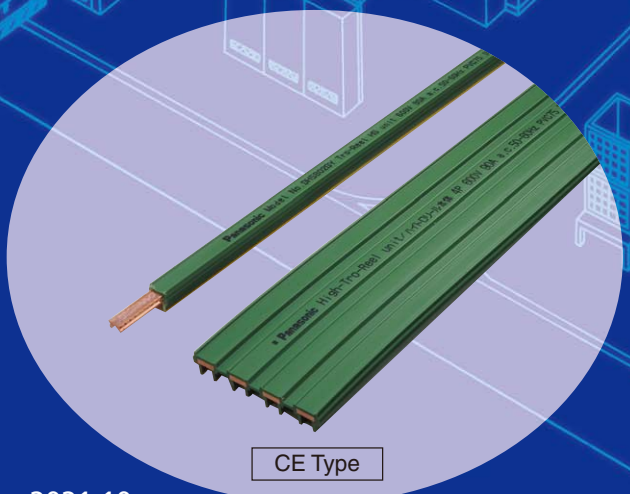
Panasonic

Insulated Trolley System

(JIS Approved)

Tro-Reel HS <Non-Tension Type> UL Listed Ⓤ
High-Tro-Reel <Non-Tension Type> UL Listed Ⓤ
High-Tro-Reel <Tension Type>
Tro-Reel

Highly Reliable Power/Data Transmission System for Moving Equipment Lines



CE Type

2021.10

Before Use

1. Periodic maintenance of this product is necessary. Use only equipment on which periodic maintenance can be performed.

2. If an abnormality (burrs, entrance/adhesion of foreign materials, etc.) occurs, there is a danger of fire due to short-circuiting or grounding. About maintenance, please refer to pages of "Maintenance".

3. The proper overcurrent breaker should be used on the primary side of the power supply.

   - Failure to protect the circuit may cause an phase-to-phase short circuit, which could cause a fire due to high current flowing as a continuous arc discharge. -

4. It is obligatory that construction using the Insulated Trolley System be performed in accordance with the Electrical Equipment Technology Standards (laws) and Internal Wiring Regulations.

   - If appropriate circuit protection is not provided, there is a risk of fire if short-circuiting or over-current flow occurs. -

5. Since the performance of the Insulated Trolley System is greatly affected by installation accuracy (horizontality/verticality of main body), sufficient care should be taken regarding design and installation.

6. Since there is a risk of disconnection or short-circuiting in the Insulated Trolley System depending on the installation conditions and usage environment, it should not be used for applications requiring extremely high reliability (equipment greatly affected by circuit breakers for leakage current, etc., medical equipment, applications directly affecting human life).

7. When designing a system using the Insulated Trolley System, include appropriate safety measures in case of an accident during use.

8. There are limitations on the environments in which the Insulated Trolley System can be used. Please refer to the following points about usage location when considering use of the Insulated Trolley System.

   1)For environments where flammable gases or dust (explosive/ flammable) are generated, since sparks may occur during use of this product, the Insulated Trolley System cannot be used based on the Electrical Equipment Technology Standards (laws) and Internal Wiring Regulations.

   2)Do not use where exposure occurs.
   Otherwise, electric shock, fire or damage due to falling of equipment may occur.

   3)Use within an ambient temperature range of -10℃ to 40℃.
   For details about use in other temperature ranges, such as in refrigerated warehouses, contact Panasonic Corporation.

   4)Clean rooms, food factories, etc.
   Since friction dust is generated by this product, it is not suitable for use in such environments.

   5)Environments where corrosive gases are generated, etc.
   Since equipment falling or faulty contact may occur with the Insulated Trolley System due to corrosion, it cannot be used in such environments.

   Be sure to use the products in the correct type of location.
   - Not doing so could lead to electric shocks, fire, or damage due to falling equipment. -

9. This product has a limited service life. The service life differs depending on conditions such as the operating ratio and operating environment etc. However, the product is expected to degrade after 10 years and, in a worst case scenario, might burn out or cause a fire. Therefore, we recommend replacing this product before the end of its service life. Replace the necessary parts according to the maintenance schedule.

10. The current collector and conductors deteriorate over time. Wear and tear may be uneven depending on the accuracy of installation and usage environment.
    Ensure that there is no inclination if contact was made between the current collector and conductor during installation.
    - Wire separation or damage due to falling equipment may occur. -

11. Use within the following running speed range. However, limitations may be applied depending on the load and type of voltage. Contact Panasonic Corporation. for further information.
    Be sure to use the products at the correct running speed.
    - Not doing so could lead to fire caused by sparks, contact failure, or deviation of the collector arm. -

Product		Running Speed
Tro-Reel HS		● Less than 300m/min (Less than 60m/min for the guide cap installation section)
High Tro-Reel	Tension Type	● Less than 300m/min
	Non-Tension Type	● Less than 200m/min (Less than 60m/min for the guide cap installation section
Tro-Reel		● Less than 300m/min (Less than 60m/min for the guide cap installation section)

⚠Safety Precautions (Tro-Reel HS, High-Tro-Reel)

■ Ask qualified electrician for troubleshooting and maintenance. Please be sure to show Operation / Installation Manual to that engineer.
■ Installation of the Tro-Reel HS, High-Tro-Reel must be performed only by a licensed electrician. To prevent injury or accidents, always pay attention to the following points.

■ Precautions on installation

⚠Warning

- **Do not modify the Tro-Reel HS, High-Tro-Reel 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.**
- **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 joiner.**
  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.

■ Precautions on use

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

⚠Warning

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- **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.
- **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.

■ Precautions for Inspection

■ Installation of the Tro-Reel HS, 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, High-Tro-Reel in any way.** Otherwise, electric shock, fire or damage due to falling of equipment may occur.
- **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.

⚠Caution

- **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.**
- **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 joiner.**
  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.

⚠Safety Precautions (Tro-Reel)

■ Ask qualified electrician for troubleshooting and maintenance. Please be sure to show Operation / Installation Manual to that engineer.
■ Installation of the Tro-Reel must be performed only by a licensed electrician. To prevent injury or accidents, always pay attention to the following points.

■ Precautions on installation

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- **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.**
- **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

- **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.**
  (**When corrosion resistance is required, please use the stainless steel products.**)
- **Do not install this product at the place where corrosion-resistance is absolutely necessary, for example, at ocean district, cement factory or sewage treatment plant.** Electric shock, fire or damage due to equipment falling may occur.
- **In case of using outdoor or at a very damp indoor, use hanger with an insulator.**
- **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.
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- **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.
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- **When replacing the collector, be sure to confirm the duct unit phase (R.S.T) before connecting the leads to the load.**
  Failure to do so may cause fire due to sparks.

Maintenance schedule

■ 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.

Tro-Reel HS, High-Tro-Reel <Non-Tension Type>

Maintenance done by the electrical work trader.

	At introduction / The 5th year / The 10th year	
Tro-Reel HS unit High-Tro-Reel unit	• 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. • 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. • Check the Tro-Reel unit is not away from the hanger. (Once every 3 to 6 months) → Install the Tro-Reel unit on the hanger. • 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.	Product exchange recommendation.
Joiner Center feed-in joiner	• Check whether there is loosening of the fixation screw or the terminal screw. (Once every 3 to 6 months) → Retighten. • Check whether the resin has not been damaged. (Once every 3 to 6 months) → Exchange products.	
Hanger Guide cap Insulating piece	• Check whether there is loosening of the nut. (Once every 3 to 6 months) → Retighten. • Check whether the resin has not been damaged. (Once every 3 to 6 months) → Exchange products.	
Collector arm	• Check whether there is loosening of the bolt. (Once every 1 to 3 months) → Retighten. • Check whether wear has reached the replacement line. (Once every 1 to 3 months) → Exchange the collector, when worn out to the replacement line. • 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.	

High-Tro-Reel <Tension Type>, Tro-Reel

Maintenance done by the electrical work trader.

	At introduction / The 5th year / The 10th year	
High-Tro-Reel unit Tro-Reel unit	• 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. • 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. • Check the Tro-Reel unit is not away from the hanger. (Once every 3 to 6 months) → Install the Tro-Reel unit on the hanger. • 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.	Product exchange recommendation.
End tension insulator	• Check the coil spring length. (Once every 3 to 6 months) → Adjust to proper length. • Check whether there is loosening of the nut of the coil spring. (Once every 3 to 6 months) → Retighten. • Check whether the resin has not been damaged. (Once every 3 to 6 months) → Exchange products.	
Joiner Center feed-in joiner	• Check whether there is loosening of the fixation screw or the terminal screw. (Once every 3 to 6 months) → Retighten. • Check whether the resin has not been damaged. (Once every 3 to 6 months) → Exchange products.	
Hanger	• Check whether there is loosening of the nut. (Once every 3 to 6 months) → Retighten. • Check whether the resin has not been damaged. (Once every 3 to 6 months) → Exchange products.	
End tension insulator Center fixed insulator Guide cap Insulating piece	• Check whether the resin has not been damaged. (Once every 3 to 6 months) → Exchange products.	
Collector arm	• Check whether there is loosening of the bolt. (Once every 1 to 3 months) → Retighten. • Check whether wear has reached the replacement line. (Once every 1 to 3 months) → Exchange the collector, when worn out to the replacement line. • 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.	

Now available from Panasonic : a wide variety of wiring systems providing increased flexibility for your production line.

Ideal for high-speed monorails.

Tro-Reel HS <Non-Tension Type> (for indoor use only)

(High Speed)

UL Listed

The V-shaped conductors provide a large contact surface area, ensuring consistent power supply even at high speeds and preventing problems such as separation from wires. Even though an 8P installation measures only 124mm in height, it can still handle a large number of control wires. Rating is 600V, 90A.

※Products displaying the CE Type are available.

Ideal for auto conveyors and monorails.

High-Tro-Reel <Non-Tension Type> (for indoor use only)

UL Listed

Multi-lead system permits setup even in confined spaces. Perfect for curved lines and traversers. Sections can be divided into different voltages as needed. Four types available : 3P, 4P, 5P and 6P at 60A.

Ideal for supplying power to confined spaces in hoists and cranes.

High-Tro-Reel <Tension Type> (for indoor use only)

UL Listed (Only 3P, 4P 60A are available)

Thanks to its multi-lead system, it's possible to minimize both time and space in installation. A High-Tro-Reel can be set up joint-free for up to 50m. Various types available : 3P, 4P and 5P at 60A and 90A, and 3P and 4P at 150A and 200A.

※CE Type products are also available (4P only).

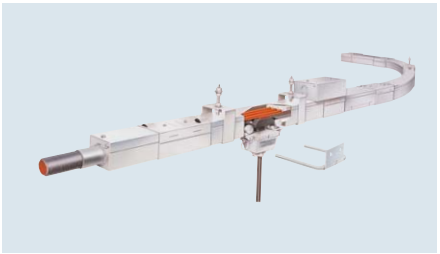
Jointless installation of up to 100m.

Tro-Reel (for indoor and outdoor use)

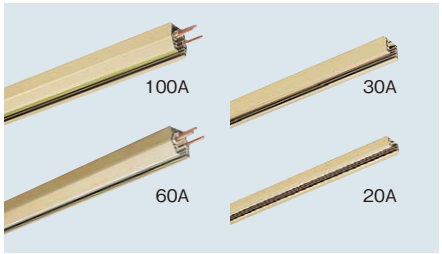
Tro-Reel is a single-lead insulated trolley, so it's easy to set up. Since it's possible to set up as much as a 100m Tro-Reel without any joints, it's easier to install a wide range of special power source routes. Various types available : 60A, 150A, 200A, 300A and 150A stainless steel units for places where corrosion resistance is necessary.

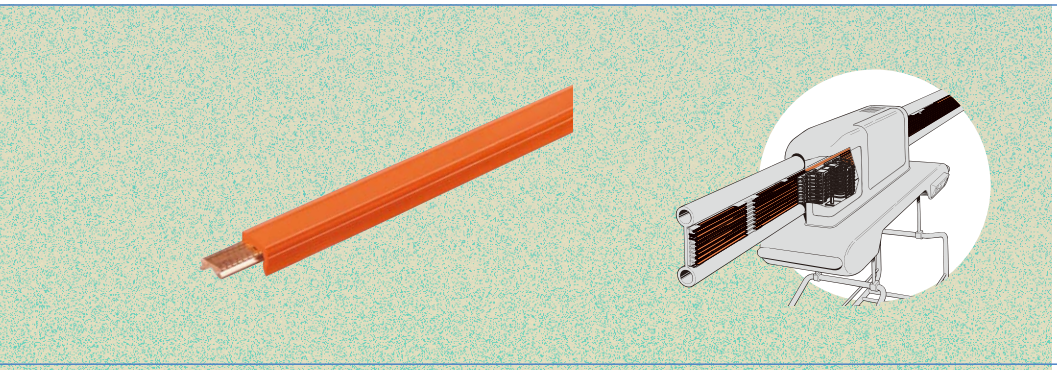
<Related Products>

Trolley ducts

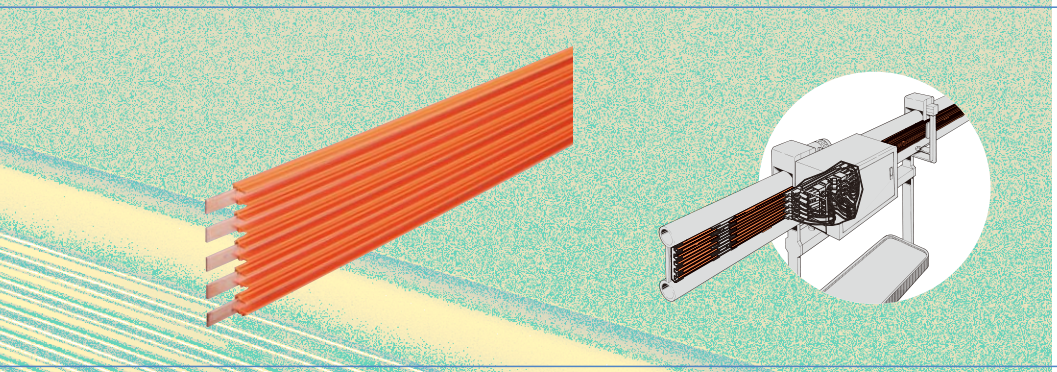


Factory Line

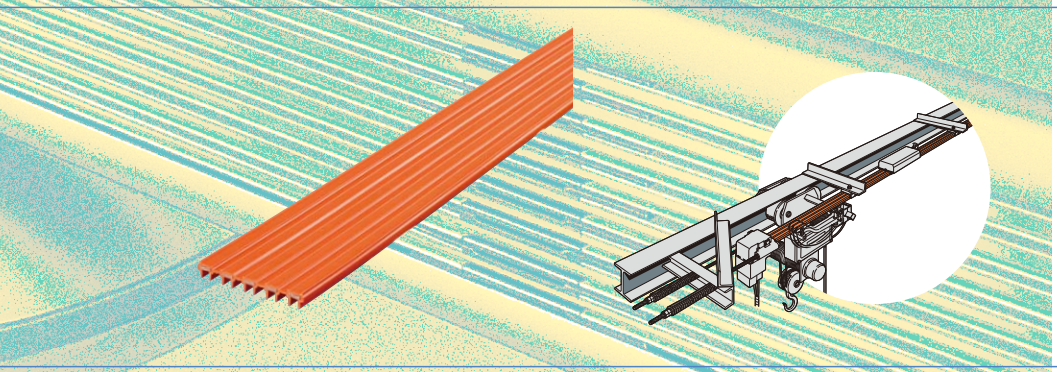




Tro-Reel HS
<Non-Tension Type>



High-Tro-Reel
<Non-Tension Type>



High-Tro-Reel
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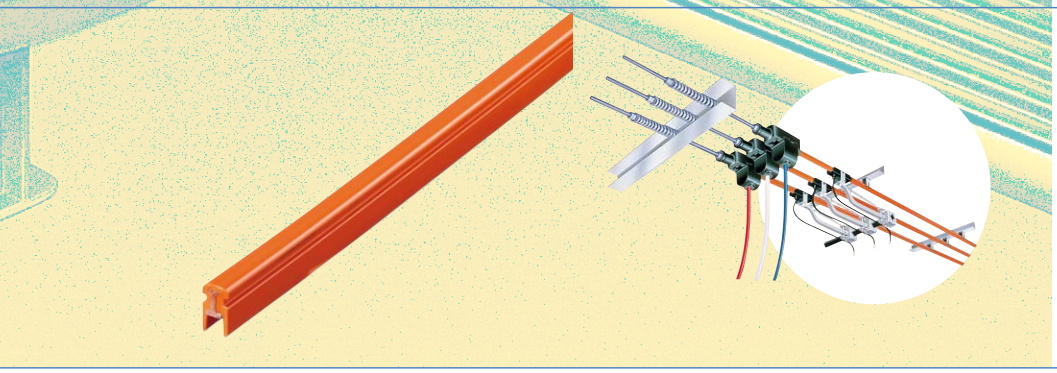
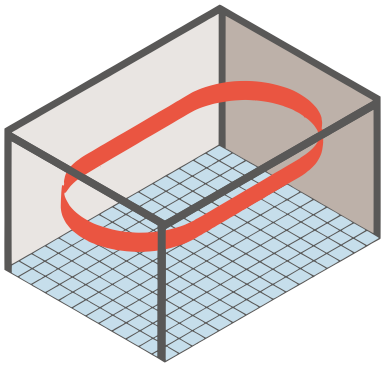
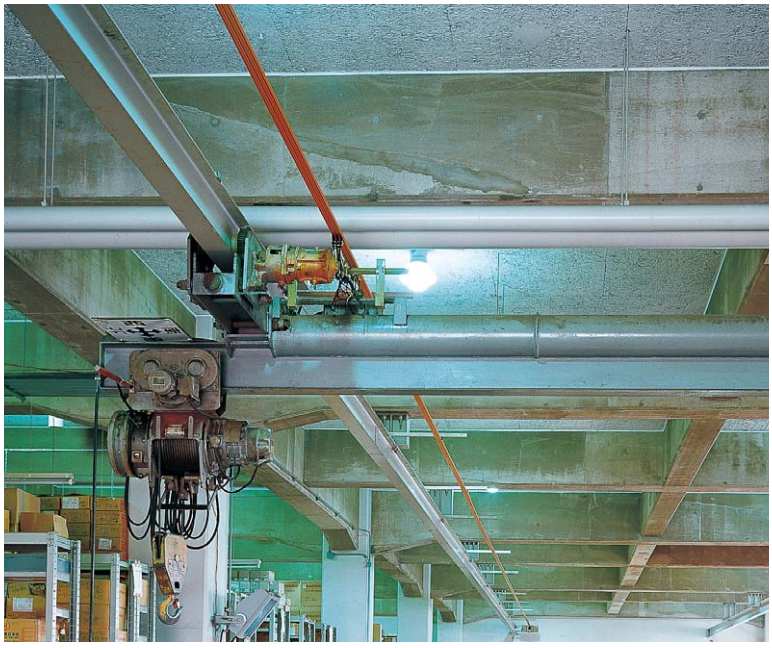


Tro-Reel

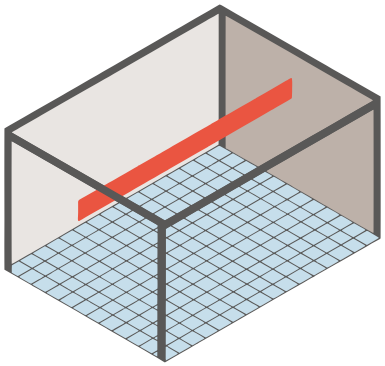
For the most efficient use of factory space.

High-Tro-Reel <Non-Tension Type>





High-Tro-Reel <Tension Type>



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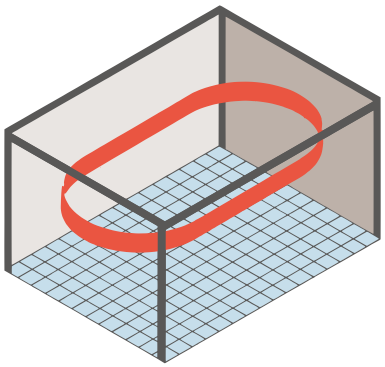
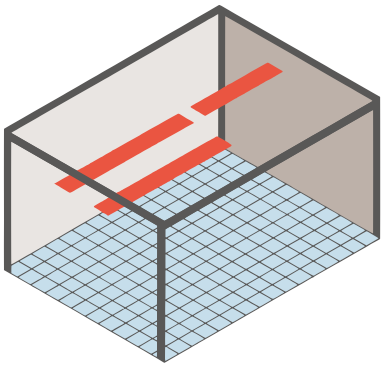


Easy installation of endless and track switching power routes.

Tro-Reel



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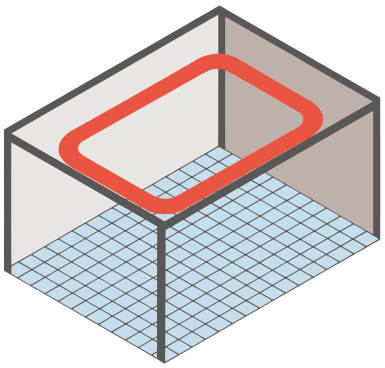

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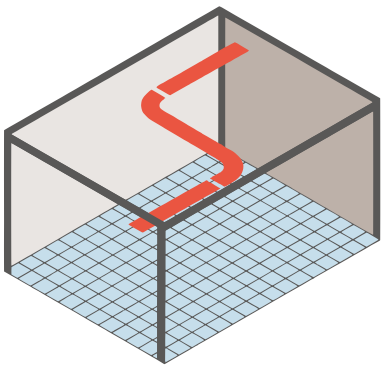
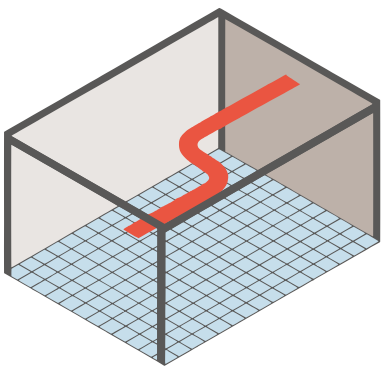
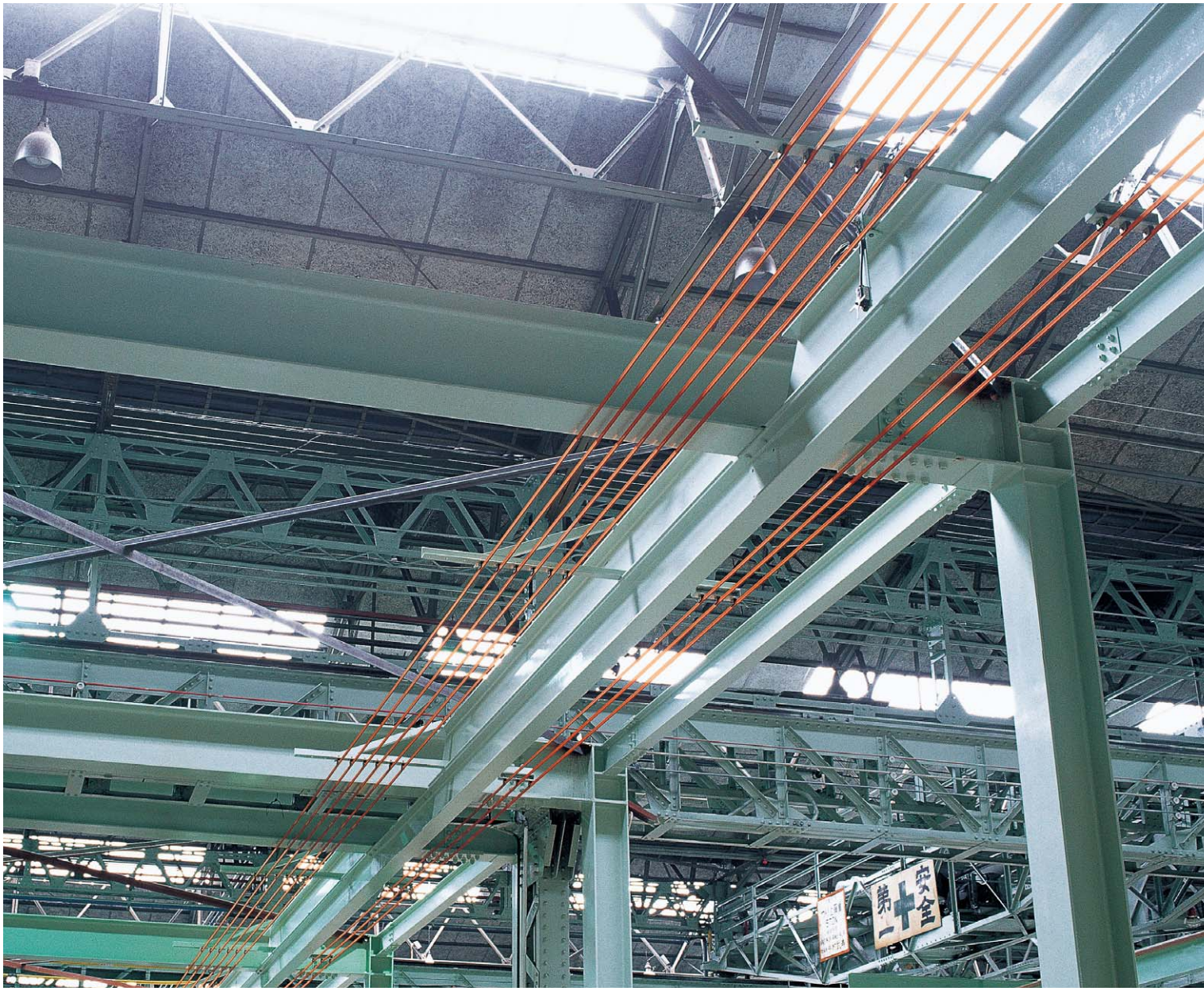


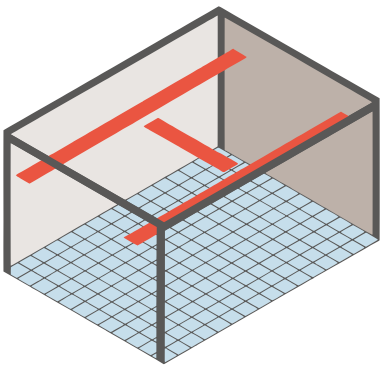
Tro-Reel



Speedy installation of extra-long lines of over 100m.

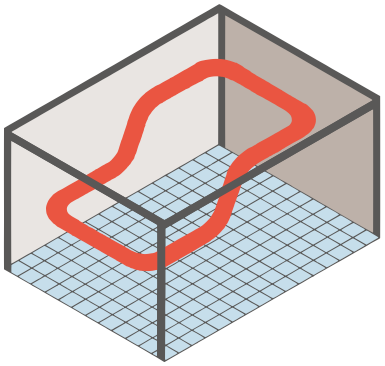


Tro-Reel

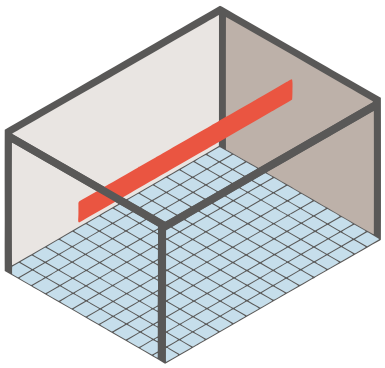


Ideal for all kinds of applications including hoists and cranes.

Tro-Reel



High-Tro-Reel



Selection Guidelines for Tro-Reel HS, High-Tro-Reel and Tro-Reel

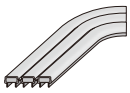
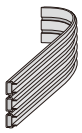
■Installation Locations and Conditions of Use

General Environment	Tro-Reel HS <Non-Tension Type>	High-Tro-Reel <Non-Tension Type>	High-Tro-Reel <Tension Type>				Tro-Reel				
	90A	60A	60A	90A	150A	200A	60A	150A	200A	300A	SUS150A
Indoor	○	○	○	○	○	○	○	○	○	○	○
Outdoor	×	×	×	×	×	×	○	○	○	○	○

Special Environment	Tro-Reel HS <Non-Tension Type>	High-Tro-Reel <Non-Tension Type>	High-Tro-Reel <Tension Type>				Tro-Reel				
	90A	60A	60A	90A	150A	200A	60A	150A	200A	300A	SUS150A
Locations where acid is generated (Plating factory, paint factory, chemicals factory etc.)	×	×	×	×	×	×	×				
Locations where alkali is generated (Plating factory, paint factory, chemicals factory etc.)	×	×	×	×	×	×	×				
Locations where corrosive gas is generated (Sewage plant, chemicals factory etc.)	×	×	×	×	×	×	×				
Locations where oil mist is generated											
Locations where flammable gas is generated	×	×	×	×	×	×	×	×	×	×	×
Locations where flammable dust is generated	×	×	×	×	×	×	×	×	×	×	×
Locations where dust is generated (Cement factory etc.)	×	×	×	×	×	×					
Locations where steam is generated (Locations with high humidity)	×	×	×	×	×	×					
Locations where salt-air damage occurs (Coastal areas etc.)	×	×	×	×	×	×	×	×	×	×	
Locations where condensation is generated	×	×	×	×	×	×					
Locations with low humidity (less than 20%)											
Locations where the permitted ambient temperature (-10℃ to 40℃) is exceeded											

With regard to special environments, there are cases in which the equipment can be used in ▭ conditions. Contact Panasonic Corporation for further information.
The equipment cannot be used in [×] sections.

■Applications of the Transfer Circuit System and Guide to Conditions of Use

Nature of the Applications	Tro-Reel HS <Non-Tension Type>	High-Tro-Reel <Non-Tension Type>	High-Tro-Reel <Tension Type>				Tro-Reel				
	90A	60A	60A	90A	150A	200A	60A	150A	200A	300A	SUS150A
Line Length	No limit	No limit	100m or less ※1				No limit ※2				
Compatible with curved sections (horizontal direction) 	R1000mm or more ※4	×	×				For 30A conductors: R800mm or more For 60A conductors: R1200mm or more For 100A conductors: R2400mm or more				
Compatible with curved sections (vertical direction) 	R800mm or more	R800mm or more	×				R5000mm or more				
With points and changes	○	○	×				○				
When circuit division is required	○	○	×				○				
Tension Type Products			○				○				
Non-Tension Type Products	○	○					○				
Running Speed	300m/min ※5	200m/min ※5	300m/min				300m/min ※5				
Changes from open spaces			×				○				

※1 : The distance that tension can be applied using one terminal tightening insulator is 50 m. (Contact Panasonic Corporation for further information about use with line lengths between 100m and 150m)
※2 : If the line length exceeds 100 m, use an intermediate tightening insulator.
※3 : For expansion, use the following:
"For 90A: 1 location every 50m"
"For 300A, 500A: 1 location every 30m"
※4 : Special processing is required for horizontal curves of the Tro-Reel HS (R1000mm to R1500mm). Contact Panasonic Corporation.
※5 : The trolley running speed of sections that have a guide cap installed is less than 60m/min.
There are special cases in which the equipment can be used in ▭ conditions. Contact Panasonic Corporation for further information.

■Table of insulated trolleys based on rated capacity

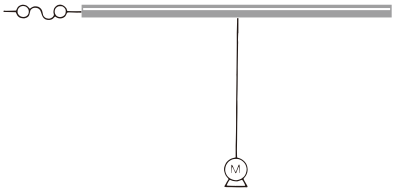
The chart below shows the Panasonic Insulated Trolleys for selection based on rated capacity. Select the most suitable product by determining the proper voltage, current and number of poles in relation to the location of use, taking into account the above "General guidelines for uses and requirements of mobile power supply systems," and considering the cost-effectiveness of each insulated trolley.

Rated voltage (V)	600V																			
Rated current (A)	60A					90A							150A			200A			300A	500A
Number of poles (P)	1P	3P	4P	5P	6P	1P	2P	3P	4P	5P	6P	7P	8P	1P	3P	4P	1P	3P	4P	1P	1P
Tro-Reel HS <Non-Tension Type>							●	●	●	●	●	●	●								
High-Tro-Reel <Non-Tension Type>		●	●	●	●																
High-Tro-Reel <Tension Type>		●	●	●				●	●	●					●	●		●	●		
Tro-Reel	●													●			●			●	

■Calculation of rated current by load capacity

The following explains the calculation of applicable rated current (hereafter referred to as the "applicable rating") and gives examples classified into three load: 1) a single load, 2) two or more loads, and 3) two or more loads, at least one of which is a motor.

1. A single load



(1) A motor (calculated at a working voltage of 200V)

If the rated current of the load is less than 50A:

Applicable rating is ≥1.25 times the rated current of the load.

If the rated current of the load is more than 50A:

Applicable rating is ≥1.1 times the rated current of the load.

(2) Other loads (except a welder):

Applicable rating is ≥ 1.0 time the rated current of the load.

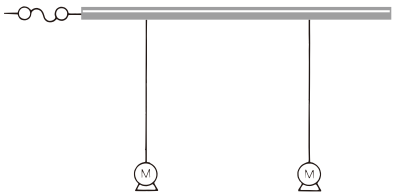
Example calculation

- One 5.5kW motor is used (load current of 26A).
- Total load current = 26A×1.25 = 32.5A
- Accordingly, the products with the following rating would be suitable.

Product	Unit	Collector arm
Tro-Reel HS <Non-Tension Type>	90A	60A (tandem)
High-Tro-Reel <Non-Tension Type>	60A	60A (tandem)
High-Tro-Reel <Tension Type>	60A	※60A
Tro-Reel	60A	※60A

※The asterisk indicates use of two 30A collector arms in tandem.

2. Two or more loads



(1) Motors

If the rated current of the load is less than 50A:

Applicable rating is ≥1.25 times the total rated current of the motors.

If the rated current of the load is more than 50A:

Applicable rating is ≥1.1 time the total rated current of the motors.

(2) Other loads (except a welder):

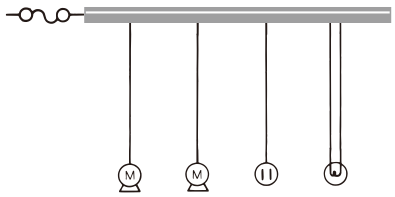
Applicable rating is ≥ 1.0 times the total rated current of the motors.

Example calculation

- Fifteen 0.75kW motors are used (load current of 4.7A).
- Total load current = 4.7A×15×1.1 = 77.55A
- Accordingly, the products with the following rating would be suitable.

Product	Unit	Collector arm
Tro-Reel HS <Non-Tension Type>	90A	30A
High-Tro-Reel <Non-Tension Type>	——	——
High-Tro-Reel <Tension Type>	90A	30A
Tro-Reel	150A	30A

3. Two or more loads, at least one of which is a motor



(1) If the total rated current of the motor(s) is less than that of the other loads:
Applicable rating is ≥ 1 time the total rated current of the whole load.

(2) When the total rated current of the motor(s) is more than that of other loads:

- If the total rated current of the motor(s) is less than 50A:
  Applicable rating is ≥ (1.25 times the total rated current of the motor(s)) + (1 time the total rated current of other loads).
- If the total rated current of the motor(s) is more than 50A:
  Applicable rating is ≥ (1.1 times the total rated current of the motor(s)) + (1 time the total rated current of other loads).

Example calculation

(1) When the total rated current of the motor(s) is less than that of other loads:

- Three 0.75kW motors (load current of 4.7A) and three 1.7kW heaters (load current of 4.9A) are used.
- Total load current = (4.7A × 3) + (4.9A × 3) = 28.8A
- Accordingly, the products with the following rated current would be suitable.

Product	Unit	Collector arm
Tro-Reel HS <Non-Tension Type>	90A	30A
High-Tro-Reel <Non-Tension Type>	60A	30A
High-Tro-Reel <Tension Type>	60A	30A
Tro-Reel	60A	30A

(2) When the total rated current of the motor(s) is more than that of other loads:

- Two 3.7kW motors (load current of 17A) and two 2kW/3ϕ heaters (load current of 5.77A) are used.
- Total load current = (17A × 2 × 1.25) + (5.77A × 2) = 54.04A
- Accordingly, the products with the following rated current should be suitable.

Product	Unit	Collector arm
Tro-Reel HS <Non-Tension Type>	90A	30A
High-Tro-Reel <Non-Tension Type>	60A	30A
High-Tro-Reel <Tension Type>	60A	30A
Tro-Reel	60A	30A

■Notes regarding calculation

(1) Determine the motor load current by calculation based on the nameplate, catalogue, indoor wiring regulations, and other pertinent regulations. For a general estimation, assume 4A per 1kW at 200V.

(2) If the demand factor, power factor and other relevant values are known, use them to correct the calculation for the load current. Also, try to select the most cost-effective setup, taking such points as additional power installation into consideration.

(3) For an overhead traveling crane, you may use the following equation for calculation.

$$\text{Total loads current} = \text{Main hoisting motor current} + \frac{\text{Auxiliary hoisting motor current} + \text{Traveling motor current} + \text{Traversing motor current}}{2}$$

■Effects of voltage drops

When the installed wiring is very long, voltage drops affect the motor and other loads positioned far from the power supply. If the voltage drop is too extreme (according to calculation of drop at the farthest point from the power supply when the total load current is applied), the rated current on the wiring should be raised by one step, or the power supply points should be changed or increased in number. The voltage drop in between the distribution board and the power supply points should also be taken into account.

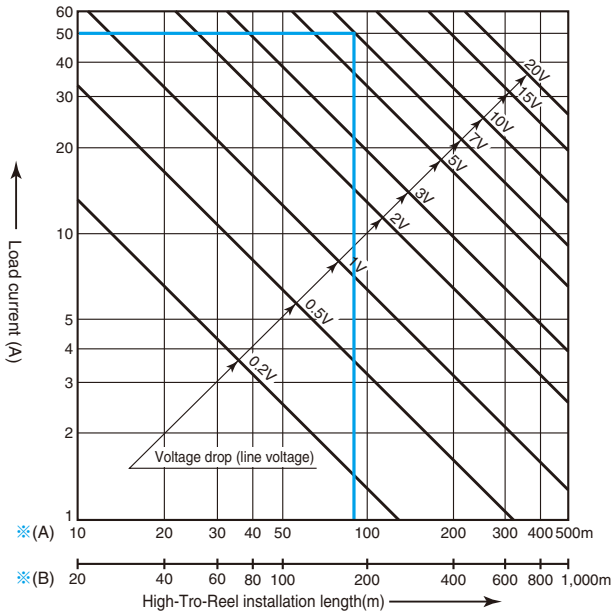
●Voltage drop calculation equation (three-phase, three-wire)

$E = \sqrt{3} \cdot I \cdot Z \cdot L$, where "I" is total rated load current (A), "Z" is impedance (Ω/m), and "L" is line length (m).

■Reading the charts

For example, assume that a 60A High-Tro-Reel has been installed for 90m, power is fed into the end of the unit, and the total rated current of the load is 50A. Mark the 90m point on the horizontal axis, and the 50A point on the vertical axis, and the intersection of the two lines indicates the voltage drop to be about 7V.

●High-Tro-Reel 60A (three-phase, three-wire)



※(A)represents the length when power is fed into only one end.
※(B)represents the length when power is fed into both ends or at the center.

■Legal restrictions on insulated trolley installation in Japan

Bare trolley wires and insulated trolleys (including Tro-Reel HS, High-Tro-Reel and Tro-Reel), used to supply power to low-voltage mobile electrical equipment, are called "contact wires," and are subject to the following detailed stipulations under the Regulations on Electrical Installation.

1) Location of use
2) Materials and structure
3) Wire supporting intervals
4) Distance between wires
5) Clearance from building structures
6) Clearance from other wiring and piping
7) Circuit protection
8) Prohibited installation locations

The following section discusses some of the main items from the above list and compares insulated trolleys and bare trolley wires.

■Restrictions on location of use

Bare trolley wires	Insulated trolleys
Must be installed at least 3.5m above floor level. Clearance of at least 2.3m vertically and 1.2m horizontally must be provided from ladders and inspection platforms.	Must be mounted somewhere that inspection is possible, but not in an area that unauthorized persons can access easily.

■Restrictions on distance between wires

Bare trolley wires	Insulated trolleys
Regardless of whether installed in an enclosed (but accessible) location or an open location, for horizontal installations, wires must be kept at least 14cm away from other wires, and at least 20cm away from other wires for other installations.	No restrictions.

■Restrictions on clearance from building structures

Bare trolley wires	Insulated trolleys
Must be positioned at least 4.5cm away from building structures in moist or humid places, and at least 2.5cm in other places.	No restrictions.

■Restrictions on clearance from other indoor wiring and piping

Bare trolley wires	Insulated trolleys
Must be positioned at least 30cm away from other wires, signal lines, and water and gas pipes.	Must be positioned at least 10cm away from other wires, signal lines, and water and gas pipes.

■Excerpts from the Regulations on Electrical Installation

●Provisions regarding installation of bare trolley wires: Article 173, Paragraph 2 (outline)

Installation of low-voltage contact wires must conform to the following items when the insulator-supported wiring is placed in an open indoor place, except cases in which wires are placed inside machinery.

1. Wires must be placed at an elevation of at least 3.5m from the floor, and must not be installed in a place easily accessible to unauthorized persons (following passages omitted).
2. Wires must be at least 2.3m above and 1.2m laterally separated from walkways, stairs, ladders, inspection platforms (excluding platforms used specifically for wire inspection that are equipped with locking devices to prevent access by unauthorized persons), and other similar articles installed on construction and traveling cranes, except in cases where appropriate protectors are provided.

●Main points regarding insulated trolley installation: Article 173, Paragraph 6 (outline)

① Insulated trolleys must not be installed in a place easily accessible to unauthorized persons.
② Insulated trolleys and accessories must conform to quality standards.
③ Openings must be directed downward or sideways.
④ Trolley ends must be insulated.
⑤ Tension must be applied to both ends so that wires are securely fastened (in addition to being fixed at support points).
⑥ Hangers must be:
  a) placed at intervals of 6m or less when sufficient tension is applied.
  b) placed at the following intervals where tension cannot be applied because of location (curves, etc.) or materials:
  –2m or less for conductors with a cross-sectional area less than 500㎟ (1m or less for curved sections with radius of 3m or less).
  –3m or less for conductors with a cross-sectional area of 500㎟ or more (1m or less for curved sections with radius of 3m or less).
⑦ Collector devices must be arranged so that they will not touch any building structures.
⑧ Outdoor-use hangers or outdoor-use retaining fixtures must be used in humid or moist areas.
⑨ When installing insulated trolleys outdoors or along outside walls of buildings, they should be placed so that water can not penetrate or accumulate around them.

As can be seen from the above, insulated trolleys are much more advantageous than bare trolley wires in terms of restrictions on installations.

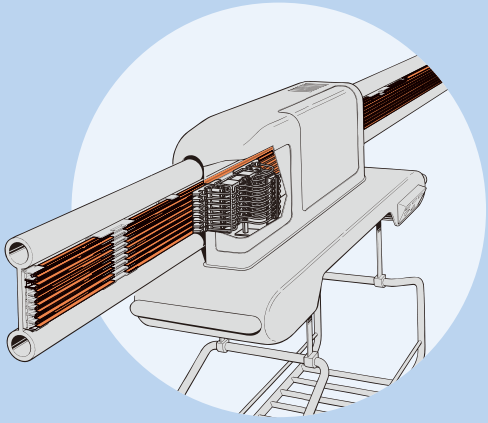
Insulated trolleys have:

①no restrictions regarding elevation from the floor.
(However, it must be positioned in a place that prevents accidental contact.)
②no restrictions regarding distance between wires.
③no restrictions regarding clearance from building structures.

Tro-Reel HS (High Speed)
<Non-Tension Type>

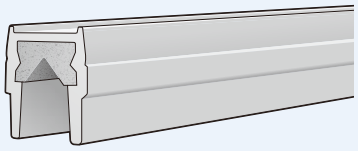
Indoor Use Insulated Trolleys · UL Listed

**The 3m long Tro-Reel HS units are installed consecutively along the side of the rail.
The units can manipulate motor conveyors through complex linear routes at high speeds.**



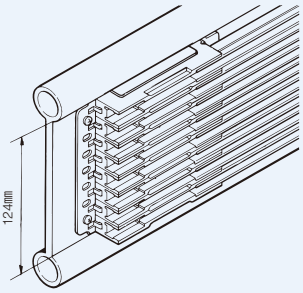
The V-shaped conductors provide a large contact surface area, ensuring a consistent power supply even at high speeds.

The conductors have a unique V shape that increases the contact area between the conductors and the collector arm.
As a result, the power supply is consistent, even when the conveyors are travelling at high speeds, effectively preventing such problems as separation from wires.



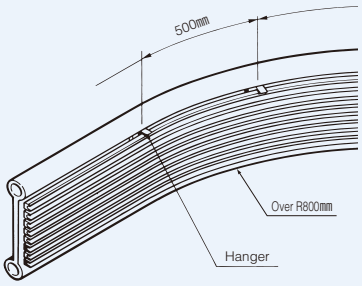
An 8P installation measures only 124mm in height. Easy setup even in confined spaces.

For precision control of conveyers, use of multiple control wires is essential. With the Tro-Reel HS, even when 8P is installed, the height remains just 124mm. (Depending on the combination of components used, installations larger than 8P are also possible. For details, contact us.)



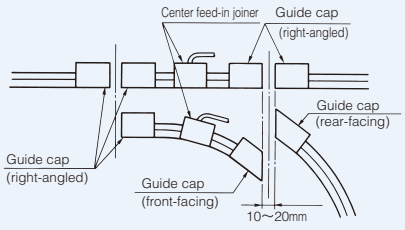
Easy installation of curved lines as tight as 800mm in radius.

Installation of curves with the Tro-Reel HS is very easy. The V-shaped conductor can be installed in curves as tight as 800mm in radius without the use of any special bending tools, so it's ideal even for complex layouts.



Easily adaptable to complex line configurations, such as sections with different voltages, insulated sections, turntables and traversers.

Installation of insulated sections and sections with different voltages is possible by simply inserting insulating pieces. By using a guide cap, the Tro-Reel HS can accommodate transfers between lines via turntables and traversers.



⚠Please follow the safety precautions on page 2.

Tro-Reel HS <Non-Tension Type> for indoor use only UL Listed

Unit : mm

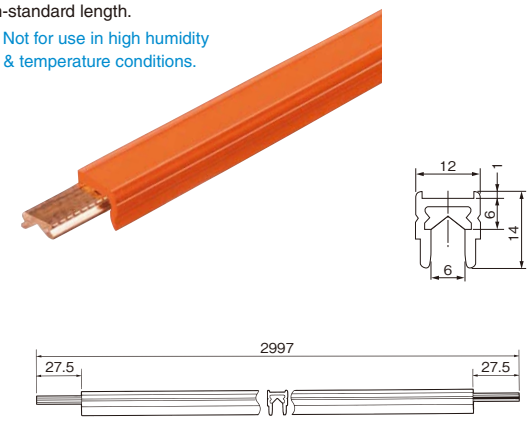
Note: Refer to page 41 for the products with CE Mark.

90A Tro-Reel HS unit (for indoor use only) UL Listed

- ●Rating: 600V, 90A
- ●Conductor material: Copper 28㎟
- ●Insulating sheath material: Rigid PVC (heat resistance: 75℃)
  Orange (hazard color)(Munsell 2.5YR 6/13)
  Ligth Blue(Munsell 5.5PB 5.2/10)

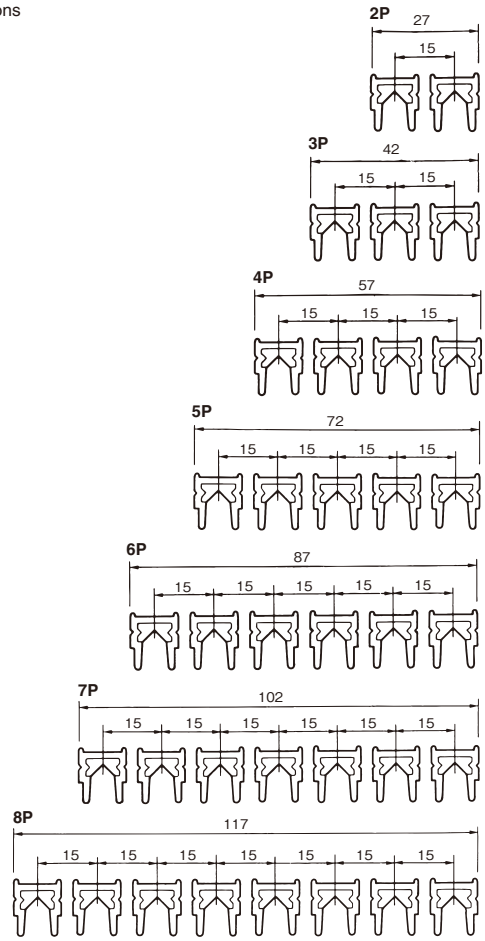
●Contact us in case of non-standard length.

Note: Not for use in high humidity & temperature conditions.



