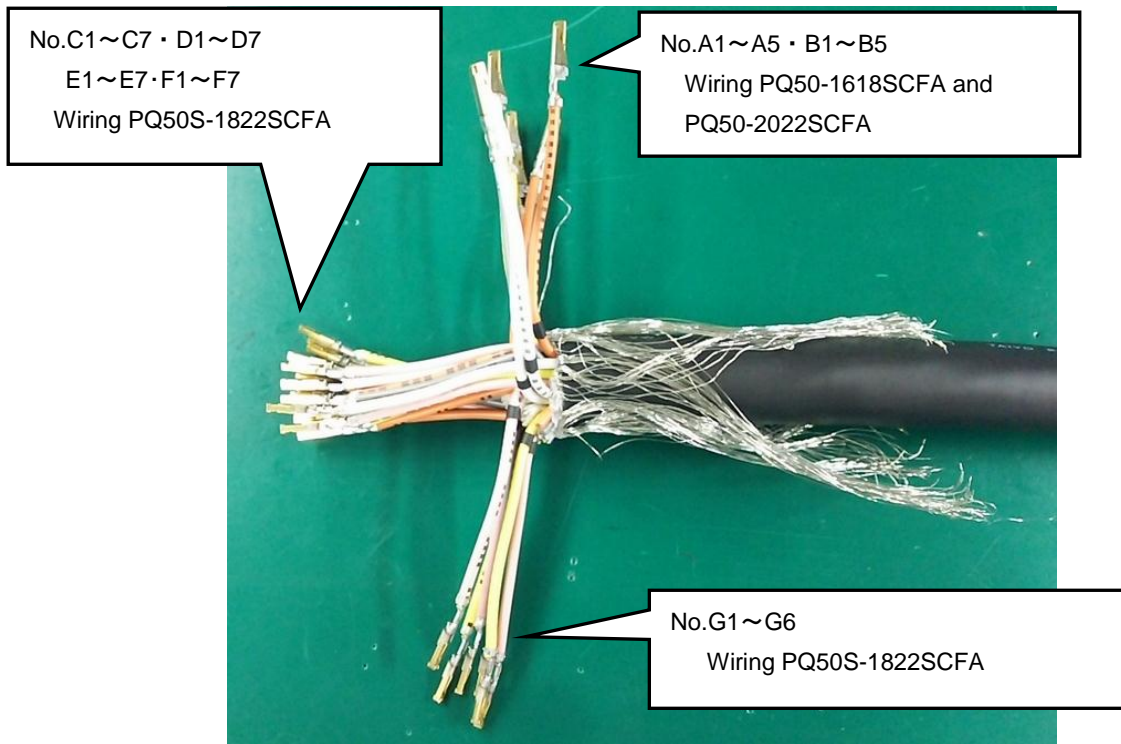
Strips of pin arrangement numbers C1 to C7, D1 to D7, E1 to E7, F1 to F7, G1 to G6 are performed to crimp the terminal for PQ50S.



*For crimp height (C/H) and insulation height (I/H) and crimp quality standards, refer to the crimp conditions table and crimp quality standards document for each terminal.

<Terminal crimping completed>

The photo shows the PQ50-1618SCFA, PQ50-2022SCFA, PQ50S-1822SCFA female crimped terminal on AWG # 17 wire.



6-3. Insertion into the Cover Case and Insertion of Terminals into crimping housing

6-3-1 Insertion into Cover case (signal side)

Grasp the bundle of crimped terminals and pass it through the signal side cable (as shown in the picture when the lower side is a signal) of the cover case.

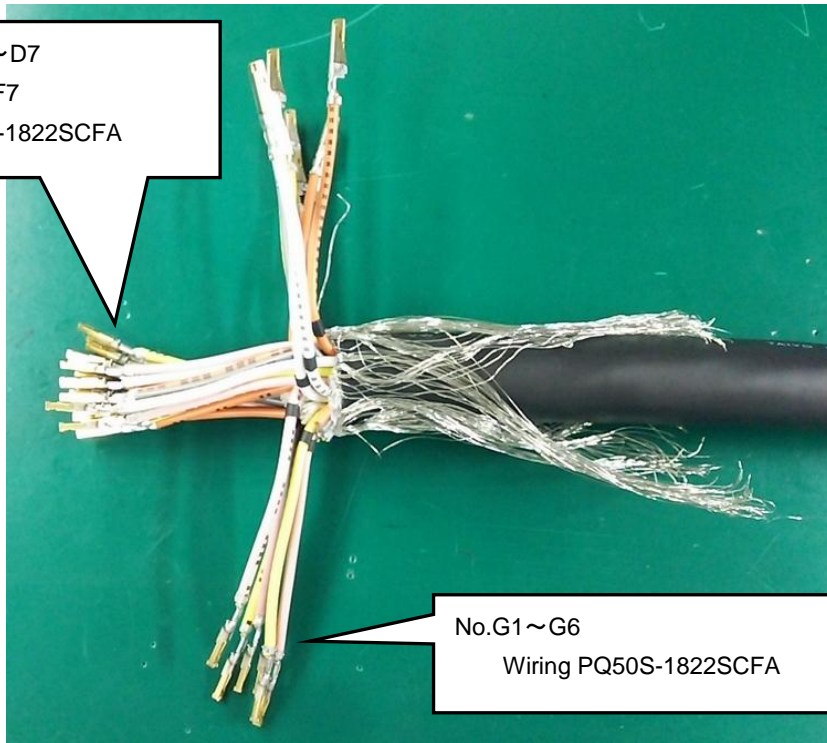
*Can be inserted into the cover case before crimping the terminal and crimped later.

Select according to the wiring work on the power supply side "signal side".

No.C1~C7 · D1~D7

E1~E7·F1~F7

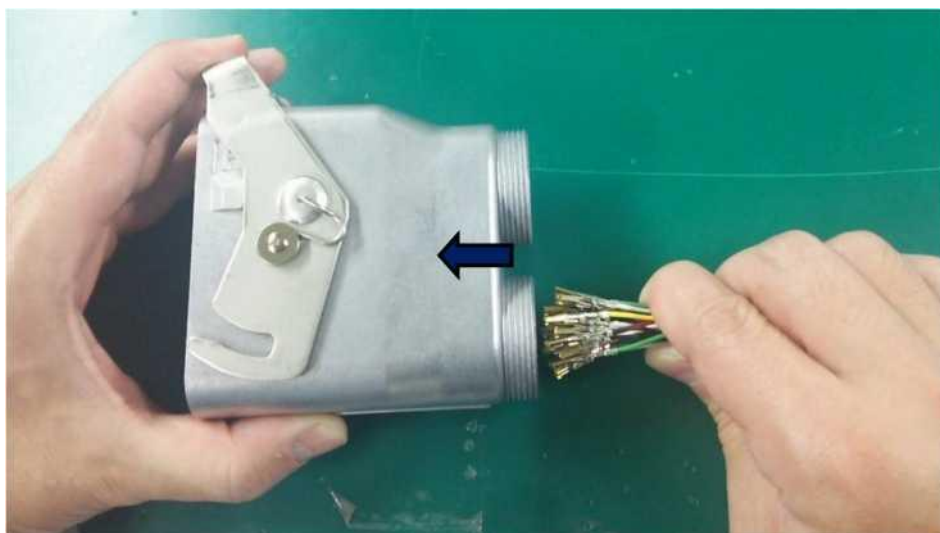
Wiring PQ50S-1822SCFA



No.G1~G6

Wiring PQ50S-1822SCFA

After inserting



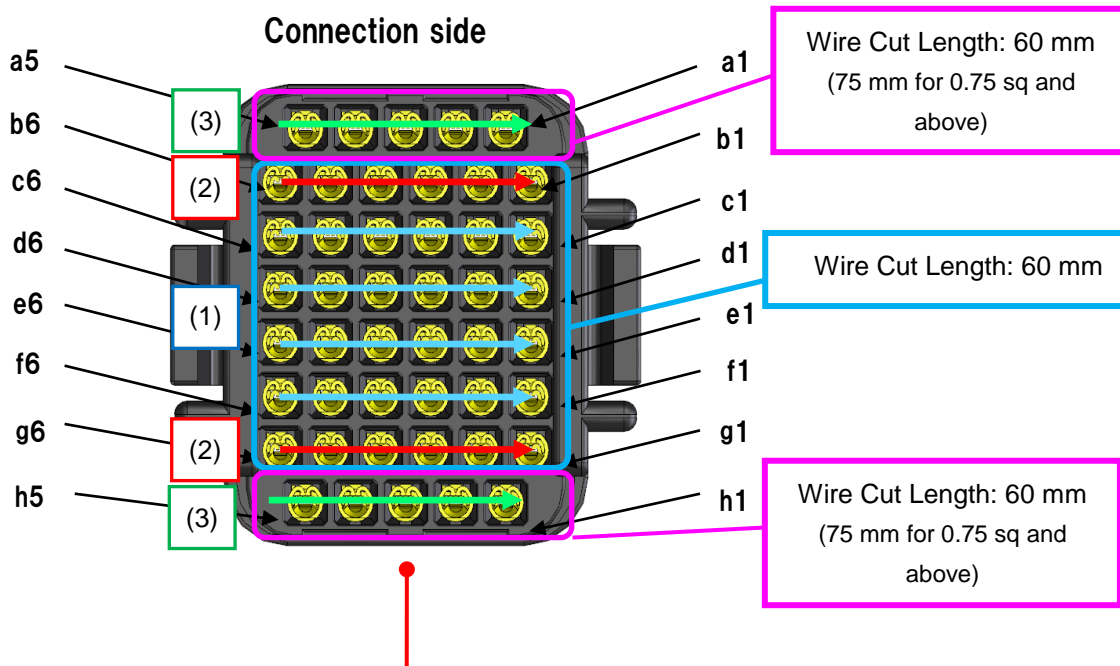
6-3-2.Insert crimp housing terminal (signal side)

Insert crimp terminals in the following order of pin arrangement. Insert terminals according to the assignment of the cable specification and connector pin arrangement.

*Refer to the wiring diagram from the manufacturer for detailed pin assignments.

[Point] In order to prevent insertion errors of crimping, crimp terminals are inserted in order from the most end in the following procedures (1), (2), (3).

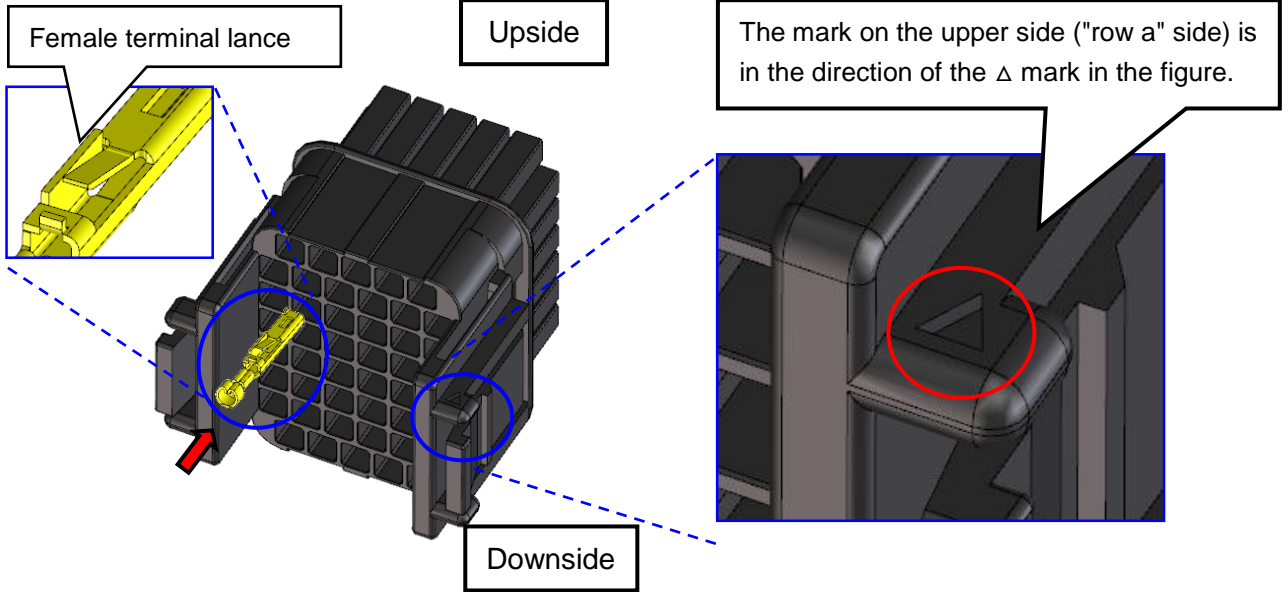
*When inserting the terminal, be careful not to entangle with the wires of the terminal which have already been inserted, and insert the terminal by routing.



