Yonggui Toyo Company Profile

1. Company Introduction:

Chengdu Yonggui Toyo Rail Transit Equipment Co., Ltd. (hereinafter referred to as Yonggui Toyo) was established on August 23, 2017, with a registered capital of 30 million yuan, and a capital contribution ratio of 51% of Zhejiang Yonggui Electric Appliance Co., Ltd., 49% of Toyo Electric Manufacturing Co., Ltd., address: No. 369, Chuangfei Road, Shibantan Town, Xindu District, Chengdu, and its business scope: R&D, production, maintenance and other businesses of complete sets of electrical equipment such as pantographs, electrical connectors, and traction for rail vehicles.

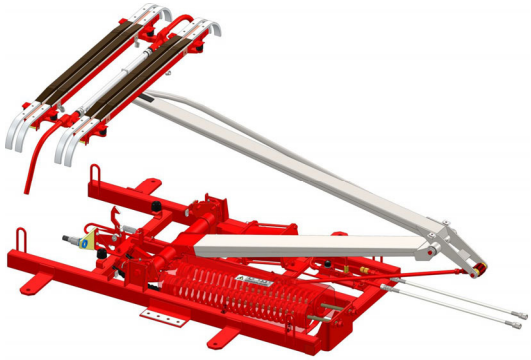
Headquartered in Zhejiang Yonggui Electric Appliance Co., Ltd., located in Tiantai, Zhejiang, it was successfully listed on the Shenzhen Stock Exchange in 2012 with the stock code 300351 Qualifications and honors: a national high-tech enterprise, and has won more than 40 national invention patents
There are more than 300 patents, seven categories of rail transit products: pantographs, throughways, connectors, door systems, battery power systems, shock absorbers, axle counting systems, and four major industrial fields: rail transit, new energy, communications, and military equipment.

Founded in 1918 and listed on the Tokyo Stock Exchange in 1949, Toyo Electric Manufacturing Co., Ltd. is headquartered in Tokyo, Japan, with four business divisions. The pantograph manufacturing base is located in the Yokohama factory, which began manufacturing pantograph products in 1931, entered the Chinese market in 2015, and landed in Xindu District, Chengdu in 2017.

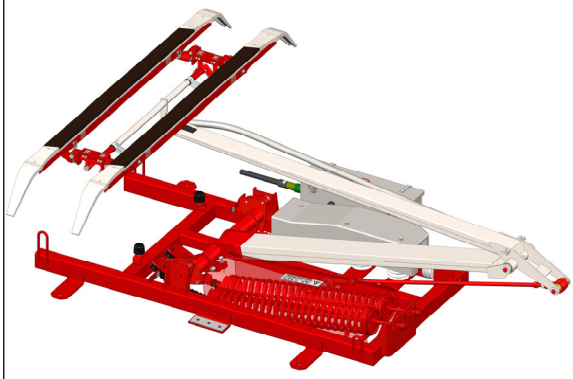
2. Product introduction:

1）Pantograph products

（1） PT7203 Pantograph:

	PT7203： Grid voltage: DC 1500 V Pantograph name: Single-arm pantograph Recommended maximum speed: 120 km/h Recommended current value: 1600 A Lift Supply: Spring Tension Pantograph Lift / Air Pressure Drop Pantograph Lift Method: Hook Unlock (Pneumatic/Electromagnetic) Rated operating air pressure: 450 kPa Minimum working air pressure: 350 kPa Static contact force: 80±10 N Maximum working height (without insulator): 2235 mm Slide Material: Metal-impregnated carbon slide Slide plate fixing method: bolt fastening Weight (without insulator): about 170 kg Working ambient temperature: -40°C~+70°C
	