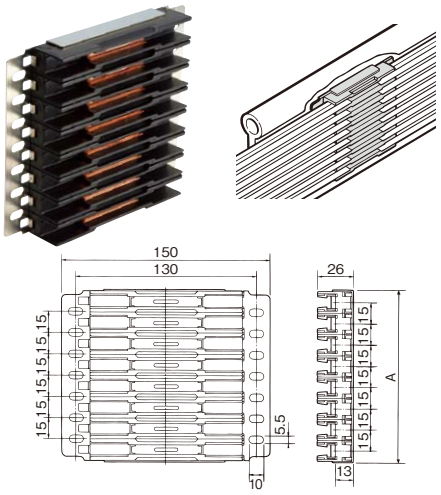
Cat. No.	Sheath color	Rating	Standard length	Weight (kg)	Units per box	Units per carton
DH5801	Orange	600V90A	3m	1.00	—	20
DH5801L	Light Blue	600V90A	3m	1.00	—	20

●Dimensions



Joiner UL Listed

Used to connect the Tro-Reel HS units together.
Joiners allow for expansion and contraction of the Tro-Reel HS units due to temperature fluctuations. Lock screw not included.



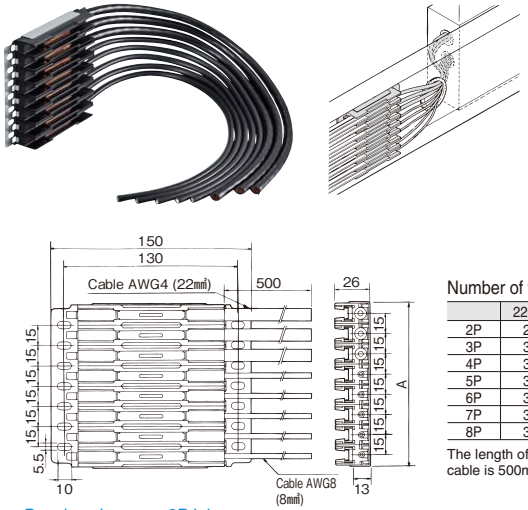
Drawing shows an 8P joiner.

Cat. No.	Rating	A	Weight (kg)	Units per box	Units per carton
DH5822	2P600V90A	33	0.14	—	40
UL **DH5823**	3P600V90A	48	0.17	—	40
UL **DH5824K**	4P600V90A	63	0.22	—	30
UL **DH5825K**	5P600V90A	78	0.28	—	20
UL **DH5826K**	6P600V90A	94	0.34	—	20
UL **DH5827K**	7P600V90A	109	0.39	—	20
UL **DH5828K**	8P600V90A	124	0.45	—	20

Center feed-in Joiner UL Listed

Equipped with power supply cables. Simultaneously supplies power and connects the Tro-Reel HS units together. Lock screw not included.

Note: Cannot be used as an end feed.



Drawing shows an 8P joiner.

Number of feedcables

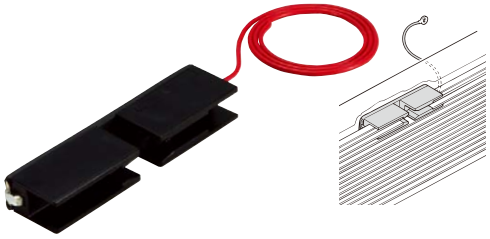
	22㎟	8㎟
2P	2	—
3P	3	—
4P	3	1
5P	3	2
6P	3	3
7P	3	4
8P	3	5

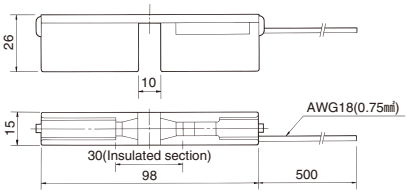
The length of a feed cable is 500mm.

Cat. No.	Rating	A	Weight (kg)	Units per box	Units per carton
DH5862	2P600V90A	33	0.43	1	10
UL **DH5863**	3P600V90A	48	0.64	1	10
UL **DH5864**	3P600V90A 1P600V30A	63	0.77	1	10
UL **DH5865**	3P600V90A 2P600V30A	78	0.89	1	10
UL **DH5866**	3P600V90A 3P600V30A	94	1.02	1	10
UL **DH5867**	3P600V90A 4P600V30A	109	1.14	1	10
UL **DH5868**	3P600V90A 5P600V30A	124	1.26	1	10

Insulating piece — UL Listed

Used to separate circuits by providing an insulated section on the line. In addition to providing insulation between two circuits, it feeds power to one of the separated circuits.

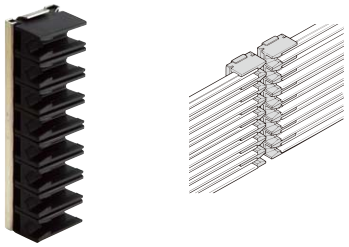


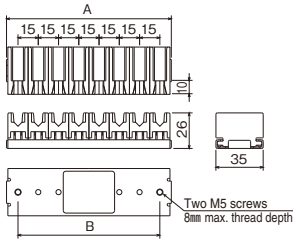


Cat. No.	Rating	Weight (kg)	Units per box	Units per carton
DH5886K	300V1A	0.03	1	60

Guide cap (right-angle cut) — UL Listed

Used to guide the collector arms from one straight section to another via turntables and traversers. Also used as an end cap for closing off the end of a Tro-Reel HS unit.



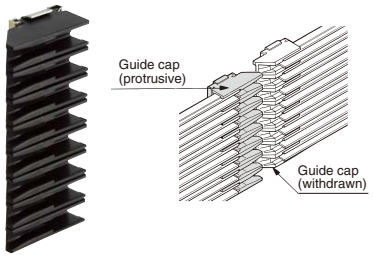


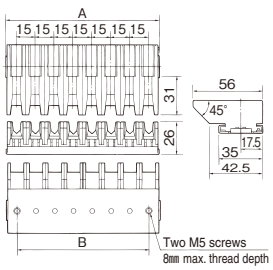
Drawing shows an 8P guide cap.

	Cat. No.	Type	A	B	Weight (kg)	Units per box	Units per carton
	DH5832	For 2P	32	15	0.03	—	50
UL	**DH5833**	For 3P	47	30	0.03	—	50
UL	**DH5834K**	For 4P	62	45	0.04	—	35
UL	**DH5835K**	For 5P	77	60	0.05	—	35
UL	**DH5836K**	For 6P	92	75	0.06	—	20
UL	**DH5837K**	For 7P	107	90	0.07	—	20
UL	**DH5838K**	For 8P	122	105	0.09	—	20

Guide cap (protrusive 45° cut) — UL Listed

Used to guide the collector arms from one curved section to another via traversers. The end is a front-facing 45° angle.



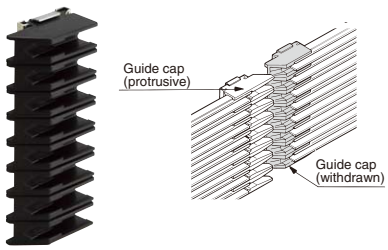


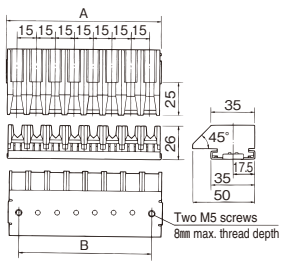
Drawing shows an 8P guide cap.

	Cat. No.	Type	A	B	Weight (kg)	Units per box	Units per carton
	DH5842	For 2P	32	15	0.04	—	45
UL	**DH5843**	For 3P	47	30	0.04	—	45
UL	**DH5844K**	For 4P	62	45	0.06	—	35
UL	**DH5845K**	For 5P	77	60	0.07	—	25
UL	**DH5846K**	For 6P	92	75	0.09	—	15
UL	**DH5847K**	For 7P	107	90	0.10	—	15
UL	**DH5848K**	For 8P	122	105	0.12	—	15

Guide cap (withdrawn 45° cut) — UL Listed

Used to guide the collector arms from one curved section to another via traversers. The end is a rear-facing 45° angle.





Drawing shows an 8P guide cap.

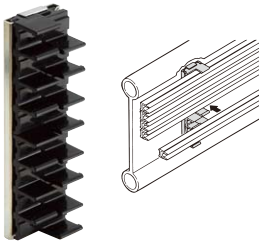
	Cat. No.	Type	A	B	Weight (kg)	Units per box	Units per carton
	DH5852	For 2P	32	15	0.04	—	45
UL	**DH5853**	For 3P	47	30	0.04	—	45
UL	**DH5854K**	For 4P	62	45	0.06	—	35
UL	**DH5855K**	For 5P	77	60	0.07	—	25
UL	**DH5856K**	For 6P	92	75	0.09	—	15
UL	**DH5857K**	For 7P	107	90	0.10	—	15
UL	**DH5858K**	For 8P	122	105	0.12	—	15

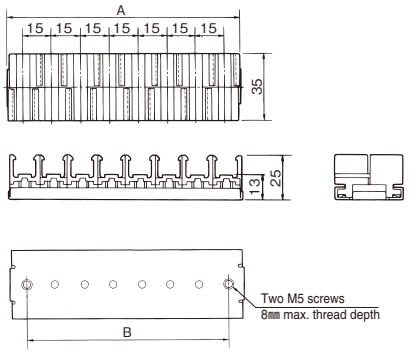
Hanger

UL Listed

Used to mount the Tro-Reel HS units on the side of the rail.
Hangers should be used at intervals of 600mm or less on straight sections and 500mm or less on curved sections.

Note: Contact us in case of using the hangers where solvents such as cutting oil may wet them directly.





Drawing shows an 8P hanger.

Cat. No.	Type	A	B	Weight (kg)	Units per box	Units per carton
DH5872	For 2P	32	15	0.03	—	50
UL **DH5873**	For 3P	47	30	0.03	—	50
UL **DH5874K**	For 4P	62	45	0.04	—	35
UL **DH5875K**	For 5P	77	60	0.05	—	35
UL **DH5876K**	For 6P	92	75	0.06	—	20
UL **DH5877K**	For 7P	107	90	0.06	—	20
UL **DH5878K**	For 8P	122	105	0.07	—	20

Collector arms

UL Listed

Attached to the moving equipment and used to supply power from the Tro-Reel HS unit to the equipment. Mount rod and mount plate types are available to fit mounting hardware

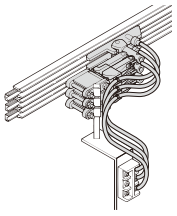
Length of lead wire 300mm

●Single type (for mount rod)

●Tandem type (for mount rod)

●Tandem type (for mount plate)

●Single type (no saddle)

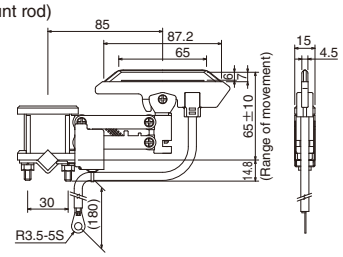


The collector arms should be replaced when it wears down to the replacement indication line. Typical collector service life is approximately 20,000km.

Cat. No.	Type	Rating	Weight (kg)	Units per box	Units per carton
DH58901K1	Single (for mount rod)	1P600V30A	0.14	1	16
DH58911K1	Tandem (for mount rod)	1P600V30A×2	0.23	1	16
DH58912K1	Tandem (for mount plate)	1P600V30A×2	0.23	1	16
DH58920K1	Single (no saddle)	1P600V30A	0.11	1	16

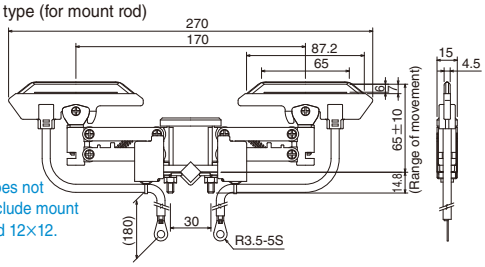
●Single type (for mount rod)

Note: Does not include mount rod 12×12.



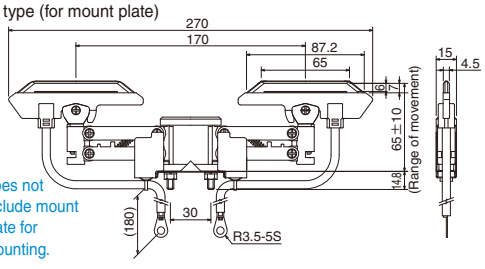
●Tandem type (for mount rod)

Note: Does not include mount rod 12×12.

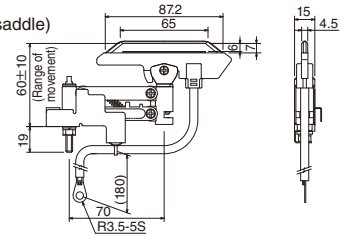


●Tandem type (for mount plate)

Note: Does not include mount plate for mounting.



●Single type (no saddle)



Collector arm supporter

These components are mounted on the collector arm.
They keep the arm horizontal and minimize uneven abrasion of the collector shoe.
It is also possible to mount them on existing collector arms.

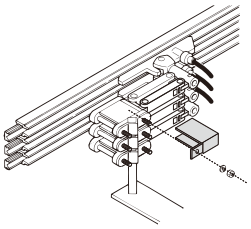
Note: UL standards do not apply.

●For single type (no saddle)

●For tandem type and single type (for mount rod)

※Two units are required when mounting on the tandem type.

●For tandem type (for mount plate)

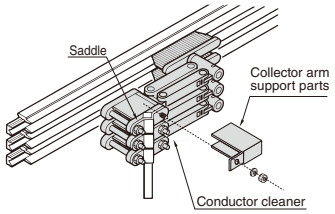


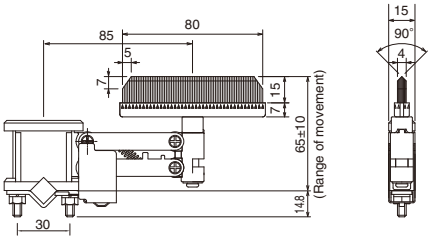
Cat. No.	Type	Weight (kg)	Units per box	Units per carton
DH58870	Single (no saddle)	0.013	12	120
DH58871	Tandem, single (for mount rod)	0.007	12	120
DH58872	Tandem (for mount plate)	0.017	12	120

Conductor cleaner

This nylon brush is used to clean the conductor surface of the Tro-Reel HS units.

Note: UL standards do not apply.



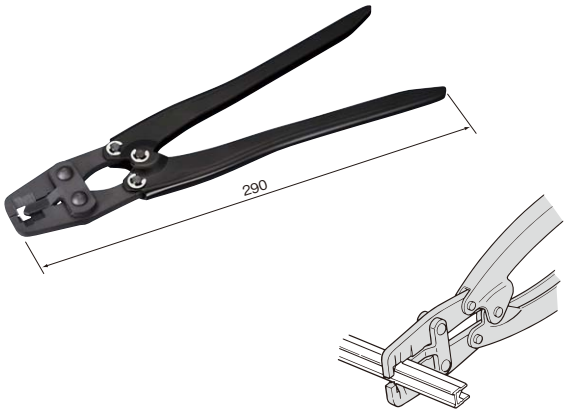


Cat. No.	Type	Weight (kg)	Units per box	Units per carton
DH58851K1	Single (for mount rod)	0.11	1	16

Sheath cutter

This labor-saving tool makes it possible to cut the insulating sheath of the Tro-Reel HS units with just one hand.

Note: UL standards do not apply.

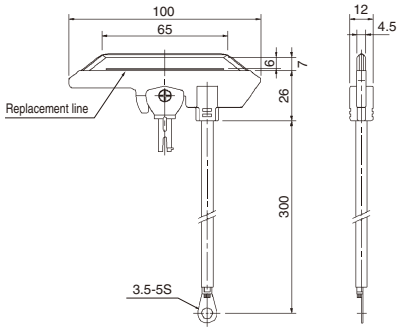


Cat. No.	Weight (kg)	Units per box	Units per carton
DH5884K1	0.40	1	10

Collector (replacement part)

Note: UL standards do not apply.

Note: This collector is a replacement part for using collector arms which are of an earlier type than the collector arms listed on page 19 of this catalog.

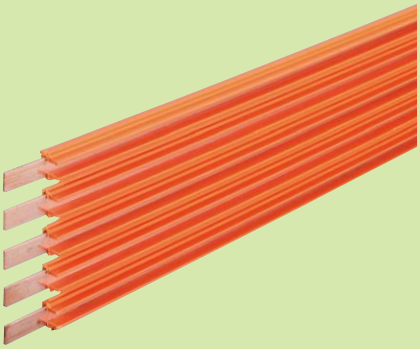


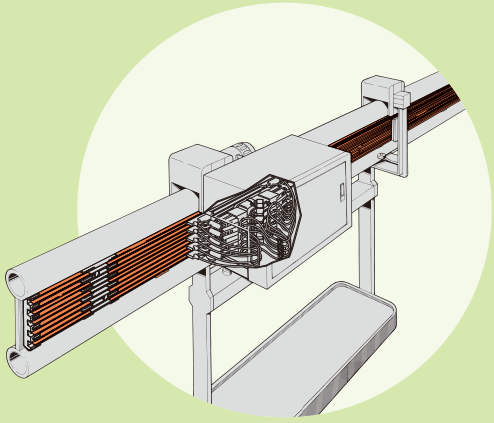
Cat. No.	Rating	Weight (kg)	Units per box	Units per carton
DH5883K	1P600V30A	0.06	10	100

High-Tro-Reel
<Non-Tension Type>

Multi-Lead Indoor Use Insulated Trolleys · UL Listed

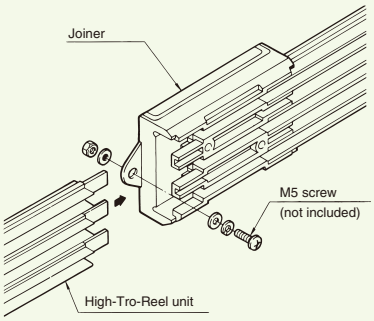
The 3m long High-Tro-Reel units are installed consecutively along the side of the rail. Recommended for powering auto conveyors and monorails.





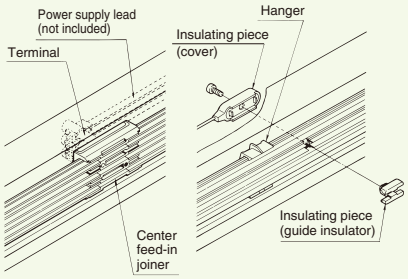
Compact and easy to install.

Multi-lead system allows setup even in confined spaces. Simply snap the unit onto the hanger. Using joiners when connecting the units vastly reduces setup time.



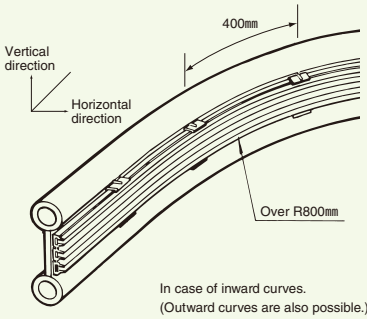
Flexible positioning of power supply points and circuit sections.

With its center-feeding method, power can be supplied from anywhere on the line. Sections with different voltages can be installed by simply inserting insulating pieces.



Installation on curved lines.

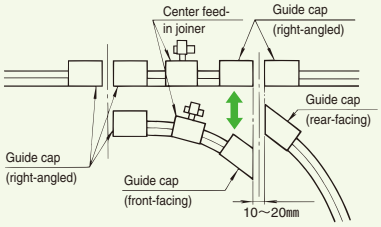
Use on vertical curves with a radius of as tight as 800mm is possible, so it's perfect for even multi-curve installations.
(Horizontal curves are not possible.)



In case of inward curves.
(Outward curves are also possible.)

Turntable/traverser applicability.

The guide cap enables smooth transfer of collector arms. Provides problem-free transfer between lines of different voltages in Flexible Manufacturing System (FMS) factories.



Power supply and commands transmitted simultaneously.

With a single 5P or 6P High-Tro-Reel unit, both three-phase power and control commands can be transmitted simultaneously. Moving/controlling systems for transfer robots and auto conveyors can be installed even in confined spaces.
(Please contact to ask us about more information.)

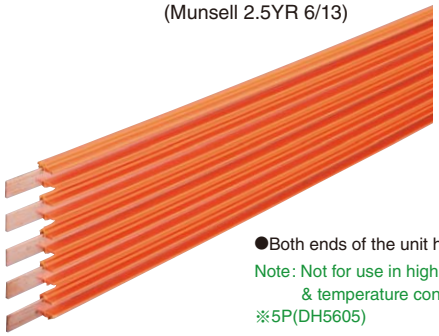
⚠Please follow the safety precautions on page 2.

High-Tro-Reel <Non-Tension Type> for indoor use only UL Listed

Unit : mm

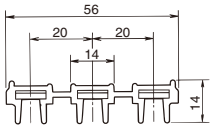
60A High-Tro-Reel units (for indoor use only) UL Listed

●Rating 3P, 4P, 5P, 6P at 600V, 60A
●Conductor materials Copper (8㎟) + Copper (20㎟)
●Insulating sheath material Rigid PVC (heat resistance: 75℃)
Orange (hazard color)
(Munsell 2.5YR 6/13)

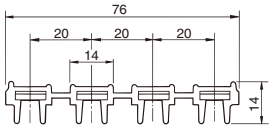


●Both ends of the unit have terminals.
Note: Not for use in high humidity & temperature conditions.
※5P(DH5605)

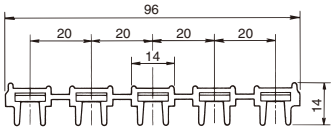
3P



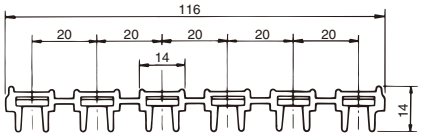
4P



5P



6P

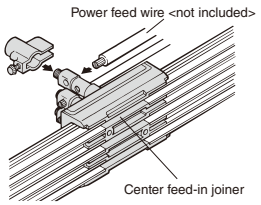


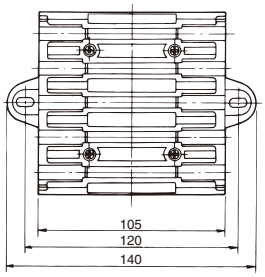
Cat. No.	Rating	Standard length	Weight (kg)	Units per box	Units per carton
DH5603	3P600V60A	3m	3.13	—	5
DH5604	4P600V60A	3m	4.18	—	5
DH5605	5P600V60A	3m	5.22	—	5
DH5606	6P600V60A	3m	6.27	—	5

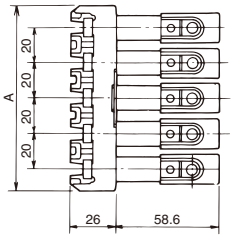
●60A units longer than 2997mm are available by special order (up to 6m)

Center feed-in joiner UL Listed

Used to supply power. Also used to connect the High-Tro-Reel units.
Note: Cannot be used as an end feed.
※5P(DH5615K)







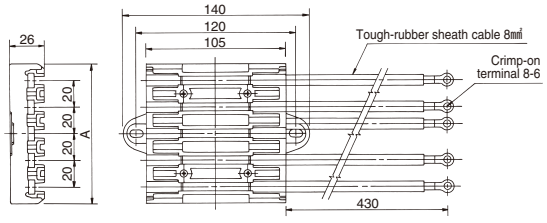
Drawing shows a 5P joiner.

Cat. No.	Rating	A	Weight (kg)	Units per box	Units per carton
DH5613K	3P600V60A	65	0.35	1	10
DH5614K	4P600V60A	85	0.46	1	10
DH5615K	5P600V60A	105	0.56	1	10
DH5616K	6P600V60A	125	0.66	1	10

Center feed-in joiner (side-cable type)

Used to supply power. Also used to connect the High-Tro-Reel units.

Note: UL Approval Pending
Note: Cannot be used as an end feed.
※3P(DH56131K)



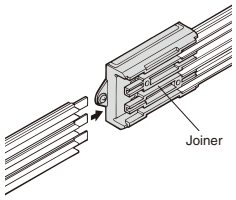
Drawing shows a 5P joiner.

Cat. No.	Rating	A	Weight (kg)	Units per box	Units per carton
DH56131K	3P600V60A	65	0.35	—	1
DH56141K	4P600V60A	85	0.46	—	1
DH56151K	5P600V60A	105	0.56	—	1
DH56161K	6P600V60A	125	0.66	—	1

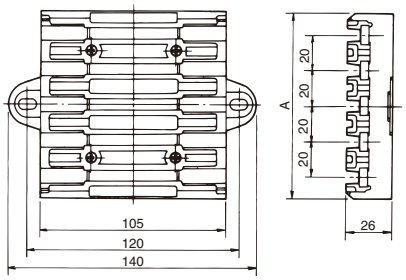
Joiner — UL Listed

Used to connect the High-Tro-Reel units together. Joiners allow for expansion and contraction of the units due to temperature fluctuations.

※5P(DH5625K)



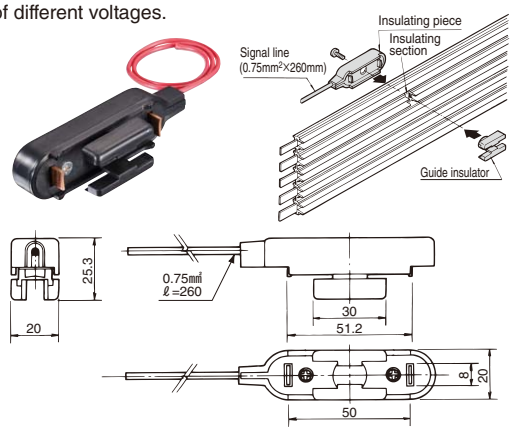
Cat. No.	Rating	A	Weight (kg)	Units per box	Units per carton
DH5623K	3P600V60A	65	0.21	1	20
DH5624K	4P600V60A	85	0.26	1	20
DH5625K	5P600V60A	105	0.32	1	20
DH5626K	6P600V60A	125	0.38	1	20



Drawing shows a 5P joiner.

Insulating piece — UL Listed

Used to separate circuits by providing an insulated section on the line. In addition to providing insulation between two circuits, it can also feed power of different voltages.



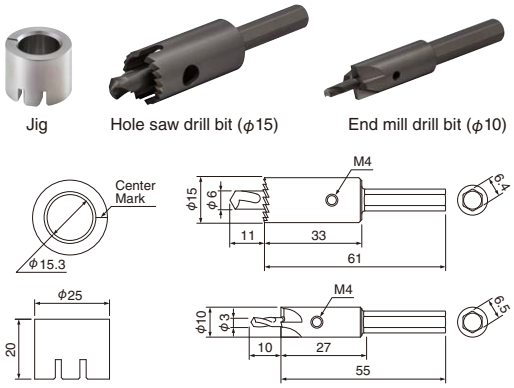
Cat. No.	Rating	Weight (kg)	Units per box	Units per carton
DH5681	1P300V1A	0.01	1	50

●Please use a special drill (DH5682K) for insulating piece installation.

Special drill attachments

Special tools for mounting insulating pieces on a unit.

Note : UL standards do not apply.



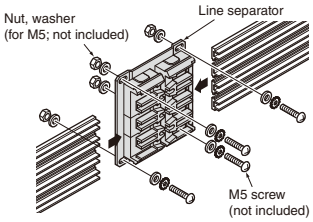
Cat. No.	Weight (kg)	Units per box	Units per carton
DH5682K	0.07	1	20

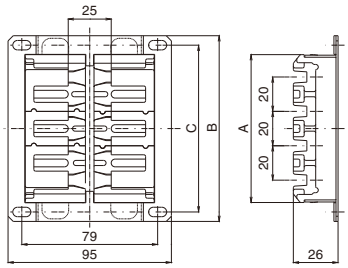
●The set consists of 2 different drills and a jig.

Line separator — UL Listed

Used to separate circuits by creating an insulated section partway along the line.

※4P(DH5664)





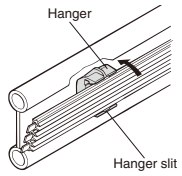
Drawing shows a 4P separator.

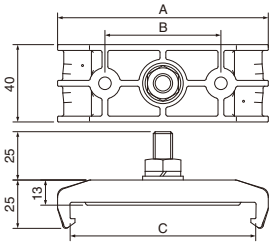
Cat. No.	Type	A	B	C	Weight (kg)	Units per box	Units per carton
DH5664	For 4P	86	108	97	0.20	1	10
DH5665	For 5P	106	128	117	0.23	1	10

Hanger — UL Listed

Used to mount the High-Tro-Reel units on the side of a rail. Can also be used with tension type units. Standard support interval is 400mm.

※5P(DH5775K2)





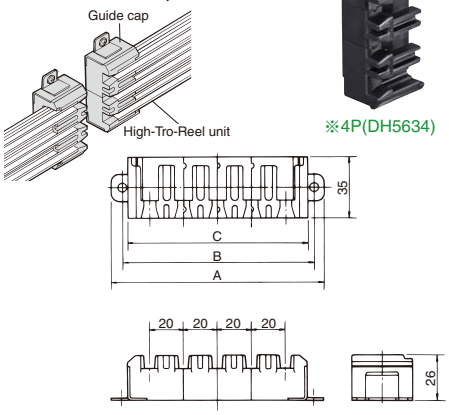
Drawing shows a 5P hanger.
ϕ6.5mm holes are not incorporated in 3P and 4P hangers.

Cat. No.	Type	A	B	C	Weight (kg)	Units per box	Units per carton
DH5773K2	For 3P	69	—	56	0.06	20	100
DH5774K2	For 4P	89	—	76	0.07	10	50
DH5775K2	For 5P	109	60	96	0.08	10	50
DH5776K2	For 6P	129	80	116	0.09	10	50

Guide cap (right-angle cut) UL Listed

Used to guide the collector arms from one straight section to another via turntables and traversers. Can be used as an end cap.

※4P(DH5634)



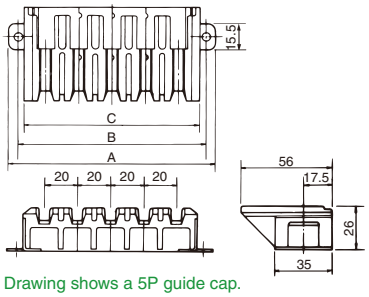
Drawing shows a 5P guide cap.

Cat. No.	Type	A	B	C	Weight (kg)	Units per box	Units per carton
DH5633	For 3P	85	73	66	0.05	1	30
DH5634	For 4P	105	93	86	0.06	1	30
DH5635	For 5P	125	113	106	0.08	1	30
DH5636	For 6P	145	133	126	0.09	1	30

Guide cap (protrusive 45° cut) UL Listed

Used to guide the collector arms from one curved section to another via traversers. The end is a front-facing 45° angle.

※5P(DH5645)



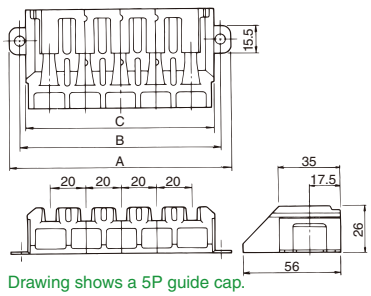
Drawing shows a 5P guide cap.

Cat. No.	Type	A	B	C	Weight (kg)	Units per box	Units per carton
DH5643	For 3P	85	73	66	0.07	1	30
DH5644	For 4P	105	93	86	0.09	1	30
DH5645	For 5P	125	113	106	0.11	1	30
DH5646	For 6P	145	133	126	0.13	1	30

Guide cap (withdrawn 45° cut) UL Listed

Used to guide the collector arms from one curved section to another via traversers. The end is a rear-facing 45° angle.

※5P(DH5655)



Drawing shows a 5P guide cap.

Cat. No.	Type	A	B	C	Weight (kg)	Units per box	Units per carton
DH5653	For 3P	85	73	66	0.07	1	30
DH5654	For 4P	105	93	86	0.09	1	30
DH5655	For 5P	125	113	106	0.11	1	30
DH5656	For 6P	145	133	126	0.13	1	30

Collector arms UL Listed

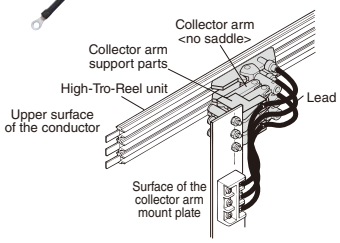
Attached to the moving equipment and used to supply power from the High-Tro-Reel units to the equipment. Mount rod and mount plate types are available to fit mounting hardware.

●Single type (for mount rod)

●Tandem type (for mount rod)

●Tandem type (for mount plate)

●Single type (no saddle)



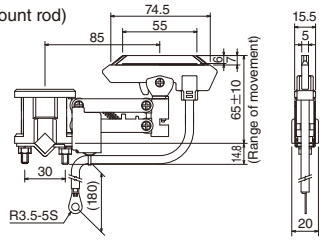
The collector arms should be replaced when it wears down to the replacement indication line. Typical collector service life is approximately 20,000km.

Length of lead wire 300㎜

Cat. No.	Type	Rating	Weight (kg)	Units per box	Units per carton
DH56901K1	Single (for mount rod)	1P600V30A	0.14	1	16
DH56911K1	Tandem (for mount rod)	1P600V30A×2	0.23	1	16
DH56912K1	Tandem (for mount plate)	1P600V30A×2	0.23	1	16
DH56920K1	Single (no saddle)	1P600V30A	0.11	1	16

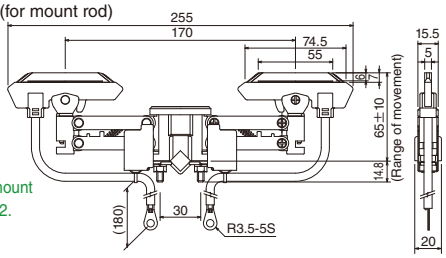
●Single type (for mount rod)

Note: Does not include mount rod 12×12.



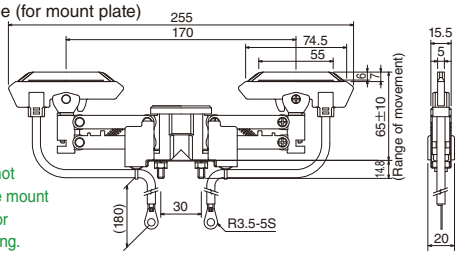
●Tandem type (for mount rod)

Note: Does not include mount rod 12×12.

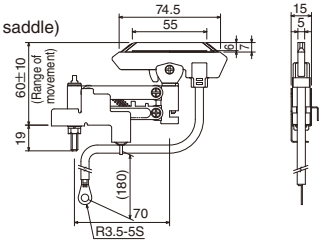


●Tandem type (for mount plate)

Note: Does not include mount plate for mounting.



●Single type (no saddle)



Collector arms (with flat connection terminals)

Collectors can be easily connected and disconnected to/from lead wires with just one motion.
Mount rod and mount plate types are available to fit mounting hardware.

Note : UL certification not yet obtained.

●Single type (for mount rod)

●Tandem type (for mount rod)

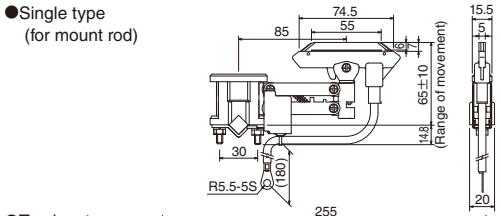
●Tandem type (for mount plate)

●Single type (no saddle)

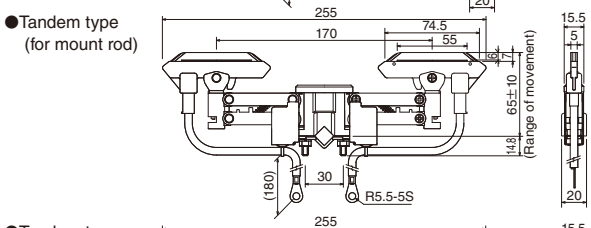
The collector arms should be replaced when it wears down to the replacement indication line. Typical collector service life is approximately 20,000km. Length of lead wire 300㎜

Cat. No.	Type	Rating	Weight (kg)	Units per box	Units per carton
DH56931K1	Single (for mount rod)	1P600V20A	0.14	1	16
DH56941K1	Tandem (for mount rod)	1P600V20A×2	0.23	1	16
DH56942K1	Tandem (for mount plate)	1P600V20A×2	0.23	1	16
DH56950K1	Single (no saddle)	1P600V20A	0.11	1	16

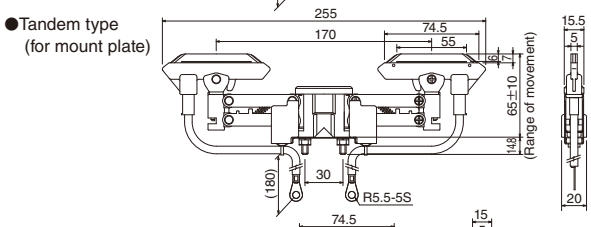
●Single type (for mount rod)



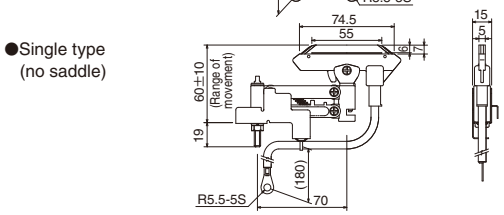
●Tandem type (for mount rod)



●Tandem type (for mount plate)



●Single type (no saddle)



Collector arm supporter

These components are mounted on the collector arm.
They keep the arm horizontal and minimize uneven abrasion of the collector shoe.
It is also possible to mount them on existing collector arms.

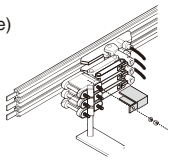
Note : UL standards do not apply.

●Single type (no saddle)

●Tandem type and single type (for mount rod)

※Two units are required when mounting on the tandem type.

●Tandem type (for mount plate)

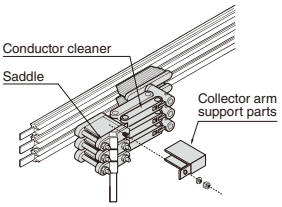


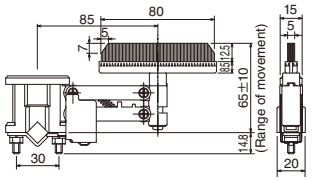
Cat. No.	Type	Weight (kg)	Units per box	Units per carton
DH58870	Single (no saddle)	0.013	12	120
DH58871	Tandem, Single (for mount rod)	0.007	12	120
DH58872	Tandem (for mount plate)	0.017	12	120

Conductor cleaner

This nylon brush is used to clean the conductor surface of the High-Tro-Reel units.

Note : UL standards do not apply.



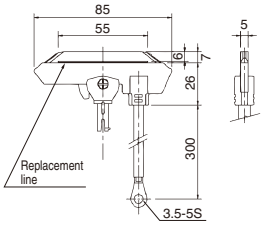


Cat. No.	Type	Weight (kg)	Units per box	Units per carton
DH56851K1	Single (for mount rod)	0.12	1	16

Collector (replacement part)

Note : UL standards do not apply.

Note : This collector is a replacement part for using with collector arms which are of an earlier type than the collector arms listed on page 25 of this catalog.



Length of lead wire 300㎜

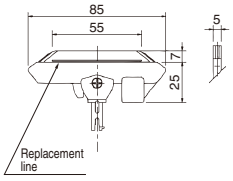
Cat. No.	Rating	Weight (kg)	Units per box	Units per carton
DH5683K3	1P600V30A	0.06	10	100

Collector (with flat connection terminals; replacement part)

Collectors can be easily connected and disconnected to/from lead wires with just one motion.

Note : UL standards do not apply.

Note : This collector is a replacement part for using with collector arms which are of an earlier type than the collector arms listed on page 26 of this catalog.

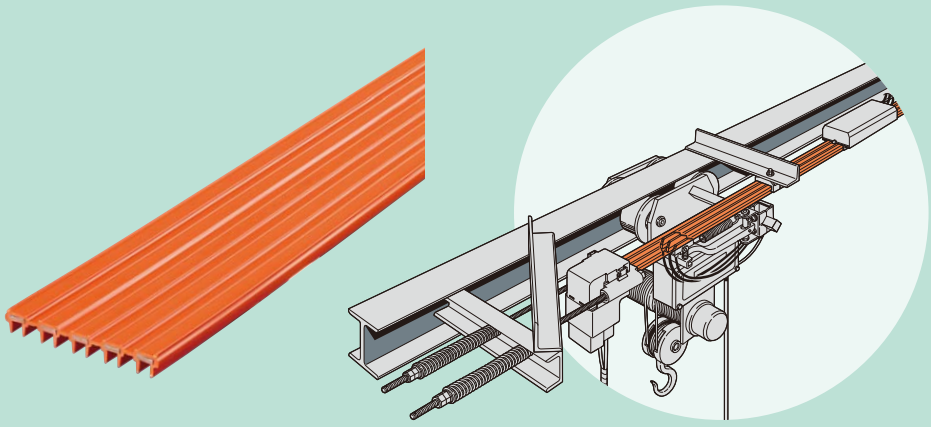


Cat. No.	Rating	Weight (kg)	Units per box	Units per carton
DH5684K2	1P600V20A	0.04	10	100

High-Tro-Reel
<Tension Type>

Multi-Lead Indoor Use Insulated Trolleys 3P·4P 60A UL Listed

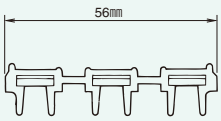
A recommended power supply system for hoists and cranes. Installed using tension applied to both ends of the unit.



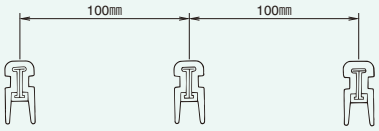
Reduces installation space to one-third.

Use of a multiple-lead system eliminates the need to provide space between leads as required in conventional insulated trolleys. This results in a space saving of 66% over the Tro-Reel insulated trolley.

●**High-Tro-Reel**

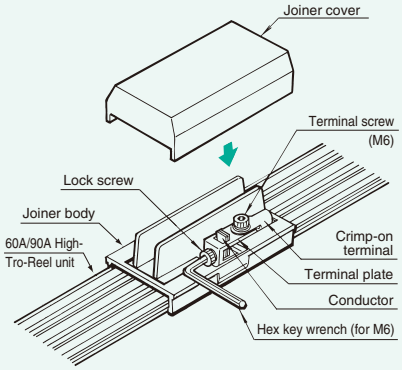


●**Tro-Reel**



50 meter jointless installation.

High-Tro-Reel coils are 50m long, so there is no need for joints in installations up to 50m. Using joiners can make even lines longer than 50m easy to install. With 60A and 90A units, joiners can supply power from anywhere on the line.



Reduces installation time.

Processes from unpacking to on-site cutting, setup, mounting onto the hangers and tension application can all be handled with the 3P unit. Its unique configuration eliminates the need for straightening and other adjustments after installation. This reduces installation time compared to conventional insulated trolleys.

Perfect for powering hoists and cranes.

4P and 5P types are ideal for hoists and cranes requiring multiple lead wiring (including control leads) in a confined space.

Dependable power collection during travel.

Since the collector arms maintain stable contact pressure, there is less chance for the collectors to become separated from wires due to vibration or swinging.

⚠**Please follow the safety precautions on page 2.**

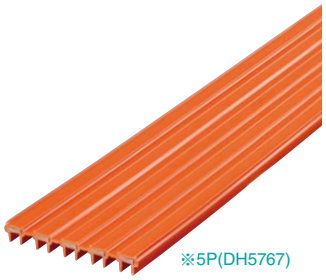
High-Tro-Reel <Tension Type> for indoor use only 3P·4P 60A UL Listed

Unit : mm

Note: Refer to page 43 for the products with CE Mark.

60A/90A High-Tro-Reel units (for indoor use only)

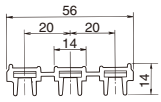
●Rating 3P, 4P, 5P at 600V, 60A, 90A
●Conductor materials 60A: Steel (8㎟) + Copper (20㎟),
90A: Copper (28㎟)
●Insulating sheath material Rigid PVC (heat resistance: 75℃)
Orange (hazard color)
(Munsell 2.5YR 6/13)



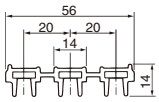
※5P(DH5767)

●Cross-section

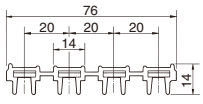
3P60A



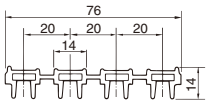
3P90A



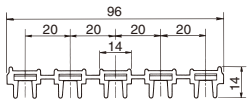
4P60A



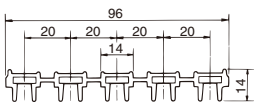
4P90A



5P60A



5P90A



60A

Cat. No.	Rating	Length	Weight (kg)
DH5761	3P 600V 60A	10m	10.2
DH5763		30m	30.5
DH5765		50m	50.9
DH5762	4P 600V 60A	10m	13.8
DH5764		30m	41.5
DH5766		50m	69.1
DH5767	5P 600V 60A	10m	17.1
DH5768		30m	51.3
DH5769		50m	85.4

60A (UL Listed)

Cat. No.	Rating	Length	Weight (kg)
DH5761U	3P 600V 60A	10m	10.2
DH5763U		30m	30.5
DH5765U		50m	50.9
DH5762U	4P 600V 60A	10m	13.8
DH5764U		30m	41.5
DH5766U		50m	69.1

※Available in coil form only. Contact us in case of non-standard length.

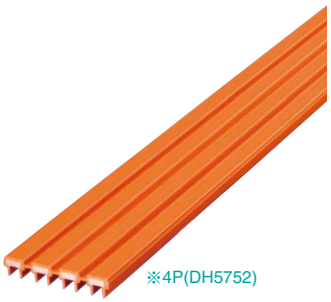
90A

Cat. No.	Rating	Length	Weight (kg)
DH5791	3P 600V 90A	10m	10.6
DH5793		30m	31.7
DH5795		50m	52.8
DH5792	4P 600V 90A	10m	14.2
DH5794		30m	42.6
DH5796		50m	71.0
DH5797	5P 600V 90A	10m	17.9
DH5798		30m	53.6
DH5799		50m	89.3

※Available in coil form only. Contact us in case of non-standard length.

150A/200A High-Tro-Reel units (for indoor use and machine interior use only)

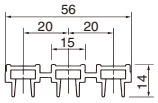
●Rating 3P, 4P at 600V, 150A, 200A
●Conductor material 150A/200A: Copper (46.2㎟),
●Insulating sheath materials 150A: Rigid PVC (heat resistance: 75℃)
200A: Rigid PVC (heat resistance: 95℃)
Orange (hazard color)
(Munsell 2.5YR 6/13)



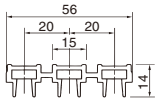
※4P(DH5752)

●Cross-section

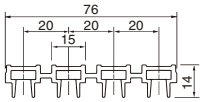
3P150A



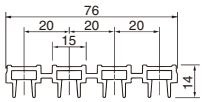
3P200A



4P150A



4P200A



150A

Cat. No.	Rating	Length	Weight (kg)
DH5751	3P 600V 150A	10m	15.2
DH5753		30m	45.5
DH5755		50m	75.8
DH5752	4P 600V 150A	10m	20.4
DH5754		30m	61.1
DH5756		50m	101.8

※Available in coil form only. Contact us in case of non-standard length.

200A

Cat. No.	Rating	Length	Weight (kg)
DH5731	3P 600V 200A	10m	15.2
DH5733		30m	45.5
DH5735		50m	75.8
DH5732	4P 600V 200A	10m	20.2
DH5734		30m	60.5
DH5736		50m	100.8

※Available in coil form only. Contact us in case of non-standard length.

End tention insulator

Attached to both ends of the High-Tro-Reel unit to absorb expansion and contraction due to temperature fluctuations.
For 60A, 90A, 150A, and 200A.

Note: Can be used with lines 100m or less in length.

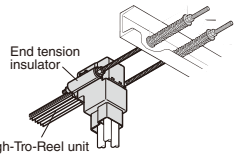
After setting the High-Tro-Reel unit, the terminal, and the terminal plate in the end tension insulator. The terminal plate and the terminal where fixed bolt M6×12 was tightened with the specified torque cannot be used again.

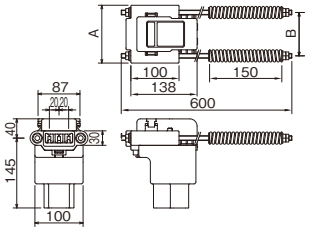
Don't use them again.

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

●With feed-in terminal (Cable side-out type).
For 60A, 90A, 150A and 200A.

※3P(DH57032K)

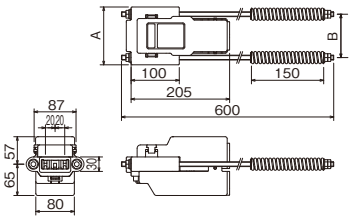




Drawing shows a 3P end tention insulator.

●With feed-in terminal (Cable bottom-out type).
For 60A, 90A, 150A and 200A.

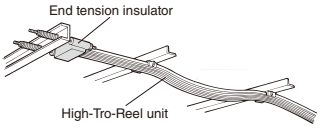
※3P(DH57034K)

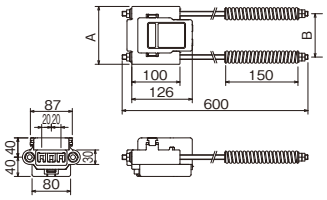


Drawing shows a 3P end tention insulator.

●Without feed-in terminal.
For 60A, 90A, 150A and 200A.

※3P(DH57132K)





Drawing shows a 3P end tention insulator.

