

## High-Tro-Reel Operation Manual <Tension Type>( Without CE Type ) Indoor Use Only

The product-life is different in use conditions and the service space, however, It is possible to use it for about t 10 years by regularly maintaining and the regular service in correct construction.

- Before using, be sure to read through this Operation / Installation Manual and use the product correctly.
- After reading, keep this Operation / Installation Manual with you for your reference.
- Ask qualified electrician for troubleshooting and maintenance.  
Please be sure to show this Operation / Installation Manual to that engineer.
- We have quality, strive to improve reliability, however, It finally becomes difficult the continuing use due to the deterioration of the material. Deterioration is different in use conditions like the availability and the ambient environment, etc. but degrading the year.

In the worst case degradation is the cause of the fire burning. so we recommend early inspection and replacement.

- For a long time - you use this product on your own, "Maintenance Table" Please always check regularly once a year based on the least.
- If you have trouble checking in, please contact the electrician.
- This product is an important asset - customers. Please check and the following things must be observed.
- This product is an important asset of customers. Please check and understand the following text carefully.

In addition, safety precautions, to the extent expected by the Company are listed.

### Precautions on installation

Installation of the High-Tro-Reel must be performed only by a licensed electrician. To prevent injury or accidents, always pay attention to the following points.

#### Warning

- **Do not modify the Tro-Reel HS in any way.** Otherwise, electric shock, fire or damage due to falling of equipment may occur.
- **Do not use where exposure occurs.** Otherwise, electric shock, fire or damage due to falling of equipment may occur
- **Use at ambient temperature -10 °C ~ 40 °C. If you use outside this temperature range, please contact Panasonic Corporation.**
- **If any abnormalities occur, turn off the power immediately and contact a qualified electrician for inspection and repair.**  
Otherwise, electric shock, fire or damage due to falling of equipment may occur.
- **The replacement product is required for electrical worker qualifications.**
- **Do not use the collector shoes past replacement indication lines.**  
Otherwise, a unit may produce sparks, causing fire, poor contact or separation of collector arms from wires.
- **To prevent electric shock, be sure to turn off the power before starting any inspection.** Otherwise, electric shock may occur.
- **Be sure to do a pre-use test run of equipment and do periodic inspections.**  
Otherwise, electric shock, fire or damage due to falling of equipment may occur.
- **When damage and crack occurred in the insulating sheath of the duct, please change the duct.**  
Otherwise sparking may occur, causing fire, poor contact, or derailing of the trolley, etc.

#### Caution

- **This product is for general indoor use only. Do not use this product for a damp place, a place where corrosive gas is generated or a place where cutting oil is directly splashed.** Electric shock, fire or damage due to equipment falling may occur.
- **Collector shoes use a dry lubrication system. Do not apply any other lubricants to the collector shoes or a unit's conductor surface. poor contact may occur.**
- **Traveling speed must be 300m/min. or less. (60m/min. or less in guide caps mounting section). However, further restrictions may be necessary depending on the load and voltage types. for details, please contact Panasonic Corporation,**  
Otherwise, a unit may produce sparks, causing fire, poor contact or separation of collector arms from wires.
- **If products are not used for a long period of time, the unit's conductor surfaces may become oxidized, resulting in poor contact.**  
Clean the conductors before resuming operation and be sure to do periodic inspections to prevent fire or electric shock.
- **During the inspection, wear protective gear such as helmets and gloves. Observe may cause injury .**
- **When mounting the duct to the hanger, stuff a duct into a hanger not to pinch a hand. Observe may cause injury to your fingers.**
- **When remove the duct from the joiners, pull it out while holding the tip of the duct. so that the duct may not jump out from Joyner.**  
Observe, damage to the ducts, may cause injury.
- **When filing the ends of the duct, use protective gear such as glasses.** Otherwise, your finger may be injured.
- **Be sure to remove burrs using file after cutting, drilling.** Observe may cause injury to your fingers.
- **When replacing the current collector arm, Be sure that collector arms are mounted parallel to the duct unit with no twisting.**  
Failure to conform to this table may cause poor collector arm contact or separation from wires.
- **When replacing the collector, be sure to confirm the duct unit phase (R.S.T) before connecting the leads to the load.**  
Failure to do so may cause fire due to sparks.

## ■ Maintenance schedule of High-Tro-Reel(Tension Type)

The product-life is different in use conditions and the service space, however, It is possible to use it for about t 10 years by regularly maintaining and the regular service in correct construction.

Please check by the maintenance table based on this maintenance schedule.  
Refer to the maintenance table of P.37 for a concrete check item.

### Maintenance done by the electrical work trader.

	At introduction	The 5th year	The 10th year
High-Tro-Reel unit	<ul style="list-style-type: none"> <li>• Check the presence of remarkable dirt of the surface of the conductor. (Once every 3 to 6 months) → Clean it with the cotton waste etc.</li> <li>• Check the Tro-Reel unit doesn't become it in a zigzag line. (Once every 3 to 6 months) →Review the size between conductors in the joint.</li> <li>• Check the Tro-Reel unit is not away from the hanger. (Once every 3 to 6 months) →Install the Tro-Reel unit on thehanger.</li> <li>• Check whether there is not crack and a lack of the insulation sheath (Once every 3 to 6 months) →Product exchange recommendation that exchanges the Tro-Reel unit.</li> </ul>		
End tension insulator	<ul style="list-style-type: none"> <li>• Check the coil spring length. (Once every 3 to 6 months) →Adjust to proper length.</li> <li>• Check whether there is loosening of the nut of the coil spring. (Once every 3 to 6 months) →Retighten.</li> <li>• Check whether the resin has not been damaged. (Once every 3 to 6 months) →Exchange products.</li> </ul>		
Joiner Center feed-in joiner	<ul style="list-style-type: none"> <li>• Check whether there is loosening of the fixation screw or the terminal screw. (Once every 3 to 6 months) →Retighten.</li> <li>• Check whether the resin has not been damaged. (Once every 3 to 6 months) →Exchange products.</li> </ul>		
Hanger	<ul style="list-style-type: none"> <li>• Check whether there is loosening of the nut. (Once every 3 to 6 months) →Retighten.</li> <li>• Check whether the resin has not been damaged. (Once every 3 to 6 months) →Exchange products.</li> </ul>		
Collector arm	<ul style="list-style-type: none"> <li>• Check whether there is loosening of the bolt. (Once every 1 to 3 months) →Retighten.</li> <li>• Check whether wear has reached the replacement line. (Once every 1 to 3 months) →Exchange the collector, when worn out to the replacement line.</li> <li>• Check damage of spring pin and rotation axis, wear-out of metal fittings of spring receiving. (Once every 1 to 3 months)→Exchange products when damage or abnormality is found. Please keep normal.</li> </ul>		
			Product exchange recommendation.

# Trial run · Periodic inspection · Maintenance table

## Notes

<To Maintenance manager>

- Inspections item at the time of the pre-use test run(Checking at periodic inspection).
- For using safely, please inspect the system one month after starting regular operation.
- The inspection cycle is mentioned below. However, determine your own inspection cycle based on the actual operating rate and environmental condition.
- Items in bold: Inspection items requiring particular attention.

Result	○ : Normal	Measures	○ : Exchange required
	×		● : Finished with exchange
			△ : Adjustment required
			▲ : Finished with adjustment

