

Metal Fabrication

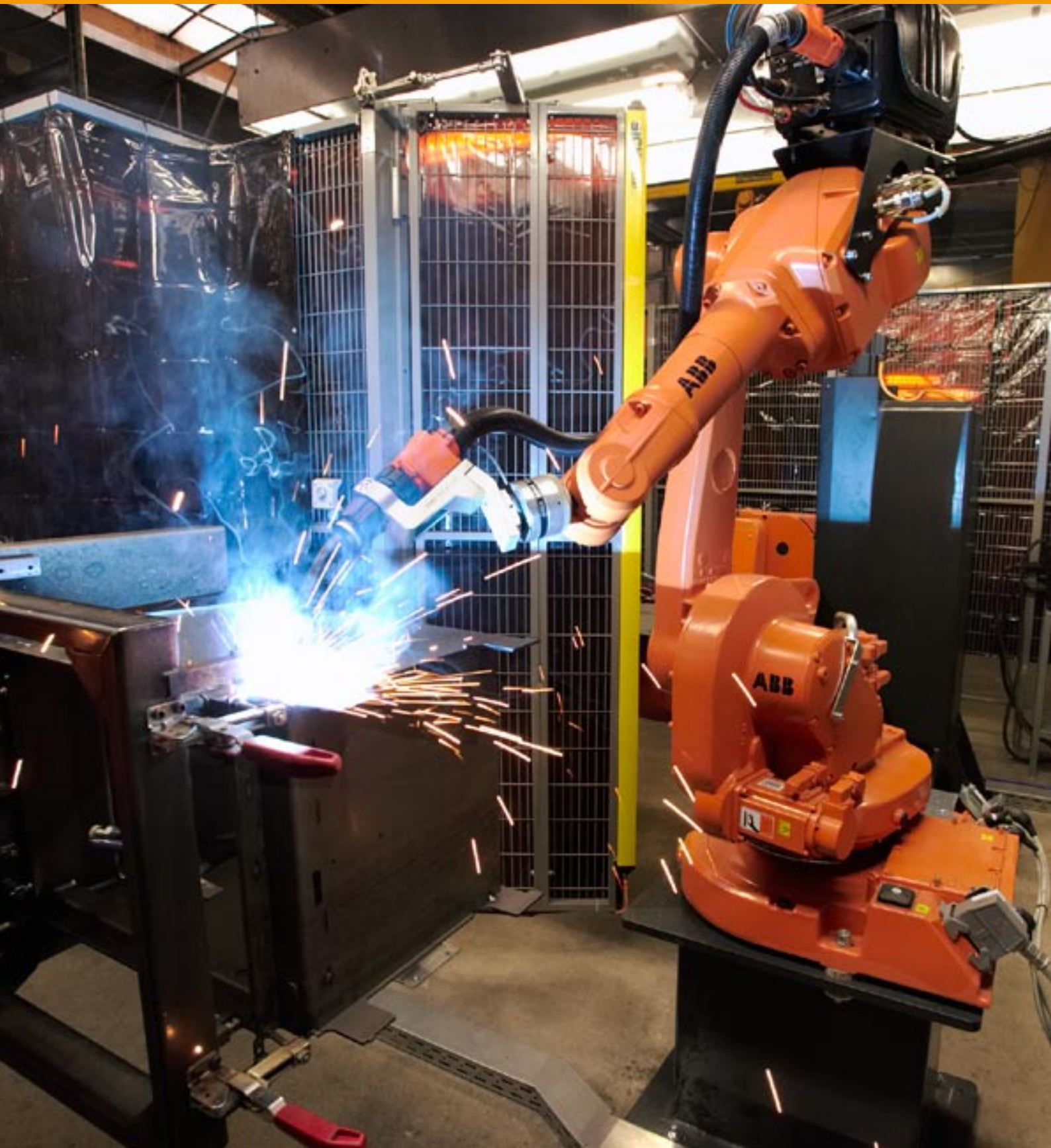
Robot-based automation for the metal fabrication industry



The **heart** of Robotics

ABB

Welcome to ABB's World of Metal Fabrication



Face competition with flexible six-axis robots

The metal fabrication industry is working under increasing cost pressures. Manufacturers are forced to find new and innovative ways to increase production efficiency while maintaining a high parts quality.

