

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

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

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

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

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

## Precautions on installation

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

### Warning

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

### Caution

- **This product is for general indoor use only. Do not use this product for a damp place, a place where corrosive gas is generated or a place where cutting oil is directly splashed.** Electric shock, fire or damage due to equipment falling may occur.
- **Collector shoes use a dry lubrication system. Do not apply any other lubricants to the collector shoes or a unit's conductor surface. poor contact may occur.**
- **Traveling speed must be 200m/min. or less (60m/min. or less in guide caps mounting section). However, further restrictions may be necessary depending on the load and voltage types. for details, please contact Panasonic Corporation,**  
Otherwise, a unit may produce sparks, causing fire, poor contact or separation of collector arms from wires.
- **If products are not used for a long period of time, the unit's conductor surfaces may become oxidized, resulting in poor contact.**  
Clean the conductors before resuming operation and be sure to do periodic inspections to prevent fire or electric shock.
- **During the inspection, wear protective gear such as helmets and gloves. Observe may cause injury .**
- **When mounting the duct to the hanger, stuff a duct into a hanger not to pinch a hand. Observe may cause injury to your fingers.**
- **When remove the duct from the joiners, pull it out while holding the tip of the duct. so that the duct may not jump out from Joyner.**  
Observe, damage to the ducts, may cause injury.
- **When filing the ends of the duct, use protective gear such as glasses.** Otherwise, your finger may be injured.
- **Be sure to remove burrs using file after cutting, drilling.** Observe may cause injury to your fingers.
- **When replacing the current collector arm, Be sure that collector arms are mounted parallel to the duct unit with no twisting.**  
Failure to conform to this table may cause poor collector arm contact or separation from wires.
- **When replacing the collector, be sure to confirm the duct unit phase (R.S.T) before connecting the leads to the load.**  
Failure to do so may cause fire due to sparks.

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

## Precautions on installation

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



### Warning

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



### Caution

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

## ■ Maintenance schedule of High-Tro-Reel unit

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

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

### Maintenance done by the electrical work trader.

At introduction

The 5th year

The 10th year

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

# Trial run · Periodic inspection

Notes

- For using safely, please inspect the system one month after starting regular operation.
- The inspection cycle is mentioned below. However, determine your own inspection cycle based on the actual operating rate and environmental condition.

Notes

<To Maintenance manager>

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

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

A title	Check day	Y	D	M	The check person in charge
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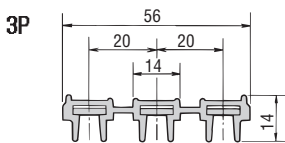
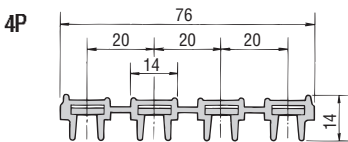
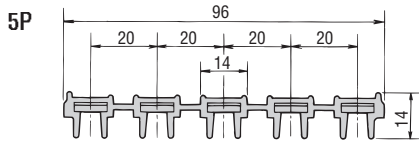
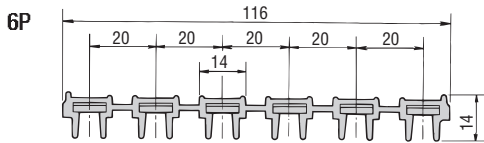
Name	Contents of inspection	Remedy	※	Result	Measures	Inspection cycle (standard)
Trio-Reel unit	Check to see if there is any foreign particles adhering on its sliding surface or if it is seriously contaminated.	Clean with a specific purpose cleaner or waste cloth.				the number of passes through the collector's arm: 1,000,000
	Is there any ark generated protrusion (convex shaped) on its sliding surface?	Remove any protrusion (convex) on the arc scratch using a file. ※ If you can not fix, please replace the duct. scratch using a file.				
	Is there damage and crack at the insulating sheath ?	If the tip of the sheath thickness is 1.2mm or less, please replace insulation	○			
	What is the meander of the duct or swell in the regulations? <Refer to installation manual11> The serpentine tolerance: standard ± 5 mm Tolerance of modulation : standard ± 3mm	Adjust it within specified size. ·Adjust the length of the duct, or Aalign the joiner. ·Adjust the mounting position of the hangers.	○			
	Is there a significant twisting or bending of the duct?	Correct the twisting or bending of the duct. ※ If you can not fix, replace the duct.	○			
	Isn't the unit dislocated from the hanger? <Refer to installation manual4>	Review for any dislocated position on the unit. Correct if any.	○			
	Amount of wear of the conductor is correct? Amount of wear of the conductor :0.5 mm or less	If it exceeds a threshold amount of wear, please replace the main conductor In case of wearing down to the replacement indication line at next inspection, please replace earlier than usual.				
	Don't the insulated sheath and the resin part of collector spinning shaft touch?	Check the amount of wear of the collector and conductor of the duct, replace it if necessary.				
Joiner (Center feed-in joiner)	Are not there the cracks and damaged on a plastic part?	When damage and crack occurred in the fixed end insulator, please change it.				
	Is there any fixed screw loosen?	Retighten.	○			
	Are correct clearance size of between the conductors ? <Refer to installation manual11> ·Or less · 10 °C: 5 ~ 13 mm · 11 °C ~ 40 °C: 3 ~ 10 mm	Adjust the proper clearance size. ·Adjust the length of the duct, or Aalign the joiner. ·Adjust the mounting position of the hangers.	○			
	Are correct joiner mounting size? <Refer to installation manual11> ·Or less · 10 °C: 3003 mm · 11 °C ~ 40 °C: 3000 mm	Adjust it within specified size.	○			
Joiner (Center feed-in joiner)	Are correct cutting size of the duct or the duct end ? <Refer to installation manual8> · The duct cutting Size: size of between Joiner (L) -3mm ※ The same is the case of the Center Feed-in Joiner . ·Cutting Size of the duct end :Remove the insulating sheath 27.5mm from the edge of the duct.	Adjust it within specified size.	○			
	Are insert the conductor and sheath of a duct certainly? <Refer to installation manual5>	Insert the duct to ensure.	○			
Hanger	Did you set up the correct size and mounting hangers? <Refer to installation manual11> ·Straight sections: Max 400 mm ·Curved section : Max 400 mm	Adjust to the proper pitch	○			
	Is there any fixed screw loosen?	Retighten.	○			
Guide cap	Are not there the cracks and damaged on a plastic part?	When damage and crack occurred in the fixedend insulator, please change it.	○			
	Amount of wear of the plastic is correct? Amount of wear of the plastic :0.5 mm or less Exchange of a guide is when the conductor sliding surfaces will become taller than the guide-cap sliding surfaces, the number of times of passage of the collector is 5 million times.	Please exchange, when the amount of wear of a guide cap resin part is 0.5 mm or more.				
	Are correct clearance size of between the guide cap? <Refer to installation manual10> Is the gap between the guide cap size correct? ·Guide cap mutual clearance: 10 ~ 20mm Horizontal: Max 2mm Vertical: Max 2mm Please have the above range, even when loaded to rated load on the trolley at any time.	Adjust it within specified dimension.	○			
	Is there any fixed screw loosen?	Retighten.	○			