	A	B
3P	120	90
4P	140	110
5P	160	130

●With feed-in terminal (Cable side-out type)

Cat. No.	Type	Weight (kg)	Units per box	Units per carton
DH57032K	For 3P	1.8	—	1
DH57042K	For 4P	2.1	—	1
DH57052	For 5P	2.4	—	1

●With feed-in terminal (Cable bottom-out type)

Cat. No.	Type	Weight (kg)	Units per box	Units per carton
DH57034K	For 3P	1.8	—	1
DH57044K	For 4P	2.1	—	1
DH57054	For 5P	2.4	—	1

●Without feed-in terminal

Cat. No.	Type	Weight (kg)	Units per box	Units per carton
DH57132K	For 3P	1.7	—	1
DH57142K	For 4P	2.0	—	1
DH57152	For 5P	2.3	—	1

End tension insulator for lateral movement

Tension insulator for use in short-distance line internal wiring such as in cranes. Since the end tension insulator comes equipped with inward-facing springs for tension application, the High-Tro-Reel provides the most effective use of factory space.

For installation procedures, please refer to the specialized installation manual.

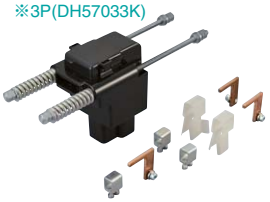
After setting the High-Tro-Reel unit, the terminal, and the terminal plate in the end tension insulator. The terminal plate and the terminal where fixed bolt M6×12 was tightened with the specified torque cannot be used again.

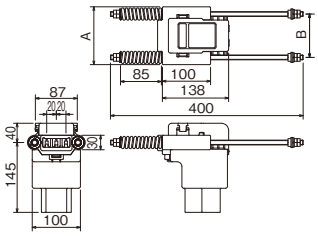
Don't use them again.

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

●With feed-in terminal (Cable side-out type).
For 60A, 90A, 150A and 200A.

※3P(DH57033K)

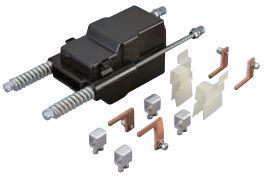


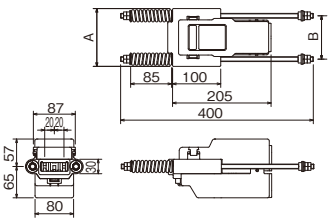


Drawing shows a 3P end tention insulator.

●With feed-in terminal (Cable bottom-out type).
For 60A, 90A, 150A and 200A.

※4P(DH57045K)

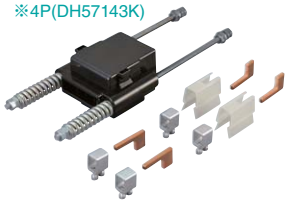


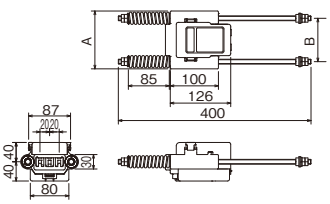


Drawing shows a 3P end tention insulator.

●Without feed-in terminal.
For 60A, 90A, 150A and 200A.

※4P(DH57143K)





Drawing shows a 3P end tention insulator.

	A	B
3P	120	90
4P	140	110
5P	160	130

●With feed-in terminal (Cable side-out type)

Cat. No.	Type	Weight (kg)	Units per box	Units per carton
DH57033K	For 3P	1.5	—	1
DH57043K	For 4P	1.8	—	1
DH57053	For 5P	1.8	—	1

●With feed-in terminal (Cable bottom-out type)

Cat. No.	Type	Weight (kg)	Units per box	Units per carton
DH57035K	For 3P	1.5	—	1
DH57045K	For 4P	1.8	—	1
DH57055	For 5P	1.8	—	1

●Without feed-in terminal

Cat. No.	Type	Weight (kg)	Units per box	Units per carton
DH57133K	For 3P	1.4	—	1
DH57143K	For 4P	1.7	—	1
DH57153	For 5P	1.7	—	1

Joiner

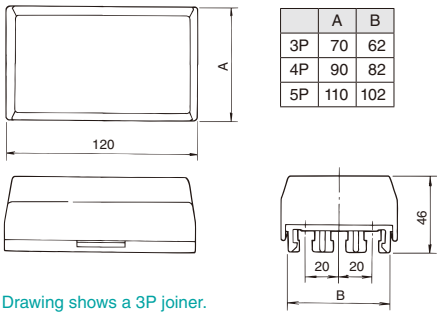
Used to connect the High-Tro-Reel units. Can also supply power from anywhere on the line (60A and 90A types).

●With feed-in terminal
For 60A and 90A

※4P(DH5724K2)

●With feed-in terminal
For 150A and 200A

※4P(DH5727K1)



Drawing shows a 3P joiner.

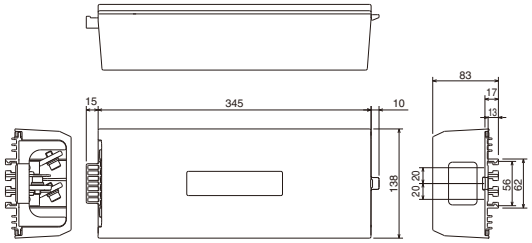
	A	B
3P	70	62
4P	90	82
5P	110	102

Cat. No.	Type	Rating	Weight (kg)	Units per box	Units per carton
DH5723K	For 3P, 60A/90A	3P 600V 90A	0.18	1	20
DH5724K2	For 4P, 60A/90A	4P 600V 90A	0.31	1	10
DH5725	For 5P, 60A/90A	5P 600V 90A	0.37	1	10
DH5726	For 3P, 150A/200A	3P 600V 200A	0.20	1	20
DH5727K1	For 4P, 150A/200A	4P 600V 200A	0.26	1	10

Center feed-in joiner

Used to feed power from anywhere on the line and connect the High-Tro-Reel units (150A and 200A types).
For 150A and 200A.

※4P(DH57271)



Drawing shows a 3P center feed-in joiner.

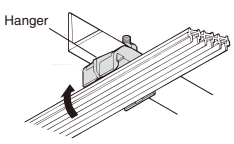
Cat. No.	Type	Rating	Weight (kg)	Units per box	Units per carton
DH57261	For 3P, 150A/200A	3P 600V 200A	1.9	—	1
DH57271	For 4P, 150A/200A	4P 600V 200A	2.2	—	1

Hanger

UL Listed

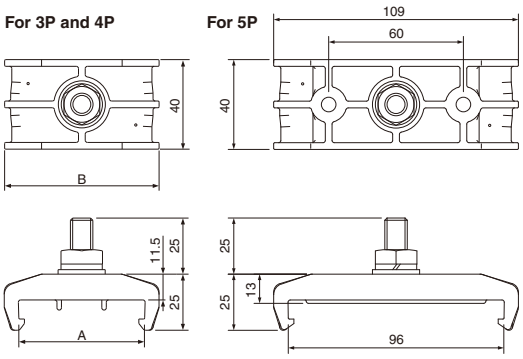
Used to mount the High-Tro-Reel units on the side of a rail.
Can also be used with tension type units. Standard support interval is 400mm.

※5P (DH5775K2)



For 3P and 4P

For 5P



Drawing shows 3P and 5P hangers.
3P and 4P types are not equipped with a ϕ 6.5mm hole.

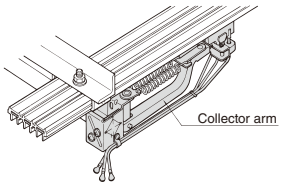
	A	B
3P	56	69
4P	76	89

Cat. No.	Type	Weight (kg)	Units per box	Units per carton
DH5773K2	For 3P	0.06	20	100
DH5774K2	For 4P	0.07	10	50
DH5775K2	For 5P	0.08	10	50

Collector arm

Attached to the moving equipment and used to supply power from the High-Tro-Reel unit to the equipment.

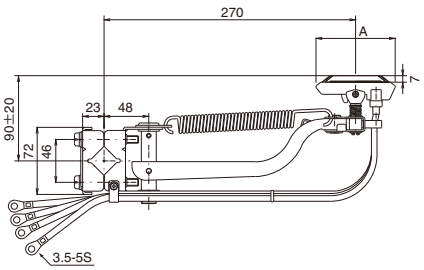
※4P(DH5744K3)



Cat. No.	Rating	Weight (kg)	Units per box	Units per carton
DH5743K3	3P 600V 30A	0.67	—	1
DH5744K3	4P 600V 30A	0.98	—	1
DH5745K2	5P 600V 30A	1.08	—	1
DH5746K2	3P 600V 60A	0.81	—	1
DH5747K2	4P 600V 60A	1.16	—	1
DH5748K2	5P 600V 60A	1.32	—	1
DH5741K2	3P 600V 100A	1.06	—	1
DH5742K2	4P 600V 100A	1.41	—	1

Collector arms can be linked together and used in tandem configuration when it is critical that the collectors are not separated from the wires.

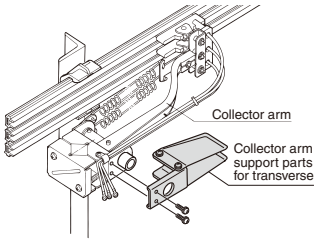
	A	Crimp-on terminal
30A	55	3.5-5S
60A	70	8-6
100A	95	14-6



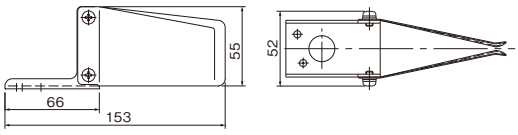
※Drawing shows 4P collector arm.

Collector arm support parts for transverese

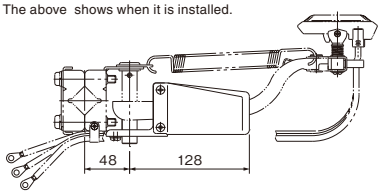
Applicate for 30A, 60A, and 100A collector arms.
When installing a collector arm horizontally, mounted collector arm support parts for transverse on base of the collector arm as shown.



Cat. No.	Weight (kg)	Units per box	Units per carton
DH5249K	0.13	1	24



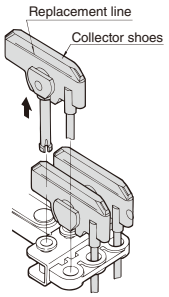
The above shows when it is installed.



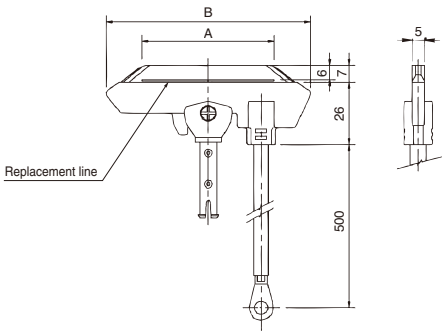
Collector (replacement parts)

The number of collectors in a set conforms to the number of poles.
Replace collectors when they wear down to the replacement indication line (approx. 5,000km).

※4P(DH5787K1)



Cat. No.	Rating	Units per box	Units per carton
DH5783K1	3P 600V 30A	1	30
DH5784K1	4P 600V 30A	1	20
DH5785K1	5P 600V 30A	1	20
DH5786K1	3P 600V 60A	1	30
DH5787K1	4P 600V 60A	1	20
DH5788K1	5P 600V 60A	1	20
DH5781K2	3P 600V 100A	1	20
DH5782K2	4P 600V 100A	1	10

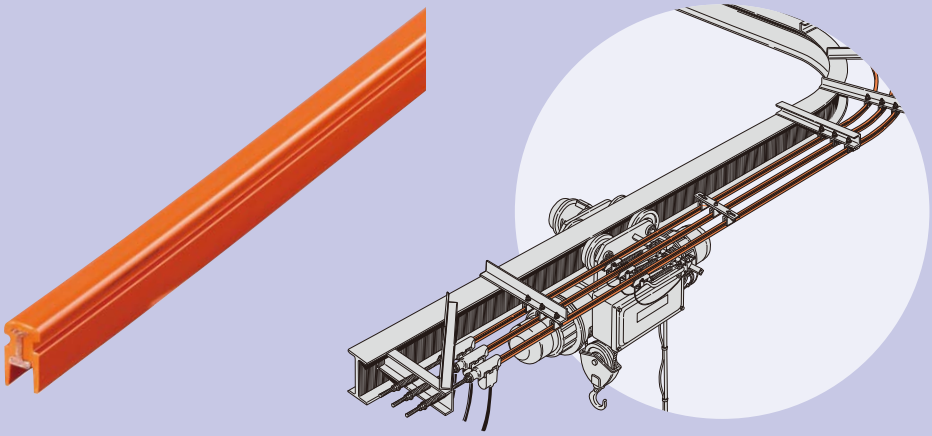


	A	B	Crimp-on terminal
30A	55	85	3.5-5S
60A	70	100	8-6
100A	95	125	14-6

Tro-Reel

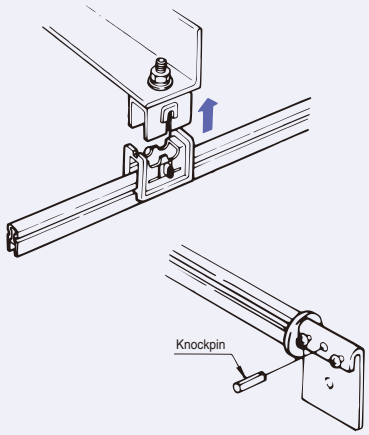
Single-Lead Insulated Trolleys for Indoor and Outdoor Use

Quickly installable trolley providing up to 100m of jointless reel. Choose from 300A, 200A, 150A, 60A types depending on your load.



Simple installation and on-site adjustment.

The Tro-Reel can be installed in the same way as bare trolley wires, simply by securing one end, applying pressure to the other end, and supporting the unit with hangers at intervals of less than 4m (for standard installations). Attachment and removal of hangers are also quick and easy, and end tension is controlled with a simple knockpin. Even unpacking it is simple, requiring only a minimum of labor and tools. All cutting and bending needed to match the line can be done on-site.



Different types for different capacities.

Tro-Reel is available in four types (300A, 200A, 150A, 60A) to cover a wide range of capacities. This provides a large power savings by allowing the selection of the exact rating of the hoist or crane being used.

Selection guide

Rating (A)	Electric hoists			Cranes			Travel distance	
	Less than 5t	5t or more	Less than 10t	Less than 5t	5t or more	10t or more	Short	Long
60A	○			○			○	
150A		○			○			○
200A			○			○		○
300A			○			○		○

Easy installation of special lines.

Special lines including curved lines, endless lines, switching tracks (turntables and traversers), circuit separation, vertical curves and outdoor lines are all easy to install. Downward-facing and horizontal facing installations are also possible.

Up to a 100 meters without a joint.

The Tro-Reel units are extra-long so installations of up to 100m are possible without any joints. (Installation of lengths longer than 100m is also possible using intermediate tension insulators.)

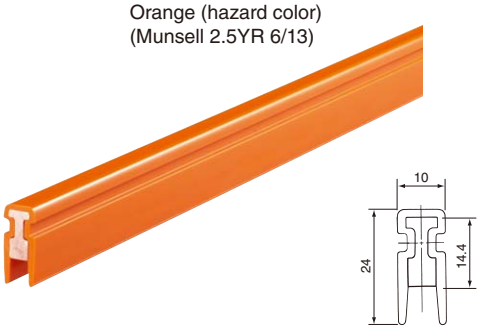
Dependable power collection during travel.

Since the collector arms maintain stable contact pressure, there is less chance for the collectors to become separated from the leads due to vibration or swinging.

⚠Please follow the safety precautions on page 3.

300A Tro-Reel unit (for indoor and outdoor use)

●Rating 600V, 300A
●Conductor material Copper 70㎟
●Insulating sheath material Rigid PVC (heat resistance: 95℃)
Orange (hazard color)
(Munsell 2.5YR 6/13)



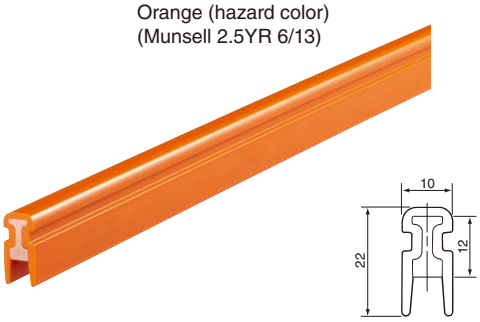
300A

Cat. No.	Product	Carton dimensions (mm)	Weight (kg)
DH5470	100m coil	1475×1475×50	80.0
DH5478	80m coil	1340×1340×50	64.8
DH5476	60m coil	1340×1340×50	48.6
DH5474	40m coil	1140×1140×50	33.4
DH5471	10m coil	1000×1000×50	8.6

Note: Available in coil form only.
Contact us in case of non-standard length.

200A Tro-Reel unit (for indoor and outdoor use)

●Rating 600V, 200A
●Conductor material Copper 46㎟
●Insulating sheath material Rigid PVC (heat resistance: 75℃)
Orange (hazard color)
(Munsell 2.5YR 6/13)



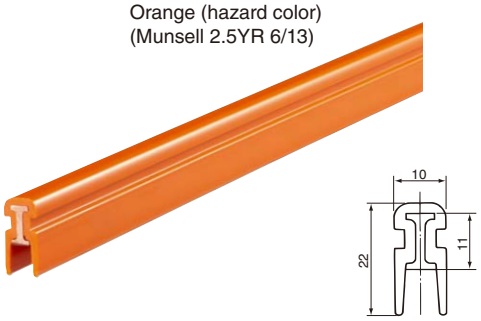
200A

Cat. No.	Product	Carton dimensions (mm)	Weight (kg)
DH5440	100m coil	1475×1475×50	59.0
DH5448	80m coil	1340×1340×50	48.0
DH5446	60m coil	1340×1340×50	37.0
DH5444	40m coil	1140×1140×50	26.0
DH5441	10m coil	1000×1000×50	6.4

Note: Available in coil form only.
Contact us in case of non-standard length.

150A Tro-Reel unit (for indoor and outdoor use)

●Rating 600V, 150A
●Conductor material Copper 30㎟
●Insulating sheath material Rigid PVC (heat resistance: 75℃)
Orange (hazard color)
(Munsell 2.5YR 6/13)



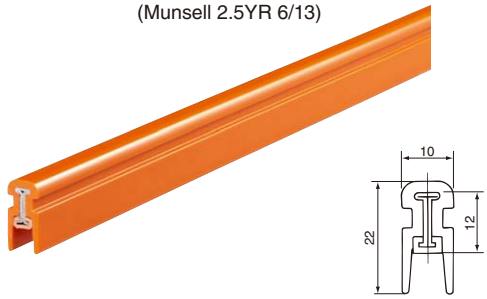
150A

Cat. No.	Product	Carton dimensions (mm)	Weight (kg)
DH5450	100m coil	1475×1475×50	45.0
DH5458	80m coil	1340×1340×50	36.0
DH5456	60m coil	1340×1340×50	28.0
DH5454	40m coil	1140×1140×50	20.0
DH5451	10m coil	1000×1000×50	5.4

Note: Available in coil form only.
Contact us in case of non-standard length.

60A Tro-Reel unit (for indoor and outdoor use)

●Rating 600V, 60A
●Conductor materials Steel (22.5㎟) + Copper (15㎟)
●Insulating sheath material Rigid PVC (heat resistance: 75℃)
Orange (hazard color)
(Munsell 2.5YR 6/13)



60A

Cat. No.	Product	Carton dimensions (mm)	Weight (kg)
DH5460	100m coil	1475×1475×50	47.0
DH5468	80m coil	1340×1340×50	39.0
DH5466	60m coil	1340×1340×50	29.0
DH5464	40m coil	1140×1140×50	21.0
DH5461	10m coil	1000×1000×50	5.0

Note: Available in coil form only.
Contact us in case of non-standard length.

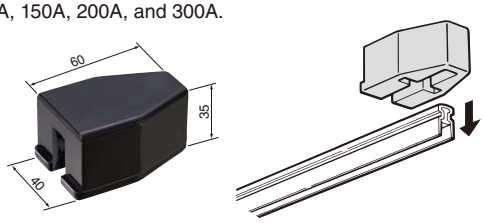
■Type of packing

Note: Unit to prevent the twist of the main unit body, please use DH5538K.

Product	Carton dimensions (mm)
	A×B
100m coil	1475×1475
80m coil	1340×1340
60m coil	1340×1340
40m coil	1140×1140
10m coil	1000×1000

Fixed end insulator

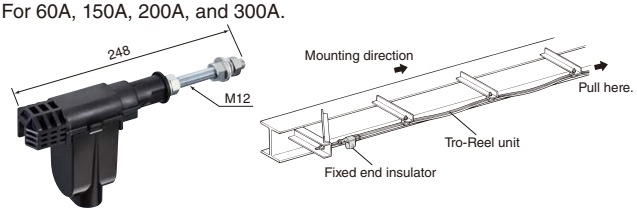
(with ϕ5mm knock pin)
This insulator is mounted on the end of the Tro-Reel to apply tension.
For 60A, 150A, 200A, and 300A.



Cat. No.	Weight (kg)	Units per box	Units per carton
DH5513	0.1	3	45

Fixed end insulator (with bolt)

(with securing terminal and ϕ5mm knock pin)
Mounted onto the end of the Tro-Reel unit to apply tension.
Equipped with a lock bolt. Cannot be used for supplying power.
For 60A, 150A, 200A, and 300A.

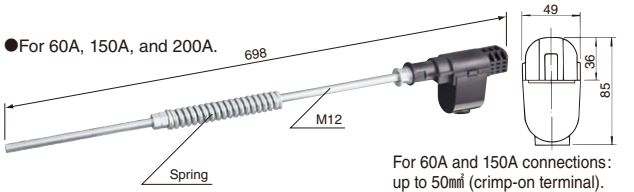


Cat. No.	Weight (kg)	Units per box	Units per carton
DH5514	0.65	1	3

End tension insulator

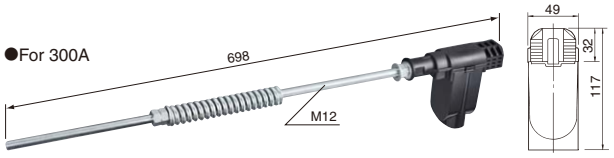
(with feed-in terminal and ϕ5mm knock pin)
This insulator applies tension to the end of the Tro-Reel to absorb expansion and contraction due to temperature fluctuations. A feed-in terminal is provided for power input.

●For 60A, 150A, and 200A.

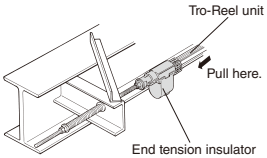


For 60A and 150A connections:
up to 50㎟ (crimp-on terminal).
For 200A connections: up to 100㎟
Crimp-on terminal not included.

●For 300A



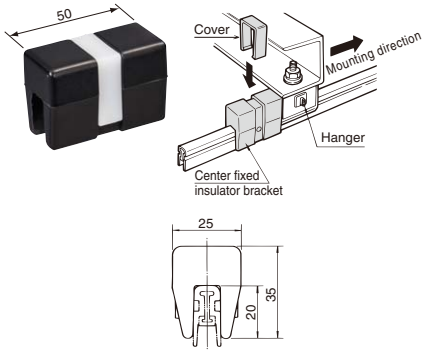
For 300A connections:
up to 150㎟ or 100㎟×2.
Crimp-on terminal not included.



Cat. No.	Type	Weight (kg)	Units per box	Units per carton
DH5512K	For 60A, 150A	0.75	1	3
DH5522K	For 200A	1.2	1	3
DH5532	For 300A	1.2	1	3

Center fixed insulator

(with ϕ5mm knock pin)
When the Tro-Reel is installed along a horizontal curve, this insulator is attached between the straight section and the curved section to apply tension to the straight section.
For 60A, 150A, 200A, and 300A.

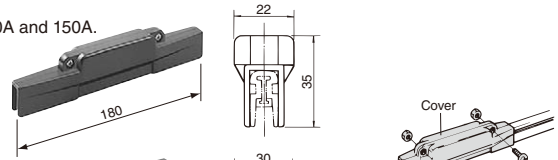


Cat. No.	Weight (kg)	Units per box	Units per carton
DH5515	0.06	3	90

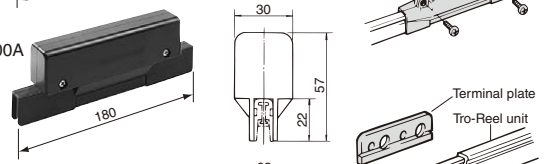
Joiner

Used to connect Tro-Reel units. (Feed-in terminal not included.)

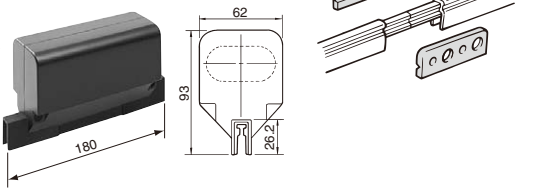
For 60A and 150A.



For 200A



For 300A

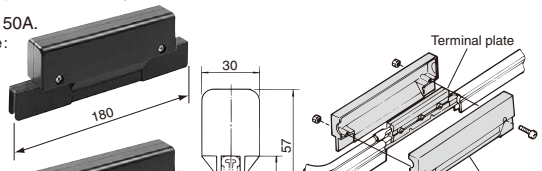


Cat. No.	Type	Weight (kg)	Units per box	Units per carton
DH5561K	For 60A, 150A	0.13	1	10
DH5563K	For 200A	0.4	1	20
DH5566	For 300A	0.4	1	6

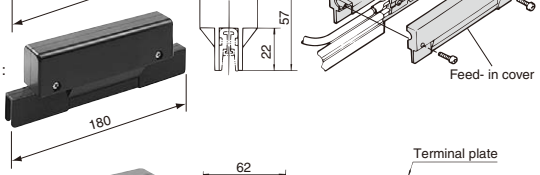
Center feed-in joiner

(with feed-in terminal and ϕ5mm knock pin)
Used to feed power from anywhere on the line and connect the Tro-Reel units.

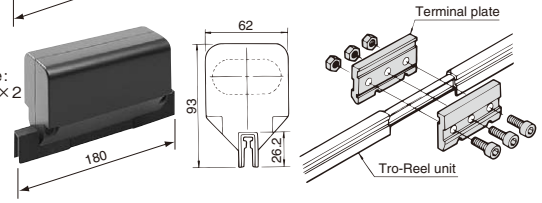
For 60A and 150A.
Compatible wire:
50㎟ or less



For 200A
Compatible wire:
60 - 100㎟



For 300A
Compatible wire:
150㎟ or 100㎟×2

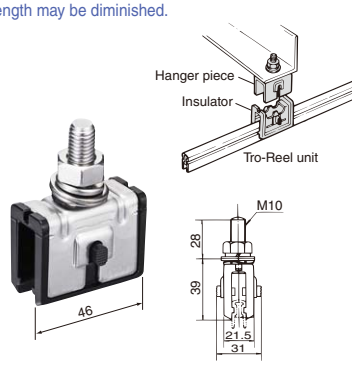


Cat. No.	Type	Weight (kg)	Units per box	Units per carton
DH5562K	For 60A, 150A	0.35	1	20
DH5564K	For 200A	0.73	1	20
DH5565	For 300A	0.53	1	6

Standard hanger

This hanger is a support bracket used to attach the Tro-Reel units to a building structure.
For 60A, 150A, 200A, and 300A.

Note : When using in locations where it may come into direct contact with cutting oil, etc., or in acidic atmospheres, strength may be diminished.

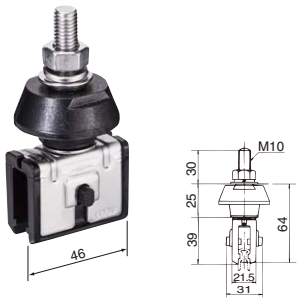


Cat. No.	Weight (kg)	Units per box	Units per carton
DH5516K	0.12	30	120

Hanger with insulator

Used to attach the Tro-Reel units to a building structure. Especially effective for installation outdoors and in dusty places.
For 60A, 150A, 200A, and 300A.

Note : When using in locations where it may come into direct contact with cutting oil, etc., or in acidic atmospheres, strength may be diminished.

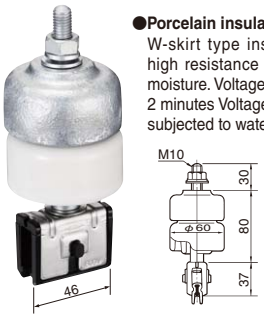


Cat. No.	Weight (kg)	Units per box	Units per carton
DH5517K	0.17	20	80

Hanger with porcelain insulator

For use in locations where corrosion resistance is especially important, such as coastal areas, cement plants, and sewage treatment facilities.
For 60A, 150A, 200A, and 300A.

Note : When using in locations where it may come into direct contact with cutting oil, etc., or in acidic atmospheres, strength may be diminished.



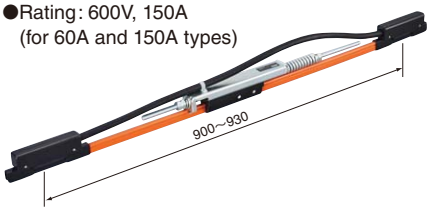
●Porcelain insulator attributes
W-skirt type insulator featuring high resistance to salt, dust and moisture. Voltage resistance: 15kV, 2 minutes Voltage resistance when subjected to water: 8kV, 1 minute

Cat. No.	Weight (kg)	Units per box	Units per carton
DH5520K	0.7	—	20

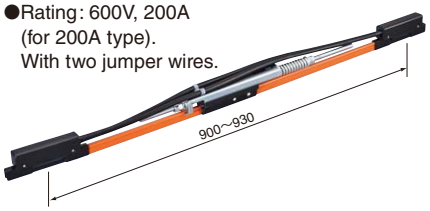
Intermediate tension insulator

Used for intermediate tension support on circular lines and straight lines longer than 100m.
It absorbs expansion and contraction due to temperature fluctuations.

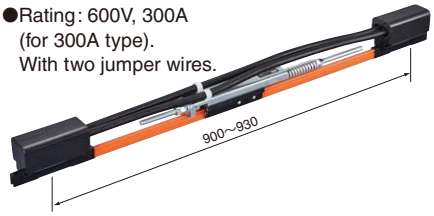
●Rating : 600V, 150A
(for 60A and 150A types)

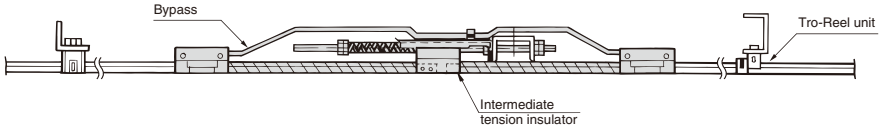


●Rating : 600V, 200A
(for 200A type).
With two jumper wires.



●Rating : 600V, 300A
(for 300A type).
With two jumper wires.



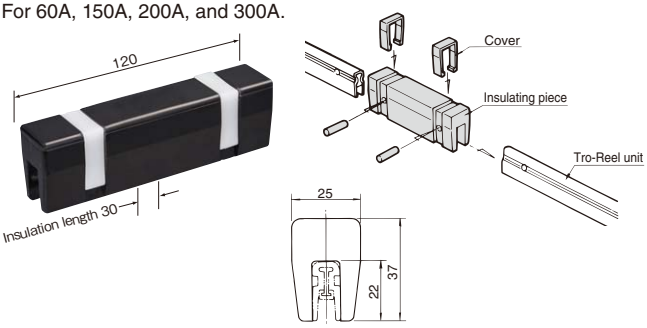


Cat. No.	Type	Weight (kg)	Units per box	Units per carton
DH5552K	For 60A, 150A	2.9	1	3
DH5553K	For 200A	3.0	1	3
DH5554	For 300A	4.5	1	3

Note : An intermediate tension insulator must be used together with a center fixed insulator.

Insulating piece

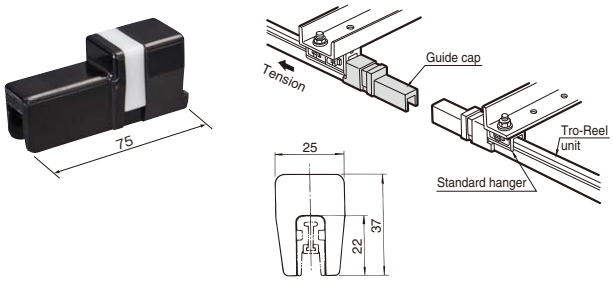
Used for electrical circuit separation.
For 60A, 150A, 200A, and 300A.



Cat. No.	Weight (kg)	Units per box	Units per carton
DH5582	0.13	3	45

Guide cap

This guide cap guides the collector arm during transfers via turntables, traversers and similar applications.
For 60A, 150A, 200A, and 300A.

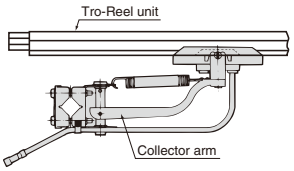


Cat. No.	Weight (kg)	Units per box	Units per carton
DH5581	0.07	3	30

Collector arm

Attached to the moving equipment and used to supply power from the Tro-Reel unit to the equipment.

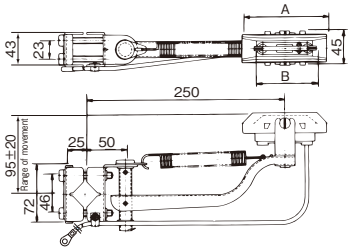
●30A (with 3.5㎟ lead) wire



●60A (with 8.3㎟ lead) wire

●100A (with 13.8㎟ lead) wire

Note : When used together with a stainless steel unit, the rated current of the collector arms is one-half that shown in the table at right.

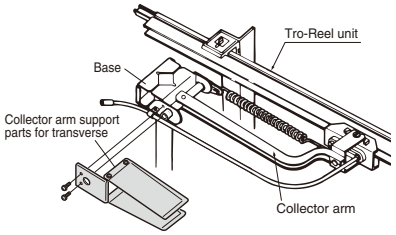


Cat. No.	Type	Tro-Reel minimum curve radius	Weight (kg)	A	B	Units per box	Units per carton
DH5240K1	30A	800㎜	0.8	105	77	1	3
DH5241K1	60A	1,200㎜	1.0	158	76	1	3
DH5242K1	100A	2,400㎜	1.1	158	118	1	3

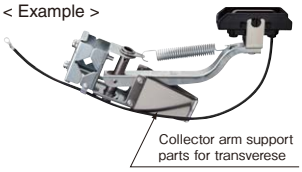
Collector arm support parts for transverese

Applicate for 30A, 60A, and 100A collector arms.
When installing a collector arm horizontally, mounted collector arm support parts for transverse on base of the collector arm as shown.

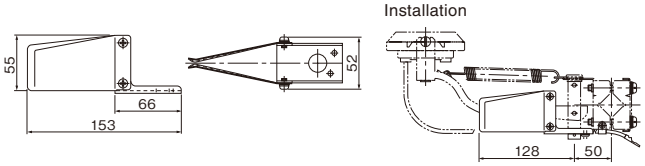
Note : Contact Panasonic Corporation. for further information on vertical curves.



< Example >



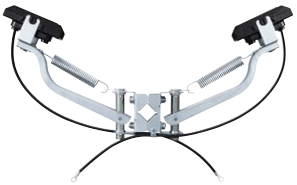
Installation



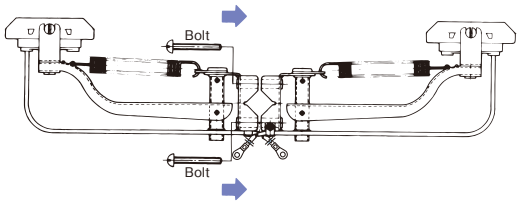
Cat. No.	Weight (kg)	Units per box	Units per carton
DH5249K	0.13	1	24

●Tandem type

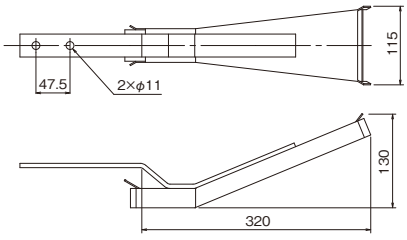
The tandem-type collector arm (two collector arms) can be used for circuit separation and transfer lines, or when it is critical that the collectors are not separated from the leads.



< Assembly drawing >



Pickup guide (Custom-made products)



For 60A, 150A, 200A, 300A
Even when Tro-Reel is only used in parts of the line, the system is constructed so that the collector arm can be inserted smoothly from an open space to inside the trolley. However, be sure to use a centered collector arm.

Centering-type collector arm

A type of collector arm to be used for a line that has a transfer area with a pickup guide.

Note : When used together with a stainless steel unit, the rated current of the collector arm is one-half that shown in the table at right.

※A pickup guide is a special-order item that ensures that the collector arm slides smoothly into the Tro-Reel even when used only on parts of the line.

Cat. No.	Rating	Lead	Weight (kg)	Units per box	Units per carton
DH52401K1	30A	3.5㎟	0.8	—	3
DH52411K1	60A	8.3㎟	1.0	—	3
DH52421K1	100A	13.8㎟	1.1	—	3

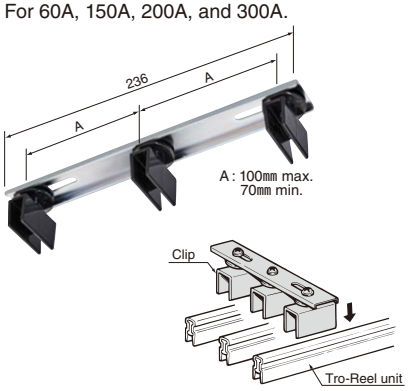
Conductor cleaner (with arm)

Used to clean the Tro-Reel conductor surfaces. Mount the cleaner on the collector arm mount rods for periodic cleaning.

Cat. No.	Weight (kg)	Units per box	Units per carton
DH52409K1	0.7	—	3

Spacer

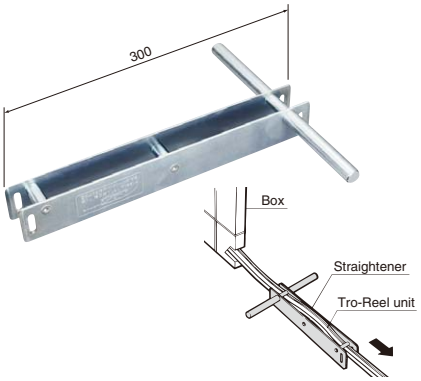
Used as a backing support for the Tro-Reel to prevent shifting and inclination.
For 60A, 150A, 200A, and 300A.



Cat. No.	Weight (kg)	Units per box	Units per carton
DH5518	0.18	5	20

Straightener

Used to straighten the Tro-Reel unit when removed from the coil package.
For 60A, 150A, 200A, and 300A.

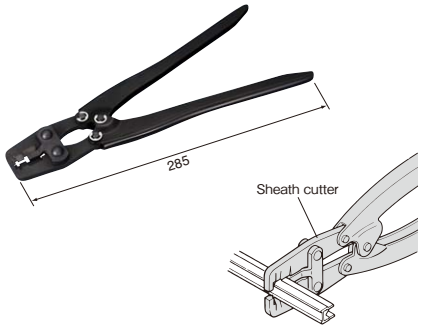


Cat. No.	Weight (kg)	Units per box	Units per carton
DH5538K	0.72	1	20

Sheath cutter for Tro-Reel

This labor-saving tool makes it possible to cut the insulating sheath of the Tro-Reel units with just one hand.

Note: Not for use with the 300A type Tro-Reel.

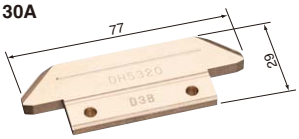


Cat. No.	Weight (kg)	Units per box	Units per carton
DH5575K1	0.40	1	10

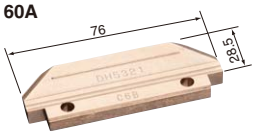
Collector shoe (Replacement parts)

●Material: Copper base sintered alloy

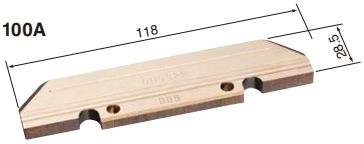
30A

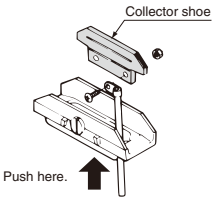


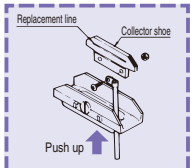
60A



100A







Collector shoes should be replaced when they wear down to the replacement indication line (approx. 5,000km).

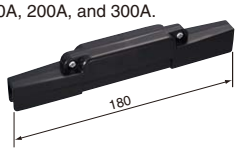
Cat. No.	Rating	Units per box	Units per carton
DH5320	30A	10	100
DH5321	60A	10	100
DH5322	100A	10	100

Collector head holder (Replacement parts)

Cat. No.	Rating	Units per box	Units per carton
DH52403	For 30A	—	15
DH52413	For 60A, 100A	—	10

Sheath repair cover (Replacement parts)

For 60A, 150A, 200A, and 300A.



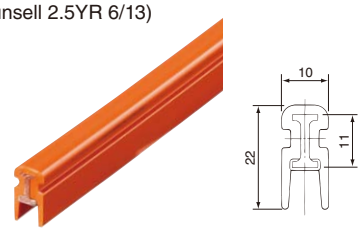
Cat. No.	Units per box	Units per carton
DH5560	1	20

Stainless steel Tro-Reel

For use in locations where corrosion resistance is especially important, such as coastal areas, cement plants, and sewage treatment facilities.
For details regarding recommended usage conditions, contact us.

150A stainless steel coiled Tro-Reel unit

- ●Rating — 600V, 150A
- ●Conductor materials — Copper (30㎟) + Stainless steel (5.2㎟)
- ●Insulating sheath material — Rigid PVC (heat resistance : 75℃) Orange (hazard color) (Munsell 2.5YR 6/13)

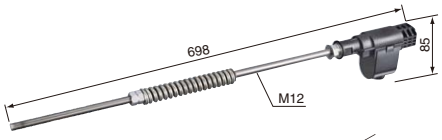


Cat. No.	Product	Carton dimensions (mm)	Weight (kg)
DH5450S	100m coil	1475×1475×50	45.0
DH5458S	80m coil	1340×1340×50	37.0
DH5456S	60m coil	1340×1340×50	27.5
DH5454S	40m coil	1140×1140×50	19.7
DH5451S	10m coil	1000×1000×50	5.5

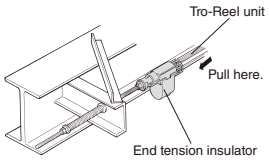
Note : Available in coil form only. Contact us in case of non-standard length.

Stainless steel end tension insulator

This insulator applies tension to the end of the Tro-Reel to absorb expansion and contraction due to temperature fluctuations.



Note : When using in locations where it may come into direct contact with cutting oil, etc., or in acidic atmospheres, strength may be diminished.

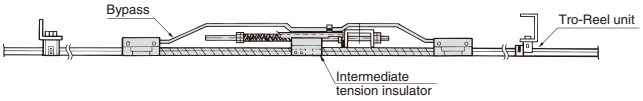


Cat. No.	Weight (kg)	Units per box	Units per carton
DH5512S	0.75	1	3

Stainless steel intermediate tension insulator

Used for intermediate tension support on circular lines and straight lines longer than 100m. Applies tension to the Tro-Reel unit to absorb expansion and contraction due to temperature fluctuations.

Note : When using in locations where it may come into direct contact with cutting oil, etc., or in acidic atmospheres, strength may be diminished.

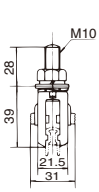


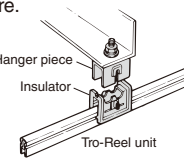
Cat. No.	Rating	Weight (kg)	Units per box	Units per carton
DH5552S	150A	2.92	1	3

Stainless steel standard hanger

Used to secure the Tro-Reel unit to a building structure.

Note : When using in locations where it may come into direct contact with cutting oil, etc., or in acidic atmospheres, strength may be diminished.



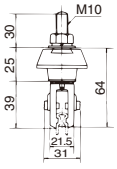


Cat. No.	Weight (kg)	Units per box	Units per carton
DH5516S1	0.12	30	120

Stainless steel hanger with insulator

Used to secure the Tro-Reel unit to a building structure in outdoor installations or in locations subject to excessive dust.

Note : When using in locations where it may come into direct contact with cutting oil, etc., or in acidic atmospheres, strength may be diminished.



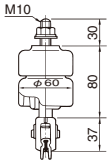
Cat. No.	Weight (kg)	Units per box	Units per carton
DH5517S1	0.17	20	80

Hanger with porcelain insulator

Used in coastal areas, cement plants, sewage treatment facilities and other locations where improved insulation is required.

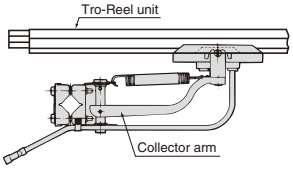
Note : When using in locations where it may come into direct contact with cutting oil, etc., or in acidic atmospheres, strength may be diminished.

●Porcelain insulator attributes
W-skirt type insulator featuring high resistance to salt, dust and moisture.
Voltage resistance: 15kV, 2 minutes
Voltage resistance when subjected to water: 8kV, 1 minute



Cat. No.	Weight (kg)	Units per box	Units per carton
DH5520	0.7	—	20

Stainless steel collector arm



Note : When used to gether with a stainless steel unit, the rated current of the collector arm is one-half that shown in the table below.

Cat. No.	Rating	Weight (kg)	Units per box	Units per carton
DH5240S1	30A	0.8	1	3
DH5241S1	60A	1.0	1	3
DH5242S1	100A	1.1	1	3

Tro-Reel HS
<Non-Tension Type>

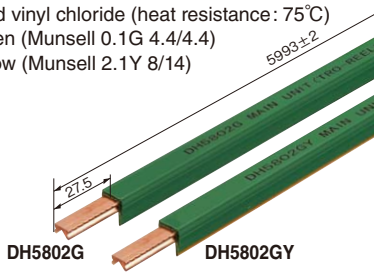
Indoor-Use Insulated Trolleys CE

90A Tro-Reel HS Unit (for indoor use only)

- ●Rating 600V, 90A
- ●Rated insulation voltage 630V
- ●Conductor material Copper 28㎟
- ●Insulating sheath material Rigid vinyl chloride (heat resistance: 75℃)
  Green (Munsell 0.1G 4.4/4.4)
  Yellow (Munsell 2.1Y 8/14)

●Contact us in case of non-standard length.

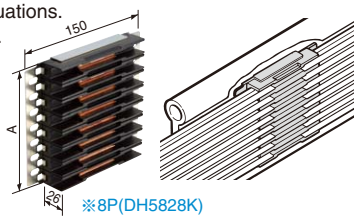
Note: Not for use in high-humidity & temperature conditions.



Cat. No.	Sheath Color	Application	Standard Length	Weight (kg)
DH5802G	Green	Power / signal	6m	2.00
DH5802GY	Green + yellow	Grounding	6m	2.00

Joiner

Used to connect the Tro-Reel HS units together.
Joiners allow for expansion and contraction of the Tro-Reel HS units due to temperature fluctuations.
Lock screw not included.



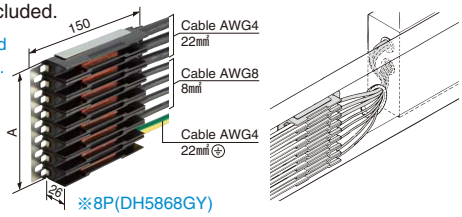
※8P(DH5828K)

Cat. No.	Rating	A	Weight (kg)
DH5824K	4P600V90A	63	0.22
DH5825K	5P600V90A	78	0.28
DH5826K	6P600V90A	94	0.34
DH5827K	7P600V90A	109	0.39
DH5828K	8P600V90A	124	0.45

Center feed-in Joiner

Equipped with power supply cables (500mm).
Simultaneously supplies power and connects the Tro-Reel HS units together.
Lock screw not included.

Note: Cannot be used as an end feed.

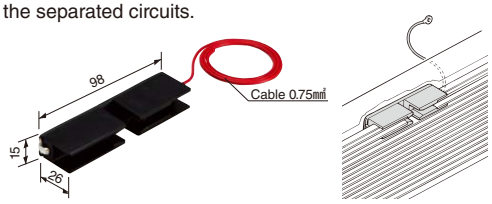


※8P(DH5868GY)

Cat. No.	Rating	A	Weight (kg)
DH5864GY	4P600V90A	63	0.50
DH5865GY	4P600V90A 1P600V30A	78	0.57
DH5866GY	4P600V90A 2P600V30A	94	0.64
DH5867GY	4P600V90A 3P600V30A	109	0.71
DH5868GY	4P600V90A 4P600V30A	124	0.78

Insulating piece

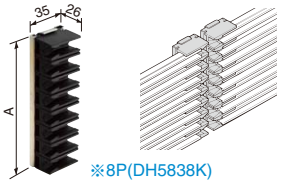
Used to separate circuits by providing an insulated section on the line.
In addition to providing insulation between two circuits, it feeds power to one of the separated circuits.



Cat. No.	Rating	Weight (kg)
DH5886K	300V1A	0.03

Guide cap (right angle cut)

Used to guide the collector arms from one straight section to another via turntables and traversers. Also used as an end cap for closing off the end of a Tro-Reel HS unit.