A title	Check day	Y	D	M	The check person in charge
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Name	Inspecting point	Contents of inspection	Remedy	※	Result	Measures	Inspection cycle (standard)																
High-Tro-Reel unit	Conductor	Check to see if there is any foreign particles adhering on its sliding surface or if it is seriously contaminated.	Clean with a specific purpose cleaner or waste cloth.				Once every 3 to 6 months																
		Is there any ark generated protrusion (convex shaped) on its sliding surface?	Remove any protrusion (convex) on the arc scratch using a file.																				
		Amount of wear of the conductor is correct? Amount of wear of the conductor :0.5 mm or less	If it exceeds a threshold amount of wear, please replace the main conductor In case of wearing down to the replacement indication line at next inspection, please replace earlier than usual.																				
	Unit	Is the unit moving in zigzag way?	Review distance between conductors at connecting section.		○																		
		Isn't the unit dislocated from the hanger?	Review for any dislocated position on the unit. Correct if any.		○																		
		Is the unit mounted parallel to the traveling rail?	Adjust the unit to be parallel.		○																		
	Insulating sheath	Is there any cracked or broken?	Replace if cracked or broken sheath is found.		○																		
Don't the insulated sheath and the resin part of collector spinning shaft touch?		Check the amount of wear of the collector and conductor of the duct, replace it if necessary.																					
End tension insulator	Coil spring	<b>Is the coil spring length adequate?</b>	Adjust the coil spring length to be adequate. When applying tension to the High-Tro-Reel unit, be sure to tighten the nuts on the tension bolts evenly. <table border="1" style="margin: 5px 0;"><thead><tr><th>Ambient temperature during installation</th><th>Coil spring length, (Q)mm</th><th>Tension(N)</th></tr></thead><tbody><tr><td></td><td>115</td><td>4508</td></tr><tr><td>10°C or lower</td><td>70 (For transverse)</td><td>3332 (For transverse)</td></tr><tr><td>11~40°C</td><td>125</td><td>3136</td></tr><tr><td></td><td>75 (For transverse)</td><td>2254 (For transverse)</td></tr></tbody></table>	Ambient temperature during installation	Coil spring length, (Q)mm	Tension(N)			115	4508	10°C or lower	70 (For transverse)	3332 (For transverse)	11~40°C	125	3136		75 (For transverse)	2254 (For transverse)		○		
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Is there any nut (double nut) of coil spring loosen?	Retighten.		○																				
Insulator	<b>Is there any feed-in terminal screw loosen?</b>	Retighten.		○																			
Resin section	Is there any cracked or broken on resin section?	Replace if cracked or broken sheath is found.																					
Cover	Is there any off or drop-out on the cover?	Attach the cover for off or drop-out of the cover.		○																			
Joiner	Connection	Is there any aperture or difference in level between conductors?	Correct the connection for aperture or difference in level.		○																		
		Is there any serious flaw or crack on the conductor surface?	Do over again the cutting and correct for serious flaw or crack.																				
		<b>Is there any fixed screw loosen?</b>	Retighten.		○																		
Cover	Is there any cracked or broken on resin section?	Replace the cover if cracked or broken on resin is found.																					
	Is there any off or drop-out on the joiner cover?	Attach the cover for any off or drop-out of the cover.		○																			
Joiner (without feed-in terminal)	Joints	Is there a large gap between the tow conductors?	Fix the conductor connection section.		○																		
		Is there a significant damage and cracks on conductor surface?	Re-processing terminal again, and fix																				
		<b>Is there a loose the screws?</b>	Tighten screws more.		○																		
Center feed-in joiner	Terminal	<b>Is there a loose the terminal screws ?</b>	Tighten screws more.		○																		
	Cover	Is there a damage or cracks in the resin?	Replace the cover.																				
Is there a out of Joiner cover or drop out?		Attached to the cover		○																			
Hanger	Nut	Is there any mounting nut loosen?	Retighten.		○																		
	Resin section	Is there any cracked or broken on resin section?	Replace if cracked or broken sheath is found.																				
Collector arm	Collector shoes	Is there any serious wear to replacement indication line.	Replace the collector shoes if there is wear to replacement indication line.																				
		Is there any ark generated protrusion (convex shaped)?	Remove the protrusion (convex) on the arc scratch using a file.																				
		Is there any bur generated?	Remove the bur using a sand paper.																				
	Arm	Is there any mounting bolt loosen?	Retighten.		○																		
		<b>Is the arm installing dimension correct?</b> Dislocation in left and right direction: ±10mm or less Position of mount rod and sliding surface (movable range): 90±20mm	Adjust its mounting dimension.		○																		
		Is there any serious twisting on the mount rod?	Correct twisting.		○																		
		Is there any curve or variation on the arm?	Replace the arm if there is curve or variation.																				
	Spring pin	Is there any chip or broken?	Replace if chip or broken spring pin is found.																				
	Spinning shaft	Is there any cracked or broken on the spinning shaft?	Replace if cracked or broken spinning shaft is found.																				
	Spring bearing metal	Is there any wear or hole loosen on spring bearing metal?	Replace the collector shoes if there is wear to replacement indication line.																				
Lead wire	Is there any damage on the sheath of lead wire?	If there is damage, replace the collector shoes.																					
	Is the collector shoes pulled by the lead wire?	If the collector shoes pulled, correct to have extra length on lead wire.		○																			
Mount metal	Are the centers of the collector arm mounted metal and the Hi-Tro-Reel unit matching?	Correct to be match the centers.		○																			
Collector arm support parts for transverse	Unit	Are there modification of a spring (6.2mm or more clearance between the spring) or rust on the spring?	Deformation of the spring, if there is rust, replace																				
		Are there abnormal wear?	If there is abnormal wear of the arm, replace the collector arm.																				
		<b>Is there a loose the screws?</b>	Tighten screws more.		○																		
High-Tro-Reel	Confirm insulation resistance and contact resistance level according to the Government Rules in your country.																						

- Before assembling, be sure to read through this Operation / Installation Manual for correct assembly.
- The work must be performed by a qualified engineer.
- After setup, Please pass this Operation Manual / Installation Manual to the customer.

## Precautions on installation

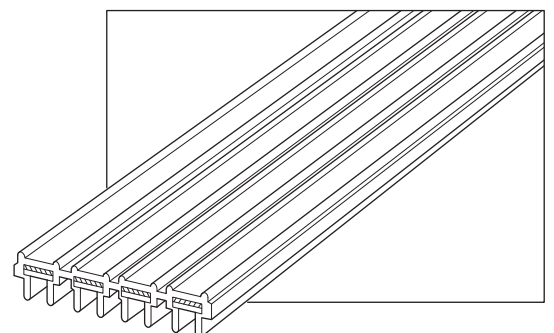
Installation of the High-Tro-Reel must be performed only by a licensed electrician. To prevent injury or accidents, always pay attention to the following points.

### Warning

- **Do not modify the Tro-Reel HS in any way.**  
Otherwise, electric shock, fire or damage due to falling of equipment may occur.
- **Do not use where exposure occurs.**  
Otherwise, electric shock, fire or damage due to falling of equipment may occur.
- **Use at ambient temperature -10 °C ~ 40 °C. If you use outside this temperature range, please contact Panasonic Corporation.**
- **Install this product according to the construction rules in Electrical Equipment Technical Standards .**  
Especially for the primary side of power supply of the duct, use an adequate over-current breaker.
- **Installation must be carried out correctly according to this Installation/Operation Manual included with the products.**  
Improper installation may result in electric shock, fire or damage due to equipment falling.

### Caution

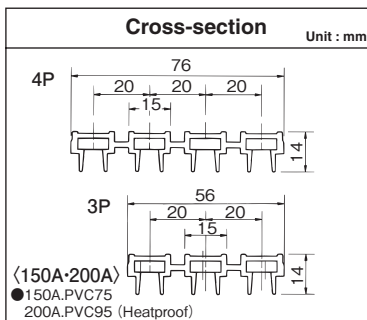
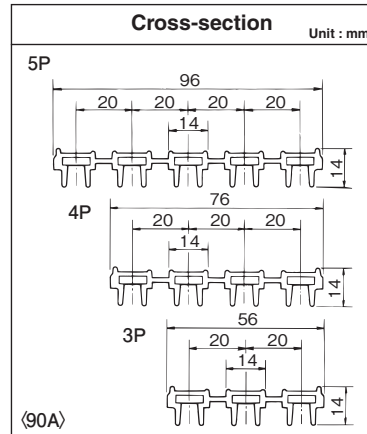
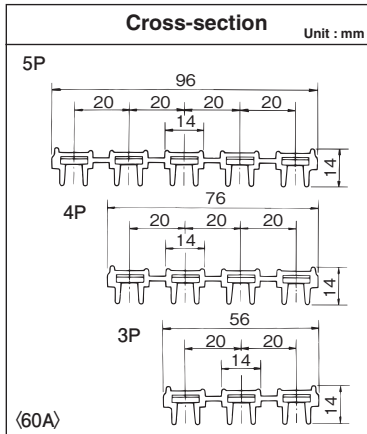
- **This product is for general indoor use only. Do not use this product for a damp place, a place where corrosive gas is generated or a place where cutting oil is directly splashed.**  
Electric shock, fire or damage due to equipment falling may occur.
- **Position the opening of a unit facing downward or sideways. If installed with the opening facing upward, a unit may produce sparks, causing fire, poor contact or separation of collector arms from wires.**
- **When damage and crack occurred in the insulating sheath of the duct, please change the duct.**  
Otherwise sparking may occur, causing fire, poor contact, or derailing of the trolley, etc.
- **When mounting the duct to the hanger, stuff a duct into a hanger not to pinch a hand.**  
Observe may cause injury to your fingers.
- **When remove the duct from the joiners, pull it out while holding the tip of the duct. so that the duct may not jump out from Joyner.**  
Observe, damage to the ducts, may cause injury.
- **When filing the ends of the duct, use protective gear such as glasses.**  
Otherwise, your finger may be injured.
- **Be sure to remove burrs using file after cutting, drilling.**  
Observe may cause injury to your fingers.
- **Use products only within the specified rating and load capacity.**  
Violation of specified ranges may cause burning or fire.
- **Firmly fix this product to the material of construction and construct it.**  
Otherwise, fire or damage due to falling of equipment may occur.
- **Construct the material of construction that installs the product firmly.**  
Otherwise, damage due to falling of equipment may occur.



# Installation Procedures for High-Tro-Reel <Tension Type>

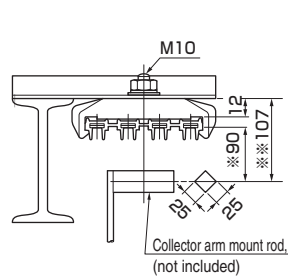
Please see below 24P. when use CE type

## Cross-section

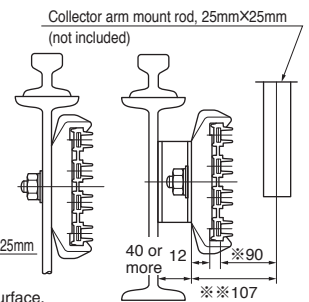


## Installation procedure

### Downward installation



### Horizontal installation



Asterisk (※) indicates the conductor sliding surface.  
 The asterisk (※※) indicates the dimensions at the hanger mounting bracket section.

### Joiner

Connects the High-Tro-Reel units together in long installations. (more than 50m) Can also feed power to 60A and 90A High-Tro-Reel units.

### Hanger

Fixes the High-Tro-Reel units to a building structure at an interval of 4m or less for standard installations, and 2m or less for horizontal installations.

### Center feed-in joiner

Connect the High-Tro-Reel unit together in long installations. Can also feed power to 150A and 200A High-Tro-Reel unit. The lead-in-side set up a hanger at 450~550 mm, the other side set up a hanger at 550~750 mm

### Collector arm

Collects power during travel. Able to travel at 300m/min. on a straight section.

● End tension insulator (Putting under cable)  
 On both supply and tightening of the body.