Name	Contents of inspection	Remedy	※	Result	Measures	Inspection cycle (standard)
Insulating piece	Is there any cracked or broken on plastic section?	Retighten.	○			the number of passes through the collector's arm: 1,000,000
	Is there any fixed screw loosen?	Adjust the position of Hunger.	○			
	If do not need the signal lines, Are isolated the end of the wire by insulating tape ?	Insulate the end of an electric wire with insulating tape,without disturbing the driving arm collector.	○			
Collector arm	Is the arm installing dimension correct? <Refer to installation manual⑧> Single-type (for mounting rod ), tandem-type (for mounting rod ) The length of to the center of themounting rod from the sliding surface (movable range): 65±10mm tandem-type (for mounting plate ) The length of to themounting plate from the sliding surface (movable range): 65±10mm Single-type (for mounting plate ) The length of to the center of themounting plate from the sliding surface (movable range): 60±10mm	Adjust the collector arm in the reference value.	○			Distance of the collector arm :3000km
	Is the center of a duct and the collector arm on a straight line? <Refer to installation manual⑧> Installation Tolerance: ± 3mm center"	Adjust its mounting dimension.	○			
	Is the collector arm attached in parallel with a duct, so that it cannot twist?	Mount the collector arm in parallel with the duct.	○			
	Is there any serious wear to replacement indication line Is there any serious wear to replacement indication line? or,Does exceed a travel distance of 20,000 km?	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. by the time of the next check.				
	Are there significant contamination,foreign matter adhering , occurred burr in collector?	Remove it with sandpaper or wes.				
	Is there any ark generated protrusion ?	Remove the protrusion (convex) on thearc scratch using a file.				
	Is there wear of plastic part of the collector plastic part?	Adjust the collector arms mounting dimensions. If there is significant wear, please replace the current collector.				
	Does the collector move smoothly?	If the motion is not smooth, replace the current collector and the collector arm.	○			
	Is there any curve or variation on the arm?	Replace the arm if there is curve or variation.	○			
	Is there any chip or broken?	Replace if chip or broken spring pin is found.	○			
	Is the collector shoes pulled by the lead wire?	If the collector shoes pulled, correct to have extra length on lead wire.	○			
	Is there any damage on the sheath of lead wire?	If there is damage, replace the collector shoes.	○			
	Are there any terminal screws or thefixed screws loosen?	Retighten.	○			
Is not there any mistake in the contact terminal position (R, S, T, E, and signal connection line) of a lead?	Make a tightening of the connection terminals	○				
unit	After checking the above construction, to determine the insulation resistance. Working voltage 300V or less 150V or less voltage to ground: Longer than 0.1MΩ 150V or higher voltage to ground: Longer than 0.2MΩ Working voltage 300V or higher, than 0.4MΩ					the number of passes through the collector's arm: 1,000,000

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

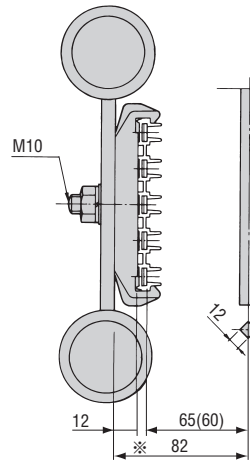
(Install explanation of this product is described with 3P and Installations of 4P and 5P, 6P like in the same way.)

