

滁州市精美家电设备股份有限公司

KCM MACHINE MANUFACTURING CO., LTD

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**KCM** 精美家电  
设备制造

## 产品画册

滁州市精美家电设备股份有限公司

KCM MACHINE MANUFACTURING CO., LTD

KCM MACHINE  
MANUFACTURING

HONEST  
COOPERATION

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# OVERVIEW FROM KCM

## 滁州市精美家电设备股份有限公司简介

KCM Machine Manufacturing Co., LTD is a Professional Manufacturer for Machine and Mold& Tools in Making Home Appliance Product such as Refrigerator and Chest Freezer etc.... As an international market - oriented manufacturer, KCM has Two Division separately that one for Equipments and another one for Mold and Tools. KCM located in CHUZHOU city of Anhui province in China, half an hour's way of distance from NANGJING International Airport of Jiangsu Province. There are Totally around 157 staffs in the company which including R&D Engineers and Technical personnel 55 people that percentage by 35% of KCM total Personnel, Among them Around 45 technical personnel directly engaged in product development, accounting for 28.7% of its work force. generator and Chest Freezer etc....

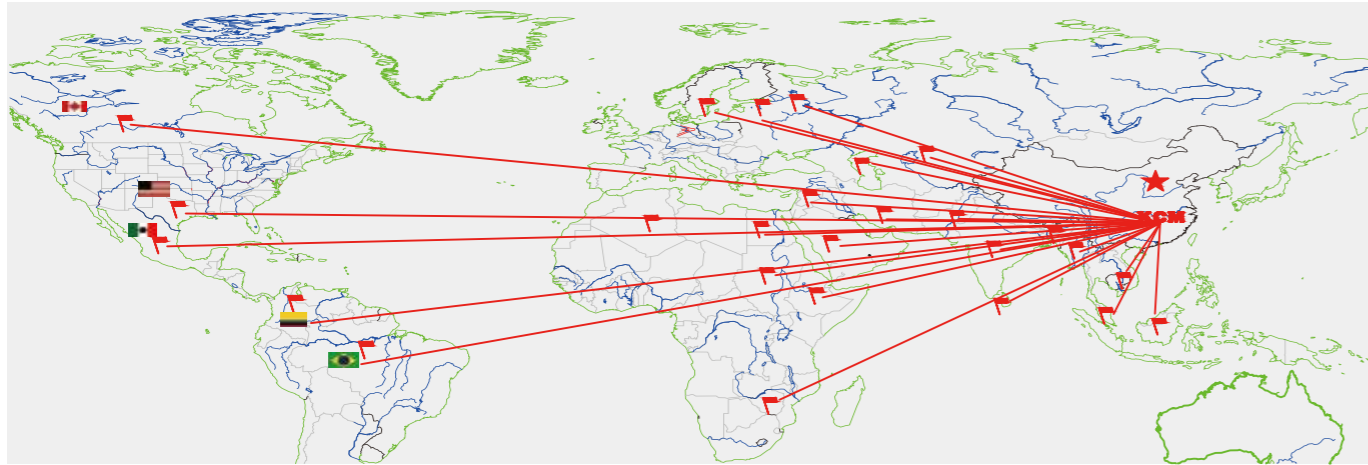
Since KCM was found in July 2009, Partnership Ties were built by more than 35 countries including Germany, South Africa, Egypt, Iran, Turkey, the United States, South Korea, Canada and India, etc. and Oversea Clients with KCM such as LIEBHERR, SIEMENSE, ALASKA, KLIMSSAN, SHARP, TOSHIBA, ELECTROSTAR, EMERSUN and so on, As well as Domestic well-known Brand Manufacturers like HAIER, MIDEA, LG, HISENSE, SHARP MEILING, SIEMENSE, TCL etc.

滁州市精美家电设备有限责任公司是一家以国际市场为导向的家电机械设备及相关装备模具的设计及生产制造厂家，公司位于紧邻南京半小时圈的安徽省滁州市，公司现有员工 157 人，其中各类专业技术人员 55 人，占员工总数的 35%，直接从事产品开发的技术人员达 45 人，占员工总数的 28.7%。

公司自 2009 年 7 月组建以来，公司的产品已经拓展到美国、加拿大、德国、俄罗斯、南非、埃及、伊朗、土耳其、韩国、印度等 40 多个国家，公司先后与海内外如西门子，利勃海尔，夏普，东芝，海尔集团、美的、LG、海信、三菱、TCL 集团、IAC 集团等多家知名企业进行广泛合作。



## COMPANY PROFILE 公司简介



KCM covers an area of nearly 20,000 square meters. And wide range of advanced mechanical processing Machines, Multiple CNC Machine Center, Image Measuring Instrument with High Precision, Electronic Automatic Tensile Testing Machine, Milling Planer, WEDM, etc. Advanced processing facilities is critical for guarantee KCM Product Quality and Delivery Time.

精美设备占地面积近 20000 平方米。公司拥有各种先进的机械加工机床、多数控加工中心、高精度图像测量仪、电子自动拉伸试验机、铣床、WEDM 等。先进的加工设施保证了精美设备产品的质量和交付时间。

## KCM MANAGEMENT OF CULTURE AND PHILOSOPHIES

### 精美的企业文化

<b>LOYALTY</b> 忠诚	LOYALTY IS THE MOST VALUABLE QUALITY; 忠诚最具有价值;
<b>INTEGRITY</b> 诚信	HONESTY AND CREDIT IS LIFE ALL LONG; 诚信是立身之本;
<b>HARDWORK</b> 勤劳	HARDWORK LEADS TO FINAL SUCCESS EVEN NO FAST AND CLEVER; 成功往往来源于勤奋, 勤能补拙;
<b>RESPOSIBILITY</b> 责任	POWER AND COURAGE AFFORDING DUTY AND NOT BELONG TO COWARDICE; 责任不属于懦弱及无能的人;
<b>ENTHUSIASM</b> 热情	WITHUOT ENTHUSIASM WILL LEAVE WORLD ONLY INDIFFERENCE; 热情是打开冷漠人际的钥匙;
<b>DEDICTED</b> 敬业	POTENTIAL ABILITY BASED ON DEDICATION MORE OR LESS FOR YOUR WORK; 爱岗敬业方能激发潜能;
<b>THRIFTY</b> 节俭	TRADITIONAL VERTUE OF CHINESE IN HISTORY; 中华民族的传统美德;

## KCM ACHIEMENT AND CERTIFICATE

### 精美设备的成就及证书

KCM is now a company integrated with informatization and industrialization, it has won many titles like Private Sci - Tech Enterprises in Anhui Province, High - Tech Enterprises in Anhui Province, Excellent Enterprise of Intellectual Property Rights in ChuZhou City. KCM has been a member of the China Die & Mold Industry Association. It has also participated in setting three national standards, with Punching Guiding Slider being one of them. What's more, KCM has won a number of invention and Utilit model patents, and has obtained the GB/T19001-2008 GB/T24001-2004 Environmental Management System and Quality Management System Certification.

Based on the focus of high starting point and high level, KCM has set the most rigorous and careful arrangements in the area of institutional framework, personnel allocation, R & D gradient as well as equipment purchasing. With a group of experienced technical services team, KCM has made great breakthroughs in terms of new product development, new technology innovation and technology improvement. KCM observes the principle of—Achievements in Science and Technology, Efficiency in Research and Development and always regards technical and product innovation as its most important work. The scientific attitude held by the company created an excellent overall condition in the product innovation.

精美是一家集信息化和工业化于一体的公司, 曾荣获安徽省民营科技企业、安徽省高新技术企业、滁州市知识产权优秀企业等多项称号。精美一直是中国模具工业协会的成员。它还参与制定了三项国家标准, 《冲压导向滑块》就是其中之一。此外, 精美还获得了多项发明和实用新型专利, 并获得了 GB/T19001-2008 GB/T24001-2004 环境管理体系和质量管理体系认证。

聚焦于高起点、高水平的重点, 精美设备在机构框架、人员配置、研发梯度以及设备采购等方面做出了最严格、最细致的安排。凭借一支经验丰富的技术服务团队, 精美在新产品开发、新技术创新和技术改进方面取得了巨大突破。精美遵循“科技成就、研发效率”的原则, 始终将技术和产品创新视为其最重要的工作。公司秉持的科学态度为产品创新创造了良好的整体条件。



# SHEET METAL FORMING EQUIPMENT

## 钣金成型设备

### 1. SHEET METAL WORKS 钣金类

The Side Panel Roller Forming Line is specially for fridge outer shell processing which is composed by loading station, punching and piercing, 180°turnover, roller forming, Z-L bending, belter conveyor and U bending(if have) together with Robot Device for Taking off finished Parts for moving to required place for next operation.

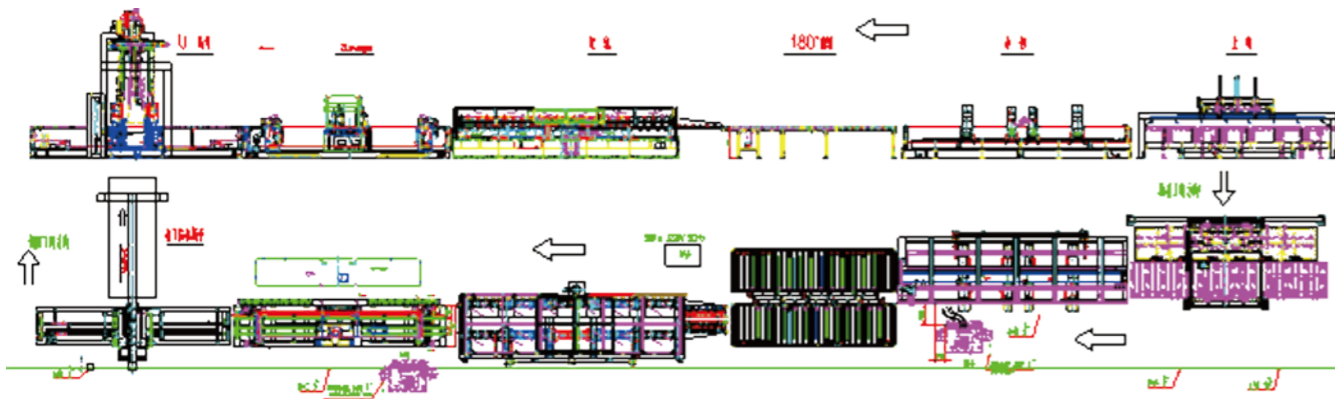
侧板辊轧成型线是专门用于加工冰箱外壳的，由上料工位、冲切冲孔工位、180°翻转工位、辊轧成型工位、Z-L折弯工位、皮带输送和U折弯(如果有)以及用于取下成品钣金件并移动到所需位置的机器人组成。

#### 1.1. KCM ROLLER FORMING LINE

##### 精美辊轧成型线

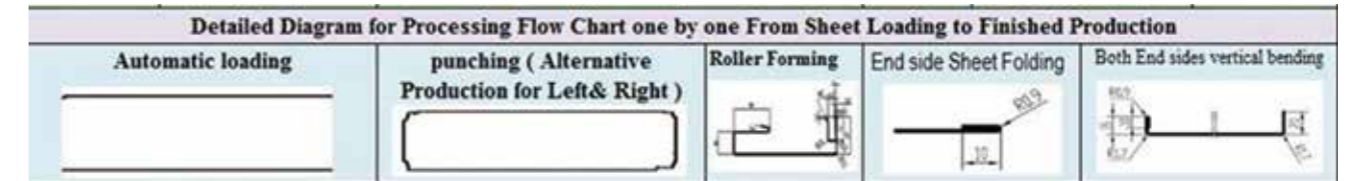
##### 1.1.1 HAIER REFRIGERATOR SIDE PANEL FORMING LINE

###### 海尔冰箱侧板成型线



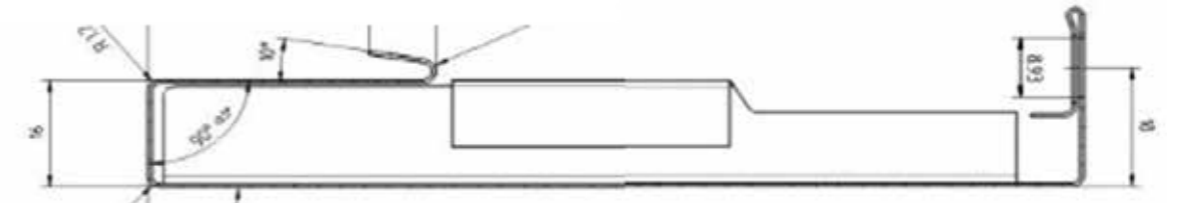
##### 1.1.2 SUDAN LIEBHERR ROLLER FORMING LINE BY SINGLE SIDE PANEL (R&L);

###### 苏丹利勃海尔左右侧板辊轧成型线



**Processing Flow:** Automatic Loading → Punching and Piercing Station → Roller Forming → End Side Bending Both Sides → Final End Side Vertical Bending → Unloading by One Left Piece and Then Right Piece, Material by PCM or Cold Roll Steel Sheet by 0.45-0.55mm.