More and more manufacturers are turning to six-axis robots to face these challenges. As the leading robot supplier since 30 years, ABB is capable of providing robotics solutions that help you stay competitive today and tomorrow.

Meeting demands of rapid changeovers

Not only does a robot automate processes such as cutting and arc welding, it also performs post-process applications such as quality control, assembly, packaging and palletizing. All integrated in a single operation that requires minimum operator intervention.

Robots used to be reserved for advanced assembly lines and long-series production. Due to their ever-increasing flexibility, resulting mainly from the intelligent use of offline programming and other software solutions, robots can today be economically viable even for smaller enterprises producing short series – or even for one-piece production.

ABB robots come with advanced, yet easy-to-use software solutions. Operators can easily change between ready-made robotic schemes, reducing change-over times.

Equipment and software packaged together

ABB provides robot solutions for every metal fabrication application: cutting, forming, joining, surface treatment, inspection and material handling. You can implement them at any level you like – from an individual palletizing cell to a complete automated production facility integrating material flow and final product inspection.

Purchasing all equipment and software from one supplier simplifies ordering, reduces costs and shortens delivery times. Since all ABB components have been lab tested together, you can trust them to work smoothly together as a single unit.

ABB has a large number of metal fabrication integrators in every part of the world and together with our global service organization, it adds up to giving you the best support to meet your needs.



Global service, support and training

Increasingly complex production lines demand more service to maximize availability. ABB supports you throughout the lifecycle of your equipment. Our field service includes service agreements, technical assistance and 7/24/365 call-out response.

“The aftersales service from ABB is very important to us. We expect ABB to deliver high quality, value-added service at all times. And that requires good personal relations between our companies. Together, as a team, we are striving for continuous improvement.”

Dirk Stoll
Plant Manager Roermond
ArvinMeritor Emissions Technologies

Local and global support centers hold inventory of new parts for dispatch within 24 hours or for

door-to-door delivery. Consignment stock can be stored on your site for instant access, in which case warranty begins when the part is used. Our web-based parts system, Parts OnLine, gives you instant access to global parts availability.

ABB training centers are located all around the world. No other robot manufacturer has such a large investment in training equipment, nor professional instructors dedicated full-time to the training of customer staff.

Robot automation solutions for every process

Together with our partners all over the world, we provide complete automation solutions for virtually every metal fabrication process in industrial applications. Thanks to ABB six-axis robots, automation can be implemented throughout the production line – from cutting steel plate or tubes, via a range of processing applications, to shipment of the finished part.



Cutting

Robots are ideal for mechanical, oxy, plasma, laser or water-jet cutting. They produce a consistently high quality, even in advanced operations such as cutting cone-shaped holes, by automatically compensating for internal friction in the robot's arms. Fixturing costs can be reduced since there is no need to re-position the workpiece between operations. Robots also eliminate the need for a gantry or other additional equipment, saving floor space.

Supported processes:

- Oxy cutting
- Plasma cutting
- Laser cutting
- Waterjet cutting
- Mechanical cutting



Forming

Robots eliminate the risk of injury in press tending, press brake tending or tube bending operations. They load and unload parts quickly, safely, and without fatigue. Working with heavy workpieces, one robot can replace two operators, by loading, unloading and carrying out material handling in a single sequence. ABB's BendWizard software offers rapid offline programming, making robots economically viable even in small batch runs.

