

ABB Robotics, Vitezslav Lukas, 2013-06-18 in Mainz

Opportunities in Welding & Cutting Value Provider Conference 2013

Welcome !

- Arc welding
- Laser cutting
- Feedback from you

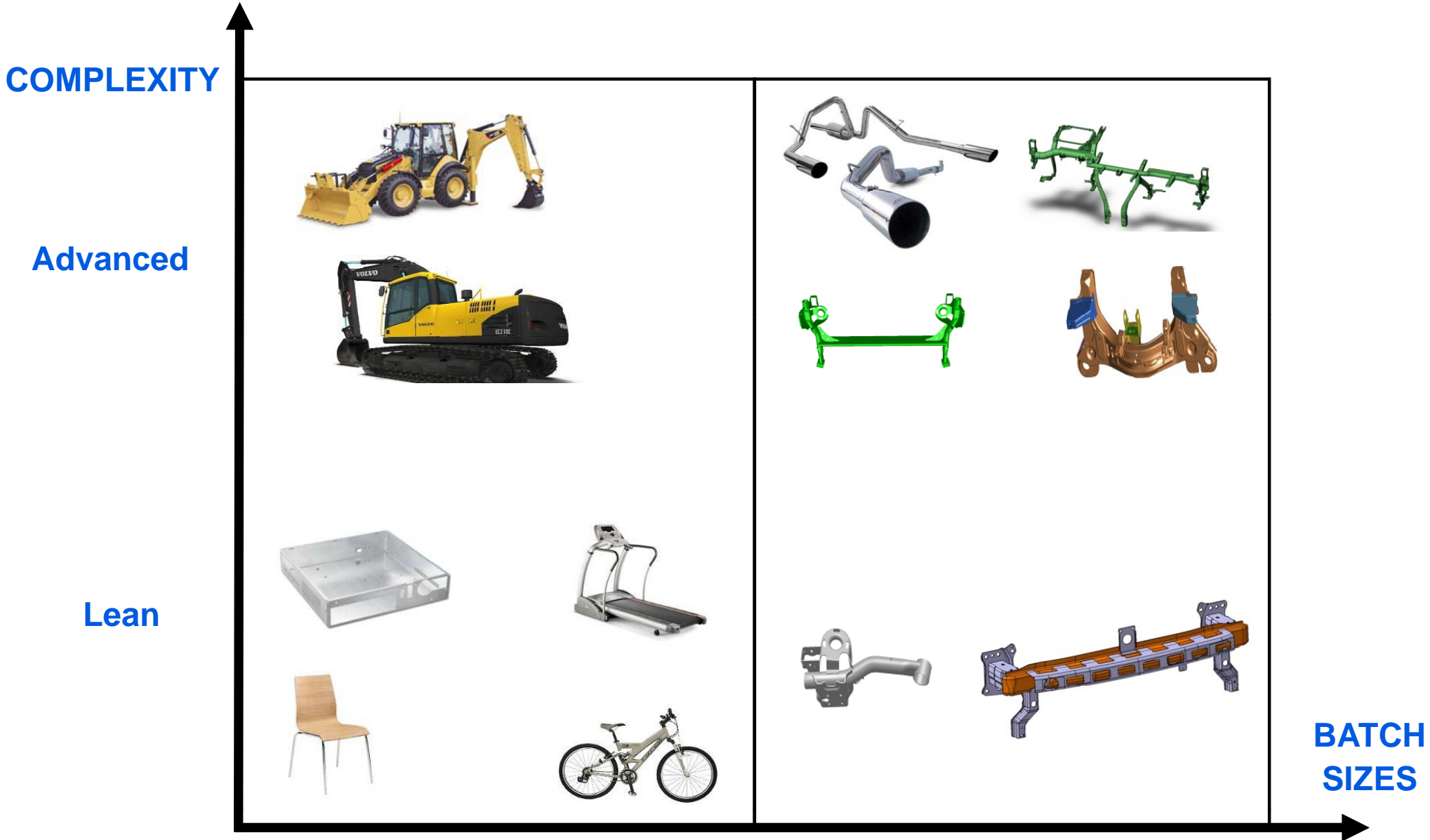
- *Not included: Spot welding is presented in another session*

ABB is the pioneer in robotic arc welding

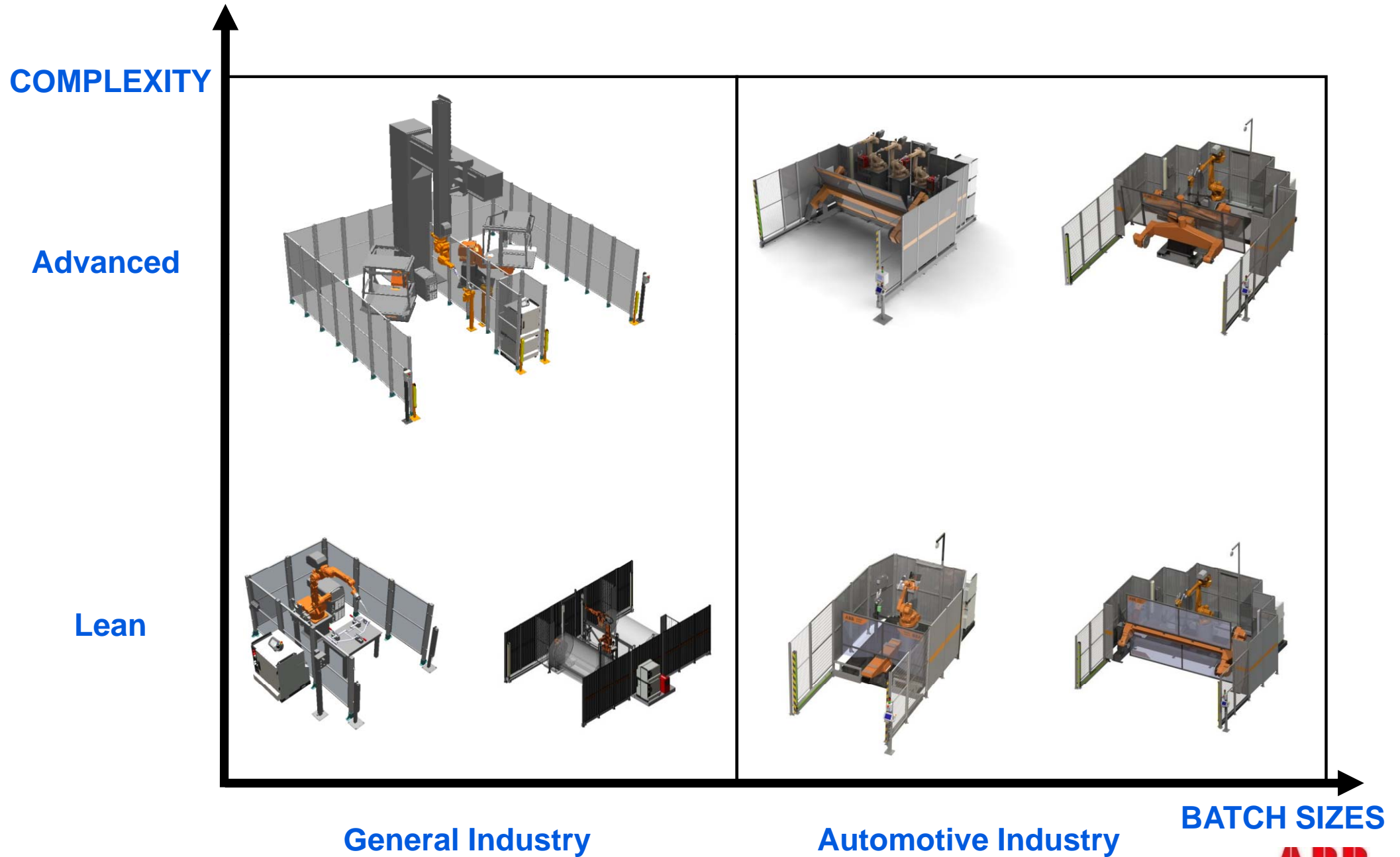


- ABB sold the world's first arc welding robot in 1975
- ABB has since delivered 30 000 Arc Welding robots
- Well prepared to handle ArcWelding
 - Stiff robots, Positioners, Track Motions
 - Peripherals (Motors, Gear Units..)
 - ArcWelding cells
 - Robust software platform
 - Robot controller firmware
 - Off-line programming
 - Process simulation
 - Interfacing to power sources

