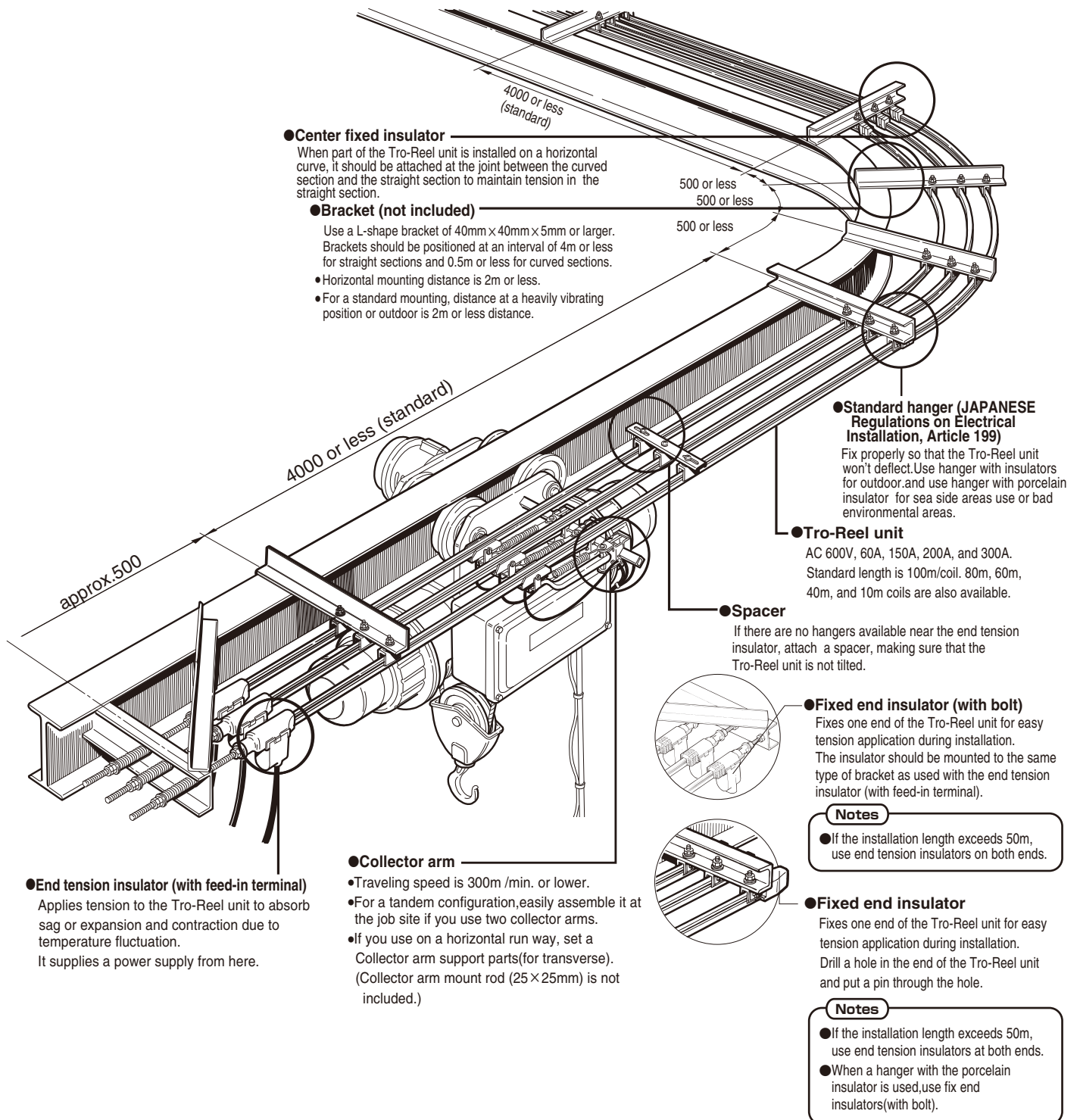
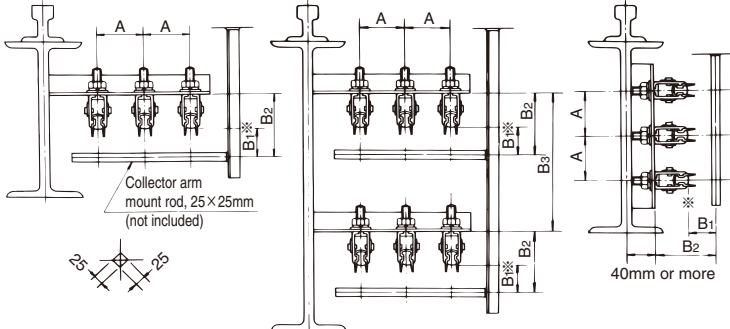




Standard Installation Procedures for Tro-Reel

The following drawing shows the dimensions for mounting I -beams and other building structures, support brackets(not included) and Tro-Reel unit to I -beams and other building structure.

●Standard installation ●Two-stage installation ●Horizontal installation



The asterisk (*) indicates the conductor sliding surface.

Installation size (mm)

Size Hanger types	A size		B size		
	Minimum	Standard	B1	B2	B3
Standard hanger	75	100	95	135	295
Hanger with insulator				160	320

Note: The B3 size is applied for a L-shape bracket of 40mm × 40mm × 5mm.

Installation Procedures for Tro-Reel unit and hanger supporting distance

Tro-Reel unit mounting method and hanger intervals.

Hanger intervals	Standard installation	4m or less
	Horizontal installation	2m or less

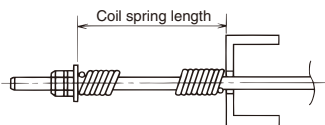
Caution

Do not step on or bang the Tro-Reel unit on the ground to straighten.

The insulating sheath of Tro-Reel unit is made of rigid PVC, which becomes fragile and stiffen under low temperatures. As this may damage the unit. Use a straightener to straighten the coils before installation. Failure to do so may cause poor collector arm contact or separation from wires.

Critical six points on installation

1 Sufficient tension must be applied to the end tension insulator.



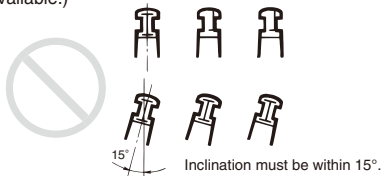
● Ambient temperature during installation and coil spring tightening length

Ambient temperature	Coil spring length
10°C or lower	115mm
11-40°C	125mm

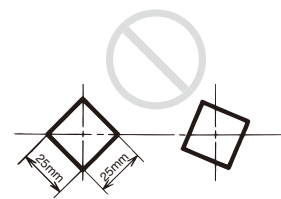
If tension is not sufficient, the collector arm may be derailed or fallen.

2 Avoid tilting or twisting in the Tro-Reel unit.

If the Tro-Reel unit is tilted, the collector arm will separate from the wires. Be sure to correct any tilting found during installation. (A spacer to prevent tilting and twisting is also available.)

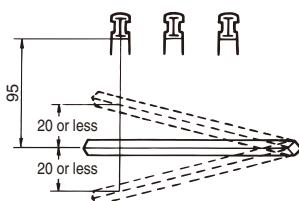


3 The collector arm mount rod must be properly mounted without any twisting.

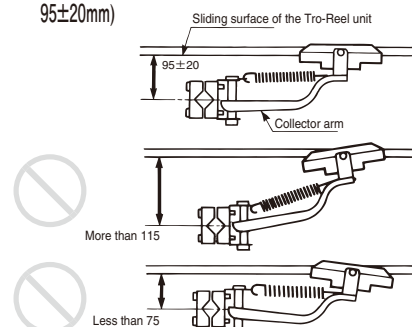


4 Be sure to check for tilt in the collector arm mount rod.

Be sure that arm swing is within 20mm, even during travel.

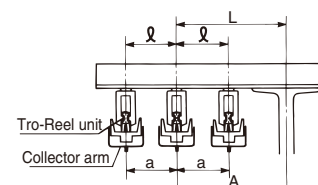


5 Set the distance between the collector arm mount rod and the sliding surface of the Tro-Reel unit to 95mm.(Central value of the collector arm permitted movable range 95±20mm)



6 The Tro-Reel unit must be aligned with the center of the collector arm.

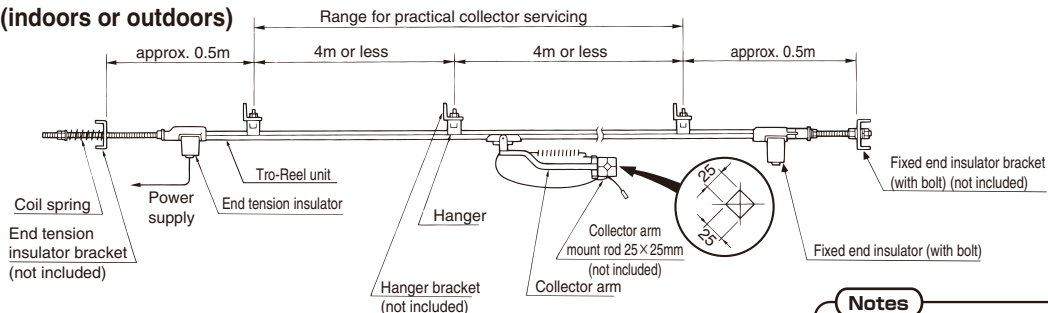
Set the length of "L" and "A" as well as "a" and "a" to the same length.



