

KITO TD Rail

Instruction Manual

To Customer

- Thank you for purchasing the KITO TD rail.
- Those in charge of assembly and maintenance of the KITO TD rail are requested to read this manual. After reading, please keep this manual at hand for future use.

Table of Contents

■ Introduction	2
■ Safety Precautions	3
■ Handling the Product	3
■ Assembly	6
■ Periodic Inspection.....	14

Introduction

The KITO TD rail is designed and manufactured for wiring a crane, and so on.

This Instruction Manual is intended for those in charge of assembly and maintenance (personnel with expertise*) of the KITO TD rail.

After reading, please keep this manual at hand for future use.

* Those approved by an entity of being familiar with the structure and mechanism of the crane, etc. and having expertise.

■ Disclaimer

- KITO shall not be liable for any damage incurred thereof due to natural disaster such as fire, earth quake and thunderbolt, conduct by third party, accident, willful conduct or negligence by customer, erroneous use and other use exceeding the operational condition.
- KITO shall not be liable for any incidental damage due to the use or non-use of the product such as the loss of business profit, suspension of business and damage of the lifted load.
- KITO shall not be liable for any damage arising from negligence of the contents in the Instruction Manual and the use of the product exceeding the scope of its specification.
- KITO shall not be liable for any damage arising from the malfunction due to the combination of the product with other devices in which KITO is not concerned.
- KITO shall be indemnified from any loss of life, bodily injury and property damage due to the use of our product for which it has passed 1 years since its delivery.

Safety Precautions

The KITO TD rail may fall off or cause an electric shock, if it is improperly assembled and installed. Prior to assembly and installation, read this Instruction Manual thoroughly to assemble and install it properly. Prior to use, fully understand the mechanism of the device, safety information and precautions.

Description of Signal Words

This Instruction Manual classifies the safety information and precautions into two categories of "DANGER" and "CAUTION".



DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Further, the event described in CAUTION may result in serious accident depending on the situation. Both DANGER and CAUTION describe important contents. Please follow the instruction.

Description of Safety Symbols



Prohibited

⊘ means "Prohibited" or "You must not do".

Prohibited action is shown in the circle or described near the circle.



Mandatory

ⓘ means "Mandatory Action" or "You must do".

Required action is shown in the circle or described near the circle.

Handling the Product

DANGER



Prohibited

- **Never allow assembly and installation of the rail by other than the professionals or qualified personnel.**
- **Do not energize the rail until completion of its assembly and installation.**
- **Never remodel the product and its accessories.**
- **Never use other than KITO original parts.**
- **Do not use the rail in an atmosphere of a combustible gas, powder dust (explosive, combustible) or oil mist, and outdoors.**
- **Do not use the rail in a special environment such as a clean room, food-related facility.**
- **Do not use the rail in a place where the ambient temperature is beyond a range of -20 to 55°C or there may be dew condensation due to an excessive temperature change. The rail may cause an electric shock, catch fire or fall off.**

Failure to comply with these instructions may result in death or serious injury.



Mandatory

- **Check that the installation site of the KITO TD rail has sufficient strength.**
- **When disposing of the product, observe the ordinances provided by a local government or the regulations provided by an entity.**

Failure to comply with these instructions may result in death or serious injury.

CAUTION

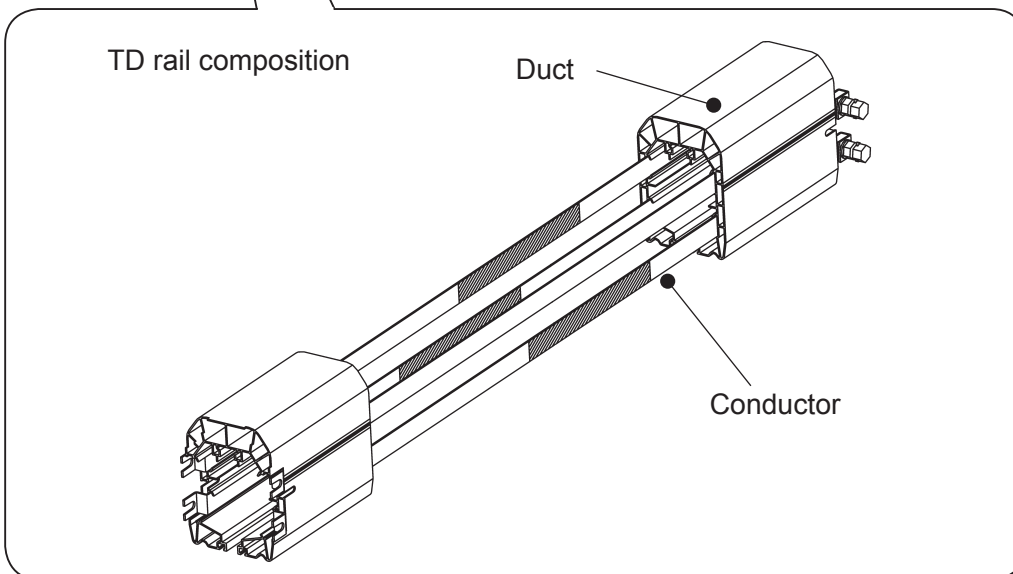
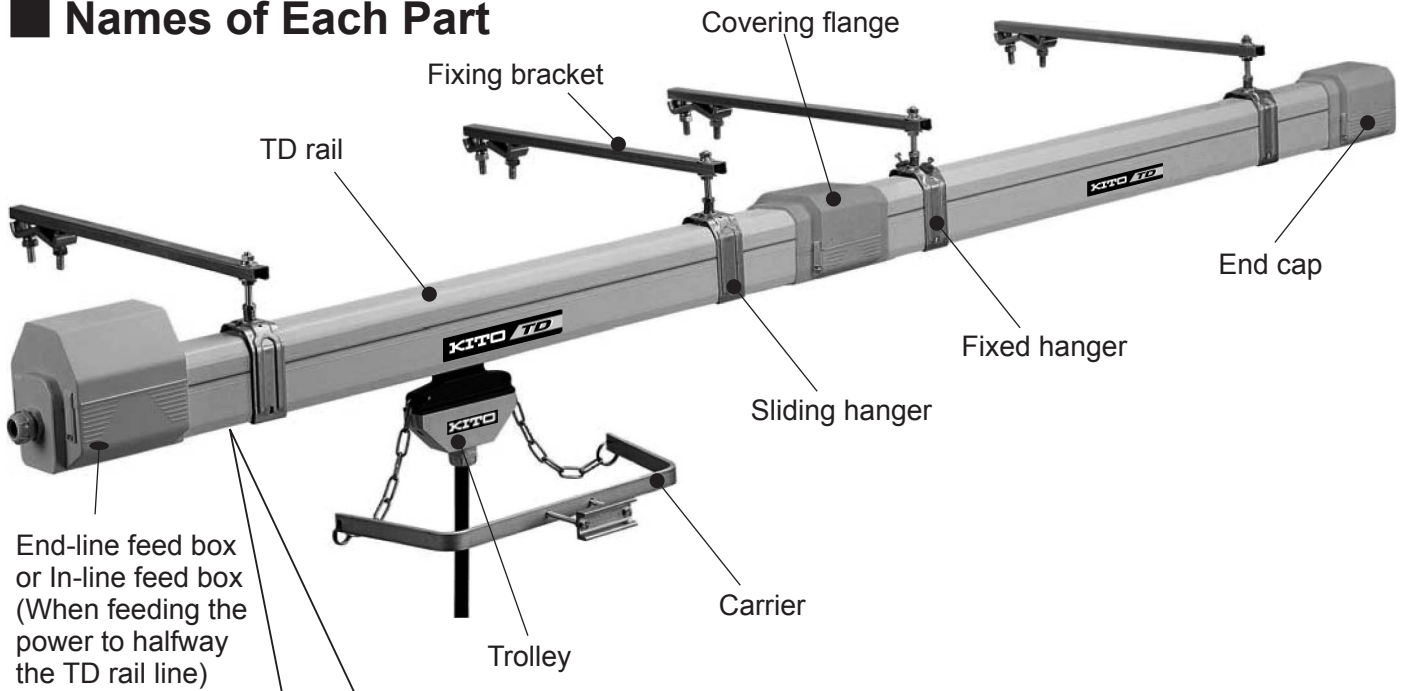


Mandatory

- **Be sure to install the KITO TD rail in such a manner that its opening will face downward.**

If not, the rail may catch fire due to spark or have a contact failure.

