WE WALK ALONGSIDE THE WORLD

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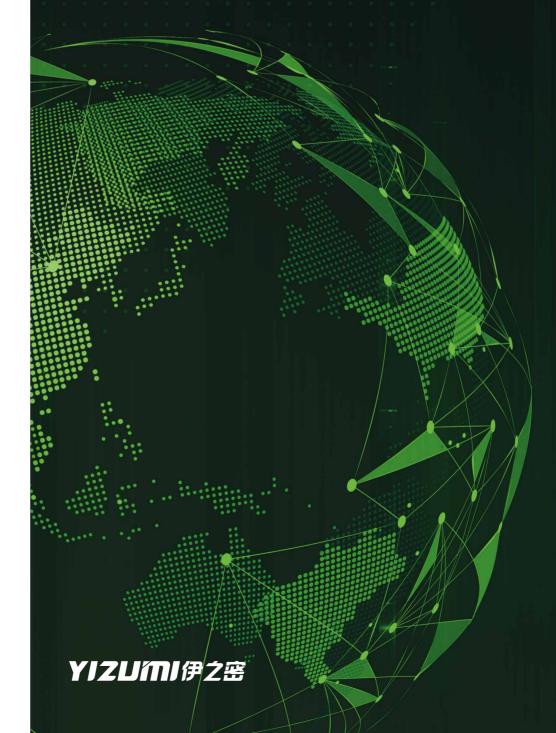


Stefan Fritsche YIZUMI Die Casting Best Return on Investment for our Customers About LEAP—the Road to LEAP

YIZUMI

New Integrated Design-YIZUMI Launched the Second Generation of H Series Die Casting Machine

A Story of YIZUMI LEAP Series Die Casting Machine





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New Vision, New Product, New Opportunities

Since the first die casting machine designed and manufactured by YIZUMI in 2004, YIZUMI has successfully installed more than 8,000 die-casting machines worldwide by now. Over the past 17 years, YIZUMI has consistently benchmarked the world`s best technologies and launched new products with ever higher performance and standards.

In the coming five years, under the guidance of our new die casting vision 2025- Best Return on Investment for Our Customers, YIZUMI will invest heavily to scale up its facilities as a foundation to reach our goals. In May 2020, the YIZUMI Global Innovation Center was roofed. As the global innovation incubation base of YIZUMI, it will offer an R&D cooperation platform for cutting-edge technology development, providing the base for continuing innovation. YIZUMI also established the Die Casting Technical Service Center (TSC) in 2021 which covers pre-sales technical support and provides customers with integrated solutions for die-casting cells, technology support in die design as well as casting process optimization. Continuous investment in our people aiming at enhancing our organization's capabilities have highest priority to provide competitive benefits to our customers. Connecting global resources, YIZUMI has set up R&D and technical centers in China, Germany, and the United States to help seize international opportunities. The cooperation with European experts and technical partners is facilitating YIZUMI's progress to become World Class in Die Casting.

In terms of market share, brand reputation and recognition, YIZUMI's strategic goal is to rank among the world's top three in the industry. Benchmarking European standards in machine quality and service capability will provide the guideline for our progress.

Applying our customer-focused approach, we continue striving for smart answers to questions like

- How can we be of more value to our customers?
- How can we help our customers to be more competitive and effective, even more than they are today?
- How can we strive for a great and flawless YIZUMI-customer experience?

Setting a technology milestone, we are proud to introduce the YIZUMI LEAP Series of Die Casting Machines. Ranging from 1800 to 45000 kN of locking force, LEAP's advanced, real time closed loop injection provides highest international level of casting performance resulting in highest OEE. The system is complemented by a highly innovative and energy saving hydraulic drive-group as well as a state-of-the-art HMI featuring highly intuitive programming.

World Class Technology at fair prices

We are certain that the LEAP series of die casting machines will be a strong driving force of YIZUMI's strategic development to bring competitive benefits to our customers.

Gao Chao General Manager of YIZUMI Die Casting Division

2021 DIE CASTING YIZUMI 02



The Road to LEAP

A Story of YIZUMI LEAP Series **Die Casting Machine**

In recent years, under the general trend of energy conservation and emission reduction, the global demand for new energy vehicles has ushered in rapid growth. The die-casting industry is facing a new round of transformation and upgrading with new energy vehicles putting forward higher requirements for die-casting technology and complex thin-walled die-casting parts.

After extensive market research and benchmarking advanced international technology, YIZUMI addresses future challenges with its new generation LEAP series of die casting machines. LEAP offers highest precision and repeatability coupled with a modern control system offering intuitive and easy operation. This technology platform lays the foundation for smart cell integration ensuring highest equipment availability. To further support our customers to achieve competitive OEE, YIZUMI is building up top class capabilities in the fields of die design and casting process optimization.

Breaking the boundaries to provide customers with the best return on investment

YIZUMI's new generation LEAP series diecasting machine offers customers a higher overall equipment effectiveness (OEE) based on the independently developed Yi-Cast real time closed loop injection to improve overall casting performance with its world class precision and process consistency.

In addition, complemented by a highly innovative and energy-saving hydraulic drivegroup as well as a state-of-the-art HMI featuring customer focused intuitive programming, the LEAP series allows intelligent exchange of information regarding quality, operational performance, and parameter settings, making the management of YIZUMI's solutions easy, efficient, and

"The LEAP series die-casting machines deliver the best return on investment for our customers." As Stefan Fritsche, YIZUMI CSO for Die Casting &Metal Forming, said, "To bring real and competitive value to our customers, YIZUMI decided that a holistic approach would be the key to this revolutionary leap."



LEAP

*The recorded data are all from the internal test in YIZUMI factory, and the final data please refer to the actual machine.

At the beginning of product development, YIZUMI actively applied its IPD (Integrated Product Development) method, with its market-orientation and focus on customer needs & requirements. We learned to understand the pain-points of customers' employees in their diverse roles in actual production and use of die casting equipment. Through several years of indepth observation and research, we obtained first-hand feedback, which helped LEAP products to achieve a leap in key performance.

"Deep Connection" is the driving force behind YIZUMI's technological leadership. To create a new generation of revolutionary products and services. YIZUMI is committed to connecting European advanced diecasting technology, integrating global resources, building a China-Europe technology platform, and introducing European die-casting experts to overcome technical challenges together. At the same time, we cultivate the core technical capabilities of our Chinese engineers, from knowledge transfer to active creation.

YIZUMI employed a well-known industrial design company to craft the design of the new die-casting models. The goal of the LEAP design is to effectively integrate safety needs with functional requirements and offer an attractive visual appeal. YIZUMI's aim is to ensure a great customer experience with our new LEAP product.