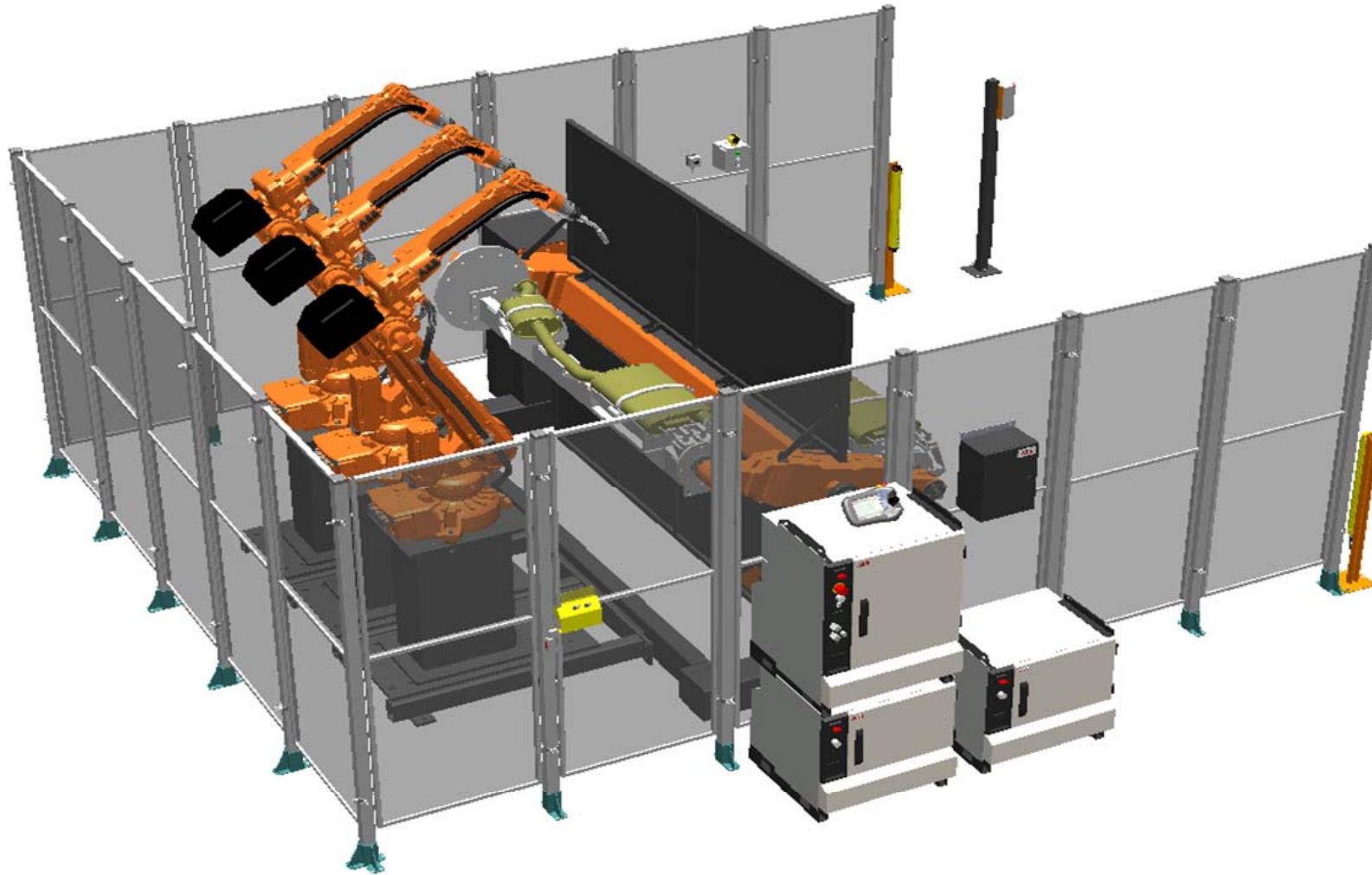
The arc welding market



Types of production cells

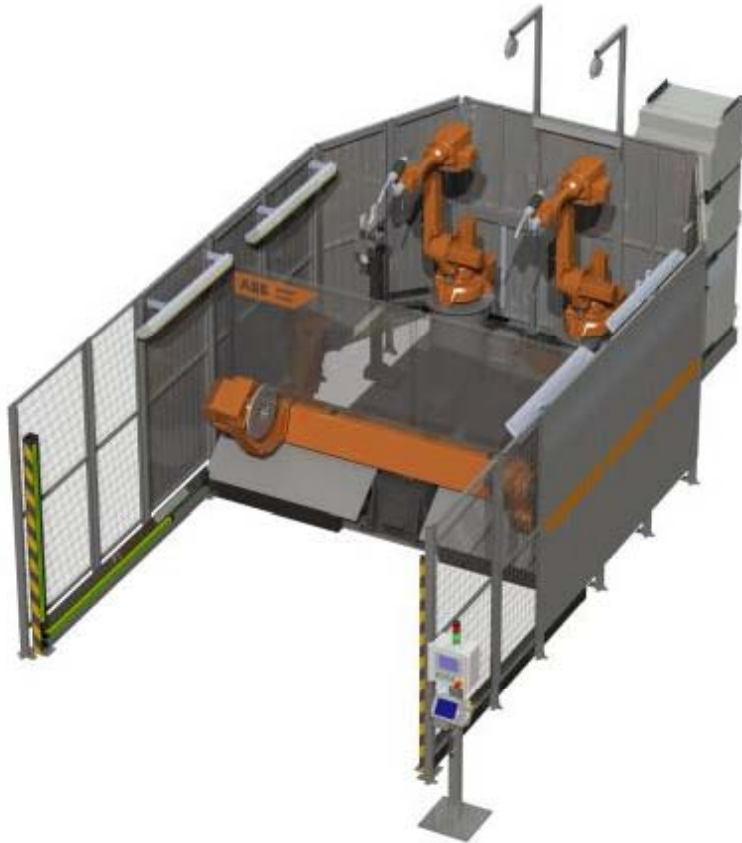


Automotive offer – High output and high welding quality



Automotive offer – Standardized ArcWelding cells

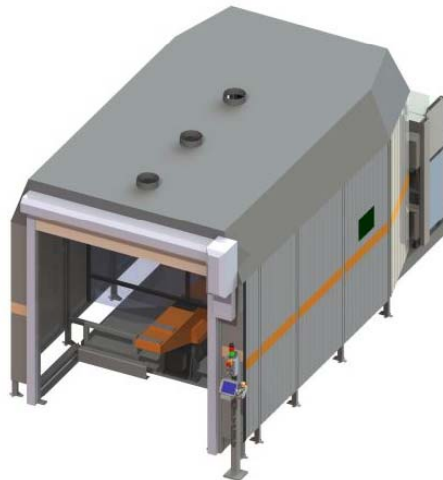
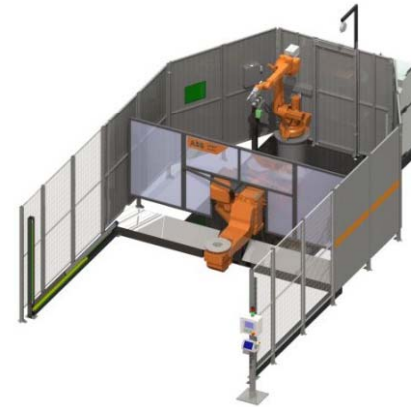
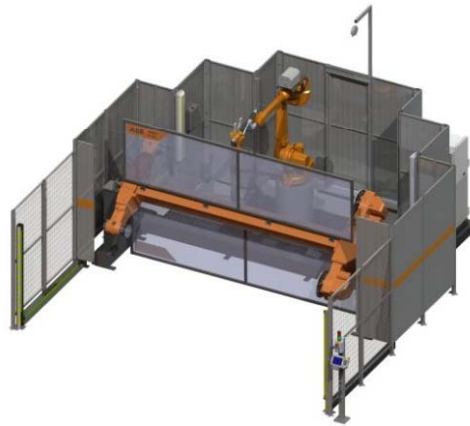
FlexArc®



