

# Robotic Arc Welding

The intelligent choice





## **How smart do you want your robot to be?**

You want the best arc-welding and thermal-cutting robots on the market. But exactly what qualities are you looking for? Let's say you demand reliability, above all.

## Meet the challenge

Can your robots handle the gear-crunching, velocity-defying requirements of twenty-four hours-a-day, high-speed processing with limited downtime? Or handle errors and recover automatically without impacting on production cycles?

When tasks change, can you make the switch smoothly and still perform with the same efficiency as in the previous task?

What about path-following accuracy? Without sophisticated software-driven motion control and high-speed acceleration, your robot's performance, speed and accuracy are compromised. And your reputation and profitability with it.

And how quickly and easily do you want your robots to interface with other processes, external drives, positioners and so on? Or connect to single-cell systems and large-scale factory automation systems?

In today's ever faster, cost-squeezed manufacturing environments, you will be asked to respond to these challenges. So how do you meet them? The answer is simple: with robots from ABB, the smartest welding solutions available.

### **Build your solutions with our toolbox**

No matter what challenges you face, we'll provide you with the right welding- or thermal-cutting solution that fulfills your specifications. For instance, if you're a small company, you may want standard plug-and-play packages such as FlexArc™ for welding batches of smaller components. Or install our powerful suite of software products known as ArcWare™.

If you need more specialized welding- or thermal-cutting applications, you can write an application program based on our high level, open software language, one of the most advanced in the industry. This ability to access and reprogram the robot's behavior is a key advantage of ABB's toolboxes, a modular concept that includes all the hardware and software you need for your welding- or thermal-cutting applications.

Exactly what do these toolboxes consist of? Basically, it consists of a wide selection of industrial robots, welding or laser equipment, external devices such as positioners, communications interfaces, plus the S4Cplus controller, which contains ABB's powerful software and the brains of your robots.

With our welding toolboxes, you can achieve your goals.



## Get down to business

Faster. Better. Cheaper. To meet these demands, you need to focus more rigorously on your core business. With our easy-to-assemble toolboxes, you can get down to business more quickly.

Whether your manufacturing plant is small, medium or large, we can help you get the most out of your robots. And if you're a system integrator, ABB is your ideal business partner. We'll support you with the tools you need to advance your customers' business.

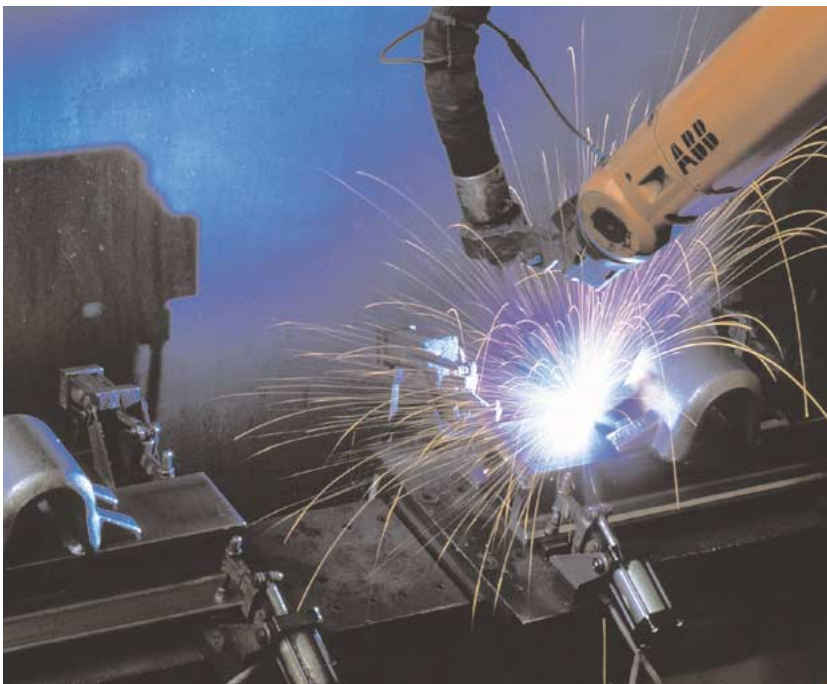
Here's only a couple of examples – from hundreds of solutions we've helped our customers implement.