Names of Each Part



Opening the Package

● Checking the product

- Make sure that the indications on the package and the product coincide with your order.
- Make sure that the product is not deformed and damaged due to the accident.

Operating Conditions and Specifications

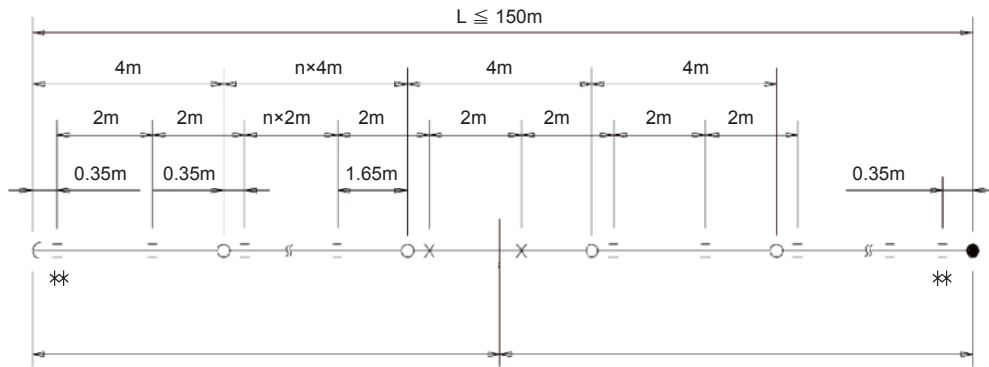
Type	Rated voltage	Rated current	Poles	Standard length (m)
ME4604KT	750V	60A	4P	4
ME4603KT				3
ME4602KT				2
ME4601KT				1
ME4104KT				4
ME4103KT		3		
ME4102KT		2		
ME4101KT		1		
ME5604KT		60A	5P	4
ME5603KT				3
ME5602KT	2			
ME5601KT	1			

Materials used

- TD rail: Self-extinguishing vinyl chloride resin (PVC)
- Covering flange, end cap, end-line feed box, in-line feed box: Self-extinguishing plastic
- Ambient temperature: -20 to 55°C
- Ambient humidity: 90%RH or less (no condensation)
- Max. service length: 150m
- Trolley speed: 100 m/min. or less
- Protection code: IP23
- Applicable standards: JIS C8373, EN60439-2, EN60204-32

Configuration Layout

Attach each member according to a configuration layout.



** Attach the sliding hangers at 0.35 m from both ends.

Legend

- X Fixed hanger
- Sliding hanger: Space 2 m apart at maximum.
- O Covering flange
- End-line feed box
- C End cap: Attach to the end of the TD rail.

CAUTION

Mandatory

- Attach the fixed hangers near the center of the line.

* The above layout shows the position of the feed box as an example. Determine its position based on the calculation of voltage drop described below.

<Calculation of Voltage Drop>

Voltage drop will be as a rule 2% or less of the standard voltage in the trunk line and the branch circuit, respectively.

$$\Delta U = \sqrt{3} \times Z \times L_t \times I$$

ΔU : voltage drop

I: current in continuous operation or at start-up, as appropriate (In Amperes)

L_t : length of the section considered (in m) (see figure-1)

Z: line impedance (in Ω/m) (see table-1)

Fig. 1 Calculation

Length of Line Sections

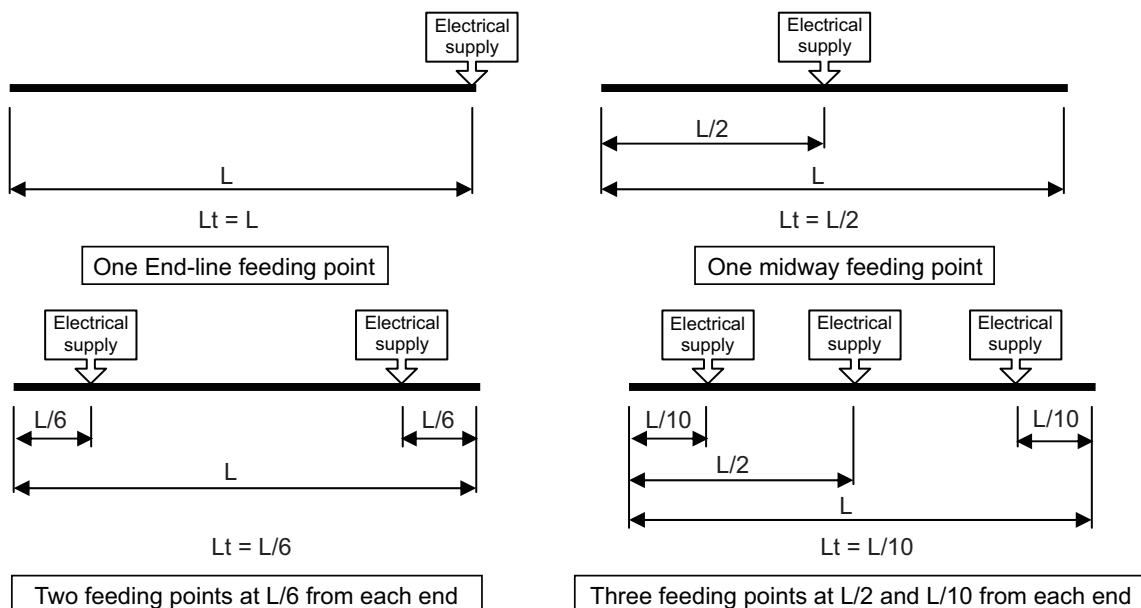


Table 1 Impedance selection table

Current rating (A)	Impedance (Ω/m) $\times 10^{-3}$	
	Ambient temperature 20°C	Ambient temperature 35°C
60	1.2	1.26
100	0.77	0.81

Assembly

⚠ DANGER

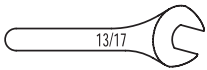


Mandatory

- Be sure to turn off the power for the line prior to assembly.
- Failure to comply with this instruction may result in death or serious injury.

1 Fixing bracket

Attach the fixing brackets to a traveling or traversing rail.



