HAITIAN
PLASTICS MACHINERY

MARS SERIES

SERVO-HYDRAULIC SOLUTION

600 – 33,000 kN

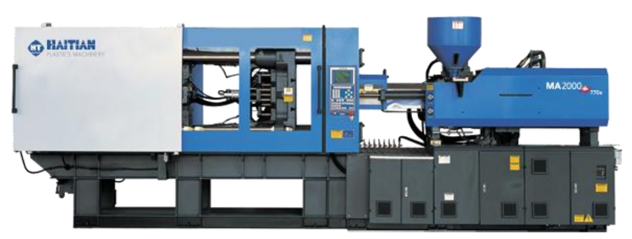
MA

Research & Development

Early Stage
2006 - 2007

HTF Series
MA servo control
technology was born

Generation I
2007 - 2012



Servo energy-saving
technology mature
and extension

Generation II
2013 - 2018

Servo technology
upgrading

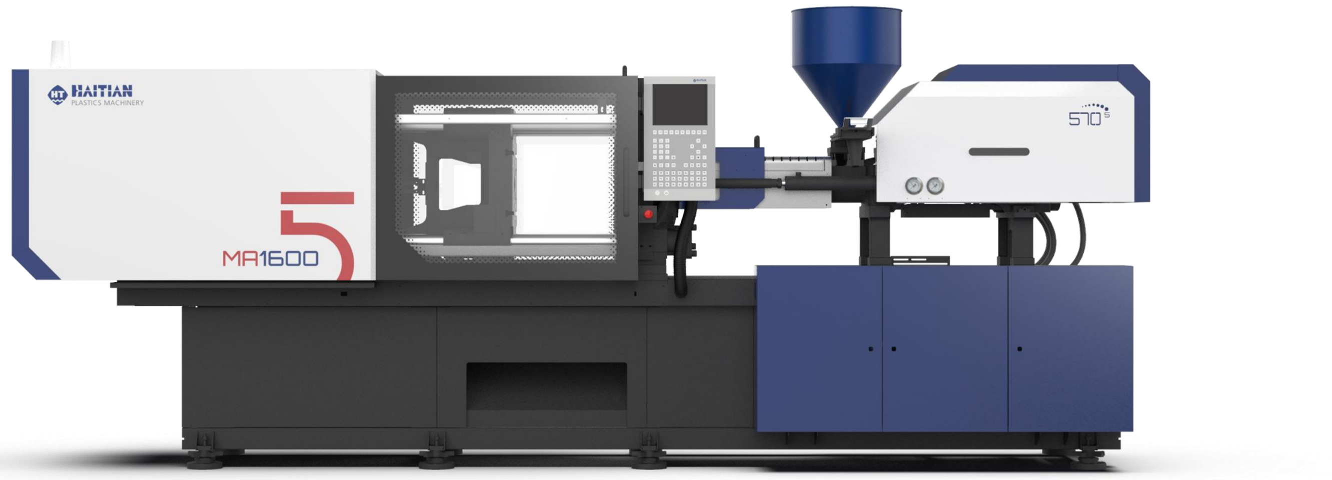
Generation IIs
2015 - 2018

More precise

Generation III
2019 - 2022

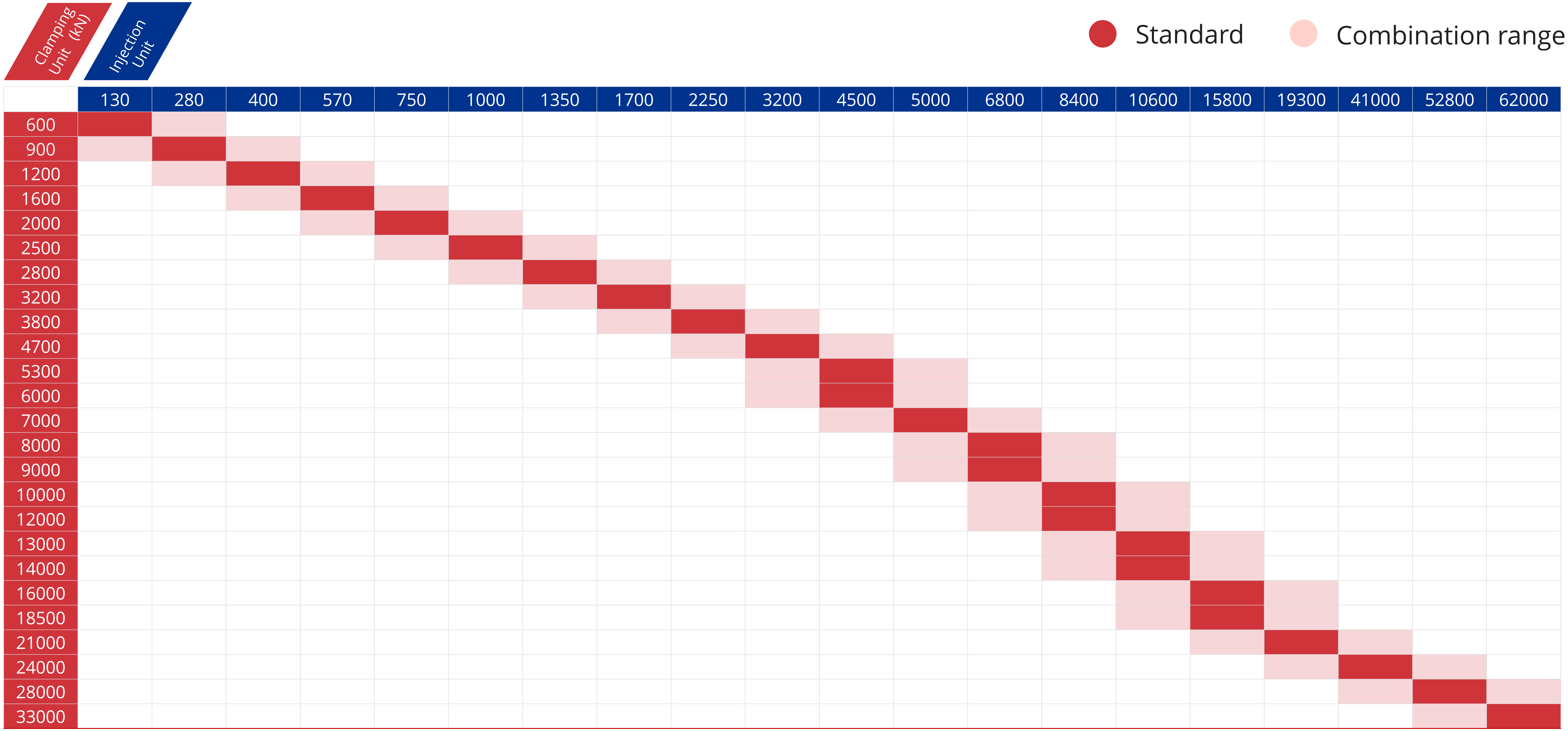
Smart
Dynamic
Interactive

Generation V
2023



Intelligent
Flexible
Sustainable

Machine Range & Combinations



Features

01 Powerful

- High Injection Performance
- Resistant Plasticization Unit
- Rigid Clamping Unit Structure

02 Efficient

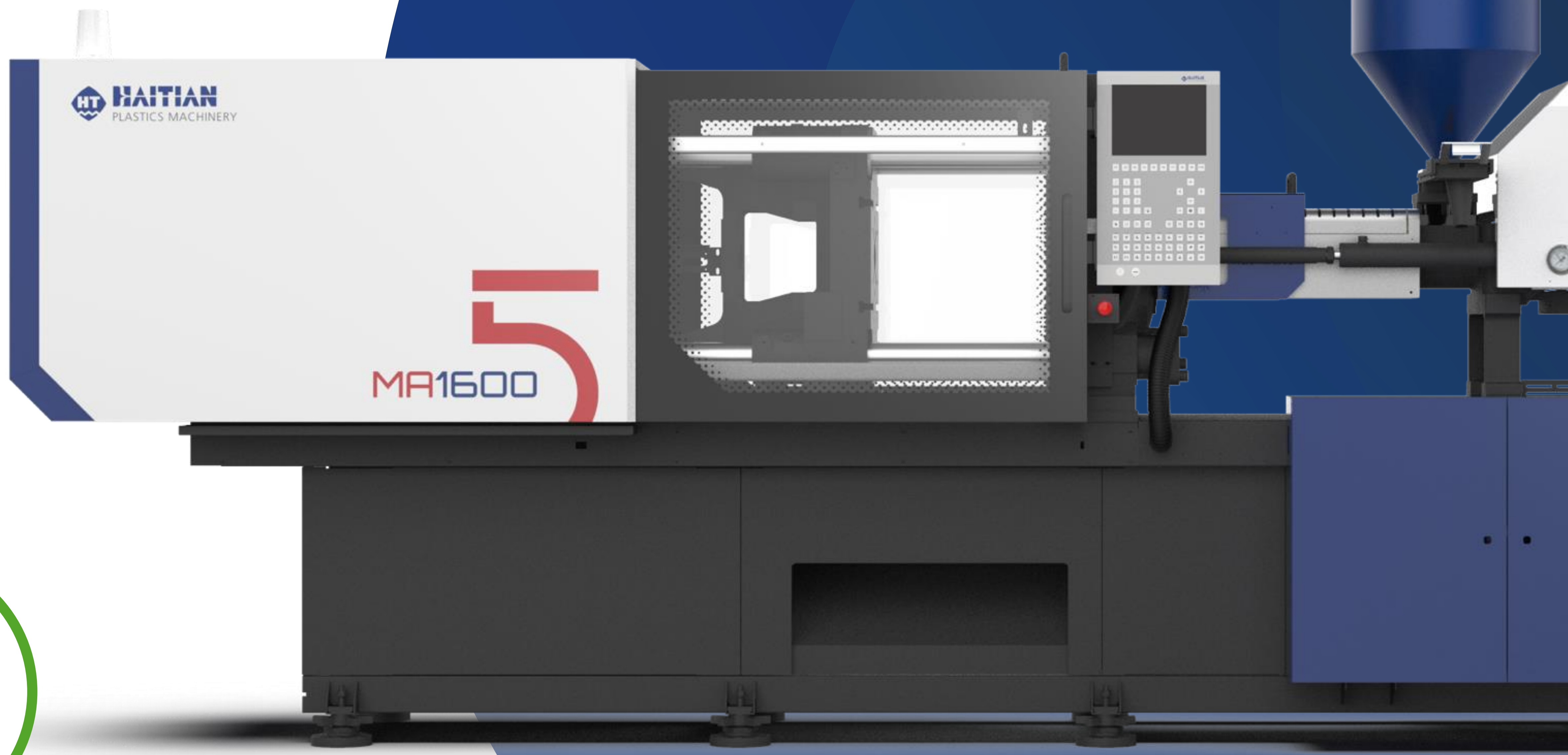
- Electrical Charging as Standard
- Energy Saving
- Flexible Cooling/Thermal Control

03 Hardware

- Electrical parts
- Hydraulic parts

04 Smart Technology

- Smart Algorithms
- HT- XTEND



Introducing HT·XTEND

*The new **Standard** in Injection Molding through Smart Machine Technology*

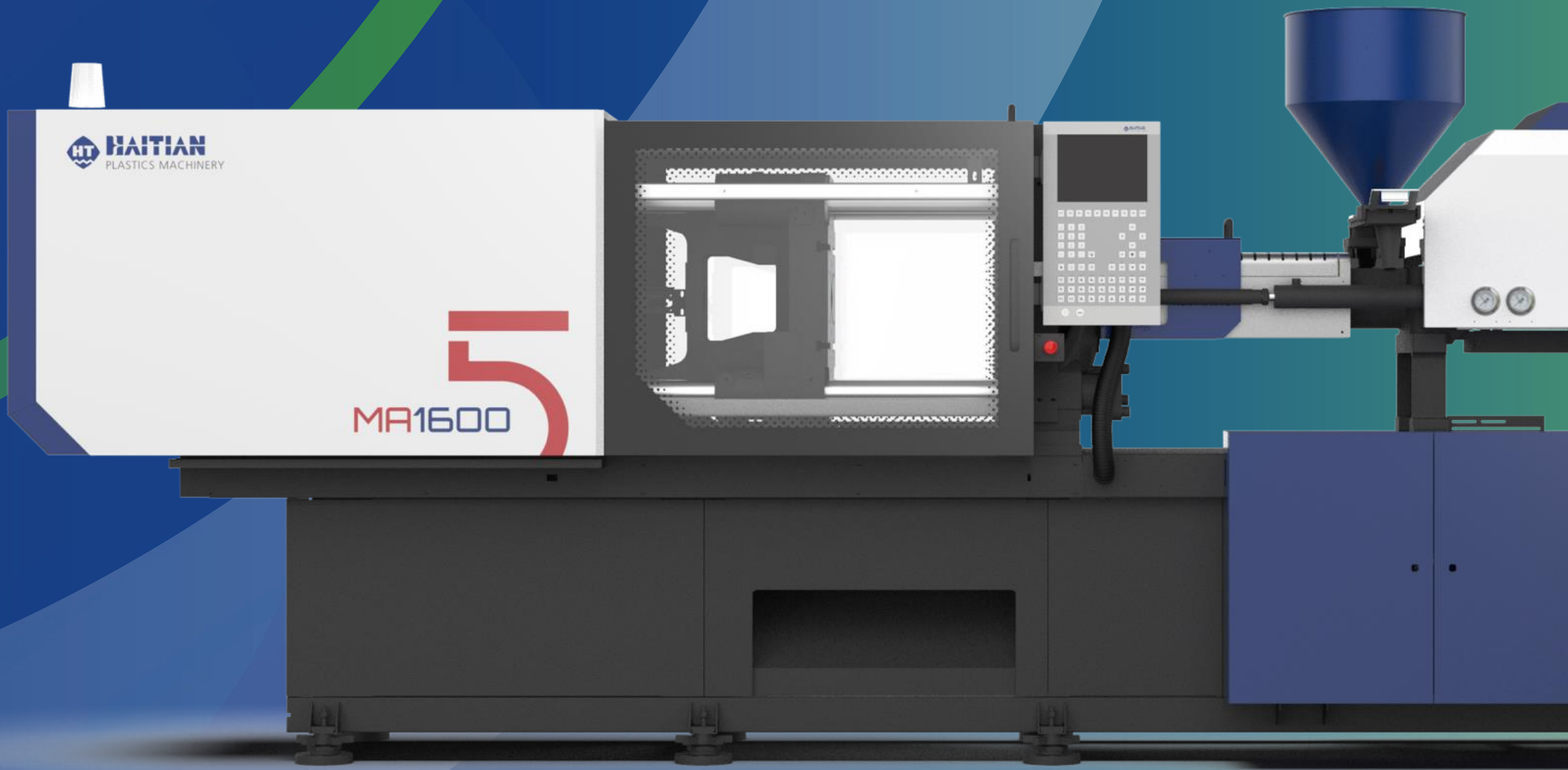
Hardware Design

Control Technology

Communication Technology

Sensor Technology

AI Algorithms



Introducing HT·XTEND

Real-time Monitoring

Greater flexibility in production

Increased Output with reduced costs

AI-driven optimization

HT·XTEND

Enhanced Safety and Monitoring

Improved Precision and Quality Control

Adaptive control systems

Adaptability to New Materials

Cost Reduction and ROI

Minimizing downtime & maintenance expenses

Energy Savings and Sustainability

HT·XTEND

HT·CLAMP

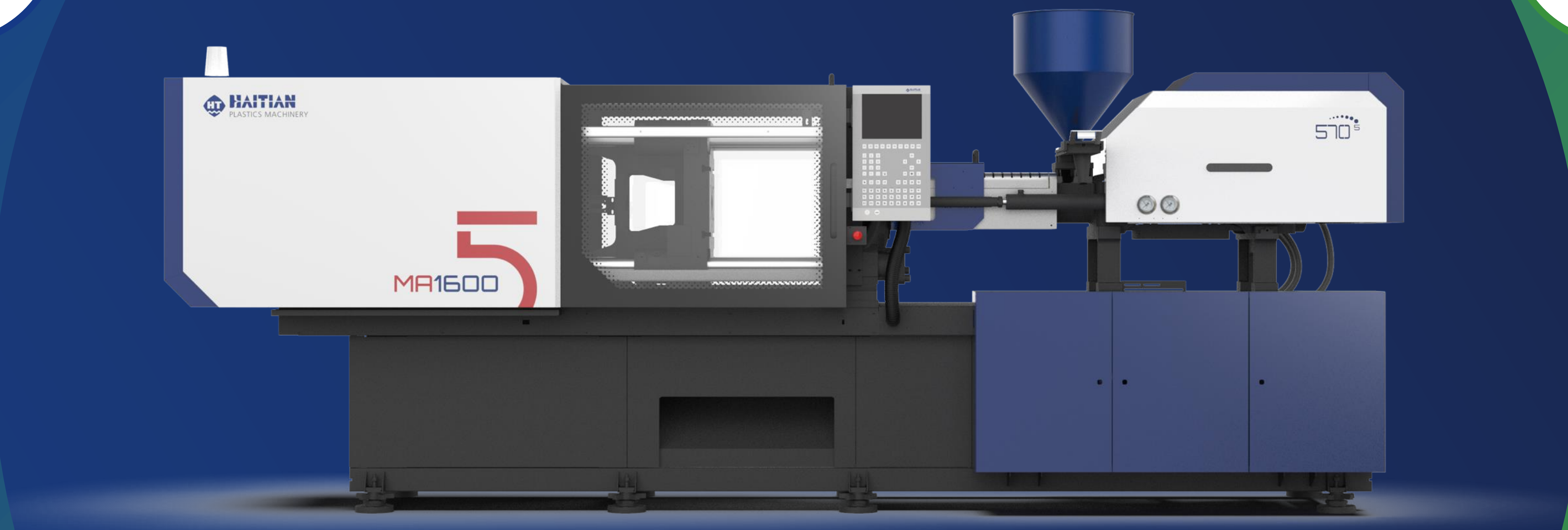
HT·INTEGRATE

HT·ENERGY

HT·DIAGNOSE

HT·CHARGE

HT·LUBRICATE



Smart Machine Technology
as a
Standard

Overview Haitain Mars Series

High Rigid Platen

Structure reduces platen deformation and improves product quality

Intelligent Mold Open/Close

Self-learning and -correcting algorithms adjusts positioning quickly and precisely

Supervised Energy Consumption

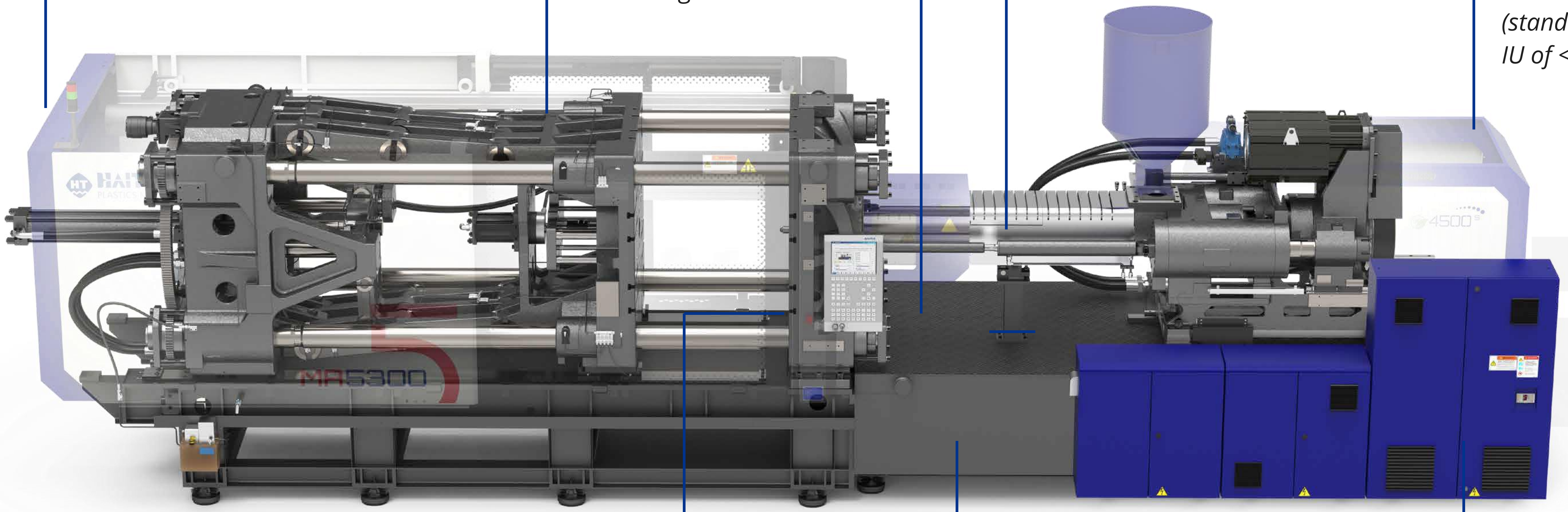
Smart energy consumption monitoring and auxiliary management via HMI