### Detroit calling

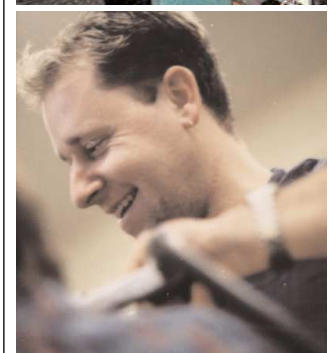
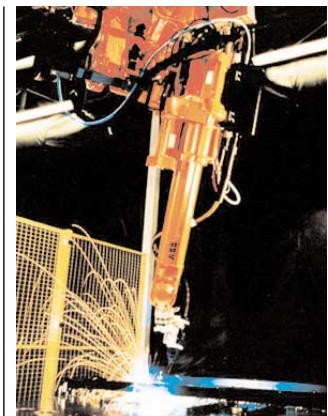
An auto parts manufacturer wanted to land a new contract involving a new line of sports utility vehicles manufactured by major US automaker. To do so, the auto parts manufacturer needed robot-laser technology that was capable of cutting holes of different shapes into SUV frames with extremely high precision.

Not having the expertise inhouse, the auto parts manufacturer turned to one of its system integrators to see if they could help. Working closely with ABB's engineers in Fort Collins, Colorado, a team involving the system integrator and auto parts

“We can help our customers utilize their arc welding robots as effectively as possible so that the same robot can laser cut, pick up another piece, weld and when completed pick up the whole piece and throw into a pallet.”