Supported processes:

- Press tending
- Press brake tending
- Tube bending



Joining

Our arc welding solutions range from single-robot cells to complete manufacturing solutions. Multiple-robot configurations, in which one robot loads and positions the workpiece while one or several others weld, allow for rapid processing of even very complex operations. Our robots are also suitable for e.g. laser, plasma and spot welding as well as brazing, gluing and hemming.

Supported processes:

- Arc welding
- Laser welding
- Plasma welding
- Poke welding
- Spot welding
- Stud welding
- Brazing
- Clinching
- Hemming
- Gluing



Surface treatment

ABB paint robots eliminate hazardous manual work, while reducing paint consumption and increasing quality. Our complete painting solutions also include paint distribution equipment, atomizers and paint handling equipment. In finishing, robots relieve operators of harmful grinding or deburring work, while providing higher surface quality and throughput due to excellent path accuracy regardless of load.

Supported processes:

- Painting
- Deburring
- Grinding
- Cleaning
- Polishing
- Finishing
- Plasma coating
- Sealing



Inspection

Robots are ideal for verifying the shape of a workpiece after processing, or checking that a weld or string of sealing polymer or glue meets quality requirements. In measuring processes, a robot can be used to load the workpiece into a measuring device, or be integrated into the measuring process itself. Thanks to their reach and precision, robots can perform sensitive measuring tasks in places that are difficult to reach manually.

Supported processes:

- Final parts inspection
- Inline measuring



Material handling

ABB robots range from picker robots that stack small components to power robots that swing 550 kg bulky steel plate. They come in different protection classes, making them as suitable for clean-room operation as for dusty or humid environments. To cut cycle times, you can push an ABB robot hard without overloading it, thanks to the integrated overload protection system, which automatically adjusts the operating speed to the load.

Supported processes:

- Holding and manipulating the workpiece while processing
- Material handling between operations
- Stacking / de-stacking
- Picking
- CNC machine tending
- Palletizing / de-palletizing

Example of a robot-automated production line:

From steel tube to bicycle

The illustration shows a sample plant layout for manufacturing bicycles, using a high level of robot automation. It shows the gradual processing of steel tubes into a complete bicycle frame, involving cutting, forming, joining, surface treatment and material handling operations.