Resistant Plasticizing Unit

Strong performance with high wear resistance of plasticized parts *(doubled compared G3)*

Electrical Charging

Improves plasticizing speed and quality, while reducing energy consumption of the entire process *(standard for models with IU of < 10600)*



Intelligent Lubrication

Precise lubrication control, self-optimizing lubrication parameters

HMI

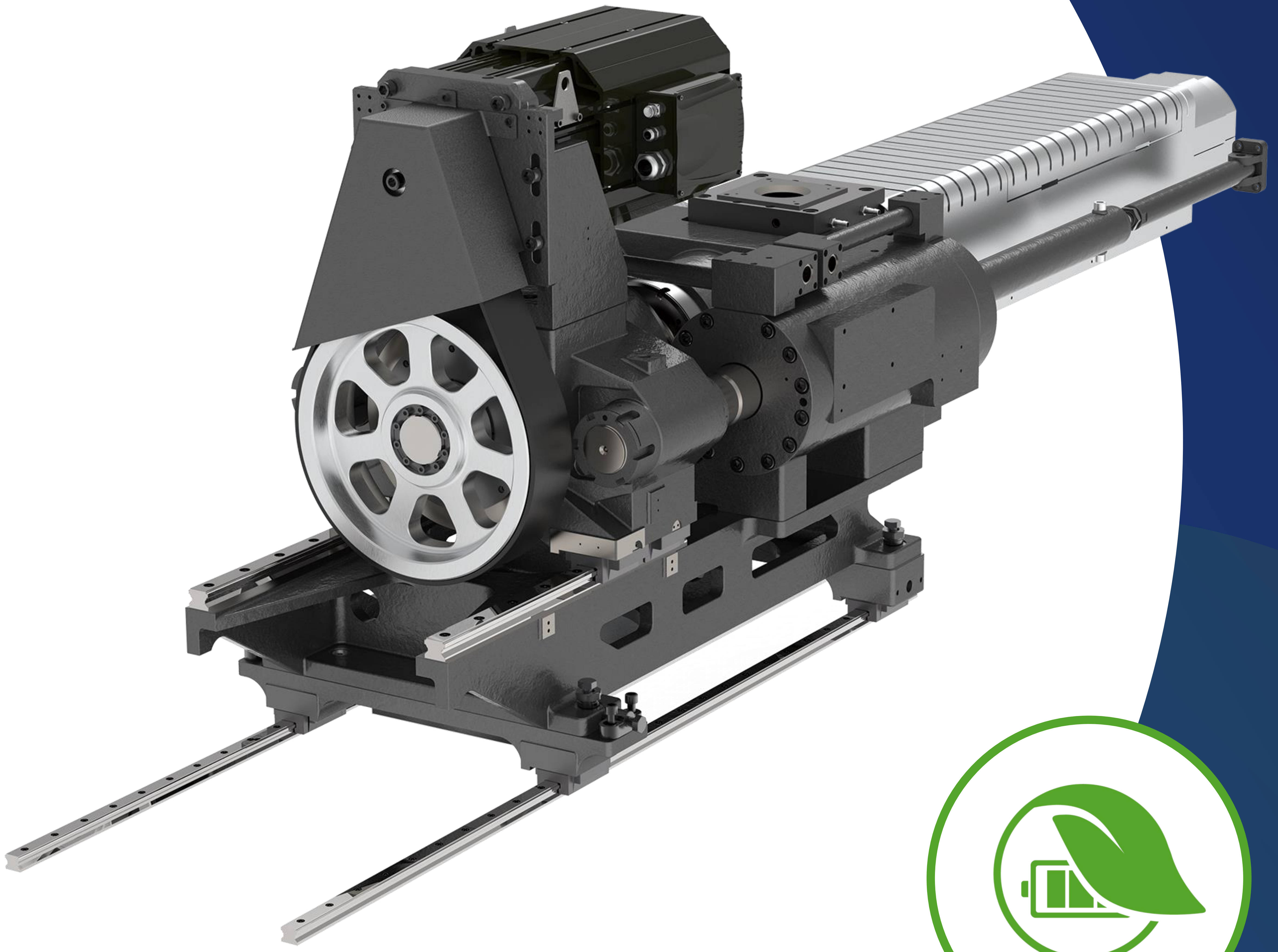
Large-screen control panel and UI design make for fast and intuitive interaction with machine

Dust-free distribution box

Extension of service life of technical components

High-response servo system

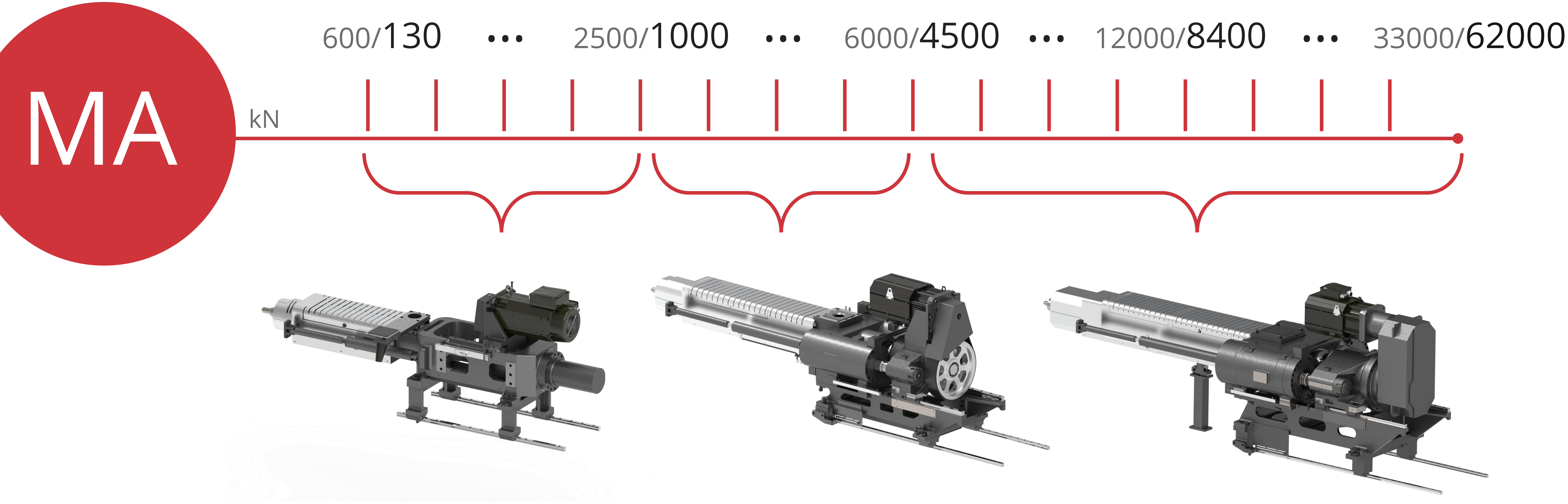
Tailor-made servo power system, high-speed response, dynamic sensitivity, and surging power



Injection Unit

- IU Structures
- Plasticizing Components
- Double-layer Linear Guides
- Energy-saving Heating Device
- Material Leakage Detection
- Full Closed-loop Injection Control
- Injection Performance
- Electrical Charging
- Charging Performance

Injection Unit Structures

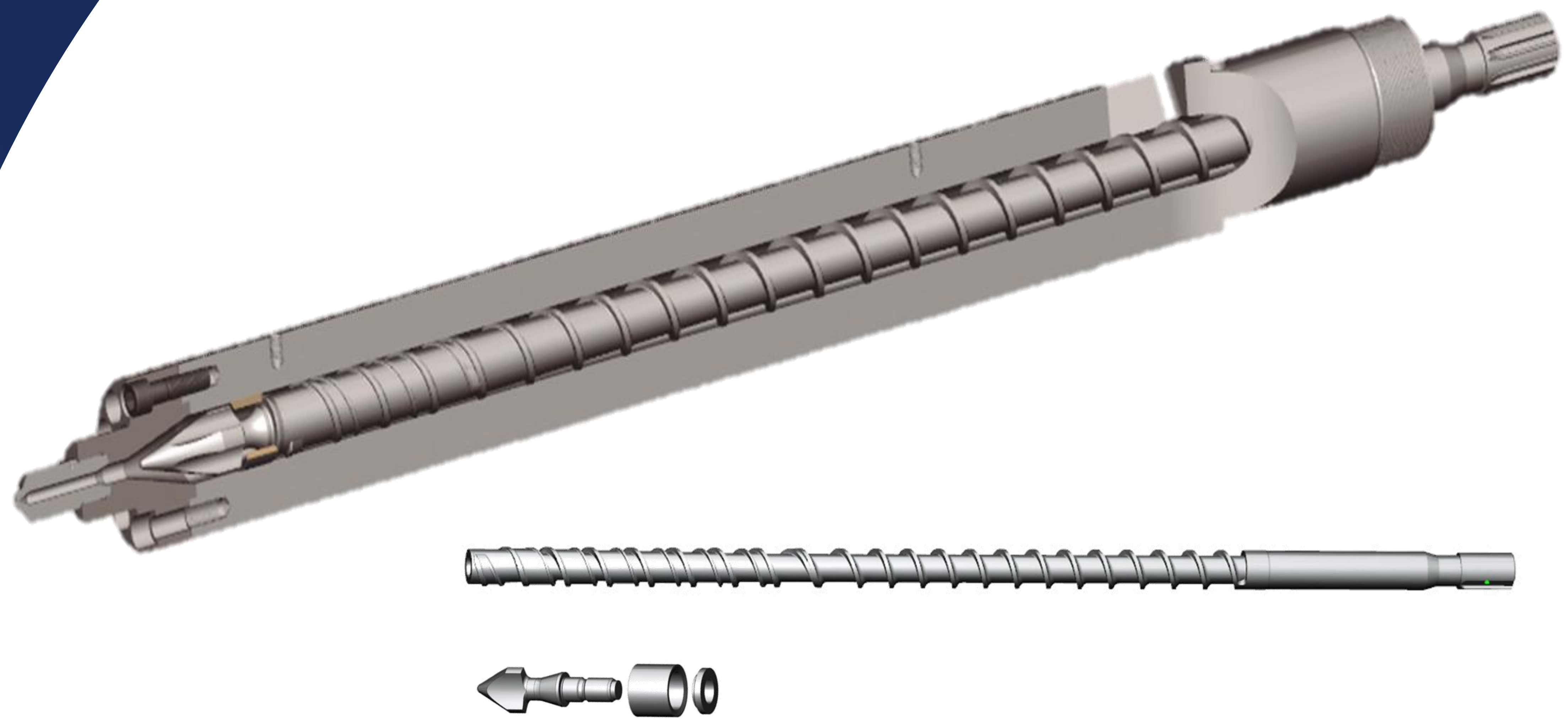


The injection oil cylinder below 250T, changing from a dual-cylinder to a single-cylinder, reduces injection resistance by 44% to 78% at various flow rates under no-load conditions.
Injection unit 130-8400 equipment with electrical change motor,above is option.

Plasticizing Components

Highly resistant and efficient

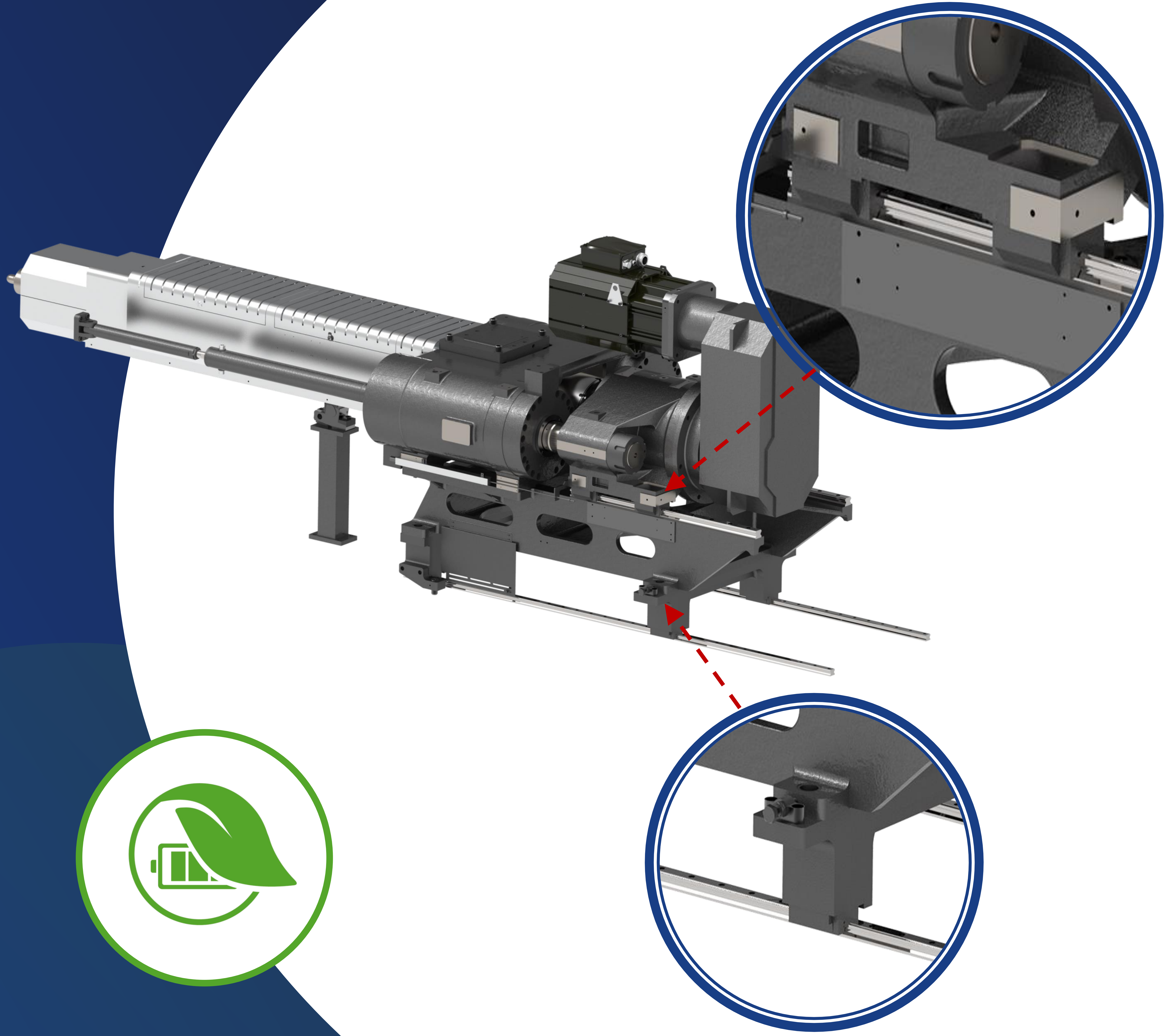
- > 2500 kN: A screw and models below 2500 kN are standard with all hard screws
- 250T B/C screw and 250T and above models are standard with bi-metal screw
- Alloy barrel is used for models 2100T and below
- Wear resistance is greatly improved to further generations



Double-layer Linear Guides

Max. support for carriage and IU

- Low friction coefficient
- Low injection inertia
- High injection precision
- Better acceleration and deceleration response
- Precise back pressure control
- Wear resistance greatly improved to further generations



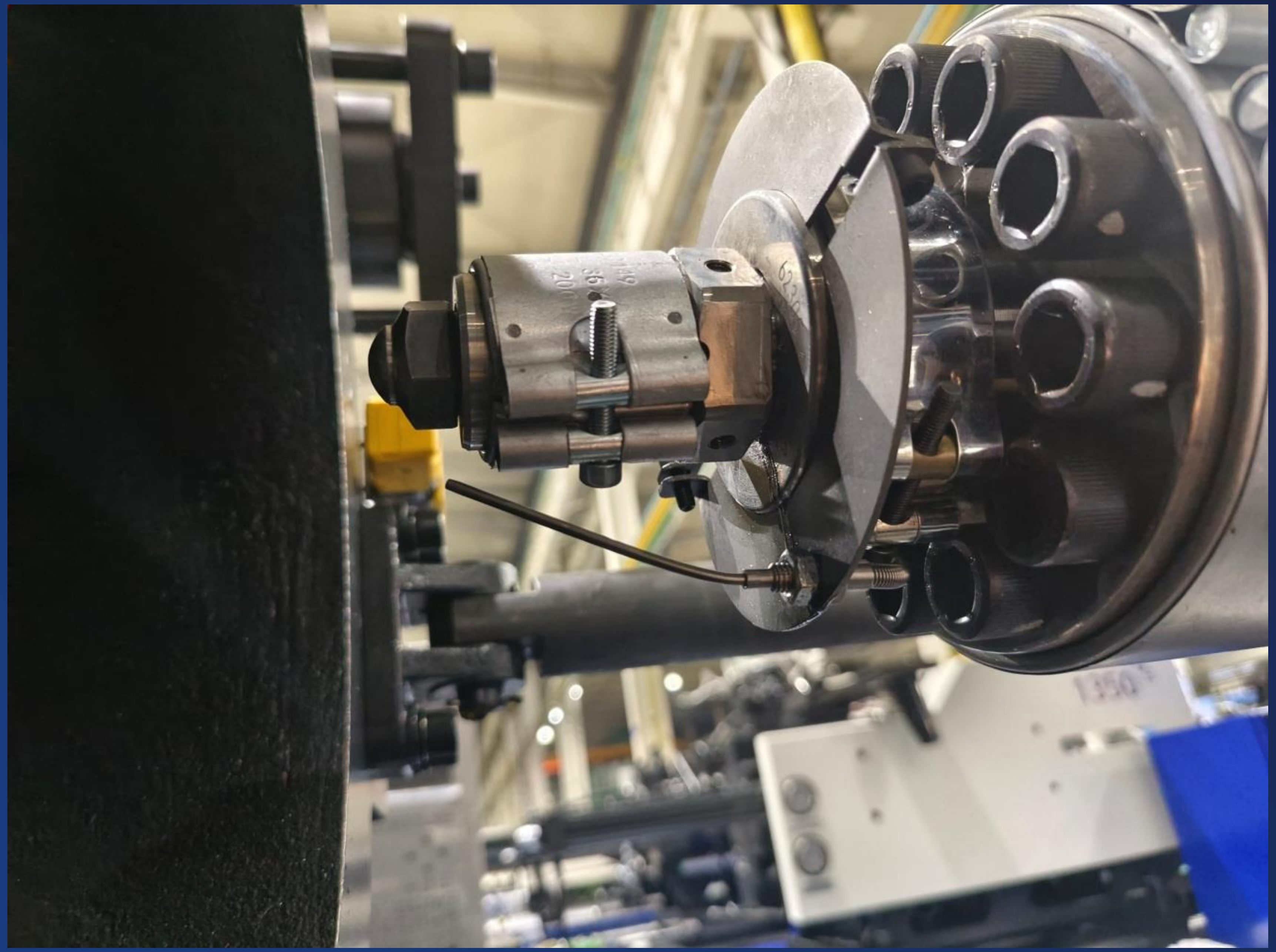
Energy-saving Heating Device

- Overall better energy saving results
- Optimal insulation
- Easy and quick to dismantle

Type	New	Old
Heating Energy (kW)	**3.14**	3.55
Saving	12 %	-
Description	Housing on top, left and right sides to save energy	-

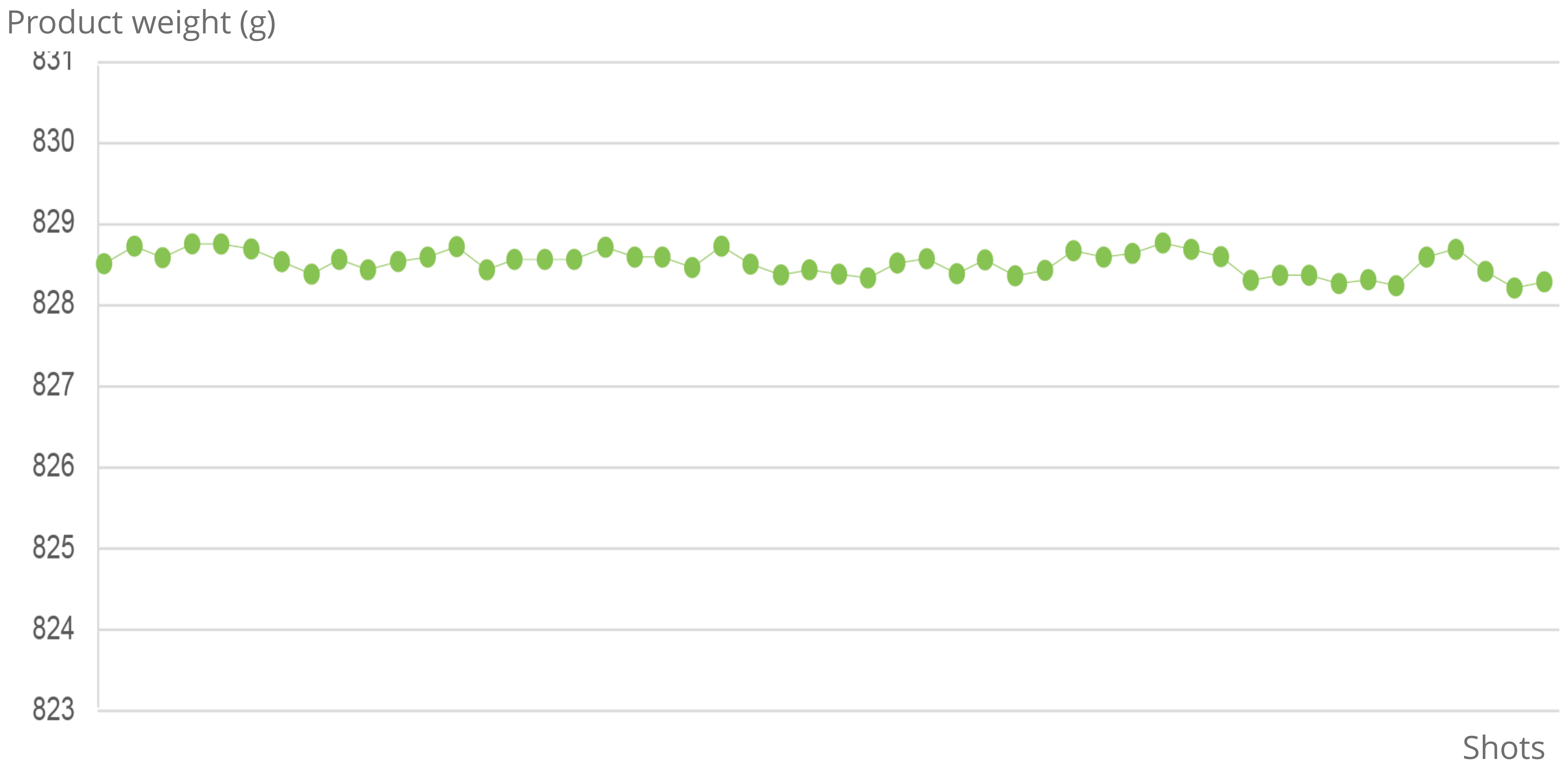
Material Leakage Detection

When the nozzle contact surface leakage to the detection switch, and the computer read the temperature and time to a certain range, the machine will alarm, customers can choose use or not.