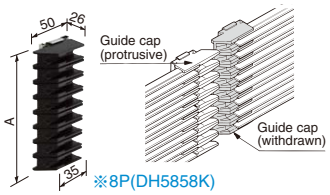


※8P(DH5838K)

Cat. No.	Type	A	Weight (kg)
DH5834K	For 4P	62	0.04
DH5835K	For 5P	77	0.05
DH5836K	For 6P	92	0.06
DH5837K	For 7P	107	0.07
DH5838K	For 8P	122	0.09

Guide cap (withdrawn 45° cut)

Used to guide the collector arms from one curved section to another via traversers. The end is a front-facing 45° angle.



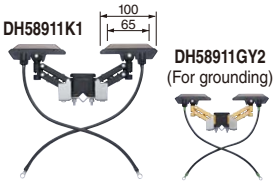
※8P(DH5858K)

Cat. No.	Type	A	Weight (kg)
DH5854K	For 4P	62	0.06
DH5855K	For 5P	77	0.07
DH5856K	For 6P	92	0.09
DH5857K	For 7P	107	0.10
DH5858K	For 8P	122	0.12

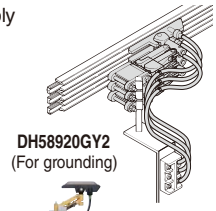
Collector arms

Attached to the moving equipment and used to supply power from the Tro-Reel HS unit to the equipment.

●Tandem type



●Single type (no saddle)

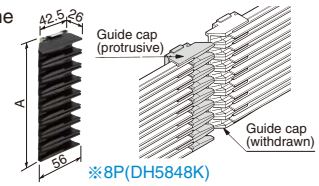


Cat. No.	Type	A	Weight (kg)
DH58911K1	Tandem (for mount rod)	1P600V30A×2	0.23
DH58912K1	Tandem (for mount plate)	1P600V30A×2	0.23
DH58920K1	Single (no saddle)	1P600V30A	0.11
DH58911GY2	Tandem type for grounding (for mount rod)	1P600V30A×2	0.23
DH58912GY2	Tandem type for grounding (for mount plate)	1P600V30A×2	0.23
DH58920GY2	Single type (no saddle) for grounding	1P600V30A	0.11

Note : When using the single type (no saddle), be sure to combine multiple units per 1P
The collector arms should be replaced when it wears down to the replacement indication line. Typical collector service life is approximately 20,000km.

Guide cap (protrusive 45° cut)

Used to guide the collector arms from one curved section to another via traversers. The end is a front-facing 45° angle.



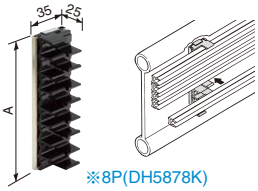
※8P(DH5848K)

Cat. No.	Type	A	Weight (kg)
DH5844K	For 4P	62	0.06
DH5845K	For 5P	77	0.07
DH5846K	For 6P	92	0.09
DH5847K	For 7P	107	0.10
DH5848K	For 8P	122	0.12

Hanger

Used to mount the Tro-Reel HS units on the side of the rail.
Hangers should be used at intervals of 600mm or less on straight sections and 500mm or less on curved sections.

Note : Contact us in case of using the hangers where solvents such as cutting oil may wet them directly.

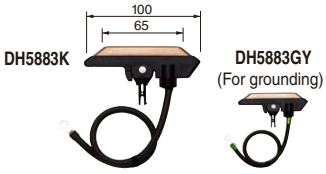


※8P(DH5878K)

Cat. No.	Type	A	Weight (kg)
DH5874K	For 4P	62	0.04
DH5875K	For 5P	77	0.05
DH5876K	For 6P	92	0.06
DH5877K	For 7P	107	0.06
DH5878K	For 8P	122	0.07

Collector (replacement part)

Note : This collector is a replacement part for using collector arms which are of an earlier type than the collector arms.



Cat. No.	Rating	Weight (kg)
DH5883K	1P600V30A	0.06
DH5883GY	1P600V30A For grounding	0.06

EN Specifications (European specifications)

CE

■Applicable EN standards for insulated trolleys

EN60204-1 : Electrical equipment of machines
EN61439-1,6 : Low-voltage switchgear and controlgear assemblies
EN61534-1 : Powertrack systems

■Contents of specifications and measures adopted

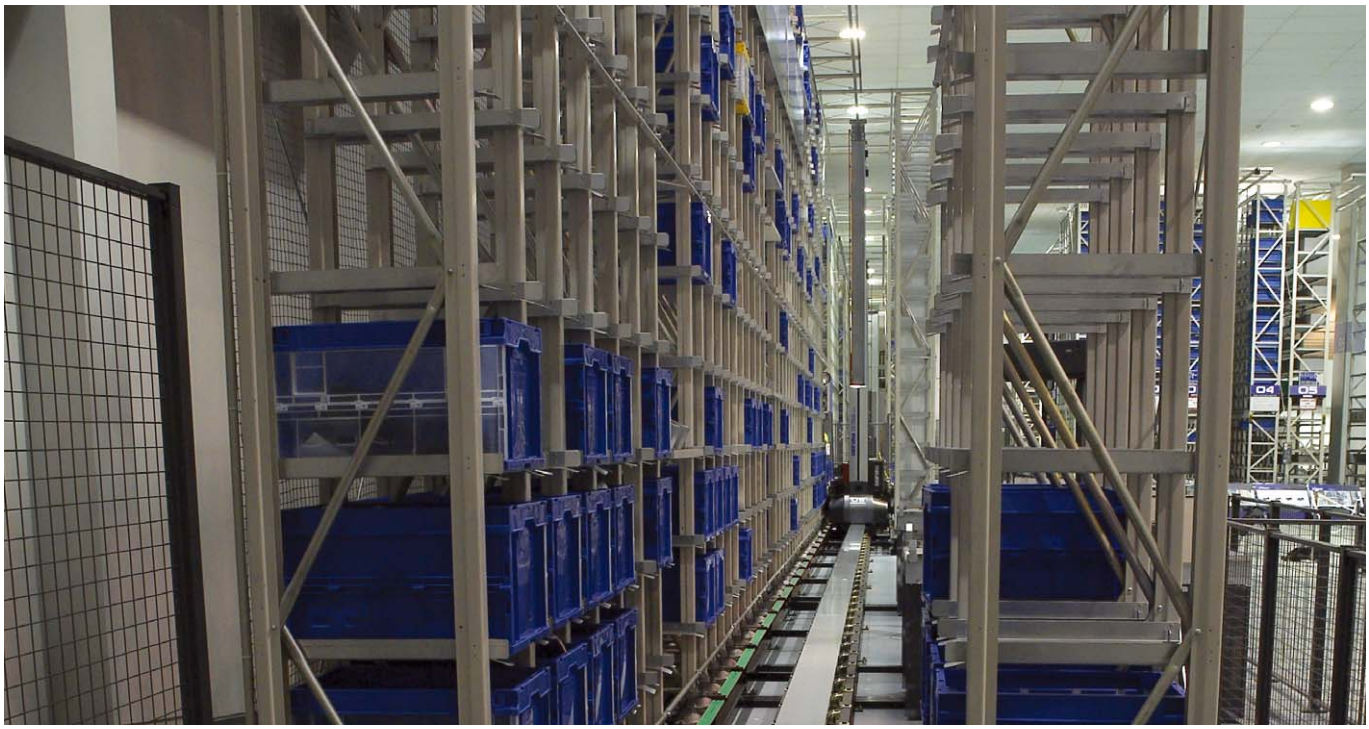
POINT 12.7.2 Protective conductors
The continuity to protective conductors using sliding contacts shall be ensured by taking appropriate measures (for example, duplication of the current collector, continuity monitoring).
→ **The construction of collector arm only adopts tandem type.**

POINT 13.2 Identification of conductors
13.2.1 General requirements
Each conductor shall be identifiable at each termination in accordance with the technical documentation.
→ **A collector arm for grounding is designated, so grounding unit is clearly identifiable.**

POINT 13.2.2 Identification of the protective conductor/ protective bonding conductor
The protective conductor/ protective bonding conductor shall be readily distingushable from other conductors by shape, location, marking, or colour.
→ **A grounding unit is available in a green basic background color with yellow lines.**

High-Tro-Reel
<Tension Type>

Multi-Lead Indoor-Use Insulated Trolleys CE



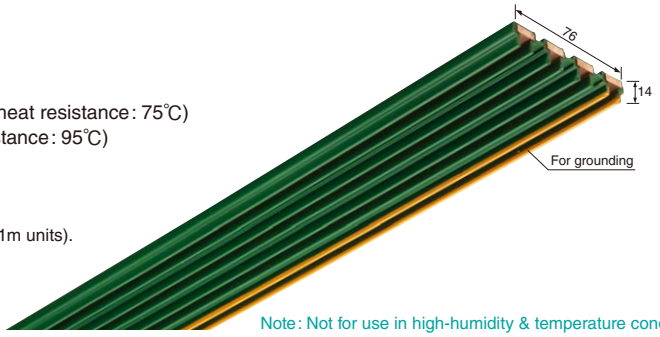
60A/90A/150A/200A High-Tro-Reel units (for indoor use only)

●Rating	4P600V 60A/90A/150A/200A
●Rated insulation voltage	630V
●Conductor material	60A Steel (8㎟) + Copper (20㎟) 90A Copper (28㎟) 150A/200A Both copper (44㎟)
●Insulating sheath material	60A/90A/150A Rigid vinyl chloride (heat resistance: 75℃) 200A Rigid vinyl chloride (heat resistance: 95℃) Green (Munsell 0.1G 4.4/4.4) Yellow (Munsell 2.1Y 8/14)

DH96 custom-made U

Four types (60A, 90A, 150A and 200A), produced at designated lengths (in 1m units).

Maximum designated length
60A : 100m
90A : 95m
150A : 65m
200A : 60m

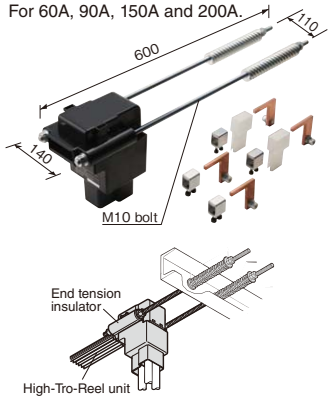


Note: Not for use in high-humidity & temperature conditions.

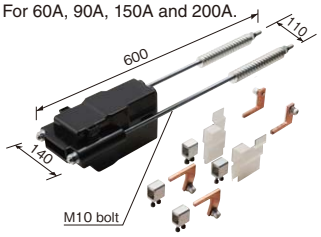
End tension insulator

Attached to both ends of the High-Tro-Reel unit to absorb expansion and contraction due to temperature fluctuations.
For 60A, 90A, 150A and 200A

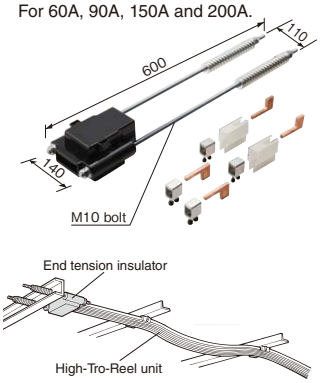
●With feed-in terminal (Cable side-out type).
For 60A, 90A, 150A and 200A.



●With feed-in terminal (Cable bottom-out type).
For 60A, 90A, 150A and 200A.



●Without feed-in terminal.
For 60A, 90A, 150A and 200A.



After setting the High-Tro-Reel unit, the terminal, and the terminal plate in the end tension insulator. The terminal plate and the terminal where fixed bolt M6×12 was tightened with the specified torque cannot be used again.

Don't use them again.

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

●With feed-in terminal (Cable side-out type)

Cat. No.	Type	Weight (kg)
DH57042K	For 4P	2.1

●With feed-in terminal (Cable bottom-out type)

Cat. No.	Type	Weight (kg)
DH57044K	For 4P	2.1

●Without feed-in terminal

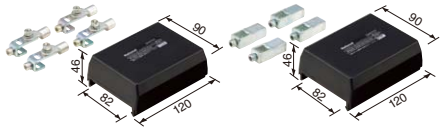
Cat. No.	Type	Weight (kg)
DH57142K	For 4P	2.0

Joiner

Used to connect the High-Tro-Reel units.
Can also supply power from anywhere on the line.
(60A and 90A types)

●With feed-in terminal, for 60A and 90A

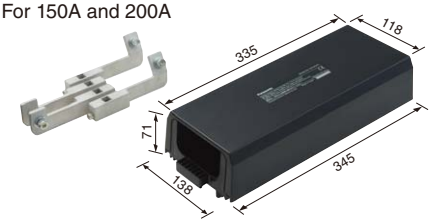
●Without feed-in terminal, for 150A and 200A



Cat. No.	Type	Rating	Weight (kg)
DH5724K2	For 4P, 60A/90A	4P600V90A	0.31
DH5727K1	For 4P, 150A/200A	4P600V200A	0.26

Center feed-in joiner

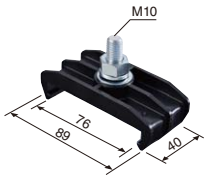
Used to feed power from anywhere on the line and connect the High-Tro-Reel units.
For 150A and 200A



Cat. No.	Type	Rating	Weight (kg)
DH57271	For 4P, 150A/200A	4P600V200A	2.2

Hanger

Used to mount the High-Tro-Reel units on the side of a rail. Can also be used with tension type units.
Standard support interval is 400mm.



Cat. No.	Type	Weight (kg)
DH5774K2	For 4P	0.07

Collector arm

Attached to the moving equipment and used to supply power from the High-Tro-Reel unit to the equipment.

	A
30A	55
60A	70
100A	95

●Tandem type, downward-facing

Cat. No.	Rating	Weight (kg)
DH57443GY2	4P600V30A ×2	2.0
DH57473GY2	4P600V60A ×2	2.2
DH57423GY2	4P600V100A×2	2.4

Collector arm support parts for transverese

Applicate for 30A, 60A, and 100A collector arms.
When installing a collector arm horizontally, mounted collector arm support parts for transverse on base of the collector arm as shown.

Note: This product does not carry the CE mark.

Cat. No.	Weight (kg)	Units per box	Units per carton
DH5249K	0.13	1	24

Collector (replacement parts)

Used to replace the collector on a collector arm when it becomes worn.
The collector should be replaced when it wears down to the replacement indication line. Typical collector service life is approximately 5,000km.

	A	B
30A	55	85
60A	70	100
100A	95	125

Cat. No.	Rating	Weight (kg)
DH5784GY	4P600V30A	0.30
DH5787GY	4P600V60A	0.44
DH5782GY1	4P600V100A	0.67

EN Specifications (European specifications)

CE

■Applicable EN standards for insulated trolleys

EN60204-1: Electrical equipment of machines
EN61439-1,6: Low-voltage switchgear and controlgear assemblies
EN61534-1: Powertrack systems

■Contents of specifications and measures adopted

POINT 12.7.2 Protective conductors
The continuity to protective conductors using sliding contacts shall be ensured by taking appropriate measures (for example, duplication of the current collector, continuity monitoring).
→ **The construction of collector arm only adopts tandem type.**

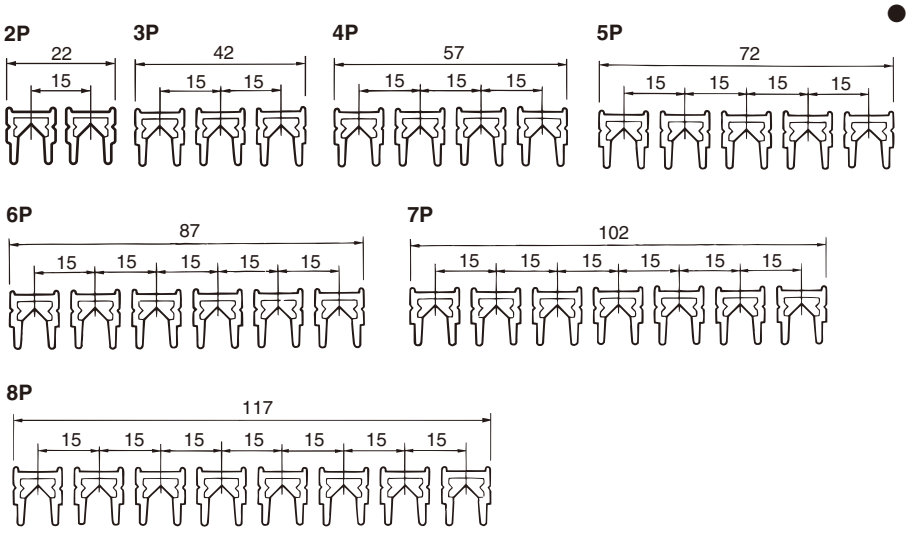
POINT 13.2 Identification of conductors
13.2.1 General requirements
Each conductor shall be identifiable at each termination in accordance with the technical documentation.
→ **A collector arm for grounding is designated, so grounding unit is clearly identifiable.**

POINT 13.2.2 Identification of the protective conductor/ protective bonding conductor
The protective conductor/ protective bonding conductor shall be readily distingushable from other conductors by shape, location, marking, or colour.
→ **A grounding unit is available in a green basic background color with yellow lines.**

Tro-Reel HS Installation Manual <Non-Tension Type>

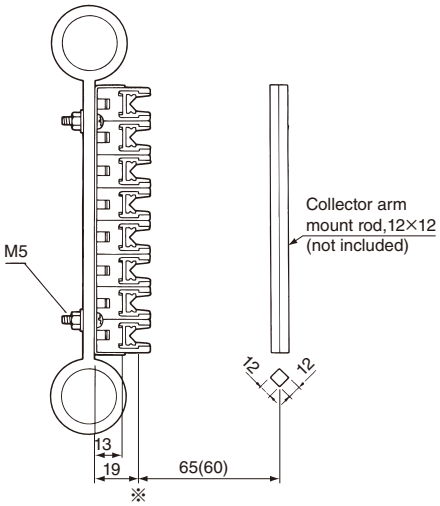
Unit : mm

■Cross-section dimensions

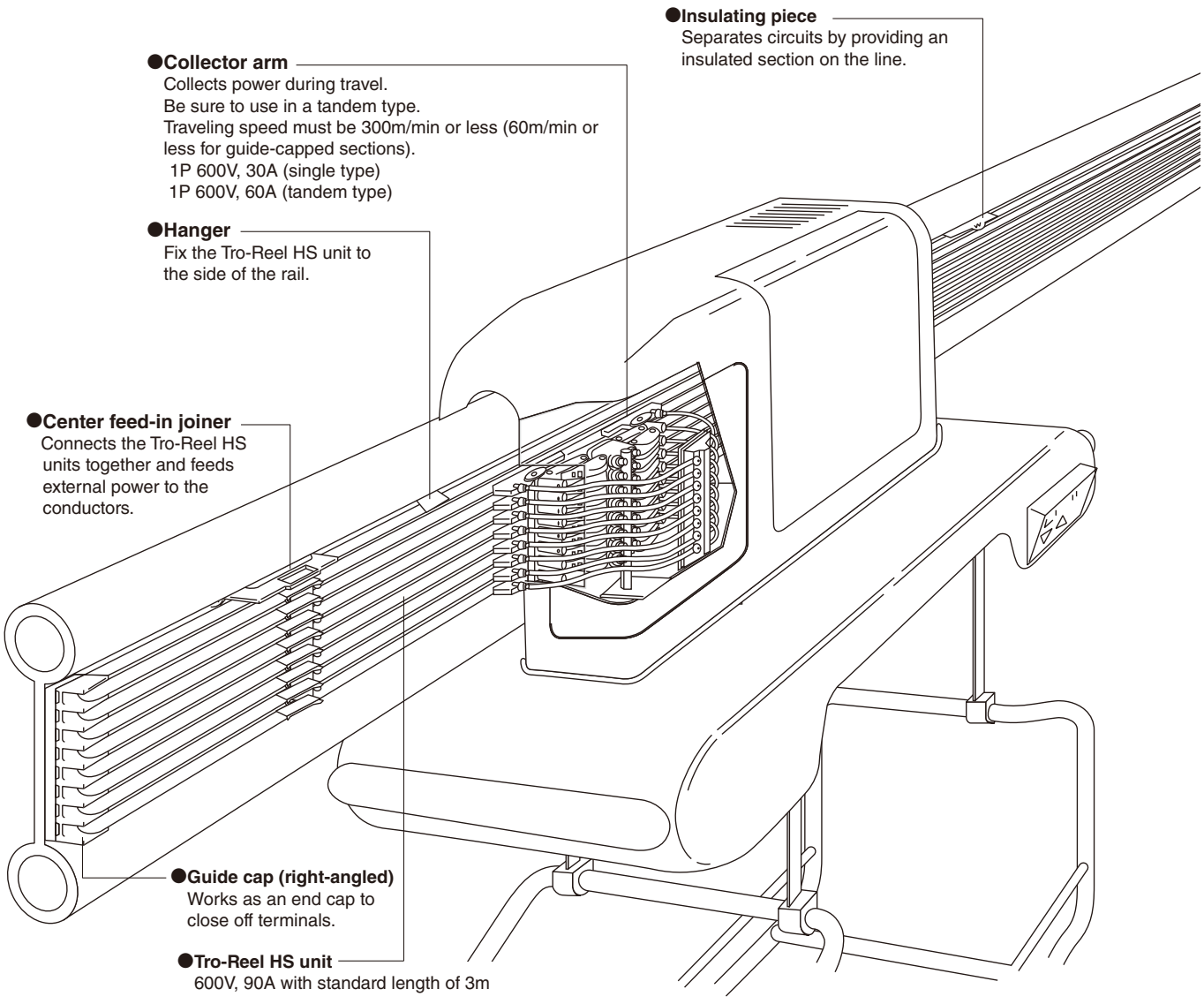


■Standard installation procedure

● In case of using a tandem type of collector arm



The values in parentheses for collector arm（without saddle）size. Attach the collector arm to the collector arm mount plate.
The asterisk (※) indicates the upper conductor surface of the Tro-Reel HS unit.



●Insulating piece
Separates circuits by providing an insulated section on the line.

●Collector arm
Collects power during travel.
Be sure to use in a tandem type.
Traveling speed must be 300m/min or less (60m/min or less for guide-capped sections).
1P 600V, 30A (single type)
1P 600V, 60A (tandem type)

●Hanger
Fix the Tro-Reel HS unit to the side of the rail.

●Center feed-in joiner
Connects the Tro-Reel HS units together and feeds external power to the conductors.

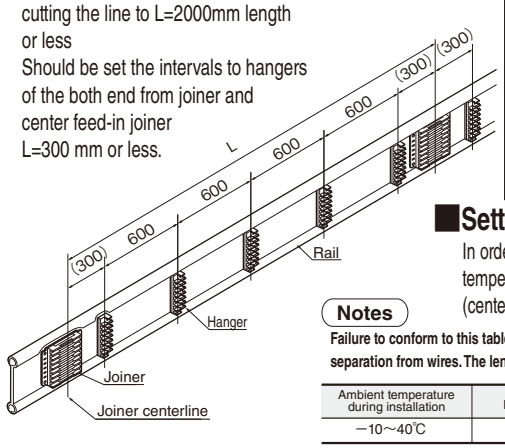
●Guide cap (right-angled)
Works as an end cap to close off terminals.

●Tro-Reel HS unit
600V, 90A with standard length of 3m

1 Setting intervals for joiners and hangers

■Setting intervals for hangers

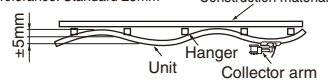
Hangers should be positioned at intervals of 600mm or less for straight sections and 500mm or less for curved sections.In case of working after cutting the line to L=2000mm length or less
Should be set the intervals to hangers of the both end from joiner and center feed-in joiner
L=300 mm or less.



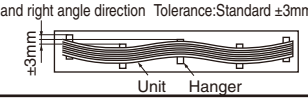
Notes

- **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 ±5mm



Swell: Displacement of collection arm press direction and right angle direction Tolerance:Standard ±3mm



■Setting joiner intervals

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

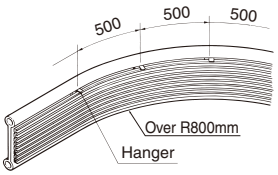
Notes

Failure to conform to this table may cause poor collector arm contact or separation from wires. The length of the Tro-Reel HS unit is 5993±2mm.

Ambient temperature during installation	Mounting size	Distance between conductors at joint
−10～40℃	6000mm	1～12mm

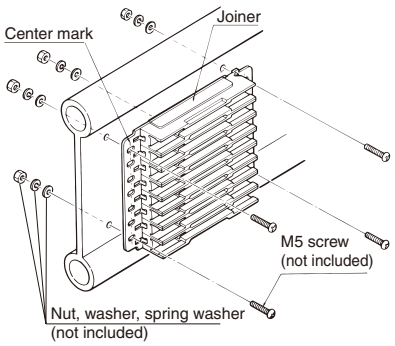
■Setting intervals for hangers on curved sections

Inward curves(Outward curves also available.)
Hangers should be placed at intervals of 500mm or less on curves.



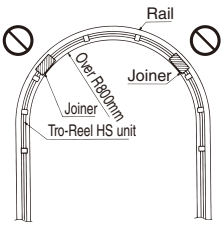
2-1 Joiner installation

1.Drill holes in the rail matching the position of the joiner as shown below. (See 2-2.)
2.Screw the joiner to the rail in line with the center mark.



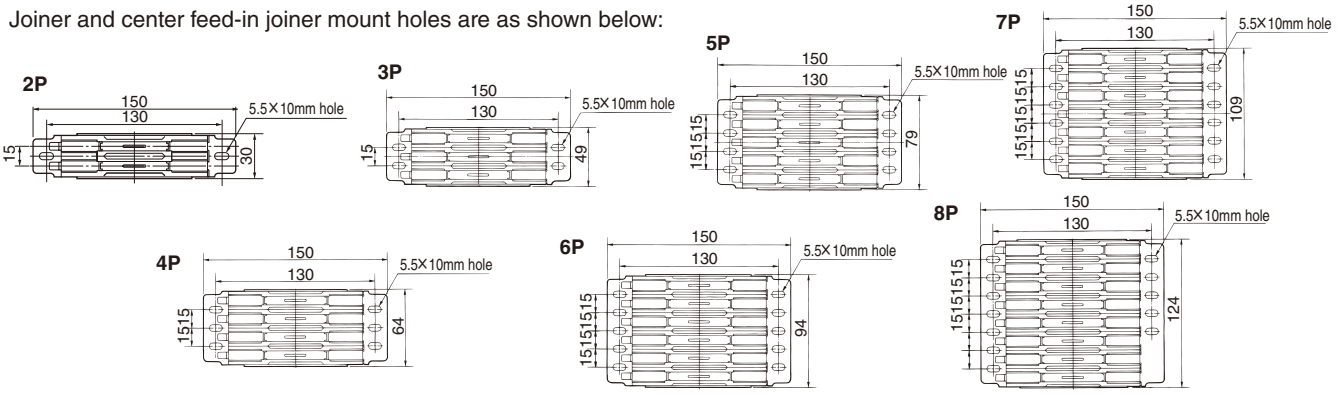
Notes

Avoid positioning joints on curved sections. If installation on curved sections is inevitable, please mount the joint at the straightest part of the curved section, as shown in the drawing.

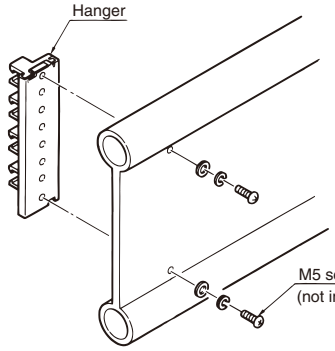


2-2 Joiner mount hole dimensions (center feed-in joiner)

Joiner and center feed-in joiner mount holes are as shown below:

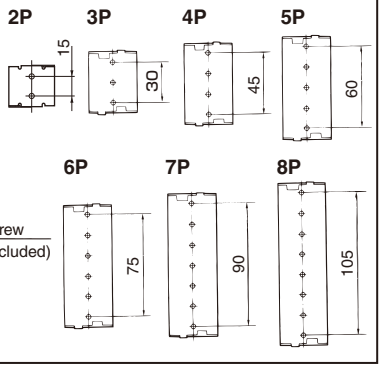


3 Hanger installation



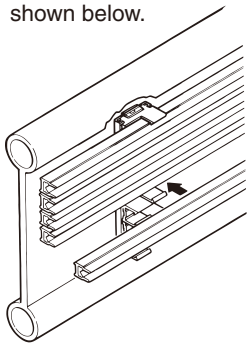
●Gap between screws

(two M5 screws; 8mm thread depth)



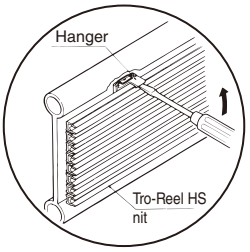
4 Mounting the Tro-Reel HS unit onto the hangers.

Snap the Tro-Reel HS unit onto the hanger as shown below.



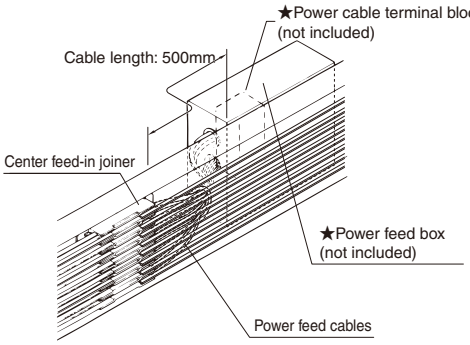
■Removing the Tro-Reel HS unit

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



5 Center feed-in joiner installation

1.Drill holes in the rail. (See 2-2. Joiner mount hole dimensions.)
2.Screw the center feed-in joiner to the rail in line with the center mark.



■Number of power cables

	AWG4 (22mm²)	AWG8 (8mm²)
2P	2	—
3P	3	—
4P	3	1
5P	3	2
6P	3	3
7P	3	4
8P	3	5

※Power cable length is 500mm.

★ When using a center feed-in joiner as a UL Approved item, make sure to meet the following requirements.
1.Power feed box: The specifications must comply with the UL50 Enclosure For Electrical Equipment.
2.Power cable terminal block: Must be one of the items shown in the table.

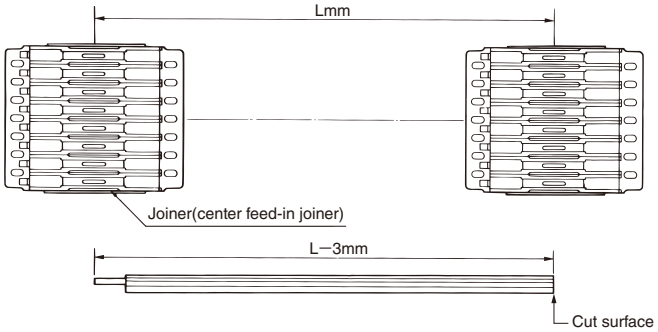
Maker	Item No.	Screw tightening torque N/m (kgf/cm)
KASUGA ELECTRIC WORK., LTD.	TX-100	8～10 {80～100}
KYORITU KEIKI CO., LTD.	KT-100, KTR-100	8.5～11 {85～110}
YOSHIDA ELECTRIC INDUSTORY CO., LTD.	UKU-125	6～9 {60～90}

⚠Caution

Be sure to screw the power cable tarminal block in tightly.
Failure to do so may cause fire.

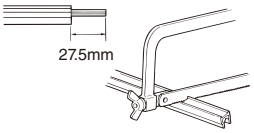
6 Cutting the Tro-Reel HS unit and terminals

1.Line up the Tro-Reel HS unit between the center points of the two joiners (central dimension "L") and cut 3mm off of one end being careful not to cut the conductor.

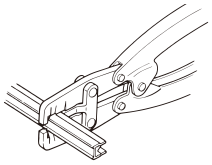


2.Mark the length to be cut off on the Tro-Reel HS unit as shown below and remove the insulating sheath using a hacksaw or the special sheath cutter.

● **Using a hacksaw**



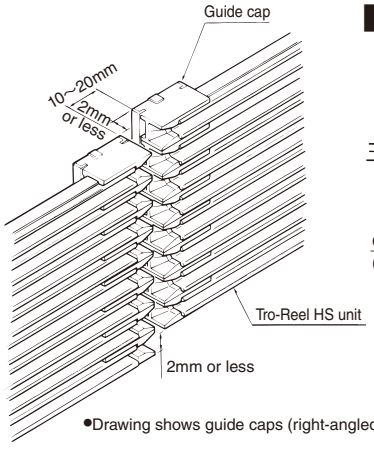
● **Using the special sheath cutter**



Notes

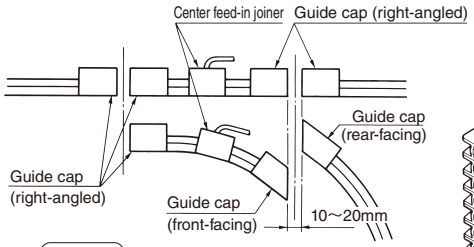
- **Be careful not to damage the conductor when cutting with a hacksaw.**
- **Remove the burrs from both cut surfaces using a knife or a file.**
  Failure to do so may cause poor collector arm contact.

7 Guide cap installation



●Drawing shows guide caps (right-angled).

■ Usage of guide cap



Notes

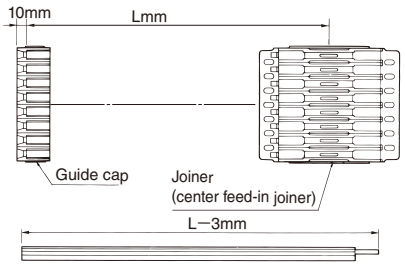
- **Use a tandem-type collector arm and set traveling speed at 60m/min or less for switching sections.**
- **Be sure to use only the specified dimensions for each mounting part.**
  Failure to do so may cause poor collector arm contact or separation from wires.

Cutting the Tro-Reel HS unit and terminals

Line up the Tro-Reel HS unit between the center points of the joiner and the guide cap (central dimension "L") and cut 3mm off of one end being careful not to cut the conductor.

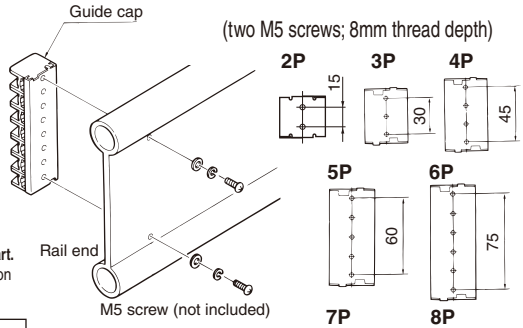
Notes

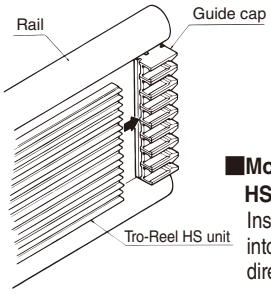
Remove the burrs from both cut surfaces using a knife or a file.
Failure to do so may cause poorcollector arm contact.



■Mounting a guide cap

1.Drill holes in the rail as shown below.
2.Screw a guide cap to the rail and insert the Tro-Reel HS unit into the guide cap.





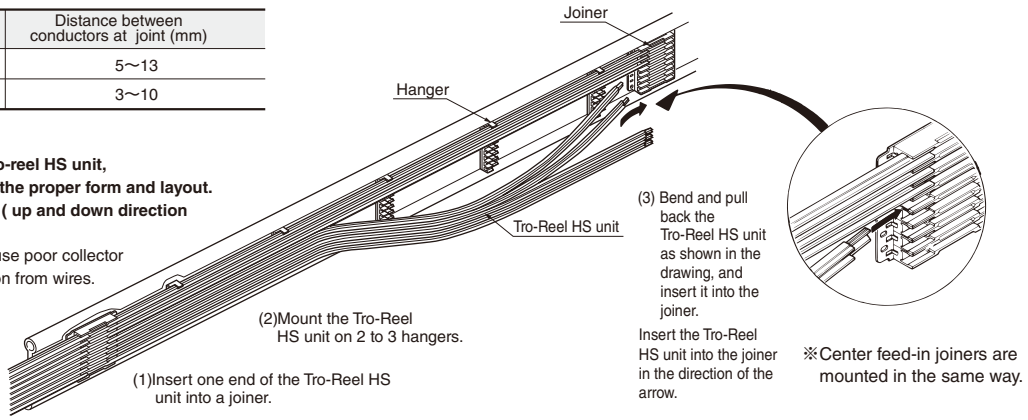
■Mounting the Tro-Reel HS unit to the guide cap
Insert the Tro-Reel HS unit into the guide cap in the direction of arrow.

8 Tro-Reel HS unit connection

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

Notes

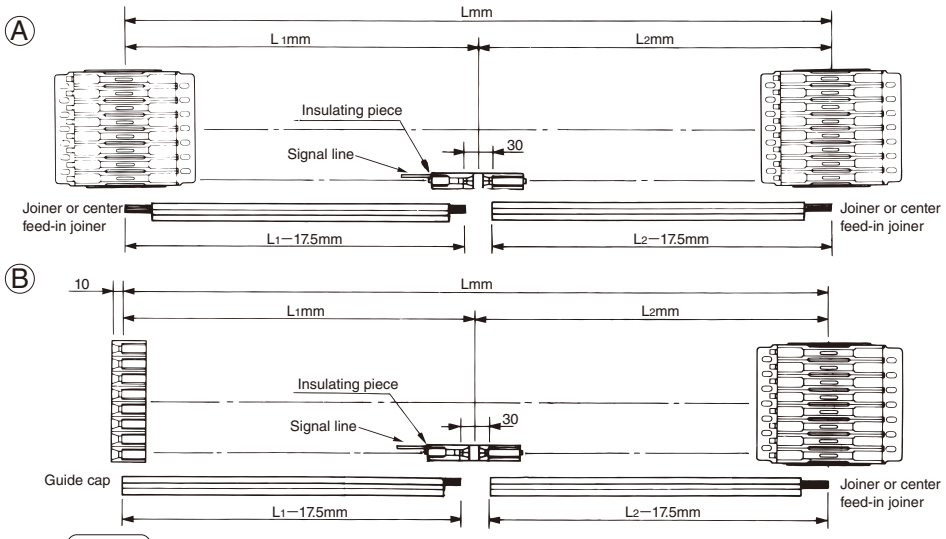
When mounting the Tro-reel HS unit,
Be careful to maintain the proper form and layout.
Do not be meandering (up and down direction ±3mm or less)
Failure to do so may cause poor collector arm contact or separation from wires.



9 Insulating piece installation

■Cutting the Tro-Reel HS unit

Line up each Tro-Reel HS unit (in (A) and (B) below) with the “L” dimension, and cut the units to the appropriate length.

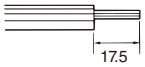


Notes

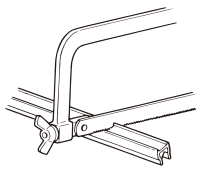
If signal lines are not needed, insulate the end of the line with vinyl tape so that it won’t affect collector arm travel.

● Cutting the power feed side

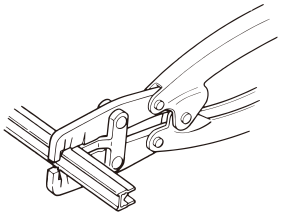
Mark the length to be cut off on the Tro-Reel HS unit as shown below and cut the insulating sheath using a hacksaw or the special sheath cutter.



● Using a hacksaw



● Using the special sheath cutter



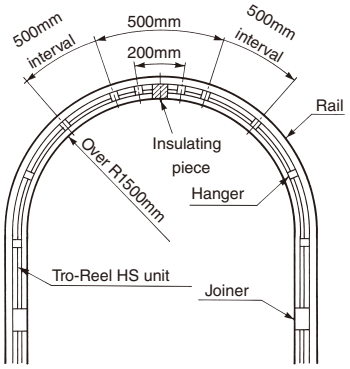
Notes

●Be careful not to damage the conductor when cutting with a hacksaw.
●Remove the burrs from both cut surfaces using a knife or a file.
Failure to do so may cause poor collector arm contact.

● Installation to curved sections (inward and outward curves)

(1) Over 1500mm in radius:
1. Position hangers at 500mm intervals.
2. Position hangers 200mm from each end of the insulating piece.

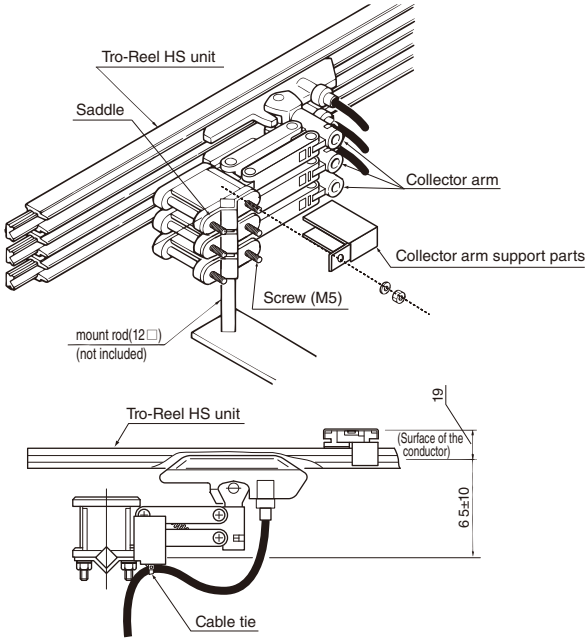
(2) Less than 1500mm in radius:
1. position hangers the same as shown above (1).
2. Bend the Tro-Reel HS unit to the required degree before mounting it. (The unit can be bent by hand.)

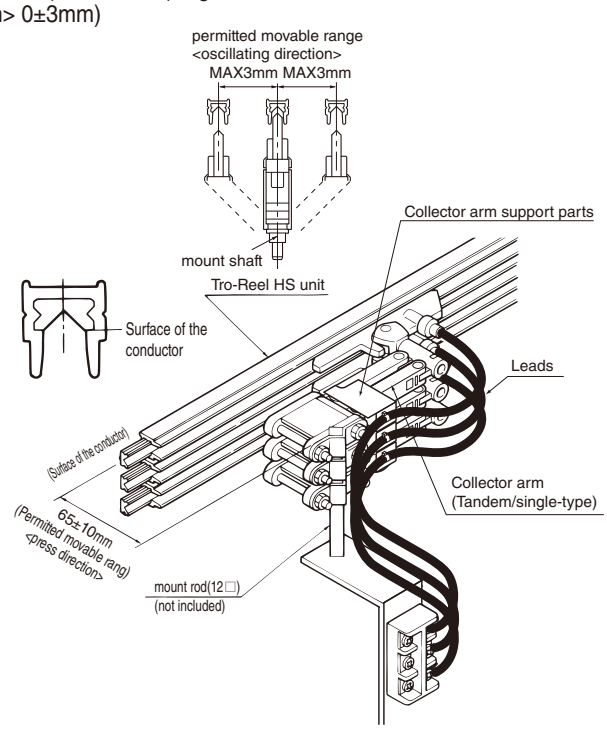


10 Collector arm installation

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

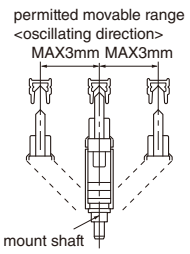
1. Mount the supporting parts of collector arm on saddle
2. Set the distance from the upper surface of the Tro-Reel HS conductor to the center of collector arm mount rod to 65mm (The collector arm permitted movable range <press direction> central value of 65mm ±10mm)
3. Should be put the center of Tro-Reel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

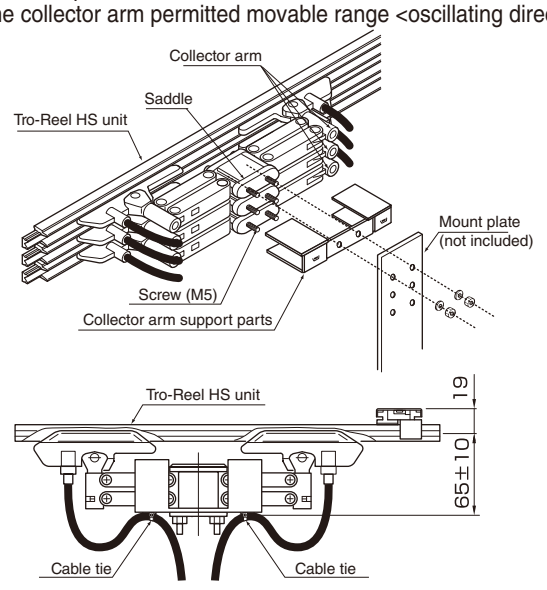


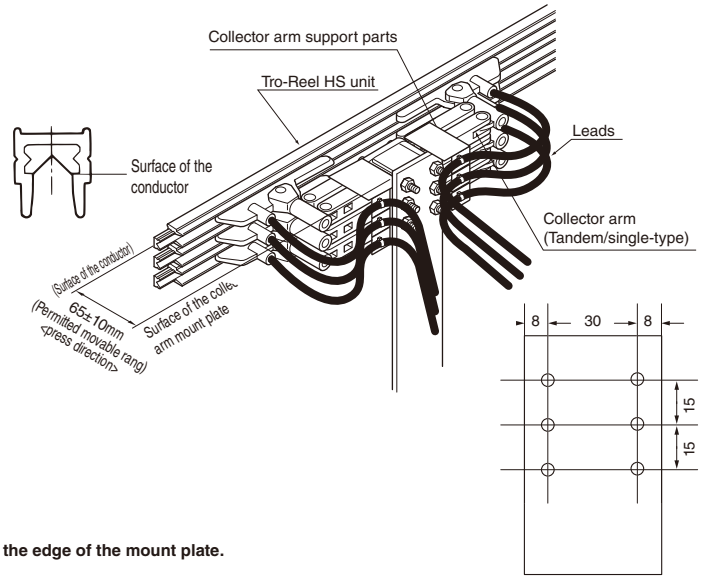


■ Tandem/collector arm（mount plate type）

1. Mount the supporting parts between saddle and the mount plate.
2. Set the distance from the upper surface of the Tro-Reel HS conductor to the upper surface of the 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 Tro-Reel HS conductor and collector arm (mount shaft) together. (The collector arm permitted movable range <oscillating direction> 0±3mm)





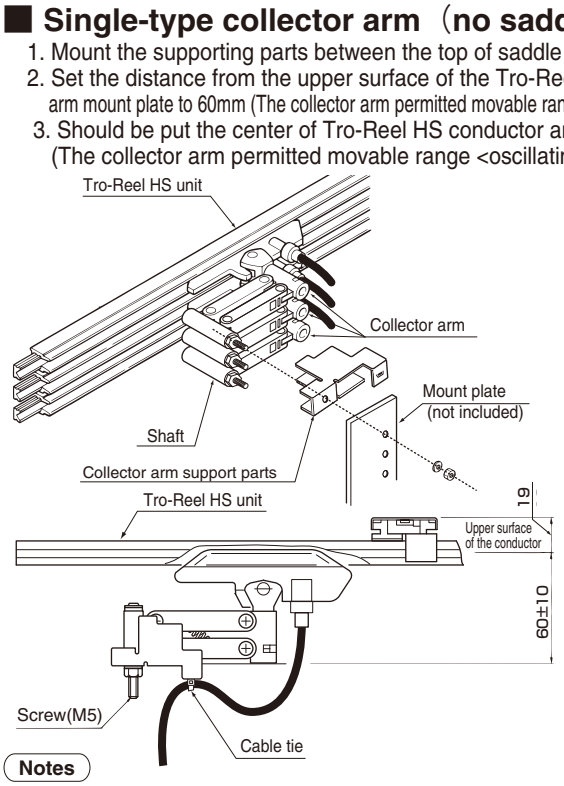


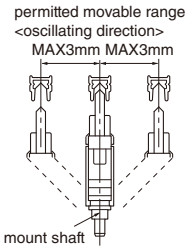
Notes

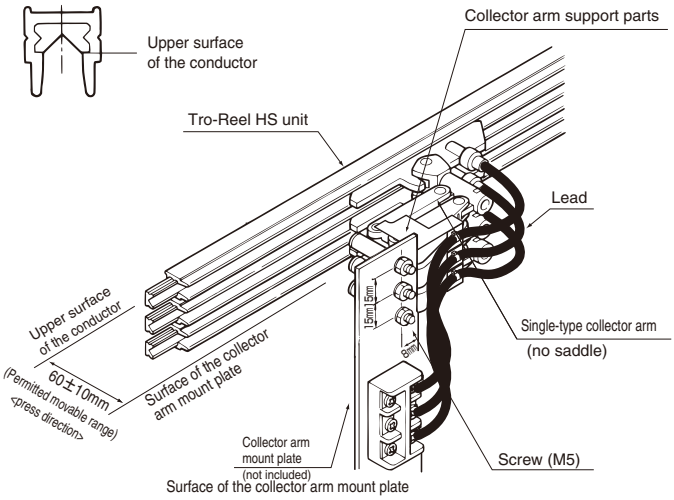
- **Collector arm mounting screw should be positioned 15 mm apart**
- **Mount plate mounting hole shoud be positioned 30 mm and 8 mm awayfrom the edge of the mount plate.**

■ 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 Tro-Reel HS conductor to the center of 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 Tro-Reel HS conductor and collection arm (mount shaft) together. (The collector arm permitted movable range <oscillating direction> 0±3mm)





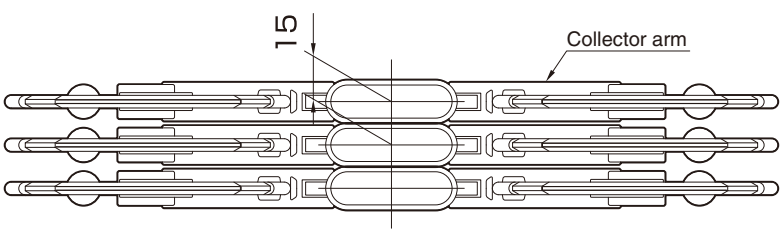


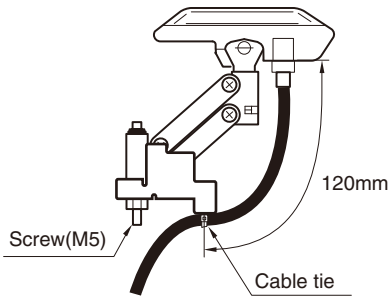
Notes

Collector arm mounting screw should be positioned 15 mm apart and 8 mm awayfrom the edge of the mount plate.

