Trolley Duct Maintenance (Test run and periodic inspection)

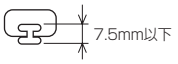
Notes

＜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	

Product	Parts	Inspection area	Inspection details	Possible causes of problems	Remedy/countermeasure	※	Result	Measures	Inspection frequency
Trolley Ducts Drop-out ducts	Conductor	Surface	Check for deposits of foreign substances.	Oil and/or dust particles present in duct interior.	Clean using conductor cleaner. Depending on the conditions, it can be smoothed with a file. Clean inside of duct with air blower, etc.				Once every 3 to 6 months
			Check for scratches.	Oil and/or dust particles present in duct interior.					
			Check for burrs on the conductor.	Contact between conductor and collector is uneven.	Clean using conductor cleaner. Adjust how trolley is pulled.				
				Surface of trolley collector is uneven.	Clean using conductor cleaner. Grind the surface of the trolley collector.				
			Check for traces of arcing.	Burr occurred on conductor and short-circuited.	Clean using conductor cleaner. Depending on the conditions, it can be smoothed with a file. Clean inside of duct with air blower, etc.				
				Contact between conductor and collector was lost.	Check the wear condition of the collectors and replace if necessary. Check whether foreign materials have gotten inside the duct, and clean out if necessary.				
				A conductive foreign material got inside and short-circuited.	Check whether foreign materials have gotten inside the duct, and clean using air blower, etc.				
			(Disconnected conductor sections)	There is a large difference in voltages between the two conductors.	Use a file to file down conductors. Modify circuit.				
			(Trolley transfer sections)	There is a large voltage difference between the conductor and the collector at the time of the trolley transfer.	Use a file to file down conductors. Modify circuit.				
			Has wear condition reached the exchange standard? **Does wear of a duct reach a standard of exchange before the next check?**	Estimated replacement The 20 million number of times of trolley passage or wear of conductor 0.5 mm depth  Measure the duct terminal area after removing a conductor joint.	Replace trolley				
		Joints	**Check if conductor splice screws are loose.**	Duct is moving a lot.	Tighten screws more. (Proper tightening torque: 1.0 to 1.5N・m) Take anti-vibration countermeasures.	○			
			Check that the two conductor joint screws on each side of the splice are tight.	Faulty installation	Fix by fastening with 2 screws on each side.	○			
	Insulator	Surface/side surface	Check that there are no cracks.	Duct fell or was subject to impact.	Replace duct body.				
	Duct (casing)	Duct inside surfaces	Check for dust particle accumulation.	Friction dust; Entrance of dust from outside	Clean with cotton rags or air blower.				
			Check for burrs on the duct opening.	Trolley is running tilted due to the influence of the cable. Trolley is running tilted due to the effect of center of gravity.	Remove burrs and clean inside of duct. Adjust how trolley is pulled.				
			Do not wear on the case?	It wears out by friction with a trolley.	Replace the duct.				
		Joints	Check for misalignment of the duct openings.	Connecting plate is not securely fit into the curled section of the duct.	Fit connecting plate securely into the curled section of the duct.	○			
			Check that joint sections are straight and not angled.	Duct was not installed perfectly straight.	Change the positions of the hangers and brackets, and improve the linearity of the duct.	○			
		Drop-outs	Check that doors are securely closed.	Lock pin is not fit securely into the curled section of the duct.	Fit lock pin securely into the curled section of the duct.	○			
Feed-in boxes Center feed-in boxes	Terminal	Screws; Conductor splices	**Check for looseness.**	Duct is moving a lot.	Tighten screws more. (Proper tightening torque: 1.0 to 1.5N・m) Take anti-vibration countermeasures.	○			
			Check for discoloration.	Temperature increase due to loose screws or disconnection of wiring.	Tighten screws more. Replace wires.				
			Check that the two conductor splice screws on each side of the splice are tight.	Faulty installation	Fix by fastening with 2 screws on each side.	○			
			Check if screws on power supply section are loose.	——	Tighten screws more.	○			

Product	Parts	Inspection area	Inspection details	Possible causes of problems	Remedy/countermeasure	※	Result	Measures	Inspection frequency
Trolleys	Collectors	Friction surfaces; Side surfaces	Check for deposits of foreign substances.	Oil and/or dust particles present in duct interior.	Clean with cotton rags, etc.				Once every 1 to 3 months
			Check for roughness.	There is a difference in height between the conductor connection sections. Traces of arcing generated on the conductor are grinding it down.	Fix the conductor connection section. Grind off the traces of arcing on the conductor surface.				
			Check for traces of arcing on surface. (Inside of duct)	Contact between conductor and collector was lost.	Grind the conductor surface. Replace if necessary. Check whether foreign materials have gotten inside the duct, and clean out if necessary.				
			Check for traces of arcing on surface. (Inside of duct)	A conductive foreign material got inside and short-circuited.	Check whether foreign materials have gotten inside the duct, and clean using air blower, etc.				
			Check for traces of arcing on surface. (Inside of duct)	There is a large voltage difference between the two conductors at the disconnected section.	Use a file to file down conductors. Modify circuit.				
			Check for traces of arcing on surface. (Inside of duct)	At the trolley transfer section, there is a large voltage difference between the conductor and the collector at the time of the trolley transfer.	Use a file to file down conductors. Modify circuit.				
			Check whether wear has reached the wear limit line or whether it will reach the wear limit line before the next maintenance.	——	Replace collectors.				
			Check that conductor surface is even.	Contact between the conductor and collector is tilted. Duct itself is twisted due to faulty installation.	Grind the surface of the collector. If necessary, adjust the way the trolley is pulled. Adjust the linearity of the duct body.				
			Check for occurrence of burrs.	——	Remove burrs.				
			Check that collector moves up and down smoothly.	Friction dust has accumulated and movement has become poor.	Disassemble collector section and clean.				
	Running wheels; Guide wheels	——	Check if wheels rotate smoothly. Check for abnormal rattling.	Bearing damage, etc.	Replace trolley.				
	Terminal boxes	Terminal	**Check screws for looseness. Check for discoloration.**	Looseness of screw or disconnection.	Tighten screws more. Fix disconnection.				
		Cable clamps	Check if cable is clamped correctly.	Clamp size is not suitable for outside diameter of cable.	Correc	○			
			Check that pulling is not done with cable.	——	Adjust how trolley is pulled.	○			
			Check for cable insulation damage.	Cable is often bent. Force is applied to cable.	Adjust cable wiring conditions.				
	Pulling method	——	When pulling with chain: Vertical direction : Within 30° Horizontal direction : Within 15°	——	Adjust how trolley is pulled. Adjust pulling angle.	○			
	Travel characteristics	——	Check that trolleys can move within the duct smoothly.	Opening is narrowed because of hanger. Duct is not properly connected.	Adjust hanger. Adjust connection.	○			
(Common inspection items for all Trolley Duct components)	Insulation resistance Ground resistance	Between poles Between pole and ground Duct and equipment	When operating voltage is 300V or less: Voltage to ground 150V or less : 0.1MΩ or more Voltage to ground higher than 150V : 0.2MΩ or more When operating voltage is more than 300V:0.4MΩ or more Operating voltage: 300V or less: D-type grounding : 100Ω or less More than 300V: C type grounding : 10Ω or less	——	・Clean the surface of the trolley duct insulator. ・Clean trolley surface or inside of terminal box.				
Hanger and bracket	——	Mounting parts, screws, nuts, etc.	・Check screws and nuts for looseness. ・Check for deformation. ・Check that hanger is properly fastened to duct.	——	Retighten screws. Correct.				Once every 3 to 6 months