

Haitian Fifth Generation Servo Hydraulic Two-Platen Injection Molding Machine

JU5





技术恰到好处



紧凑型二板解决方案
海天JU5系列



智能技术



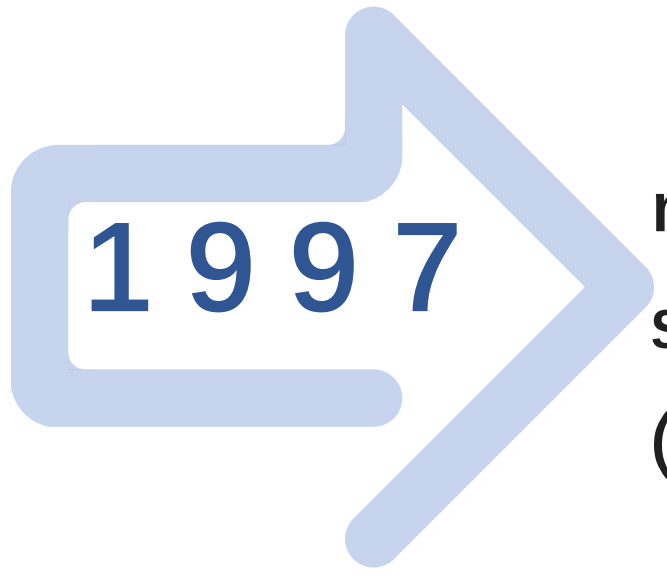
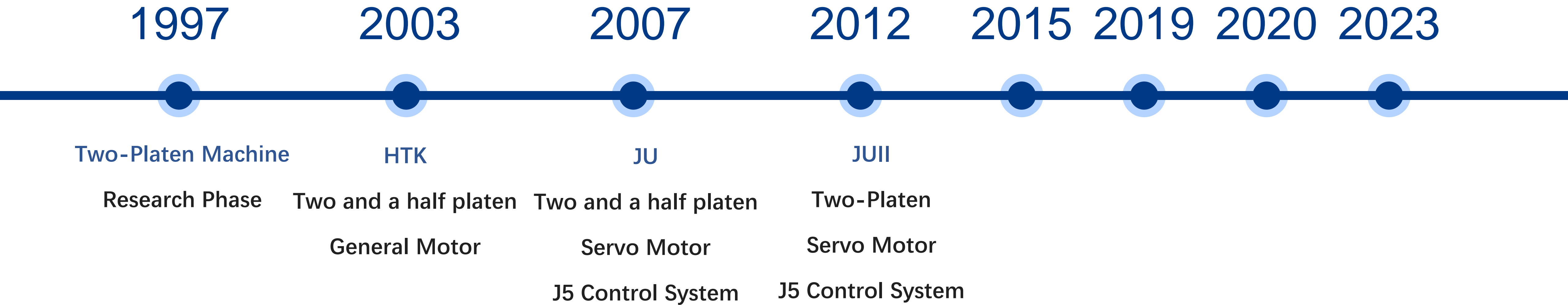
灵活集成



可持续发展

Two-Platen Machine Development History

First order for 8800T injection molding machine



Early development of Haitian two-platen machine: servo motor and J5 card make Haitian second board machine become energy-saving (analog communication) injection molding machine



Two-Platen Machine Development History

1997 2003 2007 2012 2015 2019 2020 2023

First order for 8800T injection molding machine

JUIIS

JUIII

JUSE

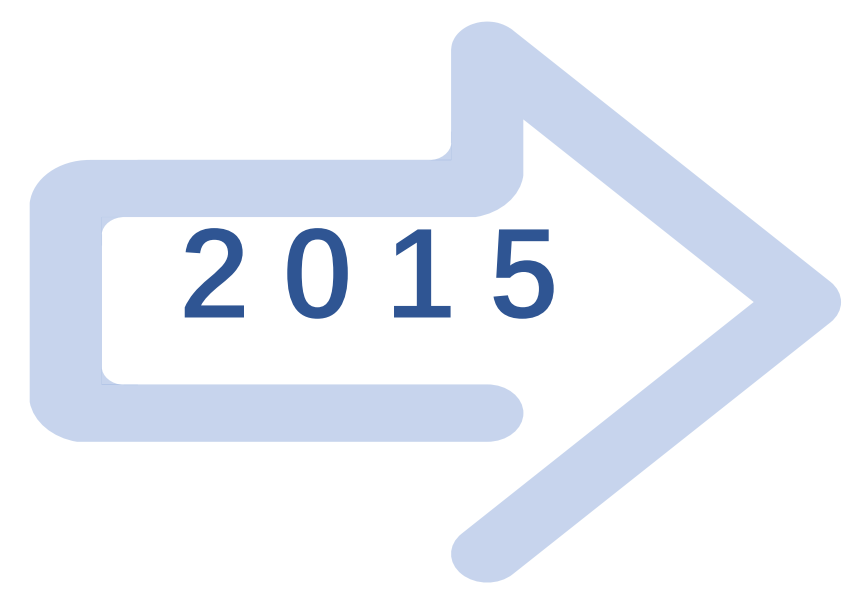
JUV

Two-Platen
Tier bar suspension
Servo Motor
J5 Control System

Two-Platen
Tier bar suspension
Servo Motor
J6 Control System

More in line with
domestic and foreign
customers use habits

Two-Platen
Tier bar suspension
Servo Motor
J6 Control System



Haitian second board machine sales
and reputation continue to rise

Start converting to digital volume
communication (J6 card)



Production Base

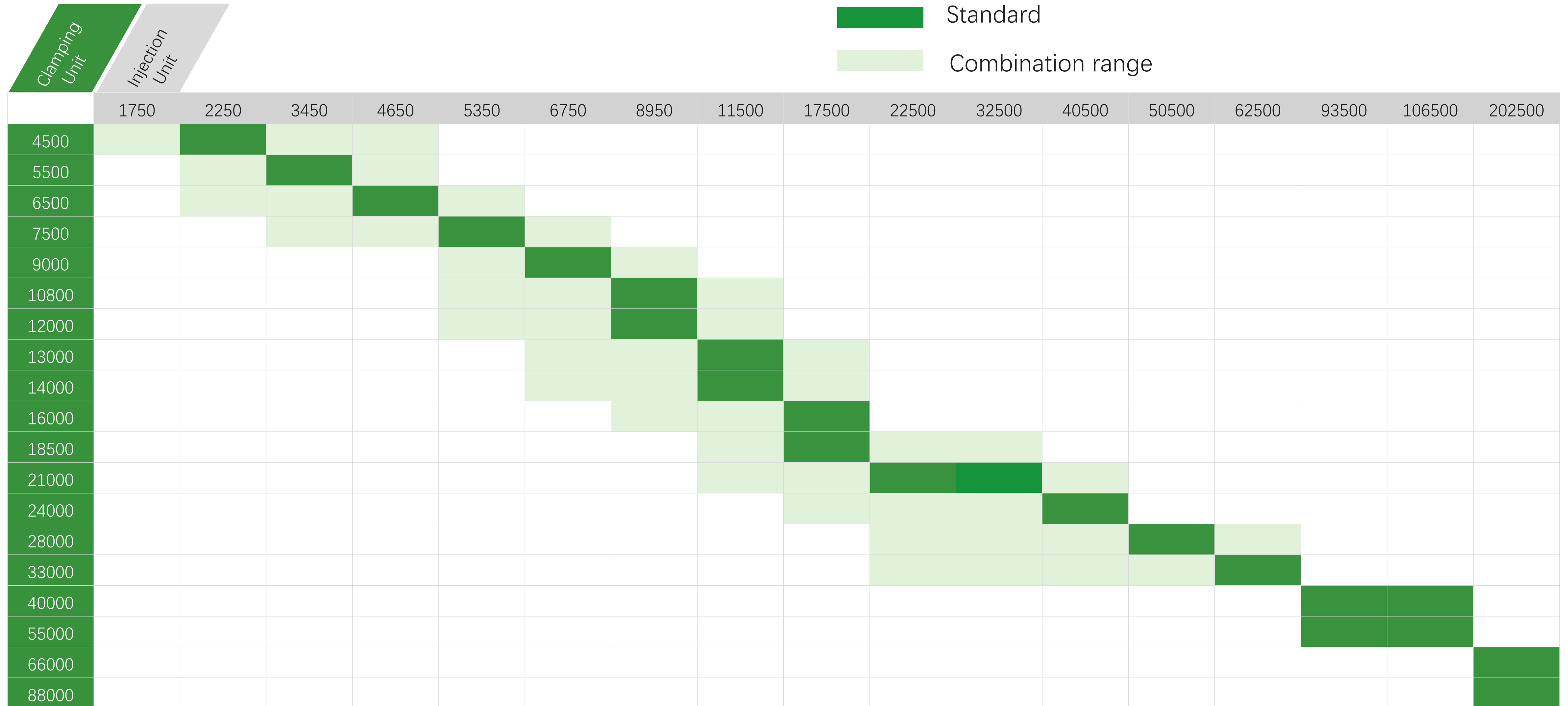


Tongtu Road Production Base

- 180,000 Square meter
- 5 factory areas
- 7 workshops
- 650 employees



Machine Specification



Summary of Highlights

HT Clamping

Optimized correction algorithm, accurate mold opening and positioning, stable and fast movement

Large module space

Mold transfer stroke, ejection stroke and layout are highly expandable to meet the demands of different industries.

HT consumption management

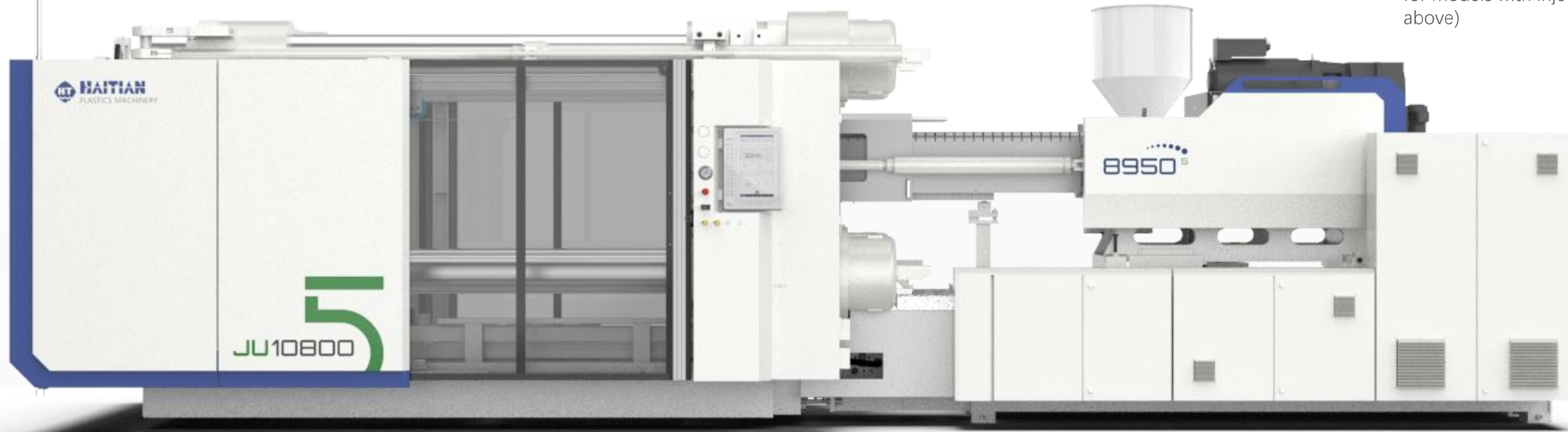
Refined energy consumption monitoring and auxiliary management

Comprehensive upgrade of plasticizing equipment

The plasticizing performance is greatly improved, and the wear resistance of plasticized parts is doubled.

Equipped with electric charging device

While the plasticizing speed and quality are improved, the energy-saving efficiency of the whole machine is also comprehensively improved (optional for models with injection equivalent of 11,500 and above)



small space

The whole machine has a compact structure and high utilization rate of factory space

HT control technology

The new large-screen control panel combined with the new UI design makes the interactive experience more friendly.

Intelligent diagnosis and assistance

Graphical digital bus topology, quickly locate fault nodes and determine the cause of the fault

High response servo system

Tailor-made servo power system, high-speed response, dynamic sensitivity, and strong power

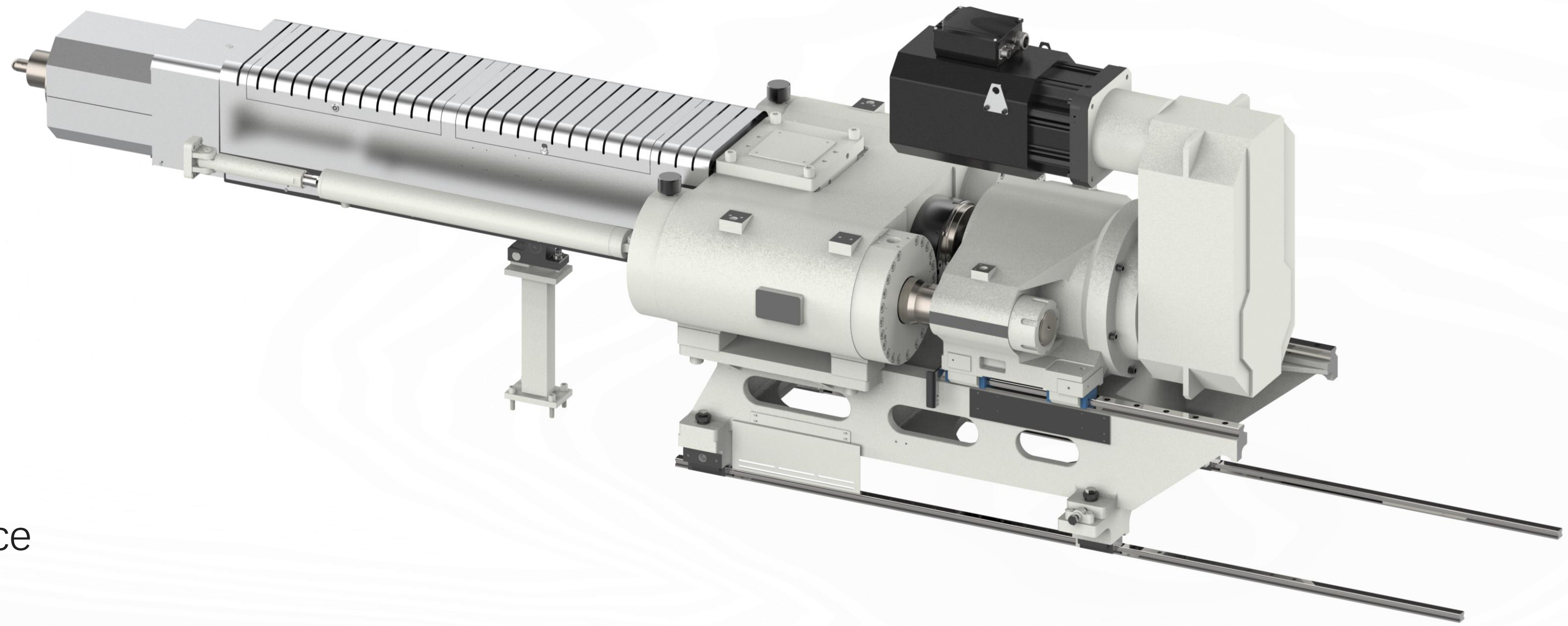
Accurate temperature monitoring

The oil temperature is accurate, the process status is stable, the blanking temperature is accurate, the material storage is stable, and the whole machine operates more stably.

Overall appearance



- ◆ Electricity Charging Application
- ◆ Full Closed Loop Injection
- ◆ Dual-cylinder balanced injection system
- ◆ Screw Barrel Special Allocation
- ◆ Easy Screw Barrel Removal
- ◆ Barrel Support Device Is Easy To Adjust
- ◆ Double-Layer Linear Guide Structure
- ◆ Easy Maintenance
- ◆ Energy-Saving Thermal Insulation Device



Injection Unit

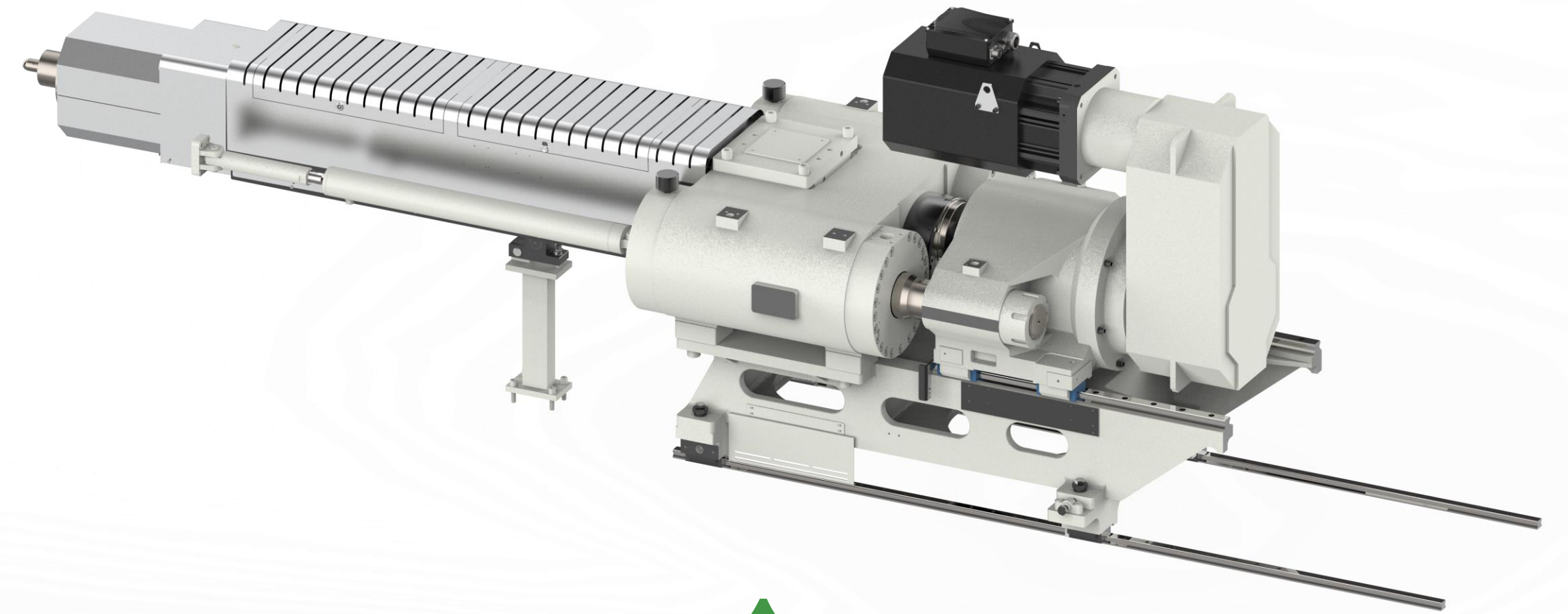
Injection Unit

-Electricity Charging Application



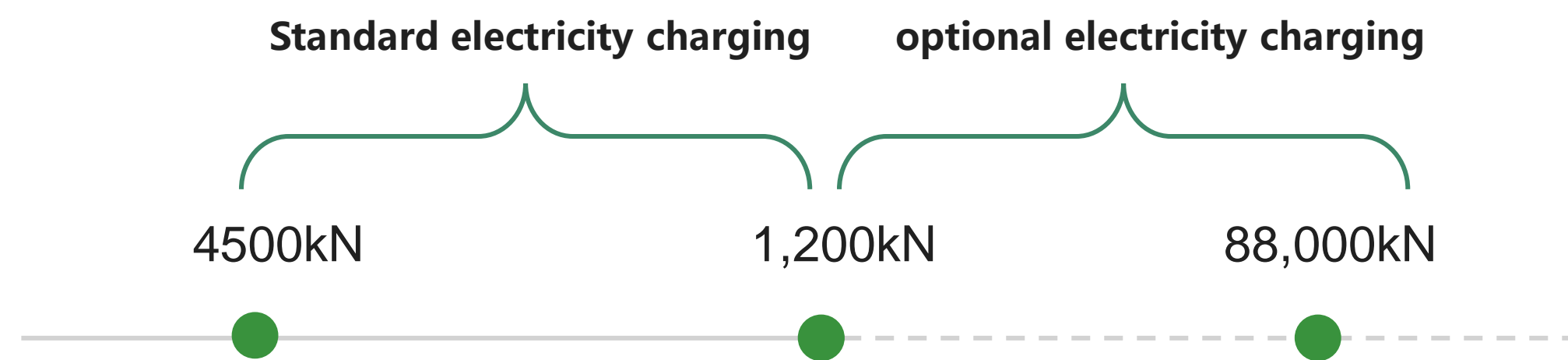
Standard Electricity Charging For Some Models

- Low speed fluctuation, stable storage, high precision
- Reduce noise
- Standard electricity charging , using a single driver switch control of charging motor and system motor, without mold opening and closing, charging linkage function



15% ↑
Plasticizing Efficiency

20% + ↓ **More than 30% injection volume**
Machine Energy Consumption



Injection Unit

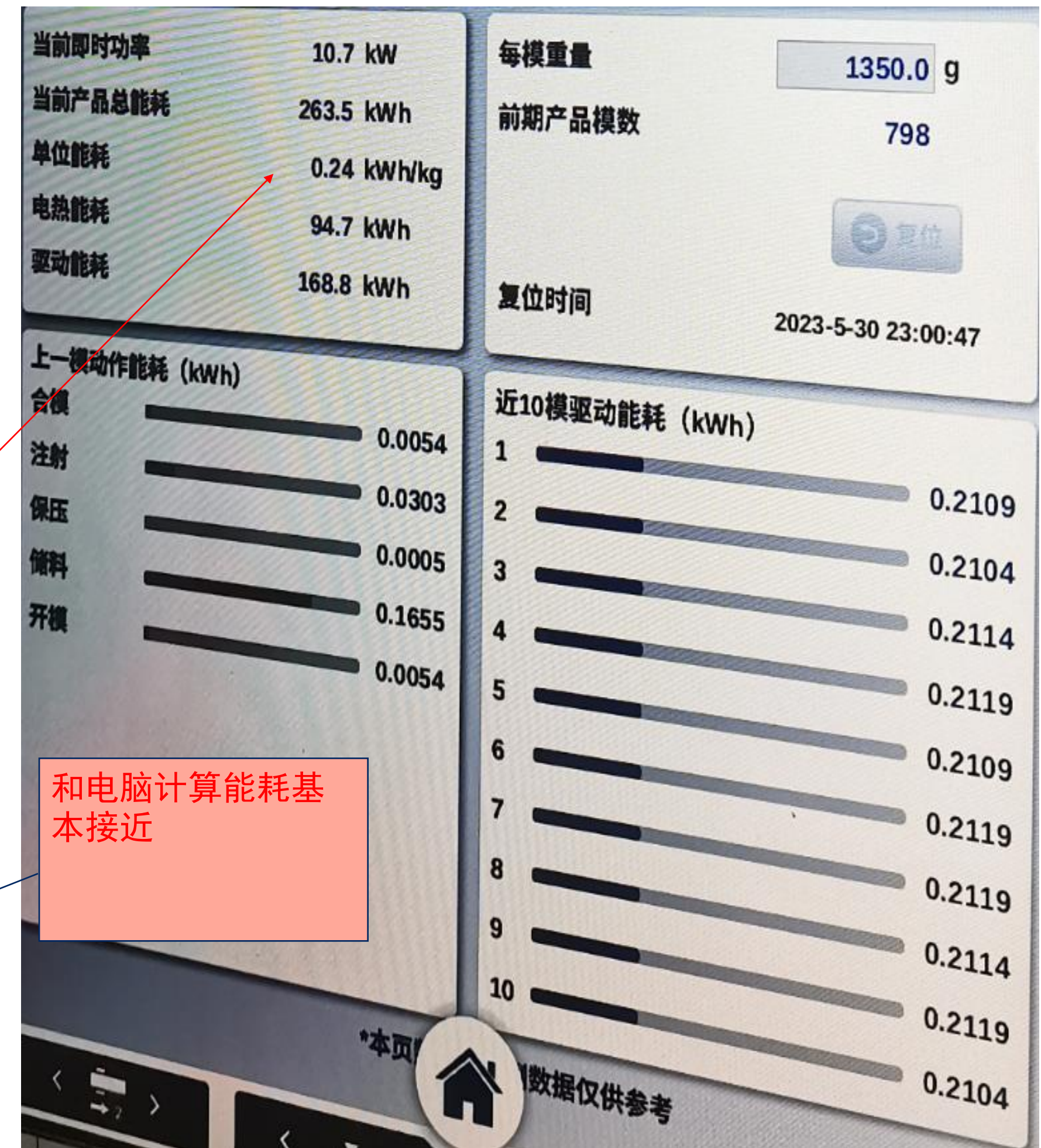
- Energy consumption data comparison test

