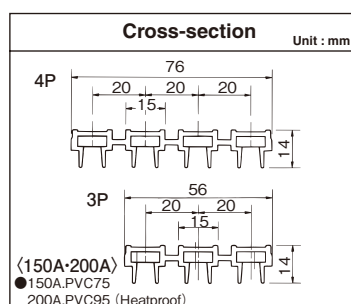
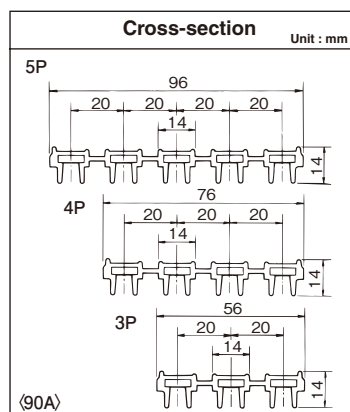
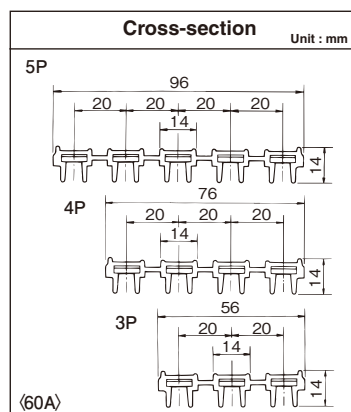


# Installation Procedures for High-Tro-Reel <Tension Type>

Unit : mm

## Cross-section



### Collector arm

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

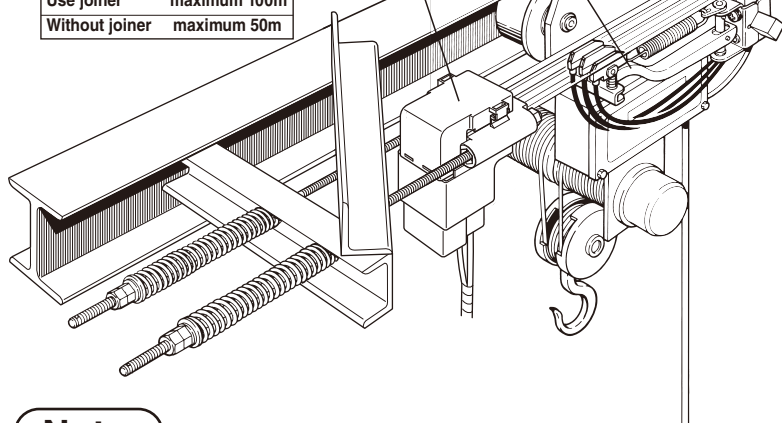
### End tension insulator (Putting under cable)

On both supply and tightening of the body.

## Products outline

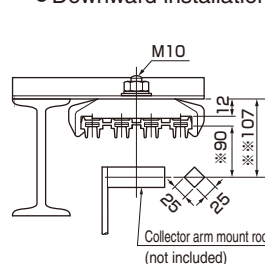
length of the line laid down

Use joiner	maximum 100m
Without joiner	maximum 50m



## Installation procedure

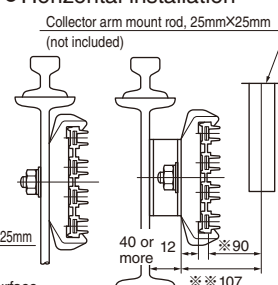
### Downward installation



Asterisk (\*) indicates the conductor sliding surface.

The asterisk (\*\*) indicates the dimensions at the hanger mounting bracket section.

### Horizontal installation



### 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

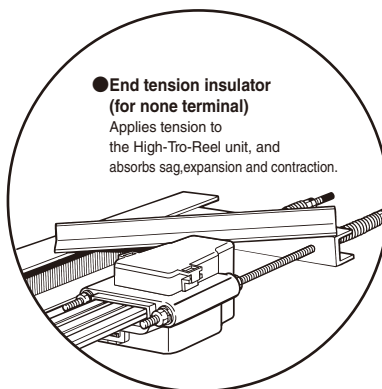
Connect the High-Tro-Reel unit together in long installations. Can also feed power to 150A and 200A High-Tro-Reel unit. The lead-in-side set up a hanger at 450~550 mm, the other side set up a hanger at 550~750 mm

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

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

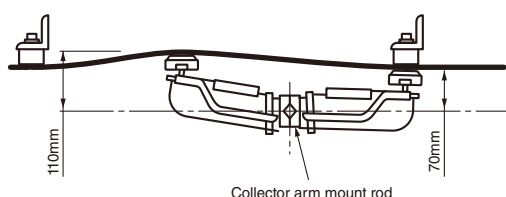
### End tension insulator (for none terminal)

Applies tension to the High-Tro-Reel unit, and absorbs sag, expansion and contraction.

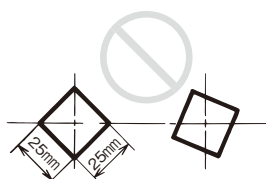


## Notes

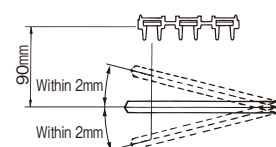
1. When collector arm mount rod set up a reference position, the operating range from 70mm~110mm of collector arm set up to be twisting.



