Automatic Shelling OCTOPUS

九轴数控自动制壳&自动摘挂机械手-八爪侠



PATENT PENDING

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This OCTOPUS (9-Axis CNC automatic shelling and automatic gripping & hanging robot) has been researched & developed by our company for several years. And after many years of use in our foundry, the quality is stable and reliable. In 2022, we put OCTOPUS into production and on the market for selling. It is the best choice for investment casting foundries to realize the intelligent and digital transformation in shelling process.

九轴数控自动制壳&自动摘挂机械手“八爪侠”经过本公司多年研发，经在本公司多年使用，质量稳定可靠，于 2022 年实现量产对外销售。是精铸企业制壳工序生产实现智改数转的不二选择。



This OCTOPUS can automatically identify and grip the clusters from the matched carousel (shelling&drying line), and then coat slurry, control slurry and rainfall sand (float sand) for clusters. After that, it will automatically hang the clusters back to the carousel. Matched with our company's equipment of automatic slurry-adding, automatic sand-adding and slurry smoother, the automation of shelling production can be truly realized.

九轴数控自动制壳&自动摘挂机械手“八爪侠”可实现在配套的制壳干燥线（悬链）上自动识别模组并自动取件后进行粘浆、控浆、淋砂（浮砂）后再自动挂放至干燥线（悬链）上，再配套安装本公司的自动补浆、自动补砂及自动吹气后，可真正实现了制壳生产的自动化。

With the application of OCTOPUS, the shelling production becomes easier than before ever. The operation is simple and easy-to-learn, and maintenance and adjustment is convenient.

采用九轴数控自动制壳&自动摘挂机械手“八爪侠”进行制壳工序的生产，使精铸企业老大难的制壳工序变成了简单工序。操作简单易学，维护调整方便。

- **Comparison sheet of production efficiency and qualification rate for several shelling methods**
- **几种制壳方式的生产效率、合格率对比一览表**

Shelling line 制壳线	Hand-made shelling line 手工制壳线	General robot-arm shelling line 普通机械手制壳线	Automatic intelligent shelling line 自动智能制壳生产线	
Shelling Method 制壳方式	Hand-made shelling & fixed drying rack 手工制壳&固定干燥架	Manual gripping and hanging & shelling by robot-arm 人工摘挂&机械手制壳	Automatic Shelling by Robot 机器人摘挂&制壳	**Automatic shelling OCTOPUS** **自动制壳和自动摘挂机械手"八爪侠"制壳**
Shelling workshop area 制壳车间面积	1,500 ㎡	1,200 ㎡	1,000 ㎡	1,000 ㎡
Daily production capacity 每天产能 (8 hours/shift, 3 shifts/day)	1,200 clusters 串	1,200 clusters 串	1,400 clusters 串	1,800 clusters 串
Drying cycle/each layer 每层干燥时间	12-24 hours	8-10 hours	6-8 hours	6-8 hours
Each shell cluster weight 每串重量	15 kgs 33 lbs	30 kgs 66 lbs	30 kgs 66 lbs	30 kgs 66 lbs
Each casting cluster weight 每串铸件重量	23 kgs 50 lbs	45 kgs 99 lbs	45 kgs 99 lbs	45 kgs 99 lbs
Monthly production capacity 每月产能	100,000 kgs 220,462 lbs	100,000 kgs 220,462 lbs	120,000 kgs 264,554 lbs	150,000 kgs 330,693 lbs
Shelling scrap rate 制壳废品率	15%	5%	3%	3%
Shelling staff numbers 制壳员工人数	12 persons 12 人	8 persons 8 人	2 persons 2 人	1 person/shift 1 人/班

➢ Casting Roughness Comparison/铸件表面粗糙度对比

			Lost wax casting(low temperature wax)	
		Investment casting(low temperature wax)		
	Investment casting(medium temperature wax)			
Casting Roughness(Ra)	3.2	6.4	12.5	25
	Investment casting(medium temperature wax)			
		Investment casting(low temperature wax)		
			Lost wax casting(low temperature wax)	

Surface finish of Investment casting(low temperature wax)



Surface finish of Investment casting(medium temperature wax)



Casting Tolerance Comparison/铸件公差对比

Linear Dimensional Casting Tolerance Grades(DCTG)
Casting Tolerance (ISO 8062-3)