4 • Inspection

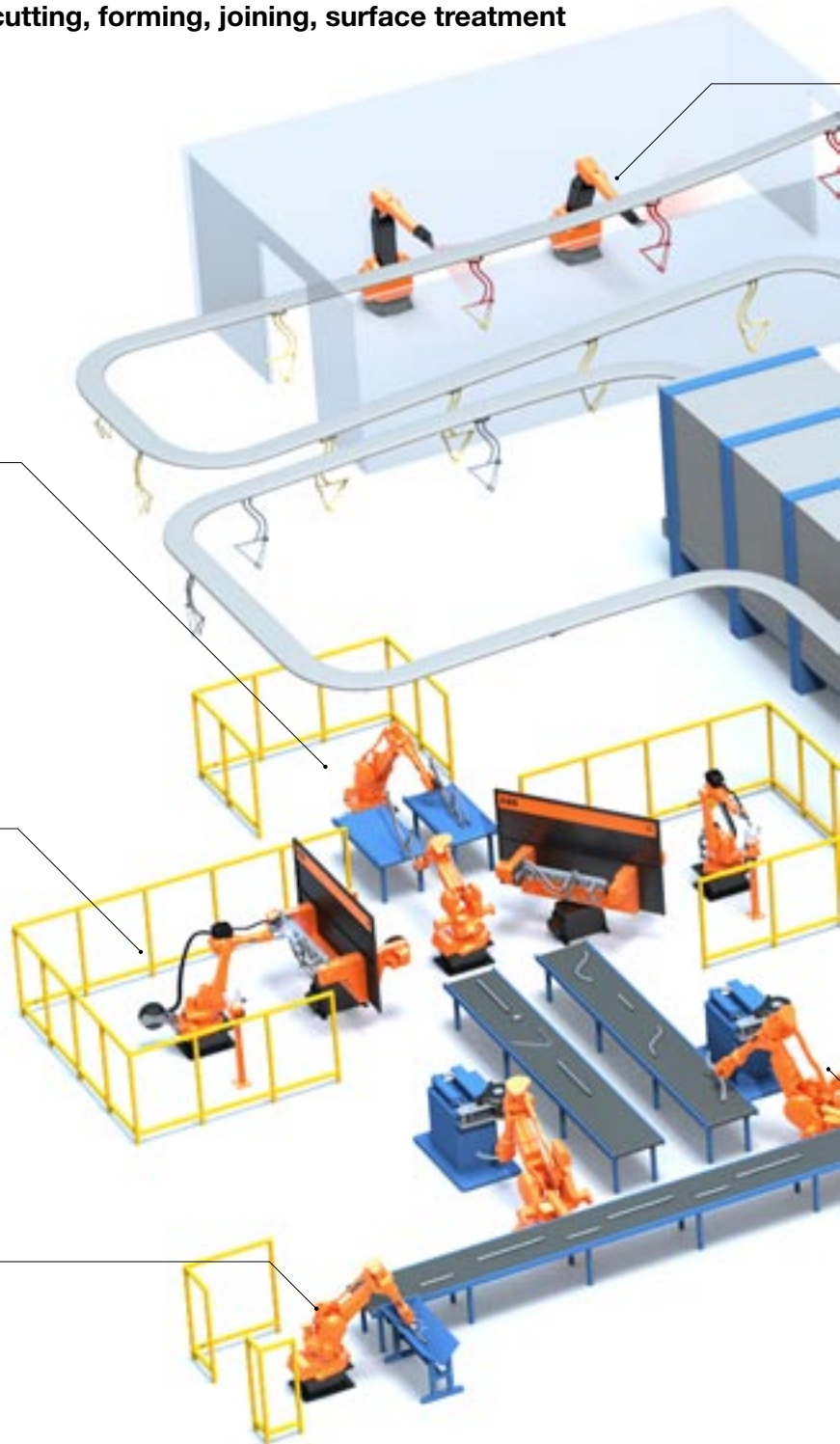
An inspection robot measures the tolerances of each weld using a camera and places the approved frame on an overhead belt for painting. Faulty frames are discarded.

