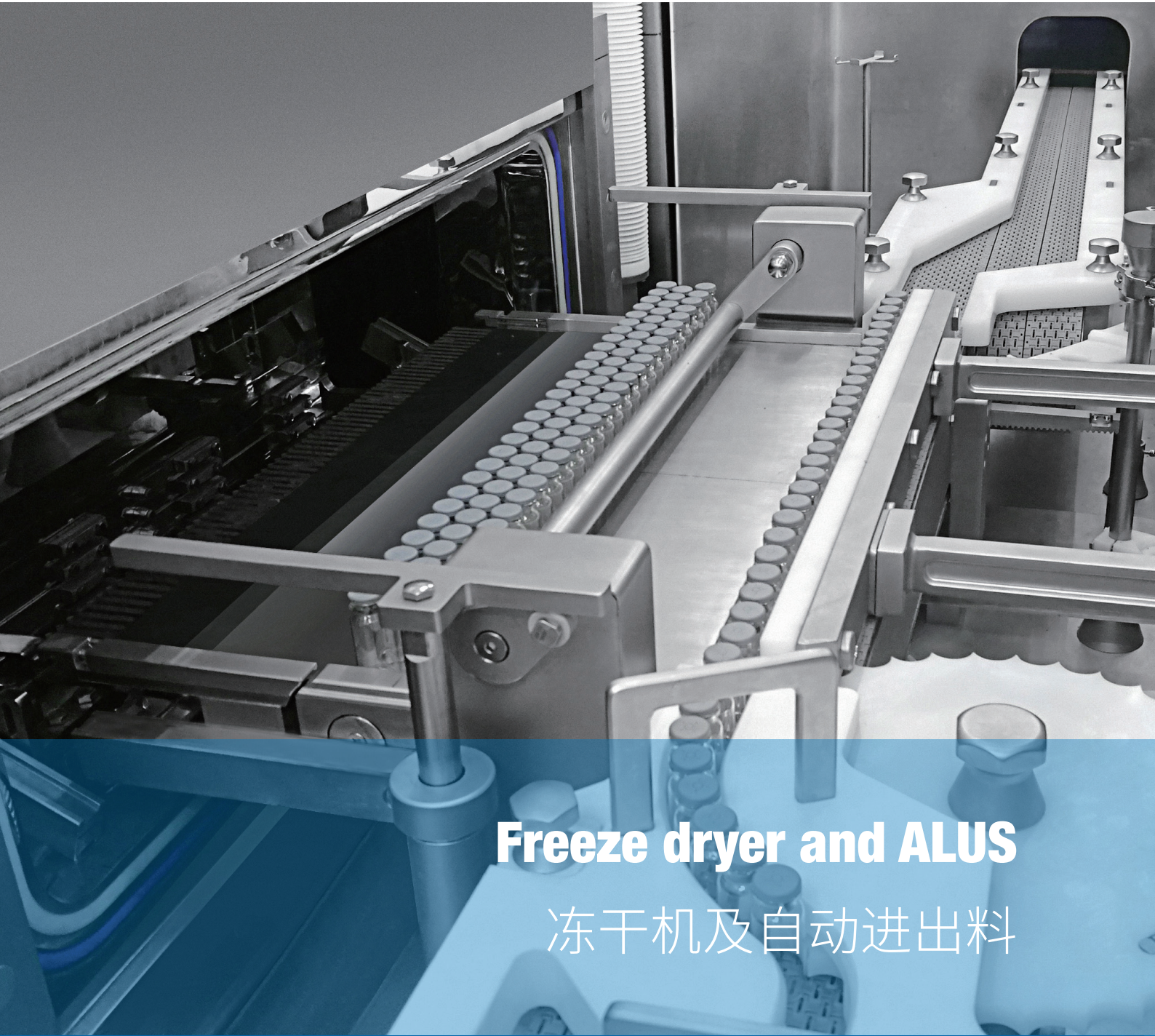




Freeze dryer and ALUS
冻干机及自动进出料

让世界制药工业插上智慧的翅膀

Equip global pharmaceutical manufacturing industry with intelligent wings.





制剂冻干整体解决方案 Preparation freeze-drying integral solution	- 02 -	冻干整体解决方案 Freeze-drying integral solution	- 01 -
原料药冻干整体解决方案 API freeze-drying integral solution	- 03 -		
高附加值食品、化妆品等冻干整体解决方案 Freeze-drying integral solution to high value-added food and cosmetics etc.	- 04 -		
无菌制剂冻干机 Sterile preparation freeze dryer	- 06 -	冻干机 Freeze-dryer	- 05 -
原料药冻干机 API freeze dryer	- 08 -		
洁净冻干机 Clean freeze dryer	- 10 -		
实验室冻干机 Laboratory freeze dryer	- 13 -	自动进出料系统 ALUS	- 16 -
固定式自动进出料系统 RGV ALUS	- 18 -		
移动式自动进出料系统 AGV ALUS	- 20 -		
冻干工艺服务 Freeze-drying process services			- 21 -





楚天科技股份有限公司成立于 2000 年，是中国医药装备行业的领军企业，也是世界医药装备行业的知名企业之一。主营业务系医药装备及其整体技术解决方案，并率先推动智慧医药工厂的研究与开发。公司系中国 A 股上市公司。旗下拥有德国 ROMACO 集团、楚天华通、四川医药设计研究院、楚天飞云、楚天源创、楚天微球、楚天 SUT、楚天思为康、楚天华兴、楚天长兴、楚天科仪、楚天净邦、楚天智能机器人等多家全资或控股子公司，全球员工总数 8000 余人，总资产 110 亿元。

公司已有长沙和德国两大运营总部，建有长沙中央技术研究院、欧洲技术研究院和四川医药设计研究院三大研发机构。设有国家级企业技术中心，国家级创新基地，博士后科研工作站，院士专家工作站等多个技术与创新平台。截止 2023 年 7 月 31 日，共提出 5083 项中国专利申请，授权专利 4093 项，有效专利 3020 项。另提出 50 件 PCT 国际专利申请，在美国、俄罗斯、印度、韩国、德国、印尼、欧洲等多国获得 24 项专利授权。牵头制订了本系统国家行业产品技术标准 20 多项。产品已出口到亚洲、欧洲、南美洲等近 60 个国家和地区，国际市场占有率正逐年快速提升。

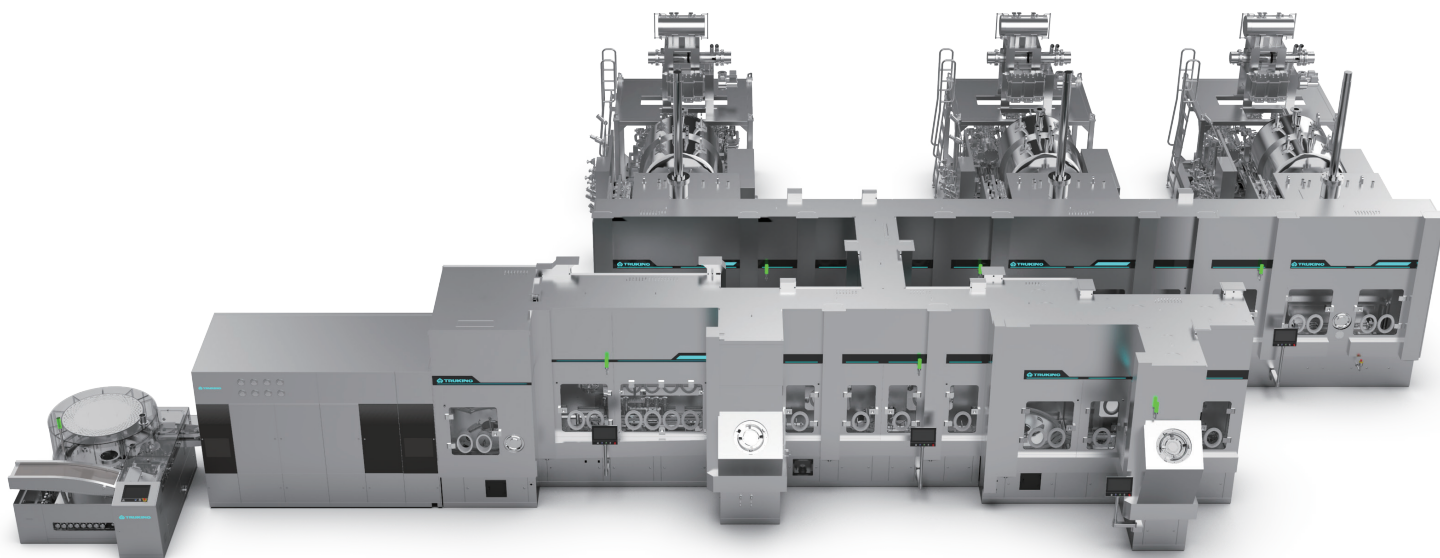
Founded in 2000, Truking Technology Limited has become a leading pharmaceutical equipment company in China and renowned around the world. It specializes in pharmaceutical equipment and integrated solutions, and takes the initiative to push forward the R&D of smart pharmaceutical factory. It is a listed A-share company with multiple wholly-owned or controlling subsidiaries, such as Germany based Romaco Group, Truking Watertown, Sichuan Pharmaceutical Design Institute, Truking Feiyun, Truking Ingenuity Biotechnology, Truking Microspheres, Truking SUT, Truking Siweikang, Truking Wachine, Truking Changxing, Truking Scientific Instrument, Truking Joband, Truking Intelligent Robot, etc. Truking has over 8000 employees around the globe, with a total asset of over 11 billion RMB.