Product production energy consumption comparison		
	JU5500III3430	JU5500V/3450
		
Machine Code:	202212055064583	202312055011059
Materials:	PP	PP+1%Back Materials
Product Size: mm	280*280*480*1.5	340*340*470*2.2
Mould Size: mm	760*760*850	780*780*830
Product Weight: g	1342	1329
Heating Temperature: °C	235	260
Mold Opening Distance: mm	1020	1150
Set Mold Locked Force: Ton	250	265
Actual Mold Locked Force: Ton	257	285
Injection Stroke: mm	304	278.6
Charging Back Pressure: bar	5	3 ~ 5
Screw Speed: rpm	195	200

Injection Unit

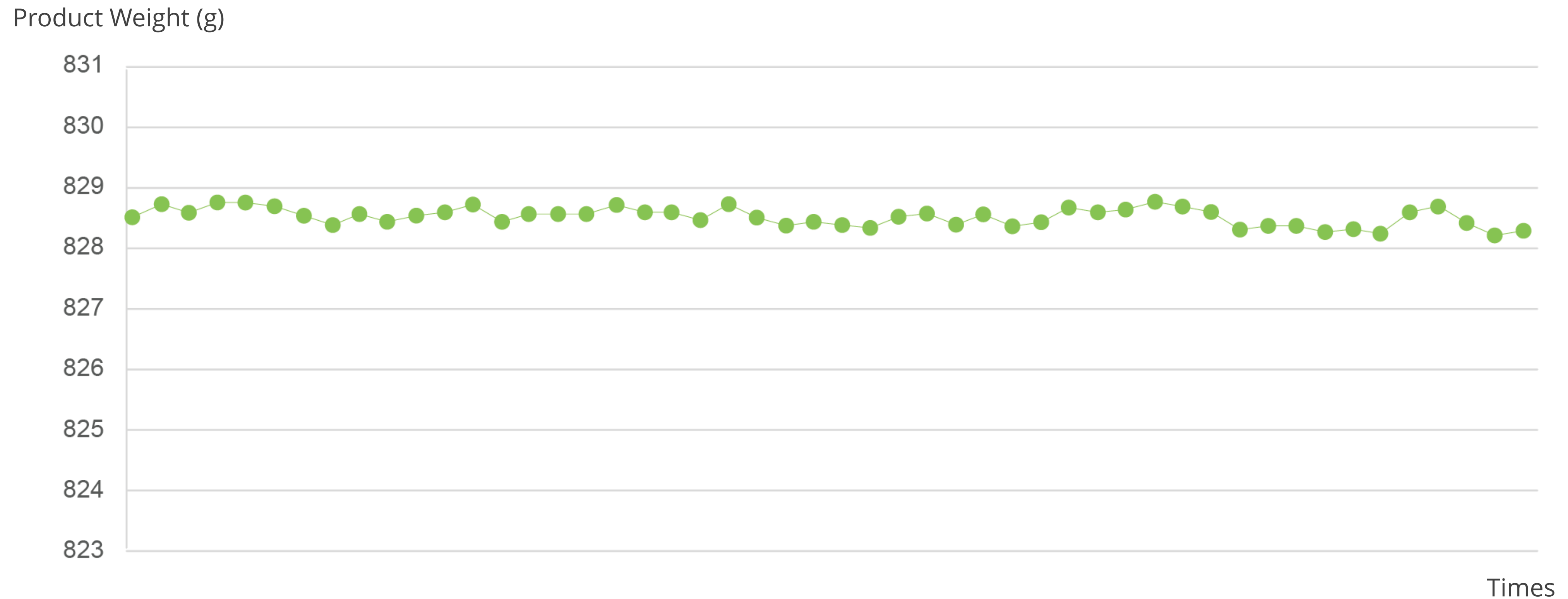
- Energy consumption data comparison test

	JU5500III3430	JU5500V/3450	percentage
Production cycle of single piece: s	66.4	44.3	33%
Time of mold opening and closing: s	10.95	9.3	15%
Injection Time: s	7.3	6	
Charging Time: s	24	15.5	35%
Cooling Time: s	35	19	
Time of core out: s	4	3	
Parts removal time: s	9	7	
Energy consumption (30 times) :kwh	13.481	8.8246	
Time (30 times) : s	1991.8	1337	
Total weight of product (30 times) : g	40278	39869	
Energy consumption: kwh/kg	0.3347	0.2213	34%
Actual energy consumption: kwh/kg		0.2533	24%
Robot	Contain	Contain	
Vacuum loader	Contain	Contain	
labeler	Contain	Contain	
Chiller	None	External Power supply without energy	
Theoretical calculation chiller energy consumption: kwh/kg		0.032	



Injection Unit

-Injection fully closed loop

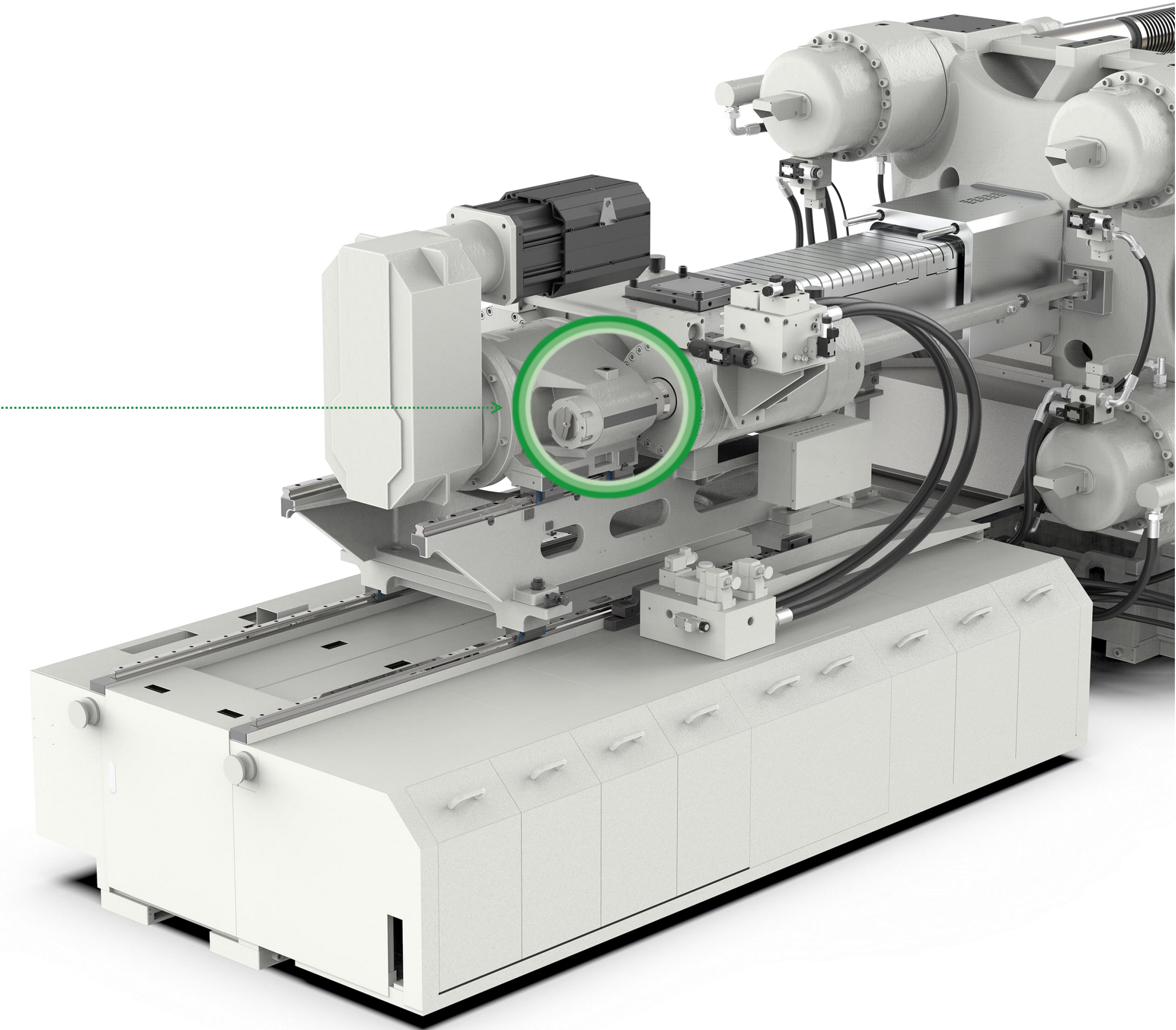
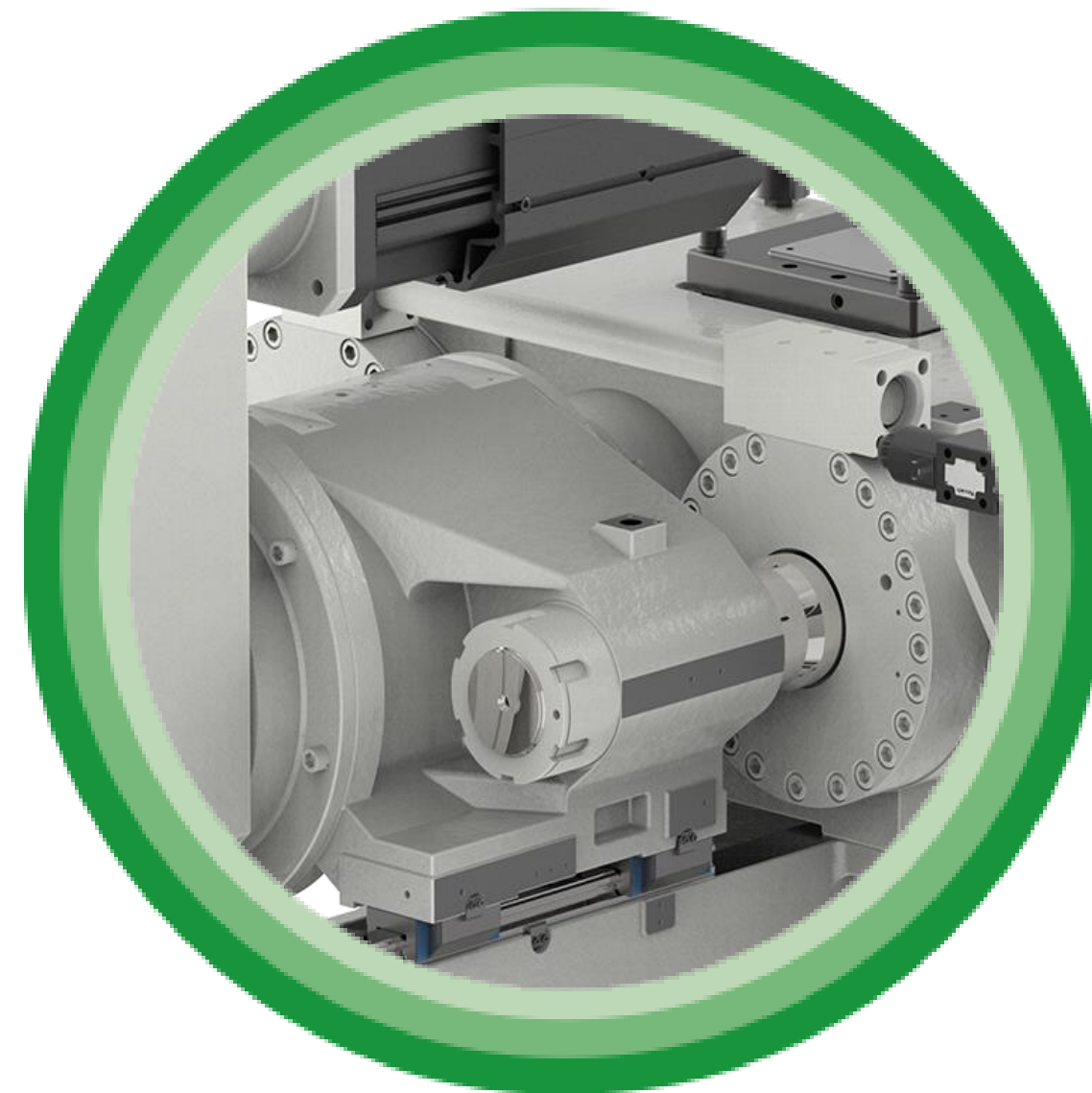


- Achieve fine control of injection movement, rapid response, high injection repeatability, good low-speed stability, and good product consistency, which not only improves equipment performance but also improves process adaptability.

Injection Unit

-Dual-cylinder balanced injection system

- High rigidity balanced dual-cylinder structure design
- Modular system
- Injection cylinder special design, differential injection
- Faster injection speed
- Guarantee low speed stability



Injection Unit

- Longer service life of screw barrel

Standard universal bimetal
screw bimetal K1 barrel

450t-550t: ABC

Variable pitch bimetal
screw bimetal K1 barrel

1300t-1400t: CD
650t-2100t: C

Variable pitch chrome plated
screw bimetal K1 barrel

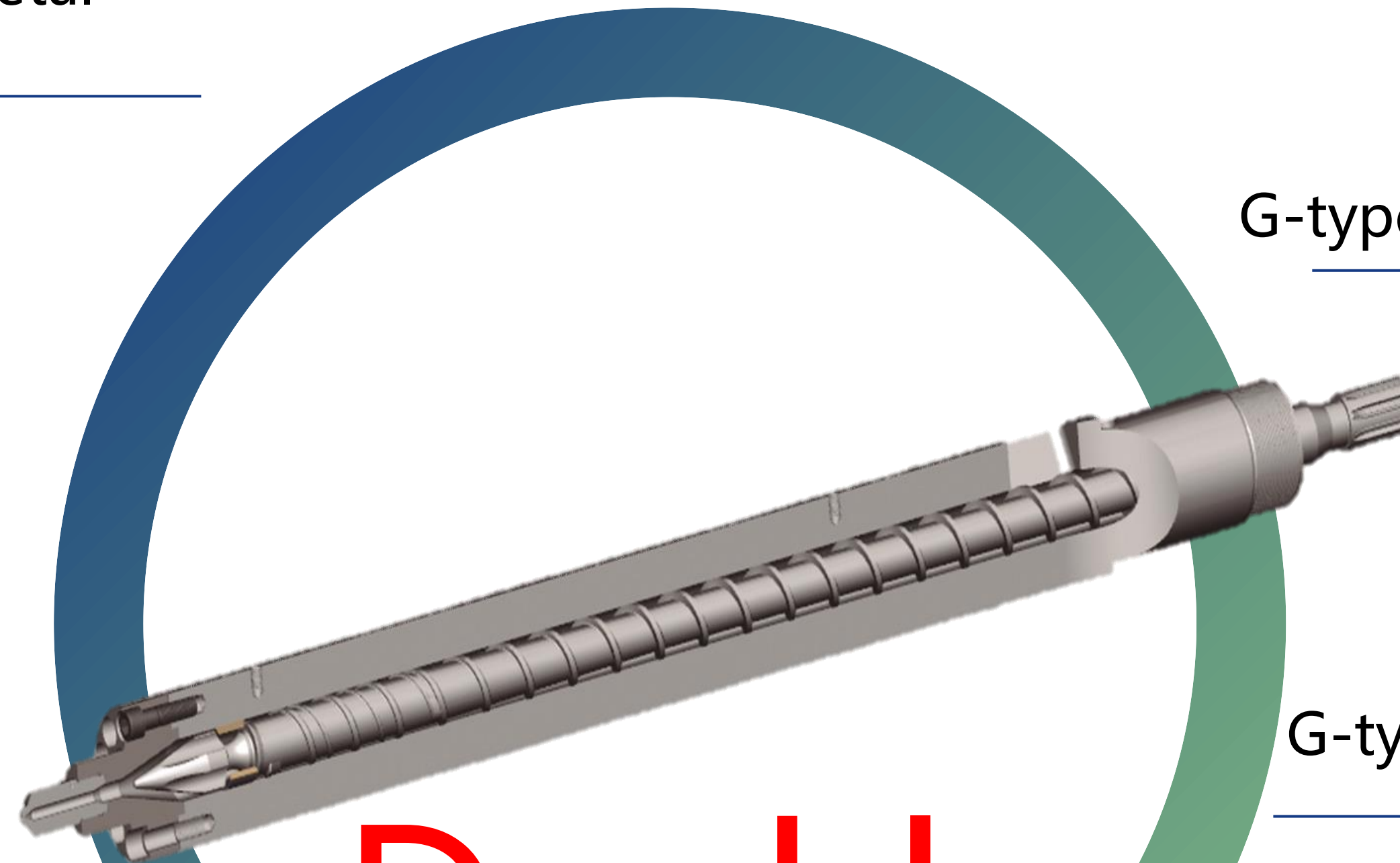
650t-2100t: AB

G-type bimetal screw nitriding barrel

2400t and above

G-type bimetal screw bimetal K1 barrel

2100t: D

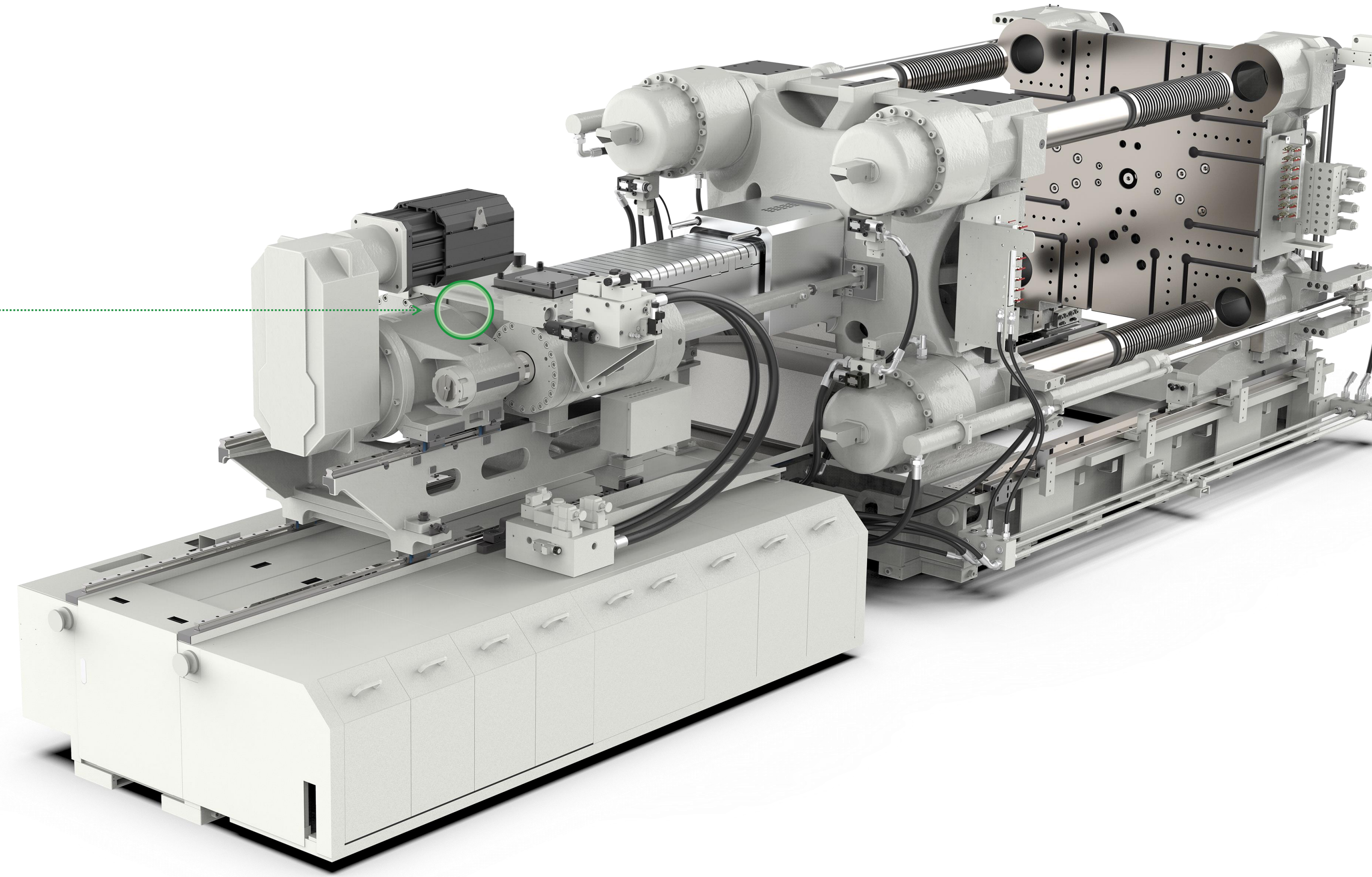
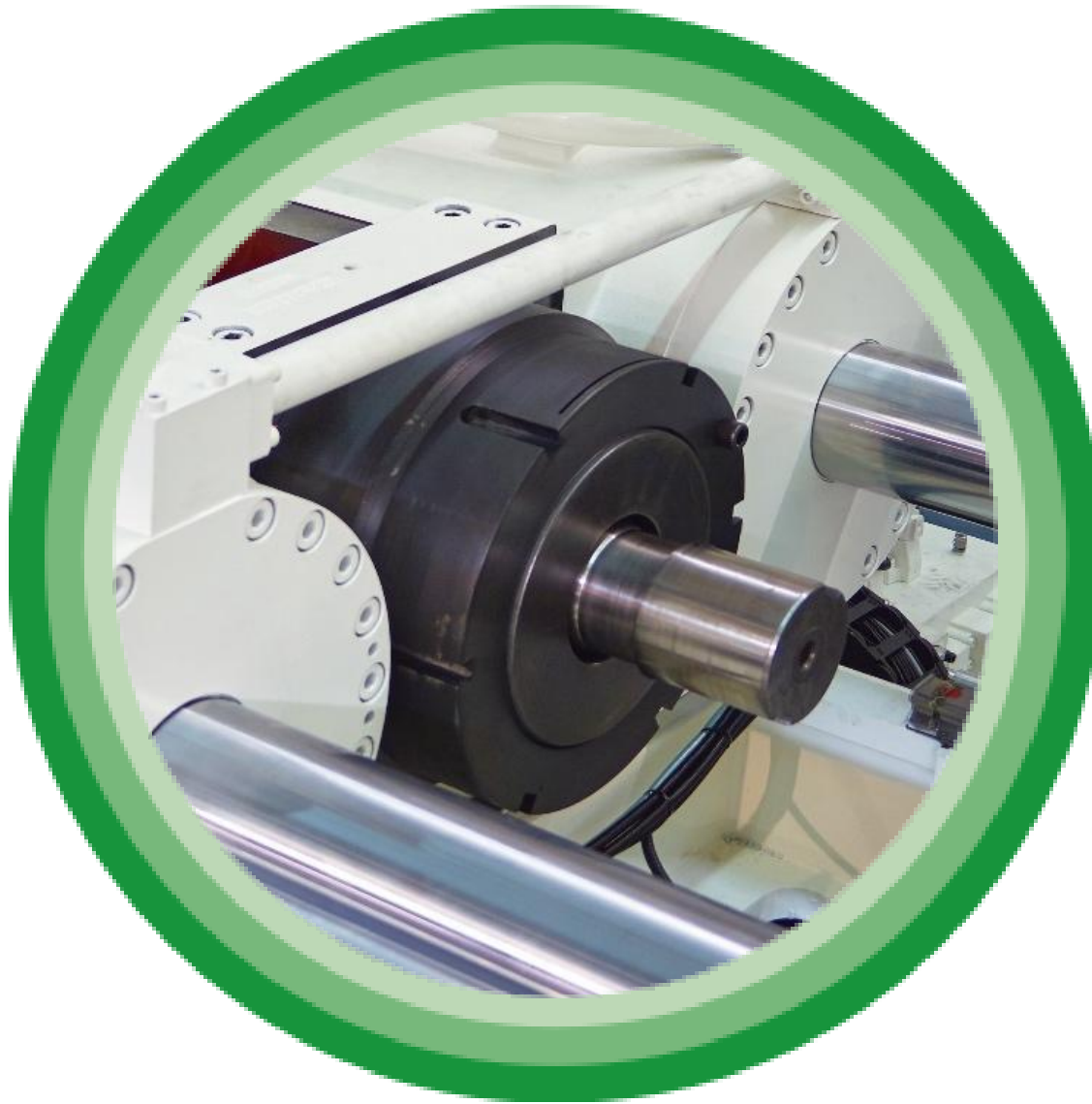