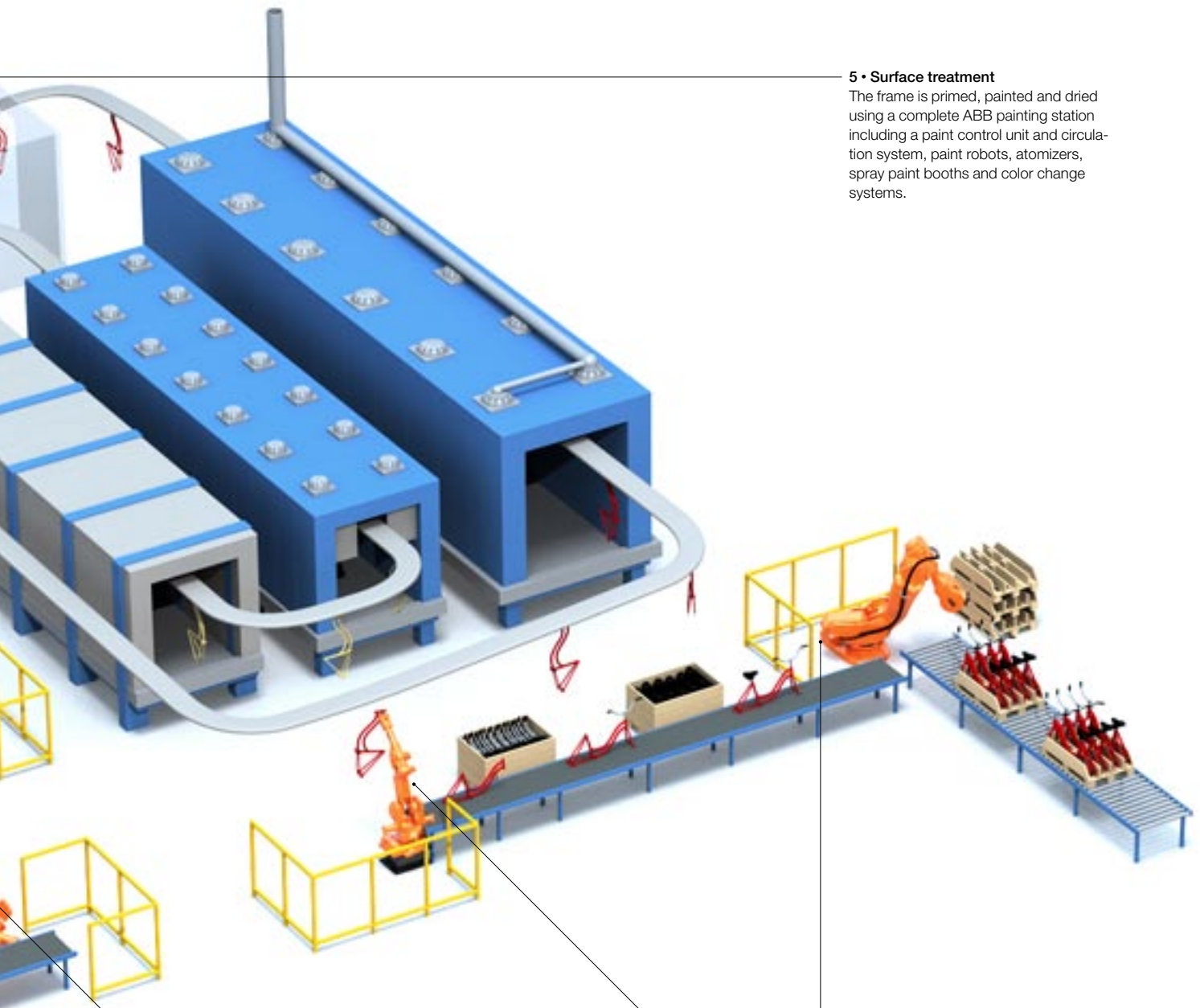
3 • Joining

A loader robot picks (center) up the tubes and loads them into a positioner, along with other frame parts. The positioner swings around 180 degrees to allow an arc-welding robot to begin welding. After welding, the loader robot extracts the frame and places it on an inspection table. Two parallel welding cells are used for maximum efficiency.

1 • Cutting

A plasma-cutting robot makes cone-shaped holes in the bicycle's head tube and seat post mast to prepare for arc welding of the lower bars.





5 • Surface treatment

The frame is primed, painted and dried using a complete ABB painting station including a paint control unit and circulation system, paint robots, atomizers, spray paint booths and color change systems.

2 • Forming

Robots load the lower bar tubes into a tube-bending machine that gives them the desired curved shape. After processing, the robots extract the tubes and place them on a conveyor belt for downstream processing.

6 • Material handling

A robot (left) places the painted frame on a roller conveyor for manual mounting of saddles, handle bars, etc. A second robot palletizes the bicycles to prepare for packaging and delivery.

A complete range of six-axis robots

ABB six-axis robots give you a unique advantage – total flexibility. As standard products, robots can be implemented with a minimum of prior engineering work to automate practically any processing and post-processing task in your plant.

Flexible and cost-effective production

By using robots to carry out post-processing tasks while the next part is being produced, you can do more in the same amount of time. For example, the robot can inspect and place a bended tube on a conveyor belt while the next tube is being processed in the tube-bending machine. Combining the work of two robots, one can be used to arc weld while the other is loading the next part on a positioner.