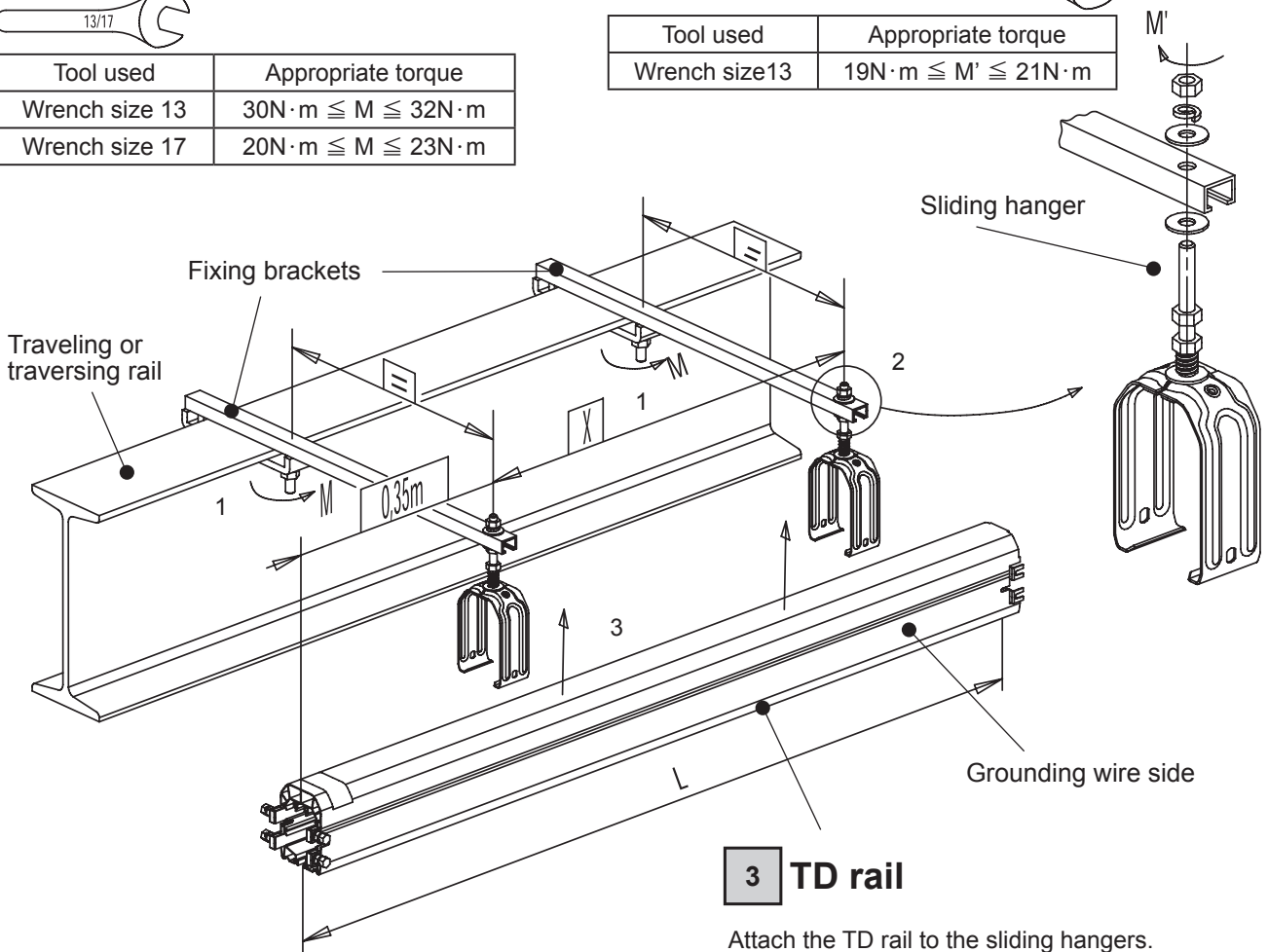
Tool used	Appropriate torque
Wrench size 13	$30\text{N}\cdot\text{m} \leq M \leq 32\text{N}\cdot\text{m}$
Wrench size 17	$20\text{N}\cdot\text{m} \leq M \leq 23\text{N}\cdot\text{m}$

2 Sliding hanger

Attach the sliding hangers to the fixing brackets.



Tool used	Appropriate torque
Wrench size 13	$19\text{N}\cdot\text{m} \leq M' \leq 21\text{N}\cdot\text{m}$



3 TD rail

Attach the TD rail to the sliding hangers.

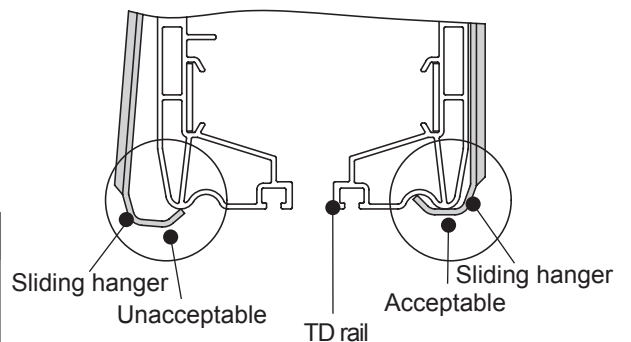
L (m)	$L \leq 4$
No. of sliding hangers	2 or 3 pcs.
X	2 m or less

⚠ CAUTION

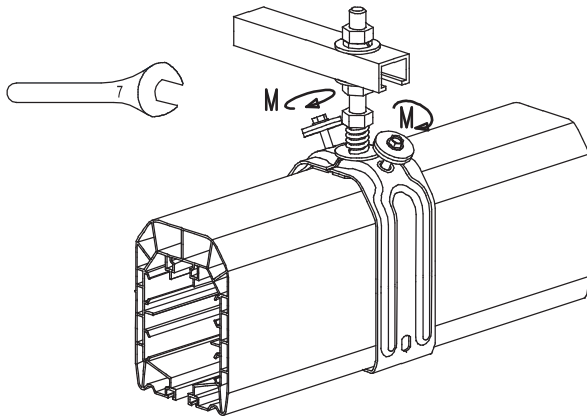


Mandatory

- Attach the sliding hanger securely onto the TD rail.



4 Fixed hanger



Seeing ■ Configuration Layout on Page 5, attach the fixed hangers.

Tool used	Appropriate torque
Wrench size 7	$2.0N \cdot m \leq M \leq 3.0N \cdot m$

5 Connecting the conductor

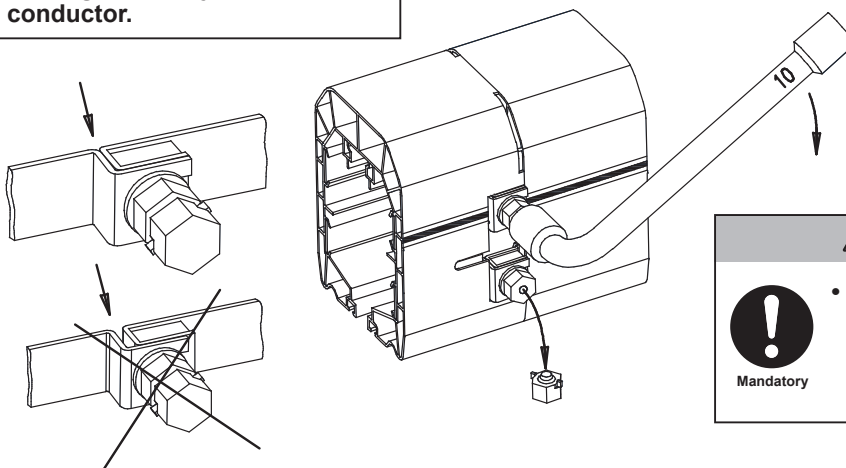
⚠ CAUTION



Mandatory

- Using exclusive connection bolts, attach the conductor in such a manner that there will be no gap at the joint of the conductor.

Tighten the connection bolts until they are wrenched off.