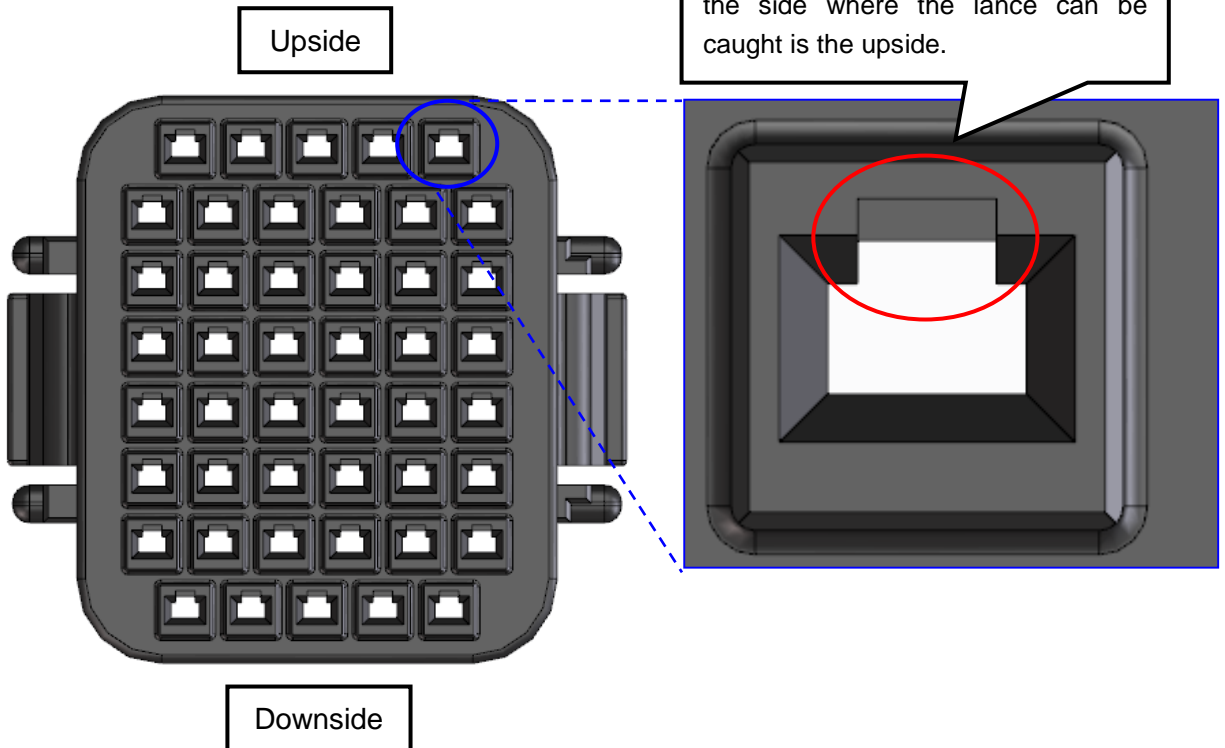
PQ50WASX-46S-UNIT (Shield Female Crimping Housing)

- (1) Insert crimp terminals into columns c, d, d, and f.
- (2) Insert crimp terminals into columns b and g.
- (3) Insert crimp terminals into row a.

Terminal Insert Direction



【The front of interlock】



<Terminal insert completed>



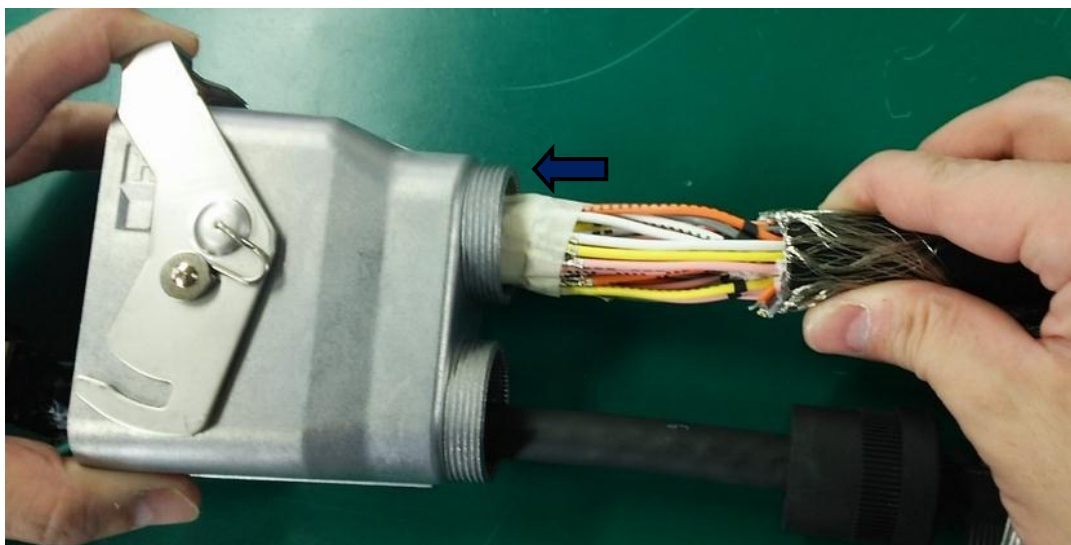
6-3-3.Insertion into cover case (power supply side)

The crimped terminals are bundled with a tape or the like, and passed through a power supply side cable (b) (If the upper side is the power supply side, as shown in the photo) of the cover case.

*Can be inserted into the cover case before crimping the terminal and crimped later. Select according to the wiring work on the power supply side "signal side."
Be careful not to deform the terminal lance during insertion by bundling with tape.



Grasp the bundle of crimped terminals and pass it through the power supply cable slot (If the power supply is on the upper side, as shown in the photo) of the cover case.

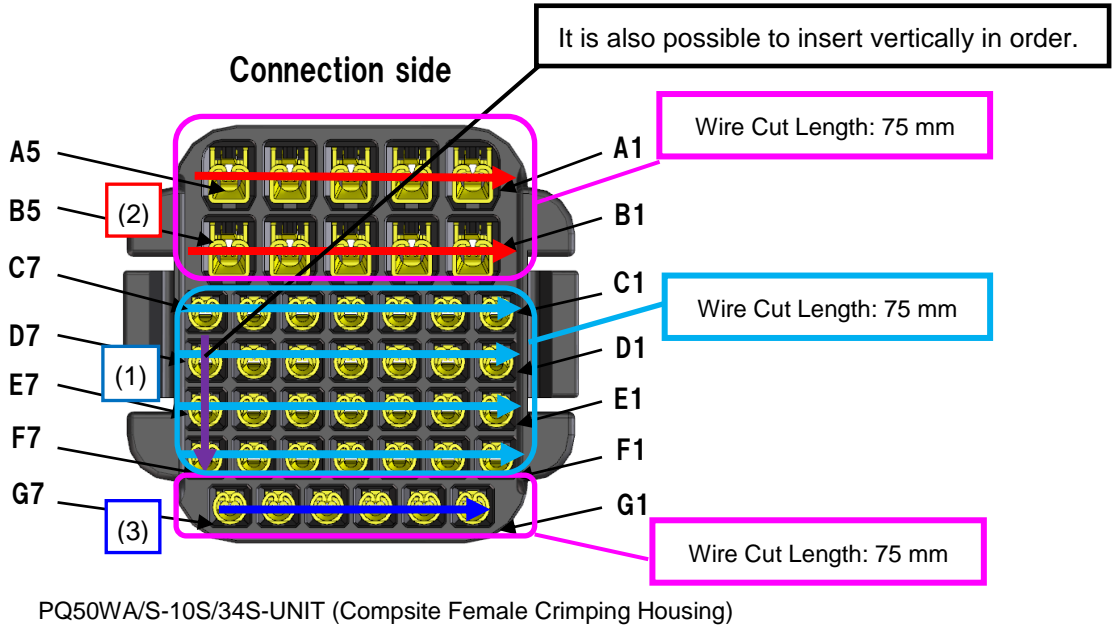


6-3-4. Insert terminal into crimping housing (power supply side)

Insert crimp terminals in the following order of pin arrangement.
Insert terminals according to the assignment of the cable specification and connector pin arrangement.
*Refer to the wiring diagram from the manufacturer for detailed pin assignments.

Insert crimp terminals in order from the end in the procedure of (1), (2) and (3).

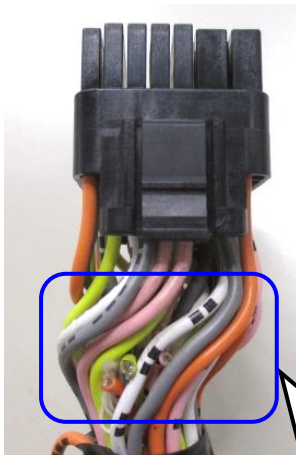
- (1) Insert crimp terminals in the order of row C, row D, row E, row F (step cut wires to 65 mm).
- (2) Insert crimp terminals in the order of row A and row (step cut wires to 75 mm).
- (3) Insert crimp terminals into G row (step cut electric wires to 75 mm).



Wire routing

When inserting a crimping terminal, the crimping terminal is inserted by routing the wire away from the connected wire so that the wires are not entangled with each other.

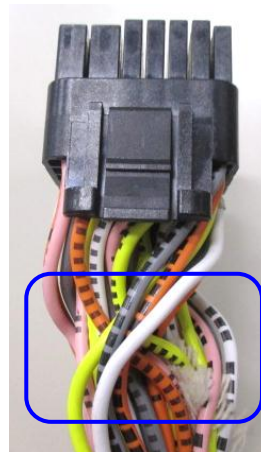
Good Example



The state of being inserted from the root into other wires without entanglement.

Since the excess length is removed and easy to bend, the load on the lance is hardly applied when twisting or tensile load is applied.

Bad Example



The state in which electric wires are straddled and entangled.

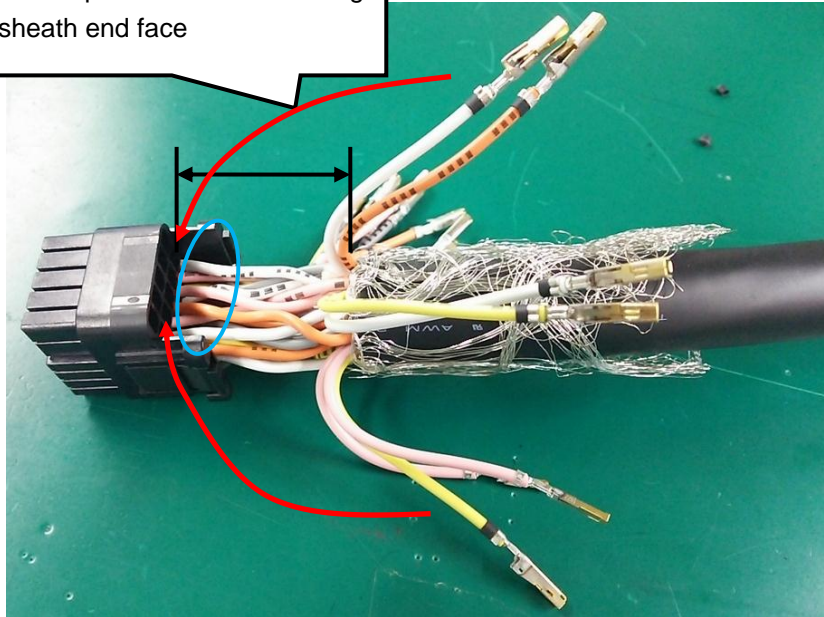
The pulling is tightened, and a load is easily applied to the lance when twisting or tensile load is applied.

<(1) columns C to F >

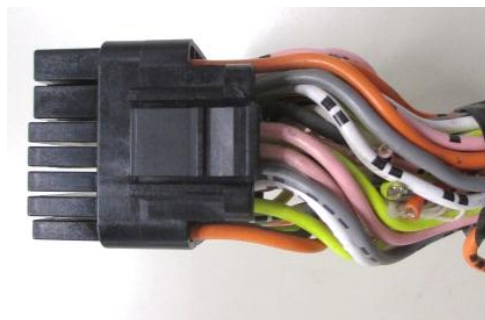
In this state, the positional relationship between the housing and the end face of the cable is determined by the bending force of the wires inserted in the rows C, D, E, and F.

(1) The crimped electric wires (2) and (3), which are 10 mm longer than the length of the crimped electric wires (2) and (3), are pulled and inserted.

(1) Insertion (row C to F) generally determines the position of the housing from the sheath end face



Terminal Insert Completed



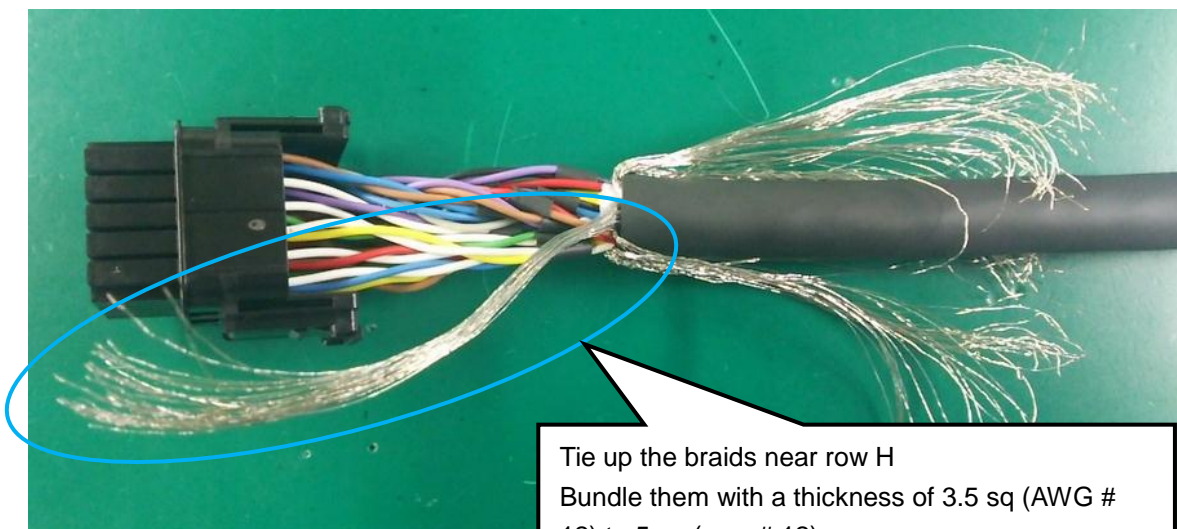
6-4. Braided shield treatment

6-4-1. Braided shield processing (signal side)

Stranded wires of the braided shield are arranged so as to have a thickness (cross-sectional area) of recommended 3.5 sq (AWG #12) to 5 sq (AWG #10).