## ● Cross-section

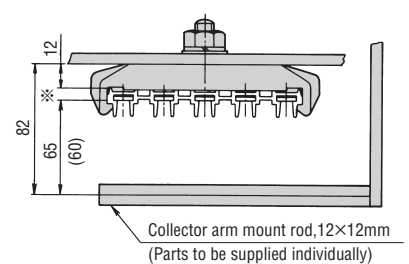


## ● Standard installation (For 5P type)

Normal installation

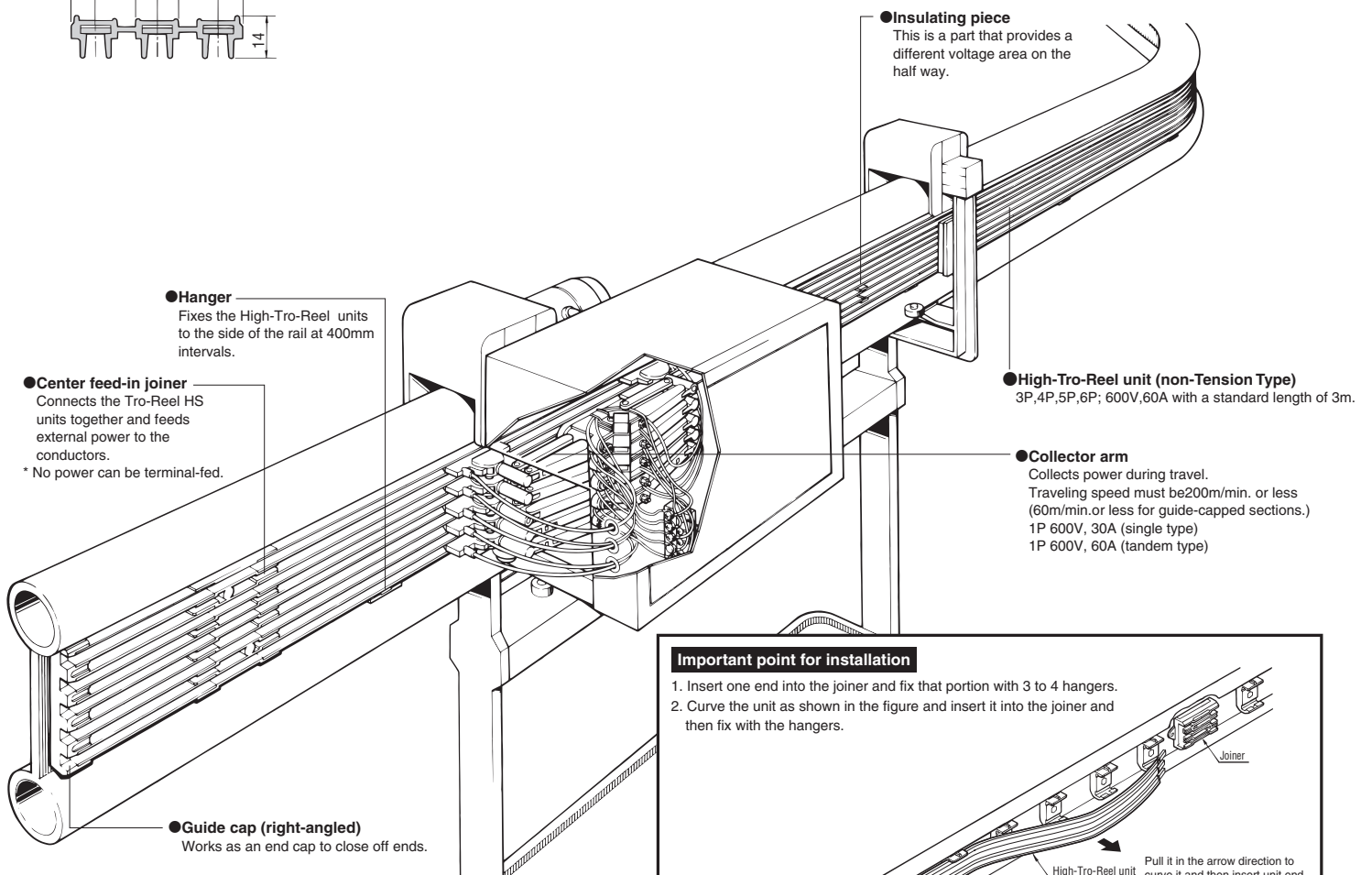


Lay horizontally



Mount for collector arm (without saddle) to the collector arm mount plate with the inner size of ( )  
The asterisk (\*) indicates the High-Tro-Reel unit's conductor sliding surface.

Unit : mm



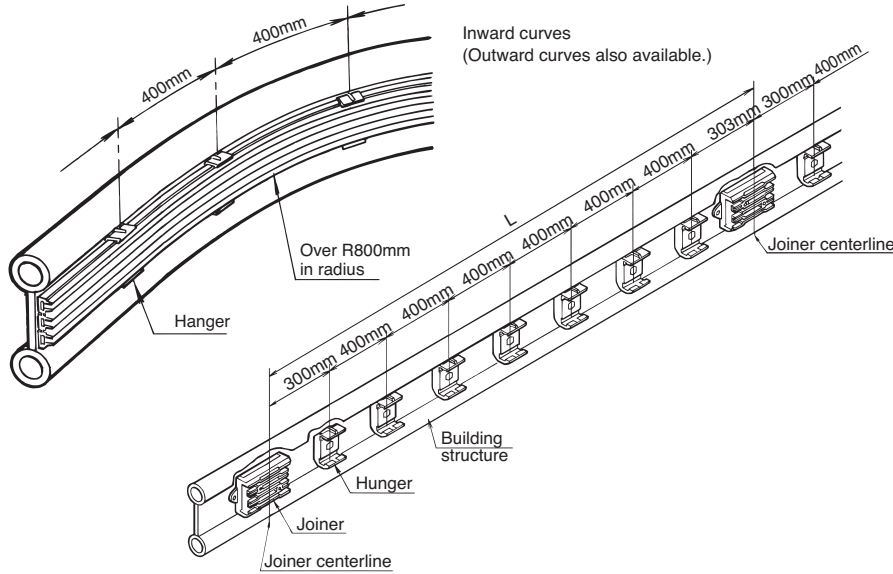


# 1 Setting joiner and hanger intervals

## Setting intervals for hangers

Hangers should be positioned at intervals of 400mm or less for straight sections and curved sections.

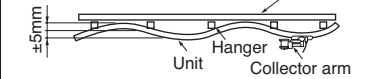
Should be set the intervals to hangers of the both end from joiner and center feed-in joiner L=300 mm or less.



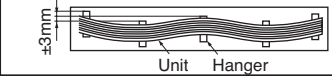
### Notes

●Should be installed the hangers and joiners as the snaking/swell of Tro-Reel HS get within tolerance.