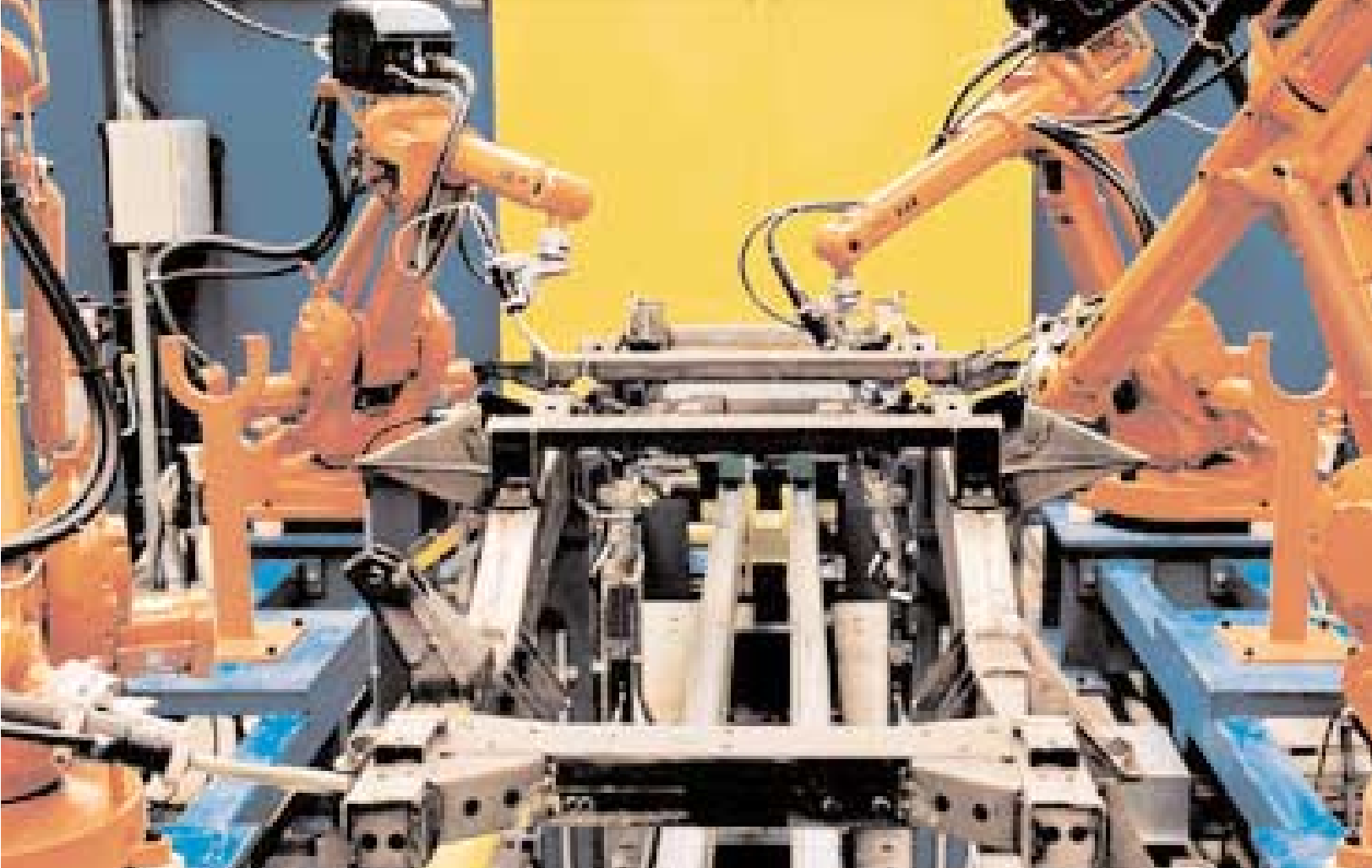


Welding is hot and dangerous work. A robot can perform twenty-four hours per day without succumbing to stress or fatigue—something humans cannot do.



With a skilled welder in charge, multiple robots become the ultimate power tool, producing four to six times the work a welder can do by hand.





Higher quality standards coupled with lower cost requirements have led to a growing demand for robots in the manufacturing process.

manufacturer developed a laser solution that achieved a new level of accuracy. The technical solution was based on a combination of sophisticated laser-based calibration equipment combined with ABB's advanced motion control features.

The solution developed by the team helped the subcontractor win a contract that included three dozen high-precision laser robots. Its success also meant that the auto parts manufacturer was awarded a much larger job-building a transfer line that included 250 robots.

"Without ABB's laser capability, the auto parts manufacturer may never have succeeded," said one participant in the project.

### **A flexible toolbox**

Let's take a look at a system integrator that utilizes ABB's standard solutions for a wide range of applications.

This particular integrator has a base of customers consisting of small- to medium-sized automotive manufacturers in developing countries. These customers need a solution that is cost-effective and flexible enough to be used in as many welding-related processes as possible. ABB's flexible toolbox was the solution.

"We can help our customers utilize their arc-welding robots as effectively as possible so that the same robot can laser cut, pick up another piece, weld and when completed pick up the whole piece and throw into a pallet," explains the integrator.

In many cases, the integrator provides turnkey solutions that include applications that precede or follow the customer's welding process. Plus, he provides solutions for tooling, power sources, safety, logistics and cell concept.



The powerful IRB 140 welding robot is small enough to fit in crowded workplaces.

## Reap the benefits of our technology

Many manufacturers operate in a multi-system environment where components with different standards and interfaces have been acquired from a variety of suppliers. With ABB's smart solutions, you can connect your robots to any power sources, data networks, positioners and other third-party devices, regardless of standards or interfaces.

### Built on an open structure

How do we achieve this? By equipping our robots with a wide range of universal communications interfaces, configurable from S4Cplus, your robot's controller. You can connect your robot to a PC for servicing purposes or the factory data network using one of two Ethernet links.

Plus, your robot's controller contains the standard fieldbuses and serial channels for interfaces with a wide range of power sources and distributed devices. We've deliberately simplified the cabling systems required for our robots, reducing the chances of breakdowns and the need for maintenance requirements.

