DEMARK

Smart factory in XIWANG FOOD

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Customer background

Shandong Xiwang Food Co., Ltd. is a wholly-owned subsidiary of Xiwang Food Co., Ltd., which is the largest corn germ oil production base in China. The company currently has more than 1,700 employees which main product is Xiwang brand corn germ oil and other healthy oil species including sunflower oil, olive oil, peanut oil, linseed oil. In August 2010 it is titled "China Corn Oil City" by the China Food Industry Association, and in February 2011 went public in Shenzhen A share mainboard (stock code 000639) which is the first landing of the domestic A shares of the corn oil companies.

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Customer background

The company relies on the agricultural industrialization of the national key leading enterprises, China Sugar - West King Group unique resource advantages, to achieve the full protection of corn oil and crude oil production capacity. The company has the most advanced corn oil production process and a full set of production lines in China, and production process has achieved smart automation control. It is the only one monitoring quality from raw materials to the products in China. The company introduced the German company Krones blow irrigation one machine to achieve the organic combination of blowing and filling, which is the most advanced and fastest filling equipment in the world. With bold innovation in 2016, it cooperates with the domestic plastic packaging industry well-known equipment and solutions provider DEMARK to create wisdom factory.

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Introduction of smart factory

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Products

- In this factory, Demark offers customer 24 differents kinds of products including 10 kinds of PET preforms, 7 kinds of caps, 4 kinds of handles, and 3 kinds of rings.



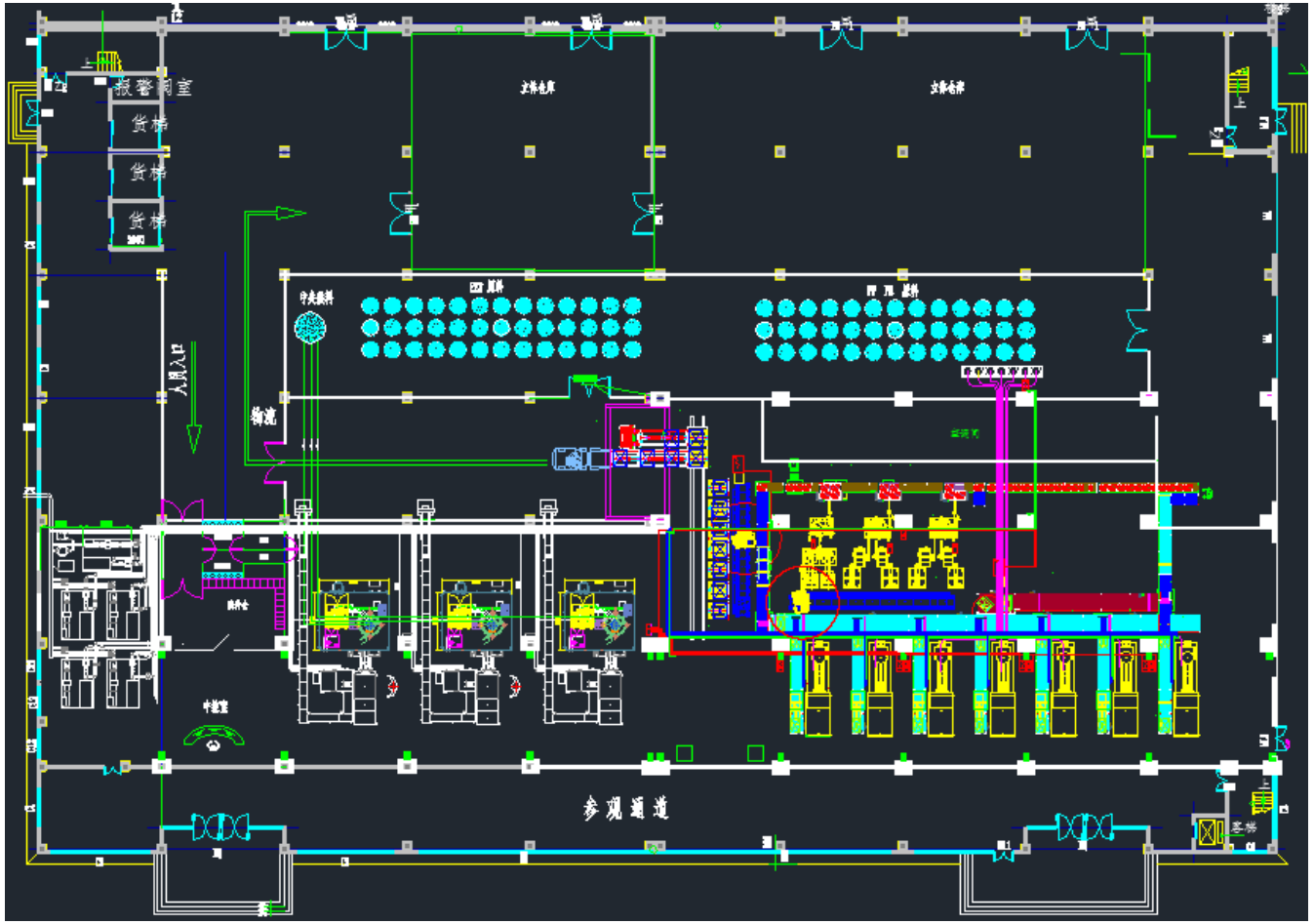




Equipment layout

- Demark offers a complete solution for the smart factory which is from the customer's products injection system, the central feeding system, the production of auxiliary equipment, product delivery and assembly automation, logistics automation, to the workshop production and management information system-DNET. In the entire smart factory project, Demark undertakes the project pre-planning, the implementation of the entire project, the final acceptance. Demark not only provides high-speed injection molding equipment, but also the integration of a number of domestic and foreign equipment providers, which is the so-called one-stop solution delivered to the customer's hands.

Equipment layout



Stereoscopic warehouse

Central feed

Robot automation

Injection molding machine

Auxiliary machine

Central control room

Production Process Introduction - Preform Injection Molding

- Demark DP300 / 5000 injection molding system, this high-speed pet preform injection molding system has obvious advantages to produce preforms, which has shorter injection cycle time, higher production capacity which help customer save nearly a million yuan every month.
- Demark preform mold has professional mold design and processing and manufacturing capacity which ensures product quality and longer life.
- Ultra-high-speed side of the multi-station cooling robot ensures the rapid cooling of the preform and avoid pollution in cleaning room.
- Secondary cooling conveyor line cools the preform furthera and ensures the cooling effect.
- With the help of automatic hoisting machine and slow down packing system, the preofrms flow through the cooling line and packed directly and then enter the stereoscopic warehouse which avoid pollution during the full production process.

Production process description - cap, handle, ring injection molding

- Cap, ring, handle the injection. Demak selects FANUC α-S300iA electric injection molding machine for client.
- Demark offers cap, handle and ring molds, molds equipped with Mold Master hot runner and temperature control components.
- Each injection molding machine is equipped with product taking-out robot and each product is equipped with a gripping system and supports for quick access, which makes the automatic production possible.
- The automatic transmission line is installed next to each injection molding machine. Ater gripped and packed by the robot, the products are directly transported to the specified location by the automated transmission line and the application robot assembles and palletize which saves labor cost a lot.