To establish strong in-house die-casting expertise, YIZUMI has invested heavily in its R&D and casting process capabilities. Our Product and Process Application Center (PPAC) offers a great platform to carry out diverse casting trials, mold sampling as well as casting process training. Close cooperation with carefully selected experts allows our team to be trained on casting processes and tool designs in order to provide our customers with the support they need to compete in their markets.

Further enhancing YIZUMI's organizational capabilities, we partnered up European experts in various key technology fields. Close teamwork between these experts with our technical team generates the ability to look at engineering problems from different perspectives and find new, innovative solutions for the benefit of our customers.

Andre Dylong, YIZUMI's service partner in Europe, said: "We are proud to bring our more than 30 years of die-casting experience to this international project and it is exciting for us and interesting to work closely with the YIZUMI team."

LEAP takes off -Benchmarking the top-line die-casting machines in the world

The word "LEAP" is not only the name for YIZUMI's new generation die-casting machines but also demonstrates YIZUMI's commitment to "Breaking the boundaries and overcoming our limitations to make YIZUMI a world top 3 company in our

The new generation LEAP series is the result of cooperation made possible between YIZUMI's experienced international R&D team and YIZUMI's technical team in China. The overall performance of the LEAP technology promises customers world class

As Wang Bo, the Product and Market Management manager of YIZUMI's Die-Casting Division, said, "The new generation LEAP series features greatly enhanced injection performance with an intuitive HMI. The improved clamping system as well as our energy-saving drive group make LEAP an efficient, stable, and automated die-casting production unit. By using the independently developed Yi-Cast real time closed loop injection control system, LEAP guarantees the quality of every shot."

The new generation LEAP die-casting machine features a 24-inch display, a 4-core i5 processor, a powerful industrial computer, and a Twincat 3.0 enabled visualization system. It is a machine with a smart "brain".

"The ORCA control system of the LEAP diecasting machine is sharp like a killer whale." said Bo Wang. "Users can easily and effectively manage the key production parameters with the help of the ORCA control system, including speed, pressure, stroke, high-speed starting point, plunger resistance, pressure build-up time, injection stroke, biscuit thickness, vacuum level. clamping force, temperature, flow, etc., to improve the efficiency of machine operation and process quality."

LEAP series die-casting machines can fulfill the requirements of semi-solid metal casting. magnesium alloy and aluminum alloys for high-end auto parts such as gearbox housings or structural parts. The first model of LEAP series die-casting machine launched is the 1250T. Other tonnages from 400T to 5000T will follow to complete the series.

Looking back, every generation of YIZUMI die-casting machines has always been a significant improvement providing great benefits to the global market. YIZUMI believes that its highly competitive position can only be retained through continuous innovation and creativity. At this moment, let us look forward to the takeoff of LEAP series die-casting machine in the new age!



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LEAP

About I FAP **Engineers**

The birth of every great product is inseparable from the ingenuity of the R&D team. Every time they move forward, they will spark inspiration, and every cooperation they make will reveal the charm of wisdom. When faced with new challenges, they are not afraid of breaking the boundaries. It is such a group of advanced and excellent R&D engineers who bring us the brand-new product——LEAP Series Die Casting Machine.

"For me to multiply the technology and transfer the knowhow to YIZUMI by close collaboration seemed to be a great project to apply my know-how in a meaningful way."

Working for a German service provider, I was in charge of developing the control system of DCM in a team. I did all the programing and all the necessary algorithms for the innovative 2 stage hydraulic drive unit as well as for the high performance real-time-closedloop shot control.

YIZUMI had already signed a technical agreement with our team for after sales service in Europe and I was working on our project. So for me to multiply the technology and transfer the knowhow to YIZUMI by close collaboration seemed to be a great project to apply my know-how in a meaningful way.

High-tech made easy I would say. Based on strong team cooperation, we could establish a fantastic control system - ORCA - allowing top casting performance while handling remains easy for the operator due to the intuitive HMI.

Looking back, although the pandemic has made teamwork difficult, the effort and focus of the team and management at YIZUMI propelled me forward to transfer the knowhow needed to the team at YIZUMI. Many telcos and personal visits (including guarantine stays) where needed to establish all high-level software and transfer all knowhow to my colleagues at YIZUMI. This great experience with a very hard working and capable team in China motivated me tremendously.

——Timo (Engineer in YIZUMI LEAP Project)



Timo Engineer in YIZUMI LEAP Project



"Thanks to the whole team! Together we found new solutions how to control movements and pressures in the best way. "

As an engineer from Switzerland, I have fun improving my work continuously. In the past, I have worked for a leading die casting machine manufacturer for 29 years and continuously improved hydraulic and shot end performance for them.

In 2019 YIZUMI was scouting the European market for die casting engineering specialists. I found the YIZUMI focus on achieving a highperformance die casting machine very interesting. The YIZUMI strategy and my own interests are perfectly aligned and so it did not take much time to agree to build a world class DCM made by YIZUMI.

Due to cultural differences between China and Europe, we learned a great deal on both sides. Together we realized a lot of new technical solutions in a rather short time and tested them over a longer period. The verification process was stressful at the beginning. But together we found new solutions how to control movements and pressures in the best possible way.

This time we established a fantastic product with great energy efficiency and top of the line injection performance and repeatability for the YIZUMI brand. We increased system pressure to 210 bar for faster shot reactions and more power during the filling phase; First time in die casting we charge the accumulator during shot completely. The loading starts in 1st. phase and ends in 3rd phase; The servo drive pump unit and the new toggle system design reduces closing and opening times of the die movements.....

I am really proud of our work and the whole team and of our international collaboration.

--- Daniel (Engineer in YIZUMI LEAP Project)



Daniel Engineer in YIZUMI LEAP Project

"From design, production to finished product, it is a complicated and challenging process."

Because none of us communicated in our mother tongue, there were some difficulties in understanding. Especially when expressing technical terms, a simple word in Chinese or German may require a detailed explanation in English, and it may finally not be understood. Thus, we needed to look through dictionaries and English academic journals, accumulate vocabulary to remove language obstacles.

During the academic discussion, I realized the differences in the product concepts between the two sides. Instead of plunging into solutions and getting lost in product goals like we used to do, the overseas engineers will identify the customer needs first. After a series of brainstorming sessions, they began to make process analyses, clarified the objectives and technical requirements, and then selected the goals and next steps. Finally, a precisely designed solution is carried out. I see the rigorous and meticulous craftsmanship spirit in them.

Taking a design into production and turning it into a product is a complex and challenging process, and I am honored to be a part of this interesting project. The new generation LEAP series provides an upgraded and optimized injection system, control system, clamping system, etc. We believe that it can bring more value to customers in the field of industrial application.