Components for straight section installation

Line length less than 50m(Use an end tension insulator on only one end.)

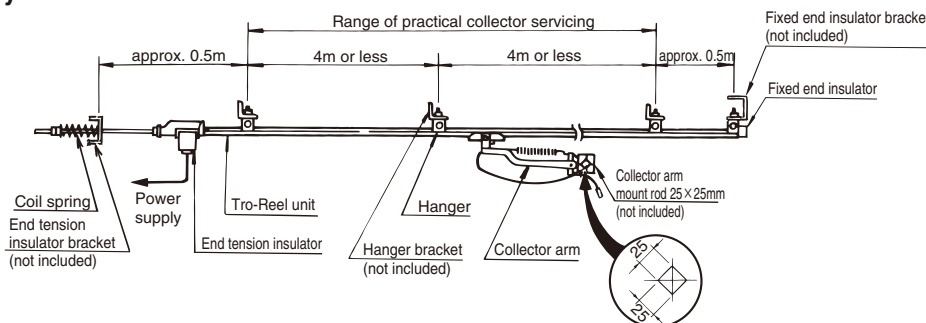
Both area (indoors or outdoors)



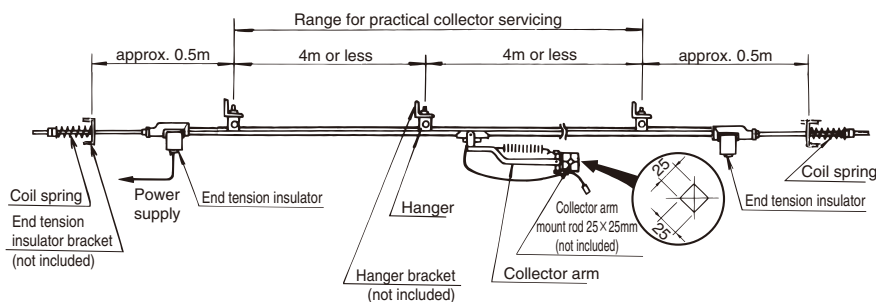
Notes

- When using the Tro-Reel unit outdoors, use end tension insulators (with bolt) on both ends.

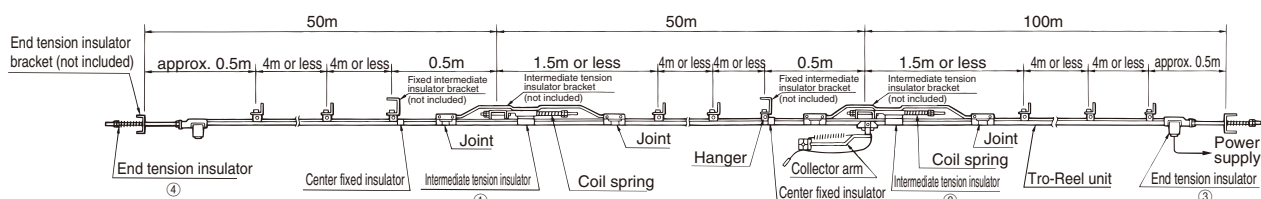
Indoor area only



Line length of 50-100m (Use end tension insulators on both ends.)



Line length of 100m or longer (Use end tension insulator and intermediate tension insulator.)



For brackets adjacent to Center fixed ediate insulators, use a shape bracket 75mm×40mm×5mm or larger.

Notes

- If using an intermediate tension insulator, a fixed intermediate insulator is also necessary.
- Installation (tension application) procedures (tension application) should be performed in numerical order: ①, ②, ③ and ④.

Components for curved section installation

When installing the Tro-Reel on curved sections, tension must not be applied to curved sections. Therefore, for installation on curved sections, the line must have some straight sections where center fixed insulators, end tension insulators, or intermediate tension insulators can be installed for tension application.

Notes

Please follow the instructions below to prevent poor collector arm contact and separation from wires:

- Be sure to attach center fixed insulators at the joint between the curved section and the straight section to maintain tension in the straight section.
- Hangers should be positioned at an interval of 0.5m or less for curved sections and 4m or less for straight sections. but the place where the vibration is intense, and outdoor use, Hangers should be positioned at interval of 2m or less for straight sections.
- If using hangers with insulator, be sure to use two of them in places where center fixed insulators are mounted.
- Do not position joints in curved sections.
- Power must be supplied to the Tro-Reel unit in straight sections.

Minimum curve radius

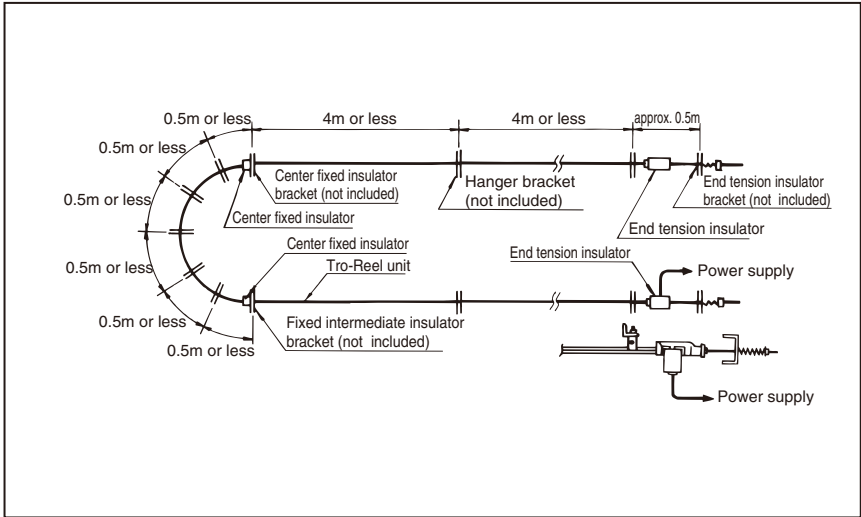
Rated current of collector arm	Minimum curve radius
30A	800mm
60A	1200mm
100A	2400mm

Hanger interval

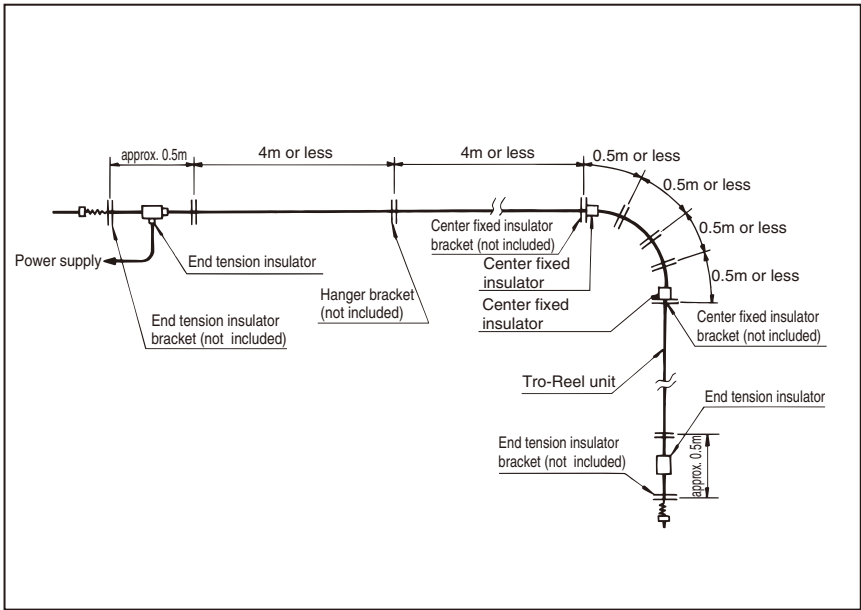
Hanger interval	curved section	0.5m or less
	straight section	4m or less case of the outdoor areas and areas exposed to heavy vibration, 2m or less

For brackets adjacent to center fixed insulators, use a □ - shape bracket 75mm × 40mm × 5mm or larger. Failure to do so may cause poor collector arm contact or separation from wires.