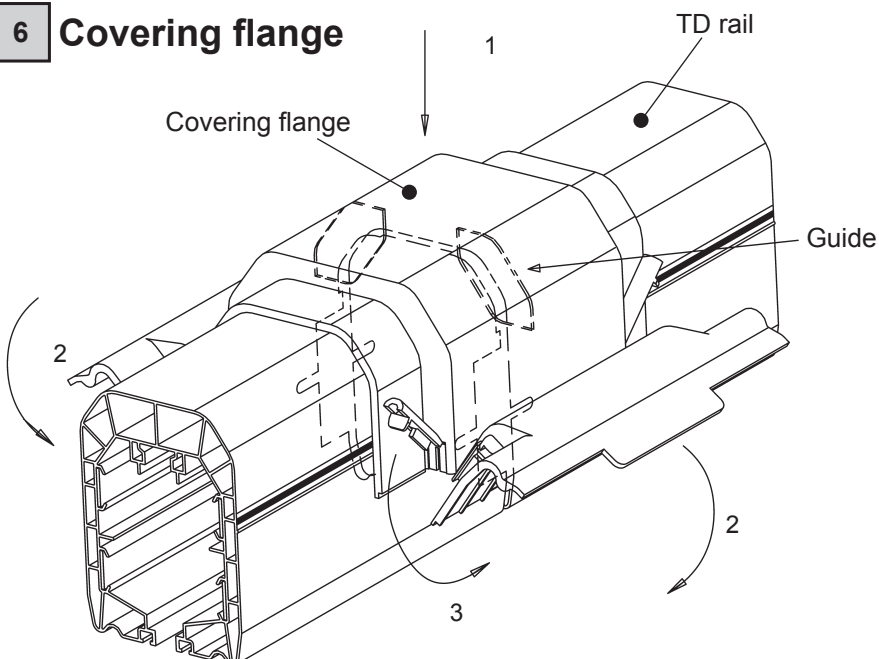
⚠ CAUTION



Mandatory

- Care should be taken not to turn the inner bolt head together.

6 Covering flange



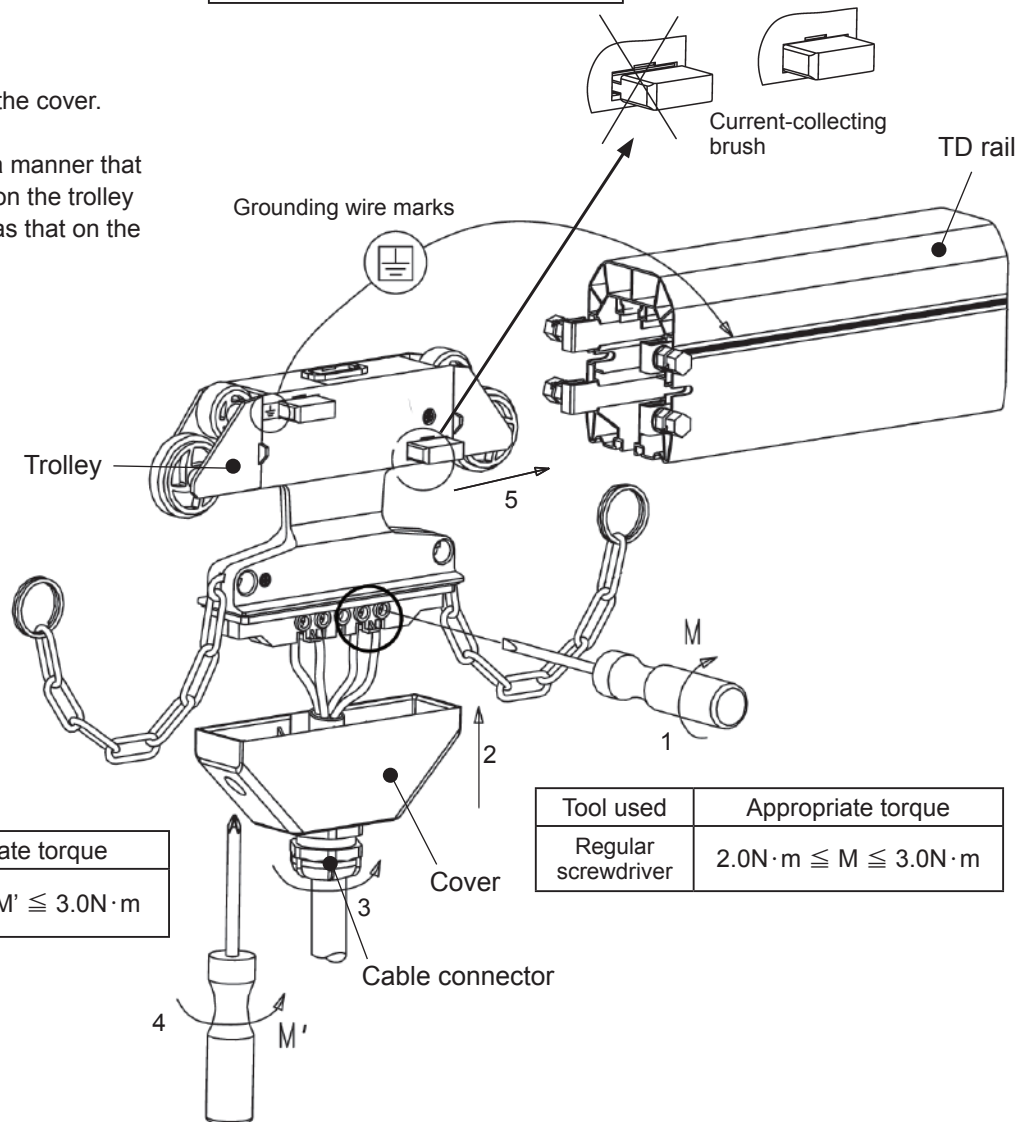
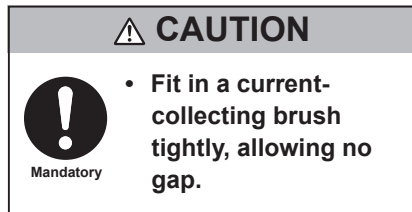
1. Attach the covering flange to the joint of the TD rails. When this is done, insert the inner guides of the covering flange into two gaps between the TD rails.

2. Set the side covers into the lower side of the TD rail.

3. Set the fixing clicks into the side cover.

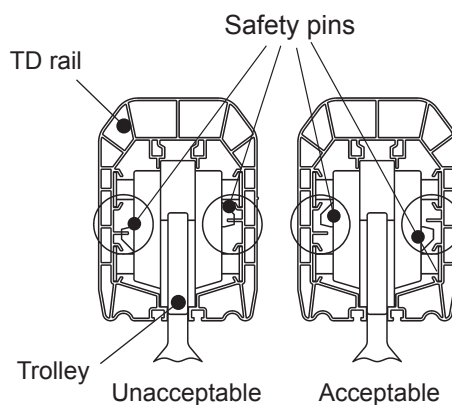
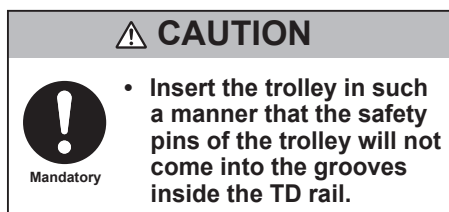
7 Trolley

1. Attach a connection cable to a terminal block.
2. Attach a cover.
3. Attach a cable connector.
4. Tighten the setscrews of the cover.
5. Insert the trolley in such a manner that the grounding wire mark on the trolley will be on the same side as that on the TD rail.