TRUKING has two operational headquarters respectively in Changsha, China and Germany; three big research institutes, namely Changsha Central Technology Research Institute, Europe Technology Research Institute, and Sichuan Pharmaceutical Design Institute. It has established many platforms for technology innovation, such as National Enterprise Technology Center, National Innovation Center, Post-Doctoral Research Center, and Academician Expert Workstation. By July 31, 2023, it has filed 5,083 patent applications in China and 50 PCT international patent applications. It also has 4,093 authorized patents and 3020 valid patents in China, and 24 patents have been authorized in the United States, Russia, India, Korea, Germany, Indonesia, Europe and other countries. So far, Truking has taken the lead in the formulation of more than 20 national technical standards. With its products being exported to nearly 60 countries and regions such as Asia, Europe, and South America, Truking's international market share is rapidly increasing year by year.

冻干整体解决方案 Freeze-drying integral solution

楚天科技致力于冻干整体解决方案，专注于无菌制剂、原料药冻干领域。楚天科技凭借专业设计能力及制造能力，为客户提供冻干机单机及整体方案，涉及行业有化学原料药、抗生素类原料、无菌制剂等，特别在生物制药行业，如血液制品、疫苗、抗体药物等。楚天冻干机单机及整体方案服务于国内外各领域的制药企业及高附加值食品、化妆品企业，已出口至亚洲、欧美、南美洲、非洲等 40 多个国家及地区，成为全球冻干机及冻干整体解决方案的主要供应商。

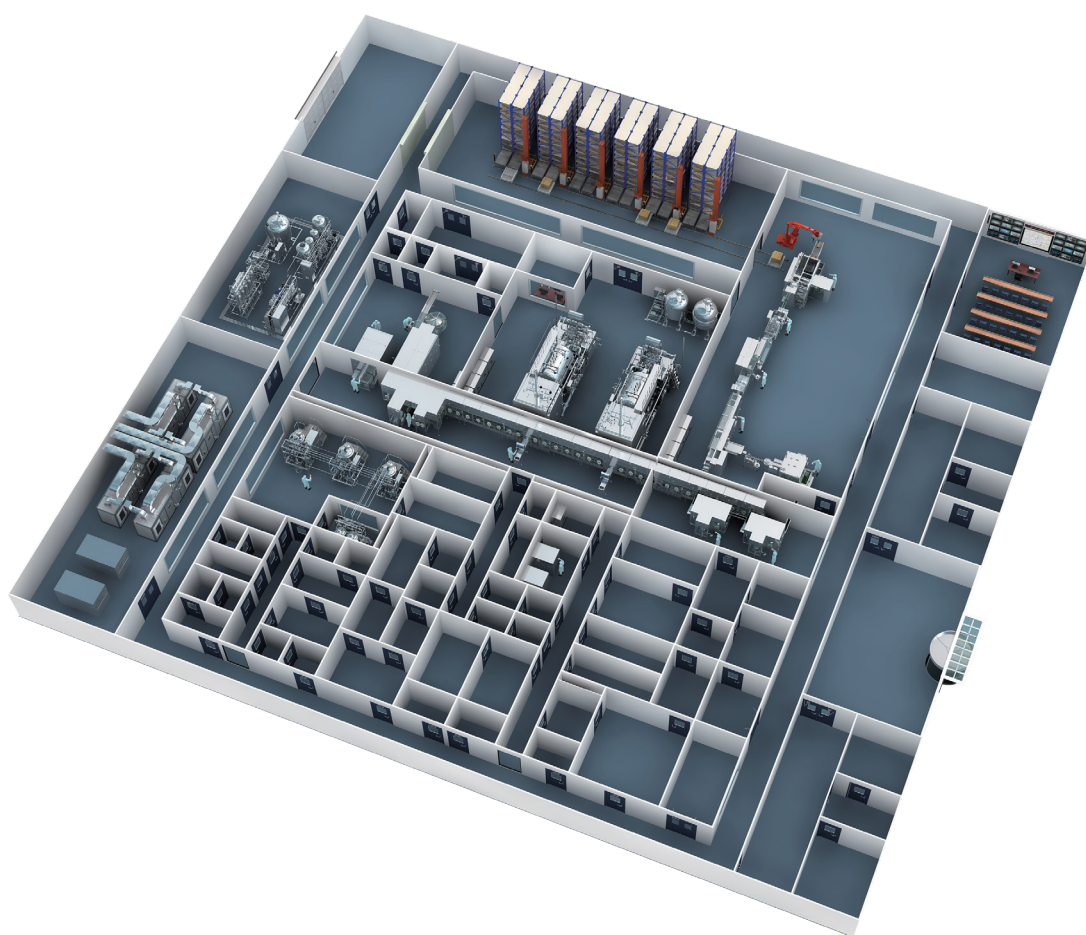
TruKing Technology is committed to freeze-drying integral solution, and specializes in sterile preparation and API freeze drying. Thanks to its professional design and manufacturing capacity, TruKing Technology offers customers single and integral solutions to freeze dryer. This involves chemical APIs, antibiotics raw materials and sterile preparation etc., especially biopharmaceutical industry, such as blood products, vaccine and antibody drugs. The single and integral solutions of TruKing's freeze dryer serves pharmaceutical companies at home and abroad in various areas and companies of high value-added food and cosmetics. They have been exported to 40 countries and territories in Asia, Europe, South America and Africa, making TruKing a major supplier in global integral solutions to freeze dryer and freeze drying.



▶ 制剂冻干整体解决方案 Preparation freeze-drying integral solution

依据客户产量和厂房布局需求，灵活设计冻干机结构，并以满足 GMP 为基础，注重最优布局以降低能耗。提供固定式及移动式（RGV、AGV）自动进出料系统，可实现固定式进出料、移动式进出料、固定式进料与移动式出料组合、前端固定式进料后端固定式出料等灵活的进出料方式，能满足客户不同需求。

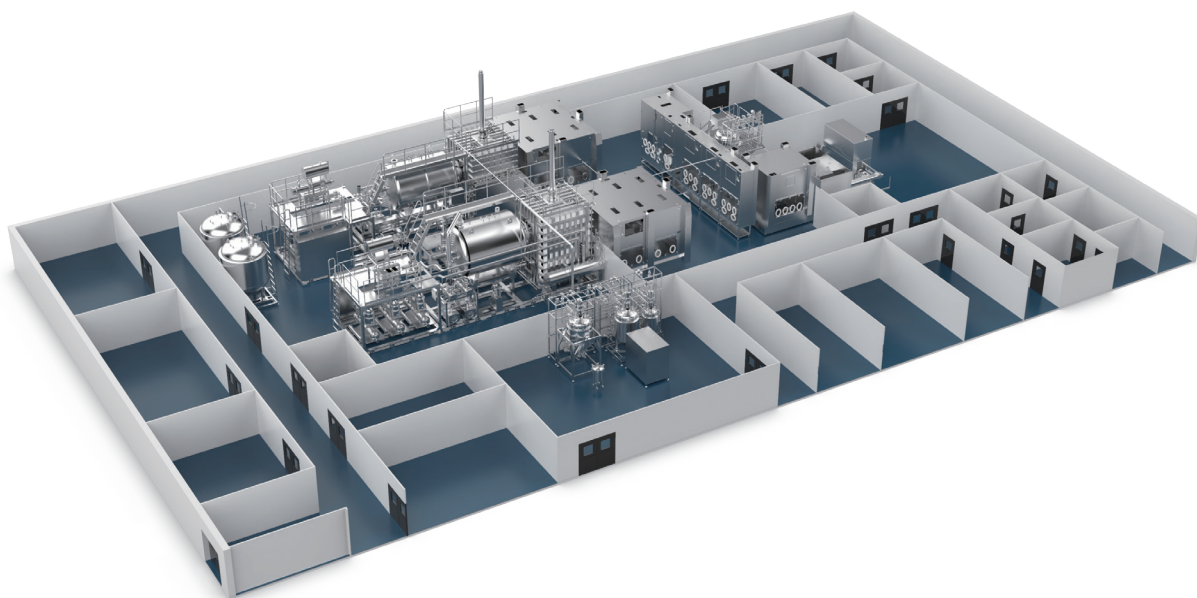
The freeze-drying structure is flexibly designed to meet the demand for customer production capacity and plant layout; it also meets the GMP as the basis and pays attention to optimizing layout to reduce energy consumption. RGV ALUS and AGV ALUS are provided to achieve RGV loading and unloading, AGV loading and unloading, the combination of RGV loading and AGV unloading, front-end RGV loading and rear-end RGV unloading among other flexible loading and unloading manners to meet different demands of customers.