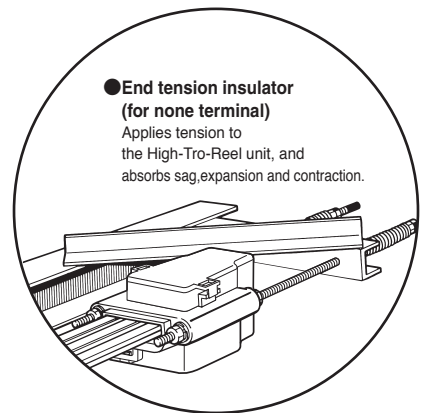
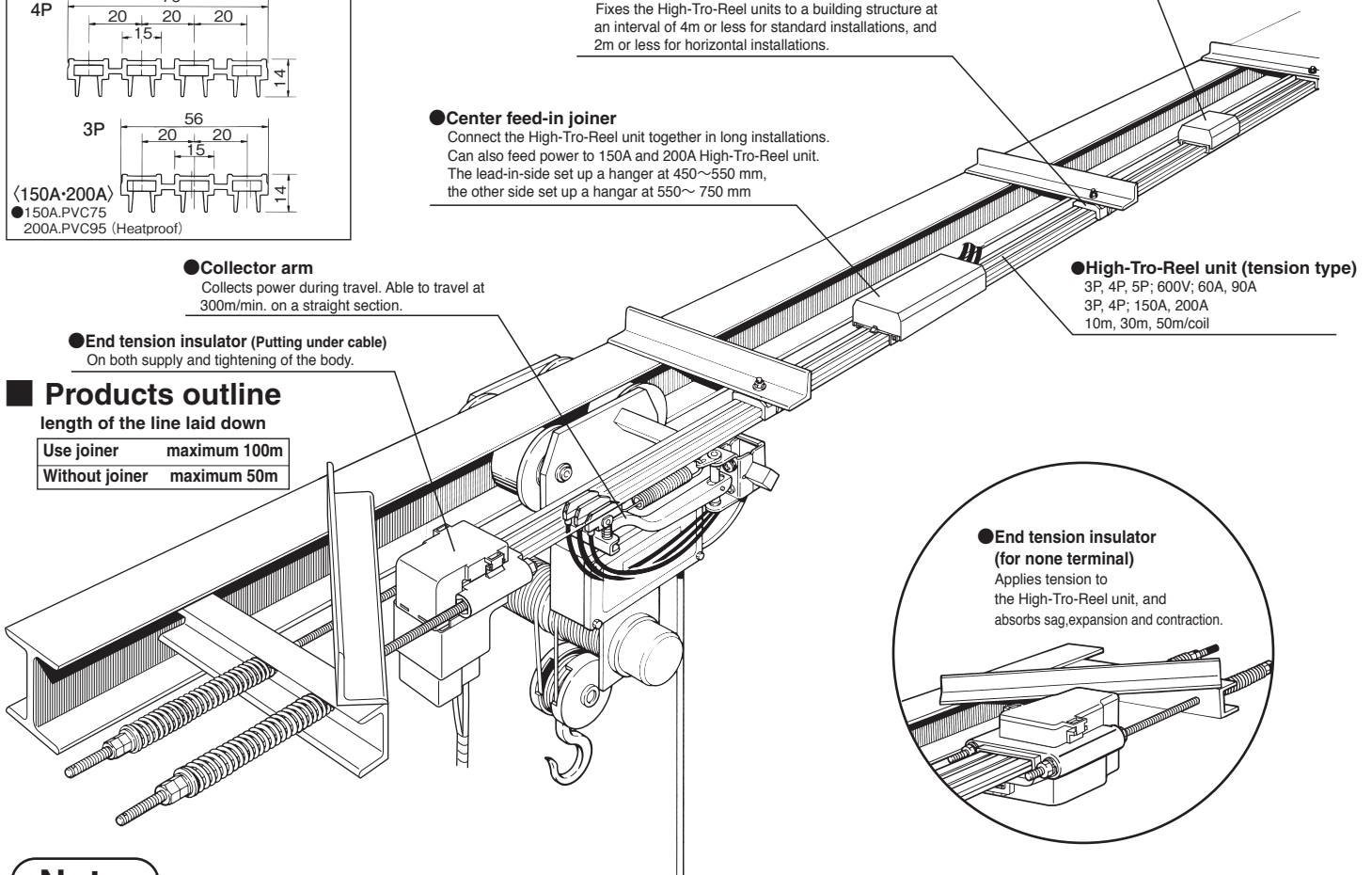
### High-Tro-Reel unit (tension type)

3P, 4P, 5P; 600V; 60A, 90A  
 3P, 4P; 150A, 200A  
 10m, 30m, 50m/coil

## Products outline

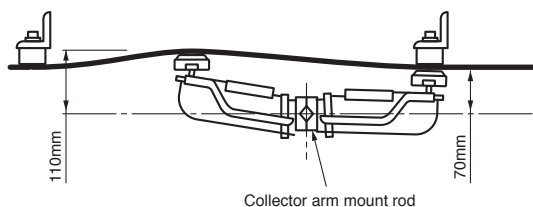
length of the line laid down

Use joiner	maximum 100m
Without joiner	maximum 50m

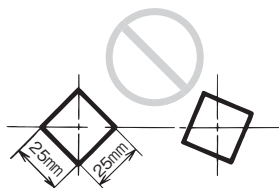


## Notes

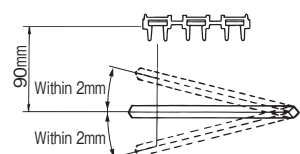
1. When collector arm mount rod set up a reference position, the operating range from 70mm~110mm of collector arm set up to be twisting.



2. The collector arm mount rod must be properly mounted without any twisting.



3. Set it up so that the collector arm mount rod may become parallel to the high tro-reel unit.





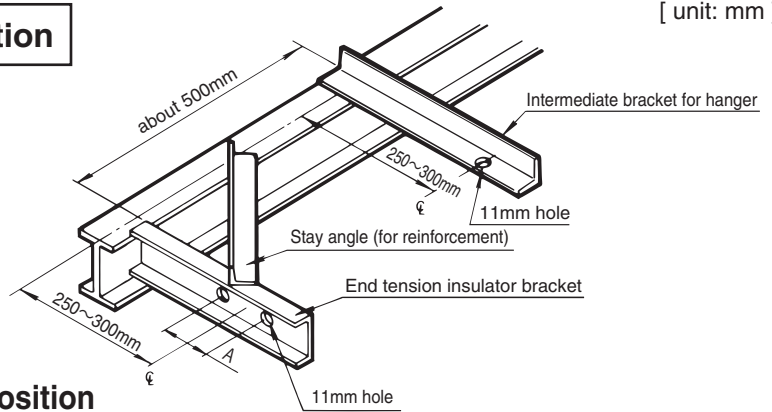
# Mounting the bracket

[ unit: mm ]

## End tension insulator mounting section

Unit : mm

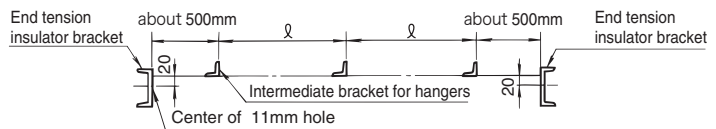
	A	B
3P	90	130
4P	110	150
5P	130	170



## Bracket position

### Bracket dimension and installation position

Be sure to have enough brackets for the length of the line. Two kinds of brackets are required: end brackets and intermediate brackets.



Type and use of brackets	Angle dimensions	High-Tro-Reel unit installation method	Interval between hangers(λ)(mm)
For hangers	L -40×40×5	Standard installation (general use)	4000
For end tension insulators	C -75×40×5	Horizontal installation	2000

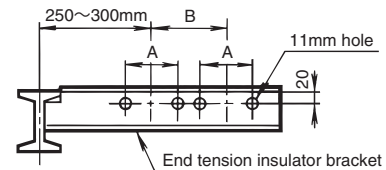
### Notes

- If using brackets other than those specified above, brackets of the same or superior strength must be used. Failure to do so may cause damage due to falling of equipment.
- When mounting an end tension insulator, place one intermediate bracket 500mm away from the end bracket.

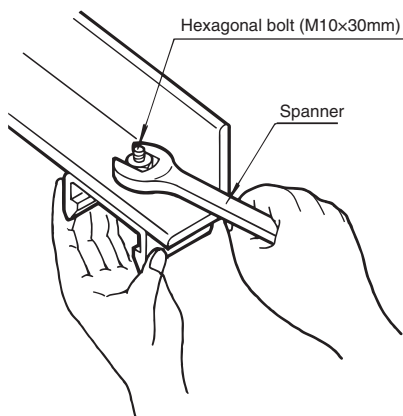
## Parallel installation

### Notes

- When installing two or more High-Tro Reel lines, reinforce end tension insulator brackets by increasing angle size by one step. Failure to do so may cause damage due to falling of equipment.



## 1 Mounting hangers on the bracket

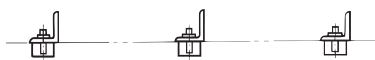


### Point of installation

Hanger should be mounted on the bracket beforehand on the ground.

### Notes

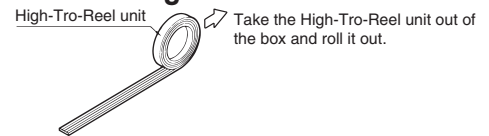
- Make sure brackets are parallel to the line. Failure to do so may cause poor connect arm contact.



## 2 Stretching and cutting the High-Tro-Reel unit

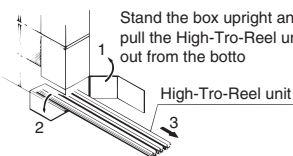
### Open the box and stretch the High-Tro-Reel unit.

<10m coil>

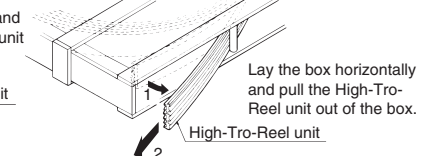


<30m and 50m coil>

#### • Cardboard box



#### • Crate

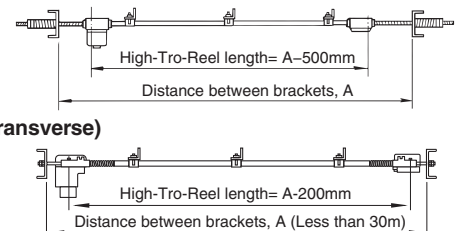


### Notes

- Be careful that the end of the High-Tro-Reel unit doesn't swing up.
- Be careful not to step on or band the High-Tro-Reel unit on the ground as this may damage the unit. Failure to do so may cause damage.

### Cutting the High-Tro-Reel unit to the length of the line.

Cut the High-Tro-Reel unit to 500mm shorter length from the distance between the brackets at both ends (the range of practical collector serving +1m).