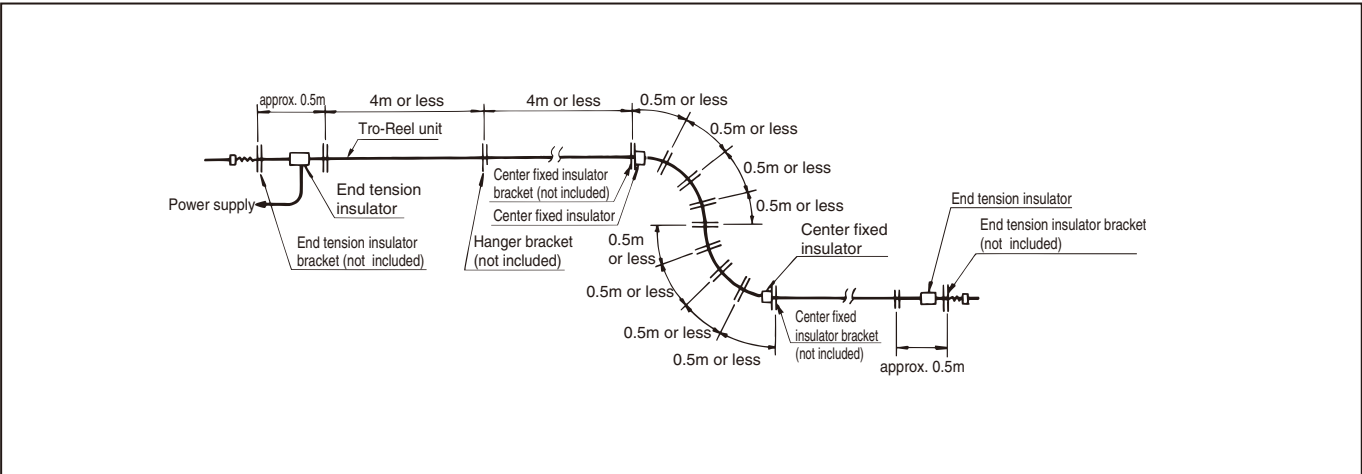
U-shaped line



L-shaped line

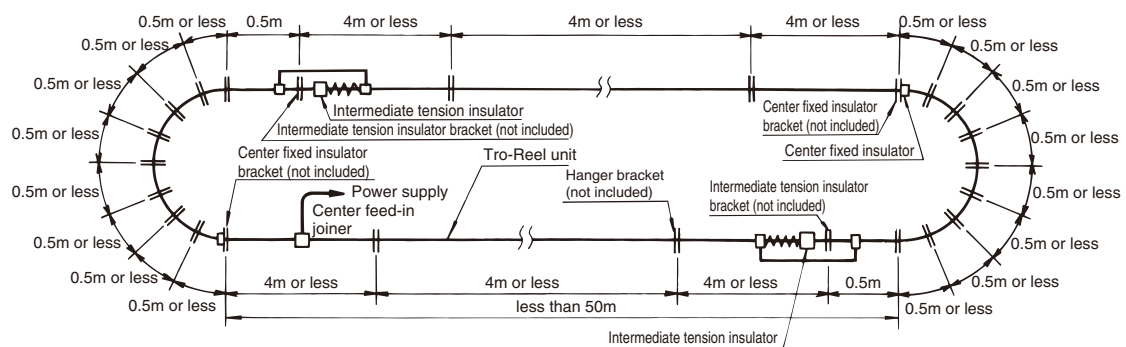


S-shaped line



Endless line

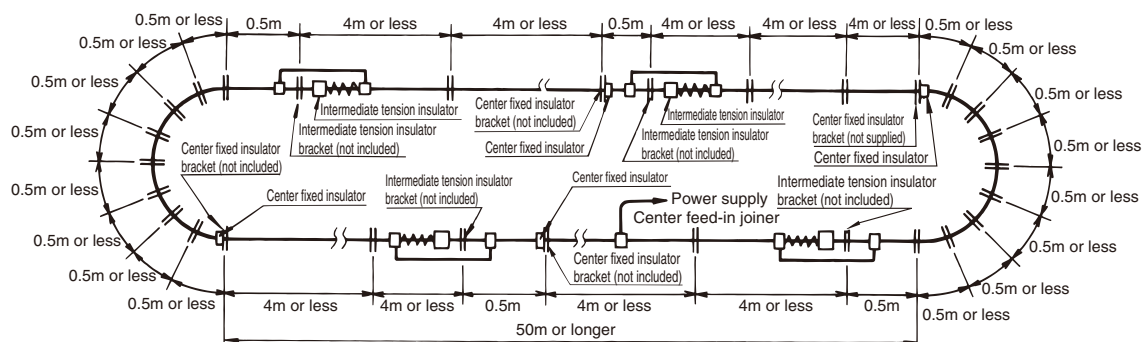
(1) Straight line of less than 50m



Notes

- If using a intermediate tension insulator, a center fixed insulator is also necessary.

(2) Straight line of 50m or longer Intermediate tension insulators must be positioned at 50m intervals.



Notes

- If using a intermediate tension insulator, a center fixed insulator is also necessary.

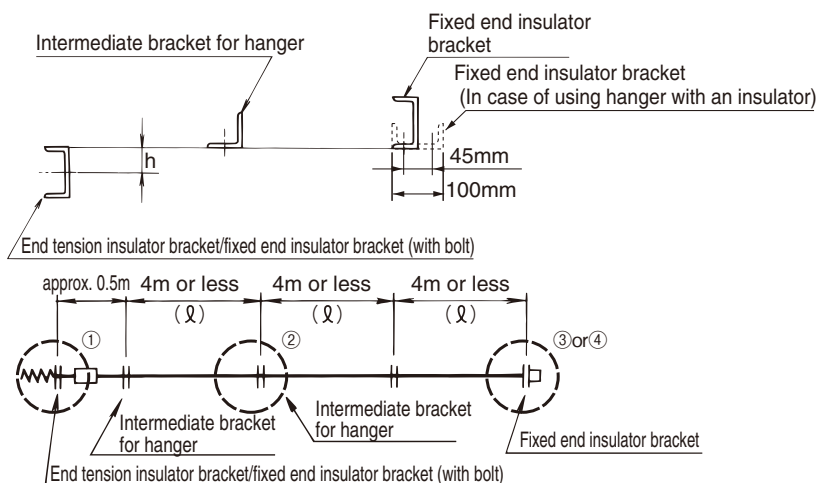
Bracket dimension and installation position

Make sure to have enough brackets for the entire length of the line.
two kinds of brackets are required: end bracket and intermediate bracket.

Notes

Since brackets are not included, it is necessary to prepare them before installation.

Straight installation



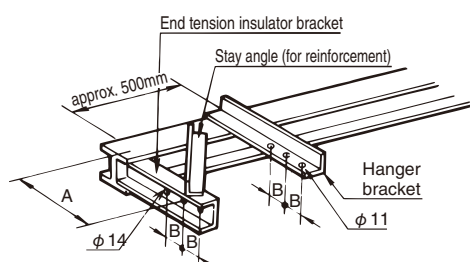
Hanger types	h
Standard hanger	32mm
Hanger with insulator	57mm

Type and use of bracket	Angle size	A size	B size	
			Minimum	Standard
For hanger	L -40 × 40 × 5	250~300mm	75mm	100mm
For end tension insulator	C -75 × 40 × 5			
For fixed end insulator				
For fixed end insulator(with bolt)				
For fixed end insulator (In case of using hanger with an insulator)	C -100 × 50 × 5			

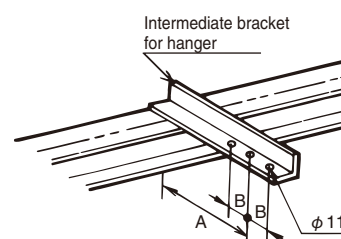
Notes

- If using brackets other than specified above, use brackets of the same or superior strength.
Failure to do so may cause damage due to falling of equipment.
- When mounting end tension insulators, attach an intermediate bracket 500mm away from the end bracket.
Failure to do so may cause poor collector arm contact.
- End brackets must be reinforced with proper stay angles.
Failure to do so may cause damage due to falling of equipment.

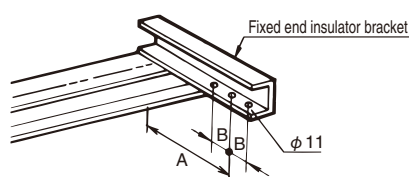
① End tension insulator section/fixed end insulator section (with bolt)



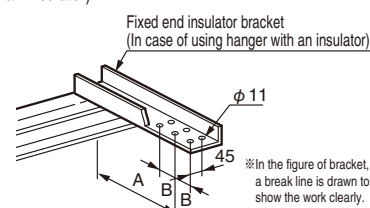
② Standard hanger section



③ Fixed end insulator section



④ Fixed end insulator section (In case of using hanger with an insulator)

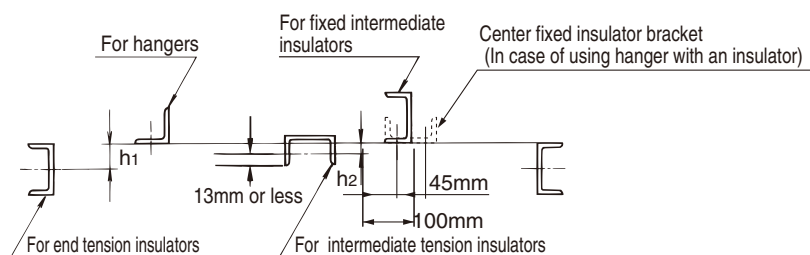


※ In the figure of bracket, a break line is drawn to show the work clearly.