加工流程：自动上料，冲切冲孔，辊轧成型，双边端边折弯，端边垂直折弯，左右侧板下料。材料是厚度0.45-0.55mm的PCM或者冷轧板。



DOMESTIC CUSTOMER BY ZHONGGU RETAILER AUTOMATION MACHINE FOR SIDE U-SHELL ROLLER FORMING LINE

国内客户-中谷U型壳侧板自动成型线



1.1.4 IRAN CUSTOMER BY AYDIN WIDE SERIES REFRIGERATOR U-SHELL SIDE PANEL ROLLER FORMING FULL AUTO LINE

伊朗客户AYDIN宽系列冰箱U型外壳侧板辊轧成型全自动生产线



1.1.5 PAKISTAN VARIOLINE VISI-COOLER SIDE PANEL ROLLER FORMING FULL AUTO LINE

巴基斯坦VARIOLINE 侧板辊轧成型全自动生产线



1.1.6 THAILAND SANDEN U SHELL FORMING LINE WITH DECOILING, LEVELING, LENGTH CUTTING, ROBOT UNLOADING

泰国U壳成型线，包括开卷工位，校平工位，定长切断，冲切，翻转，辊轧，Z-L折弯，U型折弯，机器人下料。

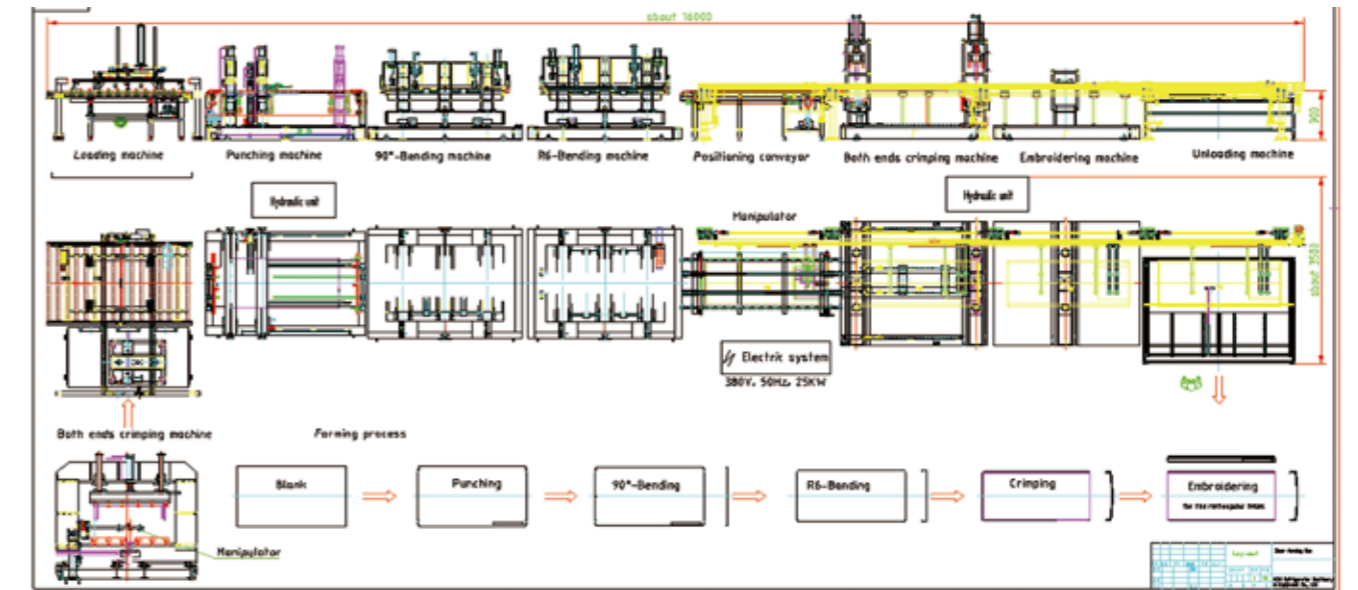


1.2 OVERVIEW OF KCM DOOR METAL LINE'S ACHIEVEMENT

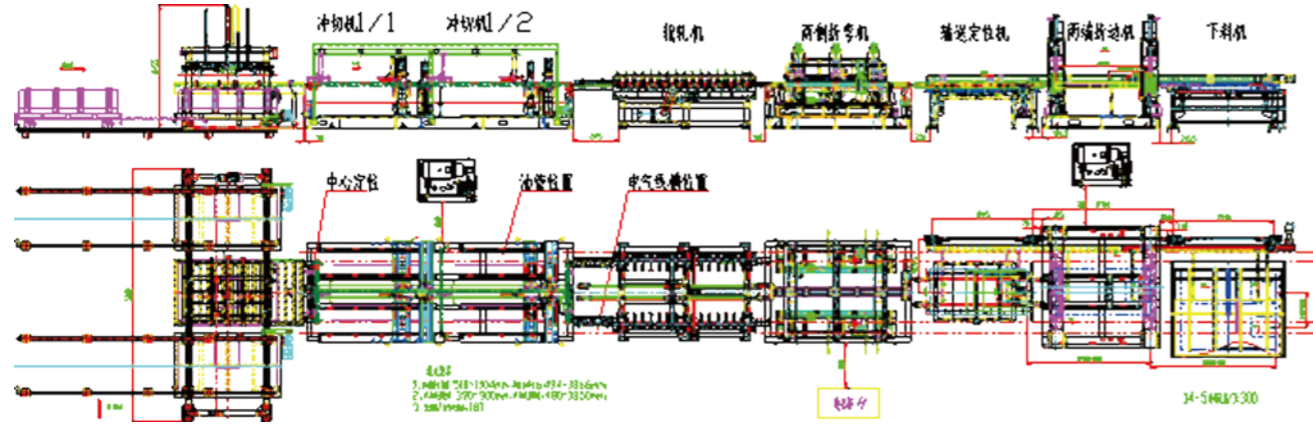
门壳成型线

1.2.1. DOOR FORMING MACHINE FOR CAPRI SOUTH AFRICA

南非CAPRI的门壳成型设备



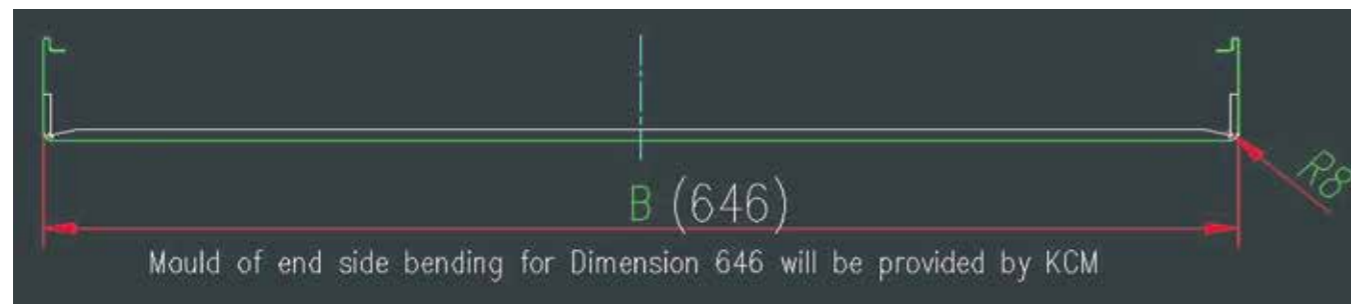
1.2.2 KCM DOOR FORMING LINE FOR IRAN ELECTROSTEEL BY HIDDEN CAP STYLE  
 伊朗-隐藏门端盖门壳成型线



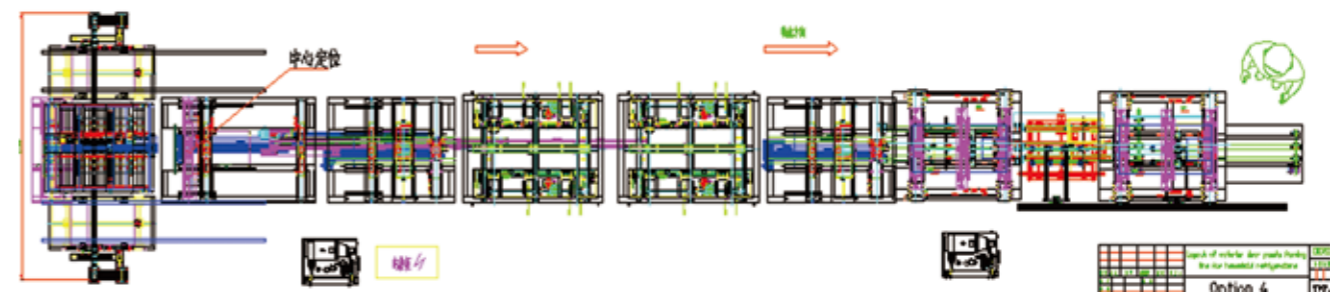
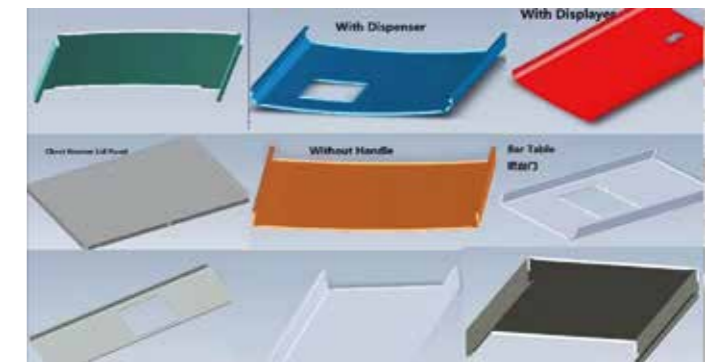
Working Procedure by Processing Flow : See below in details.

Automatic Door Panel Sheets forming line for refrigerator & freezer's doors as the attached 2 profiles (including → 1. Two trolleys automatic sheet loading → 2. punching with set of moulds for profile 1 & 2 → 3. roller forming → 4. both side bending profile → 5. mechanical arm → 6. end side bending with set of moulds for profile 1 → 7. Displayer and Water Dispenser Forming Station. → 8. Unloading with pneumatic.

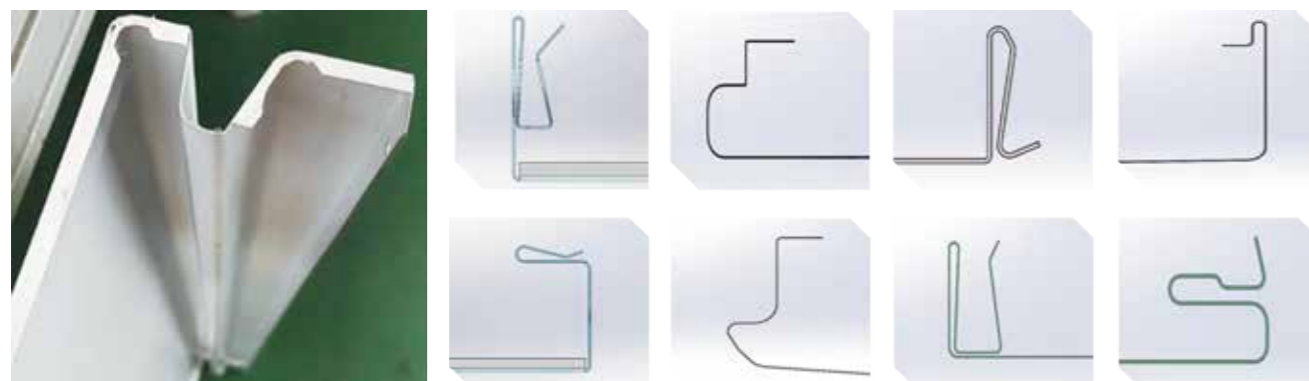
侧板辊轧成型线是专门用于加工冰箱外壳的，由上料工位、冲切冲孔工位、180°翻转工位、辊轧成型工位、Z-L 折弯工位、皮带输送和 U 折弯（如果有）以及用于取下成品钣金件并移动到所需位置的机器人组成。



1.2.3 DOOR PANEL FORMING LINE FOR DIROIT UKRAINE, INCLUDING LOADING-PUNCHING-CORNER FLANGING-END FLANGING  
 乌克兰门壳成型线，先角部翻边，再端边翻边。更适合应用于系列产品。



**1.2.4 CNC FLEXIBLE DOOR FORMING LINE FOR GLORY RUSSIA FOR VARIOUS SHAPE PRODUCTION, DECOILING-LEVELING-PUNCHING-CNC BENDING-TWO PARTS CUTTING/SEPARATING- END FLANGING.**  
多形状门壳CNC折弯成型线。可以通过编程的方式以达到多种形状的门体成型。



**1.3 OTHER SIMPLE WAY FOR PROCESSING DOOR END SIDE BENDING BY METAL STAMPING DIES**

**门壳成型钣金模具**

Above mentioned by Hydraulic Press Tools or Special Press Machine for working together with Metal Stamping Dies to finish All needed End Side Bending Processing, and this way is simply and Cheaper for New Model Investment in the Initial marketing development.