					Lost wax casting(low temperature wax)		
				Investment casting(low temperature wax)			
			Investment casting(medium temperature wax)				
Norminal dimensions(mm)		DCTG4	DCTG5	DCTG6	DCTG7	DCTG8	DCTG9	DCTG10
-	≤ 10	0.26	0.36	0.52	0.74	1.00	1.50	2.00
> 10	≤ 16	0.28	0.38	0.54	0.78	1.10	1.60	2.20
> 16	≤ 25	0.30	0.42	0.58	0.82	1.20	1.70	2.40
> 25	≤ 40	0.32	0.46	0.64	0.90	1.30	1.80	2.60
> 40	≤ 63	0.36	0.50	0.70	1.00	1.40	2.00	2.80
> 63	≤ 100	0.40	0.56	0.78	1.10	1.60	2.20	3.20
> 100	≤ 160	0.44	0.62	0.88	1.20	1.80	2.50	3.60
> 160	≤ 250	0.50	0.70	1.00	1.40	2.00	2.80	4.00
> 250	≤ 400	0.56	0.78	1.10	1.60	2.20	3.20	4.40
> 400	≤ 630	0.64	0.90	1.20	1.80	2.60	3.60	5.00
> 630	≤ 1000	---	1.00	1.40	2.00	2.80	4.00	6.00
			Investment casting(medium temperature wax)					
				Investment casting(low temperature wax)				
					Lost wax casting(low temperature wax)			

➢ Features/特征

Automatic Gripping & Hanging

自动摘挂





Working with automatic slurry-controlling by slurry smoother (eliminating air bubbles), automatic slurry-adding for slurry tank and automatic sand-adding for sand rainfall machine to realize intelligent shelling

配合自动吹气控浆（消除气泡）、浆桶自动补浆、淋砂机自动加砂，实现智能化制壳





CNC program controlled shelling actions, shelling actions can be shifted quickly and conveniently.

制壳动作数控程序化，各种制壳动作快捷调用





➢ Characteristic/特点



★Production efficiency increased

生产效率提高

★Product quality more stable

产品质量稳定

★Labor intensity decreased

劳动强度下降

★Production environment improved

生产环境改善

★Operation simple and easy-to-learn

操作简单易学



➢ Typical Automatic Shelling Line Configuration/典型制壳生产线配置

Automatic Shelling Line Typical Unit

(6 OCTOPUS + 6 Drying Line Carousels)

Basic Equipment

Item	Product Name	Specification / Instruction	Unit	Quantity
1	9-Axis CNC Automatic Shelling and Automatic Gripping & Hanging Robot **OCTOPUS** (Sand Floating) 九轴数控自动制壳自动摘挂机械手-八爪侠	LC-48483F0	PC	1
2	9-Axis CNC Automatic Shelling and Automatic Gripping & Hanging Robot **OCTOPUS** (Sand Rainfall) 九轴数控自动制壳自动摘挂机械手-八爪侠	LC-48483A0	PC	5
3	Energy-saving Slurry-dipping Machine (Frequency Conversion) 节能粘浆机（变频）	ZJJ18-1200*750	PC	6
4	Sand-floating Tank for Primary Coating (Frequency Conversion) 浮砂桶（变频)	FSJ2-18-800*1000	PC	1
5	Roller Sand-rainfall Machine (Frequency Conversion) 滚筒淋砂机（变频）	GLS18-1600*900	PC	5
6	Drying Line (automatic operation) 干燥线（自转）	Distance 480MM/300 Meters 间距480mm/300米	PC	6
7	Clusters Storage Line 蜡模存储线	Distance 480MM/300 Meters 间距480mm/300米	PC	1
8	Converter/Shift-Line Robot (shelling line) 转线机器人（制壳线）	Pre-wetting/Line-shift 预湿/转线	PC	1
9	Automatic Shelling Line Control System 自动线制壳线控制系统	Software + Commissioning 软件+调试	Set	1