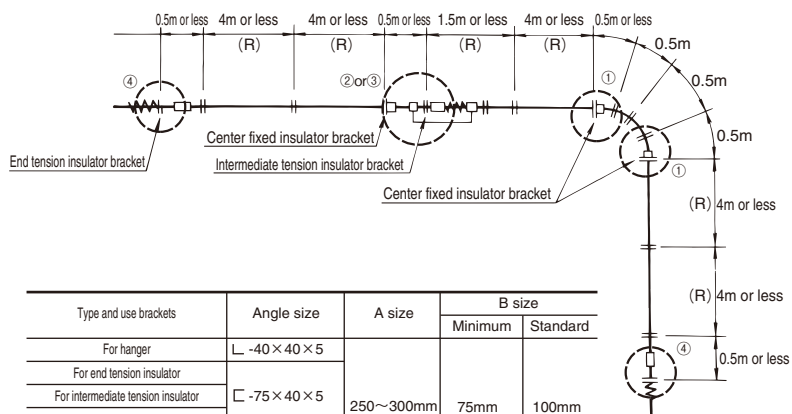
Notes

- Mount the fixed end insulator brackets (for using a hanger with an insulator) of C-100×50×5 size in the direction as shown in the figure.

Curve installation



Hanger types	h ₁	h ₂
Standard hanger	32mm	8mm
Hanger with insulator	57mm	33mm

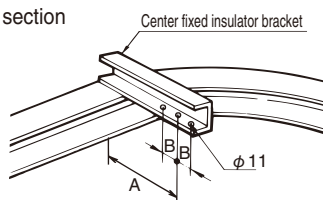


Type and use brackets	Angle size	A size	B size	
			Minimum	Standard
For hanger	L -40 × 40 × 5	250~300mm	75mm	100mm
For end tension insulator	C -75 × 40 × 5			
For intermediate tension insulator				
For center fixed insulator				
For intermediate tension insulator (In case of using hanger with an insulator)				
	C-100 × 50 × 5			

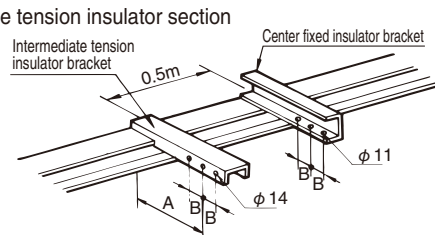
Notes

- If using brackets other than specified above, use brackets of the same or superior strength. Failure to do so may cause damage due to falling of equipment.
- When mounting end tension insulators, attach an intermediate bracket 500mm away from the end bracket. Failure to do so may cause poor collector arm contact.
- End brackets must be reinforced with proper stay angles (reinforcing structure). Failure to do so may cause damage due to falling of equipment.

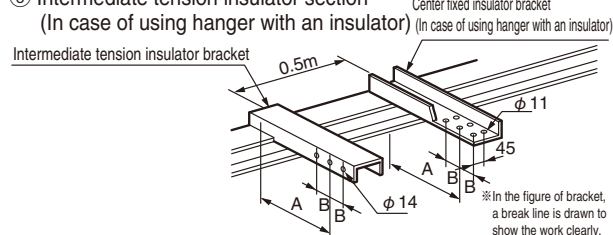
① Center fixed insulator section



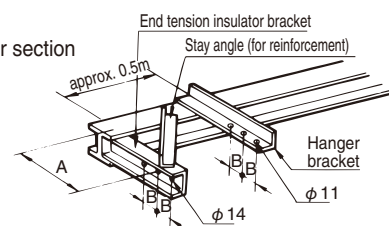
② Intermediate tension insulator section



③ Intermediate tension insulator section



④ End tension insulator section

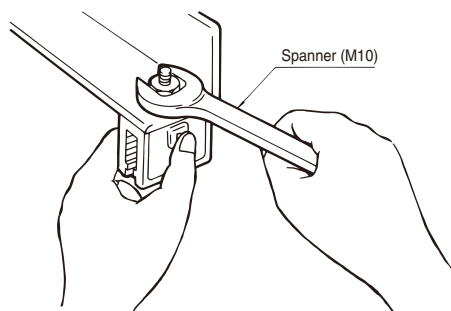


Notes

- Mount the fixed end insulator brackets (for using a hanger with an insulator) of C -100×50×5 size in the direction as shown in the figure.

Basic procedures for straight installation

1 Mounting hangers on the bracket



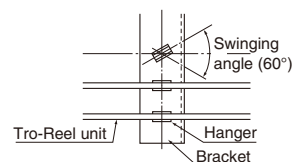
- Hangers should be mounted on the bracket beforehand on the ground.



Notes

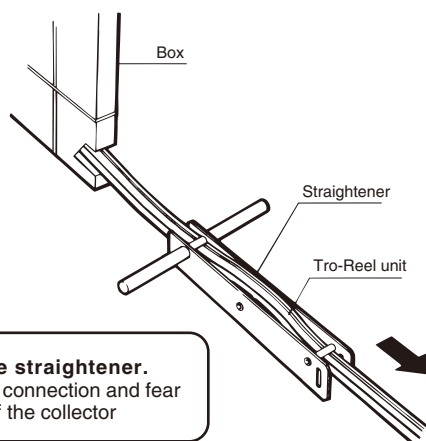
- **Brackets must be mounted parallel to the line.**
Failure to do so may cause poor collector arm contact or separation from wires.

- A hanger can rotate on its axis. Confirm rotate angle on its axis (Max 30 degrees) after mounting it to a racket.



2 Unpacking and cutting the Tro-Reel unit.

Stand the Tro-Reel box upright and pull out the unit out from the bottom of the box. Use the straightener to remove curl in the coil and prevent unit twisting.



Notes

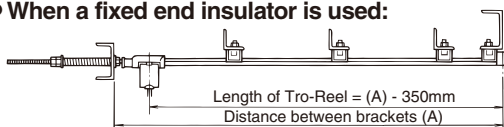
- **Please use the straightener.**
There are a bad connection and fear of the dropout of the collector

■ Cutting the unit to the length of the line.

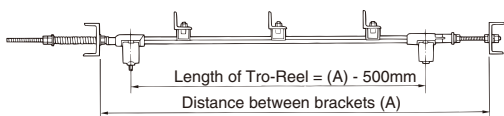
Measure the distance between the brackets at both ends (the range of practical collector servicing + 1m) and cut the unit to the length.

■ One-end tension system

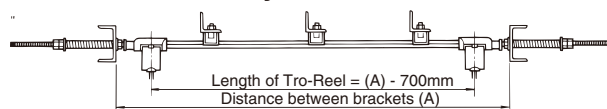
- **When a fixed end insulator is used:**



- **When a fixed end insulator (with bolt) is used:**



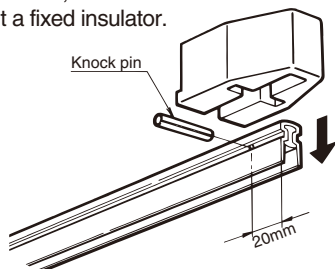
■ Both-end tension system



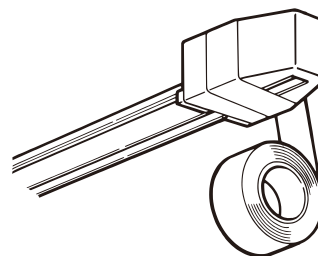
3 Mounting the fixed end fixture (for less than 50m)

● **When a fixed end insulator is used:**

1. Drill a $\phi 5\text{mm}$ hole 20mm away from the end of the Tro-Reel unit, drive in a knock pin, and mount a fixed insulator.



2. Use insulation tape on the fixed insulator to prevent damage due to falling of equipment.



● **When a fixed end insulator (with bolt) is used:**

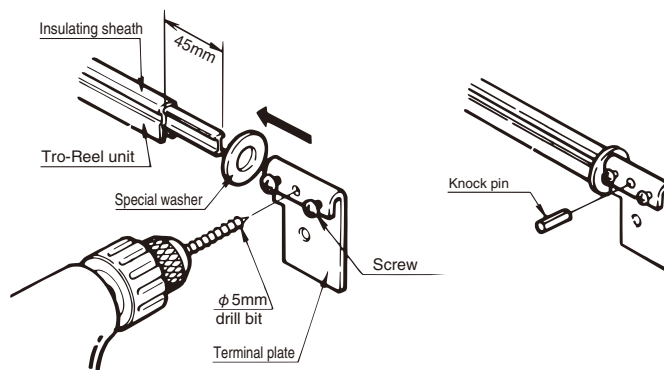
Mount the insulator the same way as **4-6** (Mounting an end tension insulator).

4 Mounting the end tension insulator terminal plate to the Tro-Reel unit

1. Cut 45mm off of the end of the Tro-Reel insulating sheath. Attach the special washer and terminal plate. Tighten the terminal plate screws.
2. Drill a $\phi 5\text{mm}$ hole into the Tro-Reel conductor and drive in a knock pin.

Notes

- **Be sure to mount the special washer.**
Failure to do so may cause damage due to falling of equipment.

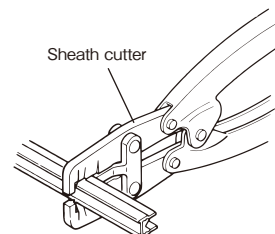


- There is a sheath cutter for Tro-Reel that enables smooth cutting of insulation sheath. (For use of 60A, 150A and 200A units)

Notes

- The sheath cutter cannot be used for 300A unit.