----Zhang Dunji (Engineer in YIZUMI LEAP Project)



Zhang Dunji Engineer in YIZUMI LEAP Project

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"We choose the most suitable solution for customers to address the challenges in casting manufacturing."

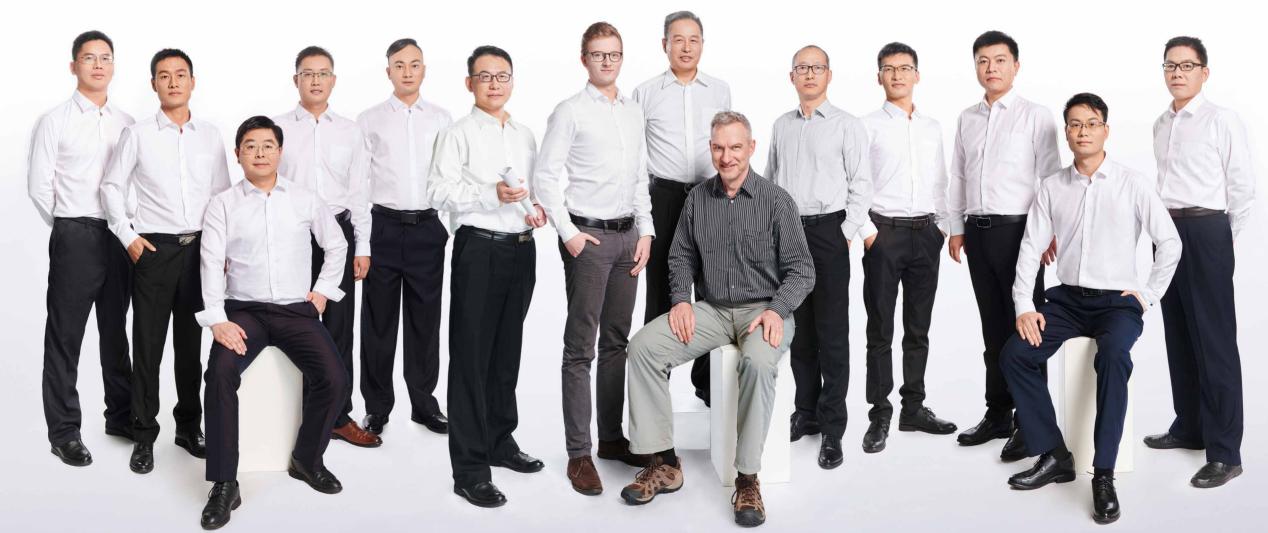
Among the three solutions proposed by the team, we decided to choose the most challenging but the most effective one that is both, suitable for customer's requirements and adding a professional design to our new product. Working closely with suppliers and experts on sheet metal projects, we were able to carry out this solution. Throughout the process, we maintained our focus on the longevity and durability of our new DCM——the important factors that influence the customer's ROI.

During the whole project, the Chinese team members have been able to discuss problems (and solutions) with European experts in a more timely and direct manner and constantly adjust the product as needed. From the very beginning, members have paid special attention to details and proactively eliminated downstream problems, which would help increase machine uptime. Cooperation with European partners provided our team members with opportunities to improve their working ability, skills and knowledge, and widen their international perspective.

——YIZUMI Product Management Team

TEAM

LEAP



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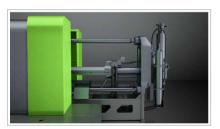
About LEAP Product Performance

LEAP's advanced, real time closed loop injection provides highest international level of casting performance resulting in highest OEE. The system is complemented by a highly innovative and energy saving hydraulic drive-group as well as a state-of-the-art HMI featuring highly intuitive programming. World Class Technology at fair prices.

YIZUMI LEAP Injection Unit-Quality with Every Shot

This is innovation by YIZUMI. A powerful combination of state-of-the-art casting injection control performance at fair prices. Developed by YIZUMI together with an international team of highly experienced engineers, our LEAP system offers highest casting performance. Finely adjusted algorithms which have been developed inhouse combined with a high-performance control system, high speed pilot valves and

special purpose servo valves offer you a world class injection performance. The YIZUMI real time closed loop control system detects any process deviation and immediately adjusts the injection process. This greatly enhances your process repeatability and your casting quality consistency. Breaking of the injection speed at the end of cavity filling reduces flash and increases productivity and die life.



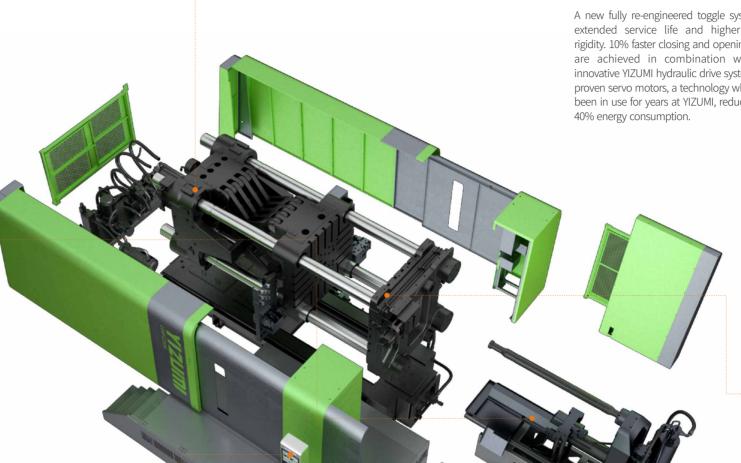
YIZUMI ORCA Control System & Performance HMI

A top-of-the-line control system designed by YIZUMI. The result of a close collaboration between YIZUMI and renowned European specialists, the YIZUMI ORCA enhances casting process management in every aspect. Intuitive and easy to understand graphical screens save programming time and reduce extensive training needs. The HMI menu conveniently offers easy access for operators, process engineers, maintenance teams as well as quality managers alike.

The user interface with its large touch screen provides direct access to programming functions, alarm messages as well as the multifunctional shot curve display.

Tolerance bands set for critical process parameters and SPC data management make quality management easy to ensure highest OEE for you.







A new fully re-engineered toggle system for extended service life and higher platen rigidity. 10% faster closing and opening times are achieved in combination with the innovative YIZUMI hydraulic drive system. The proven servo motors, a technology which has been in use for years at YIZUMI, reduce up to Easy programming of speeds, automatic dieheight & locking force as well as precise dieposition-stops add to the overall efficiency.

Flexible energy boards allow easy adjustments and customization of all energy & functional connections between the DCM and the die casting tool.



Performance Focused Machine Design

The result of a close cooperation between the YIZUMI design team and a professional design outfit provides our customers with a new YIZUMI die casting machine design focused on efficient & safe operation in your die casting plants.

