

YIZUMI伊之密

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MG

Thixomolding Machine

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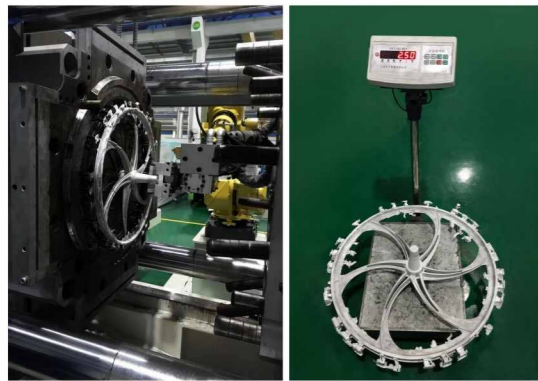


Semi-solid metal is a kind of slurry in which solid particles are suspended in a liquid matrix. The rheological behavior of the semi-solid slurry enables it to flow well and be easily made into metal parts via general processing.

With a thixomolding machine, magnesium alloy chips are fed into a barrel, sheared by a rotating screw and gradually heated to semi-solid slurry.



Development of Thixomolding Technology



In the 1970s, Massachusetts Institute of Technology conducted the research and development of semi-solid metal forming technology, which was a new field of metal forming technology. That ground-breaking technology was further developed with magnesium and magnesium alloys (thixomolding technology in 1990). In 1991, well-known hydraulic and die casting equipment manufacturer HPM from the United States was the first to acquire technology patent license and developed the first-generation thixomolding machines that were sold later. Japan's JSW and Canada's Husky also launched similar products in 1992 and 1997 respectively.

In recent years, thixomolding technology has been introduced to China. In 2009, Yizumi succeeded in developing China's first thixomolding machine which aroused intensive attention. The new product, named after MG series, passed domestic technical .

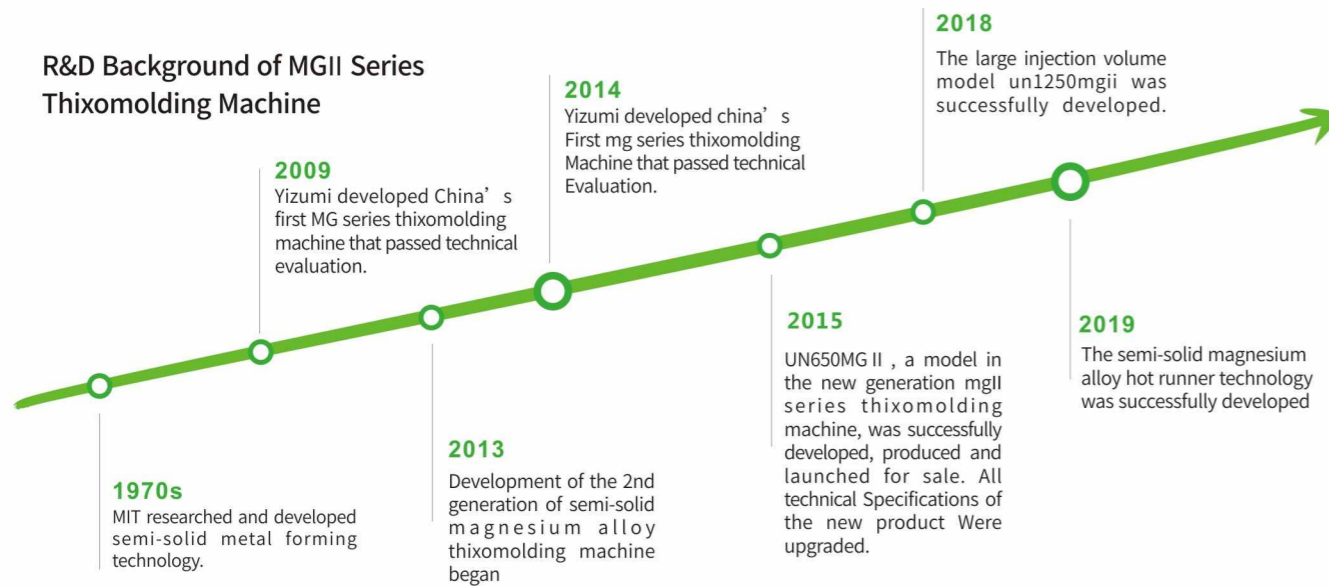
In 2014, Yizumi conducted the formulation of "Thixomolding Machine Industry Standard" as one of the main drafters.

In 2015, the new generation of semi-solid magnesium alloy thixomolding machine UN650MGII was successfully developed; and various technical indicators have been comprehensively upgraded, comparable to the current leading technologies in Japan and the world. The products were named the MGII series and went on sale in the same year.