Main equipment details

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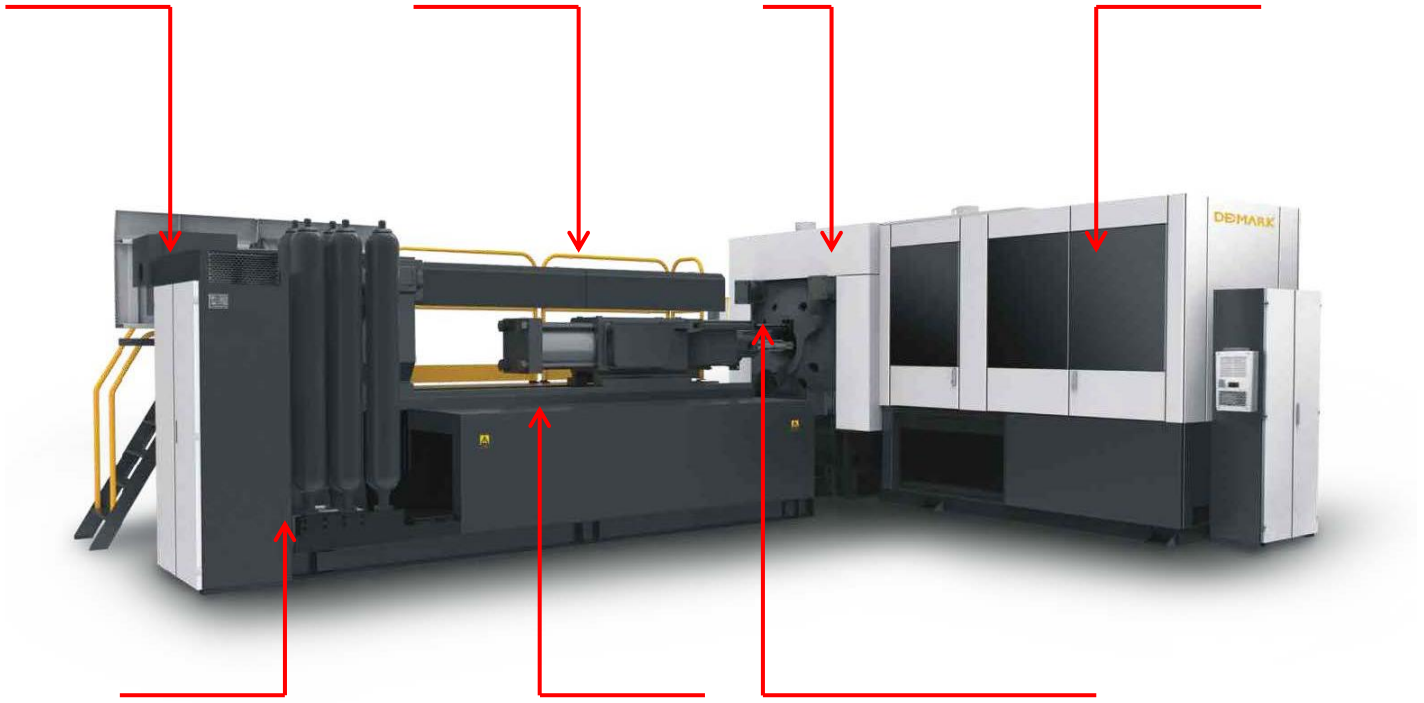
DP300 / 5000 preform injection molding system, 3 sets for preform injection

伺服电机溶胶
Servo motor plasticization

同步溶胶
Synchronous plasticization

可靠的锁模
Reliable clamping

后冷却机械手
After cooling the manipulator



高效蓄能器
High efficient accumulator

伺服阀控制
Servo valve control

人机交互系统
Man-machine interactive system

DP300 / 5000Preform injection molding system, main technical parameters

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MODEL			UNIT	IPET300/3500	IPET300/5000	IPET400/5000	IPET500/6000
INJECTION UNIT 注塑单元	螺杆长径比	Screw L/D Ratio	L/D	25	25	25	25
	螺杆直径	Screw Diameter	mm	100	120	120	130
	射出量（PET）	Shot Weight(PET)	g	3500	5000	5000	6000
	塑化率（PET）	Plasticizing Rate(PET)	g/s	200	300	300	380
CLAMPING UNIT 合模单元	锁模力	Clamping Force	T	300	300	400	500
	移模行程	Clamping Stroke	mm	585	585	670	500
	最大/小模厚	Max/min Thickness of Mould	mm	300-720	300-720	300-820	600-1350
	导杆间距(宽x高)	Space Between Tie Bars(WxH)	mm	660x760	660x760	845x845	920x920
	顶出行程	Ejector Stroke	mm	180	180	180	180
	顶出力	Ejector Force	T	20	20	28	38
	顶出杆根数	No.of Ejector Pins	pcs	9	9	13	10
MOULD 模具规格	最大腔数	Cavity(Max)	pcs	72	72	96	128
	模具形式	气动针阀式热流道瓶坯模具		Needle Vale Of Non-cutting PET Preform Mold			
POWER UNIT 电气单元	马达功率	Pump Motor Power	KW	81+82	81+82	81+82	110+110
	机械手功率	Robot Power	KW	36	36	43	108
	熔胶电热容量	Heater Input Capacity	KW	78	86	86	120
	模具加热容量	Mould Heater Capacity	KW	55	55	68	90
ROBOT 取胚冷却机械手	机械手真空吸头	Manipulator	cavity	216	216	288	128x3
	瓶坯冷却装置	Cooling Form	cavity	72x3	72x3	96x3	128x3
	外型尺寸(长x宽x高）	Size(LxWxH)	cm	263x157x230	263x157x230	281x160x250	360x320x260
OTHER 其他	电力要求（交流三相四线制）	Power supply (3-phase AC)	V/HZ	380/50	380/50	380/50	380/50
			KW	332	332	360	538
	冷冻水要求	Chilling Water	℃	5-10	5-10	5-10	7-9
			Mpa	0.8	0.8	0.8	0.8
			L/min	900	900	1200	1200
	冷却水要求	Cooling Water	℃	<25	<25	<25	<25
			Mpa	0.3	0.3	0.3	0.3
			L/min	300	300	300	300
	压缩空气要求	Compressed Air	Mpa	0.7-0.9	0.7-0.9	0.7-0.9	0.7-0.9
			L/min	800	800	1200	1200
	主机外型尺寸(长x宽x高)	Machine Size(LxWxH)	cm	930x180x250	990x180x250	1090x205x260	1150x250x270
	整机重量	Machine Weight	T	26	28	34	38