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

### End tension insulator mounting section

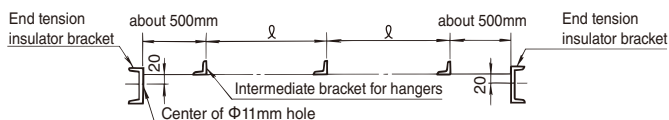
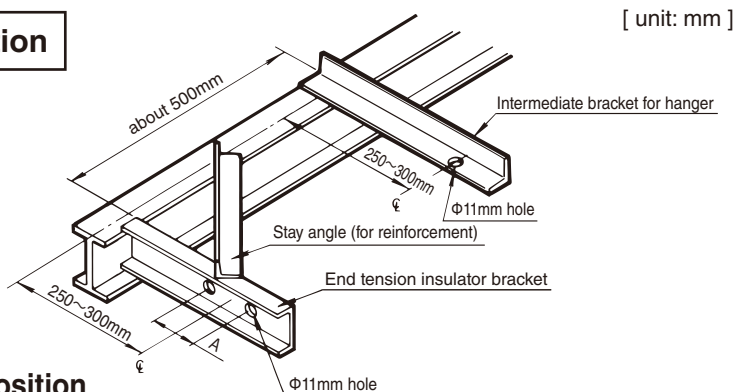
Unit : mm

	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
For hangers	L -40×40×5
For end tension insulators	└ -75×40×5

High-Tro-Reel unit installation method	Interval between hangers (L)(mm)
Standard installation (general use)	4000
Horizontal installation	2000

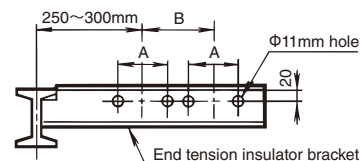
#### Notes

- 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.

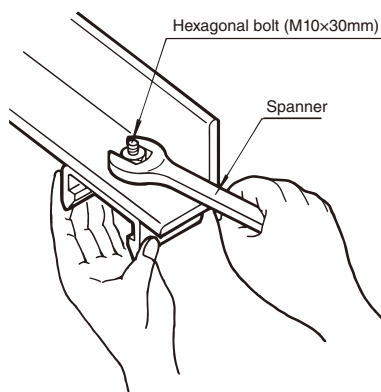
### Parallel installation

#### 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

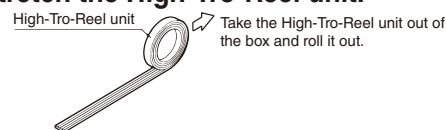
- Make sure brackets are parallel to the line. Failure to do so may cause poor collector arm contact.



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

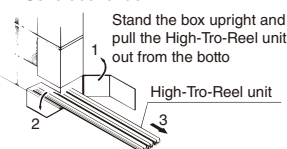
### Open the box and stretch the High-Tro-Reel unit.

<10m coil>

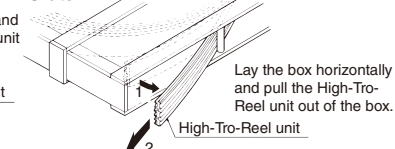


<30m and 50m coil>

#### • Cardboard box



#### • Crate

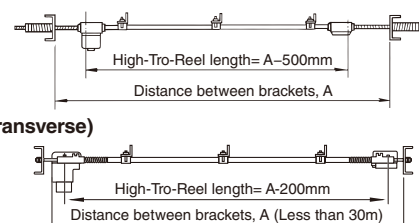


#### Notes

- 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

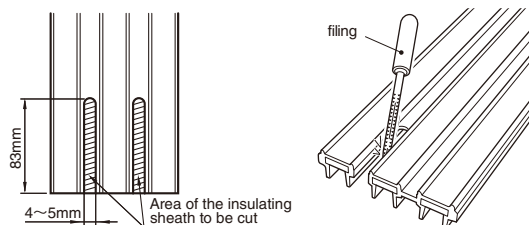
#### Notes

- 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

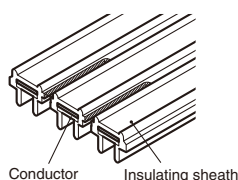
1. Cut a sheath according to the size that exists in figure.

• Please use the gimlet or the file.



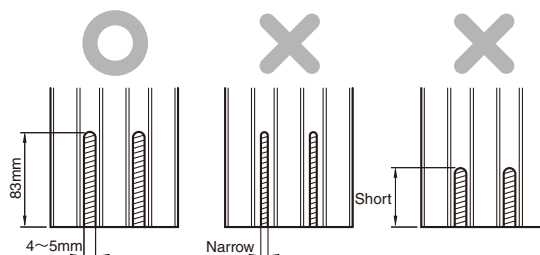
Filing(recommendation): The file-saw type M is made by Nigata seik.

#### Completed Figure

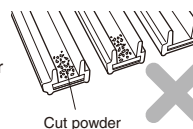


### Caution

- 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.



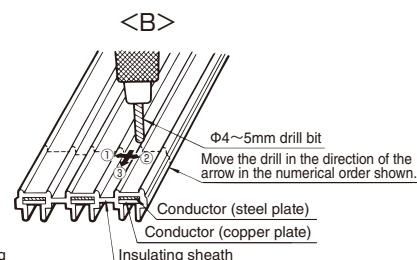
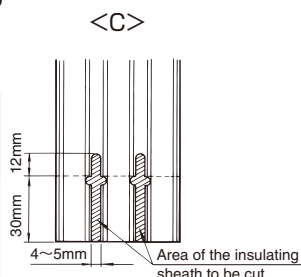
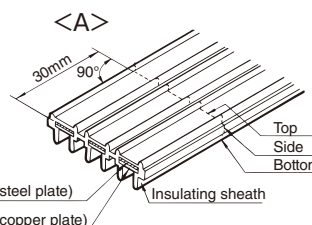
### Processing for the center feed-in joiner

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)

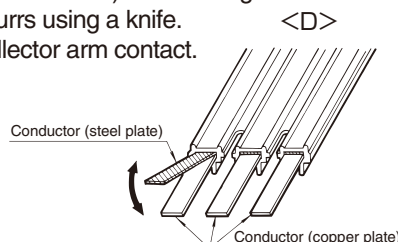
2. Cut the insulating sheath using a  $\Phi 4 \sim 5$  mm drill bit, as shown on Figure <B>. Slightly exaggerating the cut to the side (Working ① ⇔ ②), as shown in Figure <C>. makes the insulating sheath easier to remove.