This improved productivity comes with the flexibility to compete with increased agility, enabling you to cope with shorter product life cycles and tighter operating margins. Catering to every conceivable need, our robots perform a variety of tasks during the production cycle. This means you can look forward to a far more flexible and cost-efficient operation

The trend points to six axes

Six-axis robots are today more accessible to manufacturers than ever before – which is reflected in increasingly advanced plant automation solutions around the

world. Easy-to-use software and man-machine interfaces are important explanations to the current trend towards using six-axis robots.

Programming used to be a time-consuming task. Today, offline programming lets engineers optimize process operation and eliminate errors before going into production.

ABB's FlexPendant interface helps operators take on more tasks themselves, including changing between ready-made welding schemes and performing fault management, speeding up changeovers while reducing operational disturbances.

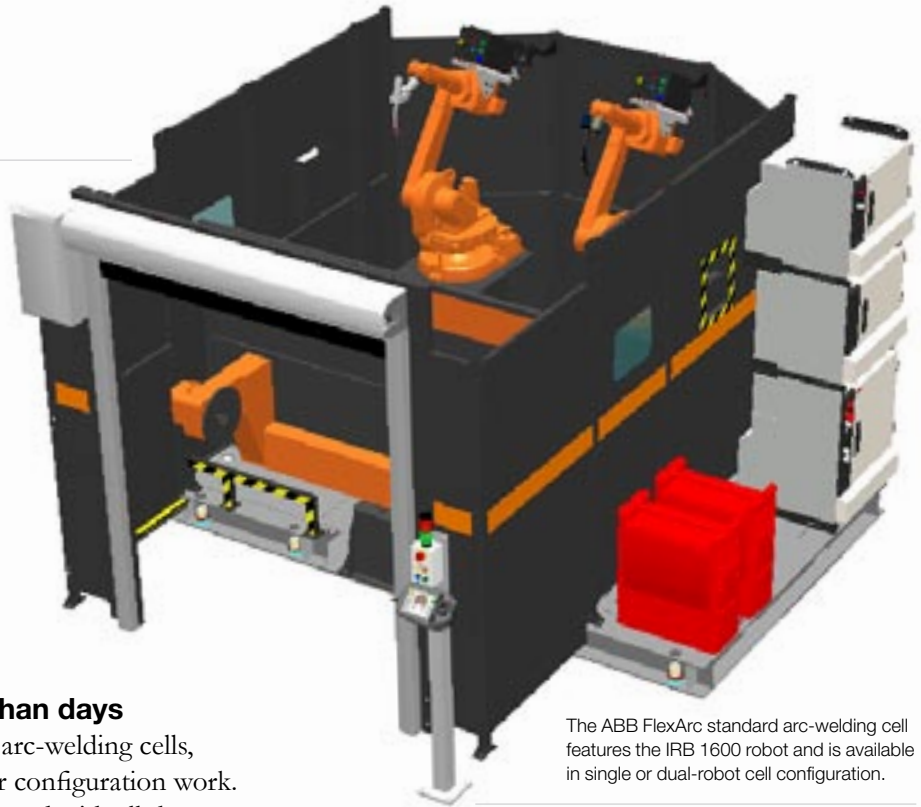
ABB's robot family

ABB offers everything from small, fast and cost-efficient robots for the production of smaller items in large volumes to powerful, shelf-mounted machines with long reach and high handling capacity for heavy parts production.

Our range covers the whole spectrum of operating environments. With a reputation for reliability, durability, fast-working cycles and superior accuracy, ABB robots are suitable for the demanding or arduous environments in metal fabrication.



General robots	IRB 140	IRB 1410	IRB 1600	IRB 2400	IRB 4400
Lifting capacity (kg)	5	5	5 – 7	5 – 16	10 – 60
Reach (m)	0.81	1.44	1.2 – 1.45	1.5 – 1.8	1.95 – 2.55



An arc-welding cell up and running in minutes rather than days

ABB offers a range of packaged arc-welding cells, ready to implement without prior configuration work. These solutions come pre-engineered with all the components necessary for robot-automated arc welding – robot, positioner, power source and ABB’s IRC5 control system.