原料药冻干整体解决方案 API freeze-drying integral solution

根据药品特性，提供多种原料药冻干整体解决方案：盘式冻干整体解决方案、翻板式冻干整体解决方案、框套膜式冻干整体解决方案、膜盒式冻干整体解决方案。配置自动等高进出料板层结构，可以实现全密闭等高进料及开小门等高出料，方便与隔离器对接，工艺无菌保障能力强，减少药品受环境影响。翻板式冻干整体解决方案更适用于有刺激性原液产品及冻干后容易吸潮的药品。

Various types of API freeze-drying integral solutions are provided based on features of the drugs: disc-type freeze-drying integral solution, reverse plate-type freeze-drying integral solution, frame and sheath type freeze-drying integral solution, bellows-type freeze-drying integral solution. Automatic equal-height loading and unloading shelf structure is configured to achieve fully closed equal-height loading and small-door opening equal-height unloading, convenient to connect with isolator. It has strong process sterile guarantee capacity and minimizes the effects of environment on the drugs. Reverse plate-type freeze-drying integral solution is more suitable for raw liquid products containing stimulus and drugs absorbing moisture after freeze drying.



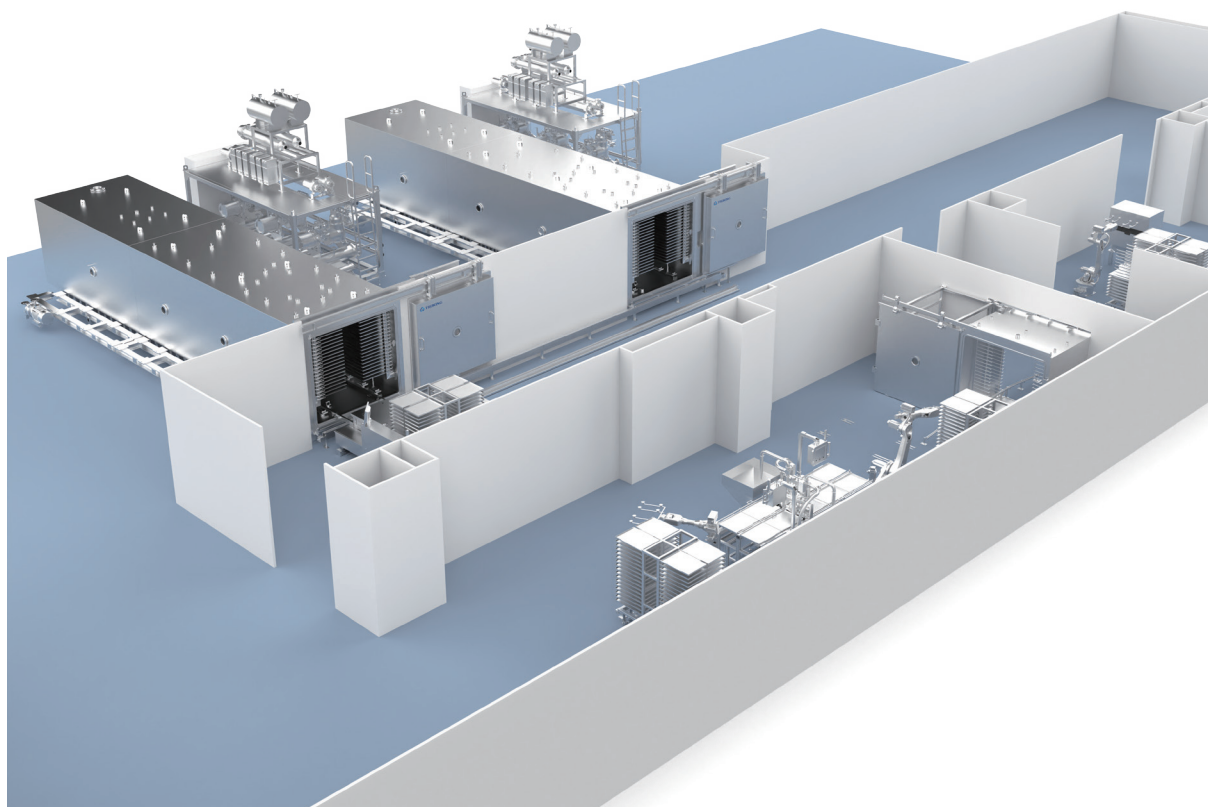
➤ 高附加值食品、化妆品等冻干整体解决方案 Freeze-drying integral solution to high value-added food and cosmetics etc.

在医美、中药、食品、益生菌等领域，楚天积累了丰富的项目经验，研发了国内第一台液氮造粒机及适用于冻干珠冻干的整体解决方案。冻干机采用先进真空钎焊板层，板层封边采用全球第一个智能焊接柔性自动化生产线，实现全过程质量可追溯，板层温度均一性好，板层通过正压测试及氦质谱负压测试，最大限度降低风险，确保设备全生命周期不泄漏。

楚天为提高整机质量，冻干机的部件制造定制了专用加工设备，如为了箱体、冷阱密封性能及达到进出料系统制造精度，定制了大型专用立式数控镗铣床；对冻干机压紧法兰、大门、进出料小门平面及密封结构进行焊接后的整体加工，确保设备性能。

Truking has accumulated rich project experience in cosmetic medicine, TCM, food, probiotics etc.. It developed the first domestic liquid nitrogen granulator and integral solution to freeze-drying of freeze-drying beads. The freeze dryer adopts the advanced vacuum brazing shelf, the shelf edge is processed by the first global soft welding automatic production line, achieving the traceability of the quality throughout the process; uniformity of the shelf temperature is good; the shelf passes positive pressure test and Helium mass spectrometry negative pressure test to minimize risks and ensure that the full life cycle of the machine will not be leaked.

In order to improve the whole machine quality, specialized processing equipment has been customized for parts manufacturing of freeze dryer. For example, to make the sealing performance of the tank and cold trap to reach the precision of manufacturing ALUS, a large specialized vertical CNC boring and milling machine is customized, the whole processing of the freeze dryer pressure plug flange, sealing door, loading and unloading sealing door plane and sealing structure after welding to ensure device performance.



冻干机 Freeze-dryer

真空冷冻干燥机主要用于生物制品、化学制品、瓶冻（冻干注射剂）、盘冻（原料药）、天然药物、热敏性药物、抗菌素、口服冻干片剂、医美、化妆品、食品等领域，实现冻干过程，达到干燥目的。楚天真空冷冻干燥机有 LYOTK、LAB -LYOTK、API- LYOTK 和 CL- LYOTK 四个系列。

Vacuum freeze-dryers are mainly used in biological products, chemical products, bottle freeze-drying (freeze-dried injections), plate freeze-drying (API), natural drugs, thermosensitive drugs, antibiotics, oral freeze-dried tablets, medical cosmetics, cosmetics, food, etc., to achieve the freeze-drying process and the drying purpose. Truking vacuum freeze-dryer has four series, i.e. LYOTK, LAB -LYOTK, API- LYOTK and CL- LYOTK.

产品系列 Product series	主要用途 Main application	板层面积 Shelf area	最大凝冰量 Maximum ice freezing amount	冻干批次装量 Freeze-drying batch filling volume
LYOTK	中试冻干生产及大规模工业化无菌制剂冻干 Pilot test freeze-drying production and large-scale industrial sterile preparation freeze drying	1m ² -45m ²	20Kg - 800Kg	瓶径 22mm 西林瓶 2220 -101250 支 瓶径 16mm 西林瓶 4100 - 193000 支 Bottle diameter 22mm vial 2220 -101250 Bottle diameter 16mm vial 4100 - 193000
LAB-LYOTK	科研实验室进行冻干实验 Freeze-drying experiment in research lab	0. 2m ² - 1m ²	4Kg - 20Kg	瓶径 22mm 西林瓶 570 -2280 支 瓶径 16mm 西林瓶 1112 -4456 支 Bottle diameter 22mm vial 570 -2280 Bottle diameter 16mm vial 1112 -4456
API- LYOTK	中试冻干生产及大规模工业化无菌 / 非无菌原料药冻干 Pilot test freeze-drying production and large-scale industrial sterile/non-sterile API freeze drying	5m ² -40m ²	100Kg - 800Kg	冻干原液 75-800L Freeze-drying raw liquid
CL- LYOTK	中试冻干生产及大规模工业化非无菌物料冻干 Pilot test production and large-scale industrial non-sterile raw material freeze drying	3m ² -50m ²	40Kg - 1000Kg	盘冻干原液 30-1000L 瓶径 16mm 西林瓶 12000 - 220000 支 Tray freeze drying raw liquid 30-1000L Bottle diameter 16mm vial 12000 - 220000

» 无菌制剂冻干机 Sterile preparation freeze dryer



主要用途 / Main Application

用于制备各种无菌制剂产品，包括化学药品、血液制品、疫苗、抗体等。通过冻干过程，将这些液体产品转化为固体形式，提高其稳定性和延长保质期，方便使用、分发和储存。

Used to produce sterile preparation products, including chemical medicine, blood products, vaccine and antibody etc.. Through the freeze drying process, it transforms the liquid products into solid forms to improve its stability and prolong its service life and make it convenient for use, distribution and storage.