Typical Automatic Shelling Line Unit Production Capacity

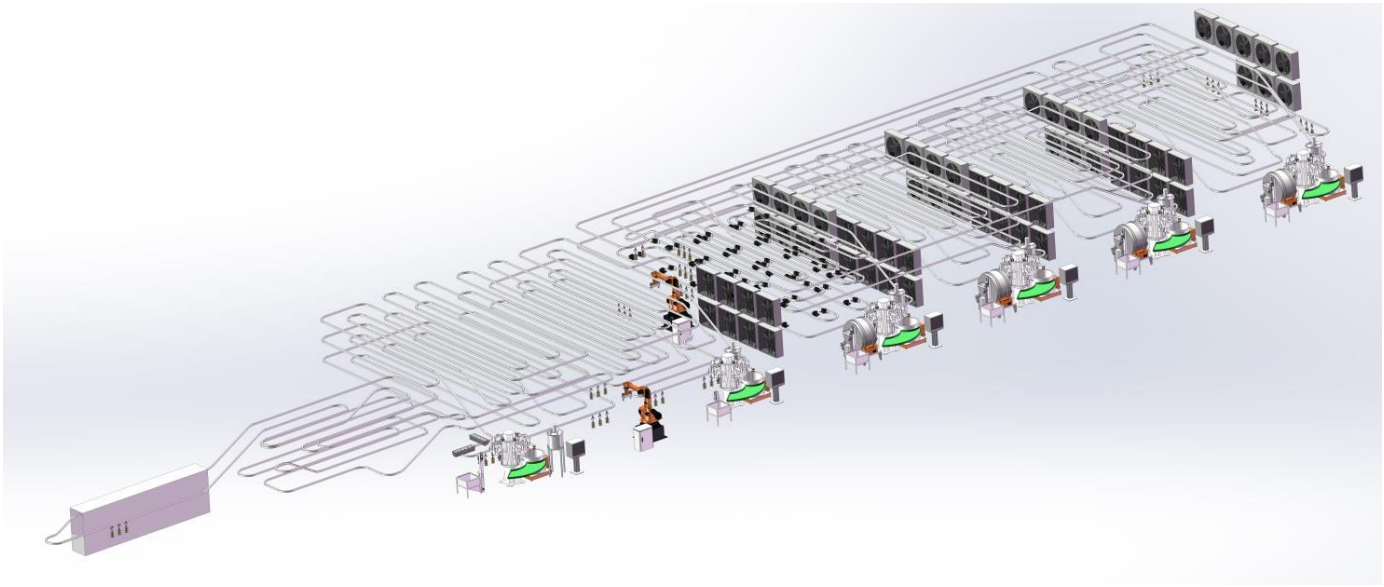
1	Daily production capacity(8 hours/shift, 3 shifts/day) 每日产能 （8小时/班，3班/天）	Max 1,800 clusters/day 最多1,800串/天
2	Each shell cluster weight 每串模壳重量	Max 30 kgs/cluster ≤30公斤
3	Time for one shelling cycle for one OCTPUS 八爪侠单工位制壳循环时间	About 70 seconds 约70秒
4	Shelling workshop staff numbers 制壳员工人数	1 person/shift 1人/班
5	Shelling workshop area 制壳车间面积	About 1000 ㎡ 约1000平方米
6	Power comsumption 功能消耗	About 150 KW 装机约 150KW

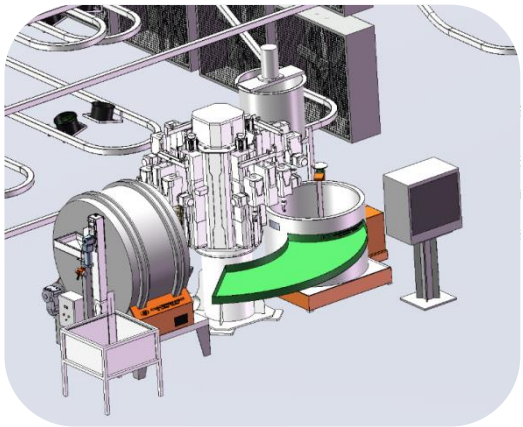
Optional Equipment

Item	Product Name	Specification / Instruction	Unit	Quantity
1	Clusters Auto-cleaning Machine 模组自动清洗机	L800W600H600	Set	1
2	Automatic Slurry-smoothening Machine 自动吹气机		Set	6
3	Slurry-controlling Tank 控浆槽	With bracket 含支架	Set	6
4	Slurry tank level detection and tracking 浆桶液位检测及跟踪	50mm	Set	6
5	Automatic Slurry-adding System 自动补浆系统	With Slurry-adding tankΦ800*700 含补浆桶Φ800*700	Set	6
6	Automatic Sand-adding System 自动加砂系统	Bucket-lifting Type 提升斗式	Set	6
7	Slurry tank automatic water adding system 浆桶自动加水系统		Set	6
8	Cluster bar 模组十字棒芯（非坩埚型）		Set	9600
8	Slurry pre-mix machine 浆料快速搅拌机		Set	4
9	Slurry pre-mix tank 节能配浆桶		Set	6

➢ Typical Automatic Shelling Line Layout

➢ 典型自动制壳生产线布局





Contact:

International Sales Company:

JOC MACHINERY CO., LTD.

Address: 20/F., 26 N. Zhongshan Rd, Nanjing, Jiangsu, China, 210008

Contact Person: Brooks Xu

Tel: +86 13770914070

Email: brooksxu@jocmachinery.com

peter@jocmachinery.com

中国销售：**江阴鑫联金属制品有限公司**

公司地址：江苏省无锡江阴市新桥镇丰园路 7 号、东园路 2 号

联系人：于万旭 13915234569 臧俊国 15861611058 潘开锋 13912450602

邮箱：sales@uni-metals.com;

yuwanxu@uni-metals.com