### Caution

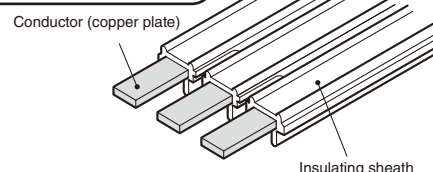
- Be careful not to damage the conductor(copper plate) when cutting with a hacksaw. Failure to do so may cause damage due to failing of equipment.



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



## 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 mounting 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

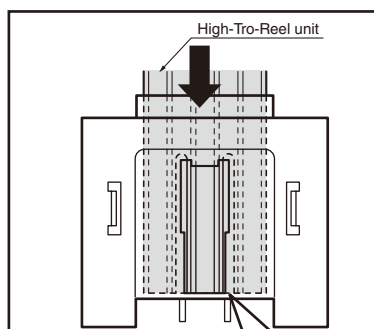
- ① Set the central terminal and the terminal plate-LB. (Point 1 of execution)
- ② ① Fit the insulator terminal tightening, 2mm shifted to the side the High-Tro-Reel unit
- ③ To arrange like terminal plate -LB (Point 2 of execution), and tighten temporarily the fixation screw to facilitate the insertion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

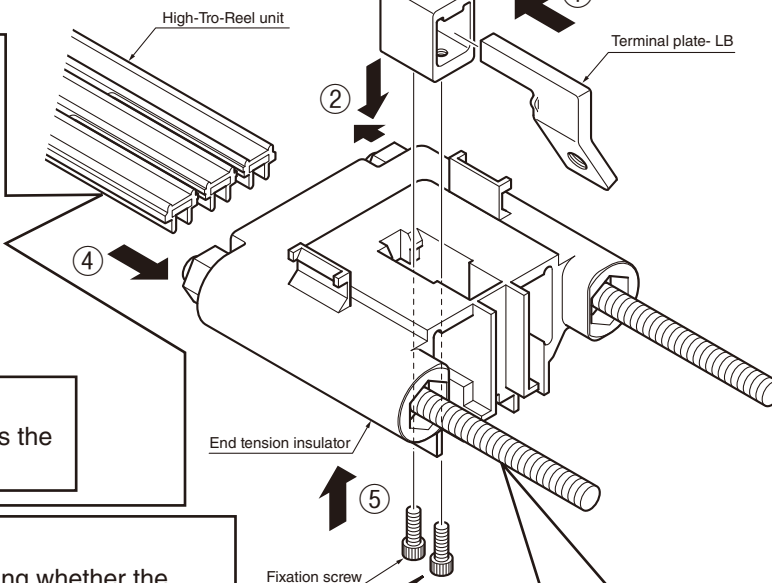
### (Point 1 of execution)

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



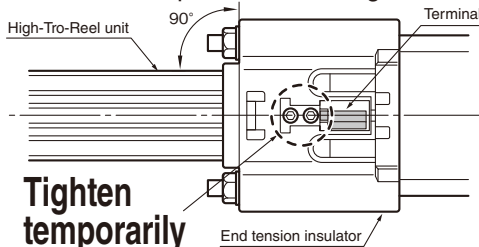
### (Point 3 of execution)

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



### (Point 4 of execution)

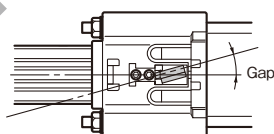
Tighten temporary after confirming whether the terminal plate-LB and the end tension insulator are the horizontal compared with the High-Tro-Reel unit.



**Tighten temporarily**

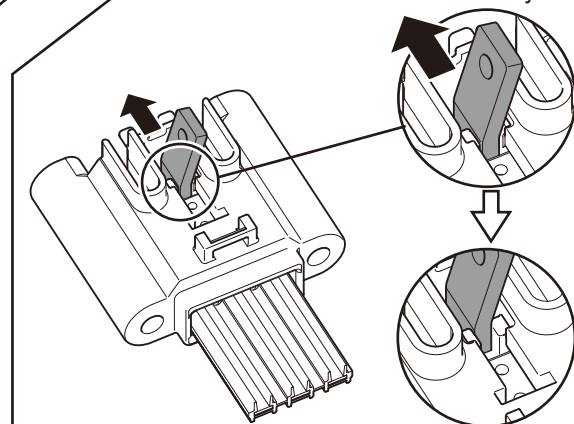


Set up the terminal plate- LB so as not to incline.



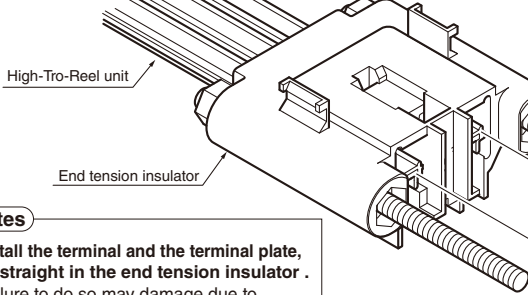
### ③ (Point 2 of execution)

Move the terminal plate to the direction of the arrow by 5mm.



## (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:  $7\text{N} \cdot \text{m} \sim 9\text{N} \cdot \text{m}$ )

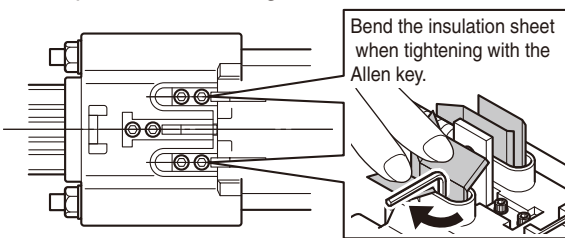


### Notes

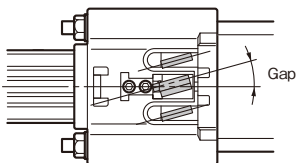
- Install the terminal and the terminal plate, to straight in the end tension insulator. Failure to do so may damage due to falling of equipment.

