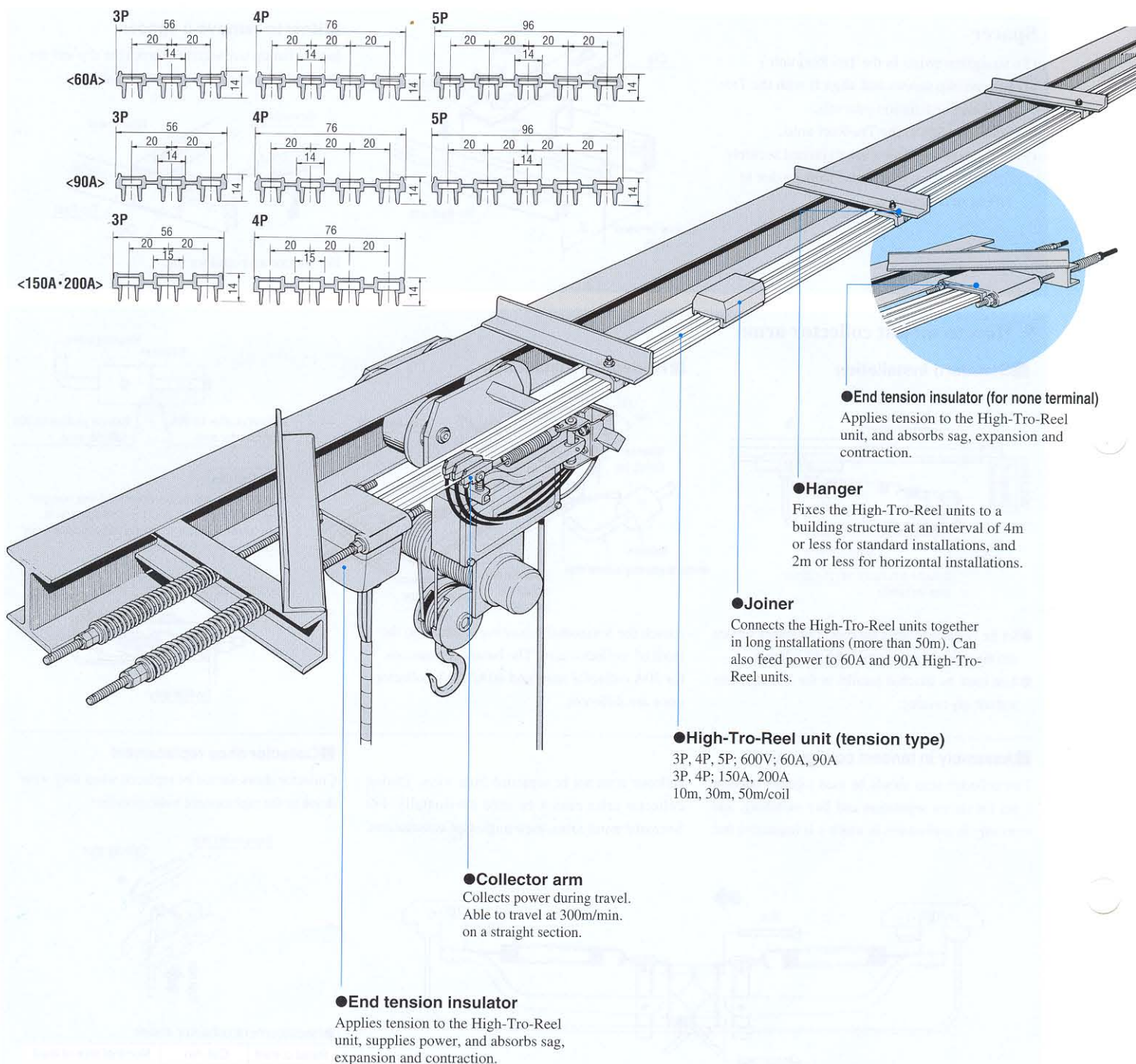


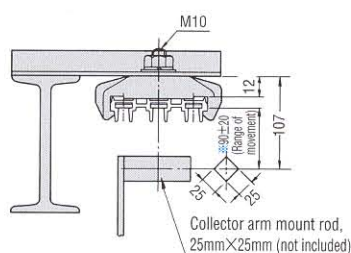
Installation Procedures for High-Tro-Reel (Tension Type)

