Industrial Robots for Non-Ferrous Casting Tasks



How Manufacturers Use Robots for Non-Ferrous Casting Tasks

Manufacturers use robots in non-ferrous casting to automate and enhance various processes, improving efficiency, accuracy, and safety. Non-ferrous casting involves metals such as aluminum, copper, and magnesium, which have distinct properties and processing requirements. Here's how robots are integrated into non-ferrous casting tasks:

Material Handling and Preparation

- **Automated Loading:** Robots handle the transportation of raw materials (e.g., ingots or scrap) to melting furnaces or processing areas, minimizing manual labour and improving safety.
- **Material Sorting:** Robots equipped with vision systems can sort and organize scrap metals for recycling, ensuring a continuous supply of quality raw materials.

Melting Process

- **Furnace Operations:** Robots are used to load materials into melting furnaces, including induction and electric arc furnaces. This reduces the risk of injuries from handling heavy materials.
- **Temperature Monitoring:** Robots with sensors can monitor the temperature of the molten metal, ensuring it is maintained at optimal levels for casting.

Finishing and Machining Operations

- **Trimming and Grinding:** Robots handle trimming, grinding, and machining tasks to achieve precise dimensions and desired surface finishes on non-ferrous castings.
- **Polishing:** Automated polishing robots enhance the aesthetic qualities of cast parts, particularly those requiring a smooth finish.

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Safety Enhancements

- **Reducing Human Risk:** By automating tasks that involve heavy lifting or exposure to hazardous environments, robots significantly reduce the risk of workplace injuries.
- **Ergonomic Support:** Robots assist human workers by handling heavy or awkward components, enhancing workplace ergonomics.

The Types of Robots Used for Non-Ferrous Casting Applications

In non-ferrous casting applications, several types of robots are employed to streamline processes, improve efficiency, and enhance safety. Here are the main types of robots used in non-ferrous casting:

- Mobile robots
- Vision-Integrated robots
- Robotic Welding Systems
- Grinding and Finishing Robots

Mobile Robots

- **Description:** Autonomous robots that navigate their environment, often equipped with sensors and cameras.
- Applications:
 - Material Delivery: Transport materials and finished castings throughout the facility.
 - **Inventory Management:** Assist in managing inventory levels and organizing materials.

Vision-Integrated Robots

- **Description:** Robots equipped with vision systems for enhanced accuracy and quality control.
- Applications:
 - **Quality Control Inspections:** Identify defects and ensure that cast parts meet specifications.
 - **Guided Picking:** Use visual systems to accurately locate and handle components during processing.

Robotic Welding Systems

- **Description:** Specialized robots designed for automated welding processes.
- Applications:
 - **Joining Components:** Weld non-ferrous castings or components together, ensuring strong connections.
 - **Repair Work:** Perform welding repairs on defective cast parts.

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Grinding and Finishing Robots

- Description: Robots equipped with grinding and finishing tools.
- Applications:
 - $\circ\quad$ Surface Finishing: Grind, polish, or deburr cast parts to improve surface quality.
 - **Trimming Operations:** Remove excess material from castings to achieve desired specifications.



What will be the Non-ferrous Castings Market Size During the Forecast Period?



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