### (Point 7 of execution)

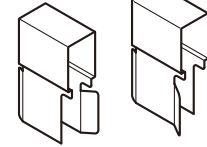
Tighten after confirming whether the terminal plate and the end tension insulator are the horizontal compared with the High-Tro-Reel unit.



Set up the terminal plate so as not to incline.



### Insulation sheet for feeding from under



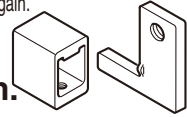
※ Please note the direction of the insulating sheet.

## ! 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.

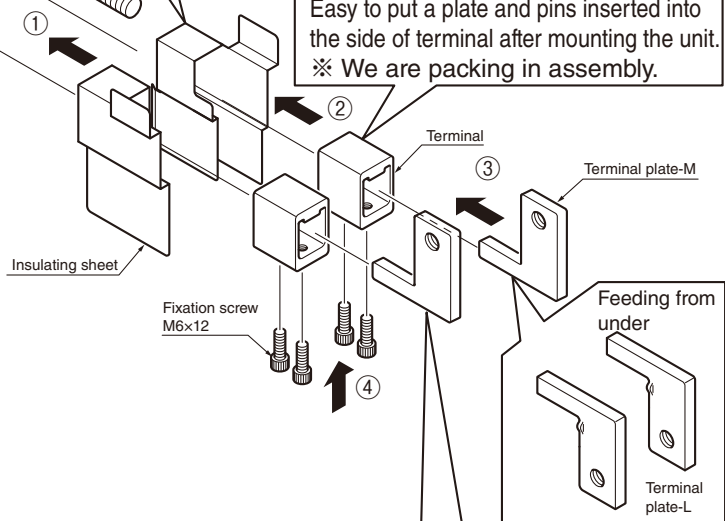
**Don't use them again.**

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.



## ! Caution

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

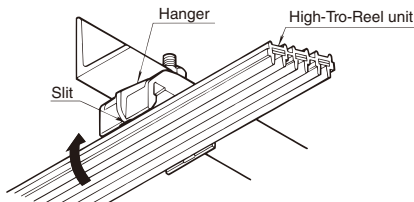
### (Point 6 of execution)

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.

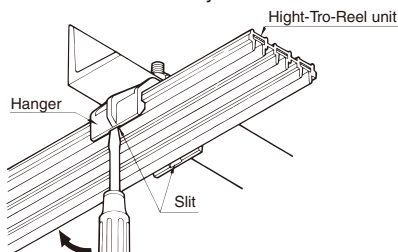
### ■ Mounting the High-Tro-Reel unit to the hanger

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



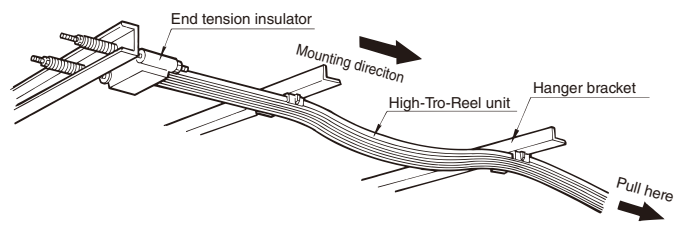
### ■ Removing the High-Tro-Reel unit

Insert a screwdriver into the slit and try it out.

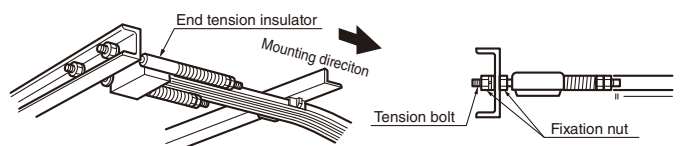


### ■ Temporarily fix the High-Tro-Reel unit to the hanger in the proper order starting at the end.

1. Tightening the tension bolt to the insulator blanket by the fixation nut
2. Temporarily fix 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.



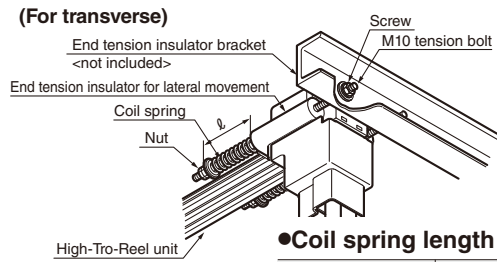
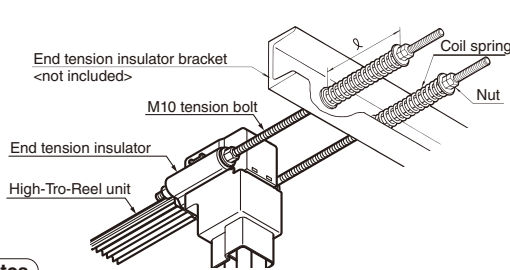
### (For transverse)





## 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.

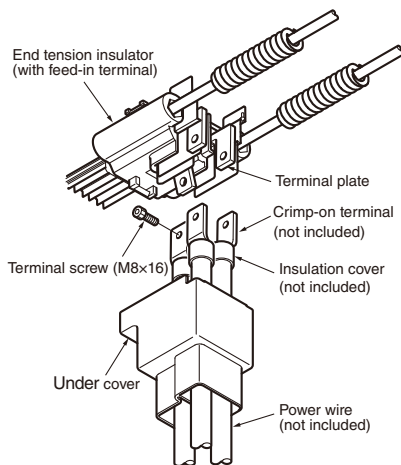
#### ●Coil spring length and tension

Ambient temperature during installation	Coil spring length, (ℓ)mm	Tension(N)
10°C or lower	115	4508
	70 (For transverse)	3332 (For transverse)
11~40°C	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.) Please refer to the page of the CE type.