Tool used	Appropriate torque
Phillips screwdriver	$2.0\text{N} \cdot \text{m} \leq M' \leq 3.0\text{N} \cdot \text{m}$

Tool used	Appropriate torque
Regular screwdriver	$2.0\text{N} \cdot \text{m} \leq M \leq 3.0\text{N} \cdot \text{m}$



- A recommended connection cable size is 4 mm² or more; connectable up to 6 mm².
- The trolley should be inserted and removed at the end of the line.
- When inserting and removing the trolley halfway the line, assemble an introduction gate (ME4706KT, ME4756KT, ME4710KT: options) into the line or use a TD rail connection bolt set (ME1345: option).
- Purchase the connection cable separately. It is recommended to attach bar-shaped crimp terminals to the end of the connection cable.

8 In-line feed box

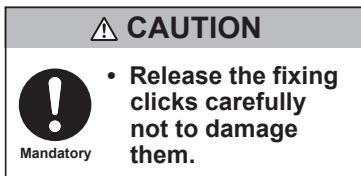
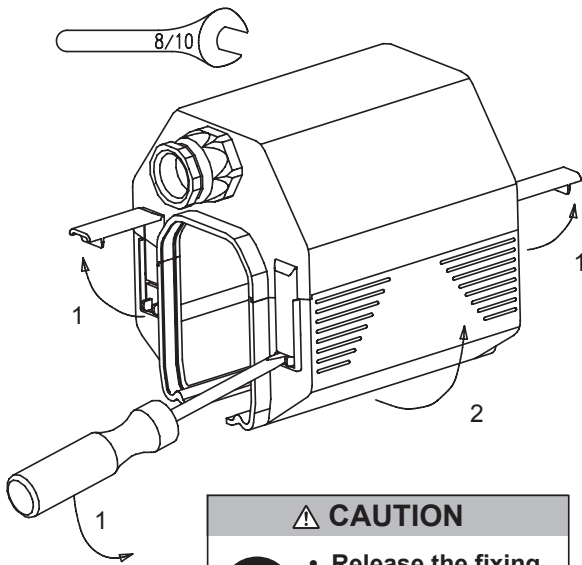
Model ME1300 and ME1330

1. Release the side cover fixing clicks with a regular screwdriver, etc. and raise them upward.

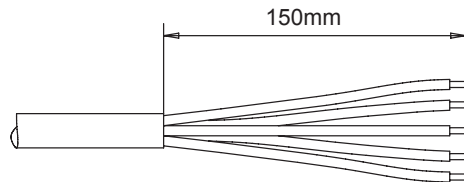
2. Open the side covers.

3. Place the in-line feed box temporarily near the joint of the TD rails and insert a power cable through a cable connector.

4. Attach round crimp terminals to the end of the power cable and attach them to the TD rail with accessory bolts. (Purchase the round crimp terminals separately.)

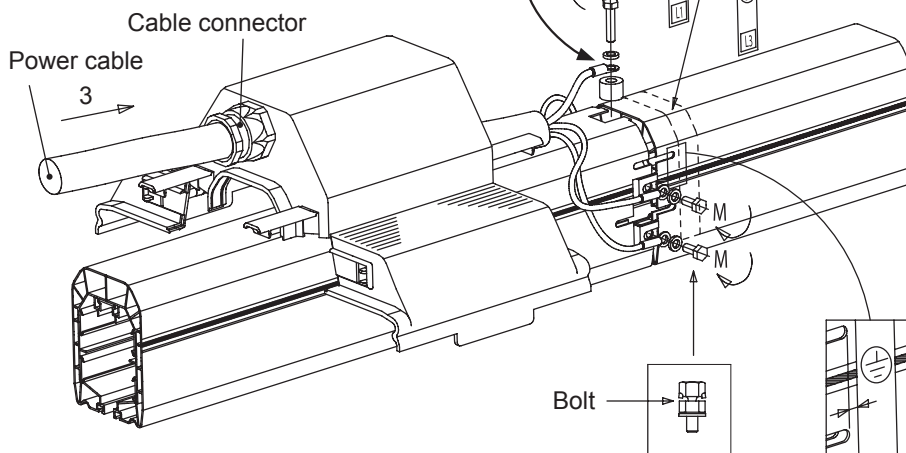


Power cable end processing dimension



Bolt	Appropriate torque
Accessory M5 bolt	$4.1\text{N}\cdot\text{m} \leq M \leq 5.4\text{N}\cdot\text{m}$

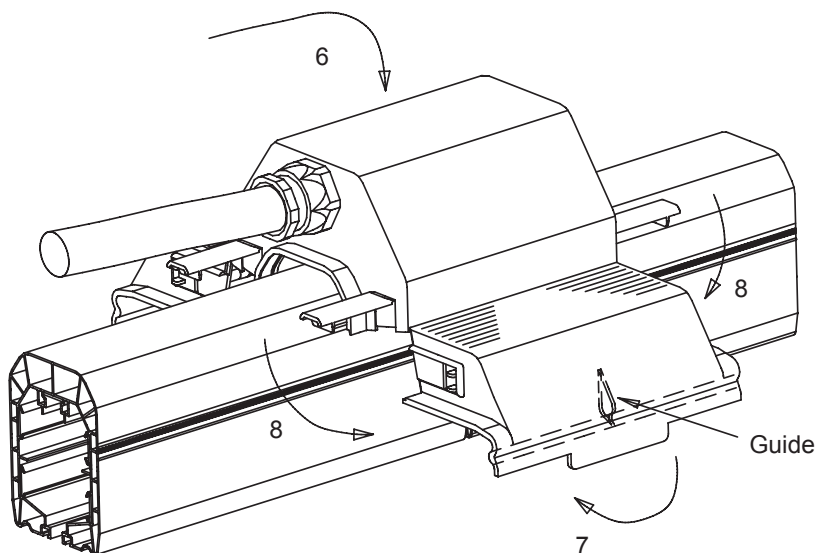
5. Affix an accessory phase (L1, L2, L3, N, grounding wire) indicating label near the cable mounting position.



6. Attach the temporarily placed in-line feed box to the joint of the TD rails.

7. Set the side covers of the in-line feed box into the lower side of the TD rail. When this is done, insert the inner guides of the side covers into the gap between the TD rails.