性能优势 / Performance Advantages

- ◉ 温度控制精确：使用先进的温度控制系统，能够提供精确的温度设置和调节。
 - ◉ 真空控制精准：在脱水过程中，通过精确控制真空度，可以加速水分的升华和去除，确保脱水效果良好。合适的真空控制还有助于防止产品的氧化反应和重吸附。
 - ◉ 优化的冷冻系统：配备优化的冷冻系统，采用先进的制冷技术和控制手段，能够快速冷冻物料并形成均匀的冰晶结构，保持产品的结构完整性和质量稳定性。
 - ◉ 灵活的控制系统：可实现多种参数的实时监测和调节，包括温度、真空度、压力、加热速率等，保证冻干效果和产品质量。
- + Precise temperature control: use advanced temperature control system enabling precise temperature setting and adjustment.
 - + Precise vacuum control: during dehydration, precise vacuum control can accelerate the sublimation and removal of moisture to ensure good dehydration effects. Proper vacuum control is conducive to prevent oxidation reaction and re-adsorption of the products.
 - + Optimized freezing system: equipped with optimized freezing system, it adopts advanced refrigeration technologies and control means and is able to quickly freeze materials and form uniform ice crystal structure to keep product structure integrated and the quality stable.
 - + Flexible control system: it can realize real-time monitoring and regulation of multiple parameters, including temperature, vacuum degree, pressure, heating rate etc., to ensure optimal freeze-drying effects and product quality.

- ◎ 高效的界面：具有图形化显示、实时数据追踪和操作记录等功能，提供便利性和效率性的同时，也提供了数据分析和质量管理的基础。

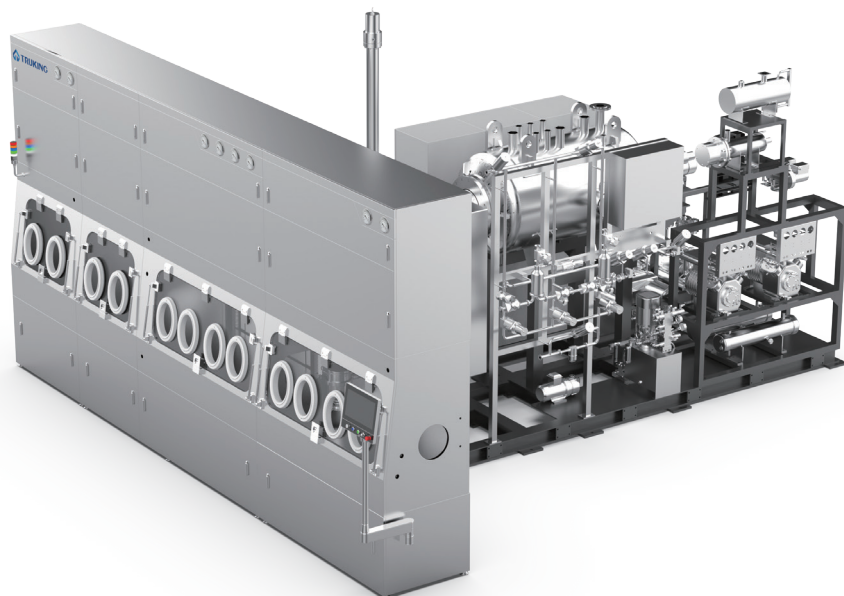
- + Efficient user interface: it has functions of image display, real-time data trace and operation recording. This offers convenience and efficiency, as well as the basis for data analysis and quality management.



技术参数 / Product Parameters

机型 Model		LYOTK 1	LYOTK 3	LYOTK 5	LYOTK 7	LYOTK 10	LYOTK 15	LYOTK 20	LYOTK 25	LYOTK 30	LYOTK 35	LYOTK 40	LYOTK 45
板层面积（m ² ） Shelf area (m ²)		1	3	5	7	10	15	20	25	30	35	40	45
有效板层面积（m ² ） Effective shelf area (m ²)		0.97	2.77	4.94	6.59	9.88	14.52	19.35	22.87	28.45	34.43	39.73	43.34
最大装瓶数 Maximum number of bottling	个 /Φ 16mm	4100	12000	21696	29154	43731	64500	85800	101400	126412	153153	176715	193000
	个 /Φ 18mm	3332	9550	17100	22800	34200	50540	68035	80405	100347	120848	139440	153135
	个 /Φ 22mm	2220	6345	11562	15252	22878	33790	45562	53846	66690	80730	93150	101250
板层尺寸 Shelf dimension	宽 (mm) Width(mm)	455	648	948	948	948	948	1248	1248	1548	1548	1548	1548
	深 (mm) Depth(mm)	615	970	970	1270	1270	1270	1270	1524	1524	1830	1830	2000
板层数量（个） Shelf number		4+1	5+1	6+1	7+1	9+1	10+1	11+1	13+1	13+1	13+1	15+1	15+1
板层间距（mm） Shelf gap (mm)		120（根据客户需要，间距不同时板层面积将可能有所改变） 120 (according to customer needs, shelf area may change when the gap is different)											
板层温度范围 Temperature range of shelf		（- 55℃ ~+80℃）											
冷凝器极限温度 Condenser extreme temperature		≤ -75℃											
极限真空（mbar） Extreme vacuum (mbar)		0.005											
压缩空气 Compressed air		>6BarG											
冷凝器捕水量（Kg） Water-catching amount of condenser (Kg)		20	60	100	160	200	240	400	500	600	700	800	900
外形尺寸 Dimensions		根据平面图纸 According to plan											
设备重量（Kg） Weight of the equipment (Kg)		3900	5400	10000	12000	18000	21000	23000	26000	30000	32000	34000	36000
装机功率（Kw） Installed power (Kw)		15	35	43	55	72	103	141	151	182	212	222	260
冷却水量（m ³ /h） Cooling water amount (m ³ /h)		5	7	11	16	18	25	37	37	42	50	50	72
纯蒸汽耗量（Kg/h） Pure steam consumption (Kg/h)		60	90	140	190	240	300	380	430	510	570	600	650
纯水 / 注射水量（m ³ /h） Pure water/injection water amount (m ³ /h)		12	12	12	14	14	15	16	16	18	20	22	24

原料药冻干机 API freeze dryer



主要用途 / Main Application

主要用于制备冻干的原料药产品，能够保护原料药的活性、提高储存和运输稳定性、增加可溶性和可制备性，从而为药物制造商提供高效、可靠的原料药制备工艺。

Mainly used for making freeze-drying APIs, it can protect activity of the API, improve storage and transport stability, increase solubility and preparation, thus offering drug-makers efficient and reliable API-making process.



性能优势 / Performance Advantages

- 自主创新结构：采用四周围边板层设计，等高自动定量灌装，开小门形式的等高自动出料方案，保证进料和出料过程均在无菌环境下进行，减少人为交叉污染风险，减少成品与湿空气接触时间。
- 高效的脱水能力：通过施加适当的真空和控制温度，将原料药中的溶剂从冻结状态直接转化为气态，实现快速脱水，保持原料药的活性成分。
- 灵活的控制系统：可实现多种参数的实时监测和调节，包括温度、真空度、加热速率等，保证冻干效果和产品质量。

- + Self-innovation structure: it adopts four-surrounding shelf design, automatic filling of equal height in a fixed amount, automatic unloading scheme of equal height in the form of opening the sealing door. This ensures loading and unloading in sterile environment, reduces human-induced cross contamination and reduces contact time of finished product and wet air.
- + Efficient dehydration capacity: by applying appropriate vacuum and controlling temperature, it transforms directly the solvent in the API from the frozen state to the air state, achieves fast dehydration and keep the activity of the API.
- + Flexible control system: it realizes real-time monitoring and adjustment of parameters, including temperature, vacuum degree, heating rate, etc., to ensure freeze-drying effect and product quality.

