

Prestressed Sleeper Production Line

Technical Document

14 July 2026





HENAN TIECHUANG RAILWAY EQUIPMENT CO.,LTD

incorporating China Railway Supplies Alliance (CRSA)



Greetings!

We would like to express our heartfelt gratitude for your attention towards one of our products developed by Hebei Electromechanical Manufacturing Co Ltd as a benchmark enterprise in the prefabricated concrete equipment manufacturing sector, we feel honored to share the opportunity to showcase our professional expertise and exceptional services to your esteemed organisation

Our products have been exported to many international markets in the Middle East, Central Asia, Southeast Asia, Africa, South America, including Saudi Arabia, Mexico, Egypt, India, Kazakhstan, the Philippines, Ethiopia, Colombia, Russia and other countries, winning a wide range of international influence and market recognition.

Hebei Xindadi focuses on the research and development and manufacturing of precast concrete production equipment, is committed to creating maximum value for customers, and has served more than 600 customers globally, and has provided a total of more than 1,000 precast concrete component production lines.

We have a team of more than 130 technical engineers, holding nearly 100 patents, through continuous technological progress and cost optimization, to achieve win-win development with customers.

Through Hebei Xindadi production line, we look forward to becoming a long-term, stable and win-win partner of your company. We firmly believe that with our expertise, innovative technology and excellent service we can add strong momentum to your precast concrete production projects

Please find attached a proposal that can be further tailor-made to your specific requirements. We look forward to further discuss the details of our potential collaboration.

Through Hebei Xindadi production line, we look forward to becoming a long-term, stable and win-win partner of your company. We firmly believe that with our expertise, innovative technology and excellent service we can add strong

1. Design basis	1
2. Overview of the Production Line	2
2.1. Process layout diagram	4
2.2. Process Flow Diagram	4
2.3. Material Flow	4
2.4. Technical Parameters	5
2.5. Technical Characteristics	5
3. Production line equipment	6
3.1. Concrete distributor	6
3.2. Vibration Table	8
3.3. Embossing device	10
3.4. Curing system	11
3.5. Turning machine	13
3.6. Demolding platform and demolding roller conveyor	15
3.7. Finished product conveying	17
3.8. Gathering roller conveyor	19
3.9. Gathering Machine	21
3.10. Automatic Tensioning (De-tensioning) Machine	23
3.11. Mold Conveying Roller Track	26
3.12. Split-type transverse transfer trolley	28



Design Basis

- (1) Production efficiency: 600/day,
- (2) Terrain and other conditions: No restrictions :
- (3) Equipment automation level: It doesn't need to be highly automated, considering cost;
- (4) Single project or permanent factory: planned to be permanent
- (5) Sleeper type



2. Overview of the Production Line

The prestressed railway sleeper production line independently developed and manufactured by Hebei Xindadi Electromechanical Manufacturing Co., Ltd. is based on circular automation. By combining the current production status of prestressed railway sleepers in China and abroad, and aiming to improve labor productivity, reduce production costs, stabilize product quality, and simplify production management, the company has absorbed advanced technologies and experiences and is firmly rooted in both domestic and international markets.

The production line mainly includes the concrete pouring system, vibration and embossing system, intelligent curing system, flipping and demolding system, finished product gathering and palletizing system, mold return and conveying system, steel bar placing system, tensioning system, and intelligent control system.