Snaking: Displacement of collector arm press direction  
Tolerance: Standard  $\pm 5\text{mm}$  Construction material



Swell: Displacement of collection arm press direction and right angle direction  
Tolerance: Standard  $\pm 3\text{mm}$



## Setting joiner intervals

In order to absorb expansion and contraction due to temperature fluctuations in the High-Tro-Reel unit, joiners (center feed-in joiners) must be positioned as below.

### Notes

●Failure to conform to this table may cause poor collector arm contact or separation from wires.

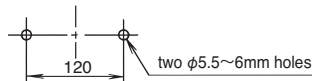
●The length of the joiner is  $2997\pm 2\text{mm}$ .

Ambient temperature during installation	Mounting size: L (mm)	Distance between conductors at joint (mm)
10°C or lower	3003	5~13
11~40°C	3000	3~10

# 2 Joiner installation

1. Drill holes in the building structure as shown below.

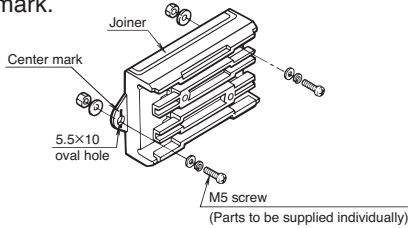
●Preparatory drilling on building structure (for 3P, 4P, 5P and 6P)



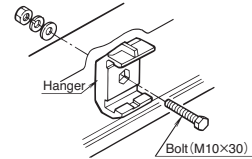
### Notes

When drilling holes, use the joiner center mark as a reference.

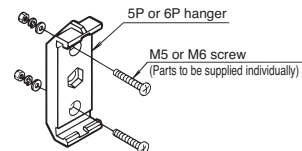
2. Screw the joiner to the building structure in line with the center mark.



# 3 Hanger installation



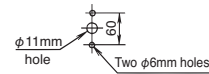
●Fixing 5P or 6P hangers using two screws



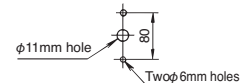
(Applicable when two screws are used to fix 5P or 6P hangers.)

●Preparatory drilling on building structure

For 5P type

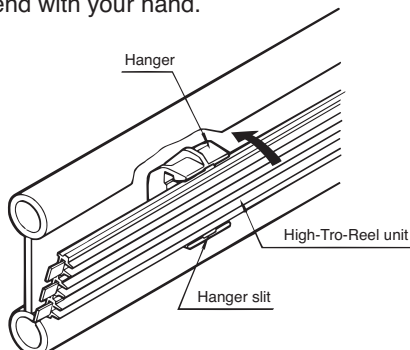


For 6P type



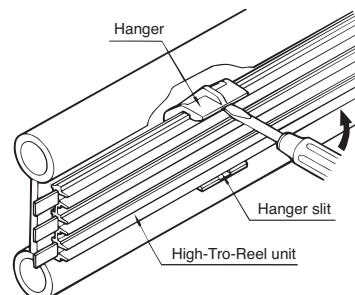
# 4 Mounting the High-Tro-Reel unit on a hanger

Insert one end of the High-Tro-Reel unit into the hanger and push the other end with your hand.



## Removing the High-Tro-Reel unit

Insert a flat tip screwdriver into the hanger slit. Then, lift the upper holder upward while pulling the lower holder down.



## 5 High-Tro-Reel unit connection

Insert the High-Tro-Reel unit into the joiner in the direction of the arrow.

### Notes

When mounting the High-Tro-Reel unit,

Be careful to maintain the proper form and layout.

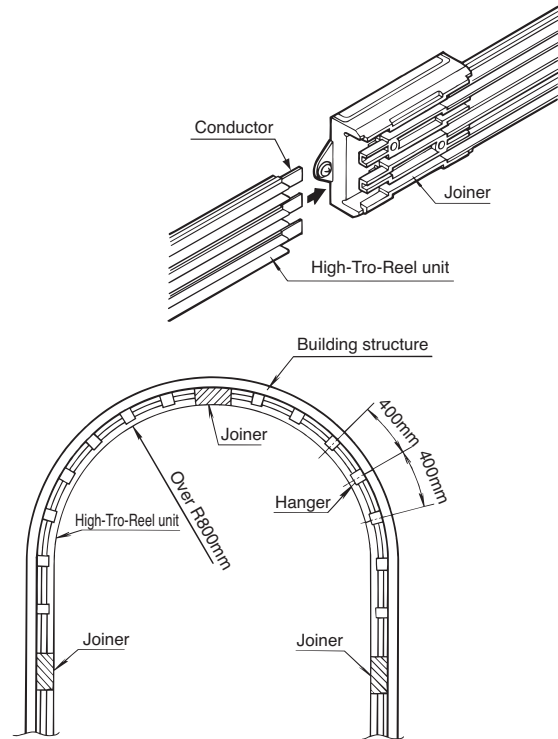
Do not be meandering ( up and down direction  $\pm 3\text{mm}$  or less)

Failure to do so may cause poor collector arm contact or separation from wires.

Ambient temperature during installation	Distance between conductors at joint (mm)
10°C or lower	5~13
11~40°C	3~10

### Notes

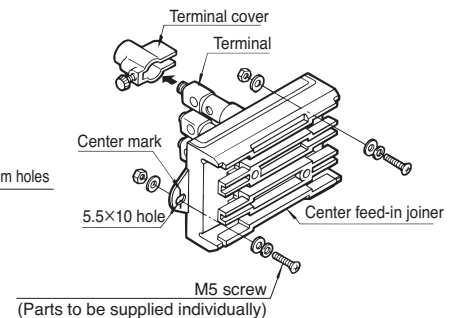
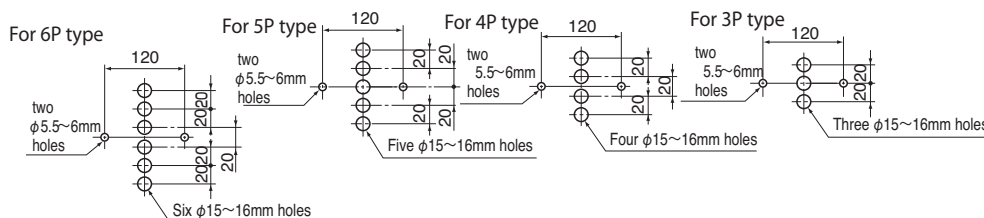
For inward curves, position a joiner (or joint) at the center of the curve. (For outward curves, a joiner can be positioned on any part of the unit.)