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

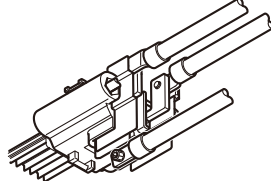
#### ● Installing the cover and remove



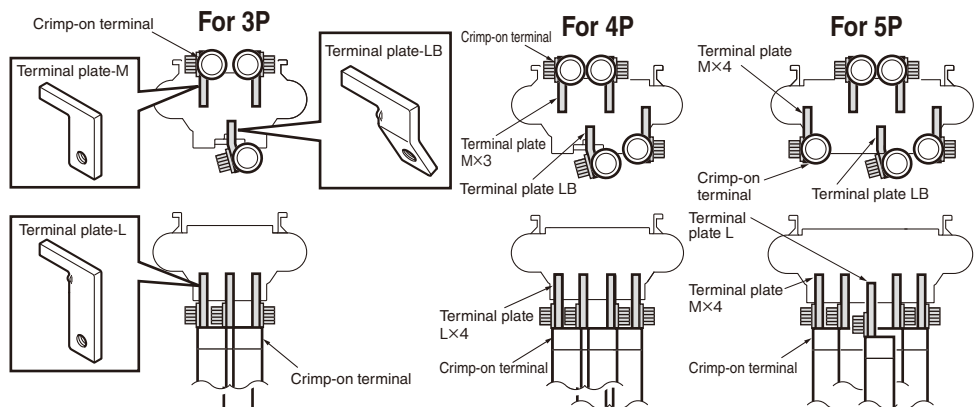
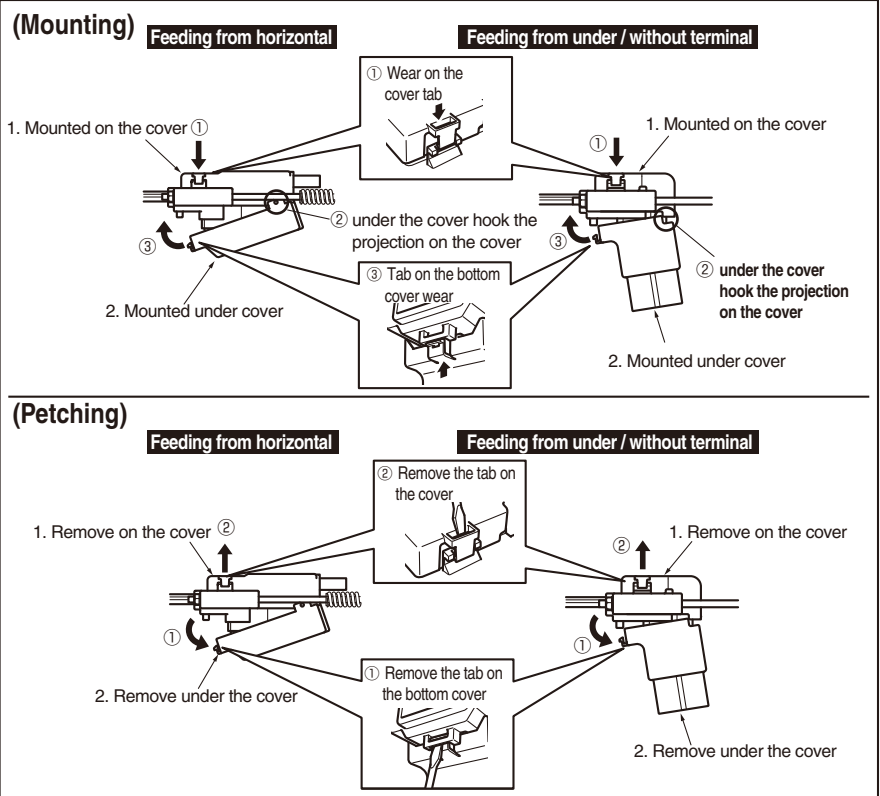
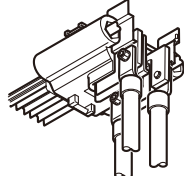
Recommend using JIS standard crimp terminals and insulating cap

- Crimp terminal sequence and mounting direction of the terminal plate

#### [For feeding from horizontal]



#### [For feeding from under]



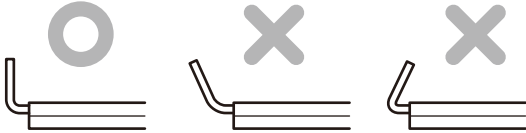
The terminal arrangement for none terminal is the same for feeding from horizontal.

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

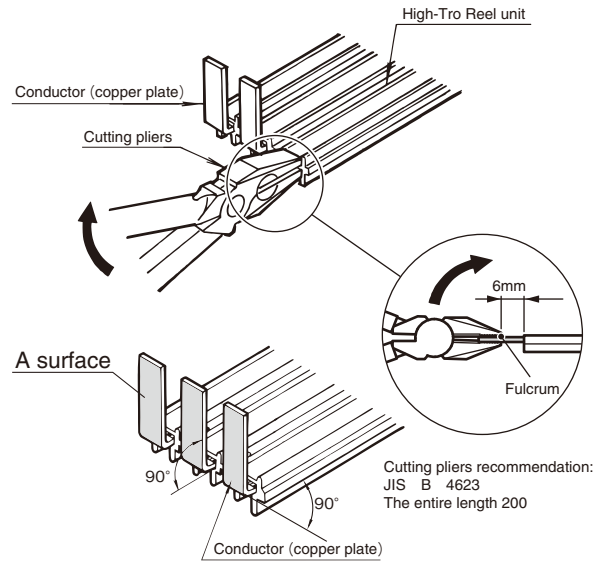
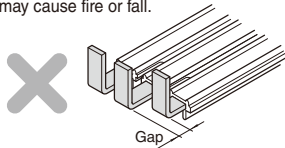
1. Cut 30mm of the insulating sheath and the copper plate.  
(See 3 Cutting the High-Tro-Reel unit)
2. Bend up the copper plate to a 90°.