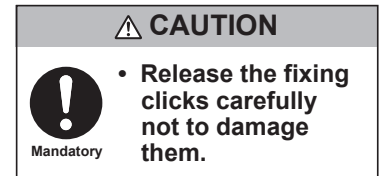
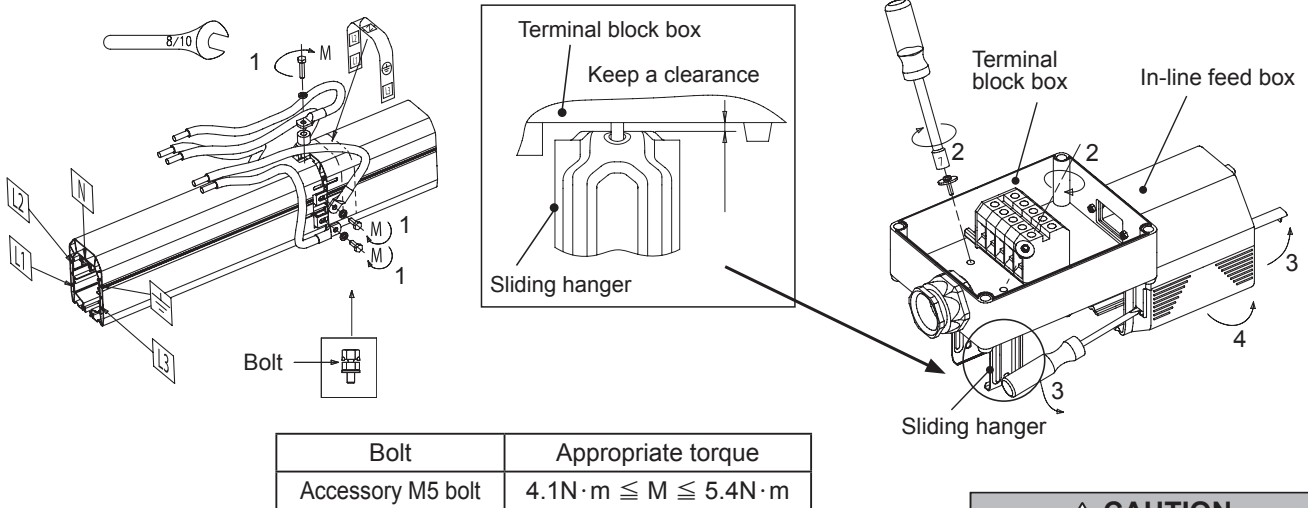
8. Set the fixing clicks into the side covers.



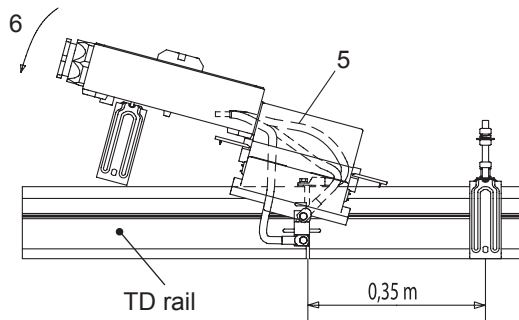
Model ME1329 and ME1332

1. Attach an accessory cable to the joint of the TD rails, using accessory bolts.
2. Keeping a clearance against a terminal block box, tighten a bolt lightly to fix the accessory sliding hanger temporarily.

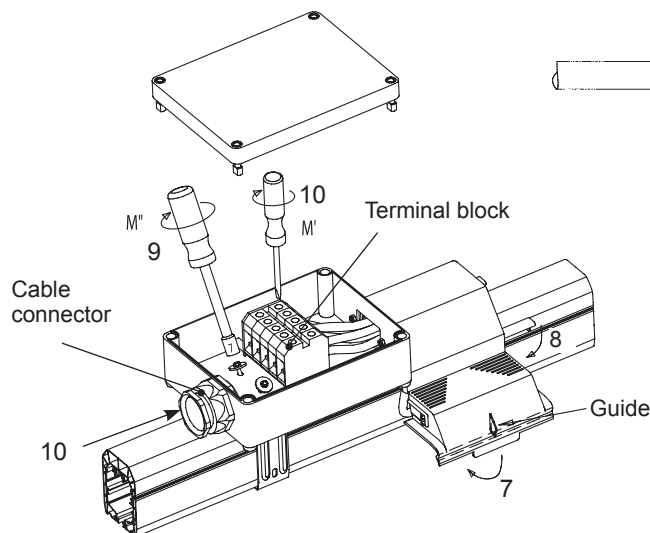
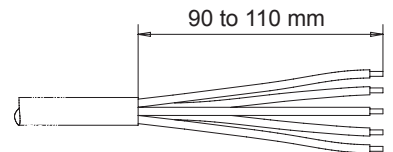
3. Release the side cover fixing clicks with a regular screwdriver, etc. and raise them upward.
4. Open the side covers.



5. Put the cable attached in Step 1 into the terminal block box from inside the in-line feed box cover.
6. Fit the sliding hanger onto the TD rail.
7. Set the side covers into the lower side of the TD rail. When this is done, insert the inner guides of the side covers into the gap between the TD rails.
8. Set the fixing clicks into the side covers.
9. Secure the sliding hanger temporarily fixed in Step 2.
10. Connect the end of the cable put into the terminal block box in Step 5. Insert the power cable through the cable connector to connect it to the terminal block.



Power cable end processing dimension



Part	Appropriate torque
M'	$2.5\text{N}\cdot\text{m} \leq M' \leq 5.0\text{N}\cdot\text{m}$
M''	$3.0\text{N}\cdot\text{m} \leq M'' \leq 5.0\text{N}\cdot\text{m}$

9 End-line feed box

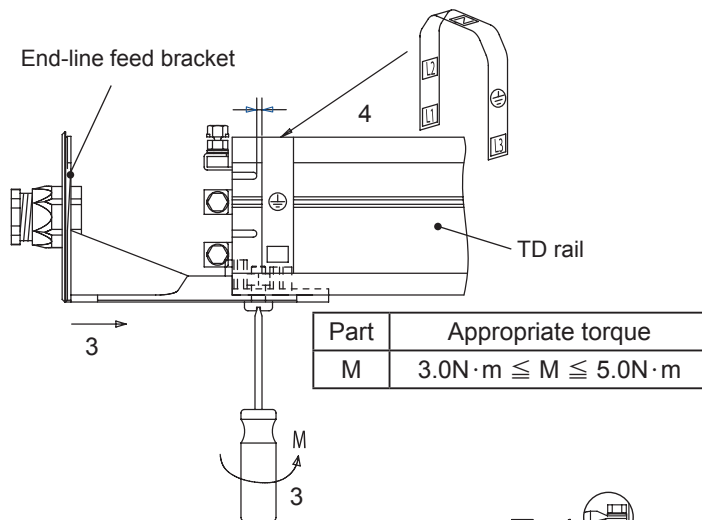
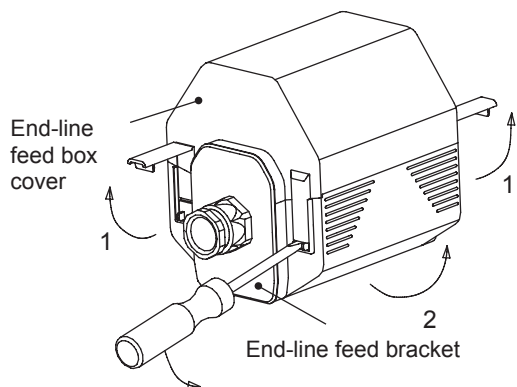
CAUTION



- Release the fixing clicks not to damage them.

Mandatory

1. Release the side cover fixing clicks with a regular screwdriver, etc. and raise them upward.
2. Open the side covers to remove the end-line feed box cover.
3. Attach the end-line feed bracket (lower part of the end-line feed box) to the end of the TD rail, and tighten setscrews.
4. Affix an accessory phase (L1, L2, L3, N, grounding wire) indicating label to the end of the TD rail.
5. Insert the power cable through the cable connector and attach round crimp terminals to the end of the power cable to connect them to the TD rail. (Purchase the round crimp terminals separately.)