### Flexibility – a whole new meaning

At a very early stage, you face the challenge of tailoring your applications to meet your specific manufacturing needs.

To meet these requirements, ABB provides a powerful suite of easily configurable arc-welding

application software known as ArcWare™. If you are an advanced user and want to develop your own specific functionality, RAPID™, ABB's high-level programming language, lets you do so.

### Pre-program off line

Even off-line programming, normally a complicated process, is a snap. You can create, simulate or pre-program your robots off line, then download it from your PC into the robot controller, within seconds.

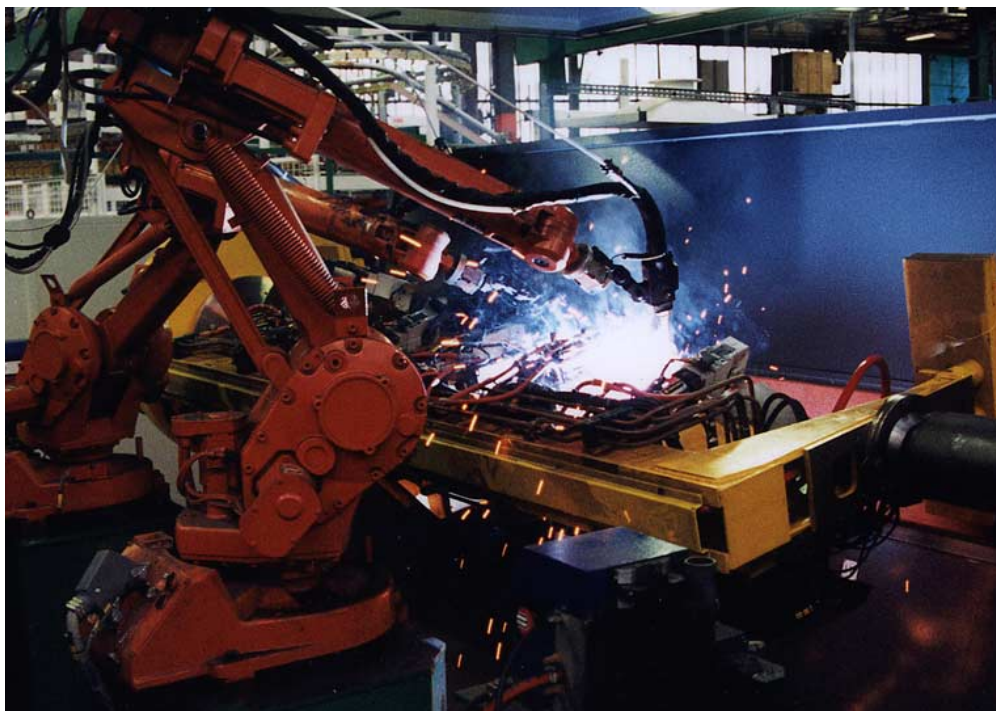
Plus you've got superb handling flexibility. You can choose from among a wide variety of robots, from compact to large workhorse robots, suiting most welding application from bicycle frames to ship hulls.

### Position your robot anywhere

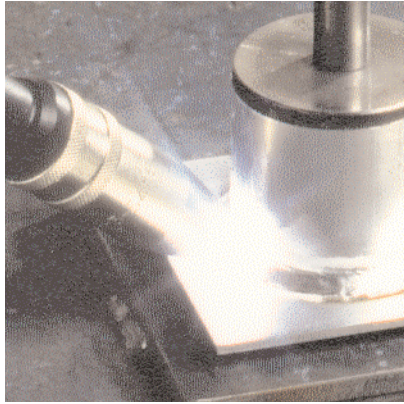
Depending on the robot, you can mount it on a wall or inverted from gantries, columns with booms and elevators for heavy-duty welding, allowing for a wide variety of working range capabilities. And to this you can also add work piece positioners with one to two extended axes.