Safety first and foremost. Our new design protects your personnel by keeping energy lines and moving parts away, while allowing open access to your operations and maintenance teams in a perfect balance between safety and efficiency.



LEAP

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WORLD CLASS DIE CASTING **LEAP Series** Die Casting Machine **Highly Efficient User-Friendly** Precise & Repeatable **Energy-Saving** 10 % faster & Intuitive ORCA-HMI Yi-Cast Up to 40% highly repeatable Self-learning real-time control with innovative hydraulic

Enterprise

YIZUMI Established a Die Casting Technical Service Center:

Providing Solutions by Integrating Resources

There are currently over 8000 die-casting machines made by YIZUMI operating worldwide

"We Walk Alongside the World" has been YIZUMI's corporate objective. To achieve this ambitious goal and establish a high reputation for products made in China, YIZUMI not only constantly expands investment in facility construction and scales up itself but also strengthens its soft power—technical capabilities.

In 2021, YIZUMI established the Die Casting Technical Service Center (TSC), forming a technical team that covers pre-sales technical support, integrated solutions for die-casting cells, dies, die-casting process, and product debugging.

In the future, the "TSC" will become a customer-facing window to bridge customer needs and product development. The only aim of our continuous improvement is to provide better products and services to our customers.

Improve pre-sales support Minimize customers' investment risk

The TSC is fulfilling a key function to help us implement our strategy. A technical team that is supporting our customers, and which is supporting our sales force. In recent years, YIZUMI has gradually transitioned from a machinery supplier to an overall solution provider, striving to become the most cost-effective solution provider in the industry.

The Technical Service Center consists of application technology department, engineering department, die casting Product & Process Application Center (PPAC), and project management department. The technical services provided by the team now cover pre-sales tech support, die-casting cells, overall solutions, molds, die-casting processes, and try-out. As contact window to customers, pre-sales support can allocate all resources of the center to meet customer needs, including technical communications. overall solution development and quotations, as well as plant planning, to reduce the risk of customer investment in R&D and improve customer satisfaction.

Technical Service Center_



"We are a service-oriented enterprise that fulfills these needs," said Jian Jiang, Senior Manager of YIZUMI Die-casting Technical Service Center. "In the future, we are committed to providing our customers the stable equipment performance, and overall solutions with high OEE and ideal Takt Time to satisfy their requirements, improve their experience, and finally enhance the brand influence of YIZUMI."



Accumulation of industry expertise Supporting customers' production success

In recent years, YIZUMI has made great efforts to build and retain a high-performing team, focusing on attracting and cultivating top talents, and enhancing the strength of R&D innovation by connecting advanced European technologies.

In May of 2019, Stefan Fritsche, a European die-casting industry expert, joined YIZUMI as the CSO for Die Casting &Metal Forming, responsible for promoting the international operations and product development strategies and establishing the new Die Casting Technical Service Center.

In addition, YIZUMI attracted experts and technical talents in the fields of dies, processes, die casting machines, peripherals and automation from all over the world.

YIZUMI invests great amounts of resources and R&D funds into the Technical Service Center every year and works with both domestic and foreign professionals and partners on the research of cutting-edge applications in the industry.

In 2020, the structural casting trials (Daimler B-Pillar) which our PPAC team executed with support from international die-casting experts, allowed us to prove that YIZUMI can offer solutions in structural castings on top international standard.

Likewise, the ongoing Mg Thixomolding and aluminum Reocasting projects also follow this kind of cooperation model. Upon successful development of the technology and application, YIZUMI will introduce them to the customers, providing technical guidance and support in terms of product design, die design, and product try-out to support customer`s production success.

"In the process, both domestic and foreign industry experts and partners can share resources with the customers." Jian Jiang stressed that it is YIZUMI's goal to provide customers with cost-effective and the best quality service through the company's professional capability.

Product & Process Application Center To provide multiple services to customers

YIZUMI invested more than 10 million CNY in the Product & Process Application Center (PPAC), which started the operation in 2020. The Center connects high-quality customers worldwide with mold manufacturers for practical production testing and research, providing customers with a wide range of services and training.

In the first-phase planning and construction, the 3000T automatic die-casting cell includes the die casting machine and other peripheral equipment such as melting furnace, mold temperature controller, spot cooling unit, extraction and spraying robots. It also adopts the 3D-coordinate-measuring-machine, spectrometer, and X-ray equipment. The diecasting cell is also equipped with Yi MES (Intelligent Execution System) developed by YIZUMI, ensuring real-time monitoring of process parameters and production status.

"In the past, many new products and processes were tested with the die-casting machine running just dry cycles. This made it hard to reflect the real equipment operating condition," said Jian Jiang. "With our PPAC, we now can validate the feasibility and reliability of technology and products before introducing them to customers. It improves customer satisfaction with the product."

In addition, the platform of the PPAC provides YIZUMI with a learning opportunity about the die casting process. We strongly believe that only when we know the die casting process well are we also able to design great, international level die casting

machines. Equipment, Automation, Die and Process go hand in hand to create a top-quality production which provides competitiveness to our customers.

The application center also provides services as a training base. In terms of customer training, the actual production carried out by the PPAC help customers begin their production faster.

Jian Jiang said: "In the future, we hope to turn the technical service center into a highend die-casting technology platform that integrates user training, information exchange, and application development, bringing new services to the industry and leading the die-casting industry towards the age of intelligence."





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2021 DIE CASTING **YIZUMI** DIE CASTING 2021

Enterprise Enterprise

Magnesium Alloy: Material of the Future

YIZUMI UN300MGII & UN1500MGII Thixomolding Machines Advantageous in both small and large part production

At the Auto Shanghai this year, many brands including BMW and Volkswagen highlighted their new energy vehicles. Mercedes-Benz even started to develop a luxury electric car series. The development of new energy vehicles has become an unstoppable trend. A new round of competition has begun.

Magnesium and magnesium alloys are recognized as one of the lightest structural metallic materials and are known as green materials with great development and application potential in the 21st century. Magnesium alloys have the advantages of light weight, high strength, good mechanical properties and heat dissipation, etc., making them the preferred material for lightweight vehicles. It is for sure that there will be more and more applications with the advent of the electric era.

Bestseller in China, Germany, and US Long-term strategic cooperation with customers

In the international market, the promotion of new energy vehicles brought a lot of demand. Despite the impact of the pandemic, several customers in China, Germany and the United States purchased the Thixomolding machines from YIZUMI for the production of lightweight components.

In April this year, the U.S. customer completed the installation and commissioning of the machine and ran a trial production of a 1.5 kg seatback. The customer is very satisfied with the product quality. In addition, the customers in Germany and China have also achieved mass production and are pleased with the machine efficiency and product yield.