●Cross-section

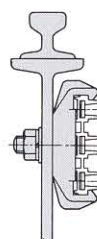


●Standard installation procedure

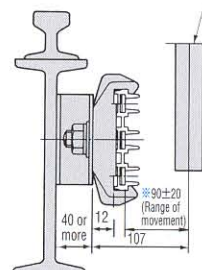
●Standard installation



●Horizontal installation

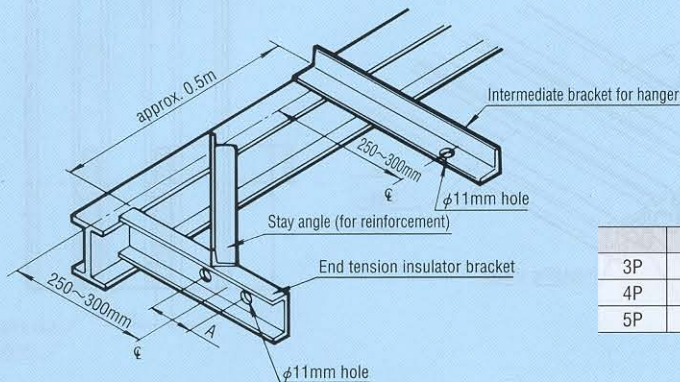


Collector arm mount rod, 25mm×25mm (not included)



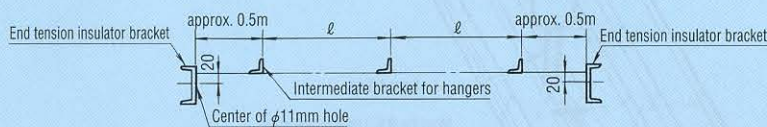
※Distance between the High-Tro-Reel unit's conductor sliding surface and the collector arm mount rod.

End tension insulator mounting section



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

Bracket position



Type and use of brackets	Angle dimensions
For hangers	L -40×40×5
For end tension insulators	C -75×40×5

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

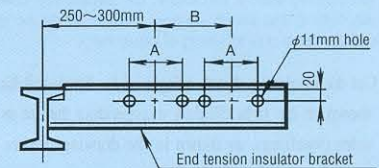
Bracket dimension and installation position

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

Caution

1. 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.
2. When mounting an end tension insulator, place one intermediate bracket 0.5m away from the end bracket.

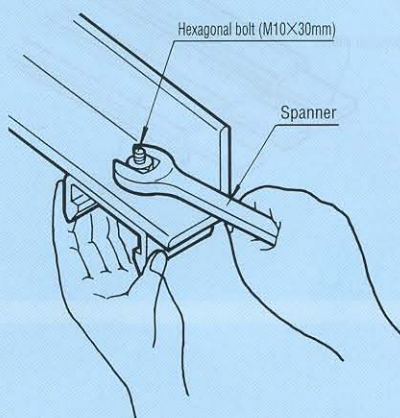
Parallel installation



Caution

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.

Caution

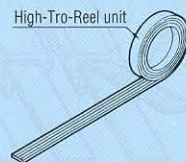
Make sure brackets are parallel to the line. Failure to do so may cause poor collect arm contact.



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

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

<10m coil>

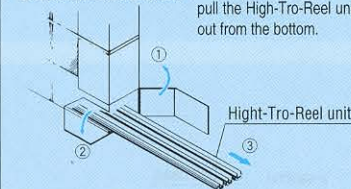


Take the High-Tro-Reel unit out of the box and roll it out.

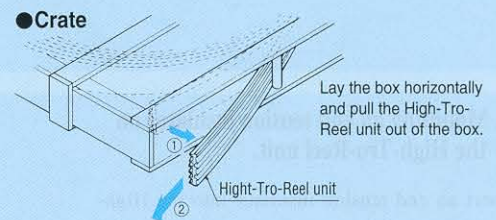
<30m and 50m coil>

Cardboard box

Stand the box upright and pull the High-Tro-Reel unit out from the bottom.



Crate



Caution

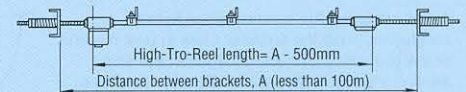
1. Be careful that the end of the High-Tro-Reel unit doesn't swing up.
2. Be careful not to step on or bang the Tro-Reel units on the ground as this may damage the units.

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

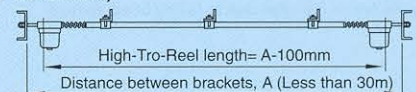
Measure the distance between the brackets at both ends (the range of practical collector servicing + 1m) and cut the High-Tro-Reel unit to that length.

Caution

If the line is over 100m long, please use Tro-Reel.



(For transverse)



3. Cutting the High-Tro-Reel unit

1. Mark the dimensions shown in Table 1 on the High-Tro-Reel unit, and cut the top, sides 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 90A, 150A and 200A, cut off only the insulating sheath.)