Double

Injection Unit

- Easy screw barrel removal

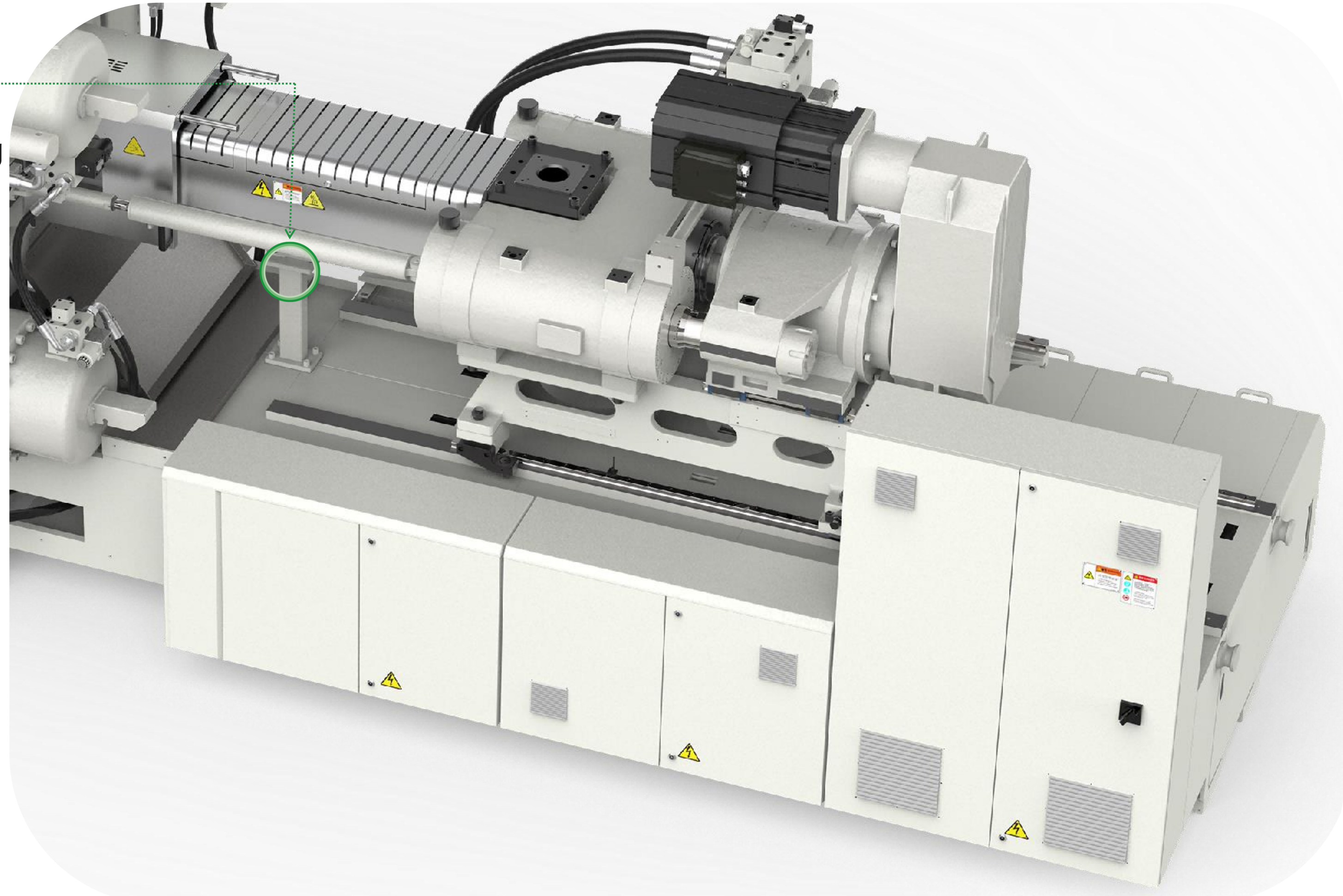
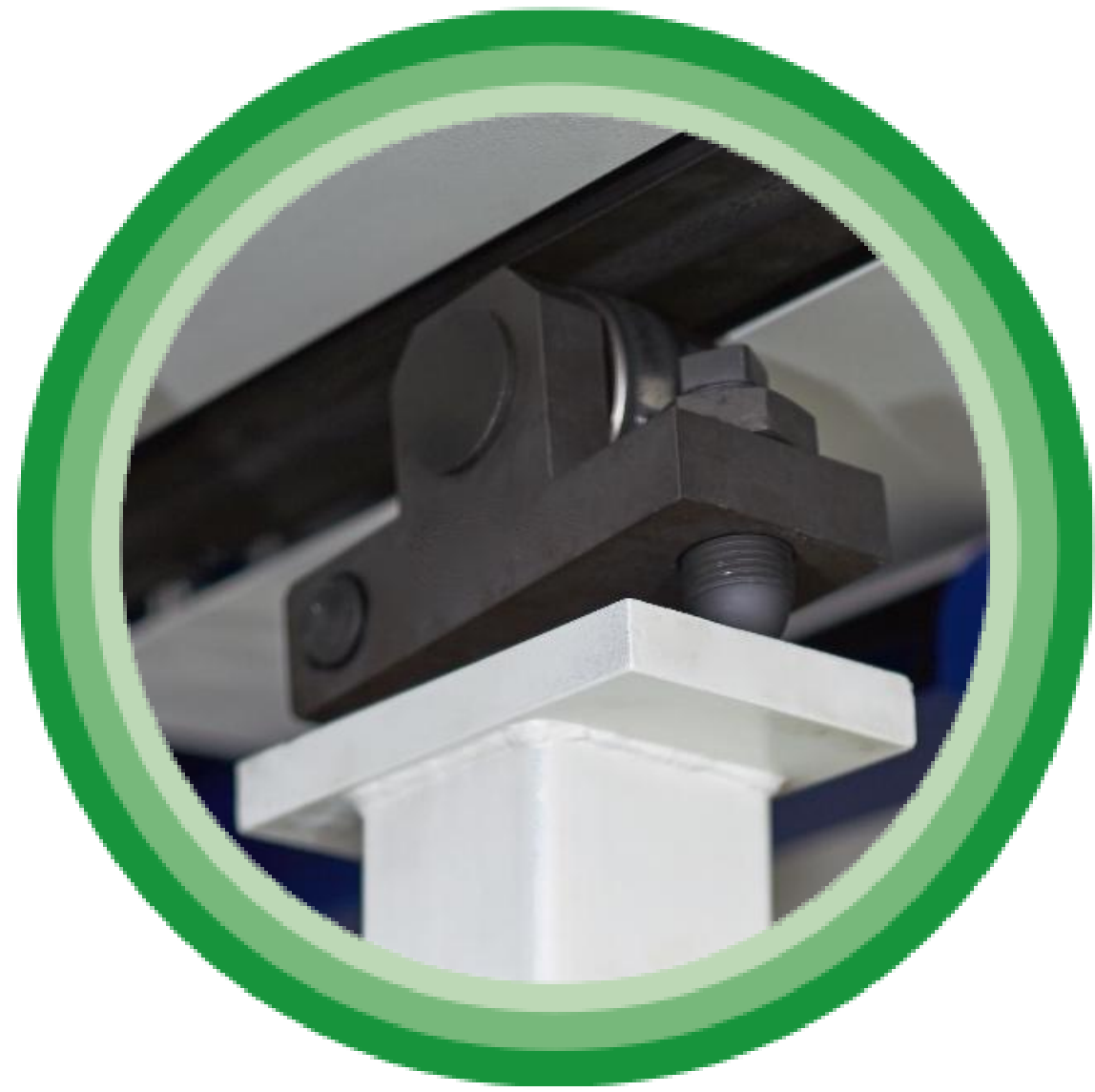
○ Rapid screw barrel change design (11,500 injection equivalent and above)



Injection Unit

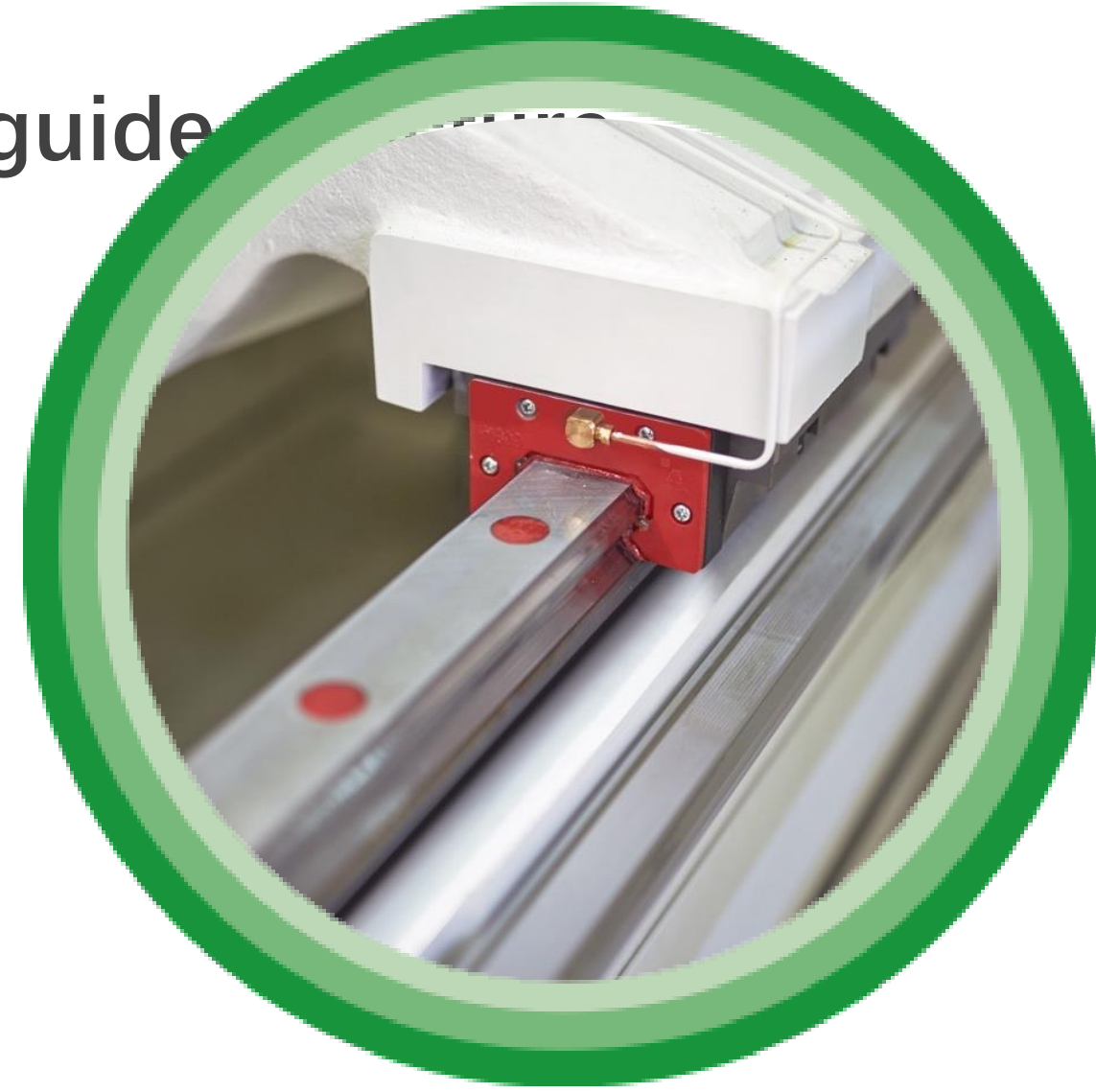
- Barrel support device is easy to adjust

○ The barrel support device is more convenient for fine tuning



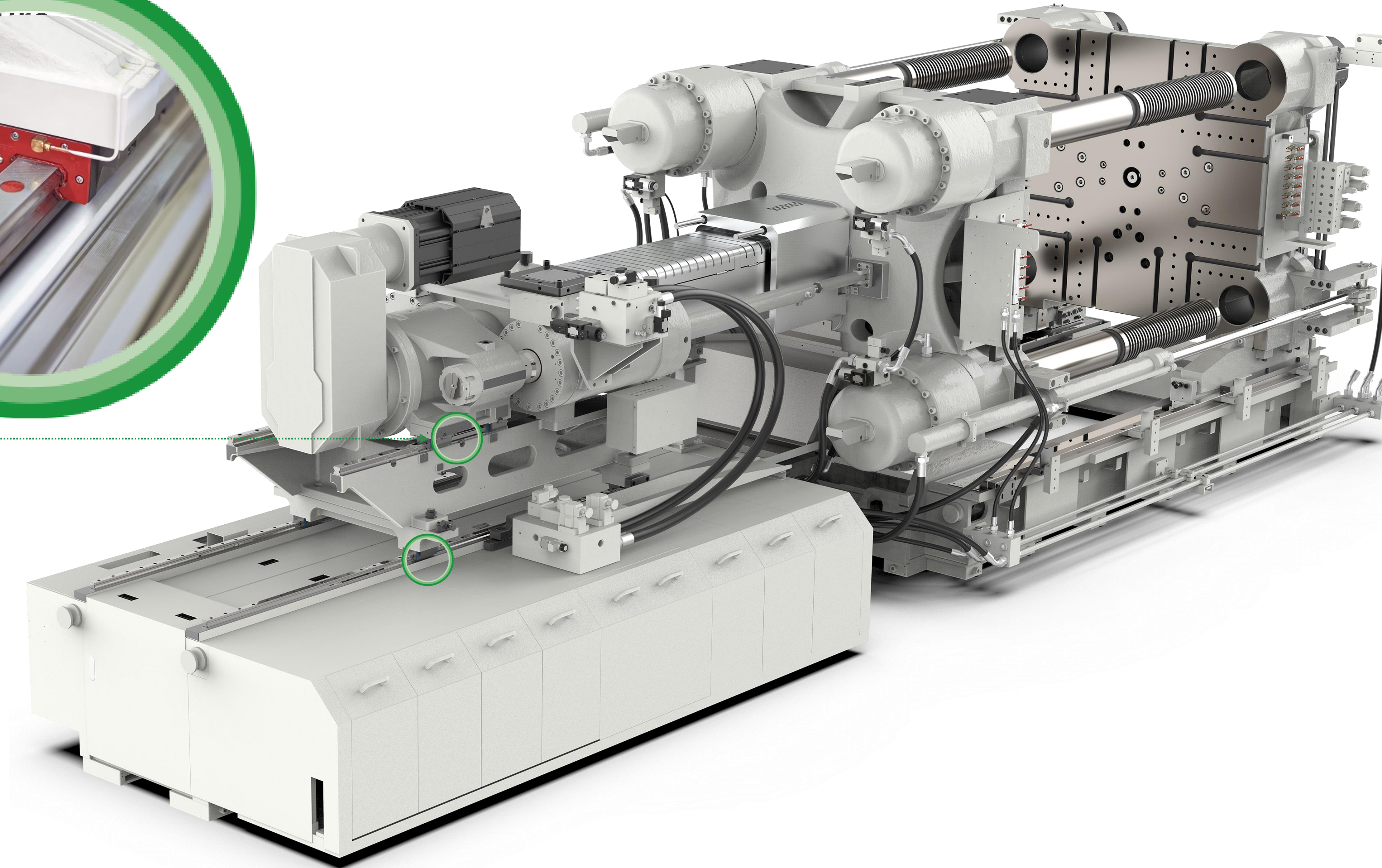
Injection Unit

- Double-layer linear guide



Linear guide rails are used for integral movement and injection

- Low friction coefficient
- Low injection inertia
- High injection precision

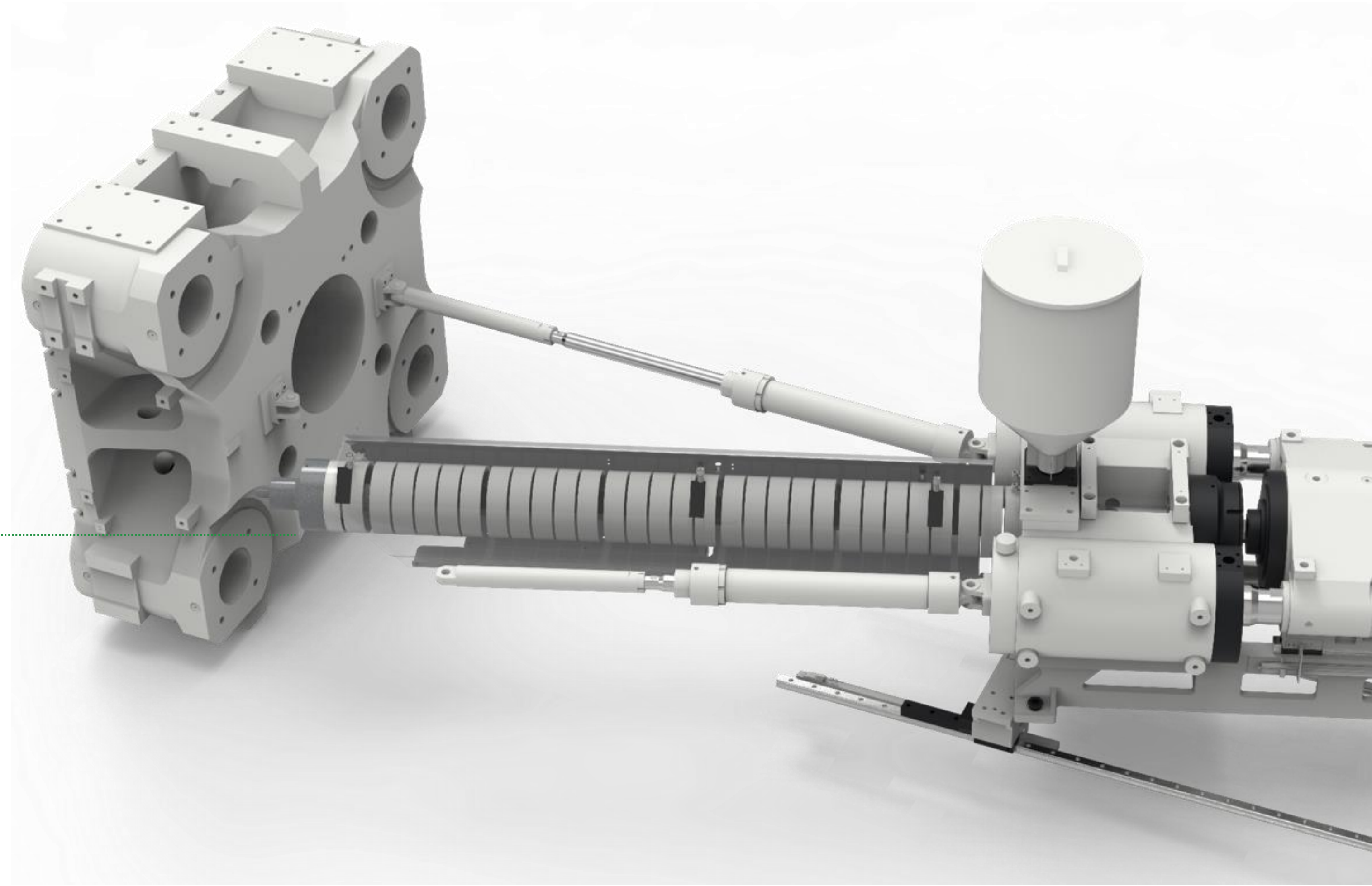


Injection Unit

- Easy maintenance

Save at least **30%** time

- The injection unit can be rotated to facilitate the replacement and maintenance of the screw barrel



Injection Unit

- Energy-saving thermal insulation device



- Double barrel shell structure, removable energy-saving insulation structure design, effectively improve the heating and insulation effect