Notes

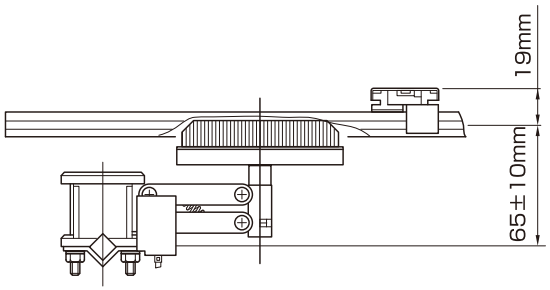
1. **Be sure to use only the specified dimensions for each mounting part.**
   For operating the equipment, set the collector arm within permitted movable range of 65±10mm (60±10mm for single).
2. **Collector arm mounting screw should be positioned 15 mm apart and Collector arms (single-type with no 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 Tro-Reel HS 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 3 from center of the Tro-Reel HS 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 exchanging 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 separately.
   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 Tro-Reel HS unit phase (R.S.T) before connecting the leads to the load.**
7. **When mounting 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. **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.

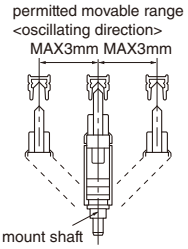


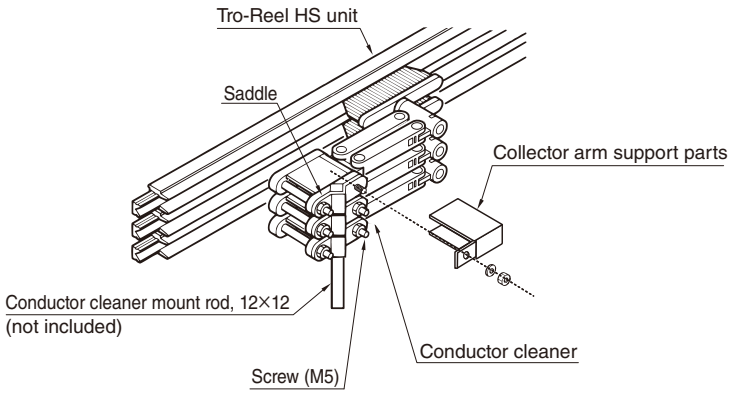


11 Mounting a conductor cleaner

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







Notes

Be sure that the conductor cleaner is mounted parallel to the Tro-Reel HS unit with no twisting.
Failure to do so may cause fire due to sparks, poor collector arm contactor separation from wires.

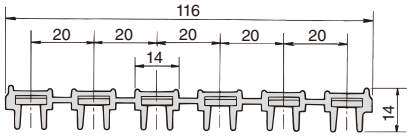
Installation Procedures for High-Tro-Reel <Non-Tension Type>

Unit : mm

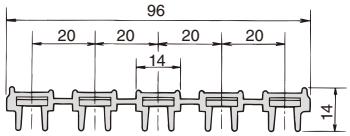
(Install explanation of this product is described with 3P and Installations of 4P and 5P, 6P like in the same way.)

● Cross-section

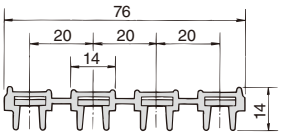
6P



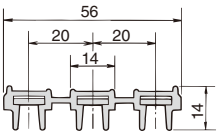
5P



4P

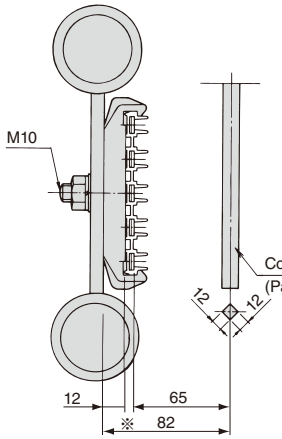


3P

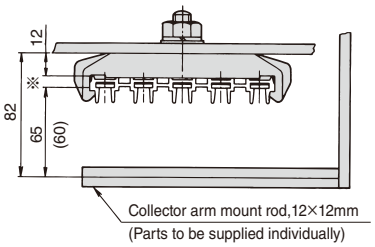


● Standard installation (For 5P type)

Normal installation



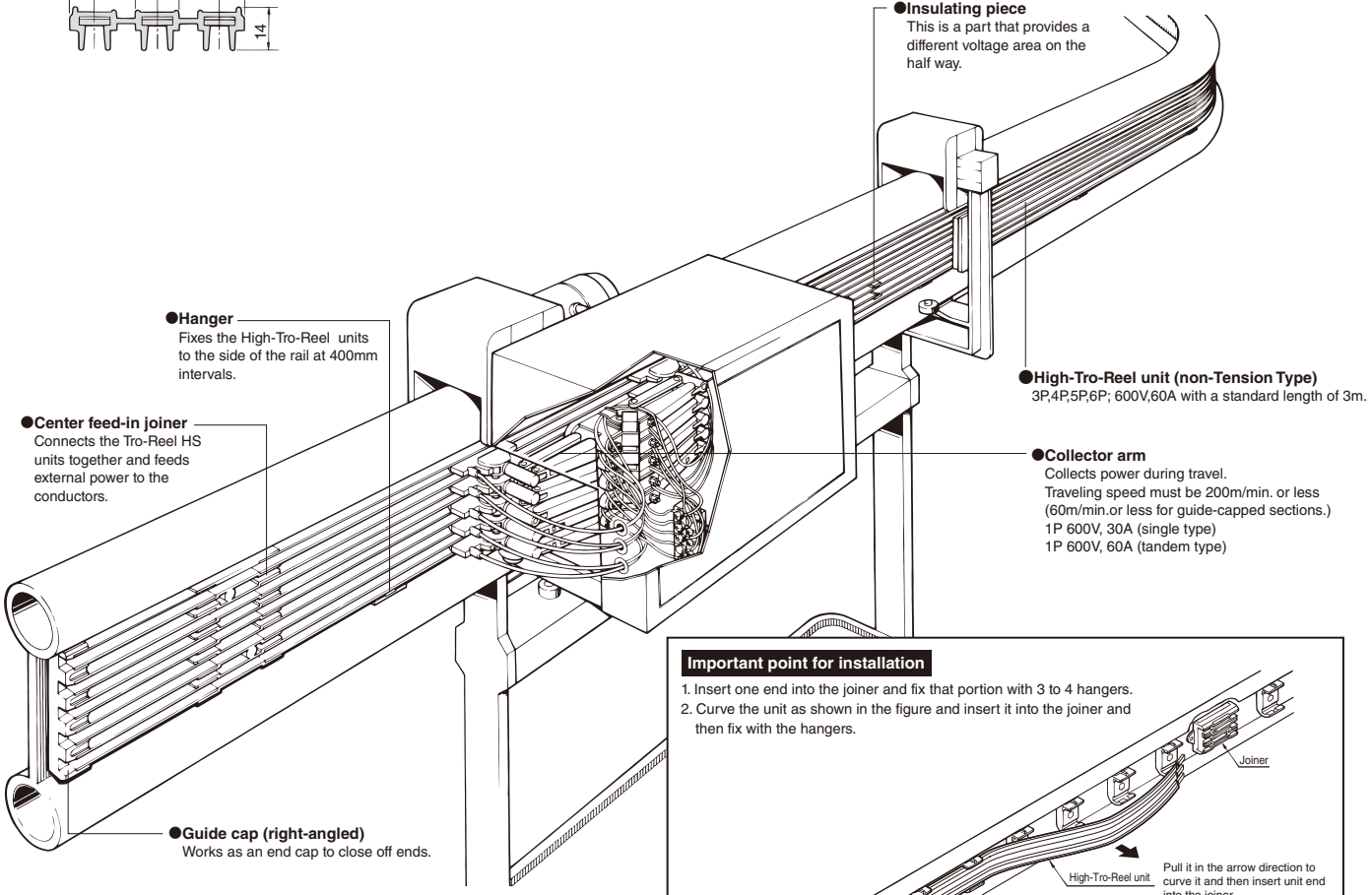
Lay horizontally



Mount for collector arm (without saddle) to the collector arm mount plate with the inner size of ( )

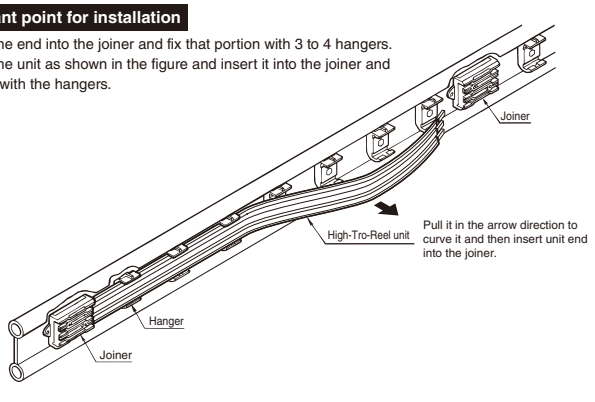
The asterisk (※) indicates the High-Tro-Reel units conductor sliding surface.

Unit : mm



Important point for installation

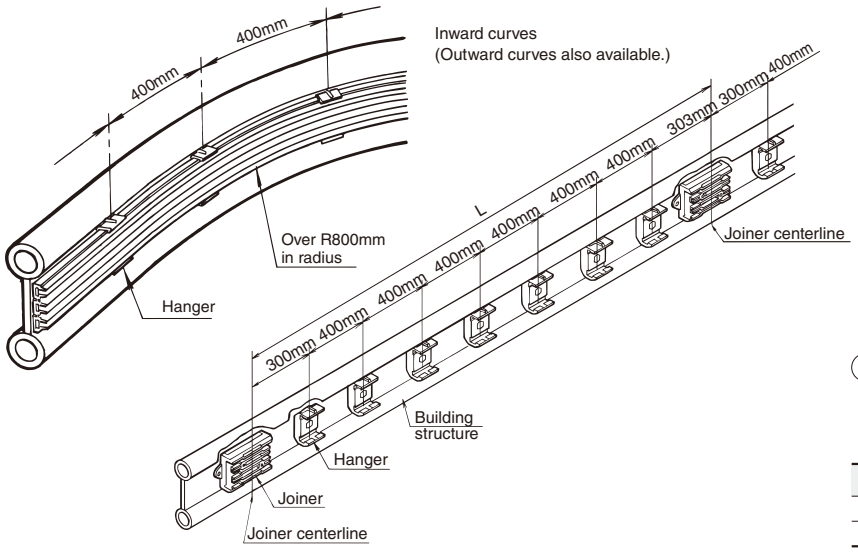
1. Insert one end into the joiner and fix that portion with 3 to 4 hangers.
2. Curve the unit as shown in the figure and insert it into the joiner and then fix with the hangers.



1 Setting joiner and hanger intervals

■Setting intervals for hangers

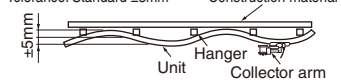
Hangers should be positioned at intervals of 400mm or less for straight sections and curved sections.
Should be set the intervals to hangers of the both end from joiner and center feed-in joiner L=300mm or less.



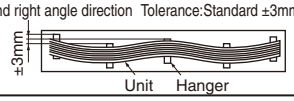
Notes

- **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 ±5mm



Swell: Displacement of collector arm press direction and right angle direction Tolerance:Standard ±3mm



■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

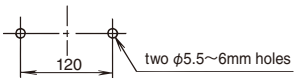
- **Failure to conform to this table may cause poor collector arm contact or separation from wires.**
- **The length of the joiner is 2997±2mm.**

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

2 Joiner installation

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

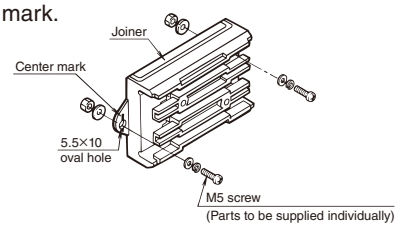
- **Preparatory drilling on building structure (for 3P, 4P, 5P and 6P)**



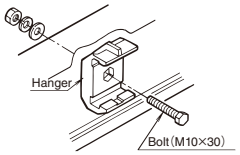
Notes

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

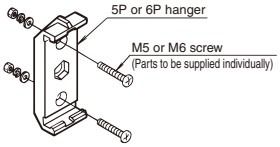
2. Screw the joiner to the building structure in line with the center mark.



3 Hanger installation



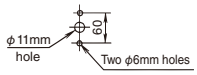
- **Fixing 5P or 6P hangers using two screws**



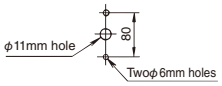
(Applicable when two screws are used to fix 5P or 6P hangers.)

- **Preparatory drilling on building structure**

For 5P type

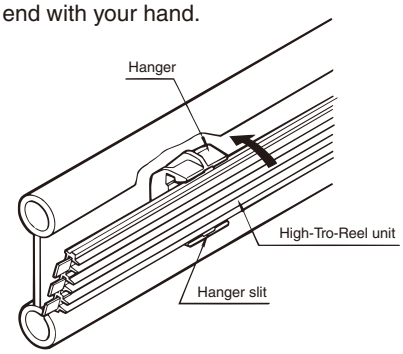


For 6P type



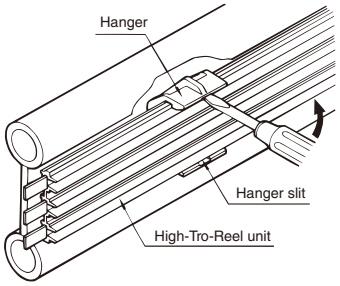
4 Mounting the High-Tro-Reel unit on a hanger

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.



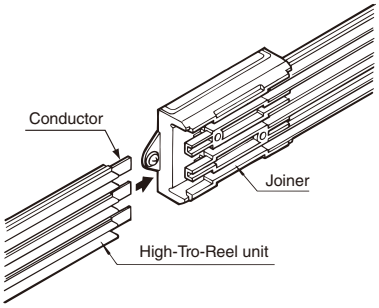
5 High-Tro-Reel unit connection

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

Notes

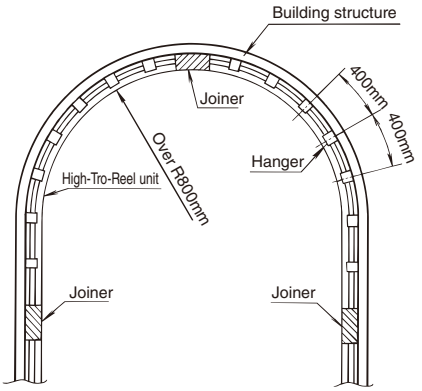
When mounting the High-Tro-Reel unit,
be careful to maintain the proper form and layout.
Do not be meandering (up and down direction ±3mm or less)
Failure to do so may cause poor collector arm contact or separation from wires.

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



Notes

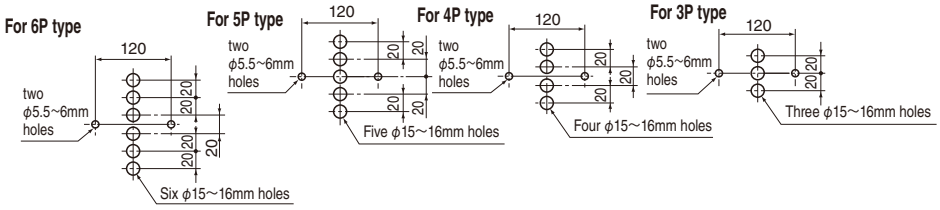
For inward curves, position a joiner (or joint) at the center of the curve. (For outward curves, a joiner can be positioned on any part of the unit.)

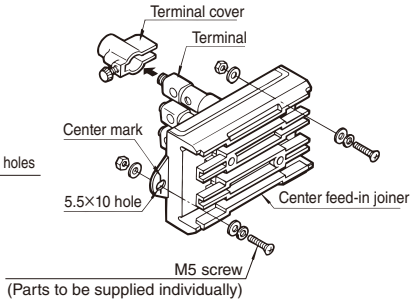


6 Center feed-in joiner installation

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.

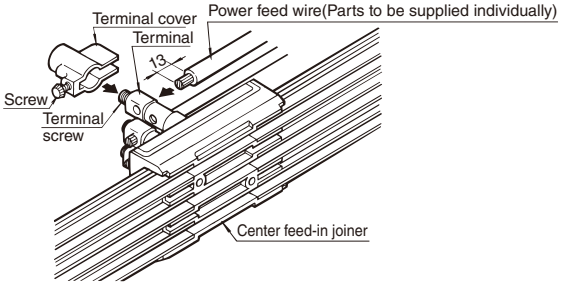




Notes **When drilling holes, use the center mark of the center feed-in joiner as a reference.**
Use a hole saw to drill ϕ15～16mm holes.

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.

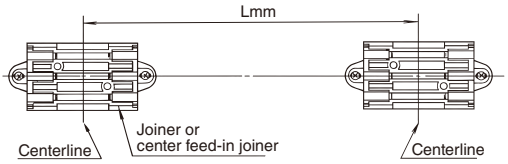


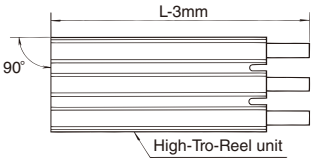
⚠Caution

1. Use 5.5 to 22mm² power feed wires.
2. Be sure to crimp the inclvded crimp sleeve before connecting the signal feed wire (0.75 to 2mm²) 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.



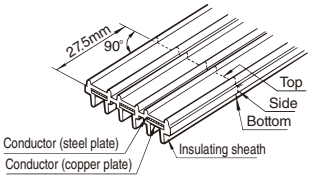


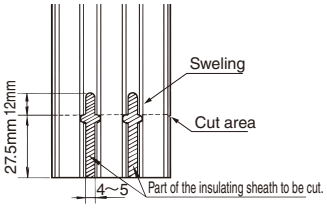
9 Cutting the High-Tro-Reel unit

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.

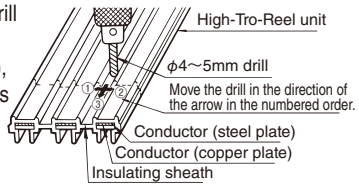
⚠Caution

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 ϕ4~5mm 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.



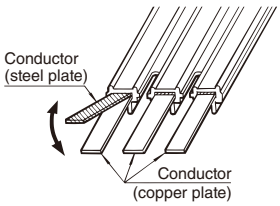
Notes

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

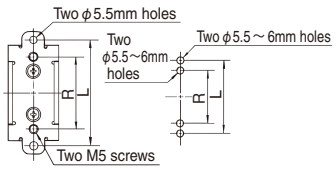
Remove the burrs from both cut surfaces using a knife or a file.
Failure to do so may cause poor collector arm contact or separation from wires.



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.

●Installation procedure

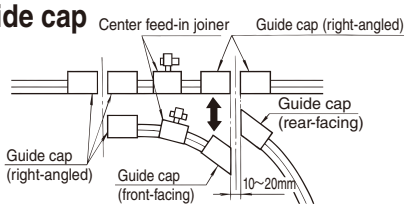
L size: front-mounting ℓsize: front-mounting

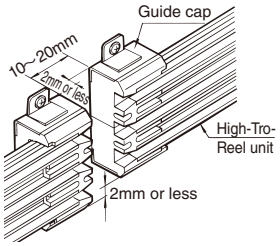
Notes

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)	ℓ(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

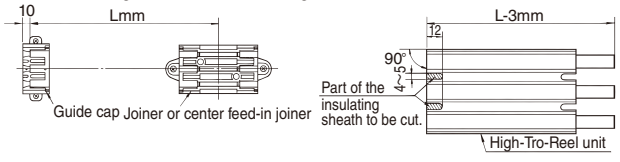
■Usage of guide cap





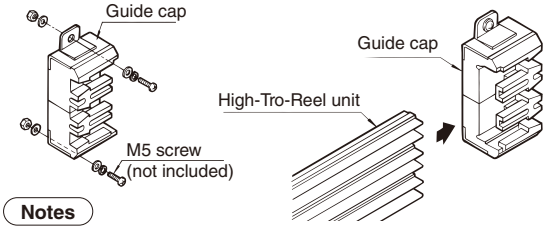
Cutting the High-Tro-Reel unit and insulating sheath

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 aϕ4~5mm 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.

■High-Tro-Reelunit installation



Notes

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

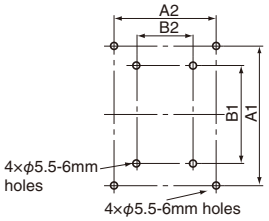
11 Line separator installation

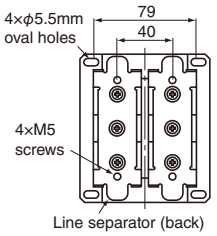
1. Drill holes in the building structure as shown below. Hole positions are different according to whether it will be installed from front or back.
2. Screw a line separator to the building structure using screws (M5; not included) and insert the High-Tro-Reel unit into the line separator.

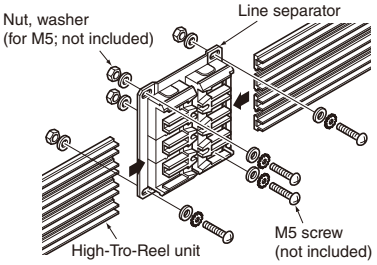
Notes **Use a tandem-type collector arm and set the maximum traveling speed to 200m/min, or lower.**

● **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

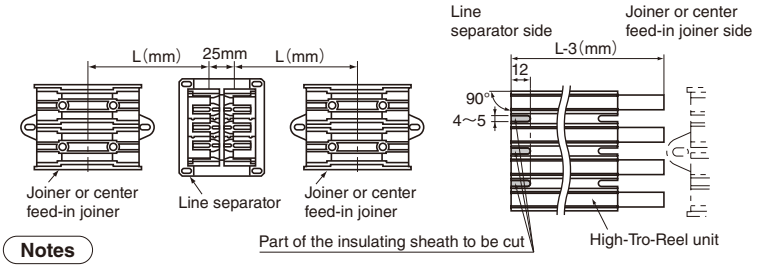






Cutting the High-Tro-Reel unit and insulating sheath

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.

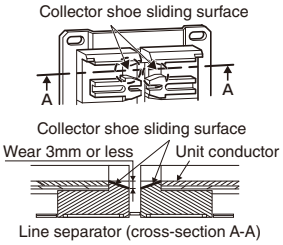


Notes

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 surface. Line separators should also be replaced 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.

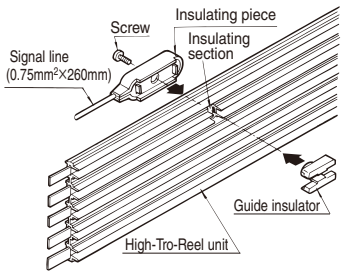


⚠Caution

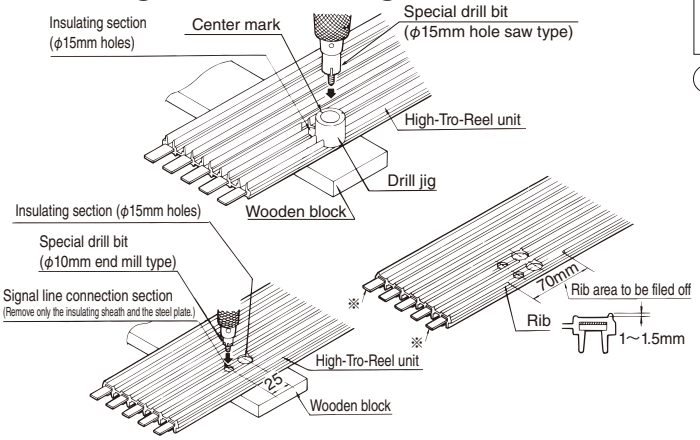
Use line separators within the wear range.
Failure to do so may result in derailment of the collector arm, fires due to sparking, or poor contact.

12 Insulating piece installation

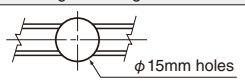
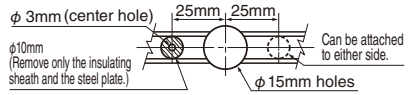
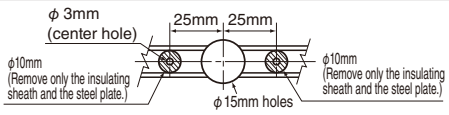
1. Drill holes in the High-Tro-Reel unit using the special jig (insulating piece drill jig).
2. Insert a guide insulator and a insulating piece into the insulating section and screw them in.



■Drilling holes in the High-Tro-Reel unit



■Usage of insulating piece

Usage	Hole drilling in the High-Tro-Reel unit
Signal line insulation	
Signal line insulation + One-side power feed	
Dual-side power feed for repair	

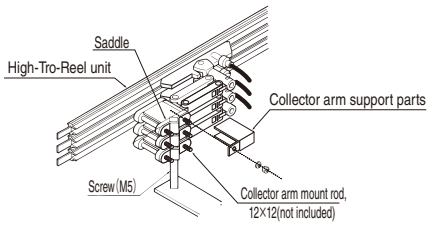
Notes

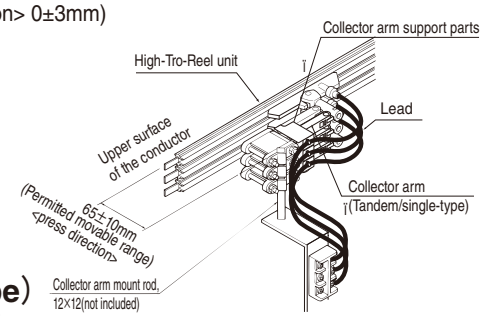
1. **Position the High-Tro-Reel unit on a wooden block and drill holes using the drill jig (positioning the center mark inside the jig.)**
2. **Hold the end mill or hole saw drill upright against the High-Tro-Reel unit when drilling.**
3. **For insulating sections, drill holes slowly to prevent damage 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.**

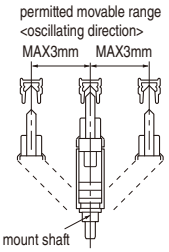
13 Collector arm installation

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

①Mount the supporting parts of collector arm on saddle
②Set 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)
③Should 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)

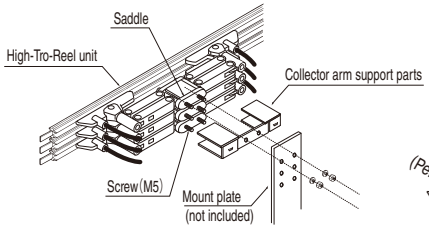


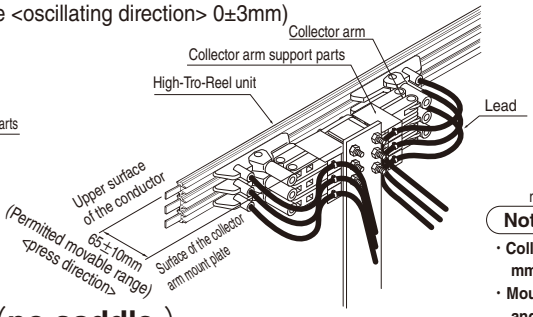


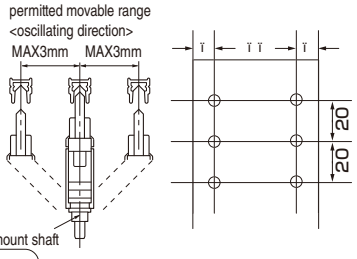


■Tandem/collector arm（mount plate type）

①Mount the supporting parts between saddle and the mount plate.
②Set 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)
③Should 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)





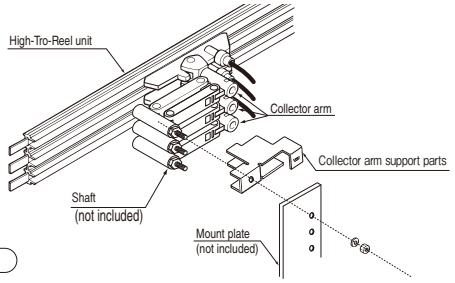


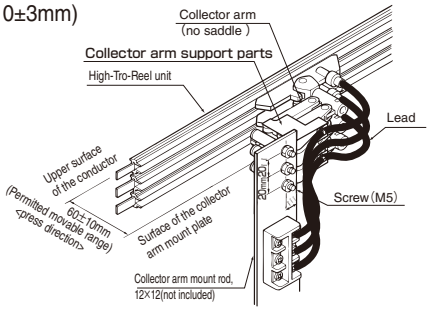
Notes

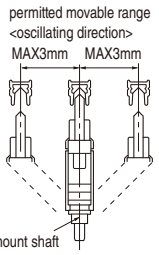
- **Collector arm mounting screw should be positioned 20 mm apart**
- **Mount plate mounting hole shoud be positioned 30 mm and 8 mm away from the edge of the mount plate.**

■single-type collector arm（no saddle ）

①Mount the supporting parts between the top of saddle and the mount plate.
②Set 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)
③Should 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)





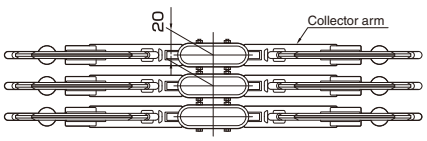


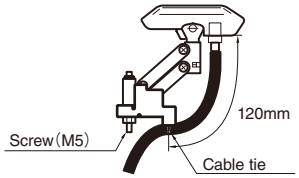
note

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

note

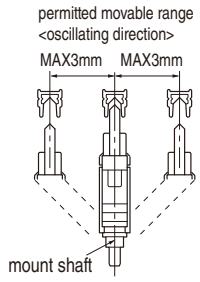
1. **Be sure to use only the specified dimensions for each mounting part. For operating the equipment, set the collector arm within permitted movable range of 65±10mm (60±10mm for single).**
2. **Collector arm mounting screw should be positioned 20 mm apart and Collector arms (single-type with no saddle 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 exchanging 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 separately. 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 mounting 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 aim 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.

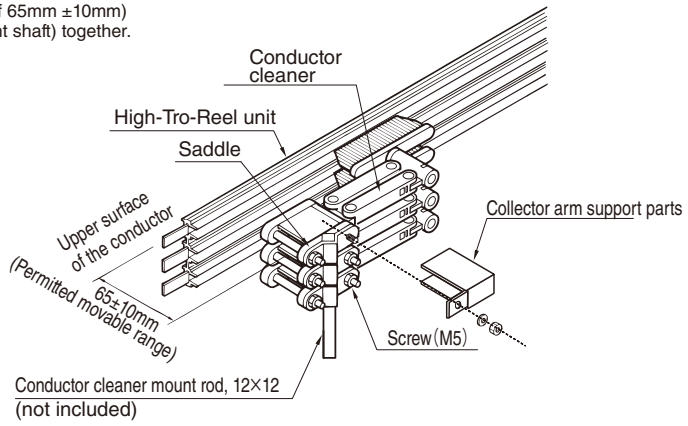




14 Mounting a conductor cleaner

①Mount the supporting parts of collector arm on saddle
②Set 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 ±10mm)
③Should be put the center of High-Tro-Reel conductor and collector arm (mount shaft) together.
(The collector arm permitted movable range <oscillating direction> 0±3mm)





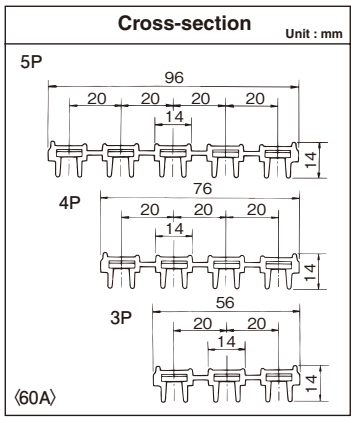
note

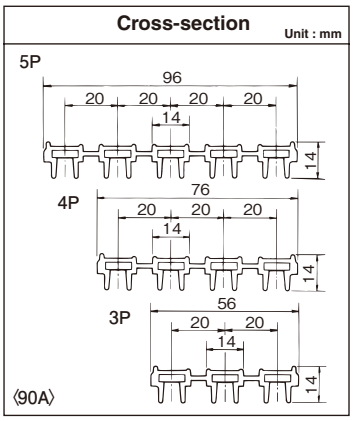
・Be sure that the conductor cleaner is mounted parallel to the High-Tro-Reel unit with no twisting.

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

Unit : mm

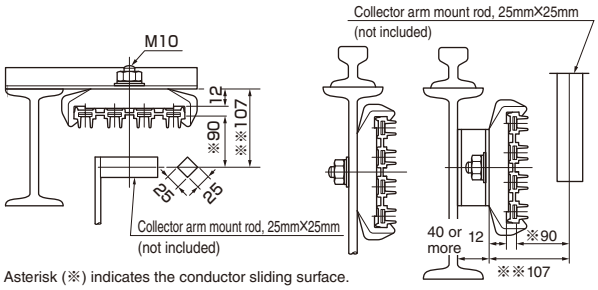
■ Cross-section



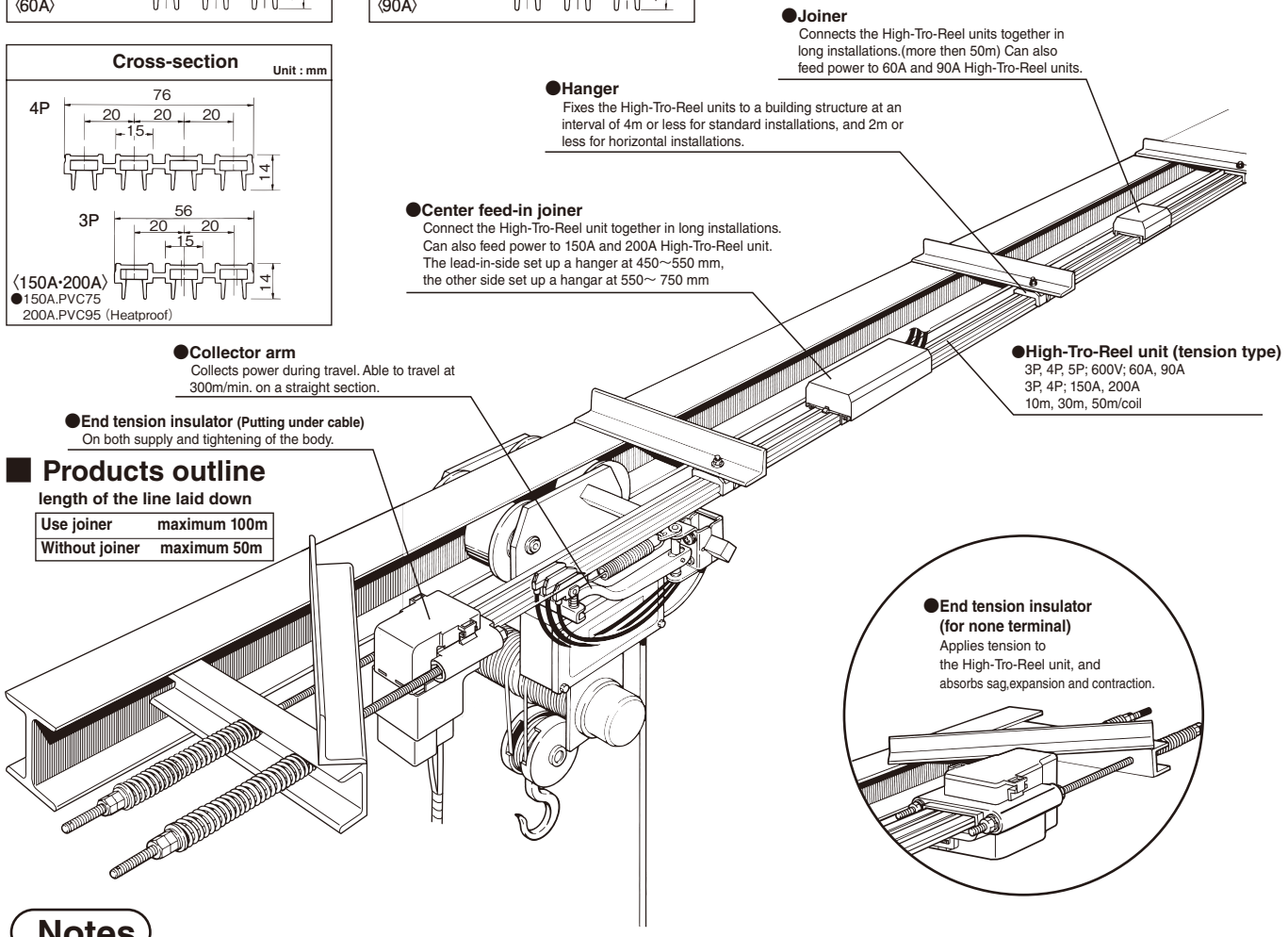


■ Installation procedure

● Downward installation ● Horizontal installation



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



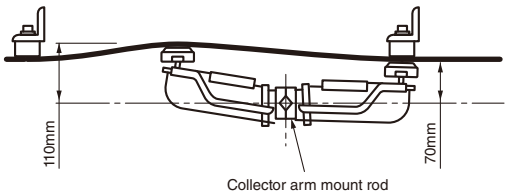
■ Products outline

length of the line laid down

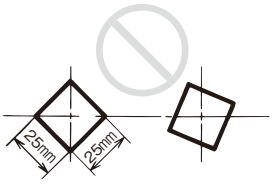
Use joiner	maximum 100m
Without joiner	maximum 50m

Notes

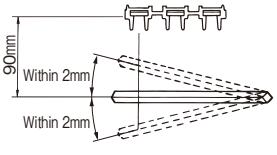
1. When collector arm mount rod set up a reference position, the operating range from 70mm～110mm of collector arm set up to be twisting.



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



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



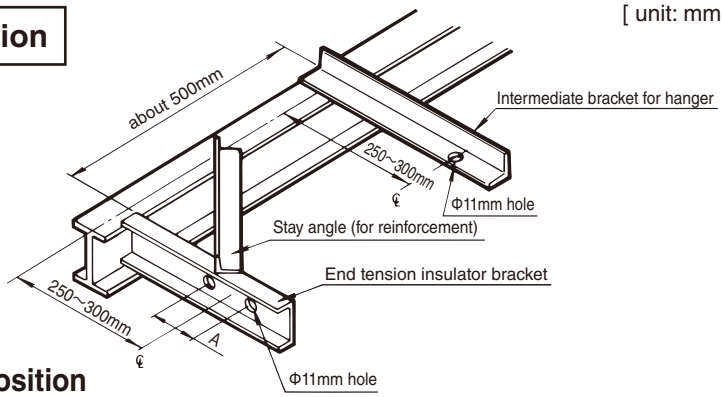
■ Mounting the bracket

[unit: mm]

End tension insulator mounting section

Unit : mm

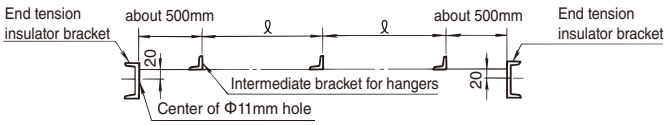
	A	B
3P	90	130
4P	110	150
5P	130	170



Bracket position

■Bracket dimension and installation position

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



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

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

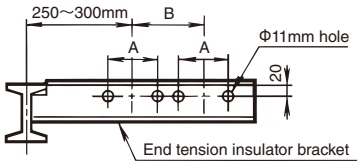
Notes

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

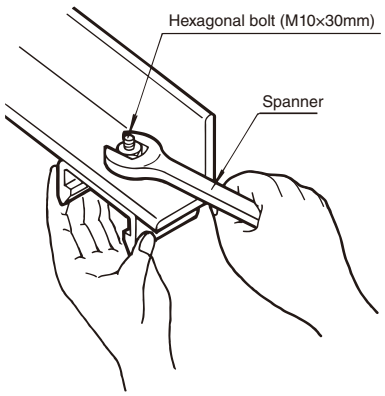
Parallel installation

Notes

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



1 Mounting hangers on the bracket

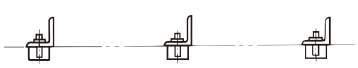


Point of installation

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

Notes

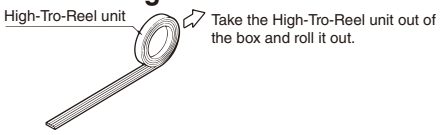
- **Make sure brackets are parallel to the line.**
  Failure to do so may cause poor collector arm contact.



2 Stretching and cutting the High-Tro-Reel unit

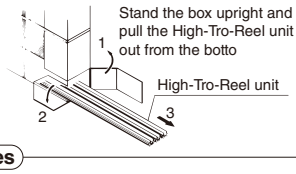
■Open the box and stretch the High-Tro-Reel unit.

<10m coil>

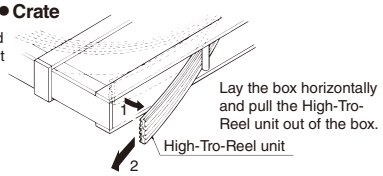


<30m and 50m coil>

● Cardboard box



● Crate

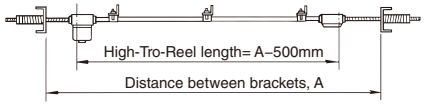


Notes

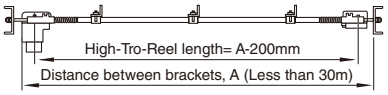
- **Be careful that the end of the High-Tro-Reel unit doesn't swing up.**
- **Be careful not to step on or band the Hight-Tro-Reel unit on the ground as this may damage the unit.**
  Failure to do so may cause damage

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

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



(For transverse)



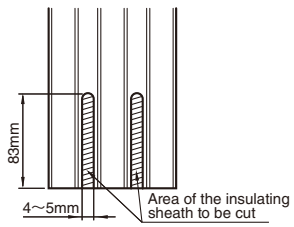
3 Cutting the High-Tro-Reel unit

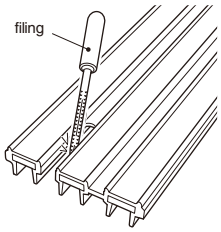
Notes

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

Processing for the End tension insulator

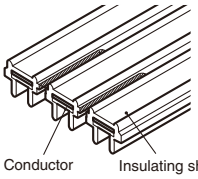
1. Cut a sheath according to the size that exists in figure.
・Please use the gimlet or the file.





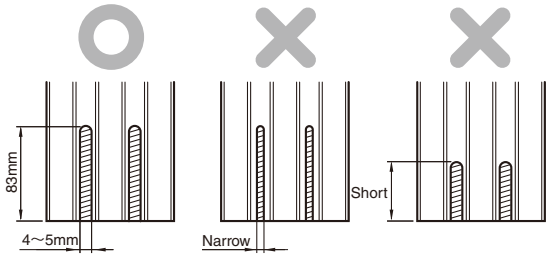
Filing(recommendation): The file-saw type M is made by Nigata seik.

Completed Figure

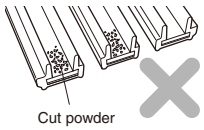


⚠Caution

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



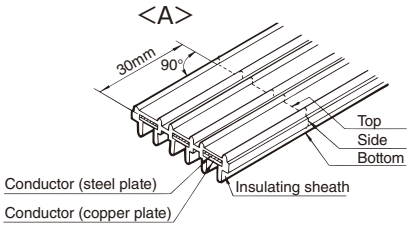
- **After an insulation sheath cut, please confirm that the cut powder of the insulation**
sheath doesn't stick to the conductor surface (a copper sheet). might be the fire by the poor contact.



Processing for the center feed-in joiner

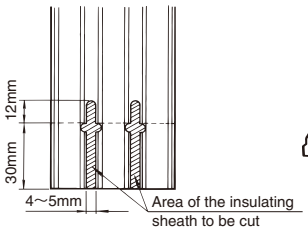
1. Make the dimension shown in Figure <A> on the High-Tro-Reel unit, and cut the top, side and bottom of the insulating sheath using a hacksaw.On the top surface, make a thin cut line down to the conductor steel plate. (For 90 A, 150 A, 200 A cut only the insulating sheath)

<A>

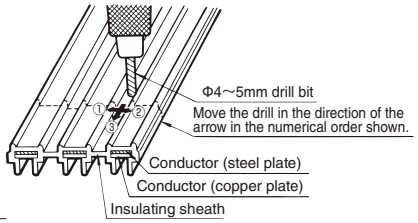


2. Cut the insulating sheath using a Φ 4 ～ 5 mm drill bit, as shown on Figure <B>.Slightly exaggerating the cut to the side (Working ① ⇔ ②), as shown in Figure <C>.makes the insulating sheath easier to remove.

<C>



<B>

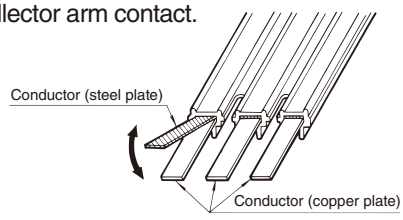


⚠Caution

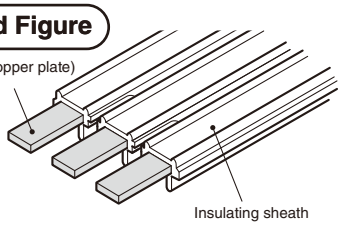
- **Be careful not to damage the conductor(copper plate) when cutting whit a hacksaw.**
Failure to do so may cause damage due to failing of equipment.

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

<D>



Completed Figure



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

According to the following,
Feeding from horizontal

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

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

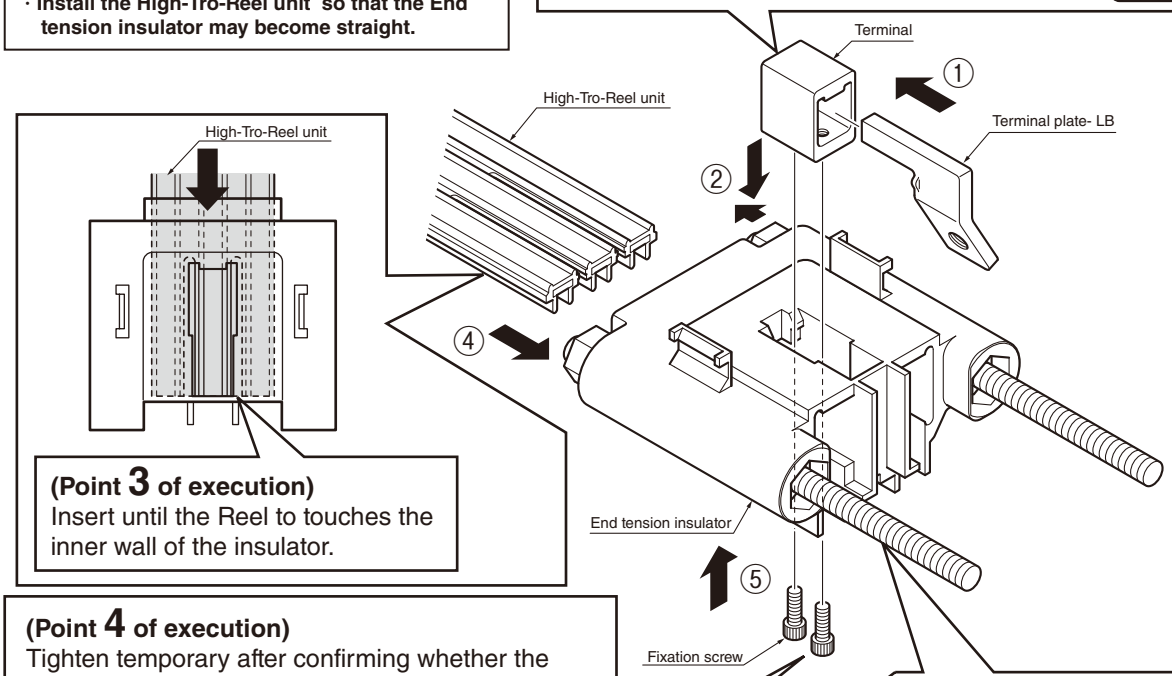
(1) Mounting the terminal from the upper

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

⚠Caution

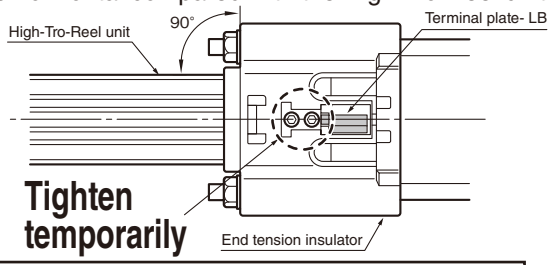
- **When installing the terminal plate in the conductors, Push firmly until the High-Tro-Reel to touches the inner wall of the insulator.**
- **Install the High-Tro-Reel unit so that the End tension insulator may become straight.**

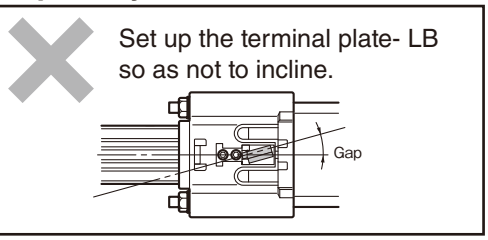
(Point 1 of execution)
Installing the terminal into the direction which the needle of terminal stick into the sheath side of the High-Trp-Reel.