Full Closed-loop Injection Control

Repetitive accuracy testing of product weight



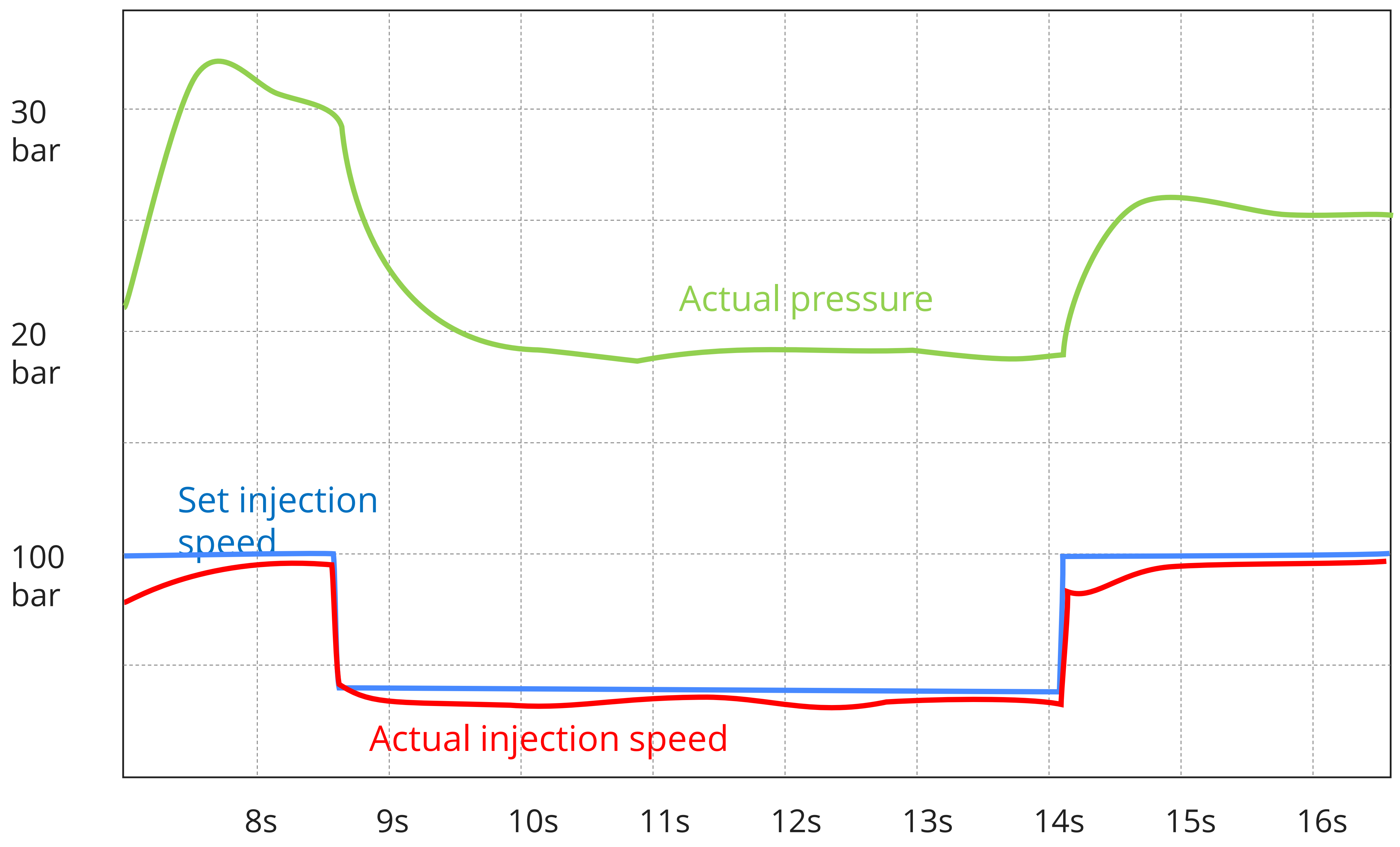
Repetitive injection positioning accuracy testing of high & low speed

China National Standard	MA1600V	MA1600III
Repetitive injection positioning accuracy	0.080 mm	0.160 mm
Repetitive injection positioning accuracy of high speed	0.431 mm	0.452 mm

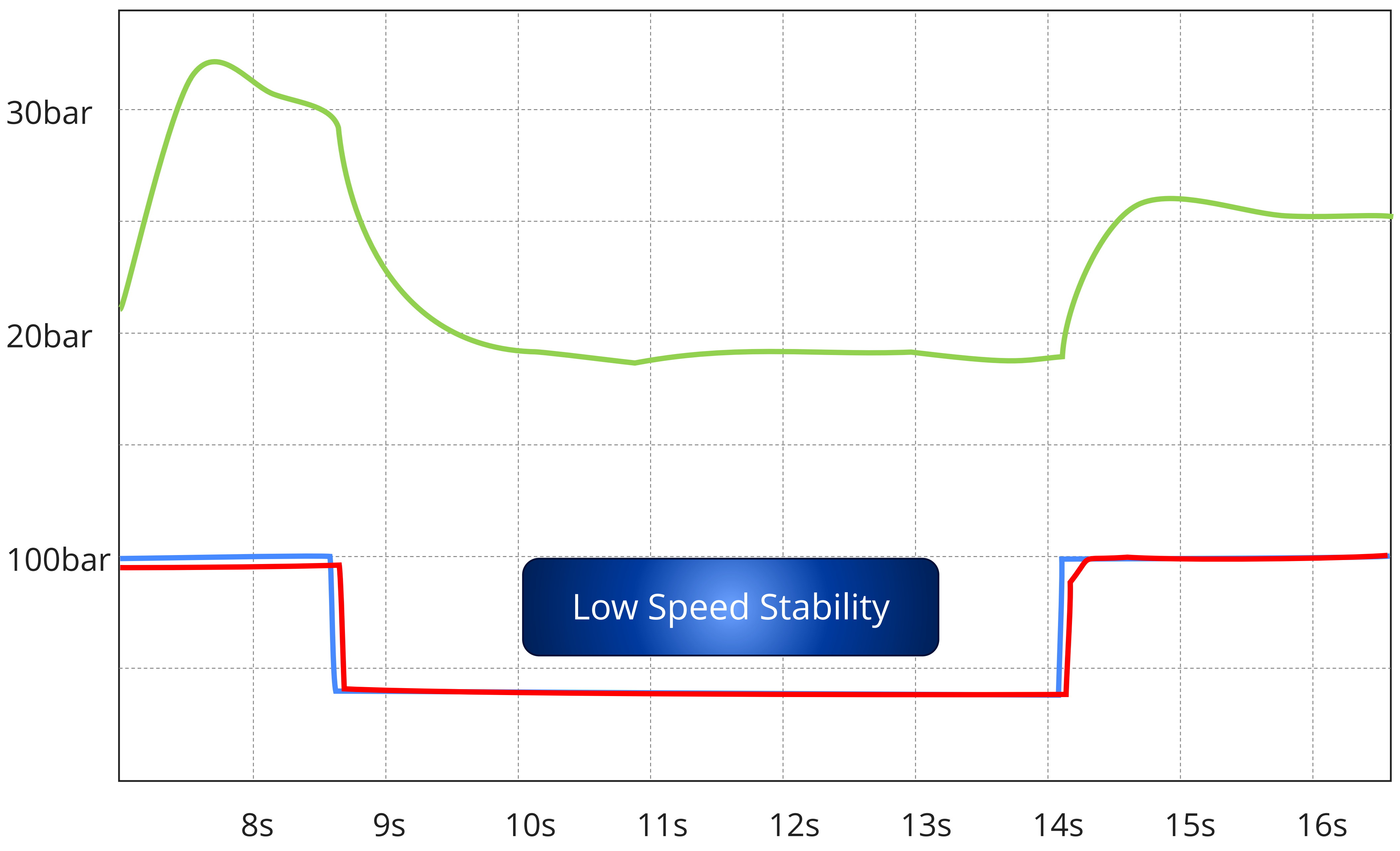
- High precision and repeatability
- Fast response
- Stability also at low injection-speeds
- Process adaptability
- Consistent product quality

Full Closed-loop Injection Control

Standard Mode



Full closed-loop mode



Application: Acrylic cosmetic box on MA3200

Actual Pressure

Set Injection Speed

Actual Injection Speed

Injection Performance Improvements

MA

kN

600/130 ••• 2500/1000 ••• 6000/4500 ••• 12000/8400 ••• 33000/62000

Motor power improve 5 -10 %

- Injection pressure improve 5 – 8 %
- Full range of injection pressure increase
- The parameter setting expanded from max. 17.5 to 18.5 MPa

- Improved injection molding capability
- Simplifies product manufacturing
- Versatility in manufacturing process

Charging Performance Improvements

MA

600/130 ··· 2500/1000 ··· 6000/4500 ··· 12000/8400 ··· 33000/62000

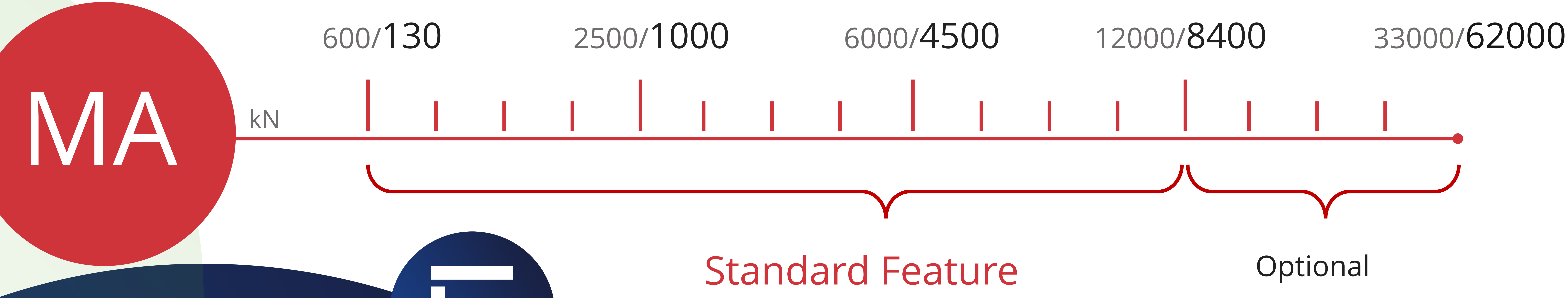
kN

- Screw speed increase 5-23 %
- Plasticizing ability improved 2-17 %

- Screw speed increase 25-35 %
- Plasticizing ability improved 18-24 %

- Overall improvement of plasticizing efficiency
- Shorten dry cycle times

Electrical Charging



- Reduced Energy Consumption
- Improving production cycle times
- Higher Charging Precision

Electrical Charging

Condition	Item	**MA1600V**	MA1600III
China National Standard (without mold)	Energy Consumption (KW·h)	**0.879**	1.028
	Material (kg)	**3.095**	3.190
	Energy Consumption Ratio (kW·h/kg)	**0.284**	0.322
	Charging Proportion	**40%**	40%
China National Standard (with mold)	Energy Consumption (KW·h)	**1.0139**	1.3788
	Material (kg)	**3.870**	3.88
	Energy Consumption Ratio (kW·h/kg)	**0.262**	0.355
	Charging Proportion	**58%**	58%

26%

Machine energy consumption reduction

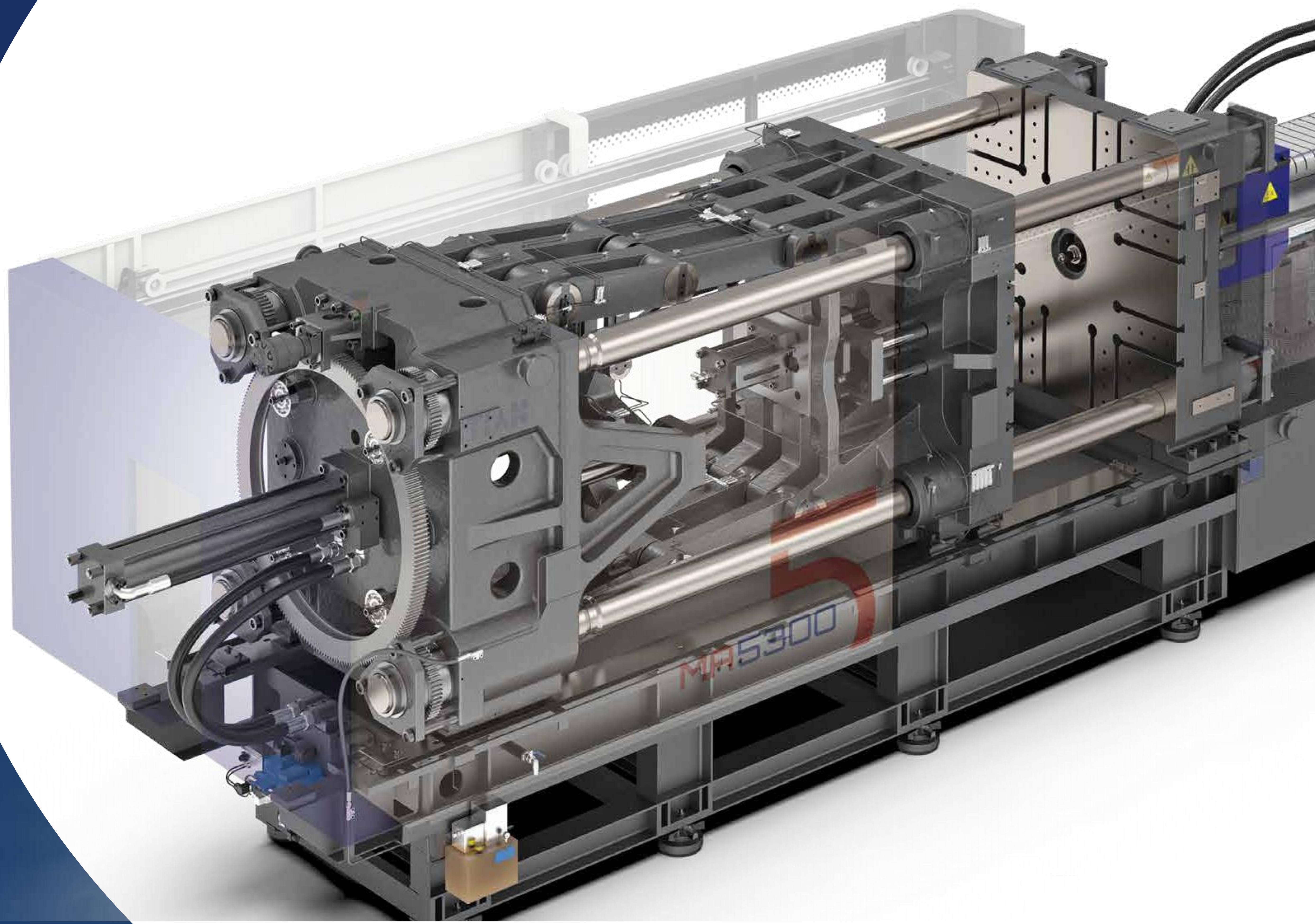
MAV1600 equipped with electrical charging

- Under no-load testing with PP material (MFR 30), the energy consumption decreased by 12%.
- Under loaded conditions with the mold (basin mold) using PP material (MFR 10), the energy consumption decreased by 26%.

* according to national standard with unit KW·h/kg.

