

# Robot-Based Foundry Automation

Optimising Your Foundry's Processes and Productivity



The **heart** of Robotics

**ABB**

# Profit from the market leader's expertise

Like many other industries, foundries are constantly on the lookout for new ways to boost their productivity, cut costs and increase quality. But once the decision for ABB's leading high-performance robot technology has been made, there is no need to look any further: lower production costs and scrap rates, increased up-time and consistent, superior quality are the compelling benefits with ABB robots.

## Sand Core Process

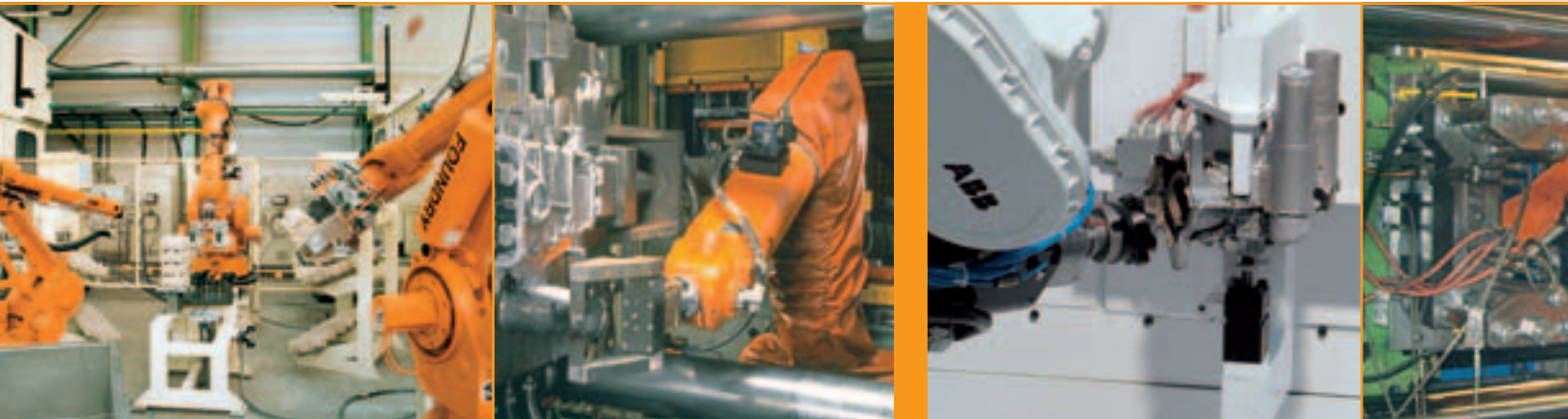
- Core shooting
- Core assembling
- Core gluing
- Core cleaning
- Core handling

## Casting

- Die-casting
- Sand-casting
- Gravity-casting
- Lost-foam

## Cleaning

- Deburring
- Deflashing
- Degating
- Premachining



### ■ Following the automotive trend

With the massive shift from iron to aluminium and other light alloys – for both ecological and economical reasons – foundries are investing heavily in new machinery. With the aluminium content in vehicles rising by 5.5 % each year, some 12 million tonnes of aluminium will be cast in 2010. To handle this workload, around 70 new foundries will have to be built annually. At ABB we are moving right along with this trend, providing the new businesses with proven robot-based solutions including progressive production cell technology.

### ■ Experienced solutions for downstream aluminium

Our commitment to foundry automation is based on almost 40 years of experience and covers every aspect of the production process – all the way from smelter to the finished automotive part. ABB's robots are always there to gain efficiency along the entire value chain. This synergised-system concept based on specific robots designed for the need of each process offers many advantages like enormous flexibility, high levels of reliability, and consistent capacity utilisation all along the foundry line.