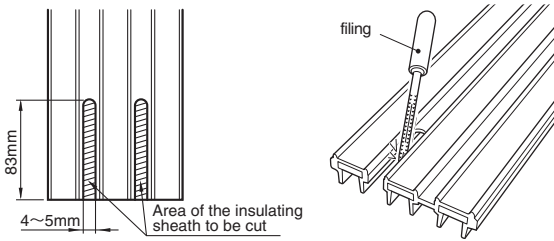
### 3 Cutting the High-Tro-Reel unit

#### Notes

- If the High-Tro-Reel unit is curled, be sure to straighten it before cutting.
- Any unnecessary protrusions on the conductor should be cut off.

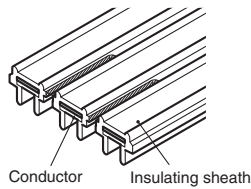
### Processing for the End tension insulator

1. Cut a sheath according to the size that exists in figure.
  - Please use the gimlet or the file.



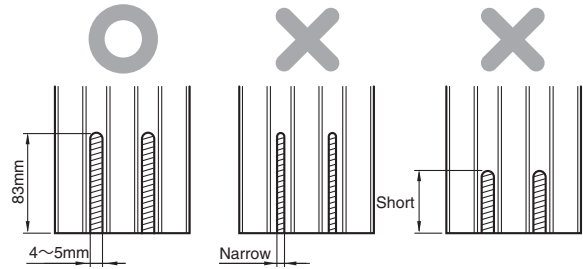
Filing (recommendation): The file-saw type M is made by Nigata seik.

#### Completed Figure

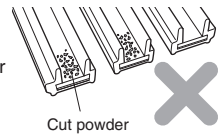


### Caution

- Cut a narrow insulating sheath, or shorter, can not be inserted into the insulator. HighTro-Reel unit can not be secured, it may fall fire.

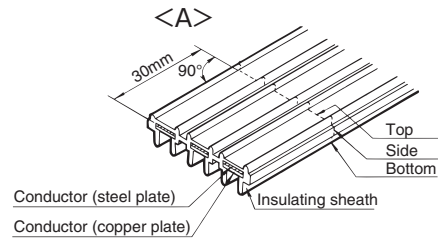


- After an insulation sheath cut, please confirm that the cut powder of the insulation sheath doesn't stick to the conductor surface (a copper sheet). might be the fire by the poor contact.

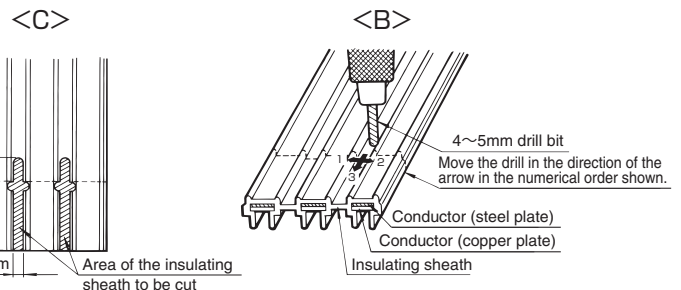


### Processing for the center feed-in joiner

1. Make the dimension shown in Figure <A> on the High-Tro-Reel unit, and cut the top, side and bottom of the insulating sheath using a hacksaw. On the top surface, make a thin cut line down to the conductor steel plate. (For 90 A, 150 A, 200 A cut only the insulating sheath)



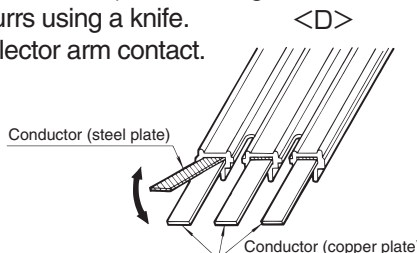
2. Cut the insulating sheath using a 4 ~ 5 mm drill bit, as shown on Figure <B>. Slightly exaggerating the cut to the side ((Working ① ⇔ ②), as shown in Figure <C>. makes the insulating sheath easier to remove.



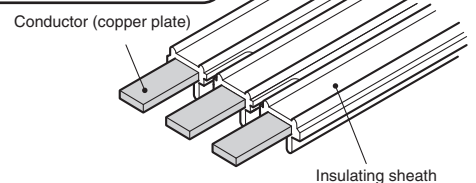
### Caution

- Be careful not to damage the conductor (copper plate) when cutting with a hacksaw. Failure to do so may cause damage due to failing of equipment.

3. Break off the upper conductor (steel plate) at the cut line. (Not necessary with 90A, 150A or 200A units.) After cutting the insulating sheath, remove the burrs using a knife. Failure to do so may cause poor collector arm contact.



#### Completed Figure



### Caution

- The cut steel plates are needed when connected to the main unit.

## 4 Mounting an end tension insulator on the High-Tro-Reel

According to the following,  
Feeding from horizontal

■ Set the terminal and the terminal plate, the insulation sheet to the End tension insulator from the top and sides.

When mount the terminal plates, Please see 7 Feeding power to the High-Tro-Reel(Crimp terminal sequence and mounting direction of the terminal plate).

### (1) Mounting the terminal from the upper

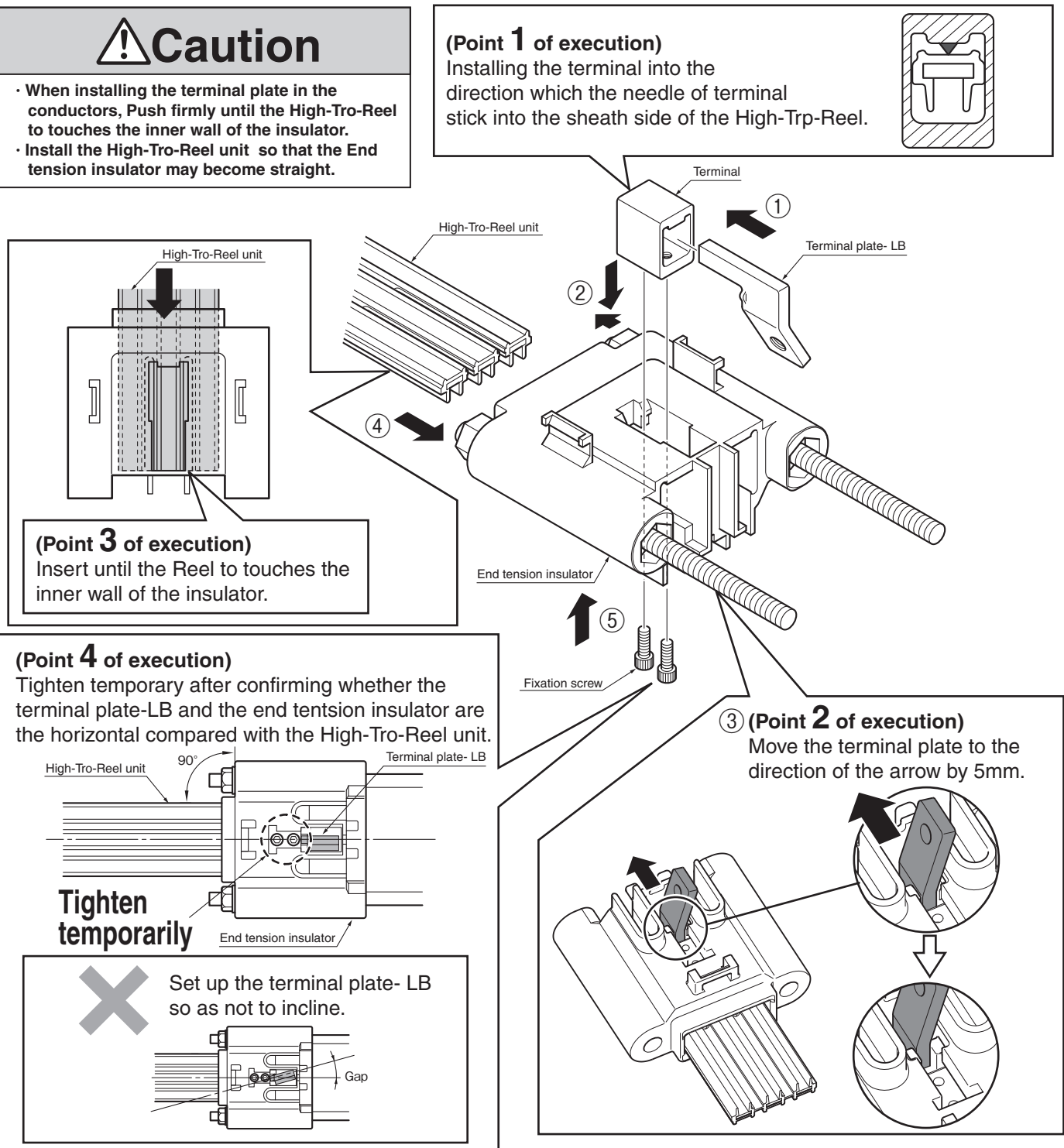
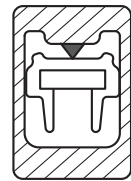
- ① Set the central terminal and the terminal plate-LB.(Point 1 of execution)
- ② ① Fit the insulator terminal tightening, 2mm shifted to the side the High-Tro-Reel unit
- ③ To arrange like terminal plate -LB (Point 2 of execution), and tighten temporarily the fixation screw to facilitate the insertion of the High-Tro-Reel unit.
- ④ Move the terminal plate to the direction of the arrow by 5mm.(Point 3 of execution)
- ⑤ Tighten terminal plate-LB by the fixation screw temporarily.(Point 4 of execution)

### ! Caution

- When installing the terminal plate in the conductors, Push firmly until the High-Tro-Reel touches the inner wall of the insulator.
- Install the High-Tro-Reel unit so that the End tension insulator may become straight.

### (Point 1 of execution)

Installing the terminal into the direction which the needle of terminal stick into the sheath side of the High-Tro-Reel.

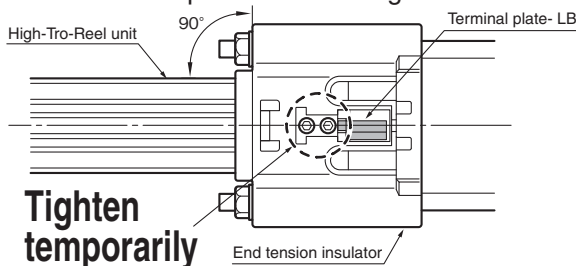


### (Point 3 of execution)

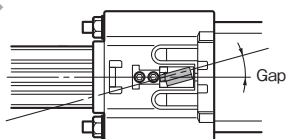
Insert until the Reel touches the inner wall of the insulator.