### Caution

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



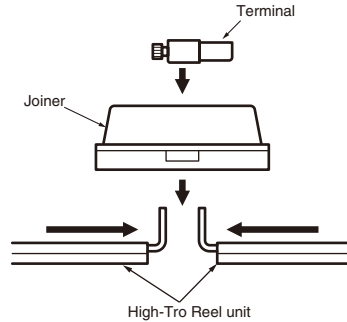
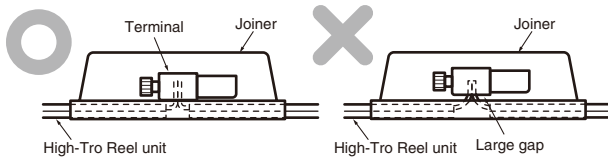
- Make the position where each conductor bends the same.  
Failure to do so may cause fire or fall.



3. Inserting the each conductors into the joiner.

### Caution

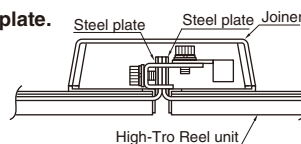
- Inserting the each conductors into the joiner.  
Failure to do so may cause fire or fall.



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

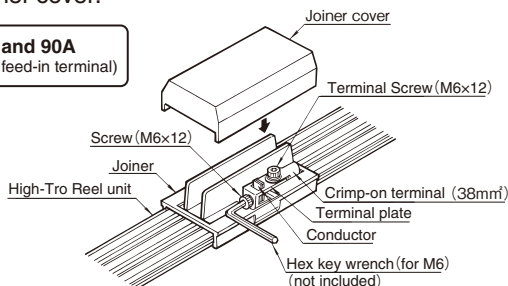
- For 60A, please place the cut iron plate.  
Failure to do so may cause fire or fall.



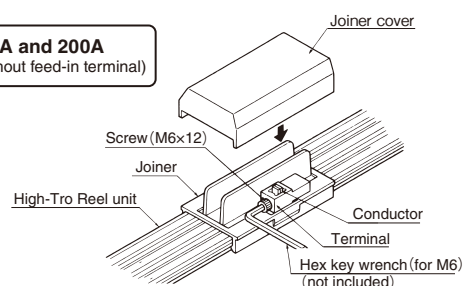
(For 60A, please place the conductor by cut iron plate to tighten securely.)

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 from 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 to the page of the CE type.

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

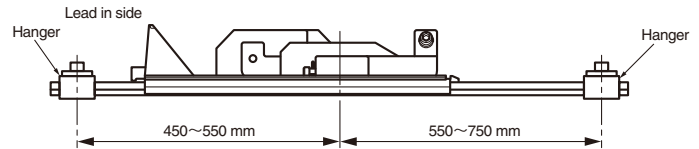
[60A・90A] Joiner (with feed-in terminal)

[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

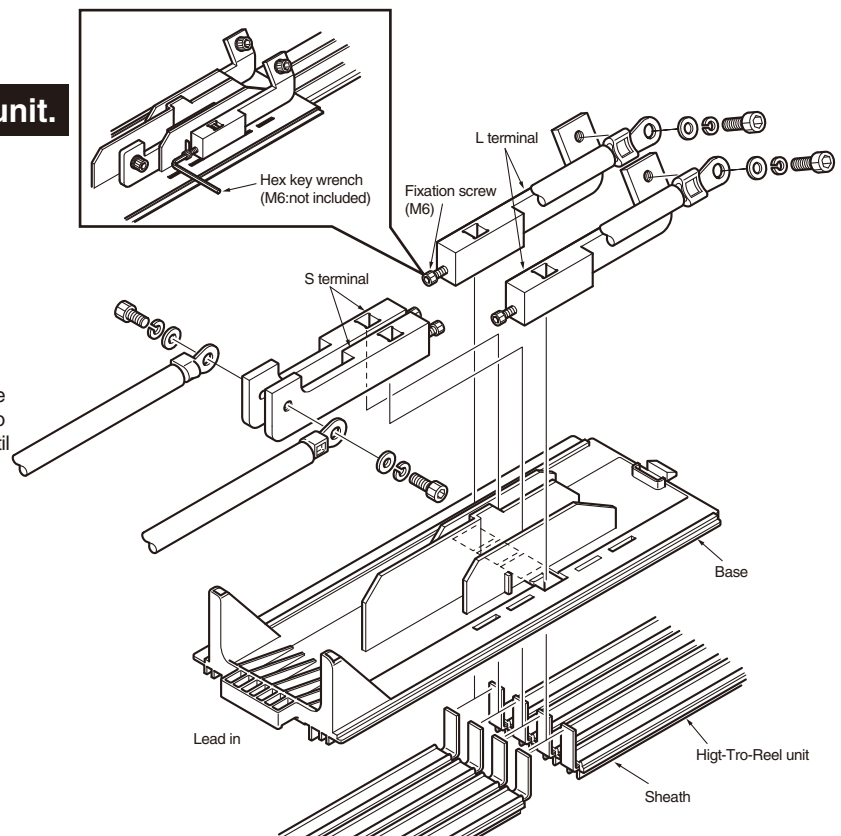
### Connection the High-Tro-Reel unit.

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

Please see 8 Connecting the High-Tro-Reel unit

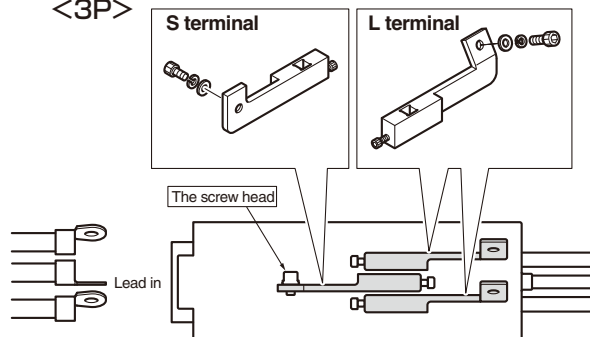
#### Center feed-in joiner

1. Peel the sheath, bend the conductor to a 90°  
(See 8 Connecting the High-Tro-Reel unit, to 1 or 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).