## Palletising



## Machining

- Machine tool tending
- Secondary deburring
- Washing
- High pressure water jet washing



## Surface treatment

- Blasting
- Painting
- Corrosion protection

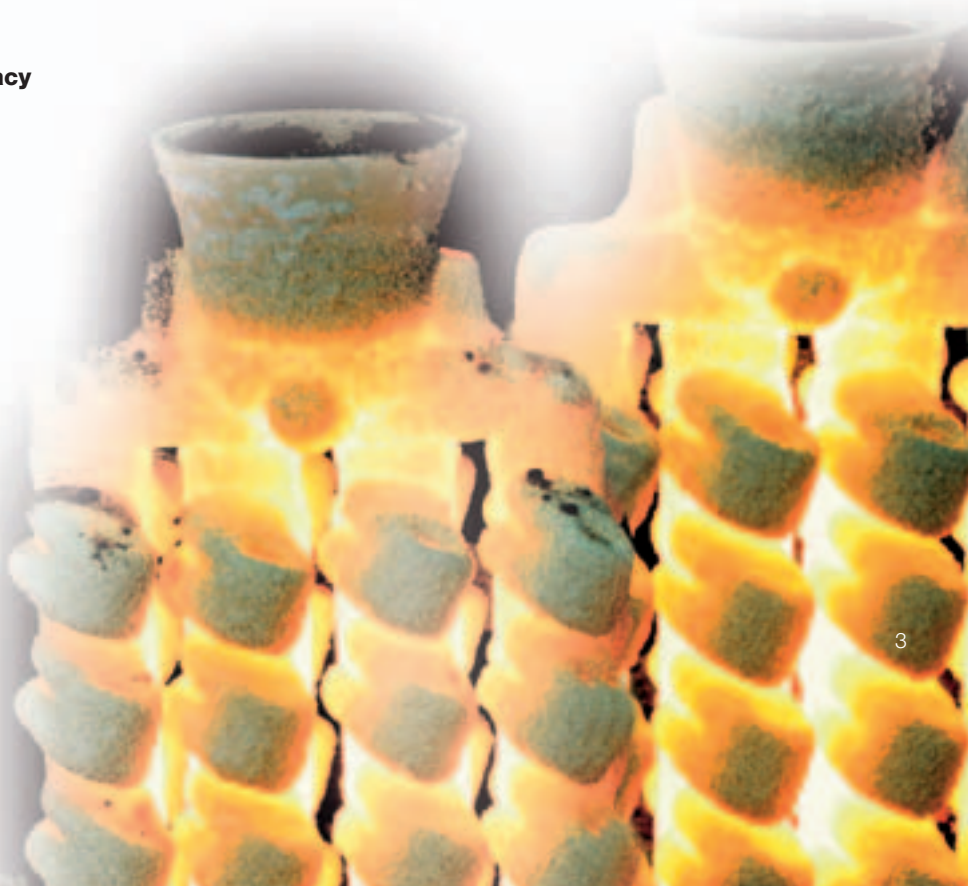


## Quality

- X-ray
- Leakage test
- Dimensional accuracy

### ■ Strong partners in perfection

All around the globe, ABB's products and solutions are available from a unique distribution network that no other manufacturer can rival. Furthermore we are privileged to work with strong and competent partners including the world's leading OEMs and system integrators. The result: superior foundry process know-how, top level software, hardware, and services providing our customers with nothing less than the best possible solution. Anywhere at any time.



# ABB robots in foundries: the complete range



Even for a robot, a foundry is not a workplace like any other. The exceptionally tough work environment demands appropriate protection – the more comprehensive the better. ABB offers an extensive range of foundry-adapted robots with payloads up to 650 kg, by specialized high function controllers and a wide range of software products.



## **IRC5:**

### **the modularised way to success**

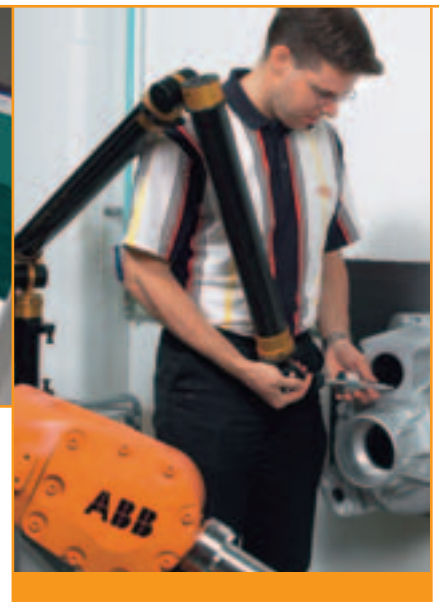
ABB's innovative IRC5 robot control system sets new standards with its modularised concept, a human-engineered FlexPendant programming unit with special foundry applications interface and fully synchronous, simultaneous control of up to four robots using MultiMove. The patented TrueMove and QuickMove functions assure precise, rapid robot movements throughout the working range.