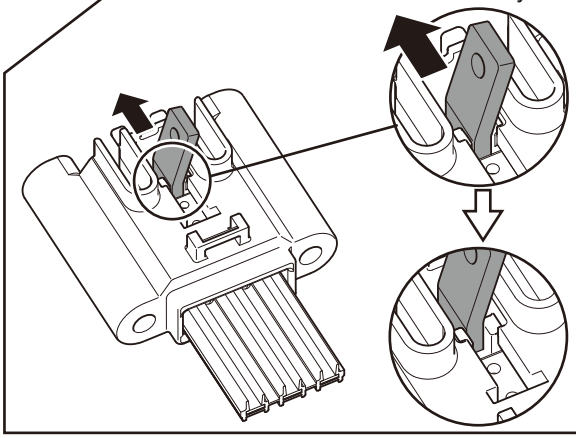
(Point 3 of execution)
Insert until the Reel to touches the inner wall of the insulator.

(Point 4 of execution)
Tighten temporary after confirming whether the terminal plate-LB and the end tentsion insulator are the horizontal compared with the High-Tro-Reel unit.





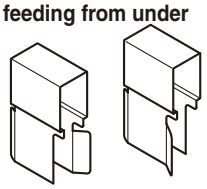
③ **(Point 2 of execution)**
Move the terminal plate to the direction of the arrow by 5mm.



(2) Mounting the terminal from side

① Fitting the insulation sheet in the opening side of the end tension insulator.
② Insert the terminal.(Point 5 of execution)
③ Insert the terminal plates.(Point 6 of execution)
④ Fully tighten the fixation screw <Table1 > the High-Tro-Reel, the terminal, the terminal plate, and the end tension insulator. (Point 7 of execution) (Proper torque: 7N • m ~ 9N • m)

Insulation sheet for feeding from under

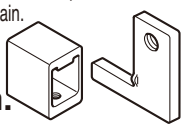


※ Please note the direction of the insulating sheet.

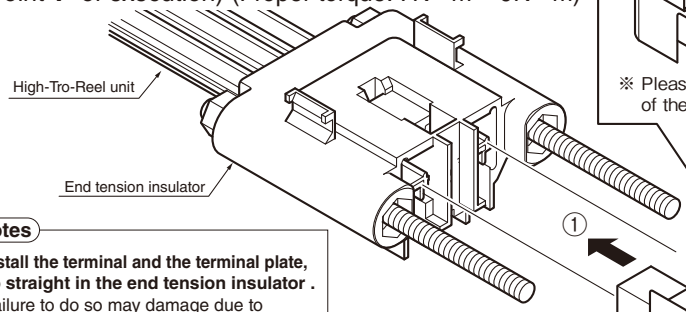
⚠Caution

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

Don't use them again.



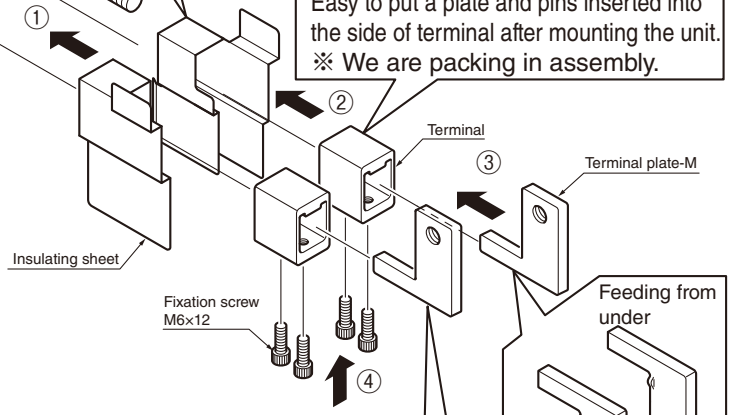
Please inquire of store purchased when the terminal and the terminal plate are necessary.



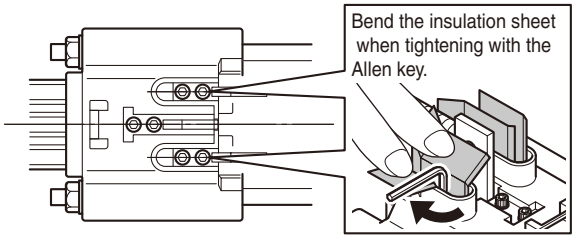
Notes

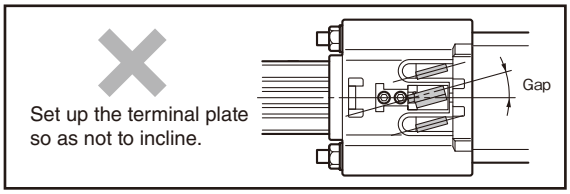
- **Install the terminal and the terminal plate, to straight in the end tension insulator .** Failure to do so may damage due to falling of equipment.

(Point 5 of execution)
Easy to put a plate and pins inserted into the side of terminal after mounting the unit.
※ We are packing in assembly.



(Point 7 of execution)
Tighten after confirming whether the terminal plate and the end tentsion insulator are the horizontal compared with the High-Tro-Reel unit.





⚠Caution

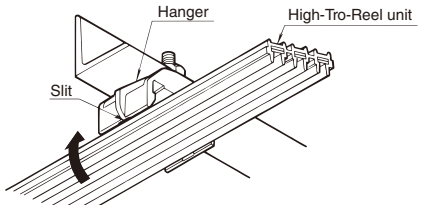
- **Tighten screws to ensure.** Otherwise, electric shock or fire may occur.

(Point 6 of execution)
The terminal plate is different depending on the power feeding.Please shown 7 Feeding power to the High-Tro-Reel (Crimp terminal sequenceand mounting direction of the terminal plate).

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

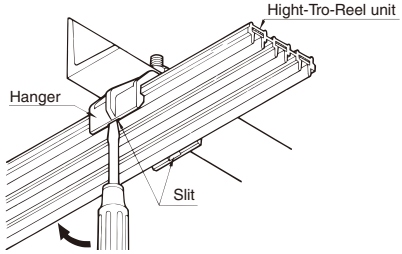
■ Mounting the High-Tro-Reel unit to the hanger

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



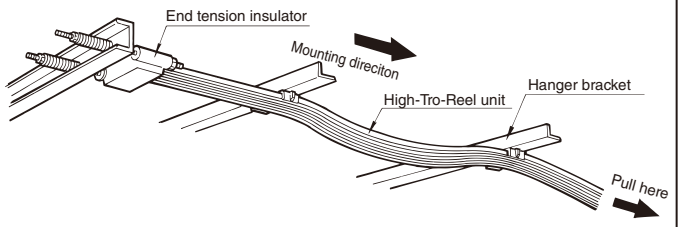
■ Removing the High-Tro-Reel unit

Insert a screwdriver into the slit and try it out.

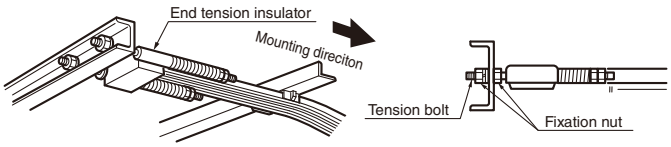


■ Temporarily fix the High-Tro-Reel unit to the hanger in the proper order starting at the end.

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

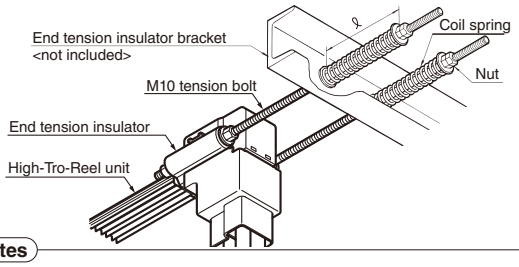


(For transverse)

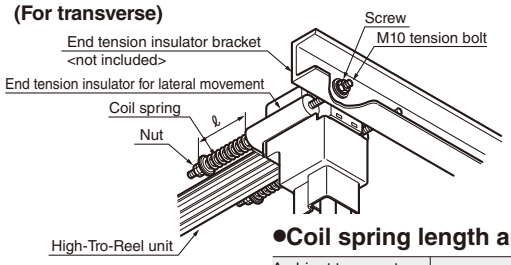


6 Tightening the High-Tro-Reel unit

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



(For transverse)



Notes

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

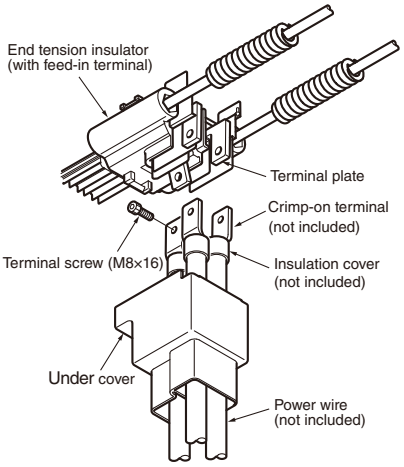
●Coil spring length and tension

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

7 Feeding power to the High-Tro-Reel

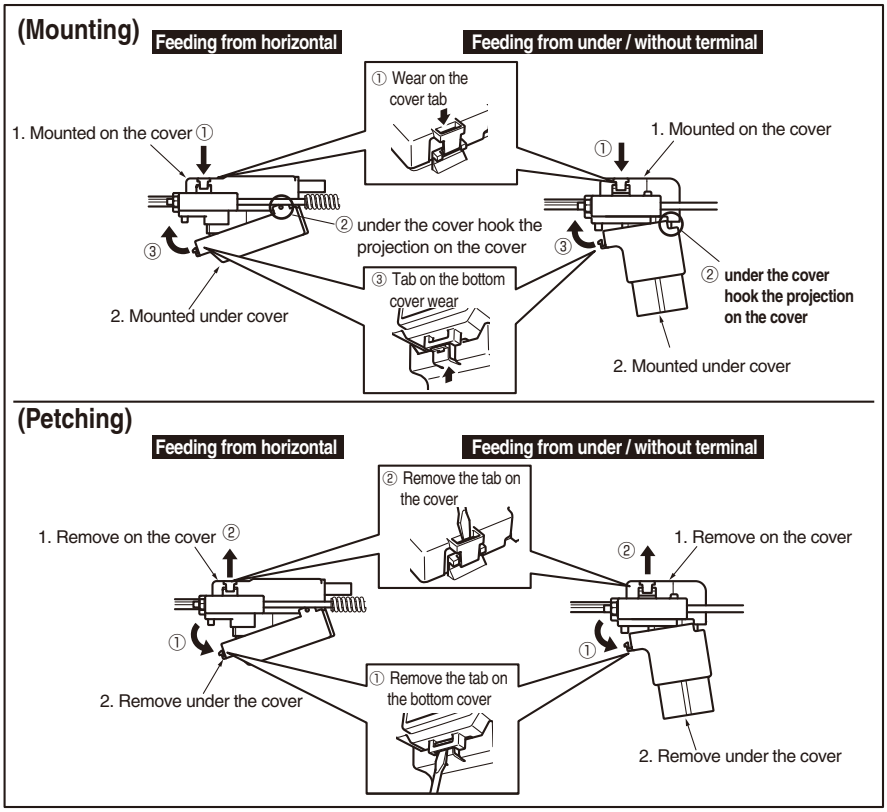
(Power is fed from the line end via an end tension insulator with a feed-in terminal.) Please refer to the page of the CE type.

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



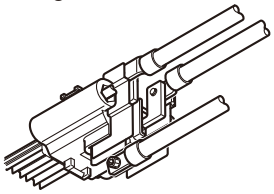
Recommend using JIS standard crimp terminals and insulating cap

● Installing the cover and remove

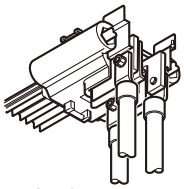


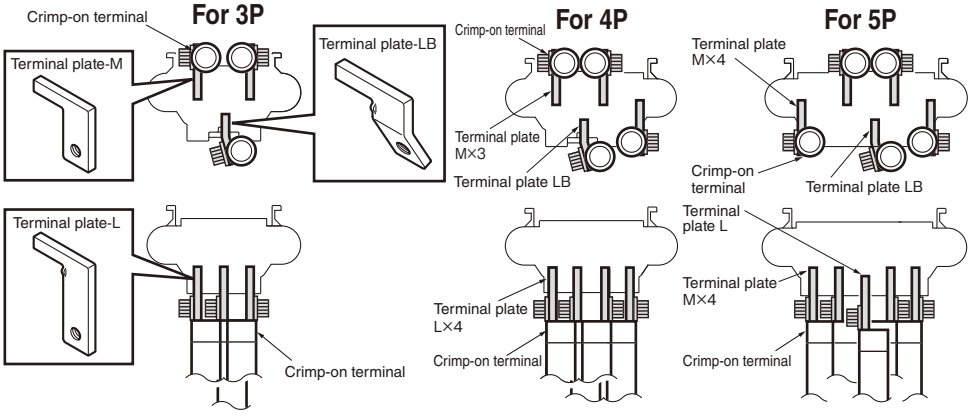
- Crimp terminal sequence and mounting direction of the terminal plate

【For feeding from horizontal】



【For feeding from under】

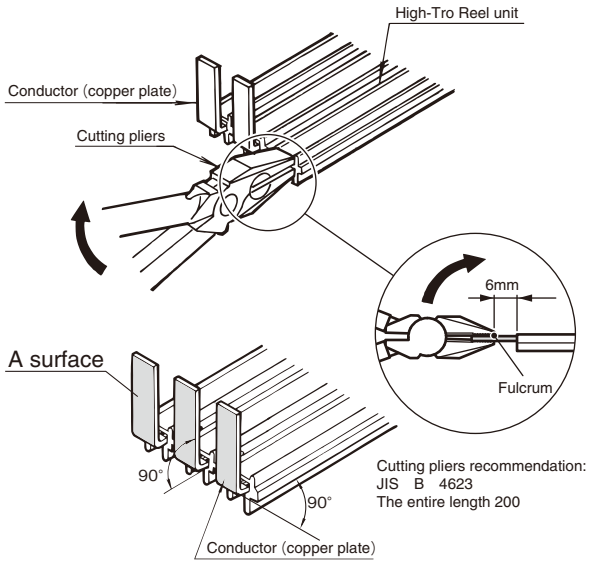




The terminal arrangement for none terminal is the same for feeding from horizontal.

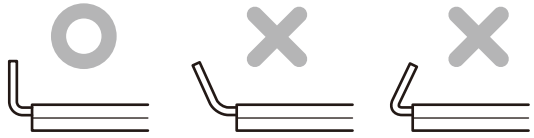
8 Connecting the High-Tro-Reel units (Use a joiner to connect units.)

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

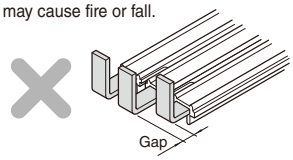


⚠Caution

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



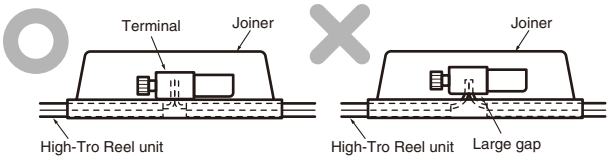
- **Make the position where each conductor bends the same.**
  Failure to do so may cause fire or fall.

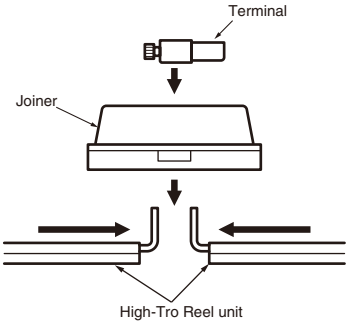


3. Inserting the each conductors into the joiner.

⚠Caution

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

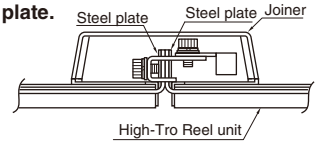




4. Overlaying each conductor, insert the terminal to it, tighten the fixation screw with a hex key wrench. (Tightening torque: 9.3N • m ~ 11.3N • m)

⚠Caution

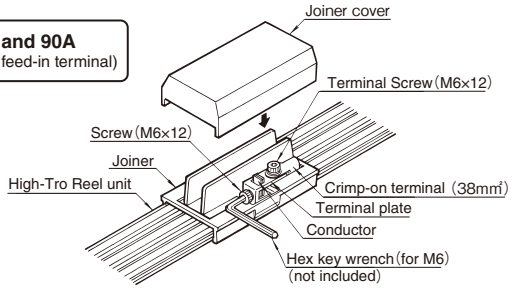
- **For 60A, please place the cut iron plate.**
  Failure to do so may cause fire or fall.



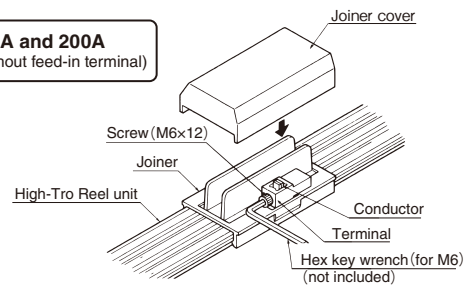
(For 60A, please place the conductor by cut iron plate to tighten securely.)

5. Install the joiner cover.

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



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



⚠Caution

- **Attach a hanger within 500mm from joiner.**
  Failure to do so may cause poor collector arm contact or separation from wires.
- **Tum 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 duo to falling of equipment.
- **Inserting the terminal until it touches the base.**
  Failure to do so may cause fire.
- **Be sure to tighten the terminal screw and fixed screw.**(Tightening torque: 9.3N • m ~ 11.3N • m)
  Failure to do so may cause fire or damage due to falling of equipment.

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

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

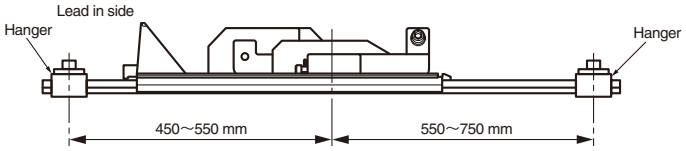
■ When powering middle of the High-Tro-Reel unit, use the following products.

【60A・90A】 Joiner (with feed-in terminal)
【150A・200A】 Center feed-in joiner

Mounting position of the hanger.

Joiner (with feed-in terminal)

Install a hanger within approximately 500mm.



Center feed-in joiner

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

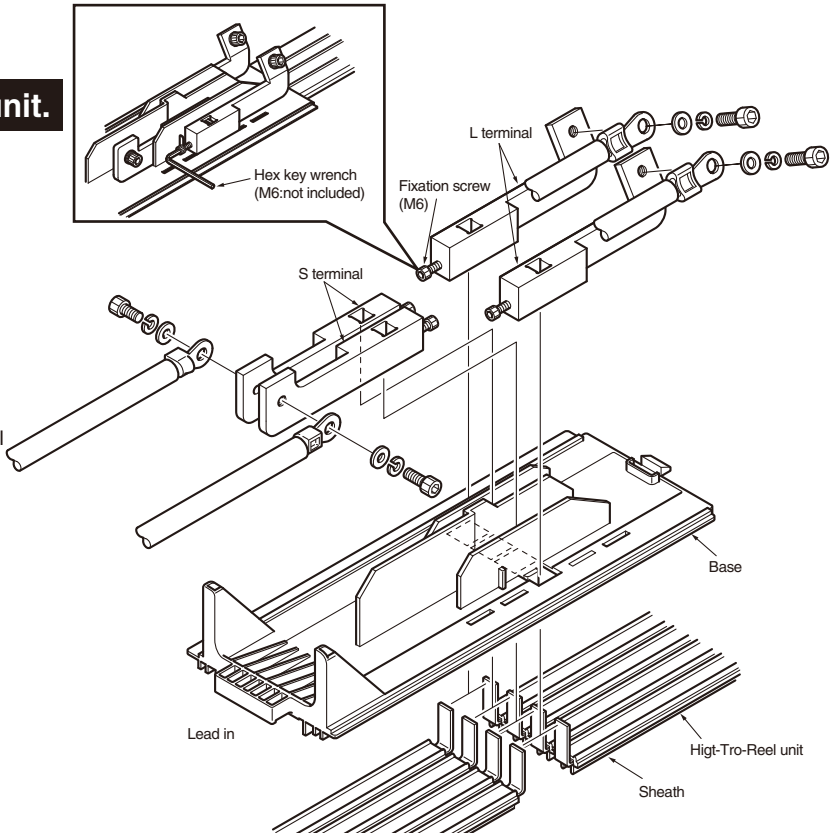
Connection the High-Tro-Reel unit.

Joiner (with feed-in terminal)

Please see 8 Connecting the High-Tro-Reel unit

Center feed-in joiner

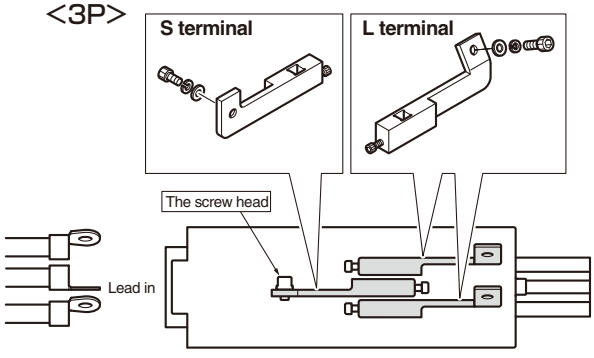
1. Peel the sheath, bend the conductor to a 90°
   (See 8 Connecting the High-Tro-Reel unit, to 1or 2)
2. Insert the High-Tro-Reel unit to the base.
   • Note the direction of the wire service entrance.
3. Insert 2 type of terminals shown in following the figure
   < Terminal sequence of the center feed-in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



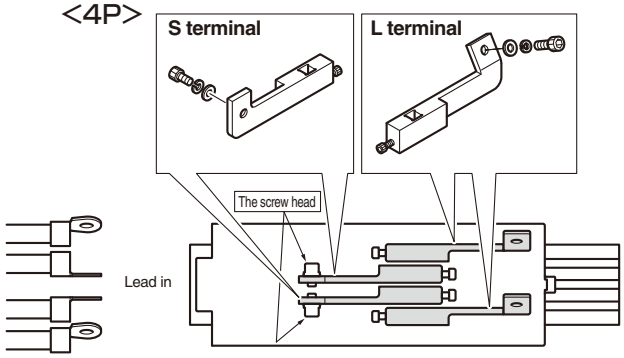
<Terminal sequence of the center feed-in joiner>

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

<3P>



<4P>



⚠Caution

- **Install the hanger in a specified position.**
  Failure to do so may derail the current collector arm and cause loose connection.
- **Tum up all conductors so that tips (the fold surface) line up evenly,and bend it without damaging it.**
  Failure to do so may cause poor contact or crack of the joint.
- **Do not bend in the bending back of the conductor.**
  Failure to do so may cause crack in the bent part, fire and damage duo 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

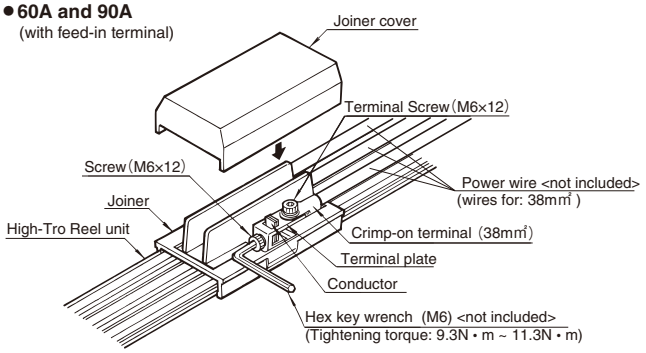
Joiner (with feed-in terminal)

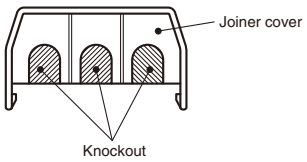
1. Put up the power wires, connect the power wire to the terminal plate using a crimp-on terminal.
   Be sure to tighten the terminal screw by hex key wrench.
   (Tightening torque: 9.3N・m ~ 11.3N・m)
2. After connection with the power wire , remove knockouts of the Joiner cover, and cover. Cutting plane of the knockout must be chipped with the knife etc.

⚠Caution

- **The terminal screw must be securely tightened.**
  (Tightening torque: 9.3N・m ~ 11.3N・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)



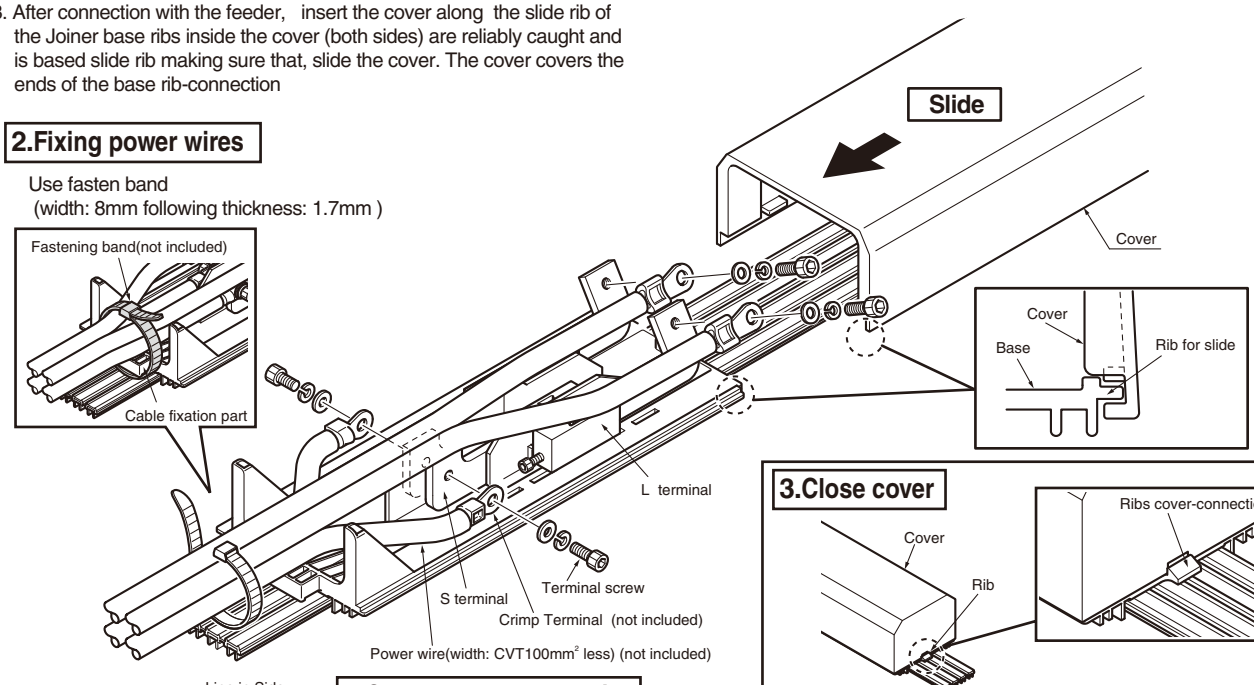


Center feed-in joiner

1. Put up the power wires from the line entrance,connect the power wire to the terminal plate using a crimp-on terminal(not included).
   Be sure to tighten the terminal screw by hex key wrench(M8:not included).
   (Tightening torque: 12.5N • m ~ 15N • 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.
2. Band the power wire with the cable fixation part by fastening band.
   The power wire is sold separately.
3. After connection with the feeder, insert the cover along the slide rib of the Joiner base ribs inside the cover (both sides) are reliably caught and is based slide rib making sure that, slide the cover. The cover covers the ends of the base rib-connection

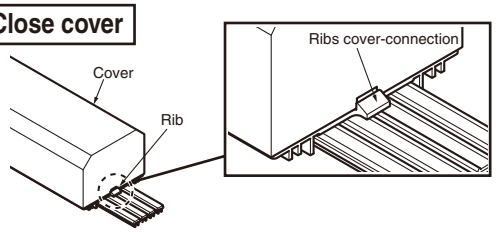
2.Fixing power wires

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



1.Connect the power wire

3.Close cover

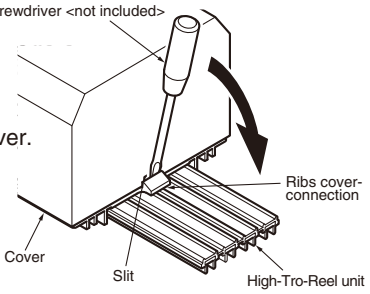


Sliding the cover to overcome the rib to ensure.

⚠Caution

- **The terminal screws must be securely tightened.(Tightening torque: 12.5N・m ~ 15N・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.

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

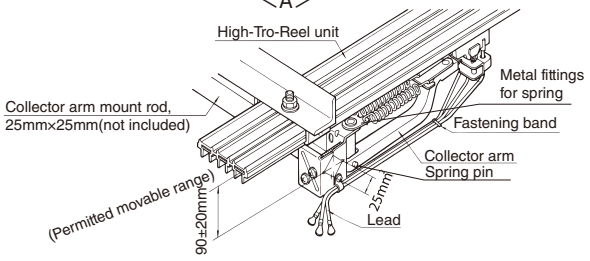


10 Collector arm installation Please refer to the page of the CE type.

■ Standard installation

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

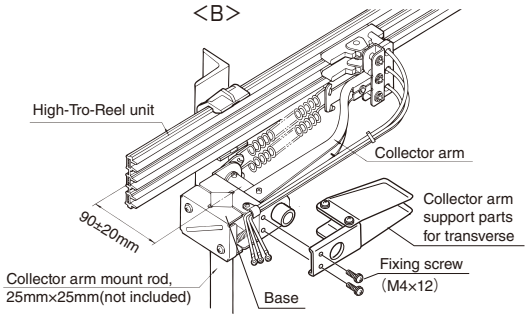
<A>



■ Horizontal installation with its opening facing

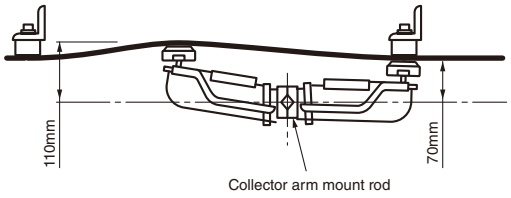
As shown in a figure,mounted collector arm support parts for transverse on base of the collector arm.Tightening torque of fixing screws：0.98 N・m～1.32 N・m
Set the distance between the High-Tro-Reel conductor sliding surface and collector arm mount rod to 90mm (Central value of the collector arm permitted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

<B>

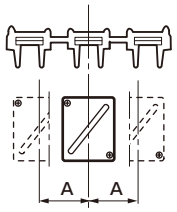


Use range of movable

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



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



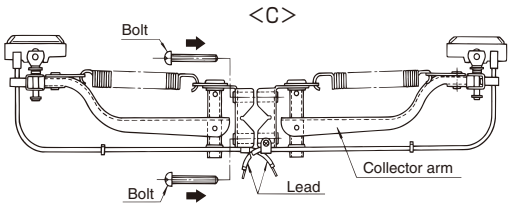
Dimension A of permitted movable range
Distance to the center of the collector arm from the center of the duct

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

■ Assembly in tandem configuration

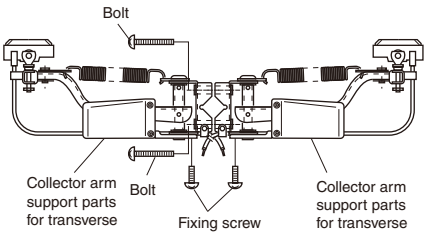
Two collector arms (tandem type) should be used together in lines with a circuit of 100A or higher, and especially in applications in which it is imperative that collector arms not be separated from wires. (shown<C>)

<C>



■Horizontal installation with its opening facing into tandem-type

Mounting the horizontal support parts in both the collector arms

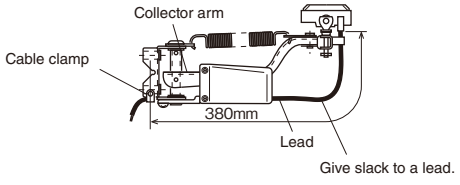


⚠Caution

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

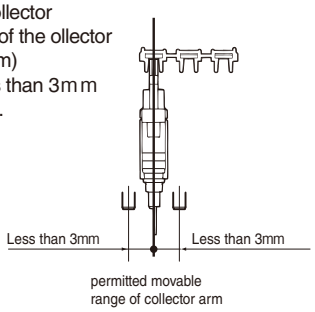
■Wire clamp

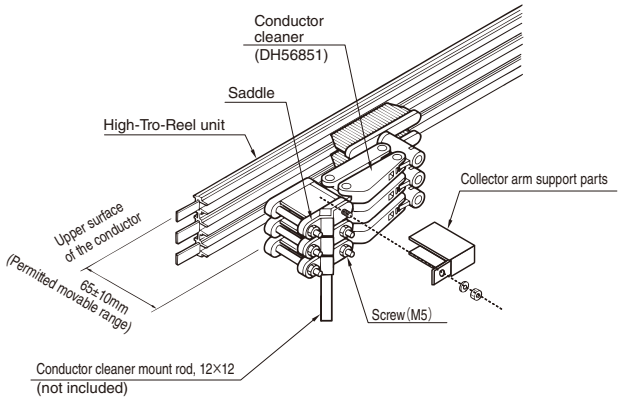
Give slack to a lead.(Lead is a fixed position, 380mm from the base of collector)
Do not affect a collector's run.



11 Mounting a conductor cleaner

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



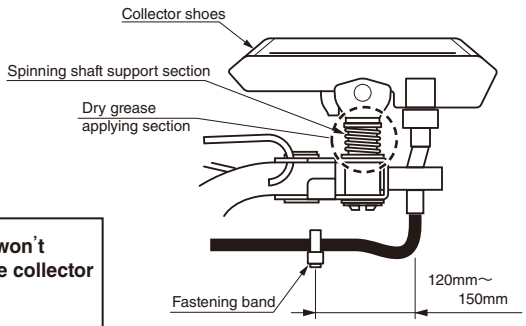


Notes

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

12 Inspection of spinning shaft support parts

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



⚠Caution

・Please pay attention so that the dry grease won't adhere on the surfaces of conductor and the collector shoes of the High-Tro-Reel unit.
Otherwise, poor contact may occur.

・After applying the dry grease, be sure to do a pre-use test run.
Otherwise, electric shock or fire may occur.

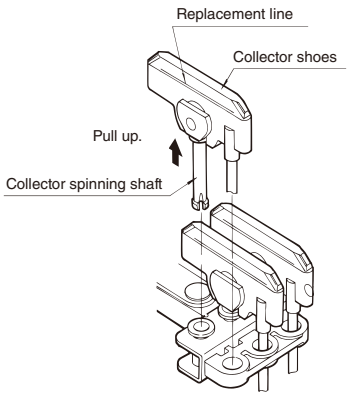
・For the inspection for sliding of collector shoes, perform periodic inspection leaving about 3 to 6 months intervals, though it slightly varies depending on the operating condition or environment.
If the collector is vertical movement is not smooth, separation of lines or abnormal wear of collector shoes may occur.

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

13 Collector shoe replacement

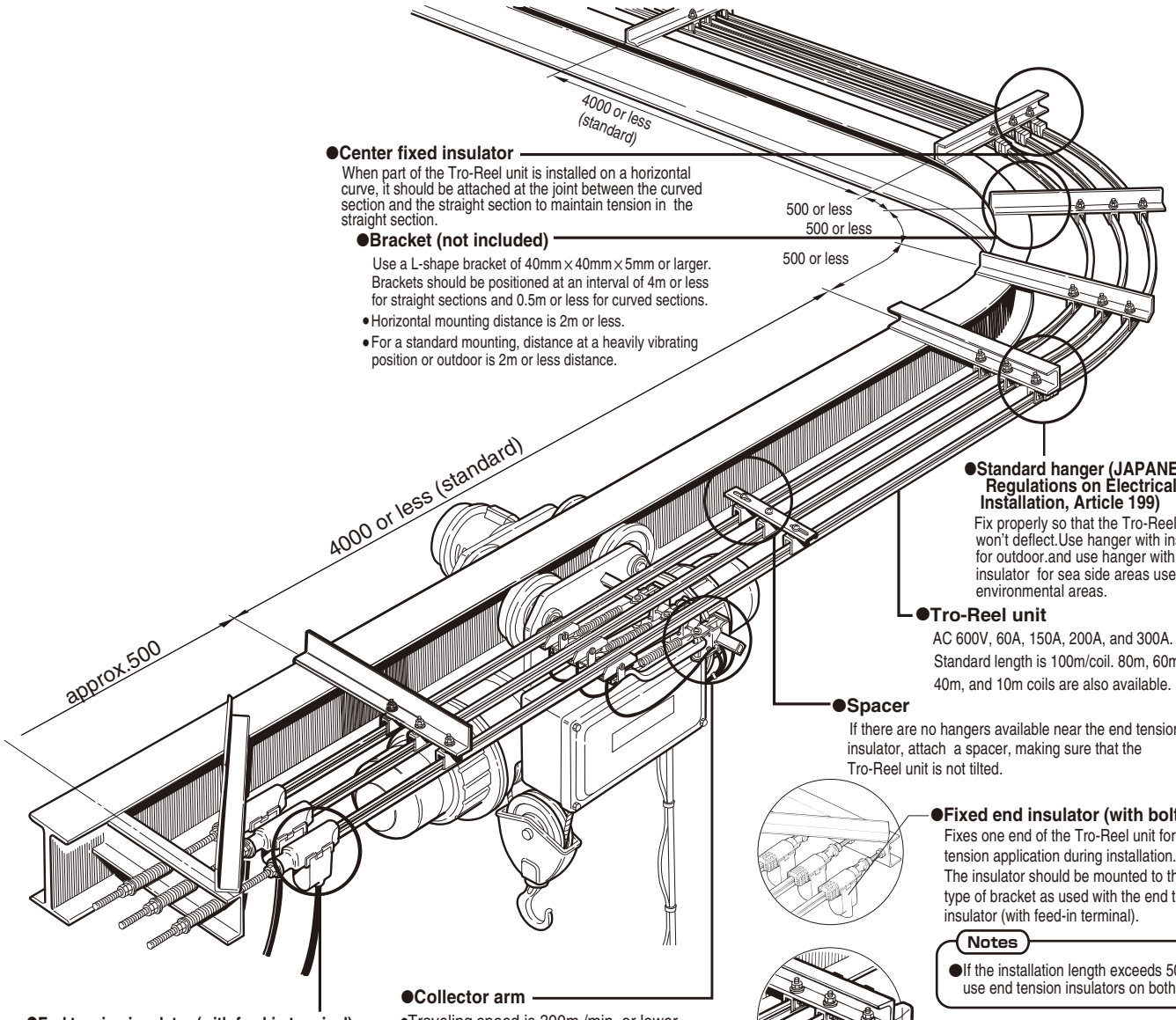
Please refer to the page of the CE type.

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



Installation Procedures for Tro-Reel

Unit : mm



●Center fixed insulator

When part of the Tro-Reel unit is installed on a horizontal curve, it should be attached at the joint between the curved section and the straight section to maintain tension in the straight section.

●Bracket (not included)

Use a L-shape bracket of 40mm × 40mm × 5mm or larger. Brackets should be positioned at an interval of 4m or less for straight sections and 0.5m or less for curved sections.

- Horizontal mounting distance is 2m or less.
- For a standard mounting, distance at a heavily vibrating position or outdoor is 2m or less distance.

●Standard hanger (JAPANESE Regulations on Electrical Installation, Article 199)

Fix properly so that the Tro-Reel unit won't deflect.Use hanger with insulators for outdoor.and use hanger with porcelain insulator for sea side areas use or bad environmental areas.

●Tro-Reel unit

AC 600V, 60A, 150A, 200A, and 300A.
Standard length is 100m/coil. 80m, 60m, 40m, and 10m coils are also available.

●Spacer

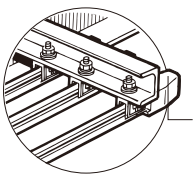
If there are no hangers available near the end tension insulator, attach a spacer, making sure that the Tro-Reel unit is not tilted.

●Fixed end insulator (with bolt)

Fixes one end of the Tro-Reel unit for easy tension application during installation.
The insulator should be mounted to the same type of bracket as used with the end tension insulator (with feed-in terminal).

Notes

- If the installation length exceeds 50m, use end tension insulators on both ends.



●Fixed end insulator

Fixes one end of the Tro-Reel unit for easy tension application during installation.
Drill a hole in the end of the Tro-Reel unit and put a pin through the hole.

Notes

- If the installation length exceeds 50m, use end tension insulators at both ends.
- When a hanger with the porcelain insulator is used,use fix end insulators(with bolt).

●Collector arm

- Traveling speed is 300m /min. or lower.
- For a tandem configuration,easily assemble it at the job site if you use two collector arms.
- If you use on a horizontal run way, set a Collector arm support parts(for transverse). (Collector arm mount rod (25 × 25mm) is not included.)

●End tension insulator (with feed-in terminal)

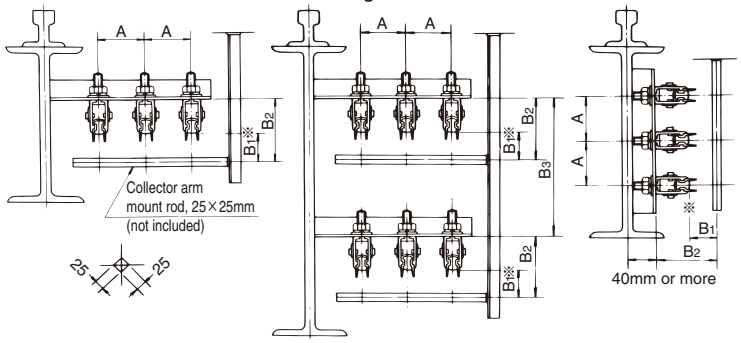
Applies tension to the Tro-Reel unit to absorb sag or expansion and contraction due to temperature fluctuation.
It supplies a power supply from here.

Unit : mm

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	B_1	B_2	B_3
Standard hanger	75	100	95	135	295
Hanger with insulator				160	320

Note: The B_3 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
		When installed outdoors or in a place exposed to heavy vibration such as for horizontal wiring in cranes: } 2m or less
	Horizontal installation	2m or less

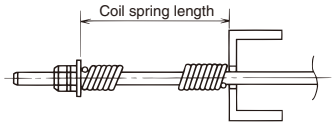
⚠ Caution

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.



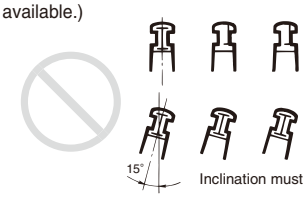
● Ambient temperature during installation and coil spring tightening length

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

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

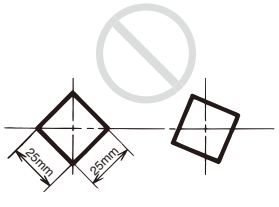
2 Avoid tilting or twisting in the Tro-Reel unit.

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.)



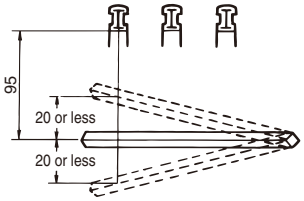
Inclination must be within 15°.

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

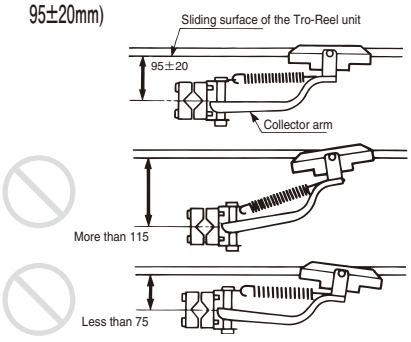


4 Be sure to check for tilt in the collector arm mount rod.

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

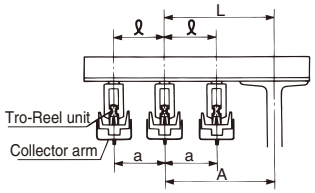


5 Set the distance between the collector arm mount rod and the sliding surface of the Tro-Reel unit to 95mm.(Central value of the collector arm permitted movable range 95±20mm)



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

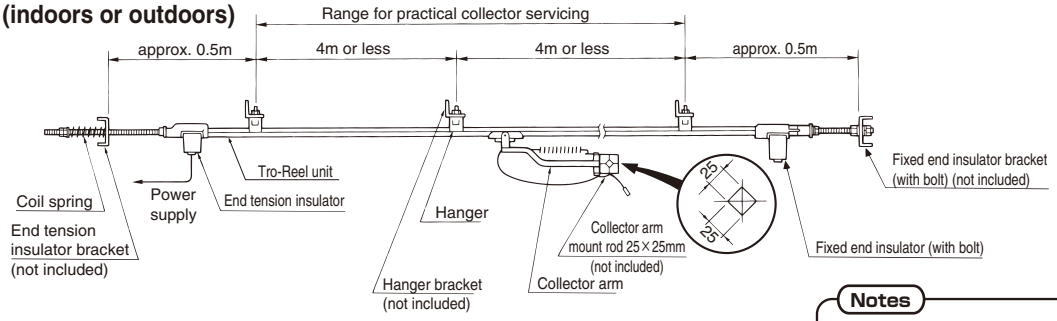
Set the length of "L" and "A"as well as "ℓ" and "a" to the same length.



Components for straight section installation

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

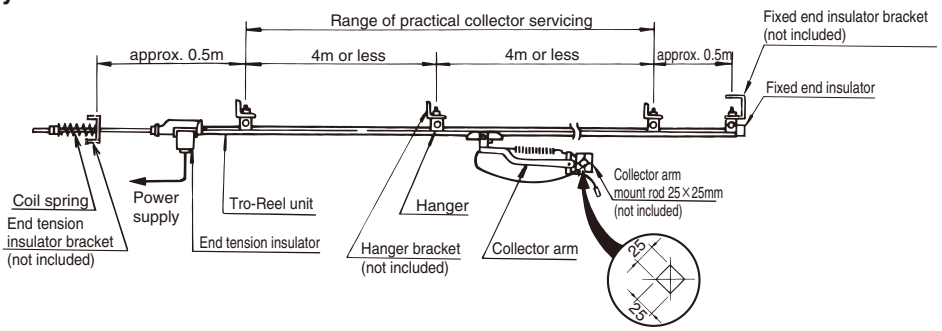
● **Both area (indoors or outdoors)**



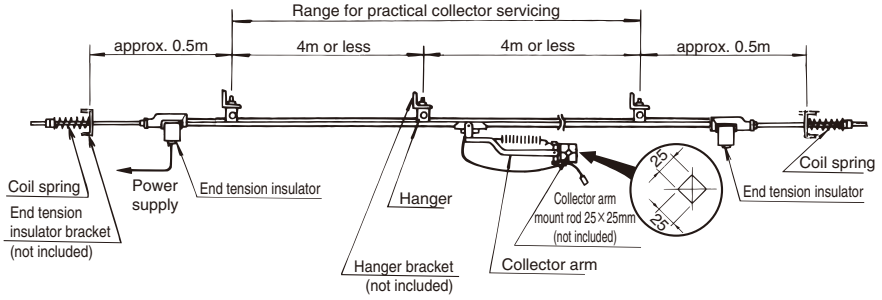
Notes

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

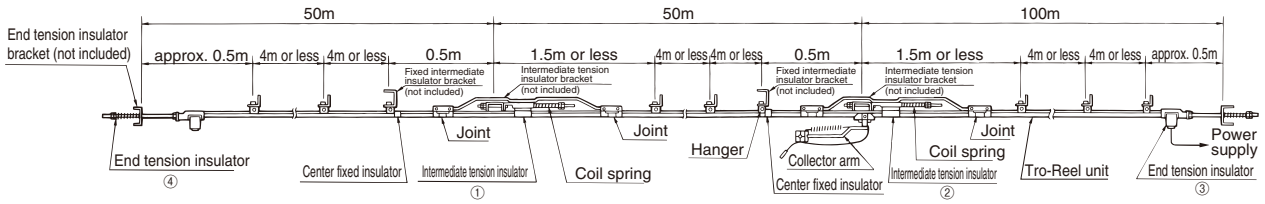
● **Indoor area only**



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

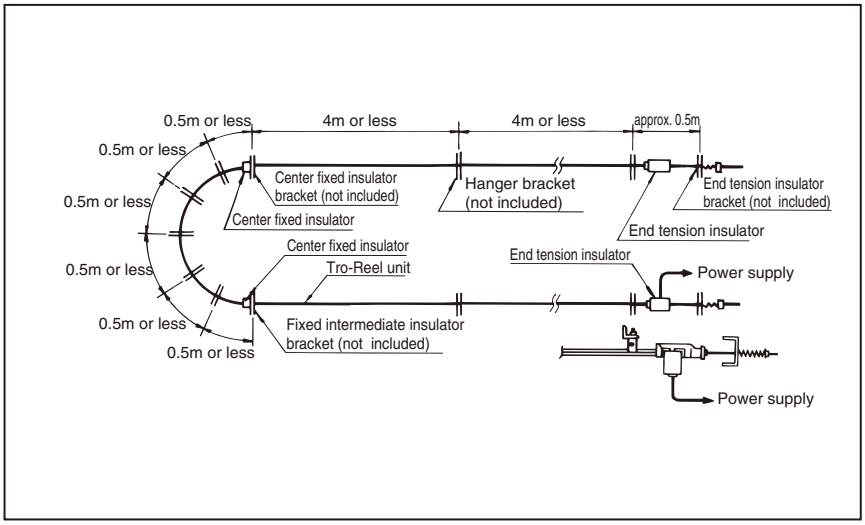
Rated current of collector arm	Minimum curve radius
30A	800mm
60A	1200mm
100A	2400mm

● Hanger interval

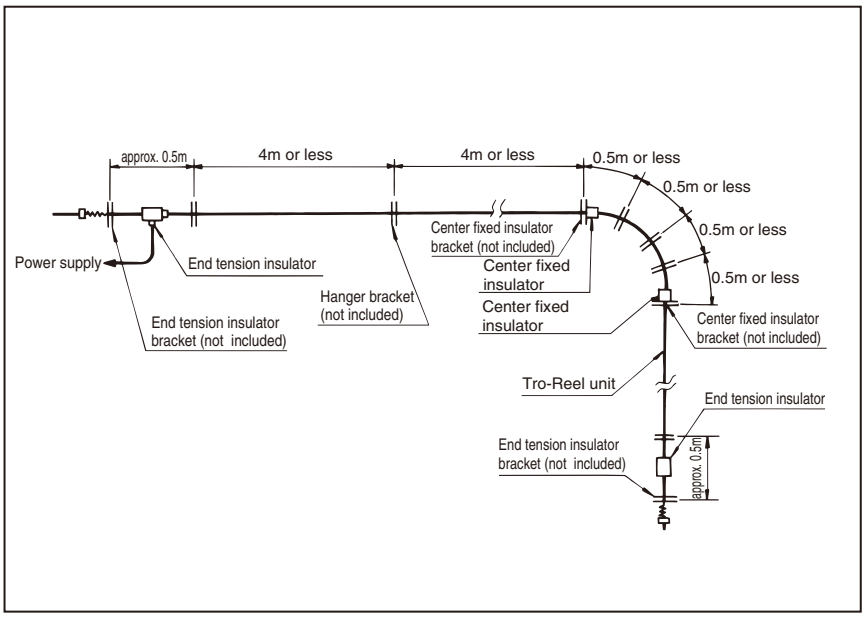
Hanger interval	curved sectoin	0.5m or less
	staight section	4m or less
		case of the outdoor areas and areas exposed to heavy vibration. 2m or less

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.