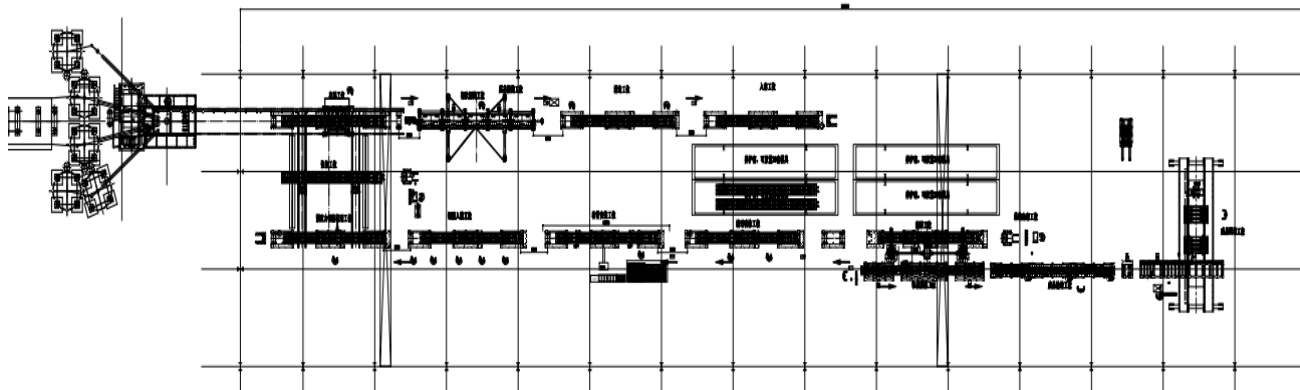
The production process adopts high-precision and high-structural-strength forming molds. The concrete is poured into the molds by a distributor, and after being vibrated on a vibrating table, the molds are hoisted into a curing chamber. Through four stages of steam curing, namely standing, heating up, maintaining a constant temperature, and cooling down, the strength of the components reaches $\geq 75\%$ of the designed strength, and then the production process of turning the molds and demolding is carried out. Meanwhile, the empty molds automatically return along the mold conveyor line. On the mold conveyor line, workstations such as cleaning, spraying release agents, installing mold accessories, inserting steel wires into the molds, tensioning, distributing and vibrating the concrete, curing, turning and demolding, conveying the finished products, cutting the steel wires, and automatically stacking the railway sleepers are set up, forming an information-based, intelligent, and automated circular operation process.



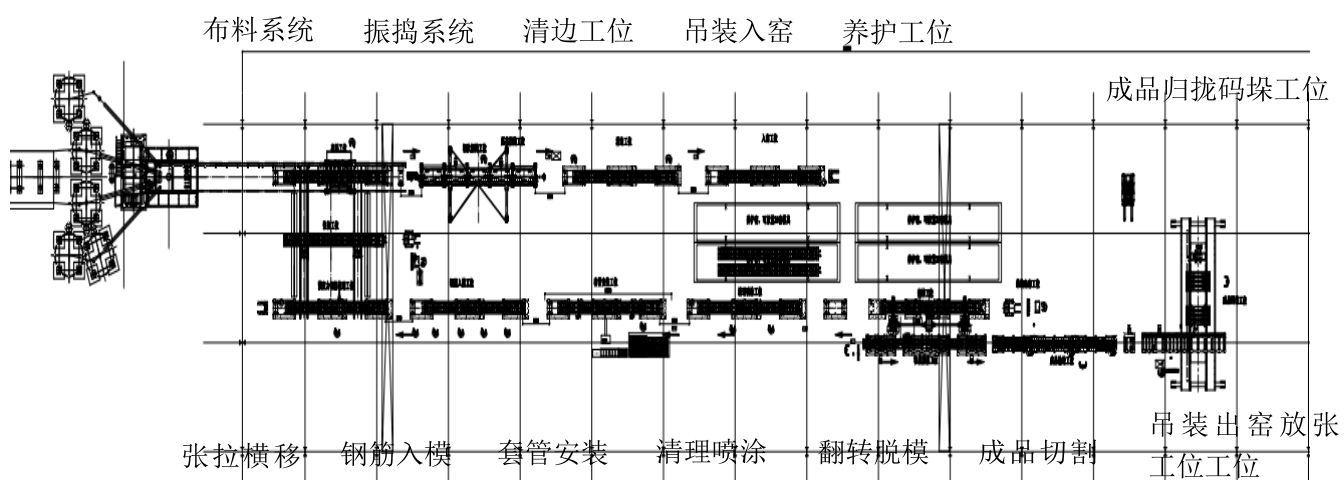
Informatization and intelligent management are the inevitable trends and paths for the development and growth of enterprises. At present, Hebei Xindadi has established a complete and independent management software development team. It has independently developed a remote centralized control system (simulation interface), a production management system, and a Manufacturing Execution System (MES). This has enabled the collection and control of data throughout the entire life cycle of components and production lines, ensuring the unobstructed transmission of production information in all aspects, improving management efficiency, and reducing management costs.