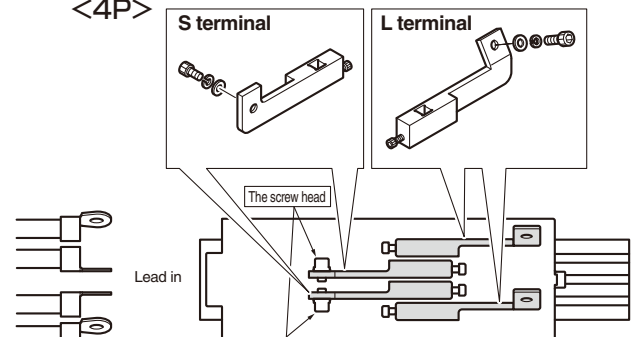


### < Terminal sequence of the center feed-in joiner >

<3P>



<4P>



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



**Caution**

- **Install the hanger in a specified position.**  
Failure to do so may derail the current collector arm and cause 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, fire and 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:  $9.3\text{N} \cdot \text{m} \sim 11.3\text{N} \cdot \text{m}$ )
- After connection with the power wire, remove knockouts of the Joiner cover, and cover. Cutting plane of the knockout must be chipped with the knife etc.

## Caution

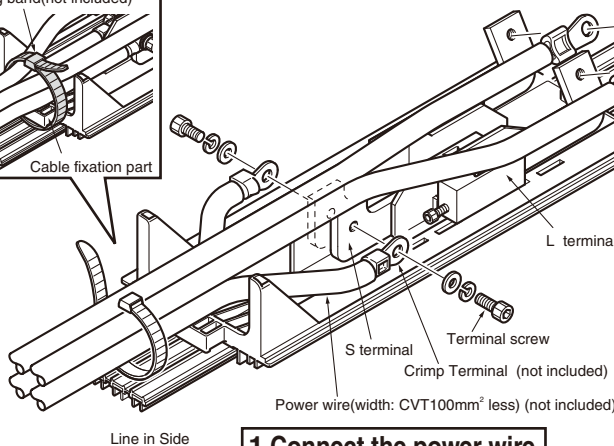
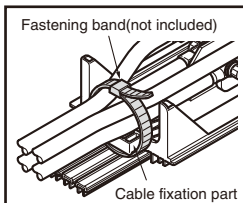
- The terminal screw must be securely tightened.**  
(Tightening torque:  $9.3\text{N} \cdot \text{m} \sim 11.3\text{N} \cdot \text{m}$ )  
Failure to do so may cause fire or damage due to falling of equipment.
- The cover to ensure.**  
Failure to do so may cause an electric shock.

### 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:  $12.5\text{N} \cdot \text{m} \sim 15\text{N} \cdot \text{m}$ )
  - 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.  
The power wire is sold separately.
- 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)

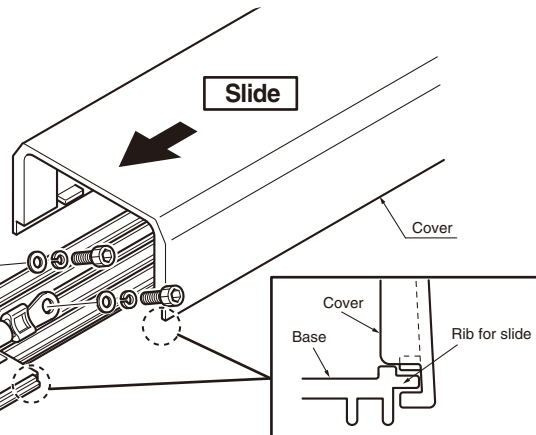
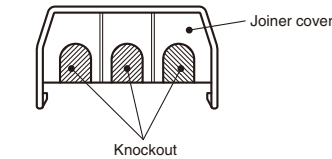
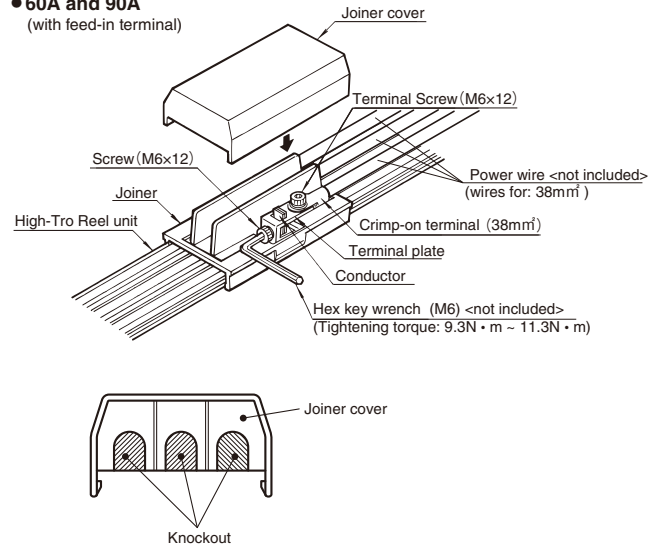


### 1.Connect the power wire

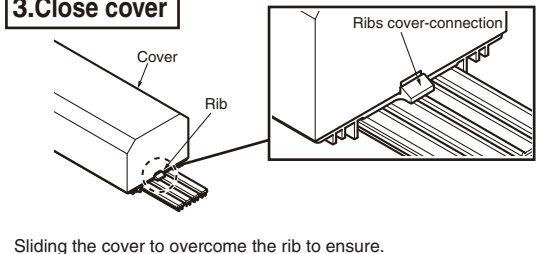
- The terminal screws must be securely tightened.**(Tightening torque:  $12.5\text{N} \cdot \text{m} \sim 15\text{N} \cdot \text{m}$ )  
Failure to do so may cause fire or damage due to falling of equipment.
- Sliding the cover to overcome the rib-Connection may cause electric shock.**  
Failure to do 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