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Preform and cap mold

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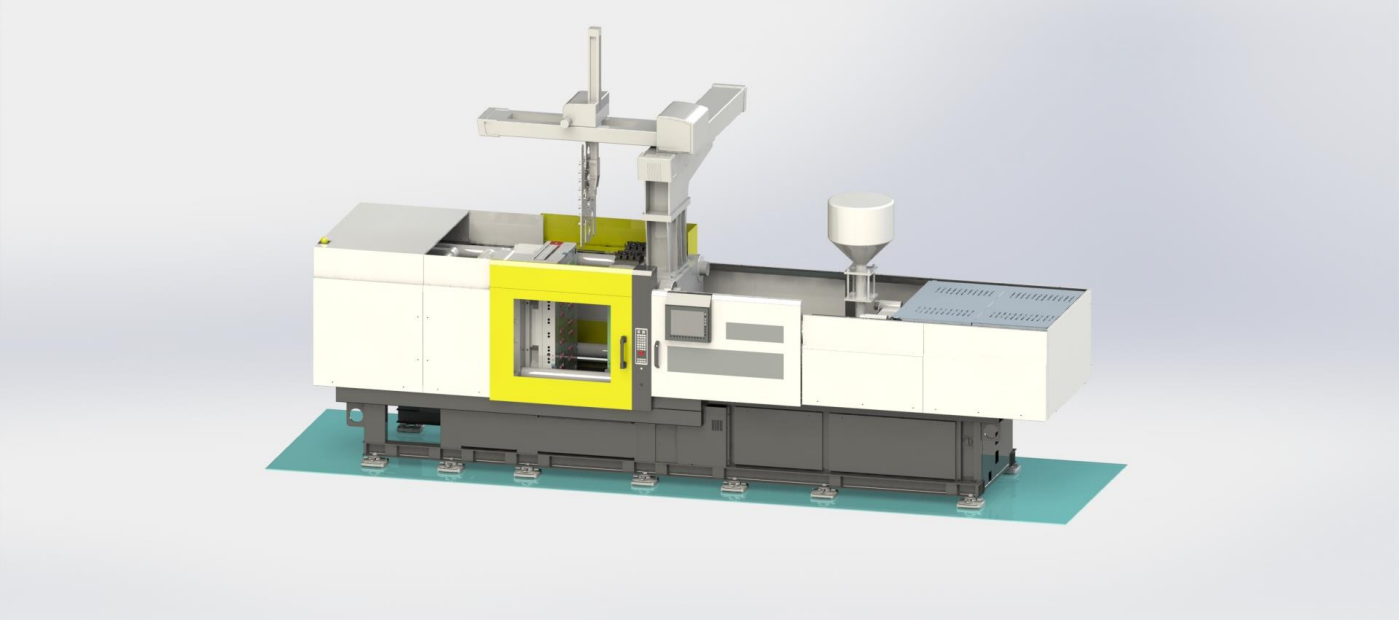
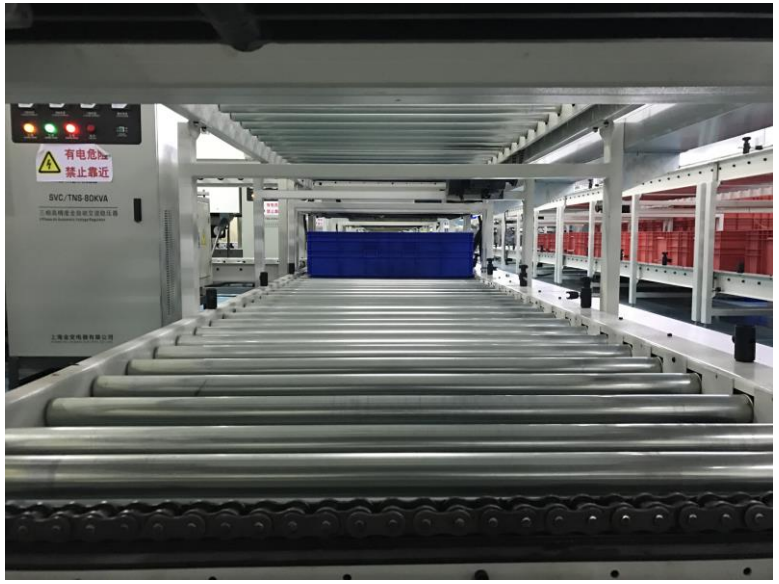
Bottle Cap Injection Molding System α-S300iA Electric Injection Molding Machine equipped with Top-mounted manipulator, 7 sets for cap, handle and lifting ring injection



- Central feeding system supplies raw material to each injection molding machine automatically. After the product injected and molded, the automatic robot takes out and packs them which achieves unmanned production.

Logistics automation and RGV stacking carts



- With the automatic transmission lines in the whole factory and smart management system, the lower conveyor line sends empty boxes to the injection molding machine, and after automatic packing completed, the recycling boxes with products are transferred to the handling or palletizing station by the upper conveyor line. Then the transfer robot and palletizing robot take the work next.

R-2000iC/165F
seven-axis handling robot

- Seven-axis handling robot combined with RFID radio frequency identification technology to classify different products and supplies raw material to cap grouping machine and cap covering machien which achieves one automatic production line for multiple caps.

Total 3 sets of cap grouping and covering machine are used to cover the butterfly cap and group the upper and lower cap.

- 。
- The upper and lower covers need to be assembled in the cap grouping machine, and the flipping process needs to be covered through cap covering machine. The waterfall cap sorting machine and linear air supply system ensure the production of more than 400 pcs per minute The handling robot feeding raw material to cap grouping and covering machine by automatically identifying the type of caps. These several types of caps are packed automatically after the completion of assembling, then are stacked and stored in warehouse through the automatic transporting system.

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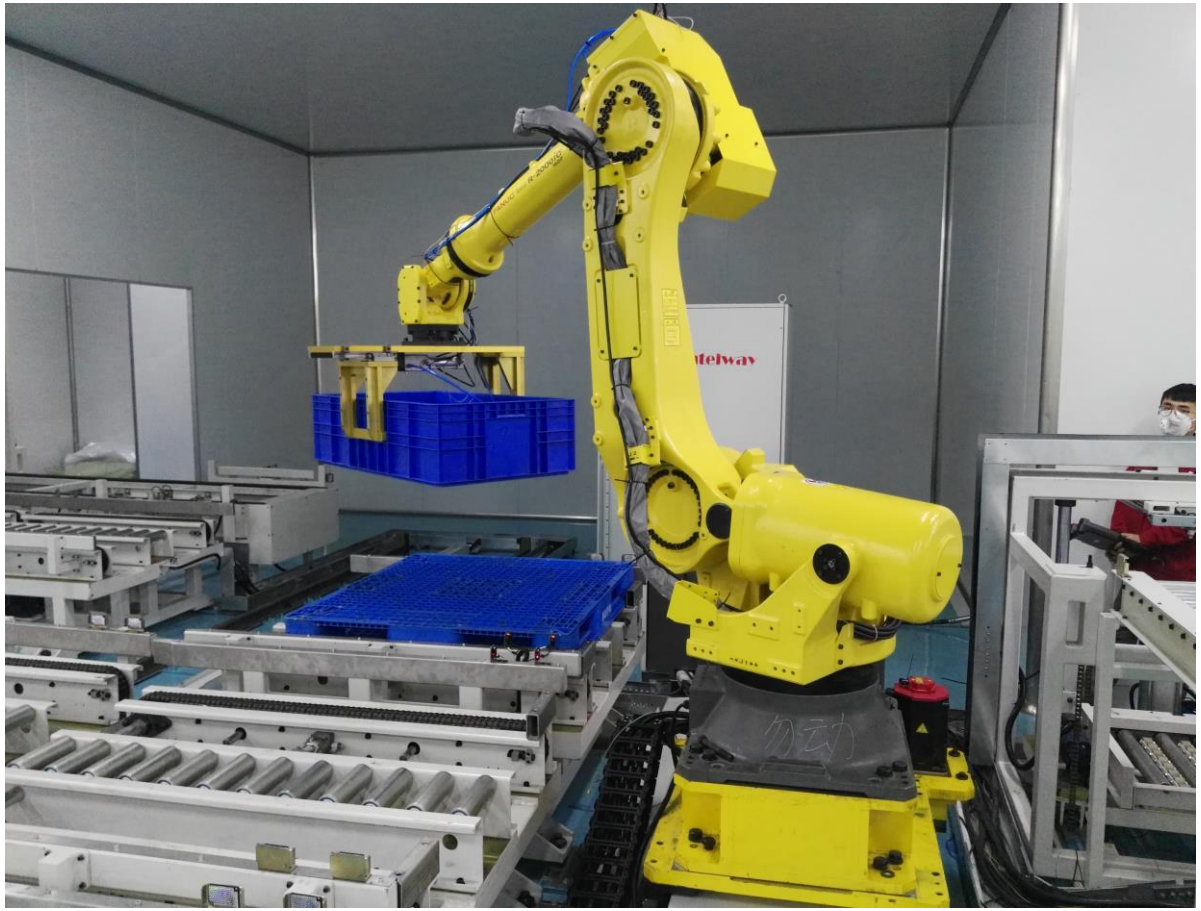
R-2000iC/165F

seven-axis stacking robot

- Combing with RFID radio frequency identification technology, the seven-axis stacking robot sorts and stacks different products from the production line which saves work of manually transportation and stacking.



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RGV

stacking moving carts

- After stacked, 7 pallets are transferred to injection molding workshop exit by the RGV stacking moving carts, then transported to warehouse by forklift.