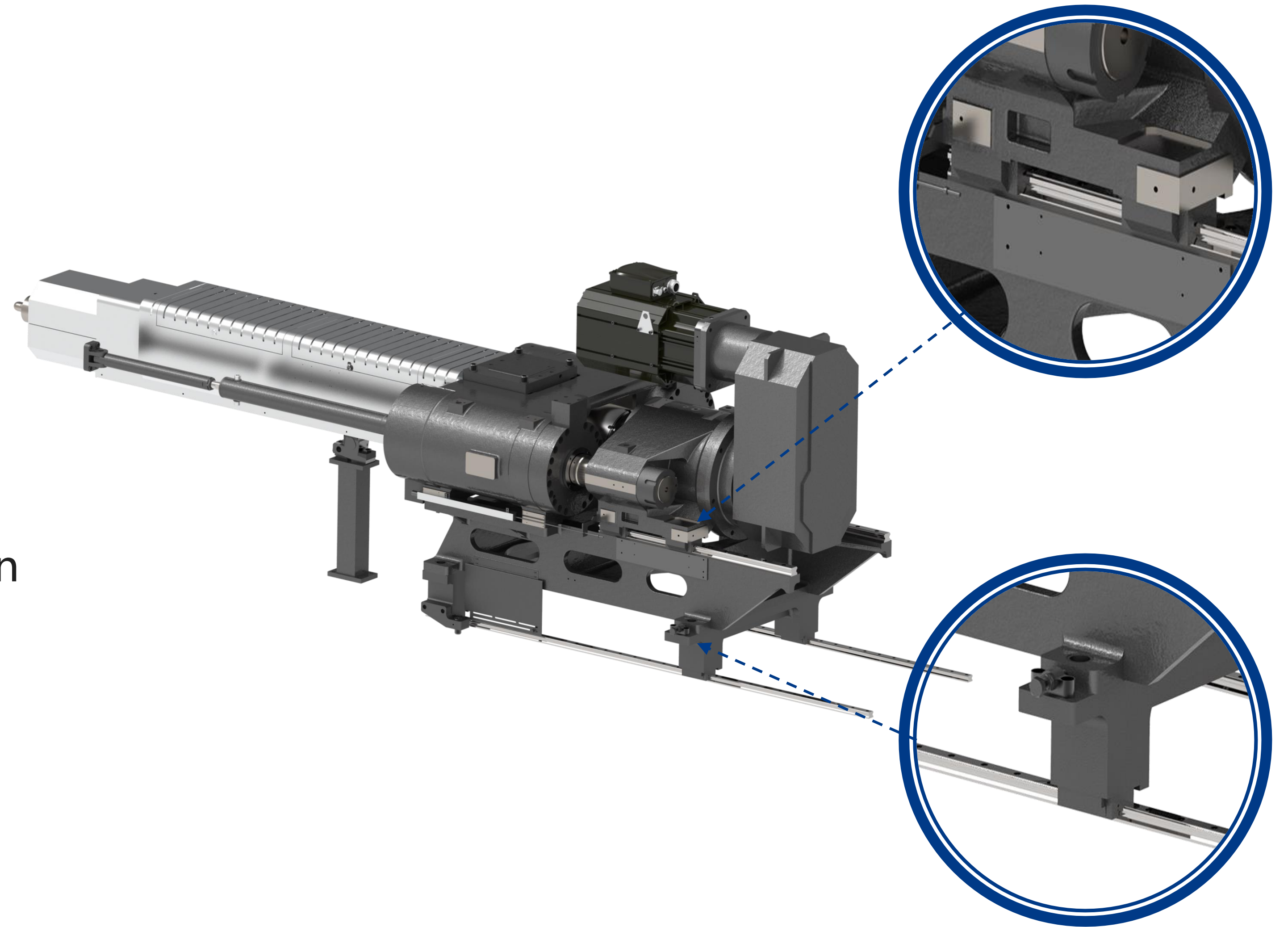


Injection Unit

Double liner structure

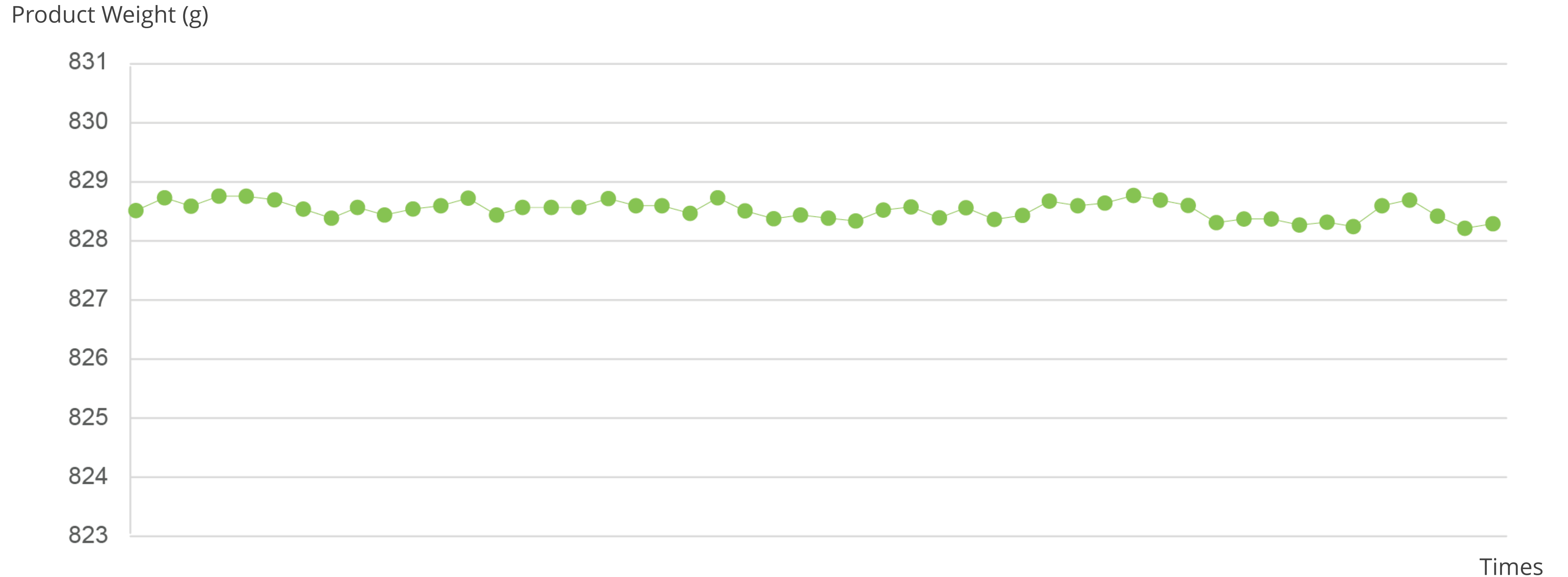
Linear guide rails are used to guide the moving and injection units

- Low friction coefficient
- Low injection inertia
- High injection precision
- Better acceleration and deceleration response
- More precise back pressure control



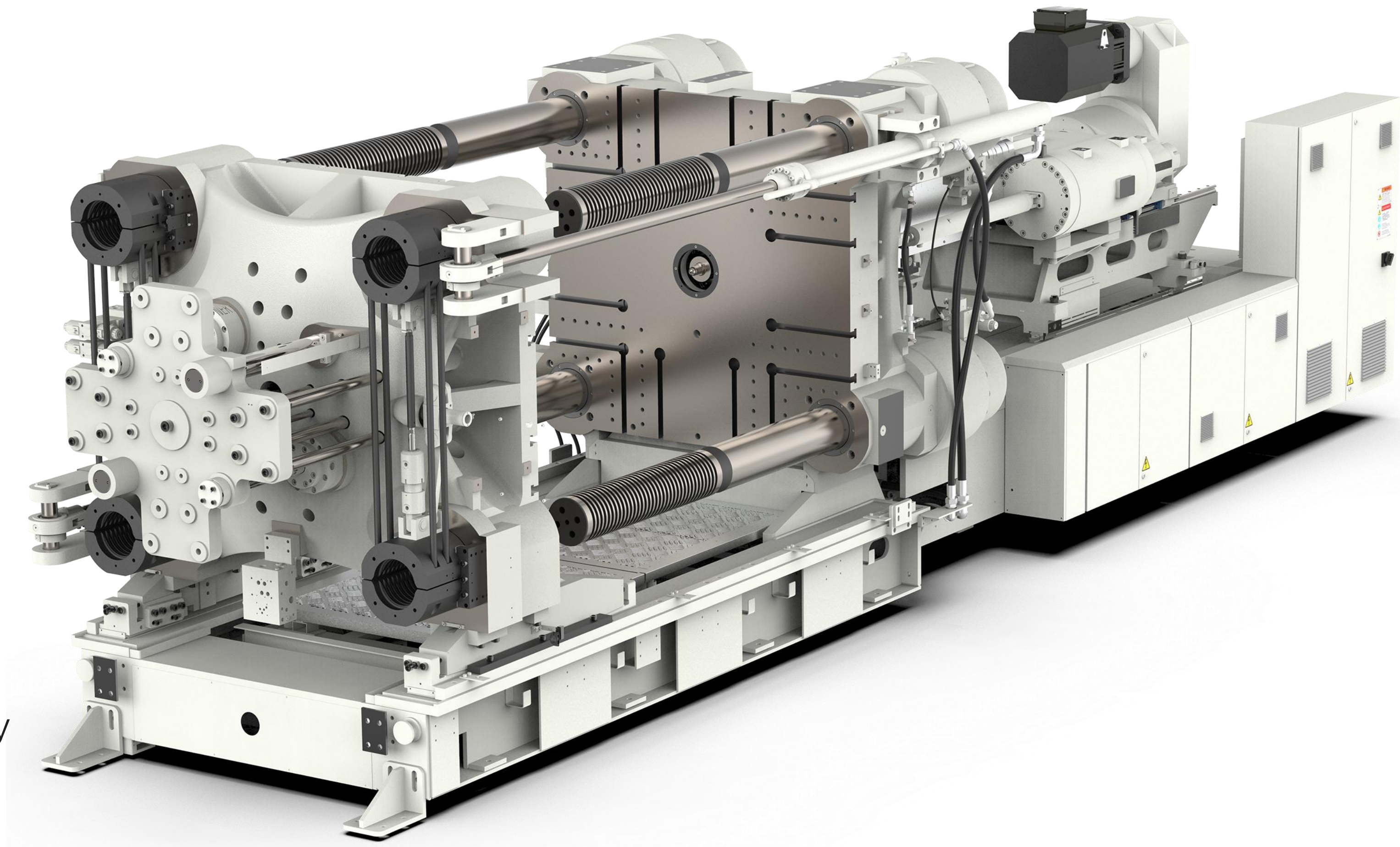
Injection Unit

Full closed loop injection



- We have achieved fine control of the injection movement, rapid response, high injection repetition precision, low speed stability, product consistency, and improved the performance of the equipment while improving the adaptability of the process

- ◆ Clamping cylinder
- ◆ Lock system
- ◆ Ejection system
- ◆ Moving platen support mechanism
- ◆ Clamping area safety pedal
- ◆ Tie bar positioning
- ◆ Lubrication system
- ◆ Custom opening and closing mold proportional valve applications
- ◆ High opening mold positioning accuracy
- ◆ Faster cycle times

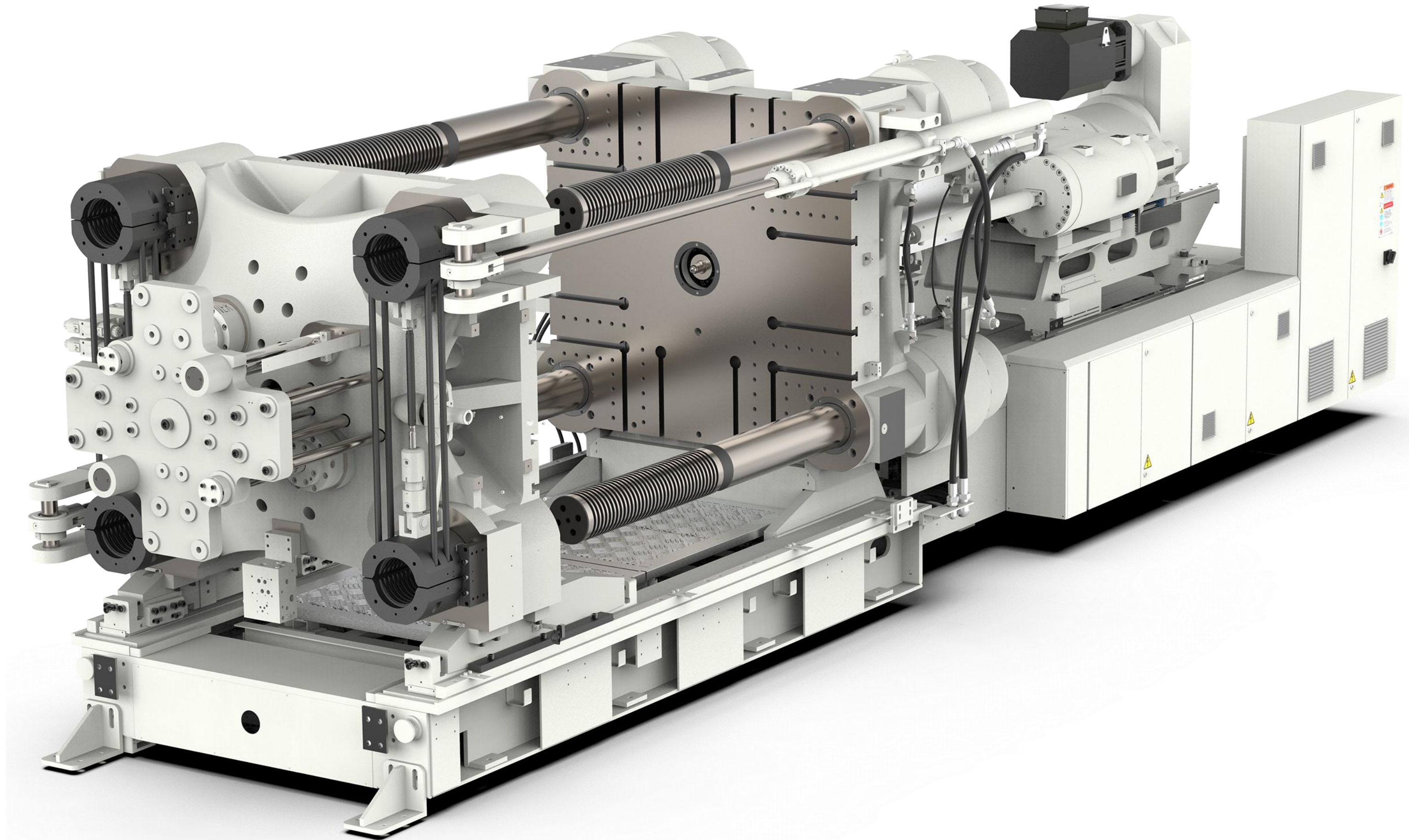


Clamping Unit

Clamping Unit

- Compact overall structure

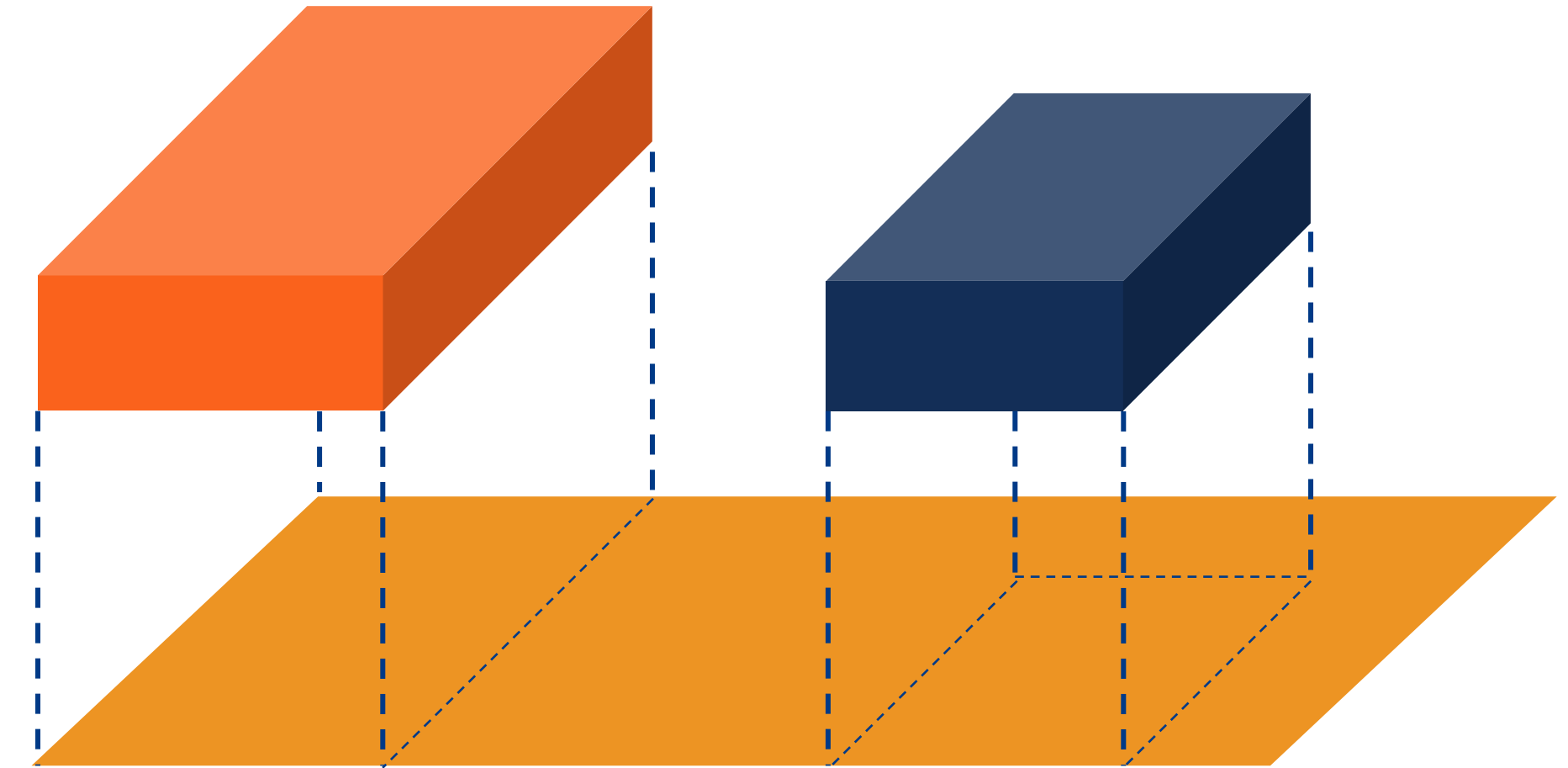
- Larger mold space, easier to operate, is the ideal carrier for large and multi-cavity complex molds
- Increase the scalability of the device layout and optimize the selection of automation options to bring more available space



Clamping Unit

- Compact overall structure

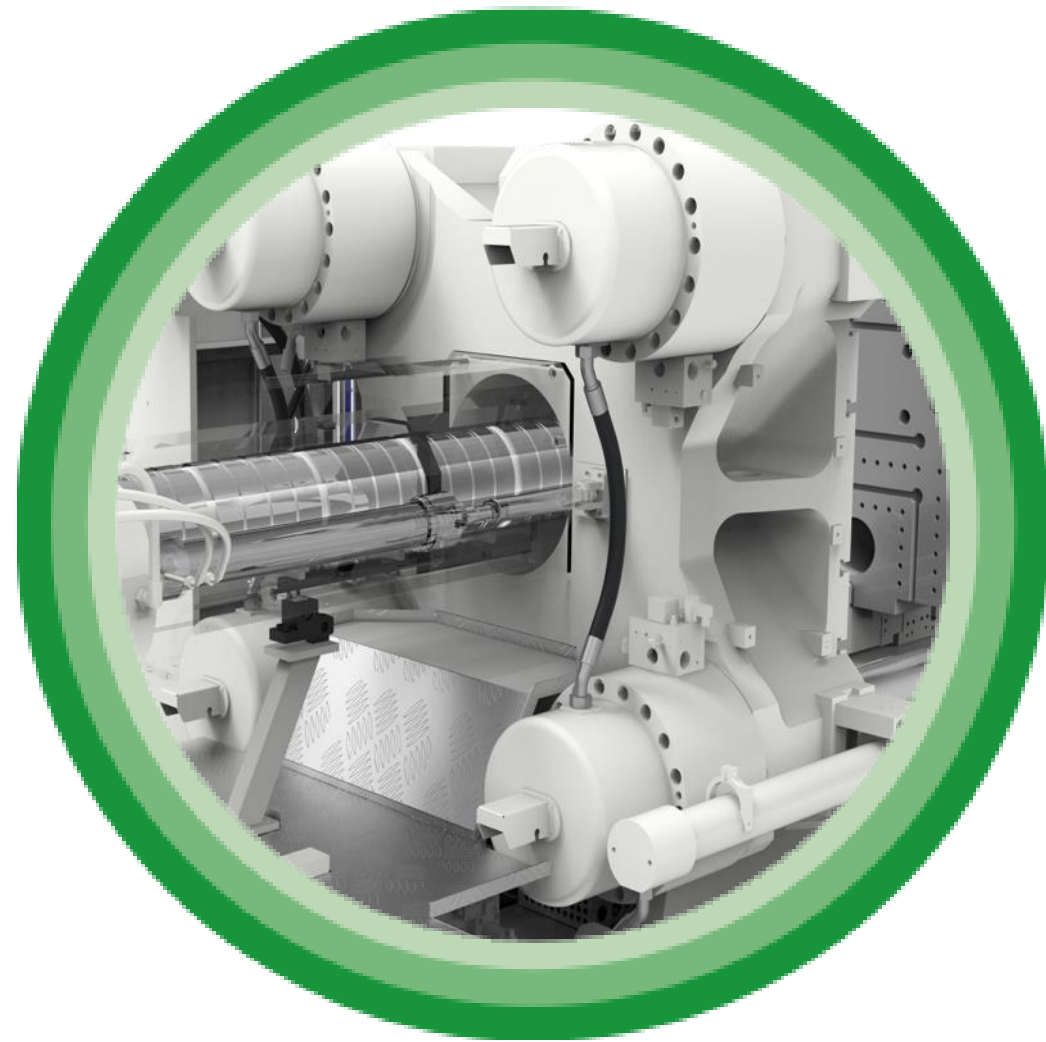
- The compact structure of the whole machine, the floor area is reduced by more than 10%, especially for the large and medium-sized injection molding machine, the demand space is further reduced, the plant utilization rate is greatly improved, and the factory operating costs are reduced.



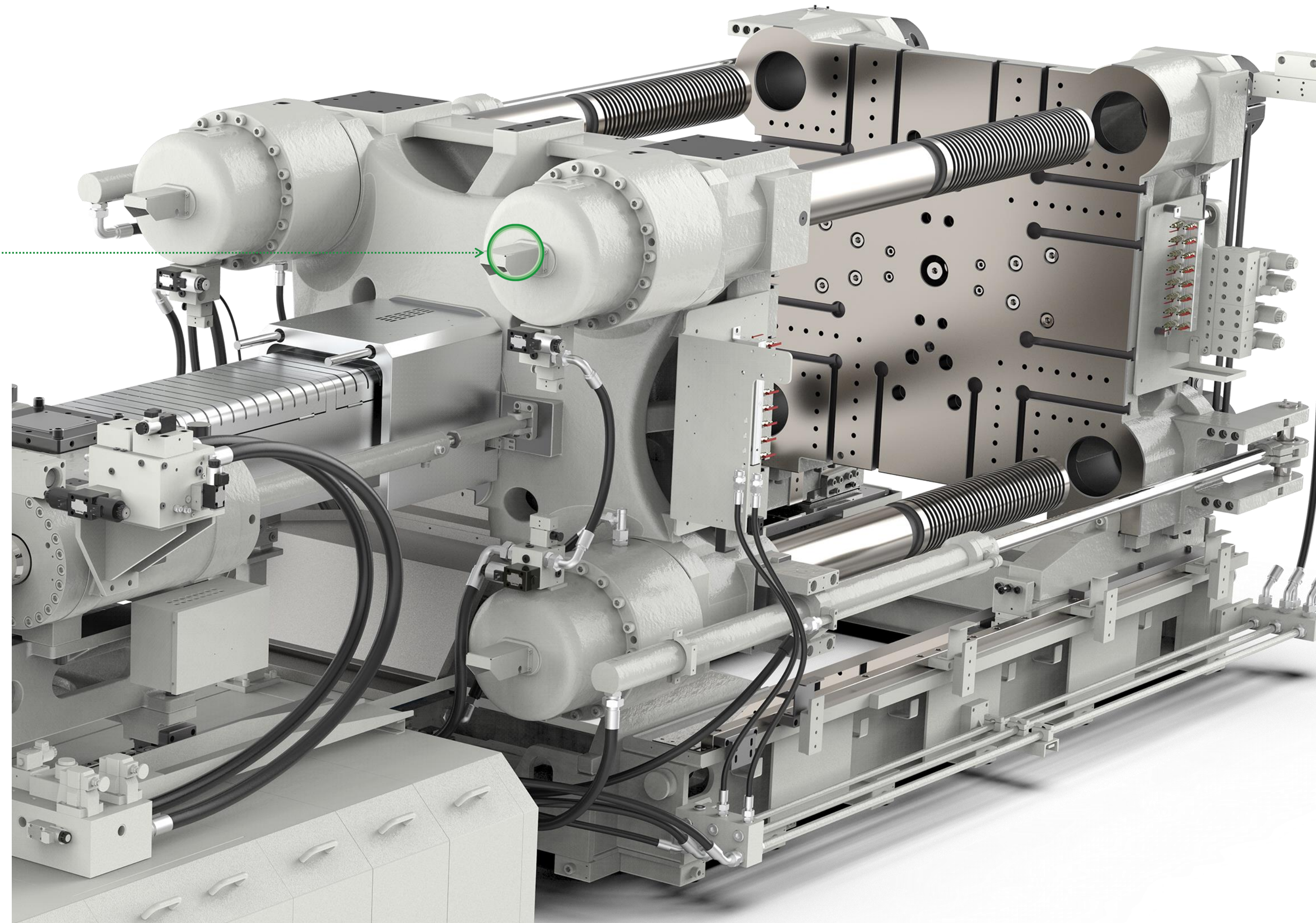
	width		Length		Site area comparison
	JU111	JUV	JU111	JUV	
450	2168	2168	6866	6755	-1.62%
1080	3301	3040	9610	9302	-10.86%
1850	4148	3754	12277	11911	-12.20%