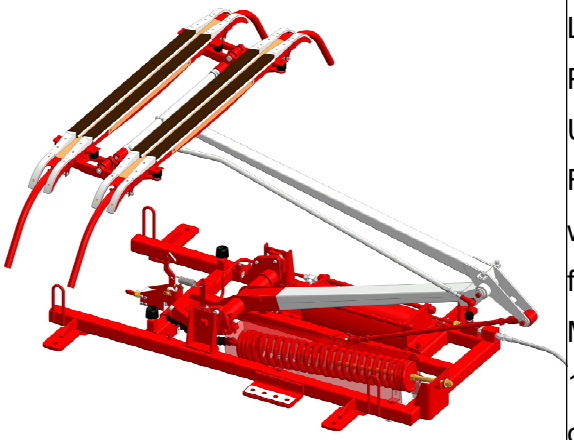
（2） YT7204 Pantograph:

	YT7204: Grid voltage: DC 750 V Pantograph name: Single-arm pantograph recommended maximum speed: 80 km/h Recommended current value: 1600 A Lift supply: spring tension pantograph lifting/electric pantograph lowering pantograph lifting method: electric Normal operating voltage: 24V Static contact force :50±10 N Maximum working height (without insulator): 2290 mm Slide Material: Metal-impregnated carbon slide Slide plate fixing method: bolt fastening Weight (without insulator) : about 170 kg Working ambient temperature: -40°C~+70°C

（3） YT7101 Pantograph:

	YT7101: Grid voltage: AC 25 kV / DC 1500 V Pantograph name: Single-arm pantograph Recommended maximum speed: 200 km/h Recommended current value: 1000 A Lift force supply: spring tension pantograph lifting / air pressure drop pantograph lifting method: pneumatic lock hook unlocking Rated working air pressure: 450 kPa Minimum working air pressure: 350 kPa Static contact force: 70±10 N Maximum working height (without insulator): 1962 mm Slide Material: Metal-impregnated carbon slide Slide plate fixing method: bolt fastening Weight (without insulator): about 150 kg Working ambient temperature: -40°C~+70°C

（4） YT7102 Pantograph:



YT7102：

Grid voltage: DC 1500 V

Pantograph name: Single-arm pantograph

recommended maximum speed: 130 km/h

Recommended current value: 1600 A

Lift Supply: Spring Tension Pantograph Lift / Air Pressure Drop Pantograph Lift Method: Hook Unlock (Pneumatic/Electromagnetic)

Rated operating air pressure: 450 kPa Minimum working air pressure: 350 kPa Static contact force: 80±10 N

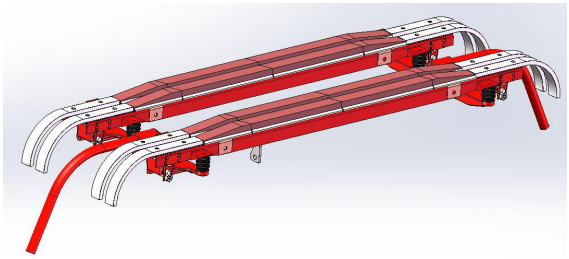
Maximum working height (without insulator): 1935 mm Slide Material: Metal-impregnated carbon slide

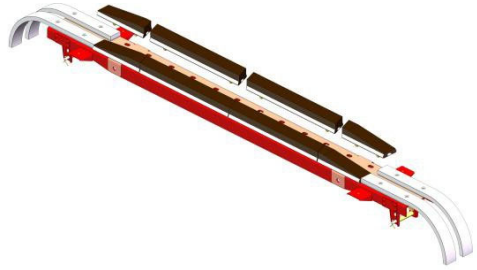
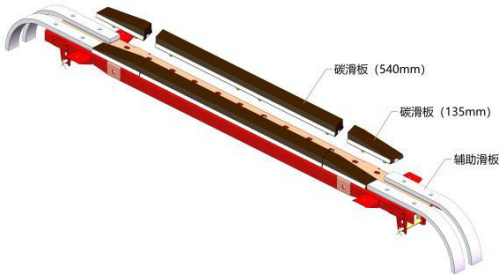
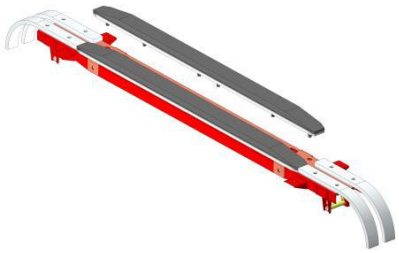
Slide plate fixing method: bolt fastening