- ◎ 数据记录和追踪功能：监测和控制冻干过程中的关键参数变化，为质量分析和过程优化提供数据支持，符合药品监管的合规性要求。

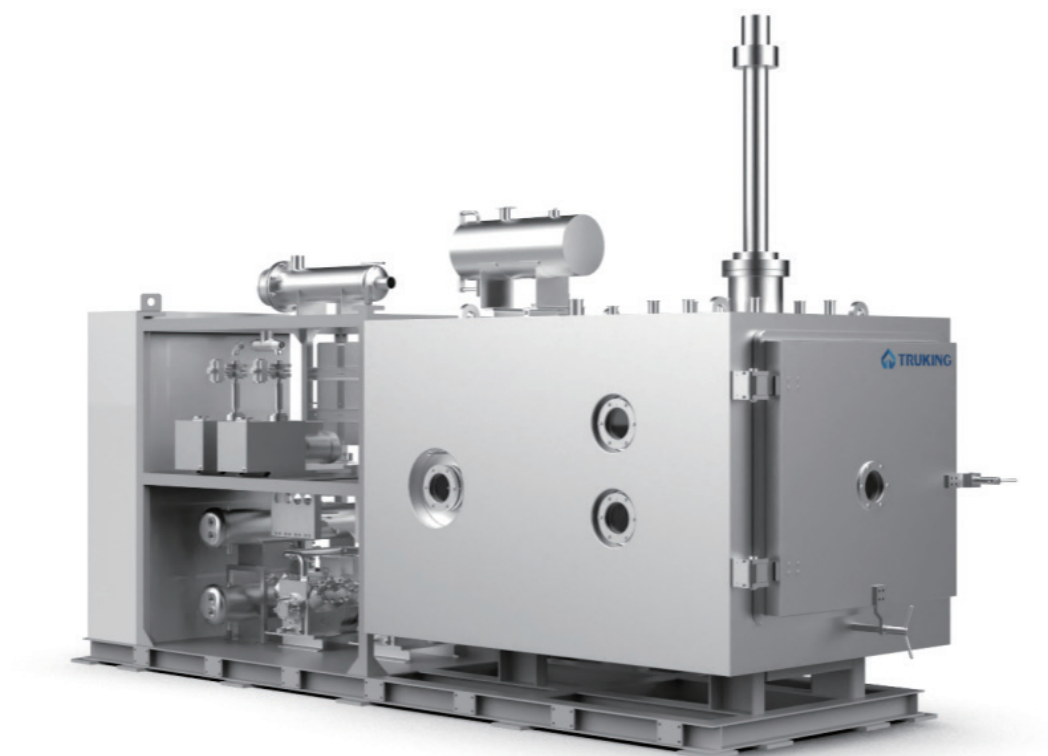
- + Data recording and traceability: it monitors and controls changes in key parameters during lyophilization, offer data support for quality analysis and process optimization to meet regulatory compliance requirements.



技术参数 / Product Parameters

机型 Model		LYOTK 5	LYOTK10	LYOTK15	LYOTK 20	LYOTK 25	LYOTK 30	LYOTK 40
板层面积 (m ²) Shelf area (m ²)		5	10	15	20	25	30	40
有效板层面积 (m ²) Effective shelf area (m ²)		5.5	11.1	15.8	20.3	25.1	30.1	40.1
药液装量 (L) Liquid product filling volume (L)		83	166	237	305	376	451	602
板层尺寸 Shelf dimension	宽 (mm) Width(mm)	948	1248	1548	1548	1548	1548	1548
	深 (mm) Depth(mm)	970	1270	1460	1460	1620	1620	1620
板层数量 (个) Shelf number		6	7	7	9	10	12	16
围边高度 (mm) Surrounding edge height (mm)		30						
板层温度范围 Temperature range of shelf		-55°C ~+80°C						
冷凝器极限温度 Condenser extreme temperature		≤ -75°C						
极限真空 (mbar) Extreme vacuum (mbar)		0.005						
压缩空气 Compressed air		>6BarG						
冷凝器捕水量 (Kg) Condenser water-catching amount (Kg)		100	200	300	400	500	600	800
外形尺寸 Dimensions		根据平面图纸 According to plan						
设备重量 (Kg) Weight of the equipment (Kg)		10000	18000	21000	23000	26000	30000	34000
装机功率 (Kw) Installed power (Kw)		43	72	103	141	151	182	222
冷却水量 (m ³ /h) Cooling water amount (m ³ /h)		11	18	25	37	37	42	50
纯蒸汽耗量 (Kg/h) Pure steam consumption(Kg/h)		100	210	260	300	320	380	450
纯水 / 注射水量 (m ³ /h) Pure water/injection water amount (m ³ /h)		12	14	15	16	16	18	20

▶▶ 洁净冻干机 Clean freeze dryer



主要用途 / Main Application

- ◉ 食品加工：用于冻干各种食品，例如咖啡、水果、蔬菜、奶制品等，保持食品营养成分、口感和风味，同时延长食品的保质期。
 - ◉ 草药和中药制备：可应用于草药和中药的制备过程，有助于保留草药和中药的活性成分，便于保存和使用。
 - ◉ 生物制品和生物样品：可用于冻干血浆、细胞和组织样本等，确保生物制品的长期保存和稳定性。
- + Food processing: it is used for freeze-drying food, such as coffee, fruits, vegetables, dairy products, etc., to maintain the nutrients, taste and flavor of food while extending the shelf life.
 - + Herbal and TCM preparation: it can be applied to the preparation process of herbal medicine and TCM; this helps keep the activity of the herbal medicine and TCM and makes them convenient for storage and use.
 - + Biological products and samples: it can be used for freeze drying plasma, cell and tissue samples etc., ensure the long-term preservation of biological products and stability.

- ◉ 化妆品和个人护理产品：可用于制备化妆品和个人护理产品，如面膜、护肤品、护发产品等，可提高产品的稳定性、延长保质期，并方便携带和使用。
 - ◉ 物理学和化学实验：可用于冻干实验样品、溶液和反应物，通过冻干技术，这些产品可以得到更好的保护、更长的保存期限，保持其重要特性和性能。
- + Cosmetics and individual care products: it can be used for preparing cosmetics and personal care products, such as facial masks, skin care products, hair care etc., to improve stability and prolong shelf life of the product and make them convenient to bring and use.
- + Physical and chemical experiment: it can be used for freeze-drying experiment samples, solution and reactants. Freeze-drying technology provides these products better protection, longer shelf life, and maintains their important features and performance.



性能优势 / Performance Advantages

- ◉ 定制化配置：用户可以根据处理物料的性质和规模选择合适的设备容量、真空系统和控制系统等，满足其特定的工艺要求和产量需求。
 - ◉ 自动化控制系统：可实现全面的过程监控和调节，实时监测温度、真空度、加热速率等关键参数，并进行智能调节，确保冻干过程的稳定性和一致性。
 - ◉ 能耗和环保优化：采用节能技术，如热泵回收系统、低温循环液等，以降低能源消耗。同时，还可采用高效过滤和排放控制技术，以减少对环境的影响。
- + Customized configuration: users can select proper machine capacity, vacuum system and control system based on the features and scale of the materials processed to meet specific process requirements and production volume demands.
- + Automatic control system: it can realize comprehensive process monitoring and regulation, monitor temperature, vacuum degree, heating rate etc. among other key parameters in a real-time manner, and regulates smartly. This ensures stability and uniformity of the freeze-drying process.
- + Energy consumption and environmental protection upgrading: it adopts energy conservation technology, such as heat pump recycling system and low-temperature recycling liquid etc. to reduce energy consumption. Meanwhile, it can also adopt efficient filtration and discharge control technologies to reduce the impact on the environment.