上面提到的液压压机或专用压机与金属冲压模具一起工作，完成所有需要的端边折弯，这种方式适用于早期新模型的开发，较为简单价廉。

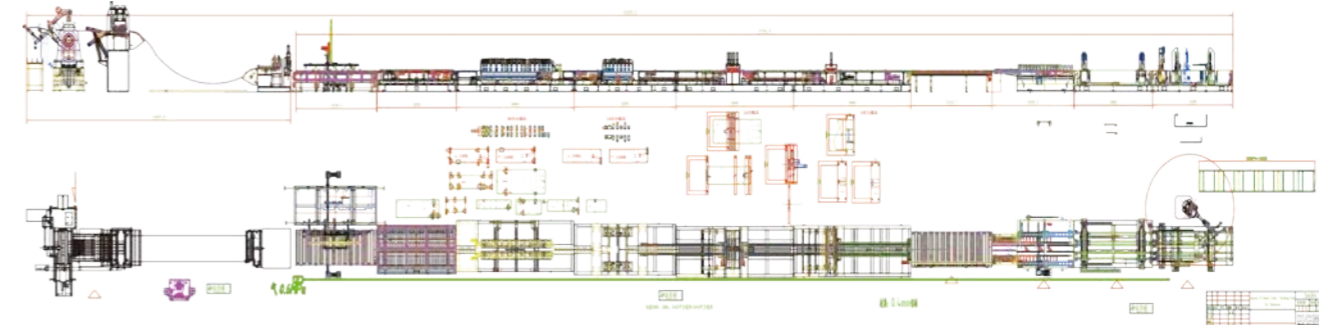


**1.4 INNER TANK METAL FORMING LINE**

**内胆钣金成型线**

**1.4.1 INNER TANK BOTTOM PANEL FORMING LINE FOR SANDEN THAILAND, DECOILING-LEVELING-LENGTH CUTTING-LOADING/STOCKING-PUNGHING1,2,3,4-180 TURN-OVER-ROLLER FORMING-U BENDING-ROBOT UNLOADING**

开卷，较平，长度方向切断，上料，冲切，180度旋转，辊轧成型，U折，机器人下料

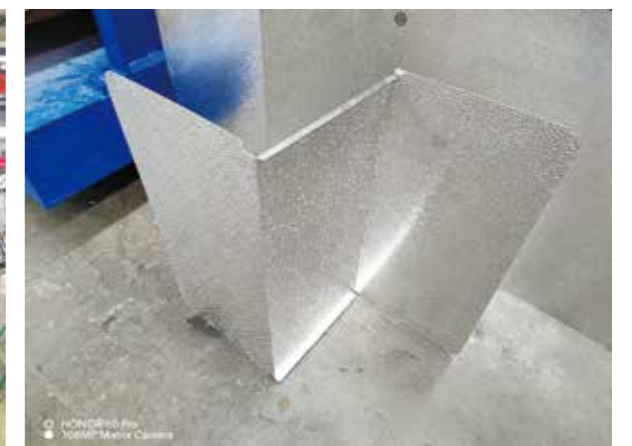


**1.4.2 Z SHAPE INNER TANK FOR FROST RUSSIA**

**Z底板内胆成型线**

Loading-punching-roller forming-end bending-U bending

上料,冲切,辊轧成型,端边折弯,U折



**1.4.3 BIG/SMALL C INNER PANEL FORMING LINE**  
大小C内胆成型线

Loading-punching-Roller forming-End bending-U bending  
上料, 冲切, 辊轧成型, 端边折弯, U折



**1.5 MULTI FUNCTION FORMING LINE**

多功能成型线, 可用于生产冷柜前后左右板以及门板。

**1.5.1 CHEST FREEZER OUTER SHELL FRONT+REAR+LEFT+RIGHT PANEL INTEGRATED FORMING LINE, LOADING-CLAMPER PUNCHING-SIDE BENDING-END BENDING**

前面板+后面板+左面板+右面板一体化成型线, 上料-夹钳运输并冲孔-侧折弯-端边折弯

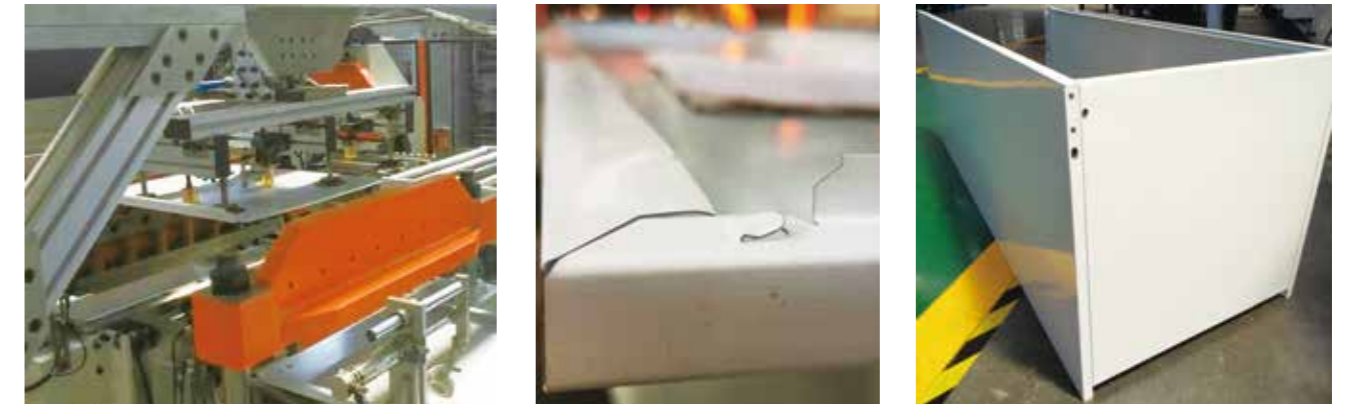


**1.5.2 FRIDGE SIDE PANEL + TOP PANEL FORMING LINE**

冰箱侧板+顶板成型线

Decoiling-leveling-length cutting-punching-roller forming-top/side cutting-top panel ZL bending-top panel end bending-side panel end corner forming

开卷, 校平, 长度方向定尺切断, 冲孔, 辊轧成型, 切断, 顶板 ZL 折弯, 顶板端边折弯, 侧板端边角部成型



**1.6 WASHING MACHINE OUT SHELL BENDING AND RIVETING MACHINE**

洗衣机外壳折弯铆接机



## PU FOAMING MACHINE 发泡设备

### 2. PU FOAMING PLANT PU 发泡设备

PU Foaming Equipment normally used in Isolation Layer Production for Refrigerator, Chest Freezer, Water Dispenser, Retailer Automation Machine etc.... This Equipment is concluded by Cabinet PU Foaming and Door Body Foaming as following in details:

#### ADVANTAGE:

Auto adjustable in width and length, so different model can be produced in one fixture, only changing the inner plug, the mold changing is also quickly, because the mold can be taken on the moving carrier and moving to belt line, auto raise to the top position, manually positioning and auto locking and fixing the mold frame to fixture top frame.  
长度和宽度可以自由调节, 不同型号的产品可以在同一台夹具生产, 仅需更换发泡模具即可。

01

Suitable to mass production, especially the one model for large quantity production, because if frequently changing mold for different model, it will take more for stopping whole line in waiting for finishing mold changing.  
适用于批量生产, 特别是一种型号的大批量生产。

02

High efficiency in full auto production procedure: Because of cabinet are fully feed, unloaded and injected and heated etc, thus the operator only checking and cleaning the foaming scraps after curing and feeding another one.  
全自动生产程序效率高。

03

Place occupation compact than carousel line because of the circling moving around an round railway on the ground.  
更加节约空间, 效率更高。

04

## 2.1. CABINET FOAMING FIXTURES 箱发夹具

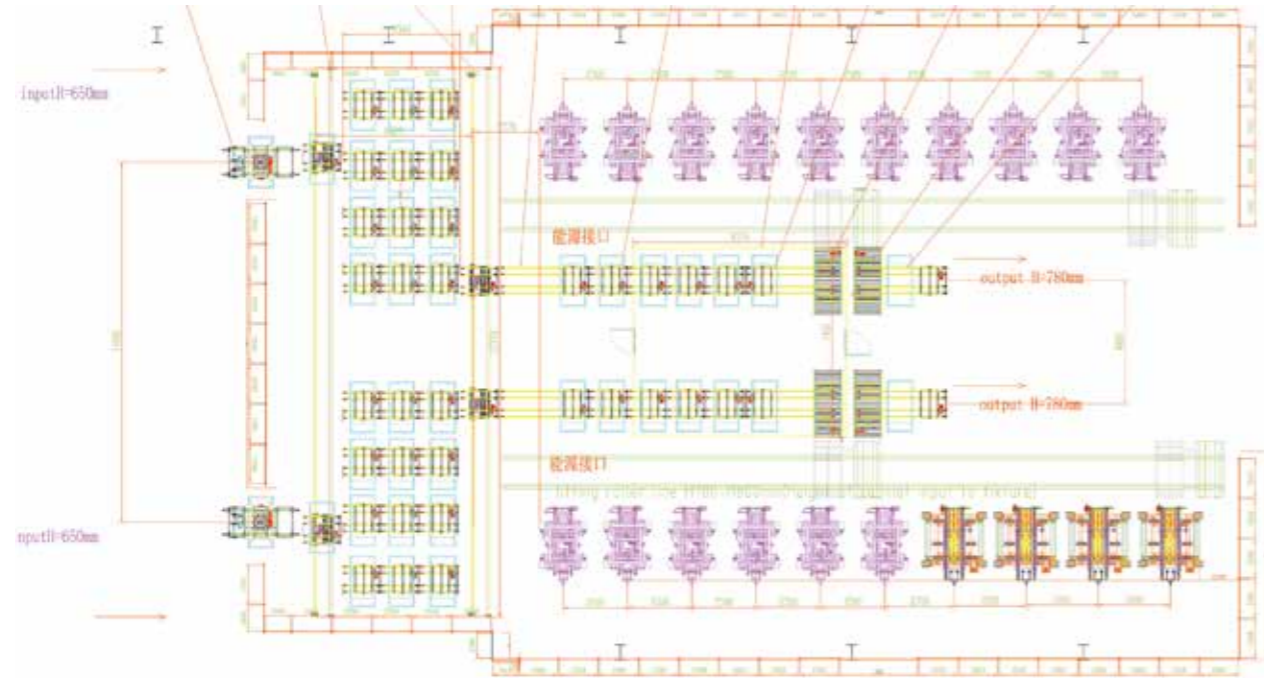
2.1.1 Motor driving, fixture move up/down by motor, side walls open/closed by mechanism, injected from front or rear side, normally used for small cabinet, less cost, more noise;

电机驱动, 夹具由电机驱动上下移动, 侧板开启 / 关闭是机械结构, 从前侧面或后侧面冲注, 通常用于小型机柜, 成本低, 噪音大;



巴基斯坦海尔 20 工位箱体发泡夹具





24 STATIONS CABINET FOAMING LINE FOR DIXON INDIA

24工位箱体发泡线

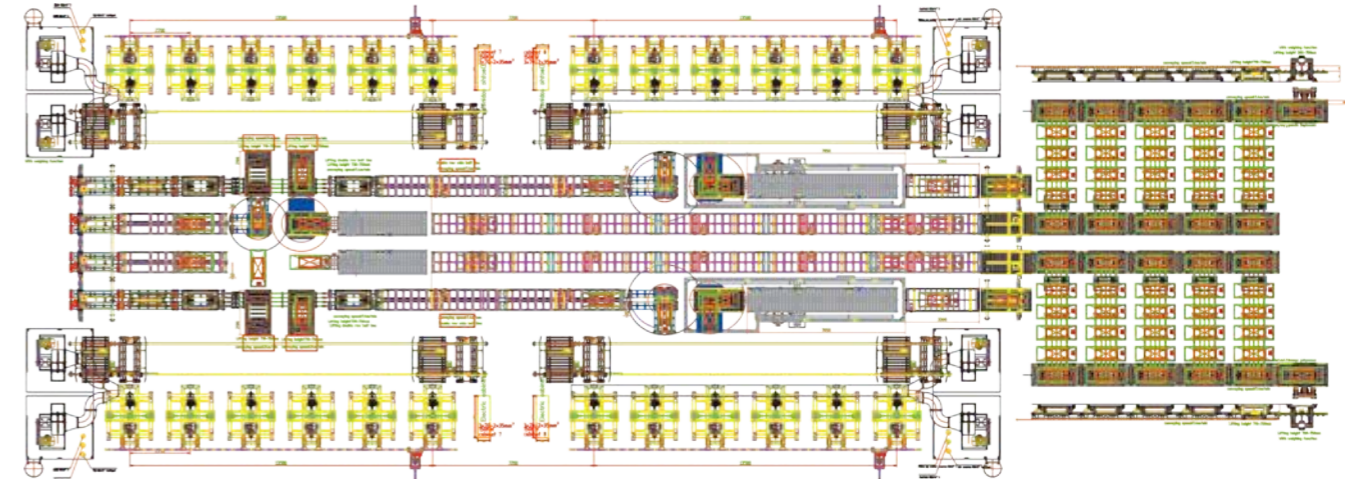
Motor driving via ball screw, 4 injection gun, 4 double direction shuttle, 4 pre-heating house, Width/length automatic adjusting by servo system.