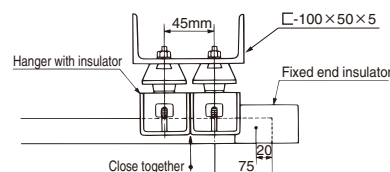
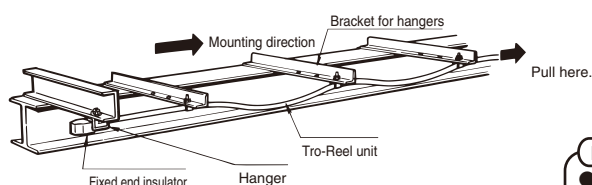
- Attach insulators after the Tro-Reel unit is mounted on the ceiling. Attaching insulators beforehand makes it difficult to lift the unit.



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

Temporarily mount the unit on the hangers in order starting at the end. Pull the unit with a rope, and make sure that it doesn't sag.

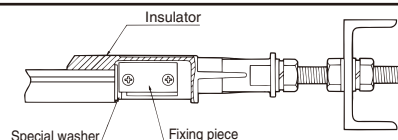
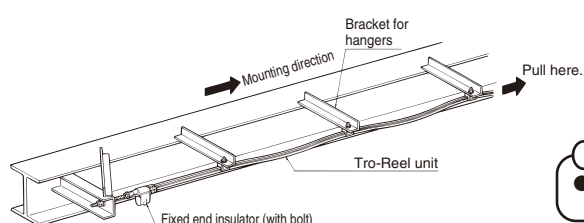
● When a fixed end insulator is used:



Notes

- When using hangers with insulators, be sure to mount two of them with close together. Failure to do so may cause damage due to falling of Tro-Reel unit by the damage of the hangers with insulators.

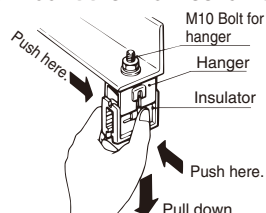
● When a fixed end insulator (with bolt) is used:



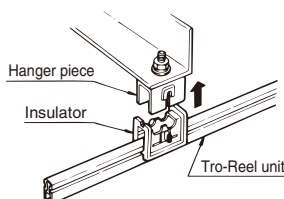
Notes

- Be sure to mount the special washer. Failure to do so may cause damage due to falling of equipment.

■ How to mount the Tro-Reel unit

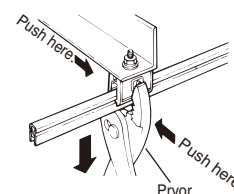


1. Remove the insulator from the hanger.



2. Fit the removed insulator into the Tro-Reel unit and push them securely into the hanger (as before). Failure to do so may cause damage due to falling of equipment.

■ How to remove the Tro-Reel unit



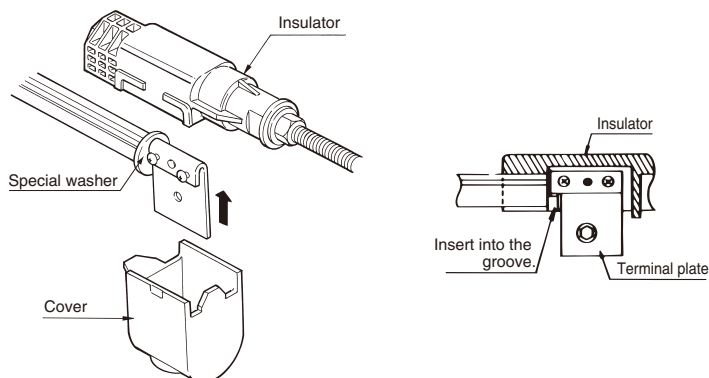
Grip the insulator buttons with pliers and pull it down.

6 Mounting an end tension insulator to a terminal plate

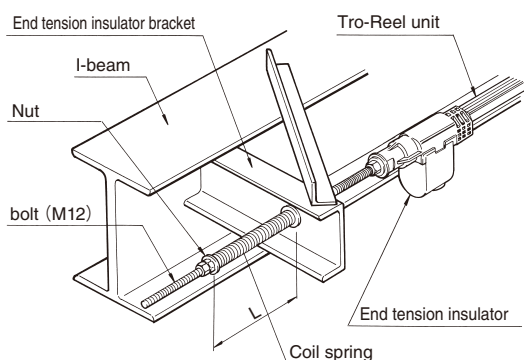
1. Insert the terminal plate into the groove of insulator.
2. Mount the cover to the insulator.

Notes

- Be sure to mount the special washer. Failure to do so may cause damage of the insulator.



7 Tightening the Tro-Reel unit



Pull the Tro-Reel unit tight and tighten the end tension insulator nut snugly.

● Length of coil spring

Ambient temperature during installation	L	Tension (N)
10°C or lower	115mm	2254
11~40°C	125mm	1568

Notes

- After completing installation, run the hoist or crane ten or more times and reconfirm the spring tightening length. Failure to do so may cause poor collector arm contact or separation from wires.
- After installation, let the hoist and crane travel for more than 10 times and recheck the tightness of spring. If this job is not properly done, bad contact or detailing of collector arm may occur.

8 Feeding power to the Tro-Reel

Power can be fed from the line end via an end tension insulator.

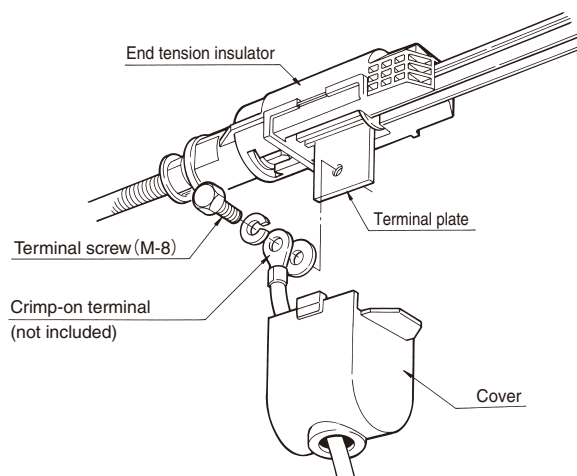
Connect the power wire to the terminal plate using a crimp-on terminal.



Caution

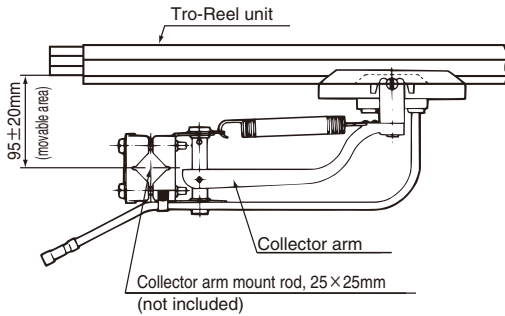
Terminal screws must be securely tightened. Failure to do so may cause fire.

Applicable crimp-on terminals: $\leq 50\text{mm}^2$ (60A, 150A)
 $\leq 100\text{mm}^2$ (200A)
 $\leq 150\text{mm}^2$ or $100\text{mm}^2 \times$ (300A)
 Crimp-on terminals are not included.



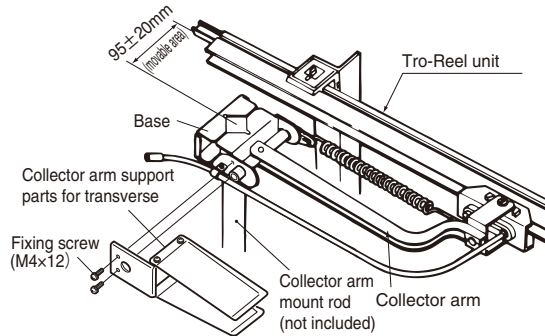
9 How to mount collector arms

Standard installation



- Set the distance from the bottom surface of the Tro-reel conductor to the center of the collector arm mount rod (not included) to 95mm (in the center of the conductor cleaner mounting tolerance movable range 95±20mm)
- Arm must be attached parallel to the Tro-Reel unit without any twisting.

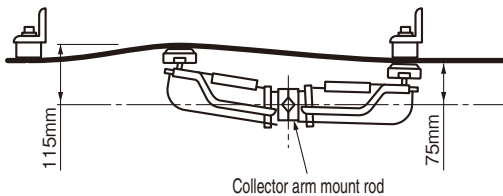
Horizontal installation



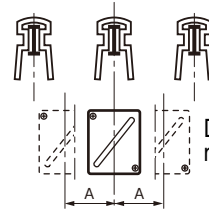
- As shown in a figure, mounted collector arm support parts for transverse on base of the collector arm.
- Tightening torque of fixing screws : $0.98 \text{ N} \cdot \text{m} \sim 1.32 \text{ N} \cdot \text{m}$
- Set the distance from the bottom surface of the Tro-reel conductor to the center of the collector arm mount rod (not included) to 95mm (in the center of the conductor cleaner mounting tolerance movable range 95±20mm)

Use range of movable

When collector arm mount rod set up a reference position, the operating range from 75mm ~ 115mm of collector arm set up to be twisting. Adjust the arm mount rod between the High-Tro-Reel unit to become 115mm or less and 75mm or more at the center between hangers, and 75mm or more at the bracket.