## **RobotStudio:**

### **for genuine offline programming**

Cost-efficient offline programming is the best way to maximise return on investment in robotics. ABB's simulation and offline programming software, RobotStudio, allows robot programming to be carried out in the office without shutting down production. It also enables robot programs to be prepared in advance, increasing overall productivity.



## **TeachSaver:**

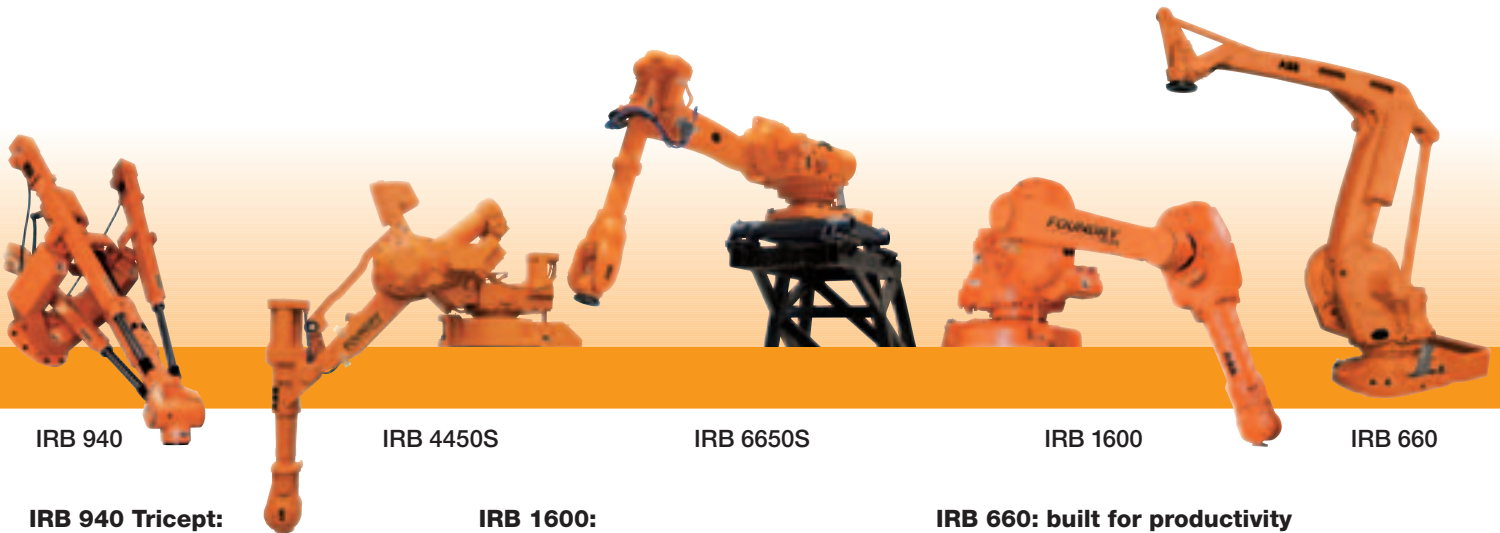
### **more than a time-saver**

For a long time, the elaborate programming required was the biggest impediment to using robots to clean cast components. ABB's TeachSaver software package reduces this process by up to 90%. More: using a virtual offline robot cell also ensures significantly greater accuracy than with classical teaching.

# Foundry Plus – built to take the heat

Completely sealed, equipped with a two-component high-resistance enamel surface and IP67 certified, ABB's Foundry Plus range of fully foundry adapted industrial robots can take more than just the heat. These robots are ready to meet the challenges of spits, sands and lubricants of modern high-performance foundries on a daily basis.