技术参数 / Product Parameters

机型 Model		LYOTK 3	LYOTK 5	LYOTK 8	LYOTK 10	LYOTK 15	LYOTK 20	LYOTK 25	LYOTK 30	LYOTK 35	LYOTK 40	LYOTK 45	LYOTK 50
板层面积 (m ²) Shelf area (m ²)		3	5	7	10	15	20	25	30	35	40	45	50
有效板层面积 (m ²) Effective shelf area (m ²)		2.77	4.94	6.59	9.88	14.52	19.35	22.87	28.45	34.43	39.73	43.34	43.34
最大装瓶数 Maximum number of bottling	个 /Φ 16mm	12000	21696	29154	43731	64500	85800	101400	126412	153153	176715	193545	220000
	个 /Φ 18mm	9550	17100	22800	34200	50540	68035	80405	100347	120848	139440	153135	168300
	个 /Φ 22mm	6345	11562	15252	22878	33790	45562	53846	66690	80730	93150	101250	114750
药液装量 (L) Liquid product filling volume (L)		45	75	105	150	225	300	375	450	525	600	675	750
板层尺寸 Shelf dimension	宽 (mm) Width(mm)	648	948	948	948	948	1248	1248	1548	1548	1548	1548	1548
	深 (mm) Depth(mm)	970	970	1270	1270	1270	1270	1524	1524	1830	1830	2000	2000
板层数量 (个) Shelf number		5+1	6+1	7+1	9+1	10+1	11+1	13+1	13+1	13+1	15+1	15+1	17+1
板层间距 (mm) Shelf gap (mm)		100 (根据客户需求, 间距不同时板层面积将可能有所改变) 100 (based on customer demand, shelf area may be subject to change when gap is different)											
板层温度范围 Temperature range of shelf		-55°C ~+80°C											
冷凝器极限温度 (°C) Condenser extreme temperature		≤ -75°C											
极限真空 (mbar) Extreme vacuum(mbar)		0.01											
压缩空气 Compressed air		>6BarG											
冷凝器捕水量 (Kg) Condenser water-catching amount (Kg)		60	100	160	200	300	400	500	600	700	800	900	1000
外形尺寸 Dimensions		根据平面图纸 According to plan											
设备重量 (Kg) Weight of the equipment (Kg)		5000	7000	8000	11000	14000	18000	22000	26000	28000	30000	32000	34000
装机功率 (Kw) Installed power (Kw)		35	52	65	72	103	141	151	182	212	222	242	262
冷却水量 (m ³ /h) Cooling water amount (m ³ /h)		7	11	16	18	25	37	37	42	50	50	72	72
纯蒸汽耗量 (Kg/h) Pure steam consumption(Kg/h)		60	100	150	210	260	300	320	380	380	450	650	650
纯水 / 注射水量 (1/ min) Pure water/injection water amount (1/ min)		90	120	150	160	200	230	260	280	280	300	300	300

实验冻干机 Laboratory freeze dryer



主要用途 / Main Application

实验型冻干机主要用于科研、实验室和小批量生产等场景。

- ◎ 生物样品冻干：可用于冻干生物样品，如细胞培养物、细胞、组织、血浆、血清等。冻干生物样品可在长时间内保持活性和稳定性，方便保存和运输。
- ◎ 药物研发和制剂制备：可用于冻干药物原料、药物中间体和药物制剂，以保留药物的活性成分、延长保质期，便于输送和稳定储存。
- ◎ 食品研究与加工：可用于食品研究、新产品开发和小型批量生产，可冻干食品样品、食材、调味料等，以保持食品的口感、质量和风味，延长保质期，方便储存和运输。

Laboratory freeze dryer is mainly used in scenes of research, laboratory and small-batch production etc.

- + freeze-drying of biological samples: it can be used for freeze-drying biological samples, such as cell cultures, cell, tissue, plasma and serum. Freeze-drying biological samples maintain active and stable in a long time, convenient for preservation and transportation.
- + Drug development and preparation making: it can be applied to materials of freeze-drying drugs and development of drugs so as to maintain the active ingredients of the drugs and prolong shelf life and make the drugs convenient for transport and stable for storage.
- + Food research and processing: it can be used for food research, new product development and small-scale batch production. It can freeze dry food samples, food materials, and seasoning etc., to maintain the taste, quality and flavor of the food, prolong shelf life and make them convenient for storage and transportation.

- 化学品和实验试剂：可用于冻干化学试剂、酶、抗体、催化剂等，以方便保存和使用，同时提高其稳定性和持久性。
 - 天然产物研究和保藏：可用于冻干天然产物样品，如植物提取物、海洋生物提取物等，以保存其活性成分、方便长期保存和后续研究。
- + Chemicals and experiment reagent: it can be used for chemical reagent, enzyme, antibody and catalyst etc., to make them convenient for preservation and use and improve their stability and durability.
 - + Natural product research and preservation: it can be used for freeze-drying natural product samples, such as plant extracts, marine life extracts etc., to maintain their active ingredients and make it convenient for long-term preservation and continued research.



性能优势 / Performance Advantages

- 高效的冻干速度：具备高效的冻干速度，可以在较短时间内完成冻干过程，有助于提高生产效率和样品处理能力。
 - 高精度的真空控制：配备高精度的真空控制系统，可以根据需要精确控制冻干室内的真空度，保证冻干效果和样品质量。
 - 灵活的控制系统：可根据不同样品和需求进行灵活调整冷却速率、加热速率、持续时间等参数，以满足不同样品的处理要求。
 - 保护样品结构和活性的工艺：在冻干过程中最大程度地减少冻结过程对样品的损伤，有助于保持样品的原始形态和活性成分。
 - 可靠的安全保护机制：如过温保护、过流保护等，确保设备和样品的安全运行，并提供可靠的安全保障。
 - 小型便携：相比于大型工业冻干机，实验型冻干机具有较小的尺寸和轻便的设计，便于移动和携带，适用于小型实验室和移动实验室等场景。
 - 可选配多种附件：可配备多种附件，如不同尺寸的托盘、瓶装器、连续供料装置等。这种可选配的特点使得它们更加灵活和适应不同的实验需求。
 - 高级数据采集与记录：可实时监测和记录关键参数，如温度、真空度、加热速率等，保持过程的可追溯性和数据的精确性。
 - 用户友好的界面和操作：具备用户友好的界面和操作方式，如触摸屏、图形化操作界面等。这使得用户能够轻松设置和监控冻干过程，实现简便的操作和控制。
- + Efficient freeze-drying speed: it has efficient freeze-drying speed, which means it can complete the freeze-drying process in short time, conducive to improve productivity and sample processing capacity.
 - + High precision vacuum control: it is equipped with highly precise vacuum control system, able to control precisely the vacuum degree inside the freeze-drying room based on the demand to ensure optimal freeze-drying effects and sample quality.
 - + Flexible control system: it can flexibly adjust cooling rate, heating rate and continuing time among other parameters based on different samples and demands to meet handling requirements of different samples.
 - + The process that protects sample structure and activity: it minimizes the harm of the freeze-drying process to samples during freeze drying, conducive to maintain the original form and active ingredients of the samples.
 - + Reliable safety protection mechanism: such as over temperature protection, overcurrent protection etc. to ensure the safe operation of the machine and samples and provide reliable safe guarantee.
 - + Small and portable: compared to large industrial freeze dryer, laboratory freeze dryer has smaller size and light design, convenient to take along with. It is applicable to scenes such as small laboratories and mobile laboratories.
 - + Can be equipped with various fittings: it can be configured with various fittings, such as trays, bottlers, and continued supply device of different sizes. This function makes the dryer more flexible and adaptable to different experiment demands.
 - + Advanced data collection and recording: it can monitor and record key parameters in a real-time manner, such as temperature, vacuum degree and heat rate to make the process traceable and the data precise.
 - + User-friendly interface and operation: it has user-friendly interface and operations, such as touch screen and imaged operation interface. This makes the users easy to set up and monitor the freeze-drying process, realizing simple operations and control.

- ◎ 卫生易清洁设计：采用卫生易清洁设计，如不锈钢材质、平整无死角的冻干室表面等。这使得设备易于清洁和消毒，降低交叉污染的风险。

这些特点使得实验型冻干机成为科研、实验室和小批量生产领域中不可或缺的工具，满足样品冻干处理的要求，为实验和研究提供了更便捷、准确和可靠的冻干处理解决方案。

- + Hygiene-based and easy-to-clean design: it adopts hygiene-based and easy-to-clean design, such as stainless steel material and freeze-drying room with flat surface without dead angle. This makes the machine easy to clean and sterilize, and lowers down the risk of cross contamination.

These features make the laboratory freeze-dryer indispensable tool for research, laboratory and small-batch production. It meets the requirements for freeze-drying handling of samples, and offers more convenient, concrete and reliable freeze-drying solution for experiments and research.



技术参数 / Product Parameters

机型 Model		LAP-LYOTK0.2	LAP-LYOTK0.5	LAP-LYOTK 1
板层面积 (m ²) Shelf area (m ²)		0.2	0.5	1
有效板层面积 (m ²) Effective shelf area (m ²)		0.26	0.52	1.03
最大装瓶数 Maximum number of bottling	个 /φ 16mm	1114	2228	4456
	个 /φ 18mm	846	1692	3384
	个 /φ 22mm	570	1140	2280
板层尺寸 Shelf dimension	宽 (mm)	315	315	455
	深 (mm)	455	455	615
板层数量 (个) Shelf number		2+1	4+1	4+1
板层间距 (mm) Shelf gap (mm)		80mm&160mm(2+1)		
板层温度范围 Temperature range of shelf		-55℃~ +80℃		
冷凝器极限温度 Condenser extreme temperature		≤ -75℃		
极限真空 (mbar) Extreme vacuum (mbar)		0.01		
冷凝器捕水量 (Kg) Condenser water-catching amount (Kg)		4	10	20
外形尺寸 Dimensions		根据平面图纸 According to plan		
设备重量 (Kg) Weight of the equipment (Kg)		1200	1250	1500
装机功率 (Kw) Installed power (Kw)		10	10	15
冷却水量 (m ³ /h) Cooling water amount (m ³ /h)		3	3	3

自动进出料系统 ALUS



主要用途 / Main Application

主要用于西林瓶半加塞药品从灌装加塞机至冻干机、冻干机至轧盖机之间无菌传输与联接，具有先进的整体集成化进出瓶机构，完全实现人员隔离状态下的产品自动转运。

It is mainly used for sterile conveyance and connection of vial half-stoppering drugs from filling and stoppering machine to freeze dryer, and freeze dryer to capper. It has advanced overall integrated bottle inlet and outlet mechanism, and fully realizes automatic conveyance of products under manual isolation.