Clamping Unit

- Clamping cylinder



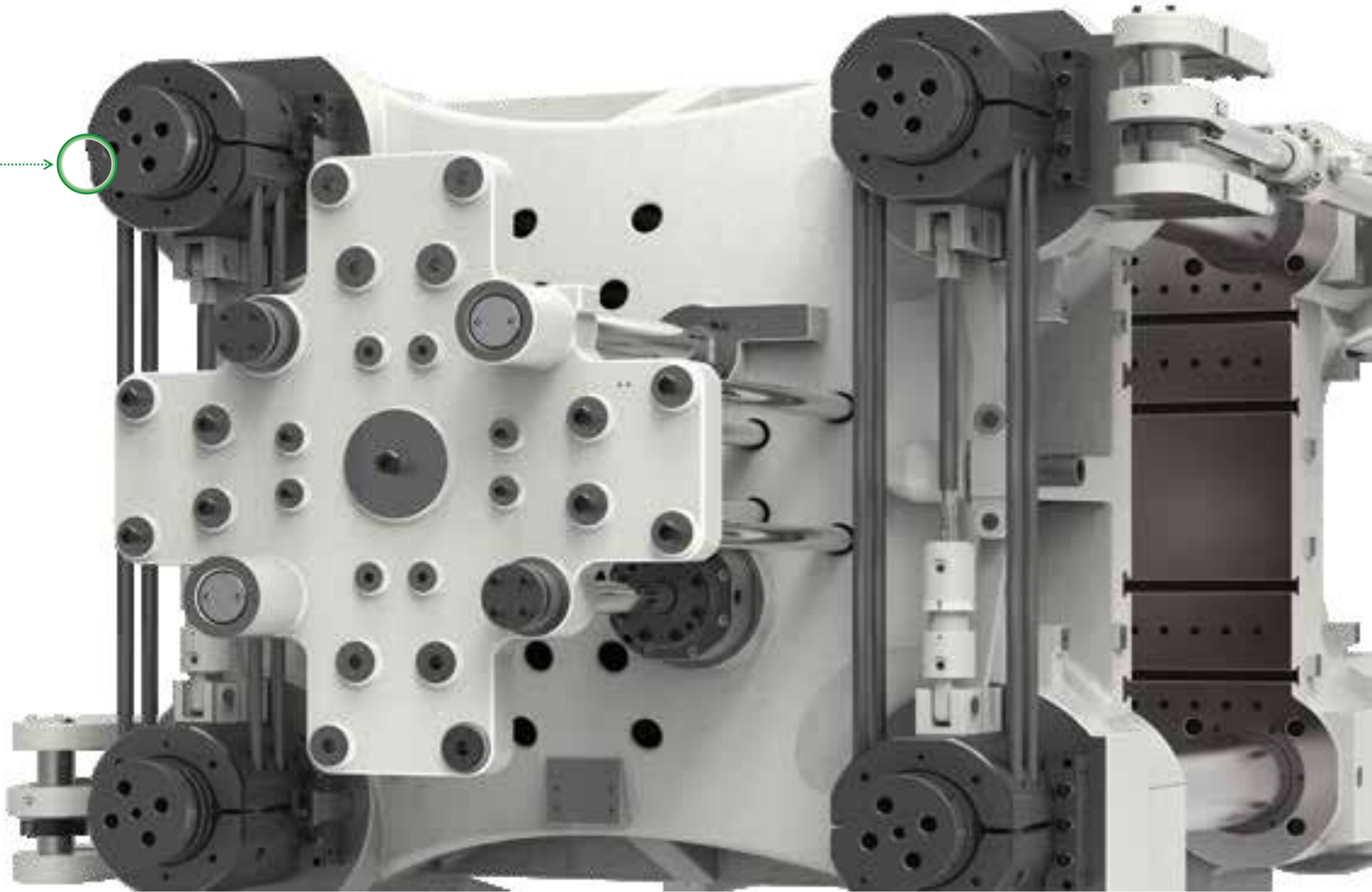
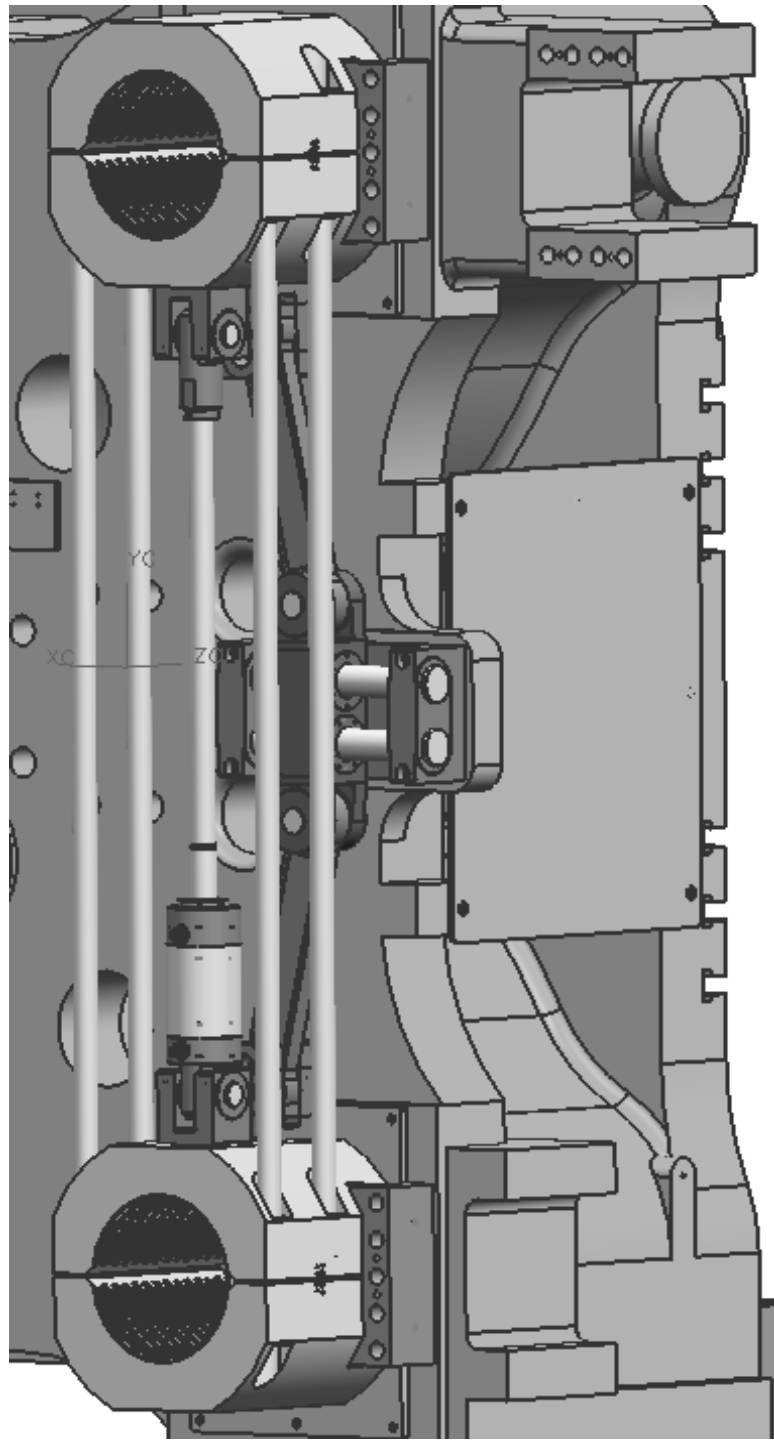
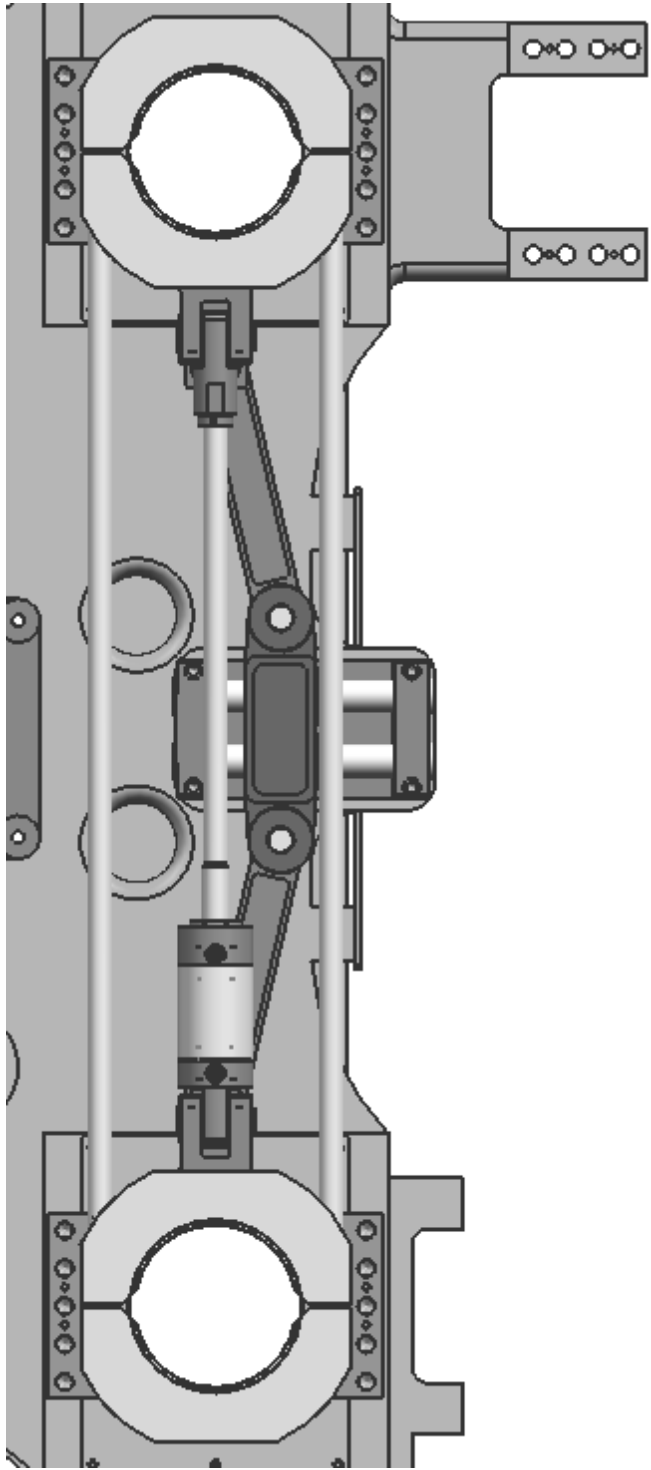
- Four short-range clamping cylinders mounted on a fixed form quickly establish clamping forces.
- The clamping force can be monitored in real time by the pressure sensor, and the clamping force has good repeatability.



Clamping Unit

- Lock system

- Synchronous holding mechanism
- Fast and reliable response



Clamping Unit

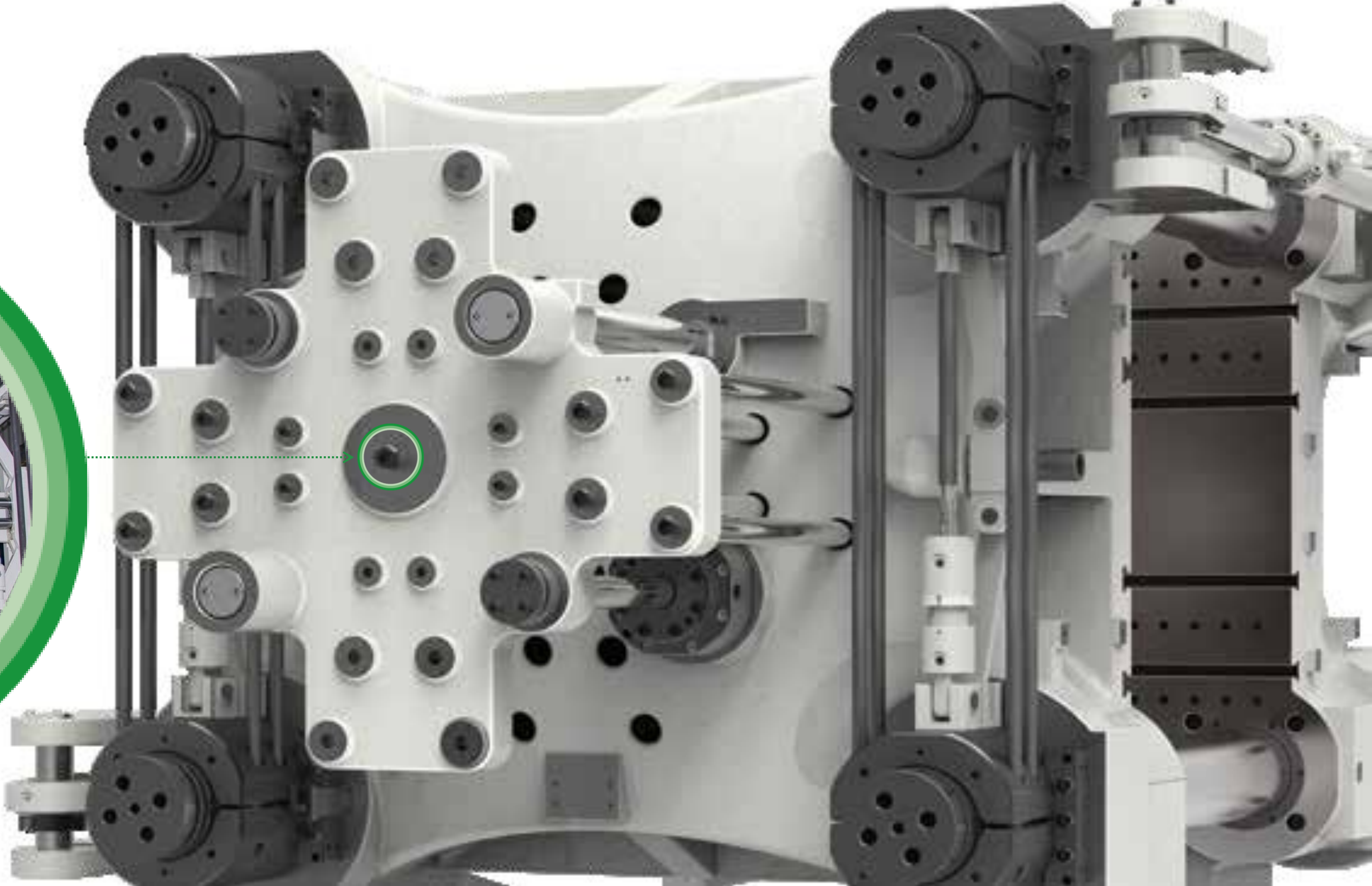
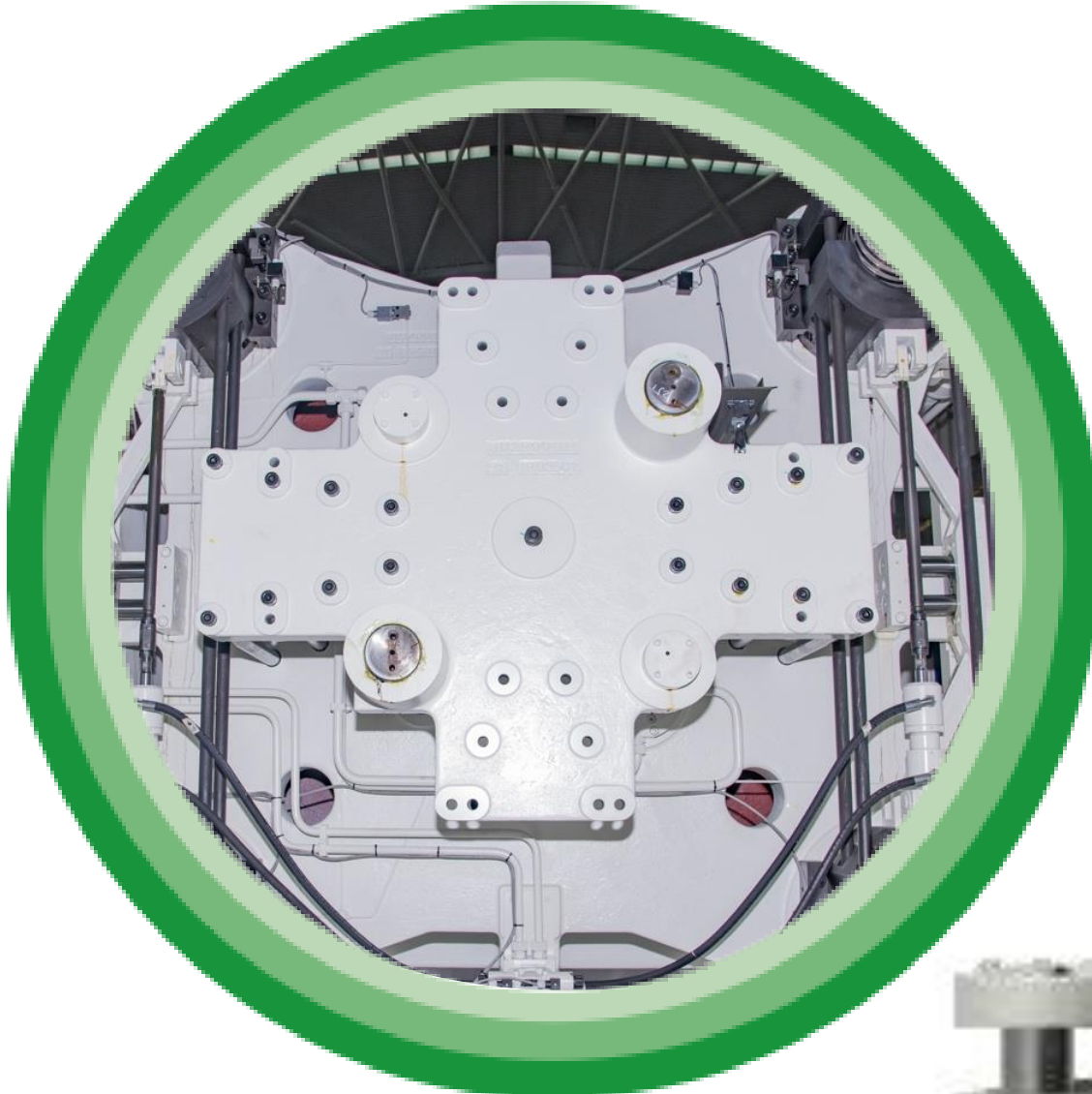
-Ejection system

- Inverted ejection cylinder
- Ejection travel adjustable for more flexibility

450-900T



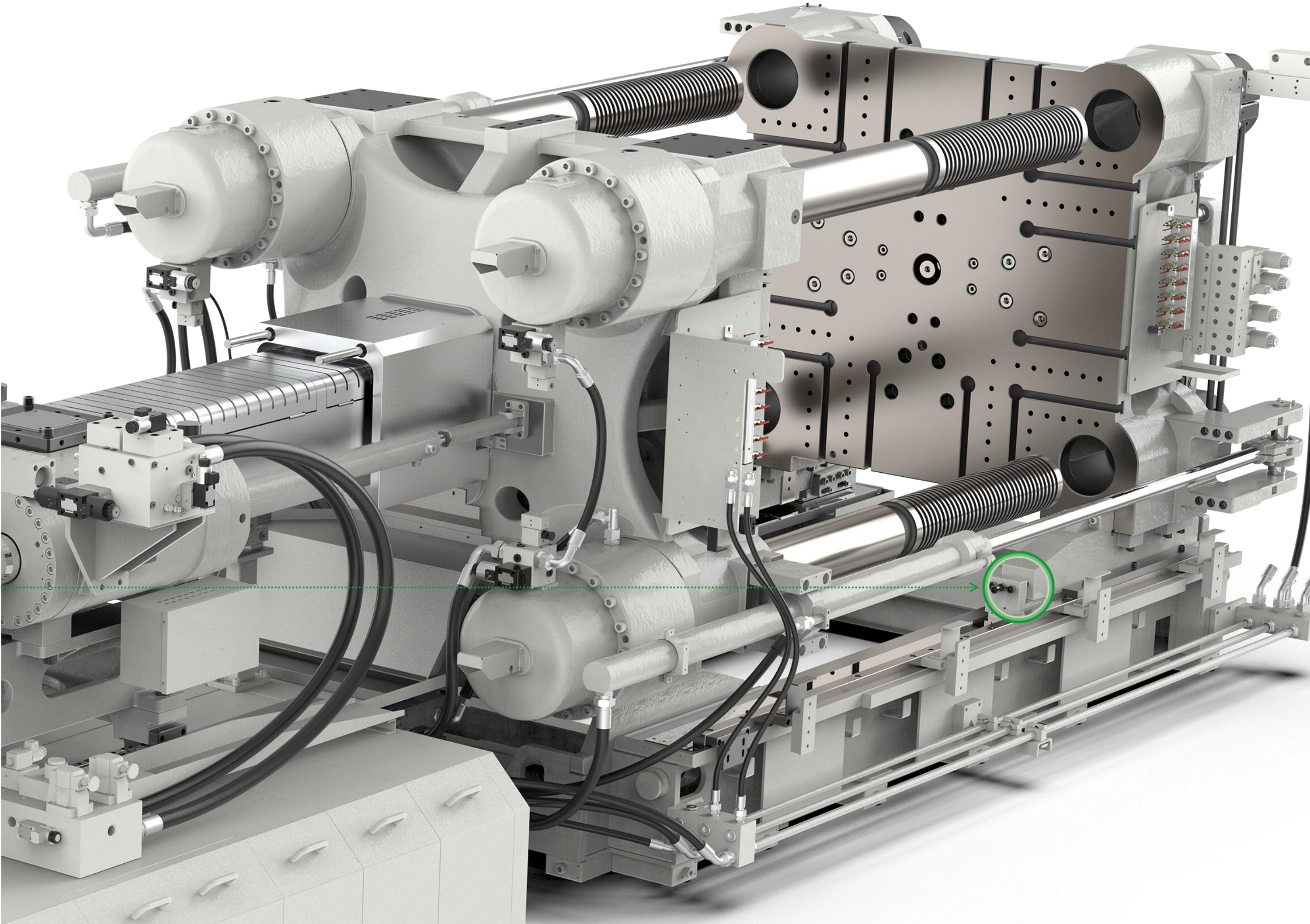
900T and above



Clamping Unit

-Moving platen support mechanism

- The high rigidity of the second plate sliders and the underside and side guide mechanism ensure that the motion accuracy of the moving form is maintained even when heavy molds are installed.