⚠ Caution

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

<Table 1>

High-Tro-Reel unit end cut dimensions	ℓ (mm)
End tension insulator section	83
Joiner section	30

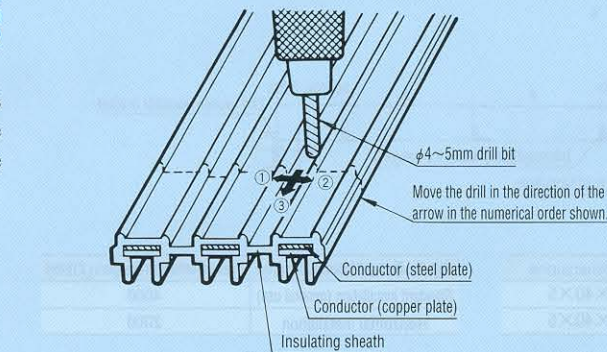
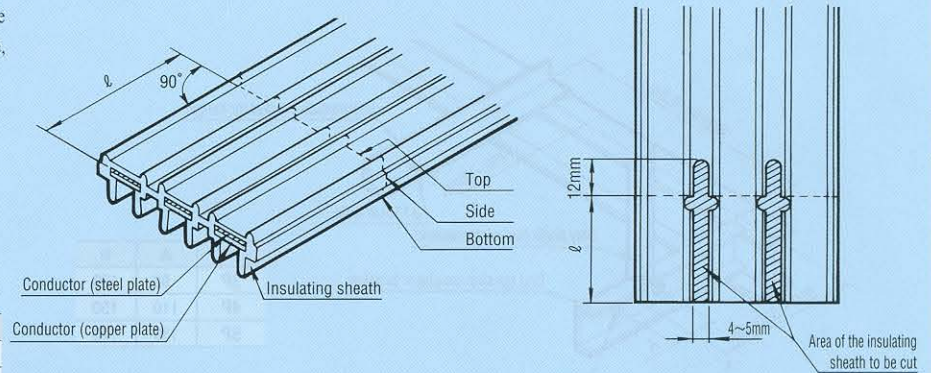
⚠ Caution

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

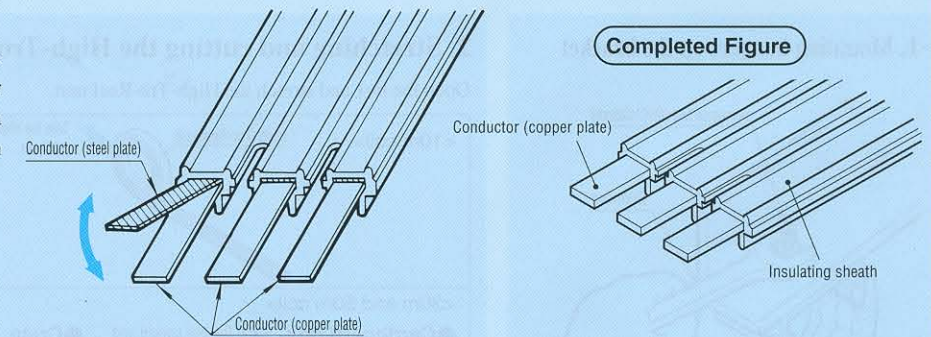
2. Cut the insulating sheath using a $\phi 4\sim 5\text{mm}$ drill bit, as shown on the right. Slightly exaggerating the cut to the sides (swelling), as shown in the drawing, makes the insulating sheath easier to remove.

⚠ Caution

Be careful not to damage the lower conductor (copper plate).



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.

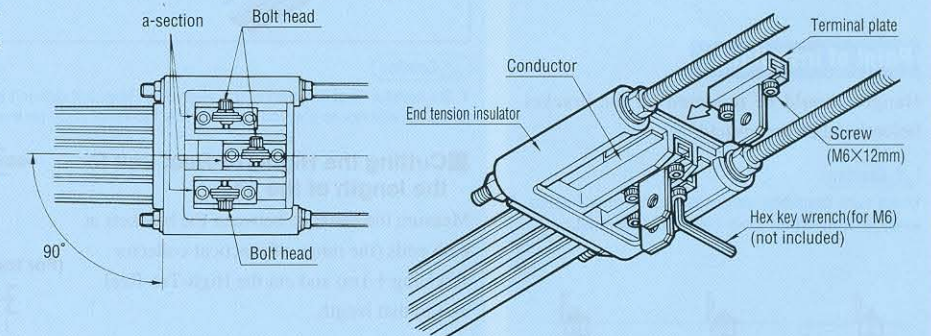


4. Mounting an end tension insulator on the High-Tro-Reel unit.

Insert an end tension insulator into the High-Tro-Reel unit. Mount and screw a terminal plate to the conductor.