电机通过滚珠丝杠驱动, 4个充注枪头, 4个双向运载小车, 4个预热室, 宽度/长度由伺服系统自动调节。



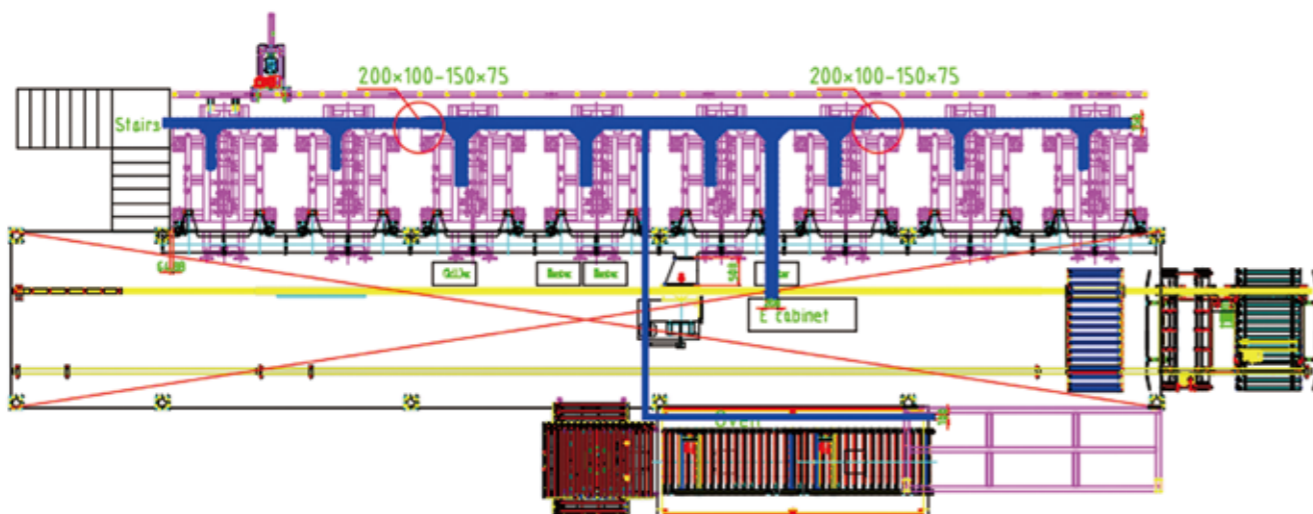
EIGHT STATIONS CABINET FOAMING LINE FOR ALASKA EGYPT

八工位直线箱发线



fixture move Up/down by oil cylinder with four column, side wall opened/closed by mechanism, structure more compact, used for big width over 800mm, slight noise.

夹具上下由四柱油缸驱动, 侧板开合是机械结构, 更加紧凑, 适用于 800mm 以上的宽度, 噪音小。



**EIGHT STATIONS FOAMING LINE FOR THAILAND**

泰国八工位商业冷柜大尺寸箱体发泡线

Hydraulic lifting, double belt feeding, one Injection gun and one loading/unloading shuttle.

液压上下, 双皮带送料, 一个充注枪, 以及一个上料 / 下料小车。



**XINGYUAN HUNAN FOUR STATIONS FOAMING LINE.**

四工位箱体发泡线



**2.1.2.3 HAIER PROJECT IN RIZHAO FACTORY FOR CABINET PU FOAMING BY 6 STATIONS:**

六工位箱体发泡线



**2.1.3. HYDRAULIC DRIVING FIXTURE LIFTING UP/DOWN VIA 4 COLUMN, CABINET FACE DOWN, INJECTING FROM TOP, USED FOR BIG SIZE CABINET.**

四柱液压发泡夹具, 箱体口朝下发泡, 顶部充注。适用于大尺寸箱体。



**2.1.4 SETTLE FIXTURE**

定制式发泡夹具

Integrated out plate and inner plug together, open and closed by pneumatic cylinder, featured with lower cost, easily operation and maintenance. Normally equipped crane for loading and unloading cabinet manually, injection hole most on back side.

内外模一体, 采用气缸控制外夹打开关闭, 成本低, 操作维护方便。充注孔多在背面。

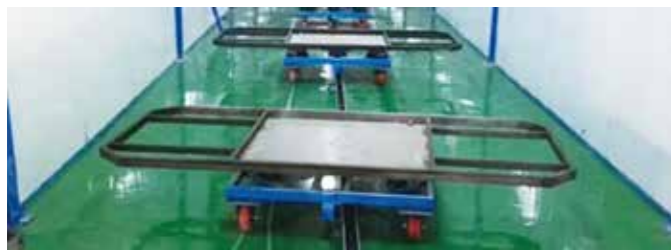


### 2.1.5 CAROUSEL CABINET FOAMING LOOP LINE

#### 箱体发泡地轨循环线

Multi settled fixtures connected end to end, cycled around on a rail, featured with low cost, easily operation and maintenance, but occupies big area.

多台夹具环形相连，在轨道上循环运行，成本低，操作维护方便，但占地面积大。



## 2.2 DOOR FOAMING LINE

### 门发泡夹具

#### 2.2.1 ROTARY DRUM FOR DOOR BODY FOAMING

##### 门体发泡转鼓 (4-8工位)

DOOR BODY PU FOAMING BY ROTARY DRUM WITH 4- 8 STATIONS.

4-8工位门体旋转发泡

Detailed Information About KCM Rotary Drum for Door PU Foaming Plant



### DETAILED INFORMATION

#### 详细信息

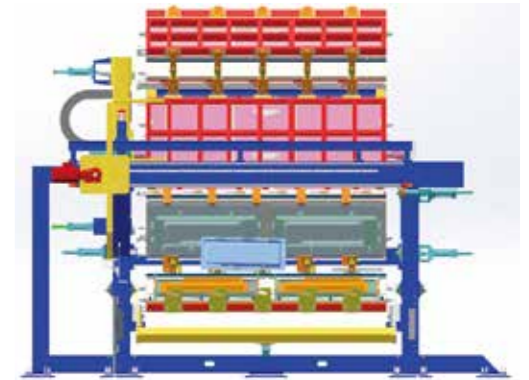
- Outline dimensions of machine (LxWxH): about (6100×6000×4600) mm (reference)
- workstations: 8
- dimensions of mould plate (LxW): 2000mm x 900mm (can be provided in accordance with customer's special requirements)
- closing height of fixture: 220mm
- time of production cycling (not including manual operating time): 65s
- foaming material: C5 or F1
- 机器外形尺寸(LXWXH):约(6100×6000×4600) MM
- 工位数:8
- 模板尺寸(长宽):2000MM × 900MM(可根据客户要求)
- 夹具闭合高度:220MM
- 生产节拍(不含人工操作时间):65S
- 发泡材质:C5或F1

### HYDRAULIC DRIVING DOOR FOAMING DRUM

#### 液压驱动门发泡转鼓

The hydraulic Seven Stations Door Foaming Drum is the most popular one. mainly used for Refrigerator or Chest freezer door foaming, composed of main frame, revolving drum, seven pieces of jigs, hydraulic driven and positioning, jigs opening and locking system, water heating/cooling and temperature regulator, pouring gun moving cart, ventilation system, electrical and pneumatic system and etc.

该设备比较受欢迎。主要用于冰箱或冰柜门发泡，由主机架、转鼓、七付夹具、液压驱动及定位、夹具开启及锁定系统、水加热/冷却及温度调节器、移动充注枪头、通风系统、电气及气动系统等组成。



### SERVO MOTOR DRIVING DOOR FOAMING DRUM

伺服驱动门发泡转鼓

The motor driving one shares similar structure, the drum rotated by a strong reducing servo motor via a big gear dish, positioning more precisely compare to hydraulic counterpart, a sensor detect the angle to eliminate accumulative tolerance, the pin, locker, fork driven by motor as well, featured with more stable running, lower noise, faster movement, the site could be drier and cleaner after long time working without Oil pump, cylinder and hoses



与液压式的结构类似，转鼓由伺服电机通过大齿轮盘控制旋转，定位比液压更精确，传感器检测角度以消除累积公差，销、锁也由电机驱动，运行更稳定，噪音更低，运动更快。现场更干燥，更清洁。

### 2.2.2 CAROUSEL PU FOAMING LINE FOR CABINET AND DOOR BODY BOTH

箱体门体发泡地轨线

The single jig mounted on the circular rail which driven by a reducing motor run continuously, that is Carousel, jigs can be locked or unlocked by pneumatic cylinder before opening and after closing. a strong circular arc steel rises up smoothly to stretch up the jigs after unlocked. In opening, 1st station for unloading door, 2nd one for loading new, 3rd for pouring, then same steel structure close jigs fast and gradually and move into oven house for curing. the gun fixed while jigs move, this style are easily operated and better maintainability, it's most efficiency one due to 2 working stations, all jigs are moving on the ground so the jig quantity could be increased to 20 even 30.

单个夹具安装在圆形轨道上，由减速电机驱动连续运行，夹具在开启前和关闭后可通过气缸锁定或解锁。夹具移动，枪头固定，操作方便，可维护性好，所有的夹具都在地面上移动，所以夹具的数量可以增加至20个甚至30个，是效率最高的一种。



### 2.2.3 STRAIGHT LINE DOOR FOAMING JIGS

箱体门体发泡地轨线

Jigs settled on the ground and line straightly with same movement of opening or closing In this style, pouring gun runs on the rail straightly by encoded or servo motor, this style is simple, more economical, but occupy larger area, operators would move more to different jigs, the gun moves long distance above could be less efficiency

通过编码或伺服电机在导轨上直线运行，结构简单，经济，但占地面积较大，操作人员移动较多，效率较低。



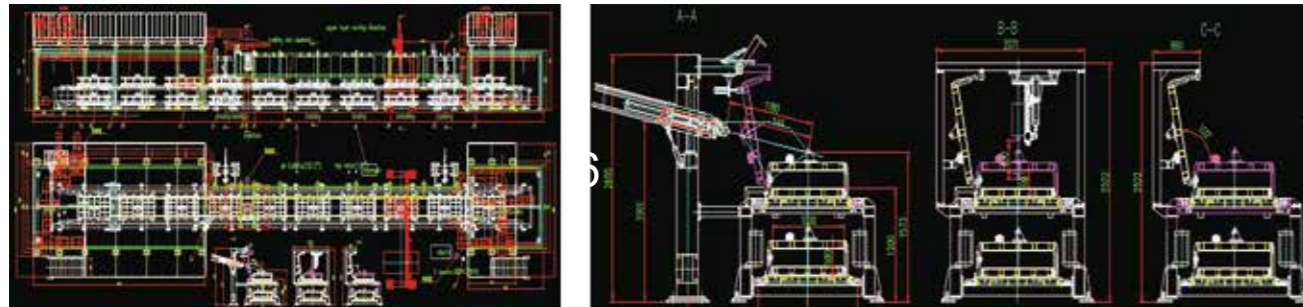
### 2.2.4 DOUBLE LAYOR CYCLING DOOR FOAMING LINE

双层门体发泡循环线

Other style foaming jigs like upper and lower layer cycling one normally consist of 12 or 14 jigs moving on two layers, towards left on upper rail and return in lower, 2 elevators lift jigs up and down in both ends. Each mold equipped sequence cylinder, when the V shape side pushers pinned jigs, the air will be supplied to the cylinders to drive molds open or close, there are 3 essential robots, one for unloading foamed door, one for pouring, and last one for cover the liner on. The robots can be increased according to takt time.

上下循环式，通常由12或14个夹具组成，分为两层移动。上层轨道上向左移动，在下层轨道上返回，两台电梯在两端上下升降夹具。





**2.2.5 VERTICAL MULTI-LAYER FOR SANDWICH DOOR FOAMING JIGS**  
垂直多层门体发泡夹具

For some small door liner, the Sandwich jigs are good option as well, it's a multi-layer jigs stack up together, a cylinder mounted above to lift them open or close, small and compact are main characters of this style, it occupy only few square meters. the injection can be done once for 3 or 4 layers. The loading and unloading can be also done together.

对于小型门体或者类似产品,这是一个很不错的选项。小而紧凑是主要特点,占地面积小,一次可以充注几层。



**VACUUM THERMO FORMING MACHINE**  
真空热成型机

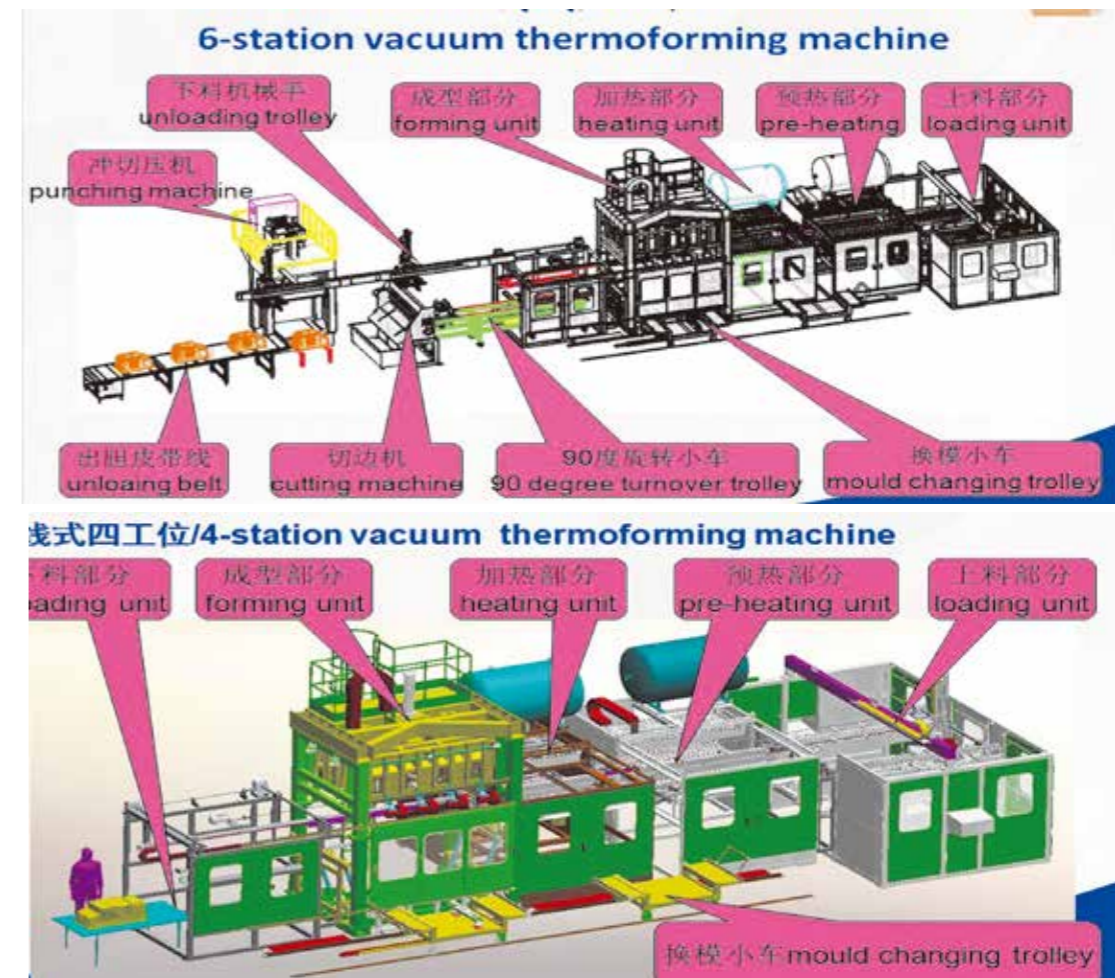
**3.VACUUM THERMO FORMING MACHINE 真空成型设备**