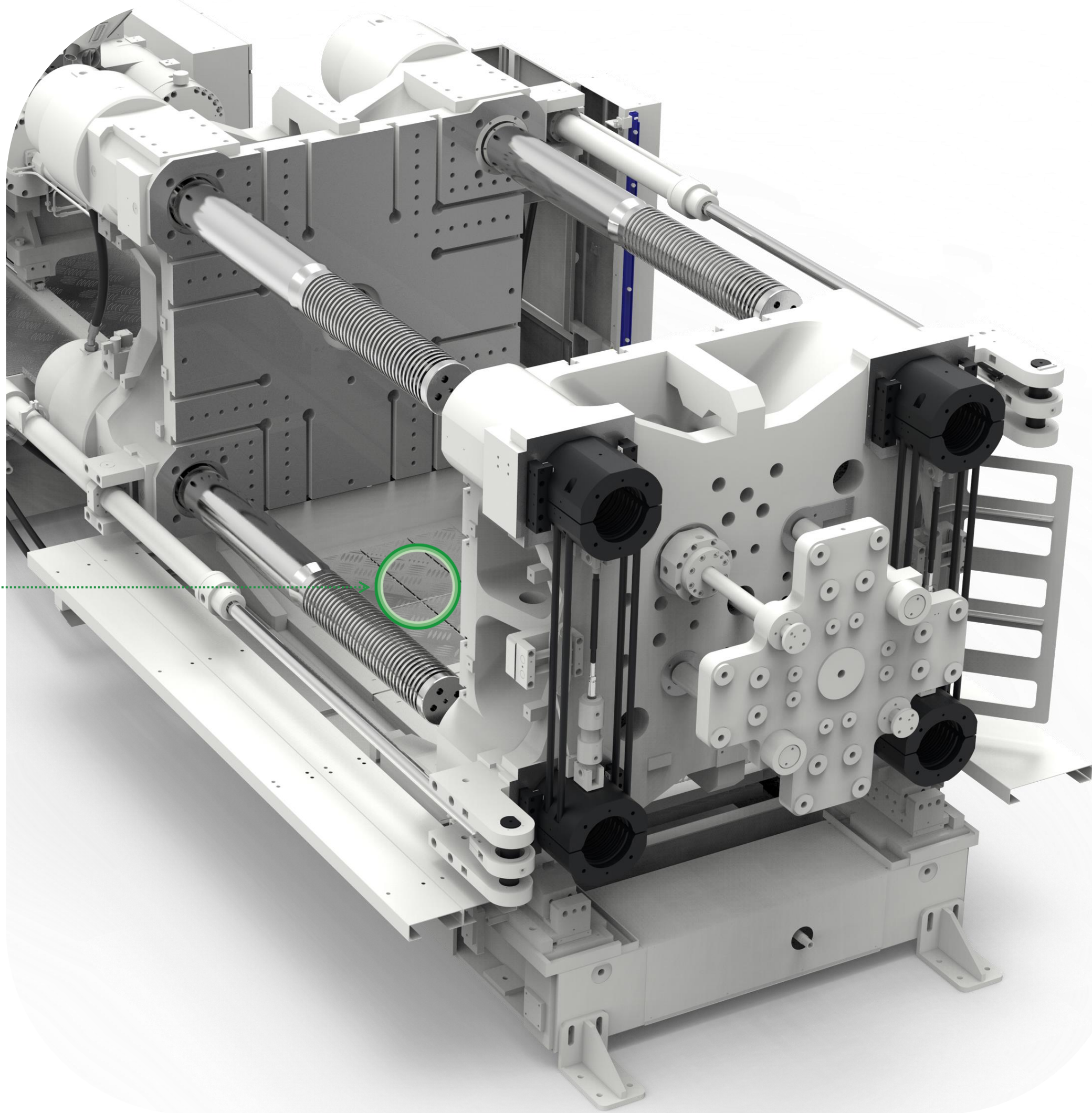


Clamping Unit

-Clamping area safety pedal

- Equipped with a large area safety pedal to provide safety protection in the mold closing area.

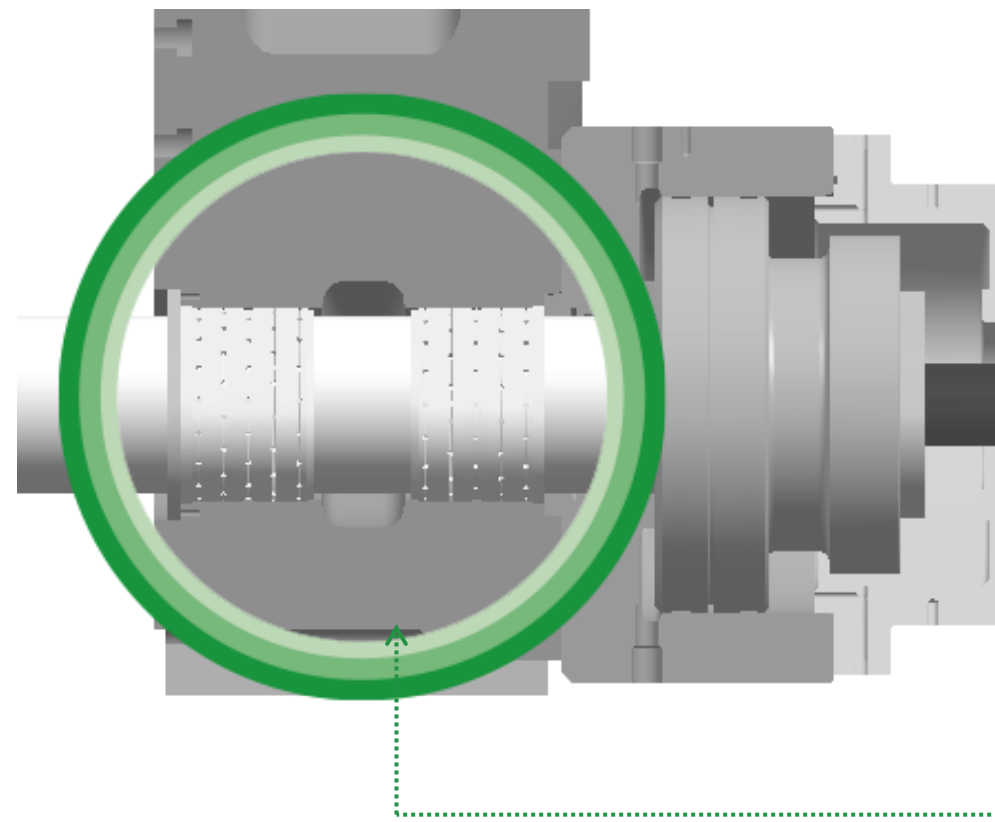
900T and above



Clamping Unit

-Tie bar positioning

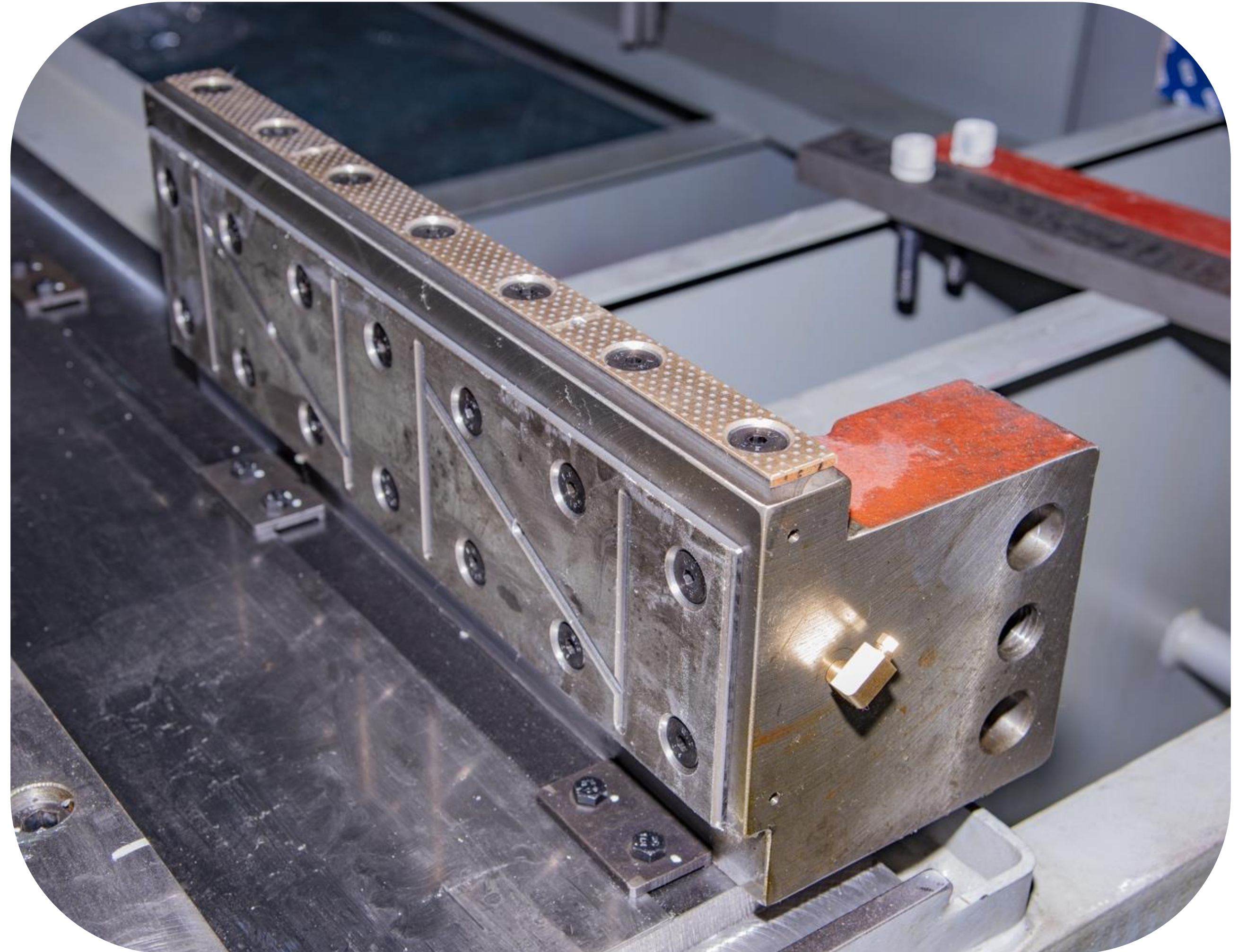
- The front and rear bushings provide better support for the tie bar
- The clamping cylinder is located in the fixed template
- The position of the tie rod is monitored by a high-precision displacement sensor



Clamping Unit

-Lubrication system

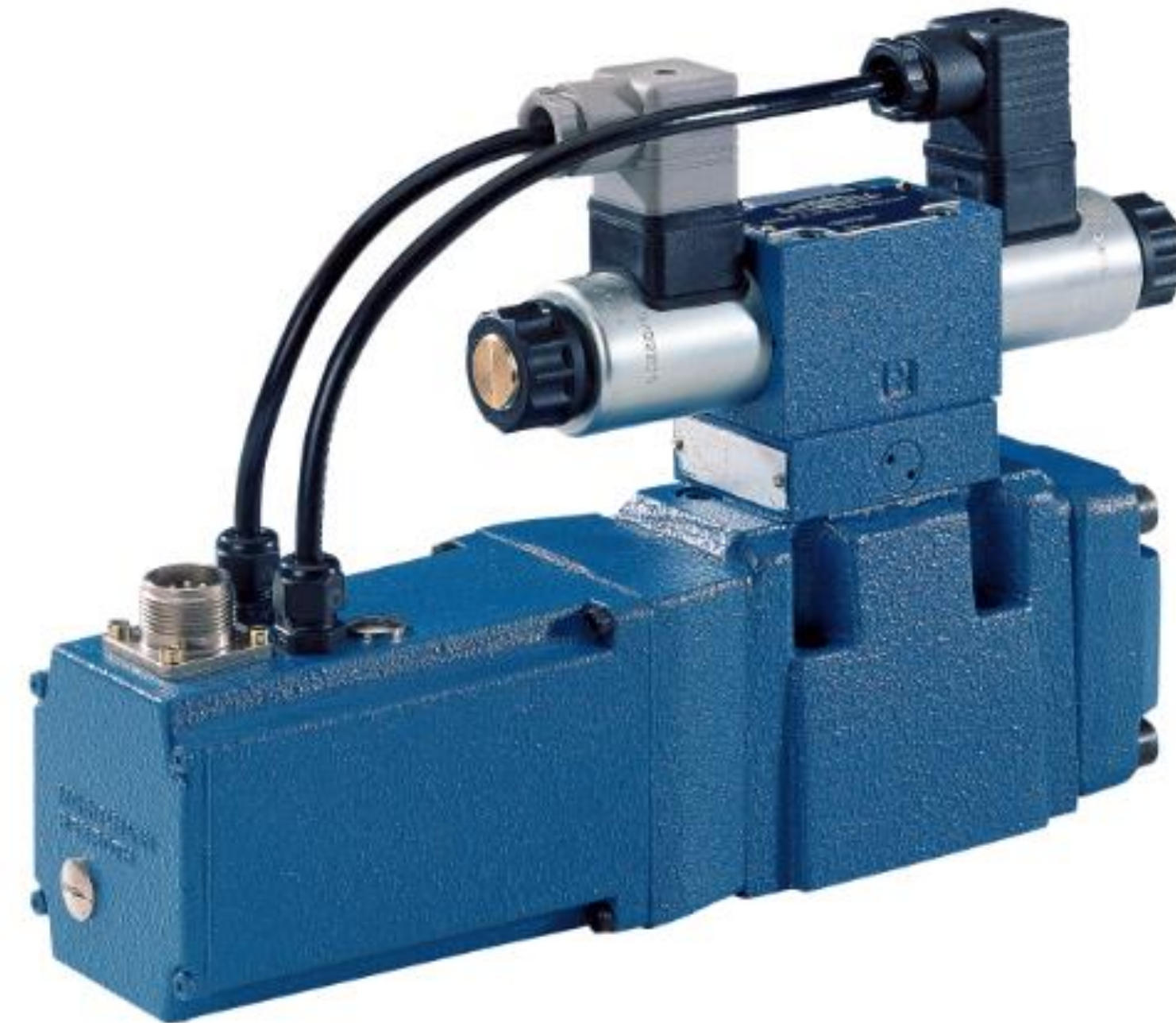
- The fixed plate and lock realize oil-free self-lubrication (design pressure injection oil cup), which improves the cleanliness of the machine.
- Moving platen material is used at the sliding foot of the second plate, very little oil lubrication (thin oil)
- Lubrication parameters are optimized and lubrication frequency is more reasonable



Clamping Unit

-Custom opening and closing mold proportional valve applications

- Apply proportional valves with custom spool
- The repeat accuracy of the die end position has been increased from the current 1mm to 0.5mm (up to 0.3mm for some models).
- Mold locking, mold breaking action is faster
- Higher operation accuracy



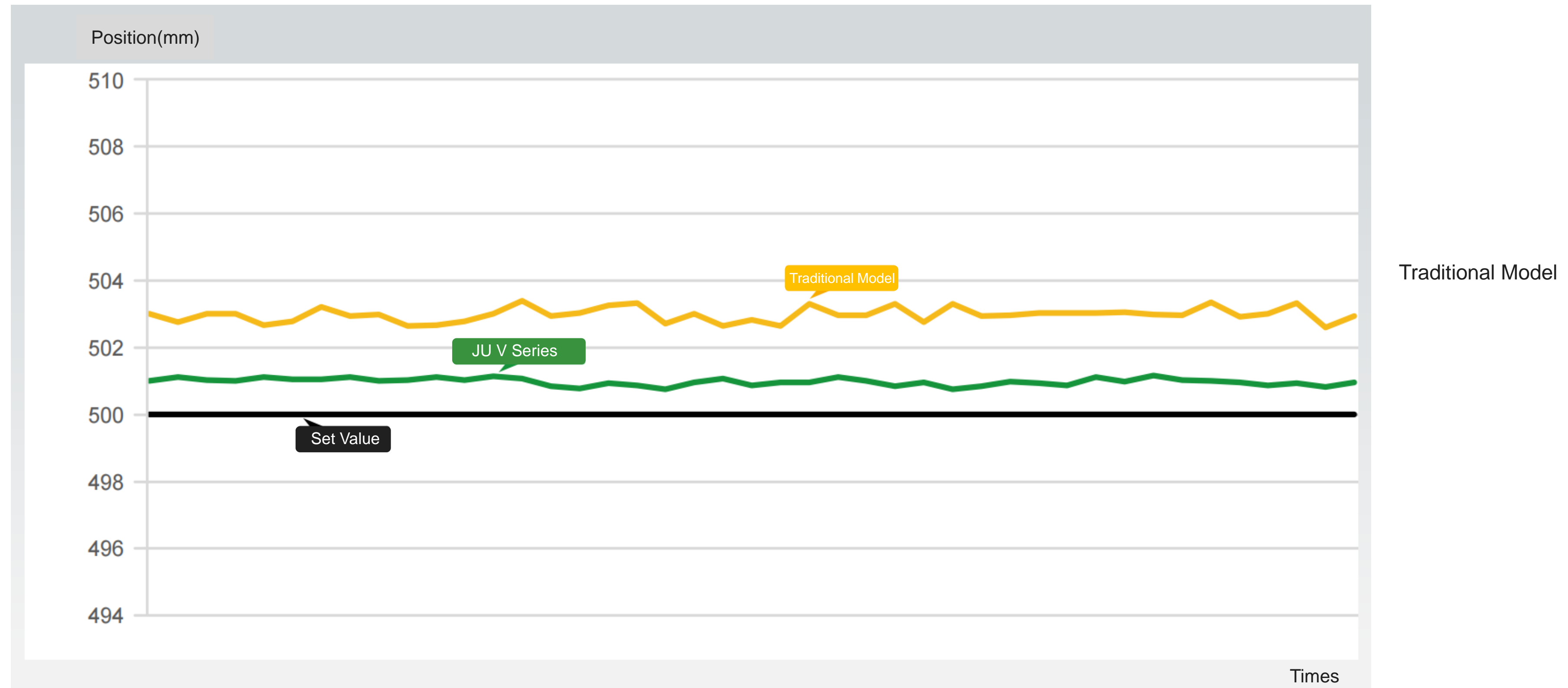
Opening and closing mold proportional valve

Clamping Unit

-High opening mold positioning accuracy

HT Clamp smart mold opening and closing 2.0

- Program self-learning function
- Open mold positioning accuracy improved



Clamping Unit

-Faster cycle times

- Control optimization: multi-PID, hierarchical control, program task cycle speed up.
- Tuning optimization: parameter setting
- Short, reasonable power output overshoot
- Short open speed limit

Machine of 650T laboratory data: Dry cycle 3s

产品数	2015	循环时间	560.81	模具数据	drycycletest	
间隔: 1	模数	全部测量	100			
模数	循环时间	实际合模时间	实际开模时间	模板位置	实际闭模时间	实际开模时间
[l]	[ms]	[ms]	[ms]	[mm]	[ms]	[ms]
2000	2999.89	837.88	883.89	744.5	323.83	319.86
2001	3019.26	837.80	883.89	744.6	325.85	321.88
2002	3000.13	837.90	883.82	744.5	327.84	303.89
2003	3019.92	837.85	877.78	745.3	327.87	323.96
2004	3020.53	837.88	877.78	745.6	329.88	319.88
2005	2999.96	843.89	877.75	744.7	325.82	301.89
2006	2979.56	837.85	877.82	744.2	311.87	299.91
2007	2980.09	837.86	877.79	744.9	309.83	303.88
2008	3019.91	843.88	877.80	744.9	327.83	323.97
2009	3020.52	843.91	877.78	744.6	323.88	319.88
2010	3000.13	837.86	877.78	744.2	311.86	319.87
2011	3019.57	843.88	877.83	744.5	325.83	321.93
理想值	7	1127.49	1499.44	747.4	0.00	0.00
最小值	6	837.80	877.75	744.2	309.83	299.91
最大值	3	843.91	883.89	745.6	329.88	323.97
区别	7	6.11	6.14	1.4	20.05	24.06
平均值						

Clamping Unit

-High efficiency: the dry cycle is shortened, and the machine runs faster

- Control optimization: multi-PID, hierarchical control, program task cycle speed up
- Tuning optimization: parameter setting
- Short, reasonable power output overshoot
- Short open speed limit

Tons(t)	Cycle (s)		
	JU III	JU V Open loop Closed loop	
750	4.5	4.5	4.5
1400	6.5	5.87	5.89
1850	7	6.2	6.5

New Servo Drive System

- The fifth generation of dedicated servo system independently researched by Haitian
- New high drive servo system
- Japan SUMITOMO latest high speed gear pump
- High efficiency, energy saving, low noise, stable operation, excellent performance
- Faster injection with accelerated response of 100ms



The fifth generation special servo motor



Fifth generation dedicated servo drive



GREEN VANTAGE



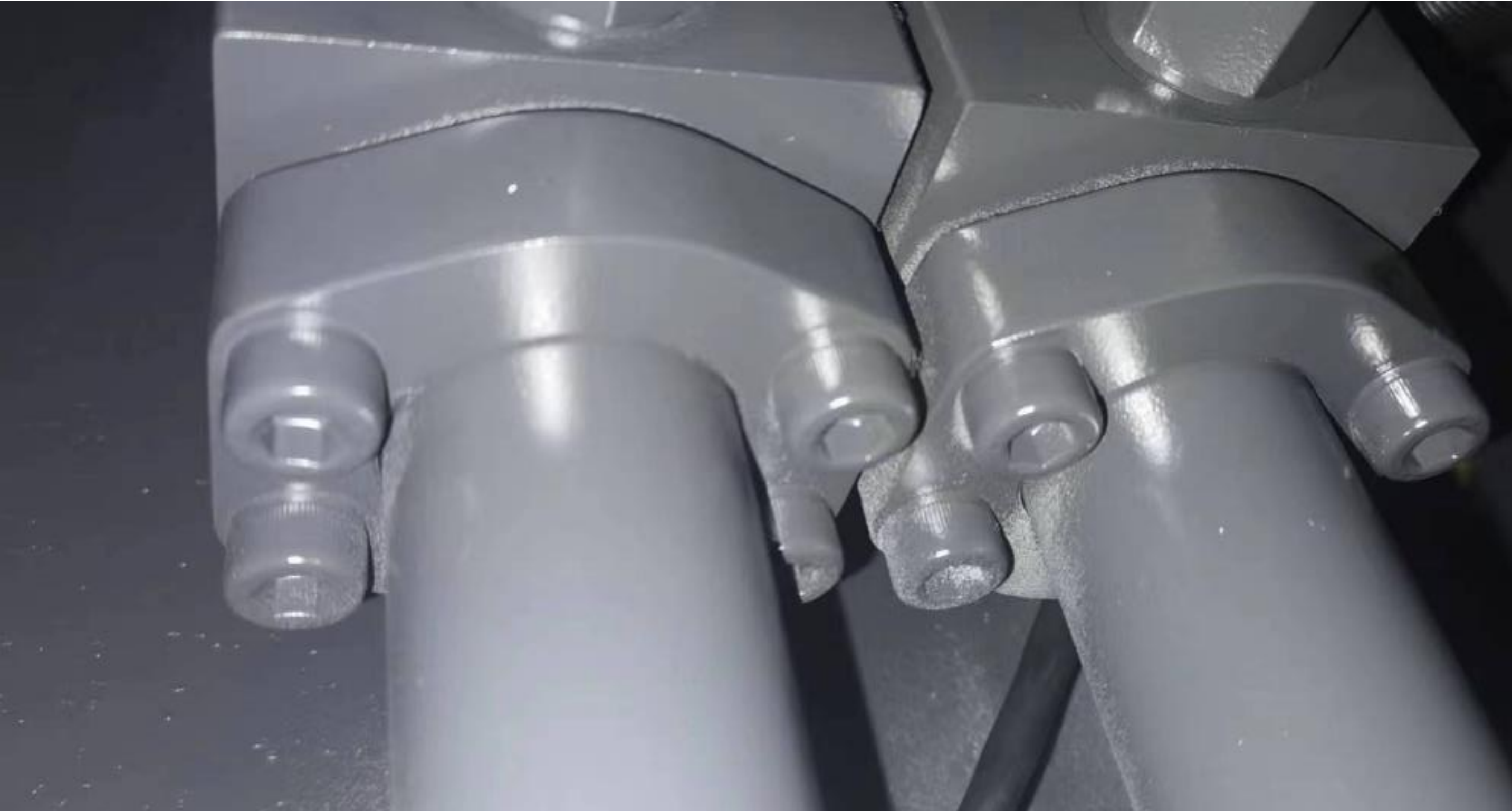
SPEED VANTAGE



- Japan SUMITOMO latest high speed gear pump

New Servo Drive System

Nozzle process



Nozzle process

- Power pipeline non-welding process
- Cleaner and reduces the risk of oil spills



New Servo Drive System

HT Temperature control

Precise monitoring of inlet temperature, oil temperature, effectively improve the cooling capacity and oil temperature control accuracy, so as to ensure the stability of machine performance

- Feeding port, oil cooler water valve standard
- Full range of independent cooling and filtration system push-on
- At the same time, the independent cooling system adopts the modular design concept, which integrates the oil pump motor, cooler and filter design to reduce the quantity and distribution of pipelines



Haitian "HT" Ecology

With the digital smart platform as the carrier, the mechanical equipment is endowed with flexible engine.