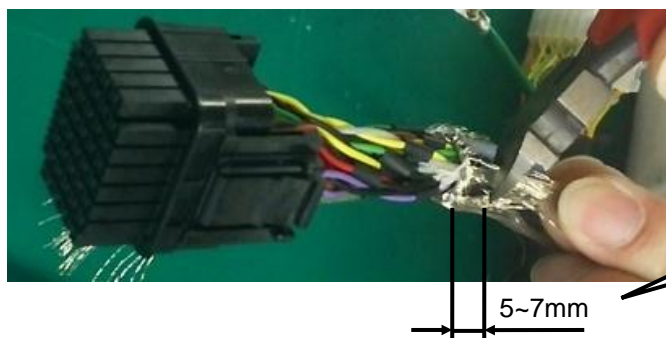
Terminal address number of the housing Bundle braided shields near the "h" side.

*The distance when screwing the round crimp terminal to the plug case is shortened, and shielding performance is improved.



Tie up the braids near row H
Bundle them with a thickness of 3.5 sq (AWG # 12) to 5 sq (awg # 12).

Cut the remaining braided shield. (Leave 5 ~ 7 mm from the sheath edge.) Then fold back toward the sheath end face.



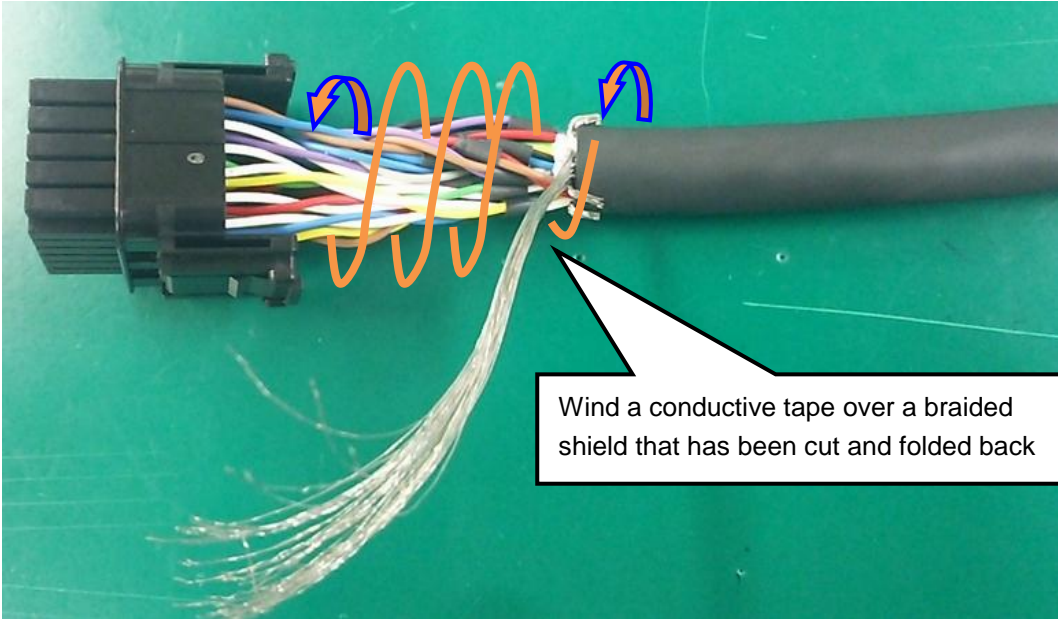
Tie up the braids near row H
Bundle them with a thickness of 3.5 sq (AWG # 12) to 5 sq (awg # 12).

5~7mm

The conductive tape is started to be wound so as to be brought into close contact from above the cut and folded braided shield, and spirally wound on the crimping housing side across the bundled braided shield.

*Be careful that there is no gap between the pitches of the conductive tape.

At the beginning of the winding, the tape is strongly wound, and at the vicinity of the base of the housing side, the tape is wound to such an extent that the tapes are brought into close contact with each other so that a load is not applied to the terminal lance part.

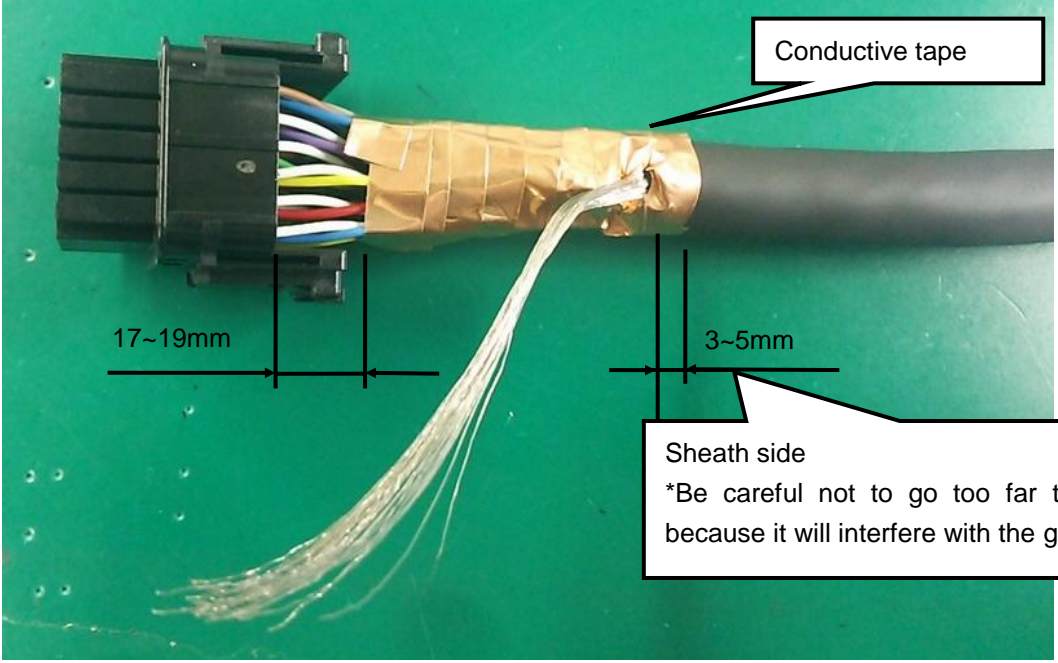


[Guide for Winding Conductive Tape]

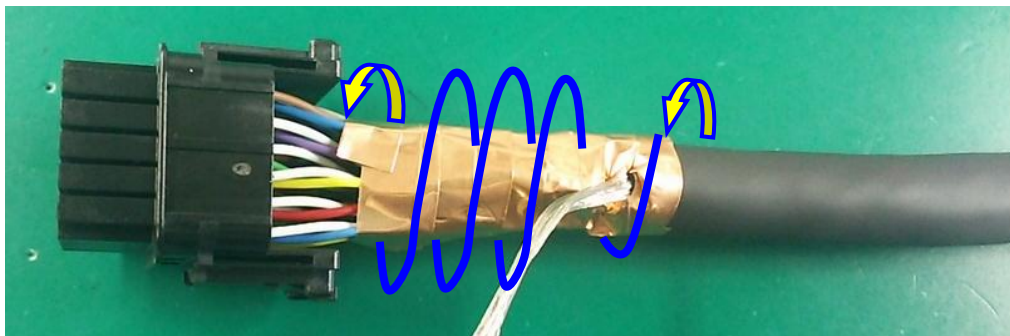
Wrap the conductive tape in the following position:

Guideline: Use with 12 mm width of conductive tape Use with 7 mm width of conductive tape Use with 300 mm length of conductive tape About 450 mm length

< Conductive Tape Wrapped in Complete Condition >



The insulating tape is started to be wound so as to be brought into close contact from above the conductive tape, and is spirally wound on the crimping housing side across the bundled braided shield.



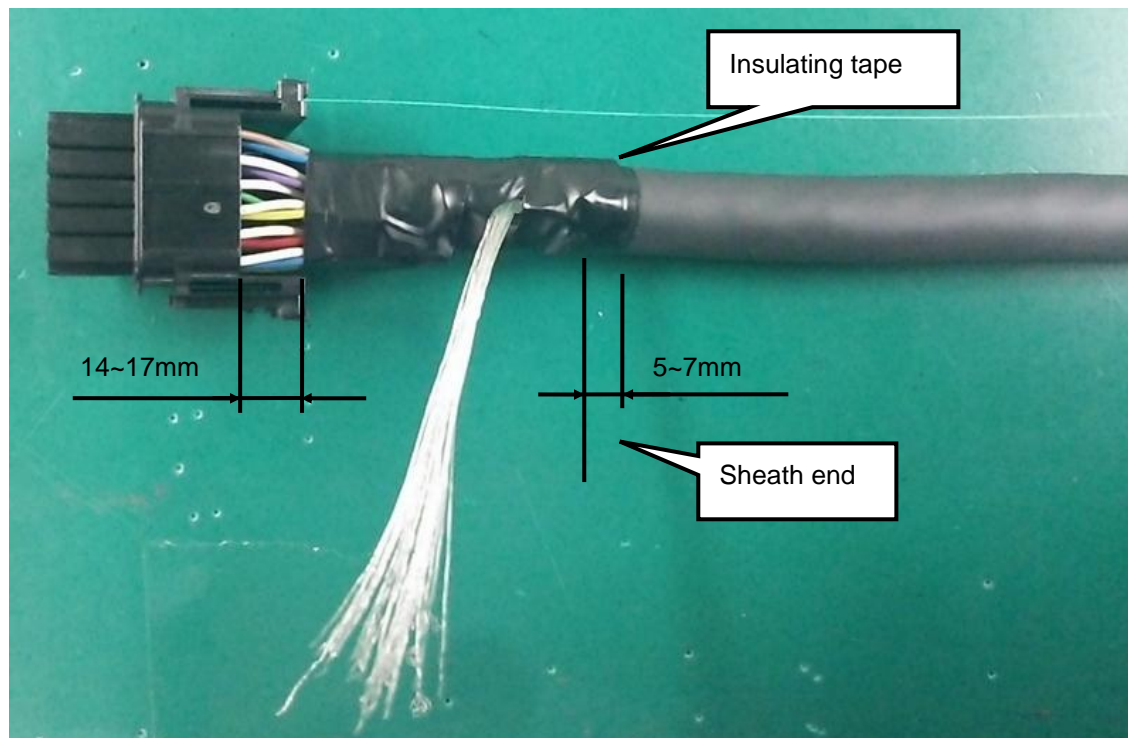
*Be careful that there is no gap between the pitches of the insulating tape.
At the beginning of the winding, the tape is strongly wound, and at the vicinity of the base of the housing side, the tape is wound to such an extent that the tapes are brought into close contact with each other so that a load is not applied to the terminal lance part.