**3.1 CLAMPER TRANSFERRING VACUUM FORMING MACHINE BY MULTI STATIONS**

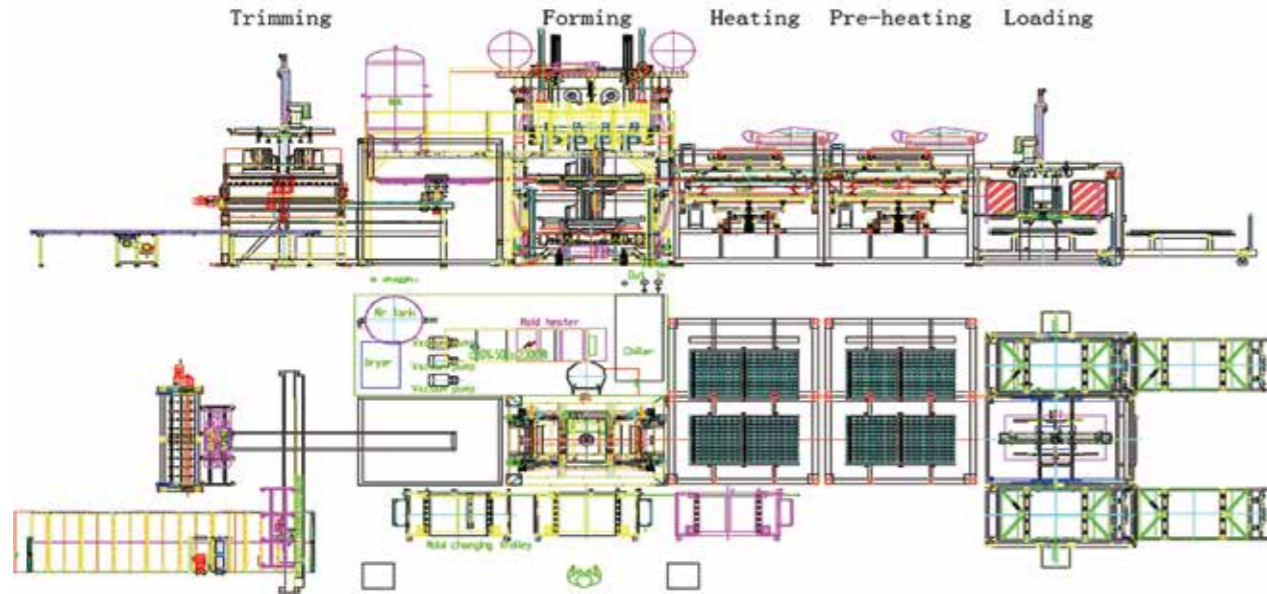
**夹钳式输送多工位真空真型机**

Vacuum Forming Machine from KCM by Multi-Stations to be composed by Sheet Loading Station, Centering Sheet, Clamping Device for Moving Sheet to Next Station, Pre-Heating Station, Heating Station, Thermo-Forming Station by Negative Pressurized Cabin for Pressing Sheet and Vacuuming Bulb, and then Vacuuming at the same Station, after finishing Vacuuming, Robot for picking up Inner Liner to Rotary Device for moving to Next Cutting Machine for Trimming Peripheral Sides, then for final Robot to transferring to fixed Position for finishing one Production Circle and Start Again next circle.

真空成型机是由上料, 对中装置, 夹钳输送 HIPS 板材向下一个工位, 加热, 预热, 成型, 机械手抓取成型后的板材放置到旋转装置上, 旋转装置运行到切边机, 切边后由机械手抓取转送到制定的位置, 随后进行下一个生产运行。



### 3.1 CLAMPER TRANSFERRING VACUUM FORMING MACHINE BY MULTI STATIONS 夹钳式输送多工位真空成型机



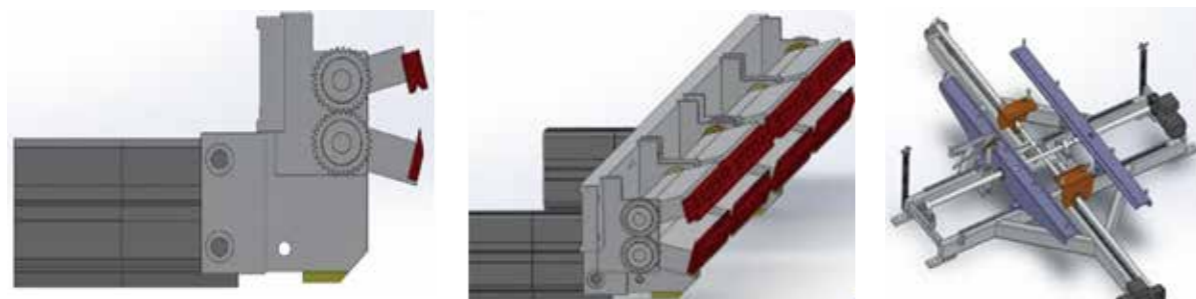
DETAILS FOR KCM VACUUM FORMING MACHINE BY TECHNICAL DESCRIPTIONS AS BELOW:

#### MAINTechnical PARAMETER 设备主要技术参数

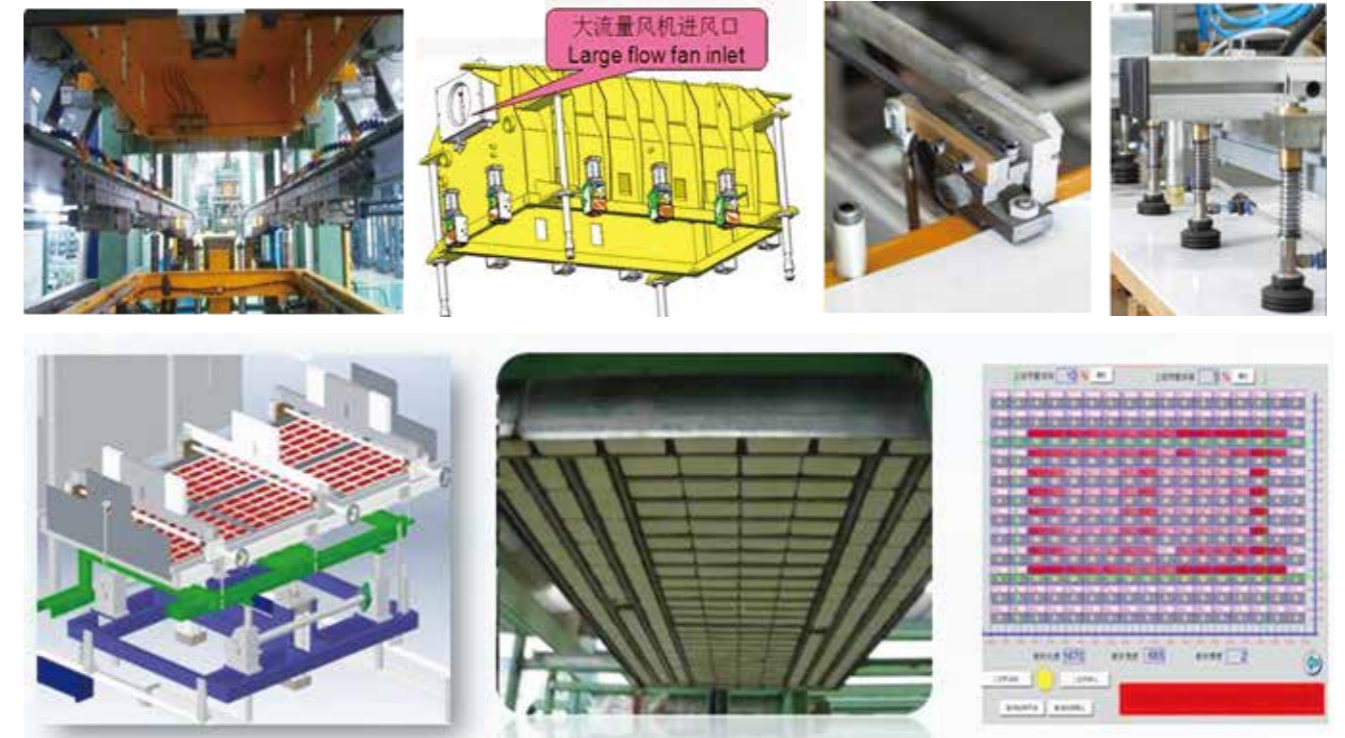
- 成型面积/thermoforming area:  
2000X1000X650 (adjustable against customer requirement)
- 设备总电容量/Total power: about 430kw
- 成型板材/Material :ABS、HIPS
- 板材厚度/Sheet thickness :2.0mm-5.0mm
- 生产节拍/Cycle time: HIPS38s/pcs
- 合格率/Qualified rate:  
1000件以上大于等于98%:(98% producing more than1000pcs )

It adopts pneumatic clamp loading system which can apply the 2.0to 5.0 thickness sheet without adjustment. The clamp conveyingsystem can avoid the Substandard product which the chain conveying caused by sheet dropping or scrap dropping.

采用气动夹钳式夹料机构，自动适应 2.0~5.0mm 板材厚度变化而不需调整。夹钳输送克服了链条输送时造成的掉料和掉屑造成的产品报废现象。

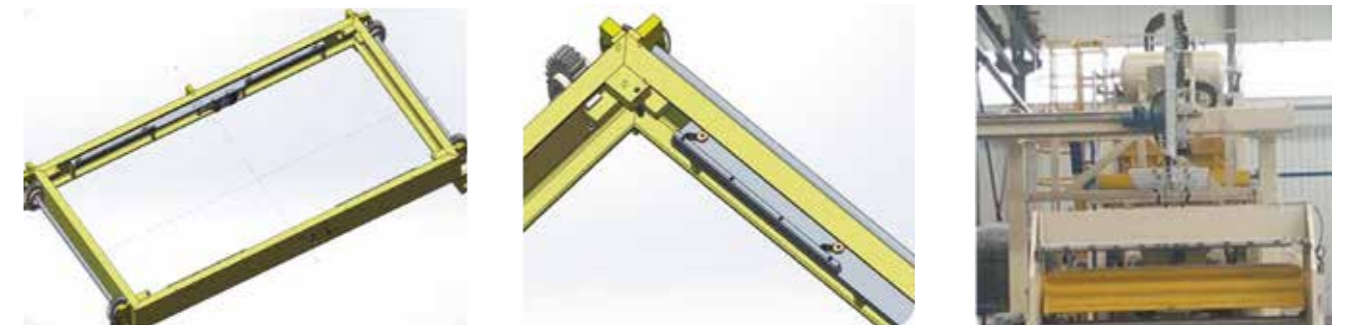


Productcooling: it adopts compressed coolingairorfan cooling(the chillerprovidestheair with temperature range 5 to 10 °C) to reduce the coolingtimeand ensure the production cycle time 38S.

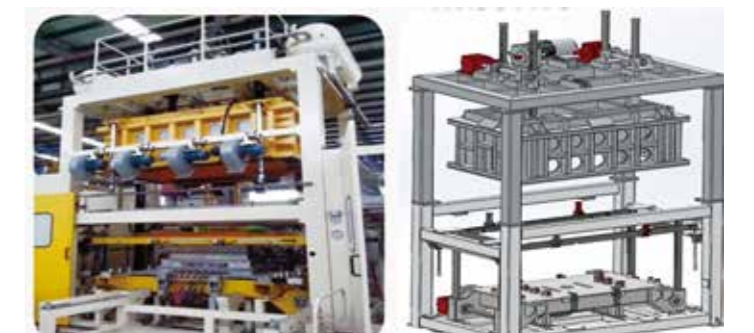


The mold frame adopts automaticlocking device to ensure the moldexchange time is less than 20 minutes.

模具台面框采用自动锁紧机构，换模时间不超过 20 分钟。



The servo motor driving system is adopted for the lower mold plate and vacuum chamber. Both the setting and adjusting of the technological parameter are fast and exactly.