Weight (without insulator): about 160 kg

Working ambient temperature: -40°C~+70°C

2. Slide products

1, 7203, 7102 series pantograph slide plates	
	The carbon Slide structure used in this series of pantographs can be selected according to the actual situation of the line: three-section, four-stage, and integral, breaking through the limitations of the integrated carbon Slide structure of conventional subways in China. For the carbon Slide of this structure, if there is a carbon Slide drop in the operation of the vehicle, it can be turned 180 degrees separately to continue to be used, and if there is unilateral eccentricity, it can be Turn the pantograph 180 degrees to continue use.

	Four-section Slide: The structure is 135mm+270mm+270mm+135mm combination, and each carbon slide can be replaced separately, which is easy to maintain and save operating costs.
	Three-section Slide: Three-section structure: The structure is 135mm+540mm+135mm or 270mm+270mm+270mm combined, and each carbon slide can be replaced separately, which is easy to maintain and save operating costs.
	Integral Slide: The structure is 810mm for a single root, and the wire mesh pull-out value is relatively large, and the ADD is required to be used under the automatic lowering pantograph. (ADD airway is selected according to the project).
Note: The above two series of pantograph Slides are interchangeable	
	Integral Slide: The structure is 1050mm single, the wire mesh pull-out value is relatively large, and the ADD automatic lowering pantograph is required to be used under the working conditions, this type is a standard unified Slide. (ADD airway selected according to the project)
2. 7101 series pantograph slide plate	

	Three-stage structure: The structure is 192.5mm+675mm+192.5mm combined, and each carbon slide can be replaced separately, which is easy to maintain and save operating costs
	Monolithic structure: The structure is 1060mm for a single root, and the wire mesh pull-out value is relatively large, and the ADD is required to be used under the automatic lowering of the pantograph.

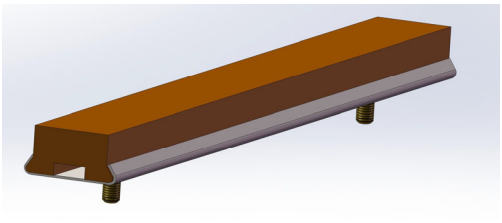
Slide performance parameters

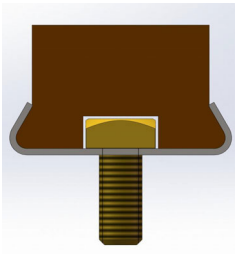
The Name Of The Project	Unit	Technical Requirements	
		Pure Carbon	Immersion Metal Carbon
Bulk density	g/cm3	≤1.8	≤4.0
Flexural strength	MPa	≥30	≥60
compressive strength	MPa	≥40	≥180
Impact toughness	J/cm2	≥0.10	≥0.20
20°C resistivity	μΩ·m	≤40	≤10

In addition to the above Slides, our company is producing pantographs and current collector Slides in various subways in China