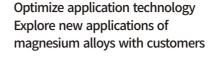
CASTWERK is a German company specialized in auto part production, producing structural parts like new energy vehicle screens. Their customers include large auto parts suppliers such as BOSCH and Continental, and end customers such as Volkswagen. In response to the market demand, the company is planning to import the third Thixomolding machine from YIZUMI this summer.

Meigaomei Nuojiang (Tongchuan) New Materials Co., Ltd. is a hi-tech enterprise specialized in the design, R&D, and production of high-strength magnesium alloy materials. They supply high-quality magnesium alloy customized products to the aerospace-, military-, automotive-, 3C-, biomedical-, high-end equipment-, and other industries. The enterprise focuses on the Thixomolding technology R&D while massproducing magnesium alloy parts.

Besides manufacturers, R&D institutions are also important strategic partners for YIZUMI. The Center of Casting Lightweight Materials and Engineering at the University of Kassel (GTK) is a research institute which has its focus on casting technology. At present, the center teams up with YIZUMI to research the use of a multiple points hot runner system for our Thixomolding technology.

demonstrate our Thixomolding technology to customers in Europe and around the world. It will be our best example," said Tieiun Sui, the Product Manager of YIZUMI

"Cooperating with GTK, YIZUMI can Thixomolding Project.



Based on the cooperation with customers in China, Germany, and the United States, YIZUMI has obtained many technical feedbacks to optimize existing equipment and add more features to the machine in response to the needs of customers.

This year, YIZUMI will continue to explore new applications of magnesium alloys with our customers. For example, the UN300MGII and UN1500MGII models developed by YIZUMI will provide Thixomolding technology benefits in both small-part and large-part production.

The main field of UN300MGII application will be small parts, including 3C electronics, drone components, and some small auto parts. There will be three options for the diameter of screw and barrel (small, medium and large diameter), allowing customers to

choose the most appropriate specifications for their applications to ensure product quality and production yield. It employs an energy-saving servo drive system that greatly reduces energy consumption. The new design includes an optimized movement control system to improve operation efficiency, increase customer output, and bring customers better molding quality and productivity.

"The UN300MG II will offer great opportunities to our customers in the smaller component markets." said Mr. Philipp Ochotta, Head of R&D of YIZUMI (Germany), our Lightweight and Multi-component Manufacturing Research Center. "YIZUMI Thixomolding machines combine the technologies of Germany and China, and the technology is constantly improving. We are confident that its performance fulfills international standards."

Developed by YIZUMI headquarters and YIZUMI Germany R&D center since 2021, UN300MGII is a small-shot-weight model which has adopted Europe's cutting-edge hot runner technology and provides better filling performance and product quality. The products made by this machine feature dimensional stability, high functional integration, lightweight, and less postmachining process requirements.

"The product will make its debut at CHINA DIECASTING 2021. We want our customers to have a close look at the machine's appearance and operation, especially its excellent performance." Tiejun Sui hopes that the exhibition will help visitors better understand the Thixomolding technology.





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Applications of Semi-solid Process at YIZUMI

Semi-solid metal casting (SSM) refers to the technology where the temperature drops to put the aluminum alloy between its liquidus and solidus temperature (mushy zone) during its process of solidification from liquid to solid. By applying a certain external influence in this phase, the microstructure of the aluminum alloy is presented as a globular primary surrounded by the liquid phase. In the mushy zone, the aluminum alloy can form certain shapes as a solid piece but flow when extruded under a slight external force. The SSM technology completes the die-casting process by taking advantage of the properties of aluminum alloys in this state.



Aluminum alloy mushy zone: 590-610°C

The potential for forming processes based upon semi-solid metal alloys was first recognized in the early 1970s at MIT. After more than 40 years of development, it is becoming a mature technology and has been recognized by industries in North America, Europe, Japan, Korea, and other developed countries. The technology is now widely used in automotive, motorcycle, bicycle, engineering machinery, electronic products, and other fields for high-end component preparation and production. The R&D of SSM technology in China started

during the Ninth Five-Year Plan period. After 20 years of development, while many indepth theoretic types of researches have been conducted, the industry has not achieved large-scale production with most applications remaining in the pilot production stage. Our company teamed up with Fujian Jiangle Rheocomp Machinery Co., Ltd. in 2020 to carry out semi-solid metal casting studies and have made some breakthroughs in auto and communication applications.

Technology Advantages

Compared with the conventional die-casting process, the semi-solid metal casting technology has the following advantages:

1. The SSM technology can effectively control the blowhole defects in the casting parts. In the process of flow, the semi-solid metal presents an orderly and controllable macroflow state. This characteristic allows the metal fluid to fill the metal mold cavity in an orderly manner as designed, pushing the air in the cavity to the end of the cavity to be finally discharged through air vent. It prevents the cavity from retaining air, reduces blowhole defects, and improves the density of castings.

2. The SSM technology can effectively control the shrinkage defects in the casting parts. When the metal solidifies from liquid to solid, it has to undergo two volume contraction phases: liquid contraction and solidification contraction. It only takes one volume contraction stage - solidification contraction to change from semi-solid state to solid. Compared with liquid metals, semi-solid metals have a smaller volume shrinkage rate in the solidification process. Under the natural solidification condition, the same volume of semi-solid metal results in less shrinkage in volume than that of liquid metal.

3. The SSM technology can effectively reduce the hot cracking tendency of casting parts. Hot cracking is caused by the internal stress generated in the process of alloy solidification. SSM technology eliminates the internal stress produced during dendrite coherency to reduce the alloy shrinkage and the hot cracking tendency.

4. As high-quality SSM parts are virtually blowhole-free, the castings can undergo high temperature heat treatment to further increase the productivity and improve the weldability of the parts. The SSM technology has retained the characteristics of high efficiency in conventional die-casting production, ideal for the manufacturing components on a large scale. In general, compared with the traditional casting with molten metal, the parts manufactured using SSM technology offer better mechanical performance.