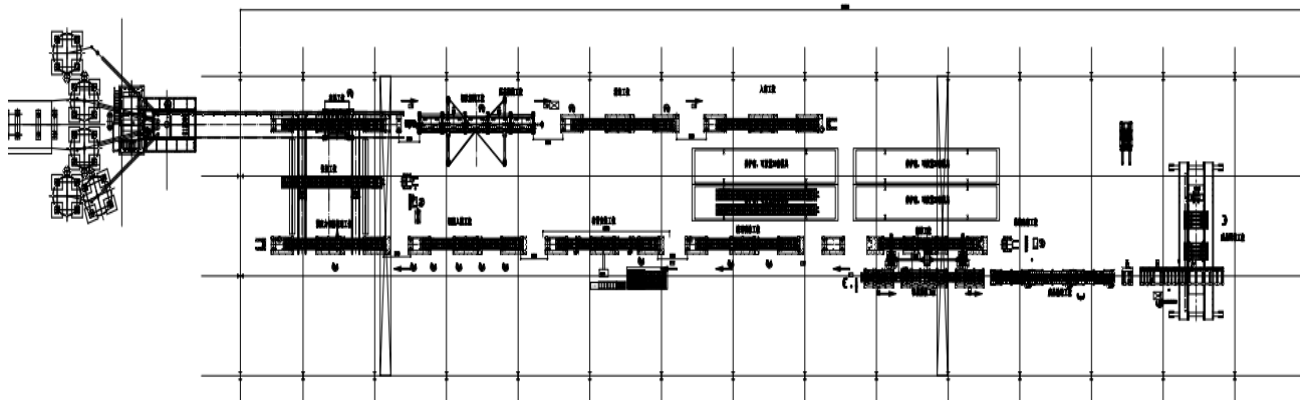
2.1. Process layout diagram



2.2. Process Flow Diagram 生产线工艺流程图



2.3. Material Flow 生产线物料流转



混凝土流转Concrete Circulation



模具输送及转运Mold Conveying and Transferring



轨枕输送及转运Sleeper Conveying and Transferring

因为专注，所以更专业



2.4. Technical Parameters

No. 序号	Production line content 生产线相关内容	Parameter 参数	Notes 备注
1	Production line type 生产线类型	Integrated production line 轨枕生产线	prestressed sleepers 预应力轨枕
2	Power 生产线功率	340kw	
3	Covered area 生产线占地	135m×24m	
4	Mold type 模具形式	2×5 type	10 pcs/mold 10 根轨枕/模
5	Number of curing chamber 养护窑数量	4set	Each curing chamber can hold 20 sets of molds 每座窑可放置 20 套模具
6	Production line cycle time 生产线节拍	6 minutes	
7	Production line capacity 生产线产能	≥600 pcs/shift	两班制每班 3h

2.5. Technical Characteristics 生产线技术特点

- 2.5.1. The spreader adopts a ground-traveling design, which can receive concrete directly from the mixing plant. With a double-port material distribution structure, it can pour concrete into two sleeper molds simultaneously.
- 布料机采用地走型的形式，可直接从拌合站接混凝土，采用双口布料的形式，可同时对两根轨枕模具进行浇筑混凝土。



3. Production Equipment

3.1. Concrete distributor



3.1.1. Function Description

The concrete distributor is a specialized equipment used to distribute concrete into the molds of railway sleepers.

3.1.2. Structural composition

① The concrete placing boom is mainly composed of a traveling mechanism, a concrete placing hopper, a hydraulic door-opening system, a steel structure frame, a cleaning platform, and an electrical control system.

3.1.3. Performance characteristics

① The concrete distributor adopts frequency conversion drive technology, ensuring the smooth and efficient operation of the entire machine.

② The spreader adopts a double-port material distribution design, which can pour concrete into two sleeper molds at the same time.

③ The concrete distributor is equipped with a weighing device to display the volume of concrete in the silo in real time



- ④ An audible and visual alarm device is installed during the operation of the concrete distributor.