FlexArc provides high customer values

- Predictable „Plug&Produce“ solution
- Full library of Layouts and RobotStudio models
- Consisting of integrated components onto one common platform
- Designed to use minimum amount of floor space
- Wide range of FlexArc cells
- No engineering on cell is required
- Short lead time (ready-cell on stock)
- Reliable, proven solution
- Easy to install and relocate
- Valuable functionalities improving productivity (BullsEye, WeldRecovery, HMI)

Automotive offer – Standardized ArcWelding cells FlexArc® - examples

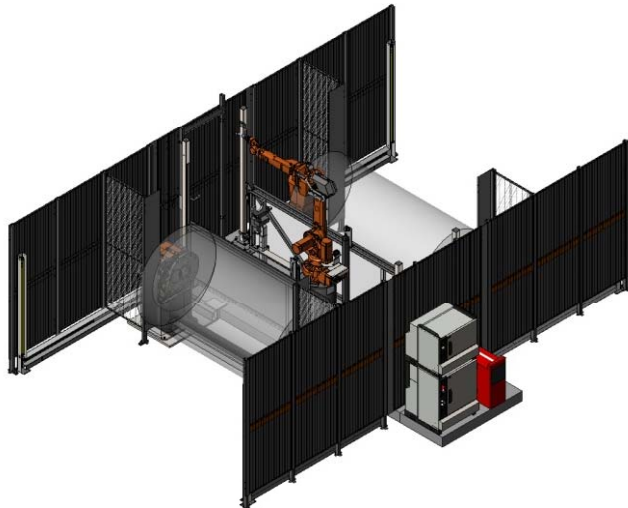


General industry

Welding of parts with lower complexity

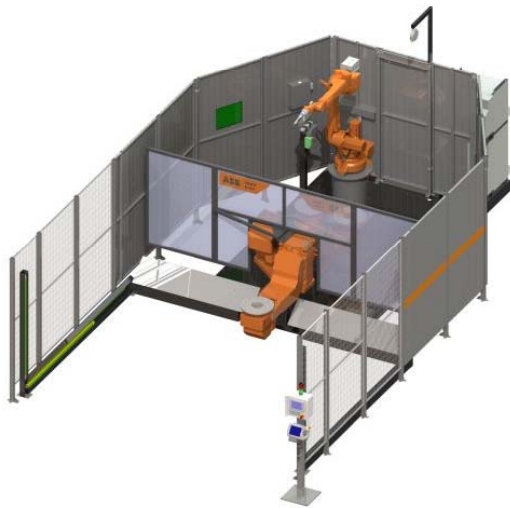


- High demand on cost effectiveness
 - While keeping versatility for future products
- Simple design and welding equipment
- Different logistics and material flow compared to Automotive



General industry

Welding of parts with medium/high complexity

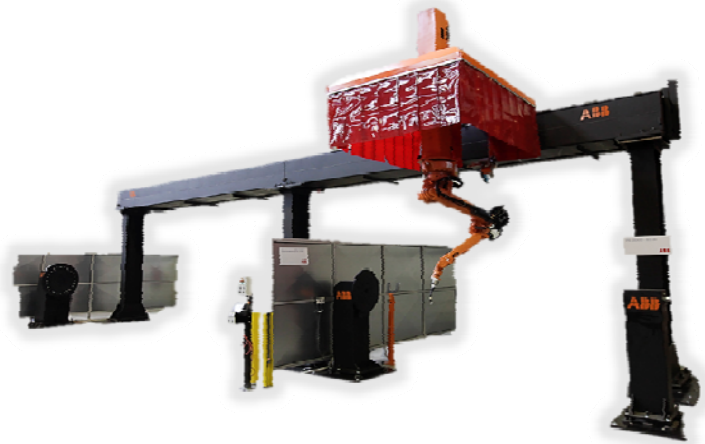


- Demand on positioning in more than 1 axis
- Keeping versatility for future products
- Quality welding process and equipment
 - Frequent use of seam tracking
 - Manual Jog functionality
- Off-line programming appreciated in many cases



General industry

Welding of large structures



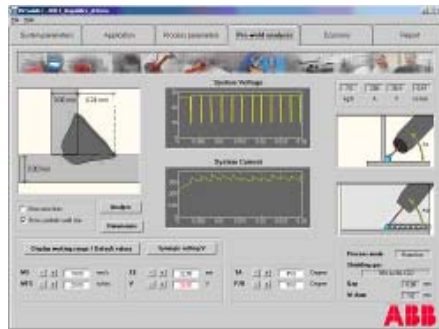
- Large structures determine type of the station
- Complex welding process and equipment
 - Frequent use of seam tracking
 - Manual Jog functionality
- Reliable equipment needed to withstand harsh environment
- Now available:
 - Modularized Gantry
 - High payload positioners



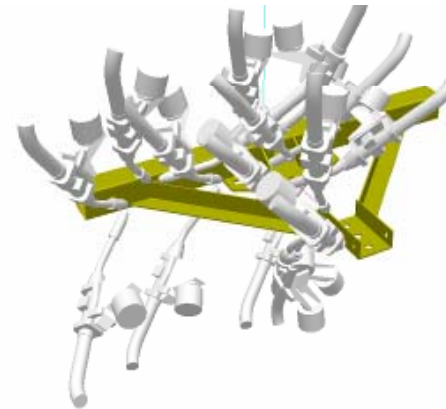
RobotStudio brings high cell efficiency

Short and reliable cycle times, easy to re-program

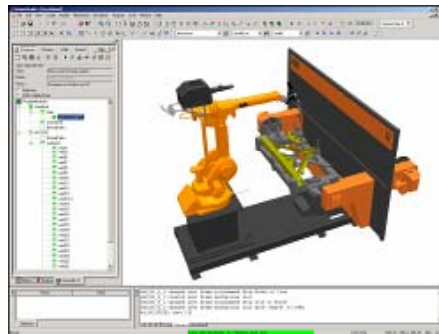
Process simulations...



..give torch angles for fixture design...



Off-line programming....



..gives cycle time reductions...