[Guideline for winding insulating tape]

Wrap an insulating tape in the following position.:

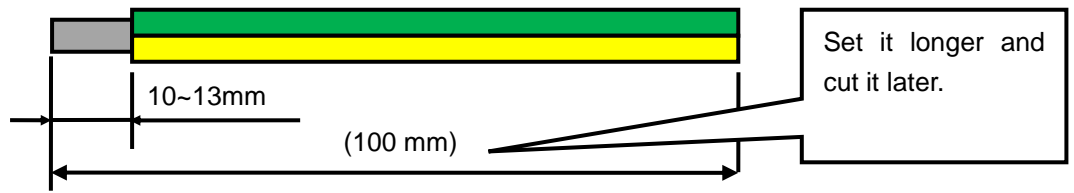
Standard: Insulation Tape 10 mm Width Usage Insulation Tape Length Approximately 350 mm

< Insulation tape winding completed condition >

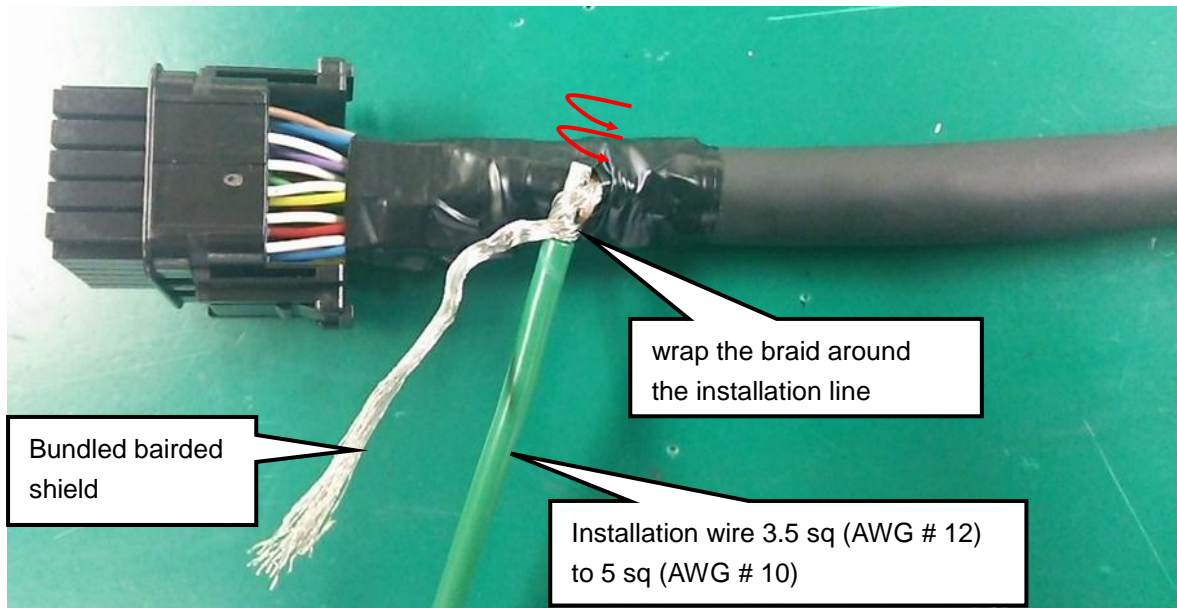


6-4-2. Connecting the ground wire (signal side)

To strip a grounding wire (green/yellow) of recommended 3.5 sq (AWG # 12) to 5 sq (AWG # 10).



A braided shield bundled to the tip of a stripped grounding wire is spirally wound. So, 10 mm from the base of the braided shield, you start winding the end of the ground wire around the bottom of the vampire. (* Implemented to provide flexibility against bending of the grounding wire.)

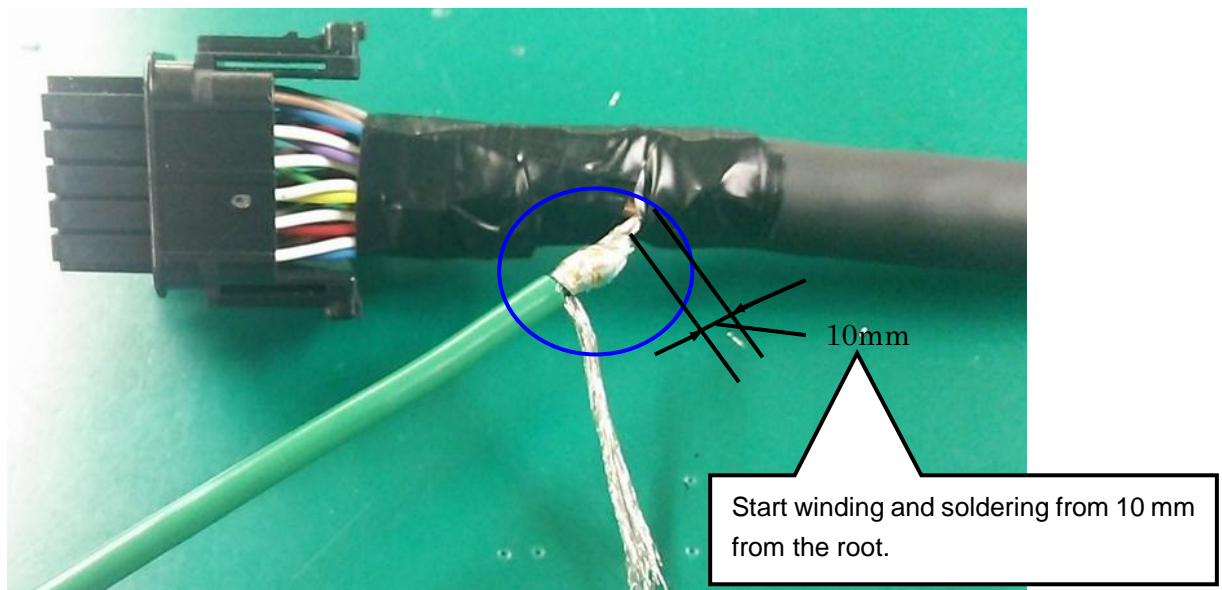


The place where the braided shield is wound is soldered, and the remaining braided shield is cut.

[Soldering Conditions]

Iron Tip Temperature: 400 °C to 420 °C

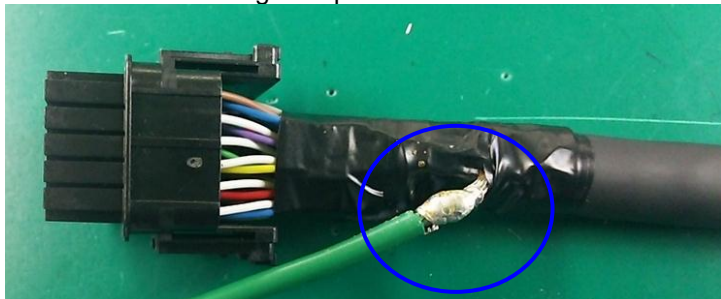
Solder time: about 1 sec for preliminary soldering, about 2 sec for soldering



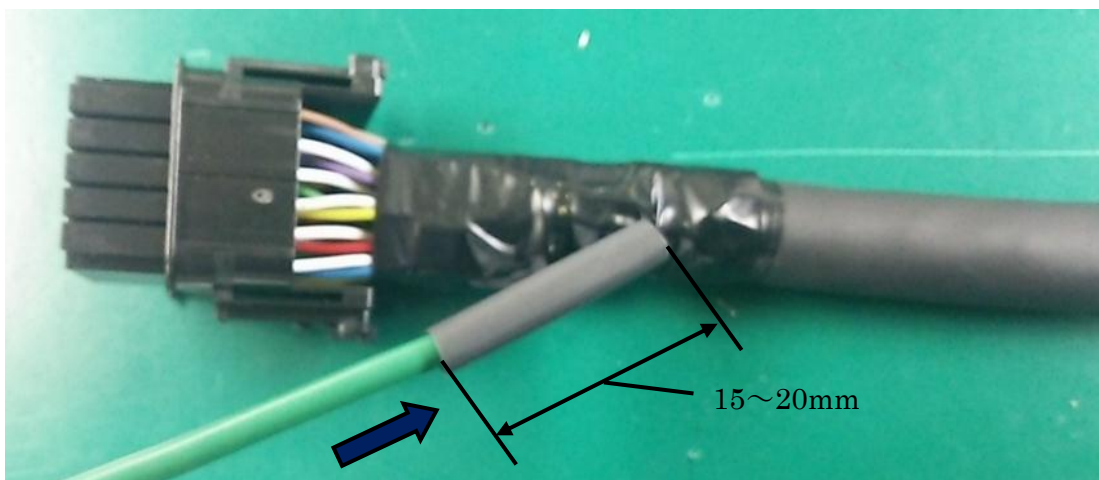
Cut the remaining braided shield.



< Ground Wire Soldering Complete >



In order to cover the soldering part, a heat-shrinkable tube is covered.
Recommended Heat Shrinkage Tube Diameter: S 5 ~ 6 Length 15 ~ 20 mm

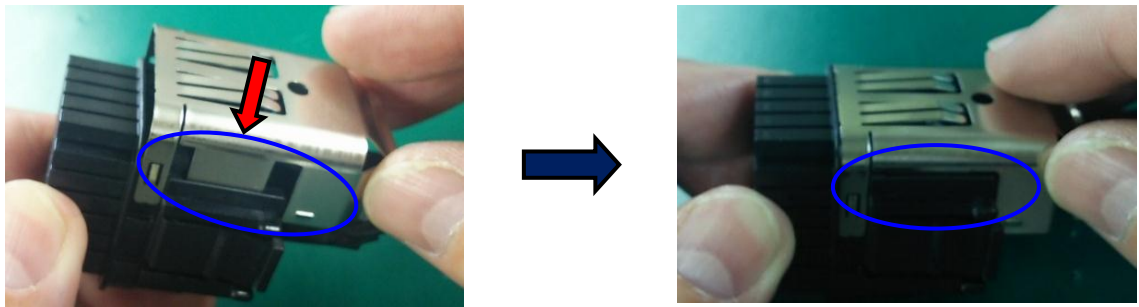


Shrink the heat shrink tube.



6-4-3.Shell integration (signal side only)

Assemble two attached shells (S shell in the photo) into the housing.



< About fitting the shell >

Insert the shell into the four grooves of the housing.

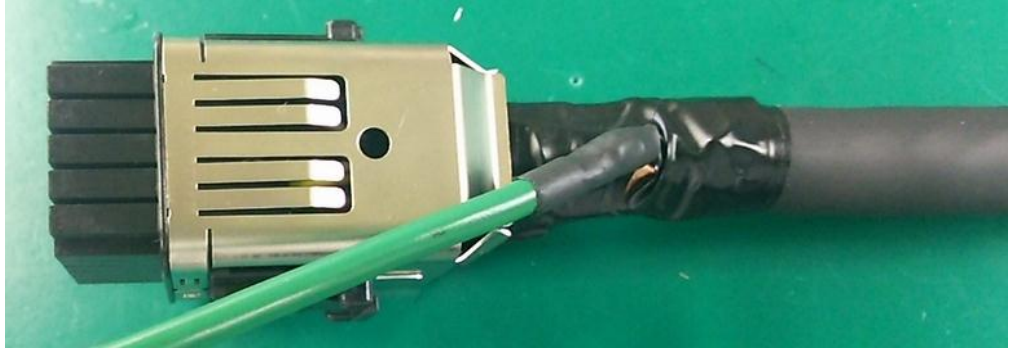


Confirm that the two fitting parts are firmly fitted as shown in the figure.

< Shell built-in completed >



< Installation of grounding wire and shell completed >

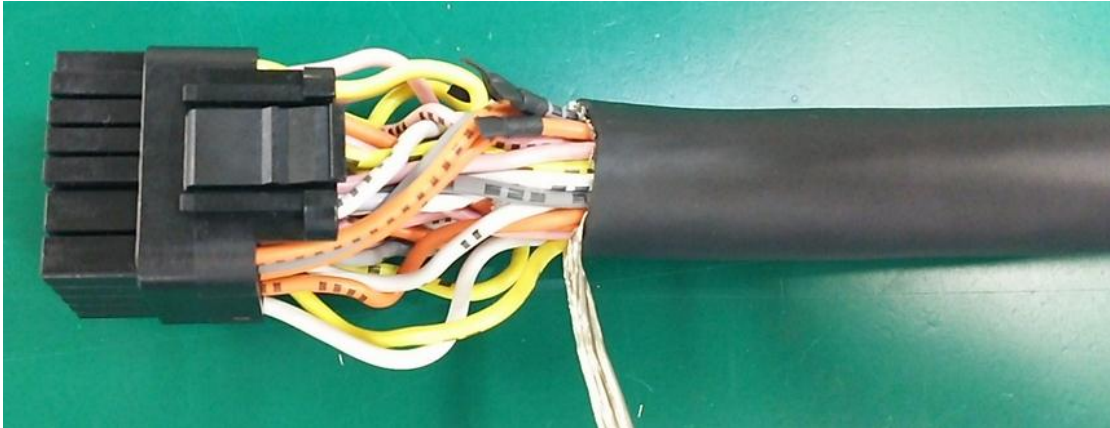


6-4-4. Braided shield processing (power supply side)

Connect the ground wire in the same manner as the signal side.

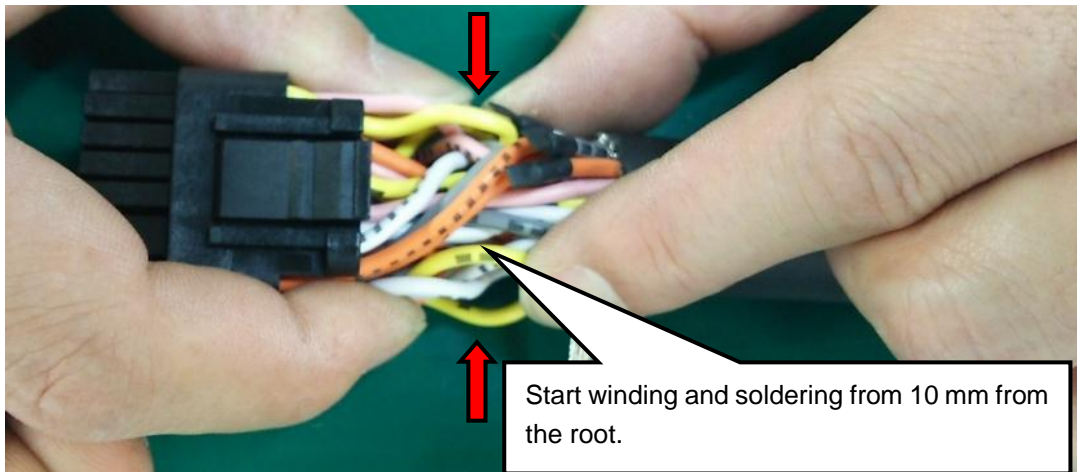
Stranded wires of the braided shield are arranged so as to obtain thickness (area) of recommended 3.5 sq to 5 sq (AWG # 12 to # 10).