⚠ Caution

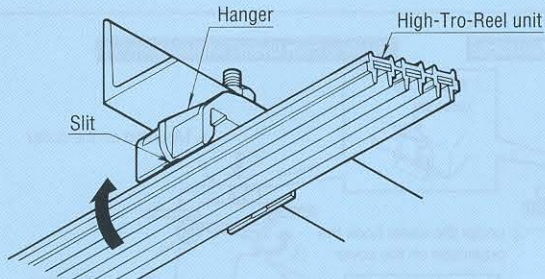
- 1. When attaching the terminal plate to the conductor, push the terminal plate in until the end plane (a-section) fits snugly against the end tension insulator. Mount the High-Tro-Reel unit perpendicular to the end tension insulator. Tighten screws securely. Failure to do so may cause fire or damage due to falling of equipment.



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

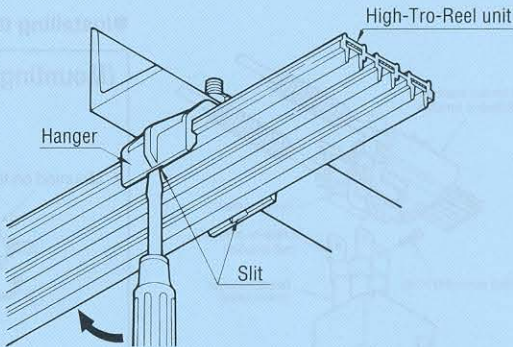
■Mounting the High-Tro-Reel unit to the hanger

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



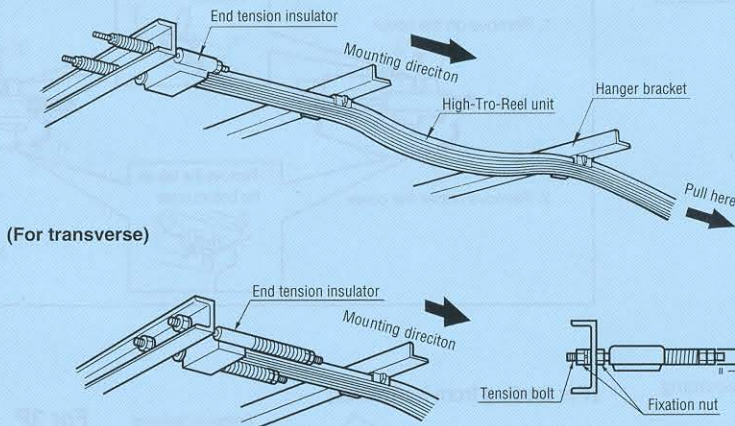
■Removing the High-Tro-Reel unit

Insert a screwdriver into the slit and pry it out.



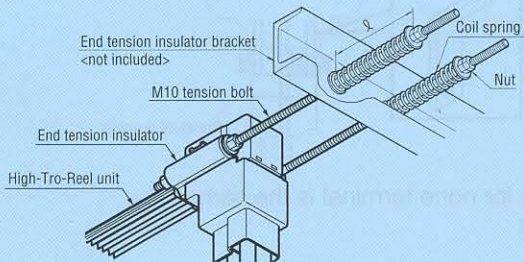
■Temporarily fix the High-Tro-Reel unit to the hanger in the proper order starting at the end.

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.

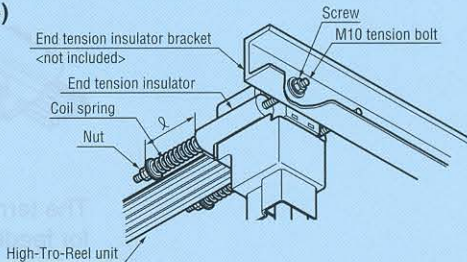


6. Tightening the High-Tro-Reel unit

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



(For transverse)



⚠Caution

- 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.