RobotStudio ArcWelding PowerPac

Accurate simulations and true off-line programming

RobotStudio

ArcWelding PowerPac

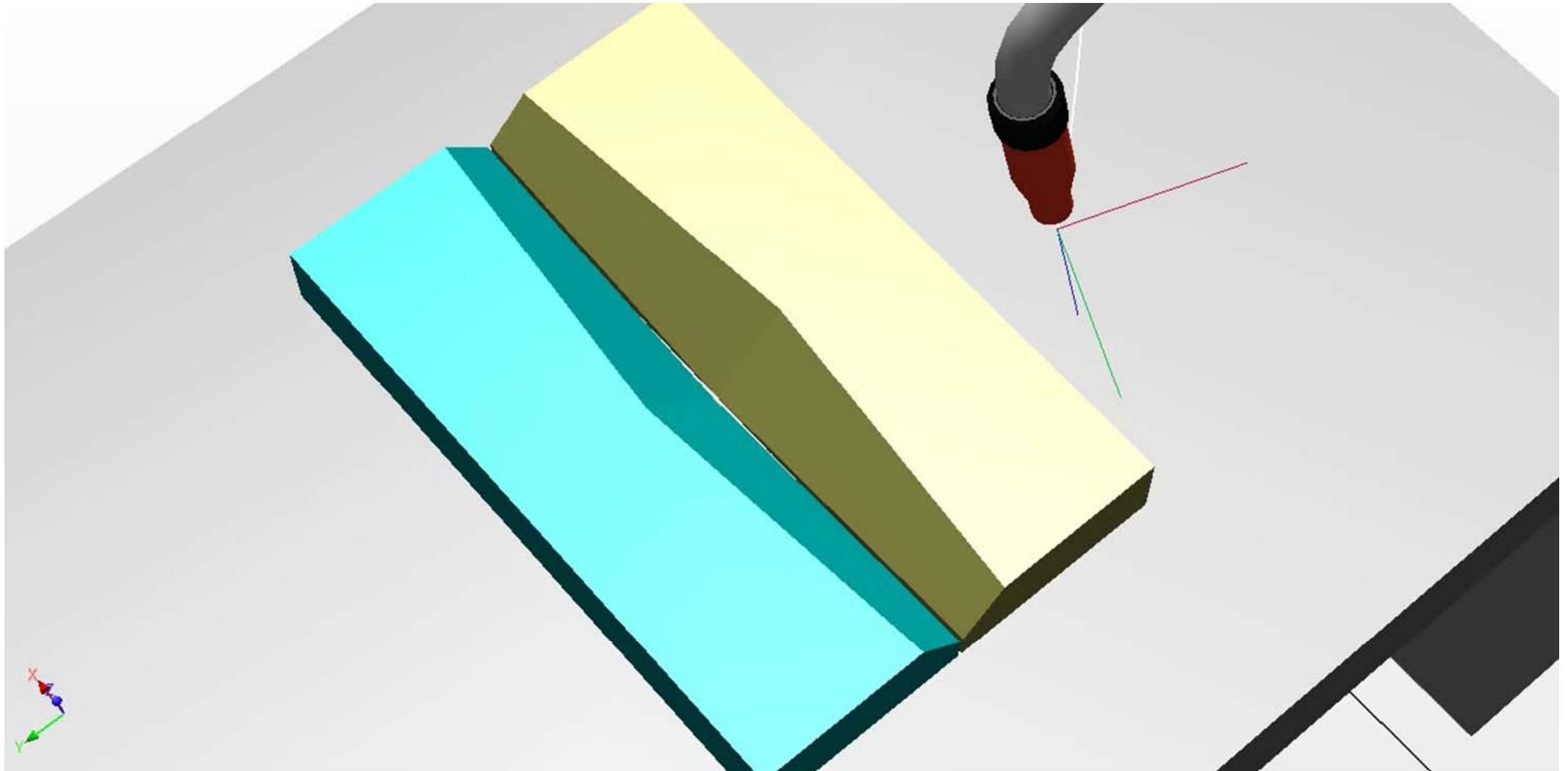
Production Manager

Increasing production uptime and quality

RobotWare
Production Manager

General industry

WeldGuide III with adaptive filling



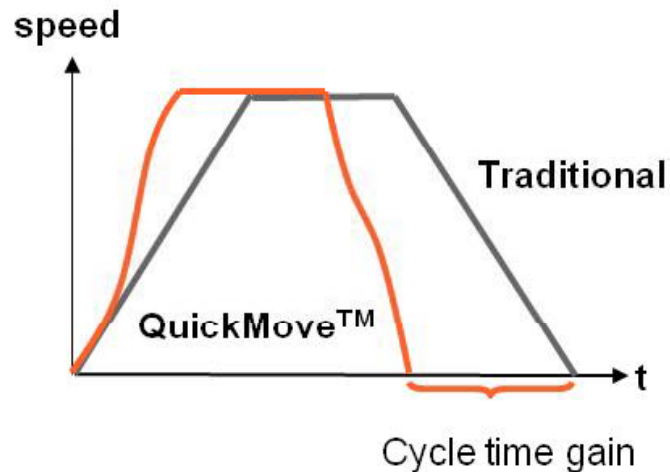
General industry

Capability to integrate Laser Tracking Systems

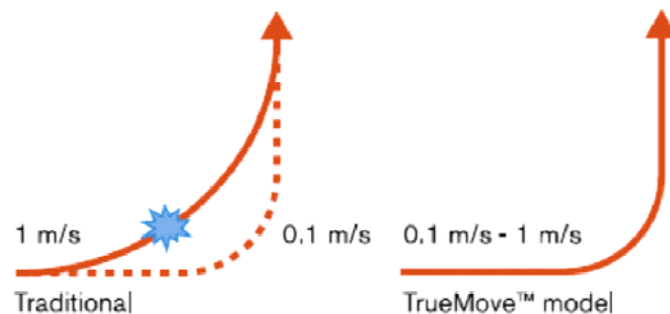


QuickMove™ and TrueMove™

Fast and accurate movements, high quality output



- QuickMove™
 - Highly accurate dynamic model with advanced servo control
 - On-line optimization of speed and acceleration
 - Shorter cycle times vs. competition



- TrueMove™
 - For high accuracy applications
 - Makes the path independent of the speed.
 - The best path accuracy and repeatability on the market