Technical requirements for diecasting machines

The complexity of the SSM process puts forward new requirements for die-casting machines. YIZUMI's high-performance aluminum alloy semi-solid casting system is a perfect fit for the technical requirements of the aluminum alloy semi-solid casting process by offering the following specifications:

1. Uniformly accelerated impact-resistant injection start;

2. Adjustable injection speed from 0.05 m/s to 8.0 m/s. Injection repeatability (at steady state) $\leq \pm 0.2$ m/s. Speed overshoot ≤ 0.2 m/s. 20-Stage injection speed control;

3. Directly set injection speed and closed-loop controlled injection speed. Self-adaptive injection process. Real-time automatic adjustments to control parameters reducing or eliminating the need for manual data adjustments by operators;

- 4. Control to rapid switching from Slow Speed (multi-stage possible) → Fast Speed → Pressure Intensification. The accuracy of switch over position from slow to filling speed is ≤5mm;
- 5. Minimum opening control of the servo valve to provide reliable safety assurance;
- 6. Powerful, clear, and accurate injection curve display system. It features: Curve zooming and moving as well as accurate measurement. Curve storing, searching, and printing. Setting and managing reference curves:
- 7. Extra large memory and PLP for all production management;

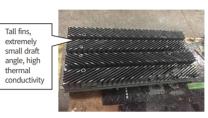
Applications

1. Applications in communication industry

As the 5G AUU machine power consumption and single chip power consumption are about 2 times that of 4GRUU, the requirement for unit weight cooling capacity increases significantly. Because of that, the design of the aluminum alloy housing has to improve the heat dissipation capability of the housing by changing the aluminum alloy and increasing the height of the heat sink cooling fins;

Research shows that the lower the silicon content in the aluminum alloy, the lower the thermal conductivity. However, it reduces the fluidity of the molten aluminum alloy and causes warping and cold-flow. The use of aluminum alloy semi-solid casting technology can solve the fluidity issue of the molten aluminum alloy and improve the product quality;

At present, among the major 5G housing manufacturers, many have adopted the aluminum alloy semi-solid casting technology for the production of 5G housing. For instance, Zhuhai Runxingtai uses our 4000-T die-casting machines and Fujian Kinrui Hi-tech uses our 2000/3000-T die-casting machines in the housing manufacturing; 5G products are shown in the picture below:



2. Applications in auto industry

With the increase of automobile ownership every year, automobiles have become the main consumer of petroleum products. To tackle air pollution and other emission problems, China has strictly formulated standards for fuel consumption of passenger cars, and put forward stringent requirements for passenger vehicle fuel consumption and carbon dioxide emissions. Auto makers are striving to achieve energy savings and feul efficiencies by developing new energy vehicles and reducing the weight of automobiles.

Research indicates that for fuel vehicles, a 10% reduction of vehicle weight can increase the fuel efficiency by 6%-8%; if the vehicle weight can be reduced by 100KG, fuel efficiency per 100km will be improved by 0.3-0.6L. For electric vehicles, if the weight of a vehicle is reduced by 10KG, its mileage can increase by 2.5KM.

Consequently, replacing steel and forged parts with aluminum alloy in vehicles to achieve weight reductions has become a trend. As the aluminum alloy semi-solid casting technology can satisfy the requirements for product performance, increasing number of auto products are manufactured using the SSM process.





Weight: 9 kg (Replacing gravity casting with a T6 to simplify machining)



Weight: 14 kg (Replacing gravity casting with a T6 to simplify machining)



Weight: 4 kg (Die-casting parts)



%The recorded data are all from the internal test in YIZUMI factory, and the final data please refer to the actual machine.

17 yizumi die casting 2021

Case

Taishan Zhongmei Technology Co., Ltd.:

Make Quality Magnesium Alloy Products Affordable for Everyone

With the continuous improvement of technological innovation capabilities, the production process is changing rapidly. As a green material for the 21st century, magnesium alloy has a wide range of applications in new energy vehicles, aircraft, high-speed railway, drones and other fields, providing lightweight, high strength, and good shock absorption benefits.

Located in Jiangmen, Taishan City, Guangdong Province, Taishan China Magnesium Technology Co., Ltd. (Taishan China Magnesium) is a high-tech enterprise specializing in the R&D, production, and sales of magnesium alloy products. With a full industry chain in development of magnesium alloy materials/products, mold design/manufacturing, magnesium diecasting/extrusion/forging, it provides customers with cost-effective and highefficient solutions.

Acquire advanced equipment to establish a stable production system

Quality driven products "Made by China Magnesium" become best-sellers both domestically and internationally

Entering the facilities of Taishan China Magnesium, you will see a full array of diecasting machines made by YIZUMI in operation. As an enterprise dedicated to the R&D and application of magnesium alloy, Taishan China Magnesium sets Thixomolding and heavy-duty die-casting as its key direction of process development.

"Good tools are prerequisite to the success of a job." Since 2018, Taishan China Magnesium has been working with YIZUMI and acquired more than 30 magnesium alloy die-casting machines with clamping force ranging from 300T to 3000T to meet the different needs of customers.

"The Thixomolding process solves the problems in magnesium alloy molding, such as porosity and issues related to density and ductility." Jianping Tang, the deputy general manager of the company said, "We chose to work with YIZUMI because we believe in the competence and experience of YIZUMI in the field of die-casting. Also, YIZUMI's diecasting machines provide good accuracy and stable performance for continuous mass production, bringing us greater benefits."

With more than 20 years of experience in non-ferrous metals, Jianping Tang has built up experience and expertise in the industry. He is keenly aware that the demand for magnesium alloy is growing strongly as industries (especially new energy vehicles) have an urgent need for lightweight











Therefore, Taishan China Magnesium has begun to plan for heavy-duty die-casting production lines. "Automakers are increasingly turning to magnesium alloy molding for automotive structural parts such as center consoles, dashboards, and dashboard frames," said Jianping Tang, "Thixomolding is transitioning from smallmedium units to large units. We will gradually change to 3000T or larger tonnage die-casting machines to cope with the

As the world's first manufacturer that independently developed the integrated magnesium alloy bicycle wheels, Taishan China Magnesium adheres to quality control in both raw materials and the production process. It has developed a rigorous production and manufacturing system as well as a product testing system. The company also has an industry-leading German TUV certification lab.

growing needs of new energy vehicles."

Now, the products made by Taishan China Magnesium are sold to UK, Germany, Japan, US, and many other countries, ranging from rail transport, new energy vehicles, aerospace, power tools, robots, medical equipment, and sports equipment. The company has independently developed a number of products, with more than 50 domestic and foreign intellectual property rights and patents.

Effective cooperation between Universities and Industry promotes continuous innovation

Developments of Magnesium applications in China benefit the overall industrial supply-chain

Taishan China Magnesium teams up with a number of magnesium plants in Shanxi, Shaanxi, and Ningxia to develop magnesium alloy products, improve their post-machining processes, and promote the applications of magnesium alloy in various fields by taking advantage of its properties such as lightweight, high strength, shock absorption, and noise reduction.

In addition, to push forward the development of the magnesium alloy industry, Taishan China Magnesium actively collaborates with higher education institutions to establish R&D centers and incubation platforms, striving to build China's first magnesium alloy industry incubation base. Meanwhile, through the adoption of new materials, new processes, new products, and new technologies related to the magnesium alloy industry, Taishan China Magnesium leads the effort to shape up an industrial ecological chain.