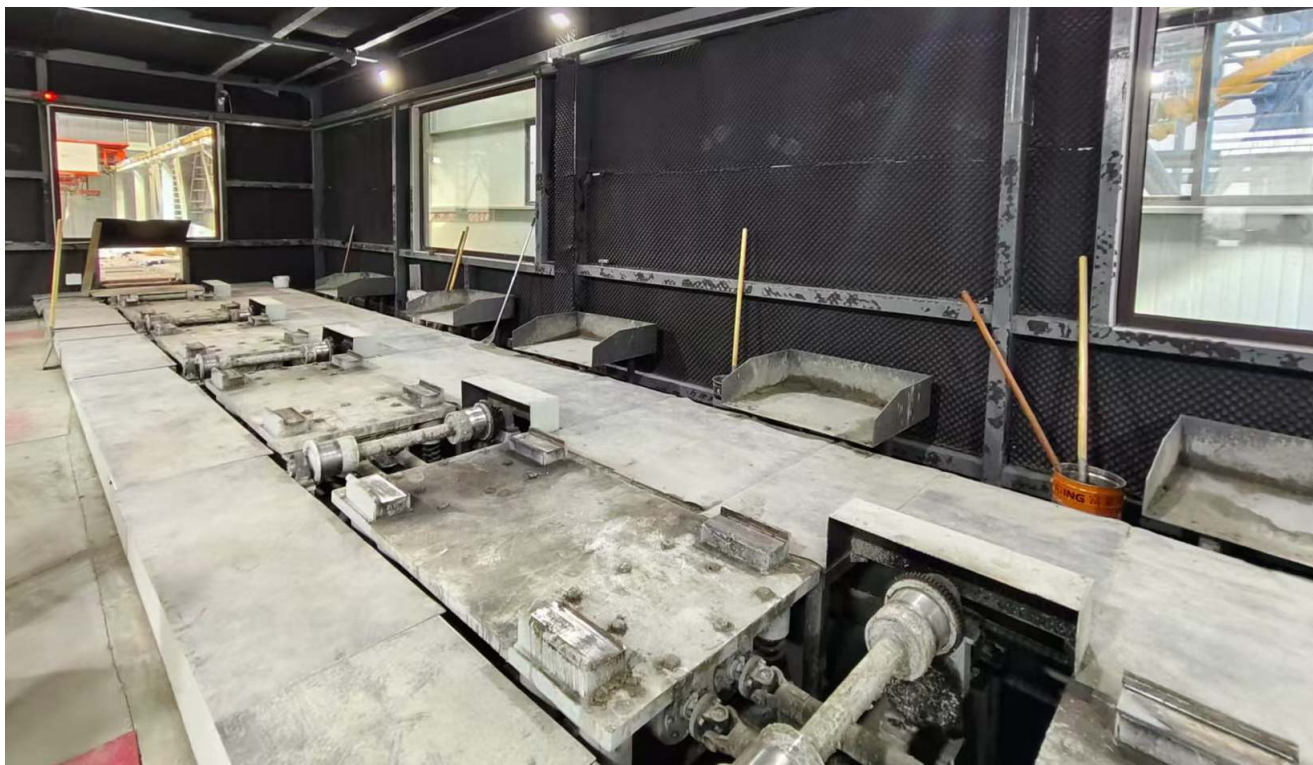
3.1.4. Technical specifications and parameters

Technical parameter table

No. 序号	Name 名称	Unit 单位	Numerical value 数值
1	Bucket capacity 料斗容积	m ³	2
2	Distributing speed 布料速度	m ³ /min	0.5-1.0
3	Running center distance 走行中心距	mm	3050（Adjustable）
4	Running speed 走行速度	m/min	0-30
5	Power consumption index 耗电指标	kw	25



3.2. Vibration Table



3.2.1. Function Description

The vibration table is a specialized piece of equipment used to vibrate and compact the concrete inside the railway sleeper molds.

The molds are conveyed to the vibration station through the lifting roller conveyor. When the molds arrive, the roller conveyor lowers, and the molds are placed on the surface of the vibrating table for vibration compaction. After the vibration process is completed, the lifting roller conveyor rises and transports the molds to the next working station.

3.2.2. Structural composition

The vibration table is composed of a vibration base, a vibrating table stand, a vibration drive mechanism, a lifting roller conveyor, a lifting drive mechanism, a lifting mechanism, a hydraulic system, and an electrical control system.



The vibration table base comprises a table surface, vibrators, shock-absorbing springs, and a base.

The vibration drive mechanism is composed of a universal shaft, a coupling, and a spline shaft. It is driven by an electric motor, which drives the vibrators to rotate.

The lifting roller conveyor is used for conveying the molds and driving the molds to rise and fall.

The connecting rod lifting mechanism is used for the lifting of the roller conveyor.

3.2.3. Performance characteristics

① The vibration table uses variable frequency drive technology, which can adjust the vibration frequency according to the sleeper production process to achieve variable frequency vibration.

② The vibration table adopts an integrated drive structure, so that the exciting force of each vibration table seat remains the same.

③ The lifting roller adopts variable frequency technology, and the conveying mold is stable and reliable.