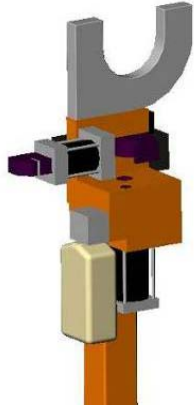
IRBP positioners - High safety level

Automatic restart after emergency stop

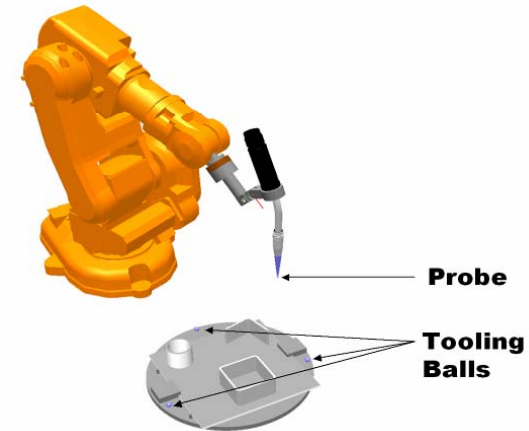


Tools that enhances quality, reliability & up-time

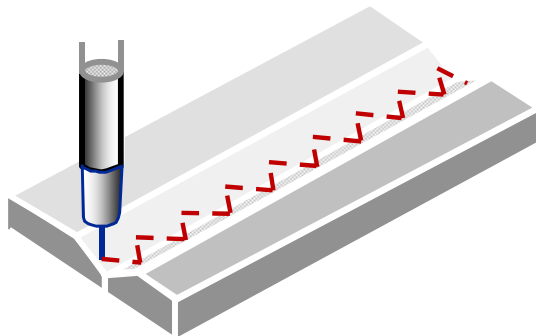
Torch service center



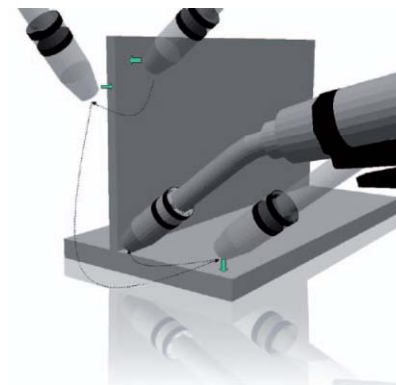
Navigator



WeldGuide III



SmarTac



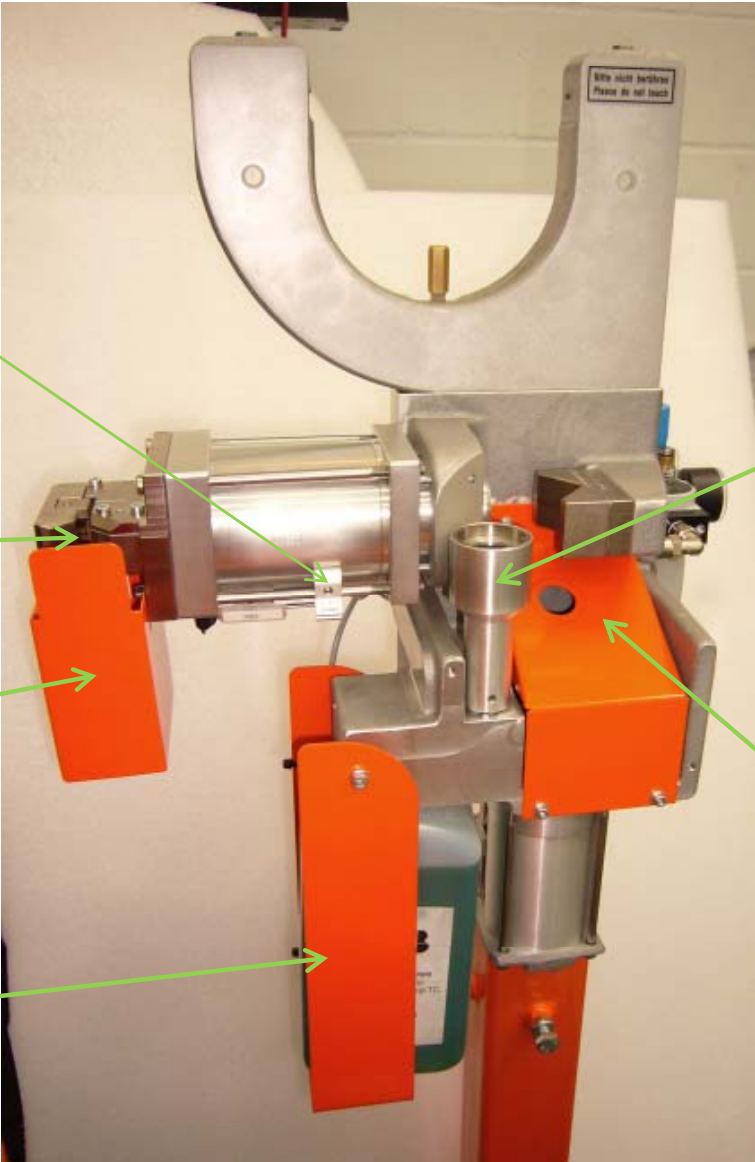
Facelift of well appreciated ABB Torch Service Center

Sensors to detect the position of the pneumatical cylinder

Spread insertion for wire cutting

Tank for wires

Protection plate to shelter the bottle of release agent & level sensor



Socket for a better spray result

Beveled cover to direct the milled weld spatter



Single point of programming

Shortens the commissioning and programming time

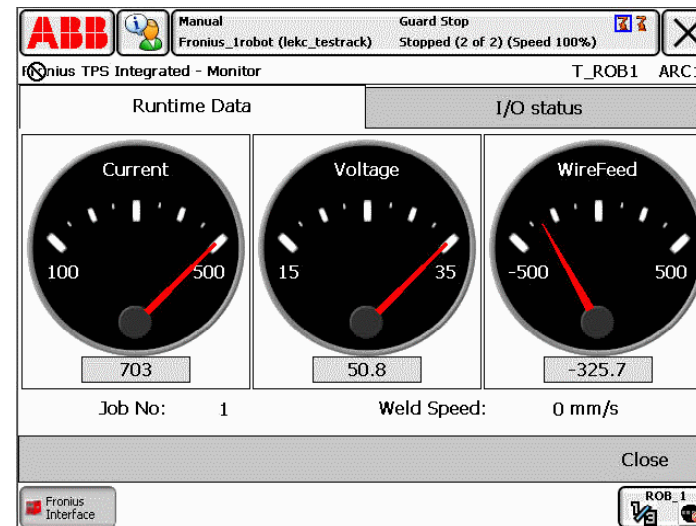


Full integration of the process equipment

Ex. Fronius



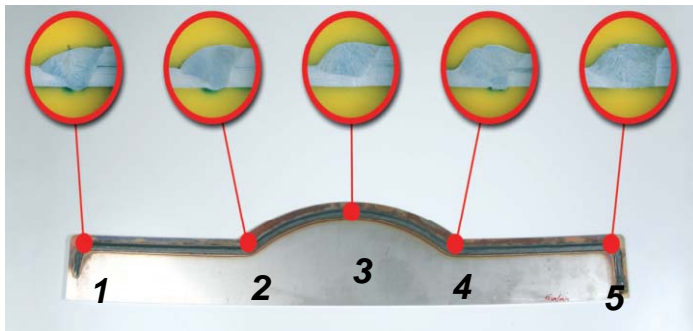
- Integrated hose package
- Integrated wire feeder
- Integrated cabling from wire feeder to the base
- Fronius TPS integrated user interface → “Single-point-of-programming”



Speed Weld Pack with SKS power source

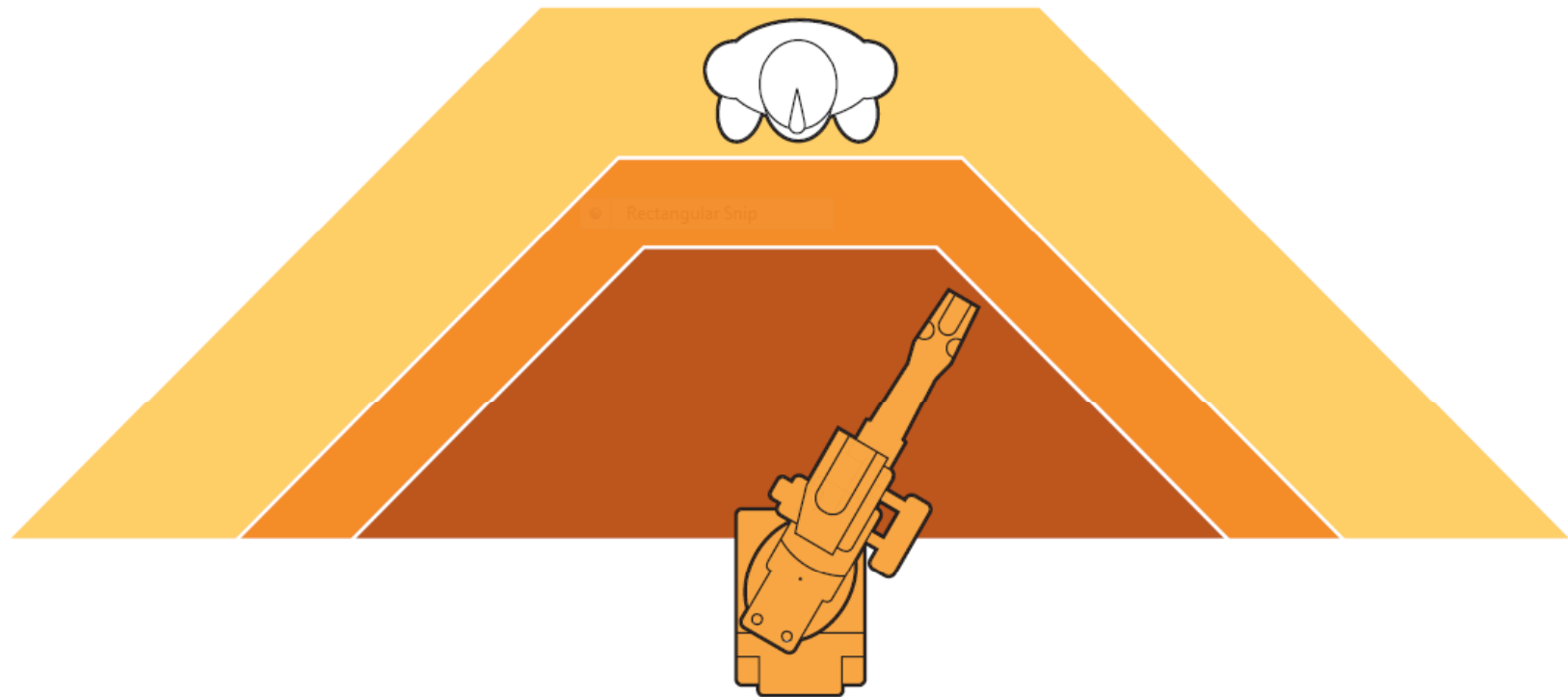


- If the TCP speed increases/decreases the wire feed speed will automatically react
- **Optimum welding results** with constant weld penetration and identical appearance at all points of the weld seam (even at the torch reorientation points)
- **Constant energy input per length** – the energy provided in time remains constant during welding
- **Process optimization** – visualization of the actual TCP speed during welding supports easy optimization of the process.
- **Work made easier and time saved** – even with complicated weld seam geometries only one welding program and one welding speed setting is required