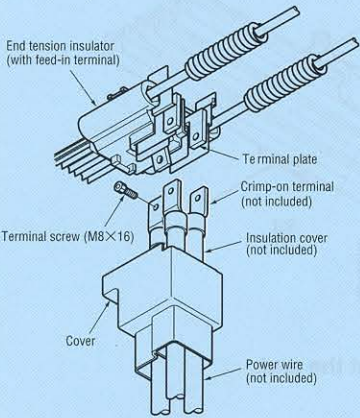
●Coil spring length and tension

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)

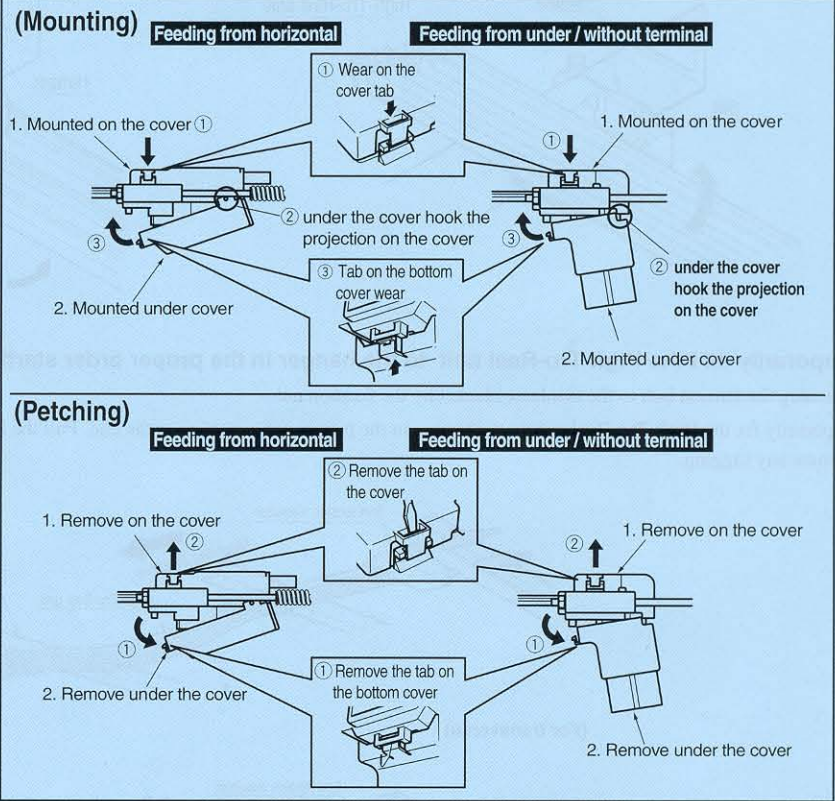
7. Feeding power to the High-Tro-Reel (Power is fed from the line end via an end tension insulator with a feed-in terminal.)

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

●Installing the cover and remove

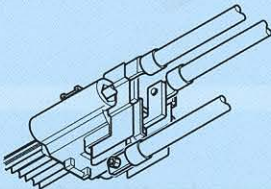


Recommend using JIS standard crimp terminals and insulating cap

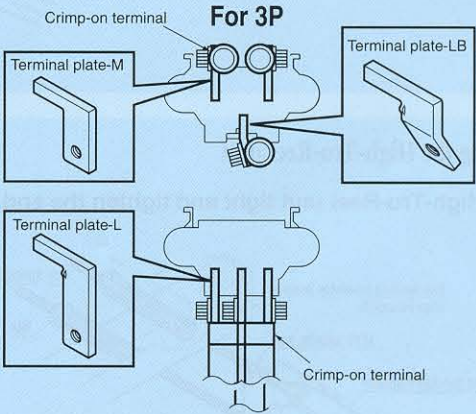
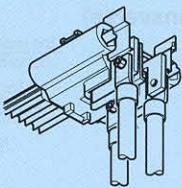


• Crimp terminal sequence and mounting direction of the terminal plate

[For feeding from horizontal]



[For feeding from under]



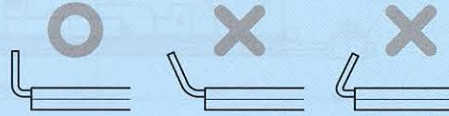
The terminal arrangement for none terminal is the same for feeding from horizontal

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°.

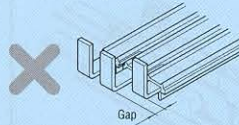
Caution

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



Caution

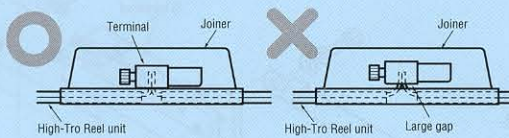
- Make the position where each conductor bends the same.
Failure, to do so may cause fire or fall.



3. Inserting the each conductors into the joiner.

Caution

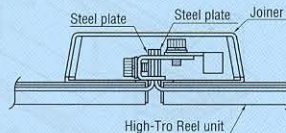
- Inserting the each conductors into the joiner.
Failure, to do so may cause fire or fall.