In 2018, through the technical cooperation between China and Germany, the large injection volume model UN1250MGII was developed, with an injection volume of 2.5kg, which is the maximum injection volume that can be achieved by similar machines in the world.

In 2019, the semi-solid magnesium alloy hot runner technology was developed and successfully applied to the German customer's scooter mold to produce better quality products.

R&D Background of MGII Series Thixomolding Machine



Advantages of Thixomolding



Shaping more complex parts



Low molding temperature, long mold life and little deformation of products



High precision and good surface quality of finished parts



No Sf6 shielding gas, environmentally-friendly



Raw materials

Screw

Barrel

3D schematic of barrel



No furnace



No ladler



No Sf6 shielding gas



Using chipped magnesium alloys instead of magnesium ingots

Q&A

Magnesium alloy chips are used as feedstock for thixomolding. When the machine is operating, the chipped magnesium alloys in the hopper are fed into the barrel continuously. Propelled forward by the rotating screw and heated by the heaters outside the barrel, the magnesium chips become semi-solid slurry that is accumulated in the front of the screw and then injected into the die.

Q: What's the difference between thixomolding and powder metallurgy?

A: In powder metallurgy, a general injection molding machine is needed for melting only the plastic materials in feedstock for part forming.

Q: Does thixomolding need melting furnace and conveying device?

A: No. Thixomolding is a process in which magnesium alloy chips are directly fed to the machine for semi-solid injection molding. The feedstock is melted by the barrel heaters, without additional melting and conveying devices.

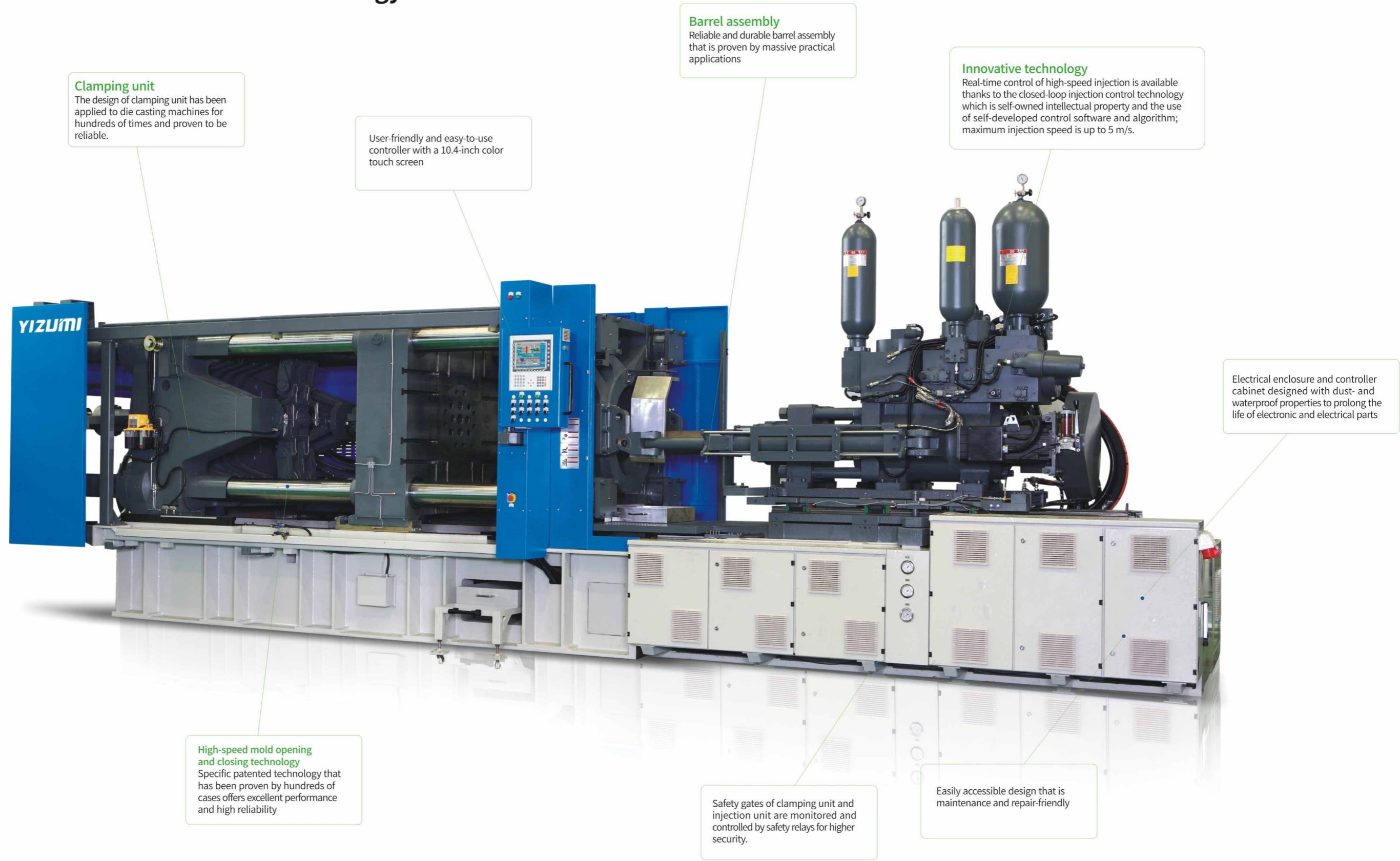
Q: Can a thixomolding machine produce aluminum alloy parts?