The Jump of overall digital platforms

AI Algorithm ●

Sensing Technology ●

Communication Technology ●

Control Technology ●

Hardware Design ●

HT-EXTEND



Haitian "HT" Ecology

Digital leading lets the wisdom further



More than that
Haitian HT function is under continuous development and update



Smart Technology

New UI design

○ Enjoy convenient "man-machine integration" interactive experience

Centralized display of machine status

Animation effect
Card style design

Display of important production information

New menu system





Smart Technology

Control panel upgrade

New Control Panel

KEBA controller + 19.68 inches Panel

New UI design

- Configuration of large screen control panel, bring intelligent friendly, convenient "man-machine integration" interactive experience

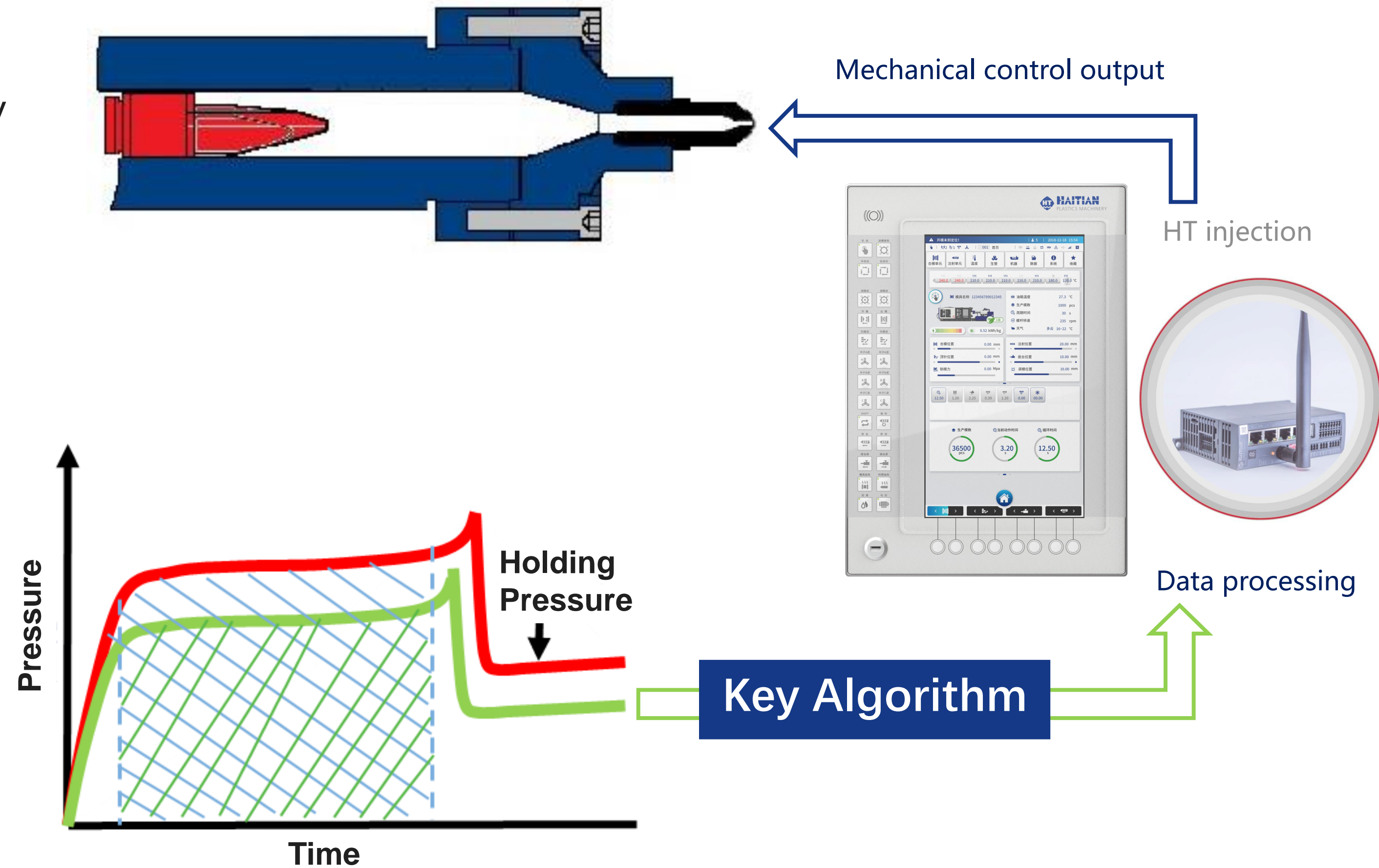
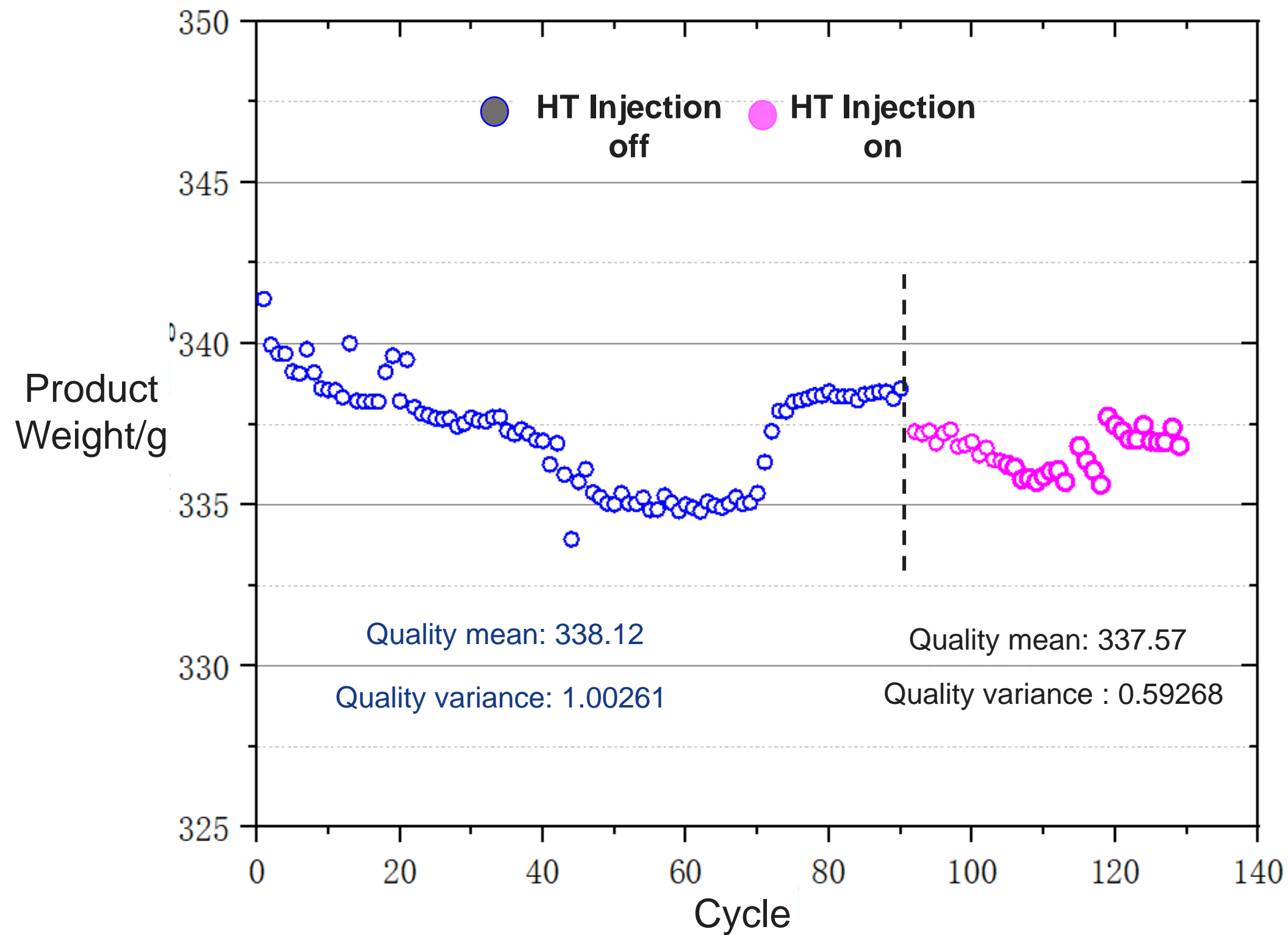




Smart Technology

HT injection

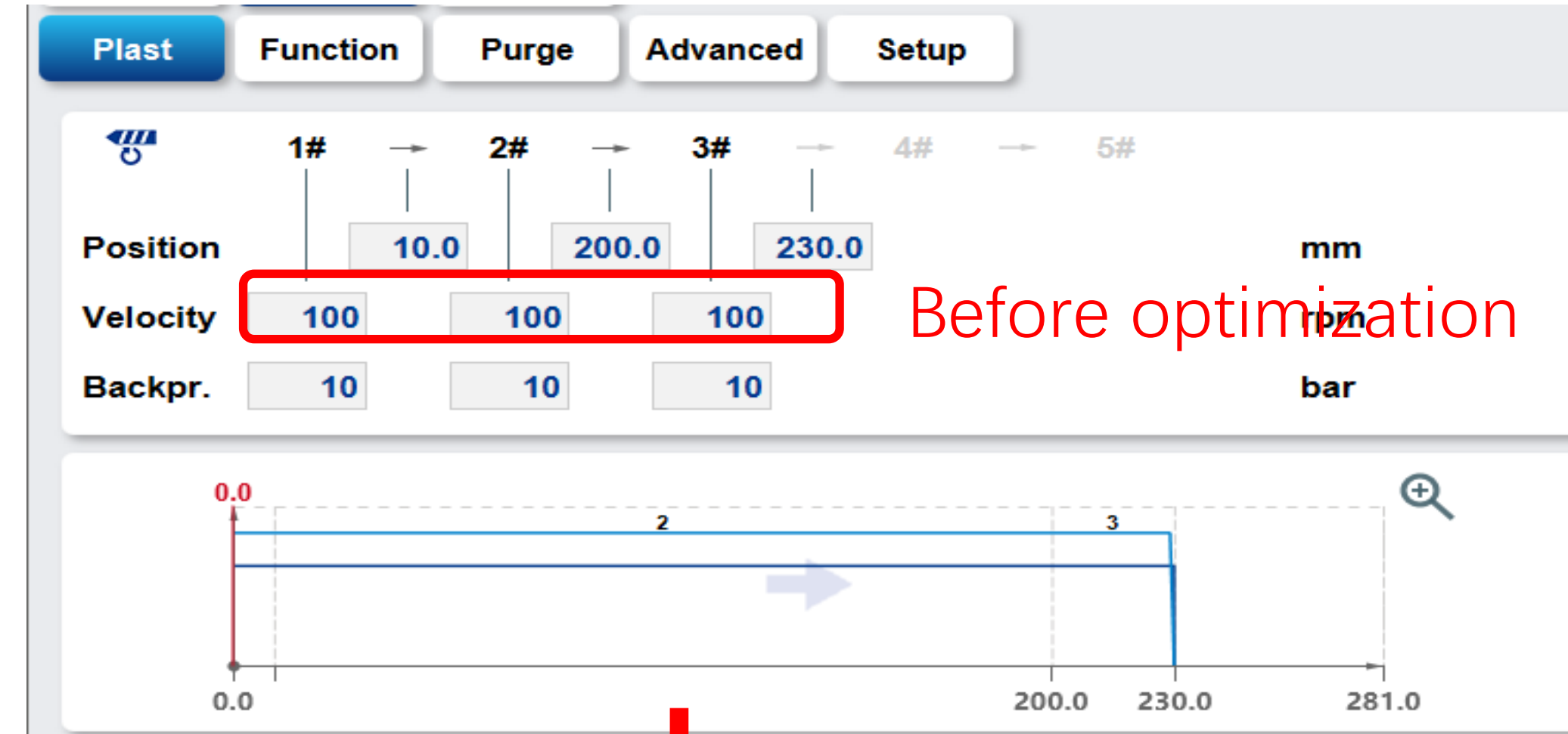
- Improving weight stability of injection molded products
- Some disturbance factors in the injection filling process are controlled in real time to achieve the weight stability control goal of the injection product



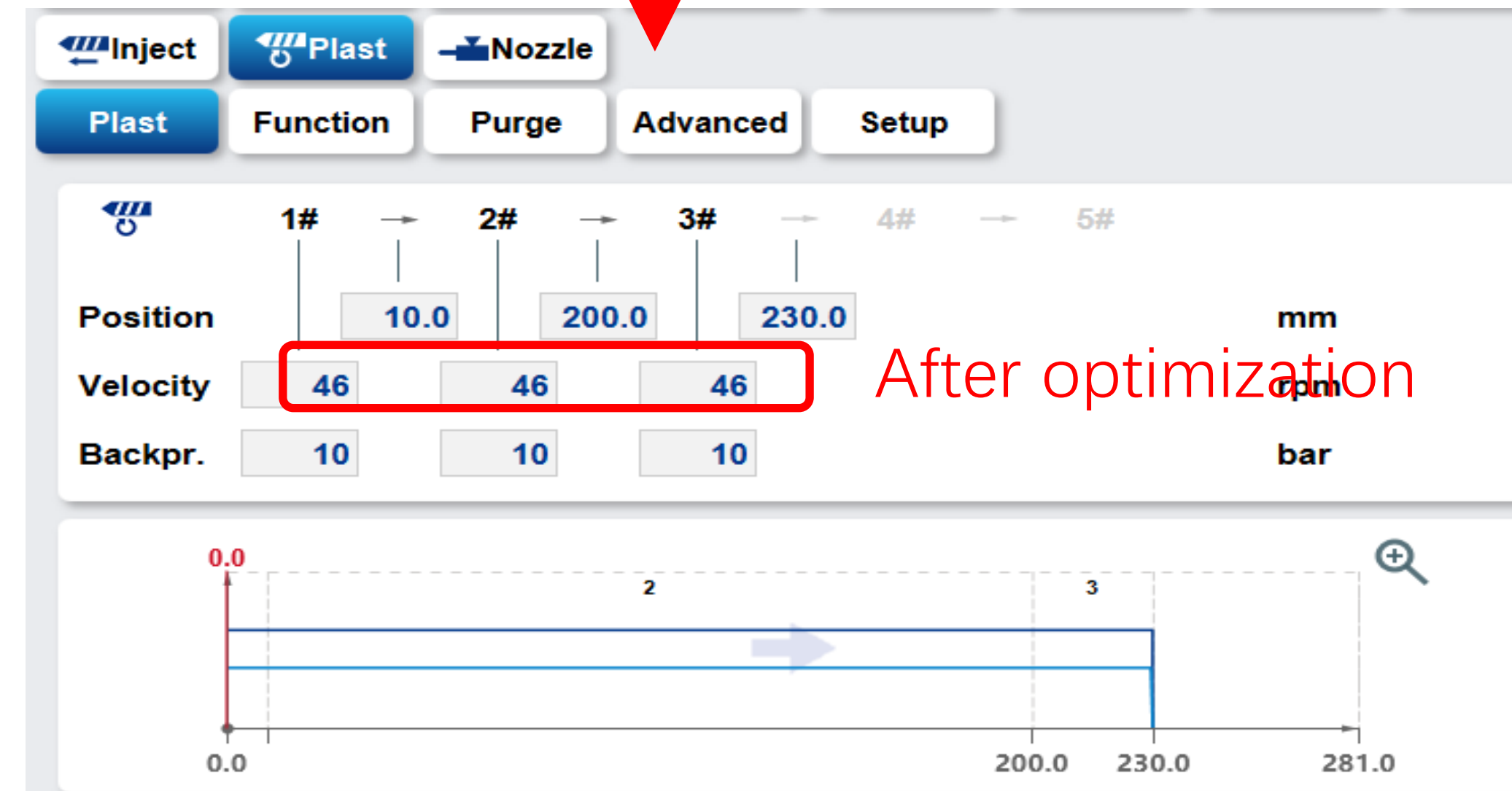


HT charging

- Energy consumption reduction
- Screw barrel wear is reduced



Before optimization



After optimization

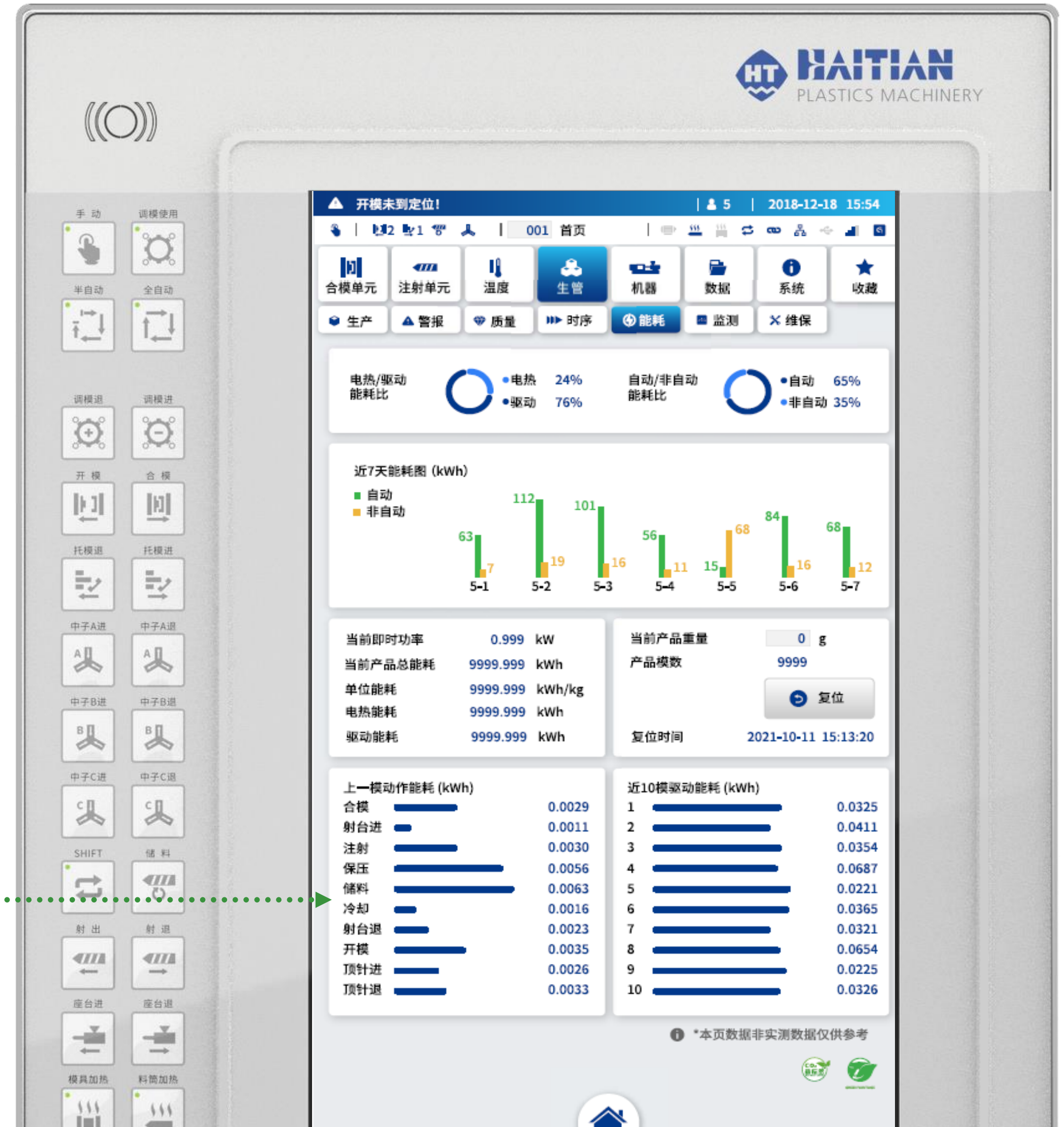


Smart Technology

HT energy consumption management

- No need to match a electric meter, and easily enable refined energy consumption monitoring and analysis
- Enables customers to optimize energy efficiency
- Easy for customers to plan the power layout of the plant
- Easy for customers to find the most energy-efficient production plan

Refined energy consumption display ○



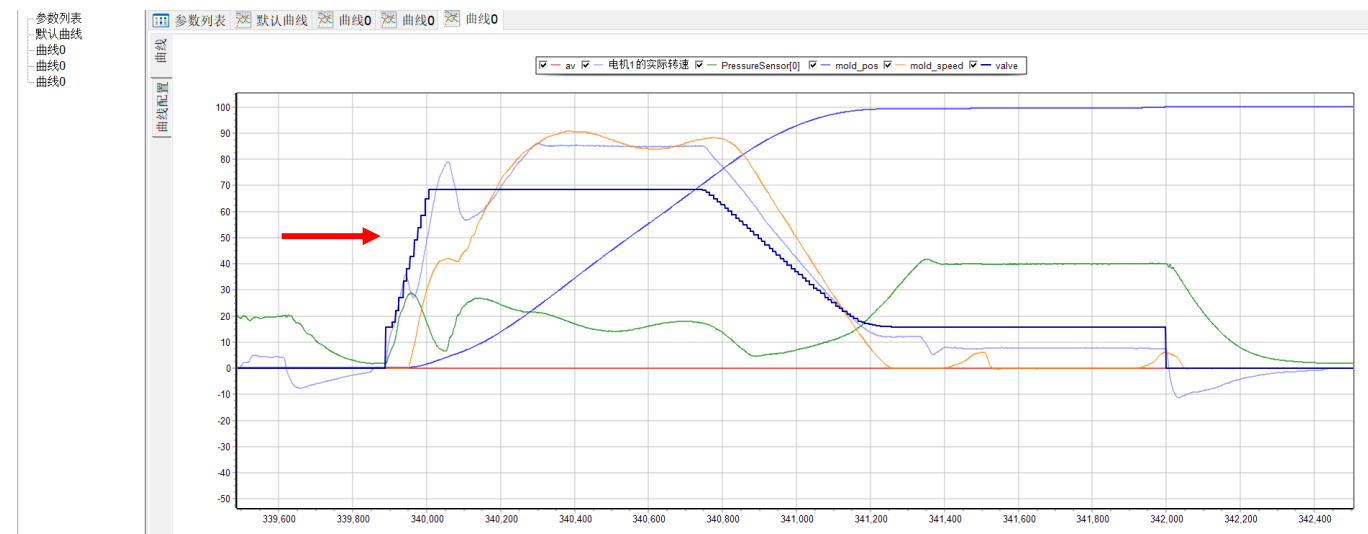


Smart Technology

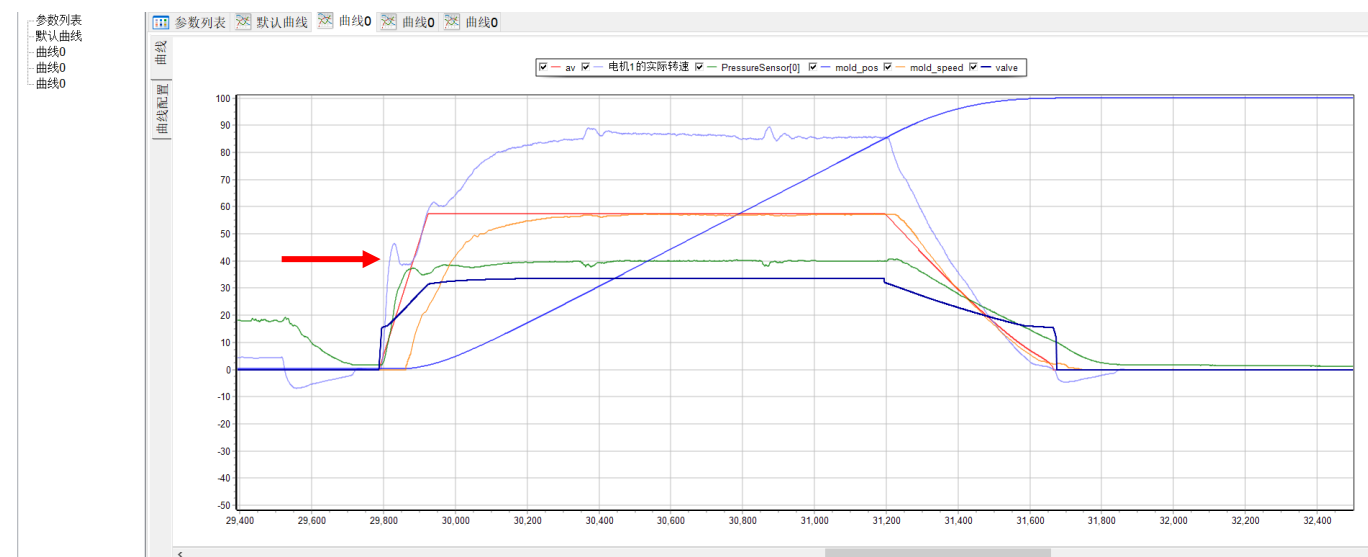
HT Clamp 2.0

- The process interface is simplified, the default opening mold 1 section, closing mold 2 sections
- Independent process parameters, independent motion control PID, independent proportional valve linear, more stable operation, better curve following
- More accurate positioning, open mold positioning repetition accuracy is high, repetition accuracy of 0.5mm