**3.1.1 SIX STATIONS CABINET VACUUM FORMING MACHINE FOR GLORY RUSSIA**  
六工位箱体真空成型机

Loading, Pre-heating-Heating-Forming-Trimming-Multi cavity cutting  
上料, 预热, 加热, 成型, 切边, 切断, 下料



**3.1.2 FIVE STATIONS CABINET VACUUM FORMING MACHINE FOR GLORY RUSSIA**  
俄罗斯五工位箱体真空成型机

Loading, Pre-heating-Heating-Forming-Double blade Trimming-Multi cavity cutting



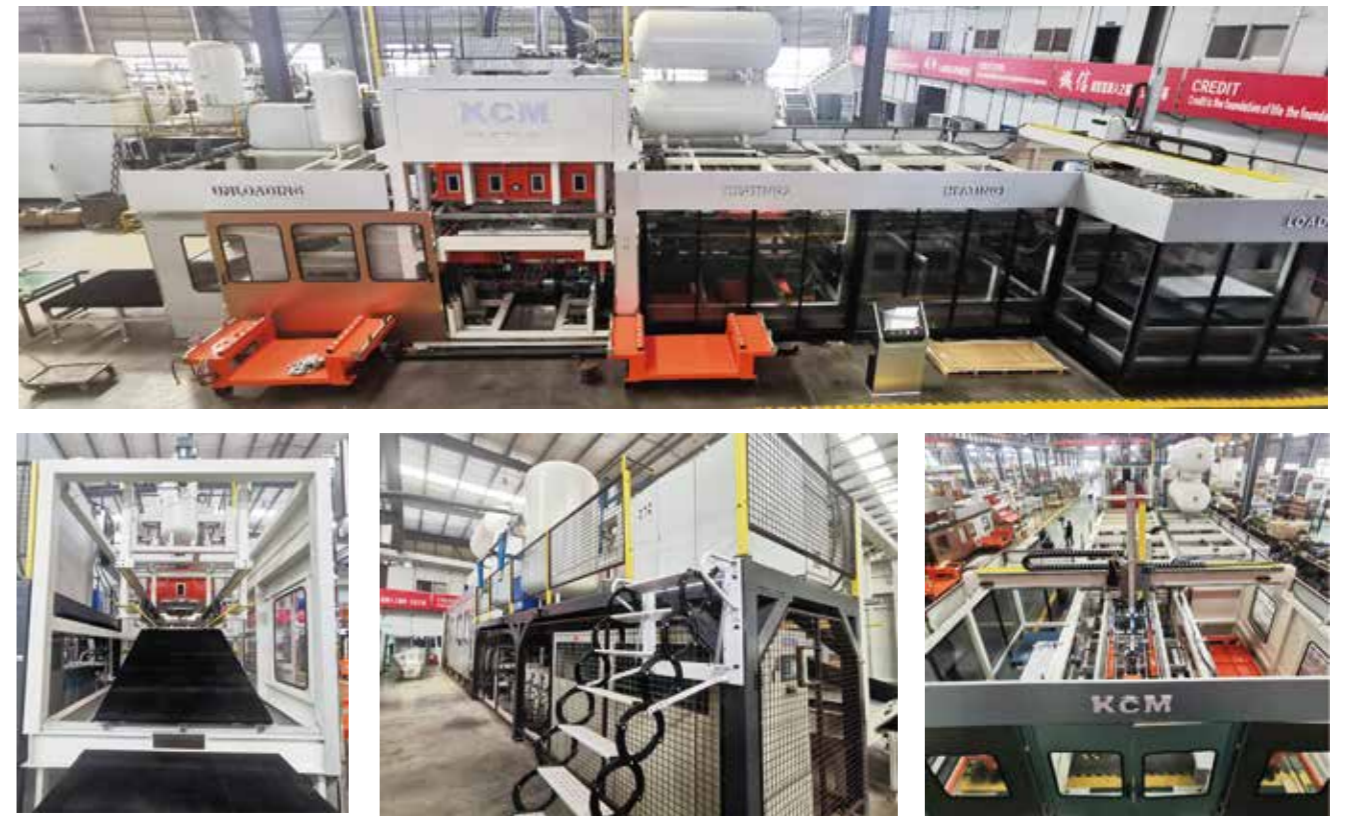
**3.1.3 FIVE STATIONS CABINET VACUUM FORMING MACHINE FOR HISENSE**  
海信五工位箱体真空成型机

Loading, Pre-heating-Heating-Forming-Double blade Trimming-Multi cavity cutting



**3.1.4 FOUR STATIONS VACUUM FORMING MACHINE FOR DIXON INDIA**  
印度四工位真空成型机

Loading-Pre heating-Heating-Forming



### 3.1.5 THREE STATIONS VACUUM FORMING MACHINE FOR WESTERN INDIA

印度三工位真空成型机

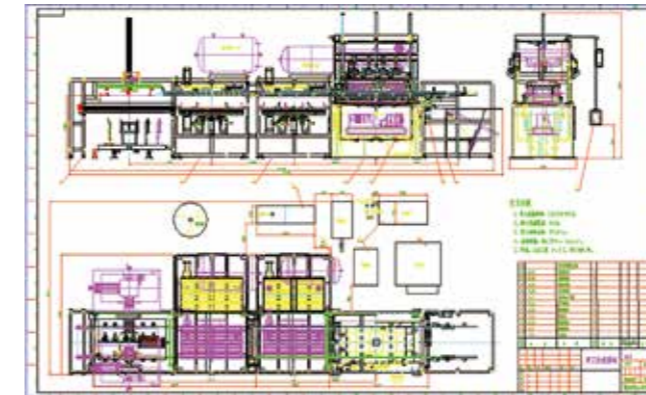
Loading- Heating-Forming-unloading



### 3.2 SPIKE CHAIN TRANSFERRING SIMPLE MULTI STATIONS VACUUM FORMING MACHINE

链条式输送多工位真空成型机

Two Stacks of Loading Station, Pre-Heating Station, Heating Station ( Both with Ceramic Heaters), Vacuum Forming Machine, Unloading to Slant Table, Other related Accessories such as Water Cooler, Vacuuming Pump and Tanks, Control System with S-7 PLC, Mold Hot Water Temperature Controller, Hydraulic and Pneumatic System as well etc.

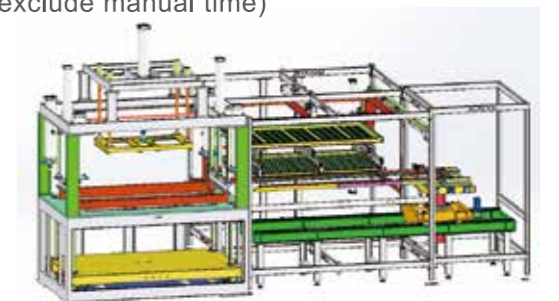


### 3.3 DOUBLE STATION VACUUM FORMING MACHINE

双工位真空成型机

Loading- Forming

- Size: 8000×5400×4800(L×B×H)mm
- Forming area: 2000mm\*900mm
- Max forming depth: 650mm
- Heating power: around 190Kw (Max) ; single 400W
- Main power: around 230Kw (Max)
- Forming mode: male forming
- Cycle time: around door 70s/pcs, cabinet 120s/pcs(exclude manual time)
- Compressed air: 2" (0.55-0.65Mpa)
- Water: 0.2T/H
- Sheet thickness: 1.0--5.5mm (door≤2mm)
- Sheet material: ABS or HIPS
- Platform height: 1600 mm
- Accuracy: ±0.2mm,



### OPERATION PROCESS:

Manually load-clamp-heat-transfer-frame press-bubble-mold rise-clamper return-vacuum-cool-demold-Next loading while previous sheet vacuuming



### 3.4 SINGLE STATION FORMING MACHINE

#### 单工位真空成型机



ABS 板手动装卸后, 夹紧、加热、成型、冷却、压紧等工序应在同一工位完成。

The unit is single-station forming machine. After ABS boards are loaded and unloaded manually, the working procedure including clamping, heating, forming, cooling and holding down shall be performed at the same station. The detailed process is as follows: Put the board materials for forming on the workbench of a forming machine → the hydraulic cylinder drives the swaging frame to move downwards and press against the sheet material → the heating plate moves forward to heat the sheet material → the heating plate retreats to original place after completion of heating → bubbling (blowing for a half arc as a bubble) → the forming die goes upward in place → vacuum to absorb heated sheet materials to the surface of forming die → the upper die carrier goes downward for assisted forming (stamping, manual cutting, if this is necessary) → the cooling device cools the liner after forming → the upper die carrier goes upward → de-molding → the forming die goes downward → the swaging frame goes upward → manually remove the formed working pieces.

**PARAMETERS:**

1、Equipment size(for reference):	4500×3200×4000(L×B×H)mm
2、Forming area:	1800mm× 800mm
3、Maximum forming depth:	650mm
4、Heating power:	about 126Kw
5、Total power consumption:	about 135Kw
6、Mode of forming:	Male forming
7、Tact time:	for 1.0—5 mm HIPS or ABS board, 90s/per mold for door inner liner and 200s/per mold for cabinet inner liner (not including manual loading and unloading time);
8、Compressed air source:	1/2''(0.5-0.8Mpa)
9、Total pneumatic capability:	20m3/h(0.5Mpa);
10、Working height:	1700 mm
11、Material thickness:	1.0—5 mm(for cabinet, thickness≤3.2 mm)
12、Material:	ABS or HIPS



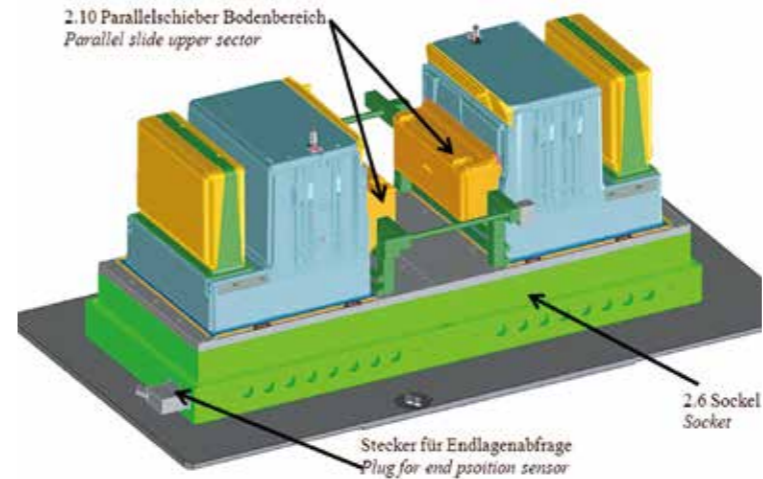
**MOLDS AND DIES**

**模具**

**4.MOLDS& DIES 模具**

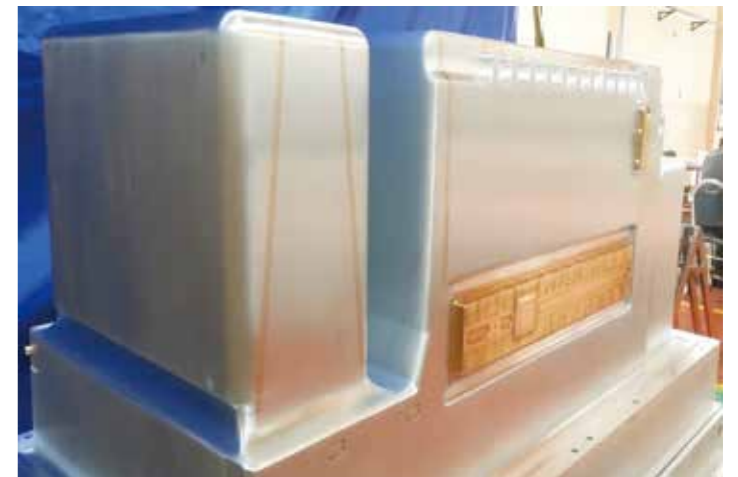
**4.1VAUUM FORMING MOLDS**

4.1.1 The core mould' s material adopt ZL401, and the mould base select casting part of aluminium alloy, so the mould has advantage performance of light weight and well ridigity and intensity, the casting parts don' t allow any faults of little apertures, sands, cracks and any other marks of being amended.



4.1.2 The roughness degree of out surface of core mould is Ra0.05~Ra0.08, Φ0.6 vacuum holes are placed in the surface of the core mould in average, bronze bars are studded around the mould peripheral edges. All vacuum holes should guarantee all kinds of complicated shapes can be formed clearly.

4.1.3 Thickness 1. 5mm、diameter 12mm purple bronze pipe is embeded in core mould and mould base. Bending bronze pipe can' t be shrivelled for hot water circuit flowing smoothly. The pipe line layout' s principle in distribution and specification of designing hot water circuits is for quickly heating mould surface in average. The distance between two neibour pipe lines is 70-80mm and distance to the surface is 20-25mm. All pipe compression resistance not less 0. 8Mpa and don' t leakage of water. All pipe linking adopt soft high temperature pipe with screw thread.



## 4.2 PU FOAMING MOLDS

### 发泡模具

Foaming mold is mainly used in refrigerators, freezers, vending machines and other products that need refrigeration, as well as cars, refrigerated cars and other insulation layers.