SafeMove

Humans and robots interacting in a safe way

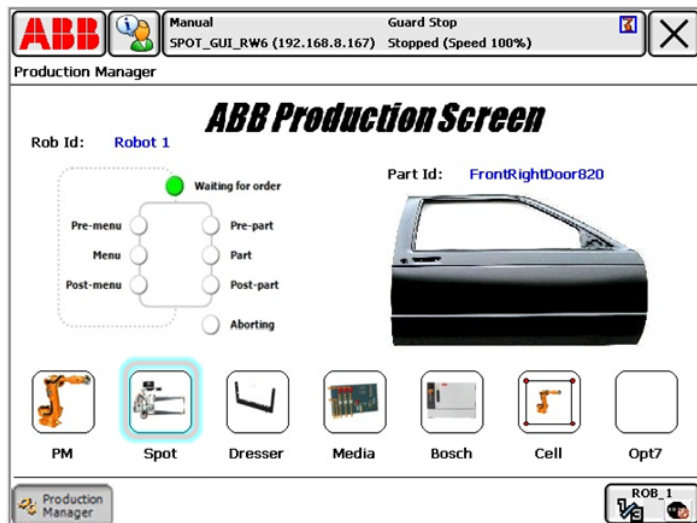


Production screen

NEW tool to customize FlexPendant screens

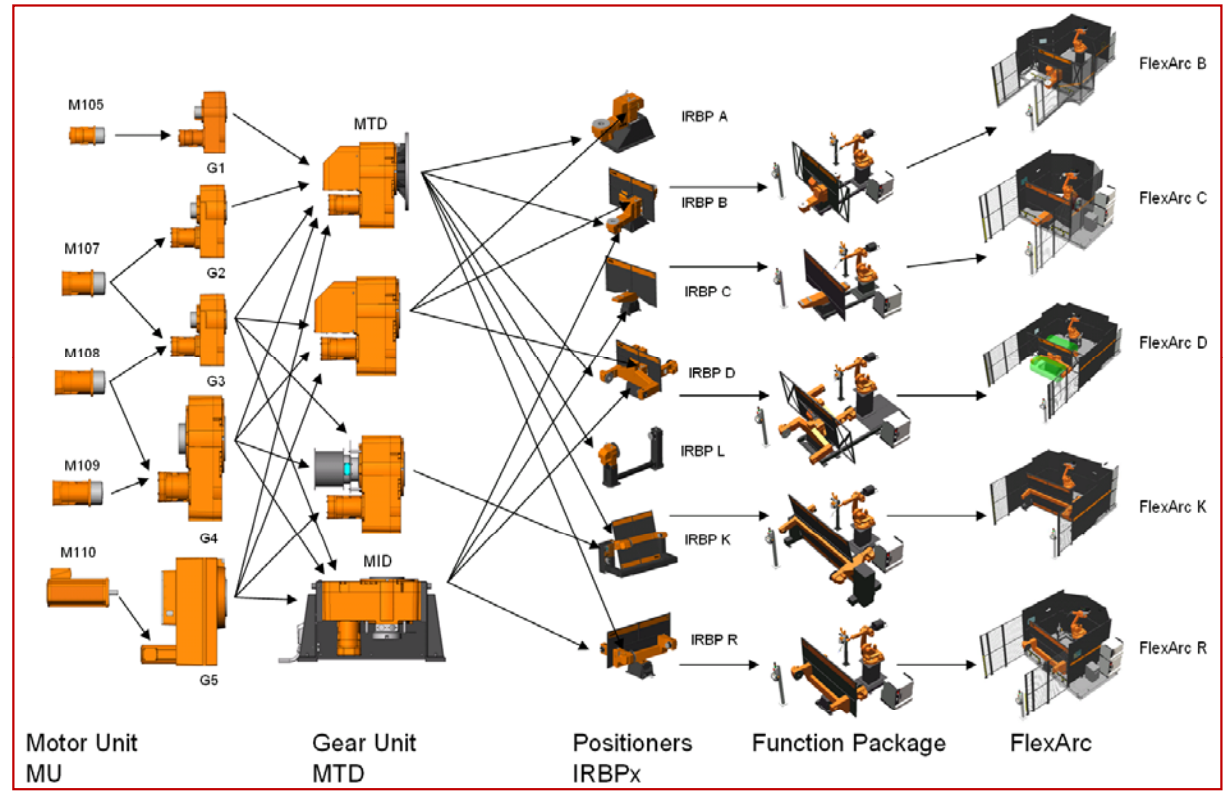


- Benefit: Enables operators to interact efficiently with robot cell from FlexPendant
 - Intuitive graphical interface lowers learning curve
 - Quick overview of cell status
- Development of screens made with ScreenMaker and FlexPendant SDK

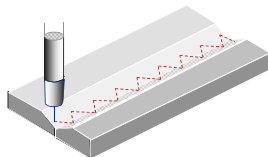


Arc welding products

Product overview



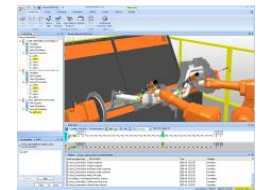
Torch Service Center with BullsEye



Weldguide III



RobotWare Arc

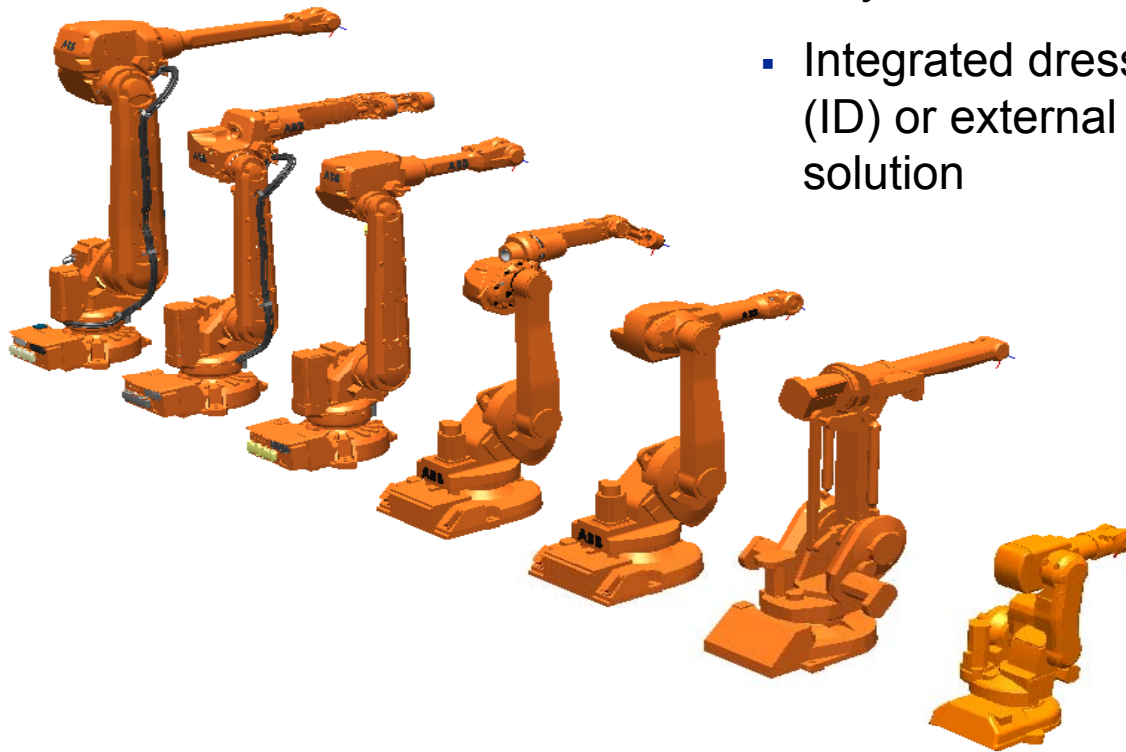


RobotStudio AW PowerPac

Arc welding products

Wide range of robots for all your needs of welding

- Reach from 0.8m to 2.5m
- Payload from 4kg-20kg
- Integrated dressing solutions (ID) or external dressing solution