3.2.4. Technical specifications and parameters

Technical parameter table

No. 序号	Name 名称	Unit 单位	Numerical value 数值
1	Exciting force 激振力	KN	6-12
2	Vibration motor power 振动电机功率	Kw	45
3	Lifting stroke 升降行程	40mm	40
4	Lifting type 升降型式		Swing 摆动
5	Conveying speed 输送速度	0-30m/min	0-30m/min



3.3. Embossing device



3.3.1. Function Description

The embossing device is a specialized piece of equipment used for embossing the patterns on the bottom of railway sleepers.

3.3.2. Structural composition

The embossing device is composed of a steel structure support, a transverse movement and lifting mechanism, a hoisting frame, an embossing plate, and an electrical control system.

3.3.3. Performance characteristics

- ① It is simple and convenient to replace the embossed plate.
- ② The transverse movement and lifting adopt an electric hoist, which has a simple and practical structure.
- ③ It covers 3 workstations horizontally, enabling the advance storage of embossed plates.

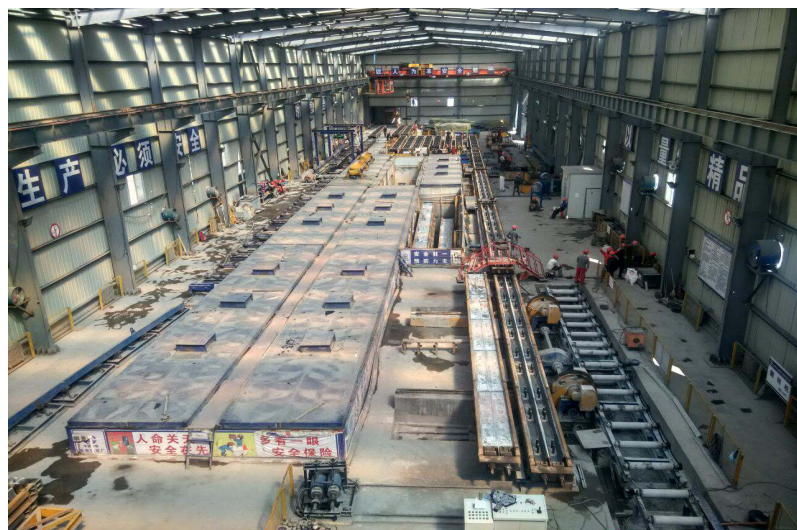


3.3.4. Technical specifications and parameters

Technical parameter table

No. 序号	Name 名称	Unit 单位	Numerical value 数值
1	Lifting capacity 提升能力	t	5
2	Lifting stroke 升降行程	mm	1500
3	Power consumption index 耗电指标	kw	16.5

3.4. Curing system



3.4.1. Function Description

The curing system is a system that uses hot water to generate hot air to accelerate the curing of concrete products and realizes the curing of concrete by adjusting the temperature in the curing kiln to the set temperature.

3.4.2. Structural composition

The curing system is mainly composed of steam pipelines, spray pipelines, ventilation pipelines, control systems, etc. The steam pipelines carry the steam generated by the boiler and transport it into the curing chamber, which is used to increase the curing temperature inside the curing chamber. The spray pipelines carry room-temperature pressurized water, enabling it to atomize inside the curing chamber to ensure that the humidity meets the standards during the sleeper curing process. The



ventilation pipelines are mainly used to discharge the hot steam inside the curing chamber during the cooling process, ensuring the cooling curve. The curing temperature control system can achieve automated control and adjustment.

The temperature and humidity inside the curing chamber can be adjusted according to the production requirements.

The temperature and humidity inside the curing chamber are adjusted to the set reference values through temperature sensors, humidity sensors and the control system.

The concrete curing process adopts the self-developed curing system of Hebei Xindadi. This system has functions such as curing control, parameter setting, report generation, data tracking, and curve viewing. The control part uses the DTM/DTE multi-channel dedicated temperature controller, which has control modes such as manual, PID, and multi-segment PID. It employs the PT100 temperature sensor and the HM1500 high-precision humidity sensor to conduct real-time temperature and humidity detection in the curing area, and the control accuracy can reach 0.5°C. For the upper-level operation part, the Advantech IPC610L industrial computer is equipped with a 21-inch 1080P display screen. It can collect on-site temperature data in real time and complete the display and storage of relevant data.



3.5.1. Function Description

The turning machine is a specialized piece of equipment for turning over and demolding railway sleepers.