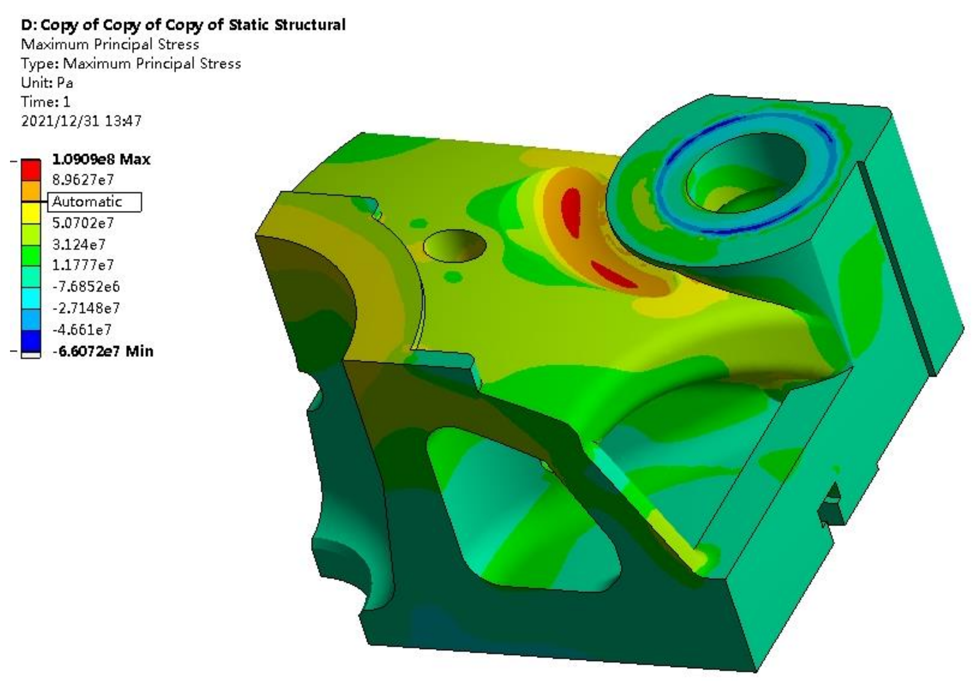
Clamping Unit

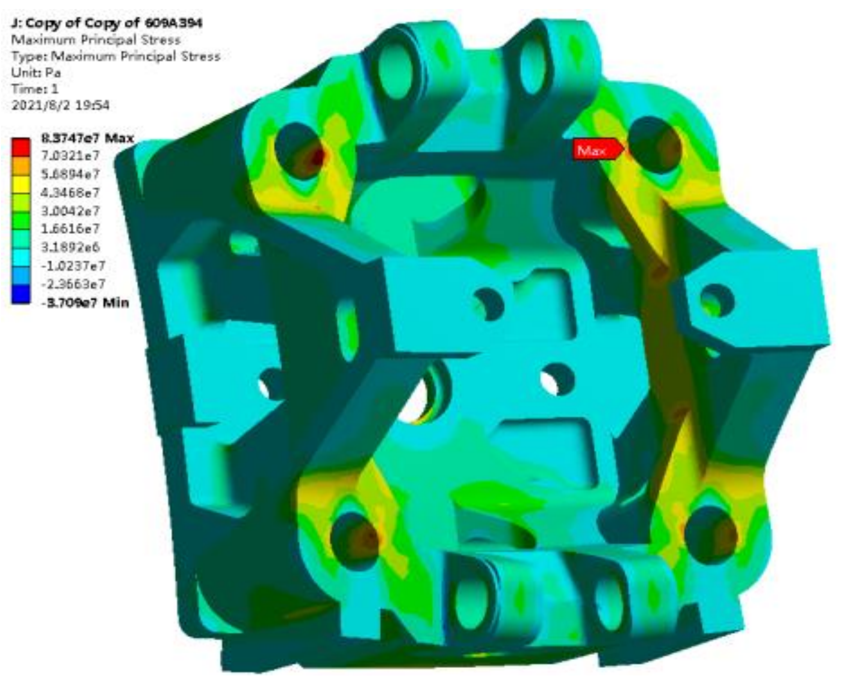
- High-rigid platen structure HT·XTEND
- High precision in positioning
- Dry cycle
- Precise mold positioning
- Lubrication Optimization



High-rigid Platen Structure

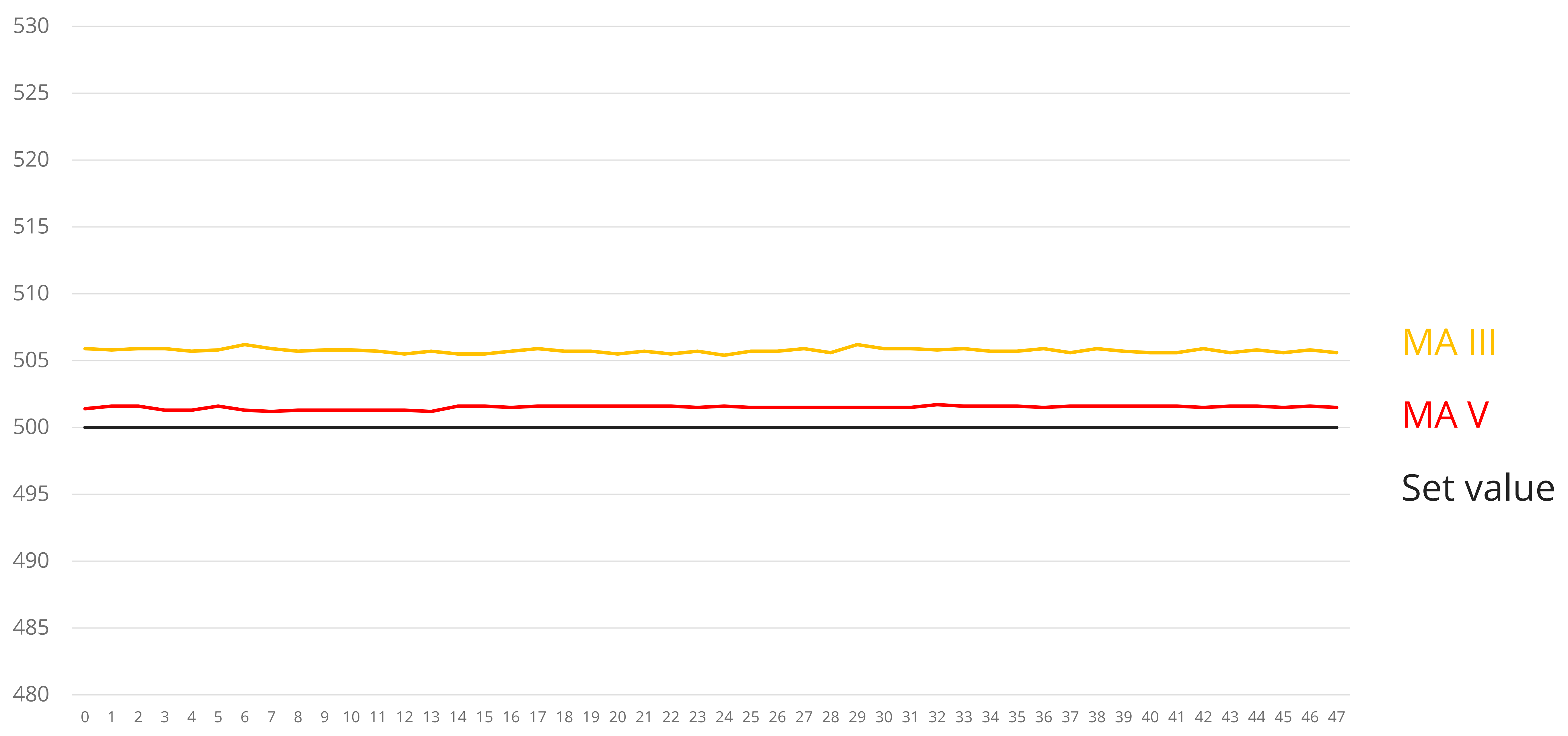
- Centralized Pressure Platen
- High rigidity against deformation
- Even pressure distribution across the surface
- Excellent moving platen support to protect the mold





HT·CLAMP

High Precision in Positioning

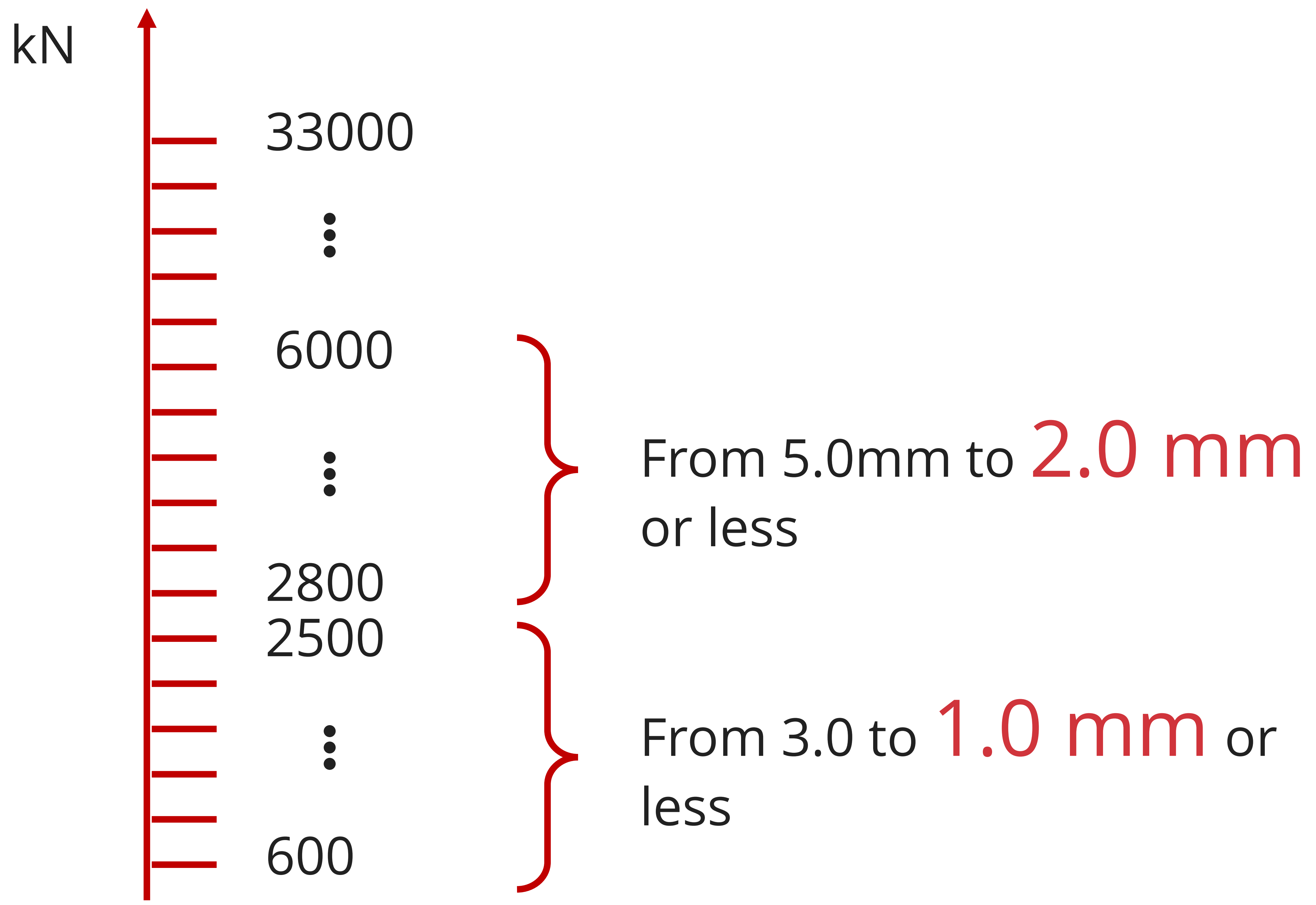


HT·CLAMP

- Program self-learning function
- Program self-correction function
- Excellent Clamping Positioning accuracy

High Precision in Positioning

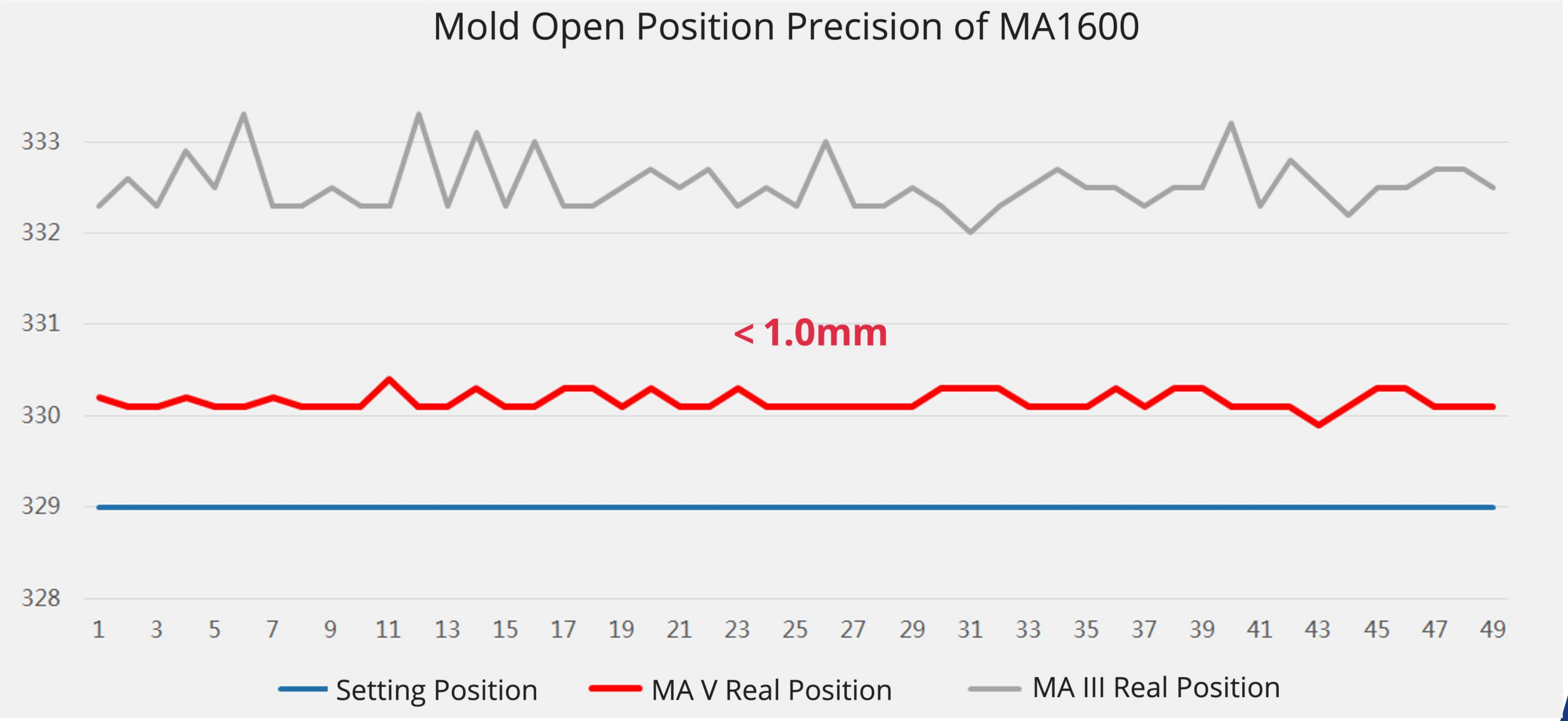
By further optimizing the overall structure, oil circuit and program, the repeatability of clamping position optimized



Dry Cycles in 5th Generation

Specification	Dry Cycle time (s)
MA600V/130	1.4
MA900V/280	1.5
MA1200V/400	1.7
MA1600V/570	1.9
MA2000V/750	2.0
MA2500V/1000	2.1
MA2800V/1350	2.25
MA3200V/1700	2.35
MA3800V/2250	2.6
MA4700V/3200	2.8
MA5300V/4500	3.05
MA6000V/4500	3.3
MA7000V/5000	3.6
MA8000V/6800	3.9
MA9000V/6800	4.3
MA10000V/8400	4.6
MA12000V/8400	4.8

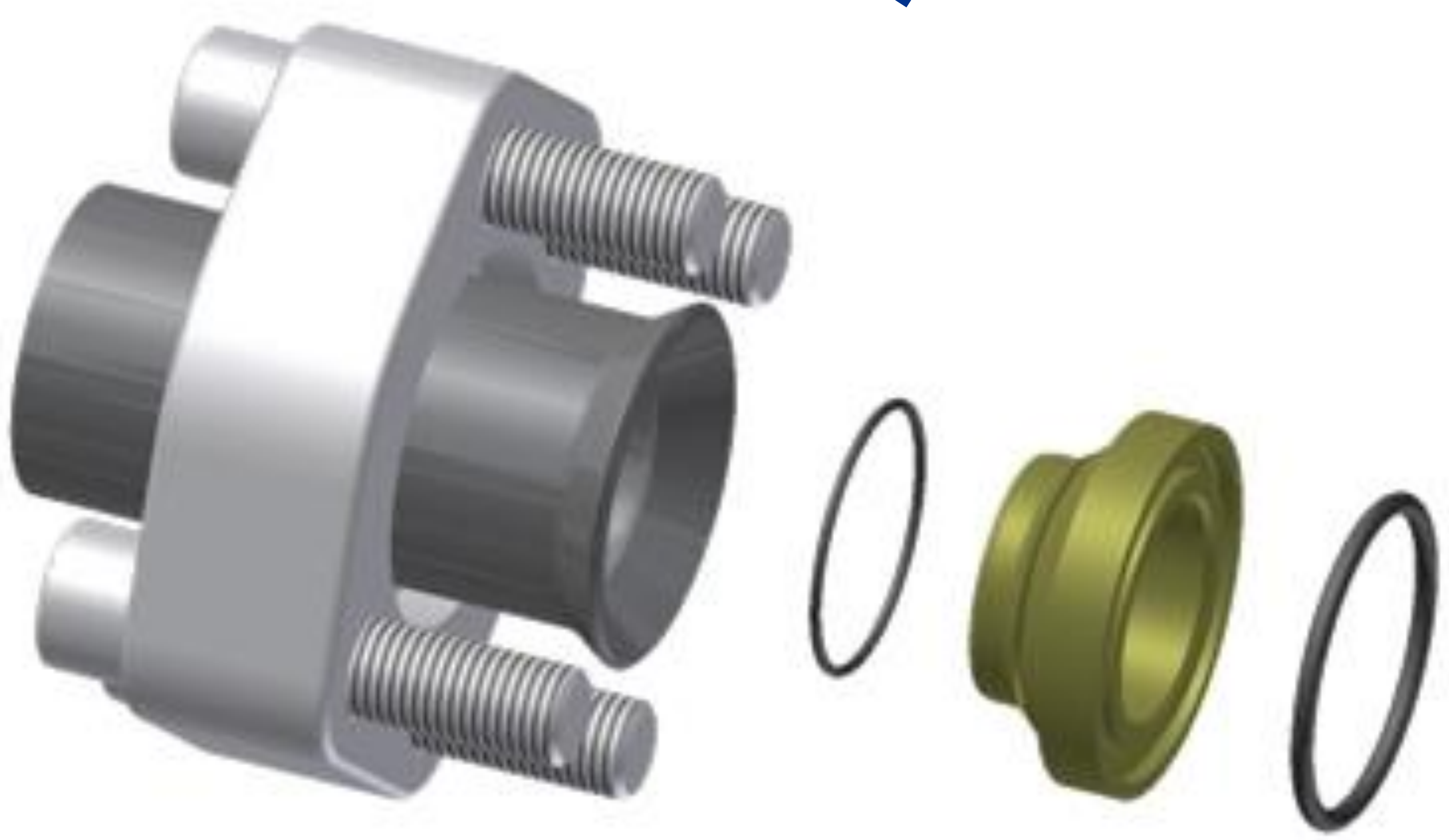
Precise Mold Positioning

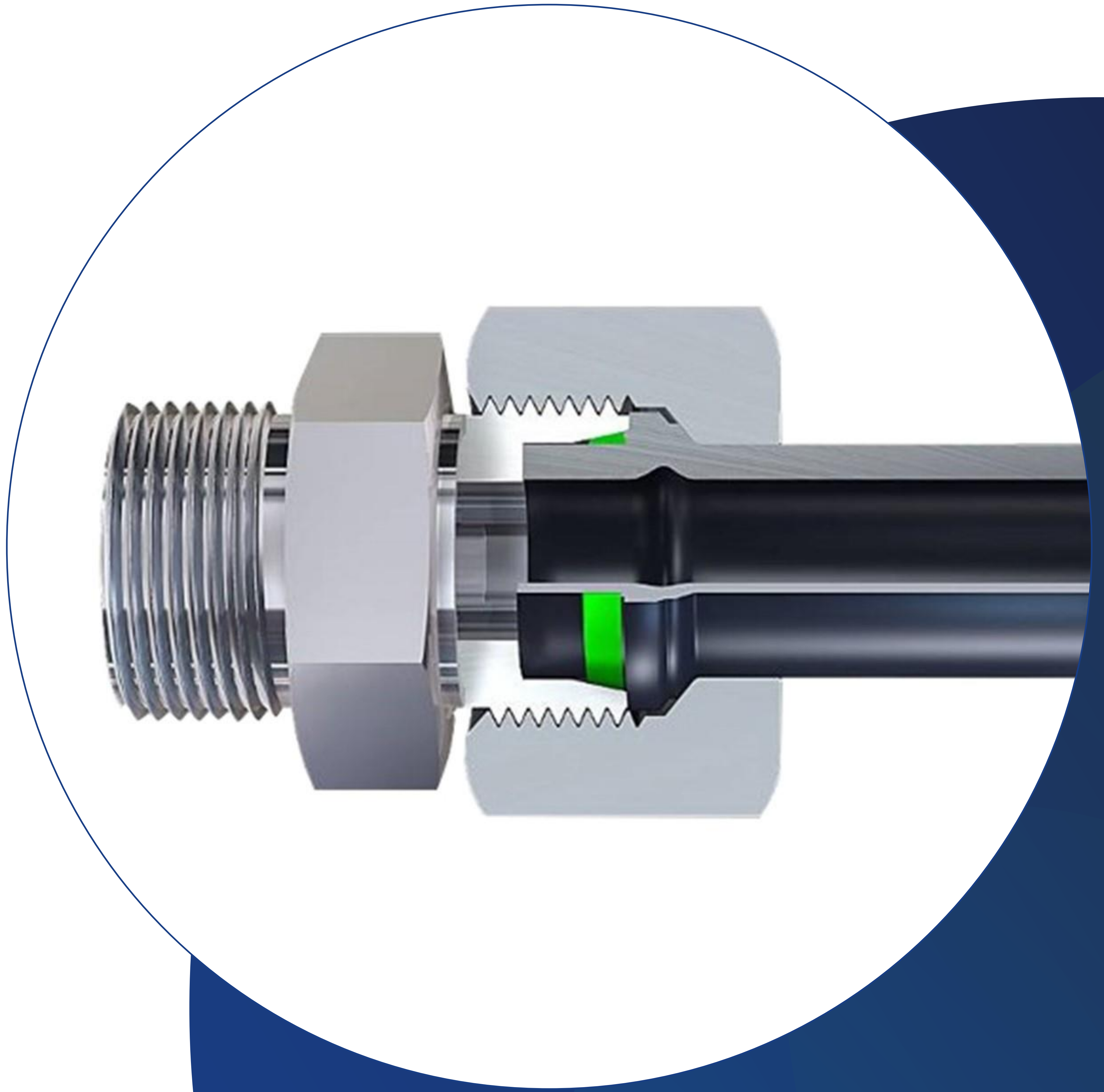


- Self-learning and –correcting algorithm
- Correction of the position deviation
- Precise mold positioning
- Stable and fast performance