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

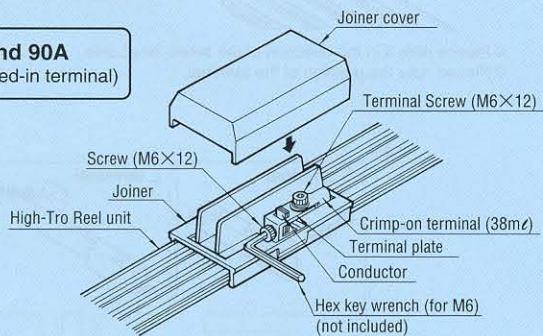
- For 60A, please place the cut iron plate
Failure, to do so may cause fire or fall.



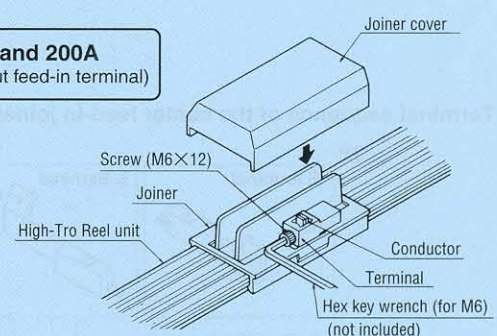
(For 60A, please place the conductor by cut iron plate to tighten securely.)

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 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 middle of the High-Tro-Reel unit

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

- 60A and 90A: Joiner (with feed-in terminal)
- 150A and 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

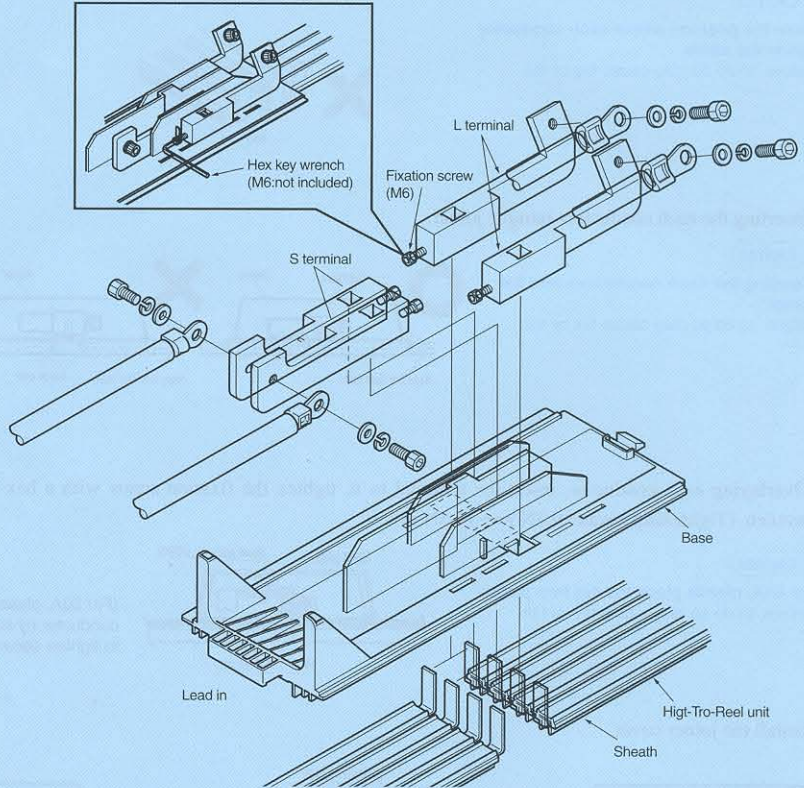
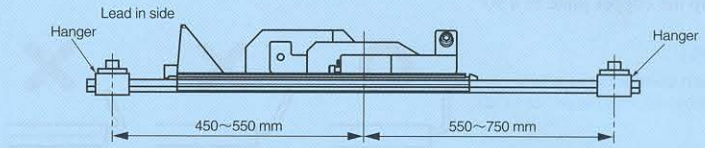
■ Connection the High-Tro-Reel unit

● Joiner (with feed-in terminal)

Please see 8. Connecting the High-Tro-Reel unit.