To bind a braided shield near the side of an address arrangement No. "Row G" of a housing.



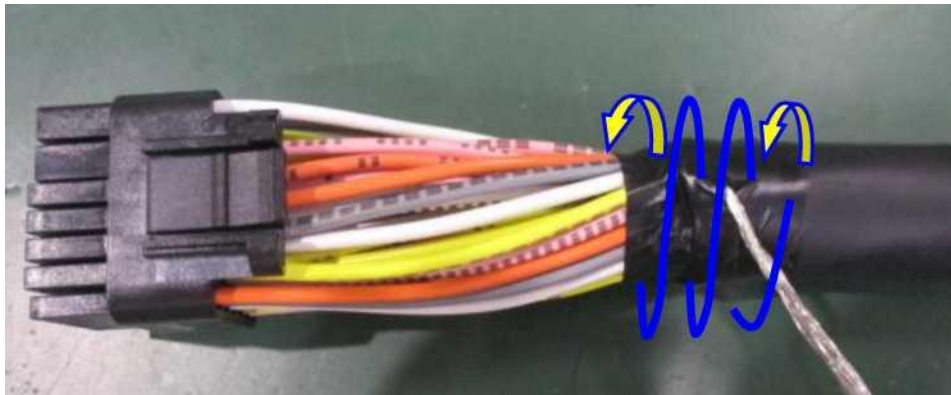
Cut all remaining braided shields. (Do not leave from sheath end face)

Since the cables in rows A, B, and G are inflated by an excess length, push them with your fingers to squeeze the outside to prevent them from inflating.



On the power supply side, the insulating tape is started to be wound from the sheath end face without winding the conductive tape, and is spirally wound on the crimping housing side across the bundled braided shield.

*Interposing • Winding insulating tape so that the cut end surface of the braided shield is not exposed.

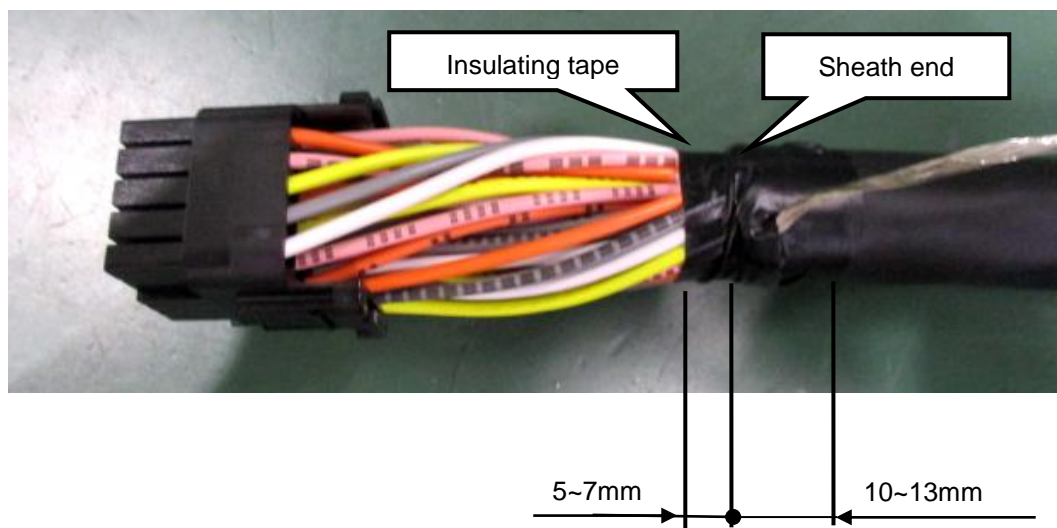


[Guideline for winding insulating tape]

Wrap an insulating tape in the following position.:

Standard: Insulation Tape 10 mm Width Usage Insulation Tape Length Approximately 200 mm

< Insulation tape winding completed condition >

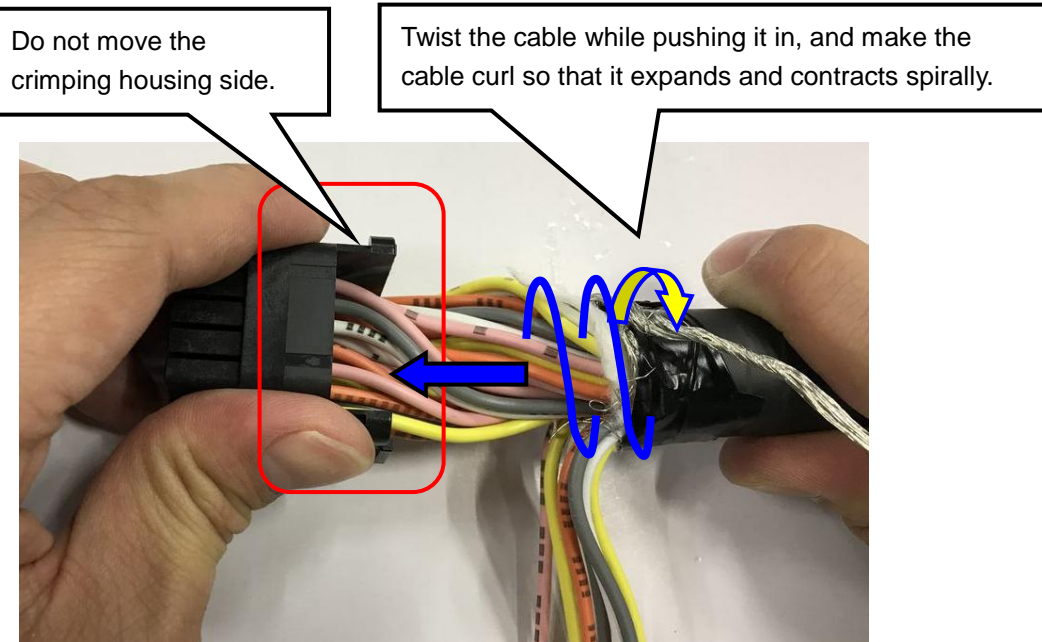


6-4-5. Make wire curl (power supply side)

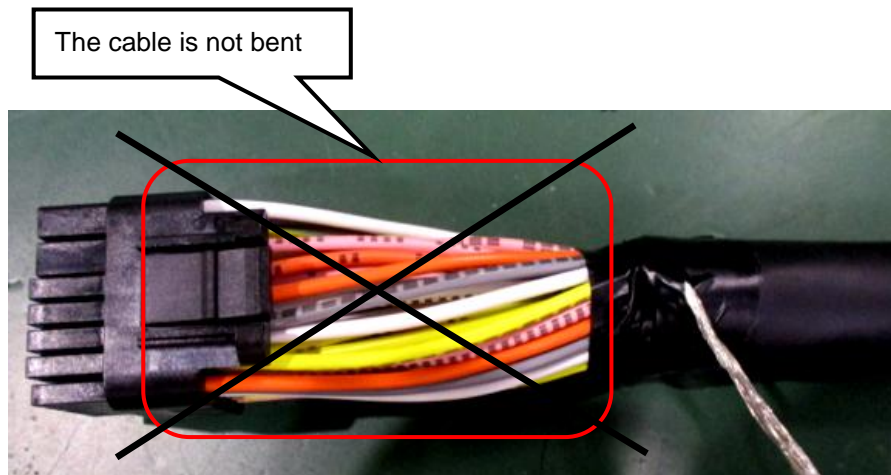
Grasp both sides of the crimping housing and fix it together with the cab tire cable. While pushing it into the crimping connection side, twist it counterclockwise about half a circle, and make the wire curl.

As a result, when the wire is pushed or pulled toward the connection part side, the entire wire expands and contracts spirally, making it easier to store it in the cover case, which is a post-process.

*There is a possibility that the crimping case will not be able to be stored in the cover case in the later work process (4-7. Plug Case Screws) if the wires are straight and stretched.

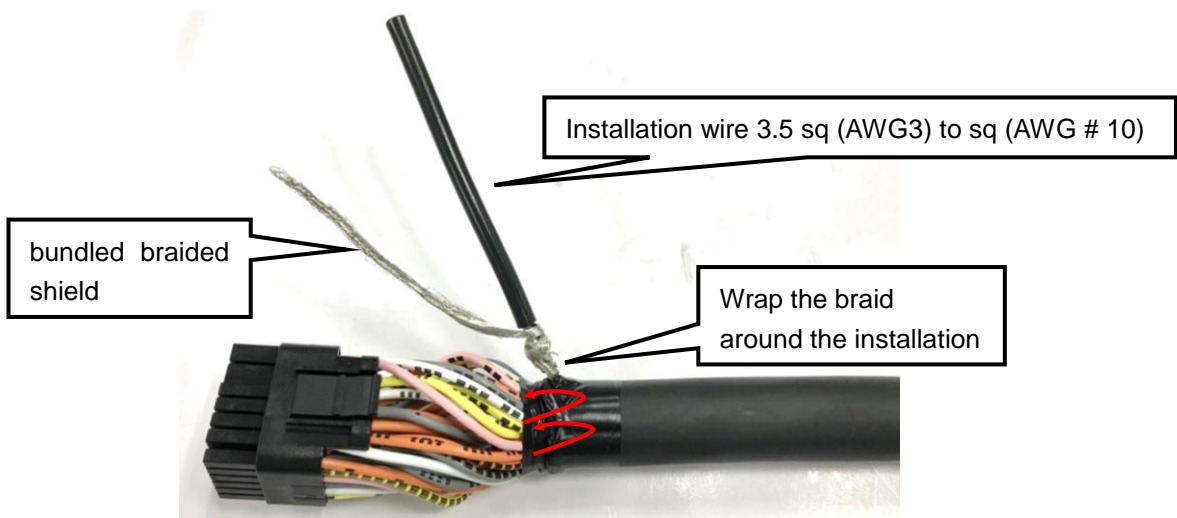


If the wire is straight as described below and there is no curl, it will be difficult to store it in the cover case of the later process. (The bending force of the wire makes the insertion very hard.)



6-4-6.Connecting the ground wire (power supply side)

A braided shield bundled to the tip of a stripped grounding wire is spirally wound as in the signal side. The tip of the grounding wire starts to wind from the part 10 mm from the root of the bundled braided shield.

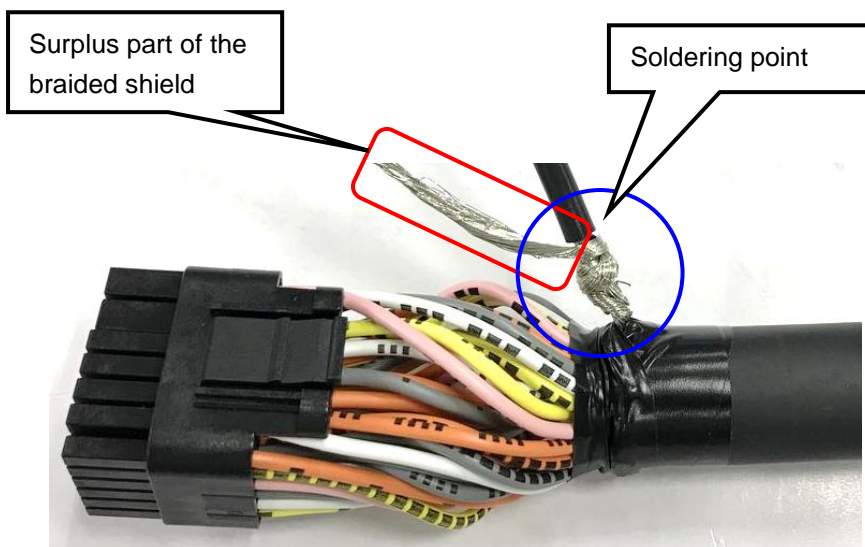


The place where the braided shield is wound is soldered similarly to the signal side. Cut the remaining braided shield.