Non-Welding Technology

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

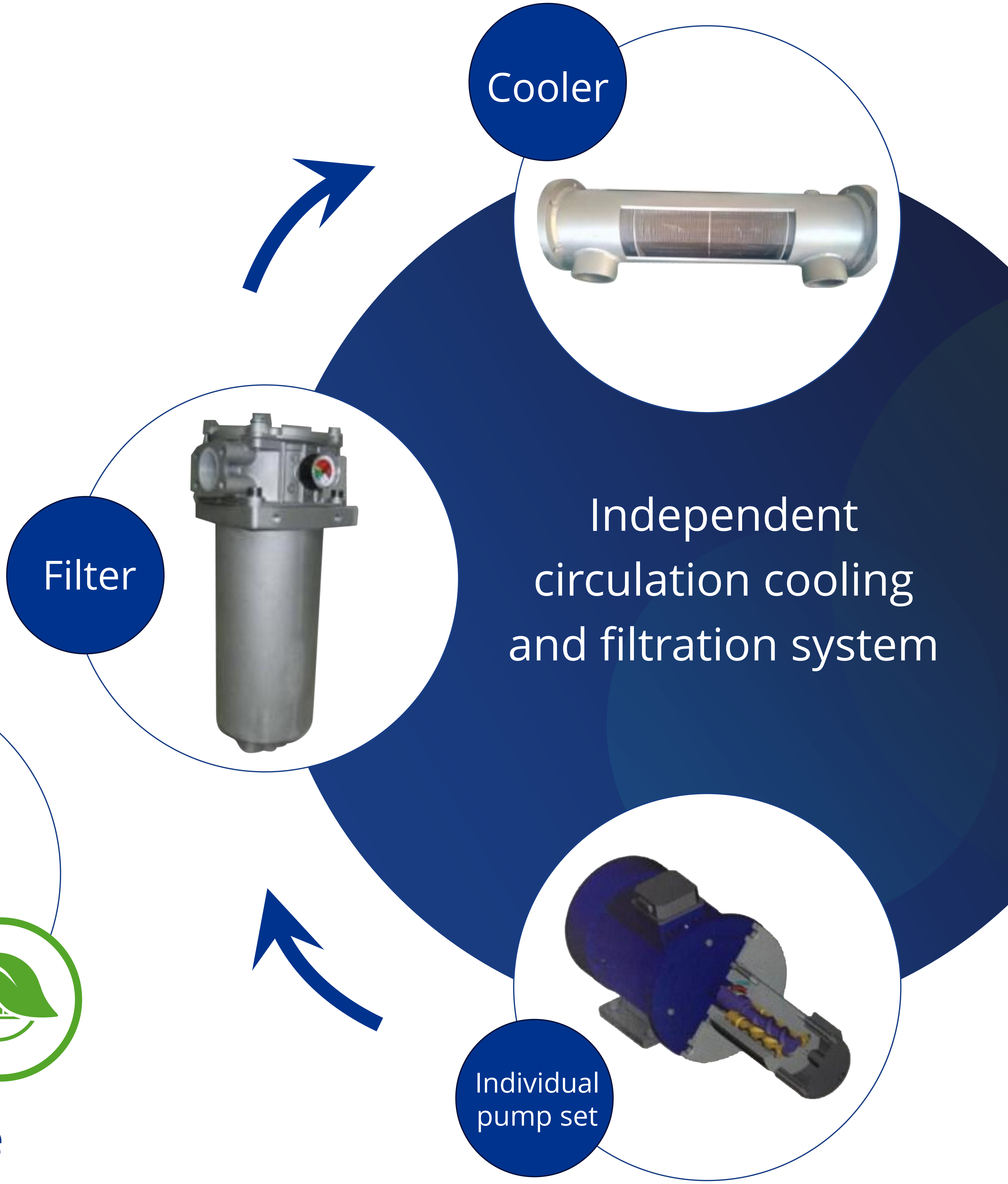




Efficient Oil Temperature Control

- Precise oil temperature control
- Stable machine performance due to oil cleaning
- Special: 2800 and above machines with a separate filtration system
- Water control valve for oil cooling

Water control valve



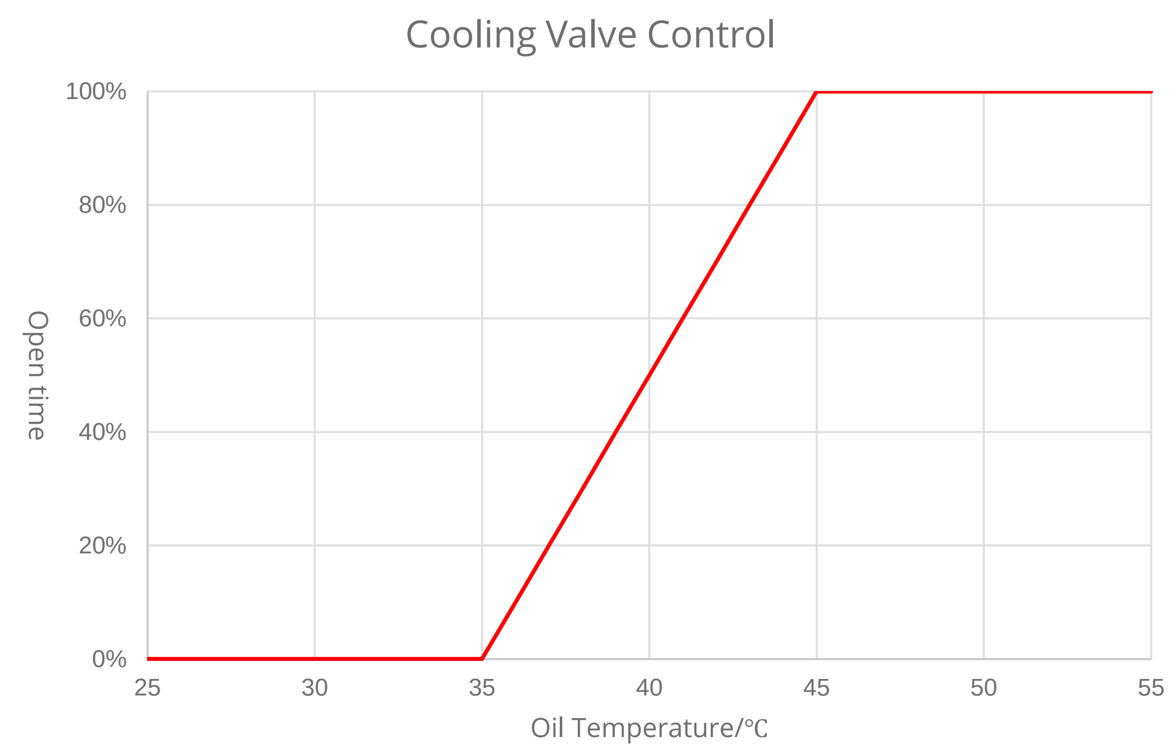
Water Control Valve for Oil Cooling

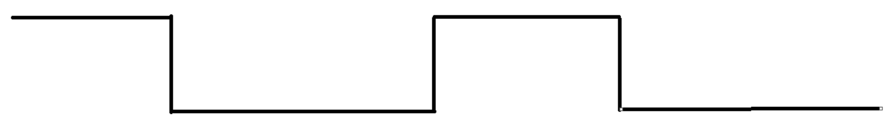
- PWM water control valve opens the cooling water circuit when oil temperature > set temperature
- Stabilization of Oil temperature

35℃ Valve open

45℃

40% Open/close time ratio





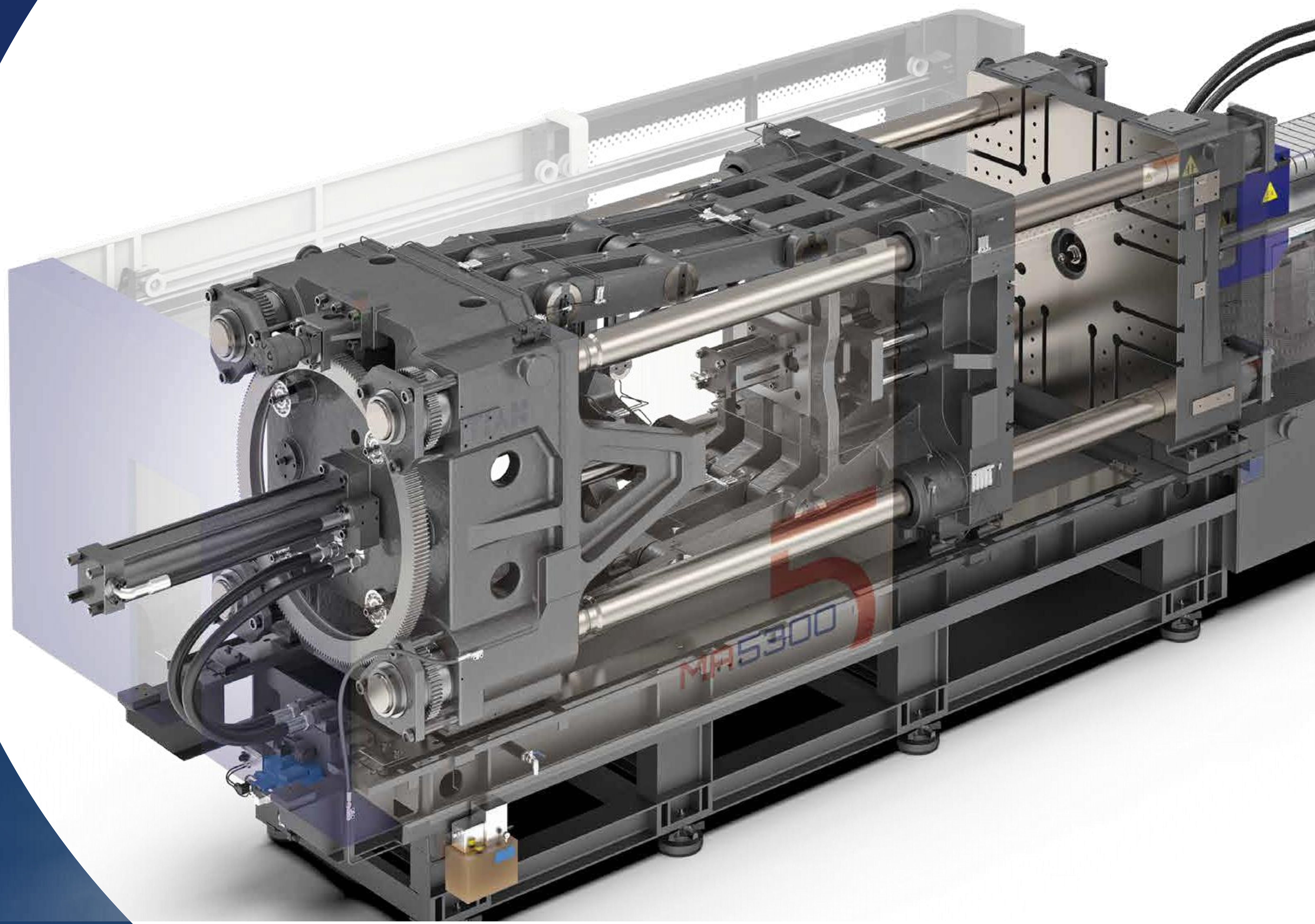
Condition	Heating Power	Oil Temp.	Water Flow Rate	Cooling Temp.	Chiller Flow Rate
PWM	10%	36.6	4.16L/min	25	26L/min
	15%	38.3	8.58L/min	25	26L/min
	20%	38.8	9.88L/min	25	26L/min
	26%	40.5	14.3L/min	25	26L/min
Normally Open	15%	32.8	26.00L/min	25	26L/min

Test Design:

15% is a normal range, 20% is considered an extreme condition. At 15% heating power, the cooling water PWM can save 17.5 L/min of water supply that occupying 67.3% of the total volume. The water temperature fluctuation is calculated to be between 0.8~1.3 ℃ after PWM control.

Drive Technology

- Mars Servo Drive System
- Haitian Servo Technology



Mars Servo Drive System

Dedicated servo power system for injection molding machines

High performance servo drive system

SUMITOMO high speed gear pumps

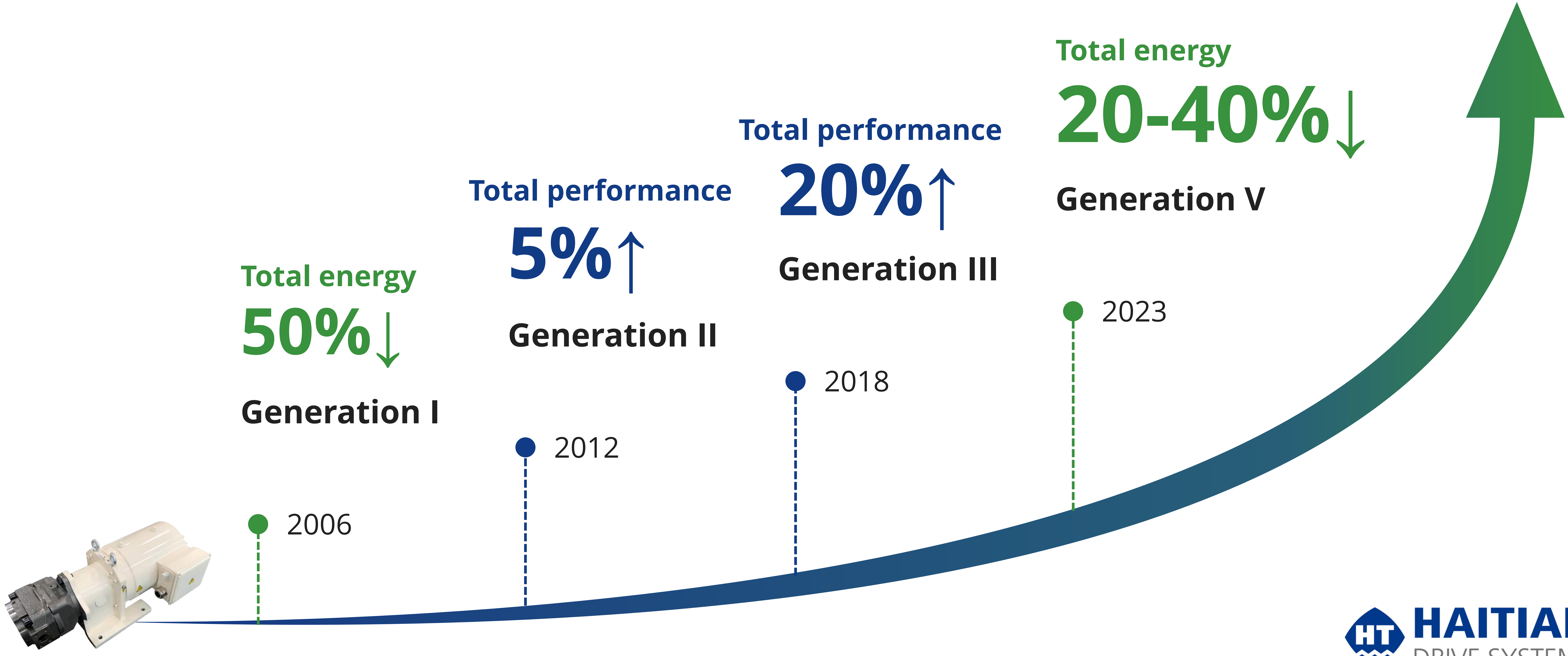
185 bar

System pressure

Efficient, energy saving, quiet and stable operation

Ultra-high dynamic response of 100 ms

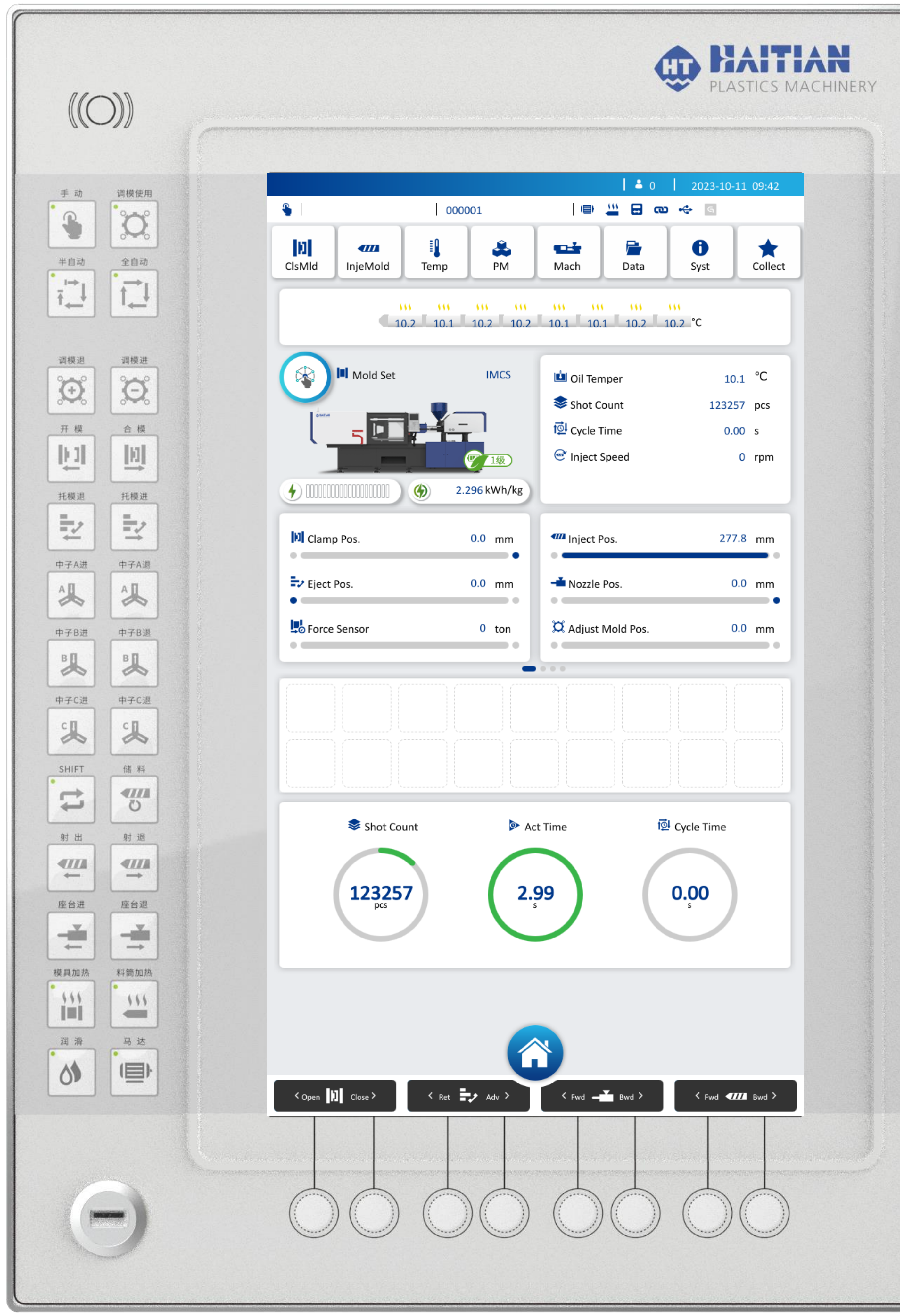
Haitian Servo Technology



HAITIAN
DRIVE SYSTEMS

Software and Control

- Control Panel
- UI Design
- HT ·INJECTION
- HT ·CHARGE
- HT·LUBRICATE
- HT·DIAGNOSE
- HT·ENERGY