### (Point 4 of execution)

Tighten temporary after confirming whether the terminal plate-LB and the end tension insulator are the horizontal compared with the High-Tro-Reel unit.



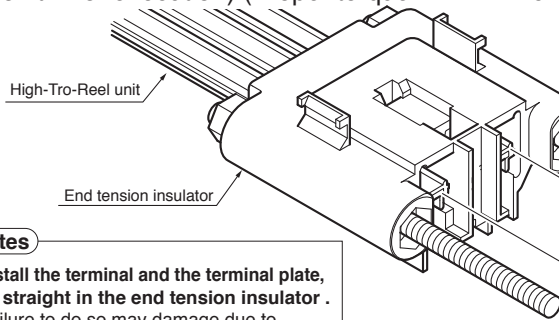
Set up the terminal plate- LB so as not to incline.



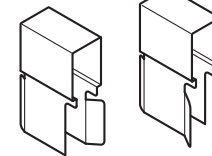


## (2) Mounting the terminal from side

- ① Fitting the insulation sheet in the opening side of the end tension insulator.
- ② Insert the terminal. (Point 5 of execution)
- ③ Insert the terminal plates. (Point 6 of execution)
- ④ Fully tighten the fixation screw <Table 1> the High-Tro-Reel, the terminal, the terminal plate, and the end tension insulator. (Point 7 of execution) (Proper torque:  $7N \cdot m \sim 9N \cdot m$ )



### Insulation sheet for feeding from under



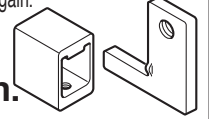
□ Please note the direction of the insulating sheet.

## ! Caution

After setting the High-Tro-Reel unit, the terminal, and the terminal plate in the end tension insulator. The terminal plate and the terminal where fixed bolt M6x12 was tightened with the specified torque cannot be used again.

**Don't use them again.**

Please inquire of store purchased when the terminal and the terminal plate are necessary.



### (Point 5 of execution)

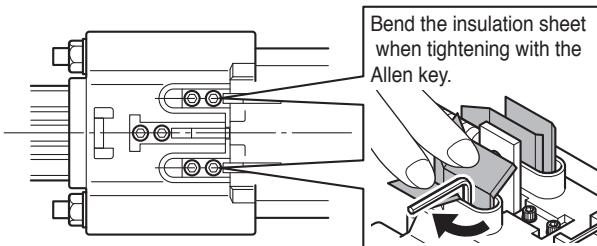
Easy to put a plate and pins inserted into the side of terminal after mounting the unit.  
※ We are packing in assembly.

### Notes

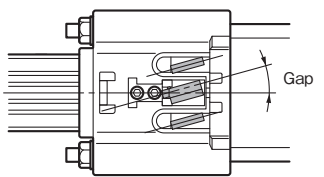
- Install the terminal and the terminal plate, to straight in the end tension insulator. Failure to do so may damage due to falling of equipment.

### (Point 7 of execution)

Tighten after confirming whether the terminal plate and the end tension insulator are the horizontal compared with the High-Tro-Reel unit.



Set up the terminal plate so as not to incline.



## ! Caution

- Tighten screws to ensure. Failure, may fall fire. Otherwise, electric shock or fire may occur.

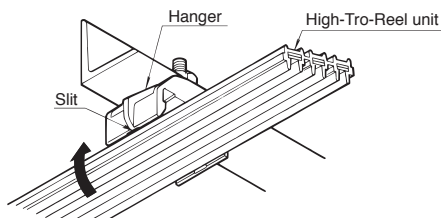
### (Point 6 of execution)

The terminal plate is different depending on the power feeding. Please shown 7 Feeding power to the High-Tro-Reel (Crimp terminal sequence and mounting direction of the terminal plate).

## 5 Lifting the High-Tro-Reel unit and securing it to the brackets starting on the end tension insulator side.

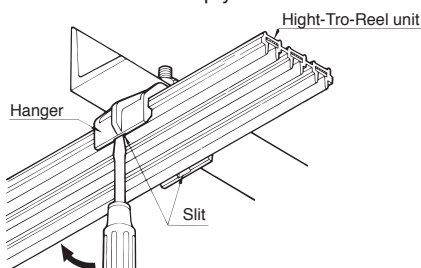
### ■ Mounting the High-Tro-Reel unit to the hanger

Insert one side of the High-Tro-Reel unit into the hanger and push the other side in by hand.



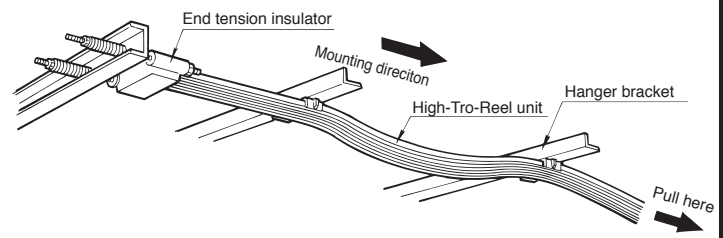
### ■ Removing the High-Tro-Reel unit

Insert a screwdriver into the slit and pry it out.

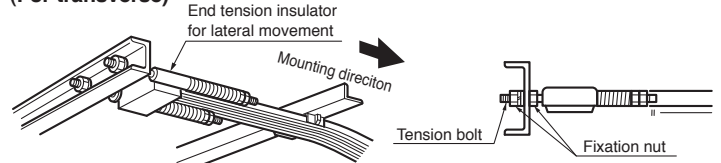


### ■ Temporarily fix t the High-Tro-Reel unit to the hanger in the proper order starting at the end.

1. Tightening the tension bolt to the insulator blanket by the fixation nut
2. Temporarily fix t the High-Tro-Reel unit to the hanger in the proper order starting at the end. Pull the High-Tro-Reel unit tight using rope, being sure to eliminate any sagging.

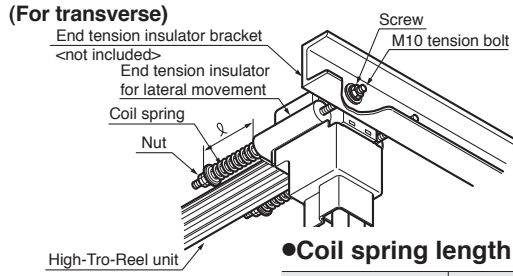
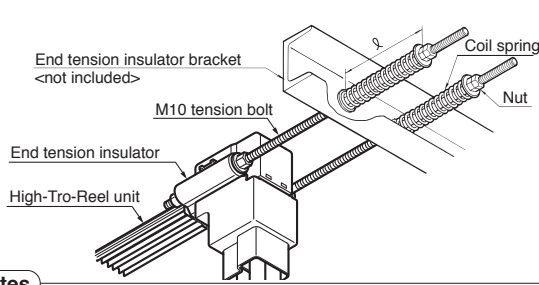


### (For transverse)



## 6 Tightening the High-Tro-Reel unit

■ Pull the High-Tro-Reel unit tight and tighten the end tension insulator nuts snugly.



### Notes

- When applying tension to the High-Tro-Reel unit, be sure to tighten the nuts on the tension bolts evenly.
- Do not excessively tighten so that the coil spring contacts. Otherwise, the conductor of the unit may be disconnected.
- After installation, run the truck for Hoist crane ten times to reconfirm coil spring tightening length. Failure to do so may cause poor collector arm contact or separation from wires.

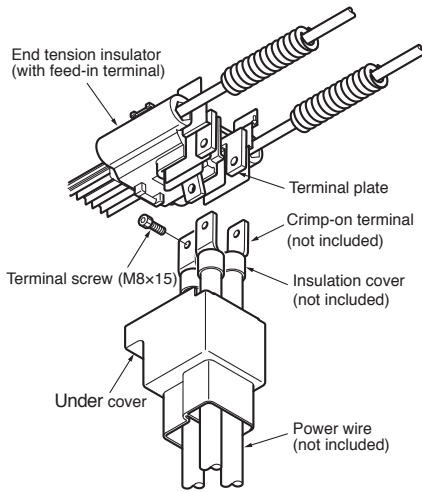
### ● Coil spring length and tension

Ambient temperature during installation	Coil spring length, (L)mm	Tension(N)
10□ or lower	115	4508
	70 (For transverse)	3332 (For transverse)
11~40□	125	3136
	75 (For transverse)	2254 (For transverse)

## 7 Feeding power to the High-Tro-Reel (Power is fed from the line end via an end tension insulator with a feed-in terminal.)

■ Connect the power wire; to the terminal plate using the crimp-on terminal.