技术特点 / Technological features

- 提高产品无菌保障水平，降低生产质量控制风险；
 - 减少无菌室人员，从而减少室内微生物负荷；
 - 采用集成控制系统，实现进出料系统与冻干机、灌装线和轧盖机的控制互锁；
 - 完整的电气安全回路，可靠的检测数据分析与报警功能；
 - 人性化操作界面，灵活的控制模式，可编辑生产配方，可追溯完整操作记录。
- + Better guarantee the sterile status of the product, and lower down the risk of production quality control;
 - + Reduce the number of personnel in sterile room so as to reduce the microbial load inside the room;
 - + It adopts integrated control system to achieve control and interlock of ALUS with freeze dryer, filling line and capper;
 - + It has complete electric safety circuit, reliable functions of data detection and warning;
 - + It has humane operation interface, flexible control model, editable production recipe, and traceable complete operation records.

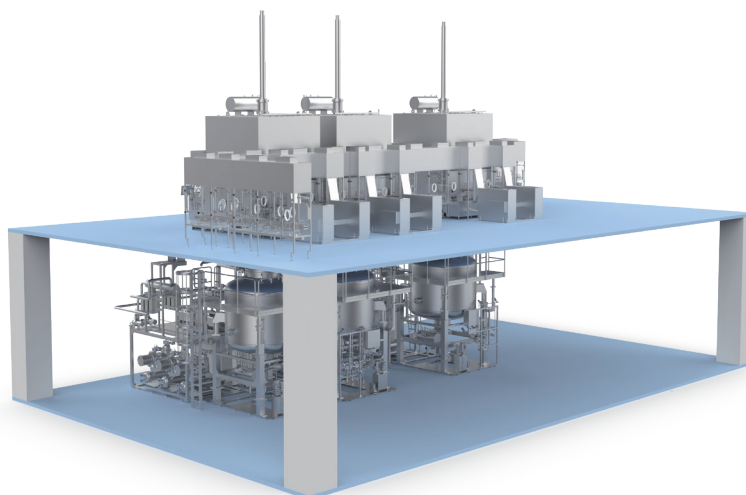


系统分类 / System classification

- 固定式自动进出料系统（单排 or 双排）；
 - α- 自动进出料系统（单排 or 双排）；
 - 移动式自动进出料系统；
 - 混合式自动进出料系统。
- + RGV ALUS (single row or double row);
 - + α-ALUS (single row or double row);
 - + AGV ALUS;
 - + Mixed ALUS

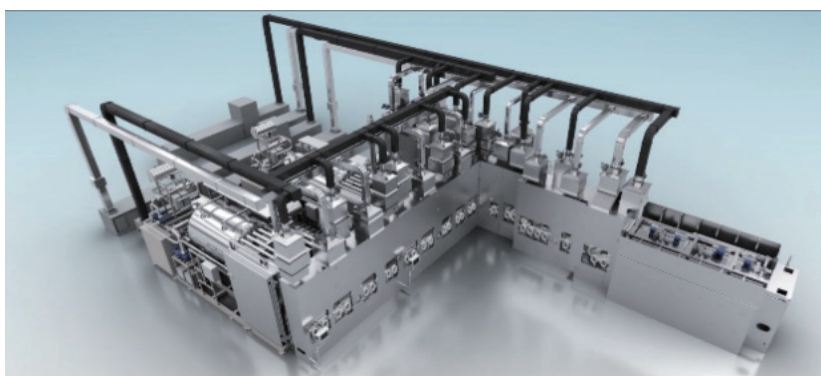


经典案例 / Classic cases



多台冻干机前进后出案例

The case of multiple freeze dryers entering with the front part and outing with the rear part



西林瓶水剂与冻干共线 T 型布局生产案例

The case of T-shape layout for production of vial aqueous solution and freeze drying joint line

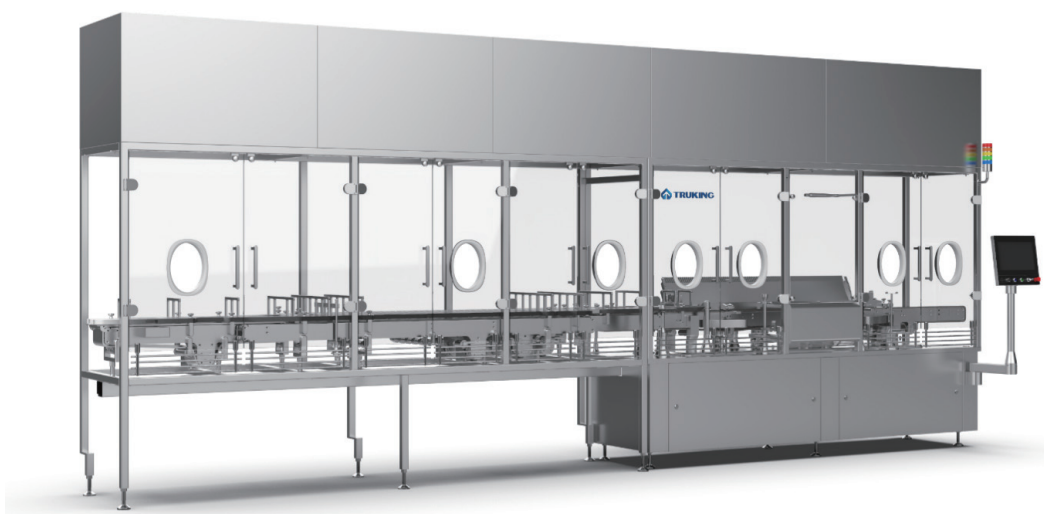
LALUTK系列固定式自动进出料系统 LALUTK series RGV ALUS



主要技术参数 / Main technical parameters

机型与产能 Model and production capacity		LALUTK-06	LALUTK-09	LALUTK- 12	LALUTK- 15
西林瓶规格 (直径 × 高度) Vial specification (diameter × height)	2ml($\phi 16 \times 35$)	12000 pcs/h	18000 pcs/h	24000 pcs/h	30000 pcs/h
	10ml($\phi 22 \times 49.7$)	11000 pcs/h	15000 pcs/h	21000 pcs/h	25300 pcs/h
	20ml($\phi 27 \times 58$)	7000 pcs/h	10000 pcs/h	12000 pcs/h	20000 pcs/h
	30ml($\phi 32 \times 70$)	5500 pcs/h	7200 pcs/h	9000 pcs/h	16500 pcs/h
	50ml($\phi 42.5 \times 73$)	4000 pcs/h	4800 pcs/h	7200 pcs/h	10800 pcs/h
	100ml($\phi 51.6 \times 94.5$)	3000 pcs/h	4000 pcs/h	4800 pcs/h	7200 pcs/h

α-LALUTK系列固定式自动进出料系统 α-LALUTK series RGV ALUS



主要技术参数 / Main technical parameters

机型与产能 Model and production capacity		α-LALUTK-06	α-LALUTK-09	α-LALUTK-12	α-LALUTK-15
西林瓶规格 (直径 × 高度) Vial specification (diameter x height)	2ml(φ16×35)	16800 pcs/h	24000 pcs/h	33000 pcs/h	36000 pcs/h
	10ml(φ22×49.7)	12000 pcs/h	18000 pcs/h	24000 pcs/h	30000 pcs/h
	20ml(φ27×58)	9000 pcs/h	15000 pcs/h	18000 pcs/h	22800 pcs/h
	30ml(φ32×70)	7200 pcs/h	12000 pcs/h	15000 pcs/h	18000 pcs/h
	50ml(φ42.5×73)	6000 pcs/h	9000 pcs/h	10000 pcs/h	13200 pcs/h
	100ml(φ51.6×94.5)	4800 pcs/h	7200 pcs/h	9000 pcs/h	12000 pcs/h