Talking about the future, Taishan China Magnesium is full of confidence, "YIZUMI's continuous investment in technology research and development coincides with our development roadmap. We will continue to maintain the strategic collaboration with YIZUMI." Jianping Tang stated that aiming to make quality magnesium alloy products

affordable for everyone, Taishan China Magnesium will live up to its initial aspiration, keep pursuing greater innovation capabilities, and promote the application of magnesium alloy in the fields of new energy automobiles, drones, and high-speed rail.

MG

Case

PROFESSIONAL:

Reach Higher with PROFESSIONAL

Annual Production Capacity More Than 6000 Tons

Pursuit of Quality, Market Driven

Building up a strong Corporate Reputation in the Industry

Founded at the beginning of 2017, PROFESSIONAL started the operation in June of the same year, primarily producing valve body and precision die-casting components for electrical appliances, auto parts, lighting fixtures, and telecommunications equipment. It is an innovative enterprise specializing in design, R&D, smelting, aluminum die-casting, high-precision machining, and mold design and manufacturing.

"In the past, quality tells you how good the enterprise is. Today, quality determines whether the enterprise can survive." Kunguang Li is well aware that choosing the right die casting machine with good performance is the reliable assurance of the high-quality die castings.

On this account, PROFESSIONAL has increased its investment and acquired diecasting equipment from YIZUMI several times. As of today, six die-casting production lines consisting of YIZUMI's 650T, 1650T, 2000T, and various other die-casting machines are working smoothly in the factory. In addition, these lines are equipped

with advanced spectrometers, X-ray flaw detectors, three coordinates measuring instruments, and other precision testing equipment and tools, providing a sound quality assurance system for the products.

"From the general-purpose aluminum and magnesium die-casting machine in earlier years to the H series heavy-duty die-casting machines today, I have witnessed the evolution of YIZUMI's die-casting machine family." Regarding the cooperation with YIZUMI, Kunguang Li said, "YIZUMI machines offer a robust and reliable performance with low failure rate. Their clamping system also provides great strength, stiffness, and durability. The injection system maintains excellent stability and repeatability which could meet the production needs."

After four years of development, PROFESSIONAL has become more skillful with aluminum alloy production technology. In the meantime, the enterprise also introduced ultra-low speed, vacuum, local squeezing, and other advanced die-casting mold technologies to meet production capacity needs.

Today, PROFESSIONAL has made its name in the die-casting industry for its high-quality and efficient production of aluminum alloy die casting products. Relying on its "Professional" dedication, the company continues to grow, with its annual output of aluminum alloy die-casting products now exceeding 6000 tons.



Boost profits by cutting costs and enhancing productivity

Becoming an Industry Leader

The market competition in the future is becoming more fierce and complex. How to maintain core competitiveness under the new circumstances has become a great challenge for enterprise managers.

Through scientifically based management, improvement of product quality, and reduction of production costs, PROFESSIONAL is able to provide customers with the best quality service at preferential prices which in turn allows the customers to have a price advantage on the market for more purchase orders. PROFESSIONAL's business goal is to achieve a "Win-Win" result.

How to reduce the production costs? As Kunguang Li said, in today's die-casting industry, the time to make windfall profits relying only on hardware advantages is long gone. You have to find your profit point through scientifically based management.

For instance: in die-casting production, each die-casting process consists of various process steps. Establishing each step with a stable process is a key to a high quality die casting production.

A well designed Quality Management System with a detailed Control Plan will ensure that process inconsistencies or rejects may be

detected early in the value adding process. This will ensure a cost efficient overall manufacturing performance.

Also, in the die design, manufacturing and heat treatment processes, if you put every step under control, you can ensure both the service life of the mold and the quality of the die-casting products to save production costs.

"Our company is continuously deepening and extending markets." said Kunguang Li, "As long as we have the regional market and retain the key customers, our sales are guaranteed."

Speaking of the vision of the enterprise, Kunguang Li is full of confidence: "As we rely on our strong technical background to drive the market, we believe that it won't take long for PROFESSIONAL to become a rising star in the die-casting industry as an innovative leader."











Profession



Product

New Integrated Design- YIZUMI Launched the Second Generation of H Series Die Casting Machine

(1800-45000 kN)

In 2017, YIZUMI launched the H series die casting machine, whose quality is comparable to the quality standards of European and American equipment, and its stability and high repeatability have won recognition from many customers around the world. YIZUMI heavy-duty die casting solutions with machines sizes of 3500T, 4000T, 4500T helped some well-known Chinese companies such as CNHTC, LIJIA, RUNXINGTAI, WUXI LANGSHION, Wenzhou RUIMING, Dongguan JIANSHENG realize mass production of large castings, which include gearbox housings for trucks, 5G base stations, battery housings for new energy vehicle as well as structural castings incl. shock towers, instrument panels, etc. At the same time, many H series die-casting machines have been exported to other countries and regions, such as Europe, Asia, America, receiving positive comments from overseas customers.

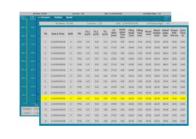
Based on years of experience in the use of H series die-casting machines in customer sites, the YIZUMI Chinese technical team, together with a European technical expert team, launched the second generation of H series die-casting machines (1800-45000 KN), whose injection performance, mold opening and clamping performance as well as overall stability have been significantly upgraded. The brand-new H series provides customers with more precise injection control, higher repeatability, and manufacturing capabilities to meet international quality requirements providing great benefits to the market.

1. Upgraded Injection Unit, Top Injection Capability

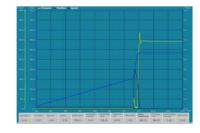
① A new integrated injection hydraulic adds injection performance and casting process stability while reducing components and increasing machine availability.



② Highly precise & repeatable switch-over to fast filling phase further increases casting process consistency for our customers. These improvements are based on a successful international engineering cooperation. Precisely triggering the fast-filling phase is critical for many die casting applications. The HII-S provides a high standard of precision to switch-over to the cavity filling phase and significantly reduces V1 starting vibration. A repeatability of max +/-2mm satisfies the highest requirements.

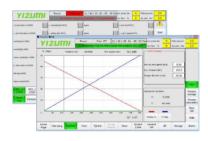


③ With its optimized hydraulic system, the HII-S system offers high injection acceleration (small-sized machine ≥50G, large-sized machine≥30G). In combination with its high-capacity P/Q performance, the HII-S die casting machine is built to provide high casting quality with even the most difficult of parts.

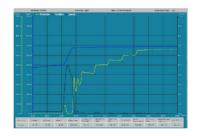


④ A 30% improved pressure build-up time offers an intensification performance satisfying even the most challenging of applications.