Factory automation

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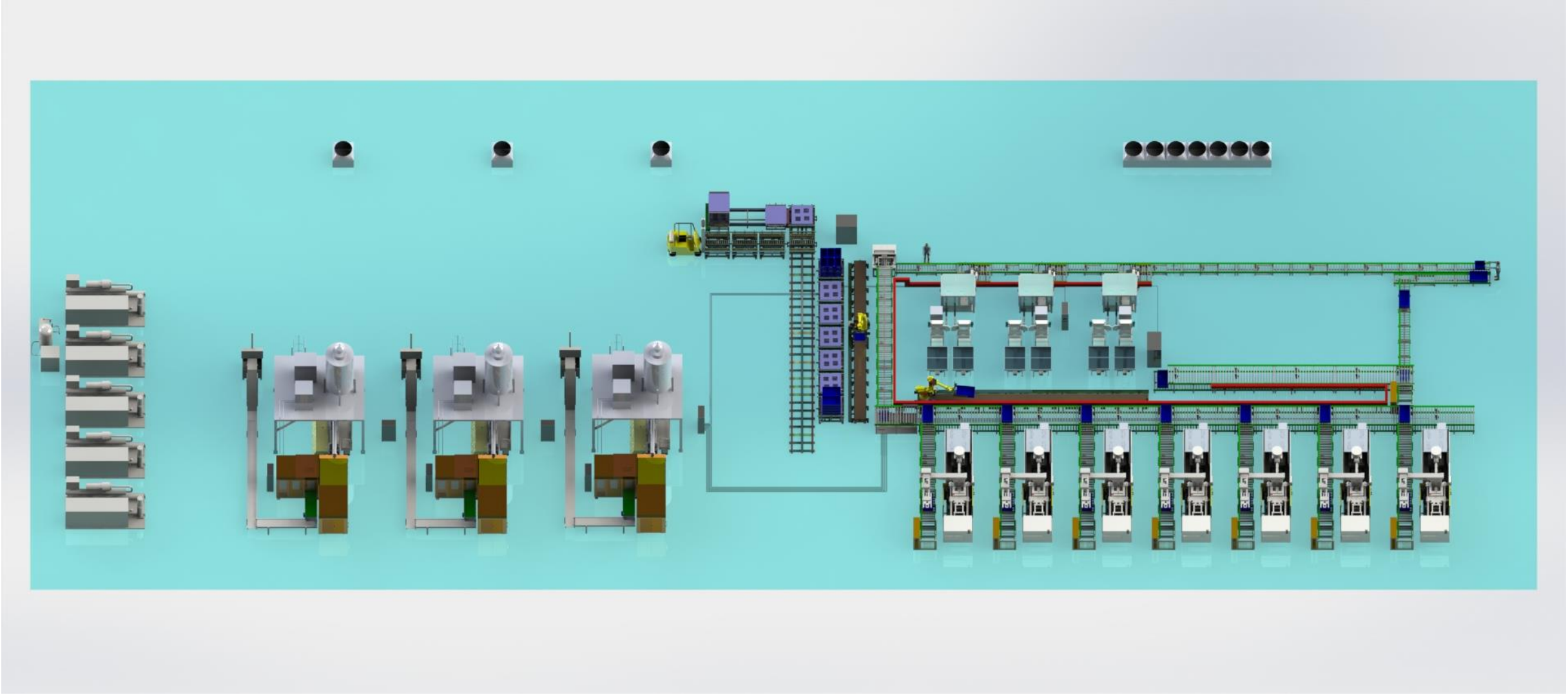
Intelligent conveyor line and robot handling palletizing system



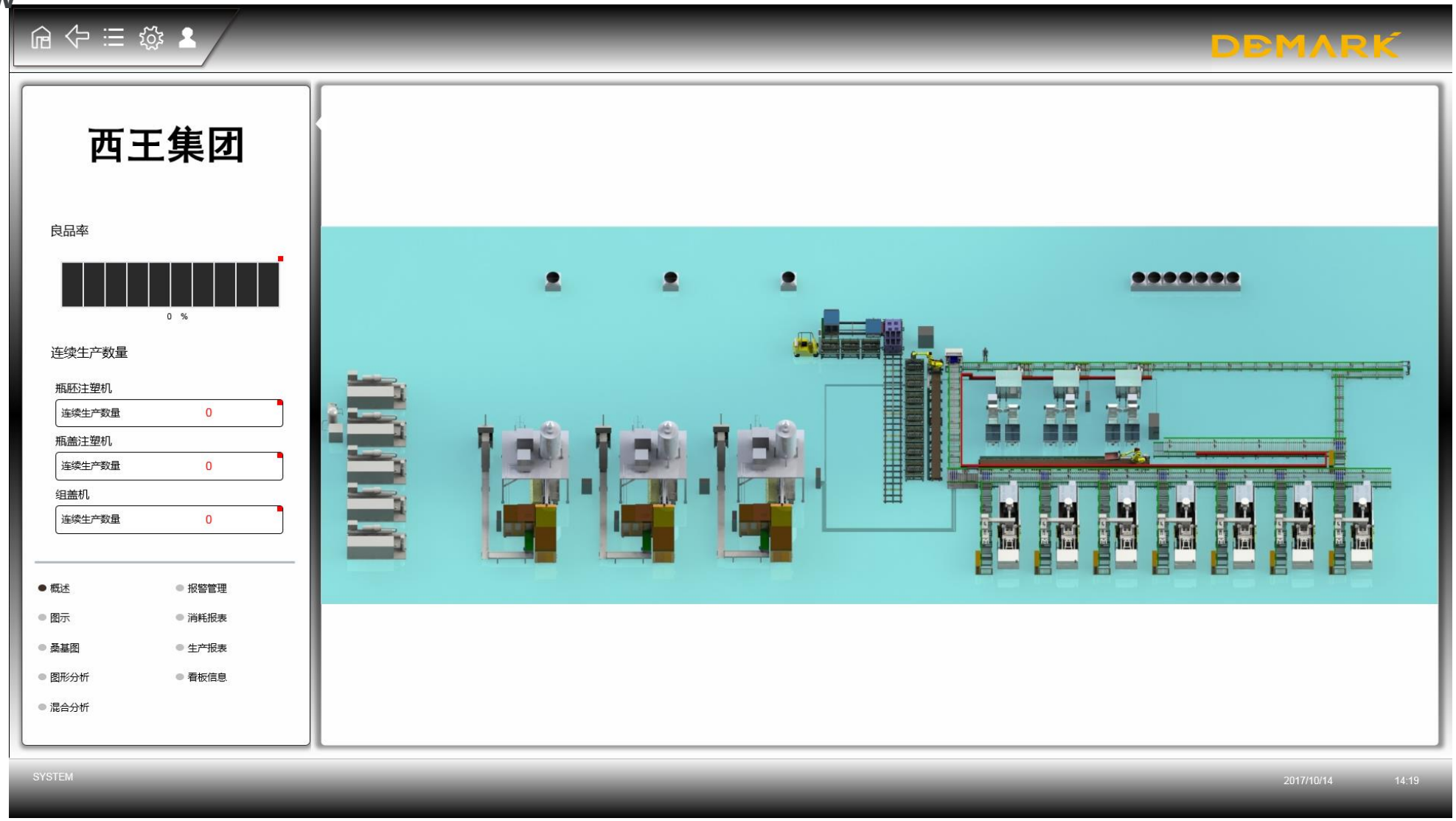
RFID radio frequency identification technology for turnover box allocation and product classification

- Paste the RFID tag at the bottom of the turnover box.
- A radio frequency identification antenna and a controller are distributed throughout the plant.
- In the smart factory, combined with RFID radio frequency identification technology, the delivery system and robot applications allocate turnover box to each machine, and through the intelligent RFID radio frequency identification system, the turnover boxes full of products coming out from each machine are sorted and transferred by transporting system. It helps the robot sort, transport and palletize and achieve intelligent.