Slide construction

1. For our 7203 four-slide plate, when pressed-in, there is no bonding technology and can be stored for a long time;





2. The rest of the Slides are bonded and can be stored for 2 years.

3. Supply performance:

Statement of performance						
NO.	Delivery time	client	Project content	Number of supply columns	Number of pantographs	remark
1	May 2018	Chengdu Changke Xinzhu Rail Transit Equipment Co., Ltd	Chengdu Metro Line 5	52	156	
2	April 2018	CRRC Changchun Rail Coach Co., Ltd	Chengdu Metro Line 5	10	30	
3	December 2018	Chengdu Changke Xinzhu Rail Transit Equipment Co., Ltd	Chengdu Metro Line 8	38	76	
4	November 2018	CRRC Changchun Rail Coach Co., Ltd	Chengdu Metro Line 8	5	10	
5	June 2018	Chengdu CRRC Sifang Rail Vehicle Co., Ltd	Chengdu Metro Line 6	60	180	
6	June 2018	CRRC Chengdu Locomotive and Rolling Stock Co., Ltd	Chengdu Metro Line 6	15	45	
7	June 2019	Chengdu CRRC Sifang Rail Vehicle Co., Ltd	Chengdu Metro Line 11	16	48	
8	April 2019	CRRC Chengdu Locomotive and Rolling Stock Co., Ltd	Chengdu Metro Line 11	17	51	
9	December 2019	Chengdu Changke Xinzhu Rail Transit Equipment Co., Ltd	Dujiangyan M-TR project	18	18	streetcar
10	October 2019	Zhuhai Nanzi Electrical System Engineering Co., Ltd	Chengdu Line 6 engineering inspection cart	1	2	
11	October 201910	Beijing Qifan Lutong Technology Co., Ltd	Chengdu Line 6 pantograph Grid inspection cart	1	1	
12	December 2019	Chengdu CRRC Sifang Rail Vehicle Co., Ltd	Chengdu Line 1 overhaul	17	34	overhaul

13	January 2020	Jiangsu Jinchuang Rail Technology Co., Ltd	Chengdu Line 11 engineering inspection cart	1	1	
14	May 2020	Chengdu Changke Xinzhu Rail Transit Equipment Co., Ltd	Chengdu Line 4 frame repair	27	54	Frame repair
15	September 2020	CRRC Tangshan Locomotive and Rolling Stock Co., Ltd	Taizhou S1 line	31	62	municipality
16	September 2020	China Railway Rail Transit Equipment Co., Ltd	CM160 City Car Project	1	1	municipality
17	February 2021	Chengdu CRRC Sifang Rail Vehicle Co., Ltd	Chengdu Metro Line 2 overhauled 1.2 million kilometers	32	64	overhaul
18	February 2021	Chengdu Changke Xinzhu Rail Transit Equipment Co., Ltd	Chengdu 160KM city car trial production project	1	2	municipality
19	February 2021	CRRC Chengdu Locomotive and Rolling Stock Co., Ltd	Chengdu 160KM city car trial production project	1	1	municipality
20	February 2021	CRRC Changchun Rail Coach Co., Ltd	Tianjin Metro Line 6 and 8	32	64	
21	July 2021	Chongqing CRRC Long Passenger Rail Vehicle Co., Ltd	Chongqing Line 4 Phase 2	36	144	AS models
22	May 2021	Tianjin CRRC Sifang Rail Vehicle Co., Ltd	Tianjin Metro Line 9 Phase 1 and Phase 2 were renewed	38	76	overhaul
23	September 2021	CRRC Nanjing Puzhen Vehicle Co., Ltd	Shaoxing Line 2	1	2	
24	September 2021	Hangzhou CRRC Vehicle Co., Ltd	Shaoxing Line 2	10	20	
25	September 2021	Wenzhou CRRC Sifang Rail Vehicle Co., Ltd	Wenzhou city S2 line	37	74	municipality
26	March 2022	Qingdao Zhonggong Jihua	Special 5G mining vehicle	3	6	Special type of car
27	May 2022	CRRC Chengdu Locomotive and Rolling Stock Co., Ltd	Chengdu Line 19 Phase II	45	90	municipality
28	May 2022	Chengdu Changke Xinzhu Rail Transit Equipment Co., Ltd	Chengdu Line 8 Phase II	11	22	
29	Expected December 2022	CRRC Chengdu Locomotive and Rolling Stock Co., Ltd	Chengdu Line 27	29	58	

30	Expected December 2022	Tianjin CRRC Sifang Rail Vehicle Co., Ltd	Tianjin Jinghai Line	10	20	
31	Expected December 2022	Chengdu Changke Xinzhu Rail Transit Equipment Co., Ltd	Chengdu Line 30	36	72	
32	Expected March 2023	CRRC Chengdu Locomotive and Rolling Stock Co., Ltd	Ziyang line	11	22	
total				643	1506	

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