The turning machine can turn the railway sleeper molds on the mold conveying roller table by 180° and place them on the finished product demolding roller table. It can also turn the demolded railway sleeper molds by 180° and place them back on the mold conveying roller table.

3.5.2. Structural composition

The turning machine is composed of the turnover support, turnover arms, transmission mechanism, mold clamping mechanism, and electrical control system.

3.5.3. Performance characteristics

- ① The turning machine adopts frequency conversion drive technology, ensuring the stable and efficient operation of the whole machine .
- ② The turning machine is equipped with a mechanical transmission mechanism, which



guarantees the synchronism during the turnover process of the turnover machine.

- ③ The turning machine uses hydraulic locking to ensure the safety of mold locking.
- ④ The turning machine is interconnected with the mold conveying system and the demolding platform, enabling the automatic alignment of the equipment
- ⑤ An audible and visual alarm device is installed during the operation of the turning machine.

3.5.4. Technical Specifications and Parameters

Technical Parameter Table

No.	Name	Unit	Numerical value
1	Turning angle 翻转角度	°	180°
2	Turning speed 翻转速度	r/min	2
3	Center distance between turnover arms 翻转臂中心距	mm	6500 (Adjustable)
4	Power consumption index 耗电指标	kw	34.5



3.6. Demolding platform and demolding roller conveyor



3.6.1. Function Description

The demolding platform is a specialized piece of equipment used for demolding the finished railway sleepers from the sleeper molds that have been turned over by 180°.

The demolding roller conveyor is used to transport the demolded railway sleepers to the station of the finished product conveying roller conveyor.

3.6.2. Structural composition

The demolding platform is composed of a steel structure base, a lifting device, sleeper supports, and a vibration system.

The demolding roller conveyor is composed of a steel structure base, a conveying roller conveyor, a transmission mechanism, and an electrical control system.

3.6.3. Performance characteristics

① The demolding platform adopts vibration demolding to ensure the yield rate of the railway sleepers during demolding.



② The demolding platform is equipped with a sleeper support induction device. After all the railway sleepers in the mold have been demolded, it can transmit a signal to the turnover machine.

③ The demolding roller conveyor adopts frequency conversion drive technology, ensuring the stable and efficient operation of the whole machine.

3.6.4. Technical specifications and parameters

Technical parameter table

No.	Name	Unit	Numerical value
1	Diameter of the roller bar 辊杠直径	mm	180
2	Inner width of the roller conveyor 辊道内宽	mm	905
3	Height of the tread surface 踏面高度	mm	656
4	Conveying speed 输送速度	m/min	0-35
5	Drive power 驱动功率	kw	4.4



3.7. Finished product conveying



3.7.1. Function Description

The finished product conveying roller table is a specialized piece of equipment used for transporting the demolded finished railway sleepers. It transports the demolded railway sleepers to the prestressed steel bar cutting station.

3.7.2. Structural composition

The finished product conveying roller table is composed of an adjusting base, a conveying roller conveyor, a transmission mechanism, and an electrical control system.

3.7.3. 性能特点

① The finished product conveying roller table adopts frequency conversion drive technology, ensuring the stable and efficient operation of the whole machine.



3.7.4. Technical specifications and parameters

Technical parameter table 技术参数表

No. 序号	Name 名称	Unit 单位	Numerical value 数值
1	Diameter of the roller bar 辊杠直径	mm	180
2	Inner width of the roller conveyor 辊道内宽	mm	905
3	Tread surface height 踏面高度	mm	656
4	Conveying speed 输送速度	m/min	0-35
5	Power consumption index 耗电指标	kw	6



3.8. Gathering roller conveyor



3.8.1. Function Description

The gathering roller conveyor is a specialized piece of equipment used to transport the railway sleepers after the prestressed steel bars have been cut to the finished product gathering station.

3.8.2. 结构组成

The gathering roller conveyor is composed of a steel structure base, a conveying roller conveyor, a transmission mechanism, and an electrical control system.

3.8.3. 性能特点

- ① The gathering roller conveyor adopts frequency conversion drive technology, ensuring the stable and efficient operation of the whole machine.
- ② The roller bars of the gathering roller conveyor are thickened to ensure that the finished railway sleepers do not chip off at the corners during the conveying process.