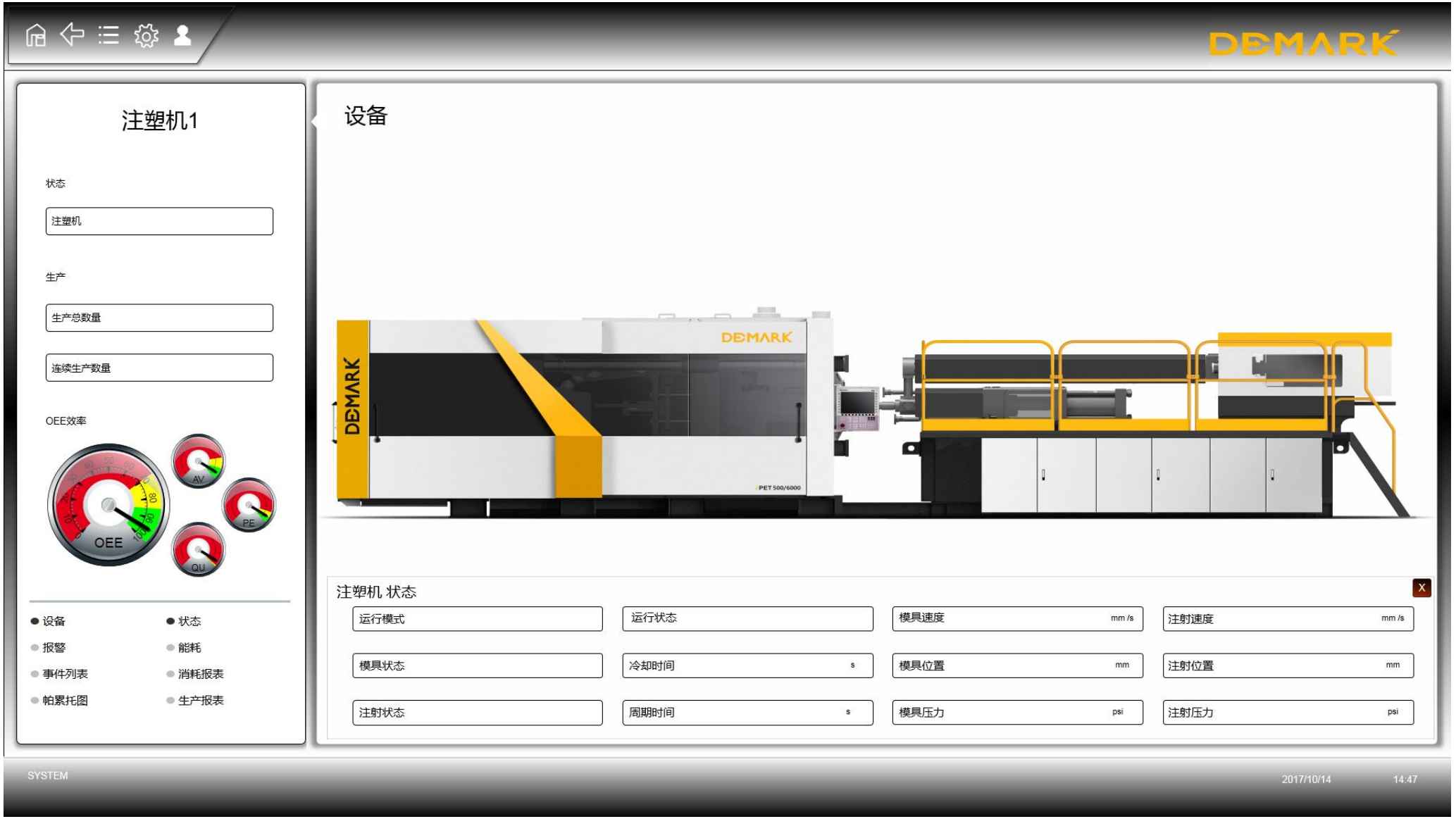
工厂信息化管理系统-DNET

Factory information management system -DNET

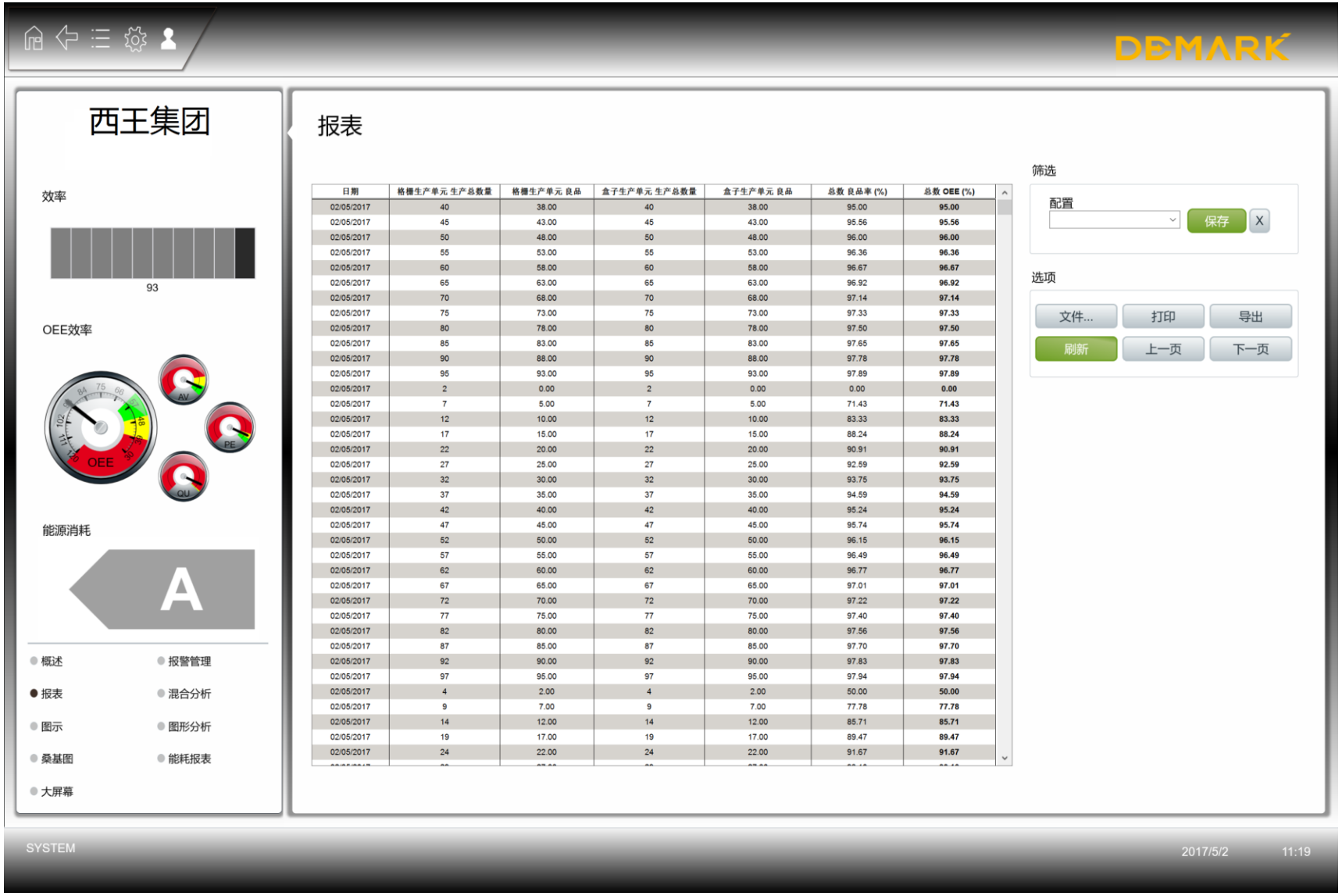
总览 The overview



Equipment state

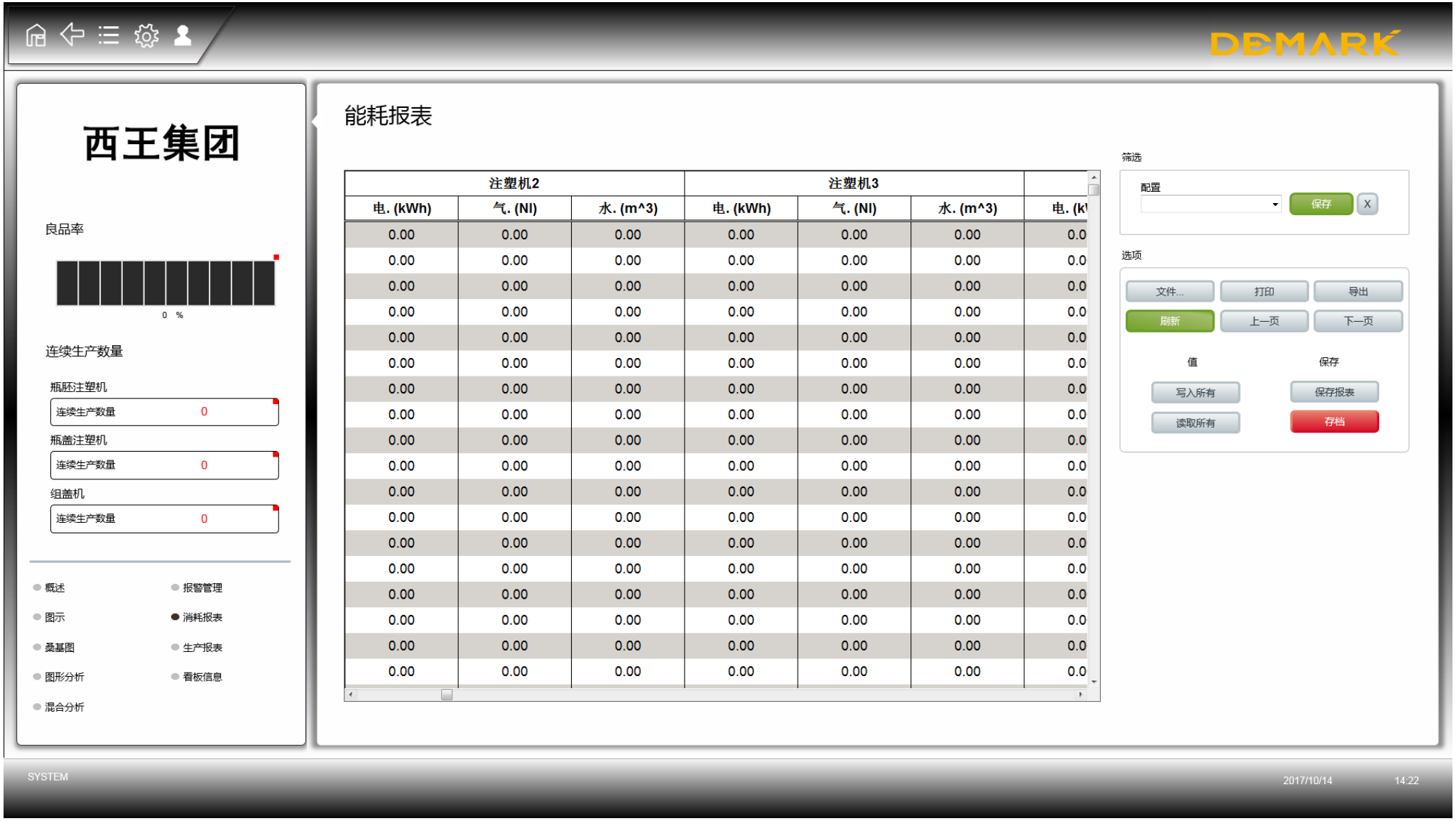


Production status report

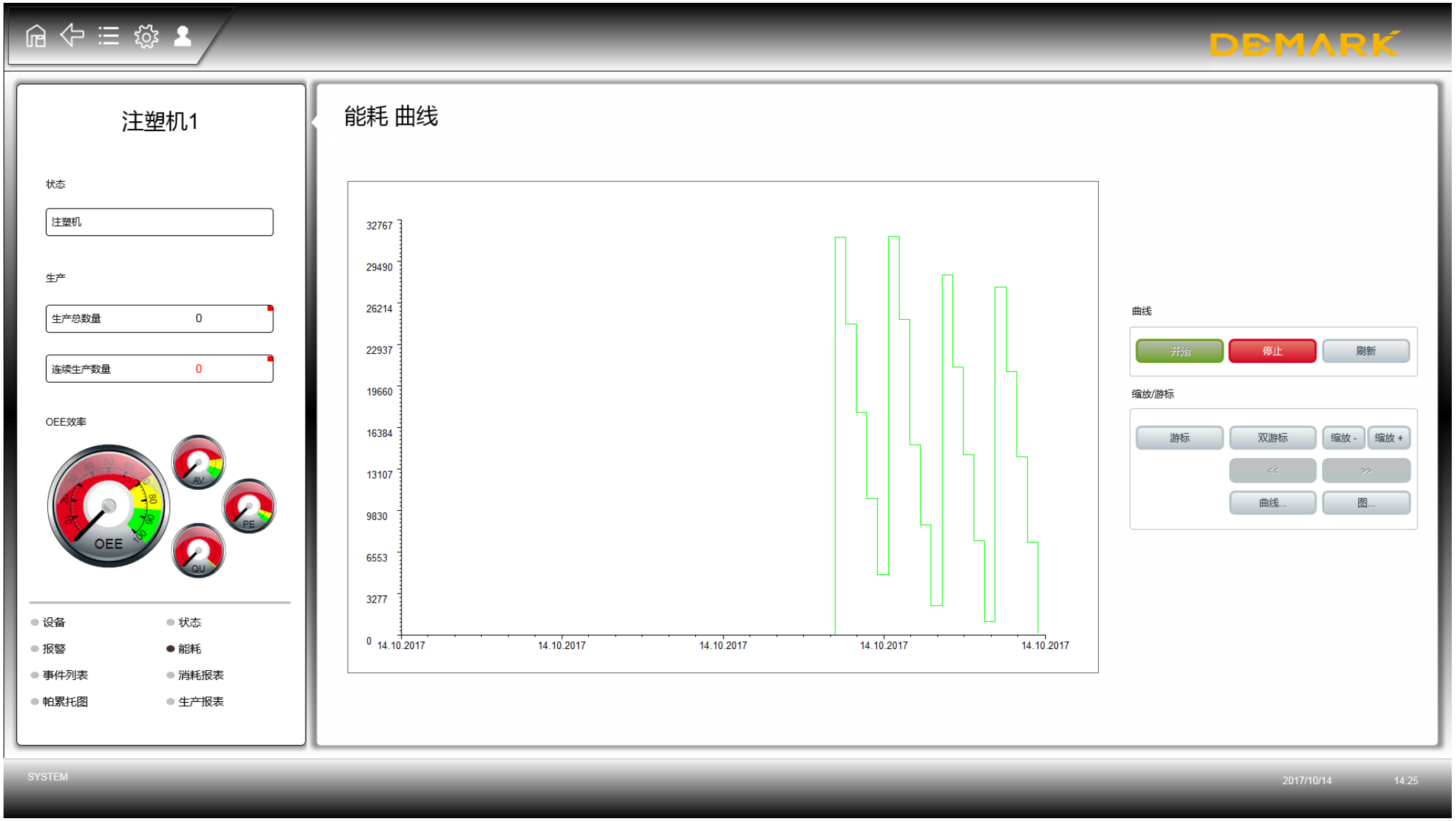


日期	格栅生产单元 生产总数量	格栅生产单元 良品	盒子生产单元 生产总数量	盒子生产单元 良品	总数 良品率 (%)	总数 OEE (%)
02/05/2017	40	38.00	40	38.00	95.00	95.00
02/05/2017	45	43.00	45	43.00	95.56	95.56
02/05/2017	50	48.00	50	48.00	96.00	96.00
02/05/2017	55	53.00	55	53.00	96.36	96.36
02/05/2017	60	58.00	60	58.00	96.67	96.67
02/05/2017	65	63.00	65	63.00	96.92	96.92
02/05/2017	70	68.00	70	68.00	97.14	97.14
02/05/2017	75	73.00	75	73.00	97.33	97.33
02/05/2017	80	78.00	80	78.00	97.50	97.50
02/05/2017	85	83.00	85	83.00	97.65	97.65
02/05/2017	90	88.00	90	88.00	97.78	97.78
02/05/2017	95	93.00	95	93.00	97.89	97.89
02/05/2017	2	0.00	2	0.00	0.00	0.00
02/05/2017	7	5.00	7	5.00	71.43	71.43
02/05/2017	12	10.00	12	10.00	83.33	83.33