Control Panel

New control panel

60T - 600T

KEBA controller

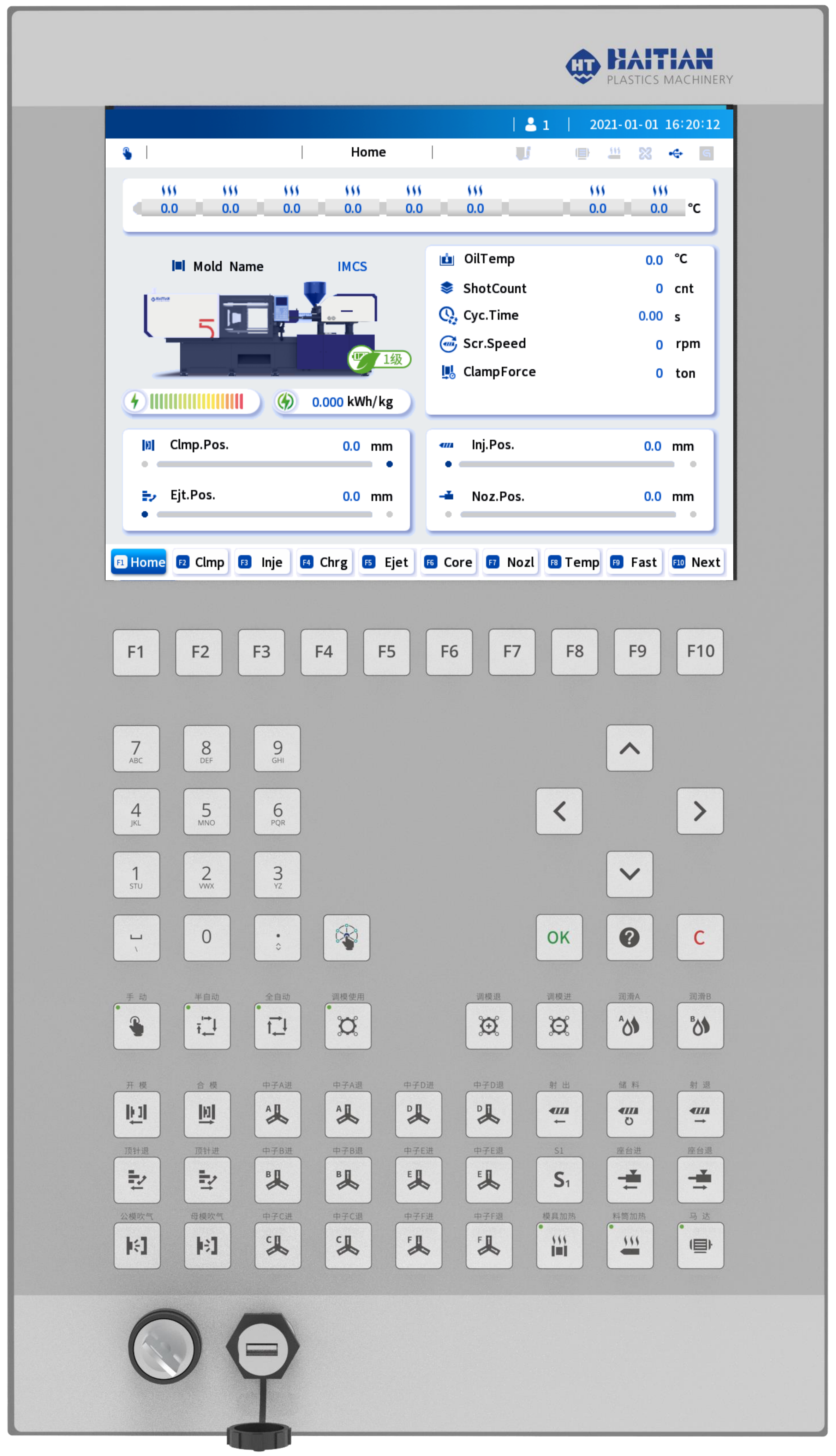
controller +

15.74inchesPanel

700T - 3300T

KEBA controller

+ 19.68 inches Panel



MAV 12 inches panel

MAV 15 inches panel

UI Design

New UI design

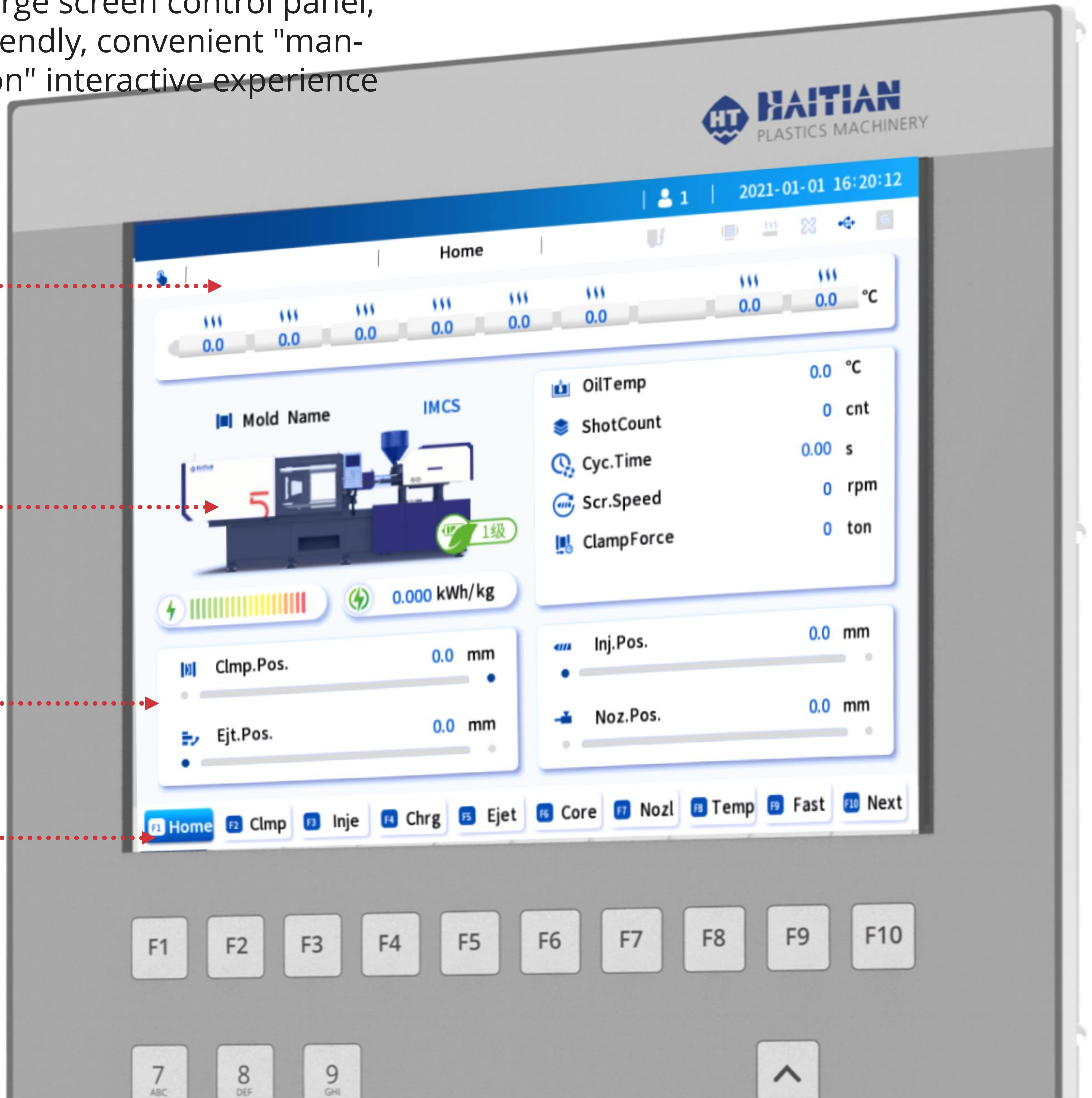
Configuration of large screen control panel, bring intelligent friendly, convenient "man-machine integration" interactive experience

Centralized display of machine status

Animation effect
Card style design

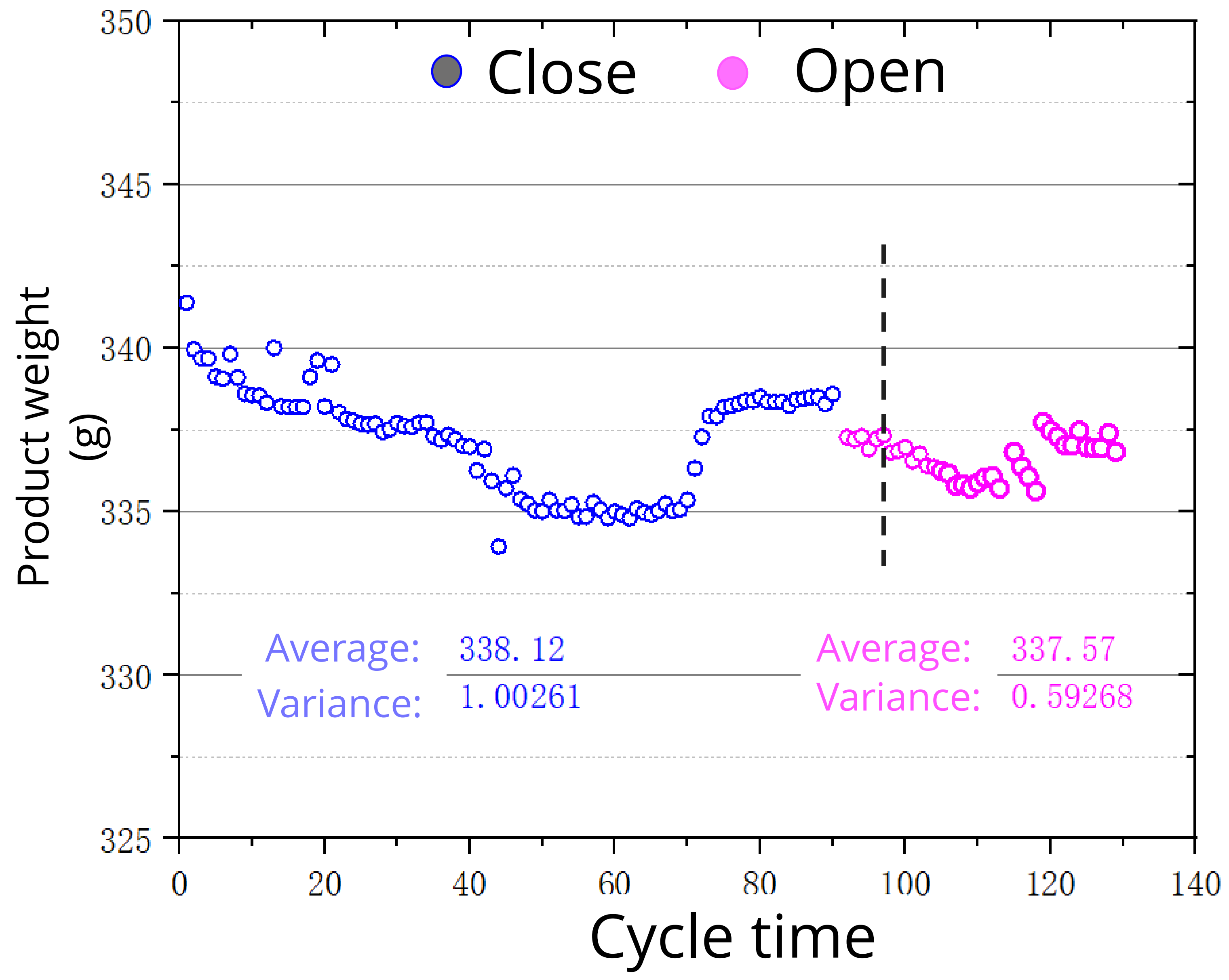
Display of important production information

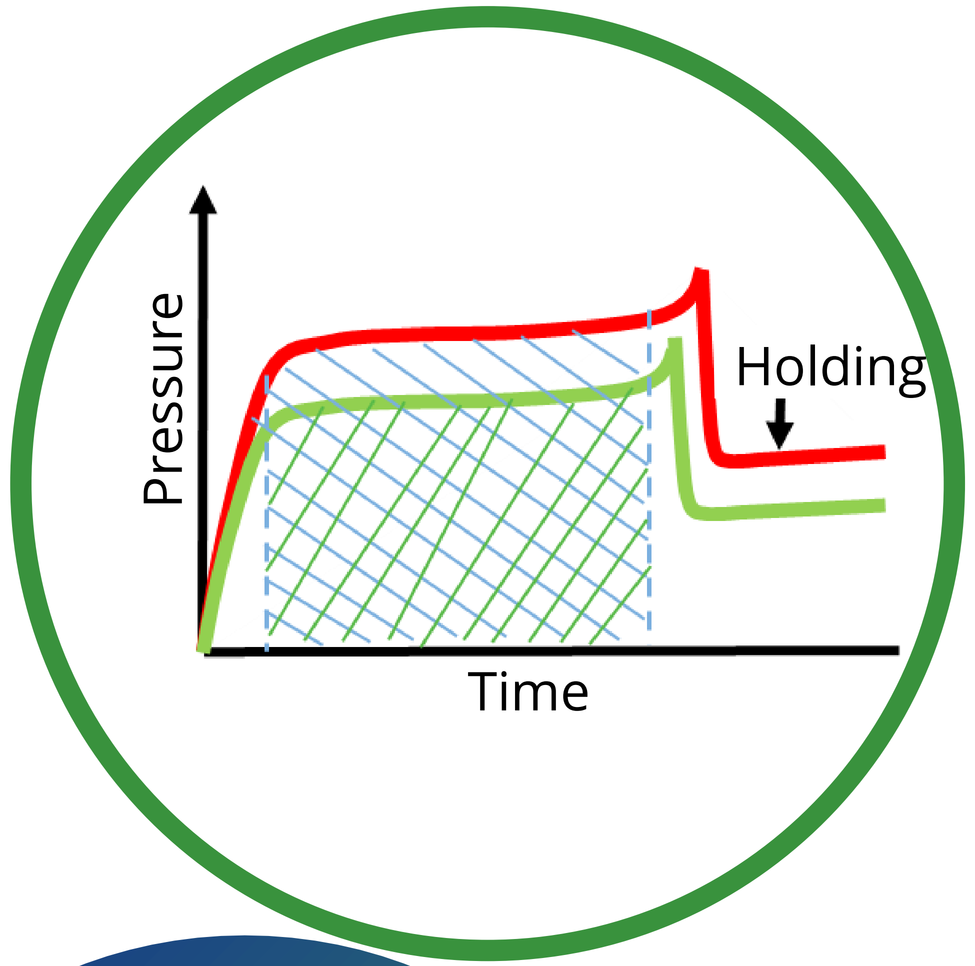
New menu system



HT·INJECT

- Real time monitoring of injection process
- Improves weight stability of injected products
- Acitve compensation of external disruptive factors