This type of mold includes: integral foaming fixture (including internal and external clips), foaming mold core, etc. Mold core material:

ZAlSi5Cu1Mg Chemical ingredient: Si :4.5-5.5 , Cu: 1.0-1.5 , Mg: 0.4-0.6 , Al: Fe(sand casting): 0.000 ~ 0.600 Fe(Metal casting): 0.000 ~ 1.000 , Mn: ≤0.5(impurity) , Zn: ≤0.3(impurity) , Ti+Zr: ≤0.15(impurity) , Be: ≤0.1(impurity) , Sn: ≤0.01(impurity) , Pb: ≤0.05(impurity) 。



## 4.3 METAL DIE

### 钣金模具

METAL DIE USED FOR METAL PANEL FORMING/PUNCHING/BENDING/FLANGIG



## CONVEYOR& ASSEMBLY LINE

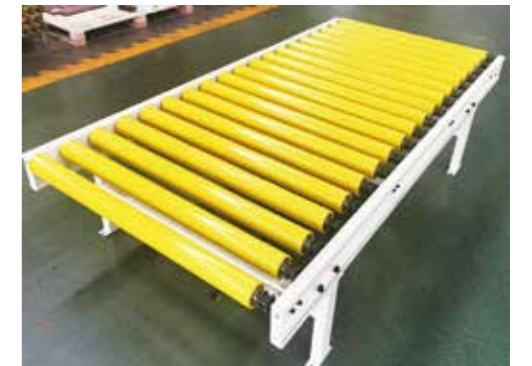
### 输送线

## 5.CONVEYOR AND ASSEMBLY LINE 输送线

Conveyor and assembly line, production line for refrigerator,chest freezer,washing machine,air conditioner,vending machine etcetra. and conveyor includes slat conveyor,roller conveyor,template conveyor,crossed device lifter rotation device upright ninety and one hundred eighty degree turner, function of production line by pre-assembly,final assembly,vacuum pump loop line, cooling performance testing line,packing etcetra.

### 5.1 ROLLER CONVEYOR

#### 滚筒输送线



### 5.2 BELT CONVEYOR

#### 皮带输送线



### 5.3 DIIRECTION TURNING CONVEYOR

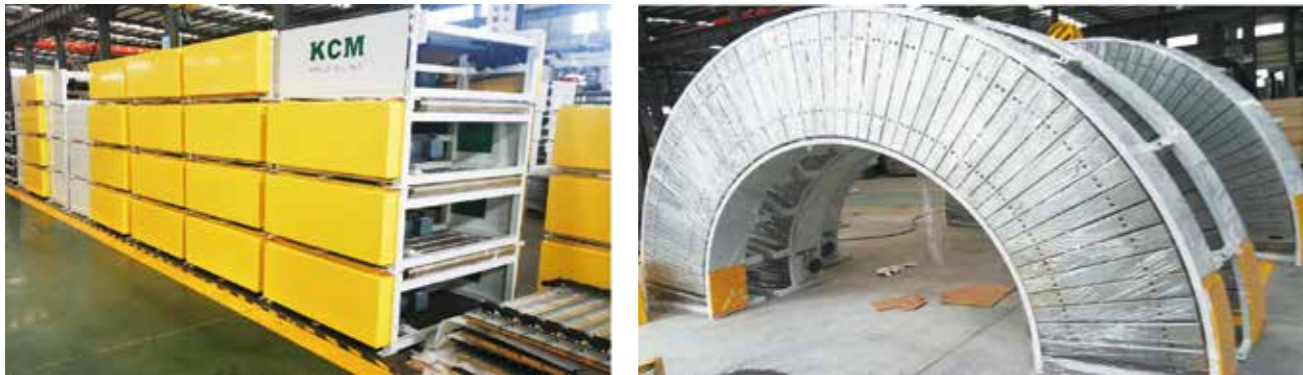
#### 转向输送



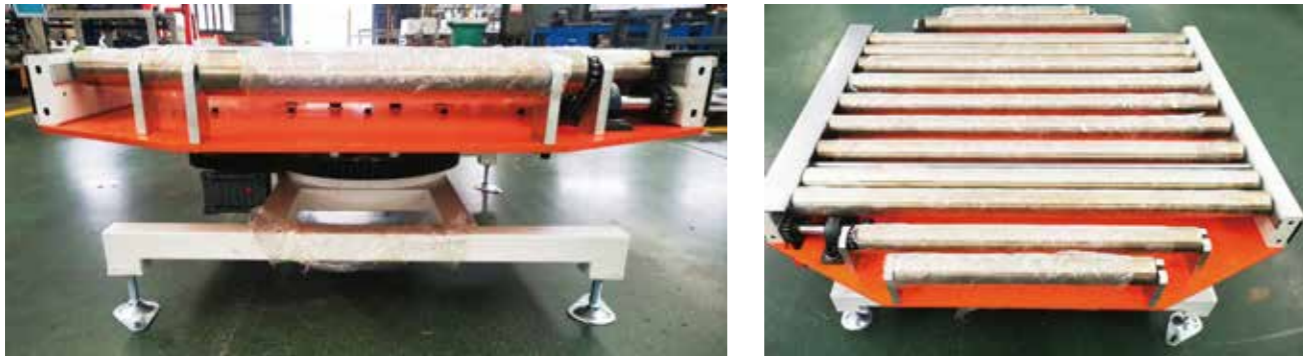
### 5.4 LIFTER CHAIN CONVEYOR 链条顶升输送



### 5.5 SLAT CONVEYOR 面板输送线



### 5.6 90 DEGREES ROTATION CONVEYOR 90度旋转输送



### 5.7 CLASSIFIED BY FUNCTION AS ASSEMBLY LINE, VACUUM LOOP LINE, TESTING LINE ETC. 真空循环线



## SPECIAL PURPOSE MACHINE 专机

### 6. SPECIAL PURPOSE MACHINE 专机

#### 6.1 GLASS DOOR AUTOMATIC GLUING MACHINE 玻璃门自动打胶线

This SPM for the purpose of making Automatic Glue Injection and Pasting by Pressing Tools Between Fridge Door Plastic Frame and Glass of the Surface for Glass Door Refrigerator

Models. And Jigs by Movement Floating way that very convenient for Changing Different Models Jig that only placing the related Jig onto Mold Changing Platform and then directly pushing into right Position.

Equipment of this SPM is composed by 12 Stations of Conveyor system ( two Layers ), Robot and Glue Injection Machine, Pressing Tools, Automation Lifter by 2 units, Mold Changing Conveyor, Gantry type for Unloading finished Door ( Optional that can be canceled according to customer need or not ), Exact Door Models Jig, RFID Recognition system from Jig, Pneumatic System and Electrical System etc ... . Glue material for Injection will be prepared by the users and Detailed Layout of SPM Proposal as following:



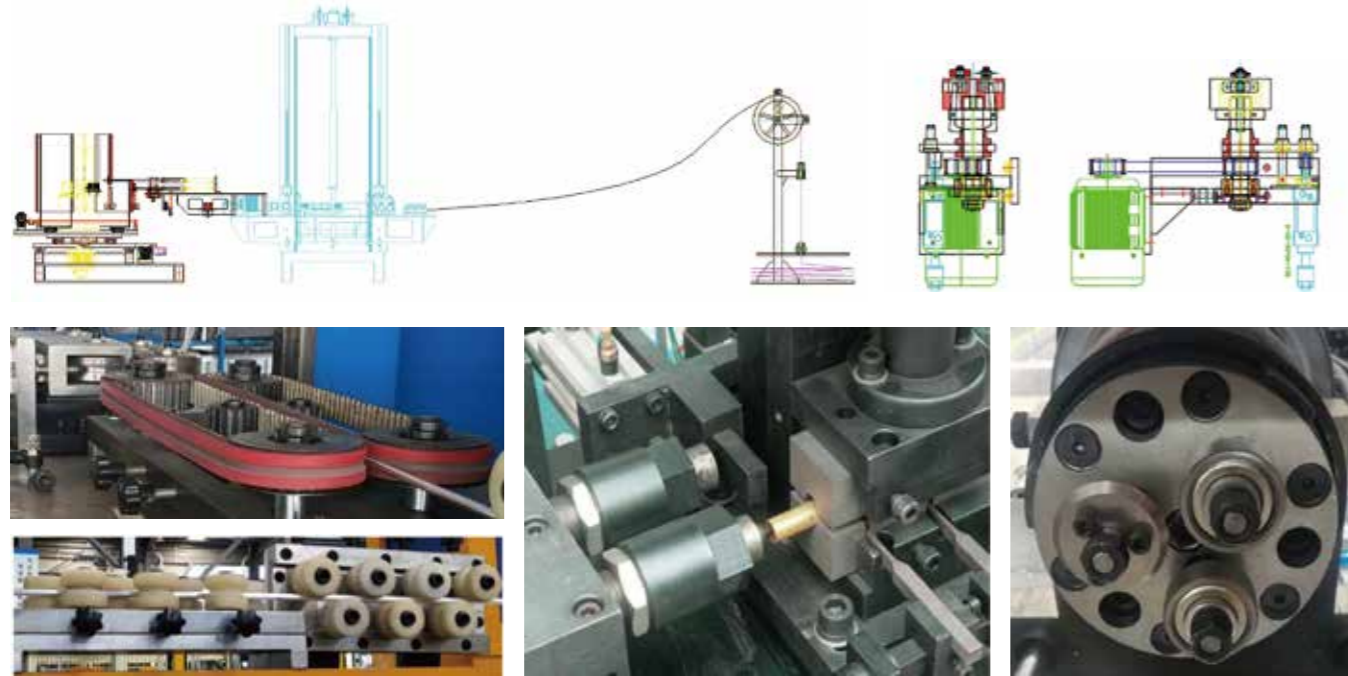
该设备由 12 个工位输送系统（两层），机器人和打胶机，冲压工位，2 台自动升降机，换模输送机，门体下料的龙门架（可根据客户需要），各型号的工压合工装夹具，夹具 RFID 识别系统，气动系统和电气系统等组成 .... 注胶材料由用户自行准备。

方案详细布局如下：



## 6.2 EVAPERATOR TUBE WINDING MACHINE, 蒸发管绕管机

Especially for chest freezer inner liner to be covered by aluminum pipe evaporator that auto winding pipe around outside of inner liner.



### 6.2.1 SINGLE AXIS WINDING MACHINE, 单轴绕管机

consist of Decoiler, Lifting table(straightening-feeding-D shape pressing-tube cutting), mold table (dead mold core or automatical adjusting mold+patch)



**Machine size:** Around 10000\*2900\*1900mm;  
**Working piece size:** L\*W\*D=(730~940)\*(600)\*(310/760)mm  
**Production:** Refer to drawing;  
**Production TAKT:** 50-60s;  
**Pipe material:** Aluminum  $\phi$  6-8mm, (thickness 0.65~1mm),  
**Power:** About 5.5Kw(380V, 50Hz);



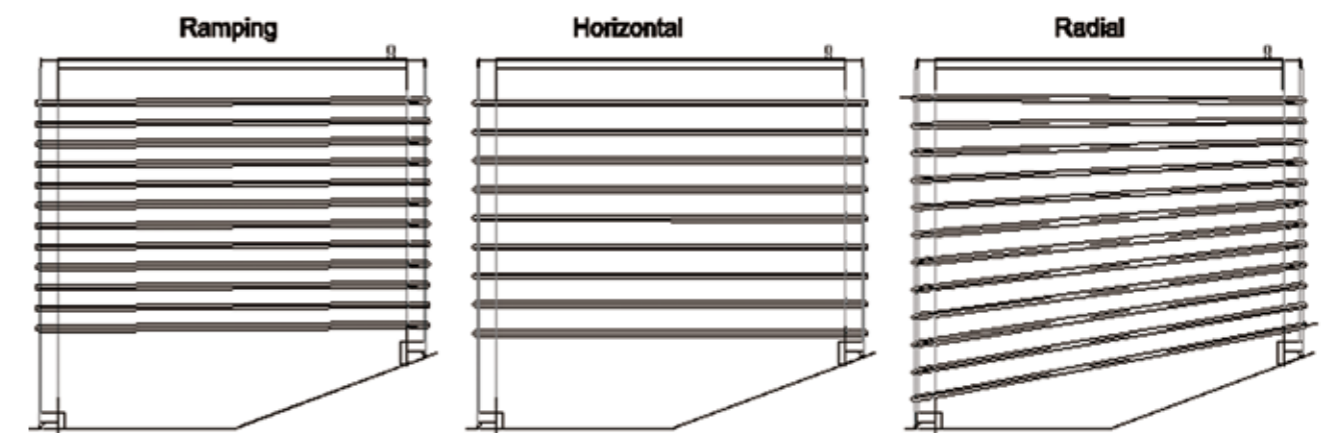
### 6.2.2 MULTI AXIS WINDING MACHINE 多轴绕管机

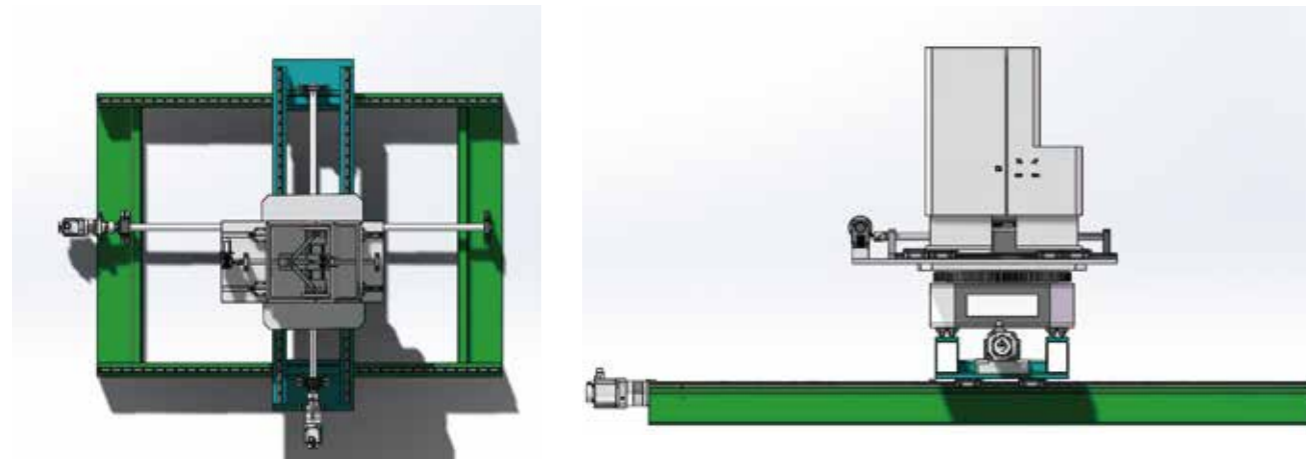
Winding table rotated by 3 Axis servo motors X( transverse), Y(longitudinal) and Z(rotary) via screw rods, three of which moving as a changing speed to achieve a curve, each winding process can be break up into:

X moving forward straightly ( pipe follow A side)—rotation 90 ° --- Y moving forward straightly ( pipe follow B side)—rotation 90 ° --- X moving forward straightly ( pipe follow C side)—rotation 90 ° --- Y moving forward straightly ( pipe follow D side)—rotation 90°, next turn...