(§) Increased casting process transparency saves time and eases programming. Based on technology data entry the YIZUMI HII-S control system calculates critical casting process data to support process engineers (specific screen Type is needed). The PQ2 diagram showing the actual operating point is displayed on the HMI screen to support the process engineer with great transparency (Specific Screen Type is needed).



©Optional real-time closed-loop control systems ensure quality consistency over long periods of time. Pressure, speed real-time detection and automatic correction of process parameters enable a high degree of consistency in the customer's production process. Available as an option is our closed-loop system with automatic self-learning function and motor driven cartridge valve adjustment, allowing customers to set pressure and speed values conveniently on the HMI.

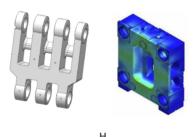


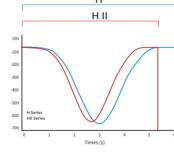
2.The HII-S internalizes advanced design concepts and offers re-Engineered, high-strength clamping units to ensure faster opening & closing speeds, higher platen rigidity, and longer toggle service life.

① Applying finite element analysis allowed platen weight reductions making for faster opening and closing movements.



② A new design based on FEM analysis offers an even distribution of force while minimizing platen bending. Optimized clamping unit shortens cycle times, significantly increases platen rigidity and improves customer's overall production output.

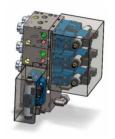




3.High Performance Hydraulic Drive System

① A well-balanced hydraulic drive system supports faster cycle times at lowest energy consumption. High quality, energy efficient and with higher capacity, this hydraulic drive allows fastest hydraulic movements of die, cores and accu charging to support our customer`s high OEE expectations.

② Highest quality standards and fast delivery times are made possible by the YIZUMI modular machine design which includes concurrent manufacturing and testing of individual machine modules. A large variety of selectable functional options further benefit our customers.



4.International Standard Electrical Control System

① Our high level design complies with worldwide safety standards. Short-Circuit breakers effectively protect circuit boards and electronic components. Automatic prewarning alarms of fluid levels (hydraulic oil / lubrication) and temperatures (hydraulic oil /cabinet temperature) ensure a stable and highly productive operation of YIZUMI equipment.

② The integrated operating panel is easy to use and saves time for the operator as well

as the casting process engineers. Finding functions, monitoring production, and setting parameters are made easy by a structured HMI menu on a large touch screen.

③ The new and optimized HMI offers intuitive and easy-to-understand maintenance functions, maintenance tips and comprehensive alarm information as well as operation guidance. Operational efficiency is further improved by user-friendly functions such as production start with reduced speed and pressure, plunger friction detection and precise, vibration free slow speed during the pre-filling phase.

④ The HII-S control system features standardized interfaces offering great flexibility in the choice of peripherals. Cell integration made easy.

5.Yi-MES System (Option)

Specially designed for the die casting industry, the Yi-MES system is a great choice for SMEs. Its multiple functional modules ensure efficient management, help facilitate production plan and achieve digitized monitoring and quality management. Yi-MES system provides professional digital factory solutions for the whole die-casting process.





*The recorded data are all from the internal test in YIZUMI factory, and the final data please refer to the actual machine

YFO YFO

YFO-based Instant Prime Service

Timely, Professional, Customer First

YFO (Yizumi Factory Outlet) model ensures high response speed and controllability of the service and it is also Yizumi's new global service strategy for the future. In regards to the service concept, we not only ensure the safety of customer's production activity, but also endeavor to fulfill the ultimate goal of reducing the risk of downtime through every detail and improving customer's productivity.

 \square





From pre-sales consulting to on-site installation and commissioning, from after-sales regular inspection to spare part delivery and customer training, every YFO service engineer has successfully handled over 300 cases and their high-quality professional services will ensure your machines operate normally.

The worldwide part supply network ensures smooth, prompt and accurate part distribution A total of 35 spare part centers and maintenance part warehouses Abroad Spare part warehouses in 15 overseas countries France Poland Russia Spain Turkey Iran Korea China Vietnam Malaysia Indonesia Mexico Brazil

YFO one-stop spare part service solution Save your time, worry and money

Unified service channel, hour-level spare part delivery service available

Key spare parts are purchased from manufacturers, ensuring the price transparency and economy.

More durable and applicable.



365/24

24-hour hotline available for 365 days, nearly 200 maintenance experts ready to respond to your needs.

*Service reaction time may vary in different markets

72

YFO service network in 35 Chinese cities and 37 overseas countries provide better access to service.

8,000 +

So far the service team has provided YFO service support for over 8,000 machines to ensure highest machine availability to our customers.

10+

Over half of YFO service engineers have over 10 years of professional experience.

5,000+m²

Powerful spare part warehouse system covers warehouses in 35 Chinese cities and 15 overseas spare part centers, total warehousing area up to 5,000m².

YFO

Eight YFO Commitments Focus on machines; greater focus on customer experiences

8 specialized services allowing you to have a better customer experience







Presales Consultancy & Technical Support

Delivering exhaustive die casting machines and auxiliary equipment selection solutions, professional configuration and optimization solutions of its manufacturing technologies.



Professional Technical Training

Exquisitely designed, nationwide standardized courseware menu selection system, the national instructing team will personally visit the sites to customize the trainings.



Professional Parts Supply

5 warehouse agencies and 2 service centers with warehouse inventories overseas, spanning across Asia, America and Europe, achieving a 24-hour turnaround of common parts delivery.



PLC Remote Service Mode

Remote process support within the whole world. It can rapidly resolve the customized requirements for the customer processes.



GPS Vehicle Monitoring System

Over 50 service vehicles with realtime online monitoring control nationwide. Timely nearby dispatch services ensuring its response speed.



e-service 24-hr Online Services

One button to report any repairs with the mobile apps. Swiftly search for malfunctions, building the mobile after-sales experiences for the customers.



Technology Service Center

The service center, which is directly under the management of Yizumi's headquarters, the service engineers deliver timely and effective services. Meanwhile, there are 2 technology service centers in India and Vietnam.



Permanent Engineers' Services

In view of the key markets already developed, Yizumi will dispatch the Chinese engineers to reside at the markets permanently, providing timely and highly efficient services to the customers.

YIZUMI e-service

Delivering a real-time service system for its clients

Through YIZUMI e-service, you can have a full-day, online support, mobile and rapid remote repair and maintenance as well. Regardless of where you are, it can deliver a rapid, convenient, online after-sales service, ensuring the equipment to be maintained in the best condition for the long term.















YIZUMI e-service can deliver the followings to you



Mobile Operation: Smart Phone/Tablet/PC Multiplatform available.

Download the APP, enter equipment serial number /scan equipment QR code and the registration is completed.



IOS



Android

*Currently only available in China