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



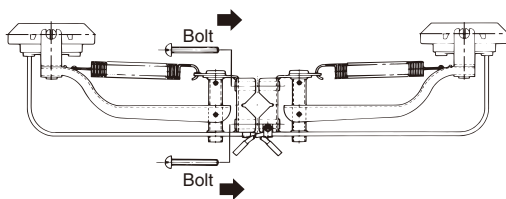
Dimension A of permitted movable range

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

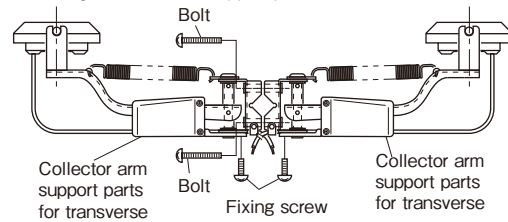
Assembly in tandem configuration

- Two collector arms should be used together (tandem type) for circuit separation and line switching, and especially in applications in which it is imperative that collector arms not be separated from wires. Tandem collector arms cannot be used horizontally. For horizontal installations, use a single-type collector arm.



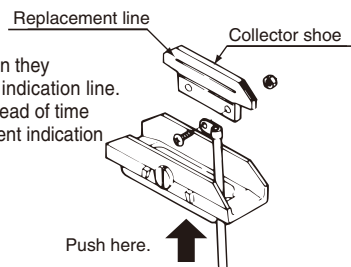
Horizontal installation with its opening facing into tandem-type

- Mounting the horizontal support parts in both the collector arms



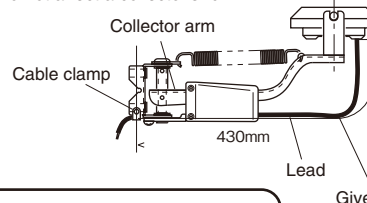
Collector shoe replacement

- Collector shoes should be replaced when they partially wear down to the replacement indication line. Please exchange the collector shoes ahead of time when it will be worn out to the replacement indication line by the time of the next check.



Wire clamp

- Give slack to a lead. (Lead is a fixed position, 430mm from the base of collector)
- Do not affect a collector's run.



Give slack to a lead.

Notes

- After installation, be sure that the hanger, the Tro-Reel unit and the collector arm are level. Failure to do so may cause poor collector arm contact.
- When you want to use the collector arms with centerring horizontally, please contact Panasonic electric Works, Ltd.
- In a horizontal ways case, be sure to use the horizontal support parts. Failure, there is a risk of derailment or loose arms collector.
- Distance to the center of the collector arm from the center of the duct

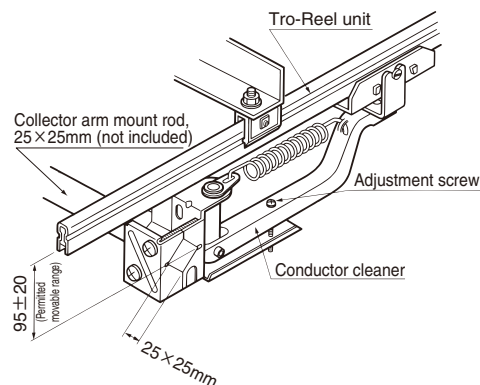
Installation Procedures for other parts

10 Conductor cleaner installation

- Set the distance from the bottom surface of the Tro-reel conductor to the center of the collector arm mount rod (not included) to 95mm (in the center of the conductor cleaner mounting tolerance movable range 95 ± 20 mm)

Notes

- The conductor cleaner must be mounted parallel to the Tro-Reel unit without any twisting.
- When cleaning is complete, either remove the conductor cleaner, or tighten the adjustment screw so that the brush doesn't touch the conductor.



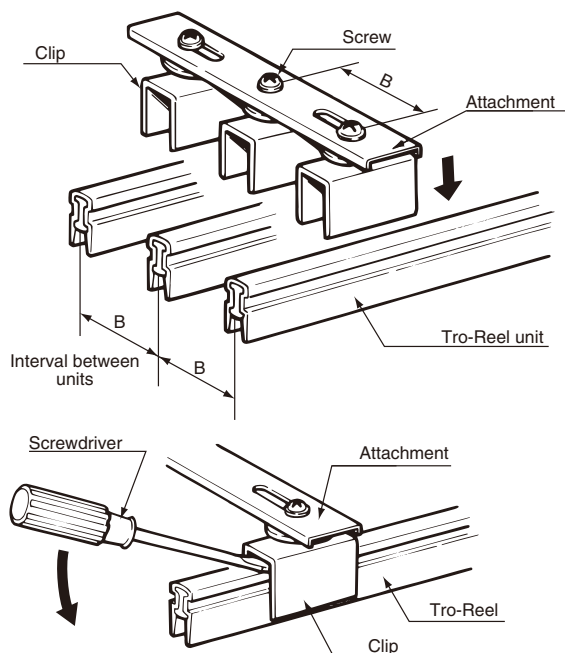
■ Spacer To straighten twists in the Tro-Reel unit.

● How to install a spacer

- Loosen clip screws and align B with the Tro-Reel unit installation intervals.
- Snap the clips to the Tro-Reel units.
- Make sure the screws are tightened securely. Failure to do so may cause damage due to falling of equipment.

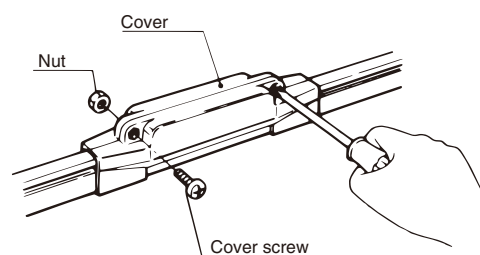
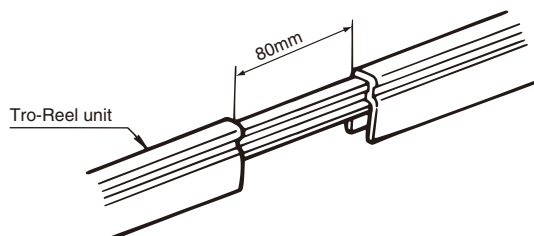
● How to remove a spacer

Insert a flat tip screwdriver between the clip and the Tro-Reel and try down with the screwdriver.



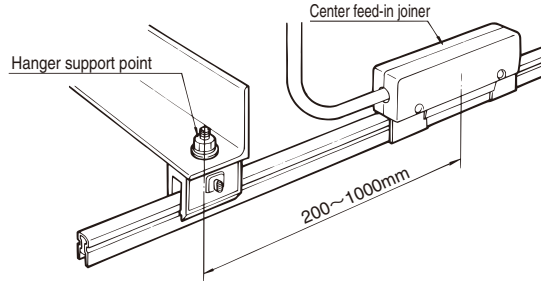
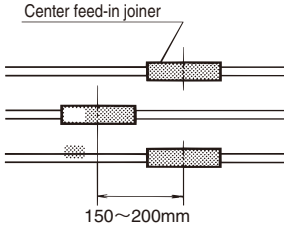
■ Sheath repair cover

- Cut 80mm off of each end of the insulating sheath.
- Fit on a Sheath repair cover .
For indoor and outdoor use.



Center feed-in joiner To feed power from an intermediate point on a line or from a joint between Tro-Reel units.

Offsetting mounting positions makes installation easier.



Caution

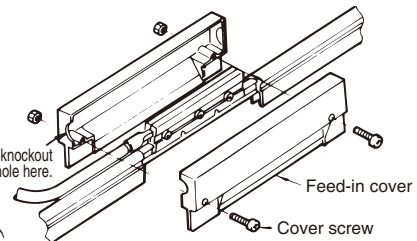
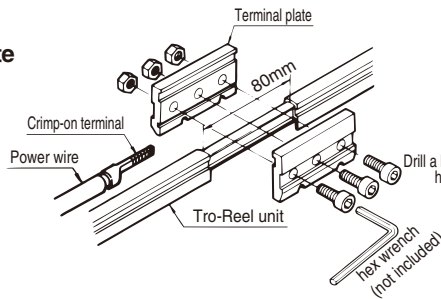
To prevent terminal screws from loosening due to vibration, a center feed-in joiner must be mounted 200 to 1000mm away from the hanger support point. Failure to do so may cause fire.

< 60A · 150A >

(Wire units must be 50mm² or less)

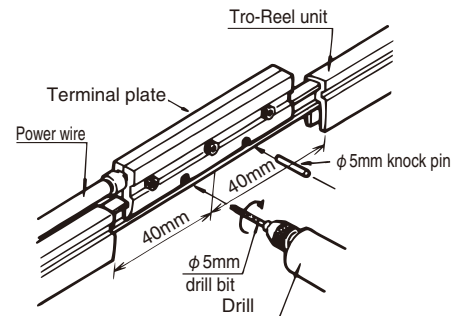
● When power is fed from an intermediate point on a line

1. Cut 80mm off of the insulating sheath.
2. Sandwich the conductor and the power wire crimp-on terminal between the terminal plates, and tighten three screws with a hex wrench [Setting Torque 6.9~7.9N · m]. Failure to do so may cause fire.
3. Fit on a cover.