### Translating intelligence into productivity

In recent years, ABB's engineers have sought to further advance its robots' performances through software solutions. As a result, ABB's robots are



The ability to produce a variety of products depends on planning. This welding cell can produce eight variations of exhaust units.



industry leaders in motion control, a software feature that affects path accuracy, acceleration speed as well as synchronization with external devices.

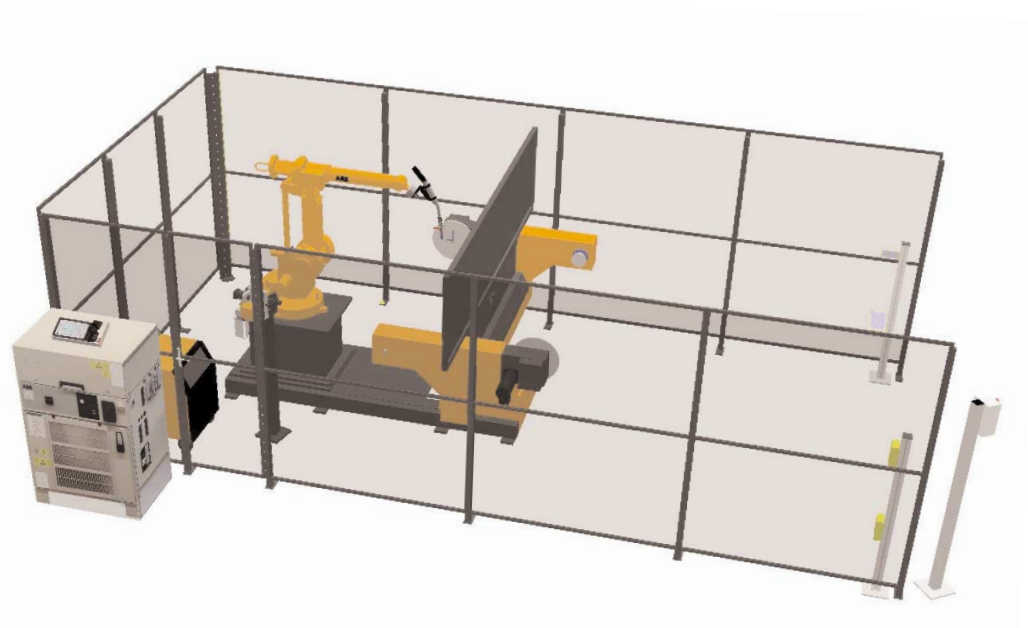
### **Accuracy determines quality**

When moving between two welds in arc welding, for example, your speed of acceleration determines your robots performance and your rate of productivity. And accuracy determines quality—all crucial factors in your bottom line.

Our emphasis on software development has reaped many other benefits.

### **Prevent collisions**

For example, based on established patterns, a robot software feature can detect a collision before it happens and take steps to prevent it. If a collision does occur, the robot will shut off, back up and restart at the point where it stopped—slashing downtime and maintenance costs. If the welding gun is knocked out of position, you can perform an automatic tool calibration with ABB's BullsEye® feature and make sure the robot is ready to go back online.



Robot Studio, a true off-line programming and simulation software, runs on a standard PC and allows you to visualize and confirm new solutions without disrupting ongoing production.



## Products for Arc Welding

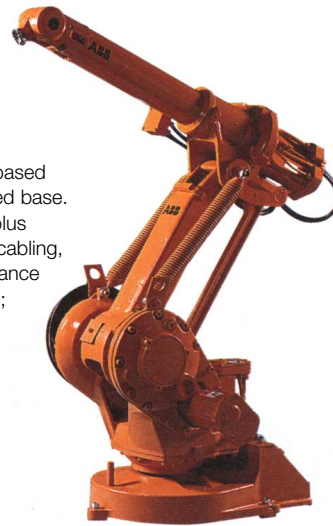
### IRB 140

ABB's fastest and smallest arm-based industrial robot. Highly flexible with slim wrist, 6-axis robot able to reach into narrow, small spaces. Easy-to-mount equipment. Robust and compact. The standard IRB 140 can be mounted at any angle without modification for optimum reach and efficiency. Load capacity: 5 kg; supplementary load is: 1.5 kg; reach: 0.81 meters.