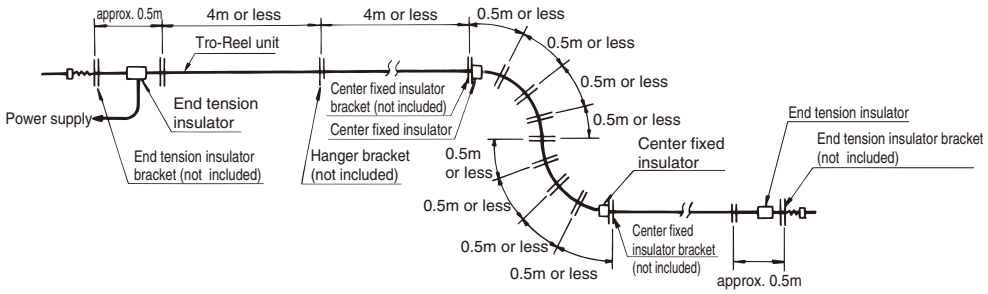
■U-shaped line



■L-shaped line

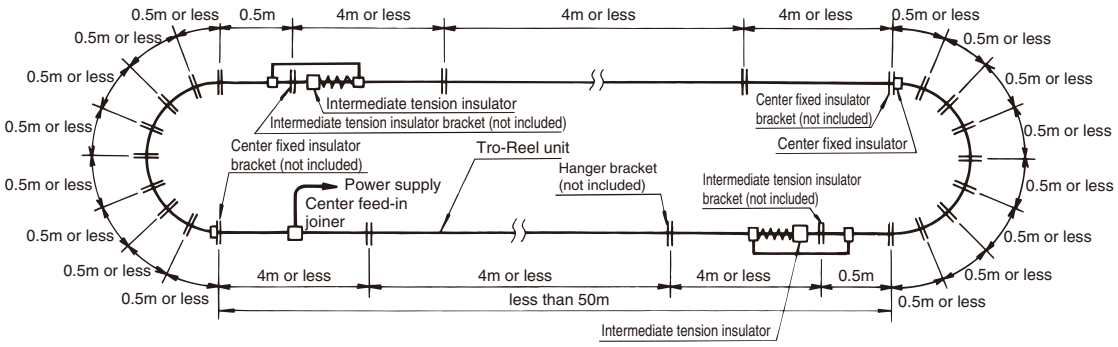


■S-shaped line



■ Endless line

(1) Straight line of less than 50m

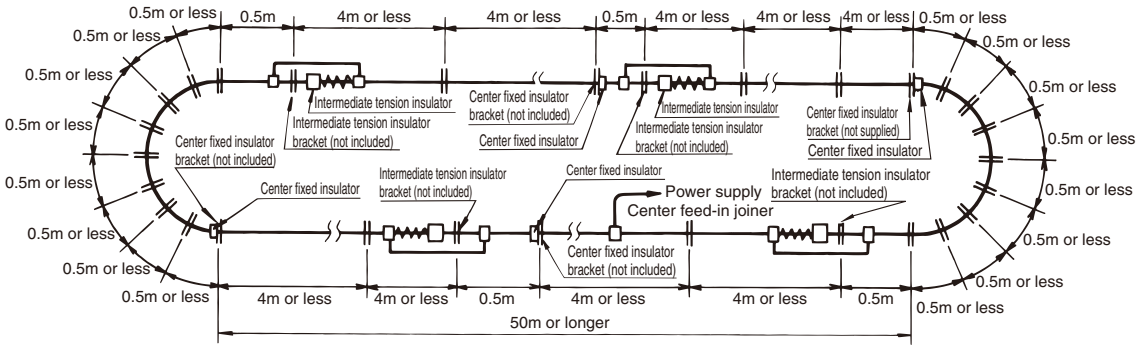


Notes

●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.

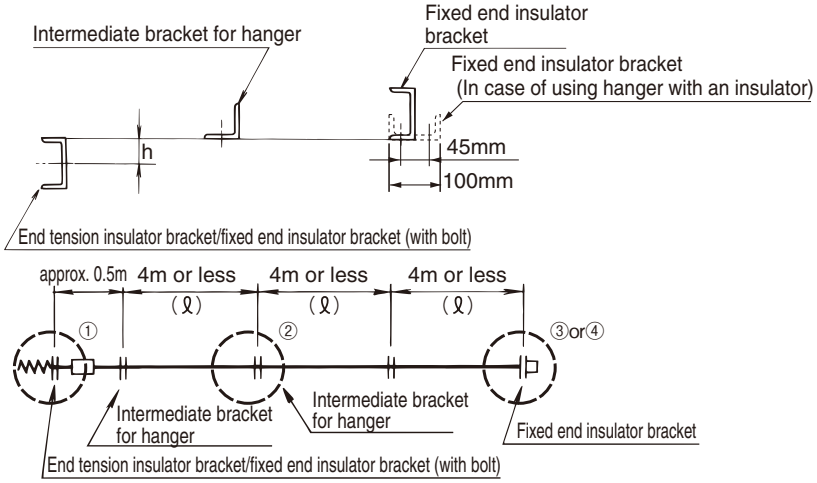
Bracket dimension and installation position

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



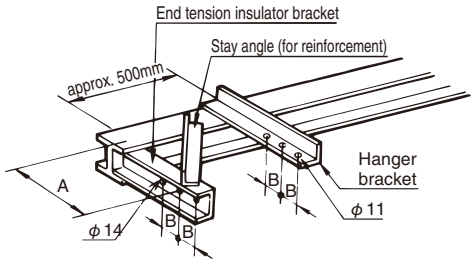
Hanger types	h
Standard hanger	32mm
Hanger with insulator	57mm

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			

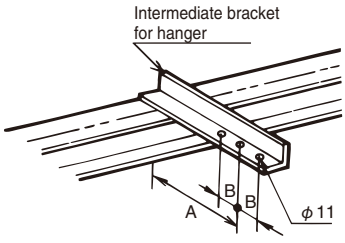
Notes

- **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.

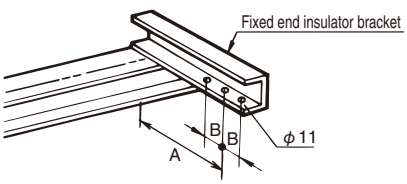
① End tension insulator section/fixed end insulator section (with bolt)



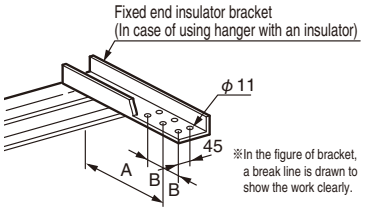
② Standard hanger section



③ Fixed end insulator section



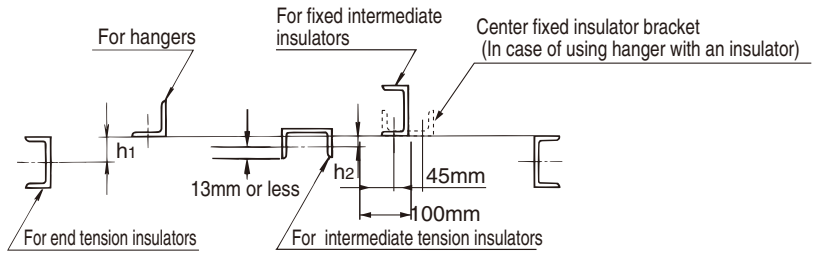
④ Fixed end insulator section
(In case of using hanger with an insulator)



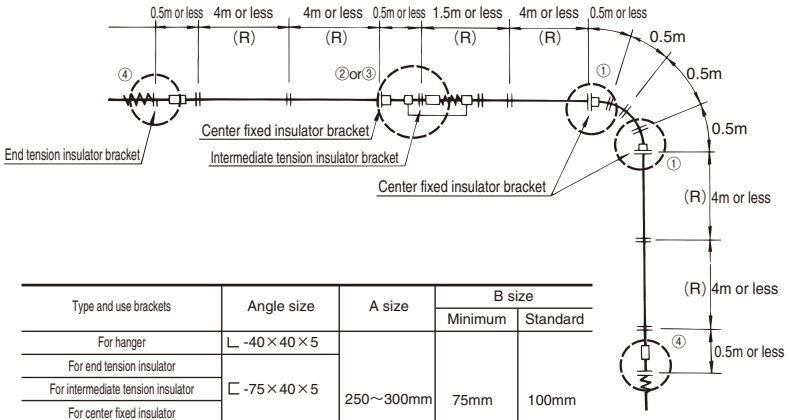
Notes

- **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

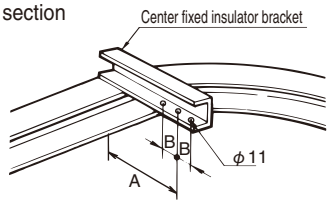


Type and use brackets	Angle size	A size	B size	
			Minimum	Standard
For hanger	L -40×40×5	250～300mm	75mm	100mm
For end tension insulator	C -75×40×5			
For intermediate tension insulator				
For center fixed insulator				
For intermediate tension insulator (In case of using hanger with an insulator)	C-100×50×5			

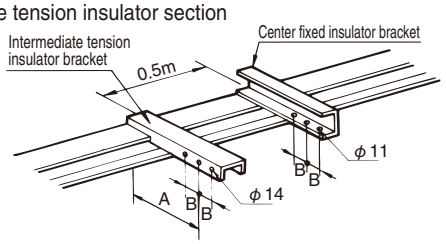
Notes

- **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.

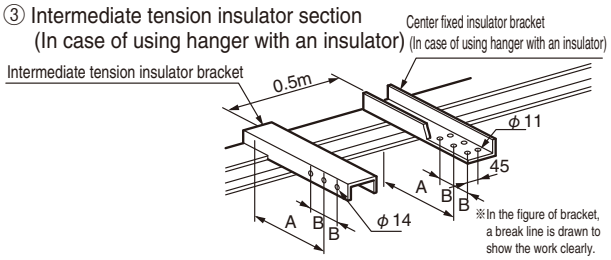
① Center fixed insulator section



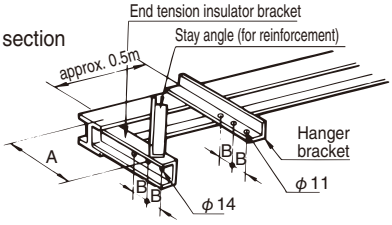
② Intermediate tension insulator section



③ Intermediate tension insulator section (In case of using hanger with an insulator)



④ End tension insulator section

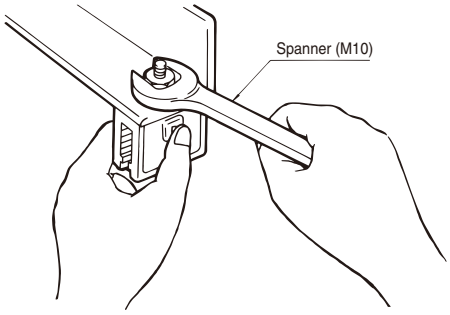


Notes

- **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

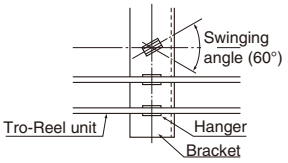


- Hangers should be mounted on the bracket beforehand on the ground.

Notes

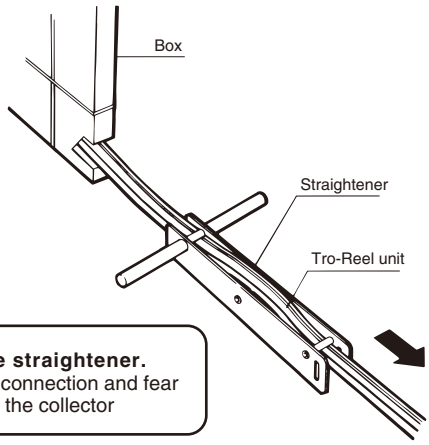
●**Brackets must be mounted parallel to the line.**
Failure to do so may cause poor collector arm contact or separation from wires.

- 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

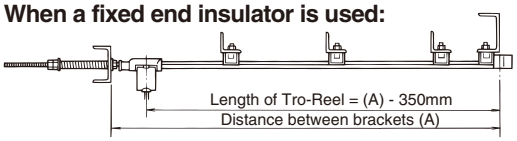
●**Please use the straightener.**
There are a bad connection and fear of the dropout of the collector

■ Cutting the unit to the length of the line.

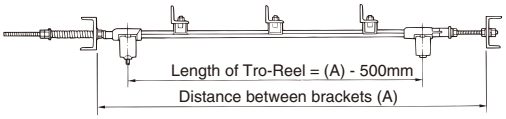
Measure the distance between the brackets at both ends (the range of practical collector servicing ＋1m) and cut the unit to the length.

■ One-end tension system

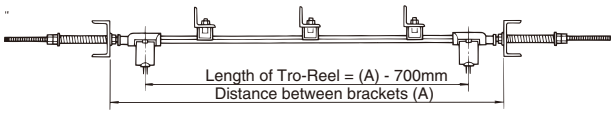
●**When a fixed end insulator is used:**



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



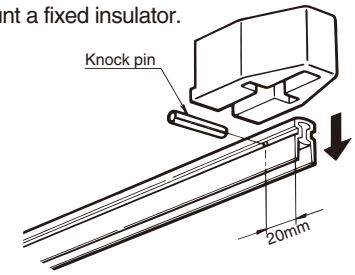
■ Both-end tension system



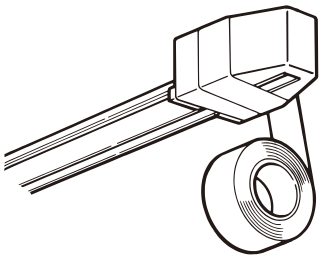
3 Mounting the fixed end fixture (for less than 50m)

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

1. Drill a ϕ5mm 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:**

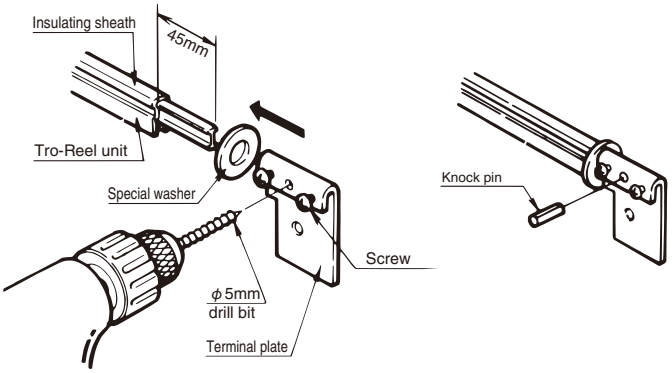
Mount the insulator the same way as 4-6 (Mounting an end tension insulator).

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 ϕ5mm 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.

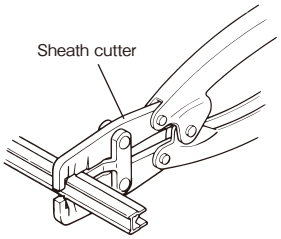


● There is a sheath cutter for Tro-Reel that enables smooth cutting of insulation sheath. (For use of 60A, 150A and 200A units)

Notes

● **The sheath cutter cannot be used for 300A unit.**

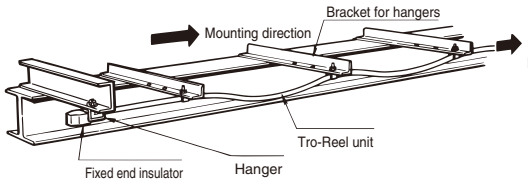
● Attach insulators after the Tro-Reel unit is mounted on the ceiling. Attaching insulators beforehand makes it difficult to lift the unit.

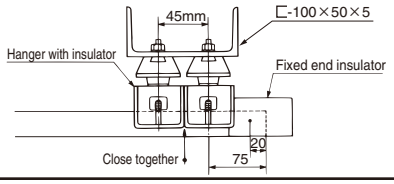


5 Lifting the Tro-Reel unit and securing it to the brackets starting on the fixed end insulator side

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:**

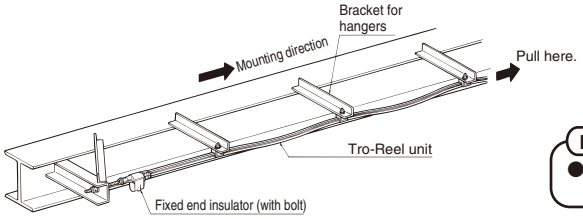


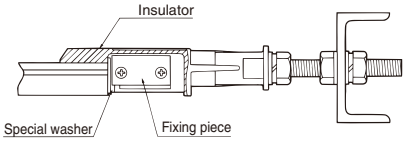


Notes

●**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:**

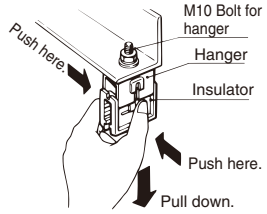




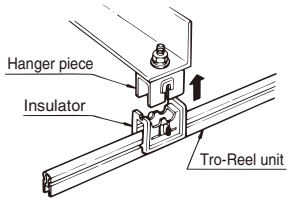
Notes

●**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

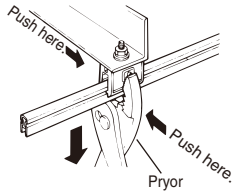


1. Remove the insulator from the hanger.



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



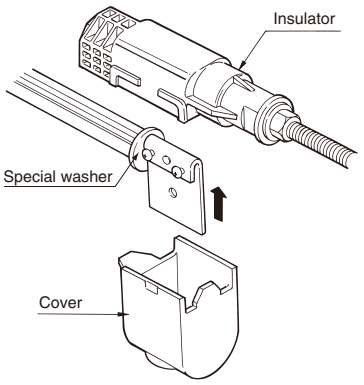
Grip the insulator buttons with pliers and pull it down.

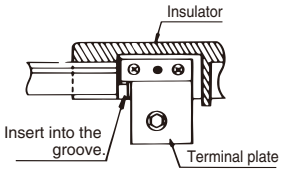
6 Mounting an end tension insulator to a terminal plate

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

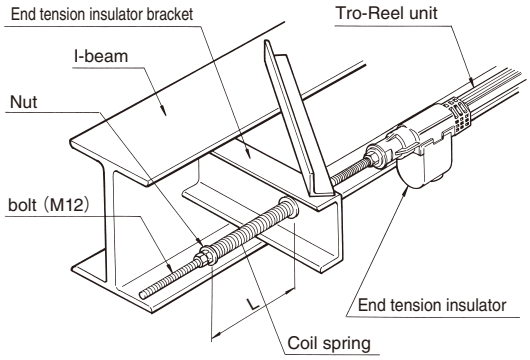
Notes

- **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℃ or lower	115mm	2254
11～40℃	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.**

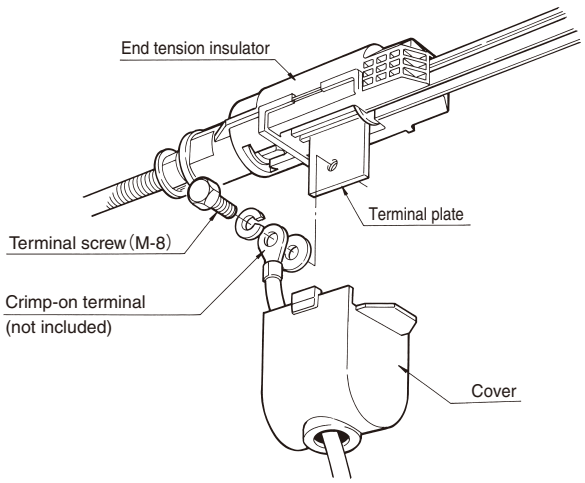
8 Feeding power to the Tro-Reel Power can be fed from the line end via an end tension insulator.

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

⚠ Caution

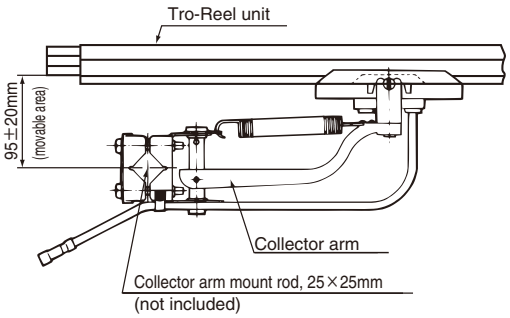
Terminal screws must be securely tightened.
Failure to do so may cause fire.

Applicable crimp-on terminals: ≤50mm^2 (60A, 150A)
≤100mm^2 (200A)
≤150mm^2 or 100mm^2 × (300A)
Crimp-on terminals are not included.



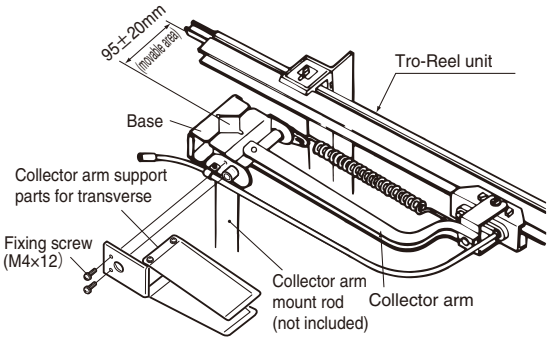
9 How to mount collector arms

■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



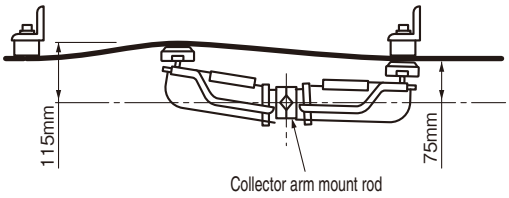
- As shown in a figure,mounted collector arm support parts for transverse on base of the collector arm.

Tightening torque of fixing screws：0.98 N・m～1.32 N・m

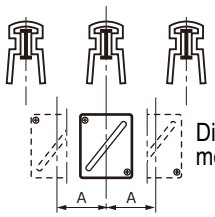
- Set the distance from the bottom surface of the Tro-reel conductor to the center of the collector arm mount rod (not included) to 95mm (in the center of the conductor cleaner mounting tolerance movable range 95±20mm)

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



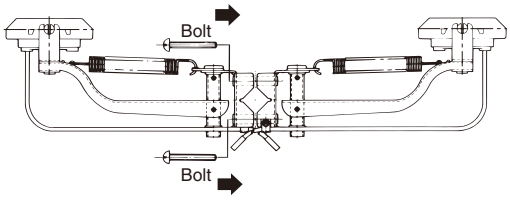
Dimension A of permitted movable range

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

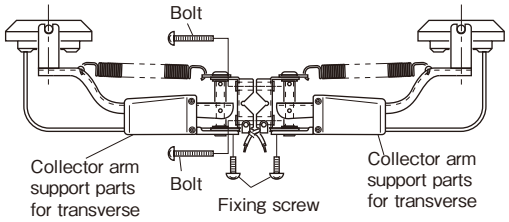
■Assembly in tandem configuration

- Two collector arms should be used together (tandem type) for circuit separation and line swiching, 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.



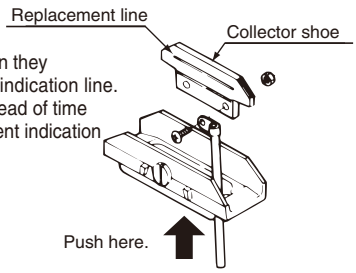
■Horizontal installation with its opening facing into tandem-type

- Mounting the horizontal support parts in both the collector arms



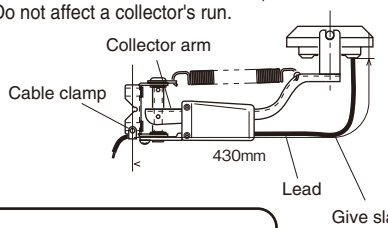
■Collector shoe replacement

- 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.



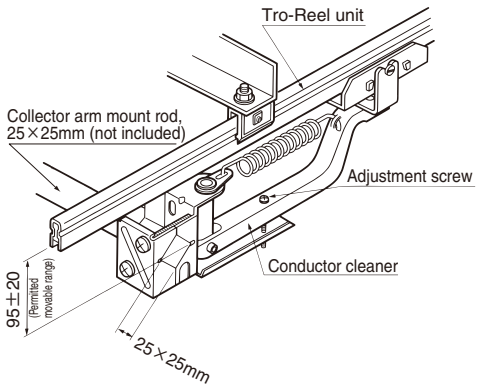
Notes

- 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 clerner mounting tolerance movable range 95±20mm)



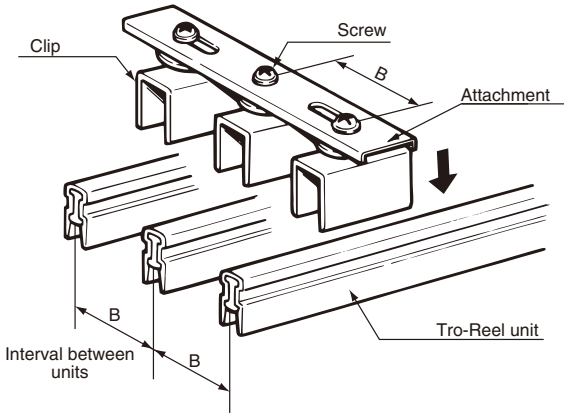
Notes

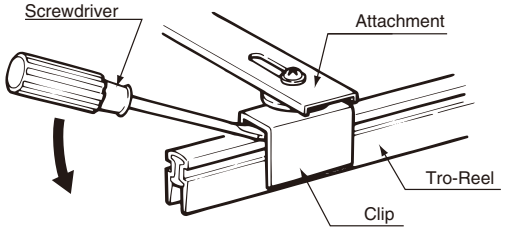
- **The conductor cleaner must be mounted parallel to the Tro-Reel unit without any twisting.**
- **When cleaning is complete, either remove the conductor cleaner, or tighten the adjustment screw so that the brush doesn't touch the conductor.**

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

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

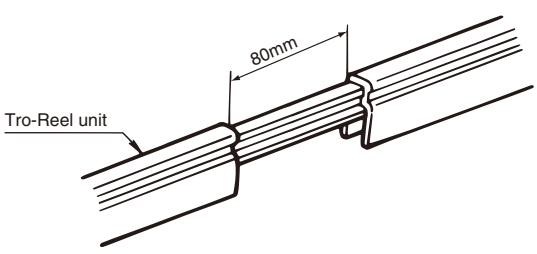
- **How to remove a spacer**
  Insert a flat tip screwdriver between the clip and the Tro-Reel and try down with the screwdriver.

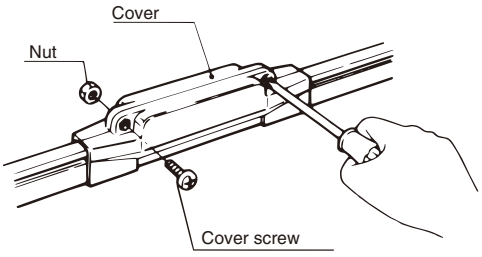




■ Sheath repair cover

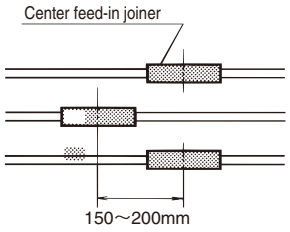
1. Cut 80mm off of each end of the insulating sheath.
2. Fit on a Sheath repair cover . For indoor and outdoor use.

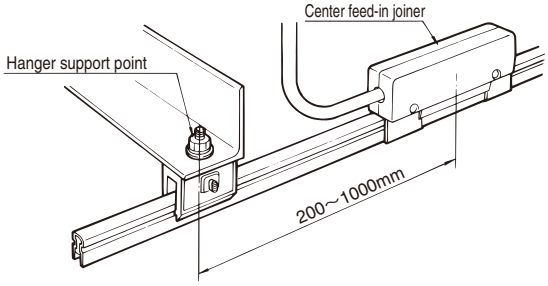




■ Center feed-in joiner To feed power from an intermediate point on a line or from a joint between Tro-Reel units.

Offsetting mounting positions makes installation easier.





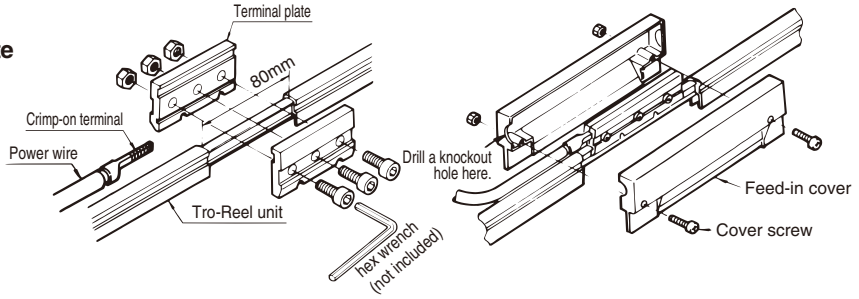
⚠ Caution

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 50mm²or less)

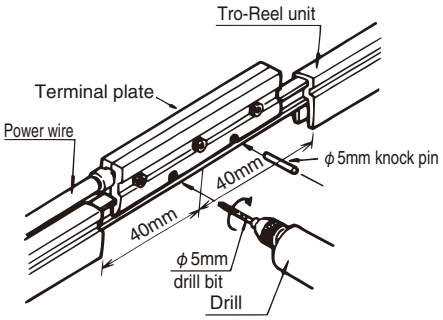
- **When power is fed from an intermediate point on a line**

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.

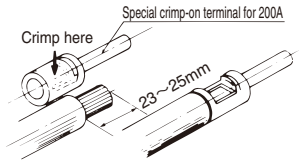


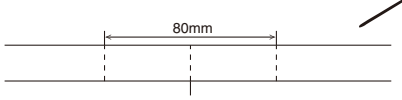
- **When connecting units and feeding power simultaneously**

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 ϕ5mm 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).





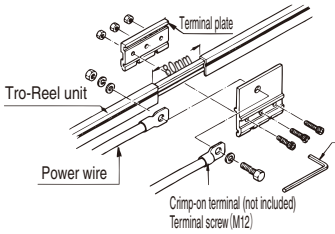
Making additional cuts midway makes it easier to peel off the insulating sheath.

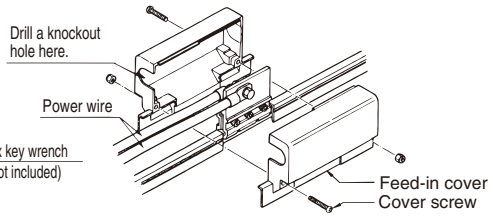
Notes

- **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 ϕ5mm hole in the conductor and insert a knock pin through the hole.** Failure to do so may cause damage due to falling of equipment.

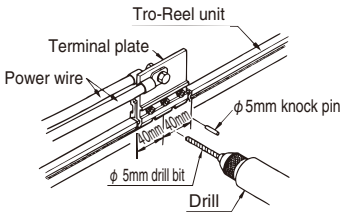
< 300A > (applicable wire of 150mm² or less, or 100mm²×2)

■ 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

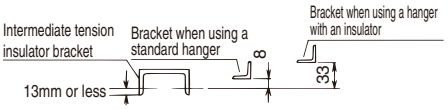
- **Be sure to use a file of ϕ5 size.**
- **The ϕ5mm knock pins must be securely fitted.**
  Failure to do so may cause damage due to falling of equipment.

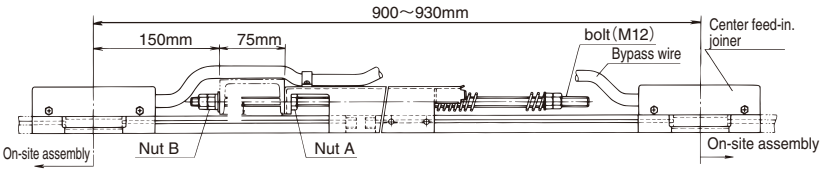
Intermediate tension insulator

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

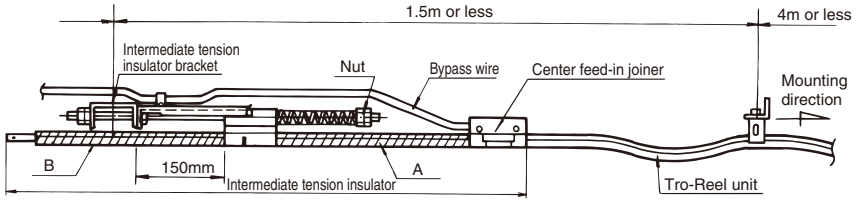
Mount the intermediate tension insulator to the intermediate tension insulator bracket using nuts A and B.

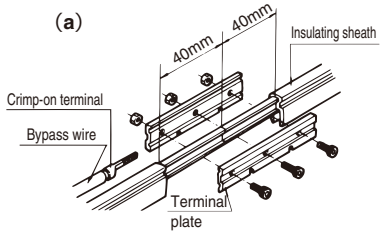


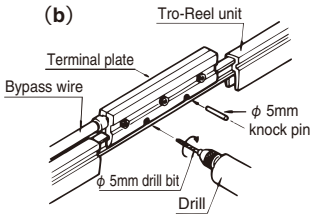


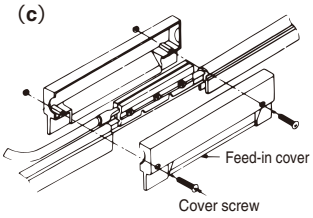
● Connection to Tro-Reel <60A and 150A and 200A>

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.









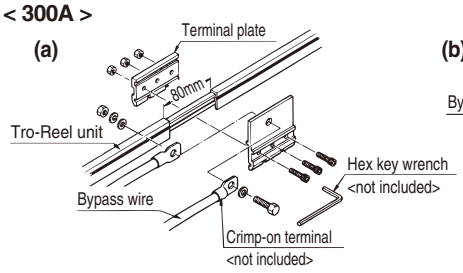
For steps (a), (b) and (c), please follow the center feed-in joiner mounting procedure in Section **8**.

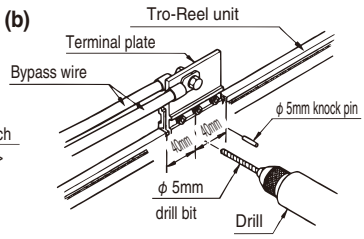
3. Temporarily fix the Tro-Reel unit to the hangers in order starting from the intermediate tension insulator side.

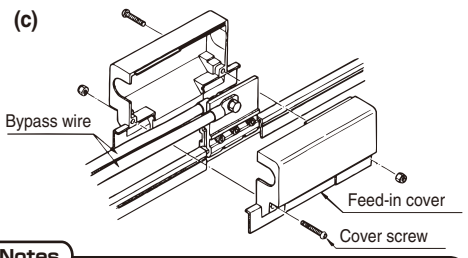
Notes

●Be sure to use a file of ϕ5 size.
Terminal screws and ϕ5mm 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.

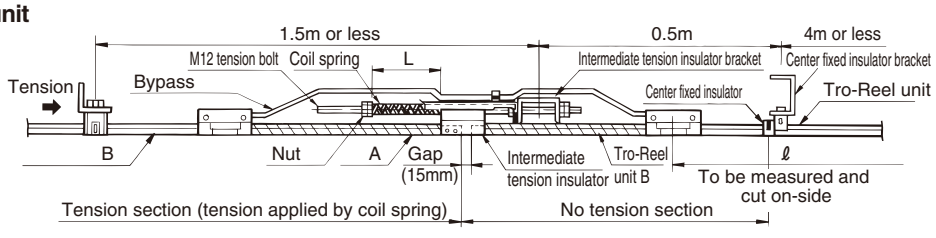
Notes

●Be sure to use a file of ϕ5 size.
●The ϕ5mm 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 ± 5mm.



● Coil spring length

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

Notes

●Set the gap to 15mm ± 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.

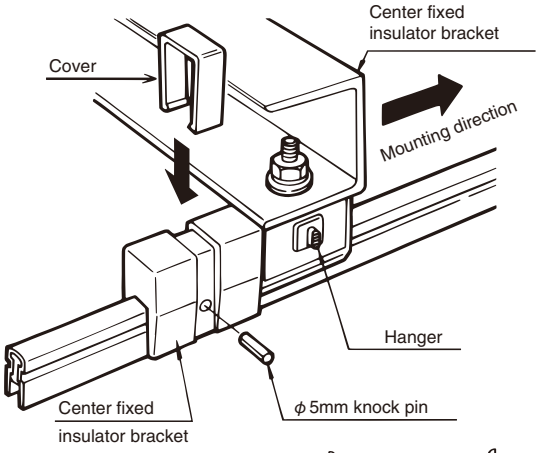
■ Center fixed insulator

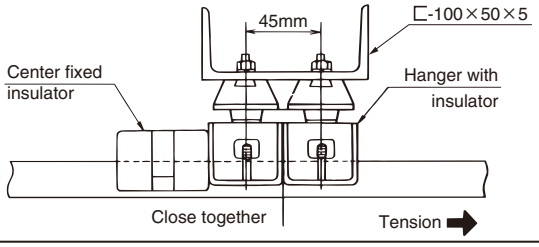
This part is to be used in horizontal curves, and should be attached at the joint between straight and curved sections to apply tension in the straight section.

1.Mount center fixed insulators to hangers (shown above).
2.Attach the insulator to the Tro-Reel unit. Drill a ϕ5mm 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 ϕ5 size.**
  Otherwise, falling may occur.
- **In the case of a porcelain insulator hanger with it, Please contact Pansonic Electric Works Co.,Ltd.**
- **Mount the cover by all means.**
  Failure to do so may cause electric shock.



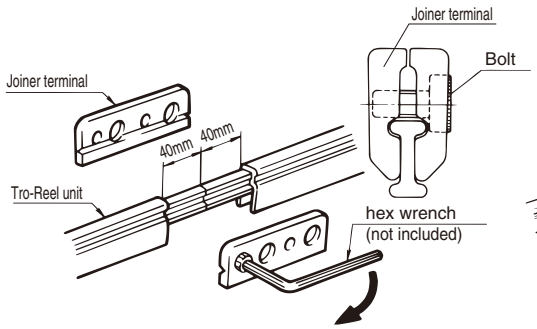


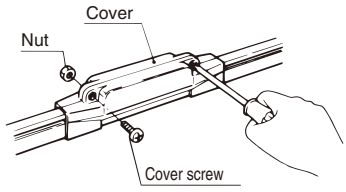
■ Joiner

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 .



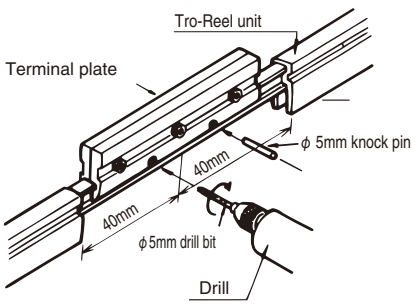


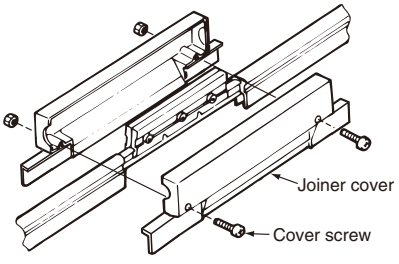
● 200A and 300A

1.Cut 40mm off of each end of the insulating sheath.
2.Connect the conductors with the terminal plates and drill
ϕ5mm boles in the conductors.Insert knock pins through the holes.
3. Fit on a Sheath repair cover .

Notes

- **Be sure to use a file of ϕ5 size.**
  Failure to do so may cause poor collector arm contact or damage due to falling of equipment.

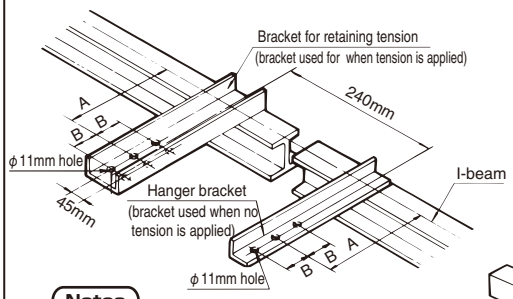


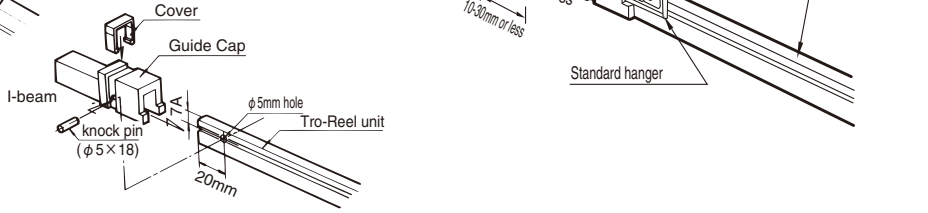


■ Guide cap To guide collector arms via turntables or traversers.

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 ϕ5mm hole 20mm away from the end of the Tro-Reel unit. Be sure to use a file of ϕ5 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	C 100×50×5			





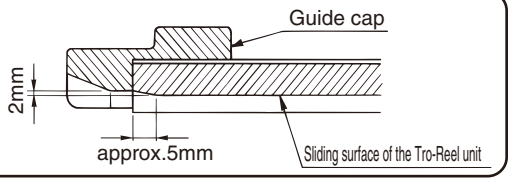
Notes

- **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 Pansonic Electric Works Co.,Ltd.**
- **Mount the cover by all means.** Failure to do so may cause electric shock.

Notes

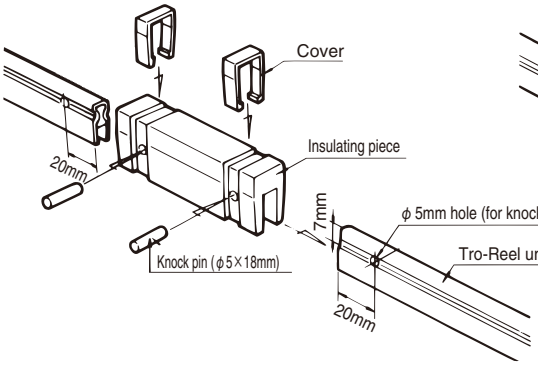
<Mounting to 300A Tro-Reel unit>

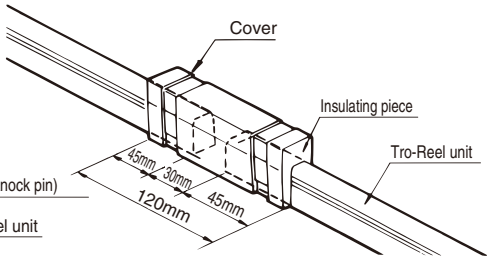
- **Since there is a gap between the guide cap and the sliding surface to the Tro-Reel unit, the end of the Tro-Reel unit must be chamfered as shown right.** Failure may cause bad contact or collector arm derailing.



■ Insulating piece To Separate circuits electrically.

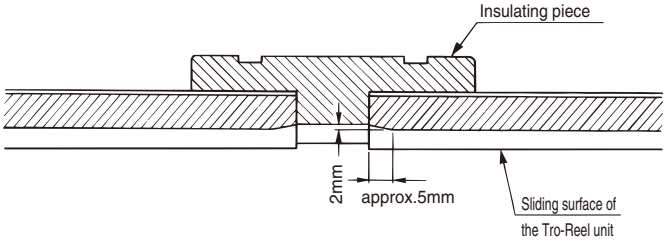
1. Drill a ϕ5mm hole 20mm away from each end of the Tro-Reel unit
2. Mount an insulating piece and secure it with a knock pin.Be sure to place a knock pin securely. Failure to do so may cause damage due to falling of equipment.
3. Fit on the cover.





Notes

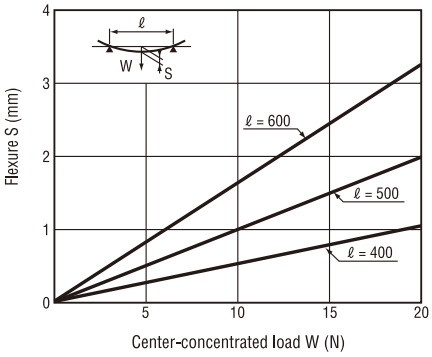
- **Mount the cover by all means.** Failure to do so may cause electric shock.
- **<300A>** **Since there is a gap between the insulating piece and the sliding surface of the Tro-Reel unit, the end of the Tro-Reel unit must be chamfered as shown at right.** Failure may cause bad contact or collector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



General Properties

Tro-Reel HS

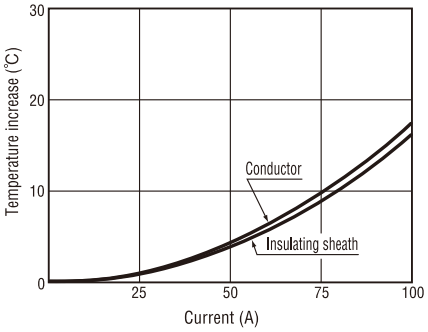
■Load vs. flexure (non-tension type)



■Temperature increase characteristics

Current level vs. Tro-Reel HS unit's temperature increase

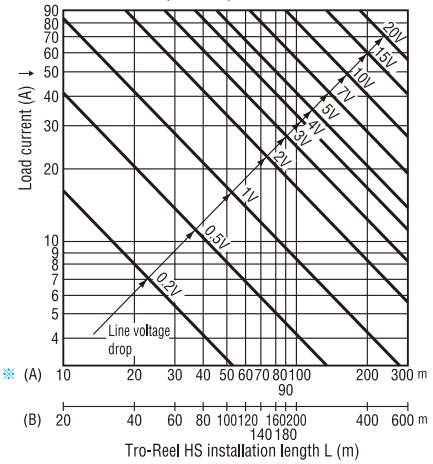
Tro-Reel HS 600V, 90A (3-phase)



■Line voltage drop (3-phase, 3-wire, 60Hz)

●Distance between wires : 15mm
●Line voltage drop equation :
Line voltage drop $E = \sqrt{3} \cdot I \cdot Z \cdot L$
I : Rated current (A)
L : Tro-Reel HS length (m)
Z : Impedance (Ω/m)

Tro-Reel HS 3P, 600V, 90A



※(A) represents the length when power is fed into only one end. (B) represents the length when power is fed into both ends or at the center.