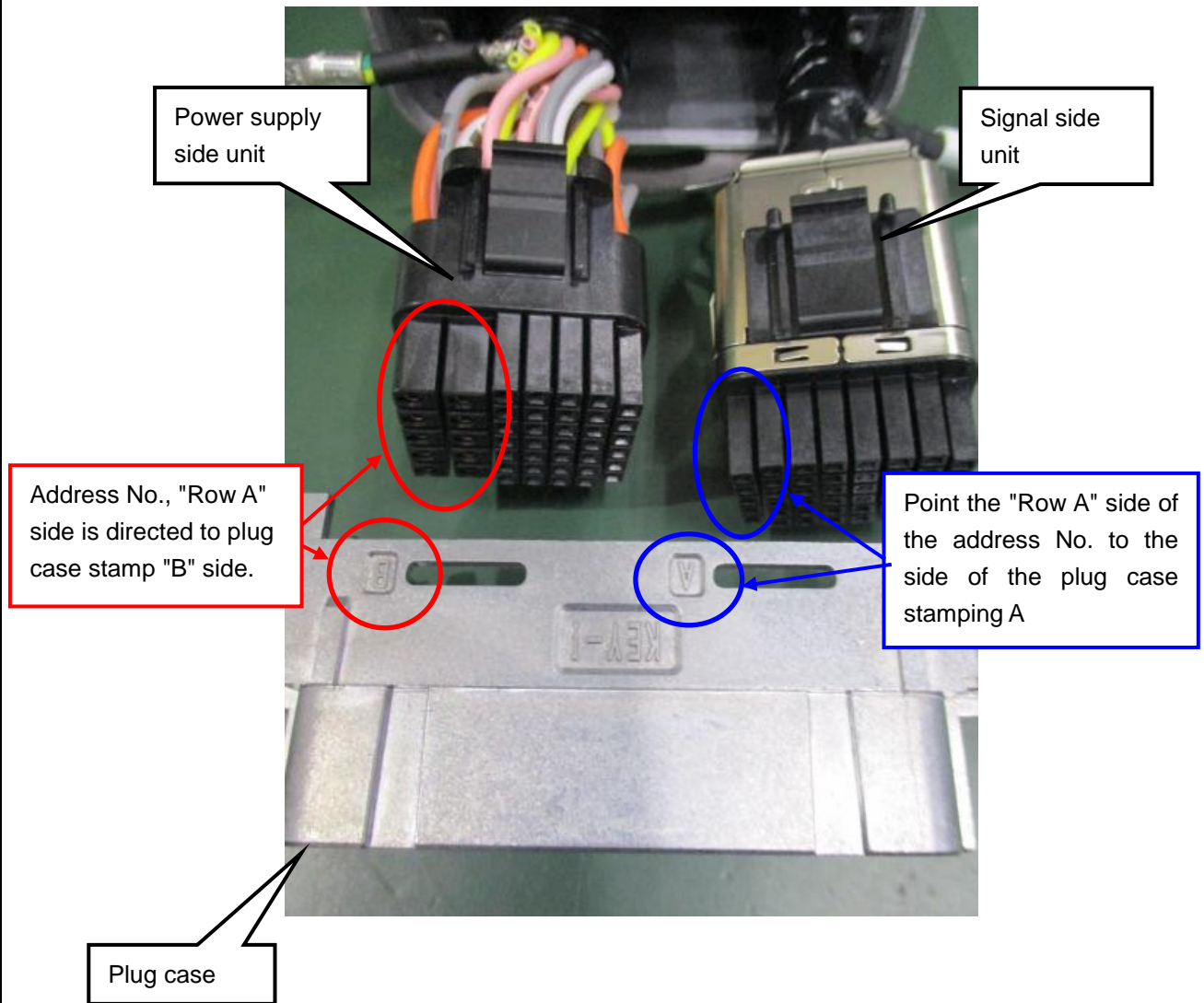
[Soldering Conditions]

Iron Tip Temperature: 400 °C to 420 °C

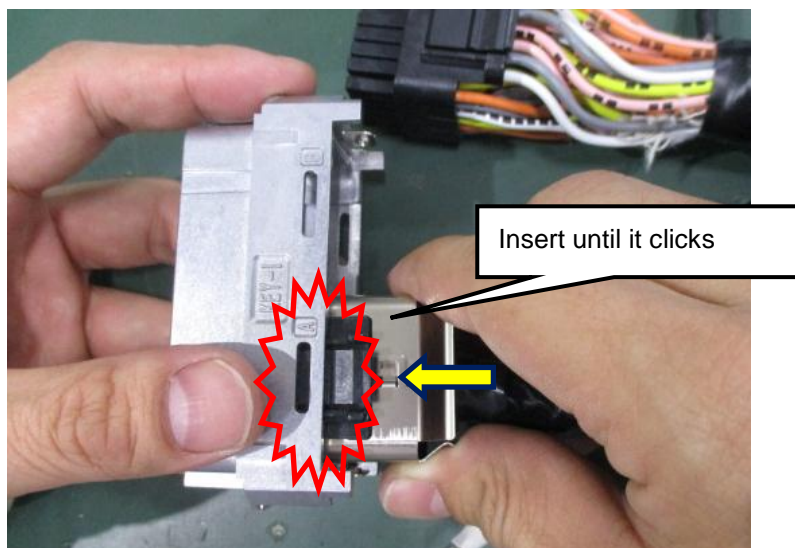
Solder time: about 1 sec for preliminary soldering, about 2 sec for soldering



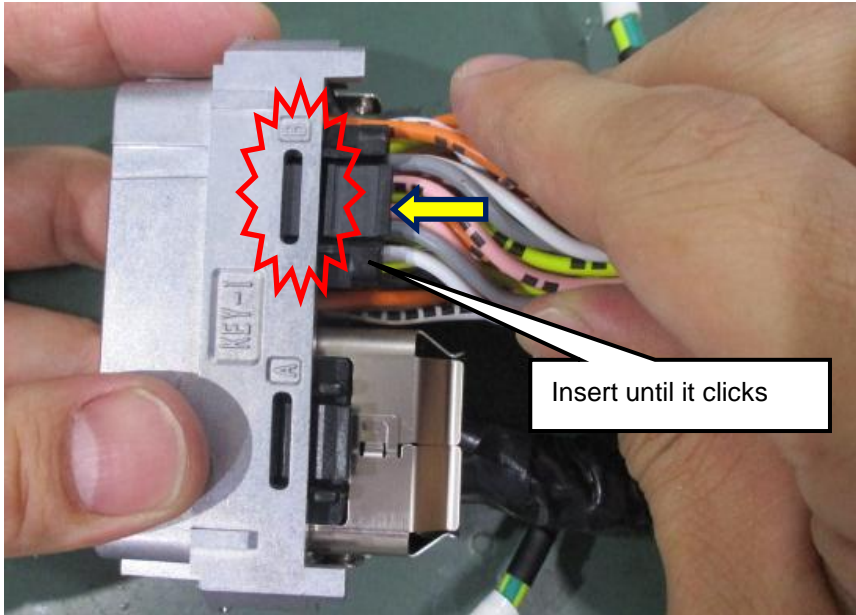
6-5. Insertion of Signal Unit and Power Supply Unit



Insert until the signal unit side housing locks.

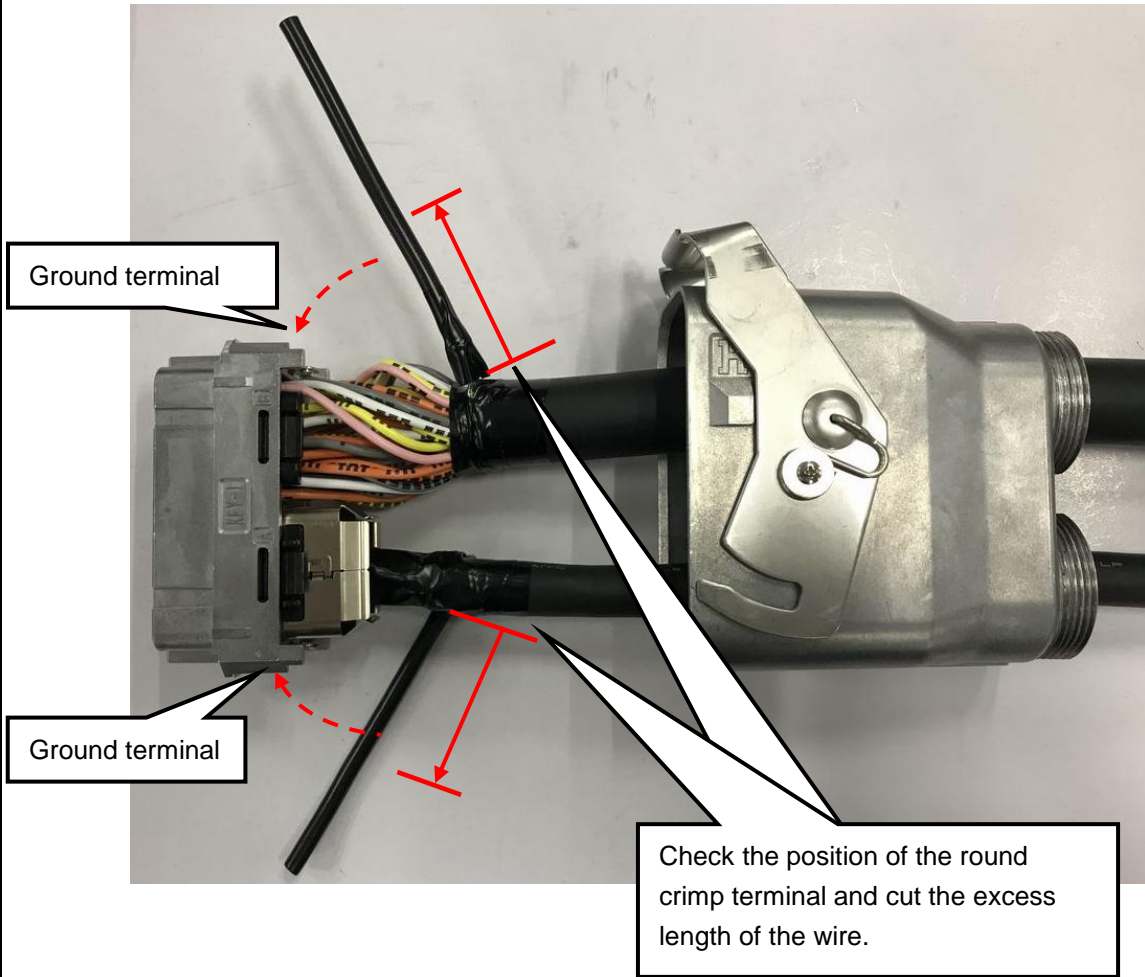


As in the case of the signal side, insert until the sound of locking the housing is heard.



6-6. Mounting the ground wire and Round crimp terminals mounting and plug case

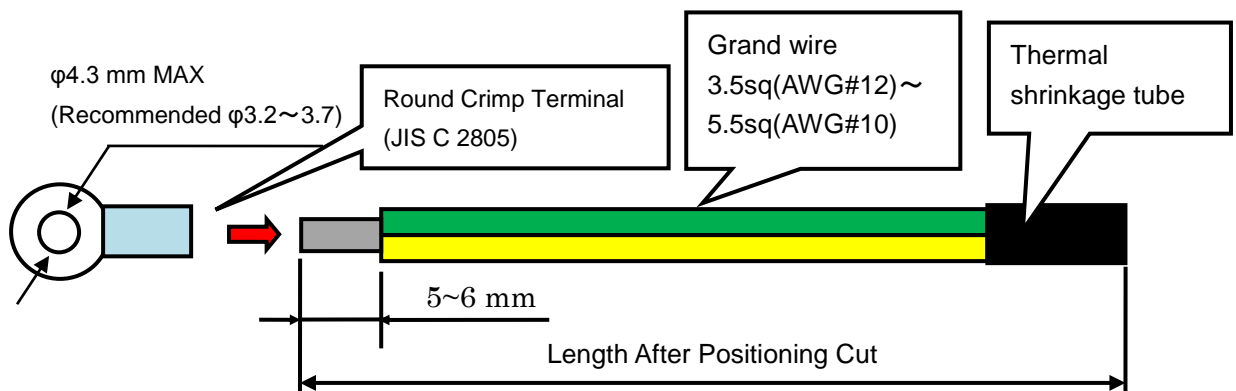
Check the screw hole of the ground terminal on the plug case side and the position to attach the round crimp terminal, and cut the excess length of the ground wire.



Strip the ground wire (green/yellow).

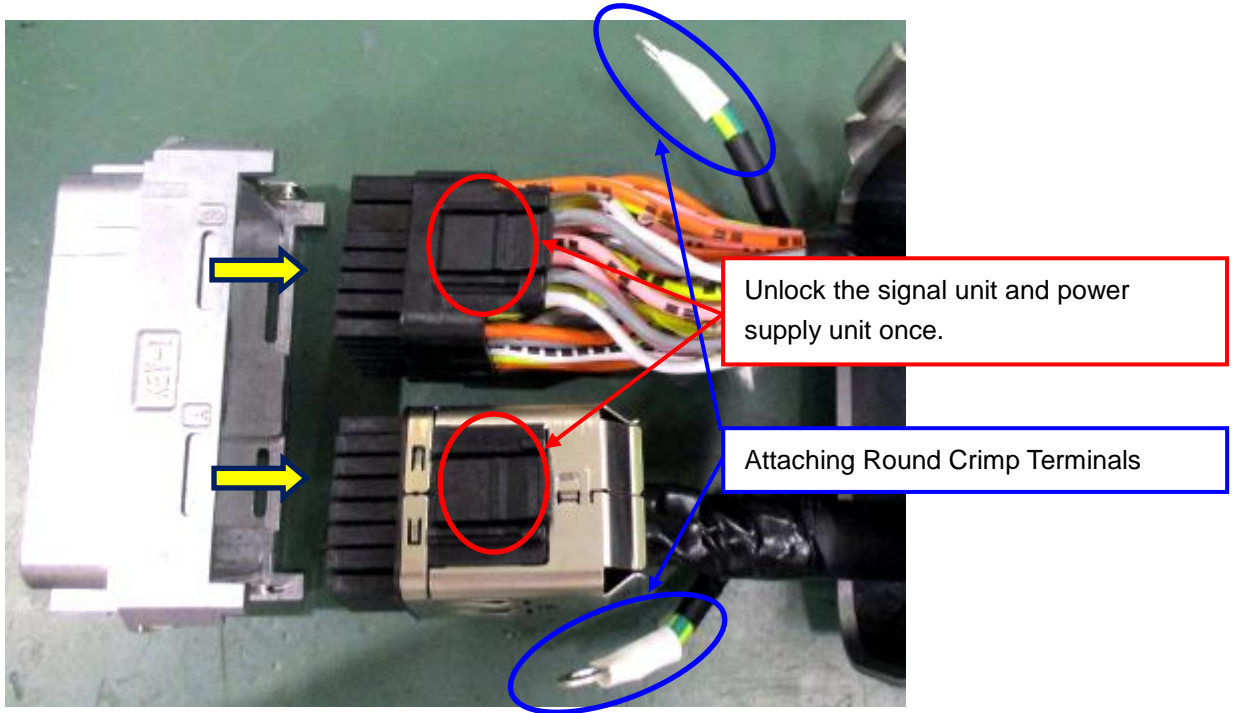
Recommended JIS C 2805 Round Crimp Terminals

3.5 sq (AWG #12) to 5.5 sq (AWG #10) with Applicable Mounting Screw Hole Diameter $\phi 3.2 \sim 3.7$
(Example)(ii) Made of Chiff: R 5.5 -3 M-R 5.5 -3 N-R5. 5 -3 S-R 5.5 -3.5 N-R 5.5 -3.5 S-R 5.5 -3.5 etc.