### IRB 1400

Robust, well-proven, 6 axis, arm-based industrial robot with a large installed base. Well-balanced arm construction, plus maintenance-free gearboxes and cabling, reducing noise levels and maintenance requirements. Load capacity: 5 kg; reach: 1.44 meters.



### IRB 2400L

Slim yet robust arm-based, 6-axis robot. All the IRB 2400 industrial robots are ideal for arc-welding applications. Features unlimited axis 6. IRB 2400L load capacity is 7 kg; reach 1.8 meters. IRB 2400/10 load capacity is 10 kg; reach 1.5 meters. IRB 2400/16 load capacity; 16 kg; reach: 1.5 meters.



### IRB 4400

Compact, versatile robot with medium to heavy handling capacity. The 6-axis robot can handle loads up to 60 kg, or up to 45 kg at very high speeds. Reach: 1.96 meters.







**S4Cplus industrial robot controller**

Compact, highly configurable modular system with operator-friendly interfaces. S4Cplus contains a powerful computer system that supports the ArcWare suite of welding software products, plus RAPID, ABB's open and highly advanced robot language. S4Cplus features a dynamic model-based control system, including QuickMove functions for self-optimizing and precision path-following capability. Other software modules can be added to control external axis.

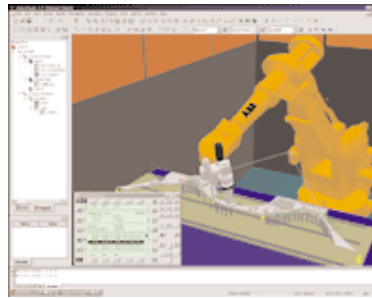
**ArcWare**

ArcWare is a powerful suite of software products that provide a wide range of high quality, accurate and flexible welding functions. ArcWare includes features such as a universal welding interface for power sources; voltage, current, weld and wire-speed tuning; error handling; wire tip redefinition; coordination of tracking systems; multitasking; and advanced motion, among others. The software can be loaded via PC.



**WebWare™**

A comprehensive web-based software platform for production management, monitoring and control. WebWare enables you to communicate with your robot over the Internet.



**RobotStudio™**

A powerful software for true off-line programming and simulation on a standard Windows PC. Based on ABB Virtual Robot technology, it allows very realistic simulations, using real robot programs and configuration files identical to those used in production.



**Peripheral equipment**

ABB's arc welding robots are equipped with a robot-mounted wire-feed unit, a welding torch and a power source (far left) suitable for your specific currency requirements. Other peripheral equipment that supports arc-welding applications includes BullsEye (left), a completely automated calibration tool that ensures error-free adjustments, and the positioners (above), designed for workpieces where welding in precisely correct positions is required.



Service ▼

Support ▼

Training ▼

## We're close

ABB has comprehensive global presence, so wherever you may be located, we're close to you. For you, being close to us of course means being close to the products, services and knowledge we provide.

### Effective utilization through training

The training centers we run worldwide are staffed by full-time professional instructors, offering you and your personnel hands-on training backed by years of know-how and expertise. Standard and customized courses are available on programming, maintenance, processes and application.

### Service support based on know-how and availability

Experienced ABB engineers are on hand to help you with field service support, out of hours assistance, technical support and remote diagnostics. They'll visit you regularly, come to see you whenever you need them.

### The right part at the right time

From new, service exchange and repair parts to upgrade kits, consumables and customer consignment stocks – we supply what you need, when you need it.

### Service agreements for controlled production costs

We offer you a range of service agreements including preventive maintenance, warranty extension, service availability and full maintenance responsibility. We make sure your robot system works smoothly. Day in day out. Year-round.