In this way the pipe can keep straightly when winding to avoid pipe angles on the corner, besides, the pipe ramp also can be set for different vein type.

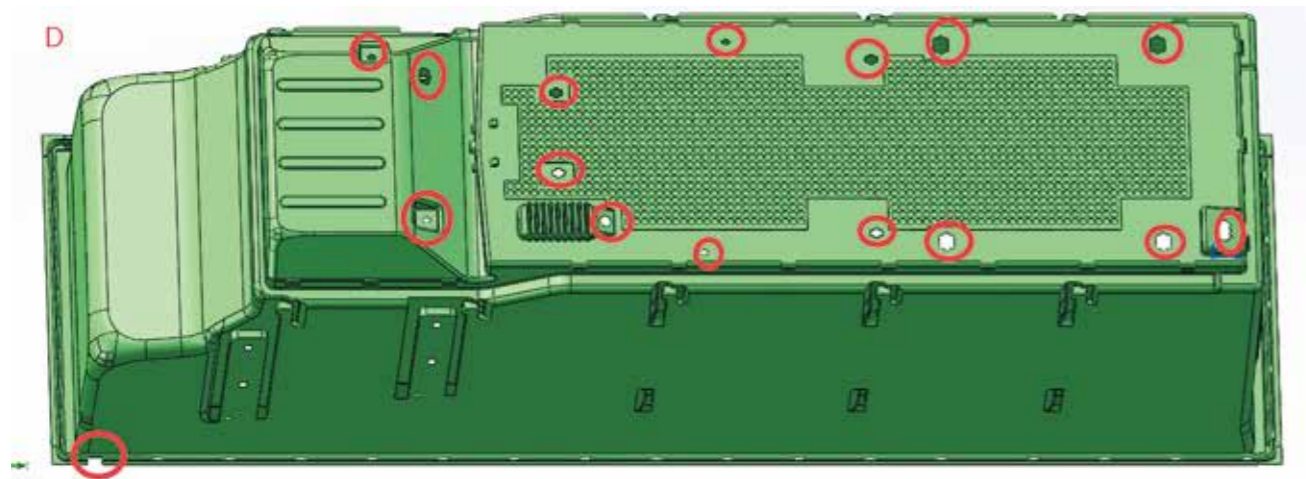
The mould core combined of 3 parts for 2 models, left plate, right plate driven by servo motor via a bidirection screw rod, middle patch pushed by a cylinder via a link mechanism, the corner radian around 30mm.





### 6.3 INNER LINER HOLE PUNCHING MACHINE

**6.3.1** Inner liner hole punching machine designed by production drawing, punchign die driven by oil or air cylinder, one model production with one mold, cheaper, faster. Manual operation cycle time:20~30s

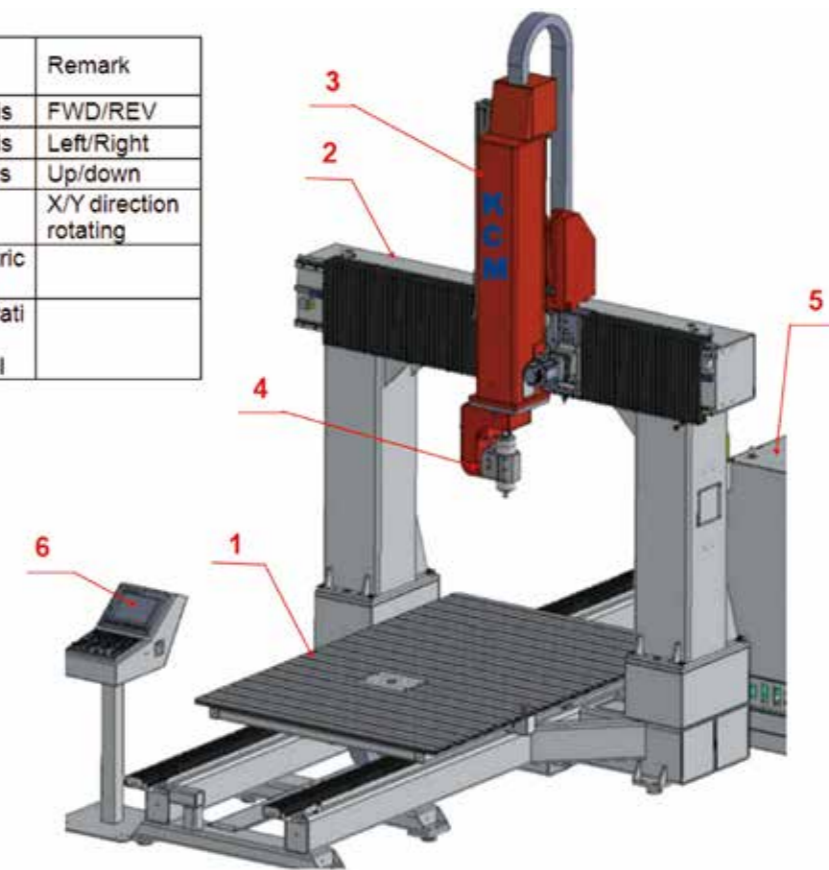


**6.3.2** Flexible hole cutting machine, two solutions for different production shape punching in one machine by program selection, cutting gun controlled by muti axis CNC system.

#### 6.3.2.1 FIVE AXIS CNC NONMETAL MACHINE SENTER

Processing plastic material (ABS、HIPS、PP、PS、PVC、PC、 etc.) and its composite material products, the finished material for three-dimensional or multidimensional special-shaped cutting, drilling, etc. fast speed, fast cutting. Drilling, especially side drilling, requires the spindle swing Angle. The five-axis machine tool is imported double swing head spindle, which can realize 360 ° swing Angle for drilling processing.

No.	Item	Remark
1	Y Axis	FWD/REV
2	X Axis	Left/Right
3	Z Axis	Up/down
4	C/B Axis	X/Y direction rotating
5	Electric box	
6	Operati on panel	

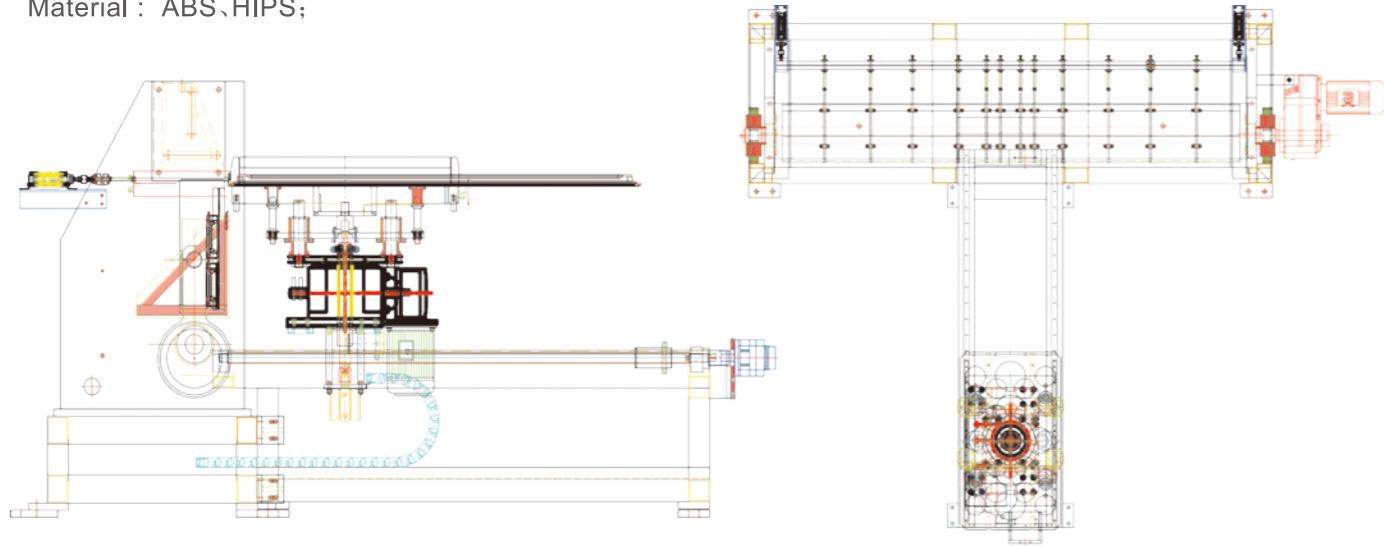


#### 6.3.2.2 LASER CUTTING MACHINE

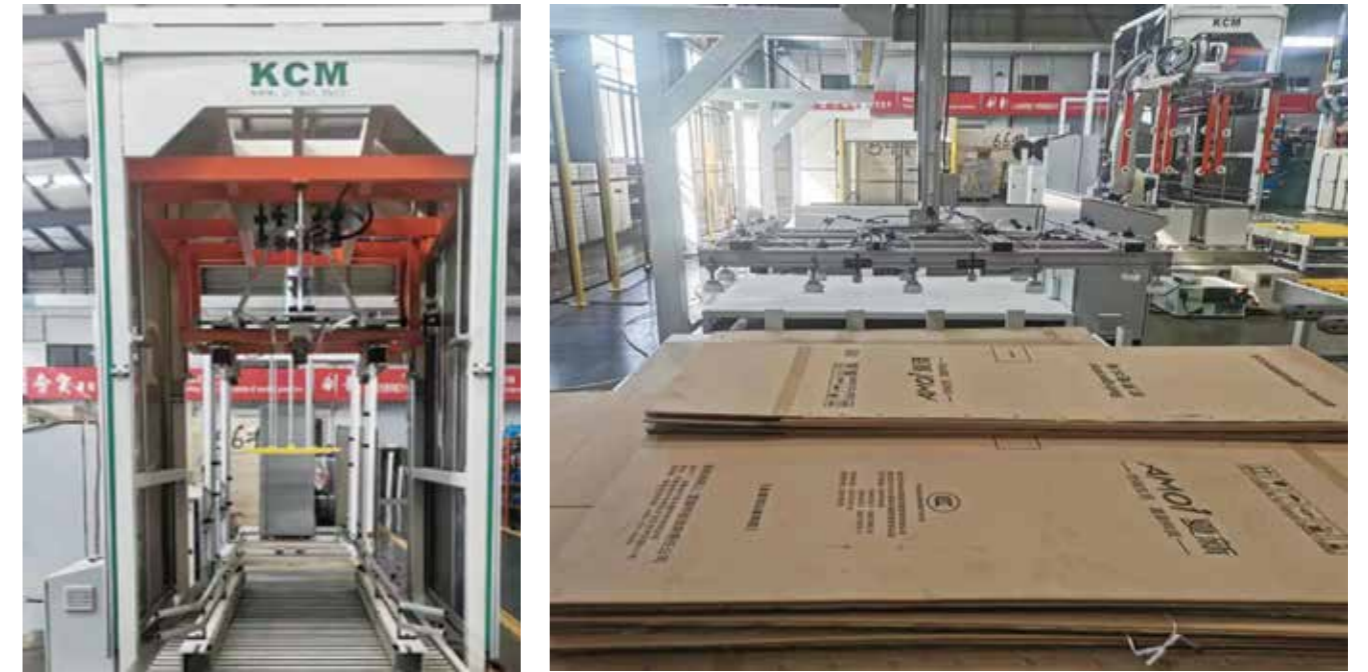


### 6.4 INNER LINER FOUR EDGE TRMMING MACHINE 内胆四周切边机

Machine size L\*W =3120mm\*3570mm;  
Height for work piece: From ground 1000mm;  
Thickness of ABS  $\leq$  5.5mm;  
Material : ABS、HIPS;



### 6.5 CARTON BOX SHEATHING\SEALING \PAKAGING LINE 纸箱套箱、封箱、包装线



Carton box picked by robot, put onto cabinet with automatic dimension adjusting,  
Sealing machine with tape  
Package box