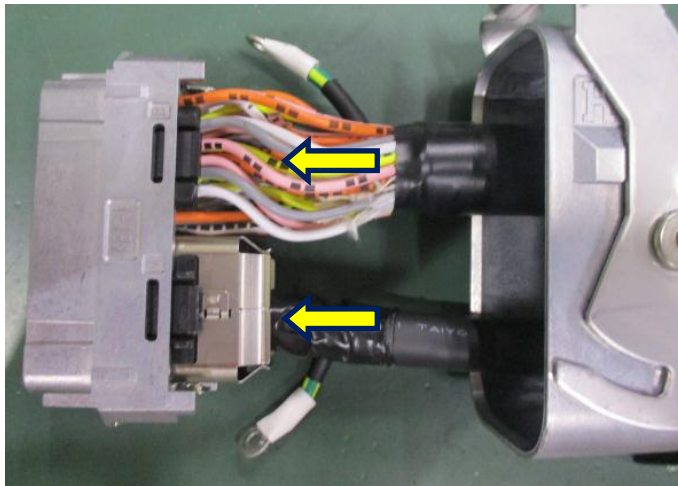


After the wire surplus length is cut, the signal unit and the power supply unit are once removed, and the round crimping terminal is crimped by a commercially available tool.

(Both signal side "power supply side")



The signal unit and the power supply unit are inserted again.

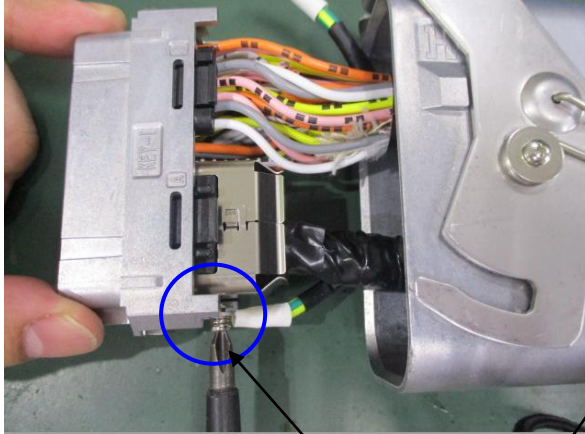


Screw the round crimp terminal to the screw hole of the ground terminal.

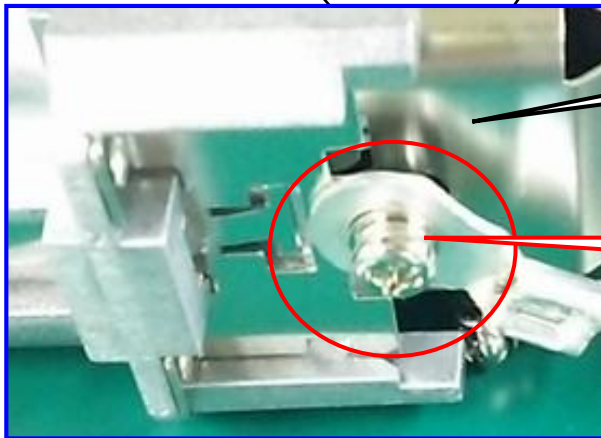
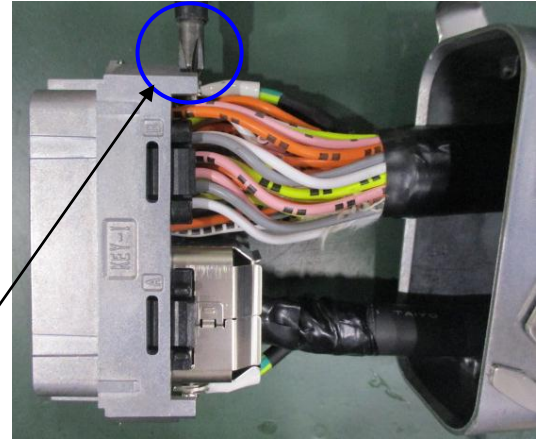
*Use commercially available "M3 x 4 spring washer + plain washer incorporated round head screw" for mounting screw.

Recommended tightening torque: 0.32 ~ 0.63 N · m

Signal side unit side



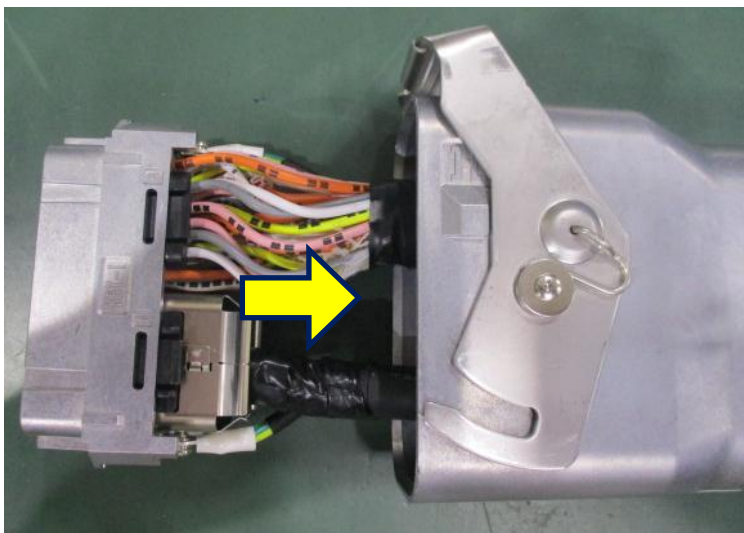
Power supply side unit



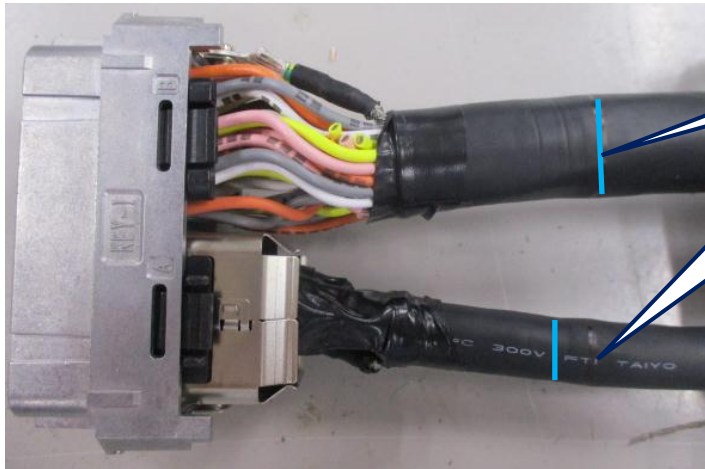
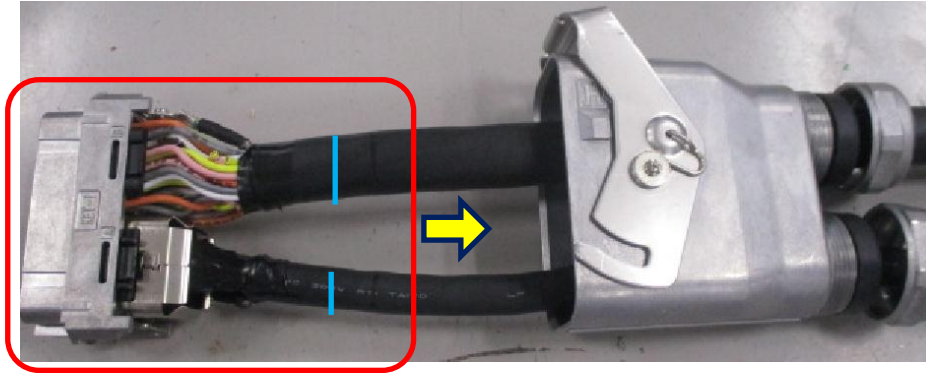
Ground terminal

Round Crimp terminals attached

After mounting the round crimp terminal, the entire plug case is housed in the cover case.



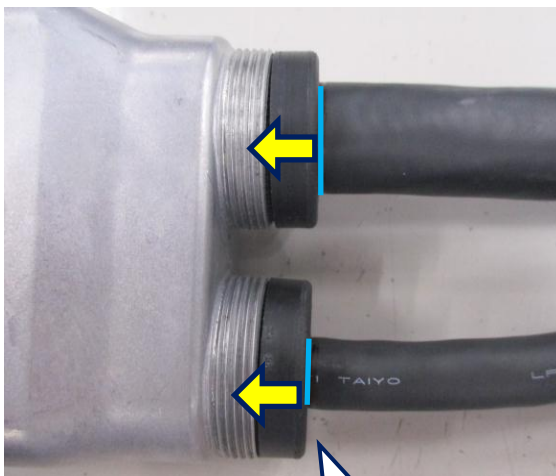
Check the previously marked part and store the entire plug case.



Places marked with a marker or the like so that the position can be seen

The entire plug case is moved and positioned so that the marking enters the inside of the cover case from the end face of the gasket clamp.

*When positioned, the entire plug case protrudes approximately 5 ~ 7 mm from the end face of the cover case.



Adjust the marking so that it is slightly inside the gasket end face.



5~7mm

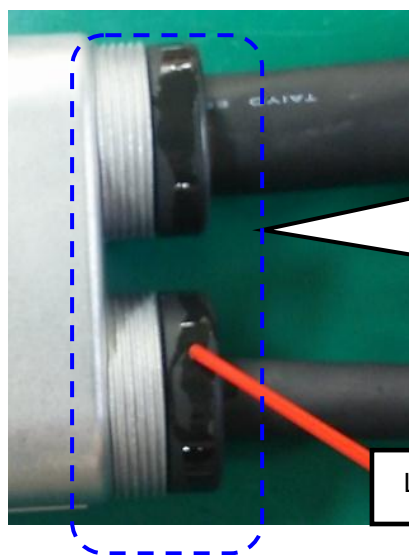
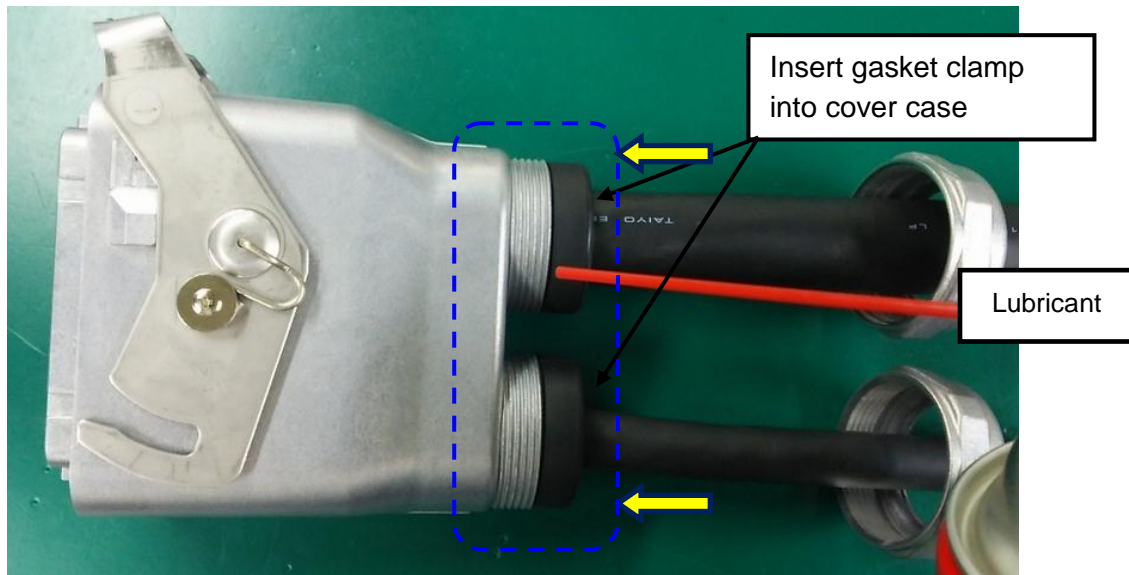
When the marking is adjusted near the end face of the gasket, the entire plug case protrudes about 5 ~ 7 mm.