02/05/2017	17	15.00	17	15.00	88.24	88.24
02/05/2017	22	20.00	22	20.00	90.91	90.91
02/05/2017	27	25.00	27	25.00	92.59	92.59
02/05/2017	32	30.00	32	30.00	93.75	93.75
02/05/2017	37	35.00	37	35.00	94.59	94.59
02/05/2017	42	40.00	42	40.00	95.24	95.24
02/05/2017	47	45.00	47	45.00	95.74	95.74
02/05/2017	52	50.00	52	50.00	96.15	96.15
02/05/2017	57	55.00	57	55.00	96.49	96.49
02/05/2017	62	60.00	62	60.00	96.77	96.77
02/05/2017	67	65.00	67	65.00	97.01	97.01
02/05/2017	72	70.00	72	70.00	97.22	97.22
02/05/2017	77	75.00	77	75.00	97.40	97.40
02/05/2017	82	80.00	82	80.00	97.56	97.56
02/05/2017	87	85.00	87	85.00	97.70	97.70
02/05/2017	92	90.00	92	90.00	97.83	97.83
02/05/2017	97	95.00	97	95.00	97.94	97.94
02/05/2017	4	2.00	4	2.00	50.00	50.00
02/05/2017	9	7.00	9	7.00	77.78	77.78
02/05/2017	14	12.00	14	12.00	85.71	85.71
02/05/2017	19	17.00	19	17.00	89.47	89.47
02/05/2017	24	22.00	24	22.00	91.67	91.67

Energy consumption report



Energy consumption analysis



Alarm management