3.8.4. Technical specifications and parameters

Technical parameter table

No.	Name	Unit	Numerical value
1	Diameter of the roller bar 辊杠直径	mm	180
2	Inner width of the roller conveyor 辊道内宽	mm	905
3	Tread surface height 踏面高度	mm	656
4	Conveying speed 输送速度	m/min	0-35
5	Power consumption index 耗电指标	kw	4.4



3.9. Gathering Machine



3.9.1. Function Description

The finished product gathering machine is a specialized piece of equipment used to gather two finished railway sleepers arranged side by side onto a chain conveyor.

3.9.2. Structural composition

The finished product gathering machine is composed of a steel structure support, a traveling mechanism, a lifting mechanism, a sleeper hanger, and an electrical control system.

3.9.3. Performance characteristics

- ① The traveling mechanism of the finished product gathering machine adopts frequency conversion drive technology, ensuring the stable and efficient operation of the whole machine.
- ② The finished product gathering machine can be used for gathering turnout sleepers.



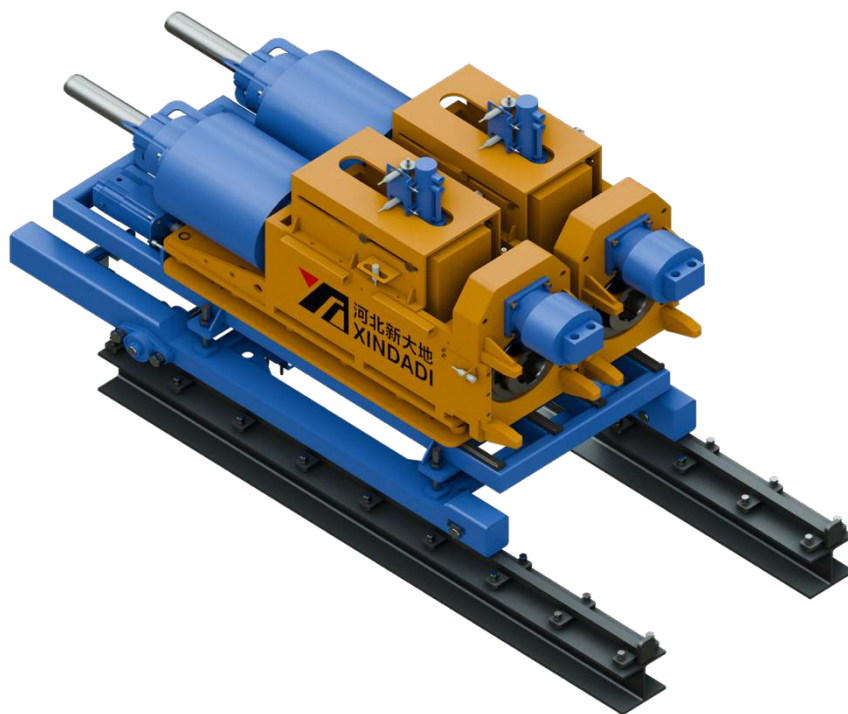
3.9.4. Technical specifications and parameters

Technical parameter table

No.	Name	Unit	Numerical value
1	lifting capacity 提升能力	t	3
2	Lifting stroke 升降行程	mm	100-1500 (Adjustable)
3	Total power 总功率	6kw	
4	Power Consumption Index 耗电指标	kw	9



3.10. Automatic Tensioning (De-tensioning) Machine



3.10.1. Function Description

The automatic tensioning (de-tensioning) machine is a special equipment for the tensioning (de-tensioning) of prestressed steel wires.

3.10.2. Structural composition

The automatic tensioning (de-tensioning) machine is composed of a base, a leveling mechanism, an alignment system, a floating device, a tensioning (de-tensioning) mechanism, and an electrical control system.

The base of the tensioning (de-tensioning) machine is fixed on the concrete floor and is used to support the tensioning (de-tensioning) mechanism.

The leveling mechanism is used to support the railway sleeper mold, jack up the railway sleeper mold to a certain height, and keep the mold horizontal.