● Installing the cover and remove

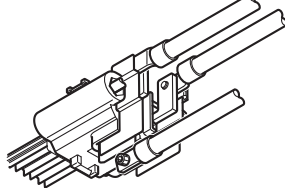


Recommend using JIS standard crimp terminals and insulating cap

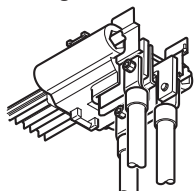
Terminal screw(M8×15)  
(Tightening torque:22N·m~25N·m)

- Crimp terminal sequence and mounting direction of the terminal plate

[For feeding from horizontal]

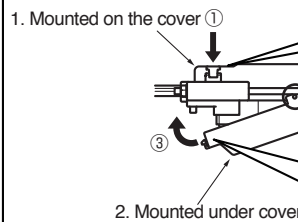


[For feeding from under]

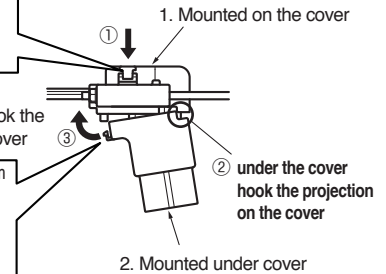
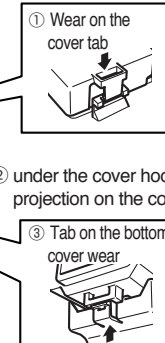


(Mounting)

Feeding from horizontal

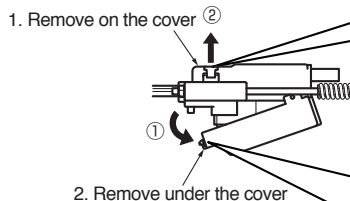


Feeding from under / without terminal

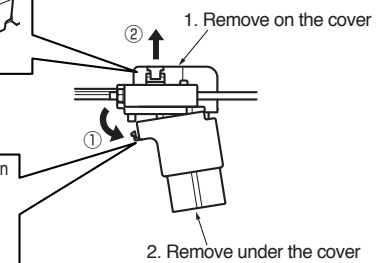
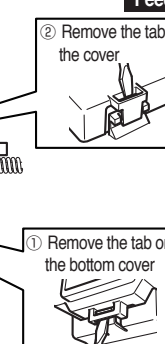


(Patching)

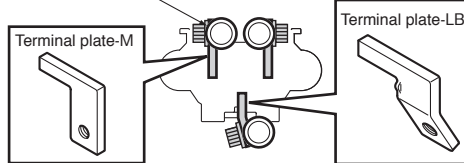
Feeding from horizontal



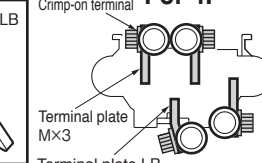
Feeding from under / without terminal



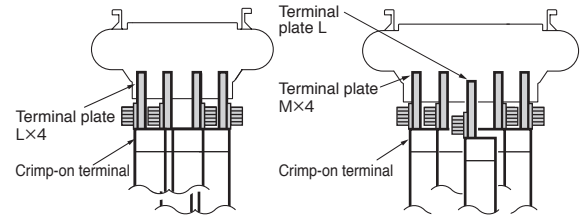
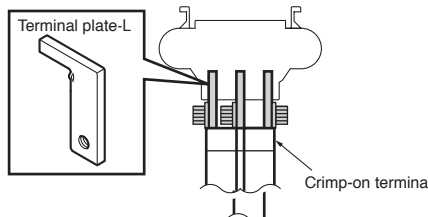
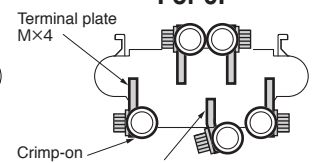
Crimp-on terminal For 3P



Crimp-on terminal For 4P



Terminal plate M×4 For 5P



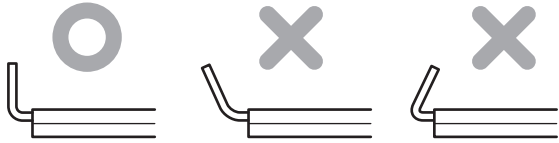
The terminal arrangement for none terminal is the same for feeding from horizontal.

## 8 Connecting the High-Tro-Reel units (Use a joiner to connect units.)

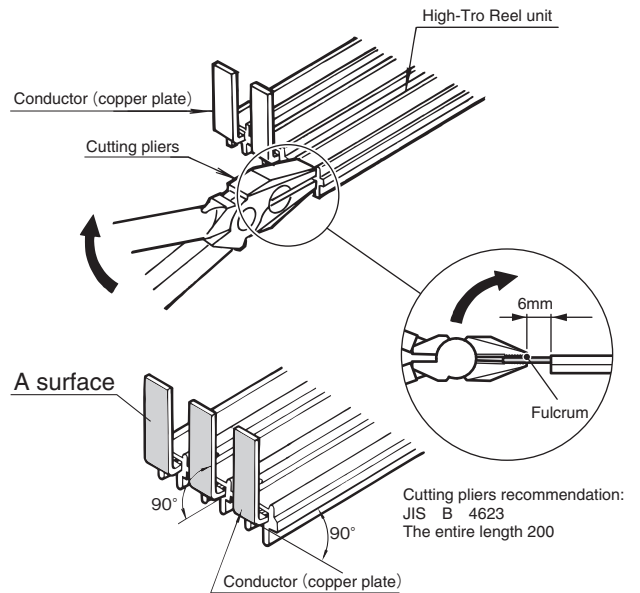
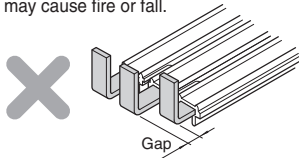
1. Cut 30mm of the insulating sheath and the copper plate.  
(See 3 Cutting the High-Tro-Reel unit)
2. Bend up the copper plate to a 90°.

### Caution

- Bend each conductor to a 90°  
Failure, to do so may cause fire or fall.



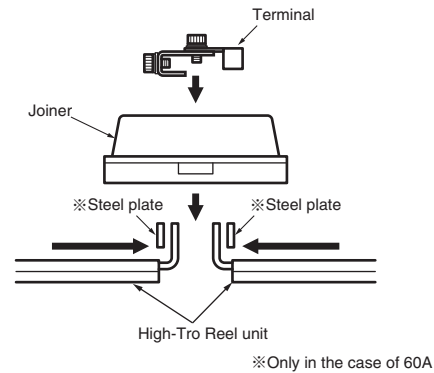
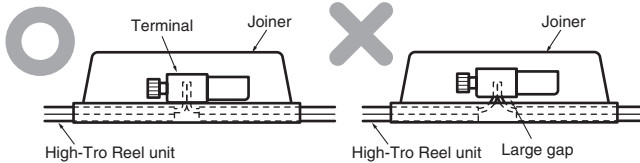
- Make the position where each conductor bends the same.  
Failure, to do so may cause fire or fall.



3. Inserting the each conductors into the joiner.

### Caution

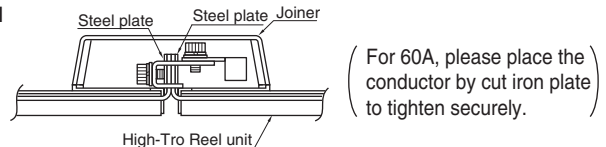
- Inserting the each conductors into the joiner.  
Failure, to do so may cause fire or fall.



4. Overlaying each conductor, insert the terminal to it, tighten the fixation screw with a hex key wrench. (Tightening torque: 9.3N • m ~ 11.3N • m)

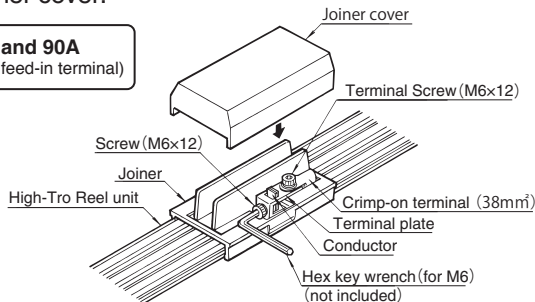
### Caution

- For 60A, the conductor is inserted between the steel plates.  
Failure, to do so may cause fire or fall.

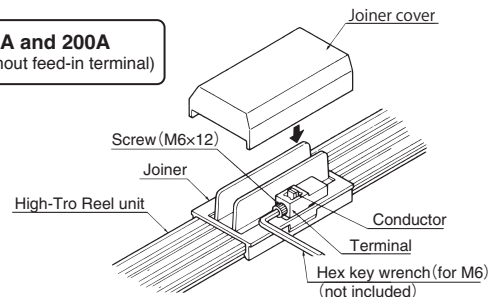


5. Install the joiner cover.

- 60A and 90A (with feed-in terminal)



- 150A and 200A (without feed-in terminal)



### Caution

- Attach a hanger within 500mm before or after joiner.  
Failure to do so may cause poor collector arm contact or separation from wires.
- Turn up all conductors so that tips (See A surface in the drawing) line up evenly, and bend it without damaging it.  
Failure, to do so may cause poor contact or crack of the joint.
- Do not bend in the bending back of the conductor.  
Failure, to do so may cause crack in the bent part, cause fire or cause damage due to falling of equipment.
- Inserting the terminal until it touches the base.  
Failure, to do so may cause fire.
- Be sure to tighten the terminal screw and fixed screw. (Tightening torque: 9.3N • m ~ 11.3N • m)  
Failure to do so may cause fire or damage due to falling of equipment.

## 9 Feeding power to the middle of the Higt-Tro-Reel unit.

Feeding power from on the way of the line is Joiner (with feed-in terminal) or Center feed-in joiner. Please refer even to page 22 for the CE type.

■ When powering middle of the High-Tro-Reel unit., use the following products.

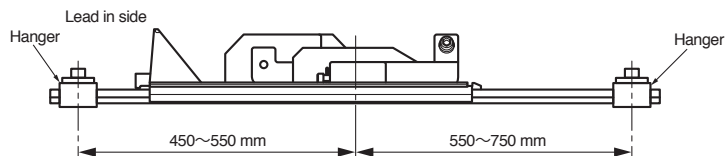
[60A · 90A] Joiner (with feed-in terminal)

[150A · 200A] Center feed-in joiner

### Mounting position of the hanger.

#### Joiner (with feed-in terminal)

Install a hanger within approximately 500mm.