Event list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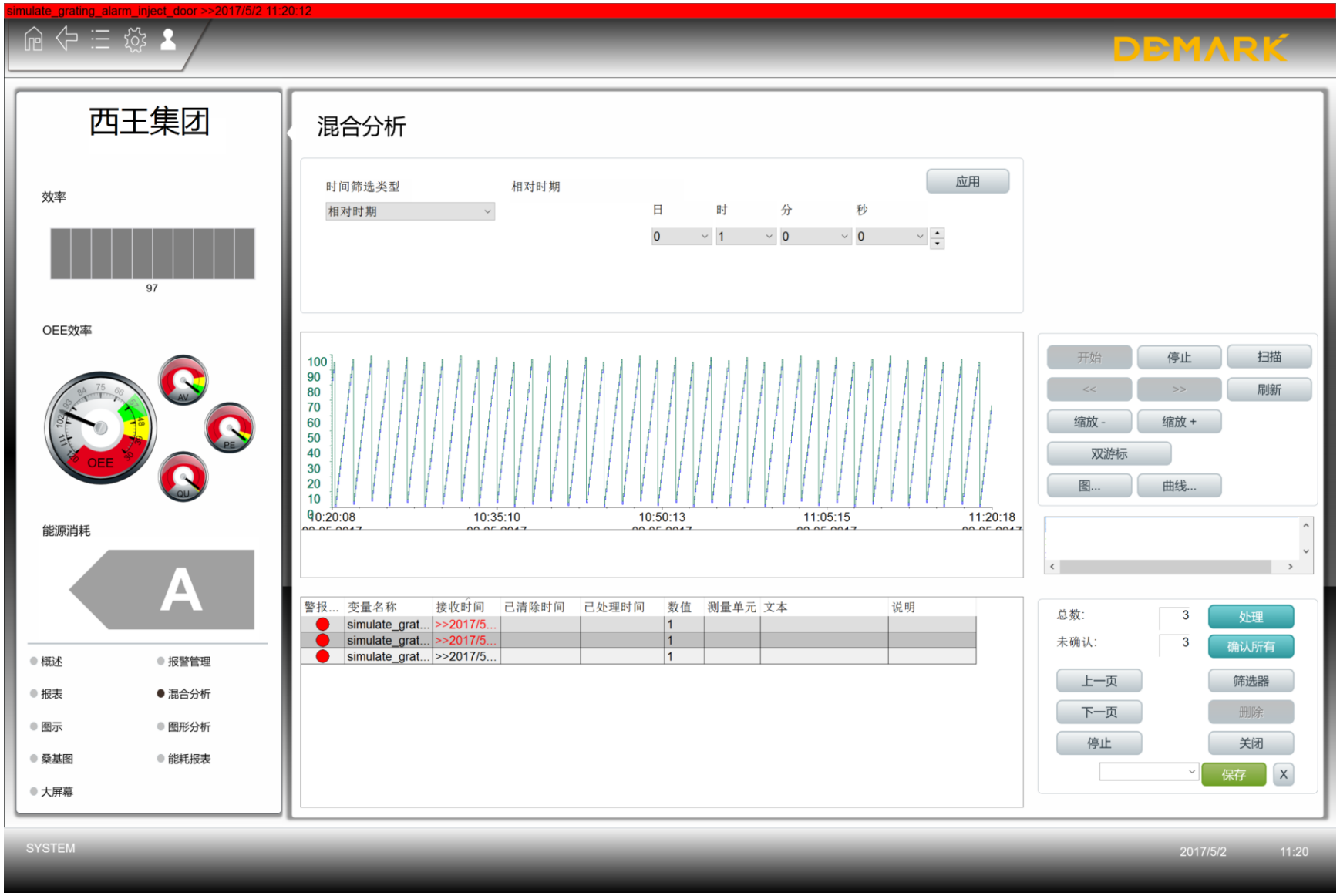
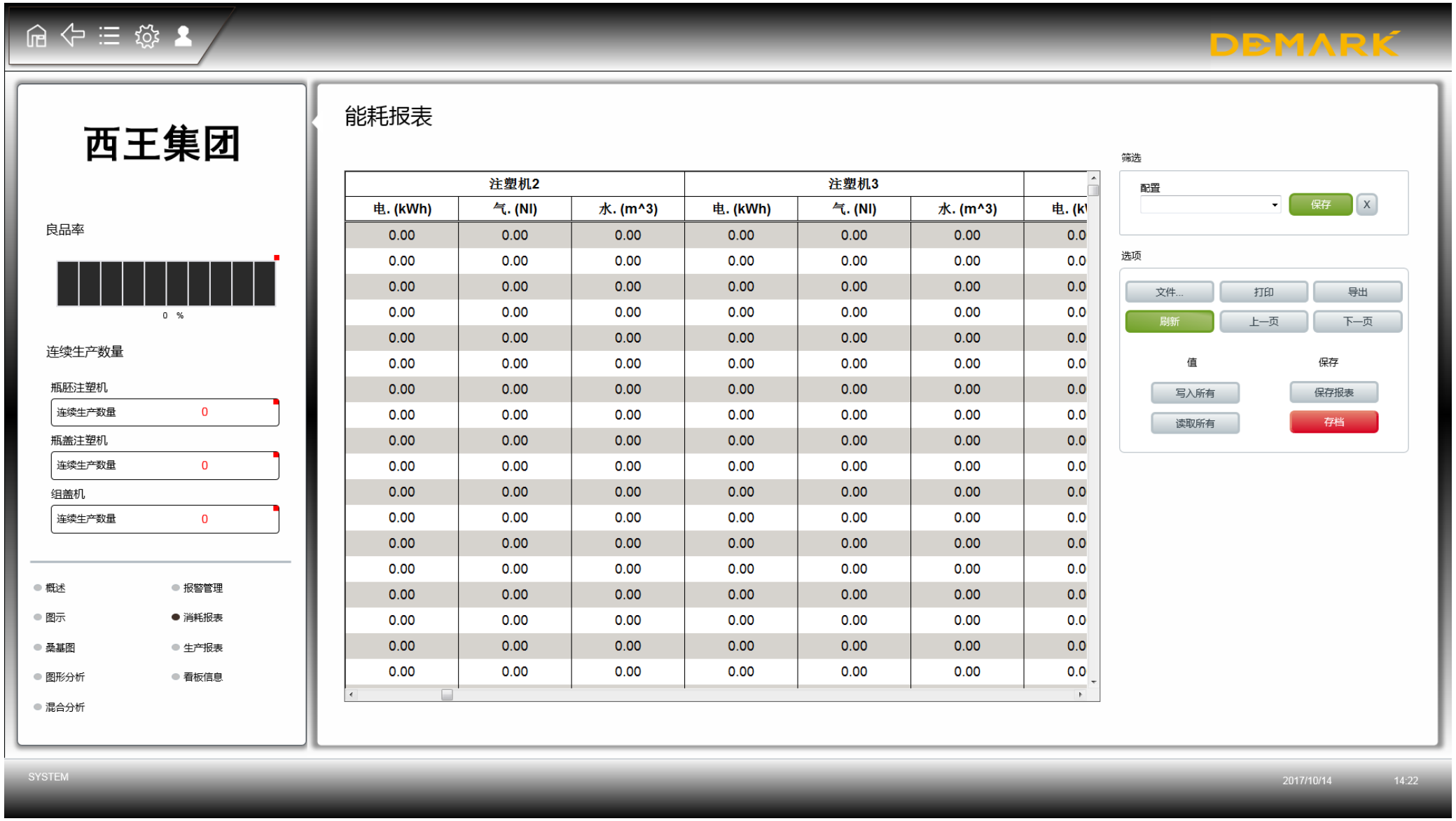
注塑机1
状态
注塑机
生产
生产总数量 0
连续生产数量 0
OEE效率
OEE
AV
PE
QU
设备
状态
报警
能耗
事件列表
消耗报表
帕累托图
生产报表
事件列表
接收时间 文本 变量名称 数值 测... 用户 - 全名 计算机名 说明
2017/10/14 14:05:29 系统启动 SYSTEM DEMARK-PC
2017/10/14 14:06:37 项目'EPLAS'重载 SYSTEM DEMARK-PC
2017/10/14 14:09:42 项目'EPLAS'重载 SYSTEM DEMARK-PC
2017/10/14 14:11:04 项目'EPLAS'重载 SYSTEM DEMARK-PC
2017/10/14 14:12:50 项目'EPLAS'重载 SYSTEM DEMARK-PC
2017/10/14 14:14:32 项目'EPLAS'重载 SYSTEM DEMARK-PC
2017/10/14 14:18:56 项目'EPLAS'重载 SYSTEM DEMARK-PC
2017/10/14 14:21:27 项目'EPLAS'重载 SYSTEM DEMARK-PC
2017/10/14 14:23:03 修改自发值：(1) sankey_air_control 1 SYSTEM DEMARK-PC
2017/10/14 14:23:04 修改自发值：(1) sankey_water_control 1 SYSTEM DEMARK-PC
2017/10/14 14:23:06 修改自发值：(1) sankey_electricity_co... 1 SYSTEM DEMARK-PC
注释
筛选
Current filter
[*]-[*]-[T,Rel:0d,1h,0m,0s]
筛选器
Total Events 11
配置
保存
X
选项
停止
打印
SYSTEM
2017/10/14
14:24