A: The screw and barrel suitable for semi-solid aluminum alloy molding have not yet been developed, so aluminum alloys now are not applicable to thixomolding.

Q: Are the screw and barrel of a thixomolding machine the same as that of the injection molding machine?

A: They basically work the same way. But as thixomolding requires higher temperature, the screw and barrel of a thixomolding machine are made of a special type of alloy.

More Than 20 Years of Mature Technology



Clamping unit
The design of clamping unit has been applied to die casting machines for hundreds of times and proven to be reliable.

User-friendly and easy-to-use controller with a 10.4-inch color touch screen

Barrel assembly
Reliable and durable barrel assembly that is proven by massive practical applications

Innovative technology
Real-time control of high-speed injection is available thanks to the closed-loop injection control technology which is self-owned intellectual property and the use of self-developed control software and algorithm; maximum injection speed is up to 5 m/s.

Electrical enclosure and controller cabinet designed with dust- and waterproof properties to prolong the life of electronic and electrical parts

High-speed mold opening and closing technology
Specific patented technology that has been proven by hundreds of cases offers excellent performance and high reliability

Safety gates of clamping unit and injection unit are monitored and controlled by safety relays for higher security.

Easily accessible design that is maintenance and repair-friendly

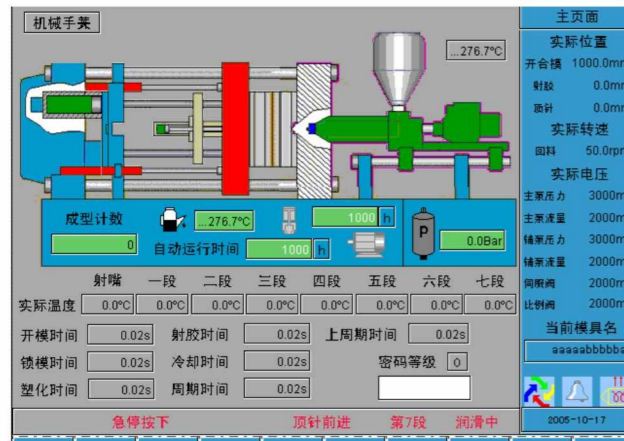
Application



The 10.4-inch touch screen and 500MHz controller facilitate operation and high-speed control via Ethernet.



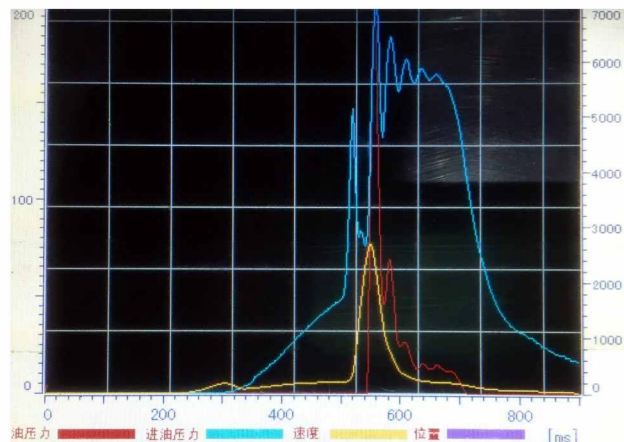
Modular design of the control system facilitates extending functions. Ethernet interface is available as a standard feature for the purpose of information exchange with other equipment and data management software.



Parameters of the machine are clearly displayed and monitored on screen in real-time.