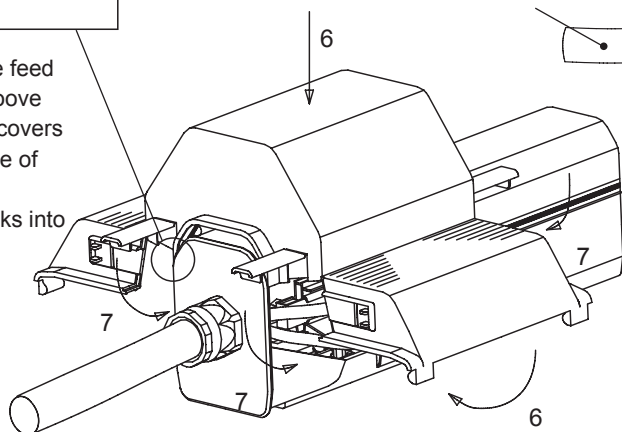
CAUTION



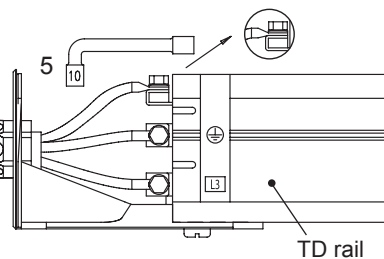
- Fit in along a groove

Mandatory

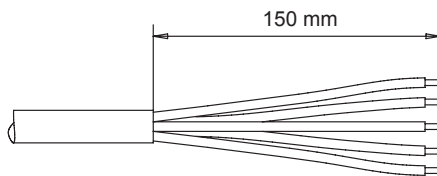
6. Fit in the end-line feed cover along a groove and set the side covers into the lower side of the TD rail.
7. Set the fixing clicks into the side covers.



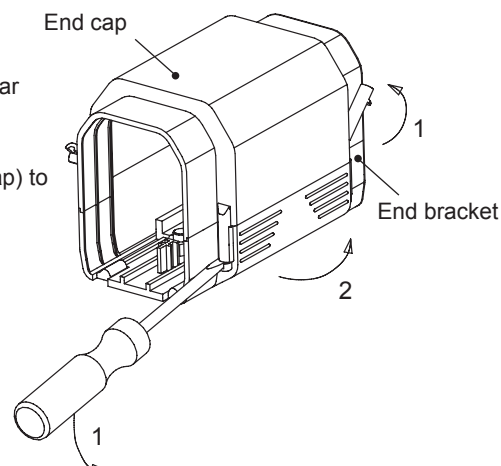
Power cable



Power cable end processing dimension



End cap



10 End cap

CAUTION

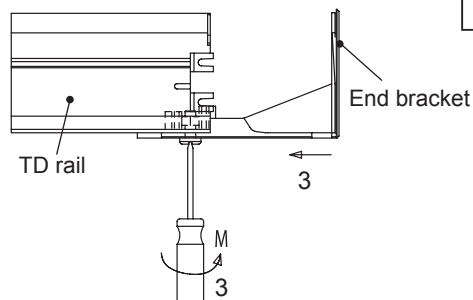


- Release the fixing clicks carefully not to damage them.

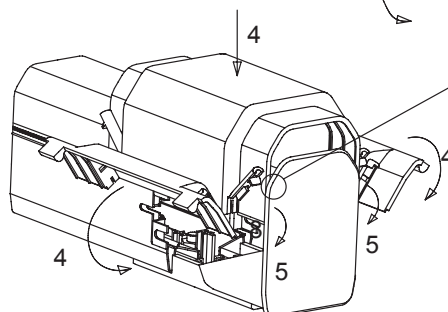
Mandatory

1. Release the side cover fixing clicks with a regular screwdriver, etc. and raise them upward.
2. Open the side covers to remove the end cap.
3. Attach the end bracket (lower part of the end cap) to the end of the TD rail and tighten setscrews.

Part	Appropriate torque
M	$3.0\text{N}\cdot\text{m} \leq M \leq 5.0\text{N}\cdot\text{m}$



4. Fit in the end cap along a groove and set the side covers into the lower side of the TD rail.
5. Set the fixing clicks into the side covers.



CAUTION



- Fit in along a groove

Mandatory

11 Connecting the trolley

⚠ CAUTION



Mandatory

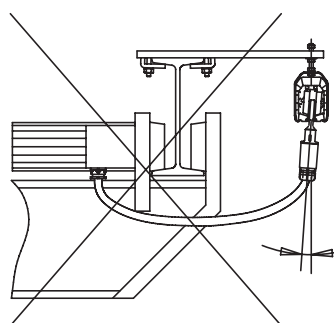
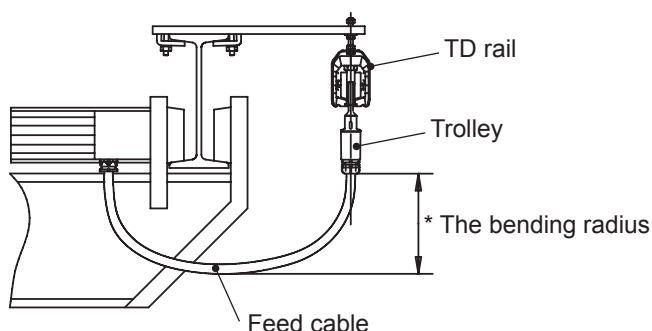
- **Make sure that a feed cable does not tilt mounting of the trolley.**

If the trolley is used in a tilted state, its service life is shortened.

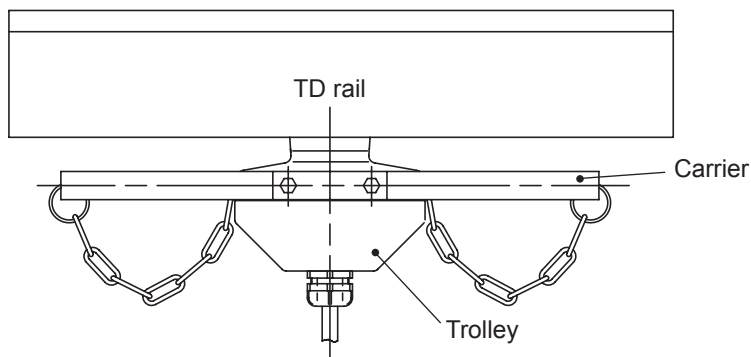
- **The bending radius* of the feed cable to be connected to the trolley should be greater than the allowable bending radius of that cable.**

- **Make sure that the trolley and the feed cable do not come into contact with the surrounding parts.**

Failure to comply with these instructions may result in injury or damage on your properties.

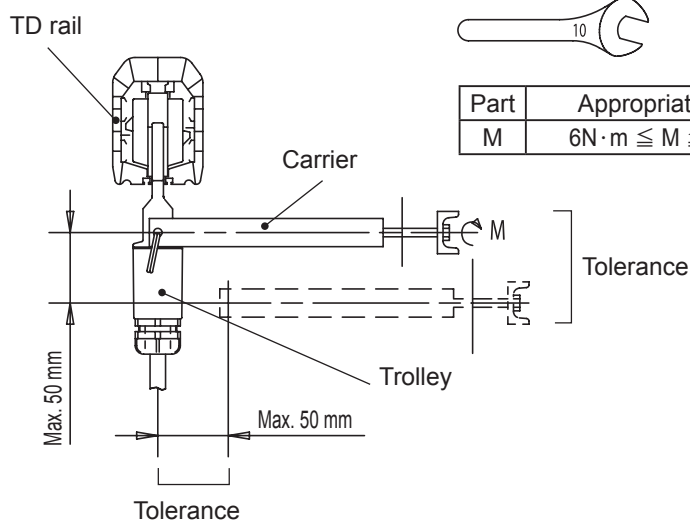


12 Mounting the carrier



1. Mount the carrier to the crane, hoist, and so on.
2. Put the rings attached to the trolley chains into the holes in both ends of the carrier.