## 6 Center feed-in joiner installation

1. Drill holes in the building structure as shown below.
2. Remove the terminal cover, insert the joiner into the building structure, line it up with the center mark, and screw it in.

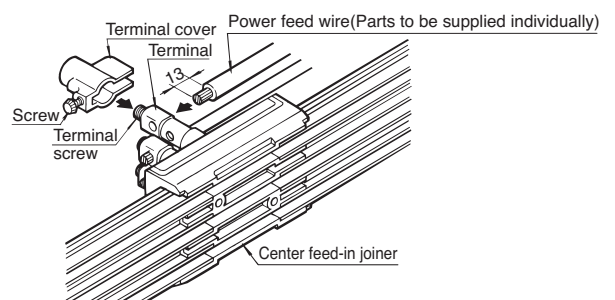
### ●Preparatory drilling on building structure.



**Notes** When drilling holes, use the center mark of the center feed-in joiner as a reference. Use a hole saw to drill  $\phi 15\sim 16\text{mm}$  holes.

## 7 Supplying power to the High-Tro-Reel

1. Remove 13mm of the sheath covering the power feed wire, insert the wire into the terminal, and screw it in securely with the terminal screw. Terminal screws must be securely tightened. Failure to do so may cause fire.
2. Screw the terminal cover to the terminal.



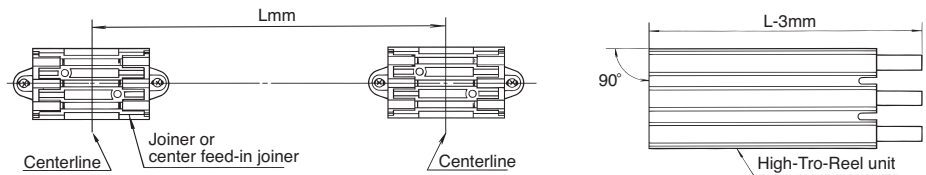
## Caution

1. Use 5.5 to 22mm<sup>2</sup> power feed wires.
2. Be sure to crimp the included crimp sleeve before connecting the signal feed wire (0.75 to 2mm<sup>2</sup>) to the terminal. Failure to do so may cause fire.



## 8 Cutting the High-Tro-Reel unit

Line up the High-Tro-Reel unit between the center points of the two joiners (central dimension L) and cut 3mm off of one end.



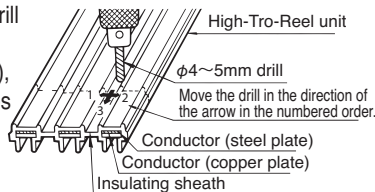
## 9 Cutting the High-Tro-Reel unit

1. Mark the length to be cut off on the High-Tro-Reel unit as shown below, and cut the top, sides and bottom of the insulating sheath using a hacksaw. On the top surface, make a thin cut down to the conductor steel plate.

### Caution

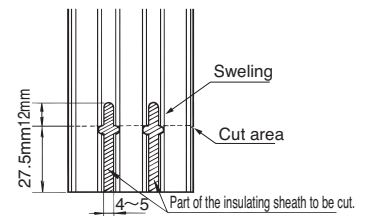
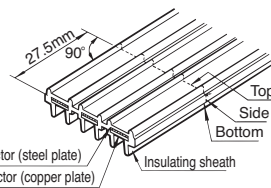
Be careful not to damage the conductor (copper plate) when cutting with a hacksaw. Damage may cause fire or damage due to falling of equipment.

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



#### Notes

1. Be careful not to damage the lower conductor (copper plate).
2. Hold the drill upright against the High-Tro-Reel unit when cutting the insulating sheath.



3. Break off the upper conductor (steel plate) at the cut line.

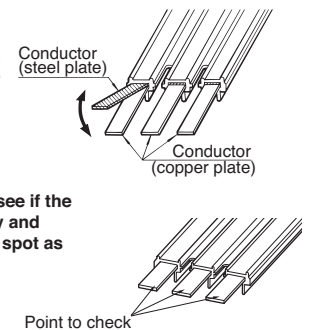
#### Notes

1. Remove the burrs from both cut surfaces using a knife or a file. Failure to do so may cause poor collector arm contact or separation from wires.

Failure to do so may cause poor collector arm contact or separation from wires.

2. In cutting the line, check to see if the conductor surface gets rusty and discolored. Sandpaper such spot as required. Failure to do so may cause poor collector arm contact.

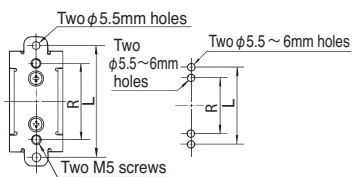
Failure to do so may cause poor collector arm contact.



## 10 Guide cap installation

1. Drill holes in the building structure as shown below.

### Preparatory drilling on building structure



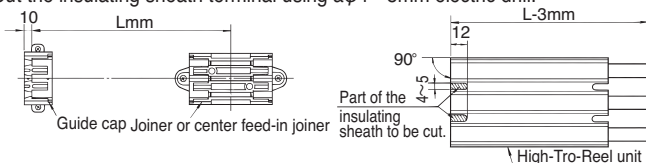
2. Screw a guide cap to the building structure and insert the High-Tro-Reel unit into the guide cap.