Motion curve: open loop



Motion curve: Closed loop



The screenshot shows the HT Clamp 2.0 process interface. At the top, there is a navigation bar with icons for '合模' (Closing), '注射' (Injection), '温度' (Temperature), '生管' (Mold), '机器' (Machine), '数据' (Data), '系统' (System), and '收藏夹' (Favorites). Below this is a sub-menu with '开合模' (Opening/Closing), '设定' (Settings), and '高级' (Advanced). The main interface is divided into several sections:

- 1段 模保 高压**: Parameters for the first section, including position (50.0 mm), pressure (100 bar), and speed (80%).
- 位置 压力 速度**: A graph showing the position, pressure, and speed curves for the first section. The position curve is blue, pressure is orange, and speed is green. A red vertical line is at 1101.1.
- NoOfPoints 2**: Parameters for the number of points, including mold force (800 t) and mold time (15.0 s).
- 1段 破模**: Parameters for the first section, including position (1100.0 mm), pressure (100 bar), and speed (80%).
- 位置 压力 速度**: A graph showing the position, pressure, and speed curves for the first section. The position curve is blue, pressure is orange, and speed is green. A red vertical line is at 1101.1.
- NoOfPoints 2**: Parameters for the number of points, including mold force (800 t) and mold time (15.0 s).
- 开模快速**: A toggle switch for fast opening, currently turned on.
- 实际合模时间 3.2 s**: Actual closing time.
- 实际高压时间 1.7 s**: Actual high pressure time.
- 模具速度 0 mm/s**: Mold speed.

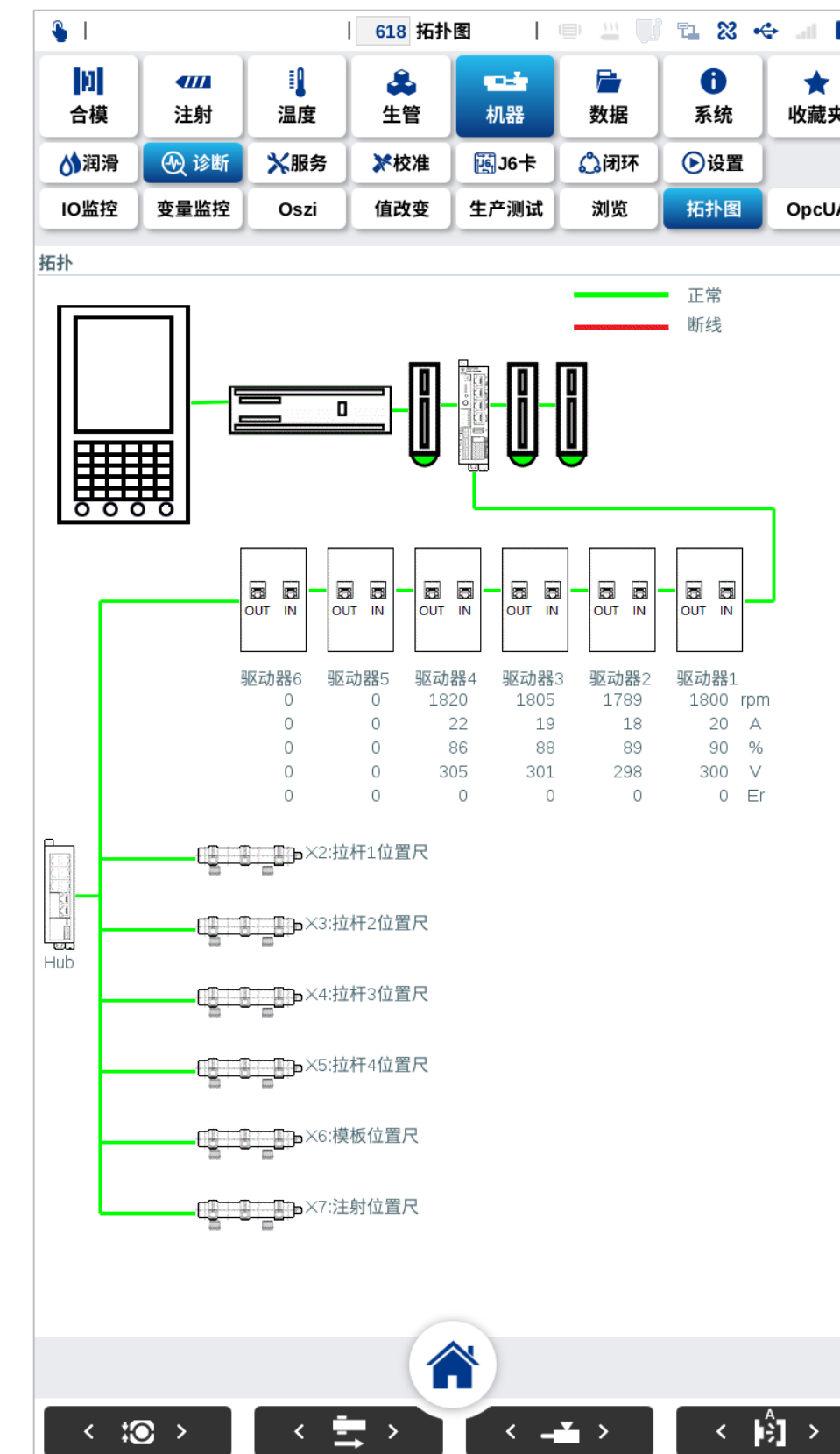


- The self-diagnosis function uses ETHERCAT technology, which can quickly locate the fault point, timely feedback on equipment anomalies, reduce downtime, and escort daily production.

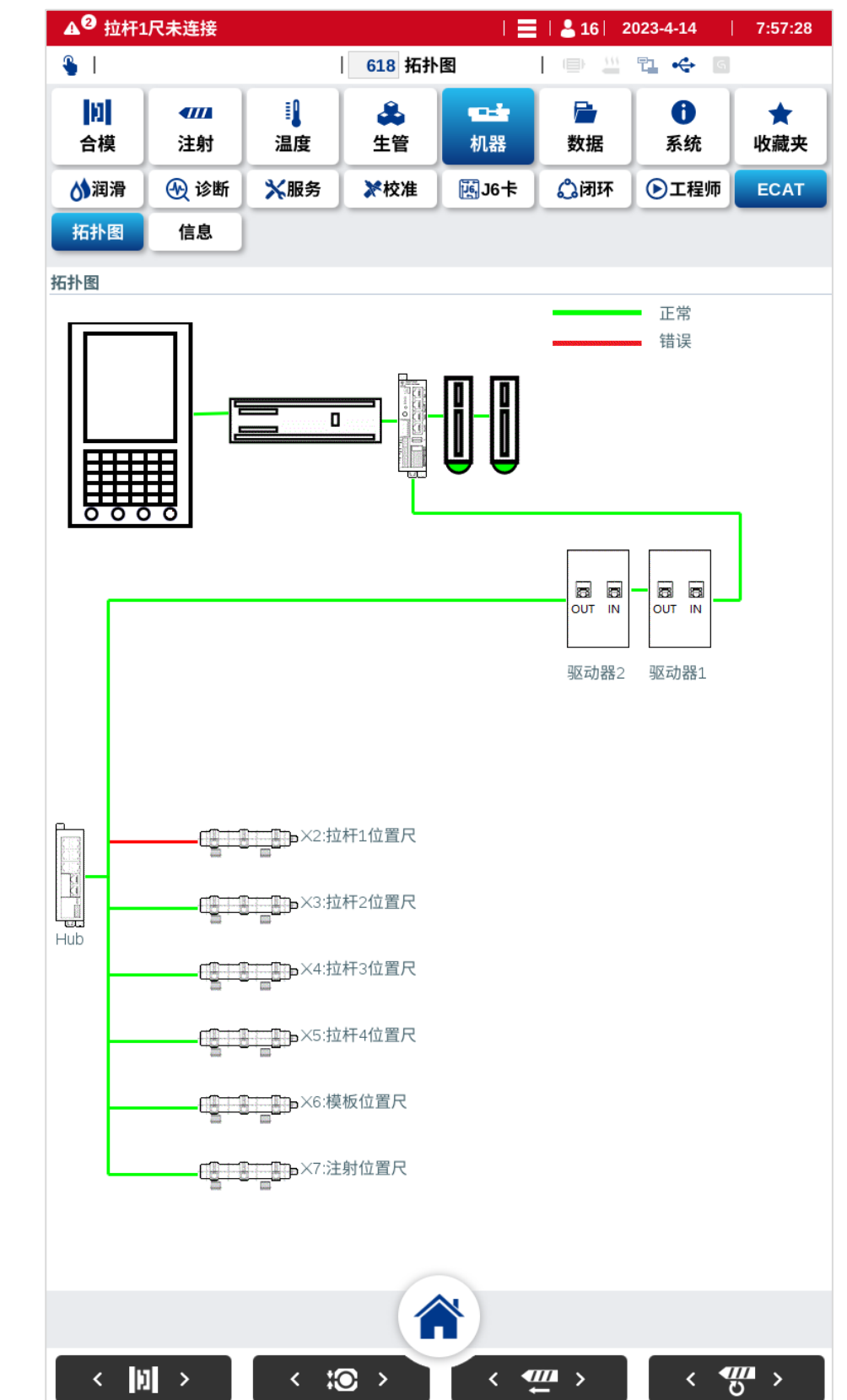
Configuration :

Host +J6 card +6 drives +6 digital ruler

Normal



Position Indicates the status when the line is broken





Smart Technology

HT Diagnosis

- The online help function provides troubleshooting measures
- Maintenance tips
- Qr code alarm help

类别	维护项目	维保倒计	疲劳度
I类	I类维护项目 每7天	0 天	100%
II类	II类维护项目 每500小时	32 小时	85%
III类	III类维护项目 每3000小时	89 小时	65%
IV类	IV类维护项目 每6000小时	158 小时	51%
V类	V类维护项目 每12000小时	311 小时	24%
VI类	VI类维护项目 每36000小时	608 小时	20%

I类维护项目

- × 检查急停
- × 检查前后安全门
- × 检查安全踏板
- × 检查射出防护罩
- × 检查尾部安全门
- × 液压合模安全装置

扫描二维码获得帮助

暂时忽略 | 复位退出

序号	代码	开模序号	警示说明	起始时间	还原时间
1	0	0	调模润滑失败	2018-12-18 00:00:00	00:00:00
2	0	0	液压保险异常	2018-12-18 00:00:00	00:00:00
3	0	0	关模未到位	2018-12-18 00:00:00	00:00:00
4	0	0	调模润滑失败	2018-12-18 00:00:00	00:00:00
5	0	0	液压保险异常	2018-12-18 00:00:00	00:00:00
6	0	0	关模未到位	2018-12-18 00:00:00	00:00:00
7	0	0	调模润滑失败	2018-12-18 00:00:00	00:00:00
8	0	0	液压保险异常	2018-12-18 00:00:00	00:00:00
9	0	0	关模未到位	2018-12-18 00:00:00	00:00:00

液压保险异常

原因 液压安全阀芯未及时打开或关闭。

影响 警报灯亮, 停任何动作。

复位 按手动键清除警报, 重复刚才操作, 如警报依旧, 则检查液压保险安全阀。如果液压安全检测开关, 不是阀芯内置式的, 则调整液压安全检测开关的安装位置, 使之能正确感应; 检查液压安全阀, 看是否有卡住等异常现象。

报警解决

扫描二维码获得帮助

确认





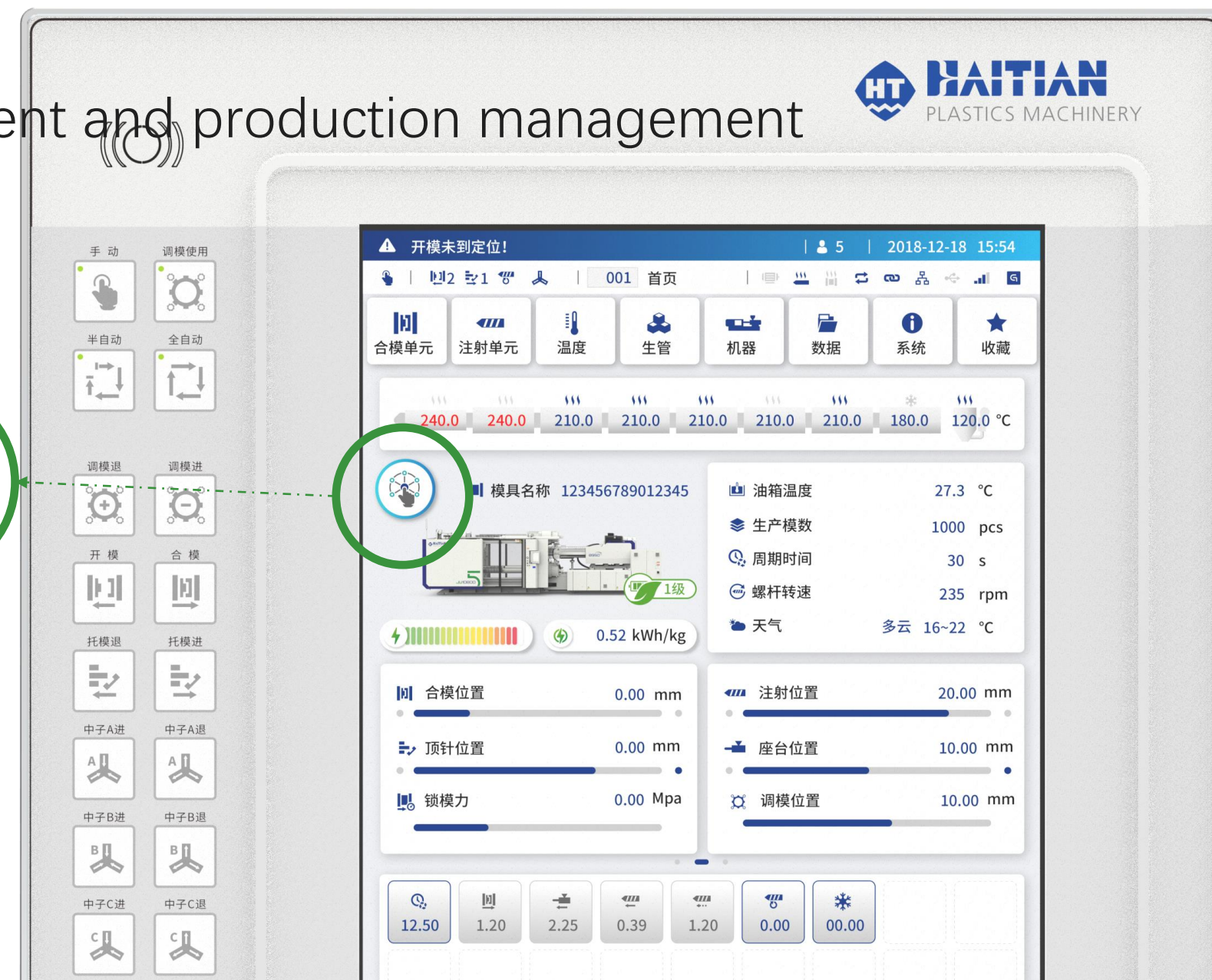
Smart Technology

HT integration

Efficient and flexible integration and control of peripheral auxiliaries

- To realize the injection molding machine control system as the center, centralized control of each production unit, so that the injection molding machine really become the center of the entire molding system and the base station of the network system.
- Mold information is associated with peripheral equipment to achieve highly automated production
- Make production data more transparent and production management more efficient

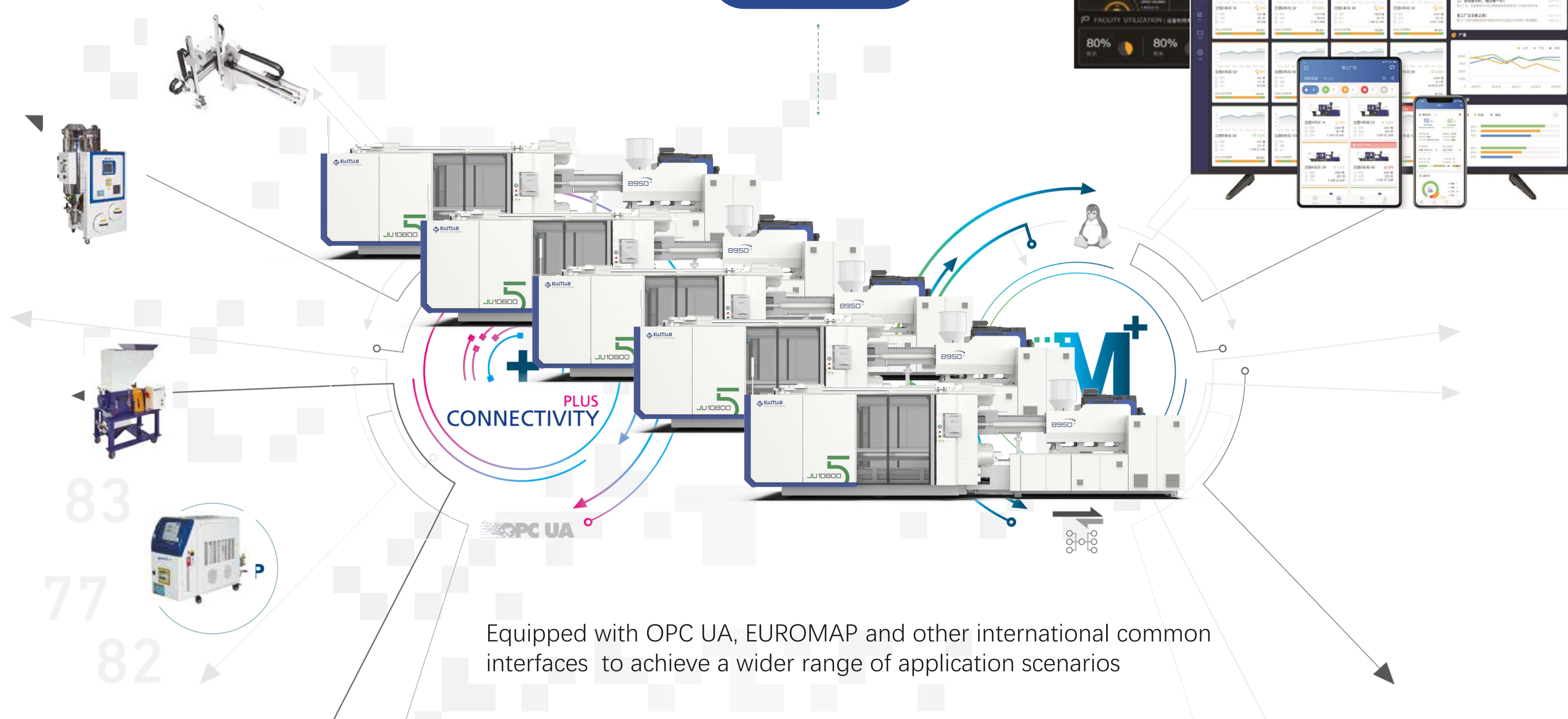
Smart auxiliary shortcut button





Smart Technology

HT integration



Equipped with OPC UA, EUROMAP and other international common interfaces to achieve a wider range of application scenarios



Smart Technology

HT integration

Dry hopper Integrated Control (option)

- After determining the type of raw materials, the corresponding drying temperature and drying time are intelligently recommended.
- After setting drying time, countdown reminder
- Timing switch function
- Fan, electric heating working state display

The screenshot shows a control interface for a dry hopper. At the top, there is a status bar with a warning icon and the text "开模未到定位!", a user icon with the number "5", and the date and time "2018-12-18 15:54". Below this is a navigation bar with icons for home, back, and other functions, and the text "001 首页".

The main interface is divided into several sections:

- Current Drying Temperature:** 当前干燥温度 78.6 °C
- Percentage:** 百分比 22 %
- Set Drying Temperature:** 设定干燥温度 80.0 °C
- Drying High Temperature Alarm:** 干燥高温报警 95.0 °C
- Raw Material Selection:** 原料大类 PA, 原料小类 PA66+30%GF. A recommendation is shown: 建议100°C, 3小时. A "读取" (Read) button is present.
- Timing Settings:** 定时开 使用 08:00, 定时关 不使用 20:00.
- Control Panel:** A large button labeled "停止" (Stop) with a countdown timer showing "00:02:21".

At the bottom, there is a navigation bar with buttons labeled F1 主页, F2 温度, F3 干燥 (highlighted), F4 曲线, F5 参1, F6 参2, F7 设定, F8 PID, F9 流道, and F10 返回. A small information icon and text "干燥温度, 范围0~300" are also visible.



HT integration



○ Through the powerful information technology capability and the connection of global factories, the operation status of each injection molding machine in all factories in the world can be mastered in the central war situation control room.



Industry Application



Automobile Industry

- Plastic parts products in the automotive manufacturing industry
- Suitable for various process technologies and application needs, providing efficient and high-quality solutions.

Consumer electronics industry

- plastic spare parts products in consumer electronics
- Provide efficient and high-quality solutions for molding multiple cavities.

Appliance Industry

- Plastic products in household appliances
- Provide flexible, efficient and stable solutions for product characteristics

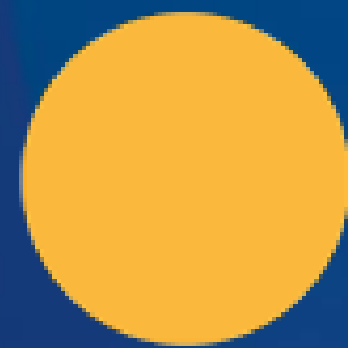
Daily necessities industry

- Plastic products used in daily life
- Respond to the surge in customer costs, focus on customers' return on investment, and provide various economical solutions



Thank You !

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