Just place the cell in the desired location in the plant, connect the power cable, air pressure and shielding gas, select the appropriate welding program and start working. A virtual replica of the actual cell is always available for you at abb.com.

The ABB FlexArc standard arc-welding cell features the IRB 1600 robot and is available in single or dual-robot cell configuration.

As complete solutions, our arc-welding cells are easy to move within or between plants – making them perfectly suitable for today’s rapid production change-overs. And since the cells are based entirely on standard components, they are highly cost-effective and equally available to customers all over the world.



IRB 6600	IRB 7600	Paint robots	IRB 540	IRB 580	IRB 5400
200 – 350	300 – 450	Lifting capacity (kg)	5	10	25
2.55 – 3.5	2.3 – 3.5	Reach (m)	1.7 – 2.6	2.2 – 2.6	3.1 – 3.5

Controller and software solutions for easy operation



"The FlexPendant makes robot operation really easy," says Kees Loots, robot operator at Van de Wetering in Boxtel, Netherlands. "The operator panels are so easy to understand it only takes x days/hours/etc to get into full production."

Make life on the shop floor easy

ABB's IRC5 robot controller offers a lot of opportunities when it comes to programming and operating robots. IRC5 can control up to four robots at once, independently or in coordinated patterns.

This makes robot performance more efficient, reducing cycle times while increasing production flexibility. IRC5 can control a wide range of industrial motions faster, more flexibly and with more uptime than any comparable controller.

Now you can look forward to greater efficiency in terms of installation, set-up and actual production. With the ABB FlexPendant's color screen, logical and simple visual language and graphical user interface, programming is easy, operation is easy and information access is easy.

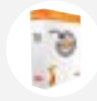
Optimize your robot for arc welding

RobotWare Arc is a software product that optimizes your robot for arc welding. It is a simple yet powerful program since both the positioning of the robot and the process control and monitoring are handled in only one instruction. I/O signals, timing sequences and weld error actions can be easily configured to meet the requirements of each specific installation.

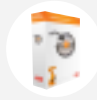
Advantages of RobotWare Arc

- Easy to program and operate with graphical FlexPendant
- Tuning of welding parameters during operation
- Short learning time
- Easy to access different motion solutions such as weaving in different patterns
- Prepared to handle different types of welding equipment
- Hot edit to optimize positions and speed in run mode
- Advanced error handling
- Prepared for different types of sensors for seam tracking

RobotStudio for simulation and programming

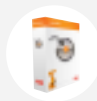


RobotStudio lets you use your PC to build and simulate cells as well as prepare programming to reduce installation and changeover time. In short, run the entire production on your computer before you go live.



ArcWeld PowerPac for RobotStudio lets you simulate arc welding programs for your robots on your PC.

More software for increased productivity



VirtualArc provides programmers and process engineers with a rapid, yet detailed evaluation of a weld. This reduces the need for testing while improving productivity and welding quality.



RobotWare Arc helps you optimize programming and operation of arc welding applications while ensuring maximum arc welding performance.

MultiArc lets you run four robots on one controller. The ABB Dynamic Model with QuickMove and TrueMove optimizes robot path accuracy, acceleration and speed. Cuts programming and cycle time.



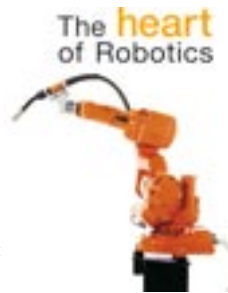
IRC5
ABB's IRC5 robot controller lets you control up to four robots simultaneously.



FlexPendant
ABB's graphical input device FlexPendant makes robot programming easy.

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's products, systems and services available wherever they are needed.



Welcome to ABB – The heart of Robotics



www.abb.com/robotics