Arc welding products

Wide range of positioners and track motions



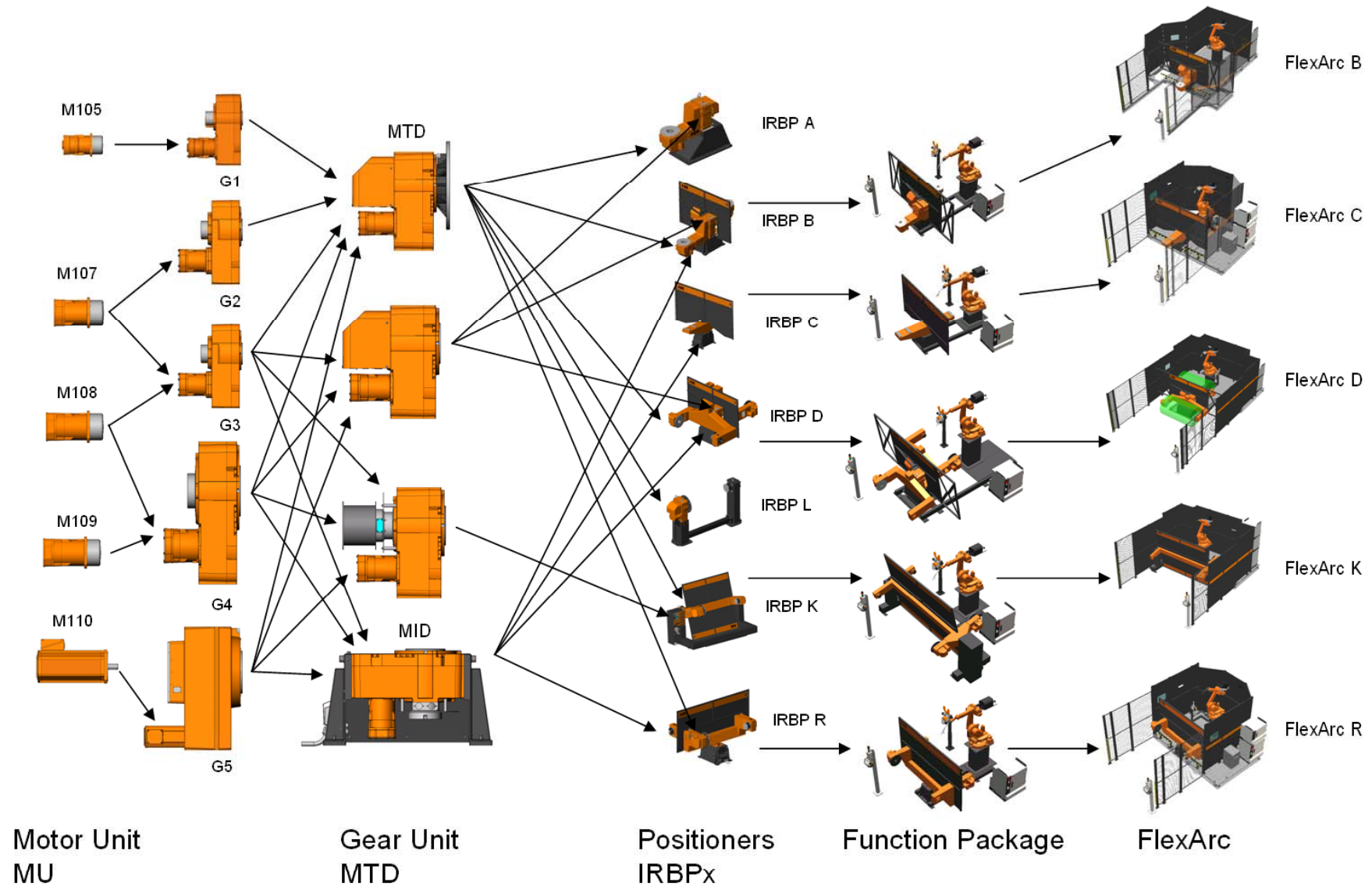
Arc welding products

Motor and gear units for easy integration



Arc welding products

Integration levels as you demand...



Remote Service

Securing your production

Remote Service

The technology to reach your robot system globally



“Black box in the airplane”

Features for advanced services

- Real time alarm monitoring & notification
- Online via MyRobot to analyze and solve failures
- Predictive failure indication
- Diagnostic for predictive maintenance
- Up and running within minutes

Technologies

- Wireless or internet data transmission
- Customer web interface
- Secured VPN access

Laser Cutting: Pre-engineered cells

Application centers in Europe, Americas and China



- Cutting applications
 - Hot stamped steel and hydro-formed parts
 - Ferrous material $\leq 6\text{mm}$ (0.25") in thickness
 - 3D contoured surfaces
- Benefits
 - Up to 35% lower capital investment
 - Higher manufacturing flexibility
- Key cell components
 - IRB 2400 and IRB 4400 for best combination of path accuracy and arm rigidity
 - IRBP Positioners
 - Calibration tools
 - Laser cutting softwares



RobotWare Cutting

RobotStudio Cutting PowerPac

Robotic Laser Cutting

From pre-purchase to operation



- Investment cost lower than traditional 5-axis laser cutting machines

Robotic Laser Cutting

From pre-purchase to operation



- Productivity comparable to traditional 5-axis laser cutting machines in this price range
- Part and shape dimensions are comparable to cutting machines

Robotic Laser Cutting

From pre-purchase to operation



- Variety of cell configurations to meet specific requirements, including multiple robots

Robotic Laser Cutting

From pre-purchase to operation



- Generate and test robotic cutting programs in an off-line environment before production starts
- Fast and accurate tuning, calibration, integration and generation of programs on the robot controller

Robotic Laser Cutting Lab Cell

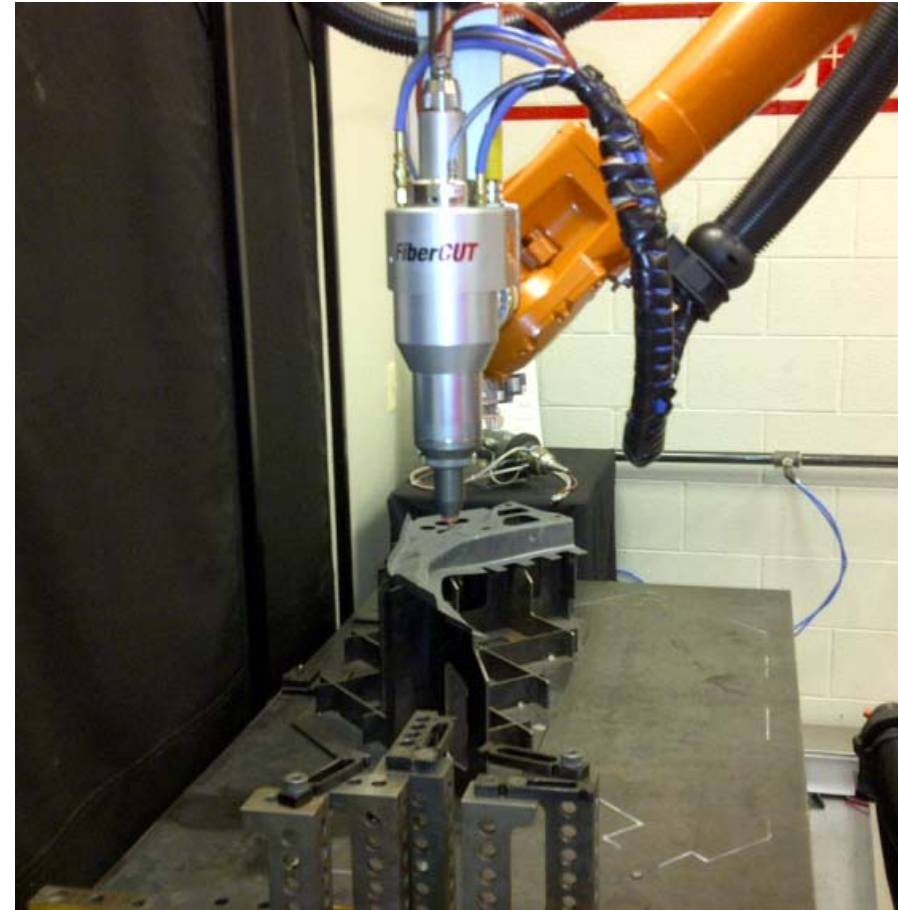


- **Laser Equipment:**
 - Laser : Rofin(2kW) and Trumpf(3kW)
 - Cutting head: Precitec
 - Fume Extraction : Bofa International
 - Cutting gas: O2 and N2
- **Robot :**
 - IRB2400 prepared for Laser Cutting
 - RW Cutting
- **Controls:**
 - ABB AC500-S control box for standalone cells
 - Control Panel ABB CP675
- **PC tools:**
 - RobotStudio Cutting PowerPac
- **Laser Enclosure**