#### Notes

Use a tandem-type collector arm and set traveling speed at switching sections to 60m/min. or lower.

### Cutting the High-Tro-Reel unit and insulating sheath

1. Line up the High-Tro-Reel unit between the center points of the joiner and the guide cap (central dimension "L") and cut 3mm off of one end.
2. Cut the insulating sheath terminal using a  $\phi 4\sim 5$ mm electric drill.



- Notes** Remove the burrs from both cut surfaces using a knife or a file. Failure to do so may cause poor collector arm contact.

### Usage of guide cap

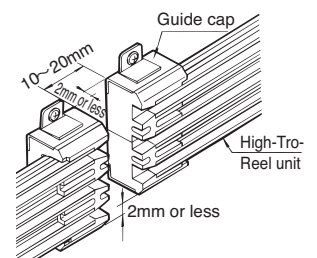
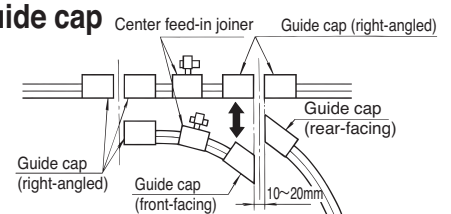
#### Installation procedure

L size: front-mounting     $\lambda$  size: front-mounting

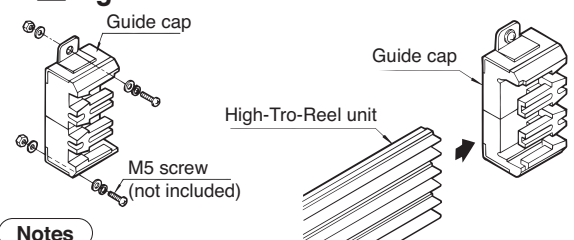
#### Notes

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.

Number of poles (item)	L (mm)	$\lambda$ (mm)
3P (right-angled, front, rear-facing)	73	50
4P (right-angled, front, rear-facing)	93	70
5P (right-angled, front, rear-facing)	113	90
6P (right-angled, front, rear-facing)	133	110



### High-Tro-Reel unit installation



#### Notes

Screws must be securely tightened. Failure to do so may cause damage due to falling of equipment.

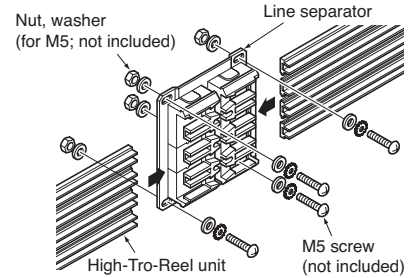
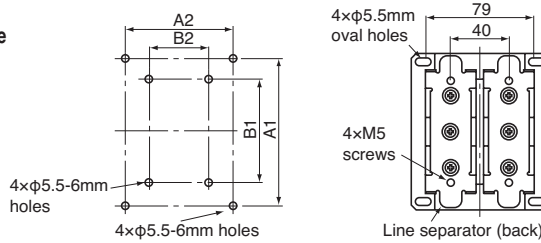
# 11 Line separator installation

1. Drill holes in the building structure as shown below. Hole positions are different according to whether it will be installed from or back.
2. Screw a line separator to the building structure using screws (M5; not included) and insert the High-Tro-Reel unit into the line separator.

**Notes** Use a tandem-type collector arm and set the maximum traveling speed to 200m/min, or lower.

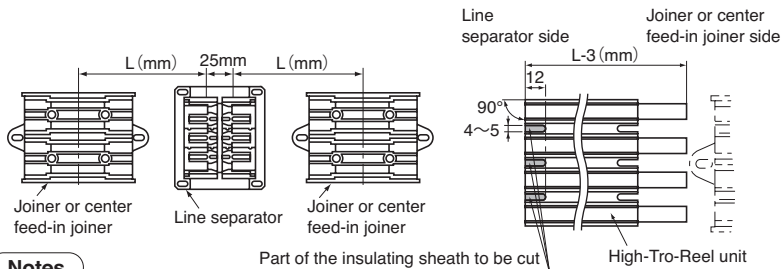
### Preparatory drilling on building structure

Mounting method		For 4P	For 5P
Installed from front	A1	97	117
	A2	79	79
Installed from back	B1	70	90
	B2	40	40



### Cutting the High-Tro-Reel unit and insulating sheath

1. Line up the High-Tro-Reel unit between the center points of joiner and the line separator, and cut 3mm off of one end.
2. Cut the insulating sheath as shown in the drawing at right using an electric drill with a φ4 to 5 bit.

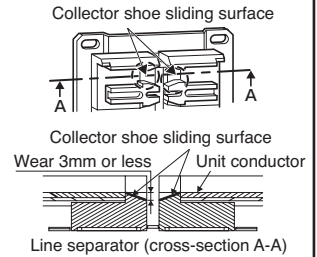


#### Notes

1. After cutting, remove the burrs from cut surfaces using an electrical knife or file. Remove sharp edges from the conductor using a file or similar tool. Failure to do so may cause poor contact or derailment of the collector arm.
2. Set the intervals between hangers at 400mm or less. Intervals longer than this may result in derailment of the collector arm.

### Replacing line separators

Line separators should be replaced when the collector shoe sliding surface of the line separator has worn down 3mm from the conductor. Line separators should also be replaced early when it is possible that the wear amount will reach 3mm before the next inspection. at right using an electric drill with a φ4 to 5 bit.