#### Center feed-in joiner

The lead-in-side set up a hanger at 450~550 mm,  
The other side set up a hanger at 550~ 750 mm

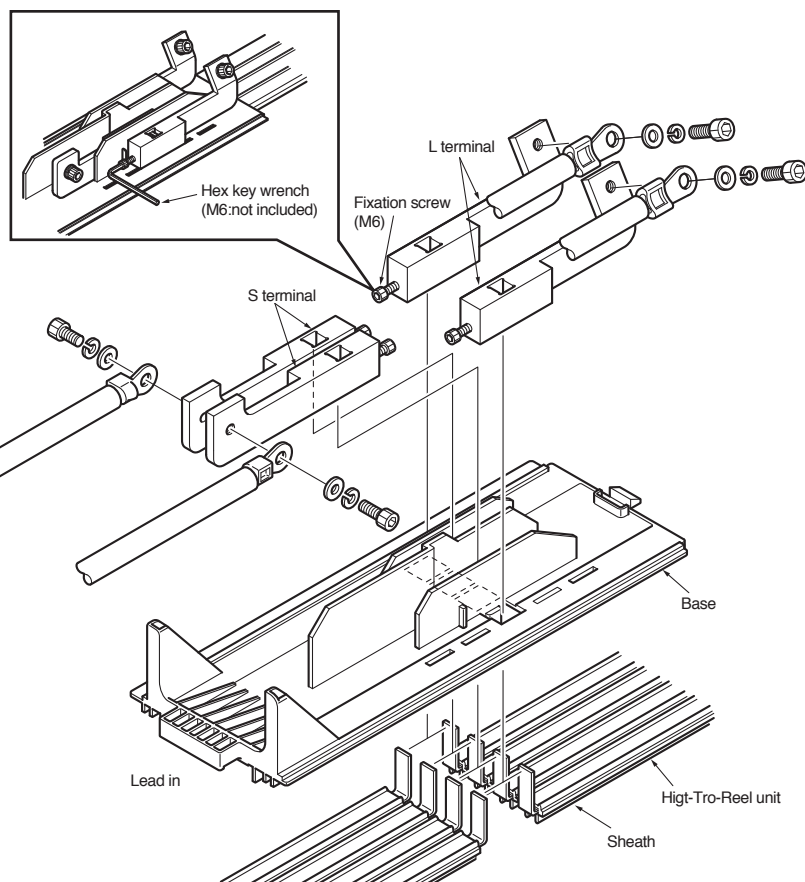
### Connection the Higt-Tro-Reel unit.

#### Joiner (with feed-in terminal)

Please see 8 Connecting the High-Tro-Reel unit

#### Center feed-in joiner

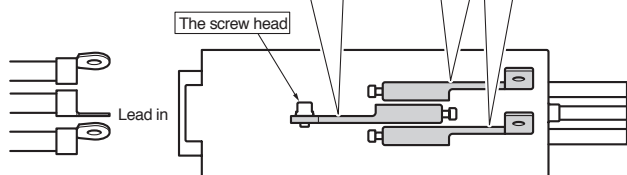
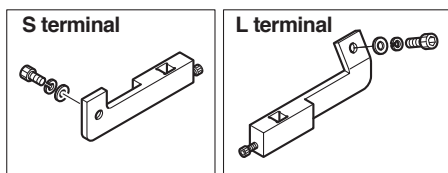
1. Peel the sheath, bend the conductor to a 90°  
(See 8 Connecting the High-Tro-Reel unit, to 1or 2)
2. Insert the High-Tro-Reel unit to the base.  
• Note the direction of the wire service entrance.
3. Insert 2 type of terminals shown in following the figure < Terminal sequence of the center feed-in joiner > into the Joint part of conductors. Inserting the terminal until it touches the base.  
• Failure, to do so may cause fire.
4. Fixation screw of the terminal must be securely tightened by hex key wrench(M6: not included)  
(Tightening torque: 9.3N · m ~ 11.3N · m).



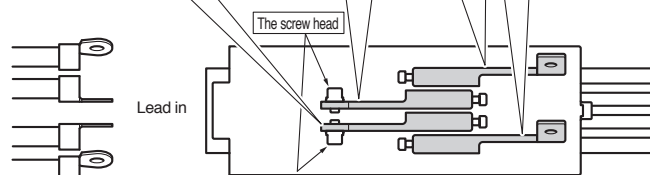
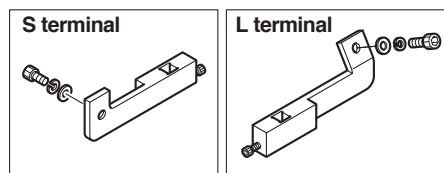
### < Terminal sequence of the center feed-in joiner >

※ Please note it in the direction of the screw head side.  
※ Please note the position of the terminal.

<3P>



<4P>



## Caution

- **Install the hanger in a specified position.**  
Failure, as it may derail the current collector arm loose connection.
- **Turn up all conductors so that tips (the fold surface) line up evenly, and bend it without damaging it.**  
Failure, to do so may cause poor contact or crack of the joint.
- **Do not bend in the bending back of the conductor.**  
Failure, to do so may cause crack in the bent part, cause fire or cause damage due to falling of equipment.
- **Fixation screw must be securely tightened.** Failure, to do so may cause fire.  
(Tightening torque: 9.3N · m ~ 11.3N · m)
- **Inserting the terminal until it touches the base.**  
Failure, to do so may cause fire.



## Feeder connection

### Joiner (with feed-in terminal)

- Put up the power wires, connect the power wire to the terminal plate using a crimp-on terminal.  
Be sure to tighten the terminal screw by hex key wrench.  
(Tightening torque:  $9.3N \cdot m \sim 11.3N \cdot m$ )
- After connection with the power wire, removes knockouts of the Joiner cover, and cover. Cutting plane of the knockout must do the chipping with the knife etc.

## Caution

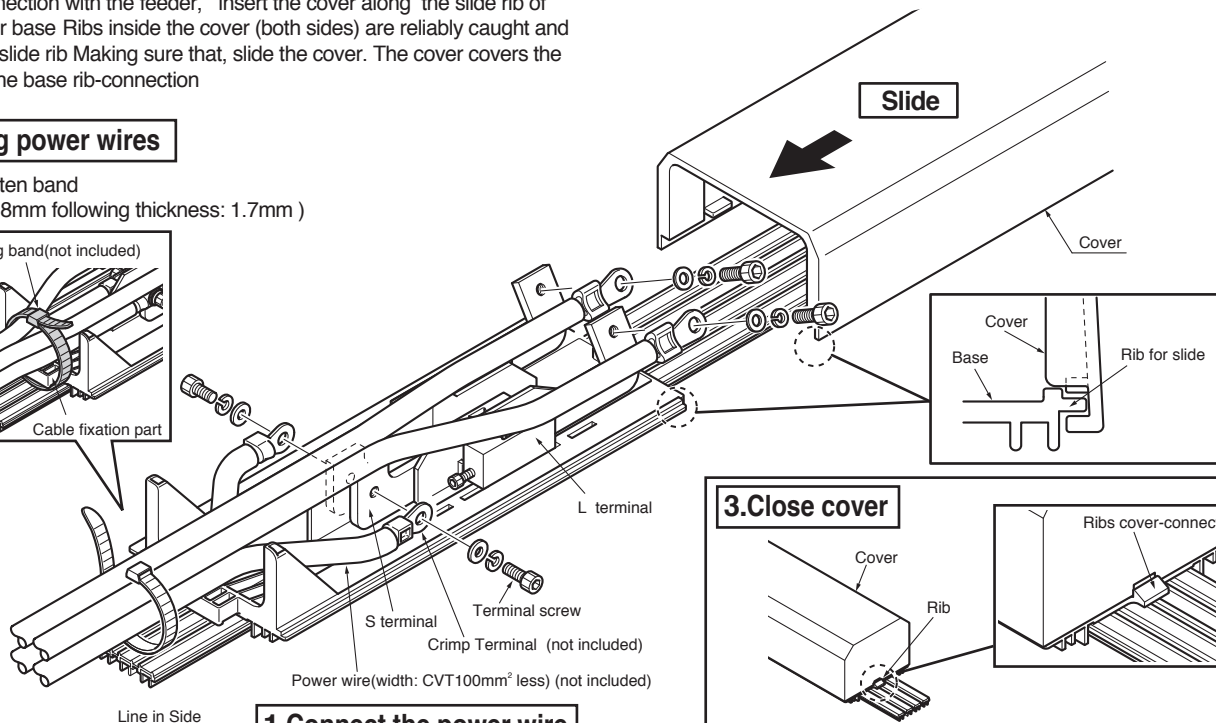
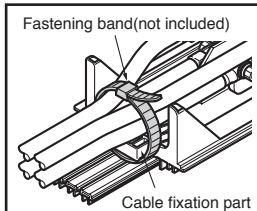
- The terminal screw must be securely tightened.  
(Tightening torque:  $9.3N \cdot m \sim 11.3N \cdot m$ )  
Failure to do so may cause fire or damage due to falling of equipment.
- The cover to ensure.  
Failure to do so may cause an electric shock.

### Center feed-in joiner

- Put up the power wires from the line entrance, connect the power wire to the terminal plate using a crimp-on terminal (not included).  
Be sure to tighten the terminal screw by hex key wrench (M8: not included).  
(Tightening torque:  $12.5N \cdot m \sim 15N \cdot m$ )
  - Please use the crimp terminal in accordance with JIS standard.
  - S terminals connected to the terminal, then connect the L terminal
  - Ending up on the wire as the wire is floating.
- Band the power wire with the cable fixation part by fastening band (not included).
- After connection with the feeder, insert the cover along the slide rib of the Joiner base. Ribs inside the cover (both sides) are reliably caught and is based slide rib. Making sure that, slide the cover. The cover covers the ends of the base rib-connection.

### 2. Fixing power wires

Use fasten band  
(width: 8mm following thickness: 1.7mm)

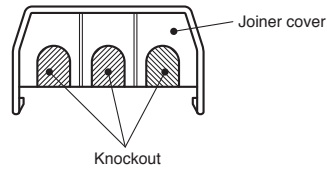
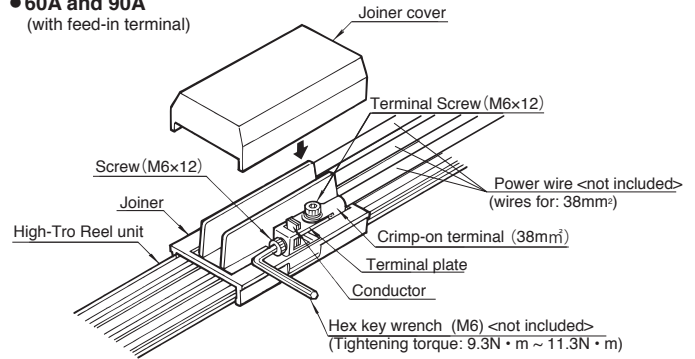


### 1. Connect the power wire

- The terminal screws must be securely tightened. (Tightening torque:  $12.5N \cdot m \sim 15N \cdot m$ )  
Failure to do so may cause fire or damage due to falling of equipment.
- Sliding the cover to overcome the rib-connection. May cause electric shock.  
Failure to do so may cause an electric shock.
- Fasten certainly a power line using the fastening band.  
Failure to do so may cause fire or damage due to falling of equipment.