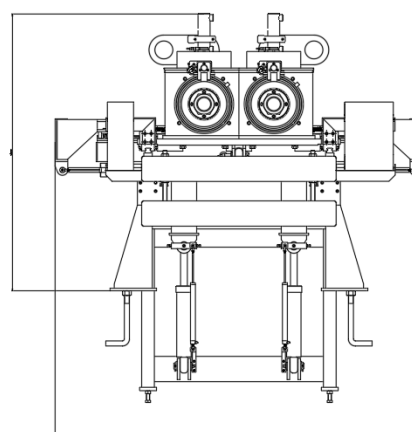
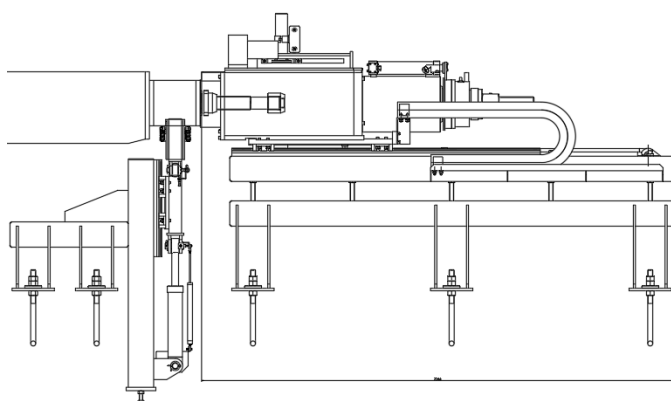


The alignment system includes a transverse and a longitudinal running system, which are used for the precise alignment of the tensioning (de-tensioning) system.

The floating device is installed on the alignment system and is flexibly connected to the tensioning (de-tensioning) system.

The tensioning (de-tensioning) system includes a reaction frame, a hydraulic cylinder, and a sensor.

3.10.3. Technical Specifications and Parameters



Technical Parameter Table

No. 序号	Name 名称	Unit 单位	Numerical value 数值
1	Rated Tensioning Force 额定张拉力	KN	1250
2	Maximum Working Pressure 最大工作压力	MPa	35
3	Maximum Tensioning Stroke 最大张拉行程	mm	200
4	Tensioning Center Distance 张拉中心距	mm	330-365 (Adjustable)
5	Flow Rate 流量	L/min	0.38-2.58



6	Fuel Tank Capacity 油箱容积	L	165
7	Precision of Tensioning Force 张拉力精度		$\leq 3\%$
8	Loading Rate of Tensioning Force 张拉力加载速率		$\leq 30\text{KN/s}$
9	Power Consumption Index 耗电指标	21kw	



3.11. Mold Conveying Roller Track



3.11.1. Function Description

The mold conveying roller track is a special equipment for the circulation of railway sleeper molds on the production line.

3.11.2. Structural composition

The mold conveying roller track is composed of a steel structure base, a conveying roller track, a transmission mechanism, and an electrical control system.

3.11.3. Performance characteristics

- ① The driving of the mold conveying roller track adopts frequency conversion drive technology, ensuring the stable and efficient operation of the whole machine.
- ② A protective cover is installed on the mold conveying roller track to ensure the safety of the conveying process.



3.11.4. Technical Specifications and Parameters

Technical Parameter Table

No. 序号	Name 名称	Unit 单位	Numerical value 数值
1	Roller diameter	mm	180
2	Inner width of the roller track	mm	905
3	Tread height	mm	475
4	Conveying speed	m/min	0-30
5	Power consumption index	kw	4.4



3.12. Split-type transverse transfer trolley



3.12.1. Function Description

The split-type transverse transfer trolley is used for lateral transportation of moulds after steel wires are loaded into the mould cavities.

3.12.2. Structural composition

The split-type transverse transfer trolley consists of travelling system, jacking system and electrical control system.

3.12.3. Performance characteristics

- ① The split-type transverse transfer trolley adopts variable-frequency drive, featuring stable and high-efficiency operation.
- ② It can achieve signal interconnection and communication with the mold conveying system, enabling automatic alignment and operation.

3.12.4. Technical Specifications and Parameters

Technical Parameter Table

No. 序号	Name 名称	Unit 单位	Numerical value 数值
1	Lifting Capacity 举升能力	t	8t×3 (Adjustable)
2	Lifting Stroke 举升行程	mm	80
3	Running Speed 走行速度	m/min	0-20
4	Running Spacing 走行间距	mm	6000 (Adjustable)
5	Stepping Distance 步进距离	mm	2640 (Adjustable)
6	Power Consumption Index 耗电指标	kw	5.5



HENAN TIECHUANG RAILWAY EQUIPMENT CO.,LTD

Contact Person: Mr Sule Guo
Tel/Whatsapp : +86 159 2020 5050
Qiankun Avenue East Road North, Tangyin Country
Henan Province, China