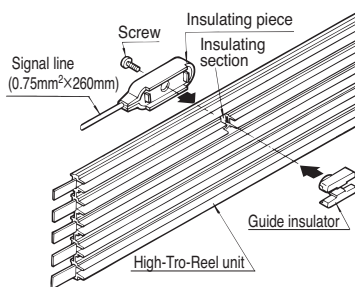


## Caution

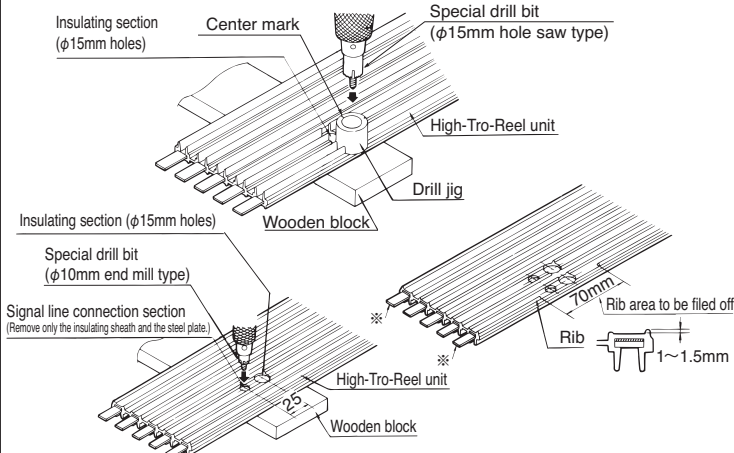
Use line separators within the wear range. Failure to do so may result in derailment of the collector arm, fires due to sparking, or poor contact.

# 12 Insulating piece installation

1. Drill holes in the High-Tro-Reel unit using the special jig (insulating piece drill jig).
2. Insert a guide insulator and an insulating piece into the insulating section and screw them in.



### Drilling holes in the High-Tro-Reel unit



### Usage of insulating piece

Usage	Hole drilling in the High-Tro-Reel unit
Signal line insulation	φ15mm holes
Signal line insulation + One-side power feed	φ3mm (center hole), φ10mm (Remove only the insulating sheath and the steel plate.), 25mm, 25mm, φ15mm holes. Can be attached to either side.
Dual-side power feed for repair	φ3mm (center hole), φ10mm (Remove only the insulating sheath and the steel plate.), 25mm, 25mm, φ15mm holes. (Remove only the insulating sheath and the steel plate.)

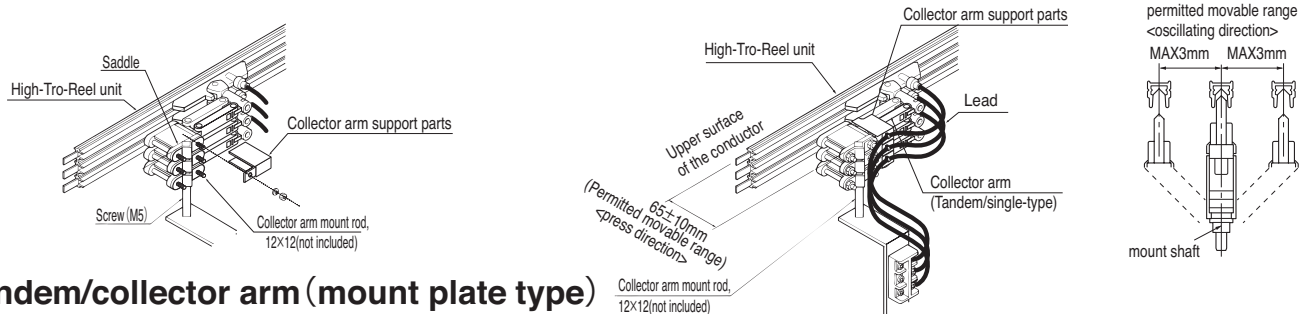
#### Notes

1. Position the High-Tro-Reel unit on a wooden block and drill holes using the drill jig (positioning the center mark inside the jig).
2. Hold the end mill or hole saw drill upright against the High-Tro-Reel unit when drilling.
3. For insulating sections, drill holes slowly to prevent damage to the insulating sheath.
4. Remove cutting chips from the hole saw drill with a flat tip screwdriver.
5. When making both ends (\*section) of the High-Tro-Reel conductor insulating sections, remove the rib with a knife.
6. Remove the burrs from both cut surfaces using a knife or a file. Failure to do so may cause poor collector arm contact.
7. After drilling holes in the signal line joint, be sure to remove the burrs from the φ3mm center hole on conductor sliding surface. Failure to do so may cause poor collector arm contact.
8. If signal lines are not needed, insulate the end of the line with vinyl tape so that it won't affect collector arm travel.

## 13 Collector arm installation

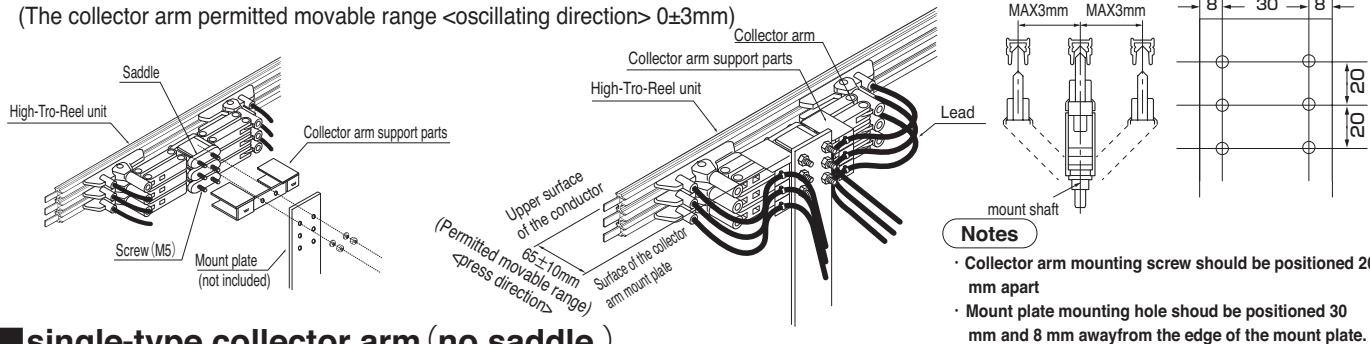
### ■ Tandem/single-type collector arm (mount rod type)