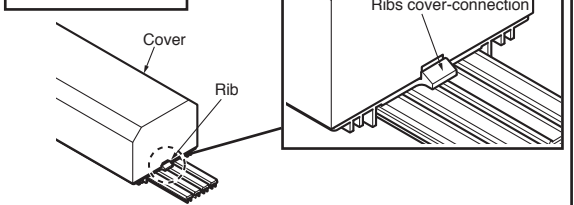
## Caution

### 60A and 90A (with feed-in terminal)



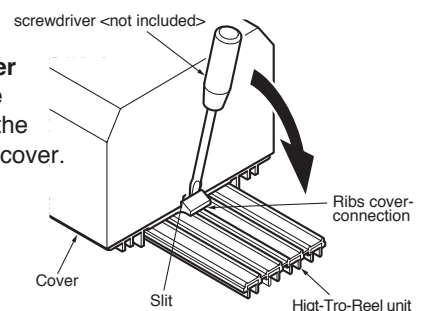
Slide

### 3. Close cover



### Removing the cover

Insert the screwdriver <not included> into the slit of the cover, Slide the cover in the lifting the cover.

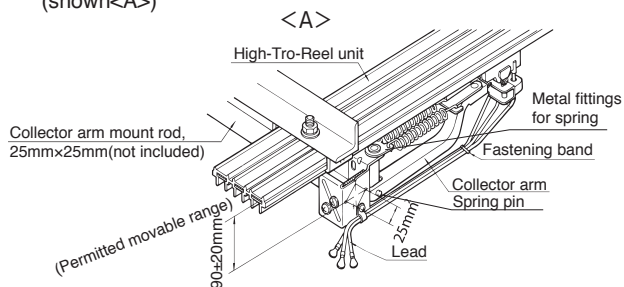




# 10 Collector arm installation Please refer 3 even to page 21 for the CE type.

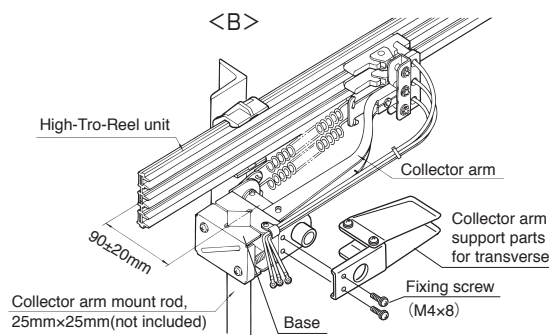
## Standard installation

Set the distance between the High-Tro-Reel conductor sliding surface and collector arm mount rod to 90mm (Central value of the collector arm permitted movable range  $90\pm 20$ mm). (Set the distance to 90mm at the hanger bracket section.) (shown<A>)



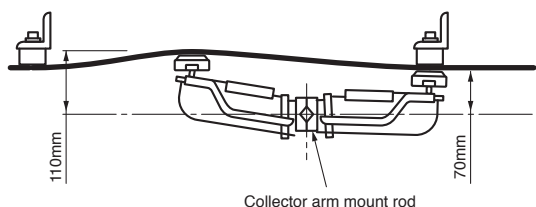
## Horizontal installation with its opening facing

As shown in a figure, mounted collector arm support parts for transverse on base of the collector arm. Tightening torque of fixing screws :  $0.98 \text{ N} \cdot \text{m} \sim 1.32 \text{ N} \cdot \text{m}$  Set the distance between the High-Tro-Reel conductor sliding surface and collector arm mount rod to 90mm (Central value of the collector arm permitted movable range  $90\pm 20$ mm). (shown<B>)

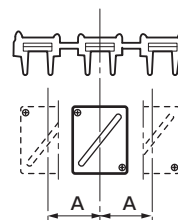


## Use range of movable

When collector arm mount rod set up a reference position, the operating range from 70mm ~ 110mm of collector arm set up to be twisting. Adjust the arm mount rod between the High-Tro-Reel unit to become 110mm or less and 70mm or more at the center between hangers, and 70mm or more at the bracket.



Distance to the center of the collector arm from the center of the duct

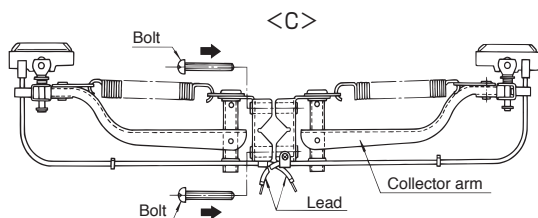


Dimension A of permitted movable range  
Distance to the center of the collector arm from the center of the duct

Not use the horizontal support parts	15mm
Use the horizontal support parts	5mm

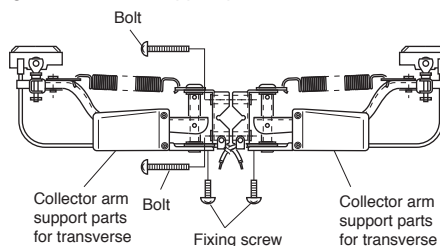
## Assembly in tandem configuration

Two collector arms (tandem type) should be used together in lines with a circuit of 100A or higher, and especially in applications in which it is imperative that collector arms not be separated from wires. (shown<C>)



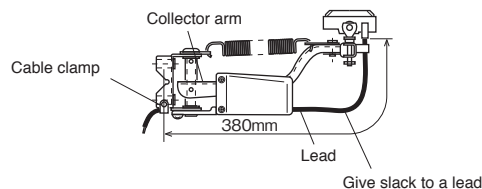
## Horizontal installation with its opening facing into tandem-type

Mounting the horizontal support parts in both the collector arms



## Wire clamp

Give slack to a lead. (Lead is a fixed position, 380mm from the base of collector) Do not affect a collector's run.

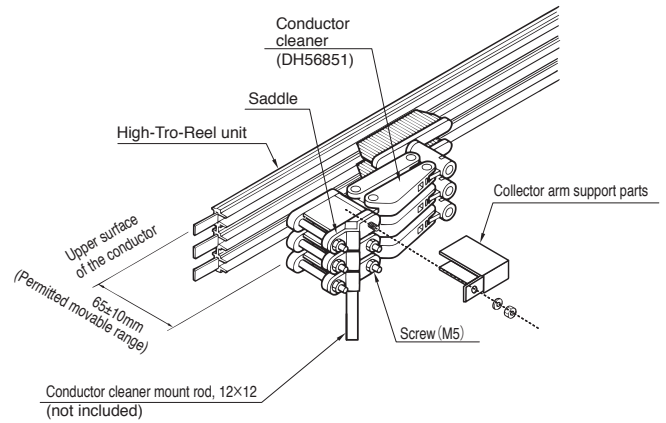
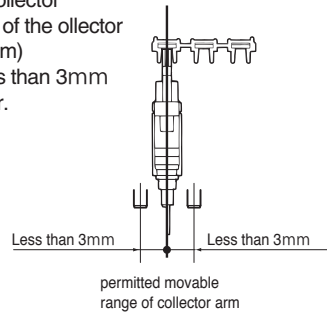


## Caution

- During operation of equipment, use the collector arm within permitted movable range  $90\pm 20$ mm.
- Be sure that collector arms are permitted movable range to the High-Tro-Reel unit with no twisting.
- Be sure to confirm the High-Tro-Reel unit phase (R.S.T) before connecting the leads to the load.
- In case of horizontal installation, be sure to use the Collector arm support parts (for transverse) with its opening facing side. Otherwise, poor collector arm contact or separation from wires may occur.
- Mount the length from the center of the duct to the center of the collector arm within A size.

## 11 Mounting a conductor cleaner

1. Mount the supporting parts of collector arm on saddle
2. Set the distance from the upper surface of the High-Tro-Reel conductor to the center of collector cleaner mount rod to 65mm (Central value of the collector cleaner permitted movable range  $65 \pm 10$  mm)
3. Mount the center of collector cleaner to less than 3mm from center of the High-Tro-Reel conductor.

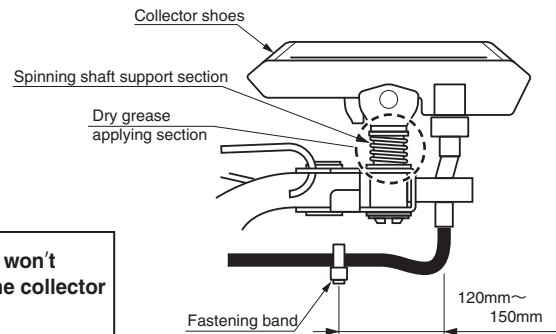


### Notes

- Be sure that the conductor cleaner is mounted parallel to the High-Tro-Reel unit with no twisting.

## 12 Inspection of spinning shaft support parts

- If vertical movement of the collector shoes is not smooth, remove chips adhering on the surface of the spinning shaft support section. Then apply commercially available dry grease 3 to 4 times (Recommended: Japan Dry Slide Company's product No.M10/40). After that, slide the collector shoes (spinning shaft support section) vertically for several times so that the dry grease is evenly applied on the surface of the spinning shaft support section.



### Caution

- Please pay attention so that the dry grease won't adhere on the surfaces of conductor and the collector shoes of the High-Tro-Reel unit. Otherwise, poor contact may occur.
- After applying the dry grease, be sure to do a pre-use test run. Otherwise, electric shock or fire may occur.
- For the inspection for sliding of collector shoes, perform periodic inspection leaving about 3 to 6 months intervals, though it slightly varies depending on the operating condition or environment. If the collector is vertical movement is not smooth, separation of lines or abnormal wear of collector shoes may occur.

• Please inquire Nippon Dry Slide Co., Ltd.  
+81-072-257-2221.

## 13 Collector shoe replacement

Please refer 4 even to page 21 for the CE type.

- The replacement indication line is marked to collector shoes. Collector shoes should be replaced when they wear down a part at least to the replacement indication line. In case of wearing down to the replacement indication line at next inspection, please replace earlier than usual. After replacing the collector shoes, fasten the leads with fastening band (supplied with the collector shoes).