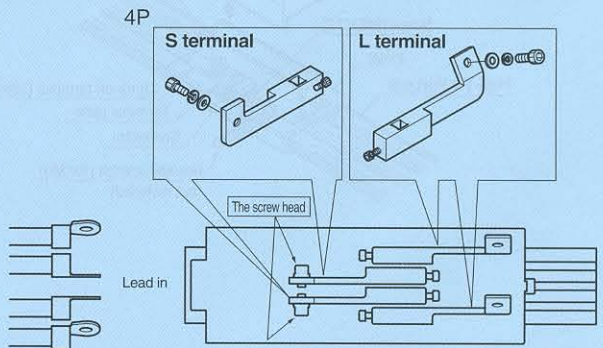
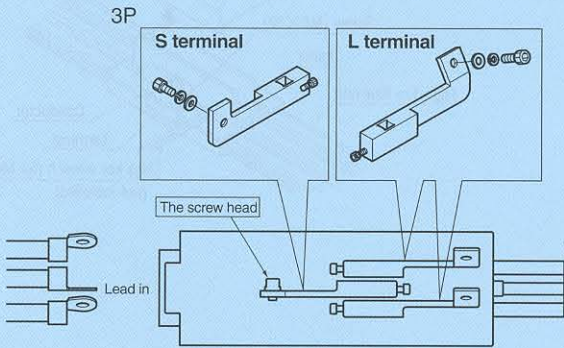
● Center feed-in joiner

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 two types of terminals shown in following the figure “Terminal sequence of the center feed-in joiner” into the joint part of conductors. Inserting the terminal unit to 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).



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

Terminal sequence of the center feed-in joiner



⚠ 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.

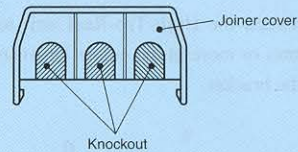
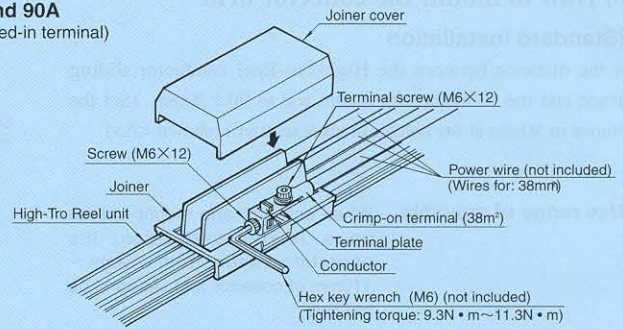
(Tightening torque: $9.3\text{N} \cdot \text{m} \sim 11.3\text{N} \cdot \text{m}$).

- 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: $9.3\text{N} \cdot \text{m} \sim 11.3\text{N} \cdot \text{m}$)
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.

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

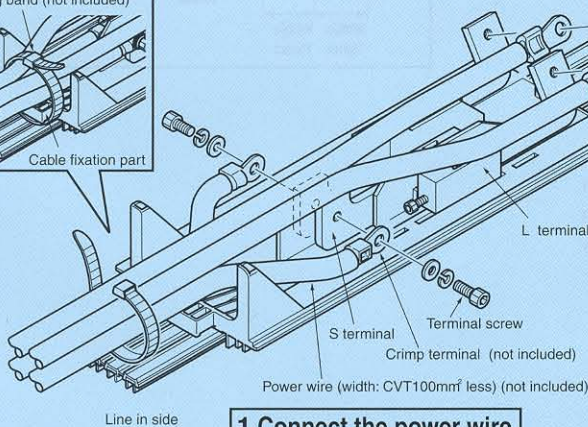
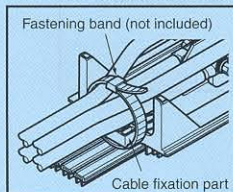


Center feed-in joiner

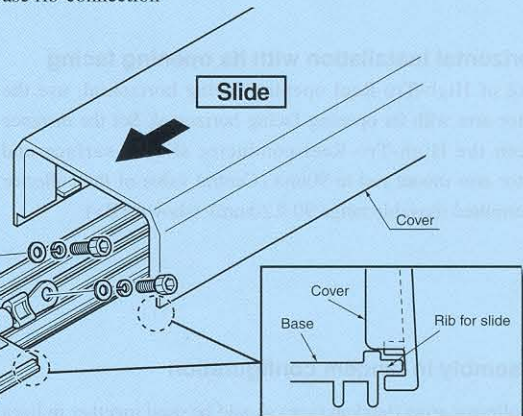
- Put up the power wires from the line entrance, connect the power wire to the terminal plate using a crimp-on terminal (not included).
Be sure to tighten the terminal screw by hex key wrench (M8: not included).
(Tightening torque: $12.5\text{N} \cdot \text{m} \sim 15\text{N} \cdot \text{m}$).
 - Please 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 (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