[Note]

When the marking position and the gasket end face are not aligned and the marking is visible to the outside, It may not be satisfied with clamping strength or waterproof performance. Therefore, be careful to adjust the position so that the marking enters the inside of the gasket end face without fail.

6-7. Built-in end bell cap

The gasket clamp is slid and inserted into the cover case, and a lubricant is applied to the screw thread part of and cover case of the side face part of the gasket clamp.



Lubricant on side and thread of gasket was applied.

[Note]

Do not apply lubricant to the holes inside the cables and gaskets.

If lubricant gets on it, wipe it off well.

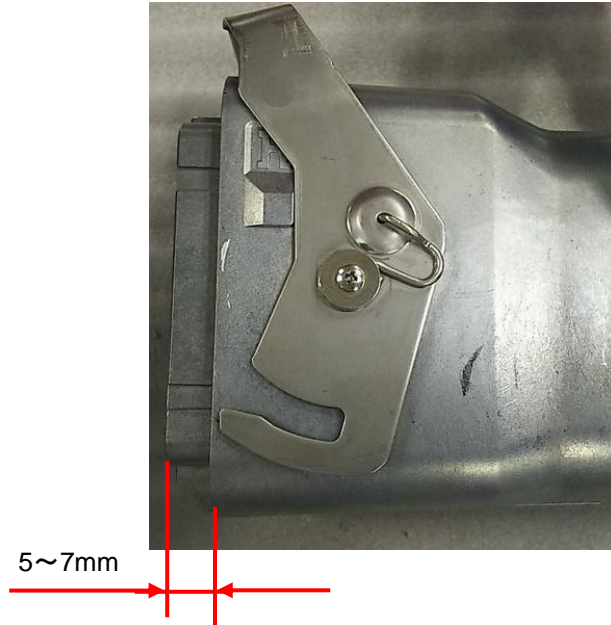
Due to the frictional force between the gasket clamp and the end bell cap, the cable may rotate when the end bell cap is turned.

Therefore, when a lubricant such as KURE 5 -56 is applied to the side surface of the gasket clamp, the rotation of the cable is improved.

Note that the cable may rotate when loosening the gasket clamp after tightening.

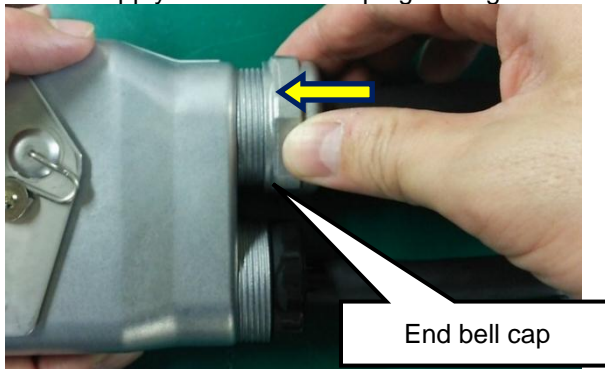
The entire plug case should protrude 5 ~ 7 mm from the end of the cover case.

*A load is not directly applied to the lance by the deflection of the electric wire inside the cover case after the screw fastening and fixing of the plug case by the amount protruded from the end face of the cover case.



Slide the end bell cap and fasten it to the cover case temporarily by hand.

Power-supply side End bell cap tightening



Signal side End bell cap tightening



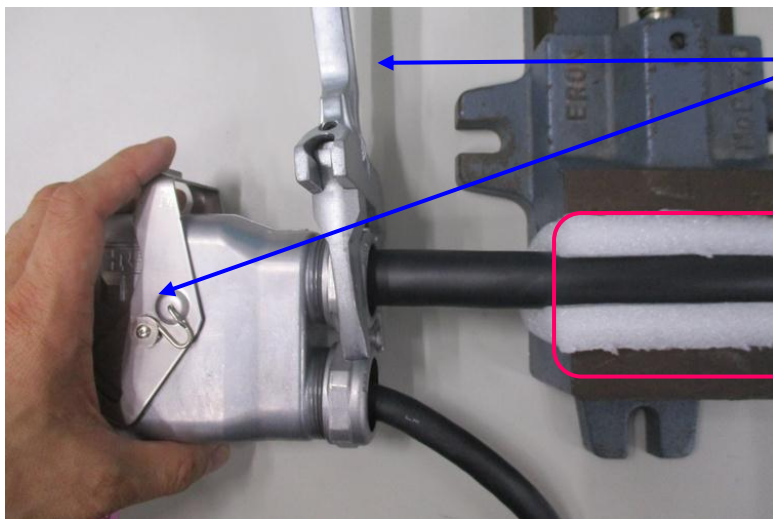
[Point] If the screws are difficult to fit, turn the end bell cap counterclockwise with the end bell cap pressed against the cover case side, and the screw threads will engage with each other. Tighten the screws from this state.

If the screws are forcibly tightened in a condition where they are difficult to fit, the screws may bite in the middle, and after that, the screws may not be able to be removed from and.

Tighten the end bell cap with a large diameter spanner (with an opening width of 45 mm or more). Hold the cover case side with one hand in a state where the cable side is fixed so as not to be damaged by a vise, etc. (a cushion material, etc., is used for the clamp part), and tighten the end bell cap.

*The cab tire cable is secured by end-bell cap tightening.
This is done to minimize the overall twist.

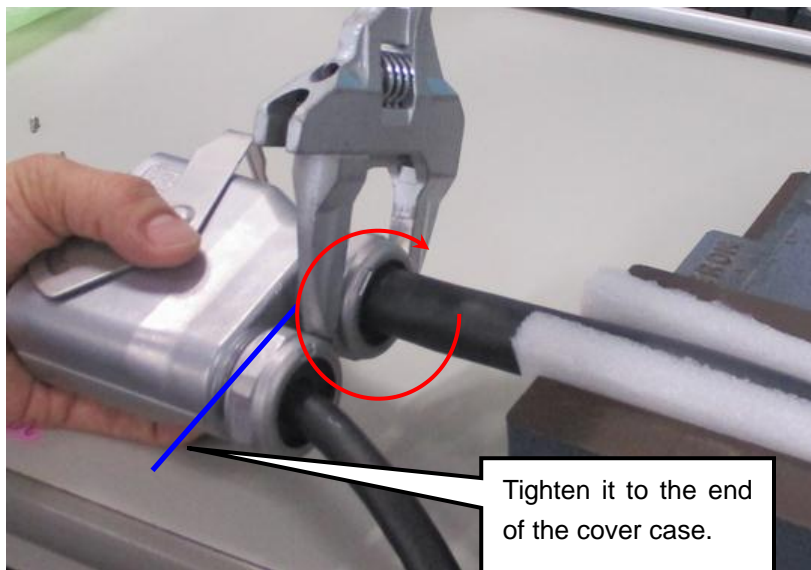
If the twist is large, the wires inside may get entangled and pulled, causing the terminal to come off, so be careful.



Hold the cover case by hand and tighten the end bell cap.

To fix a cable with a vise or the like while keeping the cable in a state not to be damaged.

Tighten the end bell cap to the end of the cover case. (Until the screws do not turn)



Tighten it to the end of the cover case.

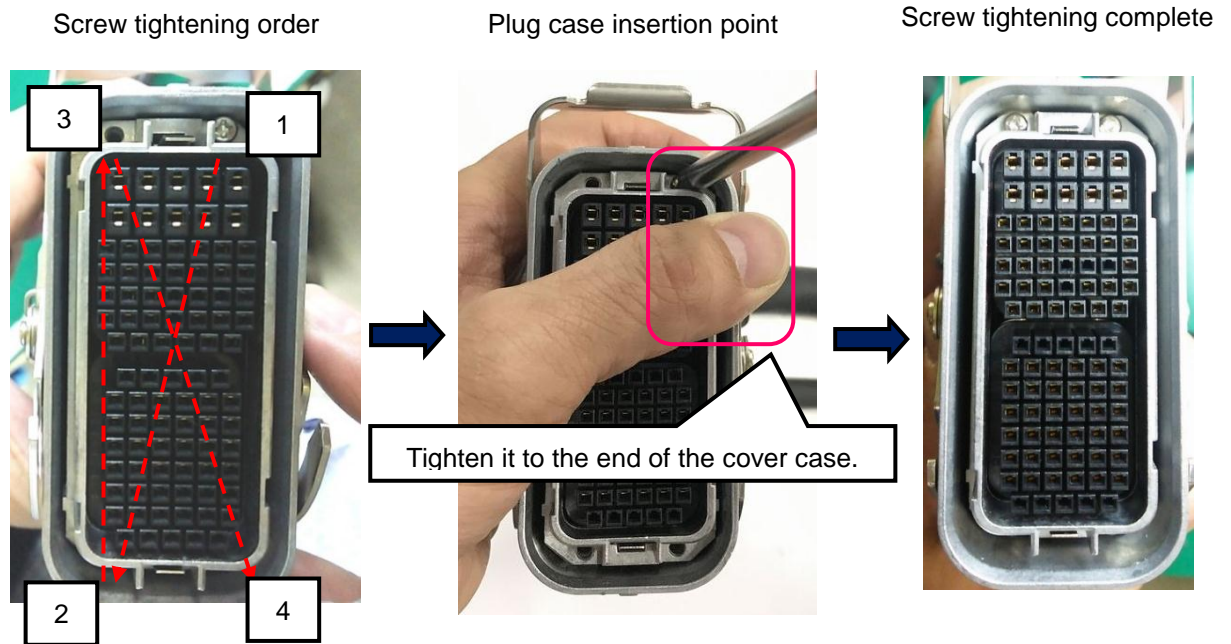
6-8. Plug case screw tightening

Fix four plug cases with the attached screws while pushing them in the direction of the engagement axis. When tightening the screws, temporary fixing is performed diagonally in the order of (1) n (2) n (3) n (4), and then final tightening is performed in the same order. *Recommended torque for final tightening is as follows.

*When the plug case is pushed in, screw fastening is performed while pushing the plug case near the screw fastening part by fingers.

If the housing tip is pushed hard, it may break or deform. When the plug case is hard to be pushed in, do not push the plug case into the plug case by force, and reapply the curling as described in 6 -4 -5.

Recommended tightening torque: 0.32 ~ 0.63 N · m



Wiring complete



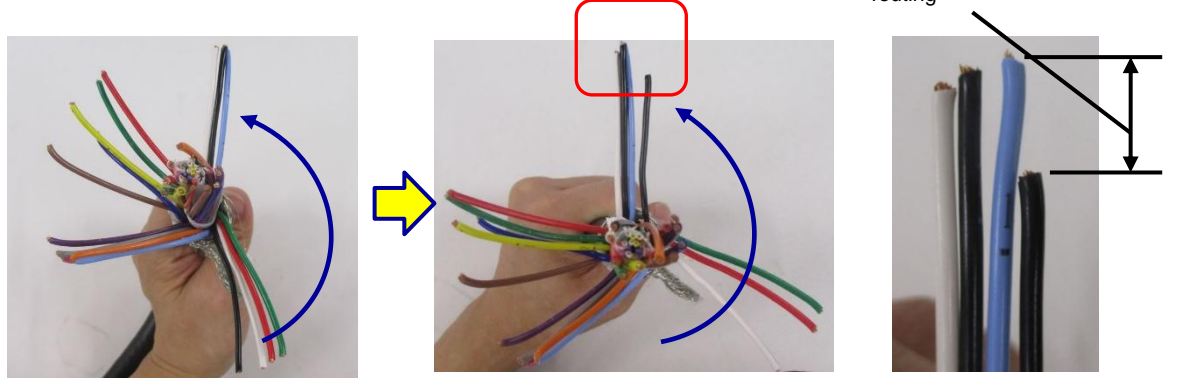
[Note] When transporting finished harnesses, the connectors should be packed with air caps, etc., and care should be taken to ensure that there are no scratches, dents, deformation, or damage due to impact such as dropping.

Additional Information - Wire Routing and Step Cutting

Depending on the wire arrangement of the cable and the pin arrangement on the connector side, the wire may be routed at a maximum of 180 ° to insert the terminal into the crimping case. At this time, a difference occurs in the length to the wire tip.

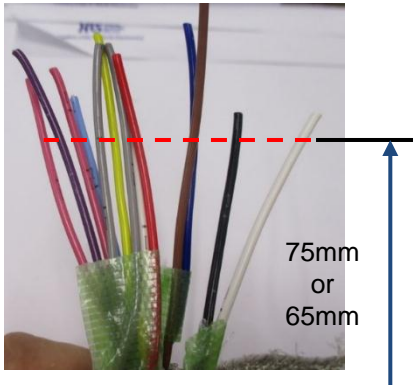
* The difference in the length of the wire depends on the diameter of the cable, but there is a maximum difference of half the circumference.

(f) In the case of 180 ° electric wire routing



If the wire lengths are cut to a specified length (75 mm and 65 mm) after the wires are routed and aligned in consideration of the order in which they are inserted into the crimping case, there will be no difference due to the routing of the wires, and the load on the terminal lance portion will be less likely to occur.

(1) For each row considering the wiring shown below draw a wire around beforehand.



(2) After wire routing, Cut electric wires.



(3) Strip the tip. Crimp the terminals.



After the wires are drawn in advance for each line, the wires are cut and the lengths are aligned.