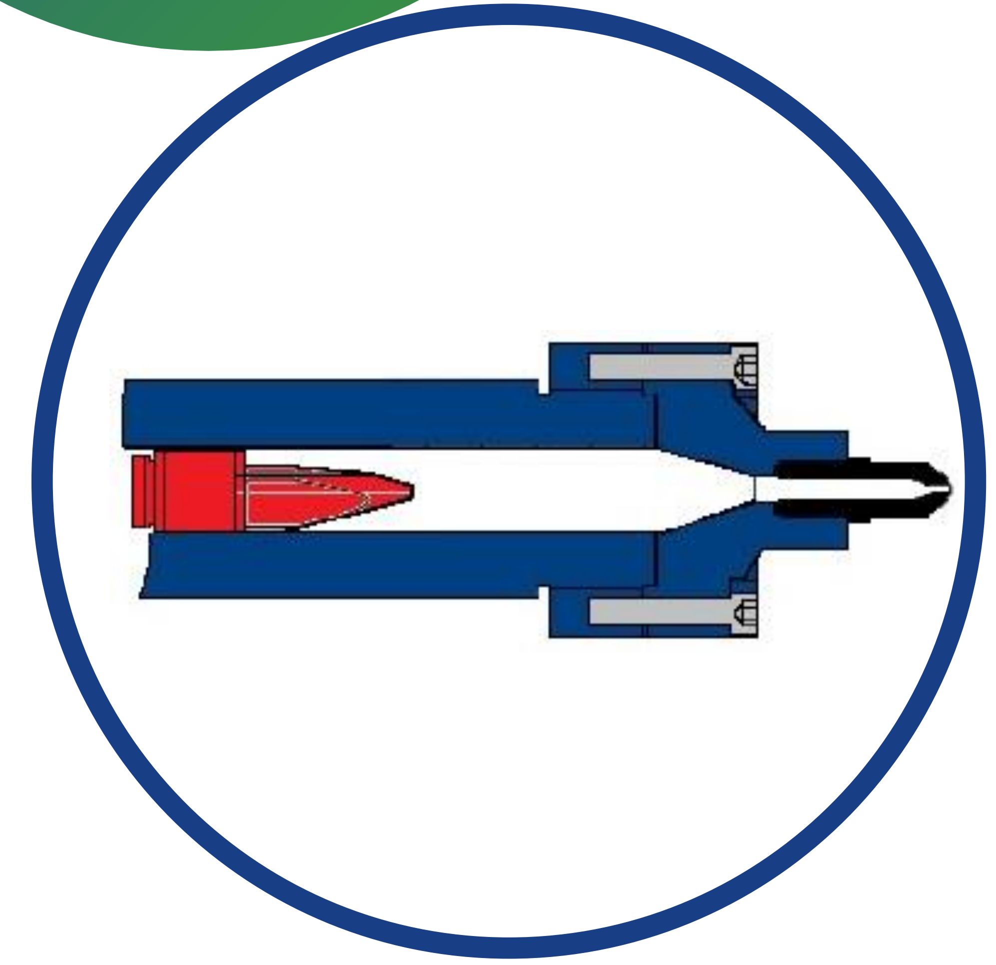




Key Algorithms

Data Processing

Controlled mechanical output

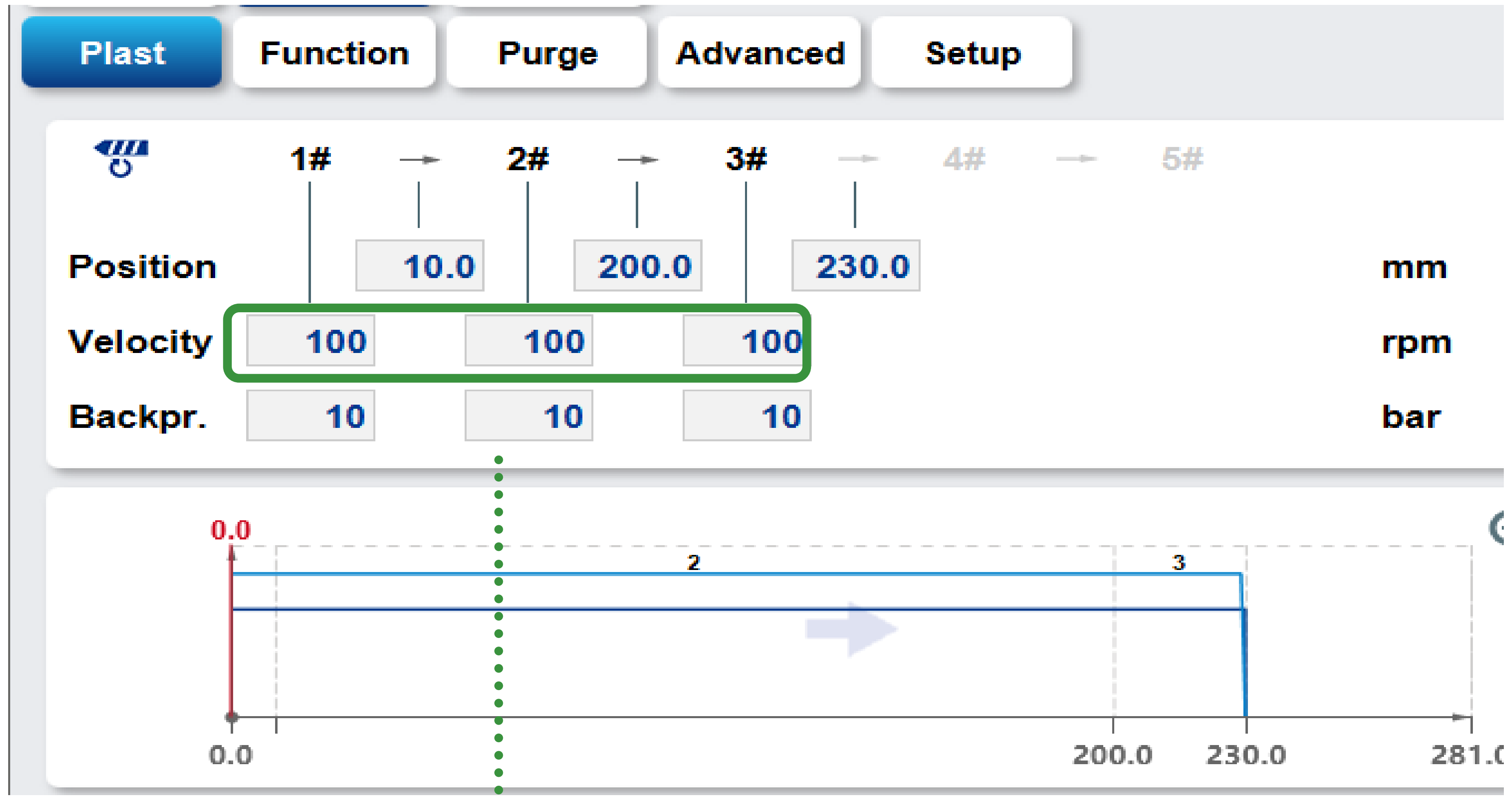


HT·CHARGE

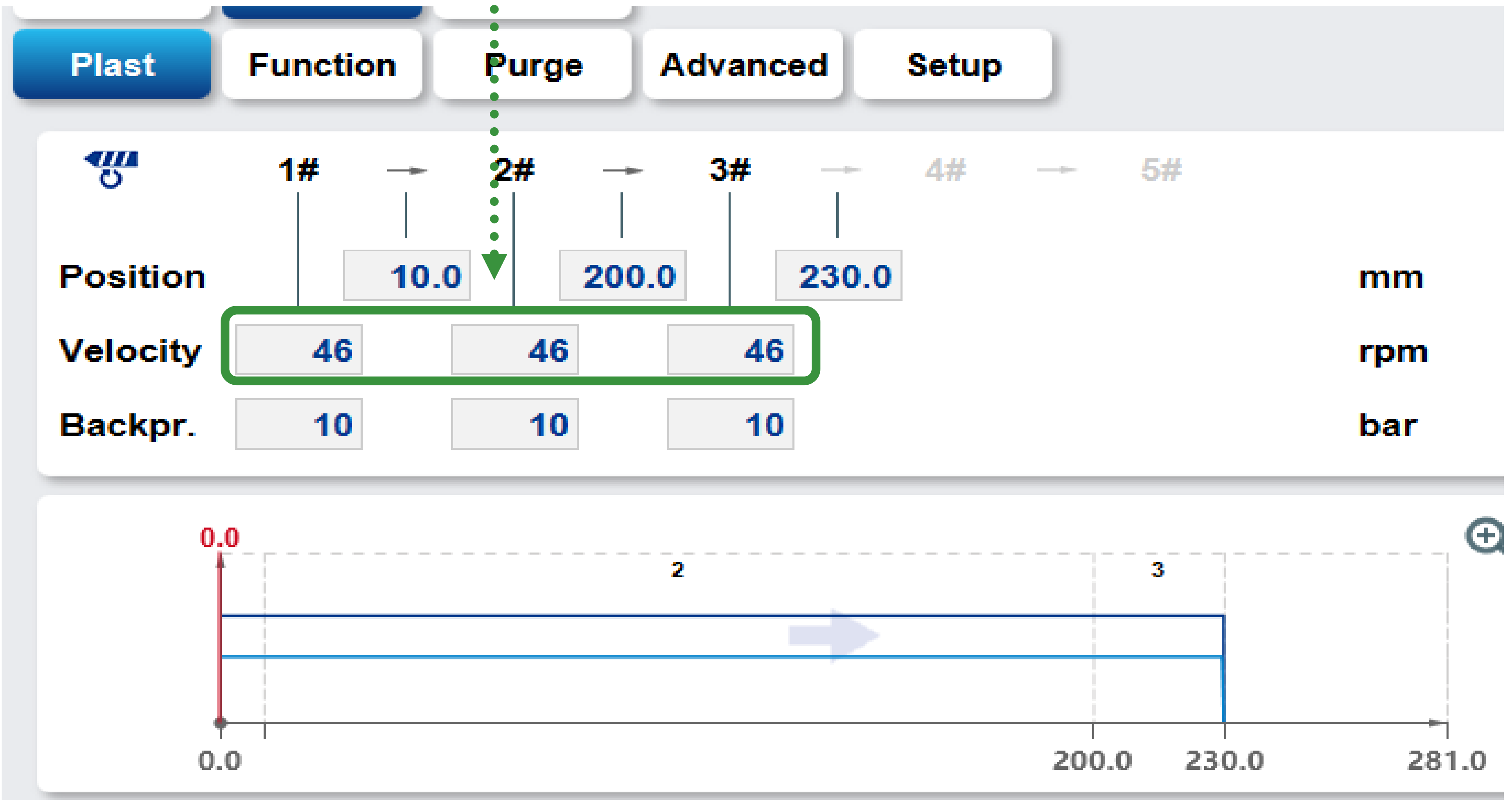
Intelligent Charging

- Energy consumption reduction
- Screw barrel wear is reduce

Before optimization



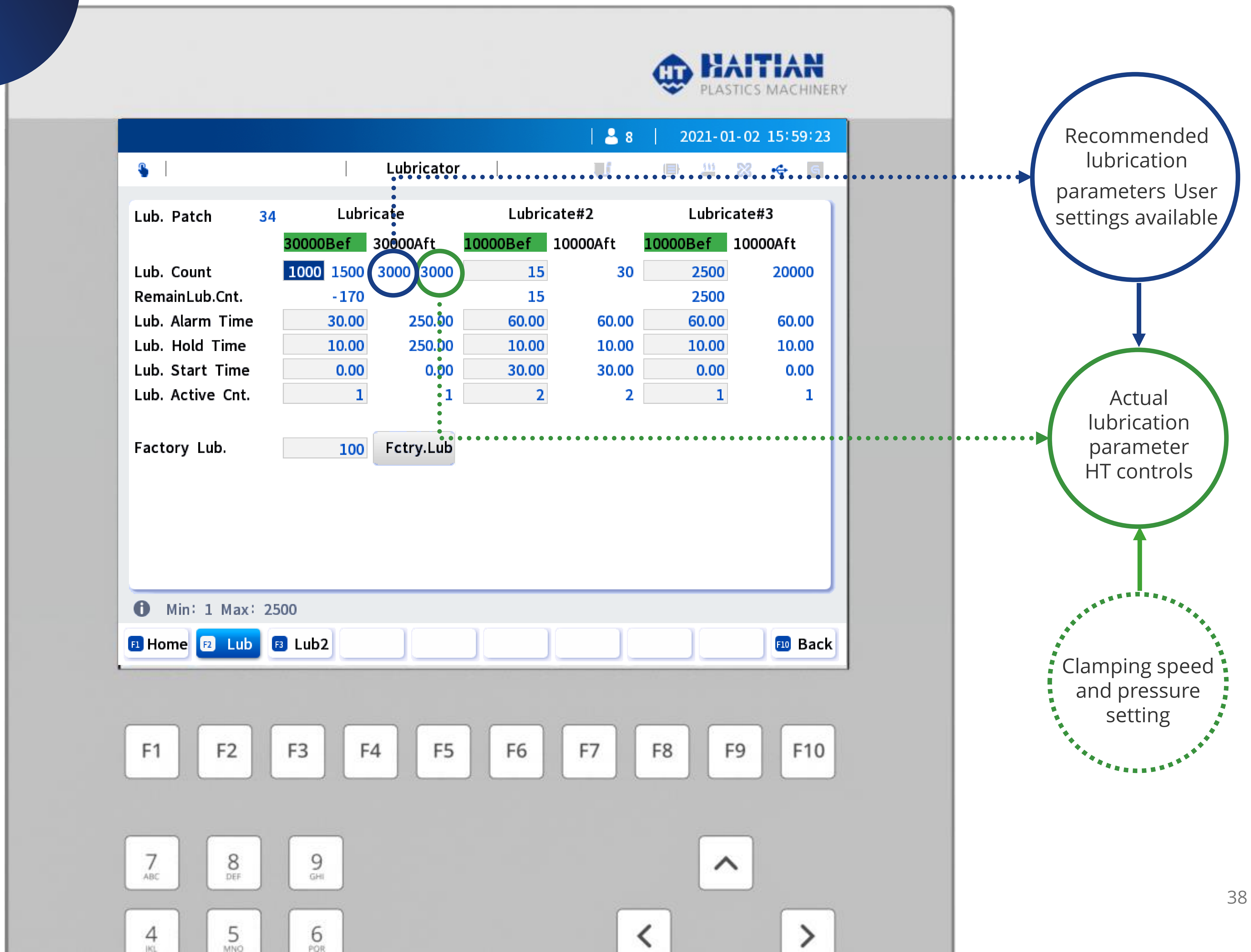
After optimization



HT·LUBRICATE

HT·LUBRICATE

- Algorithms and a precise lubrication model dynamically match the optimal lubrication quantity and parameters
- Intelligently optimized through multi-data algorithms such as lubrication control, cycle times, mold opening stroke and mold clamping pressure
- Automatically calculates lubricating oil consumption and displays the percentage of lubricating parts remaining in real time

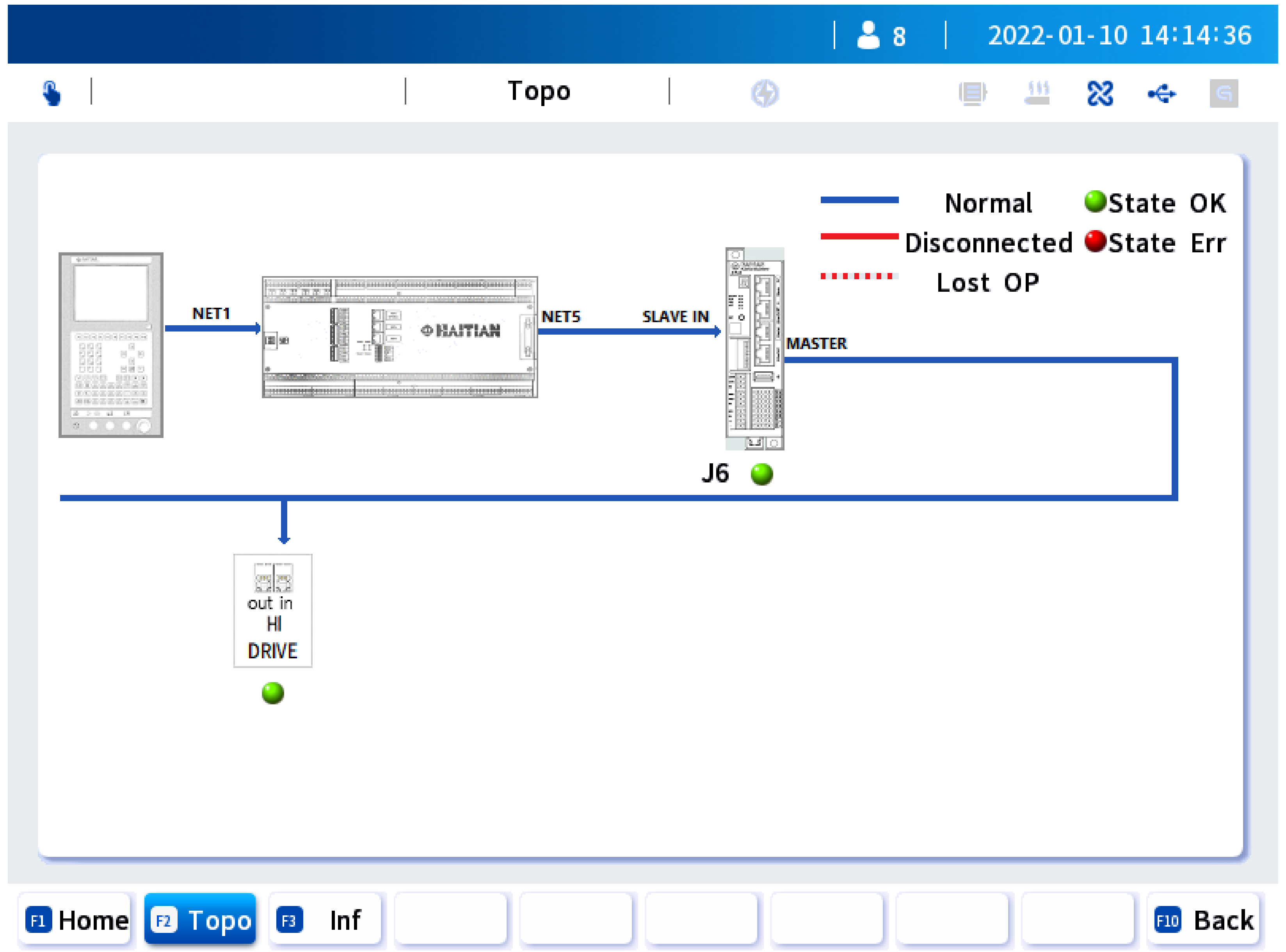


HT·DIAGNOSE

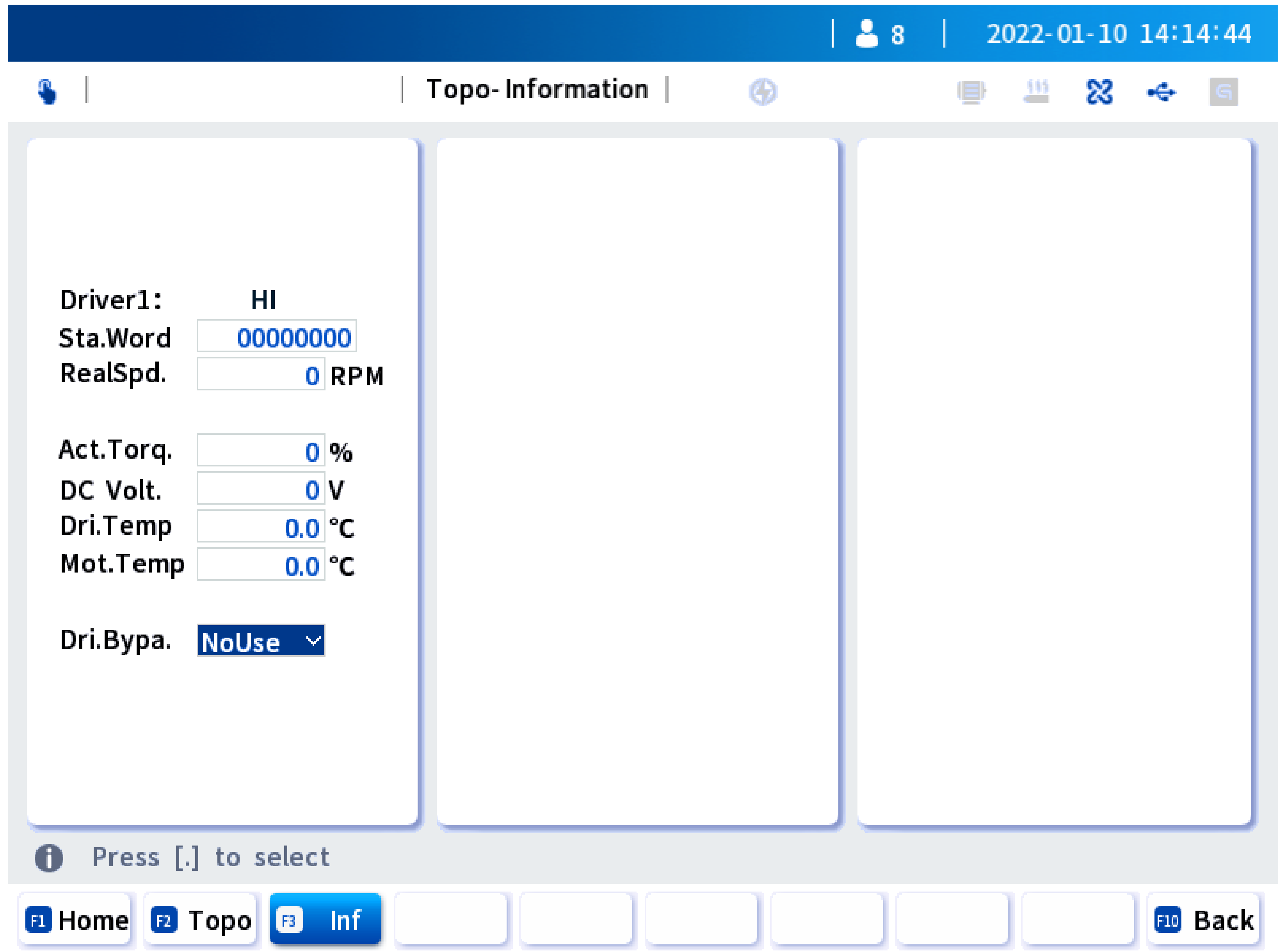
HT·DIAGNOSE

- The topology of the injection molding machine can be displayed on the controller to help the operator quickly determine the cause of the fault and locate the corresponding module.
- The monitoring points include: controller/J6 card/drive/transducer