Graphical analysis

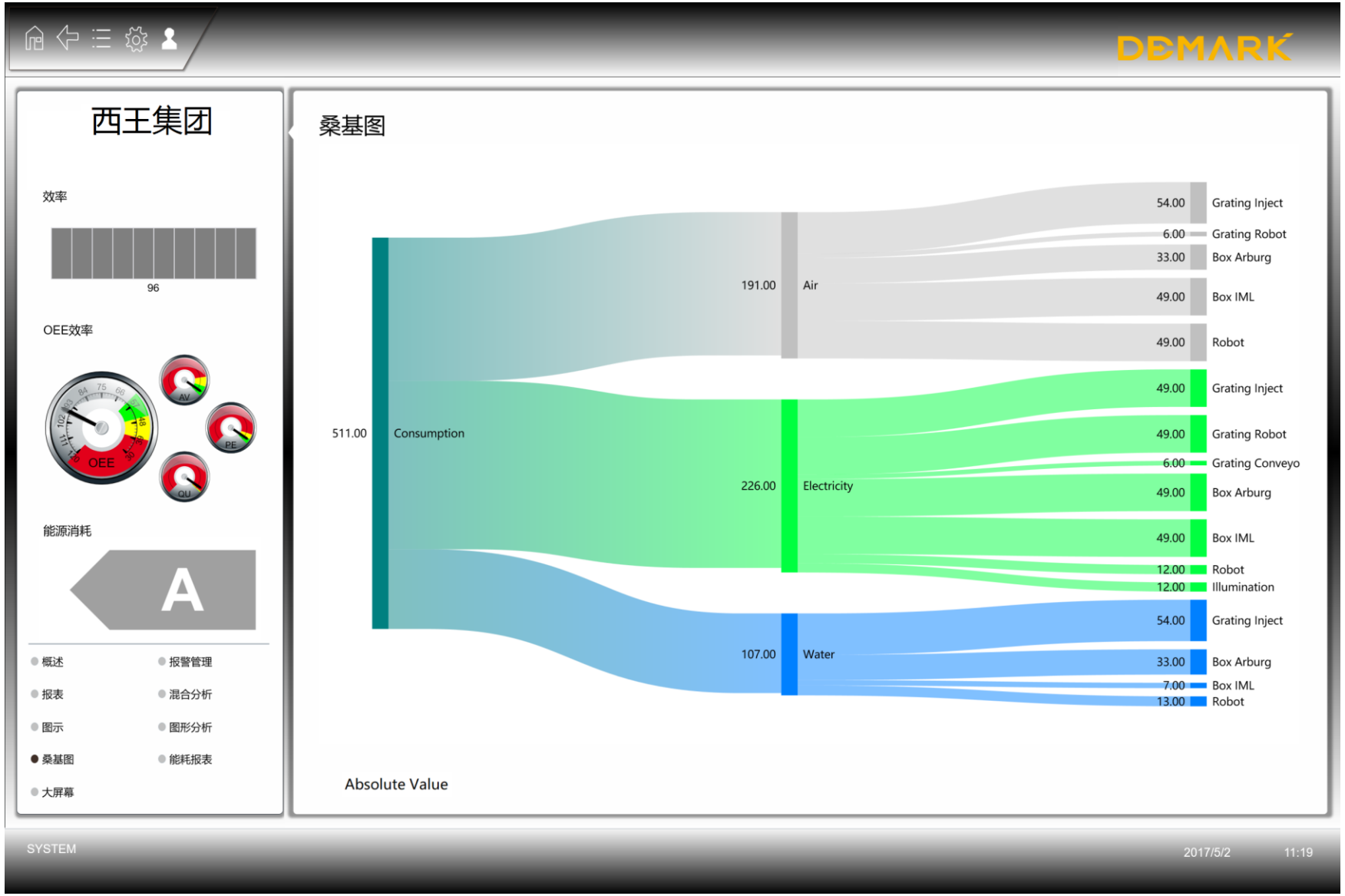
Mixed analysis



Pareto diagram



Sankey


西王集团
效率
96
OEE效率
OEE
AV
PE
QU
能源消耗
A
概述
报警管理
报表
混合分析
图示
图形分析
桑基图
能耗报表
大屏幕
桑基图
511.00
Consumption
191.00
Air
226.00
Electricity
107.00
Water
54.00
Grating Inject
6.00
Grating Robot
33.00
Box Arburg
49.00
Box IML
49.00
Robot
49.00
Grating Inject
49.00
Grating Robot
6.00
Grating Conveyo
49.00
Box Arburg
49.00
Box IML
12.00
Robot
12.00
Illumination
54.00
Grating Inject
33.00
Box Arburg
7.00
Box IML
13.00
Robot
Absolute Value
SYSTEM
2017/5/2
11:19

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感谢聆听 THANKS FOR WATCHING