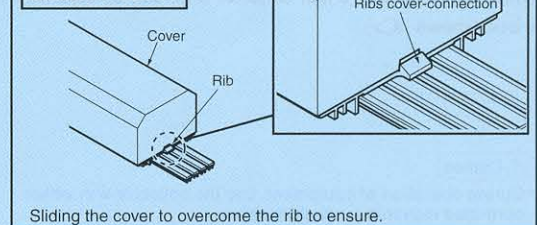
Use fastening band
(Width: 8mm following thickness: 1.7mm)



1.Connect the power wire

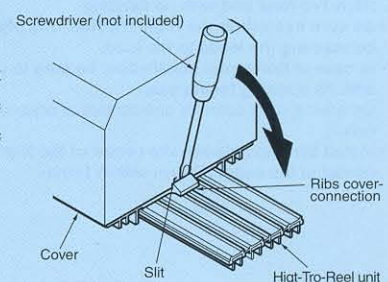


3.Close cover



Removing the cover

Insert the screwdriver (not included) into the slit of the cover, Slide the cover in the lifting the cover.



Caution

- 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.

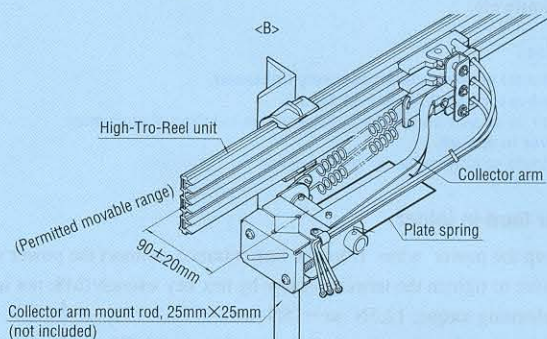
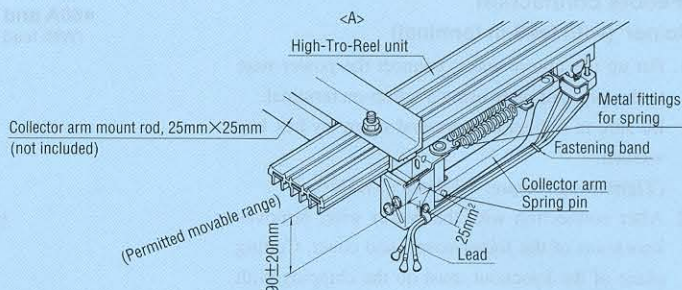
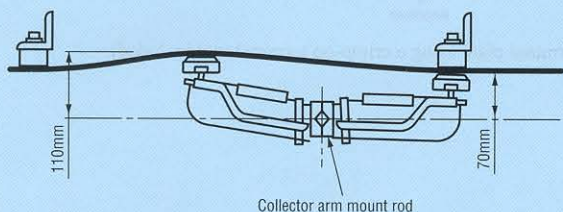
10. How to mount the collector arm

■ Standard installation

Set the distance between the High-Tro-Reel conductor sliding surface and the collector arm mount rod to $90 \pm 20\text{mm}$. (Set the distance to 90mm at the hanger bracket section.) (shown <A>)

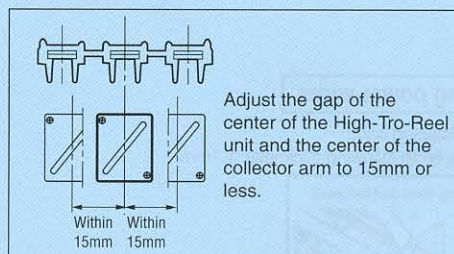
- **Use range of movable** When collector arm mount rod set up a reference position, the operating range from 70mm ~ 110mm of collector arm set up to be twisting.

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.



■ Horizontal installation with its opening facing

In case of High-Tro-Reel opening facing horizontal, use the collector arm with its opening facing horizontal. 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)

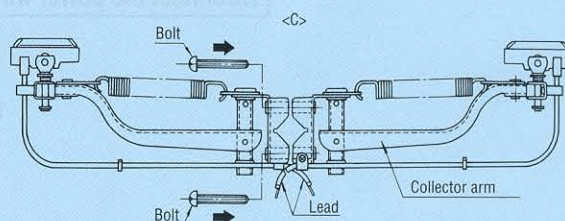


■ Assembly in tandem configuration

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>)

⚠ 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 with its opening facing side.
- Otherwise, poor collector arm contact or separation from wires may occur.
- Install the gap between the center of the High-Tro-reel and the center of the collector arm within 15mm.



11. Collector shoe replacement (Please refer 4. even to page 20 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).