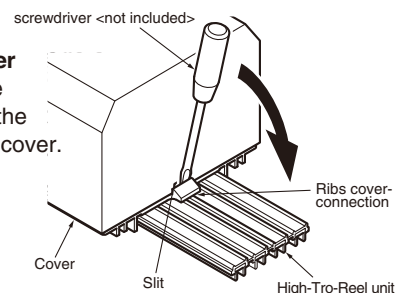
### ● 60A and 90A (with feed-in terminal)



### 3.Close cover



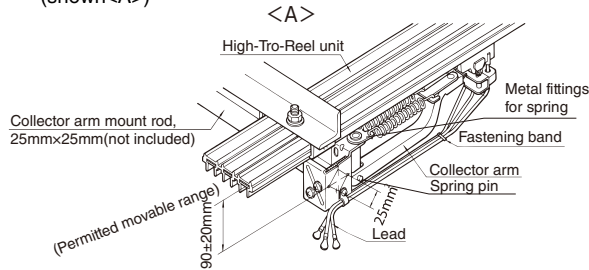
- Removing the cover**  
Insert the screwdriver <not included> into the slit of the cover, Slide the cover in the lifting the cover.



## 10 Collector arm installation Please refer to the page of the CE type.

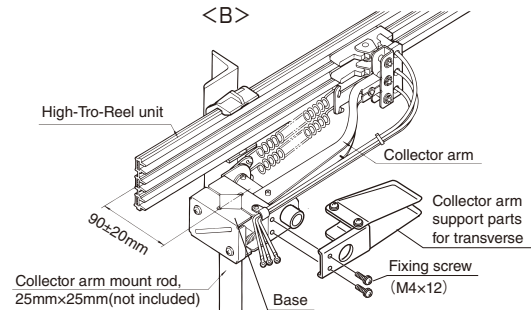
### Standard installation

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  $90\pm 20\text{mm}$ ).  
(Set the distance to 90mm at the hanger bracket section.)  
(shown<A>)



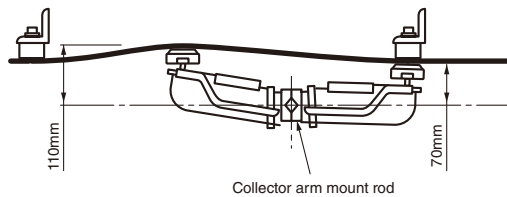
### Horizontal installation with its opening facing

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  $90\pm 20\text{mm}$ ). (shown<B>)

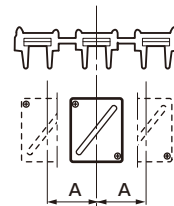


### Use range of movable

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

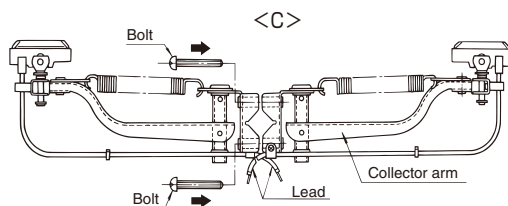


Dimension A of permitted movable range  
Distance to the center of the collector arm from the center of the duct

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

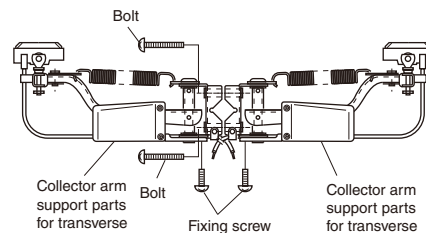
### Assembly in tandem configuration

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

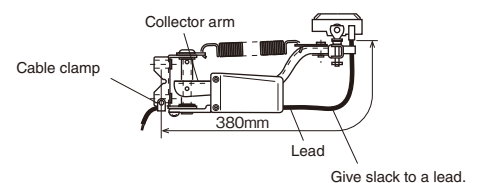


## ⚠ Caution

- During operation of equipment, use the collector arm within permitted movable range  $90\pm 20\text{mm}$ .
- 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.

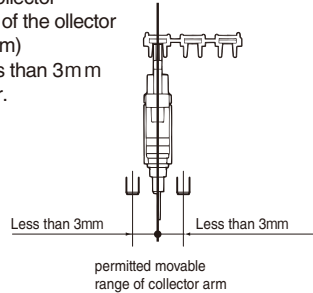
### Wire clamp

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



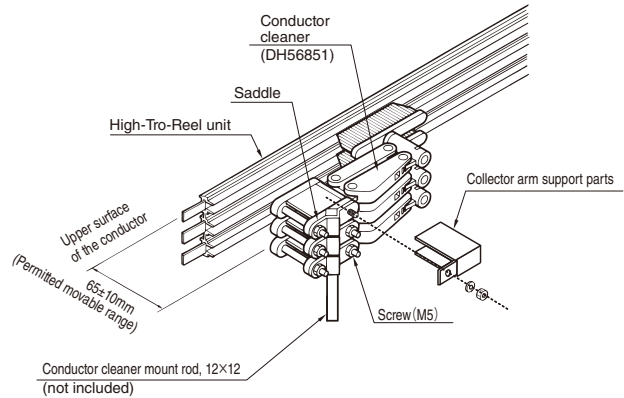
## 11 Mounting a conductor cleaner

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.



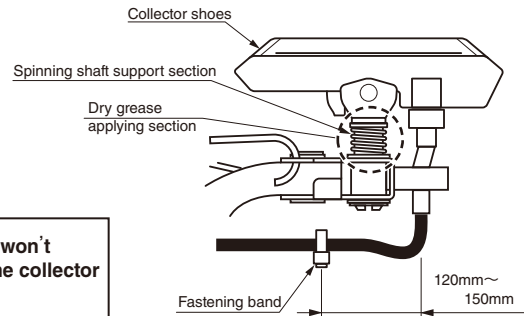
### Notes

- 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 to the page of 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).