Quick setup screen, where all injection molding parameters can be set

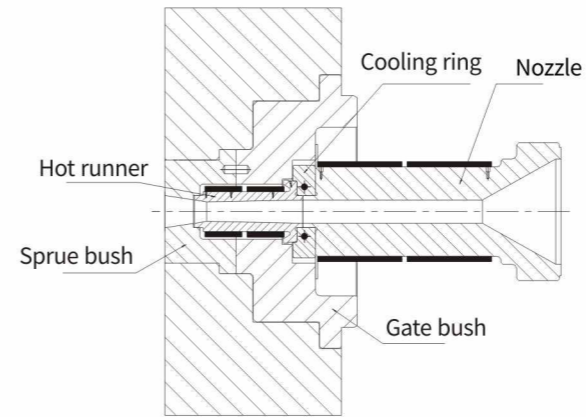


Real-time graphic display of high-speed injection

| 统计开始 | 当前循环次数 | 当前页 | 开模位置 [mm] | 射胶终点 | 切换位置 | | | |
|------|--------|--------|-----------|-------|---------------|---------|--------|---------|
| 循环次数 | 注射时间 | 塑化时间 | 循环时间 | 开模时间 | 最大注射速度 [mm/s] | | | |
| 67 | 1.79 s | 1.53 s | 25.87 s | 551.0 | 2.79 s | 32.3 mm | 2804.1 | 40.0 mm |
| 66 | 1.80 s | 1.49 s | 25.72 s | 551.1 | 2.77 s | 32.5 mm | 2795.1 | 40.0 mm |
| 65 | 1.78 s | 1.45 s | 25.80 s | 551.1 | 2.76 s | 32.5 mm | 2824.5 | 40.0 mm |
| 64 | 1.79 s | 1.49 s | 25.90 s | 551.1 | 2.78 s | 32.5 mm | 2824.5 | 40.0 mm |
| 63 | 1.78 s | 1.55 s | 25.59 s | 551.1 | 2.79 s | 32.4 mm | 2816.4 | 40.0 mm |
| 62 | 1.79 s | 1.45 s | 25.80 s | 551.0 | 2.81 s | 32.5 mm | 2816.4 | 40.0 mm |
| 61 | 1.79 s | 1.46 s | 25.99 s | 551.1 | 2.81 s | 32.4 mm | 2811.4 | 40.0 mm |
| 60 | 1.80 s | 1.45 s | 25.67 s | 551.0 | 2.80 s | 32.4 mm | 2788.2 | 40.0 mm |
| 59 | 1.80 s | 1.45 s | 25.83 s | 551.0 | 2.80 s | 32.5 mm | 2780.5 | 40.0 mm |
| 58 | 1.79 s | 1.45 s | 25.86 s | 551.1 | 2.80 s | 32.2 mm | 2814.2 | 40.0 mm |
| 最小 | 1.78 s | 1.45 s | 25.59 s | 551.0 | 2.76 s | 32.2 mm | 2780.5 | 40.0 mm |
| 最大 | 1.80 s | 1.55 s | 25.99 s | 551.1 | 2.81 s | 32.5 mm | 2824.5 | 40.0 mm |

The screen showing actual injection molding parameter statistics, in which the injection ending position deviation is 0.4mm and the mold-open ending position deviation is 0.1mm, which indicates stable performance.

Molding Case



Hot Runner Technology

The hot runner mold technology maintains the magnesium alloy material in the hot runner of the mold in a semi-solid state by heating. The hot runner system is an extension of the nozzle that eliminates the need to remove the aggregate from the runner after shutdown and only needs to be heated to bring the hot runner to the desired temperature for the next injection. This technology is especially suitable for mass production, high raw material prices and high product quality requirements.

Advantages of hot runner mold technology

- Reduce manufacturing cost
- Improve product quality
- Excellent process control



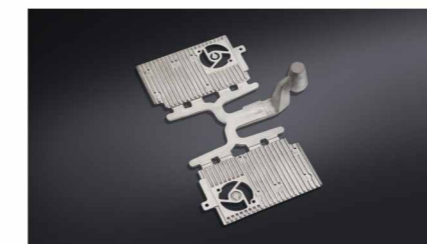
Scooter chassis (Application of hot runner technology)

Cavity: 1
Size: 546mmx140mmx142mm
Weight: 1.2Kg
Cycle time: 43s
Thickness: (1~4)mm



PC keyboard base

Cavity: 1
Size: 335x230x10mm
Weight: 124g
Cycle time: 36s
Thickness: (0.45~0.65)mm



Sound equipment of car

Cavity: 2
Size: 145x80x11mm
Weight: 120g
Cycle time: 30s
Thickness: (2~11)mm



UAV battery shell

Cavity: 1
Size: 130x136x65mm
Weight: 52.2g
Cycle time: 30s
Thickness: (0.4~0.6)mm



Car electrical element

Cavity: 1
Size: 200x140x50mm
Weight: 350g
Cycle time: 36s
Thickness: (1~10)mm