### Reconditioning to give your equipment a new lease of life

We can provide a standard robot refurbishment program, mechanical unit exchange, electronic board repairs and sales of second hand robots.

### Optimized production through process and application consulting

This is a comprehensive service that covers productivity analysis, process optimization, system upgrades and reconfiguration.

### A worthy product

We believe if a picture is worth a thousand words, so is the product it depicts. We've sold more than 90,000 fully-automated industrial robots world-wide over a period of more than 25 years. So why not contact us for a closer look and demonstration. And maybe even a few more words about the robot system of your choice.



Effective utilization of the robot and the software products is achieved through local hands-on training.

**Take your pick!**



ABB can significantly improve manufacturing processes through our extensive range of robotic products, systems, and service solutions.



**Your local contacts**

**Argentina** Asea Brown Boveri S.A. Buenos Aires +54 11 4 229 5500/5600 **Australia** ABB Industry Pty Ltd. Lilydale +61 3 9735 7222 **Austria** ABB AG Wien +43 1 60109 3721 **Benelux** Asea Brown Boveri S.A.-N.V. Zaventem +32 2 718 6311 **Brazil** Asea Brown Boveri Ltda. Osasco-Sao Paulo +55 11 7088 9111 **Canada** Asea Brown Boveri Inc. Brampton +1 905 460 3000 **China** ABB Engineering (Shanghai) Ltd Shanghai +86 21 504 80 101 **Czech Republic** Asea Brown Boveri s.r.o. Praha +420 2 2283 2111 **Denmark** ABB Energi & Industri A/S Skovlunde +45 44 50 44 50 **Estonia** ABB Esti AS Tallinn +372 6 711 800 **Finland** ABB Service OY Helsinki +358 10 222 000 **France** ABB Flexible Automation s.n.c. Saint Ouen l'Aumône +33 1 3440 2525 **Germany** ABB Flexible Automation GmbH Friedberg +49 6031 850 **Hungary** ABB Ltd. Gyor +39 96 512 950/953 **India** Asea Brown Boveri Ltd. Bangalore +91 80 839 5181 **Italy** ABB Flexible Automation S.p.A. Milano +39 02 26232 1 **Japan** ABB K.K. Tokyo +81 3 5482 2160 **Korea** Asea Brown Boveri Ltd. Seoul +82 2 528 3070 **Malaysia** ABB Industrial and Building Systems Sdn Bhd Kuala Lumpur +60 3 973 6888 **Mexico** ABB Mexico S.A.de C.V. Mexico +52 5 328 1400 **Norway** ABB Flexible Automation A/S Bryne +47 51 489 000 **Poland** ABB Centrum Automatyka Katowice +48 71 347 5611 **Portugal** Asea Brown Boveri SA Amadora +351 21 425 6335 **Romania** Asea Brown Boveri SR Bucharest +40 1 310 4380 **Slovak Republic** ABB Elektro s.r.o. Bratislava +421 7 4926 6314 **Slovenia** Asea Brown Boveri d.o.o Ljubljana +386 1 5875 480 **South Africa** ABB Automation (Pty) Ltd Alrode +27 11 864 5340 **Spain** ABB Flexible Automation S.A. Sant Quirze del Vallès +34 93 728 8700 **Sweden** ABB Flexible Automation AB Västerås +46 21 344 500 Laxå +46 584 82000 **Switzerland** ABB Flexible Automation AG Zürich +41 1 435 6555 **Taiwan** Asea Brown Boveri Ltd. Taipei County +886 2 2601 5025 **Thailand** ABB Industry Ltd. Bangkok +66 2 709 3346 **Turkey** AB Rotech Izmir +90 232 252 0677 **United Kingdom** ABB Flexible Automation Milton Keynes +44 1908 350 300 **USA** ABB Flexible Automation Inc. New Berlin WI +1 262 785 3400 Auburn Hills MI +1 248 391 9000 Welding Systems Div. Fort Collins CO +1 970 225 7600 Paint Automation Div. Indianapolis IN +1 317 876 9090

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