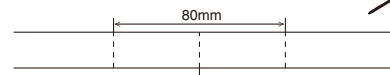
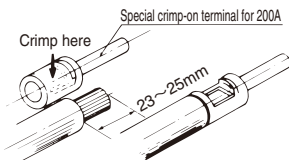
● When connecting units and feeding power simultaneously

1. Cut 40mm off of each end of the insulating sheath.
2. Sandwich the conductor and the power wire crimp-on terminal between the terminal plates, and tighten three screws with a hex wrench [Setting Torque 6.9~7.9N · m]. Failure to do so may cause fire.
3. Connect the conductors with the terminal plates and drill $\phi 5$ mm holes in the conductors. Insert knock pins through the holes.
4. Fit on a cover.



< 200A > (applicable wire: 60-100mm²)

Use the special crimp-on terminal (included).



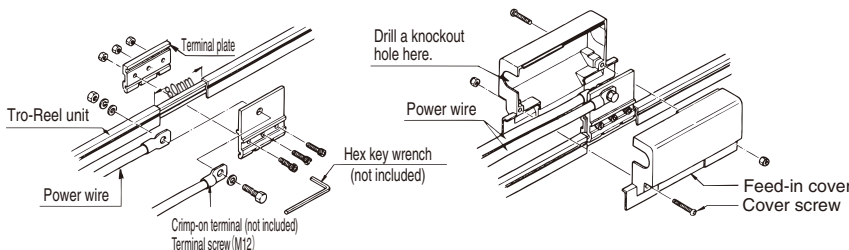
Making additional cuts midway makes it easier to peel off the insulating sheath.

Notes

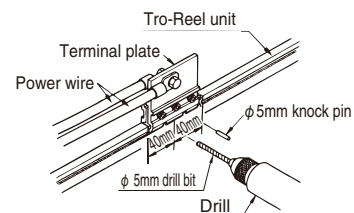
- When power is to be fed from the joint of Tro-Reel units, cut 40mm off of each end of the insulating sheath and connect them to the terminal plates. Drill a $\phi 5$ mm hole in the conductor and insert a knock pin through the hole. Failure to do so may cause damage due to falling of equipment.

< 300A > (applicable wire of 150mm² or less, or 100mm² × 2)

■ When power is fed from an intermediate point on a line.



■ When connecting units and feeding power simultaneously



Caution

The terminal screws must be securely tightened. (tightening torque 6.9~7.9N · m)
Failure to do so may cause fire.

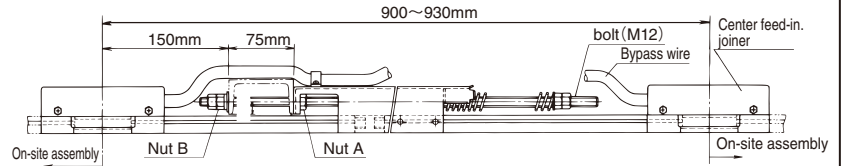
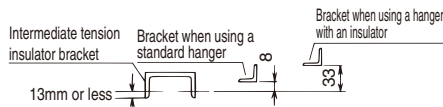
Notes

- Be sure to use a file of $\phi 5$ size.
- The $\phi 5$ mm knock pins must be securely fitted. Failure to do so may cause damage due to falling of equipment.

Intermediate tension insulator Applies tension to a straight line of more than 100m or to an endless line, and absorbs expansion and contraction in the Tro-Reel unit due to temperature fluctuation.

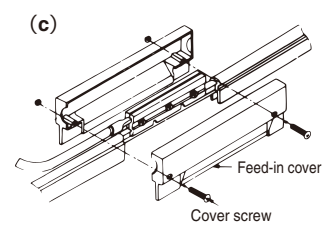
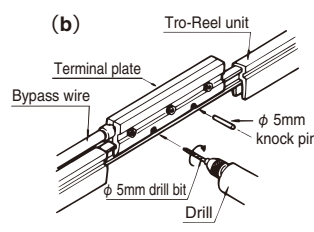
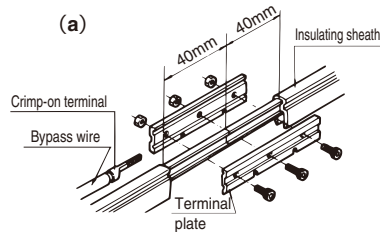
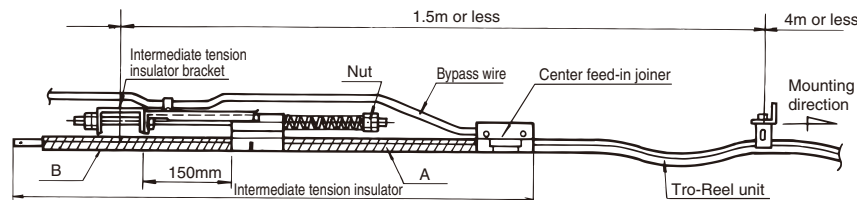
● Mounting an insulator on a bracket

Mount the intermediate tension insulator to the intermediate tension insulator bracket using nuts A and B.



● Connection to Tro-Reel <60A and 150A and 200A>

1. Loosen the intermediate tension insulator nuts. Set the distance between the intermediate tension insulator and the intermediate tension insulator bracket to 150mm.
2. Connect the intermediate tension insulator A and the Tro-Reel unit with a center feed-in joiner.



For steps (a), (b) and (c), please follow the center feed-in joiner mounting procedure in Section 3.

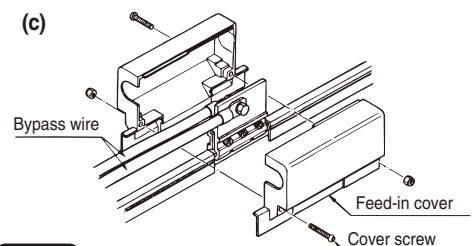
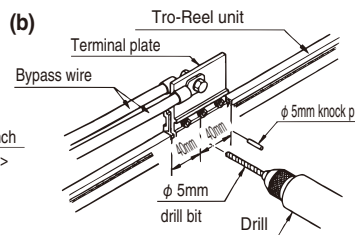
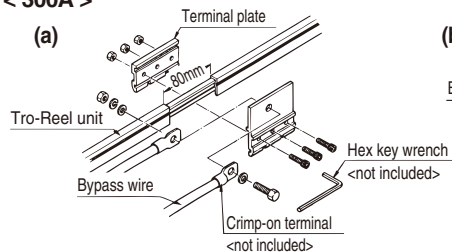
3. Temporarily fix the Tro-Reel unit to the hangers in order starting from the intermediate tension insulator side.

Notes

- Be sure to use a file of $\phi 5$ size.

Terminal screws and $\phi 5$ mm knock pins must be securely tightened. (tightening torque 6.9~7.9N·m)
Failure to do so may cause poor collector arm contact or damage due to falling of equipment.

< 300A >



Caution

Terminal screws must be securely tightened.
Failure to do so may cause fire.

Notes

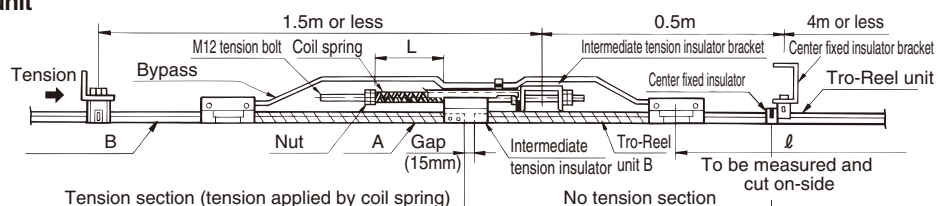
- Be sure to use a file of $\phi 5$ size.

- The $\phi 5$ mm knock pins must be securely fitted.

Failure to do so may cause damage due to falling of equipment.

● Applying tension to the Tro-Reel unit

1. To take up the sag of the Tro-Reel unit, tighten the tension bolt nut until the coil spring is the length indicated below.
2. Please install a center fixed insulator in being making the space become to 15mm $\pm$ 5mm.



● Coil spring length

Ambient temperature during installation	L
10°C or lower	115mm
11~40°C	125mm

Notes

- Set the gap to 15mm $\pm$ 5mm regardless of ambient temperature.

● If using intermediate tension insulator, a center fixed insulator is also necessary.
Failure to do so may cause poor collector arm contact or separation from wires.

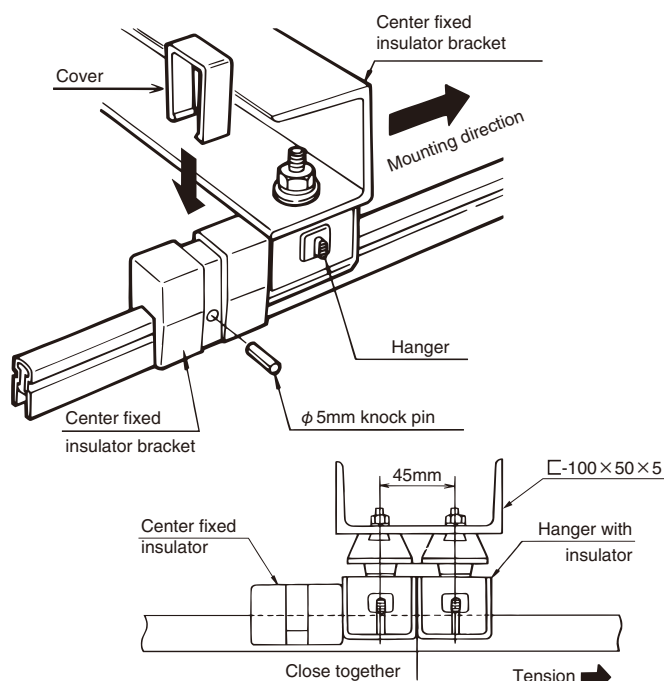
Center fixed insulator

This part is to be used in horizontal curves, and should be attached at the joint between straight and curved sections to apply tension in the straight section.