LALUTK-RGV系列移动式自动进出料系统 LALUTK-RGV series AGV ALUS



主要技术参数 / Main technical parameters

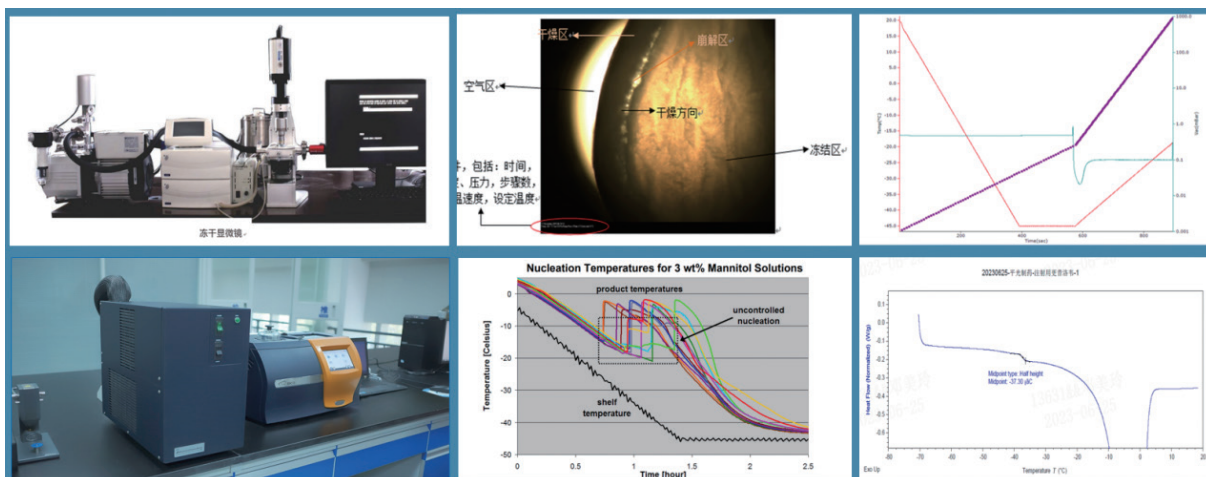
机型与产能 Model and production capacity		LALUTKRGV12-1	LALUTKRGV15-1	LALUTKRGV12-2	LALUTKRGV15-2
西林瓶规格 (直径 × 高度) Vial specification (diameter × height)	2ml($\phi 16 \times 35$)	24000 pcs/h	30000 pcs/h	30000 pcs/h	35000 pcs/h
	10ml($\phi 22 \times 49.7$)	20000 pcs/h	25000 pcs/h	24000 pcs/h	30000 pcs/h
	20ml($\phi 27 \times 58$)	1200 pcs/h	20000 pcs/h	15000 pcs/h	23000 pcs/h
	30ml($\phi 32 \times 70$)	8000 pcs/h	15000 pcs/h	10000 pcs/h	18000 pcs/h
	50ml($\phi 42.5 \times 73$)	5000 pcs/h	6000 pcs/h	/	/
	100ml($\phi 51.6 \times 94.5$)	3000 pcs/h	4000 pcs/h	/	/

冻干工艺服务 Freeze-drying process services



成立于 2012 年，面积约 200 m²。自实验室成立至今，全年实验量稳步增长，实验室以公司战略需求和冻干技术发展前沿为导向，开展生物药、化药、原料药、益生菌、医美、食品等领域的冻干工艺研究，在基础方面提供关键性的理论依据和原理性技术支持。

Founded in 2012, covering an area of 200 m². Since its founding, the laboratory has witnessed stable increase of the experimental amount. Guided by the company's strategic demand and the frontline development of freeze-drying technology, it conducts freeze-drying research in biological drugs, chemical medicine, APIs, probiotics, aesthetic medicine and food etc., and offers key theoretical basis and principle technology support in basics.





提供的服务 / Services offered

冻干参数检测：检测制品溶液的共晶点、崩塌温度、共熔点、玻璃化转变温度

冻干工艺分析：制品溶液的预冻设计，指导干燥过程的参数设计，防止制品出现融化、坍塌等问题

冻干成品质量检测与问题解决：判定药品晶态，帮助客户规避和解决冻干过程中遇到的质量属性问题

曲线优化：为已有工艺曲线但需要进一步完善的用户提供工艺优化服务，提升药品冻干速率，缩短冻干周期

工艺开发：帮助客户开发冻干曲线，开发药品冻干处方

工艺放大：为需要小规模生产或实验小试转变为大规模生产的客户提供帮助

Freeze-drying parameter detection: detect the eutectic point, collapse temperature, joint melting point, glass-oriented transformed temperature of the solution.

Freeze-drying process analysis: pre-freezing design of the solution, guide parameter design of the drying process, prevent the products from melting and collapsing etc..

Quality detection and problem solving of freeze-drying products: judge the crystalline state of drugs, help customers avoid and address quality problems in freeze-drying process.

Curve optimization: offer users with process curve but needing further improvement process optimized services, improve drug freeze-drying rate, shorten freeze-drying cycle.

Process development: help customers develop freeze-drying curve, develop drug freeze-drying prescription.

Process enlargement: offer help to customers who need to transform from small-scale production or experimental trial to large-scale production.

冻干工艺整体解决方案





服务理念

400-9988-900



秉承“一切为客户着想，为一切客户着想，为客户着想一切”的理念，以“为客户创造价值”为己任，楚天专注于打造一流的研发、设计、销售、制造、服务团队及服务管理体系，为客户提供高效、优质的产品与服务。



◎ 项目规划支持

楚天拥有系列专业医药设计院、产品研究院，一批行业资深科研技术人员，无菌制药工艺的验证专家、教授等，为客户的项目提供科学、有效的技术规划支持。



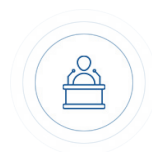
◎ 过程保障服务

楚天推出的医药装备整体解决方案，实现药品生产过程的全自动化、无菌化，智能检测、分选，以及计算机验证保障，生产出让市场“放心”的产品。



◎ 走进园区服务

楚天作为设备供应商，不仅仅将行业法规标准融入到产品设计、制造中，还让法规标准以讲座、交流的形式走进园区，与药企的工艺、生产形成互动与融合。



◎ 设备管理咨询服务

楚天致力于满足客户效益最大化需求，提供一揽子的设备管理模式，协同药厂实现投入最小化，产出最大化。

- ◎ 坚持“以客户为中心”，以匠人之心打造极致服务体验，为客户创造更多价值

34 全国 34 个省（市）

365 全年 365 天

7x24 7X24 小时服务时间

- ◎ 我们随时待命为客户单位设备正常运行保驾护航

- + 现场安装、调试、验收
- + 设备工艺、操作、维护等相关培训
- + 周期性的定期上门维护与回访
- + 设备各部件性能的检测与保养
- + 备品备件的及时供应
- + 产品技术升级与技术二次开发
- + 设备大修



Service Concept

400-9988-900



Adhering to concept of “all for customers, for all customers” , and with the mission of “creating value for customers” , TRUKING focuses on building first-class R&D, design, sales, manufacturing, service teams and service management system to offer high-efficient and high-quality products and services for the customers.



◎ Project Planning Support

TRUKING has a series of professional medical and pharmaceutical design institutes, product research institutes, a group of senior scientific research and technical personnel, aseptic pharmaceutical process verification experts, professors, etc., to provide scientific and effective technical planning support for customers' projects.

◎ Service In The Park

As an equipment supplier, TRUKING not only integrates industrial regulations and standards into product design and manufacturing, but also introduces the industrial regulations and standards into Truking industrial park in the form of lectures and exchanges to interact and integrate with the technology and production of pharmaceutical enterprises.

◎ Process Assurance Service

TRUKING launched the overall solution for medical & pharmaceutical equipment realizing the full automation and aseptic production process, intelligent detection and sorting of the drug, as well as computer verification assurance so as to produce assured products for market.

◎ Equipment Management Consultation Service

TRUKING aims to satisfy the maximum benefited demands of the customer and to provide a package of equipment management services to realize minimization investment and maximization production output together with pharmaceutical factories.

- ◎ Adhere to the philosophy of "customer-centric", TRUKING creates the extraordinary service experience with the spirit of the craftsman, to create more value for customers.
- ◎ We are always ready to escort the normal operation of the customer's equipment.

- + Onsite equipment installation, commissioning, acceptance
- + Training for equipment process, operation and maintenance
- + Periodic door-to-door maintenance and return visit
- + Performance test and maintenance for machinery parts
- + Timely supply of spare parts
- + Product technology upgrading and secondary development
- + Equipment overhaul



www.truking.com



地址 Add: 国家级宁乡经济技术开发区楚天科技工业园 邮编 P.C: 410600

Truking Technology Industrial Park, Ningxiang National Economic and Technological Development Zone

电话 Tel: 0731-87938288 传真 Fax: 0731-87938201

邮箱 E-mai: truking@truking.cn

产品技术改进恕不另行通知，本公司保留对本手册内容的最终解释权，本册图片供参考，以实物为准。2023年8月版

The company reserves the right to interpret the contents of this manual without prior notice. The pictures in this manual are for reference and subject to the actual conditions.

Aug. 2023 Edition