- 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 arm mount rod to 65mm  
(The collector arm permitted movable range <press direction> central value of 65mm ±10mm)
- ③ Should be put the center of High-Tro-Reel conductor and collection arm (mount shaft) together.  
(The collector arm permitted movable range <oscillating direction> 0±3mm)



### ■ Tandem/collector arm (mount plate type)

- ① Mount the supporting parts between saddle and the mount plate.
- ② Set the distance from the upper surface of the High-Tro-Reel conductor to the center of collector arm mount plate to 65mm  
(The collector arm permitted movable range <press direction> central value of 65mm ±10mm)
- ③ Should be put the center of High-Tro-Reel conductor and collection arm (mount shaft) together.  
(The collector arm permitted movable range <oscillating direction> 0±3mm)

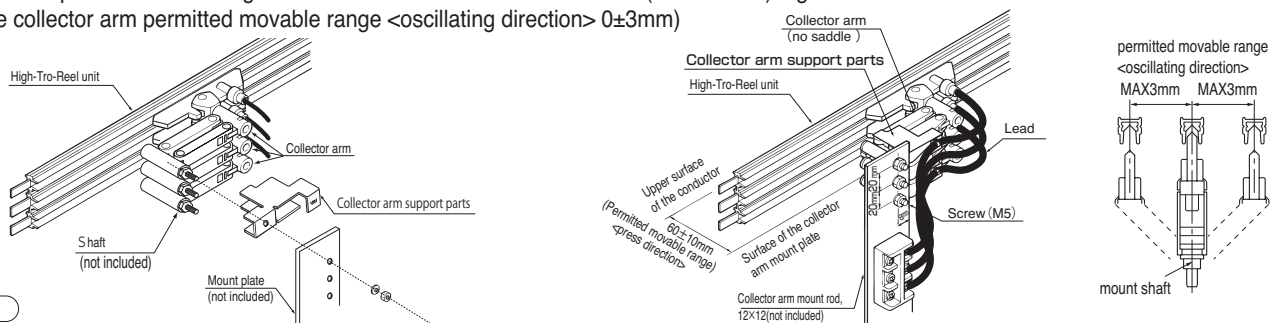


#### Notes

- Collector arm mounting screw should be positioned 20 mm apart
- Mount plate mounting hole should be positioned 30 mm and 8 mm away from the edge of the mount plate.

### ■ single-type collector arm (no saddle)

- ① Mount the supporting parts between the top of saddle and the mount plate.
- ② Set the distance from the upper surface of the High-Tro-Reel conductor to the upper surface of the collector arm mount plate to 60mm  
(The collector arm permitted movable range <press direction> central value of 60mm ±10mm)
- ③ Should be put the center of High-Tro-Reel conductor and collection arm (mount shaft) together.  
(The collector arm permitted movable range <oscillating direction> 0±3mm)

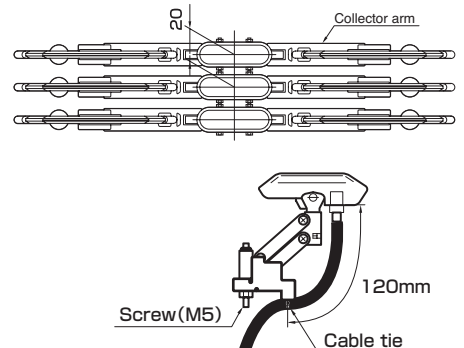


#### note

- Collector arm mounting screw should be positioned 20 mm apart and 8 mm away from the edge of the mount plate.

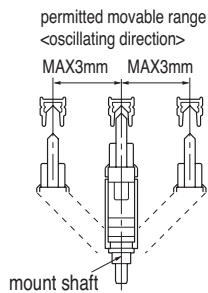
#### note

1. Be sure to use only the specified dimensions for each mounting part. For operating the equipment, set the collector arm within permitted movable range of 65±10mm (60±10mm for single).
2. Collector arm mounting screw should be positioned 20 mm apart and Collector arms (single-type with no saddle excluded) must be positioned close to each other as shown in the drawing at right.
3. Be sure that collector arms are mounted parallel to the High-Tro-Ree unit with no twisting.  
Failure to conform to this table may cause poor collector arm contact or separation from wires.
4. Mount the center of collector arm to less than 3mm from center of the High-Tro-Reel conductor.  
Failure to conform to this table may cause poor collector arm contact or separation from wires.
5. Hold the leads in using the cable ties (included) When exchange the replacement part of collector, hold the leads in using the cable ties (length less than 100 mm and width less than 3 mm) which is sold generally. Then, keep slack in the leads (The length of lead to fix is about 120 mm from replacement part of collector). Do not influence movement of the collector arm.  
Failure to occur biased wear of collector arm and fragment of sheath.
6. Be sure to confirm the High-Tro-Ree unit phase (R.S.T) before connecting the leads to the load.
7. When mount the Insulated terminals to the terminal, Do not twist more than required.  
Failure to occur biased wear of collector arm and fragment of sheath.
8. Exchange of the collector arm once in exchange three times of replacement part of collector.
9. When mount the collector arm support parts, If it is changed or damaged by fall, Exchange the new parts.  
Failure to occur biased wear of collector arm and fragment of sheath.



## 14 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  
(The collector arm permitted movable range <press direction> central value of 65mm  $\pm$ 10mm)
- ③ Should be put the center of High-Tro-Reel conductor and collection arm (mount shaft) together.  
(The collector arm permitted movable range <oscillating direction>  $0\pm 3$ mm)



**note**

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