■Electrical properties (3-phase, 3-wire)

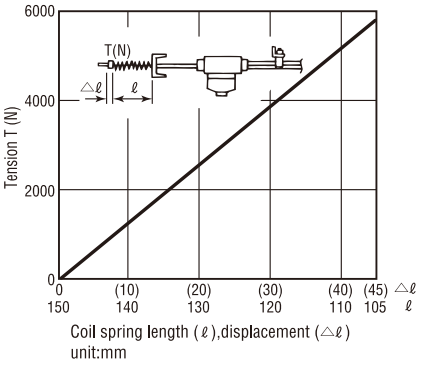
●Distance between wires : 15mm

Rating (A)	Frequency (Hz)	Electrical properties, unit : $\times 10^{-3}$(Ω/m)		
		Electrical resistance (R)	Reactance (X)	Impedance (Z)
(3P)600V90A	50	0.68	0.14	0.69
	60		0.17	0.70

High-Tro-Reel

■Tension (tension type)

End tension insulator's coil spring length vs. tension

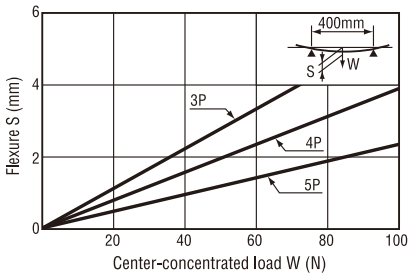


(1) Coil spring characteristics
●Length when not compressed : 150mm
●Length when compressed : 105mm

(2) Coil spring length and tension during setup

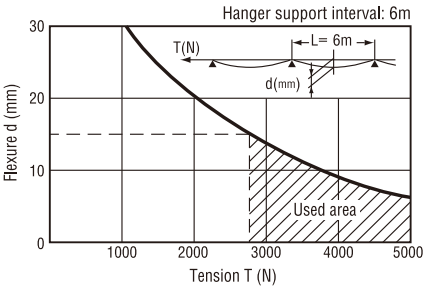
Setup environmental temperature	Coil spring length ℓ	Tension T (N)
10℃ or below	115mm	4508
11～40℃	125mm	3136

■Load vs. flexure (non-tension type)



■Flexure (tension type)

High-Tro-Reel unit's tension vs. flexure



■Electrical properties (3-phase, 3-wire)

●Distance between wires : 20mm

Rating (A)	Frequency (Hz)	Electrical properties, unit : $\times 10^{-3}$(Ω/m)		
		Electrical resistance (R)	Reactance (X)	Impedance (Z)
3P 600V60A	50	0.86	0.19	0.88
	60		0.23	0.89
3P 600V90A	50	0.63	0.14	0.64
	60		0.17	0.65
3P 600V150A	50	0.44	0.13	0.46
	60		0.16	0.47
3P 600V200A	50	0.48	0.13	0.49
	60		0.15	0.50

High-Tro-Reel

■Line voltage drop (3-phase, 3-wire, 60Hz)

●Distance between wires : 20mm

●Line voltage drop equation :

Line voltage drop $E = \sqrt{3} \cdot I \cdot Z \cdot L$

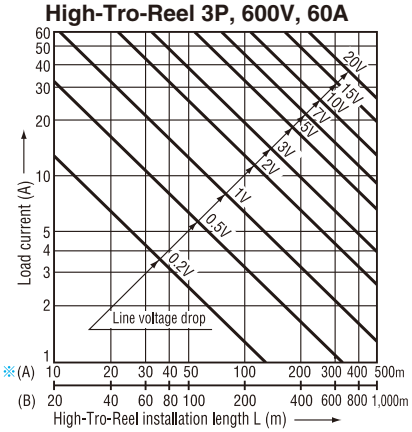
I : Rated current (A)

L: High-Tro-Reel length (m)

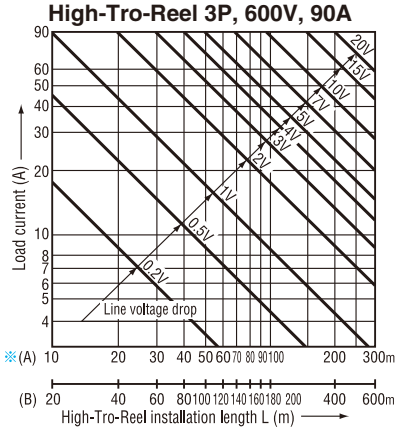
Z: Impedance (Ω/m)

※(A) represents the length when power is fed into only one end. (B) represents the length when power is fed into both ends or at the center.

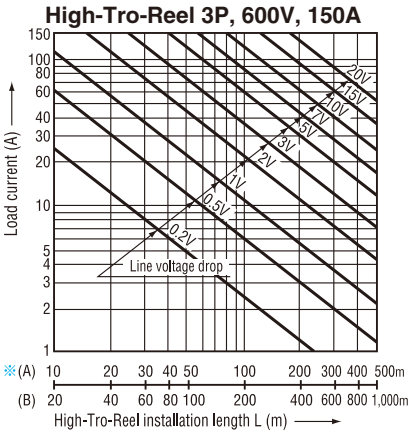
High-Tro-Reel 3P, 600V, 60A



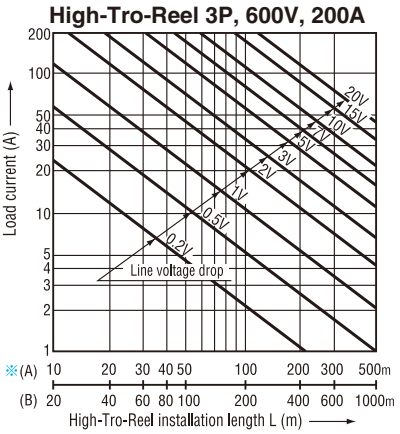
High-Tro-Reel 3P, 600V, 90A



High-Tro-Reel 3P, 600V, 150A



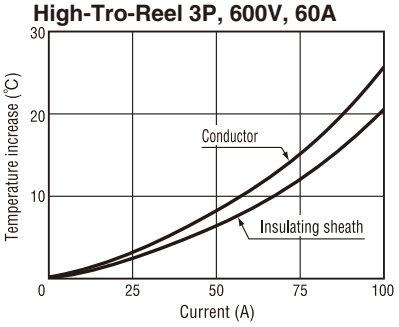
High-Tro-Reel 3P, 600V, 200A



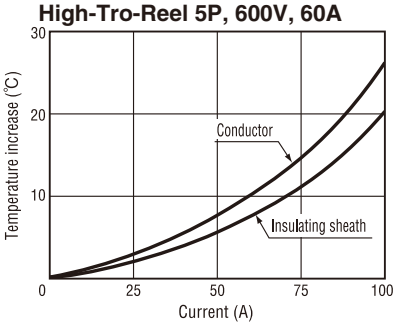
■Temperature increase characteristics

Current level vs. High-Tro-Reel unit's temperature increase

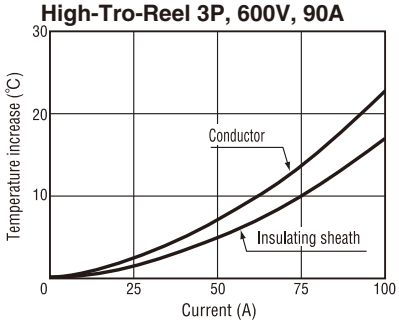
High-Tro-Reel 3P, 600V, 60A



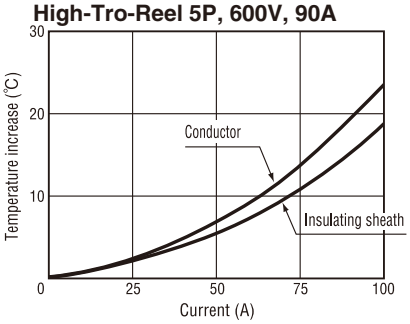
High-Tro-Reel 5P, 600V, 60A



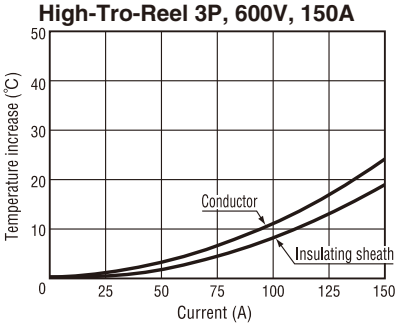
High-Tro-Reel 3P, 600V, 90A



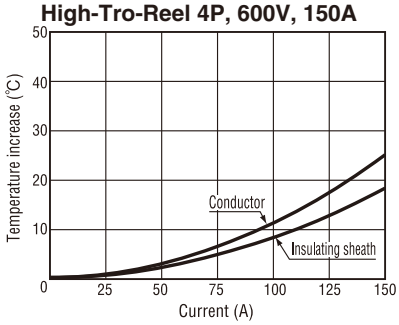
High-Tro-Reel 5P, 600V, 90A



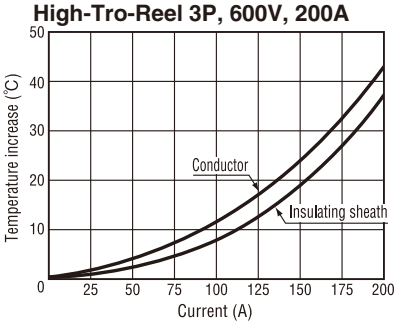
High-Tro-Reel 3P, 600V, 150A



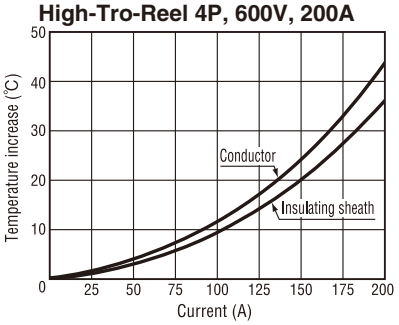
High-Tro-Reel 4P, 600V, 150A



High-Tro-Reel 3P, 600V, 200A



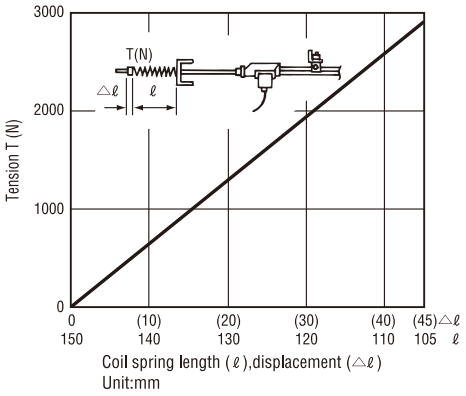
High-Tro-Reel 4P, 600V, 200A



Tro-Reel

■Tension (tension type)

End tension insulator's coil spring length vs. tension



(1) Coil spring characteristics

●Length when not compressed : 150mm

●Length when compressed : 105mm

(2) Coil spring length and tension during setup

Setup environmental temperature	Coil spring length ℓ	Tension T (N)
10℃ or below	115mm	2254
11～40℃	125mm	1568

■Impedance (3-phase, 3-wire) Distance between wires : 100mm

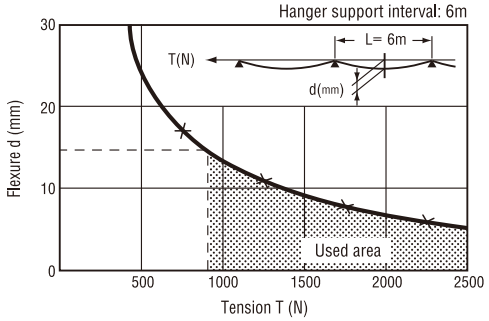
Unit : $\times 10^{-3}$(Ω/m)

Rating	50Hz			60Hz		
	R	X	Z	R	X	Z
60A	1.10	0.26	1.13	1.10	0.31	1.14
150A	0.58	0.19	0.61	0.58	0.23	0.64
200A	0.37	0.19	0.41	0.37	0.23	0.43
300A	0.32	0.22	0.38	0.32	0.26	0.41

R : Electrical resistance, X : Reactance, Z : Impedance

■Flexure

Tro-Reel unit's tension vs. flexure



■Line voltage drop (3-phase, 3-wire, 60Hz)

●Distance between conductors : 100mm

●Line voltage drop equation :

Line voltage drop $E = \sqrt{3} \cdot I \cdot Z \cdot L$

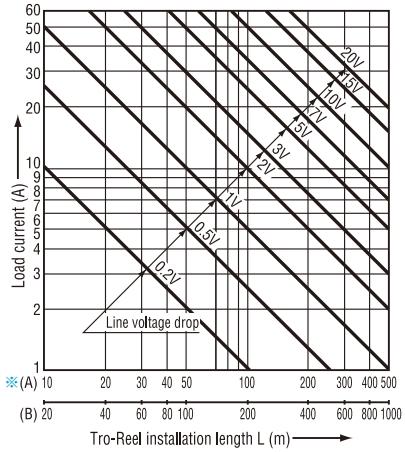
I : Rated current (A)

L : Tro-Reel length (m)

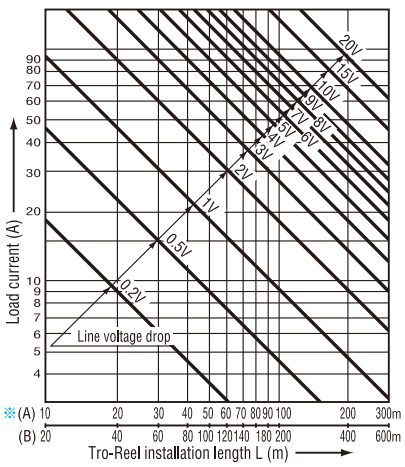
Z : Impedance (Ω/m)

※(A) represents the length when power is fed into only one end. (B) represents the length when power is fed into both ends or at the center.

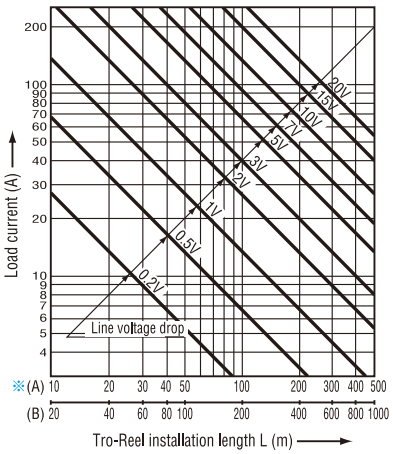
Tro-Reel 60A



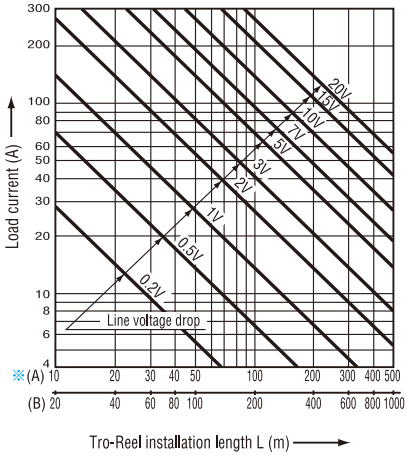
Tro-Reel 150A



Tro-Reel 200A



Tro-Reel 300A

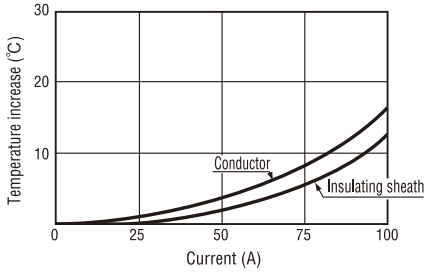


Tro-Reel

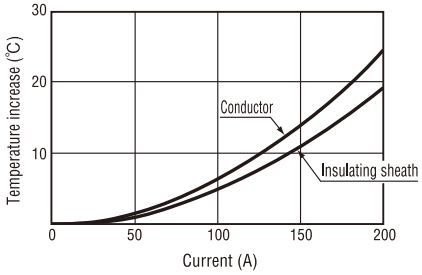
■Temperature increase characteristics

Current level vs. Tro-Reel unit's temperature increase

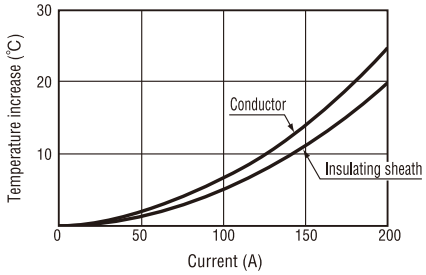
Tro-Reel 60A



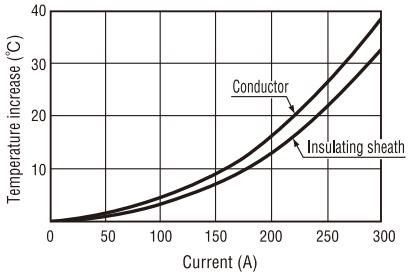
Tro-Reel 150A



Tro-Reel 200A



Tro-Reel 300A



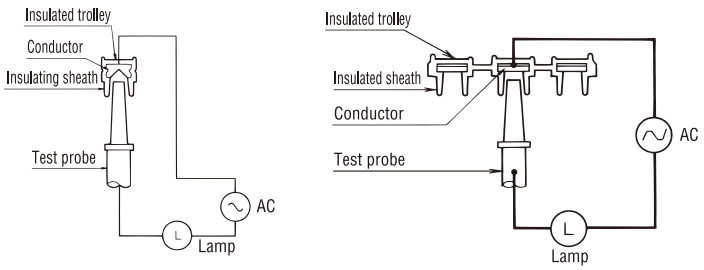
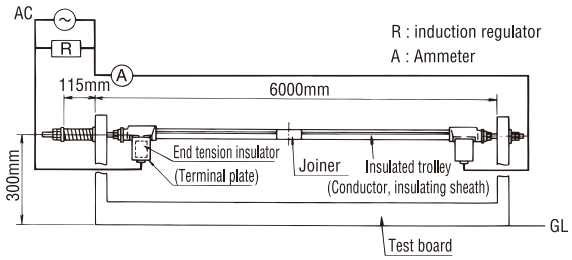
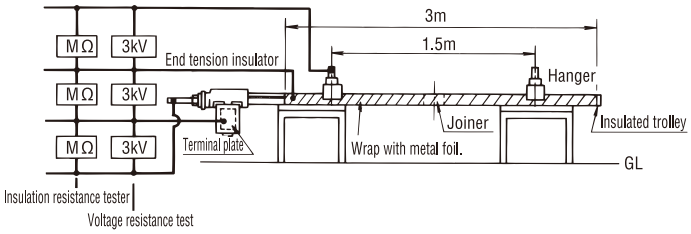
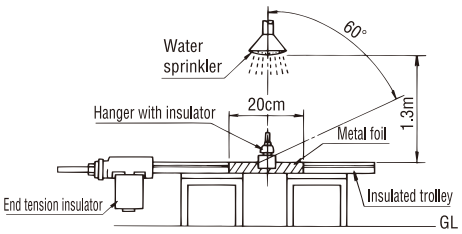
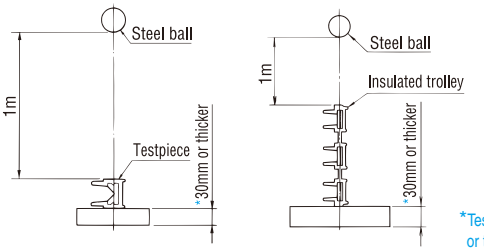
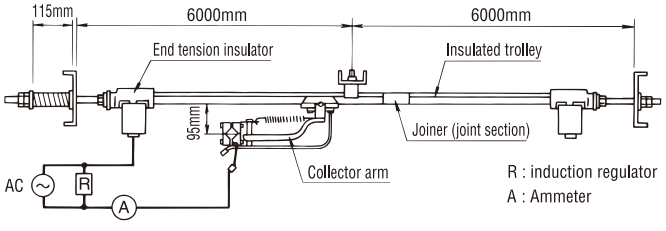
Related Legal Regulations in Japan (for Contact Wires)

Bare trolley wires and insulated trolleys (including Tro-Reel HS, High-Tro-Reel and Tro-Reel) used to supply power to low-voltage mobile electrical equipment are called “contact wires,” and are subject to the following detailed stipulations under the Regulations on Electrical Installation.

Related legal regulations :
(Regulations on Electrical Installation)
Article 199 : Indoor wiring of low-voltage contact wires
Article 217 : Wiring of low-voltage contact wires close to building structures or outdoors.
Article 225 : Installation of amusement trolley cars

Item \ Type	Bare trolley wires	Insulated trolleys
1. Location of use	●Must be installed in an open location or an enclosed (but accessible) location. ●Must be installed at an elevation of at least 3.5m from the floor, and must not be installed where it can be easily accessed by unauthorized persons. ●Wires must be at least 2.3m above and 1.2m laterally separated from walkways of crane girders, stairs, ladders, and inspection platforms of cranes.	●Must be installed in an open location or an enclosed (but accessible) location. ●Must not be installed where it can be easily accessed by unauthorized persons.
2. Materials and structure	●Hard-drawn copper wires with diameters of 6mm or those with equivalent or higher strength, having a cross-sectional area of 28mm² or more must be used. At voltages of 300V or lower, hard-drawn copper wires with diameters of 3.2mm or those with equivalent or higher strength, having a cross-sectional area of 8mm² or more must be used.	●Hard-drawn copper wires with diameters of 6mm or those with equivalent or higher strength, having a cross-sectional area of 28mm² or more must be used.
3. Wire support point intervals	●Wire support point intervals must be kept 6m or less. However, the intervals can be12m or less for 28cm or longer horizontal installations, and for other installations of 40cm or longer.	●Wire support intervals must be kept 6m or less when installed with tension applied to both ends. ●For non-tension installations, the wire support intervals must be as follows : Conductor cross-sectional area / Support intervals Less than 500㎟ / 2m or less* 500㎟ or more / 3m or less* *1m or less for curved sections with radius of 3m or less.
4. Distance between wires	●In an open location, wires must be kept at least 14cm away from other wires for horizontal installations, and at least 20cm away from other wires for other installations. ●In an enclosed (but accessible) location, wires must be kept at least 12cm away from other wires. However, wire support intervals must be 1.5m or less for wires with a cross-sectional area of less than 1cm² and 2.5m or less for wires with a cross-sectional area of 1cm² or more. (Wire support intervals must be 1m or less for curves with radius of 1m or less.) ●Exceptions from the restrictions at above : When rigid insulation barriers are provided between wires, and between the collector device’s charging section and wires of an opposite polarity.	
5. Clearance from building structures	●Wires and collector device’s charging section must be placed : a) at least 4.5cm away from building structures in moist or humid places. b) at least 2.5cm away from building structures in other places. ●Exceptions : When rigid insulation barriers are provided to separate wires and collector device’s charging section from building structures.	No restrictions.
6. Clearance from other wiring and piping	●Must be positioned at least 30cm away from other wires, low-current lines, water, gas or other similar lines.	●Must be positioned at least 10cm away from other wires, low-current lines, water, gas or other similar lines.
7. Circuit protection	●Switching devices and overcurrent breakers dedicated for contact wires must be provided. ●Switching devices must be installed in places which allow for easy switching at proximity of contact wires.	Same as left.
8. Prohibited installation locations	●Contact wires must not be installed in the following areas : a) areas exposed to particulates that may cause deflagration or areas where explosion may occur. b) areas exposed to flammable gases or combustible substance steam. c) areas exposed to easily combustible or hazardous materials (including celluloid, matches and kerosene). d) powder magazines. e) areas exposed to easily combustible fibers including cotton, linen and silk, and areas exposed to particulates other than listed in a) through d), above. Exceptions are made when appropriate measures to prevent such particulates from accumulating in the contact wires or their periphery are taken, and when the contact wires and the collector devices are also installed to prevent separation from each others.	Same as left.

Covered trolley wire systems must fulfill performance requirements listed below when tested with JIS C3711-2007 specified methods.

Test	Performance requirements
1. Structure test	The lamp must not light when test probe is inserted into the trolley unit opening. 
2. Temperature test	Temperature increase: 45℃ or below.  Drawing shows a Tro-Reel.
3. Insulation resistance test	Insulation resistance: 5MΩ or greater.  Drawing shows a Tro-Reel.
4. Voltage resistance test	Must withstand AC 3000V for 1 minute.
5. Water sprinkler test (Tro-Reel)	Insulation resistance: 5MΩ or greater. Must withstand AC 3000V for 1 minute.  Drawing shows a Tro-Reel. Note: With the opening facing downward.
6. Impact test	The insulated trolley must be able to withstand breakage or cracking and to satisfy performance requirements for insulation resistance and voltage resistance when a steel ball of approximately 50g (mass) is dropped from a height of 1m.  *Test board should be made of 30mm or thicker hard wood material.
7. Travel test	The collector's brush terminal temperature increase must be kept to 55℃ or below and performance requirements for insulation resistance and voltage resistance must be fulfilled after the collector arm passes the trolley joint section 20,000 times and after a minimum travel distance of 120,000m.  Drawing shows a Tro-Reel.

Maintenance (Trial run･Periodic inspection) — Tro-Reel HS <Non-Tension Type>

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
	× : Abnormality		● : Finished with exchange
			△ : Adjustment required
			▲ : Finished with adjustment

A title		Check day	Y D M	The check person in charge	

Name	Contents of inspection	Remedy	※	Result	Measures	Inspection cycle (standard)
Tro-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? 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?	Review for any dislocated position on the unit. Correct if any.	○			
	Are there occurred whiskers(Bali) of conductors ?	If whiskers (Bali) occurs , remove by using the conductor cleaner.				
	Amount of wear of the conductor is correct? Amount of wear of the conductor :0.7 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 ? ･Or less ･ 10 ℃: 5 ～13 mm･11 ℃ ˜ 40 ℃: 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? ･Or less ･ 10 ℃: 3003 mm ･ 11 ℃ ˜ 40 ℃: 3000 mm	Adjust it within specified size.	○			
	Are correct cutting size of the duct or the duct end ? • 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?	Insert the duct to ensure.	○			
Hanger	Did you set up the correct size and mounting hangers? ･Straight sections: Max 600 mm ･Curved section : Max 500 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.				

Name	Contents of inspection	Remedy	※	Result	Measures	Inspection cycle (standard)
Guide cap	Are correct clearance size of between the guide cap ? 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.	○			
Insulating piece	Is there any cracked or broken on plastic section?	Replace if cracked or broken sheath is found.	○			the number of passes through the collector's arm:1,000,000
	Are correct cutting size of the duct or the duct end ? The duct cutting Size: The length of the duct (standard length L) -17.5 mm . ･Cutting Size of the duct end :Remove the insulating sheath 17.5mm from the edge of the duct,	Adjust its mounting dimension.	○			
	Are hanger located within 100 mm from side to side insulating piece?	Adjust the position of Hunger.	○			
	Do not cover broken or damaged signal wires?		○			
Collector arm	Is the arm installing dimension correct? Single-type (for mounting rod), tandem-type (for mounting rod) The length of to the center of the mounting rod from the sliding surface (movable range): 65±10mm tandem-type (for mounting plate) The length of to the mounting plate from the sliding surface (movable range): 65±10mm Single-type (for mounting plate) The length of to the center of the mounting 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? 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? 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.				
	Are there significant contamination,foreign matter adhering or occurred burr in collector?	Remove it with sandpaper or wes.				
	Is there any ark generated protrusion ?	Remove the protrusion (convex) on the arc scratch using a file.				
	Is there wear of plastic part of the collector plastic part?	Adjust the collector arms mounting dimensions.				
	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 the fixed 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, check the insulation resistance. ■In case of 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 ■In case of working voltage 300V or higher than 0.4MΩ					the number of passes through the collector's arm:1,000,000

Maintenance (Trial run･Periodic inspection) — High-Tro-Reel <Non-Tension Type>

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
	× : Abnormaliy		● : Finished with exchange
			△ : Adjustment required
			▲ : Finished with adjustment

A title		Check day	Y D M	The check person in charge	

Name	Contents of inspection	Remedy	※	Result	Measures	Inspection cycle (standard)
Tro-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? 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?	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 ? ･Less then 10 ℃: 5 ～13 mm ･11 ℃ ~ 40 ℃: 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? ･Less then 10 ℃: 3003 mm ･11 ℃ ~ 40 ℃: 3000 mm	Adjust it within specified size.	○			
Joiner (Center feed-in joiner)	Are correct cutting size of the duct or the duct end ? • 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?	Insert the duct to ensure.	○			
Hanger	Did you set up the correct size and mounting hangers? ･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 ? 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 gap between the guide cap size correct? ･10～20 mm	Adjust its mounting 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 the end of the wire isolated 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? ■In case of single-type (for mounting rod), tandem-type (for mounting rod) The length of to the center of the mounting rod from the sliding surface (movable range): 65±10mm ■In case of tandem-type (for mounting plate) The length of to the mounting plate from the sliding surface (movable range): 65±10mm ■In case of single-type (for mounting plate) The length of to the center of the mounting plate from the sliding surface (movable range): 60±10mm	Adjust the collector arm in the reference value.	○			Distance of the collector arm :20,000km
	Is the center of a duct and the collector arm on a straight line? ※Installation Tolerance: ± 3mm from 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? 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 or occurred burr in collector?	Remove it with sandpaper or wes.				
	Is there any ark generated protrusion ?	Remove the protrusion (convex) on the arc 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 the fixed 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, check the insulation resistance. ■In case of 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 ■In case of working voltage 300V or higher than 0.4MΩ					the number of passes through the collector's arm:1,000,000

Maintenance (Trial run･Periodic inspection) — High-Tro-Reel <Tension Type>

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
	× : Abnormality		● : Finished with exchange
			△ : Adjustment required
			▲ : Finished with adjustment

A title		Check day	Y D M	The check person in charge	

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

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)

Maintenance (Trial run･Periodic inspection) – Tro-Reel

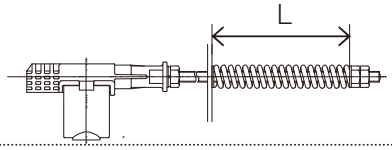
Notes

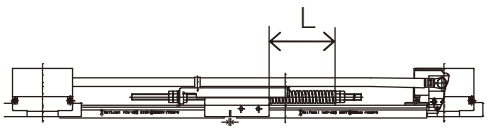
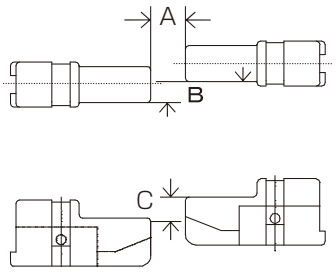
<To Maintenance manager>

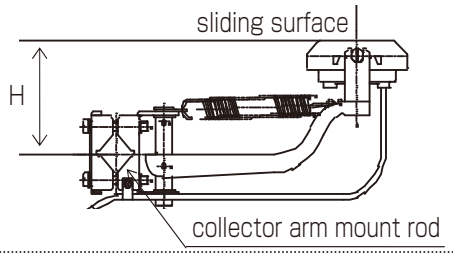
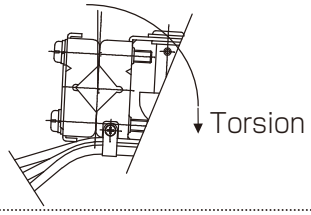
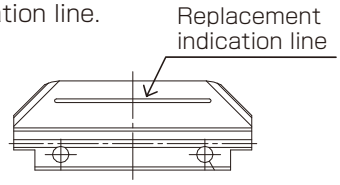
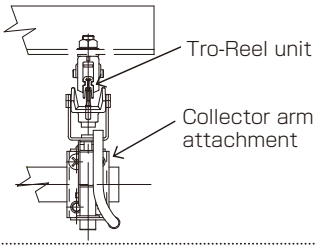
- ※:Inspections item at the time of the pre-use test run(Checking at periodic inspection).
- For using safely, please inspect the system one month after starting regular operation.
- The inspection cycle is mentioned below. However, determine your own inspection cycle based on the actual operating rate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

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

A title		Check day	Y D M	The check person in charge	

Name	Contents of inspection	Remedy	※	Result	Measures	Inspection cycle (standard)
Tro-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.				Once every 3 to 6 months
	Is there any ark generated protrusion on its sliding surface?	Remove any protrusion (convex) on the arc scratch using a file.				
	Is there damage and crack at the insulating sheath ?	When damage and crack occurred in the insulating sheath of the duct, please change the duct.	○			
	Is there sharpen at the insulating sheath ?	When thickness of the insulating sheath is equal to or less than 1.2mm, please change the duct.				
	Is the duct installed in parallel for a rail?	Please adjust the duct so that it is parallel at a rail.	○			
	Isn't the unit dislocated from the hanger?	Review for any dislocated position on the unit. Correct if any.	○			
	Are not there remarkable torsion and the curve of the duct?	Please revise turning remarkable torsion.	○			
	Amount of wear of the conductor is correct? Amount of wear of the conductor o：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.	○			
Fixed end insulator (without bolt)	Are not there the cracks and damaged on a resin part?	When damage and crack occurred in the fixed end insulator, please change it.	○			
	Do stop it i in an insulating tape?	Please install an insulating tape.	○			
Fixed end insulator (with bolt)	Are not there the cracks and damaged on a resin part?	When damage and crack occurred in the fixed end insulator, please change it.	○			
	Is't there the slack of the lock bolt?	Retighten	○			
	Is not there the torsion?	Please revise torsion.	○			
	Is not there the exposure of the conductor?	Please install a repair cover for sheaths	○			
End tension insulator	Is the coil spring set definitely? Length of the coil spring L =115-125mm 	Please adjust it to reasonable length When tighten the duct, please tighten a nut of the tightening bolt with balancing in turn. Ambient temperature / L: the case of less than 10℃ 115mm; the case of 11℃～40℃ 125mm	○			
	Does not a nut (a double nut) of the coil spring part have the slack?	Retighten	○			
	Does not a bolt for electric wire connection of the feeding-in terminal part have the slack?	Retighten	○			
	Are not there the cracks and damaged on a resin part?	When damage and crack occurred in it, please change it.	○			
	Are not there a loser of the cover part, the falling off?	When loser and the falling off occurred, confirm the state of the cover, and please install the cover.	○			
	Is not there the exposure of the conductor?	Please install a repair cover for sheaths	○			
	Is not there the torsion?	Please revise torsion.	○			
Center fixed insulator	Are not there the cracks and damaged on a resin part?	When damage and crack occurred in it, please change it.	○			
	Are not there a loser of the cover part, the falling off?	Please install the cover.	○			
Joiner	Isn't there the conductor of the joint have a gap and the step?	Please revise a gap, the step.	○			
	Isn't there the slack of the connection bolt?	Retighten (tightening torque 6.9～7.9N･m)	○			
	Are not there the cracks and damaged on a resin part?	When damage and crack occurred in it, please change it.	○			
	Are not there a loser of the cover part, the falling off?	Please install the cover.	○			

<table>
<tr><th>Name</th><th>Contents of inspection</th><th>Remedy</th><th>※</th><th>Result</th><th>Measures</th><th>Inspection cycle (standard)</th></tr>
<tr><td rowspan="3">Center feed-in joiner</td><td>Isn't there the slack of a bolt for electric wire connection of the feeding-in joiner ?</td><td>Retighten</td><td>○</td><td></td><td></td><td rowspan="20">Once every 3 to 6 months</td></tr>
<tr><td>Are not there the cracks and damaged on a resin part?</td><td>When damage and crack occurred in it, please change it.</td><td>○</td><td></td><td></td></tr>
<tr><td>Are not there a loser of the cover part, the falling off?</td><td>Please install the cover.</td><td>○</td><td></td><td></td></tr>
<tr><td rowspan="4">Hanger</td><td>Is the hanger installation pace equal to or less than 4m?</td><td>Please install a hanger to become equal to or less than 4m.</td><td>○</td><td></td><td></td></tr>
<tr><td>As for the curve department and the hanger installation of both ends of the terminal tightening insulator, is the pace equal to or less than 500mm?</td><td>Please install a hanger to become equal to or less than 500mm.</td><td>○</td><td></td><td></td></tr>
<tr><td>Is not there the slack of the installation bolt?</td><td>Retighten</td><td>○</td><td></td><td></td></tr>
<tr><td>Are not there the cracks and damaged on a resin part?</td><td>When damage and crack occurred in it, Please change it.</td><td>○</td><td></td><td></td></tr>
<tr><td rowspan="6">Intermediate tension insulator</td><td>Is the center fi xed insulator attached so that the gap between the ducts may be set to 15mm ± 5mm?</td><td>Please adjust so that the gap between the ducts is set to 15mm ± 5mm.</td><td>○</td><td></td><td></td></tr>
<tr><td>Is the coil spring set definitely?
Length of the coil spring L =115-125mm
  </td><td>Please adjust it to reasonable length.<table><tr><th>Ambient temperature</th><th>L</th></tr><tr><td>the case of less than 10℃</td><td>115mm</td></tr><tr><td>the case of 11℃～40℃</td><td>125mm</td></tr></table></td><td>○</td><td></td><td></td></tr>
<tr><td>Does not a nut (a double nut) of the coil spring part have the slack?</td><td>Retighten</td><td>○</td><td></td><td></td></tr>
<tr><td>Isn't there the slack of a bolt for electric wire connection of the feeding-in joiner ?</td><td>Retighten</td><td>○</td><td></td><td></td></tr>
<tr><td>Are not there the cracks and damaged on a resin part?</td><td>When damage and crack occurred in it, Please change it.</td><td>○</td><td></td><td></td></tr>
<tr><td>Are not there a loser of the cover part, the falling off?</td><td>Please install the cover.</td><td>○</td><td></td><td></td></tr>
<tr><td rowspan="2">Insulating piece</td><td>Are not there the cracks and damaged on a resin part?</td><td>When damage and crack occurred in it, Please change it.</td><td>○</td><td></td><td></td></tr>
<tr><td>Are not there a loser of the cover part, the falling off?</td><td>Please install the cover.</td><td>○</td><td></td><td></td></tr>
<tr><td rowspan="4">Guide cap</td><td>Are the installation dimensions clearance?
  </td><td>Please revise it to dimensions in the clearance<table><tr><th></th><th>A</th><th>B</th><th>C</th></tr><tr><td>length</td><td>10 ～ 30mm</td><td>5mm lower</td><td>7mm lower</td></tr></table></td><td>○</td><td></td><td></td></tr>
<tr><td>Are not there a loser of the cover part, the falling off ?</td><td>Please install the cover.</td><td>○</td><td></td><td></td></tr>
<tr><td>Does not the resin part have the abrasion?</td><td>When I am worn, please change</td><td></td><td></td><td></td></tr>
<tr><td>Are not there the cracks and damaged on a resin part?</td><td>When damage and crack occurred in it, Please change it.</td><td>○</td><td></td><td></td></tr>
</table>

Name	Contents of inspection	Remedy	※	Result	Measures	Inspection cycle (standard)
Collector arm	Is installation dimensions H of the collector arms 	Please correct so that the distance H is set to 95mm(Central value of the collector arm permitted movable range ± 20mm) between the conductor sliding surface and collector arm mount rod. Please measure H size, where the collector shoes is touched in the hanger.	○			Once every 1 to 3 months
	Does not the collector arm mount rod have the remarkable torsion? 	When there is remarkable torsion, please revise the collector arm.	○			
	Does not the collector shoes have the outbreak such as Bali?	Please remove it with sandpaper.				
	Is there any serious wear to replacement indication line. 	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.				
	The center of the both sides of the collector arm attachment and Tro-Reel unit arranges. 	Please revise it so that the center matches.	○			
	Is there any ark generated protrusion ?	Remove the protrusion (convex) on the arc scratch using a file.				
	Is there any mounting nut loosen?	Retighten	○			
	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 there any wear or hole loosen on spring bearing metal?	Replace the collector shoes if there is wear to replacement indication line.				
	Is there any damage on the sheath of lead wire?	If there is damage, replace the collector shoes.	○			
	Is the collector shoes pulled by the lead wire?	If the collector shoes pulled, correct to have extra length on lead wire.	○			
Collector arm support parts for transverse	Are there modification of a spring (6.2mm or more clearance between the spring) or rust on the spring?	Deformation of the spring, if there is rust, replace				
	Are there abnormal wear?	If there is abnormal wear of the arm, replace the collector arm.	○			
	Is there a loose the screws?	Tighten screws more.	○			

Collector Block

Improves efficiency and safety of conveyor lines.

Conveyor lines, essential for aging and product inspection, used to have the following problems:

- Collectors tended to have poor contact and frequently separated from wires.
- Collectors wore out easily and needed frequent replacement.
- Charging parts were fully-exposed, increasing electric shock hazard. Panasonic has developed new collectors and charging parts that eliminate these problems. These new products are guaranteed to improve the efficiency and safety of your conveyor lines.

■ Improved reliability in contact areas.

The contact pressure between the collector and the conductor is kept at a constant level, minimizing separation from wires and derailing.

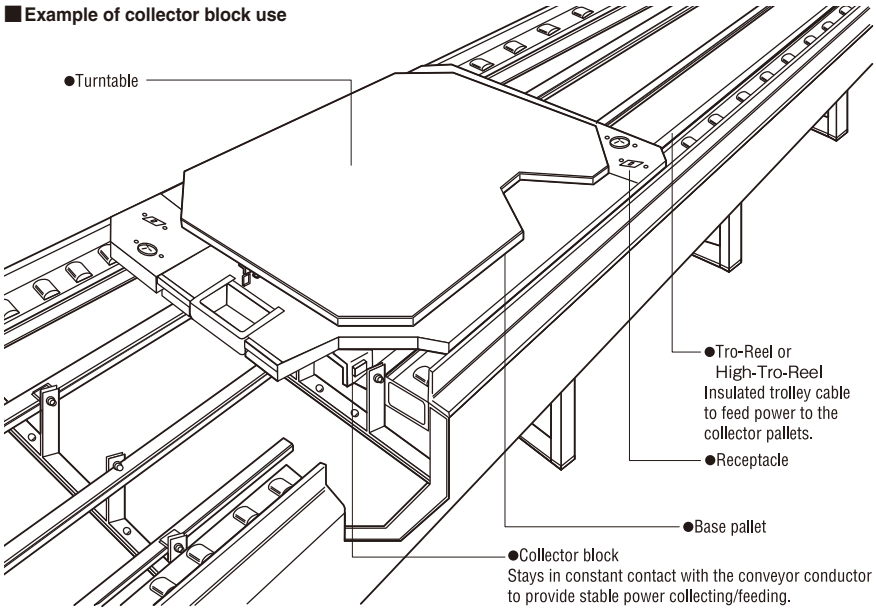
■ Collectors with superior abrasion resistance.

Collectors have extremely high endurance, require replacement less often, and ensure easy maintenance and inspection.

■ Insulated trolleys provide enhanced safety.

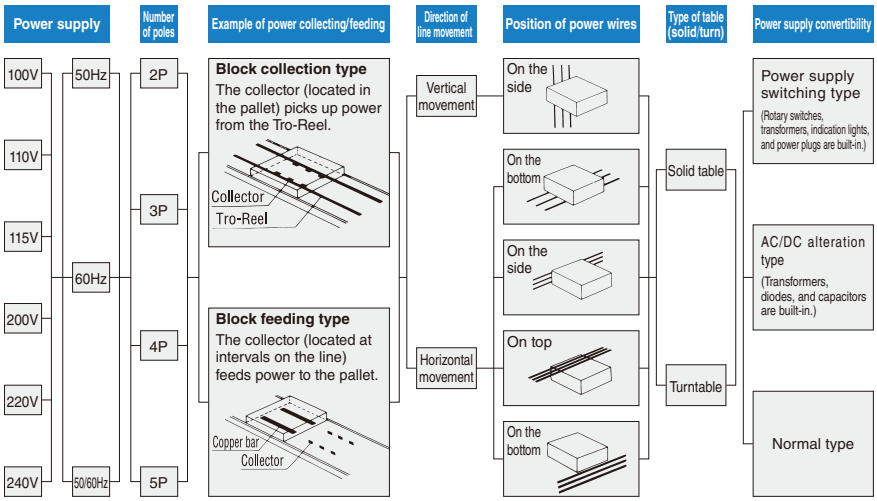
Insulated trolleys, such as Tro-Reel and High-Tro-Reel (in which conductors are protected by an insulated cover), are used on charging sections to prevent electric shock and short circuiting.

■ Example of collector block use



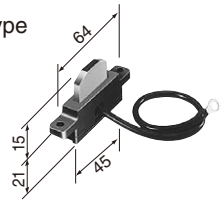
■ Product system

A wide variety of items for all kinds of power types and positions, test types, test products, and other line conditions.

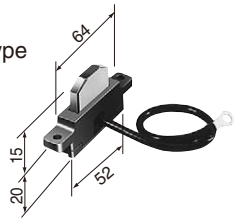


■ Collector block

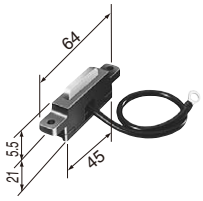
A-type



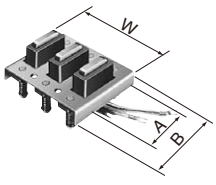
B-type



D-type



C-type



Types	W	A	B
2P	61	60	80
3P	94	60	80
4P·5P	150	90	120

Pictures show 3p collector blocks

■ Product lines

Type	Use	Rated current	Cat. No.
A-Type	Collect power from Tro-Reel	5A	**DH6811K1**
			DH6821K1
B-Type	Collect/feed power from/to copper bar	5A	**DH6812**
			DH6822
		15A	**DH6832**
D-Type	Collect/feed power from/to copper bar	5A	**DH6813K1**
			DH6823K1
C-Type	Collect/feed power from/to copper bar	2P20A	**DH6824**
		3P20A	**DH6825**
		4P20A	**DH6826**
		5P20A	**DH6827**

■ Collector block specifications (same for A, B, D, and C type)

Rating	Voltage	300V AC
	Current	5A, 15A (for certain B-types), 20A (for C-type)
Insulation resistance		100MΩ at 20℃ (500V DC megohmmeter)
Withstanding voltage		1,600V for one minute
Temperature increase		55 degrees or less
Environment	Ambient temperature	–10℃ to 40℃
	Ambient humidity	85% or less
Life		3,000km
Collector speed		0.5~10m/min.

● A-type and D-type with lead at the bottom are available by special order.

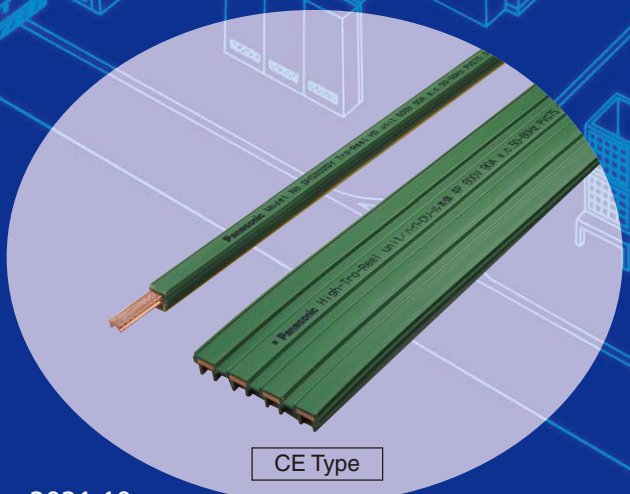
Panasonic

Insulated Trolley System

(JIS Approved)

Tro-Reel HS <Non-Tension Type> UL Listed Ⓤ
High-Tro-Reel <Non-Tension Type> UL Listed Ⓤ
High-Tro-Reel <Tension Type>
Tro-Reel

Highly Reliable Power/Data Transmission System for Moving Equipment Lines

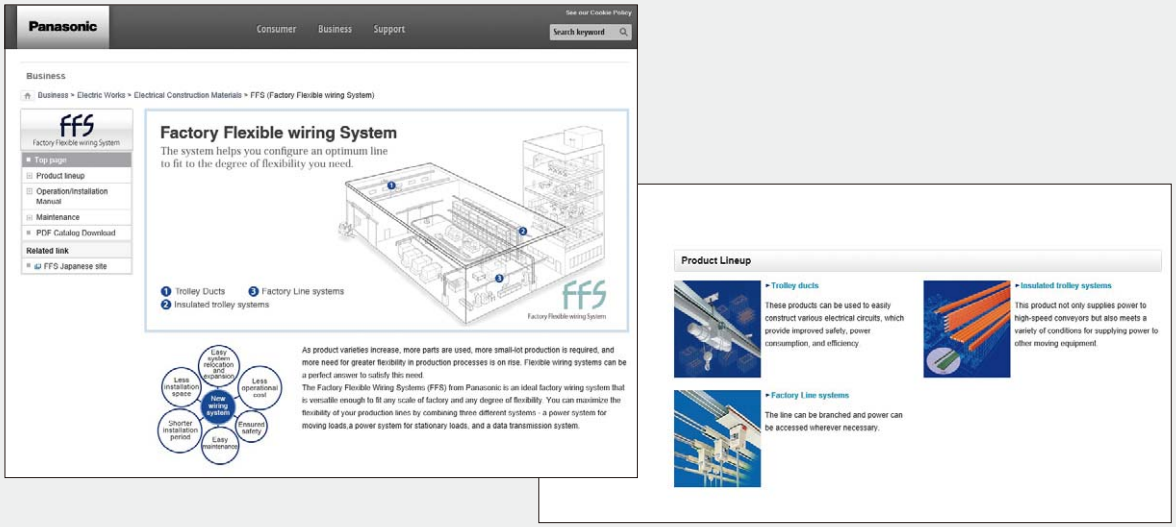


CE Type

2021.10

For information on the Panasonic Factory Flexible wiring System, visit

https://panasonic.net/electricworks/ecm/ffs/



※Note that screen images may be added or updated from time to time.

You can also download specification drawings and Operation/Installation Manuals.

Please contact .....

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