<TD rail cross-sectional view>



Part	Appropriate torque
M	$6\text{N}\cdot\text{m} \leq M \leq 8.0\text{N}\cdot\text{m}$

13 Cutting the TD rail

⚠ CAUTION

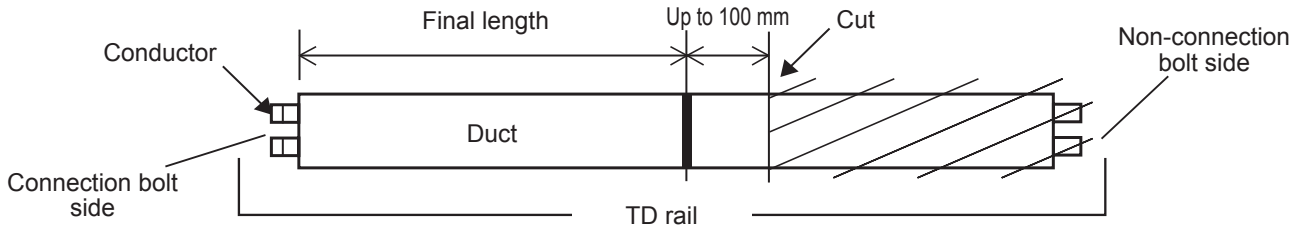


Mandatory

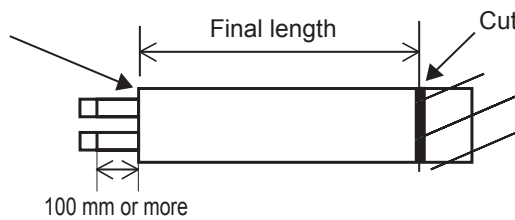
- When cutting the TD rail to adjust the line length, cut its non-connection bolt side. If the TD rail is cut on the connection bolt side, it cannot be connected to other TD rail or end feed is disabled.

Failure to comply with this instruction may result in injury or damage on the properties.

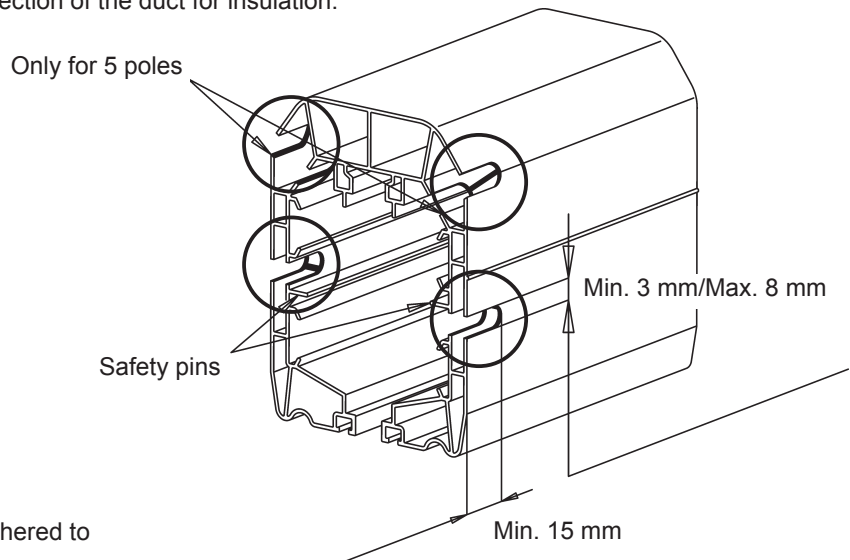
1. Cut the TD rail to approx. 100 mm longer than the final length.



2. Draw out the conductor by 100 mm or more and cut to the final length.

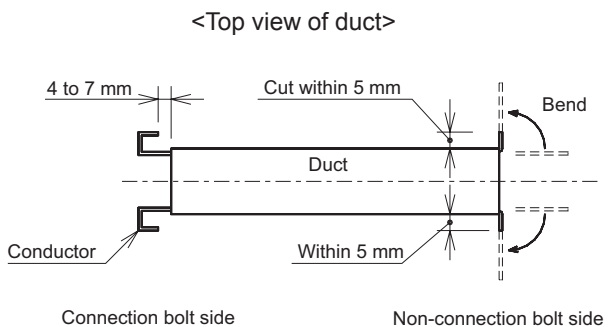


3. Make connection cuts in the cutting section of the duct for insulation.



4. Deburr the cuts and eliminate dust adhered to the conductor.

5. Draw out the conductor by 4 to 7 mm on the connection bolt side. Bend the end of the non-connection-side conductor and cut the surplus conductor at a position of 5 mm or less from the duct surface.



6. Seeing  on Page 11, attach the end cap to the cutting side.

Periodic Inspection

Carry out periodic inspection according to the frequency of use, traveling distance, and environment.

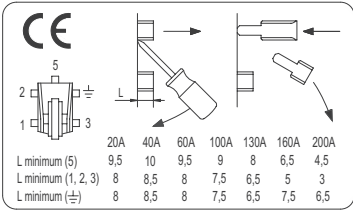
⚠ DANGER



- Prior to carrying out periodic inspection, be sure to turn off the power.
- When working in a high place, wear a helmet and a safety belt. Wear also a protective gear (protective glasses, insulating gloves) according to work.
- Be sure to carry out periodic inspection when the traveling distance has reached 3,000 km or after using the TD rail for one year at maximum.
- When the TD rail has not been used for a long period (3 months as a guide), carry out periodic inspection prior to using it again.

Failure to comply with these instructions may result in death or serious injury.

■ Inspection Items

Item	Check method	Criteria	When failed	
TD rail	Duct	Check the duct body visually.*	No damage such as breakage, cracks	Replace.
	Duct	Check the inside of the duct visually.*	No carbon dust or contamination inside the duct	Clean with a blow gun, etc.
	Conductor	Check the surface condition of the conductor visually.* • Normally, the surface of the conductor becomes glossy due to repetitive passing of the trolley.	No damage on the conductor (oxidation, polishing dust, contamination, damage by electric arc)	Use a cleaning trolley to clean. If not remedied, replace.
			No coarse surface of the conductor	Run the cleaning trolley. • The cleaning trolley is not designed for long-distance travel. The current-collecting brush is worn out faster than standard ones.
	Check the joint visually and using a tool.	No loose connection bolts	Replace.	
Current-collecting brush	Check the limit value of the current-collecting brush. (Inscribed on the label affixed to the side of the trolley.)  • If the conductor is damaged, the current-collecting brush has a shorter service life.	Within the limit value	Replace.	
Trolley	Check the rings, chains and rollers visually.	(1) No damage or cracks (2) No accumulated carbon dust	(1) Replace. (2) Eliminate the carbon dust. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">⚠ CAUTION • Replace every 10,000 km or so even if the criteria are satisfied.</div>	
End-line feed box	Check for loose connection visually and using a tool.	No loose connections	Seeing Page 11, attach correctly again.	
	Check the end-line feed box visually.	No damage such as breakage, cracks	Replace.	
Covering flange and end cap	Check for loose connection visually and using a tool.	No loose connections	Seeing Pages 7 and 11, attach correctly again.	
	Check the covering flange and the end cap visually.	No damage such as breakage, cracks	Replace.	
Sliding hanger and fixing bracket	Check the screws and nuts visually and using a tool.	No loose screws or nuts	Retighten.	
	Check the hanger and the fixing bracket visually.	No damage such as breakage, cracks	Replace.	

* Check the conductor visually from below. For the invisible conductor, image its condition based on the visible one.

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