1. Mount center fixed insulators to hangers (shown above).
2. Attach the insulator to the Tro-Reel unit. Drill a $\phi 5\text{mm}$ hole. Insert a knock pin and fit on the cover.

Notes

- When using hangers with insulators, be sure to mount two of them.
Failure to do so may cause damage due to falling of equipment.
- Be sure to use a file of $\phi 5$ size.
Otherwise, falling may occur.
- In the case of a porcelain insulator hanger with it, Please contact Panasonic Electric Works Co., Ltd.
- Mount the cover by all means.
Failure to do so may cause electric shock.

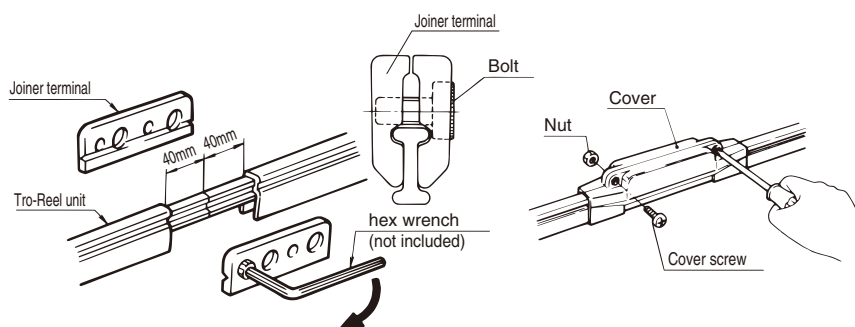


Joiner

To connect Tro-Reel units together.

60A · 150A

1. Cut 40mm off of each end of the insulating sheath.
2. Sandwich the conductor between joiner terminals. Tighten the bolts with a hex wrench tight [Setting Torque 6.9~7.9N·m]. Failure to do so may cause poor collector arm contact or damage due to falling of equipment.
3. Fit on a Sheath repair cover.

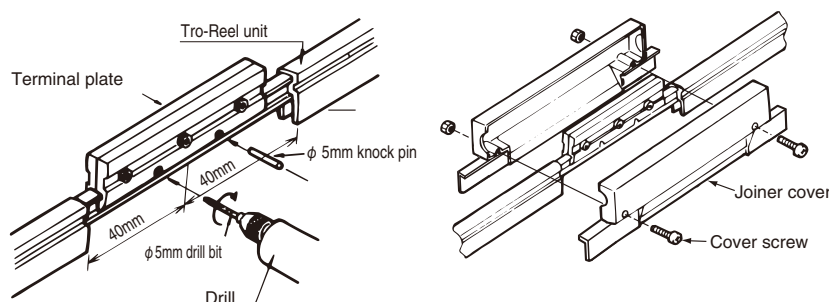


200A and 300A

1. Cut 40mm off of each end of the insulating sheath.
2. Connect the conductors with the terminal plates and drill $\phi 5\text{mm}$ holes in the conductors. Insert knock pins through the holes.
3. Fit on a Sheath repair cover.

Notes

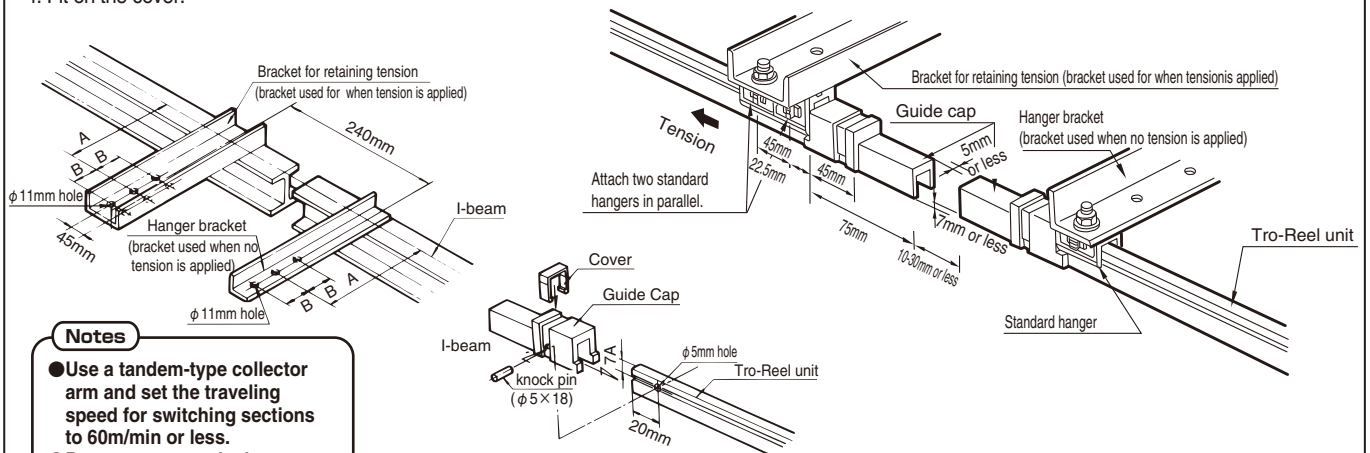
- Be sure to use a file of $\phi 5$ size.
Failure to do so may cause poor collector arm contact or damage due to falling of equipment.



Guide cap To guide collector arms via turntables or traversers.

1. Mount the bracket to an I-beam or other building structure. Distances (A) from the I-beam and the mounting interval are as shown in the right description.
2. Drill a $\phi 5\text{mm}$ hole 20mm away from the end of the Tro-Reel unit. Be sure to use a file of $\phi 5$ size.
3. Place the guide cap and secure it with a knock pin.
4. Fit on the cover.

Type	Angle dimensions for 3P	A size	B size	
			Minimum	Standard
Hanger bracket	L -40×40×5	250~300mm	75mm	100mm
Bracket for retaining tension	□ 100×50×5			

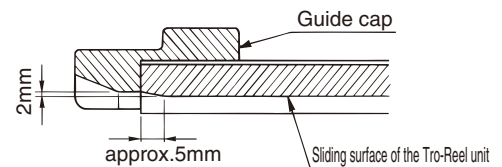


Notes

- Use a tandem-type collector arm and set the traveling speed for switching sections to 60m/min or less.
- Be sure to use only the specified dimensions for each mounting part.
Failure to do so may cause poor collector arm contact or separation from wires.
- In the case using at outdoors, Please contact Panasonic Electric Works Co., Ltd.
- Mount the cover by all means.
Failure to do so may cause electric shock.

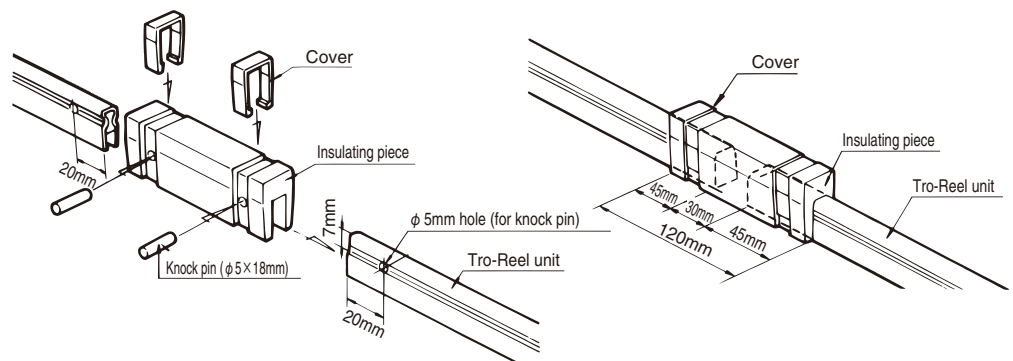
Notes

- <Mounting to 300A Tro-Reel unit>
- Since there is a gap between the guide cap and the sliding surface to the Tro-Reel unit, the end of the Tro-Reel unit must be chamfered as shown right.
Failure may cause bad contact or collector arm derailing.



Insulating piece To Separate circuits electrically.

1. Drill a $\phi 5\text{mm}$ hole 20mm away from each end of the Tro-Reel unit
2. Mount an insulating piece and secure it with a knock pin. Be sure to place a knock pin securely. Failure to do so may cause damage due to falling of equipment.
3. Fit on the cover.



Notes

- Mount the cover by all means.
Failure to do so may cause electric shock.
- <300A>
Since there is a gap between the insulating piece and the sliding surface of the Tro-Reel unit, the end of the Tro-Reel unit must be chamfered as shown at right.
Failure may cause bad contact or collector arm derailing.