**FOUNDRY**  
**PLUS**



IRB 940

IRB 4450S

IRB 6650S

IRB 1600

IRB 660

**IRB 940 Tricept:**  
**the robot for special jobs**

- Dedicated to pre-machining and all material removal applications where accuracy is pivotal
- Innovative mechanical design
- Equipped with standard robot controller functionality

**IRB 4450S:**  
**fast, compact and versatile**

- Optimised to work together with medium sized die-casting machines from 800 – 2000 tonnes in spraying
- Ideal for foundry through its compact wrist and working range in downward direction

**IRB 6650S: in a class of its own**

- Largest work envelope in its class
- The ideal solution for handling jobs at die-casting machines from 2000 – 5000 tons
- It can reach exceptionally far and deep or tilt completely backwards

**IRB 1600:**  
**the all-round winning athlete**

- A fast and strong bending backwards robot suitable for die-casting machines from 400 – 800 tons
- Faster than any other competing robot in its class
- Payload options are 5 or 7 kg (up to 10 kg with “wrist down”)

**IRB 660: built for productivity**

- A speedy machine that combines a 3.15 meter reach with a 250 kg payload
- For easier palletising application in the downstream and upstream production in foundries
- Handling of ingots and palletising of final castings as example

**ChipProtection:**  
**keeping the robot cell free from chips**

- Mounted above the second axis of the IRB 6600 and IRB 7600
- Effective protection of the robot's entire base frame
- Reducing the need for maintenance



**TrackMotion:**  
**for that vital extra mobility**

- The feature greatly extends robot reach with a fully integrated 7th axis
- Specifically designed foundry version
- With IP67 protection on motors and cables



## Other Processes

Foundries are a very complex environment to work in. The automation of specialised tasks such as investment casting, ingot handling or forging requires detailed process know-how and the right hardware to handle castings and cores with power and precision. This is where ABB's robots enter the arena.



### Forging

Forging crankshafts is a tough business. With steel bodies and billets weighing well over 300 kg, robots working in a forging line need as much power as precision. The IRB 7600 power robot has both: Equipped with special forging grippers and handling capacities between 150 and 650 kg it is a real heavy metal virtuoso.

### Labelling

Castings like aluminium cylinder heads need to be labelled with information like date, time and status to ensure traceability. An IRB 140 robot equipped with a simple pneumatic graver is one of most flexible and cost-efficient solutions to easily label cast parts whenever and wherever necessary.



### Investment casting

Dipping wax trees in water based slurry to continuously build the ceramic shell with special sand, is a process in investment casting that is often robotised. With a reach of up to 3.5 m and a handling capacity of 150 kg, ABB's IRB 7600 is the perfect alternative to get the job done. Furthermore, robots are frequently used for post processing applications such as grinding and polishing.

### Truck unloading and ingot handling

Ingot handling is an application found in casting shops where aluminium ingots are produced. When it comes to handling, the IRB 660 four-axis robot is the perfect tool for the task: it comes equipped with a special purpose pneumatic gripper for handling the solidified aluminium ingots and features a payload of up to 250 kg. For even heavier handling, the IRB 7600 is the perfect choice with a capacity of up to 650 kg.

### Zinc die-casting

Tending a zinc die-casting machine requires total reliability and efficiency in a harsh environment. The IRB 140 Foundry Plus robot featuring full IP67-classification is ready to take this challenge. Thanks to its compact dimensions, it is even suited for portable robot cells that can be moved away for tool changes and servicing of the die-casting machine.



Whatever your business may require, you can be sure to find the right service-solution.

## Our service – another key to your success

State of the art robot and specific solutions to the foundry industry are not everything ABB has to offer. Our products are backed-up and supplemented by tailor-made services or service packages.

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- Performance Service Contracts including full service, total equipment management and automation performance management
  - Productivity Improvement Projects ranging from analysis and asset re-utilisation to system upgrades, modifications and refurbishing
  - Field Services providing helpdesk and remote services 24/365, service contracts, installation and commissioning and many more
  - Parts & Logistics Services featuring spare parts sales, repair centres and inventory management
  - Training for our products and systems as well as documentation

## The heart of Robotics



Over the last three decades, ABB has remained committed to building and strengthening relationships with customers, integrators and partners throughout the world.

Underpinning this commitment is our belief that at the heart of innovative robotics lie mutual trust and confidence. This belief has helped us to achieve clear leadership in a demanding field. Today, in the automotive, metal fabrication, foundry, consumer and plastics industries, our solutions help to pave the way for optimised production. Across the world, our global network of sales and service centres, and our carefully selected partners, make ABB products, systems and services available wherever they are needed.

**Welcome to ABB – The heart of Robotics**

# ABB

[www.abb.com/robotics](http://www.abb.com/robotics)