Laser Cutting Repeatability Study

Process Parameters

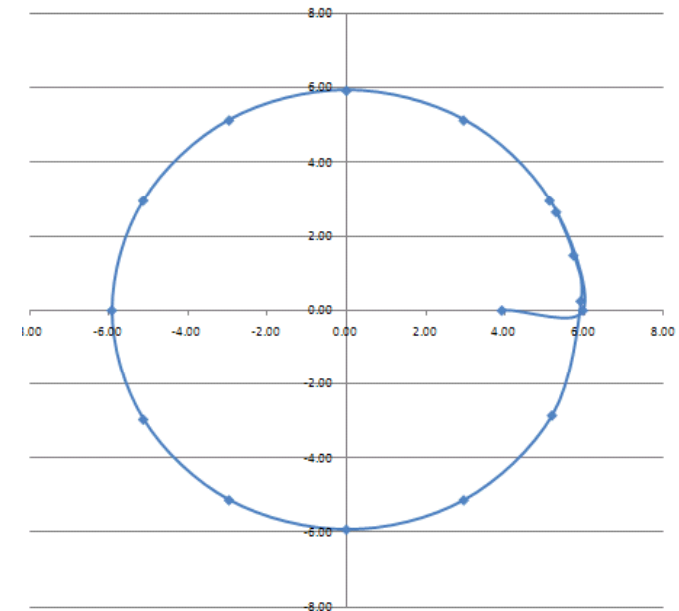
- Hole Diameter: 12.05mm
- Cut Speed: 45mm/sec
- Gas Type: Nitrogen
- Gas Pressure: 14,5bar
- Tip Standoff: 1.0mm
- Focal Point: -3.0mm



Laser Cutting Repeatability Study

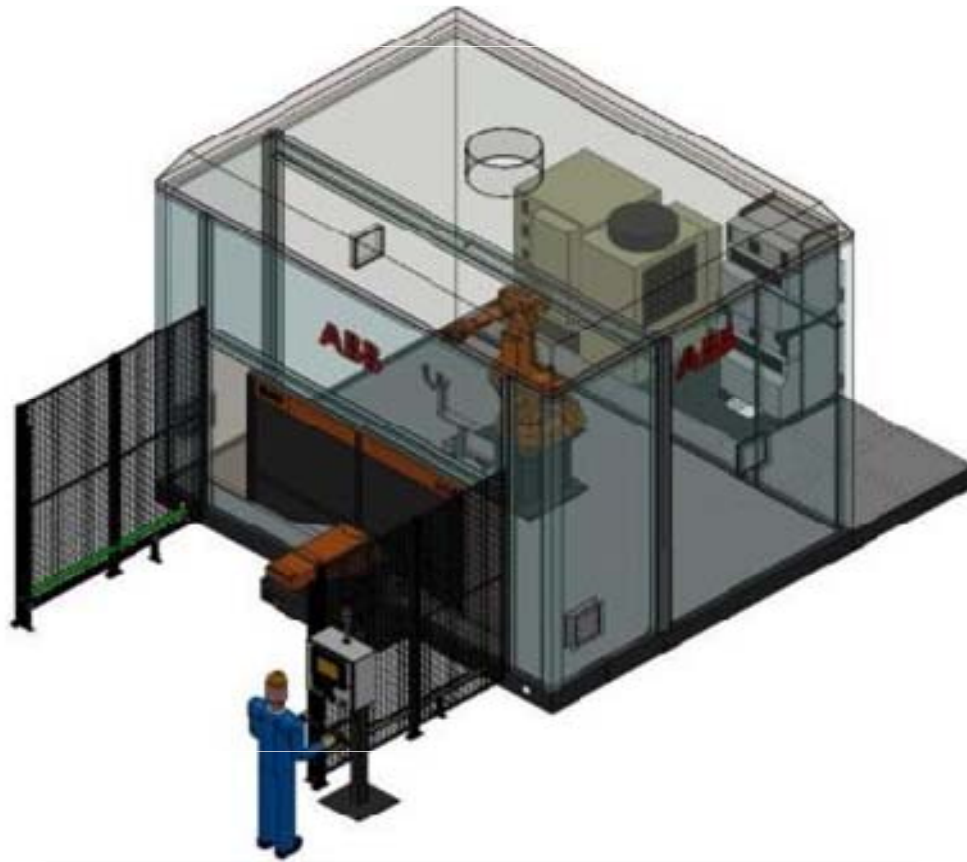
Conclusions

- The total measured range of the 30-piece laser cut hole sample was = 0.05mm
- Alterations to the lead-in segment of the cut virtually eliminated the small burr found at the start/stop location of the cut
- The elimination of the burr will improve the diameter repeatability of the hole

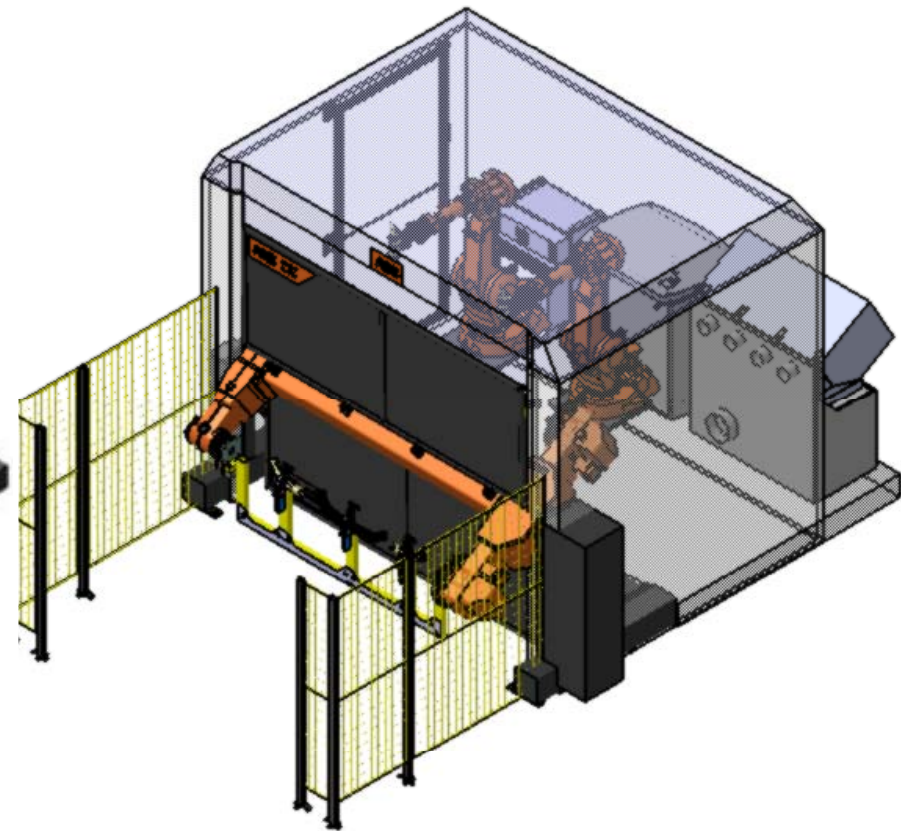


Laser Cutting - Concept Cells Standalone Examples

▪ABB LaserCut Single 2KW



▪ABB LaserCut Double 2x2KW



Feedback from You, please !

1. What do you see as the most interesting offer or feature for you in this presentation?
2. Which offer or feature do you miss ?
 - Think for 5 minutes !
 - Then say what you think !

**Power and productivity
for a better world™**

ABB