Smart self-detection



V1.0

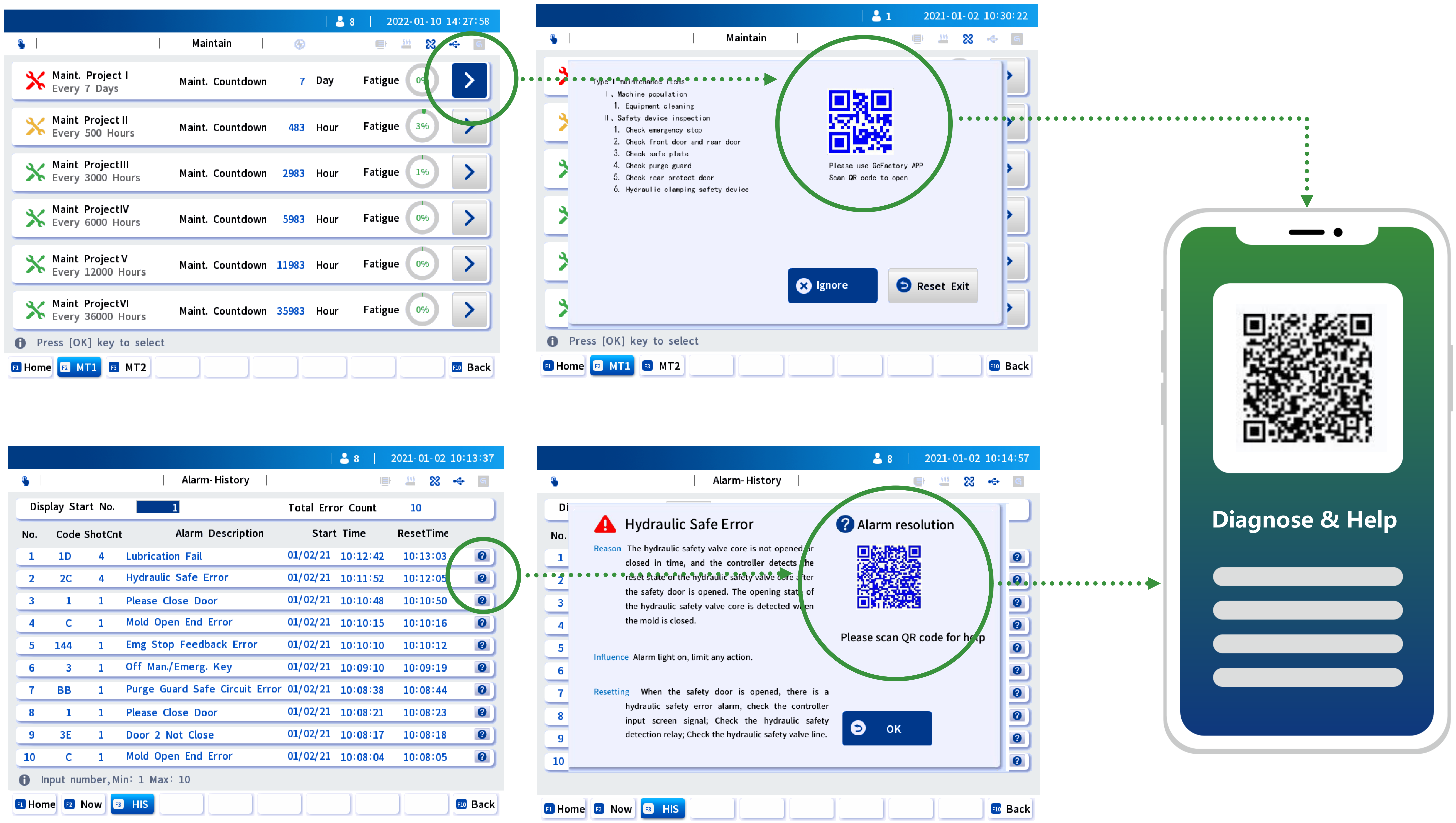


V2.0

HT·DIAGNOSE

HT·DIAGNOSE

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

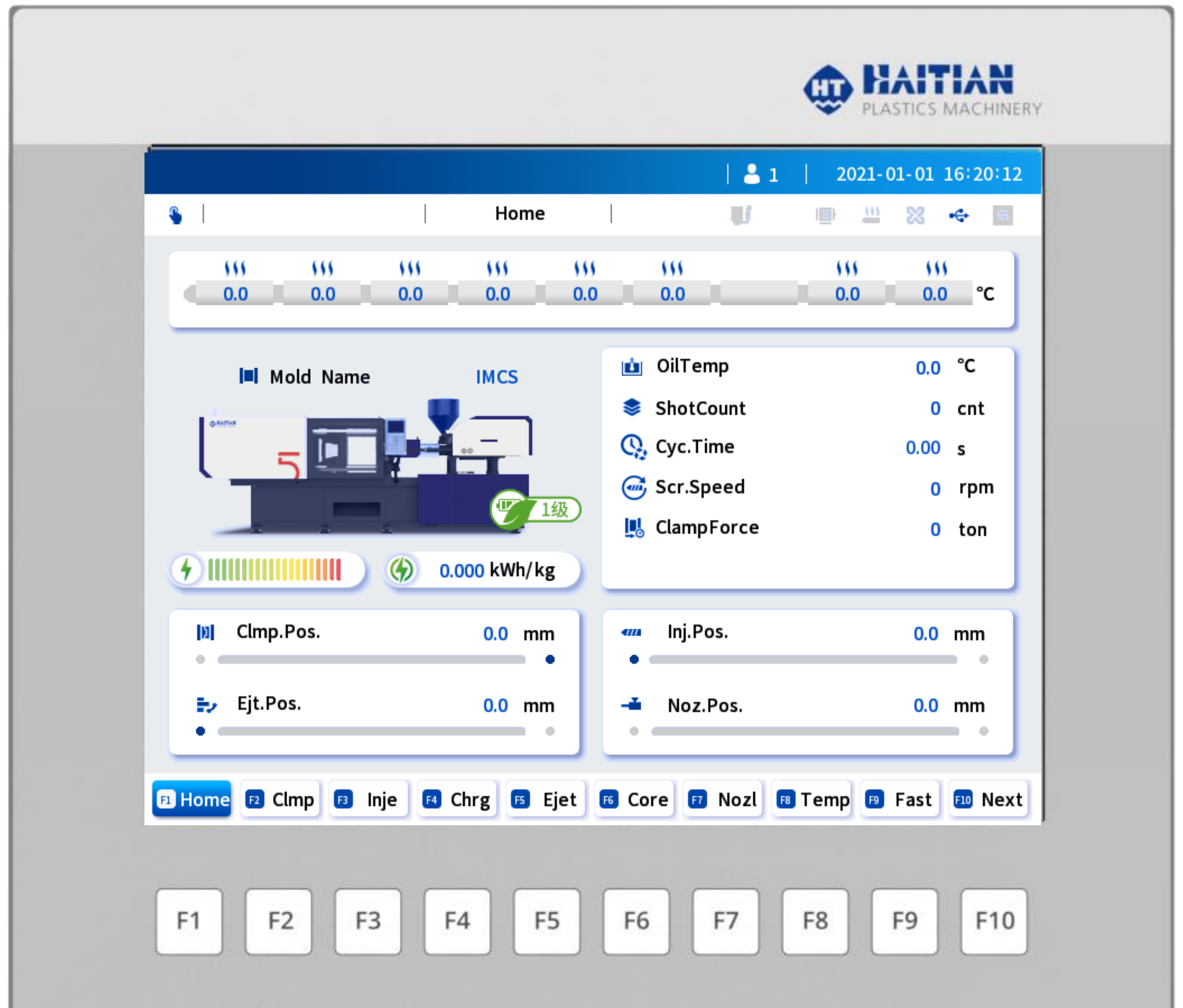


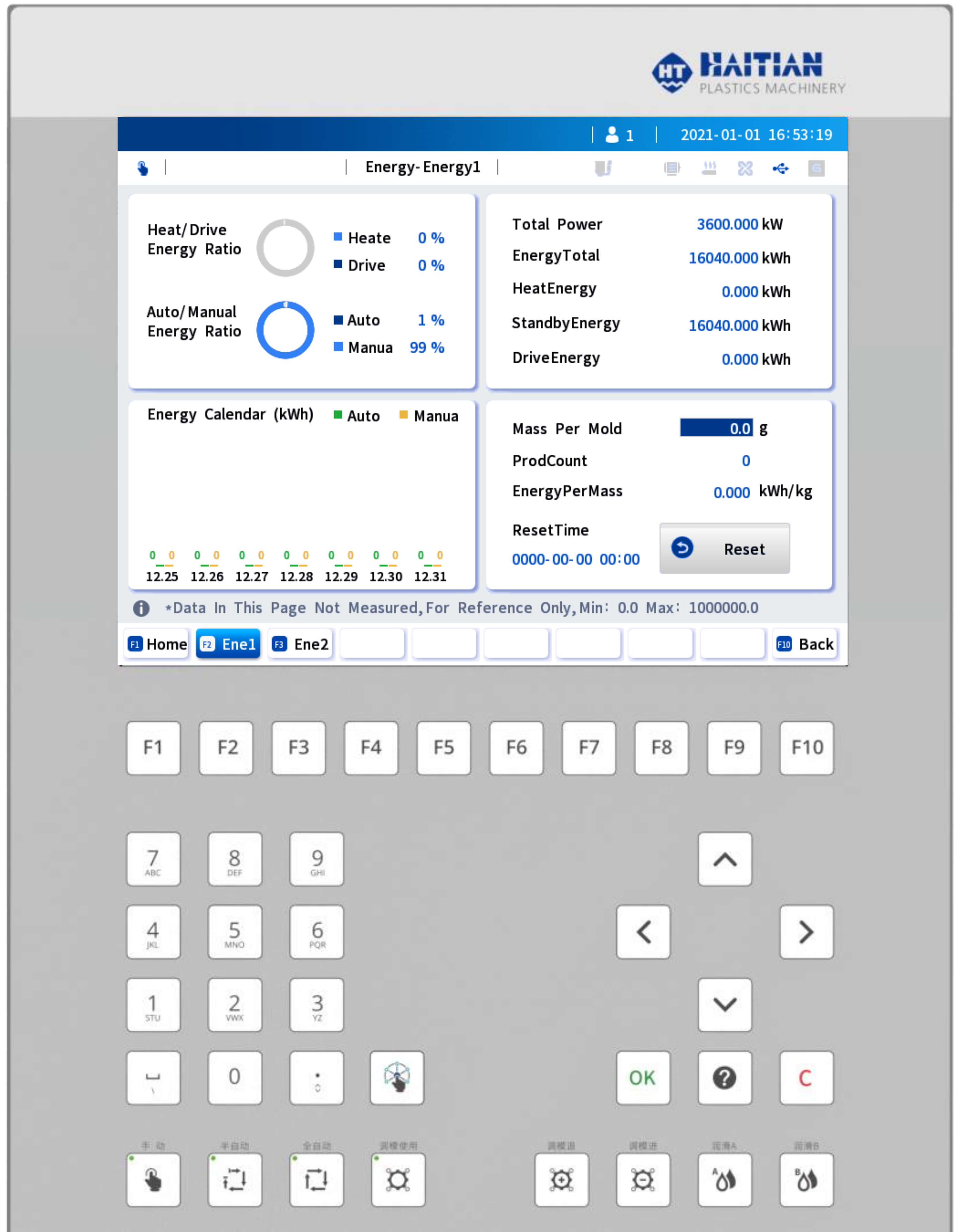
HT·ENERGY

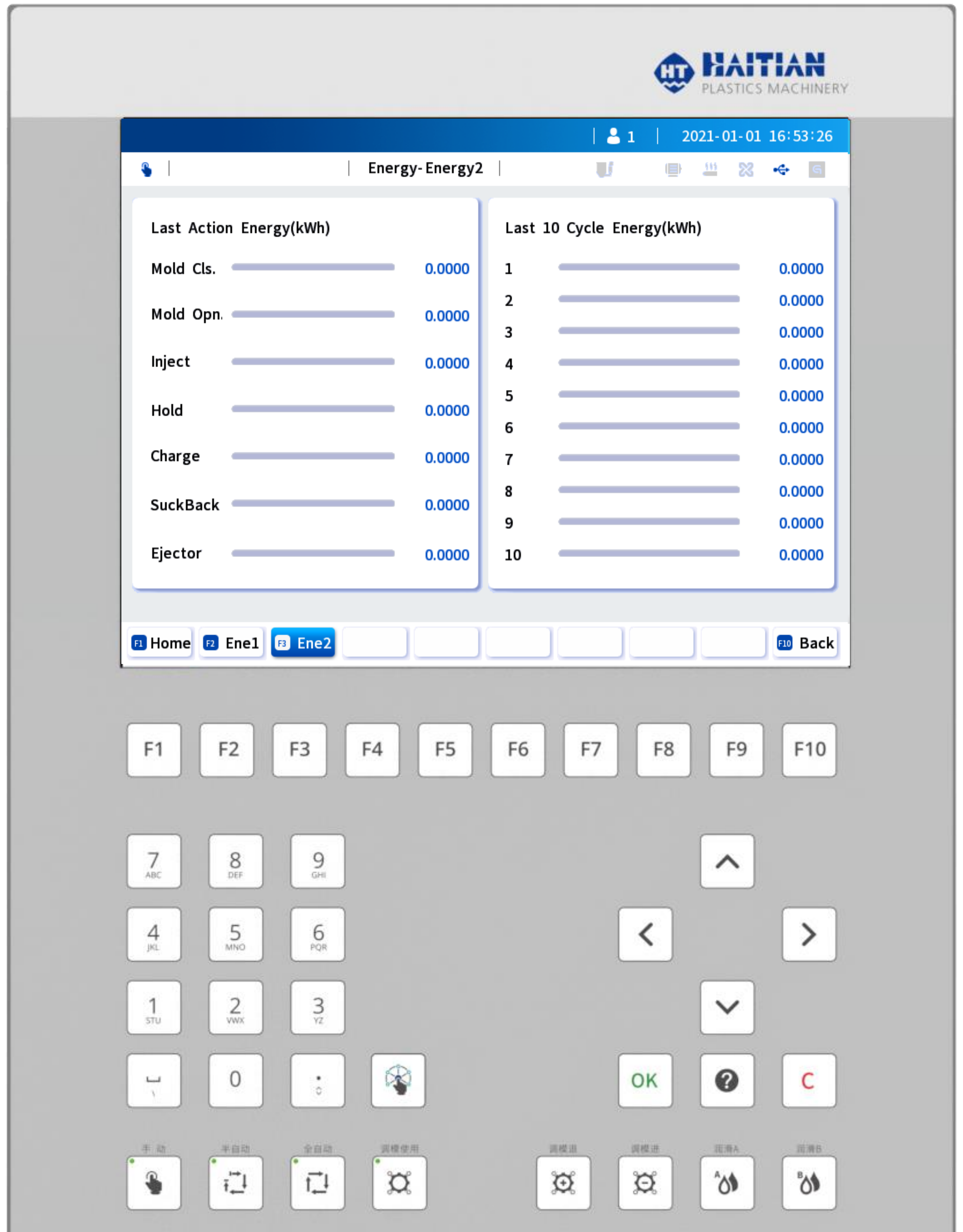
HT·ENERGY

- Real-time display of refined energy consumption information
- Enables customers to optimize energy efficiency
- Reduce energy consumption and waste
- Full range standard

No need to match an electric meter, and easily enables refined energy consumption monitoring and analysis





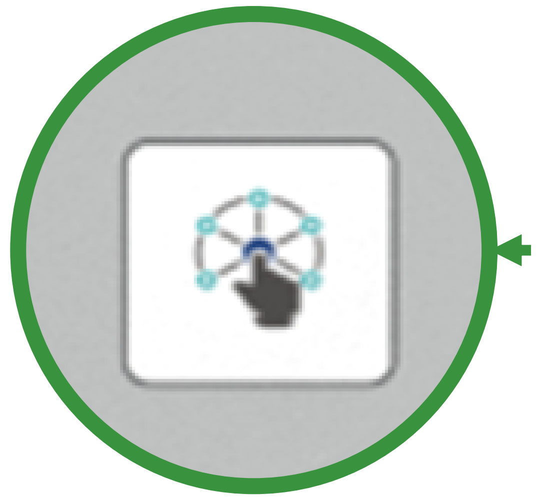


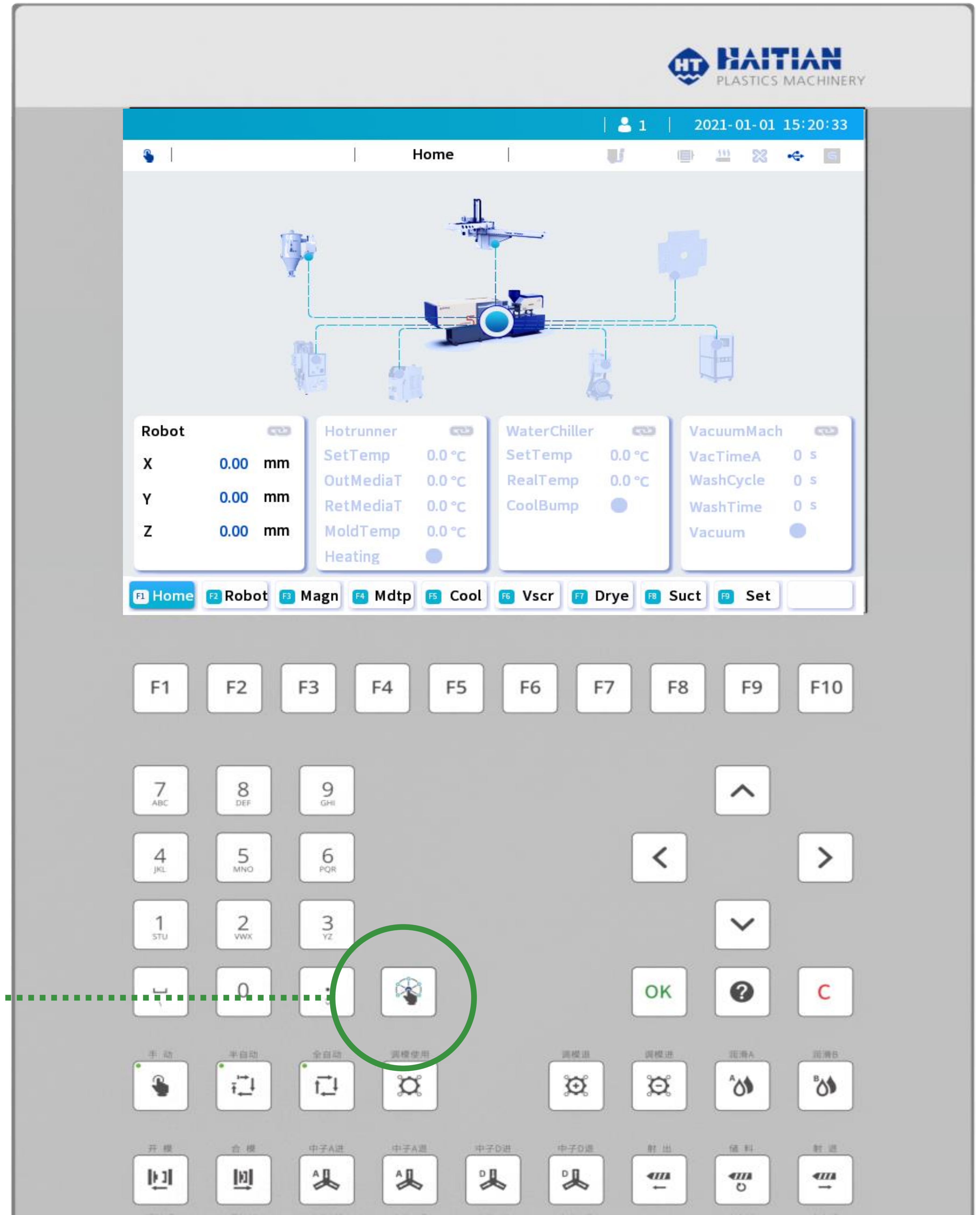
Flexible Integration

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

Integration & Control of Auxiliary

- High flexibility for integrated products
- Injection molding machine control system as the center
- Control each production unit via network system
- Mold information is associated with peripheral equipment to achieve highly automated production
- Make production data more transparent and production management more efficient
- Shortcut Buton

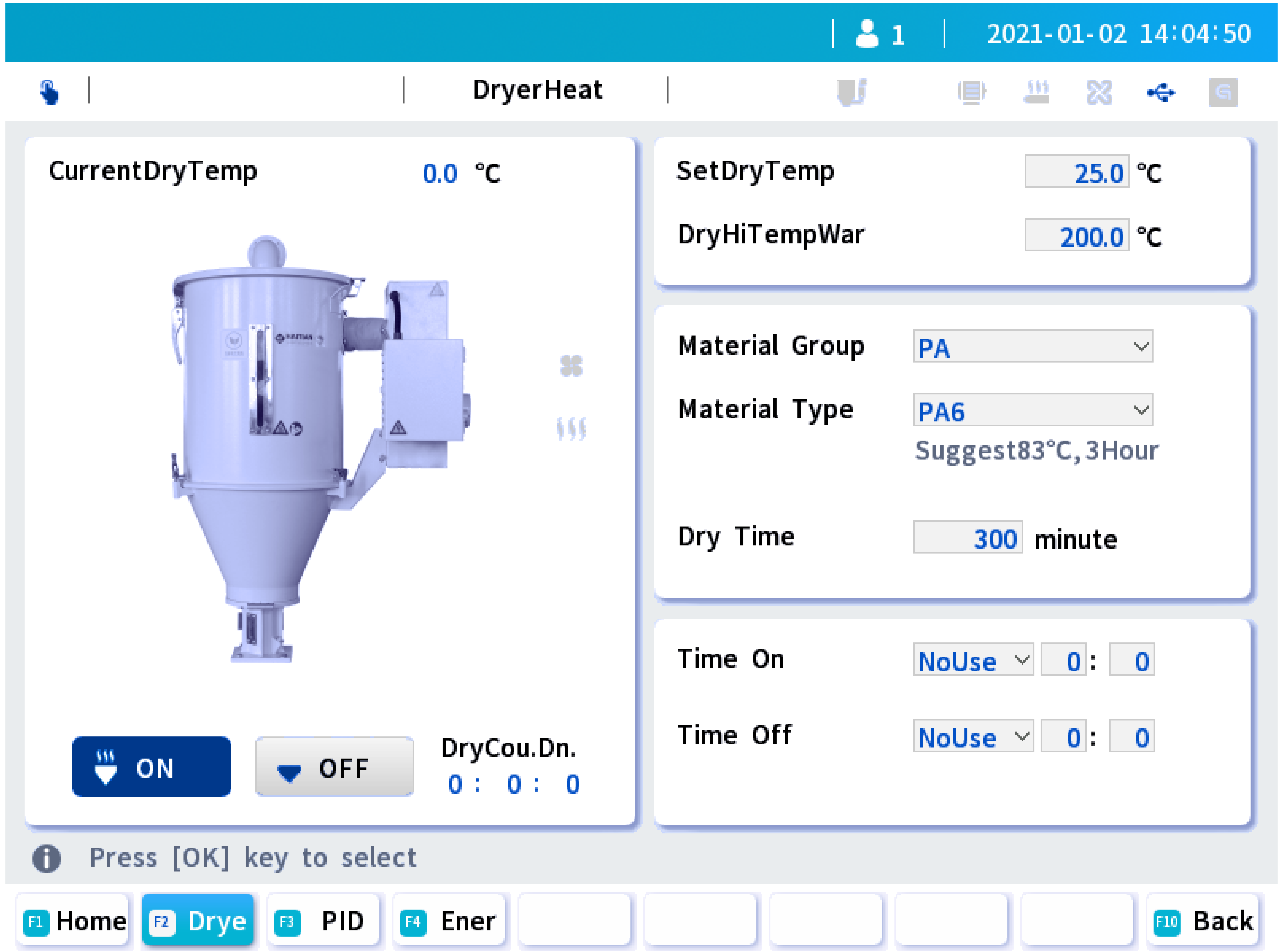




Integration & Control of Auxiliary

Drying hopper integrated control (optional)

- 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 and electric heating working status display



Integration & Control of MES

Through informatization capabilities and connection with global factories, the centralized command center to have real-time oversight of all factories worldwide and the operational status of each injection molding machine, all from within the control room.

Industry Application

Automotive

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

Consumer Electronics

In the consumer electronics industry, plastic spare parts products in consumer electronics are designed to provide efficient and high-quality solutions for molding multiple cavities.

Appliances

Plastic products in household appliances provide flexible, efficient and stable solutions based on product characteristics

Daily Necessities

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

HAITIAN
PLASTICS MACHINERY

MA

MARS SERIES

Thank You!